Montana Fish, Wildlife & Parks

1400 South 19th Avenue
Bozeman, MT 59718

February 1, 2014

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

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

MT Historical Society, State Historic Preservation Office, P.O. Box 201202, Helena, MT 59620-1202
MT State Parks Association, P.O. Box 699, Billings, MT 59103
MT State Library, 1515 E. Sixth Ave., P.O. Box 201800, Helena, MT 59620
James Jensen, Montana Environmental Information Center, P.O. Box 1184, Helena, MT 59624
Janet Ellis, Montana Audubon Council, P.O. Box 595, Helena, MT 59624
George Ochenski, P.O. Box 689, Helena, MT 59624
Jerry DiMarco, P.O. Box 1571, Bozeman, MT 59771
Montana Wildlife Federation, P.O. Box 1175, Helena, MT 59624
Wayne Hurst, P.O. Box 728, Libby, MT 59923
Jack Jones, 3014 Irene St., Butte, MT 59701
Jack Atcheson, 2309 Hancock Avenue, Butte MT 59701
U.S. Army Corp of Engineers, Helena
U.S. Fish and Wildlife Service, Helena
U.S. Fish and Wildlife Service, 420 Barrett Street, Dillon, MT 59725
Big Hole Watershed Committee, P.O. Box 931, Butte, MT 59703
Montana Trout Unlimited, P.O. Box 7186, Missoula, MT 59807
Dan Vermillion, FWP Commissioner, Livingston MT
Earnest and Colleen Bacon, 2215 Fishtrap Creek Road, Wisdom, MT 59761
Dept. of Natural Resources and Conservation, 730 N. Montana Street, Dillon, MT 59725-9424
George Grant Chapter of Trout Unlimited, P.O. Box 563, Butte, MT 59703
Skyline Sportsmen, P.O. Box 173, Butte, MT 59703
Anaconda Sportsmen, 2 Cherry, Anaconda, MT 59711
E.T. Bud Moran, Chairman CSKT, PO Box 278, Pablo, MT 59855
Doug Wasileski, Pyrimad Mountain Lumber, Inc, PO Box 549, Seeley Lake, MT 59868
Jim Roscoe, American Wildlands HD Prgm., 215 E Helena, ST, Dillon, MT, 59725
Butch Wales, PO Box 605, Philipsburg, MT 59858
DNRC, 1300 Maquire Rd, Anaconda, MT 59711
Marvin Miller, MT Bureau of Mines and Geology, 1300 W Park St, Butte, MT 59701
Cornielia Hudson, Bureau of Land Management, 1005 Selway Dr, Dillon, MT 59725
Kevin Chappell, DNRC, PO Box 201601, Helena, MT 59620
Weed Coordinator, MTFWP, 1420 E 6TH Ave, Helena, MT 59620
Willie A. Sharp, Chairman, BTBC, 1 Agency Square, Browning, MT 59417
McCoy Oatman, Nez Perce Tribe Exec, Cmt, PO Box 305, Lapwai, ID 83540
Carolyn B. Smith, Sho-Ban Cultureal Res. Coord., PO Bos 306, Fort Hall, ID 83203
Chris Marchion, Anaconda Sportsmen Club, 2105 Garfield, Anaconda, MT 59711
Kim Wilson, Deerlodge, Conservation Coolition, 405 N Last Chance Gulch, Helena, MT 59601
Jim Miller, Friends of the Bitterroot, PO Box 442, Hamilton, MT 59840
Bill Orsello, Trails Chair, MT Wildlife Federation, 314 Holter, Helena, MT 59601
Stephen Flynn, Sum Mountain Lumber, Inc., PO Box 389, Deerlodge, MT

Al Lubeck, 2710 Amherst, Ave, Butte, MT 59701
Adam Rissien, ORV Coordinator, Wildands CPR, PO Box 7516, Missoula, MT 59807
Josiah Pinkham, Tribal Arch., Nez Perce Tribe, PO Box 365, Lapwai, ID 83540
Anaconda Deerlodge County Commission, 800 So Main, Anaconda, MT 59711
Bob Applebee, 102 Trails End Rd, Bozeman, MT 59715
Brian and Susan Bonner, PO Box 4226, Butte, MT 59702
Lori Jo Mann, Gramot Co Timber Committee, #9 Mann Ln, Philipsburg, MT 59858
Sara Johnson, Native Ecosystems Council, PO Box 125, Willow Creek, MT 59760
Peter N Kurtz, Svens Bikes, 106 E Comercial Ave, Anaconda, MT 59711
Highlands Cycling, 1454 Dewey Blvd, Butte, MT 59701
Pete Bengyfield, Western watersheds Project, 623 S Nelson, Dillon MT 59725
Yvette, Tuell, Environmental Program Manager, Shoshone-Bannock Tribes, PO Box 306, Fort Hall, ID 83203
William Bigday, Cultural Burial Preservation, PO Box 17, Pryor, MT 59066
Karl, Barnickol, 317 Cabin Grove Lane, St Louis, MO 63141
Tom Harmon, 1662 Ausburg Dr, Billings, MT 59105
Peter Frick, PO box 26, Wisdom, MT 59761
Hans Humbert (Bacon Ranch), 3326 Lower North Fork Road, Wise River, MT 59762

Ladies and Gentlemen:

Montana Fish Wildlife and Parks (FWP) is proposing to restore westslope cutthroat trout (WCT) to Pintler Creek upstream of Pintler Falls including Oreamnos Lake. Rainbow trout is the only fish species present in Pintler Creek upstream of the falls and in Oreamnos Lake. Rainbow trout would be removed using rotenone and cutthroat trout would be restocked into the stream and lake. Nearly the entire proposed project is located within the Anaconda-Pintler Wilderness Area. The preferred alternative would be to use a helicopter to transport equipment and personnel to the project location including to Oreamnos Lake. A motorized boat would be used to apply rotenone to the lake. Non motorized equipment would be used to apply rotenone to the stream. Rotenone would be neutralized at Pintler Falls using potassium permanganate preventing fish from being killed downstream of the proposed project area. Once rainbow trout are removed, non-hybridized WCT from the Big Hole drainage would be used to repopulate Pintler Creek upstream of the falls and Oreamnos Lake.

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

Montana Fish, Wildlife & Parks invites you to comment on the attached proposal. Public comment will be accepted until June 19th, 2014 @ 5:00 pm. Comments should be sent to the following:

Montana Fish, Wildlife & Parks
Pintler Creek Cutthroat Restoration
Attn: Jim Olsen
1820 Meadowlark Ln.
Butte, MT 59701

Or e-mailed to: jimolsen@mt.gov

Sincerely,

Patrick J. Flowers
Region Three Supervisor

MONTANA FISH, WILDLIFE & PARKS
FISHERIES BUREAU

Environmental Assessment for Westslope Cutthroat Trout Restoration in Pintler Creek in the Big Hole River Drainage

PART I: PROPOSED ACTION DESCRIPTION

A. Type of Proposed Action:

Montana Fish Wildlife and Parks (FWP) is proposing to restore westslope cutthroat trout (WCT) to Pintler Creek upstream of Pintler Falls including Oreamnos Lake. Rainbow trout is the only fish species present in Pintler Creek upstream of the falls and in Oreamnos Lake. Rainbow trout would be removed using rotenone, and cutthroat trout would be restocked into the stream and lake. Nearly the entire proposed project is located within the Anaconda-Pintler Wilderness Area. The preferred alternative would be to use a helicopter to transport equipment and personnel to the project location including to Oreamnos Lake. A motorized boat would be used to apply rotenone to the lake. Non-motorized equipment would be used to apply rotenone to the stream. Rotenone would be neutralized at Pintler Falls using potassium permanganate preventing fish from being killed downstream of the proposed project area. Once rainbow trout are removed, non-hybridized WCT from the Big Hole drainage would be used to repopulate Pintler Creek upstream of the falls and in Oreamnos Lake.

B. Agency Authority for the Proposed Action:

- FWP is required by law (§87-1-201(9)(a) Montana Code Annotated [MCA]) to implement programs that manage sensitive fish species in a manner that assists in the maintenance or recovery of those species, and that prevents the need to list the species under § 87-5-107 MCA or the federal Endangered Species Act. Section 87-1-201(9)(a), M.C.A.

- FWP is a signatory to the Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana (FWP 1999, 2007) which states: "The management goal for WCT in Montana is to ensure the long-term, self sustaining persistence of the subspecies within each of the five major river drainages they historically inhabited in Montana, and to maintain genetic diversity and life history strategies represented by the remaining local populations."

- According the FWP Statewide Fisheries Management Plan, the restoration goal for WCT east of the Continental Divide (Upper Missouri River Basin upstream from and including the Judith River) is to restore secure conservation populations of WCT to 20% of the historic distribution (FWP 2012). Populations of WCT are considered secure by FWP when they are isolated from non-native fish, typically by a physical fish passage barrier, have a population size of at least 2,500 fish, and occupy sufficient (5 to 6 miles) habitat to assure long-term persistence. Currently WCT (including slightly hybridized population > 90% WCT) occupy approximately 8% of their historic habitat.

B. Estimated Commencement Date:

August to early September 2014.
Potential second removal if necessary in August to early September 2015.

.

D. Name and Location of the Project:

Westslope cutthroat trout restoration in Pintler Creek in the Big Hole River drainage.

Pintler Creek forms the county line between Beaverhead and Deerlodge Counties. It is located approximately 18 miles north of Wisdom Montana; T1N R15W Sec3, T2N R15W Sec 7, 8, 17, 20, 28, 29-34. See the location map on page 4.

E. Project Size (acres affected)

1. Developed/residential – 0 acres
2. Industrial – 0 acres
3. Open space/Woodlands/Recreation – 0 acres
4. Wetlands/Riparian –Stream miles in the proposed action include approximately 10.3 miles of Pintler Creek and 2.2 miles of Beaver Creek for a total of roughly 12.5 miles. Oreamnos Lake is 8.8 surface acres (max depth 27 ft) and contains roughly 150 acre-ft of water.
5. Floodplain – 0 acres
6. Irrigated Cropland – 0 acres
7. Dry Cropland – 0 acres
8. Forestry – 0 acres
9. Rangeland – 0 acres

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

The cutthroat trout is Montana's state fish. Westslope cutthroat trout *Oncorhynchus clarkii lewisi* (WCT) were first described by the Lewis and Clark Expedition in 1805 near Great Falls, Montana, and are recognized as one of 14 interior subspecies of cutthroat trout. The historical range of WCT includes Idaho, Montana, Washington, Wyoming, and Alberta, Canada. In Montana, WCT occupy the Upper Missouri and Saskatchewan River drainages east of the Continental Divide, and the Upper Columbia Basin west of the Divide. Although still widespread, WCT distribution and abundance in Montana has declined significantly in the past 100 years due to a variety of causes including introductions of nonnative fish, habitat degradation, and over-exploitation (Hanzel 1959, Liknes 1984, McIntyre and Rieman 1995, Shepard et al. 1997, Shepard et al. 2003). Reduced distribution of WCT is particularly evident in the Missouri River drainage where genetically unaltered WCT are estimated to persist in less than 4% of the habitat

> they once occupied, and most remaining populations are restricted to isolated headwater habitats (Shepard et al. 2003; Shepard et al. 2005). Further, many of these remaining populations are at risk of extinction due to small population size and the threats of competition, predation and hybridization with non-native trout species.

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

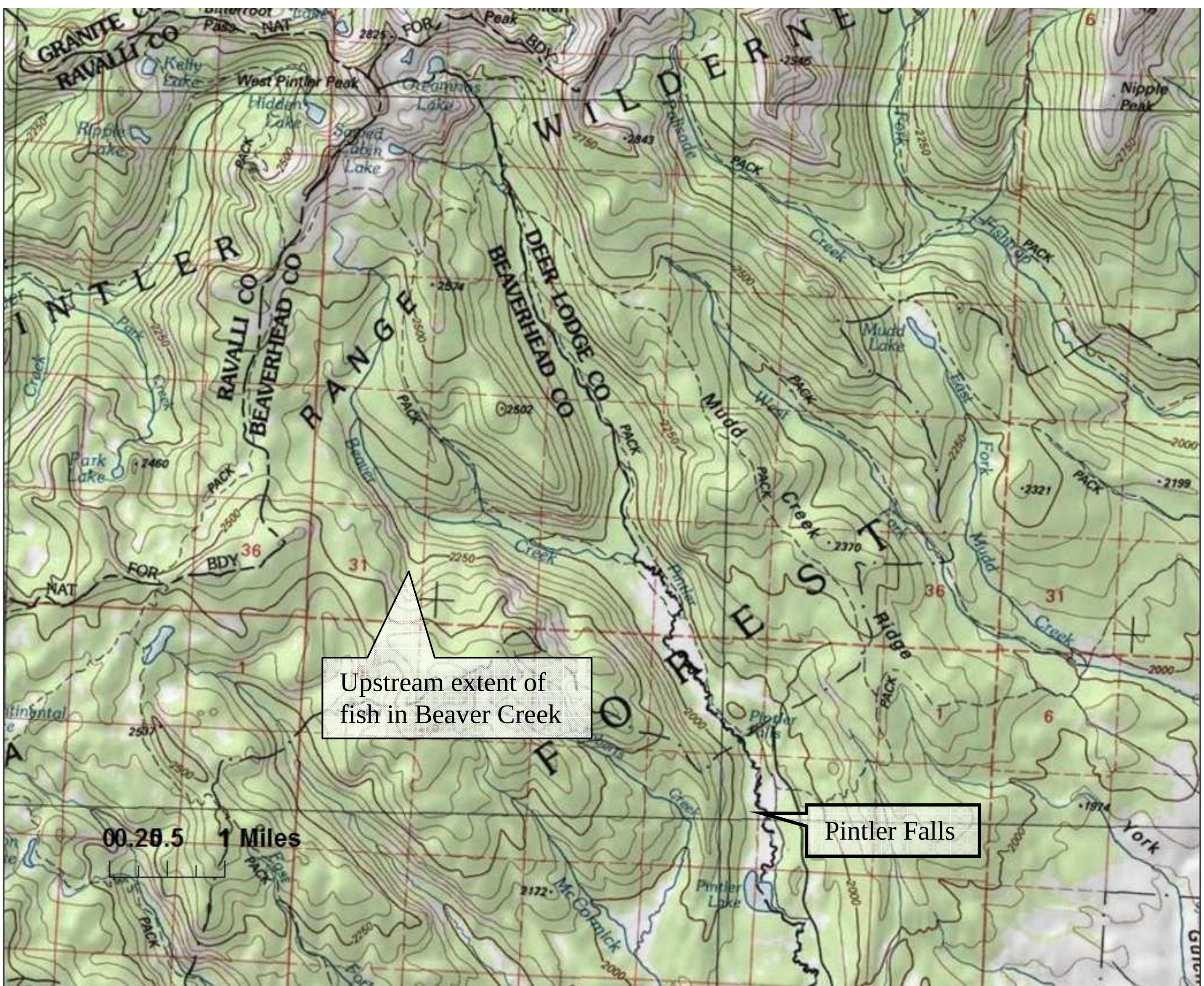
In an effort to advance range-wide WCT conservation efforts in Montana, a Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana was developed in 1999 by several federal and state resource agencies (including the BLM, Montana Fish, Wildlife & Parks [FWP], the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

WCT historically occupied approximately 2,100 miles of streams and river in the Big Hole drainage. Currently there are a total of 47 remaining populations of WCT in the Big Hole occupying approximately 129 miles of stream (6% of historic range). Of the 47 remaining populations, at least 39 are considered at risk (an additional 5 have unknown population status). An at risk population is one that is not likely to persist over the long-term because of several factors including poor habitat, small population size and the presence of non-native species. A secure population is one that has a high probability of persisting through time because it is isolated from the threats of non-native species and occupies adequate habitat at a high enough density to avoid suffering the negative consequences of genetic inbreeding (Wang et al. 2002). Hilderbrand and Kershner (2000) recommended a 2,500 fish minimum WCT population size for long-term persistence (>100 years). Harig and Fausch (2002) recommended the minimum amount of occupied habitat per population is 5.6 square miles (minimum watershed size) for increased likelihood of success of translocation projects. Prior to 2011, only one population of WCT in the Big Hole drainage was considered secure and met these minimum criteria for increased likelihood of long-term presentence. The other 46 remaining populations, including those whose status is unknown, are at risk. These remaining local populations maintain the genetic diversity of the species and each may perpetuate adaptive traits that are important to the species as whole (Leary et al. 1998). Data collected from streams in the Big Hole drainage over the past 5 years indicate that many of the WCT populations in the drainage have dramatically declined, become hybridized or have been extirpated (Olsen 2011a). If actions are not taken to conserve WCT in the Big Hole, more populations will be lost. Since 2011, 4 westslope cutthroat trout projects have been completed in the Big Hole drainage securing approximately 33 miles of stream habitat. The long-term goal for WCT in the Big Hole is to restore approximately 20% of the historic habitat (420 miles) to WCT. Projects which restore WCT are necessary to ensure the continued survival of the species in the Big Hole drainage and elsewhere. In addition, efforts to stabilize and increase WCT populations may prevent future listing of WCT under the Endangered Species Act.

The goal of the proposed project is to expand the current range of WCT into Pintler Creek by removing introduced rainbow trout and restocking the stream and Oreamnos Lake with westslope cutthroat trout. If implemented, the proposed action would result in the creation of a WCT population that would inhabit over 12 miles of stream and one lake making it the largest cutthroat population in the Big Hole drainage.

<u>Pintler Creek</u>

Pintler Creek drains from the Pintler Mountain Range north of Wisdom (Figure 1). Its headwaters are located in the Anaconda-Pintler Wilderness Area. Upstream of Pintler Falls the stream has only one major tributary, Beaver Creek. At its headwaters are 2 named lakes:



Oreamnos and Sawed Cabin. Bear Lake is also located at the headwaters of Beaver Creek. Upstream of Pintler Falls is Pintler Meadows which contain a mix of habitat conditions from dense willows and relatively stable banks near the downstream end of the meadow to less stable banks in the mid and upper reaches. Upstream of Pintler Meadows and in the majority of Beaver Creek the stream is moderate gradient with dense spruce canopy cover. The Anaconda-Pintler Wilderness boundary is located approximately 0.1 miles upstream of Pintler Falls. A trail system beginning near the falls and extending to the headwaters at Oreamnos Lake provides access to the drainage. Downstream of Pintler Falls, Pintler Creek flows through a large wet meadow before emptying into Pintler Lake approximately 2 miles below the falls. Pintler Lake contains Arctic grayling, burbot, hybridized cutthroat trout, rainbow trout, brook trout and longnose and white suckers.

