FISHERY MANAGEMENT INVESTIGATIONS

IDAHO DEPARTMENT OF FISH AND GAME

FISHERY MANAGEMENT ANNUAL REPORT
Virgil Moore, Director

SOUTHWEST REGION — MCCALL 2015

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September 2017
IDFG 16-116

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HIGH ALPINE LAKE SURVEYS

ABSTRACT

In 2015, ten high mountain lakes were surveyed within the McCall sub-region. All lakes surveyed were in the Payette and Salmon River drainages. Westslope Cutthroat Trout *Oncorhynchus clarkii lewisi* were found in four lakes and only Brook Trout *Salvelinus fontinalis* were found in one lake. One lake had both Brook Trout and Westslope Cutthroat Trout. In one lake, only tiger muskellunge (*Esox masquinongy X Esox lucius*) were collected and in another Brook Trout were collected but tiger muskellunge were observed. All lakes where surveyed for the presence of amphibians by species, and other physical metrics.

Black Lake had been stocked with tiger muskellunge in 2007 in an attempt to remove all Brook Trout. Gillnetting indicated that virtually all Brook Trout had been eliminated from the lake with the exception of a log jam and marsh area adjacent to the lake outlet and stream interface and the outlet stream. Therefore, in 2015 we treated the outlet area and Lake Fork Creek downstream approximately 0.6 km to a natural bedrock fish migration barrier with rotenone to remove Brook Trout.

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INTRODUCTION

Alpine Lake Surveys

Surveys are conducted annually to gather current data on fish populations in high mountain lakes (HMLs) throughout the region. The data collected from these surveys provides managers with information on how fish populations are functioning based on human impact, other species presence, amphibian presence, water quality information, as well as previous years' stocking.

Black Lake Brook Trout Removal

Nonnative Brook Trout *Salvelinus fontinalis* populations in high mountain lakes threaten the persistence of native fish and often offer limited fishing opportunity because of stunted growth. Elimination of Brook Trout populations by stocking Tiger muskellunge *Esox lucius x masquinongy* may be an efficient means for eliminating some populations, especially in low complexity habitats. Elimination of Brook Trout populations and subsequent restocking with native western salmonids, would contribute to angling quality and conservation efforts.

In 2007, the Idaho Department of Fish and Game (IDFG) identified nine alpine lakes in the Southwest Region containing stunted Brook Trout populations (Koenig et al. 2015). These lakes were stocked with Tiger Muskellunge (40 fish/ha) with an average length of 317 mm. Black Lake was one of the nine lakes included in this research project.

Successful Brook Trout removal in Black Lake would be an important step in the protection of Bull Trout *Salvelinus confluentus* found in Rapid River. Since stocking tiger muskellunge in 2007, Black Lake gillnetting surveys indicated that tiger muskellunge had successfully removed most if not all Brook Trout from the lake. However, Brook Trout still occupied water around the log jam at the outlet and the outlet stream (Lake Fork) where they are inaccessible to tiger muskellunge. Removing these last remaining Brook Trout would be a critical step to reduce the likelihood of Brook Trout recolonizing Black Lake.

METHODS

Alpine Lake Surveys

Surveys were completed by a two person team that accessed all 10 high mountain lakes by foot. Fish were sampled using experimental mountain lake gill nets (one sinking, one floating) were set from shore and fished overnight. Catch was recorded separately between floating and sinking nets. Catch between sinking and floating nets was compared using paired t-test ($\alpha = 0.10$).

After the nets were set a one person raft was used to gather water temperature and water conductivity data (using an electronic conductivity meter) as well as determining the maximum depth of the lake via an electronic depth finder. The other member would walk around

the lake's shore conducting a VES (Visual Encounter Survey) recording amphibian presence as well as collecting data regarding human use via fire pit and campsite counts.

Lake inlet and outlet data was also gathered as they walked the lake and recorded the depth, width, substrate, fish presence, and spawning substrate. Team members also sampled fish from lakes by angling from shore or raft. The next morning the nets were pulled and all fish collected were identified by species and weighed (g), and measured for total length (mm). Data were later entered into the Lakes and Reservoirs Database.

Black Lake Brook Trout Removal

In 2015, IDFG staff used rotenone to remove remaining Brook Trout from the outlet area and down Lake Fork Creek approximately 0.64 km to natural, bedrock out-cropping, fish migration barrier. A complete description of the application methods are described in the Pesticide Discharge Management Plan and Application Record presented in Appendix A.

RESULTS AND DISCUSSION

Alpine Lake Surveys

In 2015, ten HMLs were surveyed in the McCall sub-region. Of the ten lakes surveyed, five lakes had an amphibian population, five had Westslope Cutthroat Trout *Oncorhynchus clarkii lewisi*, three had Brook Trout *Salvelinus fontinalis*, two had Rainbow Trout *Oncorhynchus mykiss*, and two lakes had tiger muskellunge *Esox masquinongy x Esox Lucius* present. Four lakes had a combination of one or more fish species present (Table 1).

Shirts Lake, Corral Lake, and Granite Twin lakes were found to have either no fish or a small number of fish. These lakes were previously stocked with tiger muskellunge for a fish research project to eliminate the lake's Brook Trout population. In Corral Lake, the treatment appears to be successful. In 2014, one tiger muskellunge was caught and removed via angling. In 2015, no fish were observed using both gill net and hook and line methods.

In 2015, tiger muskellunge were observed visually in both Shirts and Granite Twin lakes. Shirts Lake was found to have no other fish present and Granite Twin Lakes had two Brook Trout caught using gill nets and hook and line sampling methods. More work may be needed to remove tiger muskellunges from these lakes in order to establish new trout populations.

Six of the ten lakes were found to have a population of amphibians present with 4 lakes having Western Toads *Anaxyrus boreas* as the primary amphibian species and two lakes with Columbia Spotted Frogs *Rana luteiventris* as the primary amphibian species (

Table 2).

We compared catch rates between floating and sinking gill nets at each lake. Out of the ten lakes surveyed, six lakes provided an adequate number of fish caught using both float and sinking gill nets (one of each per lake); which allowed a comparison of which type of gill net was more proficient at capturing fish. Mean catch of trout from sinking gill nets (24 fish/net) was significantly higher than from floating (14 fish/net) gill nets (P = 0.019, df = 5). Sinking gill nets had a 71% higher average catch of fish than floating gill nets (

Table 3).

Black Lake Brook Trout Removal

The high gradient and large boulder and timber substrate of Lake Fork made treatment more difficult and it went much longer than anticipated. Overall the removal of Brook Trout went well. Dead fish were observed from the Black Lake outlet area downstream to the live cage located just above the migration barrier. All fish in live cages below the migration barrier were alive and well the morning following the treatment.

MANAGMENT RECOMMENDATIONS

1. Continue conducting annual HML surveys in order to obtain information on lakes that haven't been surveyed in recent years.
2. Continue to use sinking or both sinking and floating gill nets to conduct surveys. Angling only techniques tended to not provide adequate information for a complete population analysis of a given lake.
3. Lake Fork should be electrofished in 2016 to evaluate effectiveness of the treatment.

LOWLAND LAKE SURVEYS

LAKE CASCADE ANNUAL FISHERY SURVEY

ABSTRACT

We completed the annual fall gillnetting in Lake Cascade to monitor fish communities. We netted 466 Yellow Perch *Perca flavescens* comprising 29% of total catch, 275 Northern Pikeminnow *Ptychocheilus oregonensis* (17% of catch) and 248 Largescale Sucker, *Catostomus macrocheilus* (16% of catch). Mean catch for all sizes of Yellow Perch per net site was 31 and 14.5 for fish greater than 250 mm. Yellow Perch greater than 250 and 300 mm made up 47% and 27%, respectively. Of all yellow perch collected, eight percent were greater than 350 mm. The mean catch of Northern Pikeminnow greater than 350 mm was 7.8 per gill net site, with no statistical change since 2012.

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INTRODUCTION

Since the Yellow Perch *Perca flavescens* restoration treatments were completed in 2004, 2005, and 2006 (Janssen et al. 2008), fish management activities on Lake Cascade have been directed at monitoring the changes in the fish community. Specific objectives listed in the IDFG 2013-2018 Fisheries Management Plan (IDFG 2012) included monitoring abundance, size, and age trends of the Yellow Perch and Northern Pikeminnow *Ptychocheilus oregonensis* populations.

To maintain the Yellow Perch fishery, we must prevent excessive predation by Northern Pikeminnow (NPM). IDFG studies in the early 2000's indicated that a NPM population trending toward a majority of fish greater than 350 mm was a severe threat to the Yellow Perch fishery and required immediate control measures to be implemented (Allen et al. 2009). Therefore, the abundance and size distribution of Northern Pikeminnow must be monitored.

Since 2012 we have conducted annual, standardized, October, fish community surveys to monitor changes in abundance and length composition of the Northern Pikeminnow and Yellow Perch populations. The surveys also provide insight into the entire fish community in Lake Cascade. We completed another October survey in 2015.

METHODS

We sampled all 15 gill net sites in 2015 which are described in Janssen et al. (2014). One sinking and one floating, IDFG standard experimental lake survey gill net was set at each site. At shoreline sites, sinking gill nets were attached to or near the shore. The floating net was set in a minimum of 3 m deep water as close to the shoreline set as possible. For the mid-lake sample sets the gill nets were placed in near proximity to each other. Nets were fished overnight and pulled the next day. All fish were identified and measured for total length (nearest mm) and a subsample of each 10 mm length group weighed.

Length frequency data was used to age Yellow Perch. Multiple attempts to age Yellow Perch using scales, otoliths, and fin rays over the last several years were unsuccessful as many annuli were not represented in a large percentage of samples. Utilizing annual length frequency data collected from the annual fall surveys and following individual age classes through the years has proven to be more reliable for fish up to 5 or 6 years of age.

RESULTS

Yellow Perch were the most abundant species with 466 netted and they comprised 29% of total catch (

Table 4). We also netted 275 Northern Pikeminnow (17% of catch) and 248 Largescale Sucker *Catostomus macrocheilus* (16% of catch). The Largemouth Bass *Micropterus salmoides* population appears to be increasing as we collected 26, the most ever in our annual fall fish survey.

We collected 469 kg of Largescale Suckers, which made up 48% of the total biomass collected in gill nets followed by Northern Pikeminnow and Yellow Perch at 138 kg and 117 kg, respectively. Smallmouth Bass *Micropterus dolomieu* were fourth in overall weight at 103 kg. Length frequency data for all fish collected are presented in (Table 5).

Mean catch for all Yellow Perch per gill netsite was 31 and 14.5 for fish greater than 250 mm (Table 6). Yellow Perch greater than 250 and 300 mm made up 47% and 27% respectively, of total catch and eight percent were greater than 350 mm. Incremental Relative Stock Densities for 200, 250, 300, and 380 mm Yellow Perch were 57, 47, 27, and 1.5, respectively (

Table 7).

Two year old Yellow Perch were the strongest age class collected, at over twice the rate of any other age class (Figure 1). Yellow Perch length frequency distribution suggests ages of 200 mm, 250 mm, and 300 mm fish to be three, four to five and six to seven years old, respectively. Mean relative weights of Yellow Perch were 95.3 (Table 8).

Overall mean catch of Northern Pikeminnow was 18 per gillnet site, and 8 fish/site for those greater than 350 mm. Based on 90% confidence intervals, there has been no statistical change in mean catch for all Northern Pikeminnow or those greater than 350 mm since 2012 (Table 6).

We collected 234 Rainbow Trout *Oncorhynchus mykiss* of which only four were thought to be of natural origin. Natural origin trout ranged in size from 385 mm to 545 mm. Hatchery Rainbow Trout ranged in size from 185 mm to 595 mm TL.

We collected 142 Smallmouth Bass that ranged in length from 146 to 490 mm TL. Relative weights averaged 98.2 with incremental Relative Stock Densities for 300, 400 and 450 mm of 86, 24, and 3 respectively (Table 9).

The IDFG standard lake survey gill nets were ineffective at capturing Yellow Perch less than 140 mm and Northern Pikeminnow less than 160 mm.

DISCUSSION

IDFG studies of the Yellow Perch decline in the early 2000's indicated that the presence of a Northern Pikeminnow (NPM) population dominated by fish greater than 350 mm and a marked decline or absence of juvenile Yellow Perch were warning signs of a pending Yellow Perch crash (Allen et al. 2009). The Lake Cascade Yellow Perch and NPM monitoring strategy uses the percent of NPM greater than 350 mm to determine the need for population reduction to protect the Yellow Perch fishery.

Currently, the NPM population appears stable but the percent of fish greater than 350 mm has risen annually since 2012 and was 43% in 2015. Since the start of the standard fall gillnetting in 2012 there has been no statistical difference in either mean gill net catch of all NPM and number of NPM greater than 350 mm. We would expect the number of NPM greater than 350 mm to increase each year since the removal projects in 2004, 2005, and 2006 as more age classes recruit to this size class. A previous age and growth study in Lake Cascade prior to the removal projects indicated a maximum age of approximately 20 years with the majority of fish ranging from 11 to 18 years old (Janssen et al. 2008). In 2011, NPM ages were two to six for fish from 200 to 466 mm in total length (Janssen et al. 2012).

Rotenone treatments in 2010 and 2013 in the North Fork Payette River to remove spawning NPM were thought to be unsuccessful as very few dead fish were observed. The treatments in 2015 using Merwin Traps in lake and rotenone in the NFPR were more successful in removing Northern Pikeminnow (see Merwin trapping and rotenone project sections of this

report). Impacts of the 2015 treatments on the population are unknown but may help explain why there was no increase in the number of NPM over 350 mm.

The Yellow Perch population appears to be strong and continues to produce satisfactory levels of perch greater than 300 mm. The mean catch rate of Yellow Perch per gillnetting site has not changed statistically since 2012. Yellow Perch Proportional Stock Densities for RSD-300 (130 mm stock) for 2013, 2014, and 2015 were 13, 32, and 27 respectively (

Table 7). Relative Stock Densities for 300 mm and 380 mm fish have fluctuated from 13 to 32 and 0.7 to 1.4 respectively over the last three years' surveys. This indicates strong numbers of perch over 300 mm, with slight increases in the truly large perch over 380 mm.

Largemouth Bass appear to be increasing in number as total catch has increased from two in 2012, to nine and five in 2013 and 2014, and 26 in 2015.

MANAGEMENT RECOMMENDATIONS

1. Continue annual fall gill net surveys on Lake Cascade to monitor Yellow Perch and Northern Pikeminnow populations. These data also provide valuable insight into the populations and fishery status of stocked salmonids and other game fish.

LAKE CASCADE ICE FISHING CREEL SURVEY

ABSTRACT

Over the past several years, Lake Cascade has produced three Idaho record Yellow Perch during the winter ice fishing period. We used a bus route creel survey design according to the methods described by Pollock et al. (1994) to collect angler effort and harvest data during the Lake Cascade ice fishing season. The ice fishing season in 2014/15 was unusually short due to warm weather and rain. Lake Cascade was totally ice-free by March 8th, 2015. There were a total of 22 days of creel surveys conducted over the six week period from January 10th through February 16th. We report total angler effort, catch and harvest statistics for Yellow Perch and Rainbow Trout during this period.

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INTRODUCTION

Over the past several years, Lake Cascade has produced three Idaho record Yellow Perch during the winter ice fishing period. To closely monitor this important Idaho fishery, McCall subregion staff sought to determine fishing pressure and harvest. We collected harvest and fishing effort information using a creel survey conducted throughout January and February 2015.

METHODS

We used a bus route creel survey design according to the methods described by Pollock et al. (1994) to collect angler effort and harvest data during the Lake Cascade ice fishing season. Specifically, the survey was stratified by day type (weekend/holidays and weekdays), lake section (North and South) and time period (AM/PM). Sampling was conducted four to five times per week, with all weekend days and holidays being surveyed, as well as two random weekdays. Sample days were split into two, equal length time periods (AM and PM) from the sunrise to sunset day length on the 15th of each month. Each section consisted of three angler access locations.

The section and time period to be sampled were randomly chosen for the first weekend and first weekday day of each month. The lake section sampled was then alternated on all following weekend and holiday days for the month. The lake section to be sampled was alternated for weekday sample days separately. Time period sampled was also alternated by day type and section for each following sample day. i.e. consecutive AM or PM time periods sampled for all the North section weekdays were alternated independently from the South section weekdays and similarly for weekend/holiday days.

Daily starting access site and rotation sequence (clockwise or counterclockwise) were chosen randomly. The amount of time spent waiting at each access site was determined by shift length, travel times between access sites and expected use at each site (Table 10). Wait times per access site were adjusted as actual use percentages were determined. Upon arrival at each access site, the number of vehicles present was noted. The specific time in which a vehicle arrived or departed was recorded throughout the wait period. Access sites and wait times for each are presented in Table 11. Any angler leaving the location during the wait period was interviewed as to the number of anglers in vehicle, amount of time spent fishing and how many fish were caught, kept, and released.

