FISHERY MANAGEMENT INVESTIGATIONS

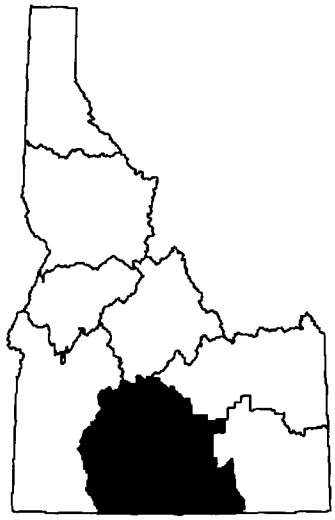
IDAHO DEPARTMENT OF FISH AND GAME

FISHERY MANAGEMENT ANNUAL REPORT

Cal Groen, Director

MAGIC VALLEY REGION

2006



By

Rob Ryan, Regional Fishery Biologist
Erin Gutknecht, Fishery Technician
Douglas Megargle, Regional Fishery Manager

Dec. 2008
IDFG 08-136

TABLE OF CONTENTS

2006 Magic Valley Region Fishery Management Report

	Page
Surveys and Inventories - Mountain Lakes	
Mountain Lakes Surveys – Perkons and Johnson Creek Lakes	
ABSTRACT	1
INTRODUCTION	2
METHODS	2
RESULTS AND DISCUSSION	2
MANAGEMENT RECOMMENDATIONS	3
Figures	4
Surveys and Inventories – Lowland Lakes and Reservoirs	
Lake and Reservoir Surveys – Anderson Ranch Reservoir, Lake Walcott, Magic Reservoir, Morrow Reservoir, Oakley Reservoir, and Salmon Falls Creek Reservoir	
ABSTRACT	5
INTRODUCTION	7
METHODS	9
RESULTS AND DISCUSSION	14
MANAGEMENT RECOMMENDATIONS	23
Figures	24
Tables	33
Surveys and Inventories – Rivers and Stream Investigations	
River and Stream Surveys – Billingsley Creek, Big Wood River, and Six Mile Creek	
ABSTRACT	50
INTRODUCTION	51
METHODS	52
RESULTS AND DISCUSSION	53
MANAGEMENT RECOMMENDATIONS	57
Figures	58
Tables	66
Literature Cited	71
Appendices	74

2006 Magic Valley Region Fishery Management Report

Mountain Lake Surveys

ABSTRACT

Magic Valley Region fishery management staff surveyed two mountain lakes during the reporting period.

Perkons Lake showed good survival of out-planted cutthroat trout *Oncorhynchus clarkii.* Trail use and fire-rings indicated low to moderate human activity and at least two life stages of amphibians were observed along the shore of the lake.

No fish were observed or sampled in Johnson Creek Lake. The lake exhibited few signs of human use or activity and antidotal information suggests that the lake may not support a fishery. Amphibians were observed but abundance appeared lower than in previous surveys.

INTRODUCTION

Perkons Lake

Perkons Lake is a 3.1 ha alpine cirque lake with a north facing exposure located in the Ross Fork drainage of the South Fork Boise River. There are two inlets and one outlet. Surface elevation of the lake is 2,655 meters (m). There is moderate use by anglers and campers. The lake was originally stocked in 1969 but was not regularly stocked until 1988 when a three year stocking rotation was implemented. Approximately 1,000 rainbow trout fry *O. mykiss* are stocked with a 2-3 year rotation.

Johnson Creek Lake

Johnson Creek Lake is a 1.4 ha alpine cirque lake with a south-east aspect located in the Ross Fork of the South Fork Boise River. Surface elevation of the lake is 2657 m above sea level. Johnson Creek drains into the Ross Fork of the South Fork Boise. The lake is accessed by trail with the remaining 1-2 km being extremely primitive.

Johnson Creek Lake was first stocked in 1988 and has received intermittent out-plants between then and 2006. Approximately 500 rainbow trout are stocked each time.

METHODS

Mountain Lake surveys are conducted using Idaho Department of Fish and Game (IDFG) standard protocol. Fish are sampled with one over-night gill net set. Nets are set and retrieved using a small inflatable raft or tube. Mountain lake gill nets, Swedish-made Lundgrens Type A lightweight multi-filament sinking gill nets measuring 1.5 m wide, with six 7.6 –m panels, in bar mesh sizes: 46, 38, 33, 30, 25, and 19 mm, are set overnight or at the discretion of the survey crew if lake size and or low fish abundance prohibit the full net set. A description of equipment used in mountain lake surveys is listed in Appendix 1. The lakes were surveyed on July 20 and 21, 2006.

All fish are identified to species, measured to total length, and weighed. Catch data is summarized by species for length, weight, relative abundance, and catch-per-unit-of-effort (CPUE).

A cursory survey of amphibians is made near the shoreline by turning over rocks and logs and visually searching the littoral zone of the lake. Angler use and area development is observed around the lake.

RESULTS AND DISCUSSION

Perkons Lake was sampled (Appendix 2) with a single high mountain lake gill net set overnight on July 20, 2006 at 2000 hours and pulled July 21, 2006 at 0830 hours. Fish sampled included 27 rainbow trout and one rainbow cutthroat hybrid ranging in size from 140-295 mm total length (TL) (Figure 1). The outlet has approximately 100 m of suitable spawning habitat. Maximum lake depth is 13.7 m with an average depth of 7.1 m. Secchi depth was 7.6 m. Surface water temperature was 15 C°. Three people fished for one hour and 15 minutes resulting in a catch rate of 4.6 fish/hour. One unidentified frog was seen but could not be captured.

Habitat is suitable for trout survival and stocking rates appear to be sufficient to produce good catch rates for anglers. The lake appears to receive moderate to low use as indicated by relatively few active fire rings.

One sinking high mountain lake gill net was set in Johnson Creek Lake at 20:15 hours on July 26, 2006 and pulled at 08:05 hours on July 27, 2006. No fish were sampled in the net, and no fish were observed. The lake had no inlet and one outlet with no suitable spawning habitat. The average depth of the lake was 2.7 m with a maximum depth of 3.8 m. Secchi disc measures were greater than lake depth. There was evidence of light use by pack teams as indicated by two campsites and fire pits. There was a partial foot trail around the lake.

One adult western long-toed salamander *Ambystoma macrodactylum* was observed along with 15 larval salamanders. This represents a major change in salamander abundance as measured in a 2003 survey where biologists observed pelagic larval salamanders in high abundance. The lake was stocked a few months later in 2003 yet no fish were detected in the fishery. The 2003 out-plant may have had a negative impact upon the western long-toed salamander abundance or the population may have succumb to poor winter habitat given the relative shallow nature of the lake. The lack of fish found may be the result of winter kill, poor post-stocking survival, or lack of food resources.

MANAGEMENT RECOMMENDATIONS

1. The density and frequency of hatchery out-plants should remain the same for Perkons Lake. The fishery should be surveyed again in about five years to reevaluate the stocking program.

2. Johnson Creek Lake should be removed from the stocking rotation. The habitat is not optimal for salmonid survival; particularly the lack of depth. This fishery is considered very difficult to access and is likely not targeted by anglers.

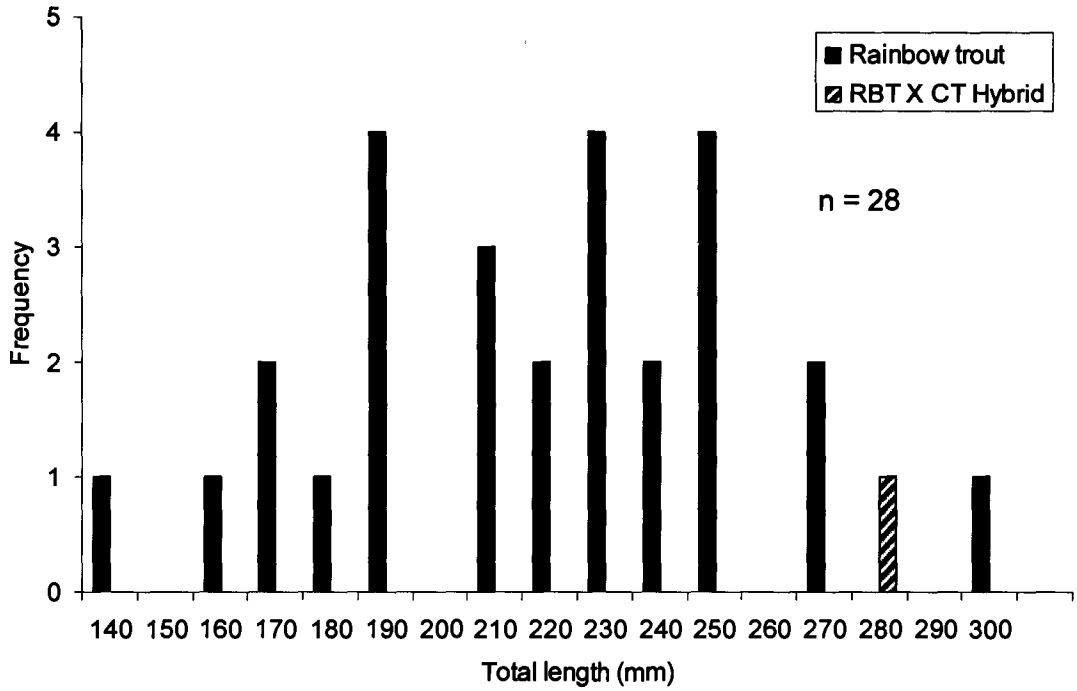


Figure 1. Length frequency of fish captured by sampling gear from Perkons Lake on July 20, 2006.

LOWLAND LAKES AND RESERVOIRS

ABSTRACT

Anderson Ranch Reservoir kokanee abundance and escapement monitoring was conducted in 2006. Total abundance of kokanee *O. nerka* among all strata and age groups was estimated at 1,429,825 fish and a density of 966 fish/ha. Estimated kokanee standing crop among all strata and age groups was 26.79 kg/ha. Total count of kokanee spawners among all sites combined across dates was 6,158 fish.

A standard lowland lake survey and creel survey were conducted on Lake Walcott to identify trends in the fishery and associated angler use. Potential differences in relative abundance created by angler accessibility/exploitation and/or habitat variation were also evaluated by CPUE between reservoir access areas and reservoir habitat types. Differences in CPUE were detected in comparisons of all species between open and closed boating areas. Survey results indicated a shift in species composition from 1987. Angler effort was estimated for three survey strata at 9,430; 15,952; and 14,982 angler hours, respectively. Creel survey results suggested Lake Walcott receives low angling pressure.

Magic Reservoir yellow perch *Perca flavescens* stock structure was evaluated to determine current population status, establish a standard sampling protocol to compare changes in yellow perch stock structure over time, and provide future angling forecasts. A total of 1,603 yellow perch were caught. Six age classes were identified with the oldest fish estimated at age-11.

Morrow Reservoir was sampled to determine the current status of the fishery and identify whether stocking might be needed to supplement this fishery. A total of 679 fish were captured with the majority of the catch made up of largemouth bass *Micropterus salmoides* (n=63) and bluegill *Lepomis macrochirus* (n=616).

Standardized forage monitoring was conducted on Oakley Reservoir to develop a relationship to walleye *Sander vitreus* population dynamics. Forage fish sampled included: spottail shiner *Notropis hudsonius* (6.42%), walleye (0.75%), yellow perch (92.61%), and sucker *Catostomus spp.* (0.21%). Resulting trends in CPUE varied by species, but indicated overall abundance was high.

Walleye investigations were undertaken on Salmon Falls Creek Reservoir (SFCR) to gather information on abundance, growth, mortality, reproduction, exploitation, and diet. Exploitation investigations were initiated by tagging walleye. Geometric mean catch per net for walleye ≥ 450 mm was 3.32, nine ages were sampled, maximum age was 14, and female diversity index was 0.76. Walleye diet samples were collected from May to October 2005. Identified stomach contents were 97% fish by weight. Non-salmonid and crappie were the most frequent food items encountered.

A stocking evaluation was initiated in 2006 to determine the success of stocking fingerling trout strains in SFCR. Steelhead, rainbow trout, and rainbow x cutthroat hybrid fingerlings were stocked for evaluation. Returns will be discussed in future reports.

An angler creel survey was completed to provide angler effort, harvest, and catch rate data to relate to walleye investigations and fingerling trout evaluation. Anglers fished 68,440 hours and harvested an estimated 20,292 rainbow trout, 545 kokanee, 1,193 walleye, 2,204 yellow perch, and 621 smallmouth bass *Micropterus dolomieu*. Average season catch rate for all salmonids was 0.52 fish/hour and 0.24 fish/hour for non salmonids.

INTRODUCTION

Anderson Ranch Reservoir

Anderson Ranch Reservoir is a Bureau of Reclamation (BOR) impoundment on the South Fork Boise River in Elmore, County. Maximum reservoir storage capacity is 60,833 hectare meters, of which 3,575 ha is considered dead storage (U.S.G.S. 1996). Anglers fishing Anderson Ranch Reservoir target primarily kokanee, rainbow trout, smallmouth bass, and yellow perch. Bull trout *Salvelinus confluentus* and various nongame fish species are also present. Kokanee are managed for a consumptive fishery with a daily bag limit of 25 fish and a possession limit of 50 fish. Trends in reservoir kokanee abundance are monitored on an annual basis using trawling techniques.

The South Fork Boise River is the major tributary of Anderson Ranch Reservoir. It flows primarily through U.S. Forest Service lands in Elmore and Camas counties. Kokanee migrate upstream from Anderson Ranch Reservoir to spawn in the river from late August into early October.

Anderson Ranch Reservoir kokanee abundance and escapement monitoring was continued in 2006 in an effort to identify management needs for maintaining the fishery.

Lake Walcott

Lake Walcott was formed in 1906 following completion of Minidoka Dam. Lake Walcott was constructed primarily for power production and irrigation. The reservoir covers an area of approximately 4,900 ha and lies at an elevation of 1,385 m. The Minidoka National Wildlife Refuge surrounds Lake Walcott, which is located about 19 km northeast of the town of Rupert, Idaho in Minidoka County. The reservoir is relatively shallow and composed of large marsh areas located along shoreline reaches. The system currently supports a substantial non-game fish community comprised primarily of Utah chub *Gila atraria*, common carp *Cyprinus carpio*, and various sucker species. Game fish species present include: smallmouth bass, rainbow trout, and yellow perch. Smallmouth bass were introduced in 1988 and 1990 and have expanded through natural recruitment.

Lake Walcott sampling efforts in 2006 were conducted as part of standardized population trend monitoring of regional waters. A creel survey, funded by the U.S. Bureau of Reclamation, was also conducted in conjunction with sampling efforts.

Magic Reservoir

Magic Reservoir is located approximately 48 km north of Shoshone, Idaho. Primary drainages which feed the reservoir are the Big Wood River and Camas Creek. The earthen dam was first constructed in 1909 and enhanced in 1917 to a maximum height of 34.4 m. Reservoir uses include: irrigation, downstream flood control, hydroelectric power production, and recreation. The reservoir is approximately 1,529 ha when full with a maximum storage of approximately 24 ha km. The reservoir is subject to extreme drawdown associated with irrigation needs. During high water years water is passed over a spillway into the lower Big Wood River drainage.

The reservoir provides a year-round fishery for rainbow trout, brown trout *Salmo trutta*, yellow perch, and smallmouth bass. A rainbow trout fishery is maintained by hatchery supplementation. Brown trout and rainbow trout natural recruitment occurs on a limited basis in the Big Wood River above the reservoir.

The purpose of this sampling effort was to evaluate the yellow perch stock structure following a long drought period. Additionally, gill net mesh size was evaluated with respect to catch and perch collecting effectiveness (CPUE). Results were used to establish a standard sampling protocol to compare changes in yellow perch stock structure over time and to provide an ice fishing forecast for Magic Reservoir.

Morrow Reservoir

Morrow Reservoir is a small irrigation impoundment (24 ha) located northwest of Glenns Ferry, ID. The reservoir is charged with flows from the Little Canyon Creek (Grunder et al. 1987) and is subject to dewatering in drought years.

The reservoir historically contained warmwater fish species. Past sampling has shown the presence of yellow perch, black crappie *Pomoxis nigromaculatus*, largemouth bass, bluegill, and brown bullhead *Ameiurus nebulosus*.

Low water levels and near dewatering have been reported over the previous three to five years coinciding with drought conditions in the area. It was unknown if a fishery persisted in the reservoir through this series of poor water years.

An electrofishing survey was conducted on Morrow Reservoir to determine the current status of the fishery and identify whether stocking might be needed to augment this fishery.

Oakley Reservoir

Oakley Reservoir is a 548 ha irrigation impoundment located in the lower reaches of the Goose Creek and Trapper Creek drainages. The fishery is managed for rainbow trout and walleye. Other species present include yellow perch, sculpin *Cottus spp.*, sucker and spottail shiner. Spottail shiners were introduced in 1989 to provide additional walleye forage.

Standardized forage monitoring is conducted annually in Oakley Reservoir to monitor walleye forage availability. Trends in forage availability are used to project related annual walleye population success. Monitoring of trends in forage abundance was continued in 2006. Evaluation of walleye hatchery supplementation into the first winter was also conducted in 2006. Results will be used to determine the contribution of hatchery supplemented walleye to the fishery.

Salmon Falls Creek Reservoir

Salmon Falls Creek Reservoir (SFCR) is a 1,376 ha irrigation impoundment located on Salmon Falls Creek in Twin Falls County. SFCR is unique to the Magic Valley Region in that the dam was constructed to allow a large inactive storage capacity

in the reservoir and subsequently, productive fish habitat even in low water years. SFCR is managed as a mixed species fishery for, rainbow trout, walleye, kokanee, yellow perch, smallmouth bass, and black crappie. SFCR is one of only three waters in Idaho providing a sanctioned walleye fishery.

Walleye investigations were undertaken on SFCR in 2006 to gather information on abundance, growth, mortality, reproduction, exploitation, and diet. Forage monitoring was also continued in 2006 to follow trends in forage abundance relative to walleye population dynamics. In addition, a stocking evaluation was initiated to appraise the success of stocking fingerling trout strains in SFCR. An angler creel survey was completed to provide angler effort, harvest, and catch-rate data to relate to walleye investigations and fingerling trout evaluation.

METHODS

Lowland lake surveys are conducted utilizing IDFG standardized protocols. One unit of effort under standard protocol consists of one trap net night, one sinking gill net night, one floating gill net night and one hour of nighttime electrofishing. Sample locations are typically randomly selected initially and maintained for future surveys. A description of equipment used in lowland lake surveys is listed in Appendix 1.

Fish sampled during lowland lake surveys are identified and measured to total length in millimeters with a sub-sample weighed in grams. Data are summarized by species for length, weight, relative abundance, relative biomass, and CPUE. Population indices including proportional stock densities (PSD), relative stock densities, and relative weights (Wr) are calculated as described by Anderson and Newman (1996) when appropriate. Catch by age is determined by analysis of length frequency or more definitively by otolith analysis from a representative collection of fish. When otoliths are sampled, five otoliths are taken from each available centimeter (cm) length group of a sampled species

Water quality measures typically collected include: temperature, dissolved oxygen, specific and ambient conductivity, secchi depth, total alkalinity, and total hardness. Water quality measures are collected during day time hours. Zooplankton samples are collected from three locations distributed throughout the lake or reservoir. Zooplankton quality index (ZQI) is determined from collected samples as described by Teuscher (1999). ZQI is used to evaluate productivity in the given water body.

Trends in Anderson Ranch Reservoir kokanee abundance were monitored using nighttime trawling techniques described by Rieman (1992). Sample dates were on or around a new moon period. Reservoir sample strata were defined in Figure 2. Designated strata followed historical protocol (Partridge and Warren 1995). Seven transect tows were taken per strata. Trawling tows were completed using a 4.46 m^2 framed trawl net pulled at approximately 1.59 m/second (s). Net hauls were made on 180 s intervals per depth strata. Net hauls were made at three m depth intervals from 12 m to 27 m. In the event reservoir depth did not allow for completing all depth strata identified, maximum depth was adjusted.

Kokanee sampled during trawl efforts were measured to total length and weighed. Otoliths and scales were sampled from representative centimeter groups. Ages were estimated from otoliths and scales. Otoliths were viewed in whole and or half view in the lab using a dissecting microscope under 10X – 40X magnification. Scales were placed between two glass slides and viewed with a microfiche reader.

Abundance, relative density, and standing crop were estimated by age group using an Excel® spreadsheet developed by IDFG fisheries research personnel (Bill Harryman, IDFG, personal communication). Kokanee densities were calculated using strata area determined by measuring area within the current reservoir water elevation. Water elevation was taken from the Department of Interior, Bureau of Reclamation website (www.usbr.gov). Area was estimated from a rule curve generated from measured area within elevation contours.

Kokanee escapement was monitored between August 19 and October 8, 2006 at 13 sites on the South Fork Boise River and Trinity Creek. These are standard sites at which counts have been made since 1989 for spawner trend information, except for the trap site just downstream of the Pine Bridge, which was added to the survey in 1990 (Partridge and Corsi 1993). Survey sites are accessed by way of a paved and gravel graded road that follows the river from Pine, Idaho to the confluence of Big Smokey Creek. Site locations are listed in association with Appendix 2. Spawner count frequency was reduced in 2006. Counts were made every other week throughout the monitoring period.

A standard lowland lake survey was conducted on Lake Walcott in May and June of 2006. Lake Walcott is divided into boating and non-boating access areas by the Minidoka National Wildlife Refuge. The sections included a main reservoir area and the upper more riverine reservoir area. Sampling efforts were roughly divided among reservoir sections to evaluate angling and habitat impacts on relative fish abundance and specifically smallmouth bass populations. Six units of sample effort were applied. Two units of effort were applied in each of the open and closed boating areas of the main reservoir. One unit of effort was applied collectively in each of the open and closed boating areas of the upper reservoir. The upper boundary of the reservoir was designated as the boating closure zone above the Gifford Springs boating area. Approximate sample areas were listed in Appendix 2. Water quality measures were not collected.

Impacts of angler accessibility and habitat variation on the relative abundance of all species and smallmouth bass specifically were evaluated using sample catch rates. The relative abundance was measured in CPUE of all species for combined gears was compared between reservoir access areas (open vs. closed) and reservoir habitat types (main vs. upper riverine) using a paired t-test for sample means ($\alpha = 0.20$), to evaluate impacts of angler accessibility and habitat variation. Catch of smallmouth bass by electrofishing effort unit were compared by access areas and reservoir habitat types using a two sample t-test for sample means ($\alpha = 0.20$).

