



**FEDERAL AID IN FISH RESTORATIONS  
1999 JOB PERFORMANCE REPORT  
PROGRAM F-71-R-24**

**Steven M. Huffaker, Director**

**REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS  
MAGIC VALLEY REGION (Subprojects I-E, II-E, III-E)**

**SUBPROJECT I-E SURVEYS AND INVENTORIES**

Job a. Magic Valley Region Mountain Lakes Investigations

Job b. Magic Valley Region Lowland Lakes Investigations

Job c. Magic Valley Region Rivers and Streams Investigations

**SUBPROJECT II-E TECHNICAL GUIDANCE**

**SUBPROJECT III-E HABITAT MANAGEMENT**

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## 1999 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job: a

Title: Mountain Lakes Investigations

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

Four lakes within the South Fork Boise River drainage were surveyed for fish and fish habitat in 1999. Smoky Dome Lakes consist of three lakes or ponds; only the largest was surveyed. Smoky Dome Lake had rainbow trout *Oncorhynchus mykiss* present, but numbers were few. Although spawning habitat was fair to excellent, stocking records indicate these fish were likely of hatchery origin. Ross Fork Lakes consist of four lakes; all were surveyed except Ross Fork Lake #1. Several smaller ponds in the area were not surveyed. Ross Fork Lakes #2 and #3 had stocked rainbow trout, cutthroat trout *O. clarki* and hybrids. Ross Fork Lake #4 had fair numbers of hatchery origin cutthroat trout. Spawning habitat in all three lakes is of marginal quality for maintaining a fishery.

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## OBJECTIVES

To obtain current information for fishery management decisions on mountain lakes, including angler use and success, fish population characteristics, spawning potential, stocking success, limnology, morphology and notes on other aquatic life; and develop management recommendations.

## METHODS

Fish sampling methods consisted of gillnetting with Swedish-made Lundgrens Type A lightweight multi-filament gill nets that were 1.5 m deep with six 7.6 m wide panels. The panels consisted of six different bar mesh sizes: 46, 38, 33, 30, 25, and 19 mm. The gill nets were set and retrieved by the use of a small inflatable rubber raft. Fish data collected included species identification, total length and weight measurements.

Water samples were collected and limnology data was analyzed for pH, total hardness, alkalinity as CaCO<sub>3</sub> and conductivity. Samples were analyzed within two days using a HACH Water Chemistry kit, a Solu bridge conductivity meter and an Oakton pH meter. Numerous locations were plotted for bathymetric maps with a nylon rope marked in 1.0 m increments for depth measurements. Surface water temperatures were taken with a thermometer in all lakes.

## RESULTS AND DISCUSSION

### Smoky Dome Lake

Smoky Dome Lake is a 0.6 ha alpine cirque lake located in the Boardman Creek drainage of the South Fork Boise River at UTM Z11, 665,880 m E, 4,818,934 m N. Surface elevation of the lake is 2,634 m. To reach the trailhead, take Forest Service Road #010 at Couch Summit for about 21.9 km to the trailhead of Boardman Creek and Smoky Dome Lake. Smoky Dome Lake is approximately 6.1 km from the trailhead. The lake has been stocked approximately every three years with 160-960 rainbow trout *Oncorhynchus mykiss* fry since at least 1967 (Appendix A). The most recent stocking of 500 rainbow trout fry occurred on September 15, 1994. Past stocking records called it Boardman Lake.

Smoky Dome Lake was surveyed with a single sinking gill net set at 1730 hours August 11, 1999 and retrieved at 1230 hours August 12, 1999. Fish sampled include four rainbow trout with a mean total length of 345 mm and a mean weight of 490 g. Individual sizes were 275 mm, 265 g; 310 mm, 375 g; 350 mm, 490 g; and 445 mm, 710 g. Scale samples indicate that some natural reproduction is occurring. An inspection of the lake found three small tributaries with about 200 m of excellent habitat suitable for spawning, and one inlet had approximately 30 m of moderately suitable spawning habitat. The lake has an east facing aspect and the maximum depth observed was 2.4 m (Figure 1). Two unidentified small toads approximately 50 mm long and about 500 tadpoles were observed. The majority of the lake bottom was covered with aquatic vegetation approximately 2.5 cm thick.

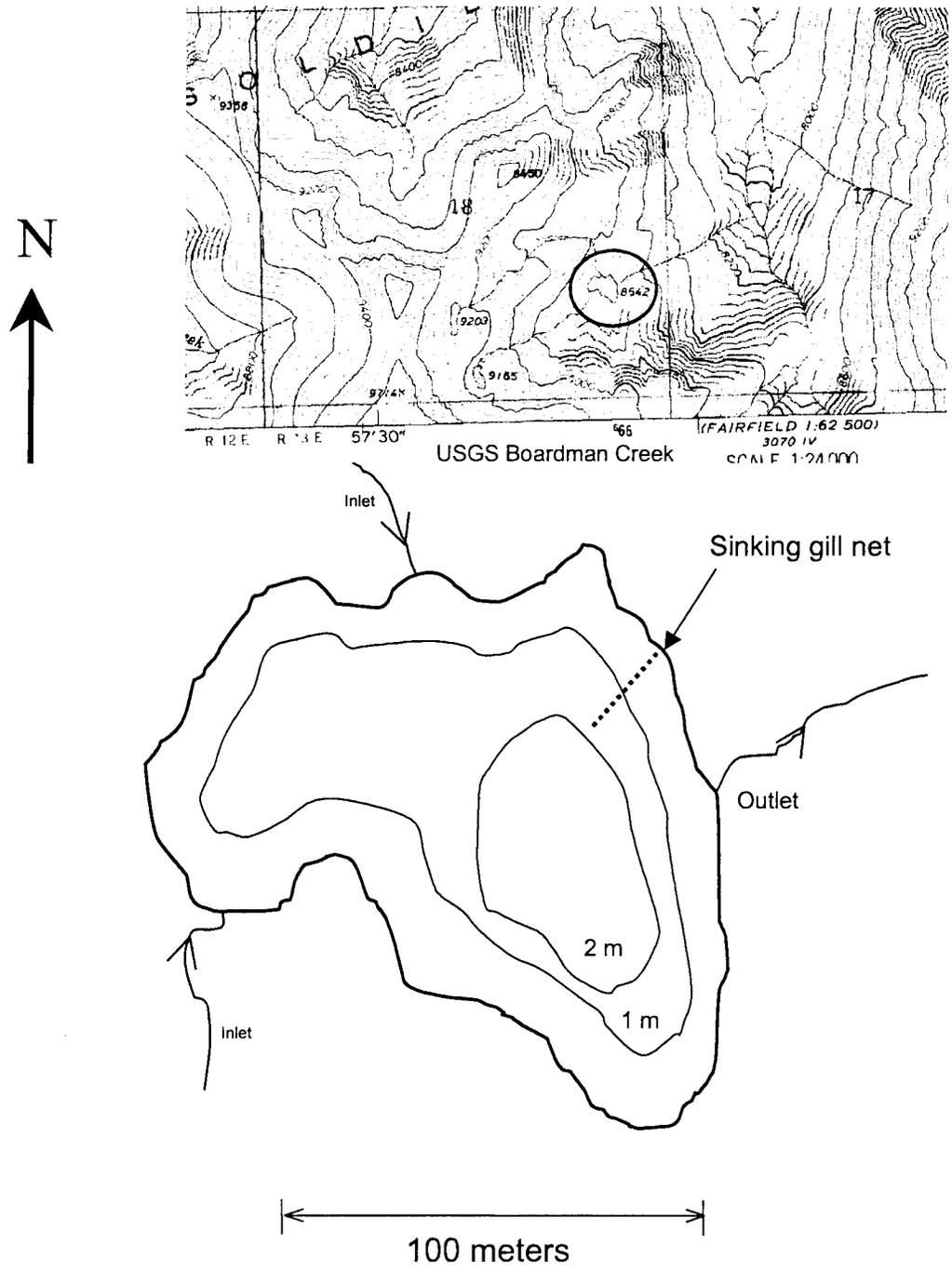


Figure 1. Map of Smoky Dome Lake with bathymetric contours and location of gill net set, August 11, 1999.

Surface water temperature was 13°C at 1400 hours on August 12, 1999. Secchi visibility was greater than lake depth. Other water quality measurements were:

Total alkalinity as CaCO <sub>3</sub> :	27 mg/l
Total hardness:	70 mg/l
Conductivity	60 µSiemen/cm @ 25°C
pH:	8.9

Evidence indicates the lake receives moderate use by anglers, campers and hikers by a good foot trail that partially encircles the lake. Fish numbers in the lake were low, partially due to the missed stocking in 1998. The stocking program should continue as in the past on a three-year maintenance rotation since natural reproduction does not appear to fully support the fishery.

### **Ross Fork Lake #2**

Ross Fork Lake #2 is one of four lakes and several small ponds lying along a bench on the western side of South Fork Ross Fork Creek. It is a 2.0 ha lake located in the South Fork Ross Basin drainage of the South Fork Boise River at UTM Z11, 658,415 m E, 4,846,198 m N. Surface elevation of the lake is 2,669 m. It can be accessed by a trail that starts near Red Horse Mine, reached from the Bear Creek road from the South Fork Boise River. The lake is approximately 8.6 km from the trailhead. Stocking records indicate the lake has been stocked with 350 to 1,000 cutthroat trout *O. clarki* fry about every three years since at least 1965 (Appendix A). It was most recently stocked with 1,000 cutthroat fry on September 11, 1998. Stocking records also indicate that the lake was stocked in 1965 and 1967 with 1,500 to 1,800 rainbow trout fry. Due to the complex topography of the area, this lake may have been mistaken for one of the other Ross Fork lakes and stocked differently from what the stocking records indicate.

Ross Fork Lake #2 was surveyed with a single sinking gill net set at 1820 hours August 30, 1999 and retrieved at 0920 hours August 31, 1999. Fish sampled include six cutthroat trout, two rainbow trout and one cutthroat x rainbow trout hybrid (Table 1). The outlet had approximately 20 m of fair quality spawning habitat but none in the inlet. Some natural spawning must be occurring due to rainbow trout and young-of-the-year (YOY) trout fry observed in the outlet. The lake has a south-facing aspect and the maximum lake depth observed was 12.5 m (Figure 2). Tadpoles were observed in some nearby ponds that were not directly connected to the lake.

Secchi visibility was 10 m and surface water temperature was 13°C at 1015 hours August 31, 1999. Other water quality measurements taken from a surface sample are as follows:

Total alkalinity as CaCO <sub>3</sub> :	10 mg/l
Total hardness:	10 mg/l
Conductivity:	20 µSiemen/cm @ 25°C
pH:	7.4

Table 1. Total length frequencies and average weights of fish sampled by gillnetting Ross Fork Lake #2, August 30, 1999.

Total length (mm)		Cutthroat trout	Rainbow trout	Cutthroat x rainbow trout hybrids
220	Number		1	
	Avg. weight (g)		106	
230	Number	1		
	Avg. weight (g)	130		
260	Number		1	
	Avg. weight (g)		180	
310	Number	1		
	Avg. weight (g)	305		
320	Number	1		
	Avg. weight (g)	370		
350	Number	1		
	Avg. weight (g)	290		
360	Number	1		
	Avg. weight (g)	405		
380	Number	1		
	Avg. weight (g)	605		
460	Number			1
	Avg. weight (g)			1,000
Total sampled:		6	2	1

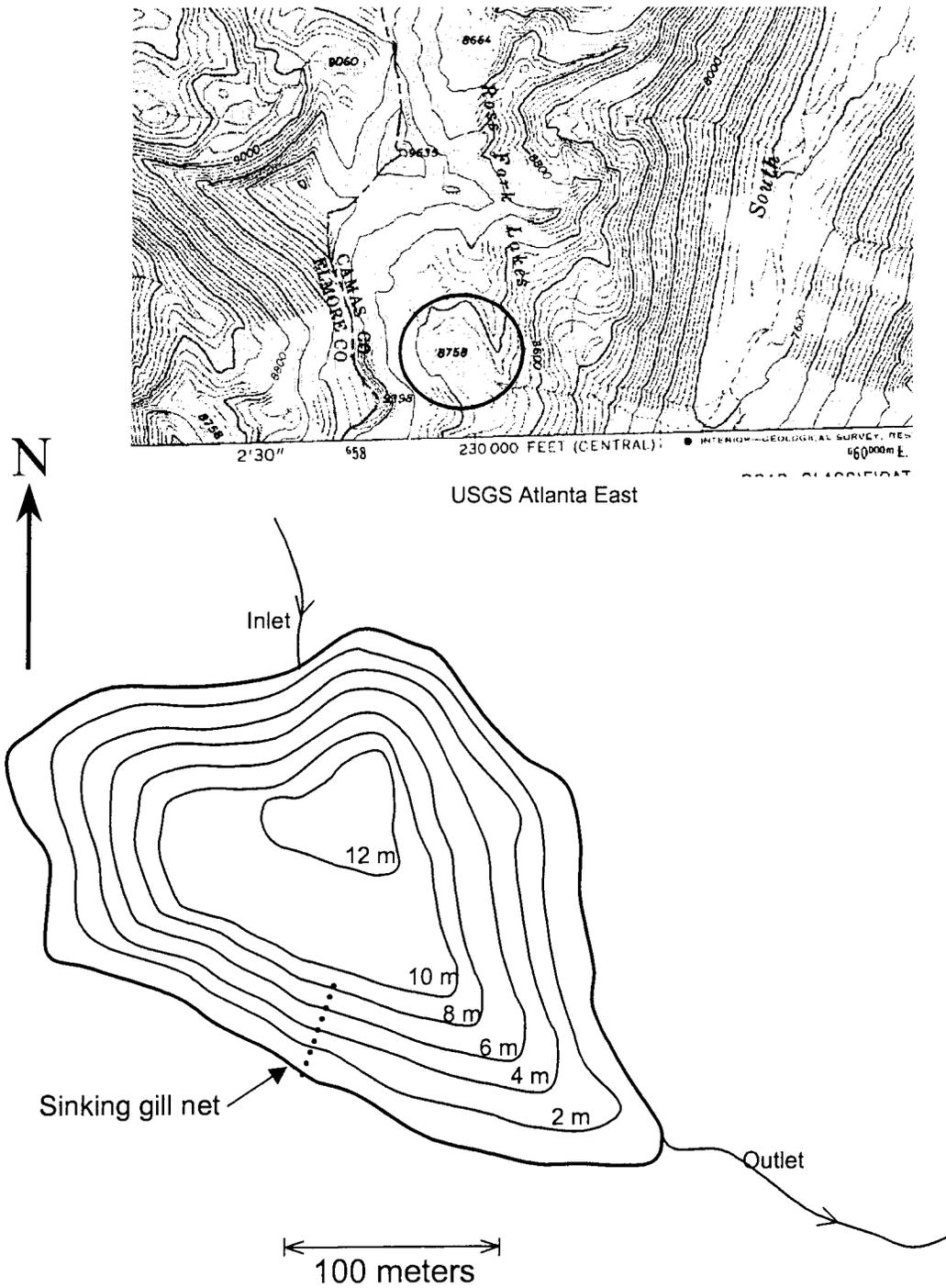


Figure 2. Map of Ross Fork Lake #2 with bathymetric contours and location of gill net set, August 30, 1999.

A fair foot trail partially encircling the lake indicates the lake receives light to moderate use by anglers, campers and hikers. The trail linking Ross Fork Lake #2 to Ross Fork Lake #3 is poor. The stocking program should continue as in the past on a three-year maintenance rotation.

### **Ross Fork Lake #3**

Ross Fork Lake #3 is a 2.4 ha alpine cirque lake located in the South Ross Fork Basin drainage of the South Fork Boise River at UTM Z11, 658,418 m E, 4,844,427 m N. Surface elevation of the lake is 2,620 m. It can be accessed by a good trail starting near Red Horse Mine that can be reached from the Bear Creek road from the South Fork Boise River. The lake is approximately 7.2 km from the trailhead. Stocking records indicate the lake was stocked in 1965 and 1967 with 2,000 cutthroat trout fry, and more recently on September 11, 1998 with 500 rainbow trout fry (Appendix A). Due to the complex topography of the area, this lake may have been mistaken for one of the other Ross Fork lakes and stocked differently from what the stocking records indicate.

Ross Fork Lake #3 was surveyed with a single sinking gill net set at 1730 hours August 30, 1999 and retrieved at 1130 hours August 31, 1999. Fish sampled include 19 rainbow trout, 1 cutthroat trout and 1 cutthroat x rainbow trout hybrid (Table 2). The two inlets and one outlet observed had approximately 23 m of fair spawning habitat. Maximum lake depth observed was 23 m (Figure 3). Tadpoles were observed in the inlets and seeps near the lake.

Secchi visibility depth was 12 m and surface water temperature was 14°C at 1330 hours. Other water quality measurements taken from the surface sample were as follows:

Total alkalinity as CaCO <sub>3</sub> :	17 mg/l
Total hardness:	13 mg/l
Conductivity:	20 µSiemen/cm @ 25°C
pH:	7.1

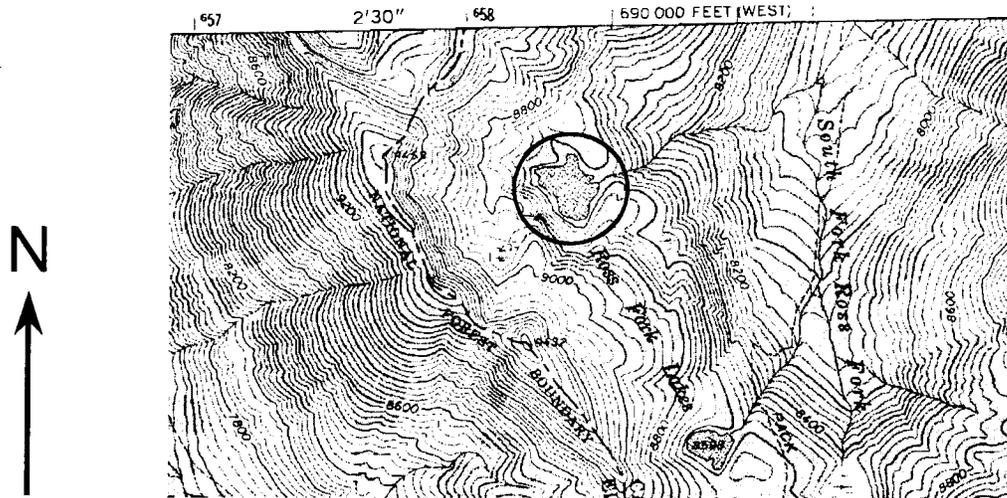
Evidence indicates the lake receives moderate use by hikers, campers and anglers. A good trail partially encircles the lake. The stocking program should be increased to stocking every three years to improve the fishery.

### **Ross Fork Lake #4**

Ross Fork Lake #4 is a 1.2 ha alpine cirque lake located in the South Ross Fork Basin drainage of the South Fork Boise River at UTM Z11, 658,821 m E, 4,844,427 m N. Surface elevation of the lake is 2,620 m. It can be accessed by a good trail that starts near Red Horse Mine, which can be reached from the Bear Creek road from the South Fork Boise River. The lake is approximately 5.1 km from the trailhead. The lake was stocked with 300 to 960 rainbow trout fry about every three years since at least 1973 (Appendix A.). It was most recently stocked with 500 rainbow trout fry on September 15, 1994. It was also stocked in 1967, 1969 and 1971 with cutthroat trout fry. Due to the complex topography of the area, this lake may have been mistaken for one of the other Ross Fork lakes and stocked differently from what the stocking records indicate.

Table 2. Total length frequencies and average weights of fish sampled by gillnetting Ross Fork Lake #3, August 30, 1999.

Total length (mm)		Cutthroat trout	Rainbow trout	Cutthroat x rainbow trout hybrids
110	Number	1		
	Avg. weight (g)			
160	Number		3	
	Avg. weight (g)		46	
170	Number		2	
	Avg. weight (g)		51	
190	Number		2	
	Avg. weight (g)		71	
200	Number		3	
	Avg. weight (g)		83	
230	Number		1	
	Avg. weight (g)		138	
250	Number		1	
	Avg. weight (g)			
260	Number		1	
	Avg. weight (g)		180	
270	Number		1	
	Avg. weight (g)			
290	Number		1	
	Avg. weight (g)		265	
320	Number		3	
	Avg. weight (g)		261	
360	Number		1	
	Avg. weight (g)		420	
410	Number			1
	Avg. weight (g)			610
Total sampled:		1	19	1



USGS Ross Peak

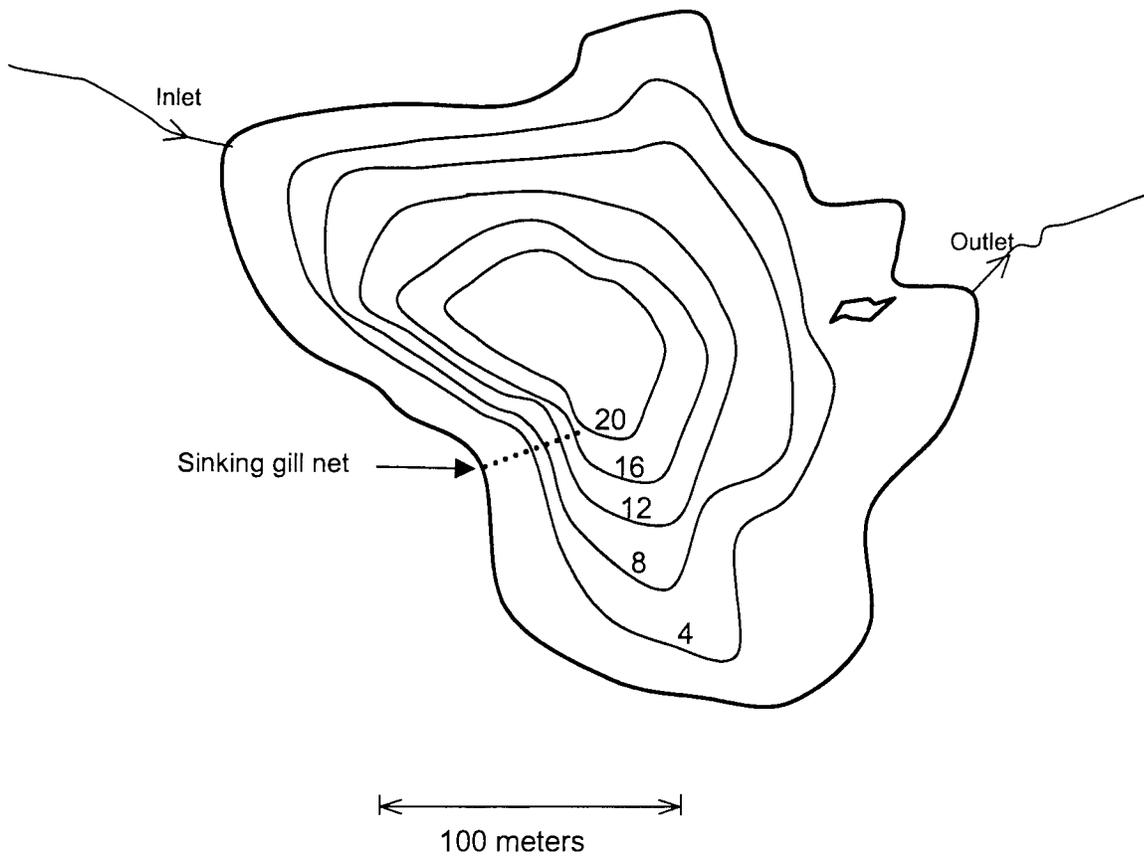


Figure 3. Map of Ross Fork Lake #3 with bathymetric contours and location of gill net set, August 30, 1999.

Ross Fork Lake #4 was surveyed with a single sinking gill net set at 1600 hours August 30, 1999 and retrieved at 1300 hours August 31, 1999. Fish sampled included 28 cutthroat trout (Table 3). Suitable habitat for trout spawning was not observed. Columbia spotted frogs *Rana pretiosa* were observed in the lake. The lake has a south-facing aspect and the maximum depth observed was 6 m (Figure 4).

