FISHERY MANAGEMENT INVESTIGATIONS

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2012 Southwest Region – McCall Fishery Management Report

LOWLAND LAKES

Abstract

We completed angler use and creel surveys on Rowland Pond, Little Payette Lake and Brundage Reservoir in 2012. Angler effort on Rowland Pond, from May 12 to October 10, 2012, was estimated to be 10,928 hours. We estimated a total catch of 14,399 Rainbow Trout *Oncorhynchus mykiss* and a total harvest of 8,320 (58%). The average catch rate was 1.32 trout/hour. We completed a creel survey on Little Payette Lake from May 12 to October 10 in 2012. Anglers spent an estimated 6,687 hours catching a total of 298 Kokanee *Oncorhynchus nerka kennerlyi*, 334 Rainbow Trout, and 1,042 Smallmouth Bass *Micropterus dolomieu*, for a total of 1,674 fish. A total of 871 fish were harvested (268 Kokanee, 334 Rainbow Trout, and 269 Smallmouth Bass). Total angling pressure and catch on Little Payette Lake was lower in 2012 than the 1990 estimate of 9,360 angler hours and 3,732 game fish caught. Brundage Reservoir angler effort was estimated to be 4,625 hours from June 19 to October 10, 2012. Anglers caught 1,035 Rainbow Trout and 1,066 westslope Cutthroat Trout *Oncorhynchus clarkii lewisi* with an average catch rate of 0.45 trout/hour. Total harvest on Brundage Reservoir was 138 fish (6.5%) (68 Rainbow Trout and 70 Cutthroat Trout).

We completed angler vehicle and angler use surveys on C. Ben Ross Reservoir and Fischer Pond respectively, using trail camera photos taken every four hours. We estimated a total of 999 vehicle hours on C. Ben Ross Reservoir of which 301 and 328 hours were spent in June and July, respectively. The majority of angler use (796 hours) was observed during weekdays. We estimated a total of 1,463 angler hours were spent on Fischer Pond of which 504 and 348 hours were spent in June and July, respectively.

Little Payette Lake has always been a fairly poor trout fishery, due to its low productivity and relatively large populations of Largescale Suckers *Catostomus macrocheilus* and Northern Pikeminnow *Ptychocheilus oregonensis*. We investigated removing Largescale Sucker and Northern Pikeminnow from the lake utilizing Merwin traps in 2010 and 2011. We repeated the trapping again in 2012. We collected and removed a total of 35 Northern Pikeminnow and 195 Largescale Sucker greater than 250 mm, and 57 Northern Pikeminnow and four Largescale Suckers less than 250 mm. The overall catch rate was 0.96 Northern Pikeminnow and 2.07 Largescale Suckers per trap day, compared to 0.75 Northern Pikeminnow and 1.26 Largescale Suckers per trap day in 2011. Merwin traps were not an effective removal method.

The Payette Lake Kokanee population was estimated using hydroacoustic gear. The total Kokanee population estimate was 81,617, a 38% decline from 2011. Kokanee population estimates by size class were 63,489 natural fry, 11,063 size 2, 5,873 size 3, and 1,192 size 4. All size class estimates were lower than the 2011 estimates.

We chemically treated Lost Valley Reservoir with rotenone to remove an undesirable Yellow Perch *Perca flavescens* population. We used drip stations and one crop duster airplane to apply a total of 642.5 L. of Prentox Synpren-Fish Toxicant (EPA #655-421) to Lost Creek, Lost Valley Reservoir proper and the plunge pools below the dam on October 31, 2012.

We completed an intensive gill netting survey on Lake Cascade in both June and October of 2012 to evaluate all fish species populations and in particular the Yellow Perch and

Northern Pikeminnow populations. We sampled the same sites in both spring and fall surveys and statistically evaluated variability between nets and between the two time periods to determine the most efficient survey time period and number of sample sites required to detect a 50% change in population size of both Yellow Perch and Northern Pikeminnow. In June, we collected 1,316 fish of 13 species, and in October we collected 1,760 fish of 14 species. Yellow Perch were the most abundant species netted in both spring and fall 2012 comprising 33% and 35% of the catch, respectively. The Northern Pikeminnow population consisted primarily of young fish as 69% and 62% of all pikeminnow collected in the spring and fall sampling periods respectively, were less than 350 mm. Variability in total catch was lower for Yellow Perch in the fall sampling and virtually the same for both sampling periods for Northern Pikeminnow. Statistical analysis indicated that 15 sample sites (one floating and one sinking experimental net) would detect a 50% change in population size with 80% confidence intervals at a power of 80% for both Yellow Perch and Northern Pikeminnow. The sample sites and effort of the 2012 surveys will be used as the baseline for future annual fall trend gillnetting surveys.

Lake Cascade catchable Rainbow Trout stockings were cut from 100,000 annually to 81,730 (44,100 fall 2011, 37,630 summer 2012) in 2012 due to poor returns in recent years and cost. In lieu of catchables we stocked 389,100 Hayspur strain fingerling Rainbow Trout (42,330 triploid and 346,770 diploids). The diploid fingerlings were split into two separate evaluation groups and each of the three groups was fluorescent grit marked a unique color to evaluate relative survival between stocking sites and between triploid and diploid groups. The lake was sampled monthly with gill nets and catch per effort was evaluated for each group. All groups were collected each month sampled (June through October). Relative catch per net was greatest for triploid fish in every month but August and was 2.4 times greater than either diploid group in October. Catch rates of diploid fish released at Poison Creek boat ramp were higher each month sampled than the Blue Heron boat ramp released diploids. Triploid fingerlings were released at the Blue Heron boat ramp.

To monitor impacts of increased Yellow Perch production as a result of the Yellow Perch restoration project we monitored zooplankton size and quality as a food source in the lake. Average ZQI values in 2012 for two of the three sample sites were in the top 50% of Idaho waters sampled. Low ZQI values in August and September were thought to be the result of zooplankton cropping by large numbers of juvenile Yellow Perch, Rainbow Trout and Kokanee. Future Rainbow Trout stockings should be made in early to mid-June to take advantage of higher zooplankton densities.

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Objectives

To conduct investigations and implement management strategies on lowland lakes and reservoirs to protect, maintain, and enhance McCall area fish and fisheries.

Rowland Pond, Brundage Reservoir and Little Payette Lake Creel Surveys

Introduction

Angler use and harvest had never been documented on Rowland Pond and Brundage Reservoir and Little Payette Lake had a creel survey last completed in 1990. Rowland Pond is a 0.8 ha, gravel pit pond that sits at an elevation of 1,560 m. The pond is managed as a put-and-take, catchable Rainbow Trout *Oncorhynchus mykiss* fishery. The pond is stocked annually with 6,000 to 8,000 catchable Rainbow Trout with 6,000 stocked in 2012.

Brundage Reservoir is a 109 ha irrigation reservoir that sits at an elevation of 1,898 m. The reservoir had a 500 acre foot conservation pool established around 1988, making it suitable for sustaining trout year around. Fishery management objectives changed in 1990 from a general trout fishery to a quality trout fishery. Various fishing rules have been implemented over the years on Brundage Reservoir. The rule from 2008 through 2010 was no harvest under 20 inches and no bait. The current rule was enacted in 2011 and is two trout, none over 14 inches and no bait.

Brundage Reservoir contains both Rainbow Trout and Cutthroat Trout *Oncorhynchus clarkii lewisi*. Rainbow Trout were stocked in the 1990's. However, due to natural Rainbow Trout production, slow growth rates of trout, and harvest restriction rules no fish had been stocked since 2008.

The last creel survey of Little Payette Lake was in 1990 (Janssen and Anderson 1994) and since that time the fishery has changed dramatically. The lake was managed as a quality Rainbow Trout fishery in 1990 following a fishery restoration project in 1987 to remove Northern Pikeminnow and Largescale Suckers. Estimated angler use in 1991 was 9,360 hours. Northern Pikeminnow and Largescale Sucker populations rebounded within five to seven years while Rainbow Trout survival and growth declined to pre-treatment rates.

Rainbow Trout are presently managed as a stocked "put and take" fishery and have taken a lower priority with many anglers whom now pursue trophy Smallmouth Bass and Tiger Muskie. Both species are stocked semiannually with the intention of utilizing the overabundant Northern Pikeminnow and Largescale Sucker and to provide a unique fishery. A rotenone treatment of Little Payette Lake would restore the trout fishery but is currently cost prohibitive. We completed a creel survey on Little Payette Lake in 2012 to determine angler use and examine changes in angler use with the change in management strategies since 1990.

Methods

IDFG personnel conducted creel investigations on Brundage Reservoir from June 19 to October 10, 2012 and Rowland Pond and Little Payette Lake from May 12 to October 10, 2012.

A slightly modified 'Access-Access' creel survey design (Pollock et al. 1994) was chosen to assess angling pressure and catch rates for these fisheries.

All three creel surveys were setup to be completed in an eight hour survey day. Creel personnel visited all three fisheries, for two hours each, during each creel survey day. Creel surveys were conducted on four randomly chosen weekdays and four randomly chosen weekend days for each month in the survey period. Each sixteen hour fishing day (0600 – 2300 hours) was divided into two eight hour survey periods; AM (0600 – 1400) and PM (1400 – 2300), and one of those survey periods (AM or PM) was randomly chosen to be surveyed on each survey day. The starting lake and direction of rotation (Rowland, Brundage, Little Payette Lake or Little Payette Lake, Brundage, Rowland) were also randomly chosen for each survey date.

The number of angler vehicles was recorded when creel personnel arrived at an access site. Creel personnel also recorded the time of arrival/departure of all angler vehicles and the numbers of anglers per vehicle during the two hour on site time. Completed trip anglers departing a site were interviewed to obtain party size, number of hours fished, and catch and harvest by species, allowing the estimate of catch and harvest rates.

Estimated angler effort was calculated based on total angler vehicle time observed during the two hour survey time at the boat ramp. Creel personnel counted the number of angler vehicles when they arrived at the boat ramp. The time of arrival/departure of all angler vehicles and the numbers of anglers per vehicle during the two hour on site time were also recorded.

The total angler vehicle time, during the two hours surveyed on each creel date, was multiplied by eight to determine the amount of angler effort for the entire 16 hour fishing day. Daily effort estimates were used to calculate average effort per day for weekdays and weekend days, separately, and those daily averages were used to calculate monthly angling effort for all fishing parties. To determine monthly angler hour pressure, monthly party estimates were multiplied by the average number of anglers per party for each month, based on the number of anglers observed in each party during vehicle arrivals and/or interviews,. Monthly catch and harvest estimates were calculated based on monthly catch rates by species multiplied by the monthly angler hours estimate.

Results

Rowland Pond

Rowland Pond averaged 2.6 anglers per vehicle during the creel survey period (May 12 to October 10, 2012). Total angler effort was 10,928 hours (Table 1). Angler effort was highest during June and July, with 3,873 and 3,848 hours, respectively.

We estimated that anglers caught a total of 14,399 Rainbow Trout at Rowland Pond during the sampling period (Table 1). June and July produced the highest catch estimates with 6,440 and 4,746 Rainbow Trout, respectively. We estimated total trout harvest to be 8,320 fish, or 58% of total catch. The average catch rate was 1.3 fish/hour with catch rates being highest in August (1.7 fish/hour) and lowest in September (0.94 fish/hour).

Brundage Reservoir

The survey revealed an average of two anglers per vehicle at Brundage Reservoir during the creel survey period (June 19 to October 10, 2012). Total angler effort was 4,625 hours (Table 2). Angler effort was highest at the reservoir during July and August, with 1,138 and 2,329 angler hours of fishing pressure, respectively.

We estimated that anglers caught a total of 1,035 Rainbow Trout and 1,066 Cutthroat Trout, for a total of 2,101 fish at Brundage Reservoir (Table 2). August produced the highest catch estimates during the survey period, with 986 Rainbow Trout and 672 Cutthroat Trout. Of the estimated 2,101 total trout caught, we estimated total harvest to be 138 fish (6.6% of total) (68 Rainbow Trout and 70 Cutthroat Trout). Angler catch rates averaged 0.45 fish per hour during the survey period and were highest in August (0.52 fish/hour) and lowest in September (no fish reported) however, only two interviews were made in September.

Little Payette Lake

IDFG personnel conducted creel investigations on Little Payette Lake from May 12 to October 10, 2012. Based on completed trip interviews we determined that there were, on average, two anglers present per vehicle at Little Payette Lake during the creel survey period. Total angler effort for the creel survey period was 6,687 hours (Table 3).

Angler effort was highest at the reservoir during July and August, with 2,474 and 1,845 hours of fishing pressure, respectively. We estimated that anglers caught a total of 298 Kokanee, 334 Rainbow Trout, and 1,042 Smallmouth Bass *Micropterus dolomieu*, for a total of 1,674 fish

July produced the highest overall catch estimates during the survey period with 194 Kokanee, 274 Rainbow Trout, and 431 Smallmouth Bass. Of the estimated 1,674 total fish caught, 52% or 871 were harvested. This included 268 Kokanee *Oncorhynchus nerka kennerlyi*, 334 Rainbow Trout, and 269 Smallmouth Bass. Anglers averaged one fish every four hours during the survey period, with catch rates being highest in July (0.42 fish/hour) and lowest in September (no fish reported). No Tiger Muskies *Esox lucius x E. masquinongy* were reported caught during the creel survey. However, interest in these fish was very apparent during the survey but catch rates were very low and none were encountered during the survey.

Discussion

Rowlands Pond

Angler use on Rowlands pond was high and estimated harvest (8,320) far exceeded the number of fish stocked in 2012 (6,000). Reasons for the discrepancy are unclear but were may have been a result of low sampling rate as we spent only 2 hours per survey day at the lake. Also, we have no idea how many catchables over winter in Rowlands Pond and these fish could have accounted for a number of the excess fish. There were 1,719 catchables stocked in October 2011 which may have contributed fish to the 2012 harvest. The 2012 data revealed that there was little harvest after August. The catchable plants in Rowlands pond are very successful and virtually every fish stocked is at minimum caught and released at least once.

Brundage Reservoir

Brundage Reservoir catch rates were lower than expected and did not meet the IDFG Fishery Management Plan goal of one fish per hour. However, past gill netting surveys indicate good numbers of trout in the lake. The reservoir has a history of overstocking resulting in poor growth rates; therefore it has only been stocked once in the last five years with 5,000 Cutthroat Trout fry. Trout growth rates were examined in 2011 and were found to be poor (Janssen et al. 2013).

Little Payette Lake

Total angling pressure on Little Payette Lake was about 28% lower in 2012 than the 9,360 hours reported in 1990. (Janssen and Anderson 1992). Species composition of catch in 1990 was 3,601 Rainbow Trout, 53 Smallmouth Bass, 61 Kokanee, and 11 Northern Pikeminnow.

Management Recommendations

1. Continue with 6,000 catchables per year in Rowland Pond.
2. Gill net Brundage Reservoir in 2013 to examine trout catch rates, sizes and growth rates and compare to previous years samples.

C. BEN ROSS RESERVOIR AND FISCHER POND ANGLER USE INVESTIGATIONS

Introduction

C. Ben Ross is a 142 ha, irrigation reservoir that is drawn down annually to less than 1% of its total volume in the fall. In spite of the severe drawn downs it produces a very successful quality largemouth bass *Micropterus salmoides* fishery. A special harvest rule of no harvest before July 1st and a two bass limit after July 1, none of which could be between 305 mm and 406 mm was initiated in 1994 and continues today.

Fischer Pond was constructed on city property within the city limits of Cascade, Idaho in 2000. It is managed as a family fishing water and stocked annually with catchable size Rainbow Trout.

Annual angler use had never been estimated for either C. Ben Ross Reservoir or Fischer Pond. An angler use study was conducted on both waters in 2012.

Methods

Digital trail cameras (Moultrie 6MP Infrared I-60) were used at both lakes to moniotor angler use. One camera was positioned to view the entire boat ramp/parking area at C. Ben Ross Reservoir (CBR) and two cameras were positioned to view the entire perimeter of Fischer Pond (FP). Cameras were set to take one high resolution digital photo every four hours throughout each day. Photos at C. Ben Ross Reservoir were used to count vehicles and photos at Fischer Pond were used to count anglers.

Trail camera photos were downloaded onto a laptop twice per month. We then reviewed each high-resolution photo to determine the number of vehicles or anglers present. The average number of vehicles (CBR) or anglers (FP) per count per day was multiplied by the number of hours in the fishing day (1/2 hr before sunrise to ½ hour after sunset) to determine daily vehicle or angler hours. We assumed all vehicles counted at the boat ramp at CBR represented anglers and we had no data on number of anglers per vehicle and no estimate of anglers entering or fishing the lake from other sites. However, the boat ramp is the only access site for boats and most of the lake is accessable only by boat. We felt that the boat ramp represented over 90% of the angler use there. A small number of non-angling recreational boats also visit the lake in the summer months.

Results

The angler use survey was conducted from April 5 through September 30, 2012 at CBR and from May 1 through October 8, 2012 at FP. We estimated a total of 999 vehicle hours during the 145 days sampled at CBR which comprised 796 hours over the 103 weekdays and 203 hours over the 42 weekend days(Table 4). Vehicle/angler use peaked at the boat ramp at CBR in June and July with 301 and 328 hours, respectively. Vehicle/angling pressure was lowest in August with 107 total vehicle hours.

