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

PROJECT I.	SURVEYS AND INVENTORIES
Job a.	Magic Valley Region Mountain Lakes Investigations
Job b.	Magic Valley Region Lowland Lakes and Reservoirs Investigations
Job c.	Magic Valley Region Rivers and Streams Investigations
PROJECT II.	TECHNICAL GUIDANCE
PROJECT IV.	POPULATION MANAGEMENT

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1994 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-19

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job: a

Title: High Mountain Lakes Investigations

Contract Period: July 1, 1994 to June 30, 1995

ABSTRACT

A total of 43 high mountain lakes were stocked with rainbow trout *Oncorhynchus mykiss* and cutthroat trout *O. clarki* fry (see Subproject IV-E, this report). No surveys and inventories were done on high mountain lakes within this region for this contract period.

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1994 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-19

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job: b

Title: Lowland Lakes Investigations

Contract Period: July 1, 1994 to June 30, 1995

ABSTRACT

Standardized lowland lakes sampling protocols were followed on the Bruneau Sand Dunes ponds, Lower Salmon Falls Reservoir, Little Camas Reservoir, and several of the Hagerman Wildlife Management Area warmwater fish ponds. Results from the Bruneau Sand Dunes ponds indicate that the 20 inch (505 mm) minimum length limit for largemouth bass *Micropterus salmoides* has created a good population of fish in the 200 to 450 mm length range, with a fair number of bluegill *Lepomis macrochirus* and pumpkinseed *L. gibbosus* also present. The presence of numerous carp *Cyprinus carpio* in the upper pond has caused the water to become turbid, thus possibly decreasing pond productivity. The Lower Salmon Falls Reservoir survey sampled several species of nongame fish, hatchery rainbow trout *Oncorhynchus mykiss*, brown trout *Salmo trutta*, largemouth bass, smallmouth bass *M. dolomieu*, and bluegill. The Hagerman Wildlife Management Area pond surveys sampled largemouth bass, bluegill, brown bullhead *Ameiurus nebulosus*, and yellow perch *Perca flavescens*. One carp was also sampled from the West Highway pond. Little Camas Reservoir survey results indicated a high density of small black crappie *Pomoxis nigromaculatus* present with some hatchery rainbow trout and smallmouth bass.

Electrofishing on Salmon Falls Creek Reservoir sampled smallmouth bass, walleye *Stizostedion vitreum*, yellow perch, rainbow trout and kokanee *O. nerka kennerlyi*. Nighttime midwater trawling sampled 95 kokanee from age 0+ through age 2+, and bottom trawling sampled 13 walleye ranging in total length from 150 to 190 mm. Beach seining on Salmon Falls Creek Reservoir indicated good numbers of young-of-the-year (YOY) yellow perch and spottail shiners *Notropis hudsonius* as forage. Oakley Reservoir beach seining results indicated spottail shiners still present.

Nighttime midwater trawling on Anderson Ranch Reservoir sampled 287 kokanee ranging from age 0+ through age 2+. Kokanee of hatchery and wild origin were both identified to be present in the age 0+ sample. Kokanee spawner trend surveys on the upper South Fork Boise River counted a total of 1,362 adult kokanee in 1994, the second highest number observed since counts began in 1989. These fish were smaller than the previous year's mature kokanee with mean size in 1994 being 248 mm compared to 380-400 mm average length in 1993 and 1992.

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OBJECTIVES

To maintain information for fishery management activities and decisions for lowland lakes and reservoirs.

METHODS

Kokanee *Oncorhynchus nerka kennerlyi* abundance and age structure were estimated in Anderson Ranch and Salmon Falls Creek Reservoir using a nighttime midwater trawl. Methodology for the trawling and data analysis followed those described by Rieman (1992).

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 and/or a drift boat equipped with a Coffelt VVP-15 electrofisher powered by a Honda 5000 generator, variable (19 to 64 mm) square mesh 38 x 1.8 m gill nets, 20 mm square mesh size trap (frame) nets with a 1.8 x 0.9 m box and five 0.76 m diameter hoops, and a 15.2 m long, 6.2 mm square mesh beach seine. Bottom trawling was done utilizing a 4.3 m wide bottom trawl which was pulled with a Boston Whaler boat powered with a 90 horsepower Evinrude engine at approximately 1,700 rpms. Data analysis included population estimates using an adjusted (Chapman) Peterson mark-recapture estimate (Ricker 1975), total length frequencies, estimated length-at-annulus back-calculated from scale measurements, and trend data used to compare with similarly acquired data from previous years.

Creel surveys were nonstructured types which were nonrandom and included primarily fisherman catch rates for all species at a given water. Fisherman interviews were structured to obtain information on whether or not the fisherman was a resident of Idaho, hours fished on that water that day, terminal tackle type (bait, lure, or fly), method of fishing (still boat, trolling boat, shoreline, wading, or float tube), and number of fish caught.

Limnological samples were taken by sampling surface waters for specific conductance, 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 specific conductance and an Oakton PhTestr2 was used for measuring pH. Temperature and dissolved oxygen profiles were measured in-situ using a Y.S.I. model 57 temperature/dissolved oxygen meter from a boat.

RESULTS AND DISCUSSION

Anderson Ranch Reservoir

Daytime temperature and dissolved oxygen profiles were measured at four sites on July 7, 1994, prior to sampling kokanee with a midwater trawl (Figures 1 and 2). Water levels permitted partitioning the reservoir into two strata for kokanee sampling on the nights of July 16 and 17, 1994. A total of 10 transects were trawled within the two strata. Depths trawled ranged from 7.5 to 28.0 m (stepped) in both strata. Age 0+ kokanee sampled were classified as wild origin if less than 90 mm and as hatchery origin if greater than 90 mm and less than 140 mm. Kokanee between 150 and 220 mm were classified as age 1 + fish and kokanee between 230 and 260 mm were classified as age 2+ fish. Estimated densities were 191 fish/ha for age 0+ kokanee of wild origin, 106 fish/ha for age 0+ kokanee of hatchery origin, 368 fish/ha for age 1 + kokanee, and 28 fish/ha for age 2+ kokanee (Table 1). Total length frequencies for each age class with weights of fish sampled are given in Table 2.

Kokanee spawning was monitored with counts of adult fish observed at 13 sites on the South Fork Boise River and Trinity Creek between August 22 and September 27, 1994. These are the same sites that counts have been made since 1989 for spawner trend information except for the trap site which was added to the survey in 1990 (Partridge and Corsi 1993). A total of 1,362 spawners were observed, which indicates a good escapement for the year (Table 3, Figure 3). The average total length of these kokanee from a sample of 30 spawned-out fish was 248 mm. Prespawning adult kokanee sampled by gillnetting in August of 1992 was 390 mm for females and 400 mm for males (Warren and Partridge 1994). Spawning adult kokanee observed in 1993 escapement surveys appeared to be approximately the same size as those sampled in 1992 (Warren and Partridge 1995). The decrease in spawner size in 1994 may be a result of earlier maturation or that the population is now experiencing a stunted growth rate due to decreased reservoir size associated with a low water year thus increasing kokanee densities.

Bruneau Sand Dunes State Park Ponds

The Bruneau Sand Dunes State Park ponds are located at the base of the large sand dune within the park, which is approximately 25 km south of Mountain Home, Idaho. Several ponds developed in the early 1950s after ground water levels were raised by row and flood irrigation of nearby agricultural lands (Horton 1990). A change to sprinkler irrigation on essentially all of the nearby farms to conserve water had lowered the ground water level enough to drop the pond water levels by an average of 1.3 m, thus creating only two adjacent ponds. A pump was installed and put into operation to bring Snake River water into pond #1 (northeast pond) beginning in the Spring of 1987. This pumping system included a 300 m long filter pond adjacent to pond #1. The upper (northeast) pond is estimated to be 12 ha in surface area, and

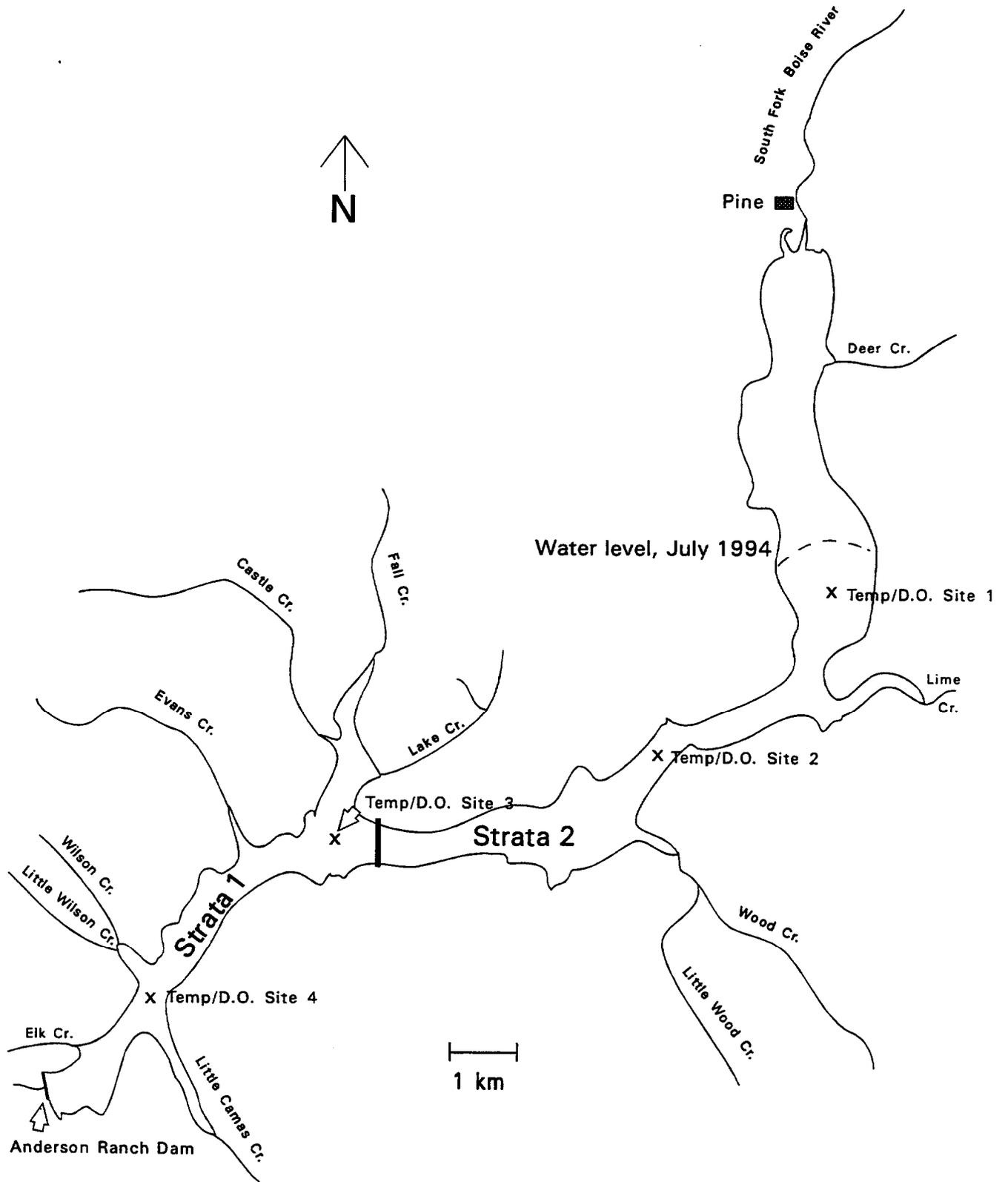


Figure 1. Map of Anderson Ranch Reservoir with boundaries for each strata trawled and limnological sampling sites.

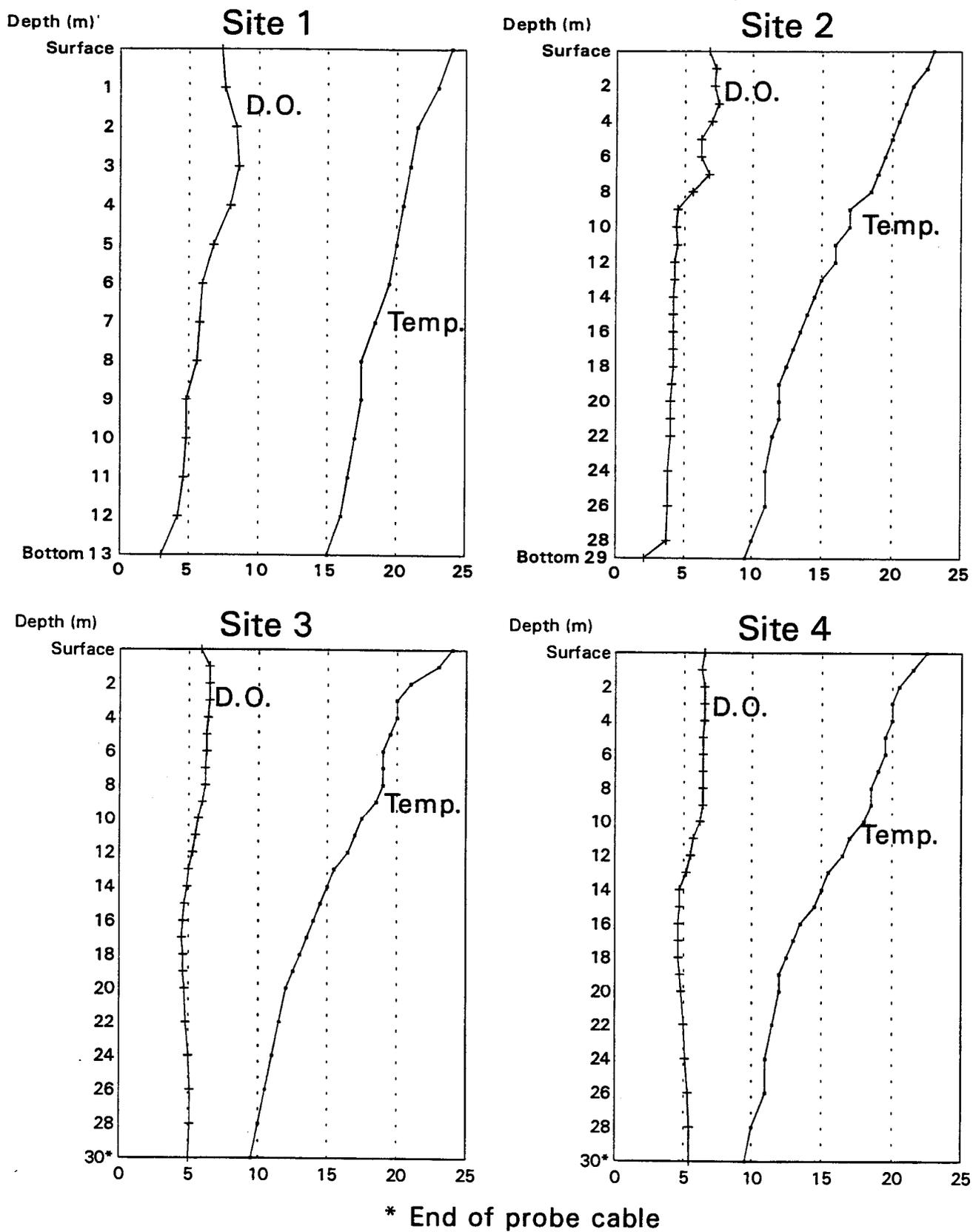


Figure 2. Daytime temperature (celcius) and dissolved oxygen (mg/l) profiles for four sites at Anderson Ranch Reservoir, July 7, 1994.

Table 1. Anderson Ranch Reservoir kokanee population and density estimates based on nighttime midwater trawling results, July 1994.

	Age 0 (Wild)	Age 0 (Hatchery)	Age 1	Age 2	Age 3
Population estimate					
Strata 1	42,471	9,384	83,230	3,597	0
Strata 2	<u>187,940</u>	<u>117,532</u>	<u>361,562</u>	<u>30,109</u>	<u>0</u>
Total	230,411	126,916	444,791	33,706	0
Pop. Variance	2.0×10^{10}	6.0×10^8	1.0×10^{11}	5.0×10^8	-
Density (fish/ha)					
Strata 1	83	18	163	7	0
Strata 2	263	164	505	42	0
Average ^a	191	106	368	28	0
Avg. total length (mm)	64	123	198	244	-

^a Weighted average based on number of transects in strata.

Table 2. Total length frequency (mm) and mean weight (g) of kokanee sampled by midwater trawling in Anderson Ranch Reservoir, July 1994.

Length Range (mm)	Kokanee							
	a Age 0+		b Age 0+		Age 1+		Age 2+	
	no.	avg. wt.	no.	avg. wt.	no.	avg. wt.	no.	avg. wt.
0-9								
10-19								
20-29								
30-39								
40-49	2	<1.0						
50-59	17	1.3						
60-69	39	2.1						
70-79	17	3.0						
80-89	6	4.0						
90-99			2	6.0				
100-109			8	8.0				
110-119			8	12.0				
120-129			25	14.0				
130-139			22	12.3				
140-149			5	26.0				
150-159								
160-169					2	36.0		
170-179								
180-189					10	58.6		
190-199					47	65.4		
200-209					46	72.2		
210-219					14	80.6		
220-229					6	88.5		
230-239							3	100.0
240-249							3	120.0
250-259							4	130.0
260-269							1	159.0
270-279								
280-289								
290-299								
Number:	81		70		125		11	
Avg. lgth.:	64		123		198		244	
Total								
Sampled:	81		70		125		11	

a Kokanee of wild origin.

b Kokanee stocked as 76 mm long fingerlings on May 2, 1994.

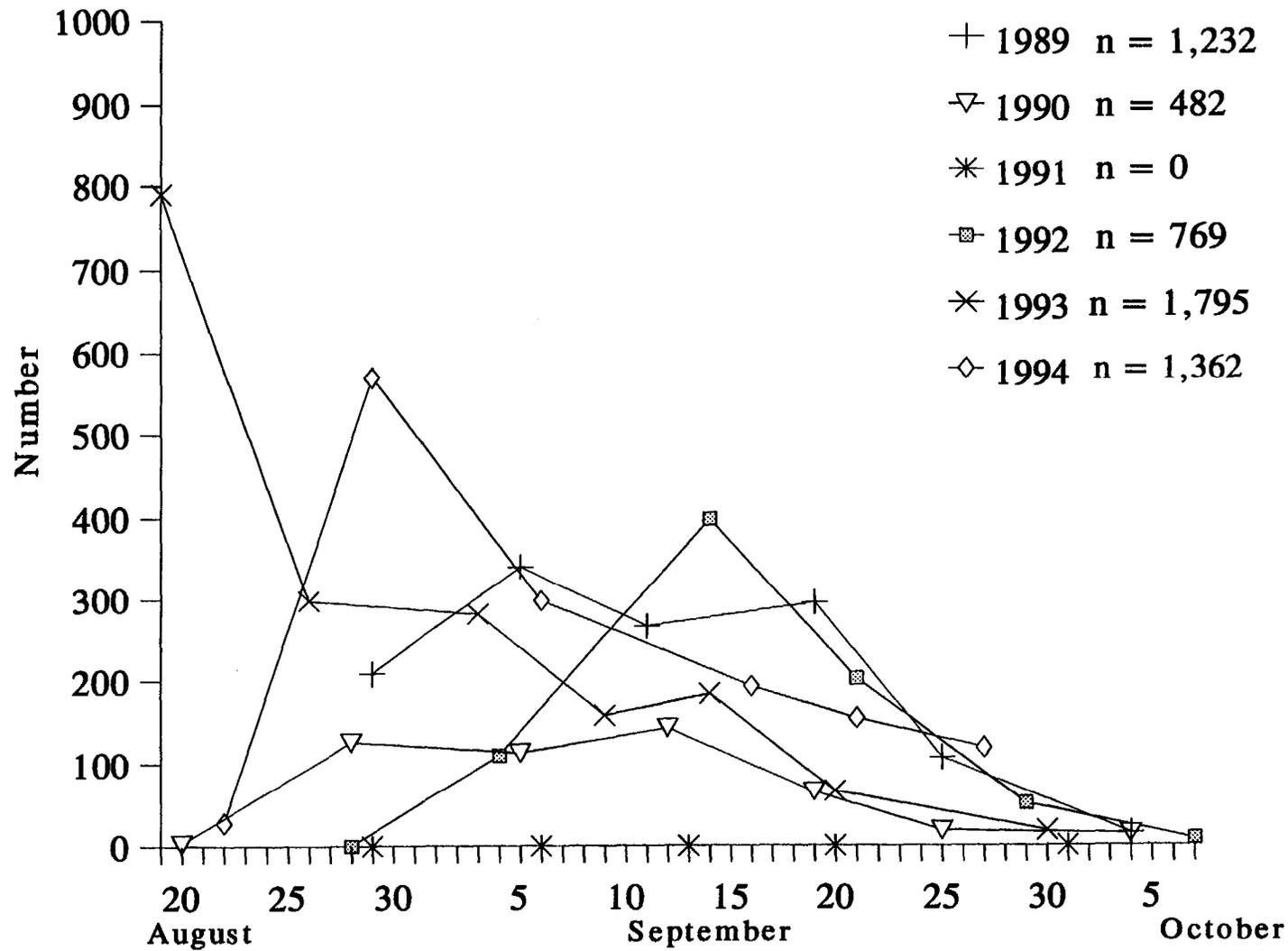


Figure 3. Total number of spawning kokanee observed at 13 trend monitoring sites on the South Fork Boise River, 1989-1994.

Table 3. Number of kokanee observed at selected sites on the South Fork Boise River, 1994, during spawning ground surveys.

Location ^a	Aug 22	Aug 29	Sep 6	Sep 16	Sep 21	Sep 27
1	25	500	150	60	35	5
2	2	40	1	9	1	1
3	0	6	31	6	0	3
4	1	5	24	54	43	57
5	0	0	0	0	0	0
6	0	19	19	20	54	37
7	0	0	9	3	2	0
8	0	0	51	24	2	0
9	0	0	2	12	12	5
10	0	0	10	0	0	3
11	0	0	1	5	5	8
12	0	0	0	0	0	0
13	0	0	0	0	0	0
Total:	28	570	298	193	154	119

^aSite 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 - Chaparrel hole: 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 hole: SE1/4, SE1/4, Sec 7, T3N, R12E
- 11 - Deadwood hole: NE1/4, NE1/4, Sec 22, T3N, R12E
- 12 - Big hole: SE1/4, SW1/4, Sec 18, T3N, R13E
- 13 - Smokey Creek hole: SE1/4, SW1/4, Sec 9, T3N, R13E

the lower pond is estimated to be 32 ha in surface area at current water management levels (Partridge and Warren 1994). Over the last few years the filter pond became filled with algae, thus preventing water from trickling through the sand into pond #1. Water has thus flowed directly from the filter pond through a gate into pond #1. Pond #2 receives water directly from pond #1 through a metal culvert.

The fishery in both ponds is managed for largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, and pumpkinseed *Lepomis gibbosus*. There is currently a two fish, 20-inch (508 mm) minimum length limit for largemouth bass on both ponds. Standardized lowland lakes sampling protocols were followed for assessing the fishery at the two ponds on July 24 and 25, 1994. One unit of sampling effort, which includes one frame net, one sinking and one floating gill net and 60 minutes of electrofishing effort, was expended on each of the ponds. The drift boat was used on pond #1 and the Smith-Root electrofishing boat was used on pond #2. Numbers and species of fish sampled in pond #1 included 29 largemouth bass, 31 bluegill, and 54 common carp *Cyprinus carpio*. Numbers and species of fish sampled in pond #2 included 233 largemouth bass, 5 bluegill, 14 pumpkinseed, and 11 common carp. Fish sampling results are summarized in Table 4 and length frequencies of fish sampled by gear types are given in Tables 5 and 6. Large adult common carp were present in pond #1 in 1991 (Partridge and Warren 1994), and were probably in the system prior to pumping from the river. The oldest largemouth bass in pond #1 from which scale samples were taken was 5 + years of age which back calculated to 420 mm at time of fifth annulus formation (Table 7). The oldest largemouth bass in pond #2 from which scale samples were taken was 4+ years of age, which back-calculated to 371 mm at time of fourth annulus formation (Table 7). Proportional stock densities (PSDs) of largemouth bass based on the electrofishing samples was 19% for pond #1 and 24% for pond #2. Bluegill PSDs were 8% for pond #1 and not calculated for pond #2, with only four fish in the electrofishing sample.

Specific conductance, total alkalinity, total hardness, secchi visibility depth, and pH were measured from surface samples from each pond. Results of those tests are given in Table 8. The high specific conductance, total alkalinity, and total hardness in pond #2 is most likely a result of pond evaporation concentrating dissolved minerals within the closed system. Temperature and dissolved oxygen profiles were measured at 0345 on pond #2 and at 0440 on pond #1 on July 25 for a nighttime profile. At pond #1, temperatures ranged from 22°C at the bottom to 24°C at the surface, and dissolved oxygen ranged from 2 mg/l at the bottom to 9 mg/l at the surface (Figure 4). Pond #2 temperatures ranged from 23°C at the bottom to 27°C at the surface and dissolved oxygen ranged from 1 mg/l at the bottom to 9 mg/l at the surface (Figure 4).

Dog Creek Reservoir

A total of 28,000 R1 rainbow trout *Oncorhynchus mykiss* weighing 20.8 fish/lb, averaging 76 mm in total length were stocked into Dog Creek Reservoir on December 13, 1993. A total of 3,120 (11%) of these fish were marked with an adipose fm clip for later identification to

Table 4. Summary of fish sampled at the Bruneau Dunes State Park ponds utilizing one unit of standardized sampling protocols, July 24-25, 1994.

Pond # 1

Species	Total Length Range (mm)	Percent of Sample (n = 114)	No. per unit of sampling effort
Largemouth bass	40-475	25	29
Bluegill	40-165	27	31
Common carp	330-415	48	54

Pond #2

Species	Total Length Range (mm)	Percent of Sample (n = 263)	No. per unit of sampling effort
Largemouth bass	120-425	89	233
Bluegill	80-215	2	5
Pumpkinseed	160-195	5	14
Common carp	470-575	4	11

Table 5 . Fish sampled at Bruneau Sand Dunes pond #1 (small) utilizing one unit of standardized lowland lakes sampling protocols, July 24-25, 1994.

Length Range (mm)	Largemouth bass										
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length		Average Weight		Relative Weight
	no.	%	no.	%	no.	%	no.	%	no.	avg.	
0-9											
10-19											
20-29											
30-39											
40-49							1	4.5			
50-59											
60-69											
70-79											
80-89											
90-99											
100-109											
110-119											
120-129											
130-139											
140-149	1	25.0							1	34	89
150-159							1	4.5	1	35	74
160-169							1	4.5			
170-179											
180-189							1	4.5			
190-199							2	9.1	1	78	80
200-209			1	33.3					1	100	87
210-219							1	4.5	1	118	88
220-229							1	4.5	1	145	94
230-239							1	4.5			
240-249											
250-259			1	33.3			3	13.6	4	198	86
260-269							5	22.7	2	223	85
270-279	1	25.0							1	255	87
280-289	1	25.0					1	4.5	1	312	95
290-299							1	4.5	1	265	72
300-309							1	4.5	1	340	83
310-319											
320-329							2	9.1	2	428	85
330-339											
340-349											
350-359											
360-369											
370-379											
380-389											
390-399											
400-409											
410-419											
420-429											
430-439			1	33.3					1	1100	87
440-449											
450-459											
460-469											
470-479	1	25.0							1	1700	101
480-489											
490-499											
Number:	4		3		0		22				
Avg length:	232		228				235				
Total sampled:	4		3		0		22				

Table 5. Continued.

Length Range (mm)	Common carp							
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length	
	no.	%	no.	%	no.	%	no.	%
0-9								
300-309								
310-319								
320-329								
330-339	6	28.6					4	19.0
340-349	4	19.0	1	8.3			1	4.8
350-359	7	33.3	4	33.3			3	14.3
360-369	1	4.8	2	16.7			4	19.0
370-379			2	16.7			4	19.0
380-389			1	8.3			2	9.5
390-399	2	9.5					2	9.5
400-409	1	4.8	2	16.7				
410-419							1	4.8
420-429								
430-439								
440-449								
Number:	21		12		0		21	
Avg length:	351		368				363	
Total								
sampled:	21		12		0		21	

Length Range (mm)	Bluegill							
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length	
	no.	%	no.	%	no.	%	no.	%
0-9								
10-19								
20-29								
30-39								
40-49							2	6.7
50-59								
60-69								
70-79							3	10.0
80-89							10	33.3
90-99							9	30.0
100-109							3	10.0
110-119							1	3.3
120-129								
130-139								
140-149								
150-159								
160-169	1	100.0					2	6.7
170-179								
180-189								
190-199								
200-209								
210-219								
220-229								
230-239								
240-249								
Number:	1		0		0		30	
Avg length:	160						90	
Total								
sampled:	1		0		0		30	

Table 6 . Fish sampled at Bruneau Sand Dunes pond #2 (large) utilizing one unit of standardized lowland lakes sampling protocols, July 24-25, 1994.

Length Range (mm)	Largemouth bass										Relative Weight		
	Sinking g.n.		Floating g.n.		Frame net		Electrofishing		Average				
	Length no.	%	Length no.	%	Length no.	%	Length no.	%	Weight no.	avg.			
0-9													
10-19													
20-29													
30-39													
40-49													
50-59													
60-69													
70-79													
80-89													
90-99													
100-109													
110-119													
120-129								1	0.7				
130-139						1	8.3	2	1.4				
140-149	1	2.3	2	5.4	3	25.0	11	7.9	5	37		98	
150-159	2	4.5	4	10.8	6	50.0	11	7.9	4	49		103	
160-169			1	2.7	1	8.3	24	17.1	4	59		103	
170-179			1	2.7	1	8.3	25	17.9	7	65		93	
180-189	3	6.8	3	8.1			14	10.0	3	84		101	
190-199	3	6.8	2	5.4			19	13.6	6	109		111	
200-209	3	6.8	3	8.1			5	3.6	6	112		97	
210-219			1	2.7			2	1.4					
220-229	1	2.3					2	1.4	1	144		93	
230-239			1	2.7			3	2.1	2	160		90	
240-249	1	2.3	1	2.7									
250-259	5	11.4	2	5.4			4	2.9	2	243		105	
260-269	6	13.6	3	8.1			3	2.1	5	246		94	
270-279	6	13.6	7	18.9			2	1.4	5	273		93	
280-289	7	15.9	1	2.7			4	2.9	3	310		94	
290-299	4	9.1	5	13.5					3	343		93	
300-309								1	0.7				
310-319													
320-329													
330-339													
340-349													
350-359								1	0.7	1	820		124
360-369	1	2.3											
370-379													
380-389													
390-399	1	2.3						4	2.9	3	853		91
400-409													
410-419								1	0.7	1	920		84
420-429								1	0.7				
430-439													
440-449													
450-459													
460-469													
470-479													
480-489													
490-499													
Number:	44		37		12		140						
Avg length:	250		227		151		193						
Total sampled:	44		37		12		140						

Table 6. Continued

Length Range (mm)	Sinking g.n. Length		Floating g.n. Length		Bluegill Frame Length		Electrofishing Length	
	no.	%	no.	%	no.	%	no.	%
0-9								
10-19								
20-29								
30-39								
40-49								
50-59								
60-69								
70-79								
80-89					1	100.0		
90-99							1	25.0
100-109								
110-119								
120-129								
130-139								
140-149							1	25.0
150-159								
160-169								
170-179								
180-189							1	25.0
190-199								
200-209								
210-219							1	25.0
220-229								
230-239								
240-249								
Number:	0		0		1		4	
Avg length:					85		158	
Total								
sampled:	0		0		1		4	

Table 6. Continued.