A random stratified roaming angler survey was conducted from May 1, 2006 to October 15, 2006 encompassing five strata: Smith Springs boating area (1), Gifford Springs boating area (2), Lake Walcott (spillway to boating closure boundary) (3), Minidoka spillway (4), Upper South Side Canal (5), (Figure 3). The survey included only portions of Lake Walcott open to boating.

Angler counts and interviews were conducted on randomly chosen dates and times during each interval. Survey intervals were 24 days in length. Interval days were stratified by weekday and weekend day types. Ten weekday and four weekend days were surveyed per interval from one half hour before sunrise to one half hour after sunset. Survey strata were combined into three selection groups for calendar scheduling. Groups consisted of geographically similar location and included: Minidoka spillway and Upper South Side Canal, Lake Walcott (spillway to boating closure boundary), along with Smith and Gifford springs boating areas. In selection groups containing two locations, selected survey times were applied to one stratum with the second stratum instantaneous count following the completion of the first. Selection groups were scheduled with unequal probability of selection in any given interval. Selection groups one and two were the primary focus of the creel effort and were given a probability of 0.40. Selection group three was given a probability of 0.20.

All surveys consisted of two instantaneous counts separated by approximately three hours. Instantaneous counts were conducted consistently. Angler interviews were conducted primarily around angler counts. Interviewed anglers were asked to report on their residency, length of outing, method of angling, and catch. Fish encountered during interviews were identified and measured to total length. Count and interview data was analyzed using the IDFG Creel Software Program (version 1.7).

Magic Reservoir yellow perch were sampled with eight sinking gill nets. Four nets were set each of two nights on October 3 and 4, 2006. Net dimensions are described in Table 1.

Captured fish were identified to species, measured and weighed. A subsample of yellow perch otoliths were collected from representative size classes. Catch data were stratified by panel (mesh-size) to assess the sampling gear. Catch data were compiled and summarized to determine CPUE, compare CPUE among gill net mesh sizes, and to describe the stock structure of yellow perch. FAST© 2.1 software was use to estimate the PSD.

Plankton were sampled monthly from May to June at three reservoir locations as previously described in the general methods section. Plankton haul data were used to describe reservoir productivity (ZPR and ZQI) as described by Teuscher 1999.

Morrow Reservoir was surveyed at night on May 22, 2006. The fishery was sampled with boat electrofishing gear as described in the general methods and Appendix 1. A total of four 15 minute units of effort were completed. Nearly the entire perimeter of the reservoir was sampled within the timed effort. Netters applied equal netting effort to all species encountered.

A forage monitoring survey was conducted at Oakley Reservoir on August 8, 2006 following standardized protocol. Protocol consisted of 10 minutes of electrofishing at 10 standard locations. Location coordinates are listed in Appendix 2. Forage fish were designated as fish equal to or less than 150 mm. Resulting data were used to follow trends in CPUE of forage species. Results from 2006 were compared to results from 2004 and 2005.

Approximately 550,000 micro fry walleye were stocked in Oakley Reservoir in June of 2006. Young-of-the-year (YOY) walleye were collected during forage evaluation efforts to determine what proportion were from hatchery out-plants. YOY walleye were collected during forage fish collection. Attempts were also made to collect age 0+ walleye in gill nets in October of 2006. Walleye that were determined by length group to be age 0+ were collected and frozen. Otoliths were later removed and sent to Ron Brooks at the Fisheries and Illinois Aquaculture Center and Department of Zoology at Southern Illinois University in Carbondale, Illinois for analysis. Otoliths were visually inspected for presence of oxytetracycline (OTC) marks. Marked and unmarked fish were represented as a percentage of the total sample.

Fall Walleye Index Monitoring (FWIN, Morgan 2002) was initiated in October 2006 in an effort to monitor walleye population trends in SFCR. FWIN data will also be used in future regulation evaluations. Based on a maximum reservoir surface area, a sample size of 16 gill net nights was targeted. A biological threshold of 300 walleye was set prior to sampling. Sampling was discontinued when either sample size or biological threshold were met. Gill nets were eight panel monofilament 1.8 m deep, 61.0 m long, with 7.6 m panels measuring 25 mm, 38 mm, 51 mm, 64 mm, 76 mm, 102 mm, 127 mm, and 152 mm stretched mesh. Net locations were randomly selected and documented in Appendix 2. Net sets were equally split between two depth strata including 2 – 5 m and 5 – 15 m depths. All nets were placed perpendicular to the shoreline. Netting was conducted when water temperatures were between 10 °C and 15 °C.

All walleye collected were measured and weighed. All fish species collected were measured with a sub-sample weighed. Otoliths were collected from all walleye. Otoliths were prepared for age estimation by breaking centrally, burning or browning the broken edge with an alcohol burner, and viewing the broken edge with a dissecting microscope at 30X – 40X. Otoliths were submerged in water for better viewing clarity. Growth patterns were observed by estimating mean length at age by sex. Changes in growth have been used to characterize exploitation in walleye fisheries (Gangle and Pereira 2003).

Mortality and survival were estimated to evaluate the effects of exploitation and natural limiting factors. Walleye annual mortality and survival were estimated using a catch curve by sex (Van Den Avyle 1993). Catch curves were generated in FAST© (Fisheries Analysis and Simulation Tools, Version 2.1).

Condition indices were generated from collected walleye to describe the general health of the population. Visceral fat was removed and weighed to measure condition as a visceral fat index. The visceral fat index was calculated as the ratio of visceral fat weight to total body weight and described as a percentage. Gonads were removed and weighed to estimate a gonadal somatic index value for each fish. The gonadal somatic index value was calculated as ratio of gonad weight to body weight and described as a percentage. Relative weights were calculated and summarized by size groups in FAST© (Anderson and Neumann 1996).

All walleye were evaluated for sexual maturity (Duffy et al. 2000). Total length and age at 50% maturity was determined using logistic regression (Quinn and Deriso 1999). A female diversity index value was estimated based on the Shannon diversity index to describe the diversity of the age structure of mature females (Gangle and Pereira 2003). The female diversity index has been shown to be sensitive to exploitation

and may provide indications of overexploitation (Gangle and Pereira 2003). Ovaries were collected from mature females for estimation of fecundity. Fecundity estimates were generated from a sub-sample of eggs, weighed and counted from each fish. Fecundity estimates will be used in future population modeling.

Benchmark classifications developed for Ontario walleye management (George Morgan, Laurentian University Sudbury, Ontario, personnel communication) were applied to SFCR data. Benchmarks were used to classify the relative condition of the walleye population. Classification parameters included: CPUE for walleye ≥ 450 mm, number of age classes present, maximum age, and female diversity index (Table 2). Parameters represented measures of abundance, growth, age structure, and recruitment potential. Parameters were scored from one to three; three reflecting a healthy stable population. The average score among all parameters reflected the overall health of the population.

Walleye stomach contents were collected in 2005 to provide better understanding of the influence forage availability has on walleye success in SFCR. A boat electrofisher was used to collect stomach samples. Stomachs were removed whole and placed in 10% formalin for storage.

Stomach contents were removed, identified, blotted dry and wet weighed to the nearest gram by category. Identification of stomach contents was completed using a dissecting microscope and a bone key provided by the Washington Department of Fish and Wildlife (Bill Baker, WDFW, personal communication). Contents were broken down by category to include: fish (general), invertebrate (general), other/unknown, salmonid, non-salmonid, rainbow trout, yellow perch, walleye, kokanee, crappie, sucker, smallmouth bass, northern pikeminnow *Ptychocheilus oregonensis*, and crayfish *Pacifastacus spp.*

Forage monitoring surveys were conducted on August 7, 2006 at standard SFCR locations. Protocol consisted of 10 minutes of electrofishing at 10 standard locations. Location coordinates are listed in Appendix 2. Forage fish were designated as fish equal to or less than 150 mm. Resulting data were used to follow trends in CPUE of forage species from 2004.

A stocking evaluation was conducted from June through September of 2005 to evaluate the success of stocking different strains of fingerling trout in SFCR. On June 30, 2005 a total of 19,796 steelhead were out-planted at 221 mm average length. Of those steelhead stocked, 13,187 were marked with a right ventral fin clip. On September 15, 2005 a total of 176,600 rainbow trout fingerlings of 89 mm average length were stocked with adipose fins removed for identification. On September 29, 2006 a total of 30,706 rainbow x cutthroat hybrid fingerlings were stocked in SFCR also for evaluation of out-plant success. Hybrid cutthroat will be identified by throat slash. Fish observed in creel survey efforts were inspected for marks to determine the relative return rate of fingerling out-plants.

An angler creel survey was initiated on April 12, 2006 to follow trends in angler effort and harvest and to provide catch data for evaluation of fingerling trout out-plants. The IDFG creel survey program (IDFG 2005 Version 1.7) was used to design the creel survey. Survey design included 35 day interval periods stratified by day type. Three weekday and three weekend/holiday days per interval were randomly selected and

scheduled from one half hour before to one half hour after sunrise and sunset, respectively. Equal probability of day time was given to each selection. An additional count was added to each scheduled angler count approximately three hours either earlier or later than the scheduled count depending on time. Typically, additional counts were added three hours later than surveys scheduled early in the day and three hours earlier for surveys scheduled late in the day. Additional counts around mid-day surveys were left to the discretion of the creel clerk. Angler counts were conducted by boat as allowed by weather. During weather unsuitable for boat travel, counts were conducted at three primary access points by vehicle including SFCR dam, Grey's Landing, and Big Sand Bay. Interviewed anglers were asked to report on their residency, length of outing, method of angling, and catch. Fish encountered during interviews were identified and measured to total length.

Estimated effort and harvest were compared to previous creel efforts. Effort was standardized to the total number of days encompassed by the creel survey by using the ratio of estimated effort to total creel days (EFFORT/DAYS). Harvest was standardized by harvest per effort/day.

SFCR walleye exploitation was estimated to evaluate the influence of current angling regulations on the population. To estimate exploitation, walleye were tagged with Floy tags for angler return. Only fish greater or equal to 250 mm were tagged. Walleye were collected from tournament anglers participating in a Walleye Unlimited tournament on SFCR on June 17 and 18, 2006. A total of 66 walleye returned by anglers for weigh-in were tagged and released. Walleye were also collected with standard boat electrofishing gear. An additional 47 fish were tagged from electrofishing efforts. One hundred fish were double tagged for evaluating tag retention. Tags provided a return phone number and individual tag identification number. Fish were scattered at release. Tag return information was taken by phone and/or direct return by anglers.

Approximately 400,000 micro fry walleye were stocked in SFCR in June of 2006. YOY walleye were collected during forage evaluation efforts to determine what proportion was from hatchery out-plants. Walleye that were determined by length group to be age 0+ were collected and frozen. Otoliths were removed and later sent to Ron Brooks at the Fisheries and Illinois Aquaculture Center and Department of Zoology at Southern Illinois University in Carbondale, Illinois for analysis. Otoliths were visually inspected for presence of OTC marks. Marked and unmarked fish were represented as a percentage of the total sample.

RESULTS AND DISCUSSION

Anderson Ranch Reservoir

Anderson Ranch Reservoir kokanee were sampled on August 25 through 27, 2006. Reservoir elevation on sample dates was approximately 1,274 m. Kokanee trawls were completed in all three designated strata (Table 3).

Total abundance of kokanee among all strata and age groups was estimated at 1,429,825 fish, representing a density of 966 fish/ha. Reservoir densities of age zero, one, two, and three kokanee in 2006 were estimated at 802, 130, 27, and 7 fish/ha, respectively. Abundance and density estimates by age from 2006 to 1993 are

summarized in Table 4. Standing crop estimated for 2006 among all strata and age groups was 26.79 kg/ha. Mean total length of age three fish was 348 mm.

Estimates of kokanee abundance and density are among the highest reported since 1993. Summed density (fish/ha) of kokanee across all age classes was greater than the average from 1993 to 2006 (Table 5). Mean total length of age 3 kokanee suggested densities were not significantly limiting kokanee growth. Age 0 year-class strength likely reflected greater than average escapement in 2005. Qualitative kokanee spawner counts conducted since 1989 were used to describe relative escapement value. Age 3 year class strength was lower than 2005 estimates. Kokanee spawner counts in 2006 provided some support for this decline.

Total count of kokanee spawners among all sites combined across dates was 6,158 fish (Table 6). The total kokanee spawner count was less than corresponding days in 2005 (7,227 fish). However, run timing appeared to be later than in 2005. General observations indicated escapement, although potentially reduced from 2005, remained relatively high.

Future escapement will be measured through kokanee trapping at the newly constructed weir on the South Fork Boise River. Accurate escapement monitoring will ideally provide valuable information for modeling kokanee population dynamics in combination with trawl data. It is recommended that angling data also be incorporated into modeling efforts. Defining a balance between catch size and catch rates is important to providing quality angling.

Lake Walcott

A lowland lake survey was completed on Lake Walcott from May 30, 2006 to June 15, 2006. Fish species sampled and relative abundance by all combined gears included: common carp (3%), smallmouth bass (25%), rainbow trout (<1%), redside shiner *Richardsonius balteatus* (1%), sculpin (<1%), sucker (7%), Utah chub (61%), and yellow perch (1%) (Table 7). Game fish and non-game fish made up a total of 27% and 73%, respectively. Species specific catch statistics were listed in Table 8.

Utah chub and smallmouth bass were most abundant in the catch for all combined gear types. CPUE by weight for all gear types was dominated by carp (40%), followed by sucker spp (23%), Utah chub (19%), and smallmouth bass (15%), respectively (Table 9). Electrofishing was the most efficient gear type across all species with the exception of Utah chub which were most vulnerable to passive gears (Table 10).

We collected 1,267 smallmouth bass which ranged from 60 – 470 mm total length. Mean total length was 136 mm. Sample weight was 132 kg, or 15 % of the total biomass. Proportional stock density (PSD; Anderson and Newman 1996) was 42 and Relative Stock Density (RSD) -305 was 30, suggesting harvestable fish (305 mm) are relatively abundant. Wr ranged from 99 - 124, indicating average to above average weight for a given length smallmouth bass in Lake Walcott.

We collected 77 yellow perch ranging from 70 – 200 mm and averaged 102 mm. Sample weight was 0.99 kg, or less than 1 % of the total biomass. PSD (Anderson and Newman 1996) was 100. However, only one fish was collected of stock length or

greater indicating low catch rates combined with small average length. Wr was 62 – 95, indicating below average weight for existing Lake Walcott yellow perch.

We collected 28 rainbow trout, ranging from 195 – 575 mm with an average length of 269 mm. Sample weight was 8.5 kg, or 2% of the total sample. PSD (Anderson and Newman 1996) was 11. Wr was 94 – 107. Wr for the majority of the catch was 94 – 96, indicating slightly below average weight for Lake Walcott rainbow trout. The majority of rainbow trout collected were from the upper reservoir area and identified as hatchery fish. These rainbow trout were likely from a June out-plant made at the Gifford Springs area during the survey period.

No differences in CPUE (all species) were detected between open and closed boating areas (α = 0.20, df = 7, P = 0.291), but significant differences were detected between main reservoir and upper reservoir areas (α = 0.20, P = 0.123). Species including smallmouth bass and Utah chub appeared to be most influenced by sample location (Table 11). There were no differences in electrofishing catch of smallmouth bass between open and closed boating areas (α = 0.20, df = 39.2, P = 0.998). Catch of smallmouth bass were significantly different between main and upper reservoir stratum (α = 0.20, df = 18.5, P = 0.089).

Creel Survey

A total of 154 interviews encompassing 207 anglers were completed in the survey period. Average party size was 2.18 anglers. Total effort for the survey period was calculated for survey sections two through four. Insufficient angler contacts were made to estimate angler effort in sections one and five. Angler effort was estimated at 9,430; 15,952; and 14,982 angler hours in survey sections two, three, and four, respectively (Table 12). Anglers varied by angling and access method across all survey sections (Table 13). Bait, lure, and fly anglers made up 39.4%, 59.4%, and 0.6%, respectively. Most anglers accessed the fishery by boat (61%) and bank (38%) with only 2% using float tubes.

Catch and harvest consisted of primarily rainbow trout and smallmouth bass in sections two, three, and four (Table 12). Inadequate angler contacts were made to estimate catch and harvest in sections one and five. Catch rates for rainbow trout ranged from 0.17 to 0.03 fish/hour. Catch rates for smallmouth bass ranged from 0.45 to 0.02 fish/hour. Catch rates were greatest for both species in section two. Total harvest of rainbow trout for the survey period was estimated at 1,280; 2,033; and 109 trout for sections two, three, and four, respectively. Mean length of harvested trout was 506 mm. No smallmouth bass harvest was observed in sections two and three, and harvest of only 21 smallmouth bass was estimated in section four. One channel catfish *Ictalurus punctatus* catch was documented in section 4. Bow fishermen targeting carp were noted in section 4 although harvest was not documented.

Standard survey results continued to support a shift in species composition from 1987 (Grunder et al. 1989) identified in 2004 (Ryan et al. 2007). A shift in dominant gamefish abundance from yellow perch to smallmouth bass was the most notable change. A change in CPUE from 2004 and 2006 was also considerable for Utah chub (Table 13). Changes in relative abundance of all species were not notable. Since sampling dates differed among years direct comparison of results by year was not

considered to be feasible. Potential size biases related to sample timing were identified in 2004-2005 Lake Walcott smallmouth bass electrofishing efforts (Ryan et al. 2007).

Fish abundance did vary by reservoir location. Described differences in relative abundance of all species and specifically smallmouth bass between main and upper reservoir areas may be related to habitat differences and the influence of annual water level fluctuations on the available habitat. Further study is needed to describe and compare habitat between the main and upper reservoir. A better understanding of habitat and its role on smallmouth bass use and or mortality is important when considering management changes.

Lake Walcott receives relatively low angler use. Comparative angler effort on Salmon Falls Creek Reservoir, also in the Magic Valley Region, during a similar time frame in 2006 was 68,440 angler hours versus 15,952 angler hours on Lake Walcott. Use varied by survey section and was likely affected by spring water levels. High water levels associated with a good water year in 2006 likely contributed to low angler effort specifically in the Minidoka spillway section. Anglers typically access the spillway section by wading or traversing rocky channels in low water. High flow precluded wading access. Poor catch rates also likely influenced angler effort and associated harvest.

Anglers reported poor catch rates on rainbow trout throughout the 2006 boating season. Lack of angler success is likely due to low densities in available waters suggested by 2006 relative abundance measures and CPUE. Densities may also reflect out-plant location success. Rainbow trout were only stocked at the Gifford Springs access location. Fish stocked at Gifford Springs may not access main reservoir areas where higher angler effort was documented. Standard survey sample locations for rainbow trout supported this suggestion. Tagged rainbow trout were stocked in Lake Walcott in 2006 to evaluate angler exploitation and will provide some information on stocking location success.

Rainbow trout catch rates and associated harvest suggested low return on stocked fish. Estimated rainbow trout harvest summed among all sites was 3,350 trout. A total of 20,000 catchable-size (203+ mm) rainbow trout were stocked on May 25, 2006. Estimated return, assuming harvested trout represent the out-plant event, was 17%. The average length of harvested rainbow trout was significantly larger than would be expected from 2006 catchable-sized rainbow trout. Therefore, initial return was actually less than 17% and doesn't appear to meet the management goal of 40% return on catchable-sized rainbow trout out-plants.

Estimated smallmouth bass harvest in 2006 may not represent true harvest levels in low angler contact creel survey sections. Few angler contacts were made in survey sections one, two, and five and the applied sample frequency was likely not adequate to detect harvest accurately. Anglers contacted during fishery sampling events reported harvest of smallmouth bass in survey section two in 2006 yet none were observed in the creel census.

Magic Reservoir

Total catch was 2,694 fish in the standard sampling effort. Sportfish species captured included rainbow trout, brown trout, smallmouth bass, and yellow perch. Nongame fish captured included redside shiner and bridgelip sucker *Catostomus columbianus*. Yellow perch were the most abundant species in the catch at 57% (Table 14).

The total yellow perch catch was 1,603. Total length averaged 163 mm and ranged from 90 to 320 mm (Figure 4). Six age classes were identified with the oldest fish estimated at age-11. No perch between age-3 and age-8 were collected. PSD was estimated at 22.3 (95% CI=19.0-25.5).

Yellow perch have successfully recruited over the past three years in Magic Reservoir. Anglers can expect better catch rates during the 2006 ice fishing season than in years past with harvestable sized perch ranging from 140 to 320 mm from two size groups in winter 2006. It appears as though the recent moderate and high water years have provided sufficient spawning and rearing habitat. The concern regarding past failed recruitment was confirmed as evidenced by age groups sampled. The timing of the recruitment failure coincides with drought years where the reservoir was either extremely low or subject to early drawdown.

Most perch size classes could be sampled using the 13, 19, 25, and 32 mm mesh panels. The majority of yellow perch were caught in the smallest three mesh sizes (13, 19, 25 mm). Yellow perch were recruited to all panels (Figure 5) however the largest perch were recruited mainly to the 32 and 38 mm panels. The largest perch were made up of fish 9-11 years old and we would not expect larger perch to be produced on a regular basis. Additionally, the 38 and 51 mm mesh sizes represented the lowest perch CPUE (<10 perch) and resulted in the greatest sport fish by-catch (smallmouth bass). Sport fish by-catch could be substantially reduced by eliminating those panels with mesh sizes greater than 32 mm (38 and 51 mm).

We would recommend yellow perch be sampled using gill nets with mesh sizes of 13, 19, 25 and 32 mm bar mesh to monitor the perch stock structure over time. Variation in the mean CPUE estimates indicate more sampling is required than is practical to achieve greater precision; however, our goal was not to establish a sampling protocol to detect small CPUE changes (i.e. small effect size). Significant data was secured from the use of eight nets to adequately describe the yellow perch stock structure and provide angling forecasts.

Plankton samples were collected and processed for each of the three months. Plankton biomass and associated indices are reported in Table 15. The ZPR and ZQI estimates were all within ranges that would imply there was sufficient perch forage.

