



**FEDERAL AID IN FISH RESTORATIONS
2000 JOB PERFORMANCE REPORT
PROGRAM F-71-R-25**

Steven M. Huffaker, Director

**REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS
SOUTHWEST REGION (McCall) (Subprojects I-C, II-C, III-C)**

PROJECT I. SURVEYS AND INVENTORIES

- Job a. McCall Subregion Mountain Lakes Investigations**
- Job b-1. McCall Subregion Lowland Lakes Investigations**
- Job b-2. Cascade Reservoir, Yellow Perch Investigations**
- Job c. McCall Subregion Rivers and Streams Investigations**

PROJECT II. TECHNICAL GUIDANCE

PROJECT III. HABITAT MANAGEMENT

By

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2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management

Project I: Surveys and Inventories

Subproject I-C: Southwest Region (McCall)

Job: a

Title: Mountain Lakes Investigations

Contract Period: July 1, 2000 to June 30, 2001

ABSTRACT

Fish population status and/or physical habitat parameters were surveyed, and stocking strategies were assessed on eight mountain lakes in 2000.

Westslope cutthroat trout *Oncorhynchus clarki lewisi* were collected from CR Lake (07-422), Long Lake (07-528), Rice Lake (07-525), and Willow Basket Lake (07-403). Brook trout *Salvelinus fontinalis* were collected from Box Lake (09-377), Granite Twin Lake (07-194), and Nethker Lake #1 (07-414). Bull trout *S. confluentus* were found in Rice Lake (07-525). No fish were collected from Nethker Lake #2 (07-443), however frogs and salamanders were abundant.

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OBJECTIVES

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

INTRODUCTION

The Idaho Department of Fish and Game (IDFG) conducts standard mountain lake surveys each year to evaluate and adjust the mountain lakes fish-stocking program (Janssen et al. In Press). We completed surveys on eight lakes in 2000.

METHODS

We examined fish populations and habitats in each lake using the Department's standard mountain lakes survey methods. We set gill nets (125-ft sinking) in the afternoon and pulled them the next morning. All fish collected were weighed to the nearest g and total length measured to the nearest mm.

RESULTS

Department personnel collected fish population and habitat data from eight mountain lakes in 2000, which included Box Lake (09-377), CR Lake (07-422), Granite Twin Lake (07-194), Long Lake (07-528), Nethker Lake #1 (07-414), Nethker Lake #2 (07-415), Rice Lake (07-525), and Willow Basket Lake (07-403). Fish were found in seven of the eight lakes surveyed. Length frequencies and average condition factors are listed in Table 1. Completed survey forms and maps are presented in Appendices A through H.

Two sinking mountain lake nets were set overnight in Box Lake (09-377). Brook trout *Salvelinus fontinalis* of average to slightly below average condition were caught. Box Lake had not been stocked since 1971.

Sampling efforts revealed CR Lake (07-422) to have a healthy westslope cutthroat trout *Oncorhynchus clarki lewisi* population. CR Lake had been stocked with westslope cutthroat trout in 1992, 1993, 1996 and 1999.

Granite Twin Lake (07-194) supports a healthy population of brook trout. Granite Twin Lake was stocked with rainbow trout *O. mykiss* in 1990, 1993, 1996 and 1999 and with Arctic grayling *Thymallus arcticus* in 1997. An adult western toad *Bufo boreas* was observed near the lake.

Both westslope cutthroat trout and rainbow trout were present in Long Lake (07-528). Rainbow trout were stocked in 1991, 1994 and 1997. Westslope cutthroat trout were stocked in 1990.

Nethker Lake #1 (07-414) was stocked in 1991, 1994 and 1997 with westslope cutthroat trout; however, no westslope cutthroat trout were collected. One very large brook trout was caught in the gill net.

We collected no fish in Nethker Lake #2 (07-443) which has no stocking history. We found populations of Columbia spotted frogs *Rana luteiventris* and unidentified juvenile salamanders.

We set one net at dusk in Rice Lake (07-525). Three bull trout *S. confluentus* were caught within fifteen minutes and the net was pulled. Rice Lake had been stocked with westslope cutthroat trout annually from 1995 through 1999. No westslope cutthroat trout were collected in the nets. However, one angler interviewed at the lake indicated catching five westslope cutthroat trout and one bull trout in one hour of fishing.

Willow Basket Lake (07-403) supported several age classes of westslope cutthroat trout, which were stocked in 1991, 1994 and 1997.

Table 1. Total number and average condition factors (Ktl) or relative weights (Wr) by length group of each species of fish sampled in mountain lakes in 2000.

Lake	Cat. No.	Species Ktl/ Wr	Total length (inches)														
			4	5	6	7	8	9	10	11	12	13	14	15	16	20	
Box Lake	09-377	Brook trout		2	3	1	5	7	2	4	4	1	1				
		Wr		71.9	78.2	71.1	82.2	81.3	85.9	79.3	74.2	67.6	77.7				
CR Lake	07-422	Cutthroat trout	4						2	2	2	2					
		Ktl	1.64						1.01	0.95	0.86	0.96					
Granite Twin Lake	07-194	Brook trout	5		1	15	17	22	6	1							
		Wr	6.3		81.9	72.8	72.2	68.3	77.3	88.8							
Long Lake	07-528	Cutthroat trout											4		2		
		Ktl											0.80		0.87		
		Rainbow trout										2	1				
		Ktl										1.11	0.94				

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Table 1. Continued.

Lake	Cat. no.	Species Ktl/ Wr	Total length (inches)													
			4	5	6	7	8	9	10	11	12	13	14	15	16	20
Nethker Lake # 1	07-414	Brook trout														1
		Wr														86.1
Rice Lake	07-525	Bull trout							2						1	
		Ktl							NA							
Willow Basket Lake	07-403	Cutthroat trout			1	10	9	1								
		Ktl			0.67	1.08	1.07	1.17								

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RECOMMENDATIONS

1. Continue to monitor fish populations in high mountain lakes in the region and make appropriate management changes.
2. Continue working with the Payette National Forest personnel collecting baseline fisheries and habitat data in high mountain lakes.
3. Discontinue stocking Granite Twin Lake and Nethker Lake #1 as fish stockings are unsuccessful.

LITERATURE CITED

Janssen, P. J., K. A. Apperson and D. R. Anderson. In press. Regional Fishery Management Investigations. 1999 Job Performance Report. Program F-71-R-24, Idaho Department of Fish and Game, Boise.

APPENDICES

Appendix A. Granite Twin Lake Survey Form and Map.

Lake Name: Granite Twin Lake Date: 07/20/00
IDFG Catalog #: 07-0194 EPA #:
Major Drainage: Little Salmon River Minor Drainage: Corral Creek, Goose Creek
County: Adams Region: SW/McCall
USFS Ranger District: McCall Wilderness Area:
Section: 2 Township: 20N Range: 2E Elevation: 7164 ft

Physical:

Lake Type: 2 1. Cirque 2. Moraine 3. Slump 4. Caldera 5. Beaver
Total Surface Area: 16.4 ha
Depth Profile: 2 Aspect: 3
1. deep (75% of lake >6m deep) 1. Lake has north facing exposure
2. moderate (50% of lake >6m deep) 2. Lake has south facing exposure
3. shallow (25% of lake >6m deep) 3. Lake has east facing exposure
Maximum Depth: 19.8 m 4. Lake has west facing exposure
Average Depth: 7.4 m 5. Lake is exposed on all directions

Chemical:

Alkalinity: 10 mg/l pH: 7.4
Conductivity: 5 umHOS/cm² Temp (surface): 21°0 F
Secchi depth: . m Temp (bottom):
. F

Spawning Potential:

Inlet(s): 3(number) Outlet(s): 1(number)
Length accessible for spawning: Length a accessible for spawning:
0 m 0 m
Inlet spawning suitability: 4 Outlet spawning suitability: 4
1. excellent (abundant)
2. adequate (enough to maintain suitable spawning populations)
3. fair (not enough to maintain population)
4. poor (not suitable for successful spawning)

Use:

Campsites: 0 (number) Fire Pits: 1 (number) Litter: L M H
Trail around lake: complete partial none trampled: Y N
Access: good trail poor trail cross country
Access directions: Motorcycles, etc., old jeep trail

Biological:

Zooplankton Composition and Density
Genera Identified % of sample Size Density(g/l)

Appendix A. Continued.

Insect Composition and Abundance:

Aquatic Genera	Relative Abundance			Terrestrial Genera	Relative Abundance		
	L	M	H		L	M	H
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Fish Survey:

Fisherman: 0 (numbers)
 Fish Caught:
MH

Hours Fished:
 Fish/hour:

Abundance: L

Length Frequency:

Species	Total Length (mm)								
	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
BRK			5	13	38	11			
Total			5	13	38	11			

Fish Condition:

Species	Total Length (mm)		Weight (g)		Condition (k or Wr)	
	Mean	Range	Mean	Range	Mean	Range
BRK	214.5	108-282	97.5	8-290	71.45	52.2-113.1

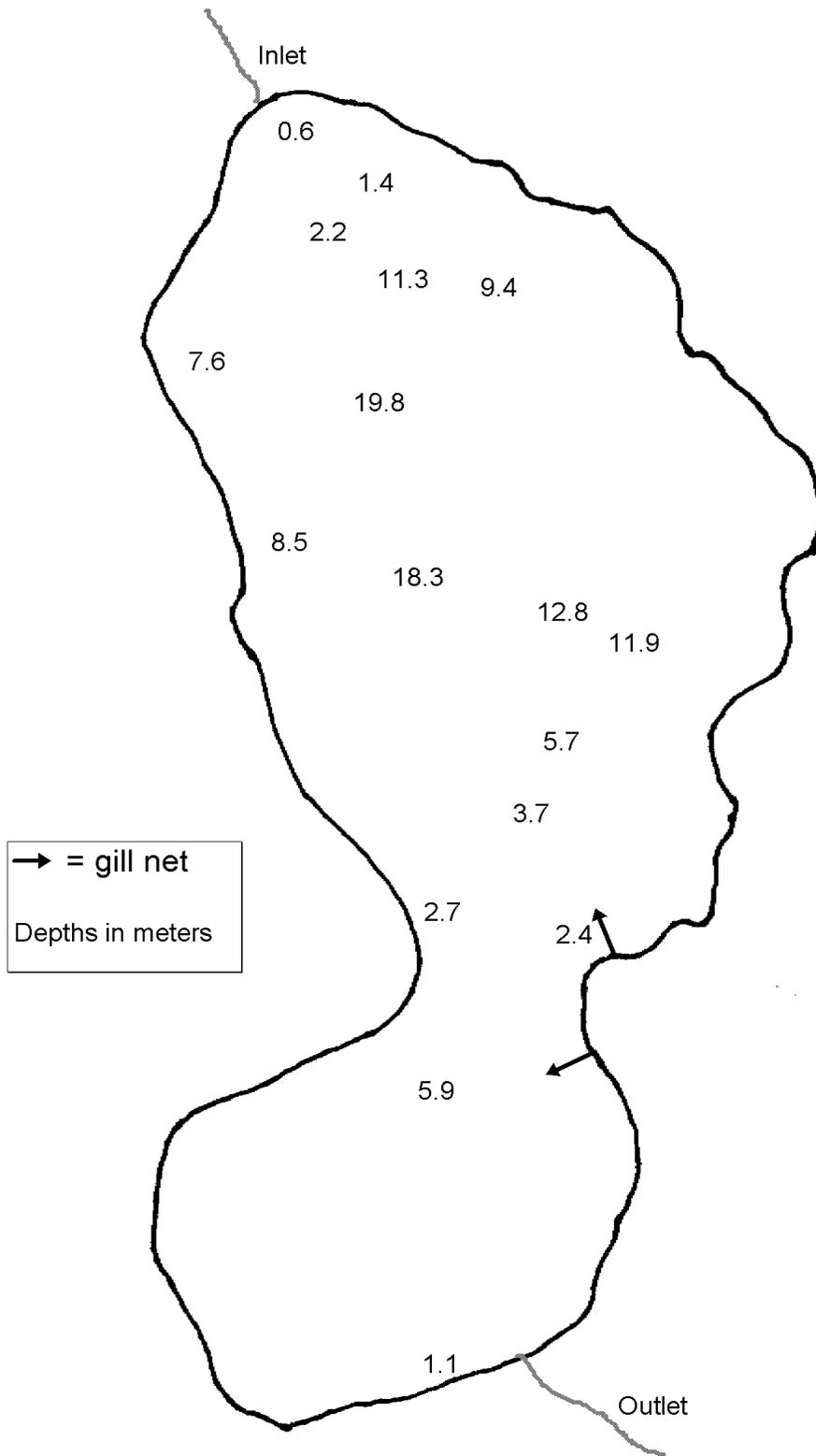
Stocking History:

Year	Species	Number	Comments
1999	K1	1000	
1997	GR	4200	
1996	K1	250	
1993	R9	1000	
1990	R4	1000	

Comments:

1 Western Toad Adult

Appendix A. Continued.



Granite Twin Lake

Appendix B. Willow Basket Lake Survey Form and Map.

Lake Name: Willow Basket Lake Date: 08/23/00
IDFG Catalog #: 07-0403 EPA #:
Major Drainage: Sesech Minor Drainage: Willow Basket Creek
County: Valley Region: 3M
USFS Ranger District: McCall Wilderness Area:
Section: 6 Township: 21N Range: 5E Elevation: 7320 ft

Physical:

Lake Type: 2 1. Cirque 2. Moraine 3. Slump 4. Caldera 5. Beaver
Total Surface Area: 1.6 ha
Depth Profile: 3 Aspect: 3
1. deep (75% of lake >6m deep) 1. Lake has north facing exposure
2. moderate (50% of lake >6m deep) 2. Lake has south facing exposure
3. shallow (25% of lake >6m deep) 3. Lake has east facing exposure
Maximum Depth: 4.7 m 4. Lake has west facing exposure
Average Depth: 2.8 m 5. Lake is exposed on all directions

Chemical:

Alkalinity: mg/l pH: 8.4
Conductivity: 10 umHOS/cm² Temp (surface): 18° 0 F
Secchi depth: . m Temp (bottom):
. F

Spawning Potential:

Inlet(s): 1(number) Outlet(s): 1(number)
Length accessible for spawning: 10 m Length a accessible for spawning: 0 m
Inlet spawning suitability: 4 Outlet spawning suitability: 4
1. excellent (abundant)
2. adequate (enough to maintain suitable spawning populations)
3. fair (not enough to maintain population)
4. poor (not suitable for successful spawning)

Use:

Campsites: 0 (number) Fire Pits: 0 (number) Litter: L M H
Trail around lake: complete partial none trampled: Y N
Access: good trail poor trail cross country
Access directions: Follow ATV trail off Ruby Meadows Road to Willow Basket Creek.
Follow creek up to the lake. Creek goes underground in several places, follow channel.

Biological:

Zooplankton Composition and Density
Genera Identified % of sample Size Density(g/l)

Appendix B. Continued.

Insect Composition and Abundance:

Aquatic Genera	Relative Abundance	Terrestrial Genera	Relative Abundance
Midges	L <input type="checkbox"/> M <input type="checkbox"/> H <input checked="" type="checkbox"/>	Bees	L <input type="checkbox"/> M <input checked="" type="checkbox"/> H <input type="checkbox"/>
Dragon flies	L <input type="checkbox"/> M <input checked="" type="checkbox"/> H <input type="checkbox"/>	Wasps	L <input type="checkbox"/> M <input type="checkbox"/> H <input checked="" type="checkbox"/>
Beetles	L <input checked="" type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>	Horseflies	L <input type="checkbox"/> M <input checked="" type="checkbox"/> H <input type="checkbox"/>

Fish Survey:

Fisherman: 0 (numbers)
 Fish Caught:
MH

Hours Fished:
 Fish/hour:

Abundance: L

Length Frequency:

Species	Total Length (mm)								
	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
CUT				10	11				
Total				10	11				

Fish Condition:

Species	Total Length (mm)		Weight (g)		Condition (k or Wr)	
	Mean	Range	Mean	Range	Mean	Range
CUT	199	165-229	86.4	30-140	1.06	0.67-1.35

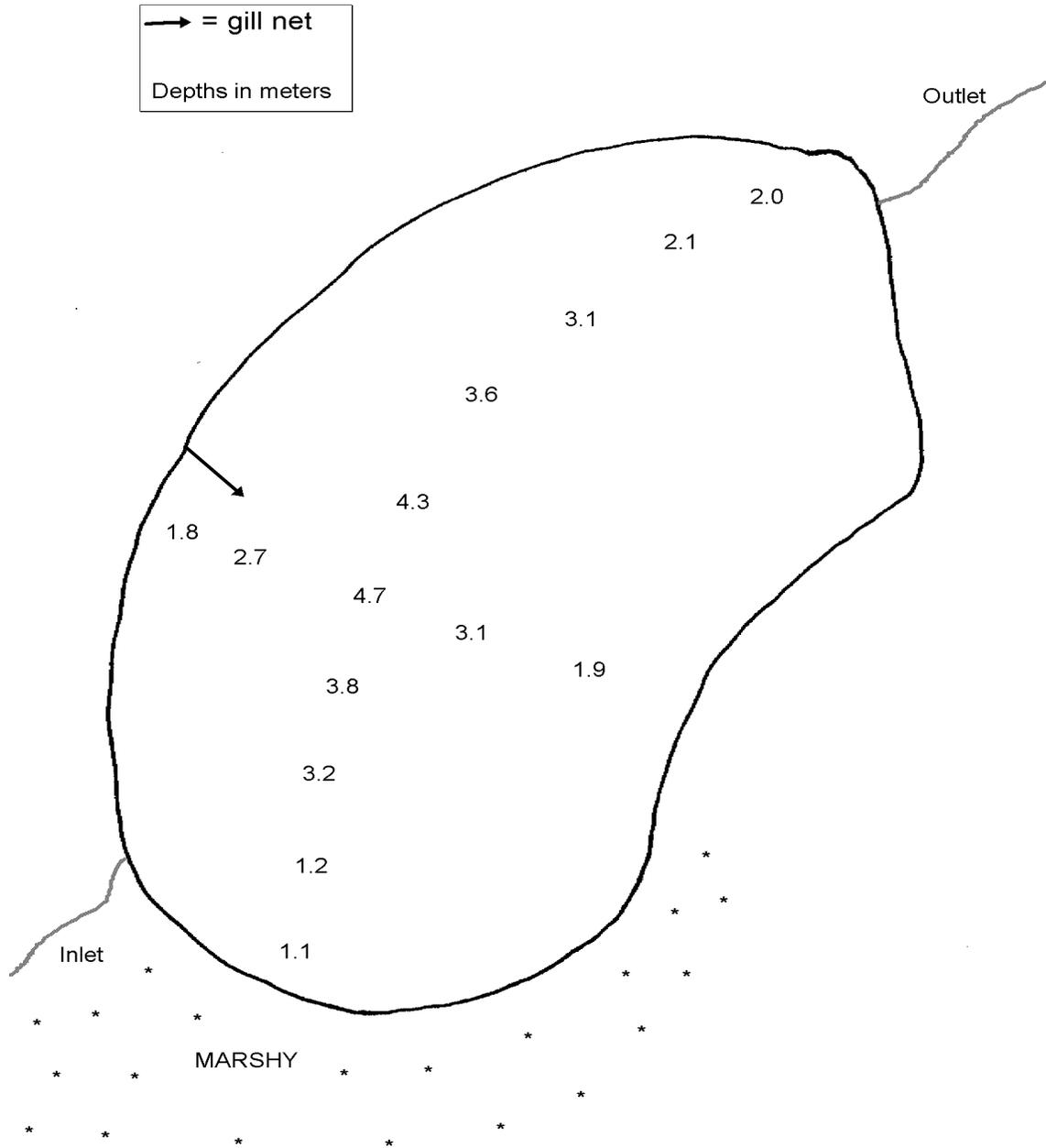
Stocking History:

Year	Species	Number	Comments
1999	C2	500	
1997	C2	500	
1996	Gn	370	
1995	C2	350	
1994	C2	1300	

Comments:

Lotus lilies prevalent along shallow edges.