We estimated a total of 1,463 angler hours over the 160 days that were surveyed on Fischer Pond (589 angler hours over 114 weekdays and 874 angler hours of 46 weekend days) (Table 5). May and June received the most angling pressure, with 516 and 504 angler hours, respectively. Of the four months surveyed, pressure was lowest in September and August, which received a total of 105 and 224 angler hours, respectively.

Discussion

Angling pressure was unexpectedly low in Fischer Pond at 1,715 hours, especially when compared to Rowland Pond where there were 10,928 angler hours of pressure. Fischer Pond has an aquatic vegetation problem late in the summer but spring and early summer angling pressure was expected to be much higher. Also, even though two cameras were used on Fischer Pond to minimize blind spots for cameras, leaves on trees and bushes no doubt blocked some anglers from both camera views. Angling pressure the first two to three weeks of the season at Rowlands Pond equaled the annual pressure at Fischer Pond. Reasons for the lower use are unclear but may be based on lower population base within 10 miles of the pond and/or the close proximity of Horsethief Reservoir and Lake Cascade. The number of fish stocked into Fischer Pond should be reduced by 4,500 fish due to low angling pressure.

Management Recommendation

1. Reduce the Fischer Pond annual catchable rainbow stockings from 6,000 to 1,500.

LITTLE PAYETTE LAKE NORTHERN PIKEMINNOW AND LARGESCALE SUCKER REMOVAL

Introduction

Little Payette Lake has a long history as a "put and take" Rainbow Trout fishery. Historical data indicate that, with the exception of a couple periods following chemical renovation and fish stocking treatments, the lake has always been a fairly poor fishery due to its low productivity and relatively large populations of Largescale Sucker *Catostomus macrocheilus* (LSS) and Northern Pikeminnow *Ptychocheilus oregonensis* (NPM).

The lake was chemically treated with rotenone in 1987 to remove NPM and LSS populations with the intent to produce a trophy Rainbow Trout fishery. A trophy trout fishery had been established by 1989 and in 1990 angler use was estimated to be 9,360 angler hours or 2,674 angler days (3.5 hours per day) from Memorial Day weekend through Labor Day weekend (Janssen and Anderson 1992). Using the mean value for angler spending at Little Payette Lake in 2003 ($180/day; (IDFG 2003)) the estimated value of the 1990 fishery was $481,371. However, by 1993, NPM and LSS biomass exceeded game fish biomass in gill net surveys (Janssen et al. 1997). As a result, Rainbow Trout survival and growth rates, as well as angler use, declined rapidly over the next couple of years.

Currently, angler use on the lake is much lower than it could potentially be. The potential as a family fishery is significant as the lake sits within a mile of the City of McCall. A Rainbow Trout fishery developed and maintained on this lake would result in a dramatic increase in angler use and provide another quality fishery in the McCall area similar to Horsethief Reservoir.

We began and conducted a LSS and NPM removal feasibility study utilizing Merwin traps in 2010 and 2011 (Janssen et al. 2011). We repeated the trapping again in 2012 due to large differences in catch rates between the first two years.

Methods

We utilized two, 3.7 m deep Merwin traps with 30.5 m leads to collect all fish in 2012. Merwin traps were placed in water at least 3.7 m in depth and leads were attached to the shoreline. The traps were fishing 7 days a week, 24 hours a day. The traps were checked one to two times a week. All fish collected were removed, identified, measured to the nearest mm, and counted. All NPM and LSS suckers were killed and disposed of in the lake. All other species were released alive back into the lake.

Results

A total of two Merwin traps were placed in the lake on May 1 and removed June 18, 2012, fishing a total of 96 trap days. We placed traps in close proximity to two of the three 2010 and 2011 trap locations (west shoreline and south shoreline approximately 350 m west of the dam).

We collected and removed a total of 35 NPM and 195 LSS greater than 250 mm, and 57 NPM and 4 LSS less than 250mm. The overall catch rate was 0.96 NPM and 2.07 LSS per trap day, compared to 0.75 NPM and 1.26 LSS per trap day in 2011. Six additional species of fish were caught, including 78 Tiger Muskie and 33 Kokanee, while the Merwin traps were deployed.

Total catch by species and month is given in Table 6. Length frequencies of all game fish collected are in Table 7.

Little Payette Lake was stocked with 9,300 catchable size Rainbow Trout on May 23. The Merwin traps caught 457 Rainbow Trout measuring between 120 – 320 mm over the following three weeks. The Rainbow Trout collected in this size range were not used in our calculations of "total catch-2012" and "% of total catch-2012" for the five fish species listed in Table 7, to avoid their influence on those numbers.

Discussion

Merwin traps were not very efficient at capturing NPM and LSS in Little Payette Lake and their use should be discontinued. Future efforts to remove fish in Little Payette Lake should be shifted to gillnetting. We collected 71 LSS and 100 NPM in one night in 2011 using four standard, IDFG sinking gill nets in Little Payette Lake (Janssen et al. 2013).

A population collapse of NPM and LSS may occur in the near future as length frequency data indicated that recruitment of adult LSS and NPM appears to be limited especially for LSS (Figure 1). No LSS between 270 and 410 mm and very few NPM between 210 and 510 mm were collected in the Merwin traps. Tiger Muskie predation on NPM and LSS, primarily on these missing length groups, was the likely cause of the low numbers. The Washington Department of Fish and Wildlife found that Tiger Muskie prefer prey size 1/3 their body length (Bill Baker, WDFW, personal communication). The lack of prey species between 270 and 410 mm and a length frequency spread for most Tiger Muskies from 760 to 1,010 mm fits this scenario (Figure 2). Age data collected from Little Payette Lake in 2011 determined that both LSS greater than 500 mm and NPM greater than 420 mm were 9 to 18 years old (Janssen et al. 2013). Therefore, natural mortality could be significant in the coming years for both species.

A stocked, catchable size Rainbow Trout is also very near the preferred size prey item for the Tiger Muskie in Little Payette Lake. Therefore, since very few nongame fish of the preferred prey size group are still present in the lake, stocked Rainbow Trout catchables would be an instant prey item and are no doubt consumed in short order.

The current fishery management strategy for Little Payette Lake is a general fishery for Tiger Muskie, Rainbow Trout, and Kokanee and a trophy Smallmouth Bass fishery. The questions for future management are complex. Tiger Muskie predation appears to be impacting nongame fish numbers which should allow for better trout survival and growth. However, stocked Rainbow Trout catchables are the ideal size for Tiger Muskie predation, therefore trout survival will probably be marginal at best. Elimination of the Tiger Muskie stockings would allow the nongame fish numbers to rebound quickly, again decreasing trout survival and growth. The cost of a rotenone treatment would be in excess of $540,000 in chemical alone (@ $60/3.97 L).

Without the option of a total fish removal project the Rainbow Trout stocking program should be discontinued as they have little chance for survival. The trophy Smallmouth Bass and Tiger Muskie fisheries will continue to utilize the non-game fish present and we will manage for this unique fishery. Angler use in 2012 was 28% lower than that reported in 1990 (see Little Payette Lake creel survey report, following section) but is no doubt much higher and cost effective than just a catchable trout program would be. Currently Rainbow Trout stocking contribute virtually nothing to this fishery with only 334 Rainbow Trout estimated caught of the 9,600 stocked in 2012 (see Little Payette Lake creel survey report, following section). Nongame

fish removal efforts should be discontinued as they provide forage for the species currently managed in the lake.

Management Recommendations

1. Discontinue use of Merwin traps for NPM and LSS removal.
2. Eliminate catchable stocking.
3. Maintain management for Tiger Muskie and trophy Smallmouth Bass.

PAYETTE LAKE - KOKANEE INVESTIGATIONS

Introduction

Fishery management on Payette Lake was focused on maintaining the Kokanee *Oncorhynchus nerka kennerlyi*, Rainbow Trout *Oncorhynchus mykiss*, and trophy lake trout *Salvelinus namaycush* fisheries (IDFG 2007). Rainbow Trout were managed as a put and take fishery. Lake trout and Kokanee management has been a dynamic balancing act between special lake trout rules and Kokanee stocking with fairly extensive monitoring. The fact that Kokanee were the primary forage fish for lake trout in Payette Lake makes the methods to achieving this goal all the more confounding.

Lake trout and Kokanee have co-existed in Payette Lake since the early 1940's and management of the trophy lake trout fishery started in 1996. Kokanee stocking in Payette Lake was suspended in 1994 as a result of IDFG research studies indicating that hatchery stocked Kokanee fry and fingerlings contributed little to this population (IDFG unpublished). Since that time, Kokanee spawner numbers have declined approximately 50% with each subsequent generation (Janssen et al. 2013). We reinstated annual Kokanee stocking of hatchery raised fry and fingerlings in 2007. We have stocked from 87,000 to 460,000 Kokanee fry/fingerling annually since 2007. We surveyed Payette Lake Kokanee densities in 2012 to monitor effectiveness of the recent Kokanee stockings.

Methods

We monitored the Kokanee population in 2012 by conducting a lake-wide, hydroacoustic survey of Payette Lake. The mobile survey was conducted using the IDFG Nampa Fish Research hydroacoustic echo sounding equipment and 6.4 m Koeffler boat and on the night of July 28, 2012. Kokanee abundance was estimated using a Simrad EK60 scientific echo sounder with a split-beam 120 kHz transducer. The echo sounder was set to ping at 3.3 ping/s, and the transducer was mounted to a pole off the port side of the boat. The transducer when lowered was about 0.5 m below the surface. Prior to the survey, we calibrated the echo sounder using a 23 mm copper calibration sphere, with a target strength (TS) of -40.4 decibels (dB), to set the gain and adjust for signal attenuation to the sides of the acoustic axis. We used Simrad's ER60 software to determine, and input, the calibration settings.

Three previously established lake sections (Janssen et al. 2011) were used again in the 2012 survey in order to maintain consistency in methods. However, calculated total area of Kokanee habitat (water depth > 12.2 m), used to calculate the population estimates, was increased from 1,606 ha to 1,715 ha (6.8%) in 2012. The new section areas were; Southwest –

899 ha, East – 724 ha, and Narrows – 90 ha) (). We also used the transects previously established by Janssen et al. (2011) which followed a uniformly spaced, zigzag pattern traveling from shoreline to shoreline; (), (MacLennan and Simmons 1992). During the 2012 survey, all transects used were the same as in 2011, for a total of 18 transects. However, transects 12 and 13 in the Southwest section were combined during analyses. We maintained a boat speed of approximately 1.5 m/s during the survey.

Echo integration techniques were used to estimate Kokanee abundance from hydroacoustic files (echograms). Echogram data was viewed and analyzed using SonarData's Echoview software, version 5.0.78. Within the echogram, a box was drawn around the Kokanee layer of each transect (on average, 5 m to 35 m deep), integrated to obtain the nautical area scattering coefficient (NASC), and analyzed to obtain the mean target strength (TS) of all returned echoes (Maiolie and Elam 1995). This integration accounted for fish that were too close together to detect as a single target (MacLennan and Simmons 1992). Densities were then calculated by the equation:

$$\text{Density (fish/ha)} = (\text{NASC} / 4\pi 10^{TS/10})\ 0.00292$$

Where: NASC = total backscattering (m^2/nautical mile)
TS = mean target strength in dB for the area sampled

The target strength data from all returned echoes that qualified as single fish target were binned into 1 dB intervals (adjusted target strength) for each transect. We then graphed a frequency distribution of fish target strengths from all survey transects (

Figure 4). Love's equation (1971) was used to calculate fish lengths at each break between size classes. These size class breaks were subsequently used to generate age-specific abundance and density estimates.

Single fish targets were categorized into Kokanee or non-Kokanee groups based upon their TS. All single targets less than -60.0 dB were considered too small to be Kokanee fry. Targets greater than -33.0 dB were thought to be too large to be Kokanee, and were most likely lake trout.

Because of size and age overlaps between hatchery and wild Kokanee, ages and lengths at age were very difficult to determine. Trawl surveys in 2011 resulted in only six fish being collected with inconclusive ageing results due to wild and hatchery fish identification and age and size overlap. Also, Kokanee lengths collected during spawner counts in September, 2012 ranged from 360mm to 480mm, but there were two distinct size classes within spawners. The first class was 360mm to 410mm and the other group from 430 to 480mm TL. Since definitive age class information was not available, fish target strengths were binned into size classes strictly on the reservoir wide target strength frequency of all detected fish targets in the Kokanee range. All fish targets between -60.0 dB [approximately 16mm total length (TL); (Love 1971) and -33.0 dB (410 mm), were defined as Kokanee (

Figure 4), and within this range Kokanee were partitioned into four size classes. Thus, class one consisted of target strengths from -60.0 to -48.0 dB (16-67mm), class two were -47.9 to –42.0 dB (68-138mm), class three were -41.9 to -37.0 dB (139-253mm), and class four Kokanee included targets between -36.9 and - 33.0 dB (254-410mm).

Mean density of each size class of Kokanee in each lake section was calculated and multiplied by the area of that section to obtain size class abundance estimates per reservoir section. Abundance estimates for each reservoir section were totaled to obtain total size class population estimates and the size class estimates were totaled to obtain total Kokanee abundance in the entire lake.

Results

A total of 296 echo returns were recorded from fish within the Kokanee layer of all hydroacoustic transects. Fish target strengths from returned echoes ranged between -60 and -30 dB (Table 8 and

Figure 4). Approximately 73% of fish targets had target strengths within the Kokanee fry range. Across all transects collected on Payette Lake in 2012, total Kokanee densities ranged from 4 to 204 fish/ha (Table 9). The highest densities of all age class were mostly found on the northeastern end of the lake.

We estimated a total of 63,489 Kokanee fry (90% CI +/- 35,041), 11,063 size class two fish (90% CI +/- 8,820), 5,873 size class three (90% CI +/- 4,855), and 1,192 size class four Kokanee (90% CI +/- 692) in Payette Lake (Table 10). The abundance of all Kokanee was estimated at 81,617 fish (90% CI +/- 43,951).

Discussion

The total population estimate for Kokanee in Payette Lake decreased about 42%, from 139,901 (82 Kokanee/ha); (Janssen et al. 2013) in 2011 to 81,617 (51 Kokanee/ha) in 2012. Abundance of all size classes decreased dramatically in 2012. Overall Kokanee survival (13%) was very poor during 2012 (August, 2011 – July, 2012) and in contrast to 2011, survival was poor for all size classes. Survival of size classes two, three, and four was 13%, 16%, and 8%, respectively. We could expect about 60% annual survival rates for a population with little or no predation (Maiolie and Elam 1995). Therefore, it appears predation severely impacted the survival of all age classes during 2012. We would expect predation to be highest on the most abundant size class, with no real preference based on size alone, especially predation by lake trout.

Hydroacoustics provide a quick and reliable method to estimate Kokanee abundance and densities in lakes and reservoirs, but like any method, still has limitations. During our survey we defined all fish targets within the acoustic target strengths of -60 dB to -33 dB (16 to 410 mm) as Kokanee. Thus, it should be noted that other species may have been detected, thereby potentially inflating Kokanee estimates. Species present that could have been incorporated include lake trout, Largescale Suckers *Catostomus macrocheilus*, Mountain Whitefish *Prosopium williamsoni*, Northern Pikeminnow *Ptychocheilus oregonensis*, and Rainbow Trout. Although all of these species could overlap with Kokanee in size (TS), none of these fish are known to be pelagic, especially at night. In addition, all shallow, near shore targets of all sizes were excluded from analyses. And larger fish targets (greater than -33.0 db) within pelagic areas were not counted as Kokanee. Therefore, we are confident that few non-target species were incorporated into these estimates.

The equipment, software, and analyses used to conduct this survey and analyze the data remained the same as in 2010 and 2011 with the exception of total area of Kokanee habitat (area of lake with water depth > 12.2 m) as mentioned above in the methods. Therefore,

total population estimates for Payette Lake were slightly higher in 2012 relative to the 2010 and 2011 estimates.

Several improvements could be made to further enhance our methods. In 2011, defining acoustic size class breaks solely by acoustic target strength frequency data was not preferred, which leaves some uncertainty regarding the true size class abundance and densities. Thus, we recommend continuing annual trawl surveys in conjunction with hydroacoustics to improve size class estimates of Kokanee, as well as to provide a comparison to hydroacoustic estimates. Trawl sampling provides age-at-length data, even if only a small sample size is obtained, and results in more accurate age class-specific population estimates than using hydroacoustics alone (Stark and Stockner 2006). This year we maintained a minimum ping rate of 0.3 sec/ping (3.3 pings/sec), which should have increased the precision of adjusted fish target strengths, thereby reducing the likelihood of including fish outside of the Kokanee TS range.

If we apply this year's size/age class survival rates (Table 10), to the 2012 abundances; we would expect only 8,290 class two Kokanee (5.2 fish/ha), 1,757 class three (1.1 fish/ha), and 486 class four (0.3 fish/ha) fish in August 2013. During 2012, survival of all size classes was low, but it is not clear what sources of mortality caused this decline. Although natural mortality could be quite high, a great deal of total annual mortality is likely due to predation. Predation is likely to continue to decrease Kokanee abundance until natural reproduction is virtually eliminated. If this happens, the only means of maintaining Kokanee in Payette Lake will be through stocking hatchery Kokanee. If overall survival doesn't increase dramatically in 2013, the Kokanee population in Payette Lake will effectively collapse.

