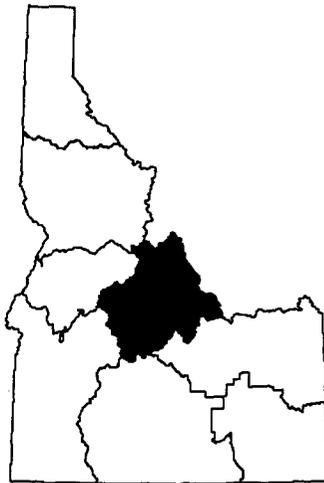


FISHERY MANAGEMENT INVESTIGATIONS



**IDAHO DEPARTMENT OF FISH AND GAME
FISHERY MANAGEMENT ANNUAL REPORT**

Cal Groen, Director



SALMON REGION

2006

Authors:
Tom Curet,
Regional Fishery Manager
Bob Esselman,
Regional Fishery Biologist
Marsha White,
Regional Fisheries Technician
Arnie Brimmer
Regional Fishery Biologist

March 2008
IDFG
08-113

TABLE OF CONTENTS

	<u>Page</u>
<u>Rivers and Streams Investigations</u>	
ABSTRACT	1
INTRODUCTION	3
Wild Trout Population Surveys.....	3
Fluvial Trout Monitoring	3
Big Springs Creek and Lemhi River.....	3
Bear Valley Creek	3
East Fork Hayden Creek.....	3
Hayden Creek.....	4
Alpine and Fishhook Creeks.....	4
Fourth of July Creek.....	4
Pahsimeroi, East Fork, Squaw Pond, and Sawtooth weirs and traps.....	4
OBJECTIVES	4
STUDY AREA AND METHODS.....	5
Wild Trout Population Studies.....	5
Fluvial Trout Monitoring	6
Big Springs Creek and Lemhi River.....	6
Bear Valley Creek	6
East Fork Hayden Creek.....	6
Hayden Creek.....	6
Alpine and Fishhook Creeks.....	7
Fourth of July Creek.....	7
Pahsimeroi, East Fork, Squaw Pond, and Sawtooth weirs and traps.....	7
RESULTS AND DISCUSSION.....	7
Wild Trout Population Studies.....	7
Fluvial Trout Monitoring`	20
Big Springs Creek	20
Bear Valley Creek	21
East Fork Hayden Creek.....	24
Hayden Creek.....	24
Alpine and Fishhook Creeks.....	24
Fourth of July Creek.....	26
Pahsimeroi, Squaw Pond, East Fork, and Sawtooth weirs and traps.....	26
LITERATURE CITED.....	35

TABLE OF CONTENTS (Continued)

Page

LIST OF TABLES

Table 1.	Combined salmonid population estimates including fry, 95% confidence intervals (CI), and species composition for selected streams in the upper Salmon River basin, 2006.....	8
Table 2.	Salmonid species, number of fish observed, mean total length (mm) and size range (total length mm) for selected streams in the upper Salmon River, basin, 2006.....	14
Table 3.	Combined non-target fish population densities, and species composition for selected streams surveyed in the upper Salmon River Basin, 2006.....	17
Table 4.	Number of resident rainbow trout redds counted in the Big Springs Creek (BSC) and Lemhi River, 1994 to 2007.....	21
Table 5.	Hayden Creek bull trout redd count summary, 2006.....	24
Table 6.	Bull trout redd counts observed in trend survey sections of Alpine Creek, 1998 to 2006.....	27
Table 7.	Bull trout redd counts observed in trend survey sections of Fishhook Creek, 1998 to 2006.....	27
Table 8.	Resident trout trapping summary at the Pahsimeroi Fish Hatchery, 1990 to 2006.....	30
Table 9.	Non-target fish encountered during steelhead and chinook salmon trapping dates at the East Fork Satellite Facility, 1984 to 2006.....	32
Table 10.	Non-target fish encountered during steelhead and chinook salmon trapping dates at Sawtooth Fish Hatchery, 1984 to 2006.....	33