Morrow Reservoir

A total of 679 fish were captured with 3,572 seconds of electrofishing. The average catch rate for bluegill and largemouth bass for a 15-minute electrofishing sample unit was 155 and 16 fish, respectively (Table 16).

The catch was made up of largemouth bass (n=63) and bluegill (n=616) (Table 16). Bluegill lengths averaged 80 mm and ranged from 25-200 mm (Figure 6). The lengths of largemouth bass averaged 257 mm and ranged from 115-405 mm. No fish were collected older than age-3 (Figure 7).

The species composition of the catch differed from past sampling. Largemouth bass and black crappie were the only species present in a previous sampling effort in 1988 (Partridge et al 1990).

Historic stocking records indicate IDFG have transplanted largemouth bass (1993, 1996, and 2000) and bluegill (1993) to the reservoir. The 2006 catch composition reflects a simple fish community; which could be the result of recent transplants.

Oakley Reservoir

Forage fish sampled included: spottail shiner (6.42%), walleye (0.75%), yellow perch (92.61%), and sucker species (0.21%) (Table 17). CPUE for yellow perch increased considerably from 2004 and 2005 (Table 18) (Ryan et al., 2007). CPUE for spottail shiner was down from 2005, but comparable to 2004 (Table 19) (Ryan et al. 2007). CPUE for walleye was down from 2004 and 2005.

Data suggested forage is abundant and primarily represented by yellow perch. Higher spring reservoir levels likely contributed to good perch recruitment. It is unclear why walleye and other forage did not respond in the same manner. Continued monitoring of forage abundance is recommended for evaluation of trends in relation to walleye population status. It is also recommended that FWIN be conducted on Oakley Reservoir as a means of monitoring walleye population status.

Seven age 0+ walleye were collected in electrofishing efforts and examined for OTC marks. No age 0+ fish were collected in gill net efforts. No OTC marked walleye were identified. Data suggested 2006 supplementation was a failure. The difficulty in collecting age 0+ samples, although limiting in evaluation sample size, supported the suggested recruitment failure. It is recommended that walleye supplementation be continued to evaluate variation among water years and out-plant densities.

Salmon Falls Creek Reservoir

FWIN netting was completed on October 17 and 18, 2006. A total of 12 net nights were completed prior to nearing the biological threshold. A total of 292 walleye were collected comprising 34% of the total catch. By-catch species collected in association with walleye netting included: black crappie (0.47%), northern pikeminnow (2.10%), rainbow trout (3.73%), smallmouth bass (1.75%), spottail shiner (0.82%), sucker spp (23.34%), and yellow perch (34.07) (Table 19). Mean length and weight for collected species are also listed in Table 19.

CPUE ranged from seven to 74 walleye per net. Relative abundance measured as arithmetic and geometric mean CPUE for all age classes were 24 and 20, respectively. Geometric CPUE for walleye ≥ 450 mm was 3.32.

Total length of sampled walleye ranged from 125 mm to 690 mm. Mean TL was 366 mm. Mean weight of sampled walleye was 696 g. PSD (Anderson Neumann 1996) of the sampled population was 40. Walleye of stock size (249 mm) and greater made up 93% of the sampled population. Ten percent of the sampled walleye were of preferred length (509 mm) or greater (Figure 8).

Thirteen age classes were present in the collected samples. Ages ranged from zero to 14. Nine age classes were present with greater than one sample represented. Age classes six through eight and fourteen were represented by only one sample. No walleye were collected in age classes 11 and 12 (Figure 9). Annual mortality based on catch curve analysis was 17% (age classes 1-14) and 33% (age classes 1-10) for females and males, respectively (Figure 10). Corresponding survival was 83% and 67%, respectively. Missing cohorts observed in age frequencies were also observed in walleye length frequencies (Figure 11). Walleye growth varied by sex of fish. Female growth described by length at age was greater than comparable male growth when viewed over all age classes (Figure 12).

Observed walleye had a mean gonadal somatic index of 1.40 and 1.51 for males and females, respectively. Mean visceral fat indices were 3.49 and 3.23 for male and female walleye, respectively. Relative weight ranged from 96 to 129 for males and from 90 to 104 for females.

Female (42%) and male (58%) walleye densities were roughly equivalent. However, larger size class fish were dominated by female walleye (Figure 13). Males were 54% mature with females being only 17% mature. Age and length at 50% maturity for female walleye were estimated at five years and 481 mm, respectively. Age and length at 50% maturity for male walleye were two years and 313 mm, respectively. Female diversity index was valued at 0.76. Female walleye had an average of 858 eggs*g^{-1}. Average fecundity was 215,705 eggs/female.

Benchmark classification scoring indicated the SFCR walleye population was moderately healthy and stable (Table 20). The final classification score was 2.5 out of 3. Observed age classes and maximum age did not meet the maximum classification, although maximum classifications were nearly met in both criteria.

Walleye stomachs were collected on May 3, May 13, July 8, September 28, and October 17, 2005 and May 3, 2006. Stomachs were taken from 56 total walleye. Sample size varied by date (Table 21). Walleye collected ranged from 285 mm to 800 mm. Mean length of sampled walleye was 505 mm. Average weight of sampled walleye was 1,601 g with standard deviation 1,203 g.

Identified stomach contents were 97% fish by weight (Table 22). Rainbow trout made up 49% of the identified fish content by weight, but were represented by only seven fish. Rainbow trout were only consumed by walleye 500 mm or greater with the majority of identified rainbow trout consumed by walleye larger than 700 mm. Northern pikeminnow, non-salmonids, crappie, and yellow perch made up the majority of the remaining identified biomass. Non-salmonids and crappie were the most frequent food items encountered.

Forage fish sampled included: black crappie (1.39%), smallmouth bass (10.76%), spottail shiner (0.87%), walleye (1.74%) and yellow perch (84.90%) (Table 23). Sucker

spp. and northern pikeminnow made up the remaining 0.35% of the total catch. CPUE for yellow perch increased considerably from 2004 and comparable to 2005 (Ryan et al. 2007). CPUE for black crappie, smallmouth bass, and spottail shiner was down from 2005, but comparable to 2004 (Table 24) (Ryan et al. 2007). A positive trend in walleye abundance in the catch from 2004 was observed.

Tagging efforts resulted in 112 tagged walleye. One tagging mortality occurred resulting in 111 walleye released. A total of seven tags were returned as of February 15, 2007 for an uncorrected return rate of 6.31%. All returned tags were from harvested fish. Two tagged fish were recaptured in FWIN efforts.

Forty seven age 0+ walleye otoliths were evaluated for OTC marks. No OTC marked fish were identified. Results indicated walleye fry stocking was likely a failure in 2006.

FWIN survey results indicated walleye were abundant in SFCR. FWIN survey results from Washington State lakes and reservoirs were comparable with an average CPUE of 19 (WDFW 2005). In contrast, CPUE from FWIN surveys conducted across the province of Ontario ranged from 2.8 to 10.7 fish per net (Ministry of Natural Resources (MNR) 2005).

Condition indices point towards the SFCR walleye population being comparable to populations in Minnesota and Washington State when looking at growth rates and condition factors. Relative weight values indicated average to above average weight for a given length. Visceral fat content of walleye from all size classes was observed to be high. PSD indicated a large proportion of the population is quality size or greater reflecting a quality fishery. Benchmark classifications also identified the SFCR walleye population as healthy and stable.

Observed creel statistics likely reflect forage abundance. Forage availability has been suggested to be negatively correlated to walleye catch rates (VanDeValk et al. 2005). Walleye catch rates and harvest was low in 2006. Angler perception did not reflect a high density fishery. Forage monitoring indicated forage levels were up in 2005 and 2006. It is recommended that the relationship between walleye catch rates, forage abundance, and walleye abundance continue to be evaluated to provide guidance in further walleye management and regulation setting activities.

Walleye diet evaluations generated no strong conclusions. Samples represented only a select few dates. The majority of samples were collected on four dates representing spring and fall time periods. Results did support our forage monitoring protocol with consumed items being similar to those tracked in monitoring surveys. Data suggested rainbow trout were not as important as other food items for the full range of observed walleye size classes. In contrast crappie, yellow perch, and combined non-salmonids were consumed by walleye of all observed length ranges. Non-salmonids including crappie, yellow perch, and smallmouth bass were observed at high levels in the forage survey conducted in 2006. Forage availability potentially played a role in observed diet.

Forage monitoring results suggested forage is abundant and not limited. Higher spring reservoir levels likely contributed to good forage recruitment. Continued

monitoring of forage abundance is recommended for evaluation of trends in relation to the walleye population and condition factors.

Understanding exploitation is important for determining the effects of harvest regulations on the walleye population structure. Estimated walleye harvest of 1,193 fish (Table 25) in 2006 suggested exploitation of walleye in SFCR was limited. The reported uncorrected estimate of exploitation supports the suggestion that a small proportion of the walleye present were harvested in the reported 2006 season. It is recommended that exploitation evaluations continue and ideally be combined with a population estimate to better understand the impact of current fishing regulations.

Reported rainbow trout catch rates were high and met the management goal. Catch rates followed large catchable out-plants in 2004, 2005, and 2006.

Observed trends in yellow perch harvest were believed to be tied to population abundance. Catch of yellow perch in beach seining efforts from 1995 and 2002 demonstrate a decline similar to that detected in harvest trends.

Kokanee harvest increased in 2006 from previous levels observed in 1995, 2002, and 2005. However, the level of harvest remains low compared to other hatchery supported fisheries in SFCR. Limited kokanee harvest may be an indication of limited out-plant survival and/or limited angler effort on kokanee, specifically. Few anglers contacted in 2006 indicated they targeted kokanee. Use of kokanee in SFCR should be evaluated to ensure survival of stocked fish is not limiting angler returns. If in fact little to no harvest has occurred due to low survival, discontinuation of kokanee out-plants should be considered.

To date no marked rainbow x cutthroat trout fingerlings have been observed in creel survey contacts. Evaluation through creel survey observations will continue in 2007.

Creel survey results were reported for dates between April 9 and October 15, 2006 including eight interval periods. A total of 68,440 (± 6,518, 95% CI) hours of angler effort were estimated for the designated time period. Average season catch rate for all species was 0.75 fish per hour. Anglers were estimated to have harvested a total of 20,292 (± 2,462, 95% CI) rainbow trout, 545 (± 0, 95% CI) kokanee, 1,193 (±99, 95% CI) walleye, 2,204 (±213, 95% CI) yellow perch, and 621(±77, 95% CI) smallmouth bass. Catches of other species were considered negligible. Effort and harvest by species were summarized in Table 25.

Average season catch rate for all salmonids was 0.52 fish/hour. Salmonid catch rates met the management goal of 0.50 fish per hour as listed in the 2001-2006 Idaho Fish and Game Fisheries Management Plan. Catch rates in 2006 provided evidence that management goals associated with catch rates are achievable.

Trends in creel data for years 1995, 2002, 2005, and 2006 indicated stable to increasing value of effort/days and stable harvest per effort/day for all species excluding rainbow trout (Table 26). Rainbow trout harvest standardized by effort/day was greater than previously reported in any year.

MANAGEMENT RECOMMENDATIONS

1. Continue monitoring Anderson Ranch Reservoir kokanee densities.

2. Evaluate potential of using kokanee density estimates for predicting catch rates and catch size in Anderson Ranch Reservoir.

3. Evaluate kokanee escapement needs and modeling capabilities in association with South Fork Boise River weir.

4. Continue exploitation evaluations for the Lake Walcott fishery.

5. Evaluate stocking densities and locations on Lake Walcott to optimize return to the creel.

6. Investigate habitat influence and access management on smallmouth bass population structure and distribution in Lake Walcott.

7. Continue FWIN surveys. Annual data will provide a better understanding of the role of exploitation, angling regulations, forage abundance, and stocking in SFCR and Oakley Reservoir walleye management.

8. Continue forage monitoring for use with walleye population trend monitoring in SFCR and Oakley Reservoir.

9. Estimate walleye abundance in SFCR through mark/recapture effort.

10. Continue walleye fry stocking evaluations in SFCR and Oakley Reservoir.

11. Continue evaluation of hybrid trout fingerlings through the expected duration of the current out-plants in SFCR.

12. Evaluate kokanee stocking densities and associated catch rates in SFCR.

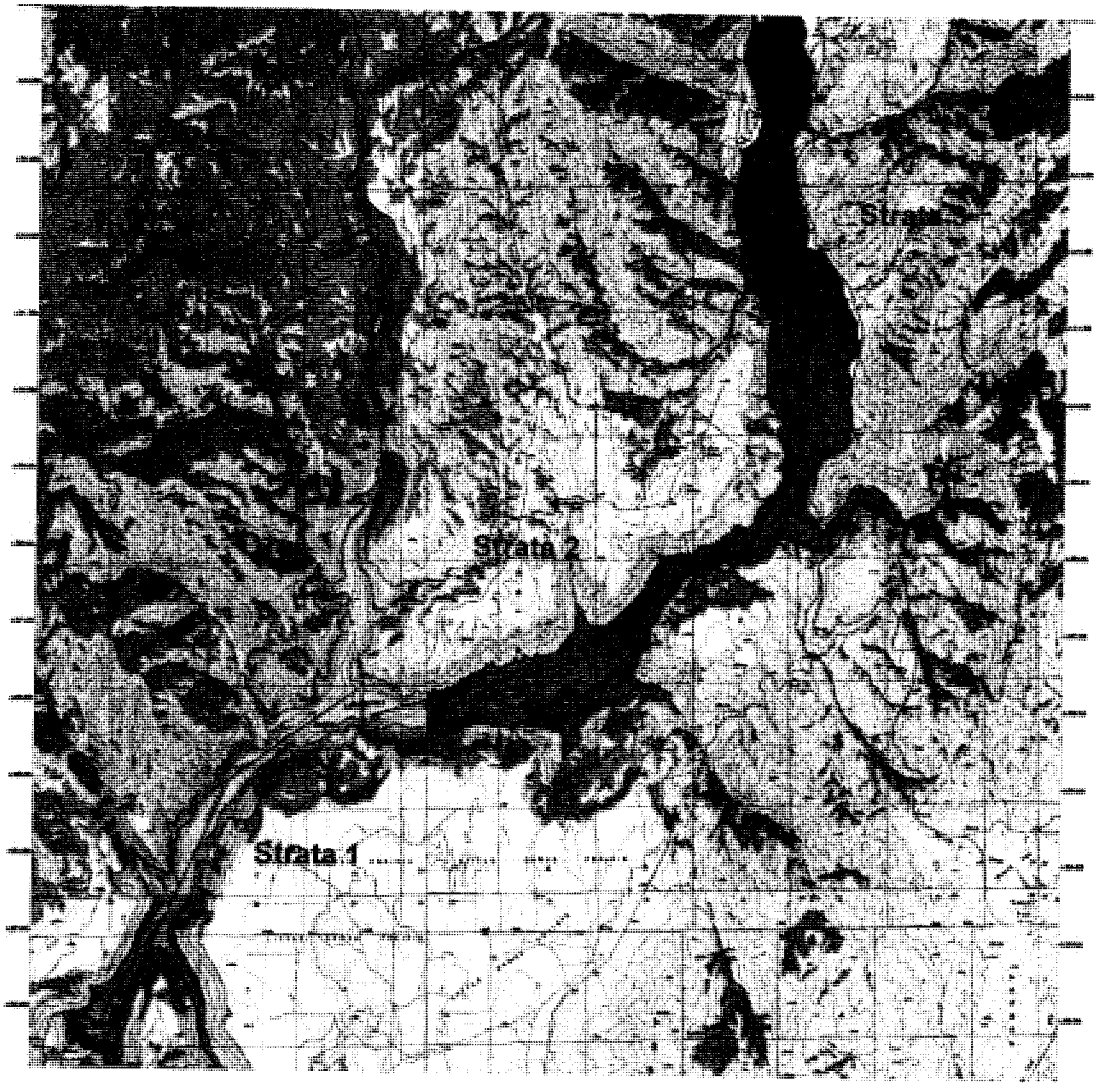


Figure 2. Anderson Ranch Reservoir kokanee trawl strata and transect locations. Transects represent approximate paths on which trawls were completed.

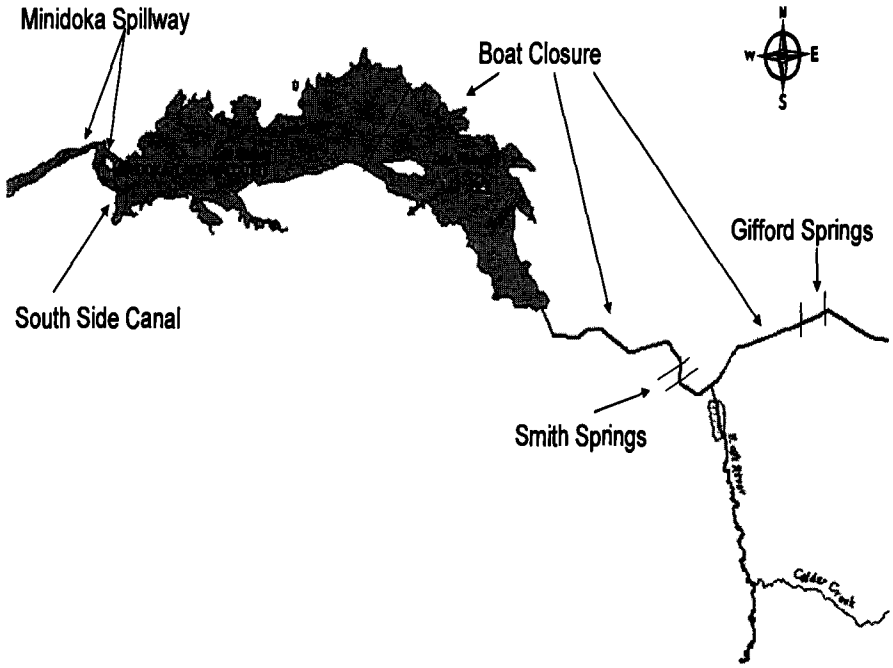


Figure 3. Boat closure area and angler survey locations on Lake Walcott, Idaho.

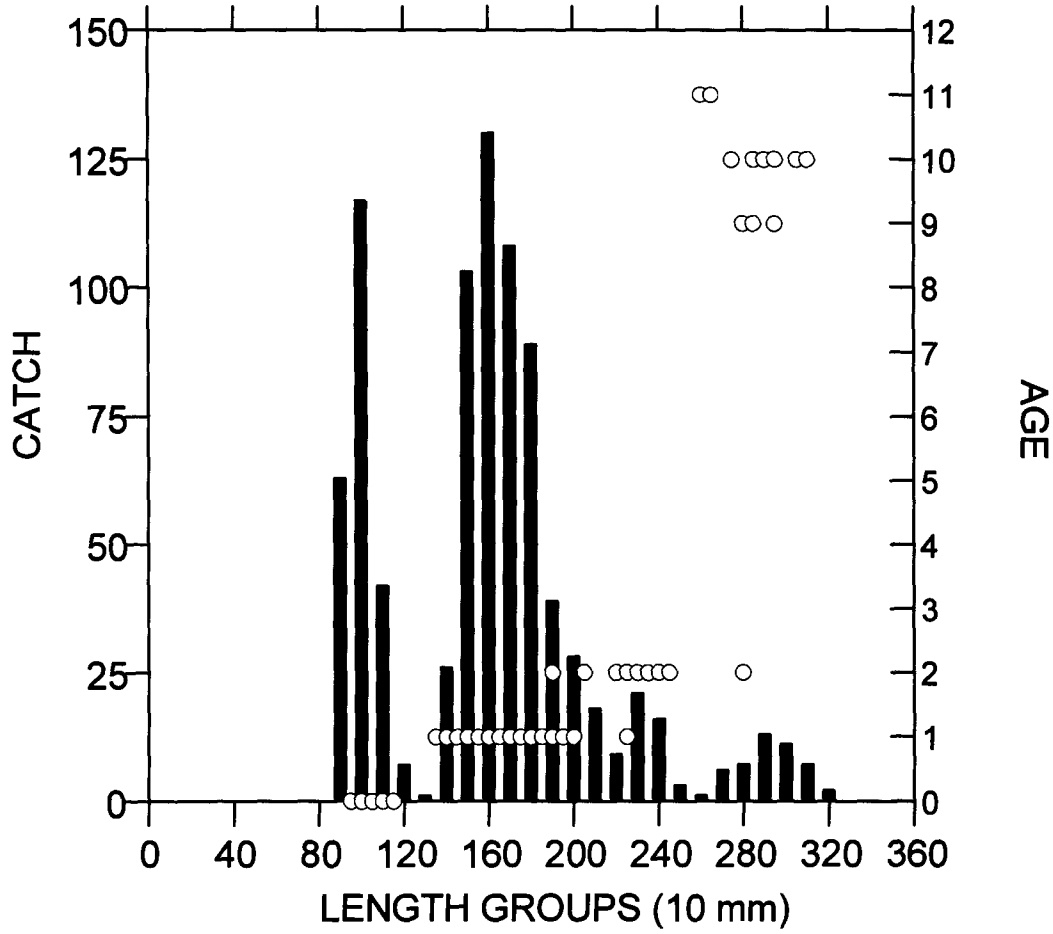


Figure 4. Length (N=867) and age (N=94) of yellow perch caught in gill nets in Magic Reservoir.

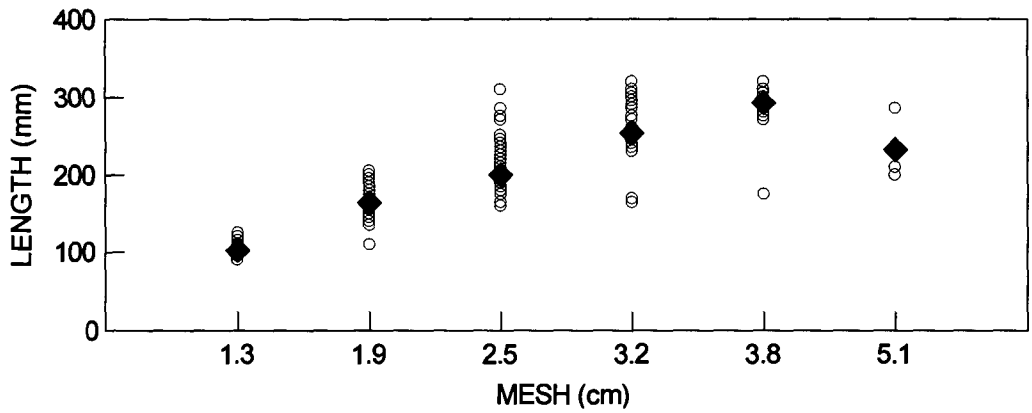


Figure 5. Perch catch by length and mesh size from Magic Reservoir. Average lengths are denoted by a diamond.

