Montana Fish, Wildlife & Parks

2300 Lake Elmo Drive
Billings, MT 59105

April 11, 2007

TO: Environmental Quality Council
Director's Office, Dept. of Environmental Quality
Montana Fish, Wildlife & Parks*
- Director's Office
- Parks Division
- Fisheries Division
- Wildlife Division
- Regional Supervisors
- Lands Section
- Design & Construction
- Legal Unit
- Federal Aid Coordinator (when P-R, D-J project)

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Sarah Elliott, Press Agent, Governor's Office*
Maureen Theisen, Governor's Office*
Montana Historical Society, State Preservation Office
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Montana Wildlife Federation
Montana State Library*
George Ochenski
Montana Environmental Information Center
Wayne Hirst, Montana State Parks Foundation
FWP Commissioner Shane Colton*
DNRC Area Manager, Southern Land Office
Scott Barndt, USFS, Bozeman; Scott Shuler, USFS, Livingston; Scott Bosee, GYC, Bozeman
Other Local Interested People or Groups
* (Sent electronically)

Ladies and Gentlemen:

A draft Environmental Assessment has been prepared for removing brook trout from Goose Creek, and Huckleberry, Mutt and Jeff lakes in the headwaters of the Stillwater River, and can be reviewed on the Fish, Wildlife and Parks website at fwp.mt.gov under recent public notices. This removal (using rotenone) would protect a self-sustaining population of native Yellowstone cutthroat trout in Goose Lake, and allow reestablishment of cutthroat trout in the treated waters.

Any questions should be directed to Jim Olsen (328-4626) or Jim Darling (247-2961). Written comments should be addressed to the undersigned at 2300 Lake Elmo Drive, Billings MT 59105; or by e-mail to ghammond@mt.gov, by May 11, 2007.

Sincerely,

Gary Hammond
Regional Supervisor

# Yellowstone Cutthroat Restoration in Goose Creek

## Draft Environmental Assessment

Spring 2007
Montana Department of Fish, Wildlife and Parks
Region 5, Billings MT

# Cover Sheet

# Yellowstone Cutthroat Restoration in Goose Creek

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| Proposed Action: | Montana Fish, Wildlife and Parks (FWP), in cooperation with the Custer and Gallatin National Forests, is proposing to chemically remove brook trout from the headwaters of Goose Creek. Goose Lake contains an unhybridzed, self-sustaining population of Yellowstone cutthroat trout (YCT) and is the current source of wild brook stock for the Big Timber Hatchery. Brook trout have the potential to colonize the lake from the stream and lakes below and displace the YCT through competition and predation. This project will also secure 6 miles of cutthroat habitat in streams and will convert 3 lakes that contain stunted populations of brook trout to YCT. |
| Type of Document: | Environmental Assessment (EA) |
| Lead Agency: | Montana Fish, Wildlife and Parks (FWP) |
| Responsible Official: | Gary Hammond<br>Regional Supervisor, Region 5<br>Montana Fish, Wildlife and Parks<br>2300 Lake Elmo Drive<br>Billings, MT 59105<br>(406) 247-2940 |
| For Further Information: | Jim Olsen<br>Regional Fisheries Biologist<br>Montana Fish, Wildlife and Parks<br>1 Elizabeth Avenue<br>Absarokee, MT 59001<br>(406) 328-4636 |
| Special Note: | Comments received in response to this EA will be available for public inspection and will be released in their entirety if requested pursuant to the Montana Constitution. |

How to Read this EA

To read this EA more effectively, carefully study this page. Following State regulations, we have designed and written this EA: (1) to provide the project decision makers with sufficient information to make an informed, reasoned decision concerning the proposed Yellowstone cutthroat restoration in Goose Creek, and (2) to inform members of the affected and interested public of this project so they may express their opinions to the project decision-makers.

This EA follows the organization and content established by the Environmental Quality Council (EQC) Regulations (ARM 36.2.521-36.2.543). The EA consists of the following chapters:

1.0 Purpose and Need for Action
2.0 Alternatives, Including the Proposed Action
3.0 Past and Current Conditions of Resources in Proposed Project Area and Summary Comparison of Predicted Environmental Effects
4.0 List of Preparers
5.0 List of Agencies and Persons Consulted
6.0 References

**Chapters 1 and 2** together serve as an Executive Summary. We have written these two chapters so that non-technical readers can understand the potential environmental, technical, economic, and social consequences of taking and not taking action.

- Chapter 1 introduces the Yellowstone cutthroat restoration project in Goose Creek and provides a brief explanation of the project, including relevant environmental issues and the relevant laws and regulations with which FWP must comply.

- Chapter 2 and 3 serve as the heart of this EA. Chapter 2 provides detailed descriptions of Alternative A: No Action or not performing any brook trout eradication, and Alternative B: the proposed chemical removal of brook trout with additional subalternatives within this action. Most importantly, it includes a summary comparison of the two alternatives on the human environment, providing a clear basis for choice between the two alternatives for the public and the decision makers.

- Chapter 3 briefly describes the past and current condition of the relevant resources in the project area that would be potentially affected. It also compares the consequences for implementing Alternative A or B. These predictions include the direct, indirect, short-term, long-term, irreversible, and cumulative effects of implementing the alternatives.

# 1.0 Chapter 1: Purpose and Need for Action

## 1.1 Proposed Action: Chemical removal of brook trout from Goose Creek

The Montana Department of Fish, Wildlife and Parks (FWP), in cooperation with the Custer and Gallatin National Forests, is proposing to use the chemical rotenone in the formulation of CFT Legumine to chemically remove brook trout from the Goose Creek drainage to protect the Goose Lake Yellowstone cutthroat trout (YCT) population. The project would involve treating approximately 6 miles of Goose Creek and its fish bearing tributaries, along with three lakes (Huckleberry, Mutt and Jeff) which contain self-sustaining, overpopulated populations of brook trout.

## 1.2 Location

The location of this project is approximately 5 miles north of Cooke City, Montana (T8S R14E Sec 36). The treatment area would extend from the barrier falls, located on Goose Creek approximately 1 mile downstream from Goose Lake (Map 1), to the confluence with the Stillwater River (approximately 4 miles of stream), and would include two small side drainages. The first drainage from the south contains Huckleberry, Mutt and Jeff lakes (all located on the same unnamed tributary), and a second unnamed tributary that has a brook trout population extending to within approximately 1.5 miles from its confluence with Goose Creek. The project is located entirely on the Custer National Forest (CNF). Huckleberry, Mutt, and Jeff lakes are located outside of the Absaroka-Beartooth Wilderness Area, but Goose Creek forms the wilderness boundary and will be considered inside the wilderness. Although these waters are within the CNF, the Gallatin National Forest's Gardiner Ranger District administers the area in accordance with the CNF Forest Plan, and the latter will be the lead forest for this project.

## 1.3 Purpose and Need for Action

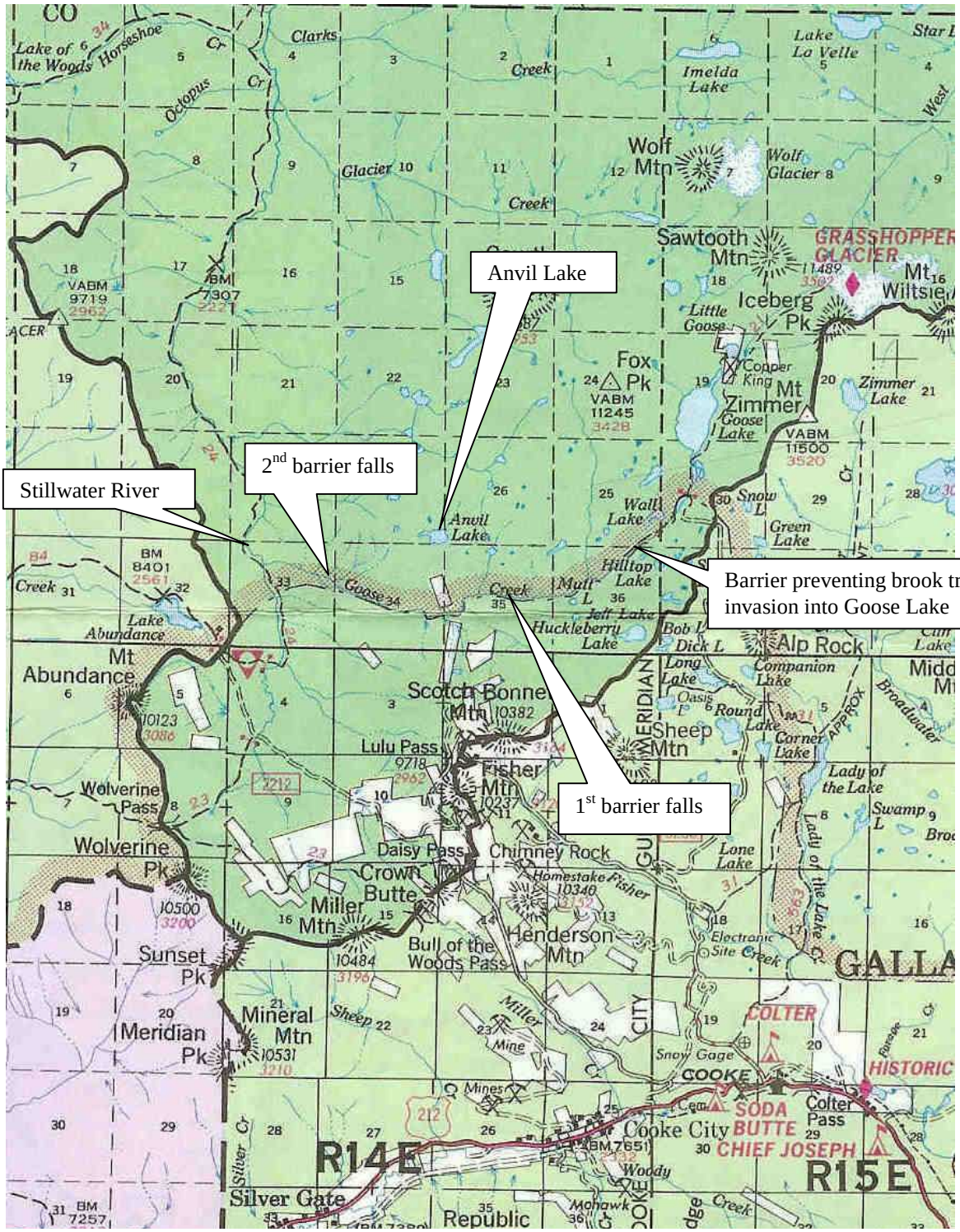
The purpose and need of this project is to replace the existing fisheries in Goose Creek, Huckleberry, Mutt and Jeff lakes with Yellowstone cutthroat trout (YCT) in an effort to protect Goose Lake from brook trout colonization. The proposed action would also secure habitat for YCT in Goose Creek, i.e. habitat free from the negative effects of competition, predation and displacement from brook trout, and aid in the long-term conservation of the species.

### 1.3.1 Need for YCT restoration

Yellowstone cutthroat trout are native to the Upper Snake River drainage and Yellowstone River drainage in Idaho, Montana, and Wyoming. YCT are the only native trout species present in the Yellowstone River Drainage, including the Stillwater River and Goose Creek drainages. Because of overfishing, introduction of non-native specie, habitat degradation and disease, native YCT populations have declined dramatically. In the mid-Yellowstone drainage (from Springdale to mouth of the Bighorn River), YCT occupy only a small fraction of their historic range (<5%), and many of the remaining populations are threatened by the presence of non-native fish that hybridize with, compete for food and space with, and prey upon the native cutthroat. Because of their dramatic decline and the persistent threats from non-native fishes and other sources efforts are underway to protect and expand populations of the species. Such project will help ensure the long-term persistence of the species. YCT are a Species of Special Concern in the State of Montana and on the Sensitive Species List for R1 of the US Forest Service. YCT have been petitioned for listing under the Endangered Species Act, and the outcome of the petition and subsequent litigation are pending.

### 1.3.2 Importance of Goose Lake to YCT conservation

Goose Lake, located at the head of Goose Creek near the headwaters of the Stillwater River (Map 1), harbors a self-sustaining, unhybridized population of YCT. Although there is no stocking record for the lake, it is unlikely that the YCT population is aboriginal because it is isolated from the rest of the drainage by two substantial bedrock waterfalls (Photo 2 and 3). Because of the robust nature of the fish population and its relative accessibility via the Goose Lake Jeep Trail, the lake has recently become the wild brood source for the Yellowstone River Trout Hatchery in Big Timber. The Goose Lake fish will eventually replace the McBride Lake stock formerly used as a brood source to stock waters in the Absaroka-Beartooth Mountains and other areas. YCT from the Yellowstone River Trout Hatchery are important to the long-term conservation of YCT. Not only are the fish used for production fisheries management (i.e., put, grow, and take fisheries), but they are also a conservation brood stock. Fish from the hatchery are used in fisheries restoration projects to expand current populations and refound new populations following non-native fish removal. Further, because of its large YCT population and the number of wild fish from which fertilized eggs can be collected, the Goose Lake YCT fishery provides unique advantages from a conservation genetics perspective.




Map 1. Goose Creek and the upper Stillwater River, showing locations of barriers and lakes.

### 1.3.3. Threats to Goose Lake YCT

In lower Goose Creek drainage, brook trout dominate the fishery. A small tributary stream and its three interconnected lakes, Huckleberry, Mutt and Jeff, all contain brook trout and drain into Goose Creek. The brook trout in these lakes are overabundant, resulting in small fish in relatively poor condition. There is a small bedrock/boulder cascade in Goose Creek approximately 1.5 miles downstream of Goose Lake that appears to be functioning as a barrier to fish migration (Photo 1). This barrier is keeping brook trout from colonizing Goose Lake; however, this is not a complete barrier to fish passage. It is possible that under certain flow conditions, or if there were changes in the geomorphology of the stream channel, that fish would be able to move upstream. In other streams and lakes in the Absaroka-Beartooth Mountains and across the west, brook trout tend to out-compete native cutthroat because of their ability to reproduce in streams with abundant fine sediments, and their ability to reproduce in standing water bodies such as lakes and ponds. Their ability to reproduce and their voracity in many cases has lead to the removal of YCT from lakes and streams. If brook trout colonized Goose Lake, it is likely that they would eliminate eventually the YCT population. Because of these threats, FWP, in cooperation with the Gallatin and Custer National Forests, is proposing to remove brook trout from Goose Creek, Huckleberry, Mutt and Jeff lakes using the piscicide rotenone. The removal efforts would be scheduled for mid August 2007. After brook trout removal, Goose Creek would be stocked with YCT. Therefore, in addition to protecting the Goose Lake population of fish, the project would increase the distribution of YCT by approximately 6 miles. Projects such as this help to prevent YCT from becoming listed under the Endangered Species Act. Huckleberry, Mutt and Jeff lakes will also be restocked with YCT. These lakes, and Huckleberry Lake in particular, should provide larger healthier fish for anglers.

