



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

Steven M. Huffaker, Director

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

- PROJECT I. SURVEYS AND INVENTORIES**
 - Job a. Southwest Region Mountain Lakes Investigations**
 - Job b. Southwest Region Lowland Lakes Investigations**
 - Job c. Southwest Region Rivers and Streams Investigations**
- PROJECT II. TECHNICAL GUIDANCE**
- PROJECT III. HABITAT MANAGEMENT**

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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-D: Southwest Region

Job No.: a

Title: Mountain Lakes Investigations

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

ABSTRACT

Eighteen mountain lakes were visited in 2000 to determine status of fish and amphibian populations. Two lakes were in the South Fork Boise River drainage and 16 were in the Middle Fork Boise River drainage. Lakes were surveyed with either or a combination of angling, overnight gillnetting, and shoreline observation. Twelve of the 18 lakes contained hatchery trout populations. Amphibians were observed at nine lakes, four of which also had fish present.

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OBJECTIVES

1. 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.

METHODS

Eighteen alpine lakes and ponds in the South and Middle Fork Boise River drainages were surveyed by headquarters and regional fishery staff to determine status of fish and amphibian populations. Survey methods and intensity varied by location and ease of access but included visual observations from shore, angling, and overnight gillnetting. Gill nets were 30.5 m long with 7.6 m panels of 19, 25, 32, and 38 mm square mesh monofilament. All fish captured in gill nets or by angling were measured to the nearest mm and weighed to the nearest g when possible. Areas immediately around each lake were visually surveyed for campsites, trash, and other signs of human use; ease of access was also recorded. Amphibian presence or absence was noted during shoreline surveys. Data collected were entered into the Southwest Region mountain lake database, and one-page summaries were produced for each lake visited.

RESULTS

Of the 18 lakes surveyed, 16 were in the Middle Fork Boise River drainage and two were in the South Fork Boise River drainage (Table 1; Appendix A). Both gillnetting and angling were used to collect fish in North and South Twin Lakes, Roaring River Little Lake, and Smith Creek Lake. Roaring River Big Lake was sampled with gill nets. Angling only was used in Lynx Creek lakes #1 and #2, Greylock Lake #8, and Queens River Lake #1. Remaining lakes in the Middle Fork Boise River drainage were surveyed by visual observation from the shoreline.

Fish were sampled in 12 of the 18 lakes (Table 1; Appendix A). Hatchery rainbow trout *Oncorhynchus mykiss* were found in Smith Creek Lake, Twin Sisters Lake (North and South), Roaring River Big Lake, Roaring River Little Lake, and Lynx Creek Lake #1. Hatchery rainbow trout in Smith Creek Lake averaged 492 mm and 1,177 g. Hatchery rainbow trout in Roaring River Little Lake averaged 173 mm and 33 g. Twin Sisters Lake (South) had hatchery rainbow trout averaging 198 mm and 57 g. One rainbow trout sampled by angling at Twin Sisters Lake (South) was 432 mm in length.

Hatchery Westslope cutthroat trout *Oncorhynchus clarki lewisi* were sampled in Lynx Creek lakes #1 and #3; in Greylock lakes #7, 8, 10, and 11; and in Queens River Lake #1 (Table 1; Appendix A). Lakes that appeared to be fishless were Lynx Creek lakes #4 and #5, Greylock Lake #12, and Queens Rivers lakes #2 and #3.

Amphibians were observed at nine lakes, four of which also had fish present (Table 1; Appendix A). Amphibian species included spotted frogs *Rana luteiventris*, western toads *Bufo boreas*, and long toed salamanders *Ambystoma macrodactylum*. Because these surveys were unstructured no assessment of relative amphibian abundance among lakes was possible.

Table 1. Summary of sampling effort and fishery data for mountain lakes in the Middle Fork and North Fork Boise River drainages, September 2000.

Drainage	Lake	Sampling effort ^a	Fish species observed, or captured ^b	Amphibian species observed ^c
SF Boise River	Smith Creek Potter	ANG, GN OBS	HRB	LTS
MF Boise River	Twin Sisters N	ANG, GN	HRB	
	Twin Sisters S	ANG, GN	HRB	
	Roaring River Big Lake	GN	HRB	TF, SF
	Roaring River Little Lake	ANG, GN	WRB, HRB	SF
	Lynx Creek #1	ANG	WCT, WRB	LTS
	Lynx Creek #3	ANG	WCT	LTS
	Lynx Creek #4	OBS		LTS
	Lynx Creek #5	OBS		LTS
	Greylock #7	OBS	WCT	
	Greylock #8	ANG	WCT	
	Greylock #10	OBS	WCT	
	Greylock #11	OBS	WCT	
	Greylock #12	OBS		
	Queens R #1	ANG	WCT	
	Queens R #2	OBS		LTS, WT
	Queens R #3	OBS		LTS

^a GN = overnight gillnetting, ANG = angling, OBS = cursory shoreline observations

^b HRB = hatchery rainbow trout, WRB = wild rainbow trout, CTT = cutthroat trout

^c TF = tree frog, SF = spotted frog, LTS = long-toed salamander, WT = western toads

RECOMMENDATIONS

1. Do not stock Potter Lake; leave as a refuge lake for amphibians.
2. Monitor amphibian populations in lakes where they occur sympatrically with hatchery fish.

APPENDICES

Appendix A. Mountain lake sampling data, September 2000.

Mountain Lake General Information

Lake Name:	SMITH CREEK LAKE	Quadmap:	Trinity Mtn
Planting Number:	100123	Outlet:	Fall Ck
County:	ELMORE	Drainage:	SFBR
National Forest:	BOISE	Tributary To:	SFBR
Township:	3N	Lake Type:	Cirque
Range:	8E	Elevation:	2401 m
Section:	10	Size:	2.1 ha
UTM E:	621,854	Maximum Depth:	3.5 m
UTM N:	4,830,042	Aspect:	S
Spawning Potential:	None	Comments:	No small fish observed, no amphibians observed, large fish in gill net, good condition

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/15/00
 Human Use: Heavy
 Campsite Condition: Undeveloped
 Campsite Number: 3
 Campfire Rings: 2
 Trail Condition: good
 Trail Difficulty: moderate
 Litter: minimal

Angler Information:

Date: 9/15/00
 Number of Anglers: 1
 Hours Fished: 1
 Total Caught: 3
 Catch per Hour: 3

Mean Length and Weight Report:

Species	Geartype	Date
HRB ^a	Gillnet	9/15/00

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
HRB	492	29	1177	184	1.0

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
HRB	3	419	558
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/15/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: 0

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
HRB						7

^a Hatchery rainbow trout

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	TWIN SISTERS #1 (NORTH)	Quadmap:	Trinity Mtn
Planting Number:	100195	Outlet:	Trinity Ck
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	Trinity Ck
Township:	3N	Lake Type:	Moraine
Range:	8E	Elevation:	2419 m
Section:	2	Size:	ha
UTM E:	624,124	Maximum Depth:	m
UTM N:	4,830,133	Aspect:	N
Spawning Potential:	poor spawning potential intermittent inflow	Comments:	Difficult access, lake is used though, beer bottles evident. 2 anglers 30 minutes 20 fish caught all between 6 - 10 inches.

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: Fair
 Campsite Condition: Undeveloped
 Campsite Number: 2
 Campfire Rings: 2
 Trail Condition: poor
 Trail Difficulty: difficult
 Litter: minimal

Angler Information:

Date: 9/14/00
 Number of Anglers: 2
 Hours Fished: 1
 Total Caught: 20
 Catch per Hour: 20

Mean Length and Weight Report:

Species	Geartype	Date
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Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
---------	------------------	------	-----------------	------	----------

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
HRB ^a	20	152	254
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: 0

Length Frequency

Species	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
Captured						

^a Hatchery rainbow trout

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	TWIN SISTERS #2 (SOUTH)	Quadmap:	Little Trinity Lake
Planting Number:	100196	Outlet:	
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	3N	Lake Type:	Cirque
Range:	8E	Elevation:	m
Section:	2	Size:	ha
UTM E:	623,896	Maximum Depth:	m
UTM N:	4,831,085	Aspect:	N
Spawning Potential:		Comments:	
No spawning habitat			Difficult access 2 large firerings, beer bottles present. 2 anglers 40 minutes 5 fish caught, 1 at 17 inches, others between 8-10 inches.

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: Fair
 Campsite Condition: Undeveloped
 Campsite Number: 1
 Campfire Rings: 1
 Trail Condition: poor
 Trail Difficulty: difficult
 Litter: minimal

Angler Information:

Date: 9/14/00
 Number of Anglers: 2
 Hours Fished: 2
 Total Caught: 5
 Catch per Hour: 2.5

Mean Length and Weight Report:

Species	Geartype	Date
HRB ^a	Gillnet	9/14/00

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
HRB	198	13	57	26	0.6

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
HRB	5	203	432
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: 0

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
HRB		4	5	3		1

^a Hatchery rainbow trout

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	ROARING RIVER BIG LAKE	Quadmap:	Trinity Mtn
Planting Number:	100190	Outlet:	Roaring R
County:	BOISE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	3N	Lake Type:	Moraine
Range:	8E	Elevation:	2439 m
Section:	1	Size:	3.6 ha
UTM E:	625,440	Maximum Depth:	m
UTM N:	4,830,625	Aspect:	N
Spawning Potential:	poor	Comments:	Heavy human use adjacent to lake, fish diet of ants, leaf hoppers, misc. beetles amphibians observed were small frogs and toads.

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: Heavy use
 Campsite Condition: developed campground
 Campsite Number: 5
 Campfire Rings: 5
 Trail Condition: good
 Trail Difficulty: moderate
 Litter: minimal

Angler Information:

Date: 9/14/00
 Number of Anglers: 0
 Hours Fished: 0
 Total Caught: 0
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date
HRB ^a	Gillnet	9/14/00

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
HRB	279	31	210	50	1.0

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: present
 Spotted Frog Juv: present
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 2
 Tree Frog Juv: 0
 Salamanders: 0

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
HRB			1		1	

^a Hatchery rainbow trout

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	ROARING RIVER LITTLE LAKE	Quadmap:	Trinity Mtn
Planting Number:	100191	Outlet:	Roaring River
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	3N	Lake Type:	Moraine
Range:	8E	Elevation:	2378 m
Section:	1	Size:	2.0 ha
UTM E:	625,440	Maximum Depth:	m
UTM N:	4,830,625	Aspect:	N
Spawning Potential:	poor	Comments:	Easy access, 2 anglers 1 hour 30 fish all 6-8 inches. No spawning habitat on outlet.

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: Fair
 Campsite Condition: developed campground
 Campsite Number: 1
 Campfire Rings: 1
 Trail Condition: fair
 Trail Difficulty: moderate
 Litter: minimal

Angler Information:

Date: 9/14/00
 Number of Anglers: 2
 Hours Fished: 1
 Total Caught: 30
 Catch per Hour: 30

Mean Length and Weight Report:

Species	Geartype	Date
HRB ^a	Gillnet	9/14/00

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
HRB	173	7	33	5	0.4

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
HRB	30	100	254
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: present
 Spotted Frog Juv: present
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: 0

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
WRB	10	18	5			

^a Hatchery rainbow trout

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	LYNX CREEK #1 (WEST)	Quadmap:	Atlanta East
Planting Number:	100264	Outlet:	Lynx Ck
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	6N	Lake Type:	
Range:	12E	Elevation:	2569 m
Section:	19	Size:	5.5 ha
UTM E:	653,893	Maximum Depth:	m
UTM N:	4,856,053	Aspect:	
Spawning Potential:		Comments:	

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/13/00
 Human Use: Limited
 Campsite Condition: Fair
 Campsite Number: 1
 Campfire Rings: 2
 Trail Condition: none
 Trail Difficulty: difficult, xcountry
 Litter: m/h

Angler Information:

Date: 9/13/00
 Number of Anglers: 2
 Hours Fished: 1
 Total Caught: 6
 Catch per Hour: 6

Mean Length and Weight Report:

Species	Geartype	Date
WCT ^a	Angling	9/13/00
WRB ^b	Angling	9/13/00

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
WCT	280	20	0	0	0.0
WRB	233	54	0	0	0.0

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
WCT	2	260	300
WRB	4	150	390
	0	0	0

Amphibian Report:

Date: 9/13/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: present

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
WCT				1		
WRB		2	3			

^a Westslope cutthroat trout

^b Wild rainbow trout

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	LYNX CREEK #3 (EAST)	Quadmap:	Atlanta East
Planting Number:	10U077	Outlet:	Lynx Ck
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	6N	Lake Type:	
Range:	12E	Elevation:	2470 m
Section:	19	Size:	3.8 ha
UTM E:	654,386	Maximum Depth:	m
UTM N:	4,856,052	Aspect:	
Spawning Potential:		Comments:	

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/16/00
 Human Use: Limited
 Campsite Condition: Good
 Campsite Number: 3
 Campfire Rings: 3
 Trail Condition: none
 Trail Difficulty: difficult, xcountry
 Litter: medium

Angler Information:

Date: 9/16/00
 Number of Anglers: 2
 Hours Fished: 2
 Total Caught: 9
 Catch per Hour: 4.5

Mean Length and Weight Report:

Species	Geartype	Date
WCT ^a	Angling	9/16/00

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
WCT	331	10	0	0	0.0

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
WCT	9	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/16/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: present

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
WCT				2	6	1

^a Westslope cutthroat trout

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	LYNX CREEK #4 (POND B)	Quadmap:	Atlanta East
Planting Number:	LC400	Outlet:	Lynx Creek
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	6N	Lake Type:	Cirque
Range:	12E	Elevation:	2569 m
Section:	19	Size:	0.2 ha
UTM E:	654,104	Maximum Depth:	0 m
UTM N:	4,856,057	Aspect:	NE
Spawning Potential:	none	Comments:	Not angled, too shallow for fish, long-toed salamanders present.

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: None
 Campsite Condition: Poor
 Campsite Number: 1
 Campfire Rings: 1
 Trail Condition: none
 Trail Difficulty: difficult x-country
 Litter:

Angler Information:

Date: 9/14/00
 Number of Anglers: 0
 Hours Fished: 0
 Total Caught: 0
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date
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Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
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Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: present

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
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Appendix A. Continued.

Mountain Lake General Information

Lake Name:	LYNX CREEK #5 (POND D)	Quadmap:	Atlanta East
Planting Number:	LC500	Outlet:	Lynx Creek
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	6N	Lake Type:	Moraine
Range:	12E	Elevation:	2569 m
Section:	19	Size:	0.2 ha
UTM E:	654,533	Maximum Depth:	m
UTM N:	4,855,823	Aspect:	NE
Spawning Potential:	none	Comments:	No fish present, long-toed salamanders present.

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: None
 Campsite Condition: Poor
 Campsite Number: 0
 Campfire Rings: 0
 Trail Condition: none
 Trail Difficulty: difficult xcountry
 Litter:

Angler Information:

Date: 9/14/00
 Number of Anglers: 0
 Hours Fished: 0
 Total Caught: 0
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date
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Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
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Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: present

Length Frequency

Species	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
Captured						

Appendix A. Continued.

Mountain Lake General Information

Lake Name: POTTER
 Planting Number: 10U086
 County: ELMORE
 National Forest: 31.1E
 Township: 3N
 Range: 8E
 Section: 10
 UTM E: 621,207
 UTM N: 4,829,967
 Spawning Potential: none

Quadmap: Trinity Mtn
 Outlet:
 Drainage: SFBR
 Tributary To: SFBR
 Lake Type: Cirque
 Elevation: 2506 m
 Size: 0.6 ha
 Maximum Depth: 2.5 m
 Aspect: S

Comments:
 No fish observed one 2.5 - 3 inch salamander observed.
 Good trail to lake. Frog ponds to the W are barren, too shallow to hold fish.

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO3):
 Hardness (mg/l CaCO3):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/15/00
 Human Use: Fair
 Campsite Condition: Undeveloped
 Campsite Number: 1
 Campfire Rings: 1
 Trail Condition: good
 Trail Difficulty: moderate
 Litter:

Angler Information:

Date: 9/15/00
 Number of Anglers: 0
 Hours Fished: 0
 Total Caught: 0
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date		
Species	Mean Length (mm)	Mean Weight (g)	S.E.	C-Factor

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/15/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: present

Length Frequency

Species	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
Captured						

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	GREYLOCK MOUNTAIN LAKE#7	Quadmap:	Atlanta East
Planting Number:	GM700	Outlet:	Unnamed trib.
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:		Lake Type:	Morraine
Range:		Elevation:	2600 m
Section:		Size:	ha
UTM E:	654,331	Maximum Depth:	m
UTM N:	4,857,320	Aspect:	NE
Spawning Potential:		Comments:	No flowing water connecting #7 to #8. Several fish observed from 1.5" to 7", obvious natural production.

Chemical Report:

Date:
 Alkalinity (mg/l CaCO3):
 Hardness (mg/l CaCO3):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: none
 Campsite Condition: good
 Campsite Number: 1
 Campfire Rings: 0
 Trail Condition: none
 Trail Difficulty: difficult, xcountry
 Litter: none

Angler Information:

Date:
 Number of Anglers:
 Hours Fished:
 Total Caught
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date
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Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
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Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
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Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: none observed

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
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Appendix A. Continued.

Mountain Lake General Information

Lake Name:	GREYLOCK MOUNTAIN LAKE#8	Quadmap:	Atlanta East
Planting Number:	GM800	Outlet:	Unnamed trib.
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:		Lake Type:	Morraine
Range:		Elevation:	2592 m
Section:		Size:	2.1 ha
UTM E:	654,450	Maximum Depth:	m
UTM N:	4,857,510	Aspect:	NE
Spawning Potential:		Comments:	Main lake down approx. 4 ft. from full pool. Morraine seperates #8 from #9.

Chemical Report:

Date:
 Alkalinity (mg/l CaCO3):
 Hardness (mg/l CaCO3):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: NONE
 Campsite Condition: GOOD
 Campsite Number: 1
 Campfire Rings: 0
 Trail Condition: none
 Trail Difficulty: difficult, xcountry
 Litter: none

Angler Information:

Date: 9/14/00
 Number of Anglers: 2
 Hours Fished: 1
 Total Caught: 17
 Catch per Hour: 17

Mean Length and Weight Report:

Species	Geartype	Date
WCT	Angling	9/14/00

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
WCT	268	7	0	0	0.0

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
WCT	17	220	300
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: 0

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
WCT	17		4	17	17	17

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	GREYLOCK MTN LAKE #10	Quadmap:	Atlanta East
Planting Number:	GM1000	Outlet:	Unnamed Trib.
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:		Lake Type:	Morraine
Range:		Elevation:	2561 m
Section:		Size:	ha
UTM E:	654,599	Maximum Depth:	m
UTM N:	4,857,508	Aspect:	NE
Spawning Potential:	none	Comments:	Visual observations in 2000. Fish seen rising.

Chemical Report: No data collected

Date:
 Alkalinity (mg/l CaCO3):
 Hardness (mg/l CaCO3):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/15/00
 Human Use: None
 Campsite Condition: Poor
 Campsite Number: 0
 Campfire Rings: 0
 Trail Condition: none
 Trail Difficulty: difficult xcountry
 Litter:

Angler Information:

Date: 9/15/00
 Number of Anglers: 0
 Hours Fished: 0
 Total Caught: 0
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date
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Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
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Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/15/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: 0

Length Frequency

Species	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
Captured						

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	GREYLOCK MTN LAKE #11	Quadmap:	Atlanta East
Planting Number:	GM1100	Outlet:	Unnamed Trib.
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:		Lake Type:	Morraine
Range:		Elevation:	2378 m
Section:		Size:	ha
UTM E:	655,006	Maximum Depth:	m
UTM N:	4,857,320	Aspect:	NE
Spawning Potential:	none	Comments:	Visual observations in 2000. Assume downstream migrants from #10.

Chemical Report:

Date:
 Alkalinity (mg/l CaCO3):
 Hardness (mg/l CaCO3):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/15/00
 Human Use: None
 Campsite Condition: Poor
 Campsite Number: 0
 Campfire Rings: 0
 Trail Condition: none
 Trail Difficulty: difficult xcountry
 Litter:

Angler Information:

Date: 9/15/00
 Number of Anglers: 0
 Hours Fished: 0
 Total Caught: 0
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date
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Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
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Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/15/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: 0

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
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Appendix A. Continued.

Mountain Lake General Information

Lake Name:	GREYLOCK MTN LAKE #12	Quadmap:	Atlanta East
Planting Number:	GM1200	Outlet:	Unnamed Trib.
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:		Lake Type:	Cirque
Range:		Elevation:	2683 m
Section:		Size:	ha
UTM E:	654,421	Maximum Depth:	m
UTM N:	4,858,353	Aspect:	E
Spawning Potential:	none	Comments:	Visual observations in 2000.

Chemical Report:

Date:
 Alkalinity (mg/l CaCO3):
 Hardness (mg/l CaCO3):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/15/00
 Human Use: None
 Campsite Condition: Poor
 Campsite Number: 0
 Campfire Rings: 0
 Trail Condition: none
 Trail Difficulty: difficult xcountry
 Litter:

Angler Information:

Date: 9/15/00
 Number of Anglers: 0
 Hours Fished: 0
 Total Caught: 0
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date
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Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
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Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/15/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: 0

Length Frequency

Species	Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
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Appendix A. Continued.

Mountain Lake General Information

Lake Name:	QUEENS R #1	Quadmap:	Atlanta East
Planting Number:	100225	Outlet:	Queens R
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	6N	Lake Type:	
Range:	11E	Elevation:	2405 m
Section:	13	Size:	4.8 ha
UTM E:	652,090	Maximum Depth:	m
UTM N:	4,856,880	Aspect:	
Spawning Potential:		Comments:	

Chemical Report:

Date:
 Alkalinity (mg/l CaCO₃):
 Hardness (mg/l CaCO₃):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: **limited**
 Campsite Condition: **poor**
 Campsite Number: 1
 Campfire Rings: 3
 Trail Condition: **none**
 Trail Difficulty: **difficult, xcountry**
 Litter: **high**

Angler Information:

Date: 9/14/00
 Number of Anglers: 2
 Hours Fished: 1
 Total Caught: 1
 Catch per Hour: 1

Mean Length and Weight Report:

Species	Geartype	Date
WCT	Angling	9/14/00

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
WCT	500		0		0.0

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
WCT	1	500	500
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: present

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
WCT	1			1	1	1

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	QUEENS R #2	Quadmap:	Atlanta East
Planting Number:	100226	Outlet:	Queens R
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	6N	Lake Type:	
Range:	11E	Elevation:	2531 m
Section:	24	Size:	1.6 ha
UTM E:	652,480	Maximum Depth:	m
UTM N:	4,856,260	Aspect:	W
Spawning Potential:		Comments:	Visual observations only in 2000. Long toed salamanders present.

Chemical Report:

Date:
 Alkalinity (mg/l CaCO3):
 Hardness (mg/l CaCO3):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: None
 Campsite Condition:
 Campsite Number:
 Campfire Rings:
 Trail Condition: none
 Trail Difficulty: difficult xcountry
 Litter:

Angler Information:

Date: 9/14/00
 Number of Anglers: 0
 Hours Fished: 0
 Total Caught: 0
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date
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Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
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Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: present

Length Frequency

Species Captured	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
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Appendix A. Continued.

Mountain Lake General Information

Lake Name:	QUEENS R #3	Quadmap:	Atlanta East
Planting Number:	100227	Outlet:	Queens R
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	6N	Lake Type:	
Range:	11E	Elevation:	2409 m
Section:	13	Size:	0.6 ha
UTM E:	652,700	Maximum Depth:	m
UTM N:	4,857,500	Aspect:	
Spawning Potential:	none	Comments:	No fish present, long toed salamanders present.

Chemical Report:

Date:
 Alkalinity (mg/l CaCO3):
 Hardness (mg/l CaCO3):
 pH:
 Conductivity (uS/cm):
 Surface Temp(C):
 Secchi (m):

Human Use Report:

Date: 9/14/00
 Human Use: None
 Campsite Condition: Poor
 Campsite Number: 0
 Campfire Rings: 0
 Trail Condition: none
 Trail Difficulty: difficult xcountry
 Litter:

Angler Information:

Date: 9/14/00
 Number of Anglers: 0
 Hours Fished: 0
 Total Caught: 0
 Catch per Hour:

Mean Length and Weight Report:

Species	Geartype	Date
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Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
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Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0	0
	0	0	0
	0	0	0

Amphibian Report:

Date: 9/14/00
 Spotted Frog Adults: 0
 Spotted Frog Juv: 0
 Tailed Frog Adults: 0
 Tailed Frog Juv: 0
 Tree Frog Adults: 0
 Tree Frog Juv: 0
 Salamanders: present

Length Frequency

Species	<151mm	151-200mm	201-250mm	251-300mm	301-350mm	>350mm
Captured						

2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-25

Project I: Surveys and Inventories

Subproject I-D: Southwest Region

Job No.: b

Title: Lowland Lakes Investigations

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

ABSTRACT

We evaluated the hatchery rainbow trout *Oncorhynchus mykiss* stocking program at C.J. Strike Reservoir using jaw tagged catchables, three groups of differentially grit marked fingerlings, and a creel survey. Jaw tagged catchables were released at two locations in the fall of 1999 and spring of 2000. Grit marked fingerlings were released at three locations. Returns of jaw-tagged catchables were significantly different between stocking locations, but season of stocking did not influence returns. A total of 23 grit marked fingerlings were recaptured using electrofishing, gillnetting, and angling. Ninety-six percent of the recaptured fingerlings were from two of the three release locations. Between April and November, growth of fingerlings averaged 283 mm. Angler effort and rainbow trout harvest was evaluated during March, April, and May. A total of 828 anglers were interviewed. Total hours of fishing were estimated to be 25,804 h for bank anglers and 18,028 h for boat anglers. For anglers specifically targeting trout, the catch rate was 0.19 rainbow trout/h.

Lake Lowell and C.J. Strike Reservoir were sampled with a multiple gear lowland lake sampling strategy, which included experimental gill nets, trap nets, and boat electrofishing. In Lake Lowell, a total of 244 fish were collected. Black crappie *Pomoxis nigromaculatus*, bluegill *Lepomis macrochirus*, channel catfish *Ictalurus punctatus*, largemouth bass *Micropterus salmoides*, smallmouth bass *M. dolomieu*, and yellow perch *Perca flavescens* were the gamefish represented in the catch. Nongame species represented 63% of the total catch. A total of 1,096 fish were collected in C.J. Strike Reservoir. Captured gamefish included smallmouth bass, largemouth bass, bluegill, pumpkinseed *L. gibbosus*, black crappie, white crappie *Pomoxis annularis*, warmouth *Lepomis gulosus*, yellow perch, rainbow trout, brown bullhead *Ameiurus nebulosus*, and channel catfish. Nongame species comprised 32% of the total catch.

Succor Creek Reservoir was sampled with experimental gill nets and trap nets. Captured gamefish included wild redband trout *O. mykiss gairdneri* and hatchery rainbow trout. Nongame species collected included bridgelip sucker *Catostomus columbianus* and redband shiner *Richardsonius balteatus*. As in 1996, bridgelip sucker dominated the total catch.

Hydroacoustic surveys were conducted on Arrowrock, Lucky Peak, and Deadwood reservoirs. The estimate of pelagic fish abundance in Arrowrock Reservoir was 62,000 \pm 49%. An estimated 65% of the fish were northern pikeminnow *Ptychocheilus oregonensis*. Rainbow trout and smallmouth bass each comprised 11.5% of the estimated population in the reservoir. The estimate of pelagic fish abundance in Lucky Peak Reservoir was 95,000 \pm 12%. The mean density of pelagic fish in the reservoir was 86 fish/ha. Densities ranged from 14 to 132 fish/ha.

The sonar estimate of kokanee *O. nerka* abundance in Deadwood Reservoir was 266,000 \pm 30%. Kokanee less than 100 mm (YOY) comprised 93% of the estimated population. The abundance of age-1 and age-2 kokanee was estimated at 10,000 and 7,000, respectively.

Zooplankton samples were taken in August from C.J. Strike, Arrowrock, and Lucky Peak reservoirs. In C.J. Strike Reservoir the zooplankton quality index (ZQI - a measure that includes abundance and zooplankton size) was very similar to 1999. The only section sampled with a considerable change was in the Snake River Arm. In 1999, the ZQI in the Snake River Arm was 0, while in 2000 the same section had a ZQI of 1.12. Average ZQI increased from 1999 to 2000 in Lucky Peak Reservoir but decreased in Arrowrock Reservoir.