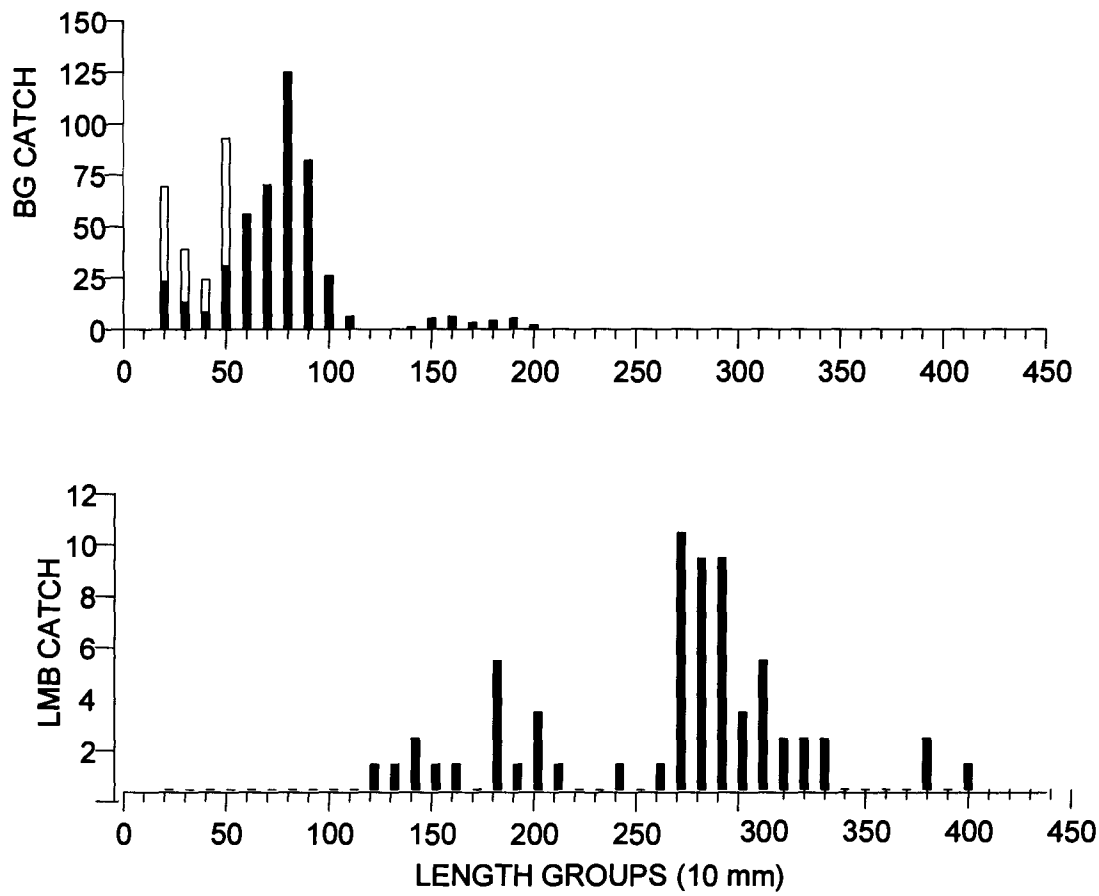


Figure 6. Length frequency histogram of bluegill (upper) and largemouth bass (lower) caught from Morrow Reservoir on May 22, 2006. Crosshatch bar on bluegill figure represents batch counted and then extrapolated fish lengths.

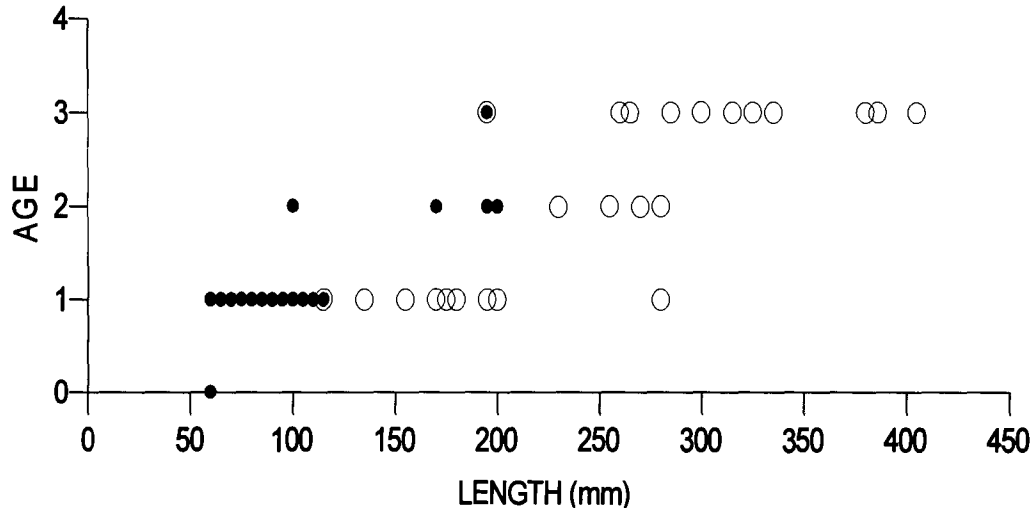


Figure 7. Length at age of largemouth bass (open circles) and bluegill (solid circles) sampled in Morrow Reservoir on May 22, 2006.

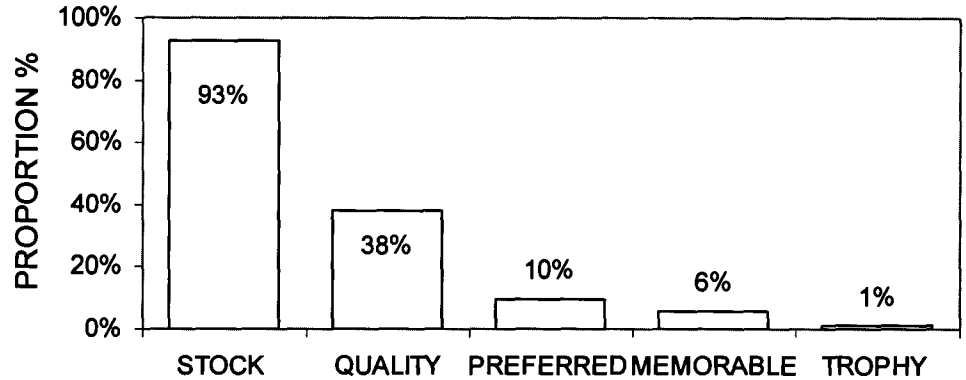


Figure 8. Relative population proportions of walleye by angling size class sampled in the Salmon Falls Creek Reservoir FWIN survey.

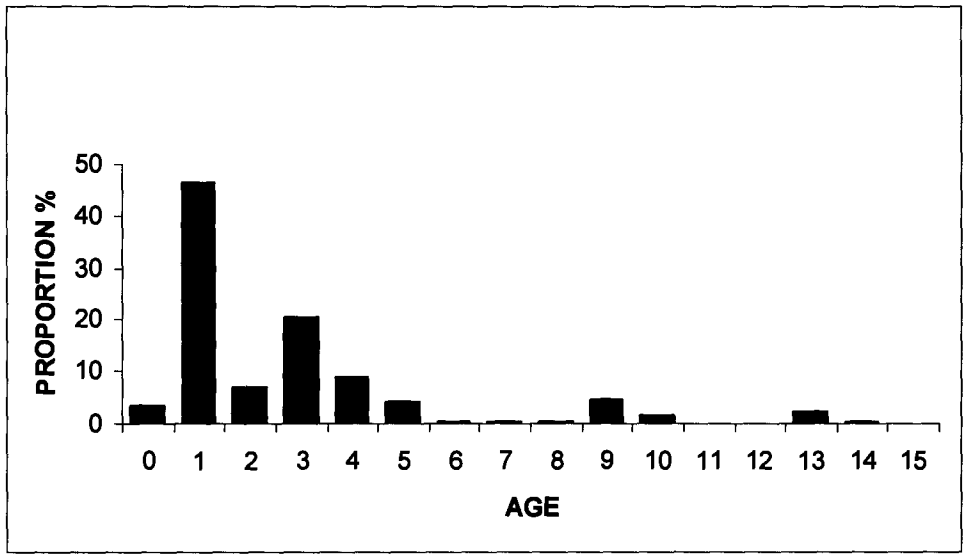


Figure 9. Proportion of walleye by age class represented in the Salmon Falls Creek Reservoir FWIN catch.

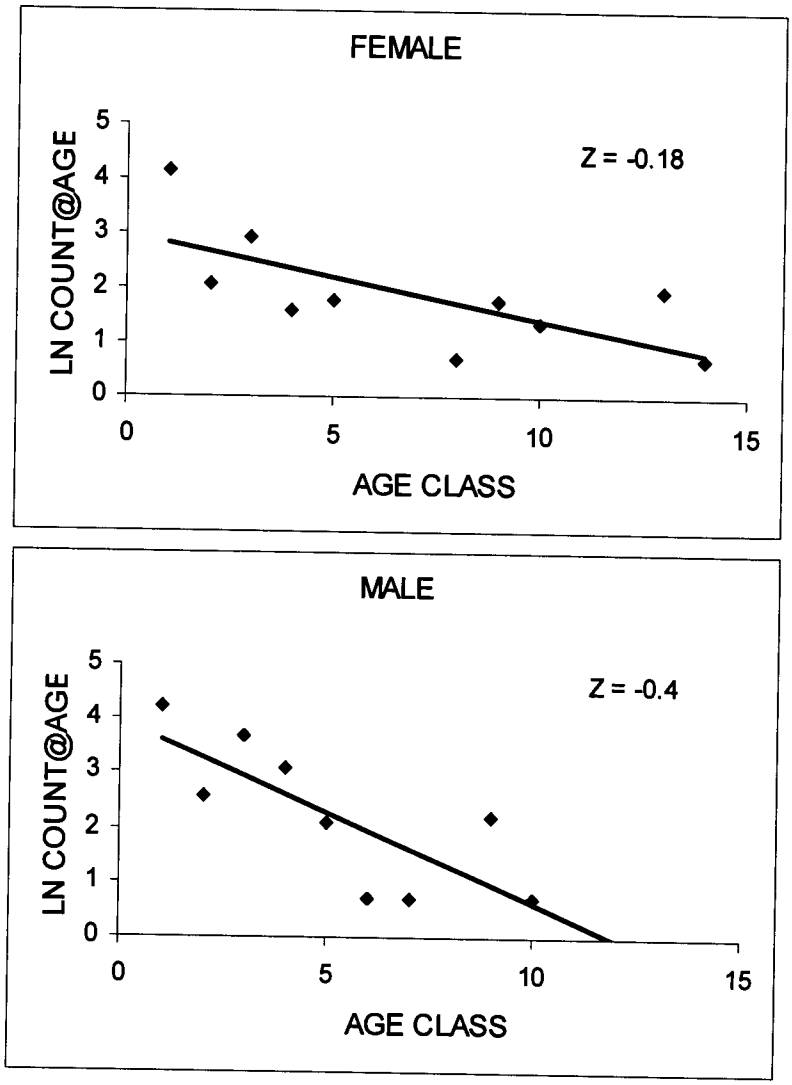


Figure 10. Catch curves by sex for walleye collected in Salmon Falls Creek Reservoir.

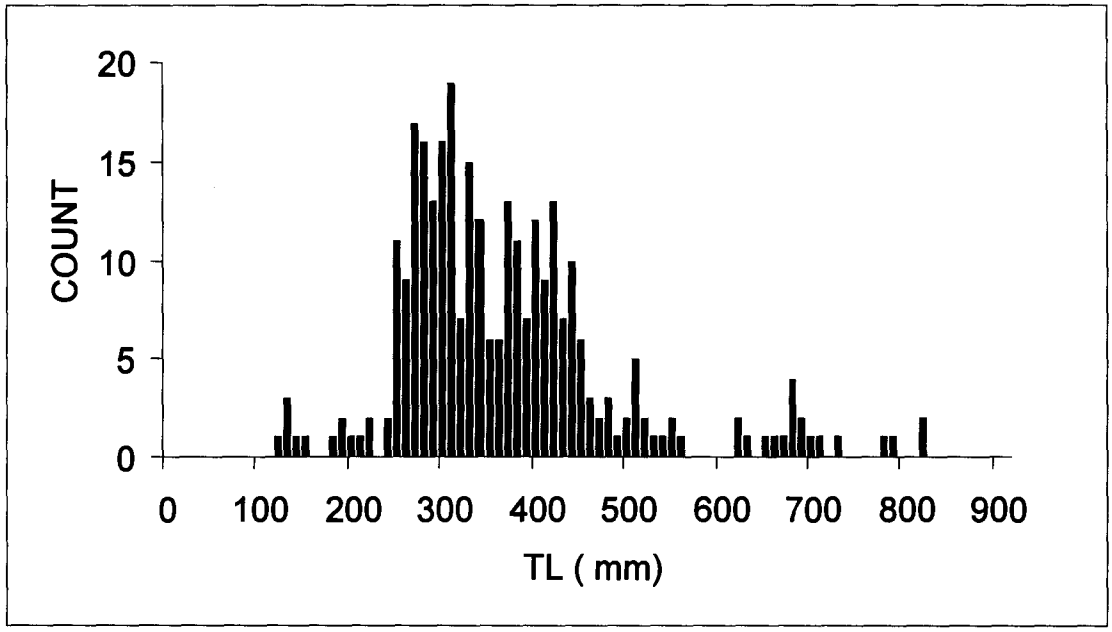


Figure 11. Length frequency of walleye sampled in the Salmon Falls Creek Reservoir FWIN survey.

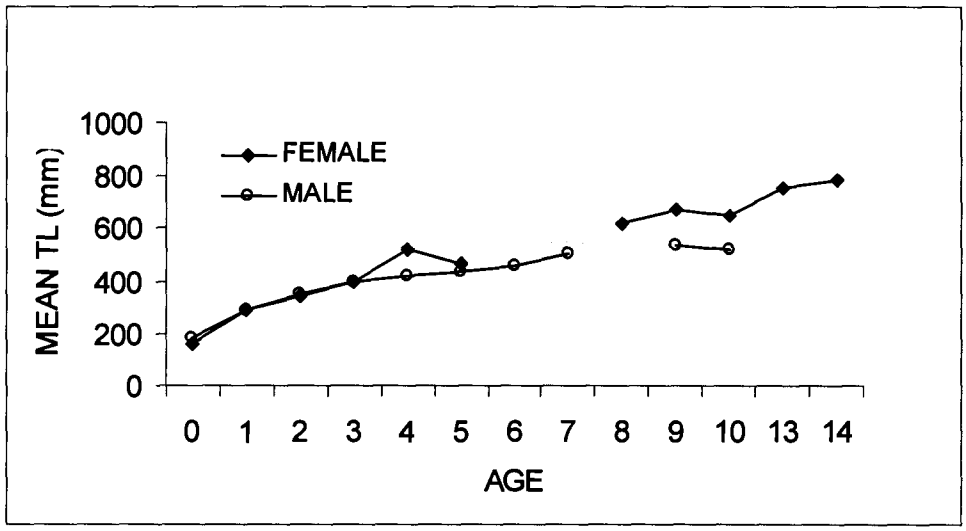


Figure 12. Length at age for male and female walleye collected in Salmon Falls Creek Reservoir.

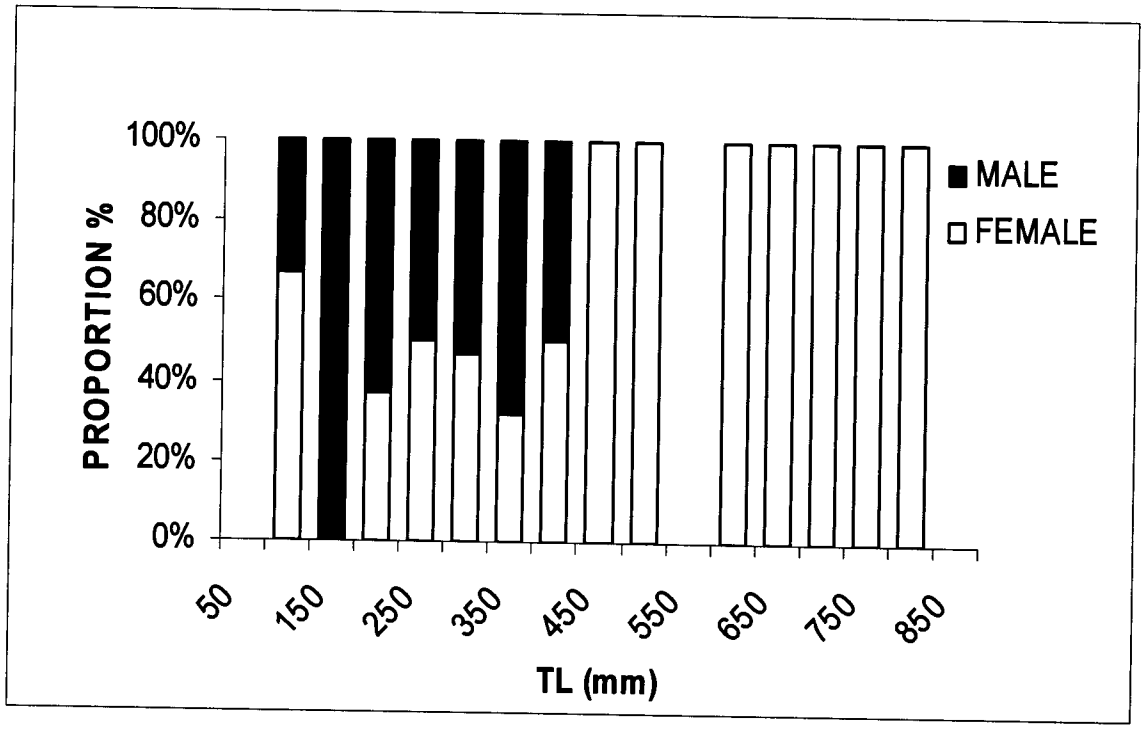


Figure 13. Proportion of male and female walleye by length group sampled in Salmon Falls Creek Reservoir FWIN survey.

Table 1. Catch, lengths, and CPUE (one overnight set) of yellow perch in gill nets from Magic Reservoir in October, 2006.

		Bar mesh size (mm)						
Catch	Net #	13	19	25	32	38	51	ALL
Counts	1		6	30	18	13	1	68
	2	141	229	50				420
	3		86	11	3	0	0	100
	4	22	40	44				106
	5	257	218	50				525
	6	83	115	40				238
	7		84	7	14	1	0	106
	8		2	5	12	19	2	40
Relative	All	31%	49%	15%	3%	2%	<1%	100
CPUE	N	4	8	8	4	4	4	8
	Ave.	126	98	30	12	8	1	200
	SE	50	31	7	3	5	<1	64
TL (mm)	N	503	780	237	47	33	3	1603
	Ave.	102	164	200	253	292	232	163
	Min.	90	110	160	165	175	200	90
	Max.	125	205	310	320	320	285	320

Table 2. Benchmark classification parameters for walleye in Salmon Falls Creek Reservoir.

PARAMETER	VALUE	POINT	NOTE
CPUE≥450	3.32	3	GEOMEAN
AGE CLASSES	9	2	WITH > 1 IN SAMPLE
MAXIMUM AGE	14	2	
FEMALE DIVERSITY	0.76	3	

Table 3. Trawl method statistics by strata and transect (TRAN). Statistics summarized include number of steps completed (STEPS), time per step (TIME), mean time between steps (TBS), maximum depth sampled (MAX D), and minimum depth sampled (MIN).

STRATA	TRAN	STEPS	TIME (s)	TBS (s)	MAX D (m)	MIN D (m)
1	1	5	180	35.3	27	12
1	2	5	180	33.8	27	12
1	3	5	180	35	27	12
1	4	5	180	33.5	27	12
1	5	5	180	34.3	27	12
1	6	5	180	33.8	27	12
1	7	5	180	34.5	27	12
2	1	5	180	34	27	12
2	2	5	180	31.3	27	12
2	3	5	212	32	27	12
2	4	5	180	32.5	27	12
2	5	5	180	29.3	27	12
2	6	5	180	28	27	12
2	7	5	180	29.5	27	12
3	1	5	180	28.8	27	12
3	2	5	180	28.5	27	12
3	3	5	180	31.5	27	12
3	4	5	180	31.8	27	12
3	5	5	180	31.3	27	12
3	6	5	180	30	27	12
3	7	5	180	30.5	27	12

Table 4. Anderson Ranch Reservoir kokanee population and density estimates by year and age class.

2006		Age-0	Age-1	Age-2	Age-3
Strata 1 (7 Trawls)					
	Pop. +/- 95%C.I.	980,772 +/- 925,093	95,789 +/- 101,049	2,957 +/- 2,786	0
	Density (Fish/ha)	1662.32	162.35	5.01	
	S.D. of Density	2135.75	233.29	6.43	
Strata 2 (7 Trawls)					
	Pop. +/- 95%C.I.	146,505 +/-105,551	50,082 +/- 18,386	27,982 +/- 14,385	3,410 +/- 3,555
	Density (Fish/ha)	261.62	89.43	49.97	6.09
	S.D. of Density	256.74	44.72	34.99	8.65
Strata 3 (7 Trawls)					
	Pop. +/- 95%C.I.	59,304 +/- 28,141	47,019 +/- 15,596	9,589 +/- 6,417	6,417 +/- 2,727
	Density (Fish/ha)	179.71	142	29.06	19.45
	S.D. of Density	116.18	64.39	25.44	11.26
Whole Reservoir					
	Pop. +/- 95%C.I.	1,186,580 +/- 820,884	192,890 +/- 91,609	40,528 +/- 14,106	9,827 +/- 3,998
	Density (Fish/ha)	801.74	130.33	27.38	6.64
Previous year's whole reservoir population and density estimates					
2005	Pop +/- 95%C.I.	526,307 +/- 113,860	37,980 +/- 18,282	12,736 +/- 5,322	20,652+/- 11,320
	Density (Fish/ha)	348.32	25.14	8.43	13.67
2004	Pop. +/- 95%C.I.	--	--	--	--
	Density (Fish/ha)	--	--	--	--
2003	Pop. +/- 95%C.I.	166,214 +/- 108,094	9,062 +/- 8,475	3,790 +/- 4,377	1,091 +/- 2,641
	Density. (Fish/ha)	111.55	6.08	2.54	0.73
2002	Pop.. +/- 95%C.I.	18,744 +/- 14,339	3,775 +/- 7,775	1,965 +/- 3,103	0
	Density (Fish/ha)	13	3	1	0
2001	Pop. +/- 95%C.I.	33,702 +/- 23,245	64,570 +/- 61,034	28,736 +/- 18,606	0
	Density (Fish/ha)	41	78	35	0

Table 4. (cont.)

