



**FEDERAL AID IN FISH RESTORATIONS  
2001 JOB PERFORMANCE REPORT  
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**Steven M. Huffaker, Director**

**REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS  
SOUTHWEST REGION (Subproject I-D, II-D, IV-D)**

**PROJECT I. SURVEYS AND INVENTORIES**

- Job a. Southwest Region Mountain Lakes Investigations**
- Job b. Southwest Region Lowland Lakes Investigations**
- Job c. Southwest Region Rivers and Streams Investigations**
- Job d. Southwest Region Salmon and Steelhead Investigations**

**PROJECT II. TECHNICAL GUIDANCE**

**PROJECT III. HABITAT MANAGEMENT**

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## 2001 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-26

Project I: Surveys and Inventories

Subproject I-D: Southwest Region

Job No.: a

Title: Mountain Lakes Investigation

Period Covered: July 1, 2001 to June 30, 2002

### ABSTRACT

No mountain lake sampling was conducted in the Southwest Region in 2001.

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## 2001 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-26

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Subproject I-D: Southwest Region

Job No.: b

Title: Lowland Lakes Investigations

Contract Period: July 1, 2001 to June 30, 2002

### ABSTRACT

Crane Creek Reservoir was sampled with a multiple gear lowland lake sampling strategy, which included experimental gill nets and trap nets. White crappie *Pomoxis annularis*, brown bullhead *Ameiurus nebulosus*, and channel catfish *Ictalurus punctatus* were the only game fish captured. Channel catfish appear to be reproducing and are reaching sizes >500 mm. Non-game species captured were common carp *Cyprinus carpio* and bridgelip sucker *Catostomus columbianus*, which represented 6% of the total catch. White crappie made up 79% of the total catch. The mean length and CPUE for white crappie was very similar to previous surveys.

Twenty-nine fish were collected by gillnetting in Deadwood Reservoir in July. Game fish sampled included westslope cutthroat trout *Oncorhynchus clarki lewisi*, mountain whitefish *Prosopium williamsoni*, and redband trout *Oncorhynchus mykiss gairdneri*. No kokanee *Oncorhynchus nerka kennerlyi* were collected.

Gillnetting in May in Sage Hen Reservoir collected 148 fish. Captured game fish included 65 hatchery rainbow trout *O. mykiss* and 83 wild rainbow (redband) trout. Gill net catch rates were considerably higher than in 1994, but the hatchery/wild fish ratio was similar.

Two pairs of gill nets were set overnight at Claytonia pond in June to monitor game fish and to document the presence or absence of common carp. None were observed or collected.

Electrofishing was used to sample Crane Falls Lake, Horseshoe Bend Mill Pond, Indian Creek Reservoir, and West Sawyer's Pond. Crane Falls Lake was sampled in May. Largemouth bass *Micropterus salmoides* CPUE, proportional stock density, and relative weight were lower than in 1998. Bluegill *Lepomis macrochirus* CPUE declined markedly and average size increased slightly compared to 1998.

Horseshoe Bend Mill pond was sampled in April to evaluate the fishery following pond reconstruction and stocking in 2000. Twenty-one largemouth bass and thirteen bluegill were collected. Several hundred young-of-year bluegill and largemouth bass were observed, indicating successful reproduction.

Largemouth bass and bluegill populations in Indian Creek Reservoir continued to improve from 1996 to early 2001, but the reservoir received virtually no runoff in 2001. With the reservoir expected to go dry, regional crews electrofished and removed 2,229 largemouth bass and 2,786 bluegill in April 2001. Mean length of largemouth bass was 300 mm, 7% larger than recorded in 1999. CPUE for largemouth bass was down 51% from 1999. With fewer largemouth bass present, recruitment of bluegill appeared to improve. The mean length of bluegill (160 mm) was very similar to previous years, but bluegill <150 mm were present in higher densities than observed in previous samples. Only a small pool remained by fall.

Indian Creek Reservoir was opened to salvage fishing on June 11, and by late summer only a small pool remained. Due to low spring runoff and drawdown for irrigation, Blacks Creek Reservoir was also opened to salvage fishing on June 11 and was effectively dry after mid-July. Mountain Home Reservoir was opened to salvage fishing on June 22 and was effectively dry after July.

In 1999, West Sawyer's Pond was donated to the Department from a private landowner. Electrofishing conducted in May 2001 indicated that the pond contained bluegill, largemouth bass, pumpkinseed *Lepomis gibbosus*, and brown bullhead. Largemouth bass and bluegill up to 468 mm and 192 mm, respectively, were collected.

A creel survey was conducted at C.J. Strike Reservoir to evaluate angler effort and hatchery rainbow trout harvest during April, May, and June 2001. There were 435 anglers interviewed. Estimated effort for bank anglers was 12,394 hours, and 17,903 hours for boat anglers. Most of the angling effort during the survey was directed at crappie *Pomoxis spp.* The overall hatchery rainbow trout catch rate was 0.03 trout/hour, but this included anglers targeting species other than trout. Total catch rates were 1.4 trout/hour for bank anglers and 1.3 trout/hour for boat anglers.

Zooplankton samples were taken from Arrowrock, Lucky Peak, and C.J. Strike reservoirs in 2001. A slight increase in the zooplankton quality index (ZQI - a measure that includes zooplankton abundance and size) was observed in Arrowrock Reservoir from 2000 to 2001. A small decrease in ZQI was observed for Lucky Peak Reservoir. The C.J. Strike ZQI results were considerably higher at all sample sites than in 2000.

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## OBJECTIVES

1. Use standardized sampling methods to describe fish population trends in regional lakes and reservoirs.
2. Continue evaluations of hatchery rainbow trout growth and return to creel in C.J. Strike Reservoir.
3. Use standardized methods to assess zooplankton size structure trends in C.J. Strike, Lucky Peak, and Arrowrock reservoirs.

## METHODS

### Standardized Lowland Lake Surveys

Gillnetting methods included both floating and sinking experimental nets. Experimental gill nets were 45.7 m long by 1.8 m deep, and were composed of 6-7.6 m panels of 1.9, 2.5, 3.2, 3.8, 5.2, and 6.4 cm bar mesh. Nets were set in late afternoon and pulled the following morning. Nets were set by tying or anchoring one end of the net near or on shore in water less than 0.5 m deep and extending the net perpendicular to shore. When more than one floating or one sinking net was used per water, nets were set to alternate large and small mesh ends of the nets next to shore. One unit of gill net effort was defined as one floating and one sinking experimental gill net fished overnight. Gill net catch per unit effort (CPUE) was calculated as the combined catch of one floating and one sinking experimental net, by both number and weight, per night. (Hereafter, gill net catch refers to combined catch from one floating and one sinking experimental gill net.)

Trapnetting was conducted using standard trap nets composed of two light steel frames measuring 1.8 m x 0.9 m, covered with 19 mm square black mesh, and with five 76 cm steel round hoops with crow foot throats on the first and third hoops, and with 23 m long lead lines 0.9 to 1.3 m in height. Trap nets were set on shallow sloping areas with the top of the steel frame within 0.3 m of the water surface and the lead lines tied to shore. Trap nets were set late in the afternoon and pulled the following morning. One unit of trap net effort was defined as one trap net fished overnight. Trap net CPUE (number and weight) was calculated as the mean catch of individual trap nets set overnight.

Electrofishing was conducted from a boom mounted electrofishing boat, with one or two netters collecting fish. Electrofishing was conducted along shorelines areas only. Attempts were made to collect all immobilized fish. One unit of electrofishing effort was defined as one hour of activated electrode time. Unless otherwise noted, all electrofishing was conducted at night. Electrofishing CPUE was calculated as catch (number and weight) per hour of activated electrode time.

### **Crane Creek Reservoir**

Crane Creek Reservoir was sampled with both gill nets and trap nets on July 13, 2001. Two units of gillnetting effort were used. One pair of nets was set along the southwest shore and the other along the northeast shore. In addition, six trap nets were set overnight at various sites along the north, northeast, southeast, south, southwest, and northwest shorelines.

### **Deadwood Reservoir**

Deadwood Reservoir was sampled with two units of gill net effort on July 6, 2001. The objective was primarily to develop sampling protocols to monitor kokanee *Oncorhynchus nerka* abundance and size structure. Previous gillnetting was primarily done in the fall, and was ineffective in sampling adult kokanee. One additional pair of gill nets was fished during the day on July 6, 2001. All nets were set on the west side of the reservoir at established sampling sites.

### **Sage Hen Reservoir**

Sage Hen Reservoir was sampled with two units of gill net effort on May 16, 2001. Nets were set on the southeast side of the reservoir towards the dam, and on the west side of the reservoir.

### **Claytonia Pond**

Claytonia Pond was sampled with two units of gill net effort on May 8, 2001. One pair was set on the south side of the pond adjacent to habitat structure placements, and the other on the north side of the pond where no aquatic habitat enhancements have been made.

### **Crane Falls Lake**

Electrofishing was conducted after sunset on May 14, 2001 using 0.75 h of energized field time. Two netters and one boat operator collected the sample. Sampling conditions were very similar to previous years.

### **Horseshoe Bend Pond**

Electrofishing was conducted for 0.5 h on April 23 to evaluate the fishery following pond reconstruction and stocking in 2000. One boat operator and two netters were used. All sampling was conducted after sunset.

## **Indian Creek Reservoir**

A boom mounted electrofishing boat was used to salvage largemouth bass and bluegill during mid-day on April 23, May 4, and May 10. One hour of activated electrofishing time was used on April 23, and approximately 4 hours per day in May. Fish were transported in an oxygenated live well to Horseshoe Bend Mill Pond, Beach's Pond, Caldwell Rotary Pond, Marsing Pond, and Claytonia Pond.

## **West Sawyer's Pond**

In 1999, this pond was donated to the Department from a private landowner. Shortly thereafter, a concrete boat ramp and an outhouse were constructed on site. The pond is located adjacent to the west side of the preexisting Sawyer's Pond, with a dirt levee separating the two ponds. To help distinguish between the new Sawyer's Pond and the old, the new pond will be named West Sawyer's Pond and the old will become East Sawyer's Pond. West Sawyer's Pond will be managed for warm water fish and will be maintained as an IDFG sportsman's access. This was the first IDFG fisheries survey of the pond. One hour of electrofishing was conducted on May 10, 2001. One boat operator and two netters were used. All sampling was conducted after sunset.

### **Salvage Fishing Seasons**

As a result of drought conditions and low water levels, fish bag limits and gear restrictions were removed on three regional reservoirs in 2001. Salvage orders went into effect for Indian Creek and Blacks Creek reservoirs on June 11, and for Mountain Home Reservoir on June 22.

### **C.J. Strike Reservoir Hatchery Trout Evaluations**

#### **Fish Sampling**

C.J. Strike Reservoir was sampled with floating gill nets on April 4-5, June 1, and September 27, 2001. Four floating experimental gill nets were set either overnight, or for one-hour periods. Floating gill nets were used in an effort to target jaw-tagged and grit-marked rainbow trout *Oncorhynchus mykiss* stocked in 1999 and 2000 as part of an ongoing hatchery trout evaluation at C.J. Strike Reservoir (Flatter et al. in press).

C.J. Strike Reservoir was electrofished on March 28, 2001. This was also a focused effort to capture marked hatchery rainbow trout. Electrofishing was conducted using a boom mounted electrofishing boat. A total of 84 minutes of activated electrode time was used within 20 feet of the shoreline on the east side of the main reservoir.

## **Creel Survey**

As part of an ongoing evaluation of hatchery rainbow trout stocking strategies (Flatter et al. in press), a randomized roving creel survey was conducted at C.J. Strike Reservoir during April, May, and June of 2001. Our intent was to evaluate success of anglers targeting rainbow trout, and also to record data from any marked rainbow trout observed in the harvest. Creel information was collected one weekday and one weekend day per week through the survey interval. Creel clerks had predefined time intervals to conduct instantaneous angler pressure counts. Clerks conducted angler interviews randomly between pressure count times. In addition to standard creel survey questions, anglers were asked whether they were fishing specifically for rainbow trout. A subsample of rainbow trout observed in the harvest was measured. Volunteers provided a majority of the labor for the roving survey. Questionnaires were also used to collect the above information from anglers who were away from their vehicles and could not be reached. Self-addressed, postage prepaid envelopes accompanied questionnaires placed on vehicles.

All census and interview data was entered into a program developed by Bill Babcock of the Colorado Division of Wildlife, Aquatic Research Section (C-SAP Creel Survey Analysis Program, Colorado Division of Wildlife Aquatic Research, Fort Collins, CO).

## **Zooplankton Surveys**

Zooplankton samples were taken from C.J. Strike, Lucky Peak, and Arrowrock Reservoirs in August 2001. Samples were taken following methods outlined by Teuscher (1999).

## RESULTS AND DISCUSSION

### Standardized Lowland Lake Survey

Sampling methods and amount of effort in each location are presented in Appendix A.

#### Crane Creek Reservoir

One night of gillnetting and trapnetting on Crane Creek Reservoir yielded a total of 1,234 fish (Appendix B, C). Captured game fish included white crappie *Pomoxis annularis*, brown bullhead *Ameiurus nebulosus*, and channel catfish *Ictalurus punctatus*. Non-game fish captured included common carp *Cyprinus carpio* and bridgelip sucker *Catostomus columbianus*.

White crappie was the predominant game fish sampled, comprising 79% of the total catch by number. Gill nets and trap nets were equally effective in capturing white crappie, with 491 caught in gill nets and 516 caught in trap nets (Table 1; Appendix B, C). Lengths of white crappie ranged from 80 to 310 mm, with a mean of 189 mm. The mean length and CPUE was very similar to previous surveys (Table 2).

There were 127 brown bullheads captured, with the majority (97) caught in the trap nets (Table 1; Appendix B, C). Lengths ranged from 160 to 240 mm, with a mean of 217 mm. The CPUE and size structure were similar to previous years.

All (n=27) channel catfish captured were caught in the gill nets (Table 1; Appendix B, C). Lengths ranged from 195 to 580 mm, with a mean of 281 mm. Channel catfish CPUE (13.5) was approximately four times the observed CPUE in 1998 (Allen et al. 2001). The last recorded stocking of channel catfish in Crane Creek Reservoir was in 1990 when 16,000 fingerlings were stocked. The range of sizes observed in our samples suggests that natural recruitment has occurred since that time. Though not abundant, they appear to be growing well and attaining large sizes, and add diversity to the fishery. Supplemental stocking should be considered as channel catfish are available.

Common carp were the predominant non-game fish captured (n=68; Table 1, Appendix B, C). Lengths ranged from 295 to 620 mm, with a mean of 403 mm. Mean length has steadily increased since 1995 (Table 2). Carp CPUE (34) exceeded 1995 and 1998 sampling results by 17% and 26%, respectively. Common carp represented less than 6% of the total fish sampled by number, but over 60% by weight (Appendix B).

Table 1. Crane Creek Reservoir gill net and trap net results for July 13, 2001.

Species	Length Range (mm)		Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught
	Min.	Max.			
White crappie	80	310	491	516	1007
Brown bullhead	160	240	30	97	127
Common carp	290	620	68	0	68
Channel catfish	190	580	27	0	27
Bridgelip sucker	260	330	5	0	5

### Deadwood Reservoir

Gillnetting yielded only 29 fish, including mountain whitefish *Prosopium williamsoni*, westslope cutthroat trout *Oncorhynchus clarki lewisi*, and rainbow (redband) trout *O. mykiss gairdneri* (Appendix B, C). Mean lengths for sampled species were 327, 410, and 271 mm, respectively. No kokanee, bull trout *Salvelinus confluentus*, or non-game fish were collected.

Mountain whitefish were the most abundant species captured, comprising 79% (n=23) of the total catch (Appendix B, C). Mountain whitefish ranged in size from 180 to 390 mm, with a mean of 340 mm. Gill net CPUE was 7 during daytime netting, and 11 during the nighttime effort.

Wild rainbow (redband) trout were the second most abundant fish encountered, comprising 14% (4 fish) of the catch (Appendix B, C). Lengths ranged from 220 to 320 mm, with a mean of 271 mm.