Appendix B. Continued.



Willow Basket Lake

Appendix C. Nethker Lake # 1 Survey Form and Map.

Lake Name: Nethker Lake #1 Date: 08/12/00
IDFG Catalog #: 07-0414 EPA #:
Major Drainage: SFSR Minor Drainage: Lake Creek
County: Idaho Region: 3M
USFS Ranger District: McCall Wilderness Area:
Section: 15 Township: 22N Range: 4E Elevation: 7040 ft

Physical:

Lake Type: 2 1. Cirque 2. Moraine 3. Slump 4. Caldera 5. Beaver
Total Surface Area: 2.3 ha
Depth Profile: 3 Aspect: 1
1. deep (75% of lake >6m deep) 1. Lake has north facing exposure
2. moderate (50% of lake >6m deep) 2. Lake has south facing exposure
3. shallow (25% of lake >6m deep) 3. Lake has east facing exposure
Maximum Depth: 3.2m 4. Lake has west facing exposure
Average Depth: 2.6m 5. Lake is exposed on all directions

Chemical:

Alkalinity: 10 mg/l pH: 6.0
Conductivity: 20 umHOS/cm² Temp (surface): 17.2°F
Secchi depth: . m Temp (bottom):
. F

Spawning Potential:

Inlet(s): 1(number) Outlet(s): 1(number)
Length accessible for spawning: Length a accessible for spawning:
0 m 100 m
Inlet spawning suitability: 4 Outlet spawning suitability: 3
1. excellent (abundant)
2. adequate (enough to maintain suitable spawning populations)
3. fair (not enough to maintain population)
4. poor (not suitable for successful spawning)

Use:

Campsites: 3 (number) Fire Pits: 3 (number) Litter: L M H
Trail around lake: complete partial none trampled: Y N
Access: good trail poor trail cross country
Access directions: Park on road to Josephine Lake. Use GPS coordinates to determine when you are close to due south of the lake. Hike up over the ridge and down the ridge on the west side of the lake.

Biological:

Zooplankton Composition and Density
Genera Identified % of sample Size Density(g/l)

Appendix C. Continued.

Insect Composition and Abundance:

Aquatic Genera	Relative Abundance	Terrestrial Genera	Relative Abundance
Water Beetles	L <input type="checkbox"/> M <input type="checkbox"/> H <input checked="" type="checkbox"/>	Yellow Jackets	L <input type="checkbox"/> M <input type="checkbox"/> H <input checked="" type="checkbox"/>
Dragon Flies	L <input type="checkbox"/> M <input type="checkbox"/> H <input checked="" type="checkbox"/>	Bald Faced Hornets	L <input checked="" type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>
	L <input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>		L <input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>

Fish Survey:

Fisherman: 0 (numbers)

Hours Fished:

Fish Caught:

Fish/hour:

Abundance: L

MH

Length Frequency:

Species	Total Length (mm)								
	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
BRK									520 mm
Total									1

Fish Condition:

Species	Total Length (mm)		Weight (g)		Condition (k or Wr)	
	Mean	Range	Mean	Range	Mean	Range
BRK	520	520	1700	1700	86.11	86.11

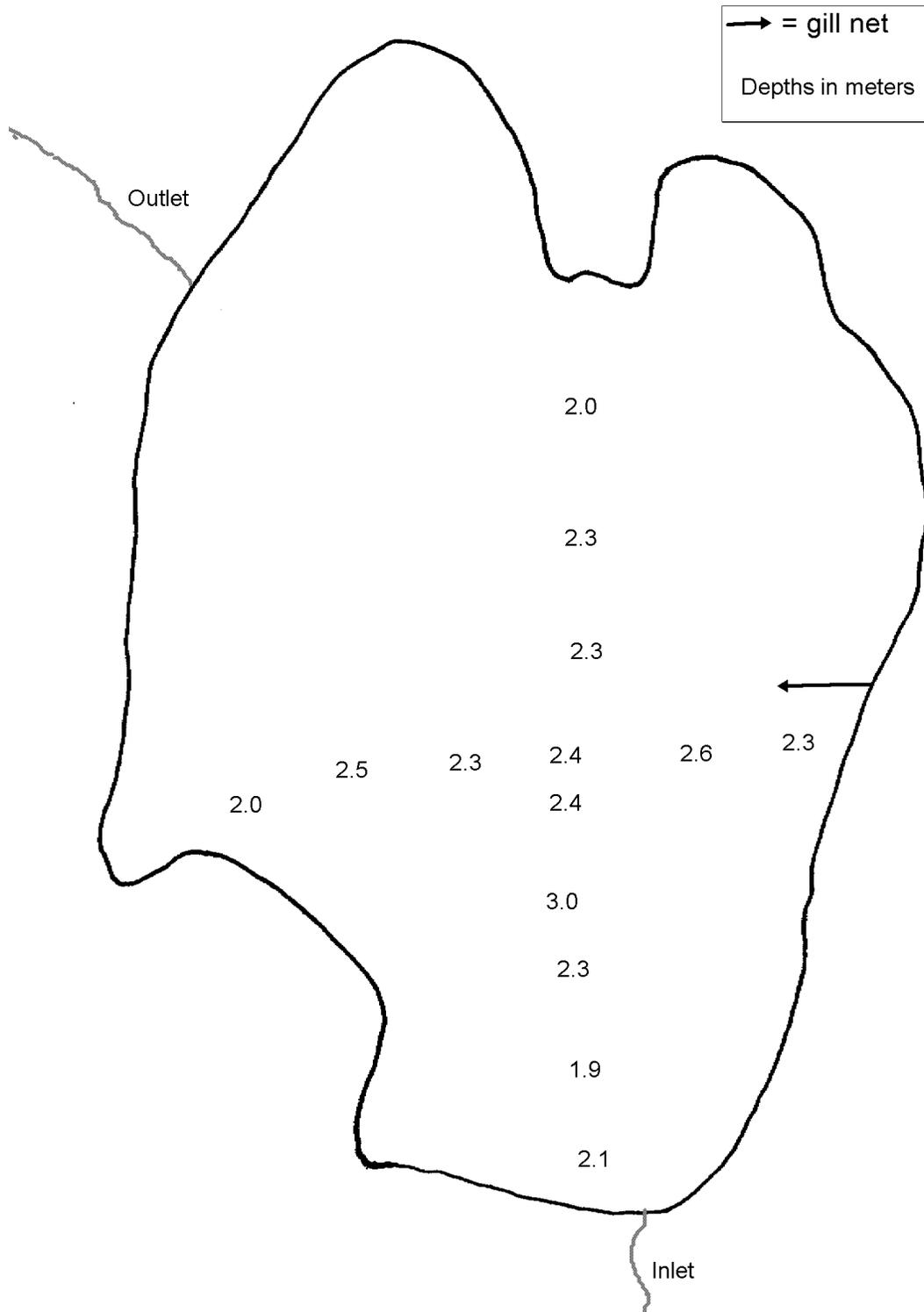
Stocking History:

Year	Species	Number	Comments
1997	K1	1000	
1994	R9	1000	
1991	R4	1000	

Comments:

Sandpipers, lilies and unknown salamander species present.

Appendix C. Continued.



Nethker Lake # 1

Appendix D. Nethker Lake # 2 Survey Form and Map.

Lake Name: Nethker Lake #2 Date: 08/21/00
IDFG Catalog #: 07-0415 EPA #:
Major Drainage: SFSR Minor Drainage: Lake Creek
County: Idaho Region: 3M
USFS Ranger District: McCall Wilderness Area:
Section: 16 Township: 22N Range: 4E Elevation: 7520 ft

Physical:

Lake Type: 1 1. Cirque 2. Moraine 3. Slump 4. Caldera 5. Beaver

Total Surface Area: 0.7 ha

Depth Profile: 3

Aspect: 1

- | | |
|------------------------------------|--------------------------------------|
| 1. deep (75% of lake >6m deep) | 1. Lake has north facing exposure |
| 2. moderate (50% of lake >6m deep) | 2. Lake has south facing exposure |
| 3. shallow (25% of lake >6m deep) | 3. Lake has east facing exposure |
| Maximum Depth: 2m | 4. Lake has west facing exposure |
| Average Depth: 1m | 5. Lake is exposed on all directions |

Chemical:

Alkalinity: 10 mg/l	pH: 6
Conductivity: 20 umHOS/cm ²	Temp (surface): 16.5°F
Secchi depth: . m	Temp (bottom):
. F	

Spawning Potential:

Inlet(s): 1(number)	Outlet(s): 1(number)
Length accessible for spawning: 100 m	Length a accessible for spawning: 100+ m
Inlet spawning suitability: 2	Outlet spawning suitability: 2
1. excellent (abundant)	
2. adequate (enough to maintain suitable spawning populations)	
3. fair (not enough to maintain population)	
4. poor (not suitable for successful spawning)	

Use:

Campsites: 0 (number)	Fire Pits: 1 (number)	Litter: L <input checked="" type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>
Trail around lake: <input type="checkbox"/> complete <input type="checkbox"/> partial <input checked="" type="checkbox"/> none		trampled: <input type="checkbox"/> Y <input type="checkbox"/> N
Access: <input type="checkbox"/> good trail <input checked="" type="checkbox"/> poor trail <input type="checkbox"/> cross country		

Access directions: Follow trail up Nethker Creek. Lake is on south side at the upper end of the drainage.

Biological:

Zooplankton Composition and Density

Genera Identified	% of sample	Size	Density(g/l)
-------------------	-------------	------	--------------

Appendix D. Continued.

Insect Composition and Abundance:

	Relative Abundance	Terrestrial Genera	Relative Abundance
Aquatic Genera	L <input type="checkbox"/> M <input type="checkbox"/> H <input checked="" type="checkbox"/>		L <input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>
Dragon Flies	L <input type="checkbox"/> M <input type="checkbox"/> H <input checked="" type="checkbox"/>		L <input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>
Water Beetles	L <input type="checkbox"/> M <input checked="" type="checkbox"/> H <input type="checkbox"/>		L <input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>
	L <input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>		L <input type="checkbox"/> M <input type="checkbox"/> H <input type="checkbox"/>

Fish Survey:

Fisherman: 0 (numbers)

Hours Fished:

Fish Caught:

Fish/hour:

Abundance: L

M H

Length Frequency:

Species	Total Length (mm)								
	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
None									
Total									

Fish Condition:

Species	Total Length (mm)		Weight (g)		Condition (k or Wr)	
	Mean	Range	Mean	Range	Mean	Range
None						

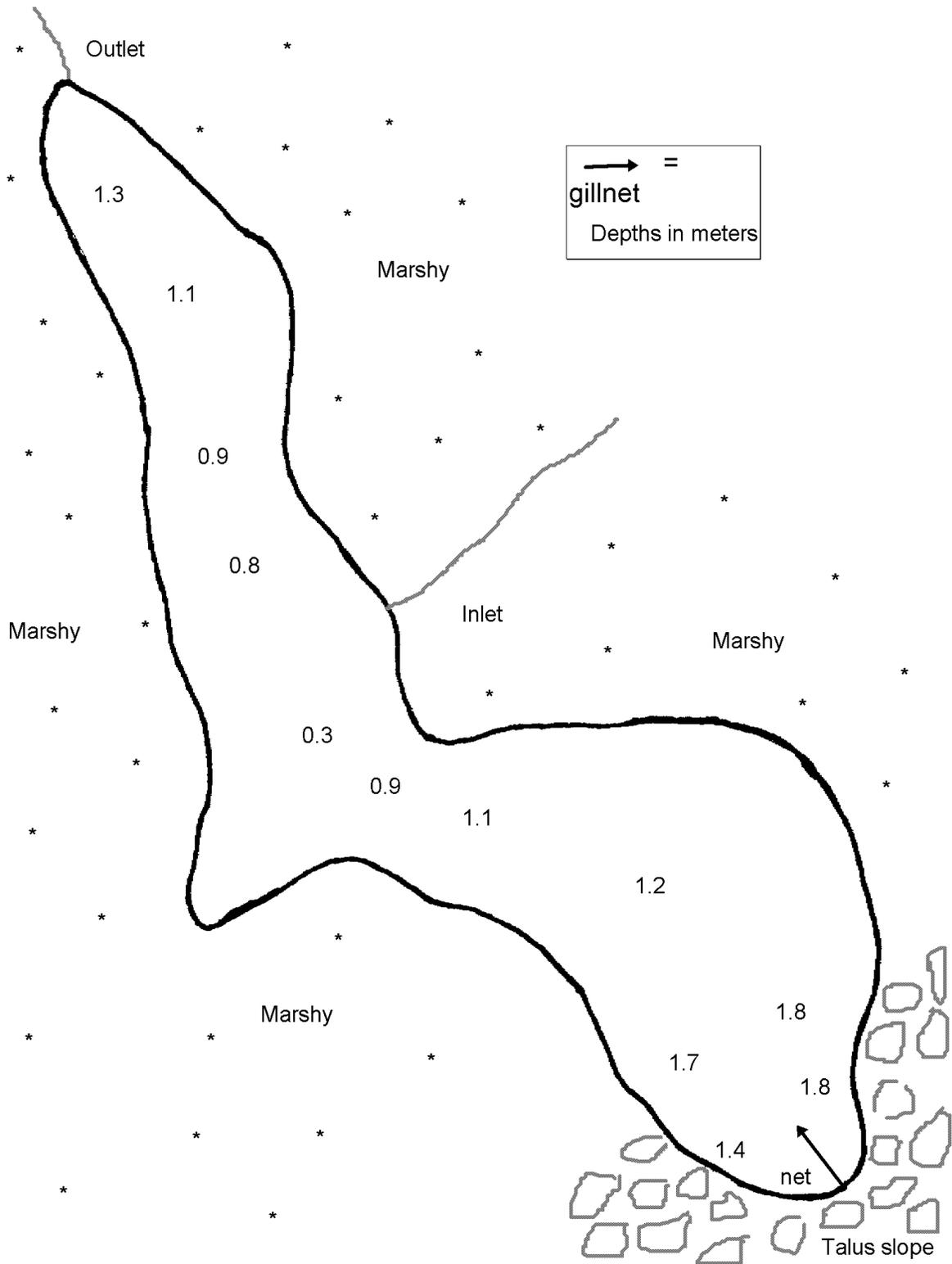
Stocking History:

Year	Species	Number	Comments
			No stocking history found

Comments:

Saw juvenile salamanders (not able to catch to identify), adult spotted frogs, northern goshawk, freshwater shrimp and sandpipers.

Appendix D. Continued.



Nethker Lake # 2

Appendix E. CR Lake Survey Form and Map.

Lake Name: CR Lake Date: 08/23/00
IDFG Catalog #: 07-0422 EPA #:
Major Drainage: SFSR Minor Drainage: Lake Creek
County: Idaho Region: SW/McCall
USFS Ranger District: McCall Wilderness Area:
Section: 16 Township: 23N Range: 4E Elevation: 8040 ft

Physical:

Lake Type: 1 1. Cirque 2. Moraine 3. Slump 4. Caldera 5. Beaver

Total Surface Area: 2.4 ha

Depth Profile: 2

Aspect: 1

- | | |
|------------------------------------|--------------------------------------|
| 1. deep (75% of lake >6m deep) | 1. Lake has north facing exposure |
| 2. moderate (50% of lake >6m deep) | 2. Lake has south facing exposure |
| 3. shallow (25% of lake >6m deep) | 3. Lake has east facing exposure |
| Maximum Depth: 8.2m | 4. Lake has west facing exposure |
| Average Depth: 5m | 5. Lake is exposed on all directions |

Chemical:

Alkalinity: 0 mg/l	pH: 6.5
Conductivity: 10 umHOS/cm ²	Temp (surface): 16.5°F
Secchi depth: . m	Temp (bottom):
. F	

Spawning Potential:

Inlet(s): 0(number)

Outlet(s): 0(number)

Length accessible for spawning:

Length a accessible for spawning:

m

m

Inlet spawning suitability:

Outlet spawning suitability:

- | |
|--|
| 1. excellent (abundant) |
| 2. adequate (enough to maintain suitable spawning populations) |
| 3. fair (not enough to maintain population) |
| 4. poor (not suitable for successful spawning) |

Use:

Campsites: 1 (number) Fire Pits: 3 (number) Litter: L M H
 Trail around lake: complete partial none trampled: Y N
 Access: good trail poor trail cross country
 Access directions: Warren Wagon Road past Burgdorf. Park at first road past Willow Creek.
 Cut up the ridge to the lake.

Biological:

Zooplankton Composition and Density

Genera Identified	% of sample	Size	Density(g/l)
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Appendix E. Continued.

