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Environmental Assessment

Fall Creek and Woods Lake Colorado River cutthroat trout reclamation project

Norwood Ranger District,
Grand Mesa, Uncompahgre, and Gunnison National Forests

San Miguel County, CO

Sections 21-36, T. 42 N., R. 11 W., New Mexico P.M.

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[Environmental Assessment and map available at <http://www.fs.fed.us/r2/gmug/policy/>]

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SUMMARY

The Grand Mesa, Uncompahgre, and Gunnison National Forest has analyzed a proposal from the Colorado Division of Wildlife (CDOW) to eradicate non-native fish from Fall Creek and its tributaries upstream of Woods Lake by means of chemical treatment, and to re-establish native Colorado River cutthroat trout (CRCT) to these waters. The project area is located approximately 10 miles south of Placerville, CO, and is adjacent to the Woods Lake State Wildlife Area. Approximately 3.4 miles of treatment is proposed within the Lizard Head Wilderness area. The project is within the Norwood Ranger District, Uncompahgre National Forest, Colorado. This action is needed to expand the distribution and abundance of native CRCT within the Fall Creek watershed by eradicating existing non-native trout population above Woods Lake. The existing population of non-native trout has displaced the native population of CRCT from approximately 5 miles of historic habitat in the headwaters of Fall Creek. Additionally, expansion of the current CRCT distribution in Fall Creek would greatly benefit native CRCT recovery efforts with the species historic range, which included Colorado, Utah, and Wyoming.

The proposed action would completely eradicate non-native trout from the project area. Brook, brown, and rainbow trout are non-native trout present in the project area and are all aquatic Management Indicator Species (MIS) in the GMUG Forest Plan. However, non-native trout would be replaced by another MIS species, CRCT. The proposed action would also have effects to native amphibians and existing aquatic invertebrate populations that are within the treatment area. However, this effect is expected to be localized, and recovery of the species is expected following the chemical treatment (see Environmental Consequences Section of EA).

Terrestrial mammals and birds could potentially consume treated surface water or rotenone-killed fish. However, application of rotenone would not affect wildlife in the area since the chemical has an extremely low toxicity to wildlife species (Ling 2003). A thorough review of rotenone effects to wildlife species by EPA (2007) and Ling (2003) indicates that rotenone is not easily absorbed in higher animals and does not accumulate in the body. The project would also affect beaver since the removal of beaver dams would occur. However, the species and beaver dams are expected to return following the completion of the project. The project would not affect threatened, endangered and candidate species. The project would have some short term effects to terrestrial sensitive species (see Environmental Consequences Section of EA).

Short-term impacts to recreation use are expected to occur during the implementation of the project, causing hikers, fisherman, and other recreation users to be displaced approximately 1 week. Impacts to recreational fishing opportunities would occur in the project area. These impacts are expected to last for two years until the project area is restocked. Anglers that typically use this area would be displaced to other fishing locations in the area for 2 years. Future fishing regulations may be set by CDOW following the project. A cultural clearance has occurred in the project area, and concluded that historic properties would not be adversely affected (see Environmental Consequences Section of EA).

A Minimum Requirements Decision Guide was used completed for the project and determined that the project design and implementation meets the minimum requirements for the administration of the area, and is consistent with the intent of the Wilderness Act. Wilderness Act (P.L. 88-577) states that:wilderness areas “shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, *and so to provide for the protection of these areas, the preservation of their wilderness character.*” (Sec. 2a). Section 4(b) gives the primary management direction for wilderness. It states that even when the agency’s administers the area for other purposes, the agency must also “preserve its wilderness character.”

In addition to the proposed action, the Forest Service also evaluated a no action alternative. Based upon the effects of the alternatives, the Responsible Official will decide:

- Whether or not to issue a special use permit to the CDOW to eradicate non-native fish from Fall Creek and its tributaries upstream of Woods Lake by means of chemical treatment, and to re-establish native CRCT to these waters.
- If an action alternative is selected, what under what conditions and by which methods would the activities be conducted.

INTRODUCTION

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

- Introduction: The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- Comparison of Alternatives, including the Proposed Action: This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- Environmental Consequences: This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by affected resource areas. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- Agencies and Persons Consulted: This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- References: This section provides a list of studies used to support the analysis.
- Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Ouray Ranger District Office in Montrose, CO.

Background

The Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) is an indigenous species that historically occupied portions of the Colorado River drainage in Wyoming, Colorado, Utah, Arizona, and New Mexico (Behnke 1992). CRCT historically occupied about 21,319 miles of habitat in the western U.S. Currently CRCT occupy just 14% of their historical habitats (Hirsch et al 2005). Conservation populations of pure-strain CRCT (populations showing genetic introgression rates of less than 10% with rainbow and other non-native cutthroat trout) are known to occur in 22 watersheds on the GMUG NF (James and Speas 2005). Distribution is restricted to 96 miles of stream, representing just 3% of the historic distribution on the GMUG NF. The majority of these populations are threatened by non-native trout invasions. Other populations of CRCT show high levels of introgression with non-native rainbow and other non-native cutthroat trout, and represent an additional 7% of the current CRCT distribution. Stocking efforts to restore

native CRCT populations have been unsuccessful, requiring fisheries managers to look at more aggressive non-native fish removal methods. Fall Creek headwaters have been identified as a primary CRCT expansion area since 1999, and were identified in James and Speas (2005) as a high quality site for several biological and resource management reasons.

In 2007, a fish migration barrier was constructed at the mouth of Woods Lake to block downstream fish from moving upstream and into the project treatment area. An additional barrier is tentatively scheduled to be built on the Hughes Ditch in 2008. Construction of these barriers is essential to the project, keeping non-native fish from re-invading into the treatment area.

The analysis area for the project is the Fall Creek watershed, and is approximately 26,643 acres. Approximately 20% of the analysis area is managed as part of the Lizard Head Wilderness Area. The headwater areas of the analysis area is minimally managed and used primarily for hiking, fishing, camping, and some motorized recreational use. Several water diversions are present as well. A large portion of the lower watershed is private land, consisting of larger ranches and second homes.

The project area is composed of the 5 miles of fishing-bearing sections of the tributaries coming into Woods Lake, including the small 3-acre lake located adjacent to Woods Lake. It also includes a short 1-mile section below the outlet of Woods Lake where potassium permanganate will be administered to neutralize rotenone. This project area may also be referred to as the treatment area. The project area is managed primarily for non-motorized recreation. There is currently no livestock management in the project area. The Hughes Ditch is the only water diversion in the project area.

Purpose & Need for Action

The purpose of the proposed action is to facilitate the restoration of a native CRCT population in Woods Lake and its upstream tributaries, including Fall Creek and Muddy Creek. The need for the project is to expand the distribution and abundance of native CRCT within the Fall Creek watershed by eradicating existing non-native trout population above Woods Lake. The existing population of non-native trout has displaced the native population of CRCT from approximately five miles of historic habitat in the headwaters of Fall Creek. Additionally, expansion of the current CRCT distribution in Fall Creek would greatly benefit native CRCT recovery efforts with the species historic range, which included Colorado, Utah, and Wyoming.

The project would also help reduce the likelihood of the species becoming Federally-listed under the Endangered Species Act (ESA). CRCT were petitioned for Federal listing in 1999, but found to be not warranted for listing by the U.S. Fish and Wildlife Service in 2004. It was again reviewed for Federal listing in 2006, but after a 12-month review, was again, found to be not warranted for Federal listing under ESA.