LIST OF FIGURES

Figure 1.	Resident rainbow trout spawning redds counted during ground surveys in the upper Lemhi River (Beyeler Ranch) and Big Springs Creek (Neibaur and Tyler ranches), 1994 to 2007.....	22
Figure 2.	Bear Valley bull trout redd counts, 2002 to 2006.....	23
Figure 3.	Bull trout redd counts in East Fork Hayden creek, 2002 to 2006.....	25
Figure 4.	Annual counts of completed fluvial bull trout redds observed in Fourth of July Creek (SNRA), 2003 to 2006.....	28

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Figure 5. Annual count of resident rainbow trout trapped at the Pahsimeroi Fish Hatchery, 1990 to 2006.....	29
Figure 6. Annual count of bull trout trapped at East Fork Satellite Facility, 1985 to 2006.....	31
Figure 7. Annual count of non-target salmonids trapped at Sawtooth Fish Hatchery, 1985 to 2006.....	34
APPENDIX	
Appendix A. Site characteristics of streams surveyed in the upper Salmon River in 2006	37
<u>Lowland Lakes Investigations</u>	
ABSTRACT	43
INTRODUCTION	44
Carlson Lake.....	44
Herd Lake	44
Jimmy Smith Lake.....	44
Williams Lake.....	45
Yellowbelly Lake	45
OBJECTIVES	45
Carlson Lake.....	45
Herd Lake	45
Jimmy Smith Lake.....	46
Williams Lake.....	46
Yellowbelly Lake	46
METHODS	46
Carlson Lake.....	46
Herd Lake	46
Jimmy Smith Lake.....	47
Williams Lake.....	47
Yellowbelly Lake	47
RESULTS AND DISCUSSION.....	47
Carlson Lake.....	47
Herd Lake	48

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Jimmy Smith Lake.....	51
Williams Lake.....	51
Yellowbelly Lake	51
RECOMMENDATIONS.....	54
Carlson Lake.....	54
Herd Lake	55
Jimmy Smith Lake.....	55
Williams Lake.....	55
Yellowbelly Lake	55
LITERATURE CITED.....	56

LIST OF TABLES

Table 1.	Comparison of brook trout sampling efforts in Carlson Lake, 1998 to 2006.....	48
Table 2.	Comparison of rainbow trout sampling efforts at Herd Lake, 1994 to 2006.....	50
Table 3.	Comparison of rainbow trout sampling efforts in Jimmy Smith Lake, 1996, 2001, 2003, 2005 and 2006.....	52
Table 4.	Summary of Yellowbelly Lake gillnetting efforts, 1961, 1978, 2001 and 2004 to 2008.....	53
Table 5.	Yellowbelly Lake fish stocking history from 1968 to 2006, listing most recent to earliest	54

LIST OF FIGURES

Figure 1.	Length frequency histograms for Carlson Lake brook trout, 2002 to 2006.....	49
Figure 2.	Comparison of rainbow trout length frequencies in Herd Lake, 2003, 2005, and 2006.....	50
Figure 3.	Comparison of rainbow trout length frequencies in Jimmy Smith Lake, 2003, 2005, and 2006	52

Mountain Lake Activities

ABSTRACT		57
----------------	--	----

TABLE OF CONTENTS (Continued)

	<u>Page</u>
INTRODUCTION	58
OBJECTIVES	58
Mountain Lake Stocking	58
METHODS	58
Mountain Lake Stocking	58
Mountain Lake Surveys	58
RESULTS AND DISCUSSION	59
Mountain Lake Stocking	59
Mountain Lake Surveys	64
RECOMMENDATIONS	69
LITERATURE CITED	70

LIST OF TABLES

Table 1.	Bahls Total Campsite Impact Rating for Lakes	59
Table 2.	Salmon Region alpine lakes stocked in 2006 by Sawtooth Fish Hatchery personnel	60
Table 3.	Salmon Region alpine lakes stocked in 2006 by Sawtooth Fish Hatchery personnel due to the 2005 Valley Road wildfire that prevented stocking	62
Table 4.	Salmon Region alpine lakes stocked during the summer of 2006 by McCall Fish Hatchery personnel	63
Table 5.	Salmon Region alpine lakes stocked during the summer of 2006 by McCall Fish Hatchery personnel from 2005s stocking rotation list due to availability of fish	64
Table 6.	Salmon Region alpine lakes stocked during the summer of 2006 by McCall Fish Hatchery personnel from 2005s stocking rotation list due to availability of fish	64
Table 7.	Salmon Region alpine lakes surveyed in 2006	65