Insect Composition and Abundance:

Aquatic Genera	Relative Abundance			Terrestrial Genera	Relative Abundance		
	L	M	H		L	M	H
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Fish Survey:

Fisherman: 0 (numbers)

Hours Fished:

Fish Caught:

Fish/hour:

Abundance: L

MH

Length Frequency:

Species	Total Length (mm)								
	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
Cutt			4			4	4		
Total			4			4	4		

Fish Condition:

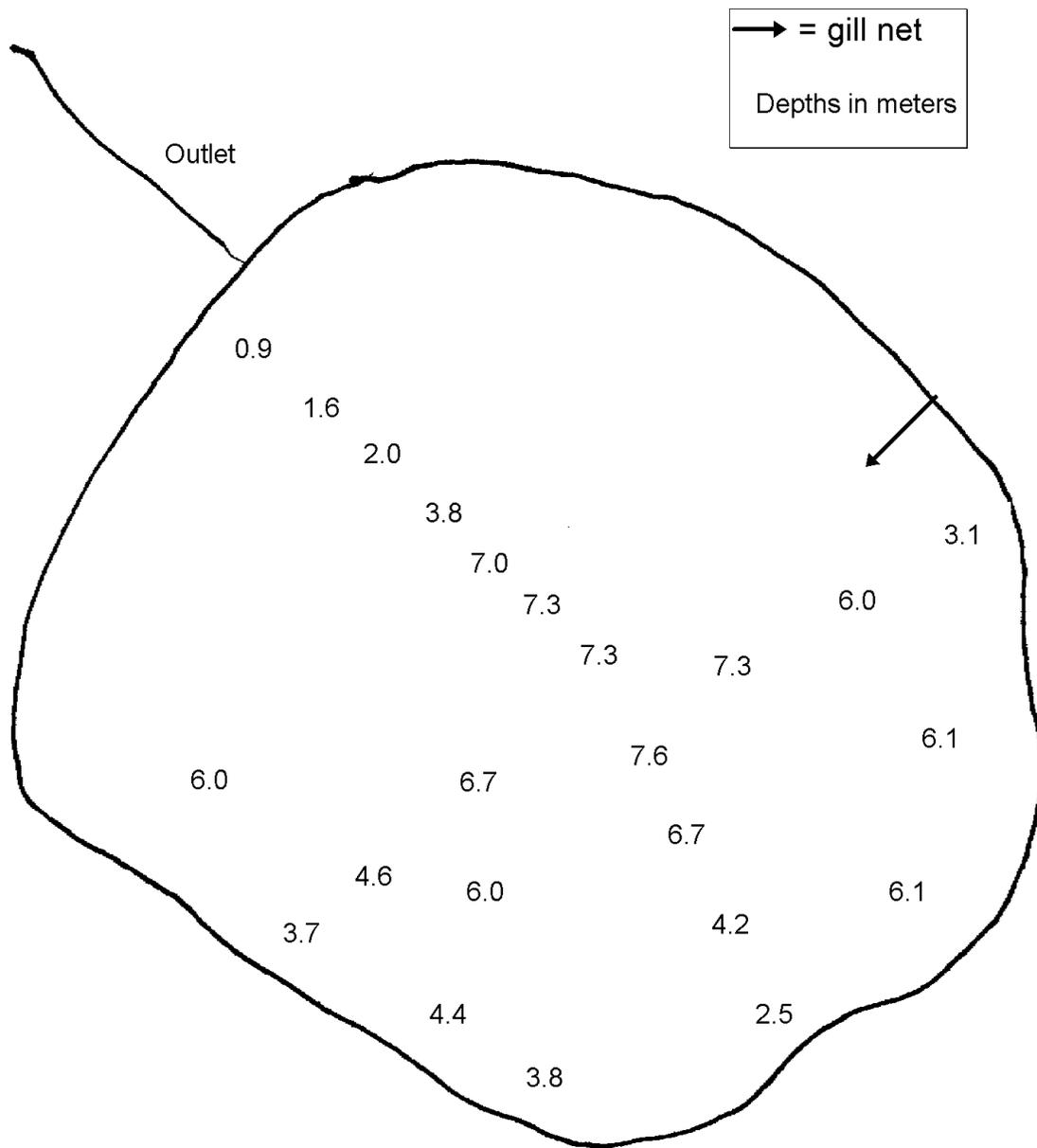
Species	Total Length (mm)		Weight (g)		Condition (k or Wr)	
	Mean	Range	Mean	Range	Mean	Range
Cutt	243	110-345	191	25-375	1.17	0.840- 1.64

Stocking History:

Year	Species	Number	Comments
1999	C2	500	
1996	C2	500	
1993	C2	500	
1992	C2	500	

Comments:

Appendix E. Continued.



CR Lake

Appendix F. Rice Lake Survey Form and Map.

Lake Name: Rice Lake Date: 07/18/00
IDFG Catalog #: 07-0525 EPA #:
Major Drainage: South Fork Salmon River Minor Drainage: Rice Creek
County: Valley Region: SW/ McCall
USFS Ranger District: Cascade Wilderness Area:
Section: 32 Township: 14 Range: 7 Elevation: 7560 ft

Physical:

Lake Type: 2 1. Cirque 2. Moraine 3. Slump 4. Caldera 5. Beaver
Total Surface Area: 2.2 ha
Depth Profile: 3 Aspect: 1
1. deep (75% of lake >6m deep) 1. Lake has north facing exposure
2. moderate (50% of lake >6m deep) 2. Lake has south facing exposure
3. shallow (25% of lake >6m deep) 3. Lake has east facing exposure
Maximum Depth: 1.4 m 4. Lake has west facing exposure
Average Depth: 0.7 m 5. Lake is exposed on all directions

Chemical:

Alkalinity: 20 mg/l pH: 8.0
Conductivity: 50 umHOS/cm² Temp (surface): 16.0°F
Secchi depth: . m Temp (bottom):
. F

Spawning Potential:

Inlet(s): 13(number) Outlet(s): 1(number)
Length accessible for spawning: Length a accessible for spawning:
100 m all m
Inlet spawning suitability: 1 Outlet spawning suitability: 3
1. excellent (abundant)
2. adequate (enough to maintain suitable spawning populations)
3. fair (not enough to maintain population)
4. poor (not suitable for successful spawning)

Use:

Campsites: 2 (number) Fire Pits: 3 (number) Litter: L M H
Trail around lake: complete partial none trampled: Y N
Access: good trail poor trail cross country
Access
directions:

Biological:

Zooplankton Composition and Density
Genera Identified % of sample Size Density(g/l)

Appendix F. Continued.

Insect Composition and Abundance:

Aquatic Genera	Relative Abundance			Terrestrial Genera	Relative Abundance		
	L	M	H		L	M	H
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Fish Survey:

Fisherman: 1 (numbers)
Fish Caught: 6

Hours Fished: 1
Fish/hour: 6

Abundance: LMH

Length Frequency:

Species	Total Length (mm)								
	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
BT						2			1
Total						2			1

Fish Condition:

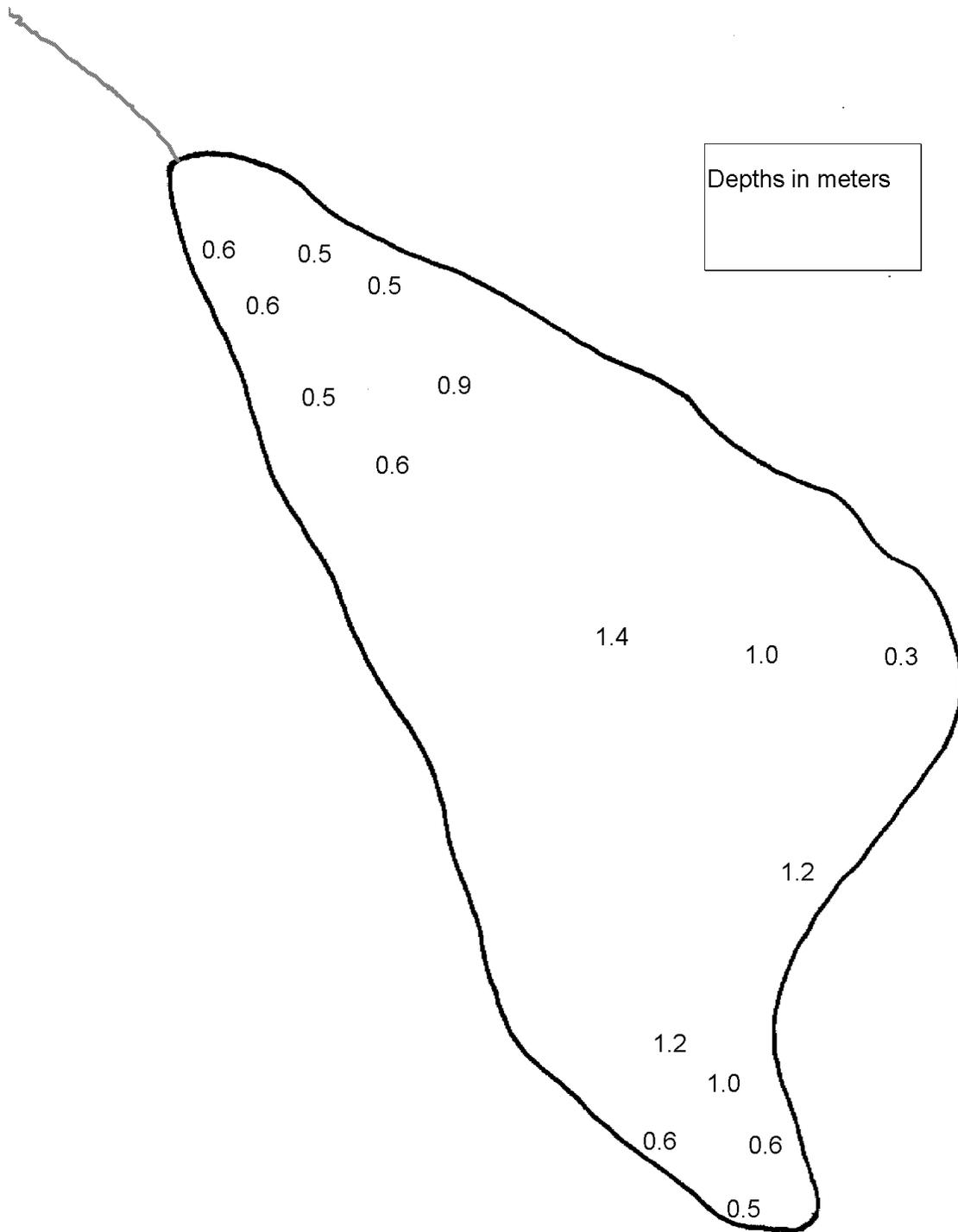
Species	Total Length (mm)		Weight (g)		Condition (k or Wr)	
	Mean	Range	Mean	Range	Mean	Range
BT	309	261-400				

Stocking History:

Year	Species	Number	Comments
1999	C2	500	
1998	C2	500	
1997	C2	500	
1996	C2	500	
1995	C2	500	

Comments:

Many fish seen rising, caught 3 bull trout in 15 minute gill net set!



Rice Lake

Appendix G. Long Lake Survey Form and Map.

Lake Name: Long Lake Date: 07/18/00
IDFG Catalog #: 07-0528 EPA #:
Major Drainage: sfsr Minor Drainage: Morman Creek
County: Valley Region: 3M
USFS Ranger District: Cascade Wilderness Area:
Section: 31 Township: 14N Range: 7E Elevation: 7660 ft

Physical:

Lake Type: 2 1. Cirque 2. Moraine 3. Slump 4. Caldera 5. Beaver
Total Surface Area: 8.14 ha
Depth Profile: 2 Aspect: 1
1. deep (75% of lake >6m deep) 1. Lake has north facing exposure
2. moderate (50% of lake >6m deep) 2. Lake has south facing exposure
3. shallow (25% of lake >6m deep) 3. Lake has east facing exposure
Maximum Depth: 12.8 m 4. Lake has west facing exposure
Average Depth: 6.7 m 5. Lake is exposed on all directions

Chemical:

Alkalinity: 20 mg/l pH: 8.7
Conductivity: 30 umHOS/cm² Temp (surface): 18.0°F
Secchi depth: . m Temp (bottom):
. F

Spawning Potential:

Inlet(s): 4(number) Outlet(s): 1(number)
Length accessible for spawning: 7 m Length a accessible for spawning: 40 m
Inlet spawning suitability: 3 Outlet spawning suitability: 4
1. excellent (abundant)
2. adequate (enough to maintain suitable spawning populations)
3. fair (not enough to maintain population)
4. poor (not suitable for successful spawning)

Use:

Campsites: 6 (number) Fire Pits: 6 (number) Litter: L M H
Trail around lake: complete partial none trampled: Y N
Access: good trail poor trail cross country
Access directions:

Biological:

Zooplankton Composition and Density
Genera Identified % of sample Size Density(g/l)

Appendix G. Continued.

Insect Composition and Abundance:

Aquatic Genera	Relative Abundance			Terrestrial Genera	Relative Abundance		
	L	M	H		L	M	H
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Fish Survey:

Fisherman: 0 (numbers)

Hours Fished:

Fish Caught:

Fish/hour:

Abundance: L

MH

Length Frequency:

Species	Total Length (mm)								
	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
CUT								4	2
RBT							3		
Total							3	4	2

Fish Condition:

Species	Total Length (mm)		Weight (g)		Condition (k or Wr)	
	Mean	Range	Mean	Range	Mean	Range
CUT	382	360-420	517	390-645	0.83	0.80-0.87
RBT	334	327-349	392	360-415	1.05	0.94-1.19

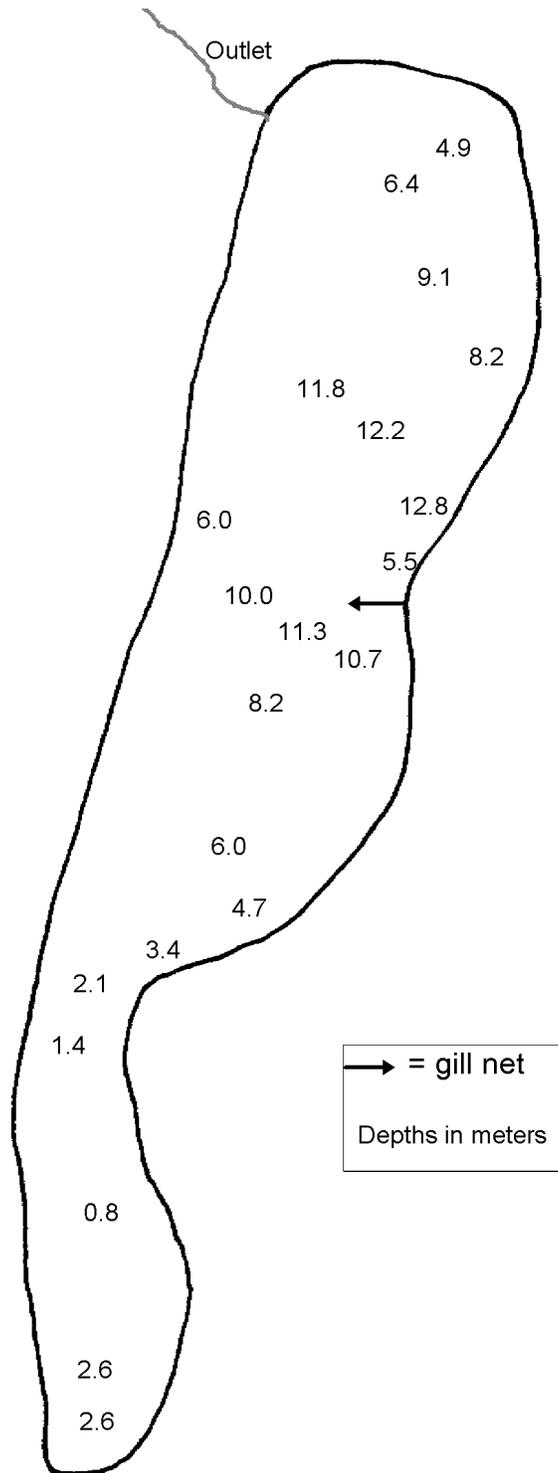
Stocking History:

Year	Species	Number	Comments
1997	K1	500	
1994	R9	1000	
1991	R4	500	
1990	C2	1000	

Comments:

1 Harlequin hen and 2 young

Appendix G. Continued.



Long Lake

Appendix H. Box Lake Survey Form and Map.

Lake Name: Box Lake Date: 9/13/00
IDFG Catalog #: 09-0377 EPA #:
Major Drainage: NFPR Minor Drainage: Box Creek
County: Valley Region: SW/ McCall
USFS Ranger District: McCall Wilderness Area:
Section: 33 Township: 20N Range: 4E Elevation: 7200 ft

Physical:

Lake Type: 2 1. Cirque 2. Moraine 3. Slump 4. Caldera 5. Beaver
Total Surface Area: 57.0 ha
Depth Profile: 1 Aspect: 4
1. deep (75% of lake >6m deep) 1. Lake has north facing exposure
2. moderate (50% of lake >6m deep) 2. Lake has south facing exposure
3. shallow (25% of lake >6m deep) 3. Lake has east facing exposure
Maximum Depth: 27.4 m 4. Lake has west facing exposure
Average Depth: 17.9 m 5. Lake is exposed on all directions

Chemical:

Alkalinity: mg/l pH: 7.0
Conductivity: 10 umHOS/cm² Temp (surface): 17.°F
Secchi depth: . m Temp (bottom):
. F

Spawning Potential:

Inlet(s): 3(number) Outlet(s): 1(number)
Length accessible for spawning: 325 m Length a accessible for spawning:
to and from lake during low water m Earthen dam at outlet. Culvert would allow access
Inlet spawning suitability: 1 Outlet spawning suitability: 2
1. excellent (abundant)
2. adequate (enough to maintain suitable spawning populations)
3. fair (not enough to maintain population)
4. poor (not suitable for successful spawning)

Use:

Campsites: 7 (number) Fire Pits: 9 (number) Litter: L M H
Trail around lake: complete partial none trampled: Y N
Access: good trail poor trail cross country
Access directions: Access via Crest Line trail from Pearl Lake trailhead or Black Lee Creek
(Box lake trail) off Lick Creek road

Biological:

Zooplankton Composition and Density
Genera Identified % of sample Size Density(g/l)

Insect Composition and Abundance:

Aquatic Genera	Relative Abundance			Terrestrial Genera Huge ant hatch	Relative Abundance		
	L <input type="checkbox"/>	M <input type="checkbox"/>	H <input type="checkbox"/>		L <input type="checkbox"/>	M <input type="checkbox"/>	H <input checked="" type="checkbox"/>
	L <input type="checkbox"/>	M <input type="checkbox"/>	H <input type="checkbox"/>		L <input type="checkbox"/>	M <input type="checkbox"/>	H <input type="checkbox"/>
	L <input type="checkbox"/>	M <input type="checkbox"/>	H <input type="checkbox"/>		L <input type="checkbox"/>	M <input type="checkbox"/>	H <input type="checkbox"/>

Fish Survey:

Fisherman: 0 (numbers)
 Fish Caught:
MH

Hours Fished:
 Fish/hour:

Abundance: L

Length Frequency:

