Idaho Department of Fish and Game
2003 Fishery Management Report

Southwest Region - Nampa
2003

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Mountain Lakes Investigations

Brian Flatter, Regional Fishery Biologist

ABSTRACT

Seven mountain lakes were sampled in 2003 to monitor fish populations and document presence or absence of amphibians. All lakes were tributaries to the upper Middle Fork Boise River, three in the Grouse Creek drainage, three in the Decker Creek drainage, and one in the Leggit Creek drainage. Lakes were surveyed with a combination of angling, overnight gillnetting, and shoreline observations. Five of the seven lakes contained redband trout *Oncorhynchus mykiss gairdneri* populations, two contained westslope cutthroat *O. clarkii lewisi*, and Leggit Lake contained long-toed salamanders *Ambystoma macrodactylum*.

OBJECTIVE

1. Obtain current information for fishery management decisions on mountain lakes, include 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

Seven alpine lakes and ponds in the Middle Fork Boise River drainage were surveyed by regional fishery staff to monitor fish populations and to document the presence or absence of amphibians. Survey methods and intensity varied by location and ease of access, but included visual observations from shore for all lakes surveyed, angling at six of the lakes, and overnight gillnetting (two gill nets set overnight/lake) at five of the lakes. 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. Conductivity, pH, and temperature were recorded at the time of sampling. Maximum depth of each lake was measured by lowering a weighted and marked cord from a float tube. Areas immediately around each lake were visually surveyed for campsites, trash, and other signs of human use. Cursory amphibian surveys were completed by noting their presence or absence while walking around the lakeshore. Data collected were entered into the Southwest Region mountain lake database, and one-page summaries were produced for each lake visited. Ease of access, and global positioning coordinates (Garmin Rino model 120 GPS, Nad27, Conus, UTM format) were recorded for each lake visited. Digital photos of each lake surveyed were archived in regional files.

RESULTS AND DISCUSSION

Photos, UTMs, and directions to each lake were archived in regional data files. All seven of the lakes surveyed were in the Middle Fork Boise River drainage near the town of Atlanta (Figure 1). Both gillnetting and angling were used to collect fish in Grouse Creek lakes #1 and #2. Grouse Creek Lake #3 was a small bog lake that did not appear able to support fish. Decker Creek lakes #1 and #2 were sampled with gill nets, and Decker Creek Lake #3 was sampled by angling (Table 1). Leggit Lake was sampled with gillnetting and angling.

Rainbow trout *O. mykiss gairdneri* were sampled in Grouse #1, Grouse #2, and Leggit Lake. There were 3 age classes of rainbow trout collected in Grouse Lake #1, 4 in Grouse Lake #2, and 2 in Leggit Lake.

Westslope cutthroat trout *O. clarki lewisii* were sampled in Decker Creek lakes #1 and #2. There were 3 age classes of westslope cutthroat trout in #1 and 3 in #2. No fish were caught by angling, or observed at Decker Creek Lake #3.

Leggit Lake had long toed salamanders *Ambystoma macrodactylum* present. Amphibians were not observed in any of the other lakes. .

Grouse Creek lakes #1 and #2 are currently supporting self-sustaining populations of rainbow trout with fish up to 279 mm. With angler catch rates exceeding 10 fish/h and no previous history of being stocked, the Grouse lakes require no additional stocking. Angler use of Grouse lakes #1 and #2 appears to be moderate by way of the trail leading to the lakes which is open to motorized vehicles. With little apparent ability to support fish, Grouse Creek Lake #3 should be left fishless for amphibians.

Although we were unable to catch or observe any fish in Decker Creek Lake #3, Decker Creek lakes #1 and #2 contain enough naturally reproducing westslope cutthroat trout to provide good angling opportunities without supplemental stocking. While the physical characteristics of #3 were very similar to #1 and #2, Decker Creek #3 should be left fishless for amphibians. The Decker Creek lakes had no record of ever being stocked.

Leggit Lake was the only lake we visited that was in the Department's stocking rotation, historically receiving 500 fry every two years. The two age-classes we collected were likely stocked in 1999 and 2001 as fry (Table 2). No fish exceeding 235 mm were collected. The historical stocking rate of Leggit Lake was increased 50% in 2001 and 300% in 2003 and included the use of sterile rainbow trout (Table 2). The change was a result of a sterile fish evaluation being conducted by the Nampa Fish Research staff. The results of the modified stocking regime will be evaluated in 2006 by staff from Nampa Fish Research.

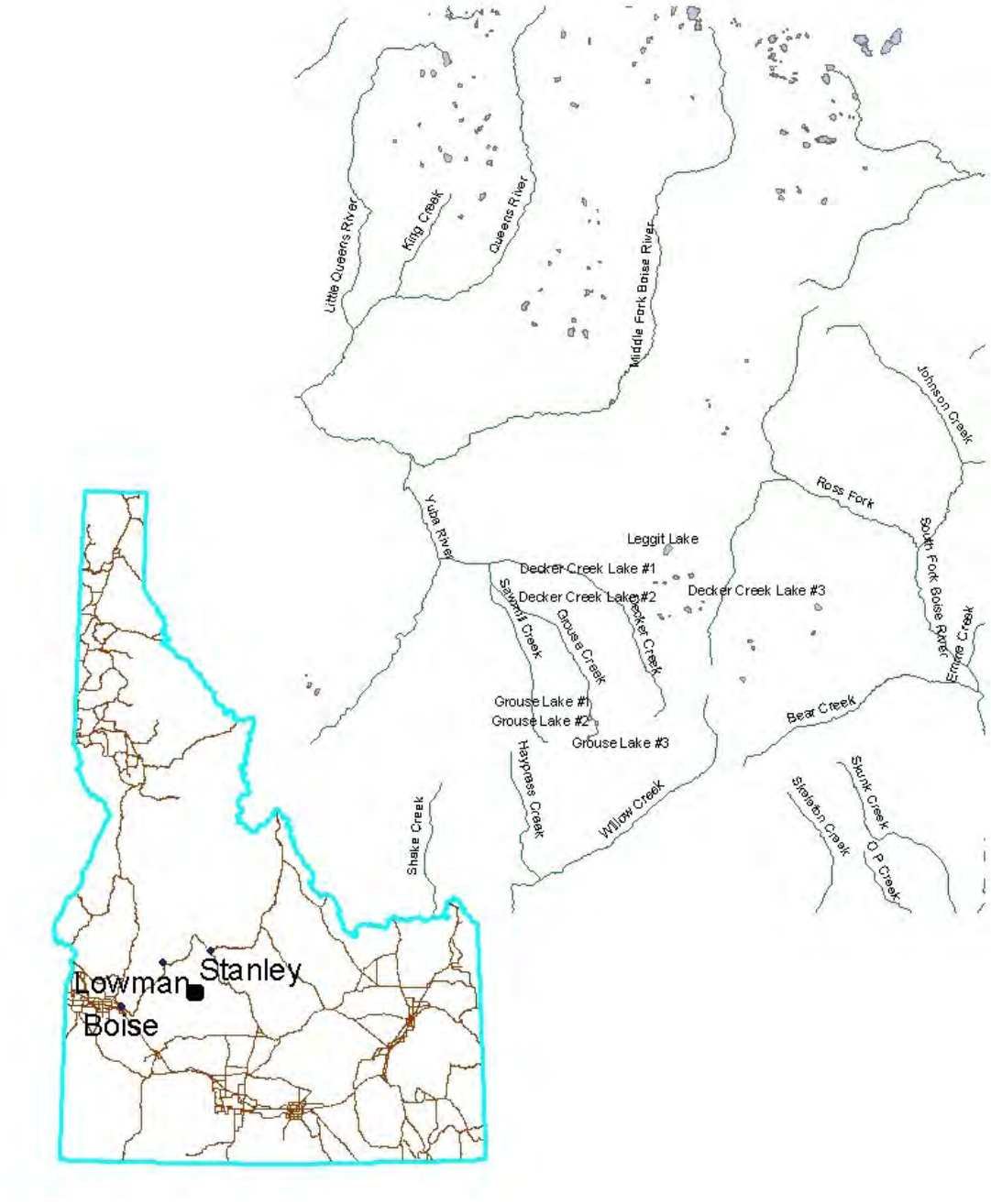

Figure 1. Location of mountain lakes in the Middle Fork Boise River drainage sampled by regional fishery staff in 2003.

Table 1. Units of sampling effort for mountain lake sampling, 2003.

Lake Name	Date	Geartype[a]	Effort
Grouse #1	9/3/03	GN	1
Grouse #1	9/3/03	AN	1
Grouse #2	9/3/03	GN	1
Grouse #2	9/3/03	AN	0.6
Grouse #3	9/3/03	-	Observations only
Leggit	9/22/03	GN	1
Leggit	9/22/03	AN	2
Decker Creek #1	9/23/03	GN	1
Decker Creek #2	9/23/03	GN	1
Decker Creek #3	9/23/03	AN	2

[a] Units of effort:
GN = pairs of floating and sinking experimental gill nets set overnight
AN = hours of angling.

Table 2. Ten-year rainbow trout stocking history for Leggit Lake.

Year stocked	Hatchery strain[a] and number of fry stocked	Comments
1994	K1, 600	
1995	K1, 500	
1997	K1, 500	
1999	K1, 500	Likely sampled in 2003
2001	T9, 750	Likely sampled in 2003
2003	R1, 500	
2003	T9, 1,000	

[a] K1 = Kamloops rainbow,
T9 = Hayspur or Troutlodge triploid rainbow,
R1 = Hayspur rainbow

RECOMMENDATIONS

1. Grouse Creek Lake #3 and Decker Creek Lake #3 should be left fishless for amphibians.

2. Grouse Creek lakes #1 and #2 and Decker Creek lakes #1 and #2 contain enough naturally-reproducing westslope cutthroat trout to provide good angling opportunities without supplemental stocking.

3. Monitor progress of Leggit Lake sterile trout stocking program to determine if changes in the historical stocking protocol will benefit the fishery.

APPENDIX

Appendix A. Mountain lake general information for 2003 surveys.

Lake Name:	DECKER CREEK #1	Quadmap:	Atlanta East
Planting Number:	10U027	Outlet:	
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	5N	Lake Type:	Morraine
Range:	12E	Elevation:	2658 m
Section:		Size:	ha
UTM:	0657245	Maximum Depth:	3 m
	4847085	Aspect:	W
Spawning Potential:		Comments:	
Limited at inlet during spring		Westslope cutthroat sampled in the lake.	

Chemical Report:

Date:	9/23/03
Alkalinity (mg/l CaCO3):	
Hardness (mg/l CaCO3):	
pH:	9
Conductivity (uS/cm):	20
Surface Temp(C):	11
Secchi (m):	

Human Use Report:

Date:	9/23/03
Human Use:	
Campsite Condition:	None
Campsite Number:	0
Campfire Rings:	0
Trail Condition:	None
Trail Difficulty:	Very Difficult, no trail
Litter:	None

Angler Information:

Date:	9/23/03
Number of Anglers:	0
Hours Fished:	0
Total Caught	0
Catch per Hour:	

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

Mean Length and Weight Report:

Species	Geartype	Date
WCT	Gillnet	9/23/03

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
WCT	256	13	0	0	0.0

Amphibian Report:

Date:	9/23/03
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	1		2	8		

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	DECKER CREEK #2	Quadmap:	Atlanta East
Planting Number:	10U028	Outlet:	
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	5N	Lake Type:	Morraine
Range:	12E	Elevation:	2720 m
Section:		Size:	ha
UTM:	0657623	Maximum Depth:	5 m
	4847121	Aspect:	W

Spawning Potential:
Limited at inlet, several juvenile trout observed in inlet.

Comments:
Westslope cutthroat sampled in the lake.

Chemical Report:

Date:	9/23/03
Alkalinity (mg/l CaCO3):	
Hardness (mg/l CaCO3):	
pH:	9.2
Conductivity (uS/cm):	20
Surface Temp(C):	9
Secchi (m):	

Human Use Report:

Date:	9/23/03
Human Use:	
Campsite Condition:	Poorly Developed
Campsite Number:	2
Campfire Rings:	2
Trail Condition:	None
Trail Difficulty:	Very Difficult, no trail
Litter:	Old cans

Angler Information:

Date:	9/23/03
Number of Anglers:	0
Hours Fished:	0
Total Caught	0
Catch per Hour:	

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

Mean Length and Weight Report:

Species	Geartype	Date
WCT	Gillnet	9/23/03

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
WSC	244	11	0	0	0.0

Amphibian Report:

Date:	9/23/03
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		1	3	3		

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	DECKER CREEK #3	Quadmap:	Atlanta East
Planting Number:	10U029	Outlet:	
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	5N	Lake Type:	Cirque
Range:	12E	Elevation:	2764 m
Section:		Size:	ha
UTM:	0657876	Maximum Depth:	9.5 m
	4847283	Aspect:	W
Spawning Potential:		Comments:	

No spawning potential observed. No fish caught by angling.

Chemical Report:

Date:	9/23/03
Alkalinity (mg/l CaCO3):	
Hardness (mg/l CaCO3):	
pH:	8.7
Conductivity (uS/cm):	10
Surface Temp(C):	11
Secchi (m):	

Human Use Report:

Date:	9/23/03
Human Use:	
Campsite Condition:	None
Campsite Number:	0
Campfire Rings:	0
Trail Condition:	None
Trail Difficulty:	Very Difficult, no trail
Litter:	None

Angler Information:

Date:	9/23/03
Number of Anglers:	2
Hours Fished:	1
Total Caught	0
Catch per Hour:	0

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

Mean Length and Weight Report:

Species	Geartype	Date
	Angling	9/23/03

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

Amphibian Report:

Date:	9/23/03
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

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	GROUSE #1	Quadmap:	Ross Peak
Planting Number:	100261	Outlet:	Grouse Creek
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	Yuba R
Township:	5N	Lake Type:	Morraine
Range:	12E	Elevation:	2456 m
Section:	31	Size:	ha
UTM:	0655820	Maximum Depth:	7.2 m
	4843896	Aspect:	NE

Spawning Potential:
Some top of outlet, bottom of inlet

Comments:
Immediate Outlet has good gravel, high gradient, large substrate within 100 ft. of lake. Inlet good gravel for approx. 100' high gradient, large substrate. No amphibs observed. 3 fire rings, no litter, good trail, use trail bikes.

Chemical Report:

Date:	9/3/03
Alkalinity (mg/l CaCO3):	
Hardness (mg/l CaCO3):	
pH:	9.2
Conductivity (uS/cm):	30
Surface Temp(C):	17
Secchi (m):	

Human Use Report:

Date:	9/3/03
Human Use:	High use
Campsite Condition:	very good
Campsite Number:	3
Campfire Rings:	3
Trail Condition:	very good
Trail Difficulty:	steady uphill, but good trail
Litter:	none

Angler Information:

Date:	9/3/03
Number of Anglers:	2
Hours Fished:	0.5
Total Caught	11
Catch per Hour:	22

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
WRB	11	152	203

Mean Length and Weight Report:

Species	Geartype	Date
WRB	Angling	9/3/03
WRB	Gillnet	9/4/03

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
WRB	158	4.8	26.6	2.7	0.49

Amphibian Report:

Date:	9/3/03
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

WRB	10	39	5	0	0	0

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	GROUSE #2	Quadmap:	Ross Peak
Planting Number:	10U065	Outlet:	Grouse Creek
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	Yuba R
Township:	4N	Lake Type:	Morraine
Range:	12E	Elevation:	2496 m
Section:	6	Size:	ha
UTM:	0655244	Maximum Depth:	4.5 m
	4841847	Aspect:	NE

Spawning Potential:
Some at inlet for short distance.

Comments:
Broken trail between #1 and #2, 1 fire ring. No litter, natural spawning occurring based on juvenile fish captured. No amphibs observed.

Chemical Report:

Date:	9/3/03
Alkalinity (mg/l CaCO3):	
Hardness (mg/l CaCO3):	
pH:	9.2
Conductivity (uS/cm):	20
Surface Temp(C):	16
Secchi (m):	

Human Use Report:

Date:	9/3/03
Human Use:	Low use
Campsite Condition:	fair
Campsite Number:	1
Campfire Rings:	1
Trail Condition:	good
Trail Difficulty:	moderate
Litter:	none

Angler Information:

Date:	9/3/03
Number of Anglers:	2
Hours Fished:	0.3
Total Caught	3
Catch per Hour:	10

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
	0	0.0	
WRB	3	152	279
	0	0	0
	0	0	0

Mean Length and Weight Report:

Species	Geartype	Date
WRB	Angling	9/3/03
WRB	Gillnet	9/4/03

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
HRB	211	37	72.1	10.5	0.84

Amphibian Report:

Date:	9/3/03
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
WRB	4	10	8	1	0	0

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	LEGGIT	Quadmap:	Atlanta East
Planting Number:	100262	Outlet:	
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	MFBR
Township:	5N	Lake Type:	Cirque
Range:	12E	Elevation:	2625 m
Section:	16	Size:	ha
UTM:	0657804	Maximum Depth:	9.4 m
	4848403	Aspect:	N
Spawning Potential:		Comments:	
none		Stocked in 2001, and 2003 with Hayspur and Troutlodge triploid rainbow trout, amphibians present.	

Chemical Report:

Date:	9/22/03
Alkalinity (mg/l CaCO3):	
Hardness (mg/l CaCO3):	
pH:	9
Conductivity (uS/cm):	40
Surface Temp(C):	14
Secchi (m):	

Human Use Report:

Date:	9/22/03
Human Use:	
Campsite Condition:	Good
Campsite Number:	2
Campfire Rings:	2
Trail Condition:	Good
Trail Difficulty:	Steep last mile
Litter:	none

Angler Information:

Date:	9/22/03
Number of Anglers:	1
Hours Fished:	2
Total Caught	5
Catch per Hour:	2.5

Species	Number Caught	Minimum Length (mm)	Maximum Length (mm)
HRB	5	120	235

Mean Length and Weight Report:

Species	Geartype	Date
HRB	Angling	9/22/03
HRB	Gillnet	9/23/03

Species	Mean Length (mm)	S.E.	Mean Weight (g)	S.E.	C-Factor
HRB	183	19	0	0	0.0

Amphibian Report:

Date:	9/22/03
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
HRB	6	8	4	0	0	0

Appendix A. Continued.

Mountain Lake General Information

Lake Name:	GROUSE #3	Quadmap:	Ross Peak
Planting Number:	10U066	Outlet:	Grouse Creek
County:	ELMORE	Drainage:	MFBR
National Forest:	BOISE	Tributary To:	Yuba R
Township:	4N	Lake Type:	Cirque
Range:	12E	Elevation:	2628 m
Section:	6	Size:	ha
UTM:	0655311	Maximum Depth:	1 m
	4841506	Aspect:	N

Spawning Potential:
none

Comments:
No fish observed, no amphibs observed, no fire rings, little use, frogpond. Located at the top of the drainage, small rivulet stream flowing into a small pond approx. 4 m across.