SALMON REGION 2006 FISHERY MANAGEMENT ANNUAL REPORT

Rivers and Stream Investigations

ABSTRACT

During the summer and fall of 2006, personnel from the Idaho Department of Fish Game and Salmon-Challis National Forest sampled 69 tributary streams of the upper Salmon River basin to determine fish species composition, relative abundance, and size distribution. Of these 69 streams surveyed, 64 had fish present. Rainbow trout/steelhead *Oncorhynchus mykiss* were found in 47% of the 64 fish-bearing streams surveyed and had total lengths ranging from 23 to 270 mm. Westslope cutthroat trout *O. clarkii lewisi* were found in 66% of the fish-bearing streams surveyed and had total lengths ranging from 25 to 317 mm. Bull trout *Salvelinus confluentus* were found in 42% of the fish-bearing streams surveyed and had total lengths ranging from 15 to 379 mm. Brook trout *S. fontinalis* were found in 23% of the surveyed streams with fish and had total lengths ranging from 35 to 235 mm. Juvenile Chinook salmon *O. tshawytscha* were found in 14% of surveyed streams with fish present. Apparent hybrid rainbow/cutthroat trout *O. mykiss x O. clarkii lewisi* were found in 2% of streams where fish were detected. The one apparent hybrid rainbow/cutthroat trout was 145 mm total length. Non-target fish were found in 41% of the fish-bearing streams surveyed in 2006.

Regional fishery personnel conducted rainbow trout and bull trout spawning ground surveys to monitor redd count trends in the Lemhi River watershed. A total of 233 rainbow trout redds were counted from three survey transects in the upper Lemhi River and in Big Springs Creek. Overall, the number of rainbow trout redd counts in these transects increased this year compared to a total of 215 redds counted in 2006. Additionally, regional fishery staff counted 39 bull trout redds in a trend transect of upper Hayden Creek in the Lemhi River drainage, compared to 22 redds counted in this stretch last year. New bull trout redd count sites were established this year upstream of the upper Hayden Creek site. A total of 267 bull trout redds were observed in these new areas. Bull trout trend sites surveyed during 2006 in the upper Salmon River drainage totaled 109 redds compared to 77 bull trout redds counted in the same trend sites during 2005.

Fish hatcheries in the region collect data on non-target species encountered at their respective weirs. Regional fishery staff use this information as an aid in monitoring the status and timing of fluvial fish movement in regional waters. Forty-two rainbow trout and one Westslope cutthroat trout were counted at the Pahsimeroi Hatchery rack during 2006. Bull trout numbers trapped at the East Fork Satellite Facility totaled 262 along with one Westslope cutthroat trout, two rainbow trout, and 122 mountain whitefish. Twenty-five bull trout, 3 Westslope cutthroat trout, 18 rainbow trout, and 35 mountain whitefish were encountered at

Sawtooth Fish Hatchery. Numbers of bull trout appear to be increasing at upper Salmon River traps while Westslope cutthroat trout and rainbow trout numbers remain stable but low. Mountain whitefish numbers at the traps are variable but appear to be increasing in recent years.

Authors:

**Tom Curet
Regional Fishery Manager**

**Bob Esselman
Regional Fishery Biologist**

**Marsha White
Regional Fisheries Technician**

**Amie Brimmer
Regional Fishery Biologist**

INTRODUCTION

Wild Trout Population Surveys

During the summer and fall of 2006, personnel from the Idaho Department of Fish and Game (IDFG) and the Salmon-Challis National Forest cooperatively inventoried fish communities in tributary streams of the upper Salmon River basin. Accurate and current information is needed to effectively manage fish stocks, particularly since several endangered fish species, including bull trout *Salvelinus confluentus*, Chinook salmon *Oncorhynchus tshawytscha*, sockeye salmon *O. nerka*, and steelhead trout *O. mykiss*, are known to inhabit the upper Salmon River basin.