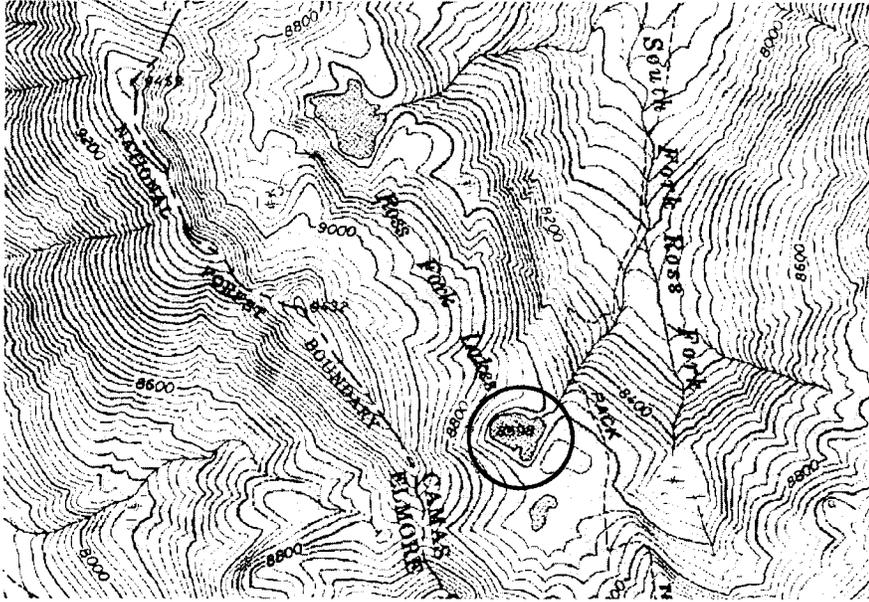
Secchi visibility was greater than lake depth and surface water temperature was 15.5°C at 1600 hours August 31, 1999. Other water quality measurements taken from the surface are as follows:

Total alkalinity as CaCO <sub>3</sub> :	33 mg/l
Total hardness:	23 mg/l
Conductivity:	40 μSiemen/cm @ 25°C
pH	8.2

A good trail partially encircles the lake, and evidence indicates the lake receives moderate use by hikers, campers and anglers. The stocking program should continue as in the past on a three-year maintenance rotation.

Table 3. Total length frequencies and average weights of fish sampled by gillnetting Ross Fork Lake #4, August 30, 1999.

Total length (mm)		Cutthroat trout
150	Number	2
	Avg. weight (g)	43
160	Number	1
	Avg. weight (g)	48
170	Number	7
	Avg. weight (g)	53
180	Number	7
	Avg. weight (g)	67
190	Number	8
	Avg. weight (g)	77
200	Number	3
	Avg. weight (g)	94
Total sampled:		28



USGS Ross Peak

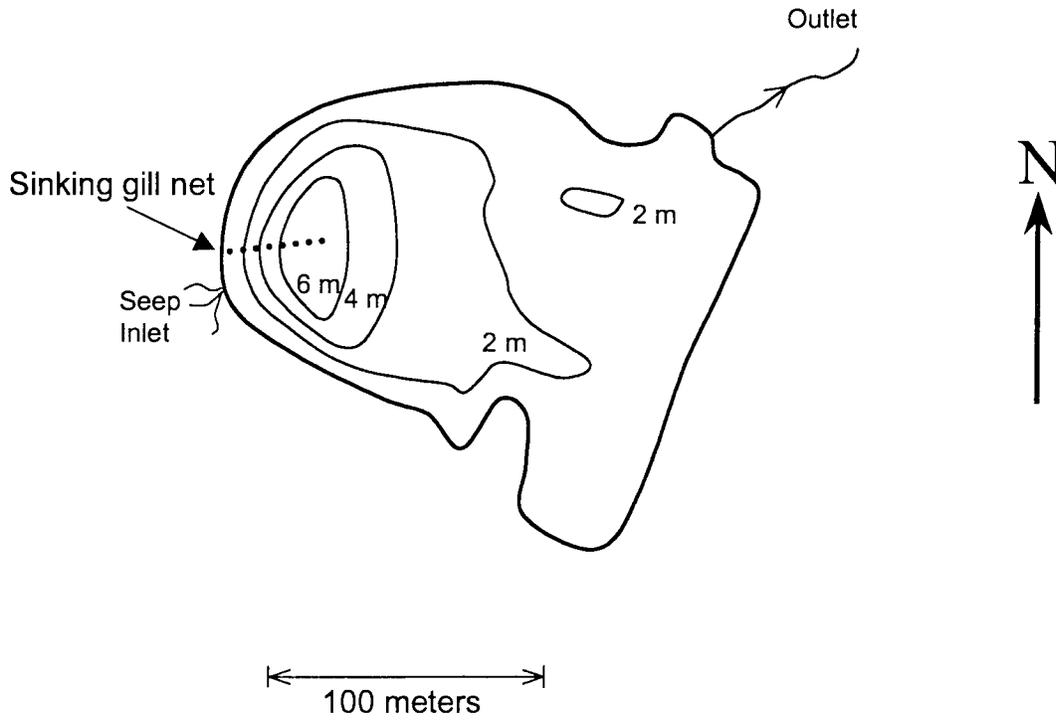


Figure 4. Map of Ross Fork Lake #4 with bathymetric contours and location of gill net set, August 30, 1999.

## **ACKNOWLEDGEMENTS**

We would like to thank fishery aide Mike Hillesland for his assistance in surveying Smoky Dome Lake and Ross Fork Lake.

## APPENDIX

Appendix A. Recorded fish stocking for Smoky Dome and Ross Fork lakes #2, #3 and #4, 1965 to 1999.

Date planted	Species	Number planted
<u>Smoky Dome Lake (Boardman Lake)</u>		
08/09/67	Rainbow trout	500
08/21/69	Rainbow trout	920
09/05/73	Rainbow trout	960
09/03/76	Rainbow trout	162
08/22/79	Rainbow trout	565
08/19/82	Rainbow trout	400
09/23/85	Rainbow trout	300
08/31/88	Rainbow trout	500
09/04/91	Rainbow trout	500
09/15/94	Rainbow trout	500
<u>Ross Fork Lake #2</u>		
09/28/65	Cutthroat trout	2,000
09/28/65	Rainbow trout	1,800
08/21/69	Cutthroat trout	520
08/19/71	Cutthroat trout	500
09/05/73	Cutthroat trout	544
09/03/76	Cutthroat trout	384
08/22/79	Cutthroat trout	564
08/17/82	Cutthroat trout	500
09/23/85	Cutthroat trout	350
08/31/88	Cutthroat trout	500
09/04/91	Cutthroat trout	500
09/15/94	Cutthroat trout	500
09/11/98	Cutthroat trout	1,000
<u>Ross Fork Lake #3</u>		
09/28/65	Cutthroat trout	2,000
08/09/67	Cutthroat trout	2,000
09/11/98	Rainbow trout	500
<u>Ross Fork Lake #4</u>		
08/21/69	Cutthroat trout	920
08/19/71	Cutthroat trout	1,000
09/05/73	Cutthroat trout	960
09/03/76	Rainbow trout	648
08/22/79	Rainbow trout	565
08/19/82	Rainbow trout	400
09/23/85	Rainbow trout	300
09/04/91	Rainbow trout	500
09/15/94	Rainbow trout	500

## 1999 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job: b

Title: Lowland Lakes and Reservoirs Investigations

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

Fisheries in Oakley and Pioneer reservoirs were investigated in 1999 using standardized lowland lakes survey protocols. Oakley Reservoir was found to have a strong population of rainbow trout *Oncorhynchus mykiss* and walleye *Stizostedion vitreum* although total fish biomass was dominated by Utah sucker *Catostomus ardens*. Yellow perch *Perca flavescens* and spottail shiner *Notropis hudsonius* were also abundant, providing a forage base for piscivorous species. Results of the Pioneer Reservoir investigation indicated moderate numbers of largemouth bass *Micropterus salmoides* as well as small numbers of bluegill *Lepomis macrochirus*, pumpkinseed *L. gibbosus* and yellow perch. Total fish biomass at Pioneer Reservoir was dominated by common carp *Cyprinus carpio*.

Kokanee *O. nerka* in Anderson Ranch Reservoir were sampled by midwater trawling, which indicated approximately 1.4 million age 0 fish present. This was the highest number of a single year class ever estimated for the reservoir since trawling was first used to assess the population in the 1980s. The annual spawning run abundance trend count indicated a strong 1999 run but not as high as the run in 1998.

Magic Reservoir brown trout *Salmo trutta* spawning abundance was monitored with a redd count as in previous years. There were 443 redds counted in the Big Wood River, higher than any previous years' counts.

Water quality samples were taken through the ice at Mormon Reservoir and sent to a water quality analysis laboratory. Results showed a high productivity level which explains the reasons for fish kills in intermittent years, dense aquatic vegetation, and good fish growth.

An annual forage fish trend survey at Salmon Falls Creek Reservoir indicated a low abundance of forage species present. Springtime electrofishing sampled walleye for age and growth data. Results showed growth rates for walleye had not slowed despite low forage abundance.

Anderson Ranch, Fish Creek, Little Wood River and Salmon Falls Creek reservoirs were sampled for zooplankton quality index.

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## OBJECTIVES

To obtain current information for fishery management decisions on lowland lakes and reservoirs, including angler use, success, harvest and opinions, fish population characteristics, stocking success, return-to-the-creel for hatchery trout, limnology and to develop appropriate management recommendations.

## METHODS

Kokanee *Oncorhynchus nerka* abundance and age structure were estimated in Anderson Ranch Reservoir using a nighttime midwater trawl. Methods used for the trawling followed those described by Rieman (1992), and population estimates were made by using an Excel spreadsheet developed by fishery research (Bill Harryman, Idaho Department of Fish and Game, personal communication).

General fishery data in lakes and reservoirs were collected and analyzed utilizing standardized fish sampling gear and methodologies. Sampling gear included a Smith-Root Model SR-18 electrofishing boat with a Model 5.0 pulsator, variable (19 to 64 mm) bar mesh 38 x 1.8 m gill nets and a 2 cm bar mesh size trap (frame) net with a 1.8 x 0.9 m box and five 76 cm diameter hoops. Other sampling gear included a 15.2 x 1.4 m long beach seine with 6.2 mm bar mesh netting. Beach seine samples were taken by holding one end of the seine stationary at the shoreline while the other end was taken straight out into the water perpendicular to the shoreline. With the shore end remaining stationary, the other end was swept shoreward with the lead line held near the bottom. A single unit of standardized lowland lake sampling protocol included one sinking variable mesh gill net, one floating variable mesh gill net, and one trap net set overnight with one hour of nighttime electrofishing. Data analysis for standardized lowland lake surveys included total length frequencies of all fish sampled and an estimate of total biomass of all fish sampled broken down by species. Relative weights for rainbow trout *O. mykiss* were based on standard-weight equations developed by Simpkins and Hubert (1996). Relative weights for walleye *Stizostedion vitreum* were based on standard-weight equations developed by Murphy et al. (1990). Growth was estimated by back calculating total length at annuli on scales. Asymptotic or "ultimate" length estimates were based on methods described by Ricker (1975).

Redd counts for brown trout *Salmo trutta* were made by walking upstream through the prescribed reach a week or two after the end of the spawning season.

Limnological samples were taken by sampling surface waters for conductivity, pH, total hardness, and alkalinity. A Hach Kit was used for the total hardness and alkalinity measurements, a Solu Bridge conductivity meter was used for measuring conductivity and an Oakton PhTestr2 was used for measuring pH. Temperature and dissolved oxygen profiles were measured from a boat in-situ using a Y.S.I. model 57 temperature/dissolved oxygen meter. A Secchi disk was used from a boat.

Zooplankton ratio (ZPR) and zooplankton quality index (ZQI) were estimated for several regional reservoirs from methods described by Teuscher (1999). The ZPR is estimated by calculating the ratio of the biomass of zooplankton sampled with a 750  $\mu\text{m}$  mesh-sized zooplankton net to the biomass of zooplankton sampled with a 500  $\mu\text{m}$  mesh-sized zooplankton

net. The ZQI is calculated by multiplying the sum of the zooplankton weight collected in the 500  $\mu\text{m}$  and the 750  $\mu\text{m}$  mesh nets by the ZPR ratio. A 153  $\mu\text{m}$  mesh zooplankton net was used to estimate overall zooplankton abundance.

## RESULTS AND DISCUSSION

### Anderson Ranch Reservoir

Anderson Ranch Reservoir was partitioned into three strata and trawled for kokanee on the nights of July 12-13, 1999. Fourteen transects ranging from 11 m to 26 m deep were trawled in the three strata in four steps. All kokanee sampled were classified into three age class groups; fish up to 99 mm in total length were classified as age 0+ fish, fish from 100 to 259 mm long were classified as age 1+ fish, and fish at least 260 mm long were classified as age 2+ fish. Kokanee population and density estimates with comparisons of previous years' population and density estimates are given in Table 1. The Age 0+ cohort population estimate for 1999 was greater than any previous year's age 0+ cohort estimate. Total length frequencies for each age class of fish sampled are given in Table 2. Daytime temperature and dissolved oxygen profiles were taken at three locations July 12, 1999. Results indicate strong temperature stratification with the thermocline beginning at about 3 m deep and the top of the hypolimnion at approximately 15 m deep (Figure 1).

Kokanee spawning was monitored with counts of adult fish observed at 13 sites on the South Fork Boise River and Trinity Creek between August 20 and October 4, 1999 (Table 3). Counts have been made for spawner trend information at the same sites since 1989 except for the trap site just downstream of Pine bridge, which was added to the survey in 1990 (Partridge and Corsi 1993). In 1999, the concrete sill forming the base of the kokanee trap was removed from the river prior to the kokanee run. Without the sill, which acted as a partial barrier, the kokanee count at this site was substantially lower than previous years' counts. The total annual count for 1999 was 16,709 spawning kokanee, which is less than the 1998 count but greater than the long-term average of 7,837 spawners per year and the second highest count to date (Figure 2). Twenty-eight kokanee were sampled using a cast net at the Deadwood Creek confluence to estimate average total length and weight of this year's spawners. Average total length of females was 324 mm and average total length of males was 325 mm (Table 4).

Bull trout *Salvelinus confluentus* are known to be present in Anderson Ranch Reservoir during the winter months. They then move upstream into the South Fork of the Boise River during the spring until they spawn in late summer or early fall, much like an adfluvial population in a large natural lake system. To learn more about the bull trout population in Anderson Ranch Reservoir and the South Fork of the Boise River, the Bureau of Reclamation provided the Department with funding to for an extensive study on bull trout in 1998 and 1999. Results of this study will be available in a report being prepared by Partridge et al.

Zooplankton available for rainbow trout was low in Anderson Ranch Reservoir. Results of sampling during July, August and September are covered in the Regional Zooplankton Surveys section in this report.

Table 1. Anderson Ranch Reservoir kokanee population and density estimates based on nighttime midwater trawling results in July 1999 and several previous years' total population estimates for comparison.

	Age 0+	Age 1+	Age 2+	Age 3+
<b>Strata 1 (5 trawls)</b>				
Pop. est.	789,769	1,170	1,170	0
Density est. (fish/ha)	1,579	2	2	0
Variance of density est.	1,050,604.5	27.4	27.4	-
<b>Strata 2 (5 trawls)</b>				
Pop. est.	601,336	6,669	10,004	0
Density est. (fish/ha)	1,266	14	21	0
Variance of density est.	129,254.6	27.4	232.9	-
<b>Strata 3 (4 trawls)</b>				
Pop. est.	55,840	4,709	4,037	0
Density est. (fish/ha)	243	20	18	0
Variance of density est.	1,676.9	308.0	410.9	-
<b>Entire reservoir</b>				
Pop. est.	1,446,945	12,549	15,210	0
Conf. int. $\pm 95\%$	521,699	5,578	8,980	-
Density est.	1,201	10	13	0
<b>Previous years' population and density estimates:</b>				
<b>1998</b>				
Pop. est.	117,620	32,815	10,039	0
Variance of pop. est.	$5.0 \times 10^8$	$8.0 \times 10^8$	$8.9 \times 10^6$	-
Avg. density est.	109	29	8	0
<b>1997</b>				
Pop. est.	853,932	34,582	5,831	0
Variance of pop. est.	$7.0 \times 10^8$	$5.0 \times 10^7$	$2.1 \times 10^6$	-
Density est. (fish/ha)	497	23	4	0
<b>1996</b>				
Pop. est.	109,400 <sup>a</sup>	7,733	3,551	0
Variance of pop. est.	$2 \times 10^8$	$4 \times 10^7$	$7 \times 10^6$	0
Density est. (fish/ha)	64	6	2	0
<b>1995</b>				
Pop. est.	3,134 <sup>a</sup>	15,995	38,364	0
Variance of pop. est.	$3 \times 10^6$	$3 \times 10^7$	$5 \times 10^7$	-
Density est. (fish/ha)	2	11	25	0
<b>1994</b>				
Pop. est.	230,411 (wild)	444,791 <sup>a</sup>	33,709 <sup>a</sup>	0
Variance of pop. est.	$2 \times 10^{10}$	$1 \times 10^{11}$	$5 \times 10^8$	-
Density est. (fish/ha)	191	368	28	0
Pop. Est.	126,916 (hatchery)			
Variance of pop. est.	$6 \times 10^8$			
Density est. (fish/ha)	106			
<b>1993</b>				
Pop. est.	212,788 (wild)	2,380	1,427	660
Variance of pop. est.	$5 \times 10^9$	$6 \times 10^6$	$2 \times 10^6$	$4 \times 10^5$
Density est. (fish/ha)	212	2	1	1
Pop. est.	33,564 (hatchery)			
Variance of pop. est.	$4 \times 10^8$			
Density est. (fish/ha)	26			

<sup>a</sup> Estimate of wild and hatchery fish combined for year.

Table 2. Total length frequencies of kokanee sampled by mid-water trawling at Anderson Ranch Reservoir, July 12 and 13, 1999.

Total length (mm)	Number within age class		
	Age 0+	Age 1+	Age 2+
0-9			
10-19			
20-29			
30-39	55		
40-49	723		
50-59	394		
60-69	112		
70-79	15		
80-89			
90-99			
100-109			
110-119			
120-129			
130-139			
140-149			
150-159			
160-169			
170-179			
180-189		1	
190-199		1	
200-209		3	
210-219		4	
220-229		4	
230-239		1	
240-249			
250-259			
260-269			1
270-279			0
280-289			4
290-299			1
300-309			4
310-319			2
320-329			1
330-339			2
340-349			1
350-359			
360-369			
370-379			
380-389			
390-399			
Total Sampled	1,299	14	16

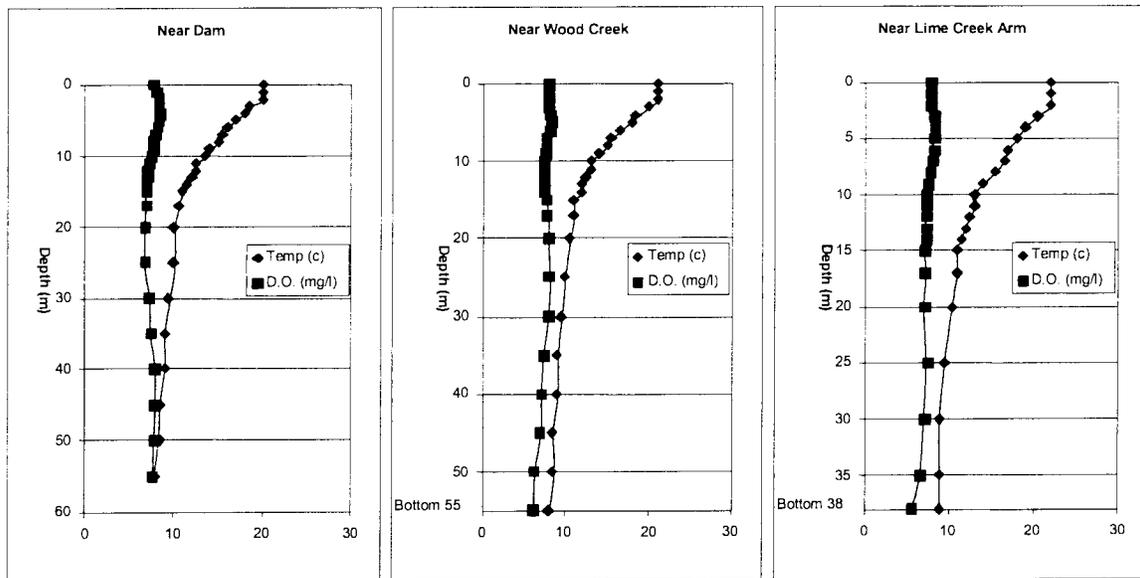


Figure 1. Daytime temperature and dissolved oxygen profiles at three sites at Anderson Ranch Reservoir, July 12, 1999.

Table 3. Number of kokanee observed at selected sites on the South Fork Boise River during spawning ground surveys, 1999.

Location <sup>a</sup>	8/20	8/28	9/3	9/10	9/17	9/24	10/4
1	0	110	4	2	0	0	10
2	20	0	75	10	0	0	3
3	35	30	150	6	5	0	3
4	35	150	125	150	150	130	60
5	8	3	2	7	1	4	0
6	20	250	200	550	150	250	150
7	12	35	75	50	50	12	30
8	25	230	150	200	100	35	35
9	125	240	350	400	100	40	25
10	400	400	500	1,500	1,000	300	60
11	50	550	300	400	500	800	300
12	40	1,000	700	650	400	120	40
13	12	85	100	200	500	25	600
Total:	782	3,083	2,731	4,125	2,956	1,716	1,316

<sup>a</sup> Site descriptions:

- 1 Trap site: NW1/4 NE1/4 Sec 30 T2N R10E
- 2 Prospect hole: NW1/4 NE1/4 Sec 18 T2N R10E
- 3 Johnson hole: SW1/4 NE1/4 Sec 5 T2N R10E
- 4 Paradise hole: SW1/4 NW1/4 Sec 33 T3N R10E
- 5 Trinity Creek: SE1/4 SW1/4 Sec 9 T3N R10E
- 6 Section 10 hole: SE1/4 NE1/4 Sec 10 T3N R10E
- 7 Chaparral campground: NE1/4 NE1/4 Sec 12 T3N R10E
- 8 Ranger station hole: NE1/4 NE1/4 Sec 8 T3N R11E
- 9 Virginia Gulch Bridge: SE1/4 SE1/4 Sec 9 T3N R11E
- 10 Baumgartner campground hole: SE1/4 SE1/4 Sec 7 T3N R12E
- 11 Deadwood confluence: NE1/4 NE1/4 Sec 22 T3N R12E
- 12 Big hole: SE1/4 SW1/4 Sec 18 T3N R13E
- 13 Smoky Creek confluence: SE1/4 SW1/4 Sec 9 T3N R13E

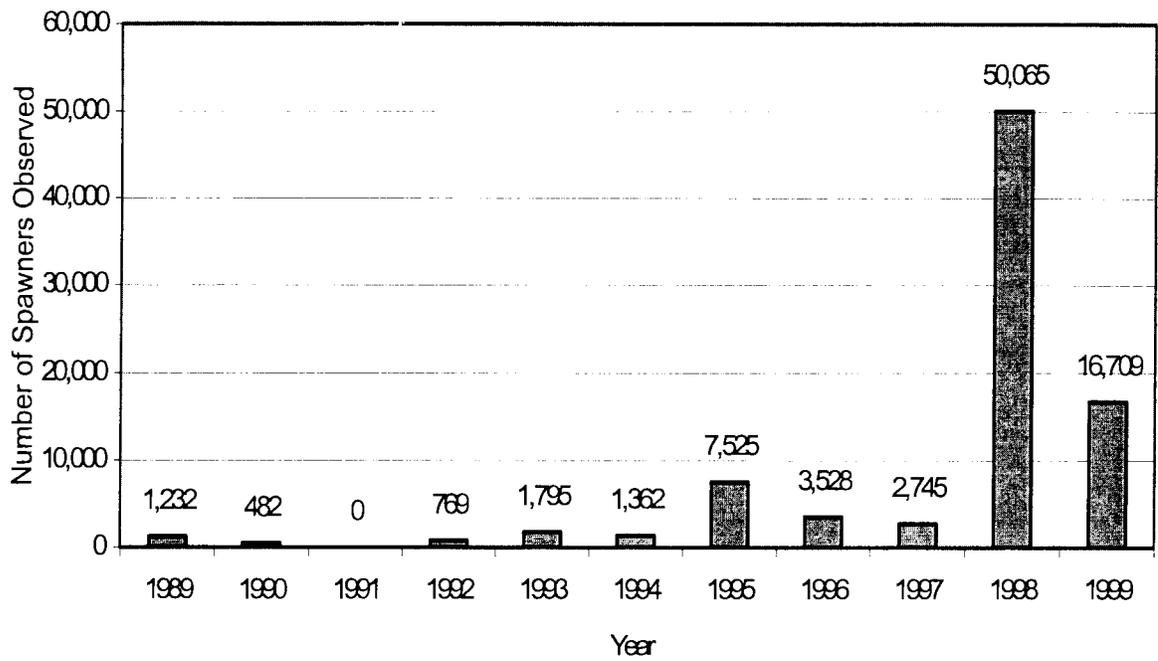


Figure 2. Total numbers of spawning kokanee observed at thirteen trend monitoring sites on the South Fork Boise River on a weekly basis during the spawning season, 1989-1999.

