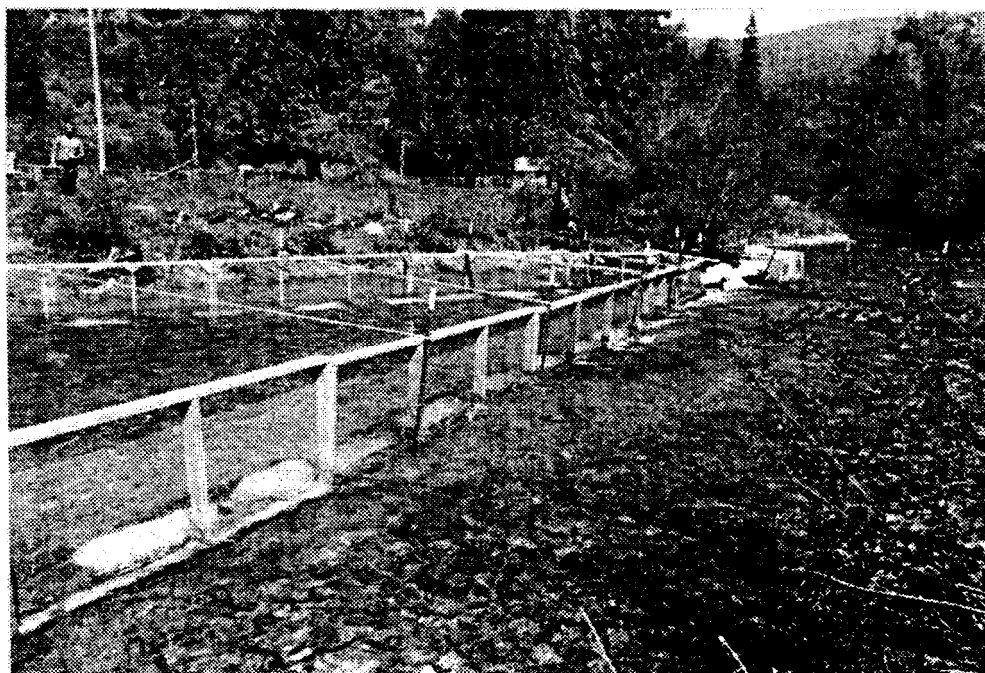


FISHERY RESEARCH



FEDERAL AID
IN
FISH RESTORATION

Job Performance Report, Project F-73-R-8
Subproject IV: RIVER AND STREAM INVESTIGATIONS
Study IV: North Idaho Streams Fishery Research



By

William D. Horton
Senior Fishery Research Biologist

December 1987

TABLE OF CONTENTS

	<u>Page</u>
Job. 1: <u>Fish Population Inventory</u>	
ABSTRACT	1
INTRODUCTION	2
OBJECTIVE	2
RECOMMENDATIONS	4
METHODS	4
Fish Distribution and Abundance	4
Spawning Surveys	4
Creel Survey	4
Electrofishing	4
Snorkeling	5
Fish Movements and Exploitation	5
Weir and Trap Operations	5
Lake Merwin Trap	6
Project Angling	6
Cutthroat Trout Exploitation and Movement	6
RESULTS	8
Fish Distribution and Abundance	8
Spawning Surveys	8
Creel Survey	8
Electrofishing	11
Snorkeling	11
Fish Movement and Exploitation Estimates	11
Weir and Trap Operations	11
Lake Merwin Trap	17
Project Angling	17
Exploitation Estimates	17
Cutthroat Trout Movement	20
DISCUSSION	23
Fish Distribution and Abundance	23
Fish Movement and Exploitation Estimates	24
LITERATURE CITED	25
APPENDIX	27

LIST OF TABLES

	<u>Page</u>
Table 1. Operation of migratory fish traps placed in tributaries of the Coeur d'Alene River, spring 1985	7
Table 2 Spawning surveys of Coeur d'Alene River tributaries, 1985	9
Table 3. Daily random creel information from Coeur d'Alene River, 1985	10
Table 4. Fish species captured by electrofishing (+) in tributaries to the Coeur d'Alene River, 1985	12
Table 5. Summary of fish densities (fish/100 m ²) collected during the summer of 1985 in tributaries of the Coeur d'Alene River	15
Table 6. Catch of salmonids in migratory fish traps placed in Coeur d'Alene River tributaries, 1985	16
Table 7. Fish captured in Lake Merwin trap located in the Coeur d'Alene River at Bull Run Lake Bridge, 1985	18
Table 8. Trout captured and tagged by project angling in the Coeur d'Alene River during 1985	19
Table 9. Movement of tagged cutthroat trout in the Coeur d'Alene River system.....	21

LIST OF FIGURES

Figure 1. Tributaries surveyed in the lower Coeur d'Alene River drainage, 1985	3
Figure 2. Length frequency of cutthroat and rainbow x cutthroat trout captured by electrofishing, traps, weirs and hook-and-line sampling in the Coeur d'Alene River drainage, 1985	13
Figure 3. Length frequency of brook and rainbow trout captured by electrofishing, traps, weirs and hook-and-line sampling in the Coeur d'Alene River drainage, 1985 . .	14

LIST OF APPENDICES

Appendix A. Conductivity of tributaries to the Coeur d'Alene River 1985	27
---	----

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Job 2: <u>Fish Habitat Description</u>	
ABSTRACT	28
INTRODUCTION	29
OBJECTIVE	29
RECOMMENDATIONS	29
METHODS	29
RESULTS	30
DISCUSSION	30
LITERATURE CITED	33
APPENDICES	34

LIST OF FIGURES

Figure 1. Tributaries surveyed in the lower Coeur d'Alene River. drainage, 1986	31
--	----

LIST OF APPENDICES

Appendix A-1. Stream habitat survey summary for Evans Creek, Fernan District, Coeur d'Alene National Forest . .	35
Appendix A-2. Stream habitat survey summary for Evans Creek, Fernan District, Coeur d'Alene National Forest . .	36
Appendix A-3. Stream habitat survey summary for Evans Creek, Fernan District, Coeur d'Alene National Forest . .	37
Appendix B-i. Stream habitat survey summary for Fortier Creek, Fernan District, Coeur d'Alene National Forest . .	38
Appendix C-1. Stream habitat survey summary for Fourth of July Creek, Fernan District, Coeur d'Alene National Forest	39

LIST OF APPENDICES (Continued)

	<u>Page</u>
Appendix C-2. Stream habitat survey summary for Fourth of July Creek, Fernan District, Coeur d'Alene National Forest	40
Appendix D-1. Stream habitat survey summary for French Gulch Creek, Fernan District, Coeur d'Alene National Forest	41
Appendix D-2. Stream habitat survey summary for. French Gulch Creek, Fernan District, Coeur d'Alene National Forest	42
Appendix E-1. Stream habitat survey summary for Skeel Gulch Creek, Fernan District, Coeur d'Alene National Forest	43
Appendix F-1. Stream habitat survey summary for Thompson Creek, Fernan District, Coeur d'Alene National Forest . .	44
Appendix F-2. Stream habitat survey summary for Thompson Creek, Fernan District, Coeur d'Alene National Forest . .	45
Appendix G-1. Stream habitat survey summary for West Fork Thompson Creek, Fernan District, Coeur d'Alene National Forest	46
Appendix H-1. Stream habitat survey summary for Willow Creek, Fernan District, Coeur d'Alene National Forest . .	47
Appendix I-1. Stream habitat survey summary for Bear Creek, Wallace District, Coeur d'Alene National Forest .	48
Appendix J-1. Stream habitat survey summary for Brown Creek, Wallace District, Coeur d'Alene National Forest .	49
Appendix K-1. Stream habitat survey summary for Coal Creek, Wallace District, Coeur d'Alene National Forest .	50
Appendix L-i. Stream habitat survey summary for Cougar Gulch Creek, Wallace District, Coeur d'Alene National Forest	51
Appendix M-1. Stream habitat survey summary for East Fork Eagle Creek, Wallace District, Coeur d'Alene National Forest	52
Appendix M-2: Stream habitat survey summary for East Fork Eagle Creek, Wallace District, Coeur d'Alene National Forest	53

LIST OF APPENDICES (Continued)

	<u>Page</u>
Appendix N-1. Stream habitat survey summary for West Fork Eagle Creek, Wallace District, Coeur d'Alene National Forest	54
Appendix O-1. Stream habitat survey summary for Graham Creek, Wallace District, Coeur d'Alene National Forest .	55
Appendix P-1. Stream habitat survey summary for Grizzly Creek, Wallace District, Coeur d'Alene National Forest. .	56
Appendix P-2. Stream habitat survey summary for Grizzly Creek, Wallace District, Coeur d'Alene National Forest .	57
Appendix Q-1. Stream habitat survey summary for Hat Creek, Wallace District, Coeur d'Alene National Forest .	58
Appendix R-1. Stream habitat survey summary for Lost Creek, Wallace District, Coeur d'Alene National Forest .	59
Appendix R-2. Stream habitat survey summary for Lost Creek, Wallace District, Coeur d'Alene National Forest .	60
Appendix S-1. Stream habitat survey summary for East Fork Lost Creek, Wallace District, Coeur d'Alene National Forest	61
Appendix T-1. Stream habitat survey summary for Scott Creek, Wallace District, Coeur d'Alene National Forest. .	62
Appendix U-1. Stream habitat survey summary for Steamboat Creek, Wallace District, Coeur d'Alene National Forest. .	63
Appendix U-2. Stream habitat survey summary for Steamboat Creek, Wallace District, Coeur d'Alene National Forest. .	64
Appendix V-1. Stream habitat survey summary for East Fork Steamboat Creek, Wallace District, Coeur d'Alene National Forest	65
Appendix W-1. Stream habitat survey summary for West Fork Steamboat Creek, Wallace District, Coeur d'Alene National Forest	66
Appendix X-1. Sample of habitat summaries used to produce Appendices A-1 through W-1	67

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Job. 3: <u>Fish Species and Stock Evaluation</u>	
ABSTRACT	70
INTRODUCTION	71
OBJECTIVES	71
METHODS	71
LITERATURE CITED	72

JOB PERFORMANCE REPORT

State of: Idaho Name: RIVER AND STREAM
INVESTIGATIONS
Project No.: F-73-R-8 Title: North Idaho Streams
Fishery Research
Subproject No.: IV
Study No.: IV
Job No.: 1. Fish Population Inventory
Period Covered: March 1, 1985 to February 28, 1986

ABSTRACT

A study of the Coeur d'Alene River was conducted in 1984 and 1985 to obtain fisheries and habitat information for most tributaries between the mouth and the special-regulations boundary at Yellow Dog Creek. Emphasis was placed on those streams accessible to migratory trout populations.

The Coeur d'Alene River system supports viable populations of cutthroat trout (Salmo clarki), rainbow trout (Salmo gairdneri) and brook trout (Salvelinus fontinalis) in its lower reaches. All 25 tributaries surveyed supported populations of cutthroat trout and approximately half of these streams had rainbow and brook trout. Hybridization of cutthroat and rainbow trout was noted in 40% of the tributaries. Bull trout (Salvelinus confluentus) numbers are very depressed, with only three individuals captured in 1985. Most of the trout fishing occurs the river upstream from Dudley (near Cataldo). Anglers interviewed while fishing this area caught trout and char at a rate of 0.51 fish per hour in the spring. The catch rate was higher below the South Fork (0.64 fish/hour) than above (0.47 fish/hour).

Electrofishing was used to capture over 400 trout which were tagged for estimates of movement and angling mortality. Relative trout abundance was estimated by snorkeling at 14 transects in 10 streams. Densities ranged from 0 to 17.5 trout per 100 m². Most streams were too small to snorkel effectively.

Weirs were operated in six tributaries to assess use by migratory trout spawners. Tagged trout were recovered by anglers up to 32 km from spawning streams. Attempts to capture migratory trout with a Lake Merwin trap were unsuccessful.

Estimated minimum angling mortality was 32% for trout tagged with reward mandible tags.

Author:

William D. Horton
Senior Fishery Research Biologist

INTRODUCTION

Information gathered during recent years by anglers, conservation officers and fish management personnel indicated a decline in the Lake Coeur d'Alene trout catch. At the same time, angler effort and catch was increasing in the main Coeur d'Alene River downstream from the South Fork. Of particular concern was the number of large (>300 mm) trout being harvested in this area. In 1984 the Idaho Department of Fish and Game initiated studies of fish populations and habitat in the Lower Coeur d'Alene River system to develop management proposals.

Ellis (1932) reported the South Fork and the main river below the South Fork were so polluted from mine waste that the river was devoid of life. This condition existed since before the turn of the century. Now that the pollution has lessened, fish numbers and angling activity has increased.

In 1973 the Idaho Department of Fish and Game conducted studies on the Coeur d'Alene River to evaluate abundance, population structure and harvest of game fish above Enaville (Bowler 1974). Bowler compared cutthroat trout populations of the Coeur d'Alene and St. Joe rivers, documenting the poor condition of the Coeur d'Alene River fishery. Bauer (1975) inventoried tributaries for spawning use by adfluvial cutthroat trout. The Environmental Protection Agency did bioassay work on the South Fork and the main stem in June 1973 (Kreizenbeck 1973) and July 1974 (Bauer 1975). All rainbow trout held in live boxes at seven locations in and below the South Fork in 1973 died within 48 hours. By 1974, the toxicity had decreased and fish in the main river survived at least 72 hours. However, the South Fork was still toxic to trout within 20 hours. Now trout are caught throughout the season within the same stream reaches. Lewynsky and Bjornn (1983) evaluated the effects of special regulations established on the Coeur d'Alene River in 1975. They also determined seasonal distribution and trout movement and estimated mortality rates for comparison with Bowler's results.