Angler effort for the North and South sections of the lake on survey days was estimated using the “time interval count of anglers’ cars present” method described by Pollock et al. (1994). Weekly total angler effort estimates for the North and South sections of the lake were calculated using mean angler effort on survey days by day type for a given week. Daily mean effort was then multiplied by the number of day types for that week. Holidays were counted as weekend days. Monthly catch and harvest rates for the North and South sections were calculated by totaling monthly catch by species and dividing by total angler hours of interviewed anglers (ratio of means). Monthly catch and harvest rates were then multiplied by the total angler hours estimates to calculate weekly catch and harvest by species. Monthly catch and

harvest rates were used instead of weekly catch rates due to low numbers of angler interviews in some weeks.

RESULTS AND DISCUSSION

The ice fishing season in 2014/15 was unusually short due to warm weather and rain. Lake Cascade was totally ice-free by March 8th, 2015. There were a total of 22 days of creel surveys conducted over the six week period from January 10th through February 16th in which there was enough ice to safely fish. Interviews revealed a majority of ice anglers were targeting Yellow Perch. There were a small number of people targeting Rainbow Trout, but most of the Rainbow Trout came as a bycatch to Yellow Perch anglers.

January catch and harvest rates for Yellow Perch in the North section were 1.37 and 0.22 fish/hour, respectively and 0.41 and 0.25 respectively in the South section (Table 12). The February Yellow Perch catch rates were 1.07 per hour in the North section and 0.17 in the South section (

Table 13). No Rainbow Trout were reported caught in January on the North section. The Rainbow Trout catch rate was a 0.04 fish per hour in February with no harvest recorded.

Angler effort on the North section of Lake Cascade was estimated at 4,232 angler hours during our survey period (

Table 14). There was more angling effort on the weekends, with 2,617 hours compared to 1,614 hours during the weekdays. Total harvest was 1,118 Yellow Perch and no Rainbow Trout. The mean number of anglers per vehicle on the North section was 1.8.

We estimated that anglers caught a total of 5,617 Yellow Perch on the North section of Lake Cascade. Of that total, 1,117 Yellow Perch were harvested. The majority of fish caught and harvested were done so during the last two weeks of January which accounted for 65% of the season total.

South section angling pressure was an estimated 6,903 hours. Nearly 75% (5,249 hours) of the effort came within a week's period between 1/24/15 and 2/1/15 (Table 15). This coincided with a local ice fishing derby being held that same weekend. January catch and harvest rates for Yellow Perch on the South section were lower than the North at 0.41, while harvest was slightly higher at 0.22 fish/hour. The mean number of anglers per vehicle on the South section was 2.2.

South section catch rates resulted in an estimated 2,567 Yellow Perch being caught and 1,726 being harvested. An estimated 232 Rainbow Trout were harvested during the total survey period. No Rainbow Trout were estimated to be caught during February.

MANAGEMENT RECOMMENDATIONS

1. Continue the bus route creel survey design described by Pollock et al. (1994) to monitor winter ice fishing pressure and catch rates on Lake Cascade.

LAKE CASCADE HOLIDAY ANGLERS COUNTS

ABSTRACT

We conducted Lake Cascade holiday angler counts on Memorial Day, July 4th and Labor Day to continue our long term angling pressure trend. In 2015, counts averaged 44 angling boats and 42 shore anglers, the second highest since the creel survey in 1992 when total angling pressure was 321,000 hours.

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INTRODUCTION

The last comprehensive angler creel surveys were completed on Lake Cascade in 2010, 1991 and 1992. Annual holiday fishing boat and shore angler counts began in 1996 as a relatively inexpensive way to track changes in angling pressure between years when more comprehensive creel surveys were completed. The angler counts coincidentally started just prior to the collapse of the Yellow Perch fishery. This has given managers a tool to monitor changes in angling pressure prior to and during the fishery collapse as well as after the Yellow Perch fishery restoration project from 2004 through 2006. We completed holiday angler counts again in 2015.

METHODS

We conducted holiday angler counts at 10 AM in 2015 on Memorial Day, July 4th and Labor Day. A boat was utilized to count all fishing boats and shore anglers. We calculated the yearly average angler count for boat and shore anglers across all three surveys.

RESULTS

Shore angler and fishing boat counts were completed on Memorial Day, July 4th and Labor Day in 2015. The average count for boats and shore anglers was in 2015 was 44 and 42, respectively (Table 16) The 2015 counts were the third highest since the creel survey in 1992 (52 boats and 28 shore anglers) when total angling pressure was 321,000 hours.

DISCUSSION

Angling pressure has increased since the recovery of the Yellow Perch fishery. The Idaho Yellow Perch state record was broken three times and an ice fishing world record was broken in 2013, which piqued the interest of anglers all around the country.

MANAGEMENT RECOMMENDATIONS

1. Continue holiday angler counts on Lake Cascade to monitor angler use and compare results with future creel survey studies.
2. Complete a lake wide creel census of Lake Cascade, a year-long creel survey in the next 2-3 years to document angler use and fish catch and harvest.

LAKE CASCADE NORTHERN PIKEMINNOW REMOVAL

ABSTRACT

Merwin traps and rotenone were used to reduce the Northern Pikeminnow population of Lake Cascade. We treated the North Fork Payette River above Lake Cascade using rotenone to remove Northern Pikeminnow during their spawning migration. We completed three treatments and killed an unknown number of fish. Three Merwin traps were fished for 65 days in 2015 in Lake Cascade. Northern Pikeminnows were the target species with 2,168 removed.

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INTRODUCTION

Studies in 2004 and 2005 indicated that NPM predation on Yellow Perch must be controlled to maintain the Yellow Perch fishery in Lake Cascade, and therefore, their population must be controlled (Allen et al. 2009). NPM control measures should be implemented before the majority of NPM are greater than 350 mm. It took approximately 20 years (1973 to 1994) from the earlier NPM treatments for the NPM population to expand and control recruitment of all fish in the lake.

Ten years have passed since the last NPM reduction treatments were completed in Lake Cascade. While the NPM population size structure has not reached a critical level, there are a large number of fish greater than 350 mm present in the lake (see annual fishery survey this report). Therefore, in 2015 we utilized rotenone in the North Fork Payette River and in-lake Merwin traps to reduce adult NPM numbers in Lake Cascade.

During the Department's Lake Cascade fishery restoration efforts of ten years ago, we had utilized Merwin traps to successfully capture Northern Pikeminnow (NPM) and a variety of other fish species (Allen et al. 2009). The large stationary traps are relatively low maintenance and can effectively fish for months at a time.

METHODS

We applied rotenone on three separate treatment days in May and June 2015. The application site was the second bend upstream of Hartsell Bridge on the North Fork Payette River. Methods and results for the rotenone treatment are included in the Pesticide Discharge Management Plan and Application Record completed for the Idaho Department of Agriculture presented in Appendix B.

We operated three Merwin traps in the northern area of Lake Cascade from the end of April through June, 2015. One trap was at the Gold Fork River cut on the old Highway 55, the second trap was near the western point of Boulder Creek and the third trap was located just north of the Buttercup Campground on the west shore of the reservoir. The traps were visited one or two times per week via boat and all fish were documented. Northern Pikeminnow and Largescale Sucker individuals were enumerated and then euthanized as the trap was emptied. All other fish species were released alive.

RESULTS AND DISCUSSION

The three traps captured 13 different fish species in 2015. The most numerous species captured were Black Bullhead followed by NPM (Table 17). A total of 5,953 individual fish were captured, averaging 30 fish per trap per day. Eleven NPM were captured per trap day, of which 8.4 NPM per trap day were greater that 350 mm (which we categorized as adults). The total number of NPM adults for the 65 days of trapping was 1,630 which comprised 27.4% of the total catch (Table 17).

MANAGEMENT RECOMMENDATIONS

1. Utilize Merwin traps to remove NPM from Lake Cascade for at least one more field season to continue reducing NPM adults.

LAKE CASCADE YELLOW PERCH ANGLER EXPLOITATION

ABSTRACT

We tagged Yellow Perch in 2015 with t-bar anchor tags to estimate angler harvest. Similar studies were completed in 2009 and 2013. Yellow Perch greater than 250 mm were tagged in May 2015. Both exploitation (harvest) and total use (harvested or released) rates from May 2015 through January 2016 were 4.9%, which is less than half the rates measured in 2009 and 2013.

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INTRODUCTION

As the Yellow Perch population continued to increase from its low in the mid 2000's, so have the number of anglers pursuing Yellow Perch. To examine the level of angler exploitation of Yellow Perch we tagged perch larger than 250 mm in 2009, 2013, and again in 2015.

METHODS

Standard IDFG lake survey trap nets were used to collect Yellow Perch from multiple locations around the lake. Fish collected were measured to the nearest mm and all fish larger than 250 mm were tagged with a bright orange t-bar anchor tag, anterior to the dorsal fin. We utilized the statewide IDFG fish exploitation tag return program "Tag, You're It" administered by the IDFG Fishery Research office to collect and summarize tag return data. Methods utilized to determine exploitation rates of tagged fish are presented in Meyer et al. (2012).

RESULTS

We collected and tagged 494 Yellow Perch from March 19 to April 17, 2015. Tagged fish ranged in size from 250-396 mm TL and averaged 297 mm. We had a total of 29 tags returned in 2015 which included from 2009 (n = 2), 2013 (n = 12), and 2015 (n = 15). All 15 tag returns from 2015 were harvested fish.

Tag loss and non-reward tag return rates, determined from double-tagged perch in a previous study, were 1.2% and 58.5% respectively (Meyer et al. 2012). Total use (harvest plus released fish) in 2015 through January 2016 was 4.9%, while exploitation was 4.9%. This compares to 16% and 14% total use and harvest exploitation respectively in 2009 and 15.6 and 13.9%, respectively in 2013.

DISCUSSION

Exploitation and total use in 2015 was approximately 1/3 of that observed in 2009 and 2013. Reasons for the decline are unknown and none of the three years of exploitation estimates included ice fishing. Therefore, the short ice fishing season in 2014/2015 was not a factor. There were no indications that survival of tagged fish would have changed in 2015 from previous years' tagging. Mean catch of Yellow Perch in the fall 2015 survey has not change significantly since 2012. While not documented, there were numerous reports of slow fishing in 2015. Anecdotal evidence suggests that a very large age class of young-of-year Yellow Perch in 2015 may have kept older Yellow Perch well fed, reducing their willingness to bite on fishing tackle.

Current levels of Yellow Perch harvest are unlikely to be affecting the population. Given the present harvest rate of 4.9%, we speculate that harvest is not affecting numbers of Yellow Perch over 250 mm. Recruitment of fish into this size group would replace any and all angler

mortality**.** Biologists have examined catch curves of annual gill netting to evaluate total mortality between ages. However, we are unable to make any conclusions because of the large variability in catch between years.

MANAGEMENT RECOMMENDATIONS

1. Repeat the exploitation study in 2017 or 2018 to monitor changes in harvest exploitation rates on Lake Cascade. This would allow us to address angler suggestions of creel limits on large Yellow Perch.

C. BEN ROSS RESERVOIR EVALUATION

ABSTRACT

We completed a fishery survey on C. Ben Ross Reservoir. We collected a total of 162 fish of five species: Largemouth Bass *Micropterus salmoides*, Bluegill *Lepomis macrochirus*, Black Crappie *Pomoxis nigromaculatus*, White Crappie *Pomoxis annularis*, and Rainbow Trout. Largemouth Bass made up 70.4% of the total catch and 91.4% of the total weight of all fish collected. Bluegill and crappie numbers continued to decline from previous surveys. We transplanted approximately 950 White Crappie, 150 Black Crappie and 20 Bluegill from Crane Creek Reservoir to address declining forage fish numbers.

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INTRODUCTION

C. Ben Ross Reservoir in Adams County is 360 acres at an elevation of 3,146 feet above sea level. The water storage is fully appropriated and typically drained to the outlet invert. The remaining pool is approximately 10 acres. Once drained to outlet level the valve is closed a slowly refills by end of spring runoff. This water use scenario no doubt has a significant impact on the lake fishery.

The reservoir is the only significant Largemouth Bass *Lepomis salmoid*es fishery in the McCall sub region. A quality bass rule (no harvest before July 1st, and a two bass limit after July 1, none between 305 mm and 406 mm) has been in effect since 1994. To evaluate the effects of the quality bass regulation we have surveyed the reservoir approximately every five years since 1993. We completed another IDFG standard lowland lake survey of C. Ben Ross Reservoir in 2015. To address the concerns of the declining forage base in C. Ben Ross in previous surveys, we transplanted Black and White Crappie and Bluegill from Crane Creek Reservoir.

METHODS

We sampled the sportfish community at C. Ben Ross Reservoir with a combination of gill nets and boat electrofishing. We set one floating and one sinking IDFG Standard Survey gill net and two standard trap nets in C. Ben Ross Reservoir. Nets were set in the evening, fished all night and pulled the following morning. Six electrofishing sites were chosen at random and night electrofished a total of 10 minutes each. We collected length data from all fish species and weights from up to five fish from each one-cm length group.

We calculated largemouth bass Proportional Stock Densities (PSD) and Relative Stock Densities (RSD) for fish in the slot and for fish larger than the slot length. The assigned stock, RSD-slot, and RSD->slot, total length values were 200 and 305 mm, 306 to 406 mm, and > 406 mm respectively.

We used four trap nets and boat electrofishing gear to collect White and Black Crappie and Bluegill from Crane Creek Reservoir. Fish collected were held overnight in live cages and transported the next morning.

RESULTS

We completed the C. Ben Ross survey on June 24, 2015 and collected a total of 162 fish of five species; Largemouth Bass, Bluegill *Lepomis macrochirus*, Black Crappie *Pomoxis nigromaculatus*, White Crappie *Pomoxis annularis*, and Rainbow Trout. Largemouth Bass and Bluegill made up the majority of fish collected (

Table 18). Largemouth Bass made up 70.4 % of the total catch and 91.4% of the total weight of all fish collected. Length frequencies of each game fish species are presented in Table 19. Largemouth bass relative weights averaged 104.2 for fish greater than 200 mm.

Largemouth Bass PSD, RSD-SLOT, and RSD->SLOT were 22, 13, and 8, respectively in 2015. The RSD-slot of 13 was the lowest since 1993, prior to when the restrictive harvest rule was implemented (Table 20).

Age and growth data from studies in 2010 indicated that the large group of bass from 210 mm to 250 mm, collected this year, were 2 years old. Combined Bluegill and crappie biomass collected in 2015 was 0.87 kg. This compares to 20.8, 4.7, 2.4, and 2.7 kg collected with the same gear in 1993, 1999, 2004, and 2010 respectively (Janssen et al. 2011).

To address the decline in forage fish species abundance noted in this and previous surveys, we transplanted approximately 950 White Crappie, 150 Black Crappie and 20 Bluegill from Crane Creek Reservoir on June 18, 2015

DISCUSSION

The gap in the number of bass just under the slot and the decline in the number of bass in and over the slot limit suggest an increase in bass harvest since 2010. However, maximum length of bass collected increased in 2015 (475 mm) and has increased every survey year since 1993 (Table 21). The 2010 survey indicated that harvest of Largemouth Bass greater than 406 mm was minimal and that fish were probably dying of old age before being harvested as evidenced by the presence of bass 13 to 17 years of age (Janssen et al. 2011).

Historical low and still declining catch rates of forage species such as bluegill and crappie are of concern. Additional surveys will help evaluate the effectiveness of the Crappie and Bluegill transplants. Additional transplants should be made over the next few years to supplement the forage base.

Largescale Sucker were once abundant in C. Ben Ross as we collected 22 in 1993 (Janssen et al. 1997). Since then, their numbers have declined and we collected only two in 2010 and none in this years' survey. It appears that Largemouth Bass predation has eliminated this species from the lake.

The next lake survey in approximately five years will help evaluate the effectiveness of the forage fish transplants in addition to the status of the Largemouth Bass population.

MANAGEMENT RECOMMENDATIONS

1. Continue to collect and transplant adult Bluegill and crappie from other waters into C. Ben Ross.

2. Maintain current quality bass size regulation on C. Ben Ross Reservoir. Remove the July 1st date restriction as there is little evidence that this is required to recruit small bass into the fishery.

3. Survey C. Ben Ross again in 2020.

HORSETHIEF RESERVOIR ROTENONE TREATMENT

ABSTRACT

We completed a rotenone treatment of Horsethief Reservoir in October of 2015 to remove illegally introduced Black Bullhead *Ameiurus melas*.

