Montana Fish, Wildlife & Parks

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DATE: August 1, 2005

TO: Potentially Interested Party

FROM: Laura Katzman, Montana Fish, Wildlife and Parks

SUBJECT: Notification of proposed chemical treatment of bluegill from two private ponds near Cabinet Gorge Reservoir and Noxon, Montana

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Montana Fish, Wildlife and Parks in cooperation with Avista Corp. is proposing to remove bluegill and other non-native fish from two private ponds near Cabinet Gorge Reservoir and Noxon, Montana (T26N R33W Sect. 11) with the fish toxicant rotenone in September 2005. Bluegill are not native to Montana and were not thought to be present in the Lower Clark Fork River Drainage. However, in the fall of 2003, bluegill were sampled in the two private ponds and both are connected to Cabinet Gorge Reservoir during high flows. Introduced fish can cause substantial changes to aquatic ecosystems that are often negative, particularly for native fish and existing sport fisheries. This project is being proposed to prevent bluegill from establishing populations in Cabinet Gorge Reservoir or other water bodies downstream.

The proposed project is beginning its public input process through the Montana Environmental Policy Act. This mailing is to notify interested parties that an Environmental Assessment of the project was released August 1, 2005, and the public comment period is open through September 1, 2005.

Please contact Laura Katzman with Montana Fish, Wildlife and Parks (P.O. Box 95, Thompson Falls, MT 59873; 827-9320) to request a copy of the environmental assessment or if you have any questions or comments regarding the proposed project.

Environmental Assessment for Proposed Bluegill Removal from Two Private Ponds near Noxon, Montana

Prepared by:

Laura Katzman, Fisheries Biologist
Montana Fish, Wildlife and Parks
Thompson Falls, Montana

August 2005

Bluegill Removal Project

Cover Sheet

Proposed Action:	Montana Fish, Wildlife and Parks in cooperation with Avista Corp. proposes to protect fisheries in Cabinet Gorge Reservoir and other water bodies downstream by removing bluegill *Lepomis macrochirus* from two private ponds near Noxon, Montana (T26N R33W Sect. 11) using rotenone, a fish toxin, in September 2005.
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Lead agency:	Montana Fish, Wildlife and Parks
Responsible official:	Jim Satterfield, Regional Supervisor Montana Fish, Wildlife and Parks 490 N. Meridian Rd. Kalispell, MT 59901 (406) 751-4566
For further information:	Laura Katzman, Fisheries Biologist Montana Fish, Wildlife and Parks P.O. Box 95 Thompson Falls, MT 59873 (406) 827-9320
Special Note:	Comments received in response to this Environmental Assessment will be available for public inspection and will be released in their entirety if requested pursuant to the Montana Constitution.

Chapter 1.0: Purpose of and Need for Action

1.1 Proposed Action: Bluegill Removal

Montana Fish, Wildlife and Parks (MFWP) in cooperation with Avista Corp. is proposing to protect fisheries in Cabinet Gorge Reservoir and other water bodies downstream by removing bluegill *Lepomis macrochirus* from two private ponds near Noxon, Montana using rotenone, a fish toxin, in September 2005.

1.2 Need for the Action

Bluegill are not native to Montana and were not thought to be present in the Lower Clark Fork River Drainage. However, in the fall of 2003, bluegill were sampled in the two private ponds near Noxon, Montana and both ponds are connected during high flows to Cabinet Gorge Reservoir. Introduced fish can cause substantial changes to aquatic ecosystems that are often negative, particularly for native fish and existing sport fisheries. This project is needed to prevent bluegill from establishing populations in Cabinet Gorge Reservoir or water bodies downstream in order to protect native and existing sport fisheries.

1.2.1 How Bluegill Could Affect Fisheries Downstream

It is not known what effects bluegill would have on downstream fisheries if they established populations. However, almost all introductions of fish in the freshwaters of the Unites States have proven harmful to native fish communities (Taylor et al. 1984; and Courtenay and Robins 1989; cited in Tyus and Saunders 2000). At least 536 nonnative fishes (representing 75 families) have been introduced into the freshwaters of the United States (Fuller et al. 1999; Heidinger 1999; and Li and Moyle 1999; cited in Tyus and Saunders 2000). As nonnative fishes were introduced, many native fish populations declined, presumably due to adverse interactions that have affected 70% of fishes listed under provisions of the Endangered Species Act (Lassuy 1995; and U.S. Fish and Wildlife Service 1998; cited in Tyus and Saunders 2000). Of the 30 fishes that became extinct in the United States during the 20th century, introduced fishes were implicated in 24 extinctions (80%), and introduced fishes were the only factor in two extinctions (Miller et al. 1989, cited in Tyus and Saunders 2000).