Pintler Falls forms a natural barrier to upstream fish passage. It is unclear if the stream upstream of the falls was historically fishless or if a native population of WCT at one time existed. Recent surveys indicated that Pintler Creek upstream of the falls contains a self-sustaining population of rainbow trout (Olsen 2011a). There is no stocking record for rainbow trout in Pintler Creek upstream of the falls. Rainbow trout were introduced to Oreamnos Lake in 1934 and the lake was periodically stocked with rainbow trout until 2002. There are no fish in Sawed Cabin Lake, Bear Lake and an unnamed lake upstream of Oreamnos Lake (Olsen 2011b). There appears to be some reproduction of rainbow trout in Oreamnos Lake and out-migrating fish from the lake may be the source of fish to the stream below. Rainbow trout are also present

Figure 2. Pintler Falls during high water flows in June of 2008.

in the lower 2 miles of Beaver Creek, but the headwaters of Beaver Creek are fishless (Figure 1). Tailed frogs are present in the stream from Pintler Meadows to near the headwater lakes including in Beaver Creek. Tailed frog tadpole density appears to be highest in fishless sections of streams in the drainage (i.e., outlet stream of Sawed Cabin Lake and upper Beaver Creek (Olsen 2011a). Spotted frogs are also common through Pintler Meadows and at Bear Lake.

Because rainbow trout readily hybridize with WCT, to accomplish the proposed action of establishing a non-hybridized population of WCT in Pintler Creek upstream of the falls, rainbow trout would need to be removed. The most effective way to remove fish on a large scale such as in Pintler Creek is to use a piscicide. Rotenone is a commonly used piscicide that is highly targeted at fish and has no impact on terrestrial plants and animals and limited impacts to non-target aquatic organisms (aquatic insects and larval amphibians) at fish killing concentrations. FWP has a long history of using rotenone to manage fish populations in Montana that spans as far back as 1948. The department has administered rotenone projects for a variety of reasons, but principally to improve angling quality or for native fish conservation. Rotenone is a naturally occurring substance derived from the roots of tropical plants in the bean family such as the jewel vine (*Derris* spp.) and lacepod (*Lonchocarpus* spp.) that are found in Australia, southern Asia, and South America. Rotenone has been used by native people for centuries to capture fish for food in areas where these plants are naturally found. It has been used in fisheries management in North America since the 1930s. Rotenone has also been used as a natural insecticide for gardening and to control parasites such as lice on domestic livestock (Ling 2002).

Rotenone acts by inhibiting oxygen transfer at the cellular level. It is especially effective at low concentrations with fish because it is readily absorbed into the bloodstream through the thin cell layer of the gills. Mammals, birds and other non-gill breathing organisms do not have this rapid absorption route into the bloodstream and therefore there are no effects at fish killing concentrations. The most common route of exposure to non-gill breathing animals is through ingestion. Rotenone is not well absorbed through the digestive system and is readily broken down by digestive processes, and thus terrestrial animals can tolerate exposure to concentrations much higher than those used to kill fish. Rotenone can have negative impacts on larval amphibians and aquatic invertebrates because they primarily breathe through their skin and/or gills. Impacts to larval amphibians such as spotted frogs and western toad present in the proposed project area can be reduced by delaying rotenone application until late in the summer (August or September) when most juveniles have metamorphosed into air-breathing adults. Air-breathing adult amphibians are not affected by rotenone at fish killing concentrations. Because tailed frogs tadpoles, present in Pintler Creek, remain in their juvenile state for multiple years, FWP anticipates that some mortality would occur as a result of treatment with rotenone. However, recent experiments suggest that tailed frog mortality is not considerable at the fish killing concentrations proposed for Pintler Creek (1 part per million (ppm), product which is equal to 50 parts per billion (ppb) rotenone). In, 2013 tailed frog tad poles were exposed to 1 ppm and lesser concentrations of rotenone in the West Fork of Mudd Creek (located just to the east of Pintler Creek), and roughly 1/3 of the tadpoles exposed died 24 hr after exposure (Olsen 2013 unpublished data). The long-term impacts of tadpole mortality in Pintler Creek should be minimal because air-breathing adult tailed frogs would not be affected by rotenone, and because over 3 miles of fishless stream in Beaver Creek and the headwaters of Pintler Creek where tadpoles are abundant would not be treated. Impacts to aquatic invertebrates have been shown to be temporary. While sometimes significant reductions in aquatic invertebrates can follow rotenone application, populations have been shown to recover within a year or two.

The label requirements for product concentration in streams is 1 part rotenone formulation (5% rotenone) to 1 million parts water (1ppm). The rotenone product proposed for use in Pintler Creek is CFT Legumine (5% rotenone). Spring areas may also be treated with the powder formulation of rotenone *(*Prentox, 7% rotenone) or a sand/powder mix to prevent fish from seeking these areas as freshwater refuges during the application. The streams would be treated using drip stations which are containers that administer diluted CFT Legumine to the stream at a constant rate. These drip stations would apply rotenone to the stream at a rate of 1 ppm for 4 hours. In addition, backwaters, spring areas and small tributaries would be treated with backpack sprayers according to the CFT Legumine label specifications. The total amount of chemical to be applied to the stream is dependent on the flow of the stream and the distance downstream the chemical would remain active (determined by on-site testing). Assuming Pintler Creek is flowing 5 cubic feet per second and there is 12 miles of stream within the treatment area and the chemical remains active for 2 miles, 12 liters of CFT Legumine would be required to treat the entire stream. It is expected that fish killing concentrations of Legumine would be present in the streams for 24-48 hr after application, after which time it will have naturally detoxified and diluted.

Rotenone would be applied to Oreamnos Lake also at a concentration of 1 ppm. The chemical would be applied to the lake using a small gasoline powered motor boat. Backpack sprayers may be used to treat grassy or shallow areas around the margins of the lake that are difficult to access with a boat. It is anticipated that the rotenone in the lake will be at a fish killing concentration for 1-3 weeks following application.

There are 3 ways in which rotenone can be detoxified; natural oxidation, dilution by freshwater and introduction of a neutralizing agent such as potassium permanganate. To prevent the rotenone from traveling downstream of the proposed treatment area, potassium permanganate would be used to neutralize any rotenone remaining in the stream at Pintler Falls (see Comment 2a below). The CFT Legumine label states that a minimum of 20-30 minutes of contact time between rotenone treated waters and the applied neutralizing agent (potassium permanganate) is necessary to fully detoxify the rotenone. Because the rotenone is not instantly detoxified downstream of the barrier site, a detoxification zone would be established. The detoxification zone is defined as the distance the stream travels in 30 minutes downstream of the fish barrier (this will likely less than ¼ mile in Pintler Creek). Potassium permanganate is readily oxidized by natural processes in the stream and therefore it is imperative that adequate permanganate be applied to the stream to still be present and active at 30 min of travel time downstream. The determination of the appropriate amount of permanganate to fully neutralize any remaining rotenone is derived by on-site testing. Stream discharge would be measured prior to detoxification, and the potassium permanganate would be applied at the rate of 3-5 ppm as specified on the Legumine label.

Neutralization would commence in Pintler Creek according to the FWP Rotenone Detoxification Policy which states that detoxification with potassium permanganate should begin no less than 2 hours before the theoretical arrival time of treated waters at the detoxification station. Potassium permanganate would be directly measured in the water downstream of the application point using a colorimeter. A concentration of 0.5-1.0 ppm potassium permanganate would be maintained downstream at 30 minutes of stream travel distance of the application point to completely neutralize the rotenone. When this concentration is maintained, all of the rotenone in treated water is fully neutralized. In addition to direct measurement of the permanganate in the water, caged fish (westslope cutthroat trout from the Anaconda Hatchery, or brook trout captured in Pintler Creek) would be placed in the stream downstream of the detoxification zone to monitor the effectiveness of the detoxification station during the treatment. Caged fish would also be placed and monitored in the creek immediately upstream of the detoxification station to indicate when rotenone is no longer present in the stream and when detoxification is no longer required. If sentinel fish in treated stream water show no signs of distress within 4 hours, the stream water is considered no longer toxic, and detoxification can be discontinued. Neutralization would continue until the theoretical time in which all treated waters would have passed the fish barrier and when sentinel fish can survive for an additional 4 hours. It is anticipated that this would occur in Pintler Creek within 24-48 hr after rotenone application. Successful application of potassium permanganate would prevent any killing of non-target fish below the proposed project area including in Pintler Lake.

The transportation of personnel and equipment to the project site under the proposed action would be done by helicopter. The helicopter would land at a suitable location outside of the wilderness area for equipment loading. Equipment would be transported to the site using a sling to Oreamnos Lake and Pintler Meadows. Personnel would be transported to these same locations in the helicopter. It is likely that 2 sling loads of equipment will be taken to Oreamnos Lake and 1 to Pintler Meadows. It will likely take 3 trips to transport all personnel to the lake. The lake treatment would be completed in 1 day, and all equipment and personnel would be ferried back to loading location or Pintler Meadows. Equipment ferried to Pintler Meadows would be carried out on foot once the treatment is complete. Therefore, it is likely that all helicopter trips would be completed in 1 day. Treatment of the stream downstream of Oreamnos Lake would be completed by a crew of 6-8 people in 2-4 days. Personnel would camp at the north end of Pintler Meadows during rotenone application. Detoxification at Pintler Falls with potassium permanganate is anticipated to last 24-48 hours after the application of rotenone is complete.

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

If all the rainbow trout are not removed during the first treatment, it may be necessary to implement a second treatment to achieve the desired objectives of complete removal of non-native fish. To determine if complete fish removal is achieved, streams would be electrofished following treatment. A second treatment would be completed the following year if the objectives of the project were not met and non-native fish were found in the stream. In the event that an additional treatment is necessary, landowners, stakeholders and other interested parties would be notified.

To minimize the risk of the public being exposed to rotenone or treated waters, public access to the Pintler Trail and to Pintler Falls would be closed during treatment (likely for 1 week). The Pintler Creek trailhead would be posted with signs indicating the closure. Other potential access points (i.e., trails) would also be signed. Additional signs would be placed at stream crossings informing the public of the presence of treated waters and to keep out while rotenone is being applied. Additionally, the timing of the treatment will be coordinated with the grazing lessee to ensure that livestock are not in Pintler Meadows during the treatment.

Once rainbow trout are removed from Pintler Creek, it will be restocked with WCT. The source of these fish has not yet been determined, but they will be non-hybridized WCT from within the Big Hole drainage. Potential sources of fish that are in immediate need of conservation include Squaw Creek and Squaw Lake. Other populations may include Plimpton Creek or Cherry Lake.

Funding

Project expenses listed below would be covered under standard FWP and US Forest Service (USFS) budgets as a part of normal personnel duties. Supplies and material including CFT Legumine and potassium permanganate account for the majority of the cost of this project. Expected expenses are reviewed in Table 2. This table does not include personnel expenses. No additional funding would be required for personnel services by FWP or USFS.

Table 2. Projected expenses for the proposed westslope cutthroat trout restoration project.

Expenses	Units	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST
Fish removal	85 gal	CFT Legumine	$80.00	$6800.00
	150 lbs	$KMnO_4$	$1.45	$217.00
	5 hr	Helicopter hours	$500.00	$2500.00
		Project Total		$9517.00

PART II. ALTERNATIVES

Alternative 1 – No action

The no action alternative would allow status quo management to continue. The rainbow trout fishery in Pintler Creek and Oreamnos Lake would remain the same. The "No Action" alternative would not fulfill the State's obligation to seek to ensure the long-term persistence of WCT distributed across its historical range (FWP 2007). Pintler Creek is an ideal location to restore WCT because of the large drainage size, high quality habitat and the presence of a natural barrier. In other streams where WCT restoration has taken place and a fish passage barrier was constructed, project expenses are significantly greater. Construction of larger barriers can exceed $300,000. Further, no suitable location to construct a fish barrier outside of the Anaconda Pintler Wilderness has been identified. Generally an ideal fish barrier location would consist of a bedrock canyon where the stream channel is highly confined. Such an area does not exist on Pintler Creek downstream of Pintler Falls to the confluence with the Big Hole River.

Removal of non-native fish downstream of Pintler Falls would not be feasible because of the presence of a native population of Arctic grayling in Pintler Lake. Further, if such a site existed and a fish barrier could be constructed downstream, for WCT restoration to occur rainbow trout would still have to be removed from the stream upstream of Pintler Falls to prevent fish from migrating downstream and hybridizing with WCT.

Although the 'no action" alternative would not accomplish the goals of WCT conservation, it would avoid the potential impacts of motorized use (helicopter and boat) in the Anaconda Pintler Wilderness Area and the effects of applying of a piscicide. The "No Action" alternative also would not have temporary impacts to recreation in the Pintler Creek drainage with loss of access during the treatment. Temporary impacts to non-target aquatic invertebrates and to juvenile stages of tailed frogs would also be avoided. Further, there would be no loss of the rainbow trout fishery under the No Action alternative in Pintler Creek or Oreamnos Lake.

Because the No Action alternative does not meet the goals of WCT restoration in the Big Hole drainage and there are no other alternatives to construct a fish barrier downstream of the Anaconda Pintler Wilderness, the No Action alternative was not considered the preferred alternative. If the No Action alternative is selected and the downward trend in WCT in the Missouri River drainage and other areas of Montana continues, it is likely that the fish will warrant further protection such as listing under the Endangered Species Act. Such listing could have wide ranging ramification on land, water and other resource management, particularly on federal lands.

Alternative 2 – Proposed Action: Restoration of WCT in Pintler Creek through the removal of rainbow trout using rotenone and restocking of cutthroat trout. Mechanized means (helicopter) would be used to access the area and a motorized boat would be used to apply rotenone to the lake.

This alternative would involve WCT restoration in Pintler Creek upstream of Pintler Falls through the removal of rainbow trout and restocking of WCT. The piscicide proposed for rainbow trout removal would be rotenone in the formulation of CFT Legumine (5% rotenone). Rotenone applied to the stream and lake would be detoxified within ¼ mile downstream of Pintler Falls using potassium permanganate; therefore there should be no effects on the fishery downstream of the proposed treatment area. Personnel and equipment would be transported to Oreamnos Lake via helicopter. Rotenone would be applied to the lake using a gasoline powered motorboat. By using mechanized means, the amount of time and personnel it would take to complete the treatment would be greatly reduced and the impacts on wilderness would be reduced compared to the other alternatives considered for restoring WCT. Non-mechanized means would be used to administer rotenone to the stream downstream of the lake.

Using a helicopter, it would be possible to transport all equipment and personnel to the project site and treat Oreamnos Lake and a minimum of 1 mile of stream in 1 day. It would likely take an additional 2-4 days to treat the stream down to Pintler Falls. Using mechanized means to perform the work proposed, the project could be completed in 3-6 days with only 6-8 personnel, which are significantly fewer man-days than the other alternatives considered. Further, by reducing the man-days in the wilderness and by not using pack stock (see below), the impacts to trails and other resources wilderness would be minimized. The proposed Action would also be the safest means of achieving WCT restoration in the watershed. The use of a helicopter to transport rotenone and equipment to the lake is the safest means of transporting personnel and equipment to the treatment area including Oreamnos Lake. Other alternatives considered including the use of pack stock pose a significantly higher risk of an accident occurring that could injure personnel or potentially lead to a chemical spill. The risk of human exposure to undiluted rotenone is significantly greater if an accident were to occur with pack stock. The use of a helicopter would increase noise in the drainage and negatively affect wilderness character and could potentially displace some wildlife species. However, it should be noted that biannual helicopter flights are done by FWP in the Anaconda-Pintler Wilderness during the stocking of high elevation lakes with WCT.

The Proposed Action offers the highest probability of achieving the goal of removing rainbow trout and restoring WCT to Pintler Creek with fewest impacts to the wilderness, and it reduces the likelihood of an accident occurring resulting in injury to personnel or a potential chemical spill than any of the other alternatives selected. WCT restoration will aid in overall conservation of the species within their historic range. Successful completion of the proposed action would result in nearly 12 miles of habitat that would be secured for WCT in the Big Hole drainage resulting in the largest population of secured WCT in the Big Hole Drainage.

Alternative 3 -- Restoration of WCT in Pintler Creek through the removal of rainbow trout using rotenone and restocking of cutthroat trout. Non-mechanized means would be used to access the drainage and apply rotenone to Oreamnos Lake.

This alternative would involve WCT restoration in Pintler Creek upstream of Pintler Falls through the removal of rainbow trout and restocking of WCT identical to the proposed action, but non-mechanized means of accessing the drainage and applying rotenone would be used. Access to the drainage is possible by foot or horse back from the Pintler Creek trailhead. From this access point, it is roughly 8 miles to Oreamnos Lake. To treat the lake using non-mechanized means would require the use of livestock to transport 30-50 gallons of rotenone and 2 inflatable, oar-powered boats to the lake in addition to application and safety equipment. Because of the long trip to the lake and the increased time it would take to treat the lake without the use of a motorized boat, it would likely take 1 day to reach the lake and set up camp, 1 day to treat the lake, and 1 day to pack back to the trailhead (3 days total). Therefore, livestock and 4-8 people would be required to stay at least 2 nights at the lake to complete the lake portion of the treatment. An extended stay would require additional stock to carry camping gear and food to support the application crew overnight. It would likely require 6-10 stock animals to transport the necessary equipment to Oreamnos Lake to complete this phase of the project.

Once the lake portion of the project was complete, the equipment used would need to be transported back to the trailhead and the stream treatment equipment would need to be packed back to the headwaters of the drainage. The stream treatment equipment is bulky (backpack sprayers and 5-gal containers) and would require several stock animals to transport. Transporting the equipment to the site would likely require a full day. The stream treatment would likely be completed in 3-4 days after which time the stock would pack the equipment back to the trailhead (6 days total). It is likely that the stock would remain in the drainage during the entire time of the treatment so equipment could be moved each day. There are suitable pastures in the Pintler Creek drainage near Oreamnos Lake and farther downstream at Pintler Meadows that could provide forage for stock during overnight stays. However, extended stays would require the movement of livestock to reduce impacts to vegetation from both consumption and trampling.

The use of non-mechanized means to access and transport equipment to the proposed treatment area would conform to existing uses in the Anaconda-Pintler Wilderness Area and still accomplish the goal of WCT restoration; however, this alternative likely would result in significantly more man-days, additional impacts to wilderness resources and additional expense to complete the project than the Proposed Action. The use of non-mechanized means to remove rainbow trout from Pintler Creek would require a minimum of 4 additional days of work (24 man-days, which is 50% more than the Proposed Action) to accomplish the proposed WCT. More personnel would be required because personnel would be needed to pack, ride and manage stock animals, and additional days would be needed because of the additional time it would take to reach the destinations using stock rather than a helicopter. The impacts to physical resources such as the trail system and native vegetation where stock would be kept would be considerably greater than the other alternatives considered with the exception of the No Action alternative. Further, to hire an outfitter to provide transportation of equipment to the site would likely cost between $5,000 and $7,000 which is more than double the expense of using mechanized means as in the Proposed Action.

The risk of injury and a potential chemical spill significantly increase if pack stock are used to transport personnel and equipment to the application area. While the use of stock is a traditional means of accessing wilderness areas and has a long track record of use, the probability of an accident significantly increases with sometimes unpredictable stock animals and variable terrain versus other methods of transportation. Many scenarios are possible in a wilderness setting that could cause stock animals to lose a load including a fall on rough terrain or potentially becoming spooked and bucking. If a stock animal transporting rotenone was to lose its load and the barrels were to rupture causing a spill, the risk of human and animal exposure would greatly increase. When handling undiluted product the product label states, "Do not get in eyes, on skin, or on clothing. Wear goggles or safety glasses. When handling undiluted product, wear a respirator with an organic-vapor-removing cartridge with a prefilter approved for pesticides." Personnel traveling to the application site would not be wearing this equipment thus if an accident were to occur the risk of exposure is greatly increased. Further, a chemical spill would have to be reported to the Montana Department of Agriculture who would then stipulate how that spill would have to be remedied. Remedies for a rotenone spill could include the removal of contaminated soil and plant matter and transportation of affected material to an appropriate disposal location. It is also highly likely that some of the staff assisting with the WCT restoration in Pintler Creek would be unfamiliar with pack stock animals increasing the risk of an accident that could cause personal injury or a chemical spill.

