Region One
490 North Meridian Road
Kalispell, MT 59901
(406) 752-5501
Fax: 406-257-0349
Ref: JS062-12
August 9, 2012

Ladies and Gentlemen:

Fish, Wildlife & Parks (FWP), Region One, is seeking public comment for the proposed Bass Lake Restoration Project for the purpose of removing northern pike from Bass Lake and Mud Creek and restocking the lake with westslope cutthroat trout. This project would be conducted within the Mud Creek watershed located approximately 6 miles southeast of the city of Eureka, Montana. The removal of northern pike would help restore native fish populations in the Tobacco River and Lake Koocanusa, which Bass Lake and Mud Creek feed. The Bonneville Power Administration (BPA) is proposing to fund the Bass Lake Restoration Project. A copy of the draft environmental assessment (EA) is enclosed.

The draft is out for a 30-day public review through September 8, 2012. Please contact FWP Fisheries Biologist Jim Dunnigan, (406) 293-4161, Ext. 200, or e-mail to jdunnigan@mt.gov with questions or comments.

Sincerely,

James R. Satterfield, Jr.

James R. Satterfield Jr., Ph.D.
Regional Supervisor

/ni
Enclosure
c: *Governor's Office, Attn: Sheena Wilson, PO Box 200801, Helena, 59620-0801
*Environmental Quality Council, PO Box 20, Helena, 59620-1704
*Dept. of Environmental Quality, Planning, Prevention & Assistance, PO Box 200901, Helena, 59620-0901
*Dept. of Environmental Quality, Permitting Compliance, PO Box 200901, Helena, 59620-0901
*Montana Fish, Wildlife & Parks, Director's Office; Legal Unit – Jessica Snyder; Fisheries – Karen Zackheim; Rebecca Cooper.
*DNRC, PO Box 201601, Helena, 59620-1601 (Patty Greene)
*CSKT, P O Box 278, Pablo, MT 59855
*Montana Historical Society, SHPO, 225 North Roberts, Veteran's Memorial Building, Helena, 59620-1201
*Montana State Library, 1515 East Sixth Ave., Helena, 59620-1800
*Adam McLane, Montana Environmental Information Center, PO Box 1184, Helena, 59624
George Ochenski, 4 Harrison Avenue, Helena, MT 59601
*Wayne Hirst, Montana State Parks Foundation, PO Box 728, Libby, 59923
*Montana State Parks Association, PO Box 699, Billings, 59103
*Joe Gutkoski, President, Montana River Action Network, 304 N 18th Ave., Bozeman, 59715
*Senator Chas Vincent, 34 Paul Bunyan Lane, Libby, MT 59923
*Representatives Mike Cuffe, P O Box 1685, Eureka, MT 59917 & Gerald Bennett, 784 Taylor Road, Libby, MT 59923
*Lincoln County Commissioners, 512 California Avenue, Libby, MT 59923
Lincoln County Libraries, 220 W 6th Street, Libby; 318 Dewey Avenue, Eureka; and 207 N 3rd, Troy, MT
Interested Parties
* E-mailed

# Draft Environmental Assessment for the Bass Lake Restoration Project

Prepared by:

MONTANA FISH, WILDLIFE & PARKS
FISHERIES and WILDLIFE DIVISIONS

and

BONNEVILLE POWER ADMINISTRATION
(DOE/EA-1932)

## PART I: PROPOSED ACTION DESCRIPTION

**A. Type of Proposed Action:** Montana Fish, Wildlife & Parks (MFWP) is proposing to remove a northern pike (*Esox lucius)* population in Bass Lake and Mud Creek in northwest Montana by applying the piscicide (pesticide poisonous to fish) rotenone and restocking the lake with native westslope cutthroat trout (*Oncorhynchus clarkii lewisii)*. Northern pike are predatory fish that eat native salmonids, including westslope cutthroat trout, which has detrimental effects on native fish populations. The removal of northern pike would help restore native fish populations in the Tobacco River and Lake Koocanusa, which Bass Lake and Mud Creek feed. The Bonneville Power Administration (BPA) is proposing to fund the Bass Lake Restoration Project.

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

1. MFWP Authority under State Law

> **87-1-702. Powers of MFWP relating to fish restoration and management.** The department [MFWP] is hereby authorized to perform such acts as may be necessary to the establishment and conduct of fish restoration and management projects as defined and authorized by the act of congress, provided every project initiated under the provisions of the act shall be under the supervision of the department, and no laws or rules or regulations shall be passed, made, or established relating to said fish restoration and management projects except they be in conformity with the laws of the state of Montana or rules promulgated by the department, and the title to all lands acquired or projects created from lands purchased or acquired by deed or gift shall vest in, be, there remain in the state of Montana and shall be operated and maintained by it in accordance with the laws of the state of Montana. The department shall have no power to accept benefits unless the fish restoration and management projects created or established shall wholly and permanently belong to the state of Montana, except as hereinafter provided.
>
> **87-1-201. Powers and Duties**. Subsection (9)(a) The department shall implement programs that:
>
> (i) manage wildlife, fish, game, and nongame animals in a manner that prevents the need for listing under 87-5-107 or under the federal Endangered Species Act, 16 U.S.C. 1531, et seq.;
>
> (ii) manage listed species, sensitive species, or a species that is a potential candidate for listing under 87-5-107 or under the federal Endangered Species Act, 16 U.S.C. 1531, et seq., in a manner that assists in the maintenance or recovery of those species.

2. BPA

BPA is a federal power marketing agency that is part of the U.S. Department of Energy (DOE). BPA's operations are governed by several statutes, such as the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act) (16 U.S.C. 839 *et seq.*). Among other things, the Northwest Power Act directs BPA to protect, mitigate, and enhance fish and wildlife affected by the development and operation of the Federal Columbia River Power System. To assist in accomplishing this, the Act requires BPA to fund fish and wildlife protection, mitigation, and enhancement actions consistent with the Northwest Power and

Conservation Council's (NPCC's) Fish and Wildlife Program. Under this program, the NPCC makes recommendations to BPA concerning which fish and wildlife projects to fund.

BPA is providing funding through the "Libby Reservoir Mitigation Restoration and Research, Monitoring and Evaluation" program for the piscicide application and monitoring portions of the Bass Lake Restoration Project. The Libby Mitigation Program implements the NPCC plan to enhance hydropower-affected fish stocks in the Montana portion of the Kootenai Watershed. Fish restoration efforts in this work plan are consistent with the Libby Dam Fisheries Mitigation and Implementation Plan and the Kootenai Subbasin Plan. MFWP is funding the fish stocking portion of the project through other MFWP funding sources.

In addition to Northwest Power Act obligations, BPA, as a federal agency, also must comply with the National Environmental Policy Act (NEPA) (42 U.S. Code [USC] 4321 et seq.), which requires federal agencies to assess the impacts their actions may have on the environment. BPA developed the Fish and Wildlife Implementation Plan Environmental Impact Statement (FWIP EIS) and accompanying Record of Decision in 2003 to assist with NEPA compliance for fish and wildlife mitigation projects. BPA evaluates all fish and wildlife mitigation projects to determine whether they fall within the scope of the FWIP EIS and Record of Decision.

Generally, BPA's funding of projects similar to the Bass Lake Restoration Project is addressed by the Fish and Wildlife Implementation Plan Environmental Impact Statement (EIS). BPA documents its NEPA analysis as part of a validation process using software developed to help manage fish and wildlife projects funded by BPA throughout the Columbia River Basin. MFWP evaluated the Bass Lake Restoration Project and determined an EA was required. For this project, BPA accepts MFWP's determination and proposes to complete an EA jointly.

BPA is the lead federal agency under NEPA for this EA. Major federal actions significantly affecting the quality of the human environment must be evaluated in an EIS. BPA helped prepare this EA to determine if its Proposed Action of providing funding to MFWP for the Bass Lake Restoration Project would cause effects of a magnitude that would warrant preparing an EIS, or whether it is appropriate to prepare a Finding of No Significant Impact (FONSI) or whether it is an appropriate action to validate under the FWIP EIS.

**C. Estimated Commencement Date:** This project would commence in late summer/fall 2012. MFWP anticipates that a single application of the piscicide rotenone to Bass Lake and lower Mud Creek may not be completely effective at removing the present fish community within this system due to hiding refugia within the lake and creek. Therefore, two piscicide applications may be needed to effectively remove all individuals. If needed, the second piscicide application would occur in the fall of 2013.

**D. Name and Location of the Project**: This project is referred to as the Bass Lake Restoration Project, and the purpose of the project is to remove northern pike from Bass Lake and Mud Creek and restock the lake with westslope cutthroat trout. This project would be conducted within the Mud Creek watershed located approximately 6 miles southeast of the city of Eureka, Montana. Specifically, Bass Lake is located within Township 35 North, Range 26 West, Section 4, Lincoln County, Montana (Figure 1), Latitude 48.82385 degrees North, Longitude -115.95818

degrees West. Mud Creek and the vast majority of Bass Lake are located on private property, but a small portion of the northeast side of the lake is bordered by National Forest (Figure 2).

**E. Project Size (acres affected):**

Bass Lake is an earthen dam impoundment on Mud Creek with a surface area of 11.8 acres, a maximum depth of approximately 11.5 feet, and a volume of 50.6 acre-feet (Figure 3). Mud Creek is a small 2nd order stream with a base flow that ranges from about 1-3 cubic feet per second (cfs) and a bankfull width of approximately four feet. The proposed rotenone treatment would encompass Bass Lake and approximately 1,370 feet of Mud Creek between Bass Lake and a small dam (Mill Pond, Figure 2) upstream of Bass Lake, which is an upstream fish migration barrier. Approximately 1,700 feet of Mud Creek between Bass Lake and its confluence with Therriault Creek would be detoxified with potassium permanganate after the rotenone treatment. The outlet of Bass Lake is an upstream fish barrier, and although northern pike may inhabit Mud and Therriault Creeks downstream of Bass Lake, the limited habitat in these waters likely limits their ability to persist.

