

**Draft Environmental Assessment  
for  
Conducting a Depletion Population Estimate  
for  
Lake Trout in Swan Lake, Montana**

**May 2, 2008**



***Montana Fish,  
Wildlife & Parks***

## **Environmental Assessment for Conducting a Depletion Population Estimate for Lake Trout in Swan Lake, Montana**

**Proposed Action:** Montana Fish, Wildlife & Parks (FWP) proposes to conduct a depletion population estimate of lake trout in Swan Lake, Montana. The proposed action would involve contracting with professional fishery consultants to conduct gill netting over a three-week period beginning in late August or early September 2008. Information obtained from the proposed action will aid in understanding the status and characteristics of the lake trout population, and the potential impacts of lake trout on the aquatic ecosystem in Swan Lake, and will help to determine feasibility and effectiveness of alternatives for managing the lake trout population (e.g., suppression of the population). All lake trout sampled during the project will be culled; those that are salvageable and of suitable size for consumption will be field-dressed and donated to food banks or other facilities.

**Lead Agency:** Montana Fish, Wildlife & Parks

**Responsible Official:**

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**Public Meeting:** A public meeting is scheduled for Wednesday, June 4, 7:00-9:00 p.m. at the Montana Fish, Wildlife & Parks headquarters, 490 North Meridian Road, Kalispell, Montana.

**Comment Period:** There will be a 30-day comment period through June 10, 2008. Please direct questions or comments to:

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## **1.0 Purpose of and Need for Action**

### **A. Proposed Action**

Montana Fish, Wildlife & Parks (FWP), and Partners (i.e., US Fish and Wildlife Service, US Forest Service, Montana State University Cooperative Fisheries Research Unit, Trout Unlimited, Confederated Salish and Kootenai Tribes, and the Montana Department of Natural Resources and Conservation) propose to conduct a depletion population estimate for lake trout *Salvelinus namaycush* in Swan Lake, Montana. A depletion population estimate requires multiple days of netting effort while removing (culling in this case) all lake trout sampled during a three-week period. As fish are removed from the lake, the average catch rate will decline. Biologists can use the rate of decline in catch to determine what number of fish existed prior to the action. Due to the numbers of fish needed to be handled, we propose to utilize the skills, equipment, and expertise of professional fishery consultants. A research project conducted in the fall of 2007 resulted in about 1,400 lake trout being tagged and released alive. Recapture of these tagged fish will provide additional data to further improve the quality of our analysis.

#### **1. Funding**

The project is anticipated to cost between \$40,000 and \$60,000. Funding will be through Montana Fish, Wildlife & Parks, with contributions from the Partners.

#### **2. Estimated Time Line**

The project is anticipated to begin in late August or early September 2008 and continue for a three-week period. Depending on logistics, netting activities may continue into October.

### **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.

### **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 Valley has historically been home to a stable, healthy bull trout population. In 1998, anglers began to occasionally catch adult-sized (20-30-inch) lake trout from Swan Lake and the Swan River. This caused alarm because lake trout are not native and are notorious for rapidly expanding and dominating fish communities in lakes at the expense of bull trout and kokanee salmon. In 2003, the level of concern was compounded when biologists gillnetted a 9-inch juvenile lake trout from Swan Lake during standard low-intensity sampling efforts, indicating that wild reproduction was occurring. A similar survey in 2004 captured 7 more juvenile lake trout. In 2005, biologists captured 28 juvenile lake trout, mostly 9-12 inches long.

In 2006, MSU conducted a six-week series of gill-net surveys on Swan Lake, from mid-September through the last week of October 2006. Single mesh 250-foot gill nets, with 1” bar mesh size (2” stretch) were deployed throughout the lake in order to gather some baseline data and attempt to capture adult lake trout for sonic tag implants. During the six-week period, 28 such net sets resulted in capture of 110 bull trout and 194 lake trout.

During 2007, an effort was made to estimate the population of lake trout in Swan Lake using mark-recapture techniques. Although over 2,000 lake trout were netted, the resulting population estimate was questionable due to the low number of recaptured lake trout observed. Many possible reasons exist for the low recapture rate of lake trout, including changes in behavior of marked fish, mortality in marked fish, etc.

The deployment of gill nets on a large scale has proven effective in capturing large numbers of lake trout for similar research efforts in the Great Lakes area and most recently (2005-2006) in northern Idaho (Lake Pend Oreille and Priest Lake) and (2007) in Swan Lake. Since existing equipment (state, federal, and Tribal) is inadequate to efficiently handle large numbers of fish, professional gillnetters are required.