Because of the additional impacts of pack stock on physical and biological resources in the area, the increased time and manpower necessary to complete the project, increased time the drainage would remain closed to public access and the additional safety risks of associated with Alternative 3, it was eliminated from further consideration.

Alternative 4 –Mechanically remove rainbow trout from the Pintler Creek drainage.

This alternative would involve the use of electrofishing rather than rotenone to remove rainbow trout from Pintler Creek upstream of the falls and nets to remove fish from Oreamnos Lake. Multiple-pass electrofishing has been used to eradicate nonnative trout from several small streams in north-central Montana (Big Coulee, Middle Fork Little Belt, and Cottonwood creeks) and in SW Montana (Muskrat, Whites, and Staubach creeks). Electrofishing can be an effective means of capturing fish in streams; however, electrofishing has limitations. Generally it is only 50 -70% efficient at capturing fish depending on the type of habitat present. Electrofishing is particularly inefficient at capturing juvenile fish and, therefore, generally requires efforts spanning multiple years to allow juvenile fish to grow to the size where they can be captured. Electrofishing is also very labor intensive. The project reaches where electrofishing removals have been successful were generally less than 3 miles in length and required up to 25 electrofishing removal passes over 3-5 years to eradicate the unwanted species.

Eradication of rainbow trout from Pintler Creek upstream of the falls with electrofishing would be difficult because of the length of stream (12 miles total) and the complexity of the habitat, particularly in Pintler Meadows where some pools are greater than 4 ft deep. For example, electrofishing removal efforts in McVey Creek near the town of Wisdom in the early 1990's and from 2005-2007 were not successful at achieving a significant reduction in brook trout numbers in the stream. To achieve complete removal of rainbow trout from the proposed stream with electrofishing would require a 4-5 year commitment of 3-4 crews (6-12 people) for a minimum of 2 weeks each year. Such an effort would be impractical and cost prohibitive. It would represent the most expensive alternative considered in this analysis. Further, given the length of the stream and the complexity of the habitat, it is unclear whether 100% rainbow trout removal could be achieved. Removing rainbow trout using rotenone as described in the Proposed Action, on the other hand, would require 6-8 people for 4-7 days to complete. Other expenses for rotenone and potassium permanganate would be less than $10,000.

Using netting to eradicate rainbow trout from Oreamnos Lake presents similar challenges to electrofishing. Gill nets would be used to capture and remove fish from the lake. Gill nets have been shown to be effective in some situations at removing fish from lakes; however, there are several drawbacks with this methodology. First, it is difficult to completely remove fish from larger (> 5 acre), deeper (> 20 ft) lakes. Second, intensively gillnetting lakes is very time consuming and labor intensive. Third, gillnetting is not effective at capturing juvenile fish, therefore, the netting generally has to occur over a multiple years to allow juvenile fish to grow to the size that they can be effectively captured in nets. A related project was performed in Silver (10.0 acres) and Prospect lakes (6.8 acres) in the Absaroka-Beartooth Wilderness south of Big Timber, Montana. These two lakes were intensively gillnetted (15-20 nets per lake) for four years before fish removal was considered complete. Similarly, Bighorn Lake, a 5.2-acre lake located in Banff National Park in Alberta, Canada, was gillnetted from 1997 to 2000 to remove an unwanted population of brook trout (Parker et al. 2001). Over 10,000 net nights (1 net night = 1 net set overnight for at least 12 hours) were conducted over a 4-year period in Bighorn Lake to remove the population which totaled 261 fish. The researchers concluded that the removal of nonnative trout using gill nets was impractical for larger lakes (> 5 acres). In clear lakes, trout have the ability to become acclimated to the presence of gill nets and will avoid them. These researchers reported observing brook trout avoiding gill nets within about 2 hours of being set.

Knapp and Matthews (1998) reported that Maul Lake, a 3.9-acre lake in the Inyo National Forest in California, was gill netted from 1992 to 1994 to remove a population of brook trout. The population, which totaled 97 fish, was successfully removed with an effort of 108 net days. The researchers reported that following the removal of brook trout from Maul Lake it was mistakenly restocked with rainbow trout. Efforts to remove them using gill nets were implemented immediately. From 1994 through 1997, 4,562 net days were required to remove the 477 rainbow trout from the lake. These researchers reported that gill nets could be used as a viable alternative to chemical treatment. They acknowledged that the small size and shallow depth of Maul Lake were conditions that allowed a successful fish eradication using gill nets. Their criteria for successful fish removal using gill nets include lakes less than 3.9 surface acres, less than 19 feet deep, with little or no inflow or outflow to perpetuate reinvasion, and no natural reproduction. Although not tested, the maximum size of a lake that they surmised could be depopulated using gill nets was 7.4 surface acres and 32 feet deep. Oreamnos Lake is 8.8 acres and 27 feet deep.

Deploying gill nets and using electrofishing to remove rainbow trout from Pintler Creek upstream of the falls would take considerable effort. Given the remote nature of the stream and Oreamnos Lake, it would be impractical to commit the kind of effort mentioned above to eradicate rainbow trout using mechanical means. Further, given the size and depth of the lake and the length and complexity of the habitat in the stream, it may be impracticable to completely remove rainbow trout. Due to these considerations and potential incomplete results, this alternative has a low probability of meeting the objectives for restoring WCT. For these reasons this alternative was eliminated from further consideration. Although Alternative 4 would not likely accomplish the goals of WCT conservation, it would have fewer potential impacts to non-target aquatic invertebrates and to juvenile stages of tailed frogs than Alternatives 2 or 3.

Alternative 5: Use angling to eliminate rainbow trout from the Pintler Creek and Oreamnos Lake.

FWP has the authority under commission rule to modify angling regulations for the purpose of removing unwanted fish from a lake or stream. Unfortunately, this method would not result in complete fish removal for a number of reasons. First, Pintler Creek is remote with a small fish population and likely currently receives little fishing pressure. Attracting anglers to the stream to harvest trout would be very difficult because of the hike required to reach the stream, small size of the streams, and small size of fish. Oreamnos Lake is also remote but it does receive some fishing pressure. Recreational angling has been shown to reduce the average size of fish and reduce population abundance, but rarely, if ever, has it been solely responsible for eliminating a fish population. Using angling techniques alone in the stream would not result in removal of rainbow trout and would not achieve the objective of conserving non-hybridized cutthroat trout. For these reasons, this method of fish removal was considered unreliable at achieving the objective of complete fish removal and was eliminated from further analysis.

PART III. ENVIRONMENTAL REVIEW

A. PHYSICAL ENVIRONMENT

1. LAND RESOURCES Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Soil instability or changes in geologic substructure?		X				
b. Disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil which would reduce productivity or fertility?		X				
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		Yes	2a
b. Changes in drainage patterns or the rate and amount of surface runoff?		X				
c. Alteration of the course or magnitude of flood water or other flows?		X				
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	2a,f
i. Effects on any existing water right or reservation?		X				
j. Effects on other water users as a result of any alteration in surface or groundwater quality?		X				
k. Effects on other users as a result of any alteration in surface or groundwater quantity?		X				
l. Will the project affect a designated floodplain?		X				
m. Will the project result in any discharge that will affect federal or state water quality regulations? (Also see 2a)			X		Yes	2m

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

To reduce the impact of the piscicide on water quality, a detoxification station would be established immediately downstream of Pintler Falls. There are three ways in which rotenone can be detoxified once applied. The most common method is to allow natural breakdown to occur. Rotenone is a compound that is susceptible to natural breakdown (detoxification) through a variety of mechanisms such as water chemistry, water temperature, exposure to organic substances, exposure to air, and sunlight intensity (Ware 2002; ODFW 2002; Loeb and Engsrtom-Heg 1970; Engstrom-Heg 1972; Gilderhus et al. 1986). Rotenone persistence studies by Gilderhus et al. (1986) and Dawson et al. (1991) found that in cool water temperatures of 32 to 46^{o}F the half-life ranged from 3.5 to 5.2 days. Gilderhus et al. (1986) reported that 30% mortality was experienced in rainbow trout exposed to degrading concentrations of actual rotenone (0.004 ppm) in 46^{o}F pond water 14 days after a treatment. By day 18, the concentrations were sub lethal to trout. The second method for detoxification involves basic dilution by fresh water. This may be accomplished by fresh ground water or surface water flowing into a lake or stream. The final method of detoxification involves the application of an oxidizing agent like potassium permanganate. This dry crystalline substance is mixed with stream or lake water to produce a concentration of liquid sufficient to detoxify the rotenone. Detoxification is accomplished after about 15-30 minutes of exposure time between the two compounds (Prentiss Inc. 1998, 2007). FWP expects the stream would naturally detoxify down to the fish migration barrier within 24-48 hr after application of rotenone because of natural breakdown processes and dilution from freshwater sources. At the fish barrier, potassium permanganate would be used to detoxify any remaining rotenone present in the stream and prevent rotenone from traveling more than ¼ mile downstream of Pintler Falls.

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

Comment 2f: No contamination of groundwater is anticipated to result from this project. Rotenone binds readily to sediments, and is broken down by soil and in water (Skaar 2001; Engstrom-Heg 1971, 1976; Ware 2002). Rotenone moves only one inch in most soil types; the only exception would be sandy soils where movement is about three inches (Hisata 2002). In California, studies where wells were placed in aquifers adjacent to and downstream of rotenone applications have never detected rotenone, rotenolone, or any of the other organic compounds in the formulated products (CDFG 1994). Case studies in Montana have concluded that rotenone movement through groundwater does not occur. For example, at Tetrault Lake, Montana, neither rotenone nor inert ingredients were detected in a nearby domestic well which was sampled two and four weeks after applying 1.8 ppm rotenone to the lake. This well was chosen because it was down gradient from the lake and also drew water from the same aquifer that fed and drained the lake. In 1998, a Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well, located 65 feet from the pond, was analyzed and no evidence of rotenone was detected. In 2001, another Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well located 200 feet from that pond was tested four times over a 21-day period and showed no sign of contamination. In 2005, FWP treated a small pond near Thompson Falls with Prenfish to remove pumpkinseeds and bass. A well located 30 yards from the pond was tested and neither Prenfish nor inert ingredients were found in the well.   In Soda Butte Creek near Cooke City, a well at a Forest Service campground located 50 ft from a treated stream was tested immediately following and 10 months after treatment with Prenfish, and no traces of rotenone were found

(Olsen 2006). Because rotenone is known to bind readily with stream and lake substrates, FWP does not anticipate any contamination of ground water as a result of this project.

Comment 2m: FWP would apply rotenone under the Montana Department of Environmental Quality (DEQ) General Permit for Pesticide Application (#MTG87000). A Notice of Intent was accepted by the Department of Environmental Quality for this project. The NOI included the waters proposed in this EA. A letter was received from DEQ dated August 13, 2012 recognizing the Notice of Intent and allowing MFWP to operate under the General Permit for Pesticide Application.

Cumulative Impacts: The proposed action of piscicide treatment would have a short term impact on water quality (piscicides) in Pintler Creek. Because of the rapid breakdown rate of CFT Legumine and active neutralization at the fish barriers, these impacts would attenuate through time and would not impact long-term water quality or the productivity of fisheries resources after restocking. FWP does not expect the proposed actions to result in other actions that would create cumulative impacts to water resources in the proposed streams nor does FWP foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to water resources related to treatment of the proposed stream with rotenone.

3. <u>AIR</u> **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Emission of air pollutants or deterioration of ambient air quality? (also see 13 (c))		X				
b. Creation of objectionable odors?		X				3b
c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally or regionally?		X				
d. Adverse effects on vegetation, including crops, due to increased emissions of pollutants?		X				
e. Will the project result in any discharge which will conflict with federal or state air quality regs?		X				

Comment 3b: The advantage of CFT Legumine over other rotenone products that have been used in the past is that it has less petroleum hydrocarbon solvents such as toluene, xylene, benzene, and naphthalene. By comparison, Prenfish has a strong chemical odor. CFT Legumine is virtually odor-free and performs almost identically to older products (e.g., Prenfish, Noxfish).

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

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

Comment 4a: Under the Proposed Action there would be some disturbance of vegetation along the stream during the treatment due to increased foot traffic. These impacts should be minimal because travel up and down the stream would be done on an existing trail systems that provides good foot access to the sites. Vegetation disturbance would be lessened by the use of a helicopter to access the project site. FWP anticipates any impacts to plants resulting from trampling would be unnoticeable within 1 growing season or less. Rotenone does not affect plants at concentrations used to kill fish. Vegetation disturbances are expected to be short term and minor.

Comment 4c: Candystick, Lyall phacelia, Crosby's buckwheat, storm saxifrage Lemhi beardtongue, and northern spikemoss are listed as species of concern or potential species of concern that could occur within the proposed project area. No impacts to these species are anticipated as a result of the proposed action. All rotenone products, including CFT Legumine, have no impacts on aquatic or terrestrial plant species at fish killing concentrations. Some trampling is possible due to increase foot traffic along the proposed streams; however, these impacts should be minimal because of existing trails that provide good foot access to the sites.

Cumulative Impacts: Impacts to vegetation from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would create cumulative impacts to vegetation in the proposed WCT restoration stream. If the new fisheries were to attract more recreational use, vegetation could potentially suffer from increased trampling. However, based on other similar WCT fisheries and their limited use, FWP would conclude that it is very unlikely that the new WCT fishery would attract significant interest and associated higher use levels. FWP does not foresee any other activities in the basin proposed for

WCT restoration that would add to impacts of the proposed action. As such there are no cumulative impacts to vegetation related to the proposed action.

5. **FISH/WILDLIFE** **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Deterioration of critical fish or wildlife habitat?		X				
b. Changes in the diversity or abundance of game animals or bird species?			X		yes	5b
c. Changes in the diversity or abundance of nongame species?			X		yes	5c
d. Introduction of new species into an area?			X			5d
e. Creation of a barrier to the migration or movement of animals?		X				
f. Adverse effects on any unique, rare, threatened, or endangered species?			X			5f
g. Increase in conditions that stress wildlife populations or limit abundance (including harassment, legal or illegal harvest or other human activity)?			X			5g
h. Will the project be performed in any area in which T&E species are present, and will the project affect any T&E species or their habitat? (Also see 5f)			X		Yes	See 5f
i. Will the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)			X			5i

Comment 5b: This project is designed to eradicate non-native rainbow trout (a game fish) in Pintler Creek upstream of Pintler Falls. However, this impact is minor and temporary because WCT (also a game fish) would be restocked and would eventually repopulate the stream. Therefore, there would be no net loss of habitat occupied by self-sustaining populations of wild game fish. There would be no proposed changes in the fishing regulations as a result of this project; however, once WCT become established in the stream, they should be able to support some degree of harvest and the current catch and release regulations for cutthroat trout in streams may be modified to allow some harvest. Rotenone, when applied at fish killing concentrations, has no impact on terrestrial wildlife including birds and mammals that consume dead fish or treated water.

Comment 5c:

Aquatic Invertebrates:

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

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

The possibility of eliminating a rare or endangered species of aquatic invertebrate in the proposed streams by treating with rotenone in the formulation of CFT Legumine is very unlikely. Montana Natural Heritage lists no species of concern or potential species of concern of aquatic invertebrates in Pintler Creek. In SW Montana, aquatic invertebrates are routinely collected prior to WCT restoration projects in mountains streams. In all cases, these collections have shown aquatic invertebrate assemblages typical of headwater streams in southwestern Montana, and in no cases have threatened or endangered species been discovered. FWP expects that the proposed streams contains the same type of aquatic invertebrate assemblage as found in other nearby streams, and the possibility of eliminating a rare or endangered species is minimal. Aquatic invertebrates would be collected from the stream prior to treatment with rotenone and 1 year post treatment to monitor the recovery of aquatic invertebrate populations.

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

Birds and Mammals:

Mammals are generally not affected by rotenone at fish killing concentrations because they neutralize rotenone by enzymatic action in their stomach and intestines (AFS 2002). Studies of risk for terrestrial animals found that a 22 pound dog would have to drink 7,915 gallons of treated lake water within 24 hours, or eat 660,000 pounds of rotenone-killed fish, to receive a lethal dose (CDFG 1994). The State of Washington reported that a half pound mammal would need to consume 12.5 mg of pure rotenone to receive a lethal dose (Bradbury 1986). Considering the only conceivable way an animal can consume rotenone under field conditions is by drinking lake or stream water or consuming dead fish, a half pound animal would need to drink 16 gallons of water treated at 1 ppm.

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

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

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

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

> *Since rotenone is applied directly to water, there is little likelihood that terrestrial forage items for birds will contain rotenone residues from this use. While it is possible that some piscivorous birds may feed opportunistically on dead or dying fish located on the surface of treated waters, protocols for piscicidal use typically recommend that*

dead fish be collected and buried, rendering the fish less available for consumption (see Section IV). In addition, many of the dead fish will sink and not be available for consumption by birds. However, whole body residues in fish killed with rotenone ranged from 0.22 μg/g in yellow perch (Perca flavescens) to 1.08 μg/g in common carp (Cyprinus carpio; Jarvinen and Ankley 1998). For a 68 g yellow perch and an 88 g carp, this represents totals of 15 μg and 95 μg rotenone per fish, respectively. Based on the avian subacute dietary LC_{50} *of 4,110 mg/kg, a 1,000-g bird would have to consume 274,000 perch or 43,000 small carp. Thus, it is unlikely that piscivorous birds will consume enough fish to result in a lethal dose.*

Amphibians and Reptiles:

Potential amphibians and reptiles found within the proposed treatment areas include: long-toed salamanders (*Ambystoma macrodactylum*), spotted frogs (*Rana pretiosa*), western toads *(Bufo boreas)*, tailed frogs (*Ascaphus montanus*) (amphibians) and western terrestrial garter (*Thamnophis elegans*), common garter (*T. sirtalis*) and rubber boa (*Charina bottae*) snakes (reptiles). Rotenone can be toxic to gill-breathing larval amphibians, though air breathing adults are less sensitive. Chandler and Marking (1982) found that Southern Leopard frog tadpoles were between 3 and 10 times more tolerant than fish to Noxfish (5% rotenone formulation). Grisak et al. (2007) conducted laboratory studies on long-toed salamanders, Rocky Mountain tailed frogs (*Ascaphus truei*), and Columbia spotted frogs and concluded that the adults of these species would not suffer an acute response to Prenfish at trout killing concentrations (0.5-1 ppm) but the larvae would likely be affected. These authors recommended implementing rotenone treatments at times when the larvae are not present, such as the fall, to reduce the chance of exposure to rotenone treated water and potential impacts to larval amphibians. The proposed stream would be scheduled for treatment in August or September, which would reduce but not eliminate potential impacts to larval amphibians. Any reduction in amphibian abundance would be expected to be short term because of the low sensitivity of adults to rotenone, and because most larval amphibians, with the exception of tailed frogs, would have metamorphosed by August-September, when the treatment is planned.