Fluvial Trout Monitoring

Big Springs Creek and Lemhi River

In 1994, IDFG initiated resident rainbow trout redd count surveys on Big Springs Creek (BSC), a tributary to the upper Lemhi River near Leadore. By 1997, regional fishery staff had established three transect areas to monitor long-term resident rainbow trout population trends: two on Big Springs Creek (BSC) and one on the upper Lemhi River. These efforts are conducted to identify trends in the number of redds observed. Fishing rule changes on the Lemhi River were implemented in 1994 so that only rainbow trout 14 inches and over could be harvested. Theoretically, rule changes, habitat improvement projects, and tributary reconnect projects should produce increased number of rainbow trout spawners within these transect areas.

Bear Valley Creek

This year marked the fifth year of counting bull trout redds in Bear Valley Creek, a tributary of Hayden Creek in the Lemhi River drainage. The area surveyed in Bear Valley Creek is located within a relatively low gradient meadow formed by a historic landslide. The redd count transect is located about 3.2 km upstream from the confluence of Bear Valley Creek with Hayden Creek. Bear Valley Creek is an important tributary for spawning fluvial bull trout in the Lemhi River drainage (Esselman et al. 2008).

East Fork Hayden Creek

East Fork Hayden Creek, a tributary to Hayden Creek in the Lemhi River drainage, has a bull trout spawning transect in a meadow 5 km upstream from its confluence with Hayden Creek. Counts have been done at this transect since 2002.

Hayden Creek

Historically, the main stem of Hayden Creek has been monitored annually in the early fall for Chinook salmon spawning redds. Within the Lemhi River drainage, the Hayden Creek watershed is the only known location where fluvial-sized bull trout rear and spawn (Lamperth et al. 2007). In 2005 many bull trout adults were observed spawning in upper Hayden Creek above the mouth of Bear Valley Creek. Consequently, regional fishery staff initiated bull trout redd counts on Hayden Creek from approximately the mouth of East Fork Hayden Creek upstream to the mouth of Carol Creek. In 2006, radio tagged bull trout were detected in Wright, Bray, and West Fork Hayden creeks. As a result, surveys were expanded to include redd counts in these tributaries.

Alpine and Fishhook Creeks

In 1998, standardized bull trout redd count surveys were initiated on Alpine Creek (tributary to Alturas Lake) and Fishhook Creek (inlet to Redfish Lake) in the upper Salmon River drainage to monitor long-term bull trout spawning trends.

Fourth of July Creek

Bull trout redds in Fourth of July Creek were counted for the fourth year in 2006. Fourth of July Creek is a tributary to the main stem Salmon River, 23.4 km south of Stanley, in the Sawtooth National Recreation Area (SNRA). The survey transect starts approximately 6.8 km upstream from the mouth of Fourth of July Creek and ends approximately 5.8 km upstream from the start of the transect. Bull trout redd counts in Fourth of July Creek were initiated in 2003 to monitor fish population responses to recently employed flow improvement projects, elimination of passage barriers at diversion structures, and screening of irrigation ditches.

Pahsimeroi, East Fork, Squaw Pond, and Sawtooth weirs and traps

Annually, non-target salmonid species are encountered at the Pahsimeroi, East Fork, Squaw Pond, and Sawtooth Fish Hatchery weirs as part of routine steelhead and Chinook salmon trapping activities. These non-target catches provide a reliable method of enumerating fluvial fish migrating into the Pahsimeroi River, East Fork Salmon River, and the upper Salmon River drainage.

OBJECTIVES

Evaluate fish populations in rivers and streams of the Salmon Region.

Evaluate the effects of harvest restrictions and habitat improvement efforts on resident rainbow trout populations in the upper Lemhi River and Big Springs Creek.

Evaluate the number of bull trout redds in Bear Valley, East Fork Hayden, Hayden, Alpine, Fishhook, and Fourth of July creeks to provide baseline and trend information relative to bull trout recovery efforts and harvest restrictions. Based on bull trout movement studies, expand surveys to include other likely spawning reaches.