Table 4. Total length frequencies and average weights of spawning kokanee sampled from the South Fork Boise River at the Deadwood Creek confluence, September 10, 1999.

Total length (mm)		Females	Males
250	Number		1
	Average weight (g)		146
280	Number	1	
	Average weight (g)	158	
290	Number		1
	Average weight (g)		310
300	Number	1	1
	Average weight (g)	286	278
310	Number	1	4
	Average weight (g)	205	314
320	Number	2	2
	Average weight (g)	309	372
330	Number	4	3
	Average weight (g)	348	379
340	Number	1	5
	Average weight (g)	382	402
350	Number		1
	Average weight (g)		416
Total sampled		10	18

### **Magic Reservoir**

A spawning ground survey was performed November 23, 1999 on the Big Wood River upstream of Magic Reservoir to monitor spawning activities of brown trout that had moved upstream from the reservoir. The survey included the reach from Sheep Bridge to the outflow of a private pond on the east side of the Big Wood River approximately 1.5 km upstream of Stanton Crossing bridge. A total of 443 redds were counted (Table 5), almost double the 1998 count (255 redds), and is the highest number ever recorded since counts began in 1986.

### **Mormon Reservoir**

Several water quality parameters were measured from three locations on Mormon Reservoir on February 4, 1999. Temperature and dissolved oxygen profiles were measured in front of the dam at two locations: approximately 150 m north of the spring area on the west side of the reservoir and approximately 50 m south of the west side spring area. Dissolved oxygen levels were found to be less than 2 mg/l at all depths at both upper reservoir sites near the spring but at least 5 mg/l or higher near the surface at the dam site (Figure 3). A 5-day biological oxygen demand (BOD-5) grab sample was taken in front of the dam at 1 m and 4 m deep. Total

ammonia nitrogen, total Kjeldahl nitrogen and total NO<sub>2</sub> + NO<sub>3</sub> as nitrogen were measured from a surface sample taken near the dam. Samples for BOD-5 were taken at 1 m deep from the two sites near the spring area at which the temperature and dissolved oxygen profiles were measured. The BOD-5 and tests for nitrogen were sent for analysis to the Department of Environmental Quality Laboratory in Boise with the following results:

Site	BOD-5 (mg/l)	Total ammonia as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total NO <sub>2</sub> + NO <sub>3</sub> as N (mg/l)
In front of dam - D1	> 8	-	-	-
In front of dam - D3	3			
In front of dam - D5	-	0.228	1.61	<0.005
150 m north of spring - S1	3			
50 m south of spring - S2	6			

A water sample taken from the surface through the ice near the dam had a pH of 8.6. Other parameters measured from a sample taken at 1 m, located 150 m north of the west spring included total alkalinity of 95 mg/l and total hardness of 142 mg/l. Overall, the results indicated moderately high levels of nitrogen but very high biological oxygen demand from all samples. This is most likely due to the reservoir's shallow water conditions and large quantity of decaying aquatic vegetation under the ice. The large quantity of vegetation indicates high nutrient levels. Fishing through the ice at Mormon Reservoir has reportedly been poor the last several years, probably due to low dissolved oxygen levels. There have been minor winter fish kills reported the last several years but no reports of complete winterkill.

Table 5. Brown trout redd counts and spawning activity on the Big Wood River and Rock Creek upstream of Magic Reservoir monitored since 1986.

Date	Big Wood River <sup>a</sup>					Rock Creek
	Reach 1	Reach 2	Reach 3	Reach 4	Total	
Nov. 19, 1986	-- <sup>d</sup>	26	-- <sup>b</sup>	96	122	-- <sup>d</sup>
Nov. 19, 1987	104	62 <sup>c</sup>	-- <sup>b</sup>	30	196	-- <sup>d</sup>
Nov. 15, 1988	13	75	31	39	158	-- <sup>d</sup>
Nov. 18, 1989	6	20	33	8	67	1
Nov. 20, 1990	1	25	30	14	70	0
Nov. 15, 1991	3	30	38	15	86	0
Nov. 19, 1992	5	14	9	15	43	0
Nov. 24, 1993	1	28	-- <sup>b</sup>	15	43	0
Nov. 16, 1994	9	27	56	5	97	0
Nov. 16, 1995	2	29	54	32	117	0
Nov. 11, 1996	-- <sup>d</sup>	8	37	51	96	-- <sup>d</sup>
Nov. 25, 1997	-- <sup>d</sup>	44	53	23	120	-- <sup>d</sup>
Nov. 23, 1998	-- <sup>d</sup>	45	139	71	255	-- <sup>d</sup>
Nov. 23, 1999	-- <sup>d</sup>	104	209	130	443	-- <sup>d</sup>

<sup>a</sup> Reach 1 - Rock Creek to Sheep Bridge  
 Reach 2 - Sheep Bridge to fence at USGS station  
 Reach 3 - Fence to Stanton Crossing  
 Reach 4 - Stanton Crossing to Davis Pond  
 Rock Creek - Highway 20 to mouth

<sup>b</sup> Combined with previous reach

<sup>c</sup> A total of 42 female brown trout were trapped and spawned from this reach by Hayspur Hatchery in 1987

<sup>d</sup> Not surveyed

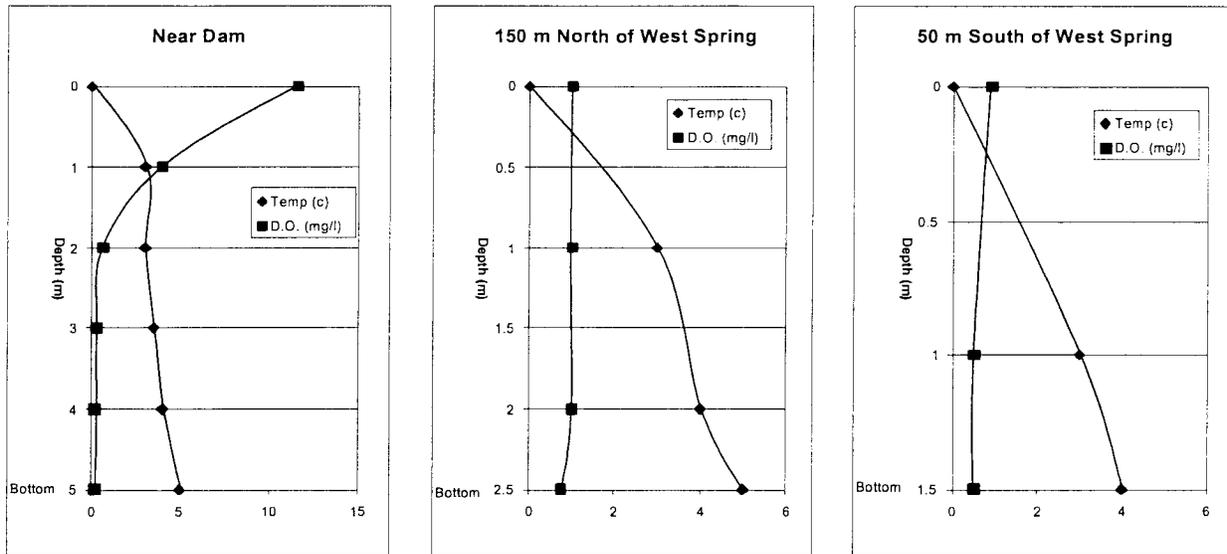


Figure 3. Daytime temperature and dissolved oxygen profiles for three sites on Mormon Reservoir, February 4, 1999.

Because of concerns about winter fish survival at Mormon Reservoir, we set gill nets at four sites during the day on May 15, 1999. We set a net near the dam for two to three hours each at the mouth of a bay on the east side of the reservoir, off the south shore of the narrows in the middle of the reservoir, and in the west spring area. Two rainbow trout were sampled in the net near the dam. One was 470 mm long and weighed 1,350 g and the other was 215 mm long weighing 100 g.

### Oakley Reservoir

Oakley Reservoir (Lower Goose Creek 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 walleye and for put-grow-and-take rainbow trout. One million walleye were initially stocked there on April 21, 1989 and subsequently stocked on an intermittent basis in 500,000 to 1,000,000 fish lots. Most of these fish were received and stocked as fry from the Garrison National Fish Hatchery in North Dakota. Rainbow trout are stocked on a regular basis as catchable-sized fish and fingerlings.

Annual trend sampling for forage fish was conducted on August 17, 1999 by beach seining five sites at Oakley Reservoir. Surface water temperature at time of sampling was 19°C. All sampling sites were on the east side of the reservoir and included one near the Goose Creek inlet, one approximately halfway between the Trapper Creek arm and the Goose Creek inlet, one in the Trapper Creek arm, one near the boat ramp, and one near the dam. Numbers of each species sampled include 101 young-of-the-year yellow perch *Perca flavescens*, 62 spottail

shiner *Notropis hudsonius*, and 3 sculpin *Cottus sp.* Numerous spottail shiner swam through the mesh of the seine and were not sampled. Results indicate good numbers of forage fish for walleye are present in Oakley Reservoir.

A standardized lowland lake survey was also done on Oakley Reservoir June 14-16, 1999. Fish were sampled with four units of sampling effort that included four floating gill nets, four sinking gill nets, four trap nets set overnight, and 4.0 hours of electrofishing effort. All sampling was spread throughout the reservoir (Figure 4). The electrofishing effort included only the total time that power was on, which was monitored with a timer. Equal effort was made to net all fish stunned regardless of size or species for the first 15 minutes of electrofishing effort at each of the four sites. After 15 minutes, equal effort was made to net all fish except for Utah sucker *Catostomus ardens*, which were very abundant and tended to overcrowd the live well after only a short period of sampling. Numbers and biomass of fish sampled per unit of standardized effort are given in Table 6. Total length frequencies, numbers and average weights of fish sampled are given by species and sampling gear in Appendix A. The most numerically abundant species sampled was yellow perch and the most abundant in terms of total biomass was Utah sucker. Other species sampled include rainbow trout of hatchery origin and rainbow trout of undetermined origin, walleye, spottail shiner, and mottled sculpin *Cottus bairdi*.

Walleye growth and aging estimates were based on back-calculations from scale samples, with ages validated by a length frequency histogram of all walleye sampled (Figure 5) and inspection of otoliths and opercular bones as described by Mackay et al. (1990) (Table 7).

Scale samples were taken from several of the rainbow trout that, based on their lack of fin erosion, appeared to be of either wild origin or stocked as fingerlings. Annuli were difficult to discern on several of the samples making it impossible to back calculate length at age. Along with length frequencies and past stocking records, some of the scales do indicate that growth rates may be approximately 13 mm per month, or 156 mm per year, for stocked fish.

A daytime temperature and dissolved oxygen profile was measured near the Trapper Creek arm and near the dam on June 15, 1999 (Figure 6). Total alkalinity measured as CaCO<sub>3</sub> was 100 mg/l, total hardness was 133 mg/l and pH was 8.0, for a surface sample. Specific conductivity measured 285 μSiemen/cm near the dam and 220 μSiemen/cm at the inlet. Secchi visibility was 1.0 to 1.2 m near the dam.

### **Pioneer Reservoir**

Pioneer Reservoir is an 89 ha impoundment with a mean depth of 1.2 m when full. It is located approximately 13 km northwest of the town of Bliss, Idaho and receives most of its water from Clover Creek. The fishery has not been surveyed in the last several years and there is no annual stocking of fish into the reservoir. A standardized lowland lakes survey was done June 3, 1999 on Pioneer Reservoir with two trap nets, two floating gill nets and two sinking gill nets set overnight, and 1.34 hours of nighttime electrofishing. Equal effort was made to net all fish stunned while electrofishing regardless of size or species. Total numbers and biomass of each species sampled per unit of effort are given in Table 8. Species sampled include brown

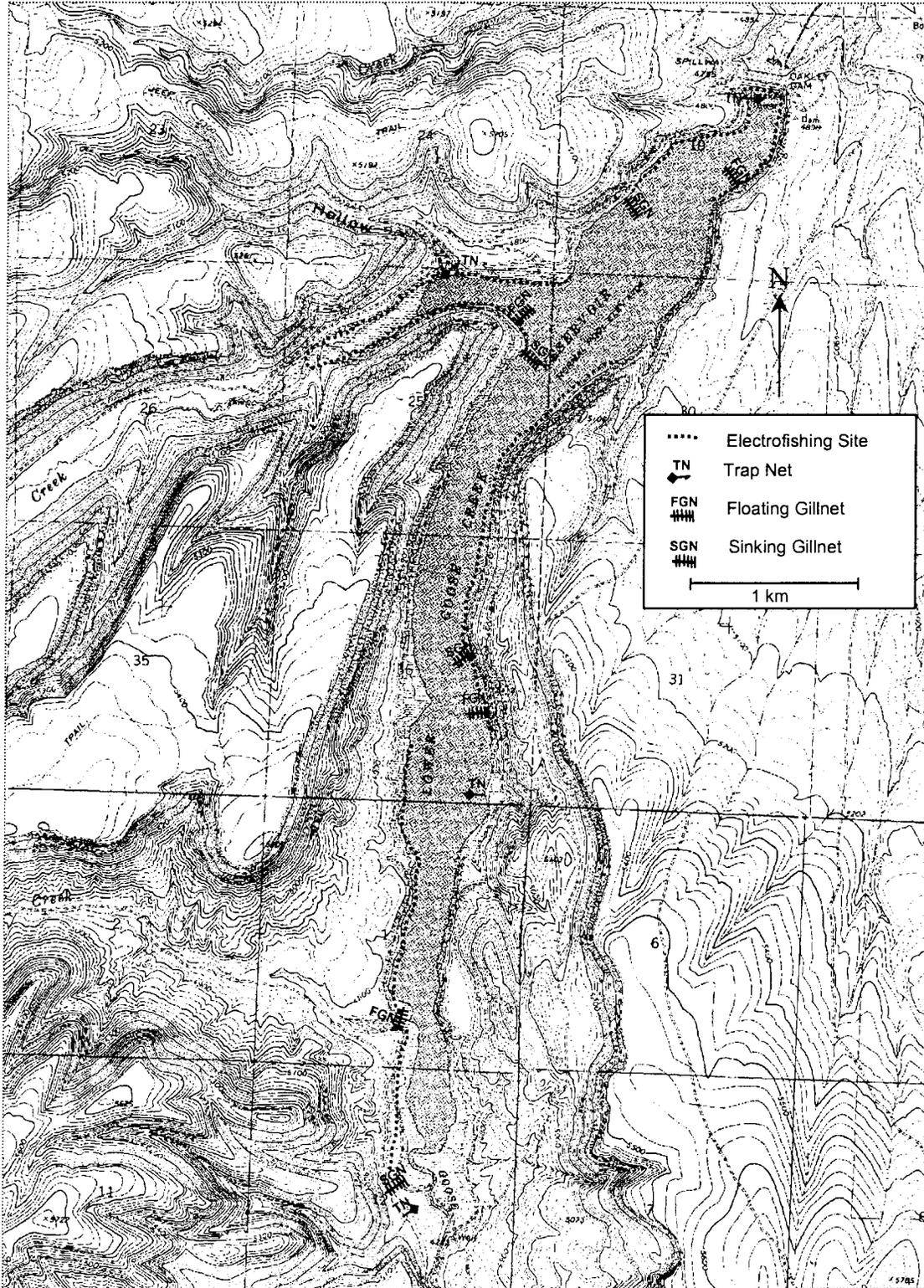


Figure 4. Map of Oakley Reservoir (Lower Goose Creek Reservoir) with June 15 and 16, 1999 fish sampling locations.

Table 6. Oakley Reservoir standardized lowland lake sampling results, June 1999.

Species	Catch per unit of standardized lowland lakes sampling effort <sup>a</sup>				
	Total length (mm) range	Number per unit of effort	Percent by Number	Weight (kg) per unit of effort	Percent by weight
Rainbow trout identified as hatchery origin	110-530	90	17.0	22.9	13.7
Rainbow trout of unknown origin	110-535	5	0.9	3.3	2.0
Walleye	140-620	28	5.3	15.3	9.2
Yellow perch	55-240	175	33.0	3.2	1.9
Mottled sculpin	50-75	4	0.2	<0.1	<0.1
Spottail shiner	70-115	79	14.9	0.5	0.3
Utah sucker	100-650	491	28.5	287.3	72.9
Total	-	872	100.0	332.5	100.0

<sup>a</sup> One unit of sampling effort is equal to one floating gill net, one sinking gill net, and one trap net set overnight and one hour of night time electrofishing.

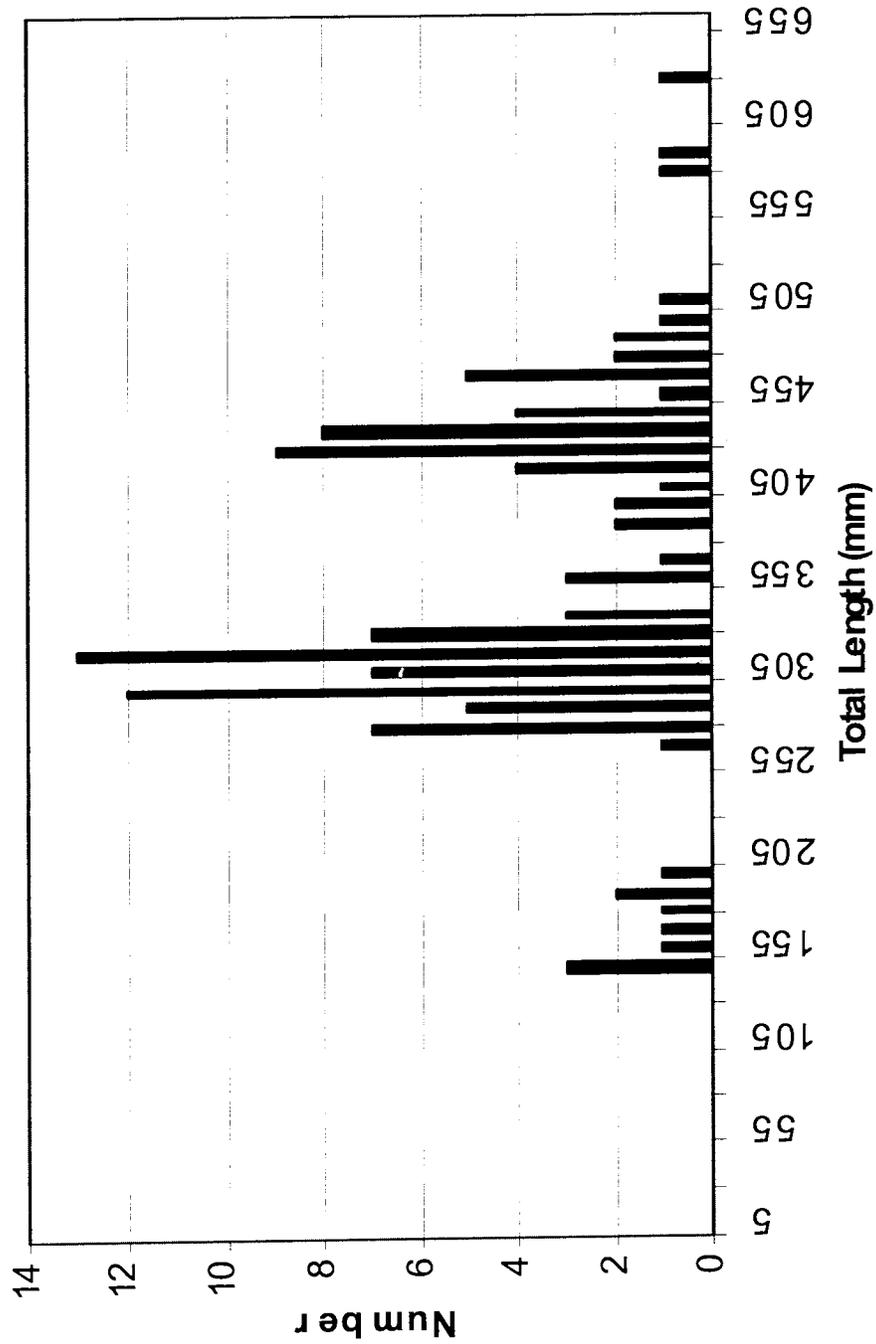


Figure 5. Total length frequency of 113 walleye sampled with four units of lowland lakes sampling protocols at Oakley Reservoir, June 1999.

Table 7. Back-calculated length at annulus for walleye sampled at Oakley Reservoir, June 16, 1999. Standard deviation is in parentheses.

Year class	Number of fish	Mean length at annulus (mm)						
		1	2	3	4	5	6	7
1998	4	148 (13.53)						
1997	16	140 (26.88)	330 (113.15)					
1996	2	125 (16.17)	260 (36.09)	359 (28.30)				
1995	11	127 (18.24)	243 (33.55)	345 (13.88)	424 (11.89)			
1994	4	149 (32.80)	243 (40.73)	335 (34.07)	407 (10.10)	458 (2.13)		
1993	1	169 (-)	278 (-)	372 (-)	497 (-)	544 (-)	575 (-)	
1992	2	146 (2.86)	259 (34.04)	357 (37.96)	431 (28.21)	482 (28.76)	514 (40.73)	543 (32.87)
Weighted average length:		139	285	352	425	477	534	543

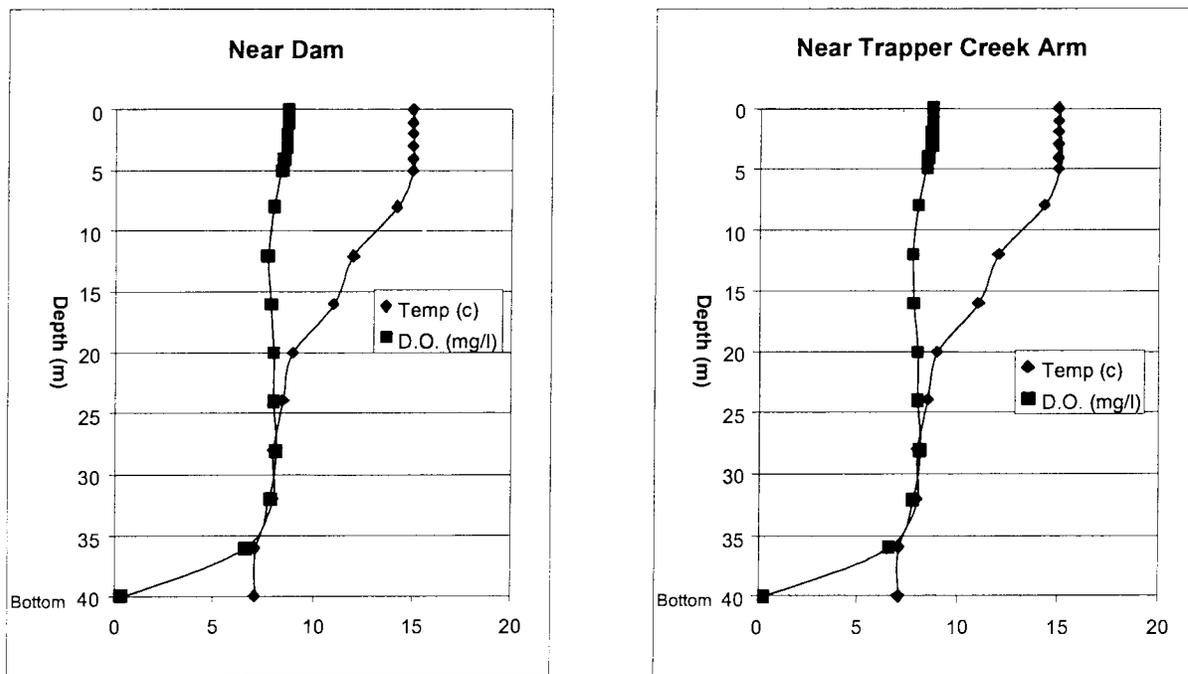


Figure 6. Daytime temperature and dissolved oxygen profiles at two sites at Oakley Reservoir, June 15, 1999.

