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FISHERY MANAGEMENT INVESTIGATIONS

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Steven M. Huffaker, Director

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

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

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1996 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job: a

Title: Mountain Lakes Investigations

Contract Period: July 1, 1996 to June 30, 1997

ABSTRACT

Nine high mountain lakes were stocked by regional personnel in 1996. Species stocked included Yellowstone cutthroat trout *Oncorhynchus clarki* from Henry's Lake, golden trout *O. aquabonita*, and Arctic grayling *Thymallus arcticus*.

There were 25 regional high mountain lakes investigated in 1996. Twenty-one were in the upper Big Wood River drainage and four were the Independence Lakes complex south of Burley. Some of the lakes were small shallow ponds, which appeared incapable of supporting trout year round but were investigated for amphibians. Gillnetting at several of the larger lakes indicated that some of the lakes still had hatchery fish present that had been stocked as fry in 1994 and some had good spawning habitat with wild trout present. Amphibians found at some of the lakes included long-toed salamander *Ambystoma macrodactylum* and spotted frog *Rana pretiosa*.

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OBJECTIVES

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

METHODS

Yellowstone cutthroat trout *Oncorhynchus clarki* from Henry's Lake, golden trout *O. aquabonita* and Arctic grayling *Thymallus arcticus* fry were stocked into alpine lakes by fishery management personnel from a vehicle or by backpack.

Several Big Wood River drainage high mountain lakes were investigated during the summer of 1996. Information gathered included legal description and Universal Transverse Mercator (UTM) coordinates, biological, physical, chemical, and descriptive data. Fish populations were sampled with Swedish-made Lundgrens Type A lightweight multi-filament gill nets and by angling. Angling effort is reported as hours fished per person with one fishing rod. Nets were sinking nets measuring 1.5 m deep with six 7.6 m wide panels with the following bar mesh sizes: 46, 38, 33, 30, 25, and 19 mm. A small inflatable rubber raft was used for setting and retrieving gill nets. Fish data analysis included identification to species, total length and weight measurements of some of the fish sampled.

Limnological data including pH, total hardness, alkalinity as $CaCO_3$ and conductivity were measured by collecting surface samples in plastic bottles from the raft for some lakes. The samples were taken to the regional office within two days of collection for analysis using a HACH Water Chemistry kit, a Solu bridge conductivity meter and Oakton pH meter. Ambient surface water temperatures were recorded at the lakes from the raft with a mercury thermometer, and temperature and dissolved oxygen profiles were measured by using a Y.S.I. Model 57 meter on some lakes accessible by vehicle. Bathymetric maps were made by using a nylon rope marked in 1 m increments for depth measurements at several locations then plotting on a surface map. Lake areas and locations were determined from USGS topographic maps.

RESULTS AND DISCUSSION

Alpine Lake Stocking

Regional personnel stocked nine alpine lakes with fish in July and August 1996. Arctic grayling were stocked into three regional lakes on July 24 with Independence Lake #2 receiving 2,000 fish and Hideaway and Big Lost lakes receiving 500 fish each. Four other regional alpine lakes received Yellowstone cutthroat trout fry on July 24. Lake Cleveland and Big Trinity Lake each received 2,000 fish, Little Trinity Lake received 1,000 fish and Titus Lake received 500 fish. On August 28, Amber Lake #3 (South) received its first planting of golden trout with 1,023 fish planted and Baker Lake received 2,006 golden trout weighing 10,613 fish per kilogram.

Amber Lakes

The north Amber Lake, sometimes referred to as Amber Lake #1, is an alpine cirque lake in the headwaters of the North Fork Big Wood River. It is located in T6N R17E Sec 19 NE1\4 and at UTM Z 11, 703,180 m E, 4,857,200 m N. Surface elevation is 2,753 m and total surface area is approximately 0.9 ha when full. There are no records of the lake being stocked within the last several years. It was investigated August 15-16, 1996 and was reached by hiking on a good trail for approximately 5 km from the trailhead at the confluence of the North Fork and the West Fork Big Wood River. The water level was 2.4 vertical meters below the outlet and had no visible inflow. Maximum depth as measured on August 16, 1996 was 3.0 m (Figure 1). The shore area was covered with logs, the substrate consisted of boulder, cobble, gravel and sand, and there were no aquatic macrophytes observed. Surface water temperature was 19°C at 1630 hours on August 16, 1996. Total alkalinity as $CaCO_3$ was 36 mg/l, total hardness was 35 mg/l, pH was 8.1, and specific conductivity was 90 umHOS/cm from a sample taken from the surface. Secchi visibility was greater than total depth. One sinking gill net was set at 1700 hours on August 15 and then pulled at 1000 on August 16, 1996. No fish were caught in the net. No fish were seen rising during the investigation and there was no sign of recent fishing activity. There appeared to be no suitable trout spawning habitat. Several adult long-toed salamander *Ambystoma macrodactylum* were found under numerous logs along the shore between the water's edge and high water line. No amphibian larvae were observed in the water. There was a dense population of fairy shrimp (Order *Anostraca*) and copepods in the water.

The south Amber Lake, sometimes referred to as Amber Lake #3, is located at T6N R17E Sec 19 SE1/4 and UTM Z 11, 703,160 m E, 4,856,630 m N. Surface elevation is 2,782 m and total surface area is about 0.9 ha when full. It was stocked with 500 cutthroat trout fry on September 15, 1994 and with 1,023 golden trout fry on August 28, 1996. It was investigated August 15-16, 1996 and was reached by hiking on a good trail for approximately 5 km from the confluence of the North Fork and the West Fork Big Wood River. The water level was 0.3 vertical meters below the top of the outlet but had a subsurface outflow that appeared within a few meters downstream of the outlet. There was no visible inflow. Maximum depth as measured on August 16, 1996 was 6.2 m (Figure 1). Parts of the shoreline and the lake contained logs, the substrate consisted of boulder, cobble, gravel and sand and there were no aquatic macrophytes observed. Surface temperature was 18°C at 1920 on August 15, 1996. Total alkalinity as $CaCO_3$ was 37 mg/l, total hardness was 36 mg/l, pH was 8.2, and specific conductivity was 80 umHOS/cm from a sample taken from the surface. Secchi visibility was 6.0 m. One sinking multiple mesh gill net was set at 2000 on August 15 then pulled at 0700 on August 16, 1996. No fish were caught in the net. No fish were seen rising during the investigation and there was no sign of recent fishing activity. There appears to be no suitable trout spawning habitat available. Several adult long-toed salamander were found under numerous logs along the shore and one larval salamander was observed in the water. There was a dense population of copepods in the water. Based on these results stocked fish did not survive two years after being stocked in 1994. This may be because of the 1994-1995 low water year, which may have caused a winterkill.

The east Amber Lake is reached by hiking on a good trail for approximately 4.5 km from the trailhead at the confluence of the North Fork and the West Fork Big Wood River. It is located at T6N R17E Sec 19 SE1/4 and in UTM Z 11, 703,540 m E, 4,856,900 m N. It has a total surface area of about 0.3 ha when full. There are no records of the small lake ever being stocked with fish. The lake was investigated August 16-28, 1996. There was no discernible

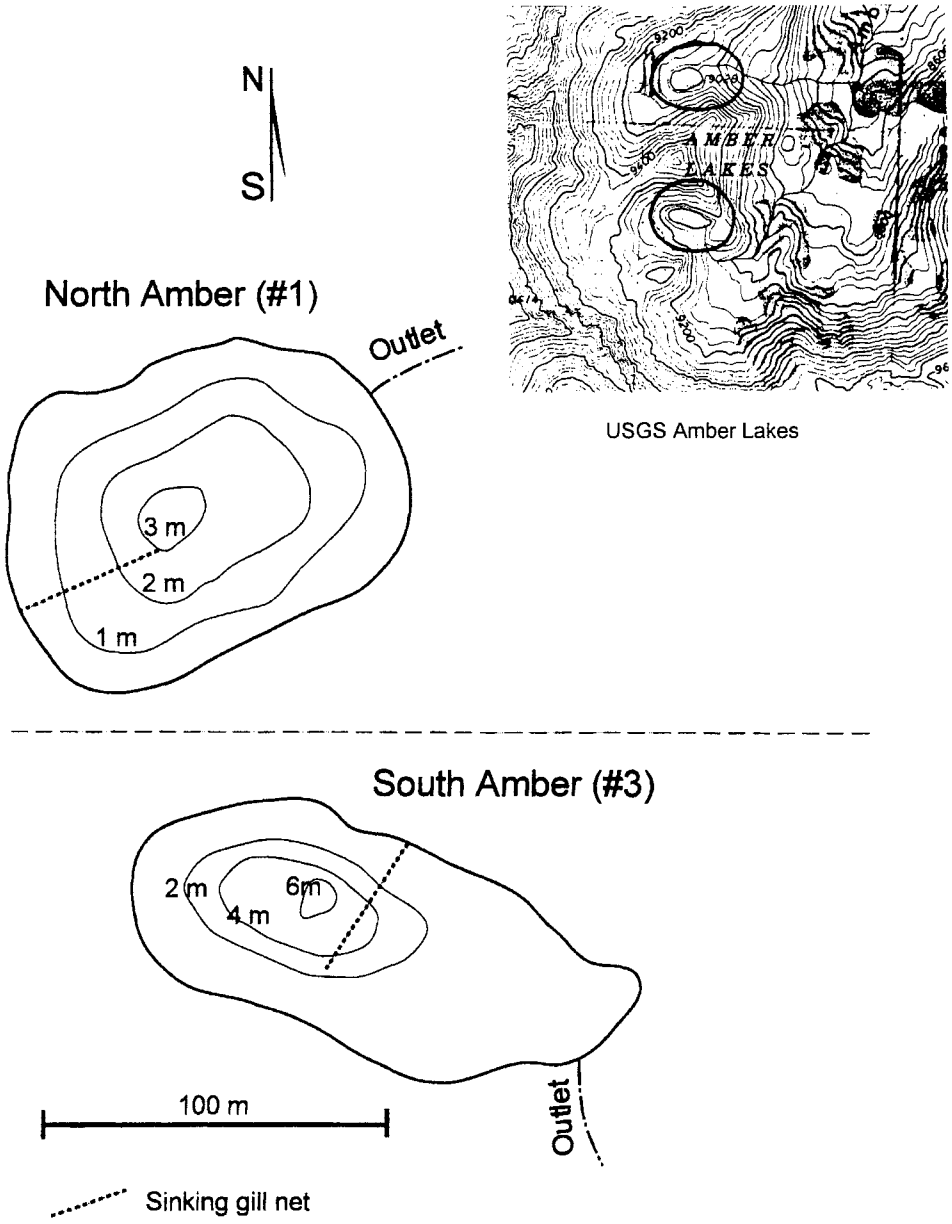


Figure 1. Map of Amber Lakes #1 and #3 with bathymetric contours and location of gill nets set on August 15, 1996.

outlet and no surface inflow. Surface elevation is 2,660 m. Maximum depth as measured on August 16, 1996 was 1.0 m but it was dry 12 days later when visited again. The substrate consisted of boulder, cobble, and gravel and there were no aquatic macrophytes. The pond is too small and shallow to support fish. Several adult long-toed salamander were found under some rocks near the shore on the August 16 visit but no larvae were observed in the water.

Baker Lake

Baker Lake has been stocked with golden trout fry several times since 1960 with most plantings occurring intermittently since 1987. The lake received 4,818 golden trout in August 1996. The lake was extensively surveyed by Idaho Department of Fish and Game (IDFG) regional fisheries personnel in 1992 (Warren and Partridge 1994) and 1993 (Partridge and Warren 1995). Results of those surveys indicated that cutthroat trout and cutthroat trout x rainbow trout *O. clarki* x *O. mykiss* hybrids were the most prevalent fish in the lake. Brown trout *Salmo trutta* were also sampled in small numbers in both years. Baker Lake fish were again sampled on August 28, 1996 with one sinking multiple mesh gill net set for two daylight hours and with four hours of angling effort. Total length frequencies of all fish sampled are given in Table 1. A total of 16 cutthroat trout or cutthroat trout x rainbow trout hybrids and one brown trout was sampled. No golden trout were sampled. Small young-of-the-year trout fry were observed in the outlet area indicating that natural reproduction was occurring. No amphibians were seen near Baker Lake. Surface water temperature at time of sampling was 17°C.

Big Lost Lake

Big Lost Lake is a 3.3 ha alpine lake located at T5N R15E Sec 27 NW1/4 and in UTM Z 11, 688,320 m E, 4,845,860 m N at the headwaters of Norton Creek, a tributary to Baker Creek. Surface elevation is 2,792 m when full. The lake has received cutthroat trout fry every three years with the last stocking occurring in 1994. Arctic grayling fry were stocked in 1995 and in July 1996. A fishery and bathymetric survey was made on the lake August 20-21, 1996 (Figure 2) and was reached by hiking approximately 2.9 km from the trailhead on Norton Creek. The water level was approximately 1.5 vertical meters from spilling, which is considered high compared to previous low water years. There was no surface water flowing into or from the lake at the time of the survey. The lake's substrate is composed primarily of gravel, rubble and boulder with no visible attached macrophytes. Secchi visibility depth was 6.0 m, which was the maximum lake depth. Surface water temperature was 17°C and total alkalinity as $CaCO_3$ was 38 mg/l. There was a dense copepod and fairy shrimp population. One sinking multiple mesh gill net was set at 1900 hours on August 20 then pulled at 0700 hours on August 21, 1996. A total of 65 grayling of one age class were sampled. Total lengths ranged from 160 mm to 200 mm and averaged 177 mm. Weights ranged from 40 g to 60 g with little variation in physical conditions among fish. No other fish were sampled or seen. It is suspected that all fish stocked prior to 1995 did not survive winter conditions. Scale analyses indicate that the Arctic grayling sampled were from the 1995 fry plant. There appeared to be no trout spawning habitat available. No amphibians were found in or near the lake during the survey.

Table 1. Total length frequencies and average weights of fish sampled by two hours of gillnetting and angling at Baker Lake, August 28, 1996.

Length range (mm)	Cutthroat trout				Cutthroat x rainbow hybrid				Brown trout			
	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.
0-9 / 140-149												
150-159												
160-169												
170-179												
180-189												
190-199	3	27.3	3	67								
200-209												
210-219												
220-229												
230-239					1	20.0						
240-249												
250-259												
260-269	1	9.1	1	186								
270-279												
280-289	1	9.1							1	100.0	1	222
290-299												
300-309					2	40.0	1	222				
310-319												
320-329	2	18.2	1	280								
330-339												
340-349	1	9.1	1	425								
350-359					1	20.0	1	450				
360-369	1	9.1										
370-379	1	9.1	1	410								
380-389												
390-399	1	9.1										
400-409												
410-419												
420-429					1	20.0	1	600				
430-439												
440-449												
Number:	11				5				1			
Average length:	293				321				285			

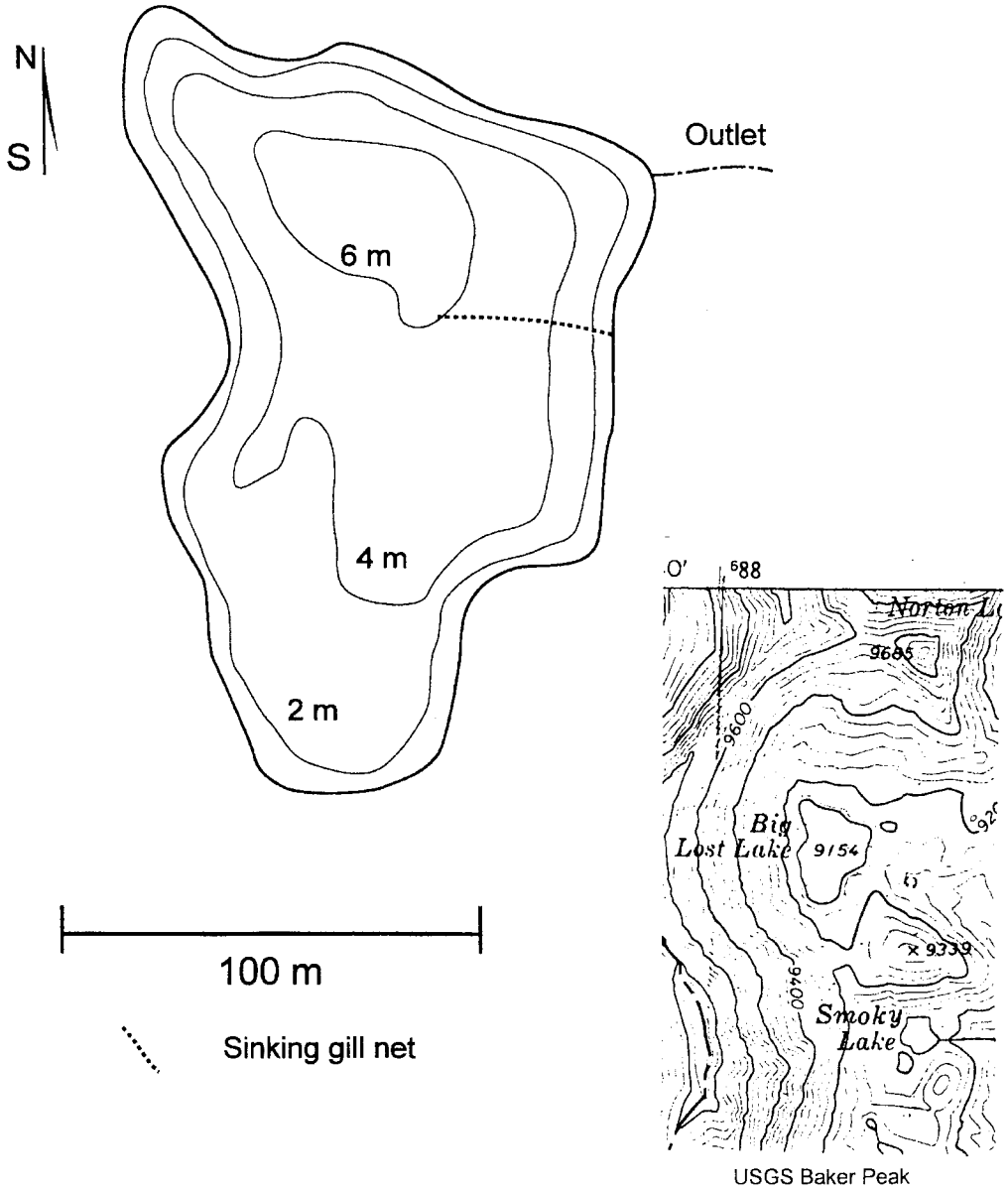


Figure 2. Map of Big Lost Lake with bathymetric contours and location of gill net as surveyed on August 20, 1996.

Dollar Lake

Dollar Lake is a 0.2 ha impoundment located at T4N R17E Sec10 SW1/4 SE1/4 and in UTM Z 11, 708,140 m E, 4,840,300 m N which is 1.5 km west of Ketchum. Surface elevation is 1,815 m. It is stocked several times annually with catchable sized rainbow trout and receives fairly high angler pressure. It is easily accessed by a paved road following Warm Springs Creek with a small parking area nearby. It was investigated on August 8, 1996. Maximum depth was 3.75 m (Figure 3). Water temperature ranged from 19°C at the bottom to 26°C at the surface and dissolved oxygen ranged from 5.8 mg/l at the bottom to 7.1 mg/l at the surface at 1400 hours. Total hardness was 118 mg/l, total alkalinity as $CaCO_3$ was 97 mg/l, specific conductivity was 180 umHOS/cm, and pH was 8.7 from a surface sample. The substrate is composed primarily of sand and gravel with a thin layer of attached filamentous algae. Rainbow trout of various size classes including fish smaller than hatchery catchables indicate that some natural recruitment is occurring. No amphibians were observed in or near the lake.

Hidden Lake

Hidden Lake is a 0.5 ha lake within the Norton Creek drainage located at T5N R15E Sec 27 NE1/4 and in UTM Z 11, 689,000 m E, 4,845,550 m N. Surface elevation is 2,688 m. The lake was investigated on August 20 and 21, 1996. There was no developed trail to the lake but it is accessed by hiking a short distance from the trail leading to Little Lost (Smoky) Lake. The lake was full and had a small flowing inlet on the north side and a small outlet on the east side. The lake was completely surrounded by standing timber and had a maximum depth of 2.5 m (Figure 4). There was a planktonic algae bloom but was not dense enough to obscure visibility to the bottom, the substrate was silty and completely covered with a dense layer of filamentous algae. A gill net was set at 1620 on August 20, 1996 from the north shore near the inlet and pulled at 1100 on August 21, 1996. No fish were sampled and none were seen while investigating the lake. No amphibians were seen in or near the lake. Total alkalinity as $CaCO_3$ measured 55 mg/l and surface water temperature was 16°C at 1600 on August 20, 1997.

Independence Lakes

The Independence Lakes complex, located on Mount Independence in the South Hills south of Burley, consists of four lakes ranging in size from 1.2 ha to 4.0 ha in surface area. Elevations range from 2,705 m at Lake #1 to 2,796 m at Lake #4. Water flows consecutively through all of the lakes before it enters Green Creek, a tributary to Cassia Creek. Independence Lake #1 is located at T14S R24E Sec 16 and in UTM Z 12,280,320 m E, 4,675,330 m N. It is reached by a 4 km hike on a good trail that leads to the rest of the lakes, which are less than 0.5 km from the next lake in the chain. Independence Lake #1 was last stocked with cutthroat trout fry in 1991, Independence Lakes #2 and #3 have been stocked with cutthroat and rainbow trout fry intermittently for the last several years and Lake #2 has also received Arctic grayling fry several times in the last decade. No stocking records have been found for Lake #4, which is suspected to be too shallow to over winter fish. Past records indicate that water levels fluctuate three to four m in Lakes #2 and #3, depending on run-off year and that intermittent fish kills have occurred in Lake #3. All four lakes were investigated July 24-25, 1996.

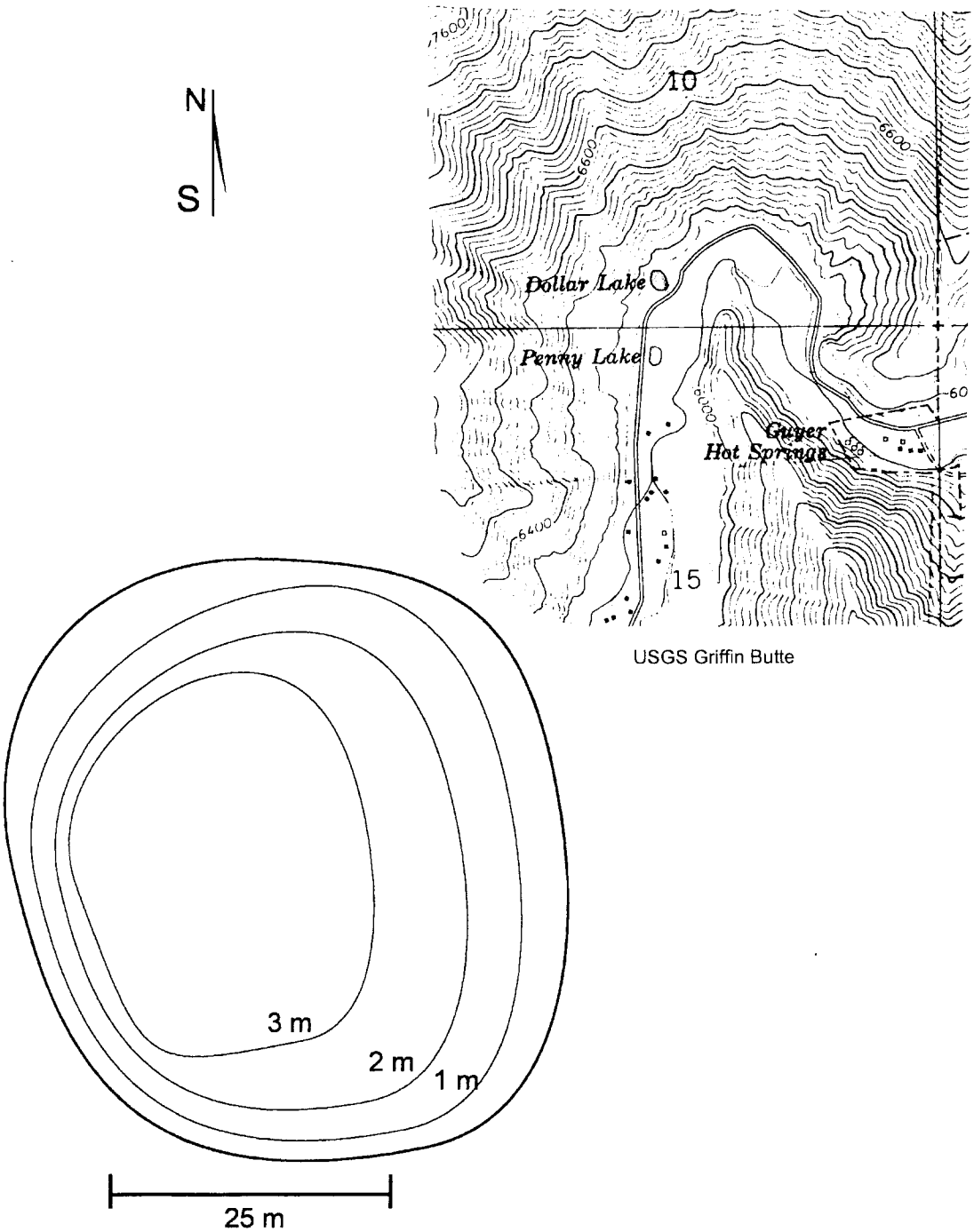


Figure 3. Map of Dollar Lake with bathymetric contours as surveyed on August 8, 1996.

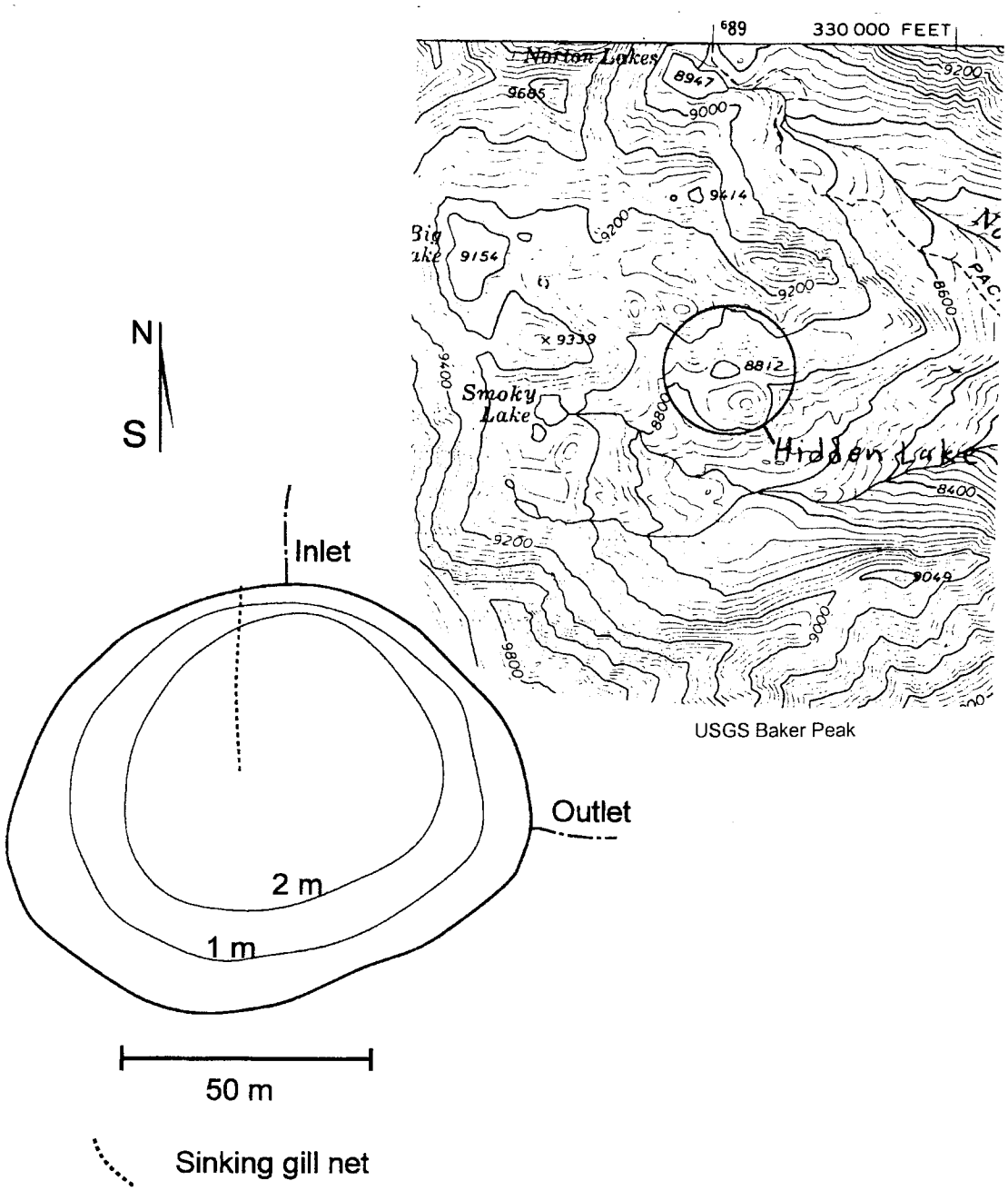


Figure 4. Map of Hidden Lake with bathymetric contours and location of gill net as surveyed on August 20, 1996.

Independence Lake #1 had a gill net set at 2100 on July 24 and pulled at 0900 on July 25, 1996. Results are given in Table 2. Scale samples from nine wild rainbow trout indicate that fish at age 1 are approximately 115 mm long and fish at age 2 are 175 mm long. Maximum depth was about 3 m and total surface area was 1.8 ha (Figure 5). The lake has a south facing exposure, the shoreline is heavily timbered and there was evidence of heavy use from day-hikers, fishermen, horseback riders, and campers. An inlet to the lake provides 30 m of spawning habitat, which successfully produces wild rainbow trout since they were present in large numbers in the lake. Water flows through an outlet that provides 10 m of spawning habitat. Specific conductivity was 20 umHOS/cm and pH was 9.5 for a sample taken from the surface. Surface water temperature was 14°C at 0900 on July 25, 1996. Approximately 30% of the lake's surface is covered with attached macrophytes. No amphibians were observed anywhere near the lake.

Independence Lake #2 is a 5.6 ha lake located at T14S R24E Sec 17 and in UTM Z 279,800 m E, 4,675,100 m N. Surface elevation is 2,755 m. Independence Lake #2 had a gill net set at 2200 on July 24 and pulled at 1000 on July 25, 1996. Results are given in Table 2. Scales from the three cutthroat trout indicate that fish at annulus 1 average 163 mm long. Scales from seven Arctic grayling indicate that fish at annulus 1 average 112 mm long and fish at annulus 2 average 248 mm long. Maximum depth of the lake was 9.75 m (Figure 6). The lake has an east facing exposure, the shoreline has some timber and there was evidence of heavy use from day-hikers, fishermen, horseback riders and campers. There is an inlet to the lake that is probably not suitable for spawning habitat since no or few wild trout were present. There was no surface flow at the outlet and the water level was 0.6 vertical meters from spilling. Specific conductivity was 20 umHOS/cm and pH was 8.8 from a sample taken from the surface. No amphibians were observed in or near the lake.

Independence Lake #3 is located at T14S R24E Sec 20 and in UTM Z 279,700 m E, 4,674,650 m N. Surface elevation is 2,775 m. Independence Lake #3 had a gill net set at 2030 on July 24 and pulled at 1050 on July 25, 1996. Results are given in Table 2. Scales from the three cutthroat trout indicate that fish at annulus 1 average 171 mm long. There were large numbers of dead fish in the water in late stages of decay, which were most likely from a winter fish kill. Maximum depth was 9.7 m and total surface area was 1.8 ha (Figure 7). The lake has an east facing exposure, the shoreline has some timber and there was evidence of moderate use from day-hikers, fishermen, horseback riders, and campers. There was water flowing through an inlet and outlet, neither of which appeared to be suitable for spawning. Specific conductivity was 20 umHOS/cm and pH was 8.6 for a sample taken from the surface. No amphibians were observed anywhere near the lake.

Independence Lake #4 is located at T14S R24E Sec 20 and in UTM Z 279,580 m E, 4,674,430 m N. Surface elevation is 2,794 m. Independence Lake #4 was investigated on July 25, 1996 but no gill net was set to sample fish. It is a 1.4 ha cirque lake with a maximum depth of approximately 2 m. There was no flowing inlet but there was a flowing outlet with poor fish spawning potential. No fish or amphibians were observed in or near the lake. It appeared to receive light use from hikers. Specific conductivity was 20 umHOS/cm and pH was 8.7 for a sample taken from the surface.

Table 2. Total length frequencies and average weights of fish sampled from the Independence Lakes complex with gill nets, July 1996.

Length range (mm)	Independence #1 Rainbow trout Length no.	%	Weight (g) no.	avg.	Independence #2 Cutthroat trout Length no.	%	Weight (g) no.	avg.	Arctic grayling Length no.	%	Weight (g) no.	avg.	Independence #3 Cutthroat trout Length no.	%	Weight (g) no.	avg.
0-9 / 40-49																
50-59																
60-69																
70-79																
80-89	1	3.6														
90-99	1	3.6	1	8												
100-109																
110-119																
120-129																
130-139	2	7.1	2	27												
140-149																
150-159									2	15.4	2	35				
160-169									1	7.7	1	40				
170-179	3	10.7	2	47					7	53.8	7	48				
180-189	3	10.7	3	57					2	15.4	2	51				
190-199	7	25.0	7	65	1	33.3	1	62								
200-209	3	10.7	3	83												
210-219	1	3.6	1	98[a]	1	33.3	1	98					1	33.3	1	120
220-229	2	7.1	2	92									1	33.3	1	140
230-239	2	7.1	2	120	1	33.3	1	116								
240-249	1	3.6	1	140									1	33.3	1	188
250-259	2	7.1	2	146												
260-269																
270-279																
280-289																
290-299																
300-309																
310-319																
320-329																
330-339									1	7.7	1	299				
340-349																
Number:	28				3				13				3			
Avg length:	190				214				184				223			

[a] Cutthroat trout x rainbow trout hybrid.

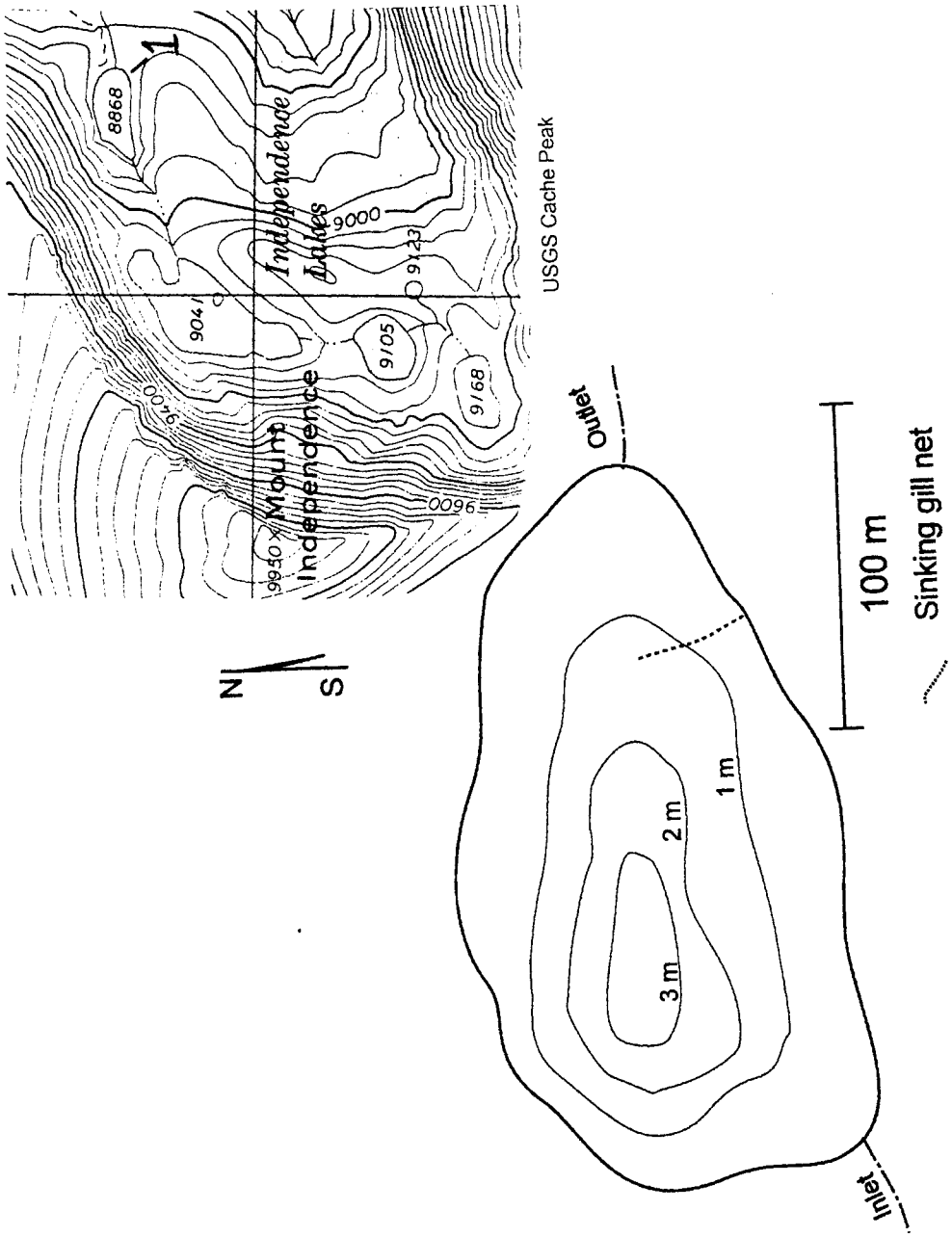


Figure 5. Map of Independence Lake #1 with bathymetric contours and location of gill net as surveyed on July 25, 1996.