In order to understand the impacts of this newly established population of lake trout, and to develop methods of managing the population, accurate information on the newly established lake trout population [e.g., population size, population demographics (growth rate, fecundity, etc.) and life history] is needed. This information is important in determining the feasibility and effectiveness of long-term intervention options. In order to provide a reliable population estimate and to validate the 2007 estimate, a depletion population estimate is proposed in 2008. To conduct a depletion population estimate, multiple netting events are required where all sampled fish are removed from the population. As more fish are removed from the population, the average catch rate begins to decline. Once biologists determine the declining rate of catch, they can estimate the number of fish that originally existed in the population.

## **E. Objectives of the Action**

### **Objective 1**

The primary objective of the proposed action is to obtain a more reliable estimate of the population and size structure of lake trout in Swan Lake. Other biological information will also be collected and utilized to gain a better understanding of the newly established population and its potential impacts on native and recreational fisheries.

### **Objective 2**

The secondary objective of the proposed action is to begin controlling expansion of the population of lake trout in Swan Lake. Based on similar examples in Montana and surrounding states and our collective scientific judgment based on known facts, the unchecked expansion of lake trout in Swan Lake will lead to collapse of the kokanee salmon and bull trout (a federally listed species under the Endangered Species Act) fisheries. Depending on the outcome of the depletion population estimate, future suppression efforts may be considered. However, subsequent environmental assessment will be conducted prior to entering into any long-term suppression program.

## **F. Relevant Plans, EISs, EAs, Regulations, and Other Documents**

- Hazardous Analysis and Critical Control Point (HACCP) Plan for the 2007 Swan Lake netting effort: In 2007, an HACCP plan was developed for deploying the professional gill-netting vessel from Idaho into Swan Lake. This plan identifies and addresses potential pathways to prevent the movement and spread of Aquatic Nuisance Species (ANS) such as zebra mussels and Eurasian milfoil on equipment.
- 2007 Benefit/Risk Analyses for the Swan Lake Trap Net and Gill Net Survey: The US Fish and Wildlife Service and FWP developed a benefit-risk analysis in 2007 to determine the risks to bull trout. This document proved valuable for estimating the impact of netting operations on bull trout. Upon conclusion of the 2007 research effort, bycatch of nontarget species and associated bull trout mortality was lower than expected.
- Request For Proposals (RFP) for professional gillnetters: An RFP is being developed concurrently with this environmental assessment. This document requests proposals from contractors to conduct the gill netting described in this environmental assessment. The RFP has a caveat that any contract developed through the RFP process is contingent on public support and a decision notice for this environmental assessment.

## **G. Decisions to Be Made**

The decision maker will determine the following from this EA:

- Determine if alternatives meet the project objectives.
- Determine which alternative should be selected.
- 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 Analysis**

The Swan drainage contains one of Montana's most stable and healthy bull trout populations, as well as important fisheries for kokanee and northern pike. 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. However, 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. In 2003, Montana Fish, Wildlife & Parks (FWP) gillnetted a 9-inch juvenile lake trout from Swan Lake during annual monitoring efforts, providing the first evidence of lake trout reproduction in the Swan system, and these numbers have continued to grow. 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.

These findings 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, CSKT, DNRC, USFS) and Trout Unlimited. The SVBTWG determined that, if left unchecked, it is a matter of time until lake trout will become the dominant piscivore (fish predator) in the Swan ecosystem. The SVBTWG was formalized by an MOU in 2005 and in the past three years has made efforts toward evaluating and assessing the lake trout threat.

In recent years, FWP has increased annual spring and fall gill-net sampling to improve information about lake trout population structure and distribution. Each year since 2003, fall

sampling captured an increasing number of juvenile lake trout. In 2005, biologists netted 28 juvenile lake trout 9-12 inches long. No adult lake trout were captured in gill-net sets prior to 2006. This information, along with the capture of very few lake trout as reported by anglers in 2005 or 2006, suggested that populations of adult or subadult lake trout in Swan Lake were low.

The SVBTWG made a considerable effort to live-capture adult lake trout in the fall of 2005 for the purpose of implanting sonic tags and tracking the fish to pinpoint their spawning locations. FWP purchased sonic tags and telemetry equipment. The Forest Service, FWP, and a volunteer experimentally set out three Merwin traps and a number of portable fyke nets and checked them three times per week for a month, between mid-October and mid-November. Nearly 4,000 fish of 18 species were handled and released, but no lake trout were captured. It was believed that the shallow set locations, necessitated by the gear design, coupled with apparent low densities of adult lake trout, were not conducive to lake trout capture. Still, this information was considered useful for establishment of baseline species distribution and abundance.