1. Developed/Residential – 0 acres
2. Industrial – 0 acres
3. Open space/Woodlands/Recreation – 0 acres
4. Wetlands/Riparian –13 acres
5. Floodplain – .13 acres
6. Irrigated Cropland – 0 acres
7. Dry Cropland – 0 acres
8. Forestry – 0 acres
9. Rangeland – 0 acres

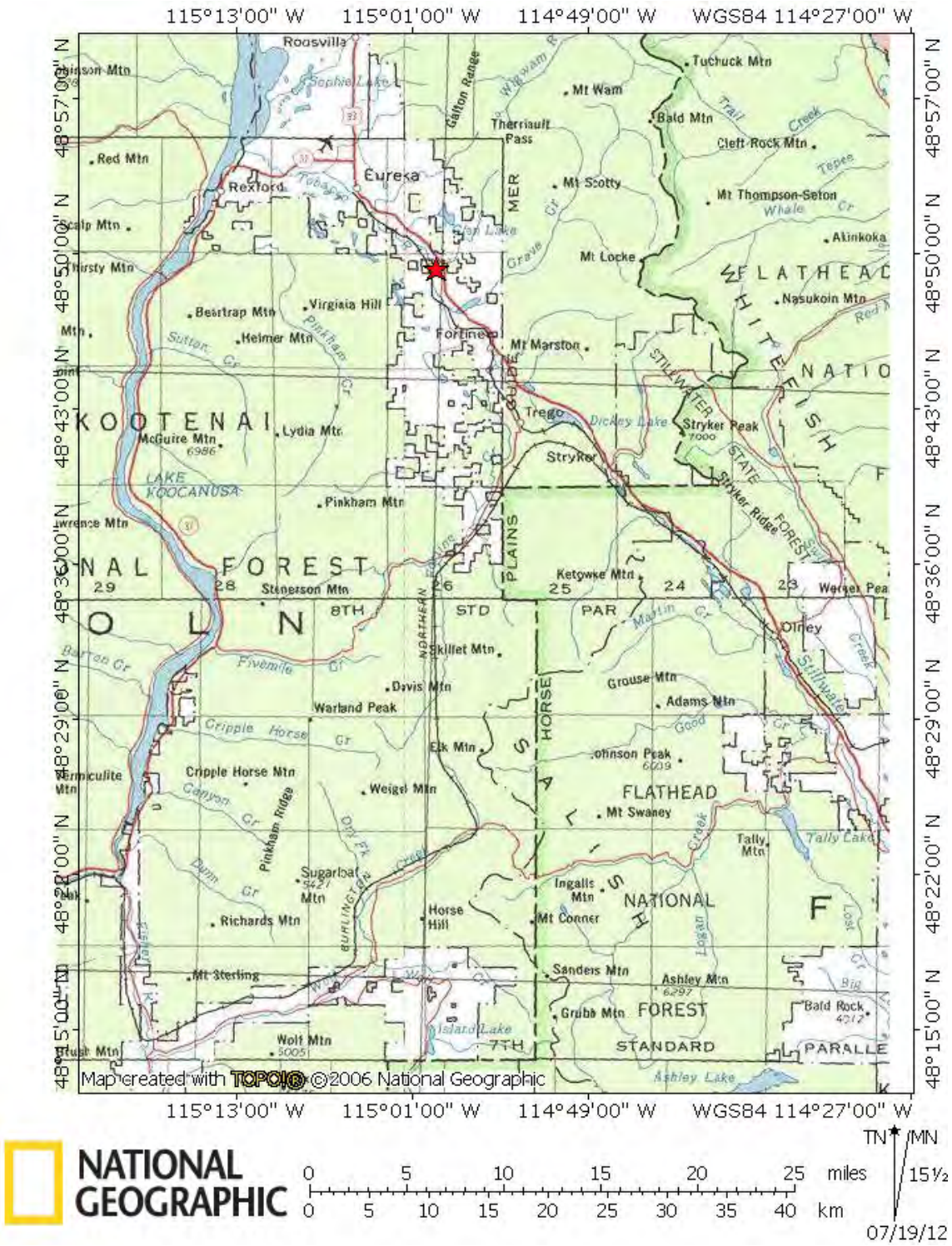


Figure 1. Location of the Bass Lake Restoration Project area (red star), located on the west side of US Hwy. 93 approximately 6 miles southeast of Eureka, Montana.

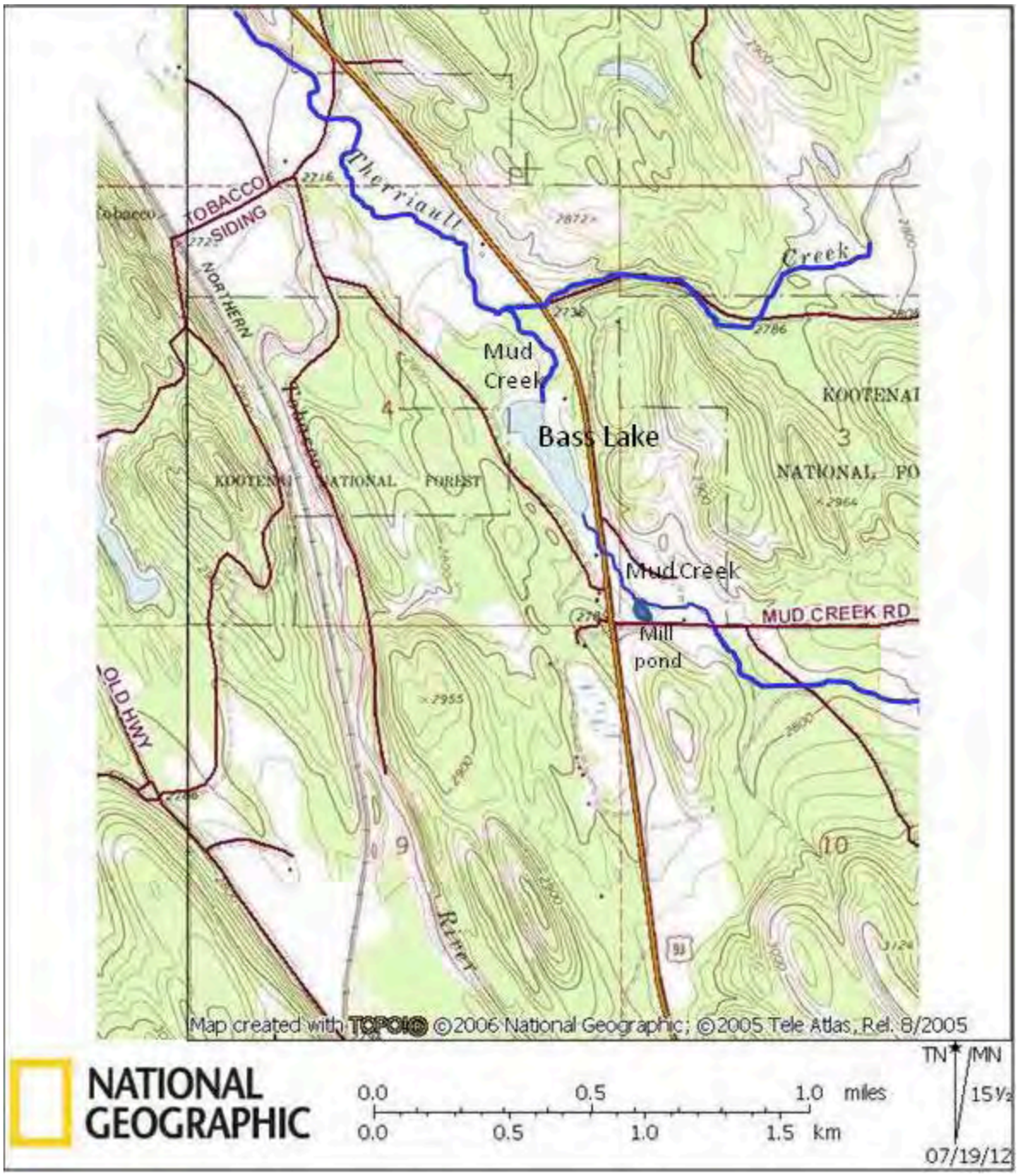


Figure 2. Location of the Bass Lake Restoration Project area, including Bass Lake and Mud Creek. Mud and Therriault Creeks flow in north-western direction.

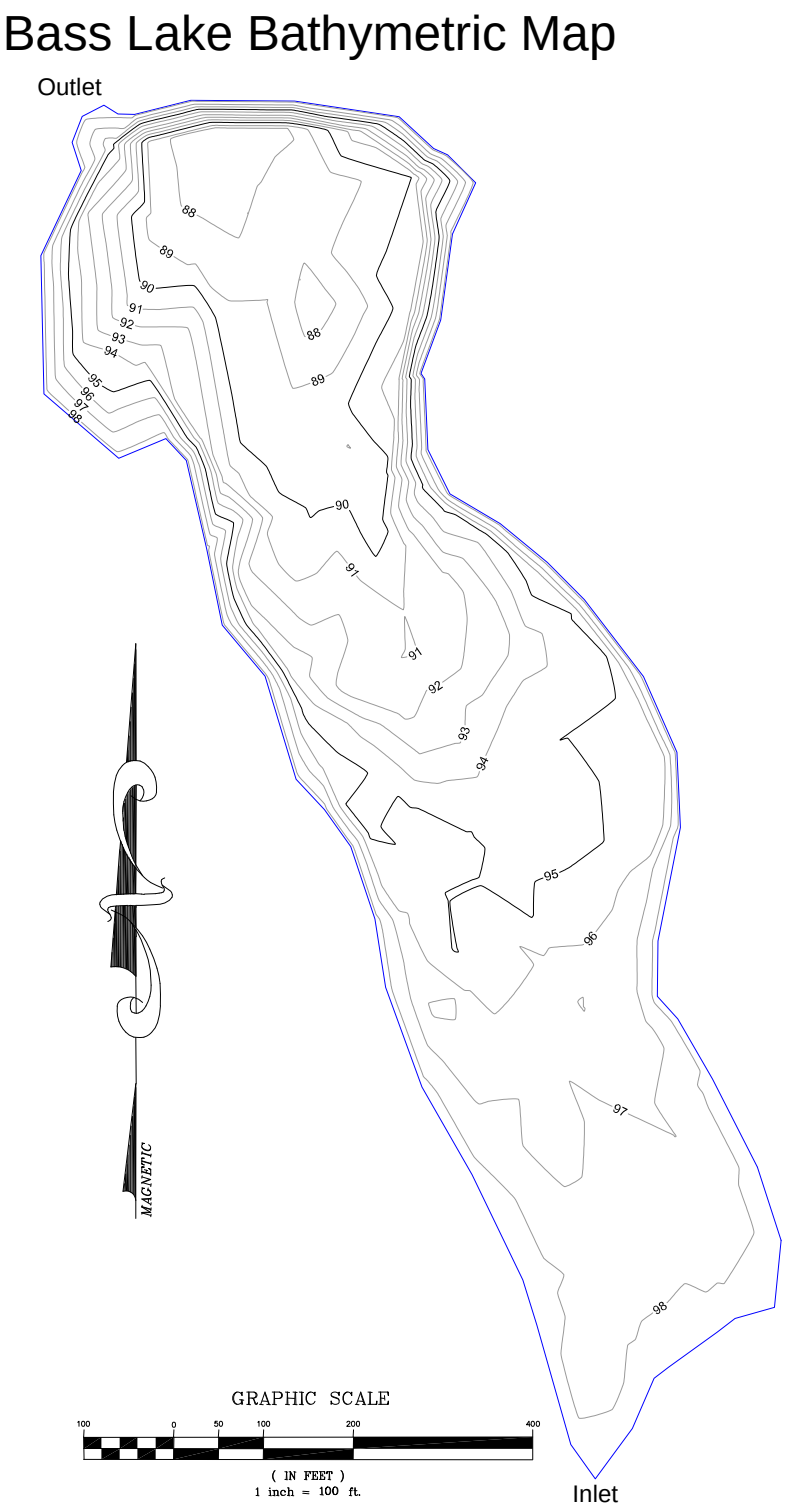


Figure 3. Bathymetric map of Bass Lake (1-foot contour lines) which has a surface area of 11.8 acres, a maximum depth of 11.5 feet, and a volume of 50.6 acre-feet.