Four fishing tournaments were held at Lake Lowell during April, May, and August 2000. A total of 312 anglers fished for 5,092 hours and caught 1,853 largemouth bass and 7 smallmouth bass.

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INTRODUCTION

C. J. Strike Reservoir Hatchery Trout Evaluations

C. J. Strike Reservoir is an Idaho Power Company hydropower reservoir located on the Snake River at river mile 494, approximately 20 miles southwest of Mountain Home. The reservoir was constructed in 1952 and is operated to generate power during peak demand periods, described by the company as block loading. It is managed as a run-of-the-river facility, with average daily fluctuations in pool elevation of only 9 to 12 cm. Storage capacity and reservoir area are 250,000 acre ft and 7,500 acres, respectively. The reservoir is classified as eutrophic (Milligan et al. 1983). The Snake River Arm receives the primary inflow and is subject to high flushing flows during spring runoff. The Bruneau River Arm is shallower and has lower water turnover. During summer months elevated temperatures and depressed dissolved oxygen restrict usable trout habitat in the reservoir, especially in the Bruneau River Arm (Idaho Power Company 1998).

C. J. Strike Reservoir supports a mixed stock fishery comprised of hatchery rainbow trout *Oncorhynchus mykiss*, smallmouth bass *Micropterus dolomieu*, largemouth bass *M. salmoides*, bluegill *Lepomis macrochirus*, yellow perch *Perca flavescens*, channel catfish *Ictalurus punctatus*, black crappie *Pomoxis nigromaculatus*, white crappie *P. annularis*, white sturgeon *Acipenser transmontanus*, along with catostomid and cyprinid nongame species. The hatchery rainbow trout are stocked at both fingerling and catchable sizes, and typically reach sizes of 350-500 mm. During the drought period of 1987 to 1992, anglers reported the rainbow trout fishery was a major attraction of C. J. Strike Reservoir. A creel census conducted during 1992-1993 indicated trout anglers averaged 0.38 trout per hour ranging from 320 to 410 mm. In the three or four years preceding this study, anglers complained the fishery was not as good as prior years (Allen et al. 1995). Idaho Power Company studies (1998) showed similar catch rates for anglers who fished primarily for rainbow trout (0.32 trout/h during 1995-1996 and 0.58 trout/h during 1996-1997).

Limnological Characteristics

C.J. Strike Reservoir has a mean annual flow of 312 m³/s with a retention time of approximately eight days (Idaho Power Company 1998). Spill occurs when inflows exceed 425 m³/s. C.J. Strike Reservoir has two very distinct segments in terms of limnological characteristics, however. The Snake River Arm receives inflow from the Snake River and has an annual mean flow of 305 m³/s, and the Bruneau Arm receives inflow from the Bruneau River (annual mean flow of 7 m³/s). Relative to the Snake River Arm, the Bruneau Arm has a much higher water retention period.

The low water retention time in the Snake River Arm results in reduced zooplankton production compared to the Bruneau River Arm. Zooplankton sampling in 1998 (Teuscher 1999), a relatively high water year, indicated zooplankton production index (ZPI) and zooplankton quality index (ZQI) of 0.0 for the Snake River Arm. In 1999 and 2000, ZPI and ZQI were 0, 0.84, 0, and 0.32, respectively (this report). In the Bruneau Arm, 1998 ZPI and ZQI values were 0.52 and 0.55, respectively. In 1999 and 2000, Bruneau Arm ZPI and ZQI values were 0.53, 0.48, 0.5, and 0.48, respectively. These results suggest little or no useable

zooplankton (>2 mm in size) exist for trout to forage on in the Snake River Arm during normal water years, while moderate levels of zooplankton are available for trout in the Bruneau Arm.

The water quality in C.J. Strike Reservoir is likely not adequate to fully support all beneficial uses (Idaho Power Company 1998). During the summer, dissolved oxygen and warm water temperatures result in reduced living space for cold water species (Idaho Power Company 1998). This limitation is greatest in the Bruneau River Arm where the retention time of water is higher. In 1996, Idaho Power Company documented 3 ppm dissolved oxygen at 12 m and water temperatures exceeding 20°C at 10 m in the Bruneau Arm. C.J. Strike Reservoir is limited by food availability and water quality in the Snake River Arm and by water quality in the Bruneau River Arm.

History of Trout Management

As with most reservoir fisheries in Idaho, Idaho Department of Fish and Game (Department) maintains trout fisheries through the release of hatchery-reared fish. Although various sizes of trout are stocked, all are managed as put-and-grow with substantial growth expected before the fish are harvested. The return goal for put-and-grow stocking programs is 100% by weight. Through the mid 1980s, the Department primarily utilized catchable sized (200-275 mm) rainbow trout for stocking into C.J. Strike Reservoir to maintain a sport fishery. During 1987, as part of a cost savings program, the Department began utilizing fall fingerling releases as an alternative to some catchable rainbow trout releases. The fall fingerlings averaged 100-150 mm (stocked in October), and the program relied on over winter growth in the reservoir to produce 200-300 mm fish by the following year. A third size of fish listed as spring fingerlings (50-75 mm released during April-June) has been also been used. During 1991, the Department conducted a study in C.J. Strike Reservoir to evaluate return to creel for fall versus spring fingerling rainbow trout releases. The results indicated extremely poor returns from the fall fingerling releases.

From 1987 through 1995, southern Idaho experienced extended drought conditions that resulted in decreased annual runoff. During this period a number of irrigation reservoirs in Idaho did not refill, and as a result fish allocated for release into these waters were excess to statewide stocking requests. A large number of the excess fish were diverted to run-of-the-river reservoirs, including C.J. Strike Reservoir. During the drought period, large numbers of both catchable and fingerling sized rainbow trout were released into the reservoir (Figure 1). This period of increased hatchery releases corresponds to anglers' reports of "good fishing" in the early to mid-1990s. With the return of normal snowpack conditions during 1996, normal stocking programs resumed in other waters, and hatchery trout releases into C.J. Strike Reservoir were reduced.

The final change in hatchery management occurred between 1996 and 1998. Budget constraints in the hatchery system necessitated a shift from catchable-only stocking to a mix of spring fingerlings and catchables. This shift was driven by economics, with the expectation that survival of less expensive fingerlings would be adequate to sustain the fishery.

Our management goal for C.J. Strike Reservoir has been to maintain a mixed stock fishery with a catch rate of 0.5 rainbow trout/h for anglers targeting trout. However, it is unclear whether this goal is attainable given the limitations described above. Due to this uncertainty, the Department conducted a 20-month evaluation to evaluate hatchery rainbow trout returns

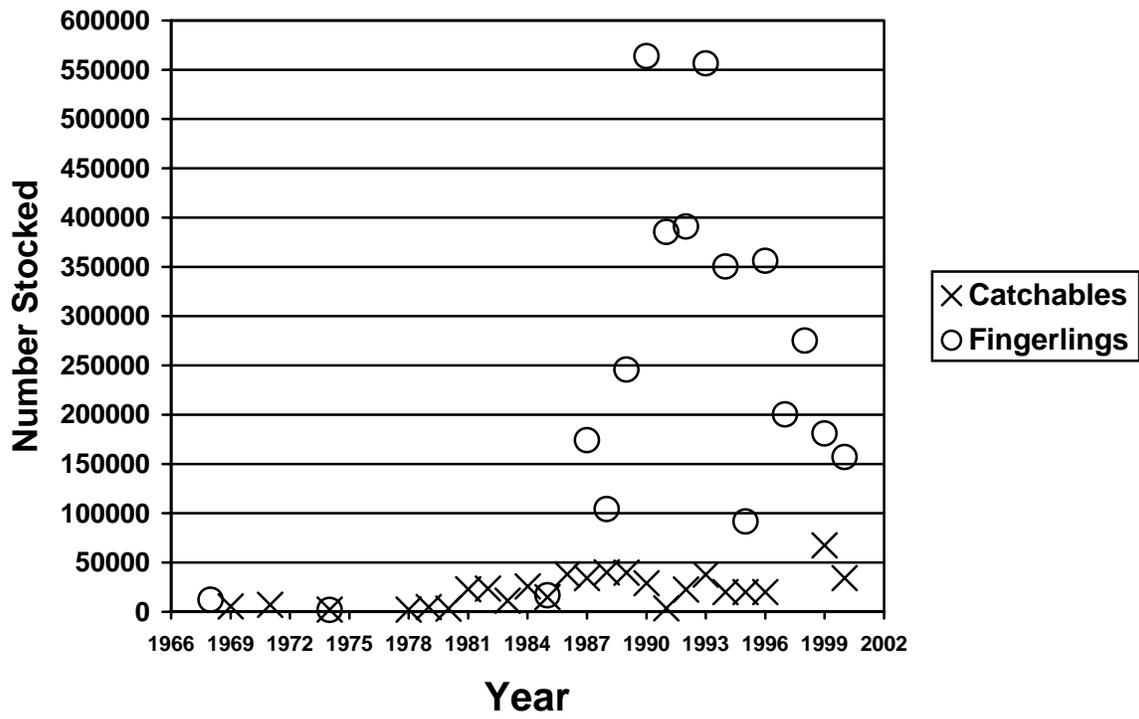


Figure 1. Total number of hatchery rainbow trout stocked in C.J. Strike Reservoir between 1968 and 2000.

from a variety of release sizes, times, and locations. Our intent was to compare and refine stocking strategies, and also to describe the expected quality (catch rates and size) of the trout fishery with changes in stocking strategies and water conditions.

Lake Surveys

Standardized lake surveys with a combination of electrofishing, gillnetting, and trapnetting are used to survey fish populations in new waters and also to assess trends in species composition, abundance, and size structure over time. In this report period standardized surveys were completed on Lake Lowell, C.J. Strike Reservoir, and Succor Creek Reservoir. Data were compared to previous efforts where possible.

Hydroacoustic Surveys

Recent advances in hydroacoustic technology may enable fishery managers to estimate and monitor pelagic fish abundance and size distribution in lakes and reservoirs with minimal investment in manpower. In 1999, with funding from U.S. Bureau of Reclamation (BOR), IDFG purchased hydroacoustic equipment and began developing methods to survey fish populations in lakes and reservoirs throughout southern Idaho (Teuscher 2001). Fisheries Research personnel are taking the lead in technology development, with regional fish management staff providing logistical support and the additional netting data required to segregate hydroacoustic estimates by species. In 2000, southwest region fisheries staff assisted research with surveys on Arrowrock, Lucky Peak, and Deadwood reservoirs.

Zooplankton Sampling

Zooplankton abundance and size structure can serve as an indicator of productivity and food availability in lakes and reservoirs. Teuscher (1999) used several indices of zooplankton abundance and size structure to prescribe stocking rates for fingerling rainbow trout in Idaho waters. Structured monitoring of these indices may help fishery managers understand relationships between reservoir levels, water turnover rates, water quality, and food availability, growth, and survival for stocked and naturalized fish. In 2000, zooplankton data were collected for C.J. Strike, Arrowrock, and Lucky Peak reservoirs and compared to first-year data collected in 1999.

OBJECTIVES

1. 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.

METHODS

C.J. Strike Reservoir Hatchery Trout Evaluations

Creel Survey

A randomized creel survey was used during the months of March, April, and May 2000 to evaluate success of anglers targeting trout. Creel information was collected one weekday and one weekend day per week for a total of eight days a month. The reservoir was divided into three sections: the Snake River Arm, the Bruneau River Arm, and the main reservoir (confluence of the two rivers). Creel clerks had predefined time intervals to conduct instantaneous angler pressure counts. Clerks conducted angler interviews randomly between pressure count times. Anglers were asked a series of questions including: if they were fishing specifically for rainbow trout, total hours fished, if their fishing trip was completed, and the total number of fish kept and released. Creel clerks also recorded fishing method used (bait, lures, etc.), type of angler (bank, boat, float tube), and lengths of rainbow trout kept. Questionnaires were used to collect the above information from anglers who were away from their vehicles and could not be reached. Self-addressed, postage prepaid envelopes accompanied questionnaires placed on vehicles. Volunteers provided a majority of the labor.

All census and interview data was entered into a program developed by Bill Babcock of the Colorado Division of Wildlife, Aquatic Research Section (C-SAP Creel Survey Analysis Program, Colorado Division of Wildlife Aquatic Research, Fort Collins, CO). The software was used to generate estimates of total angler effort, catch rate, harvest rate, and species composition.

Catchable Rainbow Trout Evaluation

Our first objective was to determine the stocking strategy that would support the catch rate goal of 0.5 rainbow trout/h. To reach that objective, we first evaluated our current stocking timing and locations to determine how we could maximize the return of hatchery catchables. Two release periods, October 1999 and March 2000, and two release locations, Cottonwood access area in the Bruneau River Arm and Loveridge Bridge in the Snake River Arm, were tested respectively. There were a total of four groups of catchables released. Each release group had 5,000 230-280 mm rainbow trout, 2,000 of which were tagged with individually numbered monel-metal jaw tags (size 8). Voluntary tag returns by anglers were used to evaluate the four release groups. A reward program for tag returns was used to encourage tag returns. Anglers submitting tag returns were entered into two \$100.00 gift certificate drawings to be held March 31 and December 31, 2000. Access points around C.J. Strike Reservoir were posted to alert anglers about the tag return program. Tag returns were recorded by location of harvest: main reservoir, Snake River above dam, Snake River below dam, or the Bruneau Arm.

Based on power analysis and expected tag returns, we determined each release group required 2,000 tagged trout (assuming a power of 0.80 and an alpha of 0.10 at an effect size of 20%). The power analysis assumed a 5% minimum tag return rate (based on 1999 hatchery evaluation). Given the number of tags applied, the effect size (detectable difference in return

among stocked groups) will decrease if a higher tag return rate occurs. A series of 2 x 2 Chi-square tests were used to test the differences in tag returns between season and location of release. Total return to the creel was estimated by multiplying tag return data by 2 to correct for non-return bias (Nicols et al. 1991).

Fingerling Rainbow Trout Evaluation

Given the high cost of producing catchable rainbow trout, it may be impractical to use catchables exclusively in a 3,000 ha reservoir to meet our rainbow trout catch rate goal. With a much lower overall production cost than catchables, fingerling rainbow trout could potentially be used in C.J. Strike Reservoir to enhance the reservoir trout population. We evaluated the overall contribution of stocked fingerlings to the reservoir trout population and compared relative survival at three historical stocking locations. Each of the three stocking locations were assessed by their ability to maximize the recruitment of stocked fingerlings to the C. J. Strike fishery. Three groups of fingerling rainbow trout were released before spring runoff at Cottonwood access area on the Bruneau River Arm, at the Idaho Power boat ramp located near the main body of the reservoir between the mouths of the Snake River Arm and the Bruneau Arm, and at the Loveridge Bridge boat ramp on the upper Snake River Arm.

On March 23, 2000 three groups of 50,000 fingerlings were differentially batch marked prior to release using either green, red, or orange fluorescent grit. Marking success was evaluated two weeks following grit application. Hand-held ultraviolet lights (UVP, Inc., model UVL-4, 365 nm) were used to identify grit marked fish. Approximately three weeks later on April 12 a subsample of 110 fish was taken from each marked group to determine overall marking success. All marked fingerlings were stocked in C.J. Strike Reservoir on April 13, 2000. At release the green group averaged 50 fingerlings/lb (mean total length = 98 mm), the orange group 42/lb (104 mm), and the red group was smallest at 57/lb (93 mm). The green group was released at the Idaho Power boat ramp, orange were released at the Loveridge Bridge boat ramp, and the reds were released at the Cottonwood access area. The only fingerlings stocked in C.J. Strike Reservoir in 2000 were the 150,000 in this evaluation. In the two years prior to 2000, a total of 460,000 were stocked.

Sampling methods included floating experimental gill nets, trap nets, angling, and night electrofishing beginning in March 2000. Recaptured grit marked fish were used to determine relative survival and the proportion of standing stock made up by the marked fish. Based on our a priori power analysis, we determined that 172 grit marked fingerlings needed to be captured to test the difference between release groups using a chi square analysis. Grit marked fish checked in the creel survey, and those collected while gillnetting were combined to obtain the desired sample size.

Standardized Lake Surveys

Lake Lowell

Sampling was conducted on May 31, 2000 utilizing 0.57 h of electrofishing, two units of gillnetting and two units of trapnetting (Appendix A). Sampling gamefish populations in Lake

Lowell has proven to be difficult in the past, and collection efforts in 2000 were no exception. Poor electrofishing conditions caused by a high lake level likely lowered our catch per unit effort (CPUE) of all species. Either future electrofishing surveys need to be scheduled when the lake level is below a majority of the woody and aquatic shoreline vegetation, or other methods of collecting fisheries data need to be employed.

Regional fisheries staff and volunteers also collected catch data for four large tournament events on Lake Lowell. Tournament dates were April 15, April 29-30, May 13, and August 19, 2000. Anglers were required to measure and record length for all largemouth and smallmouth bass captured and released. In addition, fisheries staff measured all fish brought to tournament weigh-ins.

C.J. Strike Reservoir

A lowland lake sample was conducted May 12, 2000 using 1.9 h of electrofishing, four trap nets, and five pairs of floating and sinking gill nets (Appendix A). C.J. Strike Reservoir was full and the water temperature in the Bruneau Arm was 14EC at 1044 h. The weather during fish collection efforts was sunny and clear, the evening low air temperature recorded at the Cottonwood access area on May 11 was 0EC. Sampling sites were chosen in the general area of previous fish collections.

Netting locations included the Bruneau Arm (south side near the Cottonwood rearing ponds, directly north of the Cottonwood access area on the opposite side of the reservoir near the pump station, and two sites along the north side between the pump station and the first dirt road access to the east), the main reservoir area (three sites directly east of the Idaho Power boat ramp on the eastern shoreline between the start of the Snake River Arm canyon and the narrows leading to the Bruneau Arm), and the Snake River Arm (four sites on 2 km of the eastern shoreline beginning in the Canyon Creek area and moving upstream).

Electrofishing was conducted on the eastern end of the Bruneau narrows, BLM Recreation Cove, the pump cove on the eastern shoreline straight east from the Idaho Power boat ramp, and Canyon Creek cove.

Succor Creek Reservoir

Two trap nets and two sinking gill nets were set overnight on June 20, 2000 (Appendix A). The reservoir was approximately 3 m below full capacity. The water was very turbid and had a surface temperature of 10°C at 1000 h on June 21. Evidence of past bank fishermen was observed in the form of two fire rings and numerous forked rod holders near the dam. The reservoir was last sampled on June 14, 1996 with two trap nets and two pair of experimental gill nets (Allen et al. 1999). Succor Creek Reservoir is stocked each June with 5,000 hatchery rainbow trout fingerlings.

Hydroacoustic Surveys

Regional fishery staff assisted on hydroacoustic surveys during 2000 on Arrowrock and Lucky Peak reservoirs by completing all necessary gill net data collection. Deadwood Reservoir was also gillnetted and sonar surveyed by fishery research staff. The Arrowrock Reservoir survey was intended to be the first in a series of monitoring events tied to the BOR valve replacement project on Arrowrock Dam. The BOR project will eventually drain Arrowrock Reservoir to less than one percent of storage capacity. Lucky Peak Reservoir lies directly downstream of the Arrowrock Dam and would receive all entrained fish from the Arrowrock project and was thus deemed worthy of creating baseline survey work. Deadwood Reservoir was surveyed to estimate kokanee *Oncorhynchus nerka kennerlyi* abundance.

Hydroacoustic Sonar

Sonar estimates of pelagic fish abundance were calculated for the three waters. Tusescher (2001) describes the methods and equipment used to calculate the fish density estimates.

Netting

Netting required to partition pelagic fish abundance by species utilized standard Department sinking and floating experimental gill nets. Nets were placed overnight in Lucky Peak Reservoir on June 26, 2000. A series of vertical gill nets were also used. The gill net effort was partitioned into three strata; Arrowrock Dam Arm, main lake narrows, and main pool. The specifics of netting are documented in Teuscher (2001).

In Arrowrock Reservoir vertical and standard experimental gill nets were deployed on June 27, 2000. Here, standard nets were only set for half-hour time periods to minimize capture mortality of listed bull trout *Salvelinus confluentus*.

Deadwood Reservoir was gillnetted by fishery researchers; the gill net data are not included in this report.

Zooplankton Sampling

Zooplankton samples were collected in August from C.J. Strike, Lucky Peak, and Arrowrock reservoirs. Sampling followed the techniques developed by Teuscher (1999) and was designed to describe relative size structure of the zooplankton communities for comparisons across waters or over time in the same water. Standardized depth for all net tows was 9.1 m. Data collected in 2000 were compared to data from 1999 for each reservoir.

RESULTS AND DISCUSSION

C.J. Strike Reservoir Hatchery Trout Evaluation

Creel Survey

A total of 828 anglers were interviewed during the March-May survey period, including 583 bank anglers, 253 boat anglers, and 2 float tube anglers. Seventy bank and 22 boat anglers were specifically targeting trout. Of the total anglers interviewed, 79 (9.5%) responded by the mail-in census forms left on vehicles. Total hours of fishing during March, April, and May 2000 were estimated at 25,804 for bank anglers and 18,028 for boat anglers.

Rainbow trout were the most preferred species during the census period (26% of all anglers contacted; Table 1). Crappie species (black and white combined) were the second most preferred species (24% of all anglers contacted), white sturgeon were the target species for 20% of all anglers contacted. Smallmouth bass anglers comprised 14% of all contacts, followed by yellow perch, catfish, largemouth bass, and common carp *Cyprinus carpio* anglers (7%, 6%, 2% and 1%, respectively).

Table 1. Species preferred by anglers interviewed on C.J. Strike Reservoir, March-May 2000.

Species preferred	# anglers interviewed	% of total anglers interviewed
Rainbow trout	215	26
Crappie spp.	202	24
White sturgeon	166	20
Smallmouth bass	115	14
Yellow perch	58	7
Catfish spp.	46	6
Largemouth bass	20	2
Carp	6	1

For anglers not specifically targeting trout, the estimated total catch (bank and boat anglers combined) was 1,376 rainbow trout for an average catch rate of 0.032 fish/hour (Table 2). Total harvest (fish caught and kept), and estimated harvest rate for bank and boat anglers combined was estimated as 1,146 rainbow trout, and 0.026 rainbow trout/h, respectively.

For anglers specifically targeting trout, the catch rate was 0.20 fish/h for both bank and boat anglers combined (Table 2). Catch rates were 0.28 fish/h for bank anglers, and 0.04 fish/h for boat anglers. Total harvest rate for anglers targeting trout was 0.18 fish/h (bank and boat anglers combined), and total estimated harvest was 8,854 rainbow trout.

Our management goal for catch rate (0.5 rainbow trout/h) was not met during this evaluation. It is very likely that drought conditions coupled with increased stocking directly resulted in the higher catch rates reported by Idaho Power Company (0.32/h during

Table 2. Estimated total catch, catch rate, total harvest, and harvest rate by bank and boat anglers on C.J. Strike Reservoir during March – May, 2000.

Species	Total catch ^a		Total Both (SE)	Total catch rate (fish/hour)			Total harvest		Total (SE)	Harvest rate (fish/hour)		
	Bank	Boat		Bank	Boat	Both (SE)	Bank	Boat		Bank	Boat	Both (SE)
RBT	714	662	1,375 (472)	0.028	0.037	0.032 (0.00)	631	515	1,146 (432)	0.025	0.027	0.026 (0.00)
RBT ^b	8,925	688	9,613 (6749)	0.280	0.040	0.200 (0.150)	8,167	688	8,854 (6,741)	0.260	0.040	0.180 (.15)
WCR	8,353	18,086	26,439 (9,963)	0.324	1.003	0.603 (0.183)	6,755	13,954	20,709 (7,333)	0.175	0.602	0.472 (.126)
BCR	2,223	174	2,397 (2,305)	0.086	0.010	0.055 (0.052)	2,010	174	2,184 (2,068)	0.088	0	0.050 (.046)
STG	462	35	496 (263)	0.018	0.002	0.011 (0.00)	0	0	0 1,200	0	0	0 0.027
SMB	2,287	3,511	5,797 (2,148)	0.089	0.195	0.132 (0.033)	473	727	1,200 (584)	0.018	0.040	0.027 (.01)
LMB	53	1,477	1,530 (661)	0.022	0.070	0.035 (0.014)	10	75	85 (59)	0.018	0.028	0.002 (0.00)
YLP	578	1,266	1,844 (765)	0.001	0.001	0.042 (0.015)	464	505	968 (419)	0.001	0.001	0.022 (0.00)
CAT	15	14	28 (16)	0.002	0.082	0.001 (0.00)	15	14	28 (16)	0	0.004	0.001 (0.00)
CRP	52	0	52 (21.3)	0.002	0	0.001 (0.00)	7	0	7 (8)	0	0	0.00 (0.00)

^a Total catch includes all fish caught and released.

^b Catch information for anglers specifically targeting trout.

1995-1996 and 0.58/h for 1996-1997) and IDFG in 1992 (0.38/h). Angler interviews conducted in 2000 indicate that years with good or excellent rainbow trout fishing largely coincided with the recent drought period. If the year 2000 snow pack and resulting runoff conditions continued over the next several years, catch rates would likely be much closer to our management goal due to carryover of annually stocked rainbow trout. It would be prudent to conduct a short-term creel survey in the spring of 2001 to test this theory.

The popularity of the rainbow trout fishery is well documented. However, during the March to May period of this survey, only 26% of the anglers surveyed said they were fishing specifically for rainbow trout. The effects of several years of reduced stocking, high flows, and lower catch rates preceding this survey likely resulted in anglers looking elsewhere for rainbow trout fishing opportunities. If drought conditions persist for an extended period, reservoir conditions will improve and surplus hatchery trout stocking will increase. Extra emphasis should be placed on promoting the trout fishery as catch rates and size of fish improve.

Catchable Rainbow Trout

Fall and spring catchables were released October 8, 1999 and March 3, 2000, at a mean length of 260 mm and 254 mm, respectively. A total of 614 tags were returned by anglers between October 8, 1999 and December 31, 2000, or 8% of the total stocked. Estimated total tag returns (corrected for non-compliance) were 22% and 26% for rainbow trout released at Cottonwood access area in the spring and fall, respectively. Returns from spring and fall Cottonwood groups were not significantly different ($P=0.12$). Corrected Snake River returns were 6% for the fall stocking and 8% for the spring stocking. Returns from the spring and fall Snake River groups were not significantly different ($P=0.16$). There was a significant difference ($P<0.0001$) in returns between fish released at the Cottonwood access area and the Snake River.

Stocking location for catchables in C.J. Strike Reservoir appears to have significant influence on return to creel. From the onset of this evaluation it was understood that both stocking locations had advantages and disadvantages. The Cottonwood stocking site, although close to concentrated angling pressure, was located in an area with a low pool turnover rate. While this generally provides a good food base for trout, water quality is frequently compromised June through August with widespread blue-green algae blooms. The Snake River stocking site was many miles from concentrated angling pressure and the reservoir outlet and was adjacent to areas of the reservoir with lower retention time and productivity (see Zooplankton Sampling, this report).

The Cottonwood stocking site produced, by far, the best in-reservoir return of catchables. Trout stocked at Cottonwood access area were returned approximately four times more frequently than catchables stocked at the Snake River site. In terms of overall numeric return by group, the spring 2000 stockings were highest at 23% for the Cottonwood site and 8% for the Snake River site. We could not reliably estimate return by weight with available data, but based on the growth rates and average size of trout harvested it is likely that weight return on catchable-size fish meets or exceeds the 100% goal. To optimize return of hatchery catchables in the future, all stocking should take place in the spring and at the IDFG Cottonwood access area in the Bruneau Arm. Under no circumstances should catchables be stocked at the Snake River site.

While in the process of collecting grit marked fingerlings, many jaw tagged catchables were also encountered. These data, in conjunction with information provided from anglers, were used to estimate relative growth among stocked groups. Catchables released in October 1999 are estimated to have grown approximately 12.5 mm/month through November 2000, and those released in March 2000 averaged 19 mm/month through November (Figure 2).

In contrast to the differences in overall tag returns between stocking sites, growth of all stocked groups was very similar. In November of 2000, the mean length of all returned fish was approximately 425 mm. By November of 2001, the mean length was approaching 500 mm (Figure 2). Zooplankton forage assessments conducted in August 2000 indicate that zooplankton availability was excellent for trout throughout the reservoir (data from this report). These data suggest that if similar sized catchables are stocked and reared under comparable environmental conditions, a portion should be expected to carryover at least two years and gain 200 mm in the process.