Authors:

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INTRODUCTION

Black Bullheads *Ameiurus melas* were reported being caught by anglers in Horsethief Reservoir during the summer of 2014. Subsequent gillnetting surveys in the fall of 2014 confirmed the presence of large numbers of Black Bullheads. Bullheads have never been introduced into Horsethief by IDFG and are the result of an illegal introduction.

Bullheads jeopardize the entire trout fishery in Horsethief Reservoir as they compete directly with trout for food which results in poor growth and survival rates of stocked trout. Bullheads also compete with trout for anglers' baits thereby reducing catch rates of the more desirable trout. Horsethief Reservoir has been treated four times since 1983 to remove illegally introduced Yellow Perch.

METHODS

In October, 2015 we utilized rotenone to remove Black Bullheads from the Lake. Complete methods are described in the Pesticide Discharge Management Plan and Application Record completed for the Idaho Department of Agriculture presented in Appendix C.

RESULTS AND DISCUSSION

All results from this treatment are documented in Appendix C under the Pesticide Discharge Management Plan and Application Record completed for the Idaho Department of Agriculture.

RIVERS AND STREAMS

NORTH FORK PAYETTE RIVER KOKANEE SPAWNER COUNTS

ABSTRACT

The 2015 Kokanee *Oncorhynchus nerka kennerlyi* spawning run estimate in the North Fork Payette River above Payette Lake was 320 fish, the lowest recorded escapement since 1988.

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INTRODUCTION

The total kokanee *Oncorhynchus nerka kennerlyi* adult escapement into the North Fork Payette River (NFPR) from Payette Lake has been enumerated since 1988 to assess spawning escapement and to serve as a method of validating kokanee population/density estimates and survival estimates from in-lake population work. It also helps evaluate kokanee stocking efforts. The estimate was completed again in 2015.

OBJECTIVES

To conduct investigations and implement management strategies to protect, maintain, and enhance fish and fisheries in McCall Sub-Region's rivers and streams.

METHODS

Twice weekly during the kokanee spawning run the entire stretch of river utilized by spawning was walked and all live spawners counted. The total run estimate was made by multiplying the largest daily count by 1.73 (Frost and Bennett 1994). Samples of dead post-spawn kokanee that still have an intact tail are measured for total length.

RESULTS

We completed four kokanee spawner counts on the NFPR. The first count was made on September 9, 2015 and 168 spawners were counted. The peak count of 185 was made on September 11, 2015. The total spawning run estimate was 320 (185*1.73) fish (

Table 22). Mean total length of kokanee spawners was 455 mm.

DISCUSSION

Kokanee numbers are perilously low and continued efforts are needed to reduce kokanee predation by Lake Trout *Salvelinus namaycush* in Payette Lake. Kokanee fingerling stockings were discontinued in 2015, as they only served as forage for Lake Trout. The number of Kokanee spawning each year is an important tool in monitoring effects of any changes in Kokanee stockings and Lake Trout harvest rule changes. Increases in run size would indicate improved Kokanee survival from reduced predation rates.

MANAGEMENT RECOMMENDATIONS

1. Continue the kokanee spawner counts as they are a good indicator of in-lake survival changes.
2. Liberalize Payette Lake harvest rules on Lake Trout to reduce their numbers in an attempt to improve Kokanee survival and recover the Kokanee fishery.

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TABLES

Table 1. Total number of fish collected by species and lake collected with standard high mountain lakes gill nets between June 7, 2015 and August 6, 2015.

Lake name	Catalog number	Westslope Cutthroat	Brook Trout	Rainbow Trout	Rainbow Trout X Cutthroat Trout hybrids	Tiger muskie	Total fish caught
Corral Lake	07-177	0	0	0	0	0	0
Serene Lake	07-159	8	20	0	0	0	28
Granite Twin	07-194	0	2	0	0	Obs.	2
Louie Lake	07-318	11	0	0	0	0	11
Duck Lake	07-365	0	40	0	0	0	40
Lake Rock Lake	07-409	66	0	0	0	0	66
Long Lake	07-528	0	0	12	2	0	14
Shirts Lake	09-271	0	0	0	0	1	0
Crystal Lake	09-351	25	0	0	0	0	25
Brush Lake	09-387	0	0	4	49	0	53

Table 2. Mountain lakes by catalog number with associated data**;** primary fish species present, (most abundant listed first), amphibian presence, stocking history, and level of human use surveyed between July 7, 2015 and August 6, 2015.

Lake name	Catalog number	Survey date	Fish species observed	Year last stocked	Amphibians present	Human use
Corral Lake	07-177	8-4-2015	No Fish	2014	Western Toad	Low
Serene Lake	07-159	8-6-2015	Brook Trout Westslope Cutthroat Trout	2014	None observed	Medium
Granite Twin	07-194	7-27-2015	Brook Trout Tiger Musky (observed not collected)	2014	Western Toad	Low
Louie Lake	07-318	7-7-2015	Westslope Cutthroat Trout	2014	Western Toad	High
Duck Lake	07-365	7-30-2015	Brook Trout	1990	Not Surveyed	High
Lake Rock Lake	07-409	7-16-2015	Westslope Cutthroat Tout	2014	Columbia Spotted Frog	Medium
Long Lake	07-528	7-19-2015	Rainbow Trout Westslope Cutthroat. X Rainbow Trout	2013	None Observed	Medium
Shirts Lake	09-271	7-9-2015	Tiger muskellunge	2014	Western Toad	Medium
Crystal Lake	09-351	7-30-2015	Westslope Cutthroat Trout	2012	None Observed	Medium
Brush Lake	09-387	7-13-2015	Westslope Cutthroat. X Rainbow Trout,Rainbow Trout	2012	Columbia Spotted Frog	Medium

Table 3. Total numbers of fish caught per type of gill net (sink or float) during high mountain lake sampling by net type and lake in 2015.

Lake	Sink	Float
Duck Lake	30	14
Serene Lake	24	4
Long Lake	8	4
Brush Lake	32	21
Lake Rock Lake	37	29
Crystal Lake	13	12
Total	144	84
Average	24	14

Table 4. Total catch of fish collected with gill nets in Lake Cascade in October 2015.

Species	Number caught	Percent by number	Sum of weight(kg)	Percent by weight
Yellow Perch	466	29.3%	116.78	11.9%
Northern Pikeminnow	275	17.3%	137.83	14.0%
Largescale Sucker	248	15.6%	469.01	47.7%
Rainbow Trout (hatchery)	230	14.5%	77.40	7.9%
Smallmouth Bass	142	8.9%	102.91	10.5%
Black Bullhead	132	8.3%	56.50	5.8%
Pumpkinseed *Lepomis gibbosus*	36	2.3%	1.64	0.2%
Largemouth Bass	26	1.6%	5.53	0.6%
Mountain Whitefish *Prosopium williamsoni*	21	1.3%	7.18	0.7%
kokanee (late) *Oncorhynchus nerka* kennerlyi	5	0.3%	1.54	0.2%
Black Crappie	4	0.3%	1.29	0.1%
Rainbow Trout (wild)	4	0.1%	0.37	0.0%
Bridgelip Sucker *Catostomus columbianus*	1	0.3%	4.52	0.5%
Grand Total	1,590	100.0%	982.50	100.0%

Table 5. Length frequencies by species[1] of fish collected with gill nets in Lake Cascade in October 2015.

Length Group (mm)	YP	NPM	LSS	RBT (Hatchery)	SMB	BBH	PMPSD	LMB	MWF	KOK (Late)	BC	RBT (wild)	BLS
70-79							1						
80-89							1						
90-99							11						
100-109							5						
110-119	1												
120-129							5	1					
130-139	5				1		4	2					
140-149	41				2		1	5					
150-159	64				1		2	3					
160-169	47				1		3	4					
170-179	17	3					3						
180-189	11	7		1		1		1					
190-199	14	12				2		1					
200-209	5	12		1		1				1			
210-219	9	12		8		3		1					
220-229	9	15		19	1	2		1					
230-239	12	14		35	3	2		1					

Table 5. Cont

Length Group (mm)	YP	NPM	LSS	RBT (Hatchery)	SMB	BBH	PMPSD	LMB	MWF	KOK (Late)	BC	RBT (wild)	BLS
240-249	13	10	1	37	2	7		1			3		
250-259	20	9	1	32	1	13		2					
260-269	8	5	1	24	4	9							
270-279	16	8	1	11	1	9							
280-289	18	4	3	7	5	15		1		1			
290-299	28	7	1	6	2	9			2				
300-309	23	10	2	2	4	9			1	1	1		
310-319	23	3		1	1	13			4				
320-329	19	9			5	6			4	1			1
330-339	10	6	4		5	9			3				
340-349	16	11			10	4			3				
350-359	13	12		1	19	3			2				
360-369	13	13	1	1	15	5			1				
370-379	4	10	1	1	10	5							
380-389	6	18		4	10	1			1			1	
390-399	1	10	4	4	7	1							
400-409		10	1	5	4	1							
410-419		6	4	8	3					1			
420-429		3	2	3	4	1							

Table 5. Cont

Length Group (mm)	YP	NPM	LSS	RBT (Hatchery)	SMB	BBH	PMPSD	LMB	MWF	KOK (Late)	BC	RBT (wild)	BLS
430-439		6	6	3	8			2					
440-449		3	6	1	3								
450-459		3	5	2	1							1	
460-469		2	5	2	6								
470-479		2	7		1								
480-489		2	14	2	1							1	
490-499		4	12	1	1								
500-509		1	10	1									
510-519		1	10										
520-529		2	20	1									
530-539		1	21	1									
540-549		2	19	1								1	
550-559		2	15	2									
560-569		1	16	1									
570-579			9										
580-589			7			1							
590-599		2	13	1									
600-609		1	5										
610-619		1	6										

Table 5. Cont

Length Group (mm)	YP	NPM	LSS	RBT (Hatchery)	SMB	BBH	PMPSD	LMB	MWF	KOK (Late)	BC	RBT (wild)	BLS
620-629			3										
630-639			9										
650-659			2										
680-689			1										
Grand Total	466	275	248	230	142	132	36	26	21	5	4	4	1

[1]YP=Yellow Perch, NPM=Northern Pikeminnow, LSS=Largescale Sucker, RBT=Rainbow Trout, SMB=Smallmouth Bass, BBH=Black Bullhead, PMPSD=pumpkinseed, LMB=Largemouth Bass, MWF=Mountain Whitefish, KOK=kokanee , BC=Black Crappie, BLS=Bridgelip Sucker.

Table 6. Total catch and mean catch per gillnetting site with 90% confidence intervals of Yellow Perch, Northern Pikeminnow, Yellow Perch greater than 250 mm, and Northern Pikeminnow greater than 350 mm collected in Lake Cascade in October 2012, 2013, 2014, and 2015.

	Yellow Perch			Northern Pikeminnow			Northern Pikeminnow > 350 mm	
Year	Total catch	Mean catch (± 90% CI)	Mean catch > 250 mm (± 90% CI)	Total catch	Mean catch (± 90% CI)	Percent > 350 mm	Total catch	Mean catch (± 90% CI)
2012	608	40 ± 11	18 ± 4	351	23 ± 10	31	110	7.3 ± 3
2013	739	49 ± 28	13.5 ± 23	213	14 ± 7	33	70	4.7 ± 2
2014	441	29 ± 10	19 ± 32	335	22 ± 10	36	122	8.1 ± 4
2015	465	31 ± 10	14.5 ± 5.5	275	18 ± 6	43	118	7.9 ± 4

Table 7. Incremental Relative Stock Densities** (RSD) for 200, 250, 300, and 380 mm Yellow Perch collected with gill nets in Lake Cascade in October 2012, 2013, 2014, and 2015.

Year	RSD-200 (PSD)	RSD-250	RSD-300	RSD-380
2012	69	45	27	1.2
2013	66	27	13	0.7
2014	89	65	32	1.4
2015	57	47	27	1.5

**Stock Length = 130 mm, Quality Length = 200 mm, Preferred = 250 mm, Memorable = 300, Trophy = 380 mm.

Table 8. Mean relative weights of Yellow Perch, Smallmouth Bass, and Largemouth Bass by length group collected with gill nets from Lake Cascade in October 2015.

Species	Length group	Number of fish	Average relative weight
Yellow Perch	110-119	1	
	130-139	5	
	140-149	41	
	150-159	64	
	160-169	47	
	170-179	17	
	180-189	11	
	190-199	14	
	200-209	5	
	210-219	9	
	220-229	9	
	230-239	12	104.7
	240-249	13	88.3
	250-259	20	100.1
	260-269	8	100.5
	270-279	16	101.6
	280-289	18	92.4
	290-299	28	97.1
	300-309	23	99.2
	310-319	23	99.9
	320-329	19	93.6
	330-339	10	93.4

	340-349	16	95.8	
	350-359	13	95.4	
	360-369	13	92.0	
	370-379	4	84.5	
	380-389	6	90.5	
	390-399	1	78.5	
Yellow Perch Total		466		95.3
Smallmouth Bass	130-139	1		
	140-149	2		
	150-159	1		
	160-169	1		
	220-229	1	109.5	
	230-239	3	94.7	
	240-249	2	99.3	
	250-259	1	108.6	
	260-269	4	108.5	
	270-279	1	113.4	
	280-289	5	94.9	
	290-299	2	114.2	
	300-309	4	114.2	
	310-319	1		
	320-329	5	101.5	
	330-339	5	95.7	
	340-349	10	103.5	
	350-359	19	99.0	
	360-369	15	97.4	

	370-379	10	98.	
	380-389	10	93.7	
	390-399	7	93.1	
	400-409	4	90.9	
	410-419	3	99.4	
	420-429	4	92.4	
	430-439	8	95.3	
	440-449	3	90.9	
	450-459	1	85.0	
	460-469	6	81.6	
	470-479	1	91.2	
	480-489	1	78.0	
	490-499	1	93.0	
Smallmouth Bass Total			142	98.2
Largemouth Bass	120-129	1		
	130-139	2		
	140-149	5		
	150-159	3		
	160-169	4		
	180-189	1		
	190-199	1		
	210-219	1	118.6	
	220-229	1	114.6	
	230-239	1	156.1	
	240-249	1	112.0	
	250-259	2	134.8	

280-289	1	144.1	
430-439	2	115.3	
Largemouth Bass Total	26		127.7

Table 9. Incremental Relative Stock Densities[1] (RSD) of Smallmouth Bass collected with gill nets in Lake Cascade in October 2015.

Size group	Value
RSD-300	86
RSD-300-400	63
RSD-400	24
RSD-450	3

[1]Stock = 180mm, Quality = 300 mm, Preferred = 400 mm

Table 10. Day length, shift length, and total wait times (minutes) for ice fishing creel survey on Lake Cascade in 2015.

	January (minutes)	February (minutes)
Avg. Day Length	560	625
Shift Length	280	312
North Wait Time*	216	248
South Wait Time*	240	272

*Wait time = Shift length - Travel Time

Table 11. Bus route creel survey access sites and wait times by month on Lake Cascade in 2015.

Lake section	Site #	January wait times	February wait times
North	Boulder Creek Boat Ramp	72	83
North	Poison Creek Boat Ramp	72	83
North	Medicare Point (WGS84=44.639988:116.117687)	72	83
South	Sugarloaf Boat Ramp/Old Hwy Area	103	116
South	Cascade City Boat Ramp Area	103	116
South	Blue Heron Boat Ramp	34	40

Table 12. Catch and harvest rates from creel survey data on Lake Cascade from January 10th through the 31st , 2015.

Section	Species	Catch rate	Harvest rate
North	Yellow Perch	1.37	0.22
	Rainbow Trout	0.0	0.0
South	Yellow Perch	0.41	0.25
	Rainbow Trout	0.04	0.04

Table 13. Catch and harvest rates from ice fishing creel survey data on Lake Cascade from February 1st through 16th, 2015.

Section	Species	Catch rate	Harvest rate
North	Yellow Perch	1.07	0.53
	Rainbow Trout	0.0	0.0
South			
	Yellow Perch	0.17	0.0
	Rainbow Trout	0.0	0.0

Table 14. Estimated ice angler effort and catch by time period and species on North section of Lake Cascade in January and February 2015.