**F. Narrative Description of Proposed Action**
MFWP and BPA will use the following needs and purposes to evaluate the alternatives considered in the EA.

Project Need:

- Eradicate the source of northern pike in Koocanusa Reservoir.

MFWP needs to decide whether to proceed with the proposed alternative. BPA needs to decide whether to provide funding to MFWP for its proposal to eradicate the source of northern pike in Koocanusa Reservoir and restore native westslope cutthroat trout in Bass Lake and its surrounding waters.

Project Purposes:

- Prevent or contain invasive aquatic nuisance species in Lake Koocanusa.
- Create genetic reserves to conserve native westslope cutthroat trout.
- Implement and evaluate on-the-ground habitat enhancement efforts that alleviate limiting factors such as predation by nonnative northern pike on native westslope cutthroat trout.

*Background*

Mud Creek originates in the Whitefish Mountain Range and flows approximately 5.7 miles across private and public land (USFS) before flowing into Bass Lake (Figure 1). Mud Creek leaves Bass Lake and flows another 0.3 miles before entering Therriault Creek approximately 0.8 miles upstream of the confluence of Therriault Creek and the Tobacco River (Figure 2). Therriault Creek enters the Tobacco River approximately 12.5 miles upstream of Lake Koocanusa (Figure 1). Bass Lake was created by an earthen impoundment on Mud Creek in the mid to late 1940s. Bass Lake is located on the west side Highway 93 approximately 6 miles southeast of Eureka, Montana, has a surface area of 11.8 acres, and a maximum depth of approximately 11.5 feet.

Historical fisheries data for Mud Creek is limited. However, the lack of natural barriers prior to the creation of Bass Lake suggests that native species such as cutthroat, bull trout (*Salvelinus confluentus*), and mountain whitefish (*Prosopium williamsoni*) may have historically utilized Mud Creek. In the early 1900s rainbow trout (*Oncorhynchus mykiss)* and brook trout (*Salvelinus fontinalis*) were either introduced to or colonized the Mud Creek watershed. Shortly after the Bass Lake Dam was constructed, largemouth bass (*Micropterus salmoides)* and bluegill (*Lepomis macrochirus)* were illegally introduced to the Mud Creek watershed, and sometime in the mid 1990s northern pike were illegally introduced to Bass Lake (MFWP unpublished data). In 2010, MFWP sampled Bass Lake and Mud Creek, and found that northern pike were confined to Bass Lake and that portion of Mud Creek downstream of fish barrier located approximately 0.26 miles upstream of the lake. Since the construction of Libby Dam in 1972, northern pike observations in the Tobacco River and Lake Koocanusa have been rare, but in the recent years the occurrence of northern pike in MFWP annual gill-netting surveys of Lake Koocanusa has increased. Angler observations of northern pike have also become more frequent, primarily around the mouth of

the Tobacco River (MFWP unpublished data). Northern pike reproduction is likely limited in Lake Koocanusa due to fluctuating water levels and the lack of aquatic vegetation. Northern pike were illegally introduced to Bass Lake in the mid to late 1990s and may be contributing to the persistence of northern pike in Lake Koocanusa.

Bass Lake is a small, shallow lake with abundant aquatic vegetation, but a limited prey base, which may contribute to northern pike emigrating from this water body. Lower Mud Creek, Therriault Creek, and the Tobacco River have limited habitat suitable for northern pike. Therefore, the northern pike that emigrate from Bass Lake likely inhabit Lake Koocanusa. Northern pike are predatory fish that can have detrimental impacts on native species, such as cutthroat and bull trout and other nongame native species in Therriault Creek, the Tobacco River, and Lake Koocanusa.

*Proposed Activities*

MFWP proposes to use rotenone to remove all fish from Bass Lake and a short portion of Mud Creek upstream of Bass Lake, and restock these waters with westslope cutthroat trout from the Washoe Park Hatchery in Anaconda, Montana. MFWP has a long history of using rotenone to manage fish populations in Montana that span as far back as 1948. MFWP has administered rotenone projects for a variety of reasons, but principally to improve angling quality or for native fish conservation.

Rotenone is a naturally occurring substance derived from the roots of tropical plants in the bean family, such as the jewel vine (*Derris* spp.) and lacepod (*Lonchocarpus* spp.) that are found in Australia, Oceania, southern Asia, and South America. Rotenone has been used by native people for centuries to capture fish for food in areas where these plants are naturally found. It has been used in fisheries management in North America since the 1930s. Rotenone has also been used as a natural insecticide for gardening and to control parasites such as lice on domestic livestock (Ling 2002).

MFWP proposes to use CFT Legumine, a commercial formulation that contains 5% rotenone as the active ingredient, as the primary piscicide for this project to remove all species of fish including northern pike from Mud Creek and Bass Lake. CFT Legumine acts like other formulations of rotenone 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. However, mammals are generally not affected by exposure to or by the consumption of rotenone because they neutralize rotenone by enzymatic action in their stomach and intestines (AFS 2002). 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). After the treatment, MFWP would conduct electrofishing surveys in Mud Creek and gill netting in Bass Lake to determine if all the northern pike were killed. If needed, a second piscicide application would occur in the fall of 2013. In the event that a second treatment is necessary, additional environmental compliance would be completed as needed.

The boundaries for the proposed treatment area include Bass Lake and approximately 0.26 miles of Mud Creek immediately upstream of Bass Lake. These waters would be treated with CFT Legumine brand 5% rotenone. The manufacturer's label recommendations for concentrations for

normal pond/lake use would be followed when treating the lake, which, for northern pike, is 0.5-1.0 mg of CFT Legumine per 1 liter of water (ppm). Concentrations adequate for northern pike are similar to concentrations adequate for trout, so on-site assays using caged trout would be used to determine the appropriate concentrations needed, which is estimated not to exceed 1.0 ppm.

Although there is no domestic surface water use within the proposed project area, signs would be posted to warn people not to drink the water or to swim immediately after the application of rotenone, and not to consume the dead fish. Neighboring ground water well owners would also be notified, and pre- and posttreatment water sampling and analysis would be conducted to evaluate any possible contamination.

Bass Lake has an approximate volume of 50.6 acre-feet, (Figure 3), which would require approximately 16.9 gallons of CFT Legumine in the lake to achieve 1.0 ppm concentration of rotenone at the current lake level. However, in order to minimize the amount of rotenone required to adequately treat Bass Lake, and to increase the potential to meet project objectives in a single piscicide application, MFWP may elect to lower the water surface elevation manually by up to 1.4 feet. MFWP would accomplish this by hand-removing large rocks from the lake outlet that are currently controlling lake elevation and preventing upstream fish migration into the Bass Lake. After completion of the rotenone treatment, the rocks would be replaced to allow the lake to return to water surface elevation that existed prior to treatment. Reducing the depth of Bass Lake by 1.4 feet would reduce the lake surface area to 9 acres and the lake volume to 36.8 acre-feet, but would still maintain the existing upstream fish barrier at the lake outlet. This would decrease the amount of CFT Legumine needed to 12.3 gallons and eliminate the need to treat the marshy cattail area on the south end of the lake. MFWP estimates that CFT Legumine in the lake would persist in the lake up to 14 days based on the volume of fresh water entering the lake from Mud Creek, water temperature, sunlight intensity, and alkalinity.

In Bass Lake, the CFT Legumine would be dispensed by a small boat, and in Mud Creek (immediately upstream of the lake) drip stations would be used to dispense the CFT Legumine. A drip station is a small container that dispenses a measured amount of liquid rotenone to a stream at a constant rate for a specific period of time. Drip stations would be calibrated to deliver a rotenone concentration of up to 1.0 ppm for a 4-hour treatment. Specific spacing and CFT Legumine delivery volumes would be determined prior to treatment using dye tests to determine water travel times and flow (discharge) measurements at each drip station site. Using the criterion described above, treatment of Mud Creek may require up to approximately 0.5 gallons of CFT Legumine. This estimate was calculated assuming a 6-hour treatment using 1 drip station at the upper project boundary on Mud Creek and a flow of 2.9 cubic feet per second. Rotenone would be applied to the marshy areas around the lake and to the backwaters of Mud Creek with backpack sprayers. Complete application of the rotenone would likely be done in one day. MFWP will collect the dead fish and dispose of them in a landfill. The materials and equipment would be transported to the site by a truck for the treatments of both the lake and stream.

There are three ways in which rotenone can be detoxified; natural oxidation, dilution by freshwater, and introduction of a neutralizing agent such as potassium permanganate. In Bass Lake, natural detoxification is proposed and in Mud Creek, downstream of the Bass Lake,

potassium permanganate is proposed for detoxification (see Part III. Environmental Review, Comment 2a). According to the manufacturer's label, potassium permanganate should be applied to water at the appropriate concentration to compensate for organic demand of the stream and/or lake bottom so that enough remains to neutralize the rotenone. The detoxification zone is defined as the distance that water in the stream travels in 15-to-30-minutes contact time after the addition of the potassium permanganate. Thus, the detoxification zone for this project is the section of Mud Creek between Bass Lake and the confluence of Mud Creek with Therriault Creek. The discharge of Mud Creek would be measured prior to treatment and the potassium permanganate would be applied at the rate specified on the manufacturer's label. On-site assays would be conducted in Mud Creek prior to the treatment to determine the appropriate amount of permanganate necessary to neutralize the rotenone prior to entering Therriault Creek.

The rotenone added to Mud Creek would not persist for more than approximately 48 hours, but treated lake water would be flowing from the lake for an extended period of time. With a lake volume of 36.8 acre-feet and a stream inflow of 2.9 cubic feet per second, the water retention would be approximately 7 days. Through natural oxidation and inflow dilution, the rotenone in Bass Lake would be neutralized within 7 to 12 days. Nevertheless, the detoxification station 50 feet downstream of the lake would be operated until sentinel fish (fish used to test for the presence of rotenone) between the lake and the detoxification station survive and show no signs of stress for 4 hours as specified by the label. As an added margin of safety, MFWP would have approximately twice the amount of potassium permanganate on hand as theoretically estimated to ensure adequate neutralization of rotenone flowing from Bass Lake.

