Montana Fish, Wildlife & Parks

Region One
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Ref: JS043-11
September 8, 2011

Ladies and Gentlemen:

Montana Fish, Wildlife & Parks (FWP), Region 1, has written a draft environmental assessment (EA) proposing to conduct a 3-year study to assess the efficacy of using modified electrofishing equipment to destroy nonnative lake trout embryos in Swan Lake, Montana. Information obtained from the study will help determine the feasibility and effectiveness of alternatives for managing the lake trout population in Swan Lake.

A copy of the draft is enclosed. The public comment period for this draft EA runs through 5:00 p.m., September 29, 2011. Please direct your questions or comments to Fisheries Biologist Leo Rosenthal, FWP, 490 N Meridian Road, Kalispell, MT 59901, (406) 751-4548 or e-mail to lrosenthal@mt.gov.

Sincerely,

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

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Enclosure
c: *Governor's Office, Attn: Mike Volesky, PO Box 200801, Helena, MT 59620-0801
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*Dept. of Environmental Quality, Planning, Prevention & Assist., PO Box 200901, Helena, 59620
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*Montana Fish, Wildlife & Parks - Director's Office: Reg Peterson; Fisheries: Bruce Rich; Rebecca Cooper; & Legal Unit: Jessica Fitzpatrick
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*Montana State Parks Association, PO Box 699, Billings, 59103
*Joe Gutkoski, President, Montana River Action Network, 304 N 18th Ave., Bozeman, 59715
*Representatives Joe Read, Janna Taylor, Daniel Salomon, Scott Reichner, Mark Blasdel
*Senators Verdell Jackson, Shannon Augare, Carmine Mowbray
*Flathead County Commissioners, 800 S Main Street, Kalispell, MT 59901
Lake County Commissioners, 106 Fourth Avenue E, Polson, MT 59860
Interested Parties

*E-mailed

Draft Environmental Assessment for the Use of Modified Electrofishing Equipment to Destroy Lake Trout Embryos in Swan Lake, Montana

September 8, 2011

Montana Fish, Wildlife & Parks

Environmental Assessment for the Use of Modified Electrofishing Equipment to Destroy Lake Trout Embryos in Swan Lake, Montana

Proposed Action: Montana Fish, Wildlife & Parks (FWP) in collaboration with Montana Cooperative Fishery Research Unit (MTCFRU) propose to conduct a 3-year study to assess the efficacy of using modified electrofishing equipment to destroy nonnative lake trout embryos in Swan Lake, Montana. The proposed study would occur annually for three years during September, October, and November starting in 2011. Funding has been secured for the first year of the proposed study, and obtaining funding for additional years will depend on the relative success of the first year of study. Information obtained from the proposed study will help determine the feasibility and effectiveness of alternatives for managing the lake trout population in Swan Lake (e.g., suppression of the population).

Lead Agency:
Montana Fish, Wildlife & Parks

Responsible Official:
Jim Satterfield
Regional Supervisor
Montana FWP, Region 1
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Comment Period:
The public comment period will be through Thursday, September 29, 2011. Comments may be e-mailed to lrosenthal@mt.gov or written comments may be sent to the following address:

Leo Rosenthal, Fisheries Biologist
FWP, Region 1
490 North Meridian Road
Kalispell, MT 59901
406-751-4548

Chapter 1: Purpose of and Need for Action

A. Proposed Action

Montana Fish, Wildlife & Parks (FWP) in collaboration with Montana Cooperative Fishery Research Unit (MTCFRU) propose to conduct a 3-year study to assess the efficacy of using modified electrofishing equipment to destroy nonnative lake trout embryos in Swan Lake, Montana. Electrofishing is a standard and accepted method for nonlethally sampling fish; however, available data show that a voltage gradient of about 15 volts per inch or less is lethal to embryos of many fish species during early development. The first two years of the proposed study would involve collecting eggs and sperm from adult lake trout, placing fertilized lake trout eggs in experimental enclosures in Swan Lake at depths of about 15 to 30 feet, and exposing the experimental enclosures to a voltage gradient of about 15 volts per inch. This phase of the experiment would also evaluate the effects of various environmental conditions on the efficacy of using modified electrofishing equipment to destroy lake trout embryos. Information gained would be used to perform an experimental destruction of lake trout embryos at a larger spatial scale (e.g., entire spawning sites) during the third year of the proposed study. Collection of eggs and sperm from adult lake trout would occur concurrently with ongoing FWP lake trout management activities on Swan Lake. The proposed study would occur annually for three years during September, October, and November starting in 2011. Funding has been secured for the first year of the proposed study, and obtaining funding for additional years will depend on the relative success of the first year of study. Information obtained from the proposed study will help determine the feasibility and effectiveness of alternatives for managing the lake trout population in Swan Lake (e.g., suppression of the population).

1. Funding

The project is anticipated to cost between $77,000 and $96,000 annually. Funding for this project will be through FWP using Bonneville Power Administration (BPA) funding; additional contributions will be provided by MTCFRU. Funding has been secured for the first year of the project. Obtaining funding and initiating project activities for the two additional years of this study will depend on the relative success of the first year of study.