Table 8. Pioneer Reservoir standardized lowland lake sampling results, June 1999.

Species	Catch per unit of standardized lowland lakes sampling effort <sup>a</sup>				
	Total length range (mm)	Number per unit of effort	Percent by Number	Weight (kg) per unit of effort	Percent by weight
Bluegill	30-120	12	10.1	23	< 0.1
Brown bullhead	140-270	11	8.7	2,212	2.9
Bridgelip sucker	160-265	4	3.0	716	0.9
Common carp	270-745	30	23.9	58,914	77.1
Largemouth bass	80-400	25	20.1	4,327	5.7
Largescale sucker	245-490	13	10.9	8,551	11.2
Pumpkinseed	40-95	6	5.0	57	0.1
Utah chub	200-285	2	1.2	368	0.5
Yellow perch	80-295	21	17.1	1,219	1.6
Total	-	124	100.0	76,387	100.0

<sup>a</sup> One unit of sampling effort is equal to one floating gill net, one sinking gill net, and one trap net set overnight and one hour of night time electrofishing.

bullhead *Ictalurus nebulosus*, bluegill *Lepomis macrochirus*, pumpkinseed *L. gibbosus*, largemouth bass *Micropterus salmoides*, yellow perch, Utah chub *Gila atraria*, common carp *Cyprinus carpio*, bridgelip sucker *Catostomus columbianus*, and largescale sucker *C. macrocheilus* (Appendix B). Length at age back calculated from scale samples taken from 38 largemouth bass is given in Table 9.

Table 9. Back-calculated length at annulus (mm) for largemouth bass sampled at Pioneer Reservoir on June 3, 1999. Standard deviation is in parentheses.

Year class	Number of fish	Mean length at annulus		
		1	2	3
1998	5	105 (33.5)		
1997	23	85 (14.3)	180 (14.0)	
1996	10	83 (21.0)	179 (43.9)	256 (52.6)
Weighted average length:		87	180	256

A temperature and dissolved oxygen profile was taken at the north end of Pioneer Reservoir, which is the deepest part of the reservoir. Maximum depth was 2 m and the water temperature was 18°C at all depths. The dissolved oxygen was 8.8 mg/l at the surface and 9.0 mg/l at 1 m deep and at 2 m deep. The reservoir is probably too shallow to maintain stratification. From a sample taken at the surface, total alkalinity measured as CaCO<sub>3</sub> was 75

mg/l, total hardness was 60 mg/l and pH was 8.2. Specific conductivity measured 200  $\mu$ Siemen/cm. Secchi visibility was 0.7 to 0.8 m.

### **Salmon Falls Creek Reservoir**

Annual trend sampling for forage fish was conducted on August 16, 1999 by beach seining six sites at Salmon Falls Creek Reservoir. Surface water temperature at time of sampling was 20°C. Sites sampled are shown in Figure 7. Numbers of each species sampled include one walleye 170 mm long, one smallmouth bass *M. dolomieu* 120 mm long, five young-of-the-year crappie *Pomoxis sp.*, six young-of-the-year yellow perch, 186 spottail shiners and four crayfish *Pacifastacus sp.*

As in 1998, walleye were sampled in April during the spring spawning season by daytime electrofishing. Total length frequencies of all fish sampled are given in Table 10, which includes other incidentally sampled game fish species.

Scale samples were taken from 31 walleye for length-at-age estimates. Dorsal spines were taken from several of the 31 walleye and otoliths and opercular bones were taken from three of the fish to help validate aging (Mackay et. al. 1990). Otoliths and dorsal fin ray spines were also taken later in the year from angler-caught walleye. Results in Table 11 are comparable to length-at-age estimates from samples taken in 1990 and 1993 (Figure 8). A Walford plot (Ricker 1975) based on average growth estimates from the three separate years of data collection provided an estimate of the asymptotic or "ultimate" length of walleye expected in Salmon Falls Creek Reservoir, calculated to be 907 mm long (Figure 9).

Results of zooplankton monitoring on August 7, 1999 for samples taken at three different locations at Salmon Falls Creek Reservoir are reported in the Regional Zooplankton Surveys section in this report.

### **Regional Zooplankton Surveys**

Zooplankton was monitored in 1999 at four different regional reservoirs following methods described by Teuscher (1999). These reservoirs were Anderson Ranch Reservoir, Fish Creek Reservoir, Little Wood River Reservoir and Salmon Falls Creek Reservoir. Results are given in Table 12. Stocking recommendations based on the zooplankton quality index (ZQI) are given below (Teuscher 1999):

ZQI > 0.60:	Competition for food unlikely; stock fingerlings 150-300/acre
0.60 > ZQI > 0.10:	Competition for food may be occurring; stock fingerlings 75-150/acre
ZQI < 0.10:	Forage resources are limiting; stock fingerlings <75/acre or catchables

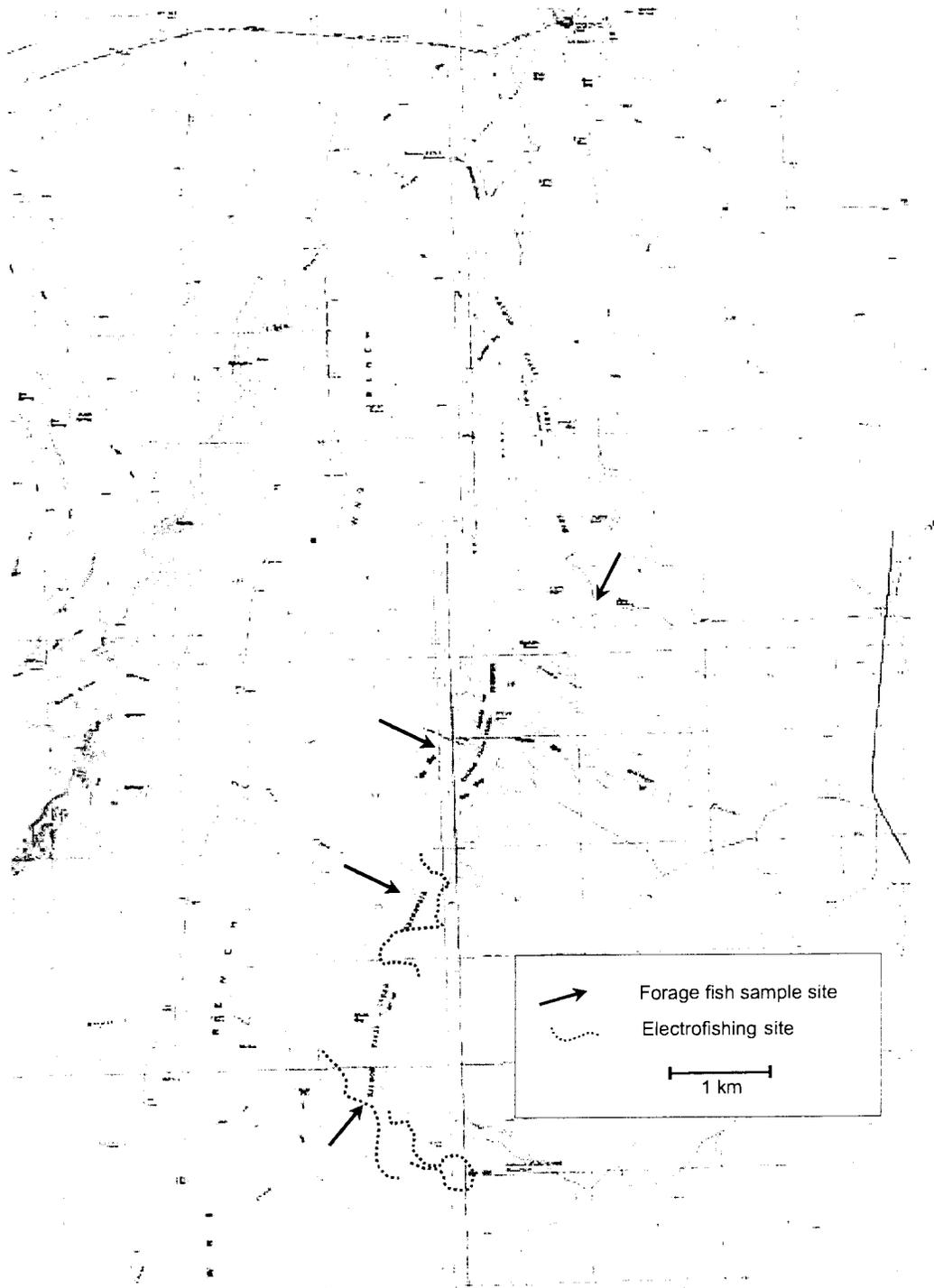


Figure 7. Location of sites sampled for walleye by electrofishing on April 22, 1999 and forage fish by beach seining on August 16 and 18, 1999 at Salmon Falls Creek Reservoir.

Table 10. Total length frequencies of all fish sampled and average weights of some fish sampled by daytime electrofishing at Salmon Falls Creek Reservoir, April 22, 1999.

Total length (mm)		Black crappie	Brown trout	Rainbow trout	Walleye	Yellow perch
170	Number		1			
	Ave. wt. (g)					
200	Number					2
	Ave. wt. (g)					
270	Number	1				
	Ave. wt. (g)	300				
280	Number				1	
	Ave. wt. (g)				160	
290	Number				2	
	Ave. wt. (g)				190	
300	Number			1	1	
	Ave. wt. (g)			200	210	
310	Number			2	2	
	Ave. wt. (g)				205	
320	Number			1	1	
	Ave. wt. (g)				220	
330	Number				3	
	Ave. wt. (g)				300	
350	Number				1	
	Ave. wt. (g)				300	
360	Number				1	
	Ave. wt. (g)				300	
370	Number				1	
	Ave. wt. (g)				300	
380	Number				1	
	Ave. wt. (g)					
390	Number				1	
	Ave. wt. (g)				500	
400	Number			1	1	
	Ave. wt. (g)				500	
410	Number				1	
	Ave. wt. (g)				400	
420	Number				2	
	Ave. wt. (g)				500	
430	Number				3	
	Ave. wt. (g)				600	
440	Number				2	
	Ave. wt. (g)				600	
460	Number				1	
	Ave. wt. (g)				700	
470	Number				1	
	Ave. wt. (g)				1,000	
500	Number				1	
	Ave. wt. (g)				1,000	
520	Number				2	
	Ave. wt. (g)				1,200	
540	Number				1	
	Ave. wt. (g)				1,300	
640	Number				2	
	Ave. wt. (g)				3,000	
750	Number				1	
	Ave. wt. (g)				5,000	
820	Number				1	
	Ave. wt. (g)				6,800	
Total number sampled:		1	1	5	34	2

Table 11. Back-calculated length at annulus for walleye sampled at Salmon Falls Creek Reservoir, April 22, 1999. Standard deviation is in parentheses.

Year class	Number of fish	Mean length at annulus (mm)													
		1	2	3	4	5	6	7	8	9	10				
1997	7	151 (23.47)	268 (14.21)												
1996	7	155 (14.04)	294 (24.26)	347 (19.48)											
1995	7	153 (14.04)	291 (30.69)	385 (30.29)	426 (20.12)										
1994	3	120 (12.36)	254 (19.25)	348 (22.98)	419 (26.66)	454 (37.71)									
1993	1	115 (-)	241 (-)	353 (-)	430 (-)	487 (-)	517 (-)								
1992	2	162 (32.03)	265 (59.49)	375 (72.77)	418 (58.00)	473 (48.72)	501 (36.69)	527 (13.84)							
1991	2	173 (9.19)	324 (6.87)	418 (21.05)	513 (26.44)	549 (12.28)	584 (6.89)	609 (3.34)	637 (0.10)						
1990	1	187 (-)	256 (-)	351 (-)	446 (-)	544 (-)	623 (-)	692 (-)	754 (-)	816 (-)					
1989	1	204 (-)	340 (-)	427 (-)	507 (-)	545 (-)	590 (-)	639 (-)	684 (-)	712 (-)	746 (-)				
Weighted avg. length:		153	282	370	440	498	557	600	678	764	746				

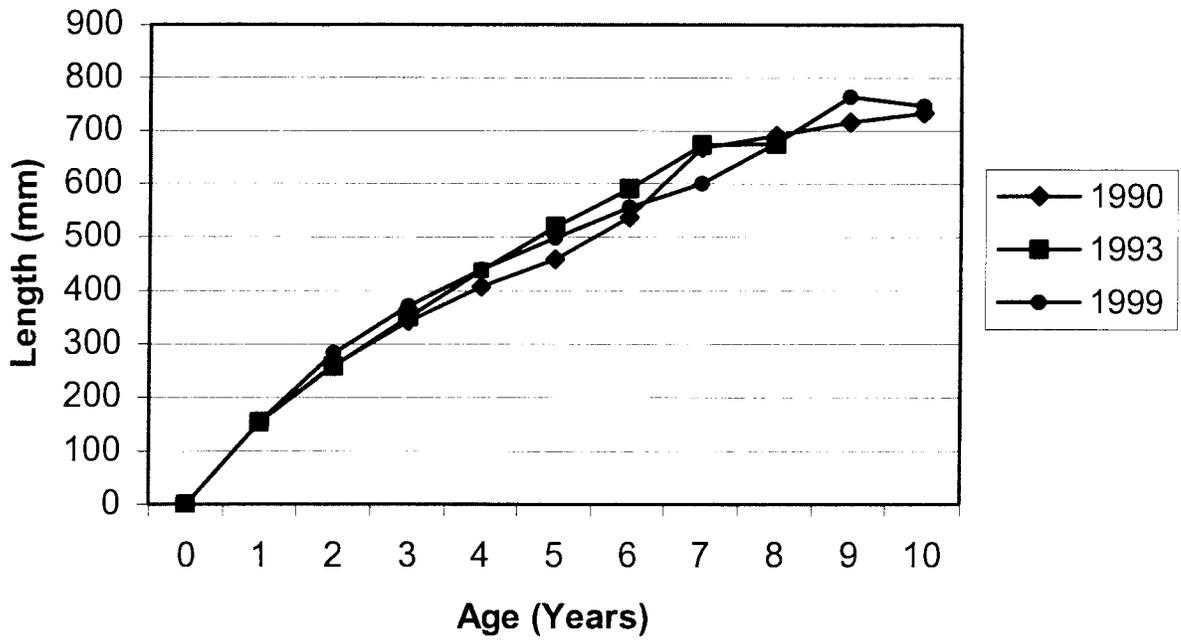


Figure 8. Estimated length-at-age for walleye sampled at Salmon Falls Creek Reservoir in three different years.

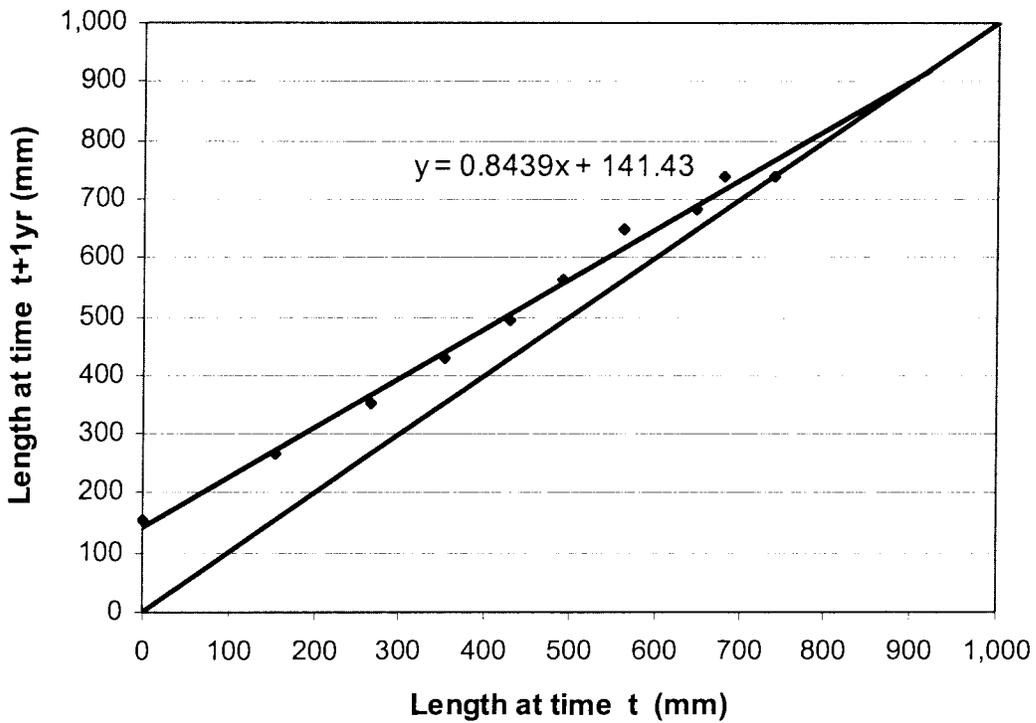


Figure 9. Walford plot of data averaged from three separate years of walleye growth estimates at Salmon Falls Creek Reservoir.

Table 12. Results of 1999 zooplankton sampling and monitoring at four reservoirs in the Magic Valley Region following methods described by Teuscher (1999).

Reservoir	Date	Location	Biomass (g/m)						Reservoir average						
			Mesh size (µm)			Mesh size (µm)			Mesh size (µm)			Mesh size (µm)			
			153	500	750	ZPR	ZQI	153	500	750	ZPR	ZQI			
Anderson Ranch Res.	7/21/99	Dam	0.59	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.20	0.01	0.04	0.01
		Wood Cr.	0.51	0.31	0.01	0.04	0.01	0.01	0.04	0.01	0.52	0.20	0.01	0.04	0.01
		Lime Cr.	0.47	0.14	0.01	0.08	0.01	0.01	0.08	0.01	0.52	0.20	0.01	0.04	0.01
Anderson Ranch Res.	8/24/99	Dam	0.26	0.04	0.02	0.50	0.03	0.03	0.03	0.03	0.27	0.09	0.04	0.44	0.05
		Wood Cr.	0.23	0.07	0.03	0.50	0.05	0.05	0.05	0.05	0.27	0.09	0.04	0.44	0.05
		Lime Cr.	0.31	0.16	0.05	0.33	0.07	0.07	0.33	0.07	0.27	0.09	0.04	0.44	0.05
Fish Cr. Res.	7/29/99	Dam	0.39	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.06	0.02	0.13	0.03
		Wood Cr.	0.24	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.06	0.02	0.13	0.03
		Lime Cr.	0.36	0.14	0.05	0.38	0.08	0.08	0.38	0.08	0.33	0.06	0.02	0.13	0.03
Little Wood River Res.	7/29/99	Upper Res.	0.23	0.57	0.56	0.98	1.10	0.98	0.98	1.10	0.23	0.57	0.56	0.98	1.10
		Dam	0.31	0.16	0.20	1.20	0.43	0.43	1.20	0.43	0.30	0.44	0.45	1.09	0.91
		Upper Res.	0.28	0.71	0.70	0.98	1.39	1.39	0.98	1.39	0.30	0.44	0.45	1.09	0.91
Salmon Falls Creek Res.	8/7/99	Whiskey Slough	0.50	0.37	0.24	0.65	0.40	0.40	0.65	0.40	0.51	0.39	0.28	0.73	0.49
		Grey's Landing	0.45	0.31	0.30	0.93	0.57	0.57	0.93	0.57	0.51	0.39	0.28	0.73	0.49
		Goose Island	0.59	0.49	0.30	0.62	0.49	0.49	0.62	0.49	0.51	0.39	0.28	0.73	0.49

Both the ZPR and ZQI for samples taken at Anderson Ranch Reservoir in 1998 (Teuscher 1999) and 1999 were in the low range. This indicated low zooplankton abundance and a low ratio of zooplankton in the preferred size range to total zooplankton present. These indices however are designed for rainbow trout and not kokanee. Samples from Fish Creek Reservoir and Little Wood River Reservoir both indicate that levels of preferred zooplankton size are in the high range and samples from Salmon Falls Creek Reservoir are in the middle range.

### **Regional Creel Surveys**

Conservation officers and regional fishery staff interviewed anglers to gather general creel information on waters throughout the region (Table 13).

Table 13. Results of creel checks performed on Magic Valley Region waters, 1999.

Water	Number of anglers	Hours fished	Species caught	Total catch (kept and released)
Big Smoky Creek	18	20	Hatchery rainbow trout	3
			Kokanee	21
Big Wood River	113	205	Rainbow trout	244
			Brook trout	3
			Mountain whitefish	1
			Brown trout	4
Billingsley Creek	4	8	Rainbow trout	16
Carey Lake	6	9	Yellow perch	11
			Largemouth bass	1
Dierkes Lake	6	7	Hatchery rainbow trout	8
Dog Creek Res.	40	108	Hatchery rainbow trout	55
			Yellow perch	30
			Bluegill	1
			Largemouth bass	6
			Bullhead	2
			Channel catfish	3
Fish Creek	31	101	Hatchery rainbow trout	91
			Brook trout	1
Fish Creek Res.	71	150	Hatchery rainbow trout	152
			Brook trout	6
Hagerman WMA	98	250	Hatchery rainbow trout	197
			Yellow perch	16
			Bluegill	146
			Largemouth bass	26
			Bullhead	1
Independence Lake	4	6	Cutthroat trout	1
Little Smoky Creek	26	15	Hatchery rainbow trout	14
			Rainbow trout	8
Little Wood River Res.	11	43	Hatchery rainbow trout	20
			Brook trout	4
Magic Res.	340	1,462	Hatchery rainbow trout	79
			Brown trout	83
			Yellow perch	1,582
			Rainbow trout	446
			Sucker	2
Mormon Res.	3	7	Hatchery rainbow trout	1
Oakley Res.	133	332	Hatchery rainbow trout	115
			Yellow perch	9
			Cutthroat trout	1
Rock Creek	4	2	Hatchery rainbow trout	15
Roseworth Res.	49	182	Hatchery rainbow trout	67
			Rainbow trout	20
South Fork Boise River	56	86	Hatchery rainbow trout	10
			Rainbow trout	46
			Bull trout	1
			Kokanee	14
Salmon Falls Creek Res.	71	206	Hatchery rainbow trout	10
			Yellow perch	9
			Walleye	19
			Rainbow trout	30
			Smallmouth bass	1
Thorn Creek Res.	20	24	Hatchery rainbow trout	29

## **ACKNOWLEDGEMENTS**

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## **APPENDICES**

Appendix A. Standardized lowland lakes fish sampling results for Oakley Reservoir, June 14-15, 1999.

Total length (mm)		Rainbow trout of hatchery origin				Total	Relative Weight
		Electrofishing	Floating gill net	Sinking gill net	Trap net		
110	Number	3				3	
	Ave. wt. (g)	16				16	1.00
120	Number	8				8	
	Ave. wt. (g)	17				17	0.82
130	Number	10				10	
	Ave. wt. (g)	23				23	0.85
140	Number	18		1		19	
	Ave. wt. (g)	30				30	0.91
150	Number	20	1			21	
	Ave. wt. (g)	33				33	0.80
160	Number	23	1	2		26	
	Ave. wt. (g)	39				39	0.80
170	Number	12				12	
	Ave. wt. (g)	58				58	0.98
180	Number	6	2			8	
	Ave. wt. (g)	56				56	0.80
190	Number	3		1		4	
	Ave. wt. (g)						-
200	Number	1		1		2	
	Ave. wt. (g)						-
210	Number	4				4	
	Ave. wt. (g)	108				108	0.97
220	Number	2				2	
	Ave. wt. (g)	74				74	0.58
230	Number	2				2	
	Ave. wt. (g)						-
240	Number			2		2	
	Ave. wt. (g)						-
250	Number	1	2			3	
	Ave. wt. (g)						-
260	Number	5	1			6	
	Ave. wt. (g)	112				112	0.53
270	Number	4	4	1		9	
	Ave. wt. (g)	235				235	1.00
280	Number	9	4	3		16	
	Ave. wt. (g)	204				204	0.78
290	Number	10	2	2		14	
	Ave. wt. (g)	293				293	1.01
300	Number	12	3	5		20	
	Ave. wt. (g)	295				295	0.91
310	Number	20	3	3		26	
	Ave. wt. (g)	346				346	0.97

Appendix A. Continued.