Species	Total Length (mm)								
	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	400+
BRK			3	9	16	18	13	1	
Total			3	9	16	18	13	1	

Fish Condition:

Species	Total Length (mm)		Weight (g)		Condition (k or Wr)	
	Mean	Range	Mean	Range	Mean	Range
BRK	246	132-360	173	20-482	71.91	63.8 - 91.7

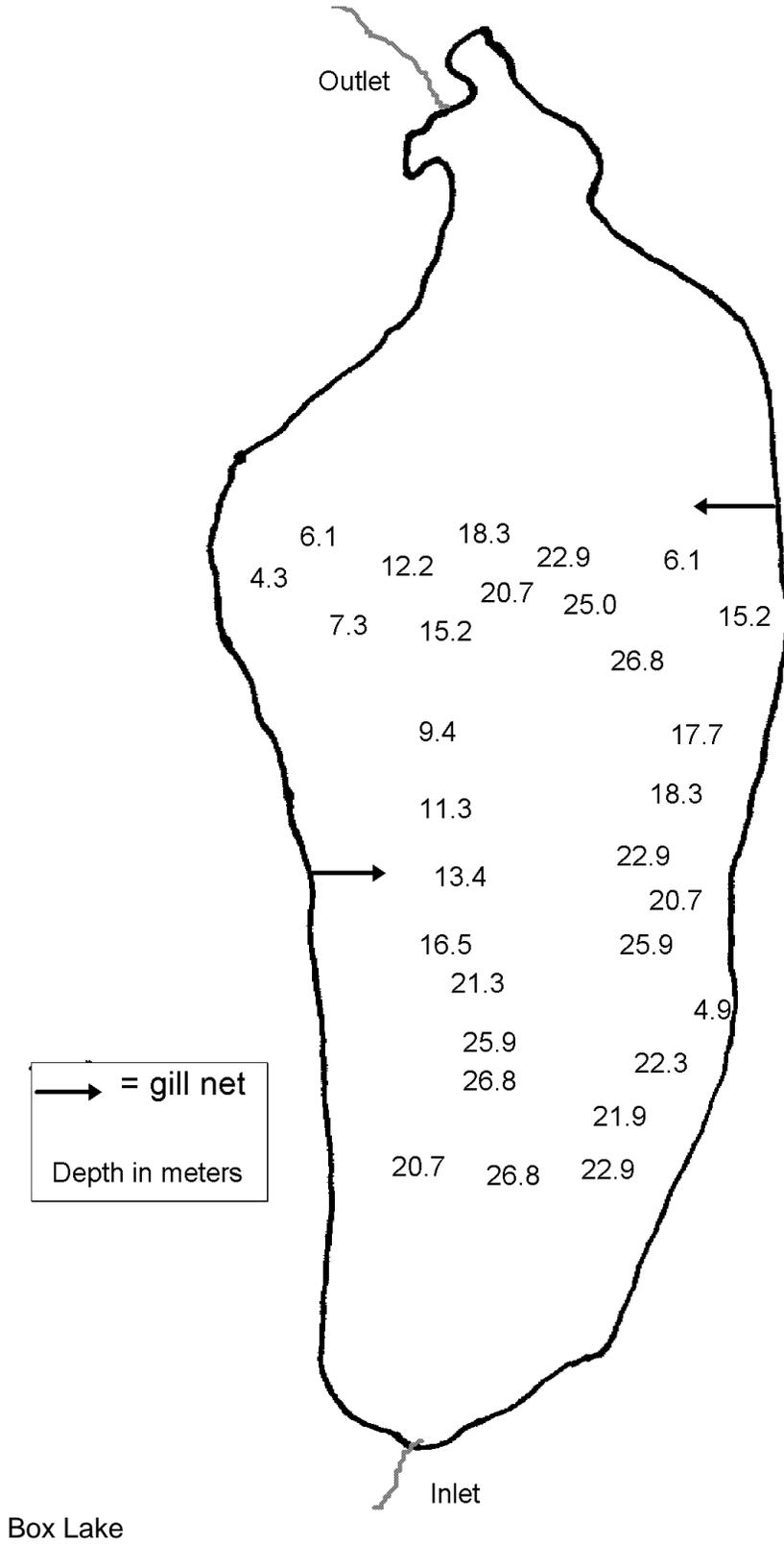
Stocking History:

Year	Species	Number	Comments
1971			Last stocked in 1971

Comments:

Two diving mountain lakes gill nets set overnight.

Appendix H. Continued.



2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management

Project I: Surveys and Inventories

Subproject I-C: Southwest Region (McCall)

Job: b-1

Title: Lowland Lakes Investigations

Contract Period : July 1, 2000 to June 1, 2001

ABSTRACT

We completed holiday shore angler and boat counts on Cascade Reservoir, recording the lowest counts ever made.

We completed a Memorial Day weekend creel survey on Horsethief Reservoir, which revealed that 1,706 angler hours were spent to catch 422 rainbow trout *Oncorhynchus mykiss*.

We completed department standard lake surveys on Granite and Upper Payette lakes.

Hydroacoustic surveys of Payette Lake revealed a kokanee *O. nerka kennerlyi* population of 620,000.

We chemically renovated Lost Valley Reservoir with rotenone to eliminate an unwanted yellow perch *Perca flavescens* population.

Author:

Paul Janssen
Regional Fisheries Biologist

OBJECTIVES

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

INTRODUCTION

Cascade Reservoir Angler Counts

Angler counts were made on Memorial Day, Fourth of July and Labor Day to monitor relative angling pressure with past survey years (Janssen et al. 2000).

Horsethief Reservoir

We conducted a Memorial Day weekend creel survey on Saturday and Sunday of that weekend to continue our annual angler use trend work.

Granite Lake and Upper Payette Lake

We completed standard department lowland lake and reservoir fish surveys on both Granite Lake and Upper Payette Lake in 2000.

Payette Lake

We completed a hydroacoustic survey of Payette Lake kokanee *Oncorhynchus nerka kennerlyi* to continue population monitoring and trend work begun in 1988.

Lost Valley Reservoir

We chemically renovated Lost Valley Reservoir to eliminate an unwanted yellow perch *Perca flavescens* population. Reasons and background for the treatment are given in the Application of Short-Term Activity Exemption presented in Appendix A.

METHODS

Cascade Reservoir Angler Counts

We completed angler counts on Memorial Day, Fourth of July and Labor Day on Cascade Reservoir (Janssen et al. 2000). We conducted counts using a fixed wing airplane at 1000, 1400 and 1800 hrs on each day. All shore anglers and all fishing boats were counted.

Horsethief Reservoir

We conducted the Memorial Day weekend creel survey May 27-28, 2000. All shore, boat, and float tube anglers were counted four times a day at four-hour intervals beginning at 0700 with the last count at 1900 hours. Between counts anglers were contacted to record number of anglers per party, number of hours fished, species and numbers of fish harvested.

Granite Lake and Upper Payette Lake

We used two standard experimental floating gill nets and two experimental sinking gill nets in both lakes. Nets in both lakes were set in the afternoon, fished all night and pulled the next day. Dissolved oxygen (DO), temperature and depth profiles were measured in both lakes. All game fish species collected were measured to the nearest mm and weighed to the nearest g. Nongame species were counted and weighed in mass.

Payette Lake

We completed kokanee population age class estimates in Payette Lake for the tenth consecutive year in 2000. Because of inconsistent results with the midwater trawl used in past years hydroacoustic methodology was utilized to complete the survey in 2000. Teuscher (2001) described the methodology used to sample Payette Lake.

Lost Valley Reservoir

Methods for the rotenone treatment are presented in the Application for Short-term Activity Exemption and the Lost Valley Reservoir rotenone renovation final report presented Appendices A and B.

RESULTS

Cascade Reservoir Angler Counts

The average number of fishing boats and shore anglers per count in 2000 was 15 and 12, respectively (Table 1). Yellow perch fishing on the reservoir was virtually non-existent as the yellow perch population remained at historic low levels.

Table 1. Average boat and shore angler counts on Cascade Reservoir on three major holidays: Memorial Day, Fourth of July and Labor Day in 1982, 1991, 1992, and 1996-2000 with corresponding intensive creel survey angler hour estimates for 1982, 1991 and 1992.

Year	Holiday counts		Estimated angler hours (hours * 1000)		
	Ave. # boats	Ave. # shore anglers	Boat anglers	Shore anglers	Total Pressure
1982	154.0	85.0	255.6	129.8	385.4
1991	41.5	32.0	135.2	102.0	237.2
1992	52.5	116.0	144.2	177.3	321.5
1996	35.0	27.0	--	--	--
1997	36.5	19.0	--	--	--
1998	58.0	39.5	--	--	--
1999	27.0	31.0	--	--	--
2000	15.0	12.0	--	--	--

Horsethief Reservoir

We estimated 1,706 angler hours were spent to catch 422 rainbow trout *Oncorhynchus mykiss* May 27-28, 2000. The overall catch rate was 0.27 trout per hour. The catch composition was 100% rainbow trout. Total angler hours were comprised of 85% shore anglers, 12% boat anglers and 3% float tube anglers.

Total fishing pressure was much higher on Sunday. Anglers spent 585 total hours on Saturday (May 27) and 1,121 total hours on Sunday (May 28). Trout harvest rates were higher on Sunday (0.28 f/h) than Saturday (0.23 f/h).

Granite Lake and Upper Payette Lake

We completed department standard lake surveys on July 25-26 and July 26-27, 2000 on Granite Lake and Upper Payette Lake, respectively. From Granite Lake we collected 63 hatchery origin, put and take size rainbow trout, one brook trout *Salvelinus fontinalis* and one redbside shiner *Richardsonius balteatus*. Dissolved oxygen levels were found to be greater than

7.6 ppm at all depths (Table 2). The thermocline was located at a depth of 5-6 m. Maximum depth of Granite Lake was 27.4 m.

We collected five species of fish from Upper Payette Lake; these included 60 largescale sucker *Catostomus macrocheilus*, 11 hatchery origin, put and take size rainbow trout, 3 brook trout, 1 mountain whitefish *Prosopium williamsoni* and 1 westslope cutthroat trout *O. clarki lewisi*. The maximum depth was 27 m and dissolved oxygen levels were greater than 5.9 ppm at all depths (Table 2). The thermocline was located at the 6-8 m depth.

Payette Lake

We completed the hydroacoustic survey on the night of August 15, 2000. The total estimated abundance of kokanee in Payette Lake was 620,000. Age class estimates were 238,000 +/-51% age-0, 226,000 +/-42% age-1 and 162,000 +/-29% age-2 and older. We found fish located at depths from 10 m to 55 m with the peak at 33 m. Teuscher (2001) gives a more in-depth report of the Payette Lake hydroacoustic sampling.

Lost Valley Reservoir

We completed the Lost Valley Reservoir rotenone treatment on October 27, 2000. We observed thousands of dead and dying yellow perch, 20 to 30 rainbow trout and two splake *S. fontinalis x S. naylori*. No other species were observed. We do not believe we achieved a total kill of yellow perch due to the large number of seeps and springs on the mud flat. We measured inflows of 12 cfs into the reservoir and 24 cfs flowing out of the dam outlet. An overview of the entire project is presented in the Lost Valley Renovation Final Report presented in Appendix B.

RECOMMENDATIONS

1. Continue holiday angler counts on Cascade Reservoir to monitor angling pressure and harvest.
2. Continue Horsethief Reservoir creel surveys on Memorial Day weekend to monitor angling pressure and success and monitor perch populations.
3. Continue to monitor yellow perch abundance in Lost Valley Reservoir.

Table 2. Dissolved oxygen (mg/l) and temperature (°C) profiles of Granite Lake and Upper Payette Lake measured July 26 and 27, 2000.

Depth (m)	Granite Lake		Upper Payette Lake	
	Temperature (°C)	DO	Temperature (°C)	DO
Surface	19.8	7.7	20.9	7.4
1	19.8	7.7	20.7	7.3
2	19.7	7.6	20.7	7.0
3	19.6	7.6	20.6	7.2
4	19.2	7.6	20.4	7.0
5	17.5	7.7	20.1	7.1
6	11.3	9.6	18.1	7.4
7	9.3	9.9	14.9	8.2
8	7.8	10.0	11.2	8.6
9	7.0	9.8	9.3	8.7
10	6.3	9.1	8.6	8.6
11	6.0	9.2	8.0	8.4
12	5.9	9.1	7.8	8.5
13	5.9	9.2	7.7	7.9
14	5.7	9.0	7.5	7.8
15	5.7	9.1	7.3	7.7
--				
25	5.0	7.7	5.9 ^a	5.9
27	5.0 ^a	7.8		

^a bottom

LITERATURE CITED

Janssen, P. J., K. A. Apperson and D. R. Anderson. 2000. Regional Fishery Management Investigations. 1996 Job Performance Report. Program F-71-R-21, Idaho Department of Fish and Game, Boise.

Teuscher, D. 2001. Fishery Research. Job Performance Report. Program F-73-R-23. Report period July 1, 2000 to June 30, 2001. Project 5--Lake and reservoir research. Idaho Department of Fish and Game, Boise.

APPENDICES

Appendix A. Lost Valley Reservoir application for short-term activity exemption.

APPLICATION FOR SHORT-TERM ACTIVITY EXEMPTION

Applicant: Idaho Department of Fish and Game (IDFG)
Contact Person Don Anderson, 634-8137
Body of Water: Lost Valley Reservoir
Tributary To: Weiser River
Objective: To chemically eradicate stunted yellow perch and restock with rainbow trout
Date: October 2000

Evidence of protection or promotion of public interest

Lost Valley Reservoir has a history of overpopulation by yellow perch and subsequent chemical rehabilitation by the Idaho Department of Fish and Game (IDFG). It was rehabilitated in 1959, 1964, 1985, 1991 and 1994 using rotenone and in 1971 using Antimycin (Fintrol). Each treatment resulted in greatly improved fishing for rainbow trout for the following 4-5 years.

Incomplete kills and illegal reintroduction allowed the yellow perch populations to rebuild to the point of overpopulation and stunting. The perch reduce survival and growth of rainbow trout and become a nuisance to anglers. The overpopulated perch average 6-7" and are unacceptable to anglers.

Following each eradication, catchable-size rainbow trout plants produced excellent fishing in the next 4-5 years. This resulting fishery was very popular and provided 50-70,000 estimated angler hours each year.

In 1996 perch began to enter the fishery. By 1999 juvenile perch were so numerous they seriously impacted trout growth and survival and interfered with angling. Many anglers complained of the decline in fishing quality to IDFG and Payette National Forest (PNF) personnel.

Recent communication with the Lost Valley Reservoir Irrigation Co. reconfirmed that the reservoir will be essentially drained by late October. They have agreed to drain the reservoir to its lowest possible level to facilitate the treatment.

The combination of the extremely low water year and the cooperative drawdown affords a good opportunity for an effective chemical rehabilitation of the reservoir. Emergent aquatic vegetation mats coupled with upwelling springs in the reservoir prevented thorough mixing of the chemical in past attempts. The vegetative mats will largely be dry and the springs identifiable at the predicted drawdown level.

Prevention of long-term injury to beneficial use

The IDFG plans to restock Lost Valley Reservoir in the spring of 2001 with catchable size rainbow trout to provide an immediate fishery. Additionally, we will stock fingerling rainbows in the summer of 2001.

Past surveys have documented yellow perch in Lost Creek upstream of the slackwater. As in past treatments, we will apply rotenone at the culvert near the mouth of the East Fork Lost Creek and treat the two miles of stream to the reservoir. Flow measurements will be taken within three days of the treatment to calculate the appropriate amount of rotenone needed. We will use a calibrated drip applicator for this part of the treatment. Rainbow and brook trout also occupy this reach of stream but are expected to repopulate from untreated areas upstream of the culvert, which is a passage barrier to perch but not the salmonid species.

The main body of the reservoir is expected to contain less than 100 acre-feet of stored water at the time of treatment. The irrigation company plans on releasing water to attain the minimum pool prior to the treatment. Within three days of treatment, we will calculate an accurate estimate of water volume (acre-feet) to be treated using the formula $((\text{length (ft)} * \text{width} * \text{mean depth})/43,560)$. Toxicant will be applied at a rate of 0.44 gallon/acre-foot (1.5ppm) (as per Roussel Biocorp Noxfish label instructions).

We have conducted *in situ*, serial dilution bioassays at 1.0, 0.75, 0.50, 0.25 and 0.0 ppm of Roussel Biocorp Noxfish, a 5.0% formulation. We will treat at 1.5 ppm to obtain effective concentrations in light of high levels of organic material and the presence of aquatic vegetation beds.

We plan to use small boats to apply rotenone to the deeper areas of the reservoir using venturi-type boat bailers. A high-pressure pump will be mounted in the boat to allow spraying the rotenone mixture into shallow areas. The lake will be partitioned by buoy lines, if needed, to assure that desired concentrations of rotenone will be distributed. Each section will contain a known volume of water and will be assigned to one boat. Each boat will apply the amount of rotenone needed to attain the selected concentration.

The irrigation company has agreed to close the outlet valve at the dam when we begin to apply the rotenone. Therefore, Lost Creek will be essentially dewatered except for leakage. The leakage, however, will have toxic levels of rotenone. Fish remaining in Lost Creek from the dam downstream about four and one-half miles to the confluence with Bear Gulch will be killed.

Hypothetical situation:

Assuming:

1. Lost Creek Q above reservoir is 10 cfs
2. Volume of storage in reservoir is 100 af
3. 1.5 ppm concentration rotenone needed

We would:

1. Apply 10.0 gallons from drip stations
2. Apply 50.0 gallons by boat application

LOST VALLEY RESERVOIR RENOVATION

Application Report

Idaho Department of Fish and Game personnel chemically eradicated Lost Valley Reservoir on October 27, 2000. The personnel included:

- Don Anderson, Regional Fisheries Manager
- Paul Janssen, Regional Fisheries Biologist, Licensed Aquatic Pesticide Applicator
- Kim Apperson, Regional Fisheries Biologist
- Kris Buelow, Fisheries Technician
- Lauri Hostettler, Fisheries Technician
- Laurie Janssen, Fisheries Technician
- Steve Kammeyer, Fish Hatchery Superintendent I
- Dale Allen, Regional Fisheries Manager
- Randy Martenez, Habitat Technician
- Vic Mason, Idaho Dept. Agriculture
- Gary Hubbler, Valley Air, Crop Duster Pilot, Licensed Aquatic Pesticide Applicator

We applied a total of 45.5 gallons of Nusyn-NoxFish, a 2 ½% synergized rotenone solution and 30 gallons of NoxFish, a 5% rotenone solution, to the inlets, springs, mudflat and isolated ponds within the reservoir perimeter, and 40 lbs of Prentox 5% rotenone powder to various seeps and springs.