The Coeur d'Alene River originates on the Pend Oreille. divide and flows southwesterly for 193 km before emptying into Lake Coeur d'Alene. The study area extends from the mouth upstream 123 km to Yellow Dog Creek, including most tributaries except the South Fork (Fig. 1).

OBJECTIVE

To assess the status of game fish populations in the lower Coeur d'Alene River system.

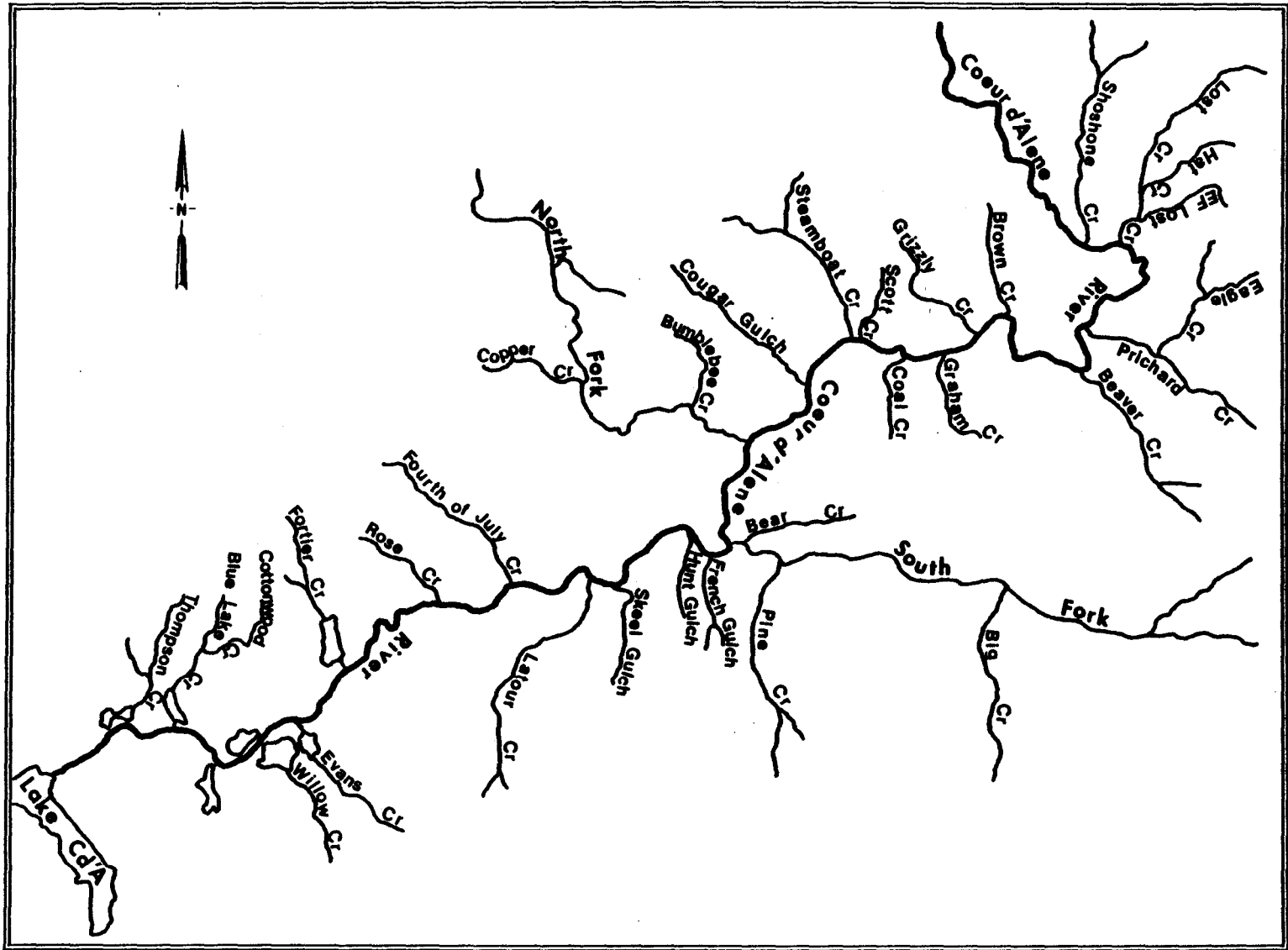


Figure 1. Tributaries surveyed in the lower Coeur d'Alene River drainage, 1985.

RECOMMENDATIONS

Research will continue through 1987. Recommendations will be provided in the completion report.

METHODS

Fish Distribution and Abundance

Spawning Surveys

Redd counts and observations of adult fish were used to identify trout spawning areas in Brown, Coal, Cougar Gulch, French Gulch, Graham, Grizzly, Scott, Skeel Gulch and Steamboat creeks. Streams were selected for spawning surveys based on information gathered in 1984. No spawning areas in lower Coeur d'Alene River tributaries have been identified in previous studies; however, Bauer (1975) documented adult cutthroat trout in several tributaries.

Number of redds and total kilometers walked were recorded for each stream, but data were not sufficient to estimate total spawning escapement.

Creel Survey

A limited creel survey was conducted during the opening weekend and weekends in June for the second year to ascertain species caught, catch rates, size of catch and distribution of effort. The census area included the Coeur d'Alene River from Dudley upstream to Shoshone Creek and the North Fork Coeur d'Alene River upstream to Laverne Creek. The survey targeted high-use days to collect baseline information and to recover tags from fish tagged during 1984 and the spring of 1985.

Electrofishing

Electrofishing was used in tributaries and the main Coeur d'Alene River for determination of species composition, size and age frequency. All game fish sampled were anesthetized and lengths were measured to the nearest millimeter. Trout less than 100 mm were measured and released and those between 100 mm and 250 mm were tagged with Floy FTF-69 fingerling tags sewn through the back near the leading edge of the dorsal fin. Trout larger than 250 mm were tagged with monel or aluminum mandible tags.

Some cutthroat trout were sexually mature at just over 100 mm long. It was assumed that mature fish of this size were tributary residents and were not tagged because they would not provide migration information. These fish had developed red opercles and reddish or darkened lateral and ventral surfaces commonly seen in larger mature cutthroat trout.

Two types of electrofishing gear were used. For tributary streams with very low conductivity (<20 micromhos/cm³), a Smith-Root Model 11A battery-powered backpack unit was effective in capturing fish. The Coeur d'Alene River was electrofished from a 4.9 m Alumaweld drift boat equipped with shocking booms, spot lights, a Coffelt variable voltage pulsator unit (Model VVP-2C, 2000 watt), a Kawasaki Model 2900 generator and live wells. A drift boat was used because the river was often too deep or too swift to wade but too shallow in many areas for a motorized boat.

Snorkeling

Estimates of relative abundance were made using underwater observation techniques similar to those described in other northwest studies (Johnson 1977; Sheppard et al. 1984; Pratt 1984). Pool-riffle-run complexes were snorkeled when present, but at least one pool and a riffle or run were done per transect. Transects were at least 30 m long. Stream widths were measured in several locations, averaged and then multiplied by the length to calculate total surface area. All densities were converted to number of fish per 100 m² for comparison with other streams within the drainage and with other drainages. Snorkeling was done in late summer and early fall at low stream discharge and when little movement of cutthroat trout occurred (Rankel 1971). Transects were chosen to represent average habitat and not ideal or exemplary pools and runs which could bias results.

Fish Movement and Exploitation

Weir and Trap Operations

In late March, weirs were installed in tributaries to determine which were used by migratory stocks of trout. The streams had to be small enough to be safely waded during spring runoff, accessible by vehicle for transportation of materials and for convenient daily checks and they had to have cutthroat or rainbow trout populations noted in 1984 (Horton 1985). Some potentially important tributaries were not trapped in 1985. Latour and Steamboat creeks and the North and South forks Coeur d'Alene River may have significant migratory trout populations but were not sampled due to heavy bedload movement during spring discharge and large size.

Two types of weirs were used to block migrating fish. Most weirs were constructed of galvanized conduit pickets supported by angle iron frames. Frames were constructed of 5.0 cm by 5.0 cm gage 8 angle iron drilled with 2.5 cm diameter holes on 3.8 cm centers, allowing 1.3 cm spacing between pickets for water and debris passage. The angle iron was welded into rectangles measuring 2.7 x 0.6 m. Conduit was cut into 1.5 m lengths and had an outside diameter of 2.2 cm. The conduit pickets were inserted into the frames after frames had been placed in the streams.

Hardware cloth weir panels were constructed similar to panels used in British Columbia streams by Conlin and Tutty (1979). Frames for the panels were built from 2 x 4 inch dimension lumber in 3.0 x 0.9 m rectangles. Hardware cloth (1.2 m wide) with 1.3 cm mesh was stapled to the frames with one foot of skirting used to prevent undercutting by placing boulders and cobbles on the skirting as it was folded upstream of the panels. Panels were placed in the stream, then bolted together for stability. Metal t-type fence posts (2.0 m) were driven into the substrate downstream from the panels to hold them in position.

The first weirs and traps were placed in French Gulch Creek on March 19 and removed on June 3, 1985. All other weirs and traps were operated between these dates (Table 1).

Lake Mervin Trap

On March 28, 1985, before spring runoff started, a Lake Mervin trap was installed in the Coeur d'Alene River under the Bull Run Lake Bridge to capture upstream migrating fish. The trap was situated facing downstream with wing extensions placed to fish more than half the width of the river. After seven days of fishing, spring runoff started and the river level rose nearly three meters as Lake Coeur d'Alene filled to maximum level. Velocities increased and associated debris made it impossible to operate the trap. The trap was pulled to the stream edge and left until runoff had subsided. On July 9, 1985, the trap was repositioned in the thalweg facing upstream to capture downstream migrating fish and was fished through July 31, 1986.

Project Angling

Project angling in the main river between slackwater influence (near the Cataldo Mission) and the South Fork confluence was utilized to tag trout in the spring prior to the fishing season. Electrofishing in this area was ineffective due to river depths.

Cutthroat Trout Exploitation and Movement

Trout were tagged after capture by: electrofishing, use of weirs and traps, project angling and personal angling. In two years, 1,272 trout between 100 mm and 250 mm total length were tagged with Floy FTF-69 fingerling tags and 126 trout longer than 250 mm were tagged with mandible tags. Angler returns of fish tagged in 1985 were used to make minimum fishing mortality estimates.

Table 1. Operation of migratory fish traps placed in tributaries of the Coeur d'Alene River, spring 1985.

Stream	Date placed	Date removed	No. days fished	Dates weirs unfishable
French Gulch Cr.	Mar 19	Jun 3	68	Mar 23-24, Apr 3-8
Hunt Gulch Cr.	Mar 26	May 1	30	Apr 3-9
Cougar Gulch Cr.	Apr 1	Jun 3	22	Apr 3-25, May 2-21
Brown Cr.	Apr 9	May 20	29	Apr 10-22
Skeel Gulch Cr.	Apr 23	May 15	22	--
Scott Cr.	May 3	May 23	20	--

To obtain tag returns and recapture information, we fished the Coeur d'Alene River with hook-and-line and electrofished some tributaries where we had tagged fish in 1984. We also mailed news releases to the local newspapers and posted signs along the Coeur d'Alene River explaining the project and asking anglers to return tags to project personnel, Conservation Officers in the area, the regional office in Coeur d'Alene, or the Enaville Resort. We asked anglers to provide date and location of capture, length and condition of fish and tag number. We sent letters with a brief history of the fish caught to each angler who returned a tag. Anglers returned 16 tags with usable information in 1985 and 1986.

Returns of fingerling and mandible tags were used to assess movement of cutthroat trout and to determine which tributaries contributed fish to the river and lake fishery. Total length, tag color and number, date and location of capture were recorded for each fish tagged and released. Fish recaptured within two kilometers of their release sites were considered as not having moved. Bjornn and Mallet (1964) used similar criteria on cutthroat trout recaptures in the Middle Fork Salmon River.

RESULTS

Fish Distribution and Abundance

Spawning Surveys

Cutthroat and rainbow trout spawning redds were indistinguishable in streams surveyed during April and May. Electrofishing and snorkeling later in the summer provided information for species composition. Skeel Gulch was used exclusively by cutthroat trout. Other streams surveyed for spawning activity had rainbow and cutthroat trout present during the summer (Table 2). Because of high and turbid spring flows, spawning adults were difficult to observe. French Gulch was the only stream in which adult fish were positively identified. In general, spawning habitat was limited and observed numbers of redds and fish were low.

Creel Survey

Anglers caught trout and char at a rate of 0.51 per hour during the May 25 to June 15 survey period. Anglers fishing the main river downstream from the confluence with the South Fork captured mostly cutthroat trout (73X) and had a higher catch rate than anglers fishing upstream. The catch rate downstream from the South Fork was 0.64 trout and char per hour and the catch rate upstream from the South Fork was 0.47 trout and char per hour (Table 3). No bull trout were checked.

Table 2. Spawning surveys of Coeur d'Alene River tributaries, 1985.