Between April 17 and May 22, 2006, FWP, with assistance from the USFS, fished three different types of trap nets in the southern portion of Swan Lake in an attempt to capture lake trout. We deployed two Merwin trap nets, three 4'-diameter fyke trap nets with 50' leads, and three cod traps. Over the sampling period, water temperatures varied from 44-55° F. The Merwin trap nets by far collected the greatest number and diversity of fish. A total of 1,258 fish were collected in both traps, representing 18 different species. Of the total, 145 were game fish, including six bull trout, but no lake trout. The dominant species captured in Merwin traps was redbreast shiners. Fyke trap nets caught a total of 119 fish and eight different species. Fyke traps caught 80 game fish including two bull trout. No lake trout were sampled in fyke traps. Yellow perch dominated the fyke trap catch. Cod traps caught the least fish (n = 25), with six different species. Eight were game fish including two bull trout. Merwin trap nets fished the top 10' of water at each trap location and fyke nets were fished in 6, 15, and 30 feet of water. All three types of trap nets were ineffective in capturing lake trout.

Analysis of these combined results led the SVBTWG to conclude that more focused research efforts were needed to better characterize the lake trout population status and structure. FWP agreed to support a graduate student project on Swan Lake, using Bonneville Power Administration (BPA) funding as a partial source of support. A plan of work was developed and, in August 2006, a graduate student was selected to conduct the research effort through the Cooperative Fishery Research Unit at Montana State University. Objectives of the study are to: 1) identify the timing and location of lake trout spawning areas, 2) evaluate alternative gear-types as methods of sampling lake trout, 3) estimate the population density and structure of lake trout in Swan Lake, and 4) model various harvest scenarios to estimate effort needed to negatively impact growth of the lake trout population.

MSU conducted a six-week series of gill-net surveys on Swan Lake, from mid-September through the last week of October 2006. Single mesh 250-foot gill nets, with 1" bar mesh size (2" stretch) were deployed throughout the lake basin to gather baseline data and attempt to capture adult lake trout for sonic tag implants. During the six-week period, 28 such net sets resulted in capture of 110 bull trout and 194 lake trout. Bycatch of other species was not accurately monitored, but consisted of about 150 mountain whitefish and several hundred cyprinids (mostly peamouth and northern pikeminnow) and suckers. Only one adult lake trout was captured alive,

sonic tagged, and released. Pit tags were implanted into 101 lake trout that were subsequently released.

The high catch of small lake trout in the fall 2006 gill-net surveys greatly increased the concern of the SVBTWG about the rapidly expanding lake trout population and led to discussions about how to improve capabilities of the research effort. Simultaneously, USFWS was able to secure funding of approximately \$40,000 to support an effort to develop a lake-wide population estimate of lake trout. The Forest Service contracted with Harbor Fisheries of Baileys Harbor, Wisconsin, to build and potentially deploy deepwater trap nets and gill nets in Swan Lake in the fall of 2007, with the goal of establishing a lake-wide lake trout population estimate. In 2006, the Forest Service also awarded a contract to produce a GIS-linked bathymetric and substrate map of Swan Lake, which was completed in 2007.

The fall 2007 fish sampling took place over a three-week period from September 17-October 4. Short-set gill nets were used to capture live fish for marking and release. Most nets were set in water 80 feet or deeper. The goal of the sampling was to release as many tagged live lake trout as possible so that a mark-and-recapture population estimate could be achieved. Biologists set a total of 26.5 miles of gill net at various locations around Swan Lake. The nets were checked about every two hours during morning and evening. In addition to gill nets, two deepwater trap nets were set, but caught relatively few fish. The total catch included 2,156 lake trout. Of these, 735 were mortalities, 30 were sonic-tagged, and 1,391 received small tags and were released to aid in population estimates.

Although over 2,000 lake trout were sampled during the 2007 effort, the validity of the population estimate was questioned because of inadequate rates of recapture. Many possible reasons exist for not obtaining a more reliable population estimate, including changes in behavior of marked fish, mortality in marked fish, etc.

The intent is to use the acquired knowledge to date and the planned action in 2008 to comprehensively assess the status of the lake trout population and to evaluate the feasibility and effectiveness of alternatives to control expansion of the lake trout population. Based on the results of this assessment and other pertinent information, FWP will consider actions recommended to manage the lake trout population. In 2009, FWP will use the preceding information and the information obtained from the preferred alternative identified in this environmental assessment to identify management alternatives through a separate environmental assessment process.

## **I. Issues Studied in Detail**

### **1. Fish and Wildlife (Issue 1)**

Conducting a depletion estimate on lake trout in Swan Lake is expected to have a short-term negative impact on the lake trout population. At this time, fishery scientists from FWP and the partner agencies are in agreement that the observed rate of lake trout expansion cannot be sustained with existing food resources in Swan Lake. For that reason, a reduction in the population is a prudent management approach. In addition, removing or not removing lake trout from Swan Lake is expected to cause changes in the diversity and abundance of other game and nongame fish species, as well as other aquatic organisms. Netting activities directed at the developing lake trout population will have direct impacts on bull trout, a

threatened species under the Endangered Species Act, and other fish communities in the lake through bycatch mortality.