2000	Pop. +/- 95%C.I.	819,828 +/- 1,076,117	54,455 +/- 40,645	4,189 +/- 6,488	0
	Density (Fish/ha)	565	38	3	0
1999	Pop. +/- 95%C.I.	1,446,945 +/- 521,699	12,549 +/- 5,578	15,210 +/- 8,980	0
	Density. (Fish/ha)	1,201	10	13	0
1998[a]	Pop.	117,620	32,815	10,039	0
	Variance of Pop.	5.0×10^8	8.0×10^8	8.9×10^6	--
	Density (Fish/ha)	109	29	8	0
1997[a]	Pop.	853,932	34,582	5,831	0
	Variance of Pop.	7.0×10^8	5.0×10^7	2.1×10^6	--
	Density (Fish/ha)	497	23	4	0
1996[a]	Pop.	109,400	7,733	3,551	0
	Variance of Pop.	2×10^8	4×10^7	7×10^6	--
	Density (Fish/ha)	64	6	2	0
1995[a]	Pop.	3,134	15,995	38,364	0
	Variance of Pop.	3×10^6	3×10^7	5×10^7	--
	Density (Fish/ha)	2	11	25	0
1994[a]	Pop.	230,411 (wild)	444,791[b]	33,709	0
	Variance of Pop.	2×10^{10}	1×10^{11}	5×10^8	--
	Density (Fish/ha)	191	368	28	0
	Pop.	126,916 (hatchery)	--	--	--
	Variance of Pop.	6×10^8	--	--	--
	Density (Fish/ha)	106	--	--	--
1993	Pop.	212,788 (wild)	2,380	1,427	660
	Variance of Pop.	5×10^9	6×10^6	2×10^6	4×10^5
	Density (Fish/ha)	212	2	1	1
	Pop.	33,564 (hatchery)	--	--	--
	Variance of Pop.	4×10^8	--	--	--
	Density (Fish/ha)	26	--	--	--

[a] Based on model by Rieman (1992)

[b] Estimate of wild and hatchery fish combined for year.

Table 5. Anderson Ranch Reservoir kokanee densities (fish/ha) by age class (0-3) for years from 1993 to 2005. Mean and standard deviation (SD) of density estimates were reported for the listed time period.

YEAR	0	1	2	3	TOTAL
1993	238	2	1	1	242
1994	297	368	28	--	693
1995	2	11	25	--	38
1996	64	6	2	--	72
1997	497	23	4	--	524
1998	109	29	8	--	146
1999	1,201	10	13	--	1,224
2000	565	38	3	--	606
2001	41	78	35	--	154
2002	13	3	1	--	17
2003	12	6	3	1	21
2004	--	--	--	--	--
2005	348	25	8	14	396
2006	802	130	27	7	966
MEAN	322	56	12	6	392
SD	364	101	12	6	390

Table 6. Kokanee observed at selected sites on the South Fork Boise River during spawning surveys. Site 1 was no longer feasible and site 12 on September 8 had just been electrofished; therefore it was not counted.

Location[a]	Aug. 25	Sep. 8	Sep. 22	Oct. 13
1	10	-	-	-
2	40	25	15	0
3	60	75	10	0
4	30	40	100	10
5	0	10	5	0
6	700	1,000	600	10
7	150	200	50	0
8	300	300	150	0
9	40	400	6	0
10	200	300	100	1
11	50	200	600	100
12	100	-	30	0
13	100	30	10	1
Total:	1,780	2,580	1,676	122

Table 7. Relative abundance by number and biomass for species collected in Lake Walcott.

SPECIES	N	TOTAL WT (g)	% CATCH	% BIOMASS
CARP	151	387,660	3%	40%
RAINBOW TROUT	28	8,461	1%	2%
REDSIDE SHINER	67	282	1%	> 1%
SCULPIN SPP	7	59	0%	> 1%
SMALLMOUTH BASS	1,267	131,962	25%	15%
SUCKER SPP	363	181,549	7%	23%
UTAH CHUB	3,093	1,090,070	61%	19%
YELLOW PERCH	77	992	2%	> 1%

Table 8. Specie composition, length (mm), and weight (g) of fish sampled from Lake Walcott using standard sampling methods. Catch data including total catch (N), average total length (AVG TL), standard deviation of total length (SD TL), average weight (AVG WT), and standard deviation of weight (SD WT) were summarized by species.

SPECIES	N	AVG TL	SD TL	AVG WT	SD WT
CARP	151	499	127	3,240	2,530
RAINBOW TROUT	28	269	88	350	601
REDSIDE SHINER	67	71	7	4	1
SCULPIN SPP	7	84	6	8	1
SMALLMOUTH BASS	1,267	133	83	282	419
SUCKER SPP	363	248	166	1,268	821
UTAH CHUB	3,093	268	85	303	227
YELLOW PERCH	77	102	16	15	10

Table 9. CPUE by number and biomass for all gear types by species for data collected in Lake Walcott.

SPECIES	N	CPUE	TOTAL WT (g)	CPUE (BIOMASS)
CARP	151	25	387,660	65
RAINBOW TROUT	28	5	8,461	1
REDSIDE SHINER	67	11	282	0
SCULPIN SPP	7	1	59	0
SMALLMOUTH BASS	1,267	211	131,962	22
SUCKER SPP	363	61	181,549	30
UTAH CHUB	3,093	516	1,090,070	182
YELLOW PERCH	77	13	992	0

Table 10. CPUE by gear and species for collections made in Lake Walcott. Gear types included: electrofishing (EFISH), trap net (TN), floating gill nets (FGN), and sinking gill nets (SGN).

SPECIES	EFISH CPUE	TN CPUE	FGN CPUE	SGN CPUE
CARP	7	4	2	5
RAINBOW TROUT	1	1	1	0
REDSIDE SHINER	11	0	0	0
SCULPIN SPP	1	0	0	0
SMALLMOUTH BASS	204	0	0	1
SUCKER SPP	35	0	1	15
UTAH CHUB	65	129	49	106
YELLOW PERCH	13	0	0	0

Table 11. CPUE for Lake Walcott by reservoir boating access areas and reservoir segment. Total units of effort for described areas are listed in heading (UNITS).

	CLOSED (3 UNITS)		OPEN (3 UNITS)		MAIN (4 UNITS)		UPPER (2 UNITS)	
SPECIES	N	CPUE	N	CPUE	N	CPUE	N	CPUE
CARP	79	26	72	24	48	12	103	52
RAINBOW TROUT	15	5	13	4	8	2	20	10
REDSIDE SHINER	63	21	4	1	62	16	5	3
SCULPIN SPP	3	1	4	1	2	1	5	3
SMALLMOUTH BASS	633	211	634	211	462	116	805	403
SUCKER SPP	157	52	206	69	213	53	150	75
UTAH CHUB	1,718	573	1,375	458	1,453	363	1,640	820
YELLOW PERCH	56	19	21	7	27	7	50	25

Table 12. Angler survey creel statistics generated in 2006 from Lake Walcott and adjacent waters.

			SECTION				
		ALL	1	2	3	4	5
TOTAL EFFORT (HOURS)				9,430	15,952	14,982	
CATCH RATE (FISH/HOUR)	ALL FISH			0.62	0.24	0.05	
	RAINBOW TROUT			0.17	0.04	0.03	
	SMALLMOUTH BASS			0.45	0.2	0.02	
	CHANNEL CATFISH		NA	0	0	0.01	NA
NUMBER HARVESTED	ALL FISH			1,280	2,033	109	
	RAINBOW TROUT			1,280	2,033	66	
	SMALLMOUTH BASS			0	0	22	
	CHANNEL CATFISH			0	0	21	
PERCENT CATCH	RAINBOW TROUT	21.9					
	SMALLMOUTH BASS	77.6					
	CHANNEL CATFISH	0.5					
ANGLER TYPE (%)	BANK	60.9					
	BOAT	37.7					
	TUBE	1.4					
(%) CATCHING	O FISH	71.9					
	1 TO 3 FISH	15.2					
	4 OR MORE FISH	13.3					
GEAR TYPE (%)	BAIT	39.4					
	LURE	59.4					
	FLY	0.6					

Table 13. CPUE and relative abundance (% CATCH) by year and species for lowland lake surveys conducted on Lake Walcott.

	CPUE		% CATCH	
SPECIES	2004	2006	2004	2006
CARP	50	25	14	3
RAINBOW TROUT	3.8	5	1	1
REDSIDE SHINER	4	11	1	1
SCULPIN SPP	1	1	0	0
SMALLMOUTH BASS	92	211	25	25
SUCKER SPP	34	61	9	7
UTAH CHUB	177	516	49	61
YELLOW PERCH	3	13	1	2

Table 14. Catch composition and mean fish lengths from eight overnight gill net sets in Magic Reservoir in October 2006.

	Total length (mm)		Mesh (mm)							
	Ave	Range	13	19	25	32	38	51	All	Rel
Brown trout	120	-na-	1	0	0	0	0	0	1	0%
Rainbow trout	271	95-580	6	12	21	12	11	0	62	4%
Redside shiner	100	90-115	114	0	0	0	0	0	114	4%
Smallmouth bass	320	175-410	0	0	5	1	9	16	31	2%
Bridgelip sucker	207	95-320	21	358	469	33	2	0	883	33%
Yellow perch	163	90-320	503	780	237	47	33	3	1,603	57%
TOTAL	- Na -	- Na -	645	1,150	732	93	55	19	2,694	100%

Table 15. Zooplankton biomass (g/m towed) collected from a 9.1 m vertical tow with three different mesh sizes from Magic Reservoir in May, June and July 2006.

	MESH SIZE (μ)				
DATE	153	500	750	ZPR	ZQI
5/26/2006	0.51	0.37	0.41	1.1	0.9
6/26/2006	1.97	0.44	0.33	0.8	0.6
7/19/2006	1.51	1.19	0.82	0.7	1.4

Table 16. Electrofishing catch and catch rates for bluegill (BG) and largemouth bass (LMB) from Morrow Reservoir on May 22, 2006.

				Rate	
Species	Unit	Effort (sec)	Catch	Fish/15min	Fish/1hr
BG	1	897	113	113	454
	2	875	97	100	399
	3	900	169	169	676
	4	900	237	237	948
	TOT	3,572	616		
	AVE			155	619
	CV			40	40
LMB	1	897	12	12	48
	2	875	8	8	33
	3	900	12	12	48
	4	900	31	31	124
	TOT	3,572	63		
	AVE			16	63
	CV			65	65

Table 17. Relative abundance (%) and CPUE by species for fish collected in forage survey in Oakley Reservoir.

OAKLEY FORAGE 2006

SPECIES	N	%	CPUE
SUCKER SPP	2	0.21	<1
SCULPIN SPP	0	0.00%	0
SPOTTAIL SHINER	60	6.42%	6
WALLEYE	7	0.75%	1
YELLOW PERCH	865	92.61%	87

Table 18. CPUE by species and year for fish collected in Oakley Reservoir forage survey.

SPECIES	2004	2005	2006
SUCKER SPP	<1	3	<1
SCULPIN SPP	3	0	0
SPOTTAIL SHINER	4	44	6
WALLEYE	8	8	1
YELLOW PERCH	21	55	87

Table 19. Summary of catch data from the Salmon Falls Creek Reservoir FWIN survey. Catch data including total catch (N), % of total catch, average total length (AVG TL), standard deviation of total length (SD TL), average weight (AVG WT), and standard deviation of weight (SD WT) were summarized by species.

SPECIES	N	% CATCH	AVG TL	SD TL	AVG WT	SD WT
BLACK CRAPPIE	4	0.47%	104	36	23	22
N. PIKEMINNOW	18	2.10%	261	54	224	120
RAINBOW TROUT	32	3.73%	307	66	349	203
SMALLMOUTH BASS	15	1.75%	316	38	483	180
SPOTTAIL SHINER	7	0.82%	110	5	12	2
SUCKERS SPP	200	23.34%	449	110	1,347	607
WALLEYE	292	34.07%	366	120	696	954
YELLOW PERCH	289	33.72%	185	67	168	116

Table 20. Benchmark classifications and ranges developed by the Ontario Ministry of Fisheries to evaluate and classify individual walleye waters.

Parameter	Healthy/Stable	Stressed/Unstable	Unhealthy/Collapsed
CPUE≥450mm	≥2.00•net-1	0.44 to 1.99•net-1	≤0.43•net-1
Number of age classes	≥11 age classes	6 to 10 age classes	≤5 age classes
Maximum age	>16 years	14 to 16 years	≤13 years
Female diversity index	≥0.66	0.56 to 0.65	≤0.55

Table 21. Dates and associated sample sizes for walleye stomach collections in Salmon Falls Creek Reservoir, Idaho in 2005 and 2006.

DATE	WALLEYE SAMPLED
05/03/05	9
05/13/05	18
07/08/05	1
09/28/05	16
10/17/05	11
05/03/06	1

Table 22. Food items collected from walleye stomachs by number and percent of weight for all stomach collected from Salmon Falls Creek Reservoir, 2005.

SAMPLE	N	% OF WEIGHT
Total Fish	NA	97.01
Total Invertebrates	NA	0.29
Other - Unknown	NA	2.78
Yellow perch	16	4.80
Crappie	26	7.35
Walleye	0	0.00
Rainbow trout	7	49.37
Sucker	8	4.36
Smallmouth bass	0	0.00
Kokanee	0	0.00
Northern pikeminnow	4	9.16
Crayfish	0	0.00
Salmonid	1	0.59
Non-salmonid	20	7.04
Unknown Fish	4	17.33

Table 23. Relative abundance (%) and CPUE by specie for fish collected in 2006 forage survey in Salmon Falls Creek Reservoir.

SPECIES	N	%	CPUE (HR)
BLACK CRAPPIE	16	1.39%	2
NORTHERN PIKEMINNOW	3	0.26%	<1
SCULPIN SPP	0	0.00%	0
SMALLMOUTH BASS	124	10.76%	12
SPOTTAIL SHINER	10	0.87%	1
SUCKER SPP	1	0.09%	<1
WALLEYE	20	1.74%	2
YELLOW PERCH	978	84.90%	98

Table 24. CPUE by species and year for fish collected in Salmon Falls Creek Reservoir forage survey.

SPECIES	2004	2005	2006
BLACK CRAPPIE	2	34	2
NORTHERN PIKEMINNOW	0	<1	<1
SCULPIN SPP	0	1	0
SMALLMOUTH BASS	7	52	12
SPOTTAIL SHINER	<1	5	1
SUCKER SPP	<1	<1	<1
WALLEYE	0	1	2
YELLOW PERCH	2	115	98

Table 25. Salmon Falls Creek Reservoir estimated angler effort (hrs) and species harvest by survey interval. Confidence bounds (95%) are listed in parenthesis. Results summarized for the time period of April 9, 2006 to October 15, 2006 (RBT= rainbow trout; CRP=crappie; KOK=kokanee; SMB=smallmouth bass; WE=walleye; and YP=yellow perch).

INTERVAL	EFFORT	RBT	CRP	KOK	SMB	WE	YP
1	20,625 (2,747)	7,060	0	467	0	0	0
2	16,802 (1,791)	4,254	0	54	104	324	131
3	12,673 (3,902)	2,424	0	24	102	245	1,075
4	7,993 (3,554)	3,253	0	0	273	273	622
5	6,576 (3,285)	1,663	21	0	121	330	261
6	3,770 (177)	1,638	0	0	21	21	115
TOTAL	68,440 (6519)	20,292 (2,462)	21 (0)	545 (0)	621 (77)	1,193 (99)	2,204 (213)

Table 26. Historical creel comparison from 1995, 2002, 2005, and 2006. Data summarized by year for standardized effort per number of scheduled creel days (EFFORT/DAY) and estimated harvest per effort/day by species (RBT= rainbow trout; CRP=crappie; KOK=kokanee; SMB=smallmouth bass; WE=walleye; and YP=yellow perch).

		ESTIMATED HARVEST PER EFFORT/DAY					
YEAR	EFFORT/DAY	RBT	CRP	KOK	SMB	WE	YP
2006	366	55	0	1	2	3	6
2005	318	35	0	0	1	3	2
2002	340	36	0	0	3	8	4
1995	433	26	1	1	1	7	64

RIVERS AND STREAMS

ABSTRACT

The Billingsley Creek fishery was surveyed to identify population changes resulting from brown trout *Salmo trutta* stocking efforts initiated in 2003. A total of 152 brown trout were collected from all locations. Collected samples of brown trout suggest poor natural recruitment. Size classes represented stocked fish from 2005 and 2006.

The Big Wood River was sampled in 2006 to evaluate trends in fish abundance and condition. Standard transects included Lower Hailey (2), Gimlet (4), and Kendall Gulch (7). Rainbow trout annual mortality was estimated from catch curves. Fish sampled in all reaches included rainbow trout, mountain whitefish *Prosopium williamsoni*, brook trout *Salvelinus fontinalis*, brown trout, sculpin, and suckers. Densities of larger fish in all reaches were stable or increasing. Estimated annual mortalities ranged from 77% to 55% representing an increase in survival in the Kendall Gulch and Gimlet transects from the late 1980s and relatively stable survival in the Lower Hailey transect. Trends in rainbow trout density and population structure suggested that populations are experiencing positive growth through consistent recruitment. Mountain whitefish numbers sampled in 2006 were down from previous years in the Lower Hailey and Kendall Gulch transects, but whitefish density was relatively stable in the Gimlet transect. Rainbow trout condition was primarily considered good among all transects.

Six Mile Creek water temperatures were monitored in the summer of 2006 to identify if water temperature potentially limits reintroduction opportunities of native Yellowstone cutthroat trout into the watershed. Water temperatures indicated suitable conditions for Yellowstone cutthroat trout exist throughout the warmest months of the year.

INTRODUCTION

Billingsley Creek

Billingsley Creek is a 13.6 km-long spring fed stream that flows into Lower Salmon Falls Reservoir - a Snake River impoundment near the town of Hagerman. The stream is used extensively as a source of irrigation water, for commercial fish rearing, and hydroelectric production.

Billingsley Creek provides both a brown trout and rainbow trout fishery. Historically, both species have been maintained by hatchery out-plants and hatchery escapement from local fish producers. Angling opportunities include multiple regulation scenarios.

The Billingsley Creek fishery was surveyed in 2002 in an effort to establish baseline trend information. Sample locations from 2002 were re-sampled in 2006 to identify population changes resulting from brown trout stocking efforts initiated in 2003. One additional site was sampled in 2006 to confirm brown trout out-plant success in the lower Billingsley Creek section.

Big Wood River

The Big Wood River originates in the Smokey Mountain, Boulder Mountain, and Pioneer Mountain ranges of south central Idaho. The river flows south – southwest from its origin to its confluence with the Little Wood River west of Gooding, forming the Malad River. Numerous diversions for irrigation and aesthetic waterways reduce flows as the Big Wood River moves through the Wood River Valley. The Big Wood River is impounded by Magic Dam located west of State Highway 75, forming Magic Reservoir. Downstream from the dam, the river is used extensively for irrigation and is often dewatered seasonally with the entire discharge being diverted in the Richfield Canal.

The Big Wood River provides a popular fishery with angling opportunities for rainbow trout, brown trout, and mountain whitefish. The Big Wood River has been managed as a trophy wild rainbow trout fishery from the Glendale Diversion upstream to its headwaters since 1977. Restrictive regulations were expanded in 1990 to increase the trophy quality of the Big Wood River fishery. The Big Wood River fishery is currently managed with three regulation combinations including a slot limit (two trout limit with none between 305 mm and 406 mm allowed), catch-and-release, and general regulations. Hatchery supplementation is currently limited to the North Fork of the Big Wood River, Big Wood River upstream of the North Fork confluence, Warm Springs Creek, Magic Reservoir, and intermittently below Magic Reservoir in the Richfield Canal. These locations are managed under general regulations.

A survey of the Big Wood River was completed in 2006 that will be used to evaluate changing habitat and angler effort and it's affect on the fishery, over time.

Six Mile Creek

Six Mile Creek is a historic tributary of the Raft River in south central Idaho. Connectivity to Raft River no longer exists. Six Mile Creek is a small spring creek that is heavily used for cattle watering and irrigation. A small impoundment is located on the lower end of the creek. Several species of sport fish currently occupy Six Mile Creek including rainbow trout and rainbow trout x cutthroat trout hybrids. Yellowstone cutthroat are the native fish in the drainage.

Six Mile Creek water temperatures were monitored in the summer of 2006 to evaluate whether water temperatures were suitable for cold water salmonids. This is part of the on-going effort to reintroduce native Yellowstone cutthroat trout to the drainage.

METHODS

River and stream surveys are conducted using electrofishing equipment. Fish are typically sampled with pulsed direct current (DC). Four different electrofishing assemblies are commonly used to conduct surveys, depending on the size of river or stream sampled. Smaller wadeable streams are sampled with a backpack electrofishing unit. Sampling is conducted in an upstream movement with one or two netters. Sampled sections are blocked with nets on both ends when depletion population estimates are desired. Larger wadeable streams and rivers are sampled with a canoe electrofishing assembly. Sampling is typically conducted in a downstream movement with multiple netters. Non-wadeable streams and rivers are sampled either with a drift boat mounted electrofishing assembly or a jet boat electrofishing assembly. Both methods consist of sampling in a downstream movement typically with two netters.