Stream	Date	No. of redds	No. adults observed	No. of km walked, starting at mouth
Brown Cr.	Apr 25	0	0	1.5
	May 1	0	0	1.0
	May 10	1	0	1.0
Cougar Gulch Cr.	Apr 25	0	0	1.0
	May 1	2	0	3.0
	May 10	4	0	1.0
E.F. Steamboat Cr.	Apr 24	0	0	1.5
	May 20	0	0	1.5
French Gulch Cr.	Apr 16	0	0	1.0
	Apr 24	4	5	1.0
	May 3	16	8	1.0
	May 14	15	11	1.0
Grizzly Cr.	May 10	0	0	1.5
	May 17	0	0	1.5
Scott Cr.	May 3	0	0	1.0
	May 17	0	0	1.5
Skeel Gulch Cr.	Apr 23	2	0	0.5
	May 3	8	0	1.0
	May 14	10	0	1.0
W.F. Steamboat Cr.	Apr 24	0	0	1.5
	May 20	0	0	1.5

Table 3. Daily random creel information from Coeur d'Alene River, 1985.

Date	Number of anglers	Hours fished	Catch ^a				Total
			CTT	RBT	HYB	BK	
Dudley to South Fork Coeur d'Alene River							
May 25	43	69	33	5	--	2	40
May 26	40	50	13	7	1	3	24
May 27	23	30	11	1	--	--	12
Jun 1	18	42	20	12	2	3	37
Jun 9	29	33	19	4	--	--	23
Jun 15	<u>13</u>	<u>26</u>	<u>21</u>	<u>3</u>	<u>--</u>	<u>--</u>	<u>24</u>
Subtotal	166	250	117	32	3	8	160
South Fork Coeur d'Alene River to <i>Shoshone</i> Creek (includes North Fork to Laverne Creek)							
May 25	57	88	17	21	--	1	39
May 26	68	57	9	19	--	2	30
May 27	37	42	5	13	1	--	19
Jun 1	31	63	7	25	2	1	35
Jun 9	50	91	14	18	1	--	33
Jun 15	<u>42</u>	<u>78</u>	<u>22</u>	<u>17</u>	<u>1</u>	<u>--</u>	<u>42</u>
Subtotal	285	419	74	113	5	4	198
Total	451	669	191	145	8	12	358

^aCTT=cutthroat trout, RBT=rainbow trout, HYB=cutthroat x rainbow cross, BKT-brook trout.

Electrofishing

Electrofishing was effective in capturing fish throughout the Coeur d'Alene River drainage, even in tributaries with low conductivity. Conductivity was measured in most tributaries surveyed (Appendix A). Cutthroat trout were found in all 25 streams surveyed in 1985 (Table 4). Rainbow trout, rainbow-cutthroat hybrids and brook trout were found in approximately half the drainage. Bull trout were observed only in Steamboat, Graham, and Brown creeks.

All game fish captured were measured and most rainbow and cutthroat trout longer than 100 mm were tagged. This also included fish captured by angling and traps. Over 500 trout were tagged in 1985.

Length-frequency distributions were developed for cutthroat, rainbow and brook trout captured in tributaries by electrofishing and weirs and for fish captured by project angling in the river (Figs. 2 and 3).

Snorkeling

Fish densities observed in 1985 varied from no fish in West Fork Steamboat Creek to 17.5 per 100 m² in Cougar Gulch Creek (Table 5). Young-of-the-year fish were observed in many transects and are included in the density estimates to compare with densities observed in 1984 (Horton 1985). Many of the smaller tributaries which were electrofished were not snorkeled.

Fish Movement and Exploitation Estimates

Weir and Trap Operations

More adult migratory cutthroat trout ascended French Gulch and Skeel Gulch creeks during the spawning migration than the other streams trapped during the spring of 1985 (Table 6). Only two other adult cutthroat trout were captured in tributary streams and one of those was later recaptured in French Gulch Creek.

French and Skeel gulches provided information on the timing of cutthroat trout spawning migrations. During installation of the French Gulch weir and trap (March 19, 1985), adult cutthroat were observed in the stream. The weir washed out March 23 and 24 during the first spring freshet and a number of fish may have passed our trap site. The first adult was captured on March 28 and upstream migrants were last captured on May 7. The first spent female was captured in the downstream trap in Skeel Gulch on April 27 and on May 2 in French Gulch. The trap was not placed in Skeel Gulch until April 23, so the first outmigrants may have been missed.

Table 4. Fish species captured by electrofishing (+) tributaries to the Coeur d'Alene River, 1985.

Stream	Species observed					
	Cutthroat trout	Rainbow trout	Hybrid RBT-CTT	Brook trout	Bull trout	Other species
Thompson Cr.	+			+		
Cottonwood Cr.	+					
Blue Lake Cr.	+			+		
Willow Cr.	+					
Evans Cr.	+					1
Fortier Cr.	+			+		1,2
Rose Cr.	+					
Fourth of July Cr.	+			+		1,3
Skeel Gulch Cr.	+					
French Gulch Cr.	+					1,3
Bear Cr.	+	+		+		
N.F. Coeur d'Alene R.	+	+		+		1,3,4
Bumblebee Cr.	+	+	+	+		
Copper Cr.	+	+		+		3
Cougar Gulch Cr.	+	+	+			1,2,3
Steamboat Cr.	+	+	+		+	
Scott Cr.	+	+	+			1
Coal Cr.	+					
Graham Cr.	+	+	+	+	+	
Grizzly Cr.	+	+	+			
Brown Cr.	+	+	+	+	+	
Eagle Cr.	+			+		1
Lost Cr.	+	+	+			1,2
E.F. Lost Cr.	+	+	+			1
Coeur d'Alene R.	+	+	+	+		3,4

Key: 1 sculpin species
 2 dace species
 3 sucker species
 4 northern squawfish

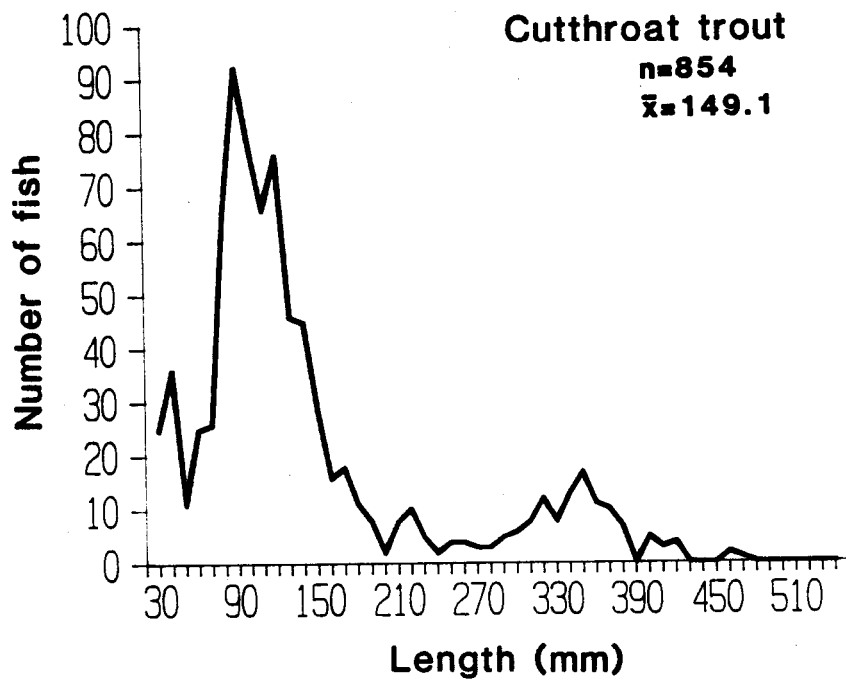
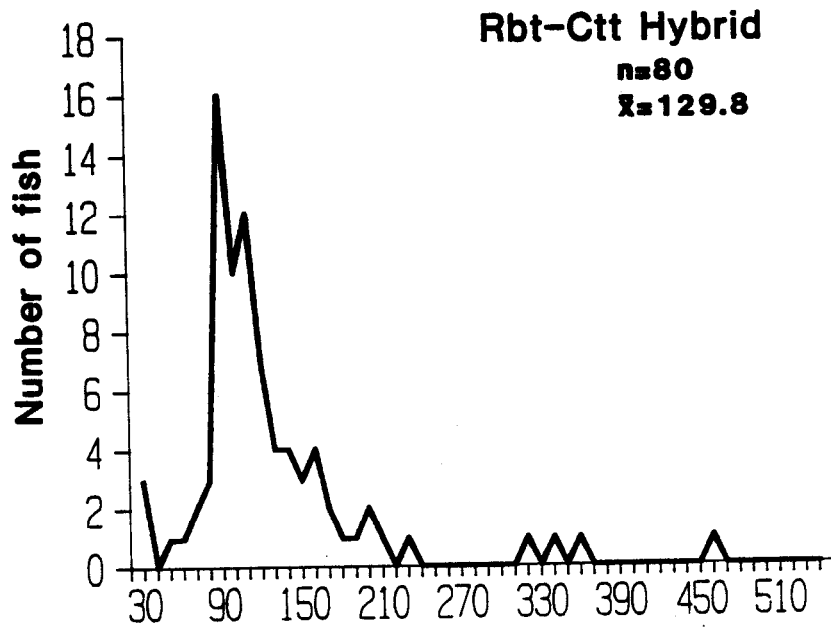


Figure 2. Length frequency of cutthroat and rainbow x cutthroat trout captured by electrofishing, traps, weirs and hook-and-line sampling in the Coeur d'Alene River drainage, 1985.

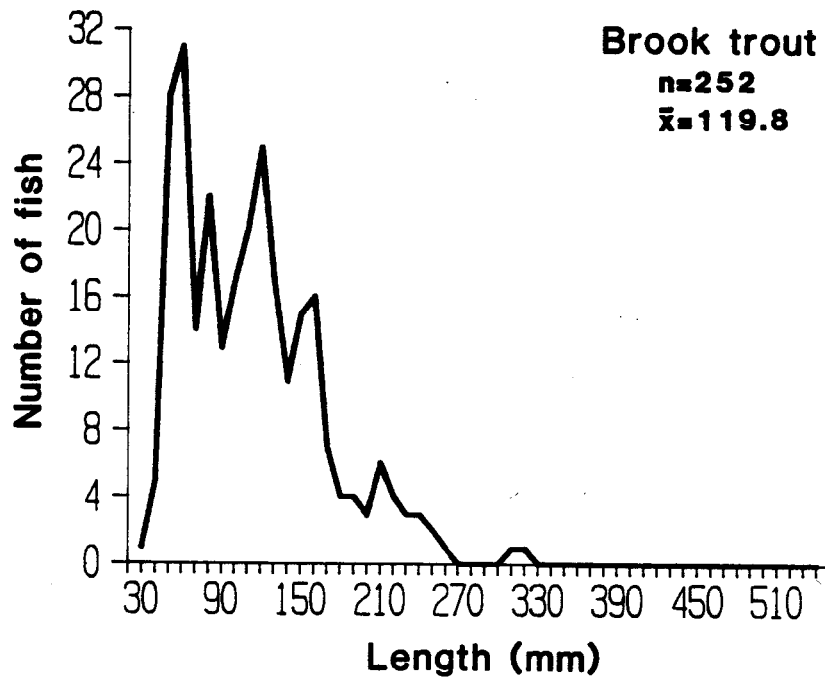
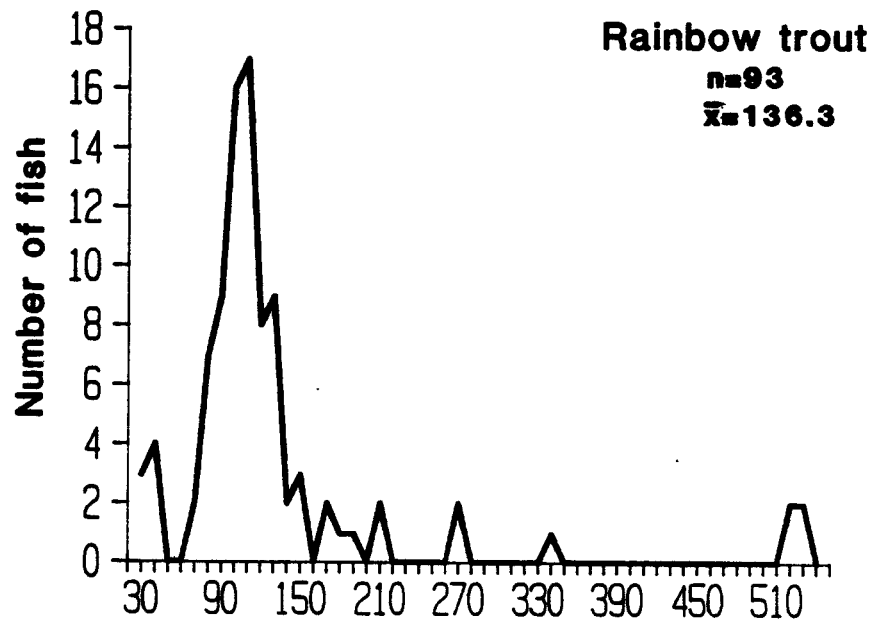


Figure 3. Length frequency of brook and rainbow trout captured by electrofishing, traps, weirs and hook-and-line sampling in the Coeur d'Alene River drainage, 1985.

Table 5. Summary of fish densities (fish/100 m²) collected during the summer of 1985 in tributaries of the Coeur d'Alene River.