The primary mechanism for bluegill having an effect on Cabinet Gorge Reservoir fisheries would likely be competition with other fish species. Bluegill eat zooplankton when they are young as do many other fish species. As bluegill increase in size they eat increasing proportions of aquatic and sometimes terrestrial insects, snails, small crayfish, amphipods, and fish eggs. These items are also quite common in the diet of many fish species, especially when the fish are young. Bluegill prefer weedy lakes and ponds with cool to moderately warm water. They are found among rocks and vegetation in the Columbia River. This

1.2.1 How Bluegill Could Affect Fisheries Downstream (cont.)

habitat overlaps with the habitat of many fish species found in Cabinet Gorge Reservoir.

Bluegill can be good to eat, but generally do not attain a size to make them a desirable sport fish particularly in a relatively cool climate like that of the Lower Clark Fork drainage. During juvenile and potentially adult life stages, bluegill could compete with more important and desired game fish that achieve larger sizes. They may also change the abundance of other prey fish in the reservoir through competition for food, which ultimately could affect popular game fish predatory species by altering the prey base.

1.3 Objectives of the Action (desired outcomes and conditions)

1.3.1 Objective #1

To remove the bluegill from the two private ponds and the channel connecting the ponds to remove the threat of bluegill establishing themselves in Cabinet Gorge Reservoir or water bodies downstream.

1.3.2 Objective #2

To protect native and sport fisheries in Cabinet Gorge Reservoir and water bodies downstream.

1.4 Relevant Plans, EISs, EAs, Regulations, and Other Documents

Montana Fish, Wildlife and Parks (MFWP) is "authorized to perform such acts as may be necessary to the establishment and conduct of fish restoration and management projects…" under statute 87-1-702.

MFWP must also follow the rules and regulations in statute 75-308 by obtaining a 308 permit from the Montana Department of Environmental Quality and following the terms of the permit.

1.5 Decision That Must 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 environment, requiring preparation of an Environmental Impact Statement.
- Determine the appropriate timing to conduct the project.

1.6 Scope of This Environmental Analysis

This section explains the scope of this environmental analysis. It briefly explains the history of this project and identifies project funding, issues studied in detail, and issues eliminated from further study.

1.6.1 History of the Planning and Scoping Process

This project was first brought to the attention of Montana Fish, Wildlife and Parks through the submission of an application for a private pond permit by a private landowner in October 2002. The application stated that there were a few rainbow trout in the ponds, but the applicant did not know where they came from. MFWP had discovered whirling disease in rainbow trout in another private pond in the Lower Clark Fork River drainage in 2002. Thus, MFWP decided to sample and test the existing fish in the pond prior to processing the private pond application.

In October 2003, we sampled the ponds with hook-and-line and gill nets. We did not catch any rainbow trout in the nets. We did catch largemouth bass *Micropterus salmoides* (n = 25)(length range: 200-380 mm), pumpkinseed *Lepomis gibbosus* (n = 69)(length range: 127-166 mm), yellow perch *Perca flavescens* (n = 5)(length range: 195-281 mm), brown trout *Salmo trutta* (n = 1)(329 mm), and bluegill (n = 13)(length range: 132-215 mm). All but the bluegill were all ready present in Cabinet Gorge Reservoir. Because introduced fish species can cause negative effects to native and sport fisheries, MFWP proposed removing the bluegill from the private ponds to protect fisheries in Cabinet Gorge Reservoir and other water bodies downstream. More background data was collected on the ponds to determine how to remove the bluegill in 2004. It was during this data collection time period that different methods of removing the fish from the ponds were considered. One method considered was removal of the bluegill with mechanical means. This method would involve drawing down the water level in the ponds with pumps and netting, trapping and/or electrofishing the fish in the ponds to physically remove bluegill. However, it was decided early in the consideration process that this method was not feasible and would not attain project objectives. The current project proposal was put forth in the fall of 2004.

Comments were sought on the project proposal from some neighboring landowners, MFWP agency specialists that review projects associated with rotenone and other fish toxicants, and collaborative, interdisciplinary teams of agency and organization representatives associated with a funding entity. The comments were sought from the fall of 2004 through the summer of 2005.

The funding for the project would come partially from Avista Corp. (Avista). Avista implements the Clark Fork Settlement Agreement (CFSA) as part of its re-licensing agreement mandated by the Federal Energy Regulatory Commission.

1.6.1 History of the Planning and Scoping Process (cont.)

Projects funded through the CFSA are reviewed and commented upon by a series of three collaborative teams of agency and organization representatives, the Management Committee, Aquatic Implementation Team, and Water Resources Technical Advisory Committee. The Management Committee must approve plans and Avista funding for proposals associated with implementing the CFSA. The Management Committee is comprised of 27 entities Avista, federal, state (Montana and Idaho) and county governments and agencies, Indian tribes, and non-governmental organizations. The Aquatic Implementation Team is a four-member team of fisheries biologists, representing Avista, MFWP, Idaho Department of Fish and Game, and the U.S. Fish and Wildlife Service, which collaboratively directs implementation of Avista's fish mitigation programs. The Water Resources Technical Advisory Committee is comprised of representatives appointed by the Management Committee and provides additional input and direction on proposals associated with implementing the CFSA.