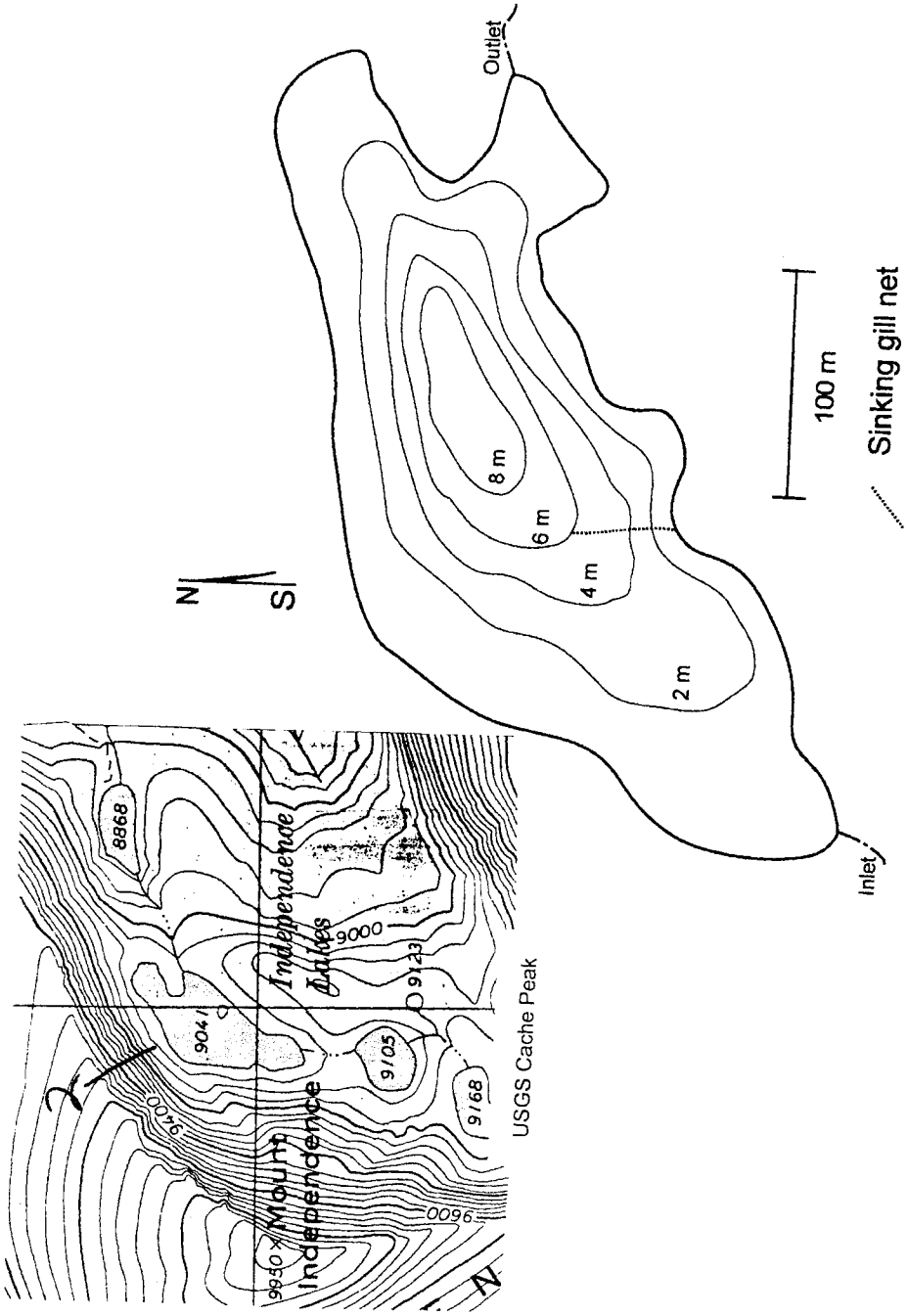


Figure 6. Map of Independence Lake #2 with bathymetric contours and location of gill net as surveyed on July 25, 1996.

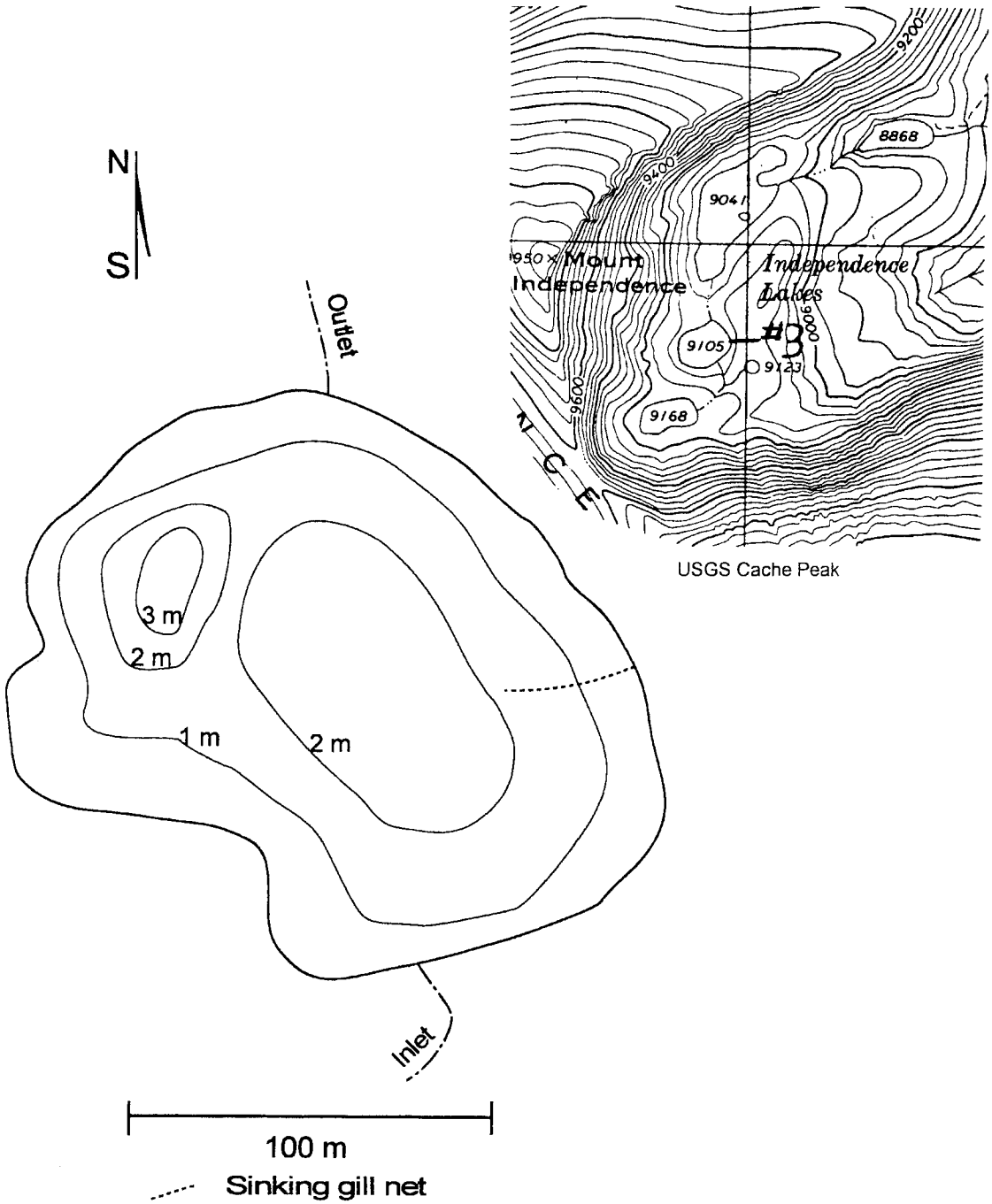


Figure 7. Map of Independence Lake #3 with bathymetric contours and location of gill net as surveyed on July 25, 1996.

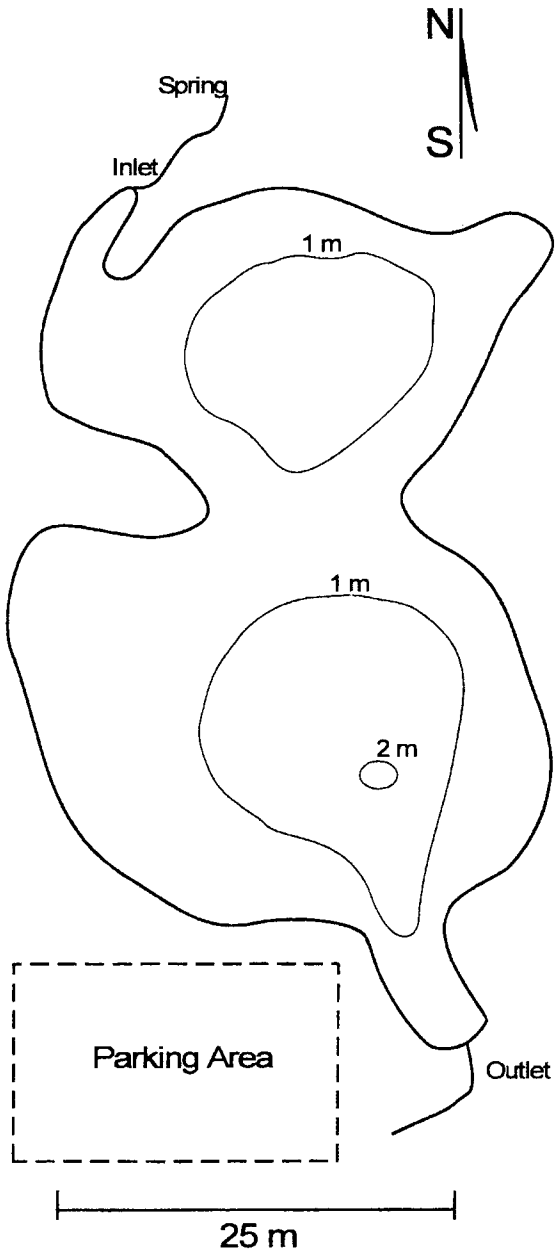
Lake Creek Lake

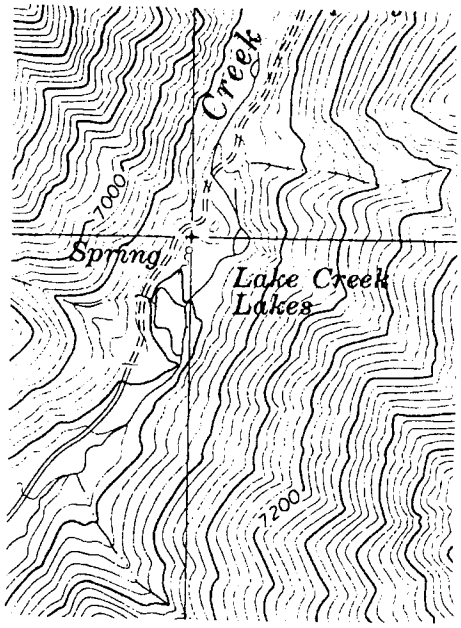
Lake Creek Lake is a 0.7 ha lake on Lake Creek which is a tributary to the Big Wood River and is located at T5N R18E Sec 17 NE1/4 and in UTM Z 11, 715,150 m E, 4,849,850 m N. Surface elevation is 2,010 m. The lake was investigated on August 8, 1996. It is easily accessed by vehicle from a parking area on the west side of the lake. The lake receives annual plantings of hatchery rainbow trout and receives heavy fishing pressure from bait, lure and fly fishermen. A temperature and dissolved oxygen sample taken during the afternoon indicated thermal stratification with a surface temperature of 16°C and a bottom temperature of 12°C at 2 m deep. Dissolved oxygen was 12.1 mg/l at all depths. Secchi visibility depth exceeded total maximum lake depth (2.0 m). Total hardness was 195 mg/l, total alkalinity as $CaCO_3$ was 155 mg/l and specific conductivity was 280 umHOS/cm for a sample taken from the surface. A visual inspection of the lake indicated the presence of numerous brook trout and hatchery rainbow trout. There appeared to be good spawning habitat available at the spring fed inlet on the north end of the lake. The majority of the lake is approximately 1 m deep with a single deeper hole approximately 2.0 m deep (Figure 8). No amphibians were observed in or near the lake.

Little Lost (Smoky) Lake

Little Lost Lake, also known as Smoky Lake, is a 0.6 ha alpine lake located at T5N R15E Sec 27 NW1/4 and in UTM Z 11, 688,550 m E, 4,845,400 m N at the headwaters of Norton Creek, a tributary to Baker Creek. Surface elevation is 2,748 m. It is reached by hiking approximately 2.6 km from the trailhead on Norton Creek. The lake received 500 cutthroat trout fry in 1994. A fishery and bathymetric survey was made on the lake August 20-21, 1996 (Figure 9). There was no visible surface inflow, but the lake was full and had a flowing outlet on the east side. The lake's substrate was composed primarily of silt and boulders with almost no attached macrophytes except for some patches of filamentous algae. Approximately 50% of the shoreline had trees and about 90% was covered with grasses, willows and other vegetation. There appeared to be no suitable trout spawning habitat in the lake. Secchi visibility depth exceeded maximum lake depth (3.0 m), surface water temperature was 17°C at 1730 on August 20, 1996 and total alkalinity as $CaCO_3$ was 49 mg/l as measured from a surface sample. There were no aquatic macro invertebrates or amphibians observed in the water and no amphibians observed anywhere near the lake. One sinking multiple mesh gill net was set at 1730 on August 20 then pulled at 1000 on August 21, 1996. A total of 17 cutthroat trout were sampled (Table 3). No other fish were sampled or seen. Scale annuli from a 260 mm and a 290 mm cutthroat trout confirm that those fish were most likely from the 1994 stocking.

There was a small 0.2 ha pond approximately 50 m south of Little Lost Lake. Maximum depth was 1.7 meters and there was a flowing spring fed inlet and outlet. No fish or amphibians were observed there but fairy shrimp and copepods were abundant. Secchi visibility exceeded maximum depth, the substrate was silt covered and there were no aquatic macrophytes.





USGS Rock Roll Canyon

Figure 8. Map of Lake Creek Lake with bathymetric contours as surveyed on August 8, 1996.

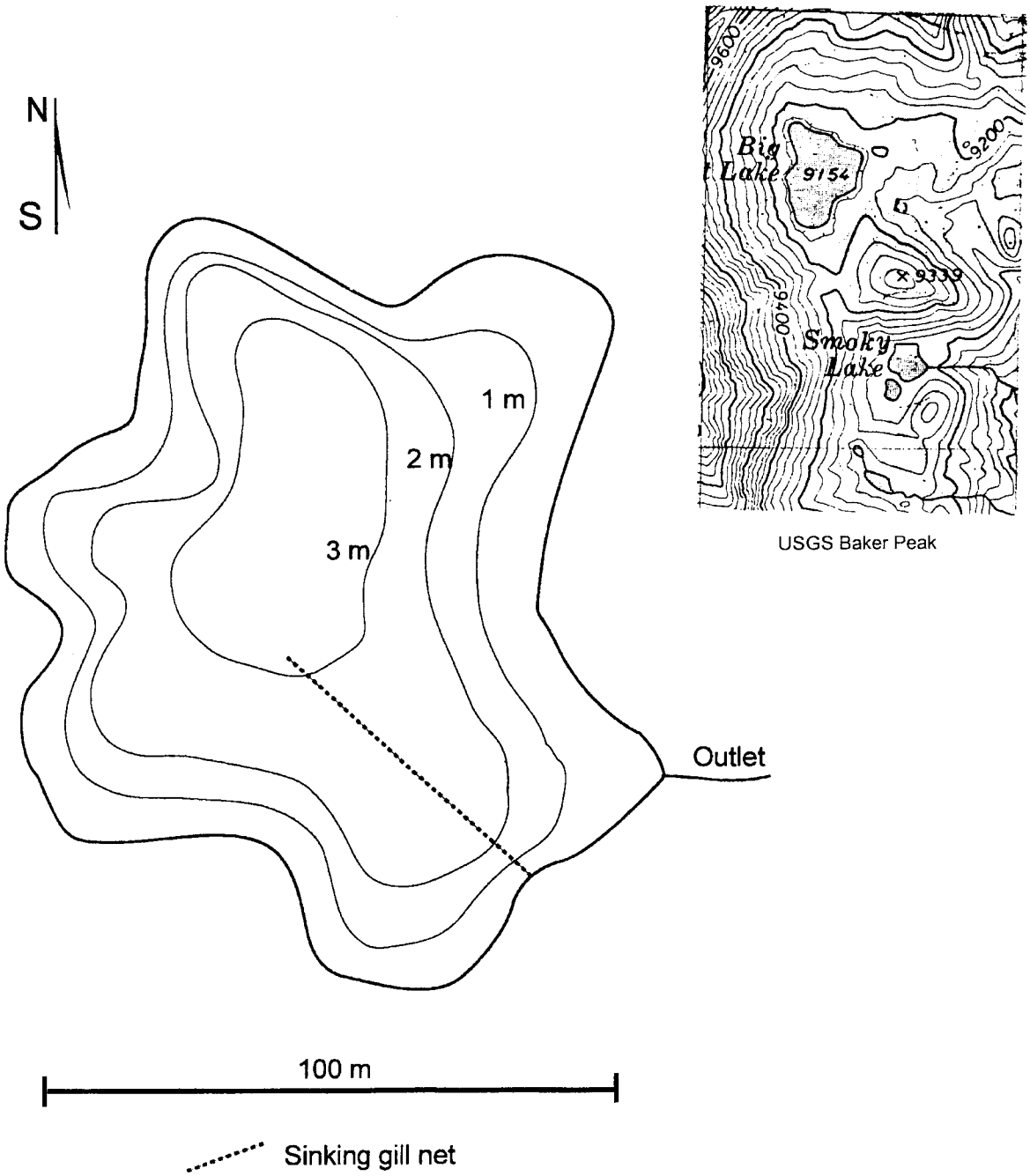


Figure 9. Map of Little Lost (Smoky) Lake with bathymetric contours as surveyed on August 20, 1996.

Table 3. Total length frequencies and weights of cutthroat trout sampled with a gill net set overnight at Little Lost Lake, August 21, 1996.

Length range (mm)	Cutthroat trout			
	Length		Weight (g)	
	no.	%	no.	avg.
0-9				
10-19				
20-29				
30-39				
40-49				
50-59				
60-69				
70-79				
80-89				
90-99				
100-109				
110-119				
120-129				
130-139				
140-149				
150-159				
160-169				
170-179				
180-189				
190-199				
200-209	1	5.9	1	80
210-219				
220-229	1	5.9	1	115
230-239	1	5.9	1	120
240-249	1	5.9	1	140
250-259	2	11.8	2	155
260-269	6	35.3	6	177
270-279				
280-289	3	17.6	3	193
290-299	2	11.8	2	250
300-309				
310-319				
320-329				
330-339				
340-349				
Number:	17			
Avg. length:	259			

Mill Lake

Mill Lake is an 6.7 ha lake located at T5N R15E Sec 11 SW1/4 and in UTM Z 11, 690,000 m E, 4,849,810 m N. Mean surface elevation is 2,507 m. There are no records of the lake being stocked with fish in at least the last decade. The lake was investigated August 26-27, 1996 (Figure 10). The lake appears to have been formed behind a large terminal glacial moraine that spans a narrow valley within the Prairie Creek drainage. There is a perennial flow of water into the lake, which has no surface outlet. The water level does fluctuate but shows no evidence that it has ever spilled over the moraine dam. Water leaves the lake by seeping through the porous moraine. The lake is reached by hiking approximately 3.1 km from the trailhead on Prairie Creek. The lake's substrate is composed primarily of cobble and boulders with silt at the inlet. There were no attached macrophytes. Approximately 50% of the shoreline had trees with the rest talus and rocky. Secchi visibility depth was 2.8 m to 3.0 m, surface water temperature was 16°C at 1700 on August 27, 1996, total alkalinity as $CaCO_3$ was 46 mg/l, total hardness was 48 mg/l, specific conductivity was 80 umHOS/cm and pH was 8.7. There were numerous larval long-toed salamander along with an abundance of fairy shrimp, copepods and mayfly larvae (*Ephemeroptera*) in the lake. One sinking gill net was set at 1730 on August 26 then pulled at 1000 on August 27, 1996. No fish were sampled and none were observed in the lake. There appeared to be suitable trout spawning habitat several meters upstream from the inlet that had formed into a braided alluvium, which may restrict fish passage at the present lake level.

Miner Lake

Miner Lake is a 6.3 ha lake in the headwaters of the Prairie Creek drainage of the Big Wood River located at T5N R15E Sec 22 and in UTM Z 11, 687,990 m E, 4,847,540 m N. Surface elevation is 2,675 m. It was last stocked with 500 cutthroat trout fry in 1994. It was investigated August 21-22, 1996. The lake was reached by hiking approximately 7.5 km up the Prairie Creek trail to Miner Canyon. The lake was full with water flowing through the outlet on the north side but the south inlet was dry. Maximum depth was 5.5 m, which was near the steep east shore (Figure 11). Surface water temperature was 15°C at 1245, total alkalinity as $CaCO_3$ was 46 mg/l, total hardness was 48 mg/l, specific conductivity was 80 umHOS/cm and pH was 8.7 as measured from a surface sample. Three sinking gill nets were set in the early evening on August 21, 1996 then pulled twelve to fifteen hours later the next morning. No fish were caught in any of the nets, but larval long-toed salamander were found in the lake and adult long-toed salamanders were found on the shore.

A 0.5 ha pond about 100 m south of Miner Lake was also investigated at the same time. No gill nets were set and no fish were seen there. Total alkalinity as $CaCO_3$ was 52 mg/l, total hardness was 58 mg/l, specific conductivity was 110 umHOS/cm and pH was 8.0 as measured from a surface sample.

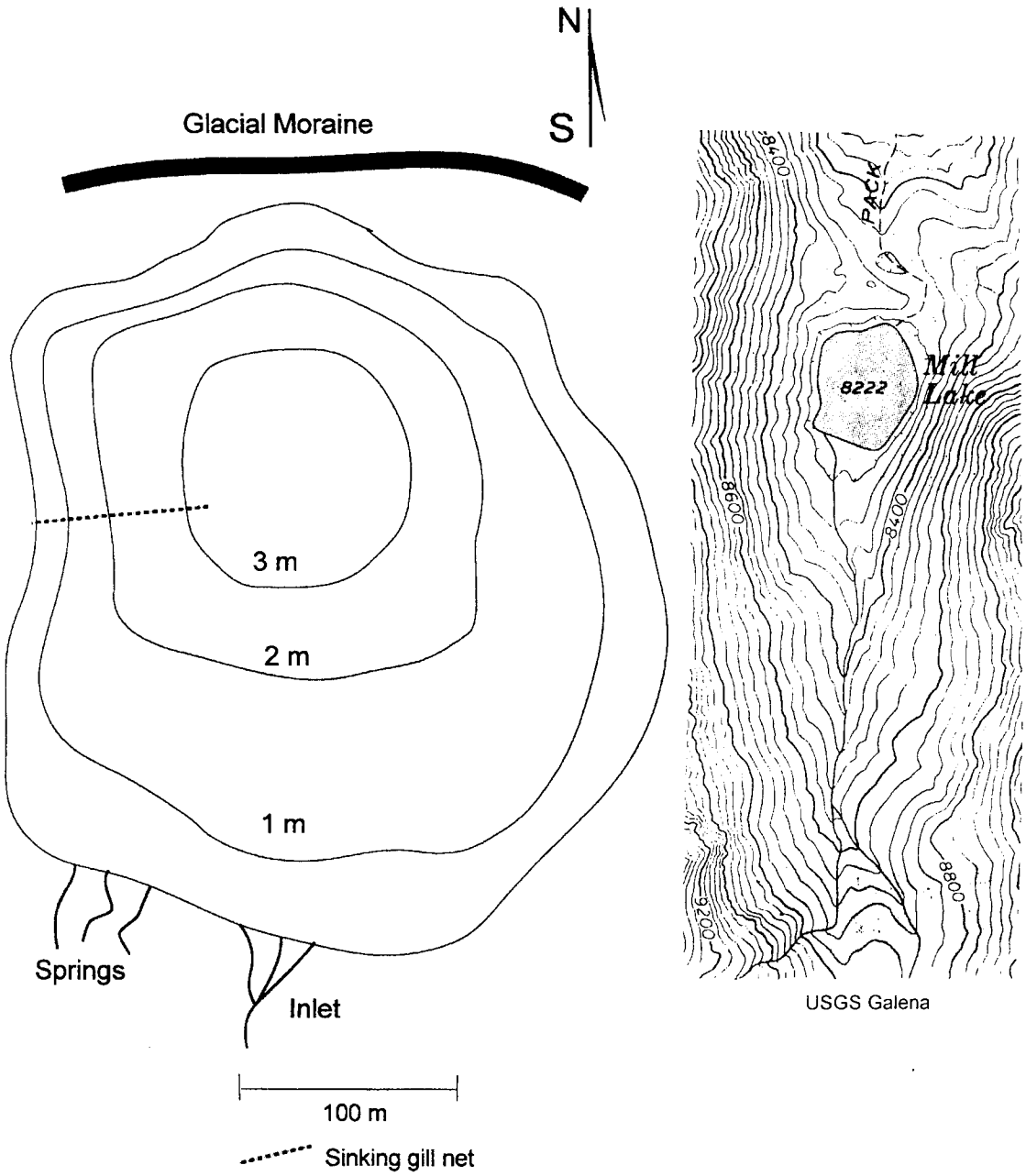


Figure 10. Map of Mill Lake with bathymetric contours and location of gill net as surveyed on August 26, 1996.

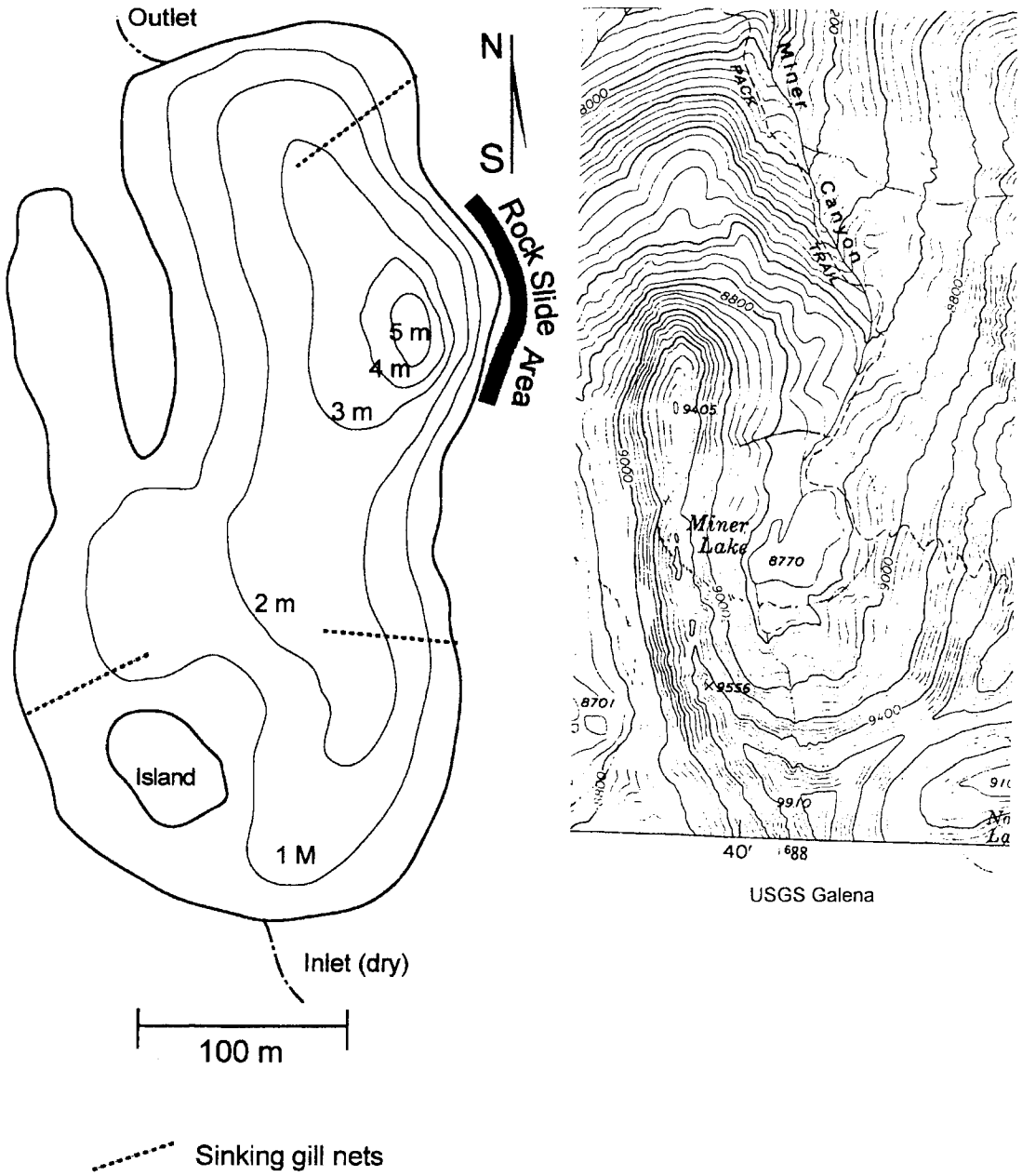


Figure 11. Map of Miner Lake with bathymetric contours and location of gill nets as surveyed on August 21, 1996.

Norton Lakes

There are two Norton Lakes within the Norton Creek drainage of the Big Wood River. Both lakes have been stocked every three years with rainbow trout fry with the last stocking occurring in August 1994. Norton Lake #1 (the south lake) is 2,729 m in elevation, about 1.6 ha in surface area and located at TN R15E Sec 22 and in UTM Z 11, 688,930 m E, 4,846,460 m N. It was investigated August 21-22, 1996. It was reached by hiking on a well-developed foot trail about 3.5 km from the trailhead at the end of the road on Norton Creek. There was moderate to heavy use of the main Norton Creek trail to both lakes by hikers and fishermen. Most of the shoreline of Norton Lake #1 is covered by timber except for the west side which is steep, broken granite talus and boulder. The lake has a perennial flow at the inlet and outlet and remains full. Maximum depth was 5.4 m (Figure 12). Secchi visibility depth was 5.0 m and surface water temperature was 18°C at 1650 on August 21 and total alkalinity as $CaCO_3$ was 51 mg/l as measured from a surface sample. One sinking gill net was set near the inlet at 1600 on August 21 then pulled at 0700 the next day. A total of 17 rainbow trout were caught (Table 4). All fish appeared to have good body condition. There were also wild young-of-the-year (YOY) trout observed in the inlet area of the lake and trout of various size classes visible in the open water, indicating that wild reproduction has been occurring there. Although annuli were difficult to discern on scales taken from seven rainbow trout it was estimated that fish 250 mm long were 2+ years of age and fish 300 mm long were 3+ years of age.

Norton Lake #2 (the north lake) was reached by hiking approximately 400 m past Norton Lake #1 up Norton Creek. It is about 2.5 ha in surface area, 2,778 m in elevation and is located at T5N R15E Sec 22 and in UTM Z 11, 688,760 m E, 4,846,790 m N. It has a maximum depth of 5.3 m (Figure 13). Approximately 40% of the lake shoreline is covered with timber and about 40% is open granite talus and boulder. The lake was full with water flowing through the outlet but there was no surface flow visible at the inlet. Surface water temperature was 12°C at 1850 on August 21, Secchi depth visibility exceeded maximum depth and total alkalinity as $CaCO_3$ was 49 mg/l as measured from a surface sample. One sinking gill net was set from the north shore at 1900 on August 21 then pulled at 0900 the next day. A total of 21 rainbow trout were caught (Table 4). There were also wild YOY trout observed in the outlet area of the lake, indicating that wild reproduction has been occurring there. Scales taken from a sample of six rainbow trout indicate that growth is slower in Norton Lake #2 than in Norton Lake #1 with a 250 mm fish being 3+ years old and a 300 mm being 3+ years old. No amphibians were found in or near the lake.

Penny Lake

Penny Lake is a 0.2 ha lake just off of the Warm Springs Creek upstream of Ketchum ID. It is located at T4N R17E Sec 15 NE1/4 and in UTM Z 11, 708,120 E, 4,840,020 N at an elevation of 1,805 m. Penny Lake is an artificial impoundment with the east shore being an earthen berm and west shore made up of road fill. It is easily accessed by vehicle and is stocked with catchable sized rainbow trout several times throughout the summer, thus receiving heavy fishing pressure. It was investigated August 8, 1996, and there was surface flow at the outlet but none at the inlet. The maximum depth was 3.5 m (Figure 14). The shoreline is treeless. The substrate is made up of gravel, cobble and sand with most of it covered by a dense layer of attached macrophytes. There were three bare patches of gravel where a spring may infiltrate through the substrate into the lake on the southeast side. Temperature and

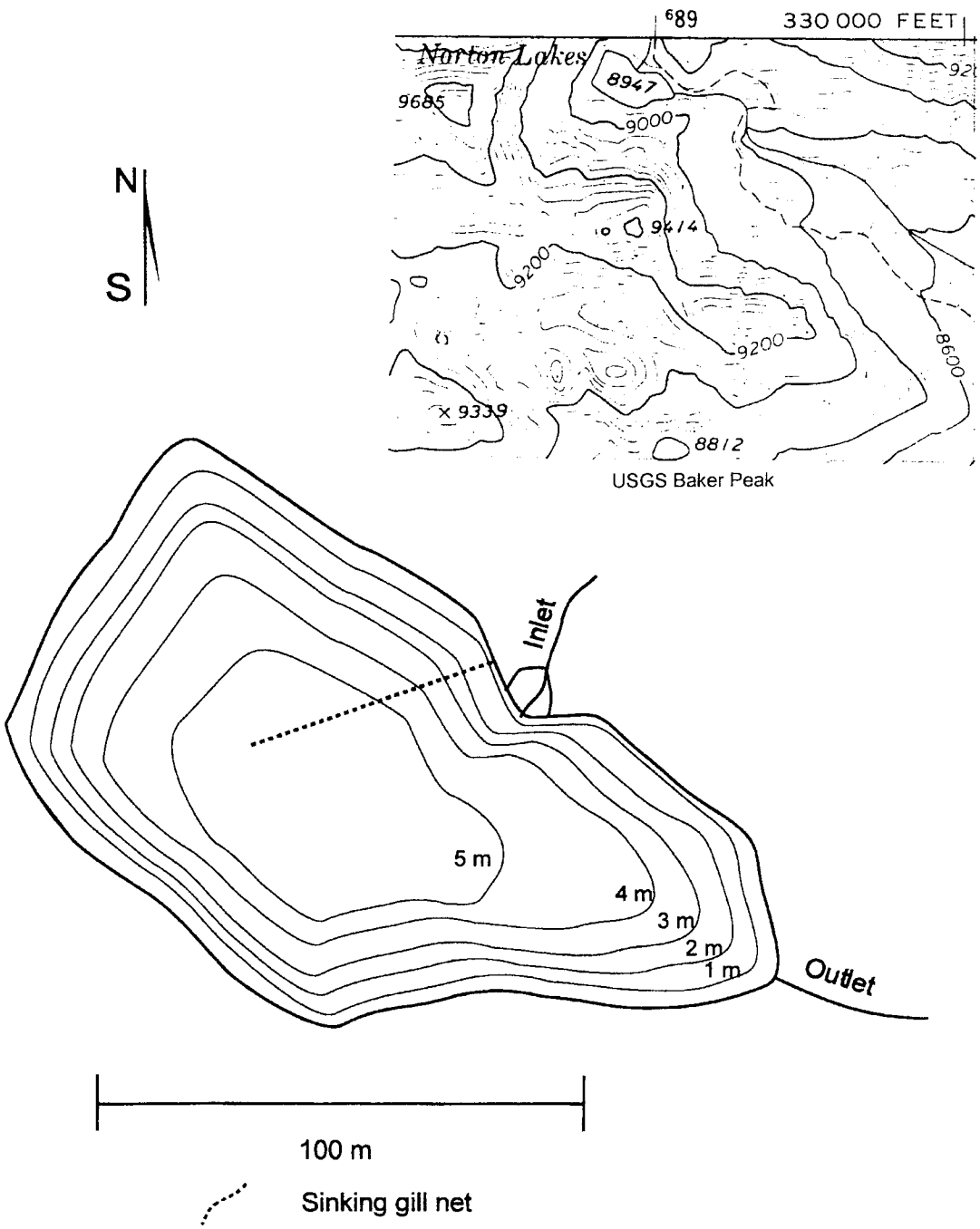
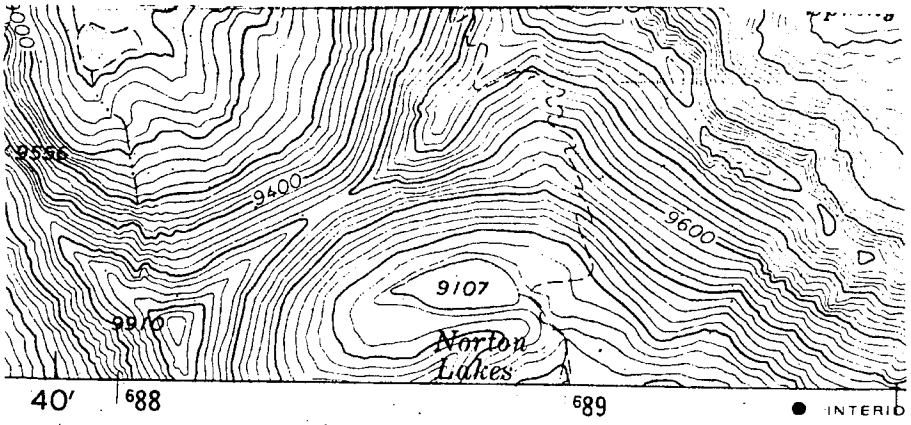


Figure 12. Map of Norton Lake #1 (South) with bathymetric contours and location of gill net as surveyed on August 21, 1996.

Table 4. Total length frequencies and weights of rainbow trout sampled with gill nets set overnight at Norton Lakes, August 21, 1996.