Based upon this years' extremely low Kokanee abundance, management actions are likely limited to large hatchery Kokanee stockings, release of wild adult spawners collected from another lake system, and/or elimination of stocking altogether. Stocking may provide sufficient Kokanee to allow natural reproduction, or they may all be predated upon and none escape to spawn.

Management Recommendations

1. Continue Payette Lake Kokanee hydroacoustic enumeration work to help evaluate annual Kokanee stocking success.
2. Complete a fishery survey in 2013 to expose any recent changes in population structures that might explain recent changes in Kokanee survival.
3. Begin a mark/recapture, lake trout population estimate study in 2013 to obtain a lake trout population estimate within two years.
4. Continue Kokanee fingerling stockings
5. Collect spawning Kokanee from another lake and release them into the NFPR above Payette Lake in 2013.

LOST VALLEY RESERVOIR FISHERY RESTORATION (ROTENONE) PROJECT

Introduction

Lost Valley Reservoir is a small irrigation reservoir located 17 miles due East of McCall, Idaho (44.966,551° N, 116.466,046° W). The water rights and dam belong to the Weiser River Irrigation District (#67) and is surrounded by U.S. Forest Service lands. At full pool the reservoir covers approximately 364 ha. The reservoir has a history of overpopulation by Yellow Perch *Perca flavescens* and subsequent chemical rehabilitations by the Idaho Department of Fish and Game (IDFG). The reservoir has been renovated in 1959, 1964, 1985, 1991, 1994, 2000, and 2007 using rotenone and in 1971 using Antimycin (Fintrol).

Incomplete control with rotenone treatments and illegal reintroductions have allowed the Yellow Perch populations to rebuild after each treatment to the point of overpopulation and stunting. The perch reduce survival and growth of Rainbow Trout and become a nuisance to anglers. The overpopulated perch average 6-7" and are unacceptable to anglers.

Annual stockings of catchable-size Rainbow Trout following each treatment have produced excellent fishing for the following 3-5 years. The resulting fisheries were very popular and provided an estimated 4,500 angler trips in 2011.

Since the last treatment in 2007, Yellow Perch began to show up in the fishery in 2010. By 2011 juvenile perch were so numerous they seriously impacted trout growth, survival and catch rates while becoming a nuisance to anglers. There were numerous angler complaints of the decline in fishing quality on the reservoir.

Alternative Yellow Perch control measures might include physical removal with nets and traps, the draining of the lake and biological control via other predatory fish species. Merwin traps were operated in the reservoir in 2005 and 2006 removing over a hundred thousand Yellow Perch with little observed effects on their numbers. Fecundity rates of Yellow Perch far outpaced trap catch rates. Enough water remains in the reservoir at typical low pool levels, through the winter months, to support a large number of Yellow Perch as we saw their numbers continue to grow from year to year. Any predatory fish species that would consume enough Yellow Perch to control their numbers would likely consume stocked Rainbow Trout as well.

No action would have resulted in the loss of a viable sport fishery in Lost Valley Reservoir. Rainbow Trout would no longer be stocked and the Yellow Perch population would continue to grow in numbers while average fish size would continue to decline (< 175 mm adults). The Department determined that a chemical treatment was the only effective method of restoring the Rainbow Trout fishery in Lost Valley Reservoir.

Methods

The draining of the reservoir afforded our best opportunity for a cost effective chemical treatment. Communication with the Weiser River Irrigation District confirmed that the reservoir could be drained by mid-October and they agreed to leave the dam gate open until the day of the treatment.

Past surveys had documented Yellow Perch in Lost Creek upstream of the reservoir's slack water area but not as high as the forks in Lost Creek, approximately two miles upstream.

Therefore, Lost Creek above the reservoir was treated with drip stations at two different sites. Constant volume/constant flow (Marriott bottle principle) drip barrels were used at Drip stations to deliver rotenone.

The furthest upstream drip station was set up on the culvert on the East Fork of Lost Creek, just 50 m upstream of the forks. The second booster drip station was placed at the wildlife interpretive site just at the perimeter of the reservoir high water mark. A final Lost Creek booster drip station was placed on the main stream channel of Lost Creek within the reservoir proper to ensure rotenone concentrations remained at prescribed label rates. Rotenone degradation from highly organic mud, decomposing aquatic vegetation and the large number of small springs and seeps within the drained lake bed were all concerns to be addressed with this booster station. Dam outlet flows, measured one day prior to the treatment, were used to determine amount of chemical to charge at both downstream booster drip stations. The mid-reservoir booster station treated all inflow into the reservoir for 16 hours post treatment.

We estimated the remaining water volume of mud flats, pot holes, seeps, springs and remaining pool in the reservoir proper after the reservoir was drained using topographic maps and aerial photos. A fixed wing, crop duster, airplane was contracted from Valley Air in Caldwell, Idaho to apply rotenone to the flooded areas in the reservoir proper above the dam.

Between the bottom two booster drip stations a 1:10 rotenone dilution was applied via back pack sprayers to possible Yellow Perch refuge areas such as oxbows, seeps, and marshy areas adjacent to Lost Creek.

The dam outlet valve was closed immediately upon the start of rotenone application to the reservoir proper. The small plunge pool below the dam was also treated. Due to outlet gate leakage and the plunge pool treatment we expected to kill fish in Lost Creek below the dam for up to 7.24 km to its confluence with Bear Gulch.

Paul Janssen was the on-site, licensed Professional Aquatic Pesticide Applicator for this project. Paul also did all of the on-site handling and mixing of undiluted rotenone.

Valley Air of Caldwell Idaho, an aerial spray contractor treated the reservoir proper and remaining pool above the dam. The Valley Air pilot was an aquatic pesticide licensed applicator and supervised all aspects of the aerial application.

IDFG personnel followed guidelines presented in the American Fisheries Society Rotenone SOP Manual ((Finlayson et al. 2010).

Results

The treatment was scheduled for October 23, 2012; however, a snow storm covered the entire lake proper with 6 inches of snow on October 22nd. This delayed the treatment indefinitely until a heavy rainstorm five days later melted all the snow off of the lake bed. The resulting runoff increased the outflow of the dam from 17 cfs to 75 cfs the day before the actual treatment day.

The treatment was completed on October 31, 2012. We started the stream drip stations at 0930 hours and the airplane began the aerial treatment at approximately 1000 hours. We applied a total of 623 L. of Prentox Synpren-Fish Toxicant (EPA #655-421) and 19 L of Noxfish

Fish Toxicant (EPA #432-172) to complete the entire treatment. We calculated flows in Lost Creek the day before the treatment at 14.0 cfs, and the dam outflow at 75 cfs. Water volume covering the lake bed was estimated to be 137 acre feet. The Prentox Synpren-Fish Toxicant was applied to all waters at concentrations of 1.7 to 2.0 ppm.

Specifically, we applied, 303 L of fish toxicant to the large number of lake bed springs, seeps, old oxbow ponds, and remaining pool with the crop duster airplane and 317.5 L was applied via drip stations to Lost Creek and one large spring (Table 11). A crew of four IDFG personnel started and kept the drip stations charged and applied 3 L of toxicant with backpacks to wet areas adjacent to Lost Creek and the plunge pool below the outlet and spillway. We also disposed of 19 L of 15 year old Noxfish Fish Toxicant in the pool above the reservoir. The airplane was in the air for three hours and 45 minutes including travel time to and from Caldwell, Idaho. The total cost of the airplane application was $2,872 or $21.97 per acre foot.

Moribund fish were observed within an hour of the beginning of the treatment. Dead and moribund fish were still observed at sunset and by the next morning all visible fish appeared to be dead. We observed very few dead trout post treatment with the vast majority of dead fish being 100 to 150 mm Yellow Perch. All dead fish were left in place as decomposed fish would aid in zooplankton production over the winter and early spring months, boosting survival and growth of the Rainbow Trout to be stocked in May, 2013

Discussion

The treatment went well and the use of the crop dusting airplane made the treatment possible and was a significant time saver. Without the airplane the reservoir water levels would have had to be held high enough for boat operation in and around the shoreline. This would have increased manpower, equipment, and chemical needs significantly.

LAKE CASCADE INTENSIVE GILLNETTING SURVEYS

Introduction

Since the Yellow Perch (YP) 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 results of those efforts. Specific objectives listed in the 2007-2012 Fisheries Management Plan included monitoring abundance, size, and age trends of the Yellow Perch and Northern Pikeminnow (NPM) populations. We continued these monitoring efforts using intensive gill netting surveys in 2012. The use of gill nets also allows us to monitor all fish species trends in the lake. To help us establish an annual fishery trend survey using gill nets we completed both a spring and fall netting survey in 2012 to compare catch statistics.

Methods

In 2011, we completed an intensive gill netting survey in which we systematically selected 23 sites around the perimeter and mid lake. In 2012, we used the 2011 catch data to determine number of gill nets required to detect changes in Northern Pikeminnow and Yellow Perch populations at 90% confidence and 80% precision. Techniques used to calculate gill net

sample size are given in the IDFG Standard Fish Sampling Protocol for Lowland Lakes and Reservoirs in Idaho (IDFG 2012).

Based on the statistical results from the 2011 gillnetting survey, 15 sites were selected for monitoring in 2012. At each monitoring site we set one sinking and one floating, standard IDFG lake survey gill net. We sampled those same sites for both spring (June) and fall (October) monitoring. At shoreline netting sites, sinking gill nets were attached to the shore. The beginning of floating net was set at the deep end of the sinking net and was placed as an extension of the sinking net. Mid lake sets were simply set within near proximity of each other. Nets were fished overnight and pulled the next day. All fish were identified, measured to total length and a sub sample weighed to the nearest gram. We used the spring and fall survey results to again calculate the number of gill net sites needed for future surveys to determine a 50% change in population numbers at 80% and 90% confidence intervals and 80% power.

Results

We sampled a total of 14 sites from June 6 through June 13, 2012 and sampled those same sites and one additional site from October 1 through October 9, 2012 (Figure 5). Specific sampling site GPS coordinates are presented in Table 12. In June, we collected 1,316 fish of 13 species, and in October we collected 1,760 fish of 14 species (Table 13). Yellow Perch were the most abundant species netted in both spring and fall 2012 comprising 33% and 35% of the catch, respectively.

We collected more of each species present in Lake Cascade in the fall sampling period than in the spring sampling period with the exception of Mountain Whitefish *Prosopium williamsoni* (10:63, spring:fall catch) and Coho Salmon *Oncorhynchus kisutch* (4:43). Length frequencies of all fish collected during the spring are presented in Table 14, and those collected during the fall monitoring period are shown in Table 15. In both sampling periods YP, Largescale Suckers and NPM were the first, second, and third most abundant fish species collected, respectively. YP made up 33% and 35% of the total catch in June and October respectively. YP, NPM and Largescale Sucker made up 12.8%, 13.4%, and 55.7% of the total weight of all fish collected in the fall survey. We collected a total of 145 Rainbow Trout in the fall gillnetting. Fingerlings stocked in the spring 2012 (see fingerling evaluation below) made up 74% of all Rainbow Trout from 190 mm to 310 mm and 67% of all Rainbow Trout from 190 mm to 400 mm collected.

The YP perch population was quite robust with age classes being represented for every year since approximately 2005 (Figure 6). There was a very large component of fish over 250 mm in the lake with 44% of all YP sampled in the fall of 2012 being greater than 250 mm and 26% greater than 300 mm.

The NPM population consisted primarily of young fish as 69% and 62% of all NPM collected in the spring and fall sampling periods respectively, were less than 350 mm. We would expect to capture fewer adult NPM in the spring as these fish have moved to the tributaries and shoreline to spawn and are less vulnerable to the gill nets. The IDFG standard lake survey gill nets are inefficient at catching young-of–year and yearling fish therefore they do not provide a good index for these fish. In particular, the gill nets are very inefficient at capturing YP less than 140 mm and NPM less than 160 mm.

Yellow Perch growth rates from length frequency data presented in Figure 6 have been excellent since the restoration treatments averaging approximately 55 mm per year from age 1 through age 5. It took 2+ years for YP to reach 200 mm and 5+ years to reach 300 mm.

Fall gillnetting was a more effective monitoring time period as we caught more fish of each species with the exception of Mountain Whitefish and Coho Salmon. Variability in catch of YP and NPM between sample sites was lower in the fall than in spring but both were higher than that observed in the 2011 gillnetting (Table 16). The calculated number of gill nets required to detect a 50% change in population size with an 80% confidence interval at a power of 80% in spring and fall was 38 and 28 and 13 and 29 nets for YP and NPM, respectively. We speculate that we had a more representative sample of adult NPM in the fall as we probably missed some of the adult spawning NPM in spring sampling.

Discussion

Fishery management goals to protect the Yellow Perch fishery are currently being met. Allen et al. (2009) describe the need to maintain a NPM population made up primarily of individuals less than 350 mm in length. Currently, as noted above, 62% of all NPM were less than 350 mm

Figure 7 illustrates the NPM population age structures in years leading up to the YP population crash and the observed changes since the restoration treatments were implemented.

To minimize the impacts of a NPM population growing in both numbers and size, rotenone treatments to remove spawning adults from the NFPR should be initiated in 2013 or 2014. Annual treatments over a five year span could significantly reduce the NPM population. The annual treatments would significantly reduce all of the spawning age classes in the lake as well as an entire generation of adult recruitment (their progeny). It takes approximately five years for Lake Cascade NPM to reach 400 mm when they become sexually mature and spawn (Janssen et al. 2013, Bennett 2004).

Growth rates of YP are expected to decline as the lake is filled to capacity with YP. Prior to the YP fishery collapse in the mid 1990's it took seven to eight years to reach 310 mm, typically the maximum sized attained (

Figure 7). The YP population is expected to become more cyclical as strong age classes dominate the fishery for four to five year stretches.

Management Recommendations

1. Establish the 2012 Lake Cascade gill netting sites as permanent and repeat the survey annually in October to monitor YP and NPM population's status and structure as well as all other fish species populations.
2. Complete spawning NPM removal/rotenone treatments on the North Fork Payette River for several consecutive years.

LAKE CASCADE RAINBOW TROUT FINGERLING STOCKING EVALUATION

Introduction

Recent tagging studies (unpublished IDFG data) indicated that returns of stocked, catchable Rainbow Trout in Lake Cascade were less than one percent with some stocking having no tag returns. Approximately 100,000 catchables had been stocked in Lake Cascade annually in recent years. Due to rising costs of catchable size Rainbow Trout and their historically poor returns in Lake Cascade the stocking request was dropped from 150,000 to 70,00 beginning in 2012. A total of 81,730 catchable size Rainbow Trout (44,100 fall 2011 and 37,630 summer 2012) were stocked in 2012. More economical fingerling Rainbow Trout were stocked in 2012 in lieu of the catchable cuts. To monitor the fate of these fingerling stockings all fish were marked with a fluorescent pigment grit prior to release and then sampled monthly with gill nets. A prior Rainbow Trout fingerling stocking evaluation and creel survey on Lake Cascade in 1990 and 1991 indicated a survival rate less than 0.7% for all fish less than 250 mm at stocking (Janssen and Anderson 1994).

Methods

We fluorescent grit marked all Hayspur strain fingerling Rainbow Trout stocked in Lake Cascade in 2012. The fish were reared and marked at IDFG's Hagerman Fish Hatchery. We used two different colors (red and chartreuse) to differentiate between the two stocking sites; Poison Creek boat ramp and Blue Heron boat ramp. We used a third color (orange) to differentiate a smaller group of triploid fingerling all of which were stocked at Blue Heron boat ramp.

The grit marking technique, with the following two exceptions, is described in detail by Nielson (1990). The first exception was to mix the pigment grit with 50% water by volume instead of spraying it dry. The second exception was to spray fish just before they slid out of a 300 mm wide gate on the end of a fish grading table. The table was fed fish via an outlet hose of a fish pump that pulled fish out of the raceway. Two boards were placed parallel to the fish grading tables grading pipes in a V pattern which dewatered, funneled, and crowded the fish as they slid down the table between the two boards to a 300 mm wide opening. Fish were sprayed with pigment just before they slid out of the opening in the two boards and fell back into the raceway. This method eliminated the need for the box with a screened bottom and dip nets to fill the box with fish as described by Nielson (1990). This method was much quicker and significantly reduced handling stress on the fish.

To maintain a constant pressure of 110 psi hose pressure while continuously spraying fish, two 11 CFM portable air compressors were connected in series to one terminal hose that connected to the sand blasting gun. Manpower needs included two people to continuously crowd fish to the fish pump, one person controlling the speed of the fish pump to control the number of fish being fed onto the grading table, one person on the grading table to make sure fish kept moving down the table and funnel and a final person spraying fish with the grit.

A sample of marked live fish of each color was held at the hatchery for a minimum of one month, post marking, to allow time for grit not embedded in the fish to slough off. After one month a sample of approximately 100 fish from each color group was collected and taken to the lab. Each fish was examined under a black light for the presence of the fluorescent mark to determine percent of fish permanently marked by color group.