Quantitative stream surveys are completed using mark recapture, multiple mark recapture, or depletion estimate techniques. Mark recapture efforts are completed with one marking run and one recapture run separated by at least one week. Fish are marked by a single fin punch. Multiple mark recapture efforts are completed with multiple (typically three) passes separated by approximately one week. Fish are marked on all passes except the final pass with fin punches. Depletion estimates utilize multiple passes with removal. The sampled reach is blocked with nets during depletion estimates. Removal passes in depletion estimates are discontinued when no fish are captured or the number of fish captured in a single run is less than 25% of the total number captured. Data analysis typically includes population estimation by length group. Fish data are summarized by species for length, weight, relative abundance, relative biomass, and CPUE. Catch by age is determined loosely by analysis of length frequency or more definitively by otolith analysis from a representative collection of fish. A description of equipment used in river and stream surveys is listed in Appendix 1.

Billingsley Creek was surveyed on July 3, 2006 to evaluate the success of brown trout out-plants from 2003 to 2006. Survey locations included two sites on the Bill Jones property and two sites on lower Billingsley Creek on and above the IDFG Billingsley Creek Wildlife Management Area (WMA). Sample locations corresponded to sites sampled in 2002 (Warren et al. 2008) with one additional site added above the WMA location. Angler reports indicated higher than average densities concentrated above the WMA where sampling had not occurred previously. Fish were sampled with one pass using a canoe electrofishing assembly and drift boat electrofishing assembly for upper and lower reaches, respectively. All fish species were netted at sample locations on the Bill Jones property and the WMA. Total length and weight were taken on all species at the lower Jones and WMA sites and on all salmonids at the upper Jones and upper WMA site. Trends in population structure by year and brown trout stocking success were evaluated by comparison of relative abundance.

The Big Wood River was sampled at standard transects using a canoe electrofishing system (Appendix 2.) to evaluate trends in fish abundance and condition. Standard transects included Lower Hailey (2), Gimlet (4), and Kendall Gulch (7) defined by Thurow 1987 (Figure 14). Two electrofishing passes, separated by seven days, were completed at each transect to facilitate abundance estimation.

Upon capture, fish were identified, measured, weighed, marked, and released. Weights were taken only during the marking run. Caudal fin clips were used to mark trout and whitefish equal or greater than 100 mm for identification in the recapture run. Salmonids were counted, measured, and observed for marks in the second (recapture) electrofishing pass.

Estimates of rainbow trout and mountain whitefish were made using a modified-Peterson mark-recapture estimator (Ricker 1975). Calculations were completed in FA+ (Fisheries Analysis Software, Version 1.0.8). Estimates were calculated in 100 mm increments for fish equal or greater than 100 mm total length. A minimum of five recaptures was required for estimates. Length groups were pooled when less than five recaptures were made within an individual length group. Estimates of fish equal or greater than 200 mm were reported for evaluation of long term trends (Warren and Megargle, 2003).

Data collected were compiled, summarized, and used to estimate stock density, relative weight, annual mortality, and length at age. RSD (RSD – 400) were determined for rainbow trout collected in each transect. RSD-400 was calculated as the number of fish ≥ 400 mm divided by the number of fish ≥ 200 mm (Ney 1993). Relative weight was calculated for rainbow trout and reported as mean relative weight by 100 mm length groups in FA+ (Simpkins and Hubert 1996).

Scales and otoliths were collected from a representative group of rainbow trout. Age was estimated from scales by mounting them between two glass slides and reading on a microfiche. Age was estimated from otoliths by cleaning and reading in whole view using a dissecting microscope at 30X - 40X magnification. Otoliths were cut using a Dremel® tool and read in cross-section if the whole view was not considered to be clear. Estimated ages were used to determine length at age and applied to an age-length key to extrapolate age to all sampled fish in the marking pass (Devries and Frie 1996). Catch curves were used to estimate mortality and survival. (Van Den Avyle 1993). Catch curves were generated in FAST© (Fisheries Analysis and Simulation Tools, Version 2.1).

Habitat data was collected on a separate date following electrofishing efforts. Transect lengths and widths were measured with a Leica® LRF 900 Rangemaster rangefinder. Transect waypoints were marked for future replication using a Magellan® Sporttrack Topo Global Positioning System (GPS) (Appendix 2).

Two Hobo® temperature loggers were placed in Six Mile Creek from July 7 to November 6, 2006 to monitor summer water temperatures. Temperature loggers were placed in the upper creek section near the source spring and in the lower creek section above the existing impoundment. Sample locations were listed in Appendix 2. Temperatures were recorded every two hours.

RESULTS AND DISCUSSION

Billingsley Creek

Electrofishing surveys at the Bill Jones property locations were completed on July 3, 2006. Electrofishing surveys at the WMA locations were completed on September 26, 2006. A total of 3,769 seconds and 3,643 seconds of sample effort were completed on the lower Bill Jones and upper Bill Jones property locations, respectively. Effort was not recorded for the WMA and upper WMA sample locations.

Species collected from combined efforts included: brown trout, rainbow trout, "yellow" trout, redside shiner, Utah chub, sucker, and common carp (Table 27). A total of 561 fish were collected. Game and non-game species made up 32% and 68% of 474 fish sampled at all locations except the upper WMA location. Only trout were collected at the upper WMA location. Length, weight, and catch data by species and location are detailed in Table 28.

A total of 152 brown trout were collected from all locations. Brown trout ranged from 235 mm to 465 mm total length (Figure 15). PSD (Anderson and Neumann 1996) was 100 and reflected an absence of stock and sub-stock size classes. The absence of smaller size classes suggested brown trout have not been successful in naturally reproducing. Size classes present in sampling feasibly represent stocked fish from 2005 and 2006 and suggest brown trout out-plants have recruited to the population.

A total of 77 rainbow trout were collected from all locations. Rainbow trout ranged from 50 mm to 505 mm total length (Figure 16). No strong age class was represented in the length frequency distribution (Figure 16). Absence of significant year classes suggested poor spawning habitat or a system primarily driven by hatchery escapees. IDFG has not stocked rainbow trout in Billingsley Creek since 2002. PSD (Anderson and Neumann 1996) was 15 and reflected a low proportion of quality and larger size classes.

A total of 11 "yellow" trout were collected from the two WMA sample locations. No yellow trout were encountered on the Bill Jones property. "Yellow" trout ranged from 200 mm to 465 mm total length. "Yellow" trout are of hatchery origin. IDFG does not stock "yellow" trout in Billingsley Creek. Therefore, "yellow" trout collected are considered hatchery escapees.

Relative abundance of sampled fishes from the Bill Jones property locations from 2002 and 2006 indicated several notable changes in fish assemblage (Table 28). Brown trout were not present in 2002, but were 14.07% of the catch in 2006. Changes in brown trout abundance are attributed to hatchery supplementation efforts. A 5% increase in relative abundance of rainbow trout was detected with a 19.5% overall increase of game fish (salmonids). Relative abundance of non-game fishes declined with a notable shift in abundance of Utah chub and redside shiners. Predator introductions (brown trout) and habitat modifications on the Jones property are suspected to have influenced non-game fish assemblages.

Big Wood River

Big Wood River mark and recapture electrofishing samples were completed from September 5 to 7, 2006 and September 12 to 14, 2006 respectively. Transect length at the Lower Hailey, Gimlet, and Kendall Gulch locations were 1,082 m; 702 m; and 990 m; respectively. Mean transect width of the Lower Hailey, Gimlet, and Kendall Gulch locations were 21.68 m; 19.87 m; and 10.72 m; respectively.

Lower Hailey

Fish sampled in the Lower Hailey transect included wild rainbow trout (81%), mountain whitefish (3%), brook trout *Salvelinus fontinalis* (7%), brown trout (collected in recapture run only), sculpin spp (8%), and suckers spp (1%) (Table 29).

A total of 384 and 548 rainbow trout were collected in the Lower Hailey reach during the marking and recapture runs, respectively. Our efficiency rate (R/C unadjusted for size

selectivity) was 16%. Rainbow trout (≥ 200 mm) were estimated at 1,327 ± 376 (95% CI), which equated to 566 trout/ha (Table 30). Mean total length of rainbow trout was 205 mm and ranged from 90 mm to 440 mm (Figure 17). Length at age four was estimated at 367 mm (Table 31). Relative stock density (RSD – 400) was two, representing an increase in fish ≥ 400 mm from 2003 and a positive trend from 1992 (Figure 18). Relative weight ranged from 0.84 to 0.92 and decreased with total length (Figure 19). Rainbow trout annual mortality was estimated at 77% for ages two to five (Figure 20).

A total of 16 and 23 mountain whitefish were collected in the Lower Hailey reach during the marking and recapture runs, respectively. Only one marked fish was recaptured. No population estimate was determined due to insufficient recaptures (Table 30). Mean total length of mountain whitefish averaged 295 mm and ranged from 180 mm to 430 mm (Table 30).

Gimlet

Fish sampled in the Gimlet transect included wild rainbow trout (87%), hatchery rainbow trout (<1%), mountain whitefish (4%), brook trout (0%), longnose dace (<1%), sculpin species (8%), and suckers species (<1%) (Table 30).

A total of 414 and 518 rainbow trout were collected in the Gimlet transect during the marking and recapture runs, respectively. Our efficiency rate (R/C unadjusted for size selectivity) was 21%. We estimated the number of rainbow trout equal or greater than 200 mm at 1194 ± 223 (95% CI) which equated to 856 trout/ha (Table 30). Rainbow trout mean total length was 238 mm and ranged from 50 mm to 450 mm (Figure 21). Length at age four was estimated at 360 mm (Table 31). Relative stock density (RSD – 400) was three and represented a decline in the relative number of fish ≥ 400 mm from 2003 and a negative trend from 1992 (Figure 22). Relative weight ranged from 0.69 to 0.92 and declined with total length (Figure 22). Rainbow trout annual mortality was estimated at 61% for ages two to four (Figure 22).

A total of 17 and 18 mountain whitefish were collected in the Gimlet transect during the marking and recapture runs, respectively. Our efficiency rate (R/C unadjusted for size selectivity) was 41%. We estimated the number of mountain whitefish equal or greater than 100 mm at 42 ± 16 (95% CI) which equated to 30 fish/ha (Table 30). Mean total length of mountain whitefish was 335 mm and ranged from 250 mm to 460 mm.

Kendall Gulch (Upper Wood)

Fish sampled in the Kendall Gulch (Upper Wood) transect included wild rainbow trout (75%), hatchery rainbow trout (9%), mountain whitefish (5%), brook trout (2%), and sculpin species (10%) (Table 30.

A total of 175 and 93 rainbow trout were collected in the Kendall Gulch transect during the marking and recapture runs, respectively. Our efficiency rate (R/C unadjusted for size selectivity) was 29%. We estimated the number of rainbow trout equal or greater than 200 mm at 159 ± 25 (95% CI), which equated to 150 trout/ha (Table 30). Mean rainbow trout total length

was 219 mm and ranged from 50 mm to 430 mm (Figure 23). Length at age four was estimated at 388 mm (Table 31). Relative stock density (RSD – 400) was three and represented an increase in the relative number of rainbow trout ≥ 400 mm from 1996 (Figure 24). Relative weight ranged from 0.87 to 0.94 and decreased with length (Figure 24). Rainbow trout annual mortality was estimated at 55 % for ages two to four (Figure 24).

A total of 11 and 5 mountain whitefish were collected in the Kendall Gulch reach during the marking and recapture runs, respectively. Two marked fish were recaptured. No population estimate was made due to insufficient recaptures (Table 30). Mean total length of mountain whitefish was 367 mm and ranged from 255 mm to 410 mm (Table 30).

Big Wood River Trends

Rainbow trout densities within all transect locations from 1988 to 2006 demonstrated a positive trend in abundance of rainbow trout ≥ 200 mm (Figure 18). Corresponding trends in the relative percentage of larger rainbow trout (≥ 400 mm) from 1992 to 2006 represented by RSD-400 values within each transect were not consistent (Figure 19). Trends in RSD- 400 values for the Lower Hailey and Kendall Gulch indicated an increase in the relative proportion of larger rainbow trout present. In contrast, RSD-400 in the Gimlet transect by year indicated a negative trend. Abundance estimates for rainbow trout ≥ 300 mm from 1992 to 2006 have maintained stable to increasing trends in all transects (Figure 18). Abundance estimates for rainbow trout ≥ 400 mm were limited over the given time period due to low recaptures so no comparison was made.

Sampled numbers of mountain whitefish were low in 2006. Population estimates were feasible for the Gimlet transect only. Mountain whitefish density estimates (≥ 100 mm) per 100 m2 between 1992 and 2003 demonstrated a stable trend in both the Hailey and Gimlet reaches. Mountain whitefish density estimates per 100 m^2 between 1992 and 2006 for fish ≥ 100 mm demonstrated a stable trend in Gimlet reach. Mountain whitefish density estimates were only available in 1996 for the Kendall Gulch transect.

Trends in rainbow trout density and population structure suggested that the population is experiencing positive growth through consistent recruitment. Population trends in all reaches appeared to be positive. Although, a negative trend in the proportion of large rainbow trout (≥ 400 mm) was observed in the Gimlet transect, density of larger (≥ 300 mm) rainbow trout appeared to be stable or increasing. Results are an indication younger cohorts are increasing in density and do not necessarily reflect a decline in larger trout.

Annual mortality estimated in 2006 varied from that reported by Thurow 1987. Annual mortalities within the Gimlet and Kendall Gulch transects were lower than previously reported values of 0.75 and 0.90, respectively. Annual mortality of rainbow trout was consistent to the previously reported value within the Lower Hailey transect. Several scenarios may explain the observed changes in annual mortality. Regulation changes made in 1990 reduced harvest potential in the Lower Hailey transect area and removed harvest from the Gimlet transect area. Although, harvest potential was reduced in the Lower Hailey area, access has remained good and we believe angler effort is high. Angling regulations did not change in the Kendall Gulch area, but access to the area has been altered. Access to the Kendall Gulch area was reduced

with the removal of the Kendall Gulch road and closure of vehicle traffic from state highway 93 to stream side access points, potentially reducing angler effort. In addition, changes in habitat within each reach may influence the population it supports. High water events such as the spring 2006 high flow event noticeably altered in-stream habitat.

Condition of rainbow trout, measured as relative weight, was primarily considered good among all transects. However, within the Gimlet transect relative condition appeared to decline considerably within larger cohorts. Several large rainbow trout sampled within the Gimlet transect were likely responsible for the observed decline. The presence of large poor condition fish likely reflected a senescent cohort potentially influenced by the catch and release regulation scenario and relatively low annual mortality rate in the reach.

Mountain whitefish numbers sampled in 2006 were down from previous years in the Lower Hailey and Kendall Gulch transects. Population estimates were not considered possible due to low recaptures in these transects. The reason for low sample size was unclear. Mountain whitefish densities within the Gimlet reach were comparable to those reported in most previous years except 2000 (Warren et al. 2003). Density estimates in 2000 were considerably higher than any other year reported. A stable trend in mountain whitefish densities in the Lower Hailey reach was observed prior to 2006.

Six Mile Creek

Maximum water temperature for both locations was measured near the source spring at approximately 19° C. Maximum water temperature at the lower creek site was 16.6° C. Mean water temperature for the sampled period was approximately 9° C.

Water temperature fluctuations at the upper creek site varied dramatically between time periods July 7 to July 18 and July 18 to November 6 (Figure 25). Temperature patterns suggested logger malfunction or placement disruption. Maximum recorded water temperature at this site (source spring) also suggest data is suspect.

Water temperatures at the lower creek sample site indicated suitable conditions for Yellowstone cutthroat trout exist throughout the warmest months of the year. Despite suspect data, maximum logged temperatures at the upper creek site also indicated suitable conditions for Yellowstone cutthroat trout exist.

MANAGEMENT RECOMMENDATIONS

1. Maintain the current brown trout stocking program in Billingsley Creek.

2. Maintain trend monitoring efforts on the Big Wood River in order to follow changes in the fishery. Change potential is believed to be high under the current level of development in the Wood River Valley.

3. Investigate potential mountain whitefish population declines in the Lower Hailey and Kendall Gulch transect areas.

4. Consider Six Mile Creek for Yellowstone cutthroat reintroduction.

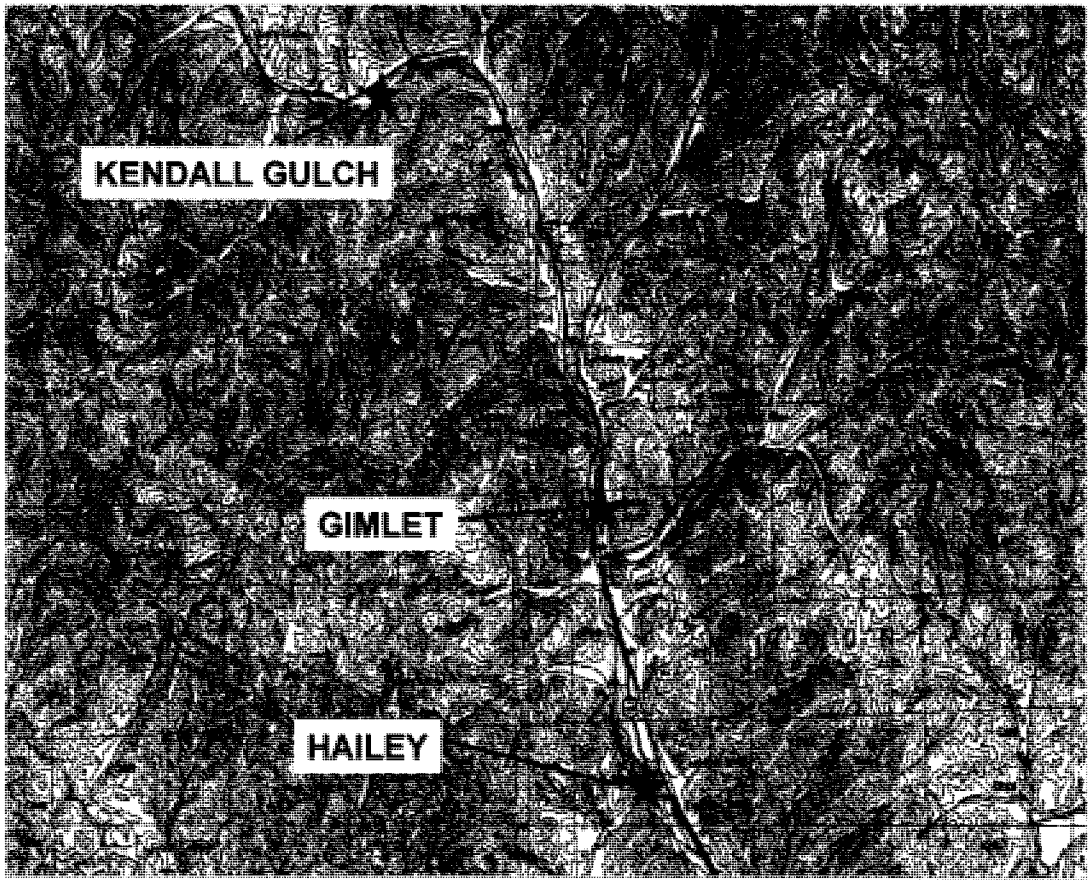


Figure 14. Big Wood River sample site locations surveyed in 2006.

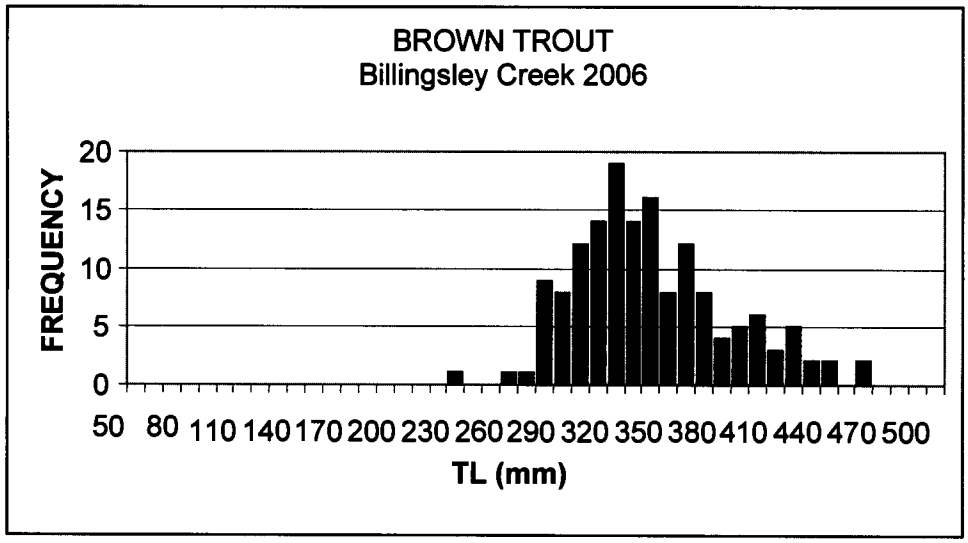


Figure 15. Billingsley Creek brown trout length (TL, total length) frequency for all combined sample locations.

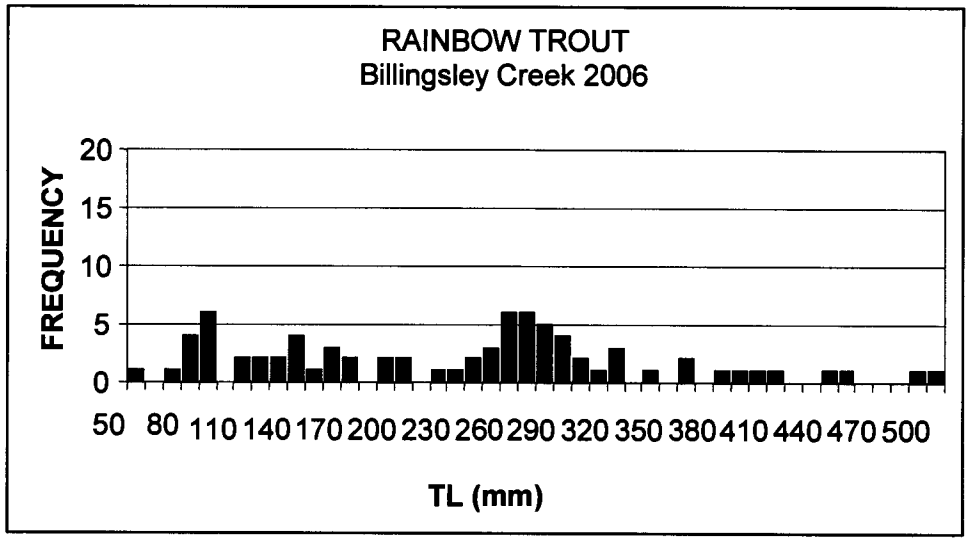


Figure 16. Billingsley Creek rainbow trout length (TL, total length) frequency for all sample locations combined.