Caged cutthroat trout would be used to measure the toxicity of the water in the lake and creek to ensure that objectives are met. After the piscicide application, caged fish would be used to evaluate when the waters are no longer toxic to fish and when fish can be restocked. The CFT Legumine label specifies that once caged fish survive 24 hours in treated lake water, it is considered detoxified and is safe for restocking. The label also states that 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. Sentinel fish would be held at the Murray Springs Fish Hatchery near Eureka throughout the course of this project.

Monitoring is an important component of this type of management activity (Meronek et al. 1996). By way of example, MFWP conducted extensive monitoring of the 2005 rotenone treatment of Martin Creek and Martin Lakes near Olney, Montana. The results of this study indicate the Martin Creek naturally detoxified as a result of dilution from freshwater within 48 hours, and the piscicide was contained within the project boundaries by detoxification with potassium permanganate and dilution by freshwater. Martin Lakes were treated with 1.17 ppm Prenfish rotenone, and although very little freshwater was flowing into the lakes, the water was no longer toxic to fish after 44 days (Schnee 2006). Plankton blooms occurred in Martin Lakes 160 days after the treatment, and Columbia spotted frogs were observed depositing eggs in Martin Lakes the following spring. In 2006, MFWP treated Blue Lake near Stryker, Montana, with 1.5 ppm Prenfish rotenone and the lake naturally detoxified in 77 days (Schnee 2007a). MFWP Libby Mitigation staff has conducted three similar projects over the past five years, and each of these projects employed a similar strategy proposed for this project (see Part III. Environmental Review, Comment 5c).

MFWP would restock Bass Lake with westslope cutthroat trout during the summer of 2013, pending the results of effectiveness monitoring after the rotenone treatment in 2012. However, if monitoring indicates northern pike remain in Bass Lake or lower Mud Creek after the 2012 treatment, a second treatment would occur in 2013, and stocking would be delayed until 2014. The hatchery fish would likely come from the Washoe State Hatchery in Anaconda, Montana, and would be age 0 westslope cutthroat trout. Electrofishing surveys in Mud Creek and gill netting in Bass Lake would be implemented to evaluate growth and relative survival of the hatchery fish.

## PART II. ALTERNATIVES

### Alternative 1 – No Action Alternative

The No Action Alternative would allow status quo management to continue, which would maintain the present angling quality and species diversity in Bass Lake and Mud Creek. Northern Pike would continue to propagate in Bass Lake and emigrate into the Tobacco River and Lake Koocanusa and would cause detrimental effects on native fish populations. Implementation of this alternative would not help conserve native salmonids, including cutthroat and bull trout in the Tobacco River or Lake Koocanusa. An environmental review of this alternative is presented in PART III.

### Alternative 2 – Rotenone removal of northern pike from Bass Lake and Mud Creek, and then restocking with westslope cutthroat trout. (Proposed Action)

The proposed action involves removing northern pike from Bass Lake and a 0.26 mile portion of Mud Creek immediately upstream of Bass Lake using CFT Legumine, a commercial formulation that contains 5% rotenone. After the successful removal of northern pike from these waters, the lake may be stocked with westslope cutthroat trout. Based on the characteristics of the lake and creek, MFWP anticipates that this project provides the highest probability of achieving the objective of eliminating the main source of northern pike to the Tobacco River drainage. An environmental review of this alternative is presented in PART IV.

## ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED STUDY

### Mechanical removal of northern pike from Bass Lake and Mud Creek, and then restocking with westslope cutthroat trout.

This alternative would involve using a combination of mechanical treatments to remove unwanted northern pike from the Bass Lake and Mud Creek. This would include gill nets and/or trap nets to remove fish from the lake, and electrofishing to remove fish from Mud Creek. Once northern pike are removed, cutthroat trout would be stocked.

Gill netting has been used successfully to remove unwanted fish from relatively small lakes. 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. Over 10,000 net nights (1 net night = 1 net set overnight for at least 12 hours) were conducted over a four 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, like Bass Lake, trout have the ability to become acclimated to the presence of gill nets and to avoid them. These researchers reported observing brook trout avoiding gill nets within about 2 hours of being set (Parker et al. 2001). It is reasonable to expect that northern pike in Bass Lake may react similarly.

Maul Lake, a 3.9-acre lake in the Inyo National Forest in California, was gillnetted 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 the rainbow trout 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. 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 included 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 felt could be depopulated using gill nets was 7.4 surface acres and 32 feet deep (Knapp and Matthews 1998). The surface area of Bass Lake is 11.8 acres.

Deploying gill nets and traps requires frequent presence at the site to check and reset nets. There would be a large time commitment required to attempt this method of fish removal. Due to these considerations and expected incomplete results, this alternative has a low probability of eliminating northern pike from Bass Lake and Mud Creek and was rejected as an alternative by MFWP.

The Montana Bull Trout Scientific Group concluded that gill netting would not result in a complete removal of fish that compete with bull trout; rather, they recommended that it be used as a suppression technique. In very specific circumstances this method could lead to total removal (MFWP 1996).

Numerous attempts have been made to remove unwanted fish using electrofishing, but this has occurred mostly in streams and has generally resulted in limited success. MFWP observed several juvenile northern pike in lower Mud Creek while sampling in 2010. Although the field crew visually observed several northern pike, they were unable to capture these fish using a backpack electrofisher. MFWP conducted an electrofishing removal of brook trout from 6 km of stream above a barrier on Muskrat Creek. Over a 4-year period, researchers electrofished 5,386 brook trout from this section and moved them below a barrier. After four years of the electrofishing effort, they concluded that the operation was not 100 percent effective and recommended that some type of fish toxin be used to permanently eliminate the brook trout from the study section (Shepard et al. 2001).

Electrofishing small streams where using piscicides is not feasible has had mixed results. Electrofishing did not eliminate rainbow trout from a Tennessee stream, but helped reduce their numbers, which helped native brook trout reestablish (Moore et al. 1983). Similar results were found using electrofishing for brook trout removals to aid native cutthroat trout in a Wyoming stream (Thompson and Rahel 1996). Five removals were required to successfully eliminate

rainbow trout from Mannis Branch Creek, Tennessee (Kulp and Moore 2000). There are a great number of studies available on the use of electrofishing to remove or reduce numbers of fish from streams (Shetter and Alexander 1970).

The Montana Bull Trout Restoration Team evaluated electrofishing as a possible means to remove competing fish species to aid in bull trout recovery. The team concluded that electrofishing could be used to help suppress target species, but would not likely be successful in total removal (MFWP 1996).

These reports demonstrate that electrofishing can be successful in some instances, but requires an incredible amount of time, specific conditions for success, and several years of effort. Numerous examples are provided to demonstrate that it can be ineffective also. Because gill netting would likely be unsuccessful in Bass Lake because the fish would likely be able to avoid netting, the lake is too large for practicable gill netting operations, and electrofishing has not proven successful for eliminating fish from streams, this alternative was eliminated from further consideration.

**Use angling to reduce the number of hybridized fish in Bass Lake and Mud Creek, and then restocking with westslope cutthroat trout.**

MFWP has the authority under MFWP Commission rule to modify angling regulations for the purpose of removing unwanted fish from a lake or stream. Unfortunately, this method does not guarantee complete removal of all fish. There are a number of reasons why this method may not work, especially in a lake like Bass Lake, which is surrounded primarily by privately owned land with limited to no public access. First, liberalizing bag limits does not guarantee every angler would keep all of the fish they catch, primarily because of differences in value systems among anglers. Recreational angling has been shown to reduce the average size of fish and reduce population abundance. As the size and abundance of fish decreases, angler satisfaction tends to decrease also. For these reasons it may be difficult to attract anglers to a site for voluntary angling, if angling quality is low, such as is the case with Bass Lake. The average size of northern pike MFWP captured in gill nets in Bass Lake in 2010 was about 22 inches (3.2 pounds). Secondly, very small fish in Bass Lake and Mud Creek would not be vulnerable to angling, leaving many fish in the lake unsusceptible to capture via angling and with an opportunity to grow and reproduce. Finally, the vast majority of shoreline on Bass Lake is privately owned, and there is no public access to the lake. In order for this alternative to be successful, a sustained angling effort over a long period would be required, which would likely be contrary to the land owners' priorities. Lifting bag limits on the lake would not likely succeed in removing fish due to difficulty in access. The amount of time required for anglers to depress or remove all fish from a lake or stream would likely require many years to accomplish. For these reasons this method of fish removal was considered unreliable at achieving complete fish removal from Bass Lake and Mud Creek and was eliminated from further analysis.

## PART III. ENVIRONMENTAL REVIEW OF THE NO ACTION ALTERNATIVE

## A. PHYSICAL ENVIRONMENT

| 1. LAND RESOURCES<br><br>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<br><br>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 | | | | |
| 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 | | | | |
| g. Changes in the quantity of groundwater? | | X | | | | |
| h. Increase in risk of contamination of surface or groundwater? | | X | | | | |
| 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 | | | | |

| **3. AIR**<br><br>**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 13c) | | X | | | | |
| b. Creation of objectionable odors? | | X | | | | |
| c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally or regionally? | | X | | | | |
| d. Adverse effects on vegetation, including crops, due to increased emissions of pollutants? | | X | | | | |
| e. Will the project result in any discharge which will conflict with federal or state air quality regulations? | | X | | | | |

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

| 5. FISH/WILDLIFE<br>Will the proposed action result in: | IMPACT Unknown | None | Minor | Potentially Significant | Can Impact Be Mitigated | Comment Index |
|---|---|---|---|---|---|---|
| a. Deterioration of critical fish or wildlife habitat? | | X | | | | |
| b. Changes in the diversity or abundance of game animals or bird species? | | | X | | no | 5b |
| c. Changes in the diversity or abundance of nongame species? | | | X | | no | 5b |
| d. Introduction of new species into an area? | | | X | | no | 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 | | | 5b |
| g. Increase in conditions that stress wildlife populations or limit abundance (including harassment, legal or illegal harvest, or other human activity)? | | X | | | | |
| h. Will the project be performed in any area in which threatened and endangered (T&E) species are present, and will the project affect any T&E species or their habitat? (Also see 5f) | | X | | | | |
| i. Will the project introduce or export any species not presently or historically occurring in the receiving location? | | X | | | | 5d |

**Comment 5b:** The No Action Alternative would continue to allow predatory northern pike to persist, reproduce, and potentially migrate from Bass Lake into the Tobacco River and Lake Koocanusa. The presence of northern pike in the Tobacco River and Lake Koocanusa may have detrimental ecological impacts on native game fish species (cutthroat and bull trout [threatened]), nonnative fish species (rainbow trout, mountain whitefish, and brook trout, and kokanee salmon [*Oncorhynchus nerka*]), and native nongame fish species within these waters, which reduces their abundance or distribution sufficiently to limit their persistence.