2. Estimated Timeline

The project is anticipated to begin in late September or early October of 2011 and continue through November of the same year. Project activities during late September and early October will include testing and calibrating electrofishing equipment. Project activities during late October and early November will include collecting eggs and sperm from lake trout (in association with ongoing FWP management activities) and distributing fertilized eggs in experimental enclosures in Swan Lake at depths of about 15 to 30 feet. Project activities during early November through late November would include exposing experimental enclosures to electricity (voltage gradient of about 15 volts per inch), evaluating the influence of electricity on the enclosed lake trout embryos, and performing surveys within areas exposed and not exposed to electricity to examine effects on other benthic (lake bottom) fauna. This same timeline will be used for all three years of the proposed study.

B. Location

Swan Lake (3,239 acres) is located in the Swan River Valley of northwest Montana. The Swan River is a major tributary to Flathead Lake. Swan Lake historically contained one of the strongest bull trout populations in the entire Columbia River Basin. Lake trout spawning areas were identified using sonic telemetry from 2007-2009. The proposed project would be limited to previously identified spawning areas located along the portion of Swan Lake adjacent to Highway 83.

C. Authority

Section 87-1-201 (1) of the Montana Code Annotated (MCA) requires Fish, Wildlife & Parks to supervise all wildlife and fish in the state of Montana. The Department may spend money for the protection, preservation, management, and propagation of fish, Section 87-1-201(3), MCA. Montana law requires the department to implement programs that manage species listed as threatened or endangered under the federal Endangered Species Act in a manner that assists in the maintenance or recovery of those species, Section 87-1-201(9), MCA.

D. Need for the Action

The Swan drainage contains one of Montana's most stable and healthy bull trout populations, as well as important kokanee and northern pike fisheries. An FWP creel survey conducted in 1995 estimated anglers expended 8,833 days of effort on Swan Lake to harvest 10,670 fish, of which 82% were kokanee, 9% were northern pike, and 5% were bull trout. In 1998 anglers began catching and reporting adult-sized (20-30-inch) lake trout from Swan Lake and the Swan River upstream of the lake. It is suspected lake trout either ascended the Bigfork Dam fish ladder prior to closure in 1993 or they were illegally introduced into Swan Lake. FWP gillnetted one 9-inch juvenile lake trout from Swan Lake during low-intensity annual monitoring in 2003; the small size of this fish provided the first evidence of successful reproduction by lake trout in the Swan drainage. Since 2003, lake trout catch from both anglers as well as FWP monitoring has continued to increase. These data led biologists to conclude that lake trout establishment is a growing threat to the bull trout populations in Swan Lake, the Swan River system, and interconnected Lindbergh and Holland Lakes upstream. Research efforts since 2006 have focused on lake trout population demographics and exploring potential techniques to reduce lake trout numbers while minimizing bull trout bycatch.

These data indicate that there is a well established lake trout population in Swan Lake and that the population is likely increasing in abundance. This is of concern to regional fisheries managers because the establishment of lake trout populations has been shown to have a negative effect on the abundance of bull trout and kokanee in other western lakes. Therefore, an experimental lake trout removal program was initiated in 2009 by FWP and its partners with the aim of controlling the lake trout population for the benefit of other fisheries. This removal effort includes removal of juvenile and subadult lake trout using small-mesh gill nets set during the late summer and removal of adult lake trout from previously identified spawning areas during the autumn. During 2009, there were 5,213 lake trout removed during the late summer and 239 lake trout removed during the autumn from Swan Lake.

The use of gill nets has proven effective in capturing large numbers of lake trout in Swan Lake. However, due to the relatively high fecundity of lake trout, early life history survival may have a significant effect on population growth rates. Therefore, researchers have suggested that lake trout suppression activities may benefit from targeted destruction of lake trout embryos in order to cause year class failure and further reduce population growth rates. Research has shown that application of electricity (e.g., a voltage gradient of about 15 volts per inch) to early stage fish embryos can cause up to 100% mortality, but equipment and techniques are not yet available for applying electricity to benthic (lake bottom) areas of lakes where spawning lake trout deposit their eggs. Therefore, the purpose of the proposed action is to develop, and experimentally test, equipment and techniques for applying electricity to lake trout spawning sites in Swan Lake with the overall objective of assisting FWP with their ongoing lake trout removal effort.

E. Objective of the Action

The primary objective of the proposed action is to evaluate the efficacy of using electricity for targeted destruction of lake trout embryos. The first two years of the proposed study would involve developing equipment for applying electricity to benthic areas of Swan Lake and testing the effects of exposing lake trout embryos, in experimental enclosures, to electricity (voltage gradient of about 15 volts per inch). The third year of the proposed study would build on knowledge gained during the first two years and would evaluate the efficacy of exposing lake trout embryos, dispersed over entire lake trout spawning areas, to a lethal voltage gradient. If effective, this tool will help halt expansion of the lake trout population in Swan Lake and, with the ongoing experimental gill net removal program, begin to cause a downward trajectory in the future growth of the lake trout population. Based on similar examples in Montana and surrounding states, and our collective scientific judgment based on available data, expansion of lake trout in Swan Lake will lead to collapse of the kokanee population (an important recreational species) and declines in the bull trout population (a federally listed species under the Endangered Species Act). The proposed 3-year study will provide information on the efficacy of targeted destruction of lake trout embryos using electricity. If effective, the methods developed during this study will be a valuable contribution to the ongoing lake trout removal effort being conducted by FWP.