Tag returns indicate a substantial number of catchable rainbow trout were entrained through C.J. Strike Dam following stocking in October 1999 and March 2000. Of the total Cottonwood and Snake River tags returned, 13% and 16% were caught below C.J. Strike Dam, respectively (Table 3). In general, entrainment losses appear similar for both stocking sites. Eighteen percent of the jaw tags returned from fish stocked at Cottonwood access area in October 1999 were captured in the Snake River below the dam, as were 10% from fish stocked in March. Jaw tags from the Snake River stocking site were also returned from below the dam, specifically, 22% and 12% of the total tags returned from the fall 1999 and spring 2000 stockings, respectively. It is unclear whether the differences in entrainment between fall and spring stocking actually reflect true differences in entrainment or simply the total time the trout had been in the reservoir. Most tag returns from entrained trout came between September 1 and November 30 each year. This fall period accounted for 83% and 50% of the total entrained Cottonwood and Snake River trout, respectively.

Tag returns from below C.J. Strike Dam suggest that, even while experiencing below normal spring and monthly flows, rainbow trout entrainment through the dam is unavoidable. Although the distance between the two stocking sites and the dam differed greatly, entrainment was very similar between stocking locations (Table 3). Timing of tag returns below the dam suggests that a large portion of the entrained rainbow trout began moving out of the reservoir in late summer, likely a result of elevated water temperatures and/or depressed dissolved oxygen levels. This loss of trout from the reservoir does create a very localized tailrace fishery that is popular with some bank anglers. The majority of anglers, however, prefer to fish for trout in the reservoir. It is also very likely that large numbers of trout leave C.J. Strike Reservoir in years when there is spill over the dam. Four of five trout fitted with radio tags by the Idaho Power Company were entrained over the spillway approximately one month after release in the spring of 1996 (Idaho Power Company 1998). While little can be done to prevent this, monitoring flows can lessen the chance of spillway entrainment during periods of high flow. If inflows to C.J. Strike Reservoir are expected to exceed 15,000 ft³/s, stocking should be delayed to avoid periods of spill over the dam.

Fingerling Rainbow Trout

Two weeks after marking, dye retention was highest in the green group at 96%. Retention was 94% for the orange group, and 92% for the red group.

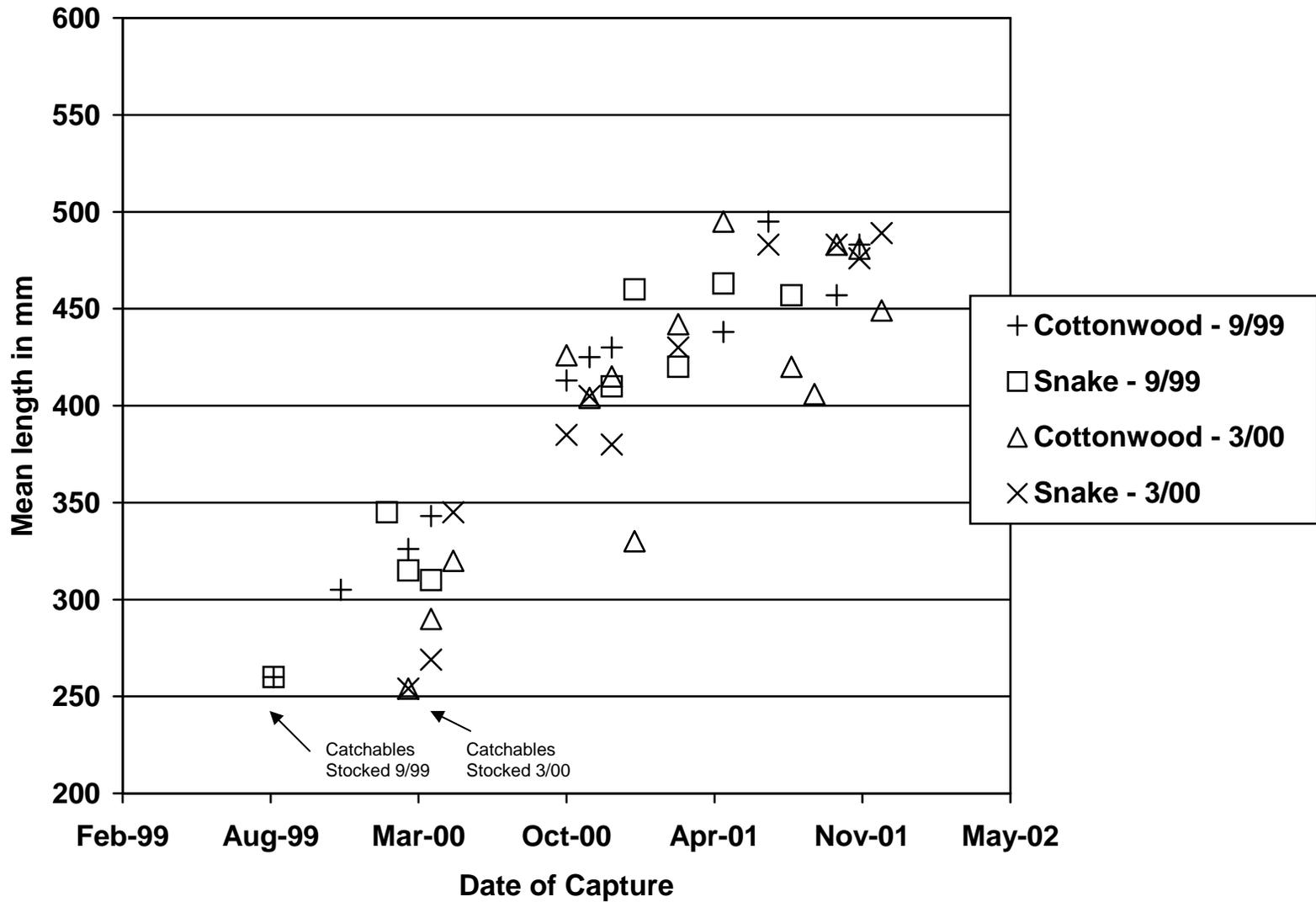


Figure 2. Growth of jaw tagged catchable rainbow trout in C.J. Strike Reservoir based on stocking location and release date. Mean monthly lengths calculated from a combination of gillnetting, electrofishing, and angler interview data.

Table 3. Total angler returns through December 22, 2000 of jaw tagged rainbow trout released in C.J. Strike Reservoir in 1999 and 2000. Returns listed by location and date of stocking and location of capture.

Location and date of stocking	Total tag return for group % ^a (number)	Percent and Total Tag Return			
		Main reservoir % (number)	Bruneau arm % (number)	Snake River above C.J. Strike Dam % (number)	Snake River below C.J. Strike Dam % (number)
Cottonwood ^b					
Fall 1999	22.3 (223/1998)	50.2 (112/223)	28.2 (63/223)	3.6 (8/223)	17.9 (40/223)
Spring 2000	25.5 (255/1999)	61.2 (156/255)	28.6 (73/255)	0.4 (1/255)	9.8 (25/255)
Snake River ^c					
Fall 1999	6.0 (60/1996)	56.7 (34/60)	6.7 (4/60)	15 (9/60)	21.7 (13/60)
Spring 2000	7.6 (76/1992)	67.1 (51/76)	7.9 (6/76)	13.2 (10/76)	11.8 (9/76)

^a Reported as twice the actual return to account for noncompliance

^b Total number of jaw tagged rainbow trout released was 1,998 on October 8, 1999, and 1,999 on March 3, 2000.

^c Total number of jaw tagged rainbow trout released was 1,996 on October 8, 1999, and 1,992 on March 3, 2000.

Recapture sampling efforts began on October 26 and continued intermittently through December 1, 2000. A total of 320 rainbow trout were collected in 7 collection days. Twenty-three (7%) of the collected fish were marked, of which, 12 were green, 10 were orange, and one was red. Twelve of the marked fish were caught in floating gill nets, 10 were caught while electrofishing at night, and one was caught while trolling a minnow type lure.

We experienced great difficulty in recapturing grit marked fingerlings. Although we delayed recapture efforts until October 2000 to allow the fish to grow large enough to be sampled effectively, our desired recapture sample of 172 grit marked fish was not reached. In an effort to increase the number of recaptures, we continued collections into early spring 2001, when five marked fish were collected. Due to the small number of recaptures, no statistical analysis to compare groups was made. If evaluations such as this are attempted in the future, boat electrofishing at night is highly recommended for recapture efforts.

Identification of the grit marked fish was problematic at times. Many of the fish identified as being marked only retained a small fleck of color. Because of the widely contrasting colors of dye used, this should not have affected our ability to differentiate which color group the fish came from. The lowest dye retention we documented in the three marked groups prior to initial release (92%) should not have hindered our ability to identify those fish in the field (Paul Janssen, IDFG personal communication). A majority of the trout we handled appeared to have been stocked as fingerlings, possibly in 1999. However, it is entirely possible that some of these were grit-marked fish and were not detected.

One of our goals in this evaluation was to assess the overall contribution of stocked fingerlings to the reservoir trout population. This proved to be very difficult. Identification of catchables and fingerlings through a pooled length frequency constructed from trout caught by anglers and electrofishing revealed no patterns enabling separation of the two. Future fingerling evaluations should include fin clipped fingerlings to enhance identification.

With the exception of the fingerlings stocked at Cottonwood access area, the growth of the marked fish was excellent. Between April and November, fingerlings released at the Loveridge Bridge and the Idaho Power boat ramp averaged 312 and 254 mm of total growth, respectively (44.6 and 36.3 mm per month). The only fish recaptured from the Cottonwood release group gained 172 mm between April and December. The mean length of captured marked fingerlings over time can be found in Figure 3.

When collection efforts resumed in 2001, an additional 116 rainbow trout were captured in 6 days. These included only five marked fish, of which three were green and two were orange. Data on all recaptured grit marked fish can be found in Table 4.

A nearly equal number of fingerlings released at the Idaho Power and Loveridge Bridge boat ramps were recaptured. Both groups grew exceptionally well, averaging over 40 mm per month between April and November 2000 (Figure 3). Only one fish from the group stocked at Cottonwood access area was recaptured. Although they had the smallest mean total length of all groups released, at 93 mm they were only 5 mm shorter than the group released at the Idaho Power site. During transport and release, they appeared healthy and no excessive mortality was observed (Dick Bittick, Transport Operator, personal communication). Water quality should not have been a factor, as it appeared normal at all sites during initial release. Fingerlings released at the Idaho Power and Loveridge Bridge boat ramps were frequently recaptured in the Bruneau Arm near the Cottonwood release site. Although the source of post-stocking mortality is unknown, it was clearly much higher than for the other stocking sites.

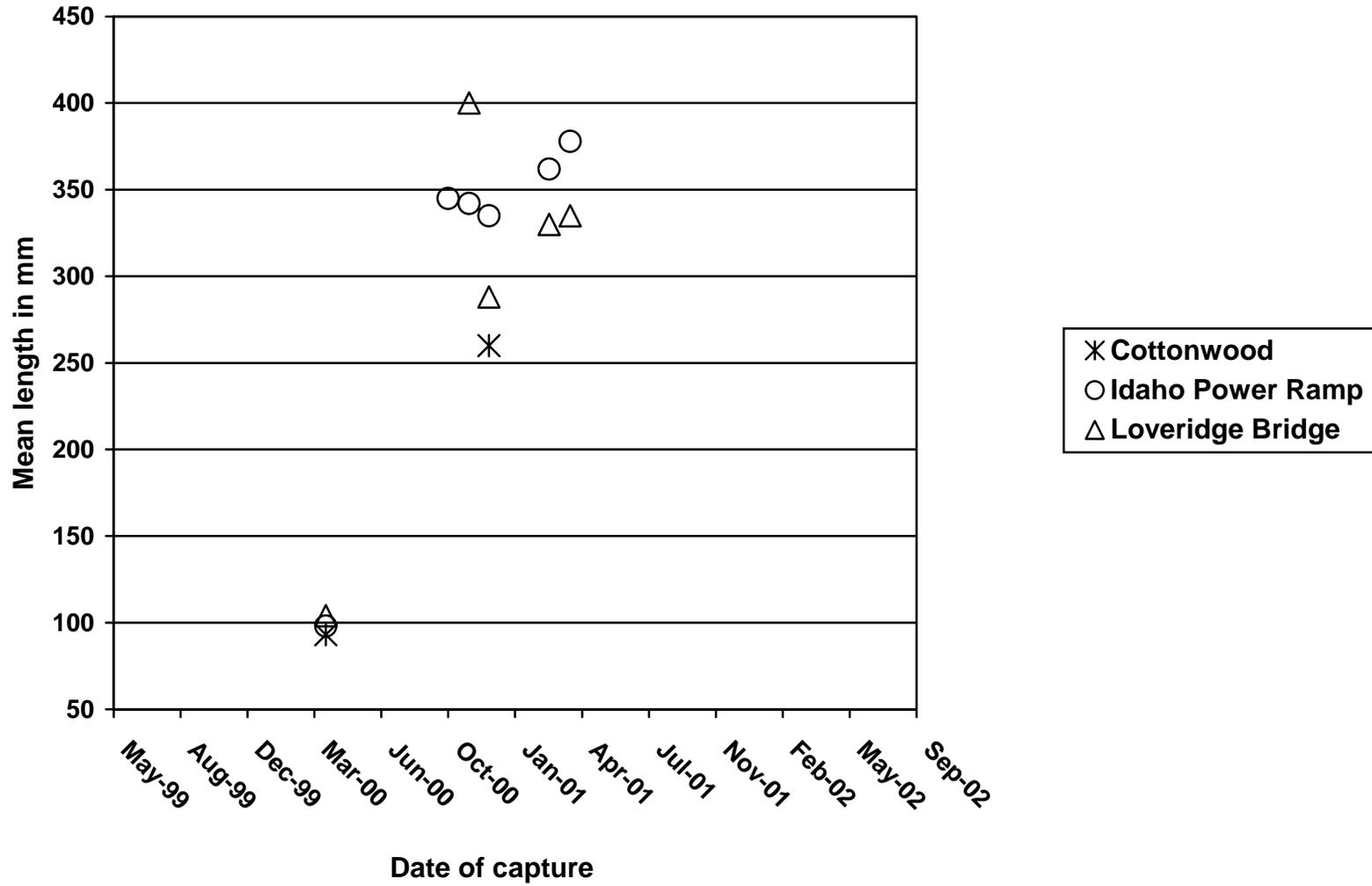


Figure 3. Growth of three groups of grit marked fingerling rainbow trout stocked in C.J. Strike Reservoir in April 2000. Mean lengths calculated from a combination of gillnetting, electrofishing, and angler interview data.

Table 4. Sampling data for three groups of grit marked fingerling rainbow trout stocked at different locations on C.J. Strike Reservoir on April 13, 2000.

Stocking location	Sample date	Length (mm)	Weight (g)	Gear type ^a
Idaho Power boat ramp				
	10/26/2000	345	475	FGN
	11/2/2000	335	434	FGN/TN
	11/2/2000	327	485	FGN/TN
	11/2/2000	330	470	FGN/TN
	11/9/2000	390	1,000	FGN
	11/9/2000	230	150	FGN
	11/9/2000	440	1,000	FGN
	12/1/2000	440	840	EF
	12/1/2000	440	1,000	EF
	12/1/2000	315	415	EF
	12/1/2000	240	140	AN
	12/1/2000	240	200	EF
	3/28/2001	370	620	EF
	3/28/2001	360	545	FGN
	3/28/2001	355	590	FGN
Cottonwood Access				
	12/1/2000	260	220	EF
Loveridge Bridge boat ramp				
	11/2/2000	420	900	FGN/TN
	11/2/2000	327	430	FGN/TN
	11/9/2000	454	1,000	FGN
	11/9/2000	430	950	FGN
	11/16/2000	370	600	FGN
	12/1/2000	310	440	EF
	12/1/2000	360	585	EF
	12/1/2000	235	130	EF
	12/1/2000	270	200	EF
	12/1/2000	265	240	EF
	3/28/2001	320	380	FGN

^a FGN=floating gill net, TN=trap net, FGN/TN=uncertain if caught in FGN or TN, EF=boat electrofishing, AN=angling

At this point, either the Idaho Power or the Loveridge Bridge boat ramps appear adequate for stocking fingerlings, but runoff conditions need to be evaluated first. If stocking when no reservoir spill is expected in the near future (inflows <15,000 ft³/s), the Idaho Power site should probably be used. This site is very close to areas that normally have excellent zooplankton production (main reservoir and Bruneau Arm). If stocking cannot be delayed to avoid spill, the Idaho Power ramp should probably be avoided due to its proximity to the dam spillway and turbine intakes. Until such a time that the Cottonwood site is reevaluated as a release site for fingerlings, it should not be used.

Although we could not reliably estimate return by weight, the good growth rates observed and large size of fish in the creel suggest that return goals were likely met. Even numeric return rates of 1-2% would have provided weight returns exceeding 100%.

Lake Surveys

Lake Lowell

A total of 244 fish were collected (Appendices B, C). Black crappie, bluegill, channel catfish, common carp, largemouth bass, largescale sucker *Catostomus macrocheilus*, northern pikeminnow *Ptychocheilus oregonensis*, smallmouth bass and yellow perch were represented in the sampling. Nongame species represented 63% of the total catch.

Electrofishing was the only sampling method successful in capturing largemouth bass, a total of three were collected. Largemouth bass adults were difficult to sample because they tended to be in the flooded brush beyond the effective reach of the electrofishing boat. No largemouth bass under 210 mm were captured or observed. As in the last spring survey of Lake Lowell in 1998 (Allen et al. 2000a), we believe spawning has been occurring and our sampling results are not likely a good indicator of over-winter survival.

A total of 50 smallmouth bass were captured, ranging in length from 60 to 305 mm. Age 0+ and 1+ smallmouth bass were well represented in the sample indicating successful spawning during 1999 and over-winter survival during 1998-99.

Bluegill were poorly represented in the catch. Only four were captured. No bluegill over 195 mm were collected. When last sampled in September 1998, the total bluegill CPUE was 65 (Allen et al. 2000a).

In the spring and summer of 2000, several anglers reported catching black crappie in the 300 mm range. Only one black crappie was collected in our sample, a 370 mm female. Although large adults are present in Lake Lowell, no age 0+ or 1+ fish were captured or observed. To date, the transfer of approximately 2,500 black crappie to Lake Lowell in 1998 has not been successful in providing a predictable fishery (Allen et al. 2000a).

Catch data for the four monitored tournaments on Lake Lowell are provided in Appendix D. A total of 312 anglers fished for 5,092 h and caught 1,853 largemouth bass and 7 smallmouth bass. The mean lengths for largemouth and smallmouth bass were 362 mm and 283 mm, respectively.

C.J. Strike Reservoir

Captured gamefish included smallmouth bass, largemouth bass, bluegill, pumpkinseed *Lepomis gibbosus*, black crappie, white crappie, warmouth *L. gulosus*, yellow perch, rainbow trout, brown bullhead *Ameiurus nebulosus*, and channel catfish (Appendix B, C). Nongame species collected included bridgelip sucker *Catostomus columbianus*, largescale sucker, chiselmouth *Acrocheilus alutaceus*, northern pikeminnow, mountain whitefish *Prosopium*

williamsoni, peamouth *Mylocheilus caurinus*, and common carp. Nongame species comprised 32 % of the total catch.

A total of 184 smallmouth bass were captured while electrofishing and gillnetting. A majority of the smallmouth bass were collected while electrofishing. Lengths ranged from 85 to 490 mm, with a mean of 204 mm (SE=5). The calculated proportional stock density (PSD) value of 16 was lower than in previous years (Table 5).

As in 1998, bluegill were only captured while electrofishing. Lengths ranged from 40 to 355 mm, with a mean of 140 mm (SE=4). Twenty-five percent of the catch was young-of-year (YOY). Hundreds of YOY were observed but not collected. The CPUE by number was 76, which was nineteen times the electrofishing CPUE in 1998 but very similar to 1997 (Allen et al. 2000b). The calculated PSD value of 49 in 2000 was very similar to three of the last four years of fish collection efforts (Table 5).

A total of 64 black crappie were captured, ranging in length from 185 to 255 mm. Although no YOY were observed or collected, 9% of the catch was less than 200 mm in length. The total CPUE was 19, slightly higher than in 1998 (CPUE=11) and very similar to 1997 (CPUE=17). Sixteen percent of the black crappie catch was 240 mm or greater in total length. In 1998 and 1997, 9% and none were 240 mm or greater in total length, respectively. The calculated PSD value of 89 in 2000 was considerably higher than in previous fish collection efforts (Table 5). No YOY were collected or observed in 1998 or 1997.

A total of 159 white crappie were captured, ranging in length from 120 to 320 mm. No YOY were observed or collected. Twenty-one percent of the white crappie catch was 240 mm or greater in length. The total CPUE was 42, which was very similar to 1998 (CPUE=37) and 1997 (CPUE=41). Anglers reported good catches of white crappie in 2000. The PSD for white crappie in 2000 was 98, continuing the increasing trend observed since 1996 (Table 5). We expect a strong year class from 1996 to provide good catches of 260 to 280 mm white crappie in 2001.

Succor Creek Reservoir

Captured gamefish included redband trout *Oncorhynchus mykiss gairdneri* and hatchery rainbow trout (Appendices B, C). Nongame species collected included bridgelip sucker and redband shiner *Richardsonius balteatus*. As in 1996, bridgelip sucker dominated samples, comprising 57% of the total catch.

A total of 25 redband trout were captured (Appendices B, C). Total lengths ranged from 210 to 435 mm. In 1996, 15 redband trout were captured and ranged from 160 to 425 mm in total length. The mean condition factor was slightly higher in 2000 than in 1996, 1.14 versus 0.89, respectively.

Fifteen hatchery rainbow trout were collected, compared to none in 1996. Lengths ranged from 210 to 315 mm, with a mean condition factor of 0.93 (Appendices B, C). All appeared to be fish from fingerling plants, suggesting good survival and growth.

Table 5. Proportional Stock Density (PSD) for bluegill, smallmouth bass, white crappie, and black crappie collected between 1995 and 2000 during lowland lake surveys of C.J. Strike Reservoir.

Year ^a	PSD			
	Bluegill	Smallmouth bass	White crappie	Black crappie
1995	50	64	50	100
1996	41	21	46	6
1997	58	26	93	63
1998	100	86	25	27
2000	49	16	98	89

^a Sample sizes in 1995 and 1998 were smaller than other years due to poor weather conditions during fish collection efforts.

Hydroacoustic Surveys

Hydroacoustic surveys and data analyses were completed by research personnel (Teuscher 2001). The amount of effort for gillnetting in each reservoir is reported in Appendix A. The length frequency and species composition of gill net catch are reported in Appendices B and C.

The sonar estimate of pelagic fish abundance in Arrowrock Reservoir was 62,000. The 90% CI was $\pm 49\%$. Fish density estimates are shown in Table 6 from Teuscher (2001). Based on the combined netting data, an estimated 65% of the fish were northern pikeminnow. Rainbow trout and smallmouth bass each comprised 11.5% of the estimated population in the reservoir.

The estimate of pelagic fish abundance in Lucky Peak Reservoir was 95,000 $\pm 12\%$. The mean density of pelagic fish in the reservoir was 86 fish/ ha. Fish densities in sonar transects ranged from 14 to 132 fish/ha (Table 7; Teuscher 2001). Table 8 (Teuscher 2001) shows netting results and sonar-expanded abundance estimates by fish species.

The sonar estimate of kokanee abundance in 2000 in Deadwood Reservoir was 266,000 $\pm 30\%$. Kokanee less than 100 mm (YOY) comprised 93% of the estimated population (Table 9, Teuscher 2001). The estimated abundance of age-1 and age-2 kokanee was 10,000 and 7,000, respectively. No previous estimates of kokanee abundance could be found for comparison.

Table 6. Fish density estimates for the sidelooking (top 8 m) and downlooking (below 8 m) transducers in Arrowrock Reservoir. Table from Teuscher (2001).

Transect	Transect length (m)	Fish densities (number / ha)		
		Sidelooking ^a	Downlooking ^b	Total
1	925	8.2	83.0	91.1
2	478	1.7	25.5	27.3
3	897	0.0	112.8	112.8
4	1,276	2.2	133.1	135.3
5	1,354	2.7	53.1	55.8
6	851	0.8	57.4	58.2
7	790	0.0	31.4	31.4
8	661	0.0	5.9	5.9
9	812	0.8	20.3	21.0
10	1,012	1.9	10.4	12.2
11	657	0.0	0.0	0.0
12	358	0.0	2.8	2.8
13	520	0.0	2.0	2.0
14	1,042	4.1	2.4	6.5
15	906	0.0	20.6	20.6
16	825	0.0	23.1	23.1
17	928	0.7	31.0	31.7
18	409	1.6	20.4	21.9
19	462	0.0	30.7	30.7
s1	807	0.8	7.0	7.8
s2	1,404	0.0	72.3	72.3
s3	228	0.0	285.6	285.6
	Mean	1.2	46.9	48.0
	S.E.	0.4	13.8	13.8

^a Top eight meters of water column.

^b Below eight meters of water.

Table 7. Transect lengths and fish densities in Lucky Peak Reservoir on June 26, 2000.
Table from Teuscher (2001).

Transect	Transect length (m)	Fish densities (number / ha)		
		Sidelooking ^a	Downlooking ^b	Total
1	1,242	3.4	10.6	14.0
2	1,338	10.4	53.3	63.7
3	1,164	9.1	90.4	99.5
4	539	0.0	65.9	65.9
5	547	7.9	51.4	59.3
6	885	2.5	54.6	57.1
7	638	3.7	106.3	110.0
8	796	1.9	95.8	97.7
9	753	1.8	116.4	118.2
10	980	1.5	82.5	84.0
11	1,284	0.5	128.9	129.4
12	774	5.1	127.2	132.3
13	426	0.9	110.1	111.0
14	1,496	0.0	102.2	102.2
15	830	1.6	76.0	77.6
16	821	6.6	115.7	122.3
17	681	1.6	61.7	63.3
18	959	0.0	122.8	122.8
19	906	0.8	74.7	75.5
20	1,023	0.0	79.4	79.4
21	784	1.3	73.3	74.6
22	526	0.0	49.8	49.8
23	679	0.0	67.3	67.3
	Mean	2.6	83.3	86.0
	90% CI	42%	13%	12%
	Abundance	3,000	92,000	95,000

^a Top eight meters of water.

^b Below eight meters of water.

Table 8. Gill net results and expanded numbers based on the sonar population estimate in Lucky Peak Reservoir. Floating gill nets were used to partition sidelooking abundance (3,000) and vertical gill nets were used to partition the downlooking estimate (92,000). Table from Teuscher (2001).

Species	Gill net proportions ^a		Sonar abundance		Total
	Floating	Vertical	Sidelooking ^b	Downlooking ^c	
Northern pikeminnow	0.60	0.31	1,795	28,308	30,103
Hatchery rainbow trout	0.10	0.23	295	21,231	21,526
Largescale sucker	0.09	0.23	270	21,231	21,501
Kokanee	0.00	0.12	0	10,615	10,615
Bridgelip sucker	0.00	0.04	0	3,538	3,538
Chiselmouth	0.17	0.04	516	3,538	4,055
Mountain whitefish	0.01	0.04	25	3,538	3,563
Wild rainbow trout	0.02	0.00	49	0	49
Smallmouth bass	<u>0.02</u>	<u>0.00</u>	<u>49</u>	<u>0</u>	<u>49</u>
Totals	1.00	1.00	3,000	92,000	95,000

^a Total number of fish captured in floating and vertical gill nets were 120 and 26, respectively.

^b Top eight meters of water.

^c Below eight meters of water.

Table 9. Transect lengths, densities and total abundance of kokanee in Deadwood Reservoir. Estimates assume all tracked fish were kokanee. Table from Teuscher (2001).

Transect		Fish densities (number / ha)				
Number	Length (m)	YOY	Age-1	Age-2	Fish >250 mm	Total
1	225	275.7	0.0	58.6	0.0	334.3
2	1,616	784.9	48.6	35.3	14.8	883.6
3	229	463.7	8.5	0.0	8.7	481.0
4	297	1,030.4	40.9	13.9	13.7	1,098.8
5	155	882.2	65.4	0.0	0.0	947.7
6	421	1,591.6	39.2	24.3	14.2	1,669.3
7	115	1,165.0	48.5	33.8	0.0	1,247.3
8	271	470.1	0.0	8.7	0.0	478.8
9	183	434.9	19.4	24.7	0.0	479.0
10	1,204	<u>539.2</u>	<u>29.1</u>	<u>23.2</u>	<u>8.4</u>	<u>599.8</u>
	Mean	763.8	30.0	22.2	6.0	822.0
	Abundance	247,000	10,000	7,000	2,000	266,000
	SE	129.3	7.1	5.7	2.1	134.7

Zooplankton Sampling

The results of 1999 and 2000 sampling are found in Table 10. In the Bruneau Arm, narrows, and main body of C.J. Strike Reservoir, the 2000 zooplankton quality indices (ZQI - a measure that includes both abundance and size) were similar to 1999. These areas of the reservoir would generally be described as moderately productive based on zooplankton size structure (Teuscher 1999). However, both abundance and size structure of zooplankton in the Snake River Arm increased from 1999 to 2000. Additional sampling in C.J. Strike Reservoir will be necessary to more clearly describe spacial and interannual variations.