Length Range (mm)	Pumpkinseed								
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length		
	no.	%	no.	%	no.	%	no.	%	
0-9									
150-159									
160-169							1	20.0	
170-179	1	33.3	3	60.0			1	20.0	
180-189	2	66.7	2	40.0	1	100.0			
190-199							3	60.0	
200-209									
210-219									
220-229									
230-239									
240-249									
Number:	3		5		1		5		
Avg length:	182		175		180		181		
Total sampled:	3		5		1		5		

Length Range (mm)	Common carp								
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length		
	no.	%	no.	%	no.	%	no.	%	
0-9									
350-359									
360-369									
370-379	1	33.3							
380-389									
390-399			1	33.3					
400-409							1	20.0	
410-419							2	40.0	
420-429							2	40.0	
430-439	1	33.3	1	33.3					
440-449									
450-459									
460-469									
470-479	1	33.3	1	33.3					
480-489									
490-499									
Number:	3		3		0		5		
Avg length:	525		530				511		
Total sampled:	3		3		0		5		

Table 7. Back-calculated length-at-annulus (mm) for largemouth bass sampled at the Bruneau Sand Dunes State Park ponds in July 1994. Standard deviation is in parentheses.

Year class	Number of fish	Pond #1				
		1	Mean length at annulus			5
			2	3	4	
1992	7	73 (23.8)	144 (37.0)			
1991	8	90 (28.0)	149 (23.2)	224 (16.8)		
1990	2	84 (18.1)	140 (24.4)	214 (50.5)	265 (25.7)	
1989	2	97 (43.3)	246 (37.9)	326 (35.4)	373 (46.5)	420 (36.0)
Weighted avg. length		84	156	259	319	420

Year class	Number of fish	Pond #2			
		1	Mean length at annulus		4
			2	3	
1993	35	111 (19.9)			
1992	19	92 (9.4)	228 (21.8)		
1991	1	80 (-)	259 (-)	328 (-)	
1990	4	104 (13.4)	265 (19.3)	333 (14.6)	371 (11.8)
Weighted avg. length		104	235	332	371

Table 8. Water quality test results from surface samples and secchi visibility depth for the two Bruneau Dunes State Park ponds on July 25, 1994.

Water Quality Variable	Pond #1 (upper)	Pond #2 (lower)
Specific conductance	450 μ /cm	1,150 p/cm
Total alkalinity as CaCO_3	165 mg/l	282 mg/l
Total hardness	167 mg/l	268 mg/l
Secchi disc visibility depth	23 cm	> 350 cm (bottom)
pH	8.4	9.7

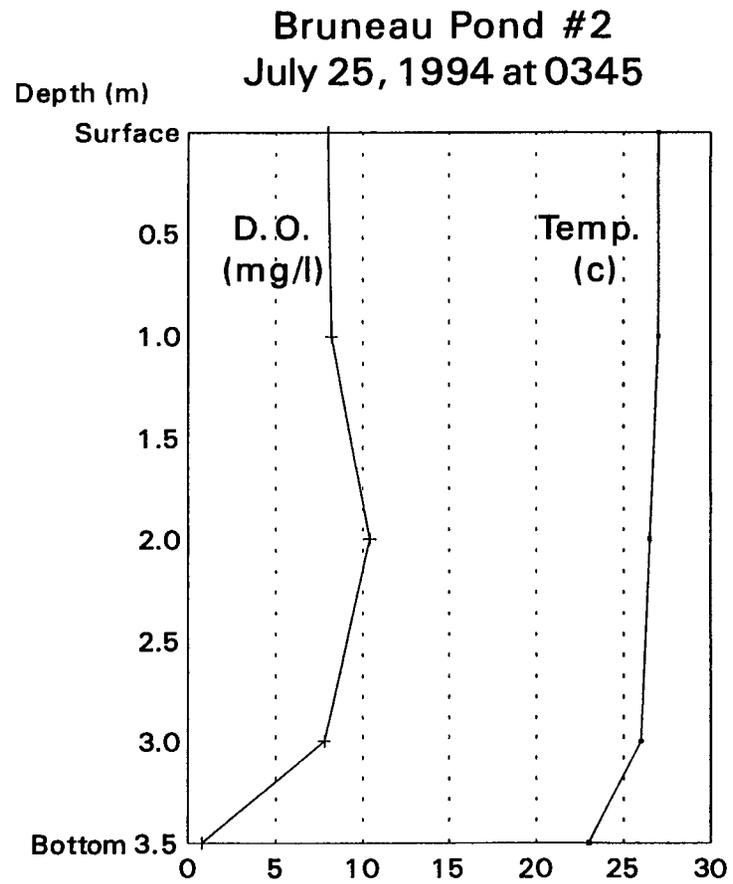
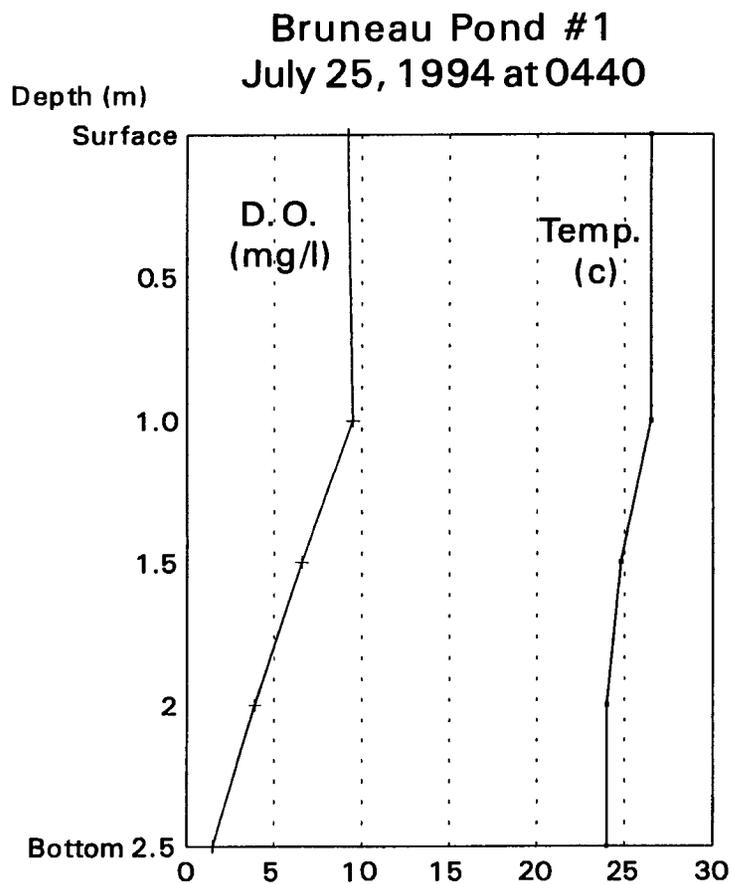


Figure 4. Night time temperature and dissolved oxygen profiles taken at Bruneau State Park ponds on July 25, 1994.

determine if fish stocked in the reservoir at that size would survive and grow. Standardized lowland lakes fish sampling protocols were later followed in May and June utilizing one floating and one sinking gill net, one frame net, and 36.7 minutes of electrofishing with power on. Of the 84 hatchery rainbow trout sampled, two had adipose fm clips (140 and 240 mm long). Some of the larger fish in the sample were probably from the stock of 2,500 fish which were planted on March 21, 1994 as 245 mm long catchables. A total of 441 fish, which included 84 hatchery rainbow trout, 8 largemouth bass, 181 yellow perch *Perca flavescens*, 80 bluegill, 10 channel catfish *Ictalurus punctatus*, 9 brown bullhead *Ameiurus nebulosus*, 14 common carp, 54 largescale sucker *Catostomus macrocheilus*, and 1 Utah chub *Gila atraria*, were sampled with all gear types used (Tables 9 and 10).

Length-at-annulus and population analyses were performed on largemouth bass in Dog Creek Reservoir in previous studies in 1989 (Dillon 1990) and 1992 (Warren and Partridge 1994). Scales were therefore not taken on largemouth bass at Dog Creek Reservoir this year.

Hagerman Wildlife Management Area

Hagerman Wildlife Management Area (WMA) has a series of ponds which are fed primarily by Riley Creek and Tucker Springs (Figure 5). Most of the ponds to the north of the state fish hatchery are managed primarily for warmwater fish, while the ponds to the south are managed as put-and-take trout fisheries. The Riley Creek Impoundment is the only pond north of the hatchery that is regularly stocked with trout. Because of the WMA's importance as a waterfowl resting area during the winter and nesting area during the spring, the fishing season on the Anderson Ponds, Goose Pond, and West Pond is open from July 1 to October 31. All other waters on the WMA are open from March 1 to October 31, except Riley Creek upstream of the state fish hatchery diversion is open to fishing year-round.

Between February and July 1994, several of the warmwater ponds were sampled by electrofishing, gillnetting, and with a frame net. Total length frequency results of fish sampled by gear type is given in Tables 11-14 along with relative weights of largemouth bass sampled. A population estimate on largemouth bass equal to or greater than 100 mm in total length was made at the West Pond by using the Peterson Mark-Recapture (Ricker 1975) method. Only fish sampled with the Smith-Root electrofishing boat was used for the estimate. A total of 92 fish were marked on June 1 with 15 recaptured out of a catch of 98 on June 14. The estimated population was 575 fish plus or minus 250 and an estimated density of 192 fish per ha. Based on recommendations by Anderson and Gutreuter (1983), only West Pond had a sample size large enough for estimating a PSD, which was 16% for largemouth bass and 51% for bluegill. The RSD-380 for the same sample of largemouth bass was 4%. PSD's for largemouth bass and bluegill in 1987 were 34% and 92%, respectively (Grunder et al. 1989). The length frequency histogram in Figure 6 graphically depicts the sharp decline in the percentage of harvestable sized largemouth bass in the sample.

Table 9. Summary of fish sampled at Dog Creek Reservoir utilizing one sinking and one floating gill net, one trap net, and 36.7 minutes of electrofishing, May and June, 1994.

Species	Total Length Range (mm)	Percent of Sample (n = 441)
Hatchery rainbow trout	100-315	19.1
Largemouth bass	180-545	1.8
Bluegill	100-155	18.1
Yellow perch	70-185	41.0
Channel catfish	190-515	2.3
Brown bullhead	170-195	2.0
Common carp	310-505	3.2
Largescale sucker	80-525	12.2
Utah chub	270	< 0.1

Table 10. Total length frequencies (mm) of fish sampled with one sinking gill net, one floating gill net, one trap net and 36.7 minutes of electrofishing at Dog Creek (Irving) Reservoir, 1994. Numbers of fish with relative abundances within each length group are given for each gear type used. Average weight (g) of fish is given for some length groups of channel catfish and largemouth bass.

Length Range (mm)	Hatchery rainbow trout								Largemouth bass				Average Weight (g)				
	Sinking a.n. Length		Floating a.n. Length		Frame net Length		Electrofishing Length		Sinking a.n. Length		Floating a.n. Length			Frame net Length		Electrofishing Length	
	no	%	no	%	no	%	no	%	no	%	no	%		no	%	no	%
0-9																	
10-19																	
20-29																	
30-39																	
40-49																	
50-59																	
60-69																	
70-79																	
80-89																	
90-99																	
100-109								1	1.4								
110-119								1	1.4								
120-129								4	5.4								
130-139								3	4.1								
140-149								2	2.7								
150-159								1	1.4								
160-169								3	4.1								
170-179						1	100.0	1	1.4								
180-189								4	5.4				1	12.5	1		78
190-199								7	9.5								
200-209								1	1.4								
210-219			1	33.3													
220-229	1	16.7	2	66.7									1	12.5	1		152
230-239								3	4.1				1	12.5			
240-249								4	5.4								
250-259	2	33.3						7	9.5								
260-269	1	16.7						15	20.3								
270-279	1	16.7						9	12.2								
280-289	1	16.7						2	2.7								
290-299								4	5.4								
300-309								1	1.4								
310-319								1	1.4								
320-329																	
330-339																	
340-349																	
350-359																	
360-369																	
370-379													1	12.5	1		700
380-389																	
390-399																	
400-409																	
410-419													2	25.0	2		1225
420-429																	
430-439													1	12.5	1		1650
440-449																	
450-459																	
460-469																	
470-479																	
480-489																	
490-499																	
500-509																	
510-519																	
520-529																	
530-539													1	12.5	1		3400
540-549																	
Number:	6		3		1		74	0	0	0	0	8					
Avg length:	257		220		175		225					352					
Total sampled:	6		3		1		74	0	0	0	8						

Table 10Continued

Length Range (mm)	Yellow perch								Bluegill								
	Sinking Length		Floating a.n. Length		Frame net Length		Electrofishing Length		Sinking a.n. Length		Floating a.n. Length		Frame net Length		Electrofishing Length		
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	
0-9																	
10-19																	
20-29																	
30-39																	
40-49																	
50-59																	
60-69																	
70-79							3	8.8									
80-89																	
90-99																	
100-109							3	8.8							1	5.0	
110-119							11	32.4							2	10.0	
120-129							6	17.6			1	25.0			6	30.0	
130-139							5	14.7	1	33.3	2	50.0			4	20.0	
140-149					1	50.0	1	2.9	1	33.3	1	25.0			4	20.0	
150-159	1	100.0	1	100.0			2	5.9	1	33.3					3	15.0	
160-169							3	8.8									
170-179																	
180-189					1	50.0											
190-199																	
Number:	1		1		2		34		3		4		0		20		
Avg length:	150		150		163		121		143		131				131		
Total																	
sampled:	1		1		2		177		3		4		0		73		

Table 10. Continued.

Length Range (mm)	Channel catfish								Brown bullhead										
	Sinking a.n. Length		Floating a.n. Length		Frame net Length		Electrofishing Length		Average Weight		Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length		
	no.	%	no.	%	no.	%	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%	
0-9																			
10-19																			
20-29																			
30-39																			
40-49																			
50-59																			
60-69																			
70-79																			
80-89																			
90-99																			
100-109																			
110-119																			
120-129																			
130-139																			
140-149																			
150-159																			
160-169																			
170-179																		2	25.0
180-189																		3	38.0
190-199									1	56.0								3	38.0
200-209																			
210-219						1	50.0												
220-229																			
230-239																			
240-249																			
250-259																			
260-269																			
270-279																			
280-289	1	50.0																	
290-299																			
300-309	1	50.0																	
310-319																			
320-329																			
330-339																			
340-349																			
350-359																			
360-369																			
370-379																			
380-389						1	50.0												
390-399																			
400-409																			
410-419			4																
420-429																			
430-439																			
440-449																			
450-459																			
460-469																			
470-479																			
480-489																			
490-499																			
500-509																			
510-519			1	100.0						1	1500.0								
520-529																			
530-539																			
540-549																			
Number:	2		1		2		5			1		0		0				8	
Avg length: 290			510		288		223			180								183	
Total																			
sampled:	2		1		2		5			1		0		0				8	

Table 10. Continued.

Length Range (mm)	Common carp				Largescale sucker										
	Sinkinn n n Length		Floatinn n n Length		Frame net Length		Electrofishing Length								
	no.	%	no.	%	no.	%	no.	%							
0-9															
10-19															
20-29															
30-39															
40-49															
50-59															
60-69															
70-79															
80-89								1 6.3							
90-99								3 18.8							
100-109															
110-119															
120-129															
130-139															
140-149															
150-159															
160-169															
170-179															
180-189															
190-199															
200-209															
210-219															
220-229															
230-239															
240-249															
250-259															
260-269						1	7.7								
270-279						2	15.4								
280-289															
290-299						2	15.4								
300-309						1	7.7								
310-319					2	28.6									
320-329															
330-339			1	50.0		1	14.3								
340-349						1	14.3								
350-359			1	50.0		2	28.6								
360-369							2	15.4							
370-379						1	7.7	2 12.5							
380-389															
390-399															
400-409							1	7.7							
410-419							2	15.4							
420-429								1 6.3							
430-439							1	7.7							
440-449															
450-459															
460-469								1 6.3							
470-479								3 18.8							
480-489															
490-499								2 12.5							
500-509					1	14.3									
510-519								1 6.3							
520-529								2 12.5							
530-539															
540-549															
Number:	0		2		0		13		0		16				
Avg length:			340				357				370				
Total sampled:	4		2		1		7		18		20		0		16

Table 10. Continued.

Length Range (mm)	Utah chub							
	Sinking g n Length		Floating g n Length		Frame net Length		Electrofishing Length	
	no.	%	no.	% no.		%	no.	%
0-9								
10-19								
20-29								
30-39								
40-49								
50-59								
60-69								
70-79								
80-89								
90-99								
100-109								
110-119								
120-129								
130-139								
140-149								
150-159								
160-169								
170-179								
180-189								
190-199								
200-209								
210-219								
220-229								
230-239								
240-249								
250-259								
260-269								
270-279			1	100.0				
280-289								
290-299								
Number:	0		1		0		0	
Avg length:			270					
Total sampled:	0		1		0		0	

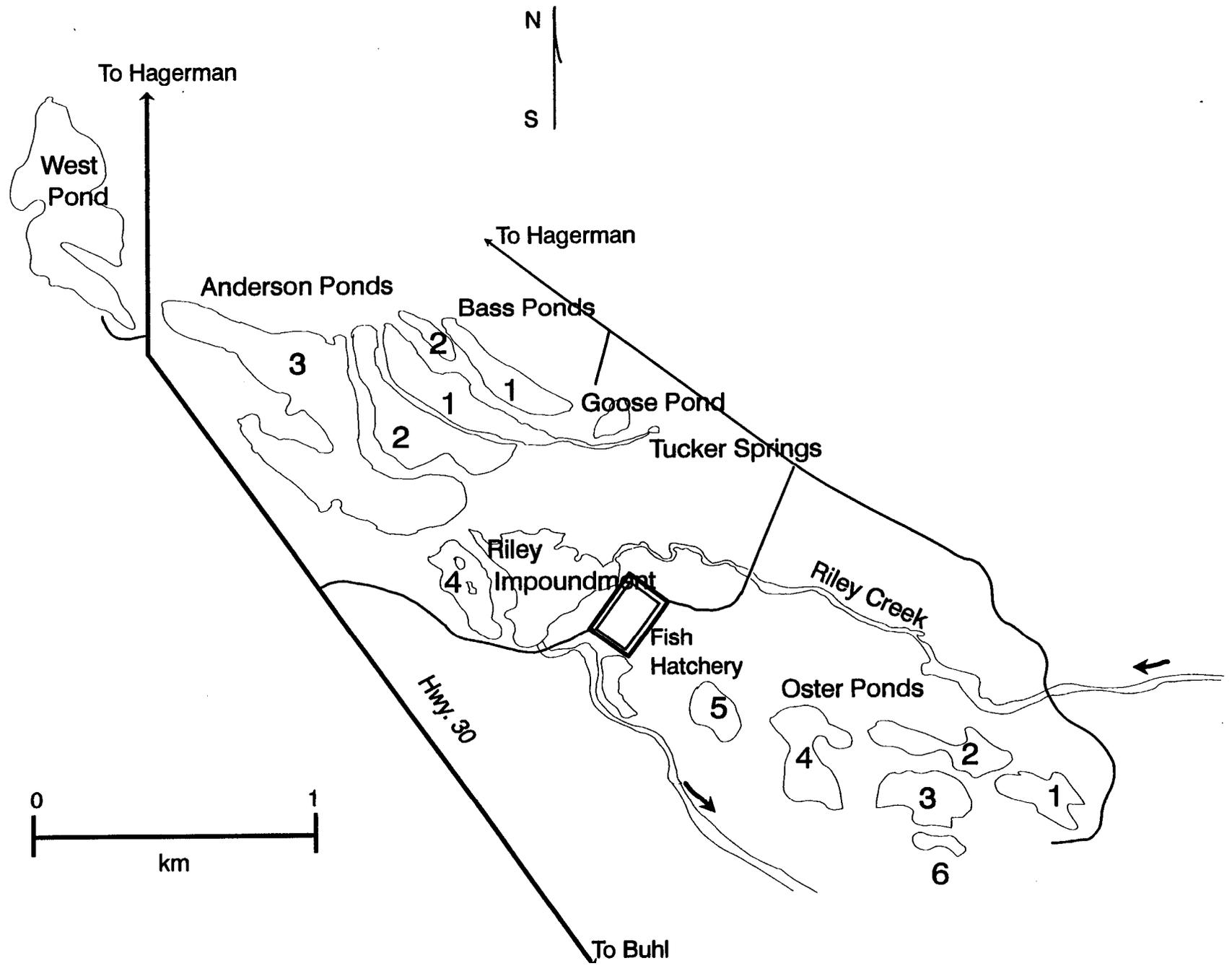


Figure 5. Impoundments located on the Hagerman Wildlife Management Area, Idaho.

Table 11. Total length (mm) and weight (g) of fish sampled with one sinking gill net, one floating gill net, one frame net, and 28.3 minutes of electrofishing at Anderson Pond #2, Hagerman Wildlife Management Area, 1994.

Date	Species	Method	Total length (mm)	Weight (g)	Relative weight
Mar 31	Largemouth bass	Sinking net	370	895	118
Mar 31	Largemouth bass	Floating net	465	1,950	124
Jun 27	Largemouth bass	Electrofishing	385	1,000	116
Jun 27	Largemouth bass	Electrofishing	440	1,500	114
Mar 31	Bluegill	Sinking net	255	650	161
Mar 31	Bluegill	Sinking net	255	690	171
Mar 31	Bluegill	Floating net	245	575	162
Mar 31	Bluegill	Floating net	270	595	122
Jun 27	Bluegill	Electrofishing	105	30	143
Jun 27	Bluegill	Electrofishing	105	32	152
Jun 27	Bluegill	Electrofishing	175	162	140
Mar 31	Brown bullhead	Floating net	295	520	
Mar 31	Brown bullhead	Floating net	330	625	
Jun 27	Rainbow trout, hatchery	Electrofishing	235		

Table 12. Total length frequencies of fish sampled by electrofishing Bass Pond #2 with electricity on for 18.3 minutes, March 4, 1994. Numbers of fish with relative abundances and weights (g) within each length group are given.

Length Range (mm)	Largemouth bass					Brown bullhead			
	Length		Weight		Relative weight	Length		Weight	
	no.	%	no.	avg.		no.	%	no.	avg.
0-9									
10-19									
20-29									
30-39									
40-49									
50-59									
60-69									
70-79									
80-89									
90-99									
100-109									
110-119									
120-129									
130-139									
140-149									
150-159									
160-169									
170-179						1	11.1	1	100
180-189									
190-199									
200-209									
210-219						1	11.1	1	148
220-229									
230-239	1	50.0	1	174	98				
240-249						2	22.2	2	260
250-259						2	22.2	2	288
260-269						2	22.2	2	295
270-279									
280-289									
290-299									
300-309									
310-319									
320-329									
330-339						1	11.1	1	680
340-349									
350-359									
360-369									
370-379									
380-389									
390-399									
400-409									
410-419									
420-429									
430-439									
440-449	1	50.0	1	1550	110				
450-459									
460-469									
470-479									
480-489									
490-499									
Number:	2					9			
Avg length:	335					248			
Total sampled:	2					9			

Table 13. Total length frequencies of fish sampled by electrofishing Goose Pond with electricity on for 25.0 minutes, February 23 and March 4, 1994. Numbers of fish with relative abundances and weights (g) within each length group are given.

Length Range (mm)	Largemouth bass					Bluegill			
	Length		Weight		Relative weight	Length		Weight	
	no.	%	no.	avg.		no.	%	no	avg
0-9									
10-19									
20-29									
30-39									
40-49									
50-59									
60-69									
70-79									
80-89									
90-99						1	11.1	1	20
100-109									
110-119									
120-129	1	4.3	1	30.0	126	1	11.1	1	30
130-139	1	4.3	1	40.0	132	1	11.1	1	42
140-149	2	8.7	2	40.0	105	2	22.2	2	56
150-159						2	22.2	2	66
160-169	1	4.3	1	50.0	87	2	22.2	2	84
170-179									
180-189	1	4.3	1	80.0	97				
190-199									
200-209									
210-219	1	4.3	1	112.0	84				
220-229									
230-239	1	4.3	1	160.0	90				
240-249	1	4.3	1	190.0	94				
250-259									
260-269	1	4.3	1	224.0	86				
270-279	1	4.3	1	270.0	92				
280-289									
290-299	6	26.1	6	325.0	88				
300-309	1	4.3	1	380.0	93				
310-319									
320-329	4	17.4	4	318.0	65				
330-339	1	4.3	1	510.0	93				
340-349									
350-359									
360-369									
370-379									
380-389									
390-399									
400-409									
410-419									
420-429									
430-439									
440-449			1	1550.0	114				
450-459									
460-469									
470-479									
480-489									
490-499									
Number:	23					9			
Avg length:	253					139			
Total sampled:	23					9			

Table 14. Total length frequencies (mm) of fish sampled with one sinking gillnet, one floating gillnet, one frame net, and 75.2 minutes of electrofishing at West Pond at the Hagerman WMA, June 1994. Numbers of fish with relative abundances within each length group are given for each gear type used. Average weight (g) of fish is given for some length groups of some species.

Length Range (mm)	Largemouth bass										Relative Weight	
	Sinking a.n. Length		Floating a.n. Length		Frame net Length		Electrofishing Length		Average Weight			
	no.	%	no.	%	no.	%	no.	%	no.	avg.		
0-9												
10-19												
20-29							1	0.5				
30-39							2	0.9				
40-49												
50-59												
60-69												
70-79							3	1.4				
80-89							8	3.8				
90-99							8	3.8				
100-109							6	2.8	4	14		105
110-119							1	0.5				
120-129							3	1.4				
130-139												
140-149												
150-159												
160-169												
170-179												
180-189							1	0.5				
190-199												
200-209							3	1.4	1	108		94
210-219							2	0.9	1	210		157
220-229							7	3.3				
230-239			1	100.0			11	5.2	3	163		92
240-249							14	6.6	5	185		91
250-259	1	25.0					21	9.9	5	202		88
260-269							25	11.8	3	215		82
270-279							32	15.1	4	265		90
280-289	2	50.0					18	8.5	2	300		91
290-299							15	7.1	6	330		90
300-309							9	4.2	1	420		103
310-319	1	25.0					4	1.9	4	388		86
320-329							1	0.5	1	420		84
330-339							4	1.9	1	460		83
340-349							3	1.4				
350-359							1	0.5				
360-369							1	0.5	1	650		90
370-379							1	0.5				
380-389							2	0.9				
390-399							2	0.9				
400-409												
410-419												
420-429												
430-439												
440-449							1	0.5	1	1300		95
450-459												
460-469							1	0.5	1	1450		92
470-479												
480-489												
490-499												
500-509												
510-519							1	0.5	1	1950		90
520-529												
530-539												
540-549												
Number:	4		1			0			212			
Avg length:	280		230						234			
Total												
sampled:	4		1			0			212			

Table 14. Continued.

Length Range (mm)	Bluegill										Yellow perch										
	Sinking a.n. Length		Floating a.n. Length		Frame net Length		Electrofishing Length		Average Weight		Sinking a.n. Length		Floating a.n. Length		Frame net Length		Electrofishing Length		Average Weight		
	no.	%	no.	%	no.	%	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%	no.	avg.	
0-9																					
10-19																					
20-29																					
30-39																					
40-49							6	0.8													
50-59							26	3.6													
60-69							34	4.7													
70-79							9	1.2													
80-89							16	2.2													
90-99						1	7.7	21	2.9												
100-109						2	15.4	51	7.0	5	23						4	9.3			
110-119						2	15.4	74	10.1	8	29						10	23.3			
120-129						1	7.7	86	11.8	8	37						8	18.6			
130-139						2	15.4	51	7.0	4	45			1	9.1					1	28
140-149			1	50.0	2	15.4	20	2.7	3	55											
150-159			1	50.0			29	4.0	1	60											
160-169							64	8.8	3	95											
170-179						2	15.4	100	13.7	7	117							1	2.3		
180-189						1	7.7	111	15.2	21	138							2	4.7		
190-199							28	3.8	6	152			3	27.3	1	50.0		4	9.3	4	80
200-209							5	0.7	3	175	2	66.7	2	18.2				4	9.3	4	120
210-219											1	33.3	1	9.1	1	50.0		2	4.7	3	110
220-229													1	9.1				5	11.6	1	135
230-239													2	18.2				3	7.0	2	150
240-249													1	9.1						1	240
250-259																					
260-269																					
270-279																					
280-289																					
290-299																					
Number:	0		2		13		731				3		11		2		43				
Avg length:			145		132		137				205		204		205		159				
Total sampled:	0		2		13		731				3		11		2		43				

Table 14. Continued.