## **2. Threatened and Endangered Species (Issue 2)**

Many examples in the west have demonstrated that introduced lake trout negatively impact native bull trout populations. These impacts stem from competition and direct predation. If lake trout are left unchecked, the Swan Lake bull trout population will decline. Bull trout will likely lose or severely reduce their adfluvial migratory life history in the basin, resulting in smaller sizes of adult bull trout. Conducting gill netting to estimate lake trout numbers or to suppress lake trout populations will have unintended impacts to the bull trout population through bycatch-related mortality. Mortality associated with the bycatch of bull trout will be minimized by rapid removal and resuscitation of all live bull trout captured in the nets, as it was during 2007 research efforts. A portion of the bull trout captured will be dead, and these fish will be retained and used for additional research objectives. Overall, bull trout bycatch mortality during lake trout gill netting will likely be insignificant relative to the direct impacts of lake trout on the bull trout population through competition and predation.

## **3. Sensitive Species (Issue 3)**

### **a. Westslope Cutthroat Trout**

Westslope cutthroat trout are in low abundance in Swan Lake. Based on experience in nearby Flathead Lake, lake trout will further reduce cutthroat abundance through predation. Netting to obtain a population estimate for lake trout is unlikely to result in mortality of westslope cutthroat trout, based on 2007 research results.

## **4. Public Controversy (Issue 4)**

The presence of lake trout in Swan Lake has generated substantial concern among fisheries professionals and the public. The proposed project and future 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.

## **J. Issues Eliminated from Further Study**

### **1. Community and Economic Impact**

Lake trout impacts to Swan Lake fisheries are likely, but the specifics are unknown. If a lake trout population becomes established, it will likely reduce kokanee salmon and bull trout populations. The resulting fishery may become similar to those found in Whitefish Lake or Lake McDonald. 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 salmon fisheries, at least so long as a lake trout population with diverse size classes is maintained. Conducting a depletion population estimate will temporarily reduce the lake trout population, thus delaying changes in other fisheries, but the effect on lake trout will only be short term. Long-term solutions to issues related to community impacts of lake trout on fishing opportunities and fishing economics will be evaluated at a later date in a separate environmental assessment investigating lake trout population management activities.



## **2. Effects on Other Wildlife**

Conducting netting activities on a water body may temporarily change behavior of some wildlife species (e.g., bald eagles); however, no negative consequences are anticipated for conducting such activities. Occasionally, fish-eating birds are captured in gill nets, but in this situation the nets will be fished in 80-foot and deeper waters where the likelihood of catching such species is very unlikely.

## **K. Applicable Permits, Licenses, and Other Consultation Requirements**

### **1. Permits**

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

### **2. Consultation Requirements**

Any alternative selected that requires bringing in a fishing boat from out of state will require consultation with FWP's Aquatic Nuisance Species Coordinator. Through this consultation a Hazardous Analysis and Critical Control Point (HACCP) plan will be developed to prevent the introduction and spread of Aquatic Nuisance Species (e.g., zebra mussels, New Zealand mudsnails, and vegetation).

## **L. Why Narrative 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, potentially negative impact (public controversy) that could not be mitigated from the proposed action. Conducting a depletion population estimate, or 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 environmental assessment 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 wanted to walk the public through the entire decision-making process.

## **2.0 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 Partners have developed two possible alternatives. The alternatives are 1) the no-action alternative and 2) conduct a depletion population estimate.

## **B. Description of Alternatives**

### **1. Alternative A: No-Action Alternative**

#### **a. Principal Actions of Alternative A**

Under Alternative A, the no-action alternative, no population estimate will be conducted. A more reliable estimate of the lake trout population will not be obtained. Under this alternative, FWP will continue annual monitoring of the fish community in Swan Lake. This monitoring will provide relative abundance information that can be used to detect trends in fish populations through time. However, trends detected by this method are often retrospective and may provide insufficient data to forestall major changes in the fish community. This alternative will result in limited abilities to determine effectiveness and feasibility of a potential lake trout population suppression program.

#### **b. Past and Present Relevant Actions**

FWP has developed a database of historic netting and invertebrate 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 lake trout population in Swan Lake will continue to grow, thereby competing with and preying on native bull trout and the recreationally important kokanee salmon and northern pike populations. Through time, anglers will lose the ability to fish for bull trout, and opportunities for kokanee fishing will be diminished. Due to these changes, it is anticipated public demand for active management of the lake trout population will eventually increase as the growth rates and sizes of the lake trout inevitably will decrease.

### **2. Alternative B: Conduct a Depletion Population Estimate of Lake Trout in Swan Lake**

Conducting a depletion population estimate of lake trout in Swan Lake will provide information needed to more accurately evaluate the population size and demographics of the lake trout population. Obtaining this baseline information will allow scientists to identify population control possibilities and to evaluate the potential efficacy of lake trout population control methods using a broad array of measurements. 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 will also allow us to determine approximate levels of needed effort and future costs associated with long-term containment of lake trout expansion.