From 1999 to 2000 in Lucky Peak Reservoir, ZQI increased in two sites and was similar in one site (Table 10). In Arrowrock Reservoir, ZQI decreased in all three sample sites in 2000. Again, additional sampling will be required to describe interannual variations and to relate zooplankton size structure to reservoir levels, turnover, or other factors.

Table 10. Zooplankton tow values in grams per meter sampled, zooplankton ratio (ZPR), and zooplankton quantity index (ZQI) for reservoirs sampled in 1999 and 2000. Depth of all samples was 9.1 meters.

Water	Sample location	Biomass (g/m)						ZPR		ZQI	
		1999			2000			750:/500:	2000	(500:+750):ZPR	2000
		153:	500:	750:	153:	500:	750:	1999	2000	1999	2000
C.J. Strike	Snake Arm @ Crane Falls	0.48	0.01	0.01	0.09	0.02	0.02	0	0.84	0	0.03
	Snake Arm @ Powerline	0.31	0.01	0.01	3.19	1.55	0.79	0	0.50	0	1.18
	Bruneau Arm	2.51	0.63	0.33	2.21	0.67	0.32	0.53	0.49	0.50	0.48
	Bruneau Narrows	2.89	0.98	0.51	1.42	0.68	0.43	0.52	0.63	0.78	0.70
	Near Dam	1.29	0.46	0.24	0.91	0.18	0.14	0.52	0.78	0.36	0.25
Lucky Peak	Upper	1.20	0.65	0.25	0.93	0.94	0.58	0.39	0.62	0.35	0.94
	Middle	0.90	0.42	0.28	0.32	0.23	0.22	0.66	0.96	0.46	0.44
	Lower	0.29	0.12	0.07	0.34	0.26	0.35	0.55	1.32	0.11	0.80
Arrowrock	Upper	0.45	0.43	0.25	0.55	0.30	0.20	0.59	0.66	0.40	0.32
	Middle	0.59	0.46	0.36	0.15	0.17	0.12	0.79	0.75	0.65	0.22
	Lower	1.12	0.87	0.70	0.46	0.44	0.21	0.81	0.47	1.27	0.30

RECOMMENDATIONS

C.J. Strike Reservoir Hatchery Trout Evaluations

1. If inflows to C.J. Strike Reservoir are expected to exceed 15,000 ft³/s, stocking should be delayed to avoid periods of spill over the dam.
2. To maximize the return of catchables, only stock in the springtime from the Cottonwood access area. No catchables should be stocked in the Snake River Arm.
3. Repeat catchable evaluation when flows are expected to be similar to the 1997 (above normal) water year to assess return and entrainment during extended periods of spill.
4. The Idaho Power ramp should be used for stocking fingerlings when no reservoir spill is expected. If stocking cannot be delayed to avoid periods of spill, the Loveridge Bridge boat ramp should be used. No fingerlings should be stocked at the Cottonwood access area.
5. Repeat evaluation of the Cottonwood access area as a stocking location for fingerlings when runoff conditions are similar to the 2000 water year.
6. Continue August zooplankton surveys of C.J. Strike Reservoir to describe forage availability for stocked trout. Include monthly estimates of useable trout habitat in both reservoir arms.
7. Promote the trout fishery in C.J. Strike Reservoir and the tailrace fishery it supports, and educate the public regarding the cyclic nature of the trout fishery in C.J. Strike Reservoir.

Lake Lowell

1. Strengthen the data reporting requirements of fishing tournaments to include documenting the length of released largemouth bass.
2. Conduct spot creel checks of boat and bank anglers in spring and summer of 2001; coordinate efforts with officers.

Succor Creek Reservoir

1. Continue stocking program but use sterile rainbow trout only.

Hydroacoustic Surveys

1. Continue sonar surveys of Arrowrock and Lucky Peak reservoirs to follow the changes to the fish populations from the rebuilding of Arrowrock Dam outlets.
2. Conduct annual sonar surveys of Deadwood Reservoir for kokanee age class estimates. This information will be used to correlate with catch rates and sizes, to predict future fishery, and to predict escapement/egg take.

Zooplankton Sampling

1. Collect semiannual samples from same waters to assist in determining stocking densities and to evaluate relative competition for preferred zooplankton.

LITERATURE CITED

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APPENDICES

Appendix A. Units of sampling effort^a for lowland lake sampling, 2000.

Water #	Lake/Reservoir Name	Date	Geartype	Effort
1000000118	ARROWROCK RES	6/27/00	VGN	3
1000000118	ARROWROCK RES	6/27/00	HFGN	11.5
1000000118	ARROWROCK RES	6/27/00	HSGN	11.5
0500000167	C J STRIKE RES	5/12/00	GN	5
0500000167	C J STRIKE RES	5/12/00	TN	4
0500000167	C J STRIKE RES	5/12/00	EF	1.97
1000000101	LAKE LOWELL	5/31/00	GN	2
1000000101	LAKE LOWELL	5/31/00	TN	2
1000000101	LAKE LOWELL	5/31/00	EF	0.57
1000000115	LUCKY PEAK RES	6/27/00	SGN	3
1000000115	LUCKY PEAK RES	6/27/00	FGN	3
1000000115	LUCKY PEAK RES	6/27/00	VGN	3
0500000169	SUCCOR CREEK RES	6/20/00	GN	1
0500000169	SUCCOR CREEK RES	6/20/00	TN	2

^a Units of effort: EF = electrofishing, hours of activated electrode time; GN = pairs of floating and sinking experimental gill nets set overnight; TN = number of trap nets set overnight; HFGN = number of hours floating gill nets were fished; HSGN = number of hours sinking gill nets were fished; VGN = number of vertical gill nets set overnight.

Appendix B. Number of fish collected, minimum and maximum length, mean length, weight and condition factor and standard errors, catch-per-effort (CPUE), percent of total catch by number and weight for fish collected during lowland lake sampling , 2000.

<i>Water</i>	<i>Species</i>	<i>Total Collected</i>	<i>Min Length (mm)</i>	<i>Max Length (mm)</i>	<i>Mean Length (mm)</i>	<i>SE Length</i>	<i>Mean Weight (g)</i>	<i>SE Weight</i>	<i>Mean CondFact</i>	<i>SE CondFact</i>	<i>CPUE (Number)</i>	<i>CPUE (Weight kg)</i>	<i>Percent (Number)</i>	<i>Percent (Weight)</i>
ARROWROCK RES														
6/27/00														
Floating Gill Net set														
	Largescale sucker	1	520	520	520		1350		0.96		0.09	0.11	10.00	28.67
	Northern pikeminnow	5	305	380	336	13	358	29	0.96	0.11	0.43	0.16	50.00	40.49
	Smallmouth bass	3	205	275	232	22	208	46	1.65	0.10	0.26	0.04	30.00	11.05
	Wild rainbow/redband	1	470	470	470		875		0.84		0.09	0.08	10.00	19.79
	Total	10									0.87	0.38		
Sinking Gill Net														
	Bridgelip sucker	20	245	410	333	11	398	39	1.02	0.03	1.74	0.69	7.35	5.21
	Bull trout	1	495	495	495		1050		0.87		0.09	0.09	0.37	0.69
	Largescale sucker	176	230	550	403	5	679	20	1.00	0.01	15.30	10.41	64.71	78.30
	Northern pikeminnow	45	235	470	360	9	423	25	0.85	0.02	3.91	1.63	16.54	12.27
	Smallmouth bass	29	150	320	220	11	178	28	1.40	0.08	2.52	0.46	10.66	3.47
	Wild rainbow/redband	1	210	210	210		100		1.08		0.09	0.01	0.37	0.07
	Total	272									23.65	13.29		
Vertical Gill Net														
	Hatchery rainbow	3	270	290	283	7	188	14	0.82	0.01	1.00	0.19	18.75	15.12
	Largescale sucker	1	405	405	405		575		0.87		0.33	0.22	6.25	17.44
	Northern pikeminnow	12	230	350	285	15	186	28	0.76	0.04	4.00	0.84	75.00	67.43
	Total	16									5.33	1.25		
C J STRIKE RES														
3/31/00														
Gill Net														
	Black crappie	4	195	215	206	4					2.00		1.92	
	Bridgelip sucker	36	215	540	347	14					18.00		17.31	
	Channel catfish	3	560	570	563	3					1.50		1.44	
	Chiselmouth	19	135	330	278	15					9.50		9.13	
	Hatchery rainbow	33	240	370	308	6					16.50		15.87	
	Largescale sucker	88	285	600	437	9					44.00		42.31	
	Mountain whitefish	1	285	285	285						0.50		0.48	
	Northern pikeminnow	15	150	570	335	27					7.50		7.21	
	Smallmouth bass	1	260	260	260						0.50		0.48	
	White crappie	1	305	305	305						0.50		0.48	

Appendix B. Continued

Water	Species	Total Collected	Min Length (mm)	Max Length (mm)	Mean Length (mm)	SE Length	Mean Weight (g)	SE Weight	Mean CondFact	SE CondFact	CPUE (Number)	CPUE (Weight kg)	Percent (Number)	Percent (Weight)
	Yellow perch	7	135	255	204	18					3.50		3.37	
	Total	208									104.00			
	4/4/00													
	Gill Net													
	Black crappie	2	205	220	213	8					1.00		0.87	
	Bridgelip sucker	19	150	290	212	9					9.50		8.30	
	Brown bullhead	1	190	190	190						0.50		0.44	
	Channel catfish	1	615	615	615						0.50		0.44	
	Chiselmouth	33	145	330	250	9					16.50		14.41	
	Common carp	2	500	620	560	60					1.00		0.87	
	Hatchery rainbow	15	240	380	328	12					7.50		6.55	
	Largescale sucker	121	230	570	391	8					60.50		52.84	
	Northern pikeminnow	19	150	570	266	25					9.50		8.30	
	White crappie	6	185	240	217	8					3.00		2.62	
	Yellow perch	10	145	270	217	10					5.00		4.37	
	Total	229									114.50			
	4/5/00													
	Gill Net													
	Black crappie	3	190	230	207	12					1.50		0.80	
	Bridgelip sucker	20	210	350	289	8					10.00		5.36	
	Channel catfish	10	530	600	566	8					5.00		2.68	
	Chiselmouth	8	160	345	256	23					4.00		2.14	
	Common carp	1	620	620	620						0.50		0.27	
	Hatchery rainbow	33	260	390	333	5					16.50		8.85	
	Largescale sucker	128	200	570	421	7					64.00		34.32	
	Northern pikeminnow	29	165	490	292	15					14.50		7.77	
	Smallmouth bass	3	270	410	333	41					1.50		0.80	
	White crappie	4	210	225	221	4					2.00		1.07	
	Wild rainbow/redband	3	345	435	380	28					1.50		0.80	
	Yellow perch	131	120	255	181	2					65.50		35.12	
	Total	373									186.50			
	5/12/00													
	Electrofishing													
	Black crappie	18	185	255	219	5	159	10	1.52	0.04	9.14	1.56	3.03	2.24
	Bluegill	149	40	355	140	4	109	7	2.55	0.06	75.63	6.62	25.08	9.53

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Appendix B. Continued

<i>Water</i>	<i>Species</i>	<i>Total Collected</i>	<i>Min Length (mm)</i>	<i>Max Length (mm)</i>	<i>Mean Length (mm)</i>	<i>SE Length</i>	<i>Mean Weight (g)</i>	<i>SE Weight</i>	<i>Mean CondFact</i>	<i>SE CondFact</i>	<i>CPUE (Number)</i>	<i>CPUE (Weight kg)</i>	<i>Percent (Number)</i>	<i>Percent (Weight)</i>
	Bridgelip sucker	8	135	300	241	23	192	34	1.35	0.16	4.06	0.78	1.35	1.12
	Brown bullhead	2	225	275	250	25	255	80	1.57	0.04	1.02	0.26	0.34	0.37
	Channel catfish	1	610	610	610		3500		1.54		0.51	1.65	0.17	2.37
	Common carp	7	400	750	604	43	4082	710	1.73	0.12	3.55	13.81	1.18	19.86
	Largemouth bass	23	230	465	350	15	721	91	1.49	0.04	11.68	8.41	3.87	12.10
	Largescale sucker	91	100	605	286	13	517	61	1.21	0.06	46.19	18.49	15.32	26.58
	Pumpkinseed	9	90	120	109	3	42	2	2.94	0.24	4.57	0.13	1.52	0.18
	Smallmouth bass	172	85	490	204	5	152	12	1.45	0.03	87.31	13.03	28.96	18.73
	Warmouth sunfish	14	85	130	108	4	42	5	3.00	0.24	7.11	0.28	2.36	0.40
	White crappie	31	210	270	231	2	194	8	1.56	0.05	15.74	2.86	5.22	4.12
	Yellow perch	65	80	240	126	5	65	10	1.54	0.10	32.99	1.27	10.94	1.83
	Total	590									299.49	69.15		
	Gill Net													
	Black crappie	42	190	250	215	2	162	19	1.61	0.17	8.40	1.34	8.16	2.52
	Bluegill	2	120	160	140	20	0	0	0.00	0.00	0.40	0.03	0.39	0.05
	Bridgelip sucker	2	200	320	260	60	400		1.22		0.40	0.08	0.39	0.15
	Channel catfish	22	210	760	575	24	2802	368	1.31	0.05	4.40	12.33	4.27	23.17
	Chiselmouth	52	155	510	253	8	214	27	1.13	0.04	10.40	2.16	10.10	4.07
	Common carp	4	634	680	650	11	3550	65	1.30	0.04	0.80	2.98	0.78	5.60
	Largemouth bass	1	510	510	510		2250		1.70		0.20	0.45	0.19	0.85
	Largescale sucker	144	215	575	382	7	783	51	1.11	0.03	28.80	20.45	27.96	38.42
	Mountain whitefish	4	155	335	275	41	275	78	1.18	0.08	0.80	0.22	0.78	0.41
	Northern pikeminnow	24	185	620	321	24	604	169	1.16	0.05	4.80	2.55	4.66	4.80
	Peamouth	9	260	360	324	13	353	42	1.00	0.04	1.80	0.64	1.75	1.19
	Smallmouth bass	12	195	455	277	22	380	99	1.52	0.06	2.40	0.88	2.33	1.65
	White crappie	113	120	325	227	2	164	7	1.36	0.06	22.60	3.80	21.94	7.15
	Yellow perch	41	80	255	212	5	120	9	1.21	0.08	8.20	1.04	7.96	1.95
	Total	472									94.40	48.96		
	Trap Net													
	Black crappie	4	195	240	215	9	174	16	1.75	0.09	1.00	0.16	11.43	5.77
	Bluegill	2	120	160	140	20	60	40	1.80	0.64	0.50	0.03	5.71	1.28
	Common carp	1	665	665	665		3500		1.19		0.25	1.04	2.86	38.16
	Largescale sucker	4	315	450	366	29	538	248	0.88	0.30	1.00	0.52	11.43	18.92
	White crappie	15	120	295	228	9	205	20	1.62	0.06	3.75	0.63	42.86	23.08

Appendix B. Continued

Water	Species	Total Collected	Min Length (mm)	Max Length (mm)	Mean Length (mm)	SE Length	Mean Weight (g)	SE Weight	Mean CondFact	SE CondFact	CPUE (Number)	CPUE (Weight kg)	Percent (Number)	Percent (Weight)
	Yellow perch	8	80	255	196	21	135	23	2.53	1.04	2.00	0.21	22.86	7.80
	Total	34									8.50	2.59		
	10/26/00													
	Gill Net													
	Black crappie	1	235	235	235		210		1.62		0.50	0.11	10.00	8.03
	Channel catfish	1	210	210	210		80		0.86		0.50	0.04	10.00	3.06
	Hatchery rainbow	1	315	315	315		390		1.25		0.50	0.20	10.00	14.91
	Mountain whitefish	1	280	280	280		200		0.91		0.50	0.10	10.00	7.65
	Smallmouth bass	1	395	395	395		990		1.61		0.50	0.50	10.00	37.86
	White crappie	2	245	255	250	5	228	3	1.46	0.07	1.00	0.23	20.00	17.40
	Yellow perch	3	155	240	193	25	97	38	1.19	0.06	1.50	0.14	30.00	11.09
	Total	10									5.00	1.31		
	10/27/00													
	Gill Net													
	Hatchery rainbow	44	220	470	379	12	707	47	1.23	0.03	22.00	15.55	55.70	75.58
	Largemouth bass	2	140	220	180	40	100	50	1.62	0.21	1.00	0.10	2.53	0.49
	Mountain whitefish	2	260	290	275	15	218	58	1.02	0.11	1.00	0.22	2.53	1.06
	Smallmouth bass	8	210	345	299	15	412	51	1.48	0.05	4.00	1.65	10.13	8.01
	Yellow perch	23	160	300	259	6	266	14	1.50	0.03	11.50	3.06	29.11	14.87
	Total	79									39.50	20.58		
	11/1/00													
	Gill Net													
	Channel catfish	1	440	440	440		650		0.76		0.50	0.33	0.64	0.78
	Hatchery rainbow	152	220	470	334	7	528	28	1.25	0.01	76.00	40.13	97.44	96.24
	Mountain whitefish	1	265	265	265		185		0.99		0.50	0.09	0.64	0.22
	Wild rainbow/redband	2	455	475	465	10	1150	50	1.14	0.02	1.00	1.15	1.28	2.76
	Total	156									78.00	41.69		
	11/9/00													
	Gill Net													
	Hatchery rainbow	148	210	480	302	7	429	29	1.31	0.02	59.20	25.38	96.73	97.96
	Largemouth bass	3	140	295	223	45	247	101	2.30	0.67	1.20	0.30	1.96	1.14
	Yellow perch	2	240	290	265	25	290	110	1.47	0.17	0.80	0.23	1.31	0.90
	Total	153									61.20	25.91		
	11/16/00													
	Gill Net													
	Hatchery rainbow	7	245	460	346	32	493	124	1.01	0.06	3.50	1.73	63.64	90.79

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Appendix B. Continued

<i>Water</i>	<i>Species</i>	<i>Total Collected</i>	<i>Min Length (mm)</i>	<i>Max Length (mm)</i>	<i>Mean Length (mm)</i>	<i>SE Length</i>	<i>Mean Weight (g)</i>	<i>SE Weight</i>	<i>Mean CondFact</i>	<i>SE CondFact</i>	<i>CPUE (Number)</i>	<i>CPUE (Weight kg)</i>	<i>Percent (Number)</i>	<i>Percent (Weight)</i>
	Mountain whitefish	2	210	210	210	0	75	5	0.81	0.05	1.00	0.07	18.18	3.95
	Yellow perch	2	190	230	210	20	100	40	1.01	0.14	1.00	0.10	18.18	5.26
	Total	11									5.50	1.90		
	CLAYTONIA P													
	5/2/00													
	Electrofishing													
	Bluegill	2	90	105	98	8	20	5	2.11	0.05	4.00	0.08	5.88	0.23
	Common carp	2	315	365	340	25	885	135	2.25	0.15	4.00	3.54	5.88	10.36
	Largemouth bass	30	120	370	289	17	509	57	1.67	0.04	60.00	30.54	88.24	89.40
	Total	34									68.00	34.16		
	LAKE LOWELL													
	5/31/00													
	Electrofishing													
	Bluegill	3	95	180	138	25	115	35	2.74	0.17	5.26	0.40	2.70	0.39
	Channel catfish	1	160	160	160						1.75		0.90	
	Common carp	16	410	645	477	15	1403	144	1.25	0.03	28.07	40.33	14.41	39.41
	Largemouth bass	3	210	380	318	54	500	208	1.26	0.11	5.26	2.63	2.70	2.57
	Largescale sucker	31	370	920	474	16	963	28	0.98	0.04	54.39	52.66	27.93	51.45
	Smallmouth bass	49	65	305	147	8	96	16	1.63	0.07	85.96	6.07	44.14	5.93
	Yellow perch	8	85	165	118	12	35	15	1.54	0.19	14.04	0.25	7.21	0.24
	Total	111									194.74	102.34		
	Gill Net													
	Black crappie	1	370	370	370		900		1.78		0.50	0.45	0.88	0.65
	Channel catfish	23	285	650	518	17	1643	156	1.15	0.03	11.50	19.82	20.35	28.45
	Common carp	42	390	535	472	5	1327	50	1.26	0.04	21.00	27.43	37.17	39.38
	Largescale sucker	44	400	520	459	4	998	24	1.03	0.02	22.00	21.44	38.94	30.77
	Northern pikeminnow	1	295	295	295		200		0.78		0.50	0.10	0.88	0.14
	Smallmouth bass	1	290	290	290		350		1.44		0.50	0.17	0.88	0.25
	Total	112									56.00	69.42		
	Trap Net													
	Bluegill	1	195	195	195		200		2.70		0.50	0.10	4.76	0.94
	Common carp	7	445	560	473	15	1256	125	1.17	0.05	3.50	4.56	33.33	42.86
	Largescale sucker	12	410	520	465	10	905	32	0.91	0.04	6.00	5.92	57.14	55.64
	Northern pikeminnow	1	250	250	250		120		0.77		0.50	0.06	4.76	0.56
	Total	21									10.50	10.64		

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Appendix B. Continued

Water	Species	Total Collected	Min Length (mm)	Max Length (mm)	Mean Length (mm)	SE Length	Mean Weight (g)	SE Weight	Mean CondFact	SE CondFact	CPUE (Number)	CPUE (Weight kg)	Percent (Number)	Percent (Weight)
LUCKY PEAK RES														
6/27/00														
Floating Gill Net														
	Chiselmouth	21	195	405	313	10	317	31	0.96	0.03	7.00	2.18	17.21	14.56
	Hatchery rainbow	12	160	405	220	29	190	70	1.31	0.10	4.00	0.74	9.84	4.91
	Largescale sucker	11	150	515	380	35	730	135	1.16	0.17	3.67	2.55	9.02	17.02
	Mountain whitefish	1	290	290	290		250		1.03		0.33	0.08	0.82	0.50
	Northern pikeminnow	73	165	400	327	8	365	20	0.92	0.02	24.33	8.74	59.84	58.24
	Smallmouth bass	2	200	335	268	68	375	225	1.74	0.14	0.67	0.25	1.64	1.67
	Total	120									40.00	14.54		
Set Sinking Gill Net														
	Bridgelip sucker	13	210	330	267	13	200	29	0.98	0.04	4.33	0.85	5.18	2.39
	Chiselmouth	18	185	340	277	9	208	16	0.95	0.03	6.00	1.27	7.17	3.58
	Hatchery rainbow	22	155	430	219	21	173	53	0.97	0.04	7.33	1.28	8.76	3.60
	Largescale sucker	95	180	510	370	8	567	29	1.01	0.01	31.67	18.04	37.85	50.73
	Mountain whitefish	21	280	390	342	7	391	24	0.95	0.02	7.00	2.75	8.37	7.73
	Northern pikeminnow	75	175	550	346	7	416	25	0.92	0.01	25.00	10.59	29.88	29.77
	Smallmouth bass	7	180	375	278	26	336	74	1.41	0.06	2.33	0.78	2.79	2.20
	Total	251									83.67	35.56		
Vertical Gill Net														
	Bridgelip sucker	1	272	272	272		120		0.60		0.33	0.06	3.85	2.48
	Chiselmouth	1	285	285	285		200		0.86		0.33	0.07	3.85	3.20
	Hatchery rainbow	6	145	350	198	32	103	61	0.81	0.09	2.00	0.21	23.08	9.29
	Kokanee salmon	3	160	281	237	39	142	63	0.83	0.14	1.00	0.14	11.54	6.20
	Largescale sucker	6	320	410	381	13	560	43	0.92	0.06	2.00	0.97	23.08	42.42
	Mountain whitefish	1	225	225	225		150		1.32		0.33	0.05	3.85	2.19
	Northern pikeminnow	8	190	370	306	19	303	51	0.93	0.07	2.67	0.78	30.77	34.24
	Total	26									8.67	2.29		
SUCCOR CREEK RES														
6/20/00														
Gill Net														
	Bridgelip sucker	54	155	350	225	6	120	11	1.01	0.02	108.00	10.99	60.67	41.92
	Hatchery rainbow	11	210	315	258	9	165	17	0.93	0.03	22.00	3.62	12.36	13.81
	Redside shiner	3	130	135	132	2	30	0	1.37	0.00	6.00	0.18	3.37	0.69
	Wild rainbow/redband	21	210	430	300	12	272	41	0.89	0.02	42.00	11.42	23.60	43.58
	Total	89									178.00	26.21		
Trap Net														
	Bridgelip sucker	2	165	225	195	30	80	40	0.97	0.08	2.00	0.17	20.00	6.25
	Hatchery rainbow	4	265	295	281	8	205	12	0.93	0.07	4.00	0.82	40.00	30.75
	Wild rainbow/redband	4	290	435	343	32	420	175	0.89	0.09	4.00	1.68	40.00	63.00
	Total	10									10.00	2.67		

Appendix C. Number collected by angling, gillnetting, trapnetting, and relative weight by water and size group of fish collected during lowland lake sampling, 2000.