			North section			
			Yellow Perch		Rainbow Trout	
Time period	Day type	Angler effort	Estimated catch	Estimated harvest	Estimated catch	Estimated harvest
1/10-16/15	Weekdays	607.50	832.28	133.65	0.00	0.00
	Weekends	501.12	686.53	110.25	0.00	0.00
1/17-23/15	Weekdays	295.20	404.42	64.94	0.00	0.00
	Weekends	737.37	1010.20	162.22	0.00	0.00
1/24-30/15	Weekdays	681.30	933.38	149.89	0.00	0.00
	Weekends	808.20	1107.23	177.80	0.00	0.00
1/31-2/6/15	Weekdays	30.60	32.74	16.22	1.22	0.00
	Weekends	333.72	357.08	176.87	13.35	0.00
2/7-13/15	Weekdays	0.00	0.00	0.00	0.00	0.00
	Weekends	153.00	163.71	81.09	6.12	0.00
2/14-16/15	Weekdays	0.00	0.00	0.00	0.00	0.00
	Weekends	84.24	90.14	44.65	3.37	0.00
Totals	Weekdays	1614.60	2202.82	364.70	1.22	0.00
	Weekends	2617.65	3414.89	752.88	22.84	0.00
	Total	4232.25	5617.71	1117.58	24.06	0.00

Table 15. Estimated ice angler effort and catch by time period and species on South section of Lake Cascade in January and February 2015.

South section						
			Yellow Perch		Rainbow Trout	
Time period	Day type	Angler effort	Estimated catch	Estimated harvest	Estimated catch	Estimated harvest
1/10-16/15	Weekdays	548.90	225.05	137.23	21.96	21.96
	Weekends	197.12	80.82	49.28	7.88	7.88
1/17-23/15	Weekdays	661.76	271.32	165.44	26.47	26.47
	Weekends	95.70	39.24	23.93	3.83	3.83
1/24-30/15	Weekdays	150.70	61.79	37.68	6.03	6.03
	Weekends	2191.20	898.39	547.80	87.65	87.65
1/31-2/6/15	Weekdays	1096.70	186.44	274.18	0.00	0.00
	Weekends	1961.52	804.22	490.38	78.46	78.46
2/7-8/15	Weekends	0.00	0.00	0.00	0.00	0.00
	Weekdays	2458.06	744.60	614.52	54.45	54.45
	Weekends	4445.54	1822.67	1111.39	177.82	177.82
Totals	Total	6903.60	2567.27	1725.90	232.28	232.28

Table 16. Mean boat and shore angler counts on Lake Cascade on three major holidays; Memorial Day, July 4th, and Labor Day, in 1982, 1991, 1992, 1996 through 2010, and 2014 and 2015 with corresponding intensive creel survey angler hour estimates for 1982, 1991, 1992 and 2009.

	Holiday counts		Estimated angler hours (hours * 1000)		
Year	Avg. boats	Avg. # shore anglers	Boat anglers	Shore anglers	Total pressure[1]
1982	154	85	255.6	129.8	385.4
1986	na	na	212.8	128.2	340.9
1991	41.5	32	135.2	102	237.2
1992	52.5	116	144.2	177.3	321.5
1996	35	27	--	--	--
1997	36.5	19	--	--	--
1998	58	39.5	--	--	--
1999	27	31	--	--	--
2000	15	12	--	--	--
2001	11	12	--	--	--
2002	16.5	12	--	--	--
2003	17	6	--	--	--
2004	23	8.5	--	--	--
2005	28	12.5	--	--	--
2006	25	23	_	_	_
2007	24	28	_	_	_
2008	34	37	_	_	_
2009[2]	29	29	29.2[2]	23.1[2]	52.3[2]

2010	22.5	22	--		--	--
2014	63	54	--		--	--
2015	44	42	--	--		--

[1] Does not include ice fishing hours.

[2] Creel survey from May 15, 2009 thru May 30, 2010

Table 17. Species composition and catch rates from Merwin traps deployed in Lake Cascade during May and June 2015.Species

Species	Total	Percent
Black Crappie	18	0.3
Rainbow Trout	186	3.1
Black Bullhead	2,700	45.0
Tiger muskellunge	40	0.7
Yellow Perch adult	252	4.2
Yellow Perch juvenile	20	0.3
Pumpkinseed Sunfish	67	1.1
Northern Pikeminnow adults (>350 mm)	1630	27.4
Northern Pikeminnow juveniles	538	9.0
Largescale Sucker	488	8.2
Redside Shinner *Richardsonius balteatus*	1	0.01
Kokanee	1	0.01
Mountain Whitefish	4	0.07
Largemouth Bass	2	0.03
Smallmouth Bass	6	0.1
TOTAL	5,953	

Table 18. Total catch of fish collected with gill nets, electrofishing, and trap nets in C. Ben Ross Reservoir in June 2015.

Species	Number collected	Percent of total number	Total weight (kg)	Percent of total weight	Mean relative weight
Largemouth Bass	114	70%	29.7	91.0%	104.2
Bluegill	42	26%	.53	2.0%	121.3
Rainbow Trout	3	2%	1.9	6.0%	108.0
White Crappie	2	1%	.03	0.7%	104.3
Black Crappie	1	1%	.31	0.3%	106.3
Grand Total	162	100%	32.47	100%	

Table 19. Number of fish collected, mean weight, and mean relative weight by species and length group collected in C. Ben Ross Reservoir survey on June 23, 2015.

Species	Length group	Number fish	Mean weight(g)	Mean relative weight
Largemouth Bass	30-39	8	2.0	
	40-49	3	2.0	
	100-109	1	15.0	
	140-149	1	43.0	
	150-159	2	50.0	
	160-169	3	65.7	
	170-179	2	80.0	
	180-189	3	110.0	
	190-199	6	111.5	
	200-209	5	137.6	119.0
	210-219	4	150.0	115.1
	220-229	17	175.6	111.6
	230-239	18	196.5	113.3
	240-249	9	219.0	112.2
	250-259	6	236.0	105.6
	260-269	3	287.7	110.2
	270-279	1	290.0	105.5
	280-289	2	312.5	100.8
	290-299	0		
	300-309	0		
	310-319	1	395.0	86.1
	330-339	5	568.2	105.5
	340-349	2	570.0	95.6
	350-359	2	668.5	102.1
	380-389	1	896.0	109.5
	420-429	2	1182.5	102.3

	430-439	3	1120.0	90.0
	440-449	1	1438.0	103.2
	470-479	1	1450.0	88.7
Largemouth Bass Total		112	265.5	98.11
Bluegill	20-29	1	1.0	
	30-39	5	1.0	
	50-59	5	4.6	
	60-69	5	5.8	
	70-79	3	8.0	
	80-89	1	14.0	
	90-99	2	15.5	
	130-139	1	65.0	125.0
	140-149	1	72.0	130.9
	150-159	1	89.0	115.6
	160-169	1	115.0	113.9
Bluegill Total		26	18.0	121.35
Black Crappie	150-159	1	88.0	
	230-239	1	220.0	104.3
Black Crappie Total		2	154.0	104.3
Rainbow Trout	320-329	2	435.0	114.3
	460-469	1	1060.0	95.3
Rainbow Trout Total		3	643.3	108.0
White Crappie	80-89	1	9.0	
	110-119	1	17.0	106.3
White Crappie Total		2	13.0	106.3
Grand Total		145		

Table 20. Proportional stock densities (PSD), and relative stock densities (RSD) for Largemouth Bass in the protected slot (RSD-slot) and for fish over the slot (406 mm) (RSD > slot) collected during IDFG standard lake surveys in C. Ben Ross Reservoir in 1993 – 2015.

Year	PSD	RSD-slot	RSD >slot
1993	13	13	0
1994	Rule change	Protected slot (306 to 406 mm)	
1996	41	41	0
1999	30	27	0
2004	74	61	1
2010	89	71	17
2015	22	13	8

Table 21. Total length frequencies of Largemouth Bass collected from C. Ben Ross Reservoir in 1993, 1996, 1999, 2004, 2010 and 2015.

Length	Year					
Group (mm)	1993	1996	1999	2004	2010	2015
30	0	0	4	4	8	9
40	0	0	1	15	21	4
50	0	0	0	10	9	0
60	0	0	1	4	7	0
70	0	1	0	1	20	0
80	0	0	0	4	21	0
90	26	3	0	2	10	0
110	6	2	3	0	0	0
120	14	2	0	0	1	0
130	6	0	7	0	2	0
140	7	2	10	2	0	1
150	4	0	6	0	5	2
160	2	0	8	1	1	3
170	2	0	2	1	0	2
180	6	0	3	0	0	3
190	5	0	3	1	0	6
200	5	0	4	0	0	5
210	20	1	8	0	1	4
220	12	0	3	1	0	17
230	9	2	1	0	1	18
240	9	1	2	0	0	9
250	7	0	1	0	0	6

260	5	2	1	1	1	3
270	6	4	3	6	3	1
280	14	5	7	2	0	2
290	8	4	9	4	2	0
300	7	1	4	0	1	0
310	9	2	2	2	2	1
320	1	1	0	3	6	0
330	0	3	1	3	3	5
340	2	1	2	0	8	2
350	0	1	2	4	8	2
360	0	3	1	6	8	0
370	0	1	3	13	3	0
380	0	0	1	7	4	1
390	0	0	2	9	4	0
400	0	0	0	5	6	0
410	0	0	0	1	0	0
420	0	0	0	0	3	2
430	0	0	0	0	1	3
440	0	0	0	0	2	1
450	0	0	0	0	3	0
460	0	0	0	0	0	0
470	0	0	0	0	0	1
	166	38	99	72	79	114

Table 22. Payette Lake kokanee spawner counts and estimated spawning run size and biomass from 1988 through 2015 in the North Fork Payette River.

Year	Peak count	Estimated number of spawners	KG/Lake ha_1	Number/Lake ha_1	Average spawner weight (g)	Average spawner total length (mm)
1988	13,200	22,800	4.6	13.3	346	--
1989	8,400	14,500	2.9	8.4	349	--
1990	9,642	16,700	3.5	9.7	358	--
1991	10,400	18,000	5.3	10.5	505	365
1992	16,945	29,300	6.4	17.1	377	
1993[a]	34,994	59,310	8.5	34.6	245	--
1994	25,550	44,200	5.5	25.8	214	--
1995	32,050	55,450	4.8	32.3	147	260
1996	35,090	60,707	5.7	35.4	162 [c]	--
1997[d]	36,300[e]	64,891	5.6	37.8	148	265
1998	14,585	25,232	2.1	14.7	143	254
1999	15,590	26,971	2.9	15.7	184	276
2000	15,520	26,850	2.9	15.6	188	286
2001[F]	15,690[g]	30,144	4.4	17.6	250[b]	--
2002	9,430	16,314	--	9.5	--	--
2003	5,430	9,394	1.5	5.5	279	--
2004	11,290	19,532	--	11.4	--	--
2005	11,780	20,780	--	12.1	--	--
2006	5,580	9,650	--	5.6	--	317
2007	3,925	6,790	1.6	4.0	401	340
2008	2,425	4,195	--	2.4	--	336

2009	1,290	2,232	--	1.3	--	405
2010	610	1,055	--	0.6	--	416
2011	435	753	--	0.4	--	390
2012	852	1,475	--	0.8	--	376/440[h]
2013	304	526	--	0.3	--	384/458[h]
2014	245	424	--	0.25	--	-
2015	185	320	--	0.19	--	455

[1] 1,717 ha usable kokanee habitat in Payette Lake (Area with depth greater than 40 feet).

[a] Estimate made from stream and weir counts (Frost and Bennett, 1994)

[b] From gill net data of captured spawners in Payette Lake during lake survey.

[c] From trawling collections made in September 1996.

[d] Includes 2,092 fish spawned and removed by Nampa Fish Hatchery.

[e] Does not include 2,092 fish spawned and removed by Nampa Fish Hatchery.

[f] Includes 3,000 fish spawned and removed by Nampa Fish Hatchery.

[g] Does not include 3,000 fish spawned and removed by Nampa Fish Hatchery.

[h] Two distinct age classes.

FIGURES

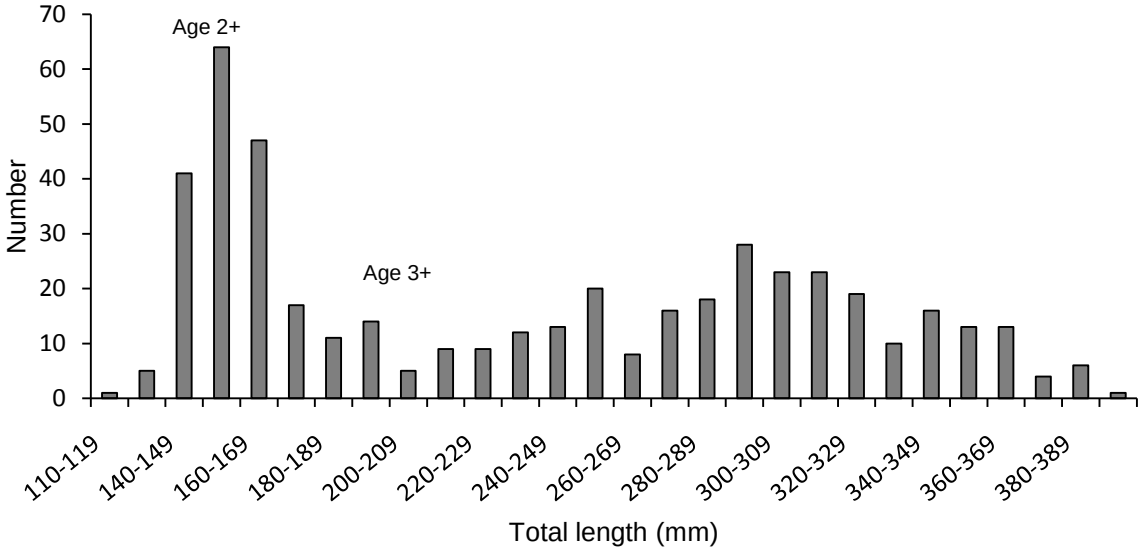


Figure 1. Length-frequency histogram and estimated age of Yellow Perch collected with gill nets in Lake Cascade in October 2015.

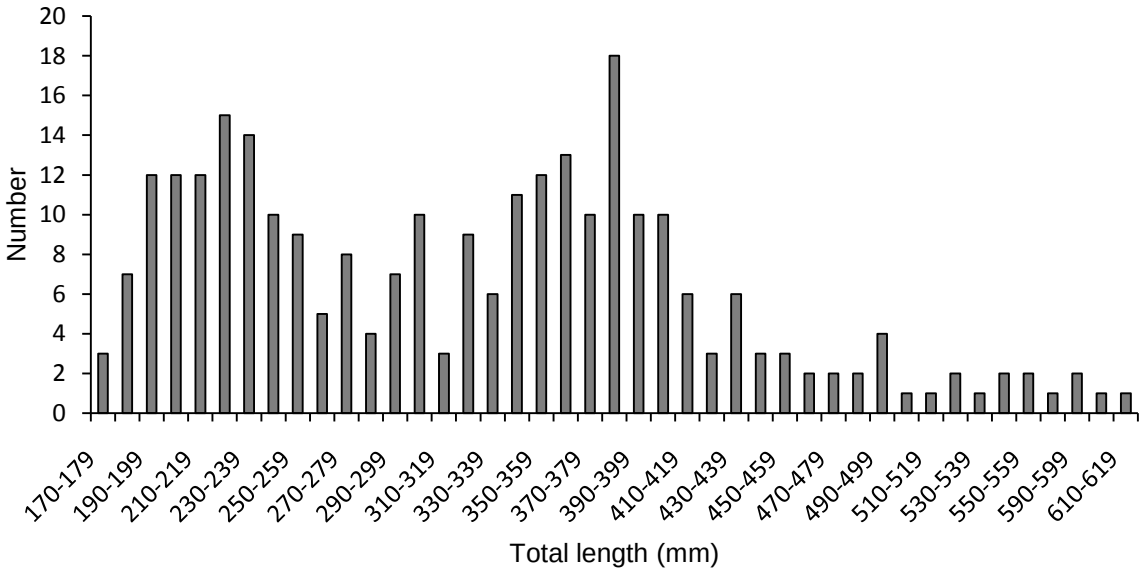


Figure 2. Length-frequency histogram of Northern Pikeminnow collected with gill nets in Lake Cascade in October 2015.