Chemical Report:

Date:	9/3/03
Alkalinity (mg/l CaCO3):	
Hardness (mg/l CaCO3):	
pH:	10.3
Conductivity (uS/cm):	20
Surface Temp(C):	16
Secchi (m):	

Human Use Report:

Date: 9/3/03
Human Use: None
Campsite Condition:
Campsite Number:
Campfire Rings:
Trail Condition:
Trail Difficulty: No trail, extremely difficult
Litter: None

Angler Information:

Date: 9/3/03
Number of Anglers:
Hours Fished:
Total Caught
Catch per Hour:

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

Mean Length and Weight Report:

Species Geartype Date

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

Amphibian Report:

Date:	9/3/03
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

Lowland Lakes Investigations

Brian J. Flatter, Regional Fishery Biologist
Kurtis E. Plaster, Senior Fishery Technician
Jeff Dillon, Regional Fishery Manager

ABSTRACT

Paddock Valley Reservoir was sampled in May by electrofishing at night to assess populations after the severe drawdown in 2002. Game fish captured included; largemouth bass *Micropterus salmoides*, black crappie *Pomoxis nigromaculatus*, bluegill *Lepomis macrochirus*, and pumpkinseed *L. gibbosus*. No non-game fish were sampled. Largemouth catch rates and size structure were at lowest levels since 1997.

Claytonia pond was sampled with experimental gill nets to monitor the abundance of common carp *Cyprinus carpio* following chemical renovation in 1999. Two common carp and two largescale suckers *Catostomus macrocheilus* were collected in one night of gillnetting. Gamefish collected included largemouth bass, channel catfish *Ictalurus punctatus*, and black crappie. Common carp abundance in Claytonia Pond remains very low.

Payette Greenbelt Pond was sampled by electrofishing on June 4 to assess game fish presence in this new urban fishery. Game fish sampled included largemouth bass, bluegill, and channel catfish. Non-game fish sampled included common carp, largescale sucker, and bridgelip sucker *C. columbianus*. Seasonal stocking of hatchery rainbow trout should be used to improve angler catch rates and harvest opportunity.

C. J. Strike Reservoir was sampled in March and April with experimental gill nets and by angling. The early spring sampling was intended to target crappie present in the reservoir, and use that information as a predictor for angling success during the late spring and early summer crappie fishery. Game fish captured included white crappie *P. annularis*, black crappie, channel catfish, smallmouth bass *M. dolomieui*, yellow perch *Perca flavescens*, and rainbow trout *Oncorhynchus mykiss.* A total of 60 crappie (black and white combined) were captured with gill nets and by angling. Gill net and angling catch rates were low through March and April, making it difficult to predict the quality of the summer crappie fishery.

Zooplankton samples were taken from Lucky Peak, Arrowrock, C.J. Strike, and Deadwood reservoirs in 2003. When compared to 2002 samples, a decrease was observed in the zooplankton quality index (ZQI - a measure that includes zooplankton abundance and size) for Deadwood, and C. J. Strike reservoirs. Lucky Peak and Arrowrock reservoirs had ZQI measurements similar to 2002.

OBJECTIVES

1. Use standardized sampling methods to describe fish population trends in regional waters.

2. Evaluate gillnetting catch-per-unit of effort as a predictor of angler catch rates for crappie spp. in C.J. Strike Reservoir.

3. Use standardized methods to assess zooplankton size structure trends in C.J. Strike, Lucky Peak, Arrowrock, and Deadwood reservoirs.

METHODS

Standardized Lowland Lake Surveys

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

Electrofishing was conducted from a boom-mounted electrofishing boat. Netting of immobilized fish was conducted with one or two netters. Electrofishing was conducted along shorelines. Attempts were made to collect all immobilized fish. Unless otherwise noted, electrofishing was conducted at night. Electrofishing CPUE was calculated as catch, by both number and weight, per hour of activated electrode time.

Paddock Reservoir

To evaluate status of fish populations after severe drawdown in 2002, an electrofishing survey was conducted May 14, 2003 using one h of energized electrode time with two netters. Electrofishing was conducted at two locations in the upper reservoir (east and west banks), one location in mid-reservoir (east bank), and one location in the lower reservoir along the face of the dam

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Claytonia Pond

Claytonia Pond was sampled using one pair of gill nets (one sinking and one floating net) on April 18 while the pond was re-filling. The gill nets were set along the north and west shorelines to monitor common carp *Cyprinus carpio* abundance.

Payette Greenbelt Pond

An electrofishing survey was conducted during the daytime on June 4 to assess species composition and size structure at this new urban fishery. One-half-hour of energized electrode time was used with two netters.

C. J. Strike Reservoir

C. J. Strike Reservoir was sampled repeatedly in an effort to evaluate spring gillnetting CPUE for crappie *Pomoxis nigromaculatus* and *P. annularis* as a predictor of angler catch rates for crappie. We chose gill nets as our primary sampling tool because past spring catches of crappie 200 mm or larger in trap nets were inconsistent and most of the shoreline surrounding the reservoir is very steep and rocky. Our main objectives in 2003, and in the future, are to monitor recruitment variability and to provide timely predictions of expected crappie fishing quality. Sample dates were March 25, April 9 and April 23 for gillnetting, and April 9 for angling. Three pairs of floating and sinking gill nets were fished overnight on each sampling date. Angling took place for a total of 2 hours using standard crappie fishing tackle. Spot creel data were collected in April, May and June to compare angler catch rates with our gill net catch.

Scale samples were taken from crappie caught by anglers and in gill nets to describe growth and age structure both species. Scales were pressed and read following techniques described by Nielsen and Johnson (1983). Fish length-at-age was back-calculated for each scale sample.

Zooplankton Surveys

Zooplankton samples were collected from Lucky Peak, and Arrowrock reservoirs on July 28, C. J. Strike Reservoir on August 5, and Deadwood Reservoir on August 6, 2003. This was the fifth year for monitoring zooplankton abundance and quality to help guide our stocking programs. Samples were taken following methods outlined by Teuscher (1999). Samples from Lucky Peak and Arrowrock reservoirs were processed on August 19 and from C.J. Strike and Deadwood on September 8.

RESULTS AND DISCUSSION

Standardized Lowland Lake Surveys

Paddock Reservoir

Paddock Reservoir was less than half-full as a result of continued drought conditions. The weather during collection efforts was clear with light winds, and the water temperature was 23°C at 2100 h. The reservoir level was approximately 2 m below the lake outlet during the winter of 2002-2003.

A total of 240 game fish were collected, including largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, black crappie, and pumpkinseed *L. gibbosus* (Appendix A). There were no non-game fish captured. Largemouth bass comprised 43% of the catch by number, and 62% by weight. Bluegill, black crappie, and pumpkinseed comprised 39%, 15% and 2% of the catch by number, respectively. Brown bullhead *Ictalurus nebulosus* are known to be present, but were not sampled by electrofishing.

Largemouth bass electrofishing CPUE by number was 83, the lowest recorded since standardized surveys began in 1995. Twelve percent of the largemouth bass in the electrofishing sample were ≥ 300 mm. Proportional stock density (PSD); Gablehouse 1984) for largemouth bass was 14, slightly lower than the 17 measured in 2002 (Table 1). Between 1994 and 1998, electrofishing CPUE for largemouth bass <200 mm was increasing slightly each year (Table 1). In 1997, annual precipitation was above normal and Paddock Reservoir remained nearly full at the end of the irrigation season. As a result, our electrofishing CPUE of largemouth bass <200 mm in 1999 indicated excellent largemouth bass recruitment following the above normal precipitation. Our catch rate for sub-adult largemouth was the lowest since 1999 and is directly related to four consecutive below normal water years and extreme late summer reservoir drawdowns occurring between 2000 and 2003.

Bluegill electrofishing CPUE by number was 75.2 (Appendix A) or 50% the CPUE observed in 2002 (Flatter et al. 2002 In press). Black crappie electrofishing CPUE by number was 30.4 or over twice the CPUE observed in 2002. It appears that the bluegill biomass in Paddock Reservoir is slowly being replaced by black crappie (Figure 1). The PSD for bluegill and black crappie was 69% and 96%, respectively, down slightly from 2002 (Table 2).

Claytonia Pond

A total of only nine fish were sampled including three largemouth bass, one channel catfish *Ictalurus punctatus*, one black crappie, two common carp, and two largescale suckers *Catostomus macrocheilus*.

In 1999 Claytonia Pond was renovated with rotenone to eliminate common carp, which in previous surveys dominated our catch. Since 1999, only five common carp have been collected in three years of sampling. At this point, common carp numbers are low and cursory creel surveys suggest angling for largemouth bass and bluegill remains excellent.

Table 1. Historical comparison of electrofishing catch-per-unit of effort (CPUE) and proportional stock density (PSD) for largemouth bass in Paddock Valley Reservoir 1994-1999, and 2002-2003.

	CPUE		
Year	All largemouth bass	Bass < 200 mm	PSD
2003	83	3	14
2002	161	6	17
1999	652	72	54
1998	136	28	86
1997	93	53	80
1996	274	0	3
1995	454	30	3
1994	78	29	0

Table 2. Historical comparison of proportional stock density (PSD) for bluegill and black crappie collected in Paddock Valley Reservoir 1995-2003.

	PSD	
Year	Bluegill	Black crappie
2003	69	96
2002	84	100
1999	6	0
1998	46	0
1997	93	100
1995	0	100

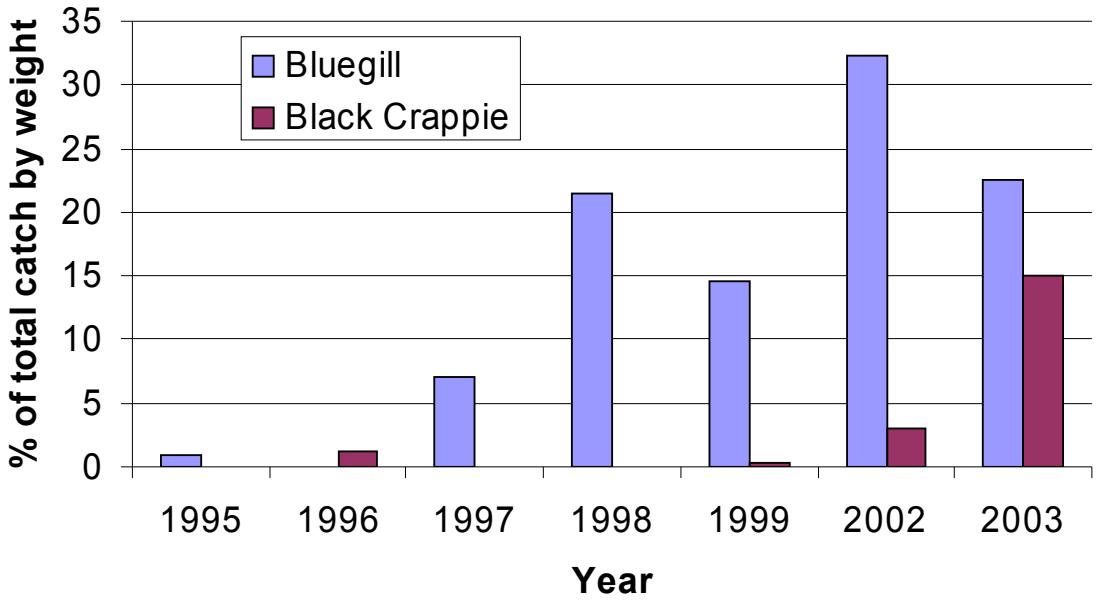

Figure 1. Bluegill and black crappie catch in Paddock Reservoir, 1995-2003.

Payette Greenbelt Pond

A total of 25 minutes of activated electrode time was used to survey this new urban fishery. A total of 78 fish were collected (Appendix A). Gamefish collected include largemouth bass, bluegill, and channel catfish. Non-game fish sampled were common carp, bridgelip suckers *C. columbianus*, and largescale suckers. Largemouth bass and bluegill PSDs were 5.5% and 90%, respectively.

This new pond will provide a fair warm water fishery with existing species and natural recruitment. The pond can also be seasonally stocked with catchable rainbow trout to improve angling and harvest opportunity. The pond lies immediately adjacent to the Payette River and has excellent angler access via a paved path which originates in the town of Payette.

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C. J. Strike Reservoir

Between late March and mid-April there were very few crappie caught in our nets or by anglers. Unfortunately, by the time the crappie became active (May and June) we were no longer netting. The latest date we had netting and angler catch data for comparison was on April 23. The gillnetting and angling catch rate for white crappie on April 23 was 0.06 and 1.0 fish/h, respectively (Table 3). The total catch rate by gill nets was 0.05 fish/h for black crappie, 0.03 fish/h for white crappie, and 0.09 fish/h for both combined (total effort was 162 h). The total catch rate for all anglers contacted specifically targeting crappie was 0.19 fish/h for black crappie, 0.23 fish/h for white crappie, and 0.43 fish/h for both combined (total angler effort of 184.5 h).

Overall, the 2003 crappie fishery was poor for anglers and we had poor catch rates while gillnetting. Our results suggest that we cannot use spring gillnetting to predict crappie fishing quality quickly enough to benefit anglers. While gillnetting may be helpful in predicting the crappie fishing in the spring following sampling, it appears to be of little use in predicting fishing in the same year the sampling occurs. By the time we were able to catch crappie in our nets, most anglers targeting crappie had started catching fish also. If the best prediction we can make is for the following spring, fall sampling with gill nets or electrofishing may be a better alternative to spring sampling. If fall sampling were to occur before lake turnover, we would likely be able to get a better estimate of recruitment and the present/expected size structure prior to the upcoming angling season.

A total of 60 crappie scale samples were taken at C. J. Strike Reservoir while netting, angling, and interviewing anglers. Forty-seven samples (31 white crappie and 16 black crappie) were collected from anglers during spot creel surveys. Another nine black crappie and five white crappie were sampled by gill net. Back-calculated lengths at age for both species are presented in Table 4. Based on this sampling, white crappie are more abundant and have much faster growth rates than black crappie in C.J. Strike Reservoir.

Table 3. Comparison of crappie catch per hour in gill nets (GN) and by anglers (AN) specifically targeting crappie in C. J. Strike Reservoir, 2003. N/C = no crappie caught.

	Date								
	March 25		**April 23**		**May 16**	**May 23**	**May 24**	**May 31**	**June 6**
Species	GN	AN	GN	AN	AN	AN	AN	AN	AN
Black crappie	0.06	N/C	0.04	N/C	0.33	N/C	0.16	0.03	N/C
White crappie	0.02	N/C	0.06	1.0	2	0.02	N/C	0.31	0.55
Both	0.07	N/C	0.09	1.0	2.33	0.02	0.16	0.34	0.55

Table 4. Mean lengths-at-annulus for white crappie and black crappie collected in C.J. Strike Reservoir in spring 2003.

Species	Age	Mean length (mm)	n
White crappie	1	106	38
	2	201	38
	3	243	38
	4	276	37
	5	305	30
Black crappie	1	83	19
	2	146	19
	3	192	8
	4	194	1
	5	-	-

Zooplankton Surveys

After five years of collecting zooplankton data two things are apparent; the relative productivity of the waters and the variability within waters which have a low retention time (Table 5).

An overall decrease in the ZQI was observed in C.J. Strike Reservoir between 2002 and 2003. Comparing the 2003 sample with the 2000 sample indicates an increase in ZQI values at the Bruneau Arm, and Bruneau Narrows sampling locations, and a slight decrease for the Crane Falls, and Powerline (Snake River arm) sample sites. The relative size and retention time of C.J. Strike Reservoir results in consistently high ZQI values and occasionally, difficult to process samples due to excessive phytoplankton (Figure 2). The Snake Arm consistently has the lowest ZQI when compared to the other areas. The ZQI values measured in C.J. Strike over the past five years suggest the reservoir zooplankton production is capable of supporting stocking rates somewhere between 75 and 150 fingerling rainbow trout per acre (Teuscher 1999). In 2003 we stocked 28 fingerling rainbow trout per acre, about one-third of the low range of rates suggested by Teuscher. Anglers have been commenting on poor trout angling over the past several years. When surplus hatchery trout are available, fingerling stocking should be increased to take advantage of the productivity in the reservoir. No zooplankton surveys have been taken during a normal water year. Near normal precipitation and river flows, and lower retention time in the reservoir, should result in lower overall zooplankton abundance.

The Arrowrock Reservoir ZQI results were lower at all sample sites than in 2002. Although Arrowrock likely has the lowest retention time of all the reservoirs we sampled, the ZQI remains relatively constant over time (Figure 3). Over the last five years, Arrowrock has had zooplankton productivity capable of supporting stocking rates somewhere between 75 and 150 fingerling rainbow trout per acre (Teuscher 1999). In 2002, 49 fingerling rainbow trout were stocked per acre. If the drought cycle continues, stocking rates should be increased to take advantage of the productivity found in the reservoir. No fingerlings were stocked in 2003 due to a planned drawdown of the reservoir.

A small increase was observed in the ZQI at middle and lower sample sites for Lucky Peak Reservoir when compared to 2002 (Figure 4). The annual ZQI variability at Lucky Peak is very likely related to the variable releases from Arrowrock Reservoir and releases downstream from Lucky Peak. The range of ZQI values over the last five years correlate to stocking rates ranging from <75 to 300 rainbow trout fingerlings per acre. In 2003, 133 fingerlings were stocked per acre. The current stocking rate appears a good compromise given the variability of the reservoir productivity.

Very little zooplankton data have been collected at Deadwood Reservoir compared to the above reservoirs. Given the importance of the kokanee salmon fishery, annual zooplankton samples should be taken to monitor forage availability for kokanee salmon. Although our data set is small, Deadwood Reservoir appears to be surprisingly productive (Figure 5). In 2003 the ZQI increased at the upper end of the reservoir but decreased at the middle and lower sample sites when compared to 2002.

Table 5. Zooplankton tow values in grams per meter sampled, zooplankton ratio (ZPR), and zooplankton quantity index (ZQI) for reservoirs sampled in 1999, 2000, 2001, 2002, and 2003. Depth of all samples was 9.1 meters.

Water	Sample Location	Biomass (g/m) 153µ	500µ	750µ	ZPR 750µ/500µ	ZQI (500µ+750µ)ZPR
C.J. Strike Res.	Snake Arm @ Crane Falls					
	1999	0.48	0.01	0.01	0	0
	2000	0.089	0.021	0.018	0.842	0.032
	2001	0.008	0.02	0.076	3.8	0.3648
	2002	0.033	0	0	0	0
	2003	0.0	0	0	0	0
	Snake Arm @ Powerline					
	1999	0.31	0.01	0.01	0	0
	2000	3.19	1.55	0.785	0.503	1.18
	2001	8.43	6.35	4.46	0.702	7.59
	2002	4.88	3.01	1.55	0.51	2.35
	2003	1.27	0.96	0.47	0.49	0.70
	Bruneau Arm					
	1999	2.51	0.63	0.33	0.53	0.5
	2000	2.21	0.671	0.322	0.479	0.476
	2001	4.22	2.78	2.94	1.06	6.06
	2002	0.97	0.53	0.61	1.17	1.33
	2003	1.65	0.67	0.38	0.57	0.599
	Bruneau Narrows					
	1999	2.89	0.98	0.51	0.52	0.78
	2000	1.422	0.679	0.430	0.633	0.701
	2001	4.47	2.19	1.07	0.48	1.58
	2002	1.28	0.94	0.57	0.60	0.92
	2003	1.48	0.84	0.64	0.76	1.12
	Near Dam					
	1999	1.29	0.46	0.24	0.52	0.36
	2000	0.91	0.18	0.14	0.784	0.25
	2001	3.02	1.08	0.5	0.46	0.72
	2002	1.93	1	0.38	0.38	0.53
	2003	1.38	0.65	0.22	0.34	0.296

Table 5. Continued.