Proposed Action

The Forest Service will evaluate the proposal from the CDOW to chemically treat all fish-bearing tributaries to Woods Lake to eliminate non-native trout, and prepare the treated waters for future CRCT stocking. These tributaries include Fall Creek, Muddy Creek, and an unnamed tributary of Woods Lake located on the eastern shore. Additionally, approximately 0.75 mile of the Hughes Ditch would also be treated, since non-native fish move from Fall Creek into this ditch throughout the year. A small 3 acre pond located northwest of Woods Lake would also be treated. Woods Lake is a 17 acre lake located in a State Wildlife Area administered by CDOW. The small 3-acre pond is partially located on the State Wildlife Area. The Forest Service does not have jurisdiction on activities occurring within the Woods Lake State Wildlife Area. However, all tributaries feeding Woods Lake are located on National Forest Lands administered by the Norwood Ranger District. Chemical treatment of Woods Lake, and not its tributaries would not meet the goals of CRCT restoration in upper Fall Creek, and therefore, would not be consistent with the Purposed and Need. Additionally, the proposed action does not address future fishing regulations in the project area since the Forest Service has no authority to regulate this activity. Fishing regulations are set and administered by the CDOW.

A registered Environmental Protection Agency (EPA) pesticide (piscicide) called rotenone, would be administered by certified pesticide applicators from the Colorado Division of Wildlife in approximately 5 miles of stream on National Forest lands, and in Woods Lake. Rotenone is a natural product isolated from certain subtropical and tropical members of the pea family found in South America and Southeast Asia. Rotenone products are classified as Restricted Use Pesticides due to acute inhalation, acute oral, and aquatic toxicity (fish and other aquatic species). EPA approved product labels allow rotenone to be applied to achieve treatment concentrations up to 50 parts per billion (ppb) in streams/rivers and up to 250 ppb in lakes/reservoirs/ponds. Potassium permanganate would be also be used to prevent residual rotenone from impacting non-target fisheries downstream of Woods Lake. Application of these chemicals consistent with their EPA approved product labels and for the objective of their intended use is consistent with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and therefore, would be consistent with Clean Water Act standards.

The application and use of rotenone is intended to target the removal of non-native trout. Rotenone is not species specific, and is expected to have effects to other non-target aquatic species such as amphibians and aquatic insects that are currently present in the analysis area. However, these impacts are expected to be short-term and affect only those species within the area treated. Impacts would not affect terrestrial species such as mammals and birds that may feed on fish. Additionally, some mortality of fish immediately downstream of Woods Lake could occur since the effects of rotenone are not immediately neutralized by potassium permanganate. However, there are no aquatic threatened or endangered species in the project area. Effects to all threatened, endangered, sensitive, Management Indicator Species, and other affected species would be addressed consistent with Endangered Species Act, National Environmental Policy Act, National Forest Management Act, and other Forest Service Manual Direction.

Delivery of project materials and equipment to and within the project area would be transported by motorized vehicles, horse, and/or foot to selected stream treatment sites. Motorized access routes to the site include FSR 621 (Woods Lake Road) and the Hughes Ditch. Trail access includes Woods Lake trail, Woods Lake Shoreline trail, and Lone Cone trail.

Woods Lake would be chemically treated by motorboat and back-pack sprayer. Fall Creek and other tributaries to Woods Lake would be treated manually, using drip stations and back-pack sprayer units. Drip stations, used to administer rotenone at selected locations, would be located prior to the treatment, and removed from site following the treatment. Potassium permanganate would be used to neutralize the piscicides immediately downstream of Woods Lake to prevent additional fish mortality below Woods Lake. Application of potassium permanganate would be administered by drip station, immediately below Woods Lake. Cages containing “sentinel” fish would be deployed over a 1-mile section of Fall Creek below Woods Lake, to determine the effectiveness of neutralizing rotenone. Removal of existing beaver dams between Woods Lake and the Hughes Ditch would need to occur to maximize the efficiency and effectiveness of the chemical treatment. This would be accomplished by explosives, chain saw, and/or hand tools. The project would require two treatment periods that would occur during the late summer of 2009 and 2010. One treatment period would occur between August and September to take advantage of low stream flow to maximize the effectiveness of the chemicals used. A second treatment period would occur the following August to September and is needed ensure the complete removal of non-native fish species. Treatment periods would last 1-2 weeks. Dead fish will not be removed from the treated streams. Leaving fish to decay would provide valuable nutrients to the treated streams.

Approximately 3.4 miles of stream would be treated within the congressionally designated Lizard Head Wilderness area. Use of motorized equipment including ATV’s, chainsaws, explosives, etc, would not occur within the Lizard Head Wilderness area. In the wilderness area, rotenone would be delivered by horse and foot, and administered by drip station and backpack sprayer. Forest Service Manual direction for Wilderness Management states that “Chemical treatment may be used to prepare waters for reestablishment of indigenous, threatened or endangered, or native species, or to correct undesirable conditions caused by human influence.” (FSM 2323.34f). A Minimum Requirements Decision Guide was used to evaluate the project and determine the tools and methods necessary to meet minimum requirements for the administration of the area for the purpose of the Wilderness Act. This document is located in the project file.

A temporary closure of Woods Lake State Wildlife Area is proposed by the Colorado Division of Wildlife. The Forest Service has proposed to close trails within the treatment area to minimize human contact during the preparation and implementation of the project. These trails include Woods Lake trail, Woods Lake Shoreline Trail, and Lone Cone trail. Signs stipulating the time and area of the closure would be posted during the project implementation. A Closure order for Woods Lake campground would not be proposed by the Forest Service.

Monitoring and Evaluation

Post-treatment monitoring would occur following each application of rotenone to evaluate the effectiveness of the treatment and need for further management. Pre- and post-treatment monitoring would also occur to evaluate short-term and long-term changes to the density and distribution of amphibians and aquatic insects. Post-stocking monitoring would occur to evaluate the distribution, abundance, and population structure of the newly established CRCT populations. Monitoring efforts would be conducted by the Forest Service and CDOW.

Decision Framework

The analysis documented in the EA will be compliant with the Forest Plan. It will not reanalyze management area allocations already specified in the Forest Plan nor will it seek to reexamine federal regulations or Forest Service policy regarding wilderness management on National Forest lands.

The Responsible Official for this action is the Regional Forester of the Rocky Mountain Region. The Responsible Official will review the proposed action, along with reasonable alternatives, and the environmental consequences of each. The Responsible Official will then make and document the final decision in a Decision Notice (DN) that meets the purpose and need of this analysis. Given the purpose and need, the Responsible Official will review the proposed action, other alternatives and mitigation measures in order to make the following decision:

- Whether or not to issue a special use permit to the CDOW to eradicate non-native fish from Fall Creek and its tributaries upstream of Woods Lake by means of chemical treatment, and to re-establish native CRCT to these waters.
- If an action alternative is selected, under what conditions and by which methods would the activities be conducted.

Management Direction

The Fall Creek and Woods Lake CRCT chemical reclamation project area is located in following Forest Plan Management Areas: 4B-Wildlife habitat management, 8B-Primitive wilderness setting, and 9A-Riparian area management (GMUG LRMP, 1991). The project would be consistent with management emphasis for each Management Area. Forest Plan direction for Wildlife and Fisheries Threatened, Endangered and Sensitive species states that the Forest Service should be “managing and providing habitat for threatened, endangered, and sensitive species as specified by the Regional Forester’s sensitive species list.” The proposed action would implement Forest Plan direction by contributing a new, self sustaining population of pure-strain Colorado River cutthroat trout.

Approximately 3.4 miles of stream would be treated within the congressionally designated Lizard Head Wilderness area. Use of motorized equipment including ATV's, chainsaws, explosives, etc, would not occur within the Lizard Head Wilderness area. In the wilderness area, rotenone would be delivered by horse and foot, and administered by drip station and backpack sprayer. Forest Service Manual direction for Wilderness Management states that "Chemical treatment may be used to prepare waters for reestablishment of indigenous, threatened or endangered, or native species, or to correct undesirable conditions caused by human influence." (FSM 2323.34f). A Minimum Requirements Decision Guide was used to evaluate the project and determine the tools and methods necessary to meet minimum requirements for the administration of the area for the purpose of the Wilderness Act.

Federal agencies are required to ensure that any action authorized, funded, or implemented would not jeopardize the continued existence of any federally-listed endangered or threatened species, or result in the adverse modification of critical habitat. The ESA and the Forest Service Manual (FSM 2670, Sections 2670.31, 2671.44) provide direction regarding required documented evaluations of effects on listed species.