Fish were captured in the lake post stocking with gill nets specifically designed to catch 100 to 300 mm fish. Each gill net was 0.91 m tall by 61 m long with four different mesh sizes, each 15.25 m long panels. The square mesh size of the four panels were 7.4 mm, 15.9 mm, 19 mm, and 25.4 mm. We used one floating gill net and one or two sinking gill nets at each sample site depending on water depth. Two sites were sampled each day and selected so that all five nets could be deployed. The sinking nets were set to sample mid-water depths by suspending them with either 0.91 m or 1.82 m long ropes below 3 floats tied equal distance along the float line in addition to the anchor/float end ropes. All sample sites were located far enough offshore to ensure that the lead line of the deepest suspended sinking net would stay a minimum of 0.5 m above the lake bottom to avoid large catches of Yellow Perch, Black Bullheads *Ameiurus melas* and Largescale Suckers *Catostomus macrocheilus*.

The lake was systematically sampled from north to south over a weeks' time in July August and September. Two sites were sampled in each of the North, Sugarloaf Island, Crown/Vista points, and Cascade City/Cabarton general areas. Actual sites varied from month to month and were arbitrarily selected. Fingerling data were collected in October in conjunction with an intensive gillnetting survey (see "Lake Cascade Intensive Gillnetting Surveys" section of this report).

All Rainbow Trout collected were taken back to the lab where they could be examined with a black light in a completely dark room for presence of the fluorescent mark. All Rainbow Trout were sorted by mark and measured for total length and weighed. When orange or red fluorescent grit particles were detected on a fish it was re-examined under a dissecting scope or magnifying glass under normal white light and the mark was compared to a grit color reference card to verify color. The red and orange grit mark fluoresce a very similar color (red) under black light but are quite different and easily distinguished under white light.

Monthly weighted catch rates were calculated by dividing the total number of fish of each color group gillnetted by the total number of actually marked fish stocked. This number was then multiplied by 100,000 and divided by the number of nets used to collect fish each month.

Results

We grit marked and stocked a total of 389,100 Hayspur strain fingerling trout into Lake Cascade in 2012. Of that total, we stocked 42,330 triploid fingerling (orange mark) at Blue Heron boat ramp on May 31st, 188,740 diploid fingerling (red) from May 31 through July 5th at Blue Heron boat ramp, and 158,030 diploid (green) fingerling at Poison Creek boat ramp from June 27 through July 2nd (Table 17). However, the percent of permanently marked, stocked fish by color group was 83%, 80%, and 69% for green, orange, and red, respectively (Table 18). Therefore; the number of stocked fish actually marked was 131,135 green, 33,864 orange, and 130,230 red.

It should be noted that the entire group of diploid Hayspur fingerling (red and green) were infected with IHN for several weeks prior to stocking. Fish marking was delayed a month to allow fish to cycle through the disease outbreak and respond to treatment. The effect of this disease outbreak on survival in Lake Cascade is unknown. The triploid fingerling (orange) remained disease free prior to marking and stocking.

We collected fish from all three color groups in each month sampled. Numbers of fish collected by month and mark are presented in Table 19 and average total length data is presented in Figure 8. Weighted catch rates were the highest in every month except August, for the triploid fingerling (orange) group (Table 19). The Poison Creek boat ramp stocked fish had the highest catch rate in August. The weighted catch rates in October were 1.7 for the triploid group versus 0.7 and 0.4 for the Poison Creek and Blue Heron release groups, respectively. The Blue Heron release group had the lowest weighted catch rate in all months sampled. Total growth in mm from initial stocking through October was measured at 118, 143, and 93 mm for Blue Heron, diploid release group, Blue Heron triploid release group, and Poison Creek release group, respectively.

Discussion

The recapture data suggests that the triploid fingerling released at Blue Heron survived better in relation to the other two diploid groups. However, differences in apparent survival between diploid and triploid groups might be explained by the disease issues endured by the diploid fish just prior to stocking (mentioned above). The diploid group released at the Poison Creek boat ramp was caught at a greater rate than the group released at the Blue Heron boat ramp in each month sampled.

Stocked fingerlings made up 66% of all Rainbow Trout from 210 to 320 mm collected in October. This size range would cover all stocked fingerlings, 2012 catchables (37,600), many of the 2011 fall catchable plant (40.000), and many natural Rainbow Trout.

It is postulated that the apparent good survival of stocked fingerling in 2012 was a result of reduced numbers of predatory Northern Pikeminnow from the Yellow Perch restoration project. And the presence of large numbers of Yellow Perch fry that had hatched just prior to the fingerling stockings. These fry would have been an immediate food source for fingerlings at time of stocking and provided an excellent food source for the reminder of the year. Many fingerling trout collected through the summer and fall months were observed regurgitating young-of-year perch.

Management Recommendations

1. Repeat the diploid fingerling relative survival evaluation in 2013. Use two colors to repeat release site comparisons.
2. Request half the 2014 fingerling stocking to be triploids and differentially mark each group to examine relative survival.

LAKE CASCADE PLANKTON MONITORING (ZQI)

Introduction

To monitor impacts of increased Yellow Perch production as a result of the Lake Cascade, Yellow Perch restoration project we monitored zooplankton size and quality as a food source in the lake. We began monitoring zooplankton in 2004 before the Yellow Perch restoration project recommendations were implemented and have continued semi-annual sampling.

Methods

We monitored zooplankton quality and abundance using the Zooplankton Quality Index (ZQI) technique described by Teuscher (1999). The same sites were sampled in 2013 as have been since 2004. The approximate NAD 27 map datum UTM coordinates for the Cascade City boat ramp, Sugarloaf Island, and Poison Creek sample sites were 573509 E, 4929565 N, 570065 E, 4941978 N and 571331 E, and 4945528 E respectively.

Results

Zooplankton sampling was completed in May through September in 2013. ZQI values averaged 0.04, 0.3, and 0.5 for the Poison Creek, Sugarloaf Island and Cascade City boat ramp, respectively. Zooplankton values peaked in July at both the Cascade City (1.5) and Sugarloaf Island (0.8) sites and there was a slight peak in September at the Poison Creek site (.06) (Table 20 and Figure 9).

Discussion

Average ZQI values in 2013 for two of the three sample sites were in the top 50% of Idaho waters sampled and reported by Teuscher (1999). Low ZQI values in August and September were thought to be the result of zooplankton cropping by large numbers of juvenile Yellow Perch, Rainbow Trout and Kokanee. Future Rainbow Trout stockings should be made in early to mid-June to take advantage of higher zooplankton densities.

Management Recommendation

1. Conduct ZQI zooplankton monitoring while doing fingerling evaluations.

RIVERS AND STREAMS

Abstract

We completed an angler use and harvest survey on the North Fork Payette River during April and May, 2012. We estimated a total of 264 angler hours spent fishing over the entire two month period. There was no harvest observed and the catch and release estimates were 10 or 56 Rainbow Trout *Oncorhynchus mykiss* depending on method of catch rate expansion over the two months.

The 2012 Kokanee *Oncorhynchus nerka kennerlyi* spawning run in the North Fork Payette River (NFPR) above Payette Lake was estimated to be 1,475 fish, double last year's estimate.

We completed ten IDFG standard stream surveys in the North Fork Payette River drainage upstream of Payette Lake. We collected both Rainbow Trout and Brook Trout *Salvelinus fontinalis* in eight of the ten streams and only westslope Cutthroat Trout *Oncorhynchus clarkii lewisi* in Fall Creek. We found only Brook Trout in Powelson Creek.

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Objectives

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

NORTH FORK PAYETTE RIVER CREEL SURVEY

Introduction

The North Fork Payette River (NFPR) between Smylie Lane Bridge and Payette Lake is 29.5 km (18.4 mi) long. This stretch of river is mostly private property, changing from urban home lots near McCall to larger ranch properties downstream. Small portions of public land lie near the southern and northern boundary of the study area. Bridges and dead-end roads provide some direct access for fishing, while a majority of the area must be accessed through private property. All but 4 km (2.5 mi) of the river are surrounded by private property. There are six primary access sites of which one crosses private property.

Prior to 1980 this section of the NFPR had a general stream fishing season and harvest limit. This same stream section was closed in 1980 to trout harvest between November 30 and Memorial Day and it remained closed through 2010. In 2010 most Idaho rivers and streams, including the NFPR, were opened to a year around, six trout harvest season in an effort to simplify fishing rules.

During the winter and spring each year, 400 mm to 610 mm, sexually mature Rainbow Trout *Oncorhynchus mykiss* migrate upstream into the NFPR from Lake Cascade to spawn. Many of these trout appear to be wild, with all of their fins intact. Some anglers speculate that these fish are remnants of endemic wild steelhead that inhabited the area prior to the 1930's.

Little angling pressure had been observed on this section of river since the 2010 rule change took effect. However, a small group of local anglers expressed concerns that the recent change in fishing rules on this stretch of river could have a negative impact on the numbers and consequently, the catch rates of these larger Rainbow Trout. Therefore, this group of anglers asked that we close this stretch of river to harvest from November 31 to Memorial Day weekend. To understand the impacts of the open harvest season during winter and early spring in this section of river, IDFG staff completed an angler use and harvest survey in 2012.

Methods

A 'bus route' creel survey design (described by Jones and Robson, 1991) was chosen to assess angling pressure and harvest for the fishery. The "bus route" survey is a timed driving route where a creel clerk sits at each public fishing access site for a prescribed amount of time and then moves on to the next access site. We identified six access sites available to the public in the study area all of which were included in the survey. All but one of the six access sites was located on public lands.

Each fourteen hour fishing day (0700 – 2100 hours) was divided into two seven hour survey periods; AM (0700 – 1400) and PM (1400 – 2100). The seven hour survey period, excluding travel time from site to site (approximately 80 minutes), was then divided up among

the six access points. Site locations are shown in Figure 10. Access sites that were known or thought to have higher angler visitation were allocated longer wait times

Creel days were stratified by weekend and weekday days. Creel surveys were conducted for nine randomly chosen days in April (five weekdays and four weekend days) and six days in May (four weekdays and two weekend days). The survey time period (AM/PM), starting location (access site), and direction of travel (clockwise or counterclockwise) were randomly chosen for each survey date.

The 'bus route' design utilized two types of data for estimating angler effort and catch (car counts and completed trip interviews, respectively). Total angler vehicle pressure (minutes) at each access site per creel clerk wait time was measured by counting the number of angler vehicles at arrival at a given site and recording arrival and departure times of all angler vehicles during the wait. The number of anglers per vehicle arriving at an access site was also recorded. Additionally, when vehicles departed an access site they were interviewed by creel personnel to obtain number of anglers, catch, and harvest rate data.

Methods used to estimate monthly angler effort and catch by day type are described in detail in Pollock et al. (1994). Specifically for the NFPR survey the total daily angler vehicle minutes recorded at each access site were doubled to account for the entire fishing day being surveyed (AM/PM). We then divided the doubled daily angler vehicle minutes at each site by the minutes of wait time at each site to get daily angler vehicle minutes per wait minutes per site. We then summed the angler vehicle minutes per wait minutes for each site to get total angler vehicle minutes for each survey day. Total daily angler vehicle minutes were expanded to to get hours.

Daily angler vehicle effort estimates were used to calculate average effort per day for weekdays and weekend days, separately, and those daily averages were used to calculate monthly effort for all fishing parties. Monthly angler vehicle effort was multiplied by the average number of anglers per party observed each month to estimate total angler hours. Finally, monthly catch and harvest estimates were calculated by multiplying monthly angler hours by average catch and harvest rates reported during completed trip interviews (number trout caught divided by time fished).

Results

Effort estimates

The creel survey was conducted from April 1, 2012 through May 25, 2012 on the NFPR. We sampled nine days in April and six days in May. Total angler vehicle effort for the entire survey was estimated to be 132 hours and total angler effort was 264 hours.

Total angler vehicle effort in April was estimated to be 76 hours and the total angler effort was estimated at 152 hours (+/- 268 hours). Anglers spent 108 hours on weekdays and 44 hours on weekend days. We observed a total of three angler vehicles during the nine survey days in April with an average of two anglers per vehicle. The average angler effort was 310 minutes per day on weekdays and 292 minutes per day on weekend days.

Total angler vehicle effort in May was estimated to be 66 hours and total angler effort 133 hours (+/- 315 hours). Only one angler vehicle, with two people, was observed during the six survey days in May.

Catch Estimates

We observed one Rainbow Trout caught per 27.3 hours of angling effort in the NFPR during the months of April and May, 2012, based on four completed trip interviews. No fish were reported caught in April and one Rainbow Trout was caught and released in May. Therefore, estimated harvest for the river during the two month survey period was zero. The estimated total catch for April was zero and based on one interview where two anglers fished for one hour and caught one Rainbow Trout the total catch estimate for May was 56. If we use the average catch rate for both months the total catch estimate was 10 Rainbow Trout.

Discussion

Very little fishing pressure was documented on the NFPR study area in April and May 2012. There were probably a small number of anglers accessing the river from private property but this number would be insignificant as the majority of anglers are forced to use public access sites. As word of this fishery gets out angler use will probably increase, however weather and river conditions in April and May can make access and fishing tough for all but the most serious anglers. We spent several days during the creel survey watching it snow or rain and the wind blow. Also, spring rains can cause snowmelt to swell and muddy up the river making it unfishable as happened in 2012 during our survey.

The 2013 IDFG statewide Fisheries Management Plan lists the NFPR as a general rule water, managed with stocked catchable-size Rainbow Trout. We do not believe special rules are warranted at this time as angling pressure is very low and much of the river is currently protected from the general angling public as public access is very limited on the lower 2/3 of the river. A small number of anglers currently float different sections of the river.

It is unlikely that these fish are remnant steelhead. The stretch of river between McCall and Smylie Lane Bridge has been chemically treated numerous times over the last 60 years to remove adult spawning Northern Pikeminnow. These “steelhead” are most likely progeny of steelhead catchables and fingerling stocked in Lake Cascade over the last ten years which migrated up the NFPR to spawn. The removal of spawning adult Northern Pikeminnow during the recent chemical treatments in 2005 and 2006 (Janssen et al. 2008) and subsequent reduction in predation on juvenile Rainbow Trout the following years, no doubt resulted in the recent surge in large, naturally produced, Rainbow Trout.

Management Recommendations

No change to the current fishing rule will be proposed. Management will continue under general fishing rules, with planted catchable Rainbow Trout utilized at public access sites on the NFPR.

NORTH FORK PAYETTE RIVER ABOVE PAYETTE LAKE - KOKANEE SPAWNER COUNTS

Introduction

The spawning run of Kokanee *Oncorhynchus nerka kennerlyi* into the 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. This estimate was completed again in 2012.

Methods

We completed Kokanee spawner counts by walking the entire stretch of river utilized by spawning Kokanee and counting all live spawners. Three counts were completed during the spawning run. Counts were made twice weekly until a peak count was established. The total run estimate was made by multiplying the largest daily count by 1.73 (Frost and Bennett 1994).

Results

We completed five Kokanee spawner counts on the NFPR. The highest live Kokanee spawner count was 852 fish on September 24th. The total spawning run estimate was 1,474 (852*1.73) fish (Table 23). There were two obvious age classes of spawners in 2012 and they averaged 376 and 440 mm in total length.

Discussion

Kokanee spawner counts were double the 2011 count. However hydroacoustic population estimates (this report) suggest an overall decline in Kokanee numbers in the lake.

Reasons for the decline are probably due to the lack of Kokanee stocking from the mid 1990's through the mid 2000's. A stock recruitment curve generated from Kokanee spawner counts versus number of spawners four years later, in years where no stocking occurred, indicate that wild fish alone would not maintain the Kokanee population (Janssen et al. 2013).

Kokanee numbers have not increased as a result of recent stockings and may indicate that predation on Kokanee has increased or that Kokanee numbers have declined to such low numbers that Kokanee stocking alone can no longer supply both prey for lake trout and sufficient spawners to maintain a viable population.

The lake trout population structure seemed to have remained relatively constant as of 2010. The 2010 gillnetting survey indicated no obvious increases in lake trout numbers or changes in length frequencies from prior surveys in the 1990's and 2000's (Janssen et al. 2011).

We stocked 87,500, 460,000, 263,265, 383,500, 400,000, and 398,000 Kokanee fingerlings from 2007 through 2012 in response to the drop in Kokanee numbers in recent years. Janssen et al. (2010) noted that stocked Kokanee do not show up as spawners until the fourth year following the year stocked. Therefore, 2012 was the second year we expected stocked Kokanee to contribute to the spawning run. This may be the reason for the two distinct

length groups of Kokanee observed in the 2012. Kokanee population estimates should be completed in each of the next several years to monitor the effectiveness of the Kokanee stockings.

Management Recommendations

1. Continue hydroacoustic surveys to estimate Kokanee population size in Payette Lake.
2. Continue annual Kokanee spawner counts as this is the most accurate method of monitoring Kokanee numbers and stocking success in Payette Lake.
3. Continue Kokanee stockings.
4. Consider stocking large numbers of adult Kokanee spawners captured from Deadwood Reservoir tributaries to further enhance Kokanee recruitment to the lake.

STANDARD STREAM SURVEYS

Introduction

The purpose of our standard stream surveys was to document the fish species present and physical habitat of streams in the North Fork Payette River drainage upstream of Payette Lake. We focused on streams that had not been previously surveyed.

Methods

The stream survey crew utilized the standard stream survey methodology presented by the August 15, 1994 memorandum by Bill Horton of Idaho Department Fish and Game. Physical habitat data was recorded only from streams where water was present. Water quality data was also collected from each stream as an addition to the standard stream methodology. Any other additionally instructive comments were recorded. Stream flows were calculated using dye time and volumetric stream measurements. Water quality was analyzed using pH, alkalinity, and hardness. Electrofishing included one pass for every 100 meter stream transect and a second pass was conducted if the first pass yielded any fish. Fish collected were identified and total length measured to the nearest millimeter.