Water	Sample Location	Biomass (g/m) 153µ	500µ	750µ	ZPR 750µ/500µ	ZQI (500µ+750µ)ZPR
Lucky Peak Res.	Upper					
	1999	1.2	0.65	0.25	0.39	0.35
	2000	0.926	0.936	0.582	0.622	0.944
	2001	0.14	0.07	0.03	0.4	0.04
	2002	1.11	0.83	0.63	0.75	1.10
	2003	0.3	0.3	0.3	1	0.60
	Middle					
	1999	0.9	0.42	0.28	0.66	0.46
	2000	0.323	0.232	0.223	0.962	0.44
	2001	0.81	0.63	0.58	0.93	1.12
	2002	0.52	0.27	0.25	0.92	0.48
	2003	0.52	0.48	0.39	0.81	0.70
	Lower					
	1999	0.29	0.12	0.07	0.55	0.11
	2000	0.343	0.262	0.345	1.32	0.80
	2001	0.29	0.10	0.08	0.79	0.14
	2002	0.13	0.13	0.09	0.67	0.15
	2003	0.79	0.45	0.25	0.56	0.39
Arrowrock Res.	Upper					
	1999	0.45	0.43	0.25	0.59	0.4
	2000	0.54	0.30	0.195	0.65	0.32
	2001	0.36	0.24	0.17	0.72	0.30
	2002	0.37	0.22	0.22	1	0.44
	2003	0.97	0.46	0.25	0.54	0.38
	Middle					
	1999	0.59	0.46	0.36	0.79	0.65
	2000	0.148	0.166	0.124	0.75	0.22
	2001	0.52	0.28	0.18	0.65	0.30
	2002	0.63	0.32	0.21	0.65	0.35
	2003	0.46	0.31	0.15	0.48	0.22
	Lower					
	1999	1.12	0.87	0.7	0.81	1.27
	2000	0.46	0.44	0.20	0.47	0.30
	2001	0.75	0.72	0.32	0.44	0.45
	2002	0.45	0.42	0.43	1.03	0.87
	2003	0.63	0.48	0.35	0.73	0.61

Table 5. Continued.

Water	Sample Location	Biomass (g/m) 153µ	500µ	750µ	ZPR 750µ/500µ	ZQI (500µ+750µ)ZPR
Deadwood Res.	Upper					
	1999	0.59	0.5	0.14	0.37	0.25
	2002	0.56	0.46	0.24	0.51	0.36
	2003	0.29	0.25	0.22	0.88	0.41
	Middle					
	1999	0.74	0.68	0.25	0.37	0.35
	2002	0.26	0.19	0.28	1.5	0.71
	2003	0.21	0.17	0.14	0.82	0.25
	Dam					
	1999	0.67	0.54	0.26	0.49	0.39
	2002	0.27	0.32	0.30	0.92	0.57
	2003	0.18	0.13	0.18	1.38	0.43

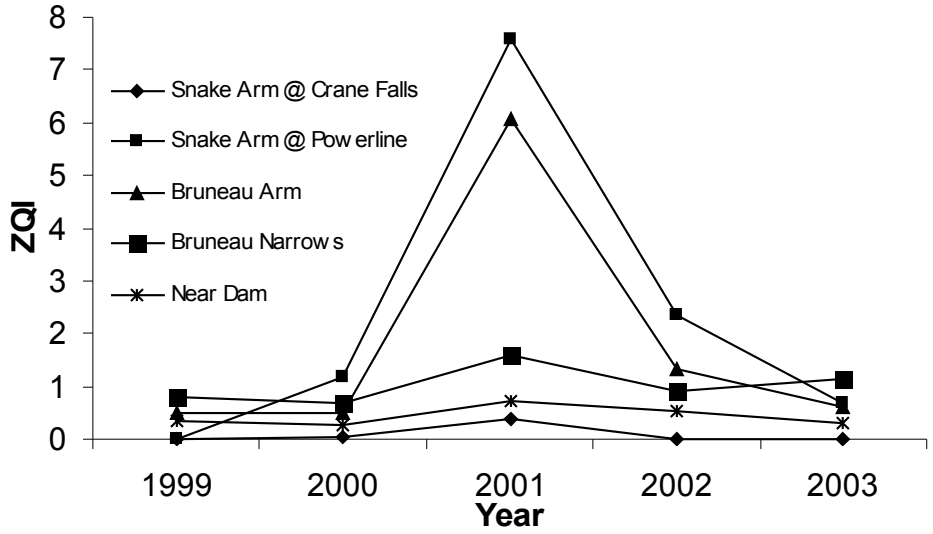

Figure 2. Zooplankton quality index (ZQI) values for C.J. Strike Reservoir, 1999-2003.

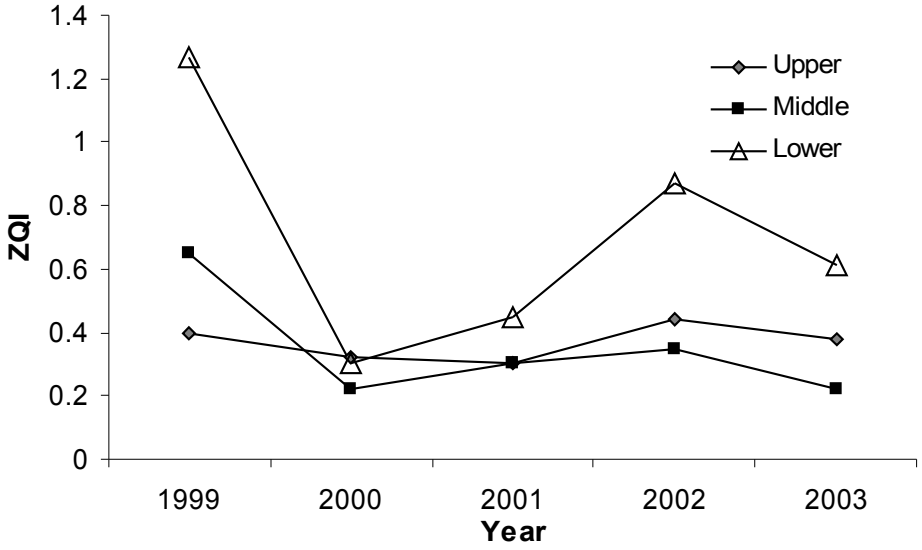

Figure 3. Zooplankton quality index (ZQI) values for Arrowrock Reservoir, 1999-2003.

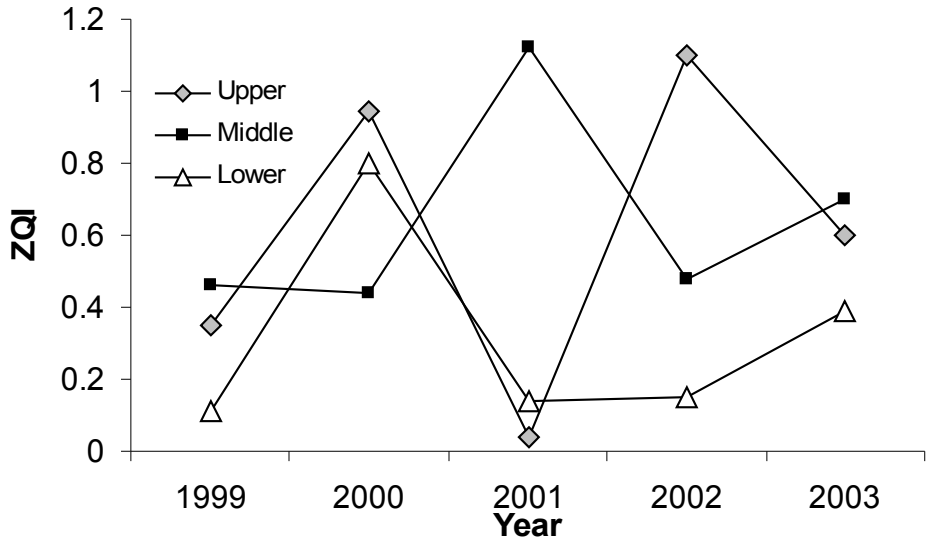

Figure 4. Zooplankton quality index (ZQI) values for Lucky Peak Reservoir, 1999-2003.

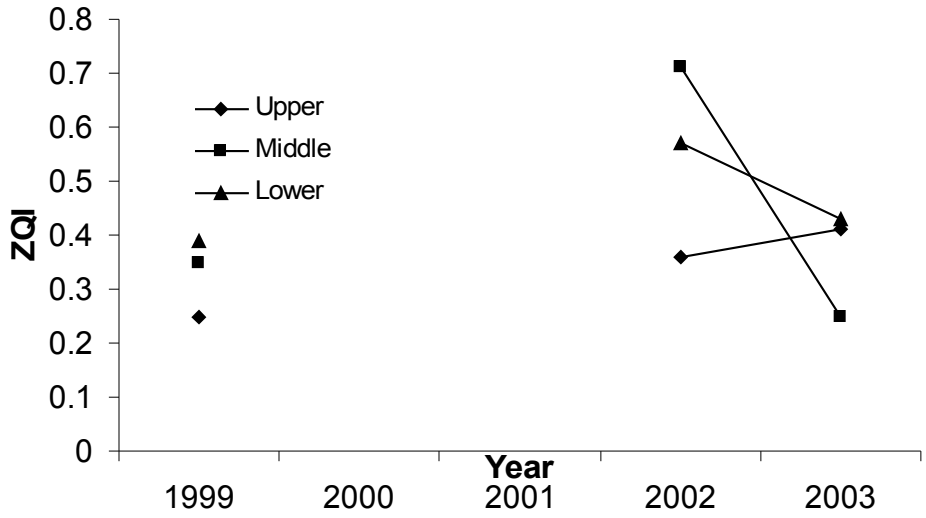

Figure 5. Zooplankton quality index (ZQI) values for Deadwood Reservoir, 1999-2003.

RECOMMENDATIONS

Paddock Reservoir

1. Continue to monitor fish populations annually until drought conditions and/or severe summer drawdowns cease.

Payette River Greenbelt Pond

1. Manage the pond as a mixed species fishery with self-sustaining populations of warmwater fish. Stock seasonally with catchable rainbow trout to improve angler success and harvest opportunity.

C.J. Strike Reservoir

1. Try fall electrofishing to monitor crappie recruitment and size structure.
2. When surplus hatchery fish are available, increase fingerling rainbow trout stocking from 28/ac to 100/ac.

Arrowrock Reservoir

1. When surplus hatchery fish are available, increase fingerling rainbow trout stocking from 49/ac to 100/ac.

Deadwood Reservoir

1. Monitor zooplankton abundance and size structure annually.

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APPENDICES

Appendix A. Number of fish collected, minimum and maximum length, weight, condition factor, standard errors, catch-per-unit-effort (CPUE), and percent of total by number and weight for fish collected during lowland lake and reservoir sampling, 2003.

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)
BEACH'S POND													
4/25/03													
Electrofishing													
Bluegill	30	60	170	105	5	30	5	1.93	0.17	120.00	3.62	50.85	12.59
Largemouth bass	14	190	355	281	15	394	53	1.68	0.18	56.00	22.06	23.73	76.70
Pumpkinseed	15	85	160	123	5	51	8	2.49	0.08	60.00	3.08	25.42	10.71
Total	59									236.00	28.76		
C J STRIKE RES													
3/25/03													
Gill Net													
Black crappie	3	175	210	188	11	102	22	1.47	0.05	1.00	0.10	9.68	2.30
Channel catfish	2	390	645	518	128	2080	1370	1.24	0.04	2.00	2.09	14.29	94.99
Hatchery rainbow	5	430	505	472	14	1295	69	1.23	0.05	1.67	2.16	16.13	48.85
Smallmouth bass	3	275	350	312	22	487	121	1.53	0.09	1.00	0.49	9.68	11.01
White crappie	1	300	300	300		355		1.31		0.33	0.12	3.23	2.68
Yellow perch	18	140	255	214	7	137	13	1.31	0.04	6.00	0.82	58.06	18.56
Total	32									12.00	5.78		
4/9/03													
Angling													
Black crappie	10	195	280	215	8	0	0	0.00	0.00	5.00	0.00	76.92	0.00
Channel catfish	1	390	390	390		710		1.20		0.50	0.36	7.69	76.66
Smallmouth bass	1	240	240	240		220		1.59		0.50	0.11	7.69	23.34
White crappie	1	280	280	280		0		0.00		0.50	0.00	7.69	0.00
Total	13									6.50	0.47		
Gill Net													
Black crappie	4	180	230	214	11	188	25	1.89	0.04	1.33	0.25	8.89	5.23
Channel catfish	7	300	395	344	13	434	58	1.04	0.05	2.33	1.01	15.56	21.09
Smallmouth bass	13	225	400	297	16	463	83	1.57	0.03	4.33	2.01	28.89	41.94
White crappie	1	275	275	275		335		1.61		0.33	0.11	2.22	2.33
Yellow perch	20	145	280	228	9	211	21	1.69	0.05	6.67	1.41	44.44	29.40
Total	45									15.00	4.78		

Appendix A. 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)
C J STRIKE RES													
4/23/2003													
Angling													
White crappie	1	285	285	285		0		0.00		0.50	0.12	100.00	100.00
Total	1									0.50	0.12		
Gill Net													
Black crappie	2	265	280	273	8	395	25	1.95	0.04	0.67	0.26	4.55	3.63
Channel catfish	12	305	630	428	33	1080	282	1.12	0.05	4.00	4.32	27.27	59.64
Hatchery rainbow	3	305	545	413	70	863	427	1.03	0.02	1.00	0.86	6.82	11.91
White crappie	3	280	300	288	6	375	23	1.56	0.06	1.00	0.30	6.82	4.07
Yellow perch	24	150	305	232	8	188	15	1.46	0.04	8.00	1.50	54.55	20.75
Total	44									14.67	7.25		
5/16/2003													
Angling													
Black crappie	1	267	267	267		0		0.00		0.33	0.00	14.29	
White crappie	6	317	356	330	6	0	0	0.00	0.00	2.00	0.00	85.71	
Total	7									2.33	0.00		
5/23/2003													
Angling													
White crappie	1	320	320	320		0		0.00		0.02	0.00	100.00	
Total	1									0.02	0.00		
5/24/2003													
Angling													
Black crappie	4	235	325	290	19	0	0	0.00	0.00	0.16	0.00	100.00	
Total	4									0.16	0.00		
5/31/2003													
Angling													
Black crappie	1	210	210	210		0		0.00		0.03	0.00	9.09	
White crappie	10	295	330	313	4	0	0	0.00	0.00	0.31	0.00	90.91	
Total	11									0.34	0.00		
6/6/2003													
Angling													
White crappie	13	279	394	331	8	0	0	0.00	0.00	0.55	0.00	100.00	
Total	13									0.55	0.00		

CLAYTONIA P

4/18/03

Gill Net

Black crappie	1	285	285	285	380	1.64	2.00	0.76	11.11	3.25
Channel catfish	1	440	440	440	960	1.13	2.00	1.92	11.11	8.22

Appendix A. 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)
	Common carp	2	300	690	495	195	3650	3050	2.13	0.09	4.00	14.60	22.22	62.47
	Largemouth bass	3	245	270	260	8	280	31	1.58	0.04	3.00	0.84	33.33	3.59
	Largescale sucker	2	490	495	493	3	1750	150	1.47	0.15	3.00	5.25	22.22	22.46
	Total	9									14.00	23.37		

Appendix A. 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)
PADDOCK RES														
	5/14/03													
	Electrofishing													
	Black crappie	38	60	280	199	13	267	18	1.82	0.03	30.40	6.22	15.83	14.96
	Bluegill	94	0	245	146	6	157	12	2.63	0.05	75.20	9.34	39.17	22.48
	Largemouth bass	104	80	335	275	4	318	8	1.44	0.01	83.20	25.98	43.33	62.54
	Pumpkinseed	4	40	85	55	11	10		1.63		3.20	0.01	1.67	0.02
	Total	240									192.00	41.55		
PAYETTE GREENBELT P														
	6/4/03													
	Electrofishing													
	Bluegill	44	30	180	104	4	29	4	1.76	0.13	88.00	2.56	56.41	2.91
	Bridgelip sucker	1	270	270	270		190		0.97		2.00	0.38	1.28	0.43
	Channel catfish	1	585	585	585		2100		1.05		2.00	4.20	1.28	4.78
	Common carp	8	500	730	591	27	3014	548	1.35	0.14	16.00	48.22	10.26	54.91
	Largemouth bass	23	100	480	338	23	690	101	1.32	0.07	46.00	31.73	29.49	36.14
	Largescale sucker	1	300	300	300		360		1.33		2.00	0.72	1.28	0.82
	Total	78												

Rivers and Streams Investigations

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ABSTRACT

Snorkeling was conducted at eleven locations of the North Fork Boise River (NFBR) in July of 2003. Five locations were along the roaded portion of the NFBR, and six locations were in the unroaded river section between Rabbit Creek and the Middle Fork Boise River. Data were compared to data collected prior to and following major landslide events that occurred in early September 1995. Redband trout *Oncorhynchus mykiss gairdneri* densities were down slightly in the roadless section of the NFBR, but were higher than those observed in 2000 for the roaded section.

Snorkeling was conducted in 14 transects of the South Fork Payette River in August 2003. All locations were previously sampled in 1996-1997, and four of the sites had also been snorkeled in 1988-1990. Redband trout densities were generally higher than those observed in 1996-97, but remain below those observed in 1988-1990.

Snorkel surveys were conducted in Elk Creek and Sulphur Creek trend areas August 12-14, 2003. Densities of juvenile Chinook salmon *O. tshawytscha* ranged from 3.2 to 26.9 fish/100 m^2 in Elk Creek and from 33.6 to 47.9 fish/100 m^2 in Sulphur Creek. Densities in Sulphur Creek were higher than either 2001, or 2002.

Chinook salmon spawning ground surveys were conducted in Bear Valley, Elk, and Sulphur Creek trend areas August 27-28. Salmon redds numbered 364, 331, and 86 in Bear Valley, Elk, and Sulphur Creeks, respectively. Redds counted in trend areas were higher than those counted in 2002 for Bear Valley Creek, but lower for Sulphur and Elk creeks.

A fish trap was operated in the Kirby Dam fish ladder during August to document bull trout *Salvelinus confluentus* migration patterns. Attraction flow was added on August 13 and continued through the trapping period. A total of five bull trout were trapped from August 16-26.

The South Fork Boise River was electrofished in late October and early November 2003 from the Village Access downstream to 1.1 km below the Cow Creek Bridge. A population estimate of 5,975 rainbow trout >129 mm was generated for this reach. Total densities of 2.4/100 m^2 for rainbow trout >129 mm, and 1.38/100 m^2 for rainbow trout >239 mm were estimated in this reach. Total abundance estimates were similar to 2000 estimates, but considerably lower than 1994 estimates. Abundance of large (>400 mm) fish decreased slightly (5%) from the 2000 survey (180/km to 170/km). Quality Stock Density (QSD) of 400 mm increased from 20% in 1994 to 61% in 2003.

Tributaries on the southern end of Deadwood Reservoir were surveyed in August for the presence of spawning kokanee *O. nerka kennerlyi*. These surveys were initiated to monitor kokanee escapement from the reservoir. Kokanee were not observed in Moulding, Beaver, South Fork Beaver or Habit creeks. Trail Creek was the only tributary where spawning kokanee

were observed. After two count areas were established, Trail Creek was walked on seven occasions between August 15 and September 14 to count the total number of kokanee in each section. The highest number of kokanee counted was 96 on August 26.