Only two westslope cutthroat trout were sampled. Both were 410 mm in length.

Kokanee are present in Deadwood Reservoir but were not sampled in our nets. They appear reduced from previous years, although useful trend data from the reservoir are not available. The kokanee spawning operation on Deadwood River has failed to meet egg-taking goals since 1999, while average size of spawners has increased. In June 2001, the reservoir population was supplemented with approximately 130,000 kokanee fingerlings in an attempt to stabilize the fishery and ensure the viability of the population as a source of early spawning kokanee eggs. Additional techniques such as hydroacoustics may be more effective for monitoring kokanee year class strength in the reservoir, predicting run size, or developing escapement goals. This should be coupled with annual assessments of zooplankton size structure as an index of kokanee forage availability.

Table 2. Mean and maximum lengths, total catch-per-unit-effort (CPUE) by number, and percentage of total catch for four species collected by gillnetting in Crane Creek Reservoir between 1995 and 2001.

Species	Year	Sample	Mean Length	Maximum Length
CPUE	% of Total	Date Catch	(mm)	(mm)
White crappie	1995 <sup>a</sup>	June 13	194	269
	278	90		
	1998 <sup>b</sup>	June 25	193	240
	273	67		
	2001	July 17	191	310
	245	79		
Channel catfish	1995	June 13	530	530
	0.5	1.4		
	1998	June 25	264	392
	3.5	1.5		
	2001	July 17	281	580
	13.5	4.3		
Brown bullhead	1995	June 13	205	210
	1	2.7		
	1998	June 25	172	195
	7.5	3.3		
	2001	July 17	218	240
	15	4.8		
Common carp	1995	June 13	200	235
	29	2.7		
	1998	June 25	374	519
	27	2		
	2001	July 17	403	620
	34	11		

<sup>a</sup> Allen et al. 1998

<sup>b</sup> Allen et al. 2001

## Sage Hen Reservoir

One night of gillnetting on Sage Hen Reservoir yielded 148 fish (Appendix B, C). Hatchery rainbow trout (n=65) and wild redband trout (n=83) were the only species collected. Mean lengths for hatchery rainbow and wild redband trout were 240 and 323 mm, respectively. Mean lengths for hatchery and wild rainbow trout sampled in 1994 were 297 and 290 mm, respectively (Allen et al. 2000).

Catch per unit effort increased in 2001 with a CPUE of 32.5 and 41.5 for hatchery and wild rainbow trout, respectively (Appendix B). CPUE in 1994 was 13, and 24.5 for hatchery and wild rainbow trout, respectively (Allen et al. 2000). Wild redband trout comprised 56% of the sample by number and 75% by weight. Mean length and weight was 323 mm and 351 g, respectively. Hatchery rainbow trout comprised the remaining 44% of the catch by number and 25% by weight, with mean length and weight of 240 mm and 149 g, respectively.

Improved water conditions and reservoir levels in the last several years may have contributed to a near doubling of the overall trout CPUE compared to 1994. Wild trout continue to comprise over half of the fish in our samples, and in 2001 wild fish average size was considerably larger than for hatchery fish. Although the proportion of wild fish in 2001 (56%) was slightly lower than reported for 1994 (70%; Allen et al. 2000), there is little indication that wild fish are overexploited. Wild fish may be less vulnerable to angling than hatchery fish. Allen et al. (2000) estimated that in 1994 wild fish comprised 70% of the trout population, but also estimated that wild trout provided only 15% of the angler harvest.

## Claytonia Pond

A total of 8 largemouth bass *Micropterus salmoides*, 10 bluegill *Lepomis macrochirus*, two channel catfish, and three largescale sucker *Catostomus macrocheilus* were captured (Appendix B, C). Largemouth bass and bluegill ranged from 140-420 mm, and 135-185 mm, respectively. Both channel catfish were less than 235 mm in length, likely the result of fingerling stocking in 1999. Low catch rates precluded any comparisons between areas with and without habitat structures.

## Crane Falls Lake

Bluegill was the most abundant species collected (Appendix B, C). The mean length was 125 mm, which was slightly larger than in 1998 (Allen et al. 2001a) and other prior samples (Table 3). Although the CPUE by number was less than 40% of the 1998 results, it was more than double the results of 1994 and 1997.

Total CPUE for largemouth bass (61) was 56% lower than recorded in 1998 and the lowest recorded since 1994 (Table 3). Mean length was very similar to previous years, mean weight was slightly higher than in 1998 but considerably lower than previous years. Proportional stock density decreased to 44.4 compared to 63.6 in 1998, average relative weights decreased from 113.6 in 1998 to 98.8 in 2001.

Table 3. Electrofishing data for largemouth bass and bluegill in Crane Falls Lake between 1994 and 2001.

Species	Year	Sample Date	Mean Length (mm) (SE)	Maximum Length (mm)	Mean Weight (g) (SE)	CPUE (fish/h)
Largemouth bass	1992 <sup>a</sup>	Sept. 14	285 (n/a)	480	n/a	108
	1994 <sup>b</sup>	May 11	266 (12.4)	n/a	442 (44.6)	105
	1997 <sup>c</sup>	May 27	315 (11.6)	440	631 (38.5)	91
	1998 <sup>d</sup>	June 10	243 (12)	423	358 (42)	139
	2001	May 14	270 (13)	470	380 (59)	61
Bluegill	1992 <sup>a</sup>	Sept. 14	n/a	320	n/a	72
	1994 <sup>b</sup>	May 11	98 (6.9)	n/a	134 (30)	55
	1997 <sup>c</sup>	May 27	107 (3.4)	180	45 (6.6)	69
	1998 <sup>d</sup>	June 10	111 (3)	190	41 (4)	369
	2001	May 14	125 (2)	170	43 (2)	140

<sup>a</sup> Allen et al. 1995

<sup>b</sup> Allen et al. 2000a

<sup>c</sup> Allen et al. 2000b

<sup>d</sup> Allen et al. 2001

## Horseshoe Bend Pond

A total of 34 fish were collected, which included 21 largemouth bass and 13 bluegill (Appendices B, C). Several hundred YOY bluegill and largemouth bass were observed but not collected, indicating reproduction occurred since the pond reconstruction. Bluegill ranged in length from 50 to 210 mm, with a mean of 120 mm. Largemouth bass ranged from 55 to 380 mm, with a mean of 268 mm.

A pump was installed in late 2000 to deliver water from the Payette River to the pond to moderate water level fluctuations. With the new water delivery system and overall habitat improvements, warm water fish populations should improve with time.

## Indian Creek Reservoir

Largemouth bass and bluegill were the only species captured by electrofishing (Appendix B, C). Fish were concentrated on what little structure remained in the reservoir. Total CPUE was 236 on April 23, and size structure for both species was very good with bluegill averaging 160 mm and largemouth bass averaging 300 mm. Total length was measured on 122 bluegill, and 114 largemouth bass on April 23. Mean lengths for bluegill and largemouth bass were 159.5 mm and 300 mm, respectively (Table 4). Very few juvenile fish were observed or collected.

Over the past five years, electrofishing CPUE for largemouth bass has decreased while mean size has increased (Table 5). Lengths ranged from 150 to 365 mm, and CPUE was 114, down considerably from 563 in 1997. Largemouth bass PSD was 83.8.

Bluegill CPUE was 122 on April 23, which exceeded 1996 and 1997 results but fell considerably short of the 1999 catch (Table 5). The mean length of bluegill (160 mm) was very similar to previous years. Bluegill less than 150 mm were much more abundant than in 1999. With fewer largemouth bass present, recruitment of bluegill appears to have improved. Bluegill PSD was 75.8. Several bluegill approximately 250 mm in length were observed but not collected.

The reservoir received very little inflow in spring 2001 and water levels dropped throughout the season. Only small reservoir releases occurred in 2000 and the spring of 2001 to maintain riparian plants in the outlet channel. By May 4, the maximum water depth in the reservoir was 1.5 m. With water levels already low, it was expected to be dry or nearly so by the end of summer. Regional fishery staff elected to salvage and relocate part of the largemouth bass *Micropterus salmoides* and bluegill *Lepomis macrochirus* populations in spring while the reservoir was still accessible. From late April to mid-May, 2,229 largemouth bass and 2,786 bluegill were collected by electrofishing and transplanted to other regional waters (Table 6). Largemouth bass CPUE jumped from 114 fish/h in April, to 550 on May 4 and May 10.

On June 11 the reservoir was opened to salvage fishing, and by late summer only a small pool remained. Anglers contacted during March and April reported excellent fishing and requested that improvements be made in the boat ramp.

Table 4. Length frequency for bluegill and largemouth bass removed from Indian Creek Reservoir on April 23, 2001.

Species	Centimeter group	Number measured
Bluegill	8	1
	12	2
	13	10
	14	16
	15	27
	16	31
	17	16
	18	6
	19	8
	20	2
	21	1
	22	2
	Mean length	159.5 mm
Largemouth bass	15	1
	16	1
	17	5
	18	4
	19	4
	20	3
	21	4
	22	5
	23	2
	27	2
	30	4
	31	3
	32	12
	33	23
	34	20
35	16	
36	5	
Mean length	299.7 mm	114

Table 5. Electrofishing data for largemouth bass and bluegill in Indian Creek Reservoir between 1996 and 2001.

Species	Mean Weight in g (SE)	CPUE Year in g (SE)	Sample Date (fish/h)	Mean Length in mm (SE)	Maximum Length in mm
Largemouth bass					
	1996 <sup>a</sup> 50 (27)		May 6 294	124 (7)	380
	1997 <sup>b</sup> 130 (15.8)		April 22 563	200 (1.4)	482
	1999 <sup>c</sup> 327 (12)		May 6 234	281 (4)	370
	2001 no data		April 24 114	300 (6)	365
Bluegill					
	1996 <sup>a</sup> 37 (6)		May 6 23	116 (5)	160
	1997 <sup>b</sup> 134 (13.7)		April 22 48	154 (6.1)	218
	1999 <sup>c</sup> 163 (41)		May 6 290	163 (13)	270
	2001 no data		April 24 122	160 (2)	225

<sup>a</sup> Allen et al. 1999  
<sup>b</sup> Allen et al. 2000  
<sup>c</sup> Allen et al. 2001b

Table 6. Warm water fish transported from Indian Creek Reservoir to regional waters in April and May 2001.

Destination	Largemouth Bass	Bluegill
Horseshoe Bend Mill Pond	575	425
Beach's Pond	416	255
Caldwell Rotary Pond	540	1,000
Marsing Pond	95	387
Claytonia Pond	603	719
Total fish removed from Indian Creek Reservoir	2,229	2,786

### West Sawyer's Pond

Bluegill, pumpkinseed *Lepomis gibbosus*, largemouth bass, and brown bullhead were captured (Appendix B, C). Bluegill and largemouth bass dominated the catch, with CPUE by number 116 and 114, respectively. Bluegill ranged in length from 73 to 192 mm and largemouth bass from 88 to 468 mm. The mean lengths of bluegill and largemouth bass were 131 and 220 mm, respectively. Hundreds of YOY bluegill, pumpkinseed, and largemouth bass were observed but not collected.

### C.J. Strike Reservoir Hatchery Trout Evaluations

#### Fish Sampling

Gillnetting yielded a total of only 19 rainbow trout (Appendix B, C). Lengths ranged from 255 to 445 mm and weights ranged from 600 to 1,225 g. Three trout sampled had jaw tags (catchable plants), and six were positive for grit marks (fingerling plants). Other species collected included white crappie, black crappie *Pomoxis nigromaculatus*, smallmouth bass *Micropterus dolomieu*, largemouth bass, yellow perch *Perca flavescens*, mountain whitefish, and northern pikeminnow *Ptychocheilus oregonensis* (Appendix A).

Twenty-one hatchery rainbow trout were collected while electrofishing. Two were positive for orange grit marks, and one was jaw tagged.

The total catch of marked hatchery rainbow trout was insufficient for detailed analysis of growth or relative abundance by stocked group. The conclusions and recommendations drawn from the previous year's (2000) evaluations (Flatter et al. in press) would not change as a result of these data.

## Creel Survey

There were a total of 435 anglers interviewed, comprised of 130 bank anglers and 305 boat anglers. Total hours of fishing during April, May, and June 2001 was estimated at 12,394 hours for bank anglers, and 17,903 hours for boat anglers.

Crappie species (black and white crappie combined) were the most preferred species during the census period (36% of all anglers contacted; Table 7). Smallmouth bass were the second most preferred species (19% of all anglers contacted), with rainbow trout being the target species of 18% of the anglers contacted. Anglers interested in catching "anything" made up 13% of all contacts during the census period.

Table 7. Species preference by anglers interviewed on C. J. Strike Reservoir, April-June 2001.

Species Preferred	# Anglers Interviewed	% Of Total Anglers Interviewed
Crappie spp.	141	36
Smallmouth bass	76	19
Rainbow trout	72	18
Not specific (anything)	52	13
Yellow perch	31	8
Largemouth bass	15	4
White sturgeon	5	1
Bluegill	1	<1
Total	393	100

Estimated total hatchery rainbow trout catch by bank and boat anglers combined was 611 trout, for a total catch rate of 0.034 trout/hour. All of the estimated trout catch was harvested; no anglers reported releasing hatchery trout. Due to a design flaw in the survey procedures, we were unable to stratify trout catch rate estimates specifically for anglers targeting trout. Overall catch rate by boat anglers was 1.3 trout/hour and overall catch rate for bank anglers was 1.4 trout/hour. Total estimated catch and harvest of all sport fish are listed in Table 8.

## Zooplankton Surveys

A slight increase in the zooplankton quality index (ZQI - includes zooplankton abundance and size) was observed in Arrowrock Reservoir from 2000 to 2001 (Table 9). A small decrease was observed in the calculated ZQI for Lucky Peak Reservoir. The C.J. Strike ZQI results were considerably higher at all sample sites than in 2000. The results of the 1999, 2000, and 2001 processed samples can be found in Table 9.

Table 8. Estimated catch and harvest data for bank and boat anglers at C. J. Strike Reservoir during April - June 2001.

Species	Total catch			Total catch rate (fish/hour)		Total harvest			Harvest rate (fish/hour)	
	Bank	Boat	Both (95% C.I.)	Bank	Boat	Bank	Boat	Both (95% C.I.)	Bank	Boat
rainbow trout	0	610	610 (257)	0	0.03	0	610	610 (257)	0	0.03
white crappie	2,426	3,002	5,428 (4,085)	0.20	0.17	2,426	2,954	5,380 (4,037)	0.20	0.17
black crappie	14,295	3,759	18,054 (6,882)	1.15	0.21	14,008	3,522	17,530 (6,736)	1.13	0.21
smallmouth bass	0	11,044	11,044 (5,262)	0	0.62	0	691	691 (505)	0	0.62
largemouth bass	0	2,396	2,396 (1,531)	0	0.13	0	1,318	1,318 (1,301)	0	0.13
yellow perch	837	2,879	3,716 (1,553)	0.07	0.16	837	2,253	3,090 (1,337)	0.07	0.16

Table 9. Zooplankton tow values in grams per meter sampled, zooplankton ratio (ZPR), and zooplankton quantity index (ZQI) for reservoirs sampled in 1999, 2000, and 2001. Depth of all samples was 9.1 meters.

Water	Sample Location	Biomass (g/m <sup>3</sup> )			ZPR 750μ/500μ	ZQI (500μ+750μ)ZPR
		153μ <sup>a</sup>	500μ <sup>a</sup>	750μ <sup>a</sup>		
C.J. Strike Res.	Snake Arm @ Crane Falls					
	1999	0.48	0.01	0.01	0	0
	2000	0.089	0.021	0.018	0.842	0.032
	2001	0.008	0.02	0.076	3.8	0.3648
	Snake Arm @ Powerline					
	1999	0.31	0.01	0.01	0	0
	2000	3.19	1.55	0.785	0.503	1.18
	2001	8.43	6.35	4.46	0.702	7.59
	Bruneau Arm					
	1999	2.51	0.63	0.33	0.53	0.5
	2000	2.21	0.671	0.322	0.479	0.476
	2001	4.22	2.78	2.94	1.06	6.06
	Bruneau Narrows					
	1999	2.89	0.98	0.51	0.52	0.78
	2000	1.422	0.679	0.430	0.633	0.701
	2001	4.47	2.19	1.07	0.48	1.58
	Near Dam					
	1999	1.29	0.46	0.24	0.52	0.36
2000	0.91	0.18	0.14	0.784	0.25	
2001	3.02	1.08	0.5	0.46	0.72	
Lucky Peak Res.	Upper					
	1999	1.2	0.65	0.25	0.39	0.35
	2000	0.926	0.936	0.582	0.622	0.944
	2001	0.14	0.07	0.03	0.4	0.04
	Middle					
	1999	0.9	0.42	0.28	0.66	0.46
2000	0.323	0.232	0.223	0.962	0.44	
2001	0.81	0.63	0.58	0.93	1.12	

Table 9. Continued.