Photo 1. Cascade on Goose Creek preventing brook trout from colonizing Goose Lake.

## 1.4 Objectives of Action (desired outcomes and conditions)

**1.4.1** Objective #1: To protect the Goose Lake population of YCT

**1.4.2** Objective #2: To remove brook trout from the Goose Creek drainage (including Huckleberry, Mutt and Jeff lakes) to its confluence with the Stillwater River, and to improve the fisheries of these lakes.

**1.4.3** Objective #3: Replace the brook trout fishery in lower Goose Creek and Huckleberry, Mutt and Jeff lakes with YCT, thereby expanding the distribution of YCT, currently restricted to the headwaters, down to the creek's confluence with the Stillwater River.

## 1.5 Decisions to be Made

- Determine if alternatives meet the project objectives
- Determine which alternative should be selected
- Determine if the selected alternative would cause significant effect(s) to the human

Map 1. Goose Creek and upper Stillwater River showing locations of barriers and lakes.

Implementation of this project will require authorization from the Forest Service to use piscicides within the Absaroka-Beartooth Wilderness. The Forest Service will make the decision on whether to authorize this use through the analysis provided in this EA.

## 1.6 Relationship of Proposed Project to Existing Plans and Agreements

The respective actions and responsibilities of the cooperators on this proposed project (FWP, GNF, and CNF) are consistent with a number of existing cooperative plans, agreements, and authorities, noted below.

**Cooperative Conservation Agreement for Yellowstone cutthroat trout within Montana.**

The primary instrument guiding mutual cooperation in cutthroat conservation projects is the Cooperative Conservation Agreement for Yellowstone cutthroat trout within Montana. In 1998, the Gallatin and Custer National Forests joined numerous other agencies and the Crow Tribe in signing a Cooperative Conservation Agreement for Yellowstone Cutthroat Trout within the State of Montana. Agencies affiliated with this effort included FWP; Montana Department of Environmental Quality; USDA Forest Service, Northern Region, Gallatin-Custer National Forests; Bureau of Land Management; U.S. Fish and Wildlife Service; Bureau of Reclamation; Bureau of Indian Affairs; and the Crow Tribe. This agreement established a framework of cooperation among the participating parties to work together for the conservation of YCT. The primary goal of the Agreement and accompanying Yellowstone Cutthroat Trout Conservation Program is to ensure the persistence of the YCT subspecies within its historic range in Montana, at levels and under conditions that provide protection and maintenance of both the intrinsic and recreational values associated with the subspecies.

There are 5 objectives stated in the Memorandum of Understanding and Conservation Agreement for Westslope and Yellowstone Cutthroat Trout (FWP et al. 2007), of which FWP and the Gallatin and Custer National Forests, among others, are signatories. This project will fulfill at least 2 objectives of the agreement:

**Objective 1.** Maintain, secure, and/or enhance all cutthroat trout populations designated as “core” or “conservation” populations. (Core populations are those that have been genetically tested, and there is no evidence of hybridization; conservation populations are those, including all core populations, that have less than 10% hybridization and whose fishery management objectives revolve around protecting cutthroat trout).

**Objective 2**. Continue to survey waters to locate additional cutthroat trout populations and determine their distribution, abundance, and genetic status.

**Objective 3**. Seek collaborative opportunities to restore and/or expand each cutthroat trout subspecies into selected suitable habitats within their respective historical ranges.

**Objective 4**. Continue to monitor cutthroat trout distributions, genetic status, and abundance using a robust, range-wide, statistically sound monitoring design.

**Objective 5.** Provide public outreach, technical information, inter-agency coordination, administrative assistance, and financial resources to meet the listed objectives and encourage conservation of cutthroat trout.

The objective of this proposal is to remove brook trout from Goose Creek down to its confluence with the Stillwater River. The population of YCT in Goose Creek is a "core" population because it has been genetically tested, and there is no evidence of hybridization. By removing brook trout, Objectives 1 and 3 will be achieved for this population. The cutthroat population will be expanded down to the confluence of the Stillwater River, and the YCT population in Goose Lake will be secured from the potential of invasion by brook trout. Further, the population of YCT in the 6 miles of Goose Creek proposed to be treated will exist free from the potential effects of non-native brook trout.

**Policies and Guidelines for Fish and Wildlife Management in National Forest and Bureau of Land Management Wilderness**

These are guidelines for fish and wildlife management in U.S. Forest Service administered wilderness areas (AWFA 2006). The guidelines indicate that:

Chemical treatment may be necessary to prepare waters for the reestablishment of indigenous fish species**,** consistent with approved wilderness management plans**,** to conserve or recover Federally listed threatened or endangered species, or to correct undesirable conditions resulting from human activity. Proposals for chemical treatments will be considered and may be authorized by the Federal administering agency through application of the MRDP as outlined in Section E., General Policy. Any use of chemical treatments in wilderness requires prior approval by the Federal administering agency.

Guidelines for Chemical Treatment

a. Use only registered pesticides according to label directions.

b. In selecting pesticides, give preference to those that will have the least impact on non-target species and on the wilderness environment.

c. Schedule chemical treatments during periods of low human use, insofar as possible.

d. Immediately dispose of fish removed in a manner agreed to by the Federal administering agency and the State agency.

**Custer National Forest Land and Resource Management Plan**

The CNF Land and Resource Management Plan (Custer Forest Plan) lists YCT as a coldwater habitat Management Indicator Species. Custer Forest Plan management standards for wildlife and fisheries management (page 16) includes the following (USDA 1986):

"[M]anage the land to maintain at least viable populations of existing native and desirable non-native vertebrate species, promote the conservation of federally listed threatened and endangered species, and coordinate and cooperate with appropriate state, federal and private agencies in the management of habitats for major interest species."

Custer Forest Plan standards for management of fisheries resources (page19) include:

1) "Fish species and habitats will be managed in cooperation with state and other Federal agencies."

2) "An inventory will be made of warm- and coldwater fisheries potential. In suitable areas, activities will be designed to maintain, develop or create cold- and warmwater fisheries. Streams and lakes supporting pure strains of fish species will be managed to maintain or expand these populations."

Custer Forest Plan wildlife and fish standards for the Absaroka-Beartooth Wilderness (Management Area 1, page 70) include:

"Management of fish and wildlife will be guided by the Memorandum of Understanding between the Montana Department of Fish, Wildlife and Parks and the Forest Service."

## 1.7 History of the Planning and Scoping Process, Public Involvement and Agencies, Individual and Groups Contacted

A meeting was held on December 21, 2006 in Livingston, Montana between FWP and the Gallatin National Forest (GNF) to discuss this proposed project. In this meeting, initial environmental issues were identified. In addition, applicable permits, a public involvement plan, and an analysis process that ensured state MEPA requirements also met federal NEPA requirements were discussed.

In February of 2007, scoping letters were sent to the individuals identified as potentially having interest in the project including the Beartooth Alliance, the Greater Yellowstone Coalition, Cooke City Chamber of Commerce, the Billings Gazette and other individuals as identified by the GNF Gardiner Ranger District and FWP. This letter briefly described the project and directed interested individuals to a web site where a draft version of this

document was available for further information. Preliminary comments received were incorporated into the EA before it was released for formal public comment. A summary of the comments received from this scoping and the response to those comments is included in Appendix 1.

The EA was released in early April, and the public comment period lasted 30 days. At a public meeting held in Red Lodge, Montana in April of 2007, more comments were received from the general public on the proposed action.

A second public meeting will be held in Cooke City, Montana in June of 2007. This meeting will be held after the EA formal comment period has ended, but FWP feels it is important to inform the local people about the proposed actions. If substantive comments that have not been previously addressed are received at the meeting, the project may be delayed until 2008 so that these comments can be given consideration.

The following resource specialists were involved in the project design, assessment of potential impacts, and development of mitigation measures: Jim Olsen, FWP Regional Fisheries Biologist; Dave Hergenrider, FWP Technician; Jim Darling, Regional Fisheries Manager; Allison Puchniak, FWP Native Species Coordinator; Scot Shuler, East Zone Fisheries Biologist, Gallatin National Forest; Scott Barndt, Forest Fisheries Biologist, Gallatin National Forest; Marion Cherry, Forest Wildlife Biologist, Gallatin National Forest; Darin Watschke, Fisheries Biologist, Custer National Forest; Kimberly Schlenker, Wilderness Specialist, Gallatin National Forest; Ken Britton, District Ranger, Gardiner Ranger District, Gallatin National Forest; Dan Seifert, Physical Scientist, Red Lodge Ranger District, Custer National Forest; Dave Schmid, District Ranger, Red Lodge Ranger District, Custer National Forest; Kate Walker, Acting Forest Supervisor, Custer National Forest; and the Piscicide Committee, FWP.

## 1.8 Permits, Licenses and Other Authorizations Required

**1.8.1** A 308 Authorization from the Montana Department of Environmental Quality is required to apply a piscicide to waters of the State of Montana. This is a temporary exemption to the state water quality standards.

**1.8.2** A certified applicator licensed through the Montana Department of Agriculture is required for the application of piscicides in waters of the State of Montana.

**1.8.3** Per the Policies and Guidelines for Fish and Wildlife Management in National Forest and Bureau of Lang Management Wilderness (AWFA 2006) and Forest Service Policy, a Minimum Requirement Decision Process (MFDP) and Pesticide Use Proposal form (FS-2100-2) will be completed and approved prior to piscicide use in the Absaroka-Beartooth Wilderness Area. With this authorization, an MDEQ 401 certification may also be required.

# 1.9 Issues

## 1.9.1 Issues studied in detail

### 1.9.1.1 Impacts of piscicides on water quality (Issue #1)

The application of rotenone to Goose Creek and Huckleberry, Mutt and Jeff lakes will result in a temporary reduction in water quality. The reduction in water quality is expected to last between 1 day (in the creek) and 4-6 weeks (in the lakes) as the piscicide naturally breaks down. During this time, water quality will be reduced such that the coldwater aquatic community, including the target organism (brook trout) and other non-target animals that respire using gills, will be impacted.

### 1.9.1.2 Impact of piscicides on non-target organisms (Issue #2)

The application of rotenone to Goose Creek and Huckleberry, Mutt and Jeff lakes will result in temporary impacts to non-target aquatic organisms, namely aquatic invertebrates. Rotenone can also have negative effects on juvenile amphibians that respire through gills or skin, i.e., tadpoles and larval salamanders. There are no anticipated negative impacts to adult amphibians, terrestrial wildlife, and livestock that may consume treated water or fish killed by rotenone.

### 1.9.1.3 Impacts to recreation and public use of area (Issue #3)

This project is located entirely on US Forest Service land that receives substantial recreational use by the public. Fishing, hunting, hiking, wildlife viewing and ATV use are all popular recreational activities that occur in the project area during the proposed treatment time. This project will result in the absence of fishing opportunities in Huckleberry, Mutt and Jeff lakes and in lower Goose Creek immediately following the project. These fisheries will be restored with YCT as soon as they can be verified brook trout free, which would occur approximately 1 year from the time of treatment.

### 1.9.1.4 Impacts on the Absaroka-Beartooth Wilderness Area (Issue #4)

Most of the project area is located outside the Absaroka-Beartooth Wilderness Area; however, portions of Goose Creek are in the wilderness. Other portions of Goose Creek form the wilderness boundary, and ephemeral tributary streams that enter Goose Creek from the north are within the wilderness area. Goose Creek and these small streams will need to be treated during the project. Conducting these treatments has the potential to impact ‘wilderness character’ in the treatment area. Briefly, wilderness character can be compromised when wilderness ecological systems and processes are impacted by effects of modern civilization, including human control and manipulation. Currently, the invasion

of brook trout threatening the Goose Lake YCT population can also be considered a negative impact to wilderness character.

#### 1.9.1.5 Impacts on the North Absaroka and Beartooth Inventoried Roadless Area (Issue #5)

Huckleberry, Mutt and Jeff lakes are in the Beartooth Inventoried Roadless Area (IRA). Portions of Goose Creek form the north boundary of portions of the North Absaroka and Beartooth IRA's.

# 2.0 Chapter 2: Alternatives, Including the Proposed Action.

## 2.1 Introduction

Alternatives, including the proposed action, are the heart of this EA. The purpose of Chapter 2 is to describe and compare the alternatives by summarizing the environmental consequences. Alternatives were planned through scoping, development of issues, and input from the U.S. Forest Service and other resource specialists. This chapter describes the activities and expected outcomes of the "Preferred" alternative and "No Action" alternative. This information is presented in a comparative format, providing the decision maker and the public a clear basis for choice among the options.
This chapter has three sections:

- Description of proposed alternatives
- Alternatives considered but eliminated from detailed study
- Summary comparison of the activities and predicted achievements of the project objectives

## 2.2 Description of Alternatives

### 2.2.1 Alternative A: No brook trout removal (No Action)

Under the "No Action" alternative, brook trout would not be removed from the Goose Creek drainage, and the fishery in the creek and in Huckleberry, Mutt and Jeff lakes would remain as they are currently. Brook trout invasion could threaten the population of YCT in Goose Lake and the use of the lake as a conservation and management brood source. As will be further discussed in Chapter 3, evidence from nearby streams indicates that there is a high likelihood that brook trout will ultimately replace YCT. There would be no expected changes in recreation as a result of the "No Action" alternative, but recreation in other lakes and streams may be affected through the loss of the YCT conservation and management brood source. Huckleberry, Mutt and Jeff lakes would continue to provide only marginal

fisheries value because of the small size of fish resulting from the high reproductive capacity of brook trout. Because brook trout are capable of spawning in sandy substrate along the shoreline and inlets and outlets of lakes, they commonly overpopulate their habitat. Most other salmonid fishes require flowing water and gravelly substrate for successful spawning. When a fish population is too large for its available resources, fish growth is slowed, resulting in abundant, but small-sized fish. Fishing limits on brook trout are liberal in the Beartooth Mountains (20 fish) to encourage anglers to harvest the fish, but because of small fish size (generally less than 8 inches), few anglers keep them. Thus, angling has not been an effective tool at reducing brook trout population size in overpopulated lakes.

Photos 2 and 3. Left, barrier falls between 1st and 2nd meadow (approximately 18 ft high). Right, series of falls approximately 1/4 mile above confluence with Stillwater River.