OBJECTIVES

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

2. Establish permanent trend sites and standardized methods to monitor stream and river fish populations.

3. Monitor use of the Kirby Dam fish ladder in August by bull trout and other fish species in the Middle Fork Boise River.

METHODS

Stream Snorkel Surveys

North Fork Boise River

Snorkel survey methods were used to identify and count fish species and numbers in the roaded and non-roaded sections of the North Fork Boise River (NFBR) during July 2003. Information was collected to document the effects of major landslide events that occurred in early September 1995 between Crooked River and Deer Park. Snorkel counts were conducted with two snorkelers moving upstream through the snorkel section identifying fish species, sizes, and numbers and a third person was used to record data. Snorkel sections were measured (length and minimum of four widths) using a hand-held laser range finder (Leica model LRF 800) to calculate area surveyed. Physical habitat measurements recorded included habitat type, substrate particle size, depth, and water temperature. GPS coordinates (NAD27 Conus, in UTMs) were collected at all snorkel sites using a Garmin Rino model 120 handheld GPS receiver. Mean densities (all sites combined) for redband trout *O. mykiss gairdneri* and mountain whitefish *Prosopium williamsoni* were compared to similar surveys completed in 1989 (Rohrer 1990), 1996 (Allen et al. 1999), and 2001 (Flatter et. al. in press).

Rabbit Creek to the Middle Fork Boise River

Six sites were snorkeled in the roadless section of the NFBR on July 29. All six sites were located between the confluence with the Middle Fork Boise River (MFBR) and the mouth of Rabbit Creek. Due to the inaccessibility of this lower section, two inflatable kayaks and a

small cataraft were utilized for transportation of the snorkel crew. All boats were launched at Blackrock Campground at 0900 on July 29, and reached the Troutdale take-out at 1830. Digital photos were taken at each site and were archived in regional computer files.

Deer Park to Black Rock Campground

Five sites were snorkeled in the roaded section of the NFBR on July 24. All sites were located between Black Rock Campground and Deer Park Campground. Digital photos were taken at each site and were archived in regional computer files.

South Fork Payette River

Snorkeling was used to identify and count fish species in the South Fork Payette River (SFPR) during August. Surveys were conducted in fourteen transects between Lowman and Grandjean over a two day period. Two snorkelers were used, traveling in an upstream direction at all sites. Snorkel sections were measured (length and minimum of four widths) using a hand-held laser range finder (Leica model LRF 800) to calculate area surveyed, and water temperature was recorded at each snorkel site. GPS coordinates (NAD27 Conus, in UTMs) were collected at all snorkel sites using a Garmin Rino model 120 handheld GPS receiver. None of the snorkel transects corresponded with hatchery stocking locations. Fish abundance data were compared to those from previous snorkel surveys conducted in 1988-1990 and 1996-1997.

Elk Creek and Sulphur Creek

Chinook salmon parr monitoring snorkel counts were conducted with two snorkelers moving upstream through the trend sections identifying fish species and sizes and a third person was used to record data. Snorkel sections were then measured (length and minimum of four widths) using a hand-held laser range finder (Leica model LRF 800) to calculate area surveyed, and water temperature was recorded at each snorkel site. Physical habitat measurements included habitat type, substrate particle size, water depth, and temperature. GPS coordinates (NAD27 Conus, in UTMs) were collected at all snorkel sites using a Garmin Rino model 120 handheld GPS receiver.

Chinook Salmon Redd Counts

Bear Valley, Elk, and Sulphur Creeks

Chinook salmon *O. tshawytscha* spawning ground surveys were conducted in Bear Valley, Elk, and Sulphur creeks trend areas on August 27-28. Redds were counted and GPS coordinates (NAD27 Conus in UTMs) were taken according to criteria described in the draft Idaho Redd Counting Manual (Idaho Fish and Game [Department] unpublished). Live fish observed were identified to sex and approximate ocean age (jacks, II, or III) when possible.

Sulphur Creek redd counts were conducted using a helicopter on September 6. Counts were done by staff of the United States Forest Service Intermountain Research Station, and data were provided by Russ Thurow.

Kirby Dam Fish Ladder Monitoring

The operational plan for the Kirby Dam fish ladder calls for the ladder to be in operation from mid-April through August of each year, primarily to allow bull trout and redband trout access to the upper MFBR for spawning and rearing (Flatter et al. In press).

In 2001, Idaho's Office of Species Conservation (OSC) directed the Idaho Fish and Game Department (Department) to monitor use of the fish ladder during the month of August for the next five years. The OSC is seeking to determine if allocating a portion of the late summer MFBR water for fish passage can be justified, particularly during drought years, or better used solely for power production by Atlanta Power Company (APC).

The fish trap was installed on August 11 and remained in place until September 1, 2003. No trapping was conducted in early August due to the Hot Creek fire and subsequent road closures following extreme thundershower events. The trap consisted of two steel grates; each installed in a vertical slot of the fish ladder. The grate on the downstream side of the trap contained a 75 x 205 mm opening to allow fish to enter the trap; the upstream grate allowed only water passage. One location of the ladder was used for trapping, close to the ladder inlet (in vertical slots numbered 14 and 15, as counted from the upstream end of the ladder moving downstream) as recommended by Flatter et al. (In press). The trap was checked for fish twice daily, in the morning and evening. When fish were captured, a third grate was installed which covered the opening in the downstream grate, and fish were removed with long handled dipnets. All collected fish were identified, weighed to the nearest gram, measured to the nearest millimeter, and released in the MFBR upstream from Kirby Dam. Because of the remote location, the trap tender was housed on site in a camp trailer.

Periodic angling was conducted in the first 150 m of river downstream of the ladder inlet throughout the trapping period to determine if large bull trout were present in the area.

South Fork Boise River Electrofishing

A mark-recapture trout population estimate for rainbow trout was conducted on the special regulations section of the South Fork Boise River (SFBR) below Anderson Ranch Dam. Comparable surveys were completed on this section in 1994, 1997 and 2000. 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 9.6 km.

Electrofishing equipment included a raft, two booms each supporting a 76 cm ring from which 8 dropper anodes were suspended, 11 m of .95 cm diameter stainless steel cable (cathode), and a Coffelt VVP-15. The VVP settings used to collect fish were 350 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 $8.5 m^3 sec^{-1}$.

Mark runs were conducted on October 22, 24, and 28. Recapture runs were on November 7 and 10. During mark runs, rainbow trout collected were marked by creating a hole in their caudal fin with a paper punch. During recapture runs, rainbow trout were marked by notching the anal fin. All unmarked rainbow trout collected were measured to the nearest mm and a subsample was weighted to the nearest g. Twenty rainbow trout between 120-125 mm were submitted to the Eagle Fish Health Laboratory (EFHL) for whirling disease analysis. During recapture runs, two additional personnel were utilized to work up captured fish, which allowed the electrofishing to continue without delays.

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 rainbow trout >129 mm. There was only one fish recaptured <239 mm. Population estimates were calculated for rainbow trout >129 mm, and >239 mm. These length groups correspond to estimates made in 1994, 1997 and 2000 (Allen et al. 2000a, 2000b and Flatter et al. In press).

A density estimate (rainbow trout/100 m^2) was made for a 1.4 km section of the SFBR beginning upstream (UTM = 11T 0618344 4801389) and ending at the Cow Creek Bridge. The boundaries of the section were chosen to simplify repeatability and to allow for habitats representative of the entire (9.6 km) study area to be included. The surface area of the 1.4 km section was determined using a hand held laser rangefinder (Leica LRF 800, to collect six widths), and All Topo map software (Version 2.0, to calculate the total section length). All fish were marked using a mid-caudal mark to distinguish them from fish marked in other areas of the SFBR. All marked and unmarked rainbow trout caught within the 1.4 km section were noted and used to calculate population and density estimates.

Kokanee Salmon Spawner Surveys in Deadwood Reservoir Tributaries

Tributary surveys are being used in conjunction with information collected by the Nampa Hatchery from the annual Deadwood River kokanee salmon *O. nerka kennerlyi* egg take weir normally installed near Wild Buck Creek. The current weir operating protocol involves installing the weir in early August and taking eggs until approximately the second week in September, while allowing no kokanee to pass above the weir. After being reared to fingerlings at the Mackay Hatchery, 120,000 kokanee are returned to the reservoir in early July.

All perennial tributaries to Deadwood Reservoir not controlled by a fish weir were surveyed on August 10 for the presence of spawning kokanee salmon. These surveys were initiated to monitor kokanee escapement from the reservoir by identifying areas utilized by spawning fish and to set up long term monitoring sites. Data from the monitoring sites will be used to determine if control measures are required to prevent excessive escapement which might interfere with our management objectives (four-year old spawners with a mean length >325 mm). Surveys were conducted by one person walking and scanning for fish. The distance each tributary was surveyed depended on the availability of suitable spawning habitat and the presence of natural migration barriers. Areas surveyed included Trail (2.4 km), Moulding (0.8 km), Beaver (0.8 km), South Fork Beaver (1.3 km) and Habit (1.6 km) creeks. When the tributary surveys were conducted, spawning kokanee salmon had started migrating up the Deadwood River approximately ten days prior. Future trend monitoring sections were established and GPS coordinates were taken to mark the boundaries.

RESULTS AND DISCUSSION

Stream Snorkel Surveys

Results from each snorkel transect are provided in Appendix A. Site descriptions (UTMs) and directions to each site are provided in Appendices B and C. Digital photos taken at each site were archived in regional computer files.

North Fork Boise River

Rabbit Creek to the Middle Fork Boise River

Snorkeling this section of the NFBR from the launch to arrival at the take out took a total of 10 hours to complete. Redband trout and mountain whitefish were observed at all locations (Appendix A). One bull trout (250 mm in section X2) was observed but was outside our established snorkel transects.

No hatchery rainbow trout *O. mykiss* were observed below Rabbit Creek. Mean redband trout density (all length classes combined) was 1.16 fish/100 m^2 compared to 0.97, 0.15 and 1.67 fish/100 m^2 in 1989, 1996 and 2001, respectively (Table 1). Densities of all but the largest size class of redband trout were equal to, or exceeded, 1989 levels. Density of redband trout >300 mm were the lowest on record. Although overall density estimates are slightly lower than in 2001, redband trout were more abundant in the roadless section in 2003 than in 1989.

Mountain whitefish density was 1.55 fish/100 m^2, which surpasses all previous density estimates (Table 1).

Although much of the substrate in the lower NFBR is still highly embedded with sand following the 1995 landslides, our cursory observations suggest that there has been a gradual recolonization of terrestrial insects throughout the non-roaded section of the NFBR since 1996.

Deer Park to Black Rock Campground

All five sites were snorkeled in one day. Water temperature ranged between 16° C and 20° C. The mean densities for redband trout were three times those found in 1989 up to Crooked River, and very similar to the 1989 levels from Crooked River to Deer Park (Table 1). Overall, densities of redband trout between 101-300 mm were higher in the roaded section than ever recorded previously. Densities of mountain whitefish were also some of the highest ever recorded. These data suggest that the redband trout and mountain whitefish populations have, for the most part, recolonized the river corridor impacted by the landslide events of 1995.

Other species observed during snorkeling surveys included Northern pikeminnow *Ptychocheilus oregonensis*, and hatchery rainbow trout. Brief site descriptions (Appendix B) will

Table 1. Snorkel estimates of mean fish densities (number/100 m^2) in the North Fork Boise River from the confluence with the Middle Fork Boise River to Deer Park in 1989, 1996, 2000, 2001 and 2003.

		Redband trout length group (mm)				Total mean density (fish /100m^2)		
						Redband trout	Mountain whitefish	Hatchery trout
Section	Year	0-100	101-200	201-300	>300			
Section 1[a]	1989	0.07	0.40	0.38	0.12	0.97	1.37	0
	1996	0	0.02	0.06	0.07	0.15	0.84	0.08
	2001	0.18	0.70	0.70	0.09	1.67	1.35	0
	2003	0.15	0.31	0.67	0.03	1.16	1.55	0
Section 2[b]	1989	0.05	0.13	0.02	0	0.20	0.22	0.36
	1996	0	0.09	0	0.04	0.13	0.23	0.11
	2000	0	0	0.09	0	0.09	0.34	0.09
	2003	0.03	0.20	0.40	0.00	0.63	1.42	0.04
Section 3[c]	1989	0.17	0.64	0.21	0	1.02	0.82	0.29
	1996	0	0.15	0.08	0	0.23	0.21	0.09
	2000	0.08	0.15	0.11	0.04	0.38	2.01	0.23
	2003	0.41	0.35	0.28	0.00	1.04	2.87	0.73

[a] Section 1 - Confluence with Middle Fork Boise River to Rabbit Creek, non-roaded section.
[b] Section 2 - Rabbit Creek to Crooked River mouth, roaded section.
[c] Section 3 - Crooked River to Deer Park, roaded section.

make these sites identifiable; they should become the standardized sites for future monitoring conducted every 3-4 years.

There are four more NFBR sites located between Graham and Deer Park that have not been snorkeled since 2000. These sites should be sampled in 2003 for trend monitoring.

South Fork Payette River

A total of fourteen sites were snorkeled on the SFPR between Lowman and Grandjean on August 18-19 (Appendices A and B). Redband trout and mountain whitefish were observed at all sites except Sacajawea Hot Springs where only mountain whitefish were observed. No hatchery rainbow trout were observed. Other species observed included mountain sucker *Catostomus platyrhynchus*, and one westslope cutthroat trout *O. clarkii lewisi*.

Overall, 64% (9/14) of the sites snorkeled had redband trout densities lower in 2003 than in 1996 (Allen et al. 1999**)**, and 36% (5/14) had densities higher. Total redband densities have declined since 1989 for all size classes (Table 2). Densities by section ranged from 0.10 to 2.82 redband trout/100 m^2 (Table 3). Very few redband trout >300 mm were observed. The areas with the highest observed densities corresponded with two general locations, Grandjean and Lowman (Table 3). Both areas are adjacent to river reaches with very difficult angler access. These data suggest that angler exploitation may have reduced redband trout densities in easily accessible areas.

Densities of mountain whitefish ranged from 0.13 to 1.01 fish/100 m^2, with mean densities lower than in 1988-1990 surveys, but higher than 1996 surveys (Table 3).

Approximately thirteen thousand catchables per year were stocked in the SFPR between 1990-1999 (Table 4). The highest mean densities of hatchery rainbow trout documented while snorkeling occurred in 1988 and 1989 (0.23 and 0.50 fish/100 m^2, respectively), both drought years in which a total of 30,700 catchables were stocked (22,900 in 1988 and 7,800 in 1989, Table 2). Between 1990 and 1997, densities of hatchery rainbow trout observed while snorkeling ranged from 0.02 to 0.05 fish/100 m^2. During the same time period, the density of redband trout across all size classes steadily declined between 1990 and 1997. Although the cause of the decline is unknown, a few likely contributing factors are extended drought and angler exploitation. Stocking of the SFPR was eliminated in 1999 following the construction of two put-and-take catchable ponds near the Ten-Mile Bridge above Lowman.

Elk and Sulphur Creeks

Five snorkel transects were completed in Elk Creek and three transects were completed in Sulphur Creek (Figure 1; Appendix C). Juvenile Chinook salmon densities ranged from 3.2 to 26.9 fish/100 m^2 in Elk Creek and from 33.6 to 47.9 fish/100 m^2 in Sulphur Creek (Table 5). Densities increased in all Elk and Sulphur Creek snorkel sites compared to 2002 surveys (Flatter et al. In press). Habitat information was forwarded to the Department's anadromous research staff for incorporation into the Idaho Salmon and Steelhead Investigations Report (Idaho Salmon and Steelhead Investigations 2003, Idaho Department of Fish and Game, in press).

Table 2. South Fork Payette River fish densities for all snorkel sites above Lowman combined, 1988-1990, 1996-1997 and 2003.

		Wild redband trout mean densities by length group (mm)				Mean density (fish/100 m^2)		
Year	Number of snorkel sites	0-100	101-200	201-300	>300	Mountain whitefish	Hatchery rainbow trout	Total number of hatchery catchables stocked
2003	14	0.24	0.80	0.21	0.02	0.83	0	0
1997	8	0.22	0.54	0.18	0.01	0.67	0.04	22,000
1996	17	0.41	0.66	0.12	0	0.25	0.05	10,000
1990	4	0.51	1.15	0.47	0.05	1.57	0.02	17,600
1989	4	2.1	2.4	0.9	0	8.4	0.5	7,800
1988	4	1.17	1.15	0.41	0	4.6	0.23	22,900

Table 3. Densities of fish (fish/100 m^2) observed while snorkeling the South Fork Payette River in 1996 and 2003.

	2003 Redband trout density by length group (mm)				Total Mean Density (fish/100m^2)			
					Redband trout		Mountain whitefish	
Section (Highway 21 mile post)	< 100	101-200	201-300	> 300	2003	1996	2003	1996
Sacajawea Hot Springs (at Grandjean)	0	0	0	0	0	0.87	0.36	0.43
Bear Cr.	0	0.71	0.83	0	1.54	0.18	0.45	0.02
Canyon Cr.	1.03	1.13	0.41	0	2.57	0.50	0.72	0.08
Bonneville (92.3)	0.64	1.10	0.18	0	1.92	3.12	0.74	0.41
Chapman Cr.	0.22	0.15	0	0	0.37	3.96	0.79	0.26
Tenmile Cr. (86.7)	0	0.13	0	0	0.13	0.64	0.80	0.21
Red Roof Cabin (85.3)	0	0.05	0.05	0	0.10	1.36	0.96	0.17
D.S. Kettle Cr. (83.1)	0.26	1.19	0.22	0	1.67	2.52	0.56	0.44
U.S. Helende Cr. (82.4)	0.05	0.14	0.14	0.05	0.38	0.85	0.76	0.47
Meadow Cr. (79.7)	0.13	0.04	0.09	0	0.26	0.85	0.74	0.41
Emma Edwards (77.5)	0.27	1.20	0.27	0	1.74	0	1.01	0
Trailer House Hole (76.3)	0.32	2.11	0.35	0.04	2.82	2.50	0.95	0.11
Vehicle Pullout (74.8)	0.06	0.23	0.13	0	0.42	0	0.13	0
Cabins below Lowman	0.34	0.83	0.38	0.08	1.63	2.57	0.36	0.53

Table 4. Total number of catchable rainbow trout stocked in the South Fork Payette River between the mouth of the Deadwood River and the Ten-Mile Bridge, 1990-1999.

Year	Total number of catchables
1990	17,600
1991	10,900
1992	9,500
1993	5,900
1994	12,900
1995	14,000
1996	10,000
1997	22,000
1998	10,000
1999	15,000

Table 5. Number of age-0 Chinook salmon in general parr monitoring sections, August 2003 in Elk and Sulphur creeks.