**Comment 5d:** MFWP would not stock fish in Bass Lake under the No Action Alternative. Northern pike would continue to persist and reproduce in Bass Lake, and continue to provide a potential source for additional illegal introductions of northern pike into regional waters that currently do not contain northern pike. Additionally, northern pike will likely continue to migrate out of Bass Lake into the Tobacco River and Lake Koocanusa, which could eventually result in sufficient abundance of northern pike in these waters to create self-sustaining populations.

## B.HUMAN ENVIRONMENT

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

| **7. LAND USE**<br><br>**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. Conflict with a designated natural area or area of unusual scientific or educational importance? | | X | | | | |
| c. Conflict with any existing land use, the presence of which would constrain or potentially prohibit the proposed action? | | X | | | | |
| d. Adverse effects on or relocation of residences? | | X | | | | |

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

| **9. COMMUNITY IMPACT**<br><br>**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<br><br>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? | | 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<br><br>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? | | | X | | | See 11c |
| d. Will any designated or proposed wild or scenic rivers, trails or wilderness areas be impacted? | | X | | | | |

**Comment 11c:** The No Action Alternative would continue to allow predatory northern pike to persist, reproduce and potentially migrate from Bass Lake into the Tobacco River and Lake Koocanusa, which could lead to the establishment of self-sustaining populations of northern pike in these waters. Northern pike predation on species of game fish may reduce the abundance of the prey species in the receiving waters, thus reducing angling opportunity for these species in these waters. Angling opportunities for northern pike in downstream waters may be increased, but this would likely occur at the expense of other popular game fish species including cutthroat, rainbow, bull trout and mountain whitefish. The majority of Bass Lake and Mud Creek are located on private lands that lack public access. Current angling opportunity in Bass Lake and Mud Creek is extremely limited and therefore recreational use is low. This situation would likely remain unchanged under this alternative. MFWP would not stock any fish in Bass Lake under this alternative.

| 12. CULTURAL/HISTORICAL RESOURCES<br><br>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<br><br>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 | | | | |
| f. Is the project expected to have organized opposition or generate substantial public controversy? | | X | | | | |
| g. List any federal or state permits required. | | X | | | | |
| h. List any anticipated or potential cumulative impacts associated with this alternative. | X | | | | | 13h. |

**Comment 1d:** The continued existence of northern pike in Bass Lake and Mud Creek will likely lead to the possible establishment of a population of northern pike in Lake Koocanusa. Bull Trout are listed as threatened under the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), with several contributing factors responsible for declines from historic levels, including predation and competition with nonnative fish species (Montana FWP 1996). Increased distribution of northern pike within the upper Kootenai River watershed may result in further decline in bull trout abundance and distribution and ultimately limit recovery efforts for this species.

## PART IV. ENVIRONMENTAL REVIEW OF PROPOSED ACTION

## A. PHYSICAL ENVIRONMENT

| 1. LAND RESOURCES<br><br>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 | | | 1d |
| 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 | | | | |

**Comment 1d:** To minimize the amount of rotenone required to adequately treat Bass Lake, and to increase the potential to meet project objectives in a single piscicide application, MFWP may elect to lower the water surface elevation up to 1.35 feet. This would be done by hand-removing large rocks from the lake outlet that are currently controlling lake elevation. The action would temporarily increase flows in Mud Creek below Bass Lake, but it would be done incrementally over several weeks during late summer when stream flows are at their lowest to avoid any potential for downstream flooding. After completion of the rotenone treatment, the rocks would be replaced to allow the lake to return to the water surface elevation that existed prior to treatment. Any alterations in stream flow in Mud Creek, Therriault Creek, or the Tobacco River would be short-term and minor.

| 2. WATER<br><br>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 | | Yes | 2b |
| 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 | see 2af |
| 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 | | | | See 2j |
| k. Effects on other users as a result of any alteration in surface or groundwater quantity? | | X | | | | |
| l. Will the project affect a designated floodplain? | | X | | | | |
| m. Will the project result in any discharge that will affect federal or state water quality regulations? (Also see 2a) | | | X | | Yes | 2m |

**Comment 2a:** Surface water quality may be temporarily impacted by the intentional use of rotenone and by algae blooms that would likely occur while fish decay. The impacts would be short-term and minor. CFT Legumine is an EPA-registered pesticide that is safe to use for removal of unwanted fish when handled properly. The concentration of the product proposed for this project is 1.0 ppm, but may be adjusted within the limits specified on the label based upon the results of on-site bioassays.

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 (Ware 2002; ODFW 2002; Loeb and Engsrtom-Heg 1970; Engstrom-Heg 1972; Gilderhus et al. 1986). Rotenone persistence studies 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; Dawson et al. 1991). One study 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 Gilderhus et al. (1986). 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).

MFWP estimates that the rotenone added to Mud Creek upstream of Bass Lake would not persist for more than approximately 48 hours, but treated lake water would be flowing from the lake for an extended period of time. After about 48 hours, Mud Creek would begin to dilute the rotenone added to Bass Lake. However, MFWP would also add potassium permanganate to the water, leaving Bass Lake to detoxify the rotenone in lower Mud Creek. The discharge of Mud Creek would be measured at the lake outlet immediately prior to treatment so that potassium permanganate application rates can be more closely determined at rates specified on the manufacturer's label and

dilution rates can be estimated. On-site assays would be conducted in this stream prior to the treatment to determine the appropriate amount of permanganate necessary to neutralize the rotenone in Mud Creek below the detoxification site. MFWP would operate the detoxification station until sentinel fish survive and show no signs of stress in the outlet stream for 4 hours as specified by the label.

Dead fish would result from this project. Approximately 70% of rotenone fish killed in Washington lakes never surface (Bradbury 1986). Although no trout were involved with his study, one study reported that at water temperatures of 40°F and less, dead fish required 20-41 days to surface (Parker 1970). The most important factors inhibiting fish from ever surfacing are cooler water (<50°F) and deep water (>15 feet). Bass Lake has a maximum depth of approximately 11.5 feet, and surface temperatures of the lake at the time of treatment are expected to be slightly warmer than 50°F, so MFWP expects that more fish may surface in Bass Lake than the Washington lakes study observed (Bradbury 1986). The Washington lakes study also reported that 9 of 11 water bodies in Washington treated with rotenone experienced an algae bloom shortly after treatment (Bradbury 1986). This is attributed to the input of phosphorus to the water as a result of decaying fish. Bradbury further notes that approximately 70% of the phosphorus content of the fish stock would be released into the lake through bacterial decay. This action stimulates phytoplankton production, then zooplankton production, and starts the lake toward production of food for fish. This change in water chemistry is viewed as a benefit to stimulate plankton growth. Any changes or impacts to water quality resulting from decaying fish would be short-term and minor, and expected to last only a couple of weeks.

**Comment 2b:** To minimize the amount of rotenone required to adequately treat Bass Lake, and to increase the potential to meet project objectives in a single piscicide application, MFWP may elect to lower the water surface elevation up to 1.4 feet. This would be done by hand-removing large rocks from the lake outlet that are currently controlling lake elevation. The action would temporarily increase flows in Mud Creek below Bass Lake, but it would be done incrementally over several weeks during late summer when stream flows are at their lowest to avoid any potential for downstream flooding. After completion of the rotenone treatment, the rocks would be replaced to allow the lake to return to the water surface elevation that existed prior to treatment. Any alterations in stream flow in Mud Creek, Therriault Creek, or the Tobacco River would be short-term and minor.

**Comment 2f**: No contamination of groundwater is anticipated to result from this project. However, if rotenone-treated water does enter the aquifer within the watershed, it would not be expected to have negative impacts. 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 (including the loam type soils around Bass Lake); the only exception would be sandy soils where movement is about three inches (Hisata 2002). In California, studies where wells were placed in aquifers adjacent to and downstream of rotenone applications have never detected rotenone, rotenolone, or any of the other organic compounds in the formulated products (CDFG 1994).

Case studies in Montana have concluded that rotenone movement through groundwater does not occur. For example, at Tetrault Lake, Montana, neither rotenone nor inert ingredients were detected in a nearby domestic well, which was sampled two and four weeks after applying 90 ppb rotenone to the lake. This well was chosen because it was down gradient from the lake and also drew water from the same aquifer that fed and drained the lake (Skaar 2001). In 1998, a Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well, located 65 feet from the pond, was analyzed and no sign of rotenone was detected. In 2001, another Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well located 200 feet from that pond was tested four times over a 21-day period and showed no sign of contamination (Skaar 2001). In 2005, MFWP treated a small pond near Thompson Falls with Prenfish to remove pumpkinseeds and bass. A well that was located 30 yards from the pond was tested and neither Prenfish nor inert ingredients were found in the well (MFWP unpublished data).

Inert ingredients in CFT Legumine volatilize rapidly in the environment by both photolysis and hydrolysis (decomposition of a chemical by light and water, respectively) and therefore do not pose a threat to the environment at the levels proposed for fish eradication.

Thus, there should be no impact on groundwater.

**Comment 2j:** The CFT Legumine label states "….Do not use water treated with rotenone to irrigate crops or release within 1/2 mile upstream of a potable water or irrigation water intake in a standing body of water such as a

lake, pond or reservoir…" There are no irrigation or potable water intakes in Bass Lake or Mud Creek within 1/2 mile of the effect area. Thus, there should be no impact to water users.

**Comment 2m:** MFWP would obtain a Pesticide General Permit (PGP), which is a permit that authorizes wastewater discharge into a state water body. In addition, MFWP would also prepare a Pesticide Management Plan as part of the permitting process. Thus, the proposed action will result in a discharge to a state water body, but this discharge would comply with state water quality regulations.

| **3. AIR**<br><br>**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 13c) | | | X | | | 3a |
| b. Creation of objectionable odors? | | | X | | yes | 3b |
| c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally or regionally? | | X | | | | |
| d. Adverse effects on vegetation, including crops, due to increased emissions of pollutants? | | X | | | | |
| e. Will the project result in any discharge, which will conflict with federal or state air quality regulations? | | X | | | | |

**Comment 3a:** This project would use a small boat and outboard motor to dispense the CFT Legumine in Bass Lake, and a small generator would be used to power the hopper to dispense the potassium permanganate, which would create some emissions, but the emissions are expected to dissipate rapidly. Any impacts from these odors would be short-term and minor.