Water	Sample Location	Biomass (g/m <sup>3</sup> )			ZPR	ZQI	
		153μ <sup>a</sup>	500μ <sup>a</sup>	750μ <sup>a</sup>	750μ/500μ	(500μ+750μ)ZPR	
Lucky Peak Res.	Lower	1999	0.29	0.12	0.07	0.55	0.11
		2000	0.343	0.262	0.345	1.32	0.80
		2001	0.29	0.10	0.08	0.79	0.14
	Arrowrock Res.	Upper	1999	0.45	0.43	0.25	0.59
2000			0.54	0.30	0.195	0.65	0.32
2001			0.36	0.24	0.17	0.72	0.30
Middle		1999	0.59	0.46	0.36	0.79	0.65
		2000	0.148	0.166	0.124	0.75	0.22
		2001	0.52	0.28	0.18	0.65	0.30
Lower		1999	1.12	0.87	0.7	0.81	1.27
		2000	0.46	0.44	0.20	0.47	0.30
		2001	0.75	0.72	0.32	0.44	0.45

<sup>a</sup> net mesh size used in zooplankton tows

## RECOMMENDATIONS

1. Continue lowland lake surveys on Crane Creek Reservoir approximately every third year. Monitor abundance of common carp and other non-game fish to determine whether reservoir renovation is necessary.
2. Investigate hydroacoustic techniques to monitor kokanee populations in Deadwood Reservoir. Develop predictors of run size and targets for spawning escapement.
3. Evaluate inflows and water levels in Indian Creek Reservoir in spring 2002. Restock with largemouth bass and bluegill if appropriate.
4. Manage the new West Sawyers Pond as a general regulation yield fishery for warm water species, with seasonal (Sep-May) hatchery rainbow trout stocking.
5. Continue annual zooplankton sampling on select regional reservoirs; include Deadwood Reservoir.

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Appendix A. Units of sampling effort for lowland lake sampling, 2001.

Location	Date	Gear Type	Effort <sup>a</sup>
C.J. Strike Res.	3/28/01	EF	1
	3/28/01	FGN	24
	4/4/01	FGN	5
	4/4/01	EF	1.5
	4/5/01	FGN	2
	6/1/01	SGN	13
	6/1/01	FGN	4
	9/27/01	FGN	4
Caldwell Pond #3	5/10/01	EF	0.5
Claytonia Pond	5/8/01	GN	2
Crane Creek Res.	7/13/01	TN	6
	7/13/01	GN	2
Crane Falls Lake	5/14/01	EF	0.75
Deadwood Res.	7/6/01	SGN	1
	7/6/01	GN	2
Gem County Pond	5/10/01	EF	0.5
Horseshoe Bend Pond	4/23/01	EF	0.5
Indian Creek Res.	4/23/01	EF	1
Marsing Pond	5/8/01	GN	1
Sage Hen Res.	5/16/01	GN	2
West Sawyers Pond	5/10/01	EF	1

<sup>a</sup> Units of effort: EF = electrofishing, hours of activated electrode time; GN = pairs of floating and sinking experimental gill nets set overnight; TN = number of trap nets set overnight; FGN = number of hours floating gill nets were fished; SGN = number of hours sinking gill nets were fished.

Appendix B. Number of fish collected, minimum and maximum length, weight, condition factor, standard errors, catch-per-unit-effort (CPUE), and percent of total by number and weight for fish collected during lake and reservoir sampling, 2001.

<i>Water</i>	<i>Species</i>	<i>Total Collected (Number)</i>	<i>Min Length (Weight) (mm)</i>	<i>Max Length (Number) (mm)</i>	<i>Mean Length (Weight) (mm)</i>	<i>SE Length</i>	<i>Mean Weight (g)</i>	<i>SE Weight</i>	<i>Mean CondFact</i>	<i>SE CondFact</i>	<i>CPUE</i>
<b>C J STRIKE RES</b>											
<b>3/28/01</b>											
<b>Electrofishing</b>											
	Hatchery rainbow trout	50	260	475	320	6	392	25	1.14	0.02	50.00
	<b>Total</b>	50									50.00
<b>Floating Gill Net set</b>											
	Hatchery rainbow trout	66	280	450	339	5	438	20	1.10	0.01	2.75
	<b>Total</b>	66									2.75
<b>4/4/01</b>											
<b>Electrofishing</b>											
	Hatchery rainbow trout	21	260	445	327	9	421	37	1.16	0.03	14.00
	Largemouth bass	1	460	460	460		2050		2.11		0.67
	Smallmouth bass	2	410	450	430	20	1215	215	1.51	0.06	1.33
	<b>Total</b>	24									16.00
<b>Floating Gill Net set</b>											
	Hatchery rainbow trout	5	290	440	344	26	471	64	1.17	0.10	1.00
	<b>Total</b>	5									1.00
<b>4/5/01</b>											
<b>Floating Gill Net set</b>											
	Hatchery rainbow trout	2	340	390	365	25	650	50	1.35	0.17	1.00
	<b>Total</b>	2									1.00
<b>6/1/01</b>											
<b>Sinking Gill Net</b>											
	Black crappie	3	235	255	247	6	213	7	1.43	0.06	0.23
	Mountain whitefish	1	320	320	320		320		0.98		0.08
	Northern pikeminnow	1	325	325	325		320		0.93		0.08
	Smallmouth bass	4	170	380	271	43	290	124	1.26	0.14	0.31
	White crappie	1	250	250	250		200		1.28		0.08
	Yellow perch	3	130	140	137	3	47	7	1.88	0.42	0.23
	<b>Total</b>	13									1.00
<b>CALDWELL POND #03</b>											
<b>5/10/01</b>											
<b>Electrofishing</b>											
	Bluegill	116	73	192	131	3	56	4	1.91	0.06	232.00
	Brown bullhead	1	355	355	355		810		1.81		2.00
	Largemouth bass	114	88	468	220	8	215	28	1.19	0.03	228.00
	Pumpkinseed	9	115	198	145	11	89	26	2.32	0.18	18.00
	<b>Total</b>	240									480.00

Appendix B. Continued.

<i>Water</i>	<i>Species</i>	<i>Total Collected (Number)</i>	<i>Min Length (Weight (mm))</i>	<i>Max Length (Number) (mm)</i>	<i>Mean Length (Weight) (mm)</i>	<i>SE Length</i>	<i>Mean Weight (g)</i>	<i>SE Weight</i>	<i>Mean CondFact</i>	<i>SE CondFact</i>	<i>CPUE</i>
CLAYTONIA P											
5/8/01											
<b>Gill Net</b>											
	Bluegill	10	135	185	156	5	85	8	2.18	0.08	5.00
	Channel catfish	2	210	230	220	10	90	10	0.84	0.02	1.00
	Largemouth bass	8	140	420	245	51	446	201	1.34	0.08	4.00
	Largescale sucker	3	335	360	347	7	530	32	1.29	0.16	1.50
	<b>Total</b>	23									11.50
CRANE CREEK RES											
7/13/01											
<b>Gill Net</b>											
	Bridgeliip sucker	5	260	330	288	14	272	49	1.09	0.07	2.50
	Brown bullhead	30	170	240	218	4	157	8	1.47	0.04	15.00
	Channel catfish	27	195	580	281	18	298	99	0.84	0.03	13.50
	Common carp	68	295	620	403	7	908	55	1.33	0.02	34.00
	White crappie	491	90	310	191	1	100	1	1.43	0.02	245.50
	<b>Total</b>	621									310.50
<b>Trap Net</b>											
	Brown bullhead	97	160	240	216	2	0	0	0.00	0.00	16.17
	White crappie	516	80	305	186	1	0	0	0.00	0.00	86.00
	<b>Total</b>	613									102.17
CRANE FALLS LAKE											
5/14/01											
<b>Electrofishing</b>											
	Bluegill	105	60	170	125	2	43	2	2.00	0.05	140.00
	Hatchery rainbow	15	235	315	267	7	205	18	1.03	0.02	20.00
	Largemouth bass	46	140	470	270	13	380	59	1.37	0.02	61.33
	Pumpkinseed	12	80	145	109	6	32	5	2.23	0.14	16.00
	Yellow perch	1	175	175	175		70		1.31		1.33
	<b>Total</b>	179									238.67
DEADWOOD RES											
7/6/01											
<b>Gill Net</b>											
	Mountain whitefish	16	180	395	327	18	397	51	0.99	0.03	8.00
	Westslope cutthroat	2	410	410	410	0	630	10	0.91	0.01	1.00
	Wild rainbow/redband	4	220	320	271	21	165	40	0.81	0.11	2.00
	<b>Total</b>	22									11.00
<b>Sinking Gill Net</b>											
	Mountain whitefish	7	350	395	370	6					7.00
	<b>Total</b>	7									7.00

Appendix B. Continued.

<i>Water</i>	<i>Species</i>	<i>Total Collected (Number)</i>	<i>Min Length (Weight (mm))</i>	<i>Max Length (Number) (mm)</i>	<i>Mean Length (Weight) (mm)</i>	<i>SE Length</i>	<i>Mean Weight (g)</i>	<i>SE Weight</i>	<i>Mean CondFact</i>	<i>SE CondFact</i>	<i>CPUE</i>
HORSESHOE BEND MILL POND											
4/23/01											
Electrofishing											
	Bluegill	13	50	210	120	16	48	19	1.10	0.30	26.00
	Largemouth bass	21	55	380	268	24	359	64	1.08	0.12	42.00
	<b>Total</b>	34									68.00
INDIAN CREEK RES											
4/23/01											
Electrofishing											
	Bluegill	122	85	225	160	2	0	0	0.00	0.00	122.00
	Largemouth bass	114	150	365	300	6	0	0	0.00	0.00	114.00
	<b>Total</b>	236									236.00
SAGE HEN RES											
5/16/01											
Gill Net											
	Hatchery rainbow	65	165	295	240	4	149	6	1.03	0.01	32.50
	Wild rainbow/redband	83	216	438	323	6	351	18	0.98	0.02	41.50
	<b>Total</b>	148									74.00
WEST SAWYERS P											
5/10/01											
Electrofishing											
	Bluegill	116	73	192	131	3	55	4	1.92	0.06	116.00
	Brown bullhead	1	355	355	355		810		1.81		1.00
	Largemouth bass	114	88	468	220	8	217	28	1.20	0.03	114.00
	Pumpkinseed	9	115	198	145	11	89	26	2.32	0.18	9.00
	<b>Total</b>	240									240.00

Appendix C. Number of fish collected by angling, gillnetting, trapnetting, and relative weight by water and size group collected during lake sampling, 2001.

WATER	DATE	SPECIES	Length group (cm)	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Relative Weight		
C.J. Strike Res.	3/28/01	Hatchery rainbow trout	26		1			103.14		
			27		4			102.74		
			28		3		1		98.86	
			29		5		1		104.15	
			30		7		5		104.98	
			31		10		12		99.95	
			32		7		14		98.13	
			33		3		6		92.72	
			34		4		8		97.30	
			35				6		99.09	
			36				6		100.68	
			37				1		107.18	
			40					1	73.32	
			41				1		93.07	
			42				3		2	93.14
	44						2	89.19		
	45						2	93.32		
	47				1			83.71		
	4/4/01	Hatchery rainbow trout	26		1				103.14	
			29		3		1		104.75	
			30		4				102.17	
			31		2		1		102.74	
			33		6		1		112.35	
			34		2		2		108.87	
			37		1				103.72	
			39					1		
			42		1				61.89	
			44		1			1	83.15	
	6/1/01	Black Crappie	23				1		97.23	
			25				2		84.17	
			32	Mountain Whitefish			1		96.72	
			32	Northern Pikeminnow			1			
			17	Smallmouth Bass			1		118.05	
		25				1		68.41		
		28				1		89.97		
		38				1		80.90		
		25	White Crappie				1	89.76		
		13	Yellow Perch				1	216.83		
	14					2	113.78			
	Caldwell Pond #3	5/10/01	Brown Bullhead	35		1				
				7	Bluegill		2			
				8			4			23.66
				9			16			87.88
				10			14			87.03
				11			9			102.04
12						12			112.55	
13						7			100.24	
14						10			99.70	
15						11			109.40	
16						13			109.90	
17						15			109.68	
18						1			113.99	
19						2			52.36	
8				Largemouth Bass			1		129.75	

Appendix C. Continued.

WATER	DATE	SPECIES	Length group (cm)	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Relative Weight
Caldwell Pond #3	5/10/01	Largemouth bass	10		1			86.30
			11		1			90.17
			12		7			71.56
			13		6			79.89
			14		12			96.37
			15		10			94.59
			16		5			79.27
			17		6			93.95
			18		7			87.95
			19		6			88.33
			20		2			108.23
			21		5			89.19
			22		2			87.27
			23		1			23.56
			24		3			75.77
			25		2			84.83
			26		2			85.49
			27		1			95.87
			28		2			90.42
			29		5			86.48
			30		6			87.32
			31		2			94.34
			32		4			97.08
			33		4			95.33
			34		2			96.58
			35		2			86.81
			37		1			91.68
			38		1			103.12
			41		2			85.11
			42		1			106.46
			44		1			106.93
			46		1			113.03
					Pumpkinseed	11		2
			12		2			
			13		2			
			17		1			
			18		1			
			19		1			
Claytonia Pond	5/8/01	Bluegill	13			2		102.04
			15			4		109.46
			16			2		104.56
			17			1		95.02
			18			1		100.50
			21	Channel catfish			1	
		23				1		97.70
		14	Largemouth bass			5		97.81
		41				1		105.03
		42				2		100.21
		33	Largescale sucker			1		
		34				1		
36				1				

Appendix C. Continued.

WATER	DATE	SPECIES	Length group (cm)	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Relative Weight		
Crane Creek Res.	7/13/01	Brown bullhead	16				1			
			17			3	1			
			18			2	4			
			19				4			
			20				1	13		
			21				1	17		
			22					10	27	
			23					10	24	
			24					3	6	
			26		Bridgelip sucker	28			2	
		31		1						
		33		1						
		19		Channel catfish		20			3	
		21			20			4		96.08
		23			21			5		89.16
		24			23			1		87.93
		27			24			1		79.60
		28			27			1		104.56
		30			28			1		87.74
		31			30			2		119.70
		33			31			1		103.91
		34			33			2		87.87
		39			34			1		103.14
		40			39			1		84.57
		41			40			1		61.70
		42			41			1		80.93
		58		42			1		108.12	
		29		Common carp	30			1		131.39
		33			30			2		
		35			33			1		
		36			35			3		
		37			36			9		
		38			37			7		
		39			38			7		
		40			39			8		
		41			40			7		
		42			41			4		
		43			42			2		
		44			43			3		
		45			44			2		
		46			45			3		
		48			46			2		
		49		48			1			
		52		49			1			
		53		52			1			
56		53			2					
62		56			1					
8		White crappie	9				1			
15			9			1	1	506.40		
16			15				1			
17			16			8	21	39.24		
18			17			39	69	42.80		
19			18			174	220	49.23		
20			19			162	111	64.30		
21			20			43	45	50.02		
			21		29	27	28	48.81		

Appendix C. Continued.