Tailed frogs present in Pintler Creek may be impacted by the use of rotenone because juvenile life stages of the amphibian are present in streams for up to 4 years before metamorphosing into air-breathing adults. These impacts should be minor and temporary because only a small proportion of the tadpoles are expected to be impacted based on recent testing (Olsen unpbl. data 2013). Further, more than 3 miles of stream in the drainage that contains tailed frog tadpoles will not be treated because no fish are present and these tadpoles will be able to recolonize the stream. Adult tailed frogs will also not be affected by the treatment and would lay eggs the following season in the stream. The effects on the species as a whole should be minimal because tailed frogs are widespread and are not considered a sensitive species. Therefore, while the local population will likely experience a decline as a result of treatment with rotenone, it is anticipated that the impacts should be short term and minor and any local population declines noted will not threaten the overall conservation of the species.

Based on this information, FWP would expect the impacts to non-target organisms in the streams proposed for WCT restoration to range from non-existent to short term and minor.

Comment 5d: WCT are native to Pintler Creek but were not likely present upstream of Pintler Falls. Therefore, following rainbow trout removal, WCT will be introduced to the Pintler Creek upstream of the falls. There should be no impacts resulting from WCT introduction beyond those present for the current rainbow trout fishery because the species occupy similar aquatic niches.

Comment 5f:

Terrestrial Organisms:

The project area is within potential grizzly bear habitat, but there are no known grizzly bears currently inhabiting the area. This project should have little or no impact on grizzly bears because the bears are not dependent on fish for food. There would be no impact on grizzly bears that consume fish killed by rotenone or consume treated waters (see comment 5c for impacts to mammals). The project would not have an impact on grizzly bears other than potential short term displacement due to increased people presence along the streams and the use of mechanized equipment.

Wolverine, fisher, northern goshawk, black rosy-finch and greater sage grouse are listed as species of special concern or potential species of concern present within or near the proposed project area. None of these species should be substantially impacted by the restoration of WCT to Pintler Creek. None of these species preys exclusively on fish or aquatic invertebrates which will be impacted by the proposed treatment. Any terrestrial organism that consumes rotenone-killed fish will not be impacted. Temporary displacement of these animals may occur as a result of increased human presence in the drainage and increased noise generated by mechanized equipment (see comment 5g for minor potential impacts), but these impacts should be short-term and minor.

One terrestrial invertebrate sensitive species may be present in the Pintler Creek drainage, the shiny tightcoil. The shiny tightcoil is a terrestrial gastropod and therefore should not be impacted by the proposed project.

Aquatic organisms:

Westslope cutthroat trout, including some populations of slightly hybridized WCT, are considered a sensitive species and a species of special concern. The intent of the Proposed Action is to conserve WCT by expanding their range into Pintler Creek and Oreamnos Lake. Restoration of WCT to Pintler Creek will require restocking the stream with non-hybridized WCT and expanding their current range into 12 miles of stream habitat and 1 lake. Therefore, the expected outcome of the proposed projects would be greatly beneficial to the long-term conservation of WCT.

Arctic grayling are also a sensitive species and present in Pintler Lake downstream of the proposed project area. There should be no impacts to Arctic grayling as a result of the proposed action because rotenone would be fully neutralized at Pintler Falls. If neutralization was for some unforeseen reason ineffective at removing all rotenone from the water, it is unlikely that grayling in Pintler Lake would be impacted. Given the distance between Pintler Falls and Pintler Lake and the significant dilution of any treated waters entering the lake, rotenone concentrations in the lake would not reach a level where fish would be killed.

The boreal whiteface is an aquatic invertebrate that is listed as a sensitive species and may occur in the Pintler Creek drainage. The boreal whiteface is a dragonfly (Order Odonata) that has an aquatic larval stage. The habitat of boreal whitefaces includes sedge marshes, mossy fens and bogs, and vegetated ponds and lakes. They are presumably on prairie lakes and ponds as well (MFG 2013). Because rotenone can impact aquatic invertebrates, it is possible that boreal whiteface may be impacted but the impacts are anticipated to be short term and minor (see comment 5c). The types of aquatic habitat this species occupies are not common in Pintler Creek upstream of the falls. Oreamnos Lake has a primarily rocky shoreline with few sedges or marshy areas. There is a small marshy area downstream of Oreamnos Lake adjacent to Pintler Meadows which may contain boreal whiteface. However, marshy or boggy areas that are not connected to the stream and therefore would not potentially contain rainbow trout would not be treated with rotenone and therefore would not be impacted by the proposed project. Any bogs that are connected to the stream through surface flow will likely be treated.

Comment 5g. There is the potential for displacement of some animals during the implementation of this project (see Comment 5f). Mule deer, elk, moose and potentially other big game species and species mentioned above (Comment 5f) may be temporarily displaced as crews are present in the drainage performing the proposed work. However, these impacts should only be minor and temporary. The total treatment should be completed within 4-6 days.

Comment 5i. It is unclear if native WCT were present in Pintler Creek upstream of Pintler Falls. Although genetic tests have not been conducted on the trout upstream of the falls, phenotypically the fish appear to be rainbow trout. However, WCT is the only native trout species to Pintler Creek and due to competition and predation from non-native trout species and degradation of habitats, WCT have been extirpated from the drainage. Therefore, the proposed action provides a unique opportunity to re-establish WCT in the Pintler Creek drainage. There is no potential to establish WCT in Pintler Creek downstream of the falls because no suitable barrier location exists, and if a barrier cannot be constructed and non-native fish removed WCT introduction would not likely be successful. In addition, other native species of high conservation value are present in Pintler Creek downstream of the falls (i.e., Arctic grayling and burbot in Pintler Lake) making non-native removal infeasible. Therefore, the only opportunity to restore WCT in the Pintler Creek drainage exists upstream of the falls. It is highly unlikely that fish were present in Oreamnos Lake prior to introduction in the early 1900s.

Cumulative Impacts: Impacts to fish and wildlife from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would create cumulative impacts to fish and wildlife resources within the proposed WCT restoration stream. If the new fishery attracts more recreational use, fish and wildlife resources could potentially suffer from the increased presence of humans. However, based on use patterns of other WCT fisheries, FWP would conclude that it is very unlikely that the new WCT fishery would attract significant interest and associated higher use levels. The current rainbow trout fishery would be replaced by WCT fisheries that occupy a similar niche and would provide similar ecological functions and provide for similar angling opportunities. FWP does not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to non-target organisms related to construction and the treatment of the proposed stream.

B. HUMAN ENVIRONMENT

6. NOISE/ELECTRICAL EFFECTS **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Increases in existing noise levels?			X		Yes	6a
b. Exposure of people to serve or nuisance noise levels?			X			6a
c. Creation of electrostatic or electromagnetic effects that could be detrimental to human health or property?		X				
d. Interference with radio or television reception and operation?		X				

Comment 6a: Noise levels would increase temporarily as a helicopter is used to access the treatment area. A helicopter would cause considerable noise at landing zones. Lesser noise would be present throughout the drainage when the helicopter is in use ferrying personnel and equipment to the sites. Some noise will be created through the use of a motorized boat to apply rotenone to Oreamnos Lake. A gasoline powered water pump would be used to fill tanks containing diluted potassium permanganate, but this pump would be operated outside the Wilderness Area and would only be operated 2-3 times a day for a period of 5-10 minutes. Other application equipment that would be used in the wilderness is not mechanized and produces no noise. These impacts should be minor and temporary as the use of the helicopter and boat is expected to last only 1 day. The noise impacts in the wilderness are anticipated to only affect wildlife species because the drainage will be closed to public access during the application of rotenone. Noise effects on wildlife are expected to be only minor and temporary. It should be noted that FWP biannual helicopter flights occur in the Anaconda-Pintler Wilderness during the stocking of high elevation lakes with WCT.

Cumulative Impacts: Increases in noise from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would create increased noise in the stream proposed for WCT restoration. FWP does not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts related to noise from the proposed treatment of the stream and lake with piscicides.

7. **<u>LAND USE</u>** **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			7b
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 7b: The proposed project in Pintler Creek lies mostly within the designated Anaconda Pintler Wilderness Area. Wilderness Areas are congressionally designated and have specific mandates governing their management to maintain their wilderness qualities (e.g., no mechanized equipment, no roads, etc.). The pillars of wilderness include areas that are: natural, undeveloped, provide outstanding opportunities for solitude, primitiveness, and unconfined recreation, and/or have special features or values associated with them. The designation and management of wilderness areas are evaluated based upon these pillars. The restoration of WCT to Pintler Creek as proposed in this document would not affect the long-term natural state of the area and the area would be returned to a more native state with the return of the native salmonid to the stream. There would be temporary effects on aquatic invertebrates and potentially tailed frog tadpoles as a result of using rotenone to remove rainbow trout (see comment 5c). However, it is expected that non target aquatic organisms would recover to pre-existing conditions within 1-3 years after the project is complete (see Comment 5c).

When the project objectives are achieved, the wilderness portion of Pintler Creek will return to a more natural state where only native fish species are present. There will be no development associated with the restoration of WCT to Pintler Creek. There would be short term and minor impacts to wilderness character through the use of mechanized equipment to access the drainage and transport personnel and equipment to the project site. There would be no long-term impacts on the solitude of the area or the primitiveness or opportunities for unconfined recreation, but there would be short-term impacts (1 day) when the helicopter and motorized boat are in use and impacts (4-6 days) when the drainage is closed to public access. Temporary impacts to solitude would also be present when performing the fish removal because of increased human presence, but these impacts should be minimized because of the lack of public access during the treatment. Only 6-8 people would be present for 4-6 days in the Wilderness Area to complete the proposed restoration. The proposed project would not negatively affect any identified special features of the Anaconda-Pintler Wilderness Area; however it would create a special feature in the wilderness through the restoration of a native fish community. On the Big Hole side of the Continental Divide, there is only 1 other stream (Plimpton Creek) with a native fish assemblage in the Anaconda-Pintler Wilderness Area (11 other streams have non-native fish communities). One of the stated goals of the Anaconda-Pintler Wilderness Area is to aid in the conservation and restoration of native fish.

Within the Anaconda-Pintler Wilderness Management Direction (Kiaser and Richardson, 2000) specific direction is given regarding fisheries management. The plan states, "Management decisions will focus on protection of those streams where known or suspected pure strains of Westslope Cutthroat or Bull trout exist". Further, the plan also includes under the goals of wilderness fisheries management to:

1. Where feasible, maintain and enhance indigenous fish species.

2. Seek native biological communities where possible.

3. Contribute to the conservation and restoration of native strains of fish.

4. Provide recreational angling where opportunities currently exist or where establishment of new populations of native species might contribute to the perpetuation of those species and provide recreation as well.

The proposed action of restoring Pintler Creek to native WCT will meet all of these goals as stated in the Anaconda-Pintler Wilderness Plan with few impacts to other wilderness management goals or objectives. It is unlikely that Pintler Creek will attract additional angling once restored to WCT. Other fisheries within the wilderness area, particularly in alpine lakes, attract some anglers. The increase in use at these lakes can lead to increasing human impacts. However, it is unlikely that anglers would specifically target Pintler Creek for angling due to its small size and the likely small size of the fish that will be present in the stream. It is anticipated that future angling at Oreamnos Lake will be similar to current use.

Unlike outside wilderness areas where individual states maintain the authority to manage fish and wildlife populations, both state and federal agencies are responsible for "fostering mutual understanding and cooperation in the management of fish and wildlife in wilderness" (Bozworth 2006). The Anaconda-Pintler Wilderness Management Direction document makes it clear that FWP has the statutory authority to manage fisheries and stock fish in Wilderness.

The use of a piscicide (rotenone) is proposed within the wilderness area to restore WCT to Pintler Creek. The agreement between the Association of Fish and Wildlife Agencies and the Forest Service and BLM (Bozworth 2006) regarding fish and wildlife management within wilderness areas states: "Chemical treatment may be necessary to prepare waters for the reestablishment of indigenous fish species**,** consistent with approved wilderness management plans**,** to conserve or recover Federally listed threatened or endangered species, or to correct undesirable conditions resulting from human activity. Proposals for chemical treatments would be considered and may be authorized by the Federal administering agency through application of the Minimum Requirement Decision Process (MRDP, Appendix 1) as outlined in Section E., General Policy (see Appendix A). Any use of chemical treatments in wilderness requires prior approval by the Federal administering agency." Precedents for similar cutthroat restoration projects within wilderness areas across Montana have been established (e.g., West Fork Mudd Creek, (Anaconda-Pintler Wilderness), Cherry Lake (Lee Metcalf Wilderness), Goose Creek and

Fourmile Creek (Absaroka-Beartooth Wilderness) among others). WCT is the only indigenous trout species to the Big Hole drainage and Pintler Creek. Therefore, the use of rotenone in the wilderness to restore WCT to Pintler Creek would correct the undesirable condition created by past stocking of non-native fish, and it is within established policy for wilderness management. Similarly, the proposed fisheries management action would advance native fish conservation within the Anaconda-Pintler Wilderness Area, which is one of the stated goals for the Wilderness Area.

Comment 7c: During treatment with rotenone, public access to the project areas would be closed for several days to prevent public exposure to rotenone. The length of the closure would depend on the amount of time it takes to complete the treatment but would not exceed 7 days. The Pintler Creek trail would be closed from the trailhead to Oreamnos Lake. The label for CFT Legumine states that detoxification should be terminated when replenished fish survive and show no signs of stress for at least four hours. FWP expects the treated waters in Pintler Creek to be non-toxic to fish in 24-48 hours after the input of rotenone. Therefore, it can reasonably be expected that any closures would last less than 7 days. The treatment would be implemented in late summer (August- September). At proposed treatment levels, stream water would not be toxic to wildlife or livestock. However, to limit any potential conflict, the treatment would be coordinated such that livestock are pastured elsewhere during the treatment period.

Cumulative Impacts: Impacts on land use from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would impact land use in the proposed WCT restoration streams. FWP does not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts related to land use from the proposed treatment of the proposed stream and lakes with piscicides.

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

Comment 8a: The principal risk of human exposure to hazardous materials from this project would be limited to the applicators of the rotenone. To limit exposure, all applicators would wear safety equipment required by the product label and MSDS sheets. Such safety equipment may include respirator, goggles, waders, Tyvek overalls, and Nitrile gloves. All applicators would be

trained on the safe handling and application of the piscicide. At least one Montana Department of Agriculture certified pesticide applicator would supervise and administer the project. A second independent applicator would verify that all label requirements and FWP's Piscicide Policy are followed. Materials would be transported, handled, applied and stored according to the label specifications to reduce the probability of human exposure or spill. See also Comment 8c for other review of risks to general public.

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

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

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

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

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

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

> *"…When rotenone is used in fish management applications, food exposure may occur when individuals catch and eat fish that either survived the treatment or were added to the water body (restocked) prior to complete degradation. Although exposure from this route is unlikely for the general U.S. population, some people might consume fish following a rotenone application. EPA used maximum residue values from a bioaccumulation study to estimate acute risk from consuming fish from treated water bodies. This estimate is considered conservative because the bioaccumulation study measured total residues in edible portions of fish including certain non-edible portions (skin, scales, and fins) where concentrations may be higher than edible portions (tissue) and the Agency assumed that 100% of fish consumption could come from rotenone exposed fish. In addition, fish are able to detect rotenone's presence in water and, when possible, attempt to avoid the chemical by moving from the treatment area. Thus, for partial kill uses, surviving fish are likely those that have intentionally minimized exposure.*
>
> *Acute exposure estimates for drinking water considered surface water only because rotenone is only applied directly to surface water and is not expected to reach groundwater. The estimated drinking water concentration (EDWC) used in dietary exposure estimates was 200 ppb, the solubility limit of rotenone. The drinking water risk assessment is conservative because it assumes water is consumed immediately after treatment with no degradation and no water treatment prior to consumption.*
>
> *Acute dietary exposure estimates result in dietary risk below the Agency's level of concern. Generally, EPA is concerned when risk estimates exceed 100% of the acute population adjusted dose (aPAD). The exposure for the "females 13-49 years old" subgroup (0.1117 mg/kg/day) utilized 74% of the aPAD (0.015 mg/kg/day) at the 95th percentile (see Table 5). It is appropriate to consider the 95th percentile because the analysis is deterministic and unrefined. Measures implemented as a result of this RED will further minimize potential dietary exposure (see Section IV)..."*

As for evaluating the human chronic risk from exposure to rotenone treated water, the EPA acknowledges the four principle reasons for concluding there is a low risk: first, the rapid natural degradation of rotenone; second, using active detoxification measures by applicators such as potassium permanganate; third, properly following piscicide labels and the extra precautions stated in this document; and finally, proper signing, public notification or area closures which limit public exposure to rotenone treated water.

As for recreational exposure, the EPA concludes no risk to adults who enter treated water following the application by dermal and incidental ingestion but requires a waiting period of 3 days after a treatment before toddlers swim in treated water. The aggregate risk to human health from food, water and swimming does not exceed the EPA level of concern (EPA 2007). Recreationists in the area would likely not be exposed to the treatments because treatment areas would be closed to public access. Signs would be in place to warn recreationists that the streams are being treated with rotenone and closed to entry. Proper warning through news releases, signing the project area, temporary road closure, and administrative personnel in the project area should be adequate to keep recreationists from being exposed to any treated waters.

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

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

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

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

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

One study, in which rats were injected with rotenone for a period of weeks, reported finding lesions characteristic of Parkinson's disease (Betarbet et al. 2000). However, the relevance of the results to the use of rotenone as a piscicide have been challenged based upon the following dissimilarities between the experimental methodology used and fisheries related applications: (1) the continuous intravenous injection method used to treat the rats leads to "continuously high levels of the compound in the blood," unlike field applications where 1) the oral route is the most likely method of exposure, 2) a much lower dose is used and 3) potential exposure to rotenone is limited to usually only a matter of days because of the rapid breakdown of the rotenone following application. Further, dimethyl sulfoxide (DMSO) was used to enhance tissue penetration in the laboratory experiment (normal routes of exposure actually slow introduction of chemicals into the bloodstream), no such chemicals enhancing tissue penetration are present in the rotenone formulation proposed for use in this treatment. Similar studies (Marking 1988) have found no Parkinson-like results. Extensive research has demonstrated that rotenone does not cause birth defects (HRI 1982), gene mutations (Van Geothem et al. 1981; BRL 1982) or cancer (Marking 1988). Rotenone was found to have no direct role in fetal development of rats that were fed high concentrations of rotenone. Spencer and Sing (1982) reported that rats that were fed diets laced with 10-1,000 ppm rotenone over a 10 day period did not suffer any reproductive dysfunction. Typical concentrations of actual rotenone used in fishery management range from 0.025 to 0.50 ppb (1 ppm product) and are far below that administered during most toxicology studies.