1.6.2 Issues Studied in Detail

1.6.2.1 Water Quality (Issue #1)

This project is designed to intentionally introduce a piscicide into surface water to remove unwanted fish, which would involve short-term and minor effects to the treated bodies of water, if the project is implemented.

1.6.2.2 Water Users (Issue#2)

There are several downstream water users that likely would not be affected if the project was implemented, because rotenone breaks down very quickly when it comes in contact with soil and is not known to travel more than 3 inches in soil. However, as a precaution, the well of the water user closest to the project would be monitored for rotenone and the water user would be provided an alternate water source for drinking and for the birds that he raises for his commercial business during the project. This would involve a short-term inconvenience for the closest downstream landowner to the project if the project is implemented.

1.6.2.3. Air Quality (Issue #3)

Liquid rotenone does have a smell like that of mothballs that may last for several days, depending on air and water temperatures and wind direction. Any smells from the liquid rotenone would be short-term and minor if the project is implemented.

Decaying fish can also cause objectionable odors. However, if the project is implemented, dead fish that are floating or along the pond shoreline would be collected and disposed of by burying them on site.

1.6.2.4 Game animals, fish, or birds (Issue #4)

This project is designed to kill unwanted fish. Brown trout, bass, and yellow perch are game species that would be killed incidental to the bluegill removal if the project is implemented. These impacts would be short-term and minor because the ponds would be restocked.

Birds and animals that drink the treated water or eat dead fish would not be affected if the project is implemented.

1.6.2.5 Non-game animals, fish, or birds (Issue #5)

Invertebrates and subadult amphibians would likely be affected by the treatment if it took place. However, adult amphibians would likely not be affected and they and invertebrate populations should rebound quickly.

Pumpkinseed are a non-game fish species that would be removed from the pond with the rotenone treatment if the project is implemented. However, pumpkinseed are a non-native fish species in the Lower Clark Fork River drainage and not a fish species the private pond owner desires to have in the pond.

1.6.2.6 Threatened or endangered species (Issue #6)

Two threatened species could be affected if the project is implemented and one if it is not implemented. Grizzly bears are known to use nearby areas and an active bald eagle nest exists within a half mile of the ponds. Both grizzly bear and bald eagle could be affected if the project is implemented. Bull trout that inhabit Cabinet Gorge Reservoir and water bodies downstream could be negatively affected if the project is not implemented.

1.6.2.7 Health hazards (Issue #7)

Because the ponds are on private property, the risk of human exposure would be most apparent for the applicators of the rotenone if the project is implemented. All assisting with the project would wear safety equipment and be trained on the safe handling and application of the piscicide. Chemicals would be transported, handled, applied and stored according to the label specifications to reduce the probability of human exposure or spill.

1.7. Issues Eliminated From Further Study

1.7.1 Threatened or endangered species (Issue #6)

1.7.1.1 Issue #1: Grizzly bears are known to use nearby areas.

Grizzly bears are listed by the U.S. Fish and Wildlife Service as threatened, with the local northwest Montana population considered warranted for endangered status. Grizzly bears may utilize the project area for spring and fall foraging habitat.

1.7.1.2 Issue #2: An active bald eagle nest exists about a half mile from the ponds.

Bald eagles may use the project area for foraging. Bald eagles are also listed as threatened under the Endangered Species Act in the Upper Columbia Basin Zone (the bald eagle recovery area that encompasses the project area).

1.7.2 Rational for elimination of grizzly bears and bald eagles from further study

Although grizzly bears are known to use nearby areas, the presence of dead fish would not likely attract them due to the small scale of this project, and our efforts to minimize exposure by burying dead fish from the site should minimize any attraction of the dead fish.

An active bald eagle nest exists within a half mile of the ponds, however, the eagles would not be using the nest during project implementation in September.

In addition, if grizzly bears or bald eagles did eat the treated fish, they would not be affected. All animals including fish, insects, birds, and mammals have natural enzymes in the digestive tract that neutralize rotenone. However, gill-breathing creatures absorb rotenone directly into their blood via their gills and thus digestive enzymes cannot neutralize it. Rotenone residues in dead fish are generally very low (<0.1 ppm), unstable like those in water, and not readily absorbed through the gut of the animal eating fish. Birds and animals that drink the treated water or eat dead fish would not be affected. A bird weighing ¼ pound would have to consume 100 quarts of treated water or more than 40 pounds of fish and invertebrates within 24 hours to receive a lethal dose. The same bird would normally consume 0.2 ounces of water and 0.32 ounces of food daily; thus, a safety factor of 1,000- to 10,000-fold exists for birds and mammals (Finlayson et al. 2000).