#### **a. Principal Actions of Alternative B**

The principal actions involved in conducting a depletion population estimate are: to enlist the services of professional fishery consultants and their equipment, conduct intensive gill netting over a three-week period, cull collected lake trout, record biological information (size, ageing structures, genetic samples, etc.) from the culled lake trout, field-dress salvageable culled lake trout, and distribute them to the public for consumption (i.e., food banks). Based on previous netting efforts, we anticipate the removal of 3,000 to 5,000 lake trout in Swan Lake under Alternative B.

### **b. Mitigation and Monitoring**

Bull trout and other fish species bycatch mortality will be mitigated by using short-duration gill-net sets, netting during periods when spawning bull trout are out of the lake in upstream spawning areas, and avoiding areas with known high catch rates of bull trout, while still providing for the broadest inference of the population estimate. Bull trout population monitoring (annual redd counts and trend netting) in addition to aquatic community monitoring (fish and invertebrates) will be continued to evaluate the effects of the lake trout population on the aquatic community and to provide information to evaluate the effectiveness of potential control operations.

### **c. Past and Present Relevant Actions**

FWP has developed a database of historic netting information. This information will be valuable in interpreting changes in the Swan Lake fish community through time.

## **C. Process Used to Develop the Alternatives**

### **1. History and Development Process of Alternatives**

A limited number of possibilities exist to directly estimate population sizes and demographics of lake-dwelling fish populations. Traditional methods used to evaluate these populations include mark-recapture population estimate methodology, depletion population estimate methodology, and census activities [partial (e.g., cove or bay) or complete] utilizing fish toxicants.

### **2. Alternatives Eliminated from Detailed Study**

Census activities utilizing fish toxicants have been used extensively in the mid-western United States. These approaches either conduct partial (e.g., cove or bay) or complete counts of fish killed during the application of fish toxicants. Given the robust population of bull trout existing in Swan Lake, this alternative is not feasible.

During 2007, an effort was made to estimate the population of lake trout in Swan Lake using mark-recapture techniques. Although netting resulted in over 2,000 lake trout being sampled, a reliable population estimate was not obtained due to limited numbers of recaptures. Many possible reasons exist for not obtaining a reliable population estimate, including changes in behavior of marked fish, mortality in marked fish, etc.

## **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 simply conduct a depletion population estimate or do not conduct a depletion population estimate.

### **2. Summary Comparison of Predicted Achievement of Project Objectives**

The primary objective of this project is to provide a population estimate of lake trout in Swan Lake. The no-action alternative will not satisfy this objective. This will limit the ability to determine current lake trout status and the feasibility and efficacy of lake trout control options. Assuming that enough lake trout can be removed over the three-week period, the primary goal of the project will be satisfied under Alternative B. The second objective of the project is to begin to address and manage the lake trout population, while at the same time

provide sufficient information to evaluate the feasibility and efficacy of future lake trout control practices. Under Alternative A, the lake trout will continue to expand and establish, but under Alternative B, conducting the depletion population estimate will effectively remove many lake trout from the population, thereby minimizing the impacts of lake trout to the existing aquatic community. Alternative B may also buy more time to identify and evaluate actions to manage the lake trout population.

### 3. Summary Comparison of Predicted Environmental Effects

We predict that Alternative A will not have any direct or immediate environmental effects; however, Alternative A may have significant long-term environmental consequences and indirect effects in not providing the information needed to evaluate the effectiveness and feasibility of control actions.

We predict that Alternative B will have direct and immediate environmental effects in the Swan Lake aquatic ecosystem. Alternative B will remove many lake trout from Swan Lake, thereby minimizing the effect (in the short term) of those lake trout on the aquatic community. In addition, Alternative B will provide information that is invaluable for determining the feasibility and efficacy of lake trout population control options. Alternative B will also have direct impacts on the bull trout population in Swan Lake through bycatch mortality; however, this mortality can be mitigated by using short duration gill-net sets, rapidly resuscitating and releasing live fish, netting during periods when spawning bull trout are out of the lake in spawning areas, and avoiding areas with known high catch rates of bull trout while still providing for the broadest inference of the population estimate. During the 2007 research project, estimated bull trout mortality was a maximum of 179 fish. With expanded effort in 2008, we estimate bull trout mortality will be no greater than double that number (n =358). The bycatch mortality associated with this project will likely be minor in comparison to the direct effect of lake trout on Swan Lake bull trout. The estimated increased bull trout bycatch mortality falls within the acceptable range for the benefit/risk analysis for the 2007 netting operation.