Stream	Strata/Section	Number observed	Area sampled (m^2)	Density (fish/100 m^2)
Elk Creek	1-A	203	1329.7	15.3
	1-B	24	752.7	3.2
	2-A	170	1328.4	12.8
	2-B	170	3255.1	5.2
	2-C	414	1540	26.9
Sulphur Creek	2-3A	241	503.4	47.9
	2-4A	437	1142.4	38.3
	2-4B	570	1694	33.6

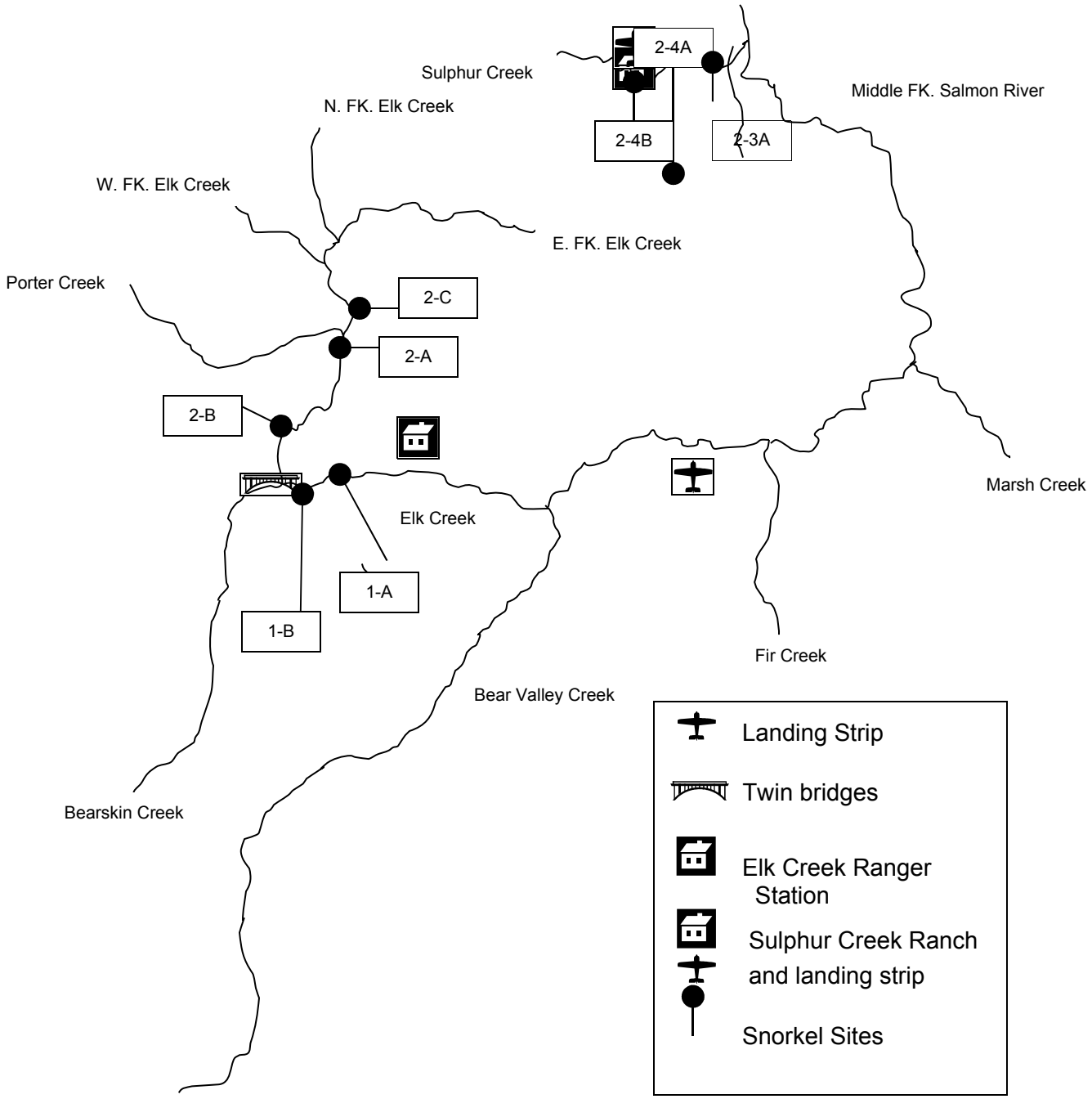

Figure 1. Chinook parr monitoring snorkel sites in Elk and Sulphur creeks, 2003.

Chinook Salmon Redd Counts

Bear Valley, Elk, and Sulphur Creeks

Trend areas surveyed in 2003 were identical to areas surveyed in the past. The number of redds counted were 364, 331, and 86 for Bear Valley, Elk, and Sulphur creeks, respectively (Table 6). Redd counts in 2003 were higher in Bear Valley Creek, but lower than those counted in 2002 for Elk Creek and Sulphur Creek (Table 7).

Live fish observed in Bear Valley Creek totaled 6 two-ocean males, 7 three-ocean males, 12 two-ocean females, and 11 three-ocean females. In Elk Creek we observed 5 two-ocean males, 5 three-ocean males, 32 two-ocean females, and 12 three-ocean females. There were no live fish reported from the helicopter survey conducted in Sulphur Creek.

Kirby Dam Fish Ladder Monitoring

The trap was in operation for a total of 504 hours between August 11 and September 1. Weather conditions for the month of August were predominantly hot and clear, with isolated thundershowers on August 15, and 21. Water temperatures ranged from 14ºC to 16ºC during the trapping period.

The first fish was trapped on August 16, and the last on August 26. A total of ten fish were captured, including five bull trout, two redband trout, one cutthroat trout, and two mountain whitefish.

Bull trout were trapped on August 16, 18, and 26 and ranged in length from 175 to 223 mm, and had a mean length of 195 mm (Table 8). Redband trout lengths were 219 and 275 mm. No bull trout were caught by angling.

Staff gauge height at the upstream end of the ladder during the trapping period ranged from 0.24 to 0.26 m (0.79 ft to 0.85 ft on gauge). As in the last several years, nearly nonexistent attraction flow plagued the fish ladder operation. Following numerous attempts by the Department to contact the APC about increasing attraction flow, the APC made the necessary adjustments to their penstock bypass system on August 15. Due to the design of the structure in place to supply and discharge attraction flow at the downstream end of the ladder, we have been unable to control or accurately quantify its delivery.

South Fork Boise River Electrofishing

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

Table 6. Chinook salmon redds counted August 27-28, 2003 in Bear Valley, Elk and Sulphur Creek trend areas.

TRANSECT Date Sampled	TRANSECT DESCRIPTION	# REDDS	# TEST DIGS	LIVE FISH WILD SPRING CHINOOK			
BEAR VALLEY CREEK TREND AREA 8/27/02				2 OCEAN FISH MALE	2 OCEAN FISH FEMALE	3 OCEAN FISH MALE	3 OCEAN FISH FEMALE
WS-9a	Mine exclosure area	3	1	0	0	0	0
WS-9b	Mine exclosure to Cub Creek	29	3	0	0	0	0
WS-9c	Cub Creek to Sack Creek	74	23	3	0	0	0
WS-9d	Sack Creek to Elk Creek	139	4	1	11	1	0
WS-10a	Elk Creek to Poker Bridge	106	0	2	0	5	9
WS-10b	Poker Bridge to Fir Creek	13	0	0	1	1	2
TOTAL FOR BEAR VALLEY CREEK		**364**	**31**	**6**	**12**	**7**	**11**
ELK CREEK TREND AREA 8/27-28/02							
WS-11a	West Fork Elk Creek to Twin Bridges	193	12	2	15	1	2
WS-11b	Twin Bridges to Guard Station	120	0	3	11	4	10
WS-11c	Guard Station to Bear Valley Creek	18	0	0	6	0	0
TOTAL FOR ELK CREEK		**331**	**12**	**5**	**32**	**5**	**12**
SULPHUR CREEK TREND AREA 8/28/02							
WS-12	Rockslide to Sulphur Cr. Ranch	46	0	0	0	0	0
OS-4	Sulphur Cr. Ranch to 1.5 miles upstream	42	0	0	0	0	0
OS-4 to NF Sulphur Creek	1.5 miles upstream of Ranch to NF Sulphur Creek	0	0	0	0	0	0
TOTAL FOR SULPHUR CREEK		**86**	**0**	**0**	**0**	**0**	**0**

Table 7. Total salmon redds counted in Bear Valley, Elk and Sulphur creek trend areas, 2000-2003.

Year	Bear Valley Creek	Elk Creek	Sulphur Creek
2000	69	83	5
2001	172	219	38
2002	245	377	93
2003	364	331	86

Table 8. Fish captured in Kirby Dam fish ladder trap August 12 to September 1, 2003.

Species[a]	Length (mm)	Weight (g)	Date collected	Time collected
BLT	175	60	8/16/03	0950
MWF	240	180	8/16/03	0950
BLT	221	84	8/18/03	1700
BLT	180	44	8/18/03	1700
BLT	223	96	8/18/03	1700
WRB	219	104	8/18/03	1700
WSC	225	100	8/26/03	0900
BLT	175	31	8/26/03	0900
WRB	275	160	8/26/03	0900
MWF	280	200	8/26/03	0900

[a]BLT = bull trout
MWF = mountain whitefish
WRB = redband trout
WSC = westslope cutthroat trout

The mean number of rainbow trout collected per day of electrofishing in 2003 was 123, compared to 155 in 2000, and 149 in 1997 (Allen et al. 2000b and Allen et al 2000a). Flows during electrofishing in 2003, 2000, and 1997 were essentially identical. During 1994 electrofishing, catch per day was 291 at flows of 8.5 m^3sec^{-1} and 199 when flows were 17 m^3sec^1. As observed in previous sampling, greater daily catch in the SFBR appears to be related to lower flow (Allen et al. 2000a).

Mark-recapture data for wild rainbow trout by cm size group are provided in Table 9. The pooled population estimates for rainbow trout >129 mm and >239 mm were 5,975 and 3,392, respectively (Table 10). In 2000, pooled population estimates for >129 mm and >239 mm rainbow trout were 5,108 and 3,995, respectively. Based on overlapping confidence intervals, population estimates for 2000 and 2003 were not significantly different.

Although the size structure of the rainbow trout population changed dramatically between 1994 and 2000, little change occurred between 2000 and 2003. QSD (400 mm) has steadily increased in the SFBR, from 19% in 1994 to 38% in 1997, 59% in 2000, and 61% in 2003 (Figure 2). Past abundance estimates for fish > 400 mm have ranged from 686 (71/km) in 1994 to 1,725 (180/km) in 2000. In 2003, abundance of rainbow trout > 400 mm decreased slightly (5%) from the 2000 survey to 1,629 (170/km). Improved water conditions since the mid-1990s may have improved survival or growth rates for adult fish even though overall densities are slightly lower.

Our results indicate that the proportion of 100-239 mm fish in the cumulative sampling effort has increased from 17% in 2000 to 47% in 2003. During the past year, anglers have expressed concern about the apparent lack of sub-adult rainbows. Because sampling conditions were essentially the same as in 2000, it is likely that the observed increase in abundance of sub-239 mm rainbow trout reflects an actual increase. Continued population monitoring on a three-year cycle is adequate to document trends in abundance, size structure, and recruitment.

Although *Myxobolus cerebralis*, the causative agent of Whirling Disease, was detected in this drainage in 1995, there is still no indication of a reduction in recruitment sometimes associated with whirling disease outbreaks (Figure 3). All twenty fish in our rainbow trout sample tested positive for *M. cerebralis* spores, as did two of the mountain whitefish.

Rainbow trout densities for the 1.4 km stretch above Cow Creek Bridge were 1.24 and 0.69 fish/100m^2 for fish >150 mm and ≥ 200 mm, respectively. For comparison, in 2002 the Box Canyon stretch of the Henry's Fork of the Snake River had a rainbow trout density of 3.2/100 m^2 (>150 mm) (Dan Garren, Department, personal communication). In 2003, four sections of the Big Wood River averaged 4 rainbow trout/100 m^2 (≥ 200 mm) (Chuck Warren, Department, personal communication).

During the months of May and June 2003, the Bureau of Reclamation (BOR) conducted scheduled repairs of the Anderson Ranch Dam outlet works. The project required temporary conversion from deep to surface releases from Anderson Ranch Reservoir. Between June 9 and June 20, the BOR documented elevated temperatures downstream in the SFBR. During this period, the SFBR surface temperature (between Danskin Bridge and Neal Bridge) ranged from 18 to 24ºC. Water temperatures decreased to 11ºC on June 7 when deep-water releases from Anderson Ranch Dam resumed (Figure 4). No SFBR fish kills were reported in 2003 and our population estimate does not suggest any population effects on wild rainbow trout. Radio tagged bull trout located in the SFBR prior to the dam repairs remained in the river during, and

Table 9. Mark-recapture data for rainbow trout in the South Fork Boise River, October and November, 2003.

Length group (cm)	Mark sample (M)	Recapture sample (C)	Recaptures (R)	Length group (cm)	Mark sample (M)	Recapture sample (C)	Recaptures (R)
<11	1	7	-	-	-	-	-
11	1	2	-	32	2	0	1
12	5	6	-	33	2	7	-
13	7	9	-	34	4	4	-
14	15	6	-	35	4	3	-
15	9	17	-	36	4	2	-
16	12	5	-	37	10	5	-
17	9	12	1	38	3	9	-
18	12	6	-	39	6	13	1
19	7	10	-	40	11	16	-
20	5	3	-	41	10	12	-
21	7	8	-	42	9	12	1
22	8	3	-	43	9	19	2
23	5	4	-	44	17	22	1
24	5	4	-	45	13	19	-
25	4	1	-	46	16	15	1
26	3	4	-	47	14	9	1
27	4	3	-	48	9	7	3
28	2	1	-	49	9	7	1
29	4	8	-	50	7	3	-
30	5	6	1	>50	12	5	1
31	8	5	-	-	-	-	-

Table 10. Comparison of rainbow trout population estimates for the South Fork of the Boise River collected in 1993, 1994, 1997, 2000, and 2003. Ninety-five percent confidence intervals are presented in parentheses, if known.

Year	Size group (mm)	Population estimate (95% CI)
2003	>129	5975 (3204<N<8746)
	>239	3392 (1786<N<4998)
2000	>129	5108 (3586<N<7474)
	>239	3995 (2735<N<6023)
1997	>129	5345
	>239	4043
1994	>129	8093
	>239	4898
1993	>129	n/a
	>239	4540

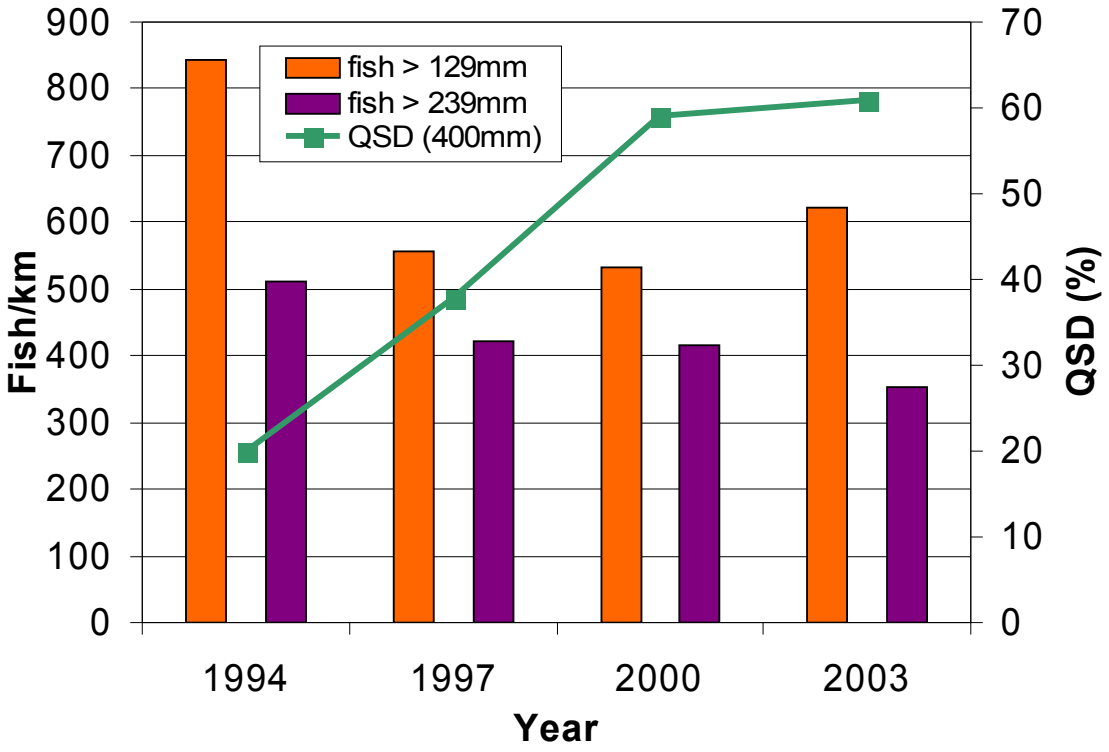

Figure 2. Densities per kilometer and QSD values for wild rainbow trout collected in the South Fork of the Boise River between Reclamation Village and a take-out 9.6 km downstream in 1994, 1997, 2000, and 2003.

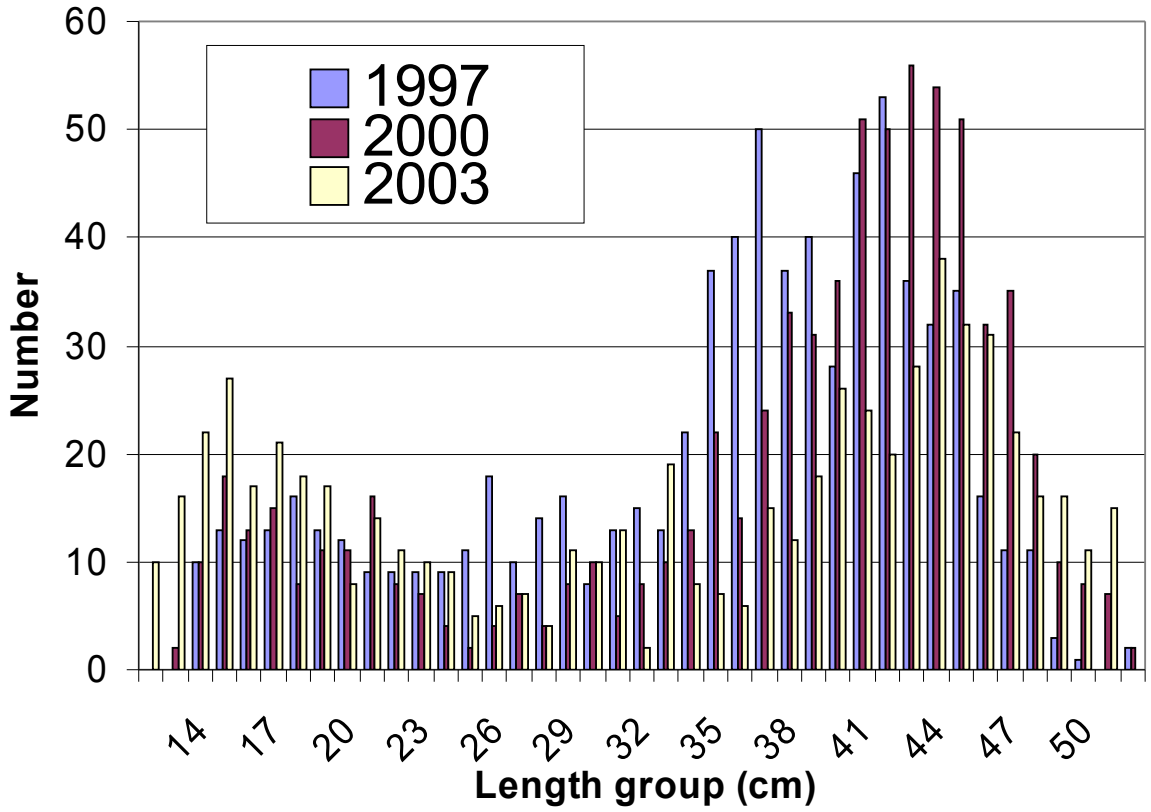

Figure 3. Length frequency of wild rainbow trout captured by electrofishing in the South Fork Boise River below Anderson Ranch Dam in fall 1997, 2000, and 2003.