F. Other Relevant Environmental Assessments (EAs)

Environmental Assessment (EA) for an Experimental Removal of Lake Trout in Swan Lake, Montana (2009): This EA analyzed the use of gillnetting for the removal of lake trout in Swan Lake over a 3-year period.
http://fwp.mt.gov/news/publicNotices/environmentalAssessments/speciesRemovalAndRelocation/pn_0038.html

G. Decisions to be Made

The decision-maker will determine the following from this EA:

i. Determine if proposed alternatives meet the project objectives.
ii. Determine which proposed alternative should be selected.
iii. Determine if the selected alternative would cause significant effects to the human environment, requiring the preparation of an environmental impact statement (EIS).

H. Scope and History of this Environmental Assessment

In 1998 anglers began catching and reporting adult-sized (20-30-inch) lake trout from Swan Lake and the Swan River upstream of the lake. Additionally, FWP gillnetted one 9-inch juvenile lake trout from Swan Lake during low-intensity annual monitoring in 2003; the small size of this fish provided the first evidence of successful reproduction by lake trout in the Swan drainage. A similar survey conducted in 2004 resulted in the capture of seven juvenile lake trout. It is suspected lake trout either ascended the Bigfork Dam fish ladder prior to closure in 1993 or they were illegally introduced into Swan Lake. These findings were of concern to regional fishery managers and other stakeholders because the establishment of lake trout in other western lakes has occurred concurrently with the decline of species such as bull trout and kokanee. Specific causes for these declines are unknown; however, fisheries scientists believe that these declines are the result of competitive and predatory interactions between lake trout and other species.

The documentation of lake trout in Swan Lake served as a catalyst in the formation of a Swan Valley Bull Trout Working Group (SVBTWG) in 2004. The SVBTWG is composed of five government agencies (FWP, USFWS, the Confederated Salish and Kootenai Tribes, Montana Department of Natural Resources and Conservation, United States Forest Service, and Montana Trout Unlimited. The SVBTWG determined that, if left uncontrolled, it is likely that lake trout will become the dominant piscivore (fish predator) in the Swan ecosystem. The SVBTWG was formalized by a Memorandum of Understanding (MOU) in 2005.

Since 2005, research and monitoring efforts have been made to evaluate and assess the threat posed by lake trout in Swan Lake. Gill net surveys conducted by FWP in 2005 resulted in the sampling of 28 juvenile lake trout, most of which were 9 to 12 inches long. MTCFRU conducted a 6-week series of gill net surveys on Swan Lake in 2006, which resulted in the sampling of 194 lake trout and 110 bull trout. In 2007 an effort was made to estimate the population size of lake trout in Swan Lake. Over 2,000 lake trout were sampled using a mark-recapture framework; however, low recapture rates resulted in a potentially unreliable population estimate. A depletion framework was used in 2008 to provide an estimate of the lake trout population size. A total of 3,487 lake trout were removed over a 3-week period, which resulted in a population estimate that varied from about 7,300 to 10,500 lake trout in Swan Lake between the sizes of 6.5 and 35.4 inches. Additional information gathered during 2007 and 2008 included data on the timing and location of lake trout spawning in Swan Lake, appropriate gear types and methods for sampling lake trout in Swan Lake, and information on the population demographics of lake trout in Swan Lake. Mathematical models were also developed to estimate the amount of harvest required to negatively affect the lake trout population growth rate. In 2009, FWP and its partners initiated an experimental lake trout removal effort on Swan Lake with the aim of controlling the lake trout population for the benefit of other fisheries. Netting conducted in 2009 and 2010 resulted in 15,580 lake trout being removed from Swan Lake.

Swan Lake represents a unique learning opportunity with regard to lake trout suppression. Similar removal efforts have been, and continue to be, conducted in other waters with as yet no clear success. Swan Lake differs from other examples because of the early stage of lake

trout establishment, the relatively small size and simple bathymetry of the lake, the important native and sport fisheries have yet to show signs of decline, and there is no established fishery for lake trout. Thorough baseline data regarding the local fish assemblage has been collected prior to lake trout establishment and will allow scientists to determine if lake trout suppression actions have been effective. Additionally the use of gill nets has proven effective in capturing large numbers of lake trout in Swan Lake.

Due to the relatively high fecundity of lake trout, early life history survival may have a significant effect on population growth rates. Consequently, researchers have suggested that lake trout suppression activities may benefit from targeted destruction of lake trout embryos in order to cause year class failure and to further reduce population growth rates. Research has shown that application of electricity (e.g., a voltage gradient of about 15 volts per inch) to early stage fish embryos can cause up to 100% mortality. The aim of the proposed study is to develop, and experimentally test, equipment and techniques for applying electricity to lake trout spawning sites in Swan Lake in order to enhance the ongoing experimental lake trout removal effort. This type of effort may be especially successful in Swan Lake where researchers have clearly defined lake trout spawning sites. Therefore, this EA will address issues related to an experimental application of electricity to lake trout spawning sites in Swan Lake.

I. Issues Evaluated in Detail

1. **Benthic Invertebrates (Issue 1)**
   Little is known about the benthic invertebrate fauna in Swan Lake. However, application of electricity to lake trout spawning sites has the potential to affect benthic invertebrates in localized areas; especially relatively sessile (immobile) or burrowing species. Chapters 3 and 4 of this EA provide additional detail about potential environmental effects on benthic invertebrates associated with the proposed action.