Length range (mm)	Norton Lake #1				Norton Lake #2			
	Length		Weight		Length		Weight	
	no.	%	no.	avg.	no.	%	no.	avg.
0-9 / 90-99								
100-109								
110-119								
120-129								
130-139								
140-149								
150-159								
160-169	1	5.9	1	40	1	4.8	1	50
170-179								
180-189								
190-199	2	11.8	2	78	1	4.8	1	75
200-209								
210-219	1	5.9	1	100	1	4.8	1	95
220-229	4	23.5	4	113	3	14.3	3	113
230-239	2	11.8	2	140	1	4.8	1	120
240-249	2	11.8	2	138	1	4.8	1	130
250-259	1	5.9	1	160	3	14.3	3	147
260-269	1	5.9	1	160	2	9.5	2	153
270-279	2	11.8	2	170	1	4.8	1	205
280-289					3	14.3	3	212
290-299					2	9.5	2	250
300-309	1	5.9	1	295	1	4.8	1	290
310-319								
320-329								
330-339								
340-349					1	4.8	1	345
Number:	17				21			
Avg. length:	232				254			



USGS Galena

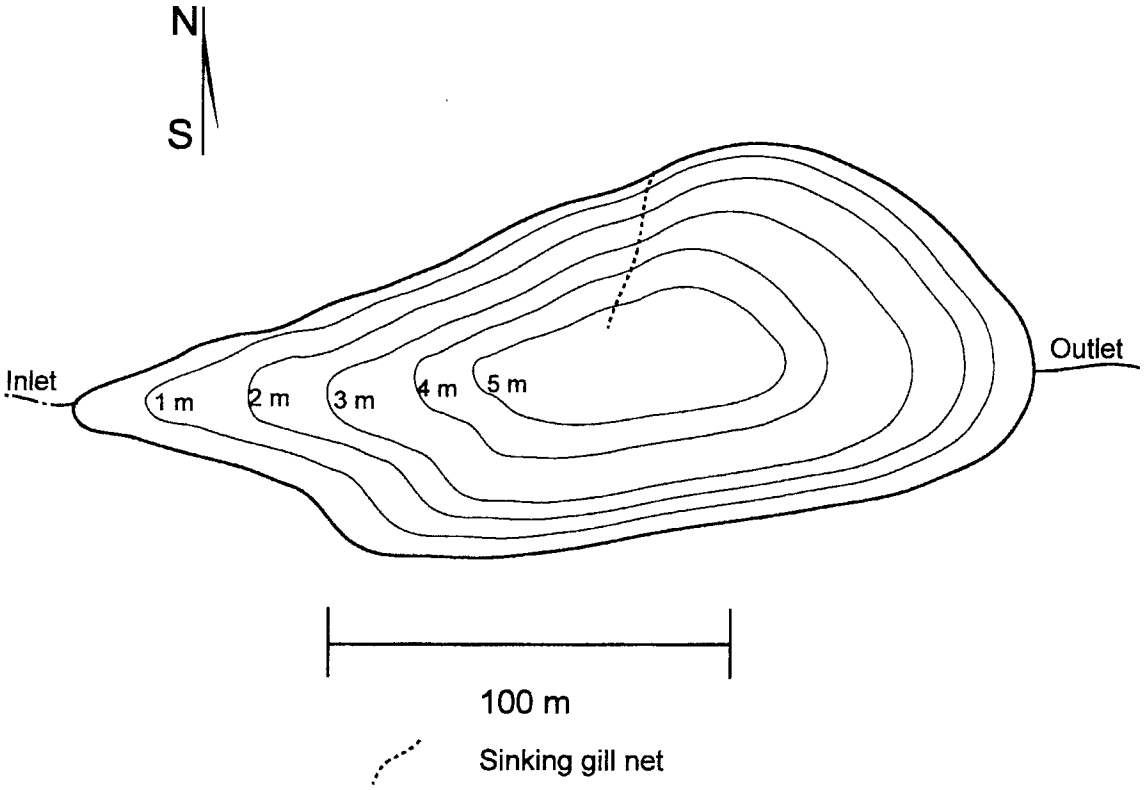


Figure 13. Map of Norton Lake #2 (North) with bathymetric contours and location of gill net as surveyed on August 21, 1996.

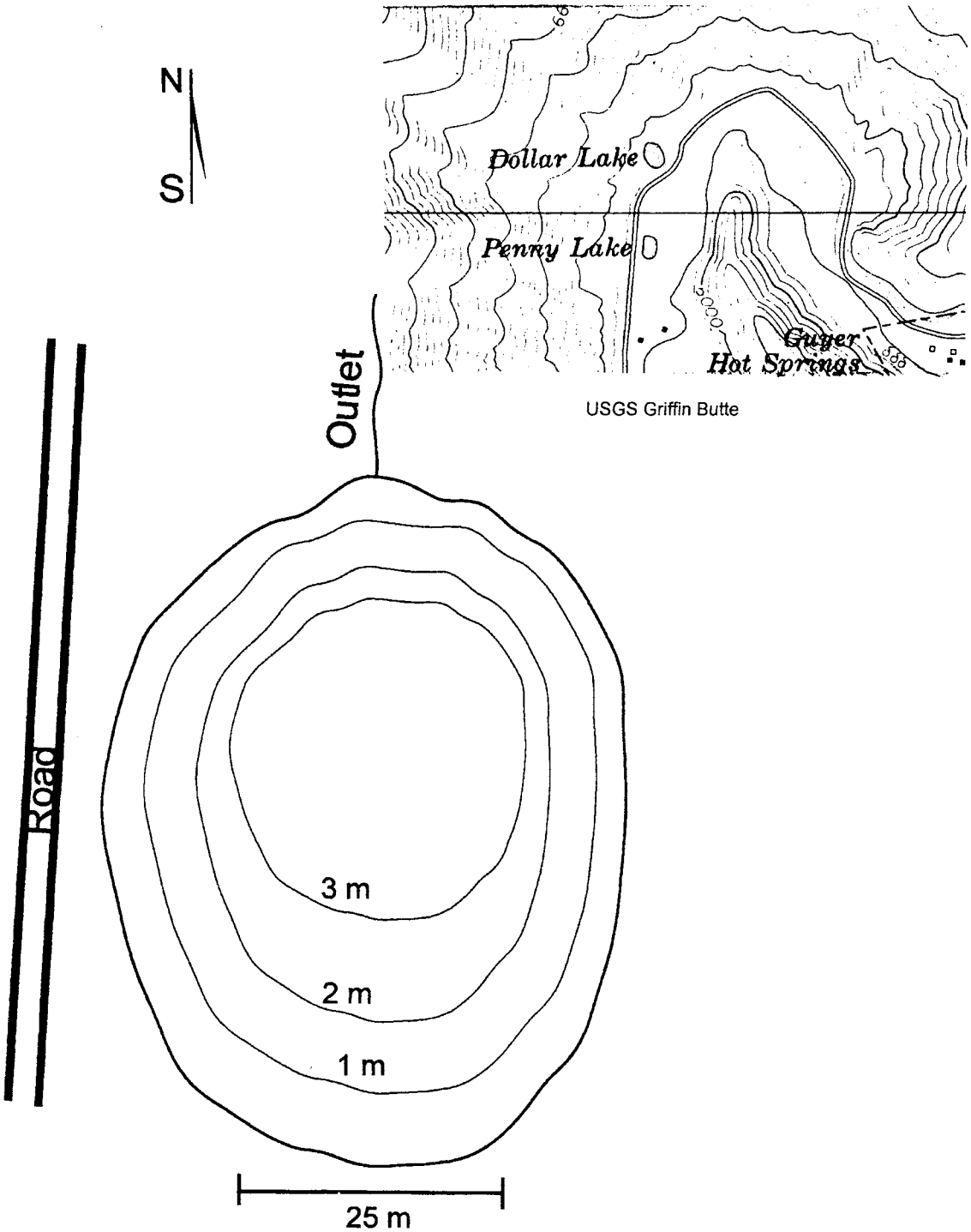


Figure 14. Map of Penny Lake with bathymetric contours as surveyed on August 8, 1996.

dissolved oxygen measurements were 17°C and 7.5 mg/l at the surface and 12°C and 5.5 mg/l near the bottom (Figure 15). Secchi visibility exceeded maximum depth, total hardness was 125 mg/l, total alkalinity as $CaCO_3$ was 49 mg/l, pH was 7.8 and specific conductivity was 220 umHOS/cm as measured from a surface sample. One adult spadefoot toad *Spea intermontana* and one western terrestrial garter snake *Thamnophis elagans* were found near the lake. Several rainbow trout 60 to 100 mm long were visible in the pond indicating that natural reproduction may be occurring in the pond or the fish move in from the outlet area which flows into Warm Springs Creek.

Prairie Lakes

There are five Prairie Lakes at the headwaters of Prairie Creek, a tributary to the Big Wood River. The lakes were investigated August 21-22, 1996. They were accessed by an 8 km trail that originates at the end of the road on Prairie Creek. Prairie Lake #2 is the largest of the five lakes and is located at T5N R15E Sec 21 and in UTM Z 11, 687,000 E, 4,846,800 N. It has been stocked every three years with the last stocking occurring in August 1994 when 500 rainbow trout fry were planted. It is about 3.1 ha in surface area, 2,652 m in elevation and has a maximum depth of 2.2 m (Figure 16). The inlet appears to have good spawning habitat. The outlet is a barrier to upstream migrating fish. Surface water temperature was 15°C at 1300 on August 21, 1996. Total alkalinity was 49 mg/l, total hardness was 52 mg/l, specific conductivity was 95 umHOS/cm, and pH was 8.2 as measured from a surface sample. One gill net was set at 1900 from the west shore and another one was set 1930 from the south shore on August 21, 1996. They were both pulled about fifteen hours later the next day. A total of 42 rainbow trout were sampled in the two nets (Table 5). Length at annuli on scales taken from 14 rainbow trout is given in Table 6. Numerous spotted frog *Rana pretiosa* tadpoles were found in the lake and adult spotted frogs in and near the lake.

Water flows from Prairie Lakes #4 and #5 and into #3. Prairie Lake #3 is located at T5N R15E Sec 21 and in UTM Z 11, 687,240 E, 4,846,950 N. It is 1.0 ha in surface area at 2,652 m in elevation. Prairie Lake #3 had a surface water temperature of 17°C at 1600 on August 21, 1996 and a maximum depth of 1.1 m (Figure 17). Total alkalinity was 48 mg/l, total hardness was 46 mg/l, specific conductivity was 95 umHOS/cm, and pH was 7.6 as measured from a surface sample. The outlet has good trout spawning habitat. One gill net was set at 2000 on August 20 then pulled at 1400 on August 21, 1996. A total of 13 cutthroat trout were sampled (Table 5). Length at annuli on scales taken from nine cutthroat trout is given in Table 7. Numerous spotted frog tadpoles were found in the lake and adult spotted frogs in and near the lake.

Prairie Lakes #1, #4 and #5 were investigated but no gill nets were set. Fish were observed in the stream upstream of the lakes. Numerous spotted frog tadpoles were found in the lake and adult spotted frogs in and near the lake.

Silver Lake

Silver Lake is a 1.2 ha lake located at T6N R16E Sec 21 and in UTM Z 11, 697,100 m E, 4,856,700 m N. It is an alpine cirque lake at the base of Silver Peak in the Boulder Mountains at an elevation of 2,941 m. It is at the headwaters of Silver Creek, which enters the Big Wood

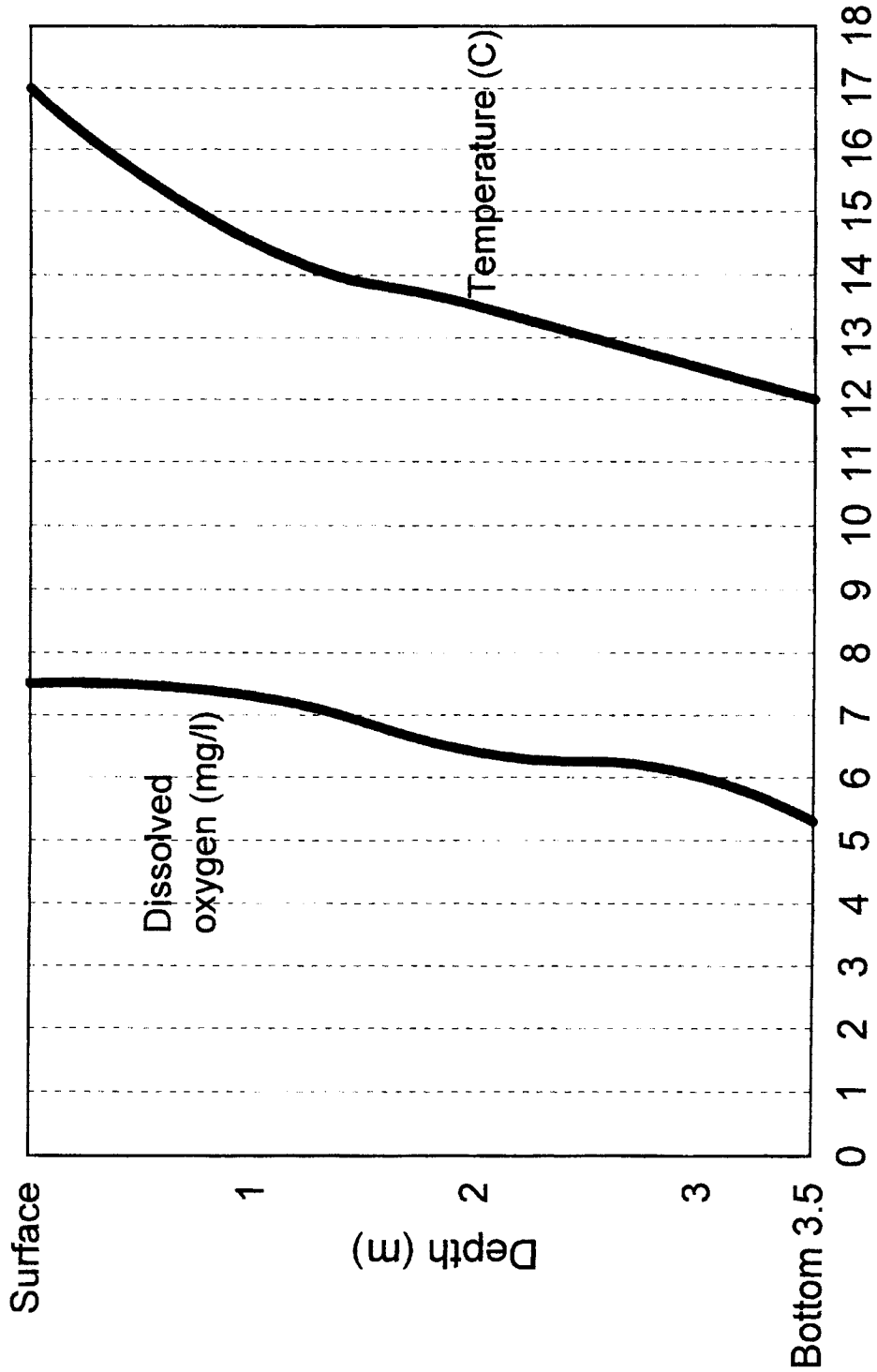


Figure 15. Temperature and dissolved oxygen profiles of Penny Lake as measured on August 8, 1996 at 1200 hours.

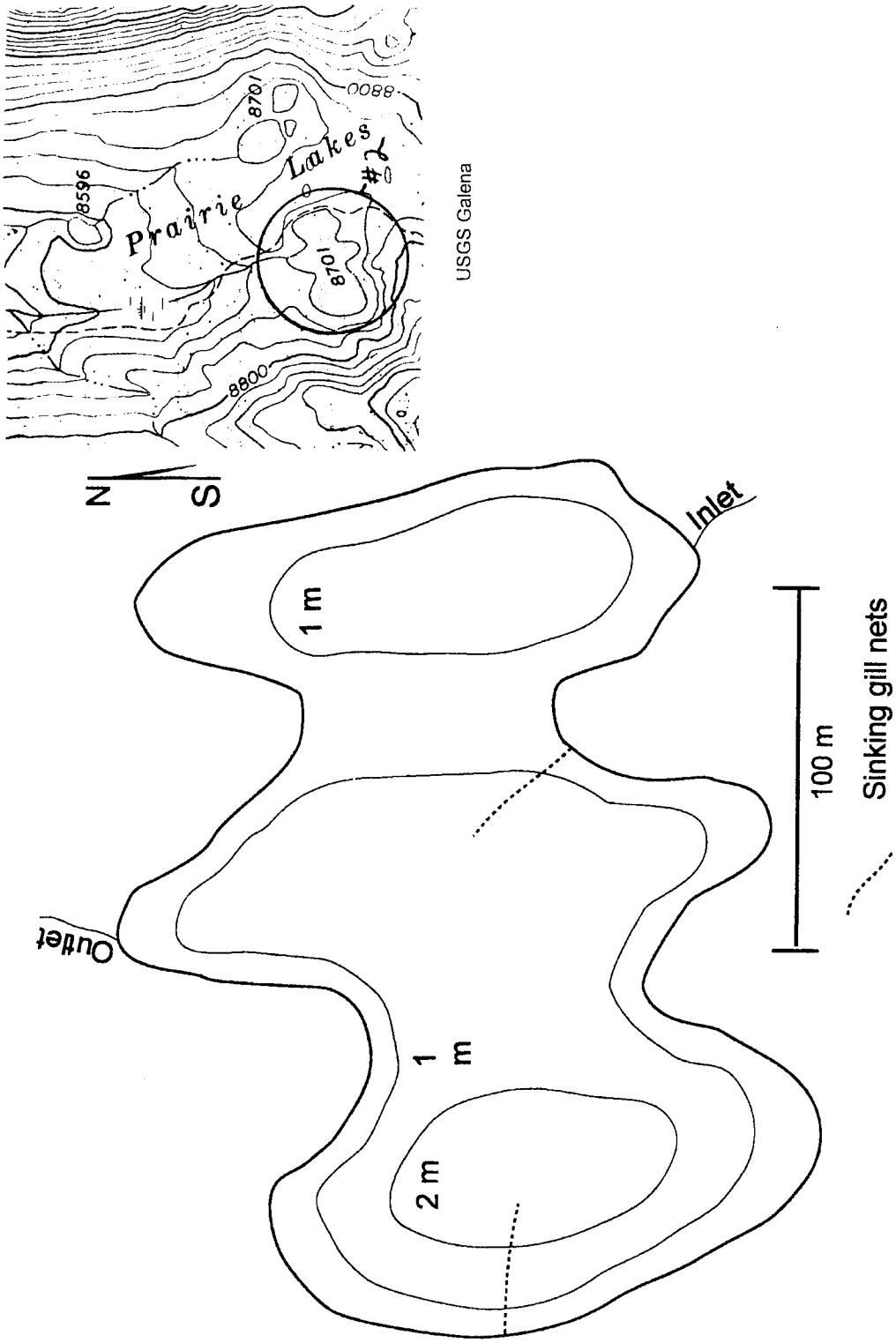


Figure 16. Map of Prairie Lake #2 with bathymetric contours and locations of gill nets as surveyed on August 21, 1996.

Table 5. Total length frequencies and average weights of fish sampled by gillnetting at Prairie Lakes #2 and #3, August 22, 1996.

Length range (mm)	Prairie Lake #2 Rainbow trout Length no.	Length %	Weight (g) no.	Weight (g) avg.	Prairie Lake #3 Cutthroat trout Length no.	Length %	Weight (g) no.	Weight (g) avg.
0-9 / 90-99								
100-109								
110-119								
120-129								
130-139								
140-149								
150-159	2	4.8	2	33				
160-169	2	4.8	2	40				
170-179	3	7.1	3	47				
180-189	3	7.1	3	65				
190-199	3	7.1	3	78				
200-209	2	4.8	2	88				
210-219	5	11.9	5	94				
220-229	2	4.8	2	115				
230-239	1	2.4	1	120	1	7.7	1	125
240-249	4	9.5	4	134	1	7.7	1	150
250-259	4	9.5	4	148				
260-269	4	9.5	4	160				
270-279	3	7.1	3	168	1	7.7	1	210
280-289	1	2.4	1	195				
290-299	1	2.4	1	200	1	7.7	1	280
300-309					2	15.4	2	293
310-319	2	4.8	2	278	2	15.4	2	340
320-329					1	7.7	1	335
330-339								
340-349								
350-359								
360-369					1	7.7	1	495
370-379								
380-389					1	7.7	1	520
390-399					1	7.7	1	500
400-409								
410-419								
420-429					1	7.7	1	725
430-439								
440-449								
Number:	42				13			
Avg length:	225				319			

Table 6. Back calculated length-at-age for rainbow trout scales sampled at Prairie Lake #2 on August 21, 1996. Standard deviation is in parentheses.

Year class	Number of fish	Mean length at annulus (mm)			
		1	2	3	4
1994	3	72(2.3)	117(6.7)		
1993	10	82(8.3)	129(21.1)	182(35.4)	
1992	1	91(-)	128(-)	192(-)	240(-)
Weighted average length		80	126	183	240

Table 7. Back calculated length-at-age for cutthroat trout scales sampled at Prairie Lake #3 on August 21, 1996. Standard deviation is in parentheses.

Year class	Number of fish	Mean length at annulus (mm)			
		1	2	3	4
1994	5	131(25.8)	207(35.8)		
1993	3	115(20.2)	202(33.6)	279(30.4)	
1992	1	115(-)	175(-)	275(-)	355(-)
Weighted average length		124	195	278	355

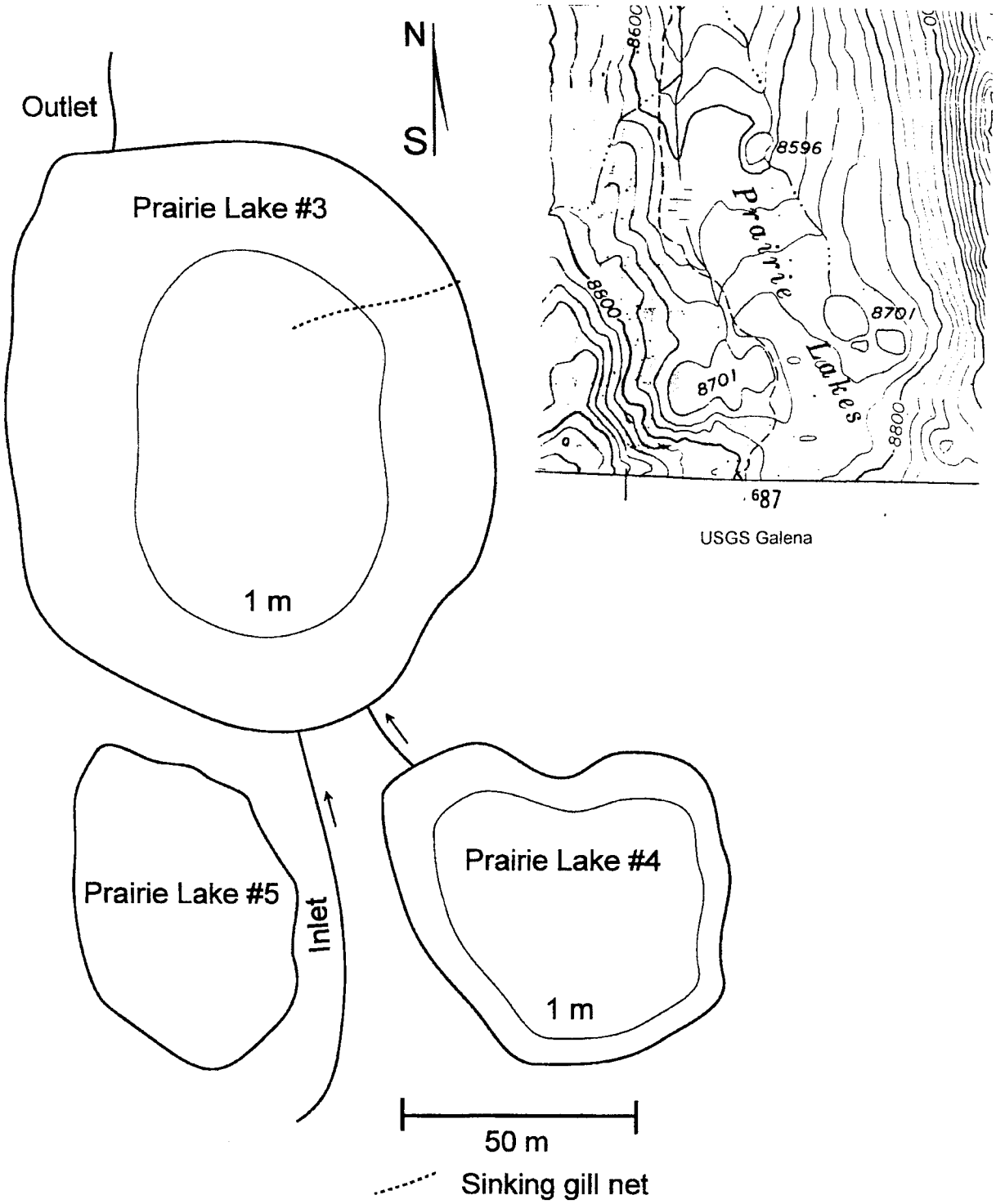


Figure 17. Map of Prairie Lakes #3, #4 and #5 with bathymetric contours and location of gill net as surveyed on August 21, 1996.

River several km upstream of Ketchum ID. Silver Lake and two other small ponds several meters southwest of Silver Lake were investigated August 13, 1996. Hiking time to the lake was about two hours over a moderately steep and rocky trail from Snow Creek, an adjacent stream. There was no visible flowing surface inlet or outlet and the water level was approximately 0.6 vertical m below the outlet level. Maximum depth was 2.7 m (Figure 18). There were no visible attached or planktonic algae, and the substrate was composed primarily of boulders and rubble with some gravel and silt. There was a sparse stand of timber covering less than half of the shoreline and a few logs in the water. There are no records of the lake ever having been stocked with hatchery fish. Secchi visibility depth exceeded maximum depth of 2.7 m, surface water temperature was 17°C at 1430, total alkalinity as $CaCO_3$ was 10 mg/l, total hardness was 14 mg/l, and pH was 8.0. There were numerous fairy shrimp observed along with copepods, but no amphibians were found. One sinking multiple mesh gill net was set at 1400 then pulled two hours later. No fish were sampled or observed in the lake, which appeared unsuitable for winter fish survival and had unsuitable trout spawning habitat. None of the surrounding ponds appeared suitable for fish survival and no amphibians were found in or near any ponds.

Titus Lake

Titus Lake is a 1.0 ha lake located at T6N R15E Sec 18 and in UTM Z 11, 684,090 m E, 4,858,150 m N. It is at the headwaters of Titus Creek, a small tributary to the headwaters of the Big Wood River near Galena Summit. Lake elevation is 2,710 m. The lake had been stocked every year with about 500 Henrys Lake cutthroat fry for the last two years and every third year prior to that with the most recent stocking occurring on July 24, 1996. Titus Lake was investigated in 1994 (Warren and Partridge 1996) and again August 30-31, 1996. The lake was reached by hiking approximately 2.5 km from a trailhead near Galena Summit. There was no visible flowing surface inlet but the lake was full with water flowing from the outlet. Maximum depth was 5.1 m (Figure 19). There was a phytoplankton bloom restricting Secchi visibility depth to 2.4 to 2.6 m. About 50% of the shoreline was covered with timber, about 30% covered with willows and the remainder was exposed bedrock. Surface water temperature was 15°C at 1050 hours. There were numerous *Cladoceran ephippia* at the water's edge. One larval salamander was observed in the water. One sinking gill net was set at 1900 on August 30 then pulled the next day at 1100. Two rainbow trout, both 90 mm, were sampled. Scale samples indicate that the fish were from the July 24, 1996 stocking. No other fish were seen or sampled from the lake. There is no apparent trout spawning habitat available in the lake. The fish that were sampled were most likely from the July 24 planting, indicating that growth was excellent but there is no winter survival since no other size classes of fish were sampled.

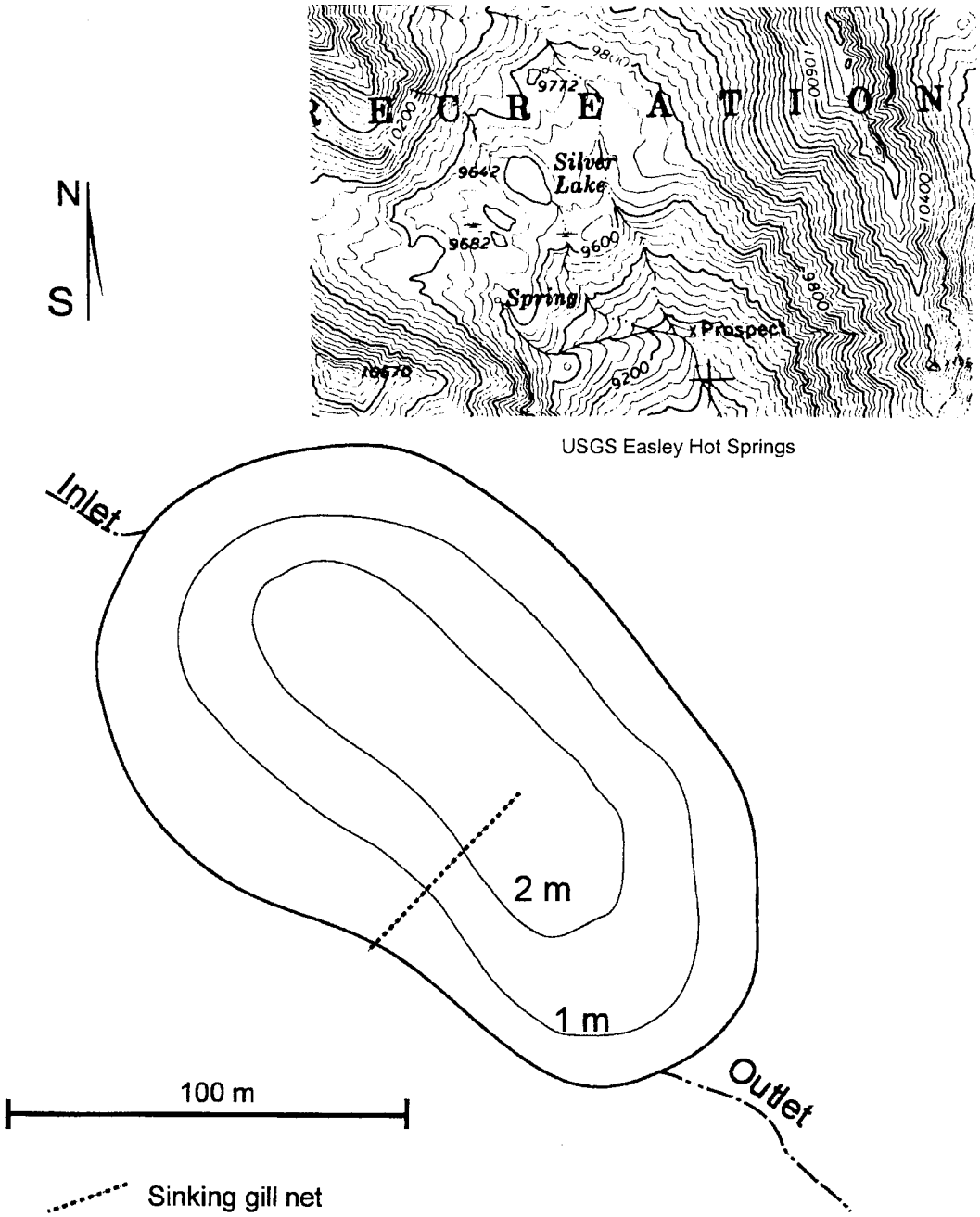


Figure 18. Map of Silver Lake with bathymetric contours and location of gill net as surveyed on August 13, 1996.

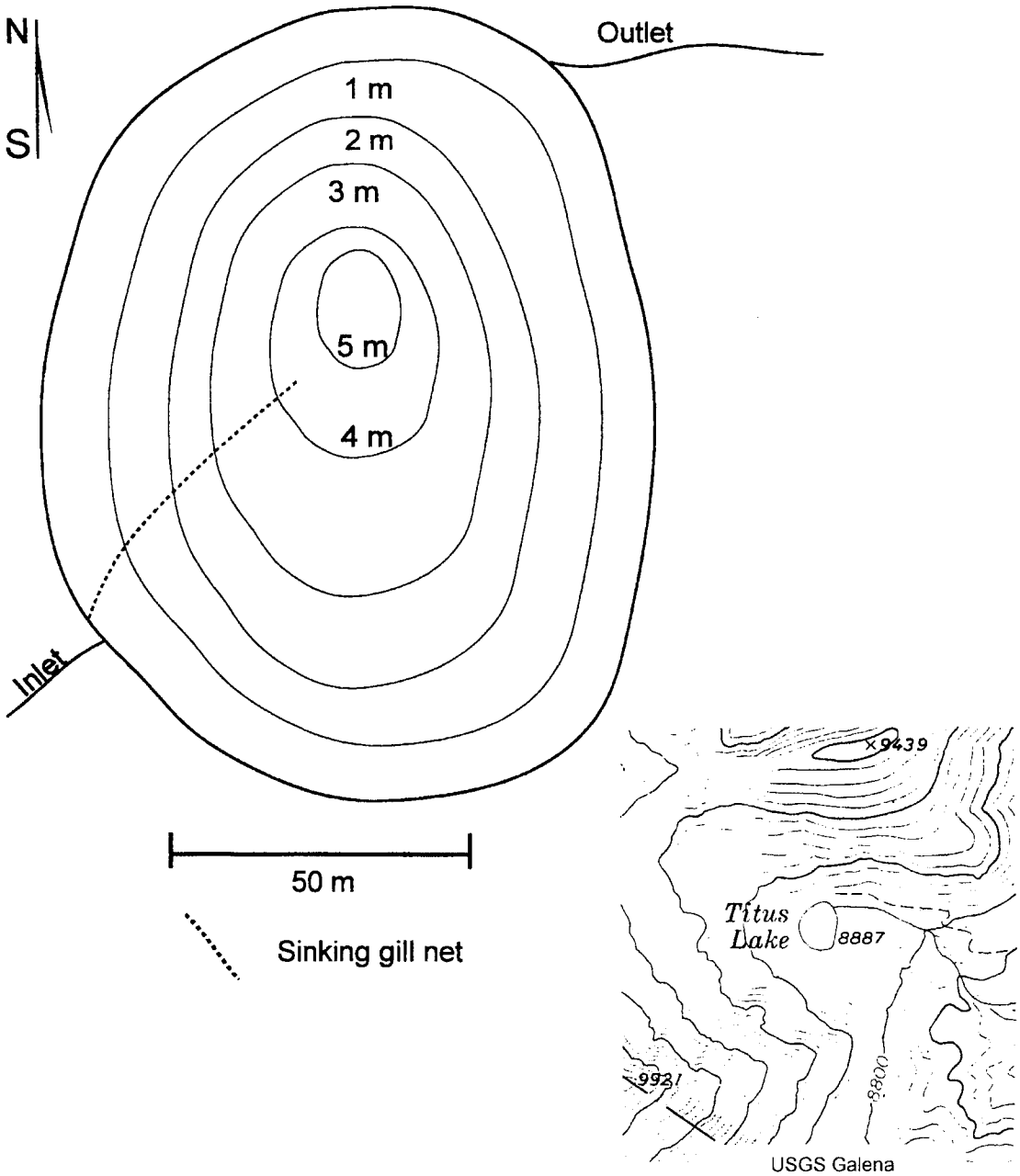


Figure 19. Map of Titus Lake with bathymetric contours and location of gill net as surveyed on August 30, 1996.

ACKNOWLEDGMENTS

We acknowledge Tim Ferguson, Bob Sellers, Roger Olsen, Mike Todd, and Bob Esselman for their assistance in high mountain lakes stocking, and Ty Cameron for his assistance in conducting lake surveys.

LITERATURE CITED

Partridge, F.E. and C.D. Warren. 1995. Federal Aid in Fish Restoration. Job Performance Report, Project F-71-R-18, Regional Fisheries Management Investigations-Magic Valley Region Mountain Lakes Investigations. Idaho Department of Fish and Game, Boise.

Warren, C.D. and F.E. Partridge. 1994. Federal Aid in Fish Restoration. Job Performance Report. Project F-71-R-17, Regional Fisheries Management Investigations-Region 4 Mountain Lakes Investigations. Idaho Department of Fish and Game, Boise.

Warren, C.D. and F.E. Partridge. 1995. Federal Aid in Fish Restoration. Job Performance Report, Project F-71-R-19, Regional Fisheries Management Investigations. Idaho Department of Fish and Game, Boise.

1996 ANNUAL PERFORMANCE REPORT

State of: Idaho | Program: Fisheries Management

Project I: Surveys and Inventories | Subproject I-E: Magic Valley Region

Job: b | Title: Lowland Lakes Investigations

Contract Period: July 1, 1996 to June 30, 1997

ABSTRACT

Anderson Ranch Reservoir kokanee *Oncorhynchus nerka* populations were estimated with a midwater trawl indicating a moderate year class of age 0+ kokanee present. Kokanee spawner abundance monitored with a weekly survey on the South Fork Boise River upstream from Anderson Ranch Reservoir indicates the second highest adult spawner escapement since surveys began in 1989.

Dog Creek Reservoir fish were sampled with one hour of nighttime electrofishing and with three trap nets. Species sampled include largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, yellow perch *Perca flavescens*, brown bullhead *Ameiurus nebulosus*, channel catfish *Ictalurus punctatus*, tiger muskie *Esox lucius x E. masquinongy*, hatchery rainbow trout *O. mykiss*, redside shiner *Richardsonius balteatus*, largescale sucker *Catostomus macrocheilus* and common carp *Cyprinus carpio*.

A private pond downstream of Little Camas Reservoir was sampled with two trap nets and electrofishing to determine if crappie were present. Black crappie *Pomoxis nigromaculatus* were found to be present, indicating that they may already be present downstream in Anderson Ranch Reservoir or may enter the reservoir in the future when water flows from the pond to the reservoir.

Forage presence and abundance was monitored by seining at Oakley and Salmon Falls Creek Reservoir. A 60 mm long walleye *Stizostedion vitreum* caught incidental to the sampling at Oakley Reservoir indicates successful spawning and recruitment of that species there.

Stone Reservoir fish were sampled with gill nets trapnetting and electrofishing in July. Fish species sampled include hatchery rainbow trout, largemouth bass, white crappie *Pomoxis annularis*, yellow perch and common carp.

Thorn Creek Reservoir fish were sampled by electrofishing in May and November to determine survival of stocked rainbow trout through the summer and winter. Results indicate good winter but poor summer survival.

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OBJECTIVES

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

METHODS

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

General fishery data in lakes and reservoirs were collected and analyzed utilizing standardized fish sampling gear and methodologies. Sampling gear included a Smith-Root Model SR-18 electrofishing boat with a Model 5.0 pulsator, a drift boat equipped with a Coffelt VVP-15 electrofisher powered by a Honda 5000 generator, variable (19 to 64 mm) bar mesh 38 x 1.8 m gill nets, 2 cm bar mesh size trap (frame) nets with a 1.8 x 0.9 m box and five 76 cm diameter hoops, and a 15.2 x 1.4 m long with 6.2 mm bar mesh beach seine. Beach seine samples were taken by holding one end of the seine stationary at the waters edge while the other end was taken straight out into the water perpendicular to the shoreline. With the shore end remaining stationary, the other end was swept shoreward with the lead line held near the bottom. Data analysis included total length frequencies, estimated length-at-annulus back calculated from scale measurements and trend data used to compare with similarly acquired data from previous years.

Limnological samples were taken by sampling surface waters for specific conductivity, pH, total hardness, and alkalinity. A Hach Kit was used for the total hardness and alkalinity measurements, a Solu Bridge conductivity meter was used for measuring specific conductivity and an Oakton PhTestr2 was used for measuring pH. Temperature and dissolved oxygen profiles were measured in-situ using a Y.S.I. model 57 temperature/dissolved oxygen meter from a boat. A Secchi disk was used from a boat. An Onset StowAway water temperature data logger was used for continuously recorded temperature information over a period of several weeks. These were set to record temperature every 48 minutes.

RESULTS AND DISCUSSION

Anderson Ranch Reservoir

Water levels permitted partitioning the reservoir into three strata for kokanee sampling on the nights of July 16 and 17, 1996. A temperature and dissolved oxygen profile was taken at three locations on July 17. 1996. Results indicate strong temperature stratification with the thermocline beginning at about 4 m in depth (Figure 1). A total of 15 transects were trawled within the three strata. Depths trawled ranged from 3 to 26 m (stepped) in the lower reservoir strata, 3 to 26 m in the mid-reservoir strata, and 3 to 18 m in the upper reservoir strata.