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
C J STRIKE RES									
	3/31/00	Black crappie							
			19			1			
			20			1			
			21			2			
		Bridgelip sucker							
			21			3			
			23			1			
			27			1			
			28			2			
			29			2			
			30			8			
			31			2			
			33			2			
			35			3			
			37			1			
			39			1			
			40			1			
			44			1			
			45			4			
			47			1			
			48			1			
			51			1			
			54			1			
		Channel catfish							
			56			2			
			57			1			
		Chiselmouth							
			13			1			
			14			1			
			15			1			
			23			1			
			28			1			
			29			2			
			30			6			
			31			3			
			33			3			
		Hatchery rainbow trout							
			24			2			
			26			5			
			28			6			
			29			1			
			30			1			
			31			1			
			33			8			
			34			6			
			35			2			
			37			1			
		Largescale sucker							
			28			1			
			30			3			
			31			5			
			32			2			
			33			6			
			34			2			
			35			1			

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
				37		2			
				38		6			
				39		2			
				40		2			
				41		1			
				42		2			
				43		8			
				44		3			
				45		4			
				47		5			
				48		9			
				49		3			
				51		4			
				52		1			
				53		6			
				55		3			
				56		5			
				57		1			
				60		1			
		Mountain whitefish							
				28		1			
		Northern pikeminnow							
				15		1			
				16		1			
				29		2			
				30		3			
				33		3			
				35		1			
				42		2			
				45		1			
				57		1			
		Smallmouth bass							
				26		1			
		White crappie							
				30		1			
		Yellow perch							
				13		1			
				16		1			
				17		1			
				23		2			
				24		1			
				25		1			
	4/4/00								
		Black crappie							
				20		1			
				22		1			
		Bridgelip sucker							
				15		1			
				16		1			
				17		1			
				18		1			
				19		4			
				20		2			
				21		3			
				23		2			
				24		1			
				26		1			

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
				28		1			
				29		1			
		Brown bullhead							
				19		1			
		Channel catfish							
				61		1			
		Chiselmouth							
				14		1			
				15		1			
				16		2			
				17		1			
				19		1			
				21		3			
				22		1			
				23		3			
				24		2			
				26		4			
				27		2			
				28		4			
				29		2			
				30		1			
				31		1			
				33		4			
		Common carp							
				50		1			
				62		1			
		Hatchery rainbow trout							
				24		1			
				26		1			
				27		2			
				31		1			
				34		3			
				35		1			
				36		4			
				38		2			
		Largescale sucker							
				23		2			
				24		1			
				25		1			
				26		5			
				28		4			
				29		4			
				30		15			
				31		4			
				32		5			
				33		2			
				34		3			
				35		6			
				36		3			
				37		2			
				38		2			
				39		3			
				40		3			
				41		4			
				42		4			
				43		3			
				44		3			

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
				45		6			
				46		5			
				47		4			
				48		9			
				49		4			
				50		3			
				51		1			
				52		1			
				53		4			
				54		3			
				55		1			
				57		1			
		Northern pikeminnow							
				15		1			
				16		1			
				17		1			
				18		2			
				20		1			
				21		1			
				22		2			
				24		1			
				25		2			
				26		1			
				27		1			
				30		1			
				36		1			
				39		1			
				45		1			
				57		1			
		White crappie							
				18		1			
				21		2			
				22		1			
				23		1			
				24		1			
		Yellow perch							
				14		1			
				20		1			
				21		3			
				22		2			
				23		1			
				24		1			
				27		1			
	4/5/00	Black crappie							
				19		1			
				20		1			
				23		1			
		Bridgelip sucker							
				21		1			
				24		1			
				25		1			
				26		2			
				27		3			
				28		1			
				29		1			
				30		2			

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
				31		3			
				32		3			
				33		1			
				35		1			
		Channel catfish							
				53		1			
				54		2			
				55		1			
				56		1			
				57		1			
				58		1			
				59		1			
				60		2			
		Chiselmouth							
				16		1			
				17		1			
				24		1			
				26		2			
				29		1			
				32		1			
				34		1			
		Common carp							
				62		1			
		Hatchery rainbow trout							
				26		1			
				27		1			
				29		2			
				30		1			
				32		6			
				33		4			
				34		9			
				35		6			
				36		1			
				37		1			
				39		1			
		Largescale sucker							
				20		1			
				25		1			
				26		2			
				29		3			
				30		4			
				31		8			
				32		6			
				33		4			
				34		2			
				35		3			
				36		4			
				38		8			
				39		2			
				40		4			
				41		2			
				42		4			
				43		8			
				44		6			
				45		10			
				46		1			
				47		6			

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
				48		8			
				49		5			
				50		3			
				51		4			
				52		3			
				53		3			
				54		6			
				55		3			
				56		3			
				57		1			
		Northern pikeminnow							
				16		2			
				20		2			
				21		1			
				23		2			
				24		1			
				25		1			
				26		3			
				27		2			
				28		4			
				30		2			
				32		2			
				34		1			
				37		1			
				38		1			
				41		1			
				42		1			
				43		1			
				49		1			
		Smallmouth bass							
				27		1			
				32		1			
				41		1			
		White crappie							
				21		1			
				22		3			
		Wild rainbow/redband trout							
				34		1			
				36		1			
				43		1			
		Yellow perch							
				12		1			
				13		2			
				14		14			
				15		10			
				16		3			
				17		15			
				18		38			
				19		21			
				20		16			
				21		2			
				22		4			
				23		3			
				24		1			
				25		1			
	5/12/00	Black crappie							

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
			19			3	1		115.41
			20			13			91.72
			21			11	2		98.51
			22			6			148.21
			23			3			84.05
			24			4	1		101.49
			25			2			87.67
		Bluegill							
			12			1	1		114.77
			16			1	1		109.50
		Bridgelp sucker							
			20			1			
			32			1			
		Channel catfish							
			21			1			196.85
			43			1			166.96
			45			1			99.74
			50			1			114.37
			52			1			110.95
			55			2			110.65
			56			2			122.88
			57			1			100.40
			58			2			124.09
			59			1			134.39
			60			1			108.99
			61			1			134.29
			62			1			113.68
			64			1			134.38
			66			2			120.82
			68			1			122.02
			74			1			132.51
			76			1			151.91
		Chiselmouth							
			15			3			
			16			2			
			17			2			
			20			1			
			21			3			
			22			2			
			24			3			
			25			13			
			26			5			
			27			7			
			28			3			
			29			1			
			30			3			
			31			1			
			32			1			
			33			1			
			51			1			
		Common carp							
			63			2			
			65			1			
			66				1		
			68			1			
		Largemouth bass							
			51			1			107.41

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
		Largescale sucker							
						1			
						1			
						2			
						2			
						1			
						3			
						1			
						1			
						6			
						4			
						10	1		
						10			
						13			
						13	1		
						6			
						4	1		
						5			
						4			
						4			
						4			
						3			
						2			
						3			
						8			
						8	1		
						4			
						5			
						2			
						2			
						3			
						1			
						3			
						2			
						5			
						2			
		Mountain whitefish							
						1			136.50
						1			128.68
						1			99.85
						1			105.20
		Northern pikeminnow							
						1			
						2			
						2			
						2			
						3			
						1			
						1			
						1			
						1			
						1			
						1			
						2			
						1			
						1			
						1			
						1			
						1			

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
			55			1			
			62			1			
		Peamouth	26			1			
			27			1			
			29			1			
			33			2			
			35			2			
			36			2			
		Smallmouth bass	19			1			95.69
			20			1			95.12
			21			1			96.92
			23			1			93.92
			24			1			89.59
			25			1			94.57
			27			2			100.12
			30			1			98.97
			31			1			88.01
			37			1			123.42
			45			1			91.13
		White crappie	12			1	1		51.78
			18			1			122.40
			19			1			
			20			8			110.30
			21			15	1		103.27
			22			29	2		117.53
			23			34	7		104.40
			24			16	3		95.51
			25			4			79.89
			26			1			114.52
			28			1			87.01
			29			1	1		51.71
			32			1			28.09
		Yellow perch	8			1	1		384.02
			14			1	1		142.23
			18			4			116.44
			19			2			103.23
			20			4	1		83.36
			21			8	1		96.90
			22			9	2		80.48
			23			4			96.66
			24			6	1		84.12
			25			2	1		56.48
	10/26/00	Black crappie	23			1			102.09
		Channel catfish	21			1			104.99
		Hatchery rainbow trout	31			1			110.99
		Mountain whitefish	28			1			90.67
		Smallmouth bass	39			1			111.18

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
		White crappie		24		1			108.01
				25		1			96.64
		Yellow perch		15		1			81.90
				18		1			92.50
				24		1			84.79
	10/27/00	Hatchery rainbow trout							
				22		2			121.14
				24		1			138.78
				26		2			139.97
				27		2			128.47
				28		3			129.24
				30		2			130.19
				31		1			119.62
				33		1			117.04
				35		1			90.35
				36		1			108.19
				38		3			108.12
				40		3			103.04
				42		4			101.25
				43		4			99.04
				44		3			100.05
				45		7			89.75
				46		2			95.27
				47		2			90.62
		Largemouth bass							
				14		1			147.51
				22		1			104.66
		Mountain whitefish							
				26		1			90.84
				29		1			112.07
		Smallmouth bass							
				21		1			123.81
				27		1			107.72
				29		1			92.37
				31		1			103.14
				32		3			100.50
				34		1			105.28
		Yellow perch							
				16		1			138.60
				20		1			103.36
				23		1			103.01
				24		1			109.73
				25		3			108.79
				26		4			105.42
				27		8			96.01
				28		2			98.53
				29		1			86.62
				30		1			92.19
	11/1/00	Channel catfish							
				44		1			77.48
		Hatchery rainbow trout							
				22		4			111.00
				23		7			110.20

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
				24		14			122.70
				25		14			122.36
				26		11			110.72
				27		11			125.35
				28		5			116.69
				29		7			116.15
				30		4			112.47
				31		5			115.09
				32		3			118.40
				33		3			101.97
				34		1			120.23
				35		1			125.77
				37		2			100.32
				38		5			107.28
				39		4			111.82
				40		4			105.25
				41		8			112.84
				42		5			102.44
				43		7			102.59
				44		10			97.34
				45		9			91.14
				46		5			93.02
				47		3			87.88
		Mountain whitefish							
				26		1			99.13
		Wild rainbow/redband trout							
				45		1			100.20
				47		1			95.67
	11/9/00	Hatchery rainbow trout							
				21		6			115.77
				22		5			114.56
				23		7			118.92
				24		22			121.67
				25		24			127.54
				26		15			124.86
				27		21			115.63
				28		4			111.09
				29		1			147.08
				30		1			132.42
				31		1			119.62
				32		1			241.23
				37		1			116.08
				39		2			117.48
				40		2			104.89
				41		2			120.53
				42		9			109.95
				43		6			99.04
				44		8			98.69
				45		4			99.36
				46		2			94.22
				47		3			94.74
				48		1			96.48
		Largemouth bass							
				14		1			295.02
				23		1			113.06
				29		1			120.43

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight	
CLAYTONIA P	11/16/00	Yellow perch	24			1			89.78	
			29			1			108.27	
		Hatchery rainbow trout	24				1		86.79	
			26				1		68.06	
			27				1		91.76	
			37				1		103.72	
			39				1		95.45	
			42				1		102.72	
			46				1		73.97	
		Mountain whitefish	21				2		81.43	
	Yellow perch	19				1		63.65		
		23				1		80.12		
		5/2/00	Bluegill	9		1				117.44
			10			1				117.40
	Common carp		31			1				
			36			1				
	Largemouth bass		12			2				96.48
			13			2				132.52
			14			1				118.70
			16			1				148.47
	17				1				182.63	
	19				1				133.27	
	28			3				117.54		
	31			2				110.98		
	33			2				135.89		
	34			3				112.53		
	35			3				111.05		
	36			6				114.01		
	37			3				108.96		
LAKE LOWELL	5/31/00	Black crappie	37				1		95.85	
		Bluegill	9		1					
			14		1					144.72
			18		1					117.93
			19					1		120.58
		Channel catfish	16		1					
			28					1		146.24
			42					2		127.52
			47					3		106.18
			48					1		112.37
			49					1		102.58
			50					1		110.25
			51					3		114.39

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
			52			2			108.45
			53			1			126.47
			54			1			128.84
			55			2			109.57
			60			1			89.37
			61			1			86.78
			63			1			122.82
			65			2			117.70
		Common carp							
			39			1			
			41		1	1			
			42		2	1			
			43		3	2			
			44			1	1		
			45		1	5	2		
			46		1	6	1		
			47		1	4	2		
			48		1	10			
			49		2	2			
			50			4			
			51		1	2			
			52		1	1			
			53			2			
			54		1				
			56				1		
			64		1				
		Largemouth bass							
			21		1				80.93
			36		1				83.26
			38		1				97.63
		Largescale sucker							
			37		1				
			40			1			
			41		1	2	1		
			42			3			
			43		4	6	1		
			44		3	5	1		
			45		6	2	3		
			46		3	8	2		
			47		6	5			
			48		2	2	1		
			49			3			
			50			5	1		
			51		2	1			
			52		1	1	2		
			53		1				
			92		1				
		Northern pikeminnow							
			25				1		
			29			1			
		Smallmouth bass							
			6		1				
			7		4				
			8		3				
			9		2				
			11		1				
			12		1				151.01

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
			13		10				136.23
			14		10				112.07
			15		4				143.50
			16		3				102.30
			17		2				126.55
			19		1				97.04
			21		1				86.41
			24		1				113.21
			25		1				81.76
			26		1				112.83
			27		2				118.49
			29			1			101.03
			30		1				84.13
		Yellow perch							
			8		2				
			9		1				
			10		2				144.08
			15		2				102.38
			16		1				
SUCCOR CREEK RES									
	6/20/00								
		Bridgelip sucker							
			15			1			
			16			3	1		
			17			7			
			18			1			
			19			3			
			20			3			
			21			3			
			22			4	1		
			23			9			
			24			9			
			25			3			
			27			2			
			28			1			
			29			1			
			30			1			
			31			1			
			33			1			
			35			1			
		Hatchery rainbow trout							
			21			1			99.95
			22			1			86.53
			24			2			79.30
			25			3			85.71
			26				1		92.37
			27				1		91.76
			28			3			86.68
			29				2		74.98
			31			1			71.15
		Redside shiner							
			13			3			
		Wild rainbow/redband trout							
			21			1			79.96
			22			2			86.53
			24			1			92.52
			25			2			76.02

Appendix C. Continued

Water	DATE	SPECIES	CM Group	Number Caught Angling	Number Caught Electrofishing	Number Caught in Gill Nets	Number Caught in Trap Nets	Total Caught	Relative Weight
				29		2	1		74.77
				30		3			80.73
				31		2	1		72.42
				32		3			78.07
				33		1	1		74.59
				34		2			65.90
				38		1			97.82
				43		1	1		98.05

Appendix D. Lake Lowell tournament angling information collected in 2000.

Date	Number of anglers	Number of hours fished	Total catch		Mean total length	
			LMB	SMB	LMB	SMB
4/15/00	178	3560	640	7	362	334
4/29/00	53	804	521		365	
5/13/00	65	568	625		363	
8/19/00	16	160	69		328	

2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-25

Project I: Surveys and Inventories

Subproject I-D: Southwest Region

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Title: Rivers and Streams Investigations

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

ABSTRACT

Grimes Creek and Mores Creek were electrofished on August 8 and 9, 2000 to conduct two-pass population estimates for rainbow (redband) trout *Oncorhynchus mykiss* in each stream. A total of five sections were electrofished in each stream. Population estimates were calculated for rainbow trout. Catchable rainbow trout were sampled in Grimes Creek at two sections, and in Mores Creek at two sections. Densities of rainbow trout ranged from 0 to 0.47 fish per 100 m² in Grimes Creek and from 0.45 to 2.35 fish per 100 m² in Mores Creek. No bull trout *Salvelinus confluentus* were sampled in either stream.

Sixteen sites in the Yuba River drainage were electrofished July 18-20. Fourteen sites contained wild rainbow trout, and bull trout were found in four.

Snorkeling was conducted in eleven locations of the Middle Fork Boise River (MFBR), three in the Yuba River, and eleven sites in the North Fork Boise River (NFBR). All MFBR snorkel locations were repeats of sites done in 1988 and 1993. Data from the NFBR was compared against snorkeling information collected prior to and following major landslide events that occurred in early September 1995. Wild rainbow trout densities in the MFBR were generally equal to or greater than those observed in 1993 and 1988. Hatchery rainbow trout were less abundant in nearly all areas. Bull trout abundance increased in three MFBR sites. All sites in the Yuba River and NFBR contained redband trout. Four of the NFBR sites contained bull trout. Redband trout densities above the NFBR landslide area were generally lower than observed in 1996, while in and downstream of the slide areas were basically unchanged.

A fish trap was operated in the Kirby Dam fish ladder for 111.5 h in July. A total of 20 fish were collected, including 9 bull trout.

The South Fork Boise River from the Village Access downstream to 1.1 km below the Cow Creek Bridge was electrofished in fall 2000. A population estimate of 5,108 rainbow trout >129 mm was generated for the sample. A total of 532 rainbow trout >129 mm per km and 416 rainbow trout >239 mm per km were estimated to occupy the sampled reach. Total abundance estimates were similar to 1997 estimates but significantly lower than 1994 estimates. Abundance of large (>400 mm) fish increased substantially from 1994 to 2000 (71/km to 180/km). Quality stock density (rainbow trout over 400 mm divided by rainbow trout greater than 200 mm) increased from 20% to 59%.

Snorkel surveys were conducted in Elk and Sulphur creek trend areas August 14-17, 2000. Densities of age zero Chinook salmon *Oncorhynchus tshawytscha* ranged from 0.08 to 0.63 fish/100m² in Elk Creek, and from 0.07 to 0.32 fish/100m² in Sulphur Creek.

Chinook salmon spawning ground surveys were conducted in Bear Valley, Elk, and Sulphur creek trend areas on August 28-30, 2000. Salmon redds numbered 69, 83, and 5 in Bear Valley, Elk, and Sulphur creek trend areas, respectively.

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OBJECTIVES

1. 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.

METHODS

River and Stream Surveys

Grimes and Mores Creeks

Electrofishing

Surveyed stream transects were established in representative stream reaches. Top and bottom transect boundaries were selected at locations which would curtail fish escapement and allow the lengths of sample sections to reach 100 m when possible.

Five sites on Grimes Creek and five sites on Mores Creek were surveyed in August 2000. A Smith-Root model 15-B backpack electrofishing unit was used for two-pass population depletion estimates. Fish from each pass were kept separate and alive in holding pens. Each fish was measured to the nearest mm and weighed to the nearest gram. Population estimates and confidence intervals were calculated by utilizing the MicroFish 3.0 program developed by Van Deventer and Platts (1989). Fish densities were calculated by dividing the population estimate by sampled area and reported as fish/100 m². Whole fish samples were taken for identification purposes.

Snorkeling

Snorkel counts were conducted with two snorkelers moving upstream through the section identifying fish species and sizes, and recording information on waterproof tablets. Snorkel sections were then measured (length and minimum of four widths) to calculate area surveyed. Physical habitat measurements were made and recorded according to habitat type, substrate particle size, depth and water temperature.

Yuba River Drainage

Electrofishing

During July 18-20, 2000, two 2-man crews used backpack electrofishing to conduct two-pass depletion estimates in five Yuba River tributaries and three mainstem reaches. All transect locations were recorded using a Global Positioning System (GPS) receiver. The length, width, and substrate types were recorded. Transects were physically marked by nailing an engraved 10 x 15 cm galvanized steel marker to a nearby tree. Electrofishing sites were named based on their distance (in miles) from their confluence with another named tributary. Data were entered into the regional stream database, and a summary report was calculated for each individual transect site.

Snorkeling

Snorkel survey methods were used to identify and count fish species on July 25, 2000. Two snorkelers worked upstream in the sample transects counting and identifying fish. A third person walked the shoreline recording data relayed to him by the snorkelers. Stream measurements and physical habitat were recorded as for Grimes and Mores creeks. Snorkel locations were in the general vicinity of obvious geographic features, such as roadway milemarkers. All transect locations were recorded using a Global Positioning System (GPS) receiver. Data were entered into the regional stream database, and a summary report was calculated for each individual transect site.

Middle Fork Boise River Snorkeling

Between July 20 and July 26, snorkel survey methods were used to identify and count fish species in the Middle Fork Boise River (MFBR). All snorkel locations were repeats of sites surveyed in 1988 (Rohrer 1989) and 1993 (Allen et al. 1996). Methods were similar to those for the Yuba River, with two snorkelers and one person recording data.

North Fork Boise River Snorkeling

Snorkel survey methods were used to identify and count fish species and numbers in the North Fork Boise River (NFBR) during July and August 2000. Information was collected to document the effects of major landslide events that occurred in early September 1995 between Crooked River and Deer Park. Data from snorkeling sections were compared against 1988 (Rohrer 1989) and 1996 (Allen et al. 1999) snorkeling results.

Kirby Dam Fish Ladder

In July 1999 the construction of a slot-type fish ladder was completed at Kirby Dam on the Middle Fork Boise River, near the town of Atlanta. Prior to the completion of the fish ladder, Kirby Dam blocked upstream fish passage for approximately 90 years. Between July 17 and July 27, 2000, a fish trap was installed in the ladder in an attempt to capture large adult adfluvial bull trout *Salvelinus confluentus* migrating upstream from Arrowrock Reservoir. Our intentions were to use telemetry to reach two objectives: 1) to identify spawning areas in tributaries upstream of Kirby Dam, and 2) establish bull trout redd count trend areas.

The trap consisted of two steel grates, each installed in a vertical slot of the fish ladder. The grate on the downstream side of the trap contained a 75 x 205 mm opening to allow fish to enter the trap; the upstream side grate allowed only water passage. Two locations of the ladder were used for trapping, near the top of Kirby Dam (in vertical slots numbered 10 and 11, as counted from the upstream end of ladder moving downstream) and very close to the downstream ladder inlet (in vertical slots numbered 14 and 15, as counted from the downstream end of the ladder moving upstream). The trap was checked for fish twice daily, in the morning and evening. The trapping period was chosen to approximately coincide with bull trout migratory movements documented in July 1998 and 1999 (Flatter 1998, 1999). When fish were captured, a third grate was installed which covered the opening in the downstream grate, and fish were removed with long handled dip nets. All collected fish were identified to species, weighed (g), measured (mm), and released upstream of the ladder.

Snorkeling was conducted in the first 100 m of river downstream from the ladder inlet prior to trap installation to determine if large bull trout were in the area. The technique used to implant radios is outlined in Flatter 1998. Implanted radios were manufactured by Advanced Telemetry Systems (ATS, Inc., Insanti, MN), and a 2% (or less) of body mass guideline was used to determine the appropriate radio size for each bull trout (Marty and Summerfelt 1986).

South Fork Boise River Electrofishing

A mark-recapture trout population estimate was attempted on the special regulations section of the South Fork Boise River below Anderson Ranch Dam. Comparable surveys were completed on this section in 1994 and 1997. The survey section extended from the Village access area to a take-out approximately 1.1 km downstream from the Cow Creek Bridge, a distance of 11.4 km.

Electrofishing equipment included a raft, two booms (anodes) each supporting a 76 cm ring from which 8 dropper electrodes were suspended, 11 m of 0.95 cm diameter stainless steel cable (cathode), and a Coffelt VVP-15. The VVP settings used to collect fish were 400 V and approximately 3 A, direct current. One person rowed the raft and one person actively attempted to capture all trout. River flow during electrofishing was approximately $8.5\text{m}^3\text{sec}^{-1}$.

Mark and recapture runs were conducted October 18-19, and November 1-2, 2000, respectively. The river was also stratified into an upper and lower section to evaluate the need to sample the entire 11.4 km reach in future surveys. The upper section was from the Village Access to the run above Indian Rock pool (6.5 km). The lower section was from Indian Rock pool to the take out (4.9 km). During mark runs, trout collected were marked by notching an

area on the upper caudal fin or an area on lower part of the caudal fin for the upper and lower sections, respectively. During recapture runs, trout were marked by notching the anal fin. All trout collected were measured to the nearest mm and weighted to the nearest g. During recapture runs, trout were measured and examined for caudal fin clips.

Population estimates and standard errors were calculated using the modified Petersen population and variance estimators (Seber 1973). Estimates were calculated by pooling mark-recapture data for all trout >129 mm. There were no recaptures for fish <129 mm. Population estimates were calculated for rainbow trout >129 mm, and >239 mm. These length groups correspond to estimates made in 1994 and 1997 (Allen et al. 2000a and 2000b).

Chinook Salmon Surveys

Parr Monitoring

Chinook salmon *Oncorhynchus tshawytscha* parr monitoring snorkel counts were conducted in August on established sections of Elk and Sulphur creeks. Two snorkelers moved upstream through the trend sections identifying fish species and sizes, and recording information on waterproof tablets. Snorkel sections were then measured (length and a minimum of four widths) to calculate area surveyed. Physical measurements were recorded concerning habitat type, substrate particle size, depth and water temperature.

Redd Counts

From August 23-25, 2000 redds were enumerated on established sections of Bear Valley, Elk, and Sulphur creeks. Global Position coordinates were taken at each identified redd according to criteria described in the draft Idaho Redd Counting Manual (IDFG unpublished). Carcasses encountered were identified as to sex and measured (fork length, and MEPS length) where possible. Scale samples were taken along with otoliths when possible to age fish. A fin clip was taken for DNA analysis. Live fish observed were visually identified as to sex and approximate ocean age (jacks, II, or III) when possible.

RESULTS AND DISCUSSION

River and Stream Surveys

Grimes and Mores Creeks

Electrofishing

Five sites were electrofished in the Grimes Creek drainage, one at the mouth, two in the middle reach, and two in the upper reach. Two-pass depletion population estimates ranged from 0 to 8 rainbow trout per transect, with densities ranging from 0 to 0.5 trout per 100 m² (Table 1). Length frequencies and general transect information are summarized in Appendix A.

Four sites were electrofished and one site was snorkeled in the Mores Creek drainage. Two-pass depletion population estimates ranged from 3 to 12 rainbow trout per transect, and densities ranged from 0.45 to 2.90 trout per 100 m² (Table 1).

Snorkeling

The lower site on Mores Creek was snorkeled due to the depth of the run sampled (average depth 0.74 m). A total of seven rainbow trout were observed for a density of 0.58/100 m². Two smallmouth bass *Micropterus dolomieu* were also observed in this section of Mores Creek (density of 0.17/100 m²). Length frequencies and general transect information are presented in Appendix A.

Table 1. Wild rainbow trout population estimates and densities in the Grimes Creek and Mores Creek drainages, August 2000.

Section name	UTM coordinates	Date collected	Population estimate (95% CI)	Density trout/100 m ²
Grimes Creek				
Grimes Pass	593581/4872576	8/8/00	3 (1.7-3)	0.43
Culvert	591809/4867981	8/8/00	4 (4-5.9)	0.47
Section 3	586581/4854711	8/8/00	0 ^a	0
Section 4	583193/4848352	8/8/00	2 (2-14.7)	0.24
Mouth	584388/4841826	8/8/00	8 (8-11.3)	0.50
Mores Creek				
Mine Ditch	594213/4854605	8/9/00	3 (3-6.3)	0.87
Tenmile	603626/4861045	8/9/00	7 (7-8)	2.90
Granite Creek	597199/4853559	8/9/00	3 (3-6.2)	0.45
Thorn Creek	586873/4844145	8/9/00	12 (8-34.9)	2.35
Wilderness Bridge	582177/4835653	8/9/00	7 ^b	0.58

^a No RBT sampled.

^b Snorkel survey.

Yuba River Drainage

Electrofishing

Fourteen of the sixteen sites contained wild rainbow trout, and bull trout were found in four. In sites containing wild rainbow trout, densities ranged from 2.3 fish/100 m² in Decker Creek to 12.3 fish/100 m² in Grouse Creek (Table 2). One 100 mm bull trout/brook trout *Salvelinus fontinalis* hybrid was captured near the mouth of Sawmill Creek. Observed bull trout densities were very low. Multiple bull trout were collected only in upper Grouse Creek (two total). Length frequencies for species observed and general transect information are summarized in Appendix B.

Snorkeling

Three transects were snorkeled in the Yuba River on July 25. All sites contained redband trout, with densities ranging from 0.15 to 8.76 fish/100 m² (Table 3). Length frequencies and general transect information are presented in Appendix B.

Table 2. Densities and population estimates of wild rainbow trout collected while electrofishing in the Yuba River drainage, July 2000.

Location/ section name	UTM location	Population estimate (95% CI) ^a	Density (fish/100 m ²) ^a
Decker Cr./D0.0	649471/4847642	10 (10-13)	2.3
Decker Cr./D0.1	650977/4847542	19 (15-34)	5.9
Decker Cr. / D0.4	653416/4847510	11 (11-14)	5.4
Grouse Cr. / G0.0	651160/4847490	6 (6-7)	3.1
Grouse Cr. / G0.1	652016/4846135	7 (7-8)	8.3
Grouse Cr. / G0.2	651286/4847061	9 (9-11)	12.3
Grouse Cr. / G0.3	651362/4846874	5 (5-7)	2.8
James Cr. / J0.2	646855/4851071	8 (8-10)	7.1
James Cr. / J1.2	646380/4850623	6 (6-7)	5.9
James Cr. / J2.0	645655/4849214	0 ^b	0
Sawmill Cr. / SM0.0	651348/4846890	0 ^b	0
Trail Cr. / T0.2	649463/4846490	2 (2-15)	3
Trail Cr. / T0.5	649661/4846270	5 (5-7)	4.1
Yuba River / Y0.2	649379/4847272	12 (12-13)	4.2
Yuba River / Y4.2	648965/4846215	8 (8-10)	2.6
Yuba River / Y4.7	648598/4845545	14 (13-19)	3.9

^a Fish greater than or equal to 100 mm in total length.

^b No fish captured or observed.

Table 3. Densities of rainbow trout observed while snorkeling in the Yuba River, July 25, 2000.

Section	Wild rainbow trout density (fish/100 m ²)				All sizes
	0-101 mm	102-203 mm	204-304 mm	>304 mm	
YU-0	0.15	0	0	0	0.15
YU-1	0.30	0.30	0	0	0.60
YUB-2	5.15	2.58	1.03	0	8.76

Middle Fork Boise River Snorkel Survey

A total of 11 transects were snorkeled in the MFBR between July 20 and July 26. All sites contained redband trout, three had bull trout, and two contained brook trout. Wild redband trout densities in most areas were equal to or greater than those observed in 1993 and 1988 (Table 4). Hatchery rainbow trout were less abundant in nearly all areas. Bull trout abundance increased in three sites. Length frequencies for species observed and general transect information is presented in Appendix C.

Table 4. Densities of rainbow trout and bull trout observed using snorkeling techniques in the Middle Fork Boise River, 1988, 1993, and 2000.