Length Range (mm)	Common carp								Brown bullhead							
	Sinking g.n.		Floating g.n.		Frame net		Electrofishing		Sinking g.n.		Floating g.n.		Frame net		Electrofishing	
	Length	Length	Length	Length	Length	Length	Length	Length	Length	Length	Length	Length	Length	Length	Length	Length
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-9																
10-19																
20-29																
30-39																
40-49																
50-59																
60-69																
70-79																
80-89																
90-99																
100-109																
110-119																
120-129																
130-139																
140-149																
150-159																
160-169																
170-179																
180-189																
190-199																
200-209																
210-219																
220-229																
230-239																
240-249																
250-259																
260-269																
270-279															1	16.7
280-289															1	16.7
290-299									1	100.0					3	50.0
300-309																
310-319																
320-329																
330-339																
340-349															1	16.7
700-709																
710-719							1	100.0								
720-729																
730-739																
740-749																
Number:	0		0		0		1		1		0		0		6	
Avg length:							710		290						296	
Total sampled:	0		0		0		1		1		0		0		6	

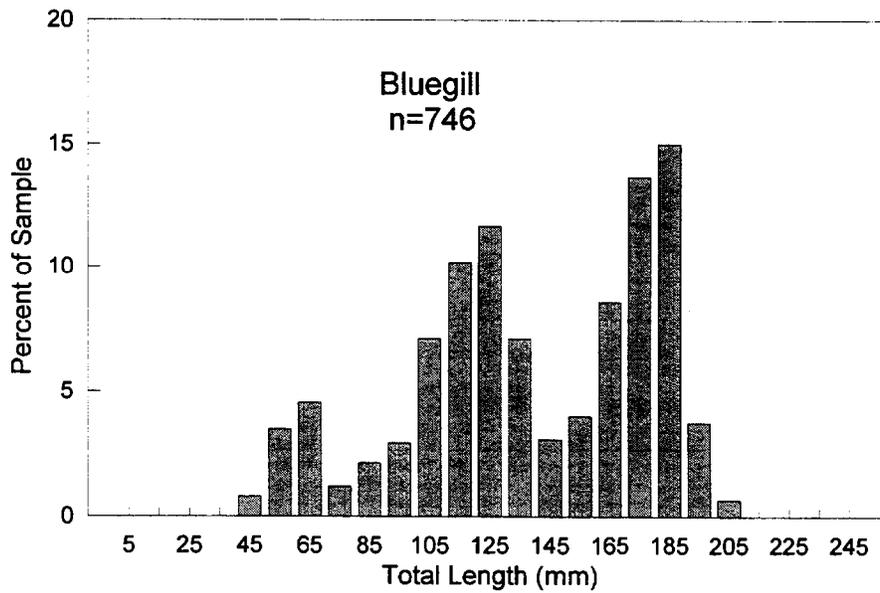
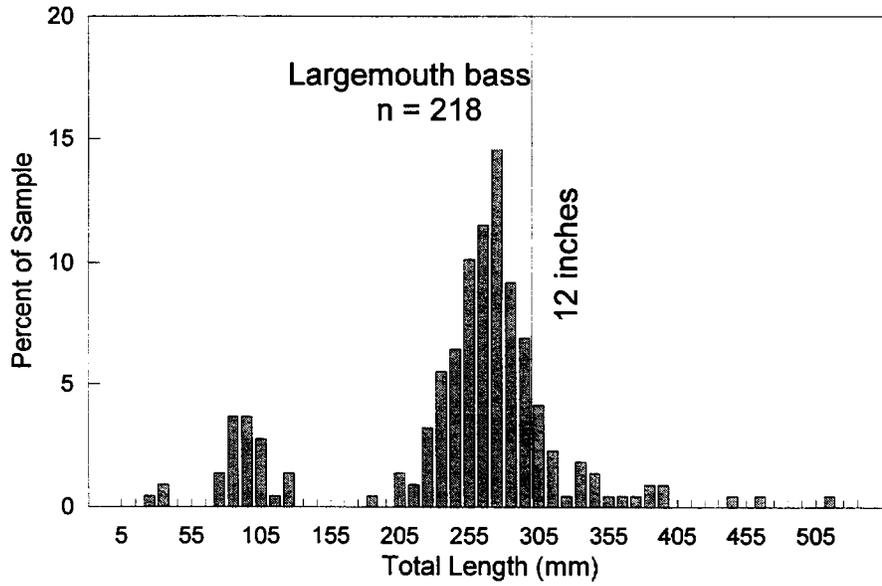


Figure 6. Total length frequency histograms of largemouth bass and bluegill sampled from Hagerman Wildlife Management Area West Hwy. Pond, June 1994.

Length-at-annulus was estimated from scales taken from largemouth bass and bluegill at West Pond (Tables 15 and 16). Results indicate that largemouth bass reach the 12 inch (305 mm) minimum length for legal harvest after their fourth annulus is laid down, and bluegill reach stock length (80 mm) at about the time their second annulus is laid down. There appears to be a slower growth rate for largemouth bass compared to what length-at-annulus data shows from 1987 (Grunder et al. 1989).

Water quality parameters measured at Anderson Ponds #2 and #3 and at West Pond included specific conductance, total alkalinity and total hardness. Temperature and dissolved oxygen was measured at Anderson Pond #2 at 0315 hours on June 28, 1994 (Table 17).

Oster Ponds are stocked at least once a month with catchable sized rainbow trout during the open season from March 1 to October 31. On February 17, 1994, 50 fish out of a plant of 1,000 fish had jaw tags put on them and stocked into Oster Lake #1. Another 1,025 fish with jaw tags on 50 of them were stocked on August 18, 1994. The jaw tags were consecutively numbered and had "RTN IFG REWARD" inscribed on them. By January 1995, a total of 17 tags (34%) from the first stocking and 4 tags (8%) from the second stocking had been returned to the Department. The same number of marked and unmarked fish were also put into the Riley Creek Impoundment on the same dates. By January 1995, a total of 4 tags (8%) from the first stocking and 7 tags (14%) from the second stocking had been returned to the Department.

Little Camas Reservoir

Little Camas Reservoir had been reported to have crappie *Pomoxis sp.* and smailmouth bass *Micropterus dolomieu* present in it for the last few years prior to 1994. Since the Idaho Department of Fish and Game (IDFG) did not stock them into the reservoir, it is assumed that they were there because of unauthorized fish plants which may have occurred after the reservoir was last treated with rotenone to eradicate all fish present in 1977. One floating and one sinking variable mesh gill nets were set overnight for 14 hours to verify their presence. A total of 283 fish were sampled, of which 77% were black crappie *P. nigromaculatus*, 12% bridgelip suckers *Catostomus columbianus*, 9% rainbow trout, and 2% smallmouth bass. Average total length of the black crappie was approximately 114 mm and ranged from 80 to 250 mm. Average total length of the hatchery rainbow trout was approximately 360 mm and ranged from 260 to 440 mm. With the propensity for the black crappie to overpopulate and reduce trout growth within the reservoir during good water years, it was decided to treat the reservoir with rotenone during the fall to exterminate all fish present.

Lower Salmon Falls Reservoir

Lower Salmon Falls Reservoir fish were sampled with one sinking and one floating gill net and one frame net at each of four sites in June 1994, and electrofished for 133 combined minutes of electrofishing at five sites in September 1994 (Figure 7). A total of 1,121 fish

Table 15. Back-calculated length-at-annulus (mm) for largemouth bass sampled at the Hagerman Wildlife Management Area West Highway pond in June 1994. Standard deviation is in parentheses.

Year class	Number of fish	<u>Mean length at annulus</u>						
		1	2	3	4	5	6	7
1993	4	76 (3.6)						
1992	8	79 (15.7)	159 (20.6)					
1991	9	67 (5.1)	135 (10.1)	204 (12.7)				
1990	10	76 (9.1)	151 (17.7)	208 (9.4)	251 (11.1)			
1989	3	97 (12.0)	202 (48.6)	256 (45.0)	290 (28.3)	311 (24.0)		
1987	3	82 (2.3)	222 (24.3)	322 (39.0)	372 (43.2)	402 (42.0)	430 (45.0)	447 (39.5)
Weighted avg. length		77	164	226	281	356	430	447
1987 weighted avg. length ^a		95	194	272	385	442	471	522

^a Grunder et al. 1989

Table 16. Back-calculated length-at-annulus (mm) for bluegill sampled at the Hagerman Wildlife Management Area West Highway pond in June 1994. Standard deviation is in parentheses.

Year class	Number of fish	<u>Mean length at annulus</u>			
		1	2	3	4
1993	8	55 (8.5)			
1992	29	47 (9.5)	73 (43.8)		
1991	11	51 (8.5)	99 (11.5)	151 (13.9)	
1990	12	50 (9.9)	104 (12.4)	162 (15.8)	181 (9.7)
Weighted avg. length		49	86	157	181

Table 17. Water quality test results for Anderson Ponds #2 and #3 and West Pond at the Hagerman Wildlife Management Area, June 1994.

Water Quality Variable	Anderson # 2	Anderson # 3	West Pond
Specific conductance	205 μ /cm	325 μ /cm	410 μ /cm
Total alkalinity as CaCO ³	120 mg/1	141 mg/1	190 mg/1
Total hardness	119 mg/1	144 mg/1	179 mg/1
Temperature (at 3:15 a. m.)			
Surface	21.5°C	(not measured)	(not measured)
1 m deep	21.0°C		
2 m deep (bottom)	20.0°C		
Dissolved oxygen (at 3:15 a.m.)			
Surface	12.5 mg/1	(not measured)	(not measured)
1 m deep	13.0 mg/1		
2 m deep (bottom)	3.5 mg/1		

representing 16 species were sampled (Table 18). Species and numbers sampled include 100 hatchery rainbow trout, 1 wild rainbow trout, 2 brown trout *Salmo trutta*, 1 mountain whitefish *Prosopium williamsoni*, 68 largemouth bass, 1 smallmouth bass, 7 bluegill, 70 chiselmouth chub *Acrocheilus alutaceus*, 170 peamouth chub *Mylocheilus caurinus*, 155 Utah chub, 77 redbreast shiner *Richardsonius balteatus*, 12 mottled sculpin *Cottus bairdi*, 11 speckled dace *Rhinichthys osculus*, 133 largescale sucker, 272 common carp, 40 northern squawfish *Ptychocheilus oregonensis*, and 1 channel catfish. Approximately 16% of all fish sampled were game fish, with the rest being either cyprinids, catostomids, or cottids. Total length frequencies of fish sampled by gear types with average weights of some species sampled are given in Table 19. Length-at-annulus was calculated for largemouth bass sampled by electrofishing in September of 1994 (Table 20). The back-calculated length at the fifth annulus was computed to be less than 305 mm, although three of the four fish estimated to be at least 4+ years of age were over 305 mm. Based on the raw assessment of the scale readings, largemouth bass appear to reach 305 mm in total length about when their fourth annulus is laid down, which is about six months later than when Dillon (1991) estimated.

An early morning dissolved oxygen and temperature profile were taken at every meter of depth near the dam and mid-reservoir near the Bell Rapids access site on June 22, 1994. There was no stratification at either site with water temperatures ranging from 19°C to 20°C and dissolved oxygen ranging from 9.8 to 10.4 mg/l.

Oakley Reservoir

Forage fish presence and relative abundances were measured in Oakley Reservoir utilizing the 15.2 m long, 6.2 mm square mesh beach seine at five sites along the west side of the reservoir. For each site, one end of the seine was held stationary at the waters edge, while the other end was taken straight out into the water perpendicular to the shore line. With the shore end remaining stationary, the other end was then swept shoreward with the lead line held near the bottom. All fish sampled were identified and enumerated with some of them measured (Table 21). Results indicate good densities of spottail shiners *Notropis hudsonius* present, as well as some young-of-the-year yellow perch for walleye *Stizostedion vitreum* forage. Sculpin *Cottus sp.* (probably mottled), and Utah sucker *Catostomus ardens* were also present in small numbers in the sample.

Salmon Falls Creek Reservoir

Salmon Falls Creek Reservoir was sampled by nighttime midwater trawling, electrofishing, beach seining, and bottom trawling in 1994. Daytime temperature and dissolved oxygen profiles were measured at three sites on July 7, 1994 (Figure 8). Temperature and dissolved oxygen profile results are given in Figure 9. Kokanee were sampled using the midwater trawl on the night of July 9, 1994. A total of 4 transects were trawled north of Greys Landing. Depths trawled ranged from 3.7 to 14.6 m (stepped). Trawling efforts resulted in

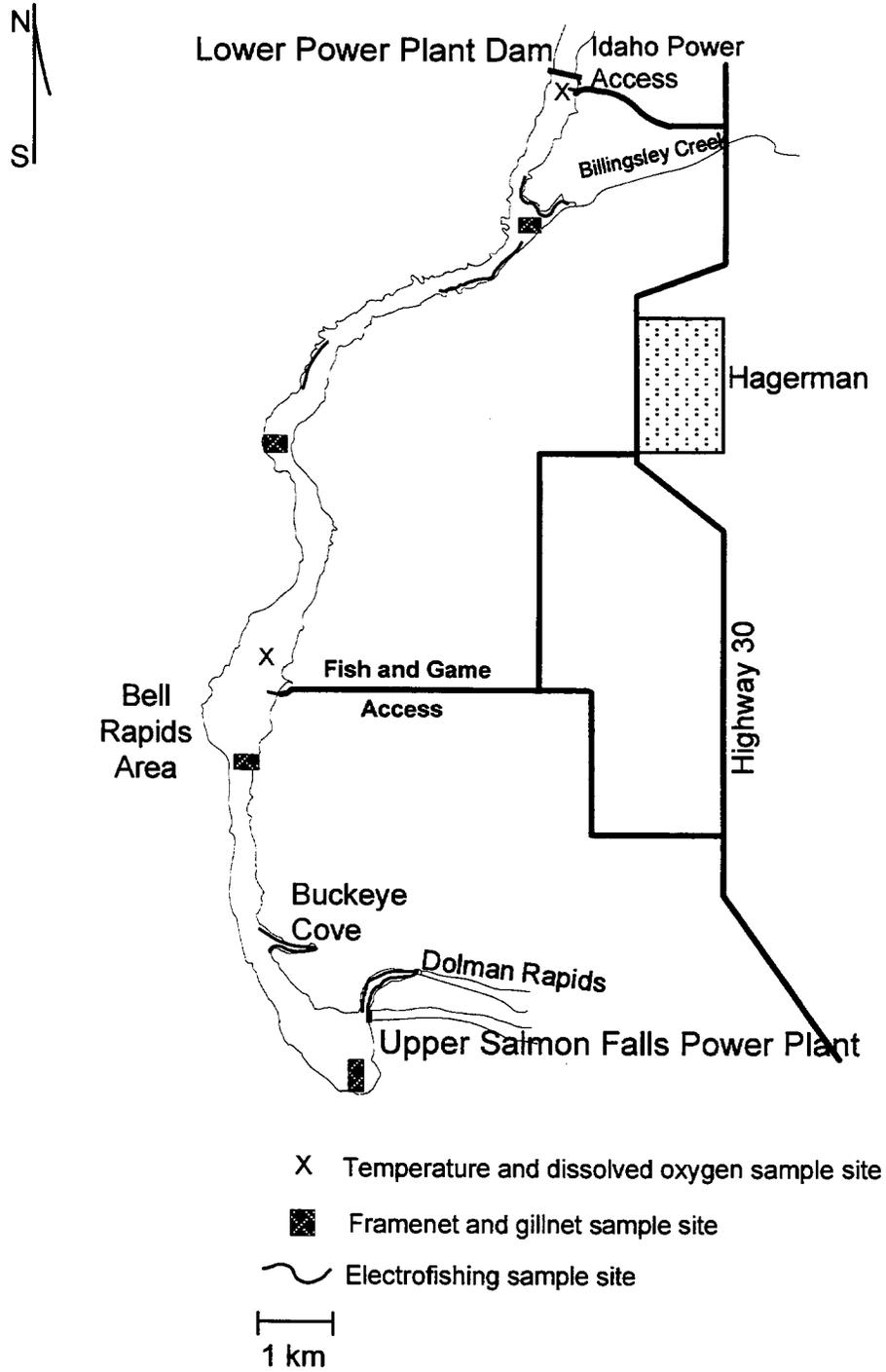


Figure 7. Map of Lower Salmon Falls Reservoir depicting fish and water quality sampling sites, 1994.

Table 18. Summary of fish sampled at Lower Salmon Falls Reservoir utilizing one sinking and one floating gill net and one trap net at each of four sites and 133 combined minutes of electrofishing at five sites, 1994.

Species	Total Length Range (mm)	Percent of Sample	Total Number Sampled
Hatchery rainbow trout	120-405	9.1	100
Wild rainbow trout	310	0.1	1
Brown trout	190-325	0.2	2
Mountain whitefish	200	0.1	1
Bluegill	30-55	0.6	7
Largemouth bass	50-475	6.2	68
Smallmouth bass	430	0.1	1
Channel catfish	520	0.1	1
Chiselmouth chub	60-225	6.4	70
Peamouth chub	40-285	15.4	170
Utah chub	50-345	14.1	155
Redside shiner	50-115	7.0	77
Speckled dace	50-105	1.0	11
Northern squawfish	50-575	3.6	40
Common carp	50-745	22.9	272
Mottled sculpin	30-85	1.1	12
Largescale sucker	70-575	12.1	133

Table 19. Total length frequencies (mm) and weights (g) of fish sampled with one sinking and one floating gill net and one trap net at each of four sites and 133 combined minutes of electrofishing at five sites at Lower Salmon Falls Reservoir, 1994. Numbers of fish and relative abundances within each length group are given for each gear type used.

Length Range (mm)	Hatchery rainbow trout								Wild rainbow trout										
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length		Average Weight		Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length		
	no.	%	no.	%	no.	%	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%	
0-9																			
10-19																			
20-29																			
30-39																			
40-49																			
50-59																			
60-69																			
70-79																			
80-89																			
90-99																			
100-109																			
110-119																			
120-129								1	1.2	1	18								
130-139								1	1.2										
140-149								1	1.2	1	30								
150-159								2	2.3	1	33								
160-169								3	3.5	2	40								
170-179								4	4.7	1	58								
180-189								10	11.6	3	56								
190-199								8	9.3	4	71								
200-209								4	4.7	1	82								
210-219								2	2.3	1	100								
220-229								1	1.2	1	116								
230-239								2	2.3	2	126								
240-249								3	3.5										
250-259								6	7.0	3	170								
260-269								7	8.1	5	178								
270-279								10	11.6	6	197								
280-289			1	8.3				7	8.1	4	215								
290-299			3	25.0				3	3.5	2	279								
300-309	1	50.0						2	2.3	2	246								
310-319	1	50.0	5	41.7				4	4.7	4	277						1	100.0	
320-329			1	8.3				1	1.2										
330-339			1	8.3				1	1.2										
340-349																			
350-359								1	1.2	1	370								
360-369								1	1.2	1	490								
370-379			1	8.3															
380-389																			
390-399																			
400-409								1	1.2	1	740								
410-419																			
420-429																			
430-439																			
440-449																			
Number:	2		12		0			86				0		0				1	
Avg	305		315					238										310	
Total sampled:	2		12		0			86				0		0				1	

Table 19. Continued.

Length Range (mm)	Largemouth bass									Smallmouth bass										
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length		Average Weight	Sinking g.n. Length		Floating g.n. Length		Frame net Length	Electrofishing Length		Average Weight			
	no.	%	no.	%	no.	%	no.	%	no. avg.	no.	%	no.	%	no.	%	no.	%	no. avg.		
0-9																				
10-19																				
20-29																				
30-39																				
40-49																				
50-59								3	4.7											
60-69								3	4.7											
70-79								1	1.6											
80-89																				
90-99																				
100-109								1	1.6	1	16									
110-119								1	1.6	1	15									
120-129								5	7.8	3										
130-139								4	6.3	3	33									
140-149								18	28.1	11	43									
150-159								6	9.4	4	50									
160-169								6	9.4	6	68									
170-179								2	3.1	2	79									
180-189																				
190-199								1	1.6	1	123									
200-209								1	1.6	1	134									
210-219																				
220-229								2	3.1	2	198									
230-239																				
240-249																				
250-259																				
260-269																				
270-279																				
280-289	1	25.0																		
290-299	2	50.0																		
300-309								1	1.6	1	560									
310-319	1	25.0																		
320-329																				
330-339								1	1.6	1	630									
340-349								5	7.8	5	720									
350-359																				
360-369																				
370-379																				
380-389								1	1.6	1	1150									
390-399								1	1.6	1	1200									
400-409																				
410-419																				
420-429																				
430-439																				
440-449																	1	100.0	1	1400
450-459																				
460-469																				
470-479								1		1	2000									
480-489																				
490-499																				
Number:	4		0		0		64			0		0		0		1				
Avg length:	292						173									430				
Total																				
sampled:	4		0		0		64			0		0		0		1				

Table 19. Continued.

Length Range (mm)	Brown trout										Mountain whitefish										
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing g		Average Weight		Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length		Average		
	no.	%	no.	%	no.	%	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%	no.	avg.	
0-9																					
10-19																					
20-29																					
30-39																					
40-49																					
50-59																					
60-69																					
70-79																					
80-89																					
90-99																					
100-109																					
110-119																					
120-129																					
130-139																					
140-149																					
150-159																					
160-169																					
170-179																					
180-189																					
190-199								1	50.0												
200-209																		1	100.0	1	71
210-219																					
220-229																					
230-239																					
240-249																					
250-259																					
260-269																					
270-279																					
280-289																					
290-299																					
300-309																					
310-319																					
320-329								1	50.0	1	325										
330-339																					
340-349																					
350-359																					
360-369																					
370-379																					
380-389																					
390-399																					
Number:	0		0		0			2				0		0				1			
Avg length:								255										200			
Total sampled:	0		0		0			2				0		0				1			

Table 19. Continued.

Length Range (mm)	Chiselmouth chub						Peamouth chub									
	Sinking g.n.		Floating g.n. Length		Frame net Length		Electrofishing g		Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-9																
10-19																
20-29																
30-39																
40-49															1	1.1
50-59															1	1.1
60-69			1	100.0			4	10.3							2	2.2
70-79							23	59.0							6	6.6
80-89							1	2.6							5	5.5
90-99							2	5.1							21	23.1
100-109							1	2.6							38	41.8
110-119															14	15.4
120-129							2	5.1							1	1.1
130-139							1	2.6								
140-149																
150-159							1	2.6								
160-169																
170-179															1	1.1
180-189																
190-199							2	5.1								
200-209																
210-219							1	2.6								
220-229							1	2.6								
230-239																
240-249																
250-259																
260-269																
270-279																
280-289															1	1.1
290-299																
300-309																
310-319																
320-329																
330-339																
340-349																
350-359																
360-369																
370-379																
380-389																
390-399																
Number:	0		1		0		39		0		0		0		91	
Avg length:			65				93								99	
Total sampled:	0		1		0		69		2		0		0		168	

Table 19. Continued.

Length Range (mm)	Utah chub								Redside shiner							
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing		Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-9																
10-19																
20-29																
30-39																
40-49																
50-59								7	9.6						4	10.0
60-69								31	42.5						11	27.5
70-79								10	13.7						6	15.0
80-89								4	5.5						2	5.0
90-99								4	5.5						7	17.5
100-109								12	16.4						8	20.0
110-119								3	4.1						2	5.0
120-129								1	1.4							
130-139																
140-149																
150-159																
160-169																
170-179																
180-189																
190-199																
200-209																
210-219																
220-229																
230-239																
240-249																
250-259																
260-269																
270-279																
280-289																
290-299																
300-309			1	25.0												
310-319																
320-329			1	25.0												
330-339			1	25.0												
340-349			1	25.0				1	1.4							
350-359																
360-369																
370-379																
380-389																
390-399																
Number:	0		4		0			73		0		0		0		40
Avg length:			325					79								80
Total sampled:	18		21		0			116		0		0		0		77

Table 19. Continued.

Length Range (mm)	Mottled sculpin						Speckled dace									
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing		Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-9																
10-19																
20-29																
30-39							1	8.3								
40-49							1	8.3								
50-59							4	33.3							3	27.3
60-69							4	33.3							1	9.1
70-79							1	8.3								
80-89							1	8.3							3	27.3
90-99															3	27.3
100-109															1	9.1
110-119																
120-129																
130-139																
140-149																
150-159																
160-169																
170-179																
180-189																
190-199																
200-209																
210-219																
220-229																
230-239																
240-249																
250-259																
260-269																
270-279																
280-289																
290-299																
300-309																
310-319																
320-329																
330-339																
340-349																
350-359																
360-369																
370-379																
380-389																
390-399																
Number:	0		0		0		12		0		0		0		11	
Avg length:							57								78	
Total sampled:	0		0		0		12		0		0		0		11	

Table 19. Continued.

Length Range (mm)	Largescale								Common carp							
	Sinkina a.n. Length		Floating a.n. Length		Frame net Length		Electrofishing Length		Sinkina a.n. Length		Floating a.n. Length		Frame net Length		Electrofishing Length	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-9																
10-19																
20-29																
30-39																
40-49																
50-59															1	0.7
60-69															9	6.1
70-79								1	1.4						34	23.0
80-89								7	10.0						33	22.3
90-99								4	5.7						28	18.9
100-109								7	10.0						15	10.1
110-119								7	10.0						6	4.1
120-129								2	2.9							
130-139															1	0.7
140-149																
150-159								2	2.9						1	0.7
160-169								1	1.4						2	1.4
170-179								1	1.4							
180-189																
190-199								2	2.9							
200-209								1	1.4						1	0.7
210-219								2	2.9							
220-229								1	1.4							
230-239						1	100.0	2	2.9							
240-249								1	1.4							
250-259								1	1.4							
260-269								1	1.4							
270-279								1	1.4							
280-289			1	50.0				1	1.4							
290-299								2	2.9							
300-309																
310-319																
320-329																
330-339								1	1.4							
340-349								1	1.4							
350-359																
360-369																
370-379																
380-389																
390-399																
400-409								1	1.4							
410-419								1	1.4							
420-429																
430-439																
440-449								2	2.9							
450-459																
460-469																
470-479								3	4.3						1	0.7
480-489								3	4.3							
490-499								2	2.9							
500-509																
510-519								2	2.9							
520-529			1	50.0				3	4.3							
530-539																
540-549								1	1.4							
550-559								1	1.4							
560-569								1	1.4							
570-579								1	1.4							
580-589																
590-599																
600-609																
610-619															3	2.0
620-629																
630-639																
640-649															2	1.4
650-659																
660-669															2	1.4
670-679																
680-689															1	0.7
690-699															1	0.7
700-709															2	1.4
710-719															1	0.7
720-729															2	1.4
730-739															1	0.7
740-749															1	0.7
Number:	0		2		1		70		0		0		0		148	
Avg length:			402		230		258								154	
Total																
sampled:	36		2		1		94		9		0		0		263	

Table 19. Continued.

Length Range (mm)	Northern squawfish								Bluegill							
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length		Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-9																
10-19																
20-29																
30-39																
40-49															1	14.3
50-59								1	2.8						4	57.1
60-69								7	19.4						2	28.6
70-79								10	27.8							
80-89								5	13.9							
90-99								1	2.8							
100-109																
110-119								1	2.8							
120-129								2	5.6							
130-139								2	5.6							
140-149								2	5.6							
150-159								1	2.8							
160-169								1	2.8							
170-179																
180-189																
190-199																
200-209																
210-219																
220-229																
230-239																
240-249																
250-259																
260-269																
270-279																
280-289																
290-299																
300-309																
310-319																
320-329																
330-339																
340-349																
350-359								1	2.8							
360-369																
370-379																
380-389																
390-399																
400-409																
410-419																
420-429																
430-439																
440-449																
450-459																
460-469																
470-479								1	2.8							
480-489																
490-499																
500-509																
510-519																
520-529																
530-539																
540-549																
550-559																
560-569																
570-579								1	2.8							
580-589																
590-599																
Number:	0		0		0			36		0		0		0		7
Avg length:								121								44
Total sampled:	3		1		0			36		0		0		0		7

Table 19. Continued.

Length Range (mm)	Channel catfish							
	Sinking g.n. Length		Floating g.n. Length		Frame net Length		Electrofishing Length	
	no.	%	no.	%	no.	%	no.	%
0-9								
10-19								
20-29								
30-39								
40-49								
50-59								
60-69								
70-79								
80-89								
90-99								
100-109								
110-119								
120-129								
130-139								
140-149								
150-159								
160-169								
170-179								
180-189								
190-199								
200-209								
210-219								
220-229								
230-239								
240-249								
250-259								
260-269								
270-279								
280-289								
290-299								
300-309								
310-319								
320-329								
330-339								
340-349								
350-359								
360-369								
370-379								
380-389								
390-399								
400-409								
410-419								
420-429								
430-439								
440-449								
450-459								
460-469								
470-479								
480-489								
490-499								
500-509								
510-519								
520-529	1	100.0						
530-539								
540-549								
550-559								
560-569								
570-579								
580-589								
590-599								
Number:	1		0		0		0	
Avg length:	520							
Total								
sampled:	1		0		0		0	

Table 20. Back-calculated length-at-annulus (mm) for largemouth bass sampled at Lower Salmon Falls Reservoir, September 1994. Standard deviation is in parentheses.

Year class	Number of fish	<u>Mean length at annulus</u>				
		1	2	3	4	5
1993	11	61 (8.7)				
1992	2	54 (8.0)	106 (22.1)			
1991	3	52 (5.1)	88 (5.6)	143 (11.7)		
1990	2	54 (4.9)	110 (32.2)	175 (39.8)	243 (54.3)	
1989	2	68 (0.2)	108 (18.0)	186 (33.8)	246 (24.8)	290 (203.4)
Weighted avg. length		59	101	164	244	290

Table 21. Total length frequency and total numbers of fish sampled from beach seining five sites at Oakley Reservoir, August 1994.

Length Range (mm)	<u>Yellow perch</u>		<u>Spottail shiner</u>		<u>Sculpin sp.</u>		<u>Utah sucker</u>	
	Length no.	%	Length no.	%	Length no.	%	Length no.	%
0-9								
10-19								
20-29								
30-39			2	4.9	2	50.0		
40-49	6	20.7			1	25.0		
50-59	10	34.5	1	2.4				
60-69					1	25.0		
70-79			9	22.0				
80-89	6	20.7	23	56.1				
90-99	6	20.7	1	2.4			1	50.0
100-109	1	3.4	5	12.2				
110-119							1	50.0
120-129								
130-139								
140-149								
Number:	29		41		4		2	
Avg. length:	66		80		43		103	
Total Sampled:	29		1,213		4		2	

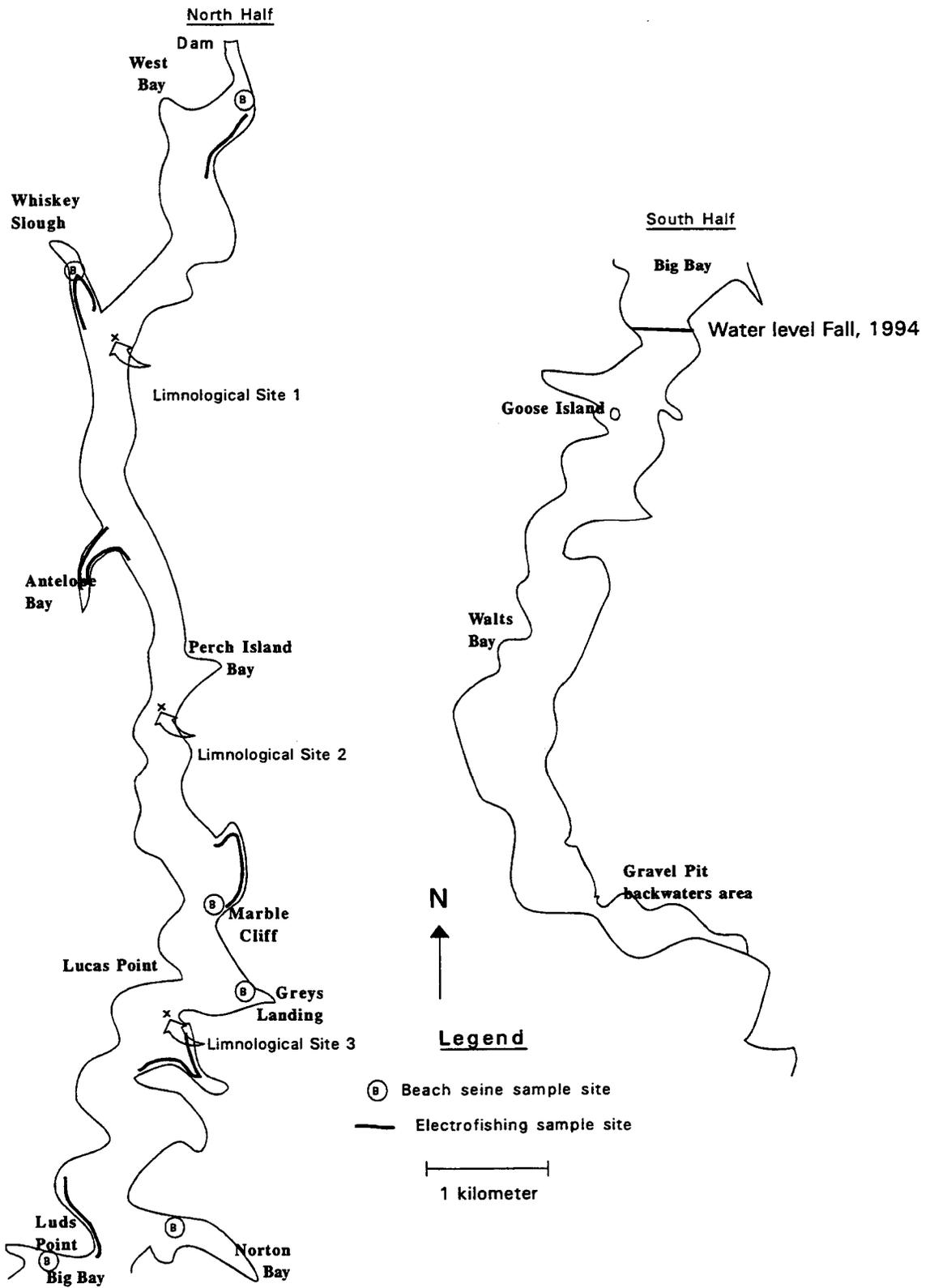


Figure 8. Map of Salmon Falls Creek Reservoir depicting electrofishing, beach seining, and limnological sampling sites, 1994.