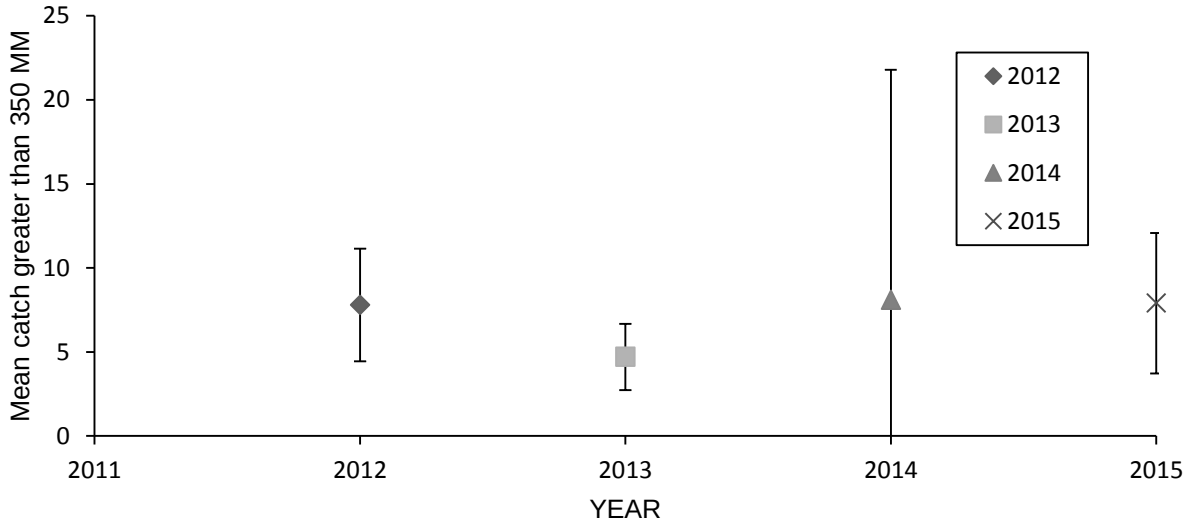


Figure 3. Mean catch of Northern Pikeminnow greater than 350 mm (with 90% confidence intervals) collected with gill nets in Lake Cascade in October 2012, 2013, 2014, and 2015.

APPENDICES

Appendix A. Black Lake/Lake Fork Creek Pesticide Discharge Management Plan

Brook Trout Removal

September 2014 to September 2015

Idaho Dept. of Fish and Game

EPA NPDES Permit #IDG87A415

Contact Dale Allen/Paul Janssen

555 Deinhard Lane

McCall, Idaho 83638

208-634-8137 or 208-634-9600

1. Project Area Description: Lake Fork, beginning at the outlet of Black Lake (headwaters of Lake Fork) (WGS84 Coordinates: 45.189891^{o} N, 116.558165^{o}), approximately 4.8 miles upstream from its confluence from Rapid River, to a natural bedrock drop fish migration barrier 0.4 miles downstream of Black Lake.

2. Target Species: Brook Trout *Salvelinus fontinalis*.

3. Problem Statement: Black lake was part of a larger research study to investigate the stocking of sterile tiger muskellunge to remove nonnative Brook Trout from mountain lakes. Since stocking in 2007, Black Lake gillnetting surveys indicate that the Tiger muskellunge have successfully removed most if not all Brook Trout. However, Brook Trout still occupy the outlet stream where they are inaccessible to muskie. To maximize success of the Brook Trout removal efforts the Department of Fish and Game needs to remove them from the lake outlet, downstream approximately 0.4 miles, to a natural fish migration barrier.

Introduction: Nonnative Brook Trout *Salvelinus fontinalis* populations in high mountain lakes threaten the persistence of native fish and often offer limited fishing opportunity because of stunted growth. Elimination of Brook Trout populations by stocking Tiger muskellunge *Esox lucius x masquinongy* may be an efficient means for eliminating some populations, especially in low complexity habitats. Elimination of Brook Trout populations, which would allow lakes to be restocked with native western salmonids, would contribute to angling quality and conservation efforts. In 2007, the Idaho Department of Fish and Game identified nine alpine lakes containing stunted Brook Trout populations. These lakes were stocked with tiger muskellunge (40 fish/ha) with an average length of 317 mm. Black lake was one of the nine lakes included in this research project.

Successful Brook Trout removal in Black Lake would be an important step in the protection of Bull Trout *Salvelinus confluentus* found in Rapid River. Since stocking in 2007, Black Lake gillnetting surveys indicate that Tiger muskie have successfully removed most if not all Brook Trout from the lake. However, Brook Trout still occupy the outlet stream (Lake Fork) where they are inaccessible to muskie.

To maximize the success of the Brook Trout removal efforts in Black Lake the Department needs to remove the remaining fish from the lake outlet downstream approximately 0.4 miles to a natural, bedrock out cropping, fish migration barrier. Rotenone will be used to remove all fish.

Electrofishing surveys on Lake Fork indicated that only Brook Trout were present down to the fish migration barrier. Only Brook Trout and Cutthroat Trout were found during two additional surveys made 0.35 and 0.6 miles below the barrier (one mile below the Black Lake outlet).

Action Threshold(s): Before all Tiger muskie have died of old age (Within one to two years). The absence of Tiger muskie would allow Brook Trout to reenter and repopulate the lake.

Water Quality: There are no Tier 3 waters in this reach and no known entities use this area for domestic or livestock water.

Alternatives Considered to the Piscicide Treatment:

No Action: If left untreated Brook Trout will re-enter and repopulate Black Lake.

Prevention Education: NA

Mechanical/Physical Methods: Lake Fork is a small stream with a large rubble and boulder substrate and large amounts of woody debris and dead fall timber over it. Mechanical removal of all Brook Trout would be impossible due to all the inaccessible hiding places created by the rocks and woody debris.

Project Implementation: IDFG will use rotenone to remove Brook Trout from the 0.4 miles of Lake Fork above the fish migration barrier. One, two hour treatment via constant flow drip applicator will be made to Lake Fork. The drip applicator will be placed at the Black Lake outlet on Lake Fork. The small marshland area at the outlet/lake interphase and a small spring creek, just above the barrier will be treated via a back pack sprayer.

All spray and other delivery systems will be calibrated prior to treatment projects. All equipment will be capable of measuring the product within tolerance limits specified by industry. A licensed applicator will be on site to conduct the treatment. Guidance for treatment and monitoring protocol will come from the latest literature including Planning and Standard Operating Procedures for the Use of Rotenone in Fish Management document written by Finlayson et al. and printed by the American Fisheries Society and Idaho State Dept. of Agriculture Herbicide/Pesticide application booklets.

Lake Fork flow will be measured the day of the treatment. The treatment will be setup to deliver a concentration of 1 ppm of a 5% rotenone active ingredient formulation. Calculation methods shown below are based on the Product Label for Prentox Synpren Rotenone with 2.5% active synergized rotenone (equal to 5% rotenone).

Stream flow measurements at the lowest downstream target area were 0.14 cfs. Prentox will be metered into the stream via the drip applicator. At a treatment level of 1 ppm rotenone, we would need to apply 0.24 cc's per minute (0.01 gallons in two hours). The back pack sprayer will be loaded with a 10% solution of the rotenone formulation.

Flow measurements of Lake Fork 0.6 miles below the fish barrier were 0.80 cfs, 5.7 times greater than the 0.14 cfs measured at the fish barrier. Therefore, rotenone concentrations in Lake Fork will be diluted to approximately 0.17 ppm within 0.6 miles of the target area.

Additional dilution will be significant downstream of the target area. There are nine perennial side tributaries shown on the USGS topography map between the target area and Rapid River.

In addition, to ensure the safety of endemic salmonid species downstream of the treatment area in Rapid River, we will neutralize the rotenone with a potassium permanganate drip station located at the fish migration barrier. Potassium permanganate (pp) will be applied at a rate of 2:1 ppm to rotenone.

Bio assay/sentinel fish will be placed in a live cage 0.35 miles below the treatment target area. A second pp drip station will be located at the trailhead 0.6 miles below the target area. In the case of observed mortality of sentinel fish the second pp drip station will be started. We expect rotenone concentrations to remain toxic for 20-30 minutes of flow time below the detox dripper.

We will use the following EPA (R10) Pesticide General Permit Best Management Practices when applying pesticides between the high water mark and the water's edge in NMFS Listed Resources of Concern (adopted April 30, 2012).

Best Management Practices (BMPs):

- Do not apply when it is raining or when there is a 75% or greater possibility of rain forecast for the 24-hour period after an application ends. Check the following website: www.noaa.gov for detailed weather forecasts.
- Use the lowest application rate to effectively control the species.
- Treat the minimum area necessary to effectively control the species.
- Do not apply with the spray nozzle aimed towards water.
- Do not spray when wind is blowing towards water.
- Do not spray when wind gusts exceed 8 mph.
- Use a non-hazardous indicator dye to prevent duplicative treatment of an area.
- Apply after the river/creek has crested and the water levels are dropping to ensure waters do not wash pesticides back into the water body.
- Spot spray using the lowest pressure and largest droplet feasible to effectively make the application without having the product run off from the plant to the ground.
- Calibrate spray equipment to ensure proper application rates.
- Drafting equipment for filling spray tanks must be equipped with back siphoning prevention devices.
- Equipment used for transportation, storage or application of chemicals should be maintained in a leak proof condition.
- Do not mix chemicals within 100 feet of surface water unless using a secondary containment system.
- Do not clean equipment within 100 feet of surface water.
- Store only the amount of pesticides needed for anticipated daily use in vehicles parked within 100 feet of surface water.

- When feasible,
    - Direct inject (e.g. basal stem treatment) or use hand application methods instead of machine applications,
    - Prioritize weed species within the waters of the US in regards to treatment,
    - Find and eradicate new and invasive weed species as soon as possible, and
    - Utilize biological control agents if approved, available and effective on target species.

The IDFG policy is to leave dead fish, post treatment, as the nutrient cycling is typically a benefit to Idaho waters (IDFG Lake Renovations Procedures Manual, 1997).

The stream will be walked post treatment to determine species and numbers of fish killed in the target area. Signage will be posted at the treatment site the day of the treatment and until treatment is completed.

The Regional DEQ Watershed Coordinator, U.S. Forest Service- Hells Canyon NRA/Eagle Cap District Ranger, Idaho Department of Agriculture Pesticide Coordinator and County Sheriff's Office will be contacted prior to the treatment.

STREAM AND RIVER MONOGRAPH

USE IN STREAMS AND RIVERS

The following use directions are to provide guidance on how to make applications of Prentox Synpren-Fish Toxicant to streams and rivers. The unique nature of every application site could require minor adjustments to the method and rate of application.

Application Rates and Concentration of Rotenone

Application of Undiluted Material

Prentox Synpren-Fish Toxicant can drain directly into the center of the stream at a rate of 0.85 to 2.4 cc per minute for each cubic foot per second of stream flow. Flow of undiluted Prentox Synpren-Fish Toxicant into the stream should be checked at least hourly. This is equivalent to from 0.5 to 2.0 ppm Prentox Synpren-Fish Toxicant, or from 0.012 to 0.050 ppm rotenone.

Calculation of Application Rate:

X = F (1.692 B) where X = cc per minute of Prentox Synpren-Fish Toxicant to the stream F = the flow rate (cu. ft/sec) (see *Computation of Flow Rate for Stream* section of the label) and B = parts per million desired concentration of Prentox Synpren-Fish Toxicant.

A treatment @ 1 cfs @ 1 ppm undiluted Synpren for 2 hour duration=

X (cc/min) = 1 cfs (1.692 * 1 ppm) = 1.7 cc/minute undiluted Synpren

Total Amount of Product Needed for Treatment:

To determine the total amount of Prentox Synpren-Fish Toxicant required, use the following equation: Y = X (0.0158C). Y = gallons of Prentox Synpren-Fish Toxicant required for the stream treatment, X = cc per minute of Prentox Synpren-Fish Toxicant applied to the stream, C = time in hours of the stream treatment.

Y (gallons) Synpren = 1.7 cc/min (0.0158 * 2 hrs.) = 0.05 gallons Synpren for a 2 hour treatment at 1 ppm @ 1 cfs.

Safety and Emergency Response: All regional offices and Wildlife Management Area headquarters will have appropriate safety gear for employees including Tyvek suits, rubber gloves, goggles, eye wash equipment, etc. There will be neutralizing chemicals (e.g. potassium permanganate) absorbent mats, and staff will know location of floating booms. Appropriate contaminated soil containers will be available at each regional office and will be handled as fitting for the material spilled.

Each facility will also have contact numbers for local emergency response personnel and facilities including Department of Fish and Game (IDFG), Department of Environmental Quality (DEQ), Department of Agriculture (ISDA), local NOAA contact (in areas with anadromous fish) and local EPA contact. Response procedures will be available to all employees of the Idaho Department of Fish and Game in electronic format.

The IDFG Pesticide Management Team for the Lake Fork rotenone treatments will include:

1. Paul Janssen, IDFG, Regional Fishery Biologist, Certified Pesticide Applicator # 43145.
2. Dale Allen, IDFG, Regional Fishery Manager
3. Other IDFG employees trained on pesticide application.

We will use the “reportable quantities” table from the EPA’s pesticide webpage. If the spill exceeds quantities identified by EPA’s website, the spill will then be reported to local emergency responders by the employee or employee’s supervisor based on human health risk, environmental risk and containment needs. we will 1) contain and stop the spill; 2) call 911 and report the incident to local emergency responders; contact the EPA in Boise, Idaho; submit a report to EPA within 30 days.

Depending on the volume, chemical, and the location of the spill; the next calls will be to the employees immediate supervisor to notify them of the chemical spilled, volume spilled, location, risk to human health, and environmental risk. The on-site supervisor/applicator will immediately contact their local supervisor and provide a situation report and response recommendations based on risk to human health and the environment.

The local supervisor will be responsible for calling necessary health care support, local DEQ (or statewide emergency hotline), local ISDA Pesticide/Herbicide regulatory authority, and local EPA contact number – based on the severity of the spill and chemical discharged. Regardless, EPA will be notified within 24 hours and a comprehensive report will be provided to EPA within 30 days.

Contact names, agency, dates and times will be recorded on a standard form by the local supervisor. These are available in electronic format at each regional office. A written report will be completed by the on-site supervisor within 48 hours with distribution to ISDA Pesticide Management Supervisor, the appropriate IDFG Bureau Chief, and the local DEQ office in addition to the EPA. If human health is at risk, the local county fire/ambulance supervisors and Emergency Management agency will receive a copy of the final report.

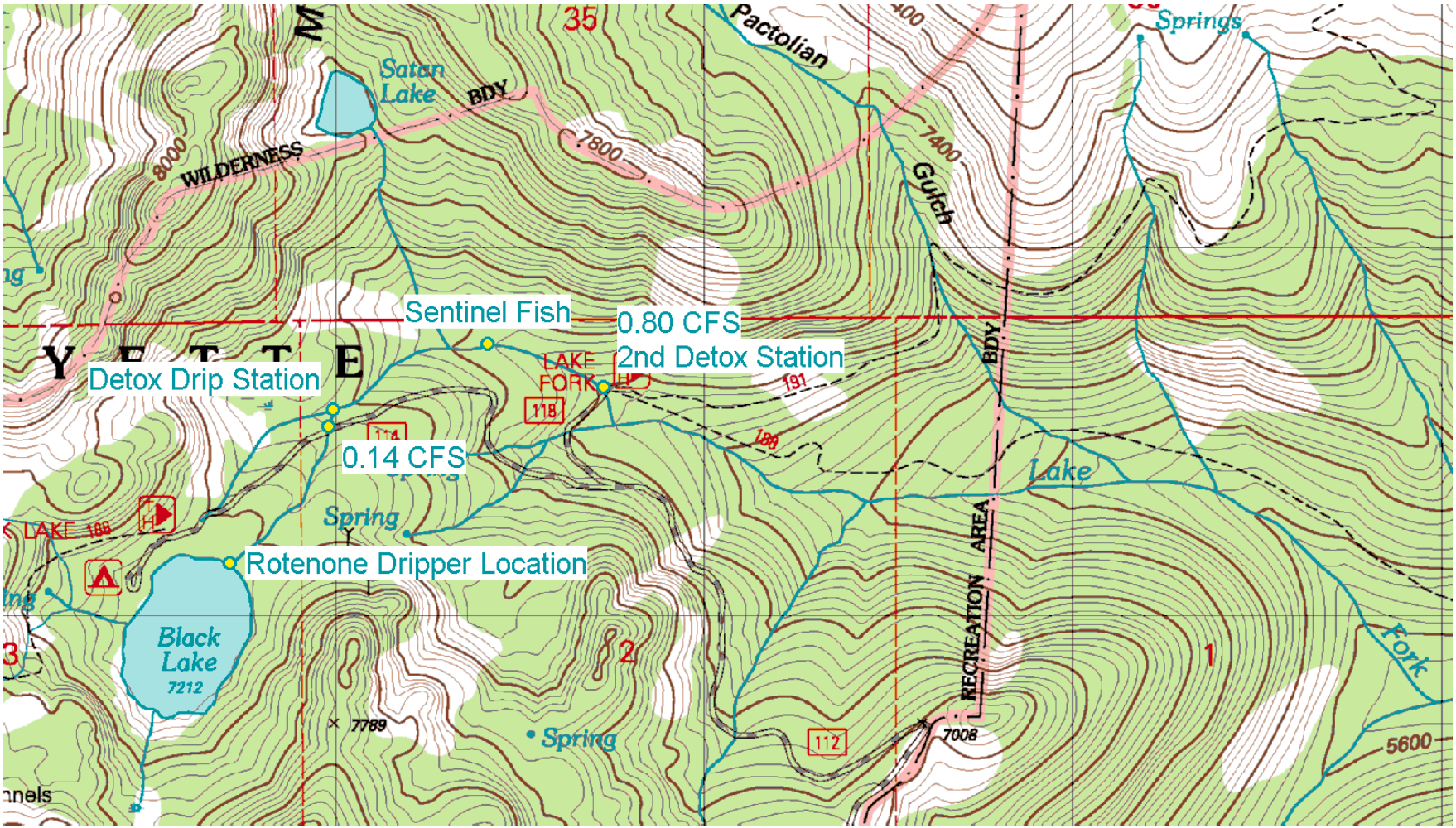
McCall IDFG Sub Region, Emergency response contact list.