Stream	Date	Water temp. C	Cutthroat trout	Rainbow trout	Unidentified salmonids	Brook trout	Other fish	Total
Bumblebee Cr.								
Site 1	8-23	9.0	-	1.8	-	0.9	-	2.7
Site 2	8-23	9.5	1.5	1.5	1.5	1.5	-	6.0
N.F. Coeur d'Alene R.								
Site 1	8-23	13.5	0.9	3.2	0.2	<0.1	0.5 ^a	4.9
Site 2	8-23	14.0	-	-	-	-	1.4 ^b	1.4
Cougar Gulch Cr.								
Site 1	8-26	-	8.6	7.5	1.4	-	-	17.5
Site 2	9-25	11.0	<0.1	4.1	0.3	-	-	4.5
Cooper Cr.	8-23	13.0	2.6			4.7	0.2 ^c	10.5
Brown Cr.	9-25	9.0	0.7	4.1	13.0	-	0.7 ^c	18.5
Grizzly Cr.	9-25	8.0	6.8	-	0.6	-	-	7.4
Scott Cr.	9-25	9.0	6.5	-	-	-	-	6.5
Steamboat Cr.								
Site 1	9-25	10.0	0.2	0.5	1.1	-	-	1.8
Site 2	9-25	9.0	-	-	5.1	-	-	5.1
W.F. Steamboat Cr.								
	9-25	7.0	-	-	-	-	-	0.0
E.F. Steamboat Cr.								
	9-25	10.5	3.4	-	0.7	-	-	4.1

Key: ^asuckers, squawfish
^bsquawfish fry
^csculpin

Table 6. Catch of salmonids in migratory fish traps placed in Coeur d'Alene River tributaries, 1985.

Stream	Trap	Cutthroat		Rainbow		CT-RB Hyb.		Brook	
		Juv	Adult	Juv	Adult	Juv	Adult	Juv	Adult
French Gulch Cr.	upstream	0	55	0	0	0	4	1	0
	downstream	6	54	0	1	0	2	0	0
Hunt Gulch Cr.	upstream	0	1	0	0	0	0	0	0
	downstream	11	0	0	0	0	0	0	0
Cougar Gulch Cr.	upstream	0	1	0	0	0	1	0	0
	downstream	23	0	0	0	4	0	0	0
Brown Cr.	upstream	0	0	0	4	0	0	0	0
	downstream	0	0	0	0	0	0	0	0
Skeel Gulch Cr.	upstream	0	1	0	0	0	0	0	0
	downstream	5	17	0	0	0	0	0	0
Scott Cr.	downstream	2	0	0	0	0	0	0	0

Traps could not be maintained in tributaries during high spring flows. Many trout apparently migrated during high flows when traps were inoperable. In French Gulch Creek, only 19 of the upstream migrants trapped and tagged before weirs washed out were later recaptured in the downstream trap and 35 untagged trout were captured in the downstream trap after reinstallation.

Hunt Gulch Creek has a small pond approximately three kilometers from the mouth that was the likely source of nine bullhead catfish captured in the downstream trap. Dace, suckers and sculpin were captured in small numbers in several streams.

The weirs were designed to catch larger fish and no juvenile emigrants were captured water levels receded and 1.3 cm mesh hardware cloth was wired to the picket weirs. The largest number of juvenile emigrants was caught in the Cougar Gulch weir.

Lake Merwin Trap

We fished a Lake Merwin trap in the Coeur d'Alene River near Bull Run Lake Bridge from March 28, 1985 until April 3, 1985, without capturing any fish. It was removed because debris collected in the nets as the stream discharge increased and was reinstalled after the discharge had subsided. It was fished again from July 9, 1985 through July 31, 1985 and captured primarily bullhead and tench (94X), but no trout (Table 7).

Project Angling

Project angling was limited to six days and 49 hours of effort in the main Coeur d'Alene River near Cataldo during spring and early summer. Angling was not efficient and was discontinued after capturing and tagging 15 trout (Table 8).

Exploitation Estimates

During 1985, 126 cutthroat trout between 250 and 473 mm were tagged with monel mandible tags. By October 1986, 12 tags had been returned by anglers. To estimate angler return rate, 19 gold-colored aluminum mandible tags with a \$5.00 reward were placed on similar sized cutthroat trout and six tags were returned by anglers. Therefore, non-return rate was 22.4% for non-reward tags and exploitation was 31.6% assuming all reward tags were returned.

Table 7. Fish captured in Lake Merwin trap located in the Coeur d'Alene River at Bull Run Lake Bridge, 1985.

Date	Bullhead species	Tench	Pumpkinseed sunfish	Kokanee salmon	Northern squawfish	Yellow perch
July 9	3	3	0	0	1	1
10	0	6	2	1(mort)	0	1
11	0	4	0	0	0	0
12	0	3	0	0	2	0
13	0	2	0	0	0	0
14	0	6	0	0	0	0
15	12	7	0	0	0	0
16	0	5	0	0	2	0
17	0	4	0	0	0	0
18	0	6	0	0	0	0
19	34	17	0	0	1	0
20	0	9	0	0	0	0
21	3	13	0	0	0	0
22	2	11	0	0	1	0
23	8	5	0	0	1	0
24	0	5	0	0	0	0
25	0	1	0	0	0	0
26	0	1	0	0	0	0
27	6	6	0	0	0	0
28		21 13	0	0	0	1
29	0	6	0	0	0	0
30	0	0	0	0	0	0
31	0	0	0	0	0	0
Total	89	133	2	1	8	3
Percent	38	56	1		3	1

Table 8. Trout captured and tagged by project angling the Coeur d'Alene River during 1985.

Date	Hours fished	Cutthroat trout tagged	CT-RB trout tagged	Location tagged
May 22	12	2	0	near Cataldo
June 6	9	1	0	near Latour Cr.
June 15	8	1	0	near Cataldo
June 16	8	3	0	near Latour Cr.
July 6	12	7	1	near Fast Hill

Cutthroat Trout Movement

Over 1,200 juvenile cutthroat trout have been tagged with Floy FTF-69 fingerling tags since 1984 to provide information on movement and tributary contribution to adfluvial cutthroat trout populations. Less than 100 juvenile rainbow trout and char were tagged incidental to this effort. Only four fingerling tag recoveries have been documented (Table 9). One cutthroat trout was caught at the same location within a week after tagging in Evans Creek in July 1984. The second recovery was a cutthroat trout tagged in Steamboat Creek in August 1985 and recovered downstream in the Coeur d'Alene River near McPhee Gulch in June 1986. It had traveled approximately 24 km and was recovered by project personnel while electrofishing. Another cutthroat trout, tagged in Willow Creek in July 1985, traveled downstream through Cave Lake to the river then upstream to the Cataldo Mission area before it was captured by an angler in July 1986. It had migrated at least 32 km. The other recovery was a bull trout tagged and harvested in Graham Creek. It had not moved from August 1984 to August 1986, but had grown from 211 to 356 mm in two years. Only two bull trout were captured in the Coeur d'Alene River system in 1984 and both were tagged in Graham Creek.

The mandible-tagged adults provided more movement information. Cutthroat trout tagged in French Gulch Creek accounted for 14 of 18 recoveries. All were recaptured in the Coeur d'Alene River. One fish was captured by an angler one km upstream from the mouth of French Gulch Creek, all others had traveled between 7 and 17 km downstream before being harvested. Two cutthroat trout tagged in the downstream trap in Skeel Gulch Creek had moved less than two km. One was caught in Higbee Slough and the other was caught in the river less than one kilometer from the mouth. The other tag recoveries came from fish tagged and released by project anglers in the river. One fish had moved four kilometers upstream from Dudley near the mouth of Fourth of July Creek. The other cutthroat trout tagged in the river moved eight kilometers downstream before being harvested.

Most tagged fish were recovered by anglers who rarely took accurate length measurements. However, most anglers were confident of specific recapture location.

Only two cutthroat trout tagged in 1985 were recovered in 1986 and no cutthroat trout tagged in the Coeur d'Alene River system was recovered from Lake Coeur d'Alene.

Table 9. Movement of tagged cutthroat trout in the Coeur d'Alene River system.

Tag type ^a and number	Tag date and location	Recovery date and location	Total length (mm) when tagged	Total length (mm) when recovered	Distance and direction moved
FT-Y 048	7/12/84, Evans Cr.	7/18/84, Evans Cr.	144	144	No movement
FT-G 140	8/6/85, Steamboat Cr.	6/17/86, River @ McPhee Gulch	130	204	24 km downstream
FT-Y 947	7/10/85, Willow Cr.	6/12/86, River @ Mission	135	228	32 km upstream
JT J0810	5/7/85, French Gulch	5/25/85, River @ Mission	408	Unk	11 km downstream
JT J0859	5/1/85, French Gulch	5/26/85, River @ Mission	373	381	11 km downstream
JT J0838	4/29/85, Skeel Gulch	5/26/85, Skeel Gulch	340	340	0.1 km downstream
REW 4	5/5/85, French Gulch	6/6/85, River @ Cataldo	371	387	7 km downstream
REW 8	5/7/85, French Gulch	6/12/85, River @ Dudley	290	305	17 km downstream
REW 10	5/13/85, French Gulch	6/12/85, River @ Cataldo	285	Unk	7 km downstream
JT F0044	5/6/85, French Gulch	6/15/85, River @ Mission	402	406	11 km downstream
JT J0802	4/12/85, French Gulch	6/15/85, River @ Mission	334	Unk	11 km downstream
JT J0803	4/28/85, French Gulch	6/16/85, River @ Mission	345	Unk	11 km downstream
JT J0857	5/1/85, French Gulch	6/16/85, River @ Mission	322	Unk	11 km downstream

Table 9. Continued.

Tag type ^a and number	Tag date and location	Recovery date and location	Total length (mm) when tagged	Total length (mm) when recovered	Distance and direction moved
JT J0830	4/29/85, French Gulch	6/25/85, River @ Kingston	373	Unk	1 km upstream
REW 16	5/30/85, French Gulch	6/?/85, River @ Mission	314	Unk	11 km downstream
JT J0826	5/24/85, River @ Dudley	6/?/85, River @ Mission	250	Unk	6 km upstream
JT J0854	5/30/85, French Gulch	7/6/85, River @ Mission	396	Unk	11 km downstream
REW 12	5/20/85, French Gulch	7/?/85, River @ Skeel Gulch	387	Unk	9 km downstream
REW 6	5/7/85, French Gulch	8/18/85, River @ Cataldo	335	Unk	7 km downstream
JT F0036	5/3/85, Skeel Gulch	5/28/86, River @ Skeel Gulch	373	381	1 km downstream
JT J0703	6/16/85, River @ Fast Hill	6/5/86, River @ Latour Cr.	358	368	8 km downstream

^aFt-Y=yellow Flow FTF-69 fingerling tag, FT-G=green Floy FTF-69 fingerling tag (RBTxCTT hybrid), JT=monel mandible tag, and REW=reward mandible tag.

DISCUSSION

Fish Distribution and Abundance

Native cutthroat trout are widely distributed throughout the Coeur d'Alene River drainage. The only tributaries sampled in which no cutthroat trout were found were too small to be effectively sampled. Despite habitat alterations from mining early in this century, severe midwinter floods in the mid-1970s and continued habitat degradation from land-use practices, cutthroat trout are found throughout the drainage.

A concern of fish managers is to provide fish for the angling public. Resident populations of trout that mature as small as 129 mm (Horton 1985) and spend their entire lives in first or second order tributaries do not provide a fishery. The large trout desired by most anglers were not found in tributaries during the summer months and few anglers were observed fishing there while project personnel were sampling these streams. These larger trout that contribute to the Coeur d'Alene River fishery are migratory fish and may be primarily adfluvial stocks; however, no conclusive evidence supports this statement. To date, no tag returns have come from Lake Coeur d'Alene and only that information will substantiate that cutthroat trout spawning in tributaries to the lower river are adfluvial. Averett (1963), Goodnight and Watkins (1976) and Lukens (1978) have identified other tributaries that recruit adfluvial cutthroat trout to the lake. Mallet (1968) believed Coeur d'Alene River cutthroat trout spawning habitat was lost due to mining pollution. Bauer (1975) references the presence of adfluvial cutthroat trout in lower river tributaries (Fourth of July, Willow, Evans and Clark creeks) and tagged 413 trout but no recoveries were reported from Lake Coeur d'Alene in subsequent studies (Goodnight and Watkins 1976; Goodnight and Mauser 1977, 1978; Lukens 1978). Despite the lack of supporting data, large cutthroat trout that utilize the lower Coeur d'Alene River system are probably adfluvial. The Willow, Evans and Clark creek spawners that Bauer (1975) described were probably adfluvial because those streams flow directly into Cave and Medicine lakes and because no large trout were found in those streams after early July. These fish may use the lateral lakes instead of migrating into the river and into Lake Coeur d'Alene.

Additional data is needed to determine the life history of Coeur d'Alene River cutthroat trout stocks. Additional work is also needed to document the status of cutthroat trout in Lake Coeur d'Alene. Mallet (1968) reported the proportion of cutthroat trout in the catch from the south end of the lake was 452 in 1958, 51% in 1959 and had declined to 0.72 by 1967. Goodnight and Watkins (1976) estimated 32 of the total catch was cutthroat trout in 1975. Since then, the kokanee salmon population has increased, which may have further impacted lake-dwelling cutthroat trout stocks.

Of the six tributaries trapped in the spring of 1985, French Gulch Creek produced the largest number of spawning trout. It is approximately 7.1 km in length, drains only 8.0 km² and flows intermittently in late summer. The adjacent land ownership is mostly private and primarily

small lot ownership along the stream channel. The stream is used extensively by domestic livestock and is generally a poor stream in terms of trout habitat. The historic use by the native cutthroat trout is unknown but it is currently an important spawning tributary for migrating trout. Electrofishing samples in 1984 and 1985 produced only juvenile cutthroat trout less than 245 mm. French Gulch would benefit from stream habitat improvements and possibly the construction of a hatching channel. Land owner involvement would be critical to a habitat restoration project, but such a project would be beneficial.