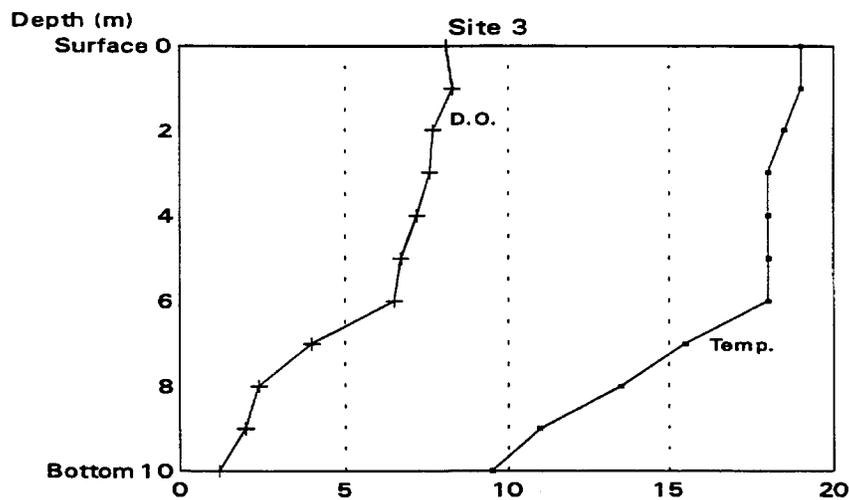
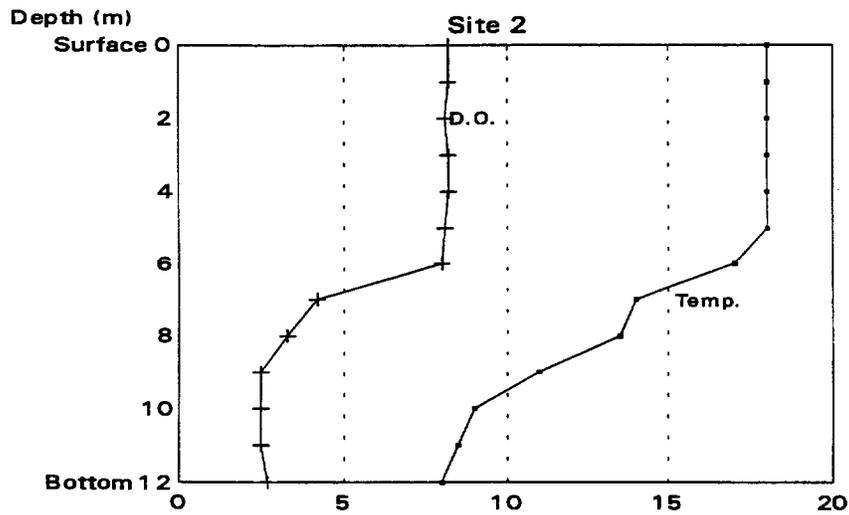
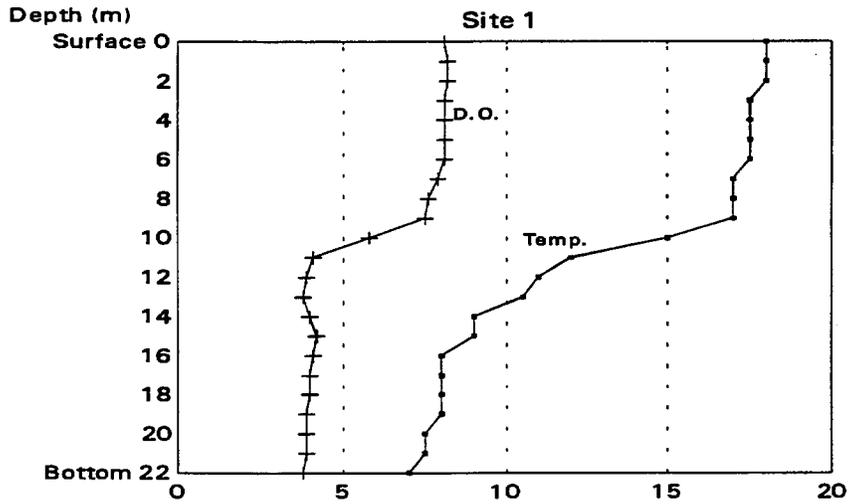


Figure 9. Day time temperature (celcius) and dissolved oxygen (mg/l) profiles for three sites at Salmon Falls Creek Reservoir, July 5, 1994..

sampling a total of 95 kokanee ranging in length from 45 to 245 mm (Table 22). Kokanee less than 80 mm (total length) were classified as age 0+ fish stocked as 45 mm long fingerlings on June 7, 1994. Kokanee at least 80 mm long but less than 130 mm were classified as age 0+ fish stocked as 76 mm long fingerlings on May 3, 1994. Kokanee at least 130 mm but less than 190 mm were classified as age 1+ fish, and kokanee at least 190 mm but less than 240 mm were classified as age 2+ fish. Density estimates of age 0+ fish were highest for the smaller fish stocked in June than for those stocked in May (Table 23), although there were 72,000 fingerlings in the June stock and 145,000 fingerlings in the May stock. Total population estimates are based on extrapolation of usable surface area to 260 ha without stratification into separate sampling units. Other species sampled in the trawl include several hundred age 0+ yellow perch.

Nighttime electrofishing was done on the evenings of October 7 and 10, 1994 utilizing the Smith-Root electrofishing boat. Six sites were sampled with power on for a total of 6,598 seconds at all sites combined. As many fish as possible were netted regardless of size or species throughout the entire sampling period at all sites. A total of 2,175 fish were sampled, with yellow perch comprising 67%, walleye 3%, smallmouth bass less than 1%, kokanee 2%, hatchery rainbow trout 17%, and wild rainbow trout less than 1% of the entire sample (Table 24). Nongame fish species comprised 10% of the entire sample (Table 25).

Six sites were sampled with a 15.2 m long, 6.2 mm square mesh beach seine on September 13, 1994 to monitor forage and spottail shiner presence. Methods used were the same as those used at Oakley Reservoir (this report). A total of 832 fish were sampled with young-of-the-year yellow perch (<70 mm total length) comprising 88% of the sample (Table 26). Spottail shiners, which were introduced into the reservoir in 1987, comprised 7% of the sample. The remaining 5% of the sample was comprised of largescale suckers, mottled sculpin, and redbreast shiners.

Approximately one million walleye sac-fry obtained from Garrison National Fish Hatchery in North Dakota were stocked into Salmon Falls Creek Reservoir on May 13, 1994. Half of the fry were put into the reservoir at Whiskey Slough and the other half put into the reservoir near the mouth of Salmon Falls Creek, which was almost up to China Creek. A bottom trawl was used on two separate days in August and September 1994 to determine the presence of young-of-the-year walleye. All trawling was done within the upper end of the reservoir between Marble Cliff Bay and Big Bay. Total time trawled was 46.5 minutes split into 10 trawls. Time per trawl ranged from 2.5 to 7 minutes. A total of 1,563 fish were sampled in the trawl which included 13 walleye (Table 27). Six of the walleye were between 150 and 190 mm in total length, which are believed to be young-of-the-year fish. No attempt was made to distinguish between walleye of wild origin and walleye of hatchery origin.

Table 22. Total length frequency (mm) and mean weight (g) of kokanee sampled by midwater trawling in Salmon Falls Creek Reservoir, July 1994.

Length Range (mm)	a		b		Age 1+		Age 2+	
	Age 0+ (K.O.)		Age 0+ (K.E.)		no.	avg. wt.	no.	avg. wt.
	no.	avg. wt.	no.	avg. wt.				
0-9								
10-19								
20-29								
30-39								
40-49	24	0.8						
50-59	17	1.0						
60-69	39	2.0						
70-79	1	2.0						
80-89			1					
90-99								
100-109			1					
110-119			2	12.0				
120-129								
130-139					4	24.5		
140-149					4			
150-159					1			
160-169								
170-179								
180-189								
190-199								
200-209								
210-219								
220-229								
230-239								
240-249							1	135.0
250-259								
260-269								
270-279								
280-289								
290-299								
Number:	81		4		9		1	
Avg. lgth.:	57		105		142		245	
Total								
Sampled:	81		4		9		1	

a Kokanee (October strain) stocked as 45 mm long fingerlings at 600 fish per lb. on June 7, 1994.

b Kokanee (early strain) stocked as 76 mm long fingerlings at 104 fish per lb. on May 3, 1994.

Table 23. Salmon Falls Creek Reservoir kokanee population and density estimates based on nighttime midwater trawling results, July 1994.

	Age 0 ^a	Age 0 ^b	Age 1	Age 2	Age 3
Population estimate	67,653	6,460	7,381	820	0
Variance of population	2.0 x 10 ⁴	6.4 x 10 ⁵	1.9 x 10 ⁵	2.1 x 10 ⁵	-
Density (fish/ha)	260	9	28	3	0
Avg. total length (mm)	52	100	137	240	

^a Kokanee stocked as 45 mm long fingerlings at 600 fish/lb. on June 7, 1994.

^b Kokanee stocked at 76 mm long fingerlings at 104 fish/lb. on May 3, 1994.

Table 24. Game fish sampled by electrofishing six sites at Salmon Falls Creek Reservoir with total length frequency and average weight (g) of some fish in each 10 mm length group percent of total and total numbers of each species sampled October 1994

Length Range (mm)	Hatchery rainbow trout				Wild rainbow trout		Kokanee				Smallmouth bass				Walleye				Yellow perch		
	Length		Weight		Length		Length		Weight		Length		Weight		Length		Weight		Length		
	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	
0-9																					
10-19																					
20-29																					
30-39																					
40-49																					
50-59																				1	
60-69																			35	12.7	
70-79																			30	10.9	
80-89																			2	0.7	
90-99																			1	0.4	
100-109																			4	1.4	
110-119																			11	4.0	
120-129																			14	5.1	
130-139																			13	4.7	
140-149																			9	3.3	
150-159														1	1.4	1	28		42	15.2	
160-169														1	1.4	1	37		24	8.7	
170-179																			17	8.2	
180-189														1	1.4	1	49		19	6.9	
190-199														3	4.1	3	41		11	4.0	
200-209																			5	1.8	
210-219											2	40.0	2	144	1	1.4	1	72	7	2.5	
220-229														3	4.1	1	90	1	1	0.4	
230-239	2	0.6												3	4.1	1	120	1	1	0.4	
240-249	2	0.6												8	10.8	3	134				
250-259	11	3.6												9	12.2	4	141				
260-269	18	5.2												9	12.2	6	157				
270-279	34	11.0												11	14.9	3	164				
280-289	37	12.0	2	252						1	20.0	1	330	4	5.4	1	200				
290-299	45	14.6			1	16.7								3	4.1	2	260				
300-309	37	12.0	1	295	2	33.3				1	20.0	1	470								
310-319	26	8.4	1	340										1	1.4	1	282				
320-329	21	6.8	2	420																	
330-339	19	6.2	1	425	1	16.7	1	2.3	1	380	1	20.0	1	610							
340-349	12	3.9					1	2.3						3	4.1	3	377				
350-359	14	4.5	1	580	1	16.7															
360-369	10	3.2	1	525	1	16.7	1	2.3													
370-379	2	0.6												2	2.7	2	453				
380-389	5	1.6							2	615											
390-399	5	1.6	1	690																	
400-409									2	4.7											
410-419	5	1.6							2	4.7											
420-429	3	1.0	2	875					5	11.6											
430-439									6	14.0											
440-449									4	9.3				1	1.4	1	800				
450-459	1	0.3	1	1200					7	16.3	2	790		3	4.1	3	930				
460-469									3	7.0	1	1000		1	1.4	1	1,000				
470-479									3	7.0											
480-489														1	1.4	1	1,150				
490-499	1	0.3	1	1500					2	4.7											
500-509														1	1.4	1	1,150				
510-519														1	1.4	1	1,375				
520-529														1	1.4	1	1,550				
530-539														1	1.4	1	1,500				
540-549																					
550-559																					
560-569														1	1.4	1	1,675				
570-579																					
580-589																					
590-599																					
Number:	308				6		43				5			74						276	
Avg length:	303				323		428				269			293						129	
Total sampled:	362				6		43				5			74						1460	

Table 25. Nongame fish sampled by electrofishing six sites at Salmon Falls Creek Reservoir with total length frequency, percent of total and total numbers of each species sampled, October 1994.

Length Range (mm)	Bridgelip sucker		Largescale sucker		Mottled sculpin		Northern squawfish		Redside shiner		Spottail shiner	
	Length		Length		Length		Length		Length		Length	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-9												
10-19												
20-29												
30-39					2	33.3						
40-49					2	33.3			1	50.0	4	8.9
50-59					2	33.3					20	44.4
60-69											7	15.6
70-79											4	8.9
80-89												
90-99			2	2.0							1	2.2
100-109											2	4.4
110-119			1	1.0							6	13.3
120-129			1	1.0					1	50.0	1	2.2
130-139	1	6.3	1	1.0								
140-149			6	6.1								
150-159			9	9.1			1	20.0				
160-169			5	5.1								
170-179			4	4.0								
180-189	5	31.3	1	1.0			1	20.0				
190-199	1	6.3	1	1.0								
200-209	1	6.3										
210-219	2	12.5										
220-229	2	12.5					1	20.0				
230-239	1	6.3	1	1.0			1	20.0				
240-249												
250-259	1	6.3	1	1.0								
260-269			2	2.0								
270-279	1	6.3										
280-289												
290-299												
300-309	1	6.3	2	2.0								
310-319			1	1.0								
320-329												
330-339			1	1.0								
340-349			2	2.0								
350-359			1	1.0								
360-369												
370-379			2	2.0								
380-389												
390-399			1	1.0			1	20.0				
400-409			1	1.0								
410-419			1	1.0								
420-429												
430-439			5	5.1								
440-449			4	4.0								
450-459			9	9.1								
460-469			7	7.1								
470-479			6	6.1								
480-489			1	1.0								
490-499			5	5.1								
500-509			2	2.0								
510-519			3	3.0								
520-529			5	5.1								
530-539			1	1.0								
540-549			2	2.0								
550-559			1	1.0								
560-569			1	1.0								
570-579												
580-589												
590-599												
Number:	16		99		6		5		2		45	
Avg length:	211		351		43		237		82		68	
Total sampled:	16		117		6		5		2		79	

Table 26. Fish sampled by beach seining six sites at Salmon Falls Creek Reservoir with total length frequency in each 10 mm length group, percent of total and total numbers of each species sampled, September 1994.

Length Range (mm)	<u>Yellow perch</u>		<u>Spottail shiner</u>		<u>Largescale sucker</u>		<u>Mottled sculpin</u>		<u>Redside shiner</u>	
	<u>Length</u> no.	<u>Length</u> %	<u>Length</u> no.	<u>Length</u> %	<u>Length</u> no.	<u>Length</u> %	<u>Length</u> no.	<u>Length</u> %	<u>Length</u> no.	<u>Length</u> %
0-9										
10-19										
20-29							1	12.5		
30-39	1	2.6					1	12.5		
40-49	4	10.5	5	9.3	6	19.4	2	25.0	1	33.3
50-59	20	52.6	29	53.7	18	58.1	1	12.5	2	66.7
60-69	13	34.2	16	29.6	3	9.7	2	25.0		
70-79			1	1.9	2	6.5				
80-89			1	1.9	1	3.2	1	12.5		
90-99					1	3.2				
100-109			1	1.85						
110-119			1	1.9						
120-129										
130-139										
140-149										
150-159										
160-169										
170-179										
180-189										
190-199										
Number:	38		54		31		8		3	
Avg length	54		58		55		50		48	
Total										
Sampled:	736		54		31		8		3	

Table 27. Fish sampled by bottom trawling ten sites at Salmon Falls Creek Reservoir with total length frequency in each 10 mm length group, percent of total and total numbers of each species sampled, August and September 1994.

Length Range (mm)	Walleye		Yellow perch				Black		Largescale sucker		Spottail shiner		Redside shiner			
	Length no.	%	Age 0+ no.	Age 0+ %	Age 1+ no.	Age 1+ %	>Age 2+ no.	>Age 2+ %	Length no.	%	Length no.	%	Length no.	%		
0-9																
10-19										2	20.0					
20-29									16	27.1						
30-39			1	0.5					9	15.3	1	10.0	5	8.9		
40-49			20	9.0					18	30.5			15	26.8		
50-59			13	5.9					15	25.4			33	58.9		
60-69			39	17.6									1	1.8		
70-79			8	3.6									1	1.8		
80-89					3	1.4										
90-99					4	1.8				2	20.0					
100-109					11	5.0										
110-119					14	6.3						1	1.8	1	50.0	
120-129					7	3.2										
130-139					3	1.4					1	10.0				
140-149							9	4.1								
150-159	2	15.4					11	5.0								
160-169	1	7.7					15	6.8								
170-179	1	7.7					15	6.8								
180-189	2	15.4					13	5.9								
190-199							8	3.6								
200-209							16	7.2								
210-219	1	7.7					4	1.8	1	1.7						
220-229							3	1.4								
230-239	1	7.7					3	1.4								
240-249	1	7.7					1	0.5								
250-259	1	7.7														
260-269	1	7.7														
270-279	1	7.7														
280-289																
290-299																
//																
400-409																
410-419																
420-429																
430-439																
440-449																
450-459	1	7.7														
460-469										3	30.0					
470-479																
480-489																
490-499																
500-509																
510-519										1	10.0					
520-529																
530-539																
Number:	13		81		42		98		59		10		56		2	
Avg length:	213		52		108		177		46		243		49		80	
Total																
Sampled:	13		1,423 (all year classes combined)						59		10		56		2	

Miscellaneous Regional Creel Surveys

A region-wide creel survey was made on the opening day of the general fishing season by conservation officers and other Magic Valley Region personnel (Table 28). This survey included streams open during the general fishing season, as well as waters which were already open to fishing. There were 25 waters surveyed with a total of 730 anglers with 1,516 hours of effort and an overall catch rate of 0.83 fish per hour. Spot creel checks performed mostly by conservation officers and regional fishery personnel on days other than the general fishing season opener were also reported (Table 29). A total of 1,250 anglers with 3,216 hours of effort and an overall catch rate of 0.70 fish per hour were reported on 32 waters.

Table 28. Results of creel checks performed on Magic Valley Region waters on opening day of the general fishing season, 1994.

Location	Anglers	Hours fished	Fish ^a Caught											
			RBT	HRB	WRB	BRN	EB	KOK	BG	LMB	SMB	BBH		
Anderson Ranch Reservoir	31	72		12				57			3			11
Big Smokey Cr.	11	8												
Big Wood River, Glendale to N.Fk.	9	17			17									
Big Wood River, Upper	2	5												
Billingsly Cr.	49	79		91		3								
Carey Lake	2	14								3				
Dog Ck. Reservoir	8	10		6								4		5
Fish Creek Reservoir	57	219		163										
Hagerman W.M.A. ^b	28	68		10				96		4				55
Jarbidge River	5	4		1	8									
Little Camas Reservoir	82	64		52										
Little Smokey Cr.	19	6	8	3	1		1							
Little Wood Reservoir	6	12	14	5										
Little Wood River	7	14			1	5								
Magic Reservoir	45	161		153										
Malad River	15	22	16		6									
Oakley Reservoir	16	14		11										

65

Table 28. Continued.

Location	Anglers	Hours fished	Fish ^a Caught											
			RBT	HRB	WRB	BRN	EB	KOK	BG	LMB	SMB	BBH	WE	YP
Rock Creek Roseworth Reservoir	29 58	40 126		23 61	12	14								
Salmon Falls Creek Reservoir	54	90	12	4									22	26
Silver Creek South Fk. Boise River	52 18	146 24	56		3	12								
Sublett Reservoir	73	218		27	12	3		1						
Thorn Creek Reservoir	21	40		126										
Trapper Cr. Warm Spgs./ Trail Ck.	11 22	10 29		8 17	2		4							

^a RBT = Rainbow trout of unidentified origin, HRB = Hatchery rainbow trout, WRB = Wild rainbow trout, BRN = Brown trout, EB = Brook trout, KOK = Kokanee, BG = Bluegill, LMB = Largemouth bass, SMB = Smallmouth bass, BBH = Brown bullhead, WE = Walleye, YP = Yellow perch.

^b July 1, 1993 opening day at Anderson ponds, Bass ponds, Goose pond, and West pond.

Table 29. Continued.

Locality	Anglers	Hours fished	Fish Harvested ^a														Fish Released								
			BG	HRB	WRB	BRN	KOK	BT	SMB	BC	LMB	CC	EB	MWF	CT	CRP		WE	S	YP	BBH				
Rock Cree	4	10	12																						
Rowe Reservoir	123	432	264																						3
Almon Fall Creek Res.	134	502	81				2		18							7		306							9
Silver Cree	12	35			10	2																			20
Snake River	22	70										1				2		5				1			
South Fork Boise River	39	62	24													1									
Stone Reservoir	39	141	46															72							8
Sublett Cree	13	14	6			2																			5
Sublett Reservoir	83	240	32				2																		9

^a BG = Bluegill, HRB = Hatchery rainbow trout, WRB = Wild rainbow trout, BRN = Brown trout, KOK = Kokanee, BT = Bull trout, SMB = Smallmouth bass, BC = Black crappie, LMB = Largemouth bass, CC = Channel catfish, EB = Brook trout, MWF = Mountain whitefish, CT = Cutthroat, CC = Common carp, WE = Walleye, S = Sucker, YP = Yellow perch, BBH = Brown bullhead.

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1994 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-19

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job No.: c

Title: Rivers and Streams Investigations

Contract Period: July 1, 1994 to June 30, 1995

ABSTRACT

A survey of Salmon Falls Creek downstream of Salmon Falls Creek Dam to Balanced Rock found good populations of smallmouth bass *Micropterus dolomieu* and wild rainbow trout *Oncorhynchus mykiss* in the lower reaches and wild rainbow trout and brook trout *Salvelinus fontinalis* in the upper reaches. Habitat has been impacted by a lack of annual natural flushing flows.

The South Fork Boise River was electrofished near the mouth of Deadwood Creek. Results indicate slight increases in numbers and size of wild rainbow trout, decreases in numbers of mountain whitefish *Prosopium williamsoni* in most size classes, and a decrease from ten bull trout *Salvelinus confluentus* sampled in 1991 to three sampled in 1994.

The Big Wood River highway diversion channel and a downstream control reach were snorkeled for fish counts. Observations indicate some use of the artificial stream channel by all size classes of rainbow trout and mountain whitefish. Densities were similar in both channels for rainbow trout > 100 mm at 3.3 and 4.0/100 m², however fry densities were higher in the artificial channel (14.0/100 m²) compared to the control channel (3.3/100).

Fish were sampled in Trout Creek, a tributary to Goose Creek, within and outside of a livestock enclosure. A total of 28 cutthroat trout *O. clarki* were sampled within the enclosure and 20 upstream of the enclosure.

Other work performed includes obtaining temperature data with continuously recording thermographs on the Bruneau, Jarbidge and Big Wood rivers. A habitat assessment was done on Cedar Draw Creek, a private habitat improvement project on lower Silver Creek was investigated, and we assisted the Department of Environmental Quality with numerous stream surveys. We also assisted the U.S. Bureau of Land Management with fishery surveys on Birch and Cold creeks, tributaries to Goose Creek.

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OBJECTIVES

To maintain information for fishery management activities and decisions for rivers and streams.

METHODS

Stream habitat data was collected using ocular and measurement techniques described by IDFG (1992). Fish sampling gear included a Smith-Root Model 15-A backpack shocker, and a Coffelt Model WP-15 shocker powered by a 5,000-watt generator mounted in an aluminum canoe or drift boat. Crews using the Coffelt shocker in the canoe waded with two people each using one anode and three or four other crew members netting stunned fish. Crews using the Coffelt shocker in the drift boat netted fish from within the boat as another crew member rowed and operated the generator and shocker. The backpack shocker was used with one shocker operator and two or three netters. Population estimates were made using a two step depletion method (Seber and LeCren 1967). Sampled fish were identified, total lengths recorded in 5 mm groups, and subsamples were weighed in grams. Scale samples were taken to estimate length-at-annulus back-calculated from scale measurements.

Fish in the Big Wood River were counted while snorkeling in clear water following methods described by Thurow (1994). This entailed two adjacent snorkelers, within view of each other, working their way upstream through a sample site, counting fish as they went past them. The two snorkelers were in frequent contact with each other to avoid counting fish twice and to make sure all fish observed were enumerated and classified into a size group.

Redd counts were made on the Big Wood River by walking upstream through the prescribed reach within a week or two after the end of the spawning season for brown trout *Salmo trutta* and rainbow trout *Oncorhynchus mykiss*. All likely spawning areas within the study reaches were either observed by wading through the reach or from a high prominent place on the bank above the area.

Water temperature was monitored at two sites on Salmon Falls Creek, two sites on the Jarbidge River, one site on the Bruneau River, and two sites on the Big Wood River. Ryan Tempmentor digital recording thermographs were used at the two sites on Salmon Falls Creek, and HOBO Boxcar recording thermographs were used at the other sites. The Ryan thermographs were programmed to record temperatures every 30 minutes and the HOBO thermographs were programmed to record temperatures every 48 minutes for a 60-day duration. Daily mean, maximum, and minimum temperatures were calculated from the daily measurements.

RESULTS AND DISCUSSION

Big Wood River

On November 16, 1994, an annual count of brown trout redds was made in the Big Wood River from the mouth of Rock Creek to the pond upstream of Stanton Crossing. A total of 97 redds were observed within the entire reach, which is the highest number observed since 1988 (Table 1). The reach of Rock Creek between the Highway 20 culvert and its confluence with the Big Wood River was also surveyed, with no redds observed.

On April 20 1994, a rainbow trout redd count was made in the Big Wood River downstream of Magic Reservoir. A total of four redds were observed between the dam and the Richfield Canal diversion.

Fish were monitored in the Big Wood River artificial stream channel created in 1991 by the highway realignment project and immediately downstream near the Lake Creek public access site to measure effects the project has had on fish populations. Fish have been monitored by electrofishing at these two sites several times before the realignment project (Thurrow 1990; Partridge and Corsi 1990, 1993) and after the realignment (Partridge and Warren 1994; Warren and Partridge 1994). The Lake Creek site was 1,200 m long, and the artificial channel site was 1,000 m long. Monitoring was done on September 20 and 22, 1994 by snorkeling three randomly selected 100 m long stream sections within each of the two sites. Total numbers of wild rainbow trout less than 100 mm in total length was 42 in the artificial stream channel site and 10 in the Lake Creek site (Table 2). It should be noted that 40 of those 42 were observed within one 100 m long stream section. There were a total of six wild rainbow trout 200 mm long or greater observed within the artificial stream channel site and 12 observed within the Lake Creek site. Instream habitat was also classified at each site (Table 3).

Temperature profiles were measured with HOBO recording thermographs at the Croy Creek bridge in Hailey and at the Highway 75 bridge downstream of the North Fork confluence from July 24 to September 20, 1994. Maximum temperature recorded was 21.0°C and maximum daily average temperature was 17.1°C, both of which occurred at the Croy Creek bridge on July 24, the first full day of recorded temperatures (Table 4). It is possible that the maximum temperature for the year actually occurred before placement of the thermographs.

Due to abnormally low flows in the Big Wood River system in 1994, all water was shut off and diverted from the natural channel at the Broadford diversion on August 12, 1994. During normal water years some water is left in the natural stream channel until it reaches the Glendale diversion, approximately 4 km downstream of the Broadford diversion. As a result, Department personnel electrofished and salvaged approximately 1,476 rainbow trout, brook trout *Salvelinus fontinalis*, and mountain whitefish *Prosopium williamsoni* within that dewatered reach on August 12. All game fish collectively averaged 10.2 fish/kg. Approximately 98% of the game fish salvaged were rainbow trout. Other fish salvaged include approximately 248 bridgelip sucker

Table 1. Brown trout redd counts on the Big Wood River and Rock Creek upstream of Magic Reservoir.

Date	Area 1	Big Wood River ^a			Total	Rock Creek
		Area 2	Area 3	Area 4		
Nov 19, 1986		26	b	96	122	
Nov 19, 1987	104	62 ^c		30	196	
Nov 15, 1988	13	75	31	39	158	
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	b	15	43	0
Nov 16, 1994	9	27	56	5	97	0

^a Reach 1 - Rock Creek to Sheep Bridge.

Reach 2 - Sheep Bridge to fence at U.S.G.S. station.

Reach 3 - Fence to Stanton Crossing.

Reach 4 - Stanton Crossing to Davis Pond.

Rock Creek - Highway 20 to mouth.

^b Combined with previous reach.

^c A total of 42 female brown trout were trapped and spawned from this reach by Hayspur Hatchery in 1987.

Section ^a	Total length Range (mm)	Wild rainbow trout	Hatchery rainbow trout	Mountain whitefish
<u>Lake Creek access site</u>				
400-500 m	0-99			
	100-199			
	200-299	7		
	300-399	2		8
	400-499			1
500-600 m	0-99			
	100-199			
	200-299			
	300-399	1		4
	400-499			
1100-1200 m	0-99	10		
	100-199			
	200-299			
	300-399	2		
	400-499			
Combined	0-99	10		
	100-199			
	200-299	7		
	300-399	5		12
	400-499			1
<u>Artificial stream channel site</u>				
500-600 m	0-99	40		
	100-199	3		
	200-299	1		
	300-399			
	400-499			
800-900 m	0-99			
	100-199			
	200-299	2		
	300-399	1		2
	400-499			1
900-1000 m	0-99	2		
	100-199	1		
	200-299	2		
	300-399		1	2
	400-499			
Combined	0-99	42		
	100-199	4		
	200-299	5		
	300-399	1	1	5
	400-499			

^a As measured from downstream boundary of site.

Table 3. Instream habitat types in three 100 m long randomly selected sections at each of two sites on the Big Wood River, September 1994.