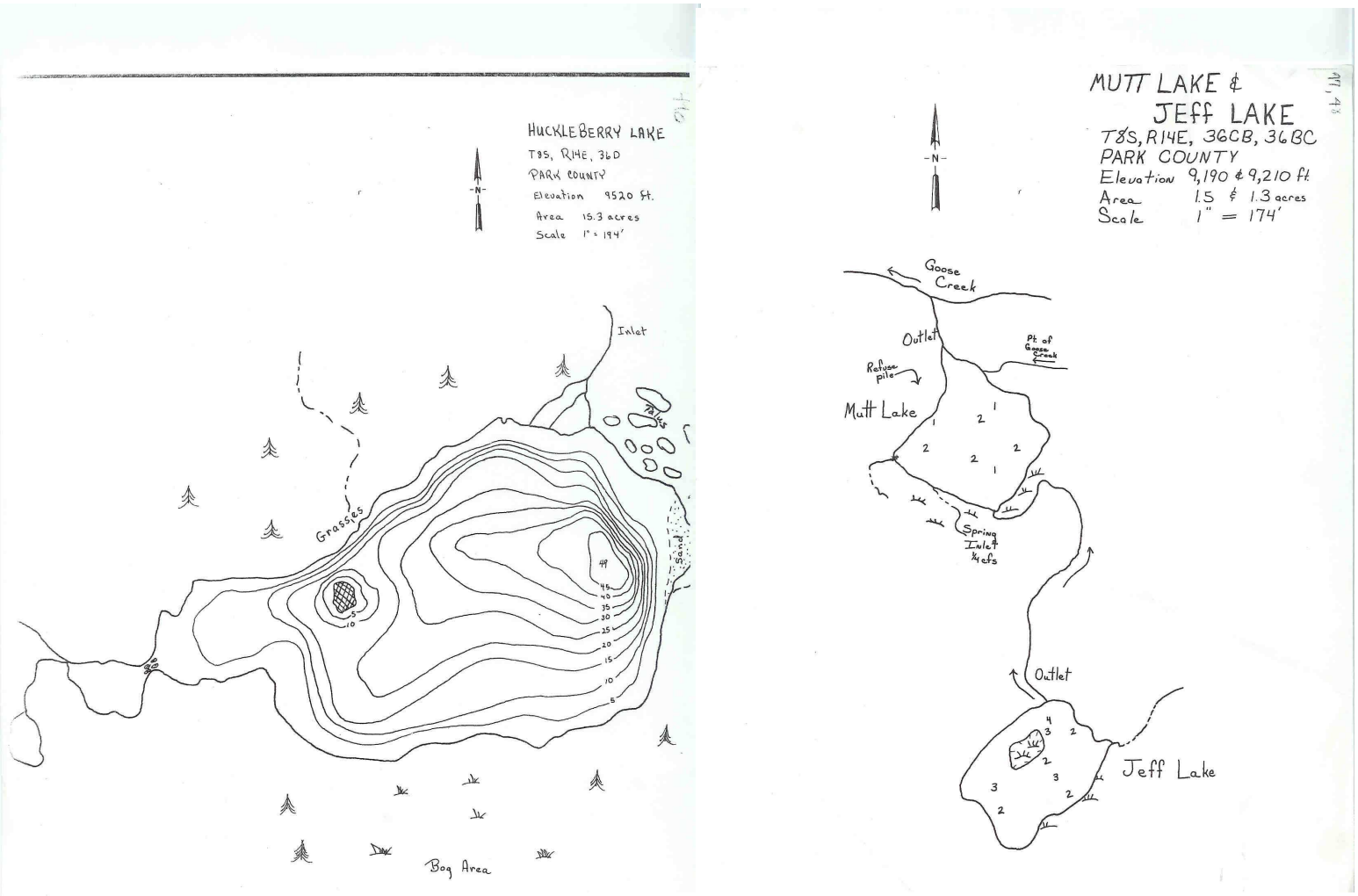
Under the no action alternative, and if brook trout did colonize and displace the fish in Goose Lake, an alternative brood source would have to be located. There are several alternative source of self-sustaining YCT populations available for brook creation or augmentation. The Yellowstone River was originally used as a brood source of fish. However, hybridization with rainbow trout and whirling disease in the Yellowstone River make collection of adults for spawning purposes problematic. McBride Lake in Yellowstone National Park has also historically been used a brood source. Difficulties in obtaining eggs from McBride Lake in Yellowstone National Park (the previous brood source for YCT in the Yellowstone River Trout Hatchery) led FWP to seek a possible alternative source of wild fish to supplement and maintain the brood stock at the hatchery and prevent domestication of the fish. Access to McBride Lake is by foot trail. Horses were used in the past

because of the distance traversed and the amount of equipment necessary to collect and transport eggs. Further, YCT in McBride Lake spawn in early July and Slough Creek must be crossed when the water is high, making access to the lake difficult and dangerous. Another complication to collecting eggs at McBride Lake is that fish from which the eggs and sperm are collected must be killed and tested for disease. The population size in McBride Lake is not as robust as that of Goose Lake, so collecting eggs and sacrificing the parents made McBride Lake an unreliable and less viable option for collecting wild fish to infuse into the hatchery brood stock. Other options are present in the Beartooth Mountains, but nearly all of these lakes are within the wilderness area and are not as easily accessible as Goose Lake. To collect eggs in these locations, a helicopter would have to be used to fly fish and eggs out of the collection site. Such use would require special exemption from the Forest Service because of the use of the helicopter in the wilderness. It would also significantly increase the cost of establishing and maintaining the brood stock through time.

As noted in the previous paragraphs, this alternative does have potential impacts to wilderness character. First, a brook trout invasion of Goose Lake threatens an indigenous population of YCT, as well as the brood source for both YCT recovery efforts and maintenance of YCT fisheries within and outside of the A-B wilderness area. All of these are part of the existing A-B wilderness character. Second, loss of Goose Lake as a brood source would likely necessitate using another brood source in the A-B, and egg collection from those potential sites has high potential for negative impacts to wilderness character.

### 2.2.2 Alternative B: Chemical removal of brook trout

Goose Lake harbors an unhybridized population of YCT that is accessible by ATV within 0.5 miles via the Goose Lake Jeep Trail. The accessibility of Goose Lake and the robust nature of the self-sustaining fish population made it a prime candidate for creating and maintaining a new YCT brood source in the Big Timber Hatchery. In 2004, 2005, and 2006, eggs were collected from YCT at Goose Lake and transported to the Yellowstone River Trout Hatchery in Big




Maps 2 and 3. Bathometric maps of Huckleberry Lake (left) and Mutt and Jeff lakes (right).

Timber for rearing. Because of the success of these egg collections and the genetic integrity of the population, Goose Lake fish will likely replace the McBride Lake brood stock at the hatchery.

Goose Creek flows out of Goose Lake to the south, and then turns to the east where it converges with the Stillwater River (Map 1). Within the Goose Creek drainage, Little Goose, Goose, Huckleberry, Mutt, and Jeff lakes contain fish. Huckleberry, Mutt, and Jeff lakes, and the creek that connects them, contain self-

sustaining populations of brook trout. Huckleberry Lake is substantially larger (15.7 acres, maximum depth 49 ft, Map 2) than Mutt (1.3 acres, maximum depth 4 ft, Map 3) or Jeff (1.5 acres, maximum depth 3.5 ft, Map 3). The brook trout in these lakes are overpopulated, with an average fish size of 7.5 in. Goose Creek is also populated with brook trout from approximately 1 mile upstream of Mutt Lake, where a small bedrock-rubble cascade (Photo 2) is acting as a barrier to fish passage, to its confluence with the Stillwater River. This cascade currently prevents brook trout from colonizing areas farther upstream, including Goose Lake. The cascade is small and does not likely function as a barrier during all flows, but no brook trout have yet been found upstream. YCT are also present in Goose Creek, but brook trout outnumber the YCT 25:1 in lower reaches of the creek. Two large meadows separated by barrier waterfalls (Photos 2 and 3) are located on Goose Creek downstream of Mutt Lake. These falls are barriers to upstream fish migration, and the lower falls prevents fish from the Stillwater River from colonizing Goose Creek. An unnamed tributary stream that drains from the south also has a brook trout population. Huckleberry, Mutt, and Jeff lakes are on the Custer National Forest, but outside the wilderness. Goose Creek forms the southern border of the Absaroka-Beartooth Wilderness Area for approximately 4 miles. The lower 2 miles of Goose Creek are within the Wilderness Area.

The intent of this project is to replace the existing fisheries in Goose Creek, Huckleberry, Mutt and Jeff lakes with YCT in an effort both to protect Goose Lake from brook trout colonization and to secure additional habitat for YCT in lower Goose Creek. To remove the brook trout, the piscicide rotenone in the formulation CFT Legumine is being proposed for use. CFT Legumine has several advantages over other formulations, including a new emulsifier and solvent that reduce the presence of petroleum hydrocarbon solvents. Fish are believed to be able to detect the hydrocarbons in other formulations and avoid treated waters, resulting in incomplete fish kills. The hydrocarbons in other rotenone formulations are highly aromatic, resulting in a distinct chemical odor during treatment. Because of the lack of hydrocarbons, the new formulation has fewer of these drawbacks. The treatment is proposed for mid August of 2007, prior to brook trout spawning in September.

Because of the large volume of water in Huckleberry Lake, a large quantity of rotenone will be required to perform the treatment. Huckleberry, Mutt and Jeff lakes would be treated at a concentration of 4 parts per million (ppm) rotenone. Approximately 348, 6.5, and 7.5 gallons of rotenone would be used to treat Huckleberry, Mutt and Jeff lakes, respectively, all of which are outside the wilderness area. The rotenone would be applied to Huckleberry Lake using a motorized boat. Chemical applied to the lake would be mixed using the propeller of the boat motor. A motorized pump would also be used to apply diluted rotenone to shallow areas of the lake and in backwaters. In more remote areas that the boat and the pump cannot reach, a backpack sprayer would be used to apply the rotenone. All personnel applying the chemical would use appropriate

safety gear and follow the methods outlined on the label for safe application of the product. Because Huckleberry Lake is deep, dry ice would be used to facilitate mixing rotenone. The dry ice would be sunk into deep portions of the lake, and the bubbling action would increase circulation of lake water to ensure complete mixing of the chemical throughout the lake. Approximately 300 lb of dry ice would be applied to the lake. Because Mutt and Jeff lakes are small and shallow, rotenone would not be applied with a motorized boat. A gasoline powered pump would be used to apply the rotenone across each lake. A boat would likely still be used, but it would not be motorized. At a concentration of 4 ppm, it is anticipated that the rotenone would naturally break down in the lakes within 4-6 weeks. The reason for the long persistence of the chemical in the lakes is the higher application rate and the lower water exchange rates in the lake versus the stream environment where the chemical usually breaks down within 8-24 h. The flow out of Huckleberry Lake in late August is undetectable. Standing water in pools downstream of the lake are present, but surface flows between pools are negligible. The outlets of Mutt and Jeff Lakes flow between 0.2 and 0.5 cfs. The flow in Goose Creek at the confluence with Mutt Lake is between 3 and 5 cfs so the chemical would be diluted to concentrations that are no longer lethal to fish or other aquatic life. Therefore, there will be no long lasting effects on water quality in Goose Creek as a result of treatment of the lakes.

In the stream, a concentration of 1 ppm rotenone would be applied using a gravity-fed, constant-head drip station (Photo 4). Drip stations are allowed to run for at least 8 hours. Backpack sprayers would be used to apply the piscicide to backwater areas or areas not connected to the main creek. No motorized equipment would be used to treat Goose Creek or in any water in the wilderness area. Drip stations would likely be spaced ¼ to 1 mile apart; the exact distance would be determined through a bioassay. A bioassay is an experiment where the chemical is applied to the target water or one of its tributaries to determine the exact distance the chemical would travel and effectively produce a 100% fish kill (termed travel time). Because factors such as water chemistry (pH, alkalinity), temperature and turbulence can affect the breakdown rate of the rotenone, and these factors vary from stream to stream, a bioassay is commonly performed to determine the distance the chemical can be expected to travel. In general, the breakdown rate of the chemical is also affected by stream volume, with faster breakdown rates in smaller streams than in larger streams. A bioassay would be performed in Goose Creek prior to treatment to determine the chemical's travel time, which would also determine the spacing between drip stations. Because part of Goose Creek enters Mutt Lake (Map 3), a drip station would be maintained constantly upstream of the lake in Goose Creek for up to 2-3 days to allow the chemical in the lake to thoroughly mix. If a drip station were not constantly maintained upstream in Goose Creek, untreated waters entering the lake could provide a refuge for brook trout to survive. Approximately 80 gallons of CFT Legumine would be applied to Goose Creek and its fish bearing tributaries starting 0.5 mile upstream of the barrier cascade currently isolating

Goose Lake from brook trout colonization (Map 1). The exact amount would be determined based upon the flow rate in the stream at the time of treatment. Beginning the treatment farther upstream will allow the chemical to mix thoroughly into the water before reaching waters containing brook trout.

Goose Creek would be treated down to the lowermost falls upstream of the confluence with the Stillwater River (Map 1). No chemical would be applied downstream of this point. No detoxification station would be used to neutralize the rotenone for this project; rather, the chemical would be allowed to naturally break down from the falls down into the Stillwater River. Detoxifying the rotenone immediately at the confluence with the Stillwater River would be logistically challenging and would pose potential additional threats to wildlife species. This detoxification would require a horse packing effort to carry the potassium permanganate $KMnO_4$ (used to detoxify the rotenone) and other required equipment to the station. Enough chemical and supplies would have to be packed to supply the station for 3-4 days. Further, the potassium

Photo 4. Constant head drip station showing bucket with diluted rotenone and constant head bowl applying rotenone to the stream.

permanganate can also have negative effects on aquatic life (Walker 2003). Detoxification stations are used when there are substantial aquatic or other resources downstream of the treatment area that are in need of protection. Because of poor water quality, there is no significant fishery immediately

downstream of Goose Creek. By allowing the chemical to naturally break down, some of the fish in the Stillwater River would likely be killed; however, that number should be minimal. The flows in the Stillwater River in August are generally 1.5 to 2 times those of Goose Creek. Therefore, any treated waters reaching the Stillwater River would be substantially diluted. Due to dilution and the natural breakdown rate of the rotenone, it is anticipated that the fish kill would not extend more than 1-2 miles downstream of the confluence with Goose Creek. Additional tributaries enter the Stillwater River downstream of Goose Creek and lessen the possibility of the chemical traveling farther than expected. New YCT migrants from Goose Creek would replace fish killed in the Stillwater River after the proposed project is completed.