A recent study linked the use of rotenone and paraquat with the development of Parkinson's disease (PD) in humans later in life (Tanner et al. 2011). The after the fact study included mostly farmers from 2 states within the United States who presumably used rotenone for terrestrial application to crops and/or livestock. Rotenone is no longer approved for agricultural uses and is only approved for aquatic application as a piscicide. The results of epidemiological studies of pesticide exposure, such as this one, have been highly variable (Guenther et al. 2011). Studies have found no correlations between pesticide exposure and PD (e.g., Jiménez-Jiménez 1992; Hertzman 1994; Engel et al. 2001; Firestone et al. 2010), some have found correlations between pesticide exposure and PD (e.g., Hubble et al. 1993; Lai et al. 2002; Tanner et al. 2011) and some have found it difficult to determine which pesticide or pesticide class is implicated if associations with PD occur (e.g., Engel et al. 2001; Tanner et al. 2009). Recently, epidemiological studies linking pesticide exposure to PD have been criticized due to the high variation among study results, generic categorization of pesticide exposure scenarios, questionnaire subjectivity, and the difficulty in evaluating the causal factors in the complex disease of PD, which may have multiple causal factors (age, genetics, environment) (Raffaele et al. 2011). A specific concern is the inability to assess the degree of exposure to certain chemicals, including rotenone, particularly the concentration of the chemical, frequency of use, application (e.g., agricultural, insect removal from pets), and exposure routes (Raffaele et al. 2011). No information is given in the Tanner et al. (2011) study about the formulation of rotenone used (powder or liquid) or the frequency or dose farmers were exposed to during their careers. There is also no information given about the personal protective equipment used or any information about other pesticides farmers were exposed to during the period of the study. It is also unclear in the Tanner et al. (2011) study the frequency and the dose individuals were exposed to during the time period of use. Without information on how much rotenone individuals were exposed to and for how long, it is difficult to evaluate the potential risk to humans of developing Parkinson's disease from aquatic applications of rotenone products.

The State of Arizona conducted an exhaustive review to the risks to human health of rotenone use as a piscicide (Guenther et al. 2011). They concluded: "To date, there are no published studies that conclusively link exposure to rotenone and the development of clinically diagnosed PD. Some correlation studies have found a higher incidence of PD with exposure to pesticides among other factors, and some have not. It is very important to note that in case-control correlation studies, causal relationships cannot be assumed and some associations identified in odds-ratio analyses may be chance associations. Only one study (Tanner et al. 2011) found an association between rotenone and paraquat use and PD in agricultural workers, primarily farmers. However, there are substantial differences between the methods of application, formulation, and doses of rotenone used in agriculture and residential settings compared with aquatic use as a piscicide, and the agricultural workers interviewed were also exposed to many other pesticides during their careers. Through the EPA reregistration process of rotenone, occupational exposure risk is minimized by: new requirements that state handlers may only apply rotenone at less than the maximum treatment concentrations (200 ppb), the development of engineering controls to some of the rotenone dispensing equipment, and requiring handlers to wear specific PPE."

It is clear that to reduce or eliminate the risk to human health, including any potential risk of developing Parkinson's disease, public exposure to rotenone treated water must be eliminated to the extent possible. To reduce the potential for exposure of the public during the proposed use of CFT Legumine to restore WCT, areas treated with rotenone would be closed to public access during the treatment. Signs would be placed at access points informing the public of the closure and the presence of rotenone treated waters. Personnel would be on site to inform the public and escort them from the treatment area should they enter. Rotenone treated waters would be limited to the proposed treatment areas by adding potassium permanganate to the stream at the downstream end of the treatment reach (fish barrier). Potassium permanganate would neutralize any remaining rotenone before leaving the project area. The efficacy of the neutralization would be monitored using fish (the most sensitive species to the chemical) and a hand held colorimeter. Therefore, the potential for public exposure to rotenone treated waters is very minimal. The potential for exposure would be greatest for those government workers applying the chemical. To reduce their exposure, all CFT Legumine label mandates for personal protective equipment would be adhered to (see Comment 8a).

Cumulative Impacts: Health hazards from the proposed action would be short term and mitigated through closure of treatment areas to public and use of proper safety equipment, etc. Because rotenone in all formulations including CFT Legumine breaks down quickly and does not bioaccumulate, there should be no long-term or cumulative impacts of the application of the piscicide. FWP does not expect the proposed action to result in other actions that would increase the risk of health hazards in the streams proposed for WCT restoration. FWP does not foresee any other activities in the basin that would add to health impacts of the proposed action. As such there are no cumulative impacts related health hazards from the proposed treatment.

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

Comment 11c: The Pintler Creek Trail would be closed during the application of rotenone to Pintler Creek. This would preclude any public access to the drainage during the treatment with rotenone to prevent human exposure to the chemical. These impacts will be short term (<7 days) and minor. Similar trail systems are present in nearby drainages that access the Anaconda Pintler Wilderness Area. These trails would be unaffected by the proposed action. The timing of the project in late summer/early fall should avoid the most busy times of year on the trail system and avoid any conflicts with hunters and/or outfitters in the drainage.

There would be a temporary loss of angling opportunity in Pintler Creek and Oreamnos Lake between the time of fish removal and for several years after until introduced fish grow to the size that they able to be caught by anglers. All streams are accessible to the public and located on public lands administered by the Forest Service. However, all the proposed streams are small and receive little angling pressure. Further, there are adjacent streams and areas downstream of fish barriers that would provide similar angling alternatives. The stream proposed for WCT restoration should be fully colonized with WCT within 5 years of project implementation and should provide the same angling opportunity to catch wild trout as pretreatment. In most cases, cutthroat trout fisheries in streams in southwest Montana are catch and release only. After establishment, FWP would evaluate whether the fishery could support harvest and if appropriate, regulations would be changed to allow anglers the option of harvesting WCT.

Cumulative Impacts: Impacts to recreation and aesthetics from the proposed action would be short term and minor. FWP does not expect the proposed action to result in other actions that would impact recreation/aesthetics in the stream proposed for WCT restoration. FWP does not foresee any other activities in the basin that would add to impacts of the proposed action. As such there are no cumulative impacts to recreation/aesthetics from the proposed action.

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

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

Comments 13e and f: The use of piscicide can generate controversy. Public outreach and information programs can inform the public on the use of pesticides. It is not known if this project would have organized opposition. Similar projects proposed and implemented in 2011-2013 had limited opposition, but they also had substantial support.

Comment 13g: The following permit would be required:

MDEQ Pesticide General Permit NDPES Discharge Permit for application of CFT Legumine.

USDA Forest Service Pesticide Use Authorization Form

PART IV. OVERLAPPING AGENCY JURISDICTION

A. Name of Agency and Responsibility
   a. Montana Department of Environmental Quality – NDPES Discharge Permit for application of CFT Legumine.
   b. US Forest Service, Beaverhead-Deerlodge National Forest, Wisdom Ranger District for management of fish habitat in Pintler Creek and temporary closure of Forest Service trails during treatment.

PART V. AGENCIES THAT HAVE CONTRIBUTED OR BEEN CONTACTED

a. Montana Department of Environmental Quality.
b. Montana Department of Fish, Wildlife & Parks – wildlife bureau
c. US Army Corps of Engineers
d. Montana Natural Heritage
e. Montana State Historic Preservation Office
f. US Forest Service, Beaverhead-Deerlodge National Forest, Wisdom Ranger District

PART VI. ENVIRONMENTAL IMPACT STATEMENT REQUIRED?

After considering the potential impacts of the proposed action and possible mitigation measures, FWP has determined that an Environmental Impact Statement is not warranted. The impacts of WCT restoration as described in this document are minor and/or temporary and mitigation for many of the impacts is possible. The primary negative impacts as a result of this project are temporary impacts to the Anaconda-Pintler Wilderness character through the use of mechanized equipment, temporary reductions in aquatic invertebrate abundance as a result of toxic effects of rotenone and impacts to tailed frog tadpoles in the Pintler Creek. Impacts to aquatic invertebrates have been shown to be short term (< 5 years) and minor and invertebrate communities are very resilient to disturbances such as treatment with rotenone. Mitigation measures, such as not treating sections of stream that do not contain fish but do contain tailed frog tadpoles and aquatic invertebrates, should reduce the impacts to this non-target species. Further, the benefit to native WCT, a species in need of conservation, would more than offset the potential negative impacts to other species.

Prepared by : Jim Olsen, Fisheries Biologist______ Date: ____5/5/2014________________

Submit written comments to: Montana Fish, Wildlife & Parks
c/o Pintler Creek WCT Restoration EA comments
1820 Meadowlark Ln.
Butte, MT 59701

Or via email to: jimolsen@mt.gov

Comment period is __45___ days. (30 d min) Comments must be received by _June 19th 2014______

PART V. REFERENCES

AFS (American Fisheries Society). 2002. Rotenone stewardship program, fish management chemicals subcommittee. www.fisheries.org/rotenone/.

Anderson, R.S. 1970. Effects of rotenone on zooplankton communities and a study of their recovery patterns in two mountain lakes in Alberta. Journal of the Fisheries Research Board of Canada. Vol 27, no. 8, 1335-1355

Betarbet, R., T.B. Sherer, G. MacKenzie, M. Garcia-Osuna, A.V. Panov, and T. Greenamyre. 2000. Chronic systemic pesticide exposure reproduces features of Parkinson's disease. *Nature Neuroscience* 3 (12): 1301-1306.

Bosworth, D. N., K. B. Clarke and J. Baughman. 2006. Policies and Guidelines for Fish and Wildlife Management in National Forest and Bureau of Land Management Wilderness.

BPA (Bonneville Power Administration) 2004. South Fork Flathead watershed westslope cutthroat trout conservation project. Draft environmental impact statement. DOE/EIS 0353. Portland, OR.

Bradbury, A. 1986. Rotenone and trout stocking: a literature review with special reference to Washington Department of Game's lake rehabilitation program. Fisheries management report 86-2. Washington Department of Game.

BRL (Biotech Research Laboratories). 1982. Analytical studies for detection of chromosomal aberrations in fruit flies, rats, mice, and horse bean. Report to U.S. Fish and Wildlife Service (USFWS Study 14-16-0009-80-54). National fishery research Laboratory, La Crosse, Wisconsin.

CDFG (California Department of Fish and Game), 1994. Rotenone use for fisheries management, July 1994, final programmatic environmental impact report. State of California Department of Fish and Game.

Chandler, J.H. and L.L. Marking. 1982. Toxicity of rotenone to selected aquatic invertebrates and frog larvae. The progressive fish culturist 44(2) 78-80.

Cook, S.F. and R.L. Moore. 1969. The effects of a rotenone treatment on the insect fauna of a California stream. Transactions of the American Fisheries Society 83 (3):539-544.

Cushing, C.E. and J.R. Olive. 1956. Effects of toxaphene and rotenone upon the macroscopic bottom fauna of two northern Colorado reservoirs. Transactions of the American Fisheries Society 86:294-301.

Cutkomp, L.K. 1943. Toxicity of rotenone to animals: a review and comparison of responses shown by various species of insects, fishes, birds, mammals, etc. Soap and Sanitary Chemicals 19(10): 107-123.

Dawson, V.K., W.H. Gingerich, R.A. Davis, and P.A. Gilderhus. 1991. Rotenone persistence in freshwater ponds: effects of temperature and sedimant adsorption. North American Journal of Fisheries Management 11:226-231.

Engel, L.S., H. Checkoway, M. C. Keifer, N. S. Seixas, W. T. Longstreth Jr., K. C. Scott, K. Hudnell, W. K. Anger, and R. Camicioli. 2001. Parkinsonism and occupational exposure to pesticides. Occupational Environmental Medicine 58:582-589.

Engstrom-Heg, R. 1971. Direct measure of potassium permanganate demand and residual potassium permanganate. New York Fish and Game Journal vol. 18 no. 2:117-122.

Engstrom-Heg, R. 1972. Kinetics of rotenone-potassium permanganate reactions as applied to the protection of trout streams. New York Fish and Game Journal vol. 19 no. 1:47-58.

Engstrom-Heg, R. 1976. Potassium permanganate demand of a stream bottom. New York Fish and Game Journal vol. 23 no. 2:155-159.

Engstrom-Heg, R, R.T. Colesante, and E. Silco.1978. Rotenone Tolerances of Stream-Bottom Insects. New York Fish and Game Journal 25 (1):31-41.

EPA, 2007. United States Environmental Protection Agency, prevention, pesticides and toxic substances (7508P). EPA 738-R-07-005. Reregistration Eligibility Decision for Rotenone, List **A** Case No. 0255.

Finlayson, B.J., R.A. Schnick, R.L. Caiteux, L. DeMong, W.D. Horton, W. McClay, C.W. Thompson, and G.J. Tichacek. 2000. Rotenone Use in Fisheries Management: Administrative and Technical Guidelines Manual. American Fisheries Society, Bethesda, Maryland.

Firestone, J.A., J.I. Lundin, K.M. Powers, T. Smith-Weller, G.M. Franklin, P.D. Swanson, W.T. Longstreth Jr., and H. Checkoway. 2010. Occupational factors and risk of Parkinson's disease: a population-based case-control study. American Journal of Industrial Medicine 53:217-223.

Fisher, J.P. 2007. Screening level risk analysis of previously unidentified rotenone formulation constituents associated with the treatment of Lake Davis. *for* California Department of Fish and Game. Environ International Corporation, Seattle.

Gilderhus, P.A., J.L. Allen, and V.K. Dawson. 1986. Persistence of rotenone in ponds at different temperatures. North American Journal of Fisheries Management. 6: 129-130.

Grisak, G. 2003. South Fork Flathead watershed westslope cutthroat trout conservation program. Specialist report for environmental impact statement. FWP, Kalispell.

Grisak, G.G., D. R. Skaar, G. L. Michael, M.E. Schnee and B.L. Marotz. 2007. Toxicity of Fintrol (antimycin) and Prenfish (rotenone) to three amphibian species. Intermountain Journal of Sciences. Vol. 13, No.1:1-8.

Guenther, H., M. Schaefer and 19 others. 2011. Rotenone Review Advisory Committee Final Report and Recommendations to the Arizona Game and Fish Department. http://www.azgfd.gov/h_f/documents/Rotenone_Review_Advisory_Committee_Final_Report_12_31_2011.pdf.

Harig, A. L. and K.D. Fausch. 2002. Minimum habitat requirements for establishing translocated cutthroat trout populations. Ecological Applications 12:535-551.

Hertzman, C., M. Wiens, and B. Snow. 1994. A case-control study of Parkinson's disease in a horticultural region of British Columbia. Movement Disorders 9(1):69-75.

Hilderbrand, R.H. and J. L. Kershner. 2000. Conserving inland cutthroat trout in small streams: how much stream is enough? North American Journal of Fisheries Management 20:513-520.

Hisata, J.S. 2002. Lake and stream rehabilitation: rotenone use and health risks. Final supplemental environmental impact statement. Washington Department of Fish and Wildlife, Olympia.

HRI (Hazelton Raltech Laboratories). 1982. Teratology studies with rotenone in rats. Report to U.S. Geological Survey. Upper Midwest Environmental Sciences Center (USFWS Study 81-178). La Crosse, Wisconsin.

Houf, L.J. and R.S. Campbell. 1977. Effects of antimycin a and rotenone on macrobenthos in ponds. Investigations in fish control number 80. U.S. Fish and Wildlife Service. Fish Control Laboratory, LaCrosse.

Hubble, J.P., T. Cao, R.E.S. Hassanein, J.S. Neuberger, and W.C. Koller. 1993. Risk factors for Parkinson's disease. Neurology 43:1693-1697.

Hughey, R.E. 1975. The effects of fish toxicant antimycin A and rotenone on zooplankton communities in ponds. Masters thesis. University of Missouri. Columbia.

Jiménez-Jiménez, F., D. Mateo, and S. Giménex-Roldán. 1992. Exposure to well water and pesticides in Parkinson's disease: a case-control study in the Madrid area. Movement Disorders 7(2):149-152.

Kiaser J, and R. Richardson. 2000. Decision Notice and Finding of no Significant Impact Anaconda-Pintler Wilderness Management Direction. USDA Forest Service, Beaverhead-Deerlodge National Forest, Bitterroot National Forest. 420 Barrett St. Dillon, MT 59725

Kiser, R.W., J.R. Donaldson, and P.R. Olson. 1963. The effect of rotenone on zooplankton populations in freshwater lakes. Transactions of the American Fisheries Society 92(1):17-24.

Knapp, R.A. and K.R. Matthews. 1998. Eradication of nonnative fish by gill netting from a small mountain lake in California. Restoration Ecology, vol. 6, 2:207-213.

Kulp, M.A. and S. E. Moore. 2000. Multiple Electrofishing Removals for Eliminating Rainbow Trout in a Small Southern Appalachian Stream. North American Journal of Fisheries Management 20:259–266.

Leary, R. 2009. Genetic testing results letter dated June 22, 2009 and November 12, 2009. University of Montana Conservation Genetics Laboratory, Division of Biological Sciences, University of Montana, Missoula, Montana 59812

Leary, R. 2010. Genetic testing results letter dated April 12, 2010. University of Montana Conservation Genetics Laboratory, Division of Biological Sciences, University of Montana, Missoula, Montana 59812

Lai, B.C.L., S.A. Marion, K. Teschke, and J.K.C. Tsui. 2002. Occupational and environmental risk factors for Parkinson's disease. Parkinsonism and Related Disorders 8:297-309.

Ling, N. 2002: Rotenone, a review of its toxicity and use for fisheries management. New Zealand Department of Conservation *Science for Conservation 211*. 40 p.

Loeb, H.A. and R. Engstrom-Heg. 1970. Time-dependant changes in toxicity of rotenone dispersions to trout. Toxicology and applied pharmacology 17, 605-614.

Marking, L.L., and T.D. Bills. 1976. Toxicity of rotenone to fish in standardized laboratory tests. Investigations in fish control number 72. U.S. Fish and Wildlife Service. Fish Control Laboratory, LaCrosse.

Marking, L.L. 1988. Oral toxicity of rotenone to mammals. Investigations in fish control, technical report 94. U.S, Fish and Wildlife Service, National Fisheries Research Center, La Crosse, Wisconsin.

Matthaei, C.D., Uehlinger, U., Meyer, E.I., Frutiger, A. 1996. Recolonization by benthic invertebrates after experimental disturbance in a Swiss prealpine river Freshwater Biology 35 (2):233-248.

Meronek, T.G., P.M. Bouchard, E.R. Buckner, T.M. Burri, K.K. Demmerly, D.C.Hatleli, R.A.Klumb, SH. Schmidt and D.W.Coble. 1996. A review of fish control projects. North American Journal of Fisheries Management 16:63-74.

Mihuc, T.B. and G. W. Minshall. 1995.Trophic generalists vs. trophic specialists: implications for food web dynamics in post-fire streams. Ecology 76(8):2361-2372

Minshall, G.W. 2003. Responses of stream benthic invertebrates to fire. Forest Ecology and Management. 178:155-161.

Montana Field Guide. 2013. Montana Natural Heritage Program. http://FieldGuide.mt.gov/detail_IIODO44010.aspx

FWP. 1996. Assessments of methods for removal or suppression of introduced fish in bull trout recovery. Montana bull trout scientific group. *for* Montana bull trout restoration team, Montana Fish Wildlife & Parks, Helena.