<u>Hulen Meadows Site</u>			
<u>Reach^a</u>			
Habitat	400-500 m	500-600 m	1,100-1,200 m
Riffle	45%	80%	20%
Run	55%	20%	80%
Pool	0%	0%	0%

<u>Artificial Channel Site</u>			
<u>Reach^a</u>			
Habitat	500-600 m	800-900 m	900-1,000 m
Riffle	30%	80%	90%
Run	70%	20%	0%
Pool	0%	0%	10%

^a As measured from downstream boundary of site.

Table 4. Daily minimum, maximum and average water temperatures (Celsius) recorded on the Big Wood River at the Croy Creek bridge in Hailey and at the Hwy. 75 bridge downstream of the North Fork confluence.

Big Wood River at Croy Creek bridge in Hailey				Big Wood River downstream of North Fork confluence		
July 24 - September 20, 1994				July 24 - September 20, 1994		
MAXIMUM - 21.0 MINIMUM - 8.8 AVERAGE - 14.5				MAXIMUM - 19.1 MINIMUM - 5.1 AVERAGE - 11.8		
DATE	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
24-Jul-94	21.0	13.6	17.1	16.6	10.8	14.1
25-Jul-94	20.5	13.4	16.6	18.0	10.2	14.0
26-Jul-94	20.5	13.1	16.5	17.0	10.2	13.7
27-Jul-94	19.6	13.3	16.2	15.3	10.6	13.3
28-Jul-94	18.7	13.3	15.6	16.4	10.3	13.1
29-Jul-94	20.1	12.8	16.1	15.8	9.9	13.0
30-Jul-94	18.4	13.8	16.0	17.0	10.9	13.7
31-Jul-94	18.8	13.6	15.7	15.0	10.9	13.0
01-Aug-94	19.3	12.8	15.7	14.2	9.9	12.0
02-Aug-94	20.1	13.1	16.3	17.4	10.3	13.5
03-Aug-94	20.5	13.3	16.7	16.7	10.0	13.6
04-Aug-94	20.5	13.0	16.6	19.1	10.2	14.4
05-Aug-94	20.8	13.1	16.7	18.8	10.3	14.5
06-Aug-94	20.5	12.7	16.2	18.8	9.4	14.0
07-Aug-94	20.3	12.4	16.0	18.4	9.4	13.8
08-Aug-94	17.4	12.7	14.8	16.1	9.7	12.5
09-Aug-94	19.8	12.4	15.6	18.0	9.4	13.5
10-Aug-94	19.0	11.7	15.1	16.9	8.3	12.5
11-Aug-94	20.3	13.0	16.1	14.2	9.9	12.4
12-Aug-94	20.1	13.0	16.2	16.1	9.2	12.7
13-Aug-94	20.6	13.0	16.4	16.7	9.7	13.3

Table 4. Continued.

DATE	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
14-Aug-94	20.8	13.0	16.5	17.5	9.7	13.6
15-Aug-94	20.5	13.3	16.3	18.5	9.9	14.0
16-Aug-94	19.3	11.9	15.2	16.6	8.5	12.7
17-Aug-94	19.5	11.7	15.2	17.7	8.5	13.0
18-Aug-94	19.3	11.6	15.0	17.4	8.3	12.9
19-Aug-94	19.1	11.7	15.0	17.5	8.3	12.9
20-Aug-94	19.3	12.4	15.5	16.7	9.2	13.0
21-Aug-94	20.0	12.7	15.7	17.7	9.7	13.5
22-Aug-94	18.7	11.6	14.5	15.6	8.1	11.8
23-Aug-94	18.2	10.5	14.0	15.9	6.8	11.2
24-Aug-94	19.0	11.1	14.5	16.6	7.7	12.0
25-Aug-94	19.1	11.1	14.5	16.4	7.8	12.1
26-Aug-94	18.0	10.9	14.1	15.5	7.4	11.6
27-Aug-94	16.7	11.3	13.7	13.4	8.1	10.8
28-Aug-94	19.3	11.3	14.5	14.5	7.7	11.2
29-Aug-94	18.4	10.8	14.1	14.7	7.1	11.0
30-Aug-94	17.7	10.5	13.7	14.8	6.6	10.6
31-Aug-94	19.3	10.8	13.8	15.3	7.2	11.2
01-Sep-94	19.3	9.6	13.2	15.0	6.9	11.0
02-Sep-94	17.4	9.6	13.1	14.4	7.1	10.9
03-Sep-94	18.4	11.3	13.6	14.5	9.4	11.6
04-Sep-94	17.0	9.2	12.6	14.1	6.6	10.3
05-Sep-94	17.5	9.4	12.8	14.2	6.2	10.2
06-Sep-94	18.2	9.4	12.9	14.4	6.0	10.1
07-Sep-94	17.5	10.3	13.6	15.1	6.9	10.9
08-Sep-94	17.7	10.5	13.6	15.1	7.1	11.1
09-Sep-94	16.7	10.5	13.1	13.6	7.7	10.7
10-Sep-94	16.1	9.7	12.1	12.8	6.9	9.7

Table 4. Continued.

DATE	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
11-Sep-94	14.2	8.8	11.6	11.1	5.1	8.3
12-Sep-94	13.3	10.0	11.7	11.7	6.3	9.0
13-Sep-94	16.6	9.7	12.4	12.2	6.9	9.5
14-Sep-94	14.1	9.6	11.8	10.9	5.8	8.5
15-Sep-94	16.3	9.6	12.3	12.8	5.5	9.0
16-Sep-94	16.9	9.9	12.7	13.6	6.3	9.8
17-Sep-94	16.9	9.9	12.8	12.0	6.5	9.5
18-Sep-94	15.5	9.6	12.4	12.5	5.8	9.2
19-Sep-94	15.6	9.7	12.1	12.2	6.0	9.2
20-Sep-94	16.3	9.2	12.	12.5	5.7	9.1

Catostomus columbianus, dace *Rhinichthys sp.*, and Wood River sculpin *Cottus leiopomus*. All salvaged fish were put into a fish transport truck and released into the pond downstream of the Hulen Meadows bridge, which is adjacent to and part of the Big Wood River. Observed brown trout were left in the salvage area.

Birch Creek

Birch Creek was surveyed by electrofishing on August 9 and 10, 1994 with the Burley District of the Bureau of Land Management (BLM) to gather baseline data for monitoring effects that some of their range management strategies are having on fisheries. Results are given in the following survey data summary with fish length frequency results given in Table 5. Habitat data is summarized in Appendix A, which is copied directly from data sheets provided by the BLM.

SURVEY DATA SUMMARY

STREAM NAME: Birch Creek (Cassia County)
Watershed: Goose Creek

Site: Lower

Legal Description: T16S, R21E, SEC 26, NE1/4

Fish Survey

Date: August 9, 1994

Water Temperature: 22°C

Fish Sampling Method: Backpack shocker

Distance Sampled (m): 100

Population Estimate Model: n. a.

Sampling Results (See Table 5)

Species: Speckled dace *Rhinichthys osculus*

Total Fish Sampled: 87

Total Length Range (mm): 35-70

Habitat Survey

(See Appendix A)

Site: Middle

Legal Description: T16S, R22E, SEC30, SW1/4

Fish Survey

Date: August 10, 1994

Water Temperature: 14°C

Table 5 . Fish sampled by electrofishing three sites at Birch Creek with total length frequency in each 10 mm length group, percent of total measured, mean weight (g) of brook trout, and total numbers of each species collected, August, 1994.

Length Range (mm)	Upper Site Brook trout				Middle Site Brook trout				Lower Site Speckled dace	
	<u>Length</u> no. %		<u>Weight</u> avg.		<u>Length</u> no. %		<u>Weight</u> no. avg.		<u>Length</u> no. %	
0-9										
10-19										
20-29										
30-39									1	4.3
40-49										
50-59	1	3.7			6	19.4			2	8.7
60-69	2	7.4			6	19.4			17	73.9
70-79	7	25.9			4	12.9			2	8.7
80-89	11	40.7			5	16.1				
90-99	2	7.4	2	6	1	3.2	1	6		
			2	8						
100-109										
110-119										
120-129										
130-139					1	3.2	1	20		
140-149					3	9.7	3	27		
150-159					2	6.5	2	35		
160-169	1	3.7	1	40	1	3.2	1	40		
170-179										
180-189	1	3.7	1	61						
190-199	1	3.7	1	63	1	3.2	1	73		
200-209	1	3.7	1	76	1	3.2	1	90		
210-219										
220-229										
230-239										
240-249										
250-259										
260-269										
270-279										
280-289										
290-299										
Number:	27				31				23	
Avg length:	93				94				63	
Total Sampled:	27				31				87	

Fish Sampling Method: Backpack shocker
Population Estimate Model: Seber-LeCren 2 pass depletion
Distance Sampled (m): 100
Sampling Results (See Table 5)
Species: Brook trout
Total Sampled: 31
Total Length Range (mm) : 50-205
Population Estimate: 33
Standard Error: 2.31
Density (no./100 m²): n.a.

Habitat Survey
(See Appendix A)

Site: Upper

Legal Description: T16S, R22E, SEC32, SE1/4

Fish Survey

Date: August 10, 1994
Water Temperature: 14°C
Fish Sampling Method: Backpack shocker
Population Estimate Model: Seber-LeCren 2 pass depletion
Distance Sampled (m): 92
Sampling Results (See Table 5)
Species: Brook trout
Total Sampled: 27
Total Length Range (mm): 50-205
Population Estimate: 29
Standard Error: 2.91 Density
(no./100 m²): n.a.

Habitat Survey
(See Appendix A)

Bruneau River and Jarbidge River

HOBO recording thermographs were put into the Bruneau River in Sec34 T7S R6E for the time period between June 28 and August 7, 1994. Maximum temperature recorded for that time period was 31.4°C on July 25, 1994, and the maximum daily average temperature was 27.5°C which occurred on July 26, 1994 (Table 6). HOBO recording thermographs were also put into the Jarbidge River immediately downstream of the confluence of the East and West Forks of the Jarbidge in Sec 10 T16S R9E for the time period between June 29 and October 16, 1994. Maximum temperature recorded at that site for that time period was 24.0°C on July 25 and

Table 6. Daily minimum, maximum and average water temperature (Celsius) recorded on the Jarbidge and Bruneau Rivers, 1994.

	Downstream of confluence of East & West Fk. Jarbidge River			Jarbidge River upstream of mouth of Bruneau River			Bruneau River near Bruneau Hot Springs		
	June 29 - Oct. 16, 1994			June 28 - Sept. 23, 1994			June 28 - Aug. 7, 1994		
	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
	24.0	3.8	15.2	28.4	10.9	19.2	31.4	17.4	24.6
DATE	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
28-Jun-94				22.8	15.0	18.5	26.0	19.0	22.2
29-Jun-94	20.5	13.3	16.5	23.3	16.4	19.8	26.8	20.8	23.5
30-Jun-94	20.3	12.5	16.3	23.1	16.7	19.9	27.1	21.3	23.8
01-Jul-94	20.3	12.7	16.2	23.6	16.1	19.8	27.5	21.6	24.2
02-Jul-94	18.4	13.1	15.7	21.3	16.9	19.3	26.4	21.3	23.6
03-Jul-94	19.8	12.0	15.6	21.1	14.7	17.8	24.0	19.6	21.6
04-Jul-94	17.5	10.9	14.1	21.0	14.2	17.7	24.8	18.4	21.2
05-Jul-94	15.6	11.9	13.4	17.7	13.8	16.0	22.3	19.0	20.4
06-Jul-94	16.9	10.3	12.9	20.1	12.5	15.6	23.3	17.4	19.8
07-Jul-94	20.0	10.5	14.7	22.3	13.9	17.9	25.9	18.4	21.8
08-Jul-94	21.6	12.4	16.5	24.3	15.6	19.8	27.1	20.1	23.4
09-Jul-94	21.4	13.8	17.4	23.8	16.9	20.4	25.5	20.8	23.4
10-Jul-94	22.1	14.2	17.6	24.3	17.7	20.6	26.0	21.1	23.2
11-Jul-94	21.1	12.5	16.5	24.1	15.8	19.8	26.4	20.0	23.0
12-Jul-94	21.4	12.4	16.5	23.8	15.9	19.7	26.4	19.8	23.0
13-Jul-94	21.6	12.4	16.6	24.1	15.8	19.7	27.1	20.6	23.5
14-Jul-94	21.8	13.0	17.0	24.8	16.4	20.2	27.8	20.6	24.0
15-Jul-94	22.6	13.1	17.5	25.4	16.7	20.6	28.8	21.1	24.6
16-Jul-94	22.4	14.2	18.0	25.9	17.4	21.2	28.9	21.6	25.1
17-Jul-94	22.1	14.8	18.4	26.4	18.5	21.9	29.5	21.9	25.6

Table 6. Continued.

DATE	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
18-Jul-94	23.5	14.5	18.5	26.2	18.5	22.0	28.4	23.3	25.5
19-Jul-94	22.9	14.5	18.3	25.4	18.4	21.2	27.5	21.6	24.2
20-Jul-94	23.6	13.6	18.1	26.4	17.2	21.1	29.5	21.0	24.8
21-Jul-94	23.8	14.1	18.7	26.6	17.9	21.8	30.0	22.1	26.0
22-Jul-94	22.3	15.3	18.9	25.5	18.7	22.0	29.5	22.8	25.8
23-Jul-94	21.0	16.7	18.9	24.5	20.0	22.0	29.5	23.8	26.2
24-Jul-94	22.8	14.8	18.7	25.7	18.2	21.6	30.4	22.9	26.4
25-Jul-94	24.0	15.3	19.5	28.0	19.1	23.0	31.4	23.8	27.3
26-Jul-94	22.9	15.9	19.5	27.5	20.0	23.4	31.1	24.7	27.5
27-Jul-94				28.4	20.3	23.4	31.0	24.1	27.2
28-Jul-94	20.8	15.9	18.5	27.1	19.8	22.6	31.1	24.1	26.8
29-Jul-94	20.8	15.3	18.2	24.7	19.0	21.7	29.3	23.5	26.0
30-Jul-94	22.9	16.1	19.1	24.3	20.1	22.0	28.0	24.5	26.1
31-Jul-94	21.3	16.3	18.7	24.1	19.3	21.6	28.5	23.8	26.1
01-Aug-94	21.4	15.8	18.2	25.9	19.5	21.9	29.5	23.1	25.8
02-Aug-94	20.1	14.2	17.1	25.7	18.8	21.6	30.8	22.8	25.9
03-Aug-94	22.6	13.8	17.8	27.3	18.2	22.1	30.8	22.9	26.4
04-Aug-94	24.0	14.2	18.8	27.7	19.0	22.7	30.6	23.8	26.9
05-Aug-94	23.5	15.1	19.2	27.5	19.1	22.6	29.8	23.3	26.4
06-Aug-94	23.6	14.5	18.9	26.9	18.4	22.0	29.6	22.9	25.9
07-Aug-94	23.1	13.9	18.4	26.6	17.5	21.5	30.0	21.8	25.6
08-Aug-94	19.6	15.3	17.6	23.5	18.8	20.6			
09-Aug-94	22.9	14.4	18.3	26.0	16.9	20.7			
10-Aug-94	20.1	15.0	17.7	24.0	17.7	20.7			
11-Aug-94	20.6	14.4	17.6	25.5	17.9	21.2			
12-Aug-94	21.8	14.8	18.2	24.0	18.7	20.9			
13-Aug-94	21.8	15.0	18.3	25.1	17.5	21.0			
14-Aug-94	21.0	15.0	18.2	24.8	18.4	21.4			

Table 6. Continued.

DATE	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
15-Aug-94	22.8	14.7	18.4	26.6	18.0	21.5			
16-Aug-94	22.1	13.1	17.5	25.5	16.7	20.5			
17-Aug-94	22.3	13.3	17.6	25.4	16.3	20.1			
18-Aug-94	22.3	13.4	17.6	25.7	16.4	20.3			
19-Aug-94	21.9	13.4	17.6	25.1	16.4	20.2			
20-Aug-94	21.4	14.2	17.7	25.5	17.0	20.6			
21-Aug-94	22.3	14.7	18.1	25.9	17.0	20.7			
22-Aug-94	20.6	13.0	16.6	24.1	16.1	19.5			
23-Aug-94	21.4	11.9	16.4	23.6	14.4	18.6			
24-Aug-94	21.3	12.5	16.7	24.8	15.1	19.3			
25-Aug-94	21.3	12.4	16.7	24.5	15.3	19.4			
26-Aug-94	20.3	12.4	16.2	23.5	15.1	19.0			
27-Aug-94	20.6	12.8	16.4	23.1	15.5	18.7			
28-Aug-94	21.6	14.2	17.4	24.5	15.6	19.3			
29-Aug-94	20.5	12.8	16.5	23.6	15.0	18.7			
30-Aug-94	19.6	11.6	15.5	22.8	13.9	17.8			
31-Aug-94	19.8	11.1	15.3	22.8	13.3	17.4			
01-Sep-94	17.5	11.9	14.9	22.9	13.9	17.8			
02-Sep-94	17.9	10.9	14.5	21.1	14.1	17.5			
03-Sep-94	19.0	12.2	15.3	21.9	14.5	17.7			
04-Sep-94	18.7	10.9	14.5	22.1	13.4	17.1			
05-Sep-94	18.7	9.9	14.2	22.1	12.4	16.5			
06-Sep-94	19.5	11.6	15.3	23.1	13.0	17.2			
07-Sep-94	20.1	11.9	15.8	24.1	13.9	18.3			
08-Sep-94	20.3	12.7	16.2	23.1	14.7	18.4			
09-Sep-94	18.5	12.2	15.1	21.1	14.1	17.1			
10-Sep-94	15.6	9.9	13.0	18.5	11.6	14.8			
11-Sep-94	15.5	8.8	12.1	17.4	10.9	14.0			

Table 6. Continued.

DATE	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
12-Sep-94	16.4	9.4	12.7	19.5	11.1	14.6			
13-Sep-94	13.1	10.2	11.8	15.9	12.0	13.4			
14-Sep-94	15.1	9.4	11.8	19.0	10.9	13.9			
15-Sep-94	16.4	9.1	12.4	20.0	11.4	14.8			
16-Sep-94	16.6	8.5	12.4	20.5	11.1	14.9			
17-Sep-94	16.3	10.0	13.1	20.0	11.9	15.3			
18-Sep-94				21.3	12.5	15.9			
19-Sep-94				21.3	12.5	16.0			
20-Sep-94				20.3	12.2	15.6			
21-Sep-94				20.5	11.9	15.3			
22-Sep-94				20.5	11.4	15.2			
23-Sep-94				20.5	11.3	15.1			
24-Sep-94									
25-Sep-94									
26-Sep-94									
27-Sep-94									
28-Sep-94	15.8	10.2	13.0						
29-Sep-94	13.9	12.2	12.8						
30-Sep-94	12.0	10.8	11.3						
01-Oct-94	14.7	10.3	12.1						
02-Oct-94	13.6	9.4	11.3						
03-Oct-94	9.9	6.2	7.8						
04-Oct-94	11.7	5.8	8.4						
05-Oct-94	9.9	7.7	8.8						
06-Oct-94	11.4	7.2	8.9						
07-Oct-94	11.6	5.8	8.5						
08-Oct-94	12.0	5.8	8.7						
09-Oct-94	12.2	5.8	9.0						

Table 6. Continued.

DATE	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
10-Oct-94	11.7	6.9	9.2						
11-Oct-94	11.4	8.3	9.6						
12-Oct-94	10.3	5.8	8.2						
13-Oct-94	10.0	7.8	8.7						
14-Oct-94	8.0	4.7	6.4						
15-Oct-94	5.2	3.8	4.5						
16-Oct-94	7.1	4.3	5.5						

August 4, 1994, and the maximum daily average temperature was 19.5°C which occurred on July 25, 1994. Another thermograph was put into the Jarbidge River upstream of its confluence with the Bruneau River in Sec5 T13S R7E. Maximum temperature recorded for that time period at that site was 28.4°C on July 27, 1994, and the maximum daily average temperature was 23.4°C on July 26 and 27, 1995.

Cedar Draw Creek

Cedar Draw Creek enters the Snake River from the south at NW Sec1 1 T9S R15E. During the summer it receives most of its flow from ground water sources and irrigation return flows which have a large amount of suspended sediments in it causing it to be extremely turbid. During the nonirrigation months, flows are reduced and water clarity is significantly improved. In an effort to reduce sediment loading into the Snake River from Cedar Draw Creek, the Idaho Department of Fish and Game (IDFG), North Side Canal Company, and Idaho Power Company are in the process of converting an old hatchery at the lower end of the stream into a desedimentation project. It will divert some of the water from Cedar Draw Creek into settling ponds before discharging it into the Snake River. Habitat measurements were taken utilizing most of the protocols for standardized stream surveys (IDFG 1992). Four reaches were surveyed between the mouth and approximately 200 m upstream of the hydropower plant outflow within the Snake River canyon (Figure 1). Results indicate that suitable gravel habitat is lacking for salmonid spawning (Table 7). Total discharge as measured at a transect within a few meters downstream of the bridge was 62.2 cfs on November 4, 1994. Water height on the gauge immediately downstream of the bridge read 4.0.

Cold Creek

Cold Creek was surveyed on August 9, 1994 with the Burley District of the BLM to gather baseline data for monitoring effects that some of their range management strategies are having on fisheries. Results are given in the following survey data summary with fish total length frequency results given in Table 8. Habitat data is summarized in Appendix A which is copied directly from data sheets provided by the BLM.

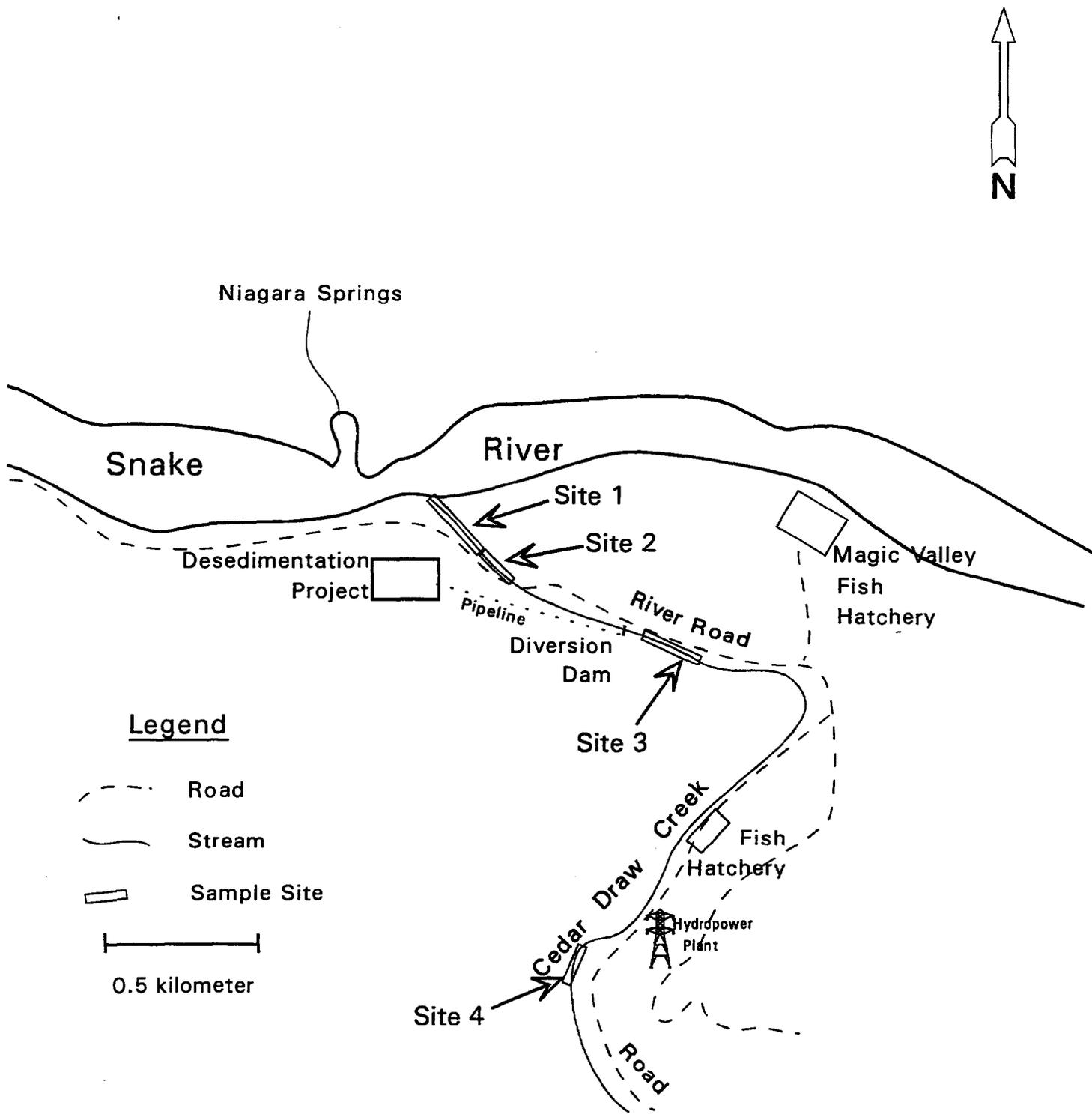


Figure 1. Map of lower Cedar Draw Creek with habitat survey sites, November 4, 1994.

Table 7. Habitat data collected from all sites surveyed in Cedar Draw Creek, November 4, 1994.

	Site			
	1	2	3	4
Reach length (m)	375	95	150	60
Mean width (m)	7.9	10.2	11.0	12.6
Mean depth (cm)	100-200 ^a	44.5	59.6	27.5
Habitat (%)				
Pool	0	0	0	0
Run	95	8	29	18
Pocket	0	8	0	27
Riffle	5	84	71	55
Backwater	0	0	0	0
Substrate Class (%)				
Sand	100	24	9	9
Gravel	0	5	0	0
Rubble	0	29	9	0
Boulder	0	42	82	91
Bedrock	0	0	0	0

^a River backwater area, too deep to wade.

Table 8 Fish sampled by electrofishing one site at Cold Creek with total length frequency in each 10 mm length group, percent of total measured, mean weights (g) of fish in some length groups, and total number of fish collected, August, 1994.

<u>Brook trout</u>				
Length Range (mm)	Length		<u>Weight</u>	
	no.	%	no.	avg.
0-9				
10-19				
20-29				
30-39				
40-49				
50-59	8	18.6		
60-69	6	14.0		
70-79	11	25.6		
80-89	6	14.0		
90-99	1	2.3		
100-109				
110-119				
120-129				
130-139				
140-149				
150-159				
160-169	1	2.3	1	50
170-179				
180-189				
190-199				
200-209	1	2.3	1	94
210-219	3	7.0	3	111
220-229	1	2.3	1	105
230-239	3	7.0	3	131
240-249	2	4.7	2	158
250-259				
260-269				
270-279				
280-289				
290-299				
Number:	43			
Avg length	105			
Total Sampled:	43			

SURVEY DATA SUMMARY

STREAM NAME: Cold Creek

Watershed: Goose Creek

Site: 8 km

Legal Description: NW SW and SW NW (below the forks)
Sec22 T15S R22E

Fish Survey

Date: August 9, 1994

Water Temperature: 15°C

Fish Sampling Method: Backpack shocker

Distance Surveyed (m): 96

Population Estimate Model: Seber. and LeCren 2 pass depletion

Sampling Results (See Table 8)

Species: Brook trout

Total Fish Sampled: 43

Total Length Range (mm): 50-245

Population Estimate: 50

Standard Error: 6.76

Density (no./100 m²): n.a.

Habitat Survey

(See Appendix A)

Little Wood River

The Idaho Division of Environmental Quality (DEQ) sampled fish from four sites of the Little Wood River with the assistance of the IDFG. This survey was done as part of DEQ's water quality monitoring plan. Results of the survey are given in the following survey data summary, with total length frequencies for brown trout given in Table 9.

SURVEY DATA SUMMARY

STREAM NAME: Little Wood River

Watershed: Wood River

Site: Cottonwood Slough

Legal Description: SE Sec6 T5S R19E

Fish Survey

Date: June 29, 1994 Water

Temperature: 18°C

Table 9. Brown trout sampled by electrofishing at the Pagan Bridge site of the Little Wood River with total length frequencies in each 10 mm length group, percent of total measured, mean weights (g) of fish in some length groups, and total number of fish sampled, June 1994.

Length Range (mm)	Brown trout		
	Length		Weight
	no.	%no.	avg.
0-9			
10-19			
20-29			
30-39			
40-49			
50-59			
60-69	1	2.61	1
70-79			
80-89			
90-99	2	5.12	9
100-109	2	5.12	13
110-119	7	17.93	17
120-129	4	10.33	20
130-139	2	5.12	25
140-149			
150-159			
160-169	2	5.11	51
170-179			
180-189	1	2.61	65
190-199	1	2.61	69
200-209	4	10.34	88
210-219	6	15.46	96
220-229	1	2.61	118
230-239	1	2.61	142
240-249	2	5.12	147
250-259	1	2.61	159
260-269			
270-279			
280-289			
290-299			
300-309	1	2.61	300
310-319	1	2.61	310
320-329			
330-339			
340-349			
Number:	39		
Avg length:	169		
Total	39		
Sampled:			

Fish Sampling Method: Coffelt VVP-15 electrofisher

Distance Surveyed (m): 118

Population Estimate Model: n.a.

Sampling Results

Species: Brown trout

Total Sampled: 1

Total length and weight: 470 mm, 1300 g

Species: Redside shiner *Richardsonius balteatus*

Total Sampled: 114

Total Length Range (mm): none measured

Species: Longnose dace *Rhinichthys cataractae*

Total Sampled: 178

Total Length Range (mm): none measured

Species: Bridgelip sucker

Total Sampled: 18

Total Length Range (mm): none measured

Habitat Survey

No habitat survey performed at this site

Site: Smith pasture

Legal Description: NE Sec34 T4S R19E

Fish Survey

Date: June 29, 1994

Water Temperature: 21°C

Fish Sampling Method: Coffelt VVP-15 electrofisher

Distance Surveyed (m):

Population Estimate Model: n.a.

Sampling Results

Species: Brown trout

Total Sampled: 1

Total length and weight: 195 mm, 85 g

Species: Redside shiner

Total Sampled: 305

Total Length Range (mm): none measured

Species: Speckled dace

Total Sampled: 368

Total Length Range (mm): none measured

Species: Longnose dace

Total Sampled: 13

Total Length Range (mm): none measured

Species: Bridgelip sucker
Total Sampled: 60
Total Length Range (mm): 75-210

Habitat Survey

No habitat survey performed at this site

Site: Richfield

Legal Description: SW NW Sec30 T4S R20E

Fish Survey

Date: June 30, 1994

Water Temperature: 20°C

Fish Sampling Method: Coffelt VVP-15 electrofisher

Distance Surveyed (m): 222

Population Estimate Model: n.a.