In preparation of the treatment, fish salvage was authorized in early September. The valve at the dam was opened mid-September by the irrigation company and allowed to drain as low as possible. The reservoir was drained by October 22, leaving a large mud flat, several creek channels, numerous seeps and springs and a shallow seven-acre pond holding approximately 18-acre feet of water. There was a net gain of water coming off of the mud flat, seeps and springs of approximately 12 cfs.

Ten-hour drip stations were installed at seven different sites to deliver enough rotenone to make a concentration of 1.5 ppm. Drippers were placed at the following locations: 1) East Fork Lost Creek (EFLC) just upstream of Lost Creek, 2) Lost Creek just upstream of the EFLC, 3) Lost Creek at the U. S. Forest Service road #089 culvert, 4) Lost Creek at the U.S. Forest Service interpretive site, 5) Lost Creek approximately 1 mile upstream from the dam on the mud flat, 6) a spring 150 yards downstream of the USFS interpretive site, and 7) a spring on the west side of the reservoir.

Two bladder bag-type hand sprayers were each loaded with 0.5 gallons of Nusyn-NoxFish and filled with water. Two people walked Lost Creek channel from the most upstream drip station down to the mud flat spraying the toxicant into isolated ponds, seep areas, and in-flowing springs.

Forty pounds of rotenone sand was applied to all seep and spring areas that could be accessed by foot. However, many if not most of the seeps and springs on the mud flat were inaccessible due to deep mud.

The 18-acre foot pool of water above the dam was treated with 18 gallons of NoxFish. This was enough chemical to treat the standing water pool as well as the 12.5-acre feet of inflow calculated to enter the pool in the six hours after the outlet was closed and before any of the chemical from the drip stations would enter the pool. Three of the 18 gallons were added to the pool to get better coverage in the outlet area when the boat ran out of chemical. Chemical was applied with a gas engine driven, water pump sprayer system mounted in a 14-ft boat. The outlet valve on the dam was closed just prior to the chemical application to the pool. Many dead and dying perch and a few trout were observed in the pool during and after the treatment.

We employed the use of a fixed wing crop duster capable of covering a 60-foot swath. The plane treated an estimated 240 acres of mud flat with 27 gallons of Nusyn-NoxFish.

We do not believe we attained a total kill within the treatment area due to the large numbers of springs and seeps on the mud flats. Future treatments should be accomplished in a similar manner to this treatment.

2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management

Project I: Surveys and Inventories

Subproject I-C: McCall Subregion

Job: b-2

Title: Lowland Lakes Investigations:
Cascade Reservoir, Yellow Perch
Investigations

Contract Period: July 1, 2000 to June 1, 2001

ABSTRACT

Investigations into the yellow perch *Perca flavescens* population collapse in Cascade Reservoir continued in 2000. We examined the predatory potential of northern pikeminnow *Ptychocheilus oregonensis* on yellow perch. We documented the fate of the 1999 yellow perch cohort and monitored the entire yellow perch population in the reservoir. We found the 1999 yellow perch cohort had virtually disappeared by August 2000. Declines in the early 1990s in the yellow perch population were probably caused by predation and/or disease. Studies in 2000 indicated northern pikeminnow to be preventing recovery of the yellow perch population.

Author:

Paul Janssen
Regional Fishery Biologist

INTRODUCTION

The yellow perch *Perca flavescens* fishery in Cascade Reservoir was described and its decline documented by Janssen et al. (2001). Reasons for the decline were investigated in 1998 and 1999 and results were presented in Janssen et al. (2001 In Press). Investigations in 1999 suggested that northern pikeminnow *Ptychocheilus oregonensis* predation may have been responsible for the decline and may possibly prevent yellow perch recovery. Therefore, investigations in 2000 focused on evaluating northern pikeminnow predation potential on yellow perch. We also continued yellow perch population trend work and followed the fate of the 1999 yellow perch cohort.

OBJECTIVES

1. Examine predatory potential of northern pikeminnow on yellow perch.
 - a) Examine historical data of yellow perch catch rates, historical data from northern pikeminnow removal efforts in the 1950s through the 1970s and historical gill net catch rates of northern pikeminnow.
 - b) Place yellow perch in net pens to protect them from predation.
 - c) Examine northern pikeminnow stomachs to determine percent yellow perch occurrence.
 - d) Complete a yellow perch population estimate.
 - e) Complete a northern pikeminnow population estimate.
 - f) Complete a bioenergetics model of northern pikeminnow predation on yellow perch.
2. Continue tracking the fate of the 1999 yellow perch cohort.
3. Continue to monitor the yellow perch population structure in the reservoir.

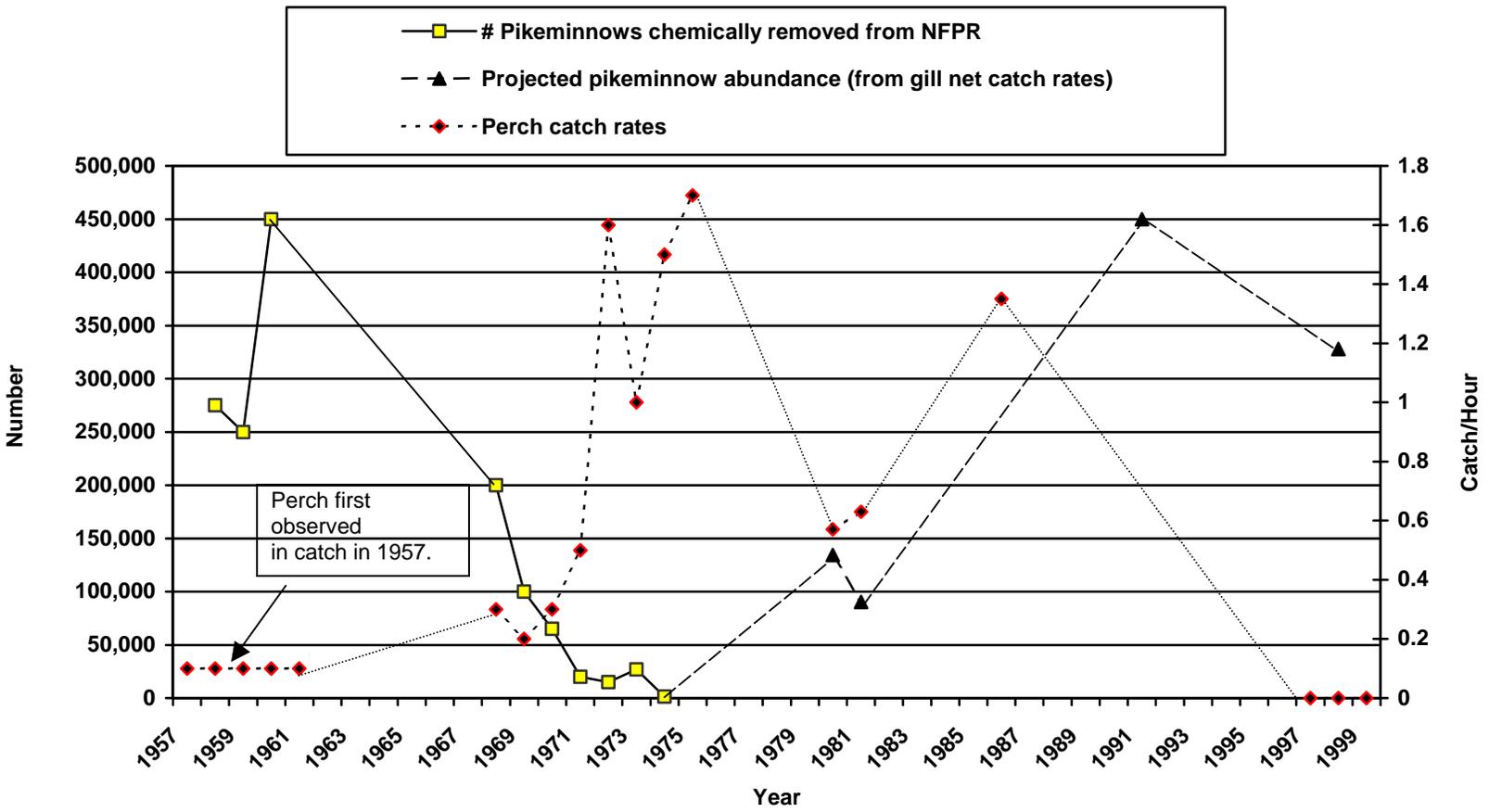
METHODS

Historical Data

Northern pikeminnow were chemically removed from the North Fork Payette River and Lake Fork Creek above Cascade Reservoir during their spawning runs in the 1950s through the 1970s (Irizarry 1970 and Welch 1975). Data from this work was compiled as well as all historical yellow perch angler catch rate data (Welch 1975, Reininger et al. 1983, Anderson et al. 1987, Janssen et al. 1994) and northern pikeminnow and yellow perch gill net catch rate data (Reininger et al. 1983, Janssen et al. 1994 and 2001).

We plotted all historical yellow perch angler catch rates on Figure 1. We also plotted the number of northern pikeminnow estimated to have been killed during the pikeminnow removal effort in the 1950s, 1960s and early 1970s. We then assumed that pikeminnow numbers had recovered to pretreatment numbers at the time of the 1991 gillnetting surveys. As a conservative population estimate we then plotted the 1991 pikeminnow gill net catch as a pikeminnow population estimate equal to the highest estimated number of pikeminnow killed during the pikeminnow removal effort. We then used gill net catch rates of

Figure 1. Historical yellow perch catch rates, estimates of numbers of northern pikeminnow chemically removed from the North Fork Payette River above Cascade Reservoir and projected northern pikeminnow numbers from gill net catch rates.



pikeminnow in 1981, 1982, and 1999 as indicators of pikeminnow abundance relative to the 1991 catch and plotted a population estimate number for each year.

Predator Exclusion

We placed yellow perch into three net pens in Cascade Reservoir to protect them from predation. Each net pen was 0.91 m² by 2.44 m. The pens were totally enclosed with a zipper on top for access into the pen.

We placed one net pen in Cabarton Bay on the boat sewage pump out barge, one pen in the Boulder Creek arm of the reservoir and one pen in the Lake Fork Creek arm. The Boulder Creek and Lake Fork Creek net pens were placed in water depths equal to the net depth. This enabled fish to contact all portions of the water column and to access multiple food sources. This also kept the fish vulnerable to any disease agents that wild fish would have been in contact with. The Cabarton Bay net was placed in water with depths much greater than the depth of the net. Age-1 yellow perch were collected with an otter trawl and placed into the net pens. The pens were checked one to two times a week from June through October for yellow perch survival.

Northern Pikeminnow Stomach Analysis

We collected northern pikeminnow in gill nets and examined stomachs to determine the percentage consuming yellow perch. Nets were set in the afternoon, fished all night and retrieved the next day.

Yellow Perch Population Estimate

We used October 1999 Cascade Reservoir trawl results, elevations and surface areas to calculate a population estimate and average weight of yellow perch. A yellow perch population estimate was calculated using the following parameters and methods. The otter trawl sampled an area 3.35 m X 375.6 m with each 5-minute tow or 1,258.26 m². In October 1999 the lake elevation was 1,469.5 m above sea level with a surface area of 87,944,000 m². Therefore, 0.000014311% (1,258.26/87,944,000) of the lake area was sampled with each trawl transect. The total population estimate equaled the average catch per trawl transect/0.000014311. We assumed that all yellow perch were vulnerable to the trawl and evenly distributed around the lake.

Northern Pikeminnow Population Estimates

We utilized the Department's hydroacoustic fish survey crew to enumerate northern pikeminnow in the lake. Teuscher (2001) gives a description of the equipment and methodology

used. We completed two hydroacoustic surveys in 2000. The first survey was completed in June when presumably most adult northern pikeminnow were near shore or spawning in the major tributaries. We also completed a survey in late summer presumably after adult spawners had returned to the lake.

We used gill nets to determine percent occurrence and size of each fish species present. These data were used to determine species composition of fish observed in the hydroacoustic survey. Gill nets were set the same week as the hydroacoustic surveys were made. We set four experimental gill nets, two floating and two sinking, each day sampled. Nets were set in the afternoon of the first day, fished overnight, pulled the next day and then reset in a different area. We made one set in four different areas of the lake.

Bioenergetics Modeling

We used the Fish Bioenergetics 3.0 computer model developed by the University of Wisconsin Sea Grant Institute (1996) to examine yellow perch predation potential by northern pikeminnow. We used northern pikeminnow bioenergetics parameters developed by Peterson and Ward (1999).

We modeled pikeminnow predation at 1% and 10% yellow perch diets with the remaining diet proportions being invertebrates. We modeled predation for 483 days, the time period from yellow perch egg hatching to August of their second year when all yearling yellow perch had disappeared in 1998 and 1999.

Yellow Perch Monitoring

We repeated the trawling effort and methodology developed in 1998 and 1999 described by Janssen et al. (2001 In Press). All yellow perch collected were counted and a representative sample of yellow perch from each sample area were measured in total length and weighed to the nearest 0.1 g.

RESULTS

Historical Data

Historical data indicate that yellow perch numbers increased only after significant numbers of northern pikeminnow were removed (Figure 1). Angler catch rates for yellow perch remained good from early 1970s through the late 1980s until northern pikeminnow numbers recovered in the early 1990s. After northern pikeminnow recovery angler catch rates for yellow perch dropped to virtually zero.

Predator Exclusion

We placed 20, 15, and 10 age-1 yellow perch in the Cabarton Bay, Boulder Creek arm, and Lake Fork Creek arm net pens respectively on June 18, 2000. The fish averaged 79 mm in total length.

Yellow perch mortalities were observed in the Cabarton Bay net pen within the first week. The pen was being spun and twisted as the attached barge was moved around by wind, which probably caused the mortalities. On July 3, 2000 the net pen was removed from the barge and moved to the bay just north of the Cabarton Bay boat ramp. There were 10 fish remaining alive in the pen when it was moved. One additional fish had died when the pen was checked on July 10, 2000. On August 3, 2000 we discovered the Cabarton Bay pen had been vandalized by someone leaving the zipper open. Only three fish remained. We lost one more fish by August 21, 2000. No more fish were lost through the release date of November 11, 2000. The two remaining fish were 96 mm and 100 mm in total length.

We had no mortalities in the Boulder Creek arm net pen until July 24, 2000. Between July 24, 2000 and August 7, 2000 we had eight mortalities. Water in the small bay where the pen was located had become quite stagnant and fish appeared to be in poor condition. We moved the pen on August 7, 2000 into the main Boulder Creek channel where wind waves and currents could help circulate water and food through the pen. As water levels dropped through the summer and fall months the net pen was moved to depths great enough to float the entire pen. We had no additional mortalities through the release date. The seven remaining Boulder Creek arm fish averaged 93 mm in total length when released.

The Lake Fork arm net pen was secured to a boat dock on the west side of the bay. This location was unprotected from wind waves and currents and therefore did not have water circulation problems. As water levels dropped through the summer and fall months the net pen was moved to depths great enough to float the entire pen. We had no mortalities in this pen during the entire five months of the study. The ten yellow perch averaged 108 mm in total length when released on November 11, 2000.

Northern Pikeminnow Stomach Analysis

We set four gill nets daily from August 10 through August 16, 2000. We collected a total of 106 northern pikeminnow from which 101 stomachs were examined for yellow perch remains. We found yellow perch remains in two stomachs. Northern pikeminnow averaged 412 mm in total length and 741 g.

Yellow Perch Population Estimate

The average catch of yellow perch per trawl transect in October 1999 was 23 (Janssen et al. 2001). We found 97.7% of the yellow perch in October 1999 to be age-0 (50-100 mm). The remaining 2.3% were 120-170 mm, age-1 yellow perch. The average weight of yellow perch collected was 2.65 g. Therefore, the population estimate was 1,607,116 yellow perch or 4,258,857 g.

Northern Pikeminnow Population Estimates

The northern pikeminnow population was estimated to be 24,000 and 240,000 in June and August respectively (Teuscher 2001). The August estimate did not include any fish in the bottom six feet of the reservoir where gill net sampling indicated that approximately one-half of the northern pikeminnow population was located. We did not sample any of the bays or sections with heavy weed cover. Therefore, we believe our August population estimate was a conservative 500,000 northern pikeminnow. Teuscher (2001) presents an in-depth report of the Cascade Reservoir fish population estimates.

Bioenergetics Modeling

The bioenergetics model revealed that one northern pikeminnow with either a 1% or 10% yellow perch diet would consume 24.8 g or 239.7 g of yellow perch in the 483 days. Using the average weight of 2.65 g per yellow perch in the lake in October 1999 and a 1% and 10% yellow perch diet, this equates to an estimated 12,400,000 g and 119,850,000 g of yellow perch consumed by 500,000 northern pikeminnow in 483 days or 4,679,000 and 45,226,000 yellow perch.

Yellow Perch Monitoring

We completed 74 trawling transects in 2001, pulling the trawl for 370 minutes and collecting 737 yellow perch. We averaged 2.7, 4.2 and 23.5 yellow perch per five-minute transect in June, August and October respectively. Trawling transect locations utilized in 2000 were established in 1998 and 1999 and are presented in Janssen et al. 2001. Catch rates in June were very low and dominated by age-1 yellow perch. Age-0 yellow perch dominated trawl catches in August and October 2000 (Figures 2, 3 and 4). As in the past two years age-1 yellow perch (1999 cohort) had virtually disappeared by the August trawling sample.

Yellow perch catch rates were highest in October (23.5/transect), and all but 27 were aged as age-0. We collected more fish in the north and south sections in October than in the other areas and months sampled. However, due to large variability in catch per trawl transect, none of the values were significantly different (95% CI) (Table 1). Catches per trawl transect were widely variable in all months and areas. Trawling in the north area was difficult due to the large number of submerged stumps and resulted in fewer transects being completed.