**Comment 3b:** CFT Legumine is relatively odor-free and does not contain the same level of aromatic petroleum solvents (toluene, xylene, benzene, and naphthalene) of other rotenone formulations and as a consequence does not have the same odor concerns and has less inhalation risks. Dead fish would result from this project and may cause objectionable odors. This condition is greatly reduced during fall applications because air and water temperatures will be lower, which will reduce the rate of decomposition of dead fish. Potential odors would be further mitigated through the collection of dead fish that are accessible, while the remaining dead fish would sink to the bottom of the lake. MFWP expects any odors from dead fish to be short-term and minor (see Comment 2a).

| **4. VEGETATION**<br><br>**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 | | | | 4f |

**Comment 4a:** Bass Lake and the portion of Mud Creek proposed to be treated are located on private land along Highway 93. The lake would be accessed across 150 feet of mowed grass, and the stream would be accessed from the highway right-of-way. There may be minor trampling of vegetation around the lake and creek during the rotenone application and around the stream during the placement and monitoring of drip stations and sentinel fish. Rotenone does not have an effect on plants at concentrations used to kill fish. Impacts from trampling vegetation are expected to be short-term and minor.

**Comment 4c:** There are no known unique, rare, threatened, or endangered plant species including Spalding's campion (*Silene spaldingii*) or water howellia (*Howellia aquatilis*) known to occupy the Bass Lake or lower Mud Creek. Therefore, this project would have no effect on unique, rare, or threatened plant species. Additionally, MFWP consulted informally with the USFWS on the effects to bull trout and determined there would be "no effect" from the proposed action. USFWS agreed with MFWP's "no effect" determination in a concurrence letter dated June 4, 2012.

**Comment 4f:** There will be no impact to prime and unique farmland because no such land types exist within the project area.

| **5. FISH/WILDLIFE**<br>**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 threatened and endangered (T&E) species are present, and will the project affect any T&E species or their habitat? (Also see 5f) | | X | | | | |
| i. Will the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d) | | | X | | | See 5d |

**Comment 5b:** This project is designed to kill northern pike, a designated game species in Montana that may have undesired ecological impacts on cutthroat and bull trout within the Tobacco River watershed and Lake Koocanusa. Although the proposed project would negatively affect the northern pike fishery, the impact from the removal of these fish is expected to benefit the native species including cutthroat and bull trout by eliminating predation from northern pike. After the successful removal of northern pike, MFWP would stock the lake with juvenile cutthroat trout, and although MFWP has never stocked Bass Lake in the past, cutthroat trout likely were historically present within the Mud Creek drainage. The stocking of cutthroat trout in Bass Lake would not pose an ecological risk to other species present within the region, including bull trout, because bull trout are not currently present in the Mud Creek watershed. This project would produce dead fish that may be an attractant for black bears, but black bears are not dependent on fish for food and would likely only scavenge on dead fish. See Comment 5c below for impacts to

mammals that consume rotenone. However, MFWP expects that any changes in the distribution of black bears as a result of this project would be short-term and minor and would be further mitigated by collection of dead fish that result from the piscicide application.

**Comment 5c:**

Nongame species that would be impacted may include zooplankton, some aquatic insects, crustaceans (crayfish), most fish species, and possibly some amphibians. The likely impacts are analyzed and discussed below.

**Aquatic Invertebrates:** Numerous studies indicate that rotenone has temporary or minimal affects on aquatic insects and plankton. One study reported that comparisons between samples of zooplankton taken before and after a rotenone treatment did not change substantially (Anderson 1970). Despite the inherent natural fluctuations in zooplankton communities, the application of rotenone had little effect on the zooplankton community. Another study reported that the application of rotenone has little lasting effect on the nontarget insect community of a stream (Cook and Moore 1969). Other studies reported that 20 of 22 zooplankton species reestablished themselves to pre-treatment levels within about 4 months of a rotenone application, and insects in a lake treated with rotenone exhibited only short-lived effects (Kiser et al. 1963; Cushing and Olive 1956). A study on three Missouri ponds treated with rotenone showed little short-term and no long term effect on population levels of zooplankton. The effects of rotenone on plankton were consistent with the natural variability that is characteristic of plankton populations, and recolonization was rapid and reached near pretreatment levels within eight months (Hughey 1975).

Studies showed that most zooplankton species survive a rotenone treatment via their highly resilient egg structures. In addition, parthenogenesis (a form of reproduction in which an unfertilized egg develops into a new individual) of some female plankton occurs, causing sexual dimorphism, which greatly increases plankton density in times of population distress (Anderson 1970; Kiser et al. 1963). Among the aforementioned studies variation in climate, physical environment, and water chemistry would likely cause subtle differences in results in other areas.

Case studies conducted on Devine Lake in the Bob Marshall Wilderness from 1994-1996 indicate that invertebrates abundance and species diversity increased following a rotenone treatment (Rumsey et al. 1996). This compares with another study that reported that oligochaetes (worms) increased in number after a rotenone treatment, then became stable (Cushing and Olive 1956). *Gammarus* species (fresh water shrimp), a common fish food item, were detected in Devine Lake only when fish were present. Neighboring Ross Lake, in the Bob Marshall Wilderness, is fishless and was used to measure natural insect and plankton variation during the Devine Lake treatment and evaluation. *Gammarus* species were never detected in Ross Lake, although it is fishless. Invertebrate numbers in Ross Lake were reported to be relatively stable, but the diversity of insects fluctuated considerably over time. Many studies report that aquatic insects are much less sensitive to rotenone treatment than fish (Schnick 1974). One study reported no short-term or long-term effects on species abundance or insect emergence in three ponds treated with 0.5 to 2.0 ppm of Noxfish 5% rotenone (Houf and Campbell 1977). In a study on the relative tolerance of different aquatic invertebrates to rotenone, 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 (Engstrom-Heg et al. 1978). Aquatic invertebrates in general are capable of rapid recovery from disturbance (Matthaei et al. 1996).

In regard to zooplankton, one study chronicled two years of post rotenone treatment monitoring for upper and lower Martin Lakes near Olney, Montana, that were treated in 2005 (Schnee 2007b). This study concluded that zooplankton density two years after the treatment were similar to pretreatment densities, and in some cases higher (see tables below). Zooplankton community composition showed no change between 2006 and 2007. Based on this, MFWP would expect the plankton species composition in Bass Lake to return to pretreatment diversity and abundance within two years of rotenone treatment.

Upper Martin Lake near Olney, Montana:

| 2005 (pretreatment) | | **2006 (posttreatment)** | | **2007 (posttreatment)** | |
|---|---|---|---|---|---|
| Date Sampled | Quantity/liter | Date Sampled | Quantity/liter | Date Sampled | Quantity/liter |
| May | No sample | 18-May-06 | 0.03 | 10-May-07 | 16.50 |
| 16-Jun-05 | 24.70 | 16-Jun-06 | 0.85 | 11-Jun-06 | 19.78 |
| 21-Jul-05 | 5.67 | 10-Jul-06 | 19.15 | July | No sample |
| 06-Aug-05 | 8.63 | 16-Aug-06 | 9.77 | August | No sample |
| 03-Oct-05 | 4.70 | 18-Oct-06 | 4.75 | 5-Oct-07 | 10.82 |

Lower Martin Lake near Olney, Montana:

| 2005 (pretreatment) | | **2006 (posttreatment)** | | **2007 (posttreatment)** | |
|---|---|---|---|---|---|
| Date Sampled | Quantity/liter | Date Sampled | Quantity/liter | Date Sampled | Quantity/liter |
| May | No sample | 18-May-06 | 0.40 | 10-May-07 | 24.40 |
| 16-Jun-05 | 24.19 | 16-Jun-06 | 3.76 | 11-Jun-06 | 27.47 |
| 21-Jul-05 | 17.82 | 10-Jul-06 | 7.46 | July | No sample |
| 06-Aug-05 | 24.60 | 16-Aug-06 | 15.43 | August | No sample |
| 03-Oct-05 | 7.71 | 18-Oct-06 | 8.46 | 5-Oct-07 | 25.72 |

This study also concluded that the effects of rotenone on nontarget organisms such as plankton, amphibians, reptiles and aquatic insects were temporary and natural reproduction and/or recolonization by these species was sufficient to restore populations to pretreatment densities within two years (Schnee 2007b).

MFWP searched the Montana Natural Heritage Program website and found no invertebrate species of concern within the project area. Nevertheless, MFWP would collect two plankton samples from Bass Lake prior to treatment in addition to annual sampling for two years following treatment. Metrics comparing pre- and posttreatment would include number of organisms per liter, species composition, and life stage (adult vs. juvenile forms). Samples would be collected using a Wisconsin net in the deepest part of Bass Lake. MFWP would also collect benthic macroinvertebrate samples from Mud Creek upstream of the rotenone treatment (control), downstream of the rotenone treatment, and downstream of potassium permanganate neutralization site using a traveling kick sample. All invertebrates would be identified to the lowest practical taxonomic level and MFWP would estimate taxa richness, EPT indices, and catch-per-unit effort.

**Amphibians and Reptiles:** MFWP observed spotted frogs (*Rana pretiosa*) and long-toed salamanders (*Ambystoma macrodactylum*) within the project area. Other amphibian species that may be present in the project area include western toads (*Bufo boreas*) and Pacific chorus frogs (*Pseudacris regilla*). Western terrestrial garter snakes (*Thamnophis elegans*), common garter snakes (*Thamnophis sirtalis*), and racer snakes (*Coluber constrictor*) likely inhabit the project area, as are painted turtles (*Chrysemys picta*), rubber boa snakes (*Charina bottae*), western skinks (*Eumeces skiltonianus*), and northern alligator lizards (*Elgaria coerulea*). However, MFWP has not observed any of these species in the vicinity of the project area during pretreatment surveys. MFWP would complete amphibian and reptile surveys for two consecutive years following treatment.

Rotenone is toxic to most gill-breathing larval amphibians, but is not harmful to adults (Schnick 1974). Southern leopard frog tadpoles are between 3 and 10 times more tolerant than fish to Noxfish (5% rotenone formulation) (Chandler and Marking 1982). Laboratory studies conducted on long-toed salamanders, Rocky Mountain tailed frogs, and Columbia spotted frogs concluded that the adult life stages of these species would not suffer an acute response to Prenfish at trout killing concentrations (0.5-1.0 ppm), but the larval and tadpole stages could be affected by rotenone at fish-killing concentrations (Grisak et al. 2007). These authors recommended implementing rotenone treatments at times when the larvae and tadpoles are not present, such as the late summer/early fall (which is the case for this project), to reduce potential for impacts to larval amphibians. Clams and snails are between 50 and 150 times more tolerant than fish to Noxfish (5% rotenone formulation) (Chandler and Marking 1982).