Figure 4. South Fork Boise River water temperatures measured at Danskin Bridge between April 1 and July 30, 2003.

immediately following, the elevated temperature period (Tammy Salow, USBR, personal communication).

Kokanee Salmon Spawner Surveys in Deadwood Reservoir Tributaries

Kokanee were not observed in Moulding, Beaver, South Fork Beaver, or Habit creeks on August 10. Trail Creek was the only tributary where spawning kokanee were observed. Following the initial August 10 survey, two trend count areas were established on Trail Creek and were revisited on seven occasions between August 15 and September 14 to count the total number of kokanee in each section. Count data and specific transect locations are provided in Table 11. The highest number of kokanee counted was 96 on August 26. The peak of the run at the Deadwood River weir occurred between August 20-23 (Brian Malaise, Nampa Hatchery, personal communication). None of the other tributaries surveyed on August 10 were revisited.

The Deadwood Reservoir kokanee population provides a very popular fishery and is in need of closer management attention. Although our tributary spawning surveys revealed very little spawning escapement outside of the Deadwood River, Trail Creek has the potential to contribute significant kokanee production to the reservoir. Given the past fluctuations in the population and our present efforts to closely manage escapement and recruitment, methods should be developed to assess natural kokanee production in Trail Creek. Spawning surveys should be conducted in all tributaries on an annual basis to monitor escapement and to identify other significant production areas.

Most of our management decisions are currently based on our best source of population data, the Deadwood River weir. We currently have very little angler data to determine if current management is providing an acceptable fishery.

Hydroacoustic data exists for Deadwood Reservoir (Butts 2004) and could potentially help predict kokanee abundance and size distribution. Unfortunately, interpreting the data has proven to be problematic. Determining the effectiveness of this new management tool should be a priority before any more data are collected.

RECOMMENDATIONS

North Fork Boise River

1. Snorkel sites from Deer Park to Graham in 2004.

2. Use site descriptions (Appendix A) and archived site photos to establish standardized trend snorkel transects. Repeat surveys every 3-5 years.

Table 11. Total number of live kokanee observed in two sections of Trail Creek when walked on seven occasions between August 15 and September 14, 2003.

	Total number of live kokanee observed	
Date	Section 1[a]	Section 2[b]
8/15/03	1	20
8/19/03	1	40
8/22/03	3	54
8/26/03	3	96
8/29/03	0	69
9/3/03	1	27
9/14/03	0	14
9/14/03	n/a	58[c]

[a] Bottom of section 1 = 4903504 north, 0606483 west
Top of section 1 = 4903267 north, 0606348 west

[b] Bottom of section 2 = 4903267 north, 0606348 west
Top of section 2 = 4902980 north, 0606101 west

[c] Between the top of section 2 to 4902723 north, 0605926 west (approximately 275 m upstream)

South Fork Boise River

1. Monitor abundance and size structure of rainbow trout every three years.

Tributaries to Deadwood Reservoir

1. Continue to monitor kokanee salmon spawner escapement in Trail Creek using established count areas.

2. Develop methods to estimate natural kokanee salmon production from Trail Creek

3. Conduct spawning surveys in all tributaries on an annual basis to monitor escapement and to identify significant production areas.

APPENDICES

Appendix A. Snorkel survey data for the North Fork Boise River and South Fork Payette River, 2003.

STREAM: Boise R, N F SAMPLE DATE: 7/24/03
SECTION: Deer Park
EPA REACH: 17050111028 QUAD MAP: Bear River
RTS: R7E, T9N, S28 UTM: 0628509 ; 4863333
SECTION DESCRIPTION: Section starts downstream of the Deer Park campground signa, if you drive to the bridge, you have gone too far, turn around and go to the first large pool downstream from the sign. Park vehicle off of the main road, next to the stream.

Transect Information:

Section Length (m): 21

Elevation (m):

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 17.3
Mean Depth (m): 1.0

Cover (%): 99

Water Chemistry

Time: 1357
H2O Temp(C): 16.5
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Habitat Type:

Pool: 41.7 %

Riffle: 8.3 %

Run: 50.0 %

Pocket: 0.0 %

Substrate

Organic: 0 %

Sand: 25 %
Gravel: 19 %
Rubble: 25 %
Boulder: 23 %
Bedrock: 8 %

Species Sampled

HRB	Hatchery rainbow
MWF	Mountain whitefish
NSF	Northern pikeminnow
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
HRB	20	SN	3
HRB	25	SN	2
MWF	20	SN	3
MWF	22	SN	4
MWF	25	SN	8
MWF	33	SN	1
NSF	28	SN	1
NSF	30	SN	1
WRB	7	SN	1
WRB	10	SN	2
WRB	12	SN	1
WRB	17	SN	1
WRB	25	SN	1

STREAM: Boise R, N F SAMPLE DATE: 7/24/03
SECTION: Crooked River
EPA REACH: 17050111026 QUAD MAP: Barber Flat
RTS: R8E, T6N, S17 UTM: 0617647 ; 4856395
SECTION DESCRIPTION: Park vehicle at the bridge which crosses Crooked River, the section is on the bend upstream from the bridge.

Transect Information:

Section Length (m): 51

Elevation (m): 402

Gradient (%): 0.95%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 21
Mean Depth (m): 0.5

Cover (%): 91

Water Chemistry

Time: 1105
H2O Temp(C): 18
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Habitat Type:

Pool: 0.0 %

Riffle: 83.3 %

Run: 16.7 %

Pocket: 0.0 %

Substrate

Organic: 0 %

Sand: 16 %
Gravel: 23 %
Rubble: 21 %
Boulder: 41 %
Bedrock: 0 %

Length Frequency

Species	CM Group	Method	Number Measured
MWF	5	SN	1
MWF	7	SN	1
MWF	12	SN	2
WRB	10	SN	1
WRB	15	SN	1
WRB	25	SN	1

STREAM: Boise R, N F SAMPLE DATE: 7/24/03
SECTION: Rabbit Creek
EPA REACH: 17050111024 QUAD MAP: Barber Flat
RTS: R7E, T5N, S10 UTM: 612443 ; 4849308
SECTION DESCRIPTION: Park vehicle near the turn at the mouth of Rabbit Creek. Walk down to the mouth of Rabbit Creek, the section begins at the mouth and continues upstream 72 meters to the upper edge of the cliff on the left hand side of the bank (looking upstream).

Transect Information:

Section Length (m): 72

Elevation (m): 366

Gradient (%): 0.54%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 18.3
Mean Depth (m): 0.8

Cover (%): 78

Water Chemistry

Time: 0930
H2O Temp(C):
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Habitat Type:

Pool: 25.0 %

Riffle: 0.0 %

Run: 75.0 %

Pocket: 0.0 %

Substrate

Organic: 0 %

Sand: 30 %
Gravel: 13 %
Rubble: 33 %
Boulder: 23 %
Bedrock: 0 %

Length Frequency

Species	CM Group	Method	Number Measured
MWF	5	SN	47
MWF	15	SN	1
WRB	15	SN	1
WRB	20	SN	2
WRB	30	SN	1

STREAM: Boise R, N F SAMPLE DATE: 7/24/03
SECTION: Bear River
EPA REACH: 17050111028 QUAD MAP: Bear River
RTS: R8E, T6N, S3 UTM: 621243 ; 4860764
SECTION DESCRIPTION: Located just upstream of the culvert which marks the mouth of Bear River. The lower end is marked by the tree growing out of the rock on the right hand bank (looking upstream).

Transect Information:

Section Length (m): 88

Elevation (m):

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 14.4
Mean Depth (m): 0.6

Cover (%): 95

Water Chemistry

Time: 1215
H2O Temp(C): 18
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

HRB	Hatchery rainbow
MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
HRB	20	SN	1
MWF	5	SN	7
MWF	15	SN	2
MWF	20	SN	4
MWF	25	SN	4
MWF	30	SN	3
WRB	15	SN	2

Habitat Type:

Pool: 13.3 %

Riffle: 13.3 %

Run: 73.3 %

Pocket: 0.0 %

Substrate

Organic: 0 %

Sand: 29 %
Gravel: 17 %
Rubble: 40 %
Boulder: 14 %
Bedrock: 0 %

STREAM: Boise R, N F SAMPLE DATE: 7/24/03
SECTION: Black Rock
EPA REACH: 17050111025 QUAD MAP: Barber Flat
RTS: R7E, T5N, S2 UTM: 613403 ; 4850207
SECTION DESCRIPTION: Located downstream of Black Rock campground. Section starts at the large triangular rock, and continues upstream 69 m to the base of the next riffle.

Transect Information:

Section Length (m): 69

Elevation (m):

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 24.8
Mean Depth (m): 0.6

Cover (%): 88

Water Chemistry

Time: 1520
H2O Temp(C): 20
Air Temp(C): 28
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Habitat Type:
Pool: 6.7 %

Riffle: 46.7 %

Run: 46.7 %

Pocket: 0.0 %

Substrate

Organic: 0 %

Sand: 22 %
Gravel: 21 %
Rubble: 28 %
Boulder: 29 %
Bedrock: 0 %

Species Sampled

HRB	Hatchery rainbow
MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
HRB	20	SN	1
HRB	22	SN	1
MWF	5	SN	3
MWF	30	SN	1
WRB	12	SN	2
WRB	15	SN	1
WRB	20	SN	2
WRB	25	SN	1
WRB	28	SN	1
WRB	30	SN	1

STREAM: Boise R, N F SAMPLE DATE: 7/29/03
SECTION: Short Creek
EPA REACH: 17050111024 QUAD MAP: Barber Flat
RTS: R7E, T5N, S10 UTM: 611637 ; 4848456
SECTION DESCRIPTION: Section begins at the mouth of Short Ck. and continues upstream 53 m.

Transect Information:

Section Length (m): 53

Elevation (m): 1207

Gradient (%): 0.95%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 23.5
Mean Depth (m): 0.6

Cover (%): 96

Water Chemistry

Time: 1010
H2O Temp(C): 17.5
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Habitat Type:

Pool:	6.7 %
Riffle:	40.0 %
Run:	53.3 %
Pocket:	0.0 %

Substrate

Organic:	0 %
Sand:	25 %
Gravel:	11 %
Rubble:	23 %
Boulder:	43 %
Bedrock:	3 %

Length Frequency

Species	CM Group	Method	Number Measured
MWF	10	SN	1
MWF	25	SN	1
MWF	27	SN	1
MWF	30	SN	4
MWF	33	SN	1
WRB	10	SN	1
WRB	30	SN	1
WRB	33	SN	1

STREAM: Boise R, N F SAMPLE DATE: 7/29/03
SECTION: X1
EPA REACH: 17050111024 QUAD MAP: Barber Flat
RTS: R7E, T5N, S22 UTM: 611190 ; 4846091
SECTION DESCRIPTION: Section is located on a large bend, downstream of the first large series of rapids in the roadless section.

Transect Information:

Section Length (m): 55

Elevation (m): 1171

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 15.2
Mean Depth (m): 1.2

Cover (%): 95

Water Chemistry

Time: 1225
H2O Temp(C): 18.8
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Habitat Type:

Pool:	26.7 %
Riffle:	13.3 %
Run:	60.0 %
Pocket:	0.0 %

Substrate

Organic:	0 %
Sand:	37 %
Gravel:	25 %
Rubble:	22 %
Boulder:	17 %
Bedrock:	5 %

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

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

STREAM: Boise R, N F SAMPLE DATE: 7/29/03
SECTION: 01 Sucker Hole
EPA REACH: 17050111024 QUAD MAP: Twin Springs
RTS: R7E, T5N, S28 UTM: 610832 ; 4845273
SECTION DESCRIPTION: Large deep pool below rapid series.

Transect Information:

Section Length (m): 46

Elevation (m): 1122

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 16.4
Mean Depth (m): 1.2

Cover (%): 100

Water Chemistry

Time: 1434
H2O Temp(C): 22
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Habitat Type:

Pool:	40.0 %
Riffle:	40.0 %
Run:	20.0 %
Pocket:	0.0 %

Substrate

Organic:	0 %
Sand:	38 %
Gravel:	21 %
Rubble:	18 %
Boulder:	23 %
Bedrock:	0 %

Species Sampled

BLS	Bridgelip sucker
MTS	Mottled sculpin
MWF	Mountain whitefish
SPD	Speckled dace
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
BLS	20	SN	1
MTS	7	SN	1
MWF	15	SN	1
MWF	20	SN	1
MWF	25	SN	2
MWF	27	SN	4
MWF	30	SN	5
MWF	33	SN	1
MWF	35	SN	3
SPD	5	SN	1
WRB	12	SN	1
WRB	15	SN	2
WRB	20	SN	1
WRB	25	SN	1
WRB	30	SN	2

STREAM: Boise R, N F SAMPLE DATE: 7/29/03
SECTION: 96 Sucker Hole
EPA REACH: 17050111024 QUAD MAP: Sheep Creek
RTS: R7E, T5N, S33 UTM: 611190 ; 4842230
SECTION DESCRIPTION: large pool below oxbow

Transect Information:

Section Length (m): 41

Elevation (m): 1073

Gradient (%): 0.95%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 16.5
Mean Depth (m): 1.3

Cover (%): 100

Water Chemistry

Time: 1800
H2O Temp(C): 22
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

BLS	Bridgelip sucker
MWF	Mountain whitefish
NSF	Northern pikeminnow
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
BLS	20	SN	1
BLS	27	SN	1
MWF	5	SN	10
MWF	25	SN	1
MWF	30	SN	7
MWF	33	SN	2
MWF	35	SN	3
NSF	12	SN	1
WRB	5	SN	1
WRB	10	SN	1
WRB	12	SN	1
WRB	25	SN	1
WRB	27	SN	1
WRB	30	SN	1

Habitat Type:

Pool:	50.0	%
Riffle:	0.0	%
Run:	41.7	%
Pocket:	8.3	%

Substrate

Organic:	0	%
Sand:	55	%
Gravel:	8	%
Rubble:	13	%
Boulder:	24	%
Bedrock:	0	%

STREAM: Boise R, N F SAMPLE DATE: 7/29/03
SECTION: X2
EPA REACH: 17050111024 QUAD MAP: Twin Springs
RTS: R7E, T5N, S21 UTM: 610406 ; 4844607
SECTION DESCRIPTION: Boulder strewn run located just upstream of a rapid series.

Transect Information:

Section Length (m): 52

Elevation (m): 1122

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 21.6
Mean Depth (m): 0.9

Cover (%): 0

Habitat Type:

Pool:	0.0	%
Riffle:	13.3	%
Run:	86.7	%
Pocket:	0.0	%

Substrate

Organic:	0	%
Sand:	18	%
Gravel:	13	%
Rubble:	21	%
Boulder:	41	%
Bedrock:	7	%

Water Chemistry

Time: 1542
H2O Temp(C): 22
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

BLT	Bull trout
LSS	Largescale sucker
MWF	Mountain whitefish
NSF	Northern pikeminnow
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
BLT	25	SN	1
LSS	45	SN	1
MWF	5	SN	1
MWF	30	SN	1
MWF	33	SN	2
MWF	35	SN	1
NSF	33	SN	1
NSF	45	SN	1
WRB	10	SN	1
WRB	12	SN	2
WRB	15	SN	2
WRB	20	SN	2
WRB	27	SN	1
WRB	30	SN	1
WRB	33	SN	1

STREAM: Boise R, N F SAMPLE DATE: 7/29/03
SECTION: French Creek
EPA REACH: 17050111024 QUAD MAP: Twin Springs
RTS: R7E, T5N, S28 UTM: 610671 ; 4843664
SECTION DESCRIPTION: Site is located at the mouth of French Creek. Start near the mouth of the creek and snorkel upstream 48 m.

Transect Information:

Section Length (m): 48

Elevation (m): 1098

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 20.8
Mean Depth (m): 0.9

Cover (%): 0

Water Chemistry

Time: 1645
H2O Temp(C): 22
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

LSS	Largescale sucker
MWF	Mountain whitefish
NSF	Northern pikeminnow
WCT	Westslope cutthroat
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
LSS	35	SN	1
LSS	40	SN	1
LSS	45	SN	1
LSS	48	SN	1
MWF	30	SN	1
MWF	33	SN	1
MWF	40	SN	7
MWF	43	SN	1
NSF	40	SN	1
WCT	12	SN	1
WRB	10	SN	1
WRB	17	SN	1
WRB	20	SN	2
WRB	22	SN	1
WRB	25	SN	1

Habitat Type:

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

Substrate

Organic:	0 %
Sand:	32 %
Gravel:	12 %
Rubble:	20 %
Boulder:	35 %
Bedrock:	0 %

STREAM: Payette R, S FSAMPLE DATE: 8/19/03
SECTION: Bear Creek
EPA REACH: 17050120011 QUAD MAP: Grandjean
RTS: R, T, S UTM: 0644633 ; 4891138
SECTION DESCRIPTION: Site is a boulder strewn area with pocket water. Section starts approx. 100 m downstream of the mouth of Bear Creek and continues upstream for 57 m.

Transect Information:

Section Length (m): 57

Elevation (m): 1421

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 19.67
Mean Depth (m):

Cover (%):

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Water Chemistry

Time: 1130
H2O Temp(C): 13
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
MWF	12	SN	1
MWF	15	SN	2
MWF	22	SN	1
MWF	33	SN	1
WRB	12	SN	3
WRB	15	SN	4
WRB	20	SN	1
WRB	22	SN	1

STREAM: Payette R, S F SAMPLE DATE: 8/19/03
SECTION: Canyon Creek
EPA REACH: 17050120011 QUAD MAP: Grandjean
RTS: R10E, T10N, S27 UTM: 640403 ; 4892274
SECTION DESCRIPTION: Site begins at the drop just downstream of Canyon Creek, and continues upstream past the mouth of Canyon Creek 73 m to the large boulder in the middle of the river.

Transect Information:

Section Length (m): 73

Elevation (m): 1463

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 13.33
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1220
H2O Temp(C):
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Habitat Type:

Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Length Frequency

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

STREAM: Payette R, S F SAMPLE DATE: 8/19/03
SECTION: Chapman Creek
EPA REACH: 17050120011 QUAD MAP: Eightmile Mtn.
RTS: R10E, T9N, S7 UTM: 635021 ; 4888397
SECTION DESCRIPTION: Follow Highway 21 to the Warm Springs turnoff near Bonneville Hot Springs. Drive up the dirt road towards the USFS helicopter pad. The section is located off this road to the left, down a steep hill, just upstream of the large bend in the river. The beginning of the section is at the riffle just upstream of a large gravel bar on the left hand bank (looking upstream), and continues 105 meters upstream.