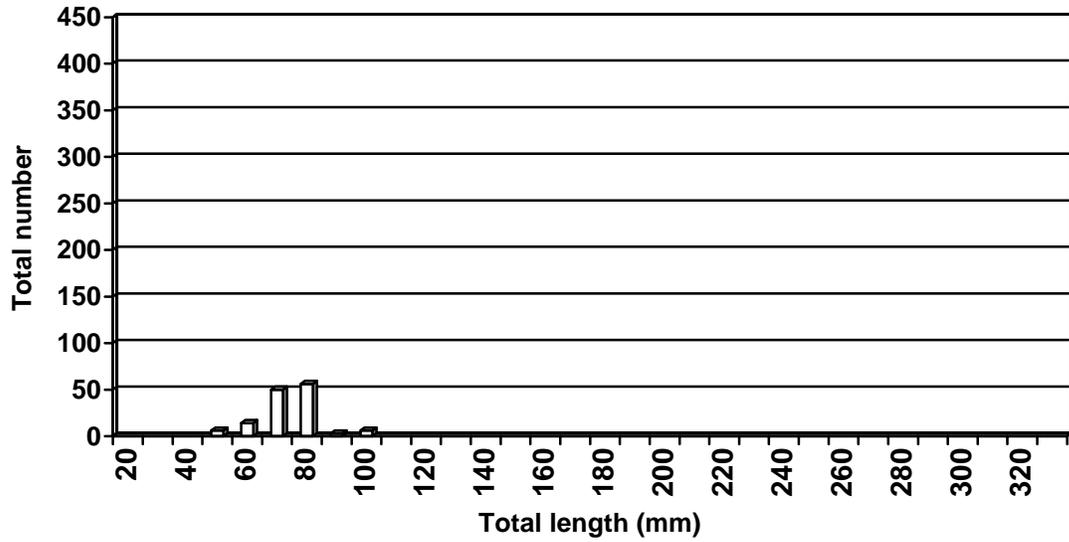


Figure 2. Length frequencies (CPUE) of yellow perch collected with a bottom trawl from Cascade Reservoir in June 2000.

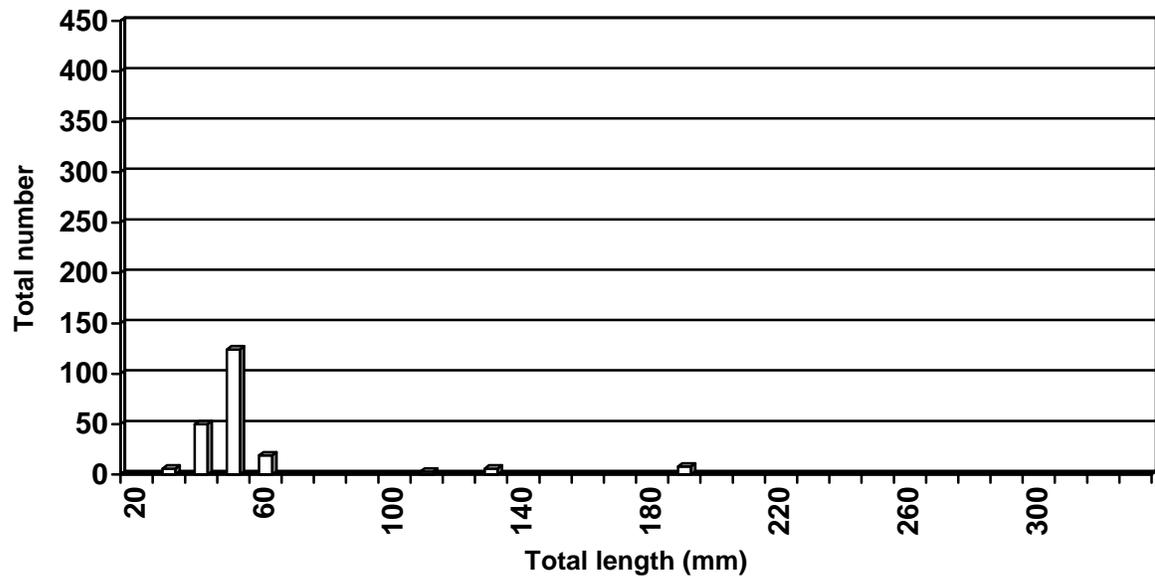


Figure 3. Length frequencies (CPUE) of yellow perch collected with a bottom trawl from Cascade Reservoir in August 2000.

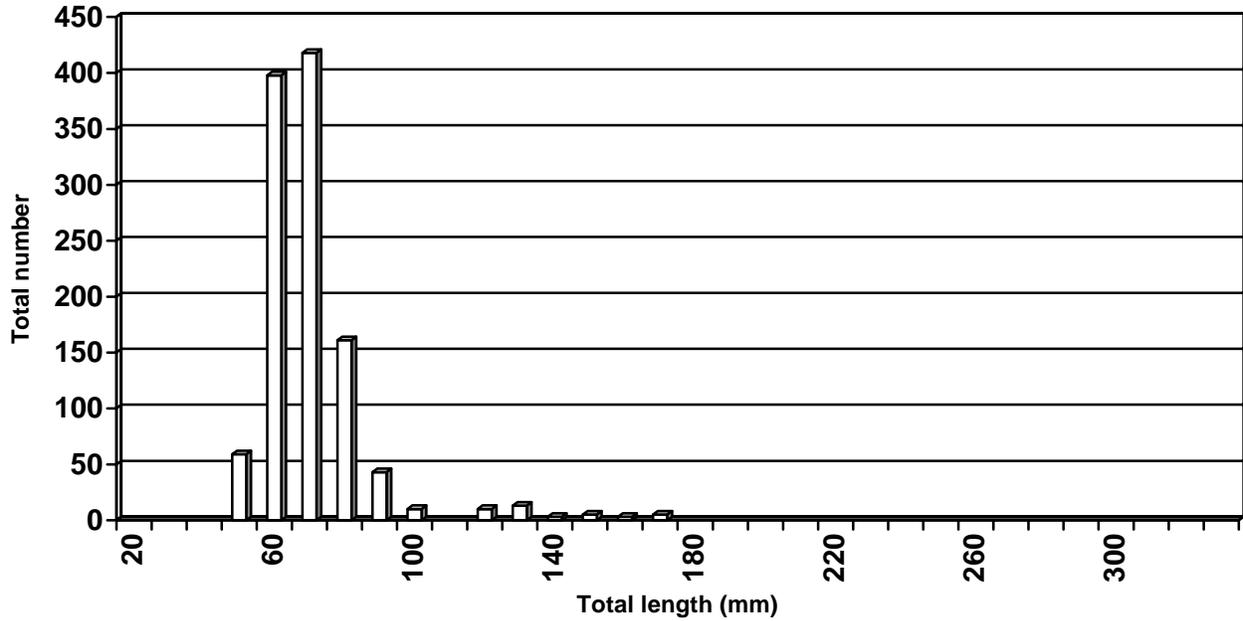


Figure 4. Length frequencies (CPUE) of yellow perch collected with a bottom trawl from Cascade Reservoir in October 2000.

Table 1. Total and mean catch of yellow perch with 95% confidence intervals by area in June, August and October 2000.

Sample month	Area							
	South		East		West		North	
	N	Average catch (+/-95% CI)	N	Average catch (+/-95% CI)	N	Average catch (+/-95% CI)	N	Average catch (+/-95% CI)
June	63	9.0 (21.0)	4	0.57 (0.91)	0	0	0	0
August	68	9.7 (20.2)	9	1.30 (1.30)	3	0.43 (1.05)	25	6.25 (10.5)
October	61	8.7 (9.05)	216	30.90 (31.9)	104	14.90 (14.6)	184	74.70 (150.7)

DISCUSSION

Studies completed in 2000 indicated that predation on yellow perch by northern pikeminnow is preventing the recovery of the yellow perch population. The few remaining adult yellow perch in 1998-2000 produced consistent age classes each year. Age-0 yellow perch growth has improved from 1998 through 2000. Total lengths averaged 56.5 mm, 61 mm, and 74 mm in 1998, 1999 and 2000 respectively in early June of their second year. Griswold (1989) reported average total lengths at the first scale annulus of 70 mm in both 1986 and 1987. The number of age-0 yellow perch in 1998 and 1999 slowly declined until virtually all were gone by August of their second year.

We saw mortality rates of age-1 yellow perch much lower in predator-excluding net pens than rates found in the open reservoir with the majority of fish surviving until released in October. Bioenergetics modeling also indicated the numbers of northern pikeminnow present in the lake could easily consume all yellow perch produced in a given year.

Pikeminnow predation, disease or possibly both, resulted in serious reductions in yellow perch numbers in the early to mid-1990s. Reservoir water level fluctuations, entrainment, water quality, food abundance and disease were examined and excluded as the probable causes of the continued decline (Janssen et al. 2001; In Press).

Studies suggested that the recovery of the yellow perch population was dependent on the significant reduction in predation pressure by northern pikeminnow. Historical data in the 1950s to the early 1970s indicated that significant reductions in the northern pikeminnow spawning population resulted in large improvements in angler catch rates for yellow perch in subsequent years (Figure 2).

RECOMMENDATIONS

Studies indicate that the recovery of the yellow perch population in Cascade Reservoir is dependent on the reduction of predation by adult northern pikeminnow. Therefore, efforts should be initiated to significantly reduce the adult northern pikeminnow population size. Yellow perch population monitoring should continue via the trawl sampling established in 1998 and 1999. This would enable us to evaluate the impacts of any northern pikeminnow removal efforts on the yellow perch population. Adult northern pikeminnow population estimate work should be continued to again determine impacts of any northern pikeminnow removal efforts.

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2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-25

Project I: Surveys and Inventories

Subproject I-C: Southwest Region (McCall)

Job: c

Title: Rivers and Streams Investigations

Contract Period: July 1, 2000 to June 30, 2001

ABSTRACT

The 2000 kokanee *Oncorhynchus nerka kennerlyi* spawning run in the North Fork Payette River above Payette Lake was estimated to be 26,850 fish with a total biomass of 5,061kg.

We completed standard Department stream surveys on 12 streams in the upper stretches and headwaters of the Little Salmon River. We collected salmonids in all streams sampled including rainbow trout *O. mykiss* and brook trout *Salvelinus fontinalis*. We also collected an unidentified subspecies of cutthroat trout *O. clarki* from Trail Creek.

Authors:

Paul Janssen
Regional Fishery Biologist

Kim Apperson
Regional Fishery Biologist

OBJECTIVE

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

INTRODUCTION

North Fork Payette River above Payette Lake

The spawning run of kokanee *Oncorhynchus nerka kennerlyi* in the North Fork Payette River (NFPR) from Payette Lake has been enumerated since 1988 to assess spawning escapement and to serve as a method of validating kokanee population/density estimates and survival estimates from in-lake population work (Janssen et al. In Press). This estimate was completed again in 2000.

Upper Little Salmon River Tributaries

We completed Department standard stream surveys on the headwaters and several tributaries of the Little Salmon River to document habitat conditions and fish species presence.

METHODS

North Fork Payette River above Payette Lake

We completed kokanee spawner counts by walking the entire stretch of river utilized by spawning kokanee and by counting all live spawners. The total spawning run estimate was made by multiplying the largest daily count by 1.73 (Frost and Bennett 1994).

Upper Little Salmon River Tributaries

We used the Department's standard stream survey methodology to complete the surveys. Transect location maps for each stream are presented in Figures 1 and 2. We made one pass with a backpack electroshocker to collect all fish. Fish collected were identified and total length measured to the nearest mm. We placed digital temperature recorders in Mud Creek and in the upper Little Salmon River to monitor summer temperatures. Locations of temperature recorders are presented in Figures 1 and 2.

RESULTS

North Fork Payette River above Payette Lake

Kokanee spawners were counted a total of five times from September 6 through September 27, 2000. The peak count of 15,520 live fish was made on September 15, 2000 (Table 1). The total spawning run estimate was 26,850 fish. Average fork length of post-spawned fish was 277 mm and 266 mm for males and females. The average weight of mature, green fish was 188.5 g (males 206 g, females 171 g).

Table 1. Estimated total kokanee spawning run size and biomass from 1988 through 2000 from Payette Lake (1,715 ha usable kokanee depth (>12 m)).

Year	Peak count	Estimated # spawners	Kg/ha	Number/ha	Average weight (g)
1988	13,200	22,800	4.6	13.3	346
1989	8,400	14,500	2.9	8.4	349
1990	9,642	16,700	3.5	9.7	358
1991	10,400	18,000	5.3	10.5	505
1992	16,945	29,300	6.4	17.1	377
1993	34,994	59,310 ^a	8.5	34.6	245
1994	25,550	44,200	5.5	25.8	214 ^b
1995	32,050	55,450	4.8	32.3	147
1996	35,090	60,707	5.7	35.4	162 ^c
1997	36,300	64,891 ^d	5.6	37.8	148
1998	14,585	25,232	2.1	14.7	143
1999	15,590	26,971	2.9	15.7	184
2000	15,520	26,850	2.9	15.6	188.5

^a Estimate made from stream and weir counts (Frost and Bennett 1994).

^b From gill net data of captured spawners in Payette Lake during lake survey.

^c From trawling collections made in September 1996.

^d Includes 2,092 females trapped and spawned by Nampa Fish Hatchery.

Upper Little Salmon River Tributaries

We surveyed 12 streams in the upper Little Salmon River drainage: Big Creek, Brown's Creek, Four Mile Creek, Little Goose Creek, Little Salmon River (LSR), West Fork of LSR, Mud Creek, Little Mud Creek, Six Mile Creek, Three Mile Creek, Trail Creek, and Vick Creek. Two transects were surveyed on both the Little Salmon River and Mud Creek. Maps of transect locations are given in Figures 1 and 2. Habitat data is presented in Appendices A-N.

We found salmonids in all streams surveyed, collecting only brook trout *Salvelinus fontinalis* from Big Creek, Brown's Creek and Mud Creek (Table 2). We collected only rainbow trout *Oncorhynchus mykiss*

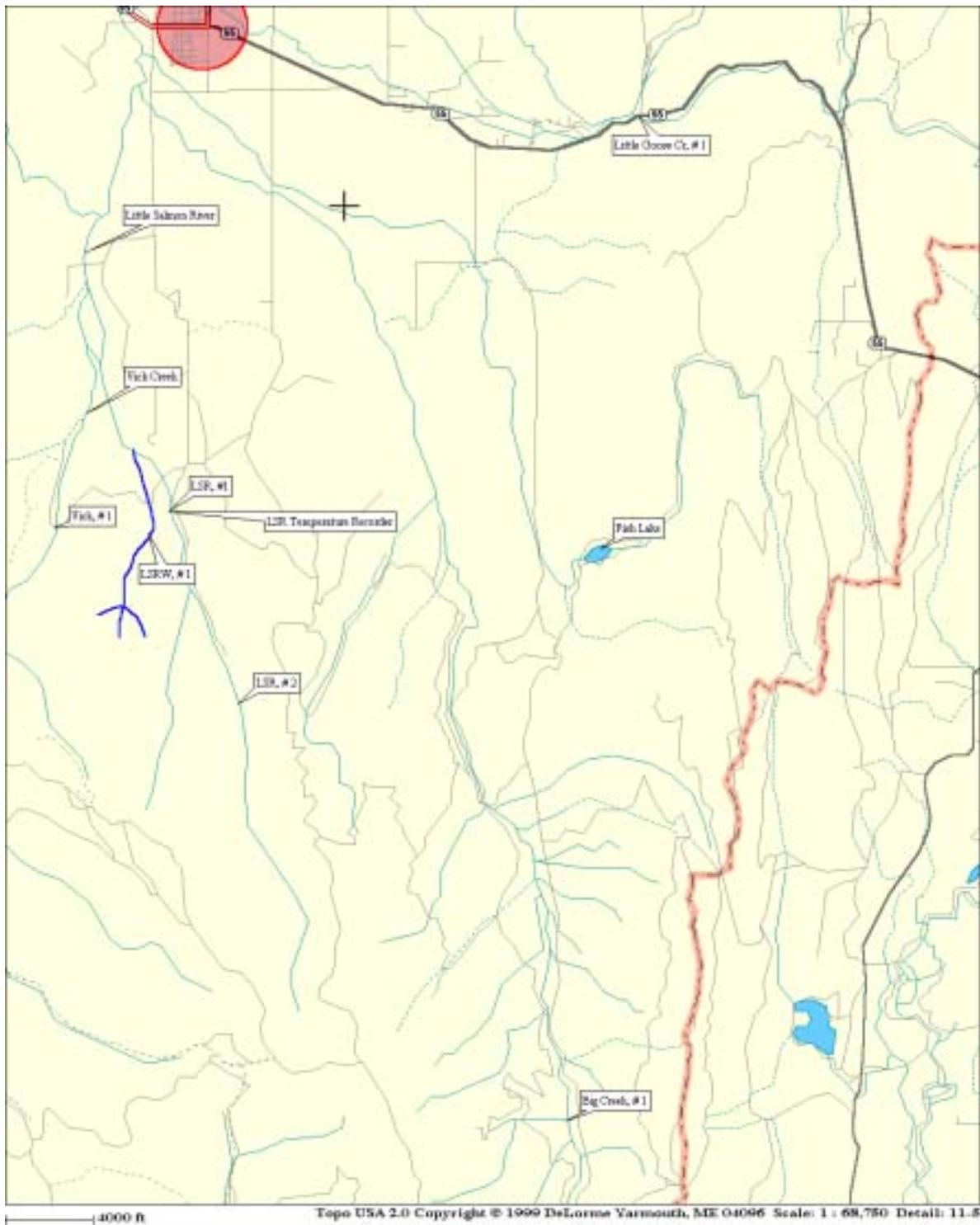


Figure 1. Little Salmon River drainage, stream survey location map (south of New Meadows).

Table 2. Length frequencies of rainbow trout (RBT), cutthroat trout (CTT), and brook trout (BRK) collected from streams surveyed in 2000.

Stream	Species	Number of fish collected per length group (mm)																					
		30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	110-119	120-129	130-139	140-149	150-159	160-169	170-179	180-189	190-199	200-209	210-219	220-229	230-239	240-249
Big Creek	BRK		2	5	2			3	2	2	2		2		1	1	1						
Brown's Creek	BRK					2	13	3	1	1	1	5	5		2	2							
Four Mile Creek	RBT								2	1			1	1									
Little Goose Creek	RBT		2	2		1	3	2	3		5	1	2	4	1	2	2	2			2		
Little Salmon River #1 (LSR #1)	RBT	4	22	10	1	1	1	2	1	1		1		1									
	RBT		2		4	2	1		1	1		2		1	1	1		1					
LSR #2	BRK																			1			
	RBT																			1			
LSR West	BRK				4		1				1												
Little Mud Creek	RBT								1														
	BRK		5	11	4			1	4	2	5	1			1	1	1	1	1	1			
Mud Creek	BRK			1																			
Upper Mud Creek	BRK		25	9		1			4	1	1	1	6	3	1		1						
Six Mile Creek	RBT								3	4	2		1	3	3	1	1	2					
	BRK							1	2				1	2			1						1
Three Mile Creek	RBT					1	1		2		1		1			2		1			2	1	1
Trail Creek	CTT			4	3	1	1	1	3		1	1		1									
Vick Creek	RBT					2	2	5	3	1	1	1		1		2	1	1		1			
	BRK			7	2																		

from Four Mile Creek, Little Goose Creek, Three mile Creek, and the lowest Little Salmon River transect. Trail Creek contained only westslope cutthroat trout *O. clarki lewisi*, and we collected both rainbow trout and brook trout from the remainder of the survey sites. Numerous nongame fish species were also collected including Paiute sculpin *Cottus beldingi*, speckled dace *Rhinichthys osculus* and longnose sucker *Catostomus catostomus*.