A Biological Assessment (BA) determining the potential impacts of the Proposed Action and all additional Alternatives, on federally-listed and candidate species has been completed and is part of the project record. The Forest Service Manual (FSM 2672, Section 2672.42 as supplemented) provides direction regarding the evaluation of impacts to the Regional Forester's list of sensitive species. A Biological Evaluation (BE) determining the potential impacts of the Proposed Action and all additional Alternatives, on Region 2 sensitive species was completed. This document is also part of the project record.

In March of 2002 the Grand Mesa, Uncompahgre, and Gunnison (GMUG) National Forests completed a six-year process of public involvement and analysis to revise the Travel Plan for the Uncompahgre National Forest. Travel management decisions were made for the Forest at two levels. The first level addressed area-wide uses during the summer and winter. The second level addressed route-specific decisions of what routes would be designated and maintained for public use, and what uses are allowed on those designated routes. Seasonal restrictions also apply to certain motorized and mechanized routes on the Forest to protect natural resources and to prevent physical damage to selected Forest roads. The proposed action does not propose changes or modifications to the current Uncompahgre Travel Plan. Use of existing roads and trails would be consistent with Uncompahgre Travel Plan.

This project is also consistent with *Conservation Agreement for Colorado River Cutthroat Trout in the States of Colorado, Utah, and Wyoming* (April 2001). Region 2 is a signatory partner in this agreement.

Public Involvement

The CDOW proposal was listed in the Schedule of Proposed Actions on January 1, 2008. KOTO Radio and the Telluride Watch newspaper ran news articles and radio spots about the project during February 2008. The proposed action was provided to the public and other agencies for comment during scoping between March 24 and April 23, 2008. The Forest Service mailed 40 letters to local individuals and agencies soliciting public input into the project. In addition, as part of the public involvement process, the Colorado Division of Wildlife held a public meeting at the Wilkinson Public Library in Telluride on April 10, 2008. Press releases for the project and the meeting were distributed by the Forest Service and CDOW to several newspapers and websites throughout Colorado during the week of March 24, 2008. Additionally, the CDOW has posted the press release on their CDOW website. Furthermore, the Forest Service added a copy of the project scoping/public comment letter to their Grand Mesa, Uncompahgre and Gunnison National Forest website.

The public scoping and public meeting generated 16 responses from the public during the 30 day period. Seven of the responses were captured and summarized at the April 10, 2008 meeting at the Wilkinson Public Library in Telluride. Eight of 16 responses were in favor of the project; five responses neutral; and three responses were not in favor of the project. Concerns over the containment of rotenone within the project area, effects to amphibians and other aquatic invertebrates, and long-term success of the project were most commonly raised by participants.

Issues

Issues are points of discussion, debate, or disagreement regarding anticipated effects of the proposed action. It is these potential effects that provide focus for environmental analysis, influence alternative development, and lead to project design criteria.

All of the comments received during scoping and subsequent public meetings were reviewed by the Responsible Official and the ID Team. The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..."

Significant Issues

There were no significant issues raised during the public involvement process. Therefore, no additional alternatives were developed.

However, many public concerns regarding the project were raised during the scoping period. In general, the public made comments regarding four primary non-significant issues: containment of rotenone within the project area; effects to amphibians and other aquatic invertebrates; alternative methods for removal of non-native trout, and the long-term success of the project. Non-significant issues regarding containment of rotenone within the project area and impacts to amphibians and aquatic invertebrates have been addressed in the Environmental Consequences section of the EA. Alternative methods on the removal of non-native trout using electrofishing and other methods was considered as an a potential alternative but eliminate from further study because it did not meet the Purpose and Need (EA, page 10). Long-term success of the project would be evaluated for years after the treatment by both the Forest Service and CDOW. Other comments were responded to in the Response to Comments document in located in the project file.

COMPARISON OF ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the Fall Creek and Woods Lake Colorado River cutthroat trout reclamation project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social and economic effects of implementing each alternative.

Alternatives

Alternative 1

No Action

Under the No Action alternative, current Forest Service management plans for the area and for the Lizard Head Wilderness area would continue to guide management of the project area. Recovery of native Colorado River cutthroat trout would not occur in the project area, and goals and objectives of the CRCT Recovery plan would not be realized. Brook trout and other non-native trout would persist in the project area. Mortality to macro-invertebrate and amphibian populations within the project area would not occur since rotenone would not be used. Short-term impacts to riparian areas associated with the removal of beaver dams would not occur. Short-term impacts to recreational users in the Woods Lake SWA and Lizard Head Wilderness area would not occur.

Alternative 2

The Proposed Action

Fall Creek and Woods Lake chemical treatment

Under the proposed action alternative current Forest Service management plans for the area and for the Lizard Head Wilderness area would continue to guide management of the

project area. Non-native trout would be removed from the project area, and replaced with native Colorado River cutthroat trout. This action would add an additional five miles and 17 acres of existing habitat to the current distribution of this species (Figure 1). Removal of non-native trout would be accomplished by the application of rotenone applied at treatment concentrations up to 50 parts per billion (ppb) in streams/rivers and up to 250 ppb in lakes/reservoirs/ponds as per EPA approved product labels. Potassium permanganate would be also be used to prevent residual rotenone from impacting non-target fisheries downstream of Woods Lake. Application of rotenone would also cause some mortality in aquatic insect and amphibians populations currently residing in the proposed treatment area. Impacts would be greatest to gilled life-history stages of both aquatic insects and amphibians. A late August and September treatment period is expected to minimize mortality among aquatic invertebrates (aquatic insects and amphibians). Past studies suggest that aquatic invertebrate species are expected to re-colonize the project area following the completion of the treatment, usually within 1-3 years. Data suggest that there will not be impacts to terrestrial wildlife species, or long-term changes in water quality. Short-term impacts to recreation use in the area are expected to occur to minimize human contact during the preparation and implementation of the project.