Transect Information:

Section Length (m): 105

Elevation (m): 1415

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 25.17
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1430
H2O Temp(C): 16
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MTS	Mottled sculpin
MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
MTS	5	SN	1
MWF	5	SN	5
MWF	7	SN	3
MWF	10	SN	1
MWF	12	SN	2
MWF	15	SN	3
MWF	20	SN	2
MWF	25	SN	2
MWF	27	SN	2
MWF	30	SN	1
WRB	7	SN	5
WRB	10	SN	1
WRB	12	SN	3
WRB	15	SN	1
WSC	15	SN	1

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

STREAM: Payette R, S F SAMPLE DATE: 8/19/03
SECTION: #6
EPA REACH: 17050120011 QUAD MAP: Grandjean
RTS: R, T, S UTM: 645958 ; 4891102
SECTION DESCRIPTION: Follow Highway 21 to the Grandjean turnoff, turn right and drive towards Grandjean. Sacagawea Hot Springs is located on the right hand side of the road. The section begins at the riffle below the hot spring, and continues upstream 55 meters to the riffle above the hot spring.

Transect Information:

Section Length (m): 55

Elevation (m): 1524

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 20.2
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1030
H2O Temp(C):
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Species Sampled

MWF Mountain whitefish

Length Frequency

Species	CM Group	Method	Number Measured
MWF	30	SN	2
MWF	33	SN	2

STREAM: Payette R, S F SAMPLE DATE: 8/19/03
SECTION: 31
EPA REACH: 17050120009 QUAD MAP: Lowman
RTS: R7E, T9N, S27 UTM: 610157 ; 4882107
SECTION DESCRIPTION: This section is located downstream of Lowman. The Lowman topograph map information for this snorkel section is T9N, R7E, S27; the site is located upstream from the mouth of Rock Creek, near Mile 108. The section starts at the cabin with the red roof, with a red roofed garage next to it, and continues upstream 70 m.

Transect Information:

Section Length (m): 70

Elevation (m): 1146

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 38
Mean Depth (m):

Cover (%):

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Water Chemistry

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

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
MWF	7	SN	1
MWF	10	SN	2
MWF	15	SN	1
MWF	20	SN	1
MWF	27	SN	2
MWF	38	SN	2
MWF	40	SN	1
WRB	5	SN	2
WRB	7	SN	4
WRB	10	SN	5
WRB	12	SN	3
WRB	15	SN	13
WRB	17	SN	1
WRB	20	SN	5
WRB	22	SN	2
WRB	25	SN	3
WRB	27	SN	4
WRB	30	SN	1
WRB	33	SN	2

STREAM: Payette R, S F SAMPLE DATE: 8/19/03
SECTION: 74.8
EPA REACH: 17050120009 QUAD MAP: Lowman
RTS: R7E, T9N, S27 UTM: 613696 ; 4880501
SECTION DESCRIPTION: Drive upstream on Highway 21 from Lowman. Snorkel site is located near mile marker 74.8. This section is 110 m long, and is a long relatively flat run.

Transect Information:

Section Length (m): 110

Elevation (m): 1195

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 28
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1540
H2O Temp(C):
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Length Frequency

Species	CM Group	Method	Number Measured
MWF	5	SN	1
MWF	7	SN	1
MWF	15	SN	1
MWF	35	SN	1
WRB	5	SN	1
WRB	10	SN	1
WRB	12	SN	1
WRB	15	SN	6
WRB	22	SN	1
WRB	25	SN	1
WRB	30	SN	2

STREAM: Payette R, S F SAMPLE DATE: 8/18/03
SECTION: 76.3
EPA REACH: 17050120009 QUAD MAP: Lowman
RTS: R8E, T9N, S31 UTM: 616156 ; 4880666
SECTION DESCRIPTION: Drive upstream on Highway 21 past Lowman to mile marker 76 which is near the old Stinker gas station above Lowman. The section name refers to mile marker 76.3, and is also known as "Trailer House Hole". This section is 160 m long, and begins downstream from the "trailer house" at a large rock outcrop on the right hand bank, looking downstream. The section continues upstream to the second riffle break located just upstream of the trailer house.

Transect Information:

Section Length (m): 160

Elevation (m): 1195

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 17.8
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1620
H2O Temp(C): 18
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
MWF	15	SN	3
MWF	17	SN	2
MWF	20	SN	3
MWF	27	SN	1
MWF	30	SN	6
MWF	33	SN	3
MWF	35	SN	7
MWF	40	SN	1
MWF	45	SN	1
WRB	10	SN	9
WRB	12	SN	9
WRB	15	SN	27
WRB	17	SN	11
WRB	20	SN	13
WRB	22	SN	3
WRB	25	SN	4
WRB	27	SN	3
WRB	30	SN	2
WRB	35	SN	1

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

STREAM:Payette R, S F SAMPLE DATE: 8/18/03
SECTION: 77.5
EPA REACH: 17050120009 QUAD MAP: Lowman
RTS: R8E, T9N, S32 UTM: 617090 ; 4880544
SECTION DESCRIPTION: Drive up Highway 21 past Kirkham Hot Springs to the historical landmark sign referring to Emma Edwards. Park near the sign, and hike down the hill to the snorkel site. The site is 117 m long and is a deep run.

Transect Information:

Section Length (m): 117

Elevation (m): 1207

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 22
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1600
H2O Temp(C): 17
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Habitat Type:

Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Length Frequency

Species	CM Group	Method	Number Measured
MWF	10	SN	1
MWF	12	SN	1
MWF	15	SN	3
MWF	17	SN	2
MWF	25	SN	1
MWF	30	SN	2
MWF	33	SN	6
MWF	35	SN	3
MWF	38	SN	6
MWF	40	SN	1
WRB	10	SN	7
WRB	12	SN	5
WRB	15	SN	23
WRB	20	SN	5
WRB	22	SN	1
WRB	25	SN	5
WRB	30	SN	1

STREAM: Payette R, S F SAMPLE DATE: 8/18/03
SECTION: 79.7
EPA REACH: 17050120009 QUAD MAP: Jackson Peak
RTS: R8E, T9N, S34 UTM: 620160 ; 4881000
SECTION DESCRIPTION: Park near mile marker 79.7 on Highway 21. The parking area is located past the private cabin on the left hand bank (looking upstream). Park the vehicle at the end of the road, and walk downstream to the section. The starting point is located at the riffle downstream of the cabin on the bend in the river; the end is 75 m upstream at the large boulder in the middle of the channel.

Transect Information:

Section Length (m): 75

Elevation (m): 1233

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 30.5
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1450
H2O Temp(C): 17
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
MWF	7	SN	8
MWF	10	SN	2
MWF	12	SN	1
MWF	15	SN	1
MWF	17	SN	1
MWF	25	SN	2
MWF	30	SN	2
WRB	17	SN	3
WRB	20	SN	1
WRB	25	SN	1

STREAM: Payette R, S F SAMPLE DATE: 8/18/03
SECTION: 82.4
EPA REACH: 17050120009 QUAD MAP: Jackson Peak
RTS: R8E, T9N, S24 UTM: 623030 ; 4883804
SECTION DESCRIPTION: Drive upstream on Highway 21 to mile marker 82.4. Turn right off the highway onto one of the dirt roads that will lead down to the river. Park at the end of the road, and walk to the snorkel site. The section begins downstream of where you park, at the large riffle break, and continues upstream 79 m.

Transect Information:

Section Length (m): 79

Elevation (m): 1280

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 26.5
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1350
H2O Temp(C): 15
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Habitat Type:

Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Length Frequency

Species	CM Group	Method	Number Measured
MWF	5	SN	1
MWF	7	SN	1
MWF	15	SN	2
MWF	25	SN	3
MWF	27	SN	1
MWF	30	SN	2
MWF	35	SN	1
MWF	38	SN	1
MWF	40	SN	4
WRB	10	SN	1
WRB	12	SN	1
WRB	15	SN	2
WRB	22	SN	1
WRB	25	SN	1
WRB	30	SN	1
WRB	33	SN	1

STREAM: Payette R, S F SAMPLE DATE: 8/18/03
SECTION: 83.1
EPA REACH: 17050120010 QUAD MAP: Jackson Peak
RTS: R9E, T9N, S19 UTM: 624041 ; 4884444
SECTION DESCRIPTION: Section is located along the highway at mile marker 83. Park vehicle in the pullout, and hike down to the long deep run. The section begins at the large boulder on left bank (looking upstream in the photo), and continues upstream 148 m to the first large riffle break.

Transect Information:

Section Length (m): 148

Elevation (m): 1301

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 18.17
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1300
H2O Temp(C): 14
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Habitat Type:

Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Length Frequency

Species	CM Group	Method	Number Measured
MWF	5	SN	1
MWF	15	SN	6
MWF	17	SN	1
MWF	20	SN	2
MWF	25	SN	2
MWF	30	SN	2
MWF	33	SN	1
WRB	7	SN	3
WRB	10	SN	4
WRB	12	SN	14
WRB	15	SN	5
WRB	17	SN	4
WRB	20	SN	9
WRB	27	SN	3
WRB	30	SN	3

STREAM: Payette R, S F SAMPLE DATE: 8/18/03
SECTION: 85.3
EPA REACH: 17050120011 QUAD MAP: Jackson Peak
RTS: R9E, T9N, S19 UTM: 625327 ; 4885145
SECTION DESCRIPTION: Snorkel from Red Roof to Green Roof

Transect Information:

Section Length (m): 144

Elevation (m): 1301

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 25.33
Mean Depth (m):

Cover (%):

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Water Chemistry

Time: 1130
H2O Temp(C): 13
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

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

STREAM: Payette R, S F SAMPLE DATE: 8/18/03
SECTION: 86.7
EPA REACH: 17050120011 QUAD MAP: Jackson Peak
RTS: R9E, T9N, S15 UTM: 629264 ; 4886201
SECTION DESCRIPTION: Begins at the mouth of Tenmile Creek and continues upstream 78 m to the next riffle break.

Transect Information:

Section Length (m): 78

Elevation (m): 1339

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 19.17
Mean Depth (m):

Cover (%):

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Water Chemistry

Time: 1011
H2O Temp(C): 12
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
MWF	7	SN	4
MWF	17	SN	1
MWF	20	SN	2
MWF	30	SN	2
MWF	35	SN	3
WRB	17	SN	1
WRB	20	SN	1

STREAM: Payette R, S F SAMPLE DATE: 8/19/03
SECTION: 92.3
EPA REACH: 17050120009 QUAD MAP: Eightmile Mtn.
RTS: R10E, T10N, S32 UTM: 636545 ; 4889895
SECTION DESCRIPTION: Drive upstream on Highway 21 past the turnoff to Bonneville Hot Springs, to mile marker 92.3. Park the vehicle and walk down to the river. The section begins at a riffle below a tree near where you park, and continues upstream 61 m.

Transect Information:

Section Length (m): 61

Elevation (m): 1390

Gradient (%): 0.00%

Population Est: 0.0 S.E(popest):
Shade (%): 0.0

Mean Width (m): 17.83
Mean Depth (m):

Cover (%):

Water Chemistry

Time: 1342
H2O Temp(C):
Air Temp(C):
pH:
Alkalinity(mg/l CaCO3):
Hardness(uS/cm3):
Conductivity(mg/l CaCO3):

Habitat Type:
Pool: %

Riffle: %

Run: %

Pocket: %

Substrate

Organic: %

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

Species Sampled

MWF	Mountain whitefish
WRB	Redband trout

Length Frequency

Species	CM Group	Method	Number Measured
MWF	5	SN	1
MWF	20	SN	1
MWF	22	SN	1
MWF	25	SN	3
MWF	33	SN	2
WRB	5	SN	2
WRB	7	SN	3
WRB	10	SN	4
WRB	12	SN	2
WRB	15	SN	6
WRB	20	SN	4
WRB	27	SN	2

Appendix B. Snorkel site descriptions, and GPS coordinates (UTM format, NAD27 Conus) for the North Fork Boise River (NFBR), and South Fork Payette River (SFPR) 2003. All GPS coordinates are for the downstream end of the snorkel sites unless otherwise noted.

River	Site name	GPS coordinates	Description
NFBR	Deer Park	628509 E 4863333 N	Drive upstream towards Deer Park Campground, if you make it to the bridge crossing the NFBR at Deer Park, you've gone too far. Driving upstream there will be a large pool on after a sharp bend in the river. The section begins at the riffle below the pool and ends 21 m upstream at the top of the pool.
	Bear River	621424 E 4860764 N	Located just upstream from the culvert which marks the mouth of Bear River. Looking upstream, the lower end is marked by the tree growing out of the rock on the right hand bank. The section is 88 m long and ends at the upstream riffle.
	Crooked River	617647 E 4856395 N	The section begins just upstream from the Crooked River Bridge. When looking upstream, the lower end is marked by a triangle shaped rock in the right side of the channel. The upper boundary is the large boulder on the right bank which is just downstream of two large trees. The section is 51 m long.
	Black Rock	613403 E 4850207 N	Park in the Black Rock Campground and hike downstream approximately 200 m to the large black rock in the river. The starting point is a triangle shaped rock in the middle of the channel. The upstream boundary is 69 m upstream at the flat rock on the right hand bank.

Appendix B. Continued.

River	Site name	GPS coordinates	Description
NFBR			
	Rabbit Creek	612443 E 4849308 N	The section begins at the mouth of Rabbit Creek and continues 72 m upstream to the upstream edge of the cliff on the left hand bank.
	Short Creek	611637 E 4848456 N	Requires floating down the river to access. The section begins at the mouth of Short Creek and continues upstream 53 m.
	X1	611190 E 4846091 N	Requires floating down the river to access. The section starts at the downstream riffle edge of a large pool and continues to a large plunge pool.
upstream			
	01 Sucker Hole	610832 E 4845273 N	The section is in a large deep pool downstream from a long series of rapids. The section has a sandy beach on the left hand side when looking upstream and a rock overhang on the right The section starts at the downstream riffle edge and m upstream through the pool to the plunge at the
band. continues 41 top.			
	X2	610406 E 4844607 N	The section is a long boulder strewn run located in a fairly flat area. The start is in the riffle just upstream from a small The section continues upstream 52 m and ends at the
rapid. pointed			rock on the left hand bank.
	French Creek	610671 E 4843664 N	The site begins at the mouth of French Creek and ends 48 m upstream.

Appendix B. Continued.

River	Site name	GPS coordinates	Description
NFBR	96 Sucker Hole	611190 E 4842230 N[A]	Section is located in a large pool on the downstream end of the oxbow near the Middle Fork Boise River. The site is 41 m long and ends at the riffle upstream of the pool.
SFPR	Bear Creek	644633 E 4891138 N	The site is a boulder strewn area with pocket water. The start is approximately 100 m downstream from the mouth of Bear Creek and ends 57 m upstream.
	Canyon Creek	640403 E 4892274 N	The site begins at the drop just downstream from the mouth of Canyon Creek and continues upstream past the mouth of Canyon river. Creek 73 m to the large boulder in the middle of the
	Chapman Creek	635021 E 4888397 N	Follow Highway 21 to the Warm Springs turnoff near Bonneville Hot Springs. Drive up the dirt road towards the USFS helicopter pad. The section is located off the dirt road to the left, down a steep hill and just upstream of the large bend in the river. Looking upstream, the section begins at the riffle just upstream from a large gravel bar on the left hand bank and continues 105 m upstream.
	Sacajawea Hot Springs	645958 E 4891102 N	Follow Highway 21 to the Grandjean turnoff, turn right and drive towards Grandjean. The hot springs are located on the

right side of the road. The Section begins at the riffle below the hot spring and continues upstream 55 m.

Appendix B. Continued.

River	Site name	GPS coordinates	Description
SFPR near	#31 Cabins below Lowman	610157 E 4882107 N	The section is located downstream from Lowman and just upstream from the mouth of Rock Creek (T9N, R7E, S27), mile post 108. The section starts at the cabin and garage with the red roof and continues upstream 70 m.
	74.8 Vehicle pullout	613696 E 4880501 N	Drive upstream on Highway 21 from Lowman. Park at the vehicle turnout near mile post 74.8. The site begins on the upstream end of the river bend at the vehicle turn out. The section is 110 m long and is a relatively flat run.
	76.3 Trailer house hole	616156 E 4880666 N	Drive upstream on Highway 21 past Lowman to mile post 76. This section is 160 m long and begins downstream from the trailer house at a large rock outcrop on the right hand bank looking downstream. The section ends at the second riffle break upstream of the trailer house.
	77.5 Emma Edwards	617090 E 4880544 N	Drive up Highway 21 past Kirkham Hot Springs and park at the Emma Edwards historical landmark sign at mile marker 77.5. The 117 m site is straight down the hill from the sign and is in a deep run.

Appendix B. Continued.

River	Site name	GPS coordinates	Description
SFPR	79.7 Meadow Creek	620160 E 4881000 N	Park at the end of the dirt road that is just past the private cabin on the left hand river bank (looking upstream) near mile post 79.7 on Highway 21. The beginning of the 75 m section is at the first riffle downstream from the mouth of Meadow Creek. The top of the section is the large boulder in the middle of the channel.
	82.4 U.S. Helende	623030 E 4883804 N	Drive upstream on Highway 21 to mile post 82.4, turn right off the highway upstream of Helende Campground and drive to the end of the road. The section begins at the large riffle break just upstream from the mouth of Helende Creek and continues upstream 79 m.
	83.1 D.S. Kettle Creek	624041 E 4884444 N	Section is located at Highway 21 mile post 83 between Kettle and Fivemile creeks. Park in pull out and hike down to the long deep run. The section begins at the large boulder on the left bank (looking upstream) and continues upstream 148 m to the first large riffle break.

Appendix B. Continued.

River	Site name	GPS coordinates	Description
SFPR	85.3 Red roof Cabin	625327 E 4885145 N	Drive to the Lowman Nature Ponds and follow the road approximately one mile and park. The section begins at the red roofed cabin on the north bank and continues upstream 144 m to the green roofed cabin.
	86.7 Tenmile Creek	629264 E 4886201 N	Begins at the mouth of Tenmile Creek and continues upstream 78 m to the next riffle break.
	92.3 Bonneville	635451 E 4889895 N	Drive upstream on Highway 21 past the turnoff to Bonneville Hot Springs and park at mile post 92.3. The section begins at the riffle below the parking area and continues upstream 61 m.

Appendix C. Descriptions of Chinook parr monitoring snorkel sites in Sulphur and Elk creeks.

Sulphur Creek - Section: 2-3A

Vehicle Access - Turn off of Idaho 21 onto USFS 082 (this road turns into USFS 579), and stay on USFS 579 past the landing strip in Bruce Meadows. Turn north on USFS 568. Stay on USFS 568 until it reaches the first Boundary Creek parking lot. Park near the restroom facilities. The trailhead begins at the parking lot.

Site Description - Stay on the pack trail approximately .75 miles, the trail splits, one fork goes towards lower Sulphur Creek on the right, the other fork goes up a short hill and will lead to upper Sulphur Creek. Take the left fork and follow it for another .75 miles through several small meadows to a point where the trail crosses Sulphur Creek. The beginning of the site is downstream of the trail crossing on Sulphur Creek. The GPS coordinates at the start of the site are UTM 11T 0633110E, 4933267N. The site begins downstream of the trail crossing and ends 70 m upstream on the upper end of the pool. Alternate name for this site is "Footbridge."