Section	Year	Wild rainbow trout density (fish/100 m ²)				Bull Trout	
		0-101 mm	102-203 mm	204-304 mm	>304 mm	All Sizes	Hatchery Rainbow Trout
Leggit Ck.	2000	0.26	0.77	0	0	0	0
8	2000	0	0.07	0.21	0.07	0	0
11	1988	0	0.84	0.06	0	0	0.28
	1993	0.34	0.89	0.83	0.05	0	0.10
	2000	0.18	0.64	0.32	0.27	0	0.05
14	1988	0.14	0.79	0.07	0	0	0.14
	1993	0.59	0.93	0.66	0.20	0.07	0.13
	2000	0.12	0.30	0.24	0.12	0	0
18	1988	0.05	0.38	0.28	0.05	0	1.09
	1993	0.70	1.31	0.14	0.14	0.05	0.05
	2000	1.06	2.11	0.82	0.23	0	0
23	1988	0	0.06	0.93	0	0	0.81
	1993	0	0.03	0.08	0.08	0	0
	2000	0.05	0.05	0.30	0.05	0	0

Table 4. continued

Section	Year	Wild rainbow trout density (fish/100 m ²)				Bull Trout	
		0-101 mm	102-203 mm	204-304 mm	>304 mm	All Sizes	Hatchery Rainbow Trout
26	1988	0.03	0.10	0.51	0	0.07	0.07
	1993	0.06	0.16	0.06	0.02	0	0.12
	2000	0.41	1.47	0.57	0.16	0.41	0.33
27	1988	0	0.31	0.87	0	0	6.53
	1993	0	0.25	0.10	0.05	0.05	0.25
	2000	0.69	1.91	0.38	0	0.61	0
30	1988	0.18	0.55	1.28	0	0.09	0.27
	1993	0.08	0.08	0.16	0	0	0.08
	2000	1.76	2.11	0.56	0.42	0.14	0
34	2000	0.56	1.80	0.11	0	0	0.22
35	1988	0.05	1.03	0.89	0	0	2.48
	1993	0.32	0.58	0.21	0	0.05	3.56
	2000	1.56	1.95	0	0	0	1.47

North Fork Boise River Snorkel Survey

A total of ten sites were snorkeled in the North Fork Boise River, five between the mouth of Rabbit Creek and Deer Park (identified as sections 2 and 3) and the remainder upstream from Deer Park (identified as section 4). Sections 2 and 3 were snorkeled on July 24 and section 4 on August 1-2, 2000. All sites contained redband trout. Four of the sites above Deer Park contained bull trout. Redband trout densities above the landslide area were generally lower than observed in 1996, while densities in and downstream of the slide areas were basically unchanged. The general trend for mountain whitefish *Prosopium williamsoni* was an increase in density. A summary of 1988, 1996 and 2000 fish densities is found in Table 5. Length frequencies for all species observed are presented in Appendix D.

Kirby Dam Fish Ladder

The trap was used at the upper site July 17-20, 2000, dismantled the evening of July 20, reinstalled at the lower site July 25, and removed from the ladder the evening of July 27. Total hours of trapping for the upper and lower sites were 63.5 and 48 h, respectively.

A total of 20 fish were collected, including wild and hatchery rainbow trout, westslope cutthroat trout *O. clarki*, brook trout, and bull trout. Bull trout represented 45% of the total catch. No fish were killed during the trapping process.

Two bull trout were captured in four days of trapping at the upper site and seven were collected in three days of trapping at the lower site. Bull trout total lengths and weights ranged from 185 to 265 mm, and 30 to 145 g, respectively. Although snorkeling conducted on July 17 indicated that three large (>350 mm) bull trout were in a pool less than 50 m downstream from the entrance to the ladder, none of these fish entered the ladder trap. The catch rates for bull trout in the upper and lower sites were 0.031/h and 0.146/h, respectively. Data for all captured species can be found in Table 6.

Most bull trout captured were too small for a radio. However, one bull trout (265 mm, 145 g) was implanted with a 3.6 g transmitter (150.303 MHz, theoretical battery life of two months). Telemetry work conducted on July 26 indicated that the bull trout had moved approximately 3 km upstream to a pool near the first bridge crossing of the Yuba River. No redds or other bull trout were observed in the area. No attempts were made to relocate the fish after July 26. We were unable to trap any other bull trout large enough to implant with a radio.

When bull trout collections are conducted in the future, the trap should be installed at the lower site and collection efforts should focus on the last week of June and the first two weeks of July. Advantages of the lower site include ease of trap installation and removal, operation, and increased bull trout catch as compared to the upper site. Although we observed several adult bull trout in the river immediately downstream from the ladder while snorkeling, we feel our trapping may have missed the peak movement of adfluvial adults.

Although we were unsuccessful in meeting our objectives, this project should be repeated as soon as possible to help monitor use of the fish ladder and recovery of bull trout in the Boise basin.

Table 5. Comparison of August fish densities (number/100 m²) for the North Fork Boise River from Rabbit Creek to Graham, 1988 versus 1996 and 2000.

	Year	<u>Wild rainbow trout length (mm)</u>				<u>Bull trout</u>	Mountain Whitefish	Hatchery rainbow trout
		0-100	100-200	200-300	>300	All Sizes		
Section 1 ^a	1988	0.07	0.40	0.38	0.12		1.37	0
	1996	0	0.02	0.06	0.07		0.84	0.08
	2000	n/a	n/a	n/a	n/a	0	n/a	n/a
Section 2 ^b	1988	0.05	0.13	0.02	0		0.22	0.36
	1996	0	0.09	0	0.04		0.23	0.11
	2000	0	0	0.09	0	0	0.34	0.09
Section 3 ^c	1988	0.17	0.64	0.21	0		0.82	0.29
	1996	0	0.15	0.08	0		0.21	0.09
	2000	0.08	0.15	0.11	0.04	0	2.01	0.23
Section 4 ^d	1988	0	0.51	0.59	0.08	0.47	4.73	0
	1996	1.01	5.43	2.54	1.09	0.34	2.31	1.41
	2000	0.71	1.89	1.83	0.15	0.71	3.98	0.03

Footnotes: ^aSection 1 – Confluence with Middle Fork Boise River to Rabbit Creek, unroaded (not sampled in 2000)

^bSection 2 – Rabbit Creek to Crooked River mouth, roaded section

^cSection 3 – Crooked River to Deer Park, roaded section

^dSection 4 – Deer Park to Graham, unroaded section

Table 6. Fish captured in Kirby Dam fish ladder trap between July 17 and July 27, 2000.

Species ^a	Length (mm)	Weight (g)	Date collected	Time collected
BLT	265	145	7/17/00	between 1630 and 2030
BRK	200	55	7/17/00	between 1630 and 2030
-----No Fish Caught-----			7/17-7/18/00	between 2030 and 0830
BLT	195	30	7/18/00	between 0830 and 1700
WRB	260	n/a	7/18/00	between 0830 and 1700
WRB	260	140	7/18/00	between 1700 and 2130
WRB	190	50	7/18/00	between 1700 and 2130
WCT	245	100	7/18/00	between 1700 and 2130
HRB	270	170	7/18-7/19/00	between 2130 and 0830
WRB	270	160	7/18-7/19/00	between 2130 and 0830
HRB	245	145	7/19/00	between 0830 and 1700
WRB	285	190	7/19/00	between 0830 and 1700
HRB	350	150	7/19-7/20/00	between 1700 and 0800
BLT	190	45	7/25-7/26/00	between 1730 and 0930
BLT	185	40	7/25-7/26/00	between 1730 and 0930
BLT	195	55	7/25-7/26/00	between 1730 and 0930
BLT	190	45	7/26/00	between 0930 and 2200
BLT	205	60	7/26-7/27/00	between 2200 and 0930
HRB	265	n/a	7/26-7/27/00	between 2200 and 0930
BLT	220	80	7/27/00	between 0930 and 1730
BLT	185	50	7/27/00	between 0930 and 1730

^a BLT = bull trout, BRK = brook trout, WRB = wild rainbow trout, WCT = westslope cutthroat trout, HRB = hatchery rainbow trout

South Fork Boise River Electrofishing

Bull trout and rainbow trout were collected during electrofishing. In addition, mountain whitefish, bridgelip sucker *Catostomus columbianus*, largescale sucker *C. macrocheilus*, northern pikeminnow *Ptychocheilus oregonensis*, dace *Rhinichthys spp.* and sculpin *Cottus spp.* were observed but not collected.

The mean number of rainbow trout collected per day of electrofishing in 2000 was 155, compared to 149 per day in 1997 (Allen et al. 2000b and Allen et al 2000a). Flows during electrofishing were approximately 8.5 m³ sec⁻¹ in 1997 and 2000. During 1994 electrofishing, catch per day was 291 at flows of 8.5 m³ sec⁻¹ and 199 when flows were 17 m³ sec⁻¹. Greater daily catch was related to lower flow (Allen et al. 2000a).

Mark-recapture data for rainbow trout by cm size group are provided in Table 7. The pooled population estimates for rainbow trout >129 mm and >239 mm were 5,108 and 3,995, respectively (Table 8). In 1997, pooled population estimates for >129 mm and >239 mm rainbow trout were 5,345 and 4,043, respectively. Population estimates for 1997 and 2000 were not significantly different (P>0.05). The overall population estimate for fish >129 mm in 2000 was significantly lower (P<0.05) than the 1994 estimate of 8,093.

Size structure of the rainbow trout population has changed significantly since 1994. QSD (400 mm) increased from 19% in 1994 to 38% in 1997 and 59% in 2000 (Figure 1). Abundance estimates for fish > 400 mm increased from 686 (71/km) to 1,725 (180/km) over this time. Improved water conditions since the mid-1990s may have improved survival or growth rates for adult fish even though overall densities are slightly lower.

Low recapture rates precluded separate population estimates for fish <239 mm. However, proportion of 100-239 mm fish in the cumulative sampling effort has decreased from 34% in 1994 to 17% in 2000. It is unclear whether this reflects a long-term decline in recruitment or merely changes in sampling efficiency or effort. Although *Myxobolus cerebralis*, the causative agent of whirling disease, was detected in this drainage in 1995, there is no indication of a catastrophic reduction in recruitment sometimes associated with whirling disease outbreaks (Figure 2). Continued population monitoring on a three-year cycle is probably adequate to document trends in abundance, size structure, and recruitment.

The population estimates generated to compare the upper and lower sample sections can be found in Table 8. Estimated abundance of fish > 129 mm was slightly higher in the lower section. The larger trout (>239 mm) had similar population estimates between sections. There were more small rainbow trout captured in the lower sample area. This is likely due to habitat differences in the two sample sections. The lower sample area has greater complexity of substrate types.

Chinook Salmon Surveys

Parr Monitoring

Five snorkel transects were completed in Elk Creek, and three transects were completed in Sulphur Creek. Chinook salmon juvenile densities ranged from 0.08 to 0.63/100m² in Elk Creek and from 0 to 0.32/100m² in Sulphur Creek (Table 9). Habitat information was forwarded to IDFG research biologist Judy Hall-Griswold for incorporation into the Idaho Salmon and Steelhead Investigations report (Salmon and Steelhead Investigations 2000 Idaho Department of Fish and Game in press).

Redd Counts

Total redds counted for the Bear Valley, Elk, and Sulphur creek trend areas were 69, 83, and 5, respectively.

Carcasses encountered totaled 8 males and 8 females in Bear Valley Creek, 17 males and 13 females in Elk Creek, and 1 female in Sulphur Creek.

Live fish observed in Bear Valley Creek totaled 9 one-ocean males (jacks), 25 two-ocean males, 13 three-ocean males, 36 two-ocean females and 31 three-ocean females. In Elk Creek there were 2 jacks, 9 two-ocean males, 3 three-ocean males, 7 two-ocean females, and 1 three-ocean female observed. Sulphur Creek had one two-ocean male, and one two-ocean female observed during redd counts.

Table 7. Mark-recapture data for rainbow trout in the South Fork Boise River, October and November 2000.

Length group (mm)	Mark sample (M)	Recapture sample (C)	Recaptures (R)	Length group (mm)	Mark sample (M)	Recapture sample (C)	Recaptures (R)
110				320	6	4	
120	1	1		330	8	5	
130	2	8		340	8	4	
140	9	9		350	8	6	
150	5	8		360	17	7	
160	6	9		370	11	12	
170	2	6		380	20	11	1
180	6	5		390	24	12	2
190	7	4	1	400	36	15	2
200	9	7		410	26	24	4
210	6	2	1	420	33	23	3
220	3	4		430	28	26	1
230	1	3		440	34	17	3
240	1	1		450	14	18	2
250	2	2		460	18	17	2
260	5	2		470	15	5	2
270	2	2		480	4	6	
280	2	6		490	4	2	
290	5	5		500	2	5	
300	1	4		>500	2		
310	5	3					

Table 8. Population estimates and densities per kilometer of rainbow trout in the upper and lower sections of the South Fork Boise River sampled in the fall of 2000.

Size group	Section ^a	Population estimate (95% CI)	Fish/km (95% CI)
>129 mm	upper	1,899 (1,136<N<3,605)	292 (175<N<555)
>129 mm	lower	3,057 (1,914<N<5,038)	624 (391<N<1,028)
>239 mm	upper	1,763 (1,054<N<3,346)	271 (162<N<515)
>239 mm	lower	2,071 (1,261<N<3,503)	423 (257<N<715)

^a Length of upper and lower sections is 6.5 km and 4.9 km, respectively.

Table 9. Number of age-0 Chinook salmon observed in general parr monitoring sections, August, 2000 in Elk, and Sulphur creeks.

Stream	Strata/Section	Number Observed	Area Sampled (m ²)	Density/ 100 m ²
Elk Creek	1-1	8	1274.9	0.63
	1-2	6	1118.9	0.54
	2-3	3	1621.6	0.19
	2-4	2	1241.9	0.16
	2-5	2	2397.1	0.08
Sulphur Creek	Footbridge	0	569.5	0
	Rock Slide	3	926.9	.32
	Ranch	1	1375.05	0.07

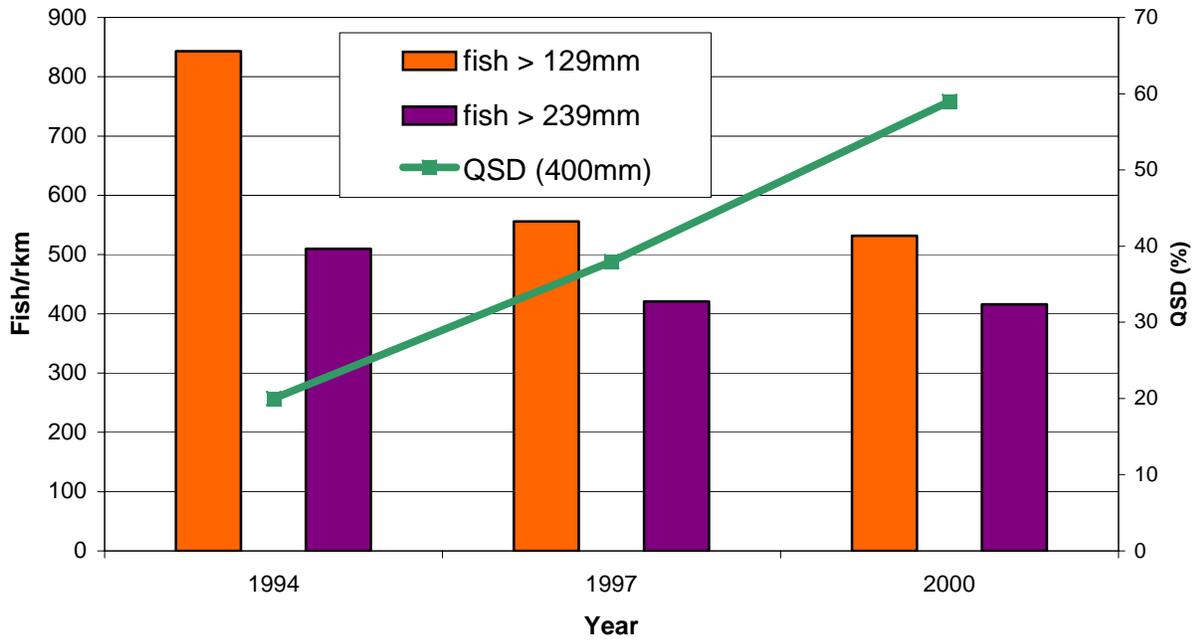


Figure 1. Densities per kilometer and QSD values for rainbow trout collected in the South Fork Boise River between Reclamation Village and a take-out 11.4 km downstream in 1994, 1997, and 2000.

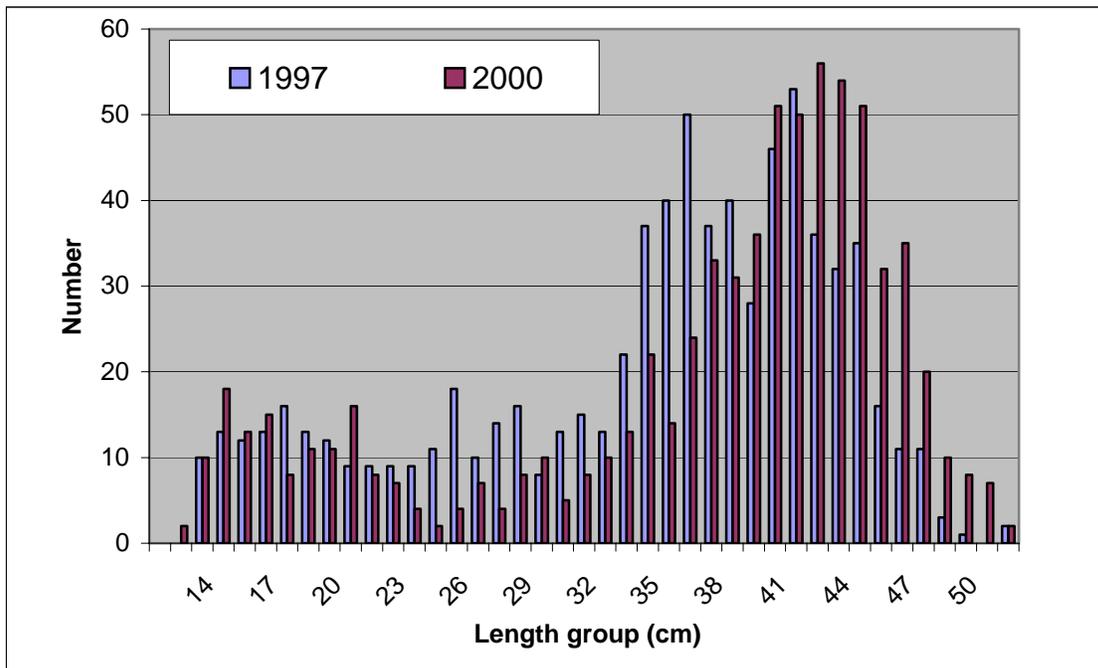


Figure 2. Length frequency of rainbow trout captured by electrofishing in the South Fork Boise River below Anderson Ranch Dam in fall 1997 and 2000.

RECOMMENDATIONS

1. Continue standardized stream surveys and fish monitoring efforts in regional streams on a three to five rotation using established methods, locations, and timing.
2. Establish new trend monitoring sites where needed in drainages throughout the region.
3. Continue monitoring fish use of Kirby Dam fish ladder. Use the lower ladder trapping site, and trap in late June through early July to maximize catch of migratory bull trout.
4. Monitor abundance and size structure of wild rainbow trout in the South Fork Boise River every three years.

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APPENDICES

Appendix A. Electrofishing surveys in the Grimes Creek and Mores Creek drainages, 2000.

STREAM: GRIMES CREEK SAMPLE DATE: 8/8/00
 SECTION: GRIMES PASS
 EPA REACH: 17050112041 QUAD MAP: Pioneerville
 RTS: R5E, T8N, S26 UTM: 593,581 E / 4,872,576 N
 SECTION DESCRIPTION: Drive up Grimes Creek to mile marker 10 above Pioneerville, park on the left.
 Section begins where you pull off the main road, and continues upstream
 113 m.

Transect Information: Habitat Type:

Section Length (m): 113.5 Pool: 0.0 %
 Elevation (m): Riffle: 46.7 %
 Gradient (%): 0.00% Run: 53.3 %
 Population Est: 3.0 S.E(popest): 0.65 Pocket: 0.0 %
 Shade (%): 0.0 Substrate
 Mean Width (m): 6.1 Organic: %
 Mean Depth (m): 0.21 Sand: %
 Cover (%): Gravel: %
 Water Chemistry Rubble: %
 Boulder: %
 Time: 11:30 Bedrock: %
 H2O Temp(C): 14
 Air Temp(C):
 pH:
 Alkalinity(mg/l CaCO3):
 Hardness(uS/cm3):
 Conductivity(mg/l CaCO3):

Species Sampled

MTS Mottled sculpin
 MWF Mountain whitefish
 WRB Wild rainbow/redband

Length frequency			
Species	CM group	Method	Number measured
BRK	11	EF	1
BRK	20	EF	1
MTS	7	EF	2
MTS	8	EF	2
MTS	9	EF	2
MWF	20	EF	1
MWF	21	EF	
WRB	9	EF	1
WRB	14	EF	1
WRB	17	EF	1

Appendix A. Continued.

STREAM: GRIMES CREEK SAMPLE DATE: 8/8/00
 SECTION: CULVERT
 EPA REACH: 17050112041 QUAD MAP: Pioneerville
 RTS: R5E, T7N, S10 UTM: 591809 E / 4867981 N ;
 SECTION DESCRIPTION: Drive up Grimes Creek road to the culvert downstream from Pioneerville.
 Top of section is the culvert, the bottom of section is at the large Ponderosa
 pine of river left (looking downstream)

Transect Information: Habitat Type:

Section Length (m): 157 Pool: 40.0 %
 Elevation (m): Riffle: 20.0 %
 Gradient (%): 0.00% Run: 40.0 %
 Population Est: 4.0 S.E(popest): 0.95 Pocket: 0.0 %
 Shade (%): 0.0 Substrate

Mean Width (m): 5.3
 Mean Depth (m): 0.26 Organic: %
 Cover (%): Sand: %
 Water Chemistry Gravel: %
 Rubble: %
 Boulder: %
 Bedrock: %

Time: 12:50
 H2O Temp(C): 20
 Air Temp(C):
 pH:
 Alkalinity(mg/l CaCO3):
 Hardness(uS/cm3):
 Conductivity(mg/l CaCO3):
 Species Sampled

- HRB Hatchery rainbow
- LND Longnose dace
- LSS Largescale sucker
- NSF Northern pikeminnow
- RSS Redside shiner

Length frequency			
Species	CM group	Method	Number measured

Length Frequency

Species	CM Group	Method	Number Measured
HRB	24	EF	1
HRB	25	EF	1
HRB	27	EF	2
LND	10	EF	1
LSS	10	EF	1
NSF	9	EF	1
NSF	10	EF	1
NSF	34	EF	1
RSS	6	EF	3
RSS	7	EF	3
RSS	8	EF	2

Appendix A. Continued.

STREAM: GRIMES CREEK SAMPLE DATE: 8/8/00
 SECTION: 1
 EPA REACH: 17050112001 QUAD MAP: Dunnigan Creek
 RTS: R4E, T5N, S35 UTM: 584388 E / 4841826 N
 SECTION DESCRIPTION: Just upstream from mouth of Grimes Creek, section goes under the bridge,
 and continues upstream another 50 m. Bridge is a private residence bridge.

Transect Information:	Habitat Type:	Pool:	0.0 %
Section Length (m):	133	Riffle:	0.0 %
Elevation (m):		Run:	100.0 %
Gradient (%):	0.00%	Pocket:	0.0 %
Population Est:	8.0 S.E(popest): 1.65		
Shade (%):	0.0	Substrate	
Mean Width (m):	10.4	Organic:	%
Mean Depth (m):	0.3	Sand:	%
Cover (%):		Gravel:	%
Water Chemistry		Rubble:	%
Time: 13:00		Boulder:	%
H2O Temp(C): 20		Bedrock:	%
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			

Species Sampled

BLS Bridgelip sucker
 HRB Hatchery rainbow
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
BLS	13 EF	1	
HRB	26 EF	1	
WRB	13 EF	1	
WRB	16 EF	3	
WRB	19 EF	1	
WRB	21 EF	1	
WRB	23 EF	1	

Appendix A. Continued.

STREAM: GRIMES CREEK SAMPLE DATE: 8/8/00
 SECTION: GRIMES 3
 EPA REACH: 17050112040 QUAD MAP: Warm Springs Point
 RTS: R4E, T6N, S24 UTM: 586581 E/ 4854711 N
 SECTION DESCRIPTION: Drive up Grimes Creek road to the second bridge above the mouth. The top of section is downstream of bridge. The bottom of section is around the large right hand bend (looking downstream).

Transect Information: Habitat Type:

Section Length (m):	110	Pool:	0.0 %
Elevation (m):		Riffle:	0.0 %
Gradient (%):	0.00%	Run:	100.0 %
Population Est:	1.0 S.E(popest):	Pocket:	0.0 %
Shade (%):	0.0		
Mean Width (m):	6.7	Substrate	
Mean Depth (m):	0.32	Organic:	%
Cover (%):		Sand:	%
Water Chemistry		Gravel:	%
		Rubble:	%
		Boulder:	%
		Bedrock:	%

Time: 14:20
 H2O Temp(C): 20
 Air Temp(C):
 pH:
 Alkalinity(mg/l CaCO3):
 Hardness(uS/cm3):
 Conductivity(mg/l CaCO3):
 Species Sampled

BLS Bridgelip sucker
 LND Longnose dace
 MWF Mountain whitefish
 SPD Speckled dace
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group	Measured	
BLS	7 EF		4
BLS	8 EF		3
BLS	11 EF		1
LND	7 EF		4
LND	8 EF		3
LND	9 EF		1
MWF	16 EF		2
MWF	17 EF		2
MWF	18 EF		1
SPD	7 EF		2
SPD	8 EF		1
WRB	15 EF		1

Appendix A. Continued.

STREAM: GRIMES CREEK SAMPLE DATE: 8/8/00
 SECTION: GRIMES 4
 EPA REACH: 17050112040 QUAD MAP: Warm Springs Point
 RTS: R4E, T5N, S10 UTM: 583193 E / 4848352 N
 SECTION DESCRIPTION: First bridge crossing above the mouth of Grimes Creek. Section starts approx. 150 m downstream of bridge and continues to the streamside access point just downstream of bridge.

Transect Information:	Habitat Type:	Pool:	0.0 %
Section Length (m):	99	Riffle:	0.0 %
Elevation (m):		Run:	100.0 %
Gradient (%):	0.00%	Pocket:	0.0 %
Population Est:	2.0 S.E(popest): 6.35		
Shade (%):	0.0	Substrate	
Mean Width (m):	8.3	Organic:	%
Mean Depth (m):	0.31	Sand:	%
Cover (%):		Gravel:	%
Water Chemistry		Rubble:	%
Time: 15:30		Boulder:	%
H2O Temp(C): 25		Bedrock:	%
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
BLS	Bridgelip sucker		
WRB	Wild rainbow/redband		

Length Frequency

Species	CM	Method	Number
	Group	Measured	
BLS	16 EF		2
WRB	16 EF		1
WRB	23 EF		1

Appendix A. Continued.

STREAM: MORES CREEK SAMPLE DATE: 8/10/00
 SECTION: THORN CR.
 EPA REACH: 17050112033 QUAD MAP:
 RTS: R, T, S UTM: 586873 E / 4844145 N
 SECTION DESCRIPTION: Turn off of Highway 21 at the Thron Cr. turnoff. Park vehicle approx 100 m from Highway 21. The site is downstream from the parking spot. Top of section is small rock dam.

Transect Information: Habitat Type:

Section Length (m):	58	Pool:	0.0 %
Elevation (m):		Riffle:	60.0 %
Gradient (%):	0.00%	Run:	40.0 %
Population Est:	12.0 S.E(popest): 13.45	Pocket:	0.0 %
Shade (%):	0.0		
Mean Width (m):	9.1	Substrate	
Mean Depth (m):	0.2	Organic:	0 %
Cover (%):	0	Sand:	22 %
		Gravel:	29 %
		Rubble:	40 %
		Boulder:	9 %
		Bedrock:	0 %

Water Chemistry

Time: 10:15
 H2O Temp(C): 18
 Air Temp(C):
 pH:
 Alkalinity(mg/l CaCO3):
 Hardness(uS/cm3):
 Conductivity(mg/l CaCO3):
 Species Sampled
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
WRB	4	EF	1
WRB	6	EF	1
WRB	7	EF	3
WRB	10	EF	1
WRB	11	EF	1
WRB	13	EF	1

Appendix A. Continued.