Fall Creek and Woods Lake Project Area

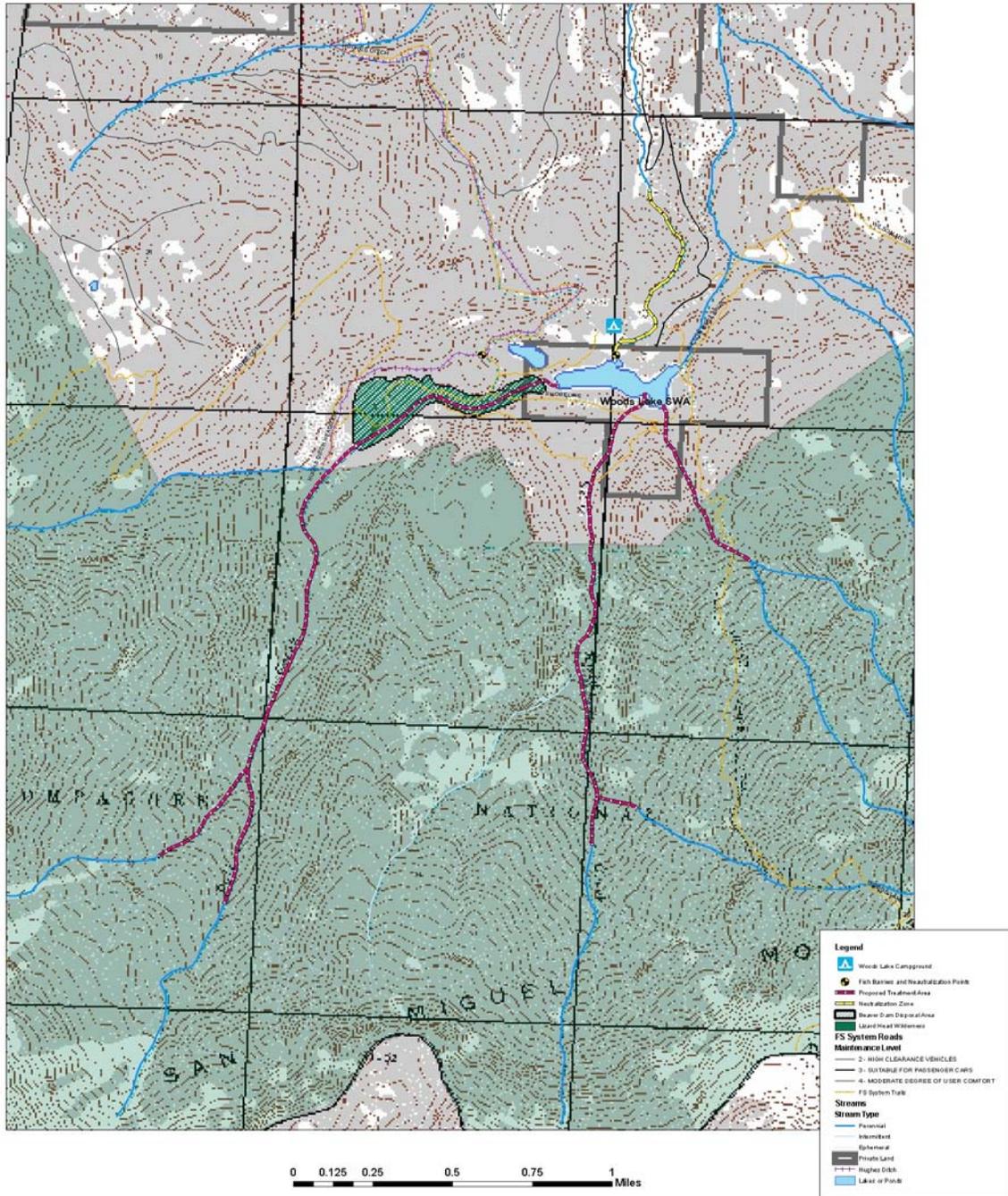


Figure 1. Map of project area including treatment area in red.
* Additional maps available at <http://www.fs.fed.us/r2/gmug/policy/>

Alternatives Considered but Eliminated from Detailed Evaluation

Several public responses during the scoping period suggested that the CDOW and the Forest Service should consider alternative non-native trout removal methods other than the application and use of rotenone. Alternative methods for the eradication of non-native fish were considered early in project planning stages, but later eliminated from further analysis for the following reason:

Alternative Non-native Trout Removal Methods

Unlimited angling and repeated electrofishing were considered as alternative means of removing nonnative trout from streams in the project area. Both of these methods may result in reduced densities of nonnative trout, but both have been shown to be ineffective in completely eliminating populations of nonnative trout (Larson et al. 1986; Moore et al., 1986; Thompson and Rahel, 1996, Moore et al. 2005). The complexity of the existing habitat, primarily beaver dam and lake habitat, and the size of Fall Creek, makes the use of these removal techniques insufficient at eradicating non-native trout from the project area. Successful reintroduction and long term persistence of CRCT to the project area requires complete removal of nonnative trout to prevent future hybridization or threats to population persistence from predation and competition (Peterson and Fausch 2002; 2004). Therefore, unlimited angling and repeated electrofishing were not advanced for detailed analysis as neither method would meet project objectives of eradicating non-native fish species, and would therefore, not meet the Purpose and Need of the project.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 1. Summary of environmental consequences by alternative

Sub-section	Alternative 1 No Action	Alternative 2 Proposed Action
Water Resources and Human Health	no change to water quality or quantity	short-term changes in water quality baseline from application of rotenone
Threatened, Endangered, and Sensitive Species	no change to TES abundance or habitat in the project area	no effect to threatened or endangered species; beneficial effects to CRCT; short-term effects to northern leopard frog
Management Indicator Species	no change to aquatic MIS composition in project area	elimination of three MIS species from project area but replaced with another MIS species that is indigenous to the watershed
Wetlands, Riparian, and Aquatic Habitat and Biota	no effects to aquatic species; no change in riparian habitat	short-term effects to amphibians; short-term effect to aquatic insects; short-term effects to fish habitat and riparian areas following beaver dam removal
Wilderness and Recreation	no change in current wilderness character; no change in current recreation use	Degradation of "untrammelled wilderness character in exchange for "natural" character; impacts to recreational fishing for 2 years
Economics	no change to local economy	no measurable change to local area economy from project
Cultural Resources	no change in cultural resources	no effect to cultural resources

ENVIRONMENTAL CONSEQUENCES

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for the comparison of alternatives presented in the chart above.

Water Resources and Human Health

Affected Environment

The treatment area lies within the upper portion of the Fall Creek 6th HUC watershed. Fall Creek flows into the San Miguel River approximately 8 miles below Woods Lake. Woods Lake is a small reservoir owned and operated by the CDOW for the purposes of recreation, fish and wildlife use. It is approximately 17 surface acres in size. The small pond to the northwest of Woods Lake will also be treated and is 3 surface acres in size.

Three perennial streams flow into the lake all of which will be treated. A portion of the Hughes ditch which provides refuge for fish will also be treated (see map). These basins and their streams are summarized in Table 2.

Table 2: Descriptive statistics for streams within project area; cfs = cubic feet per second.

	Basin Area (acres)	Miles of Channel	Mean Annual Discharge (cfs)*
Upper Fall Creek	3,722	17.5	15.8
Muddy Creek	1,991	15.3	7.19
Unnamed Tributary	670	5.8	3.6

*Values calculated from Kircher equations for areas within the Southwest Division (Kircher, et al, 1985).

Waters within the proposed treatment area are classified as suitable for Class I – Cold Water Aquatic Life; Recreation – Class 1a; Domestic Water Supply; and Agricultural. Numeric water quality standards are set based upon the classified uses. Waters suitable for Class I – cold water aquatic life can sustain such biota where physical habitat, water flows or levels, and water quality conditions result in no substantial impairment of the abundance and diversity of species. Recreation Class 1a is those waters where primary human contact uses have been documented or are presumed to be present. Agricultural use waters are suitable or intended to become suitable for irrigation of crops grown in Colorado and are not hazardous as drinking water for livestock. Domestic water supply is suitable or intended to become suitable for potable water supplies after receiving standard treatment (defined as coagulation, flocculation, sedimentation, filtration, and disinfection with chlorine or its equivalent).

Agricultural use is the primary downstream water use, although the communities of Norwood and Naturita sometimes rely on water withdrawn from the San Miguel River for domestic purposes. Those diversions occur many miles below the treatment area. The Hughes ditch is a trans-watershed agricultural diversion which takes water out of Fall Creek above Woods Lake and moves water west to its place of beneficial use in the Saltado watershed.

Within the Lizard Head Wilderness streams are designated as Outstanding Waters (OW) and carry an anti-degradation standard. This is the highest level of water quality protection and is attached to those waters that constitute an outstanding state or national resource. The State of Colorado Water Quality Control Commission has determined that these waters have exceptional recreational or ecological significance, and have not been modified by human activities in a manner that substantially detracts from their value as a natural resource.

Streams within the project area generally have gradients from 1-5% percent, and are characterized by relatively straight cascading reaches with frequently spaced pools. Stream surveys conducted on Fall Creek indicate these to be stable channels with coarse substrate.

Effects on Water Resources

No Action

There would be no change from the affected environment under this alternative.

Proposed Action

There are no federal or Colorado numeric water quality standards for rotenone. Under this project, CDOW would apply rotenone for the expressed purpose of killing unwanted fish. There may be some minimal and short-term impacts to other aquatic organisms. Detoxification, using potassium permanganate, will be done immediately downstream from Woods Lake and approximately 4,000 feet below the diversion on the Hughes ditch.

Rotenone breaks down rapidly in soil and water as it is exposed to light, heat, oxygen, and alkalinity (Skaar 2001). Other factors that contribute to degradation include the presence of organic debris, turbidity, lake morphology, dilution by freshwater, and the dosage used (Skaar 2001). Degradation is slower under conditions of cold temperature or higher elevation (Skaar 2001). Rotenone has a half life of between three and five days. Because it binds readily to sediments, it does not readily leach from soil, nor is it expected to be a groundwater pollutant. Most lakes completely detoxify within five weeks of treatment. Ultimately, rotenone breaks down into carbon dioxide and water (Sousa, et al. 1991).