Total length (mm)		Rainbow trout of hatchery origin				Total	Rel. Wt.
		Electrofishing	Floating gill net	Sinking gill net	Trap net		
320	Number	8	3	3	14		
	Ave. wt. (g)	320			320	0.82	
330	Number	13	4	1	18		
	Ave. wt. (g)	410			410	0.96	
340	Number	6	2	1	9		
	Ave. wt. (g)	508			508	1.08	
350	Number	3	1		4		
	Ave. wt. (g)					-	
360	Number	1		1	2		
	Ave. wt. (g)					-	
370	Number	1			1		
	Ave. wt. (g)					-	
380	Number	3			3		
	Ave. wt. (g)	850			850	1.30	
390	Number	3		1	4		
	Ave. wt. (g)			820	820	1.16	
400	Number	1			1		
	Ave. wt. (g)	750			750	0.98	
410	Number	1			1		
	Ave. wt. (g)					-	
420	Number	8			8		
	Ave. wt. (g)	1,083			1,083	1.23	
430	Number	1			1		
	Ave. wt. (g)					-	
440	Number	3			3		
	Ave. wt. (g)	950			950	0.94	
470	Number	2			2		
	Ave. wt. (g)	1,150			1,150	0.93	
480	Number	4			4		
	Ave. wt. (g)	1,900			1,900	1.44	
490	Number	1			1		
	Ave. wt. (g)	1,800			1,800	1.29	
500	Number	2			2		
	Ave. wt. (g)	1,700			1,700	1.14	
530	Number	1			1		
	Ave. wt. (g)	2,200			2,200	1.24	
Total number measured		235	33	28	0	296	
Total number not measured		45	5	13	0	69	
Total sampled		280	38	41	0	365	

Appendix A. Continued.

Total length (mm)		Rainbow trout of unknown origin				Total	Rel. Wt.
		Electrofishing	Floating gill net	Sinking gill net	Trap net		
110	Number	1				1	
	Ave. wt. (g)	12				12	0.75
130	Number	1				1	
	Ave. wt. (g)	22				22	0.83
160	Number	1				1	
	Ave. wt. (g)	45				45	0.91
220	Number	1				1	
	Ave. wt. (g)						-
250	Number	1				1	
	Ave. wt. (g)	155				155	0.83
280	Number			1		1	
	Ave. wt. (g)						-
300	Number	1				1	
	Ave. wt. (g)	235				235	0.73
310	Number			1		1	
	Ave. wt. (g)						-
330	Number			1		1	
	Ave. wt. (g)						-
340	Number			1		1	
	Ave. wt. (g)			350		350	0.75
380	Number	1				1	
	Ave. wt. (g)	690				690	1.06
400	Number	1				1	
	Ave. wt. (g)	680				680	0.89
410	Number	2		1		3	
	Ave. wt. (g)	905		705		838	1.02
420	Number	1				1	
	Ave. wt. (g)	1,200				1,200	1.36
430	Number	1				1	
	Ave. wt. (g)	1,100				1,100	1.16
450	Number	1				1	
	Ave. wt. (g)	1,300				1,300	1.20
490	Number	1				1	
	Ave. wt. (g)	1,800				1,800	1.29
530	Number	1				1	
	Ave. wt. (g)	1,800				1,800	1.02
Total number measured		15	0	5	0	20	
Total number not measured		0	0	0	0	0	
Total sampled		15	0	5	0	20	

Appendix A. Continued.

Total length (mm)		Walleye				Total	Rel. Wt.
		Electrofishing	Floating gill net	Sinking gill net	Trap net		
140	Number	3				3	
	Ave. wt. (g)	23				23	0.98
150	Number	1				1	
	Ave. wt. (g)	26				26	0.89
160	Number	1				1	
	Ave. wt. (g)						-
170	Number	1				1	
	Ave. wt. (g)	34				34	0.78
180	Number	2				2	
	Ave. wt. (g)						-
190	Number	1				1	
	Ave. wt. (g)	56				56	0.90
260	Number	1				1	
	Ave. wt. (g)	186				186	1.10
270	Number	6		1		7	
	Ave. wt. (g)	178				178	0.94
280	Number	1	4			5	
	Ave. wt. (g)	200	202			201	0.94
290	Number	7	4	1		12	
	Ave. wt. (g)	255	221			230	0.96
300	Number	3	1	3		7	
	Ave. wt. (g)	260		266		263	0.99
310	Number	8	2	3		13	
	Ave. wt. (g)	338	280	278		318	1.08
320	Number	5	1	1		7	
	Ave. wt. (g)	325	295	330		319	0.98
330	Number		1	2		3	
	Ave. wt. (g)			370		370	1.03
350	Number		3			3	
	Ave. wt. (g)		410			410	0.95
360	Number			1		1	
	Ave. wt. (g)						0.00
380	Number		1	1		2	
	Ave. wt. (g)		540			540	0.96
390	Number	1	1			2	
	Ave. wt. (g)	1,150	635			893	1.46
400	Number	1				1	
	Ave. wt. (g)	600				600	0.90
410	Number	3	1			4	
	Ave. wt. (g)		690			690	0.96
420	Number	5	1	3		9	
	Ave. wt. (g)	803	740	742		772	1.00
430	Number	2	4	2		8	
	Ave. wt. (g)	850	863	895		868	1.04

Appendix A. Continued.

Total length (mm)		Walleye				Total	Rel. Wt.
		Electrofishing	Floating gill net	Sinking gill net	Trap net		
440	Number	3	1			4	
	Ave. wt. (g)	950	870			910	1.01
450	Number	1				1	
	Ave. wt. (g)	975				975	1.01
460	Number	2	3			5	
	Ave. wt. (g)	1,225	1,150			1,180	1.14
470	Number	2				2	
	Ave. wt. (g)	938				938	0.85
480	Number	1	1			2	
	Ave. wt. (g)	1,200	1,200			1,200	1.01
490	Number	1				1	
	Ave. wt. (g)	1,250				1,250	0.99
500	Number	1				1	
	Ave. wt. (g)	1,350				1,350	1.00
570	Number	1				1	
	Ave. wt. (g)	2,000				2,000	0.98
580	Number			1		1	
	Ave. wt. (g)			2,020		2,020	0.93
620	Number	1				1	
	Ave. wt. (g)						-
Total number measured		65	29	19	0	113	
Total number not measured		0	0	0	0	0	
Total sampled		65	29	19	0	113	

Appendix A. Continued.

Total length (mm)		Yellow perch				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
50	Number	4				4
	Ave. wt. (g)	3				3
60	Number	48				48
	Ave. wt. (g)	3				3
70	Number	23				23
	Ave. wt. (g)	3				3
100	Number	1				1
	Ave. wt. (g)					
110	Number	3				3
	Ave. wt. (g)					
120	Number	18				18
	Ave. wt. (g)	20				20
130	Number	33	1			34
	Ave. wt. (g)	25	22			24
140	Number	34	9			43
	Ave. wt. (g)	33	33			33
150	Number	12	19			31
	Ave. wt. (g)	39	38			38
160	Number	4	7			11
	Ave. wt. (g)		46			46
170	Number	1				1
	Ave. wt. (g)					
180	Number		1			1
	Ave. wt. (g)		0			0
190	Number		1	2		3
	Ave. wt. (g)		84	85		85
200	Number		1			1
	Ave. wt. (g)		91			91
210	Number		1	1		2
	Ave. wt. (g)		133			133
240	Number	1				1
	Ave. wt. (g)					
Total number measured		182	40	3	0	225
Total number not measured		281	63	84	46	474
Total sampled		463	103	87	46	699

Appendix A. Continued.

Total length (mm)		Utah sucker				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
100	Number	1				1
	Ave. wt. (g)					
110	Number				1	1
	Ave. wt. (g)					
160	Number	1	1		1	3
	Ave. wt. (g)					
190	Number	1				1
	Ave. wt. (g)					
210	Number		1			1
	Ave. wt. (g)					
220	Number	3			1	4
	Ave. wt. (g)	122				122
230	Number	2				2
	Ave. wt. (g)					
240	Number	2		1	1	4
	Ave. wt. (g)					
250	Number	3	1			4
	Ave. wt. (g)	190				190
260	Number	2	1		1	4
	Ave. wt. (g)	215				215
270	Number			1	1	2
	Ave. wt. (g)					
280	Number		1	2	1	4
	Ave. wt. (g)					
290	Number	1		1	1	3
	Ave. wt. (g)	285				285
300	Number	3	3	2		8
	Ave. wt. (g)	300				300
310	Number	2	2	3		7
	Ave. wt. (g)	350				350
320	Number	3	2	6		11
	Ave. wt. (g)	420				420
330	Number	5	2	4		11
	Ave. wt. (g)	408				408
340	Number	3	2		1	6
	Ave. wt. (g)	560				560
350	Number	1		1		2
	Ave. wt. (g)	550				550
370	Number	1	1	1		3
	Ave. wt. (g)	615				615
380	Number		2	1		3
	Ave. wt. (g)					
390	Number	4	8	3		15
	Ave. wt. (g)					

Appendix A. Continued.

Total length (mm)		Utah sucker				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
400	Number	19	11	4		34
	Ave. wt. (g)	686				686
410	Number	20	6	13		39
	Ave. wt. (g)	783				783
420	Number	9	11	8		28
	Ave. wt. (g)	800				800
430	Number	12	9	4		25
	Ave. wt. (g)	858				858
440	Number	15	9	11		35
	Ave. wt. (g)	923				923
450	Number	10	5	5		20
	Ave. wt. (g)	983				983
460	Number	8	5	2		15
	Ave. wt. (g)	1,005				1,005
470	Number	5	5	1		11
	Ave. wt. (g)	1,100				1,100
480	Number	5	2	1		8
	Ave. wt. (g)	1,100				1,100
500	Number	2	2	2		6
	Ave. wt. (g)	1,300				1,300
510	Number	1				1
	Ave. wt. (g)	1,300				1,300
520	Number	3		2		5
	Ave. wt. (g)	1,400				1,400
530	Number	1				1
	Ave. wt. (g)					
540	Number			1		1
	Ave. wt. (g)					
650	Number	1				1
	Ave. wt. (g)					
Total number measured		149	92	80	9	330
Total number not measured		122	35	69	48	274
Total sampled		271	127	149	57	604

Appendix A. Continued.

Total length (mm)		Mottled sculpin				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
50	Number	1				1
	Ave. wt. (g)					
60	Number	1				1
	Ave. wt. (g)	3				3
70	Number	2				2
	Ave. wt. (g)					
Total number measured		4	0	0	0	4
Total number not measured		0	0	0	0	0
Total sampled		4	0	0	0	4
-----						
Total length (mm)		Spottail shiner				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
70	Number	2				2
	Ave. wt. (g)	5				5
80	Number	22				22
	Ave. wt. (g)	6				6
90	Number	17			1	18
	Ave. wt. (g)	6				6
100	Number	5			7	12
	Ave. wt. (g)	7				7
110	Number	3				3
	Ave. wt. (g)	10				10
Total number measured		49	0	0	8	57
Total number not measured		259	0	0	0	259
Total sampled		308	0	0	8	316

Appendix B. Standardized lowland lakes fish sampling results for Pioneer Reservoir, June 2-3, 1999.

Total length (mm)		Bluegill				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
30	Number	3				3
	Ave. wt. (g)					
40	Number	5				5
	Ave. wt. (g)					
50	Number	4				4
	Ave. wt. (g)					
60	Number	4				4
	Ave. wt. (g)	4				
120	Number			1		1
	Ave. wt. (g)			40		40
Total number measured		16	0	1	0	17
Total number not measured		0	0	0	0	0
Total sampled		16	0	1	0	17
-----						
Total length (mm)		Pumpkinseed			Total	
		Electrofishing	Floating gill net	Sinking gill net		
40	Number	1			1	
	Ave. wt. (g)					
60	Number	1			1	
	Ave. wt. (g)					
70	Number	2			2	
	Ave. wt. (g)	6			6	
80	Number	3			3	
	Ave. wt. (g)	13			13	
90	Number		1	1	2	
	Ave. wt. (g)		20	20	20	
Total number measured		7	1	1	9	
Total number not measured		0	0	0	0	
Total sampled		7	1	1	9	

Appendix B. Continued.

Total length (mm)		Largemouth bass				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
80	Number	1				1
	Ave. wt. (g)					
100	Number	1				1
	Ave. wt. (g)	14				14
120	Number	1				1
	Ave. wt. (g)	23				23
160	Number			1		1
	Ave. wt. (g)			55		55
170	Number	1	1			2
	Ave. wt. (g)	78	75			77
180	Number	2	5			7
	Ave. wt. (g)	82	79			80
190	Number	2	3	3		8
	Ave. wt. (g)	94	88	97		93
200	Number	4	2			6
	Ave. wt. (g)	114	108			112
220	Number			1		1
	Ave. wt. (g)			160		160
230	Number	1		1		2
	Ave. wt. (g)	157		180		169
240	Number	2				2
	Ave. wt. (g)	194				194
250	Number	1	2			3
	Ave. wt. (g)	200	210			207
280	Number	1	1			2
	Ave. wt. (g)	304	285			295
300	Number		1			1
	Ave. wt. (g)		350			350
370	Number			1		1
	Ave. wt. (g)			670		670
390	Number			1		1
	Ave. wt. (g)			850		850
400	Number	1				1
	Ave. wt. (g)	1,000				1,000
Total number measured		18	15	8	0	41
Total number not measured		0	0	0	0	0
Total sampled		18	15	8	0	41

Appendix B. Continued.

Total length (mm)		Yellow perch				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
80	Number	3				3
	Ave. wt. (g)	7				7
90	Number	1				1
	Ave. wt. (g)	8				8
100	Number	2				2
	Ave. wt. (g)	15				15
120	Number	1				1
	Ave. wt. (g)	23				23
130	Number	2	1	3		6
	Ave. wt. (g)	32	30	30		31
140	Number	1		4		5
	Ave. wt. (g)	40		34		35
150	Number	2	1	2		5
	Ave. wt. (g)	52	50	53		52
160	Number	1	1	1		3
	Ave. wt. (g)	65	60	60		62
170	Number			1		1
	Ave. wt. (g)			80		80
180	Number	1	2	1		4
	Ave. wt. (g)	93	80	90		86
200	Number			2		2
	Ave. wt. (g)			115		115
230	Number			1		1
	Ave. wt. (g)			160		160
290	Number	1				1
	Ave. wt. (g)	350				350
Total number measured		15	5	15	0	35
Total number not measured		0	0	0	0	0
Total sampled		15	5	15	0	35

Total length (mm)		Utah chub				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
200	Number			1		1
	Ave. wt. (g)			110		110
280	Number		1	1		2
	Ave. wt. (g)		305	320		313
Total number measured		0	1	2	0	3
Total number not measured		0	0	0	0	0
Total		0	1	2	0	3

Appendix B. Continued.

Total length (mm)		Brown bullhead				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
140	Number	1				1
	Ave. wt. (g)	43				43
150	Number			1		1
	Ave. wt. (g)			75		75
170	Number		1			1
	Ave. wt. (g)		90			90
180	Number		1	2		3
	Ave. wt. (g)		140	120		127
190	Number		1	1		2
	Ave. wt. (g)		140	135		138
200	Number			1		1
	Ave. wt. (g)			160		160
210	Number		2	1		3
	Ave. wt. (g)		188	160		178
230	Number		1			1
	Ave. wt. (g)		270			270
240	Number		2	2		4
	Ave. wt. (g)		303	293		298
250	Number		1	1		2
	Ave. wt. (g)		335	330		333
260	Number		1			1
	Ave. wt. (g)		395			395
270	Number		1			1
	Ave. wt. (g)		325			325
Total number measured		1	11	9	0	21
Total number not measured		0	0	0	0	0
Total sampled		1	11	9	0	21

Appendix B. Continued.

Total length (mm)		Common carp				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
270	Number		1	1		2
	Ave. wt. (g)		400	340		370
320	Number			1		1
	Ave. wt. (g)			580		580
330	Number			1		1
	Ave. wt. (g)			600		600
360	Number			1		1
	Ave. wt. (g)			750		750
370	Number			1		1
	Ave. wt. (g)			900		900
390	Number			1		1
	Ave. wt. (g)			850		850
410	Number	1	1			2
	Ave. wt. (g)	1,400	1,250			1,325
420	Number	1	1			2
	Ave. wt. (g)	1,150	1,150			1,150
430	Number		2			2
	Ave. wt. (g)		1,400			1,400
440	Number	1	1	1		3
	Ave. wt. (g)	1,400	1,450	1,100		1,317
450	Number	2		3		5
	Ave. wt. (g)	1,425		1,475		1,455
460	Number	3	1			4
	Ave. wt. (g)	1,467	1,450			1,463
470	Number		2	1		3
	Ave. wt. (g)		1,763	1,650		1,725
480	Number		1			1
	Ave. wt. (g)		1,850			1,850
490	Number			1		1
	Ave. wt. (g)			1,700		1,700
500	Number			1		1
	Ave. wt. (g)			2,025		2,025
510	Number	1	1			2
	Ave. wt. (g)	1,950	2,300			2,125
520	Number	1				1
	Ave. wt. (g)	2,200				2,200
530	Number	2		2		4
	Ave. wt. (g)	2,200		2,200		2,200
540	Number	1				1
	Ave. wt. (g)	2,300				2,300
550	Number	1		1		2
	Ave. wt. (g)	2,450		2,600		2,525
570	Number		1	1		2
	Ave. wt. (g)		2,900	2,700		2,800

Appendix B. Continued.

Total length (mm)		Common carp				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
590	Number	1				1
	Ave. wt. (g)	2,650				2,650
600	Number	2	1			3
	Ave. wt. (g)	3,350	3,050			3,250
640	Number		1			1
	Ave. wt. (g)		3,550			3,550
650	Number	1				1
	Ave. wt. (g)	4,000				4,000
740	Number	1				1
	Ave. wt. (g)	7,257				7,257
Total number measured		19	14	17	0	50
Total number not measured		0	0	0	0	0
Total sampled		19	14	17	0	50

Total length (mm)		Bridgelip sucker				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
160	Number			1		1
	Ave. wt. (g)			45		45
240	Number			1		1
	Ave. wt. (g)			180		180
250	Number		1	1		2
	Ave. wt. (g)		180	230		205
260	Number	1		1	1	3
	Ave. wt. (g)	232		240	210	227
Total number measured		1	1	4	1	7
Total number not measured		0	0	0	0	0
Total sampled		1	1	4	1	7

Appendix B. Continued.

Total length (mm)		Largescale sucker				Total
		Electrofishing	Floating gill net	Sinking gill net	Trap net	
240	Number			2		2
	Ave. wt. (g)			210		210
250	Number			2		2
	Ave. wt. (g)			228		228
260	Number		4	1		5
	Ave. wt. (g)		244	240		243
280	Number		2			2
	Ave. wt. (g)		310			310
290	Number			2	1	3
	Ave. wt. (g)			325	360	337
310	Number			1		1
	Ave. wt. (g)			445		445
320	Number			1		1
	Ave. wt. (g)			430		430
330	Number		1			1
	Ave. wt. (g)		510			510
350	Number			1		1
	Ave. wt. (g)			520		520
370	Number		1			1
	Ave. wt. (g)		810			810
430	Number			1		1
	Ave. wt. (g)			950		950
440	Number	1		1		2
	Ave. wt. (g)	1,200		1,175		1,188
450	Number			1		1
	Ave. wt. (g)			1,350		1,350
470	Number		2			2
	Ave. wt. (g)		1,350			1,350
490	Number	1				1
	Ave. wt. (g)	1,800				1,800
Total number measured		2	10	13	1	26
Total number not measured		0	0	0	0	0
Total sampled		2	10	13	1	26

## 1999 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job: c

Title: Rivers and Streams Investigations

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

Twelve regional streams within historic Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri* drainages were investigated in 1999. Fish were sampled from these streams as part of an effort to learn about the status and trends in Yellowstone cutthroat trout populations in Idaho. Comparisons of cutthroat trout population density estimates from surveys done since 1986 were mixed but did not indicate an overall trend up or down in population numbers for the species within the region. Investigations on streams not previously surveyed revealed no existence of new cutthroat trout populations.

Boardman Creek, a tributary to the South Fork Boise River, was investigated and found to have an abundance of bull trout *Salvelinus confluentus*. Smoky Dome Creek, a tributary to Boardman Creek, was also sampled and found to have an abundance of bull trout and rainbow trout *O. mykiss*.

From September through November temporary downstream fish migrant traps were put into operation on the East and West forks of the Jarbidge River near their confluence to trap bull trout. A total of five bull trout were sampled, which is up from one sampled in 1997.

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## OBJECTIVES

To obtain current information for fishery management decisions on rivers and streams, including angler use, success, harvest and opinions, fish population characteristics, spawning success, habitat characteristics, return-to-the-creel for hatchery trout and to develop appropriate management recommendations.

## METHODS

The purpose of the 1999 stream surveys in streams south of the Snake River was to document presence of Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri* in waters with no records of previous surveys and to measure changes in those populations that have been previously documented. Streams in the South Fork Boise River drainage were surveyed to document presence of bull trout *Salvelinus confluentus*.

Fish were sampled by electrofishing with a Smith-Root Model 15-A backpack shocker using one shocker operator and one or two netters. Sampled fish were identified, total lengths recorded in 10 mm length groups and subsamples were weighed in grams. Deoxyribonucleic Acid (DNA) samples were taken for determining the degree of introgression (or purity) of cutthroat trout by snipping off a portion of a fin which was placed into a small vial of ethyl alcohol and sent to the University of Idaho's Aquaculture Research Institute for analysis. Results of the DNA sampling were not available from the lab at the time this report was prepared.

Fish population estimates were made with either a two-step depletion removal method (Seber and LeCren 1967) or a multiple step removal method using a maximum-likelihood estimate with a computer program developed by Van Deventner and Platts (1989). The two-step removal method was used in most instances on small streams for comparative purposes, as it is the method used in previous years' surveys. In many cases young-of-the-year (YOY) fish were not included in the population estimates because of the low sampling efficiencies for those individuals. Length at age was estimated by back calculating to length at scale annulus.

Stream habitat data for some streams were collected using ocular and measurement techniques described by IDFG (1992). Additionally, depths were measured and composition of substrates were analyzed at one-fourth, one-half and three-fourths the measured distance across each transect. Some of the habitat classification categories used were from descriptions by Rosgen (1996). Habitat measurements were also made on some of the streams surveyed in 1999 by Idaho Department of Fish and Game (IDFG) fishery research personnel using methods described in Appendix A. Locations of stream sites were recorded using Universal Transverse Mercator (UTM) coordinates. Individual sites were located either with a Garmin Model 12 GPS unit or directly from USGS topographic maps. Accuracy between methods was usually within 250 m.

White sturgeon *Acipenser transmontanus* were sampled utilizing heavy duty rods and reels equipped with a minimum of 50 pound test line, barbless hooks, and small hatchery trout or nongame fish for bait. Fish at least 150 cm in total length were considered old enough to be mature and surgically checked for sex and gonadal development.

## RESULTS AND DISCUSSION

### Almo Creek

Almo Creek is a perennial stream that flows southeast from the South Hills near the town of Almo, Idaho into Raft River. Its headwaters originate in the steep rocky terrain on the south side of Mount Independence in the Sawtooth National Forest. It flows into the Raft River valley where it enters private ground and is eventually diverted out of its stream channel for irrigation water. A good description of the Almo Creek watershed can be found in Grunder et al. (1987) from the last survey done in 1986.

Regional personnel did a fish and habitat survey on September 24, 1999 at about the same location surveyed in 1986 (UTM Z12, 279,540 E, 4,669,780 N). Total length of stream electrofished was 80 m and average width was 2.0 m. Water temperature was 12°C when sampled at 1500 hours. Fish were sampled with two upstream passes of electrofishing with a backpack shocker. Only cutthroat trout were sampled; no other fish species appeared to be present (Table 1). There were 30 cutthroat trout sampled in the first pass and eight sampled in the second pass for a total population estimate of 41 fish +/-6 fish (95% CI). The density estimate of 25.6 fish per 100 m<sup>2</sup> was not significantly different from the density estimate of 26.6 fish per 100 m<sup>2</sup> in 1986. Excluding YOY cutthroat trout there were 18 fish sampled in the first pass and two sampled in the second pass for a population estimate of 20 fish +/-1 fish (95% CI) and a density estimate of 12.5 fish per 100 m<sup>2</sup>. Scale samples were taken for age estimates from 13 fish at least 100 mm long. No annuli were visible on any of the scales indicating that fish 90 to 139 mm long were most likely one year of age and had not laid down an annulus in their first year. Fin tissue samples were taken on a subsample of trout for DNA. Habitat survey results done by regional personnel are given in Table 2. Fishery research personnel conducted another habitat survey on October 7, 1999 with those results given in Appendix B.