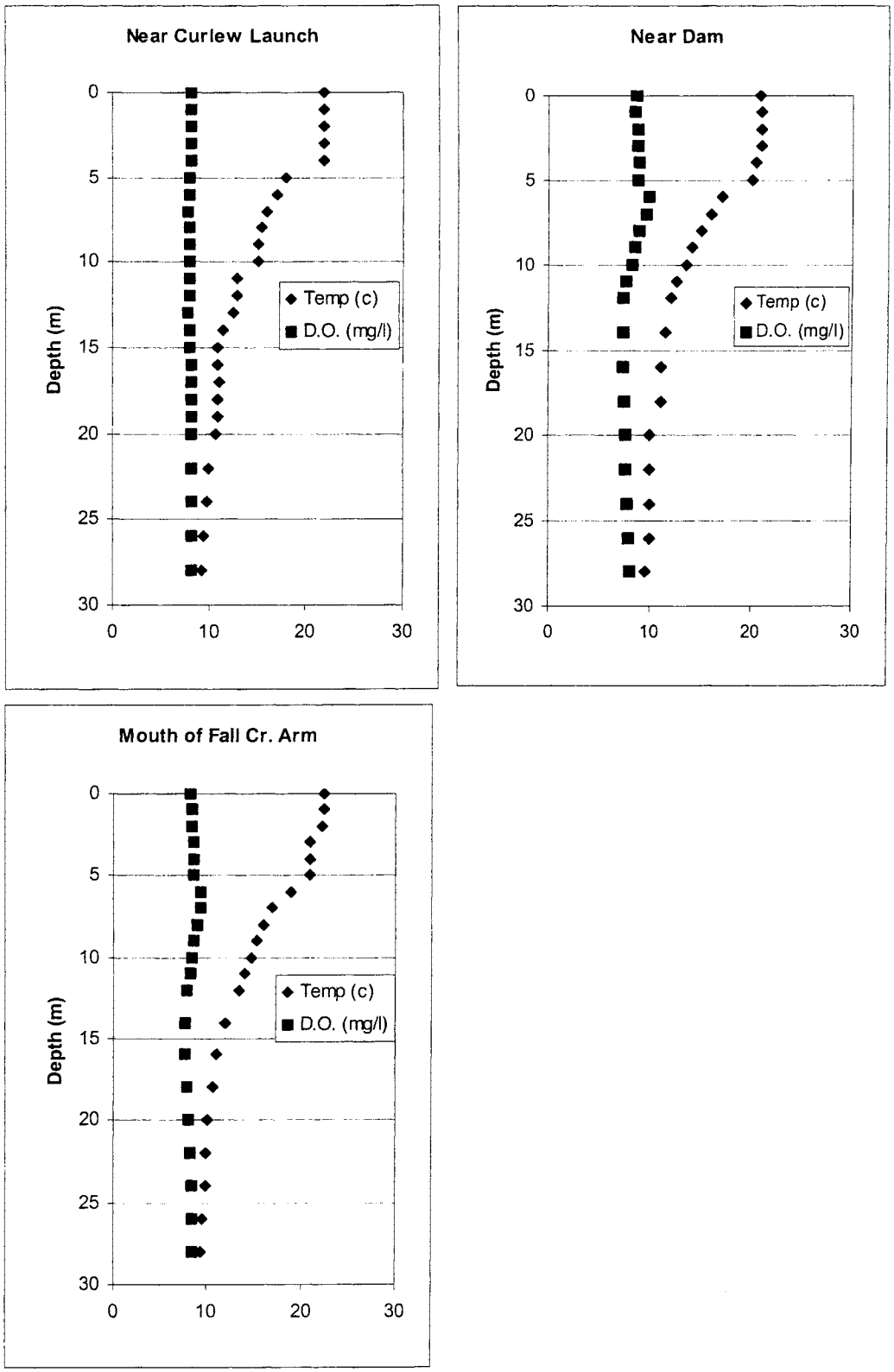

Figure 1. Daytime temperature and dissolved oxygen profiles at three locations on Anderson Ranch Reservoir on July 17, 1996.

Kokanee sampled less than 90 mm in total length were classified as age 0+ fish, kokanee from 90 to 130 mm long were classified as age 1+ fish, kokanee over 130 mm long were classified as age 2+ and older fish. Kokanee population and density estimates are given in Table 1. Total length frequencies for each age class with weights of fish sampled are given in Table 2. In addition to the kokanee, there were 1,954 young-of-the-year (YOY) yellow perch *Perca flavescens* averaging 3.2 fish per gram in weight in the trawl.

Kokanee spawning was monitored with counts of adult fish observed at 13 sites on the South Fork Boise River and Trinity Creek between August 14 and September 20, 1996. Counts have been made at these same sites since 1989 for spawner trend information except for the trap site which was added to the survey in 1990 (Partridge and Corsi 1993). A total of 3,528 spawners were observed, which is the second highest number since counts began in 1989 (Table 3, Figure 2).

Dog Creek Reservoir

Dog Creek Reservoir is managed to provide a diversity of fishing opportunities with several species of fish. The reservoir has largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, and yellow perch and has been annually stocked with catchable sized rainbow trout *O. mykiss* for a spring and fall fishery when the water is cool. It was also stocked in 1991 with 200 tiger muskie *Esox lucius x E. masquinongy* weighing 11 g each and in 1995 with 200 tiger muskie weighing 158 g each. In 1991, 180 channel catfish *Ictalurus punctatus* at 500 g each were stocked and 2,500 channel catfish at 41 g each were stocked in 1993. Fish sampling efforts in 1992 resulted in no tiger muskie and one channel catfish being sampled (Partridge and Warren 1995). Sampling efforts in 1994 (Warren and Partridge 1996) resulted in no tiger muskie and ten channel catfish with two of them large enough to be from the 1991 stocking. Fish were again sampled in 1996 with three trap nets and nighttime electrofishing with the Smith-Root electrofishing boat with the power on for one hour. All fish stunned were netted regardless of species in the first 15 minutes, and then only gamefish species were targeted in the remaining 45 minutes of electrofishing effort. Total length frequencies and weights of fish sampled are given in Table 4. Two channel catfish and one tiger muskie were sampled. The channel catfish were both probably from the 1993 fingerling stock and the tiger muskie was probably from the 1995 stocking. The low number of channel catfish sampled may be due to predation by the largemouth bass or tiger muskie. An examination of scale annuli from four largemouth bass indicates that growth rates are about the same as they were in 1992 (Warren and Partridge 1994). An examination of scales from five bluegill indicates that it may take five to six years to grow a fish to a 200 mm length.

A temperature and dissolved oxygen profile was measured near the dam at 2000 hours on June 16, 1996. Results are given in Figure 3.

Hagerman West Pond

West Pond at the Hagerman Wildlife Management Area was electrofished with the Smith-Root electrofishing boat during daylight hours on June 6, 1996 to obtain largemouth bass and bluegill for transplanting into other waters. Total time electrofished was approximately one

Table 1. Anderson Ranch Reservoir kokanee population and density estimates based on nighttime midwater trawling results in July 1996 and three previous years' total population estimates for comparison.

	Age 0+		Age 1+		Age 2+		No. trawls
Mean no. fish/ha (variance)							
Strata 1	121.5	(1,863.55)	0.0		0.0		5
Strata 2	42.2	(307.18)	0.0		4.2	(17.86)	6
Strata 3	25.6	(137.38)	22.1	(325.33)	3.1	(9.88)	4
Average[a]	64.2		5.9		2.5		
Population estimate							
Strata 1	75,938		0		0		
Strata 2	24,496		0		2,451		
Strata 3	8,966		7,733		1,100		
Total population estimate:	109,400		7,733		3,551		
Variance of pop. estimate:	$2x10^8$		$4x10^7$		$7x10^6$		
Previous years' population estimates (variance)							
1995[b]	3,134		15,995		38,364		0
	($3x10^6$)		($3x10^7$)		($5x10^7$)		-
1994	230,411	wild	444,791		33,709		0
	($2x10^{10}$)		($1x10^{11}$)		($5x10^8$)		-
	126,916	hatchery					
	($6x10^8$)						
1993	212,788	wild	2,380		1,427		660
	($5x10^9$)		($6x10^6$)		($2x10^6$)		($4x10^5$)
	33,564	hatchery					
	($4x10^8$)						
1992	No trawl performed due to low water						

[a] Weighted average based on number of transects in strata.
[b] Estimate of wild and hatchery fish combined for year.

Table 2. Total length frequency and mean weight of kokanee salmon sampled by midwater trawling in Anderson Ranch Reservoir, July 1996.

Length range (mm)	Kokanee salmon					
	Age 0+		Age 1+		Age 2+	
	no.	avg. wt. (g)	no.	avg. wt. (g)	no.	avg. wt. (g)
0-9						
10-19						
20-29						
30-39	1					
40-49	33					
50-59	28	1.3				
60-69	9					
70-79	4					
80-89	1	6				
90-99						
100-109			1	10		
110-119			4	11		
120-129			2	15		
130-139						
140-149						
150-159						
/						
290-299						
300-309						
310-319						
320-329						
330-339						
340-349					3	267
350-359					1	430
360-369						
370-379						
380-389						
390-399						
Total sampled:	76		7		4	

Table 3. Number of kokanee observed at selected sites on the South Fork Boise River during spawning ground surveys, 1996.

Location[1]	8/14	8/23	8/29	9/6	9/12	9/20
1	65	125	210	150	65	65
2	18	10	4	35	20	0
3	40	40	65	75	25	16
4	4	8	18	75	20	16
5	0	0	1	0	0	1
6	25	25	80	50	65	23
7	35	25	20	10	10	0
8	20	15	25	100	15	4
9	150	60	100	75	30	12
10	120	200	250	100	125	100
11	0	20	200	35	40	175
12	0	0	0	0	12	0
13	0	1	0	1	4	0
Total:	477	529	973	706	431	412

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

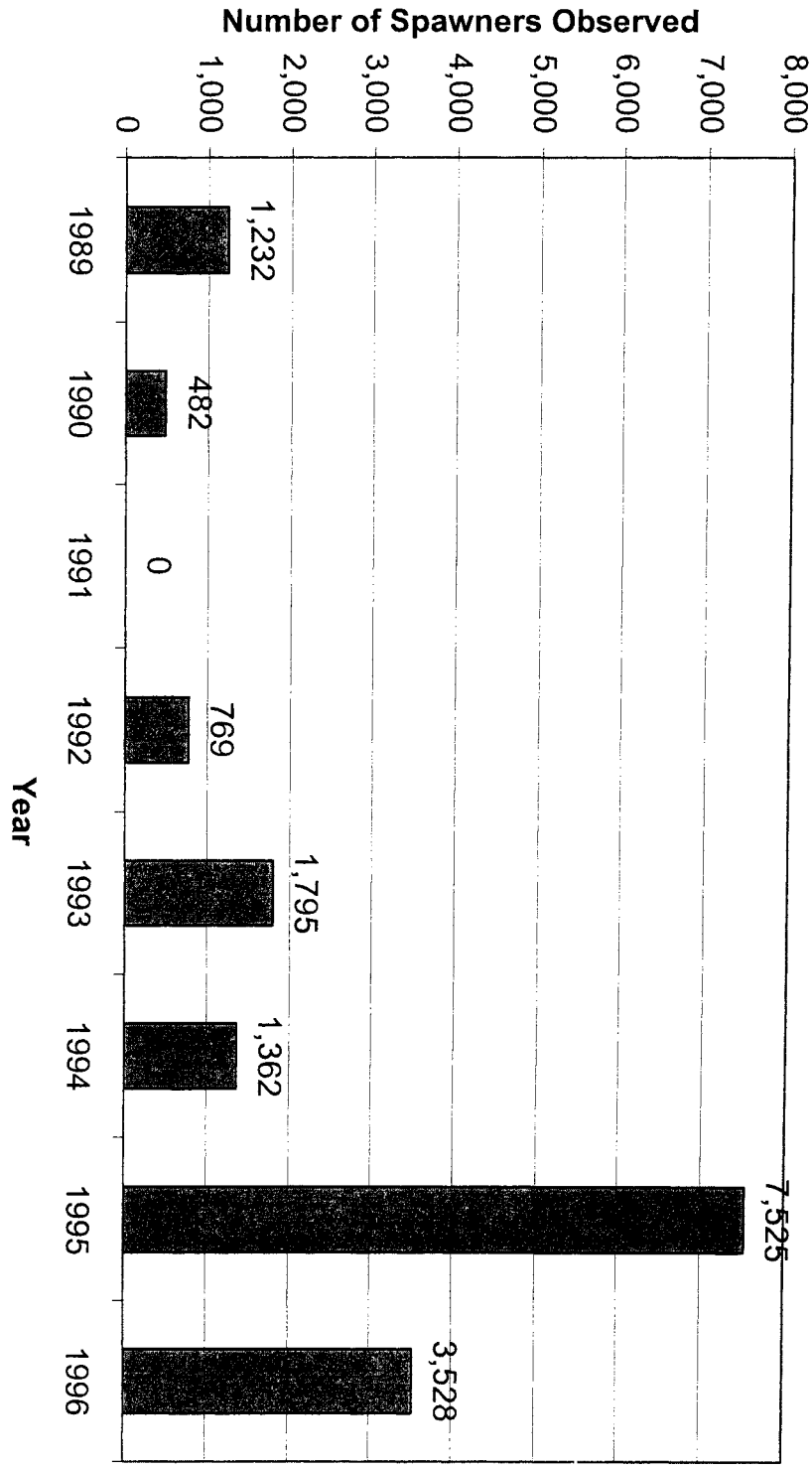

Figure 2. Annual counts of spawning kokanee from Anderson Ranch Reservoir at thirteen trend monitoring sites, 1989 through 1996.

Table 4. Total length frequencies of all fish sampled by gear type and average weights of some fish sampled at Dog Creek Reservoir, June-July 1996.

Length range (mm)	Largemouth bass						Bluegill					
	Trap net length		Electrofishing length		Average weight (g)		Trap net length		Electrofishing length		Average weight (g)	
	no.	%	no.	%	no.	avg.	no.	%	no.	%	no.	avg.
0-9												
10-19												
20-29												
30-39			1	8.3								
40-49												
50-59									3	18.8		
60-69									2	12.5		
70-79												
80-89												
90-99												
100-109			1	8.3								
110-119			2	16.7								
120-129									5	31.3	2	41
130-139			1	8.3	1	29			3	18.8		
140-149							1	25.0	1	6.3	1	40
150-159							1	25.0			1	98
160-169							2	50.0	1	6.3	3	92
170-179												
180-189			2	16.7	2	82						
190-199												
200-209			1	8.3	1	110						
210-219									1	6.3	1	226
220-229												
230-239												
240-249												
250-259												
260-269												
270-279												
280-289												
290-299												
300-309			1	8.3	1	360						
/			1	8.3	1	390						
440-449												
450-459			1	8.3	1	1,550						
460-469			1	8.3	1	1,650						
470-479												
480-489												
490-499												
Number:	0		12				4		16			
Avg length:			216				156		114			
Total Sampled:	0		12				4		16			

Table 4. Continued.

Length range (mm)	Yellow perch						Brown bullhead					
	Trap net length		Electrofishing length		Average weight (g)		Trap net length		Electrofishing length		Average weight (g)	
	no.	%	no.	%	no.	avg.	no.	%	no.	%	no.	avg.
0-9												
10-19												
20-29			1	2.2								
30-39			5	11.1								
40-49			1	2.2								
50-59												
60-69												
70-79												
80-89												
90-99												
100-109												
110-119			4	8.9								
120-129			12	26.7								
130-139			7	15.6								
140-149	4	26.7	7	15.6	4	32.8						
150-159	1	6.7	4	8.9	1	40.0						
160-169	1	6.7	2	4.4	1	46.0						
170-179	5	33.3	2	4.4	5	57.6	4	100.0			4	68
180-189	2	13.3										
190-199	1	6.7										
200-209									1	50.0		
210-219									1	50.0		
220-229												
230-239	1	6.7										
240-249												
Number:	15		45				4		2			
Avg length:	170		119				173		208			
Total Sampled:	15		67				4		2			

Table 4. Continued.

Length range (mm)	Channel catfish						Tiger musky					
	Trap net length		Electrofishing length		Average weight (g)		Trap net length		Electrofishing length		Average weight (g)	
	no.	%	no.	%	no.	avg.	no.	%	no.	%	no.	avg.
0-9												
\												
250-259												
260-269												
270-279												
280-289			1	50.0	1	190						
290-299												
300-309												
310-319												
320-329			1	50.0	1	285						
330-339												
340-349												
350-359												
360-369												
370-379												
380-389												
390-399									1	100.0	1	255
Number:	0		2				0		1			
Avg length:			300						395			
Total Sampled:	0		2				0					

Table 4. Continued.

Length range (mm)	Hatchery rainbow trout				Redside shiner *Richardsonius balteatus*			
	Trap net length		Electrofishing length		Trap net length		Electrofishing length	
	no.	%	no.	%	no.	avg.	no.	%
0-9 / 90-99								
100-109							1	50.0
110-119							1	50.0
120-129								
130-139								
140-149								
150-159								
160-169								
170-179								
180-189								
190-199								
200-209			1	25.0				
210-219								
220-229								
230-239								
240-249			1	25.0				
250-259								
260-269			1	25.0				
270-279			1	25.0				
280-289								
290-299								
300-309 / 390-399								
400-409								
410-419								
420-429								
430-439								
440-449								
450-459								
460-469								
470-479								
480-489								
490-499								
Number:	0		4		0		2	
Avg length:			246				108	
Total Sampled:	0		4		0		2	

Table 4. Continued.

Length range (mm)	Common carp						Largescale sucker			
	Trap net length		Electrofishing length		Average weight (g)		Trap net length		Electrofishing length	
	no.	%	no.	no.	%	avg.	no.	%	no.	%
0-9 / 180-189 190-199									1	20.0
200-209 210-219 220-229 230-239 240-249									2	40.0
300-309										
310-319	1	12.5	1	3.1	1	350				
320-329										
330-339										
340-349	1	12.5			1	500				
350-359			1	3.1						
360-369			2	6.3						
370-379										
380-389			2	6.3						
390-399	1	12.5	4	12.5	1	700				
400-409	1	12.5	1	3.1	1	800				
410-419			4	12.5						
420-429	1	12.5								
430-439	1	12.5	1	3.1			1	100.0		
440-449			2	6.3						
450-459			1	3.1						
460-469	1	12.5	4	12.5						
470-479			2	6.3					1	20.0
480-489										
490-499			2	6.3						
500-509										
510-519										
520-529	1	12.5	1	3.1						
530-539										
540-549										
550-559										
560-569										
570-579										
580-589										
590-599			1							
600-609			1							
Number:	8		30				1		4	
Avg length:	411		434				430		273	
Total Sampled:	8		35				1		4	

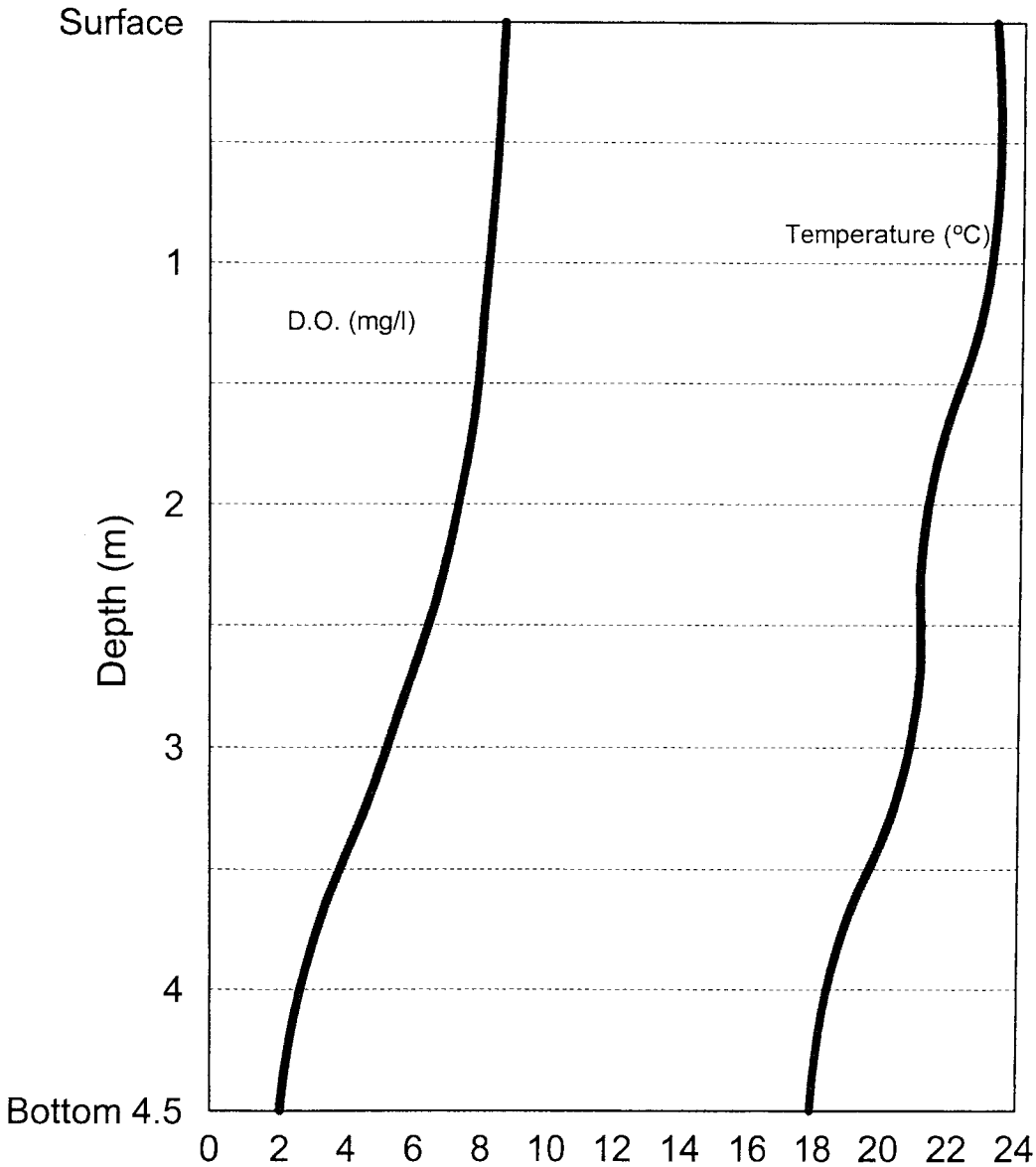

Figure 3. Daytime temperature and dissolved oxygen profile near the dam at Dog Creek Reservoir at 2000 hours, June 16, 1996.

hour with power on. All fish sampled were identified and measured to total length, then either retained for transplanting or released back into the pond. Fish species sampled include largemouth bass, bluegill, yellow perch and brown bullhead *Ictalurus nebulosus.* Total length frequencies of all fish sampled are given in Table 5.

After the north Bruneau Sand Dune pond was treated with rotenone, West Pond was again electrofished to obtain fish for toxicity testing on October 21, 1996 during daylight hours with the Smith-Root electrofishing boat. Scale samples were taken for the toxicity testing from 15 of the bluegill from West Pond to determine back-calculated length at annulus (Table 6). Results indicate growth rates are good and that few larger bluegill are found in the pond likely because exploitation rates are too high for many older fish to be present.

McFarland Private Pond (North of Little Camas Reservoir)

Little Camas Reservoir was treated with rotenone in 1994 to eradicate all fish after an abundance of black crappie *Pomoxis nigromaculatus* was discovered to be present there. Water flows out of the reservoir from the spillway and through the dam outlet into a nearby reservoir approximately 9 ha in surface area owned by McFarland. The pond was not treated with rotenone and was suspected to also have crappie present. Since water flows from the pond into Anderson Ranch Reservoir, Magic Valley Region fishery personnel set two trap nets overnight and electrofished it with the drift boat with power on for 30 minutes during daylight hours on June 5, 1996. Water temperature at time of sampling was 21°C. A total of 14 black crappie were sampled, averaging 91 mm in length and ranging 80-105 mm, all of them caught in the trap nets. There were also six redside shiners sampled. The presence of black crappie in the pond indicates that Anderson Ranch Reservoir may also have the fish in the near future if not already there.

Oakley Reservoir

Forage fish presence and relative abundance were measured in Oakley Reservoir utilizing the 15.2 m long, 6.2 mm bar mesh beach seine at five sites along the west side of the reservoir during daylight hours on August 7, 1996. Near shore, water temperature at time of seining was 19°C. All fish sampled were identified and enumerated. Species sampled include spottail shiners *Notropis hudsonius*, yellow perch, mottled sculpin *Cottus bairdi*, and walleye *Stizostedion vitreum* (Table 7).

Salmon Falls Creek Reservoir

Forage fish presence and relative abundance were measured at Salmon Falls Creek Reservoir utilizing the 15.2 m long, 6.2 mm bar mesh beach seine at five sites during daylight hours on August 6, 1996. All fish sampled were identified and enumerated and some total length measurements were made. Species sampled include spottail shiners, yellow perch, mottled sculpin, northern squawfish *Ptychocheilus oregonensis*, an unidentified sucker species *Catastomus sp.* and one crayfish not identified to species (Table 8). Near shore, water temperature at time of seining was 18°C.

Table 5. Total length frequency of fish sampled by nighttime electrofishing at West Pond at the Hagerman WMA, June 6, 1996.

Length range (mm)	Largemouth bass length		Bluegill length		Yellow perch length		Yellow bullhead length	
	no.	%	no.	%	no.	%	no.	%
0-9								
/								
70-79	1	1.4						
80-89	1	1.4						
90-99			2	0.9				
100-109			4	1.8				
110-119			4	1.8	1	5.6		
120-129			8	3.6				
130-139	3	4.3	14	6.2	1	5.6		
140-149	2	2.9	25	11.1				
150-159	6	8.6	33	14.7	4	22.2		
160-169	3	4.3	32	14.2	5	27.8		
170-179	5	7.1	38	16.9	3	16.7		
180-189	2	2.9	38	16.9	1	5.6		
190-199	4	5.7	21	9.3				
200-209	3	4.3	6	2.7	3	16.7		
210-219	4	5.7						
220-229	5	7.1						
230-239	4	5.7						
240-249	3	4.3						
250-259	2	2.9						
260-269	1	1.4						
270-279	1	1.4						
280-289								
290-299	1	1.4						
300-309	1	1.4						
310-319	2	2.9						
320-329	1	1.4						
330-339							1	50.0
340-349	4	5.7					1	50.0
350-359	3	4.3						
360-369	2	2.9						
370-379	5	7.1						
380-389								
390-399								
400-409								
410-419								
420-429	1	1.4						
430-439								
440-449								
Number:	70		225		18		2	
Avg length:	235		162		166		338	
Total Sampled:	70		225		18		2	

Table 6. Back calculated length-at-age for bluegill sampled at West Pond at the Hagerman Wildlife Management Area, October 21, 1996. Standard deviation is in parentheses.

Year class	Number of fish	Mean length at annulus (mm)		
		1	2	3
1995	1	42		
		-		
1994	8	54	98	
		(17.8)	(20.2)	
1993	6	53	103	148
		(11.8)	(17.0)	(9.9)
Weighted average length	53	100	148	

Table 7. Total length frequencies of fish sampled by shoreline beach seining five sites on Oakley Reservoir, August 7, 1997.

Length range	Spottail shiner length		Yellow perch length		Walleye length		Mottled sculpin length	
(mm)	no.	%	no.	%	no.	%	no.	%
0-9								
10-19								
20-29								
30-39	5	8.1						
40-49	4	6.5	27	30.7			2	50.0
50-59			55	62.5				
60-69	2	3.2	6	6.8	1	50.0		
70-79	32	51.6						
80-89	19	30.6						
90-99							2	50.0
100-/190-								
200-210-220-230-240-					1	50.0		
Number	62		88		2		4	
Avg	69		50		148		66	
Total sample	522		257		2		4	

Table 8. Total length frequencies of fish sampled by shoreline beach seining five sites at Salmon Falls Creek Reservoir on August 6, 1996.

Length range	Spottail shiner length		Redside shiner length		Northern squawfish length		Mottled sculpin length		Yellow perch length		Sucker spp. length	
(mm)	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
0-9												
10-19												
20-29												
30-39	8	17.0							4	3.4		
40-49	7	14.9							18	15.1		
50-59									16	13.4	4	12.5
60-69	1	2.1					1	100.0	36	30.3	21	65.6
70-79	2	4.3	1	100.0	1	16.7			19	16.0	6	18.8
80-89	9	19.1			1	16.7			16	13.4		
90-99	12	25.5			1	16.7			6	5.0		
100-109	5	10.6							3	2.5		
110-119	3	6.4			2	33.3						
120-129												
130-139									1	0.8		
140-149												
150-159												
160-169												
170-179					1	16.7					1	3.1
180-189												
190-199												
200-209												
210-219												
220-229												
230-239												
240-249												
Number:	47		1		6		1		119		32	
Avg length:	73		75		108		65		64		66	
Total sampled:	47		1		6		1		238		32	

Stone Reservoir

Standardized lowland lakes sampling protocols were followed for sampling Stone Reservoir, an impoundment on Deep Creek, a tributary to the Great Salt Lake basin in Utah (Figure 4). The reservoir's surface area is approximately 123 ha and averages about 6 m deep when full. The reservoir receives approximately 10,000 catchable sized rainbow trout annually and is managed under general statewide fishing rules. Much of the fishing pressure comes from Utah residents because of its proximity to some of Utah's larger cities.

Two floating and two sinking gill nets and two trap nets were set overnight on the evening of July 10, 1996. A total of 30 minutes of electrofishing effort (power on) was expended on the same night using the Smith-Root electrofishing boat. Equal effort was made to net all fish stunned regardless of species. Fish sampled include hatchery rainbow trout, largemouth bass, white crappie *Pomoxis annularis*, yellow perch, and common carp *Cyprinus carpio* (Table 9). Scale analysis indicates that all of the white crappie sampled were two years of age. Length at age 1 was 64 mm and length at age 2 was 145 mm. Results of the largemouth bass scale analysis are given in Table 10. Water quality measurements of a surface sample taken from a boat were 167 mg/l for total alkalinity, 8.2 for pH, 710 µSiemens/cm for specific conductivity and 179 mg/l for total hardness. Temperature and dissolved oxygen profiles were measured at two sites in the early evening on July 10, 1996 (Figures 4 and 5).

Thorn Creek Reservoir

Thorn Creek Reservoir is managed as a rainbow trout fishery under the general statewide rivers and streams fishing season. The reservoir is filled by seasonal snowmelt run-off during the spring and completely fills only in intermittent years when there is sufficient upstream snow pack. Although no water is released for downstream uses, the reservoir water level drops vertically at least two meters annually. There is usually a dense macrophyte and algae bloom by midsummer, which may cause dissolved oxygen problems during the summer and under the ice during the winter when there is a high biological oxygen demand from decaying organic matter.

Temperature and dissolved oxygen profiles were measured through the ice at two locations on February 18 and from a boat at three locations on August 27, 1996 (Figures 6 and 7). On September 12, 1996, the temperature in front of the dam was 15°C from top to bottom (3 m). Dissolved oxygen was 7-8 mg/l. Fish were sampled with the Smith-Root electrofishing boat on May 7 to determine survival through the previous winter and on November 4, 1996 to determine survival through the summer after a reported fish kill (Table 11). About one hour of electrofishing effort was done at night on both dates. A total of 50 hatchery rainbow trout ranging 150-390 mm in total length were sampled on May 7 indicating good over-wintering survival of fish from at least two fish plantings. A total of 30 hatchery rainbow trout ranging 120-350 mm in total length were sampled on November 4. Only one was greater than 255 mm indicating poor summer survival because the rest of the sample were most likely from the fall fingerling plant.

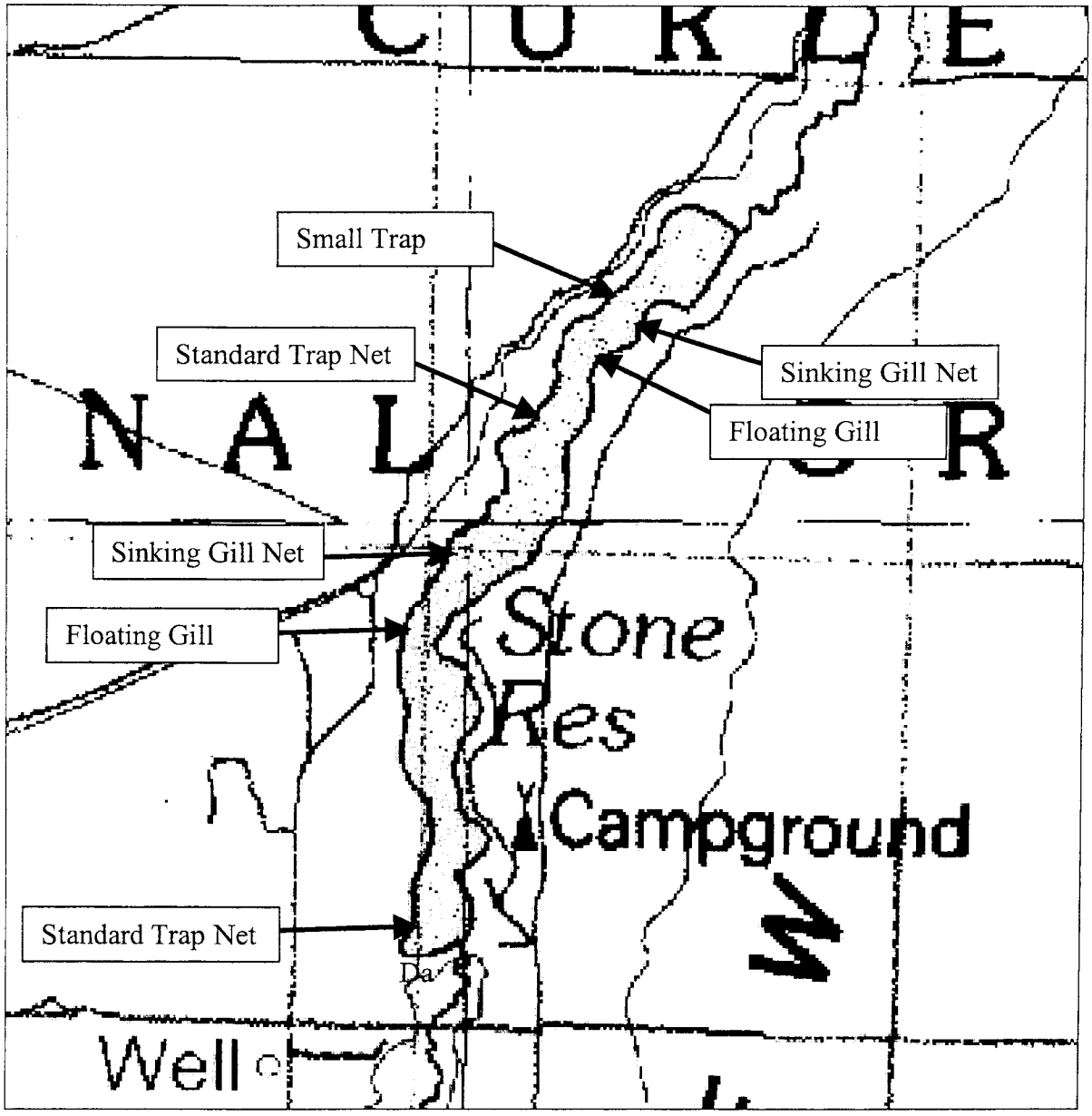

Figure 4. Map of Stone Reservoir showing locations of gill net and trap net sets, July 10, 1996.

Table 9. Total length frequencies of all fish sampled by gear type and average weights of some fish sampled at Stone Reservoir, July 10-11, 1996.

Length range (mm)	Largemouth bass									
	Sinking gill net length		Floating gill net length		Frame net length		Electrofishing length		Average weight (g)	
	no.	%	no.	%	no.	%	no.	%	no.	avg.
0-9 / 90-99										
100-109										
110-119										
120-129										
130-139										
140-149							1	10.0	1	39
150-159							1	10.0	1	50
160-169							1	10.0	1	52
170-179							2	20.0	2	53
180-189										
190-199							1	10.0	1	99
200-209										
210-219										
220-229										
230-239	1	100.0					1	10.0	1	165
240-249										
250-259										
260-269										
270-279							1	10.0	1	250
280-289										
290-299										
300-309										
310-319										
320-329										
330-339										
340-349										
350-359							1	10.0	1	515
360-369										
370-379							1	10.0	1	690
380-389										
390-399										
Number:	1		0		0		10			
Avg length:	230						221			
Total Sampled:	1		0		0		10			

Table 9. Continued.

Length range (mm)	Hatchery rainbow trout									
	Sinking gill net		Floating gill net		Frame net		Electrofishing		Average	
	no.	%	no.	%	no.	%	no.	%	no.	avg.
0-9 / 240-249										
250-259										
260-269										
270-279			1	1.7						
280-289	1	2.2	6	10.2					6	238
290-299	3	6.5	6	10.2			1	6.7	9	244
300-309	7	15.2	8	13.6			3	20.0	12	270
310-319	12	26.1	11	18.6			4	26.7	21	311
320-329	5	10.9	4	6.8			1	6.7	8	329
330-339	7	15.2	8	13.6	1	100.0	1	6.7	13	357
340-349	7	15.2	10	16.9			2	13.3	12	382
350-359	1	2.2	4	6.8			1	6.7	4	388
360-369	1	2.2	1	1.7			2	13.3	2	448
370-379	2	4.3							2	450
380-389										
390-399										
Number:	46		59		1		15			
Avg length:	321.8		316.8		335		324.3			
Total Sampled:	46		59		1		15			

Length range (mm)	White crappie									
	Sinking gill net		Floating gill net		Frame net		Electrofishing		Average	
	no.	%	no.	%	no.	%	no.	%	no.	avg.
0-9 / 140-149										
150-159										
160-169	2	14.3	2	11.1					1	54
170-179	5	35.7	1	5.6					5	64
180-189	2	14.3	9	50.0					7	78
190-199	1	7.1							1	100
200-209	2	14.3	3	16.7					4	109
210-219	2	14.3	2	11.1					2	120
220-229			1	5.6						
230-239										
240-249										
Number:	14		18		0		0			
Avg length:	183.2		187.5							
Total Sampled:	14		18		0		0			

Table 9. Continued.

Length range (mm)	Yellow perch							
	Sinking gill net		Floating gill net		Frame net		Electrofishing	
	no.	%	no.	%	no.	%	no.	%
10-19								
20-29								
30-39								
40-49								
50-59								
60-69								
70-79								
80-89								
90-99							1	8.3
100-109								
110-119							1	8.3
120-129							1	8.3
130-139							3	25.0
140-149	4	26.7	1	11.1			2	16.7
150-159	3	20.0	3	33.3			1	8.3
160-169	2	13.3	1	11.1	1	100.0	2	16.7
170-179	1	6.7	2	22.2				
180-189	2	13.3					1	8.3
190-199	3	20.0						
200-209								
210-219			1	11.1				
220-229			1	11.1				
230-239								
240-249								
Number:	15		9		1		12	
Avg length:	164.6		171.1		160		139.1	
Total Sampled:	15		9		1		12	

Table 9. Continued.