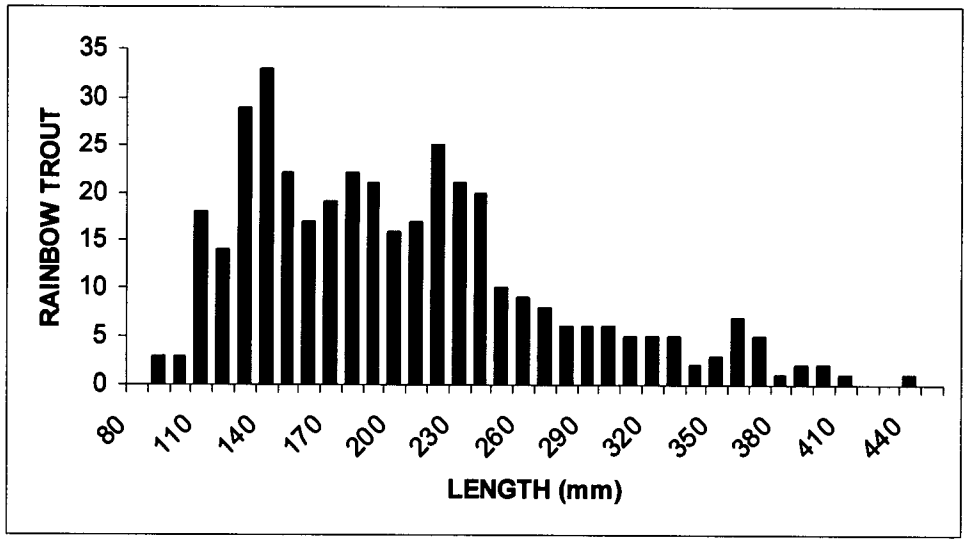


Figure 17. Length frequency histogram of Lower Hailey transect rainbow trout collected in the Big Wood River, Idaho 2006

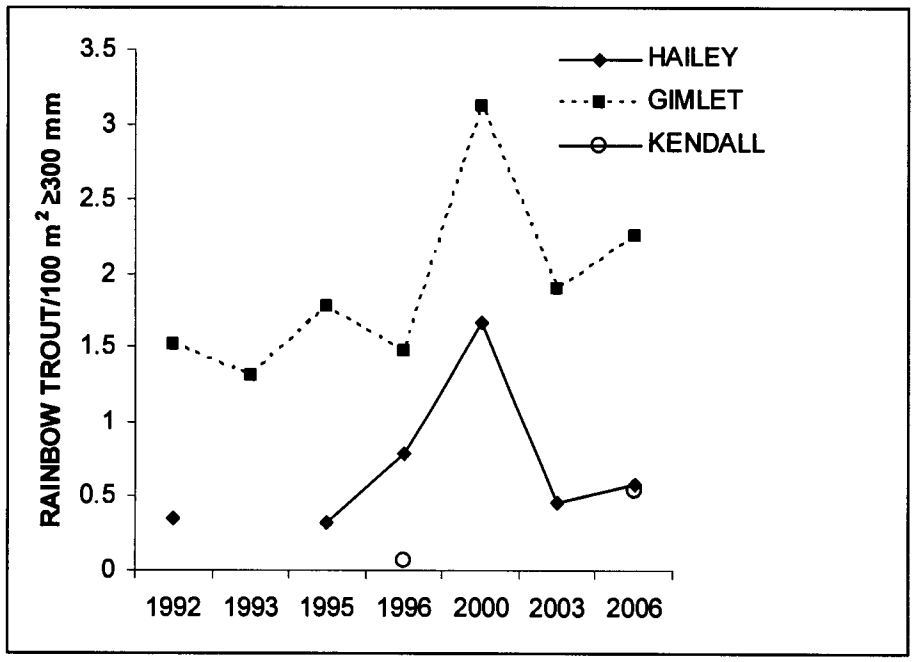


Figure 18. Estimated density of wild rainbow trout per 100 m^2 for fish ≥ 300 mm in the Big Wood River by sample transect and year.

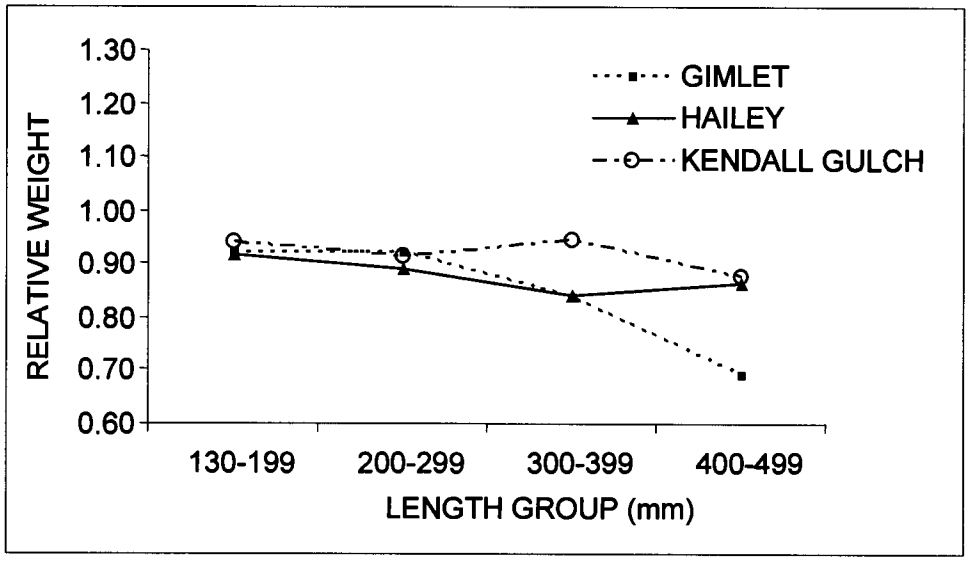


Figure 19. Mean relative weight by length group and sample transect for rainbow trout collected in the Big Wood River, Idaho 2006.

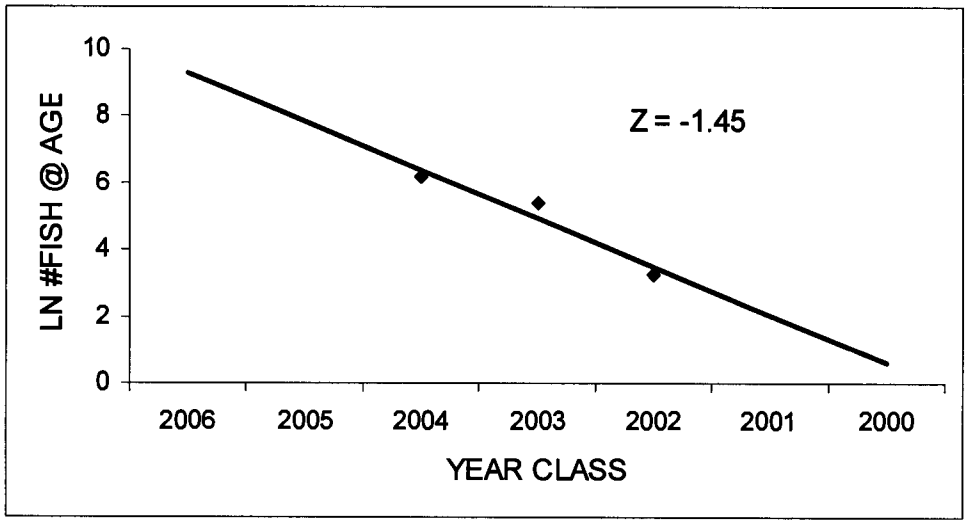


Figure 20. Catch curve for rainbow trout collected in the Lower Hailey transect of the Big Wood River.

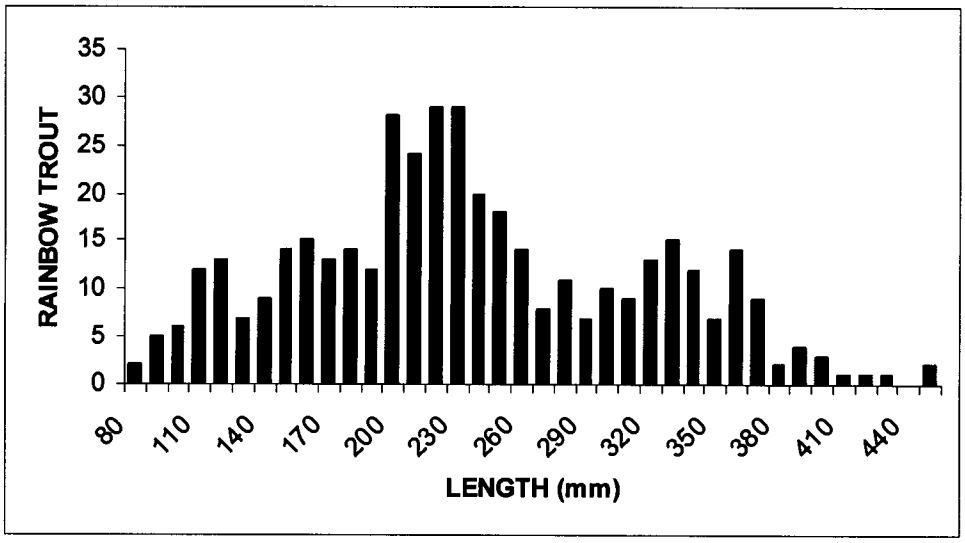


Figure 21. Length frequency histogram of rainbow trout collected in the Gimlet transect of the Big Wood River.

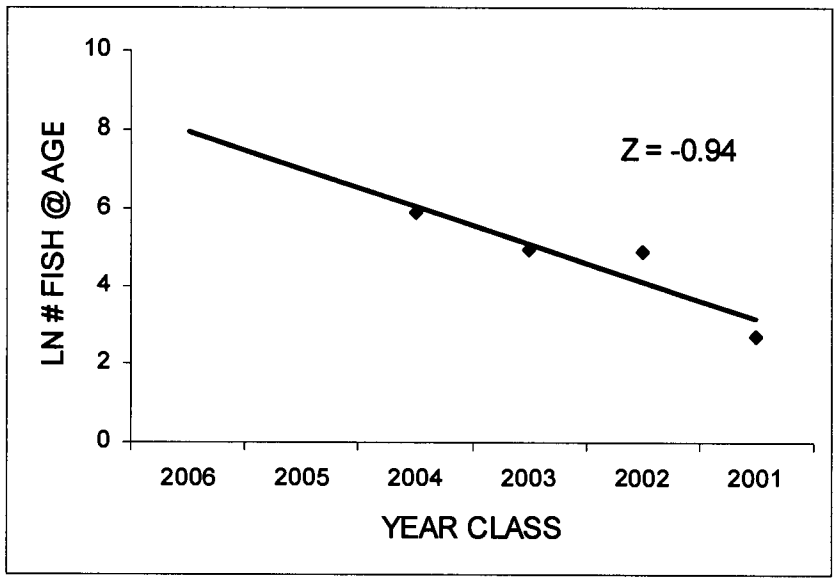


Figure 22. Catch curve for rainbow trout collected in the Gimlet transect of the Big Wood River.

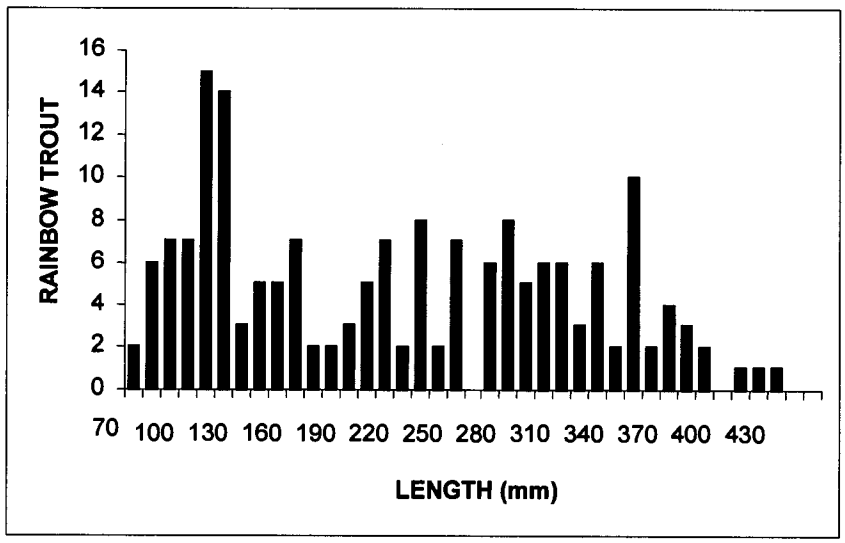


Figure 23. Length frequency histogram of rainbow trout collected in the Kendall Gulch transect of the Big Wood River.

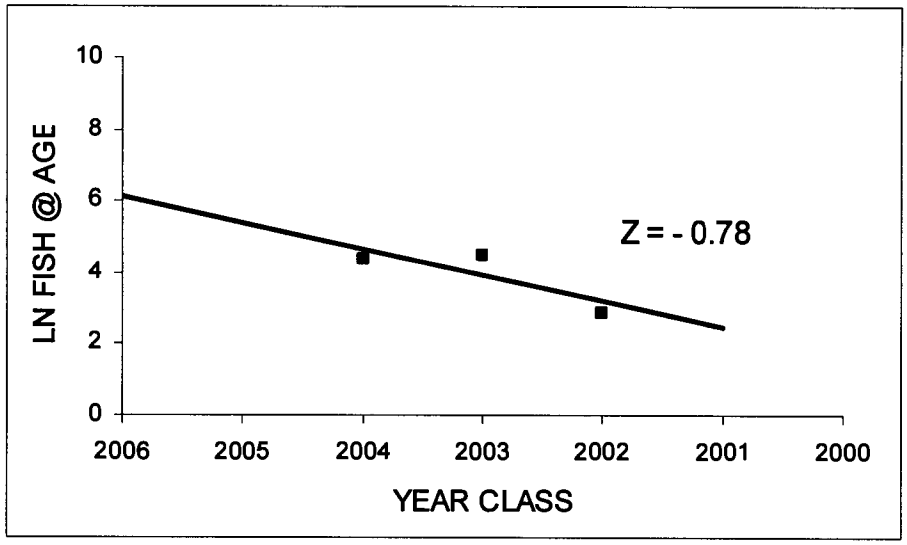


Figure 24. Catch curve for rainbow trout collected in the Kendall Gulch transect of the Big Wood River.

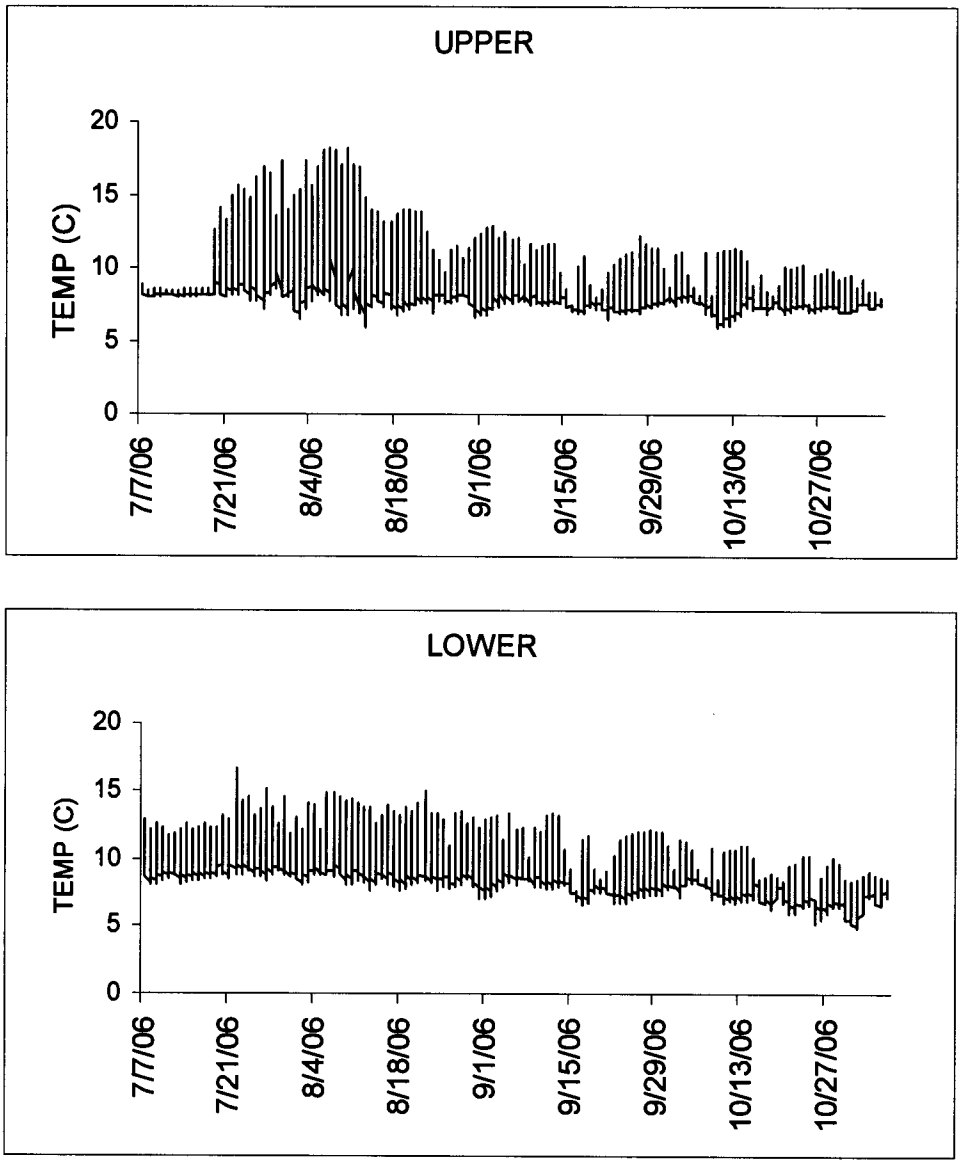


Figure 25. Temperature profiles for upper and lower Six Mile Creek, Idaho from July 7, 2006 to November 6, 2006.

Table 27. Billingsley Creek catch summary by species. Summarized values include number caught (N), total length range (TL RANGE), mean total length (TL), proportional stock density (PSD), relative weight (Wr), and total weight (WT).

		LOCATION				
SPECIES	VALUE	BJ LOW	BJ UPPER	WMA	WMA(UP)	ALL
BROWN TROUT	N	17	48	10	77	152
	TL RANGE mm	305-390	235-440	300-465	265-440	235-465
	MEAN TL	338	332	392	343	342
	PSD					100
	Wr					106
	TOTAL WT kg	7.6	18.8	7.6	36.9	70.8
RAINBOW TROUT	N	28	27	18	4	77
	TL RANGE	50-295	150-365	190-505	240-320	50-505
	MEAN TL	129	263	343	279	234
	PSD					15
	Wr					100
	TOTAL WT kg	1.1	5.6	10	0.9	17.6
YELLOW TROUT	N	0	0	5	6	11
	TL RANGE			200-455	225-465	200-465
	MEAN TL			359	379	370
	PSD					NA
	Wr					NA
	TOTAL WT kg			3.2	4.6	7.9
REDSIDE SHINER	N	107	39	0		146
	TL RANGE	65-125	90-135			65-135
	MEAN TL	89	109		NA	95
	PSD					NA
	Wr					NA
	TOTAL WT kg	0.68	NA			0.7
UTAH CHUB	N	69	56	27		152
	TL RANGE	45-250	140-255	65-285		45-285
	MEAN TL	184	202	227	NA	198
	PSD					NA
	Wr					NA
	TOTAL WT kg	3.2	NA	4.2		7.4
SUCKER	N	0	0	22		22
	TL RANGE			515-590		515-590
	MEAN TL			551	NA	551
	PSD					NA
	Wr					NA
	TOTAL WT kg			7.4		7.4
CARP	N	0	0	1		1
	TL RANGE			515		515
	MEAN TL			515	NA	515
	PSD					NA
	Wr					NA
	TOTAL WT kg			2.3		2.3

Table 28. Comparison of Billingsley Creek sample sites by year. Number caught (N) and relative abundance (% CATCH) by species for fish collected in 2002 and 2006. Values from 2002 represent a sub-sample from the lower site on the Bill Jones property. Values from 2006 represent collected fish from both upper and lower sites on the Bill Jones property

	2002		2006	
SPECIES	N	% CATCH	N	% CATCH
BROWN TROUT	0	0.00%	55	14.07%
RAINBOW TROUT	33	11.22%	65	16.62%
REDSIDE SHINER	57	19.39%	146	37.34%
UTAH CHUB	204	69.39%	125	31.97%
ALL SALMONIDS	33	11.22%	120	30.69%

Table 29. Big Wood River catch summary by location and species. Data includes only marking run data. Summary includes total caught (N), relative abundance in catch (% CATCH), mean total length (TL), standard deviation of total length (SD TL), mean weight (WT), and standard deviation of weight (SD WT).

SITE	SPECIES	N	% CATCH	MEAN TL	SD TL	MEAN WT	SD WT
GIMLET	HRBT	1	0.21%	335	NA	NA	NA
GIMLET	LND	1	0.21%	90	NA	NA	NA
GIMLET	MWF	17	3.59%	335	66	463	271
GIMLET	RBT	414	87.34%	238	79	166	142
GIMLET	SCU	39	8.23%	76	22	NA	NA
GIMLET	SUC	2	0.42%	123	18	NA	NA
HAILEY	BKT	33	6.92%	247	56	168	111
HAILEY	MWF	16	3.35%	295	66	301	196
HAILEY	RBT	384	80.50%	205	70	113	125
HAILEY	SCU	39	8.18%	73	16	NA	NA
HAILEY	SUC	5	1.05%	135	50	NA	NA
KENDALL GULCH	BKT	4	1.71%	149	70	53	66
KENDALL GULCH	HRBT	21	8.97%	249	23	156	49
KENDALL GULCH	MWF	11	4.70%	367	44	589	183
KENDALL GULCH	RBT	175	74.79%	219	98	174	187
KENDALL GULCH	SCU	23	9.83%	83	11	NA	NA

Table 30. Mark recapture data and estimates for mountain whitefish and rainbow trout sampled in the Big Wood River.