Results

The crew completed a total of 10 IDFG standard stream surveys in the North Fork Payette River drainage in 2012. GPS coordinates of stream survey locations (downstream end of transect) are presented in and presence/absence of fish and amphibian species in specific habitat data for these surveys can be found in the Department's Standard Stream Survey Database.

Brook Trout *Salvelinus fontinalis* and Rainbow Trout were both found in eight of ten streams we surveyed (Table 24). Westslope Cutthroat Trout *Oncorhynchus clarkii lewisi* were only found in Fall Creek along with Rainbow Trout and Brook Trout. We found only Brook Trout in Powelson Creek. Sculpin *Cottidae spp.* were found in two streams. Tailed frogs *Ascaphus*

montanus were found in Rapid and Twah creeks, as well as in Brush Creek which also held a population of Idaho Giant salamanders *Dicamptodon aterrimus*.

TABLES

Table 1. Angler effort and catch rate by species and month from creel survey in 2012 on Rowland Pond.

Time Period	Day Type	Angler Effort	Estimated Catch	Estimated Harvest	Catch Rate (fish/hr)
5/12 – 5/31	**Weekdays**	**538 ± 1055**	**323**	**0**	**0.60**
	Weekends	980 ± 1788	1,088	329	1.11
June	**Weekdays**	**1,339 ± 1042**	**5,249**	**1,714**	**3.92**
	Weekends	2,534 ± 2455	1,191	527	0.47
July	**Weekdays**	**3,131 ± 1104**	**4,258**	**4,258**	**1.36**
	Weekends	717 ± 470	488	265	0.68
August	**Weekdays**	**542 ± 473**	**835**	**569**	**1.54**
	Weekends	209 ± 226	79	26	0.38
September	**Weekdays**	**759 ± 564**	**888**	**632**	**1.17**
	Weekends	179 ± 206	0	0	0.00
10/1 – 10/10	**Weekdays**	**0**	**0**	**0**	**0.00**
	Weekends	0	0	0	0.00
	Weekdays	**6,309**	**11,553**	**7,173**	**1.83**
Totals	Weekends	4,619	2,406	1,147	0.52
	Total	**10,928**	**14,399**	**8,320**	**1.32**

Table 2. Angler effort and catch rate by species and month from creel survey in 2012 on Brundage Reservoir.

			Estimated Catch			Estimated Harvest			
Time Period	**Day Type**	**Angler Effort**	**Rainbow Trout**	**Cutthroat Trout**	**Total**	**Rainbow Trout**	**Cutthroat Trout**	**Total**	**Catch Rate (fish/hr)**
6/19 – 6/30	**Weekdays**	**328 ± 154**	**49**	**0**	**49**	**0**	**0**	**0**	**0.15**
	Weekends	152 ± 172	0	26	26	0	0	0	0.17
July	**Weekdays**	**232 ± 454**	**0**	**232**	**232**	**0**	**0**	**0**	**1.00**
	Weekends	907 ± 705	0	136	136	0	0	0	0.15
August	**Weekdays**	**1764 ± 1335**	**794**	**582**	**1,376**	**0**	**53**	**53**	**0.78**
	Weekends	565 ± 373	192	90	282	68	17	85	0.50
September	**Weekdays**	**253 ± 462**	**0**	**0**	**0**	**0**	**0**	**0**	**0.00**
	Weekends	424 ± 831	0	0	0	0	0	0	0.00
10/1 – 10/10	**Weekdays**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.00**
	Weekends	0	0	0	0	0	0	0	0.00
	Weekdays	**2,577**							
Totals	Weekends	2,048							
	Total	**4,625**	**1,035**	**1,066**	**2,101**	**68**	**70**	**138**	**0.45**

Table 3. Angler effort and catch rate by species and month from creel survey in 2012 on Little Payette Lake.

			Estimated Catch				Estimated Harvest				
Time Period	Day Type	Angler Effort	Kokanee	Rainbow Trout	Smallmouth Bass	Total	Kokanee	Rainbow Trout	Smallmouth Bass	Total	Catch Rate (fish/hr)
5/12–5/31	**Weekdays**	**794 ± 607**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.00**
	Weekends	122 ± 46	44	0	15	59	44	0	0	44	0.48
June	**Weekdays**	**486 ± 501**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.00**
	Weekends	610 ± 563	0	0	269	269	0	0	269	269	0.44
July	**Weekdays**	**1,613 ± 868**	**65**	**274**	**145**	**484**	**65**	**274**	**0**	**339**	**0.30**
	Weekends	861 ± 725	129	0	431	560	129	0	0	129	0.65
August	**Weekdays**	**1,398 ± 1568**	**60**	**60**	**182**	**302**	**30**	**60**	**0**	**90**	**0.22**
	Weekends	447 ± 372	0	0	0	0	0	0	0	0	0.00
September	**Weekdays**	**216 ± 423**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.00**
	Weekends	92 ± 58	0	0	0	0	0	0	0	0	0.00
10/1-10/10	**Weekdays**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.00**
	Weekends	48	0	0	0	0	0	0	0	0	0.00
	Weekdays	**4,507**				**786**					**0.17**
Total	Weekends	2,180				888					0.41
	Total	**6,687**	**298**	**334**	**1,042**	**1,674**	**268**	**334**	**269***	**871**	**0.25**
1990 Totals		**9,360**	**58**	**3,611**	**53**	**3,722**					**0.40**

Table 4. Angler vehicle use estimates by month and day type at C. Ben Ross Reservoir from April 5 through August 27, 2012.

Time Period	Day Type	Total Vehicle Hours	# Days	Average Vehicle Hours/Day
4/5 – 4/30	**weekdays**	**106**	**18**	**5.9**
	weekends	8	8	1.0
May	**weekdays**	**132**	**22**	**6.0**
	weekends	16	9	1.8
June	**weekdays**	**219**	**21**	**10.4**
	weekends	83	9	9.2
July	**weekdays**	**280**	**23**	**12.2**
	weekends	48	8	6.0
8/1 – 8/27	**weekdays**	**59**	**19**	**3.1**
	weekends	49	8	6.1
	weekdays	**796**	**103**	**7.7**
Totals	weekends	203	42	4.8
	Total	**999**	**145**	**6.9**

Table 5. Angling pressure estimates by month and day type on Fischer Pond from May 1 through October 9, 2012.

Time Period	Day Type	Total Angler Hours	# Days	Average Angler Hours/Day
May	**weekdays**	**100**	**22**	**4.5**
	weekends	164	8	20.5
June	**weekdays**	**107**	**21**	**5.1**
	Weekends	397*	9	44.1
July	**weekdays**	**196**	**22**	**8.9**
	weekends	152	9	16.9
Aug	**weekdays**	**122**	**23**	**5.3**
	weekends	101	8	12.7
Sept	**weekdays**	**46**	**20**	**2.3**
	weekends	60	10	6.0
10/1 – 10/8	**weekdays**	**18**	**6**	**3.0**
	weekends	0	2	0.0
	weekdays	**589**	**114**	**5.2**
Totals	weekends	874	46	19.0
	Total	**1,463**	**160**	**9.1**

*120 hours on free fishing day.

Table 6. Merwin trap catch by species, size, and mark by month in summer 2012 in Little Payette Lake

Species/Size/Mark	May	June	Grand Total
Largescale Suckers (> 250 mm)	166	29	195
Largescale Suckers (< 250 mm)	4	0	4
N. pikeminnow (> 250 mm)	10	25	35
N. pikeminnow (< 250 mm)	29	28	57
Tiger Muskie	50	28	78
Smallmouth Bass	1	0	1
Kokanee	27	6	33
Rainbow Trout	256	212	468
Brook Trout	1	1	2
Sculpin spp.	9	0	9
Total	553	329	882

Table 7. Length frequencies of fish collected from Merwin Traps during summer, 2012 in Little Payette Lake.

Total Length (mm)	Kokanee	Largescale Sucker	Northern Pikeminnow	Rainbow Trout	Smallmouth Bass
30-39	0	0	0	0	0
40-49	0	1	0	0	0
50-59	0	0	0	0	0
60-69	0	0	0	0	0
70-79	1	0	0	0	0
80-89	2	0	0	0	0
90-99	6	0	1	0	0
100-109	14	0	4	0	0
110-119	3	0	0	0	0
120-129	3	0	0	2	0
130-139	0	0	0	0	0
140-149	0	0	1	0	0
150-159	0	1	1	0	0
160-169	0	0	7	1	0
170-179	1	0	6	2	0
180-189	0	0	29	2	0
190-199	0	0	4	10	0
200-209	1	0	3	7	0
210-219	0	2	0	26	0
220-229	0	0	0	333	0
230-239	0	0	1	19	0
240-249	0	0	0	25	0
250-259	0	1	0	16	0
260-269	0	1	0	7	0
270-279	0	0	1	2	0
280-289	0	0	1	2	0
290-299	0	0	0	1	0
300-309	0	0	2	1	0
310-319	0	0	0	1	0
320-329	0	0	2	0	0
330-339	0	0	1	0	0
340-349	0	0	3	0	0
350-359	0	0	0	0	0
360-369	0	0	0	0	1
370-379	0	0	2	0	0
380-389	0	0	1	0	0
390-399	0	0	0	0	0
400-409	0	0	1	0	0
410-419	0	1	0	0	0

Table 7. Cont.

Total Length (mm)	Kokanee	Largescale Sucker	Northern Pikeminnow	Rainbow Trout	Smallmouth Bass
420-429	0	2	1	0	0
430-439	0	1	0	0	0
440-449	0	4	0	1	0
450-459	0	6	0	2	0
460-469	0	4	1	2	0
470-479	0	6	0	3	0
480-489	0	5	0	1	0
490-499	0	10	0	0	0
500-509	0	24	3	0	0
510-519	0	31	0	2	0
520-529	0	35	1	0	0
530-539	0	24	1	0	0
540-549	0	20	2	0	0
550-559	0	9	4	0	0
560-569	0	2	2	0	0
570-579	0	5	2	0	0
580-589	0	2	2	0	0
590-599	0	1	0	0	0
600-609	0	1	1	0	0
Total-2012	31	199	92	11 (468) [a]	1
% of Catch[b]	0.07	0.48	0.22	0.03	0.00
Total-2011	29	242	187	10	11
% of catch	0.05	0.41	0.32	0.02	0.02

a. 11 of the 468 Rainbow Trout collected were of pre, 2012 stocked catchable origin.
b. Only the 11 Rainbow Trout greater than 320mm were used in the 2012 “% of catch” calculation.

Table 8. Hydroacoustic survey transect data including number of pings analyzed, nautical area scattering coefficient (NASC), mean target strength (dB), and density estimates (no./ha) of Kokanee in each transect in Payette Lake, July 28-29, 2012.

Transect Number	Number of Pings Analyzed	NASC	Mean Target Strength (-dB)	Kokanee Density (number/ha)				
				Class 1	Class 2	Class 3	Class 4	TOTAL
1	1742	3.70	48.0	47	5	0	2	54
2	1134	12.62	31.3	0	2	2	0	4
3	1193	8.95	39.3	6	0	12	0	18
4	1996	0.35	55.9	31	0	0	0	31
5	2381	5.67	40.4	4	2	8	0	15
6	1513	8.25	50.0	148	44	0	0	192
7	2619	3.66	48.6	45	14	3	0	62
8	2738	4.54	47.2	40	9	6	0	55
9	1458	16.08	47.4	150	31	24	0	204
10	1482	1.99	55.7	173	0	0	0	173
11	1497	10.07	45.8	76	0	13	0	89
12 & 13	4641	0.43	54.4	27	0	0	0	27
14	2812	10.13	34.7	3	1	0	3	7
15	3809	4.54	45.1	27	5	0	2	34
16	3524	3.24	44.5	20	1	0	0	21
17	3921	4.38	43.5	11	6	6	0	23
18	3930	3.91	41.0	7	2	0	2	11

Table 9. Density and abundance estimates of Kokanee in Payette Lake from a hydroacoustic survey on July 28-29, 2012.

Section (area)	Kokanee Size Class	Density (fish/ha)		Abundance	
		Estimate	90% CI (+/-)	Estimate	90% CI (+/-)
East (726 ha)	Natural Fry	52	-	38,044	-
	Class 2	12	-	8,647	-
	Class 3	6	-	4,353	-
	Class 4	0	-	191	-
	Total	71	-	51,235	-
Narrows (90 ha)	Natural Fry	124	-	11,197	-
	Class 2	0	-	-	-
	Class 3	7	-	602	-
	Class 4	0	-	-	-
	Total	131	-	11,799	-
Southwest (899 ha)	Natural Fry	16	-	14,248	-
	Class 2	3	-	2,416	-
	Class 3	1	-	918	-
	Class 4	1	-	1,001	-
	Total	21	-	18,583	-
TOTAL (1,715 ha)	Natural Fry	40	20	63,489	35,041
	Class 2	7	5	11,063	8,820
	Class 3	4	3	5,873	4,855
	Class 4	1	0	1,192	692
	TOTAL	51	26	81,617	43,951

Table 10. Size class specific abundance, density, and survival estimates of Kokanee in Payette Lake from hydroacoustic surveys, 2009-2012. Size class estimates were combined in years when discerning acoustic size class breaks was not possible.

Year	Abundance (x 1,000)				
	Class 1	**Class 2**	**Class 3**	**Class 4**	**Total**
2009	104.5	17.2		4.8	126.5
2010	191.9	29.1	10.0	2.6	233.6
2011	84.7	37.0	14.4	3.8	139.9
2012	63.5	11.1	5.9	1.2	81.6
Year	**Density (Kokanee/ha)**				
	Class 1	**Class 2**	**Class 3**	**Class 4**	**Total**
2009	65	11		3	79
2010	112	17	6	1	136
2011	49	22	8	2	82
2012	40	7	4	1	51
Year	**Survival (%)**				
	Class 1	**Class 2**	**Class 3**	**Class 4**	**Total**
2009	N.A.	N.A.	N.A.	N.A.	36%
2010	N.A.	28%	73%		32%
2011	N.A.	19%	49%	38%	24%
2012	N.A.	13%	16%	8%	13%

Table 11. Estimated lake volume, stream flows and Prentox Noxfish-Fish Toxicant concentrations and amounts applied at various sites on October 31, 2012 to Lost Valley Reservoir and inflow tributaries.

Application Location	Water Volume/flow	Rotenone Treatment Concentration (ppm)	Amount Synpren Applied	Duration	Comments
Lake Proper	137 acre ft.	1.7	303 L	1 hour	Aerial application
Lost Creek Drip Station (Upstream of forks)	14.0 cfs	2.0	27 L	8 hours	
Lost Creek Drip Station (Wildlife Interpretive Site)	75 cfs	1.8	62 L	4.5 hours	Treated @ dam outflow cfs
Lost Creek Drip Station (Mid-Reservoir)	75 cfs	1.9	227 L	15.8 hours	
Spring West side of Reservoir	.51 cfs	2.0	1.5 L	4 hours	
Marshy areas, oxbows, and plunge pools below dam and spillway	?	10:1 dilution	3 L	1 application	
Pool above dam	137 acre ft.	0.11	19 L	1 app.	Disposal of 15+ year old Noxfish
Total Synpren applied			642.5 L		

Table 12. Gill netting survey site locations with GPS coordinates (WGS 84) on Lake Cascade used in both June and October 2012.

Site Name/Location	Latitude	n	Longitude	w	WPT Name
Arrowhead Point	44.6550	N	116.0918	W	ARRWHD
Boulder Creek Point	44.6847	N	116.1012	W	BLDRCR
Buttercup Campground	44.6833	N	116.1136	W	BTTRCP
Cabarton Recreation Area	44.4978	N	116.0630	W	CBRTN
Crown Point	44.5361	N	116.0674	W	Crwn P
Point South of SL Boat ramp	44.5625	N	116.0706	W	Vista
Inlet of Deer Creek	44.5658	N	116.1414	W	Deer C
Lake Fork-North Fork Point	44.6977	N	116.1127	W	LF/NF
Mid Lake West of SL Boat Ramp	44.5890	N	116.1052	W	Mid Lk
North French Creek*	44.5407	N	116.1169	W	Vn Wyk
North side of SL Island	44.6148	N	116.0848	W	N SL I
Northwest Bank from SL	44.6324	N	116.1106	W	NW BNK
Railroad Trestle	44.6776	N	116.0785	W	RR TRS
Sugarloaf Point	44.5897	N	116.0754	W	SL PT
West Bank from SL Boat Ramp	44.6000	N	116.1363	W	W Bnk

*Site not sampled in June survey.

Table 13. Gill net catch by species, number, and weight collected from Lake Cascade in spring 2011, June 2012, and October 2012.