Daily average temperatures in Mud Creek and the upper Little Salmon River averaged less than 23°C and 18°C, respectively, for the entire summer (Figures 3 and 4).

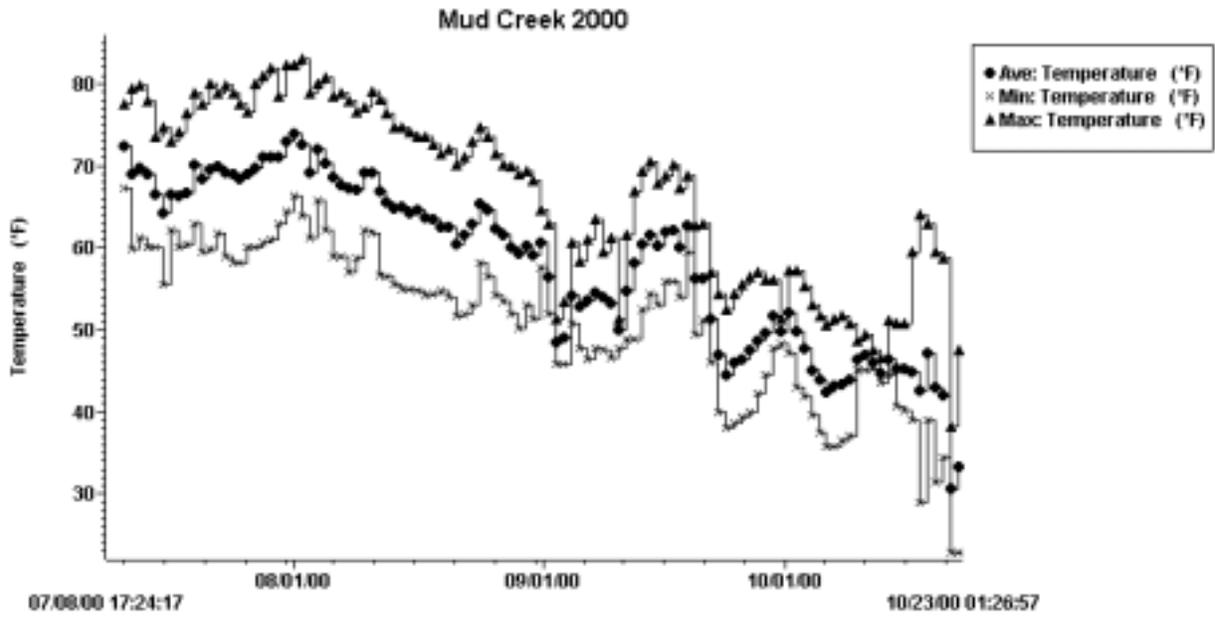


Figure 3. Maximum, minimum and average daily temperatures measured on Mud Creek in the upper Little Salmon River drainage.

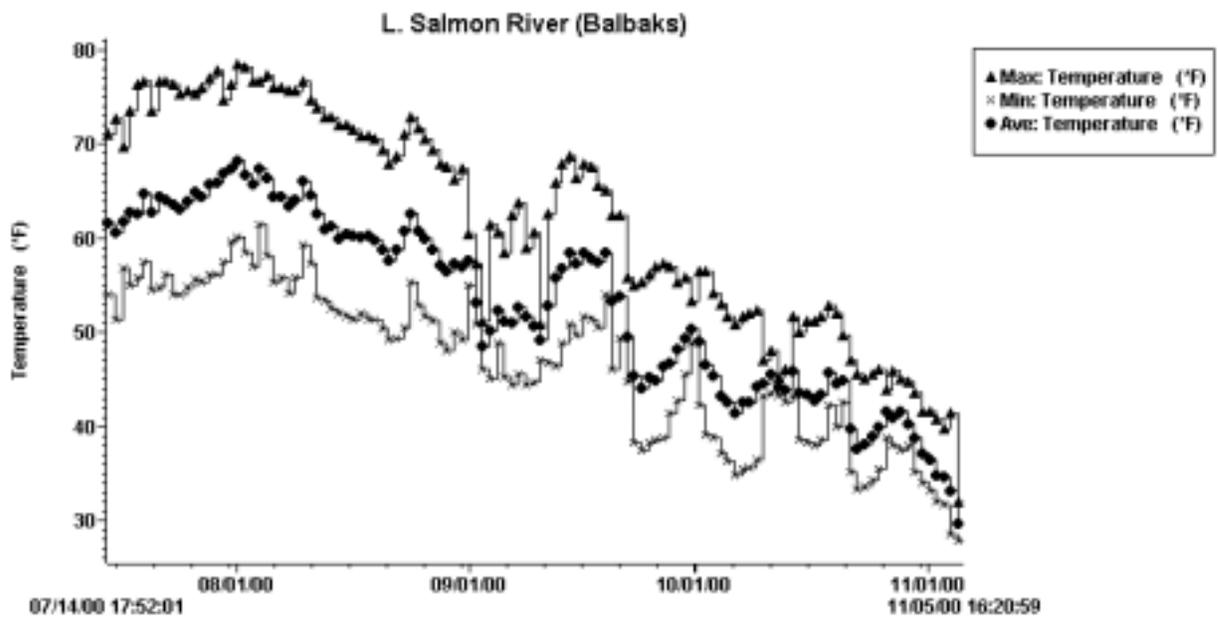


Figure 4. Maximum, minimum and average daily temperatures measured on the upper Little Salmon River.

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APPENDICES

Appendix A. Big Creek stream survey form.

FISH SURVEY DATA

Stream Big Creek Date - 8/8/00

Survey Crew - LH, BK, CE, CO

Agency: - Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R -4, R -5, R -6, R -7

Stratum

Transect - Big Creek # 1

Channel Type: B, C, Other

Section Type: Evaluation Monitoring

Quad Map - No Business Mountain

UTM x/y - 561871E / 4964595N

EPA Reach # - 17060210-019

Length - 90 m

Transect Widths - 3.8 m, 1.6 m, 4.6 m, 1.8 m

H₂O Temp - 15°C Time - 14:45 Mean Width - 3.0 m

Conductivity

umHOS

Transect Area - 270 m²

Corridor Visibility

m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofish
Other

Habitat Type: Pool, Riffle, Run/Glide, Pocket Water
14.1 m³

Appendix A. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Big Creek DATE - 8/08/00 COLLECTORS - LH, BK, CO, CE
 EPA REACH - 17060210-019 LENGTH - 90 m STRATUM

TRANSECT - Big Creek, #1 GRADIENT % / VERTICAL DROP - 1.9% / 1.7 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 5.9% Riffle %Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.)

67

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area					
					Sand	Gravel	Rubble	Boulder	Bedrock	
0	3.8	1/4	0.06	0.32		40	60			
		1/2	0.09			10	90			
		3/4	0.01				100			
15	1.6	1/4	0.10			30	70			
		1/2	0.06				100			
		3/4	0.06				100			
45	4.6	1/4	0.07				100			
		1/2	0.12			10	90			
		3/4	0.06			80	20			
75	1.8	1/4	0.09				30	70		
		1/2	0.12				30	70		
		3/4	0.12				30	70		

Appendix A. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Big Creek Date - 08/08/00
EPA Reach Number - 17060210-019 IDFG Region - 3 M
Survey Crew - LH, BK, CO, CE Transect Number - Big Creek, # 1
Transect location - Site located below open tallis slope. 300 ft. starting at briad and continuing until bushes below small log jam.

Map Reference - No Business Mountain Quad, Almost to the "Dike"

Vehicle Access - Road along Big Creek, 4.7 miles from Fish Lake Rd. intersection.

Photo Point - No pictures taken.

Comments -

Appendix B. Browns Creek stream survey form.

FISH SURVEY DATA

Stream - Browns Creek Date - 08/08/00 Survey Crew - DB, LO, KB

Agency: Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R -4, R -5, R -6, R -7

Stratum Transect - Browns Cr., # 1

Channel Type: B, C, Other Section Type: Evaluation Monitoring

Quad Map - Brundage Mountain UTM x/y - 560150E / 4996000N

EPA Reach # - 17060210-028

Length - 76.7 m Transect Widths - 4.2 m, 8.1 m, 3.0 m, 3.5 m

H₂O Temp - 14°C Time - 1400 Mean Width - 360.5 m

Conductivity - 20 umHOS Transect Area - 360.5 m²

Corridor Visibility m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofish
Other

Habitat Type: Pool, Riffle, Run/Glide, Pocket Water
m²

Appendix B. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Browns Creek DATE - 08/08/00 COLLECTORS - DB, LO, KB

EPA REACH - 17060210-028 LENGTH - 76.7 m STRATUM

TRANSECT - Browns Creek, # 1 GRADIENT % / VERTICAL DROP - 0.66% / 0.51 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 70% Riffle - 30% Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) - Very stable banks, ferns and dogwood. 30% overhead cover of spruce. Several deep pools and log jams.

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	4.2	1/4	0.12	0.24	20	5	75		
		1/2	0.18		20		80		
		3/4	0.12		100				
22	8.1	1/4	0.12			10		90	
		1/2	0.06			10		90	
		3/4	0.15		40	5	55		
44	3.0	1/4	0.09		5	10	75	10	
		1/2	0.18			5	95		
		3/4	0.30					100	
76.7	3.5	1/4	0.51	10			90		
		1/2	0.43	80		20			
		3/4	0.48		5		95		

Appendix B. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Browns Creek Date - 08/08/00
EPA Reach Number - 17060210-028 IDFG Region - 3M
Survey Crew - DB, LO, KB Transect Number - Browns Cr., # 1
Transect location - Begin just off trail at log jam. End at log crossing creek at chest height.

Map Reference

Vehicle Access - Take Forest Rd. 294 to end of road. Ends at Hard Creek Trailhead. Walk down to the creek.

Photo Point - Bottom looking downstream to start. Top looking upstream to finish.

Comments - Checked both upper forks. Found only brook trout, no sculpin or dace.

Appendix C. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Four Mile Creek DATE - 08/08/00 COLLECTORS - KB, DB, LO
 EPA REACH - 17060210-012 LENGTH - 28 m STRATUM

TRANSECT - Four Mile Creek, # 1 GRADIENT % / VERTICAL DROP - 4.7% 1.32 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool % Riffle - 75% Run/Glide % Pocket Water - 25%

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) - Banks unstable with little veg. Evidence of cattle, diversion just downstream of site. 50% overhead canopy of Douglas fir.

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth	Volume (cms)	Percent substrate class by area					
					Sand	Gravel	Rubble	Boulder	Bedrock	
0	0.9	1/4	0.07	0.11	5	20	75			
		1/2	0.07			80	20			
		3/4	0.03		20	80				
8	1.0	1/4	0.07				20	80		
		1/2	0.09		10			90		
		3/4	0.03		20	10	70			
17	1.45	1/4	0.10		5	10	85			
		1/2	0.06				50	50		
		3/4	0.04		5	15	85			
28	1.95	1/4	0.09	5	10	85				
		1/2	0.12	30	5	65				
		3/4	0.03	5	5	90				

Appendix C. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Four Mile Creek Date - 08/08/00
EPA Reach Number - 17060210-012 IDFG Region - 3M
Survey Crew - DB, KB, LO Transect Number - Four Mile, # 1
Transect location - Walk along fence to creek. Start just above diversion, continue to plunge pool.

Map Reference -

Vehicle Access - Right on Cemetary Rd in Meadows. Right on Wallace Rd to forest boundary. Cross four mile creek (steep and brushy). Continue on road just past gate, turn on Forest Road 720 on left. Cross creek park at private property marker,

Photo Point - Diversion culvert at bottom and looking upstream from culvert.

Comments -

Appendix D. Little Goose Creek stream survey form.

FISH SURVEY DATA

Stream - Little Goose Creek Date - 08/09/00 Survey Crew - LH, DB

Agency: - Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R -4, R -5, R -6, R -7

Stratum - Transect - Little Goose Creek, # 1

Channel Type: B, C, Other Section Type: Evaluation Monitoring

Quad Map - Meadows UTM x/y - E 562715 / N 4978609

EPA Reach # - 17060210-020

Length - 68.1 m Transect Widths - 2.75 m, 5.8 m, 4.4 m, 6.6 m

H₂O Temp - 15°C Time - Mean Width - 4.9 m

Conductivity - 80 umHOS Transect Area - 333.69 m²

Corridor Visibility - m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofish
Other

Habitat Type: - Pool, Riffle, Run/Glide, Pocket Water
116.4 m²

Appendix D. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Little Goose Creek DATE - 08/09/00 COLLECTORS - LH, DB
 EPA REACH - 17060210-020 LENGTH - 68.1 m STRATUM -

TRANSECT - Little Goose Cr, # 1 GRADIENT % / VERTICAL DROP - 2.5% / 1.71 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 10.5% Riffle - % Run/Glide - % Pocket Water - %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) - Red Oiser dogwood, alder, fern, and Solomon's Seal comprised most of the vegetation on the banks

76

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	2.75	1/4	0.12	0.21	5		95		
		1/2	0.21		5		5	90	
		3/4	0.18						
22.5	5.80	1/4	0.27		5	60	35		
		1/2	0.12		10		70	20	
		3/4	0.28		20	5	35	40	
45.0	4.40	1/4	0.33		5		85	10	
		1/2	0.07		5		65	30	
		3/4	0.09			10	90		
68.1	6.60	1/4	0.21		5		95		
		1/2	0.19	10		30	60		
		3/4	0.10		30	10	60		

Appendix D. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Little Goose Creek Date - 08/09/00
EPA Reach Number - 17060210-020 IDFG Region - 3M
Survey Crew - LH, DB Transect Number - Little Goose Creek, # 1
Transect location - From culvert to second major plunge pool.

Map Reference - Meadows Quad

Vehicle Access - Last Chance campground turnoff.

Photo Point

Comments

Appendix E. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Little Mud Creek DATE - 07/06/00 COLLECTORS - PJ, LH, DB
 EPA REACH - 17060210-015 LENGTH - 113 m STRATUM -

TRANSECT - Little Mud, # 1 GRADIENT % / VERTICAL DROP - 0.3% 0.33 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 38.6% Riffle %Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) - Open grass meadow, sedge lined, narrow channel, fairly incised. Degraded banks, no overhanging vegetation except sedges.

79

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	2.10	1/4	0.1	0.028	95, silt	5			
		1/2	0.11		50	50			
		3/4	0.04		85, silt	15			
35	3.05	1/4	0.14		100				
		1/2	0.16		100				
		3/4	0.11		100				
70	1.40	1/4	0.26		100				
		1/2	0.27		100				
		3/4	0.10		100				
113	1.40	1/4	0.12	50	50				
		1/2	0.02	100					
		3/4	0.04	30	70				

Appendix E. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Little Mud Creek Date - 07/06/00
EPA Reach Number - 17060210-015 IDFG Region - 3M
Survey Crew - PJ, LH, DB Transect Number - Little Mud, # 1
Transect location - Little Mud Creek Rd. 3 1/2 miles north of highway. Just dpwnstream from
1st crossing ending at confluence of two main forks. (30 yards below road)

Map Reference - Bally Mountain Quad, Little Salmon Drainage

Vehicle Access - Little Mud Creek road from highway 95. Go to first crossing.

Photo Point -

Comments - Heavy grazing, but stable banks lined with sedges.

Appendix F. Little Salmon River, Transect # 1 stream survey form.

FISH SURVEY DATA

Stream - Little Salmon River Date - 08/08/00 Survey Crew - LH, BK, CO,.CE

Agency: - Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R -4, R -5, R -6, R -7

Stratum - Transect - LSR, # 1

Channel Type: B, C, Other Section Type: Evaluation Monitoring

Quad Map - New Meadows UTM x/y - 556296E / 4972841N

EPA Reach # - 17060210-018

Length - 94.9 m Transect Widths - 3.2 m, 2.2 m, 2.3 m, 2.2 m

H₂O Temp - 25°C Time - 1430 Mean Width - 2.5 m

Conductivity - 100 umHOS Transect Area - 237.25 m²

Corridor Visibility - m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofishing
Other

Habitat Type: Pool, Riffle, Run/Glide, Pocket Water
81.3 m²

Appendix F. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Little Salmon River DATE - 08/08/00 COLLECTORS - LH, BK, CO, CE

EPA REACH - 17060210-018 LENGTH - 94.9 m STRATUM -

TRANSECT - LSR, # 1 GRADIENT % / VERTICAL DROP - 1.3% / 1.3 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 38% Riffle %Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.)

83

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	3.2	1/4	0.06	0.028	10		90		
		1/2	0.06		10	20	70		
		3/4	0.04				100		
34.5	2.2	1/4	0.06				50	50	
		1/2	0.12				30	70	
		3/4	0.07		10	30	60		
64.5	2.3	1/4	0.01			10		90	
		1/2	0.13			10		90	
		3/4	0.06					100	
94.9	2.2	1/4	0.01		90		10		
		1/2	0.09		70		30		
		3/4	0.06			40	60		

Appendix F. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Little Salmon River Date - 08/08/00
EPA Reach Number - 17060210-018 IDFG Region - 3M
Survey Crew - LH, BK, CO, CE Transect Number - LSR # 1
Transect location -

Map Reference -

Vehicle Access - South End road from New Meadows. Drive to four corners, take right, turn left after crossing LSR, drive until you can see power lines across creek.

Photo Point - `

Comments -

Appendix G. Little Salmon River, Transect # 2 stream survey form.

FISH SURVEY DATA

Stream - Little Salmon River Date - 08/09/00 Survey Crew - LH, DB

Agency: - Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R - 4, R - 5, R -6, R - 7

Stratum - Transect - LSR # 2

Channel Type: B, C, Other Section Type: Evaluation Monitoring

Quad Map - New Meadows UTM x/y - 557320E / 4969900N

EPA Reach # - 17060210-018

Length - 40.2 m Transect Widths - 3.0 m, 1.4 m, 1.6 m, 1.6 m

H₂O Temp - 15°C Time - 1500 Mean Width - 1.9 m

Conductivity - umHOS Transect Area - 76.4 m²

Corridor Visibility - m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofish
Other

Habitat Type: Pool, Riffle, Run/Glide, Pocket Water
43.2 m²

Appendix G. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Little Salmon River DATE - 08/09/00 COLLECTORS - LH, DB
 EPA REACH - 17060210-018 LENGTH - 40.2 m STRATUM -

TRANSECT - LSR, # 2 GRADIENT % / VERTICAL DROP - 2.8% / 1.1 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 16.8% Riffle %Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) - Mostly closed canopy, pine spruce forest, very little evidence of grazing.