1.8 Applicable Permits, Licenses, and Other Consultation Requirements

A permit from the Montana Department of Environmental Quality would be required to obtain authorization for use of the fish toxicant (DEQ 308).

Chapter 2.0: Alternatives Including the Proposed Action

2.1 Introduction

The purpose of this chapter is to describe the alternatives and compare the alternatives by summarizing environmental consequences.

2.2 Description of Alternatives

2.2.1 Alternative A: No Fish Removal (No Action)

2.2.1.1. Principal Actions of Alternative A

The no action alternative would allow bluegill to remain in the private ponds that are connected during spring flows to Cabinet Gorge Reservoir.

2.2.2 Alternative B: Fish Removal with Rotenone 2.

2.2.2.1. Principal Actions of Alternative B

Under Alternative B, MFWP would remove the bluegill from the private ponds and connecting channel using rotenone, a fish toxin, to prevent them from establishing populations in Cabinet Gorge Reservoir or water bodies downstream and to protect the native and existing sport fisheries.

Rotenone is a naturally occurring substance derived from the roots of tropical plants in the bean family (Leguminosae) including jewel vine (*Derris* spp.) and lacepod (*Lonchocarpus* spp.) that are found in Australia, Oceania, southern Asia, and South America (Finlayson et al. 2000). Rotenone has been used by native people for centuries to capture fish for food in areas where these plants are naturally found. It has been used in fisheries management in North America since the 1930s. Rotenone has also been used as a natural insecticide for crops and livestock.

Rotenone inhibits a biochemical process at the cellular level making it impossible for fish to use oxygen absorbed in the blood and needed in the release of energy during respiration (Oberg 1967a, 1967b, cited in Finlayson et al. 2000). Rotenone kills fish at low concentrations because it rapidly enters the blood stream through the gills.

The liquid-emulsifiable Prenfish brand rotenone containing 5% rotenone would be used to treat the ponds and connecting channel.

2.2.2.1 Principal Actions of Alternative B (cont).

We would follow the Prenfish label's recommendations for concentrations for normal pond use (0.5-1.0 ppm) when treating the ponds and connecting waters, but potentially could choose a greater concentration (up to 5 ppm is allowed by the label) if field bioassays suggest that higher concentrations are needed. The Prenfish label states that the persistence would be one week to a month depending on water temperatures, sunlight intensity, alkalinity, etc.

The rotenone would be dispensed in the ponds by boat. Drip stations would be used to dispense the rotenone in the channel connecting the ponds along with backpack sprayers for ponded areas and springs in the channel connecting the ponds. The discharge of the connecting channel would be measured prior to treatment to determine the amount of Prenfish needed in the drip stations. In addition, the powdered form of rotenone may be used to treat the springs in the upper pond and connecting channel, thus preventing fish from seeking them as freshwater refuges during the application.

Potassium permanganate would be used to detoxify the water at the lower pond outlet as an extra precautionary measure. The discharge of the lower pond would be measured prior to treatment and the potassium permanganate would be applied to the water at a rate that would neutralize the rotenone and leave a residual amount of permanganate at the end of the zone of contact between the two chemicals. This concentration used would be up to 12 mg/L.

Treatment would occur once in the ponds and for an estimated 8 hours in the connecting channel. Detoxification with potassium permanganate would occur during treatment and for one to two days following treatment.

Sentinel cages with target fish would be placed in each pond and the connecting channel to determine if the toxicity levels are effective and when the rotenone levels in the ponds are no longer toxic to fish. After this point the water is considered safe for restocking.

All dead fish would either be left on-site in the water or disposed of properly. Dead fish that are floating or along the pond shoreline would be collected and disposed of by digging a hole and burying them on site.

2.2.2.1 Principal Actions of Alternative B (cont.)

In the event some water is in the next landowner's pond downstream of the lower pond, it would also be treated.

If unforeseen circumstances confound the success of this project, it may be necessary to implement a second treatment of achieve the desired objectives. The public would be informed prior to conducting the second treatment.

2.2.2.2 Mitigation and Monitoring

2.2.2.2.1 Alternative A

The fisheries in Cabinet Gorge Reservoir are monitored every other year with gill nets and merwin traps. This monitoring would continue.

2.2.2.2.2 Alternative B

The monitoring of the fisheries in Cabinet Gorge Reservoir with gill nets and merwin traps would continue every other year.

In addition, as a precaution, the well of the water user closest to the project would be monitored for rotenone following treatment and would be provided an alternate water source for drinking and for the birds that he raises for his commercial business during the project. This would be precautionary monitoring because rotenone breaks down very quickly when it comes in contact with soil and is not known to travel more than 3 inches in soil.