As a contingency, and to ensure the rotenone does affect the fishery in the Stillwater River farther downstream than expected, an emergency detoxification station would be located on the Stillwater River approximately 3 miles downstream of the confluence with Goose Creek in the Absaroka-Beartooth Wilderness Area. Potassium permanganate is used to rapidly detoxify rotenone. $KMnO_4$ is a purple crystalline solid that readily dissolves in water. It is a strong oxidizer that is commonly used in drinking water treatment and other treatment facilities to oxidize metals, kill bacteria and viruses, and remove unpleasant tastes. Because fish are some of the most sensitive species to rotenone, the presence of the chemical in the water can be determined by observing the behavior and survival of caged fish. These sentinel fish would be placed in cages in the river upstream of the detoxification location to monitor for the presence of rotenone in the water. Signs of rotenone poisoning include loss of equilibrium and death. If signs of rotenone poisoning occur, $KMnO_4$ would be administered to the water at a concentration of approximately 4 ppm. $KMnO_4$ is administered to the stream in the same manner as rotenone (i.e., using a constant head drip station), except that a larger tank is used. The efficacy of the detoxification station would be monitored by sentinel fish located approximately 1 mile downstream of the detoxification station. If rotenone is found to travel as far downstream as the detoxification station, and the sentinel fish located upstream of the detoxification station die, they would be periodically replaced to determine when rotenone is no longer present in the water. Extra sentinel fish would be kept in the Stillwater River upstream of the confluence with Goose Creek. Only 1 day's (8-10 h) worth of $KMnO_4$ (50-100 lb) would be stored at the detoxification station. Additional permanganate would be stored in a bear-proof container or locked vehicle at the Stillwater River Trailhead. The $KMnO_4$ at the detoxification station would be treated like food and be stored in compliance with the wilderness food storage orders. All permanganate and application equipment will be packed in using backpacks.

Given the relatively remote nature of the creek and lakes, a helicopter and sling would have to be used to transport equipment (including and inflatable boat and motor), chemicals, and personnel to the project area. There would be one launch location on the west side of Scotch Bonnet Mountain near Lulu Pass and three

landing locations: near Huckleberry Lake, on the northeast side of Mutt Lake, and between the first and second barrier falls on the east side of Goose Creek. All landings and sling-load equipment drops would occur outside of designated wilderness. The proposed flight path from the launch and landing locations is less than 1 mile and does not cross any roads or recreational areas. A pickup truck and trailer would be used to transport chemical and equipment on the Daisy Pass Road to the launch point. A backup launch location would be the Forest Service Administrative Site near Colter Campground. The flight path from the administrative site to the landing location would cross Highway 212 and other Forest Service Roads and is, therefore, not the preferred launch site. Fifteen 30-gallon barrels of rotenone would be slung in along with other equipment, including an inflatable boat. The helicopter would not land within the wilderness area, and flights over the wilderness would be minimized. ATV's would also be used to transport personnel and minor equipment to near the site. There is no current road access to the project area, but the area is accessible to within 0.5 mi via the Goose Lake Jeep Trail. ATVs would not be driven off any designated Forest Service travel route.

The year following the chemical removal, the lake and stream will be monitored for the presence of brook trout. The lakes would be gillnetted in July as soon as the ice has receded, and the creek would be electrofished under low water conditions (likely in August). If brook trout are present, the project would be repeated in 2009 with monitoring in 2010. If no brook trout are present, the creek and lakes would be restocked with YCT. In Huckleberry Lake, 750 catchable-sized (approximately 8 in) and 750 2 in YCT would be stocked via helicopter into the lake. The purpose of stocking catchable-sized fish is to establish a fishery in the lake as soon as possible for anglers. Mutt and Jeff lakes would also be stocked with 2-in fish at a rate of 100 fish per acre via helicopter. For three consecutive years, Goose Creek would be stocked with 5,000 fish to establish multiple age classes of fish. Fish in Goose Creek would be stocked near Mutt Lake and between the first and second barrier falls via helicopter. The helicopter will be required to land to stock Goose Creek, but all landings will be outside the Absaroka-Beartooth Wilderness Area. All YCT stocked will be the Goose Lake strain from the Yellowstone River Trout Hatchery in Big Timber. Fish in the creek would likely become self-sustaining in 4 years, when fish begin to spawn naturally. It is unclear if the Huckleberry Lake fishery would become self-sustaining. There is spawning habitat in the outlet of the lake, but there may be insufficient flows in late summer to incubate YCT eggs. If no spawning occurs, the lake would be periodically stocked (every 4-6 years) to maintain the fishery. It is anticipated that YCT stocked into Huckleberry Lake would produce a higher quality fishery than the existing brook trout because the lakes would no longer be overpopulated. In lakes with similar YCT management and similar habitat, 14-18 in fish at 4 years old are not uncommon.

As noted in the preceding paragraphs regarding this alternative, although most activities proposed in this alternative (including all motorized actions) would

occur outside of the A-B Wilderness Area, some piscicide application will be required within the wilderness to successfully remove brook trout from Goose Creek and its tributaries. As previously described in section 1.6, the AFWA agreement details situations under which such applications of piscicide are appropriate within wilderness areas; these include treatments to re-establish an indigenous species, as proposed and described under this alternative. The guidelines further denote treatment guidelines to minimize impacts to wilderness character, and all of these have been considered in developing this alternative. Taken together, application of piscicide within the A-B Wilderness as proposed in this alternative would result in a short-term diminishment of wilderness character, during project activities, but would result in a long-term improvement in wilderness character through protection and expansion of the YCT population in Goose Lake and Goose Creek and its tributaries. Furthermore, the short-term impacts to wilderness character have been mitigated to the degree possible by including the mitigations outlined in the AWFA agreement.

### 2.2.3 Alternatives considered but eliminated from detailed study

#### 2.2.3.1 Fortifying existing barrier preventing brook trout colonization of Goose Lake

It is possible to prevent brook trout invasion of Goose Lake by fortifying the existing bedrock-rubble cascade (Photo 1) that is currently preventing brook trout from accessing Goose Lake. Although this option would not expand the current distribution of YCT in the Goose Creek drainage, it would protect the Goose Lake population from brook trout colonization. Fortification of this area would include the construction of a small concrete dam anchored to the bedrock of the streambed. A full hydrologic design was not done at this site, but the basic factors that go into barrier design include creating a drop greater than what fish can jump or velocities greater than those which fish can swim. At this particularly location the right bank of the creek is bedrock and would easily facilitate the construction of such a structure. The left bank is rubble consisting of very large boulders up to 5 ft in diameter. These boulders would have to be moved or removed through blasting in order to access bedrock to anchor the barrier structure.

##### 2.2.3.1.1 Rationale for elimination

The option of reinforcing the existing barrier was examined closely and there were 3 reasons for not going forward with that option: 1) Cost. The existing barrier in Goose Creek (Photo 1) that appears to be preventing brook trout colonization of Goose Lake is located in a remote location. Because of the remote location we would have to fly or pack all equipment and supplies into the site. Such supplies would likely include concrete, rebar, blasting supplies and some sort of equipment that is capable of lifting rocks over 1,000 lb. The cost of doing this work in the remote location would likely be between $100,000 and

$200,000. A similar project is being performed in the Pryor Mountains to protect a Yellowstone cutthroat population there and the cost of that project is over $300,000. 2) Impacts to wilderness character: Goose Creek is the wilderness boundary at this location and is therefore considered at least partly in the wilderness area. Construction of any permanent structure in the wilderness area is generally not in keeping with wilderness policy (AWFA 2006), and requires justification to and approval from, the Chief of the Forest Service in Washington, DC. 3) One of the goals of this project is also to expand the range of YCT in the Goose Creek drainage. Because of competition and predation from brook trout, YCT distribution and abundance is substantially limited. In recent surveys, we found no evidence of successful reproduction of YCT in the creek downstream of the barrier, despite abundant spawning and rearing habitat. It is likely that because of the restricted numbers and competition and predation by brook trout, that the YCT abundance and distribution would not increase naturally. If the proposed project is performed, the range of cutthroat will be expanded by about 6 miles. Projects such as this one help ensure the long-term persistence of YCT and thwart future listing of the species under the Endangered Species Act.

**2.2.3.2 Antimycin as an alternative to rotenone**

Antimycin is the only other piscicide registered for use in waters of Montana. Antimycin is used at much lower concentrations than rotenone (10 parts per billion vs. 1 part per million) and breaks down much faster. Because of its very low concentration, fish cannot detect the presence of the chemical and do not attempt to avoid treated waters. Further, antimycin may be less toxic to stream invertebrates than rotenone, while still effecting a total kill of fish (Cerreto 2004), although this has been demonstrated only in much more alkaline waters (pH 8.7-9.0) than are found in the proposed project area (pH 6.0 in Huckleberry Lake). At another project in Cherry Lake, antimycin was not effective at producing a 100% fish kill. The reason for the incomplete kill is uncertain, but may be related to not being able to thoroughly mix the chemical into the lake prior to it breaking down naturally, or to potential effects of environmental conditions unique to the lake that quickly broke the chemical down (Pat Clancy, personal communication).

Antimycin use in streams is more effective than in lakes; however, it breaks down much faster than rotenone. This breakdown rate presents additional logistical challenges for treating the creek. Further, the breakdown rate of antimycin is more strongly affected by turbulence that are abundant in Goose Creek between the meadow sections. In Goose Creek, therefore, to produce a fish kill down to its confluence with the Stillwater River, drip stations would have to be established downstream of the second barrier falls. Establishing drip stations in this reach of stream is logistically challenging.

The reach is difficult to access from upstream because of steep grades and very loose footing. It can be reached from downstream via the Stillwater Trail, but access is still difficult. The area is inaccessible via helicopter because of steep terrain and abundant burnt trees and this reach of Goose Creek is entirely within the A-B Wilderness Area. Additionally, because of the fast breakdown rate, it is estimated that at least 2 times as many drip stations would be needed with antimycin, requiring double the personnel to staff them.

##### 2.2.3.2.1 Rationale for Elimination

Because of the potential uncertainty of success using antimycin in the lakes, antimycin was dismissed as an alternative to rotenone for this proposed project in the lakes. Because of the more frequent application station that are required with the use of antimycin and the logistical challenges this would create, particularly in lower Goose Creek, it was also eliminated as an option in the stream phase of this project. Eliminating this alternative from consideration is similarly consistent with wilderness policy because this alternative would require more use and disturbance of the wilderness area to apply antimycin, with less certain results.

### 2.2.3.3 Mechanical removal

A second alternative dismissed from further consideration was attempting to mechanically remove the brook trout populations from the lakes and creek. Mechanical removal would consist of intensively gill netting the lakes and electrofishing the stream. Mechanical removal in lakes and streams can be successful, but it is very labor intensive, slow and costly. Mechanical removal efforts require many personnel to perform netting and electrofishing. The lakes would be intensively gillnetted for a period of at least 4 years 3 times per year over a period of 5 days each time with a crew of 4 people. The creek would be electrofished twice per year and would require 8 people approximately 5 days to complete each time. Further, given the complex nature of the system with several lakes connected via streams, the likelihood of complete removal using only mechanical means would be very low. Mechanical removal projects take a minimum of 4 years to complete with an estimated time commitment of 140 person-days per year to complete. Mechanical removal projects are more commonly employed where there is an existing population of native fish that is being protected because with mechanical means, the non-target fish can be released and the non-native fish can be removed. In Goose Creek, there are very few YCT.

##### 2.2.3.3.1 Rationale for Elimination

Because of the logistical challenges and additional cost of mechanical removal of brook trout from the drainage and the

uncertainty of success that accompanies mechanical removal projects, this option was not given further consideration. Eliminating this alternative from consideration is similarly consistent with wilderness policy because this alternative would require prolonged use and disturbance of the wilderness area than application of rotenone, with less certain results.

## 2.3 Summary Comparison of the Predicted Achievement of the Project Objectives, and the Predicted Environmental Effects of All Alternatives

### 2.3.1 Summary comparison of project activities

Table 1. Summary comparison of predicted achievement of Alternatives A (No Action) and B (Proposed Action).

| Objective | Indicators | Alternative A | Alternative B |
|---|---|---|---|
| Objective #1<br><br>To protect the Goose Lake population of YCT | Presence of brook trout in Goose Lake. | Brook trout would continue to have the potential to colonize Goose Lake. If the lake were colonized, the self-sustaining population of genetically non-hybridized YCT could eventually be eliminated and the wild brood source in the lake would be lost. | Brook trout would be eliminated from Goose Creek and could not naturally colonize Goose Lake. The Goose Lake population of YCT would be protected, and the future use of the lake as a wild brood source would be preserved. |

| | | | |
|---|---|---|---|
| Objective #2:<br><br>To remove brook trout from the Goose Creek drainage, including Huckleberry, Mutt and Jeff lakes, to the confluence with the Stillwater River and improve the fisheries value of Huckleberry, Mutt and Jeff lakes. | Elimination of brook trout in Goose Creek and Huckleberry, Mutt and Jeff lakes. | There would be no effect on brook trout, and Mutt, Jeff and Huckleberry lakes would continue to provide only marginal fisheries value because of overpopulation. | Brook trout would be eliminated from the Goose Creek drainage, and the fishery in Huckleberry Lake would be greatly improved because of stocking management. |
| Objective #3<br><br>Replace the brook trout fishery in lower Goose Creek and in Huckleberry, Mutt and Jeff lakes with YCT and expand the distribution of YCT, currently restricted to the headwaters, down to the confluence of the Stillwater River. | The presence of a self-sustaining YCT population in Goose Creek, Mutt and Jeff lakes and YCT in Huckleberry Lake. | There is no self-sustaining population of YCT in lower Goose Creek, and this would continue because brook trout dominate the fishery and out-compete YCT. | Goose Creek would be populated with only YCT from its headwaters to its confluence with the Stillwater River, securing approximately 6 miles of stream for YCT. |

## 2.4 Identification of the Preferred Alternative

Alternative B: Chemical removal of brook trout is FWP's preferred alternative. The selected alternative will be chosen after thorough public review and after a thorough review by the Custer and Gallatin National Forests and other interested parties.

# 3.0 Chapter 3: Past and Current Conditions of Resources in Proposed Project Area and Summary Comparison of Predicted Environmental Effects of Alternatives

## 3.1 Introduction

In Chapter 3 the past and current condition of the relevant resources in the project area that would be potentially affected are discussed. Chapter 3 also discusses issues that may be relevant to the project but were not studied in detail. The reason for no further study is also given. It also compares the consequences for implementing Alternative A or B. These predictions include the direct, indirect, short-term, long-term, irreversible, and cumulative effects of implementing the

alternatives. The chapter also discusses mitigation measures to be taken to reduce or eliminate the impacts of the proposed action.

## 3.2 Past and Current Resources Potentially Affected

### 3.2.1 Past and Current Relevant Resources in the Proposed Project Area

- **Fisheries**: Historically, YCT occupied 17,397 miles of stream habitat in the Snake and Yellowstone River drainages, but because of habitat degradation, introduction of non-native species, disease, and over-harvest, YCT have declined across their historic range. Currently, unhybridized YCT occupy less than 7-25% of their historic habitat (May et al. 2003). In Montana, approximately 25% of historically occupied habitats currently harbor YCT populations, but many of these populations are threatened by hybridization with rainbow trout and competition from non-native fish. In the mid-Yellowstone River very few populations of YCT are present and fewer are secure from the threats of non-native species. Within their native range only 2 YCT populations are present in the Stillwater River drainage (Bad Canyon Creek and Iron Creek). Both of these populations are small (less than 3 miles of stream) but are relatively secure. Other populations in the Stillwater River drainage include Picket Pin Creek, which is hybridized with rainbow trout.