Length range (mm)	Common carp							
	Sinking gill net		Floating gill net		Frame net		Electrofishing	
	no.	%	no.	%	no.	%	no.	%
0-9 / 300-309								
310-319								
320-329								
330-339								
340-349			1	5.0				
350-359	1	6.3	1	5.0			1	3.3
360-369			1	5.0			2	6.7
370-379	4	25.0	1	5.0			2	6.7
380-389	3	18.8	2	10.0			3	10.0
390-399	2	12.5	5	25.0			4	13.3
400-409	3	18.8	5	25.0			3	10.0
410-419	2	12.5	1	5.0			2	6.7
420-429	1	6.3	1	5.0			4	13.3
430-439							3	10.0
440-449							2	6.7
450-459			1	5.0			1	3.3
460-469								
470-479								
480-489							2	6.7
490-499								
500-509								
510-519							1	3.3
520-529								
530-539								
540-549								
550-559								
560-569								
570-579								
580-589			1	5.0				
590-599								
600-609								
610-619								
620-629								
630-639								
640-649								
Number:	16		20		0		30	
Avg length:	389.6		402.2				411.8	
Total Sampled:	16		20		0		30	

Table 10. Back calculated length-at-annulus for largemouth bass sampled at Stone Reservoir, July 10, 1996. Standard deviation is in parentheses.

Year class	Number of fish	Mean length at annulus (mm)				
		1	2	3	4	5
1995	2	118 (18.03)				
1994	5	64 (7.26)	161 (19.82)			
1993	-	- (-)	- (-)	- (-)		
1992	1	75 (-)	156 (-)	259 (-)	342 (-)	
1991	1	98 (-)	216 (-)	278 (-)	303 (-)	339 (-)
Weighted Avg. length		81	168	268	322	339

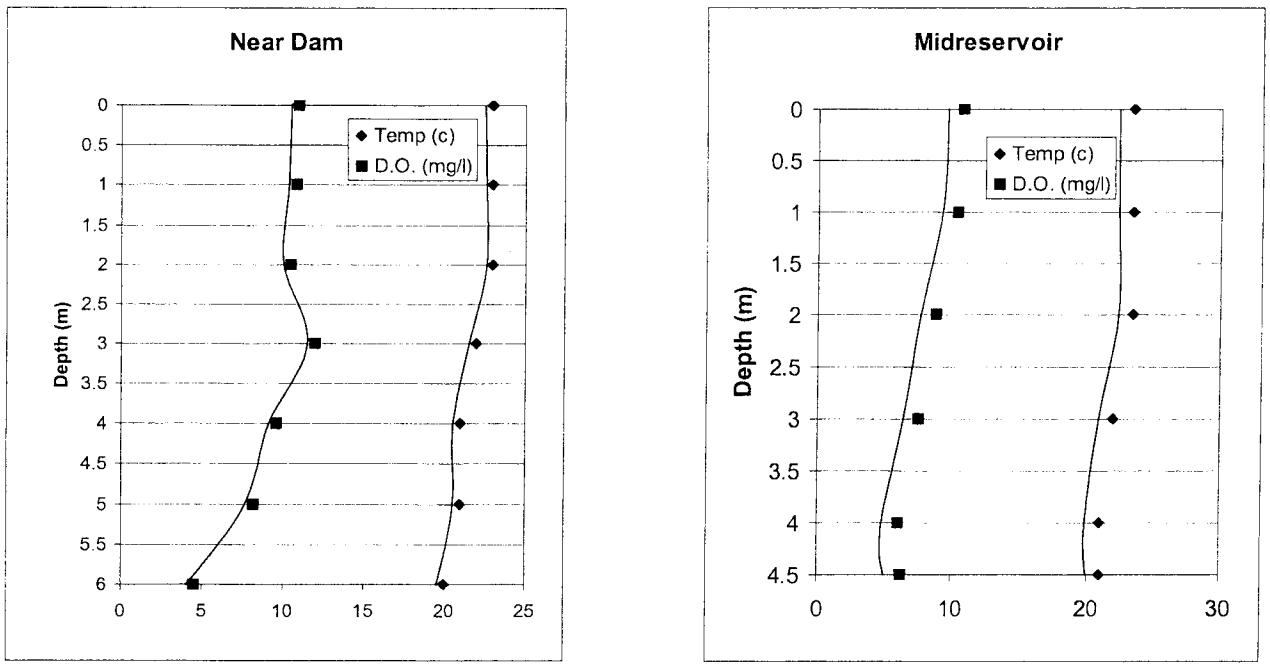

Figure 5. Daytime temperature and dissolved oxygen profiles at two locations at Stone Reservoir on July 10, 1996.

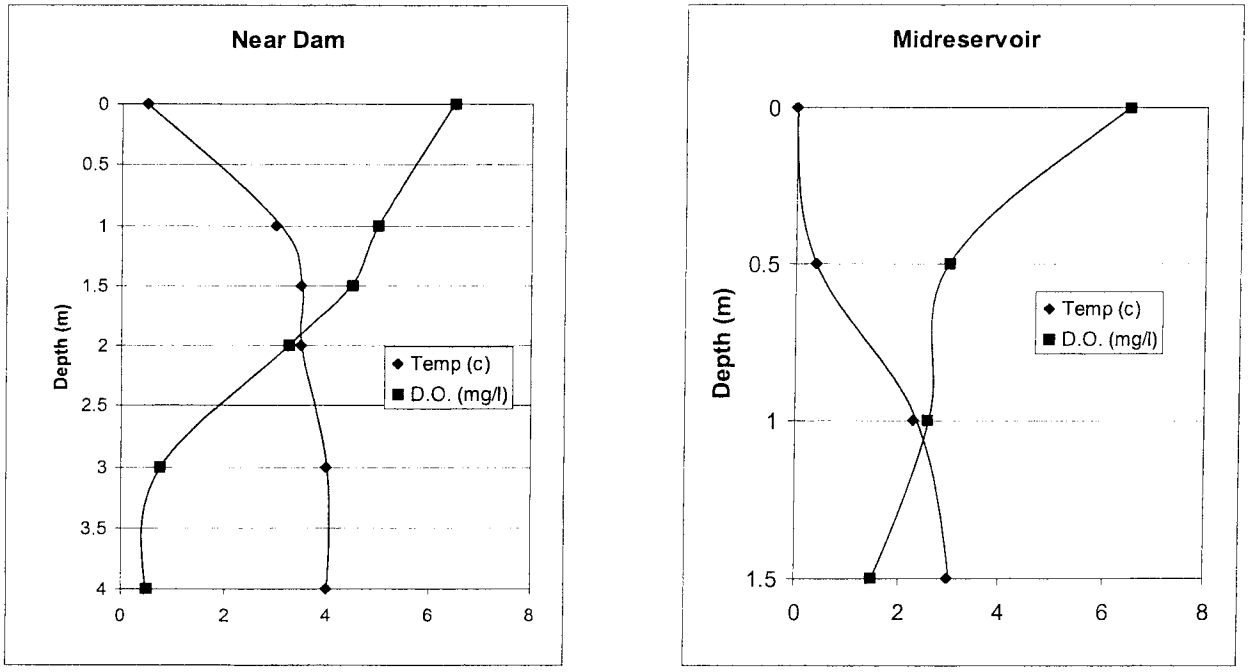

Figure 6. Daytime temperature and dissolved oxygen profiles measured under the ice at two locations on Thorn Creek Reservoir on February 18, 1996.

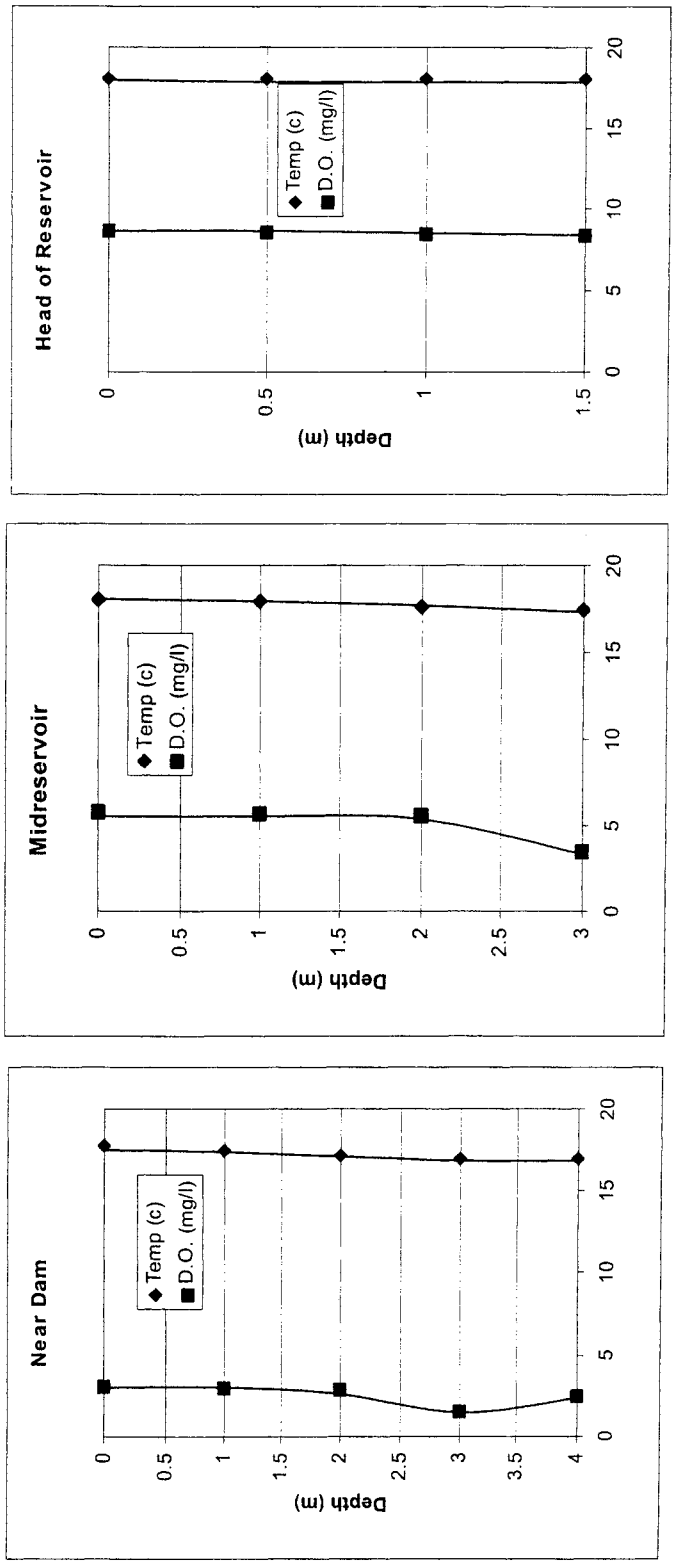

Figure 7. Daytime temperature and dissolved oxygen profiles measured at three locations on Thorn Creek Reservoir on August 27, 1996.

Table 11. Total length frequencies and average weights of fish sampled by electrofishing Thorn Creek Reservoir in the spring and fall of 1996.

Length range (mm)	May 7, 1996				November 11, 1996	
	Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%
0-9 / 90-99						
100-109						
110-119						
120-129					1	3.3
130-139					2	6.7
140-149						
150-159	1	2.0	1	42	2	6.7
160-169					3	10.0
170-179					2	6.7
180-189	2	4.0	2	71	8	26.7
190-199					8	26.7
200-209	2	4.0	1	95		
210-219	1	2.0	1	105	2	6.7
220-229						
230-239						
240-249	1	2.0	1	160		
250-259	1	2.0	1	188	1	3.3
260-269						
270-279						
280-289						
290-299						
300-309	1	2.0	1	380		
310-319	4	8.0	2	360		
320-329	4	8.0	2	400		
330-339	5	10.0	3	427		
340-349	2	4.0	1	480		
350-359	7	14.0	4	625	1	3.3
360-369	9	18.0	7	611		
370-379	4	8.0	4	708		
380-389	4	8.0	2	540		
390-399	2	4.0	1	830		
Number:	50				30	
Avg length:	326				184	
Total sampled:	50				30	

Miscellaneous Regional Creel Surveys

A region wide creel survey was made on Saturday, May 25 (Memorial Day Weekend) and on the first day of fishing seasons at the Hagerman Wildlife Management Area (March 1 and July 1, 1996) by conservation officers and other Magic Valley Region personnel (Table 12). This survey included streams open during the general fishing season as well as waters which were already open to fishing. There were 25 waters surveyed with a total of 851 anglers interviewed with 2,323 hours of effort for an overall catch rate of 0.5 fish per hour. Spot creel checks performed mostly by conservation officers and regional fishery personnel on days other than on Memorial Day weekend were also reported (Table 13). A total of 3,012 anglers with 8,037 hours of effort and an overall catch rate of 0.38 fish per hour were reported on 32 waters throughout the region.

Table 12. Results of spot creel checks performed on Magic Valley Region waters on opening day of the general fishing season, May 25, 1996.

Lake, river, stream	Anglers	Hours fished	Species[a]	Number kept or released
Anderson Ranch Reservoir	68	208.0	RBT KOK	29 86
Big Wood River	7	15.5	RBT	4
Billingsly Creek	23	54.5	RBT	106
Blair Trail Reservoir	7	6.2	RBT YBH	9 1
Bruneau Sand Dunes Ponds	1	3.0		
Dog Creek Reservoir	7	10.5	TM YBH	1 1
Featherville Ponds	22	26.0	RBT	25
Fish Creek Reservoir	26	60.0	RBT	27
Goose Creek	3	1.0		
Hagerman WMA				
March 1 Opener[b]	26	56.5	RBT BG LMB	154 37 10
July 1 Opener[c]	84	227.2	RBT LMB	297 1
Hot Springs Creek Reservoir	0	0		
Lake Creek Lake	10	12.5	RBT EB	3 17
Little Camas Reservoir	105	274.0	RBT	80
Little Wood Reservoir	34	61.0	RBT	82
Malad River	5	8.3	RBT	6
Magic Reservoir	116	410.0	RBT	173
Mormon Reservoir	24	67.8	RBT	18

Table 12. Continued.

Lake, river, stream	Anglers	Hours fished	Species[a]	Number kept or released
Morrow Reservoir	0	0		
Niagara Springs	9	5.8	RBT	7
Oakley Reservoir	31	62.0	RBT	39
			WAL	4
Rock Creek	22	22.0	RBT	7
			BRN	11
			BRK	2
Roseworth Reservoir	16	43.0	RBT	32
Salmon Falls Creek Reservoir	68	113.0	RBT	9
			WAL	1
South Fork Boise River	8	12.0	RBT	1
Stalker Creek/Silver Creek	45	156.0	RBT	136
			BRN	15
			EB	8
Stone Reservoir	14	22.0	RBT	16
Sublett Reservoir	92	268.5	RBT	110
			BRN	3
			KOK	1
			CT	10
Thorn Creek Reservoir	25	92.5	RBT	126

[a] RBT- rainbow trout, CT-cutthroat trout BRN-brown trout, WAL-walleye, KOK-kokanee, BG-bluegill, LMB-largemouth bass, EB-brook trout, YBH-yellow bullhead.
[b] Includes the Oster Lakes, Riley Impoundment and the settling pond.
[c] Includes Bass Pond, Goose Pond, the Anderson Ponds, and West Pond.

Table 13. Results of spot creel checks performed on Magic Valley Region waters in 1996, excluding opening day.

Water	Anglers	Hours fished	Species[a]	Kept	Released	Catch
Big Wood River	83	144	BRN	1	11	11
			WRB	70	1	1
			MWF	6		
			ALL	77		
Carey Lake	19	34	YP	86		86
Cassia Creek	9	18	HRB	6		6
			EB	8		8
			CT	1		1
			ALL	15		15
Cedar Draw Creek	7	18	RBT	10		10
Centennial Park	20	36	HRB	1		1
Crystal Lake	61	84	HRB	45	5	50
Deep Creek	5	5	HRB	2		2
Dierke's Lake	79	129	HRB	61		61
			LMB		2	2
			CC	1		1
			ALL	62	2	64
Dog Creek Reservoir	24	36	LMB	2		2
			YP	30	3	33
			TM		1	1
			BG	10		10
			ALL	42	4	46
Emerald Lake	27	55	RBT	6		6
Fish Creek Reservoir	254	725	HRB	405	70	475
			EB	8		8
			ALL	413	70	483
Gun Club (Norby's Pond)	10	12	RBT	1		1

Table 13. Continued.

Water	Anglers	Hours fished	Species[a]	Kept	Released	Catch
Hagerman WMA						
Bass Pond	9	13				
Oster Lakes	78	209	HRB	104	20	124
			LMB	3		3
			BG	15	15	30
			ALL	157	35	157
Riley Creek Imp.	47	98	HRB	90	10	100
			BG	2		2
			ALL	92	10	102
Settling Pond	19	40	HRB	19	8	27
Lake Cleveland	20	68	HRB	41		41
Lake Walcott	52	145	RBT	18		18
Little Camas Reservoir	30	71	HRB	23	19	42
			SMB		1	1
			ALL	23	20	43
Little Smokey Creek	23	30	HRB	25		25
			WRB	1		1
			ALL	26		26
Little Wood Reservoir	52	139	HRB	79		79
			EB	1		1
			ALL	80		80
Magic Reservoir	161	458	HRB	272		272
			BRN	1		1
			WRB	4		4
			RBT	18		18
			ALL	295		295
Mormon Reservoir	92	221	HRB	120		120
Murtaugh Lake	10	21	BBH	6		6
Niagara Springs	37	60	HRB	27	10	37
			RBT	3		3
			CRP	1		1
			ALL	31	10	41
Oakley Reservoir	70	187	HRB	117	7	122
			YP		3	3
			WE	1		1
			ALL	118	10	126

Table 13. Continued.

Water	Anglers	Hours fished	Species[a]	Kept	Released	Catch
Rock Creek	66	122	HRB	70		70
			BRN	4		4
			WRB	4		4
			ALL	78		78
Roseworth Reservoir	238	834	HRB	262		262
			RBT	23		23
			EB	1		1
			ALL	286		286
Salmon Falls Creek (Balanced Rock Park)	26	66	HRB	18		18
Salmon Falls Creek Reservoir	209	666	HRB	99		99
			SMB	3		3
			YP	88		88
			WE	99		99
			CC	1		1
			ALL	290		290
Snake River	60	111	HRB	43	10	53
			EB		2	2
			ALL	43	12	55
Snake River (below Minidoka Dam)	61	133	RBT	14		14
S.F. Boise River	13	36	HRBWR	13		13
			B	13		13
			ALL	26		26
Stone Reservoir	10	20	RBT	17		17
			YP	15		15
			ALL	32		32
Sublett Reservoir	29	89	HRB	37	12	49
			WRB	1		1
			RBT	3		3
			ALL	41	12	53
Thorn Creek Reservoir	31	90	HRB	50	10	60
Trapper Creek	11	16	HRB	2		2
			WRB	1		1
			EB	1		1
			ALL	4		4

[a] BBH-brown bullhead, BG - bluegill, BRN - brown trout, CC-channel catfish, CT - cutthroat trout, EB - brook trout, HRB - hatchery rainbow trout, KOK - kokanee, LMB - largemouth bass, MWF- mountain whitefish, RBT-rainbow trout, SMB - smallmouth bass, TM-tiger muskie, WE -walleye, WRB - wild rainbow trout, YP - yellow perch.

LITERATURE CITED

Partridge, F.E. and C.E. Corsi. 1993. Federal Aid in Fish Restoration. Job Performance Report. Project F-71-R-15, Regional Fisheries Management Investigations. Job 4-b, Region 4 Lowland Lakes and Reservoirs Investigations. Idaho Department of Fish and Game, Boise.

Partridge, F.E. and C.D. Warren. 1995. Federal Aid in Fish Restoration. Job Performance Report. Project F-71-R-18, Regional Fisheries Management Investigations. Job 4-b, Region 4 Lowland Lakes and Reservoirs Investigations. Idaho Department of Fish and Game, Boise.

Rieman, B.E. 1992. Kokanee Salmon Population Dynamics - Kokanee Salmon Monitoring Guidelines, Status and Analysis of Salmonid Fisheries, Project F-73-R-14 Subproject II, Study II. Idaho Department of Fish and Game, Boise.

Warren, C.D. and F.E. Partridge. 1996. Federal Aid in Fish Restoration. Job Performance Report Project F-71-R-19, Regional Fisheries Management Investigations. Job 4-b, Region 4 Lowland Lakes and Reservoirs Investigations. Idaho Department of Fish and Game, Boise.

1996 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-21

Project I: Surveys and Inventories

Subproject I-E: Magic Valley Region

Job No. c

Title: Rivers and Streams Investigations

Contract Period: July 1, 1996 to June 30, 1997

ABSTRACT

Results of a late summer fishery survey on six reaches of the Big Wood River indicate that the presence of the whirling disease pathogen *Myxosoma cerebralis* within the drainage has not affected the wild fish population. Population trends in all reaches surveyed also reveal that more restrictive fishing rules implemented on some reaches in 1990 have increased the numbers and densities of wild rainbow trout *Oncorhynchus mykiss*. Other streams surveyed in the Big Wood River drainage include the East Fork Big Wood River and Warm Springs Creek. Both streams were found to have wild rainbow trout, hatchery rainbow trout, brook trout *Salvelinus fontinalis* and Wood River sculpin *Cottus leiopomus*.

Marsh Creek and several of its tributaries near Albion, Idaho were extensively surveyed and found to have brook trout, hatchery rainbow trout, mottled sculpin *C. bairdi*, redside shiner *Richardsonius balteatus*, and longnose dace *Rhinichthys cataractae*. The highest trout densities were found in reaches of higher gradients where there was a mix of habitat types.

Two reaches of Shoshone Creek within the Sawtooth National Forest were sampled by electrofishing. Fish species found included wild rainbow trout, bridgelip sucker *Catastomus columbianus*, mottled sculpin, redside shiner, and speckled dace *R. osculus*.

Other streams sampled in the region were Eightmile Creek and Sixmile Creek, both tributaries to Raft River and both found to have Yellowstone cutthroat trout *O. clarki bouveri*.

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OBJECTIVES

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

METHODS

Stream habitat data was collected using ocular and measurement techniques described by Idaho Department of Fish and Game (IDFG; 1992). Fish sampling gear included a Smith-Root Model 15-A backpack shocker and a Coffelt Model VVP-15 shocker powered by a 5,000-watt generator mounted in an aluminum canoe or drift boat. Output with the Coffelt shocker was set to unpulsed direct current (DC). Crews using the Coffelt shocker in the canoe waded with two people each using one anode and three or four other crewmembers netting stunned fish. Crews using the Coffelt shocker in the drift boat netted fish from within the boat as another crewmember rowed and operated the generator and shocker. The backpack shocker was used with one shocker operator and one or two netters. Population estimates were made using a two-step depletion method (Seber and LeCren 1967), a multiple-step depletion maximum-likelihood population estimate (Van Deventer and Platts 1983), or an adjusted Peterson Mark-Recapture method (Ricker 1975). The Peterson Mark-Recapture method was done by marking groups of fish with a hole punch in the caudal fin then released back to the sampling location. Crews returned one week later to sample for the ratio estimate. Sampled fish were identified, total lengths recorded in 10 mm groups and subsamples were weighed in grams. Scale samples were taken from some fish to estimate length-at-annulus back calculated from scale measurements. Density estimates expressed as number of fish per unit area of surface water were based on total lengths and average widths of each reach sampled. For whirling disease samples, entire fish were frozen prior to shipping to the fish health laboratory in Eagle, ID.

Trout redd counts were performed by walking upstream through the prescribed reach within a week or two following the spawning season.

Water temperature was monitored with continuously recording HOBO Boxcar recording thermographs. The thermographs were programmed to record temperatures every 48 minutes for a 60-day duration then replaced for additional data. Daily mean, maximum and minimum temperatures were calculated from the daily measurements.

White sturgeon *Acipenser transmontanus* were sampled by angling utilizing heavy duty rods and reels equipped with a minimum of 50 pound test line, barbless hooks, and small hatchery trout or nongame fish for bait. White sturgeon spawning activities were monitored by submerging sturgeon egg collection mats immediately downstream of potential spawning areas. The mats were constructed of 90 x 75 x 2.5 cm fibrous air filter material held rigid by a metal frame that was lowered into the river channel and anchored to the shoreline with a rope. Mats were pulled once a week and inspected for egg adherance. The filter material was replaced every few weeks when it became heavily clogged with debris or when large holes formed.

RESULTS AND DISCUSSION

Big Cottonwood Creek

Big Cottonwood Creek is a perennial stream which flows out of the South Hills in south central Idaho into agricultural land northwest of the town of Oakley. The stream flows unimpeded until it reaches the southern boundary of the Big Cottonwood Wildlife Management Area (WMA) where it is diverted from its natural stream channel into a canal during the irrigation season. It is known from previous sampling that good numbers of Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri* exist in Big Cottonwood Creek throughout much of its length (Partridge and Corsi 1993). Utilizing the Smith-Root backpack shocker we electrofished the natural stream channel downstream of the diversion on March 5, 1996, before the irrigation season, to determine the presence of fish within the reach that becomes dewatered. Three reaches were electrofished with one upstream pass. All fish sampled were identified to species, measured and then released upstream of the diversion. The average width of the stream was approximately 3.7 m within all of the reaches and the water temperature was 3°C. The lowermost reach sampled was at the corral near the WMA residence and approximately 3.6 km downstream of the irrigation diversion. Total length of stream sampled at the corral was 65 m. No fish were seen or sampled in that reach. The next reach was 45 m long and approximately 800 m downstream from the irrigation diversion. Two cutthroat trout were sampled from that reach (Table 1). The third reach was also 45 m long and 137 m downstream from the irrigation diversion. A total of 18 cutthroat trout and three mottled sculpin *Cottus bairdi* were sampled from that reach (Table 1).

The sampling efforts indicate that fish do move downstream into the reach that becomes dewatered during the irrigation season. Preventing fish from being lost downstream into the affected reach would be difficult due to the nature of the existing dam at the diversion, particularly during periods of high runoff. There are no plans at this time to modify the structure to keep fish from going down either the natural stream channel or the canal when it is being used.

Big Wood River

Trout Redd Survey

A spawning ground survey was performed on the Big Wood River upstream of Magic Reservoir to monitor spawning activities of brown trout *Salmo trutta* that had moved upstream from the reservoir to spawn. The redd survey was done on November 19, 1996 by walking upstream from the sheep bridge to the outflow of a private pond on the east side of the Big Wood River approximately 1.5 km upstream of the Stanton Crossing bridge. A total of 96 redds were counted (Table 2). More redds may have been present than counted because of poor visibility due to rain.

Table 1. Total length frequencies of fish sampled by electrofishing at two sites on Big Cottonwood Creek at the wildlife management area on March 6, 1996. No fish were sampled at a site near the lower end of the wildlife management area.

Total length (mm)	800 m below diversion		135 m below diversion			
	Cutthroat trout		Cutthroat trout		Mottled sculpin	
	no.	%	no.	%	no.	%
0-9						
10-19						
20-29						
30-39						
40-49						
50-59						
60-69						
70-79						
80-89			2	11.1		
90-99			1	5.6	1	33.3
100-109			3	16.7	1	33.3
110-119					1	33.3
120-129						
130-139						
140-149						
150-159						
160-169						
170-179						
180-189			2	11.1		
190-199			1	5.6		
200-209	1	50.0	3	16.7		
210-219			2	11.1		
220-229	1	50.0	2	11.1		
230-239						
240-249						
250-259						
260-269						
270-279			1	5.6		
280-289			1	5.6		
290-299						
Number:	2		18		3	
Avg length:	215		176		100	
Total sampled:	2		18		3	

Table 2. Brown trout redd counts and spawning activity on the Big Wood River and Rock Creek upstream of Magic Reservoir monitored since 1986.

	Big Wood River[a]					
Date	Reach 1	Reach 2	Reach 3	Reach 4	Total	Rock Creek
Nov. 19, 1986	--[d]	26	--[b]	96	122	--[d]
Nov. 19, 1987	104	62[c]	--[b]	30	196	--[d]
Nov. 15, 1988	13	75	31	39	158	--[d]
Nov. 18, 1989	6	20	33	8	67	1
Nov. 20, 1990	1	25	30	14	70	0
Nov. 15, 1991	3	30	38	15	86	0
Nov. 19, 1992	5	14	9	15	43	0
Nov. 24, 1993	1	28	--[b]	15	43	0
Nov. 16, 1994	9	27	56	5	97	0
Nov. 16, 1995	2	29	54	32	117	0
Nov. 11, 1996	--[d]	8	37	51	96	--[d]

[a] Reach 1 - Rock Creek to Sheep Bridge.
Reach 2 - Sheep Bridge to fence at U.S.G.S. station.
Reach 3 - Fence to Stanton Crossing.
Reach 4 - Stanton Crossing to Davis Pond.
Rock Creek - Highway 20 to mouth.
[b] Combined with previous reach.
[c] A total of 42 female brown trout were trapped and spawned from this reach by Hayspur Hatchery in 1987.
[d] Not surveyed.

Fish Populations

Concerns about whirling disease parasite *Myxosoma cerebralis* led to an investigation by Magic Valley regional and fishery research personnel to determine the presence of the pathogen and its impact on the wild fish population within the Big Wood River drainage for the second year in a row. Wild rainbow trout *O. mykiss* samples collected in early 1995 from the Big Wood River near Hailey and from Warm Springs Creek, a tributary to the Big Wood River, indicated that *M. cerebralis* is present in a small percent of fish within the drainage.

To determine impacts the pathogen may have on the Big Wood River fish population and to continue monitoring population trends since fishing rules were changed in 1990, during the fall of 1996 we estimated fish populations in six reaches that had been sampled in previous years (Figure 1) (Thurow 1990; Partridge and Warren 1994). Total lengths and estimated

surface area of each reach are given in Table 3. Population estimates were made by combining 100 mm size class estimates and by pooling all mark, capture and recapture numbers for all fish >200 mm to compare estimates made by Thurow (1990) and later studies (Partridge and Corsi 1993; Partridge and Warren 1994, 1995; Warren and Partridge 1994; Warren et al. In press).

Total numbers, lengths and weights of fish sampled are given in Tables 4-11. Species sampled include wild and hatchery rainbow trout, brook trout *Salvelinus fontinalis*, mountain whitefish *Prosopium williamsoni*, Wood River sculpin *Cottus leiopomus*, bridgelip sucker *Catostomus columbianus* and longnose dace *Rhinichthys cataractae*. Population estimate data for each reach with corresponding density estimates are given in Table 12 for sampled wild rainbow trout that were greater than or equal to 100 mm long. A comparison of wild rainbow trout population and density estimates for 1996 and previous years is given in Table 13. Percentages and densities of the estimated wild rainbow trout population greater than or equal to 300 mm were calculated for each 100 mm size class for each reach for all years sampled (Table 14).

A subsample of wild rainbow trout was observed for hook scars and the presence and incidence of the *Salmincola sp.* parasitic copepod on the gills (Table 15). Results indicate that the parasite is present on fish in all reaches and that hook scars are more prevalent on fish within the catch and release section although some fish within all reaches had scarring. Although *Myxosoma cerebralis* was found in samples from 1995, at this time there appears to be no impact on the trout population within any Big Wood River reaches surveyed.

Population and density estimates for brook trout and mountain whitefish are given in Table 16 for fish in 100 mm size classes that were greater than or equal to 100 mm. In several size classes there were not enough fish sampled for a population estimate and many of the 95% confidence levels reflect the low numbers of fish sampled in some of the reaches.

East Fork Big Wood River

The East Fork Big Wood River enters the Big Wood River between Hailey and Ketchum, Idaho from the northeast. It flows for approximately 30 km from source to mouth and through the community of Triumph, an old mining site. A road provides access throughout most of the stream's length although various sections flow through private property. No fish are stocked into the stream by the Department of Fish and Game and fishing is regulated by general statewide stream rules. There have been some recent concerns that the mining site may be leaching toxic residues into the stream and ground water. There has also been some interest in the distribution and abundance of Wood River sculpin within various tributaries to the Big Wood River including the East Fork Big Wood River.

Two reaches were sampled by electrofishing with one upstream pass made by backpack electroshocker within each reach (Tables 17-18). The following stream survey summary gives sampling results for the two reaches. Reach 1 was sampled twice because an electrofishing electrode broke during the first sampling attempt on October 18, 1996. Prior to breaking the electrode probe one hatchery rainbow trout (450 mm long), 6 wild rainbow trout (averaging 129 mm long), 1 brook trout (78 mm long), and 4 Wood River sculpin (averaging 57 mm long) were sampled there. One wild rainbow trout 296 mm long had a slightly deformed head possibly due

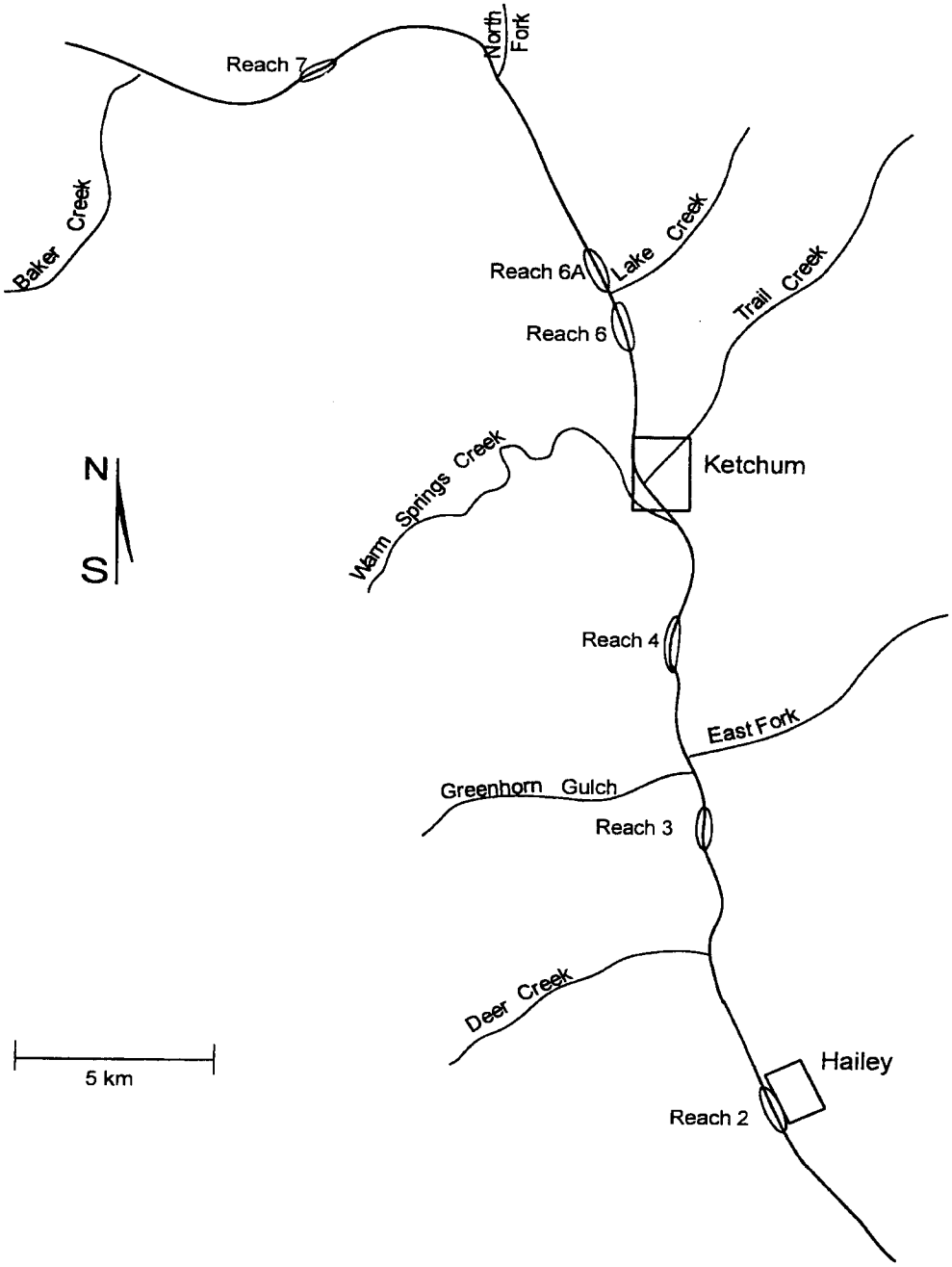

Figure 1. Map of the Big Wood River depicting reaches sampled in 1996.

Table 3. Big Wood River electrofishing reach length and width data from 1996.

	Reach	Length (m)	Mean width (m)	Surface area (ha)
2	Hailey	1,849	18.9	3.50
3	Starweather	1,022	25.8	2.64
4	Gimlet	1,472	21.2	3.12
6	Hulen Meadows	1,205	16.6	1.99
6A	Lake Creek	1,028	17.5	1.80
7	Kendall Gulch	1,068	13.0	1.39

Table 4. Total length frequencies of gamefish sampled with two passes of electrofishing in reach 2 (at Hailey) on the Big Wood River, September 26 and October 3, 1996. Sample includes recaptured fish in second pass. Average weights of subsamples within each 10 mm length group are included.

Total length (mm)	Wild rainbow trout				Hatchery rainbow trout				Brown trout		Brook trout				Mountain whitefish			
	Length		Weight (g)		Length		Weight (g)		Length		Length		Weight (g)		Length		Weight (g)	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.
0-9																		
10-19																		
20-29																		
30-39																		
40-49	3	0.2																
50-59	16	1.0																
60-69	21	1.4													1	0.2		
70-79	15	1.0																
80-89	9	0.6									4	9.1			1	0.2		
90-99	11	0.7									2	4.5			4	0.7		
100-109	40	2.6	16	10							5	11.4	4	9	18	3.2	5	9
110-119	64	4.2	6	13							4	9.1	3	14	17	3.0	7	11
120-129	65	4.3	11	18											7	1.3	3	14
130-139	84	5.5	14	22														
140-149	65	4.3	17	28											1	0.2		
150-159	60	3.9	9	36							1	2.3			2	0.4	1	37
160-169	41	2.7	10	40							2	4.5	1	44				
170-179	54	3.5	17	49							2	4.5	1	50	6	1.1	1	52
180-189	47	3.1	13	59							5	11.4	3	57	6	1.1	1	68
190-199	51	3.3	18	67							3	6.8	2	68	23	4.1	4	71

Table 4. Continued.