2. **Fish Species (Issue 2)**
   A variety of native and nonnative fish species are present in Swan Lake and its tributaries. Bull trout (a species listed as threatened under the Endangered Species Act), westslope cutthroat trout (a Montana species of special concern), mountain whitefish, pygmy whitefish, sculpin, northern pikeminnow, peamouth, longnose sucker, and largescale sucker comprise the native fish species in the basin. The nonnative fish species present in the system are lake trout, rainbow trout, kokanee, brook trout, northern pike, yellow perch, brook stickleback, central mudminnow, and pumpkinseed. Chapters 3 and 4 of this EA provide additional detail on the fish species present in Swan Lake and potential environmental effects on fishes associated with the proposed action.

3. **Public Controversy (Issue 3)**
   The expanding presence of lake trout in Swan Lake has generated substantial concern among fisheries professionals and the public. The proposed actions may cause public controversy. Some groups may argue against removing lake trout; however, others will argue for removal/control of the species to maintain the native and recreational fisheries

present in Swan Lake. Chapters 3 and 4 of this EA provide additional detail on potential public controversy associated with the proposed action.

J. Issues Eliminated from Further Study

1. Community and Economic Impact

Establishment of lake trout is likely to affect the Swan Lake fisheries, but the specifics are unknown. Initially, a robust lake trout population with trophy-sized fish produced as a result of fast growth and abundant kokanee forage would likely be attractive to anglers. However, in many similar situations, after a large lake trout population becomes established, it will likely reduce or eliminate kokanee and bull trout populations. The resulting fishery is likely to become similar to those found in Whitefish Lake and Lake McDonald where the large lake trout rapidly disappear from the population. This may change angler use of Swan Lake and indirectly cause economic changes in the community. However, the established lake trout population may offset changes in angler use related to declines in bull trout and kokanee fisheries, at least so long as a lake trout population with diverse size classes is maintained. The proposed study to evaluate the efficacy of targeting lake trout embryos for destruction will aid in an ongoing FWP effort to reduce the lake trout population, thus delaying changes in other fisheries. However, the effect on the lake trout population may be short term without long-term management. Long-term solutions to issues related to community impacts of lake trout on fishing opportunities and fishing economics will continue to be evaluated.

2. Effects on Other Wildlife

Applying electricity to benthic substrates in Swan Lake at depths of about 15 to 30 feet is not anticipated to have an effect on other wildlife species.

K. Applicable Permits, Licenses, and Other Consultation Requirements

1. Permits

Any alternative selected that requires handling of fish will require consultation with the US Fish and Wildlife Service to determine relative impacts to bull trout, a species listed as threatened under the US Endangered Species Act. At the conclusion of this evaluation, the US Fish and Wildlife Service will incorporate any additional bull trout incidental take under the existing Section 6 permit authorized by the Endangered Species Act.

L. Why an EA is Appropriate Level of Review

Based on an evaluation of impacts to the physical and human environment under MEPA, this environmental review revealed only one noteworthy potential negative impact (public controversy) that could not be mitigated from the proposed action. Removing fish species from a water body is not a new or unusual FWP action, it will not set a precedent, and it will not conflict with local, state, or federal laws or formal plans. Due to these factors, an EIS is not necessary and an EA is the appropriate level of analysis. A narrative EA was performed because this action may generate public controversy, the action has potentially noteworthy impacts that can be mitigated, and FWP wants to provide information to the public during the entire decision-making process.

Chapter 2: Alternatives Including the Proposed Action

A. Introduction

The purpose of Chapter 2 is to describe and compare the alternatives by summarizing the environmental consequences. This chapter describes the activities of the no-action alternative and all action alternatives. However, information that is more detailed can be found in Chapters 3 and 4. This chapter presents the predicted attainment of project objectives and the predicted effects of all alternatives on the quality of the human environment in comparative form, providing a basis for choice among the options for the decision-maker and the public.

FWP and MTCFRU have developed two possible alternatives. The alternatives are 1) the no-action alternative and 2) an experimental approach to evaluating the efficacy of using modified electrofishing equipment to destroy lake trout embryos in Swan Lake.

B. Description of Alternatives

1. Alternative A: No-action Alternative

a. Principal Actions of Alternative A

Under Alternative A, the no-action alternative, no experiments would be conducted to evaluate the efficacy of using modified electrofishing equipment to destroy lake trout embryos. Ongoing experimental lake trout removal being conducted by FWP on Swan Lake would not be aided by targeted destruction of lake trout embryos. This alternative will result in no information regarding the efficacy of using modified electrofishing equipment to destroy lake trout embryos.

b. Past and Present Relevant Actions

FWP initiated an experimental lake trout removal effort aimed at reducing the number of subadult and adult lake trout in Swan Lake. This effort is anticipated to last at least three years. FWP has developed a database of historic gill net sampling information. This information will be valuable in interpreting changes in the Swan Lake aquatic community through time.

c. Reasonably Foreseeable Relevant Actions Not Part of the Proposed Action

The population growth rate of lake trout in Swan Lake will be determined primarily by the number of subadult and adult lake trout removed by FWP. Year class strength will be influenced by the number of adult lake trout removed by FWP prior to spawning, but mortality of lake trout embryos will not be influenced by targeted efforts.