  YCT have also been introduced beyond their historic range into previously fishless waters, mostly in the Absaroka-Beartooth Mountains. Some of these populations are strongholds for YCT conservation because they exist in areas isolated from non-native fish. In the Stillwater River drainage there are 13 self-sustaining populations of YCT: 12 in lakes, including Goose Lake and 1 in a stream (Woodbine Creek). None of these populations are aboriginal, with the possible exception of Goose Lake (see discussion below) but are now self-sustaining and require no stocking.

  Brook trout are not native to the western United States. They are native to the east coast of North America, but were extensively stocked across the west during the late 1800's and early 1900's. Most of the populations of brook trout in the Absaroka-Beartooth Mountains were either stocked prior to the 1930's, when records were not accurately kept, or by individuals other than fish and wildlife agencies. It was a common practice in the early 1900's for sportsmen's groups and anglers to obtain fish from federal and state hatcheries to distribute across the landscape. Little is known about the origin of these fish or where they were stocked. The lakes in the proposed project area were likely stocked by one of these means because there is no stocking record. Brook trout are present in more than 110 lakes in Absaroka-Beartooth Mountains,

and several of these lakes are adjacent to the proposed project area. Because of the proximity of similar brook trout fisheries and the abundance of such fisheries in the A-B Mountains, the opportunity to angle for brook trout should not be substantially affected if the proposed action were to occur.

Brook trout presence is one of the main factors currently affecting native YCT populations. Because of the wide distribution of stocked brook trout, many of the few remaining populations of YCT are sympatric with brook trout. In streams where the two species are sympatric, often the brook trout outcompete the native YCT. A local example is Upper Deer Creek on the Gallatin National Forest near Greycliff. Anecdotal evidence suggests that only 30 years ago, YCT were abundant from the headwaters of the stream downstream approximately 10 miles below the forest boundary within private land (R. Spoon, FWP, personal communication). Currently, however, YCT are restricted to the headwaters of the creek and only occupy approximately 2 miles of stream. Even in the headwaters, brook trout outnumber YCT 10:1; without intervention, the brook trout will likely cause the YCT population to go extinct.

- **Stocking**: The Yellowstone cutthroat trout brood stock from Goose Lake is maintained in the Big Timber Hatchery and is used to stock more than 68 lakes in the Absaroka-Beartooth Mountains and other areas. Other than a limited number of grayling and golden trout, Yellowstone cutthroat trout is the only species stocked into lakes of the Absaroka-Beartooth Mountains. Goose Lake YCT are not likely an aboriginal population because of two 20-ft high waterfalls located near Goose Creek's confluence with the Stillwater River (Photos 2 and 3). There is no stocking record, however, for the lake, which would suggest that if the lake were stocked, it would have occurred prior to the 1930's, before accurate records were kept. It is possible that Goose Lake could be an aboriginal population because geologic events such as landslides or ice dams have been known to create fish passage over previously impassible bedrock waterfalls. Goose Lake is located within the Absaroka-Beartooth Wilderness Area. Huckleberry, Mutt and Jeff lakes are outside the wilderness area on the Custer National Forest. Huckleberry Lake has no stocking record for brook trout, but it was stocked with rainbow trout in 1949. Mutt and Jeff lakes have no stocking record, but were likely populated by Huckleberry Lake located farther upstream. Currently there is no stocking occurring in the Goose Lake drainage. Anvil Lake, located to the north of Goose Creek (Map 1) is stocked

with YCT. Under the "No Action" alternative, there would be no change in the stocking of lakes in the Goose Lake drainage.

- **Mining**: Mineral exploration is prevalent in the Goose Creek and Upper Stillwater River drainages. Several historic mine adits are present upstream and downstream of Goose Lake. Other adits and surface exploration sites are present near Goose Creek, extending downstream to approximately 2 miles west of Jeff Lake. Significant mining and natural mineral deposits in the Stillwater River drainage have led to high metal loads and low pH, resulting in very poor water quality. Very little aquatic life is present in the upper Stillwater River extending downstream an unknown distance from its confluence with Daisy Creek. At its confluence with Goose Creek, brook and cutthroat trout and aquatic invertebrates are present in the river (Poore 1994). These fish likely drifted downstream out of Goose Creek to populate the Stillwater River. There is some fisheries value present in the Stillwater River near its confluence with Goose Creek. Reclamation activities have been completed at Goose Lake and are nearly completed in the upper Stillwater River. These projects have the potential to improve water quality in the headwaters of the Stillwater River. The "No Action" alternative would have no additional effects on existing water quality in Goose Creek and the Stillwater River.

- **Recreational Use:** Hunting, fishing and ATV use are important recreational activities in the proposed project area. The Goose Lake Jeep Trail provides access to several lakes in the area and access to within ½ mile of Goose and Huckleberry lakes. Lakes with fisheries in the vicinity of Goose Lake include: Bob Lake (brook trout), Dick Lake (brook trout), Long Lake (brook trout), Ovis Lake (YCT), Round Lake (brook trout), Star Lake (YCT), Companion Lake (brook trout), Little Goose Lake (YCT), Incisor Lake (golden trout) and Anvil Lake (YCT), all of which are within 3 miles of the proposed project area. Under the "No Action" alternative there would be no anticipated change in the recreational use of the area.

- **Wilderness Character:** The Absaroka-Beartooth Wilderness Area is managed to maintain ‘wilderness character’, including opportunities for solitude or a primitive and unconfined type of recreation, making “the imprint of man’s work less noticeable”, protecting indigenous species, and allowing natural processes to regulate ecosystems. Under the “No Action” alternative, brook trout would remain a threat to the Goose Creek YCT, and could change wilderness character by compromising this indigenous population.

## 3.3 Issues eliminated from further study

### 3.3.1 Effects on endangered species (Issue #6)

A query of the Montana Natural Heritage database for endangered species in the project area indicated two species are present: Canada lynx, and grizzly bear.

#### 3.3.1.1 Canada lynx

There is concern that activity in the area associated with the chemical removal of brook trout in Goose Creek could result in negative impacts to lynx. The lynx is a medium-sized carnivore with a home range averaging between 16 and 44 square miles (Aubrey et al. 1999). The lynx is currently listed as a threatened species under the Endangered Species Act. The proposed project area is habitat that is suitable for lynx. In western Montana, lynx generally occur between 3,600 and 6,300 ft in mesic mixed forests. At higher elevations, lynx are associated with subalpine fir, whitebark pine and Engelmann spruce (Aubrey et al. 1999). The elevation of the proposed project area is between 8,900 and 9,800 ft, and the forest type is primarily Engelmann spruce. The primary prey of lynx is the snowshoe hare, and the two species prefer similar mid-successional forest stands. Denning generally occurs in areas with moderate canopy cover with accumulations of woody debris on the ground that provide for escape cover for kittens.

The anticipated impacts associated with this project would be temporary displacement because of increase human activity in the area. These impacts, however, should be minimal because the project is expected to last no more than 10 days, and there will be minimal personnel in the project area (5-10). Further, the large home range of the lynx would likely mean that temporary displacement from the area would not result in displacement beyond the animal's home range. A helicopter and a motorized boat would be used as part of this project, and the disturbance created by these machines may displace some animals. There are no known lynx dens in the proposed project area, and the potential for dens is likely limited because of limiting habitat. Much of the habitat is mixed meadows and treed areas, with very little woody debris on the ground that the animal prefers. If lynx or lynx dens are identified or encountered before or during the implementation of the proposed project, these areas will be avoided, and an appropriate wildlife biologist will be consulted.

##### 3.3.1.1.1 **Rationale for Elimination**

The rationale for eliminating the lynx from further study is that: (1) there are no proposed habitat alterations as a result of the proposed action and, therefore, no impacts to lynx habitat would occur, and (2)

the impacts of displacements because of activity in the area should be minor and temporary.

#### 3.3.1.2 Grizzly bear

In Montana, grizzlies primarily use meadows, seeps, riparian zones, mixed-shrub fields, closed timber, open timber, sidehill parks, snow chutes, and alpine-slabrock habitats. Habitat use is highly variable between areas, seasons, local populations, and individuals. Historically, the grizzly was primarily a plains species occurring in higher densities throughout most of eastern Montana. Grizzly bears are opportunistic and adaptable omnivores. Whitebark pine provide an important food source for the grizzly bear. Annual home ranges in the Swan Mountains, Montana, averaged 300 square miles for males and 48 square miles for females; adult home ranges are larger than those for subadults.

The proposed treatment area is near whitebark pine forests, and bears are known to frequent these areas extensively. The habitat within the proposed project area is primarily spruce forest type, but whitebark pine forests are located only a few miles to the south. The rationale for eliminating the grizzly bear from futher study is that there will be no changes to grizzly bear habitat as a result of the proposed actions. There will be increased human activity in the area that may temporarily displace bears and/or increase the potential for human-bear encounters; however, human activity in the area is currently relatively high and has historically been high. The area in the past has been extensively mined and currently there is substantial mine reclamation activities ongoing. The use of large equipment and machinery in the grizzly bear area is common during the summer months. ATV traffic is also common in the project area. Another potential factor that may increase the potential for human-bear encounters is the presence of dead fish following the treatment of the lakes and stream. The odor of fish may attract bears and increase the probability for an encounter. To mitigate for these impacts, dead fish at the lakes will be collected from the shore line and sunk in deep portions of the lake. Dead fish in the stream will be left in the stream. There is no impact of rotenone on animals that consume treated waters or fish killed by rotenone (Finlayson et al 2000) . Further, the creek will be observed from the air each day prior to workers entering the area. If bears are observed, those areas will be avoided by implementation crews.

##### 3.3.1.2.1 Rationale for Elimination

The rationalle for elimination of the grizzly bear from further study is that impacts are anticipated to be minimal on the species.  Th increased human presence and use of machinery in the area shoul represent only a small and temporary increase in human presence.

Additionally, the mitigation measures identified above should further reduce the potential for impacts or encounters with the grizzly bear if the proposed action were to occur.

### 3.3.2 Effects on sensitive species (Issue #6)

A query of the Montana Natural Heritage database for species of special concern or sensitive species in the project area indicated four species are present: Yellowstone Cutthroat Trout, Uinta chipmunk, *Dicranoweisia cirrata* and western toad. The gray wolf was also included in the sensitive species list, although populations in south-central Montana are considered experimental.

#### 3.3.2.1 Yellowstone cutthroat trout

Yellowstone cutthroat trout are native to the Yellowstone River drainage in Montana. They inhabit cold-water streams, rivers and lakes at elevations ranging from 3000 ft to over 10,000 ft. They require relatively clean (i.e., free of fine sediments) substrate to spawn. Spawning generally occurs from late May to the middle of July depending on elevation. YCT in Goose Lake generally spawn around the 3rd week in July. YCT in the lower Yellowstone River generally spawn in late May and early June.

##### 3.3.2.1.1 Rationale for Elimination

The intent of the proposed action is to increase the distribution of YCT by establishing a self-sustaining population in Goose Creek and to eliminate the brook trout threat. The proposed action would aid in the long-term conservation of the species. There will be some short-term negative impacts to YCT inhabiting Goose Creek in the proposed treatment area. YCT in this reach of stream will be killed during the application of rotenone. However, there are very few YCT in the proposed treatment area because brook trout have almost completely displaced the resident YCT. Surveys conducted in 2003 indicate that brook trout out number YCT 5 to 1 in Goose Creek immediately downstream of the passage barrier. Fewer than 100 YCT would be killed as a result of piscicide treatment. Following the treatment YCT from Goose Lake would be restocked into the creek and will establish a self-sustaining population.

#### 3.3.2.2 Uinta chipmunk

The Uinta chipmunk is a medium-sized chipmunk, with moderately distinct dorsal stripes and generally warm, brownish pelage on the flanks, shoulders, and head. Habitat use in Montana is unstudied and poorly described. The Uinta chipmunk is found at high elevations in Carbon County in subalpine forest and at treeline in krummholz vegetation, presumably subalpine fir-Engelmann spruce-whitebark pine

(Pattie and Verbeek 1967). In Montana, the Uinta chipmunk is at the extreme northern limit of the global distribution and is considered locally restricted and not abundant (Foresman 2001).

**3.3.2.2.1 Rationale for Elimination**

There should be little disturbance to the Uinta chipmunk as a result of the proposed action. There will be no changes in the habitat of the chipmunk as a result of the project. Increased human activity in the area may temporarily alter the behavior of the animal, but should not result in displacement from the area.

### 3.3.2.3 *Dicranoweisia cirrata*

*Dicranoweisia* is a non-vascular moss known to occur in high-elevation habitats. There is only one known occurrence of *Dicranoweisia cirrata* in Montana, and that is south of the project area on the Beartooth Plateau in Park County. Little is know about this plant and its distribution in Montana.

**3.3.2.3.1 Rationale for Elimination**

*Dicranoweisia cirrata* is being dismissed from further study because there will be negligible impacts to vegetation as a result of the proposed action. Personnel will use existing foot trails and roads to access areas along the creek. Further, a helicopter will be used to transport people and equipment, lessening the impacts to sensitive vegetation.

### 3.3.2.4 Western (boreal) toad

Habitats used by boreal toads in Montana are similar to those reported for other regions, and include low-elevation beaver ponds, reservoirs, streams, marshes, lake shores, potholes, wet meadows, and marshes, to high elevation ponds, fens, and tarns at or near treeline ( Boundy 2001). Boreal toads have been documented at 9,200 ft (2,810 meters) in Gallatin County in Montana. Boreal toads may wander from their breeding sites thorough coniferous forests andsubalpine meadows, lakes, ponds and marshes (Werner et al. 2004). Toads have been noted in open-canopy ponderosa-pine woodlands and closed-canopy dry-conifer forest in Sanders County (Boundy 2001), willow wetland thickets and aspen stands bordering Engelmann spruce stands in Beaverhead County (Jean et al. 2002), and mixed ponderosa pine/cottonwood/willow sites or Douglas-fir/ponderosa pine forest in Ravalli and Missoula counties. Forest cover around occupied montane wetlands may include aspen, Douglas-fir, lodgepole pine, Engelmann spruce, and subalpine fir; in local situations it may also be found in ponderosa pine forest. Normally, they remain fairly close to ponds, lakes, reservoirs, and slow-moving rivers and streams during the day, but may range widely at night. Eggs and larvae develop in still, shallow areas of ponds, lakes, or reservoirs,

or in pools of slow-moving streams, often where there is sparse emergent vegetation. Adult and juvenile boreal toads dig burrows in loose soil or use burrows of small mammals, or occupy shallow shelters under logs or rocks. At least some toads hibernate in terrestrial burrows or cavities, apparently where conditions prevent freezing (Hammerson 1999).

The reproductive biology of boreal toads in Montana is poorly described. The breeding period extends from May to July with breeding aggregations of 2 to 50 adult males and females (Werner et al. 2004). Eggs are laid from early May to late June, tadpoles are present from late May to early September, and recently metamorphosed toadlets have been reported from early June to late August (Boundy 2001). The size of one clutch in the Bitterroot Valley of Ravalli County was 20,000 eggs; eggs were laid in late May and produced metamorphosed toadlets by July 11, about 40 to 49 days after oviposition (Maxell et al. 2002).