Total length (mm)	Wild rainbow trout				Hatchery rainbow trout				Brown trout		Brook trout				Mountain whitefish			
	Length		Weight (g)		Length		Weight (g)		Length		Length		Weight (g)		Length		Weight (g)	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.
200-209	45	2.9	11	80							4	9.1	4	73	63	11.3	9	80
210-219	55	3.6	8	91							3	6.8	2	100	59	10.5	9	87
220-229	71	4.7	15	105	4	5.1					1	2.3	1	105	77	13.8	10	106
230-239	92	6.0	10	114	4	5.1									113	20.2	12	118
240-249	62	4.1	11	134	8	10.3									88	15.7	17	135
250-259	75	4.9	11	151	7	9.0									40	7.1	10	162
260-269	85	5.6	13	177	15	19.2									6	1.1	4	185
270-279	72	4.7	9	189	5	6.4					1	2.3			4	0.7	2	208
280-289	43	2.8	5	206	6	7.7	1	245			2	4.5			2	0.4	1	201
290-299	39	2.6	12	237	8	10.3					1	2.3						
300-309	41	2.7	9	256	8	10.3					1	2.3			2	0.4	1	263
310-319	26	1.7	9	297	4	5.1					3	6.8	2	306	2	0.4	1	324
320-329	22	1.4	9	314	2	2.6									1	0.2		
330-339	19	1.2	8	339											2	0.4	1	463
340-349	21	1.4	7	376	2	2.6	1	400										
350-359	16	1.0	7	394	1	1.3	1	540							1	0.2	1	485
360-369	14	0.9	5	454	1	1.3	1	533							3	0.5	1	602
370-379	16	1.0	10	483	2	2.6	1	572							2	0.4	1	520
380-389	13	0.9	6	511											2	0.4	1	550
390-399	10	0.7	6	536											2	0.4	1	561
400-409	14	0.9	8	601														
410-419	8	0.5	3	669											1	0.2		

Table 4. Continued.

Total length (mm)	Wild rainbow trout				Hatchery rainbow trout				Brown trout		Brook trout				Mountain whitefish			
	Length		Weight (g)		Length		Weight (g)		Length		Length		Weight (g)		Length		Weight (g)	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.
420-429	5	0.3	1	687														
430-439	7	0.5	5	756														
440-449	4	0.3	1	743	1	1.3	1	1,075							1	0.2	1	628
450-459	1	0.1													2	0.4		
460-469	3	0.2	1	872											1	0.2		
470-479	1	0.1	1	797														
480-489																		
490-499																		
500-509																		
510-519																		
520-529																		
530-539																		
540-549									1	100.0								
Number:	1,526				78				1		44				560			
Avg length:	218				280				545		179				223			
Total sampled:	1,526				78				1		44				560			

[1] This brown trout was sampled, marked and released in reach 3 on September 23, 1996 then recaptured in reach 2 on October 3, 1996.

Table 5. Total length frequencies of nongame fish sampled with two passes of electrofishing in reach 2 (at Hailey) on the Big Wood River, September 26 and October 3, 1996. Sample includes recaptured fish in second pass.

Total length (mm)	Wood River sculpin Length no.	Wood River sculpin Length %	Bridgelip sucker Length no.	Bridgelip sucker Length %
0-9				
10-19				
20-29				
30-39				
40-49				
50-59	3	4.3	1	2.0
60-69	16	23.2	2	4.1
70-79	14	20.3	1	2.0
80-89	8	11.6	6	12.2
90-99	16	23.2	5	10.2
100-109	9	13.0	2	4.1
110-119	3	4.3	2	4.1
120-129			8	16.3
130-139			8	16.3
140-149			8	16.3
150-159			2	4.1
160-169			1	2.0
170-179			2	4.1
180-189			1	2.0
190-199				
Number:	69		49	
Avg length:	83		120	
Total sampled:	69		49	

Table 6. Total length frequencies of gamefish sampled with two passes of electrofishing in reach 3 (Starweather) on the Big Wood River, September 23 and September 30, 1996. Sample includes recaptured fish in second pass. Average weights of subsamples within each 10 mm length group are included.

Total length (mm)	Wild rainbow trout				Hatchery rainbow trout		Brown trout				Brook trout				Mountain whitefish				Wood River sculpin	
	Length		Weight (g)		Length		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
0-9																				
10-19																				
20-29																			4	4.0
30-39	1	0.1																	6	5.9
40-49	19	1.8																		
50-59	101	9.5																	6	5.9
60-69	76	7.1	1	2															14	13.9
70-79	31	2.9	1	4											3	5.8			16	15.8
80-89	14	1.3	1	7							4	50.0			1	1.9			13	12.9
90-99	12	1.1									2	25.0			2	3.8	1	8	16	15.8
100-109	34	3.2	10	10							1	12.5			5	9.6	2	9	20	19.8
110-119	48	4.5	11	13											2	3.8	1	12	4	4.0
120-129	43	4.0	10	18											1	1.9	1	16	2	2.0
130-139	44	4.1	9	23											1	1.9	1	18		
140-149	40	3.7	10	27							1	12.5	1	31						
150-159	24	2.2	8	38																
160-169	28	2.6	12	40																
170-179	25	2.3	9	53											1	1.9	1	51		
180-189	19	1.8	7	62											1	1.9	1	50		
190-199	17	1.6	8	72																

Table 6. Continued.

	Wild rainbow trout				Hatchery rainbow trout		Brown trout				Brook trout				Mountain whitefish				Wood River sculpin	
	Length		Weight (g)		Length		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length	
Total length (mm)	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
200-209	17	1.6	5	82											1	1.9	1	82		
210-219	22	2.1	7	99											3	5.8	2	97		
220-229	34	3.2	9	108											6	11.5	2	107		
230-239	35	3.3	13	123											2	3.8	2	112		
240-249	44	4.1	11	135											2	3.8				
250-259	54	5.1	14	160											2	3.8				
260-269	49	4.6	15	178																
270-279	37	3.5	12	245																
280-289	27	2.5	8	223	1	100														
290-299	21	2.0	9	253																
300-309	18	1.7	8	276																
310-319	16	1.5	9	318																
320-329	12	1.1	6	334																
330-339	8	0.7	6	373											2	3.8				
340-349	9	0.8	5	394																
350-359	10	0.9	5	424																
360-369	10	0.9	6	427											3	5.8	2	600		
370-379	6	0.6	6	504											2	3.8	2	533		
380-389	11	1.0	3	512																
390-399	12	1.1	4	596											1	1.9	1	770		

Table 6. Continued.

	Wild rainbow trout				Hatchery rainbow trout		Brown trout				Brook trout				Mountain whitefish				Wood River sculpin	
	Length		Weight (g)		Length		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length	
Total length (mm)	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
400-409	10	0.9	7	637											3	5.8	1	821		
410-419	10	0.9	6	680											2	3.8	1	730		
420-429	7	0.7	2	690											1	1.9	1	910		
430-439	4	0.4	2	821											2	3.8	1	979		
440-449	5	0.5	3	862											2	3.8	2	898		
450-459	2	0.2	2	963											1	1.9				
460-469	2	0.2	2	994																
470-479																				
480-489																				
490-499																				
500-509																				
510-519																				
520-529																				
530-539								[1]												
540-549							1	100.0												
Number:	1,068				4		1				8				52				101	
Avg length:	189				283		545				98				251				80	
Total sampled:	1,068				4		1				8				52				101	

[1] This brown trout was sampled, marked and released.

Table 7. Total length frequencies of gamefish sampled with two passes of electrofishing in reach 4 (Gimlet) on the Big Wood River on September 25 and October 2, 1996. Sample includes recaptured fish in second pass. Average weights of subsamples within each 10 mm length group are included.

	Wild rainbow trout				Hatchery rainbow trout				Cutthroat trout				Brook trout				Mountain whitefish			
Total	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)	
length (mm)	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.
0-9																				
10-19																				
20-29																				
30-39	1	0.1																		
40-49	12	0.8																		
50-59	49	3.2																		
60-69	54	3.5																		
70-79	22	1.4																		
80-89	7	0.5	1	6									1	3.1			1	1.3		
90-99	30	2.0	5	9									5	15.6			1	1.3		
100-109	55	3.6	15	11									2	6.3	2	11	2	2.5	1	7
110-119	64	4.2	26	15									1	3.1	1	29	2	2.5	2	13
120-129	75	4.9	18	18													3	3.8	2	13
130-139	60	3.9	15	24																
140-149	67	4.4	20	33													1	1.3		
150-159	42	2.7	12	50													1	1.3		
160-169	36	2.4	16	42									1	3.1			1	1.3		
170-179	17	1.1	6	56													1	1.3	1	46
180-189	18	1.2	8	58									1	3.1	1	70	1	1.3	1	74
190-199	19	1.2	12	71									3	9.4	2	73	2	2.5	2	72
200-209	17	1.1	8	86									1	3.1			2	2.5	1	80
210-219	22	1.4	12	100									1	3.1			3	3.8	1	114

Table 7. Continued.

Total	Wild rainbow trout				Hatchery rainbow trout				Cutthroat trout				Brook trout				Mountain whitefish			
	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)	
length (mm)	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.
220-229	33	2.2	8	116									2	6.3			5	6.3	3	110
230-239	47	3.1	18	128									2	6.3	1	125	5	6.3	3	126
240-249	73	4.8	20	155					1	50.0	1	119	2	6.3	2	159	7	8.9	5	136
250-259	77	5.0	25	177	1	25.0							2	6.3	2	147	5	6.3	3	207
260-269	66	4.3	28	183									4	12.5	3	184				
270-279	90	5.9	33	216																
280-289	57	3.7	25	232																
290-299	47	3.1	15	251													1	1.3	1	270
300-309	35	2.3	16	286									2	6.3	1	295				
310-319	21	1.4	7	293									2	6.3						
320-329	28	1.8	10	324																
330-339	29	1.9	9	372					1	50.0	1	370					3	3.8	2	455
340-349	29	1.9	9	386													1	1.3		
350-359	25	1.6	6	433													4	5.1	3	511
360-369	24	1.6	13	458	2	50.0	1	525									3	3.8	2	601
370-379	31	2.0	9	453													5	6.3	3	619
380-389	32	2.1	13	531													1	1.3	1	650
390-399	24	1.6	11	588	1	25.0	1	710												
400-409	21	1.4	8	608													1	1.3	1	820
410-419	32	2.1	15	626													5	6.3	4	878

Table 7. Continued.

Total	Wild rainbow trout				Hatchery rainbow trout				Cutthroat trout				Brook trout				Mountain whitefish			
	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)	
length (mm)	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.
420-429	20	1.3	8	643													3	3.8	1	730
430-439	11	0.7	9	800													1	1.3	1	775
440-449	6	0.4	6	798													4	5.1	2	1,040
450-459	4	0.3	1	835													4	5.1	1	851
460-469	1	0.1	1	750																
470-479																				
480-489																				
490-499																				
Number:	1,530				4				2				32				79			
Avg length:	227				346				288				201				288			
Total sampled:	1,530				4				2				32				79			

Table 8. Total length frequencies of nongame fish sampled with two passes of electrofishing in reach 4 (Gimlet) on the Big Wood River, September 25 and October 2, 1996. Sample includes recaptured fish in second pass.

Total length (mm)	Wood River sculpin Length no.	Wood River sculpin Length %	Bridgelip sucker Length no.	Bridgelip sucker Length %	Longnose dace Length no.	Longnose dace Length %
0-9						
10-19						
20-29	1	1.4				
30-39	2	2.7				
40-49						
50-59	3	4.1			1	100.0
60-69	22	30.1				
70-79	10	13.7				
80-89	9	12.3	4	30.8		
90-99	6	8.2				
100-109	11	15.1	1	7.7		
110-119	6	8.2	3	23.1		
120-129	3	4.1	2	15.4		
130-139						
140-149			2	15.4		
150-159						
160-169						
170-179						
180-189			1	7.7		
190-199						
Number:	73		13		1	
Avg length:	81		116		58	
Total sampled:	73		13		1	

Table 9. Total length frequencies of gamefish sampled with two passes of electrofishing in reach 6 (Lake Creek area) on the Big Wood River, September 24 and October 1, 1996. Sample includes recaptured fish in second pass. Average weights of subsamples within each 10 mm length group are included.

	Wild rainbow trout				Hatchery rainbow trout				Brook trout				Mountain whitefish				Wood River sculpin	
Total	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length	
length (mm)	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	avg.
0-9																		
10-19																		
20-29																		
30-39	1	0.2																
40-49	12	2.7																
50-59	22	4.9															9	15.5
60-69	21	4.7															6	10.3
70-79	6	1.3							1	3.4			1	2.9			10	17.2
80-89	12	2.7							4	13.8			5	14.3			11	19.0
90-99	31	7.0							4	13.8			1	2.9			9	15.5
100-109	44	9.9	9	11					1	3.4	1	19	1	2.9			10	17.2
110-119	30	6.7	12	12									2	5.7			2	3.4
120-129	23	5.2	12	25					1	3.4			1	2.9	1	13	1	1.7
130-139	15	3.4	9	21					2	6.9	1	20						
140-149	8	1.8	7	35														
150-159	5	1.1	5	35														
160-169	13	2.9	7	39					1	3.4	1	41						
170-179	21	4.7	14	57														
180-189	9	2.0	6	60					2	6.9	1	60						
190-199	7	1.6	6	74					2	6.9	2	68	1	2.9	1	64		

Table 9. Continued.

Total length (mm)	Wild rainbow trout				Hatchery rainbow trout				Brook trout				Mountain whitefish				Wood River sculpin	
	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	avg.
200-209	7	1.6	6	89					3	10.3	3	86						
210-219	7	1.6	6	94	1	6.7												
220-229	7	1.6	4	107					3	10.3	3	118						
230-239	6	1.3	3	124	1	6.7			1	3.4	1	122						
240-249	6	1.3	5	137	1	6.7			1	3.4	1	410	1	2.9				
250-259	2	0.4	2	156	3	20.0												
260-269	12	2.7	8	175	5	33.3												
270-279	6	1.3	5	216	1	6.7			1	3.4	1	210						
280-289	14	3.1	10	230														
290-299	10	2.2	8	251														
300-309	14	3.1	9	278					1	3.4	1	370						
310-319	6	1.3	5	296														
320-329	5	1.1	4	333														
330-339	8	1.8	5	360	1	6.7	1	420	1	3.4	1	383						
340-349	4	0.9	3	378	1	6.7	1	430					2	5.7	2	470		
350-359	8	1.8	7	391									1	2.9				
360-369	3	0.7	2	523									2	5.7	2	530		
370-379	2	0.4	1	545									1	2.9	1	515		
380-389	9	2.0	9	526									1	2.9	1	638		
390-399	5	1.1	5	599									4	11.4	3	709		
400-409	3	0.7	3	612									4	11.4	3	705		
410-419	9	2.0	6	667	1	6.7	1	806										

Table 9. Continued.

Total length (mm)	Wild rainbow trout Length no.	Wild rainbow trout Length %	Wild rainbow trout Weight (g) no.	Wild rainbow trout Weight (g) avg.	Hatchery rainbow trout Length no.	Hatchery rainbow trout Length %	Hatchery rainbow trout Weight (g) no.	Hatchery rainbow trout Weight (g) avg.	Brook trout Length no.	Brook trout Length %	Brook trout Weight (g) no.	Brook trout Weight (g) avg.	Mountain whitefish Length no.	Mountain whitefish Length %	Mountain whitefish Weight (g) no.	Mountain whitefish Weight (g) %	Wood River sculpin Length no.	Wood River sculpin Length avg.
420-429	4	0.9	3	776									3	8.6	2	933		
430-439	2	0.4	2	850									2	5.7	1	1,025		
440-449	1	0.2	1	607														
450-459	2	0.4	2	873									1	2.9	1	1,099		
460-469	3	0.7	3	831									1	2.9	1	1,190		
470-479	1	0.2	1	930														
480-489																		
490-499																		
Number:	446				15				29				35				58	
Avg. length:	186				275				168				292				83	
Total sampled:	446				15				29				35				58	

Table 10. Total length frequencies of gamefish sampled with two passes of electrofishing in reach 6A (highway diversion channel) on the Big Wood River, September 24 and October 1, 1996. Sample includes recaptured fish in second pass. Average weights of subsamples within each 10 mm length group are included.

Total length (mm)	Wild rainbow trout				Hatchery rainbow trout		Brook trout				Mountain whitefish				Wood River sculpin	
	Length		Weight (g)		Length		Length		Weight (g)		Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
0-9																
10-19																
20-29																
30-39	6	1.1														
40-49	9	1.7														
50-59	35	6.7	5	2											5	10.9
60-69	41	7.8					1	6.7							4	8.7
70-79	18	3.4	1	36							12	17.9	2	2	12	26.1
80-89	31	5.9	2	5			1	6.7			5	7.5	2	4	13	28.3
90-99	53	10.1	8	9			1	6.7							7	15.2
100-109	58	11.0	13	10							1	1.5	1	10	4	8.7
110-119	34	6.5	11	14											1	2.2
120-129	26	5.0	12	23												
130-139	6	1.1	5	21			1	6.7	1	20						
140-149	5	1.0	5	27							1	1.5	1	24		
150-159	14	2.7	10	33												
160-169	13	2.5	9	39												
170-179	14	2.7	7	47			6	40.0	4	52						
180-189	13	2.5	8	61			2	13.3	1	34						
190-199	12	2.3	7	68												

Table 10. Continued.

Total length (mm)	Wild rainbow trout				Hatchery rainbow trout		Brook trout				Mountain whitefish				Wood River sculpin	
	Length		Weight (g)		Length		Length		Weight (g)		Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
200-209	6	1.1	4	82												
210-219	4	0.8	3	92			1	6.7	1	99						
220-229	9	1.7	8	110												
230-239	11	2.1	7	138	2	8.7										
240-249	5	1.0	4	140	8	34.8										
250-259	5	1.0	5	158	6	26.1										
260-269	2	0.4	1	170	3	13.0										
270-279	7	1.3	4	209	2	8.7	1	6.7	1	210						
280-289	7	1.3	6	201			1	6.7	1	260						
290-299	7	1.3	5	258												
300-309	7	1.3	5	275												
310-319	3	0.6	3	309												
320-329	5	1.0	3	333							1	1.5	1	355		
330-339	7	1.3	6	353							1	1.5	1	495		
340-349	6	1.1	5	435							2	3.0	2	484		
350-359	5	1.0	4	419	2	8.7										
360-369	4	0.8	2	465							4	6.0	4	572		
370-379	5	1.0	4	491							3	4.5	2	507		
380-389	4	0.8	3	534							3	4.5	2	613		
390-399	2	0.4	2	545							5	7.5	5	764		
400-409											1	1.5	1	832		
410-419	8	1.5	6	683							4	6.0	4	752		

Table 10. Continued.

Total length (mm)	Wild rainbow trout				Hatchery rainbow trout		Brook trout				Mountain whitefish				Wood River sculpin	
	Length		Weight (g)		Length		Length		Weight (g)		Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
420-429	2	0.4	2	705							9	13.4	6	804		
430-439	3	0.6	3	838							3	4.5	3	846		
440-449	5	1.0	5	828							3	4.5	2	948		
450-459	2	0.4	1	910							6	9.0	6	1,003		
460-469	3	0.6	2	832												
470-479	1	0.2	1	810							3	4.5	2	808		
480-489	1	0.2	1	1,003												
490-499	1	0.2	1	1,325												
Number:	525				23		15				67				46	
Avg length:	160				261		170				317				80	
Total sampled:	525				23		15				67				46	

Table 11. Total length frequencies of gamefish sampled with two passes of electrofishing in reach 7 (Kendall Gulch) on the Big Wood River, October 8 and October 15, 1996. Sample includes recaptured fish in second pass. Average weights of subsamples within each 10 mm length group are included.

	Wild rainbow trout				Hatchery rainbow trout				Brook trout				Mountain whitefish				Wood River sculpin	
Total	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length	
length (mm)	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	avg.
0-9																		
10-19																		
20-29																	2	2.4
30-39	8	3.8																
40-49	45	21.3																
50-59	17	8.1															6	7.2
60-69	2	0.9							2	20.0							4	4.8
70-79	1	0.5	1	4													4	4.8
80-89	8	3.8															23	27.7
90-99	5	2.4	5	8					1	10.0	1	5					20	24.1
100-109	19	9.0	14	10					1	10.0	1	11					16	19.3
110-119	7	3.3	7	13					1	10.0	1	15					3	3.6
120-129	6	2.8	6	17													3	3.6
130-139	8	3.8	6	21													2	2.4
140-149	10	4.7	7	24					2	20.0	1	28						
150-159	4	1.9	4	32														
160-169	7	3.3	7	39														
170-179	15	7.1	9	47					1	10.0	1	49						
180-189	4	1.9	2	58														
190-199	9	4.3	6	67					1	10.0	1	61						

Table 11. Continued.

Total length (mm)	Wild rainbow trout				Hatchery rainbow trout				Brook trout				Mountain whitefish				Wood River sculpin	
	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	avg.
200-209	4	1.9	3	92														
210-219	5	2.4	5	120	1	2.6			1	10.0	1	95						
220-229	2	0.9	2	113	1	2.6												
230-239	1	0.5			1	2.6												
240-249	5	2.4	3	119	4	10.5												
250-259	2	0.9	1	157	5	13.2												
260-269					9	23.7												
270-279	1	0.5	1	217	4	10.5												
280-289	2	0.9	1	253	4	10.5												
290-299					1	2.6												
300-309					3	7.9												
310-319	1	0.5	1	304														
320-329	2	0.9	2	358														
330-339	5	2.4	3	349	1	2.6	1.0	458					1	2.3	1	350		
340-349					1	2.6	1.0	470										
350-359	1	0.5	1	428	1	2.6												
360-369	2	0.9	1	568	1	2.6	1.0	520					10	22.7	5	506		
370-379													6	13.6	5	578		
380-389	3	1.4	1	553	1	2.6	1.0	643					9	20.5	4	667		
390-399													8	18.2	6	647		
400-409													3	6.8	3	758		
410-419													2	4.5	1	722		
420-429													3	6.8	2	780		

Table 11. Continued.

Total length (mm)	Wild rainbow trout Length no.	Wild rainbow trout Length %	Wild rainbow trout Weight (g) no.	Wild rainbow trout Weight (g) avg.	Hatchery rainbow trout Length no.	Hatchery rainbow trout Length %	Hatchery rainbow trout Weight (g) no.	Hatchery rainbow trout Weight (g) avg.	Brook trout Length no.	Brook trout Length %	Brook trout Weight (g) no.	Brook trout Weight (g) avg.	Mountain whitefish Length no.	Mountain whitefish Length %	Mountain whitefish Weight (g) no.	Mountain whitefish Weight (g) %	Wood River sculpin Length no.	Wood River sculpin Length avg.
430-439																		
440-449																		
450-459													1	2.3	1	905		
460-469													1	2.3				
470-479																		
480-489																		
490-499																		
Number:	211				38				10				44				83	
Avg. length:	130				276				132				387				90	
Total sampled:	211				38				10				44				83	

Table 12. Population estimates and densities of wild rainbow trout (≥100 mm) by size classes in the Big Wood River, 1996.

Reach/ size(mm)	Number marked	Number caught	Number recaptured	Population estimate	95% CI	No./ 100 m	No./ha
Hailey, Reach 2							
100-199	182	387	40	1,732	±495	93.7	495
200-299	288	349	90	1,111	±195	60.1	317
300-399	109	89	43	225	±47	12.2	64
400-499	23	20	9	50	±21	2.7	14
SUM (≥200)				1,387	±202	75.0	396
ALL ≥200	420	458	142	1,351	±183	73.1	386
Starweather, Reach 3							
100-199	187	134	22	1,103	±402	107.9	418
200-299	212	124	52	502	±102	49.1	190
300-399	72	39	15	183	±67	17.9	69
400-499	23	17	6	62	±33	6.1	23
SUM (≥200)				747	±126	73.1	283
ALL ≥200	307	180	73	753	±131	73.7	285
Gimlet, Reach 4							
100-199	226	211	46	1,024	±256	69.6	328
200-299	271	252	81	839	±148	57.0	269
300-399	140	137	59	324	±61	22.0	104
400-499	49	46	16	138	±51	9.4	44
SUM (≥200)				1,302	±168	88.5	417
ALL ≥ 200	460	435	156	1,280	±160	87.0	410
Lake Creek, Reach 6							
100-199	75	99	19	380	±145	31.5	191
200-299	44	33	15	96	±33	8.0	48
300-399	49	15	11	67	±18	5.6	34
400-499	19	6	3	35	±20	2.9	18
SUM (≥200)				197	±43	16.3	99
ALL ≥ 200	112	54	29	207	±49	17.2	104
Highway Channel, Reach 6A							
100-199	92	102	35	266	±69	25.9	148
200-299	37	26	14	68	±22	6.6	38
300-399	30	18	10	54	±20	5.3	30
400-499	18	8	4	34	±18	3.3	19
SUM (≥ 200)				156	±35	15.2	87
ALL ≥ 200	85	52	28	157	±38	15.3	87
Kendall Gulch, Reach 7							
100-199	46	40	21	88	±24	8.2	63
200-299	13	9	7	18	±5	1.7	13
300-399	9	5	5	10	±0	0.9	7
400-499	0	0	0	-	-	-	-
SUM (≥ 200)				29	±5	2.7	21
ALL ≥ 200	22	14	12	27	±5	2.5	19

Table 13. Estimated wild rainbow trout (≥200 mm) populations and densities in the Big Wood River. Data from 1986-1988 is from Thurow (1990), data from 1991 is from Partridge and Warren (1994), data from 1992 is from Warren and Partridge (1994), and data from 1995 is from Warren et al. (In Press).

Reach	Year	Season	Pop. estimate	95% CI	Trout/100 m	Trout/ha
2	1986	Summer	352	218-598	17.6	97
	1987	Summer	544	292-1,113	27.2	177
	1987	Fall	583	338-1,093	29.2	189
	1988	Summer	1,038	749-1,483	51.9	353
	1992	Fall	974	834-1,114	48.7	331
	1995	Fall	979	789-1,170	52.7	263
	1996	Fall	1,351	1,168-1,534	73.1	386
3	1986	Summer	460	254-920	43.1	211
	1986	Fall	81	42-171	7.6	37
	1987	Summer	244	147-433	22.9	137
	1987	Fall	220	128-413	20.6	123
	1988	Summer	392	278-569	36.7	232
	1991	Summer	547	350-743	45.3	191
	1993	Fall	329	221-437	30.7	92
	1995	Fall	449	311-587	44.7	213
	1996	Fall	753	622-884	73.7	285
4	1986	Summer	675	431-1,898	34.1	197
	1986	Fall	455	258-878	23.0	133
	1987	Summer	955	609-1,577	48.3	318
	1987	Fall	301	187-512	15.2	100
	1988	Summer	808	601-1,111	40.8	276
	1992[a]	Fall	895	713-1,077	79.9	406
	1993	Fall	1,001	770-1,232	64.2	326
	1995	Fall	985	835-1,135	67.8	343
	1996	Fall	1,280	1,120-1,440	87.0	410
6	1986	Summer	125	73-235	10.9	72
	1986	Fall	168	107-277	14.6	97
	1987	Summer	176	83-405	15.3	104
	1987	Fall	161	97-285	14.0	95
	1988	Summer	90	50-180	7.8	54
	1990[b]	Fall	199	141-289	12.1	86
	1991	Summer	132	94-171	11.4	81
	1992	Fall	209	171-243	18.2	129
	1993	Fall	213	141-285	17.3	118
	1995	Fall	188	106-268	15.5	100
	1996	Fall	207	158-256	17.2	104
6A	1991	Summer	126	63-189	12.9	86
	1992	Fall	113	85-141	11.6	77
	1993	Fall	269	174-364	25.2	174
	1995	Fall	259	153-365	26.9	172
	1996	Fall	157	119-195	15.3	87
7	1986	Summer	43	19-108	4.0	32
	1987	Summer	20	10-40	1.9	-
	1996	Fall	27	22-32	2.5	19

[a] Section length reduced due to low river flows.
[b] Includes portion of old highway river site; section length estimated to be 1.65 km and area of 2.32 ha.

Table 14. Estimated percentages and numbers of wild rainbow trout (≥200 mm only) that exceeded 300, 400, and 500 mm in the Big Wood River. Estimates from 1986-1988 adjusted for sampling efficiency. Data from 1986-1988 is from Thurow (1990), data from 1991 is from Partridge and Warren (1994), data from 1992 is from Warren and Partridge (1994), and data from 1995 is from Warren, Partridge and Frank (In Press).

		Percent			Wild rainbow trout/km		
Reach	Year	≥300	≥400	≥500	≥300	≥400	≥500
2,3,4[a]	1986-88[a]	21	5	<0.1	76	17	0.2
2	1992	10	1	0	51	4	0
	1995	12	2	0	66	13	0
	1996	20	4	0	252	27	0
3	1991	27	7	0	125	31	0
	1993	28	8	0	82	22	0
	1995	36	10	0	155	42	0
	1996	33	8	0	244	61	0
4	1992	50	12	0	226	57	0
	1993	40	15	0	258	97	0
	1995	52	10	0	352	69	0
	1996	35	10	0	418	94	0
6	1986-88[a]	27	4	0.4	30	5	0.4
	1990[b]	29	7	0	35	8	0
	1991	21	5	0	23	5	0
	1992	29	8	0	51	14	0
	1993	25	2	0	51	5	0
	1995	45	22	0	68	33	0
	1996	52	18	0	96	29	0
6A	1991	13	4	0	18	6	0
	1992	11	0	0	13	0	0
	1993	17	1	0	45	4	0
	1995	40	9	0	101	22	0
	1996	56	22	0	87	33	0
7	1986-88[a]	8	0	0	2	0	0
	1996	37	0	0	9	0	0

[a] Pooled data.
[b] Includes a portion of old highway river site, total sample length estimated to be 1.65 km.

Table 15. Percent of wild rainbow trout with observed hook scars and attached parasitic copepods *Salmincola sp.* in the Big Wood River in 1996.

Reach	Sample size	Hook scars (%)	Number of parasites on gills (%)			
			0	1-3	4-6	7+
2 (Hailey)	91	16	54	24	14	8
3 (Starweather)	187	14	72	19	6	3
4 (Gimlet)	178	25	52	21	9	18
6 (Lake Creek)	140	19	46	21	11	23
6A (Highway Channel)			No samples taken			
7 (Kendall Gulch)	46	2	80	17	2	0

Table 16. Population and density estimates of brook trout and mountain whitefish (≥100 mm) by size classes in the Big Wood River, 1996.

Reach/ size (mm)	Number marked	Number caught	Number recaptured	Population estimate	95% CI	No./100 m	No./ha
				Mountain whitefish			
Hailey, Reach 2							
100-199	33	30	3	264	±216	14.3	78
200-299	295	156	72	637	±106	34.4	187
300-399	8	9	3	23	±15	1.2	7
400-499	4	1	1	5	±0	0.3	2
SUM (≥200)				664	±107	35.9	195
ALL ≥200	307	166	76	668	±109	36.1	196
Starweather, Reach 3							
100-199	7	2	0	-	-	-	-
200-299	11	3	2	16	±8	1.6	6
300-399	4	4	2	8	±5	0.8	3
400-499	4	6	4	7	±3	0.7	3
SUM (≥200)				31	±10	3.0	12
ALL ≥200	19	13	8	31	±12	3.0	12
Gimlet, Reach 4							
100-199	3	9	1	20	±20	1.3	6
200-299	12	11	1	78	±81	5.3	25
300-399	10	6	2	26	±19	1.8	8
400-499	11	6	4	17	±7	1.1	5
SUM (≥200)				120	±83	8.1	38
ALL ≥200	33	23	7	102	±54	6.9	33
Lake Creek, Reach 6							
100-199	2	2	1	5	±3	0.4	2
200-299	1	0	0	-	-	-	-
300-399	4	6	2	12	±9	1.0	6
400-499	9	2	2	10	±0	0.8	5
SUM (≥200)				22	±9	1.8	11
ALL ≥200	14	8	4	27	±14	2.2	14
Highway Channel, Reach 6A							
100-199	1	1	0	-	-	-	-
200-299	0	0	0	-	-	-	-
300-399	9	10	2	37	±31	3.6	21
400-499	14	15	5	40	±23	3.9	22
SUM (≥200)				77	±39	7.5	43
ALL ≥200	23	25	7	78	±42	7.6	43
Kendall Gulch, Reach 7							
100-199	0	0	0	-	-	-	-
200-299	0	0	0	-	-	-	-
300-399	20	14	13	23	±3	2.2	16
400-499	6	4	3	9	±3	0.8	6
SUM (≥200)				32	±5	3.0	23
ALL ≥200	26	18	16	30	±5	2.8	22

Table 16. Continued.

Reach/ size (mm)	Number marked	Number caught	Number recaptured	Population estimate	95% CI	No./100 m	No./ha
				Brook trout			
Hailey, Reach 2							
100-199	7	15	2	43	±38	2.3	13
200-299	5	7	0	-	-	-	-
300-399	2	2	1	4	±3	0.2	1
400-499	0	0	0	-	-	-	-
SUM (≥200)				4	±3	0.2	1
ALL ≥200	7	9	1	40	±40	2.2	12
Starweather, Reach 3							
100-199	1	1	0	-	-	-	-
200-299	0	0	0	-	-	-	-
300-399	0	0	0	-	-	-	-
400-499	0	0	0	-	-	-	-
SUM (≥200)				-	-	-	-
ALL ≥200	0	0	0	-	-	-	-
Gimlet, Reach 4							
100-199	4	4	0	-	-	-	-
200-299	6	8	2	21	17	1.4	7
300-399	2	2	2	3	±0	0.2	1
400-499	0	0	0	-	-	-	-
SUM (≥200)				24	±17	1.6	8
ALL ≥ 200	8	10	4	20	±12	1.4	6
Lake Creek, Reach 6							
100-199	3	7	1	16	±16	1.3	8
200-299	0	5	0	-	-	-	-
300-399	1	1	0	-	-	-	-
400-499	0	0	0	-	-	-	-
SUM (≥200)					-	-	-
ALL ≥200	1	6	0	-	-	-	-
Highway Channel, Reach 6A							
100-199	1	4	3	8			
200-299	2	1	0	-	-	-	-
300-399	0	0	0	-	-	-	-
400-499	0	0	0	-	-	-	-
SUM ≥200)				-	-	-	-
ALL ≥200	2	1	0	-	-	-	-
Kendall Gulch, Reach 7							
100-199	5	1	0	-	-	-	-
200-299	0	1	0	-	-	-	-
300-399	0	0	0	-	-	-	-
400-499	0	0	0	-	-	-	-
SUM (≥200)				-	-	-	-
ALL ≥ 200	0	1	0	-	-	-	-

Table 17. Total length frequencies and weights of fish sampled with one pass of electrofishing in reach 1 of the East Fork Big Wood River, October 23, 1996. Average weights of subsamples within each 10 mm length group are included.

Length range (mm)	Wild rainbow trout				Hatchery rainbow trout				Brook trout				Wood River sculpin	
	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
0-9														
10-19														
20-29													1	6.7
30-39	3	7.7											2	13.3
40-49	4	10.3												
50-59	13	33.3												
60-69	4	10.3											3	20.0
70-79	1	2.6											3	20.0
80-89									2	66.7	2	5	3	20.0
90-99													2	13.3
100-109	2	5.1	2	12									1	6.7
110-119	3	7.7	3	13										
120-129	1	2.6	1	14										
130-139	1	2.6	1	21										
140-149														
150-159														
160-169	2	5.1	2	37										
170-179														
180-189	1	2.6	1	58										
190-199														
200-209														
210-219														
220-229														
230-239	1	2.6	1	146										
240-249														
250-259														
260-269														
270-279														
280-289	1	2.6	1	230										
290-299									1	33.3	1	204		
300-309	1	2.6	1	265	1	25.0	1	320						
310-319														
320-329														
330-339														
340-349														
350-359														
360-369	1	2.6	1	360										
370-379														
380-389					1	25.0	1	670						
390-399														
400-409					1	25.0	1	795						
410-419														
420-429														
430-439														
440-449														

Table 17. Continued.

Length range (mm)	Wild rainbow trout				Hatchery rainbow trout				Brook trout				Wood River sculpin	
	Length		Weight (g)		Length		Weight (g)		Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
450-459														
460-469					1	25.0	1	890						
470-479														
480-489														
490-499														
Number:	39				4				3				15	
Avg length:	98				388				153				68	
Total sampled:	39				4				3				15	

Table 18. Total length frequencies and weights of fish sampled with one pass of electrofishing in reach 2 of the East Fork of the Big Wood River on October 18, 1996. Average weights of subsamples within each 10 mm length group are included.

Length range (mm)	Wild rainbow trout				Brook trout				Wood River sculpin	
	Length		Weight (g)		Length		Weight (g)		Length	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
0-9										
10-19										
20-29									2	5.4
30-39									2	5.4
40-49	7	24.1								
50-59	10	34.5							1	2.7
60-69	6	20.7							2	5.4
70-79	1	3.4							5	13.5
80-89									8	21.6
90-99	1	3.4	1	8					10	27.0
100-109									4	10.8
110-119	1	3.4	1	15					3	8.1
120-129	2	6.9	2	18						
130-139										
140-149										
150-159					1	100.0	1	23		
160-169										
170-179	1	3.4	1	50						
180-189										
190-199										
200-209										
210-219										
220-229										
230-239										
240-249										
250-259										
260-269										
270-279										
280-289										
290-299										
Number:	29				1				37	
Avg length:	67				150				83	
Total sampled:	29				1				37	

to whirling disease. Hatchery rainbow trout sampled in reach 1 most likely came from fish plants into privately owned ponds within the drainage. Fish sampling results indicate no adverse impact from the Triumph Mine site to either trout or sculpin.

Habitat measurements in reach 1 indicate a variety of habitat types present for all trout and sculpin life stages (Table 19). The presence of several year classes of wild rainbow trout and Wood River sculpin within reach 1 confirms this. Habitat in reach 2 was not measured but a cursory examination indicated that it was composed primarily of riffles with four small pools and the substrate was composed primarily of rounded cobble. Average stream width in reach 2 was approximately 11 m.

STREAM SURVEY SUMMARY: East Fork of the Big Wood River
Watershed: Big Wood River
Reach: 1
Date of survey: October 18 and 23, 1996
Physical Description: Downstream of concrete and steel bridge approximately 2.0 km downstream of the Triumph Mine.
Legal Description: T4S R18E Sec 35 SE1/4
Quad Map: Hyndman Peak, Idaho, and Sun Valley, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040219018
Fish Survey
Fish Sampling Method: One upstream pass made with backpack shocker.
Distance Electrofished: 112 m
Population Estimate Model: Not applicable
Sampling Results: See Table 17
Species: Brook trout
Total Sampled: 3
Total Length Range: 80-295 mm
Species: Hatchery rainbow trout
Total Sampled: 4
Total Length Range: 300-465 mm
Species: Wild rainbow trout
Total Sampled: 39
Total Length Range: 30-365 mm
Species: Wood River sculpin
Total Sampled: 15
Total Length Range: 20-105 mm
Habitat Survey: See Table 19
Reach: 2
Date of survey: October 18, 1996
Physical Description: Upper boundary at the Hyndman Creek confluence upstream of Triumph mine.
Legal Description: T4N R18E Sec 25 SE1/4
Quad Map: Hyndman Peak, Idaho, and Sun Valley, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040219018
Fish Survey
Fish Sampling Method: One upstream pass made with backpack shocker.
Distance Electrofished: 88 m
Population Estimate Model: Not applicable
Sampling Results: See Table 18
Species: Brook trout
Total Sampled: 1
Total Length: 150 mm
Species: Wild rainbow trout
Total Sampled: 29
Total Length Range: 40-175 mm
Species: Wood River sculpin
Total Sampled: 37
Total Length Range: 20-110 mm
Habitat Survey: None

Table 19. Habitat survey results for the East Fork of the Big Wood River, 1996.