Moore, S. E., B. L. Ridley, and G. L. Larson. 1983. Standing crops of brook trout concurrent with removal of rainbow trout from selected streams in Great Smoky Mountains National Park. North American Journal of Fisheries Management 3:72–80.

ODFW, 2002. Questions and answers about rotenone. *from* Oregon Department of Fish and Wildlife web page, Diamond Lake rotenone treatment, www.dfw.state.or/ODFWhtml/InfoCntrFish/DiamondLake.Rotenone.html.

Olsen, J. R. 2011a. Small Stream Surveys in the Big Hole River Drainage 2008-2010. Project Number: F-113-R8-10, March 2011. Montana Fish, Wildlife and Parks, Bozeman, MT 59718.

Olsen, J. R. 2011b. Big Hole Mountain Lakes Report 2008-2010. F-113-R8-10, April 2011. Montana Fish, Wildlife and Parks, Bozeman, MT 59718.

Olsen, J. R. and K. Frazer. 2006. Mid Yellowstone Drainage Investigation Report. Project Number F-113. Montana Fish, Wildlife and Parks, Billings, MT.

Parker, B.R., D.W. Schindler, D.B. Donald, and R.S. Anderson. 2001. The effects of stocking and removal of a nonnative salmonid on the plankton of an alpine lake. Ecosystems (2001) 4:334-345.

Parker, R.O. 1970. Surfacing of dead fish following application of rotenone. Transactions of the American Fisheries Society. 99 4:805-807.

Prentiss Incorporated. 2007. Product label for CFT Legumine™ fish toxicant, 5% liquid formulation of rotenone. Sandersville, Georgia.

Raffaele, K.C., S.V. Vulimiri, and T.F. Bateson. 2011. Benefits and barriers to using epidemiology data in environmental risk assessment. The Open Epidemiology Journal 4:99-105.

Rumsey, S., J. Fraley, and J. Cavigli. 1996. Ross and Devine lakes invertebrate results – 1994-1996. File report. Montana Fish, Wildlife & Parks, Kalispell.

Schnee, M.E. 2006. Martin Lakes 1-year, post rotenone treatment report. Montana Fish, Wildlife & Parks, Kalispell.

Schnee, M.E. 2007a. Blue Lake 1-year, post rotenone treatment report. Montana Fish, Wildlife & Parks, Kalispell.

Schnee, M.E. 2007b. Martin Lakes 2-year, post rotenone treatment report. Montana Fish, Wildlife & Parks, Kalispell.

Schnick, R. A. 1974. A review of the literature on the use of rotenone in fisheries. USDI Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, LaCrosse, WI.

Shriver, E.B, and P.D. Murphy. 2007. Utilization of Tiger Muskellunge for Controlling Self-sustaining Populations of Introduced Brook Trout in Mountain Lakes. Draft report. Idaho Fish and Game, Salmon.

Shetter, D.S. and G.R. Alexander. 1970. Results of predator reduction on brook trout and brown trout in 4.2 miles of the North Branch of the Au Sable River. Transactions of the American Fisheries Society 2:312-319.

Shepard, B.B., R. Spoon and L. Nelson. 2001. Westslope cutthroat trout restoration in Muskrat Creek, Boulder River drainage, Montana. Progress report for period 1993 to 2000. Montana Fish, Wildlife & Parks, Townsend.

Skaar, D. 2001. A brief summary of the persistence and toxic effects of rotenone. Montana Fish, Wildlife & Parks, Helena.

Spencer, F. and L.T. Sing. 1982. Reproductive responses to rotenone during decidualized pseudogestation and gestation in rats. *Bulletin of Environmental Contamination and Toxicology*. 228: 360-368.

Tanner, C.M., G.W. Ross, S.A. Jewell, R.A. Hauser, J. Jankovic, S.A. Factor, S. Bressman, A. Deligtisch, C. Marras, K.E. Lyons, G.S. Bhudhikanok, D.F. Roucoux, C. Meng, R.D. Abbott, and J.W. Langston. 2009. Occupation and risk of Parkinsonism. Arch Neurology 66(9):1106-1113.

Tanner, C.M., F. Kamel, W. Ross, J.A. Hoppin, S.M. Goldman, M. Korell, C. Marras, G.S. Bhudhikanok, M. Kasten, A.R. Chade, K. Comyns, M.B. Richards, C. Meng, B. Priestley, H.H. Fernandex, F. Cambi, D.M. Umbach, A. Blair, D.P. Sandler, and J.W. Langston. 2011. Rotenone, paraquat, and Parkinson's disease. Environmental Health Perspectives 119(6):866-872.

Teixeira, J.R.M., A.J. Lapa, C. Souccar, and J.R. Valle. 1984. Timbós: ichthyotoxic plants used by Brazilian Indians. Journal of Ethnopharmacology, 10:311-318

Thompson, P. D., and F. J. Rahel. 1996. Evaluation of depletion-removal electrofishing of brook trout in small Rocky Mountain streams. North American Journal of Fisheries Management 16:332–339.

Van Goethem, D, B. Barnhart, and S. Fotopoulos. 1981. Mutagenicity studies on rotenone. Report to U.S. Geological Survey. Upper Midwest Environmental Sciences Center (USFWS Study 14-16-009-80-076), La Crosse, Wisconsin.

Wang, S., J.J Hard, and F. Utter. 2002. Salmonid inbreeding: a review. Reviews in Fish Biology and Fisheries. 11:301-319.

Ware, G.W. 2002. An introduction to insecticides 3rd edition. University of Arizona, Department of Entomology, Tuscon. *on* EXTOXNET. Extension Toxicology Network. Oregon State University web page.

Wohl, N.E. and R. F. Carline. 1996. Relations among riparian grazing, sediment loads, macroinvertebrates, and fishes in three Pennsylvania streams. Canadian Journal of Fisheries and Aquatic Sciences. 53:260-266.

Appendix A. Minimum Requirements Decision Guide

ARTHUR CARHART NATIONAL WILDERNESS TRAINING CENTER

MINIMUM REQUIREMENTS DECISION GUIDE

Westslope Cutthroat Trout Restoration in a Pintler Creek in the Anaconda-Pintler Wilderness.

". . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act..."

– The Wilderness Act, 1964

Please refer to the accompanying *MRDG Instructions* click here for filling out this guide. The spaces in the worksheets will expand as necessary as you enter your response.

Step 1: Determine if it is necessary to take action.

Description: Briefly describe the situation that may prompt action.

Montana Fish, Wildlife and Parks proposes application of piscicides (rotenone) to Pintler Creek (Anaconda-Pintler Wilderness) to remove non-native rainbow trout and restore genetically pure westslope cutthroat trout (WCT). Non-native fish removal in Pintler Creek is part of a larger project to restore WCT above Pintler Falls. Beaver Creek is hydrologically connected to Pintler Creek. Rainbow trout are also known to exist in lower Beaver Creek and would be removed as part of this project. Without removing rainbow trout from the Pintler Creek, fishery restoration of WCT in this stream would not be successful because rainbow trout would hybridize with WCT and lose their conservation value. After successful eradication of non-native trout from the system, native WCT from other nearby sources in the Big Hole drainage will be stocked into Pintler Creek to establish a population conserving local genetics in the Big Hole watershed. FWP and the Forest Service are co-signatories to a variety of MOU/MOA/conservation plans which demonstrate the commitment of both parties to this kind of activity.

Pintler Creek

Pintler Creek drains from the Pintler Mountain Range north of Wisdom (Figure 1). Its headwaters are located in the Anaconda-Pintler Wilderness Area. Upstream of Pintler Falls the stream has only one major tributary, Beaver Creek. At its headwaters are 2 named lakes: Oreamnos and Sawed Cabin. Bear Lake is also located at the headwaters of Beaver Creek. Upstream of Pintler Falls is Pintler Meadows which contain a mix of habitat conditions from dense willows and relatively stable banks near the downstream end of the meadow to less stable banks in the mid and upper reaches. Upstream of Pintler Meadows and in the majority of Beaver Creek the stream is moderate gradient with dense spruce canopy cover. The Anaconda-Pintler Wilderness boundary is located approximately 0.1 miles upstream of Pintler Falls. A trail system from near the falls provides access to the drainage and to Oreamnos Lake. Downstream of Pintler Falls Pintler Creek flows through a large wet meadow before emptying into Pintler Lake approximately 2 miles below the falls. Pintler Lake contains Arctic grayling, burbot, cutthroat trout, rainbow trout, brook trout and longnose and white suckers. Arctic grayling are present in the lower reaches of Pintler Creek near Pintler Lake and again near the confluence with the Big Hole River.

Pintler Falls forms a barrier to upstream fish passage. It is likely that the stream and lakes upstream of the falls were historically fishless. Recent surveys indicated that Pintler Creek upstream of the falls contains a self-sustaining population of rainbow trout (Olsen 2011a). There is no stocking record for rainbow trout in Pintler Creek upstream of the falls. Rainbow trout were introduced to Oreamnos Lake in 1934 and the lake was periodically stocked with rainbow trout until 2002. There are no fish in Sawed Cabin Lake, Bear Lake and an unnamed lake upstream of Oreamnos Lake (Olsen 2011b). There appears to be some reproduction of rainbow trout in Oreamnos Lake and out-migrating fish from the lake may be the source of fish to the stream below. Rainbow trout are also present in the lower 2 miles of Beaver Creek but the headwaters of Beaver Creek are fishless (Figure 1). Tailed frogs are present in the stream from Pintler Meadows to near the headwater lakes including in Beaver Creek. Tailed frog tadpole density appears to be greatest in streams in the drainage that lack fish (i.e., outlet stream of Sawed Cabin Lake and upper Beaver Creek (Olsen 2011a). Spotted frogs are also common through Pintler Meadows and at Bear Lake but were not found at Oreamnos Lake.

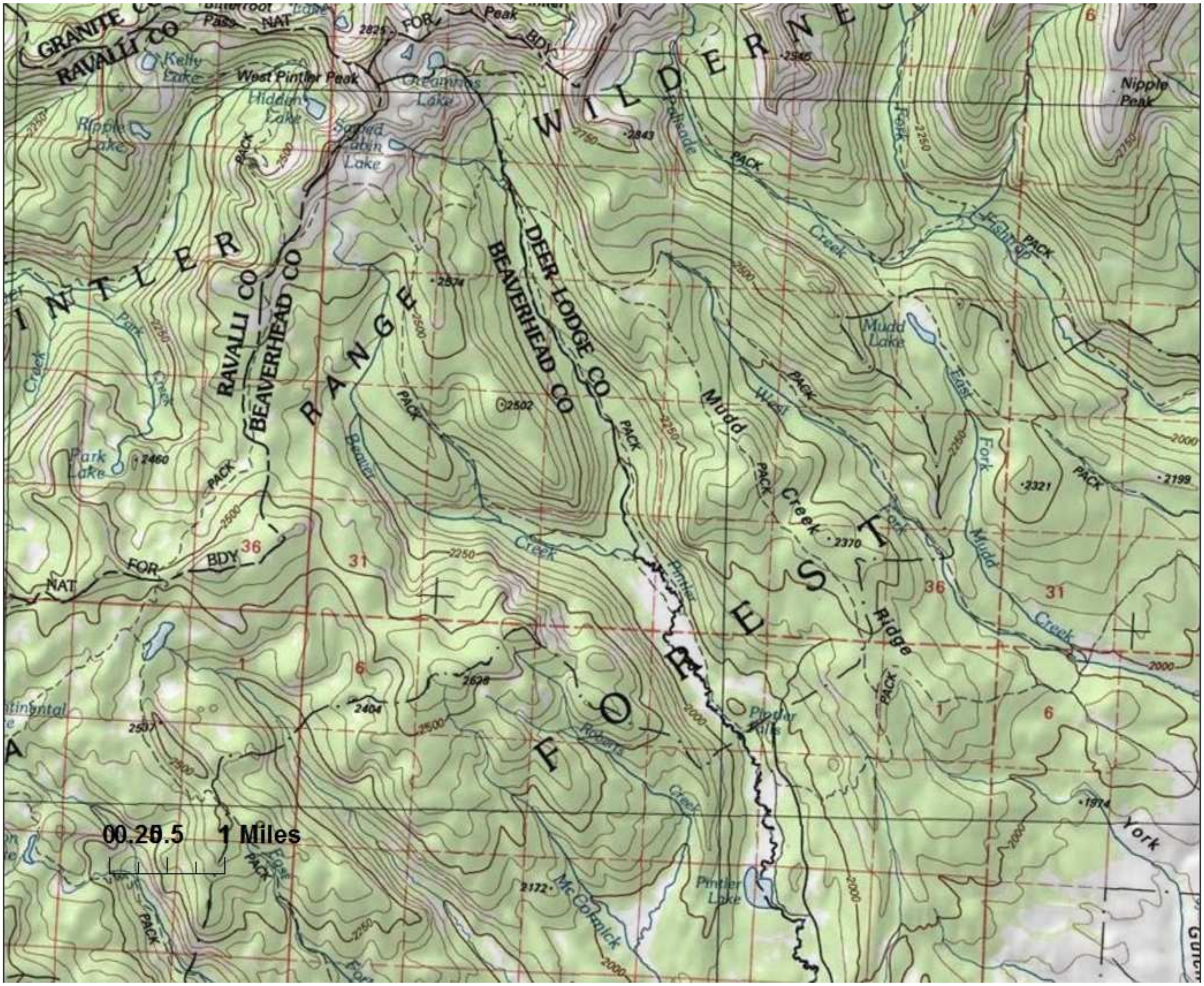


Figure 1. Map of the Pintler Creek drainage including Beaver Creek

In order to restore non-hybridized WCT in Pintler Creek upstream of the falls, rainbow trout would need to be removed. The most effective way to remove fish on a large scale such as in Pintler Creek is to use a piscicide. Rotenone is a commonly used piscicide that is highly targeted at fish and has no impact on terrestrial plants and animals and limited impacts to non-target aquatic organisms (aquatic insects and larval amphibians) at fish killing concentrations. FWP has a long history of using rotenone to manage fish populations in Montana that span as far back as 1948. The department has administered rotenone projects for a variety of reasons, but principally to improve angling quality or for native fish conservation.

The transportation of personnel and equipment to the project site under the proposed action would be done by helicopter. The helicopter would land at a suitable location outside of the wilderness area for equipment loading. Equipment would be transported to the site using a sling to Oreamnos Lake and Pintler Meadows. Personnel would be transported to these same locations in the helicopter. It is likely that 2 sling loads of equipment will be taken to Oreamnos Lake and 1 to Pintler Meadows. It will likely take 3 trips to transport all personnel to the lake. The lake treatment would be completed in 1 day and all equipment and personnel would be ferried back to loading location or Pintler Meadows. Equipment ferried to Pintler Meadows would be carried out on foot once the treatment is complete. Therefore, it is likely that all helicopter trips would be completed in 1 day. Treatment of the stream downstream of Oreamnos Lake would be completed by a crew of 6-8 people in 2-4 days. Personnel would camp at the north end of Pintler Meadows during rotenone application. Neutralization of rotenone would occur immediately downstream of Pintler Falls by applying potassium permanganate. Neutralization should be completed within 24-48 hours after the application of rotenone is complete.

Figure 2. Pintler Falls under high water conditions in 2008.

A. Describe Valid Existing Rights or Special Provisions of Wilderness Legislation

Are there valid existing rights or is there a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that allows consideration of action involving Section 4(c) uses? Cite law and section.

Yes: X☐ **No:** ☐ **Not Applicable:** ☐

Explain: 78 Stat. 896 (8) as it pertains to state jurisdiction in managing fish and wildlife within wilderness in the national forests; this is further interpreted in the AWFA agreement (2006), where chemical treatments for fisheries management, including to re-establish indigenous species, are recognized as a tool to be considered and authorized by the Federal administering agency.

Section 4d(8) of the Wilderness Act recognizes the role of state fish and wildlife agencies in management of populations in wilderness. What is being requested is chemical treatment of stream reaches for fisheries management. Management actions within wilderness may be conducted to re-establish or perpetuate an indigenous species adversely affected by human influence or perpetuate or recover a threatened or endangered species. The presence of previously stocked rainbow trout in the Pintler Creek drainage has compromised the existence of the native WCT population resulting in a population of non-native rainbow trout. This project would involve removing the existing non-native species and replacing it with the native WCT.

B. Describe Requirements of Other Legislation

Do other laws require action?

Yes: ☐ **No:** X☐ **Not Applicable:** ☐

Explain:

C. Describe Other Guidance

Does taking action conform to and implement relevant standards and guidelines and direction contained in agency policy, unit and wilderness management plans, species recovery plans, tribal government agreements, state and local government and interagency

Yes: X☐ **No:** ☐ **Not Applicable:** ☐

Explain: This action conforms with the Memorandum of understanding and conservation agreement for westslope cutthroat trout and Yellowstone cutthroat trout in Montana (hereafter, MOU; 2007) to which the FS and FWP are co-signatories. This action specifically addresses objective 3 of the MOU: Seek collaborative opportunities to restore and/or expand each cutthroat trout subspecies into selected suitable habitats within their respective historical ranges.

The action is also in line with the Anaconda-Pintler Wilderness Management Plan which states that the fisheries goals are:

1. Where feasible, maintain and enhance indigenous fish species.
2. Seek native biological communities where possible.
3. Contribute to the conservation and restoration of native strains of fish.

4. Provide recreational angling where opportunities currently exist or where establishment of new populations of native species might contribute to the perpetuation of those species and provide recreation as well.

The proposed action of establishing Pintler Creek as native WCT will meet all of these goals as stated in the Anaconda-Pintler Wilderness Plan without significant impacts to other wilderness management goals or objectives.

D. Describe Options Outside of Wilderness

Can this situation be resolved by action outside of wilderness?

Yes: ☐ **No:** X☐ **Not Applicable:** ☐

Explain: Removal of non-native rainbow trout is necessary to establishing a genetically pure WCT population in Pintler Creek. It will be nearly impossible to protect a non-hybridized WCT population in Pintler Creek from the threats of rainbow trout without removing rainbow trout from above the Pintler Falls because of the ability of the 2 subspecies to interbreed. Pintler Creek upstream of the falls an ideal location to restore WCT because of the large drainage size, high quality habitat and the presence of a natural barrier. If WCT restoration was to take place in Pintler Creek downstream of the wilderness area, a fish barrier would have to be constructed in a downstream location to prevent non-native fish recolonization of the stream. In other streams similar in size to Pintler Creek where barrier construction has taken place their construction cost can exceed $300,000. Further, surveys of Pintler Creek have not identified a suitable location to construct a fish barrier outside of the Anaconda Pintler Wilderness. Generally a suitable location for a fish barrier consists of a bedrock canyon where the stream channel is highly confined. Such an area does not exist on Pintler Creek downstream of Pintler Falls to the confluence with Big Hole River. In addition to the lack of a suitable barrier location downstream of Pintler Falls, removal of non-native fish downstream of Pintler Falls would not be feasible because of the presence of a native population of Arctic grayling in Pintler Lake. If it were feasible to restore WCT downstream of Pintler Falls rainbow trout upstream of the falls would still have to be removed from the stream upstream of Pintler Falls for the project to be successful because fish from upstream of the falls would migrate downstream and hybridized with WCT.