Potassium permanganate is one of the most widely used inorganic chemicals for the treatment of municipal drinking water and wastewater. Hundreds of drinking water treatment plants, large and small, use this versatile oxidant to improve taste and odors; to oxidize iron, manganese, and arsenic; to treat for and control zebra mussels and biofilm in raw water intake lines; to remove color; and to provide an alternative pre-oxidant to chlorine in a trihalomethane (THM) control program. Potassium permanganate is used to treat ground water as well as surface supplies.

Water quantity would not be permanently affected by the proposal. The effects on water quality from the application of piscicides and potassium permanganate would be temporary and would become undetectable after detoxification.

By the time source waters reach municipal locations, adequate dilution and natural detoxification would have occurred. Supplemental detoxification with potassium permanganate hastens this chemical process, and would virtually eliminate the possibility of acute or chronic exposure by humans to harmful levels of the chemicals.

No contamination of groundwater is anticipated to result from this project. Piscicides bind readily to sediments, suggesting that they would not seep into groundwater aquifers (Skaar 2001; Engstrom-Heg 1971, 1976). In California, studies where wells were placed in aquifers adjacent to and downstream of rotenone applications never detected rotenone or any of the other organic compounds in the formulated products (CDFG 1994).

A new rule issued by the Environmental Protection Agency (EPA) clarifies that a Clean Water Act (CWA) permit will not be required when application of a particular pesticide to or over, including near, waters of the United States is consistent with requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), i.e. application is made adhering to all requirements stated on the manufacturer's label. The rule identifies two specific circumstances where CWA permits are not required: the application of pesticides directly to water in order to control pests; and the application of pesticides to control

pests that are present over or near water, where a portion of the pesticides will unavoidably be deposited to the water in order to target the pests. Within the context of the CWA and rules regarding National Pollutant Discharge Elimination System (NPDES) permits the non-native fish within the treatment area are considered a “pest.”

Cumulative Effects

Cumulative effects take into consideration historical, ongoing, and projected future activities. Limited past management activities have occurred within the analysis area. Recreation use, fishing, hunting, campground use, and water management occur in the project area. Additional water use and low density housing developments occur in the lower end of the watershed. Despite the uses water quality is excellent. However, one large conveyance facility occurs within the project area which would have ongoing effects to water quantity during the irrigation season, removing approximately 25-30% of the stream flow. Short-term impacts to water quality may occur for a brief period following application of rotenone. However, there would be no permanent effects to water resources. Application and use of rotenone for its intended purpose is consistent with the FIFRA and therefore, the CWA. Therefore, the proposed actions would not contribute to cumulative effects on water resources.

Threatened, Endangered, and Sensitive Species

Threatened and Endangered Species

Federal agencies are required to ensure that any action authorized, funded, or implemented would not jeopardize the continued existence of any federally-listed endangered or threatened species, or result in the adverse modification of critical habitat. The Endangered Species Act (ESA) and the Forest Service Manual (FSM 2670, Sections 2670.31, 2671.44) provide direction regarding required documented evaluations of effects on listed species.

A Biological Assessment (BA) determining the potential impacts of the proposed action on federally-listed and candidate species has been completed and is part of the project record. The Forest Service Manual (FSM 2672, Section 2672.42 as supplemented) provides direction regarding the evaluation of impacts to the Regional Forester’s list of sensitive species. A Biological Evaluation (BE) determining the potential impacts of the proposed action on Region 2 sensitive species were completed. This document is also part of the project record.

Affected Environment

The following list includes threatened, endangered, and candidate species, or their habitats, that are located on the GMUG NF, or that are located adjacent to or downstream of the project and could potentially be affected (Table 3). A pre-field review was conducted of available information to assemble occurrence records, describe habitat needs and ecological requirements, and determine whether field reconnaissance is needed to complete the analysis.

Candidate species have sufficient information on their biological status and threats to warrant a proposal to list as Endangered or Threatened, but development of a listing

regulation is precluded by other higher priority listing activities. Species that are candidates for listing under the ESA are automatically placed on the Region 2 Forester’s sensitive species list. The analysis and determination of effects for candidate species are included as part of the biological evaluation for sensitive species.

No further analysis is needed for species that are not known or suspected to occur in the project area, and for which no suitable habitat is present. The following table documents the rationale for excluding a species. If suitable but unoccupied habitat is present, then additional survey is needed, or presence can be assumed and potential effects evaluated.

Table 3. List of special status species that may be affected by the project.

Common Name	Scientific Name	Status	Known or suspected to be present?	Suitable habitat present?	Designated Critical Habitat present or could be affected?	Rationale if not carried forward for analysis
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	Endangered	No	No	No	No Water Depletion
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered	No	No	No	No Water Depletion
Humpback chub	<i>Gila cypha</i>	Endangered	No	No	No	No Water Depletion
Bonytail chub	<i>Gila elegans</i>	Endangered	No	No	No	No Water Depletion
Canada lynx	<i>Lynx canadensis</i>	Threatened	Yes	Yes	Yes	Carried forward in analysis
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Threatened	No	No	No	Suitable habitat not present in project area
UintaBasin hookless cactus	<i>Sclerocactus glaucus</i>	Threatened	No	No	No	Suitable habitat not present in project area
Uncompahgre fritillary butterfly	<i>Boloria acrocneuma</i>	Endangered	No	No	No	Suitable habitat not present in project area
DeBeque phacelia	<i>Phacelia submutica</i>	Candidate	No	No	No	Suitable habitat not present in project area

Canada lynx was the only Federal listed species under ESA that is carried forward in the analysis. Lynx have not been observed in the analysis area, but are suspected to occur in the area since good quality habitat for the species occurs throughout the project area. The project area lies within the Little Cone Lynx Analysis Unit (LAU). Canada lynx habitat requirements and current vegetation conditions have been summarized in the project BE, and is part of the project record.

Forest Service Sensitive Species

Sensitive species analyzed in this EA were identified from a list of Forest Service Region 2 sensitive species based on known or historical occurrence and/or the presence of suitable habitats within the analysis area. Sensitive species determined not to occur in the analysis area or determined to be unaffected by the proposed actions are not evaluated further in this EA. The following Forest Service Region 2 species are addressed in this document: pygmy shrew (*Sorex hoyi*), American marten (*Martes americana*), wolverine,

(*Gulo gulo luscus*), northern goshawk (*Accipiter gentilis*), boreal owl (*Aegolius funereus*), black swift (*Cypseloides niger*), American three-toed woodpecker (*Picoides tridactylus*), olive-sided flycatcher (*Contopus borealis*), purple martin (*Progne subis*), northern leopard frog (*Rana pipiens*), boreal toad (*Bufo boreas boreas*), and Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*).

Suitable habitats for these species occur throughout the project area. Northern goshawk, black swift, American three-toed woodpecker, and northern leopard frog have been observed in or adjacent to the project area since 2000. One historical sighting of a wolverine has been observed near the project area. However, recent observations of wolverine have not been made. CRCT have been observed in nearby Elk Creek, but are not found in the project area. The remaining species documented above are suspected to be present in or adjacent to the project area. Habitat requirements and current vegetation conditions for these species have been summarized in the project BE, and is part of the project record.

Effects on Threatened, Endangered, and Sensitive Species (TES)

No Action

There would be no change from the affected environment under this alternative. All habitats for TES species would not change. Temporary displacement of TES would not occur.

Proposed Action

The BA prepared for this project has determined that the project would not affect Canada lynx. This determination was based on the fact that suitable lynx habitat would not be directly or indirectly modified by the project; the project would not operate in the winter, and therefore, would not result in additional snow compaction; vehicular traffic volume related to the project is not expected to increase from the baseline, and would not measurably increase the likelihood of vehicle-lynx collisions. Additionally, application of rotenone would not injure or kill Canada Lynx since the chemical has an extremely low toxicity to wildlife species (Ling 2003).