### Big Cottonwood Creek

Big Cottonwood Creek is a perennial stream flowing northeast through the South Hills in Cassia County. It originates at Jarvis Spring near the Bostetter Forest Service guard station and gains flow until it reaches the irrigation diversion at Cottonwood Wildlife Management Area (WMA), where most of the flow is diverted for irrigation from the natural stream channel by mid-summer of most years. The fishery has been previously surveyed by electrofishing on June 23, 1978 (Bell 1979) and on August 11, 1986 (Grunder et al. 1987) and by angling on June 21-22, 1990 (Partridge and Corsi 1993). Both of the previous electrofishing surveys indicated the presence of good populations of cutthroat trout plus the presence of hatchery rainbow trout *O. mykiss* which had been stocked at the upper and lower ends of the drainage from at least the 1960s until 1988. The report by Grunder et al. (1987) gives a good description of the watershed except for a subsequent change in accessibility with the IDFG's purchase of the ranch at the mouth of Big Cottonwood Canyon. Current access allows only nonmotorized traffic to enter the trail from the downstream end of the drainage. The entire stream from the upper end of Cottonwood WMA is followed by a trail to the road at the upper end of the canyon.

Table 1. Total length frequencies and average weights of fish sampled by electrofishing Almo Creek, September 24, 1999.

Total length (mm)		Cutthroat trout
40	Number	15
	Avg. weight (g)	
50	Number	3
	Avg. weight (g)	
90	Number	2
	Avg. weight (g)	13
100	Number	4
	Avg. weight (g)	12
110	Number	4
	Avg. weight (g)	15
120	Number	6
	Avg. weight (g)	18
130	Number	4
	Avg. weight (g)	23
Total sampled:		38

Table 2. Habitat survey results for Almo Creek, September 24, 1999.

Site:	UTM Z12, 279,540 E, 4,669,780 N				
Date:	09/24/99				
Channel type:	Entrenched, riffle dominated, high energy				
Avg. width (m):	2.0				
Transect interval (m):	10.0				
No. transects:	7.0				
Length surveyed (m):	80.0				
Total surface area (m <sup>2</sup> ):	161.3				
Gradient (clinometer; %):	8.66				
Gradient (map; %):	6.79				
Habitat type	Percent of total		Average depth (m)		
Backwater:	9.5		0.08		
Pocket:	9.5		0.06		
Pool:	9.5		0.23		
Riffle:	52.4		0.03		
Run:	19.0		0.08		
Substrate	Percent of total				
Silt/sand:	4.0				
Gravel:	17.1				
Rubble:	25.5				
Boulder:	53.3				
Bedrock:	0.0				
Percent substrate by habitat type:	Backwater	Pocket	Pool	Riffle	Run
% Silt/sand:	12.5	2.5	0.0	0.9	11.3
% Gravel:	30.0	17.5	2.5	10.9	35.0
% Rubble:	57.5	45.0	42.5	18.6	10.0
% Boulder:	0.0	35.0	55.0	69.5	43.8
% Bedrock:	0.0	0.0	0.0	0.0	0.0

The fishery was sampled by electrofishing with a backpack shocker at two locations on July 20, 1999 as part of the Yellowstone cutthroat trout survey. The lowermost site was located at UTM Z11, 745,399 m E, 4,686,050 m N, which is approximately 700 m upstream of the irrigation diversion and at least 5 stream km downstream of the site sampled in 1986. It was 113 m long, averaged 3.4 m wide and was sampled with three upstream passes of electrofishing. Water temperature was 15°C when sampled at 1120 hours. Species sampled included cutthroat trout and mottled sculpin *Cottus bairdi* (Table 3). There were 13 cutthroat trout sampled in the first pass, eight in the second pass and two in the third pass for a population estimate of 24 fish +/- 4 fish (95% CI) and a density estimate of 6.25 fish/100 m<sup>2</sup>. All cutthroat trout sampled were over 100 mm long although one was observed but not sampled; it appeared to be a YOY fish 30-40 mm long. The cutthroat trout density estimate from the 1986 sample was 29.4 fish/100 m<sup>2</sup>. The results between the two investigations are not comparable because the sampling and population estimate from 1986 include YOY fish that were not sampled in 1999. This may be a result of differences in sampling locations with the 1999 site possibly having unsuitable early rearing cutthroat trout habitat, or it may be a result of inadequate sampling of a population with patchy distribution.

The upper site was at the U.S. Forest Campground near Jarvis Spring at UTM Z11, 732,676 m E, 4,671,575 m N. It was 100 m long, averaged 1.29 m wide and was covered with dense riparian vegetation making electrofishing difficult and reducing sampling efficiency. It was sampled with a single upstream pass of electrofishing since only three cutthroat trout at least one year of age and 19 YOY were sampled (Table 3). No other species were sampled. Fin tissue samples were taken from a subsample of trout for DNA analysis. Fishery research personnel did a habitat survey at the upper site on October 7, 1999 (Appendix B).

### Birch Creek

Birch Creek is a small perennial stream entering Goose Creek approximately 15 km upstream of the headwaters of Oakley Reservoir and 3 km downstream of the Utah state line. It flows for approximately 5 km through Idaho from its headwaters in Utah (UTM Z12, 260,187 m E, 4,652,350 m N). The reach within Idaho is mostly on public ground with some sections fenced off from livestock grazing. Birch Creek fish were last sampled at three sites in 1994 by IDFG and Bureau of Land Management (BLM) personnel (Warren and Partridge 1996) and in 1987 by IDFG personnel (Grunder et al. 1989). This year a fish and habitat survey was done to document status of Yellowstone cutthroat trout. The reach surveyed was within a livestock enclosure at the state line, one of the same sites sampled in 1994. Two upstream passes were made with a backpack shocker on 80 m of stream with an average width of 1.7 m. The only fish species sampled was brook trout *Salvelinus fontinalis* (Table 4). There were 19 sampled in the first pass and 4 sampled in the second for a population estimate of 24 fish +/- 3 fish (95% CI) and a density estimate of 17.6 fish/100 m<sup>2</sup>. Water temperature at time of sampling was 15°C at 1500 hours. The brook trout density estimate from the 1994 sample was approximately 18.5 fish/100 m<sup>2</sup> (Warren and Partridge 1996). A single pass of electrofishing 80 m of stream at the same site by Grunder et al (1989) in 1987 sampled one cutthroat trout and seven brook trout. No other fish species were sampled from that same site in 1994. Habitat survey results by regional personnel are given in Table 5 and habitat survey results done on October 7, 1999 by fishery research personnel are given in Appendix B.

Table 3. Total length frequencies and average weights of fish sampled by electrofishing two sites on Big Cottonwood Creek, July 20, 1999.

Total length (mm)	Lower site		Upper site
	Cutthroat trout	Mottled sculpin	Cutthroat trout
30	Number		1
	Avg. weight		
40	Number	5	11
	Avg. weight		
50	Number	18	6
	Avg. weight		
60	Number	4	1
	Avg. weight		
70	Number	5	
	Avg. weight		
80	Number	12	
	Avg. weight		
90	Number	6	
	Avg. weight		
100	Number	2	1
	Avg. weight		14
110	Number	1	
	Avg. weight		
120	Number	3	1
	Avg. weight	19	22
130	Number	5	
	Avg. weight	23	
140	Number	2	
	Avg. weight	27	
150	Number	1	1
	Avg. weight	36	46
160	Number		
	Avg. weight		
170	Number	1	
	Avg. weight	58	
180	Number	2	
	Avg. weight	56	
190	Number	1	
	Avg. weight	72	
200	Number	2	
	Avg. weight	81	
210	Number	1	
	Avg. weight	110	
220	Number	1	
	Avg. weight	117	
230	Number	1	
	Avg. weight	124	
250	Number	1	
	Avg. weight	166	
260	Number	2	
	Avg. weight	202	
Number		23	22
Number not measured:		0	0
Total sampled:		23	22

Table 4. Total length frequencies and average weights of fish sampled by electrofishing Birch Creek, July 30, 1999.

Total length (mm)		Brook trout
140	Number	2
	Avg. weight (g)	35
150	Number	4
	Avg. weight (g)	48
180	Number	1
	Avg. weight (g)	66
190	Number	3
	Avg. weight (g)	71
200	Number	4
	Avg. weight (g)	78
210	Number	5
	Avg. weight (g)	90
220	Number	2
	Avg. weight (g)	102
230	Number	2
	Avg. weight (g)	110
Total sampled:		23

Table 5. Habitat survey results for Birch Creek, July 30, 1999.

Site:	UTM Z12, 260,187 m E, 4,652,350 m N				
Date:	07/30/99				
Channel type:	Moderately entrenched, riffle/run dominated, stable				
Avg. width (m):	1.7				
Transect interval (m):	20.0				
No. transects:	4.0				
Length surveyed (m):	80.0				
Total surface area (m <sup>2</sup> ):	138.7				
Gradient (%):	4.06				
Gradient (map; %):	3.40				
Habitat type	Percent of total			Average depth (m)	
Backwater:	0.0			-	
Pocket:	0.0			-	
Pool:	0.0			-	
Riffle:	36.4			0.15	
Run:	63.6			0.14	
Substrate	Percent of total				
Silt/sand:	32.3				
Gravel:	17.5				
Rubble:	18.3				
Boulder:	31.9				
Bedrock:	0.0				
Percent substrate by habitat type:	Backwater	Pocket	Pool	Riffle	Run
% Silt/sand:	-	-	-	43.5	29.3
% Gravel:	-	-	-	18.8	17.1
% Rubble:	-	-	-	20.3	14.3
% Boulder:	-	-	-	17.4	39.3
% Bedrock:	-	-	-	0.0	0.0

### Boardman Creek

Boardman Creek is a perennial stream entering the South Fork Boise River from the south approximately 3 km downstream of the Big Smoky Creek confluence (UTM Z11, 663,100 m E, 4,822,000 m N). Its headwaters originate from Iron Mountain and Smoky Dome Peak. A fish and habitat survey was done on a 66 m reach of Boardman Creek approximately 12.3 km upstream of its confluence with the South Fork Boise River on August 19, 1999. Water temperature was 9°C when sampled at 1645 hours. Two upstream passes were made with a backpack electrofisher. There were 16 bull trout sampled in the first pass and one in the second pass for a total population estimate of 17 fish +/-1 fish (95% CI) and a density estimate of 11.2 fish/100 m<sup>2</sup>. Based on body condition, the fish appeared to be residents with the larger bull trout sampled being adults. A total length frequency of all fish sampled is given in Table 6. No other fish species were sampled. Habitat survey results are given in Table 7.

### Cottonwood Creek

Cottonwood Creek is a small stream originating on the east side of Middle Mountain in Cassia County and is a tributary to Junction Creek, which is a tributary to Raft River. Most of the stream is on private ground used for livestock grazing. Regional IDFG personnel conducted a fish and habitat survey at two sites on July 27, 1999 as part of the Yellowstone cutthroat trout survey. The upper site (UTM Z12, 266,339 m E, 4,659,273 m N) was 80 m long, and no fish were sampled in a single upstream pass of electrofishing with a backpack shocker. Water temperature at time of electrofishing the upper site was 18°C. The lower site (UTM Z12, 267,711 m E, 4,657,120 m N) was 85 m long and 33 fish were sampled with a single pass of electrofishing. Water temperature at time of electrofishing the lower site was 19°C. Species sampled include mottled sculpin, redbreast shiner *Richardsonius balteatus*, speckled dace *Rhinichthys osculus*, and mountain sucker *Catostomus platyrhynchus* (Table 8). No species of trout were sampled. Habitat survey results for both sites are given in Tables 9 and 10. Total flow at the lower site appeared to be less than 0.03 m<sup>3</sup>/s and even less at the upper site. Most of the Cottonwood Creek drainage is utilized for livestock grazing and resulting impacts to the stream are evident. Gravel was present and available for use as a spawning substrate within the reaches surveyed, but bank sloughing and sedimentation appeared to have eliminated habitat diversity including deep pools. There is a small irrigation impoundment less than 1 ha in surface area a few hundred meters downstream of the lower site. The last reported presence of any trout in the drainage is about 20 years ago in this pond, which the landowners claim was once stocked with fish from a Buhl, Idaho hatchery.

### Dry Creek

Dry Creek is a perennial stream that flows north from the South Hills into agricultural land towards Murtaugh Lake. Most of the stream within the canyon is on BLM and Forest Service land, but the lower reach is on private ground with restricted public access. A road following Dry Creek for a few miles upstream from the private ground is not accessible to the public. It was previously surveyed July 19, 1988, which included electrofishing that resulted in sampling cutthroat trout x rainbow trout hybrids (Partridge et al. 1990). Regional personnel

Table 6. Total length frequencies and average weights of fish sampled by electrofishing Boardman Creek, August 19, 1999.

Total length (mm)		Bull trout
150	Number	1
	Avg. weight (g)	34
160	Number	3
	Avg. weight (g)	37
170	Number	3
	Avg. weight (g)	44
180	Number	3
	Avg. weight (g)	54
190	Number	3
	Avg. weight (g)	60
200	Number	1
	Avg. weight (g)	84
210	Number	1
	Avg. weight (g)	96
220	Number	1
	Avg. weight (g)	104
230	Number	1
	Avg. weight (g)	118
Total sampled:		17

Table 7. Habitat survey results for Boardman Creek, August 19, 1999.

Site:	UTM Z11, 663,100 m E, 4,822,000 m N				
Date:	08/19/99				
Channel type:	Meandered/outwash				
Avg. width (m):	2.2				
Transect interval (m):	15.0				
No. transects:	4.0				
Length surveyed (m):	66.0				
Total surface area (m <sup>2</sup> ):	147.4				
Gradient (%):	6.00				
Gradient (map; %):	6.56				
Habitat type	Percent of total		Average depth (m)		
Backwater:	0.0		-		
Pocket:	16.7		0.12		
Pool:	0.0		-		
Riffle:	58.3		0.08		
Run:	25.0		0.11		
Substrate	Percent of total				
Silt/sand:	1.3				
Gravel:	15.0				
Rubble:	27.1				
Boulder:	56.7				
Bedrock:	0.0				
Percent substrate by habitat type:	Backwater	Pocket	Pool	Riffle	Run
% Silt/sand:	-	0.0	-	1.4	1.7
% Gravel:	-	7.5	-	8.6	35.0
% Rubble:	-	7.5	-	27.1	40.0
% Boulder:	-	85.0	-	62.9	23.3
% Bedrock:	-	0.0	-	0.0	0.0

Table 8. Total length frequencies of fish sampled by electrofishing the lower site of Cottonwood Creek, July 27, 1999.

Total length (mm)		Mottled sculpin	Redside shiner	Speckled dace	Mountain sucker
50	Number			5	
60	Number			2	
70	Number	3		10	
80	Number	1		6	
90	Number		1	3	
110	Number	1			
120	Number				1
Number sampled:		5	1	26	1

Table 9. Habitat survey results for the lower site on Cottonwood Creek, July 27, 1999.

Site:	UTM Z12; 267,711 m E, 4,657,120 m N				
Date:	07/27/99				
Channel type:	B, moderately entrenched, run dominated				
Avg. width (m):	1.6				
Transect interval (m):	20.0				
No. transects:	4.0				
Length surveyed (m):	85.0				
Total surface area (m <sup>2</sup> ):	137.4				
Gradient (clinometer; %):	2.24				
Gradient (map; %):	1.82				
Habitat type	Percent of total		Average depth (m)		
Backwater:	8.3		0.15		
Pocket:	0.0		-		
Pool:	41.7		0.20		
Riffle:	8.3		0.02		
Run:	41.7		0.12		
Substrate	Percent of total				
Silt/sand:	75.0				
Gravel:	20.0				
Rubble:	5.0				
Boulder:	0.0				
Bedrock:	0.0				
Percent substrate by habitat type:	Backwater	Pocket	Pool	Riffle	Run
% Silt/sand:	100.0	-	96.0	10.0	62.0
% Gravel:	0.0	-	4.0	40.0	36.0
% Rubble:	0.0	-	0.0	50.0	2.0
% Boulder:	0.0	-	0.0	0.0	0.0
% Bedrock:	0.0	-	0.0	0.0	0.0

Table 10. Habitat survey results for the upper site on Cottonwood Creek, July 27, 1999.

Site:	UTM Z12; 266,339 m E, 4,659,273 m N				
Date:	07/27/99				
Channel type:	B, moderately entrenched, run dominated				
Avg. width (m):	1.2				
Transect interval (m):	20.0				
No. transects:	4.0				
Length surveyed (m):	80.0				
Total surface area (m <sup>2</sup> ):	98.7				
Gradient (clinometer; %):	6.30				
Gradient (map; %):	6.66				
<b>Habitat type</b>	<b>Percent of total</b>		<b>Average depth (m)</b>		
Backwater:	0.0		-		
Pocket:	0.0		-		
Pool:	0.0		-		
Riffle:	8.3		0.04		
Run:	91.7		0.05		
<b>Substrate</b>	<b>Percent of total</b>				
Silt/sand:	30.8				
Gravel:	49.2				
Rubble:	20.0				
Boulder:	0.0				
Bedrock:	0.0				
<b>Percent substrate by habitat type:</b>	<b>Backwater</b>	<b>Pocket</b>	<b>Pool</b>	<b>Riffle</b>	<b>Run</b>
% Silt/sand:	-	-	-	0.0	33.6
% Gravel:	-	-	-	20.0	51.8
% Rubble:	-	-	-	80.0	14.5
% Boulder:	-	-	-	0.0	0.0
% Bedrock:	-	-	-	0.0	0.0

conducted another fish survey on September 16, 1999 to evaluate status of Yellowstone cutthroat trout. The reach electrofished was located at UTM Z11, 730,728 m E, 4,692,805 m N. Total length of stream electrofished was 103 m and the average width was 3.4 m. Water temperature at time of electrofishing was 13°C at 1415 hours. Two upstream passes were made with the backpack electrofisher. Species sampled included mottled sculpin and trout that externally appeared to be cutthroat trout (Table 11). There were 25 cutthroat trout sampled in the first pass and six sampled in the second pass, excluding YOY fish, for a population estimate of 32 fish +/-5 fish (95% CI) and a density estimate of 9.4 fish/100 m<sup>2</sup>. The density estimate for trout age 1+ and older from the 1988 survey done approximately 3 km downstream was 8.1 fish/100 m<sup>2</sup> (Partridge et al. 1990). Scale samples were taken from 25 cutthroat trout. Back-calculations to length at age were not done because some fish did not appear to lay down annuli after their first year of growth, thus creating an inconsistent correlation with length frequencies. Observations of the scales indicate that fish enter their second summer (age 1+) at approximately 100 mm long, their third summer at approximately 150 mm long and their fourth summer at approximately 200 mm long. Fin tissue samples were taken from several of the cutthroat trout for DNA analysis. There were no results from the lab at the time of this writing. A habitat survey was done at this site by IDFG fishery research personnel on October 8, 1999 (Appendix B).

### Eightmile Creek

Eightmile Creek is a tributary to Raft River on the west side of the Black Pine Mountains in Cassia County, Idaho. The stream flows unimpeded for 4 to 5 km before it enters a small irrigation impoundment, where it is diverted for agricultural uses. Grunder et al. (1987) give a chemical, physical and biological description for this stream from 1986 samples including verification by Robert Behnke that the cutthroat trout present in Eightmile Creek are of the Yellowstone strain. Eightmile Creek was also surveyed on May 19, 1996 (Warren and Partridge, in press) and on September 15, 1999 by regional IDFG personnel to document presence of Yellowstone cutthroat trout. The 1999 survey was at UTM Z12, 321,528 m E, 4,668,924 m N approximately 1 stream km upstream of the 1987 survey site. Length of stream electrofished was 100 m and average stream width was 1.4 m. Fish were sampled with two upstream passes by electrofishing with a backpack shocker for a population estimate of cutthroat trout, the only species sampled (Table 12). Water temperature at time of sampling was 9°C. Of cutthroat trout sampled, there were 56 in the first pass and six in the second that were at least one year of age, for a population estimate of 63 fish +/-2 fish (95% CI) and a density estimate of 45.0 fish/100 m<sup>2</sup>. A total population estimate of all ages combined was 69 fish +/-2 fish (95% CI) and a density estimate of 49.3 fish/100 m<sup>2</sup>. Scale samples and length frequencies indicate that three year classes of fish were sampled. Fish less than 80 mm long were YOY, fish between 80 and 170 mm long were age 1+, and fish 170 mm and longer were age 2+. The 1986 cutthroat trout population density estimate was 6.9 fish/100m<sup>2</sup>, which is significantly lower than the 1999 sample. Fin tissue samples were taken from several of the cutthroat trout for DNA analysis.

Table 11. Total length frequencies and average weights of fish sampled by electrofishing Dry Creek, September 16, 1999.

Total length (mm)		Cutthroat trout	Mottled sculpin
30	Number		1
	Avg. weight (g)		
40	Number	4	
	Avg. weight (g)		
50	Number	6	2
	Avg. weight (g)		
60	Number	5	10
	Avg. weight (g)		
70	Number	1	4
	Avg. weight (g)		
80	Number		5
	Avg. weight (g)		
90	Number		7
	Avg. weight (g)		
100	Number		2
	Avg. weight (g)		
110	Number	1	2
	Avg. weight (g)	10	
130	Number	2	
	Avg. weight (g)	29	
140	Number	1	
	Avg. weight (g)		
170	Number	2	
	Avg. weight (g)	59	
180	Number	3	
	Avg. weight (g)	71	
190	Number	1	
	Avg. weight (g)	90	
200	Number	1	
	Avg. weight (g)	106	
210	Number	3	
	Avg. weight (g)	117	
220	Number	5	
	Avg. weight (g)	124	
250	Number	2	
	Avg. weight (g)	191	
260	Number	2	
	Avg. weight (g)	238	
280	Number	3	
	Avg. weight (g)	284	
240	Number	2	
	Avg. weight (g)	169	
290	Number	1	
	Avg. weight (g)	282	
320	Number	2	
	Avg. weight (g)	365	
Total sampled:		47	33

Table 12. Total length frequencies and average weights of fish sampled by electrofishing Eightmile Creek, September 15, 1999.

Total length (mm)		Cutthroat trout
40	Number	2
	Avg. weight (g)	
50	Number	4
	Avg. weight (g)	
80	Number	3
	Avg. weight (g)	8
90	Number	2
	Avg. weight (g)	
100	Number	9
	Avg. weight (g)	11
110	Number	11
	Avg. weight (g)	15
120	Number	3
	Avg. weight (g)	25
130	Number	9
	Avg. weight (g)	27
140	Number	7
	Avg. weight (g)	33
150	Number	2
	Avg. weight (g)	48
160	Number	7
	Avg. weight (g)	57
170	Number	3
	Avg. weight (g)	68
180	Number	4
	Avg. weight (g)	78
210	Number	2
	Avg. weight (g)	140
Total sampled:		68

## Goose Creek

Goose Creek is a perennial stream flowing approximately 25 km through Idaho into Nevada along the east slope of Deadline Ridge in the Cassia Division of the Sawtooth National Forest. Several kilometers into Nevada it turns to the northeast and flows through the northwest corner of Utah and flows back into Idaho for approximately 25 km before it reaches the full pool headwaters of Oakley Reservoir. All water flowing out of Oakley Reservoir is diverted for irrigation uses before it reaches the Snake River. Numerous upper Goose Creek sites have been sampled by IDFG by electrofishing in the past. One site was sampled in 1987 at the Winecup Creek confluence (Grunder et al. 1989), one site was sampled in 1989 near the Nevada state line (Partridge and Corsi 1990), and four sites were sampled between the headwaters near Porcupine Springs and the Nevada state line in 1990 (Partridge and Corsi 1993). On August 4 and 5, 1999 a fish and habitat survey was done at five sites on upper Goose Creek, which included the four sites that were surveyed in 1990.