There are other streams outside of the wilderness area that present opportunities to restore WCT and these streams are being actively restored (i.e., McVey Creek, Cherry Creek, N Fk Divide Creek, Sixmile Creek, S Fk N Fk Divide Creek, N Fk Divide Creek); however, such projects are expensive and can be cost prohibitive because of the need to construct large fish barriers that often cost > $100,000. A fish barrier naturally exists on Pintler Creek in the form of Pintler Falls. This project aims to opportunistically use this feature and establish a secure, genetically pure population of WCT. Barrier construction in the lower portion of this stream would likely prove infeasible due to the wide, low gradient nature of the valley in lower Pintler Creek.

E. Wilderness Character

How would action contribute to the preservation of wilderness character, as described by the components listed below?

Untrammeled:

WCT are native to the streams within the Anaconda-Pintler Wilderness Area but have been extirpated or severely limited by competition with non-native trout. This action removes a population of non-native rainbow trout and replaces it with native WCT. This project contributes to the conservation of a native species, which is ecologically adapted to the area; in this respect, this project represents a move towards a more untrammeled state. Further, this project fulfils the stated fisheries goals within the Anaconda-Pintler Wilderness.

Undeveloped:
This action is not needed to preserve nor will it have any impacts on undeveloped quality.

Natural:

WCT are native to the streams within the Anaconda-Pintler Wilderness Area but have been extirpated or severely limited by competition with non-native trout. Therefore, the removal of rainbow trout and establishment of WCT is needed to return the stream to a more natural state. This action removes a population of non-native rainbow trout and replaces it with native WCT. This project contributes to the conservation of a native species, which is ecologically adapted to the area; in this respect, this project is needed to move towards more 'natural' conditions. This action is needed to remove the non-native species currently altering the fishery community and to restore the ecosystem more toward its natural state.

Outstanding opportunities for solitude or a primitive and unconfined type of recreation:
This action would provide a more primitive experience for the angler who fishes in Pintler Creek because they will be able to experience the native fishery in the stream once rainbow trout are removed and WCT restored.

Other unique components that reflect the character of this wilderness:

Within the Anaconda-Pintler Wilderness there are 15 major streams on the Big Hole side of the Continental Divide. Of these 15 streams there is only 1 that currently contains a native population of WCT (Plimpton Creek). The remaining historic populations of WCT have been extirpated and replaced with non-native rainbow or brook trout. One wilderness stream was restored to WCT beginning in 2013 (West Fork Mudd Creek). Therefore, establishing WCT in Pintler Creek will add to the number of WCT populations in the wilderness and convert the stream to a more natural state. Some of the highest quality habitats for restoring WCT exist within the Anaconda-Pintler Wilderness because of the pristine nature of the area. One of the main reasons for the decline in WCT across its range is degraded habitat and the introduction of non-native species. Pintler Creek within the wilderness area has high quality habitat and the population upstream of the falls would be secure because non-native trout would be blocked from passing upstream.

F. Describe Effects to the Public Purposes of Wilderness

How would action support the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act) of recreation, scenic, scientific, education, conservation, and historical use?

Explain: Recreational opportunities will remain largely as they are now, although anglers will be able to fish for native trout in Pintler Creek and Oreamnos Lake in the future, as opposed to a non-native species now. WCT generally perform better than non-native trout, so some anglers may find the opportunity enhanced because of the larger fish present upon successful project completion. Scenic values will not change as result of this project. This project will add to the scientific base of knowledge regarding fish removals and species interactions, and therefore provides educational value as well.

According to FWP policy and the rotenone label, public access to proposed treatment areas is to be restricted to the extent practicable when rotenone is being applied to prevent public exposure to undiluted rotenone. Once rotenone is mixed into the receiving water public access can be resumed. Placards are required to be posted at access points in the treatment area. In Pintler Creek FWP would be proposing to close public access to the Pintler Creek Trail from the trailhead to Oreamnos Lake during the duration of the treatment. Under the proposed action using a helicopter to access the drainage, the closure would likely last 4-6 days. If stock is used to access the drainage the duration of the closure would at a minimum double from 8-12 days.

As stated previously, this is a conservation project for WCT. The cutthroat trout is Montana's state fish. Westslope cutthroat trout were first described by the Lewis and Clark Expedition in 1805 near Great Falls, Montana, and are recognized as one of 14 interior subspecies of cutthroat trout. Although still widespread, WCT distribution and abundance in Montana has declined significantly in the past 100 years due to a variety of causes including introductions of nonnative fish, habitat degradation, and over-exploitation. Reduced distribution of WCT is particularly evident in the Missouri River drainage where genetically unaltered WCT are estimated to persist in less than 4% of the habitat they once occupied, and most remaining populations are restricted to isolated headwater habitats. Many of these remaining populations are at risk of extinction due to small population size and the threats of competition, predation and hybridization with non-native trout species.

The declining status of WCT has led to its designation as a *Species of Special Concern* by the State of Montana, a *Sensitive Species* by the U.S. Forest Service (USFS), and a *Special Status Species* by the Bureau of Land Management (BLM). A Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana was developed in 1999 in an effort to advance range-wide WCT conservation efforts in Montana.

There are a total of 47 remaining populations of WCT in the Big Hole drainage. Of the 47, at least 39 are considered at risk (an additional 5 have unknown population status). An at-risk population is one that is not likely to persist over the long-term because of poor habitat, small population size and the presence of non-native species. Only one population of WCT in the Big Hole drainage is considered secure and meets minimum criteria for increased likelihood of long-term persistence. The other 46 remaining populations, including those whose status is unknown, are at risk. More populations will be lost if actions are not taken to conserve the fish species in the Big Hole. Projects which restore WCT are necessary to ensure the continued survival of the species in the Big Hole drainage and elsewhere. Historical uses are largely unaffected by this project.

Step 1 Decision: Is it <u>necessary</u> to take action?

Yes: X☐ **No:** ☐ **Not Applicable:** ☐

Explain: Conservation of the Big Hole WCT populations will be significantly delayed without undertaking this action. Data collected from streams in the Big Hole drainage over the past 5 years indicate that many of the WCT populations in the drainage have dramatically declined, become hybridized or have been extirpated (Olsen 2011). Many of the remaining populations of WCT are in immediate need of conservation or they face imminent extirpation. It is not possible to conserve some of these populations in their native habitat because there is no suitable place to establish a fish barrier and removing non-native fish. For populations in this situation the only chance for conservation is to replicate or translocate the population to secured habitat where non-native species are absent. One of the potential sources of WCT to introduce to Pintler Creek is from Squaw Lake which has a native population of non-hybridized WCT and has recently been invaded by non-native brook trout. Currently there is no way to conserve WCT in Squaw Lake so replicating this population in Pintler Creek will be the primary means of conserving these fish because other suitable locations for translocation in nearby habitats are not available. If such conservation actions are not taken it is possible that non-native trout brook trout would fully displace WCT. These unnatural populations of non-native trout are the result of heavy and extensive human influence decades ago. Non-native species were stocked in many area streams and lakes creating this deleterious situation for the natural WCT populations. The action of non-native trout removal in Pintler Creek is necessary to restore the natural WCT population to the drainage and conserve other populations in the Big Hole that cannot be conserved in their native habitat.

If action is necessary, proceed to Step 2 to determine the minimum tool for action.

Step 2: Determine the minimum tool.

Description of Alternative Actions

For each alternative, describe what methods and techniques will be used, when the action will take place, where the action will take place, what mitigation measures are necessary, and the general effects to wilderness character.

<u>Alternative # ___1__</u>

Description: Restoration of WCT in Pintler Creek through the removal of rainbow trout using rotenone and restocking of cutthroat trout. Mechanized means (helicopter) would be used to access the area and a motorized boat would be used to apply rotenone to the lake.

This alternative would involve WCT restoration in Pintler Creek upstream of Pintler Falls through the removal of rainbow trout and restocking of WCT. The piscicide proposed for rainbow trout removal would be rotenone in the formulation of CFT Legumine (5% rotenone). Rotenone applied to the stream and lake would be detoxified within ¼ mile downstream of Pintler Falls using potassium permanganate; therefore there should be no effects on the fishery downstream of the proposed treatment area. Personnel and equipment would be transported to Oreamnos Lake via helicopter. Rotenone would be applied to the lake using a gasoline powered motorboat. By using mechanized means the amount of time and personnel it would take to complete the treatment would be greatly reduced and the duration of impacts on wilderness would be reduced compared to the other alternatives considered for restoring WCT. Non-mechanized means would be used to administer rotenone to the stream downstream of the lake.

Using a helicopter it would be possible to transport all equipment and personnel to the project site and treat Oreamnos Lake and the stream downstream approximately 1 mile in 1 day. It would likely take an additional 2-4 days to treat the stream down to Pintler Falls. Using mechanized means to perform the work proposed, the project could be completed in 4-6 days with only 6-8 personnel, which are significantly fewer man-days than the other alternatives considered (see below). Thus, despite the additional helicopter costs, the proposed Action is the most economical of the alternatives considered. Further, by reducing the man-days in the wilderness and by not using livestock (Alternative 2), the impacts to trails and other resources wilderness would be minimized compared to the other alternatives that would result in WCT restoration. Public access to the drainage would be closed during the treatment to prevent the public from being exposed to undiluted rotenone. Under Alterntive1 public access would be closed for half or less of the anticipated time under Alternative 2 which would use stock to access the drainage. The Proposed Action offers the highest probability of achieving the goal of removing rainbow trout and restoring WCT to Pintler Creek with the least cost and fewest impacts to the wilderness. WCT restoration will aid in overall conservation of the species within their historic range. Successful completion of the proposed action would result in nearly 12 miles of habitat that would be secured for WCT in the Big Hole drainage resulting in the largest population of secured WCT in the Big Hole Drainage.

Effects: Chemical treatment would most likely result in complete removal of fish, aquatic invertebrates and tailed frog tadpoles in the stream at the time of the treatment. The duration required to get this result would be 1 day for the treatment of Oreamnos Lake and 2-4 days for the stream system. As a result of rainbow trout removal, then WCT could be established into Pintler Creek. Tailed frog tadpoles could also then recolonize the stream.

Wilderness Character
"Untrammeled" This attribute would be degraded for the short term during the period in which the activity would take place in the Wilderness. Human presence would be increased for about a week in August. And helicopter and motor boat presence would occur for about a day or 2 in August. The fishery would be changed since non-native rainbow trout would be removed. In all likelihood, rainbow trout would be completely removed in one year with this method and WCT would then become established into the stream. The overall end result would be less trammeling over the long term.

“Natural” This attribute would be slightly degraded for the short term during the period in which the activity would take place in the Wilderness. Human presence would be increased for about a week in August, and helicopter and motor boat presence would occur for about a day or 2 in August reducing the freedom from the effects of modern civilization. The fishery would be changed since non-native rainbow trout would be removed. In all likelihood, rainbow trout would be completely removed in one year with this method. WCT would then become established into the stream. The overall end result would be restoration of the native composition of the fishery and a healthier, more natural aquatic ecosystem over the long term.

“Undeveloped” This attribute would be slightly degraded for the short term during the period in which the activity would take place in the Wilderness. Human presence would be increased for about a week in August and helicopter and motor boat presence would occur for about a day or 2 in August. No structures or construction would be present.

“Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation” This attribute would be slightly degraded during the period in which the activity would take place in the Wilderness. These impacts are anticipated to be short-term and minor. Access to the drainage will be close during the treatment of the lake and stream according the rotenone label and FWP policy. The duration of this closure will span the amount of time rotenone is being applied. Using mechanized means to access the drainage and apply rotenone to Oreamnos Lake will significantly shorten the time the drainage would be closed to public access. Human presence would be increased for about a week in August and helicopter and motor boat presence would occur for 1 day in August, but this should not affect the experience of recreationists since the drainage will be closed to public access. The fishery would be changed since non-native rainbow trout would be removed. Once the project is complete, WCT would then be restocked into the stream. The overall end result would be restoration of the native composition of the fishery and to the angler catching WCT would be a more primitive experience for enjoying nature.

Application of piscicides in Pintler Creek will require a short-term loss of solitude, due to the presence of personnel and motorized equipment applying the chemicals. However, this will be of short duration (less than a week) of one year and will not be permanent. Thus, nearly identical opportunities will be present before and after the project is complete.

“Special Features and Values” This attribute would be slightly benefitted upon completion of the activity in the Wilderness. Pintler Creek would regain the unique feature of a native WCT population that would occupy this stream.

“Manageability” This attribute would remain unchanged since no activity would take place in the Wilderness to change boundaries, size, shape, or juxtaposition.

Biological and Physical Resource

Alternative 1 would have the best likelihood of accomplishing the goal of WCT restoration by removing rainbow trout. The use of rotenone would have short-term impacts on non-target organisms (gill-breathing invertebrates and tailed frog tadpoles). A proportion of invertebrates and tailed frog tadpoles in the stream at the time of treatment would be killed. However, studies show that population level impacts on invertebrates are very short-lived, and that impacts are ameliorated within a year. Impacts will be mitigated because adult tailed frogs will not be affected and approximately 3 miles of stream upstream of the treated area on Beaver Creek and in other tributaries to Pintler Creek where tailed frog tadpole are abundant will not be affected. Finally, fewer personnel are required to conduct a rotenone treatment than the other methods of removing target fish speices, so physical impacts from personnel are less than with other alterntives considered. Impacts to plants and soils will be substantially less using a helicopter to access the drainage than using livestock. Livestock have more impacts on trails than foot traffic and the use of livestock would either require the importation of feed (which could increase the risk of introducing weeds) or the use of local plants as forage. The use of a helicopter will greatly reduce the number of days personnel and stock are in the wilderness area and thus reduce the impacts to biological and physical resources.

Vegetation would not be impacted by use of the piscicide, but some foot trampling of vegetation would occur by people working on the project. Existing trails will be used to the extent possible to reduce impacts to vegetation. Further, all staff assising on the project will be wearing waders and will be using the stream bed as the main travel corridor when rotenone is applied thus lessening the impact to vegetation by trampling.

Social and Experiential Resource

Alternative 1 may affect the Wilderness experience of some visitors that may have scheduled a trip into the drainage at the time of the treatment. However this impact would be short-term (4- 6 days) and minor. This alternative requires relatively few personnel and short duration of motorized equipment to successfully complete, and requires a week of one year to complete, so will have the relatively small potential for social and experiential resource issues. The use of a helicopter would create noise and would degrade wilderness character for a short duration (1 day). It should be noted that FWP biannual helicopter flights occur in the Anaconda-Pintler Wilderness during the stocking of high elevation lakes with WCT.

Heritage and Cultural Resource

No impacts to heritage or cultural resources are anticipated.

Maintaining Contrast and Unimpaired Character

This alternative should have no long-term impacts to these attributes; some minor short-term impacts may occur, but would be less with this alternative than others.

Special Provisions

NA

Safety of Visitors, Personnel, and Contractors and Work Methods

The use of a helicopter to transport rotenone and equipment to the lake is the safest means of transporting personnel and equipment to the treatment area including Oreamnos Lake. Other alternatives considered including the use of pack stock pose a significantly higher risk of an accident occurring that could injure personnel or potentially lead to a chemical spill. The risk of human exposure to undiluted rotenone is significantly greater if an accident were to occur with pack stock. Further, because Alternative 1reduces the time personnel are present in the drainage there is less of a risk of an accident occurring during the treatment.

This alternative is safer than mechanical removal for agency staff, as personnel would not have to work in the dangerous conditions in-stream. Furthermore, fewer personnel are required, and for much shorter duration than the other alternatives considered. This alternative requires even fewer personnel than either mechanical removal or chemical removal using non-mechanized means.

Economic and Time Constraints

Because fewer personnel are required, for less time, this alternative is less expensive than the non-mechanized use alternative (Alternative 2) and the mechanical removal (Alternative 3). Both this alternative and Alternative 2 require far less effort than Alternative 3, and have a far higher probability of success, and thus are more cost-effective than Alternative 3.

Additional Wilderness-specific Comparison Criteria

This alternative has the potential for shorter duration negative impacts to wilderness character than alternative 2 and far fewer Wilderness impacts than alternative 3.

Alternative # ___2__

Description: Restoration of WCT in Pintler Creek through the removal of rainbow trout using rotenone and restocking of cutthroat trout. Non-mechanized means would be used to access the drainage and apply rotenone to Oreamnos Lake.

This alternative would involve WCT restoration in Pintler Creek upstream of Pintler Falls through the removal of rainbow trout and restocking of WCT identical to the proposed action, but non-mechanized means of accessing the drainage and applying rotenone to Oreamnos Lake would be used. Access to the drainage is possible by foot or horse back from the Pintler Creek trailhead. From this access point it is roughly 8 miles to Oreamnos Lake. To treat the lake using non-mechanized means would require the use of livestock to transport 30-50 gallons of rotenone and 2 inflatable, oar-powered boats to the lake, in addition to application and safety equipment. Because of the long trip to the lake and the increased time it would take to treat the lake without the use of a motorized boat, it would likely take 1 day to reach the lake and set up camp, 1 day to treat the lake and 1 day to pack back to the trailhead (3 days total). Therefore, livestock and 4-8 people would be required to stay at least 2 nights at the lake to complete the lake portion of the treatment. An extended stay would require additional stock to carry camping gear and food to support the application crew overnight. It would likely require 6-10 stock animals to transport the necessary equipment to Oreamnos Lake to complete this phase of the project.

Once the lake portion of the project was complete, the equipment used would need to be transported back to the trailhead and the stream treatment equipment would need to be packed back to the headwaters of the drainage. The stream treatment equipment is bulky (backpack sprayers and 5-gal containers) and would require several stock animals to transport. Transporting the equipment to the site would likely require a full day. The stream treatment would likely be completed in 3-4 days after which time the stock would pack the equipment back to the trailhead (6 days total). It is likely that the stock would remain in the drainage during the entire time of the treatment so equipment could be moved each day. There are suitable pastures in the Pintler Creek drainage near Oreamnos Lake and farther downstream at Pintler Meadows that could provide forage for stock during overnight stays. However, extended stays would require the movement of livestock to reduce impacts to vegetation from both consumption and trampling. The Pintler Creek trail would be closed during the duration of the project (minimum of 9 days and up to 12 days).

The use of non-mechanized means to access and transport equipment to the proposed treatment area would conform to existing uses in the Anaconda-Pintler Wilderness Area and still accomplish the goal of WCT restoration; however, this alternative likely would result in significantly more man-days, additional impacts to wilderness resources and additional expense to complete the project than the Proposed Action. The use of non-mechanized means to remove rainbow trout from Pintler Creek would require a minimum of 4 additional days of work (24 man-days, which is 50% more than the Proposed Action) to accomplish the proposed WCT restoration. More personnel would be required because personnel would be needed to pack, ride and manage stock animals and additional days would be needed because of the additional time it would take to reach the destinations using stock rather than a helicopter. The impacts to physical resources such as the trail system and native vegetation where stock would be kept would be significantly greater than the other alternatives considered. Further, to hire an outfitter to provide transportation of equipment to the site would likely cost between $5,000 and $7,000 which is more than double the expense of using mechanized means as in the Alternative 1. Because of the additional trammeling by man on wilderness and the additional costs of using non-mechanized means of accessing the drainage and treating Oreamnos Lake, this alternative was ranked lower than the proposed action.