Sampling Results

Species: Brown trout

Total Sampled: 1

Total length (mm) : 65 mm

Species: Redside shiner

Total Sampled: 391

Total Length Range (mm): none measured

Species: Speckled dace

Total Sampled: 412

Total Length Range (mm): none measured

Species: Longnose dace

Total Sampled: 70

Total Length Range (mm): none measured

Species: Bridgelip sucker

Total Sampled: 90

Total Length Range (mm): none measured

Habitat Survey

No habitat survey performed at this site

Site: Pagari Bridge

Legal Description: NE Sec34 T3S R20E

Fish Survey

Date: June 30, 1994

Water Temperature: 22°C

Fish Sampling Method: Coffelt VVP-15 electrofisher

Distance Surveyed (m): 220

Population Estimate Model: n.a.

Sampling Results

Species: Brown trout (See Table 9)

Total Sampled: 39

Total length range (mm) : 60-315

Species: Redside shiner

Total Sampled: 182

Total Length Range (mm): none measured Species: Speckled dace

Total Sampled: 284

Total Length Range (mm): none measured

Species: Longnose dace

Total Sampled: 39

Total Length Range (mm): none measured

Species: Bridgelip sucker

Total Sampled: 63

Total Length Range (mm) :

Habitat Survey

No habitat survey performed at this site

Rock Creek Fish Kill Evaluation

A break in one of Amalgamated Sugar's waste water treatment ponds occurred on the afternoon of March 29, 1994 spilling water contaminated with high ammonia and COD levels into Rock Creek. Although of short duration, the spill created a toxic plume of water which killed fish downstream up to 8 km until diluted by inflows and aerated by turbulence. The IDFG was notified of dead fish in Rock Creek late on March 30 by concerned anglers. Methods used and results of the ensuing investigation are given in the Technical Guidance section of this report (Project II).

Salmon Falls Creek

Salmon Falls Creek was investigated by IDFG between Balanced Rock and Salmon Falls Creek Dam. Prior to any work performed on the stream, a video tape was made of the reach between its confluence with the Snake River upstream to Salmon Falls Creek Dam to identify possible fish barriers, as well as access sites into the canyon. Due to the nature of the steep narrow canyon and the side view from the aircraft, portions of the stream channel between Lily Grade and Salmon Falls Dam were not covered on the video tape. However, the majority of the stream was observed. Large rock slides with boulders exceeding 3 m across are common

throughout the canyon, and in many areas cover the entire stream channel. Although these slides have filled the canyon bottom, in most cases they are not barriers to fish movement. Inspection of some of these slides at sample sites found water flowing under and around the boulders which allowed fish to pass these slides. Not all slides were inspected, and it is possible that a large slide area in a reach west of Hollister may be an upstream barrier at current water flows. Additional barriers to fish movement in Salmon Falls Creek are seasonal dams located at several irrigation pump sites between Balanced Rock and the Snake River. Besides the dams, pumping during low water years can dewater short reaches of the stream during the summer in this lower reach.

A total of four sites between Lily Grade and Salmon Falls Creek Dam were investigated for fish species composition and instream habitat (Figure 2). Fish were also sampled at the Balanced Rock Park (approximately river mile 16) within a 234 m long reach, but no habitat assessment was made there. Habitat and flows in this reach have been altered by road and park construction which backs water up in the channel for several hundred meters. Total length of each site sampled between Lily Grade and Salmon Falls Creek Dam ranged from 98 to 190 m long. An effort was made to select sites which appeared to represent habitat types within the reach. Fish were sampled at the four sites between Lily Grade and Salmon Falls Creek Dam with the Smith-Root backpack shocker by electrofishing with the sampling crew working their way upstream. At the Balanced Rock Park site, the drift boat with the Coffelt VVP-15 electrofisher powered with a Honda 5000 generator was used. Two passes were made at the four sites that the backpack shocker was used. All fish were identified, measured, and enumerated from each pass. Fish species sampled included hatchery and wild rainbow trout, brook trout, smallmouth bass *Micropterus dolomieu*, largescale sucker *Catostomus macrocheilus*, bridgelip sucker, reidside shiner, northern squawfish *Ptychocheilus oregonensis*, speckled dace, longnose dace, chiselmouth chub *Acrocheilus alutaceus*, and mottled sculpin *Cottus bairdi* (Tables 10-14). Smallmouth bass were present at sites 1 and 2. Brook trout were sampled only at sites 3 and 4. Although wild rainbow trout were not sampled at Balanced Rock, they were found in all other sites. Wild rainbow trout were observed below Balanced Rock at Magic Water pump site in April 1993 (Warren and Partridge 1995). Nongame fish were sampled at all sites except site 4.

Scale samples for length-at-annulus estimates were taken from some of the game fish species (Tables 15 and 16). There is no length-at-annulus estimate table for wild rainbow trout from site 1 or brook trout from sites 3 or 4 because only age 0+ and 1 + fish were sampled from these sites. Mean back-calculated length to annulus one for 15 rainbow trout sampled from the 1993 year class at site one was 145 mm with a standard deviation of 33.59. Mean back-calculated length to annulus one for five brook trout sampled from the 1993 year class at site 4 was 134 mm with a standard deviation of 26.48. Of scale samples taken from brook trout at site 3, only one was age 1+ and the rest were age 0+.

A Seber-LeCren (1967) two-pass population estimate was made for game fish species. Fish population density estimates were based on total surface area of site sampled and total population estimates (Table 17). Population density estimates for wild rainbow trout ranged from 0.8 to 14.2 fish/100 m² at sites 1-4. Brook trout density estimates in sites 3 and 4 were 0.8 and 35.0/100 m², respectively. Smallmouth bass density, which was estimated only at site 1 due to

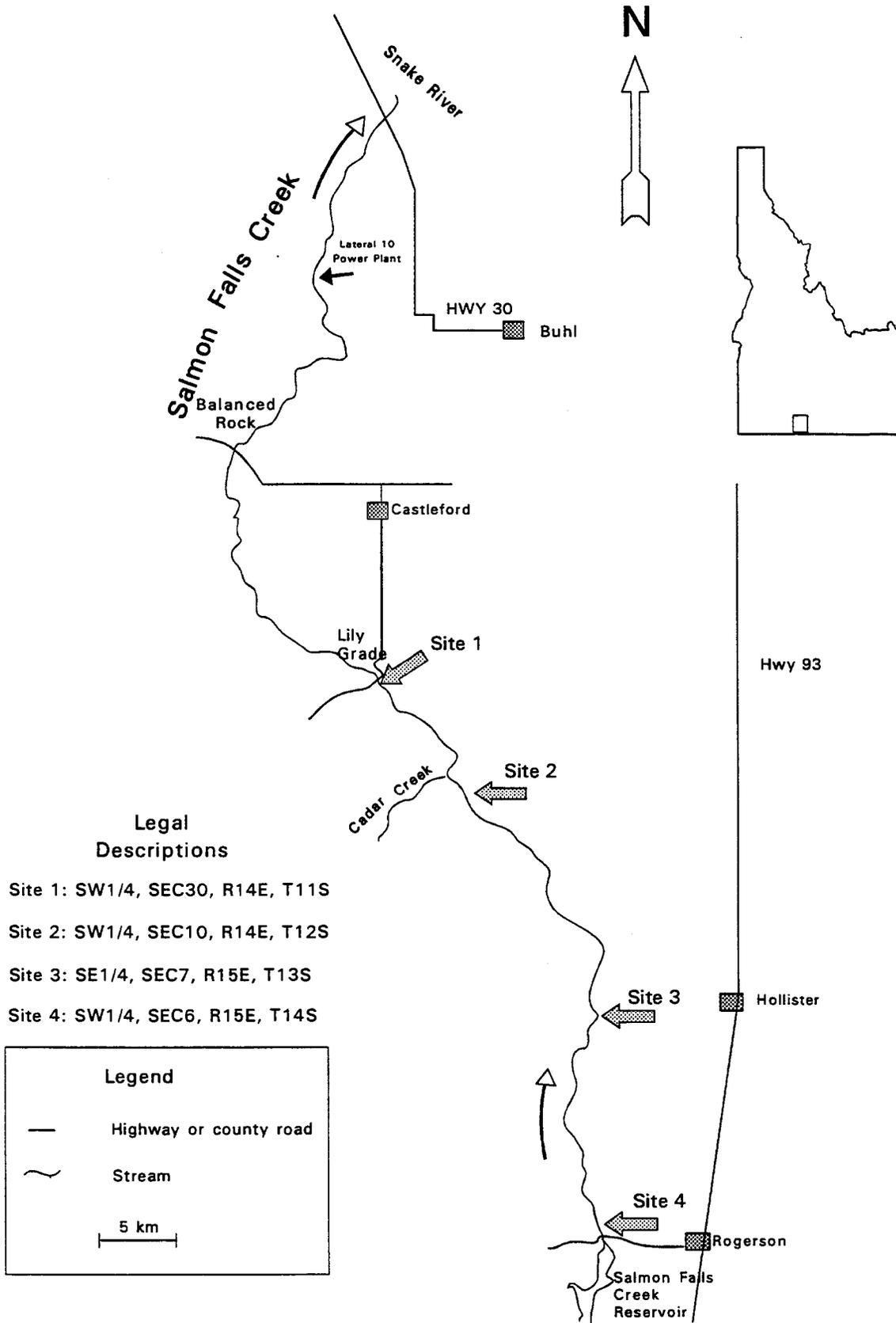


Figure 2. Map of Salmon Falls Creek depicting survey sites.

Table 10. Fish sampled by electrofishing at the Balanced Rock site of Salmon Falls Creek with total length frequency in each 10 mm length group, percent of total, mean weight (g) of hatchery rainbow trout and smallmouth bass, and total numbers of each species sampled, July, 1994.

Length Range (mm)	Hatchery rainbow trout				Smallmouth bass				Largescale sucker		Redside shiner		Northern squawfish	
	Length		Weight		Length		Weight		Length		Length		Length	
	no.	%	no	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	%
0-9														
10-19														
20-29														
30-39														
40-49														
50-59														
60-69														
70-79														
80-89											2	33.3		
90-99											1	16.7		
100-109											3	50.0		
110-119														
120-129					1	50.0	1	20						
130-139														
140-149														
150-159														
160-169														
170-179														
180-189														
190-199														
200-209														
210-219					1	50.0	1	90						
220-229													1	50.0
230-239	1	100.0	1	124										
240-249													1	50.0
250-259														
260-269														
270-279														
280-289														
290-299														
300-309														
310-319														
320-329														
330-339														
340-349														
350-359														
360-369														
370-379														
380-389														
390-399														
400-409														
410-419														
420-429														
430-439														
440-449														
450-459														
460-469								1	50.0					
470-479														
480-489														
490-499														
500-509								1	50.0					
510-519														
520-529														
530-539														
540-549														
Number.	1		1		2		2		2		6		2	
Avg length:	235				165				483		96		233	
Total sampled:	1		1		2		2		2		6		2	

Table 11. Fish sampled by electrofishing at site 1 of Salmon Falls Creek with total length frequency in each 10 mm length group, percent of total, mean weight (g) of wild rainbow trout and smallmouth bass and total numbers of each species sampled, July, 1994.

Length Range (mm)	Wild rainbow trout				Smallmouth bass				Northern squawfish		Speckled dace		Mottled sculpin		Bridgelip sucker		Chiselmouth chub		Longnose dace		Largescale sucker		Redside shiner	
	Length		Weight		Length		Weight		Length		Length		Length		Length		Length		Length		Length		Length	
	no.	%	no.	avg	no.	%	no.	avg	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-9																								
10-19																								
20-29																								
30-39													3	20.0										
40-49																								
50-59	1	3.2																						
60-69													2	13.3										924.3
70-79	1	3.2											4	26.7										616.2
80-89	1	3.2			1	4.3	1	8					5	33.3										25.4
90-99	1	3.2			3	13.0	3	11																
100-109												1	6.7											1129.7
110-119					1	4.3	1	20	1	2.9	2	100.0			1	14.3			1	50.0	1	16.7		821.6
120-129	1	3.2	1	20					2	5.7					1	14.3			1	50.0	1	16.7	1	2.7
130-139									3	8.6							6	33.3			2	33.3		
140-149	2	6.5	2	30					4	11.4							8	44.4			1	16.7		
150-159	1	3.2	1	45	1	4.3	1	50	3	8.6							3	16.7						
160-169					1	4.3	1	60																
170-179	1	3.2	1	54	3	13.0	3	65	6	17.1					1	14.3	1	5.6						
180-189	2	6.5			3	13.0	3	72	9	25.7					1	14.3								
190-199	4	12.9	4	77	1	4.3	1	94	4	11.4					2	28.6					1	16.7		
200-209	4	12.9	4	84	4	17.4	4	107	2	5.7														
210-219	3	9.7	3	97	1	4.3	1	138	1	2.9														
220-229	1	3.2	1	98																				
230-239	3	9.7	3	125	1	4.3	1	148																
240-249					1	4.3	1	180							1	14.3								
250-259	2	6.5	1	158																				
260-269					1	4.3	1	252																
270-279	1	3.2	1	176	1	4.3	1	260																
280-289																								
290-299																								
300-309	1	3.2	1	258																				
310-319																								
320-329																								
330-339																								
340-349	1	3.2	1	355																				
350-359																								
360-369																								
370-379																								
380-389																								
390-399																								
Number:	31		24		23		23		35		2		15		7		18		2		6		37	
Avg length:	192				177				166		113		68		173		143		115		138		89	
Total																								
Sampled:	31				23				70		2		15		7		18		2		6		179	

Table 12. Fish sampled by electrofishing at site 2 of Salmon Falls Creek with total length frequency in each 10 mm length group, percent of total, mean weight (g) of wild rainbow trout and smallmouth bass and total numbers of each species sampled, October, 1994.

Length Range (mm)	Wild rainbow trout		Smallmouth bass		Bridgelip sucker	Mottled sculpin	Bedside shiner	Speckled dace	Northern squawfish
	Length no.	Weight %	Length no.	Weight %	Length no.	Length no.	Length no.	Length no.	Length no.
0-9									
10-19									
20-29									
30-39							6 50.0		
40-49						1 7.7	5 41.7	2 66.7	
50-59						3 23.1	1 8.3	1 33.3	
60-69					1 12.5	4 30.8			
70-79					1 12.5	1 7.7			
80-89						3 23.1			
90-99						1 7.7			
100-109									
110-119									1 11.1
120-129									1 11.1
130-139						1 12.5			2 22.2
140-149				2 14.3	2 37				
150-159				2 14.3	2 45	2 25.0			
160-169				1 7.1	1 59	2 25.0			
170-179	1 11.1	1 56	4 28.6	4 63					2 22.2
180-189	1 11.1	1 54	1 7.1	1 84					3 33.3
190-199	1 11.1	1 66	1 7.1	1 86					
200-209									
210-219	3 33.3	3 84			1 12.5				
220-229			1 7.1	1 142					
230-239			1 7.1	1 164					
240-249									
250-259	1 11.1	1 142							
260-269	2 22.2	2 180	1 7.1	1 216					
270-279									
280-289									
290-299									
300-309									
310-319									
320-329									
330-339									
340-349									
350-359									
360-369									
370-379									
380-389									
390-399									
Number:	9		14		8	13	12	3	9
Avg length:	217		18		141	65	39	43	158
Total			1						
Sampled:	9				8	13	12	3	9

Table 13. Fish sampled by electrofishing at site 3 of Salmon Falls Creek with total length frequency in each 10 mm length group, percent of total, mean weight (g) of wild rainbow trout and brook trout, and total numbers of each species sampled, July, 1994.

Length Range (mm)	Wild trout		Brook trout		Bridgelip sucker		Chiselmout chub		Longnose dace		Mottled sculpin		Redside shiner		Speckled dace		Northern squawfish			
	Length		Weight		Length		Length		Length		Length		Length		Length		Length			
	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%		
0-9																				
10-19																				
20-29																				
30-39										2	18.2	2	10.0	1	2.0					
40-49	1	2.5					1	2.6			7	35.0	1	2.0						
50-59	3	7.5								1	9.1	1	5.0							
60-69	2	5.0								2	18.2	2	10.0	1	2.0	1	50			
70-79	1	2.5			1	12.5				1	9.1	2	10.0	2	4.1					
80-89	1	2.5			4	50.0	1	5		3	27.3	4	20.0	19	38.8					
90-99					1	12.5				1	9.1	2	10.0	13	26.5	1	50			
100-109					1	12.5	1	12	1	2.6	1	9.1		11	22.4					
110-119									7	18.4	1	25.0								
120-129									11	28.9	2	50.0						1	10.0	
130-139									2	5.3	1	25.0						2	20.0	
140-149									11	28.9								2	20.0	
150-159	6	15.0	5	35					3	7.9								1	10.0	
160-169	3	7.5	2	43	1	12.5	1	45	1	2.6										
170-179	4	10.0	2	55														2	20.0	
180-189	6	15.0	2	57					1	2.6								1	10.0	
190-199	9	22.5	4	74														1	10.0	
200-209	1	2.5	1	78																
210-219	2	5.0	2	92																
220-229																				
230-239																				
240-249																				
250-259	1	2.5	1	138																
260-269																				
270-279																				
280-289																				
290-299																				
300-309																				
310-319																				
320-329																				
330-339																				
340-349																				
350-359																				
360-369																				
370-379																				
380-389																				
390-399																				
Number:	40				8			38		4		11		20		49		2	10	
Avg length:	157							96		129		125		68		60		85	75	155
Total																				
Sampled:	40							8		38		4		11		20		49	2	10

Table 14. Fish sampled by electrofishing at site 4 of Salmon Falls Creek with total length frequency in each 10 mm length group, percent of total, mean weight (g) of fish sampled, and total numbers of each species sampled, August, 1994.

Length Range (mm)	Wild rainbow trout				Brook trout			
	<u>Length</u>		<u>Weight</u>		<u>Length</u>		<u>Weight</u>	
	no.	%	no.	ava.	no.	%	no.	ava.
0-9								
10-19								
20-29								
30-39								
40-49	1	2.0						
50-59	1	2.0						
60-69					3	1.8		
70-79					14	8.3		
80-89					18	10.7	1	4
90-99					21	12.4		
100-109					27	16.0	4	13
110-119	1	2.0	1	18	15	8.9	3	15
120-129					1	0.6		
130-139	3	6.0	2	22	1	0.6		
140-149	1	2.0			1	0.6		
150-159	3	6.0	2	41	1	0.6		
160-169	4	8.0	1	36				
170-179	5	10.0	2	56				
180-189	6	12.0	3	60	1	0.6		
190-199	3	6.0	1	92	13	7.7	1	84
200-209	2	4.0			11	6.5	3	99
210-219	4	8.0	2	112	15	8.9	3	117
220-229	4	8.0	2	113	10	5.9		
230-239	1	2.0			8	4.7	2	142
240-249	3	6.0	1	140	6	3.6	2	175
250-259	2	4.0	1	162	2	1.2	2	198
260-269	1	2.0			1	0.6		
270-279	4	8.0	4	205				
280-289								
290-299								
300-309								
310-319								
320-329								
330-339								
340-349								
350-359								
360-369								
370-379	1	2.0	1	500				
380-389								
390-399								
Number:	50				169			
Avg length:	195				142			
Total								
Sampled:	50				169			

Table 15. Back-calculated length-at-annulus (mm) for smallmouth bass sampled from Salmon Falls Creek. Standard deviation is in parentheses.

Site 1, July 13, 1994					
Year class	Number of fish	Mean length at annulus			
		1	2	3	4
1993	3	62 (0.96)			
1992	9	88 (7.33)	148 (17.70)		
1991	2	82 (10.00)	153 (19.62)	218 (17.25)	
			102 (-)	153 (-)	
			145	196	
Site 2, October 18, 1994					
Year class	Number of fish	Mean length at annulus			
		1	2	3	
1993	7	105 (12.23)			
1992	9	72 (2.33)	117 (6.51)		
1991	2	81 (18.47)	142 (6.22)	199 (7.16)	
Weighted avg. length		91	125	199	

Table 16. Back calculated length-at-annulus (mm) for wild rainbow trout sampled from Salmon Falls Creek. Standard deviation is in parentheses.

Site 2, October 18, 1994

Year class	Number of fish	Mean length at annulus	
		1	2
1993	5	117 (15.83)	
1992	4	124 (35.68)	171 (89.75)
Weighted avg. length		120	171

Site 3, August 16, 1994

Year class	Number of fish	Mean length at annulus		
		1	2	3
1993	17	128 (14.74)		
1992	(none sampled)	-	-	
1991	1	114 (-)	168 (-)	223 (-)
Weighted avg. length		127	168	223

Site 4, August 22, 1994

Year class	Number of fish	Mean length at annulus		
		1	2	3
1993	14	98 (16.71)		
1992	6	110 (17.02)	199 (26.56)	
1991	1	129 (-)	220 (-)	297 (-)
Weighted avg. length		103	202	297

Table 17. Salmon Falls Creek game fish population estimates, standard errors, and densities for sites electrofished.

	Site			
	1	2	3	4
Date	7/13/94	10/18/94	8/16/94	8/22/94
Wild rainbow trout				
Population estimate	32	12	88	131
Standard error	1.03	6.00	68.69	120.99
Density (no./100 m ²)	3.2	0.8	7.9	14.2
Brook trout				
Population estimate			8	322
Standard error			^a	93.34
Density (no./100 m ²)			0.8	35.0
Smallmouth bass				
Population estimate	25	^b		
Standard error	2.55			
Density (no./100 m ²)	2.6			

^a Standard error of population estimate of brook trout at site 3 was not calculable with second removal pass catch equal to 0.

^b Both first and second removal pass catches were equal to 7 smallmouth each at site 2.

sampling efficiency, was 2.6 fish/100 m². Population estimates were not made on nongame fish due to sampling inefficiencies on small fish.

Ten each of the brook and rainbow trout sampled from site 4 were preserved on ice in the field, then frozen and transported to the IDFG Health Laboratory to be tested for Bacterial Kidney Disease (BKD) *Renibacterium salmoninarum* and whirling disease *Myxosoma cerebralis*. For BKD testing, the 10 fish were pooled into 2 groups of 5 fish each. Tests were run utilizing the Enzyme Linked Immuno-Sorbant Assay (ELISA) and Florescent Antibody Test (FAT) procedures. Fish health laboratory test results for BKD were positive (low) utilizing the ELISA procedure and negative utilizing the FAT procedure on both rainbow and brook trout. Whirling disease samples were negative for brook trout but presumptive positive for rainbow trout. This designation was given because the State of Nevada stocked whirling disease positive rainbow trout in Salmon Falls Creek upstream of Salmon Falls Creek Reservoir in the 1980s and unidentified *Myxosoma sp.* spores were found in some of the samples sent from the study reach. It will require sending in more samples to make a definitive identification.

Habitat assessments were made at the four sites utilizing IDFG standardized stream survey protocols. Instream substrate consisted mainly of fines (sand and organic silt) and boulder. These two groups accounted for 85% to 95% of the substrate in sites 1-4 (Table 18). The highest gradient measured was within site 4, which was 5% over the entire 98 m reach. Due to the areas of boulders, the stream gradient is a stair step system of flat pool/run areas above boulder areas with steeper gradients. Stream channel type for all sites surveyed was confined. Total stream discharge as measured at the Lily Grade site on August 4, 1994 using a Marsh-McBirney flow meter and methods described by Platts et al. (1983) was 11.87 cubic feet per second (cfs).

Water temperature profiles were measured at two sites on Salmon Falls Creek using continuously recording Ryan TempMentor thermographs. One thermograph was set approximately 20 m upstream of the Lily Grade crossing within site one between the dates of May 14 and September 22, 1994, and another thermograph was set approximately 10 m upstream of the Lateral 10 power plant outflow between June 11 and October 17, 1994. Both thermographs were completely submerged within the main channel of the stream and set to record ambient water temperature every 30 minutes. Maximum water temperature at Lily Grade between May 14 and September 22, 1994 was 25.8°C (Table 19). Maximum recorded water temperature immediately upstream of the Lateral 10 hydro inflow between June 11 and October 17, 1994 was 24.0°C (Table 19). Daily average water temperatures averaged 1.6 C warmer at Lily Grade than downstream near Lateral 10 hydro, with a maximum difference of 3°C on August 6, 1994.

Silver Creek

A private instream habitat enhancement project was undertaken by a privat landowner in September 1994 on a reach of Silver Creek which flows through his property located at Sec7 T2S R21E. The project was contracted out to a private habitat consultant. Work performed included

Table 18. Habitat data collected from all sites surveyed in the Salmon Falls Creek drainage, 1994.

	Site			
	1	2	3	4
Reach length (m)	190.6	150.0	147.0	97.8
Mean width (m)	5.1	9.7	7.6	9.4
Mean depth (cm)	49.1	20.8	36.4	43.5
Habitat (%)	43.3	0.0	67.0	80.0
Pool				
Run	43.3	29.0	8.0	0.0
Pocket	3.3	25.0	0.0	0.0
Riffle	6.7	8.0	25.0	20.0
Backwater	3.3	21.0	0.0	0.0
Dry	0.0	17.0 ^a	0.0	0.0
Substrate Class (%)	41.0	50.0	54.6	22.3
Sand				
Gravel	6.7	3.8	4.6	4.0
Rubble	8.3	0.4	0.0	5.0
Boulder	44.0	45.8	40.8	68.7
Bedrock	0.0	0.0	0.0	0.0

^a Exposed rock outcroppings.

Table 19. Daily minimum, maximum and average water temperatures (Celsius) recorded at Lily Grade and immediately upstream of the Lateral 10 hydropower outflow.

	Salmon Falls Creek at Lily Grade			Salmon Falls Creek upstream of Lateral 10 hydropower outflow		
	May 14 - Sept. 22, 1994			June 11 - Oct. 17, 1994		
	MAXIMUM	25.8		MAXIMUM	24.0	
	MINIMUM	10.3		MINIMUM	13.0	
	AVERAGE	18.9		AVERAGE	18.2	
DATE	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
14-May-94	18.2	13.3	15.9			
15-May-94	16.9	15.0	15.8			
16-May-94	14.8	13.1	13.9			
17-May-94	14.1	11.5	12.8			
18-May-94	13.6	11.4	12.5			
19-May-94	13.1	10.9	12.2			
20-May-94	13.2	10.7	12.0			
21-May-94	16.5	10.3	13.4			
22-May-94	18.4	12.3	15.3			
23-May-94	20.2	13.9	17.0			
24-May-94	21.1	15.0	18.1			
25-May-94	21.8	15.6	18.7			
26-May-94	21.9	16.5	19.4			
27-May-94	19.6	17.2	18.4			
28-May-94	18.7	15.0	17.0			
29-May-94	20.2	15.1	17.6			
30-May-94	21.1	15.2	18.3			
31-May-94	19.3	16.2	17.2			
01-Jun-94	19.3	14.8	16.6			
02-Jun-94	20.3	14.4	17.5			
03-Jun-94	21.5	16.8	19.1			

Table 19. Continued.

DATE	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
04-Jun-94	21.4	16.2	19.0			
05-Jun-94	22.4	16.5	19.5			
06-Jun-94	20.4	16.2	18.1			
07-Jun-94	16.5	13.1	15.0			
08-Jun-94	18.3	12.3	15.3			
09-Jun-94	19.9	13.7	16.8			
10-Jun-94	21.1	14.8	18.0			
11-Jun-94	21.4	16.5	19.2	21.3	15.3	18.3
12-Jun-94	22.0	18.0	20.1	20.7	16.5	18.7
13-Jun-94	20.9	17.8	19.3	19.1	15.7	17.7
14-Jun-94	18.9	14.4	16.7	18.8	13.2	15.7
15-Jun-94	18.7	13.3	16.1	19.1	13.1	15.5
16-Jun-94	18.0	13.4	15.8	18.3	13.0	15.4
17-Jun-94	19.3	13.3	16.4	19.6	13.0	16.1
18-Jun-94	21.0	15.3	18.1	20.8	14.3	17.3
19-Jun-94	22.0	16.2	19.1	21.6	15.0	17.9
20-Jun-94	22.8	17.4	20.2	22.2	15.8	18.6
21-Jun-94	22.0	18.6	20.5	20.6	16.7	18.6
22-Jun-94	22.8	18.2	20.6	22.0	16.5	18.9
23-Jun-94	23.6	18.0	20.8	22.5	16.2	19.0
24-Jun-94	23.2	17.8	20.6	21.8	15.7	18.5
25-Jun-94	24.1	18.3	21.3	22.8	15.9	19.0
26-Jun-94	22.3	18.8	20.8	20.6	15.9	18.0
27-Jun-94	21.0	16.4	19.0	20.0	14.1	17.1
28-Jun-94	22.6	17.1	19.9	22.0	15.3	18.5
29-Jun-94	24.0	18.9	21.3	22.5	16.6	19.3
30-Jun-94	23.6	19.0	21.4	22.6	16.3	19.2
01-Jul-94	24.1	18.7	21.5	23.0	16.2	19.2

Table 19. Continued.

DATE	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
02-Jul-94	22.1	19.1	20.8	21.3	16.6	18.7
03-Jul-94	21.4	17.3	19.4	20.0	14.8	17.3
04-Jul-94	20.8	16.0	18.4	20.0	14.1	16.8
05-Jul-94	19.5	16.9	18.1	18.2	15.2	16.6
06-Jul-94	18.5	15.0	16.6	19.1	13.6	16.0
07-Jul-94	21.2	15.3	18.1	21.2	14.6	17.8
08-Jul-94	22.8	17.1	19.9	22.1	15.7	18.9
09-Jul-94	22.0	18.4	20.5	21.6	16.4	19.0
10-Jul-94	22.6	18.3	20.2	21.4	16.3	18.5
11-Jul-94	22.3	17.0	19.7	20.9	14.7	17.7
12-Jul-94	22.4	17.1	19.7	21.4	15.0	17.8
13-Jul-94	22.8	17.5	20.1	21.2	15.3	18.1
14-Jul-94	23.2	18.1	20.6	21.9	15.8	18.6
15-Jul-94	23.7	18.3	21.0	22.5	15.9	19.0
16-Jul-94	24.1	19.5	21.8	22.4	16.4	19.3
17-Jul-94	24.9	20.2	22.5	22.6	17.1	19.8
18-Jul-94	24.5	20.2	22.3	22.4	17.1	19.7
19-Jul-94	23.5	19.4	21.5	21.6	15.9	18.8
20-Jul-94	23.8	18.6	21.2	22.3	15.8	19.0
21-Jul-94	24.3	19.4	21.8	23.4	16.5	19.9
22-Jul-94	24.1	20.2	22.2	23.4	17.0	20.1
23-Jul-94	23.3	20.8	22.1	22.1	18.5	20.0
24-Jul-94	24.0	19.6	21.8	22.7	17.1	19.8
25-Jul-94	25.3	20.5	22.8	23.8	17.4	20.5
26-Jul-94	25.8	21.1	23.4	23.9	18.0	20.8
27-Jul-94	25.1	21.7	23.4	24.0	18.6	20.9
28-Jul-94	24.6	21.1	22.7	23.5	18.0	20.5

Table 19. Continued.