Fish Movement and Exploitation Estimates

Harvest of trout in the lower free-flowing section of Coeur d'Alene River appears significant. Exploitation estimated from recovery of reward tags was 31.6%. It is known that not all reward tags were returned and that exploitation is greater than shown by the tagging work. If the angling mortality is much higher, serious concerns about exploitation have to be voiced. Another factor to be considered is that nearly all fish were tagged during the spawning run and a potentially high rate of natural mortality exists among post spawning fish, which could have further led us to underestimate exploitation.

Over 1,200 juvenile trout and char were tagged with the Floy FTF-69 fingerling tags and only four were recovered. Poor tag retention, delayed mortality and outmigration, or a combination of these factors, could have caused the low recovery rate in tributaries. If outmigration was the reason, tag recoveries from the river and lake should have been numerous. Tag loss and delayed mortality will be analyzed in 1986.

No trout were trapped in the Lake Merwin trap in 1985 and efforts in 1984 were also unsuccessful (Horton 1985) for a variety of reasons. Timing and location of the trap were changed in 1985. We installed the trap in late March and moved it nearly 35 km upstream, still in slack water and fished the thalweg instead of the shoreline, but no trout were caught. Dealing with high spring discharge created additional problems. It appears Lake Merwin traps are not adaptable for capturing migratory trout in a riverine situation, although it was successful in capturing many other fish species. Also, installation and operation is labor intensive.

LITERATURE CITED

- Averett, R. 1963. Studies of two races of cutthroat trout in northern Idaho. Master's thesis. University of Idaho, Moscow, Idaho.
- Bauer, S. 1975. Coeur d'Alene River fisheries studies. Project Performance Report. Idaho Department of Fish and Game, Boise, Idaho.
- Bjornn, T.C., and J. Mallet. 1964. Movements of planted and wild trout in an Idaho river system. Transactions of the American Fisheries Society 93(1):70-76.
- Bowler, B. 1974. Coeur d'Alene River study. Job Performance Report, F-53-R-9, X-a. Idaho Department of Fish and Game, Boise, Idaho.
- Conlin, K., and B.D. Tutty. 1979. Juvenile salmonid field trapping manual. Fisheries and Marine Service Manuscript 11530. Department of Fisheries and Oceans. Vancouver, British Columbia, Canada.
- Ellis, M. 1932. Pollution of the Coeur d'Alene River and adjacent waters by the mine wastes. Manuscript report to the Commissioner. United States Bureau of Fisheries, Washington, D.C.
- Goodnight, W., and G. Mauser. 1977. Regional fishery management investigations. Job performance report, F-71-R-1, Job I-b. Idaho Department of Fish and Game, Boise, Idaho.
- Goodnight, W., and G. Mauser. 1978. Regional fishery management investigations. Job performance report, F-71-R-2, Job I-b. Idaho Department of Fish and Game, Boise, Idaho.
- Goodnight, W., and T. Watkins. 1976. Lake and reservoir investigations. Job performance report, F-53-R-11, Job XI-a. Idaho Department of Fish and Game, Boise, Idaho.
- Horton, W.D. 1985.** North Idaho streams fishery research. Job Performance Report, F-73-R-7. Idaho Department of Fish and Game, Boise, Idaho.
- Johnson, T.H. 1977. Catch-and-release and trophy-fish angling regulations in the management of cutthroat trout populations and fisheries in northern Idaho streams. Master's thesis. University of Idaho, Moscow, Idaho.
- Kreizenbeck, R. 1973. Coeur d'Alene livebox bioassay. United States Environmental Protection Agency, Region 1, Surveillance and Analysis Division.
- Lukens, J. 1978. Abundance, movements and age structure of adfluvial westslope cutthroat trout in the Wolf Lodge Creek drainage, Idaho. Master's thesis. University of Idaho, Moscow, Idaho.

- Mallet, J. 1968. Coeur d'Alene Lake fisheries investigations. Idaho Department of Fish and Game, Boise, Idaho.
- Lewynsky, V., and T.C. Bjornn. 1983. River and stream investigations. Job Completion Report, F-73-R-4, Study XIII, Job 1, Idaho Department of Fish and Game, Boise, Idaho.
- Pratt, K.L. 1984. Pend Oreille trout and char life history study. Idaho Department of Fish and Game, Boise, Idaho.
- Rankel, G. 1971. Life history of the St. Joe River cutthroat trout. Project F-60-R-2. Idaho Department of Fish and Game, Boise, Idaho.
- Sheppard, B.B., K.L. Pratt, and P.J. Graham. 1984. Life history and habitat use of cutthroat and bull trout in the upper Flathead River Basin, Montana. Montana Department of Fish, Wildlife, and Parks, Helena, Montana.

Appendix A. Conductivity of tributaries to the Coeur d'Alene River,
1985.

Date	Location	Micromhos/cm ³	Temp. °C
August 7	Coal Cr.	17	8
August 7	Graham Cr.	19	11
August 7	Brown Cr.	112	11
August 7	Grizzly Cr.	93	11
August 7	Steamboat Cr.	69	13
August 7	E.F. Steamboat Cr.	70	14
August 7	W.F. Steamboat Cr.	80	13
August 7	Scott Cr.	126	10
August 7	Cougar Gulch Cr.	76	14
August 8	Thompson Cr.	61	12
August 8	Blue Lake Cr.	52	11
August 8	Willow Cr.	48	15
August 8	Evans Cr.	117	13
August 8	Fortier Cr.	50	12
August 8	Bear Cr.	42	11
August 12	French Gulch Cr.	118	16
August 12	Skeel Gulch Cr.	53	12
August 12	E.F. Eagle Cr.	35	12
August 12	W.F. Eagle Cr.	40	14
August 12	Fourth of July Cr.	90	10
August 20	Lost Cr.	71	11

JOB PERFORMANCE REPORT

State of: Idaho

Name: RIVER AND STREAM
INVESTIGATIONS

Project No.: F-73-R-8

Title: North Idaho Streams
Fishery Research

Subproject No.: IV

Study No.: IV

Job No.: 2. __ Fish Habitat Description

Period Covered: March 1, 1985 to February 28, 1986

ABSTRACT

A fisheries habitat evaluation methodology, developed by U.S. Forest Service personnel, Idaho Panhandle National Forest, was utilized to survey streams on the lower Coeur d'Alene River system. Use of this stream survey system will allow comparison of results from 23 study streams with many other streams surveyed by Forest Service and Department personnel throughout northern Idaho.

Parameters surveyed include: stream order, elevation, gradient, valley bottom and channel type, temperature, habitat type, cover components and spawning sites.

Author:

William D. Horton
Senior Fishery Research Biologist

INTRODUCTION

To provide a relative index from which managers can predict impacts of land-use practices, instream water uses, proposed changes in regulations, or fishery enhancement, baseline habitat information is needed. In 1985, the habitat survey method used by the U.S. Forest Service was selected for evaluation of fish habitat. This method was developed by Idaho Panhandle National Forest personnel (E. Lider and R. Rainville, U.S. Forest Service, unpublished data) over the last four years on several drainages in northern Idaho. Their work is a modification of stream survey methods described by Duff and Cooper (1978).

OBJECTIVE

To evaluate fish habitat and identify factors that may limit production of salmonids in the lower Coeur d'Alene River system.

RECOMMENDATIONS

This project will continue through 1987. Recommendations will be presented in the project completion report.

METHODS

The habitat survey scheme used for this project was the Idaho Panhandle National Forest method. A stream survey starts by identifying stream reaches on U.S. Geological Survey 7.5 minute topographic maps, which may be refined on-site if necessary. The method defines a reach as a section of stream which has the same potential for biological production and physical alteration. It should have uniform gradient, valley bottom, stream order (discharge) and be at least 0.25 mile long.

Information was recorded on survey maps and standard survey forms (Appendix X-1). Stream reaches, fish migration barriers, sediment sources (slumps, slides, etc.), channel braiding, intermittent sections and actual segments surveyed were marked on maps. The survey form was used to record all information as collected and was later transferred to the U.S. Forest Service Data General Computer for further analysis. For each stream reach, the following data was recorded: valley bottom type, channel type, stream order, temperature, habitat type, gradient, spawning sites, pool creators, spawning site creators and cover components.

Forest Service personnel often collect additional information outside the scope of this project to develop guidelines for habitat improvement projects, timber harvest and for any other applicable land-use practices (E. Lider, U.S. Forest Service, personal communication).

Surveys were conducted to evaluate existing habitat and to compare this information to relative fish density estimates where available. The techniques have been standardized over the last couple of years by survey crews and workshops to further reduce subjectivity.

To reduce bias inherent with ocular surveys, a random number table was used to determine distances between survey sites and measurements were made at each site to classify habitat components. Pools were divided into four classes using depth, cover and area measurements. Other habitat types were classed as pocketwater, run, glide, or riffle, depending on physical characteristics. Cover (large organic material, boulders, undercut banks and overhanging vegetation) was measured to determine percentages for all habitat types, except riffles. All gradients were measured on-site with a clinometer. All distance measurements were made in English units.

After information was processed through the U.S. Forest Service computer, a printout of the fisheries habitat summary and various habitat conditions was created.

RESULTS

In the summer and fall of 1985, 32 stream reaches on 23 streams were surveyed to evaluate fisheries habitat (Fig. 1). Summaries of surveys for each stream are in the Appendices. The summaries were taken from information generated by the Data General Computer at the Panhandle National Forest Office in Coeur d'Alene. The computer printout details all data collected during the survey and computations for development of habitat components, pool creators, spawning site creators and stream cover percentages. This information is valuable and will be kept on file for the fishery manager's needs, but is not included in this report.

A sample computer printout is found in Appendix X-1 for Evans Creek.

DISCUSSION

Evaluation of stream or fish habitat is a subjective process. Subjectivity is encountered in data gathering, interpretation of definitions that describe habitat type and variability among users. The Idaho Panhandle National Forest method addresses subjectivity and several on-site workshops with the developers of the methodology (Lider and Rainville, U.S. Forest Service, personal communication) have reduced the interpretation and user variability problems.

The lack of cover within pools may be the most important factor limiting trout production in the Coeur d'Alene River system. Job 1 of this project provides relative fish densities and species composition estimated by electrofishing and/or underwater observation for all streams surveyed for habitat. Underwater observation using snorkeling techniques over the last two years in the Coeur d'Alene River tributaries has shown

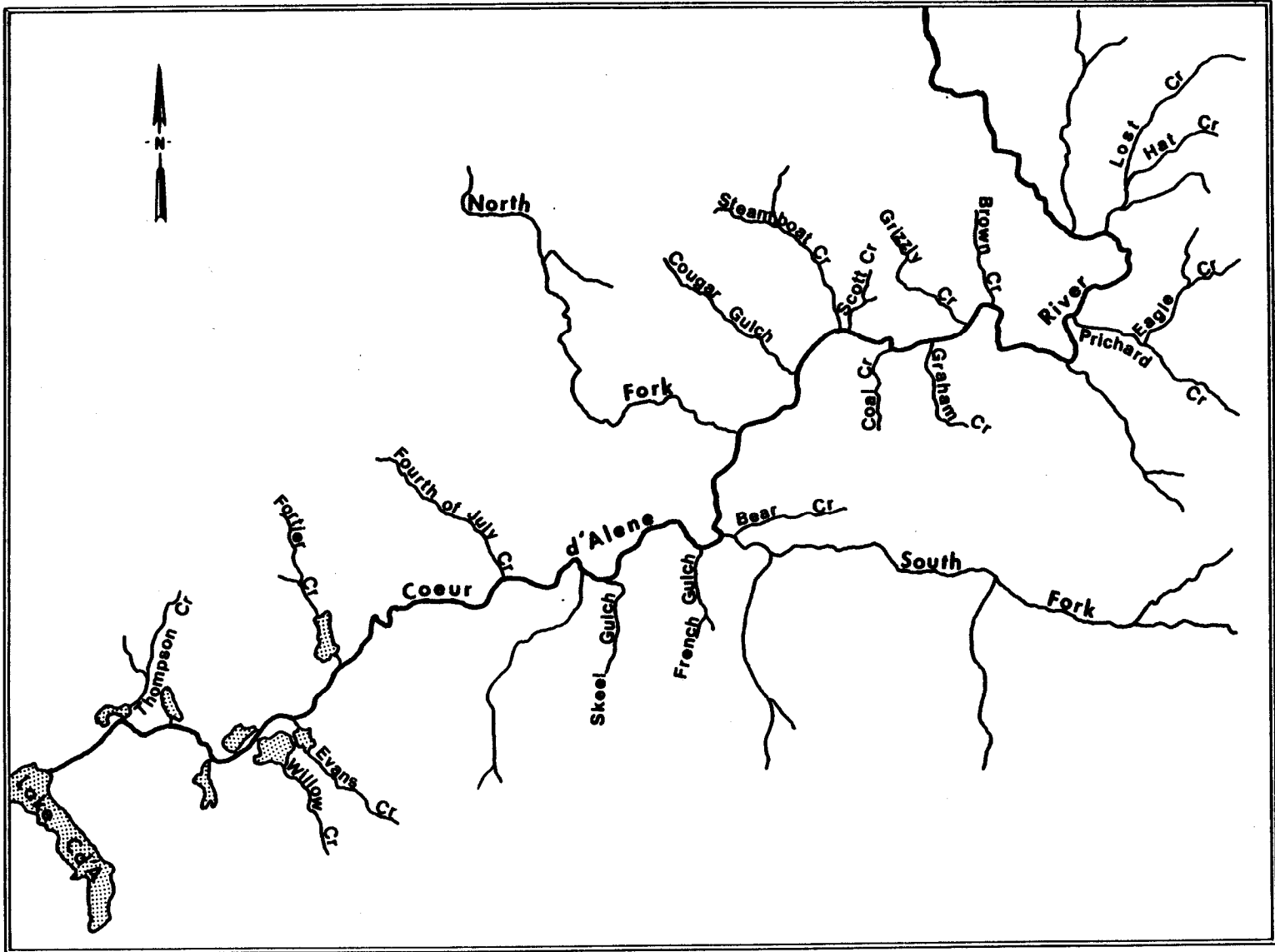


Figure 1. Tributaries surveyed in the lower Coeur d'Alene River drainage, 1985.

has shown a correlation between good cover components (particularly large, organic material) and high fish densities. However, this is not quantifiable because densities are estimated for unit areas (length and width of transect) and not for specific habitat types. When making snorkeling estimates, high quality pools were not sought, but stream reaches that typified average stream habitat were chosen to give unbiased density estimates. When pools or runs included large organic material as cover, they invariably had more fish than those where cover was absent, or provided by boulders, depth, or overhanging vegetation. Lider (in press) also noted that higher fish densities were observed in pools with large organic material. A number of other studies have shown the importance of organic material as cover for fish (Chapman and Bjornn 1969; Dolloff 1983; Bryant 1983), as essential winter habitat (Bustard and Narver 1975; Heifetz et al. 1986) and for fish food production (Elliot 1986).