LOCATION	SPECIES	SIZE CLASS	MARKED	CAPTURED	RECAPED	POP EST	SD EST	No./ha
Site 2	Mountain whitefish	≥ 100 mm	16	23	1	NA		NA
(Hailey-Lower)	Rainbow trout	100-199 mm	195	266	33	1538	221	656
	Rainbow trout	200-299 mm	138	206	22	1250	220	533
	Rainbow trout	300-399 mm	39	37	10	137	29	58
	Rainbow trout	400-499 mm	4	4	1	NA		NA
	Rainbow trout	≥ 200 mm	181	247	33	1327	188	566
Site 4	Mountain whitefish	≥ 100 mm	17	18	7	42	8	30
(Gimlet)	Rainbow trout	100-199 mm	112	234	19	1327	251	951
	Rainbow trout	200-299 mm	188	178	39	845	103	606
	Rainbow trout	300-399 mm	95	81	24	314	44	225
	Rainbow trout	400-499 mm	8	10	2	NA		NA
	Rainbow trout	≥ 200 mm	291	269	65	1194	112	856
7 (Kendall Gulch)	Mountain whitefish	≥ 100 mm	11	5	2	NA		NA
	Rainbow trout	100-199 mm	60	26	9	164	36	155
	Rainbow trout	200-299 mm	50	33	16	101	14	95
	Rainbow trout	300-399 mm	44	28	21	58	4	55
	Rainbow trout	400-499 mm	3	0	0	NA		NA
	Rainbow trout	≥ 200 mm	97	61	37	159	13	150

Table 31. Mean length at age for rainbow trout by transect collected in the Big Wood River.

	AGE					
TRANSECT	1	2	3	4	5	6
LOWER HAILEY	115	189	284	367		410
(N)	(8)	(48)	(45)	(12)		(1)
GIMLET	126	202	274	360	369	
(N)	(22)	(51)	(27)	(35)	(4)	
KENDALL GULCH	114	205	309	388		
(N)	(30)	(44)	(47)	(12)		

LITERATURE CITED

Anderson, R. O. and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries Techniques 2nd edition. American Fisheries Society, Bethesda, Maryland.

Devries, D. R. and R. V. Frie. 1996. Determination of age and growth. Pages 483-508 in B. R. Murphy and D. W. Willis, editors. Fisheries Techniques. American Fisheries Society, Bethesda, Maryland.

Duffy, M. J., J. L. McNulty, and T. E. Mosindy. 2000. Identification of sex, maturity, and gonad condition of walleye (*Stizostedian vitreum vitreum*), Ontario Ministry of Natural Resources Northwest Science and Technology, Thunder Bay, Ontario, NWST FG-05.

Gangle, R. S. and D. L. Pereira. 2003. Biological performance indicators for evaluating exploitation of Minnestoa's large-lake walleye fisheries. North American Journal of Fisheries Management 23: 1303-1311.

Grunder, S.A., L. Barrett and R.J. Bell. 1987. Regional fishery management investigations. Job Performance Report. Project F-71-R-12. Idaho Department of Fish and Game, Boise.

Grunder, S.A, S.C. Elam, and R.J. Bell. 1989. Regional fishery management Investigations. Job Performance Report. Project F-71-R-12. Idaho Department of Fish and Game, Boise.

Megargle, D.J., C.D. Warren and K. A. Frank. 2007. Federal aid in fish restoration 2002 annual performance report, Magic Valley Region. Program F-71-R-29. Report 07-43. Idaho Department of Fish and Game. Boise.

Ministry of Natural Resources (MNR). 2005. Walleye state of the resource report for southern region. http://mrn.gov.on.ca

Morgan, G. E. 2002. Manual of instructions – fall walleye index netting (FWIN). Percid community synthesis, diagnostics, and sampling standards working group. Cooperative Freshwater Ecology Unit. Sudbury, Ontario.

Ney, J. J. 1993. Practical use of biological statistics. Pages 137-158 in C. C. Kohler and W. A. Hubert, editors. Inland fisheries management in North America. American Fisheries Society, Bethesda, Maryland.

Partridge, F.E., C. Corsi, and R.J. Bell. 1990. Regional fishery management investigations. Job Performance Report. Project F-71-R-13. Idaho Department of Fish and Game, Boise.

Partridge, F. E. and C. E. Corsi. 1993. Regional fisheries management investigations. Idaho Department of Fish and Game. Job Completion Report, Project F-71-R-15, Boise.

Partridge, F. E. and C. D. Warren 1995. Regional fisheries management investigations. Idaho Department of Fish and Game. Job Completion Report, Project F-71-R-18, Boise.

Quinn, T. J., II, and R. B. Deriso. 1999. Quantitative fish dynamics. Oxford University Press, New York.

Ricker, W.E. 1975. Computations and Interpretation of Biological Statistics of Fish Populations. Bulletin No. 191. Bulletin of the Fisheries Research Board of Canada. Ottawa.

Rieman, B. E. 1992. Kokanee salmon population dynamics – kokanee salmon monitoring guidelines. F-73-R-14

Ryan, R.G. and D. J. Megargle. 2005. In review. Regional fisheries management investigations. Job Completion Report, Project F-71-R-29. Idaho Department of Fish and Game, Boise.

Ryan, R. G., D. J. Megargle, E. Gutknecht. 2005. In review. Regional fisheries management investigations. Idaho Department of Fish and Game. Job Completion Report, Project F-71-R-30, Boise.

Simpkins, D.G. and W.A. Hubert. 1996. Proposed revision of the standard-weight equation for rainbow trout. Journal of Freshwater Ecology 11(3):319-325

Teuscher, D. 1999. Project 8 – Hatchery Trout Evaluations. Subproject 2: Zooplankton Quality Index. IDFG Report No. 99-23. Idaho Department of Fish and Game, Project F-73-R-21. Boise.

Thurow, R. 1987. River and Stream Investigations. Idaho Department of Fish and Game. Job Completion Report, Project F-73-R-9, Boise.

U.S.G.S. (U.S. Geological Survey). 1996. Water Resources Data – Idaho, Water Year 1995, Vol. 2. Upper Columbia River Basin and Snake River Basin below King Hill. USGS, Boise, ID.

Van Den Avyle, M. J. 1993. Dynamics of exploited fish populations. Pages 105-134 in C. C. Kohler and W. A. Hubert, editors. Inland fisheries management in North America. American Fisheries Society, Bethesda, Maryland.

VanDeValk, A. J., J. L. Forney, J. R. Jackson, L. G. Rudstam, T. E. Brooking, and S. D. Krueger. 2005. Angler catch rates and catchability of walleyes in Oneida Lake, New York. North American Journal of Fisheries Management 25(4): 1441-1447.

Warren D. and D.J. Megargle, K. A. Frank, and F.E. Partridge. 2007. Federal aid in fish restoration 2001 annual performance report, Magic Valley Region. Program F-71-R-26. Report 03-18. Idaho Department of Fish and Game. Boise.

Warren D. and D.J. Megargle. 2007. Federal aid in fish restoration 2003 annual performance report, Magic Valley Region. Program F-71-R-28. Report 07-44. Idaho Department of Fish and Game. Boise.

Washington Department of Fish and Wildlife (WDFW). 2005. Results of the 2005 WDFW fall walleye index netting (FWIN) surveys, Sprague Lake, Scooteny Reservoir, Moses Lake, Potholes Reservoir, Banks Lake and Lake Roosevelt. http://wdfw.wa.gov.

APPENDICES

Appendix 1. Description of equipment used to sample fish populations by aquatic environment.

Fishery type	Equipment	Description
Mountain lakes	Mountain lake gill net	Swedish made Lundgrens type-A lightweight multi filament sinking net 6 panel (46, 38, 33, 30, 25, 19 mm bar-mesh) 45.6 X 1.5 m
	Scale	Pesola ©: , 0-300 g, 0-1 kg, 0-2.5 kg scales
	Float tube	Creek Company©, round
	Conductivity meter	Yellow Springs Instrument (YSI) model 30
	Depth sounder	Hondex© portable depth sounder
	Secci disc	Standard; decimeter graduation
	pH meter	Oakton © hand held pH meter - Model 35624.2
Lakes & res.	Power boat electrofisher	Smith-root © model SR-18 w/ model 5.0 pulsator
	Boom	Aluminum (2.6 m-long)
	Anode	Octopus-style steel danglers (1 m-long)
	Cathode	Boat and cathode array danglers - simultaneous
	Live well	Fresh flow aerated; 0.65 m^3
	Oxygen stone	35.6 X 3.8 cm (135 m^2); fine pore
	Generator	Honda © ; model EG5000x; 5,000 watt
	Electrofishing control box	Coffelt © ; model 15 VVP
	Sinking gill net	6 panels (19, 25, 32, 38, 51, 64 mm bar-mesh); 38 x 1.8 m; monofilament
	Floating gill net	6 panels (19, 25, 32, 38, 51, 64 mm bar-mesh); 38 x 1.8 m; monofilament
	Walleye Gill net (FWIN)	8 panel (25, 38, 51, 64, 76, 102, 127, 152 mm bar-mesh); 61 x 1.8 m, monofilament
	Trap net	1.8 x 0.9 m box, 5 - 76 cm hoops, 15.2 m lead, 2 cm bar mesh
	Seine	18 m x 1 m, 6 mm mesh 18 m x 1 m, 3 mm mesh
	Conductivity meter	Yellow Springs Instruments © (YSI); model 30
	Plankton nets	250, 500, 750 *u* mesh; 0.5 m diameter mouth; 2.5 m depth

	Temperature / D.O. meter	Yellow Springs Instruments © (YSI); model 550A
	Dip nets	2.4 m-long handles ; trapezoid heads (0.6 m^2); 9.5 mm bar-mesh
	Secci disc	Standard; decimeter graduation
	Field PDA	Juniper Systems ©, model Allegro handheld; waterproof, WinCE/DOS compatible
	Scales	AND© 5000g electronic, OHAUS© 3000g, electronic Pesola ©: , 300 g, 1 kg, 2.5 kg, 5.0 kg scales
Rivers and streams	Power boat electrofisher	Smith-root © model SR-18 w/ model 5.0 pulsator - see above for specs.
	Canoe	4.9 m-long aluminum
	Anode	13.7 m-long power cord; 2.4 m-long fiberglass handle; 0.4 m diameter steel hoop
	Cathode	Boat
	Live well	208 L plastic garbage can; O_2 supplemented
	Drift boat	4.5 m-long aluminum
	Boom	4.3 m-long fiberglass
	Anode	Octopus-style steel danglers (1 m-long)
	Cathode	Boat
	Live well	208 L rubber stock watering tub; O_2 supplemented
	Scales	AND© 5000g,electronic, OHAUS© 3000g,electronic Pesola ©: , 300 g, 1 kg, 2.5 kg, 5.0 kg scales
	Oxygen stone	35.6 X 3.8 cm (135 m^2); fine pore
	Generator	Honda © ; model EG5000x; 5,000 watt
	Electrofishing control box	Coffelt © Model 15 VVP
	Oxygen stone	35.6 X 3.8 cm (135 m^2); fine pore
	Dip nets	2.4 m-long handles ; trapezoid heads (0.6 m^2); 9.5 mm bar-mesh
	Backpack electrofisher	Smith-root © model 15-D; single anode
	Conductivity meter	Yellow Springs Instrument © (YSI) model 30

Appendix 2. Sample coordinates by location for Magic Valley Region, Idaho waters sampled in 2006.

WATER	LOCATION	GEAR	E	N	ZONE	DATUM
JOHNSON CREEK LAKE	MID LAKE	MT. LAKE GILL NETS	663,071.00	4,855,811.00	11	NAD83
PERKONS LAKE	MID LAKE	MT. LAKE GILL NETS	663,095.00	4,846,576.00	11	NAD83
ANDERSON RANCH	DAM	ZOOPLANKTON	626,276.30	4,801,844.10	11	WGS84
ANDERSON RANCH	MID RES	ZOOPLANKTON	630,216.10	4,805,829.50	11	WGS84
ANDERSON RANCH	UPPER RES	ZOOPLANKTON	637,905.20	4,810,563.30	11	WGS84
BIG WOOD RIVER	KENDALL GULCH START	E - FISHING	701,628.30	4,850,386.00	11	WGS84
BIG WOOD RIVER	KENDALL GULCH END	E - FISHING	702,054.00	4,850,738.00	11	WGS84
BIG WOOD RIVER	GIMLET START	E - FISHING	713,877.60	4,834,706.10	11	WGS84
BIG WOOD RIVER	GIMLET END	E - FISHING	714,010.40	4,833,837.60	11	WGS84
BIG WOOD RIVER	LOWER HAILEY START	E - FISHING	716,791.00	4,821,341.30	11	WGS84
BIG WOOD RIVER	LOWER HAILEY END	E - FISHING	716,866.40	4,821,012.00	11	WGS84
LAKE WALCOTT	FG1	FLOAT GILL NET	297,525.1	4,726,228.30	12	WGS84
LAKE WALCOTT	FG2	FLOAT GILL NET	298,837.50	4,728,529.70	12	WGS84
LAKE WALCOTT	FG3	FLOAT GILL NET	309,714.70	4,723,858.30	12	WGS84
LAKE WALCOTT	FG3	FLOAT GILL NET	309,597.40	4,724,069.00	12	WGS84
LAKE WALCOTT	FG4	FLOAT GILL NET	314,563.20	4,721,185.80	12	WGS84
LAKE WALCOTT	FG5	FLOAT GILL NET	320,348.90	4,721,805.90	12	WGS84
LAKE WALCOTT	FG6	FLOAT GILL NET	316,316.50	4,721,274.40	12	WGS84
LAKE WALCOTT	SG1	SINK GILL NET	297,351.20	4,726,174.10	12	WGS84
LAKE WALCOTT	SG2	SINK GILL NET	298,698.10	4,728,483.70	12	WGS84
LAKE WALCOTT	SG3	SINK GILL NET	309,405.20	4,724,337.30	12	WGS84
LAKE WALCOTT	SG3	SINK GILL NET	309,375.40	4,724,301.10	12	WGS84

LAKE WALCOTT	SG4	SINK GILL NET	314,572.40	4,720,913.30	12	WGS84
LAKE WALCOTT	SG5	SINK GILL NET	320,298.10	4,721,903.50	12	WGS84
LAKE WALCOTT	SG6	SINK GILL NET	316,268.20	4,721,157.20	12	WGS84
LAKE WALCOTT	TN1	TRAP NET	297,439.30	4,726,193.80	12	WGS84
LAKE WALCOTT	TN2	TRAP NET	298,725.40	4,728,577.40	12	WGS84
LAKE WALCOTT	TN3	TRAP NET	309,312.8 ;	4,724,558.40	12	WGS84
LAKE WALCOTT	TN4	TRAP NET	312,542.70	4,721,838.40	12	WGS84
LAKE WALCOTT	TN5	TRAP NET	320,229.00	4,721,929.40	12	WGS84
LAKE WALCOTT	TN6	TRAP NET	316,297.90	4,721,243.40	12	WGS84
MAGIC RESERVOIR	NET 1	SINK GILL NET	711,501.80	4,796,396.20	11	WGS84
MAGIC RESERVOIR	NET2	SINK GILL NET	711,562.60	4,796,181.40	11	WGS84
MAGIC RESERVOIR	NET3	SINK GILL NET	713,289.90	4,794,154.80	11	WGS84
MAGIC RESERVOIR	NET4	SINK GILL NET	712,869.40	4,794,478.80	11	WGS84
MAGIC RESERVOIR	NET5	SINK GILL NET	713,303.80	4,796,678.80	11	WGS84
MAGIC RESERVOIR	NET6	SINK GILL NET	713,180.70	4,796,893.60	11	WGS84
MAGIC RESERVOIR	NET7	SINK GILL NET	712,747.90	4,797,398.70	11	WGS84
MAGIC RESERVOIR	NET8	SINK GILL NET	712,702.50	4,797,465.90	11	WGS84
MAGIC RESERVOIR	UPPER RES	ZOOPLANKTON	710,670.30	4,799,540.50	11	WGS84
MAGIC RESERVOIR	DAM	ZOOPLANKTON	714,361.50	4,793,449.30	11	WGS84
MAGIC RESERVOIR	MID RES	ZOOPLANKTON	712,819.70	4,795,459.20	11	WGS84
OAKLEY RESEVOIR	FORAGE1	E - FISHING	257,144.00	4,674,393.00	12	WGS84
OAKLEY RESEVOIR	FORAGE2	E - FISHING	257,303.60	4,673,364.30	12	WGS84
OAKLEY RESEVOIR	FORAGE3	E - FISHING	257,166.20	4,671,989.80	12	WGS84
OAKLEY RESEVOIR	FORAGE4	E - FISHING	257,099.70	4,670,996.60	12	WGS84
OAKLEY RESEVOIR	FORAGE5	E - FISHING	257,126.30	4,669,932.50	12	WGS84

OAKLEY RESEVOIR	FORAGE 6	E - FISHING	257,299.20	4,669,338.30	12	WGS84
OAKLEY RESEVOIR	FORAGE7	E - FISHING	257,543.10	4,671,444.40	12	WGS84
OAKLEY RESEVOIR	FORAGE8	E - FISHING	259,024.00	4,675,638.90	12	WGS84
OAKLEY RESEVOIR	FORAGE9	E - FISHING	258,593.90	4,675,244.30	12	WGS84
OAKLEY RESEVOIR	FORAGE10	E - FISHING	258,141.60	4,674,805.40	12	WGS84
SALMON FALLS CREEK RES	FORAGE1	E - FISHING	687,186.70	4,675,687.30	11	WGS84
SALMON FALLS CREEK RES	FORAGE2	E - FISHING	685,940.80	4,673,259.00	11	WGS84
SALMON FALLS CREEK RES	FORAGE3	E - FISHING	685,914.20	4,670,705.50	11	WGS84
SALMON FALLS CREEK RES	FORAGE4	E - FISHING	687,089.00	4,669,854.30	11	WGS84
SALMON FALLS CREEK RES	FORAGE5	E - FISHING	687,434.80	4,668,395.80	11	WGS84
SALMON FALLS CREEK RES	FORAGE 6	E - FISHING	687,687.50	4,666,782.10	11	WGS84
SALMON FALLS CREEK RES	FORAGE7	E - FISHING	685,980.00	4,665,400.20	11	WGS84
SALMON FALLS CREEK RES	FORAGE8	E - FISHING	685,599.60	4,663,781.10	11	WGS84
SALMON FALLS CREEK RES	FORAGE9	E - FISHING	686,050.90	4,663,338.90	11	WGS84
SALMON FALLS CREEK RES	FORAGE10	E - FISHING	684,717.20	4,660,730.60	11	WGS84
SALMON FALLS CREEK RES	FWIN1	GILL NET	687,050.70	4,675,132.10	11	WGS84
SALMON FALLS CREEK RES	FWIN2	GILL NET	686,937.10	4,674,382.70	11	WGS84
SALMON FALLS CREEK RES	FWIN3	GILL NET	686,789.10	4,673,419.50	11	WGS84
SALMON FALLS CREEK RES	FWIN4	GILL NET	685,595.90	4,673,806.50	11	WGS84
SALMON FALLS CREEK RES	FWIN5	GILL NET	685,908.70	4,670,981.20	11	WGS84
SALMON FALLS CREEK RES	FWIN6	GILL NET	687,096.70	4,669,927.40	11	WGS84
SALMON FALLS CREEK RES	FWIN7	GILL NET	686,566.30	4,669,404.00	11	WGS84
SALMON FALLS CREEK RES	FWIN8	GILL NET	687,503.40	4,667,949.20	11	WGS84
SALMON FALLS CREEK RES	FWIN9	GILL NET	686,686.00	4,668,264.60	11	WGS84
SALMON FALLS CREEK RES	FWIN10	GILL NET	686,586.20	4,666,878.50	11	WGS84

SALMON FALLS CREEK RES	FWIN11	GILL NET	685,688.10	4,664,493.60	11	WGS84
SALMON FALLS CREEK RES	FWIN12	GILL NET	686,051.30	4,663,532.70	11	WGS84
SIX MILE	HEAD WATERS	TEMP LOGGER	321,488.00	4,665,922.80	12	WGS84
SIX MILE	LOWER CREEK	TEMP LOGGER	320,782.00	4,665,374.00	12	WGS84
SOUTH FORK BOISE RIVER	1	KOK COUNT	636,920.40	4,815,810.60	11	WGS84
SOUTH FORK BOISE RIVER	2	KOK COUNT	637,094.10	4,819,528.80	11	WGS84
SOUTH FORK BOISE RIVER	3	KOK COUNT	638,187.20	4,822,077.00	11	WGS84
SOUTH FORK BOISE RIVER	4	KOK COUNT	639,046.90	4,823,498.40	11	WGS84
SOUTH FORK BOISE RIVER	5	KOK COUNT	639,015.80	4,829,608.80	11	WGS84
SOUTH FORK BOISE RIVER	6	KOK COUNT	642,256.30	4,830,173.10	11	WGS84
SOUTH FORK BOISE RIVER	7	KOK COUNT	644,890.40	4,830,388.80	11	WGS84
SOUTH FORK BOISE RIVER	8	KOK COUNT	647,995.40	4,830,721.50	11	WGS84
SOUTH FORK BOISE RIVER	9	KOK COUNT	649,697.50	4,829,698.10	11	WGS84
SOUTH FORK BOISE RIVER	10	KOK COUNT	656,066.40	4,829,619.30	11	WGS84
SOUTH FORK BOISE RIVER	11	KOK COUNT	660,964.40	4,827,757.10	11	WGS84
SOUTH FORK BOISE RIVER	12	KOK COUNT	665,022.50	4,828,407.70	11	WGS84
SOUTH FORK BOISE RIVER	13	KOK COUNT	668,227.70	4,830,024.70	11	WGS84

Submitted by:

Douglas Megargle
Regional Fishery Manager

Rob Ryan
Regional Fishery Biologist

Erin Gutknecht
Fishery Technician

Approved by:

Edward B. Schriever,
Fisheries Bureau Chief

William D. Horton
State Fishery Manager