Reach 1:	Immediately downstream of concrete and steel bridge approximately 2.0 km downstream of the community of Triumph
Legal Description	T4N R18 Sec 35 SE1/4
Date of Survey	10/23/96
Total Distance Electrofished	112.0 m
Channel Type	Moderately confined (B)
Average Width	8.8 m
Transect Cross Section Interval	20 m
Area	986 m^2
No. of Cross Sections	5
Average Depth	0.21 m

Habitat Type:	Pool	Riffle	Run	Pocket	Backwater	
Percent of Transect	20	40	13	27	0	
Average Depth by Habitat Type (m)	0.26	0.21	0.20	0.17	-	
Substrate by Habitat Type						Entire site
% Silt/Sand:	33	3	10	14	-	13
% Gravel:	22	20	35	14	-	21
% Rubble:	45	61	42	50	-	52
% Boulder:	0	17	13	22	-	14
% Bedrock:	0	0	0	0	-	0

Eightmile Creek

Eightmile Creek is a tributary to Raft River on the west side of the Black Pine Mountains southeast of Malta, Idaho in Cassia County. The stream flows unimpeded for four to five km before it enters a small irrigation impoundment. Grunder et al. (1987) give a chemical, physical and biological description for this stream from 1986 samples including verification by Robert Behnke that the cutthroat trout present in Eightmile Creek is the Yellowstone strain. A single electrofishing pass was made in the Eightmile Creek reach which was 35 m long and located near the end of the road at T15S R28E Sec 2 NW1/4. A total of nine cutthroat trout were sampled from that reach (Table 20). No other fish species were sampled there. Scale samples from seven cutthroat trout indicate that total length at annulus 1 averaged 101 mm and total length at annulus 2 averaged 156 mm.

Howell Creek

Howell Creek is a tributary to Marsh Creek, which flows south from the South Hills near the town of Albion close to its irrigation water diversion point. It receives no hatchery fish from Idaho Department of Fish and Game. Three reaches were investigated on Howell Creek along with reaches on other Marsh Creek tributaries (this report) to determine the presence and density of fish and quality of stream habitat within the watershed (Figure 2). Reach H1 was in an agricultural area with a low gradient streambed. Reach H2 was located in forested high gradient terrain. Reach H3 was located approximately 1 km upstream of reach H2 and immediately downstream of the culvert under a logging road. Reach H3 was electrofished for only a few seconds to determine the presence of fish. Water velocity at that reach was 1.8 to 2.1 m/s as measured with a float and timer.

Table 20. Total length frequencies and weights of all fish sampled with one pass of electrofishing approximately 35 m at Eightmile Creek on May 9, 1996.

Length range (mm)	Cutthroat trout				
	Length		Weight (g)		
	no.	%	no.	avg.	Comments
0-9					
10-19					
20-29					
30-39					
40-49					
50-59					
60-69					
70-79	1	11.1	1	4	Immature
80-89					
90-99					
100-109					
110-119					
120-129	1	11.1	1	18	Immature
130-139	1	11.1	1	23	Immature
140-149	1	11.1	1	26	Immature
150-159					
160-169					
170-179					
180-189	1	11.1	1	52	Unknown sex
190-199	2	22.2	2	74	2 females
200-209					
210-219	1	11.1	1	84	Ripe male
220-229					
230-239					
240-249					
250-259					
260-269	1	11.1	1	161	Ripe female
270-279					
280-289					
290-299					
Number:	9				
Avg length:	168				
Total sampled:	9				

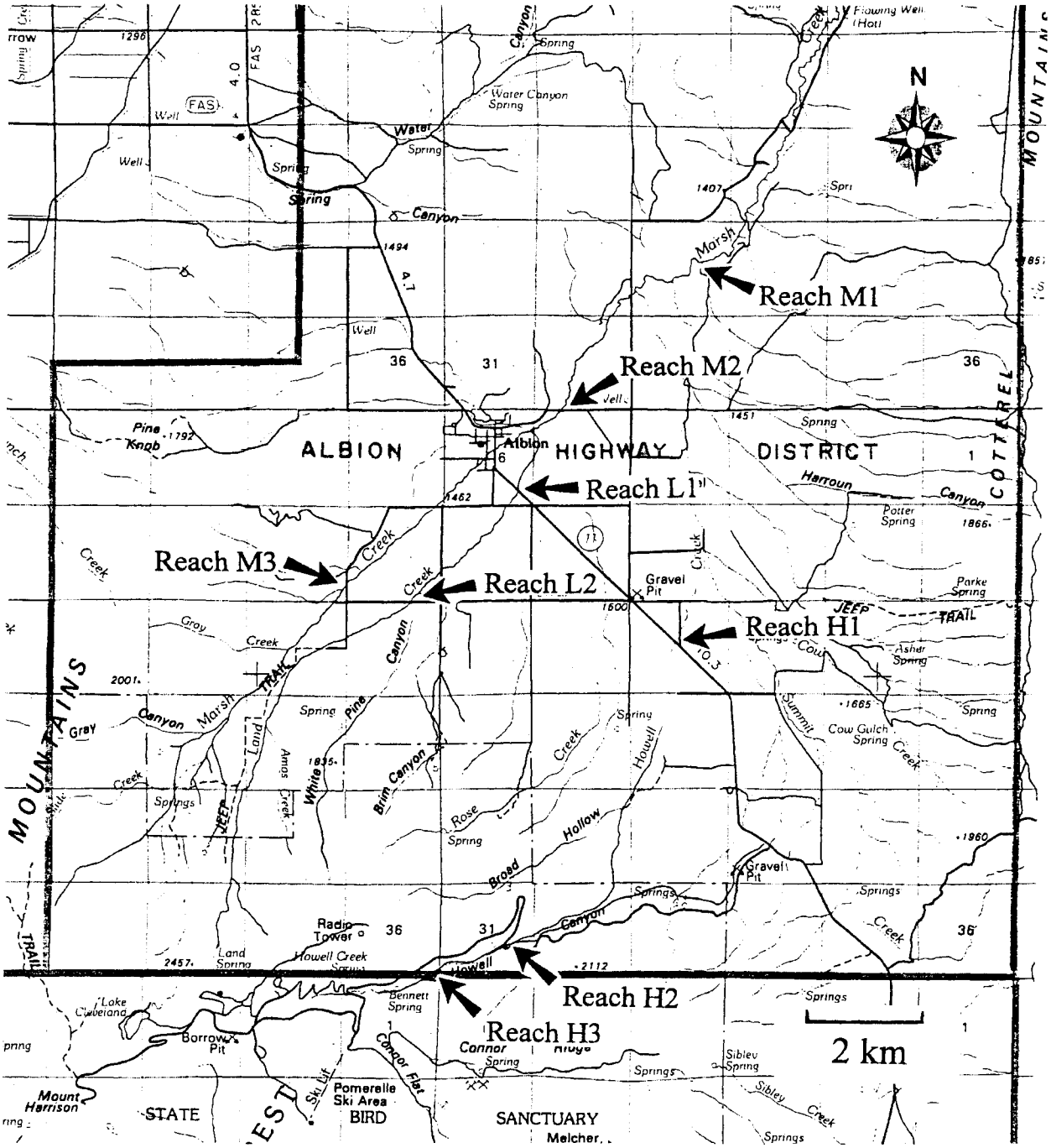

Figure 2. Map of Marsh Creek and tributaries depicting location of reaches sampled in 1996.

Figure 2. Map of Marsh Creek and tributaries depicting location of reaches sampled, 1996.

STREAM SURVEY SUMMARY: Howell Creek
Watershed: Marsh Creek of Snake River

Reach: H1
Date of survey: August 6, 1996
Physical Description: Both sides of Highway 77 culvert, approximately 9 meters downstream and the pool on the upstream side.
Legal Description: T12S R24E Sec 36 SE1/4 SE1/4
Quad Map: Albion, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040209028
Fish Survey
Fish Sampling Method: One upstream pass made with backpack shocker.
Distance Electrofished: Approx. 10 m
Population Estimate Model: Not applicable
Sampling Results: No fish
Habitat Survey: None
Reach: H2
Date of survey: July 31, 1996
Location
Physical Description: Upstream boundary was 7.5 meters downstream of the plunge pool created by a culvert under the U.S. Forest road to the Pomerelle Ski Area.
Legal Description: T12S R25E SEC31 SE1/4NE1/4
Quad Map: Albion, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040209028
Water Quality
Water Temperature: 11°C at 1745 hours
Fish Survey
Fish Sampling Method: Two equal effort upstream passes made with backpack shocker.
Distance Electrofished: 62 m
Population Estimate Model: Seber and LeCren (1967) 2-step removal
Sampling Results: See Table 21
Species: Brook trout
Total Sampled: 25
Total Length Range: 105-245 mm
Population Estimate: 43
Standard Error: 22.66
Density (no./100 m^2): 16.5
Comments: An additional 9 brook trout were sampled 7.5 meters upstream of reach H2 in a culvert plunge pool which was not included in the population estimate. No other fish species sampled.
Habitat Survey: See Table 22
Reach: H3
Date of survey: August 6, 1996
Location
Physical Description: Pool downstream of Forest Service logging road.
Legal Description: T12S R24E Sec 36 SE1/4 SE1/4
Quad Map: Albion, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040209028
Water Quality
Water Temperature: Not measured
Fish Survey
Fish Sampling Method: Backpack shocker electrofishing (10 seconds)
Distance Electrofished: Approx. 5 m
Population Estimate Model: Not applicable
Sampling Results
Species: Brook trout
Total Sampled: 1
Total Length Range: 200 mm
Habitat Survey: None

Table 21. Total length frequencies of all fish and weights of some fish sampled by electrofishing Reach H2 and the culvert plunge pool 7 meters upstream of Reach H2 on Howell Creek, July 31, 1996.

Length range (mm)	Reach H2 Brook trout Length no.[1]		Length %	Weight (g) no.	Weight (g) avg.
0-9					
10-19					
20-29					
30-39					
40-49					
50-59					
60-69					
70-79					
80-89					
90-99					
100-109	1		2.9	1	14
110-119	1	(1)	5.7	1	16
120-129					
130-139					
140-149					
150-159	3	(1)	11.4	3	44
160-169	2	(2)	11.4	2	47
170-179	1		2.9	1	49
180-189	1	(2)	11.4	2	62
190-199	5	(1)	17.1	5	83
200-209	8	(1)	25.7	8	92
210-219					
220-229	2		5.7	2	115
230-239	1		2.9	1	125
240-249		(1)	2.9		
250-259					
260-269					
270-279					
280-289					
290-299					
Number:	25	(9)			
Avg length:	182	(176)			
Total sampled:	25	(9)			

[1] Number in parentheses is number sampled in culvert plunge pool upstream of reach and not included in population estimate.

Table 22. Habitat survey results for Howell Creek, 1996.

Reach H2	Upper boundary is 7.4 m downstream of culvert under F.S. road to Pomerelle Ski Area
Legal Description	T12S R25E Sec 3, SE1/4 NE1/4
Date of Survey	July 31, 1996
Total Distance Electrofished	61.8 m
Channel Type	Confined (A)
Average Width	4.3 m
Transect Cross Section Interval	10 m
Area	266 m^2
No. of Cross Sections	5
Average Depth	0.09 m

Habitat Type:	Pool	Riffle	Run	Pocket	Backwater	Entire transect
Percent of Transect	0	87	0	13	0	
Average Depth by Habitat Type (m)	-	0.12	-	0.19	-	
Substrate by Habitat Type						
% Silt/Sand:	-	8	-	3	-	8
% Gravel:	-	12	-	8	-	11
% Rubble:	-	58	-	65	-	59
% Boulder:	-	22	-	25	-	22
% Bedrock:	-	0	-	0	-	0

Indian Fork Creek

Indian Fork Creek is a small tributary of South Heglar Canyon, part of Raft River drainage. The entire Indian Fork Creek watershed is approximately 5.5 km^2. Fifty m of the stream was electrofished with a backpack shocker on July 9, 1996. No fish were sampled. The reach averaged 0.6 m wide and 0.06 m deep. Water temperature was 10°C at time of sampling.

Land Creek

Land Creek is a tributary to Marsh Creek, which flows south from the South Hills near the town of Albion close to its irrigation water diversion point. Two reaches were investigated on Land Creek along with reaches on other Marsh Creek tributaries (this report) to determine the presence and density of fish and quality of stream habitat within the watershed (Figure 2). Reach L1 was located in an agricultural area downstream of the Highway 77 culvert. It was sampled with one upstream pass by backpack shocker to determine fish species present. A cursory habitat analysis indicated that approximately 40% of the reach was pool habitat created by the culvert and the rest was riffle habitat. Reach L2 was also in an agricultural area similar to Reach L1 and sampled with a single upstream pass with the backpack shocker.

STREAM SURVEY SUMMARY: Land Creek
Watershed: Marsh Creek of Snake River

Reach: L1
Date of Survey: August 6, 1996
Location
Physical Description: Pool and riffle immediately downstream of State Highway 77 culvert.
Legal Description: T12S R25E Sec 6 SE1/4
Quad Map: Albion, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040209028
Water Quality
Water Temperature: 12°C at 1140 hours
Fish Survey
Fish Sampling Method: One upstream pass made with backpack shocker.
Distance Electrofished: 15 m
Population Estimate Model: Not applicable
Sampling Results: See Table 23
Species: Brook trout
Total Sampled: 3
Total Length Range: 105-250 mm
Species: Mottled sculpin
Total sampled: 12
Total Length Range: 75-125 mm
Habitat Survey: None

Reach: L2
Date of Survey: July 31, 1996
Location
Physical Description: Upstream boundary of the reach was approximately 5 m downstream of county road culvert.
Legal Description: T12S R24E Sec 12 SE1/4 SW1/4
Quad Map: Albion, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040209028
Water Quality
Water Temperature: 12°C at 1300 hours
Alkalinity as $CaCO_3$: 80 mg/l
Total Hardness: 99 mg/l
Specific Conductivity: 180 µSiemens/cm
pH: 8.9
Fish Survey
Fish Sampling Method: One upstream pass made with backpack shocker.
Distance Electrofished: 82 m
Population Estimate Model: Not applicable
Sampling Results: See Table 23
Species: Brook trout
Total Sampled: 4
Total Length Range: 100-275 mm
Species: Hatchery rainbow trout
Total Sampled: 41
Total Length Range: 195-280 mm
Species: Mottled sculpin
Total Sampled: 17
Total Length Range: 60-115 mm
Habitat Survey: See Table 24

Table 23. Total length frequencies (mm) of fish sampled with one upstream pass of electrofishing in reach L1 on August 6 and reach L2 at Land Creek, July 31, 1996.

Length range (mm)	Reach L1				Reach L2					
	Brook trout		Mottled sculpin		Brook trout		Hatchery rainbow trout		Mottled sculpin	
	Length		Length		Length		Length		Length	
	no.	%	no.	%	no.	%	no.	%	no.	%
0-9 / 40-49										
50-59										
60-69									3	17.6
70-79			3	25.0					5	29.4
80-89			4	33.3					2	11.8
90-99			1	8.3					2	11.8
100-109	1	33.3			3	75.0			3	17.6
110-119			2	16.7					2	11.8
120-129 / 190-199			2	16.7			1	6.7		
200-209							1	6.7		
210-219	1	33.3					1	6.7		
220-229							2	13.3		
230-239							4	26.7		
240-249							3	20.0		
250-259	1	33.3					2	13.3		
260-269										
270-279					1	25.0				
280-289							1	6.7		
290-299										
Number:	3		12		4		15		17	
Avg length:	188		92		145		233		84	
Total sampled:	3		12		4		41		17	

Table 24. Habitat survey results for Land Creek, July 31,1996.

Reach L2	Upstream boundary of transect was approx. 5 m downstream of county road culvert across from equine hospital
Legal Description	T12S R24E Sec 12 SE1/4 SW1/4
Date of Survey	July 31, 1996
Total Distance Electrofished	82 m
Channel Type	Entrenched (G)
Average Width	2.7 m
Transect Cross Section Interval	15 m
Area	220 m^2
No. of Cross Sections	5
Average Depth	0.18 m

Habitat Type:	Pool	Riffle	Run	Pocket	Backwater	
Percent of Transect	0	53	40	7	0	
Average Depth by Habitat Type (m)	-	0.16	0.20	0.20	-	
Substrate by Habitat Type						
% Silt/Sand:	-	14	25	40	-	20
% Gravel:	-	15	23	0	-	17
% Rubble:	-	48	51	30	-	48
% Boulder:	-	23	0	30	-	14
% Bedrock:	-	0	0	0	-	0

Entire transect

Little Wood River

Fish were sampled by electrofishing at the Bear Tracks Williams State Recreation Area on the Little Wood River. On October 10, 1996 two riffle areas totaling 147 m^2 were intensively electrofished with one upstream pass for species composition utilizing the Honda 5000-watt generator with the Coffelt VVP-15 electrofisher and a hand-held electrode. Equal effort was made to net all species stunned. A total of 4 longnose dace, 12 speckled dace *Rhinichthys osculus*, 3 bridgelip suckers, and 1 brown trout were sampled. The same 1.2 km reach that was sampled in November 1993 was sampled again in October 1996 utilizing a drift boat with the Honda generator and two anode probes attached to the bow of the boat (Partridge and Warren 1995). Greater effort was extended towards netting gamefish than nongame fish while electrofishing the 1.2 km reach with the drift boat. Total length frequencies of all fish sampled from this reach are given in Table 25. Three runs were made with fish marked in the first two runs. With only three recaptured rainbow trout out of 26 marked fish and five recaptured brown trout out of 30 marked fish the probability of capture was too low for precision in a population estimate. An estimate of the brown trout population would probably overestimate the actual population because recruitment and emigration were occurring with the spawning movement of the fish. Water temperature at time of sampling varied between 5°C at 1300 hours on October 17 to 15°C at 1445 hours on October 10, 1996. No sculpin have been reported as sampled from this reach by the Idaho Department of Fish and Game or the Idaho Department of Environmental Quality since at least 1991. A total of 95 brown trout and rainbow trout combined were observed for hook scars and external *Salmincola sp.* parasites on the gills. One brown trout with a heavy parasitic infestation was found and seven brown trout and rainbow trout combined had noticeable hook scars.

The reach of the Little Wood River between the Silver Creek confluence downstream to the town of Richfield is stocked annually with brown trout fingerlings. It is suspected that most of the wild rainbow trout and some of the brown trout there are fish that have drifted downstream from Silver Creek. Fishing rules for the Bear Tracks Williams reach allow fly-fishing and catch-and-release only and fishing is allowed all year.

Marsh Creek

Three reaches were surveyed for fish and habitat on Marsh Creek as part of a drainage-wide survey, which included other Marsh Creek tributaries listed in this report (Figure 2). The lowermost reach surveyed was reach M1, which is a low gradient, reach flowing through agricultural land. Reach M2 was approximately 1.5 km upstream of reach M1 with similar habitat characteristics. Rainbow trout had been stocked at reach M2 14 days prior to the survey. Reach M3 was approximately 4.0 km upstream of reach M2 with more riffle habitat and a substrate composed of material usually associated with higher gradient streams.

Table 25. Total length frequencies of all fish sampled and average weights of some fish sampled with three passes of electrofishing at Bear Tracks Williams on the Little Wood River, October 1996. Samples include recaptured fish in second and third passes.

Length range (mm)	Wild rainbow trout				Brown trout				Longnose dace		Speckled dace		Redside shiner		Utah chub		Bridgelip sucker	
	Length		Weight (g)		Length		Weight (g)		Length		Length		Length		Length		Length	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%	no.	%
0-9																		
10-19																		
20-29											1	7.1						
30-39																		
40-49																		
50-59																		
60-69											3	21.4	1	3.4				
70-79									1	25.0	4	28.6	3	10.3				
80-89									1	25.0	3	21.4	11	37.9				
90-99									1	25.0	2	14.3	8	27.6				
100-109									1	25.0	1	7.1	3	10.3			1	2.1
110-119					2	2.7	2	13					2	6.9			1	2.1
120-129																	1	2.1
130-139																		
140-149					2	2.7	2	31					1	3.4			1	2.1
150-159					6	8.0	6										3	6.3
160-169	1	2.7	1	42	7	9.3	7										4	8.3
170-179					4	5.3	3										4	8.3
180-189					2	2.7	2										9	18.8
190-199	1	2.7	1	62	2	2.7	2								1	100.0	8	16.7
200-209	3	8.1	3		1	1.3	1	84									5	10.4
210-219	2	5.4	2	91	2	2.7	2										4	8.3
220-229	2	5.4	2															
230-239	6	16.2	6														4	8.3
240-249	2	5.4	2		2	2.7	1	143									2	4.2

Table 25. Continued.

Length range (mm)	Wild rainbow trout				Brown trout				Longnose dace		Speckled dace		Redside shiner		Utah chub		Bridgelip sucker	
	Length		Weight (g)		Length		Weight (g)		Length		Length		Length		Length		Length	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%	no.	%
250-259	3	8.1	3		1	1.3	1	152									1	2.1
260-269	3	8.1	2		4	5.3	4											
270-279	7	18.9	7		3	4.0	3	25										
280-289	2	5.4	3		3	4.0	3	39										
290-299	3	8.1	3	115	1	1.3	1	223										
300-309	2	5.4	2	31	1	1.3	1	265										
310-319					4	5.3	3	145										
320-329					6	8.0	5	370										
330-339					4	5.3	4	423										
340-349					3	4.0	3	753										
350-359					2	2.7	2	0										
360-369					4	5.3	4	89										
370-379					2	2.7	2	102										
380-389					3	4.0	3	113										
390-399																		
400-409																		
410-419					3	4.0	2	0										
420-429																		
430-439																		
440-449																		
450-459																		
460-469					1	1.3	1	880										
470-479																		
480-489																		
490-499																		
Number:	37				75				4		14		29		1		48	
Avg length:	124.1				199.5				84.5		335.7		225		195		177.0	
Total sampled:	37				75				4		14		29		1		48	

STREAM SURVEY SUMMARY: Marsh Creek
Watershed: Snake River (Middle Reach near Burley)

Reach: M1
Date of Survey: July 30, 1996
Location
Physical Description: Upstream boundary was approximately 5 m downstream of wooden bridge on Chatburn property.
Legal Description: T11S R25E Sec 28 NE1/4 SE1/4
Quad Map: Albion, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040209028
Water Quality
Water Temperature: 18°C at 1030 hours
Total Alkalinity: 128 mg/l
Total Hardness: 140 mg/l
Specific Conductivity: 242 µSiemens/cm
pH: 8.6
Fish Survey
Fish Sampling Method: One upstream pass made with a backpack shocker and on-shore Honda generator with a VVP-15 electrofisher.
Distance Electrofished: 15 m
Population Estimate Model: Not applicable
Sampling Results: See Table 26
Species: Redside shiner
Total Sampled: 5
Total Length Range: 45-85 mm
Species: Longnose dace
Total Sampled: 7
Total Length Range: 70-85 mm
Species: Mottled sculpin
Total sampled: 7
Total Length Range: 35-100 mm
Habitat Survey: See Table 27

Reach: M2
Date of Survey: July 30, 1996
Location
Physical Description: Immediately downstream of county road bridge (north side).
Legal Description: T11S R25E Sec 32 NW1/4 SE1/4
Quad Map: Albion, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040209028
Water Quality
Water Temperature: 21°C at 1445 hours
Fish Survey
Fish Sampling Method: Two equal effort upstream passes made with backpack shocker.
Distance Electrofished: 64 m
Population Estimate Model: Seber and LeCren (1967) 2-step removal
Sampling Results: See Table 28
Species: Brook trout
Total Sampled: 2
Total Length Range: 95 mm
Species: Hatchery rainbow trout
Total Sampled: 29
Total Length Range: 200-275 mm
Population Estimate: 30
Standard Error: 1.22

Density (no./100 m^2): 13.2
Species: Mottled sculpin
Total Sampled: 67
Total Length Range: 20-95 mm
Species: Longnose dace
Total Sampled: 36
Total Length Range: 40-125 mm
Species: Redside shiner
Total Sampled: 22
Total Length Range: 40-95 mm
Habitat Survey: See Table 27

Reach: M3
Date of Survey: July 31, 1996
Location
Physical Description: Immediately upstream of county road bridge (west side).
Legal Description: T12S R24E Sec 11 SE1/4 SE1/4
Quad Map: Albion, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040209028
Water Quality
Water Temperature: 17°C at 1130 hours
Fish Survey
Fish Sampling Method: Two equal effort upstream passes made with backpack shocker.
Distance Electrofished: 64 m
Population Estimate Model: Seber and LeCren (1967) 2-step removal
Sampling Results: See Table 29
Species: Brook trout
Total Sampled: 71
Total Length Range: 50-335 mm
Population Estimate: 76
Standard Error: 4.2
Density (no./100 m^2): 17.7
Species: Mottled sculpin
Total Sampled: 164
Total Length Range: 50-125 mm
Habitat Survey: See Table 27

Table 26. Total length frequencies and numbers of all fish sampled by electrofishing in reach M1 on Marsh Creek, July 30, 1996.

Length range (mm)	Redside shiner Length no.	Redside shiner Length %	Mottled sculpin Length no.	Mottled sculpin Length %	Longnose dace Length no.	Longnose dace Length %
0-9						
10-19						
20-29						
30-39			1	14.3		
40-49	1	20.0	3	42.9		
50-59						
60-69						
70-79	2	40.0			6	85.7
80-89	2	40.0	1	14.3	1	14.3
90-99			1	14.3		
100-109			1	14.3		
110-119						
120-129						
130-139						
140-149						
Number:	5		7		7	
Avg length:	71		61		74	
Total sampled:	5		7		7	

Table 27. Habitat survey results for three reaches of Marsh Creek on July 30-31, 1996.

Reach M1 On Chatburn property between wooden bridge and Howell Creek confluence

Legal Description	T11S R25E Sec 28 NE1/4 SE1/4	Channel Type	Entrenched (G)
Date of Survey	July 30, 1996	Average Width	3.9 m
Total Distance Electrofished	138 m	Transect Cross Section Interval	20 m
No. of Transects	6	Area	542 m^2
		Average Depth	0.19 m

Habitat Type:	Pool	Riffle	Run	Pocket	Backwater	
Percent of Transect	0	11	78	0	0	
Average Depth by Habitat Type (m)	-	0.16	0.28	-	0.12	
Substrate by Habitat Type						Entire transect
% Silt/Sand:	-	0	41	-	90	42
% Gravel:	-	80	45	-	10	45
% Rubble:	-	20	10	-	0	10
% Boulder:	-	0	4	-	0	3
% Bedrock:	-	0	0	0	0	0

Reach M2 Immediately downstream of county road bridge

Legal Description	T11S R25E Sec 32 NW1/4 SE1/4	Channel Type	Entrenched (G)
Date of Survey	July 30, 1996	Average Width	3.6 m
Total Distance Electrofished	64 m	Transect Cross Section Interval	10 m
No. of Cross Sections	6	Area	228 m^2
		Average Depth	0.25 m

Habitat Type:	Pool	Riffle	Run	Pocket	Backwater	
Percent of Transect	28	22	39	11	0	
Average Depth by Habitat Type (m)	0.29	0.17	0.28	0.23	-	
Substrate by Habitat Type						Entire transect
% Silt/Sand:	84	8	30	25	-	39
% Gravel:	8	47	39	30	-	31
% Rubble:	8	45	24	10	-	23
% Boulder:	0	0	7	35	-	7
% Bedrock:	0	0	0	0	-	0

Table 27. Continued.

Reach M3 Immediately upstream of county road bridge		Channel Type	Entrenched (G)
Legal Description	T12S R25E Sec11 SE1/4 SE1/4	Average Width	3.6 m
Date of Survey	July 31, 1996	Transect Cross Section Interval	10 m
Total Distance Electrofished	118 m	Area	430 m^2
No. of Cross Sections	11	Average Depth	0.13 m

Habitat Type:	Pool	Riffle	Run	Pocket	Backwater	
Percent of Transect	6	52	33	11	0	
Average Depth by Habitat Type (m)	0.12	0.12	0.15	0.13	-	
Substrate by Habitat Type						Entire transect
% Silt/Sand:	50	16	7	35	-	17
% Gravel:	10	26	10	5	-	17
% Rubble:	40	39	52	37	-	44
% Boulder:	0	19	31	23	-	22
%Bedrock:	0	0	0	0	-	0

Table 28. Total length frequencies and numbers of all fish and average weights of some fish sampled by electrofishing in reach M2 on Marsh Creek, July 30, 1996.

Length range (mm)	Brook trout				Hatchery rainbow trout		Longnose dace		Mottled sculpin		Redside shiner	
	Length		Weight (g)		Length		Length		Length		Length	
	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%
0-9												
10-19												
20-29									2	11.8		
30-39									1	5.9		
40-49							1	9.1	2	11.8	4	44.4
50-59							3	27.3			4	44.4
60-69							4	36.4	1	5.9		
70-79									2	11.8		
80-89							1	9.1	7	41.2		
90-99	2	100.	2	9			1	9.1	2	11.8	1	11.1
100-109												
110-119												
120-129							1	9.1				
130-139												
140-149												
150-159 / 190-199												
200-209					2	10.5						
210-219					1	5.3						
220-229					1	5.3						
230-239					1	5.3						
240-249					2	10.5						
250-259					8	42.1						
260-269					2	10.5						
270-279					2	10.5						
280-289												
290-299												
Number:	2				19		11		17		9	
Avg length:	95				244		69		66		54	
Total sampled:	2				29		36		67		22	

Table 29. Total length frequencies and numbers of all fish sampled and average weights of some fish sampled by electrofishing in reach M3 on Marsh Creek on July 30, 1996.

Length range (mm)	Brook trout				Mottled sculpin	
	Length		Weight		Length	
	no.	%	no.	Avg.	no.	%
0-9						
10-19						
20-29						
30-39						
40-49						
50-59	3	4.2			2	6.5
60-69	9	12.7	3	3	6	19.4
70-79	26	36.6	5	4	7	22.6
80-89	7	9.9	4	6		
90-99					7	22.6
100-109					7	22.6
110-119					1	3.2
120-129	1	1.4	1	18	1	3.2
130-139						
140-149	1	1.4	1	46		
150-159	4	5.6	4	36		
160-169	1	1.4	1	41		
170-179	3	4.2	3	55		
180-189	4	5.6	4	65		
190-199	4	5.6	4	79		
200-209	1	1.4	1	96		
210-219	1	1.4	1	98		
220-229						
230-239	3	4.2	3	127		
240-249						
250-259	1	1.4	1	221		
260-269						
270-279	1	1.4	1	250		
280-289						
290-299						
300-309						
310-319						
320-329						
330-339	1	1.4	1	410		
340-349						
Number:	71				31	
Avg length:	115				83	
Total sampled:	71				164	

Niagara Springs Creek

Most of Niagara Springs Creek water is diverted immediately downstream of the spring outlet into two fish hatcheries before being returned to the natural stream channel. Depending on Snake River water levels, the stream flows for approximately 100 m before entering the Snake River. The stream channel was visually surveyed for trout spawning activity by regional and hatchery personnel on a weekly basis between March 27 and the end of April 1996. No redds or actively spawning fish were observed within that time period, which coincides with known spawning activity on Thousand Springs Creek (this report).

Shoshone Creek

Two reaches of Shoshone Creek within the Sawtooth National Forest were sampled June 25, 1996. Reach 1 is located near the Bear Gulch confluence which receives annual livestock use and reach 2 is on the South Fork of Shoshone Creek where it is fenced to exclude livestock from the riparian zone. There have been no fish plantings into Shoshone Creek since May 1992 when approximately 9,000 fingerling brown trout were stocked. Both reaches were electrofished with one upstream pass by backpack shocker with an effort made to capture all stunned fish regardless of species.

STREAM SURVEY SUMMARY: Shoshone Creek
Watershed: Salmon Falls Creek

Reach: 1
Date of Survey: June 25, 1996
Location
Physical Description: Bear Gulch confluence.
Legal Description: T14S R18E Sec 7 SE1/4
Quad Map: Hopper Gulch, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040213097
Water Quality
Water Temperature: 18°C
Fish Survey
Fish Sampling Method: One upstream pass made with backpack shocker.
Distance Electrofished: 124 m
Population Estimate Model: Not applicable
Sampling Results: See Table 30
Species: Wild rainbow trout
Total Sampled: 7
Total Length Range: 110-235 mm
Species: Bridgelip sucker
Total Sampled: 28
Total Length Range: 80-165 mm
Species: Mottled sculpin
Total sampled: 19
Total Length Range: 40-75 mm
Species: Redside shiner
Total sampled: 57
Total Length Range: 50-95 mm

Species: Speckled dace
Total sampled: 107
Total Length Range: 30-85 mm
Habitat Survey
Mean Width: 4.2 m
Mean Depth: 0.22 m

Reach: 2
Date of Survey: June 25, 1996
Location
Physical Description: Within livestock exclosure on South Fork of Shoshone Creek
Legal Description: T14S R18E Sec 16 SW1/4
Quad Map: Pike Mountain, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040213097
Water Quality
Water Temperature: 15°C
Fish Survey
Fish Sampling Method: One upstream pass made with backpack shocker
Distance Electrofished: 150 m
Population Estimate Model: Not applicable
Sampling Results: See Table 31
Species: Wild rainbow trout
Total Sampled: 4
Total Length Range: 25-165 mm
Species: Bridgelip sucker
Total Sampled: 25
Total Length Range: 70-125 mm
Species: Mottled sculpin
Total Sampled: 11
Total Length Range: 40-55 mm
Species: Redside shiner
Total Sampled: 119
Total Length Range: 30-105 mm
Species: Speckled dace
Total Sampled: 366
Total Length Range: 30-85 mm
Habitat Survey
Lower end of reach included backwaters of small beaver pond.
Mean Width: 2.0 m
Mean Depth: 0.14 m
Substrate: Gravel suitable for spawning at upper end, silty at lower end.

Table 30. Total length frequencies of all fish and average weights of some fish sampled by electrofishing in reach 1 on Shoshone Creek, June 25, 1996.

Length range (mm)	Wild rainbow trout				Bridgelip sucker		Mottled sculpin		Redside shiner		Speckled dace	
	Length		Weight (g)		Length		Length		Length		Length	
	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%
0-9												
10-19												
20-29												
30-39											2	14.3
40-49							1	25.0			1	7.1
50-59							1	25.0	1	14.3	6	42.9
60-69									3	42.9	3	21.4
70-79							2	50.0	1	14.3	1	7.1
80-89					1	12.5			1	14.3	1	7.1
90-99					1	12.5			1	14.3		
100-109					1	12.5						
110-119	1	14.3	1	16	2	25.0						
120-129					1	12.5						
130-139					1	12.5						
140-149	1	14.3	1	30								
150-159												
160-169	3	42.9	3	45	1	12.5						
170-179												
180-189												
190-199	1	14.3	1	70								
200-209												
210-219												
220-229												
230-239	1	14.3	1	114								
240-249												
250-259												
260-269												
270-279												
280-289												
290-299												
Number:	7				8		4		7		14	
Avg length:	169				117		60		71		58	
Total sampled:	7				28		19		57		107	

Table 31. Total length frequencies of all fish and average weights of some fish sampled by electrofishing in reach 2 on Shoshone Creek, June 25, 1996.

Length range (mm)	Wild rainbow trout				Bridgelip sucker		Mottled sculpin		Redside shiner		Speckled dace	
	Length		Weight (g)		Length		Length		Length		Length	
	no.	%	no.	avg.	no.	%	no.	%	no.	%	no.	%
0-9												
10-19												
20-29	1	25.0										
30-39									2	15.4	1	9.1
40-49							1	12.5			3	27.3
50-59							7	87.5	6	46.2	4	36.4
60-69											1	9.1
70-79					1	20.0			2	15.4	1	9.1
80-89					2	40.0			2	15.4	1	9.1
90-99												
100-109	1	25.0	1	9	1	20.0			1	7.7		
110-119	1	25.0	1	17								
120-129					1	20.0						
130-139												
140-149												
150-159												
160-169	1	25.0	1	49								
170-179												
180-189												
190-199												
200-209												
210-219												
220-229												
230-239												
240-249												
250-259												
260-269												
270-279												
280-289												
290-299												
Number:	4				5		8		13		11	
Avg length:	101				93		51		62		56	
Total sampled:	4				25		11		119		366	

Sixmile Creek

Sixmile Creek is a tributary to Raft River on the southwest side of the Black Pine Mountains southeast of Malta, Idaho in Cassia County. The stream flows unimpeded for approximately 1.5 km before it enters a small irrigation impoundment. Grunder et al. (1987) gives a chemical, physical and biological description of this stream from a survey done in 1986. Two reaches of the stream were electrofished by backpack shocker May 9, 1996; one reach was within the livestock exclosure at the source and the other was immediately downstream of the exclosure. Scale samples from eight cutthroat trout indicate that total length at annulus 1 averaged 98 mm, total length at annulus 2 averaged 133 mm and total length at annulus 3 averaged 173 mm.

STREAM SURVEY SUMMARY: Sixmile Creek
Watershed: Raft River

Reach: 1
Date of Survey: June 9, 1996
Location
Physical Description: Immediately downstream of livestock exclosure.
Legal Description: T15S R28E Sec 15 NE1/4
Quad Map: Naf, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040210043
Fish Survey
Fish Sampling Method: Two equal effort upstream passes made with backpack shocker
Distance Electrofished: 96 m
Population Estimate Model: Seber and LeCren (1967) 2-step removal
Sampling Results: See Table 32
Species: Cutthroat trout
Total Sampled: 9 (4 were in spawning condition)
Total Length Range: 145-240 mm
Population Estimate: 10
Standard Error: 2.8
Density (no./100 m^2): 7.7
Habitat: Included four log-drop structures
Mean Width: 1.2 m
Mean Depth: 0.14 m
Substrate: 70% gravel, 20% cobble, 10% silt/sand

Reach: 2
Date of Survey: June 9, 1996
Location
Physical Description: Within livestock exclosure at head of spring.
Legal Description: T15S R28E Sec 15 NE1/4
Quad Map: Naf, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040210043
Fish Survey
Fish Sampling Method: One upstream pass made with backpack shocker.
Distance Electrofished: 50 m
Population Estimate Model: Not applicable
Sampling Results: See Table 32
Species: Cutthroat trout
Total Sampled: 2
Total Lengths: 160 mm and 210 mm
Habitat: Dense overhanging riparian vegetation composed mostly of grasses made sampling difficult and ineffective.

Table 32. Fish sampled at Sixmile Creek by electrofishing downstream of spring head exclosure in reach 1 and within the exclosure in reach 2, May 9, 1996.