	Number			Percent of Total Catch			Total Weight (kg)			Percent of Total Weight		
Species	**Spring 2011**	**Spring 2012**	**Fall 2012**	**Spring 2011**	**Spring 2012**	**Fall 2012**	**Spring 2011**	**Spring 2012**	**Fall 2012**	**Spring 2011**	**Spring 2012**	**Fall 2012**
Yellow Perch	578	431	608	34.8	32.8	34.6	170.2	161.0	138.4	21.3	16.0	12.8
Black Bullhead	356	59	74	21.5	4.5	4.2	81.2	23.5	25.0	10.4	2.3	2.4
Northern Pikeminnow	269	237	351	16.3	18.0	19.9	125.6	153.8	145.1	15.7	15.3	13.4
Largescale Sucker	212	276	353	12.7	21.0	20.1	307.0	523.8	601.9	38.4	52.0	55.7
Smallmouth Bass	94	50	64	5.6	3.7	3.6	45.4	31.2	47.9	5.7	3.1	4.4
Largemouth Bass	0	0	2	0.0	0.0	0.1	0.0	0.0	2.2	0.0	0.0	0.2
Rainbow Trout	88	143	145	5.3	10.8	8.2	38.9	44.1	68.6	4.8	4.4	6.3
Mountain Whitefish	26	69	10	1.6	5.2	0.6	7.1	34.6	2.5	1.0	3.4	0.2
Coho Salmon	18	43	4	1.1	3.3	0.2	6.4	28.5	3.3	0.8	2.8	0.3
Kokanee (Early)	11	4	39	0.7	0.3	2.2	10.1	3.9	38.4	1.3	0.4	3.5
Pumpkinseed	3	1	100	0.2	0.1	5.7	0.2	0.2	4.5	0.0	0.0	0.4
Black Crappie	1	1	7	0.1	0.0	0.3	0.3	0.0	0.2	0.1	0.0	0.0
Tiger Muskie	1	0	0	0.1	0.0	0.0	3.6	0.0	0.0	0.5	0.0	0.0
Channel Catfish	0	1	1	0.0	0.1	0.1	0.0	1.6	3.9	0.0	0.2	0.4
Brook Trout	0	1	2	0.0	0.1	0.1	0.0	0.5	0.4	0.0	0.1	0.0
Total	1657	1316	1760	100	99.9	99.9	796	1007	1082	100	100	100

Table 14. Length frequencies of fish collected from Lake Cascade with gill nets from June 6 through June 13, 2012.

Total Length (mm)	Brook Trout	Black Bullhead	Channel Catfish	Coho Salmon	Kokanee	Largescale Sucker	Mountain Whitefish	Northern Pikeminnow	Pumpkin seed	Rainbow Trout	Smallmouth Bass	Black Crappie	Yellow Perch
110-119	0	0	0	0	0	0	1	0	0	0	0	0	0
120-129	0	0	0	0	0	0	0	0	0	0	0	1	0
130-139	0	0	0	0	0	0	0	0	0	0	0	0	6
140-149	0	0	0	0	0	0	0	0	0	1	1	0	21
150-159	0	0	0	0	0	1	0	0	0	8	0	0	20
160-169	0	0	0	0	0	0	0	0	0	15	0	0	9
170-179	0	0	0	0	0	0	1	1	1	16	0	0	10
180-189	0	3	0	0	0	0	0	6	0	4	0	0	14
190-199	0	8	0	0	0	0	0	8	0	4	2	0	18
200-209	0	1	0	0	0	0	0	9	0	0	1	0	14
210-229	0	4	0	0	0	1	0	3	0	1	1	0	13
220-229	0	4	0	0	0	0	0	6	0	5	0	0	12
230-239	0	7	0	0	0	2	1	13	0	8	1	0	10
240-249	0	6	0	0	0	1	0	11	0	12	3	0	21
250-259	0	1	0	0	0	1	1	9	0	12	3	0	14
260-269	0	3	0	0	1	0	1	17	0	9	4	0	12
270-279	0	3	0	0	0	0	0	12	0	4	3	0	25
280-289	0	3	0	0	0	2	7	7	0	5	1	0	30
290-299	0	3	0	1	0	2	4	4	0	4	0	0	30
300-309	0	3	0	0	0	2	6	7	0	3	3	0	25
310-319	0	1	0	0	0	0	7	7	0	2	1	0	18
320-329	0	1	0	0	0	5	4	9	0	2	2	0	19
330-339	1	2	0	1	0	2	9	11	0	0	1	0	29
340-349	0	0	0	0	0	2	4	6	0	0	3	0	25
350-359	0	2	0	4	0	7	4	7	0	6	2	0	17
360-369	0	1	0	1	0	4	3	2	0	0	2	0	12
370-379	0	1	0	7	0	5	5	5	0	0	4	0	4
380-389	0	0	0	10	0	7	3	8	0	3	3	0	2
390-399	0	0	0	6	0	3	5	6	0	4	2	0	1
400-409	0	1	0	1	0	4	1	4	0	1	1	0	0
410-419	0	1	0	1	0	4	0	2	0	4	2	0	0
420-429	0	0	0	2	0	4	0	7	0	0	2	0	0
430-439	0	0	0	2	1	3	0	8	0	1	1	0	0
440-449	0	0	0	3	0	3	1	6	0	1	0	0	0

Table 14. Cont.

Total Length (mm)	Brook Trout	Black Bullhead	Channel Catfish	Coho Salmon	Kokanee	Largescale Sucker	Mountain Whitefish	Northern Pikeminnow	Pumpkin seed	Rainbow Trout	Smallmouth Bass	Black Crappie	Yellow Perch
450-459	0	0	0	0	1	7	0	10	0	0	1	0	0
460-469	0	0	0	1	1	11	0	1	0	2	0	0	0
470-479	0	0	0	1	0	10	1	4	0	2	0	0	0
480-489	0	0	1	0	0	14	0	3	0	1	0	0	0
490-499	0	0	0	1	0	18	0	3	0	1	0	0	0
500-509	0	0	0	1	0	9	0	3	0	0	0	0	0
510-519	0	0	0	0	0	20	0	3	0	1	0	0	0
520-529	0	0	0	0	0	19	0	0	0	0	0	0	0
530-539	0	0	0	0	0	16	0	0	0	0	0	0	0
540-549	0	0	0	0	0	12	0	0	0	0	0	0	0
550-559	0	0	0	0	0	16	0	1	0	0	0	0	0
560-569	0	0	0	0	0	11	0	3	0	1	0	0	0
570-579	0	0	0	0	0	4	0	0	0	0	0	0	0
580-589	0	0	0	0	0	12	0	1	0	0	0	0	0
590-599	0	0	0	0	0	8	0	3	0	0	0	0	0
600-609	0	0	0	0	0	7	0	1	0	0	0	0	0
610-619	0	0	0	0	0	6	0	0	0	0	0	0	0
620-629	0	0	0	0	0	0	0	0	0	0	0	0	0
630-639	0	0	0	0	0	6	0	0	0	0	0	0	0
640-649	0	0	0	0	0	2	0	0	0	0	0	0	0
650-659	0	0	0	0	0	1	0	0	0	0	0	0	0
660-669	0	0	0	0	0	0	0	0	0	0	0	0	0
670-679	0	0	0	0	0	1	0	0	0	0	0	0	0
680-689	0	0	0	0	0	0	0	0	0	0	0	0	0
690-699	0	0	0	0	0	0	0	0	0	0	0	0	0
700-709	0	0	0	0	0	0	0	0	0	0	0	0	0
710-719	0	0	0	0	0	0	0	0	0	0	0	0	0
720-729	0	0	0	0	0	1	0	0	0	0	0	0	0
Total	1	59	1	43	4	276	69	237	1	143	50	1	431

Table 15. Length frequencies of fish collected from Lake Cascade with gill nets from October 1 through October 9, 2012.

Total Length (mm)	Black Crappie	Brook Trout	Black Bullhead	Channel Catfish	Coho Salmon	Kokanee	Largemouth Bass	Largescale Sucker	Mountain Whitefish	Northern Pikeminnow	Pumpkin seed	Rainbow Trout	Smallmouth Bass	Yellow Perch
60-69	0	0	0	0	0	0	0	0	0	0	0	0	0	1
70-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80-89	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90-99	0	0	0	0	0	0	0	0	0	0	17	0	0	1
100-109	0	0	0	0	0	0	0	0	0	0	8	0	0	0
110-119	1	0	0	0	0	0	0	0	0	0	6	0	0	0
120-129	0	0	0	0	0	0	0	0	0	0	19	0	0	5
130-139	0	0	0	0	0	0	0	0	0	0	20	0	1	6
140-149	2	0	0	0	0	0	0	0	0	0	6	0	3	28
150-159	0	0	0	0	0	0	0	0	0	0	6	0	0	45
160-169	1	0	0	0	0	1	0	0	0	1	12	0	1	40
170-179	2	0	0	0	0	3	0	6	0	8	4	1	0	17
180-189	0	0	1	0	0	0	0	2	0	14	1	1	1	17
190-199	0	0	1	0	0	1	0	5	1	26	1	4	1	32
200-209	0	0	0	0	0	0	0	2	2	31	0	4	0	45
210-229	1	0	2	0	0	0	0	0	0	23	0	6	0	31
220-229	0	0	4	0	0	0	0	0	0	16	0	2	0	27
230-239	0	0	0	0	0	0	0	7	2	10	0	10	2	23
240-249	0	1	1	0	0	0	0	10	0	10	0	6	4	21
250-259	0	0	5	0	0	0	0	7	0	20	0	11	1	26
260-269	0	0	12	0	0	0	0	2	0	20	0	13	0	20
270-279	0	0	11	0	0	0	0	1	0	7	0	12	5	14
280-289	0	1	8	0	0	0	0	3	0	11	0	9	1	22
290-299	0	0	16	0	0	0	0	2	0	7	0	4	3	26
300-309	0	0	4	0	0	2	0	9	0	11	0	9	1	33
310-319	0	0	0	0	0	0	0	6	2	6	0	7	1	26
320-329	0	0	2	0	0	0	0	4	0	4	0	4	2	17
330-339	0	0	1	0	0	0	0	7	1	6	0	2	2	22
340-349	0	0	4	0	1	0	0	6	0	10	0	3	3	18
350-359	0	0	0	0	0	0	0	6	0	10	0	3	2	19
360-369	0	0	0	0	0	0	0	8	1	11	0	0	5	13
370-379	0	0	2	0	0	0	1	1	0	12	0	0	3	9
380-389	0	0	0	0	0	0	0	8	0	4	0	0	3	1
390-399	0	0	0	0	0	0	1	0	0	8	0	2	0	0
400-409	0	0	0	0	0	0	0	7	0	2	0	4	0	1

Table 15. Cont.

Total Length (mm)	Black Crappie	Brook Trout	Black Bullhead	Channel Catfish	Coho Salmon	Kokanee	Largemouth Bass	Largescale Sucker	Mountain Whitefish	Northern Pikeminnow	Pumpkin seed	Rainbow Trout	Smallmouth Bass	Yellow Perch
410-419	0	0	0	0	0	0	0	6	0	10	0	0	0	0
420-429	0	0	0	0	0	1	0	8	1	6	0	3	3	1
430-439	0	0	0	0	0	2	0	12	0	9	0	4	6	1
440-449	0	0	0	0	0	1	0	8	0	5	0	2	1	0
450-459	0	0	0	0	3	1	0	1	0	3	0	2	3	0
460-469	0	0	0	0	0	4	0	12	0	6	0	0	5	0
470-479	0	0	0	0	0	8	0	11	0	6	0	0	0	0
480-489	0	0	0	0	0	7	0	8	0	4	0	0	0	0
490-499	0	0	0	0	0	3	0	12	0	5	0	5	0	0
500-509	0	0	0	0	0	3	0	6	0	6	0	2	0	0
510-519	0	0	0	0	0	1	0	20	0	1	0	1	0	0
520-529	0	0	0	0	0	1	0	16	0	0	0	5	1	0
530-539	0	0	0	0	0	0	0	19	0	0	0	0	0	0
540-549	0	0	0	0	0	0	0	19	0	0	0	2	0	0
550-559	0	0	0	0	0	0	0	14	0	1	0	0	0	0
560-569	0	0	0	0	0	0	0	13	0	0	0	0	0	0
570-579	0	0	0	1	0	0	0	4	0	0	0	1	0	0
580-589	0	0	0	0	0	0	0	5	0	1	0	0	0	0
590-599	0	0	0	0	0	0	0	10	0	0	0	0	0	0
600-609	0	0	0	0	0	0	0	5	0	0	0	0	0	0
610-619	0	0	0	0	0	0	0	15	0	0	0	0	0	0
620-629	0	0	0	0	0	0	0	7	0	0	0	1	0	0
630-639	0	0	0	0	0	0	0	8	0	0	0	0	0	0
640-649	0	0	0	0	0	0	0	2	0	0	0	0	0	0
650-659	0	0	0	0	0	0	0	1	0	0	0	0	0	0
660-669	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Total	7	2	74	1	4	39	2	353	10	351	100	145	64	608

Table 16. Total gill net catch by sample site of Yellow Perch and Northern Pikeminnow with catch variability by species, and estimates of future netting effort required to detect a 50% change in population numbers at 80% and 90% confidence intervals and 80% power in Lake Cascade in spring and fall, 2012 (one floating and one sinking experimental gill net at each site).

Spring	**Number Collected**		**Fall**	**Number Collected**	
Gill Netting Sites	**Yellow Perch**	**Northern Pikeminnow**	**Gill Netting Sites**	**Yellow Perch**	**Northern Pikeminnow**
Arrowhead Point	0	33	Arrowhead Point	21	33
Boulder Creek Point	15	58	Boulder Creek Point	75	77
Buttercup Campground	50	17	Buttercup Campground	23	22
Cabarton Recreation Area	57	4	Cabarton Recreation Area	14	14
Crown Point	40	18	Crown Point	19	9
Inlet of Deer Creek	34	10	Inlet of Deer Creek	46	6
Lake Fork-North Fork Point	20	6	Lake Fork-North Fork Point	47	12
Mid Lake West of SL Boat Ramp	25	0	Mid Lake West of SL Boat Ramp	33	6
North side of Sugarloaf island	120	7	North French Creek	28	4
Northwest bank from Sugarloaf Is.	0	9	North side of SL island	75	30
Point South of SL Boat ramp	12	25	Northwest bank from Sugarloaf Is.	17	12
Old Railroad Trestle	8	25	Point South of SL Boat ramp	30	29
Sugarloaf Point	45	20	Old Railroad Trestle	95	58
West Bank from Sugarloaf Boat Ramp	5	5	Sugarloaf Point	44	33
Grand Total	**431**	**237**	West Bank from Sugarloaf Boat Ramp	41	6
			Grand Total	**608**	**351**
Mean:	30.8	16.9	Mean:	40.5	23
Sample Std. Dev. (SD):	31.53	15.01	Sample Std. Dev. (SD):	24.145	20.996
SD/mean:	1.0240	0.8864	SD/mean:	0.5957	0.8973
Number of sites needed to detect:			**Number of sites needed to detect:**		
50% change, 80% CI, 80% power:	38	28	50% change, 80% CI, 80% power:	13	29
50% change, 90% CI, 80% power:	52	39	50% change, 90% CI, 80% power:	18	40

Table 17. Rainbow Trout fingerling strain, release site, stocking date, number stocked and average length at stocking in Lake Cascade in May and June 2012.

Mark Color	Fish Strain	Stocking Location	Date of First Stocking	Number Stocked	Average Length at Stocking (mm)
Red	Hayspur (Diploid)	Blue Heron B.R	5/31	188,740	153
Orange	Hayspur (Triploid)	Blue Heron B.R.	5/31	42,330	132
Green	Hayspur (Diploid)	Poison Cr. B.R. (North)	6/28	158,030	146

Table 18. Percent grit mark retention by color group and total number and percent of each color group of marked Rainbow Trout stocked by color in Lake Cascade in May and June 2012.

Mark color	Number Fish Examined for Mark	Number Marked	Mark retention	Number Stocked	Estimated Number of Marked Fish Stocked	% of Total Fish Stocked
Red	121	84	69%	188,740	130,230	44.1
Orange	122	98	80%	42,330	33,864	11.5
Green	120	100	83%	158,030	131,165	44.4

Table 19. Monthly gill net catch, catch per gill net night (CPUE), and weighted CPUE of marked fingerling Rainbow Trout stocked into Lake Cascade in May and June 2012.

Month	Mark Color	Number Collected	CPUE (per net night)	Weighted CPUE (# caught / # stocked x 100000)/# net nights	Mean Total Length (mm)	Growth From Previous Month (mm)
July*	Red	16	0.80	**0.6**	181	
	Orange	7	0.35	**1.05**	192	
	Green	22	1.10	**0.85**	171	
Aug**	Red	22	0.88	**0.7**	200	19
	Orange	12	0.48	**1.4**	184	-8
	Green	57	2.28	**1.7**	183	12
Sep*	Red	16	0.08	**0.6**	242	42
	Orange	8	0.04	**1.2**	225	41
	Green	21	1.05	**0.8**	223	40
Oct***	Red	17	0.57	**0.4**	271	29
	Orange	17	0.57	**1.7**	275	50
	Green	28	0.93	**0.7**	239	16

*20 net nights, 61 m fingerling nets.
**25 net nights, 61m fingerling nets.
***30 net nights/15 sites, one sinking and one floating net per site, Standard IDFG survey nets.

Table 20. Zooplankton ZQI values by site and date sampled on Lake Cascade 2013.