The Coeur d'Alene River system has low salmonid densities for most streams observed. Proper habitat management is critical to reverse the decline in salmonid numbers and essential to restore tributary production levels. Habitat restoration in many streams may be necessary to provide a viable Coeur d'Alene River fishery.

J

LITERATURE CITED

- Bryant, M.D. 1983. The role and management of woody debris in west coast salmonid nursery streams. North American Journal of Fisheries Management 3:322-330.
- Bustard, D.R., and D.W. Narver. 1975. Aspects of the winter ecology of juvenile coho salmon (Oncorhynchus kisutch) and steelhead trout (Salmo gairdneri). Journal of the Fisheries Research Board of Canada 32:667-680.
- Chapman, D.W., and T.C. Bjornn. 1969. Distribution of salmonids in streams, with special reference to food and feeding. Pages 153-176 in T. G. Northcote, editor. Symposium on Salmon and Trout in Streams. H.R. MacMillan Lectures in Fisheries. University of British Columbia, Vancouver, British Columbia, Canada.
- Dolloff, C.A. 1983. The relationships of wood debris to juvenile salmonid production and microhabitat selection in small southeast Alaska streams. Doctoral dissertation. Montana' State University, Bozeman, Montana.
- Duff, D.A., and J.L. Cooper. 1978. Techniques for conducting stream habitat surveys on national resource land. U.S. Department of Interior, Bureau of Land Management, Technical Note 283, Denver, Colorado.
- Elliot, S.T. 1986. Reduction of a Dolly Varden population and macrobenthos after removal of logging debris. Transactions of the American Fisheries Society 115:392-400.
- Heifetz, J., M.L. Murphy, and K.V. Koski. 1986. Effects of logging on winter habitat of juvenile salmonids in Alaskan streams. North American Journal of Fisheries Management 6:52-58.

APPENDICES

Appendix A-1. Stream habitat survey summary for Evans Creek,
Fernan District, Coeur d'Alene National Forest.

Stream: Evans Creek
Stream reach: 01
Survey date: August 21, 1985
Starting elevation: 2135 ft.
Ending elevation: 2340 ft.
Reach distance: 21120 ft.
Average gradient: 1%
Maximum gradient: 3%
Minimum gradient: 1%
Average width of reach: 13 ft.
Total surveyed length: 2881 ft.
Stream habitat in pools: 17%
 Class 1 pools: 7%
 Class 2 pools: 2%
 Class 3 pools: 6%
 Class 4 pools: 2%
Stream habitat in runs: 53%
Stream habitat in riffles: 24%
Stream habitat in glides: 5%
Stream habitat in pocketwater: 0%
Spawning sites surveyed: 20
Total stream cover: 16%
 Large organic material: 5%
 Boulders: 2%
 Undercut banks: 2%
 Overhanging vegetation: 7%
 Other: 0%

Appendix A-2. Stream habitat survey summary for Evans Creek,
Fernan District, Coeur d'Alene National Forest.

Stream: Evans Creek
Stream reach: 02
Survey date: August 21. 1995
Starting elevation: 2340 ft.
Ending elevation: 2550 ft.
Reach distance: 9380 ft.
Average gradient: 5%
Maximum gradient: 5%
Minimum gradient: 5%
Average width of reach: 12 ft.
Total surveyed length: 778 ft.
Stream habitat in pools: 10%
 Class 1 pools: 4%
 Class 2 pools: 0%
 Class 3 pools: 6%
 Class 4 pools: 0%
Stream habitat in runs: 18%
Stream habitat in riffles: 45%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 27%
Spawning sites surveyed: 3
Total stream cover: 34%
 Large organic material: 5%
 Boulders: 13%
 Undercut banks: 4%
 Overhanging vegetation: 12%
 Other: 0%

Appendix A-3. Stream habitat survey summary for Evans Creek, Fernan District, Coeur d'Alene National Forest.

Stream: Evans Creek
Stream reach: 03
Survey date: August 21, 1985
Starting elevation: 2550 ft.
Ending elevation: 2760 ft.
Reach distance: 5300 ft.
Average gradient: 7%
Maximum gradient: -%
Minimum gradient: -%
Average width of reach: 10 ft.
Total surveyed length: 236 ft.
Stream habitat in pools: 22%
 Class 1 pools: 0%
 Class 2 pools: 0%
 Class 3 pools: 0%
 Class 4 pools: 22%
Stream habitat in runs: 6%
Stream habitat in riffles: 0%
Stream habitat in glides: 39%
Stream habitat in pocket water: 33%
Spawning sites surveyed: 3
Total stream cover: 9%
 Large organic material: 4%
 Boulders: 4%
 Undercut banks: 0%
 Overhanging vegetation: 1%
 Other 0%

Appendix B-1. Stream habitat survey summary for Fortier Creek, Fernan
District, Coeur d'Alene National Forest.

Stream: Evans Creek
Stream reach: 01
Survey date: August 21, 1985
Starting elevation: 2130 ft.
Ending elevation: 2165 ft.
Reach distance: 7650 ft.
Average gradient: 1%
Maximum gradient: 2%
Minimum gradient: 1%
Average width of reach: 9 ft.
Total surveyed length: 1965 ft.
Stream habitat in pools: 70%
 Class 1 pools: 14%
 Class 2 pools: 28%
 Class 3 pools: 17%
 Class 4 pools: 11%
Stream habitat in runs: 15%
Stream habitat in riffles: 15%
Stream habitat in glides: 0%
Stream habitat in pocket water: 0%
Spawning sites surveyed: 19
Total stream cover: 46%
 Large organic material: 13%
 Boulders: 1%
 Undercut banks: 7%
 Overhanging vegetation: 24%
 Other 1%

Appendix C-1. Stream habitat survey summary for Fourth of July Creek,
Fernan District, Coeur d'Alene National Forest.

Stream: Fourth of July Creek
Stream reach: 01
Survey date: August 19, 1985
Starting elevation: 2137 ft.
Ending elevation: 2155 ft.
Reach distance: 13200 ft.
Average gradient: 1%
Maximum gradient: 1%
Minimum gradient: 1%
Average width of reach: 14 ft.
Total surveyed length: 8499 ft.
Stream habitat in pools: 72%
 Class 1 pools: 71%
 Class 2 pools: 1%
 Class 3 pools: 0%
 Class 4 pools: 0%
Stream habitat in runs: 25%
Stream habitat in riffles: 3%
Stream habitat in glides: 0%
Stream habitat in pocket water: 0%
Spawning sites surveyed: 19
Total stream cover: 57%
 Large organic material: 1%
 Boulders: 0%
 Undercut banks: 9%
 Overhanging vegetation: 47%
 Other 0%

Appendix C-2. Stream habitat survey summary for Fourth of July Creek,
Fernan District, Coeur d'Alene National Forest.

Stream: Fourth of July Creek
Stream reach: 02
Survey date: August 19, 1985
Starting elevation: 2155 ft.
Ending elevation: 2256 ft.
Reach distance: 10560 ft.
Average gradient: 1%
Maximum gradient: -%
Reach: 14 ft.
Total surveyed length: 1021 ft.
Stream habitat in pools: 67%
Class 1 pools: 1%
Class 2 pools: 29%
Class 3 pools: 37%
Class 4 pools: 0%
Stream habitat in runs: 12%
Stream habitat in riffles: 20%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 0%
Spawning sites surveyed: 0
Total stream cover: 31%
Large organic material: 4%
Boulders: 1%
Undercut banks: 0%
Overhanging vegetation: 26 %
Other: 0%

Appendix D-1. Stream habitat survey summary for French Gulch Creek,
Fernan District, Coeur d'Alene National Forest.

Stream: French Gulch Creek
Stream reach: 01
Survey date: September 25, 1985
Starting elevation: 2150 ft.
Ending elevation: 2260 ft.
Reach distance: 9500 ft.
Average gradient: 1%
Maximum gradient: -%
Minimum gradient: -%
Average width of reach: 6 ft.
Total surveyed length: 641 ft.
Stream habitat in pools: 41%
 Class 1 pools: 0%
 Class 2 pools: 8%
 Class 3 pools: 30%
 Class 4 pools: 3%
Stream habitat in runs: 39%
Stream habitat in riffles: 18%
Stream habitat in glides: 0%
Stream habitat in pocket water: 2%
Spawning sites surveyed: 19
Total stream cover: 43%
 Large organic material: 1%
 Boulders: 0%
 Undercut banks: 3%
 Overhanging vegetation: 39%
 Other 0%

Appendix D-2. Stream habitat survey summary for French Gulch Creek,
Fernan District, Coeur d'Alene National Forest.

Stream: French Gulch Creek
Stream reach: 02
Survey date: September 25, 1985
Starting elevation: 2260 ft.
Ending elevation: 2360 ft.
Reach distance: 3200 ft.
Average gradient: 2%
Maximum gradient: 2%
Minimum gradient: 2%
Average width of reach: ft.
Total surveyed length: 269 ft.
Stream habitat in pools: 68%
 Class 1 pools: 0%
 Class 2 pools: 0%
 Class 3 pools: 39%
 Class 4 pools: 29%
Stream habitat in runs: 23%
Stream habitat in riffles: 9%
Stream habitat in glides: 0%
Stream habitat in pocket water: 0%
Spawning sites surveyed: 0
Total stream cover: 29%
 Large organic material: 12%
 Boulders: 1%
 Undercut banks: 2%
 Overhanging vegetation: 14%
 Other 0%

Appendix E-1. Stream habitat survey summary for Skeel Gulch Creek,
Fernan District, Coeur d'Alene National Forest.

Stream: Skeel Gulch Creek
Stream reach: 01
Survey date: August 19, 1985
Starting elevation: 2140 ft.
Ending elevation: 2400 ft.
Reach distance: 7400 ft.
Average gradient: 1%
Maximum gradient: 2%
Minimum gradient: 1%
Average width of reach: 5 ft.
Total surveyed length: 897 ft.
Stream habitat in pools: 36%
 Class 1 pools: 0%
 Class 2 pools: 2%
 Class 3 pools: 0%
 Class 4 pools: 34%
Stream habitat in runs: 17%
Stream habitat in riffles: 47%
Stream habitat in glides: 0%
Stream habitat in pocket water: 0%
Spawning sites surveyed: 10
Total stream cover: 25%
 Large organic material: 7%
 Boulders: 2%
 Undercut banks: 1%
 Overhanging vegetation: 15%
 Other 0%

Appendix F-1. Stream habitat survey summary for Thompson Creek,
Fernan District, Coeur d'Alene National Forest.

Stream: Thompson Creek
Stream reach: 01
Survey date: September 11, 1985
Starting elevation: 2130 ft.
Ending elevation: 2500 ft.
Reach distance: 6070 ft.
Average gradient: 5%
Maximum gradient: 9%
Minimum gradient: 2%
Average width of reach: 6 ft.
Total surveyed length: 760 ft.
Stream habitat in pools: 21%

Class 1 pools: 0%
Class 2 pools: 3%
Class 3 pools: 9%
Class 4 pools: 9%

Stream habitat in runs: 16%
Stream habitat in riffles: 55%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 9%
Spawning sites surveyed: 0
Total stream cover: 28%

Large organic material: 5%
Boulders: 3%
Undercut banks: 3%
Overhanging vegetation: 17
Other: 0%

Appendix F-2. Stream habitat survey summary for Thompson Creek,
Fernan District, Coeur d'Alene National Forest.

Stream: Thompson Creek
Stream reach: 02
Survey date: September 11, 1985
Starting elevation: 2500 ft.
Ending elevation: 2630 ft.
Reach distance: 4330 ft.
Average gradient: 5%
Maximum gradient: 5%
Minimum gradient: 5%
Average width of reach: 5 ft.
Total surveyed length: 270 ft.
Stream habitat in pools: 18%
 Class 1 pools: 0%
 Class 2 pools: 0%
 Class 3 pools: 11%
 Class 4 pools: 7%
Stream habitat in runs: 12%
Stream habitat in riffles: 59%
Stream habitat in glides: 0%
Stream habitat in pocket water: 11%
Spawning sites surveyed: 0
Total stream cover: 22%
 Large organic material: 9%
 Boulders: 5%
 Undercut banks: 0%
 Overhanging vegetation: 8%
 Other 0%

Appendix G-1. Stream habitat survey summary for West Fork Thompson
Creek, Fernan District, Coeur d'Alene National Forest.