In other areas of the species' range, the breeding period is known to be variable depending on location; in the mountains it follows the melt of winter snowpack, and in some cases eggs may be laid when ponds are still rimmed with ice. Eggs hatch in 7 to 14 days depending on water termperature (Werner et al. 2004). Tadpoles are about ¼ inch total length at hatching and grow to about 1 to 1¼ inches. New tadpoles school in large numbers, then gradually disperse in 6 to 13 weeeks before metamorphosis (Werener et al. 2004). Metamorphosis usually occurs in August in Colorado and Oregon, but may occur in late July to mid-September. Toadlets may overwinter along the borders of the pools where they developed or move to other nearby wetlands. The minimum age of breeding males is four years, and six years for breeding females; captive animals have lived up to 35 years (Hammerson 1999).

There has been one observation of western toad near the project area; therefore, measures will be taken to lessen the potential impact to this sensitive species. Ice out in Huckleberry Lake is usually around the second week in July. In Mutt and Jeff lakes and surrounding wetlands and streams iceout is usually about 2-3 weeks prior in late June. Breeding of western toads in the project area would likely occur in late June.

#### 3.3.2.4.1 Rationale for Elimination

Delaying the implementaiton of the proposed rotenone project until mid-August should allow sufficient time for the western toad tadpoles to metamorphose into adults prior to treatment. Because rotenone has no effect on metamorphosed amphibians, and most if not all juveniles should be metamorphosed by the proposed implementation time, there should be little impact to this species. Further, there will be no changes to habitat as a result of this project

that could affect the toad. Therefore, the toad was eliminated from further detailed study of potential impacts of the proposed project.

#### 3.3.2.5 Gray wolf

In 1995 and 1996, wolves were reintroduced into Yellowstone National Park and central Idaho. Wolves resulting from these reintroductions have since expanded into areas in Montana near these reintroduction sites, and continue to expand in numbers and distribution. Montana contains portions of 3 recovery zones. In the northwest Montana recovery area, wolves are classified as endangered. In the southern zones that include the areas around Yellowstone National Park (GreaterYellowstone recovery area) and the Bitterroot area of western Montana and central Idaho (central Idaho recovery area), wolves are classified as experimental, non-essential. Gray wolves reached biological recovery goals for the Northern Rocky Mountains at the end of 2002, but the delisting process has been delayed due to the lack of an approved management plan from Wyoming. Montana's and Idaho's plans were both approved by the U.S. Fish and Wildlife Service early in 2004. Gray wolves are known to inhabit the proposed project area. Similar to lynx, the main impact to wolves would be the potential for temporary displacement related to increased human presence in the proposed project area.

##### 3.3.2.5.1 Rationale for Elimination

Similar to northern lynx, the rationale for eliminating the gray wolf from further study is that: (1) there are no proposed habitat alterations as a result of the proposed action and, therefore, no impacts to wolf habitat would occur, and (2) the impacts of displacements because of activity in the area should be minor and temporary.

## 3.4 Predicted Impacts and Mitigation of Alternative A and B and potential mitigation for Alternative B.

**Table 2. Summary of Predicted Environmental Effects**

| Issue | Predicted Effects of Alternative A (No Action) | Predicted Effects of Alternative B (Proposed Action) | Can Impact Be Mitigated |
|---|---|---|---|
| **1. Water quality including cumulative effects on water quality** | No change in surface or ground water conditions in Goose Creek or in the Stillwater River downstream of the Goose Creek confluence. | Surface water quality would be temporarily altered by the introduction of rotenone to kill brook trout. There would be no impacts to groundwater, as rotenone breaks down quickly in the environment and binds readily to organic material. Cumulative impacts to water quality would be temporary and minor. | Yes |
| **2. Impact of piscicides on and non-target organisms** | No effect on non-target species such as aquatic invertebrate species in the lakes and stream. | Temporary reductions in invertebrates would occur in the lakes and the stream as a result of applying the piscicide rotenone. These impacts are generally short term, with invertebrate species richness and abundance recovering to or above pre-treatment conditions within 1-4 years. | Aquatic invertebrates: No, Vertebrates: Yes |
| **3. Impacts on coldwater fisheries** | No effect on the existing brook trout fishery in the Goose Creek drainage, but there could be a substantial effect on the YCT population in Goose Lake if brook trout eventually colonize the lake. | Coldwater fisheries would be significantly impacted as a result of the proposed action through the removal of the brook trout. Such impacts would be temporary, as the treated waters would be restocked with YCT immediately following verification of 100% brook trout removal. Significant beneficial effect of YCT enhancement would result from treatment and subsequent restocking. Benefits would include population enhancement in the Goose Creek area and in other areas stocked with Goose Lake brood stock raised in the Yellowstone River Trout Hatchery. | Yes |
| **4. Potential for chemical spill or accident** | No potential for an accidental chemical spill. | There is a risk of chemical spill under the proposed action. This risk would be minimized by following the safe handling procedures on the product label. Spill containment measures would also be utilized to mitigate risk. In the event of a spill of fuel or chemicals, Montana DEQ's spill reporting and clean-up requirements would be applied. | Yes |

| Issue | Predicted Effects of Alternative A (No Action) | Predicted Effects of Alternative B (Proposed Action) | Can Impact Be Mitigated |
|---|---|---|---|
| **5. Potential risk of human exposure to hazardous chemicals** | No risk of human exposure to rotenone or potassium permanganate. | Rotenone is a restricted-use pesticide. It can be fatal if inhaled or swallowed, and is an eye irritant. Once diluted in a stream or lake at 1-5 ppm, however, rotenone becomes a negligible hazard to humans and other animals. | Yes |
| **6. Cumulative watershed impacts** | No predicted increase in cumulative impacts to the Goose Creek or Stillwater River watersheds. | Past mining activities, current reclamation, and recreational use have impacts on the Goose Creek and Stillwater River watersheds. These impacts include increased metals loading and sediment input into streams, and increased air pollution through dust and vehicle exhaust. Cumulatively, the proposed action would have only minor additional effects on the heavily impacted Stillwater River watershed, and moderate, short-term impacts to water quality and non-target invertebrates, but populations should quickly recover. | Yes |
| **7. Impacts to recreation and public use of area** | No additional impacts of recreation on the area are anticipated. | Public use of the proposed project area may be reduced during project implementation, but reductions should be minor. The removal of the fishery in Huckleberry Lake may temporarily affect recreational use of the project area. Once established, the YCT fishery in Huckleberry Lake may attract more anglers to the lake. | Yes |
| **8. Noise impacts** | No additional impacts to noise levels in the proposed project area above those of existing vehicles and ATVs. | Noise in the area would increase temporarily during treatment as a result of the use of ATVs and a helicopter to transport equipment and personnel. | Yes |

| Issue | Predicted Effects of Alternative A (No Action) | Predicted Effects of Alternative B (Proposed Action) | Can Impact Be Mitigated |
|---|---|---|---|
| **9. Impacts on the Absaroka-Beartooth Wilderness Area** | Wilderness character may be altered in Goose Lake because YCT may be replaced by brook trout, because Goose Creek would still harbor non-native brook trout. | Minimal short-term impacts to stream segments in and adjacent to the wilderness area would occur under the proposed action. These impacts are limited primarily to temporary reductions in stream-dwelling aquatic invertebrates. There may also be temporary impacts to wilderness character due to aircraft flying over wilderness areas and ground crews conducting treatment activities. Such impacts will reduce the wilderness characteristics of "opportunities for solitude or a primitive and unconfined type of recreation" in the short-term. YCT population restoration would improve wilderness characteristics in the long-term by contributing to the "preservation and use in an unimpaired condition," making "the imprint of man's work less noticeable and improving the ecological characteristics. | Aquatic invertebrates: No, Helicopter, other human use impacts: Yes |
| **10. Impacts on additional services or funds provided by the government** | No additional funding would be required under the "No Action" alternative. If brook trout invaded Goose Lake, however, the cost of eradication would be much greater than the proposed project. | Labor cost associated with this project would be approximately 33 person-days.<br><br>Equipment, chemical and other costs would be: $43,700 | No |
| **11. Impacts to the local economy** | No change in the local economy | Minimal change is expected in the local economy. The short duration of the project should have little impact on recreational use of the area, and improving the quality of the fishery in the area may have a positive effect on the local economy. | Yes |

| Issue | Predicted Effects of Alternative A (No Action) | Predicted Effects of Alternative B (Proposed Action) | Can Impact Be Mitigated |
|---|---|---|---|
| **12. Impacts to endangered, threatened or sensitive species, including cumulative impacts** | No impacts to endangered or threatened species but a potential significant impact to YCT, a sensitive species, if brook trout colonize Goose Lake and displace the YCT population. | Minimal and temporary potential impacts to threatened, endangered or sensitive species is expected. Although the proposed project area is within the known range of some of these species, expected impacts are only temporary displacements during the implementation of the project. Positive impacts to YCT are expected as a result of the proposed action, including protection of the current wild brood source of fish and expansion of the current population of YCT in the Goose Creek drainage. All of this contributes to the current YCT conservation strategy preventing future listing under the Endangered Species Act. | Yes |
| **13. Impacts on the North Absaroka and Beartooth Inventoried Roadless Areas** | No direct impacts to the IRAs would occur. An indirect impact would be that the roadless characteristics of wildlife community diversity and habitat for proposed candidate and sensitive species would not be reestablished for YCT in the project area. A potential significant impact to YCT would occur if brook trout colonize Goose Lake and displace the YCT population. | Potential impacts to IRA characteristics are disclosed and discussed for Issue 1-8 and 12. No direct, indirect or cumulative impacts are predicted for "High quality or undisturbed soil…air."<br>No "Sources of public drinking water" are present or would be affected. No impacts to "diversity of…plant communities" are predicted.<br>"Reference landscapes" would be restored in regards to presence of the native YCT fishery in the project area.<br>No impacts to "Natural appearing landscapes with high scenic quality" would occur.<br>Because no ground disturbance is proposed, no impact to "Traditional cultural properties and sacred sites" will occur.<br>No "Other locally identified unique characteristics" have been identified or would be identified. | Long-term improvement – no mitigations needed. |

### 3.4.1 Detailed description of affected resources and mitigation measures under Alternative B

**Issue #1. Water quality, including cumulative effects on water quality**

Chemical treatment of Goose Creek, and Huckleberry, Mutt and Jeff lakes would introduce the piscicide rotenone into the water resulting in fish-killing concentrations. Rotenone is approved for fish removal projects and is highly effective at killing fish at low concentrations. Rotenone is derived from the derris root, a plant native to tropical areas of Central and South America. Native peoples dried the root and crushed it into a powder, which they applied to water to catch and kill fish for food. In the formulation CFT Legumine, the rotenone is extracted from the derris root and added to the formulation at a concentration of 5%. Rotenone has been extensively used to manage fish populations and has been routinely used in stream and lake rehabilitation. Rotenone kills fish by blocking a specific metabolic pathway at the cellular level. It enters the blood stream of fish through their gills. Rotenone is not readily absorbed into the blood through the digestive system or through the skin, lessening the risk of exposure to non-target organisms that may consume treated waters or fish killed by rotenone (Finlayson et al. 2000).

Rotenone has a half-life of 14 hours at 24$^{o}$C, and 84 hours at 0$^{o}$C, meaning that half of the rotenone is broken down and is no longer toxic within that amount of time. As temperature and sunlight increase, the rate that rotenone is broken down also increases. Higher alkalinity (>170 ppm) and pH (>9.0) also increase the rate of breakdown. Rotenone tends to bind to and react with organic molecules rendering it ineffective, so higher concentrations are required in streams with large amounts of organic debris. This binding effect is also thought to reduce the probability of rotenone affecting groundwater supplies. Testing of wells at Soda Butte Campground adjacent to the rotenone treatment of Soda Butte Creek in 2003 indicated the chemical had not contaminated the groundwater supply. Monitoring of domestic wells adjacent to other rotenone projects in northwestern Montana has detected no rotenone or petroleum constituents in the water.

Without detoxifying, rotenone in the streams would be reduced to non-toxic levels in 24-72 hours due to its natural breakdown and dilution in the aquatic environment. In lakes, rotenone is expected to break down in approximately 4-6 weeks. The reasons for the differences in the break-down rates between lakes and streams are: (1) the concentration used in lakes is generally greater, (2) the rotenone is being constantly diluted in stream environments, (3) factors such as turbulence, exposure to sunlight, and contact with organic material is greater in streams than lakes. Given the low concentration of chemical to be used, the short duration of the project, and the rapid natural breakdown of the piscicides, water quality impacts should be temporary and minimal.

To reduce the potential impact to water quality and non-target organisms (Issue #2), the following mitigation measures and monitoring efforts would be employed:

1. Only the minimum amount of piscicide to produce a 100% fish kill will be used during the project. A bioassay will be performed to determine the concentration of rotenone needed to produce a complete fish kill in Goose Creek.
2. A detoxification station will be set up approximately 3 miles downstream from the target reach. If rotenone is present, $KMnO_4$ will be used at a concentration of 2-4 ppm to neutralize the fish toxicant. This concentration should be more than adequate to reduce any remaining rotenone in the water. Experience from other projects indicates that detoxifying at a rate of 2-4 ppm effectively neutralizes piscicides and has little impact on aquatic life. Two people will be stationed at the detoxification station to monitor its effectiveness.
3. Sentinel fish (Yellowstone cutthroat trout from the Yellowstone River Trout Hatchery or brook trout from Goose Creek) will be used to monitor for the presence of rotenone in the water above and below the detoxification station. Trout are more sensitive to antimycin and rotenone than most other aquatic species, and they are used to monitor the presence of rotenone by placing them in cages in the stream. The effectiveness of the detoxification station will be monitored approximately 1 mile below the detoxification region. Sentinel fish placed in the stream upstream of the detoxification station will indicate when the detoxification station should be started (i.e., when the fish begin to show symptoms of the chemical), and when it can be stopped (when fish can survive 24 hours upstream of the detoxification station).
4. Project personnel will be trained in the use of these chemicals, including the actions necessary to deal with spills; personnel will wear proper safety equipment.
5. A communication and safety plan will be developed in the case of an accident. Personnel will be equipped with radios, so that communication can be maintained during the project implementation; a satellite phone will be available at the project area.
6. No chemical, except what is necessary for a given day of treatment, will be stored near the stream.
7. Signs will be used during the project to make travelers aware that the water from the stream and lakes is not to be consumed by persons or animals (see Issue #7).