Effects: Chemical treatment would result in complete removal of fish and removal of a proportion of the aquatic invertebrates and tailed frog tadpoles in the stream at the time of the treatment. The duration required to get this result would be 3 days for the treatment of Oreamnos Lake and 6 days for the stream system. Once rainbow trout are removed, WCT would be established into Pintler Creek. Tailed frog tadpoles could also then recolonize the stream.

Wilderness Character

"Untrammeled" This attribute would be slightly degraded for the short term during the period in which the activity would take place in the Wilderness. Human and stock presence would be increased for about a week or two in August. The fishery would be changed since non-native rainbow trout would be removed. In all likelihood, rainbow trout would be completely removed in one year with this method and WCT would then become established in the stream. The overall end result would be less trammeling over the long term.

"Natural" This attribute would be slightly degraded for the short term during the period in which the activity would take place in the Wilderness. Human and stock presence would be increased for about a week or two in August reducing the freedom from the effects of modern civilization. The fishery would be changed since non-native rainbow trout would be removed. In all likelihood, rainbow trout would be completely removed in one year with this method. WCT would then become established into the stream. The overall end result would be restoration of the native composition of the fishery and a more natural aquatic ecosystem over the long term.

"Undeveloped" This attribute would be slightly degraded for the short term during the period in which the activity would take place in the Wilderness. Human presence would be increased for about a week or two in August. No structures or construction would be present.

"Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation" This attribute would be slightly degraded during the period in which the activity would take place in the Wilderness but these impacts would be short-term and minor. The Pintler Creek Trail would be close from 9-12 days to prevent the public from being exposed to non-diluted rotenone. The fishery would be changed since non-native rainbow trout would be removed. WCT would then become established into the stream. The overall end result would be restoration of the native composition of the fishery and to the angler catching WCT would be a more primitive experience for enjoying nature.

Application of piscicides in Pintler Creek will require a short-term loss of solitude, due to the presence of personnel and stock in the drainage. However, this will be of short duration (a week or two) of one year and will not be permanent. Thus, nearly identical opportunities will be present before and after the project is complete. The only difference is that a native species will be present in the stream after the project, whereas a non-native species is currently present.

"Special Features and Values" This attribute would be slightly benefitted upon completion of the activity in the Wilderness. This attribute would regain the unique feature of the native WCT population that would occupy this stream.

"Manageability" This attribute would remain unchanged since no activity would take place in the Wilderness to change boundaries, size, shape, or juxtaposition.

Biological and Physical Resource

Using rotenone to remove rainbow trout presents the greatest likelihood of successfully removing the target organism (rainbow trout); it would have short-term impacts on non-target organisms (gill-breathing invertebrates and tailed frog tadpoles) identical to alterntive 1. The impacts of the use of livestock to transport equipment to application sites will be substantially more than the use of a helicopter as in Alternative 1. Multiple trips into the drainage with 6-10 stock animals. These stock would stay in the drainage at a minumum of 9 days and would require extra personnel to manage. The impacts on physical and biological resources are greater under Alternative 2 than Alternative 1 because of the use of stock and extra personnel needed to manage them. Finally, fewer personnel are required to conduct a rotenone treatment than mechanical removal of non-native trout (Alternative 3).

Vegetation would not be impacted by use of the piscicide, but would be consumed by livestock and trampled by footsteps of people and stock working on the project.

Social and Experiential Resource

This may affect the Wilderness experience of some visitors. This alternative requires relatively few personnel to successfully complete, and requires a week or two of one year to complete, so will have the relatively small potential for social and experiential resource issues.

Heritage and Cultural Resource

No impacts to heritage or cultural resources are anticipated.

Maintaining Contrast and Unimpaired Character

This alternative should have no long-term impacts to these attributes; some minor short-term impacts may occur, but would be less with this alternative than some others.

Special Provisions

NA

Safety of Visitors, Personnel, and Contractors and Work Methods

The risk of injury and a potential chemical spill significantly increase if pack stock are used to transport personnel and equipment to application area. While the use of stock is a traditional means of accessing wilderness areas and has a long track record use, the probability of an accident significantly increases with sometimes unpredictable stock animals and variable terrain versus other methods of transportation. Many scenarios are possible in a wilderness setting that could cause stock animals to lose a load including a fall on rough terrain or potentially becoming spooked and bucking. If a stock animal transporting rotenone was to lose its load and the barrels were to rupture causing a spill the risk of human and animal exposure would greatly increase. When handling undiluted product the product label states, “Do not get in eyes, on skin, or on clothing. Wear goggles or safety glasses. When handling undiluted product, wear a respirator with an organic-vapor-removing cartridge with a prefilter approved for pesticides.” Personnel traveling to the application site would not be wearing this equipment thus if an accident were to occur the risk of exposure is greatly increased. Further, a chemical spill would have to be reported to the Montana Department of Agriculture who would then stipulate how that spill would have to be remedied. Remedies for a rotenone spill could include the removal of contaminated soil and plant matter and transportation of affected material to an appropriate disposal location. It is also highly likely that some of the staff assisting with the WCT restoration in Pintler Creek would be unfamiliar with pack stock animals increasing the risk of an accident that could cause personal injury or a chemical spill.

This alternative is safer than mechanical removal, as personnel would not have to work in the dangerous conditions in-stream. Furthermore, fewer personnel are required, and for much shorter duration. This alternative requires even fewer personnel than the other alternatives chemical treatment requires far less effort overall than mechanical removal.

Economic and Time Constraints

Because fewer personnel are required, for less time, this alternative is less expensive than mechanical removal, yet more expensive than using the helicopter alternative. Both this alternative and alternative 1 require far less effort than Alternative 3, and have a far higher probability of success, and thus are more cost-effective than Alternative 3.

Additional Wilderness-specific Comparison Criteria

This alternative has the potential for fewer negative impacts to wilderness character than alternative 3 but due to its duration more potential for impact than alternative 1.

Alternative # ___3__

Description: Mechanically remove, using electrofishing or angling, rainbow trout from the Pintler Creek.

This alternative would involve the use of electrofishing or angling rather than rotenone to remove rainbow trout from Pintler Creek upstream of the falls and nets to remove fish from Oreamnos Lake. Multiple-pass electrofishing has been used to eradicate nonnative trout from several small streams in north central Montana (Big Coulee, Middle Fork Little Belt, and Cottonwood creeks) and in SW Montana (Muskrat, Whites and Staubach creeks). Electrofishing can be an effective means of capturing fish in streams; however, electrofishing has limitations. Generally it is only 50 -70% efficient at capturing fish depending on the type of habitat present. Electrofishing is particularly inefficient at capturing juvenile fish and, therefore, generally requires efforts spanning multiple years to allow juvenile fish to grow to the size where they can be captured. Electrofishing is also very labor intensive. The project reaches where electrofishing removals have been successful were generally less than 3 miles in length and required up to 25 electrofishing removal passes over 3-5 years to eradicate the unwanted species.

Eradication of rainbow trout from Pintler Creek upstream of the falls with electrofishing would be difficult because of the length of stream (12 miles total) and the complexity of the habitat, particularly in Pintler Meadows where some pools are greater than 4 ft deep. For example, electrofishing removal efforts in McVey Creek near the town of Wisdom in the early 1990's and from 2005-2007 were not successful at achieving a significant reduction in brook trout numbers in the stream. To achieve complete removal of rainbow trout from the proposed stream with electrofishing would require a 4-5 year commitment of 3-4 crews (6-12 people) for a minimum of 2 weeks each year. Such an effort would be impractical and cost prohibitive. It would represent the most expensive alternative considered in this analysis. Further, given the length of the stream and the complexity of the habitat, it is unclear whether 100% rainbow trout removal could be achieved. Removing rainbow trout using rotenone as described in the Proposed Action, on the other hand, would require 6-8 people for 4-7 days to complete. Other expenses for rotenone and potassium permanganate would be less than $10,000.

Using netting to eradicate rainbow trout from Oreamnos Lake presents similar challenges to electrofishing. Gill nets would be used to capture and remove fish from the lake. Gill nets have been shown to be effective in some situation at removing fish from lakes; however, there are several drawbacks with this methodology. First, it is difficult to completely remove fish from larger (> 5 acre), deeper (> 20 ft) lakes. Second, intensively gillnetting lakes is very time consuming and labor intensive. Third, gillnetting is not effective at capturing juvenile fish, therefore, the netting generally has to occur over a multiple years to allow juvenile fish to grow to the size that they can be effectively captured in nets. A related project was performed in Silver (10.0 acres) and Prospect lakes (6.8 acres) in the Absaroka-Beartooth Wilderness south of Big Timber Montana. These two lakes were intensively gillnetted (15-20 nets per lake) for four years before fish removal was considered complete. Similarly, Bighorn Lake, a 5.2-acre lake located in Banff National Park in Alberta, Canada, was gillnetted from 1997 to 2000 to remove an unwanted population of brook trout (Parker et al. 2001). Over 10,000 net nights (1 net night = 1 net set overnight for at least 12 hours) were conducted over a 4-year period in Bighorn Lake to remove the population which totaled 261 fish. The researchers concluded that the removal of nonnative trout using gill nets was impractical for larger lakes (> 5 acres). In clear lakes, trout have the ability to become acclimated to the presence of gill nets and will avoid them. These researchers reported observing brook trout avoiding gill nets within about 2 hours of being set.

Knapp and Matthews (1998) reported that Maul Lake, a 3.9-acre lake in the Inyo National Forest in California, was gill netted from 1992 to 1994 to remove a population of brook trout. The population, which totaled 97 fish, was successfully removed with an effort of 108 net days. The researchers reported that following the removal of brook trout from Maul Lake it was mistakenly restocked with rainbow trout. Efforts to remove them using gill nets were implemented immediately. From 1994 through 1997, 4,562 net days were required to remove the 477 rainbow trout from the lake. These researchers reported that gill nets could be used as a viable alternative to chemical treatment. They acknowledged that the small size and shallow depth of Maul Lake were conditions that allowed a successful fish eradication using gill nets. Their criteria for successful fish removal using gill nets include lakes less than 3.9 surface acres, less than 19 feet deep, with little or no inflow or outflow to perpetuate reinvasion, and no natural reproduction. Although not tested, the maximum size of a lake that they surmised could be depopulated using gill nets was 7.4 surface acres and 32 feet deep. Oreamnos Lake is 8.8 acres and 27 feet deep.

Deploying gill nets and using electrofishing to remove rainbow trout from Pintler Creek upstream of the falls would take considerable effort. Given the remote nature of the stream and Oreamnos Lake it would be impractical to commit the kind of effort mentioned above to eradicate rainbow trout using mechanical means. Further, given the size and depth of the lake and the length and complexity of the habitat in the stream, it may be impracticable to completely remove rainbow trout. Due to these considerations and potential incomplete results, this alternative has a low probability of meeting the objectives restoring WCT. For these reasons this alternative was eliminated from further consideration. Although Alternative 4 would not likely accomplish the goals of WCT conservation, it would have fewer potential impacts to non-target aquatic invertebrates and to juvenile stages of tailed frogs than Alternatives 2 or 3.

FWP has the authority under commission rule to modify angling regulations for the purpose of removing unwanted fish from a lake or stream. Unfortunately, this method would not result in complete fish removal for a number of reasons. First, Pintler Creek is remote with a small fish population and likely currently receive little fishing pressure. Attracting anglers to the stream to harvest trout would be very difficult because of the hike required to reach the stream, small size of the streams and small size of fish. Oreamnos Lake is also remote but it does receive some fishing pressure. Recreational angling has been shown to reduce the average size of fish and reduce population abundance, but rarely if ever has it been solely responsible for eliminating a fish population. Using angling techniques alone in the stream would not result in removal of rainbow trout and would not achieve the objective of conserving non-hybridized cutthroat trout. For these reasons this method of fish removal was considered unreliable at achieving the objective of complete fish removal and was eliminated from further analysis.

Effects: Electrofishing is inefficient at capturing juvenile fish and therefore, generally requires efforts spanning multiple years to allow juvenile fish to grow to the size where they can be captured. Electrofishing is also very labor intensive. The project reaches where electrofishing removals have been successful were generally less than three miles in length and required up to twenty-five electrofishing removal passes over several years to eradicate the unwanted species. Each electrofishing pass generally requires a crew of three to nine people. Eradication of rainbow trout from the proposed streams with electrofishing would be difficult because of the length of stream involved. To achieve complete removal of rainbow trout from the proposed streams with electrofishing would require a four to five year commitment of three to four crews (six to twelve people) for a minimum of two weeks each year. Such an effort would be impractical and cost prohibitive. It is also unclear given the length of the stream and the complexity of the habitat, whether 100% removal of rainbow trout could be achieved.

Wilderness Character

“Untrammeled” This attribute would be slightly degraded during the period in which the activity would take place in the Wilderness. Human presence would be increased for several weeks each summer for 4 or 5 years successively. The fishery would be changed since non-native rainbow trout would be removed. In all likelihood, rainbow trout would not be completely removed with this method and WCT would remain absent in Pintler Creek. WCT would not be reestablished into the stream until rainbow trout were completely removed.

“Natural” This attribute would be slightly degraded during the period in which the activity would take place in the Wilderness. Human presence would be increased for several weeks each summer for 4 or 5 years successively reducing the freedom from the effects of modern civilization. The presence of non-native rainbow trout would maintain the altered composition of the fishery in Pintler Creek. The same would be said for the aquatic ecosystem as WCT would remain absent.

“Undeveloped” This attribute would be slightly degraded during the period in which the activity would take place in the Wilderness. Human presence would be increased for several weeks each summer for 4 or 5 years. No structures or construction would be present.

“Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation” This attribute would be slightly degraded during the period in which the activity would take place in the Wilderness. This attribute is largely intact with one possible exception. The exception from the angler’s perspective would be that non-native rainbow trout would be the only species to fish for and the reminder that human actions planted those fish there.

“Special Features and Values” This attribute would be slightly degraded during the period in which the activity would take place in the Wilderness. This attribute would continue to lack the unique feature of the native WCT population occupying this stream.

“Manageability” This attribute would remain unchanged since no activity would take place in the Wilderness to change boundaries, size, shape, or juxtaposition.

Biological and Physical Resource

These methods are highly unlikely to successfully remove rainbow trout from Pintler Creek because of the difficulty in effectively capturing all of the rainbow trout present. Such an effort would require very large crews (> 10 people) repeatedly entering the wilderness for multiple years, and therefore may have impacts on physical resources. Biological effects on non-target organisms are short-term and minimal. Most likely more than 50 person-days each for 4 to 5 years would be expected for occupancy of the stream corridor.

Social and Experiential Resource

As noted above, repeated entry by a large group of workers would be required, and therefore may result in social and experiential impacts. Most likely more than 50 person-days each for 4 to 5 years would be expected for occupancy of the stream corridor.

Heritage and Cultural Resource

Very little impact would be expected to heritage or cultural resources, although it could occur inadvertently given the large number of workers present.

Maintaining Contrast and Unimpaired Character

The temporal nature of the project probably wouldn’t lead to issues here, although some impairment could occur with repeated use of the area.

Special Provisions

NA

Safety of Visitors, Personnel, and Contractors and Work Methods

There would not likely be a significant safety risk, although this alternative would require much more wading in the stream electrofishing or fishing and therefore the probability of a falling accident would increase.

Economic and Time Constraints

This alternative would greatly increase the time involved in reaching a successful outcome, and realistically would likely not result in a successful outcome. To feasibly remove rainbow trout via electrofishing or angling would require a 4 year time commitment with multiple crews spending 4-8 days per year in the stream. Finally, execution of this option would likely result in greater cost (> $10,000) over the long-run, and would certainly be less cost-effective.

Additional Wilderness-specific Comparison Criteria

This alternative would have a greater overall impact to wilderness character than the other methods being considered.

Comparison of Alternatives

It may be useful to compare each alternative's positive and negative effects over short and long terms to each of the criteria in tabular form, keeping in mind the law's mandate to preserve wilderness character.

Wilderness attribute	Alt 1-Rotenone and helicopter	Alt 2-Rotenone and stock	Alt 3- physical removal of EBT
Untrammeled	Moderately intense degrade for very short term (one week for one year); shorter term than alt 2; moderate benefit over long term	Moderate to low intensity degrade for short term (2 weeks for one year); moderate benefit over long term	Moderate to low intensity degrade for moderate duration; 2 weeks each summer 4 to 5 years duration ; little likelihood of any benefit over long term
Natural	Moderately intense degrade for very short term (one week for one year); shorter term than alt 2; moderate benefit over long term establishes native fisheries status	Moderate to low intensity degrade for short term (2 weeks for one year); moderate benefit over long term establishes native fisheries status	Moderate to low intensity degrade for moderate duration; 2 weeks each summer 4 to 5 years duration ; no benefit over long term as maintains non-native fishery
Undeveloped	Minimal degrade in short term	Minimal degrade in short term	Minimal degrade in short term; longer duration than alts 1 and 2.
Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation	Moderately intense degrade for very short term (4-6 days for one year); shorter term than alt 2; moderate benefit over long term establishes native fisheries status	Moderate to low intensity degrade for short term (2 weeks for one year); moderate benefit over long term establishes native fisheries status	Moderate to low intensity degrade for moderate duration; 2 weeks each summer 4 to 5 years duration ; no benefit over long term as maintains non-native fishery
Special Features and Values	No change in short term; moderate benefit over long term	No change in short term; moderate benefit over long term	No change in short term; no benefit over long term as maintains non-native fishery
Manageability	No change in short or long term	No change in short or long term	No change in short or long term

Step 2 Decision: What is the Minimum Tool?

The selected alternative is:

Alternative 1

Describe the rationale for selecting this alternative:

This alternative has the shortest duration, albeit slightly more intense, negative impacts to wilderness character in the short term, and the highest likelihood of successfully completing this project for conservation of WCT and benefitting the wilderness character in the long term.

This is the most cost effective practicable alternative with the potential for shortest term, temporary impacts to wilderness values. Completing this project for the conservation of WCT improves the natural quality of wilderness character in the long term. It also meets the objectives for fish and wildlife management in FSM 2323.3 by helping to conserve a native species that has a potential for future listing under ESA. The short term negative effects to the untrammeled and natural qualities of wilderness character because of the manipulation of natural conditions through introduction of a chemical piscicide and short term presence of people and mechanization are balanced by the improved long term natural conditions of wilderness character through restoration of a native species.

Describe any monitoring and reporting requirements:

FWP will need to report the amount of piscicide they ultimately use to complete this project. Fish populations in the stream will be monitored cooperatively by FWP and FS to determine success of the project.

Please check any Wilderness Act Section 4(c) uses approved in this alternative:

- x☐ mechanical transport
- ☐ motorized equipment
- ☐ motor vehicles
- x☐ motorboats
- x☐ landing of aircraft
- ☐ temporary road
- ☐ structure or installation

Be sure to record and report any authorizations of Wilderness Act Section 4(c) uses according to agency procedures.

Approvals	Signature	Name	Position	Date
Prepared by:	/s/ Dan Downing	Dan Downing	Forest Fish Biologist	January 14, 2014
Recommended:				
Recommended:				
Approved by:				