	Date Sampled					
Sample Site	**22-May**	**21-Jun**	**17-Jul**	**9-Aug**	**24-Sep**	**Average**
Poison Creek	0.05	0.04	0.04	0.02	0.06	0.04
Sugarloaf Island	0.58	0.77	0.00	0.02	0.27	0.33
Cascade City	0.89	1.54	0.07	0.02	0.11	0.53

Table 21. Access survey sites and wait times for the creel of the North Fork Payette River below McCall in April and May, 2012.

Site	Location	Wait Time
1	Outlet of Payette Lake to McCall Fish Hatchery	48 minutes
2	Boydstun Rd. Bridge	48 minutes
3	Sheep Bridge at Riverfront Park	72 minutes
4	Eddy Loop in Payette River Subdivision	48 minutes
5	Hat Ranch at end of Heinrich Rd.	72 minutes
6	Smylie Lane Bridge	72 minutes

Table 22. Transect site locations with GPS coordinates (downstream end) of IDFG standard stream surveys completed in the North Fork Payette River drainage in 2012.

Stream	Parent Drainage (HUC4)	Site location	Latitude (WGS 84)	Longitude (WGS 84)
Black Lee Creek	NFPR	Above Lick Creek Road	44.98905	-115.9555
Boulder Creek	NFPR	Above Louie Lake Road	44.87417	-116.0042
Brush Creek	NFPR	Above Bridge on Brush Cr. Road	45.06566	-116.0423
Fall Creek	NFPR	End of Fall Creek Road	44.95051	-116.0472
Jumbo Creek	NFPR	Above Lick Creek Road	44.91739	-115.9969
Powelson Creek	NFPR	Above Paddy Flat Road	44.78091	-115.8984
Rapid Creek	NFPR	Borrow Pit on Rapid Creek Road	44.80535	-115.9284
S.F. Kennally Cr.	NFPR	Above confluence w/ North Fork	44.78045	-115.8623
Tamarack Bay Cr.	NFPR	Above Eastside Drive	44.95694	-116.0504
Twah Creek	NFPR	Above Eastside Drive	45.00163	-116.0588

Table 23. Payette Lake Kokanee spawner counts and estimated spawning run size and biomass from 1988 through 2011 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	34,994	59,310[a]	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	36,300[e]	64,891[d]	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	15,690[g]	30,144[f]	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

[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.

Table 24. Fish and amphibian presence/absence data for IDFG standard stream survey sites completed in the North Fork Payette River drainage in 2012.

Stream	Easting UTM Coordinate (WGS 84)	Northing UTM Coordinate (WGS 84)	Rainbow Trout	Westslope Cutthroat	Brook Trout	Sculpin spp.	Tailed Frog	Idaho Giant Salamander
Black Lee Creek	44.98905	-115.9555	Y	N	Y	N	N	N
Boulder Creek	44.87417	-116.0042	Y	N	Y	N	N	N
Brush Creek	45.06566	-116.0423	Y	N	N	N	Y	Y
Fall Creek	44.95051	-116.0472	Y	Y	Y	Y	N	N
Jumbo Creek	44.91739	-115.9969	Y	N	Y	N	N	N
Powelson Creek	44.78091	-115.8984	N	N	Y	N	N	N
Rapid Creek	44.80535	-115.9284	Y	N	Y	Y	Y	N
S.F. Kennally Cr.	44.78045	-115.8623	Y	N	Y	N	N	N
Tamarack Bay Cr.	44.95694	-116.0504	Y	N	Y	N	N	N
Twah Creek	45.00163	-116.0588	Y	N	Y	N	Y	N

FIGURES

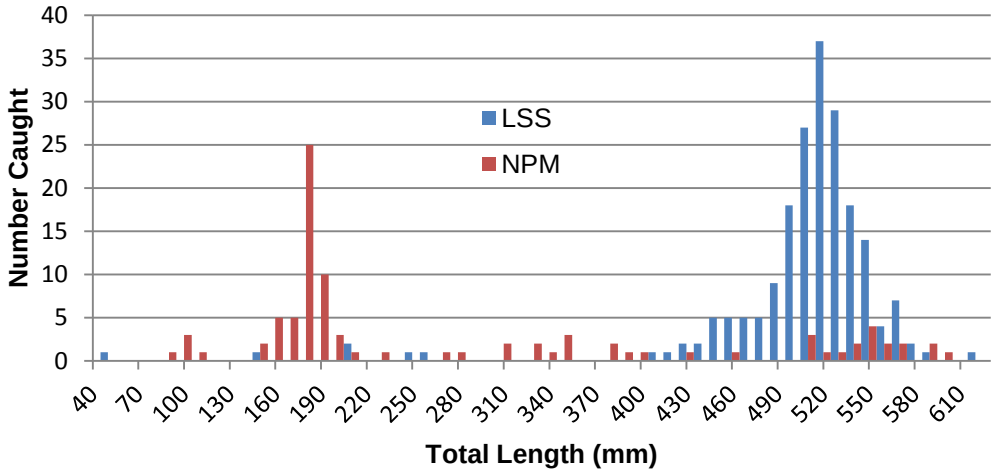

Figure 1. Length frequencies of Northern Pikeminnow and Largescale Sucker captured with Merwin traps in May and June 2012 in Little Payette Lake.

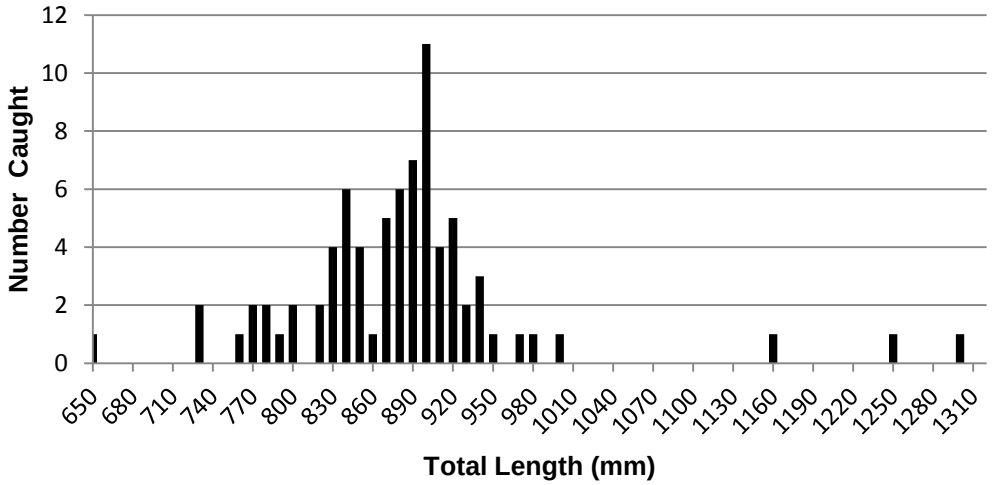

Figure 2. Length frequency of Tiger Muskie captured with Merwin Traps in May and June 2012 in Payette Lake.

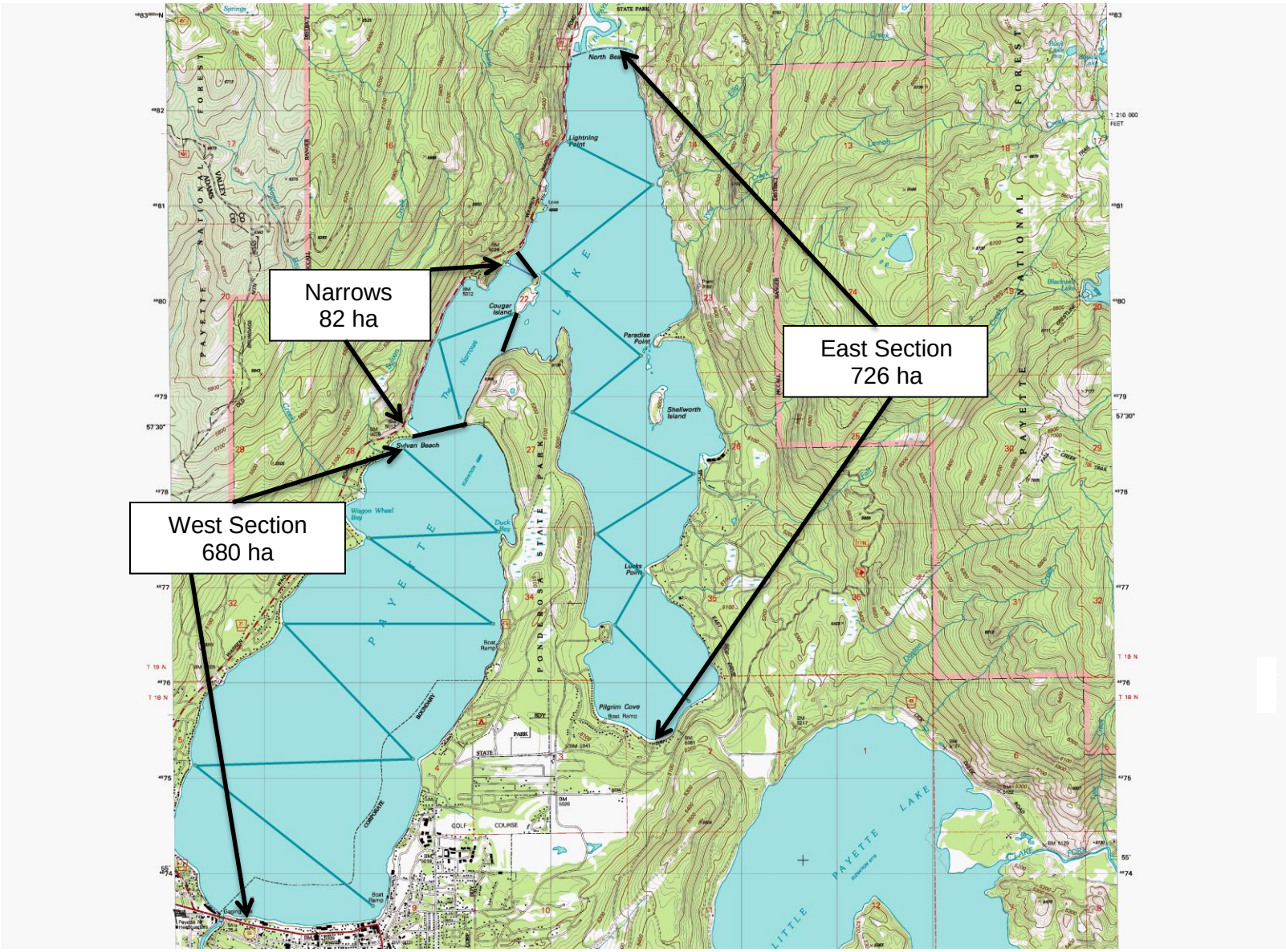

Figure 3. Hydroacoustic survey transects completed on Payette Lake on July 28, 2012.

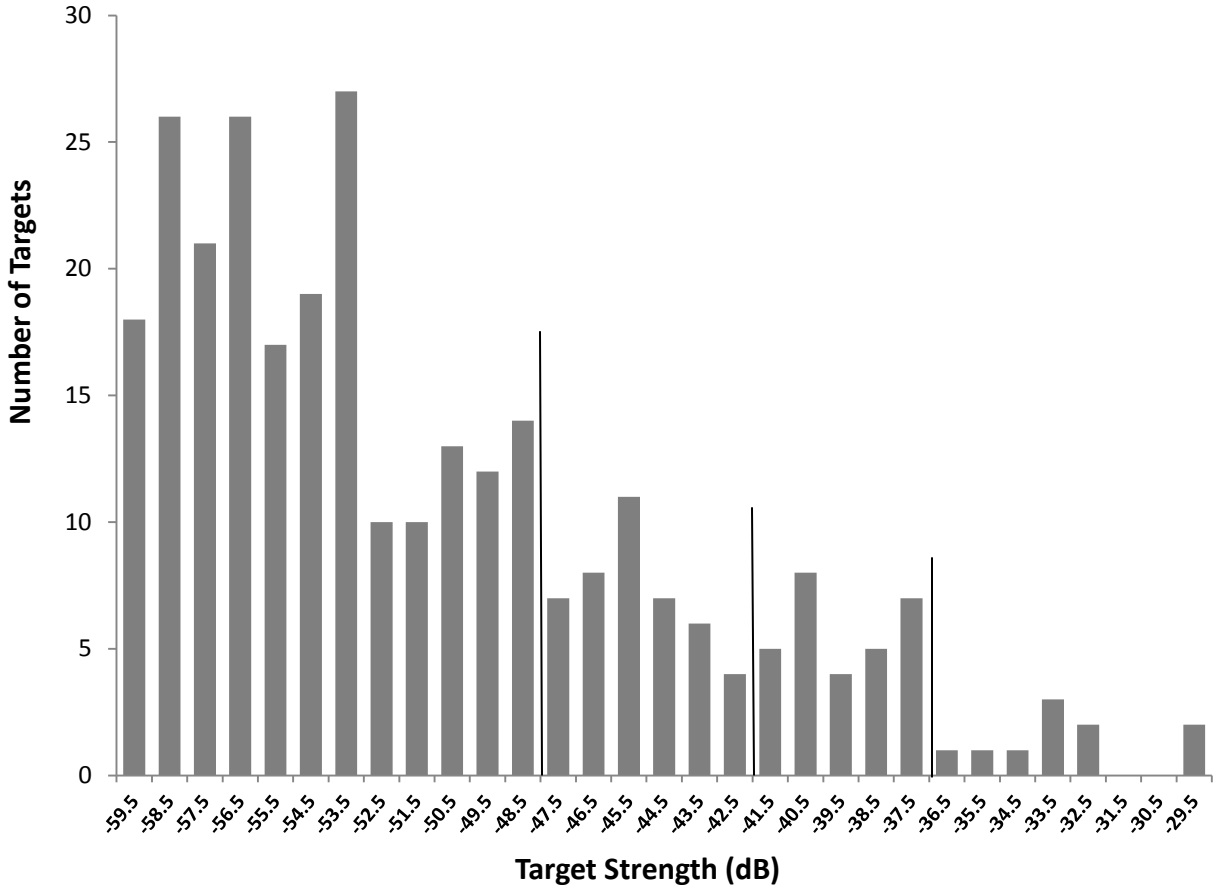

Figure 4. Frequency distribution of all fish target strengths recorded in hydroacoustic transects from the pelagic area of Payette Lake, July 28-29 2012.

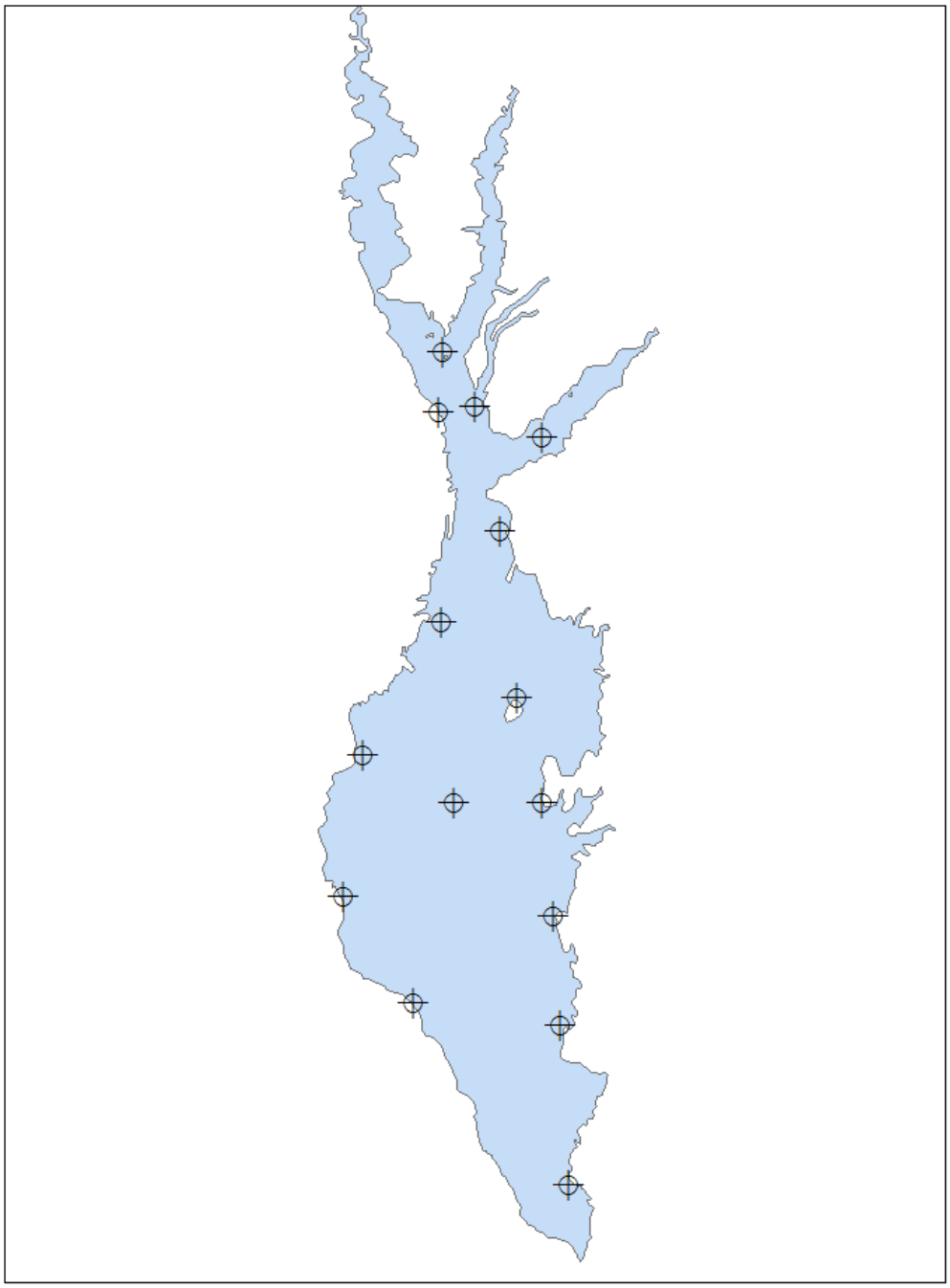

Figure 5. Gillnetting sites on Lake Cascade in June and October 2012.