2. Alternative B: Evaluating the Use of Modified Electrofishing Equipment to Destroy Lake Trout Embryos in Swan Lake – Proposed Action

The aim of the proposed 3-year study is to develop, and experimentally test, modified electrofishing equipment to destroy lake trout embryos. This study will target lake trout embryos for destruction to aid an ongoing experimental lake trout removal effort being led by FWP. Lake trout have relatively high fecundity; therefore, methods for destroying

lake trout embryos may have a significant effect on year class strength and population growth rates

Measurable goals and specific success criteria will be used to evaluate the efficacy of these actions and will be assessed on an annual basis. Through this evaluation process, methods may be adjusted to improve efficiency and plans for future management may be developed. Some lake trout control projects in the western United States have failed to establish solid baseline information; thus, the programs have struggled to show progress, and in some cases it is unknown what level of effort is required to achieve the desired lake trout population levels. Baseline population information for Swan Lake has been recorded and will continue to be collected as the project progresses. The availability of baseline data and future monitoring will allow fisheries scientists and managers to determine whether targeted destruction of lake trout embryos is having an effect on year class strength.

a. Principal Actions of Alternative B

The primary aim of this 3-year study is to develop and evaluate modified electrofishing equipment that is useful for targeted destruction of lake trout embryos. Electrofishing is a standard and accepted method for nonlethally sampling fish; however, available data show that a voltage gradient of about 15 volts per inch is lethal to embryos of many fish species during early development. The first two years of the study would experimentally evaluate the use of electricity for destroying lake trout embryos at a small spatial scale (i.e., in experimental enclosures placed in Swan Lake at depths of about 15 to 30 feet) and would evaluate environmental factors that influence the efficacy of using electricity to destroy lake trout embryos. Based on information gained during the first two years of the experiment, the third year of experiment would evaluate the efficacy of using electricity to destroy lake trout embryos at a larger spatial scale (i.e., entire spawning sites). For all aspects of this study electrofishing equipment would be used to apply electricity to benthic substrate. Electricity will not be applied throughout the entire water column.

b. Mitigation and Monitoring

Underwater videography will be used to determine the presence of fishes (other than lake trout embryos) within areas that are to be experimentally treated with electricity, and treatments will not be conducted if other fishes are present. Before and after comparisons of the benthic invertebrate fauna will be made to determine potential effects of treatments on benthic invertebrates.

c. Evaluation Criteria

This experiment will include both treatments (i.e., embryos exposed to electricity) and controls (i.e., embryos not exposed to electricity). Therefore, the efficacy of using electricity to destroy lake trout embryos in Swan Lake will be based on direct statistical comparisons between survival of embryos that have or have not been exposed to electricity.

d. Past and Present Relevant Actions

FWP has developed a database of historic gill net survey data. In the event that the methodologies developed during this study are adopted by FWP as part of their lake trout suppression program, historic gill net survey data will be valuable in interpreting the effect of targeted destruction of lake trout embryos on year class strength.

C. Process Used to Develop the Alternatives

1. History and Development Process of Alternatives

A limited number of possibilities exist to remove undesirable fish species in lake environments. These techniques include, but are not limited to: mechanical removal (i.e., netting, manipulating water levels, installation of barriers, etc.), chemical treatment, angling harvest, and biological control (examples include the use of predatory fish). These techniques all have benefits and drawbacks, and must be selected on a case-by-case basis for specific water bodies.

2. Alternatives Eliminated from Detailed Study

Fish removal projects utilizing fish toxicants have been conducted extensively in the western United States. These approaches have proven successful in many cases. However, given the robust population of bull trout existing in Swan Lake, this alternative is not feasible or prudent at this time. Similarly, the use of biological controls, such as the introduction of predatory fish, is not being considered because of the unknown consequences to bull trout and other native fish species occupying Swan Lake.

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

1. Summary Comparison of Project Activities

Comparisons of the project activities under the two alternatives are to simply conduct the proposed study to evaluate the efficacy of using electrofishing techniques to target lake trout embryos for destruction (Alternative B) or do not perform the study (Alternative A).

2. Summary Comparison of Predicted Achievement of Project Objectives

The primary objective of this project is to provide additional methods to assist FWP in their effort to remove lake trout from Swan Lake; the no-action alternative will not satisfy this objective. Under Alternative A (no action), the ongoing lake trout removal experiment will not benefit from targeting lake trout embryos for destruction, which may have a significant influence on year class strength. Under Alternative B, developing techniques for targeted destruction of lake trout embryos may provide a powerful tool for reducing year class strength.

3. Summary Comparison of Predicted Environmental Effects

FWP and MTCFRU predict that Alternative A will not have any direct or immediate environmental effects. FWP and MTCFRU predict that Alternative B will have direct effect on the lake trout population in Swan Lake. The primary spawning habitat for lake trout in Swan Lake has been identified. The ability to effectively destroy lake trout

embryos may have a significant effect on year class strength. In addition, Alternative B will provide information that is invaluable for determining the feasibility and efficacy of long-term lake trout population control options. Alternative B will likely have no impact on other fishes. Underwater videography will be used to determine the presence of other fishes during experiments, and application of treatments can be suspended if other fishes are present. It is unknown whether Alternative B will have an effect on the benthic invertebrates in Swan Lake. Data are not available regarding the benthic invertebrates in Swan Lake; however, surveys will be conducted before and after experimental treatment to evaluate potential effects of exposure to electricity on the benthic invertebrates.