WATER	DATE	SPECIES	Length group (cm)	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Relative Weight		
Crane Creek Res.	7/13/01	White crappie	25			2	1	61.94		
			26			1		78.77		
			27			1		78.41		
			30				1			
			31			1		78.90		
	5/14/01	Hatchery rainbow trout	23		3				90.53	
			24		1				99.13	
			25		2				89.03	
			26		3				94.30	
			27		2				99.79	
			30		2				93.44	
			31		2				91.78	
			Largemouth bass	14		1				103.26
				15		1				95.95
				16		1				86.71
				17		2				98.31
				18		2				103.07
				19		3				100.05
				20		2				94.56
				21		4				99.38
				22		5				96.28
				23		2				96.09
				25		1				98.02
				26		3				98.91
				27		2				99.83
				28		1				100.21
				31		1				85.28
				32		2				92.90
				33		1				96.69
			34		1				107.13	
			36		2				93.61	
			37		2				108.36	
			38		1				96.41	
			39		1				108.96	
			40		3				90.79	
			45		1				110.30	
			47		1				108.40	
			Yellow perch	17		1				96.85
	6			1						
	Bluegill	8		2						
		9		5						
		10		10						
		11		10						
		12		31						
		13		22						
14			15							
15			4							
16			3							
17			2							
Pumpkinseed		8		3						
		9		2						
		11		2						
	12		3							
	13		1							
	14		1							
	37					6				

Appendix C. Continued.

WATER	DATE	SPECIES	Length group (cm)	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Relative Weight
Crane Falls Lake	5/14/01	Pumpkinseed	38			3		
			39			3		
Deadwood Res.	7/6/01	Mountain whitefish	18			2		95.36
			20			38		99.30
			30				84.56	
			32				96.72	
			33				90.13	
			34				103.43	
			36				101.46	
			37				105.03	
			38				100.85	
			39				2	98.88
		Westslope cutthroat trout	41		2			
		Wild rainbow trout	22		1		95.18	
			26		1		77.79	
			28		1		45.09	
32			1		75.89			
Horseshoe Bend Mill Pond	4/23/01	Bluegill	5		2			
			6		3			
			12		1		79.03	
			13		1		92.52	
			14		2		93.53	
			15		1		103.26	
			18		1		117.93	
			19		1			
			21		1		103.74	
			Largemouth bass	5		1		
		6			1			
		7			1			
		13			1		93.42	
		17			2		87.11	
		24			1		87.22	
		29			1		93.06	
		32			4		67.56	
		33			4		93.58	
		34		1		102.98		
35		1		95.19				
37		2		93.03				
38		1		120.82				
Indian Creek Res.	4/23/01	Bluegill	8		1			
			12		2			
			13		10			
			14		16			
			15		27			
			16		31			
			17		16			
			18		6			
			19		8			
			20		2			
21		1						

Appendix C. Continued.

WATER	DATE	SPECIES	Length group (cm)	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Relative Weight			
Indian Creek Res.	4/23/01	Largemouth bass	15		1						
			16		1						
			17		5						
			18		4						
			19		4						
			20		3						
			21		4						
			22		5						
			23		2						
			27		2						
			30		4						
			31		3						
			32		12						
			33		23						
			34		20						
			35		16						
36		5									
Sage Hen Res.	5/16/01	Hatchery rainbow trout	16			1		84.39			
			17			3		104.18			
			18			2		114.56			
			19			1		119.93			
			20			1		86.15			
			21			4		102.74			
			22			9		93.20			
			23			10		94.63			
			24			10		94.49			
			25			4		91.40			
			26			7		89.58			
			27			5		94.36			
			28			6		88.91			
			29			2		88.15			
			Wild rainbow trout			21			1		91.59
						22			2		89.54
		23						4		90.25	
		24						3		96.36	
		25						3		105.38	
		27						5		120.20	
		28						4		92.33	
		29						6		90.94	
		30						10		86.50	
		31						11		87.97	
		32						3		87.12	
		33						1		83.12	
		35						4		78.41	
		36						5		79.49	
		37						3		81.06	
		38						3		72.43	
		39			2		79.18				
		40			6		77.11				
41			3		77.37						
42			1		72.37						
43			3		80.10						

Appendix C. Continued.

WATER	DATE	SPECIES	Length group (cm)	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Relative Weight		
W. Sawyers Pond	5/10/01	Brown bullhead Bluegill	35		1					
			7		2					
			8		4		23.66			
			9		15		88.52			
			10		16		90.87			
			11		9		102.04			
			12		12		112.55			
			13		7		100.24			
			14		11		102.34			
			15		11		109.40			
			16		11		110.36			
			17		15		109.68			
			18		1		113.99			
			19		2		52.36			
					Largemouth bass	8		1		129.75
						10		1		86.30
						11		1		90.17
						12		7		71.56
						13		6		79.89
				14			12		96.37	
				15			10		94.59	
				16			5		82.76	
				17			6		93.95	
				18			7		87.95	
				19			6		88.33	
				20			2		108.23	
				21			5		89.19	
				22			2		87.27	
				23			1		23.56	
				24			3		75.77	
				25			2		84.83	
				26			2		85.49	
				27			1		95.87	
				28			2		90.42	
				29			5		86.48	
				30			6		95.97	
				31			2		94.34	
				32			4		97.08	
				33			4		95.33	
				34			2		96.58	
				35			2		86.81	
				37		1		91.68		
				38		1		103.12		
				41		2		85.11		
				42		1		106.46		
				44		1		106.93		
		46		1		113.03				
		Pumpkinseed	11		2					
			12		2					
			13		2					
			17		1					
			18		1					
		19		1						

Appendix D. Electrofishing, gill net, and trap net catch-per-effort (CPUE) by number and weight for lowland lake sampling, 2001.

WATER GN CPUE	DATE	SPECIES	EF CPUE Total CPUE (Number) (Weight kg)	GN CPUE (Number) (Weight kg)	TN CPUE (Number) (Weight kg)	TOTAL CPUE (Number)	EF CPUE (Weight
CLAYTONIA POND							
	5/8/01	Bluegill		10		10	.43
		Channel catfish		2		2	.1
		0.10					
		Largemouth bass		8		8	1.79
		Largescale sucker		3		3	.8
		<i>Total</i>		23		23	3.12
C J STRIKE							
	3/28/01	Hatchery Rainbow	50	66		116	19.28
	4/4/01	Hatchery Rainbow	21	7		28	5.84
0.49		Largemouth Bass	1			1	1.37
1.37		Smallmouth Bass	2			2	0.65
		0.65					
		<i>Total</i>	24	7		31	7.86
0.49	8.35						
	6/1/01	Hatchery Rainbow		12			12
2.14		2.14					
		Mountain Whitefish		1			1
0.02		0.02					
		Black Crappie		3			3
0.05	0.05						
		White Crappie		1			1
0.02	0.02						
		Smallmouth Bass		4			4
0.09	0.09						
		Yellow Perch		3			3
0.01	0.01						
		Northern Pikeminnow		1			1
0.02	0.02						
		<i>Total</i>		25			25
2.35	2.35						
CRANE FALLS LAKE							
	5/14/01	Hatchery Rainbow	15			15	4.09
		Largemouth Bass	46			46	23.32
		Yellow Perch	1			1	0.09
		Bluegill	105			105	5.99
		Pumpkinseed	12			12	0.51
		<i>Total</i>	179			179	34.00
CRANE CR. RES.							
	7/13/01	Brown Bullhead		30	97	127	0.71
		Bridgelip Sucker		5		5	0.68
		Channel Catfish		27		27	4.03
		Common carp		68		68	30.42

Appendix D. Continued.

WATER	DATE	SPECIES	EF CPUE	GN CPUE	TN CPUE	TOTAL CPUE	EF CPUE
GN CPUE	TN CPUE		Total CPUE	(Number)	(Number)	(Number)	(Weight
kg)			(Number)	(Weight kg)	(Weight kg)	(Number)	(Weight
CRANE CR. RES.							
	7/13/01	White Crappie		491	516	1,007	12.88
		<i>Total</i>		621	613	1,234	48.72
DEADWOOD RES.							
	7/6/01	Rainbow Trout		4		4	0.33
		Cutthroat Trout		2		2	0.63
		Mountain Whitefish		23		23	6.01
		<i>Total</i>		29		29	6.97
HORSESHOE BEND MILL POND							
	4/23/01	Bluegill	13			13	1.26
		Largemouth Bass	21			21	15.09
		<i>Total</i>	34			34	16.35
CALDWELL ROTARY POND							
	5/10/01	Brown Bullhead	1			1	1.62
		Bluegill	116			116	12.94
		Largemouth Bass	114			114	49.09
		Pumpkinseed	9			9	1.60
		<i>Total</i>	240			240	65.25
SAGE HEN RES.							
	5/16/01	Hatchery Rainbow		65		65	4.84
		Rainbow Trout		83		83	14.56
		<i>Total</i>		148		148	19.40
SAWYER'S POND WEST							
	5/10/01	Brown Bullhead	1			1	0.81
		Bluegill	116			116	6.39
		Largemouth Bass	114			114	24.76
		Pumpkinseed	9			9	0.80
		<i>Total</i>	240			240	32.76

## 2001 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-26

Project I: Surveys and Inventories

Subproject I-D: Southwest Region

Job No.: c

Title: Rivers and Streams Investigations

Contract Period: July 1, 2001 to June 30, 2002

### ABSTRACT

Big Willow and Squaw creeks were electrofished in June of 2001, to conduct population estimates for redband trout *Oncorhynchus mykiss gairdneri*. Three sections were sampled in Big Willow Creek, and six sections were sampled in the Squaw Creek drainage. Densities of redband trout ranged from 0 to 18 fish/100 m<sup>2</sup> in Big Willow Creek, and from 0 to 5 fish/100 m<sup>2</sup> in Squaw Creek. One bull trout *Salvelinus confluentus* was sampled in Squaw Creek.

Seven sites in the Mann Creek drainage were electrofished in July 2001. One site was electrofished in the Keithly Creek drainage. Redband trout were found in all sites. No bull trout were sampled. Density of redband trout ranged from 11 to 34 fish/100 m<sup>2</sup> in Mann Creek and was 12 fish/100 m<sup>2</sup> in Keithly Creek.

The lower North Fork Boise River (NFBR) was impacted by flooding and landslides in 1995, which decreased abundance of redband trout and mountain whitefish *Prosopium williamsoni*. Snorkeling transects were conducted in five locations of the NFBR in July 2001. Mean fish densities were compared to similar snorkel surveys completed before and immediately after the landslides (1989 and 1996). Redband trout and mountain whitefish abundances have rebounded, and equaled or exceeded 1989 estimates.

A creel census was conducted on the South Fork Boise River (SFBR) between Anderson Ranch Dam and Danskin Bridge (a distance of 19.9 km). The census began in May 2001 and continued through March 31, 2002. Total estimated angler effort was 34,696 hours, 26,324 by bank/wade anglers and 8,372 by boat anglers. An estimated 18,765 fish were caught, for an overall average catch rate of 0.54 fish/hour. Total effort increased 66% since a similar 1988 survey, while catch rate declined by over 50%. Effort during the winter whitefish season increased from 3,020 hours in 1988 to 6,490 hours in 2001-2002.

A fish trap was operated in the Kirby Dam fish ladder in August to document bull trout migration patterns. A total of 17 fish were collected, including 12 juvenile bull trout. Bull trout were trapped as late as August 21.

Deadwood River upstream of Deadwood Reservoir was surveyed for fall Chinook salmon *O. tshawytscha* redds in October. Five complete and one possible redds were counted, and one live fish was observed. No carcasses were encountered. Fewer redds and live fish were observed in 2001 than in previous years.

Snorkel surveys were conducted in Elk and Sulphur Creek trend areas August 13-15, 2001. Densities of juvenile Chinook salmon ranged from 0 to 14 fish/100 m<sup>2</sup> in Elk Creek and from 0.35 to 4.3 fish/100 m<sup>2</sup> in Sulphur Creek.

Salmon spawning ground surveys were conducted in Bear Valley, Elk, and Sulphur Creek trend areas August 27-29, 2001. Salmon redds numbered 172, 219, and 38 in Bear Valley, Elk, and Sulphur Creek trend areas, respectively.

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## OBJECTIVES

1. Obtain current information for fishery management decisions on rivers and streams, including angler use, success, harvest and opinions, fish population characteristics, spawning success, habitat characteristics, return-to-the-creel for hatchery trout and develop appropriate management recommendations.
2. Establish permanent trend sites and standardized methods to monitor stream and river fish populations.

## METHODS

### Stream Population Surveys

#### **Electrofishing**

Seventeen sites were surveyed by electrofishing in June, two in Big Willow Creek, six in the Squaw Creek drainage, seven in the Mann Creek Drainage, and one site each in Keithly and Sheep creeks. Stream transects were established in representative stream reaches. Top and bottom transect boundaries were selected at locations which would curtail fish escapement and allow the lengths of sample sections to reach 100 m when possible. A Smith-Root model 15-B backpack electrofishing unit was used for conducting depletion population and density estimates. Fish from each pass were kept separate and alive in holding pens. Each fish was measured to the nearest millimeter and weighed to the nearest gram. Only fish >100mm were included in depletion estimates. Redband trout *Oncorhynchus mykiss gairdneri* density estimates in the Mann Creek and Keithly Creek drainages were compared to estimates from similar sampling in 1995 (Allen et. al. 1998). A subsample of collected game and non-game fish were preserved for identification and archived as voucher specimens at Albertson's College of Idaho. Global Positioning System (GPS) coordinates were collected at electrofishing sites using a Garmin model 12 handheld GPS receiver.

#### **North Fork Boise River Snorkeling**

The lower roadless section of the North Fork Boise River was subjected to severe landslides in early September 1995. Prior to that time, Rohrer (1990) used snorkeling techniques at four sites to estimate mean densities of wild redband trout and mountain whitefish in this reach. Snorkel estimates at five sites in 1996 suggested that the landslides and resulting habitat degradation caused both species to decline markedly (Allen et al. 1999). We repeated snorkel estimates in 2001 to evaluate the status and recovery of redband trout and mountain whitefish *Prosopium williamsoni* populations six years after the landslides.

Five sites were snorkeled in the roadless section of the North Fork Boise River (NFBR) on July 3. All sites were located between the confluence with the Middle Fork Boise River (MFBR) and the mouth of Rabbit Creek. Due to the inaccessibility of this section, inflatable kayaks, and a pontoon boat were utilized for transportation of the snorkel crew. All boats were launched at Blackrock Campground at 0900. Snorkel counts were conducted with two snorkelers moving upstream through the snorkel section identifying fish species, sizes, and numbers. Snorkel sections were measured (length and minimum of four widths) using a hand-held range finder to calculate area surveyed. Physical habitat measurements recorded were habitat type, substrate particle size, depth, and water temperature. GPS coordinates were collected at all snorkel sites using a Garmin model 12 handheld GPS receiver. Mean densities (all sites combined) for wild redband trout and mountain whitefish were compared to similar surveys completed in 1989 (Rohrer 1990) and 1996 (Allen et al. 1999).

## **Chinook Salmon Parr Monitoring**

### **Bear Valley and Sulphur Creeks**

Chinook salmon *O. tshawytscha* parr monitoring snorkel counts were conducted with two snorkelers moving upstream through the trend sections identifying fish species and sizes while recording information on waterproof tablets. Snorkel sections were then measured (length and minimum of four widths) to calculate the area surveyed. Physical measurements were made and recorded covering habitat type, substrate particle size, water depth, and temperature. Global Position System (GPS) coordinates were recorded at each snorkel site. Data were compiled and provided to IDFG anadromous research staff for inclusion in a separate report (Idaho Salmon and Steelhead Investigations, in press).

## **Chinook Salmon Redd Counts**

### **Bear Valley, Elk, and Sulphur Creeks**

Chinook salmon spawning ground surveys were conducted in Bear Valley and Elk Creek trend areas on August 27-29, 2001. Redds were enumerated and GPS coordinates were taken according to criteria described in the draft Idaho Redd Counting Manual (IDFG unpublished). Carcasses encountered were identified to sex and measured (fork length and MEPS length) when possible. Scale samples and otoliths were taken for age determination. Scales samples were and submitted to IDFG anadromous research staff, and otoliths were submitted to the USFS Rocky Mountain Research Station. A fin clip was taken from each carcass for DNA analysis. Live fish observed were visually identified to sex and approximate ocean age (jacks, II, or III) when possible. Redd counts on Sulphur Creek were conducted by Russ Thurow (USFS, Rocky Mountain Research Station). Field data were compiled and provided to IDFG anadromous research staff.