Agency	Event	Name	Phone
Idaho Department of Agriculture	Spill/Mishap	Rob Gabehart	332-8608
Idaho Department of Environmental	Spill	Lance Holloway	373-0550

Quality			
Idaho Department of Fish and Game	Any Mishap	Scott Reinecker	850-2206
U.S. EPA	Spill	Dirk Helder	(208) 378-5749
McCall Hospital	Chemical exposure	ER	634-2221
Adams County Sheriff	Spill	Ryan Zollman	911/208-253-4228
NOAA	Spill/Mishap	Dave Mabe	208-378-5697
USFWS	Mishap	Eric Leitzinger/IDFG	208-287-2798

Attachment A - General Location Map

Attachment B.



Idaho Department of Agriculture, Rotenone Application Record

Location of Application: Lake Fork, outlet from Black Lake in Seven Devils and one spring.

Exact coordinates of application sites: 45.189834/116.558013 and 45.193544/116.555087.

Date of Application: August 11, 2015

Time: 1200 thru 2300 Fish Species Targeted: Brook Trout

Brand of Chemical used: Prentiss Prenfish Toxicant EPA Registration #:655-422

Length of Stream Treated: .45 miles Lake Fork Creek and 0.08 miles of a spring creek.

Stream Flow Rate (CFS): 0.2 (0.1 in Lake Fork and 0.1 in spring creek)

Amount of Chem. Applied to Stream: 110 ml, (22 ml @ each of 3 sites on Lake Fork and 44 ml (22 ml X 2 times) on the spring creek).

Area of standing water treated: 0.075 Acre ft.: Amount of Chem. Applied to Standing Water: 48 ml

Application Rate (PPM) and duration: 1 ppm for 2 hours for each drip station on Lake Fork and the spring creek. 0.5 ppm on the Standing water in the log jam at the Black Lake outlet.

Amount of Powder Applied to All Areas: NA

Connected to water with ESA species (Y/N): Yes

Name and License Number of Applicator: Paul Janssen 43145

Name of Property Owner: State of Idaho water.

Wind Speed and Direction: Calm

Person who recommended the Product: Paul Janssen, Idaho Department of Fish and Game

Worker Protection Information Exchange: NA

Comments: The project goal was to remove Brook Trout from the outlet stream of Black Lake (7 Devils) downstream 0.64 km to a natural bedrock fish migration barrier. Tiger muskie had been stocked in Black Lake in 2006 which had removed most if not all of the Brook Trout in the lake. However, large numbers of Brook Trout remained in the outlet stream.

To protect federally listed Bull Trout, known to exist in Lake Fork below Granite Creek and the remote possibility of Chinook Salmon and wild Steelhead also being present we detoxified the rotenone below the barrier with potassium permanganate @ 4 ppm of stream flow. The day prior to the treatment we electrofished Lake Fork 0.85 and 1.3 km below the barrier and observed only Cutthroat and Brook Trout. We also electrofished Lake Fork in September, 2014 at 0.53 and 1.0 km below the barrier and found only cutthroat and Brook Trout.

The day prior to the treatment we measured flows on Lake Fork at the road culvert (above the spring creek and barrier) to be 0.1 cfs and the spring creek to be 0.1 cfs. We also measured Lake Fork flow 0.56 miles below the barrier to be 0.98 cfs (Appendix B).

We placed bio assay fish just above the barrier and 0.53, 1.0 and 1.3 km below the barrier to monitor rotenone effectiveness and detox effectiveness. We setup the rotenone detoxification dripper on the barrier and a backup detox dripper 1.0 km below the barrier.

We started the treatment at 1200 hours spraying diluted and dyed rotenone on the standing water in and around the logs in the log pile at the outlet of Black Lake. Once the dyed rotenone had cleared from the stream outlet we then started the Lake Fork dripper at 1317 hours (set to

deliver 1ppm for 2 hours). We started the spring creek dripper at 1517 hours and the detoxification dripper below the barrier at 1550 hours. The detox dripper was set to run for 5 hours.

After two hours of dripper operation, no bio assay fish had died just above the barrier and no fish were observed dead or moribund above the road for at least 200 m. At 1700 hours we walked the stream from the outlet to determine how far downstream we had killed fish. Dead fish were only observed for a distance of about 200 m below the outlet. It appeared the rotenone had been diluted to where it was no longer effective further downstream.

Lake Fork is a high gradient stream with a large boulder and deadfall substrate which created large numbers of back eddies and pocket water in, around and under these large boulders and logs. After further investigation using fluorescein dye in the stream it was obvious that these back eddies and backwaters were holding enough water for long enough times that fresh water flowing down the thalweg behind the rotenone slug was diluting the rotenone to non-toxic levels as it cascaded downstream.

At this point we determined that booster drippers would be needed to kill the remainder of the stream. The first booster was placed about 200 m below the lake outlet and started at 1730 hours. After observing the same problem (no dead fish) approximately 200 m downstream from the first booster another (2nd) booster was placed approximately 200 m further downstream from the 1st booster and it was started at 2100 hours.

We restarted the spring creek rotenone dripper at 2200 hours to keep all water toxic above the barrier. The detoxification dripper was restarted again at 2215 and ran for 5 hours. At this point however it was obvious, with the increased flows coming from Satan Creek and the dilution issues observed upstream, that downstream fish were not in jeopardy.

At 2300 hours all of the bio assay fish just above the barrier had died, indicating we finally had delivered toxic levels of rotenone throughout the entire stretch of creek above the barrier.

Bioassay fish 0.53 and 1.0 km below the barrier were checked at 0100 and 0630 the next morning and all fish were alive and well.

Appendix B. North Fork Payette River (above Lake Cascade) Pesticide Discharge Management Plan

Northern Pikeminnow and Largescale Sucker Removal

May/June 2015

Idaho Dept. of Fish and Game

EPA NPDES Permit #IDG87A415

Contact Dale Allen/Paul Janssen

555 Deinhard Lane

McCall, Idaho 83638

208-634-8137 or 208-634-9600

4. Project Area Description: Starting approximately 10 miles upstream from Cascade Reservoir (1/4 mile upstream of Smylie Lane Bridge). Zone of toxicity is expect to extend approximately 200 yards into Cascade Reservoir.

5. Target Species: Northern Pikeminnow *Ptychocheilus oregonensis* and Largescale Sucker *Catostomus macrocheilus*.

6. Problem Statement: Habitat conditions and life history characteristics in the North Fork Payette River and Cascade Reservoir favor the listed target species over gamefish species such as rainbow Trout, yellow perch, coho salmon, and kokanee salmon. Target species directly prey on game fish in the reservoir and out-compete game fish for food resources. Surveys of the fish community in the project area have been studied annually from 1998 to 2014.

Introduction: To maximize success of the yellow perch fishery restoration project, IDFG plans to continue removing as many Northern Pikeminnow (NPM) and Largescale Sucker (LSC) from the lake as possible. Although we previously removed a large share of the Lake Cascade; adult spawning, Northern Pikeminnow from the North Fork Payette River (NFPR) in 2004, 2005, and 2006, we did not impact the 4 to 5 age classes of juvenile NPM that remained in the lake. These fish have since matured and are the target of this effort as they migrate up the NFPR to spawn.

We will use rotenone to remove the adult NPM spawning migration up the NFPR. Rotenone will be applied to the NFPR approximately ¼ road miles upstream of the Smylie Lane Road bridge (WGS Coordinates: 44°47'34.79"N / 116° 8'44.71"W) (Attachment A). A two hour treatment will be made twice per week throughout the spawning run migration time period. This typically occurs approximately two weeks before and after the peak in snow runoff stream flows. Because Largescale Suckers compete directly for food and space with yellow perch, rainbow Trout, and coho salmon, reduction in their numbers is also desirable. Therefore, Largescale Suckers also migrating up the NFPR to spawn during this same time frame will be targeted as well in treatments completed weekly in May and June.

The rotenone impact zone will include the NFPR from the application site downstream and through the slack water of Lake Cascade above Tamarack Bridge and possibly into Lake Cascade below Tamarack Bridge a short distance.

Action Threshold(s): Run timing from past trapping and rotenone studies indicate water temperatures of 8^{o} C. will trigger spawning. Once target species are observed at the treatment site piscicide treatments will begin and will continue up to twice weekly until spawning fish can no longer be observed.

Water Quality: There are no Tier 3 waters in this reach and no known entities use this area for domestic or livestock water.

Alternatives Considered to the Piscicide Treatment:

No Action: If unchecked NPM and LSC will dominate the fishery in Cascade Reservoir and the NFPR. In previous years, when piscicides were not used to control target species, game fish number were greatly depressed and sport fishing collapsed on Cascade Reservoir. This negatively affected the local economy in the town of Cascade, Idaho – which is predominantly a recreation based community.

Prevention Education: Efforts to encourage angler harvest of target species through our website and providing educational posters have not demonstrated a population level impact on the target species.

Mechanical/Physical Methods: Mechanical removal of Northern Pikeminnow and Largescale Sucker using large Merwin traps was evaluated in 2004 through 2006 in Lake Cascade. We operated six Merwin traps which were 12 to 16 feet deep with 100 leads and it took two full time personnel to operate them. While we could catch both species we could not catch large enough numbers to have a biological effect on these populations.

Project Implementation: All spray and other delivery systems will be calibrated prior to treatment projects. All equipment will be capable of measuring the product within tolerance limits specified by industry. Licensed applicators will over-see all treatment projects. If projects are subcontracted, documentation of appropriate licenses and training will be part of the bid process. Guidance for treatment and monitoring protocol will come from the latest literature including Planning and Standard Operating Procedures for the Use of Rotenone in Fish Management document written by Finlayson et al. and printed by the American Fisheries Society and Idaho State Dept. of Agriculture Herbicide/Pesticide application booklets.

IDFG will place one rotenone drip station on the North Fork Payette (NFPR) ¼ mile upstream of Smylie Lane Bridge. This site is located downstream of all but two homes to minimize odor and pet problems with dead decaying fish resulting from the treatments. Procedures to minimize impacts to these two homes are given below. We will treat twice weekly to keep migrating fish from moving above our proposed treatment areas and to remove fish frequently enough to prevent them from spawning and returning back to the lake between treatments.

Treatments will be setup to deliver a concentration up to 1 ppm of Prentox Prenfish Toxicant, EPA # 655-422 for two hours. Calculations shown below are based on the product Label for Prentox Prenfish Toxicant. Anticipated flow in the NFPR at treatment will be around 450 cfs. Undiluted chemical will be metered into a perforated mixing barrel lying in the river. A water pump will then pull the mixed solution out of the mixing barrel and into a fire hose and out a nozzle that will broadcast the rotenone over a larger area of the river to accelerate the mixing of the rotenone solution in the river. This will prevent rotenone from running in a single stream down the river for long distances before thoroughly mixing. A licensed professional aquatic pesticide applicator will be on site during actual treatments.

STREAM AND RIVER MONOGRAPH

USE IN STREAMS AND RIVERS

The following use directions are to provide guidance on how to make applications of Prentox Prenfish Toxicant to streams and rivers. The unique nature of every application site could require minor adjustments to the method and rate of application.

Application Rates and Concentration of Rotenone

Application of Undiluted Material

Prentox Prenfish Toxicant can drain directly into the center of the stream at a rate of 0.85 to 2.4 cc per minute for each cubic foot per second of stream flow. Flow of undiluted Prentox Prenfish Toxicant into the stream should be checked at least hourly. This is equivalent to from 0.5 to 2.0 ppm Prentox Prenfish Toxicant, or from 0.012 to 0.050 ppm rotenone.

Calculation of Application Rate: X = F (1.692 B)

where X = cc per minute of Prentox Prenfish Toxicant to the stream F = the flow rate (cu. ft/sec) (see *Computation of Flow Rate for Stream* section of the label) and B = parts per million desired concentration of Prentox Prenfish Toxicant.

Total Amount of Product Needed for Treatment: Y = X (0.0158C)

To determine the total amount of Prenfish Toxicant required, use the following equation:

Y = gallons of Prenfish Toxicant required for the stream treatment, X = cc per minute of Prenfish Toxicant applied to the stream, C = time in hours of the stream treatment.

Therefore, if treating at 450 cfs @ 1 ppm undiluted Prenfish Toxicant for 2 hours duration:

X cc/min = 450 cfs (1.692 * 1 ppm) = 761 cc/minute undiluted Prenfish Toxicant

Y gallons Prenfish Toxicant = 761 cc/min (0.0158 * 2 hrs.) = 24.1 gallons.

Based on observations made during IDFG rotenone treatments in the NFPR in 2004, 2005, 2006 and 2010 we expect rotenone concentrations to remain toxic down to and into the pool of water

above Tamarack Bridge where rotenone should be diluted to nontoxic levels in a short period of time. However if the slug of treated water does not mix thoroughly in this pool we could see fish kills a short distance into Lake Cascade. The treatments on the NFPR will cover a distance of approximately 10 river miles. Prior treatments in 2004, 2005, 2006, and 2010 effectively killed all NPM and Suckers in a two hour time frame within the target area at a concentration of 1 to 1.5 ppm of rotenone product. Therefore, 1 to 1.5 ppm of rotenone product will be utilized in the 2015 treatments.

We intend to work with the District 65 irrigation district to reduce flows in the NFPR during treatment periods to reduce rotenone needs and increase dilution rates post treatment. USGS flow gauging station data will be utilized to determine river flows and subsequent rotenone needs. Flow data collected in April 2013 indicated that flows from other sources between the Payette Lake Dam and the rotenone application site added 100 cfs to river flows. Therefore we will add 100 cfs to the McCall USGS gauging station flow estimates to calculate flows at the application site (Smylie Bridge). Below are expanded calculations of gallons of rotenone product required for various flows, treating at 1 ppm, using the above formulas taken directly from the Product label.

a. 200 cfs = 10.7 gallons
b. 300 cfs = 16.1 gallons
c. 450 cfs = 24.1 gallons

The IDFG policy is to leave dead fish, post treatment, as the nutrient cycling is typically a benefit to Idaho waters (IDFG Lake Renovations Procedures Manual, 1997). However, there are two homes below and within ¾ mile below Smylie Lane Bridge where decaying fish and the offensive odor have become a problem in past treatments. Therefore, this stretch of river will be patrolled after each treatment and all dead fish lying out of the water will be move to deeper water or moved downstream of the houses and disposed of in the river. All other odor and dead fish complaints will be dealt with in a similar manner. This should drastically eliminate odor problems and problems with pets getting into dead fish.

Success monitoring will be accomplished by two kayakers floating for about 6 miles downstream of the mixing zone counting dead target and non-target species. If fish kill is high subsections will be counted and expanded to the whole reach to estimate fish numbers.

Two public notices were printed in the McCall Star News on May 12 and May 20, 2015. Signage will be posted at the treatment site, Smylie Bridge and Tamarack Bridge the day before and until 24 hours after application.

The Regional DEQ Watershed Coordinator, Idaho Department of Agriculture Pesticide Coordinator and County Sheriff's Office will be contacted prior to treatments in case they get calls about a fish kill.

Safety and Emergency Response: All regional offices and Wildlife Management Area headquarters will have appropriate safety gear for employees including Respirators, Tyvek suits, rubber gloves, goggles, eye wash equipment, etc. There will be neutralizing chemicals (e.g. potassium permanganate) absorbent mats, and staff will know location of floating booms. Appropriate contaminated soil containers will be available at each regional office and will be handled as fitting for the material spilled.

Each facility will also have contact numbers for local emergency response personnel and facilities including Department of Fish and Game (IDFG), Department of Environmental Quality (DEQ), Department of Agriculture (ISDA), local NOAA contact (in areas with anadromous fish) and local EPA contact. Response procedures will be available to all employees of the Idaho Department of Fish and Game in electronic format.