DATE	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
29-Jul-94	23.0	20.4	21.8	22.0	17.4	19.8
30-Jul-94	23.5	20.8	22.0	22.0	18.0	19.9
31-Jul-94	23.5	20.4	21.9	22.6	17.6	20.0
01-Aug-94	23.3	20.1	21.7	22.6	17.6	20.0
02-Aug-94	23.1	19.6	21.4	23.0	17.1	19.9
03-Aug-94	24.2	19.3	21.7	22.8	17.0	20.0
04-Aug-94	25.3	20.5	22.8	23.1	17.0	20.1
05-Aug-94	25.6	21.0	23.2	23.2	17.4	20.2
06-Aug-94	24.6	20.4	22.4	22.3	16.5	19.4
07-Aug-94	24.4	19.9	22.2	22.4	16.3	19.4
08-Aug-94	22.5	20.8	21.7	20.7	17.2	19.0
09-Aug-94	23.2	19.1	21.1	21.4	16.2	18.7
10-Aug-94	21.8	20.0	21.0	20.2	17.1	18.7
11-Aug-94	23.3	19.1	21.2	22.2	16.4	19.1
12-Aug-94	23.6	20.1	21.8	21.2	17.3	19.4
13-Aug-94	24.1	20.2	22.1	22.4	16.8	19.6
14-Aug-94	24.3	20.3	22.2	22.3	16.8	19.8
15-Aug-94	23.9	20.2	22.0	21.6	16.8	19.4
16-Aug-94	23.2	19.1	21.1	20.8	15.8	18.4
17-Aug-94	22.6	18.4	20.5	20.9	15.5	18.2
18-Aug-94	22.6	18.7	20.6	21.0	15.6	18.4
19-Aug-94	22.3	18.9	20.5	20.5	15.6	18.2
20-Aug-94	22.1	19.0	20.5	20.7	15.9	18.5
21-Aug-94	22.6	19.5	21.0	21.2	16.4	18.8
22-Aug-94	21.3	18.5	20.0	19.3	15.3	17.5
23-Aug-94	20.7	16.8	18.8	19.6	14.3	17.0
24-Aug-94	21.3	17.4	19.3	19.9	14.7	17.4

Table 19. Continued.

DATE	MAXIMUM	MINIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE
25-Aug-94	21.3	17.5	19.4	20.1	15.0	17.6
26-Aug-94	20.8	17.6	19.3	19.9	14.8	17.5
27-Aug-94	20.4	17.5	18.9	19.4	15.3	17.4
28-Aug-94	21.3	17.7	19.5	20.3	15.6	17.9
29-Aug-94	20.4	17.7	19.1	19.2	15.2	17.2
30-Aug-94	19.3	16.2	17.8	18.2	14.1	16.2
31-Aug-94	19.3	15.5	17.4	18.7	13.7	16.3
01-Sep-94	19.5	16.0	17.7	19.0	14.2	16.6
02-Sep-94	19.0	16.1	17.6	18.6	14.5	16.6
03-Sep-94	19.3	16.1	17.7	18.7	14.8	16.7
04-Sep-94	18.6	15.6	17.1	18.1	14.1	16.0
05-Sep-94	18.4	14.7	16.6	18.1	13.2	15.7
06-Sep-94	19.3	15.3	17.2	18.9	14.0	16.3
07-Sep-94	19.9	16.5	18.1	19.2	14.9	17.0
08-Sep-94	20.2	16.9	18.5	19.2	15.0	17.1
09-Sep-94	19.2	16.5	17.9	18.1	14.4	16.2
10-Sep-94	17.7	14.8	16.3	17.4	13.4	15.3
11-Sep-94	16.8	14.1	15.5	16.8	13.2	15.0
12-Sep-94	15.7	13.9	14.9	16.3	13.4	14.8
13-Sep-94	16.0	13.6	14.8	16.6	13.5	14.9
14-Sep-94	15.7	13.6	14.6	16.8	13.4	14.8
15-Sep-94	16.4	13.2	14.8	17.1	13.3	15.0
16-Sep-94	16.8	13.4	15.0	17.4	13.3	15.3
17-Sep-94	17.1	14.0	15.6	17.6	13.6	15.5
18-Sep-94	18.0	14.4	16.1	17.6	14.1	15.7
19-Sep-94	17.9	14.7	16.2	17.9	13.9	15.8
20-Sep-94	17.6	14.7	16.1	17.6	14.1	15.7

Table 19. Continued.

DATE	MAXIMU M	MINIMU M	AVERAGE	MAXIMU M	MINIMU M	AVERAGE
21-Sep-94	17.2	14.6	15.9	17.4	13.9	15.6
22-Sep-94	16.8	13.7	15.1	17.4	13.6	15.3
23-Sep-94				17.4	13.3	15.2
24-Sep-94				17.3	13.2	15.1
25-Sep-94				17.2	13.2	15.1
26-Sep-94				16.8	13.4	15.0
27-Sep-94				16.8	13.4	14.9
28-Sep-94				16.8	13.3	15.1
29-Sep-94				15.7	14.9	15.3
30-Sep-94				15.0	14.5	14.7
01-Oct-94				16.8	14.2	15.3
02-Oct-94				15.8	13.1	14.6
03-Oct-94				13.1	11.8	12.5
04-Oct-94				12.8	11.1	11.9
05-Oct-94				13.7	12.1	12.9
06-Oct-94				13.4	11.6	12.6
07-Oct-94				13.4	11.4	12.4
08-Oct-94				13.7	11.1	12.4
09-Oct-94				14.3	11.6	12.9
10-Oct-94				14.3	12.1	13.2
11-Oct-94				14.6	12.4	13.4
12-Oct-94				13.6	11.8	12.8
13-Oct-94				13.1	12.1	12.6
14-Oct-94				12.4	11.0	11.7
15-Oct-94				11.1	9.5	10.4
16-Oct-94				11.6	10.0	10.7
17-Oct-94				12.1	10.4	11.3

placement of approximately 12 m³ of 2-6 cm sized gravel for spawning habitat, as well as some bank stabilization structures utilizing logs and boulders. The gravel was placed into two patches, with the upper one measuring 4 m wide and 21 m long, and lower one measuring 4 m wide and 4.5 m long. Thickness of both patches averaged approximately 10-20 cm.

The lower Silver Creek and lower Little Wood River stream bottom accumulates a layer of some type of marl which cements the substrate together. This layer appears to be thick and strong enough to keep trout from excavating a redd into the gravel in many places. In order to measure the rate of this marling process, a sample of several pieces of new gravel was taken the day it was put into the stream and two months later on November 16, 1994. No marling appeared to have accumulated within that time period.

A redd survey performed at the site on November 16, 1994 resulted in one brown trout redd being observed on the new gravel, and possibly two redds on the natural substrate immediately upstream of the new gravel.

South Fork Boise River

The South Fork Boise River upstream of Anderson Ranch Reservoir flows mainly through U.S. Forest Service lands in Elmore and Camas counties. Access between Featherville and Big Smokey Creek is good by a graded gravel road. There have been at least three previous extensive fisheries surveys done on the South Fork Boise River. Gebhards (1964) found wild and hatchery rainbow trout, bull trout *Salvelinus confluentus*, mountain whitefish, northern squawfish, chiselmouth chub, redbreast shiner, dace species, sculpin species, and at least two different sucker species (most likely largescale sucker, mountain sucker *Catostomus platyrhynchus*, or bridgelip sucker) within the drainage. Partridge et al. (1990) did an angler survey to estimate effort and catch rates and to gather angler's opinions on different proposed management strategies for the upper South Fork Boise River. In 1992, the fishing regulations for this reach changed from general regulations to a two trout possession limit, none under 14 inches, and fishing only with artificial flies and lures with one barbless hook for the reach between the Jumbo Creek confluence upstream to the mouth of Big Smokey Creek.

Prior to the regulation change, a habitat and electrofishing survey was done on a 1,508 m section of river in August of 1991 near the mouth of Deadwood Creek (Partridge and Warren 1994). Another similar survey was done on August 17 and 24, 1994 at the same site. Fish were sampled by electrofishing in a downstream direction with the Coffelt VVP-15 electrofisher and Honda generator in an aluminum canoe. Game fish sampled included 328 wild and 43 hatchery rainbow trout, 248 mountain whitefish, 3 bull trout, and 1 cutthroat trout *Oncorhynchus clarki* (Table 20). A comparison of the number and percent of game fish sampled within 10 mm length groups from the two years of sampling are shown in Figure 3. There were 75% more wild rainbow trout sampled in 1994 (328) than in 1991 (188). There were 70% fewer bull trout sampled in 1994 (3) than in 1991 (10). Mountain whitefish numbers in the 1994 sample (248) decreased by 21% from the 1991 sample (312). Scale samples indicate that the mean length at

Table 20. Fish sampled by electrofishing the South Fork Boise River near Deadwood Creek with total length frequency in each 10 mm length group, percent of total, mean weight (g) of fish in each length group for some species, and total number of each species sampled, August 1994.

Length Range (mm)	Bull trout		Hatchery rainbow trout		Wild rainbow trout		Cutthroat trout		Mountain whitefish		Bridgelip sucker		Longnose dace		Mottled sculpin		Northern squawfish				
	Length		Weight		Length		Weight		Length		Length		Length		Length		Length				
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%	no.	%			
0-9																					
10-19																					
20-29																					
30-39														1	2.4						
40-49					1	0.3											4	6.3			
50-59																		8	12.5		
60-69																		11	17.2		
70-79					3	0.9								3	7.3			10	15.6		
80-89					1	0.3			1	0.4				8	19.5			18	28.1		
90-99					10	3.0	1	6		4	1.6			5	12.2			7	10.9		
100-109					27	8.2	3	9		8	3.2			6	14.6			5	7.8		
110-119					41	12.5	2	14		4	1.6			15	36.6						
120-129					44	13.4	6	17					1	2.4			1	1.6			
130-139					42	12.8	4	21					6	14.6							
140-149					21	6.4	2	26		1	0.4		6	14.6							
150-159					6	1.8							5	12.2					1	50.0	
160-169					10	3.0	2	41		2	0.8		4	9.8					1	50.0	
170-179					12	3.7	3	45	1	100	3	1.2		4	9.8						
180-189					13	4.0	2	66			11	4.4		1	2.4						
190-199					13	4.0	2	65			23	9.3	4	63	7	17.1					
200-209			1	2.3	8	2.4	2	85			38	15.3	2	69	6	14.6					
210-219			2	4.7	6	1.8	1	102			33	13.3	3	86	1	2.4					
220-229			2	4.7	6	1.8	2	94			15	6.0	2	97							
230-239			6	14.0	9	2.7					4	1.6									
240-249			11	25.6	8	2.4															
250-259			5	11.6	9	2.7	4	163			10	4.0									
260-269			6	14.0	10	3.0	2	176			8	3.2	1	160							
270-279			4	9.3	3	0.9					6	2.4	1	176							
280-289	1	33.3	1	205	5	11.6	8	2.4	1	228	3	1.2									
290-299			1	2.3	3	0.9					6	2.4									
300-309	1	33.3	1	230	2	0.6	1	242			10	4.0	1	250							
310-319					6	1.8	4	273			7	2.8									
320-329					2	0.6	1	310			7	2.8									
330-339					1	0.3					4	1.6									
340-349					1	0.3					13	5.2	1	350							
350-359					2	0.6	2	438			11	4.4									
360-369											9	3.6	3	472							
370-379											4	1.6									
380-389											2	0.8									
390-399	1	33.3	1	540																	
400-409											1	0.4									
Number:	3		43		328			1		248			41		41		64		2		
Avg length:	325		249		164			170		242			167		98		74		158		
Total Sampled:	3		43		328			1		248			41		44		76		2		

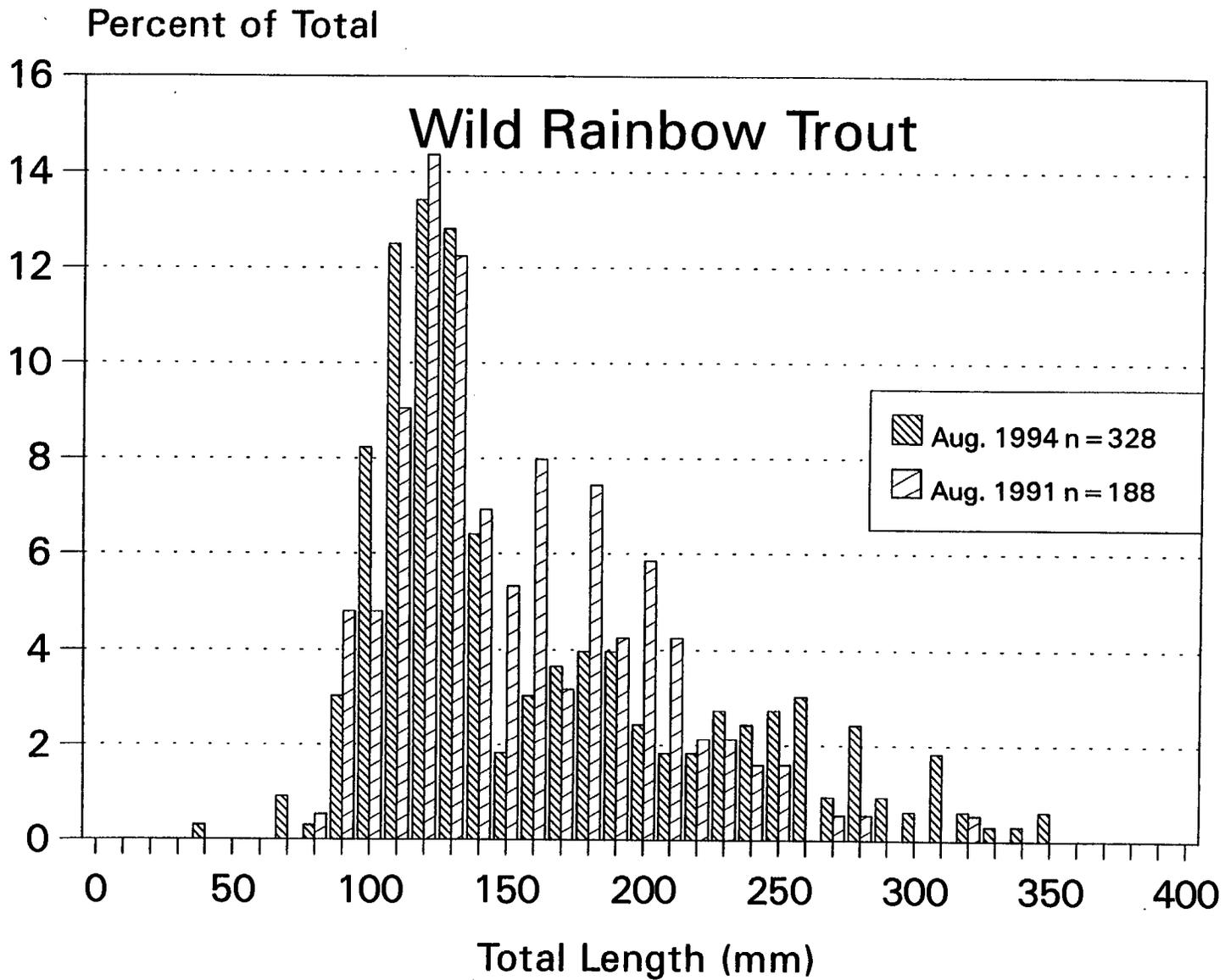


Figure 3. Total length frequency percentages of wild rainbow trout sampled from the South Fork Boise River, Aug. 1991 and Aug. 1994.

three years of age for wild rainbow trout was 221 mm, which is significantly less than the minimum length limit of 356 mm (Table 21). There were no scale samples taken from wild rainbow trout 4+ years of age.

All game fish greater than or equal to 100 mm in total length were marked with an upper caudal fin hole punch on August 17 for a Peterson mark-recapture population estimate. The recapture run was done on August 24. An estimated 576 wild rainbow trout (1.71 fish/ 100 m²) were in the reach (Table 22). There were statistically nonsignificant increases in estimated numbers of wild rainbow trout for all 100 mm size classes since 1991 (Figure 4). There were fewer estimated numbers of mountain whitefish in 1994 than in 1991 in all size classes except for the 200-299 mm class.

Trout Creek

Trout Creek is a small perennial tributary to Goose Creek. Most of the upper reaches of Trout Creek are within Sawtooth National Forest lands. It had fish and habitat surveys performed on September 14, 1994 within and outside of a riparian livestock enclosure, which has had approximately 200 m of stream protected from grazing since the mid 1980s. A total of 28 cutthroat trout were sampled within the enclosure and 21 outside the enclosure. Numerous speckled dace were sampled at both sites. Results are given in the following survey data summary, with total length frequencies of fish sampled given in Table 23. Level III habitat and biological community monitoring by Sawtooth National Forest personnel indicate that the stream within the enclosure is recovering from past livestock uses (John Lloyd, Sawtooth National Forest, personal communication).

SURVEY DATA SUMMARY

STREAM NAME: Trout Creek

Watershed: Goose Creek

Site: Within enclosure

Legal Description: NW SE Sec12 T16S R19E

Fish Survey

Date: Sept. 14, 1994

Water Temperature: 13°C

Fish Sampling Method: Backpack electrofisher

Distance Surveyed (m): 189

Population Estimate Model: Seber & LeCren 2 pass depletion

Sampling Results (see Table 23)

Species: Cutthroat trout

Total Fish Sampled: 28

Total Length Range (mm): 70-265

Table 21. Back calculated length-at-annulus (mm) for wild rainbow trout and mountain whitefish sampled from the South Fork Boise River in August, 1994. Standard deviation is in parentheses.

		Wild rainbow trout		
Year class	Number of fish	Mean length at annulus		
		1	2	3
1993	18	88 (16.53)		
1992	16	100 (9.98)	152 (13.46)	
1991	18	104 (15.68)	151 (19.95)	221 (26.55)
Weighted avg. length		97	151	221

		Mountain whitefish				
Year class	Number of fish	Mean length at annulus				
		1	2	3	4	5
1993	15	123 (16.51)				
1992	6	120 (22.64)	202 (33.53)			
1991	12	128 (31.60)	226 (36.22)	282 (31.18)		
1990	5	122 (22.11)	225 (22.21)	276 (21.80)	321 (10.35)	
1989	4	133 (20.28)	214 (22.81)	273 (15.87)	314 (11.69)	349 (16.06)
Weighted avg. length		125	219	279	318	349

Table 22. Population estimates and densities of wild rainbow trout and mountain whitefish greater than 99 mm in total length in the South Fork Boise River, August 1994.

Species/ Size (mm)	Marked	Caught	Recapture	Population estimate	95% C.I.	No./ 100 m	No./ 100 m ²
<u>Wild rainbow trout</u>							
100-199	108	121	26	492	±161	32.6	1.46
200-299	33	37	14	86	±33		0.26
300-399	10	4	2	18	±11		0.05
Sum total				596			1.77
All ≥ 100	151	162	42	576	±146	38.1	1.71
<u>Hatchery rainbow trout</u>							
100-199	0	0	0	0	-	0.0	0.00
200-299	20	23	8	56	±27		0.17
>300	0	0	0	0	-		0.00
Sum total				56			0.17
All ≥ 100	20	23	8	56	±27	3.7	0.17
<u>Mountain whitefish</u>							
100-199	17	33	6	87	±54	5.8	0.26
200-299	45	71	18	174	±66		0.52
300-399	32	33	10	105	±49		0.30
400-499	0	1	0	1	-		-
Sum total				363			1.08
All ≥ 100	94	138	34	377	±107		1.12

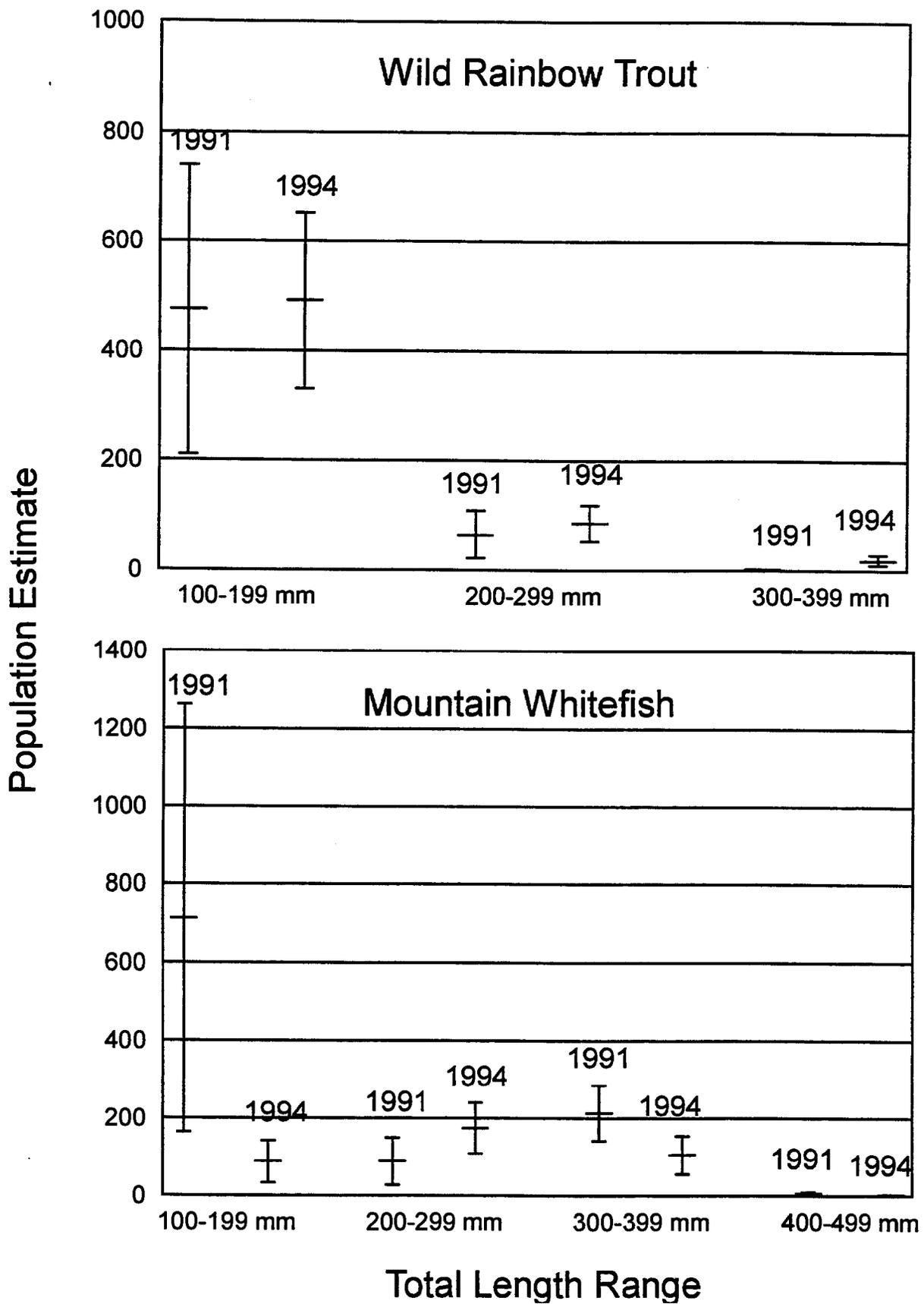


Figure 4. Total population estimates and 95% confidence intervals for wild rainbow trout and mountain whitefish sampled from the South Fork Boise River near the mouth of Deadwood Creek, August 1991 and 1994 (1991 data taken from Partridge and Warren, 1994).

Table 23. Fish sampled by electrofishing three sites at Trout Creek with total length frequency in each 10 mm length group, percent of total measured, mean weight, of cutthroat trout, and total numbers of each species sampled September, 1994.

Length Range (mm)	Within Exclosure				Above Exclosure				Beaver Pond			
	Cutthroat trout		Speckled dace		Cutthroat trout		Speckled dace		Cutthroat trout		Speckled dace	
	Length	Weight	Length	Weight	Length	Weight	Length	Weight	Length	Weight	Length	Weight
	no.	%	no.	ava.	no.	%	no.	%	no.	ava.	no.	%
0-9												
10-19												
20-29												
30-39												
40-49								3	14.3			
50-59					10	55.6				14	66.7	
60-69										3	14.3	
70-79	2	7.1	1	4	3	16.7	2	10.0			1	4.8
80-89	13	46.4	4	5	4	22.2	8	40.0	2	7		
90-99	5	17.9	4	8	1	5.6	7	35.0	2	8		
100-109	3	10.7	3	10			3	15.0	1	10		
110-119	2	7.1	2	14								
120-129												
130-139												
140-149												
150-159												
160-169												
170-179												
180-189												
190-199												
200-209												
210-219												
220-229												
230-239												
240-249												
250-259	1	3.6	1	210								
260-269	2	7.1	2	205								
270-279												
280-289												
290-299												
300-309												
310-319										1	100.	1 400
320-329												
330-339												
340-349												
350-359												
Number:	28				18		20			21		5
Avg length:	107											
Total												
Sampled:	28				50					39		5

Population Estimate: 40
Standard Error: 14.88
Density (no./100 m): 6.5
Species: Speckled dace (see Table 23)
Total Sampled: 50
Total Length Range (mm): 50-95
Population Estimate: n.a.

Comments: Site included 75 m of beaver pond and 114 m of free flowing water. Young-of-year cutthroat found exclusively in free flowing sections, adult cutthroat trout all found in beaver ponds. Four crayfish (possibly *Pacifastacus gambeli*) were also sampled.

Habitat Survey

Mean Width (m): 4.7 m (beaver pond), 2.2 m (free flowing reach)

Mean Depth (m): 30 cm (beaver pond), 5 cm (free flowing reach)

Habitat Type (%)

Pool: 40

Riffle-run-pocket: 60

Comments: We have on file at the Jerome Regional office a habitat assessment summary of this site written up by the Sawtooth National Forest for the years 1988, 1991 and 1994.

Site: Upstream of enclosure

Legal Description: NW SE Sec12 T16S
R19E

Fish Survey

Date: Sept. 14, 1994

Water Temperature: 13°C

Fish Sampling Method: Backpack electrofisher

Distance Surveyed (m): 96

Population Estimate Model: Seber & LeCren 2 pass depletion

Sampling Results (see Table 23)

Species: Cutthroat trout

Total Sampled: 20

Total Length Range (mm): 70-105

Population Estimate: 24

Standard Error: 5.87
Density (no./100 m²): 10.1

Species: Speckled dace

Total Sampled: 39

Total Length Range (mm): 30-75

Population Estimate: n.a.

Habitat Survey

Estimated flow: 3 cfs

Mean Width (m): 2.5

Mean Depth (cm): 11

Comments: This site was within a free flowing section of the reach without beaver ponds.

Site: Beaver pond upstream of enclosure

Legal	Description:	NW	SE	Sec12	T16S
R19E					

Fish Survey

Date: Sept. 14, 1994

Water Temperature: 13°C

Fish Sampling Method: Backpack electrofisher

Distance Surveyed (m): 20

Population Estimate Model: n.a.

Sampling Results (see Table 23)

Species: Cutthroat trout

Total Sampled: 1

Total Length (mm): 315

Population Estimate: n.a.

Species: Speckled dace

Total Sampled: 5

Total Length (mm): 50-65

Population Estimate: n.a.

Habitat Survey

Maximum Width (m): 25

Maximum Depth (m): 1.5

Idaho Division of Environmental Quality Surveys

The Idaho Division of Environmental Quality (DEQ) surveyed several streams throughout the region for their Beneficial Use Reconnaissance Project. This project included sampling fish by electrofishing, then identifying and enumerating all fish captured at all sites. A collecting permit was issued for the project with a Fish and Game person present for all sampling. Results are given in Appendix B.

ACKNOWLEDGEMENTS

We thank Barbara Adams, Karen Frank, Jason Kohl, and Tom Terrance who did much of the field work and data analysis, and Jeff Dillon, Chuck Alexander, and their fishery research field crew who assisted on several of the field projects. We also thank personnel in the Magic Valley Region Enforcement Bureau with their assistance and input on numerous field projects as well as volunteers with the Reservists program who put in several hours of their own time for some of our projects. We also thank Sharisa Barnes, Debbie Burch, and Sherri Moedl who assisted with the preparation of this report.

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Appendix A. Habitat data for Birch and Cold creeks as provided by the Burley District of the BLM.

Reconnaissance Habitat Data

- June 5, 1992
- Birch Creek (lower site)
- T16S R21E Sec 26 NE1/4
- Site BC2A
- Entire reach classified as riffle
- Following data is averaged from three sites nearest electrofishing transect

Canopy Density (Densiometer estimate):

0%

Substrate Sizes (Wolman pebble count estimate):

Sand/Silt (< .1 ")	Gravel (.1 to 2.5")	Cobble (2.5 to 10")	Boulder (> 10")	Bedrock
62%	35%	2%	0%	0%

Streamflow Variation:

Bankful (Width)	Max. Bankful (Depth)	Lowflow (Width)	Avg. Lowflow (Depth)
19'	1.8'	2.2'	0.32'

Bank Conditions:

Covered/ <u>Stable</u>	Covered/ <u>Unstable</u>	Uncovered/ <u>Stable</u>	Uncovered/ <u>Unstable</u>
98%	2%	0%	0%

Reconnaissance Habitat Data

- June 5, 1992
- Birch Creek (middle site)
- T16S R22E Sec 30 SW1/4
- Site BC2A
- Entire reach classified as riffle
- Following data is averaged from three sites (except where noted)

Canopy Density (Densimeter estimate):

13% (average of two sites nearest electrofishing transect)

Substrate Sizes (Wolman pebble count estimate):

Sand/Silt (<.1")	Gravel (.1 to 2.5")	Cobble (2.5 to 10")	Boulder (> 10")	Bedrock
59%	21%	21%	0%	0%

Streamflow Variation:

Bankful <u>(Width)</u>	Max. Bankful <u>(Depth)</u>	Lowflow <u>(Width)</u>	Avg. Lowflow <u>(Depth)</u>
16.6'	1.6'	1.9'	0.23'

Bank Conditions:

<u>Covered/ Stable</u>	<u>Covered/ Unstable</u>	<u>Uncovered/ Stable</u>	<u>Uncovered/ Unstable</u>
58%	17%	10%	15%

Reconnaissance Habitat Data

- June 5, 1992
- Birch Creek (upper site)
- T16S R22E Sec 32 SW SE and NE SW
- Site BC 1A
- Entire reach classified as riffle
- Following data is averaged from six sites

Canopy Density (Densimeter estimate):

19%

Substrate Sizes (Wolman pebble count estimate):

Sand/Silt (<.1")	Gravel (.1 to 2.5")	Cobble (2.5 to 10")	Boulder (> 10")	Bedrock
23%	46%	29%	2%	0%

Streamflow Variation:

Bankful <u>(Width)</u>	Max. Bankful <u>(Depth)</u>	Lowflow <u>(Width)</u>	Avg. Lowflow <u>(Depth)</u>
10.3'	1.5'	2.6'	0.23'

Bank Conditions:

<u>Covered/ Stable</u>	<u>Covered/ Unstable</u>	<u>Uncovered/ Stable</u>	<u>Uncovered/ Unstable</u>
55%	18%	17%	10%

Reconnaissance Habitat Data

- May 28, 1992
- Cold Creek
- T15S R22E Sec 22 NW SW SE and SW NW (below the forks)
- Site C6B
- Entire reach classified as riffle (2 pools with max. Depth of < 10" observed near the forks on Aug. 9, 1994)
- Following data is averaged from six sites

Canopy Density (Densiometer estimate):

43%

Substrate Sizes (Wolman pebble count estimate):

Sand/Silt (<.1")	Gravel (.1 to 2.5")	Cobble (2.5 to 10")	Boulder (>10")	Bedrock
15%	32%	35%	18%	0%

Streamflow Variation:

Bankful <u>(Width)</u>	Max. Bankful <u>(Depth)</u>	Lowflow <u>(Width)</u>	Avg. Lowflow <u>(Depth)</u>
8.7'	1.4'	4.1'	0.3'

Bank Conditions:

<u>Covered/ Stable</u>	<u>Covered/ Unstable</u>	<u>Uncovered/ Stable</u>	<u>Uncovered/ Unstable</u>
54%	4%	40%	4%

Appendix B. Synopsis of data collected in 1994 for the Idaho Department of Health and Welfare Division of Environmental Quality Beneficial Use Reconnaissance Project.