Site 1 was located at UTM Z11, 727,954 m E, 4,652,826 m N with its upper boundary at the Thoroughbred Creek confluence. Length of stream electrofished was 120 m, the average stream width was 5.3 m and water temperature at time of electrofishing was 14°C. Fish sampled with a single upstream pass of electrofishing included three cutthroat trout, one brook trout, several redbreast shiners, speckled dace, longnose dace *R. cataractae*, and mottled sculpin (Table 13). A single upstream pass of electrofishing at this same site August 24, 1989 along an undocumented length of stream sampled five cutthroat trout x rainbow trout hybrids ranging in size from 109 to 338 mm long (Partridge and Corsi 1990).

Site 2 was located at UTM Z11, 726,680 m E, 4,656,292 m N with its lower boundary at the Rattlesnake Springs confluence. Length of stream electrofished was 109 m, the average stream width was 4.5 m and water temperature at time of electrofishing was 14°C. Fish sampled with two upstream passes of electrofishing included cutthroat trout, brook trout, redbreast shiners, speckled dace, and mottled sculpin (Table 14). There were 13 cutthroat trout sampled in the first pass and four in the second pass for a population estimate of 19 fish  $\pm$  5 fish (95% CI) and a density estimate of 3.9 fish/100 m<sup>2</sup>. No cutthroat trout were sampled that appeared to be YOY fish. There were six brook trout sampled in the first pass and one in the second pass for a population estimate of seven fish  $\pm$  1 fish (95% CI) and a density estimate of 1.4 fish/100 m<sup>2</sup>. The estimate for brook trout included fish that appeared to be YOY. No cutthroat trout or brook trout were sampled at this same site with a single upstream pass of electrofishing 162 m of stream on August 8, 1990 (Partridge and Corsi 1993).

Site 3 was located at UTM Z11, 726,337 m E, 4,662,068 m N with its lower boundary at the Winecup Creek confluence. Length of stream electrofished was 103 m, the average stream width was 3.6 m and water temperature at time of electrofishing was 21°C. Fish sampled with two upstream passes of electrofishing included cutthroat trout, brook trout and mottled sculpin (Table 15). There were 10 cutthroat trout sampled in the first pass and in the second pass there were four at least age 1+ for a population estimate of 17 fish  $\pm$  8 fish (95% CI) and a density estimate of 4.6 fish/100 m<sup>2</sup>. No cutthroat trout that appeared to be YOY fish were sampled. A site approximately 3 stream km upstream of this site at the mouth of Little Goose Creek was surveyed on August 8, 1990 (Partridge and Corsi 1993). There were 15 cutthroat trout >75 mm long sampled with two passes of electrofishing at that site in 1990.

Site 4 was located at UTM Z11, 726,840 m E, 4,667,052 m N, near the Jones Creek confluence at the end of the road. Length of stream electrofished was 88 m and average

Table 13. Total length frequencies and average weights of fish sampled by electrofishing Site 1 on Goose Creek, August 5, 1999.

Total length (mm)	Number	Avg. weight (g)	Cutthroat trout	Brook trout	Mottled sculpin	Redside shiner	Speckled dace	Longnose dace
10	4							
20	6							
40	1					5	3	
50	13					2	3	
60	21					1	1	
70	5					2	2	1
80	5					5		2
90						1	1	1
100			1					
140			13					
290			1					
340			28	1				
				275				
			1					
			485					
Total sampled:	3		1	55	16	10	4	

Table 14. Total length frequencies and weights of fish sampled by electrofishing Site 2 on Goose Creek, August 5, 1999.

Total length (mm)	Cutthroat trout	Brook trout	Mottled sculpin	Redside shiner	Speckled dace
40	Number		2		
	Avg. weight (g)				
50	Number		37		
	Avg. weight (g)				
60	Number	1	11		2
	Avg. weight (g)				
70	Number	2	7	3	7
	Avg. weight (g)				
80	Number	1		2	2
	Avg. weight (g)				
90	Number	5		1	
	Avg. weight (g)				
100	Number	6			
	Avg. weight (g)				
250	Number	12			
	Avg. weight (g)				
110	Number	5			
	Avg. weight (g)				
120	Number	14			
	Avg. weight (g)				
180	Number	1			
	Avg. weight (g)				
200	Number	16			
	Avg. weight (g)				
	Number	60			
	Number	1			
	Avg. weight (g)	83			
	Number				
	Avg. weight (g)				
Total count of number measured:	17	7	57	6	11
Total count of number not measured:	0	0	34	0	0
Total sampled:	17	7	92	6	11

Table 15. Total length frequencies and average weights of fish sampled by electrofishing Site 3 on Goose Creek, August 4, 1999.

Total length (mm)		Cutthroat trout	Brook trout	Mottled sculpin
40	Number			2
	Avg. weight (g)			
50	Number			6
	Avg. weight (g)			47
60	Number			10
	Avg. weight (g)			
70	Number		2	14
	Avg. weight (g)			20
80	Number	1		9
	Avg. weight (g)			
90	Number	2		2
	Avg. weight (g)			
100	Number	4		2
	Avg. weight (g)			19
110	Number	3		
	Avg. weight (g)	12		
120	Number	1		
	Avg. weight (g)			
130	Number	2		
	Avg. weight (g)	12		
180	Number	1		
	Avg. weight (g)			
Total sampled:		14	2	45

stream width was 1.8 m. Fish sampled with two upstream passes of electrofishing included cutthroat trout, brook trout, mottled sculpin and reidside shiners (Table 16). There were 11 cutthroat trout at least one year of age sampled in the first pass and four in the second pass for a population estimate of 17 fish +/-7 fish (95% CI) and a density estimate of 10.7 fish/100 m<sup>2</sup>. There were no YOY cutthroat trout sampled in either pass. A 63 m reach approximately 1 km downstream of this site was sampled 1990 (Partridge and Corsi 1993). There were six cutthroat trout at least one year of age and nine YOY cutthroat trout sampled that year. The density estimate of cutthroat trout at least one year of age for that sample was 3 fish/100 m<sup>2</sup>.

Site 5 was located at UTM Z11, 725,883 m E, 4,670,245 m N, with the Frahm Spring confluence marking the lower boundary of the sample site. Length of stream electrofished was 108 m, average stream width was 1.5 m and water temperature was 15°C. Fish sampled with two upstream passes of electrofishing included cutthroat trout, mottled sculpin and speckled dace (Table 17). On August 8, 23 cutthroat trout at least one year of age were sampled with two upstream passes of electrofishing in the first pass and seven sampled in the second pass for a population estimate of 33 fish +/-7 fish (95% CI) and a density estimate of 20.4 fish/100 m<sup>2</sup>. There were also 14 YOY cutthroat trout sampled in the first pass and 19 in the second pass not included in the population estimate. A 98 m reach approximately 3 km downstream of this site was sampled with a single upstream pass of electrofishing on August 8, 1990

Table 16. Total length frequencies and average weights of fish sampled by electrofishing Site 4 on Goose Creek, August 4, 1999.

Total length (mm)		Cutthroat trout	Brook trout	Mottled sculpin	Redside shiner
40	Number			2	
	Avg. weight (g)				
50	Number			6	
	Avg. weight (g)			47	
60	Number			10	
	Avg. weight (g)				
70	Number		2	14	
	Avg. weight (g)			20	
80	Number	1		9	1
	Avg. weight (g)				
90	Number	2		2	
	Avg. weight (g)				
100	Number	5		2	
	Avg. weight (g)			19	
110	Number	3			
	Avg. weight (g)	12			
120	Number	1			
	Avg. weight (g)				
130	Number	2			
	Avg. weight (g)	12			
180	Number	1			
	Avg. weight (g)				
250	Number		1		
	Avg. weight (g)		15		
Total sampled:		15	3	45	1

Table 17. Total length frequencies and average weights of fish sampled by electrofishing Site 5 on Goose Creek, August 3, 1999.

Total length (mm)		Cutthroat trout	Mottled sculpin	Speckled dace
20	Number	15		
	Avg. weight (g)			
30	Number	18		
	Avg. weight (g)			
40	Number		1	
	Avg. weight (g)			
50	Number		16	1
	Avg. weight (g)			
60	Number		14	1
	Avg. weight (g)			
70	Number	3	2	2
	Avg. weight (g)			
80	Number	6	8	
	Avg. weight (g)			
90	Number	9	2	
	Avg. weight (g)			
100	Number	5		
	Avg. weight (g)	12		
110	Number	2		
	Avg. weight (g)	20		
120	Number	2		
	Avg. weight (g)	20		
150	Number	1		
	Avg. weight (g)	36		
170	Number	2		
	Avg. weight (g)	57		
Total sampled:		63	43	4

(Partridge and Corsi 1993). There were two cutthroat trout at least one year of age sampled at that site that year.

Fishery research personnel conducted a habitat survey at all five sites on October 7-8, 1999 (Appendix B).

### Graham Creek

Graham Creek is a tributary to Raft River originating in the Albion Mountains approximately 8 km west of the town of Almo, Idaho. Fishery and habitat surveys were performed on the stream at two locations upstream of Almo. No fish were sampled by electrofishing 111 m at the lower site (UTM Z12, 278,070 m E, 4,665,200 m N) and 80 m at the upper site (UTM Z12, 277,100 m E, 4,665,260 m N). Water temperature was 16°C at 1400 hours at time of electrofishing the lower site and was 13°C at 1230 hours at the upper site. Habitat survey results are given in Tables 18 and 19. Both sites had heavy riparian zone cover consisting of birch, junipers, willows, aspen trees and wild roses. The lower 60 m of the lower site was an artificial stream channel upstream of an old diversion.

Table 18. Habitat survey results for the lower site on Graham Creek, July 28, 1999.

Site:	UTM Z12, 278,070 m E, 4,665,200 m N				
Date:	07/28/99				
Channel type:	Entrenched				
Avg. width (m):	0.9				
Transect interval (m):	20.0				
No. transects:	5.0				
Length surveyed (m):	111.0				
Total surface area (m <sup>2</sup> ):	101.0				
Gradient (clinometer; %):	5.05				
Gradient (map; %):	5.91				
Habitat type	Percent of total		Average depth (m)		
Backwater:	6.7		0.18		
Pocket:	0.0		-		
Pool:	26.7		0.12		
Riffle:	0.0		-		
Run:	66.7		0.07		
Substrate	Percent of total				
Silt/sand:	56.5				
Gravel:	33.5				
Rubble:	10.0				
Boulder:	0.0				
Bedrock:	0.0				
Percent substrate by habitat type:	Backwater	Pocket	Pool	Riffle	Run
% Silt/sand:	80.0	-	92.5	-	40.5
% Gravel:	20.0	-	7.5	-	44.8
% Rubble:	0.0	-	0.0	-	14.8
% Boulder:	0.0	-	0.0	-	0.0
% Bedrock:	0.0	-	0.0	-	0.0

Table 19. Habitat survey results for the upper site on Graham Creek, July 28, 1999.

Site:	UTM Z12, 277,100 m E, 4,665,260 m N				
Date:	07/28/99				
Channel type:	Entrenched				
Avg. width (m):	1.2				
Transect interval (m):	20.0				
No. transects:	4.0				
Length surveyed (m):	80.0				
Total surface area (m <sup>2</sup> ):	96.0				
Gradient (clinometer; %):	8.13				
Gradient (map; %):	6.88				
<b>Habitat type</b>	<b>Percent of total</b>		<b>Average depth (m)</b>		
Backwater:	0.0		-		
Pocket:	8.3		0.02		
Pool:	16.7		0.08		
Riffle:	25.0		0.04		
Run:	50.0		0.06		
<b>Substrate</b>	<b>Percent of total</b>				
Silt/sand:	68.3				
Gravel:	12.1				
Rubble:	19.6				
Boulder:	0.0				
Bedrock:	0.0				
<b>Percent substrate by habitat type:</b>	<b>Backwater</b>	<b>Pocket</b>	<b>Pool</b>	<b>Riffle</b>	<b>Run</b>
% Silt/sand:	-	100.0	87.5	36.7	72.5
% Gravel:	-	0.0	10.0	23.3	9.2
% Rubble:	-	0.0	2.5	40.0	18.3
% Boulder:	-	0.0	0.0	0.0	0.0
% Bedrock:	-	0.0	0.0	0.0	0.0

### Jarbidge River

The Jarbidge River fishery was sampled with downstream migrant traps in the lower reaches of East Fork and West Fork of the mainstem near their confluence downstream of Murphy Hot Springs, Idaho. The project was funded through a challenge cost share grant to study bull trout in the Jarbidge River system. The East Fork Jarbidge River trap was put into operation September 7, 1999 and the West Fork Jarbidge River trap was put into operation September 8, 1999. Both traps were operated until November 29, 1999. This year five bull trout were sampled from both traps, which is a significant increase from the one fish sampled in 1997. A full account of trapping activities is presented in Partridge and Warren (2000).

### Little Cottonwood Creek

Little Cottonwood Creek, a tributary to Goose Creek, originates on the east side of the South Hills. Its confluence with Goose Creek is approximately 8 km downstream of Oakley Reservoir. Most of the stream appears to have a perennial flow, although during the irrigation season the lower 6 or 7 km of Little Cottonwood Creek is diverted for irrigation use and never reaches Goose Creek; the upper 7 to 8 km remains free-flowing. The upper half of Little Cottonwood Creek flows through a canyon with no defined trail, which deters access to the

stream except by foot or horseback. Two sites on Little Cottonwood Creek were investigated on July 23, 1999. No fish were sampled in the lowermost site (UTM Z12, 255,480 m E, 4,677,728 m N) with a single upstream pass of electrofishing for 100 m. The uppermost site (UTM Z11, 743,942 m E, 4,678,257 m N) was sampled with two upstream passes of electrofishing for 86 m with rainbow trout of wild origin being the only species sampled (Table 20). There were 23 rainbow trout at least one year of age sampled in the first pass and four sampled in the second pass for a population estimate of 28 fish  $\pm$  3 fish (95% CI) and a density estimate of 19.3 fish/100 m<sup>2</sup>. No fish sampled appeared to be YOY. Scale samples indicate that fish 150 to 190 mm long were age 2+ and fish 200 to 230 mm were age 3+. Fin tissue samples were taken from several fish for DNA analysis.

Regional personnel performed a habitat survey at both sites when they were electrofished on July 23, 1999 (Tables 21 and 22) and fishery research personnel did a habitat survey at the upper site on October 7, 1999 (Appendix B). Total stream discharge as estimated by a float and timer was approximately 0.04 m<sup>3</sup>/s at the lower site. Flow at the upper site was not measured but appeared to be about the same as the lower site. The lower site riparian zone was sparse with some grasses, willows and wild roses while the upper site was dense and dominated with river birch, willows and herbaceous plants. The upper riparian zone also had several areas of seep water, which enhanced the vegetation density. Water temperature at time of sampling was 15°C at 1100 hours at the lower site and 12°C at 1430 hours at the upper site.

### **Little Wood River**

The Little Wood River between the town of Richfield, Idaho and the Marley Road bridge was stocked on June 18, 1999 with 92 brown trout *Salmo trutta*. This was part of the mitigation plan for the Avonmore cheese factory ammonia spill that killed most of the fish within that reach in 1998. The brown trout were acquired by electrofishing Stalker Creek and Silver Creek on Silver Creek Preserve, owned by The Nature Conservancy. The maximum total length of fish transplanted was 620 mm, the minimum total length was 155 mm and the average was 350 mm.

### **Sixmile Creek**

Sixmile Creek is a perennial tributary to Raft River, flowing off the west flank of the Black Pine Mountains. There is approximately 1.5 km of free-flowing stream from its source at Sixmile Spring to a small irrigation impoundment at the base of Sixmile Canyon. Much of the watershed is utilized for livestock grazing except for the enclosure surrounding the spring. Riparian vegetation is sparse consisting mostly of grasses and sagebrush. The stream was investigated on September 15, 1999 as part of the Yellowstone cutthroat trout survey, since it falls within the historic range of the species and presence of cutthroat trout has been documented there in the past (Grunder et al. 1987 and Warren and Partridge In Press). The upper boundary of the reach surveyed was the downstream fence of the livestock enclosure at the spring located at UTM Z12, 321,647 m E, 4,665,731 m N. The reach sampled with two upstream passes of electrofishing was 92 m long and averaged 1.6 m wide. There were 61 fish sampled in the first pass and 16 in the second pass, which included fish that were YOY. All of the fish sampled were measured and appeared to be cutthroat trout x rainbow trout hybrids (Table 23). The population estimate of fish at least one year of age was 64 fish  $\pm$  3 fish (95% CI) and the density estimate was 43.5 fish/100 m<sup>2</sup>. The population estimate of fish of all age classes

Table 20. Total length frequencies and average weights of fish sampled by electrofishing the upper site on Little Cottonwood Creek, July 23, 1999.

Total length (mm)		Rainbow trout
150	Number	3
	Avg. weight (g)	39
160	Number	3
	Avg. weight (g)	49
170	Number	2
	Avg. weight (g)	50
180	Number	3
	Avg. weight (g)	60
190	Number	8
	Avg. weight (g)	76
200	Number	5
	Avg. weight (g)	90
210	Number	2
	Avg. weight (g)	95
230	Number	1
	Avg. weight (g)	162
Total sampled:		27

Table 21. Habitat survey results for the lower site on Little Cottonwood Creek, July 23, 1999.

Site:	UTM Z12; 255,480 m E, 4,677,728 m N				
Date:	07/23/99				
Channel type:	Entrenched, Rosgen type G4				
Avg. width (m):	1.6				
Transect interval (m):	10.0				
No. transects:	10.0				
Length surveyed (m):	100.0				
Total surface area (m <sup>2</sup> ):	162.0				
Gradient (clinometer; %):	2.69				
Gradient (map; %):	2.81				
<b>Habitat type</b>	<b>Percent of total</b>		<b>Average depth (m)</b>		
Backwater:	0.0		-		
Pocket:	13.3		0.11		
Pool:	10.0		0.17		
Riffle:	33.3		0.09		
Run:	43.3		0.14		
<b>Substrate</b>	<b>Percent of total</b>				
Silt/sand:	50.3				
Gravel:	29.3				
Rubble:	20.3				
Boulder:	0.0				
Bedrock:	0.0				
<b>Percent substrate by habitat type:</b>	<b>Backwater</b>	<b>Pocket</b>	<b>Pool</b>	<b>Riffle</b>	<b>Run</b>
% Silt/sand:	-	55.0	100.0	31.0	52.3
% Gravel:	-	10.0	0.0	32.0	40.0
% Rubble:	-	35.0	0.0	37.0	7.7
% Boulder:	-	0.0	0.0	0.0	0.0
% Bedrock:	-	0.0	0.0	0.0	0.0

Table 22. Habitat survey results for the upper site on Little Cottonwood Creek, July 23, 1999.

Site:	UTM Z11; 743,942 m E, 4,678,257 m N				
Date:	07/23/99				
Channel type:	Entrenched, vertically stable, Rosgen type G4				
Avg. width (m):	1.7				
Transect interval (m):	10.0				
No. transects:	7.0				
Length surveyed (m):	86.0				
Total surface area (m <sup>2</sup> ):	145.0				
Gradient (clinometer; %):	5.28				
Gradient (map; %):	2.81				
Habitat type	Percent of total		Average depth (m)		
Backwater:	0.0		-		
Pocket:	4.8		0.15		
Pool:	14.3		0.09		
Riffle:	38.1		0.11		
Run:	42.9		0.08		
Substrate	Percent of total				
Silt/sand:	21.7				
Gravel:	9.3				
Rubble:	48.1				
Boulder:	21.0				
Bedrock:	0.0				
Percent substrate by habitat type:	Backwater	Pocket	Pool	Riffle	Run
% Silt/sand:	-	0.0	80.0	5.0	19.4
% Gravel:	-	0.0	3.3	6.3	15.0
% Rubble:	-	100.0	16.7	33.8	65.6
% Boulder:	-	0.0	0.0	55.0	0.0
% Bedrock:	-	0.0	0.0	0.0	0.0

Table 23. Total length frequencies and average weights of fish sampled by electrofishing Sixmile Creek, September 15, 1999.

Total length (mm)		Rainbow trout x cutthroat trout hybrids
40	Number	6
	Avg. weight (g)	
50	Number	7
	Avg. weight (g)	
80	Number	1
	Avg. weight (g)	
100	Number	4
	Avg. weight (g)	14
110	Number	8
	Avg. weight (g)	12
120	Number	9
	Avg. weight (g)	21
130	Number	8
	Avg. weight (g)	23
140	Number	4
	Avg. weight (g)	38
150	Number	8
	Avg. weight (g)	41
160	Number	5
	Avg. weight (g)	47
170	Number	9
	Avg. weight (g)	63
180	Number	3
	Avg. weight (g)	91
190	Number	2
	Avg. weight (g)	96
200	Number	2
	Avg. weight (g)	105
230	Number	1
	Avg. weight (g)	155
Total sampled:		77

combined was 83 fish +/- 8 fish (95% CI) and the density estimate was 56.4 fish/100 m<sup>2</sup>. Estimated total length at age 1 from back calculations of annuli on scales was 93 mm, and estimated total length at age 2 was 139 mm. The population density estimate of cutthroat trout x rainbow trout hybrids from the June 26, 1986 sample (the only species identified from that sample) was 27.7 fish/100 m<sup>2</sup>. Total length of fish sampled ranged from 77 mm to 185 mm (Grunder et al. 1987). The 1986 sample was approximately 1.8 km downstream of the 1999 sample. The identical reach surveyed in 1999 had also been surveyed on June 9, 1996. The cutthroat trout population estimate from that sample was 7.7 fish/100 m<sup>2</sup>. The smallest fish from that sample was 145 mm long. Fin tissue samples were taken from several of the fish for DNA analysis.

### **Smoky Dome Creek**

Smoky Dome Creek is a tributary to Boardman Creek, which is a tributary to the South Fork Boise River, flowing off the north side of Smoky Dome Peak. Smoky Dome Creek was surveyed for fish and habitat August 19, 1999 approximately 1.5 km upstream from its confluence with Boardman Creek. Two upstream passes were made with the backpack shocker on 68 m of stream on a reach immediately upstream of the U.S. Forest Service road bridge at UTM Z11, 665,600 m E and 4,822,100 m N. Fish species sampled included bull trout and rainbow trout (Table 24). There were 22 bull trout sampled in the first pass of electrofishing and 10 in the second pass for a population estimate of 40 fish  $\pm$  17 fish (95% CI) and a density estimate of 13.7 fish/100 m<sup>2</sup>, which includes YOY fish. Due to the size of bull trout sampled, it could not be determined if they were resident or migratory. There were five rainbow trout sampled in the first pass of electrofishing and one in the second pass for a population estimate of six fish  $\pm$  2 fish (95% CI) and a density estimate of 2.1 fish/100 m<sup>2</sup>, which does not include YOY fish since none were sampled. There were also three tailed frog *Ascaphus truei* tadpoles and one adult sampled. Habitat survey results are given in Table 25.

### **Snake River**

The IDFG has an agreement with the College of Southern Idaho to assist with acquiring wild white sturgeon broodstock from the Snake River for artificial propagation. In 1999 we spent four days with two or more anglers fishing for white sturgeon for a total of 61 hours. A total of seven white sturgeon were landed (Table 26), none of which was large enough to be checked or appeared to have sufficient gonadal development suitable for broodstock and were released back into the river.

### **Thoroughbred Creek**

Thoroughbred Creek is a small tributary to Goose Creek with its confluence approximately 350 m upstream of where Goose Creek enters Utah. Fish were sampled on August 5, 1999 with a single upstream pass of electrofishing with a backpack shocker at UTM Zone 11, 727,980 m E, 4,652,826 m N, which is approximately 50 m upstream of its confluence. Total length of stream sampled was 55 m and average stream width was 1.9 m. Water temperature at time of electrofishing was 19°C at 1300 hours. Fish species sampled include cutthroat trout, speckled dace and mottled sculpin (Table 27). Fin tissue samples were taken from several fish for DNA analysis. Fishery research personnel did a habitat survey at this site on October 7, 1999 (Appendix B).

### **Trout Creek**

Trout Creek is a perennial stream flowing south from the east side of the South Hills for approximately 13 km before reaching the Nevada state line where it continues flowing southward before reaching Goose Creek. A survey was previously done on Trout Creek on June 23, 1987, which included stream and riparian habitat measurements, some water quality

Table 24. Total length frequencies and average weights of fish sampled by electrofishing Smoky Dome Creek, August 19, 1999.