One to two months following treatment the ponds would be sampled with gill nets to determine if the project was successful.

2.3 Process Used to Develop the Alternatives

2.3.1 History and Development Process of Alternatives

There could be environmental consequences to native and sport fisheries in Cabinet Gorge Reservoir or water bodies downstream if the bluegill establish populations there as a result of taking no action. Thus, the proposed action and other methodology of removing the bluegill were developed to determine the most effective means to remove bluegill from the private ponds with the least potential environmental consequences.

2.3.2 Alternatives Eliminated from Detailed Study

The methodology involving removing bluegill with mechanical means was eliminated from detailed study early in the consideration process for several reasons (see section 1.6.1). Due to the springs that feed the ponds, it would be difficult to draw the water down very low. This physical means of removal of bluegill would likely not be very effective and therefore, the alternative would not likely achieve a complete kill of the bluegill in the ponds. Thus, the threat of the bluegill establishing themselves in Cabinet Gorge Reservoir or bodies of water downstream would remain and project objectives could not be obtained.

2.4 Summary of Comparison of the Activities, the Predicted Achievement of the Project Objectives, and the Predicted Environmental Effects of All Alternatives

The no action alternative would allow bluegill to remain in the ponds that are connected during spring flows to Cabinet Gorge Reservoir. Under the "no action" alternative the threat of the bluegill establishing themselves in Cabinet Gorge Reservoir or water bodies downstream would remain. The native and sport fisheries that inhabit Cabinet Gorge Reservoir and water bodies downstream would continue to be threatened under the "no action" alternative.

The proposed action involves chemically removing bluegill from the two private ponds and connecting channel using the fish toxicant, rotenone. The "proposed action" alternative offers the highest probability of removing the threat of bluegill establishing themselves in Cabinet Gorge Reservoir or water bodies downstream and protecting native and existing sport fisheries. With this alternative it is technically feasible to achieve a complete kill of the bluegill in the ponds. The environmental review shows it is also environmentally feasible due to the minimal and/or temporary effects to the environment.

2.5 Identification of the Preferred Alternative

Because the "proposed action" alternative offers the highest probability of removing the threat of bluegill establishing themselves in Cabinet Gorge Reservoir or water bodies downstream and protecting native and existing sport fisheries, and the alternative is technically and environmentally feasible it is the preferred alternative.

2.6 Summary Comparison of Activities, the Predicted Achievement of the Project Objectives, and the Predicted Environmental Effects of All Alternatives

2.6.1 Summary Comparison of Project Activities

Table 2-1: SUMMARY COMPARISON OF PROJECT ACTIVITIES OF ALTERNATIVES A AND B

The following table provides a comparison of the on-the-ground activities that would occur if either Alternative A or B were implemented.

Activity	Alt. A	Alt. B
Remove bluegill from ponds using rotenone	No action	Bluegill would be removed from the ponds using rotenone

2.6.2 Summary Comparison of Predicted Achievement of Project Objectives

Table 2-2: SUMMARY COMPARISON OF PREDICTED ACHIEVEMENT OF PROJECT OBJECTIVES

Objectives	Alt. A	Alt. B
To remove the threat of bluegill establishing themselves downstream	Threat of bluegill establishing themselves downstream would remain	Likely would remove the threat of bluegill establishing themselves downstream
To protect native and sport fisheries in water bodies downstream	Native and sport fisheries in water bodies downstream would be threatened	Likely would protect native and sport fisheries in water bodies downstream

2.6.3 Summary Comparison of Predicted Environmental Effects

Table 2-3: SUMMARY OF ENVIRONMENTAL OR PREDICTED ENVIRONMENTAL EFFECTS

Issue	Alt. A	Alt. B
Water Quality	No change from current condition	Water quality effects from intentionally introducing a piscicide would be minor and short-term.
Water Users	No effects on water users	There would be a short-term inconvenience to the closest downstream water user who would be provided water during the project.
Air Quality	No change from current condition	Objectionable odors and smells caused by the project would be minor and short-term.
Game animals, fish, and birds	If bluegill establish themselves downstream, the ecosystem would change and game fish could be negatively affected.	Game fish in the pond would be killed incidentally to the bluegill removal, but the pond would be restocked. However, other game fish downstream would be protected from ecosystem changes that could occur if the project was not implemented. Birds and animals that drink the treated water or eat dead fish would not be affected
Non-game animals, fish, and birds	If bluegill establish themselves downstream, the ecosystem would change and non-game fish could be negatively affected.	Invertebrates and subadult amphibians would likely be affected. However, adult amphibians would likely not be affected and they and invertebrate populations should rebound quickly. Pumpkinseed are a non-game fish species that would be removed from the pond with the rotenone treatment. However, other non-game fish downstream would be protected from ecosystem changes that could occur if the project was not implemented.
Threatened and endangered species	If bluegill establish themselves downstream, the ecosystem would change which may affect bull trout, a threatened species.	Bull trout downstream would be protected from ecosystem changes that could occur if the project was not implemented.
Health hazards	No change from current condition	The risk of human exposure would be most apparent for the applicators of the rotenone. All assisting with the project would wear safety equipment and be trained on the safe handling and application of the piscicide. Chemicals would be transported, handled, applied and stored according to the label specifications to reduce the probability of human exposure or spill.