The IDFG Pesticide Management Team for the North Fork Payette River rotenone treatments will include:

4. Paul Janssen, IDFG, Regional Fishery Biologist, Certified Pesticide Applicator # 43145.
5. Dale Allen, IDFG, Regional Fishery Manager
6. Other IDFG employees trained on pesticide application.

We will use the "reportable quantities" table from the EPA's pesticide webpage. If the spill exceeds quantities identified by EPA's website, the spill will then be reported to local emergency responders by the employee or employee's supervisor based on human health risk, environmental risk and containment needs. we will 1) contain and stop the spill; 2) call 911 and report the incident to local emergency responders; contact the EPA in Boise, Idaho; submit a report to EPA within 30 days.

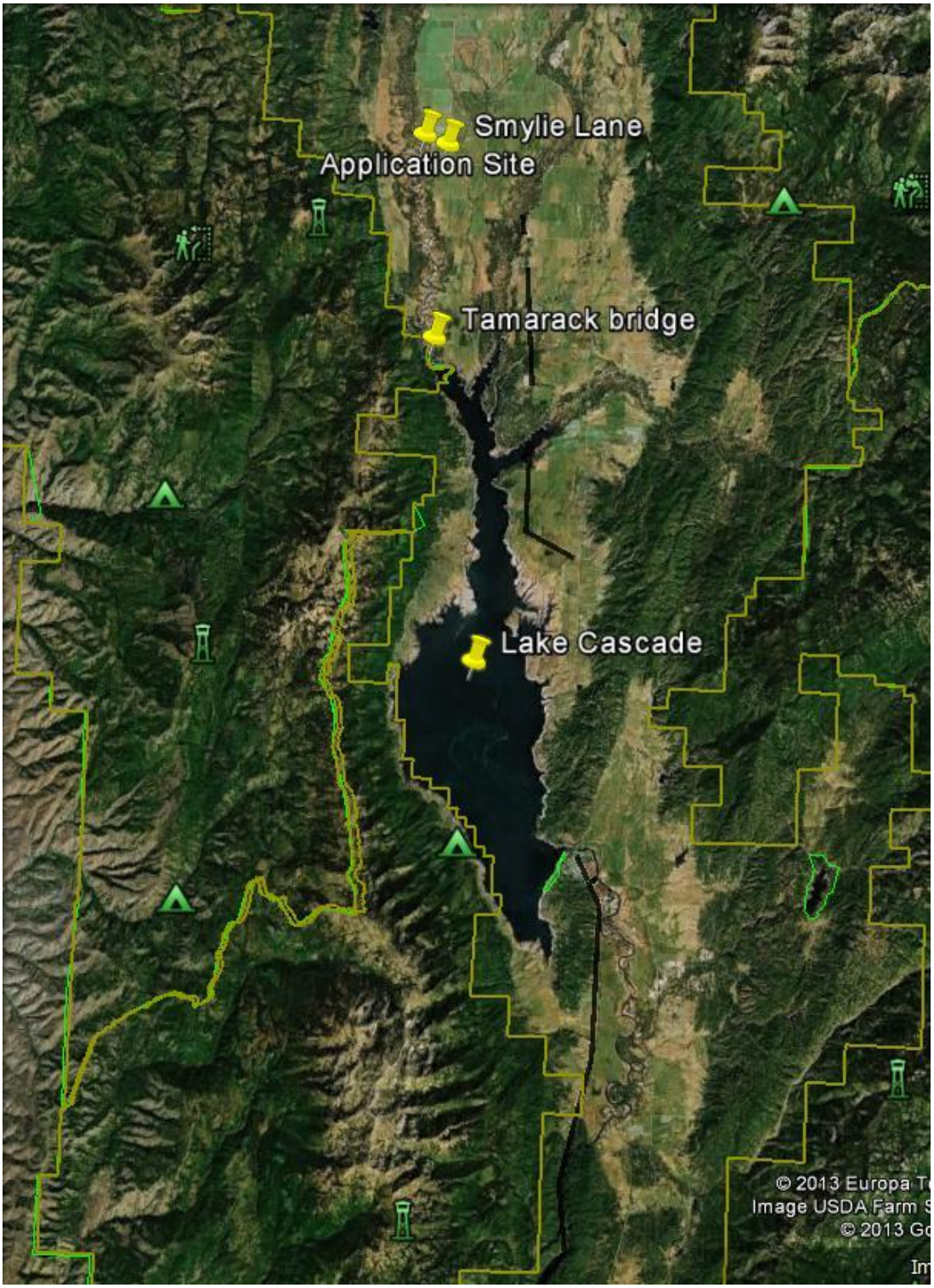
Depending on the volume, chemical, and the location of the spill; the next calls will be to the employees immediate supervisor to notify them of the chemical spilled, volume spilled, location, risk to human health, and environmental risk. The on-site supervisor/applicator will immediately contact their local supervisor and provide a situation report and response recommendations based on risk to human health and the environment. The local supervisor will be responsible for calling necessary health care support, local DEQ (or statewide emergency hotline), local ISDA Pesticide/Herbicide regulatory authority, and local EPA contact number – based on the severity

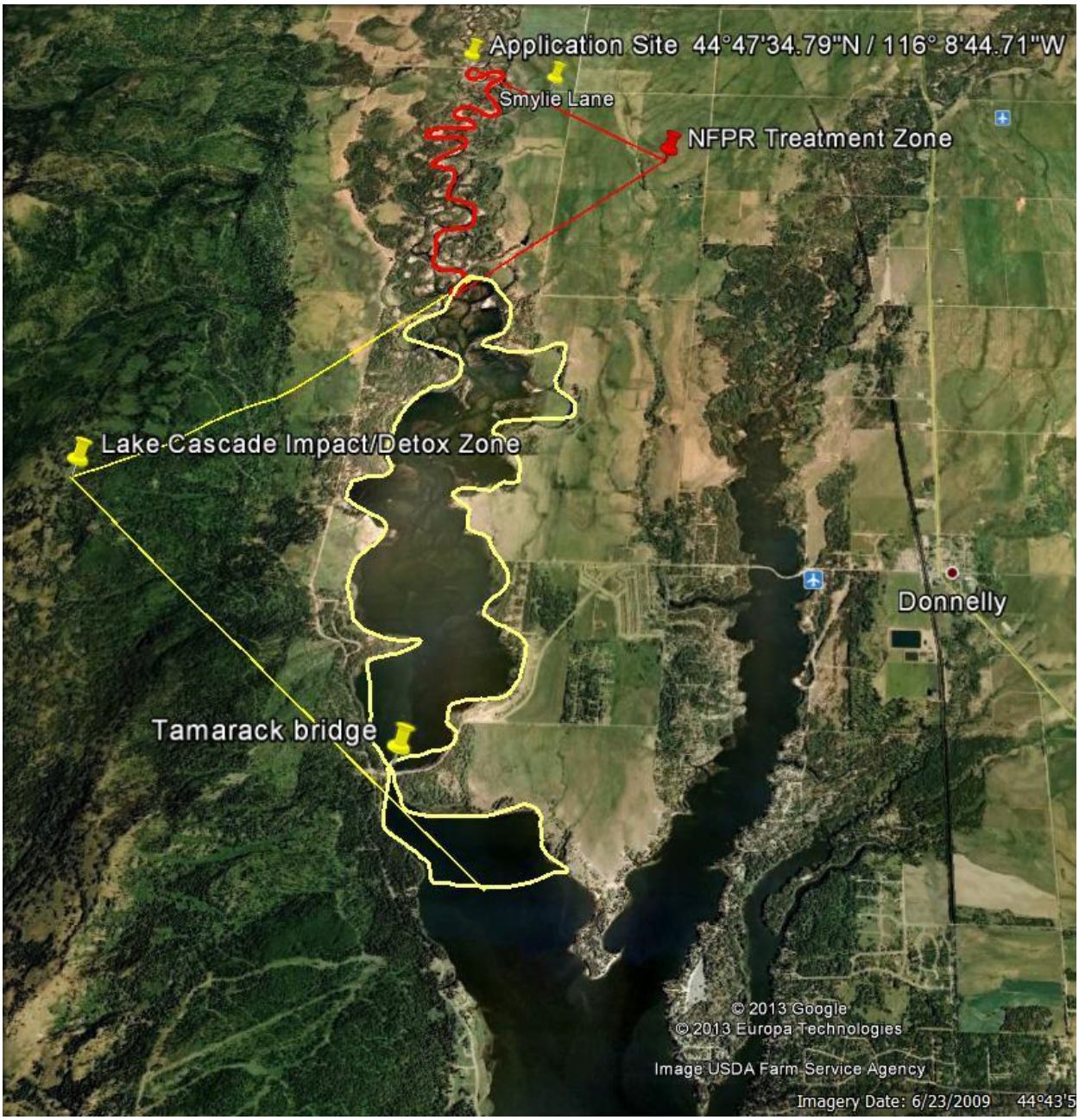
of the spill and chemical discharged. Regardless, EPA will be notified within 24 hours and a comprehensive report will be provided to EPA within 30 days. Contact names, agency, dates and times will be recorded on a standard form by the local supervisor. These are available in electronic format at each regional office. A written report will be completed by the on-site supervisor within 48 hours with distribution to ISDA Pesticide Management Supervisor, the appropriate IDFG Bureau Chief, and the local DEQ office in addition to the EPA. If human health is at risk, the local county fire/ambulance supervisors and Emergency Management agency will receive a copy of the final report.

McCall IDFG Sub Region, Emergency response contact list.

Agency	**Event**	**Name**	**Phone**
Idaho Department of Agriculture	Spill/Mishap	Rob Gabehart	332-8608
Idaho Department of Environmental Quality	Spill	Lance Holloway	373-0550
Idaho Department of Fish and Game	Any Mishap	Scott Reinecker	850-2206
U.S. EPA	Spill	Dirk Helder	(208) 378-5749
U.S. BOR	Property Owner	Mike Wissenbach	382-6544
McCall Hospital	Chemical exposure	ER	634-2221
Valley County Sheriff	Spill	Patti Bolen	911 or /382-7160

Attachment A – General Location Maps




Application Site 44°47'34.79"N / 116° 8'44.71"W
Smylie Lane
NFPR Treatment Zone
Lake Cascade Impact/Detox Zone
Donnelly
Tamarack bridge
© 2013 Google
© 2013 Europa Technologies
Image USDA Farm Service Agency
Imagery Date: 6/23/2009 44°43'5

Idaho Department of Agriculture, Rotenone Application Record

Location of Application: North Fork Payette River ¼ mile upstream from Smylie Lane Bridge.

Exact coordinates of application site: “44º_47’34.79” N , 116º_8’44.71”

Date of Application: 5/29, 6/2, and 6/6/15

Time: 0830-2000 (Time varied each treatment day) Fish Species Targeted: Northern Pikeminnow and Largescale Suckers

Brand of Chemical used: Prentox Synpren-Fish Toxicant EPA Registration #:655-422

Length of Streams Treated: Approximately 4.5 miles until stream entered Lake Cascade where chemical was diluted to nontoxic levels.

Stream Flow Rate (CFS): 300 cfs Amount of Chem. Applied to Stream: 20.1 gallons.

Area of standing water treated: NA Amount of Chem. Applied to Standing Water:

Application Rate (PPM) and duration: 1.0 ppm, 510 cc/minute for 2.5 hours.

Amount of Powder Applied to All Areas: NA

Connected to water with ESA species (Y/N): No

Name and License Number of Applicator: Paul Janssen 43145

Name of Property Owner: State of Idaho water.

Wind Speed and Direction: Maximum wind speed of 3.4 mph from N @ 18:46.

Person who recommended the Product: Paul Janssen, Idaho Department of Fish and Game

Worker Protection Information Exchange: NA

Comments: A metered flow via a constant flow dripper barrel (Design C Rotenone SOP Manual) of 510 cc/min. of undiluted Prentox drained from a hose into a mixing barrel placed in the stream. The mixture was then pumped out of the mixing barrel and and broadcast sprayed over a large area of the stream width to maximize mixing rate. When wind speeds exceeded 10 mph the mixture was sprayed directly back into the river to eliminate rotenone drift.

NFPR flows at Lardo Dam were decreased by the irrigation Co. to 200 cfs and then 100 cfs were added to the treatment calculations to allow for side tributaries, rain and irrigation runoff, and drainage out of the river banks after dropping the flows. This allowed us to insure adequate concentrations of rotenone. With this scenario even if flows did not increase any between Lardo Dam and the treatment site we would still be well within the label treatment rates.

Previous studies indicated that it takes nine hours for flows to drop at the treatment site after flows are dropped at Lardo Dam. Therefore, flows out of Lardo Dam were decreased to the target flow of 200 cfs nine hours prior to scheduled treatment time and kept at that flow for approximately nine hours.

Within ½ hour of the beginning of the treatments large numbers of moribund and dead fish were observed floating down the river below the rotenone introduction site. Within two to 24 hours after the treatments were completed the river was floated to count dead fish. However, few dead fish were observed in the river as high flows during and after treatments had flushed dead fish out of the river, where they could be counted, and into deeper water in the lake proper making fish kill estimates impossible.

Appendix C. Horsethief Reservoir Pesticide Discharge Management Plan

Black Bullhead *Ameiurus melas* Removal

October 2015

Idaho Dept. of Fish and Game

EPA NPDES Permit #IDG87A415

Contact Dale Allen/Paul Janssen

555 Deinhard Lane

McCall, Idaho 83638

208-634-8137 or 208-634-9600

7. Project Area Description: Horsethief Reservoir is owned and operated by the Idaho Department of Fish and Game (IDFG). The dam location coordinates are 44.504612 N: 115.922271 S. It was constructed in 1963. The reservoir is maintained at a full pool year around. At full pool the reservoir contains 4,900 acre-feet of water with a surface area of 270 acres and sits at an elevation of 5,056 feet. The reservoir is managed by IDFG strictly as a trout fishery and is stocked annually with Rainbow and Brown Trout.

8. Target Species: Black Bullhead *Ameiurus melas*.

9. Problem Statement: Black Bullhead were reported being caught by anglers in Horsethief Reservoir during the summer of 2014. Subsequent gillnetting surveys in the fall of 2014 confirmed the presence of large numbers of Black Bullheads. Bullheads have never been introduced into Horsethief by IDFG but are the result of an illegal introduction. Bullheads compete directly with trout for food which will eventually result in poor growth and survival rates of stocked trout. Bullheads also compete with trout for anglers' baits thereby reducing catch rates of the more desirable trout. Bullheads jeopardize the entire trout fishery in Horsethief Reservoir. Horsethief Reservoir has been treated four times since 1983 to remove illegally introduced Yellow Perch.

Introduction: Horsethief Reservoir is owned and operated by the Idaho Department of Fish and Game (IDFG). It was constructed in 1963 and is managed as a trout fishery. The reservoir is maintained at a full pool year around. At full pool the reservoir contains 4,900 acre-feet of water with a surface area of 270 acres. Rainbow Trout and Brown Trout are stocked annually to maintain the trout fishery in Horsethief Reservoir.

Yellow perch were first reported in Horsethief Reservoir in 1981, the result of an illegal introduction. By 1983 they totally dominated the fishery and were then chemically eradicated with rotenone in the fall of 1983. Following treatment the reservoir was restocked with trout and trout fishing was again excellent until 1993.

Yellow perch were again reported being caught in Horsethief Reservoir in 1993. By 1995 yellow perch totally dominated the fishery and were again chemically removed in the fall of 1995.

Yellow perch were again documented in 1997. We chemically eradicated all fish from the lake again in 1999 and by 2003 yellow perch were again documented present in the lake. Trout fishing deteriorated rapidly in 2006 and the reservoir was drained and treated again that fall.

No Yellow Perch have been observed since 2006. However, Black Bulkheads were reported being caught by anglers in 2014 and gillnetting surveys in fall 2014 confirmed the presence of large numbers of bullheads.

Bullheads compete with trout for the same food items and if left unchecked their numbers will continue grow. This will result in a stunted bullhead population and poor growth, survival, and quality of stocked trout. Trout catch rates will also decline as their numbers decline and because bullheads will compete with trout for angler baits.

Action Threshold(s): Before trout catch rates, survival and quality declines due to ever increasing bullhead numbers.

Water Quality: There are no Tier 3 waters in Horsethief Reservoir or its drainage and no known entities use the area above the dam for domestic or livestock water (Lake outlet will be closed just prior to treatment and will prevent any water from flowing downstream of dam) .

Alternatives Considered to the Piscicide Treatment:

No Action: If left untreated bullheads will significantly impact the trout fishery in the reservoir.