Other fish species will be directly affected through bycatch mortality. However, based on previous experience, the number of species and number of fish killed will be low. For example, in 2007, only 8 other species (other than lake trout and bull trout) were collected. The following table summarizes overall catch by species for the 2007 netting effort and also demonstrates the selectivity of the gear for lake trout. Mortality for other species was not determined; however, based on observations upon release and mortality rates for lake trout and bull trout, the mortality rate was low (typically 20-40% of fish captured would not be expected to survive, with some species more sensitive than others).

Species	Number Collected
Lake Trout	2174
Bull Trout	378
Northern Pikeminnow	200
Longnose Sucker	187
Largescale Sucker	25
Mountain Whitefish	32
Kokanee Salmon	39
Yellow Perch	1
Peamouth	1
Northern Pike	1

## **E. Identification of the Preferred Alternative**

The preferred alternative is Alternative B, given the ability of this alternative to satisfy the stated objectives.

## **3.0 Affected Environment**

### **A. Introduction**

Chapter 3.0, 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**

#### **Issue 1. Fish and Wildlife**

A variety of native and nonnative fish species are present in Swan Lake and its tributaries. Bull trout, westslope cutthroat trout, mountain whitefish, pygmy whitefish, northern pikeminnow, peamouth, longnose sucker, and largescale sucker comprise the native fish species in the basin. Nonnative fish species present in the system are lake trout, rainbow trout, kokanee salmon, brook trout, northern pike, yellow perch, largemouth bass, lake whitefish, brook stickleback, central mudminnow, and pumpkinseed. Swan Lake bull trout populations have long been one of the most robust 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 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 ( $\pm 925$ ) to 12,716 ( $\pm 1,896$ ) angler days. The presence of many nonnative fish poses threats to native fisheries. Aside from competing with native salmonids, brook trout hybridize with bull trout. Brook trout also directly predate on some native salmonids. Lake trout threaten native salmonid populations through competition and predation.

#### **Issue 2. Threatened and Endangered Species**

Bull trout – a threatened species under the Endangered Species Act – are present in Swan Lake and associated tributaries. Bull trout in the Swan Lake basin primarily exhibit an adfluvial life-history strategy. Under this life-history strategy, adult bull trout primarily reside in Swan Lake. Adult bull trout utilize Swan Lake tributaries for spawning. Juvenile

bull trout typically rear for two or more years in Swan Lake tributaries before migrating to Swan Lake to mature.

### **Issue 3. Sensitive Species**

Westslope cutthroat trout are a sensitive species that are present in Swan Lake. Historically, westslope cutthroat trout were the only other trout species present (other than bull trout) 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, Montana Fish, Wildlife & Parks 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 will be 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.

### **Issue 4. Public Controversy**

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 case 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 some extent, 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. 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 evidence of controversy has been presented.

## **4.0 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 Objectives of All Alternatives**

#### **1. Predicted Attainment of Project Objective 1**

##### **a. Alternative A – No Action**

The no-action alternative will not satisfy Objective 1 of providing an accurate estimate of the population of lake trout in Swan Lake. In addition, information regarding the population characteristics of the lake trout population will not be obtained in a timely manner. The lack of this information will make identifying control alternatives and evaluating the success and feasibility of control alternatives difficult, if not impossible.

**b. Alternative B – Conduct Depletion Population Estimate**

Conducting a depletion population estimate of lake trout in Swan Lake will provide the best information possible on population density and demographics of the newly formed population of lake trout. This information will be invaluable in identifying potential control alternatives and evaluating the success and feasibility of such alternatives.

**2. Predicted Attainment of Project Objective 2**

**a. Alternative A – No Action**

The no-action alternative will not help satisfy Objective 2, which is to begin removing some lake trout while more data are collected to evaluate potential long-term control options.

**b. Alternative B – Conduct Depletion Population Estimate**

Through the process of conducting a depletion population estimate, a large number (likely over 3,000) of lake trout will be removed from Swan Lake. This satisfies Objective 2.

**C. Predicted Effects on Relevant Affected Resources of All Alternatives**

**1. Predicted Effects on Fish and Wildlife (Issue 1)**

**a. Effects of Alternative A (No-Action Alternative) on Issue 1**

- Direct Effects - The no-action alternative would not have any direct or immediate effects on fish and wildlife, given that no action would take place.
- 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 removal of lake trout from Swan Lake during 2008. By not removing lake trout from Swan Lake in 2008, lake trout will become more rapidly established, thereby making future options for coping with the lake trout population expansion or restoring lost species complexes or the fishery less effective. Not taking advantage of the early stage of the lake trout population establishment in Swan Lake may ultimately have significant negative consequences for bull trout and kokanee salmon fisheries in Swan Lake. There is some concern that undocumented changes in the fish community may already be underway.
- Cumulative Effects - The indirect impacts of Alternative A on the fish community in Swan Lake may cause cumulative and indirect effects on the wildlife community. Fish available to be eaten by eagles, loons, ospreys, mink, otters, and other wildlife may be reduced. Fish species that are surface-oriented or which may spawn upstream in the Swan River, thus making them more available to predators (e.g., kokanee, mountain whitefish, cutthroat, and bull trout), will be partially or completely replaced by the more benthic-oriented and nonmigratory lake-dwelling lake trout that are largely unavailable to terrestrial predators.