Stream: West Fork Thompson Creek, tributary to Thompson Creek

Stream reach: 01

Survey date: September 11, 1985

Starting elevation: 2500 ft.

Ending elevation: 2635 ft.

Reach distance: 3700 ft.

Average gradient: 2%

Maximum gradient: 2%

Minimum gradient: 2%

Average width of reach: 3 ft.

Total surveyed length: 265 ft.

Stream habitat in pools: 45%

Class 1 pools: 0%

Class 2 pools: 15%

Class 3 pools: 0%

Class 4 pools: 30%

Stream habitat inruns: 11%

Stream habitat inriffles: 43%

Stream habitat in glides: 0%

Stream habitat in pocketwater: 0%

Spawning sites surveyed: 0

Total stream cover: 41%

Large organic material: 12

Boulders: 1%

Undercut banks: 6%

Overhanging vegetation: 22

Other: 0%

Stream: Willow Creek
Stream reach: 01
Survey date: August 21, 1985
Starting elevation: 2140 ft.
Ending elevation: 2460 ft.
Reach distance: 12670 ft.

Average gradient: 2%
Maximum gradient: 2%
Minimum gradient: 2%
Average width of reach: 6 ft.

Total surveyed length: 3221 ft.
Stream habitat in pools: 24%

Class 1 pools: 18%
Class 2 pools: 1%
Class 3 pools: 0%
Class 4 pools: 5%

Stream habitat in runs: 62%
Stream habitat in riffles: 10%
Stream habitat in glides: 4%
Stream habitat in pocketwater: 1%

Spawning sites surveyed: 5
Total stream cover: 59%

Large organic material: 9%
Boulders: 1%
Undercut banks: 5%
Overhanging vegetation: 44%
Other: 0%

Appendix I-1. Stream habitat survey summary for Bear Creek, Wallace District, Coeur d'Alene National Forest.

Stream: Bear Creek
Stream reach: 01
Survey date: September 12, 1985
Starting elevation: 2235 ft.
Ending elevation: 2310 ft.
Reach distance: 18480 ft.
Average 1%
Maximum 2%
Minimum 1%
Average width of reach: 11 ft.
Total surveyed length: ft.
Stream habitat in pools: 40%
Class 1 pools: 0%
Class 2 pools: 0%
Class 3 pools: 18%
Class 4 pools: 22%
Stream habitat in runs: 15%
Stream habitat in riffles: 45%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 0%
Spawning sites surveyed: 0
Total stream cover: 24%
Large organic material: 16
Boulders: 0%
Undercut banks: 1%
Overhanging vegetation: 7%
Other: 0%

Appendix J-1. Stream habitat survey summary for Brown Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: Brown Creek
Stream reach: 01
Survey date: August 29, 1985
Starting elevation: 2315 ft.
Ending elevation: 2700 ft.

Reach distance: 9570 ft.
Average gradient: 4%
Maximum gradient: 6%
Minimum gradient: 2%
Average width of reach: 12 ft.

Total surveyed length: 1346 ft.
Stream habitat in pools: 14%

Class 1 pools: 0%
Class 2 pools: 2%
Class 3 pools: 0%
Class 4 pools: 12%

Stream habitat in runs: 6%
Stream habitat in riffles: 67%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 12%

Spawning sites surveyed: 8' •

Total stream cover: 25%

Large organic material: 4
Boulders: 16%
Undercut banks: 0%
Overhanging vegetation: 5
Other: 0%

Appendix K-1. Stream habitat survey summary for Coal Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: Coal Creek
Stream reach: 01
Survey date: September 4, 1985
Starting elevation: 2290 ft.
Ending elevation: 3200 ft.
Reach distance: 8900 ft.

Average gradient: 10%
Maximum gradient: -%
Minimum gradient: -%
Average width of reach: 10 ft.
Total surveyed length: 305 ft.
Stream habitat in pools: 23%
Class 1 pools: 0%
Class 2 pools: 0%
Class 3 pools: 0%
Class 4 pools: 23%
Stream habitat i runs: 15%
Stream habitat i riffles: 37%
Stream habitat n glides: 0%
Stream habitat i pocketwater: 25%
Spawning sites surveyed: 1
Total stream cover: 14%
Large organic material: 7%
Boulders: 4%
Undercut banks: 0%
Overhanging vegetation: 3%
Other: 0%

Appendix L-1. Stream habitat survey summary for Cougar Gulch Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: Cougar Gulch Creek
Stream reach: 01
Survey date: September 23, 1985
Starting elevation: 2240 ft.
Ending elevation: 2640 ft.
Reach distance: 22176 ft.
Average gradient: 22
Maximum gradient: 3%
Minimum gradient: 2%
Average width of reach: 17 ft.
Total surveyed length: 2110 ft.
Stream habitat in pools: 30%
 Class 1 pools: 1%
 Class 2 pools: 9%
 Class 3 pools: 121
 Class 4 pools: 8X
Stream habitat i runs: 11%
Stream habitat i riffles: 57%
Stream habitat n glides: 0%
Stream habitat i pocketwater: 2%
 n
Spawning sites surveyed: 12
Total stream cover:
 Large organic material: 10
 Boulders: 2%
 Undercut banks: 0%
 Overhanging vegetation: 52
 Other: 0%

Appendix M-1. Stream habitat survey summary for East Fork Eagle Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: East Fork Eagle Creek, tributary to Eagle Creek
Stream reach: 01
Survey date: September 9, 1985
Starting elevation: 2640 ft.
Average gradient: 2%
Maximum gradient: 2%
Minimum gradient: 2%
Average width of reach 21 ft.
Total surveyed length: 640 ft.
Stream habitat in pools: 16%
Class 1 pools: 0%
Class 2 pools: 0%
Class 3 pools: 0%
Class 4 pools: 16%
Stream habitat in runs: 41%
Stream habitat in riffles: 23%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 19%
Spawning sites surveyed: 0
Total stream cover: 3%
Large organic material: 0
Boulders: 2%
Undercut banks: 0%
Overhanging vegetation: 1
Other: 0%

Appendix M-2. Stream habitat survey summary for East Fork Eagle Creek,
Wallace District, Coeur d'Alene National Forest.

Stream reach: 02
Survey date: September 9, 1985
Starting elevation: 2800 ft.
Ending elevation: 3400 ft.
Reach distance: 24288 ft.
Average gradient: 2%
Maximum gradient: -%
Minimum gradient: -%
Average width of reach: 20 ft.
Total surveyed length: 622 ft.
Stream habitat in pools: 12%

Class 1 pools: 0%
Class 2 pools: 0%
Class 3 pools: 9%
Class 4 pools: 3%
Stream habitat in runs: 17%
Stream habitat in riffles: 55%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 15%
Spawning sites surveyed: 1
Total stream cover: 6%
 Large organic material: 5%
 Boulders: 1%
 Undercut banks: 0%
 Overhanging vegetation: 0%
 Other: 0%

Appendix N-1. Stream habitat survey summary for West Fork Eagle Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: West Fork Eagle Creek, tributary to Eagle Creek
Stream reach: 01
Survey date: September 9, 1985
Starting elevation: 2740 ft.
Average gradient: 22
Maximum gradient: 3%
Minimum gradient: 1%
Average width of reach: 16 ft.
Total surveyed length: 2045 ft.
Stream habitat in pools: 25%
 Class 1 pools: 0%
 Class 2 pools: 0%
 Class 3 pools: 20%
 Class 4 pools: 5%
Stream inruns: 262
Stream inriffles: 48%
habitat inglides: 0%
Stream inpocketwater: 0%
habitat
Spawning sites surveyed: 5
Total stream cover: 9%
 Large organic material: 5%
 Boulders: 2%
 Undercut banks: 0%
 Overhanging vegetation: 2%
 Other: 0%

Appendix 0-1. Stream habitat survey summary for Graham Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: Graham Creek
Stream reach: 01
Survey date: September 4, 1985
Starting elevation: 2300 ft.
Ending elevation: 2430 ft.
Reach distance: 5940 ft.
Average gradient: 2%
Maximum gradient: 3%
Minimum gradient: 2%
Average width of reach: 14 ft.
Total surveyed length: 1814 ft.
Stream habitat in pools: 28%
 Class 1 pools: 3%
 Class 2 pools: 14%
 Class 3 pools: 6%
 Class 4 pools: 5%
Stream habitat in runs: 8%
Stream habitat in riffles: 64%
Stream habitat in glides: 0%
Stream habitat in pocket water: 0%
Spawning sites surveyed: 4
Total stream cover: 26%
 Large organic material: 10%
 Boulders: 4%
 Undercut banks: 4%
 Overhanging vegetation: 8%
 Other 0%

Appendix P-1. Stream habitat survey summary for Grizzly Creek,
Wallace District, Coeur d'Alene National Forest.

Stream reach: 01
Survey date: August 29, 1985
Starting elevation: 2310 ft.
Ending elevation: 2530 ft.
Reach distance: 7390 ft.
Average gradient: 4%
Maximum gradient: 4%
Minimum gradient: 3%
Average width of reach: 16 ft.
Total surveyed length: 702 ft.

Stream habitat in pools: 29%
Class 1 pools: 4%
Class 2 pools: 15%
Class 3 pools: 4X
Class 4 pools: 6%
Stream habitat in runs: 44%
Stream habitat in riffles: 11%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 18%
Spawning sites surveyed: 11
Total stream cover: 43%
Large organic material: 10
Boulders: 18%
Undercut banks: 3X
Overhanging vegetation: 12
Other: 0%

Appendix P-2. Stream habitat survey summary for Grizzly Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: Grizzly Creek
Stream reach: 02
Survey date: August 29, 1985
Starting elevation: 2530 ft.
Ending elevation: 2700 ft.
Reach distance: 4290 ft.
Average gradient: 6%
Maximum gradient: 7%
Minimum gradient: 4%
Average width of reach: 10 ft.
Total surveyed length: 463 ft.
Stream habitat in pools: 8%
 Class 1 pools: 0%
 Class 2 pools: 0%
 Class 3 pools: 0%
 Class 4 pools: 8%
Stream habitat in runs: 10%
Stream habitat in riffles: 10%
Stream habitat in glides: 0%
Stream habitat in pocket water: 11%
Spawning sites surveyed: 2
Total stream cover: 48%
 Large organic material: 6%
 Boulders: 30%
 Undercut banks: 0%
 Overhanging vegetation: 12%
 Other 0%

Appendix Q-1. Stream habitat survey summary for Hat Creek, Wallace District, Coeur d'Alene National Forest.
J

Stream: Hat Creek
Stream reach: 01
Survey date: September 4, 1985
Starting elevation: 2610 ft.

Ending elevation: 2920 ft.
Reach distance: 7590 ft.
Average gradient: 2%
Maximum gradient: 2%
Minimum gradient: 1%
Average width of reach: 5 ft.
Total surveyed length: 247 ft.
Stream habitat in pools: 42%
 Class 1 pools: 0%
 Class 2 pools: 16%
 Class 3 pools: 24%
 Class 4 pools: 2%
Stream habitat in runs: 53%
Stream habitat in riffles: 4%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 0%

 Spawning
Total sites surveyed:
al Large organic material: 15
 Boulders: 02
 Undercut banks:
 Overhanging vegetation: 32
 Other: 0%

Appendix R-1. Stream habitat survey summary for Lost Creek, Wallace District, Coeur d'Alene National Forest.

Stream: Lost Creek
Stream reach: 01
Survey date: September 4, 1985
Starting elevation: 2470 ft.
Ending elevation: 2560 ft.
Reach distance: 7900 ft.
Average gradient: 2%
Maximum gradient: 2%
Minimum gradient: 1%
Average width of reach: 20 ft.
Total surveyed length: 1976 ft.
Stream habitat in pools: 20%

- Class 1 pools: 3%
- Class 2 pools: 2%
- Class 3 pools: 8%
- Class 4 pools: 7%

Stream habitat in runs: 24%
Stream habitat in riffles: 52%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 4%
Spawning sites surveyed: 11
Total stream cover: 24%

- Large organic material: 6%
- Boulders: 12%
- Undercut banks: 0%
- Overhanging vegetation: 6%
- Other: 0%

J

Appendix R-2. Stream habitat survey summary for Lost Creek, Wallace
District, Coeur d'Alene National Forest.

Stream: Lost Creek
Stream reach: 02
Survey date: September 4, 1985
Starting elevation: 2560 ft.
Ending elevation: 2680 ft.
Reach distance: 5940 ft.
Average gradient: 2%
Maximum gradient: -%
Minimum gradient: -%
Average width of reach: 16 ft.
Total surveyed length: 535 ft.

Stream habitat inpools: 12%
Class 1 pools: 0%
Class 2 pools: 0%
Class 3 pools: 7%
Class 4 pools: 5%

Stream habitat inruns: 21%
Stream habitat inriffles: 66%
Stream habitat inglides: 0%
Stream habitat inpocketwater: 0%

Spawning sites surveyed: 3
Total stream cover: 35%
Large organic material: 26
Boulders: 0%
Undercut banks: 2%
Overhanging vegetation: 7%
Other: 0%

Appendix S-1. Stream habitat survey summary for East Fork Lost Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: East Fork Lost Creek, tributary to Lost Creek
Stream reach: 01
Survey date: September 4, 1985
Starting elevation: 2560 ft.
Ending elevation: 2780 ft.
Reach distance: 8850 ft.
Average gradient: 4%
Maximum gradient: 8%
Minimum gradient: 2%
Average width of reach: 13 ft.
Total surveyed length: 990 ft.