The expected concentration of potassium permanganate needed to neutralize rotenone will be 4 mg/L (ppm). The EPA believes the chronic toxicity of $KMnO_4$ breakdown products to be of no health concern based on the fact that they are naturally occurring and common in surface waters. The safety of $KMnO_4$ is further demonstrated by the fact that it is routinely used in drinking water treatment to achieve: oxidation of iron and manganese, oxidation of taste and odor compounds, and the control of nuisance organisms such as bacteria and viruses (USEPA 1999). At 4 ppm, the expected travel time of the permanganate is less than 1 mile before it is completely reduced. The reduction of permanganate can be visually determined by its changing from a purple to a rust color. The potential impacts to water quality

can be mitigated by only using the $KMnO_4$ if rotenone is present 3 miles downstream from the confluence of Goose Creek. If the rotenone breaks down naturally before this point, no $KMnO_4$ will be used.

The Montana Department of Environmental Quality and FWP Piscicide Committee will also review this project before implementation to ensure that impacts to water quality are considered and minimized to the extent possible.

**Issue #2. Impact of piscicides on non-target organisms**

For terrestrial wildlife, the risk of negative effects of drinking treated waters or consuming fish killed by rotenone is minimal. The absorption of rotenone through the digestive system is inefficient, and all animals, including fish, insects, birds, and mammals have natural enzymes in the digestive tract and in the liver that neutralize it. Because of the low application rate (1-4 ppm), the low absorption rate if consumed, and the natural ability of enzymes to break down the chemical, there are no anticipated impacts on terrestrial non-target organisms that consume treated water or dead fish. The rotenone will be stored in 30-gallon metal drums at the project site. These drums are animal resistant, so the risk of animals coming in contact with non-diluted rotenone is minimal.

Unlike terrestrial wildlife, some forms of amphibians and aquatic invertebrates are more susceptible to rotenone because the chemical is readily absorbed directly into their blood through skin or gills (non-oral route). Marked decreases in aquatic invertebrate populations are realized following treatment with rotenone. Both species richness and abundance are significantly impacted (Bramblett 1998; Olsen 2004). Aquatic invertebrates, however, are extremely resilient and populations quickly recover. In the treatment of Soda Butte Creek in 2003, species richness and abundance was dramatically impacted immediately following treatment with rotenone. Within one year, however, numbers of aquatic invertebrates exceeded pre-treatment levels. The total number of species was also equal to the total number observed before treatment; however, there were some differences in species composition (Olsen 2004). Other studies have reported similar results where, within 1-3 years following piscicide treatment, aquatic invertebrate communities have recovered to near pre-treatment levels (Walker 2003). To mitigate the impacts on aquatic invertebrates in Goose Creek, at least 1 mile of the creek upstream of the treatment area will be left undisturbed. This area will serve as a source of invertebrates to recolonize the habitat in the treatment reach.

Rotenone has little harmful effect on adult amphibians whose primary mode of respiration is through lungs. Juvenile amphibians (tadpoles), however, are affected by the piscicide because respiration occurs primarily through their skin. The potential impacts to amphibians can be mitigated through the timing of the chemical treatment. The treatment is proposed for mid August, at which time the majority of spotted-frog juveniles will have metamorphosed into adults, which will not be affected at the concentrations proposed for this project.

Because $KMnO_4$ is a strong oxidizer, it can also have negative effects on non-target organisms. The effects observed for aquatic invertebrates are similar to those of piscicides (Walker 2004). $KMnO_4$ is non specific, however, in the target compounds it reduces. It potentially affects all aquatic life including plants and algae. These organisms have been found to recover quickly (i.e., within 1 year) following treatment. Therefore, the effects of $KMnO_4$ on non-target organisms is expected to be temporary.

**Issue # 3. Impacts on coldwater fisheries**

The proposed project will remove brook trout from 3 lakes and several miles of Goose Creek. Of these resources, Huckleberry Lake is likely the most heavily used. The loss of brook trout from Goose Creek is considered only a minor impact because of the low quality of fishery, the proximity of adjacent, similar fisheries, and because the existing fisheries will be replaced with YCT once the project is completed. Huckleberry Lake will be stocked with catchable-sized YCT as soon as the lake can be certified brook-trout free. The fishery in Huckleberry Lake will also likely provide a higher quality angling experience because the YCT will be larger than the current population of brook trout. The project will also increase YCT, a unique and potentially endangered environmental resource with limited distribution in the Yellowstone River basin. The increase in YCT associated with this project will help ensure the long-term persistence of YCT in the Goose Creek drainage, and will aid in YCT conservation through the protection of the Goose Lake population.

**Issue #4. Potential for chemical spill or accident**

With any project that requires the use of chemicals, there is always the risk of an accidental spill. The risk of a spill can be mitigated by following the safe-handling information on the product label. Further, during transportation of the rotenone via helicopter, flights over surface water, roads or other structures will be minimized. In the event of a spill, the Montana Department of Environmental Quality, the US Forest Service and the Montana Department of Agriculture will be notified immediately. The risk of contaminating surface waters will be minimized by transporting and storing the chemical away from surface water. The properties of the chemical reduce the risk of a potential spill affecting groundwater. The ability of rotenone to move through soil is low to slight. Rotenone moves only 2 cm (<1 inch) in most types of soils. An exception would be in sandy soils where the movement is about 8 cm (slightly more than 3 inches). Rotenone is strongly bound to organic matter in soil, so it is unlikely that rotenone would enter groundwater (Dawson et al. 1991). CFT Legumine is flammable because of the emulsifiers in the formulation. The safe handling of the chemical according the product label, which includes keeping the chemical from open flames or sparks, will minimize the risks of fire and explosion. A fire extinguisher will be kept at the project site.

Before the chemical is administered to the stream, it will be diluted approximately 50 times in water at the drip station, rendering the solution non flammable.

**Issue #5. Potential risk of human exposure to hazardous chemicals**

Rotenone does not affect humans or other animals that consume treated waters or fish killed by rotenone for two reasons. First, the main pathway for rotenone to enter the bloodstream is through the respiratory system. The chemical is not readily absorbed into the blood through the digestive system or skin of humans. Second, the concentration needed to kill fish is extremely low (1-4 ppm) compared to the concentration necessary to affect humans or other terrestrial animals. Limited data from the effects on animals indicates the safe concentration for short-term human consumption is about 350 mg/l (350 ppm), nearly 100 times the application concentration (California Department of Fish and Game 1994). Rotenone does not bioaccumulate in the tissues of animals. The livers of fish and terrestrial animals can readily metabolize non-lethal doses of rotenone, converting the chemical into inert compounds that are non-toxic and can be excreted through urine. The product label indicates that fish killed by rotenone are not be consumed by humans. Sufficient human clinical trials have been conducted to certify that fish killed with rotenone are safe for human consumption. The mitigation measures mentioned in Issue #1 should reduce the risk of human and animal exposure to treated waters. The safety guidelines on the product label, which include the use of chemical resistant gloves, eye protection and the use of an organic vapor cartridge-type respirator will be followed by all personnel who handle or apply the chemical. Personnel who handle $KMnO_4$ will follow similar safety precautions, including protective gloves, safety glasses and a respirator.

**Issue #6. Cumulative watershed impacts**

The upper Stillwater River basin, including Goose Creek, is substantially affected by past and current human activities. Abandoned mines are abundant and when combined with naturally occurring, high-metals geology, the water quality in the Stillwater River is severely impacted. These impacts extend downstream beyond the confluence with Goose Creek. Water quality in the Stillwater River downstream of the confluence of Goose Creek, however, is adequate to support aquatic invertebrates and fish. Goose Creek also has a significant mining history, but the impacts on water quality have been less. Substantial efforts have been made, and are currently underway, to reclaim several mining areas in the Stillwater and Goose Creek drainages. Significant changes in water quality in the Stillwater River have yet to be realized. The proposed project would have no additional effect on current watershed impacts in Goose Creek and the Stillwater River, with the exception of the temporary impacts to aquatic invertebrates as previously discussed. Other impacts, such as increased erosion, trampling of plants, and effects on terrestrial wildlife are expected to be minor or insignificant.

**Issue # 7. Impacts to recreation and public use of area**

ATV use of the Goose Lake Jeep trail is considerable, particularly during the proposed project time of mid August. Many of these recreationists also participate in angling in the relatively abundant lakes the jeep trail accesses. The proposed action will increase ATV use of the jeep trial by the personnel involved in the project. To mitigate these impacts and to inform the public using the trail, signs will be placed at specific locations. In cooperation with the Gallatin National Forest, signs will be located at the Goose Lake Jeep Trail trailhead, at Round Lake (on Goose Lake Trail), near Long Lake (near the project area) and at the Stillwater Trailhead near Lake Abundance. An additional sign will be placed on the Stillwater Trail approximately 4 miles downstream of the confluence of Goose Creek. The signs will briefly describe the project and direct the public to avoid the project area during treatment and to avoid drinking water from the project area, including the Stillwater River to 4 miles downstream of the confluence with Goose Creek. The sign on the Stillwater Trailhead will also inform the public of the potential of observing dead fish in the Stillwater River. To mitigate the increased use of ATVs on the trail, a helicopter will be used as the primary means of transportation in and out of the proposed project area. Further, it is anticipated that the project can be completed in 5-7 days. The project will be initiated on a Monday to avoid the weekend, when recreational traffic is greatest.

**Issue #8. Noise impacts**

The use of a helicopter in the proposed project area outside the wilderness will increase the noise in a relatively pristine area. The noise impacts of the helicopter can be mitigated by minimizing the number of flights and avoiding flights over the wilderness area as much as possible. Flights during implementation of the project will also be confined to the morning and evening as much as possible.

**Issue # 9. Impacts on the Absaroka-Beartooth Wilderness Area**

Recreationists other than ATV riders and anglers also use the proposed project area. Many visitors use the Goose Lake Jeep Trail or surrounding areas (like the Stillwater Trail) as access points to reach backcountry areas in the Absaroka-Beartooth Wilderness Area. Only a small portion of the proposed project area is within the wilderness area. To reduce impacts on the wilderness and wilderness users, helicopter flights over wilderness, except directly over Goose Creek, will be avoided. Helicopter flights will be kept to the minimum necessary to complete the project. No motorized equipment will be used in the wilderness area. The impacts of rotenone on aquatic invertebrates should be minimal and short-term as discussed previously. The use of the piscicide rotenone, as opposed to antimycin or other treatment measures, also both minimizes the number of workers required to apply piscicides and increases the likelihood of a successful treatment, also thereby reducing potential impacts to wilderness character. All potential impacts of the preferred alternative to either non-target stream biota or to other aspects of wilderness character, are short-term in nature and are therefore expected to have no

long-term or cumulative negative impacts on the wilderness area. By contrast, protection of the Goose Lake YCT population by successful removal of brook trout protects, and to a degree, enhances wilderness character by preserving this native species; in this case, the cumulative impact of the treatment would be beneficial.

**Issue #10. Impacts on additional services funds provided by the government**

The proposed project would be accomplished cooperatively using personnel time contributed by the Gallatin National Forest, Custer National Forest, and FWP. Equipment costs are anticipated to be funded primarily through the FWP Future Fisheries Improvement Program (95%) and the US Forest Service (5%). The costs for this project are outlined in the budget listed below. The implementation of the proposed action will be accomplished through a commitment of 34 person-days from agency biologists in 2007-2008. The financial commitment to this project would double if a second treatment were warranted.

| Item | Quantity | Cost/Unit | Total cost |
|---|---|---|---|
| CFT Legumine rotenone (gal) | 450 | $76.00 | $34,200.00 |
| Shipping | 1 | $700.00 | $700.00 |
| Helicopter time (hours) | 20 | $360.00 | $7,200.00 |
| DEQ 308 permit | 1 | $250.00 | $250.00 |
| Dry ice (lb) | 500 | $.65 | $325.00 |
| Misc. application equipment | | | $1,025.00 |
| | | Total | $43,700.00 |

| Breakdown of person-days Activity | # people | # days | Person/days |
|---|---|---|---|
| Lake treatment | 4 | 2 | 8 |
| Stream treatment | 4 | 4 | 16 |
| Post-project assessment | 4 | 2 | 8 |
| YCT stocking | 2 | 1 | 2 |
| Total | | | 34 |

**Issue #11. Impacts to the local economy**

The economies of southern Park County, including Cooke City and Silvergate, are dependent to a large degree on tourism for revenue. Other forest-extraction and mine-reclamation activities are important contributors to the local economy. Therefore, any potential impacts to visitation in the area or recreational use may impact the local economy. The proposed action should have only minor and short-

term impacts to recreational use of the area and, therefore, little effect on the economy. This project will provide the opportunity for individuals to catch native cutthroat trout in a fairly accessible area. The improvement of the fishery in the area could result in greater recreational use, but the impact on the local economy, while positive, will likely be minimal.

**Issue #12. Impacts to endangered, threatened or sensitive species, including cumulative impacts**

As previously mentioned, the proposed project area is within the known range of several endangered, threatened and/or sensitive species. The following mitigation measures will be employed to reduce the potential for impact on these species:

- If any threatened or endangered species are encountered during the project planning or implementation periods, all activities that would potentially affect that species would cease, and the appropriate wildlife biologist would be notified immediately for consultation regarding appropriate project mitigations. Additional project alterations would be designed to reduce impacts to these animals.

- If active dens or nests of threatened, endangered, or sensitive species are located, activity will cease until appropriate wildlife biologists can be consulted to develop appropriate protective measures.

- To reduce the potential encounters of bears, particularly the grizzly bear, fish killed in lakes that float to the shore will be picked up and sunk into a deep area of the lake. Crews would work in pairs and would carry, and be trained in appropriate use of, pepper spray.

- Huckleberry, Mutt and Jeff lakes and associated wetlands are known Columbia spotted frog habitat. Although not classified as a sensitive species, the impacts of rotenone on amphibians will be mitigated by not treating the lakes until late in the summer when most amphibian larvae have metamorphosed into adult frogs. Rotenone applied at fish-killing concentrations has no effect on adult, air-breathing amphibians. Juvenile amphibians that primarily respire through their skin or through gills are negatively affected by rotenone.