### **South Fork Boise River Creel Census**

A randomized creel census was conducted during the period of May 26, 2001 through March 31, 2002. Creel information was collected on three weekdays and three weekend days per month. Specific count days and times were randomly chosen. Creel clerks had predefined time intervals to conduct instantaneous angler counts. Counts were made by car in the roaded section between Anderson Ranch Dam and Danskin Bridge. The clerks began each count at Anderson Ranch Dam and worked downstream. Clerks conducted angler interviews randomly between counts. Angler names and addresses were also collected to create an angler database for future queries, regulation setting, and public meetings. Anglers were asked a series of questions including; total hours fished, if their fishing trip was completed, the total number of fish kept and released, and their residency status. Clerks also recorded fishing methods used (lures or flies) and type of angler (bank or boat). Volunteers helped to conduct this creel census at various times throughout the study period.

All census and interview data were entered into a program developed by Bill Babcock of the Colorado Division of Wildlife, Aquatic Research Section (C-SAP Creel Survey Analysis Program, Colorado Division of Wildlife Aquatic Research, Fort Collins CO.). For comparison to previous surveys, separate estimates were calculated for the total fishing season (May 26 – Mar 31), the general stream season (May 26 – Nov 30), and the winter mountain whitefish season (Dec 1 – Mar 31).

### **Kirby Dam Fish Ladder Monitoring**

The operational plan for the Kirby Dam fish ladder calls for the ladder to be in operation from mid-April through August of each year, primarily to allow fluvial bull trout *Salvelinus confluentus* and redband trout access to the upper Middle Fork Boise River for spawning and rearing. Actual timing of use by fluvial fish has not been fully documented. Operation of the ladder in late August is a matter of contention for owners of the hydroelectric project on Kirby Dam. Their concern is that in low water years, water diverted to the fish ladder in late summer could impact power-generating capacity at the plant. To help resolve this issue, Idaho's Office of Species Conservation (OSC) directed IDFG to monitor fish use of the ladder in August, and in particular to determine whether federally listed bull trout use the ladder during this time. The OSC provided \$3,000 for monitoring efforts in 2001.

A fish trap was installed in the Kirby Dam fish ladder on August 1, 2001 and remained in place until August 28, 2001. The trap consisted of two steel grates; each installed in a vertical slot of the fish ladder. The grate on the downstream side of the trap contained a 75 x 205 mm opening to allow fish to enter the trap; the upstream grate allowed only water passage. One location of the ladder was used for trapping, close to the ladder inlet (in vertical slots numbered 14 and 15, as counted from the upstream end of the ladder moving downstream) as recommended by Flatter et al. (in press). The trap was checked for fish twice daily, in the morning and evening. When fish were captured, a third grate was installed which covered the opening in the downstream grate, and fish were removed with long handled dip nets. All collected fish were identified, weighed to the nearest gram, measured to the nearest millimeter, and released upstream of the Kirby Dam pool. Because of the remote location, the trap tender was housed on site in a camp trailer.

Periodic angling was conducted in the first 100 to 200 m of river downstream from the ladder inlet throughout the trapping period to determine if large bull trout were present in the area.

### **Deadwood River Fall Chinook Redd Counts**

Fall Chinook salmon *O. tshawytscha* were stocked in Deadwood Reservoir from 1995 to 1998 to diversify the fishery and to help control the overabundant kokanee *O. nerka kennerlyi* population in the reservoir at that time. Stocking was halted as kokanee populations declined, but by fall of 1998 spawning fall Chinook salmon were observed in the Deadwood River above the reservoir. Because natural recruitment is not desirable, it is important to monitor spawning escapement. Current management objectives for the reservoir include enhancing kokanee abundance. If fall Chinook salmon establish a self-supporting population, additional control measures may be necessary to reduce or eliminate them.

On October 10, 2001 the mainstem Deadwood River from Deer Creek downstream to Deadwood Reservoir, approximately four miles, was surveyed by foot. A crew of two counters was used. One person was taken to Deer Creek and counted downstream; the second person drove downstream approximately half way between Deer Creek and the reservoir, and parked. The second person then continued downstream to Deadwood Reservoir. All redds or live fall Chinook salmon were enumerated and GPS coordinates were taken according to criteria described in the draft Idaho Redd Counting Manual (IDFG unpublished).

## **RESULTS AND DISCUSSION**

### **Stream Population Surveys**

#### **Electrofishing**

Six sites were electrofished in the Squaw Creek drainage, two sites below the Second Fork, two sites in the Third Fork, and two sites in the upper reach of Squaw Creek (Appendix A). Redband trout densities ranged from 0 to 5 fish/100 m<sup>2</sup> (Table 1). The two sites below the Second Fork consisted of deep, swift runs that would be better suited to snorkeling. Four electrofishing sites were selected to be used as permanent monitoring sites based on water depth, accessibility, and habitat characteristics.

Two sites were electrofished in Big Willow Creek (Appendix A). Densities of redband trout in the two sites were 13 and 18 fish/100 m<sup>2</sup> (Table 1). Both sites will be designated as permanent monitoring sites.

Seven sites were electrofished in the Mann Creek drainage (Appendix A). Redband trout densities ranged from 11 to 34 fish/100 m<sup>2</sup> (Table 2). Population and density estimates were substantially lower in all sites compared to 1995 results. All seven sites were representative of the drainage, and four of the seven sites were selected as permanent monitoring locations based on accessibility and habitat characteristics (Table 2).

Table 1. Redband trout population estimates and densities in the Squaw, Big Willow, and Sheep Creek drainages sampled by electrofishing in 2001.

Section Name	UTM Coordinates (East, North)	Date Collected	Population Estimate (95% CI)	Density trout/100 m <sup>2</sup>
Squaw Creek				
Wilson Corrals*	562913/4919606	6/20/01	25 (23 - 30)	5.0
Site #3*	555809/4913323	6/19/01	0	0
Second Fork	561655/4910694	6/20/01	20 (4 - 372)	1.48
Exclosure*	557102/4919708	6/19/01	22 (22 - 24)	2.22
Box Spring	554532/4876725	6/25/01	0	0
Poison Creek*	563971/4924903	6/18/01	38 (18 - 116)	3.25
Big Willow Creek and Sheep Creek				
Gauge Station*	541097/4879978	6/13/01	120 (104 - 137)	17.95
Culvert*	545190/4883344	6/14/01	45 (41 - 54)	13.34
Sheep Creek	547758/4909209	6/18/01	0	0

\* Stream sections to be used as permanent monitoring sites.

Table 2. Redband trout population and density estimates (trout >100mm) in the Mann Creek and Keithly Creek drainages sampled by electrofishing in 1995 and 2001.

Section Name	UTM Coordinates	Year	Population estimate (90% CI)	S.E.	Density trout/100 m <sup>2</sup>
Adams Creek*	0503909/4926218	2001	16 (14 - 18)	0.7	27
		1995	62	4	57
Lower section	0504291/4933568	2001	17 (16 - 18)	0.7	15
		1995	33	1	22
Upper section*	0503926/4935727	2001	26 (20 - 32)	2.9	21
		1995	53	2	40
4 <sup>th</sup> July lower	0503650/4928511	2001	10 (8 - 12)	0.7	11
		1995	17	0	17
4 <sup>th</sup> July upper*	0501016/4932586	2001	25 (23 - 27)	1.2	34
		1995	36	0	46
Bear Creek*	0503907/4932729	2001	9 (9 - 10)	0.4	11
		1995	40	0	37
Hitt Creek	0505670/4930423	2001	30 (26 - 34)	1.7	30
		1995	53	0	64
Keithly Creek*	0512246/4929525	2001	31 (11 - 51)	9.9	12
		1995	41	5	19

\* Stream sections to be used as permanent monitoring sites.

One site was electrofished in Keithly Creek (Appendix A). Redband trout density was 12 fish/100 m<sup>2</sup>, which was considerably lower than in 1995 (Table 2). This site will remain as a permanent monitoring site.

One site was electrofished on Sheep Creek (Appendix A). No redband trout or other game fish were sampled. Non-game species were collected and preserved for identification purposes. The drainage above the mouth of Sheep Creek was dry during the summer of 2001.

Voucher fish specimens were collected from Third Fork of Squaw Creek, Sheep Creek, Keithly Creek, and Little Willow Creek (Appendix B).

## North Fork Boise River Snorkeling

Floating and completing five snorkel transects on this section took approximately 9 hours. Redband trout and mountain whitefish were observed at all locations (Appendix A). No bull trout or hatchery rainbow trout *O. mykiss* were observed. Mean wild redband trout density (all length classes combined) was 1.67 fish/100m<sup>2</sup> compared to 0.15 in 1996 and 0.97 in 1989 (Table 3). Mountain whitefish abundance was 1.43 fish/100m<sup>2</sup>, almost double the 1996 estimate and similar to the 1989 estimate.

Table 3. Comparison of mean redband trout and mountain whitefish densities (fish/100 m<sup>2</sup>) observed in the roadless section of the North Fork Boise River while snorkeling in 1989, 1996, and 2001.

Year	Number of Transects	Redband trout length group (mm)				Total Redband Trout	Total Mountain Whitefish
		<100	100-200	200-300	>300		
2001	5	0.18	0.70	0.70	0.09	61	40
1996	5	0	0.02	0.06	0.07	7	21
1989	4	0.07	0.40	0.38	0.12	56	21

Assuming each of these snorkel surveys are representative of this reach, it appears that wild redband trout and mountain whitefish populations have rebounded since the flooding and landslides of 1995. Specific snorkeling transect locations were not well documented in previous efforts, but each was comprised of four or five transects considered to be representative of the reach. Locations for the 2001 transects were recorded with GPS equipment and brief site descriptions (Appendix A). They should be repeatable and should become the standardized sites for future monitoring.

## Chinook Salmon Parr Monitoring

### Bear Valley, Elk, and Sulphur Creeks

Five snorkel transects were completed in Elk Creek and three transects were completed in Sulphur Creek. Chinook salmon juvenile densities ranged from 0 to 14 fish/100 m<sup>2</sup> in Elk Creek and from 0.4 to 4 fish/100 m<sup>2</sup> in Sulphur Creek (Table 4). Habitat information was forwarded to IDFG anadromous research staff for incorporation into the Idaho Salmon and Steelhead Investigations report (Idaho Salmon and Steelhead Investigations 2001, Idaho Department of Fish and Game, in press).

## Chinook Salmon Redd Counts

### Bear Valley, Elk, and Sulphur Creeks

The number of redds counted were 172, 219, and 38 in Bear Valley, Elk, and Sulphur creek trend areas respectively (Table 5).

Live fish observed in Bear Valley Creek totaled 5 one-ocean males (jacks), 118 two-ocean males, 7 three-ocean males, 38 two-ocean females, and 2 three-ocean females. In Elk Creek there were 3 jacks, 68 two-ocean males, 20 three-ocean males, 66 two-ocean females, and 11 three-ocean females observed (Table 5).

Table 4. Number of age-0 Chinook salmon observed in general parr monitoring sections in Elk and Sulphur creeks, August 2001.

Stream	Strata/Section	Number of parr	Area Sampled (m <sup>2</sup> )	Density parr/100m <sup>2</sup>
Elk Creek	1-1	120	1356	8.85
	1-2	8	1015	0.79
	2-3	32	692	4.62
	2-4	0	1304	0
	2-5	204	1487.5	14
Sulphur Creek	Footbridge	2	576.5	0.4
	Rock Slide	24	552.5	4
	Ranch	40	1457.5	2.7

Carcasses sampled totaled 165 males and 22 females in Bear Valley Creek, 10 males and 14 females in Elk Creek, and 13 males and 21 females in Sulphur Creek.

## South Fork Boise River Creel Census

During the entire May 26, 2001 – Mar 31, 2002 fishing season, an estimated 7,673 anglers fished in the study area. Total estimated angler effort on the SFBR was 34,696 h. Bank and boat anglers fished an estimated 26,324 and 8,372 h, respectively. Average angling trip lengths were 5 h and 9 h for bank and boat anglers, respectively (Table 6). During the last complete-season creel survey of SFBR anglers in 1988, total estimated effort was 20,902 h (Mabbott and Holubetz 1990; Table 7). Our results indicate a 66% increase in annual angler use of the SFBR since 1988.

Anglers caught an estimated 18,765 fish during the May 2001 to March 2002 fishing season (Table 8). Bank and boat anglers caught an estimated 13,347 and 5,418 fish, respectively. All of the boat effort and catch occurred during the general stream season; there was no fishing from boats during winter when flows are reduced to 300 cfs. Wild rainbow trout comprised 79% (14,815 fish) and mountain whitefish 19% (3,706 fish) of the total catch. Bull trout, northern pikeminnow *Ptychocheilus oregonensis*, kokanee, and largescale sucker *Catostomus macrocheilus* comprised the remaining 2% (233 fish) of the estimated catch. None of the anglers interviewed had harvested rainbow trout.

The combined catch rate for all fish caught between May 2001 and March 2002 by bank (0.51 fish/h) and boat anglers (0.65 fish/h) was 0.54 fish/h (Table 8). This was approximately 60% lower than the rate reported in 1988 (1.32 fish/h). The rainbow trout catch rate for bank and boat anglers was 0.36 and 0.63 trout/h, respectively (Table 8).

During the general stream season (May 26-November 30) the estimated rainbow trout catch rate for all anglers was 0.42 trout/h (Table 9). Bank and boat angler effort was 28,205 h, which was 57% higher than in 1988 and the highest on record (Table 10). Historical catch rates of rainbow trout during the general stream seasons between 1974 and 1988 ranged from 0.73 to 1.64 trout/h. The 2001 catch rate was less than half the catch rate observed in 1988 and one-fourth of the 1978 rate. Rainbow trout and mountain whitefish comprised 86% and 13% of the total catch, respectively. During the 1988 general stream season, rainbow trout and mountain whitefish comprised 76% and 23% of the total catch, respectively. We estimated that a total of 37 bull trout were caught during the survey period, which was 87% fewer than estimated in 1988 and the lowest on record since 1978 (Table 10).

Although angler effort in both the general season and winter season has increased since 1988, participation in the winter fishery increased proportionately more. Mabbott and Holubetz (1990) estimated about 3,020 h of effort during the winter of 1987-88. During the 2001-2002 winter season, effort was 6,490 h.

Table 5. Chinook salmon redd count data for Bear Valley, Elk, and Sulphur creek trend areas, August 27-29, 2001.

TRANSECT	TRANSECT DESCRIPTION	# REDDS	# TEST DIGS	LIVE FISH WILD SPRING CHINOOK			
				2 OCEAN FISH		3 OCEAN FISH	
				MALE	FEMALE	MALE	FEMALE
BEAR VALLEY CREEK TREND							
WS-9a	Mine exclosure	0	1				
WS-9b	Mine exclosure to	15	9		3		
WS-9c	Cub Creek to Sack	63	18	28	11	2	
WS-9d	Sack Creek to Elk	41					
WS-10a	Elk Creek to Poker	46	22	88	24	5	2
WS-10b	Poker Bridge to Fir	7		2			
TOTAL FOR BEAR VALLEY CREEK		172	50	118	38	7	2
ELK CREEK TREND AREA							
WS-11a	West Fork Elk Creek to Twin Bridges	152	25	21	34	11	6
WS-11b	Twin Bridges to Guard Station	50	17	31	28	2	2
WS-11c	Guard Station to Bear Valley Creek	17	2	16	4	7	3
TOTAL FOR ELK CREEK		219	44	68	66	20	11
SULPHUR CREEK TREND AREA							
WS-12	Rockslide to Sulphur Cr. Ranch	38					
TOTAL FOR SULPHUR CREEK		38					

Table 6. Angler interview data for the South Fork Boise River below Anderson Ranch Dam between May 26, 2001 and March 31, 2002.