This activity has been screened under Colorado Lynx Project Decision Tree. Results of the screened activity concluded that the proposed action would have “no effect” to the Canada Lynx.

The proposed action would have some minor effects to some terrestrial Forest Service (FS) sensitive species. Removal of beaver dams to facilitate the treatment may affect pygmy shrew habitat. However, these impacts are expected to be short-term since beaver are expected to move back into the project area following the treatment.

Disturbance from explosives and chainsaw during the removal of beaver dam areas may also temporarily displace northern goshawk, American martin, wolverine, black swift, boreal owl, American three-toed woodpecker, olive-sided flycatcher, and purple martin. However, these impacts are expected to occur for a short 1-2 week period, and would not permanently displace these species. Effects to terrestrial wildlife and birds from direct exposure or consumption of rotenone or potassium permanganate is not expected because

the chemicals are not easily absorbed by higher animals and do not accumulate in the body (Ling 2003).

The proposed action would have effects to aquatic Forest Service sensitive species such as northern leopard frog and boreal toad. Direct effects to northern leopard frog would occur from the implementation of the proposed action. Rotenone has been found to be toxic to leopard frog tadpoles (Fontenot et al. 1994, Hamilton 1941) at concentrations normally used in fish control. Various factors may affect the toxicity of rotenone to amphibians and reptiles, including temperature, pH, alkalinity, flow rate, turbidity, rotenone formulation and dosage (Fontenot et al. 1994). As leopard frogs use different habitats for breeding and wintering, applications during the late summer should minimize exposure to leopard frog, particularly the larval stages. Bradbury (1986) noted that a fall application of rotenone may have less negative affect on leopard frogs, when they have completely metamorphosed. While few studies examining the effects of rotenone on boreal toad have been conducted, affects are expected to similar. However, boreal toads have not been documented in the project area.

Observations in several Montana Fish Wildlife and Parks (MFWP) treatments in the Flathead River Basin indicate that amphibians do persist after treatments. In an unpublished MFWP biologists observed that Tom Tom Lake, located in the South Fork Flathead drainage, was treated with rotenone in October and a survey one year later found numerous spotted frog juveniles, tailed frogs, and long toed salamander larvae. Chandler and Marking (1982) found that leopard frog tadpoles were 3 to 10 times more tolerant to rotenone than fish. Brown and Ball (1943) reported that during a May rotenone treatment in Michigan, tadpoles were “greatly affected,” but within three months were “extremely numerous.”

Based on this information, it would be expected that the impacts to northern leopard frog and other native amphibians, resulting from this project to be consistent with past applications, laboratory tests, and exhaustive reports from other researchers and biologists. However, impacts to amphibians stemming from the application of rotenone are not expected to kill all northern leopard frogs in the project area. Mortality is expected to be limited to larval stages. Implementing these projects in the late summer and fall periods may help reduce any potential impacts to larval stages if larvae have completely metamorphosed. Impacts would be greatest in Woods Lake, the 3-acre pond, and low-gradient sections of Fall Creek and Muddy Creek immediately upstream of Woods Lake since these areas provide some of the most suitable habitat in the project area.

Additionally, some short-term direct effects to northern leopard frog and potential boreal toad habitat are likely to occur in the area where beaver dam removal occurs. Removal of the beaver dams would likely alter some of the preferred habitat in the area located between Woods Lake and the Hughes Ditch. However, this impact is short-term and habitat is expected to return when beaver return the area.

The proposed action “may adversely impact individuals,” but is “not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing” for pygmy shrew (*Sorex hoyi*), American marten (*Martes americana*), wolverine, (*Gulo gulo luscus*),

northern goshawk (*Accipiter gentilis*), boreal owl (*Aegolius funereus*), black swift (*Cypseloides niger*), American three-toed woodpecker (*Picoides tridactylus*), olive-sided flycatcher (*Contopus borealis*), purple martin (*Progne subis*), northern leopard frog (*Rana pipiens*), and boreal toad (*Bufo boreas boreas*).

Currently there are no CRCT in the project area. The proposed action would have a “beneficial effect” for CRCT since the project would establish a new population of CRCT in the project area. The project would also increase the distribution of CRCT by five miles and 17 acres on the GMUG NF.

Cumulative Effects

Cumulative effects take into consideration historical, ongoing, and projected future activities. The scale of the analysis is the Fall Creek 6th level HUC. Limited past management activities have occurred within the analysis area, and most aquatic habitat, wetland, and riparian areas are in high quality conditions. Recreation use, fishing, hunting, campground use, and water management occur in the project area. Additional water use and low density housing developments occur in the lower end of the watershed. Recreation use in the area is continuous during the summer and fall months each year. Use of trails and campgrounds in the area may have some minor affects on the distribution of some TES species. However, these impacts are small. The project has the potential to have some short-term impacts to the existing TES species. However, given the short duration of the project, there would be no long changes in the TES populations in the analysis area.

Management Indicator Species

NFMA establishes the use of Management Indicator Species (MIS) in project planning. MIS are those species that respond to land management activities and can be used to predict the likely responses of a wide range of species with similar habitat requirements. The GMUG Forest Plan (USFS 2005; USFS 1991,) identifies 8 MIS species (Table 4).

Table 4. List of MIS species from 2005 Forest Plan amendment.

Common Name	Scientific Name	Habitat Association
Elk	<i>Cervus elephus</i>	General habitats, habitat effectiveness, transportation
Abert’s squirrel	<i>Sciurus aberti</i>	Ponderosa pine
Brewer’s sparrow	<i>Spizella breweri</i>	Sagebrush
Northern goshawk	<i>Accipiter gentiles</i>	Aspen/conifer
Merriam’s wild turkey	<i>Meleagris gallopavo</i>	Pinyon/Juniper, oak, mtn. shrub, ponderosa pine
Pine (American) marten	<i>Martes Americana</i>	Spruce-fir
Red-naped sapsucker	<i>Sphyrapicus varius</i>	Aspen
Common trout	<i>Oncorhynchus spp.</i>	Aquatic

MIS Selection

From the list of forest-wide MIS, species or habitat suspected or known to occur in the project area include northern goshawk, American marten, red-naped sapsucker, elk and

common trout. However northern goshawk, American marten, rednaped sapsucker, and elk were eliminated from further detailed analysis because 1) their habitat will not be affected by the proposed action and 2) use of rotenone and potassium permanganate when used according to EPA labeling has not been shown to be toxic if ingested by wildlife, and 3) these chemicals have not been shown to be absorbed by higher animals and do not accumulate in the body (Ling 2003). American martin and northern goshawk are also FS sensitive species and have been evaluated above.

Common trout were selected for further evaluation in this EA. This group of aquatic species was selected because they are known to occur in the analysis area, they are the MIS for aquatic species as designated in the Forest Plan, and their habitats would be affected by the proposed projects.

Common Trout

Affected Environment

The analysis area used to evaluate common trout is the Fall Creek 6th level HUC. This area contains all tributaries to Fall Creek. All four common trout species are present in the analysis area, but only brook, brown, and rainbow trout are in the project area. Brook trout are the most abundant trout found in both the analysis and project area, occurring throughout the headwater areas, in Woods Lake, and to a lesser extent below Elk Creek. Brown and rainbow trout are also found in Woods Lake, and downstream to the San Miguel River. Elk Creek contains a population of pure-strain CRCT. However, this population is isolated in the headwater areas of Elk Creek and would be unaffected by the proposed action.

GMUG NF LRMP Amendment for MIS species (USFS 2005) has identified the assemblage of “common trout” to evaluate management affects to aquatic ecosystems. Electrofishing and observation samples indicate that all MIS trout species present in the analysis area. A review of Forest-wide fish sampling on the GMUG NF indicates that trout are widely distributed throughout the Forest. Statistics from GMUG NF LRMP suggests that there are approximately 1,200 miles of stream on the Forest that contain viable fish populations consisting of brook, rainbow, brown, and cutthroat trout. A total of 171 sites have been sampled on the GMUG NF since 2005, revealing that trout density ranges between 12 and 2,794 fish per mile, with a mean density of 536 fish per mile.