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	1.6	1/4	0.12	0.05	30		60		
		1/2	0.15			100			
		3/4	0.07		20	20	60		
27.0	1.6	1/4	0.03		10	5	85		
		1/2	0.09		5	5	70	20	
		3/4	0.06		10	90			
13.5	1.4	1/4	0.12		10		40	50	
		1/2	0.09		10	50	40		
		3/4	0.15		10	30	20	40	
40.2	3.0	1/4	0.15		70	30			
		1/2	0.12	50	10	40			
		3/4	0.18	20	30	50			

Appendix G. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Little Salmon River Date - 08/09/00
EPA Reach Number - 17060210-018 IDFG Region - 3M
Survey Crew - DB, LH Transect Number - LSR, # 2
Transect location - See GPS location and Vehicle Access

Map Reference - New Meadows Quad

Vehicle Access - Turn onto road on east side of LSR. Follow GPS location, park above, walk down steep open slope.

Photo Point -

Comments -

Appendix H. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - West Fork Little Salmon River DATE - 08/08/00 COLLECTORS - LH, BK, CO, CE

EPA REACH - 17060210-018 LENGTH - 63.4 m STRATUM -

TRANSECT - LSRW, # 1 GRADIENT % / VERTICAL DROP - 2.6% / 1.6 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 6.2% Riffle %Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) -

88

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	2.0	1/4	0.06	.06		80	20		
		1/2	0.06			70	30		
		3/4	0.10			70	30		
30.0	1.5	1/4	0.01			50	50		
		1/2	0.09			70	30		
		3/4	0.07			70	30		
45.0	1.3	1/4	0.15			100			
		1/2	0.15			10	90		
		3/4	0.06			50	50		
63.4	1.3	1/4	0.04		40	40	20		
		1/2	0.18		10	90			
		3/4	0.07		50		50		

Appendix H. Continued.

TRANSECT DESCRIPTION SHEET

Stream - West Fork Little Salmon River Date - 08/08/00
EPA Reach Number - 17060210-018 IDFG Region - 3M
Survey Crew - LH, BK, CO, CE Transect Number - LSRW, # 1
Transect location -

Map Reference -

Vehicle Access - Turn left on road past green gate (cow corral) on road off (headed west)
South end road. Start under power lines. (0.5 miles from main road)

Photo Point -

Comments -

Appendix I. Mud Creek, Transect # 1 stream survey form.

FISH SURVEY DATA

Stream - Mud Creek Date - 08/08/00 Survey Crew - DB, LO, KB

Agency: - Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R -4, R -5, R -6, R -7

Stratum - Transect - Mud Creek, # 1

Channel Type: B, C, Other Section Type: Evaluation Monitoring

Quad Map - New Meadows UTM x/y - 552100E / 4981360N

EPA Reach # - 17060210-014

Length - 114.8 m Transect Widths - 1.85 m, 3.0 m, 2.8 m, 7.3 m

H₂O Temp - °C Time - 1545 Mean Width - 3.74 m

Conductivity - 120 umHOS Transect Area - 429.4 m²

Corridor Visibility - m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofish
Other

Habitat Type: Pool, Riffle, Run/Glide, Pocket Water
m²

Appendix I. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Mud Creek DATE - 08/08/00 COLLECTORS - KB, LO, DB
 EPA REACH - 17060210-014 LENGTH - 114.8 m STRATUM -

TRANSECT - Mud Creek, # 1 GRADIENT % / VERTICAL DROP - 0.3% 0.3 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 50% Riffle %Run/Glide - 50% Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) - Live mussels, no veg on banks, very eroded by cattle. No overhead cover. Sagebrush and grass above cut banks. Chubs were sampled.

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	1.85	1/4	0.2	0.36	50, veg	50			
		1/2	0.2			100			
		3/4	0.2		5	95			
18.0	3.0	1/4	1.0		70	30			
		1/2	1.2		50, silt	50			
		3/4	0.9		50	50			
47.0	2.8	1/4	0.4		50	50			
		1/2	0.7		25	75			
		3/4	0.5		20	80			
114.8	7.3	1/4	1.1	50, silt	50				
		1/2	0.9	50, silt	50				
		3/4	0.8	100					

Appendix I. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Mud Creek Date - 08/08/00
EPA Reach Number - 17060210-014 IDFG Region - 3M
Survey Crew - DB, LO, KB Transect Number - Mud Creek, # 1
Transect location - 2 miles south of Little Mud Creek road, turn off on 1st left . Top is 1st
bridge, 0.8 miles from Hwy.

Map Reference - New Meadows Quad,

Vehicle Access - See transect location

Photo Point - Top and bottom of transect

Comments -

Appendix J. Mud Creek, Transect # 2 stream survey form.

FISH SURVEY DATA

Stream - Mud Creek Date - 07/25/00 Survey Crew - LH, DB

Agency: - Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R -4, R -5, R -6, R -7

Stratum - Transect - Mud Creek, # 2

Channel Type: B, C, Other Section Type: Evaluation Monitoring

Quad Map - Railroad Saddle UTM x/y - 547702E / 4995201N

EPA Reach # - 17060210-016

Length - 114.3 m Transect Widths - 2.5 m, 1.5 m, 1.3 m, 1.2 m

H₂O Temp - 16°C Time - 1400 Mean Width - 1.6 m

Conductivity - 60 umHOS Transect Area - 184 m²

Corridor Visibility - m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofish
Other

Habitat Type: Pool, Riffle, Run/Glide, Pocket Water
83.6 m²

Appendix J. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Mud Creek DATE - 07/25/00 COLLECTORS - LH, DB
 EPA REACH - 17060210-016 LENGTH - 114.3 m STRATUM -

TRANSECT - Mud Creek, # 2 GRADIENT % / VERTICAL DROP - 5.8% 6.6 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 13.6% Riffle %Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) - Ponderosa cover (50%). Very stable banks, brushy and lots of debris in river.

94

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	2.5	1/4	0.09	0.025		15	85		
		1/2	0.09			85	15		
		3/4	0.06		5	20	75		
39.0	1.5	1/4	0.09			10	90		
		1/2	0.12		5	5	90		
		3/4	0.09		30	60	10		
78.0	1.3	1/4	0.09			10	90		
		1/2	0.06			20	80		
		3/4	0.06		20	10	70		
114.3	1.2	1/4	0.09		60	40			
		1/2	0.09		5	95			
		3/4	0.04		100				

Appendix J. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Mud Creek Date - 07/25/00
EPA Reach Number - 17060210-016 IDFG Region - 3M
Survey Crew - LH, DB Transect Number - Mud Creek, # 2
Transect location - See vehicle access and GPS location.

Map Reference - Railroad Saddle Quad

Vehicle Access - Turn on Mud Creek Rd just past New Meadows. Take road 100. Just past where it crosses the creek take the right fork up 2 miles. You will be on the right side of the creek.

Photo Point - Bottom of transect.

Comments -

Appendix K. Six Mile Creek stream survey form.

FISH SURVEY DATA

Stream - Six Mile Creek Date - 08/08/00 Survey Crew - DB, KB, LO

Agency: - Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R -4, R -5, R -6, R -7

Stratum - Transect - 6 Mille Cr, # 1

Channel Type: B, C, Other Section Type: Evaluation Monitoring

Quad Map - Bally Mountain UTM x/y - 558957E / 4987830N

EPA Reach # - 17060210-025

Length - 79.4 m Transect Widths - 4.6 m, 3.7 m, 3.9 m, 5.2 m

H₂O Temp - 12.5°C Time - 1300 Mean Width - 4.35 m

Conductivity - 40 umHOS Transect Area - 345.4 m²

Corridor Visibility - m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofish
Other

Habitat Type: Pool, Riffle, Run/Glide, Pocket Water
m²

Appendix K. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Six Mile Creek DATE - 08/08/00 COLLECTORS - KB, LO, DB
 EPA REACH - 17060210-025 LENGTH - 79.4 m STRATUM -

TRANSECT - 6 Mile Cr., # 1 GRADIENT % / VERTICAL DROP - 3.1% 2.46 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 50% Riffle 50% Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) Fairly stable banks, 50% cover overhead of alder, dogwood, douglas fir, spruce and grand fir. Brushy deadfall in creek.

97

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	4.6	1/4	0.09	0.02		5	55	40	
		1/2	0.06		5	5		90	
		3/4	0.07				100		
15.0	3.7	1/4	0.13		5	5	90		
		1/2	0.20		10	5	85		
		3/4	0.09			5	10	85	
32.0	3.9	1/4	0.33		10			90	
		1/2	0.33		5		25	70	.30
		3/4	0.30		5	75	20		
79.4	5.2	1/4	0.26		70	10	10	10	
		1/2	0.03					100	
		3/4	0.15			5	95		

Appendix K. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Six Mile Creek Date - 08/08/00
EPA Reach Number - 17060210-025 IDFG Region - 3M
Survey Crew - KB, DB, LO Transect Number - 6 Mile Cr, # 1
Transect location - See vehicle access and GPS location

Map Reference - Circle C Ranch

Vehicle Access - Turn right off Highway 95 across from road to Zim's Hot Springs. Turn left at Circle C ranch cross Six Mile Creek take 1st road on left. Park at 1st pull out , walk to creek.

Photo Point - Top and Bottom of transect

Comments -

Appendix L. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Three Mile Creek DATE - 08/09/00 COLLECTORS - LH, DB
 EPA REACH - 17060210-012 LENGTH - 66.6 m STRATUM -

TRANSECT - 3 mile Cr, # 1 GRADIENT % / VERTICAL DROP - 3.9% 2.58 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 8.7% Riffle %Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) - 75% closed canopy, spruce fir and alders, banks eroded.

100

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	4.6	1/4	0.09	0.11	20		80		
		1/2	0.15		60		40		
		3/4	0.10		25	25	50		
22.5	2.2	1/4	0.15		30		70		
		1/2	0.13		10		90		
		3/4	0.16		10		90		
45.0	1.1	1/4	0.09		5	5	90		
		1/2	0.21			50	50		
		3/4	0.16		10	20	70		
66.6	3.1	1/4	0.21	5		95			
		1/2	0.13	5	5	90			
		3/4	0.13		5	95			

Appendix L. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Three Mile Creek Date - 08/09/00
EPA Reach Number - 17060210-012 IDFG Region - 3M
Survey Crew - LH, DB Transect Number - 3 Mile Cr., # 1
Transect location - At end of circle, an old road to the east leads to a forest service gate. Go through the gate and cut down to creek. Start at cattle crossing area, continue to deep plunge pool.

Map Reference -

Vehicle Access - In Meadows turn right on Cemetary Road to Wallace Rd. Turn right, drive to Shadow Pine Circle turn right drive into Timber Ridge Subdivision.

Photo Point -

Comments -

Appendix M. Trail Creek stream survey form.

FISH SURVEY DATA

Stream - Trail Creek Date - 07/11/00 Survey Crew - PJ, LH, DB

Agency: - Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R - 4, R - 5, R -6, R - 7

Stratum - Transect - Trail Creek, # 1

Channel Type: B, C, Other Section Type: Evaluation Monitoring

Quad Map - Indian Mountain UTM x/y - 533400E / 5002462N

EPA Reach # - 17060210-010

Length - 59.4 m Transect Widths - 2.1 m, 2.3 m, 2.5 m, 2.3 m

H₂O Temp - 12°C Time - 1445 Mean Width - 2.3 m

Conductivity - 70 umHOS Transect Area - 136.6 m²

Corridor Visibility - m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofish
Other

Habitat Type: Pool, Riffle, Run/Glide, Pocket Water
7.1 m²

Appendix M. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Trail Creek DATE - 07/11/00 COLLECTORS - PJ, LH, DB
 EPA REACH - 17060210-010 LENGTH - 59.4 m STRATUM -

TRANSECT - Trail Creek, # 1 GRADIENT % / VERTICAL DROP - 3.3% 1.98 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 5.2% Riffle %Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.) - Very stable banks, 50% cover, lots of debrs and log jams, ferns grasses, river birch, partial canopy of grand fir, Douglas fir and Ponderosa pine.

103

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
5.7	2.1	1/4	0.05	0.07	95	5			
		1/2	0.09		95		5		
		3/4	0.03		100				
25.5	2.3	1/4	0.12		95	5			
		1/2	0.15		100				
		3/4	0.13		70	30			
45.3	2.5	1/4	0.09		5	85	10		
		1/2	0.05		5	10	85		
		3/4	0.06		40	60			
59.4	2.3	1/4	0.11	30	10	60			
		1/2	0.17	50	30	20			
		3/4	0.07	5	20	75			

Appendix M. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Trail Creek Date - 07/11/00
EPA Reach Number - 17060210-010 IDFG Region - 3M
Survey Crew - PJ, LH, DB Transect Number - Trail Creek, # 1
Transect location - 0.7 Miles from BLM gate. North on 4WD road off 074.

Map Reference - Indian Mountain Quad

Vehicle Access - Go on Forest Rd. 074 past Round Valley Creek. Take Brush Creek turn off on right. Go 2.3 miles north staying on main road.

Photo Point - Top and bottom of transect

Comments -

Appendix N. Vick Creek stream survey form.

FISH SURVEY DATA

Stream - Vick Creek Date - 08/08/00 Survey Crew - LH, BK, CO, CE

Agency: - Idaho Department of Fish and Game

IDFG Region: R -1, R -2, R -3, R - M, R - 4, R - 5, R -6, R - 7

Stratum - Transect - Vick Cr., # 1

Channel Type: B, C, Other Section Type: Evaluation Monitoring

Quad Map - New Meadows UTM x/y - 554677E / 4973198N

EPA Reach # - 17060210-018

Length - 88.1 m Transect Widths - 1.3 m, 2.4 m, 1.4 m, 1.6 m

H₂O Temp - 21°C Time - 1405 Mean Width - 1.7 m

Conductivity - 000 umHOS Transect Area - 149.8 m²

Corridor Visibility - m

Methods: Snorkle (Circle, corridor, or entire stream width)
Electrofishing
Other

Habitat Type: Pool, Riffle, Run/Glide, Pocket Water
18.03 m³

Appendix N. Continued.

STREAM PHYSICAL HABITAT DATA

STREAM - Vick Creek DATE - 08/08/00 COLLECTORS - LH, BK, CO, CE
 EPA REACH - 17060210-018 LENGTH - 88.1 m STRATUM -

TRANSECT - Vick Cr., # 1 GRADIENT % / VERTICAL DROP - 2.6% 2.31 m

CHANNEL TYPES: B – confined, flushing
 C – meandered, depositional

PERCENT HABITAT TYPE: Pool - 18.3% Riffle %Run/Glide % Pocket Water %

COMMENTS (About anything instructive...vegetative cover, bank stability, etc.)

106

Transect length from bottom (m)	Width (m)	Location on transect (l to r)	Depth (m)	Volume (cms)	Percent substrate class by area				
					Sand	Gravel	Rubble	Boulder	Bedrock
0	1.3	1/4	0.10	0.02		20	80		
		1/2	0.09			50	50		
		3/4	0.06				100		
28.5	2.4	1/4	0.09		30	20	50		
		1/2	0.03			50	50		
		3/4	0.01			50	50		
57.0	1.4	1/4	0.06		80		20		
		1/2	0.13		80		20		
		3/4	0.06		100				
88.1	1.6	1/4	0.10		30	70			
		1/2	0.03	50		50			
		3/4	0.03	10	40	50			

Appendix N. Continued.

TRANSECT DESCRIPTION SHEET

Stream - Vick Creek Date - 08/08/00
EPA Reach Number - 17060210-018 IDFG Region - 3M
Survey Crew - LH, BK, CO, CE Transect Number - Vick Cr., # 1
Transect location - Falls at top end, rock island at bottom.

Map Reference -

Vehicle Access - South end road from New Meadows to Blue Bunch road past Little Salmon River.

Photo Point -

Comments -

2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management

Project II: Technical Guidance

Subproject II-C: Southwest Region (McCall)

Contract Period: July 1, 2000 to June 30, 2001

ABSTRACT

McCall Subregion fishery management personnel responded to more than 300 requests and opportunities for technical input. Comments were provided to state and federal agencies on proposed activities for which they have regulatory authority. Advice and technical assistance were provided to private businesses and the public on activities associated with fish, or having impacts on fish populations or fish habitat. The major topics of involvement included stream channel alterations, Idaho Outfitters and Guides licensing, private pond permits, and land management planning. We provided data and technical advice to an increased number of fisheries consultants. The listing of three native salmonids under the Endangered Species Act has increased the number of requests for technical input.

Regional fishery personnel continued participation on a technical advisory committee for the Big Payette Lake Water Quality Council. The group conducted studies, developed a comprehensive technical report identifying nutrient and bacterial contamination sources, and recommended remedial action.

Fishery personnel continued participation on a technical advisory committee for the Cascade Restoration Project to improve water quality and fish habitat in Cascade Reservoir. Cascade Reservoir is listed as a water quality limited water by the Idaho Division of Environmental Quality, not fully supporting beneficial uses including cold water biota. The technical advisory committee identified phosphorus sources and developed reduction measures. A Total Maximum Daily Load (TMDL) was established that would result in a 37% reduction in phosphorus loading. Source plans were prepared and an implementation plan was drafted.

WestRock Resort is proposed for the west side of Cascade Reservoir and could potentially double the population of Valley County. We provided technical review on several components of the proposal.

We also gave numerous presentations to schools, sportsperson groups, and civic organizations. We answered many questions from the angling public on fishing opportunities, regulations, techniques, and specific waters. We maintained fishing reports for the IDFG Internet Homepage and 1-800-ASK-FISH.

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2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management

Project III: Habitat Management

Subproject III-C: Southwest Region (McCall)

Contract Period: July 1, 2000 to June 30, 2001

ABSTRACT

McCall area fishery personnel participated in many fora for the restoration, maintenance, and enhancement of fish habitat and water quality. This participation included membership on several technical advisory committees for state and federal planning efforts. Fishery personnel commented on more than 300 requests for technical advice. Many proposed land management activities required Idaho Department of Fish and Game (IDFG) review to assure fish habitat consideration. Other natural resource agencies requested contributions to planning documents regarding fishery resources and habitat. Much of our participation is described in the Technical Guidance section of this annual report as there is considerable overlap between technical guidance and habitat management.

The development of community fishing ponds increases fish habitat, angler opportunity, and overall participation in the sport. McCall area fishery personnel continued planning and development of fishing ponds in the communities of Council and Cascade. Both ponds were constructed within city parks and have strong community support. Landscaping and final adjustments continue.

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