Chapter 3: Affected Environment

A. Introduction

Chapter 3, Affected Environment, identifies and describes those resources that are affected by the proposed action and is organized by general resource categories and their associated issues. It does not describe any effects of the alternatives, as these will be covered in Chapter 4. The descriptions of the existing environment found in this chapter can be used as a baseline for comparison in Chapter 4.

1. General Description and Location of Swan Lake

Swan Lake (3,239 acres) is located in the Swan River Valley of northwest Montana. The Swan drainage forms a major tributary to Flathead Lake. Swan Lake historically contained one of the strongest bull trout populations in the entire Columbia River Basin.

B. Description of Relevant Affected Resources

1. Benthic Invertebrates (Issue 1)

Little is known about the benthic invertebrate fauna in Swan Lake. However, application of electricity to lake trout spawning sites has the potential to effect benthic invertebrates in localized areas; especially relatively sessile or burrowing species. A before, after, control, impact survey may be incorporated into this study in order to determine the effects of experimental treatment on benthic invertebrates. This type of study design collects information before and after experimental treatment (in this case before and after exposure to electricity) and in treated and untreated sites (in this case in areas that are exposed to electricity and those that are not). Information to be collected and compared may include data on the number of different benthic invertebrates present and their abundances.

2. Fish Species (Issue 2)

A variety of native and nonnative fish species are present in Swan Lake and its tributaries. Bull trout (a species listed as threatened under the Endangered Species Act), westslope cutthroat trout (a Montana species of special concern), mountain whitefish, pygmy whitefish, sculpin, northern pikeminnow, peamouth, longnose sucker, and largescale sucker comprise the native fish species in the basin. The nonnative fish species present in the system are lake trout, rainbow trout, kokanee, brook trout, northern pike, yellow perch, brook stickleback, central mudminnow, and pumpkinseed.

The bull trout population in Swan Lake has been considered one of the most robust bull trout populations remaining in the historic distribution in the United States. Due to the historic strength and stability of the Swan Lake bull trout population, the opportunity for anglers to harvest bull trout in Swan Lake has been maintained. Harvesting bull trout is a unique opportunity for anglers, given the status of bull trout as a Threatened Species under the US Endangered Species Act. A substantial fishery exists in Swan Lake for kokanee salmon. In fact, creel surveys conducted in 1984 and 1995 indicated that kokanee salmon were the most targeted fish species, followed by northern pike, and bull

trout. Over the past ten years, angler effort on Swan Lake has varied from 5,865(±925) to 12,716(±1,896) angler days.

Historically, westslope cutthroat trout and bull trout were the only trout species present in the Swan Lake system. The establishment of rainbow trout and brook trout throughout the Swan Lake basin has impacted westslope cutthroat trout. Rainbow trout readily hybridize with westslope cutthroat trout. Since 1975, FWP has stocked hatchery westslope cutthroat trout into Swan Lake. However, due to the current lake trout situation and low rates of return, that stocking program was suspended starting in 2008. Although no genetic data are available, hybridized westslope cutthroat trout and rainbow trout are likely present in Swan Lake. Brook trout established throughout the Swan Lake basin compete and predate on westslope cutthroat trout. Based on experience in nearby Flathead Lake, lake trout will further impact cutthroat through predation.

For the proposed study, underwater videography will be used to determine the presence of fishes (other than lake trout embryos) within areas affected by the experiment and experiments will not be conducted if other fishes are present. If the methodologies developed in this study are adopted by FWP for future lake trout control at larger spatial scales, methods may be used to ensure that the influence on nontarget fishes are minimized (e.g., mild physical disturbance of spawning sites prior to treatment with electricity).

3. Public Controversy (Issue 3)

Nonnative fisheries impacts on native fisheries and fish removal projects often generate public controversy. Typically, public controversy related to fish removal projects centers around the use of fish toxicants, which is not the strategy in the proposed project. A growing segment of the public want to see the impacts of nonnative fish on native fish communities mitigated to prevent declines and extirpation of native species. To date, this has been the case with lake trout in Swan Lake. On the other side of the issue, anglers often resist nonnative removal programs due to the fact that they enjoy angling for the targeted species. Trophy lake trout are in demand, but many other lake trout fishing alternatives exist in the Flathead Valley. Overall, the potential exists for public controversy over decisions of this EA and future actions to manage lake trout in Swan Lake, but thus far in past scoping meetings and from press highlighting this project, little or no controversy has surfaced.

Chapter 4: Environmental Consequences

A. Introduction

Chapter 4 describes the environmental effects of each alternative on the resources described in Chapter 3 and contains scientific and analytic basis for the alternatives comparison summarized in Chapter 2. It is organized in the same manner as Chapter 3 by general resource categories and their associated issues.