	Bank Anglers	Boat Anglers	Both
Total # anglers interviewed	301	70	371
Total # hours fished	1500.1	628.1	2128.2
Average hours fished/ angler	4.98	8.97	5.74

Table 7. Estimated angler effort and catch during the combined general trout and winter whitefish seasons on the South Fork Boise River 1987-88, and 2001-02.

Year	Effort (hr)			Total Catch			Total catch rate (fish/hr)
	Bank	Boat	Total	Wild rainbow trout	Mountain whitefish	Bull trout	
1987-88	NE <sup>a</sup>	NE <sup>a</sup>	20,902	18,040	6,870	362	1.21
2001-02	26,324	8,372	34,696	9,568	3,706	61	0.38

<sup>a</sup>NE = no estimate available

Table 8. Estimated total catch and total catch rate by species for bank and boat anglers on the South Fork Boise River below Anderson Ranch Dam between May 26, 2001 and March 31, 2002.

Species	Total Catch			Total Catch Rate (Fish/h)		
	Bank	Boat	Both (S.E.)	Bank	Boat	Both (S.E.)
Rainbow trout	9,568	5,247	14,815 (3,907)	0.36	0.63	0.43 (0.11)
Northern pikeminnow	92	0.0	92 (86)	0.00	0.00	0.00 (0.00)
Mountain whitefish	3,536	171	3,706 (1,072)	0.13	0.02	0.11 (0.03)
Kokanee	42	0.0	42 (32)	0.00	0.00	0.00 (0.00)
Bull trout	61	0.0	61 (33)	0.00	0.00	0.00 (0.00)
Largescale sucker	38	0.0	38 (22)	0.00	0.00	0.00 (0.00)
All species	13,347	5418	18,765 (4,527)	0.51	0.65	0.54 (0.13)

Table 9. Estimated total catch and total catch rate by species for bank and boat anglers in the South Fork Boise River below Anderson Ranch Dam May 26 - November 30, 2001.

Species	Total Catch			Total Catch Rate (Fish/h)			
	Bank	Boat	Both (S.E.)	Bank	Boat	Both	(S.E.)
Rainbow Trout	6,561	5,247	11,809 (3,863)	0.33	0.63	0.42	(0.14)
Northern Pikeminnow	92	0.0	92 (86)	0.005	0.000	0.003	(0.0)
Mountain Whitefish	1,579	171	1,750 (609)	0.08	0.02	0.06	(0.02)
Kokanee	42	0.0	42 (32)	0.002	0.000	0.001	(0.00)
Bull Trout	37	0.0	37 (23)	0.002	0.000	0.001	(0.00)
Largescale Sucker	28	0.0	28 (20)	0.001	0.000	0.001	(0.00)
All Species	8,340	5,418	13,758 (4,344)	0.42	0.65	0.49	(0.16)

Table 10. Estimated angler effort and catch during the general trout season on the South Fork Boise River from Anderson Ranch Dam to Danskin Bridge, 1974 to 2001.

Survey period	Angler hours	Wild rainbow trout harvested	Hatchery rainbow trout harvested	Rainbow trout caught and released	Rainbow trout catch rate fish/h	Mountain whitefish caught	Bull trout caught	Catch rate
May 25 - Nov. 30 1974 <sup>a</sup>	26,443	5,710	11,832	1,730	0.73	1,727	51	2
May 29 - Nov. 30 1976 <sup>b</sup>	14,958	1,325	226	9,525	0.74	6,214	58	1
May 28 - Nov. 30 1977 <sup>c</sup>	12,117	1,103	0	10,715	0.98	2,022	8	1
May 27 - Nov. 30 1978 <sup>d</sup>	18,647	1,677	0	28,902	1.64	7,276	22	3
May 29 - Nov. 30 1982 <sup>e</sup>	13,568	668	0	18,292	1.4	1,590	54	2
May 28 - Nov. 30 1988 <sup>f</sup>	17,882	242	0	16,717	0.95	5,143	293	2
May 26 - Nov. 30 2001	28,205	0	0	11,809	0.42	1,750	37	1
<sup>a</sup> Beach 1975 includes kokanee salmon		<sup>d</sup> Moore, Cadwallader, and Mate 1979		<sup>g</sup> Total		caught		
<sup>b</sup> Mate 1977		<sup>e</sup> Reid 1983						
<sup>c</sup> Mate and Cadwallader 1978		<sup>f</sup> Mabbott and Holubetz 1990						

### Kirby Dam Fish Ladder Monitoring

The trap was used from August 1 to August 28, 2001 for a total of 744 hours of trapping time. Seventeen fish were collected, including wild and hatchery rainbow trout, and bull trout (Table 11). Bull trout represented 71% of the catch. No fish were killed during the trapping process.

Table 11. Fish captured in Kirby Dam fish ladder trap during August 2001.

Species <sup>a</sup>	Length	Weight	Date Caught	Time Caught
BLT	204	55	8/1/01	1630 - 2030 h
HRB	270	190	8/3/01	0800 - 1200 h
WRB	256	170	8/4/01	0830 - 1700 h
BLT	177	40	8/4/01	0830 - 1700 h
BLT	220	80	8/4/01	1200 - 1700 h
BLT	178	40	8/4/01	1200 - 1700 h
WRB	234	125	8/6/01	0800 - 1200 h
WRB	219	65	8/6/01	0800 - 1200 h
BLT	177	40	8/6/01	0800 - 1200 h
BLT	210	60	8/6/01	0800 - 1200 h
BLT	183	40	8/7/01	0800 - 1200 h
BLT	210	50	8/8/01	1200 - 1700 h
BLT	230	90	8/9/01	0800 - 1200 h
BLT	220	85	8/9/01	1700 - 2100 h
-----NO FISH CAUGHT BETWEEN 8/10/01 - 8/19/01-----				
BLT	203	60	8/20/01	0800 - 1200 h
BLT	236	110	8/21/01	1200 - 1700 h
-----NO FISH CAUGHT BETWEEN 8/21/01 - 8/28/01-----				
WRB	226	100	8/28/01	1700 - 2100 h

<sup>a</sup>BLT = bull trout, WRB = wild rainbow trout, HRB = hatchery rainbow trout

Twelve bull trout were captured in twenty-eight days of trapping, ten of which were captured during the first ten days of August, and the last of which was captured on August 21 (Table 11). Bull trout lengths and weights ranged from 177 mm to 236 mm, and 40 g to 110 g, respectively. The average length and weight of bull trout captured was 204 mm and 62.5 g. The catch rate for bull trout was 0.02 fish/h. Most bull trout were found in the trap at morning checks. All bull trout captured were too small to have radio transmitters implanted. No additional bull trout were caught or observed while angling downstream of the fish ladder.

Although use of the ladder by fish including bull trout was relatively low in August, it is evident that some migratory bull trout are attempting to move upstream late in the month. Trapping in August will continue through 2005, after which the operational plan for the ladder will be reviewed and, if necessary, modified.

Drought conditions were in effect during the month and no significant rainfall occurred during the trapping period. The water flow over Kirby Dam spillway diminished through the trapping period, however, water flow through the fish ladder remained relatively constant. Water temperatures ranged from 11°C to 20 °C throughout the day during the month.

Local residents expressed interest in the project. There were a number of visitors asking about various aspects of the project. A freelance reporter from a local television program filmed the fish trap and operation.

**Deadwood River Fall Chinook Salmon Redd Counts**

A total of five Chinook salmon redds were identified in the Deadwood River upstream of Deadwood Reservoir on October 10, 2001. One possible redd was observed, one live salmon was seen, and no carcasses were recovered. Redds counted in 2001 in the same section were much lower than those counted in 1998 (Table 12). Redd counts should be repeated in 2002. If numbers of redds decline further, we will assume that few fall Chinook are successfully spawning, and redd counts can be discontinued.

Table 12. Deadwood River fall Chinook salmon redd counts 1998 and 2001 from Deadwood Reservoir upstream to Deer Creek.

Year	Redds counted	Live fish counted	Carcasses recovered
1998	12	10	2
2001	5	1	0

## **RECOMMENDATIONS**

### **Stream Population Surveys**

1. Continue to establish permanent stream population trend monitoring sites. Develop a user- friendly guide to permanent monitoring sites. Repeat trend site sampling every three to five years based on annual workload and priorities.
2. Use the 2001 snorkel sites on the lower North Fork Boise River as the established trend monitoring sites.

### **Kirby Dam Fish Ladder Monitoring**

1. Investigate feasibility of eliminating spill over Kirby Dam to increase water flow through the fish ladder.

### **Deadwood River Fall Chinook Salmon Redd Counts**

1. Repeat redd counts in 2002. If redd numbers continue to decline, discontinue this survey.

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## APPENDICES

Appendix A. Electrofishing and snorkel surveys in the Big Willow, Squaw, Mann, Keithly, Sheep Creek, and North Fork Boise River drainages 2001.

STREAM: Big Willow Creek                      SAMPLE DATE: 6/14/01  
SECTION: Culvert  
EPA REACH: 17050122056                      QUAD MAP:  
RTS: R, T, S                                      UTM: 11T 0545190 ; 4883344  
SECTION DESCRIPTION: 3.5 miles upstream from Gauge Station

Transect Information:  
Section Length (m): 61.2  
Elevation (m):  
Gradient (%): 0.00%  
Population Est: 45.0 S.E(popest): 4.31  
Shade (%): 0.0

Habitat Type:  
Pool: 33.3 %  
Riffle: 26.7 %  
Run: 40.0 %  
Pocket: 0.0 %

Mean Width (m): 4.9  
Mean Depth (m): 0.23

Substrate

Organic: %  
Sand: 21.3 %  
Gravel: 8 %  
Rubble: 33.3 %  
Boulder: 37 %  
Bedrock: %

Cover (%):

Water Chemistry

Time: 12:20  
H2O Temp(C): 16  
Air Temp(C):  
pH:  
Alkalinity(mg/l CaCO3):  
Hardness(uS/cm3):  
Conductivity(mg/l CaCO3):  
Species Sampled

BLS Bridgelip sucker  
RSS Redside shiner  
SPD Speckled dace  
WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group			Measured
BLS	5	EF	1
BLS	7	EF	1
BLS	8	EF	2
BLS	9	EF	2
BLS	10	EF	10
BLS	11	EF	7
BLS	12	EF	6
BLS	14	EF	3
BLS	15	EF	6
BLS	16	EF	6
BLS	17	EF	9
BLS	18	EF	4
BLS	19	EF	3
BLS	20	EF	3
BLS	21	EF	3
BLS	22	EF	2
BLS	26	EF	1
RSS	6	EF	1
RSS	7	EF	3
RSS	8	EF	8
RSS	9	EF	8
RSS	10	EF	9
RSS	11	EF	3

Length Frequency

Species	CM	Method	Number
Group			Measured
SPD	5	EF	8
SPD	6	EF	3
SPD	7	EF	7
SPD	8	EF	1
WRB	9	EF	1
WRB	10	EF	3
WRB	11	EF	4
WRB	12	EF	9
WRB	13	EF	5
WRB	14	EF	5
WRB	14	EF	5
WRB	16	EF	3
WRB	17	EF	2
WRB	18	EF	3
WRB	19	EF	2
WRB	20	EF	3

Appendix A. Continued.

STREAM: Big Willow Creek                      SAMPLE DATE: 6/13/01  
 SECTION: Gauge Station  
 EPA REACH: 17050122056                      QUAD MAP:  
 RTS: R, T, S                                      UTM: 11T 0541097 ; 4879978  
 SECTION DESCRIPTION: Gauge station off Big Willow Cr. road

Transect Information:  
 Section Length (m): 94.4  
 Elevation (m):  
 Gradient (%): 0.00%  
 Population Est: 120.0 S.E.(popest): 8.84  
 Shade (%): 0.0

Habitat Type:  
 Pool: 46.7 %  
 Riffle: 26.7 %  
 Run: 26.7 %  
 Pocket: 0.0 %

Mean Width (m): 6.1  
 Mean Depth (m): 0.29

Substrate

Cover (%):

Organic: %  
 Sand: 10 %  
 Gravel: 20.7 %  
 Rubble: 24 %  
 Boulder: 38 %  
 Bedrock: 9.3 %

Water Chemistry

Time: 1:10  
 H2O Temp(C): 12  
 Air Temp(C):  
 pH:  
 Alkalinity(mg/l CaCO3):  
 Hardness(uS/cm3):  
 Conductivity(mg/l CaCO3):

Species Sampled

BLS Bridgelip sucker  
 SPD Speckled dace  
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group		Measured
BLS	7	EF	1
BLS	8	EF	2
BLS	9	EF	2
BLS	11	EF	3
BLS	12	EF	3
BLS	13	EF	6
BLS	14	EF	5
BLS	15	EF	5
BLS	16	EF	5
BLS	17	EF	5
BLS	20	EF	2
BLS	21	EF	1
BLS	22	EF	1
BLS	23	EF	2
BLS	28	EF	1
BLS	30	EF	1
SPD	6	EF	1
SPD	7	EF	1
SPD	8	EF	2
SPD	9	EF	1
WRB	0	EF	1
WRB	4	EF	1
WRB	11	EF	2
WRB	12	EF	6
WRB	13	EF	14
WRB	14	EF	20
WRB	15	EF	11

Length Frequency

Species	CM	Method	Number
	Group		Measured
WRB	16	EF	8
WRB	17	EF	6
WRB	18	EF	1
WRB	19	EF	3
WRB	20	EF	8
WRB	20	EF	8
WRB	21	EF	6
WRB	22	EF	4
WRB	23	EF	5
WRB	25	EF	4
WRB	26	EF	1
WRB	27	EF	1



Appendix A. Continued.

STREAM: Squaw Creek                      SAMPLE DATE: 6/20/01  
SECTION: SQUAW 9  
EPA REACH: 17050122044                  QUAD MAP: Dodson Pass  
RTS: R1E, T11N, S1                      UTM: 11T 0561655 ; 4910694  
SECTION DESCRIPTION: Begins at bridge that crosses 2<sup>nd</sup> Fork.

Transect Information:		Habitat Type:	
Section Length (m):	47.3	Pool:	13.3 %
Elevation (m):		Riffle:	33.3 %
Gradient (%):	0.00%	Run:	53.3 %
Population Est:	20.0 S.E(popest): 168.31	Pocket:	0.0 %
Shade (%):	0.0		
		Substrate	
Mean Width (m):	5.7	Organic:	%
Mean Depth (m):	0.23	Sand:	18 %
Cover (%):		Gravel:	2.7 %
		Rubble:	42 %
		Boulder:	60.7 %
		Bedrock:	%
Water Chemistry			
Time:	15:14		
H2O Temp(C):	14		
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
WRB	Wild rainbow/redband		

Length Frequency

Species	CM	Method	Number
	Group		Measured
SCL	6	EF	1
SCL	7	EF	4
SCL	8	EF	1
SCL	9	EF	2
WRB	7	EF	1
WRB	14	EF	1
WRB	19	EF	1
WRB	24	EF	1

Appendix A. Continued.

STREAM: Squaw Creek                      SAMPLE DATE: 6/18/01  
 SECTION: 2  
 EPA REACH: 17050122048                  QUAD MAP: Weiser  
 RTS: R2E, T13N, S11                      UTM: 11T 0563971 ; 4924903  
 SECTION DESCRIPTION: Poison Creek site.

Transect Information:  
 Section Length (m): 67.6  
 Elevation (m):  
 Gradient (%): 0.00%  
 Population Est: 38 S.E(popest): 38.71  
 Shade (%): 0.0

Habitat Type:  
 Pool: 33.3 %  
 Riffle: 25.0 %  
 Run: 41.7 %  
 Pocket: 0.0 %

Mean Width (m): 8.2  
 Mean Depth (m): 0.45

Substrate

Cover (%):

Organic: %  
 Sand: 4.2 %  
 Gravel: %  
 Rubble: 20.8 %  
 Boulder: 75 %  
 Bedrock: %

Water Chemistry

Time: 17:00  
 H2O Temp(C): 9  
 Air Temp(C):  
 pH:  
 Alkalinity(mg/l CaCO3):  
 Hardness(uS/cm3):  
 Conductivity(mg/l CaCO3):  
 Species Sampled

BLT Bull trout  
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group		Measured
BLT	17	EF	1
BLT	17	EF	1
WRB	7	EF	1
WRB	8	EF	2
WRB	9	EF	2
WRB	10	EF	1
WRB	12	EF	1
WRB	13	EF	1
WRB	15	EF	2
WRB	16	EF	3
WRB	18	EF	2
WRB	19	EF	1
WRB	20	EF	2
WRB	7	EF	1
WRB	8	EF	2
WRB	9	EF	2
WRB	10	EF	1
WRB	12	EF	1
WRB	13	EF	1
WRB	15	EF	2
WRB	16	EF	3
WRB	18	EF	2
WRB	19	EF	1
WRB	20	EF	2

Appendix A. Continued.