Sulphur Creek - Section: 2-4A

Vehicle Access - Turn off of Idaho 21 onto USFS 082 (this road turns into USFS 579), and stay on USFS 579 past the landing strip in Bruce Meadows. Turn north on USFS 568. Stay on USFS 568 until it reaches the first Boundary Creek parking lot. Park near the restroom facilities. The trailhead begins at the parking lot.

Site Description - Continue on the trail upstream past the 2-3A (a.k.a. "Footbridge") approximately 1 mile. At the large rockslide paralleling the trail, turn south off the trail and walk through the meadow towards Sulphur Creek. The GPS coordinates for the start of the site are UTM 11T 0631871E, 4933269N. The total length of the section is 107.5 m. Alternate name for this site is "Rockslide."

Sulphur Creek - Section: 2-4B

Vehicle Access - Turn off of Idaho 21 onto USFS 082 (this road turns into USFS 579), and stay on USFS 579 past the landing strip in Bruce Meadows. Turn north on USFS 568. Stay on USFS 568 until it reaches the first Boundary Creek parking lot. Park near the restroom facilities. The trailhead begins at the parking lot.

Site Description - From the large rockslide mentioned near section 2-4A; continue on the trail 1.5 miles to the Sulphur Creek Wilderness Ranch. Directly past the ranch, walk south past the horse pastures towards Sulphur Creek. The GPS coordinates for the start of the site are UTM 11T 0629513E, 4932214N. The total length of the section is 136 m. Alternate name for this site is "Ranch."

Appendix C. Continued.

Elk Creek- Section: 1-A

Vehicle Access - From Lowman towards Stanley on Idaho 21, drive over Banner Summit and turn left onto USFS 082 (this road turns into USFS 579). Drive upstream along Elk Creek towards the intersection of USFS 563 and USFS 579, towards the Twin Bridges. The parking spot is located 0.6 miles downstream from the bridges. Park in a pullout on the right side of the road.

Site Description - Walk across the road and down the embankment to the creek alongside the road. The GPS coordinates at the start of the site are UTM 11T 0622907E, 4919438N. The old tree that used to mark the lower boundary is now lying in the creek just below the riffle at the start of the section. The total length of the section is 119.4 m.

Elk Creek - Section: 1-B

Vehicle Access - From Lowman towards Stanley on Idaho 21, drive over Banner Summit and turn left onto USFS 082 (this road turns into USFS 579). Drive upstream along Elk Creek towards the intersection of USFS 563, and USFS 579, towards the Twin bridges. The parking spot is located 0.4 miles downstream from the bridges. Park in a pullout on the right side of the road.

Site Description - Walk across the road and down the embankment through a small grove of trees into the meadow. Hike approximately 0.2 miles across the meadow in a slight southwest direction, to the creek. The GPS coordinates at the start of the site are UTM 11T 0622672E, 4919057N. The total length of the section is 78.9 m.

Elk Creek - Section: 2-A

Vehicle Access - From the intersection of USFS 563 and USFS 579, drive east on USFS 579 over the Twin bridges over Elk Creek, and pull into the Elk Creek Trail road. Elk Creek Trail road is located off the north side of USFS 579. Park by road-closed gate and walk to Elk Creek.

Site Description - From the road-closed gate, hike through a meadow, past a wilderness registration box, up over a hill, down into the Elk Creek drainage. The total hike is about 2.5 miles one-way. The GPS coordinates of the site are UTM 11T 0623264E, 4923611N. The total length of the section is 149 m. The upper end of this section is at the mouth of Porter Creek.

Elk Creek - Section: 2-B

Vehicle Access - Take the Elk Creek access road off of USFS 579, 0.1 miles west of the Twin bridges; turn right onto an access road at the top of the hill. Drive to the end of this access road and park near the wilderness boundary sign.

Site Description - Hike from where you park the vehicle upstream approximately 0.5 miles. The GPS coordinates at the start of the site are UTM 11T 0621611E, 4920476N. The total length of the section is 216 m.

Elk Creek - Section: 2-C

Vehicle Access - From the intersection of USFS 563 and USFS 579, drive east on USFS 579 over the Twin Bridges over Elk Creek, and pull into the Elk Creek Trail road. Elk Creek Trail road is on the north side of USFS 579 2.7 miles upstream of Twin Bridges. Park by the road-closed gate and walk to Elk Creek.

Site Description - Hike across the large meadow, up and over the hill into upper Elk Creek drainage, past site 2-A, on the trail past Porter Creek to a section where there is a small finger of trees that extends toward the creek. The section is located just off of this finger of trees. The GPS coordinates at the start of the site are UTM 11T 06223641E, 4924076N. The total length of the section is 206 m.

Habitat Management

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ABSTRACT

In 2003, we continued investigating the use of barley straw as a treatment for the control of aquatic algae in five southwest Idaho ponds. Treatment sites included three ponds at the Wilson Springs Complex in Nampa, the Idaho City Pond, and one of two ponds at the Lowman Nature Pond Complex. At the application rates we used, barley straw did not provide an acceptable level of algae control in any of the treatment areas.

Cottonwood cuttings were planted at Claytonia and Redtop ponds in March and April. A total of 75 cuttings were planted at Claytonia Pond, and 50 were planted at Redtop Pond. Planting success was estimated to be less than 50% at Claytonia Pond, and 70% at Redtop Pond.

Horseshoe Bend Mill Pond was drawn down to the outlet level during the winter of 2002–2003 to control near-shore infestations of Eurasian water milfoil (*Myriophyllum spicatum*). The winter drawdown resulted in a band around the perimeter of the pond approximately 10-12 feet wide, which was free of milfoil. The pond was again drawn down to the outlet level on October 1 to repeat the treatment. On October 28 the Boise County Weed Control District applied the systemic chemical "Sonar" in an attempt to eradicate milfoil throughout the pond. The department provided a 4.8 m johnboat, and one employee to assist with the application.

At Sawyers Pond an area along the southwest bank of the middle pond was heavily eroded due to wind and wave action. A combination of topsoil, straw bales, and vegetation was moved, placed and planted in an effort to stabilize this eroded bank. The pond was re-visited in August to monitor the success of this project. Several of the transplanted cattails, rushes, and willows had taken root and were growing.

OBJECTIVES

1. Investigate methods to control nuisance aquatic plants in small pond and gravel pit fisheries.

2. Improve shoreline cover around small ponds and gravel pit fisheries.

3. Address bank erosion problem at Sawyers Pond.

METHODS

Barley Straw Treatments

The Wilson Springs Ponds, the Idaho City Pond, and the Lowman Nature Ponds experience frequent algal blooms which impede or eliminate fishing opportunity. These ponds were selected to evaluate the use of barley straw to control algae growth. Treatment dates were March 12 and June 12 for Wilson Springs ponds, and June 11 for the Idaho City and Lowman ponds.

The surface area of each treated pond was found using a hand-held global positioning unit (Garmin Rino model 120). Application rate recommendations were found in Newman (1977) and in Holz (2000). Prescribed treatment rates in these reports varied from 10 g/m^2 to 100 g/m^2 depending on the severity of algal blooms. In our experimental treatments, we used application rates from 40 to 100 g/m^2.

Barley straw bales were cut open, and loose straw was packed into onion sacks (with drawstrings) for placement into the ponds. Onion sacks were used in order to allow water to flow through the packed straw. Ten individual stuffed onion sacks were weighed with a 10 kg Pesola spring scale, to estimate average weight/sack. The number of sacks needed for each treated pond was calculated using the average weight/sack, the application rate, and the surface area of the pond (Table 1). Sacks were tied together in clusters of five using nylon bailing twine. A concrete anchor and float were attached to each cluster and the clusters were then placed throughout the ponds using a 16-foot johnboat.

A total of 485 sacks were distributed into the Wilson Springs Complex (Table 1). On average, the application rate of straw in each pond was 57 g/m^2 of surface area. A second treatment of 40 g/m^2 was placed in the South Pond three months after the initial application to evaluate whether additional straw would affect algae growth. The lower pond at the Lowman Nature Pond Complex and the Idaho City Pond were each treated with 100 g/m^2. All sack clusters were removed from all treated ponds in August and September.

All observations regarding the effectiveness of barley straw were subjective in nature and success of the treatment was measured by whether or not the ponds remained open (free of algae) through the summer.

Tree Plantings

Claytonia Pond and Redtop Pond are two reclaimed gravel pit fisheries that lack shoreline shade or cover. To improve habitat and asthetics at these ponds, we attempted to establish trees along the shoreline of each. Cottonwood trees were selected due to their availability and rapid growth. Cottonwoods cuttings were collected from the Deer Flat National Wildlife Refuge in early spring and transported to the ponds for planting. All cuttings were planted using a “Water Jet Stinger”, which produces a high-pressure stream of water. The high-pressure nozzle greatly reduces the amount of time and hand labor required to plant the cuttings. A hole was made in the soil at each pond approximately 1 m deep, cuttings were then

Table 1. Barley straw application rates for Wilson Springs Complex, Lowman Nature Ponds, and the Idaho City Pond to control algae, 2003.

Pond Name	Treatment date	Surface Area (m^2)	Application Rate (g/m^2)	Weight of Straw for Treatment (kg)	Average Weight of Straw Sacks (kg)	Number of Straw Sacks for Treatment
Wilson Springs Ponds						
South Pond	3/12	6,784	72	486	5.4	90
South Pond	6/12	6,784	40	270	5.4	50
North Pond	3/12	23,270	50	1,161	5.4	215
Trophy Pond	3/12	14,002	50	702	5.4	130
Lowman Nature Ponds						
Lower Pond	6/11	8,094	100	810	5.4	150
Idaho City Pond	6/11	2,954	100	297	5.4	55

dropped into the hole. Once the cutting was planted the soil was compacted, and the cutting was shortened to a height of 250 mm. Cottonwood plantings were completed with the assistance of Department reservists and staff. New cottonwoods were visited twice following planting to assess survival and new growth.

Claytonia Pond

In March 2003 a total of 75 live cottonwood cuttings were planted at Claytonia Pond. The cuttings were planted upslope from apple tree stumps that were placed in 1999 and 2000. All cuttings were planted along the south bank of Claytonia Pond at the high water mark to provide shaded habitat and overhead cover for fish in this pond. The plantings were visited in mid-April and again in mid-June for evaluation.

Redtop Pond

In April, a total of 50 cottonwood cuttings were transported to Redtop Pond for planting. The cuttings were visited in early June and again in July for evaluation.

Horseshoe Bend Mill Pond

Horseshoe Bend Mill Pond has been identified as a regional water body with an infestation of the noxious weed Eurasian water milfoil *M. spicatum*. Milfoil growth has become so dense throughout the pond that fishing and other recreation has been impacted. Two methods of control of milfoil were investigated at this pond. The first was a drawdown in the winter of 2002-2003, in an attempt to freeze all exposed milfoil plants during the winter months. This was only marginally successful, and in the fall of 2003 a second treatment including drawdown and the use of a systemic chemical (Sonar) was applied.

On October 1, 2003 HSB Mill Pond was drawn down to the outlet level by opening the control structure on the southeast end of the pond. Sonar was applied on October 28 from a 4.8 m johnboat, and then dispersed using the boat's outboard motor. Evaluation of the effectiveness of this treatment will be made in the spring of 2004.

The Boise County Highway District created a swimming beach on the south side of the pond near the boat ramp by hauling in approximately 31 m^3 of sand in dump trucks. In the process of creating the new beach, much of the sand moved down the bank and entered the water and came to rest approximately 4 m from the waters edge. Approximately 18 m of wetted shoreline was covered with 25 cm of sand.

Sawyer's Pond

At Sawyer's Pond approximately 25 m of the southwest bank of the middle pond was highly eroded due to wind and wave action. The steep unstable bank began sloughing into the pond, increasing turbidity and also threatening to topple a fence on the south property boundary. In April 2003 a combination of topsoil, straw bales, and vegetation were used to stabilize this eroded bank.

We placed two rows of 20 straw bales each approximately 1.5 m from the base of the eroding bank, and anchored the bales to the substrate with rebar stakes. Straw bales and rebar stakes were anchored into the top of the bank using 6 mm cable and additional rebar driven into the bank approximately 1 m past the top of the eroding edge. We then backfilled behind the straw bales with 18 cubic meters of topsoil purchased from City Transfer in Emmett. A front-end loader and operator were donated by Emmett Livestock to move the topsoil. Once topsoil was placed, cattails, rushes, and willows were planted in an effort to hold the topsoil in place and stabilize the bank. About 20 student volunteers from Emmett High School provided assistance with all phases of this work.

RESULTS AND DISCUSSION

Barley Straw Treatments

When barley straw sacks completely sink and come into contact with mud, the chemical released is inactivated (Newman 1977). When straw clusters were removed, the straw appeared compressed and decomposing. All clusters were still held together by baling twine, and all anchors were recovered. A total of 10 man-hours were needed to remove clusters at the Wilson Springs, and 6 man-hours were needed for the Lowman Nature Pond, and Idaho City Pond.

The Wilson Springs Complex stayed algae free (no dense floating algae mats) from the application date in March through the second week of June. After mid-June algae growth appeared to peak, and large floating mats increased rapidly. The same algae growth pattern has been observed historically, prior to using any barley straw.

The additional 40 g/m^2 of straw added to the South Pond appeared to increase angling opportunities slightly. A 3 m wide algae free channel extending almost the full length of the North Pond appeared following the second treatment to the South Pond. This channel provided anglers a small area to fish through the summer. In 2002, no additional straw was added, and both ponds were unfishable from the end of June through mid-September. In 2003, after two barley straw treatments, the North Pond opened completely by the end of August.

The Trophy Pond became overgrown with algae mats by the end of June, and was unfishable by July 5. Algae growth in the Trophy Pond did not appear reduced by the initial direct treatment or any of the indirect applications to the South Pond.

The lower Lowman Pond remained virtually free of algae throughout the summer; however, the upper (no straw) control pond was also relatively free of algae. Anglers at the Lowman ponds responded positively regarding the effectiveness of the barley straw treatment. Several area residents commented that the ponds remained "fishable" all summer, and there seemed to be more angler use during the past two years than in previous years. Despite the apparent decline in algal growth in 2003, and the public support for the barley straw treatments, we cannot conclude that the treatments had any real affect.

The Idaho City Pond became overgrown with algae and Eurasian water milfoil by early July, and was unfishable by mid-July. Barley straw did not noticeably reduce aquatic weeds in the Idaho City Pond.

At the application rates we used, barley straw did not provide an acceptable level of algae control in any of the treatment areas. Although it may be possible that higher treatment rates will provide different results, the costs associated with using barley straw ($291.00/ha) do not justify its use based on the poor results we observed (Table 2). We recommend investigating the use of other treatment methods to control algae, including systemic algaecides and dredging.

Tree Plantings

Claytonia Pond

The physical characteristics of the soil around Claytonia Pond made planting cottonwood cuttings extremely difficult. Nevertheless, we did observe some planting success. In mid-June approximately 40% of the 2003 cuttings showed evidence of new buds or shoots growing out of the cuttings. Cuttings that survived had sprouted multiple new limbs with leaves. Water levels in Claytonia Pond are variable during the year; the water level during the winter months is 4-5 feet below the high water mark where cottonwoods were planted. Additional plantings should not be made at Claytonia Pond until the results of our recent efforts are reevaluated in 2004.

Redtop Pond

Thirty-five of the 2003 cuttings (70%) had new buds and/or shoots by late summer. Plantings took 45 man-hours to complete.

The quality of the soil at the planting sites at Redtop Pond has allowed cottonwood cuttings to take root, and grow. A relatively high and stable water table has resulted in good cottonwood growth and survival of our 2002, and 2003 plantings. Cuttings planted in 2002 were approximately 4 m high at the time of the 2003 work. Our planting efforts should result in improving the littoral fish habitat. If a majority of the 2002 and 2003 cuttings survive, future planting efforts should focus on the north and west sides of the pond.

Table 2. Costs associated with using barley straw to control algae in the Wilson Springs Complex, Lowman Nature Ponds, and the Idaho City Pond, 2003.

Pond Name	Labor cost (@ $11.53/h)	Vehicle use and materials cost	Total project cost
Wilson Springs	$922.00	$324.00	$1246.00
Lowman Nature Ponds	$69.00	$148.00	$217.00
Idaho City Pond	$69.00	$67.00	$136.00

Horseshoe Bend Mill Pond

Following the winter drawdown of 2002-2003, we observed a band of area approximately 10 to 12-ft wide around the periphery of the pond that was vacant of milfoil growth. The absence of growth in this band indicates that the winter drawdown was successful for treating near-shore infestations. However, new milfoil growth in summer 2003 essentially negated the shoreline benefits of the winter drawdown, and the remaining surface area of the pond remained essentially unfishable.

Drawdown and chemical treatment with Sonar was also ineffective at controlling milfoil in this location. Sonar requires an extended exposure of ten days or more at prescribed concentrations, and groundwater movement in Horseshoe Bend Pond likely diluted the chemical and contributed to poor control. Future attempts to chemically control milfoil in this pond should focus on fast-acting contact herbicides.

We also observed that milfoil growth is essentially eliminated when a thick layer of sand is added to the substrate, as evidenced by the absence of milfoil near the newly created sandy beach on the south side of the pond. Milfoil did not sprout in the wetted beach area, and it was only found around the outside perimeter of the introduced sand. Under certain situations, such as a small put-and-take pond, sand might be very useful in controlling milfoil.

Sawyer's Pond

A total of 40 straw bales and 18 cubic meters of topsoil was used to reduce erosion. Vegetation that was planted into the topsoil in April rooted and grew well. Cattails were the predominant vegetation type along the base of the newly placed topsoil, with rushes and willows growing into the bank at higher bank elevations. Additional vegetation should be planted higher on the bank to stabilize the upper portion of the south bank at Sawyer's Pond. Approximately 30.5 m of bank adjacent to our treatment site is also in need of stabilization.

A 20-student high school biology class from Emmett provided assistance in moving topsoil, and planting vegetation for a total of 8 h in two days. The Sawyer's Pond bank stabilization project took a total of 136 man-hours to complete using volunteers and two Department employees. Straw cost was $120.00, rebar was approximately $120.00, cable was $130.00, and topsoil was $378.00. The total cost of the project was $748.00. Excluding labor, the project cost $30.00 per m of treated shoreline. Had volunteers not been utilized for labor, the total project cost would have been $2,316.00, or $92.60 per m (estimate 136 h of labor at $11.53/h).

RECOMMENDATIONS

Barley Straw Treatments

1. Investigate the cost of using systemic chemicals to control algae in the Lowman Ponds.

2. Line the bottom of the Idaho City Pond with a layer of sand 8-10 inches deep. Treat with systemic chemicals to control algae and Eurasian water milfoil.

3. Investigate the cost of chemical treatments for the Wilson Springs Complex.

Tree Plantings

1. Cease planting of cottonwood cuttings around Claytonia Pond; continue to monitor cuttings already in place for growth and survival.

Horseshoe Bend Mill Pond

1. Monitor Eurasian water milfoil growth during the spring of 2004. Future chemical treatments should be with fast-acting contact herbicides.

Sawyer's Pond

1. Continue bank stabilization project on adjacent eroded areas.

LITERATURE CITED

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Newman, Jonathon Dr. 1977. Control of Algae with Straw. Centre of Aquatic Plant Management, Broadmoor Lane, Sonning, Reading, Berkshire, England RG46TH.

Technical Guidance

Jeff Dillon, Regional Fishery Manager

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

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

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