B. Predicted Attainment of the Project Objective for all Alternatives

1. Predicted Attainment of the Project Objective

a. Alternative A: No-action

The no-action alternative will not satisfy the objective of assisting in the reduction of the lake trout population in Swan Lake. In addition, information regarding the use of modified electrofishing equipment to destroy lake trout embryos in Swan Lake will not be obtained. The lack of this information will make identifying future control alternatives and evaluating their success impossible.

b. Alternative B: Evaluating the Use of Modified Electrofishing Equipment to Destroy Lake Trout Embryos in Swan Lake

An experiment aimed at evaluating the efficacy of using modified electrofishing equipment to destroy lake trout embryos in Swan Lake will provide information on the feasibility of targeted lake trout embryo destruction to aid ongoing lake trout removal efforts. This information will be invaluable in identifying potential control alternatives. Concomitant with this information, Alternative B will also result in a reduction of lake trout numbers in Swan Lake. If the project is fully successful, year class reduction or failure is likely, which will greatly assist ongoing lake trout removal efforts.

C. Predicted Effects on Relevant Affected Resources of All Alternatives

1. Predicted Effects on Benthic Invertebrates (Issue 1)

a. Effects of Alternative A: No Action on Issue 1 – Benthic Invertebrates

i. Direct Effects – The no-action alternative would not have direct or immediate effects on benthic invertebrates because no action would take place.

ii. Indirect Effects – The no-action alternative may have unforeseeable effects on benthic invertebrates in Swan Lake. We are unaware of data regarding the current benthic invertebrate assemblage in Swan Lake. However, failure to reduce the number of lake trout in Swan Lake may result in additional predation pressure on benthic invertebrates.

iii. Cumulative Effects – The indirect effects of Alternative A on the benthic invertebrates in Swan Lake may alter food availability to other fishes in Swan Lake; however, comprehensive food web data (e.g., diet and food abundance data) are unavailable to make reliable predictions.

b. Effects of Alternative B: Evaluating the Use of Modified Electrofishing Equipment to Destroy Lake Trout Embryos in Swan Lake on Issue 1 – Benthic Invertebrates

i. Direct Effects – An experimental evaluation of the use of modified electrofishing equipment to destroy lake trout embryos may directly affect benthic invertebrates in localized areas that are treated with electricity. This may be particularly true for sessile or burrowing species that cannot behaviorally avoid exposure to treatment conditions (i.e., application of electricity).

ii. Indirect Effects – An experimental evaluation of the use of modified electro-fishing equipment to destroy lake trout embryos in Swan Lake may indirectly reduce predation pressure on benthic invertebrates by a novel predator (i.e., lake trout). However, data are unavailable to make reliable predictions regarding food web consequences.

iii. Cumulative Effects – Use of modified electrofishing equipment to destroy lake trout embryos may result in mortality of benthic invertebrates in localized areas; however, reducing the number of lake trout in Swan Lake may reduce predation pressure on benthic invertebrates.

2. Predicted Effects on Fish Species (Issue 2)

a. Effects of Alternative A: No Action on Issue 2 - Fish Species

i. Direct Effects – The no-action alternative would not have any direct or immediate effects because no action would take place.

ii. Indirect Effects – The no-action alternative would have indirect effects on the fish community in Swan Lake. If no action is taken, data required to identify lake trout control options and evaluate their feasibility and effectiveness will not be obtained. Further, the no-action alternative will not result in assisting ongoing FWP lake trout removal efforts. Not taking advantage of evaluating means for suppressing the population growth of lake trout during early stage of establishment in Swan Lake may ultimately have significant negative consequences for other fish species in Swan Lake. For example, bull trout and kokanee fisheries have declined concurrently with the establishment of lake trout in other western lakes. There is some concern that undocumented changes in the Swan Lake fish community may already be underway.

iii. Cumulative Effects – Not taking advantage of evaluating means for suppressing the population growth of lake trout during early stage of establishment in Swan Lake may ultimately have significant negative consequences for other fish species in Swan Lake. For example, bull trout and kokanee fisheries have declined concurrently with the establishment of lake trout in other western lakes. There is some concern that undocumented changes in the Swan Lake fish community may already be underway.

b. Effects of Alternative B: Evaluating the Use of Modified Electrofishing Equipment to Destroy Lake Trout Embryos in Swan Lake on Issue 2 - Fish Species

i. Direct Effects – An experimental evaluation of the use of modified electrofishing equipment to destroy lake trout embryos will directly reduce the number of lake

trout present in Swan Lake. This experimental evaluation will target lake trout embryos at known spawning sites. No other fish species are known to use those sites for spawning and underwater videography will be used to ensure other fish are not present during treatment. Therefore, direct effects on other fish species are not anticipated.

ii. Indirect Effects – Reducing the lake trout population in Swan Lake will have indirect effects on the remaining aquatic community in Swan Lake. A reduced population of lake trout will help to prevent negative impacts to bull trout, kokanee, and other aquatic organisms in Swan Lake.

iii. Cumulative Effects – Use of modified electrofishing equipment to destroy lake trout embryos is not anticipated to have direct effects on fish species, with the exception of lake trout. Indirect effects of the proposed project include reducing competitive and predatory interactions between lake trout, and bull trout and kokanee, which is believed to have a positive effect on the persistence of both bull trout and kokanee in Swan Lake.