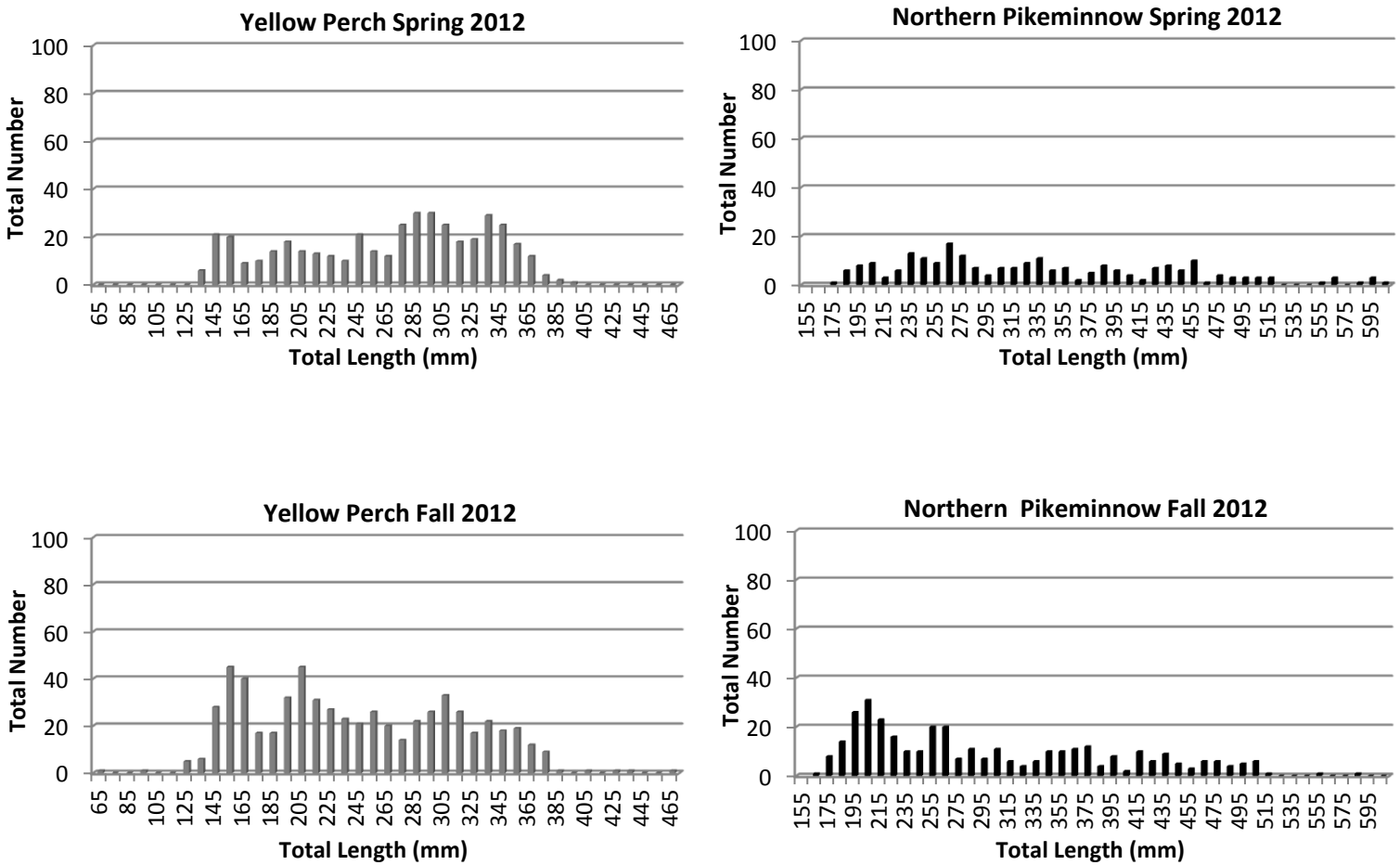

Figure 6. Length frequencies of Yellow Perch and Northern Pikeminnow collected with gill nets from Lake Cascade in spring and fall of 2012.

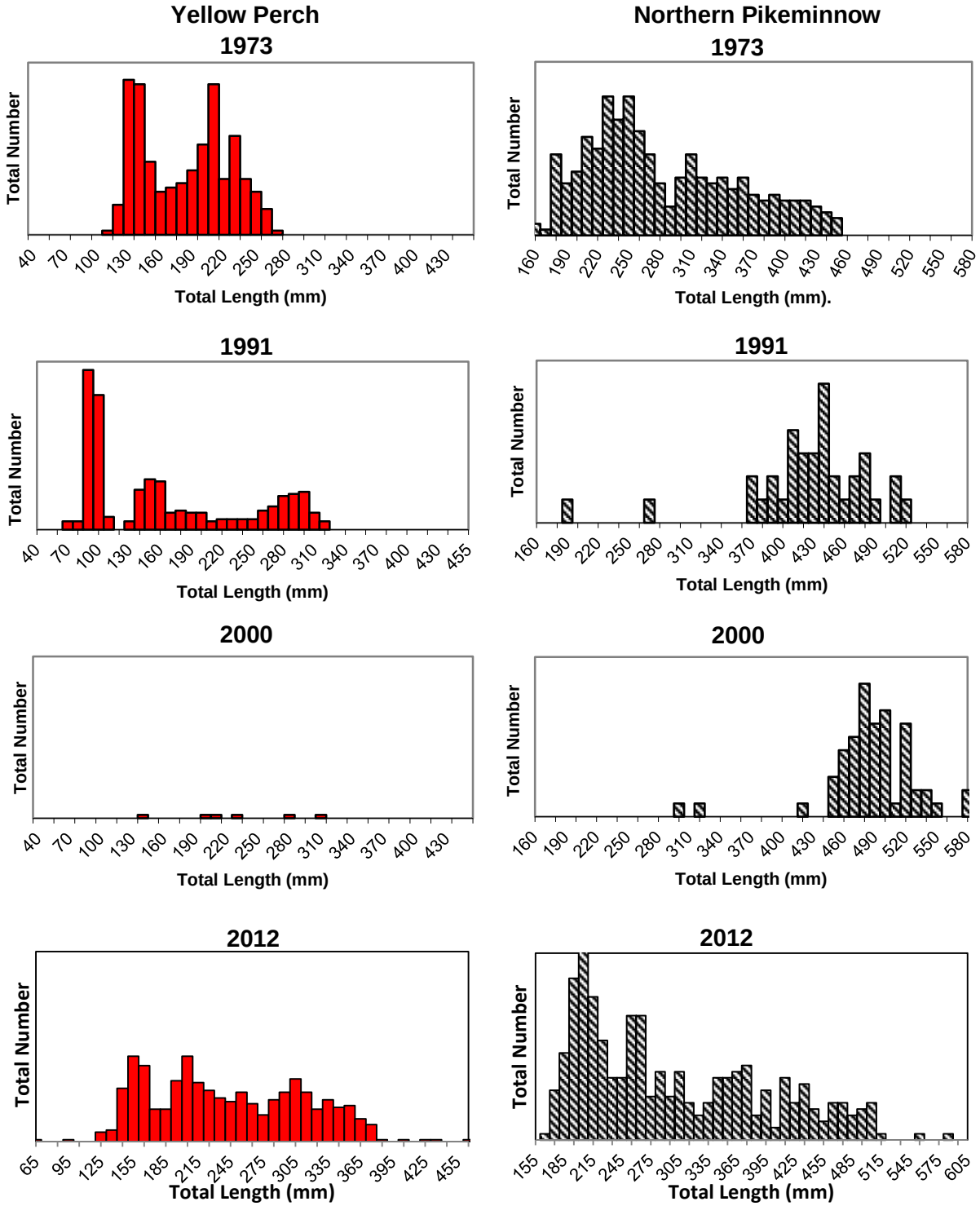

Figure 7. Length frequencies of Yellow Perch and Northern Pikeminnow collected with gillnets from Lake Cascade before (1973, 1991, and 2000), and after (Fall 2012) the Yellow Perch fishery restoration project treatments in 2004 through 2006.

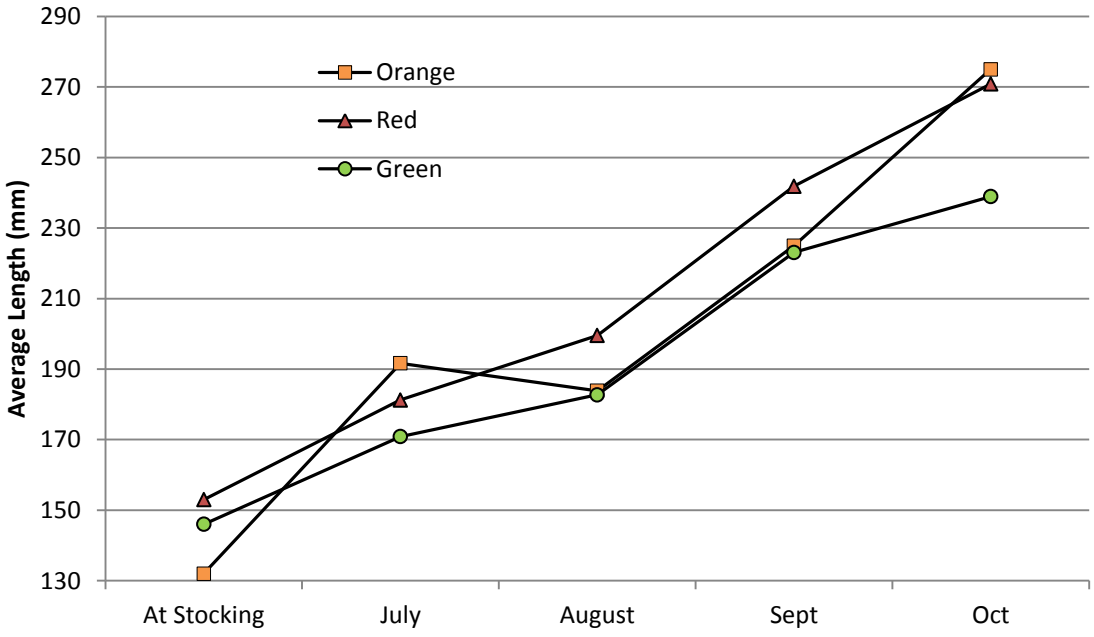

Figure 8. Total lengths of marked fingerling Rainbow Trout by month sampled in Lake Cascade.

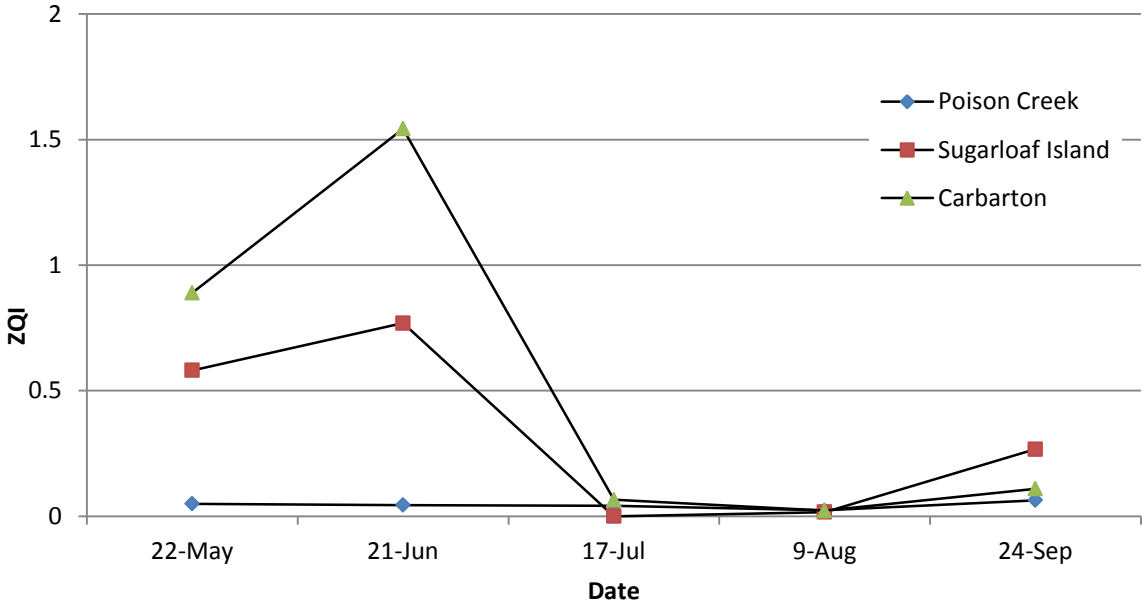

Figure 9. Plankton ZQI values by collection day sampled in Lake Cascade in 2012.

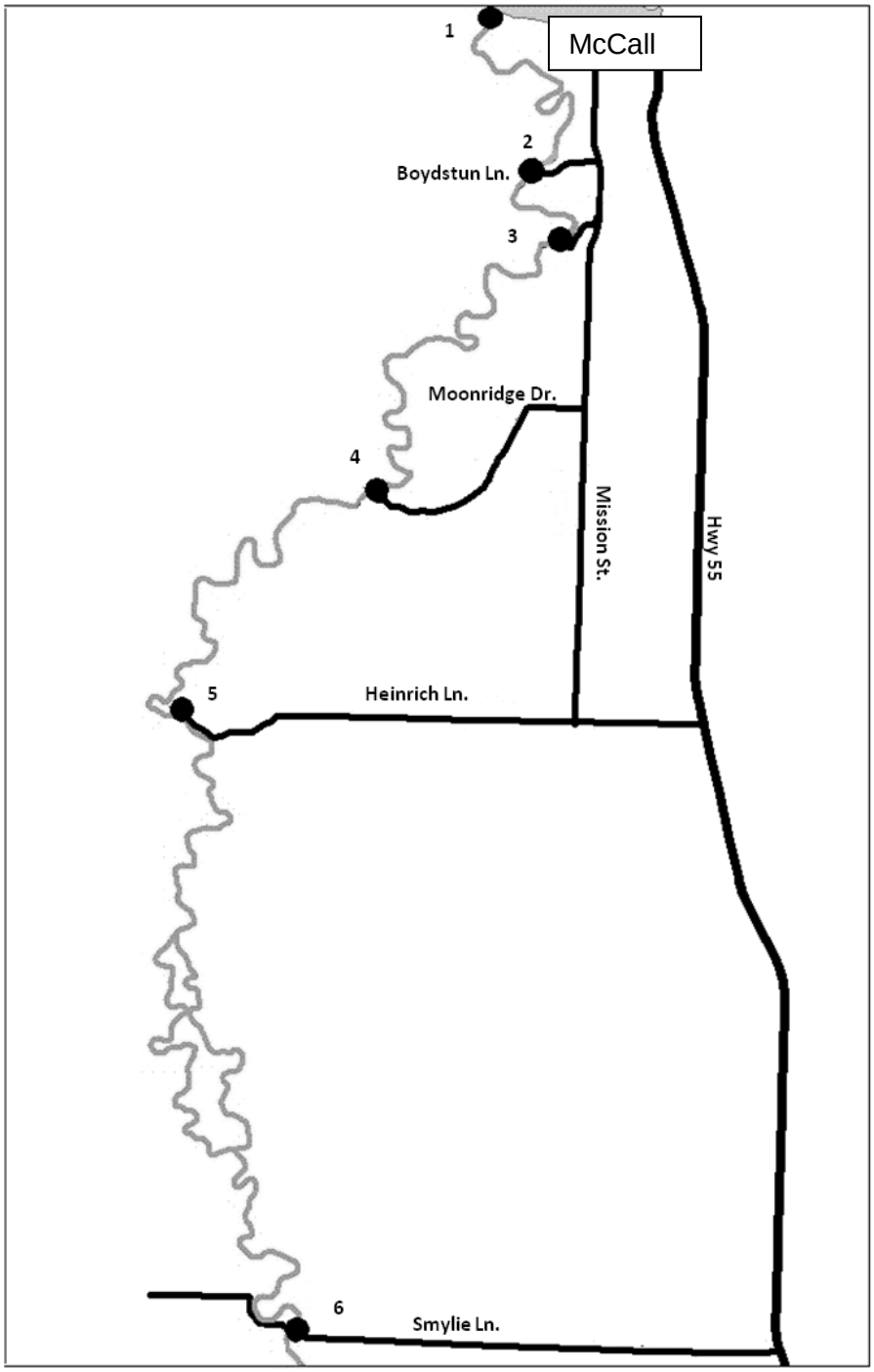

Figure 10. Map of North Fork Payette River access sites (Payette Lake outlet to Smylie Lane Bridge) creel surveyed in April and May, 2012.

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