Chapter 3.0: Affected Environment

3.1 Introduction

The "affected environment" section succinctly describes the relevant resources that would affect or that would be affected by the alternatives if they were implemented.

3.2 Description of Relevant Affected Resources

3.2.1 Water Quality (Issue #1)

The ponds are located on the north side of Cabinet Gorge Reservoir about 2.4 km (1.5 miles) east of Bull River Bay and 3.2 km (2 miles) northwest of the town of Noxon (T26N R33W Sect. 11). The ponds connect to a slough about 0.8 km southeast of the lower pond outlet (T26N R33W Sect. 14) that flows into Cabinet Gorge Reservoir during spring. The ponds may also seasonally connect through a series of seasonally wet areas about 0.8 km southwest of the lower pond outlet (T26N R33W Sect. 14 or 15).

The upper pond is about 980' long and 200' wide and mostly less than 6' deep. The lower pond is about 560' long and 40 to 80' wide and mostly less than 6' deep. Both ponds are fed by springs and a small channel connects them. A small channel exits the lower pond but goes subsurface just after it leaves the property while the spring source is being used for irrigation seasonally.

The proposed amount of rotenone (Prenfish) to be used for the project is 0.025 to 0.05 mg/L (up to 0.25 mg/L if field bioassays suggest that higher concentrations are needed) of rotenone per liter of water. Because rotenone is insoluble in water, other materials are added to help disperse it through the water column (primarily naphthalene, methylnaphthalenes, and xylenes). Although rotenone itself is not a carcinogen, TCE (trichloroethylene), a component of the liquid rotenone formulation, is a carcinogen. However, the TCE concentration in water immediately following treatment is within the level permissible in drinking water (USEPA 1980, cited in Finlayson et al. 2000).

The impacts of the application of rotenone to the water quality of the ponds and connecting channel would be short-term and minor if the project is implemented. It is anticipated that the rotenone would naturally break down in the ponds within one to four weeks following treatment. How long rotenone persists depends largely on water temperature (Finlayson et al. 2000). However, the pH, organics in the water, and other factors can also affect rotenone persistence. Between the water temperatures of 10-20°C, rotenone was found to completely degrade in one to eight weeks and the estimated half-life values vary from 7.8 to 1.5 days, respectively (CDFG 1994; Sierpmann and Finlayson 1999; Finlayson and Harrington, unpublished, cited in Finlayson et al. 2000). The Prenfish label states that the persistence would be one to four weeks depending on temperatures, alkalinity, etc. A pre-treatment bioassay using bluegill would be conducted to determine the lowest effective concentration needed. In addition, the rate of

3.2.1 Water Quality (Issue #1)(cont.)

breakdown of chemical would be monitored using caged fish that would be placed in the ponds following treatment.

Rotenone binds to organic molecules and becomes inert, and it naturally breaks down quickly in the environment without detoxification. In addition, the water leaving the lower pond does not connect with any other water body during the time of treatment or natural detoxification period following treatment.

It is unlikely that rotenone would enter groundwater because it is strongly bound to organic matter in soil (Dawson et al. 1991). The mud and organically enriched bottom the ponds would bind and inactivate the rotenone before it can enter the groundwater. Rotenone moves less than 1 inch in most types of soils, except in sandy soils where the movement is slightly more than 3 inches (Finlayson et al. 2000). Groundwater tests during past rotenone treatments in northwest Montana did not show evidence of the chemical moving into groundwater supplies or wells located near the project sites (G. Grisak, MFWP, personal communication). Even if groundwater contamination did occur, studies conducted on mammals indicate that there would be no consequences for human health, because the surface water concentrations to be used in this project are much lower than would be needed to effect humans or other mammals. Estimates of a single lethal dose to humans are 300-500 mg rotenone per kilogram of body weight (Gleason et al. 1969, cited in Finlayson et al. 2000). Thus, a 160-pound person would have to drink over 435,000 liters (about 115,000 gallons) of treated water (at 0.05 mg of rotenone per liter) at one sitting to receive a lethal dose. An intake of 0.7 mg of rotenone per kilogram of body weight per day is considered safe (Haley 1978, cited in Finlayson et al. 2000). This would mean a 160-pound person could safely drink 268 gallons of treated water (at 0.05 mg of rotenone per liter) a day, which is unlikely to ever occur.