It is important to note that many toxicity studies involve subjecting laboratory specimens to unusually high concentrations of rotenone or conducting tests on animals that would not normally be exposed to rotenone during use in fisheries management.

Based on this information MFWP would expect the impacts to nontarget organisms to range from nonexistent to short-term and minor.

**Mammals and Birds:** Mammals are generally not affected by exposure to or by the consumption of rotenone because they neutralize rotenone by enzymatic action in their stomach and intestines (AFS 2002). Laboratory tests fed forms of rotenone to rats and dogs as part of their diet for periods of six months to two years and observed effects such as diarrhea, decreased food consumption, and weight loss (Marking 1988). This study found that despite unusually high treatment concentrations of rotenone in rats and dogs, it did not cause tumors or reproductive problems in mammals. Studies of risk for terrestrial animals found that a 22-pound dog would have to drink 7,915 gallons of treated lake water within 24 hours or eat 660,000 pounds of rotenone-killed fish, to receive a lethal dose (CDFG 1994). The state of Washington reported that a half-pound mammal would need to consume 12.5 mg of pure rotenone to receive a lethal dose (Bradbury 1986). Considering the only conceivable way an animal can consume the compound under field conditions is by drinking lake or stream water, a half-pound animal would need to drink 33 gallons of water treated at 2 ppm.

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

> *When estimating daily food intake, an intermediate-sized 350-g mammal will consume about 18.8 g of food. Using data previously cited from the common carp with a body weight of 88 grams, a small mammal would only consume 21% (18.8/88) of the total carp body mass. According to the data for common carp, total body residues of rotenone in carp amounted to 1.08 µg/g. A 350-g mammal consuming 18.8 grams represents an equivalent dose of 20.3 µg of rotenone; this value is well below the median lethal dose of rotenone (39.5 mg/kg * 0.350 kg = 13.8 mg = 13,800 µg) for similarly-sized mammals. When assessing a large mammal, 1,000 g is considered to be a default body weight. A 1000-g mammal will consume about 34 g of food. If the animal fed exclusively on carp killed by rotenone, the equivalent dose would be 34 g *1.08 µg/g or 37 µg of rotenone. This value is below the estimated median lethal equivalent concentration adjusted for body weight (30.4 mg/kg * 1 kg = 30.4 mg = 30,400 µg). Although fish are often collected and buried to the extent possible following a rotenone treatment, even if fish were available for consumption by mammals scavenging along the shoreline for dead or dying fish, it is unlikely that piscivorous mammals will consume enough fish to result in observable acute toxicity* (EPA 2007).

One study, in which rats were injected with rotenone for a period of weeks, reported finding lesions characteristic of Parkinson's disease (Betarbet et al. 2000). However, the results have been challenged on the basis of methodology: (1) that the continuous intravenous injection method used leads to "continuously high levels of the compound in the blood," and (2) dimethyl sulfoxide (DMSO) was used to enhance tissue penetration (normal routes of exposure actually slow introduction of chemicals into the bloodstream). Finally, injecting rotenone into the body is not a normal way of assimilating the compound. Similar studies (Marking 1988) have found no Parkinson-like results. Extensive research has demonstrated that rotenone does not cause birth defects (HRI 1982), gene mutations (Van Geothem et al. 1981; BRL 1982) or cancer (Marking 1988). Rotenone was found to have no direct role in fetal development of rats that were fed high concentrations of rotenone (Spencer and Sing 1982). 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 ppm and are far below that administered during most toxicology studies.

Similar results determined that birds required levels of rotenone at least 1,000 to 10,000 times greater than is required for lethality in fish (Skaar 2001). Chickens, pheasants, and members of lower orders of *Galliformes* were quite resistant to rotenone, and 4-day-old chicks were more resistant than adults (Cutkomp 1943). 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 (Ware 2002).

The EPA 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 6-g yellow perch and an 8-g carp, this represents totals of 15 µg and 95 µg rotenone per fish, respectively. Based on the avian subacute dietary $LC_{50}$ of 4110 mg/kg, a 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* (EPA 2007).

It is important to note that nearly all of these examples presented here involved subjecting laboratory specimens to unusually high concentrations of rotenone or conducting tests on animals that would not be exposed to rotenone during normal use in fisheries management.

Some local species of wildlife around Bass Lake may be temporarily displaced as a result of the loss of fish as a food source during the period between the piscicide application and the restocking of cutthroat trout in the lake. These species may include osprey, mink, mergansers, belted kingfisher, and muskrats. All of these species may likely be displaced to adjacent streams/lakes during the recolonization of aquatic insects and restocking of cutthroat trout.

Based on above the information, impacts to nontarget mammals and birds would range from nonexistent to short-term and minor.

**Comment 5d:** This project involves stocking Bass Lake with hatchery-reared westslope cutthroat trout. The lake would be stocked with up to 1,000 hatchery cutthroat trout fry the following summer after the last rotenone treatment. Although MFWP has not observed westslope cutthroat in Mud Creek in recent years, westslope cutthroat trout are a native species currently present in Therriault Creek. Since Mud Creek is a tributary to Therriault Creek and there were no known historical fish barriers within Mud Creek, MFWP concluded that westslope cutthroat were historically present in Mud Creek. Therefore, the impact of stocking of westslope cutthroat trout on other wildlife species are expected to range from nonexistent to minor.

**Comment 5f**: Bull trout are listed as a threatened species under the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), but are not known to exist within Bass Lake or Mud Creek. The outlet structure of Bass Lake is currently an upstream fish barrier that precludes bull trout from colonizing Mud Creek upstream of the lake outlet. Mud Creek is a tributary to Therriault Creek, and MFWP has observed juvenile bull trout residing in lower Therriault Creek (Dunnigan et al. 2011). MFWP would operate a detoxification station in Mud Creek at the Bass Lake outlet, which is located approximately 0.8 mile upstream from the confluence of Mud Creek with Therriault Creek. In the unlikely event that the detoxification operation is not effective at neutralizing all the rotenone added to Mud Creek, it is possible that if bull trout were in the immediate vicinity of the Therriault Creek-Mud Creek confluence, they could be killed. However, the potential for any such impacts is low. MFWP bases this assumption on the following information. Any rotenone-laden waters in Mud Creek would be substantially diluted when entering Therriault Creek; base flow in Mud Creek during the project is expected to range from about 1-3 cfs, and base flow in Therriault Creek is expected to range from 9-15 cfs; the project would be conducted in late summer/early fall, a time period when most adult bull trout would have already migrated to their respective spawning tributaries; and the nearest known spawning tributary is Grave Creek, a tributary to the Tobacco River, which is approximately 3 miles upstream from the confluence of Therriault Creek. Therefore, MFWP anticipates that this project would have minor to nonexistent impacts on bull trout populations. Additionally, MFWP consulted informally with the USFWS on the effects to bull trout and determined there would be "no effect" from the proposed action. USFWS agreed with MFWP's "no effect" determination in a concurrence letter dated June 4, 2012.

Bald eagles were federally delisted from the ESA on June 28, 2007, but MFWP still considers them a sensitive species because they are one of the birds most likely to consume fish killed by rotenone. There are no known bald eagle nests in the Bass Lake area. However, bald eagles and ospreys are relatively common in the Tobacco Valley. Osprey or eagles could forage on rotenone-killed fish that result from this project. However, conducting this project in the fall would not impact bald eagle nesting, and there would likely be no impacts to bald eagles that consume rotenone-killed fish (see Comment 5c). Because Bass Lake would be restocked with westslope cutthroat, and brook

trout are present in Mud Creek upstream of the project, prey species would continue to be available to osprey or eagles that may fish the area. Any impacts to bald eagles as a result of this project are expected to be short-term and minor.

Grizzly bears are known to be in this area, but are not dependent on Bass Lake or fish in the lake or Mud Creek for food. The infrequent sighting of grizzly bears within the project area, and the human activity in the area during the project implementation, would reduce the potential for this species to consume fish killed by rotenone. See Comment 5c for impacts to mammals. Additionally, MFWP consulted informally with the USFWS on the effects to grizzly bears and determined there would be "no effect" from the proposed action. USFWS agreed with MFWP's "no effect" determination in a concurrence letter that was sent to MFWP dated June 4, 2012.

In 2011, the US Congress delisted the gray wolf from the ESA in Montana, but MFWP classifies them as a game species. The project site is within the range of the gray wolf. However, gray wolves are not dependent on fish as a source of food or on Bass Lake or Mud Creek as important habitat. Therefore, the impacts of the proposed action on gray wolves would be nonexistent for the same reasons as the grizzly bear. See Comment 5c for impacts to mammals.

MFWP did not observe any common loons at Bass Lake during surveys (MFWP, unpublished data); however, loons may occasionally use the lake for foraging. There may be a short-term and minor impact to loons that use Bass Lake for foraging. Loons maybe temporarily displaced from the lake until MFWP restocks the lake the following year or fish from upper Mud Creek colonize in the lake. There are also numerous fish-bearing lakes within a few miles of the project that can be easily used by loons in the area. See Comment 5c for impacts to birds.

The project area is within the historic range of the Coeur d'Alene salamander. The habitat requirement for this species includes splash zones of alpine waterfalls above 4,000-ft elevation. The Montana Natural Heritage program designates this species as a G4, S2, meaning that it is considered a sensitive species due to low abundance or limited information. No Coeur d'Alene salamanders have been observed or reported in the project area, and the habitat requirements for this species are not present within the project area. This project would not impact Coeur d'Alene salamanders or their habitat.

Canada lynx may be present within the general vicinity of the project area, but no known denning sites are known to occur within the area (MFWP, unpublished data). The effects of rotenone on birds and mammals have been studied extensively. Mammals in general are not affected because they neutralize rotenone by enzymatic action in their stomach and intestines (AFS 2002). Although no known denning sites for Canada lynx are known to exist within the general area, the proposed treatment date in late summer/early fall would also further serve to reduce any potential impacts to juveniles. The relatively short duration of the proposed project would also minimize impacts to Canada lynx. Therefore, based on the preceding information, MFWP believes the proposed project would not affect grizzly bears or Canada lynx. Additionally, MFWP consulted informally with the USFWS on the effects to Canada lynx and determined there would be "no effect" from the proposed action. USFWS agreed with MFWP's "no effect" determination in a concurrence letter that was sent to MFWP dated June 4, 2012.

On May 29, 2012, MFWP contacted the US Fish and Wildlife Service to determine if formal consultation with the US Fish and Wildlife Service was needed regarding impacts to ESA threatened and endangered species within the project area. MFWP determined that there would be "no effect" to threatened and endangered species. The US Fish and Wildlife Service concurred with this determination on June 4, 2012.