STREAM: Squaw Creek                      SAMPLE DATE: 6/19/01  
SECTION: SQUAW 1  
EPA REACH: 17050122048                  QUAD MAP: Twin Sisters  
RTS: R1E, T13N, S25                      UTM: 11T 0557102 ; 4919708  
SECTION DESCRIPTION: .5 MILES ABOVE EXCLOSURE

Transect Information:		Habitat Type:	
Section Length (m):	123.5	Pool:	0.0 %
Elevation (m):		Rifle:	53.3 %
Gradient (%):	0.00%	Run:	46.7 %
Population Est:	22.0 S.E(popest): 1.11	Pocket:	0.0 %
Shade (%):	0.0		
		Substrate	
Mean Width (m):	8.04	Organic:	%
Mean Depth (m):		Sand:	%
Cover (%):		Gravel:	34.7 %
		Rubble:	50.3 %
		Boulder:	15 %
		Bedrock:	%
Water Chemistry			
Time:	12:50		
H2O Temp(C):	11		
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
WRB	Wild rainbow/redband		

Length Frequency

Species	CM	Method	Number
Group			Measured
SCL	5	EF	3
SCL	6	EF	9
SCL	7	EF	10
SCL	8	EF	3
SCL	9	EF	5
SCL	10	EF	1
WRB	7	EF	3
WRB	8	EF	3
WRB	9	EF	1
WRB	11	EF	3
WRB	12	EF	1
WRB	14	EF	2
WRB	16	EF	3
WRB	17	EF	2
WRB	19	EF	3
WRB	23	EF	1

Appendix A. Continued.

STREAM: Squaw Creek                      SAMPLE DATE: 6/19/01  
 SECTION: SQUAW 3  
 EPA REACH: 17050122048                  QUAD MAP: Twin Sisters  
 RTS: R1E, T12N, S14                      UTM: 11T 0555809 ; 4913323  
 SECTION DESCRIPTION: No trout captured, abundant food available.

Transect Information:		Habitat Type:	
Section Length (m):	82	Pool:	0.0 %
Elevation (m):		Rifle:	33.3 %
Gradient (%):	0.00%	Run:	66.7 %
Population Est:	0.0 S.E(popest):	Pocket:	0.0 %
Shade (%):	0.0		
		Substrate	
Mean Width (m):	8.8	Organic:	%
Mean Depth (m):	0.24	Sand:	%
Cover (%):		Gravel:	12 %
		Rubble:	39.3 %
		Boulder:	46.7 %
		Bedrock:	2.7 %
Water Chemistry			
Time:	15:00		
H2O Temp(C):	15		
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
SPD	Speckled dace		

Length Frequency

Species	CM	Method	Number
	Group		Measured
SCL	4	EF	3
SCL	6	EF	4
SCL	7	EF	4
SCL	8	EF	1
SPD	6	EF	1
SPD	7	EF	6
SPD	8	EF	2
SPD	9	EF	1

Appendix A. Continued.

STREAM: Squaw Creek                      SAMPLE DATE: 6/20/01  
 SECTION: SQUAW 5  
 EPA REACH: 17050122048                  QUAD MAP: Tripod Peak  
 RTS: R2E, T13N, S27                      UTM: 11T 0562913 ; 4919606  
 SECTION DESCRIPTION: Site begins at Wilson Corrals Trailhead

Transect Information:		Habitat Type:	
Section Length (m):	69	Pool:	0.0 %
Elevation (m):		Rifle:	46.7 %
Gradient (%):	0.00%	Run:	53.3 %
Population Est:	25.0 S.E(popest): 2.78	Pocket:	0.0 %
Shade (%):	0.0		
		Substrate	
Mean Width (m):	6.7	Organic:	%
Mean Depth (m):	0.21	Sand:	27.3 %
		Gravel:	16 %
Cover (%):		Rubble:	23.3 %
		Boulder:	33.4 %
		Bedrock:	%
Water Chemistry			
Time:	12:30		
H2O Temp(C):	9		
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
WRB	Wild rainbow/redband		

Length Frequency

Species	CM	Method	Number
	Group		Measured
WRB	4	EF	1
WRB	5	EF	1
WRB	9	EF	1
WRB	10	EF	1
WRB	11	EF	5
WRB	12	EF	4
WRB	14	EF	1
WRB	15	EF	2
WRB	17	EF	4
WRB	20	EF	2
WRB	21	EF	1

Appendix A. Continued.

STREAM: Fourth of July Creek                      SAMPLE DATE:                      7/17/01  
 SECTION: 01  
 EPA REACH: 17050124069                      QUAD MAP:                      Sturgill Peak  
 RTS: R5W, T14N, S18                      UTM:                      44 548.465 ; 116 986.773  
 SECTION DESCRIPTION: 3.1 mi up from Mann Creek road

Transect Information:		Habitat Type:	
Section Length (m):	45.2	Pool:	25.0 %
Elevation (m):		Rifle:	50.0 %
Gradient (%):	0.00%	Run:	25.0 %
Population Est:	40.0 S.E(popest): 1.99	Pocket:	0.0 %
Shade (%):	0.0		
		Substrate	
Mean Width (m):	1.6	Organic:	%
Mean Depth (m):	0.07	Sand:	42 %
		Gravel:	49.7 %
Cover (%):		Rubble:	8.3 %
		Boulder:	%
		Bedrock:	%
Water Chemistry			
Time:	13:25		
H2O Temp(C):	11		
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
WRB	Wild Rainbow		

Length Frequency			
Species	CM	Method	Number
	Group		Measured
WRB	7	EF	5
WRB	8	EF	6
WRB	9	EF	3
WRB	10	EF	4
WRB	11	EF	4
WRB	12	EF	6
WRB	13	EF	3
WRB	14	EF	1
WRB	15	EF	2
WRB	16	EF	2
WRB	17	EF	2
WRB	18	EF	1

Appendix A. Continued.

STREAM: Fourth of July Creek      SAMPLE DATE: 7/17/01  
 SECTION: 05  
 EPA REACH: 17050124069      QUAD MAP: Sturgill Peak  
 RTS: R5W, T14N, S33      UTM: 44 511.951 ; 116 954.401  
 SECTION DESCRIPTION: Confluence of Mann Creek

Transect Information:

Section Length (m): 34.3  
 Elevation (m):  
 Gradient (%): 0.00%  
 Population Est: 16.0 S.E(popest): 0.56  
 Shade (%): 0.0

Habitat Type:

Pool: 0.0 %  
 Riffle: 25.0 %  
 Run: 75.0 %  
 Pocket: 0.0 %

Substrate

Mean Width (m): 2.8  
 Mean Depth (m): 0.08

Organic: %

Cover (%):

Sand: 20 %  
 Gravel: 26.7 %  
 Rubble: 47.5 %  
 Boulder: 5.8 %  
 Bedrock: %

Water Chemistry

Time: 12:00  
 H2O Temp(C): 12  
 Air Temp(C):  
 pH:  
 Alkalinity(mg/l CaCO3):  
 Hardness(uS/cm3):  
 Conductivity(mg/l CaCO3):  
 Species Sampled

WRB Wild Rainbow

Length Frequency

Species	CM Group	Method	Number Measured
WRB	6	EF	1
WRB	8	EF	1
WRB	9	EF	4
WRB	10	EF	2
WRB	11	EF	1
WRB	12	EF	2
WRB	13	EF	2
WRB	14	EF	2
WRB	15	EF	1



Appendix A. Continued.

STREAM: Mann Creek                      SAMPLE DATE: 7/18/01  
 SECTION: 02  
 EPA REACH: 17050124069              QUAD MAP: Sturgill Peak  
 RTS: R5W, T15N, S29                  UTM: 44 609.43 ; 116 961.429  
 SECTION DESCRIPTION: Above Spring Creek Campground where the road crosses the creek.

Transect Information:		Habitat Type:	
Section Length (m):	33.8	Pool:	41.7 %
Elevation (m):		Rifle:	25.0 %
Gradient (%):	0.00%	Run:	33.3 %
Population Est:	35.0 S.E(popest): 3.58	Pocket:	0.0 %
Shade (%):	0.0		
		Substrate	
Mean Width (m):	3.6	Organic:	%
Mean Depth (m):	0.11	Sand:	20 %
Cover (%):		Gravel:	7.5 %
		Rubble:	57.5 %
		Boulder:	15 %
		Bedrock:	%
Water Chemistry			
Time:	10:00		
H2O Temp(C):	10		
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
WRB	Wild Rainbow		

Length Frequency			
Species	CM	Method	Number
	Group		Measured
WRB	6	EF	1
WRB	7	EF	2
WRB	8	EF	3
WRB	9	EF	2
WRB	10	EF	3
WRB	11	EF	4
WRB	12	EF	5
WRB	13	EF	4
WRB	14	EF	2
WRB	15	EF	1
WRB	16	EF	4
WRB	18	EF	1



Appendix A. Continued.

STREAM: Adams Creek                      SAMPLE DATE: 7/17/01  
 SECTION: 04  
 EPA REACH: 17050124069                  QUAD MAP: Mann Creek NW  
 RTS: R5W, T13N, S4                      UTM: 44 491.125 ; 116 948.939  
 SECTION DESCRIPTION: 1 mile above Mann Creek

Transect Information:  
 Section Length (m): 29  
 Elevation (m):  
 Gradient (%): 0.00%  
 Population Est: 27.0 S.E(popest): 1.9  
 Shade (%): 0.0

Habitat Type:  
 Pool: 25.0 %  
 Riffle: 25.0 %  
 Run: 50.0 %  
 Pocket: 0.0 %

Mean Width (m): 2.1  
 Mean Depth (m): 0.13

Substrate

Cover (%):

Organic: %  
 Sand: 10.8 %  
 Gravel: 24.2 %  
 Rubble: 45.8 %  
 Boulder: 19.2 %  
 Bedrock: %

Water Chemistry

Time: 10:48  
 H2O Temp(C): 10  
 Air Temp(C):  
 pH:  
 Alkalinity(mg/l CaCO3):  
 Hardness(uS/cm3):  
 Conductivity(mg/l CaCO3):  
 Species Sampled

WRB Wild Rainbow

Length Frequency

Species	CM	Method	Number
	Group		Measured
WRB	7	EF	1
WRB	8	EF	3
WRB	9	EF	6
WRB	10	EF	1
WRB	11	EF	1
WRB	12	EF	3
WRB	13	EF	5
WRB	14	EF	3
WRB	15	EF	3



Appendix A. Continued.

STREAM: Keithly Creek                      SAMPLE DATE: 7/18/01  
 SECTION: 01  
 EPA REACH: 17050124065                      QUAD MAP: Hopper Creek  
 RTS: R4W, T14N, S29                      UTM: 44 520.26 ; 116 843.948  
 SECTION DESCRIPTION: transect is 2.4 miles from cattle guard, next to wide turnout in road

Transect Information:		Habitat Type:	
Section Length (m):	66.2	Pool:	33.3 %
Elevation (m):		Riffle:	0.0 %
Gradient (%):	0.00%	Run:	66.7 %
Population Est:	44.0 S.E(popest): 21.45	Pocket:	0.0 %
Shade (%):	0.0		
		Substrate	
Mean Width (m):	3.9	Organic:	%
Mean Depth (m):	0.16	Sand:	30 %
Cover (%):		Gravel:	25 %
		Rubble:	43.3 %
		Boulder:	1.66 %
		Bedrock:	%
Water Chemistry			
Time:	15:00		
H2O Temp(C):	15.5		
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
WRB	Wild Rainbow/redband		

Length Frequency			
Species	CM	Method	Number
	Group		Measured
WRB	3	EF	1
WRB	8	EF	1
WRB	9	EF	2
WRB	10	EF	1
WRB	11	EF	3
WRB	12	EF	4
WRB	13	EF	3
WRB	14	EF	2
WRB	15	EF	4
WRB	16	EF	2
WRB	17	EF	1
WRB	18	EF	1
WRB	19	EF	1
WRB	20	EF	1

Appendix A. Continued.

STREAM: Sheep Creek                      SAMPLE DATE: 6/18/01  
 SECTION: Sheep Creek  
 EPA REACH: 17050124013                      QUAD MAP:  
 RTS: R, T, S                                      UTM: 11T 0547758 ; 4909209  
 SECTION DESCRIPTION: Mouth of creek in enclosure

Transect Information:  
 Section Length (m): 86  
 Elevation (m):  
 Gradient (%): 0.00%  
 Population Est: 0.0 S.E.(popest):  
 Shade (%): 0.0

Habitat Type:  
 Pool: 100.0 %  
 Riffle: 0.0 %  
 Run: 0.0 %  
 Pocket: 0.0 %

Mean Width (m): 5.1  
 Mean Depth (m): 0.4

Substrate

Organic: 0 %  
 Sand: 53 %  
 Gravel: 5 %  
 Rubble: 37 %  
 Boulder: 5 %  
 Bedrock: 0 %

Cover (%): 61

Water Chemistry

Time: 10:00  
 H2O Temp(C): 12  
 Air Temp(C):

pH:  
 Alkalinity(mg/l CaCO3):  
 Hardness(uS/cm3):  
 Conductivity(mg/l CaCO3):  
 Species Sampled

BLS Bridgelip sucker  
 RSS Redside shiner  
 SPD Speckled dace

Length Frequency

Species	CM Group	Method	Number Measured
BLS	7	EF	4
BLS	8	EF	2
BLS	10	EF	2
BLS	11	EF	3
BLS	12	EF	3
BLS	13	EF	2
BLS	18	EF	1
RSS	3	EF	1
RSS	5	EF	2
RSS	6	EF	15
RSS	7	EF	22
RSS	8	EF	12
RSS	9	EF	1
SPD	3	EF	5
SPD	4	EF	33
SPD	5	EF	32
SPD	6	EF	3
SPD	7	EF	6
SPD	8	EF	2

Appendix A. Continued.

STREAM: Boise R, N F                      SAMPLE DATE: 7/3/01  
 SECTION: SHORT CREEK  
 EPA REACH: 17050111024                  QUAD MAP:  
 RTS: R, T, S                                UTM: 43.782.669 ; 115.612.641  
 SECTION DESCRIPTION: SHORT CREEK

Transect Information:		Habitat Type:	
Section Length (m):	40	Pool:	13.3 %
Elevation (m):		Rifle:	20.0 %
Gradient (%):	0.00%	Run:	66.7 %
Population Est:	0.0 S.E(popest):	Pocket:	0.0 %
Shade (%):	0.0		
		Substrate	
Mean Width (m):	24.3	Organic:	0 %
Mean Depth (m):	0.6	Sand:	23 %
		Gravel:	10 %
Cover (%):	53	Rubble:	21 %
		Boulder:	43 %
		Bedrock:	5 %
Water Chemistry			
Time:	10:16		
H2O Temp(C):	18		
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			

BLS      Bridgelip sucker  
 LSS      Largescale sucker  
 MWF     Mountain whitefish  
 NSF      Northern pikeminnow  
 WRB     Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group		Measured
BLS	30	SN	2
LSS	30	SN	13
LSS	38	SN	1
MWF	12	SN	1
MWF	15	SN	1
MWF	22	SN	1
MWF	25	SN	15
MWF	30	SN	1
NSF	33	SN	3
WRB	15	SN	9
WRB	25	SN	1
WRB	27	SN	2
WRB	30	SN	1
WRB	33	SN	1

Appendix A. Continued.