Because the channel exiting the lower pond does not have as organically rich substrate as the ponds to bind and inactivate the rotenone before it can enter groundwater, potassium permanganate ($KMnO4$), which quickly detoxifies rotenone, would be used to detoxify water exiting the lower pond. Potassium permanganate would be used to detoxify the water at the lower pond outlet at a concentration up to 12 mg/L. Detoxification with potassium permanganate would occur during treatment and for one to two days following treatment. Thus, the effects from potassium permanganate to water quality would also be short-term and minor if the project was implemented. In addition, potassium permanganate is routinely added to municipal water supplies for the control of compounds causing taste and odors.

3.2.2 Water Users (Issue#2)

Studies conducted on mammals indicate that, at the proposed concentrations, rotenone would have no effect on mammals, including humans that drink the

3.2.2 Water Users (Issue#2)(cont.)

treated water (see Water Quality Issue #1). However, the product label for the commercial form of rotenone requires that treated water not be allowed to enter potable water supplies. The studies required for setting tolerances for the use of rotenone in waters intended for irrigation, livestock consumption and garden use have been completed and suggest that at the proposed concentrations of rotenone that would be used, it would have no effect on mammals (including humans) that drink the treated water. Moreover, rotenone has also been used as a natural insecticide for crops and livestock. Regardless, the USEPA has not yet established tolerances for rotenone in potable and irrigation water. As a result, although waters with rotenone present may not cause problems, water containing residues of rotenone cannot be legally allowed for use for domestic or crop use. There are several downstream water users that likely would not be affected, because rotenone breaks down very quickly when it comes in contact with soil and is not known to travel more than 3 inches in soil. However, as a precaution, the well of the water user closest to the project would be monitored for rotenone and would be provided an alternate water source for drinking and for the birds that he raises for his commercial business during the project if the project is implemented.

3.2.3 Air Quality (Issue #3)

Liquid rotenone does have a smell like that of mothballs. This smell is likely that of naphthalene and methylnaphthalene (CDPR 1998, cited in Finlayson et al. 2000), components of the formulation of rotenone. This smell may last for several days, depending on air and water temperatures and wind direction. These relatively "heavy" organic compounds tend to sink (remain close to the ground) and move downwind. The California Department of Pesticide Regulation (CDPR 1998, cited in Finlayson et al. 2000) found no health effects from this smell. Any smells from the liquid rotenone would be short-term and minor if the project is implemented.

Decaying fish can also cause objectionable odors. However, dead fish that are floating or along the pond shoreline would be collected and disposed of by digging a hole and burying them on site if the project is implemented.

3.2.4 Game animals or birds (Issue #4)

This project is designed to kill unwanted fish. Brown trout *Salmo trutta*, largemouth bass *Micropterus salmoides*, and yellow perch *Perca flavescens* are non-native game species that would be killed incidental to the bluegill removal. These impacts would be short-term and minor because the ponds would be restocked if the project is implemented. As explained in the section on "issues eliminated from further study", fish and other gill-breathing creatures are most susceptible to the effects of rotenone. All animals including fish, insects, birds, and mammals have natural enzymes in the digestive tract that neutralize rotenone. However, gill-breathing creatures absorb rotenone directly into their blood via their gills and thus digestive enzymes cannot neutralize it. Rotenone residues in

3.2.4 Game animals or birds (Issue #4) (cont.)

dead fish are generally very low (<0.1 ppm), unstable like those in water, and not readily absorbed through the gut of the animal eating fish. Birds and animals that drink the treated water or eat dead fish would not be affected if the project is implemented. A bird weighing ¼ pound would have to consume 100 quarts of treated water or more than 40 pounds of fish and invertebrates within 24 hours to receive a lethal dose. The same bird would normally consume 0.2 ounces of water and 0.32 ounces of food daily; thus, a safety factor of 1,000- to 10,000-fold exists for birds and mammals (Finlayson et al. 2000).

3.2.5 Non-game animals or birds (Issue #5)

Invertebrates and subadult amphibians would likely be affected by the treatment. However, adult amphibians would likely not be affected and they and invertebrate populations should rebound quickly. Pumpkinseed *Lepomis gibbosus* are a non-game fish species that would be removed from the pond with the rotenone treatment. However, pumpkinseed are a non-native fish species in the Lower Clark Fork River drainage and not a fish species the private pond owner desires to have in the pond.

There would likely be a temporary reduction in invertebrates as a result of the rotenone treatment that may affect invertebrate-eating waterfowl. These impacts should be minimal if the project is implemented because studies have shown only short-term effects to invertebrate populations from rotenone (Cushing and Olive 1956; Hughey 1975).