STREAM: MORES CREEK SAMPLE DATE: 8/10/00
 SECTION: GRANITE CR.
 EPA REACH: 17050112034 QUAD MAP: Idaho City
 RTS: R6E, T6N, S30 UTM: 597199 E / 4853559 N
 SECTION DESCRIPTION: Highway 21 to Granite Cr. Recreation site. Park at the bridge. Section begins downstream 120 m below the culvert.

Transect Information: Habitat Type:

Section Length (m):	101.5	Pool:	0.0 %
Elevation (m):		Riffle:	13.3 %
Gradient (%):	0.00%	Run:	86.7 %
Population Est:	3.0 S.E(popest): 1.6	Pocket:	0.0 %
Shade (%):	0.0		
Mean Width (m):	6.5	Substrate	
Mean Depth (m):	0.18	Organic:	%
Cover (%):		Sand:	%
		Gravel:	%
		Rubble:	%
		Boulder:	%
		Bedrock:	%

Water Chemistry
 Time: 16:00
 H2O Temp(C): 22
 Air Temp(C):
 pH:
 Alkalinity(mg/l CaCO3):
 Hardness(uS/cm3):
 Conductivity(mg/l CaCO3):
 Species Sampled

HRB Hatchery rainbow
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
HRB	20	EF	1
HRB	23	EF	1
WRB	7	EF	1
WRB	10	EF	1
WRB	13	EF	1

Appendix A. Continued.

STREAM: MORES CREEK SAMPLE DATE: 8/10/00
 SECTION: MINE DITCH
 EPA REACH: 17050112039 QUAD MAP: Idaho City
 RTS: R5E, T6N, S23 UTM: 594213 E / 4854605 N
 SECTION DESCRIPTION: Drive through Idaho City past the football field on the N end of town. Park on the left hand side of the road after crossing the culvert. Section begins downstream approx. 70 m.

Transect Information:	Habitat Type:	Pool:	0.0 %
Section Length (m):	58.2	Riffle:	25.0 %
Elevation (m):		Run:	75.0 %
Gradient (%):	0.00%	Pocket:	0.0 %
Population Est:	3.0 S.E(popest): 1.65		
Shade (%):	0.0	Substrate	
Mean Width (m):	5.9	Organic:	%
Mean Depth (m):	0.15	Sand:	%
Cover (%):		Gravel:	%
Water Chemistry		Rubble:	%
Time: 12:00		Boulder:	%
H2O Temp(C):	17	Bedrock:	%
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
WRB	Wild rainbow/redband		

Length Frequency

Species	CM	Method	Number
Group		Measured	
WRB	13 EF	1	
WRB	16 EF	1	
WRB	18 EF	1	

Appendix A. Continued.

STREAM: MORES CREEK SAMPLE DATE: 8/10/00
 SECTION: 10 MILE
 EPA REACH: 17050112036 QUAD MAP: Sunset Mountain
 RTS: R6E, T7N, S36 UTM: 603626 E / 4861045 N
 SECTION DESCRIPTION: Turn off 21 at the 10 mile CG. The section begins adjacent to campsite #7
 and continues upstream to the cabin on the right bank.

Transect Information: Habitat Type:

Section Length (m):	52	Pool:	0.0 %
Elevation (m):		Riffle:	0.0 %
Gradient (%):	0.00%	Run:	25.0 %
Population Est:	7.0 S.E(popest): 0.5	Pocket:	75.0 %
Shade (%):	0.0		
Mean Width (m):	4.5	Substrate	
Mean Depth (m):	0.25	Organic:	%
Cover (%):		Sand:	%
		Gravel:	%
		Rubble:	%
		Boulder:	%
		Bedrock:	%

Water Chemistry
 Time: 14:50
 H2O Temp(C): 15
 Air Temp(C):
 pH:
 Alkalinity(mg/l CaCO3):
 Hardness(uS/cm3):
 Conductivity(mg/l CaCO3):
 Species Sampled

HRB Hatchery rainbow
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
HRB	24	EF	1
HRB	26	EF	1
WRB	10	EF	1
WRB	14	EF	3
WRB	15	EF	1

Appendix A. Continued.

STREAM: MORES CREEK SAMPLE DATE: 8/10/00
SECTION: WILDERNESS
EPA REACH: 17050112030 QUAD MAP:
RTS: R, T, S UTM: 582177 E / 4835653 N
SECTION DESCRIPTION: Highway 21 to the Wilderness Ranch bridge, turn left, cross bridge and park. Section is the run adjacent to the road upstream from the bridge.

Transect Information:

Habitat Type:

Section Length (m):	97	Pool:	0.0 %
Elevation (m):		Riffle:	0.0 %
Gradient (%):	0.00%	Run:	100.0 %
Population Est:	0.0 S.E(popest):	Pocket:	0.0 %
Shade (%):	0.0		
Mean Width (m):	11.9	Substrate	
Mean Depth (m):	0.7	Organic:	0 %
Cover (%):	0	Sand:	75 %
Water Chemistry		Gravel:	3 %
		Rubble:	11 %
		Boulder:	12 %
		Bedrock:	0 %

Time: 09:00

H2O Temp(C): 17

Air Temp(C):

pH:

Alkalinity(mg/l CaCO3):

Hardness(uS/cm3):

Conductivity(mg/l CaCO3):

Species Sampled

LSS Largescale sucker
NSF Northern pikeminnow
SMB Smallmouth bass
WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group		Measured
LSS	40 SN		22
NSF	40 SN		1
SMB	35 SN		2
WRB	7 SN		1
WRB	13 SN		2
WRB	15 SN		2
WRB	18 SN		1

Appendix B. Electrofishing and snorkel surveys conducted in the Yuba River drainage, 2000.

STREAM: Yuba River SAMPLE DATE: 7/18/00
SECTION: YUBA0.2
EPA REACH: 17050111011 QUAD MAP: Atlanta West
RTS: R11E, T5N, S4 UTM: 649379 E / 4847272 N
SECTION DESCRIPTION: 0.2 miles above Decker Creek sign on road side of creek.

Transect Information:

Section Length (m): 49
Elevation (m):
Gradient (%): 0.00%
Population Est: 12 S.E(popest): .5
Shade (%): 0.0
Mean Width (m): 6.0
Mean Depth (m): 0.3
Cover (%): 95

Water Chemistry

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

Species Sampled

BLT Bull trout
RCT Rainbow X cutthroat hybrid
WRB Wild rainbow/redband

Habitat Type:

Pool: 13.3 %
Riffle: 73.3 %
Run: 13.3 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 2 %
Gravel: 7 %
Rubble: 33 %
Boulder: 58 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number
Group		Measured	
BLT	21	EF	1
RCT	15	EF	1
SCL	6	EF	1
SCL	12	EF	2
WRB	6	EF	2
WRB	10	EF	1
WRB	12	EF	2
WRB	13	EF	1
WRB	16	EF	2
WRB	18	EF	2
WRB	19	EF	2
WRB	22	EF	2

Appendix B. Continued.

STREAM: Yuba River SAMPLE DATE: 7/19/00
SECTION: YUBA4.2
EPA REACH: 17050111011 QUAD MAP: Cayuse Point
RTS: R11E, T5N, S27 UTM: 648965 E / 4846215 N
SECTION DESCRIPTION: Sign on tree at east side of river. 30 ft. up the hill on top side of section.
Section from rock outcropping on east side of stream.

Transect Information:

Section Length (m): 43.2
Elevation (m):
Gradient (%): 0.00%
Population Est: 8.0 S.E(popest): 1
Shade (%): 0.0
Mean Width (m): 7.3
Mean Depth (m): 0.2
Cover (%): 96

Water Chemistry

Time:

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

WRB Wild rainbow/redband

Habitat Type:

Pool: 20.0 %
Riffle: 66.7 %
Run: 13.3 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 4 %
Gravel: 24 %
Rubble: 33 %
Boulder: 39 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number
Group		Measured	
SCL	7	EF	1
SCL	9	EF	1
SCL	10	EF	3
SCL	11	EF	1
SCL	12	EF	2
WRB	11	EF	2
WRB	14	EF	1
WRB	17	EF	1
WRB	19	EF	1
WRB	24	EF	1
WRB	47	EF	1

Appendix B. Continued.

STREAM: Yuba River SAMPLE DATE: 7/19/00
SECTION: YUBA4.7
EPA REACH: 17050111011 QUAD MAP: Cayuse Point
RTS: R11E, T5N, S27 UTM: NOT TAKEN
SECTION DESCRIPTION: Sign on tree at bottom of transect, west side of creek.

Transect Information:

Section Length (m): 60
Elevation (m):
Gradient (%): 0.00%
Population Est: 14.0 S.E(popest): 3.0
Shade (%): 0.0
Mean Width (m): 5.7
Mean Depth (m): 0.3
Cover (%): 96

Water Chemistry

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

WRB Wild rainbow/redband

Habitat Type:

Pool: 46.7 %
Riffle: 13.3 %
Run: 40.0 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 5 %
Gravel: 6 %
Rubble: 36 %
Boulder: 53 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number
Group		Measured	
SCL	6	EF	2
SCL	8	EF	1
SCL	9	EF	1
SCL	13	EF	1
WRB	10	EF	2
WRB	11	EF	1
WRB	13	EF	1
WRB	14	EF	1
WRB	15	EF	1
WRB	16	EF	2
WRB	17	EF	1
WRB	19	EF	2
WRB	20	EF	1
WRB	22	EF	1

Appendix B. Continued.

STREAM: DECKER CREEK SAMPLE DATE: 7/18/00
 SECTION: D0.0
 EPA REACH: 17050111012 QUAD MAP: Atlanta West
 RTS: R11E, T5N, S16 UTM: 649379 E / 4847674 N
 SECTION DESCRIPTION: Metal plate on tree, south side at bottom of section.

Transect Information: Habitat Type:

Section Length (m):	57	Pool:	20.0 %
Elevation (m):		Riffle:	80.0 %
Gradient (%):	0.00%	Run:	0.0 %
Population Est:	10.0 S.E(popest): 1.5	Pocket:	0.0 %
Shade (%):	0.0		
Mean Width (m):	7.3	Substrate	
Mean Depth (m):	0.3	Organic:	0 %
Cover (%):	89	Sand:	0 %
		Gravel:	10 %
		Rubble:	37 %
		Boulder:	53 %
		Bedrock:	0 %

Water Chemistry

Time:
 H2O Temp(C):
 Air Temp(C):
 pH:
 Alkalinity(mg/l CaCO3):
 Hardness(uS/cm3):
 Conductivity(mg/l CaCO3):
 Species Sampled
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group	Measured	
WRB	6	EF	4
WRB	10	EF	2
WRB	11	EF	1
WRB	12	EF	2
WRB	15	EF	2
WRB	16	EF	1

Appendix B. Continued.

STREAM: DECKER CREEK SAMPLE DATE: 7/19/00
SECTION: D0.4
EPA REACH: 17050111012 QUAD MAP: Atlanta East
RTS: R11E, T5N, S13 UTM: 653416 E / 4847510 N
SECTION DESCRIPTION: Low meadow on trail .8 mile up from trailhead. Look to SE corner metal plate in broken off tree.

Transect Information:

Habitat Type:

Section Length (m):	44	Pool:	0.0 %
Elevation (m):		Riffle:	0.0 %
Gradient (%):	0.00%	Run:	0.0 %
Population Est:	11.0 S.E(popest): 1.5	Pocket:	100.0 %
Shade (%):	0.0		
Mean Width (m):	4.6	Substrate	
Mean Depth (m):	0.3	Organic:	0 %
Cover (%):	0	Sand:	4 %
Water Chemistry		Gravel:	27 %
		Rubble:	45 %
		Boulder:	23 %
		Bedrock:	0 %

Time:

H2O Temp(C):

Air Temp(C):

pH:

Alkalinity(mg/l CaCO3):

Hardness(uS/cm3):

Conductivity(mg/l CaCO3):

Species Sampled

BLT Bull trout

WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group	Measured	
BLT	34	EF	1
WRB	7	EF	1
WRB	8	EF	2
WRB	9	EF	2
WRB	10	EF	1
WRB	12	EF	2
WRB	14	EF	4
WRB	18	EF	1
WRB	20	EF	2
WRB	21	EF	1
WRB	24	EF	1

Appendix B. Continued.

STREAM: Grouse Creek SAMPLE DATE: 7/19/00
SECTION: G0.0
EPA REACH: 17050111013 QUAD MAP: Atlanta East
RTS: R11E, T5N, S14 UTM: 651160 E / 4847749 N
SECTION DESCRIPTION: Start 7 m from mouth. High gradient do not shock in future.

Transect Information: Habitat Type:

Section Length (m):	35.5	Pool:	0.0 %
Elevation (m):		Riffle:	22.2 %
Gradient (%):	0.00%	Run:	0.0 %
Population Est:	6.0 S.E(popest): 0.5	Pocket:	77.8 %
Shade (%):	0.0		
Mean Width (m):	5.8	Substrate	
Mean Depth (m):	0.2	Organic:	0 %
Cover (%):	0	Sand:	0 %
		Gravel:	39 %
		Rubble:	45 %
		Boulder:	24 %
		Bedrock:	0 %

Water Chemistry

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

Species Sampled

WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group	Measured	
WRB	14 EF	1	
WRB	19 EF	1	

Appendix B. Continued.

STREAM: Grouse Creek SAMPLE DATE: 7/20/00
SECTION: G0.2
EPA REACH: 17050111013 QUAD MAP: Atlanta East
RTS: R11E, T5N, S23 UTM: 651286 E / 4847061 N
SECTION DESCRIPTION: No landmarks, use GPS to navigate back. Go up grouse cr. At 2nd climb
the section is to your right.

Transect Information:	Habitat Type:	Pool:	55.6 %
Section Length (m):	19.2	Riffle:	33.3 %
Elevation (m):		Run:	11.1 %
Gradient (%):	0.00%	Pocket:	0.0 %
Population Est:	9.0 S.E(popest): 1.0		
Shade (%):	0.0		
Mean Width (m):	3.8	Substrate	
Mean Depth (m):	0.3	Organic:	0 %
Cover (%):	100	Sand:	4 %
Water Chemistry		Gravel:	10 %
		Rubble:	63 %
Time:		Boulder:	22 %
H2O Temp(C):		Bedrock:	0 %
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			

BLT Bull trout
MTS Mottled sculpin
WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
BLT	9	EF	1
MTS	4	EF	1
MTS	9	EF	1
MTS	10	EF	1
MTS	11	EF	2
WRB	8	EF	1
WRB	10	EF	2
WRB	12	EF	1
WRB	14	EF	1
WRB	16	EF	1
WRB	18	EF	1
WRB	20	EF	1

Appendix B. Continued.

STREAM: Grouse Creek SAMPLE DATE: 7/20/00
 SECTION: G0.3
 EPA REACH: 17050111013 QUAD MAP: Atlanta East
 RTS: R11E, T5N, S23 UTM: 651362 E / 4846874 N
 SECTION DESCRIPTION: Above mouth of Sawmill Creek.

Transect Information: Habitat Type:

Section Length (m):	42	Pool:	53.3 %
Elevation (m):		Riffle:	20.0 %
Gradient (%):	0.00%	Run:	20.0 %
Population Est:	5.0 S.E(popest): 1.0	Pocket:	6.7 %
Shade (%):	0.0		
Mean Width (m):	4.2	Substrate	
Mean Depth (m):	0.3	Organic:	0 %
Cover (%):	100	Sand:	3 %
Water Chemistry		Gravel:	18 %
		Rubble:	55 %
		Boulder:	24 %
		Bedrock:	0 %

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

BLT Bull trout
 MTS Mottled sculpin
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
BLT	10	EF	1
MTS	4	EF	2
MTS	5	EF	5
MTS	7	EF	2
MTS	9	EF	1
WRB	5	EF	1
WRB	11	EF	1
WRB	17	EF	1
WRB	20	EF	2

Appendix B. Continued.

STREAM: James Creek SAMPLE DATE: 7/18/00
SECTION: JAMES0.2
EPA REACH: 17050111009 QUAD MAP: Atlanta West
RTS: R11E, T5N, S5 UTM: 646855 E / 4851071 N
SECTION DESCRIPTION: Bottom of section marked with plate J.2 Bottom 90 m below culvert on road crossing, top at log jam 50 m from bottom.

Transect Information:	Habitat Type:	Pool:	20.0 %
Section Length (m):	50	Riffle:	6.7 %
Elevation (m):		Run:	46.7 %
Gradient (%):	0.00%	Pocket:	26.7 %
Population Est:	8.0 S.E(popest): 1.0		
Shade (%):	0.0	Substrate	
Mean Width (m):	2.7	Organic:	0 %
Mean Depth (m):	0.2	Sand:	16 %
Cover (%):	78	Gravel:	22 %
Water Chemistry		Rubble:	62 %
Time:		Boulder:	0 %
H2O Temp(C):		Bedrock:	0 %
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
WRB	Wild rainbow/redband		

Length Frequency

Species	CM	Method	Number
Group		Measured	
WRB	5	EF	1
WRB	7	EF	3
WRB	11	EF	1
WRB	12	EF	1
WRB	13	EF	1
WRB	14	EF	2
WRB	16	EF	1
WRB	17	EF	1

Appendix B. Continued.

STREAM: James Creek SAMPLE DATE: 7/18/00
SECTION: JAMES1.2
EPA REACH: 17050111009 QUAD MAP: Atlanta West
RTS: R11E, T5N, S6 UTM: 646380 E / 4850623 N
SECTION DESCRIPTION: Site is located 1.2 mi upstream from mouth. 3 aspens on left side of road driving upstream. Aspens marked with plate.

Transect Information: Habitat Type:

Section Length (m):	41.6	Pool:	0.0 %
Elevation (m):		Riffle:	26.7 %
Gradient (%):	0.00%	Run:	20.0 %
Population Est:	6.0 S.E(popest): 0.5	Pocket:	53.3 %
Shade (%):	0.0		
Mean Width (m):	2.4	Substrate	
Mean Depth (m):	0.1	Organic:	0 %
Cover (%):	0	Sand:	30 %
Water Chemistry		Gravel:	25 %
		Rubble:	43 %
Time:		Boulder:	1 %
H2O Temp(C):		Bedrock:	0 %
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			

WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group	Measured	
WRB	5	EF	2
WRB	10	EF	1
WRB	13	EF	3
WRB	15	EF	2

Appendix B. Continued.

STREAM: James Creek SAMPLE DATE: 7/18/00
SECTION: JAMES2.0
EPA REACH: 17050111009 QUAD MAP: Atlanta West
RTS: R11E, T5N, S7 UTM: 645659 E / 4849214 N
SECTION DESCRIPTION: Section starts at EF James Creek. Top is marked by large pine on the road by a drop pool.

Transect Information:	Habitat Type:	Pool: 0.0 %
Section Length (m): 30		Riffle: 0.0 %
Elevation (m):		Run: 0.0 %
Gradient (%): 0.00%		Pocket: 0.0 %
Population Est: 0.0 S.E(popest):		
Shade (%): 0.0	Substrate	
Mean Width (m): 1.9	Organic: 0 %	
Mean Depth (m): 0.0	Sand: 0 %	
Cover (%): 0	Gravel: 0 %	
Water Chemistry	Rubble: 0 %	
Time:	Boulder: 0 %	
H2O Temp(C):	Bedrock: 0 %	
Air Temp(C):		
pH:		
Alkalinity(mg/l CaCO3):		
Hardness(uS/cm3):		
Conductivity(mg/l CaCO3):		
Species Sampled		

Length Frequency
Species CM Method Number
 Group Measured

Appendix B. Continued.

STREAM: Sawmill Creek SAMPLE DATE: 7/20/00
SECTION: SM0
EPA REACH: 17050111014 QUAD MAP: Atlanta East
RTS: R11E, T5N, S23 UTM: 651348 E / 4846890 N
SECTION DESCRIPTION: Site is from the mouth of the creek upstream.

Transect Information: Habitat Type:

Section Length (m):	13	Pool:	77.8 %
Elevation (m):		Riffle:	11.1 %
Gradient (%):	0.00%	Run:	11.1 %
Population Est:	0.0 S.E(popest):	Pocket:	0.0 %
Shade (%):	0.0		
Mean Width (m):	2.5	Substrate	
Mean Depth (m):	0.1	Organic:	0 %
Cover (%):	67	Sand:	1 %
Water Chemistry		Gravel:	4 %
		Rubble:	30 %
Time:		Boulder:	31 %
H2O Temp(C):		Bedrock:	0 %
Air Temp(C):			
pH:			
Alkalinity(mg/l CaCO3):			
Hardness(uS/cm3):			
Conductivity(mg/l CaCO3):			
Species Sampled			
BLT	Bull trout		

Length Frequency

Species	CM	Method	Number
	Group	Measured	
BLT	8 EF	1	
BLT	10 EF	1	

Appendix B. Continued.

STREAM: Trail Creek SAMPLE DATE: 7/18/00
SECTION: T0.2
EPA REACH: 17050111014 QUAD MAP: Atlanta West
RTS: R11E, T5N, S16 UTM: 649463 E / 4846490 N
SECTION DESCRIPTION: Stream has thick overhanging vegetation.

Transect Information: Habitat Type:

Section Length (m):	22.2	Pool:	13.3 %
Elevation (m):		Riffle:	73.3 %
Gradient (%):	0.00%	Run:	13.3 %
Population Est:	2.0 S.E(popest): 6.5	Pocket:	0.0 %
Shade (%):	0.0		
Mean Width (m):	3.0	Substrate	
Mean Depth (m):	0.5	Organic:	0 %
Cover (%):	100	Sand:	3 %
		Gravel:	31 %
		Rubble:	27 %
		Boulder:	39 %
		Bedrock:	0 %

Water Chemistry
Time:
H2O Temp(C):
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):
Species Sampled
WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group	Measured	
WRB	8 EF	1	
WRB	14 EF	1	

Appendix B. Continued.

STREAM: Trail Creek SAMPLE DATE: 7/18/00
SECTION: T0.5
EPA REACH: 17050111014 QUAD MAP: Atlanta West
RTS: R11E, T5N, S26 UTM: 649661 E / 4846270 N
SECTION DESCRIPTION: Trail Cr. Road to parking lot with trail register. Bottom is about 20 m
upstream from sign. Group of pines one has plate T1.25 top marked with a
blank plate.

Transect Information:

Section Length (m): 40
Elevation (m):
Gradient (%): 0.00%
Population Est: 5.0 S.E(popest): 1.0
Shade (%): 0.0
Mean Width (m): 2.7
Mean Depth (m): 0.2
Cover (%): 0

Water Chemistry

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

WRB Wild rainbow/redband

Habitat Type:

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

Substrate

Organic: 0 %
Sand: 8 %
Gravel: 28 %
Rubble: 58 %
Boulder: 6 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number
Group	Measured		
WRB	4	EF	1
WRB	7	EF	1
WRB	9	EF	1
WRB	11	EF	1
WRB	12	EF	2
WRB	14	EF	1
WRB	15	EF	1

Appendix B. Continued.

STREAM: Yuba River SAMPLE DATE: 7/25/00
SECTION: YU1
EPA REACH: 17050111011 QUAD MAP: Atlanta West
RTS: R11E, T5N, S9 UTM: 648289 E / 485083 N
SECTION DESCRIPTION: GPS located

Transect Information:

Section Length (m): 37.6
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 8.9
Mean Depth (m): 0.4
Cover (%): 0

Water Chemistry

Time:

H2O Temp(C):

Air Temp(C):

pH:

Alkalinity(mg/l CaCO3):

Hardness(uS/cm3):

Conductivity(mg/l CaCO3):

Species Sampled

WRB Wild rainbow/redband

Habitat Type:

Pool: 0.0 %
Riffle: 0.0 %
Run: 33.3 %
Pocket: 66.7 %

Substrate

Organic: 0 %
Sand: 0 %
Gravel: 4 %
Rubble: 34 %
Boulder: 50 %
Bedrock: 11 %

Length Frequency

Species	CM	Method	Number
Group		Measured	
WRB	7 SN	1	
WRB	15 SN		1

Appendix B. Continued.

STREAM: Yuba River SAMPLE DATE: 7/25/00
SECTION: YU2
EPA REACH: 17050111011 QUAD MAP: Atlanta West
RTS: R11E, T5N, S16 UTM: 648922 E / 4848819 N
SECTION DESCRIPTION:

Transect Information:

Section Length (m): 29
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 6.7
Mean Depth (m): 0.5
Cover (%): 0

Water Chemistry

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

WCT Westslope cutthroat
WRB Wild rainbow/redband

Habitat Type:

Pool: 0.0 %
Riffle: 0.0 %
Run: 50.0 %
Pocket: 50.0 %

Substrate

Organic: 0 %
Sand: 0 %
Gravel: 12 %
Rubble: 47 %
Boulder: 42 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number
Group		Measured	
WCT	0 SN	1	
WRB	0 SN	15	
WRB	1 SN	2	

Appendix C. Continued.

TREAM: Boise River MF SAMPLE DATE: 7/26/00
SECTION: Bread Winner
EPA REACH: 17050111001 QUAD MAP: Sheep Creek
RTS: R, T, S UTM: 614249 E / 4844262 N
SECTION DESCRIPTION:

Transect Information: Habitat Type:
Section Length (m): 90 Pool: 100.0 %
Elevation (m): Riffle: 0.0 %
Gradient (%): 0.00% Run: 0.0 %
Population Est: 0.0 S.E(popest): Pocket: 0.0 %
Shade (%): 0.0

Substrate

Mean Width (m): 24.5
Mean Depth (m): 0.0
Cover (%): 99
Organic: 0 %
Sand: 0 %
Gravel: 0 %
Rubble: 0 %
Boulder: 0 %
Bedrock: 0 %

Water Chemistry

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

HRB Hatchery rainbow
MWF Mountain whitefish
NSF Northern pikeminnow
WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number	Species	CM	Method	Number
Group		Measured		Group		Measured	
HRB	22 SN		1	WRB	12 SN		3
MWF	7 SN		1	WRB	15 SN		8
MWF	10 SN		1	WRB	17 SN		2
MWF	25 SN		3	WRB	20 SN		1
MWF	27 SN		3	WRB	23 SN		1
MWF	30 SN		10	WRB	25 SN		1
MWF	33 SN		1	WRB	27 SN		3
MWF	35 SN		6	WRB	30 SN		3
MWF	38 SN		2	WRB	33 SN		2
NSF	30 SN		1	WRB	35 SN		3
NSF	33 SN		3	WRB	38 SN		1
NSF	35 SN		2				
WRB	10 SN		3				

Appendix C. Continued.

STREAM: Boise River MF SAMPLE DATE: 7/26/00
SECTION: NEINMEYER
EPA REACH: 17050111008 QUAD MAP: Nahneke Mountain
RTS: R, T, S UTM: 615650 E / 4845583 N
SECTION DESCRIPTION:

Transect Information: Habitat Type:
Section Length (m): 68 Pool: 66.7 %
Elevation (m): Riffle: 0.0 %
Gradient (%): 0.00% Run: 33.3 %
Population Est: 0.0 S.E(popest): Pocket: 0.0 %
Shade (%): 0.0

Substrate

Mean Width (m): 24.4
Mean Depth (m): 1.1
Cover (%): 88
Organic: 0 %
Sand: 8 %
Gravel: 16 %
Rubble: 46 %
Boulder: 31 %
Bedrock: 0 %

Water Chemistry

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

Species Sampled

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

Length Frequency

Species	CM	Method	Number	Species	CM	Method	Number
Group		Measured		Group		Measured	
LSS	30	SN	2	WRB	33	SN	1
LSS	33	SN	1	WRB	35	SN	1
LSS	35	SN	3				
MWF	27	SN	3				
MWF	30	SN	29				
NSF	27	SN	2				
NSF	33	SN	2				
NSF	35	SN	3				
NSF	38	SN	1				
WRB	10	SN	2				
WRB	15	SN	4				
WRB	20	SN	1				
WRB	22	SN	2				
WRB	25	SN	2				

Appendix C. Continued.