STREAM: Boise R, N F                      SAMPLE DATE: 7/3/01  
 SECTION: SUCKERHOLE  
 EPA REACH: 17050111024                      QUAD MAP:  
 RTS: R, T, S                                      UTM: 43 43.41 ; 115 36.52  
 SECTION DESCRIPTION: DEEP SAND FILLED HOLE

Transect Information:		Habitat Type:	
Section Length (m):	32	Pool:	100 %
Elevation (m):		Riffle:	%
Gradient (%):	0.00%	Run:	%
Population Est:	0.0 S.E.(popest):	Pocket:	%
Shade (%):	0.0		
		Substrate	
Mean Width (m):	15.5	Organic:	%
Mean Depth (m):		Sand:	%
Cover (%):		Gravel:	%

Water Chemistry		Rubble:	%
Time:	17:00	Boulder:	%
H2O Temp(C):	24	Bedrock:	%
Air Temp(C):			

pH:  
 Alkalinity(mg/l CaCO3):  
 Hardness(uS/cm3):  
 Conductivity(mg/l CaCO3):  
 Species Sampled

LSS	Largescale sucker
MWF	Mountain whitefish
NSF	Northern pikeminnow
WRB	Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group		Measured
LSS	30	SN	1
LSS	35	SN	35
MWF	22	SN	1
MWF	25	SN	2
MWF	27	SN	1
MWF	30	SN	4
MWF	33	SN	2
NSF	35	SN	2
NSF	38	SN	1
WRB	5	SN	1
WRB	10	SN	1
WRB	15	SN	1
WRB	17	SN	1
WRB	20	SN	1
WRB	22	SN	1
WRB	27	SN	4

Appendix A. Continued.

STREAM: Boise R, N F  
 SECTION: X1  
 EPA REACH: 17050111024  
 RTS: R7E T5N S21  
 SECTION DESCRIPTION: New site.

SAMPLE DATE: 7/3/01  
 QUAD MAP:  
 UTM: 43 45.41 ; 115 37.07

Transect Information:

Section Length (m): 42  
 Elevation (m):  
 Gradient (%): 0.00%  
 Population Est: 0.0 S.E(popest):  
 Shade (%): 0.0

Habitat Type:

Pool: %  
 Riffle: %  
 Run: %  
 Pocket: %

Substrate

Mean Width (m):  
 Mean Depth (m):

Organic: %  
 Sand: %  
 Gravel: %  
 Rubble: %  
 Boulder: %  
 Bedrock: %

Cover (%):

Water Chemistry

Time: 12:45  
 H2O Temp(C): 20  
 Air Temp(C):  
 pH:  
 Alkalinity(mg/l CaCO3):  
 Hardness(uS/cm3):  
 Conductivity(mg/l CaCO3):

Species Sampled

LSS Largescale sucker  
 MWF Mountain whitefish  
 NSF Northern pikeminnow  
 WRB Wild rainbow/redband

Length Frequency

Species	CM Group	Method	Number Measured
LSS	30	SN	2
LSS	38	SN	11
MWF	20	SN	2
MWF	27	SN	1
MWF	30	SN	3
NSF	35	SN	1
NSF	38	SN	1
WRB	10	SN	2
WRB	12	SN	1
WRB	15	SN	4
WRB	20	SN	3
WRB	27	SN	1
WRB	30	SN	1
WRB	35	SN	2
WRB	38	SN	1

Appendix A. Continued.

STREAM: Boise R, N F  
 SECTION: X2  
 EPA REACH: 17050111024  
 RTS: R, T, S  
 SECTION DESCRIPTION: NEW SITE

SAMPLE DATE: 7/3/01  
 QUAD MAP:  
 UTM: 43 44.54 ; 115 37.44

Transect Information:

Section Length (m): 59.4  
 Elevation (m):  
 Gradient (%): 0.00%  
 Population Est: 0.0 S.E(popest):  
 Shade (%): 0.0

Habitat Type:

Pool: %  
 Riffle: %  
 Run: %  
 Pocket: %

Mean Width (m): 17.7  
 Mean Depth (m):

Substrate

Cover (%):

Organic: %  
 Sand: %  
 Gravel: %  
 Rubble: %  
 Boulder: %  
 Bedrock: %

Water Chemistry

Time: 14:00  
 H2O Temp(C): 22  
 Air Temp(C):  
 pH:  
 Alkalinity(mg/l CaCO3):  
 Hardness(uS/cm3):  
 Conductivity(mg/l CaCO3):

Species Sampled

LSS Largescale sucker  
 MWF Mountain whitefish  
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group		Measured
LSS	30	SN	6
LSS	33	SN	2
LSS	35	SN	3
LSS	40	SN	1
MWF	12	SN	1
MWF	15	SN	1
MWF	30	SN	2
MWF	33	SN	1
WRB	5	SN	2
WRB	7	SN	3
WRB	10	SN	5
WRB	12	SN	1
WRB	15	SN	2
WRB	17	SN	1
WRB	20	SN	1
WRB	22	SN	1
WRB	25	SN	5
WRB	27	SN	1

Appendix A. Continued.

STREAM: Boise R, N F  
 SECTION: X3  
 EPA REACH: 17050111024  
 RTS: R, T, S  
 SECTION DESCRIPTION: New site.

SAMPLE DATE: 7/3/01  
 QUAD MAP:  
 UTM: 43 44.22 ; 115 37.31

Transect Information:

Section Length (m): 38.6  
 Elevation (m):  
 Gradient (%): 0.00%  
 Population Est: 0.0 S.E(popest):  
 Shade (%): 0.0

Mean Width (m): 19.9  
 Mean Depth (m): 0.9

Cover (%): 36

Water Chemistry

Time: 15:30  
 H2O Temp(C): 23

Air Temp(C):

pH:

Alkalinity(mg/l CaCO3):

Hardness(uS/cm3):

Conductivity(mg/l CaCO3):

Species Sampled

BLS Bridgelip sucker  
 LSS Largescale sucker  
 MWF Mountain whitefish  
 NSF Northern pikeminnow  
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group		Measured
BLS	38	SN	3
LSS	38	SN	21
MWF	5	SN	2
MWF	15	SN	1
MWF	25	SN	6
MWF	30	SN	2
MWF	33	SN	1
MWF	35	SN	1
NSF	30	SN	2
NSF	35	SN	1
WRB	10	SN	2
WRB	20	SN	1
WRB	25	SN	1
WRB	27	SN	4

Habitat Type:

Pool: 0.0 %  
 Riffle: 0.0 %  
 Run: 100.0 %  
 Pocket: 0.0 %

Substrate

Organic: 0 %  
 Sand: 19 %  
 Gravel: 14 %  
 Rubble: 23 %  
 Boulder: 44 %  
 Bedrock: 0 %

Appendix B. Identification of vouchered fish taken during 2001 stream surveys.

Date	River/Stream	Township, Range, Section	County	Common Name	
June 19, 2001	3rd Fork Squaw Creek	T12N R1E S14	Gem	Longnose dace	<i>Rhini</i>
June 18, 2001	Sheep Creek	T12N R1W S36	Washington	Bridgelip sucker Speckled dace Redside shiner	<i>Catos</i> <i>Rhini</i> <i>Richa</i>
June 14, 2001	Little Willow Cr.	T10N R2W S29	Washington	Bridgelip sucker Redside shiner Speckled dace Rainbow trout	<i>Catos</i> <i>Richa</i> <i>Rhini</i> <i>Oncor</i>
July 18, 2001	Keithly Creek	T14N R4W S29	Washington	Mottled sculpin	<i>Cottu</i>

## **2001 ANNUAL PERFORMANCE REPORT**

State of: Idaho

Program: Fisheries Management F-71-R-26

Project II: Technical Guidance

Subproject II-D: Southwest Region

Contract Period: July 1, 2001 to June 30, 2002

### **ABSTRACT**

Regional fishery personnel continue to respond to a large number of public requests for fishing information. Biweekly ASK FISH reports were prepared and forwarded to vendors for distribution. Regional fishery staff consulted with the Environmental Staff Biologist, provided information on fish population status, and identified concerns with various projects potentially affecting fish habitat or populations in the Southwest Region. We worked with private individuals to review private pond and fish transportation permit applications.

Regional fishery personnel continued participation in the Bull Trout Recovery Unit Team for the Southwest Idaho. We staff coordinated with the U.S. Bureau of Reclamation on bull trout *Salvelinus confluentus* monitoring and trap-and-haul efforts related to the Arrowrock Dam valve replacement project. We summarized data for inclusion in the subbasin planning process for the Boise, Payette, and Weiser drainages. We provided fish population and habitat data to various agencies as requested. We participated in the white sturgeon *Acipenser transmontanus* technical advisory committee, and worked with local interests in Boise, Weiser, Meridian, Nampa, and Payette to develop urban fishing opportunities. We also continued to provide technical support to the Ted Trueblood Chapter of Trout Unlimited effort to develop a side channel in the lower Boise River.

Author:

Jeff Dillon  
Regional Fishery Manager

## 2001 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-26

Project III: Habitat Management

Subproject III-D: Southwest Region

Period Covered: July 1, 2001 to June 30, 2002

### ABSTRACT

Approximately 200 apple treetops were added to existing structures in Claytonia Pond in March to enhance habitat for warm water fish. Over 100 cottonwood cuttings were also planted around the shoreline.

In the spring of 2001, 70 PVC habitat structures were assembled and placed in the Caldwell Rotary Pond. The PVC structures cost approximately \$27 each to construct. In addition, approximately 350 apple treetops were placed in the general vicinity of the plastic habitat.

Apple treetops and Christmas trees were placed in Redtop Pond in February and March of 2001. On December 19, 50 live cottonwood tree cuttings were planted at Redtop Pond. The pond contains largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, channel catfish *Ictalurus punctatus*, and brown bullhead *Ameiurus nebulosus*.

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Jeff Dillon  
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## OBJECTIVES

1. Improve habitat structure and availability for warm water fish in small Southwest Region pond fisheries.

## METHODS

### Habitat Placement

#### **Claytonia Pond**

In 1999 and 2000 over 250 apple tree stumps were placed in Claytonia Pond and anchored using steel posts and cable. In 2001 we continued adding structure to the pond to improve habitat for largemouth bass *Micropterus salmoides* and bluegill *Lepomis macrochirus*. In March 2001, approximately 200 apple treetops were collected and transported to the pond. Treetops were donated from a Marsing orchard that had been taken out of production. All treetops were transported using a flatbed trailer. Steel cable was attached around groups of treetops and anchored to concrete blocks or to existing habitat located in and around the pond. Several treetops were placed on and around a small island in the middle of the pond. Irrigation returns should submerge all of the placed habitat by late April each year.

One hundred and twenty live cottonwood cuttings were collected from the Deer Flat National Wildlife Refuge and were around the shoreline at Claytonia Pond. Cottonwood cuttings were planted using a "Water Jet Stinger" which produces a high-pressure stream of water. The high-pressure nozzles greatly reduced the amount of time required to plant the cuttings. The cuttings were placed upslope from the shoreline structures (tree stumps) that were placed in 1999 and 2000, to provide shade cover during the summer months.

All habitat work at Claytonia Pond was done during low water periods when levels were approximately 2 m below the high water mark. Work was conducted using volunteers, Fish and Game reservists, and Department staff.

#### **Caldwell Rotary Pond**

Seventy PVC boxes (Koch 2000) were constructed at the Fish and Game Regional office during February and March 2001 for placement in the Rotary Pond. The structures are intended to provide habitat for warm water sport fish and forage fish. The PVC boxes were 1.5 m tall, and 2 m wide, and were constructed out of one-inch (2.5 cm) schedule 40 PVC pipe. The PVC boxes cost approximately \$27.00 each to construct (Appendix A).

The pipe was cut into lengths of 1 m for the tops and bottoms, and 1.5 m for the uprights. Once cutting was completed, tops and bottoms were assembled. Each top or bottom was assembled using one cross-joint, and four of the 1 m sections of pipe. The pieces were primed, coated with glue and assembled. The exposed ends of the pipe used to construct the tops and bottoms were then primed, and coated with glue, and t-joints were connected. The four uprights (1-m sections of pipe) were then primed and glued to the t-joints. The box was left incomplete to facilitate transportation to the Rotary Pond. The boxes were then completed on-site at the pond by gluing the tops onto the uprights. Construction safety fence was then wrapped around the boxes and attached with plastic zip ties. The PVC boxes were placed around fishing docks and anchored with concrete blocks.

Treetops were transported from an orchard outside of Marsing to the Rotary Pond by employees of the Canyon County Highway Department. Approximately 15 dump truck loads of treetops (350 treetops) were transported. Treetops were clustered in groups of three to five attached together using 3/8-inch (9.5 mm) steel cable, and were anchored in place using concrete blocks. Treetops were placed in close vicinity to the PVC boxes.

Additional assistance in completing the project was provided by Fish and Game reservists and the Canyon County Highway Department. Approximately 200 hours of labor were needed to complete the project.

### **Redtop Pond**

Two hundred treetops were transported from near Marsing and placed in Redtop Pond in February and March 2001 to provide habitat for warm water fish. In addition, approximately 100 Christmas trees were placed along the south bank of the pond. Labor consisted of Fish and Game reservists and staff. Sixty-four hours of manpower was needed to complete this habitat placement project.

Live cottonwood cuttings were taken from the Deer Flat National Wildlife Refuge and transported to Redtop Pond in December 2001. Fifty cottonwood cuttings were planted along the south shore using the "Water Jet Stinger" method described above.

## Discussion

### Habitat Placement

The addition of large woody debris, live trees, and PVC boxes will provide structure in these relatively small gravel ponds that would otherwise be absent. They will offer cover for largemouth bass, bluegill, and catfish *Ictalurus spp.*, as well as providing cover for forage fish. They will also serve as focal points around which anglers can fish. These projects are labor intensive, however. We estimated that about 296 man-hours were expended on these habitat enhancements (including volunteers), but actual benefits to these fisheries will be difficult to quantify.

The habitat enhancements made at the Rotary Pond should increase available habitat for largemouth bass, crappie *Pomoxis spp.*, bluegill, and bullhead *Ameiurus spp.*

### **RECOMMENDATIONS**

1. Continue with habitat placement at Redtop Pond. Utilize Cottonwood tree cuttings when available to increase riparian habitat.
2. Future electrofishing surveys should be conducted at Claytonia, Redtop, and Rotary ponds to evaluate the success of the habitat placements.

### LITERATURE CITED

Koch, K.. 2000. Lake Havasu Fisheries Improvement. U.S. Bureau of Land Management. Job Performance Report. Lake Havasu Field Office, Lake Havasu City, AZ

## APPENDIX

Appendix A. Cost breakdown for Caldwell Rotary Pond PVC boxes placed in 2001.

Assembly Date: 3/20/01  
 Personnel: 1 IDFG reservist + 2 IDFG employees  
 Start Time: 08:30  
 Finish Time: 15:30  
 Total Number Structures Built: 70  
 Approximate Dimensions: 60" tall x approximately 80" wide  
 Total Costs: \$1922.91 (labor not included)  
 Total cost per Structure \$27.47

MATERIALS <sup>a</sup>			
ITEM	DESCRIPTION	QUANTITY	TOTAL COST (\$)
PVC	1" X 10' sch 40 PVC	3,300 ' (330 X 10' lengths)	745.80
	1" sch 40 t-joints	560	221.76
	1" sch 40 cross joints	153	211.14
Construction Fence	4' X 100' Rolls	14	441.00
Concrete Blocks	8" blocks	175	157.50
Zip Ties	34" (10 pack)	110	65.45
	7.5" (100 pack)	1,800	53.46
PVC Glue and Primer	Glue 32 oz.	3	13.44
	Primer 16 oz.	4	13.36
		Total Cost of Materials	1,922.91 (incl. sales tax)
		Total Cost per Structure	27.47

<sup>a</sup>Misc. Tools Used: Chop saw with blade designed for cutting metal, flatbed trailer for raised working surface, large black felt tip pen for marking pipe, utility knife and 4' x 8' sheet of plywood for cutting construction fence, tape measure.

**Submitted by:**

**Approved by:**

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**Bill Hutchinson  
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