NAME	EPA # 170402	LOCATION	MEAN WIDTH (m)	LENGTH (m)	SPECIES SAMPLED ^e (# sampled)	MAX LENGTH (mm)	MIN LENGTH (mm)	MEAN (mm)
Billingsley Creek	12085.00	SE 24 7S 13E SE 19 7S 14E	12.3	280	RBT (395) RSS (29) CMC (2) SCU (3)	470 90 114 60	60 40 105 60	137 78 110 60
Big Cottonwood (Lower)	11054.00	SW 17 13S 21E	3.9	100	CUT (2) SCU (37)	135 125	135 125	135 125
Big Cottonwood (Upper)	11063.00	SE 30 14S 20E	2.0	100	CUT (15)	185	77	109
Birch Creek (City of Rocks)	11052.00	SW 24 14S 22E	2.9	100	RCT (37) SCU (3) WRB (3)	270 100 -	85 85 -	187 62 ..
Cassia Creek (Lower)	10006.01	SW 22 13S 25E	4.9	134	RBT (2) BKT (2) LND (15) RSS (14) SCU (157)	350 220 140 110 -	230 220 85 110 -	290 220 113 110 -
Cassia Creek (Upper)	10009.00	NE 33 13S 24E	2.6	120	CUT (26) BKT (70)	190 220	55 55	74 36
Cedar Creek	13102.00	NE 27 15S 13E	Dry when surveyed for fish	100	-	-	-	-
Fall Creek	11011.00	SW 19 15S 20E	3.1	100	RBT (3) BKT (11) SCU (2)	160 220 95	60 65 90	102 94 92

Appendix B (Cont).

NAME	EPA # 170402	LOCATION	MEAN WIDTH (m)	LENGTH (m)	SPECIES SAMPLED' (# sampled)	MAX LENGTH (mm)	MIN LENGTH (mm)	MEAN (mm)
Goose Creek (Upper)	11030.00	NW 32 15S 19E	4.2	140	RBT (1) CUT (4) BKT (2) SKU (139)	110 120 70 110	110 85 70 110	110 104 70 110
Harrington Fork (Rock Creek)	12021.00	NE 17 13S 19E	1.7	100	RBT (35)	210	85	134
Marsh Creek	09028.00	SW 28 11S 25E	3.0	100	BKT (61) SCU (270)	170 120	75 50	116 76
Raft River	10018.00	SW 32 15S 26E	5.7	180	- LND (4) RSS ^b SCU (2)	- - - -	- - - -	- - - -
Rough Creek (Corral Creek)	20023.00	NE 7 IN 13E	6.2	140	RBT (41)	210	66	75
Salmon Falls Creek	13031.00	NE 20 16S 15E	9.4	450	RBT (10) CMC (29) HRB (1) LND (187) MWF (16) RSS (100) SPD (417) SQF (26) SUC (155) YP (7)	355 185 290 - 105 100 95 215 110 145	160 115 290 - 80 100 20 80 110 145	236 140 290 - 85 100 50 154 110 145
Shoshone Creek (Lower)	13091.00	NW 24 16S 16E	7.7	236	- BLS (53) RSS (96) SMB (5) SPD (73)	- 210 135 250 80	- 135 85 35 65	- 160 94 141 71

Appendix B (Cont.).

NAME	EPA # 170402	LOCATION	MEAN		SPECIES SAMPLED` (# sampled)	MAX	MIN	MEAN (mm)
			WIDTH (m)	LENGTH (m)		LENGTH (mm)	LENGTH (mm)	
Shoshone Creek (Upper)	13099.00	SE 13 14S 17E	3.2	100	RBT (15)	165	90	120
						155	80	114
					LND (7)	.	-	-
					RSS (122)	65	65	65
					SCU (6)	-	-	-
				SPD (767)	80	80	80	
Soldier Creek	20018.00	21 IN 14E	--	--	RBT (43)	255	100	167
					BKT (272)	280	60	162
					SCU (285)			
Sublett Creek (Lower)	10047.00	SW 03 13S 29E	3.6	180	-	-	-	-
Sublett Creek (Upper)	10054.00	NW 01 13S 29E	2.7	100	BRN (180)	320	60	122
					RBT (6)	170	140	148
Trapper Creek (Lower)	11007.00	NW 4 15S 21E	4.8	180	RBT (11)	100	65	84
					HRBT (25)			
					BLS (6)	185	160	175
					LND (86)	65	65	65
					LSC (7)	195	60	98
Vinyard Creek	10054.00	SW 34 9S 18E	--	120	RCT (5)	180	115	157
					RBT (12)	190	85	132
					CUT (3)	275	130	182
					BLS (3)	21	170	183
					LN	75	75	75
					RSS (7)	90	50	79
Willow Creek (Lower)	20004.00	36 2N 15E	--	240	RBT (33)	195	40	141
					SCU (27)	130	20	79

^a RBT - wild rainbow trout; HRBT - hatchery produced rainbow trout; CUT - cutthroat trout; BRN - brown trout; RCT - rainbow - cutthroat trout hybrid; RSS - redbside shiner; LND - longnose dace; SPD - speckled dace; CMC - chiselmouth chub Acrocheilus alutaceus; SCU - unidentified sculpin species; BLS - bridgelip sucker.

^b Not counted.

1994 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-19

Project II: Technical Guidance

Subproject II-E: Magic Valley Region

Contract Period: July 1, 1994 to June 30, 1995

ABSTRACT

Magic Valley Region fishery management personnel furnished verbal and written comments of 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, and in person.

Investigation of a waste water treatment pond break on March 29, 1994 found fish had been killed up to 8 km downstream with nearly 100% kill in the first 5 km in Rock Creek, Twin Falls County. Estimated fish loss consisted of 1,338 brown trout *Salmo trutta*, 112 rainbow trout, 718 sucker *Catostomus sp.*, and 2,853 dace *Rhinichthys sp.*, sculpin *Cottus sp.* and chiselmouth chub *Acrocheilus alutaceus*.

Many miscellaneous activities were commented on, participated on, or otherwise addressed, and numerous meetings regarding fisheries were attended.

Author:

Fred E. Partridge
Regional Fishery Manager

OBJECTIVE

To furnish technical assistance, advice, guidance, and comments to other agencies, organizations, or individuals regarding any items, projects, or activities associated with or potentially affecting fishery resources and habitat in the region.

RECOMMENDATIONS

Technical guidance on issues involving fishery resources in the Magic Valley Region should be continued to assist in maintaining fishery resources.

METHODS

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

FINDINGS

Magic Valley regional fishery management personnel collected data, inspected, commented on and/or provided advice on the following major projects in 1994:

- 1) Hydroelectric projects - Time was spent on eight hydroelectric projects in the Magic Valley Region during 1994. Five of the projects are located on the Snake River and one each on the Little Wood River, Malad River, and Cedar Draw Creek.
- 2) Public information - Prepared and provided input on fishing, recreation, and access brochures for the Region including Magic and Anderson Ranch reservoirs brochures and the Statewide Angler Guide. Provide regional fishing information for the 1-800-ASKFISH service and as requested by public and media. Provided information to local fishing clubs and elementary school classes on regional fisheries and basic habitat needs of fish in the Magic Valley Region.

- 3) Stream alterations - Site inspections, recommendations, and a monitoring program were made on Silver Creek where a landowner wanted to improve trout spawning in the stream. Assistance was provided for the Regional Environmental Coordinator with site inspections and comments on projects on five different streams and rivers in the region.
- 4) Agency assistance - Regional fishery personnel provided equipment and assistance to the U.S. Geological Service, Idaho Division of Environmental Quality, U.S. Forest Service, and the U.S. Bureau of Land Management in the collection of fish to provide long-term monitoring of water quality conditions in rivers and streams and to document the presence or absence of fish species. Comments were made on Snake River water quality documents and the Snake River Aquatic Species Recovery Plan.
- 5) Water rights - Provided information to and worked with the Natural Resources Policy Bureau, the Idaho Department of Water Resources, and private individuals on water rights and minimum flows for Billingsley Creek, Cedar Draw Creek, and Jarbidge River.

Rock Creek Fish Kill

A break in one of The Amalgamated Sugar Company's waste water treatment ponds occurred on the afternoon of March 29, 1994, spilling water contaminated with high ammonia and COD levels into Rock Creek. Although of short duration, the spill created a toxic plume of water which killed fish downstream up to 8 km until diluted by inflows and aerated by turbulence. The IDFG was notified of dead fish in Rock Creek late on March 30 by concerned anglers.

Preliminary evaluation of fish mortalities in Rock Creek were conducted on March 31, 1994 by visually observing dead fish while walking Rock Creek from the sugar plant's diversion dam to Blue Lakes Boulevard. Due to stream turbidity, visibility was limited to areas less than 0.5 m deep. Dead fish were not observed above the spill site to the diversion dam. Observed dead fish between the spill site and Blue Lakes Boulevard were counted by species and lengths measured (Table 1). Additional spot observations were made from the lower Livestock Commission fence to approximately 0.8 km below Rock Creek County Park on March 31 and April 1, 1994. Dead fish were not observed at the lowest site (0.8 km below Rock Creek Park).

Due to low visibility in the stream, it was determined that electrofishing would be the most efficient method of evaluating the extent and severity of fish mortalities. Due to stream size, a five person crew, canoe, generator, and Coffelt electrofisher were used to sample for fish. Nine sites were electrofished to determine the length of stream affected for different species and to estimated fish populations in Rock Creek above (site 9) and below (site 1) the

Table 1. Length frequency of dead fish observed in Rock Creek following a spill from The Amalgamated Sugar Company's waste water ponds. Fish observed while walking between the spill site and Blue Lakes Boulevard on March 31, 1994.

Length Range (mm)	Brown trout		Rainbow trout		Sucker sp.		Chiselmouth chub		Redside shiner		Dace sp.		Sculpin sp.	
	Length		Length		Length		Length		Length		Length		Length	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-24														
25-49														
50-74									7	46.7				
75-99									5	33.3	2	33.3	2	4.1
100-124									3	20.0	3	50.0	47	95.9
125-149											1	16.7		
150-174	2	1.8			6	8.6		2	33.3					
175-199	2	1.8						1	16.7					
200-224	12	10.6			1	1.4		1	16.7					
225-249	8	7.1	1	12.5	1	1.4								
250-274	25	22.1	2	25.0	20	28.6		2	33.3					
275-299	22	19.5	1	12.5	18	25.7								
300-324	14	12.4	4	50.0	8	11.4								
325-349	9	8.0			12	17.1								
350-374	11	9.7			4	5.7								
375-399	5	4.4												
400-424														
425-449														
450-474	3	2.7												
475-499														
Number:	113		8		70		6		15		6		49	
Avg. length:	282		279		275		215		69		97		100	
Not measured:					5		1		11		1		5	

impact area (Figure 1, Table 2). Except for these two sites, sites were only electrofished once to determine species present and relative abundance (Table 3). Mark and recapture population estimates were conducted at sites 1 and 9 to provide estimates of fish populations in Rock Creek prior to the spill (Table 4). Length measurements were taken on all species to provide an estimate of species sizes (Table 5).

Based on electrofishing samples, supplemental inflows, and areas of aeration (turbulent water), the lower end of the total kill reach for individual species were established. Stream length from spill to the boundaries were measured from a USGS topographic map. Numbers of each species killed were then estimated from densities determined above and below the impact area. Due to low numbers of several species at one or the other sites, ratios of rainbow trout and suckers to brown trout observed in the original visual investigation were used to estimate total mortalities of these species. Ratios from electrofishing samples in the upper site were used for smaller fish species (sculpin, dace, and chiselmouth chub). Although there were some losses of fish below the areas of total kill, a more extensive study would have been required to determine these numbers. This was not done.

Total estimated fish loss based on estimated densities and length of stream impacted was 1,338 brown trout, 113 rainbow trout, 706 bridgelip and largescale suckers, and 2,812 mottled sculpin, dace sp. and chiselmouth chub with a overall replacement value of \$2,309 (Table 6).

During negotiations, the Amalgamated Sugar Company agreed to reimburse Idaho Fish and Game \$4,700 to cover the cost of the investigation, restock the affected reach of Rock Creek with rainbow and brown trout over a four-year period, and to make habitat improvements along Rock Creek on their property. Habitat improvements included bank stabilization projects and modify an abandoned salmon ladder so it will pass trout over their water diversion. Restocking the stream will consist of releasing 4,000, 230 mm rainbow trout each year for two years, 1,000, 355 mm rainbow trout each year for four years, 160, 406 mm rainbow trout each year for four years, and 9,000, 76-102 mm brown trout each year for four years. Due to restocking of the stream within 30 days of the loss, angler use values were not included in the mitigation.

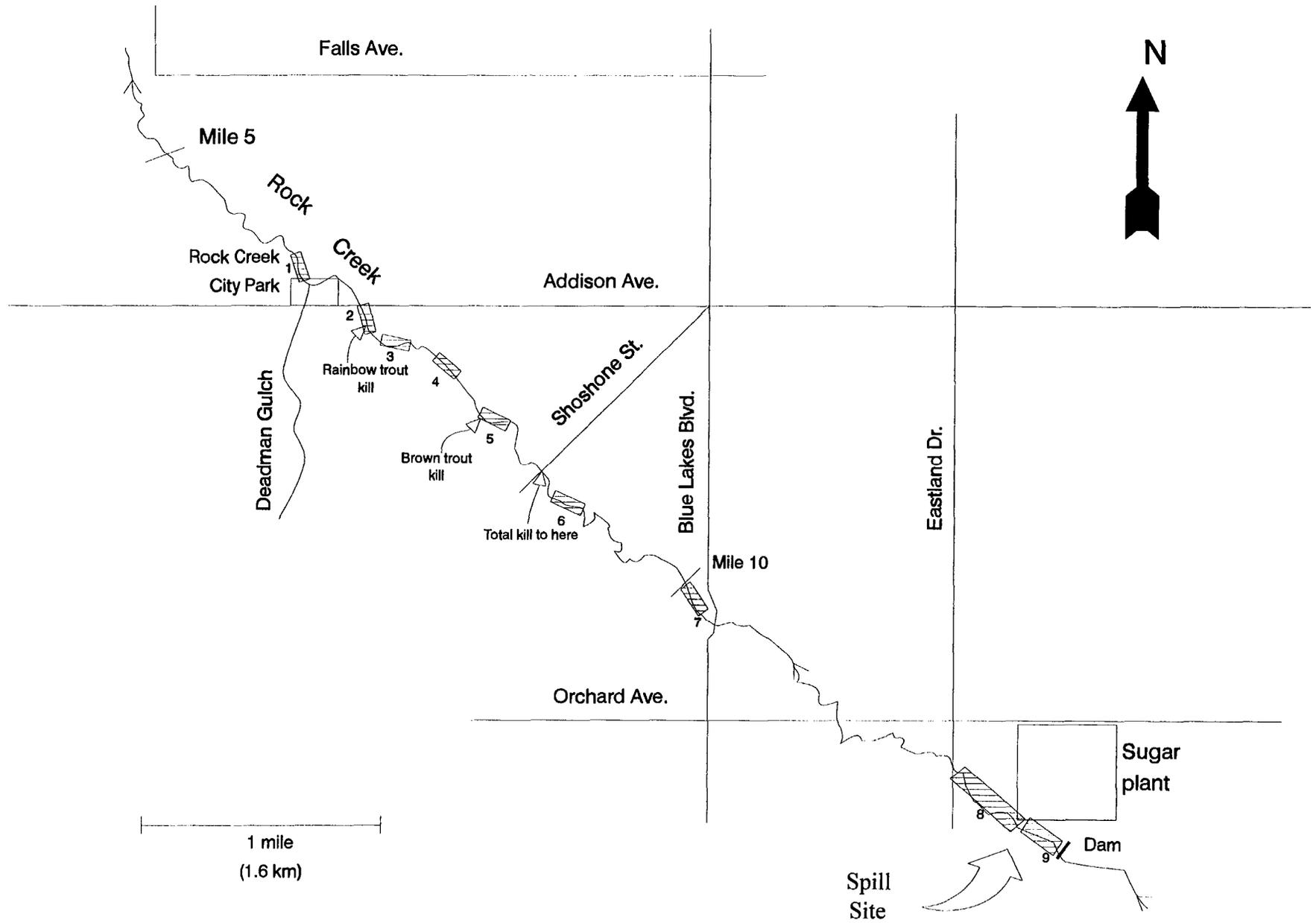


Figure 1. Electrofishing sites and extent of fish kill in Rock Creek at Twin Falls, Idaho following a spill from the Amalgamated Sugar Company's waste water ponds on March 29, 1994.

Table 2. Total length, mean width, and area of Rock Creek stream sections electrofished in April 1994 following a spill from The Amalgamated Sugar Company's waste water ponds.

Stream section	Total length (m)	Mean width (m)	Section area (m ²)
1	183	13.4	2,452
2	77	10.0	774
3	292	9.2	2,701
4	102	9.2	942
5	83	8.4	697
6	94	11.2	1,055
7	73	7.0	507
8	830	8.7	7,210
9	509	8.5	4,307

Table 3. Fish sampled by electrofishing Rock Creek in April 1994 following a spill from The Amalgamated Sugar Company's waste water ponds.

Species	Stream section								
	1 ^a	2	3	4	5	6	7 ^b	8	9 ^a
Rainbow trout Hatchery ^c	107	22	22	1	0	0	1(1)	0	1
Rainbow trout Wild	2	7	1	0	0	0	2(2)	0	3
Brown trout	56	2	5	3	0	0	0	2	58
Bridgelip sucker	93	2	67	17	21	0	2	1	40
Largescale sucker	48	1	18	1	1	0	0	0	5
Redside shiner	36	17	14	6	1	1	0	0	457
Chiselmouth chub	0	1	0	4	0	0	0	0	48
Dace, speckled & Longnose	0	0	7	1	3	0	1	0	85
Sculpin sp.	44	4	20	8	15	0	0(1)	0	93
Bluegill	0	0	0	0	0	0	0	0	1
Utah chub	0	0	1	0	0	0	0	0	0
Yellow perch	0	0	0	0	0	0	0	0	1
TOTAL	386	56	155	41	41	1	6(4)	3	792

^aSection electrofished twice (mark and recapture runs).

^bNumber in parentheses are fish sampled in hatchery outlet stream.

^cIncludes both wild and hatchery origin rainbow trout less than 90 mm.

Table 4 . Marked, recaptured and estimated populations of game and larger nongame species at sites 1 and 9, Rock Creek, April, 1994.

Species	Marked	Catch	Recapture	Population estimate	95% CL	Density	
						n/m	n/m ²
Site 1 (Rock Creek Park), April 2 and 11, 1994							
Brown trout	28	28	15	52	17	0.29	0.02
Rainbow trout	53	56	22	134	41	0.73	0.05
Sucker sp.	120	21	3	I.R. ^a	--	--	--
Chiselmouth chub	Not observed.						
Site 9 (Sugar Plant) April 1 and 11, 1994							
Brown trout	36	22	15	53	14	0.10	0.01
Rainbow trout	1	2	1	I.R.	--	--	--
Sucker sp.	9	15	1	I.R.	--	--	--
Chiselmouth chub	17	21	7	50	26	0.10	0.01

^a Insufficient returns to estimate populations.

Table 5. Length frequency of fish sampled by electrofishing in Rock Creek following a spill from The Amalgamated Sugar Company's waste water ponds. Includes fish from both above and below the spill site. All fish sampled in April, 1994.

Length Range (mm)	Rainbow trout		Brown trout	Bridgelp sucker	Largescale sucker	Redside shiner	Chiselmouth chub						
	Hatchery	Wild											
	no.	%	no.	%	no.	%	no.	%					
0-9													
10-19													
20-29													
30-39	1	0.6											
40-49	1	0.6			1	0.7							
50-59	2	1.3		1	0.4	6	4.2						
60-69	1	0.6				17	12.0						
70-79	2	1.3				31	21.8						
80-89	2	1.3		3	1.3	20	14.1						
90-99			1	5.9		25	17.6	2	4.1				
100-109	1	0.6			9	3.8	1	1.4	11	7.8			
110-119	1	0.6			3	1.3			24	16.9			
120-129			1	5.9	2	0.8	2	2.7	7	4.9	3	6.1	
130-139	1	0.6	2	11.8	2	0.8					1	2.0	
140-149	1	0.6	1	5.9	3	1.3	2	2.7			7	14.3	
150-159	3	1.9			3	1.3	1	1.4			16	32.6	
160-169	2	1.3	1	5.9	3	1.3					6	12.2	
170-179	4	2.6	2	11.8	3	1.3	1	1.4			5	10.2	
180-189	1	0.6	1	5.9	2	1.6	3	1.3	1	1.4	2	4.1	
190-199	3	1.9	1	5.9	6	4.8	3	1.3	2	2.7	2	4.1	
200-209					9	7.1	4	1.7	2	2.7	2	4.1	
210-219	11	7.1	1	5.9	14	11.1	6	2.5	7	9.5			
220-229	23	14.8	1	5.9	13	10.3	9	3.8	4	5.4			
230-239	32	20.6			19	15.1	10	4.2	8	10.8	1	2.0	
240-249	20	12.9			8	6.4	20	8.4	3	4.0	2	4.1	
250-259	13	8.4			9	7.1	18	7.6	5	6.8			
260-269	6	3.9			5	4.0	19	8.0	4	5.4			
270-279	6	3.9	2	11.8	6	4.8	27	11.3	13	17.6			
280-289	4	2.6			7	5.6	20	8.4	2	2.7			
290-299	1	0.6	1	5.9	5	4.0	16	6.7	3	4.0			
300-309	5	3.2			2	1.6	15	6.3	3	4.0			
310-319	1	0.6			7	5.6	8	3.4	1	1.4			
320-329							11	4.6	1	1.4			
330-339	2	1.3	2	11.8	2	1.6	5	2.1	2	2.7			
340-349	1	0.6			1	0.8	4	1.7					
350-359					1	0.8	6	2.5					
360-369	1	0.6			1	0.8	1	0.4	1	1.4			
370-379													
380-389					1	0.8							
390-399									2	2.7			
400-409					1	0.8							
410-419													
420-429													
430-439					3	2.4			1	1.4			
440-449													
450-459													
460-469					1	0.8							
470-479					1	0.8							
480-489													
490-499													
500-509					2	1.6							
510-519													
520-529									1	1.4			
530-539													
540-549													
550-559													
560-569													
570-579													
580-589													
590-599	2	1.3											
600-609									1	1.4			
610-619													
620-629													
630-639	1	0.6											
Number:	155		17		126		238		74		142		49
Avg. length:	231		204		260		250		258		87		160
Not measured							5				390		4

Table 5. Continued.

Length Range (mm)	Dace sp.		Sculpin sp.		Bluegill		Utah chub		Yellow perch	
	Length		Length		Length		Length		Length	
	no.	%	no.	%	no.	%	no.	%	no.	%
0-9										
10-19										
20-29										
30-39	2	3.4								
40-49	1	1.7								
50-59	1	1.7								
60-69	1	1.7	16	9.7	1	100.0	1	100.0		
70-79	6	10.2	18	10.9						
80-89	19	32.2	36	21.8					1	100.0
90-99	1	18.6	62	37.6						
100-109	12	20.3	26	15.8						
110-119	3	5.1	3	1.8						
120-129	3	5.1	1	0.6						
130-139			3	1.8						
140-149										
150-159										
160-169										
170-179										
180-189										
190-199										
200-209										
210-219										
220-229										
230-239										
240-249										
250-259										
260-269										
270-279										
280-289										
290-299										
300-309										
310-319										
320-329										
330-339										
340-349										
350-359										
360-369										
370-379										
380-389										
390-399										
400-409										
410-419										
420-429										
430-439										
440-449										
450-459										
460-469										
470-479										
480-489										
490-499										
500-509										
510-519										
520-529										
590-599										
600-609										
630-639										
Number:	59		165		1		1		1	
Avg. length:	88		88		60		65		80	
Not measured	38		20							

Table 6. Estimated economic value of fish lost in Rock Creek as a result of a spill from The Almagamated Sugar Company's waste water pond.

Species	Estimated number lost	Size range (mm)	Value range ^a (\$/ea)	Estimated value (\$)
Brown trout	1,338	203-508	0.67-3.80	1,706
Rainbow trout	113	51-381	0.08-3.58	88
Bridgelip and largescale sucker	706	51-607	0.13-5.85	289
Mottled sculpin, dace sp. and chiselmouth chub	2,812	all	0.08	225
TOTAL	4,969			2,308

^a Values from AFS 1992.

ACKNOWLEDGEMENTS

I would like to thank the Department personnel, reservists, and volunteers who assisted with the sampling and evaluation of the spill in Rock Creek. They include Charles Warren, Bill Edson, Dave Parrish, Carl Nellis, Virgil Moore, Jeff Dillon, Kent Jarcik, Mike McDonald, Russ Wood, Kent Hills, Dwight Aplanalp, Warren Wallace, Ludy Landwehr, and Dorthy Rose.

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1994 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-19

Project IV: Population Management

Subproject IV-E: Magic Valley Region

Contract Period: July 1, 1994 to June 30, 1995

ABSTRACT

Fish populations and fishing in the Magic Valley Region was enhanced by stocking approximately 3.37 million put-and-grow and 0.66 million put-and-take size fish into lakes, reservoirs, rivers, and streams accessible by vehicle. High mountain lakes were stocked with 28,800 rainbow trout *Oncorhynchus mykiss* and cutthroat trout *O. clarki* fingerlings.

Little Camas Reservoir fish were eradicated with rotenone after one unit of lowland lakes sampling protocols indicated the presence of large numbers of black crappie *Pomoxis nigromaculatus* present. Prior to treatment, 12,000 black crappie were transplanted to Salmon Falls Creek Reservoir.

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OBJECTIVES

To add and subtract fish from fish populations in order to provide better fishing for preferred game fish species.

METHODS

Trout populations in the Magic Valley Region were supplemented with both put-and-grow (51-202 mm) and put-and-take (203-660 mm) kokanee *Oncorhynchus nerka kennerlyi*, rainbow trout *O. mykiss*, cutthroat trout *O. clarki*, brook trout *Salvelinus fontinalis*, and brown trout *Salmo trutta*, which were reared primarily in Idaho Department of Fish and Game hatcheries. Other facilities which supplied trout released in the region included Ennis National Fish Hatchery and a private hatchery. Except for roadless alpine lakes, all waters were stocked from hatchery trucks. Alpine lakes were stocked either from helicopter or by backpacking plastic bags of fish. Fish stocked from helicopter were transported in bags which were then cut open and dumped as the helicopter passed over the lake.

Reservoirs with undesirable species were renovated using standardized rotenone treatments (Horton 1991).

RESULTS AND DISCUSSION

Hatchery Releases

A total of 43 high mountain lakes were stocked with 28,800 fingerling trout in the region in 1994. Most of them were stocked with either cutthroat or rainbow trout from a helicopter, except that Independence Lakes #2 and #3 were stocked by backpacking in bags of cutthroat trout. Additionally, 19 rivers, streams, and canals and 41 reservoirs, lakes, and ponds were stocked with approximately 2.37 million put-and-grow and 0.66 million put-and-take size kokanee, rainbow, and brown trout (IDFG 1995). Scotts Pond along the Snake River received 250 fingerling brook trout *Salvelinus fontinalis* fingerlings.

The Snake River between Shoshone Falls and C.J. Strike Reservoir received 451 white sturgeon *Acipenser transmontanus* averaging 373 mm. A total of 119 channel catfish *Ictalurus punctatus* averaging 493 mm were transplanted from Brownlee Reservoir to Milner Reservoir by Idaho Power Company as part of their mitigation requirements.

Little Camas Reservoir

Fish were sampled in Little Camas Reservoir during the summer of 1994. Results indicated a dense population of small black crappie *Pomoxis nigromaculatus* averaging approximately 114 mm in total length. With the black crappie's potential to overpopulate in small reservoirs like Little Camas Reservoir, it was decided to treat the reservoir with rotenone. Prior to treatment, we seined and transported approximately 12,000 live black crappie weighing 55.6 fish/lb (122.6 fish/kg) from Little Camas Reservoir to Salmon Falls Creek Reservoir on October 12, 1994. Southeast Region fishery personnel also transported an unknown number of black crappie from the reservoir to one in their region.

Actual treatment of the reservoir took place on October 21, 1994. Approximately 15 gallons of 2.5% synergized rotenone solution was used for the remaining 25 acre-feet of water left in the reservoir. One floating and one sinking gill net was set on April 10 and pulled on April 11, 1995. No fish were caught in any of the nets, indicating that a total fish kill may have been achieved with the treatment.

A total of 15,000 catchable sized and 90,000 fingerling rainbow trout were stocked in the spring of 1995. Due to public input at the meeting in Mountain Home prior to the treatment, it was decided that smallmouth bass *Micropterus dolomieu* would be restocked along with hatchery rainbow trout in the next year after the treatment process.

Salmon Falls Creek Reservoir

Approximately one million walleye *Stizostedion vitreum* sac fry obtained from Garrison National Fish Hatchery in North Dakota were stocked into Salmon Falls Creek Reservoir on May 13, 1994. Half of the fry were put into the reservoir at Whiskey Slough and the other half put into the reservoir near the mouth of Salmon Falls Creek, which was almost up to China Creek. Approximately 12,000 black crappie weighing 122.6 fish/kg (55.6 fish/lb) were transplanted to the reservoir from Little Camas Reservoir on October 12, 1994. They were released at Grey's Landing.

Headgates for Salmon Falls Creek Reservoir water used for irrigation were shut down on August 18, 1994. Regional fishery personnel salvaged 103 walleye averaging 421 mm in total length from the canal downstream from the headgates on that date. An additional ten rainbow trout, one black crappie, and six kokanee were also salvaged. All salvaged fish were returned to the reservoir.

LITERATURE CITED

Horton, W.D. 1991. Lake renovation procedures manual. Idaho Department of Fish and Game, Boise.

Idaho Department of Fish and Game. 1995. 1994 Stocking Records Statewide, Boise.

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Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

A handwritten signature in black ink, appearing to read "Virgil K. Moore", written over a horizontal line.

Virgil K. Moore, Chief
Bureau of Fisheries

A handwritten signature in black ink, appearing to read "Bill Hutchinson", written over a horizontal line.

Bill Hutchinson
State Fisheries Manager