**b. Effects of Alternative B (Conduct Depletion Population Estimate) on Issue 1**

- Direct Effects - The direct effects of conducting a depletion estimate for lake trout in Swan Lake will be obtaining sufficient information to identify and evaluate lake trout control options and causing a reduction in the lake trout population. Bycatch mortality will also directly affect other fish species in Swan Lake.

- 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 salmon, and other aquatic organisms in Swan Lake.
- Cumulative Effects – None.

## **2. Predicted Effects on Threatened and Endangered Species (Issue 2)**

### **a. Effects of Alternative A (No-Action Alternative) on Issue 2**

- Direct Effects - The no-action alternative will not have direct impacts on threatened or endangered species since no action will take place.
- Indirect Effects - The no-action alternative will have indirect effects on threatened and endangered species. Specifically, not obtaining adequate information to identify and evaluate control options for the lake trout population will limit the ability to manage lake trout. Therefore, there is a very high likelihood bull trout will be affected through predation and competition with lake trout. In addition, the no-action alternative will not result in a reduction in the lake trout population in 2008. By not reducing the lake trout population in 2008, the lake trout population may become more rapidly established, thereby limiting control options and the efficacy of future control options. If the lake trout population becomes more established, the interactions (competition and predation) between bull trout and lake trout will increase, which will negatively affect the bull trout population.
- Cumulative Effects - If the no-action alternative is chosen, continued expansion of lake trout in Swan Lake can be expected. As this occurs, lake trout may spread throughout the system, having similar negative impacts on the Swan River system and Holland and Lindbergh Lakes. All of these water bodies contain important bull trout populations. Cumulative impacts to bull trout throughout the Swan River Basin may further threaten this native species. Lake trout may also move downstream into Flathead Lake, adding to the lake trout population and exacerbating native species management issues in that water body.

### **b. Effects of Alternative B (Conduct Depletion Population Estimate) on Issue 2**

- Direct Effects - Conducting a depletion population estimate for lake trout in Swan Lake will directly affect bull trout, a threatened species under the Endangered Species Act, through bycatch mortality. Estimated mortality for bull trout will be fewer than 358 fish, based on experience from the 2007 survey. Conducting short-term gill-net sets, avoiding areas with high bull trout catch rates, and careful handling and release of collected live bull trout help mitigate mortality of bull trout. The USFWS will provide coverage for take of bull trout through Section 6 of the Endangered Species Act.
- Indirect Effects - Conducting a depletion population estimate on lake trout in Swan Lake will have positive indirect effects on bull trout. Through the process of conducting a depletion population estimate, an estimated 3,000 to 5,000 lake trout will be removed from Swan Lake. This will reduce the impacts of lake trout (predation and competition) on bull trout.
- Cumulative Effects - none.



### **3. Predicted Effects on Sensitive Species (Issue 3)**

#### **a. Effects of Alternative A (No-Action Alternative) on Issue 3 - Sensitive Species, Westslope Cutthroat Trout**

- Direct Effects - none.
- Indirect Effects - Selecting the no-action alternative will not result in an immediate reduction of the lake trout population in Swan Lake (Objective 2). As a result, lake trout predation rates on westslope cutthroat trout will not be reduced and will begin to increase as new cohorts of lake trout are produced. The westslope cutthroat trout stocking program has already been eliminated, and further negative effects on angler opportunity to catch westslope cutthroat trout can be anticipated in the lake and the Swan River.
- Cumulative Effects - none.

#### **b. Effects of Alternative B (Conduct Depletion Estimate) on Issue 3 - Sensitive Species, Westslope Cutthroat Trout**

- Direct Effects - Conducting a depletion population estimate on lake trout in Swan Lake may have direct effects on westslope cutthroat trout through bycatch mortality; however, it is likely that any bycatch mortality would be extremely low (<10 fish). The netting effort in 2007 did not sample any westslope cutthroat trout.
- Indirect Effects - Conducting a depletion population estimate on lake trout in Swan Lake will cause a direct reduction in the lake trout population, thereby indirectly reducing predation of lake trout on westslope cutthroat trout.
- Cumulative Effects - none.