Prevention Education: NA

Mechanical/Physical Methods: No known mechanical removal efforts have been successful for removing bullhead populations. They are very prolific and can repopulate quickly without total elimination.

Biological Controls: None known

Project Implementation: IDFG will use rotenone to remove Black Bullhead from Horsethief Reservoir and 1/3 mile of Horsethief Creek.

The reservoir outlet will be opened on September 8, 2015 and is expected to completely drain by mid October 2015. Only Horsethief Creek, two or three small tributaries and a few pot holes within the reservoir boundary are expected to retain water.

The main creek channel (Horsethief Creek) downstream to the dam outlet gate will be treated with a drip station located just above the road culvert approximately 1/3 mile east of the reservoir (Attachments A and B). This will remove any bullheads that may have entered the lower section of Horsethief Creek above the reservoir proper. Other tributaries to Horsethief Creek found within the lake proper will be treated in a similar fashion.

As per label; if water flow travel time from the upper drip station to the reservoir outlet is greater than one hour, “booster” drip stations will be utilized to maintain lethal concentrations of rotenone in the stream. Stream flow times to the outlet will be measured prior to treatment. The lowest downstream dripper will also be charged (in addition to the stream flow volume) to treat the volume of water in any remaining pools outside of the stream channel at 4 ppm rotenone product.

Flow timing measurements of Horsethief Creek made just prior to the treatment day will be used to determine how long it will take for the rotenone plume to reach the outlet from the uppermost dripper station. The reservoir outlet will be closed after the calculated time has elapsed. Some of the rotenone plume may go through the dam just prior to closing the gate. Therefore some fish kill may occur below the dam. However, once the outlet is closed the flows drop to zero and any fish killed with rotenone would have succumbed to stream dewatering as well.

Small remaining pools, springs, seeps, etc will be treated via backpack sprayer application loaded with a 2% rotenone solution. One larger pool will treated via backpack sprayer or boat and pump sprayer.

Exact flows and volume of remaining pools will be measured a day or two prior to the treatment date. Due to the resistant nature of bullheads to rotenone and to the mud and organic debris of the drained reservoir bottom and the cutting of sediment by the creek as the reservoir drains we will treat at the maximum label rotenone concentration (4 ppm) for tolerant species in organic ponds.

All spray and other delivery systems will be calibrated prior to treatment projects. All equipment will be capable of measuring the product within tolerance limits specified by industry. A licensed applicator will be on site to conduct the treatment. As per label instructions, guidance for treatment and monitoring protocol will come from the 2010, American Fisheries Society's "Planning and Standard Operating Procedures for the Use of Rotenone in Fish Management" document by Finlayson et al.

The IDFG policy is to leave dead fish, post treatment, as the nutrient cycling is typically a benefit to Idaho waters (IDFG Lake Renovations Procedures Manual, 1997).

Placarding of the treatment area will be posted one day prior to treatment and remain until the treatment is completed.

The Regional DEQ Watershed Coordinator, Idaho Department of Agriculture Pesticide Coordinator and County Sheriff's Office will be contacted prior to the treatment.

Safety and Emergency Response: All regional offices and Wildlife Management Area

headquarters will have appropriate safety gear for employees including Tyvek suits, rubber gloves, goggles, eye wash equipment, etc. There will be neutralizing chemicals (e.g. potassium permanganate) absorbent mats, and staff will know location of floating booms. Appropriate contaminated soil containers will be available at each regional office and will be handled as fitting for the material spilled.

Each facility will also have contact numbers for local emergency response personnel and facilities including Department of Fish and Game (IDFG), Department of Environmental Quality (DEQ), Department of Agriculture (ISDA), local NOAA contact (in areas with anadromous fish) and local EPA contact. Response procedures will be available to all employees of the Idaho Department of Fish and Game in electronic format.

The IDFG Pesticide Management Team for the Lake Fork rotenone treatments will include:

7. Paul Janssen, IDFG, Regional Fishery Biologist, Certified Pesticide Applicator # 43145.
8. Dale Allen, IDFG, Regional Fishery Manager
9. Other IDFG employees trained on pesticide application.

If a rotenone spill should occur we will use the “reportable quantities” table from the EPA’s pesticide webpage. If the spill exceeds quantities identified by EPA’s website, the spill will then be reported to local emergency responders by the employee or employee’s supervisor based on human health risk, environmental risk and containment needs. We will 1) contain and stop the spill; 2) call 911 and report the incident to local emergency responders; contact the EPA in Boise, Idaho; submit a report to EPA within 30 days.

Depending on the volume, chemical, and the location of the spill; the next calls will be to the employees immediate supervisor to notify them of the chemical spilled, volume spilled, location, risk to human health, and environmental risk. The on-site supervisor/applicator will immediately contact their local supervisor and provide a situation report and response recommendations based on risk to human health and the environment.

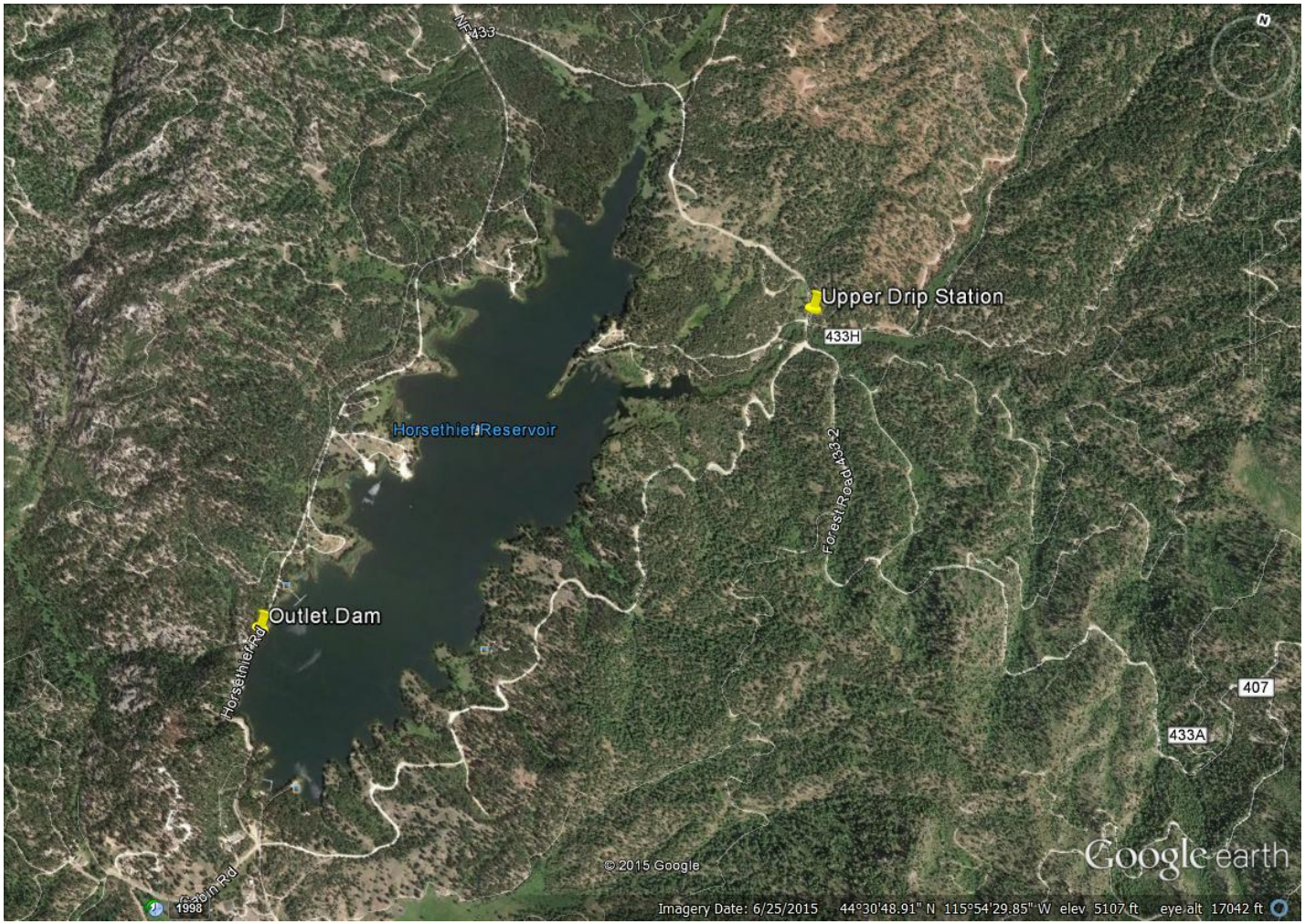
The local supervisor will be responsible for calling necessary health care support, local DEQ (or statewide emergency hotline), local ISDA Pesticide/Herbicide regulatory authority, and local EPA contact number – based on the severity of the spill and chemical discharged. Regardless, EPA will be notified within 24 hours and a comprehensive report will be provided to EPA within 30 days.

Contact names, agency, dates and times will be recorded on a standard form by the local supervisor. These are available in electronic format at each regional office. After a spill event a written report will be completed by the on-site supervisor within 48 hours with distribution to ISDA Pesticide Management Supervisor, the appropriate IDFG Bureau Chief, and the local DEQ office in addition to the EPA. If human health is at risk, the local county fire/ambulance supervisors and Emergency Management agency will receive a copy of the final report.

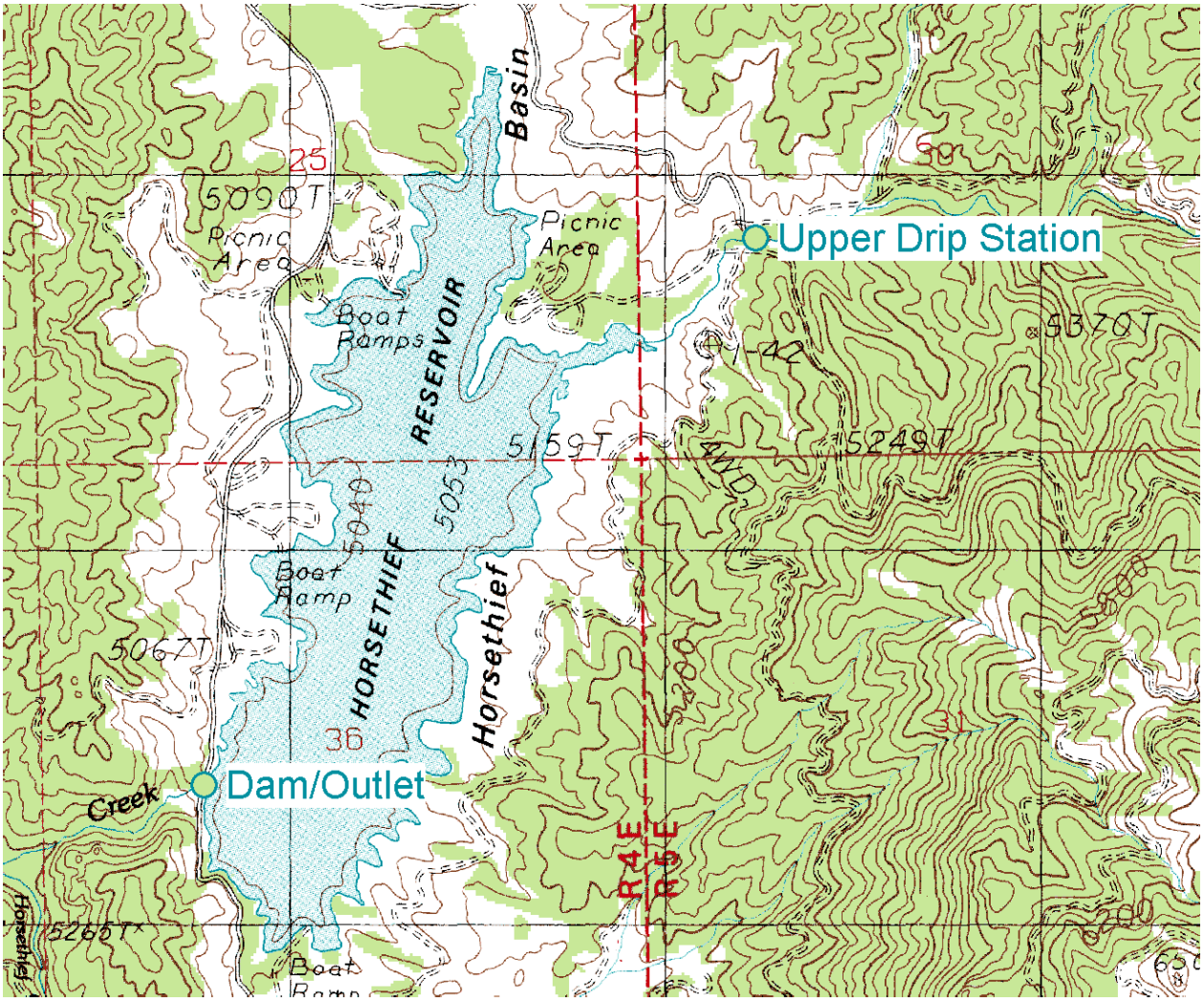
McCall IDFG Sub Region, Emergency response contact list.

Agency	Event	Name	Phone
Idaho Department of Agriculture	**Spill/Mishap**	**Rob Gabehart**	**332-8608**
Idaho Department of Environmental Quality	**Spill**	**Lance Holloway**	**373-0550**
Idaho Department of Fish and Game	**Any Mishap**	**Scott Reinecker**	**850-2206**
U.S. EPA	**Spill**	**Dirk Helder**	**(208) 378-5749**
McCall Hospital	**Chemical exposure**	**ER**	**634-2221**
Valley County Sheriff	**Spill**	**Patti Bolen**	**911/382-7160**

Attachment A - General Location Map



Attachment B.



Idaho Department of Agriculture, Rotenone Application Record

Location of Application: Horsethief Reservoir

Exact coordinates of application site: 44.504178 W / 115.919081N

Date of Application: 10/28/15

Time: 0900 - 2100 Fish Species Targeted: Black Bullhead *Ameiurus melas*

Brand of Chemical used: Prentiss Prenfish Toxicant EPA Registration #: 655-422

Length of Streams Treated: 0.32 miles above reservoir and 2.7 miles within reservoir proper.

Stream Flow Rates (CFS):

Horsethief Creek at dam outlet: 5 cfs (three, eight hour drippers @ 4.3 gallons, within Reservoir high water mark)

Horsethief Creek at Reservoir High water mark: 1 cfs (one, eight hour dripper @ 0.87 gallons, road culvert)

NF Horsethief Creek: 0.21 cfs (one eight hour dripper @ 0.2 gallons, within high water mark)

SF Horsethief Creek (Spring): 0.14 cfs (one, four hour dripper @ 0.06 gallons, within high water mark)

Total Amount of Chemical Applied to Streams: 14 gallons

Area of standing water treated: 1.14 Ac Ft. pool plus seeps and springs all sprayed with back pack sprayers.

Amount of Chem. Applied to Standing Water: 1.7 Gal

Application Rate (PPM) and Dripper Duration: 4 ppm for 8 hours

Amount of Powder Applied to All Areas: NA

Connected to water with ESA species (Y/N): No

Name and License Number of Applicator: Paul Janssen 43145

Name of Property Owner: State of Idaho water.

Wind Speed and Direction: Calm

Person who recommended the Product: Paul Janssen, Idaho Department of Fish and Game

Worker Protection Information Exchange: NA

Methods: We placed four rotenone drippers on Horsethief Creek beginning at the County road creek crossing. The highest upstream dripper was charged with 0.87 gallons of rotenone to treat the 1.0 cfs flow measured at the Reservoir's high water mark. From the dripper located at the reservoir high water mark, a booster dripper was placed downstream at each one hour flow interval on Horsethief Creek until no more than one hour flow time remained between dripper and the outlet gate. Flow times were greater than one hour from the County road to the high water mark of the reservoir and two and a half hours from the high water mark to the dam outlet. Flow times were measured using rhodamine dye.

To compensate for increasing flows, high organic content and high mud and silt load from down cutting as a result of draining the reservoir all three Horsethief Creek drippers at or below the high water mark were charge to treat the creek flow measured at the dam outlet of 5 cfs at 4 ppm. This would ensure a concentration of 4 ppm through the entire reservoir.

One dripper was placed on NF Horsethief Creek dripper. Flow time from the dripper to Horsethief Creek exceeded one hour.

All drippers in Horsethief and NF Horsethief Creeks were run continuously for eight hours. The south spring creek dripper was run for four hours.

There was a 1.14 ac ft. pool on the North end of the Reservoir that did not drain. It was treated with 1.5 gallons of Prenfish. Seeps and a small spring creek upstream of the small pond were treated with a 2% solution of Prenfish with back pack sprayers. We also sprayed the small pool below the dam spillway and the gate outlet pool.

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