Effects on Common Trout MIS species

No Action

There would be no change from the affected environment with the implementation of the No Action alternative.

Proposed Action

The proposed action would eliminate all three aquatic MIS species in the project area, and replace them with just one, CRCT. However, this is the objective of the project. After project implementation and future stocking, CRCT population should occur at densities similar to the current combined densities of brook, rainbow, and brown trout in the

project area. The project is not expected to effect MIS species downstream of the analysis area, since the effects of rotenone would be neutralized by potassium permanganate.

Since the indirect effects of the project are expected be contained in the project area, and the stream comprises such a small percent of the total habitat for trout Forest-wide, and the density of common trout in the project area would be restored by another MIS species, the viability of rainbow, cutthroat, brown, and brook trout would not be threatened by this project.

Cumulative Effects

Cumulative effects take into consideration historical, ongoing, and projected future activities. The scale of the analysis is the Fall Creek 6th level HUC. Limited past management activities have occurred within the analysis area, and most aquatic habitat, wetland, and riparian areas are in high quality conditions. Recreation use, fishing, hunting, campground use, and water management occur in the project area. Additional water use and low density housing developments occur in the lower end of the watershed. However, one large conveyance facility occurs within the project area which would have ongoing effects to water quantity during the irrigation season, removing approximately 25-30% of the stream flow. This is most likely the biggest impact to aquatic MIS species in the project area. The project has the potential to have some short-term impacts to the existing MIS species present.. However, the current MIS species would be replaced by native CRCT, which would benefit species recovery in the analysis area. Impacts to amphibians and aquatic insects are expected to be short term and restricted to Woods Lake and the 5 miles of tributaries upstream. Overall, restoration of CRCT should have a beneficial effect to the area.

Wetlands, Riparian, and Aquatic Habitat and Biota

Affected Environment

The project area is composed of three major tributaries, Fall Creek, Muddy Creek, and an unnamed tributary to the east of Woods Lake. The project area also includes the 17-acre Woods Lake, and an unnamed 3-acre lake adjacent to Woods Lake. All four common trout species are present in the analysis area, but only brook, brown, and rainbow trout are in the project area. Brook trout are the most abundant trout found in both the analysis and project area, occurring throughout the headwater areas, in Woods Lake, and to a lesser extent below Elk Creek. Brown and rainbow trout are also found in Woods Lake, and downstream to the San Miguel River.

Chorus frogs and tiger salamanders have been observed in Woods Lake, and in lower reaches of Fall Creek and Muddy Creek where gradient and beaver dams provide suitable habitat. These species have also been observed in the Hughes Ditch and the 3-acre reservoir adjacent to Woods Lake. These species appear abundant in the analysis area and within the project area. Aquatic insects and other invertebrates have not been sampled within the project area. However, FS and CDOW personnel have observed a robust and diverse aquatic insect population throughout the project area.

Observations and quantitative fish sampling done within the project area suggest that riparian and fish habitat conditions are good. Approximately, 2000 meters of Fall Creek

has been sampled in 2001, proving a good sample of riparian and fish habitat conditions (Table 5). Reach 1, located immediately above Woods Lake, provides good quality fish habitat for fish. Pool area and volume estimates indicate good summer and winter rearing habitat. Beaver dams are abundant in this reach, and provide excellent fish habitat in this reach. Pools also comprise a large percentage of the total habitat area. Some of the best spawning habitat is located in this reach. The lower reaches of Muddy Creek provide similar low gradient habitat.

Reaches 2-4 are located in higher gradient transport channel, but provide good habitat for fish. Pool depth, mean width, bankfull width, and pool area are consistent between reaches. A sharp difference in pool volume and pool area occurs between reaches 2 and 3. This is attributed to the Hughes Ditch, which removes some of the stream flow from Fall Creek. Cover is very abundant in all reaches with the main components being large woody debris (LWD), large boulder and cobbles, pool depth, and willow and tree overstory.

Willows were the most abundant riparian plant species observed in the surveys, comprising 38% of the primary vegetation observed. Forbs and grasses were also abundant throughout the project area. Riparian areas were largest in reach 1 above Woods Lake, and much shorter in reaches 2-4 due to changes in stream morphology and conifer cover. Large wetland areas have been observed adjacent to Fall Creek in Reach 1.

Table 5. Quantitative results from stream condition inventory for upper Fall Creek, August 2001. * denotes that parameter is estimated based on data from sampled reach.

Reach	1	2	3	4
Stream Name	Fall Creek	Fall Creek	Fall Creek	Fall Creek
Stream Gradient	1.7%	4%	4%	4.9%
Sample Reach Length (m)	501.8	235	278.9	517
Total Area (m ²)	4156.78	669.07	990.85	1829.2
Total Volume (m ³)	2727	94.15	253.92	142.4741
Mean Width (m)	4.73	3.05	3.63	3.72
Mean Maximum Pool Depth (m)	0.53	0.39	0.48	0.45
Mean Residual Pool Depth (m)	0.46	0.32	0.34	0.29
Mean Bank Full Width (m)	6.42	4.21	4.12	4.9
Pools/100m	5.58	5.53	2.51	4.06
Percent Pool Area (%)	89	51	47	28
LWD/100m	73.5	71	63.1	87.2
% Stable Banks	74	85	98	100
D50 (mm)	20.3	59	59	96.9

Effects on Wetlands, Riparian, and Aquatic Habitat and Biota

No Action

There would be no change from the affected environment with the implementation of No Action alternative. There would be no change to the quantity or quality of wetland, riparian or fish habitat in the project area with the No Action alternative.

Proposed Action

Implementation of the project would have effects to chorus frog and tiger salamanders in the area. Application of rotenone is expected to have similar effects to these as species as those described for northern leopard frog. Some mortality of these species is expected to occur, particularly in the lower reaches of Fall and Muddy Creeks, Woods Lake, and the unnamed 3-acre lake adjacent to Woods Lake, since these areas provide the majority of suitable habitat in the project area. Mortality is expected to affect the juvenile life-history stage of chorus frog. However, previous studies suggest amphibians should return to the project area following treatments (Montana Wildlife and Parks observations, Brown and Ball 1943)

Impacts to aquatic insects are expected to be substantial following the application of rotenone. Most studies have noted immediate declines in aquatic insects immediately following treatments. However, sensitivity to rotenone is highly variable among aquatic invertebrates although most species are more resistant than fish. Zooplankton is especially susceptible in lake and pond treatments. Lings (2003) in his review of rotenone toxicity to aquatic invertebrates suggested that cladocerans and copepods seem to be the most susceptible invertebrate groups. Ling (2003) also noted a river and stream study of aquatic insects that suggested that mayflies, caddisflies, and stoneflies were also very sensitive to rotenone. However, follow-up studies of rotenone applications have shown that populations of aquatic invertebrates recover fairly quickly to pre-treatment levels (Whelan 2002, Melaas 2001, Mangum and Madrigal 1999). Mangum and Madrigal (1999) found total invertebrate abundance returned to pre-rotenone treatment levels in 1 to 36 months across their sites. Whelan (2002) reviewed aquatic macroinvertebrate literature for both rotenone treatments and natural disturbances, and concluded that aquatic macroinvertebrate responses to natural events were often similar to rotenone treatments. A review of case of studies done on the impacts of rotenone on aquatic insects by Vinson et al. (unpublished) suggests that overall invertebrate abundances generally returned to pre-treatment levels quicker than biodiversity and taxonomic composition measures.

Some short-term changes in pool habitat would occur in the stream reaches of Fall and Muddy Creeks above Woods Lake. Removal of beaver dams would temporarily decrease pool area, volume, and depth in these sections. Additionally, short-term sediment pulses from these areas would likely occur with sediment depositing in Woods Lake. Sediment delivery could impact spawning areas downstream of the beaver dam areas, but this effect would not affect spawning fish, since they are targeted for removal the same year. These impacts are expected to be short-term since beaver are expected to re-colonize the area following treatment. Riparian and wetland areas are not expected to be impacted by the project.