### **4. Predicted Effects on Public Controversy (Issue 4)**

#### **a. Effects of Alternative A (No-Action Alternative) on Issue 4**

- Direct Effects - The no-action alternative may have direct effects on public controversy by not satisfying Objectives 1 and 2.
- Indirect Effects - Indirectly, the no-action alternative may lead to public controversy if Objective 2 is not satisfied and lake trout begin to cause population level effects on kokanee salmon and bull trout populations (among other fish species and invertebrates). Reductions in kokanee salmon and bull trout populations will indirectly affect established and traditional angling opportunities.
- Cumulative Effects - The no-action alternative is likely to eventually change the 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 Lake river system. Impacts of lake trout in these waters will be similar for bull trout, as in Swan Lake.

#### **b. Effects of Alternative B (Conduct Depletion Estimate) on Issue 4**

- Direct Effects - Conducting a depletion population estimate on lake trout in Swan Lake 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. Anglers may also question why more is not being done to curb the unauthorized lake trout introduction. Misinformation on this project will be minimized through educational opportunities and public meetings.

- Indirect Effects - Some anglers may be temporarily disrupted, precluded from fishing in chosen locations, or disturbed by sampling activities, but due to the timing of this project and short duration, such effects will be minimal.
- 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 control options for the lake trout population in Swan Lake will be considerably reduced, if not completely lost. In a long-term perspective, since the no-action alternative will not satisfy Objective 2, the ability to address the lake trout population at an early stage of establishment may be lost. If the larger cohorts of young lake trout reach sexual maturity before any control measures are implemented, the population may exhibit an exponential growth phase, after which the feasibility of control measures are severely reduced. This course of events will also result in loss of the existing multi-species fishery and will dramatically increase the difficulty of reestablishing it, if reestablishment is even possible.

### **2. Conduct a Depletion Population Estimate**

Under the depletion population estimate alternative, both objectives identified will be satisfied. First and foremost, adequate information will be obtained and used to identify and evaluate control options for lake trout in Swan Lake. Based on other lake trout control projects in the west, this information will be invaluable. Secondly, conducting the depletion estimate for lake trout will have an immediate impact on the size of the lake trout population, reducing it by an estimated 3,000 to 5,000 fish. This may have significant long-term benefits by preventing the lake trout from reaching a point of exponential population growth, where the feasibility of population control is reduced. It is unlikely complete lake trout removal from Swan Lake can ever be accomplished.

## **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 similar sampling efforts have shown that other species are not selected by deepwater gill netting.

# **5.0 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 the depletion population estimate alternative.

## **2. Support Rationale**

### **a. Environmental Protection Rationale**

Although the preferred depletion estimate alternative will cause some direct impacts to bull trout, minimal numbers of westslope cutthroat trout, and other fish species through bycatch mortality, and may result in public concern, it will provide for identification and evaluation of long-term solutions for managing lake trout in Swan Lake. Developing capability to effectively control the lake trout population in Swan Lake will mitigate future lake trout impacts on these same species and issues. It will also reduce the chances that lake trout will spread upstream into Holland and Lindbergh Lakes as well as migrate downstream into Flathead Lake, further contributing to lake trout overpopulation in that water. Based on situations similar to Swan Lake, if lake trout are not effectively controlled, the impacts to native species and important sport fisheries will be far more severe than any bycatch mortality resulting from the implementation of the depletion estimate alternative.

### **b. Project Objectives Rationale**

The preferred alternative will satisfy both objectives identified.

## **C. Monitoring Commitments**

FWP will continue monitoring fish populations in Swan Lake using standard procedures and equipment.

## **6.0 Public Participation**

### **The public will be notified in the following ways to comment on the EA for the Swan Lake Depletion Population Estimate Project for Lake Trout:**

- Legal notices will be published in the Kalispell Daily Inter Lake, the Seeley/Swan Pathfinder, the Great Falls Tribune, the Missoulian, and Helena Independent Record. News releases will be given to the same newspapers and other media outlets.
- Legal notice and the draft EA will be posted on the FWP web site:  
<http://fwp.mt.gov/publications>.
- 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.

### **Duration of comment period:**

The draft will be out for public review through June 10, 2008. A public meeting is scheduled for Wednesday, June 4, 7:00-9:00 p.m. at the Montana Fish, Wildlife & Parks headquarters, 490 North Meridian Road, Kalispell, Montana. Please direct your questions or comments to Fisheries Biologist Leo Rosenthal, FWP, 490 North Meridian Road, Kalispell, MT 59901, (406) 751-4548 or e-mail to [lrosenthal@mt.gov](mailto:lrosenthal@mt.gov).

## **7.0 List of Individuals Associated With the Project**

### **Preparers:**

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### **Internal Reviewers:**

Chris Hunter, Fisheries Division Administrator, FWP, Helena  
Bill Schenk, Attorney, FWP, Helena  
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## **8.0 List of Agencies Consulted**

U.S. Fish and Wildlife Service, Montana Field Office, Creston  
Montana Fish, Wildlife & Parks, Wildlife Division, Kalispell  
U.S. Forest Service, Flathead National Forest