STREAM: Boise River MF SAMPLE DATE: 7/26/00
SECTION: Roaring River
EPA REACH: 17050111008 QUAD MAP: Nahneke Mountain
RTS: R, T, S UTM: 625572 E / 4849517 N
SECTION DESCRIPTION: Above mouth of Roaring River

Transect Information: Habitat Type:
Section Length (m): 59 Pool: 100.0 %
Elevation (m): Riffle: 0.0 %
Gradient (%): 0.00% Run: 0.0 %
Population Est: 0.0 S.E(popest): Pocket: 0.0 %
Shade (%): 0.0

Substrate

Mean Width (m): 14.4
Mean Depth (m): 0.0
Cover (%): 100 Organic: 0 %

Water Chemistry

Time: Sand: 0 %
H2O Temp(C): Gravel: 0 %
Air Temp(C): Rubble: 0 %
pH: Boulder: 0 %
 Bedrock: 0 %

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

- LSS Largescale sucker
- MWF Mountain whitefish
- NSF Northern pikeminnow
- WCT Westslope cutthroat
- WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number	Species	CM	Method	Number
Group		Measured		Group		Measured	
LSS	40	SN	4	WRB	15	SN	5
LSS	45	SN	6	WRB	20	SN	8
LSS	46	SN	1	WRB	22	SN	2
MWF	30	SN	32	WRB	25	SN	2
MWF	33	SN	1	WRB	27	SN	1
MWF	35	SN	1	WRB	30	SN	2
MWF	40	SN	1	WRB	30	SN	2
NSF	33	SN	2	WRB	33	SN	2
NSF	35	SN	3	WCT	22	SN	1
WRB	5	SN	1				
WRB	7	SN	2				
WRB	10	SN	6				
WRB	12	SN	1				

Appendix C. Continued.

STREAM: Boise River MF
 SECTION: Dutch Creek
 EPA REACH:
 RTS: R, T, S
 SECTION DESCRIPTION:

SAMPLE DATE: 7/26/00
 17050111008 QUAD MAP: Phifer Creek
 UTM: 630975 E / 4851641 N

Transect Information:
 Section Length (m): 78.3
 Elevation (m):
 Gradient (%): 0.00%
 Population Est: 0.0 S.E(popest):
 Shade (%): 0.0
 Mean Width (m): 25.8
 Mean Depth (m): 0.6
 Cover (%): 88

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

Substrate

Organic: 0 %
 Sand: 2 %
 Gravel: 11 %
 Rubble: 63 %
 Boulder: 24 %
 Bedrock: 0 %

Water Chemistry

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

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

Length Frequency

Species	CM	Method	Number
Group		Measured	
LSS	35	SN	2
MWF	10	SN	1
MWF	30	SN	10
MWF	40	SN	1
NSF	38	SN	1
WRB	10	SN	1
WRB	15	SN	1
WRB	22	SN	3
WRB	25	SN	2
WRB	30	SN	1
WRB	35	SN	1

Appendix C. Continued.

STREAM: Boise River MF
 SECTION: Eagle Creek
 EPA REACH:
 RTS: R, T, S
 SECTION DESCRIPTION:

SAMPLE DATE: 7/26/00
 17050111008 QUAD MAP: Atlanta west
 UTM: 642164 E / 4853419 N

Transect Information:
 Section Length (m): 80.5
 Elevation (m):
 Gradient (%): 0.00%
 Population Est: 0.0 S.E(popest):
 Shade (%): 0.0
 Mean Width (m): 15.9
 Mean Depth (m): 0.7
 Cover (%): 91

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

Substrate

Organic: 0 %
 Sand: 5 %
 Gravel: 18 %
 Rubble: 71 %
 Boulder: 7 %
 Bedrock: 0 %

Water Chemistry

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

BLT Bull trout
 HRB Hatchery rainbow
 MWF Mountain whitefish
 WCT Westslope cutthroat
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number	Species	CM	Method	Number
Group		Measured		Group		Measured	
BLT	25	SN	1	WRB	15	SN	12
BLT	27	SN	1	WRB	17	SN	1
BLT	35	SN	2	WRB	20	SN	3
BLT	48	SN	1	WRB	22	SN	1
HRB	17	SN	1	WRB	25	SN	2
HRB	20	SN	1	WRB	30	SN	4
HRB	23	SN	2	WRB	33	SN	2
MWF	33	SN	15	WCT	17	SN	1
WRB	7	SN	1				
WRB	10	SN	4				
WRB	12	SN	2				

Appendix C. Continued.

STREAM: Boise River MF
 SECTION: Queens River
 EPA REACH:
 RTS: R, T, S
 SECTION DESCRIPTION:

SAMPLE DATE: 7/25/00
 17050111009 QUAD MAP: Atlanta West
 UTM: 644142 E / 4853370 N

Transect Information:
 Section Length (m): 80
 Elevation (m):
 Gradient (%): 0.00%
 Population Est: 0.0 S.E(popest):
 Shade (%): 0.0
 Mean Width (m): 16.4
 Mean Depth (m): 0.8
 Cover (%): 0

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

Substrate

Organic: 0 %
 Sand: 1 %
 Gravel: 14 %
 Rubble: 39 %
 Boulder: 29 %
 Bedrock: 17 %

Water Chemistry

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

BLT Bull trout
 MWF Mountain whitefish
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
BLT	33 SN	1	
BLT	40 SN	2	
BLT	43 SN	2	
BLT	45 SN	1	
BLT	53 SN	1	
BLT	55 SN	1	
MWF	20 SN	1	
MWF	30 SN	23	
MWF	35 SN	11	
MWF	45 SN	2	
WRB	5 SN	1	

Species	CM	Method	Number
Group		Measured	
WRB	7 SN		3
WRB	10 SN		4
WRB	12 SN		2
WRB	15 SN		16
WRB	20 SN		8
WRB	25 SN		3
WRB	30 SN		2

Appendix C. Continued.

STREAM: Boise River MF SAMPLE DATE: 7/25/00
SECTION: Cable Car
EPA REACH: 17050111008 QUAD MAP: Atlanta West
RTS: R, T, S UTM: 645986 E / 4851884 N
SECTION DESCRIPTION: section starts at cable car crossing

Transect Information:
Section Length (m): 122
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 11.7
Mean Depth (m): 0.6
Cover (%): 0

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

Substrate

Organic: 0 %
Sand: 0 %
Gravel: 15 %
Rubble: 42 %
Boulder: 46 %
Bedrock: 0 %

Water Chemistry

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

BLT Bull trout
MWF Mountain whitefish
WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
BLT	15 SN	1	
BLT	45 SN	1	
MWF	20 SN	1	
MWF	33 SN	2	
MWF	35 SN	8	
MWF	38 SN	2	
MWF	40 SN	4	
WRB	7 SN	13	
WRB	10 SN	12	
WRB	12 SN	7	

Species	CM	Method	Number
Group		Measured	
WRB	15 SN	16	
WRB	17 SN	1	
WRB	27 SN	2	
WRB	30 SN	5	
WRB	33 SN	3	
WRB	35 SN	3	

Appendix C. Continued.

STREAM: Boise River MF SAMPLE DATE: 7/25/00
SECTION: Hot Springs
EPA REACH: 17050111017 QUAD MAP: Atlanta East
RTS: R, T, S UTM: 651436 E / 4852576 N
SECTION DESCRIPTION: Downstream from the main tub.

Transect Information:
Section Length (m): 65.4
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 13.6
Mean Depth (m): 4.3
Cover (%): 0

Habitat Type:
Pool: 16.7 %
Riffle: 66.7 %
Run: 8.3 %
Pocket: 8.3 %

Substrate

Organic: 0 %
Sand: 2 %
Gravel: 8 %
Rubble: 69 %
Boulder: 17 %
Bedrock: 0 %

Water Chemistry

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

HRB Hatchery rainbow
BRK Brook trout
WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
BRK	15 SN		1
HRB	20 SN		2
WRB	7 SN		5
WRB	12 SN		5
WRB	15 SN		5
WRB	17 SN		2
WRB	20 SN		4
WRB	25 SN		1

Appendix C. Continued.

STREAM: Boise River MF
 SECTION: Old Power Plant
 EPA REACH:
 RTS: R, T, S
 SECTION DESCRIPTION:

SAMPLE DATE: 7/25/00
 17050111017 QUAD MAP: Atlanta West
 UTM: 652446 E / 4852885 N

Transect Information:
 Section Length (m): 75.5
 Elevation (m):
 Gradient (%): 0.00%
 Population Est: 0.0 S.E(popest):
 Shade (%): 0.0
 Mean Width (m): 13.6
 Mean Depth (m): 0.5
 Cover (%): 0

Habitat Type:
 Pool: 0.0 %
 Riffle: 8.3 %
 Run: 91.7 %
 Pocket: 0.0 %

Substrate

Organic: 0 %
 Sand: 9 %
 Gravel: 23 %
 Rubble: 48 %
 Boulder: 21 %
 Bedrock: 0 %

Water Chemistry

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

Species Sampled

HRB Hatchery rainbow
 BRK Brook trout
 WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
BRK	10 SN	1	
HRB	25 SN	16	
WRB	5 SN	6	
WRB	7 SN	6	
WRB	10 SN	4	
WRB	12 SN	6	
WRB	15 SN	14	
WRB	20 SN	1	

Appendix C. Continued.

STREAM: Leggitt Creek SAMPLE DATE: 7/20/00
SECTION: L0.2
EPA REACH: 17050111017 QUAD MAP: Atlanta East
RTS: R, T, S UTM: ~ 655966 E / 4854191 N
SECTION DESCRIPTION: 0.2 miles up Leggitt Creek.

Transect Information:
Section Length (m): 70
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 5.6
Mean Depth (m): 0.2
Cover (%): 0

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

Substrate

Organic: 0 %
Sand: 0 %
Gravel: 29 %
Rubble: 15 %
Boulder: 48 %
Bedrock: 7 %

Water Chemistry

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

WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
Group		Measured	
WRB	10 SN	1	
WRB	12 SN	1	
WRB	15 SN	1	
WRB	20 SN	1	

Appendix D. Snorkel surveys conducted in the North Fork Boise River drainage, 2000.

STREAM: Boise R, N F SAMPLE DATE: 7/24/00
SECTION: Bear River
EPA REACH: 17050111028 QUAD MAP: Bear River
RTS: R8E, T6N, S3 UTM: 621431 E / 4860795 N
SECTION DESCRIPTION: Above mouth of Bear River.

Transect Information:

Section Length (m): 76
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 15.5
Mean Depth (m): 0.6
Cover (%): 60

Water Chemistry

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

HRB Hatchery rainbow
MWF Mountain whitefish
WRB Wild rainbow/redband

Habitat Type:

Pool: 66.7 %
Riffle: 0.0 %
Run: 33.3 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 42 %
Gravel: 10 %
Rubble: 48 %
Boulder: 0 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number
Group		Measured	
HRB	25	SN	1
MWF	15	SN	1
MWF	25	SN	1
MWF	30	SN	15
MWF	33	SN	20
WRB	7	SN	1
WRB	15	SN	1
WRB	25	SN	1
WRB	40	SN	1

Appendix D Continued.

STREAM: Boise R, N F SAMPLE DATE: 7/24/00
SECTION: Black Rock
EPA REACH: 17050111025 QUAD MAP: Barber Flat
RTS: R7E, T5N, S2 UTM: 613694 E / 4849847 N
SECTION DESCRIPTION: Downstream of Black Rock CG.

Transect Information:

Section Length (m): 51
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 25.4
Mean Depth (m): 0.7
Cover (%): 94

Water Chemistry

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

WRB Wild rainbow/redband

Habitat Type:

Pool: 44.4 %
Riffle: 22.2 %
Run: 33.3 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 32 %
Gravel: 11 %
Rubble: 54 %
Boulder: 2 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number
	Group	Measured	
WRB	25 SN	1	

Appendix D Continued.

STREAM: Boise River, North Fork SAMPLE DATE: 7/24/00
 SECTION: Rabbit Creek
 EPA REACH: 17050111024 QUAD MAP: Barber Flat
 RTS: R7E, T5N, S10 UTM: 612447 E / 4849265 N
 SECTION DESCRIPTION: Upstream from mouth of Rabbit Creek.

Transect Information:

Section Length (m): 58.5
 Elevation (m):
 Gradient (%): 0.00%
 Population Est: 0.0 S.E(popest):
 Shade (%): 0.0
 Mean Width (m): 17.8
 Mean Depth (m): 0.9
 Cover (%): 86

Water Chemistry

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

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

Length Frequency

Species	CM	Method	Number
	Group	Measured	
HRB	28 SN	1	
LSS	45 SN	5	
LSS	50 SN	9	
MWF	18 SN	1	
MWF	20 SN	2	
MWF	25 SN	1	
NSF	38 SN	1	
WRB	20 SN	1	

Habitat Type:

Pool: 33.3 %
 Riffle: 0.0 %
 Run: 66.7 %
 Pocket: 0.0 %

Substrate

Organic: 0 %
 Sand: 25 %
 Gravel: 24 %
 Rubble: 33 %
 Boulder: 18 %
 Bedrock: 0 %

Appendix D Continued.

STREAM: Boise R, N F SAMPLE DATE: 7/24/00
SECTION: Crooked River
EPA REACH: 17050111026 QUAD MAP: Barber Flat
RTS: R8E, T6N, S17 UTM: 617723 E / 4856276 N
SECTION DESCRIPTION: Above mouth Crooked River.

Transect Information:

Section Length (m): 52.8
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 22.8
Mean Depth (m): 0.5
Cover (%): 95

Water Chemistry

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

HRB Hatchery rainbow
MWF Mountain whitefish
WRB Wild rainbow/redband

Habitat Type:

Pool: 22.2 %
Riffle: 44.4 %
Run: 33.3 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 12 %
Gravel: 11 %
Rubble: 37 %
Boulder: 41 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number
	Group	Measured	
HRB	25 SN	1	
MWF	10 SN	1	
MWF	30 SN	2	
MWF	33 SN	2	
MWF	40 SN	1	
WRB	15 SN	2	
WRB	25 SN	2	

Appendix D Continued.

STREAM: Boise R, N F SAMPLE DATE: 7/24/00
SECTION: Deer Park
EPA REACH: 17050111028 QUAD MAP: Bear River
RTS: R7E, T9N, S28 UTM: 628509 E / 4863333 N
SECTION DESCRIPTION: Downstream of Deer Park CG.

Transect Information:

Section Length (m): 17.4
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(poest):
Shade (%): 0.0
Mean Width (m): 14.0
Mean Depth (m): 0.8
Cover (%): 88

Water Chemistry

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

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

Habitat Type:

Pool: 66.7 %
Riffle: 0.0 %
Run: 33.3 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 25 %
Gravel: 8 %
Rubble: 28 %
Boulder: 22 %
Bedrock: 31 %

Length Frequency

Species	CM	Method	Number	Species	CM	Method	Number
	Group	Measured			Group	Measured	
HRB	25	SN	4	NSF	43	SN	1
HRB	30	SN	1	WRB	7	SN	1
LSS	30	SN	2	WRB	12	SN	1
LSS	33	SN	8				
LSS	40	SN	4				
LSS	45	SN	7				
MWF	15	SN	2				
MWF	22	SN	1				
MWF	25	SN	5				
MWF	27	SN	1				
MWF	30	SN	2				
MWF	33	SN	1				
MWF	35	SN	8				
MWF	38	SN	10				
NSF	25	SN	2				
NSF	30	SN	1				
NSF	40	SN	2				

Appendix D Continued.

STREAM: Boise R, N F SAMPLE DATE: 8/2/00
SECTION: NFBTRB
EPA REACH: 17050111028 QUAD MAP: Swanholm Peak
RTS: R10E, T7N, S19 UTM: 634698 E / 4864941 N
SECTION DESCRIPTION: Site is approx. 240 m upstream from the mouth of Blue Jay Creek. End
of section is the mouth of the unnamed trib. Coming in from the north.

Transect Information:

Section Length (m): 42
Elevation (m): 1646
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 13.4
Mean Depth (m): 0.5
Cover (%): 97

Water Chemistry

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

BLT Bull trout
MWF Mountain whitefish
WRB Wild rainbow/redband

Habitat Type:

Pool: 13.3 %
Riffle: 6.7 %
Run: 80.0 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 13 %
Gravel: 21 %
Rubble: 56 %
Boulder: 10 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number
Group		Measured	
BLT	20	SN	1
MWF	17	SN	1
MWF	20	SN	1
MWF	22	SN	2
MWF	25	SN	2
MWF	27	SN	3
MWF	30	SN	3
MWF	33	SN	2
WRB	15	SN	5
WRB	20	SN	1
WRB	25	SN	4
WRB	27	SN	1
WRB	30	SN	7
WRB	33	SN	1

Appendix D Continued.

STREAM: Boise R, N F SAMPLE DATE: 8/2/00
SECTION: NFBHOR
EPA REACH: 17050111028 QUAD MAP: Swanholm Peak
RTS: R9E, T7N, S24 UTM: 633591 E / 4864525 N
SECTION DESCRIPTION: Just downstream of the mouth of Horsefly Creek.

Transect Information:

Section Length (m): 66
Elevation (m): 1628
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 14.2
Mean Depth (m): 0.5
Cover (%): 98

Water Chemistry

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

BLT Bull trout
MWF Mountain whitefish
WRB Wild rainbow/redband

Habitat Type:

Pool: 33.3 %
Riffle: 20.0 %
Run: 46.7 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 7 %
Gravel: 26 %
Rubble: 26 %
Boulder: 35 %
Bedrock: 7 %

Length Frequency

Species	CM	Method	Number
Group		Measured	
BLT	0 SN	1	
MWF	0 SN	5	
MWF	1 SN	9	
WRB	0 SN	31	
WRB	1 SN	17	

Appendix D Continued.

STREAM:Boise R, N FSAMPLE DATE: 8/2/00

SECTION: NFBHOR

EPA REACH:

17050111028 QUAD MAP: Swanholm Peak

RTS: R9E, T7N, S24

UTM: 633591 E / 4864525 N

SECTION DESCRIPTION:

Just downstream of the mouth of Horsefly Creek.

Transect Information:

Section Length (m): 66
 Elevation (m): 1628
 Gradient (%): 0.00%
 Population Est: 0.0 S.E(popest):
 Shade (%): 0.0
 Mean Width (m): 14.2
 Mean Depth (m): 0.5
 Cover (%): 98

Water Chemistry

Time:

H2O Temp(C):

Air Temp(C):

pH:

Alkalinity(mg/l CaCO3):

Hardness(uS/cm3):

Conductivity(mg/l CaCO3):

Species Sampled

BLT Bull trout

MWF Mountain whitefish

WRB Wild rainbow/redband

Habitat Type:

Pool: 33.3 %
 Riffle: 20.0 %
 Run: 46.7 %
 Pocket: 0.0 %

Substrate

Organic: 0 %
 Sand: 7 %
 Gravel: 26 %
 Rubble: 26 %
 Boulder: 35 %
 Bedrock: 7 %

Length Frequency

Species	CM	Method	Number
Group		Measured	
BLT	20	SN	1
MWF	12	SN	1
MWF	20	SN	2
MWF	22	SN	2
MWF	25	SN	5
MWF	27	SN	2
MWF	30	SN	2
WRB	7	SN	6
WRB	10	SN	1
WRB	12	SN	2
WRB	15	SN	10
WRB	17	SN	9
WRB	20	SN	2
WRB	22	SN	1
WRB	25	SN	7
WRB	27	SN	4
WRB	30	SN	4
WRB	33	SN	1

Species	CM	Method	Number
Group		Measured	
WRB	35	SN	1

Appendix D Continued.

STREAM: Boise R, N F SAMPLE DATE: 8/2/00
SECTION: NFBBLJ
EPA REACH: 17050111028 QUAD MAP: Swanholm Peak
RTS: R10E, T7N, S19 UTM: 634596 E / 4864785 N
SECTION DESCRIPTION: Site is 90 m upstream from the mouth of Bluejay Creek.

Transect Information:

Section Length (m): 45
Elevation (m): 1634
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 15.3
Mean Depth (m): 0.5
Cover (%): 96

Water Chemistry

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

Species Sampled

HRB Hatchery rainbow
MWF Mountain whitefish
WCT Westslope cutthroat
WRB Wild rainbow/redband

Length Frequency

Species	CM	Method	Number
	Group	Measured	
HRB	0 SN	1	
MWF	0 SN	8	
MWF	1 SN	11	
WCT	0 SN	1	
WRB	0 SN	19	
WRB	1 SN	8	

Habitat Type:

Pool: 16.7 %
Riffle: 66.7 %
Run: 16.7 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 8 %
Gravel: 8 %
Rubble: 70 %
Boulder: 6 %
Bedrock: 11 %

Appendix D Continued.

STREAM: Boise R, N F SAMPLE DATE: 8/1/00
SECTION: NFBSIL
EPA REACH: 17050111030 QUAD MAP: Swanholm Peak
RTS: R10E, T8N, S34 UTM: 639934 E / 4871866 N
SECTION DESCRIPTION: downstream from mouth of Silver Creek.

Transect Information:

Section Length (m): 52
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 10.5
Mean Depth (m): 0.4
Cover (%): 94

Water Chemistry

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

BLT Bull trout
MWF Mountain whitefish
WRB Wild rainbow/redband

Habitat Type:

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

Substrate

Organic: 0 %
Sand: 22 %
Gravel: 27 %
Rubble: 54 %
Boulder: 0 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number	Species	CM	Method	Number
Group		Measured		Group		Measured	
BLT	15	SN	2	WRB	15	SN	5
BLT	20	SN	1	WRB	20	SN	3
BLT	25	SN	1	WRB	23	SN	1
BLT	43	SN	1	WRB	25	SN	4
BLT	45	SN	1	WRB	27	SN	1
MWF	12	SN	1	WRB	30	SN	1
MWF	17	SN	4				
MWF	20	SN	5				
MWF	22	SN	5				
MWF	25	SN	10				
MWF	27	SN	7				
MWF	30	SN	12				
MWF	33	SN	2				
MWF	35	SN	3				
MWF	38	SN	3				
WRB	7	SN	12				
WRB	10	SN	2				
WRB	12	SN	1				

Appendix D Continued.

STREAM: Boise R, N F SAMPLE DATE: 8/1/00
SECTION: NFBGRB
EPA REACH: 17050111030 QUAD MAP: Swanholm Peak
RTS: R10E, T7N, S9 UTM: 638413 E / 4868856 N
SECTION DESCRIPTION: downstream of bridge approx. 350 m.

Transect Information:

Section Length (m): 47
Elevation (m):
Gradient (%): 0.00%
Population Est: 0.0 S.E(popest):
Shade (%): 0.0
Mean Width (m): 11.7
Mean Depth (m): 0.6
Cover (%): 90

Water Chemistry

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

BLT Bull trout
MWF Mountain whitefish
WCT Westslope cutthroat
WRB Wild rainbow/redband

Habitat Type:

Pool: 58.3 %
Riffle: 25.0 %
Run: 16.7 %
Pocket: 0.0 %

Substrate

Organic: 0 %
Sand: 18 %
Gravel: 31 %
Rubble: 51 %
Boulder: 0 %
Bedrock: 0 %

Length Frequency

Species	CM	Method	Number	Species	CM	Method	Number
Group		Measured		Group		Measured	
BLT	15	SN	2	WRB	20	SN	2
BLT	17	SN	1	WRB	25	SN	6
BLT	20	SN	4	WRB	33	SN	1
BLT	40	SN	1				
BLT	43	SN	2				
BLT	45	SN	4				
BLT	50	SN	2				
MWF	5	SN	34				
MWF	20	SN	10				
MWF	25	SN	9				
MWF	30	SN	10				
MWF	35	SN	7				
WCT	35	SN	1				
WRB	7	SN	4				
WRB	10	SN	7				
WRB	12	SN	5				
WRB	15	SN	2				
WRB	17	SN	4				

2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-25

Project II: Technical Guidance

Subproject II-D: Southwest Region

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

ABSTRACT

Regional Idaho Department of Fish and Game (Department) fishery personnel responded to a large number of public requests for fishing information. Biweekly 1-800-ASKFISH reports were prepared and forwarded to vendors for distribution. Regional fishery staff consulted with the Environmental Staff Biologist for requests on fish population status and concerns on a multitude of projects in the Southwest Region. Regional fishery staff assumed duties for the Environmental Staff Biologist position that was vacant for several months. Numerous requests for fish stocking advice and/or rates were received from local Treasure Valley residents.

Regional fishery personnel participated in the Bull Trout *Salvelinus confluentus* Recovery Unit Team for the Southwest Idaho.

In cooperation with the U.S. Bureau of Reclamation, regional fishery staff participated in environmental planning for the rebuilding of the outlet works of Arrowrock Dam. Staff prepared comments on fishery mitigation and review of the draft EIS.

Author:

Dale B. Allen
Regional Fishery Manager

2000 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-25

Project II: Habitat Management

Subproject III-D: Southwest Region

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

ABSTRACT

We continued habitat enhancement efforts at Claytonia Pond to improve cover for largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, and channel catfish *Ictalurus punctatus*. In 2000 approximately 250 additional stumps were added, creating five rows that extend towards the water and perpendicular to the stump row placed in 1999. Several stumps were also placed on and around a small island in the middle of the pond to increase deep-water fish habitat. An electrofishing survey was conducted in June 2000 to document fish usage of the habitat placement. Several largemouth bass and bluegill were collected during a 45-minute sampling effort.

Seventy plastic "cube" habitat structures were placed in the Bruneau Arm of C.J. Strike Reservoir. Idaho Bass Federation volunteers, an Idaho Power Company biologist, Idaho Department of Fish and Game reservists and regional fishery staff provided the labor to construct and place the structures. The cost of materials for an individual cube was approximately \$25.00.

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OBJECTIVES

1. Construct riparian or improved pasture fencing on degraded streams on private property with good potential to enhance wild trout recruitment.
2. Provide up and downstream fish passage in key wild trout spawning and recruitment streams.
3. Create improved and additional small pond fishing opportunities in areas of easy access.

METHODS

Claytonia Pond

Habitat Placement

Apple tree stumps were collected and transported to Claytonia Pond outside of Marsing April 6-14, 2000. Stumps were donated from an orchard that had been taken out of production and were loaded onto a flatbed trailer and into a pickup truck bed. Steel posts were driven into the banks of Claytonia pond using a standard post driver. A hole was drilled into the trunk portion of each stump and a 3/8-inch cable was threaded through each stump. The ends of the cable were then connected to the steel posts with cable clamps. Irrigation returns should submerge all the placed habitat by the third week of April.

All habitat work at Claytonia Pond was accomplished during low water periods when levels are approximately seven feet below the high water mark. Work was conducted using volunteers and Idaho Department Fish and Game (IDFG) reservists and permanent staff.

Electrofishing

Electrofishing surveys were conducted in June 2000 using a boom-mounted electrofishing boat. An energized field period of 45 minutes was utilized for habitat use evaluation. Future electrofishing surveys will be conducted to evaluate the success of habitat introductions at Claytonia Pond.

C.J. Strike Reservoir

Habitat Placement

Regional Department fishery staff worked with Idaho Bass Federation volunteers, an Idaho Power Company biologist, and Department reservists to construct and place plastic "cube" habitat structures in the Bruneau Arm of C.J. Strike Reservoir. The cubes were constructed with small diameter PVC plastic pipe and PVC fittings, then cut and glued into a cubic framework. The framework measured roughly 1.2 m per side. The framework was then covered with orange plastic safety fencing that is commonly encountered at construction sites. The plastic safety fencing was attached to the framework with plastic zip ties. The completed cubes were loaded into boats and a concrete block was attached with large plastic zip ties and the cube was sunk. The cubes were placed approximately 3-5 m deep west of the Cottonwood Access Area marina opposite the irrigation pumps.

RESULTS

Claytonia Pond

Habitat Placement

In 2000, a total of 250 stumps were anchored in five rows extending towards the water and perpendicular to habitat placed in 1999. The additional five rows offer more deep water cover for largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, and channel catfish *Ictalurus punctatus* utilizing this pond. In addition several stumps were placed on and around a small island in the middle of the pond. Expended manpower totaled 76 hours for all employees, volunteers, and reservists involved with this habitat placement. Additional habitat material will be collected in December 2000 with placement in Claytonia Pond occurring in February and March 2001.

Electrofishing

Claytonia Pond was visited in June 2000 to observe fish activity in and around the habitat structure placement. A boom-mounted electrofishing boat was used for a total energized field time of 45 minutes. Several largemouth bass were electrofished in the pond, however none were shocked over the habitat structure. Few bluegill were sampled during this electrofishing period, but fish were observed using the new habitat structures.

C.J. Strike Reservoir

Habitat Placement

A total of 70 cube habitat structures were placed in the Bruneau Arm of C.J. Strike Reservoir. The cost of materials for an individual cube was approximately \$25.00. Idaho Bass Federation, Idaho Power Company and IDFG provided funds for the project. All involved groups plan to provide future funds and labor to continue constructing and placing these artificial reefs.

RECOMMENDATIONS

1. Apple tree tops should be added to Claytonia Pond in 2001 to further increase the available habitat.
2. Monitor fish populations and use of habitat structures in Claytonia Pond.
3. Continue to work with volunteer and sportsmens groups to develop habitat enhancement projects in other regional impoundments.

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