3.2.6 Health hazards (Issue #7)

The liquid rotenone formulation, Prenfish (5% rotenone), is proposed to be used for the project. Thus, at the proposed application rate of 0.5 to 1 ppm rotenone solution, the actual concentration of rotenone in the water is approximately 0.025-0.050 ppm for Prenfish (up to 5 ppm rotenone solution, which is 0.25 ppm for Prenfish if field bioassays suggest that higher concentrations are needed).

Because the ponds are on private property, the risk of human exposure would be most apparent for the applicators of the rotenone. All assisting with the project would wear safety equipment such as a respirator, goggles, Tyvek overalls, and nitrile gloves. All who assist in the project would also be trained on the safe handling and application of the piscicide. A Montana Department of Agriculture certified applicator that has successfully met the state requirements for their license would supervise the application of rotenone to the ponds and connecting channel. Chemicals would be transported, handled, applied and stored according to the label specifications to reduce the probability of human exposure or spill.

See above water and air quality issues for more information.

Chapter 4.0: Environmental Consequences

4.1 Introduction

Environmental consequences form the scientific and analytic basis for the summary comparison of effects presented in Chapter 2 of this environmental assessment. This chapter describes the environmental consequences or effects of the proposed action and the cumulative effects of the concurrent and future state activities within the analysis area.

4.2 Predicted Attainment of the Project Objectives of all Alternatives

4.2.1 Predicted Attainment of Project Objective #1

4.2.1.1 Alternative A: No Fish Removal (No Action)

The no action alternative would allow bluegill to remain in the ponds that are connected during spring flows to Cabinet Gorge Reservoir. Under the "no action" alternative the threat of the bluegill establishing themselves in Cabinet Gorge Reservoir or water bodies downstream would remain.

4.2.1.2 Alternative B: Fish Removal with Rotenone

The proposed action involves chemically removing bluegill from the two private ponds and connecting channel using the fish toxicant, rotenone. The "proposed action" alternative offers the highest probability of removing the threat of bluegill establishing themselves in Cabinet Gorge Reservoir or water bodies downstream.

4.2.2 Predicted Attainment of Project Objective #2

4.2.2.1 Alternative A: No Fish Removal (No Action)

The no action alternative would threaten native and sport fisheries in Cabinet Gorge Reservoir and water bodies downstream.

4.2.2.2 Alternative B: Fish Removal with Rotenone

The proposed action would likely protect native and sport fisheries in Cabinet Gorge Reservoir and water bodies downstream.

4.3 Predicted Effects on Relevant Affected Resources of All Alternatives

4.3.1 Predicted Effects on Relevant Resources of all Alternatives

4.3.1.1 Alternative A

Because no action would occur under this alternative, there would be no effects to water quality, water users, air quality, or health hazards.

4.3.1.1 Alternative A (cont.)

There could be negative effects to game and non-game fish downstream of the project area, however, if bluegill become established.

4.3.1.2 Cumulative effects of Alternative A

Native species in Cabinet Gorge Reservoir and water bodies downstream are all ready negatively affected by the changes in their habitat caused by Cabinet Gorge Dam and other factors, and by nonnative species. Non-native sport fish are also all ready affected by the operations of Cabinet Gorge Dam and the mix of species that live in their water body. There could be additional negative cumulative effects to game and non-game fish downstream of the project area if bluegill become established.

4.3.2.1 Alternative B

As discussed in the Affected Environment chapter, the effects to water and air quality would be short-term and minor and health hazards from the project would be minimal to applicators if care if taken to handle and use the chemical safely and properly.

As discussed in the Affected Environment chapter, the effects to game and non-game fish and wildlife species would be largely to the game and non-game fish in the ponds. The project is intentionally removing these species, all of which are non-native to the Clark Fork River drainage. In addition, there may be some short-term effects on invertebrate and amphibian populations and those animals that feed on them.

4.3.2.2 Cumulative effects of Alternative B

There should not be any cumulative effect of the proposed action because the all predicted effects are short-term and minor.

Project Funding

The funding of this project would be from Montana Fish, Wildlife and Parks and Avista Corp. Montana Fish, Wildlife and Parks would provide much of the labor needed to conduct the project and Avista Corp. would fund the supplies, materials, permitting, and some labor needed to complete the project. The funding from Avista Corp. is through the Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program of the Clark Fork Settlement Agreement. The Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program is funded by Avista Corporation pursuant to conditions of an operating license, issued by the Federal Energy Regulatory Commission, allowing continued operation of Noxon Rapids and Cabinet Gorge dams. This program is intended to offset the power peaking and reservoir operational impacts of Noxon Rapids and Cabinet Gorge dams to native salmonid species and recreational fisheries, through tributary habitat acquisition, watershed restoration and enhancement, and recreational fishery monitoring and management support.

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