Total length (mm)		Bull trout	Rainbow trout
40	Number	7	
	Avg. weight (g)		
90	Number	1	
	Avg. weight (g)		
100	Number	1	3
	Avg. weight (g)		10
110	Number		1
	Avg. weight (g)		12
120	Number	3	
	Avg. weight (g)	16	
130	Number	4	
	Avg. weight (g)	21	
140	Number	3	
	Avg. weight (g)	25	
150	Number	6	
	Avg. weight (g)	31	
160	Number	3	1
	Avg. weight (g)	34	42
170	Number	3	
	Avg. weight (g)	43	
180	Number	1	1
	Avg. weight (g)	48	70
Total sampled:		32	6

Table 25. Habitat survey results for Smoky Dome Creek on August 19, 1999.

Site:	UTM Z11, 665,600 m E, 4,822,100 m N				
Date:	08/19/99				
Channel type:	Confined, outwash				
Avg. width (m):	4.3				
Transect interval (m):	15.0				
No. transects:	4.0				
Length surveyed (m):	66.0				
Total surface area (m <sup>2</sup> ):	292.4				
Gradient (clinometer; %):	7.21				
Gradient (map; %):	6.10				
Habitat type	Percent of total		Average depth (m)		
Backwater:	0.0		-		
Pocket:	16.7		0.18		
Pool:	8.3		0.60		
Riffle:	50.0		0.09		
Run:	25.0		0.18		
Substrate	Percent of total				
Silt/sand:	5.4				
Gravel:	38.3				
Rubble:	22.9				
Boulder:	33.3				
Bedrock:	0.0				
Percent substrate by habitat type:	Backwater	Pocket	Pool	Riffle	Run
% Silt/sand:	-	2.5	0.0	10.0	0.0
% Gravel:	-	42.5	0.0	30.8	63.3
% Rubble:	-	30.0	0.0	17.5	36.7
% Boulder:	-	25.0	100.0	41.7	0.0
% Bedrock:	-	0.0	0.0	0.0	0.0

Table 26. Summary of white sturgeon fishing activity by Magic Valley personnel in 1999 between C.J. Strike Reservoir and Bliss Dam. Angler hours are the sum of the total number of hours fished for each fishing rod fished.

Date	Angler hours	White sturgeon caught
April 15, 1999	12	118 cm fork length, 129 cm total length, sex not determined, no tags detected. 172 cm fork length, 191 cm total length, sex not determined, no tags detected. 172 cm fork length, 191 cm total length, a recapture from April 15, 1999.
April 21, 1999	21	184 cm fork length, 211 cm total length, immature female, detected PIT #7F7B0A041F. 197 cm fork length, 217 cm total length, immature male, detected PIT #7F7D1B6256.
May 12, 1999	16	172 cm fork length, 198 cm total length, 74 cm girth behind pectorals, sex not determined, implanted with PIT #7F7B0E7969.
May 28, 1999	12	159 cm fork length, 164 cm total length, sex not determined, no tags detected, none implanted.

Table 27. Total length frequencies and average weights of fish sampled by electrofishing Thoroughbred Creek, August 5, 1999.

Total length (mm)		Cutthroat trout	Mottled sculpin	Speckled dace
10	Number		1	
	Avg. weight (g)			
50	Number		4	
	Avg. weight (g)			
60	Number		7	1
	Avg. weight (g)			
70	Number		3	5
	Avg. weight (g)			
80	Number	1		1
	Avg. weight (g)			
90	Number	1		
	Avg. weight (g)	12		
110	Number	1		
	Avg. weight (g)	17		
120	Number	1		
	Avg. weight (g)	20		
130	Number	1		
	Avg. weight (g)	30		
Total sampled:		5	15	7

measurements and a fishery survey (Grunder et al. 1989). On August 5, 1999 a fishery survey was done near the same reach of stream as the 1987 survey at UTM Z11, 734,000 m E, 4,658,510 m N. The reach surveyed in both years was within a livestock enclosure that has dense stands of willows and an active beaver population with several dams. The area outside the enclosure shows extensive evidence of livestock use with very little riparian vegetation and sloughing stream banks. This year's survey included three upstream passes of electrofishing with the backpack shocker on 80 m of stream within the lower reaches of a livestock enclosure. Average stream width at this site was 3.7 m, which does not include a beaver pond within the sample reach that could not be effectively electrofished. Fish sampled include cutthroat trout, rainbow trout, cutthroat trout x rainbow trout hybrids, and speckled dace (Table 28). All trout species sampled appeared to be at least one year of age and were numerically combined within each electrofishing pass for a depletion population estimate using the computer program by Van Deventer and Platts (1989). Eight trout were sampled in the first pass of electrofishing, six in the second pass and five in the third pass for a total population estimate of 28 fish +/-26 fish (95% CI) and a density estimate 9.46 fish/100 m<sup>2</sup>. The density estimate of trout from the 1987 sample, which was within the same livestock enclosure, was 33.3 fish/100 m<sup>2</sup>. Fin tissue samples were taken from several of the fish for DNA analysis. Fishery research personnel completed a detailed habitat survey at this site on October 8, 1999 (Appendix B).

Table 28. Total length frequencies and average weights of fish sampled by electrofishing in the livestock enclosure on Trout Creek, August 5, 1999.

Total length (mm)		Cutthroat trout	Rainbow trout	Cutthroat x rainbow trout hybrids	Speckled dace
10	Number				2
	Avg. weight (g)				
30	Number				2
	Avg. weight (g)				
40	Number				8
	Avg. weight (g)				
50	Number				19
	Avg. weight (g)				
60	Number				4
	Avg. weight (g)				
70	Number				1
	Avg. weight (g)				
80	Number				3
	Avg. weight (g)				
100	Number			2	
	Avg. weight (g)			12	
110	Number		1	1	
	Avg. weight (g)		20	15	
120	Number			2	
	Avg. weight (g)			20	
160	Number			1	
	Avg. weight (g)			54	
170	Number			1	
	Avg. weight (g)			55	
190	Number	2	1	1	
	Avg. weight (g)	76	78	76	
200	Number			2	
	Avg. weight (g)			88	
220	Number	1		1	
	Avg. weight (g)	138		125	
230	Number	1			
	Avg. weight (g)	140			
260	Number		1		
	Avg. weight (g)		178		
280	Number			1	
	Avg. weight (g)			170	
Number measured:		4	3	12	39
Number not measured:		0	0	0	121
Total sampled:		4	3	12	161

## **ACKNOWLEDGEMENTS**

We would like to thank fishery technician Karen Frank and fishery aide Mike Hillesland for their assistance in collecting and analyzing data for this report. Thanks also go to Keven Meyer and the fishery research crew for use of their habitat data.

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## APPENDICES

Appendix A. Description of the physical characteristics measured at each site sampled in the upper Snake River basin during 1999 (K. Meyer, Idaho Department of Fish and Game, personal communication).

Variable	Description
Rosgen stream type	Based on Rosgen's (1994) stream classification system of A through G.
Stream order	First-order streams are defined as the first solid blue line on USGS 1:24,000 USGS maps, second order streams form below the junction of two first-order streams, etc.
Water temperature	Instantaneous measurement (°C) at the time of sampling.
Gradient	Expressed as the percent of drop in water surface elevation per unit of channel length. Measured with hand-level at survey site or with a map wheel on a 1:24,000 USGS map.
Dominant riparian vegetation	Recorded separately for both sides of the stream as the type of vegetation making up the majority (>50%) of the stream margin riparian community. Options are: 1) non-vegetated, 2) grasses or forbs, 3) shrubs, 4) trees (including any woody material such as willows or alders).
Conductivity	Instantaneous measurement ( $\mu$ Siemen/cm at 25°C) at the time of sampling.
Land use activity	One of twelve classifications to characterize the dominant land use practice in the reach. Options include: 1) agriculture, 2) forest fire, 3) young trees, 4) second-growth trees, 5) old-growth trees, 6) partial cut timber, 7) active timber harvest, 8) light grazing, 9) heavy grazing, 10) mining, 11) no use, 12) undetermined.
Streamflow conditions	One of six categories to characterize what type of streamflow is occurring during sampling. Options include: 1) dry, 2) puddled, 3) low, 4) moderate, 5) high, 6) bankful.
Valley bottom type	One of five categories to indicate the shape of the valley bottom. Options include: 1) flat bottom, 2) v-shaped, 3) trough-like, 4) box canyon, 5) u-shaped.
Sinuosity	One of four categories to characterize the amount of curvature in the stream meanders. Options include: 1) low, 2) moderate, 3) high, 4) braided.
Angling pressure	One of three categories that indicate the level of anticipated angling pressure, ranging from low to medium to high. Observations are based on road accessibility and a visual assessment of angling.

Appendix B. Detailed habitat analysis on Yellowstone cutthroat trout streams in the Magic Valley Region, performed by Department fishery research personnel during 1999 (K. Meyer, Idaho Department of Fish and Game, personal communication). See Appendix A for definitions.

Stream	Reach elevation (ft)	Sub basin	UTM Coordinate		Survey date	Stream order	Rosgen type	Reach gradient (%)		Water temp (°C)	Conductivity (µSiemen/cm)	Land use activity
			Northing	Easting				Map	Level			
Almo Creek	6,400	Raft	4669900	279500	10/7/99	2	B	7.8		5	41	LG
Big Cottonwood Creek (upper)	7,270	Raft	4671819	732613	10/7/99	1	B	2.9		8	24	CT
Birch Creek	5,600	Raft	4653100	259300	10/7/99	3	C	4.1		9	9	HG
Dry Creek	4,600	Raft	4692974	730644	10/8/99	3	B	1.9	2.1	12		CT
Goose Creek @ Thoroughbred	5,700	Raft	4653008	727825	10/8/99	3	C	0.8		7	85	HG
Goose Creek @ Rattlesnake	5,795	Raft	4656600	726600	10/8/99	3	C	0.6		9	60	HG
Goose Creek @ Winecup	6,100	Raft	4662200	726300	10/8/99	3	C	0.7	0.4	3.5	48	LG
Goose Creek @ Jones	6,470	Raft	4667239	726739	10/8/99	2	B	0.7		9	36	CT
Goose Creek upper end	6,700	Raft	4670404	725839	10/7/99	2	C	2.1		12	31	CT
Little Cottonwood Creek	6,280	Raft	4678467	744208	10/7/99	1	B	7.1		8	149	HG
Thoroughbred Creek	5,700	Raft	4653060	727882	10/8/99	2	B	2.4		10	165	HG
Trout Creek	5,950	Raft	4658990	733900	10/8/99	1	C	1.8		11	200	HG

Appendix B. Continued.

Stream	Dominant riparian		Flow condition	Angling pressure	Sinuosity	Valley bottom type	Habitat survey reach geometries			
	Left bank	Right bank					Turb fast	Nonturb fast	Scour pool	Dammed pool
Almo Creek	4	4	L	L	L	T	72.4	0.0	27.6	0.0
Big Cottonwood Creek (upper)	4	4	L	H	H	F	12.9	71.7	15.4	0.0
Birch Creek	2	2	M	H	M	T	97.9	0.0	2.1	0.0
Dry Creek	4	4	L	L	L	V	75.5	7.6	16.9	0.0
Goose Creek @ Thoroughbred	4	4	L	L	M	F	27.5	21.0	51.5	0.0
Goose Creek @ Rattlesnake	4	4	L	L		V	26.2	0.0	73.8	0.0
Goose Creek @ Winecup	4	4	M	M	L	V	35.6	0.0	34.9	29.5
Goose Creek @ Jones	4	4	L	L	L	V	47.2	30.7	22.2	0.0
Goose Creek upper end Little	4	4	L	L	L	F	27.7	12.6	59.7	0.0
Cottonwood Creek	4	4	L	L	M	B	57.4	26.8	14.0	1.9
Thoroughbred Creek	4	4	L	L	L	F	95.0	0.0	5.0	0.0
Trout Creek	2	2	L	L	M	T	27.4	0.0	0.0	72.6

Appendix B. Continued.

Stream	Length (m)	Average width (m)	Avg. max. depth (mm)	Avg. max. pool depth (mm)	Average depth (cm)	Width to depth ratio	Area (m <sup>2</sup> )	Volume (m <sup>3</sup> )
Almo Creek	80.0	1.90	0.38	0.48	0.13	14.9	152.0	19.3
Big Cottonwood Creek (upper)	70.6	1.13	0.25	0.18	0.06	18.1	79.7	5.0
Birch Creek	80.0	1.70	0.27	0.27	0.08	22.5	136.0	10.3
Dry Creek	103.0	3.40	0.35	0.64	0.10	34.8	350.2	34.2
Goose Creek @ Thoroughbred	120.0	5.30	0.82	1.23	0.26	20.8	636.0	162.2
Goose Creek @ Rattlesnake	109.0	4.50	0.64	0.78	0.28	16.2	490.5	136.5
Goose Creek @ Winecup	103.0	3.60	0.32	0.35	0.13	28.7	370.8	46.5
Goose Creek @ Jones	88.0	1.60	0.23	0.37	0.10	16.6	140.8	13.6
Goose Creek (upper)	108.0	2.60	0.36	0.42	0.14	18.0	280.8	18.5
Little Cottonwood Creek	86.0	1.70	0.20	0.31	0.07	25.0	146.2	4.2
Thoroughbred Creek	55.0	1.90	0.21	0.31	0.06	29.2	104.5	10.5
Trout Creek	80.0	4.30	0.97	1.12	0.46	9.4	344.0	229.5

Appendix B. Continued.

Stream	Large woody debris		# Pockets	Reach substrate average rating							Overhead cover		
	Pieces	# Jams		Fines	Sand	Gravel	Cobble	Boulder	Bedrock	LWD	Boulder	Bank	Veg
Almo Creek	0.00	2.00	8.00	1.0	1.0	2.0	3.5	2.8	1.0	1.00	1.30	1.00	1.17
Big Cottonwood Creek (upper)	3.00	6.00	0.00	1.7	1.0	4.8	1.0	1.0	1.0	1.16	1.00	1.00	1.12
Birch Creek	0.00	0.00	10.00	2.8	1.3	2.0	3.0	1.0	1.0	1.00	1.00	1.00	1.00
Dry Creek	2.00	0.00	11.00	1.7	1.0	3.2	3.5	1.0	1.4	1.00	1.00	1.00	1.00
Goose Creek @ Thoroughbred	0.00	1.00	0.00	3.3	1.0	3.1	2.4	1.0	1.0	1.00	1.00	1.00	1.00
Goose Creek @ Rattlesnake	0.00	2.00	0.00	2.5	1.2	2.7	2.8	1.0	1.0	1.18	1.00	1.00	2.38
Goose Creek @ Winecup	0.00	0.00	0.00	1.8	1.0	2.8	3.4	1.4	1.0	1.00	1.00	1.00	1.29
Goose Creek @ Jones	0.00	0.00	0.00	2.7	1.0	3.0	1.9	1.1	1.0	1.00	1.00	1.39	1.27
Goose Creek (upper)	0.00	0.00	0.00	3.5	1.1	2.5	1.6	1.0	1.0	1.00	1.00	2.02	1.00
Little Cottonwood Creek	0.00	2.00	2.00	1.1	1.6	3.6	2.4	1.3	1.0	1.00	1.05	1.13	1.68
Thoroughbred Creek	0.00	0.00	0.00	1.0	1.0	4.0	2.9	1.0	1.0	1.00	1.00	1.42	1.05
Trout Creek	0.00	2.00	0.00	3.9	1.0	2.1	1.0	1.0	1.0	1.23	1.00	1.96	1.00

Appendix B. Continued.

Stream	Shading rating	Unstable bank rating	Fish density (#/m <sup>2</sup> )		Biomass	
			<100 mm	>100 mm	g/m <sup>2</sup>	kg/ha
Almo Creek	3.76	1.00	0.118	0.145	3.029	0.303
Big Cottonwood Creek (upper)	2.55	1.00	0.389	0.050	1.111	0.111
Birch Creek	1.79	4.02	0.000	0.169	12.718	1.272
Dry Creek	3.19	1.14	0.046	0.091	15.205	1.521
Goose Creek @ Thoroughbred	1.21	1.44	0.000	0.008	1.574	0.157
Goose Creek @ Rattlesnake	2.12	1.22	0.018	0.031	1.054	0.105
Goose Creek @ Winecup	3.28	1.00	0.022	0.030	0.620	0.062
Goose Creek @ Jones	3.27	1.00	0.284	0.064	2.067	0.207
Goose Creek upper end	1.79	1.17	0.107	0.046	1.348	0.135
Little Cottonwood Creek	2.86	1.45	0.000	0.185	13.371	1.337
Thoroughbred Creek	2.95	1.21	0.029	0.048	1.958	0.196
Trout Creek	1.00	1.00	0.000	0.081	6.165	0.617

Appendix B. Continued.

Stream	Salmonid relative abundance by weight					Salmonid relative abundance by number						
	RBT	BKT	BUT	BNT	CUT	MWF	RBT	BKT	BUT	BNT	CUT	MWF
Almo Creek	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Big Cottonwood Creek (upper)	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Birch Creek	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Dry Creek	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Goose Creek @ Thoroughbred	0.0	34.3	0.0	0.0	65.7	0.0	0.0	25.0	0.0	0.0	75.0	0.0
Goose Creek @ Rattlesnake	0.0	65.2	0.0	0.0	34.8	0.0	0.0	29.2	0.0	0.0	70.8	0.0
Goose Creek @ Winecup	0.0	4.3	0.0	0.0	95.7	0.0	0.0	12.5	0.0	0.0	87.5	0.0
Goose Creek @ Jones	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Goose Creek upper end	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Little Cottonwood Creek	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
Thoroughbred Creek	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Trout Creek	19.2	0.0	0.0	0.0	80.8	0.0	15.8	0.0	0.0	0.0	84.2	0.0

Appendix B. Continued.

Stream	Salmonid population size-structure				Species sampled	Species list
	0-100 mm	101-150 mm	151-200 mm	>200 mm		
Almo Creek	52.6	47.4	0.0	0.0	1	Cut
Big Cottonwood Creek (upper)	79.2	8.3	8.3	4.2	2	Cut, Scu
Birch Creek	0.0	8.7	34.8	56.5	1	Bkt
Dry Creek	34.0	8.5	12.8	44.7	2	Cut, Scu
Goose Creek @ Thoroughbred	0.0	50.0	0.0	50.0	5	Lnd, Rss, Scu, Bkt, Cut
Goose Creek @ Rattlesnake	37.5	50.0	4.2	8.3	5	Skd, Rss, Scu, Bkt, Cut
Goose Creek @ Winecup	31.3	62.5	6.3	0.0	3	Scu, Bkt, Cut
Goose Creek @ Jones	76.3	21.1	2.6	0.0	5	Msc, Bkt, Cut, Rss, Skd
Goose Creek upper end	69.2	23.1	7.7	0.0	3	Cut, Scu, Skd
Little Cottonwood Creek	0.0	0.0	70.4	29.6	1	Rbt
Thoroughbred Creek	33.3	50.0	16.7	0.0	3	Cut, Skd, Scu
Trout Creek	0.0	31.6	31.6	36.8	3	Cut, Rbt, Skd

## 1999 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-24

Project II: Technical Guidance

Subproject II-E: Magic Valley Region

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

Magic Valley Region fishery management personnel furnished verbal and written technical guidance to other agencies, consultants, and private individuals and organizations. Fishing information was provided to anglers in the forms of brochures, angler guides, public meetings, news releases, telephone, email, and personal communication.

Personnel commented on, participated in, and otherwise addressed many miscellaneous activities, and attended numerous fisheries meetings.

Author:

Fred E. Partridge  
Regional Fishery Manager

## OBJECTIVES

To communicate current fisheries and habitat information, concerns, and recommendations as needed to Department habitat specialists or directly to state, federal, and private parties contemplating projects with the potential to affect fish.

To provide technical fish and habitat management advice to public and private landowners and other agencies in order to sustain or enhance fish resources.

## METHODS

Reviews, field inspections, comments, expertise, and recommendations were furnished to all governmental agencies, private organizations, consultants and individuals upon request. Personnel participated in meetings, tours, and gave presentations where requested or necessary. Expertise on regional fisheries was provided to the regional environmental coordinator to assist in commenting on the numerous habitat-related projects.

## RESULTS AND DISCUSSION

Magic Valley regional fishery management personnel collected data, inspected, commented on and/or provided advice on the following major projects in 1999:

Public information - Prepared and provided input on regional fishing, recreation and access to the public in various forms including 1-800ASKFISH service and as requested by public, students, media and organized fishing clubs. Provided information to local fishing clubs and elementary school classes on regional fisheries and basic regional fish habitat needs.

Threatened and species of concern – Collected data, summarized collecting permit reports and provided information to: US Forest Service, Bureau of Land Management, Bureau of Reclamation, US Fish and Wildlife Service, Idaho Division of Environmental Quality, and Nevada Department of Wildlife on bull trout *Salvelinus confluentus* in the South Fork Boise and Jarbidge river drainages. Also provided information on native rainbow (redband) trout *Oncorhynchus mykiss*, Yellowstone cutthroat trout *O. clarki* and Wood River sculpin *Cottus leiopomus* as requested.

Agency assistance - Regional fishery personnel provided equipment and assistance to: US Geological Service, Idaho Division of Environmental Quality, US Forest Service and Bureau of Land Management in collecting fish to monitor long term water quality conditions in rivers and streams and to document the presence or absence of fish species. We also provided input on potential improvement projects at Blue Ribbon Mine and White Arrow Ponds.

Hazardous material spills – Regional fishery and environmental personnel investigated potential damaging impacts from two truck accidents that resulted in minor diesel spills into the Milner-Gooding Canal and Anderson Pond #3. No significant impacts to fishery resources were observed. Regional personnel continued to work on recovering the Little Wood River from the fish kill below Richfield by transplanting brown trout *Salmo trutta* from Silver Creek to the affected area.

## 1999 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-24

Project III: Habitat Management

Subproject III-E: Magic Valley Region

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

Magic Valley Region and Engineering Bureau personnel installed rock drop structures downstream of a culvert barrier on the Feather River to improve migration access for bull trout *Salvelinus confluentus*. Improvements at this site have the potential of opening up more than 32 km of stream above 1,500 m elevation. Additionally they performed bull trout and Yellowstone cutthroat trout *Oncorhynchus clarki* habitat surveys on ten stream sites.

Author:

Fred E. Partridge  
Regional Fishery Manager

## OBJECTIVES

Construct riparian or improved pasture fencing on degraded streams on private property with good potential to enhance wild trout recruitment.

Provide upstream and downstream fish passage in key wild trout spawning and recruitment streams.

Create improved and additional small pond fishing opportunities in areas of easy access.

## METHODS

Work with federal, state, and private land management groups to select sites and acquire funds to improve fish habitat and provide additional fishing opportunity.

## RESULTS AND DISCUSSION

### Feather River

The Feather River is a perennial stream flowing southward towards its confluence with South Fork Boise River at Featherville, Idaho. It is within the range of bull trout *Salvelinus confluentus*, which migrate throughout the South Fork Boise River basin from Anderson Ranch Reservoir to upstream tributaries where they are known to spawn. The main South Fork Boise River road crosses the Feather River 0.5 km upstream of its confluence with the South Fork Boise River. The road crossing has been considered a potential barrier to the upstream migration of bull trout and other species because of the drop of water from the culvert unto a concrete apron and due to the velocity of water flowing through the three culverts under the road. This barrier reduces access to more than 32 km of streams above 1,500 m elevation.

In November regional and Engineering Bureau personnel constructed three rock drop structures downstream of the culverts to raise the water level and flood the culvert apron during high springtime flows. Flows were also modified in one of the three culverts with the addition of a detachable fishway (Clancy and Reichmuth 1990). The US Fish & Wildlife Service Section 6 program provided funding for project construction. The Mountain Home and Glenns Ferry highway districts supplied rocks.

### Stream Surveys

Habitat type and substrate measurements, part of standard stream surveys, were made on ten stream sections in the Magic Valley Region. Eight of the sites were in Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri* waters and the other two were in bull trout waters. Additionally, fishery research personnel made detailed habitat surveys on 12 stream sites in Yellowstone cutthroat trout waters. Results are reported in Project 1, Job c of this report.

### **Miscellaneous Habitat Projects**

We assisted the regional environmental and staff biologists with habitat measurements on Trail Creek to provide information for a minimum stream flow. We worked with local scout troops in a clean-up effort of the Snake River downstream of Shoshone Falls. We provided information to public and private land management groups on effects of stream projects on instream and riparian habitat.

## LITERATURE CITED

Clancy, C.G., and D.R. Reichmuth. 1990. A detachable fishway for steep culverts. *North American Journal of Fisheries Management* 10:244-246.

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