3. Predicted Effects on Public Controversy (Issue 3)

a. Effects of Alternative A: No Action on Issue 3 - Public Controversy

i. Direct Effects – The no-action alternative may have direct effects on public controversy by not satisfying the objective of the project.

ii. Indirect Effects – Indirectly, the no-action alternative may lead to public controversy if lake trout numbers are not reduced and lake trout begin to cause population level effects on kokanee and bull trout populations (among other fish species and invertebrates). Reductions in kokanee and bull trout populations will indirectly affect established and traditional angling opportunities.

iii. Cumulative Effects - The no-action alternative is likely to affect characteristics of the fishery in the Swan River system as fish community changes occur. Continued expansion of lake trout in the Swan Lake system may eventually lead to the establishment of lake trout in Lindbergh and Holland Lakes and expansion in the Swan River system. Establishment of lake trout in these other water bodies could be detrimental to local native fish populations.

b. Effects of Alternative B: Evaluating the Use of Modified Electrofishing Equipment to Destroy Lake Trout Embryos in Swan Lake on Issue 3 - Public Controversy

i. Direct Effects - An experimental evaluation of the use of modified electrofishing equipment to destroy lake trout embryos may directly cause public controversy over the removal of lake trout. Fish removal projects have in the past caused public controversy, mainly over the use of fish toxicants; however, fish toxicants are not being used under any alternative in Swan Lake. Misinformation on this project will be minimized through educational opportunities and public meetings.

ii. Indirect Effects - Some anglers may be temporarily disrupted, precluded from fishing in certain locations, or disturbed by sampling activities. However, these disruptions will be restricted to a very short period of time (i.e., three to four weeks in the autumn) and experiments will be conducted at a very small spatial scale.

iii. Cumulative Effects - None.

D. Relationship of Short-term Uses and Long-term Productivity (on all resources)

1. No-action Alternative

Under the no-action alternative, the short-term ability to effectively identify and evaluate novel control options for the lake trout population in Swan Lake will be considerably reduced, if not completely lost. In a long-term, because the no-action alternative will not provide assistance to ongoing lake trout removal efforts on Swan Lake, the ability to cause year class failure in the lake trout population will be difficult. If the large year classes of lake trout reach sexual maturity, the population will continue to exhibit a positive growth rate.

2. Evaluating the Use of Modified Electrofishing Equipment to Destroy Lake Trout Embryos in Swan Lake

Performing an experimental evaluation of the use of modified electrofishing equipment to destroy lake trout embryos will satisfy the objectives of the project. Information will be gained on the efficacy of using a novel technique for controlling the lake trout population in Swan Lake. Based on other lake trout control projects in the West, this information will be invaluable. Development of effective methods for destroying lake trout embryos may have significant long-term benefits of providing additional tools for managing the lake trout population in Swan Lake to benefit other fisheries.

E. Any Other Disclosures

Although other nonnative species currently exist in Swan Lake (e.g., northern pike), FWP and partners have no intention to pursue removal of these species, as they do not present the same threats to bull trout populations and have coexisted for several decades. Furthermore, previous sampling efforts have shown that other species are not selected by deepwater gill netting.

Chapter 5: Identification, Rationale, and Recommendation for Preferred Project Alternative

A. Introduction

In this chapter, the preferred project alternative is identified and recommended with the supporting rationale.

B. Identification and Rationale for Preferred Alternative

1. Preferred Alternative

The preferred alternative is an experimental evaluating the use of modified electrofishing equipment to destroy lake trout embryos in Swan Lake.

2. Support Rationale

a. Environmental Protection Rationale

The preferred alternative may cause direct impacts to benthic invertebrates in Swan Lake; however, no data are currently available with respect to the diversity and abundance of benthic invertebrates in Swan Lake. Therefore, the degree of direct impact is unknown, but impacts will be restricted to treated lake trout spawning sites. Developing novel techniques for managing the population growth of lake trout in Swan Lake will assist ongoing lake trout removal efforts and assist in mitigating future lake trout impacts on other fisheries in Swan Lake. This project will also help reduce the potential for lake trout to disperse upstream into Holland and Lindbergh lakes. Based on situations similar to Swan Lake, if lake trout are not effectively controlled, the impacts to native species and important sport fisheries may be severe.

b. Project Objectives Rationale

The preferred alternative will satisfy the objectives identified.

C. Monitoring Commitments

FWP will continue monitoring fish populations in Swan Lake using standard procedures and equipment. MTCFRU and FWP will monitor the benthic invertebrate fauna at experimentally treated sites using standard procedures.

Chapter 6: Public Participation

The public will be notified in the following ways to comment on the draft EA for the Swan Lake Experimental Lake Trout Removal Project:

i. Legal notices will be published in the Kalispell Daily Inter Lake, Seeley/Swan Pathfinder, Bigfork Eagle, and Lake County Leader. News releases will be given to the same newspapers and other media outlets.

ii. Legal notice and the draft EA will be posted on the FWP web site: http://fwp.mt.gov/publications.

iii. Draft EAs will be available at the FWP Region 1 Headquarters in Kalispell and the FWP State Headquarters in Helena.

This level of public involvement is appropriate for a project of this scale.

The following is a list of agencies consulted in preparation of this EA:

- U.S. Fish and Wildlife Service, Montana Field Office, Creston

Duration of comment period, if any:

The public comment period will be through Thursday, September 29, 2011. Comments may be e-mailed to lrosenthal@mt.gov or written comments may be sent to the following address:

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Chapter 7: List of Individuals Associated With the Project

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