Stream habitat in pools: 11%
Class 1 pools: 0%
Class 2 pools: 0%
Class 3 pools: 11%
Class 4 pools: 0%
Stream habitat in runs: 16%
Stream habitat in riffles: 58%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 16%
Spawning sites surveyed: 7
Total stream cover: 58%
Large organic material: 14
Boulders: 21%
Undercut banks: 4%
Overhanging vegetation: 19
Other: 0%

Appendix T-1. Stream habitat survey summary for Scott Creek, Wallace District, Coeur d'Alene National Forest.

Stream: Scott Creek
Stream reach: 01
Survey date: August 29, 1985
Starting elevation: 2250 ft.
Ending elevation: 2520 ft.
Reach distance: 5280 ft.
Average gradient: 2%
Maximum gradient: 3%
Minimum gradient: 1%
Average width of reach: 7 ft.
Total surveyed length: 680 ft.
Stream habitat in pools: 13%
 Class 1 pools: 0%
 Class 2 pools: 0%
 Class 3 pools: 0%
 Class 4 pools: 13%
Stream habitat in runs: 12%
Stream habitat in riffles: 75%
Stream habitat in glides: 0%
Stream habitat in pocket water: 0%
Spawning sites surveyed: 6
Total stream cover: 48%
 Large organic material: 17%
 Boulders: 4%
 Undercut banks: 1%
 Overhanging vegetation: 26%
 Other 0%

Appendix U-1. Stream habitat survey summary for Steamboat Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: Steamboat Creek
Stream reach: 01
Survey date: August 8, 1985
Starting elevation: 2250 ft.
Ending elevation: 2310 ft.
Reach distance: 7920 ft.
Average gradient: 1%
Maximum gradient: 2%
Minimum gradient: 1%
Average width of reach: 27 ft.
Total surveyed length: 4550 ft.
Stream habitat in pools: 20%

Class 1 pools: 0%
Class 2 pools: 6%
Class 3 pools: 7%
Class 4 pools: 7%
Stream habitat in runs: 36%
Stream habitat in riffles: 45%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 0%

Spawning sites surveyed: 18
Total stream cover: 19%
Large organic material: 1%
Boulders: 10%
Undercut banks: 0%
Overhanging vegetation: 8%
Other: 0%

Appendix U-2. Stream habitat survey summary for Steamboat Creek,
Wallace District, Coeur d'Alene National Forest.

Stream: Steamboat Creek
Stream reach: 02
Survey date: August 26, 1985
Starting elevation: 2310 ft.
Ending elevation: 2550 ft.
Reach distance: 18500 ft.

Average gradient: 2%
Maximum gradient: 3X
Minimum gradient: 1%
Average width of reach: 28 ft.
Total surveyed length: 7899 ft.
Stream habitat in pools: 21%
Class 1 pools: 4%
Class 2 pools: 8%
Class 3 pools: 7%
Class 4 pools: 2%
Stream habitat i runs: 29%
Stream habitat i riffles: 49%
Stream habitat n glides: 0%
Stream habitat i pocketwater: 0%
n
Spawning sites surveyed: 19
Total stream cover: 21%
Large organic material: 4
Boulders: 8%
Undercut banks: 1%
Overhanging vegetation: 7
Other: 1%

Appendix V-1. Stream habitat survey summary for West Fork Steamboat
Creek, Wallace District, Coeur d'Alene National Forest.

Stream: West Fork Steamboat Creek, tributary to Steamboat Creek
Stream reach: 01
Survey date: August 29, 1985
Starting elevation: 2550 ft.
Ending elevation: 2760 ft.
Reach distance: 9240 ft.
Average gradient: 3%
Maximum gradient: 5%
Minimum gradient: 1%
Average width of reach: 16 ft.
Total surveyed length: 1316 ft.
Stream habitat in pools: 18%

Class 1 pools: 0%
Class 2 pools: 6%
Class 3 pools: 9%
Class 4 pools: 3%
Stream habitat in runs: 20%
Stream habitat in riffles: 51%
Stream habitat in glides: 0%
Stream habitat in pocket water: 11%
Spawning sites surveyed: 1
^ Large organic material: 10%
Boulders: 14%
Undercut banks: 1%
Overhanging vegetation: 3%
Other: 0%

Appendix W-1. Stream habitat survey summary for East Fork Steamboat
Creek, Wallace District, Coeur d'Alene National Forest.

Stream: East Fork Steamboat Creek, tributary to Steamboat Creek
Stream reach: 01
Survey date: August 26, 1985
Starting elevation: 2550 ft.
Ending elevation: 2710 ft.
Reach distance: 6600 ft.
Average gradient: 3%
Maximum gradient: 3%
Minimum gradient: 2%
Average width of reach: 18 ft.
Total surveyed length: 2526 ft.
Stream habitat in pools: 11%

Class 1 pools: 21
Class 2 pools: 2%
Class 3 pools: 0%
Class 4 pools: 7%
Stream habitat in runs: 15%
Stream habitat in riffles: 74%
Stream habitat in glides: 0%
Stream habitat in pocketwater: 0%
Spawning sites surveyed: 10
Total stream cover: 32%
Large organic material: 111
Boulders: 5%
Undercut banks: 11
Overhanging vegetation: 15%
Other: 0%

Appendix X-1. Continued.

KEY

SITE: SAMPLE SITE NUMBER

HABT: HABITAT TYPE
 001=CLASS 1 POOL 005=RUN
 002=CLASS 2 POOL 006=POCKETWATER
 003=CLASS 3 POOL 007=GLIDE
 004=CLASS 4 POOL 008=RIFLE

HABL: HABITAT LENGTH IN FEET

HABW: HABITAT WIDTH IN FEET (00 IF UNRECORDED)

POOLCR: FEATURE THAT CREATED POOL HABITAT TYPE
 01=LARGE ORGANIC MATERIAL 04=BEAVER DAM
 02=BOULDER(S) OR BEDROCK 05=OTHER
 03=MEANDER

CLOM: PERCENTAGE OF SITE WHERE LARGE ORGANIC MATERIAL PROVIDES FISH COVER
 CALD: PERCENTAGE OF SITE WHERE BOULDERS OR BEDROCK PROVIDE FISH COVER
 CUB: PERCENTAGE OF SITE WHERE UNDERCUT BANKS PROVIDE FISH COVER
 COV: PERCENTAGE OF SITE WHERE OVERHANGING VEGETATION PROVIDES FISH COVER
 COTH: PERCENTAGE OF SITE WHERE OTHER MATERIAL PROVIDES FISH COVER

SPNUM: TOTAL SPAWNING SITES, IF FOUND

SPWSCR: FEATURE THAT CAUSED SPAWNING SITE(S)
 U1=LARGE ORGANIC MATERIAL 04=GRADIENT
 U2=BOULDER(S) OR BEDROCK 05=ERAIIDING
 U3=MEANDER 06=OTHER

GRAD: PERCENT GRAJIENT (00 IF UNRECORDED)

ERRONEOUS INPUT SUMMARY

THIS PROGRAM DETECTED NO ERRORS IN THE DATA RECORDS OF THIS DATA SET.
 THEREFORE THE SUMMARY STATISTICS OF THIS REACH WILL BE WRITTEN ON TWO
 FILES: OUTPUT AND PROXY (THIS FILE IS FOR FURTHER DATA PROCESSING).

AVERAGE GRADIENT OF REACH: 01%
 MAXIMUM GRADIENT OF REACH: 03%
 MINIMUM GRADIENT OF REACH: 01%

AVERAGE WIDTH OF REACH: 13 FT
 TOTAL SURVEYED LENGTH: 2881 FT

HABITAT CONDITIONS

HABITAT	LENGTH (FT)	% TOTAL	AVE. WIDTH (FT)	TOT. AREA (SQ FT)	SPAWNING SITES/SURVEY	SPAWNING SITES/REACH
RIFLE	0681	24	015	10215	013	095
GLIDE	0150	05	011	01650	000	000
POCKETWATER	0000	00	000	00000	000	000
RUN	1531	53	011	16841	005	037
CL. 1 POOL	0206	07	014	02884	000	000
CL. 2 POOL	0065	02	015	00975	000	000
CL. 3 POOL	0186	06	013	02418	002	015
CL. 4 POOL	0062	02	010	00620	000	000
TOT. POOLS	00519	017				

Appendix X-1. Continued.

POCL CREATORS																	
	WOODY MAT.			BOULDERS			MEANDERS			BEAVER DAMS			OTHER			TOTAL	
	N/S	N/R	N/M	N/S	N/R	N/M	N/S	N/R	N/M	N/S	N/R	N/M	N/S	N/R	N/M	N/R	N/M
CL. 1	002	015	004	000	000	000	001	007	002	000	000	000	000	000	000	022	006
CL. 2	002	015	004	001	007	002	000	000	000	000	000	000	000	000	000	022	006
CL. 3	005	037	009	000	000	000	000	000	000	000	000	000	001	007	002	044	011
CL. 4	001	007	002	001	007	002	000	000	000	000	000	000	000	000	000	014	004
TOTAL	074 019			014 004			007 002			000 000			007 002			102	027

NOTE: N/S=NUMBER/SURVEY, N/R=NUMBER/REACH, N/M=NUMBER/MILE

SPAWNING SITE CREATORS						
	WOODY MAT.	BOULDERS	MEANDERS	GRADIENT	ERAIDING	OTHER
NUM. SUR.	004	003	001	012	000	000
NUM/REACH	029	022	007	089	000	000
NUM/MILE	007	005	002	022	000	000

NOTE: NUM. SUR.=NUMBER SURVEYED, NUM=NUMBER

STREAM COVER PERCENTAGES					
	ORGANIC MATERIAL	BOULDERS	UNDERCUT BANKS	OVERHANGING VEGETATION	OTHER
CL. 1 POOLS	015	000	005	031	004
CL. 2 POOLS	019	002	007	020	000
CL. 3 POOLS	014	003	004	009	000
CL. 4 POOLS	001	001	003	000	000
RUNS	003	002	001	004	000
POCKETWATER	000	000	000	000	000
GLIDE	000	000	000	003	000
HTD. TOTAL	005	002	002	007	000

JOB PERFORMANCE REPORT

State of: _Idaho

Name: RIVER AND STREAM
INVESTIGATIONS

Project No.: F-73-R-8

Title: North Idaho Streams
Fishery Research

Subproject No.: IV

Study No.: IV

Job No.: 3. Fish Species and Stock Evaluation

Period Covered: March 1, 1985 to February 28, 1986

ABSTRACT

Recommendations for species or stocks of fish to enhance the fishery of the lower Coeur d'Alene River system will be made when the evaluation of game fish populations and stream habitat is completed. Basic guidelines from the Idaho Department of Fish and Game Fisheries Management Plan for 1986 to 1990 will be followed.

Author:

William D. Horton
Senior Fishery Research Biologist

INTRODUCTION

Because of mine waste pollution, the Coeur d'Alene River downstream from the South Fork Coeur d'Alene River has had little fishery value during this century. Passage of environmental laws and a general concern over the effects of the pollution, coupled with economic changes, has initiated a gradual systemwide recovery and a game fish population increase. The associated increase in angler effort and catch in the river, and the apparent decline of trout populations in Lake Coeur d'Alene, has concerned fisheries managers.

The objective of this study is to evaluate and recommend species or stocks of fish that will enhance the fishery of the lower Coeur d'Alene River system. Job 2 of this study addresses habitat evaluation and successful introductions of new species or different stocks can be made only where adequate habitat is available.

The 1986 to 1990 Fisheries Management Plan of the Idaho Department of Fish and Game (1986) states: "Native wild stocks of resident trout will receive priority consideration in all management decisions involving resident fish." Concerning the introduction of exotic species, the Plan states: "Non-native salmonids and warmwater game fish will not be introduced into waters where they adversely affect goals and objectives set for native...programs. However, suitable exotic species will be utilized to establish sport fisheries in habitat unsuited for native species, or where the introduced species can provide increased fishing opportunity without undue damage to existing species."

OBJECTIVES

To evaluate and recommend species or stocks of fish that will enhance the fishery of the lower Coeur d'Alene River system.

METHODS

The status of the game fish populations and habitat in the lower Coeur d'Alene River system is being evaluated. Information from this evaluation, combined with a literature review of game fish species and direction from the Idaho Fisheries Management Plan (1986), will provide the basis for management recommendations.

Because of the close proximity of the Coeur d'Alene and St. Joe rivers, and **the** likelihood of fish movement between these rivers, no recommendation will be made until both systems are studied. Information will be provided after the 1987 field season.

LITERATURE CITED

Idaho Department of Fish and Game. 1986. Fisheries Management Plan, 1986 to 1990. Idaho Department of Fish and Game, Boise.

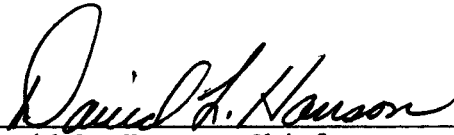
Submitted by:

William D. Horton
Senior Fishery Research Biologist

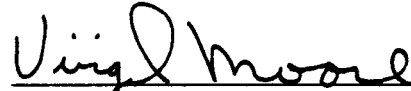
Approved by:

IDAHO DEPARTMENT OF FISH & GAME

Jerry M. Conley, Director



David L. Hanson, Chief
Bureau of Fisheries



Virgil K. Moore
Fishery Research Manager