Length range (mm)	Cutthroat trout						
	In exclosure (reach 2)		Below exclosure (reach 1)				
	Length		Length		Weight		
	no.	%	no.	%	no.	avg.	Comments
0-9							
10-19							
20-29							
30-39							
40-49							
50-59							
60-69							
70-79							
80-89							
90-99							
100-109							
110-119							
120-129							
130-139							
140-149			1	11.1	1	40	Ripe male
150-159							
160-169	1	50.0					Unknown sex
170-179			2	22.2	2	62	2 females
180-189			1	11.1	1	70	Female
190-199			2	22.2	2	90	2 females, 1 ripe
200-209			1	11.1	1	64	Unknown sex
210-219	1	50.0	1	11.1	1	79	Ripe male
220-229							
230-239							
240-249			1	11.1	1	150	Ripe male
250-259							
260-269							
270-279							
280-289							
290-299							
Number:	2		9				
Avg length:	185		190				
Total sampled:	2		9				

Snake River

Regional fisheries management personnel were involved in several projects on the Snake River in 1996. As part of the Department's commitment to assist in providing white sturgeon brood stock for the hatchery program, we spent approximately 161 angler hours fishing for sturgeon within various reaches of the Snake River downstream of Bliss Dam. Each fishing rod fished for one hour counted as an angler hour because some anglers were using multiple rods. No fish that were caught by Department personnel were retained for brood stock in 1996. A summary of effort and fish caught is given in Tables 33 and 34.

One thermograph and four sturgeon egg collection mats were put into the large deep hole downstream of Auger Falls for the period between May 6 and July 28, 1996. The egg collection mats were placed in the hole at four different locations. The mats were pulled out and inspected for sturgeon eggs weekly then replaced with new filter material once. No sturgeon eggs were found on any of the mats in 1996. Thermograph results are given in Table 35.

Thousand Springs Creek

Both channels of Thousand Springs Creek were visually surveyed for trout spawning activity March 28 and April 25. No redds or spawning fish were observed March 28, but approximately 10 redds were observed April 25. No adult sized fish were observed near the redds on that date, and all spawning activity appeared to be completed for the year.

Warm Springs Creek

Warm Springs Creek enters the Big Wood River within the Ketchum city limits after flowing for approximately 37 km through Sawtooth National Forest and private lands. Most of the stream is easily accessed by a road following its length. Catchable sized rainbow trout are stocked into it at least three times during the summer after snow run-off has subsided. It is managed under general statewide stream fishing rules. Several reaches were investigated to document species composition, wild trout year class strengths, hatchery rainbow trout persistence and stream habitat conditions (Figure 3). Fish sampling and habitat survey results are given in the following stream survey summary. Overall results indicate there are few catchable sized ($\geq$228 mm) wild rainbow trout or brook trout in Warm Springs Creek.

Table 33. Summary of sturgeon fishing activity by Magic Valley Regional personnel in 1996 between C.J. Strike Reservoir and Bliss Dam. Angler hours figure is the sum of the total number of hours fished for each fishing rod fished.

Date	Angler hours	Fish caught
March 20, 1996	22	65 cm total length, not sexed, not checked for tag. 104 cm total length, not sexed, not checked for tag.
March 21, 1996	24	None
April 4, 1996	12	None
April 5, 1996	18	178 cm total length, 162 cm fork length, immature male or female, no tags detected.
April 22, 1996	13	None
April 25, 1996	19	141 cm total length, 126 cm fork length, sex not determined, no tags detected, implanted with PIT tag #7F7D2B1916. 200 cm total length, 179 cm fork length, sex not determined, no tags detected, implanted with PIT tag #7F7B11655D.
April 26, 1996	12	199 cm total length, 177 cm fork length, immature male, detected PIT tag #7F7F435C5E and yellow Floy tag #05023
May 9, 1996	21	152 cm total length, 138 fork length, sex not determined, no tag detected. 100 cm total length, 88 cm fork length, not sexed, no tag detected.
May 24, 1996	20	108 cm total length, 95 cm fork length, not sexed, no tags detected, implanted with PIT tag #7F7B0E3923. 198 cm total length, 178 cm fork length, sex not determined, detected PIT tag #7F7F427568. 205 cm total length, 179 cm fork length, immature female, no tags detected, implanted with PIT tag #7F7B025E2B. 91 cm total length, 80 cm fork length, not sexed, no tags detected, implanted with PIT tag #7F7D446272.

Table 34. Summary of sturgeon fishing activity by Magic Valley Regional personnel in 1996 between Bliss dam and Shoshone Falls. Angler hours is the sum of the total number of hours fished for each fishing rod fished.

Date	Location	Angler hours	Fish caught
5/13/96	Below Auger Falls	2	None
5/20/96	Below Auger Falls	2	None
5/27/96	Below Auger Falls	12	None
5/30/96	Below Lower Salmon Dam	6	None
6/11/96	Below Auger Falls	8	None
6/17/96	Below Auger Falls	6	75 cm total length, 67 cm fork length, not sexed, no tags detected, implanted with PIT tag #7F7D2B7E75-061. 79 cm total length, 68 cm fork length, not sexed, detected PIT tag #7F7D356O65-063. 80 cm total length, 69 cm fork length, not sexed, detected PIT tag #7F7F533E35-065. 78 cm total length, 65 cm fork length, not sexed, detected PIT tag #7F7D35585E-067 77 cm total length, 66 cm fork length, not sexed, no tags detected, implanted with PIT tag #7F7B036300-068.
6/24/96	Below Auger Falls	8	None
7/8/96	Below Pillar Falls	4	None
7/29/96	Below Auger Falls	7	None

Table 35. Daily temperature summaries for temperatures taken every 72 minutes downstream of Auger Falls on the Snake River, May 7 through July 28, 1996.

Date	Daily mean temperature (°C)	Standard deviation	Daily max. temperature (°C)	Daily min. temperature (°C)
5/7/96	12.1	0.61	13.0	11.4
5/8/96	12.5	0.60	13.3	11.7
5/9/96	12.9	0.58	13.8	12.2
5/10/96	13.3	0.42	13.9	12.7
5/11/96	13.7	0.56	14.5	13.0
5/12/96	14.3	0.60	15.1	13.6
5/13/96	15.0	0.45	15.6	14.4
5/14/96	15.4	0.42	16.1	15.0
5/15/96	15.8	0.29	16.3	15.5
5/16/96	15.9	0.24	16.3	15.6
5/17/96	15.5	0.21	15.8	15.0
5/18/96	14.7	0.27	15.0	14.2
5/19/96	14.4	0.27	14.8	14.1
5/20/96	14.2	0.45	14.8	13.6
5/21/96	14.3	0.38	14.8	13.8
5/22/96	14.3	0.25	14.7	13.9
5/23/96	13.6	0.39	14.2	13.1
5/24/96	13.6	0.35	14.1	13.1
5/25/96	13.4	0.24	13.8	13.1
5/26/96	13.7	0.49	14.4	13.1
5/27/96	14.2	0.11	14.4	14.1
5/28/96	14.3	0.21	14.7	14.1
5/29/96	14.2	0.12	14.4	14.1
5/30/96	13.8	0.11	13.9	13.6
5/31/96	13.5	0.41	14.1	13.0
6/1/96	14.4	0.41	15.0	13.9
6/2/96	15.3	0.38	15.9	14.8
6/3/96	16.1	0.31	16.6	15.6
6/4/96	16.8	0.30	17.2	16.4
6/5/96	17.2	0.20	17.5	16.9
6/6/96	17.1	0.23	17.4	16.6
6/7/96	17.0	0.40	17.5	16.6
6/8/96	18.2	0.37	18.7	17.5
6/9/96	18.7	0.27	19.1	18.4
6/10/96	18.7	0.13	18.8	18.5
6/11/96	18.4	0.16	18.7	18.2
6/12/96	18.1	0.24	18.5	17.9
6/13/96	18.3	0.46	19.0	17.7
6/14/96	18.8	0.36	19.3	18.4
6/15/96	19.1	0.23	19.6	18.8
6/16/96	19.2	0.54	20.0	18.5
6/17/96	19.4	0.47	20.1	18.8
6/18/96	18.5	0.41	19.1	17.9
6/19/96	17.9	0.50	18.7	17.2
6/20/96	17.5	0.39	18.0	16.9
6/21/96	17.4	0.59	18.4	16.7
6/22/96	18.1	0.61	19.0	17.4
6/23/96	18.2	0.52	19.0	17.5

Table 35. Continued.

Date	Daily mean temperature (°C)	Standard deviation	Daily max. temperature (°C)	Daily min. temperature (°C)
6/24/96	18.1	0.32	18.5	17.5
6/25/96	17.6	0.36	18.2	17.0
6/26/96	17.9	0.50	18.7	17.2
6/27/96	18.1	0.46	18.7	17.4
6/28/96	18.4	0.52	19.1	17.7
6/29/96	18.3	0.51	19.0	17.5
6/30/96	18.8	0.62	19.6	18.0
7/1/96	19.5	0.70	20.5	18.7
7/2/96	20.5	0.76	21.4	19.6
7/3/96	20.9	0.37	21.4	20.5
7/4/96	21.0	0.56	21.8	20.3
7/5/96	20.9	0.35	21.4	20.3
7/6/96	20.5	0.54	21.1	19.6
7/7/96	20.4	0.56	21.1	19.6
7/8/96	20.5	0.47	21.1	19.8
7/9/96	20.8	0.52	21.6	20.1
7/10/96	21.0	0.52	21.8	20.3
7/11/96	21.4	0.47	22.1	20.8
7/12/96	21.4	0.48	22.1	20.8
7/13/96	21.5	0.48	22.3	20.8
7/14/96	21.3	0.46	21.9	20.6
7/15/96	21.2	0.46	21.9	20.6
7/16/96	21.2	0.31	21.8	20.8
7/17/96	21.2	0.55	21.9	20.5
7/18/96	21.0	0.49	21.6	20.1
7/19/96	20.7	0.45	21.3	20.0
7/20/96	20.4	0.55	21.1	19.6
7/21/96	20.4	0.59	21.3	19.6
7/22/96	20.6	0.59	21.4	19.8
7/23/96	20.9	0.66	21.9	20.0
7/24/96	21.1	0.52	21.8	20.3
7/25/96	21.3	0.53	22.1	20.6
7/26/96	21.5	0.61	22.4	20.6
7/27/96	21.7	0.55	22.4	21.0
7/28/96	21.7	0.35	22.3	21.1

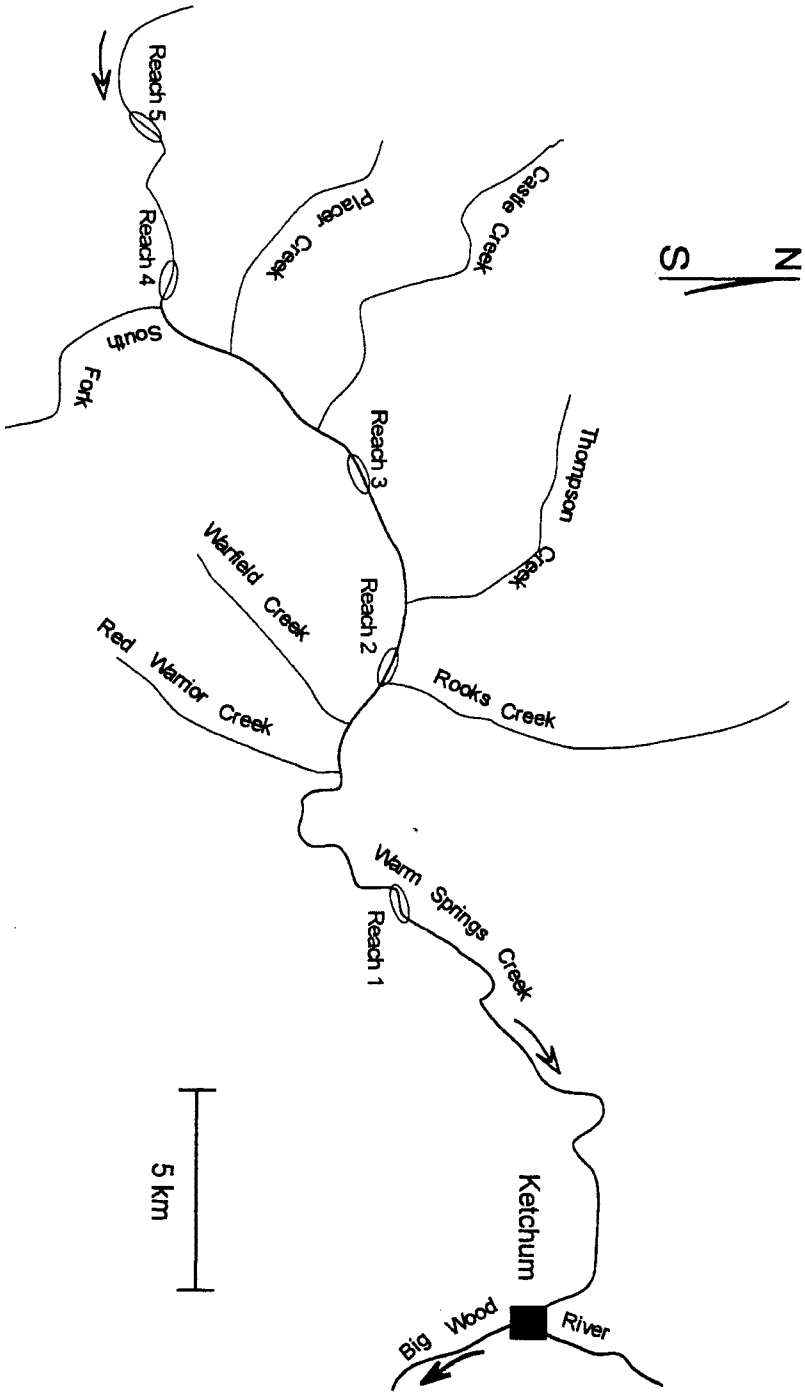

Figure 3. Map of Warm Springs Creek and reaches surveyed in 1996.

STREAM SURVEY SUMMARY: Warm Springs Creek
Watershed: Big Wood River

Reach: 1
Date of Survey: September 16, 1996
Location
Physical Description: Baskin's property
Legal Description: T4N R17E Sec 29 NW1/4 SW1/4
Quad Map: Griffin Butte, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040219052
Fish Survey
Fish Sampling Method: Two equal effort upstream passes made with backpack shocker.
Distance Electrofished: 137 m
Population Estimate Model: Seber and LeCren (1967) 2-step removal
Sampling Results: See Table 36
Species: Wild rainbow trout
Total Sampled: 186
Total Length Range: 28-235 mm
Population Estimate: 28 (For fish $\geq$100 mm)
Standard Error: 9.17
Density (no./100 m^2): 1.9
Species: Brook trout
Total Sampled: 2
Total Length Range: 65-76 mm
Species: Wood River sculpin
Total Sampled: 95
Total Length Range: 25-95 mm
Habitat: See Table 37
Reach: 2
Date of Survey: September 11, 1996
Location
Physical Description: 160 m downstream of Rooks Creek confluence.
Legal Description: T4N R16E Sec 26 SE1/4 SW1/4
Quad Map: Boyle Mountain, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040219052
Fish Survey
Fish Sampling Method: Two equal effort upstream passes made with backpack shocker.
Distance Electrofished: 67 m
Population Estimate Model: Van Deventer and Platts (1986) Three-step removal maximum likelihood estimate
Sampling Results: See Table 38
Species: Wild rainbow trout
Total Sampled: 65
Total Length Range: 38-225 mm
Population Estimate: 29 (For fish $\geq$100 mm)
Standard Error: 8.79
Density (no./100 m^2): 3.9
Species: Hatchery rainbow trout
Total Sampled: 22
Total Length Range: 205-295 mm
Species: Wood River sculpin
Total Sampled: 40
Total Length Range: 22-110 mm
Habitat: See Table 37
Reach: 3
Date of Survey: September 10, 1996

Location
Physical Description: 300 m upstream of Barr Gulch confluence
Legal Description: T4N R16E Sec 33 NW1/4 NW1/4
Quad Map: Griffin Butte, Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040219054
Fish Survey
Fish Sampling Method: Two equal effort upstream passes made with backpack shocker.
Distance Electrofished: 137 m
Population Estimate Model: Seber and LeCren (1967) 2-step removal
Sampling Results: See Table 39
Species: Wild rainbow trout
Total Sampled: 59
Total Length Range: 35-257 mm
Average Total Length: 83 mm
Population Estimate: 16 (For fish $\geq$100 mm)
Standard Error: 0.78
Density (no./100 m^2): 2.7
Species: Wood River sculpin
Total Sampled: 69
Total Length Range: 21-135 mm
Habitat: See Table 37
Reach: 4
Date of Survey: September 11, 1996
Location
Physical Description: 800 m upstream of Middle Fork and South Fork confluence
Legal Description: T3N, R15E, SEC12, NE1/4, SE1/4
Quad Map: Buttercup Mtn., Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040219056
Fish Survey
Fish Sampling Method: Two equal effort upstream passes made with backpack shocker.
Distance Electrofished: 64 m
Population Estimate Model: Not applicable
Sampling Results: See Table 40
Species: Wild rainbow trout
Total Sampled: 2
Total Length Range: 50-190 mm
Species: Brook trout
Total Sampled: 5
Total Length Range: 105-170 mm
Species: Wood River sculpin
Total Sampled: 14
Total Length Range: 40-125 mm
Habitat: See Table 37
Reach: 5
Date of Survey: September 11, 1996
Location
Physical Description: Four kilometers upstream of Middle Fork and South Fork confluence
Legal Description: T3N, R15E, SEC11, NW1/4, SW1/4
Quad Map: Dollarhide Mtn., Idaho (7.5 min U.S.G.S.)
E.P.A. Reach No.: 17040219056
Fish Survey
Fish Sampling Method: Single upstream pass made with backpack shocker.
Distance Electrofished: 85 m
Population Estimate Model: Not applicable
Sampling Results: No fish sampled, one adult tailed frog *Ascaphus truei* found
Habitat: See Table 37

Table 36. Total length frequencies of all fish sampled and average weights of some fish sampled by electrofishing in reach 1 on Warm Springs Creek, September 16, 1996.

Length range (mm)	Wild rainbow trout				Brook trout		Wood River sculpin	
	Length		Weight		Length		Length	
	no.	%	no.	avg.	no.	%	no.	%
0-9								
10-19								
20-29	1	0.5					16	16.8
30-39	11	5.9						
40-49	34	18.4					2	2.1
50-59	46	24.9					22	23.2
60-69	38	20.5			1	50.0	23	24.2
70-79	28	14.6	4	4	1	50.0	23	24.2
80-89	4	2.2	4	6			6	6.3
90-99	3	1.6	3	8			3	3.2
100-109	7	3.8	7	11				
110-119	6	3.2	6	15				
120-129	2	1.1	2	20				
130-139	1	0.5	1	24				
140-149	1	0.5	1	27				
150-159	1	0.5	1	34				
160-169	1	0.5	1	45				
170-179								
180-189	1	0.5	1	73				
190-199								
200-209								
210-219								
220-229								
230-239	1	0.5						
240-249								
250-259								
260-269								
270-279								
280-289								
290-299								
Number:	186				2		95	
Avg length:	65				70		57	
Total sampled:	186				2		95	

Table 37. Habitat survey results for Warm Springs Creek, 1996.

Reach 1	Baskin's property		Legal Description		T4N R17E Sec 29 NW1/4 SW1/4	
Date of Survey	9/16/96		Total Distance Electrofished		137 m	
Channel Type	Moderately Confined (B)		Average Width		11.0 m	
Transect Cross Section Interval	20 m		Area		1,505 m^2	
No. of Cross Sections	6		Average Depth		0.27 m	
Habitat Type:						
	Pool	Riffle	Run	Pocket	Backwater	
Percent of Transect:	0	22	72	6	0	
Average Depth by Habitat Type (m):	-	0.31	0.28	0.05	-	
Substrate by Habitat Type						Entire Site
% Silt/Sand	-	4	15	10	-	12
% Gravel	-	21	29	0	-	26
% Rubble	-	63	38	10	-	41
% Boulder	-	13	17	80	-	21
% Bedrock	-	0	0	0	-	0
Reach 2	160 m downstream of Rooks Creek confluence		Legal Description		T4N R16E Sec 26 SE1/4 SW1/4	
Date of Survey	9/11/96		Total Distance Electrofished		67 m	
Channel Type	Moderately Confined (B)		Average Width		11.1 m	
Transect Cross Section Interval	15 m		Area		740 m^2	
No. of Cross Sections	4		Average Depth		0.26 m	
Habitat Type:						
	Pool	Riffle	Run	Pocket	Backwater	
Percent of Transect:	0	33	58	8	0	
Average Depth by Habitat Type (m):	-	0.25	0.26	0.30	-	
Substrate by Habitat Type						Entire Site
% Silt/Sand	-	1	5	20	-	5
% Gravel	-	5	11	0	-	8
% Rubble	-	64	31	0	-	40
% Boulder	-	30	53	80	-	47
% Bedrock	-	0	0	0	-	0

Table 37. Continued.

Reach 3	300 m upstream of Barr Gulch confluence		Legal Description		T4N R16E Sec 33 NW1/4 NW1/4	
Date of Survey	9/10/96		Total Distance Electrofished		79 m	
Channel Type	Moderately Confined (B)		Average Width		7.6 m	
Transect Cross Section Interval	12		Area		599 m^2	
No. of Cross Sections	6		Average Depth		0.33 m	
Habitat Type:						
	Pool	Riffle	Run	Pocket	Backwater	
Percent of Transect:	22	17	61	0	0	
Average Depth by Habitat Type (m):	0.55	0.15	0.30	-	-	
Substrate by Habitat Type						Entire Site
% Silt/Sand	50	2	15	-	-	21
% Gravel	31	65	39	-	-	42
% Rubble	19	25	39	-	-	32
% Boulder	0	8	6	-	-	5
% Bedrock	0	0	0	-	-	0
Reach 1	800 m upstream of Middle Fork and South Fork confluence		Legal Description		T3N R15E Sec 12 NE1/4 SE1/4	
Date of Survey	9/11/96		Total Distance Electrofished		64 m	
Channel Type	Moderately Confined (B)		Average Width		2.6 m	
Transect Cross Section Interval	15 m		Area		166 m^2	
No. of Cross Sections	4		Average Depth		0.12 m	
Habitat Type:						
	Pool	Riffle	Run	Pocket	Backwater	
Percent of Transect:	17	33	50	0	0	
Average Depth by Habitat Type (m):	0.20	0.09	0.11	-	-	
Substrate by Habitat Type	45	7	7	-	-	Entire Site
% Silt/Sand	0	27	17	-	-	14
% Gravel	0	53	58	-	-	18
% Rubble	45	13	17	-	-	47
% Boulder	10	0	0	-	-	20
% Bedrock						2

Table 37. Continued.

Reach 5	4 km upstream of Middle Fork and South Fork confluence	Legal Description	T3N R15E Sec 11 SW1/4 SW1/4
Date of Survey	9/11/96		
Channel Type	Moderately Confined (B)	Total Distance Electrofished	85 m
Transect Cross Section Interval	15 m	Average Width	2.6 m
No. of Cross Sections	5	Area	218 m^2
Habitat Type:		Average Depth	0.12 m

	Pool	Riffle	Run	Pocket	Backwater	Entire Site
Percent of Transect:	13	33	27	27	0	
Average Depth by Habitat Type (m):	0.16	0.08	0.14	0.11	-	
Substrate by Habitat Type						
% Silt/Sand	53	31	27	32	-	33
% Gravel	13	39	34	35	-	33
% Rubble	35	30	39	32	-	34
% Boulder	0	0	0	0	-	0
% Bedrock	0	0	0	0	-	0

Table 38. Total length frequencies of all fish sampled and average weights of some fish sampled by electrofishing in reach 2 on Warm Springs Creek, September 16, 1996.

Length range (mm)	Wild rainbow trout				Hatchery rainbow trout		Wood River sculpin	
	Length		Weight		Length		Length	
	no.	%	no.	avg.	no.	%	no.	%
0-9								
10-19								
20-29							3	7.5
30-39	1	1.5						
40-49	19	29.2						
50-59	19	29.2					4	10.0
60-69	2	3.1					7	17.5
70-79							3	7.5
80-89	1	1.5	1	5			9	22.5
90-99	1	1.5	1	6			8	20.0
100-109	4	6.2	4	10			5	12.5
110-119	4	6.2	4	13			1	2.5
120-129	1	1.5	1	20				
130-139	5	7.7	5	25				
140-149	2	3.1	2	28				
150-159	1	1.5	1	38				
160-169	1	1.5	1	32				
170-179								
180-189	2	3.1	2	55				
190-199								
200-209					1	4.5		
210-219								
220-229	2	3.1	2	126	3	13.6		
230-239					2	9.1		
240-249					5	22.7		
250-259					6	27.3		
260-269					2	9.1		
270-279					1	4.5		
280-289					1	4.5		
290-299					1	4.5		
Number:	65				22		40	
Avg length:	81				247		77	
Total sampled:	65				22		40	

Table 39. Total length frequencies of all fish sampled and average weights of some fish sampled by electrofishing in reach 3 on Warm Springs Creek, September 16, 1996.

Length range (mm)	Wild rainbow trout				Wood River sculpin	
	Length		Weight		Length	
	no.	%	no.	avg.	no.	%
0-9						
10-19						
20-29					1	1.4
30-39	1	1.7				
40-49	15	25.4			1	1.4
50-59	18	30.5			13	18.8
60-69	3	5.1			20	29.0
70-79					4	5.8
80-89	3	5.1	3	8	13	18.8
90-99	3	5.1	2	11	8	11.6
100-109	1	1.7	1	14	6	8.7
110-119	4	6.8	4	17		
120-129	1	1.7	1	20	2	2.9
130-139	1	1.7	1	28	1	1.4
140-149	1	1.7	1	31		
150-159						
160-169						
170-179	2	3.4	2	64		
180-189	2	3.4	2	83		
190-199	2	3.4	2	79		
200-209	1	1.7	1	100		
210-219						
220-229						
230-239						
240-249						
250-259	1	1.7	1	228		
260-269						
270-279						
280-289						
290-299						
Number:	59				69	
Avg length:	83				75	
Total sampled:	59				69	

Table 40. Total length frequencies of all fish sampled and average weights of some fish sampled by electrofishing in reach 4 on Warm Springs Creek, September 16, 1996.

Length range (mm)	Wild rainbow trout				Brook trout				Wood River sculpin	
	Length		Weight		Length		Weight		Length	
	no.	%	no.	avg.	no.	%	no.	avg.	no.	%
0-9										
10-19										
20-29										
30-39										
40-49									1	7.1
50-59	1	50.0								
60-69									1	7.1
70-79									4	28.6
80-89									1	7.1
90-99										
100-109					1	20.0	1	12		
110-119									3	21.4
120-129					1	20.0	1	18	4	28.6
130-139					1	20.0	1	27		
140-149										
150-159					1	20.0	1	43		
160-169										
170-179					1	20.0	1	51		
180-189										
190-199	1	50.0	1	84						
200-209										
210-219										
220-229										
230-239										
240-249										
250-259										
260-269										
270-279										
280-289										
290-299										
Number:	2				5				14	
Avg length:	120				136				93	
Total sampled:	2				5				14	

DIVISION OF ENVIRONMENTAL QUALITY STREAM SURVEY RESULTS

The Idaho Division of Environmental Quality (D.E.Q.) performed numerous stream surveys for its Beneficial Use Reconnaissance Project (BURP) in 1996. Methods included sampling fish by backpack electroshocker then recording total numbers of each species of fish sampled with total length measurements on a subsample of fish. Fish sampling results are given in Table 41.

Table 41. Description of streams surveyed by the Department of Environmental Quality for Beneficial Use Reconnaissance Project surveys in 1996.

Drainage	Stream	Legal description	Date surveyed	Reach length (m)	Average stream width (m)	Fish species sampled	Average fish length (mm)	Number of fish sampled
South Fk. Boise River								
	Little Smoky Creek	T03NR14ES32SE	08/15/96	140	7	Rainbow trout	152	26
	Paradise Creek	T03NR13ES2NE	08/13/96	100	5	Rainbow trout	173	3
						Brook trout	115	12
						Sculpin	49	49
	Rosetta Creek	T03NR14ES35SW	08/15/96	100	3	Rainbow trout	86	29
						Sculpin	67	53
	Shake Creek (upper)	T4NR11ES33SW NE	07/29/96	100	3	Rainbow trout	138	16
	Shake Creek (lower)	T3NR11ES4SW NE	07/29/96	100	5	Rainbow trout	106	22
	Feather River (upper)	T4NR10ES34NW NE	07/29/96	140	5	Rainbow trout	110	2
						Sculpin		31
	Feather River (lower)	T4NR10ES34NW SE	07/29/96	140	5	Rainbow trout	133	9
						Sculpin		13
	Elk Creek (lower)	T4NR10ES16NE SE	07/02/96	115	5	Rainbow trout	138	4
						Sculpin		29
	Elk Creek (upper)	T5NR10ES33NE NW		100	5	Rainbow trout	184	8
Bruneau River								
	Big Flat (upper)	T16SR11ES19NW NE NE	07/25/96	100	4	Redside shiner	73	34
						Sculpin	65	1
						Dace	62	2
						Brook trout	120	1
	Cherry Creek (lower)	T15SR11ES29NE NE NW	07/25/96			NO FISH		
	Three Creek (lower)	T15SR11ES27NW SW SW	07/25/96	100	3	Redside shiner	54	116
						Dace	66	20
						Sucker	135	2
						Sculpin	65	1
						Crayfish		1

Table 41. Continued.

Drainage	Stream	Legal description	Date surveyed	Reach length (m)	Average stream width (m)	Fish species sampled	Average fish length (mm)	Number of fish sampled
Camas Creek								
	Beaver Creek	T01NR16ES04SW	07/07/96	100	0.5	NO FISH		
	Camp Creek (lower)	T01NR16ES35NW	07/25/96	100	2	Cutthroat	56	14
	Chimney Creek (upper)	T1NR12ES16SW SW SE	09/09/96	30		NO FISH		
	East Fork Corral Creek	T1NR13ES17SW SW SW	08/06/96	100		Rainbow trout	112	15
	Little Beaver Creek	T02NR16ES34SW	07/25/96	100	1	Rainbow trout	15	1
	Soldier Creek (lower)	T1NR14ES28NE	07/25/96	100	6	Brook trout	161	10
						Sculpin	62	14
	Soldier Creek (upper)	T02NR14ES18SW	07/25/96	100	3	Sculpin	88	11
						Brook trout	141	5
Big Wood River								
	Big Wood River	T6NR15ES14SE NW SW	08/01/96	160	8	Sculpin	72	13
						Rainbow trout	150	2
						Brook trout	45	1
	Horse Creek	T7NR15ES34NE SW SE	08/01/96	100	3	Brook trout	153	12
						Sculpin		2
	Hyndman Creek	T4NR19ES20SW	08/01/96	160	8	Rainbow trout	235	1
						Sculpin	88	4
	N. Fk. Big Wood River	T6NR17ES27NW	07/29/96	200	10	Sculpin	63	79
						Brook trout	135	1
						Rainbow trout	265	1
	Owl Creek	T6NR15ES28NW SW NE	08/15/96	100	5	Brook trout	175	2
	Senate Creek	T6NR15ES2SW SE NW	08/15/96	100	5	Brook trout	130	6
						Sculpin	61	21
	Trail Creek	T5NR18ES14NW SE NW	08/01/96	200	10	Sculpin	78	26
						Rainbow trout	245	2
						Brook trout	110	6

Table 41. Continued.

Drainage	Stream	Legal description	Date surveyed	Reach length (m)	Average stream width (m)	Fish species sampled	Average fish length (mm)	Number of fish sampled
Little Wood River								
	Copper Creek (lower)	T3NR21ES11SW	08/08/96	120	6	Brook trout	222	3
						Sculpin	70	48
						Wild rainbow trout	178	5
	Fish Creek (lower)	T1NR22ES33SE		100	5	Dace	51	43
						Sucker	60	49
						Shiner	55	4
			08/12/96			Redside shiner	55	3
	Friedman Creek	T2NR22ES7SE	08/08/96	120	6	Brook trout	110	6
						Wild rainbow trout	135	1
						Sculpin	54	29
	Little Wood River (upper)	T03NR20ES34SW		220	11	Whitefish	293	4
						Brook trout	140	4
						Rainbow trout	253	6
						Sculpin	87	23
						Dace	80	1
	Baugh Creek	T03NR20ES13SE	08/05/96	100	5	Rainbow	165	5
						Redside shiner	112	7
						Brook trout	85	1
						Dace	74	11
						Sculpin	68	3
						Sucker	95	4
	Muldoon Creek	T2NR21ES8SE	08/06/96	140	7	Rainbow trout	194	8
						Brook trout	84	44
						Redside shiner	92	16
						Dace	67	6
	Trail Creek	T02NR22ES08NW	08/08/96	100	4	Brook trout	87	15
						Sculpin		29

Table 41. Continued.

Drainage	Stream	Legal description	Date surveyed	Reach length (m)	Average stream width (m)	Fish species sampled	Average fish length (mm)	Number of fish sampled
Salmon Falls Creek								
	Big Creek	T16SR17ES11SW SW SW	08/22/96	100	2	Redside shiner	47	67
						Dace	66	116
						Sucker	47	33
	House Creek	T15SR13ES18NE NE SW	07/25/96	100	5	Dace	71	9
						Rainbow trout	151	9
						Brook trout	140	2
						Sculpin	70	15
	Salmon Falls Creek	T16SR15ES20NE	08/07/96	200	10	Northern squawfish	149	25
						Bass	178	2
						Whitefish	260	2
	Shoshone Creek	T16SR17ES03NE		100	5	Northern squawfish	86	11
						Sucker	134	23
						Speckled dace	78	16
						Redside shiner	54	76
	Hot Creek	T16SR17ES36NE	08/01/96	100	1	Speckled dace	12	168
						Redside shiner	26	16
	Langford Flat Creek	T15SR18ES18SW NW SW	08/01/96			(Dry site)		
Deep Creek								
	Deep Creek	T9SR14ES20 SW NE NW	08/22/96	180	9	Redside shiner	82	35
						Sucker	106	18
						Sculpin	70	46
Rock Creek								
	Fifth Fork Rock Creek	T14SR18ES10NW SE NE	08/22/96	100	5	Rainbow trout	154	12
Murtaugh Lake								
	East Fork Dry Creek	T12SR19ES26NW SE SW	09/06/96	25	5	Cutthroat trout	195	8
						Sculpin	75	1
	West Fork Dry Creek	T12SR19ES34NW				(Dry site)		

Table 41. Continued.

Drainage	Stream	Legal description	Date surveyed	Reach length (m)	Average stream width (m)	Fish species sampled	Average fish length (mm)	Number of fish sampled
Goose Creek								
	Fall Creek	T15SR20ES21SE SW NW	08/08/96	100	5	Wild rainbow trout	101	22
						Sculpin	80	8
	Spring Creek	T14SR23ES3SW SW SE	09/13/96	100	5	Brook trout	160	14
	Summit Creek	T14SR23ES22NW NW NW	08/08/96	100	5	NO FISH		
Raft River								
	Clyde Creek	T13SR24ES26NW SE SW	08/08/96	150	3	Rainbow trout	235	3
						Cutthroat trout	115	2
						Brook trout	215	5
						Sculpin	69	51
	Cottonwood Creek	T13SR24ES23SE	07/31/96	200	4	Brook trout	224	8
						Sculpin	92	7
	Lake Fork Creek	T12SR29ES27SE NW NE	08/20/96	100	5	Rainbow trout	67	103
						Cutthroat trout	55	6
						Crayfish	105	1
						Sculpin	99	7
	Sublett Creek	T13SR29ES3SW	08/29/96	100	5	Sculpin	55	1
						Dace	64	7
	Fall Creek	T12SR29ES27SW NE NE	08/20/96	100	5	Rainbow trout	65	61

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LITERATURE CITED

Grunder, S.A., L. Barrett and R.J. Bell. 1987. Federal Aid in Fish Restoration. Job Performance Report. Project F-71-R-11, Regional Fisheries Management Investigations. Job 4-c. Region 4 River and Stream Investigations. Idaho Department of Fish and Game, Boise.

IDFG (Idaho Department of Fish and Game). 1992. Standard Stream Surveys. Standardized methodologies for stream habitat surveys. Unpublished document. Fisheries Bureau, IDFG, Boise.

Partridge, F.E. and C.E. Corsi. 1993. Federal Aid in Fish Restoration. Job Performance Report. Project F-71-R-15, Regional Fisheries Management Investigations. Job 4-b, Region 4 Lowland Lakes and Reservoirs Investigations. Idaho Department of Fish and Game, Boise.

Partridge, F.E. and C.D. Warren 1994. Federal Aid in Fish Restoration. Job Performance Report. Project F-71-R-16, Regional Fisheries Management Investigations. Idaho Department of Fish and Game, Boise.

Partridge, F.E. and C.D. Warren. 1995. Federal Aid in Fish Restoration. Job Performance Report. Project F-71-R-18, Regional Fisheries Management Investigations. Idaho Department of Fish and Game, Boise.

Ricker, W.E. 1975. Computation and Interpretation of Biological Statistics of Fish Populations. Department of the Environment, Fisheries and Marine Service. Ottawa, Canada.

Seber, G.A.F. and E.D. LeCren. 1967. Estimating population parameters from catches large relative to the population. Journal of Animal Ecology 36: 631-643.

Thurow, R. F. 1990. Federal Aid in Fish Restoration. Job Completion Report. Project F-73-R-12, Wood River Fisheries Investigations. Idaho Department of Fish and Game, Boise.

Van Deventer, J.S. and W.S. Platts. 1983. Sampling and estimating fish populations from streams. Transactions of the North American Wildlife and Natural Resources Conference. 48: 349-354.

Warren, C.D. and F.E. Partridge. 1994. Federal Aid in Fish Restoration. Job Performance Report. Project F-71-R-17, Regional Fisheries Management Investigations. Idaho Department of Fish and Game, Boise.

Warren, C.D., F.E. Partridge and K.A. Frank. In Press. Federal Aid in Fish Restoration. Job Performance Report. Project F-71-R-20, Regional Fisheries Management Investigations. Idaho Department of Fish and Game, Boise.

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Contract Period: July 1, 1996 to June 30, 1997

ABSTRACT

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

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

Author:

Fred E. Partridge
Regional Fishery Manager

1996 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-21

Project III: Habitat Management

Subproject II-E: Magic Valley Region

Contract Period: July 1, 1996 to June 30, 1997

ABSTRACT

No habitat management activities were performed during this time period.

Author:

Fred E. Partridge
Regional Fishery Manager

1996 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-21

Project IV: Population Management

Subproject IV-E: Magic Valley Region

Contract Period: July 1, 1996 to June 30, 1997

ABSTRACT

Fish populations and fishing in the Magic Valley Region were enhanced by stocking approximately 4.3 million put-and-grow and 0.79 million put-and-take size fish into lakes, reservoirs, rivers and streams accessible by vehicle. High mountain lakes were stocked with Henrys Lake cutthroat trout *Oncorhynchus clarki* and Arctic grayling *Thymallus arcticus* fingerlings.

In September 1996, a 11 ha pond at Bruneau Dunes State Park was successfully treated with rotenone to eradicate a large population of common carp *Cyprinus carpio*.

Author:

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