**Comment 5g**. This project would utilize boat and motor on Bass Lake, and several MFWP personnel would be working on the lake and a short portion of Mud Creek during the implementation of this project. The most intense human activity at the lake and the stream would occur during the rotenone application, which is expected to last one day. During this period, the human activity would likely be higher than the area receives during most times of the year. However, the proposed project is located next to Highway 93, and there are several residences nearby, so these activities are not expected to increase wildlife stress.

**Comment 5i.** MFWP would restock Bass Lake with westslope cutthroat trout. Even though MFWP has not previously stocked Bass Lake with cutthroat trout, this native species was likely historically present within the Mud Creek drainage (see Comment 5d).

## B.HUMAN ENVIRONMENT

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

**Comment 6a:** A small boat motor and generator would be used to dispense the rotenone and potassium permanganate, which would generate some noise for a short period of time. The proposed project is located adjacent to US Highway 93, which creates a fair amount of noise, so noise generated by the project should be consistent with the current noise levels.

| 7. LAND USE<br>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. Conflict with a designated natural area or area of unusual scientific or educational importance? | | X | | | | |
| c. Conflict with any existing land use whose presence would constrain or potentially prohibit the proposed action? | | X | | | | |
| d. Adverse effects on or relocation of residences? | | X | | | | |

| 8. RISK/HEALTH HAZARDS<br>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 8ac |
| d. Will any chemical toxicants be used? | | | X | | Yes | see 8a |

**Comment 8a:** The principal risk of human exposure to hazardous pesticide materials from this project would be limited to the applicators. All applicators would wear safety equipment required by the product labels and material safety data sheets such as respirator, goggles, rubber boots, Tyvek overalls, and Nitrile gloves. All applicators

would be trained on the safe handling and application of the piscicide and potassium permanganate. Several Montana Department of Agriculture-certified pesticide applicators would supervise and administer this project. Materials would be transported, handled, applied, and stored according to the label specifications to reduce the probability of human exposure or spill. Therefore, because all applicators would be trained and would follow instructions, the risk of exposure or spill would be minor.

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

**Comment 8c:** The EPA 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 (quality of exerting a destructive or poisonous effect upon nerve tissue) risks to rotenone users, so a number of uncertainty factors were assigned to the rating values. These uncertainty factors include an additional 10x database uncertainty factor - in addition to the inter-species (10x) uncertainty factor and intra-species (10x) uncertainty factor – that has been applied to protect against potential human health effects, and the target margin of exposure (MOE) is 1,000 (EPA 2007). The following table summarizes the EPA toxicological endpoints of rotenone:

| **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<br>UF = 1000<br>aRfD = 15 mg/kg/day = 0.015 mg/kg/day<br>1000 | Acute PAD = 0.015 mg/kg/day | Developmental toxicity study in mouse (MRID 00141707, 00145049)<br>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<br>UF = 1000<br>cRfD = 0.375 mg/kg/day = 0.0004 mg/kg/day<br>1000 | Chronic PAD = 0.0004 mg/kg/day | Chronic/oncogenicity study in rat (MRID 00156739, 41657101)<br>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)<br>LOAEL = 2.4/3.0 mg/kg/day [M/F] based on decreased parental (male and female) body weight and body weight gain |

| | | | |
|---|---|---|---|
| Dermal<br>Short-,<br>Intermediate-, and<br>Long-term | NOAEL = 0.5 mg/kg/day<br>10% dermal absorption factor | Residential MOE = 1000<br>Worker MOE = 1000 | Reproductive toxicity study in rat (MRID 00141408)<br>LOAEL = 2.4/3.0 mg/kg/day |
| Inhalation<br>Short-term (1-30 days)<br>Intermediate-term (1-6 months) | NOAEL = 0.5 mg/kg/day<br>100% inhalation absorption factor | Residential MOE = 1000<br><br>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 degredation products found in the parent plant material used to make piscicidal forms of rotenone. The EPA concluded these degredation products are no more toxic than the active ingredient (EPA 2007).

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 nonedible 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 95$^{th}$ percentile (see Table 5). It is appropriate to consider the 95$^{th}$ 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 acknowledged the four principle reasons for concluding there is a low risk: 1) the rapid natural degradation of rotenone; 2) using active detoxification measures by applicators such as potassium permanganate; 3) properly following piscicide labels, which prohibit the use near water intakes; and 4) proper signing, public notification, or area closures, which limit public exposure to rotenone-treated water (EPA 2007).

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 a temporary closure would preclude many from being in the area. Proper warning through news releases, signing the project area, road closure, and administrative personnel in the project area should be adequate to keep unintended recreationists from being exposed to any treated waters. Dead fish would be collected and sunk in the lakes or removed from the site. Administering application in the fall of the year would further reduce exposure due to the relatively low number of users in this area.

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 residues 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 that of the constituent ingredients in Legumine:

> "…None of the constituents identified are considered persistent in the environment nor will they bioaccumulate (the accumulation of a substance, such as a toxic chemical, in various tissues of a living organism). 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 polyethalene glycols (PEGs) are highly soluble, have very low volatility, and are rapidly biodegraded within a matter of days. The fatty acids in the fatty acid ester mixture (Fennodefo99™) do not exhibit significant volatility, are virtually insoluble, and are readily biodegraded, although likely over a slightly longer period of time than the PEGs in the mixture. None of the new compounds identified exhibit persistence or are known to bioaccumulate. Under conditions that would favor groundwater exchange, the highly soluble PEGs could feasibly transmit to groundwater, but the concentrations in the reservoir and the rapid biodegradation of these constituents makes this scenario extremely unlikely. Based upon a review of the physical chemistry of the chemicals identified, MFWP concludes that they are rapidly biodegraded, hydrolyzed and/or otherwise photolytically oxidized (decomposition of a chemical by light) 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…"(Fisher 2007).

The Legumine MSDS states "…when working with an undiluted product in a confined space, use a nonpowered 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.

The advantage of CFT Legumine over Prenfish is that it has less petroleum hydrocarbon solvents such as toluene, xylene, benzene, and naphthalene. By comparison, Prenfish has a strong chemical odor. CFT Legumine is virtually odor-free and performs almost identically to Prenfish (Fisher 2007).

A study on how South American Indians prepare and apply *Timbó*, a rotenone parent plant, reported that the Indians extensively handled the plants during a mastication (chewing) process, and then swam in lagoons to distribute the plant pulp. No harmful effects were reported. (Teixeira et al 1984). 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 (Teixeira et al. 1984).

| **9. COMMUNITY IMPACT**<br>**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**<br>**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<br><br>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? | | | X | | Yes | See 11c |
| d. Will any designated or proposed wild or scenic rivers, trails, or wilderness areas be impacted? | | X | | | | See 11a and 11c |

**Comment 11c:** This project is designed to eradicate a population of illegally-stocked northern pike in Bass Lake, and a potential source of northern pike to downstream waters. The majority of Bass Lake and the short portion of Mud Creek that would be impacted by this project are located on private lands that lack public access. Current angling opportunity in Bass Lake and Mud Creek is extremely limited and therefore recreational use is low. This project would restock Bass Lake with cutthroat trout to help mitigate for the limited loss of northern pike recreational opportunity in Bass Lake. The removal of northern pike from Bass Lake may reduce the abundance of northern pike in the Tobacco River and Lake Koocanusa, which may also reduce predation on other popular game species of fish including cutthroat, rainbow, bull trout, and mountain whitefish. Therefore, the impact of the project on any public use of scenic rivers, trails, or wilderness areas would be short-term and minor.

| 12. CULTURAL/HISTORICAL RESOURCES<br><br>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 | | | | 12c |
| d. Will the project affect historic or cultural resources? | | X | | | | |

**Comment 12c:** The project site is located within the aboriginal range of the Confederated Salish and Kootenai Tribes of the Flathead Nation and the Kootenai Tribe of Idaho. In July 2012, cultural officers for these tribes were contacted. To date there have been no cultural or religious resources identified at the project site. There would be no ground-breaking activities associated with this project, and no known cultural or religious ceremonies proposed for the same time this project is proposed. Therefore, there would be no impacts to historical or cultural resources.

| 13. SUMMARY EVALUATION OF SIGNIFICANCE<br><br>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? | X | | | | | 13f and<br><br>13e |
| g. List any federal or state permits required or joint or overlapping authorities. | | | | | | 13g |
| h. List any anticipated or potential cumulative impacts associated with this alternative. | | X | | | | |

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

In June 2012, MFWP mailed a scoping letter to the Tobacco Valley Rod and Gun Club, the Yaak Rod and Gun Club, and the Kootenai Trout Club to request a survey of their memberships or interested public to learn about local sentiments about the proposed project.

**Comment 13g:** The following permit would be required:

Department of Environmental Quality Pesticide General Permit - authorization for a wastewater discharge permit for the purpose of applying a fish toxicant.

Because of BPA's involvement, the project would adhere to the following federal regulations as well; there would, however, be no effects to resources protected under these acts:

- The Fish and Wildlife Conservation Act of 1980
- The Fish and Wildlife Coordination Act
- Migratory Bird Treaty Act
- Bald Eagle and Golden Eagle Protection Act
- Executive Order on Environmental Justice
- The Clean Air Act
- The Federal Noise Control Act
- Farmland Protection Policy Act

## PART V. ENVIRONMENTAL ASSESSMENT CONCLUSION SECTION

1. **Based on the significance criteria evaluated in this EA, is an EIS required?** No
   **If an EIS is not required, explain <u>why</u> the EA is the appropriate level of analysis for this proposed action.**

   MFWP concludes that an EIS is not required for the implementation of this project. MFWP further concludes from the information presented in this document that the proposed activities will have either no impact or a positive impact on the physical and human environment.

2. **Public involvement:**

   The draft environmental assessment (EA) is being distributed to all individuals and groups listed in the cover letter. The EA will be placed on the MFWP web site (http://fwp.mt.gov/news/publicNotices/), and at the Bonneville Power Administration website (http://efw.bpa.gov/environmental_services/nepadocs.aspx).

3. **Comment period:**

   There will be a 30-day public comment period for this environmental assessment. Comments will be accepted through September 8, 2012. Submit comments to: Montana Fish, Wildlife & Parks, Attention: Jim Dunnigan, 385 Fish Hatchery Road, Libby, MT 59923, or e-mail to jdunnigan@mt.gov.

4. **Person(s) responsible for preparing the EA:**

   Jim Dunnigan, Fisheries Biologist, MFWP, 475 Fish Hatchery Road, Libby, MT 59923, (406) 293-4161

   Hannah Dondy-Kaplan, Environmental Specialist, Bonneville Power Administration - KEC-4, P.O. Box 3621, Portland, OR 97208-3621, (503) 230-4071

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