Effects to the existing trout composition in the project area have been described under the MIS section of this chapter.

Cumulative Effects

Cumulative effects take into consideration historical, ongoing, and projected future activities. The scale of the analysis is the Fall Creek 6th level HUC. Limited past management activities have occurred within the analysis area, and aquatic habitat is in

high quality conditions. Recreation use, fishing, hunting, campground use, and water management occur in the project area. Additional water use and low density housing developments occur in the lower end of the watershed. However, one large conveyance facility occurs within the project area which would have ongoing effects to water quantity during the irrigation season, removing approximately 25-30% of the stream flow. This conveyance facility has had some effect on aquatic insect density below the diversion. There would be short-term effects to amphibians, aquatic insects, and fish habitat in the project area. However, non-native species would be replaced by native CRCT, which would benefit species recovery in the analysis area. Impacts to amphibians and aquatic insects are expected to be short term and restricted to Woods Lake and the 5 miles of tributaries upstream. Overall, restoration of CRCT should have a beneficial effect to the area.

Wilderness and Recreation

Affected Environment

Direction in the Forest Service Handbook (FSH) and Manual (FSM) system sets overall policy for wildlife and fisheries management in wilderness. FSM 2323.32 states policy that fish management shall be consistent with wilderness values; that wilderness will be managed to provide for the perpetuation and aid in the recovery of federally listed threatened and endangered species; and that alternative areas that offer equal or better protection outside of wilderness will be used first. FSM 2323.34f explicitly recognizes that chemical treatment may be used to prepare waters to reestablish indigenous, threatened, endangered, or native species, or to correct undesirable conditions caused by human influence.

Approximately 3.4 miles of stream would be treated within the congressionally designated Lizard Head Wilderness area. Use of motorized equipment including ATV's, chainsaws, explosives, etc, would not occur within the Lizard Head Wilderness area. In the wilderness area, rotenone would be delivered by horse and foot, and administered by drip station and backpack sprayer. Forest Service Manual direction for Wilderness Management states that "Chemical treatment may be used to prepare waters for reestablishment of indigenous, threatened or endangered, or native species, or to correct undesirable conditions caused by human influence." (FSM 2323.34f). A Minimum Requirements Decision Guide was used to evaluate the project and determine the tools and methods necessary to meet minimum requirements for the administration of the area for the purpose of the Wilderness Act (located in project file).

The current recreation use of these wilderness streams is currently very low, particularly during the summer and late fall months when the treatment periods would occur. However, recreation use surrounding Woods Lake SWA and local trails is much higher. Woods Lake receives moderate fishing use during the summer and fall months. Woods Lake campground receives moderate use as well during the summer months until Labor Day.

No Action

There would be no change from the affected environment with the implementation of No Action alternative. There would be no change to the wilderness character or use in this area.

Proposed Action

Approximately 3.4 miles of stream would be treated within the Lizard Head Wilderness. The Forest Service uses a Minimum Requirements Decision Guide process to assist managers in minimizing the effects of federal actions within wilderness areas. This process concluded the following key points: 1) the project is necessary to preserve an important quality of wilderness character (naturalness) by restoring native fish to the area, and 2) no motorized or mechanized equipment would be used; instead all chemical treatment and monitoring would be delivered by horse and foot and administered by drip stations and backpack sprayers. There would be no permanent structures installed in the Wilderness. This is consistent with law, regulation, and Forest Service policy.

Application of pesticides within the Lizard Head Wilderness Area would degrade the “untrammeled” character of the wilderness in an attempt to enhance the “natural” conditions desired in management of a wilderness. The overall evaluation favors converting the fisheries species back to the natural, historic range of CRCT with minimal, short-term impact of pesticide application.

Minor impacts to wilderness users could occur during the 1-2 weeks needed to prepare and implement the project. For example, trail closure orders would be in place for public safety and to ensure that preparation and implementation are done in an efficient manner.

The project is expected to have some impacts to recreation visitors. Although the Colorado Division of Wildlife plans to close the Woods Lake State Wildlife Area during the treatment periods, the adjacent Woods Lake Campground would remain open. Trails that cross through the project area (Woods Lake Trail, Woods Lake Shoreline Trail, and Lone Cone Trail) would be closed during treatment periods to facilitate project implementation. The short duration of these closures would result in a minor inconvenience to recreation users in the area.

Recreational fishing use would cease to exist at Woods Lake SWA for two years since the current fish would be removed. However, fishing opportunities below Woods Lake would still be available. Fisherman seeking lake fishing opportunities would likely be displaced to other lakes in the Telluride, Norwood, and Montrose areas. However, fishing for native CRCT would resume following re-stocking of the lake and headwater streams and provide a unique fishing experience in the area.

Cumulative Effects

Cumulative effects take into consideration historical, ongoing, and projected future activities. Recreation use, fishing, hunting, campground use, and water management occur in the project area. Additional water use and low density housing developments occur in the lower end of the watershed. There would be no incremental effects to wilderness values as a result of the proposed actions, there would be no cumulative effect on these resources.

Economics

Affected Environment

The communities that would most likely be affected economically would be Telluride and Norwood, and surrounding communities. Services affected by the project proposal include, but are not limited to hotel and food services, gas stations, markets, fishing and hunting merchants, fishing and hunting guides, and campground concessionaires.

Effects on Economics

No Action

This alternative is not expected to directly affect local community resources as no changes would occur. This alternative would not have any direct, indirect, or cumulative economic effect on outfitter-guide or individual use of the project area.

Proposed Action

The Proposed is not anticipated to have direct economic effects to community services or businesses in the area. Outfitter guide use and other fishing use are typically concentrated in other areas of the San Miguel River so impacts to the local economy are not expected to occur. The timing of the project is not expected to affect the distribution of elk, so rifle hunting seasons should not be affected. Successful completion of the proposed action may actually have some benefit to local fishing outfitter guides since it would provide them with a new and unique fishing opportunity to market.

Cumulative Effects

Cumulative effects take into consideration historical, ongoing, and projected future activities. There would be no incremental effects on economics as a result of the proposed actions, there would be no cumulative effect on these resources.

Cultural Resources

Affected Environment

The area includes some historical sites located in and around Woods Lake, associated with the establishment of commercial and residential use in the area. Hughes Ditch has been determined to be ineligible historic site.

Effects on Cultural Resources

No Action

There would be no change from the affected environment with the implementation of No Action alternative. No cultural resources would be affected.

Proposed Action

Chemical treatment of lakes and streams in the area would not affect historic properties. Removal of beaver dams would occur within the boundaries of an eligible historic homestead site. However, ground disturbing sites are well away from the homestead site and would not be affected. The archeologist has determined that this action would not

affect historic properties in the vicinity of the project. The State Historic Preservation Office has concurred with this assessment.

Cumulative Effects

Cumulative effects take into consideration historical, ongoing, and projected future activities. There would be no incremental effects on cultural resources as a result of the proposed action; there would be no cumulative effect on this resource.

CONSULTATION AND COORDINATION

The Forest Service consulted the following individuals, Federal, state and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

INTERDISCIPLINARY TEAM:

Judy Schutz - Norwood District Ranger, Grand Mesa, Uncompahgre, and Gunnison National Forests, Norwood, CO.

Chris James - Team Leader, Fisheries Biologist, Grand Mesa, Uncompahgre, and Gunnison National Forests, Montrose, CO.

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Other agency personnel that provided information and assistance to the project.

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FEDERAL, STATE, LOCAL AGENCIES, and TRIBES CONTACTED:

U.S. Fish and Wildlife Service

Bureau of Land Management

Colorado Division of Wildlife

Division of Water Resources

San Miguel County Commissioners

San Miguel County Environmental Health

Town of Telluride

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Fall Creek and Woods Lake Colorado River cutthroat trout reclamation project

Town of Norwood
Town of Mountain Village
Ute Mountain Ute Tribe
Southern Ute Tribe
Northern Ute Tribe

A list of others contacted though scoping is located in the project record.

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