# 4.0 Chapter 3: List of Individuals Associated with the Project

Preparers:

| | |
|---|---|
| Jim Olsen | Fisheries Biologist/Project leader, FWP, Region 5, Absarokee |
| Jim Darling | Fisheries Manager, FWP, Region 5, Billings |
| Scot Shuler | Fisheries Biologist, Gallatin National Forest, Livingston |
| Darin Watschke | Fisheries Biologist, Custer National Forest, Billings |
| Scott Barndt | Fisheries Biologist, Gallatin National Forest, Bozeman |
| Allison Puchniak | Native Species Specialist, FWP, Region 5, Billings |

# 5.0 Chapter 4: List of Agencies and Persons Consulted and/or Provided Copies of this EA

ENVIRONMENTAL QUALITY
COUNCIL
CAPITOL BUILDING ROOM 106
POB 201704
HELENA MT 59620-1704

DEPT OF ENVIRONMENTAL
QUALITY PLANNING PREVENTION
ASSISTANCE
1520 E 6TH AVE
HELENA MT 59620

GEORGE OCHENSKI
POB 689
HELENA MT 59624

SHARON MOORE
DNRC AREA MANAGER
AIRPORT INDUSTRIAL PARK-IP9
BILLINGS MT 59107

MONTANA WILDLIFE FEDERATION
POB 1175
HELENA MT 59624-1175

JANET ELLIS
MONTANA AUDUBON COUNCIL
POB 595
HELENA MT 59624

PAUL HICKMAN
OUR MONTANA INC
POB 699
BILLINGS MT 59103

JIM JENSEN
MONTANA ENV INFO CENTER
POB 1184
HELENA MT 59624

WAYNE HIRST
MONTANA STATE PARKS
FOUNDATION
POB 728
LIBBY MT 59923

DAMON MURDO
MONTANA HISTORICAL SOCIETY
STATE HIST PRESERVATION OFFICE
225 NO ROBERTS
HELENA MT 59620

MONTANA STATE LIBRARY
1515 E SIXTH AVENUE
POB 201800
HELENA MT 59620-1800

SHANE COLTON
FWP COMMISSIONER
304 YELLOWSTONE
BILLINGS MT 59101

BEAR CREEK COUNCIL
P O BOX 448
GARDINER MT 59030-0448

BILLINGS ROD & GUN CLUB
P O BOX 33
BILLINGS MT 59106

ALLIANCE FOR WILD ROCKIES
P O BOX 505
HELENA MT 59624-0505

CHAIRMAN - NORTHERN CHEYENNE
TRIBAL COUNCIL
P O BOX 128
LAME DEER MT 59043-0128

CROW TRIBAL COUNCIL
P O BOX 159
CROW AGENCY MT 59022-0159

GREATER YELLOWSTONE COALITION
P O BOX 1874
BOZEMAN MT 59771

GREATER YELLOWSTONE
BACKCOUNTRY HORSEMAN
P O BOX 294
BILLINGS MT 59103

AMERICAN WILDLANDS
P O BOX 6669
BOZEMAN MT 59771

WILDERNESS WATCH
P O BOX 9175
MISSOULA MT 59807

DAN ADLAND
BEARTOOTH BACKCOUNTRY HORSEMAN
P O BOX 614
ABSAROKEE MT 59001

MARK BAUMLER
MONTANA SHPO
225 N ROBERTS ST
HELENA MT 59601-4514

MICHAEL GARRITY
ALLIANCE FOR THE WILD ROCKIES
P O BOX 505
HELENA MT 59624

ARLYN HEADDRESS
FT PECK ASSINIBOINE/SIOUX TRIBES
P O BOX 1027
POPLAR MT 59255

SARA JOHNSON
NATIVE ECOSYSTEMS COUNCIL
P O BOX 2171
WILLOW CREEK MT 59760

ED MELCHER
FRIENDS FOR OUTDOOR RECREATION
P O BOX 20275
BILLINGS MT 59104

GEORGE REED
CROW TRIBE CULTURAL AFFAIRS
P O BOX 159
CROW AGENCY MT 59022

JOHN WASHAKIE
E SHOSHONE TRIBAL CHAIRMAN
P O BOX 538
FT WASHAKIE WY 82514

JIM & HEIDI BARRETT
PARK COUNTY ENVIRONMENTAL COUNCIL
P O BOX 164
LIVINGSTON MT 59047

THOMAS ALT
7005 SANTA RACHEL STREET NE
ALBUQUERQUE NM 87113

LARRY COPENHAVER
MONTANA WILDLIFE FEDERATION
P O BOX 1175
HELENA MT 59624

JOHN GATCHELL
MONTANA WILDERNESS ASSOCIATION
30 SOUTH EWING ST
HELENA MT 59601-5704

VERNON HILL
EASTERN SHOSHONE TRIBE
BOX 538
FT WASHAKIE WY 82514

JEFF JUEL
WILD WEST INSTITUTE
P O BOX 7998
MISSOULA MT 59807

BOB MOOREHEAD
MONTANA DNRC WATER RES DIV
1371 RIMTOP DRIVE
BILLINGS MT 59105-1978

BERNARD ROSE
EASTERN WILDLANDS CHAPTER MWA
P O BOX 22045
BILLINGS MT 59104-2945

MARY WIPER
YELLOWSTONE BASIN GROUP OF SIERRA CLUB
15 N 26TH ST SUITE 203
BILLINGS MT 59101-2344

BEV CHATLAIN
BIG MOOSE RESORT
P O BOX 1009
COOKE CITY MT 59020

GRANT BARNARD
P O BOX 1658
RED LODGE MT 59068

BOB EKEY
THE WILDERNESS SOCIETY
503 W MENDENHALL
BOZEMAN MT 59715-3450

LOU HANEBURY
U S FISH & WILDLIFE SERVICE
2900 4TH AVENUE NORTH SUITE 301
BILLINGS MT 59101

BURTON HUTCHINSON
NORTHERN ARAPAHO TRIBE
P O BOX 396
FT WASHAKIE WY 82514

EUGENE LITTLECOYOTE
NORTHERN CHEYENNE TRIBAL CHAIRMAN
BOX 128
LAME DEER MT 59043

TOM PARKER
TREASURE STATE ATV ASSOCIATION
P O BOX 32055
BILLINGS MT 59107

CARL VENNE
CROW TRIBAL CHAIRMAN
CROW AGENCY MT 59022

NELLIE ISRAEL
BEARTOOTH ALLIANCE
P O BOX 76
JOLIET MT 59041

JASON AND SUSIE HAHN
ELKHORN LODGE
COOKE CITY MT 59020

VIC JACKSON
SKYLINE GUIDE SERVICE
P O BOX 27
BELFRY MT 59008

STEVE AND LISA SCHLUTER
COOKE CITY SINCLAIR
P O BOX 1030
COOKE CITY MT 59020

FLORENCE ZUNDEL
816 OLD BEACH ROAD #204
FREELAND WA 98249

EARL MCNINCH
COOKE CITY MT 59020

DREW MORRILL
P O BOX 1180
COOKE CITY MT 59020

RICK SOMMERS
COOKE CITY EXXON
P O BOX 1128
COOKE CITY MT 59020

RONNIE WRIGHT
BEARTOOTH PLATEAU OUTFITTERS
HC #48 BOX 1028
ROBERTS MT 59070

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# Appendix 1. Summary of Comments Received from Scoping Document and FWP responses to those comments.

Summary of comments made on the Goose Creek Yellowstone cutthroat trout (YCT) restoration public scoping document.

On March 2, 2007, a scoping letter was sent out to potentially interested and affected individuals, agencies and organizations seeking initial comment on the proposed chemical removal of brook trout from the Goose Creek drainage. A total of 8 comments were returned from the persons who received the scoping document. A summary of their comments is given below followed by Montana Fish, Wildlife & Parks' (FWP's) responses (in italics) where appropriate.

1. American Wildlands: "We strongly support the state of Montana's efforts to conserve and restore Yellowstone cutthroat. This project is and important part of that effort. While we do not take the application of piscicides lightly, especially in pristine environments, we think the benefits outweigh the risks in this case. The department has shown its ability to responsibly and effectively handle piscicide application in the projects far larger and more complex than this project.

   "Our only concern is that the cutthroat used to restock the treated waters will be taken from the closest possible source, preferably Goose Lake itself, to avoid genetic contamination of the Goose Lake population."

   *We will use Goose Lake sock taken from the Big Timber Hatchery to restock Goose Creek and to stock Huckleberry, Mutt and Jeff lakes.*

2. George Reed, Absaroka-Crow Nation (phone message): Goose Creek area is part of Absaroka-Crow Nation homeland and Yellowstone cutthroat trout are the only native trout and considered the real trout by the Crow. Anything to preserve the native trout of Montana is permissible as long as it does not damage the habitat or the riparian areas.

3. Tom Parker: "I think it is fine to remove the population of brook trout from the three listed lakes to include Huckleberry, Mutt, and Jeff lakes but am adamantly against any use of poison within the boundaries of the Absaroka-Beartooth Wilderness Area. If the Fish and Game along with the Forest Service can come up with a plan to remove the portion of Goose Creek from the wilderness that needs the brook trout removed I will whole hardily support you in your efforts to preserve the YCT population. The wilderness was established to let Mother Nature take its course without man inferring. Even though I personally do not agree with this course of action, while the wilderness policy is in effect, the Montana Fish and Game should not be violating the tenets of the wilderness designation"

*A change in designated wilderness area boundaries requires congressional approval. Such changes meet with considerable scrutiny from environmental groups and are seldom made. Wilderness policy does allow for the use of piscicides to remove fish, particularly for the purpose of native species conservation. We recognize the importance of wilderness areas for the preservation of natural ecosystems. The proposed project should have only minor and temporary impacts to the wilderness area. These impacts will be primarily to non-target aquatic invertebrates. Studies of rotenone on aquatic invertebrate populations indicate that within a few years, populations have recovered from rotenone treatment. In Goose Creek, we anticipate this recovery to be even more rapid because approximately 1 mile of stream upstream of the proposed project area we will not apply rotenone, and this area will serve as an immediate source of invertebrates to recolonize the stream. Because of only the minor and temporary impact to aquatic invertebrates, we feel it is more prudent to perform the proposed actions within the wilderness area and allow the ecosystem to recover naturally rather than attempt to change the wilderness boundary to exclude the proposed project area.*

4. Families for Outdoor Recreation: "Families For Outdoor Recreation believes that getting rid of Brook Trout and poisoning streams is wrong. This is a wilderness area and Mother Nature should be left to do what she will.

   "We do not understand how you are spending the money of hunters and fishers in the wilderness. Removal of the Brook trout would only benefit a small number of people who prefer Yellowstone Cutthroat Trout. Under the wilderness umbrella we, as humans, should never mess with what is in the wilderness by poisoning streams.

   "Our group believes that Brook Trout is a hardy fish and we appreciate their presence in streams and lakes. They breed on their own and should be allowed to continue naturally.

   "At Families For Outdoor Recreation, we believe that our lake and streams should remain clean."

   *We also recognize the importance of wilderness areas as places where natural processes are allowed to occur with little influence from man. However, prior to the 1800's Yellowstone cutthroat were the only fish native to the Stillwater River drainage. It is likely that much of Goose Creek was void of fish because of natural bedrock waterfalls in the lower creek. Brook trout were introduced to the drainage sometime likely in the early to mid 1900's. Wilderness policy states that piscicides can be used in the wilderness area to correct an undesirable condition. In this unique case, we believe that the presence of brook trout in the Goose Creek drainage is an undesirable condition because of their potential to invade Goose Lake and displace the Yellowstone cutthroat trout.*

   *The assumption that this project is being performed to benefit anglers who prefer to catch Yellowstone cutthroat is incorrect. The purpose for performing this project is to protect Goose Lake from invasion by brook trout and to expand the current distribution of cutthroats in the Goose Creek drainage. The most simple and cost-effective way of meeting these two objectives is through chemical eradication of the brook trout (see*

*response to comment 6). Yellowstone cutthroat trout are our native trout species in south central Montana, and their declining numbers in native habitat warrant the performance of this and other similar projects to ensure the long-term persistence of the species. The Yellowstone cutthroat trout brood stock from Goose Lake is maintained in the Big Timber Hatchery and is used to stock more than 68 lakes in the Absaroka-Beartooth Mountains and other areas. Other than a limited number of grayling and golden trout, Yellowstone cutthroat trout is the only species stocked into lakes of the Absaroka-Beartooth (A-B) Mountains. Brook trout are present in more than 110 lakes in these mountains, and several of these lakes are adjacent to the proposed project area. Because of the proximity of similar brook trout fisheries and the abundance of such fisheries in the A-B Mountains, the opportunity to angle for brook trout should not be substantially affected if the proposed action were to occur.*

*We agree that the brook trout is an important game fish species and is very hardy, particularly in mountain lake and stream habitats. However, in this particular case the presence of brook trout is undesirable because of their potential to invade Goose Lake and displace the cutthroat population. We are confident that, similar to the current brook trout populations, cutthroat trout will also breed on their own in Goose Creek and in Mutt and Jeff lakes, and they will not require future stocking. We are uncertain whether Huckleberry Lake will support cutthroat reproduction because the outlet of the lake is often low in late summer when cutthroat fry would be emerging from the gravel. If the lake does not become self-sustaining, stocking will continue to maintain the recreational fishery.*

5. Montana Historical Society: "We feel that there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time. However, should cultural materials be inadvertently discovered during this project we would ask that our office be contacted and the site investigated."

6. Grant Barnard: "Q: Why not reinforce the natural barrier in Goose Cr. to keep Brook Trout from migrating upstream? Sounds a lot simpler, cheaper, and safer than poisoning, etc.

   "Thank you for not considering using any motorized or mechanized activity in designated Wilderness for this project. (The constant erosion of Wilderness values by the Custer NF and others has been a great concern lately.) But please consider using motor vehicles or horses rather than helicopters to transport equipment and personnel to the work sites. This area is used by backpackers and fishermen seeking a quiet and wild experience and helicopter invasions are a huge intrusion and public expense, just to make your job a little easier."

   *We looked closely at the issue of reinforcing the existing barrier and there were 3 reasons for not going forward with that option: 1) Cost. Because of the remote location we would have to fly or pack all equipment and supplies into the site. Such supplies would likely include concrete, rebar, blasting supplies and some sort of equipment that is capable of*

*lifting rocks over 1,000 lb. The cost of doing this work in the remote location would likely be between $100,000 and $200,000. A similar project is being done in the Pryor Mountains to protect a Yellowstone cutthroat population, and the cost of that project is over $300,000. 2) Goose Creek is the wilderness boundary at this location and is therefore considered in the wilderness area. Construction of any permanent structure in the wilderness area is not in keeping with wilderness policy and would require Washington DC approval. 3) One of the goals of this project is also to expand the range of YCT in the Goose Creek drainage. Because of competition and predation from brook trout, YCT distribution and abundance is limited in the drainage. When the proposed project is complete, the range of cutthroat will be expanded by about 6 miles. Projects such as this one help ensure that YCT do not become listed under the Endangered Species Act.*

*We did not consider the use of stock animals rather than a helicopter because of the distance that would have to be traversed to access the site using livestock. The proposed project site is within 1/2 mile of the Goose Lake Jeep trail, but this road is too rough to transport equipment (i.e., trailer with rotenone and supplies or trailers with livestock). Rotenone comes in 30-gallon steel drums that weigh about 250 lb each, making them too large for livestock to carry. We did consider using a snow cat and transporting the rotenone into the area during the winter for use the following summer, but were concerned about leaving the chemical unguarded on site most of the summer, so this option was not given further consideration.*

7. The Beartooth Alliance was not able to submit a formal comment on this project because of time constraints, but through email stated: "I am delighted to hear of your aggressive effort to remove brook trout from the downstream areas before disaster strikes and they get upstream."

   *The Beartooth Alliance said they would submit a formal comment during the EA public comment period.*