STUDY AREA AND METHODS

Wild Trout Population Studies

Between June 26 and October 25, 2006, 69 tributary streams of the upper Salmon River basin were surveyed for fish composition, relative abundance, and size distribution. Stream characteristics, including temperature, channel type, and area sampled, were typically recorded. Drainage information and map coordinates were also documented.

Fish presence and abundance was documented using backpack electro-fishing methodologies. Site locations were selected to encompass a complete coverage of fish communities within various habitats, although some locations were based on adequate access and permission from landowners.

Streams were sampled by electro-fishing with a Smith Root SR-15 or 15D backpack shocking unit. Samplers attempted to catch all sizes of fish while moving upstream in transects that ranged from 60 to 130 meters in length following one of two stream survey protocols. For a standard stream survey (the most commonly used survey method in 2006), a given transect was sampled one, two, or three times. Captured fish were measured in total length (mm), placed in holding pens, and monitored for recovery. Once electro-fishing was completed, fish were released back into the surveyed reach. Genetic samples were taken on some game fish for analysis at a later date. Non-target fish were enumerated only. The second survey type used was presence and absence sampling whereby a stream section of unmeasured length and width was sampled to determine if fish could be detected. The deviation between sampling methods was a result of varying agency objectives and needs at sampling locations.

Where applicable, density estimates were expressed as the number of fish per 100 m². Population estimates were calculated using Microfish population software (Van Deventer and Platts, 1987). Population estimates for all species of salmonids were calculated for two- and three-pass electro-fishing transect sites when a 50% reduction in salmonid numbers was counted. Estimates were based on total sample size of all salmonids sampled during each electro-fishing pass. When consecutive electro-fishing passes did not achieve a 50% reduction, no population estimate for the stream was calculated. Young-of-the-year (YOY) fish were included in density estimate calculations. However, YOY fish were not included in population estimates where individual species could not be identified during electro-fishing surveys.

Fluvial Trout Monitoring

Big Springs Creek and Lemhi River

Since 1994 regional fishery staff have conducted resident rainbow trout redd count surveys on BSC and the Lemhi River. We established three transect areas in 1997 to monitor long-term resident rainbow trout population trends, two on BSC and one on the upper Lemhi River near Leadore. The two BSC sites include all of the stream flowing through the Karl Tyler ranch (Start: NAD27, zone 12, 310017mE, 4953211mN, and end: 307299mE, 4955469mN) and the historic Darwin Neibaur ranch (Start: NAD27, zone 12, 311162mE, 4952233mN, and end: 310017mE, 4953211mN). The upper Lemhi River site includes that section of river flowing through the Merrill Beyeler ranch from the fence line 100 meters upstream of the upper water gap to the lower fenced boundary (Start: NAD27, zone 12, 312832mE, 4950675mN, and end: 312238mE, 4952088mN). Redd counts are usually conducted during the last week of April or the first week of May using visual ground count methods. This year, regional fishery personnel conducted redd counts on April 26, 2007.

Bear Valley Creek

Fluvial bull trout redd counts on Bear Valley Creek were conducted September 8, 2006, by regional fishery staff using visual ground count methods. The redd count transect starts at NAD27, zone 12, 283019mE, 4961561mN, and ends at 282254mE, 4962248mN. The Bear Valley transect consists of c-channel habitat. In 2006, redd counts on Bear Valley Creek were expanded to include a reach upstream of the traditional meadow (trend site) to the confluence with Buck Creek (Start: NAD27, zone 12, 283049mE, 4961521mN, and end at 276386mE, 4964630mN).

East Fork Hayden Creek

The resident bull trout redd count on East Fork Hayden Creek was conducted September 8, 2006 using visual ground count methods. The redd count transect starts at NAD27, zone 12, 288525mE, 4956202mN, and ends at 288880mE, 4955583mN. The East Fork Hayden Creek transect consists of c-channel type habitat.

Hayden Creek

Expanded transects on upper Hayden Creek were surveyed for bull trout redds in 2006 incidental to an on-going, yearly survey for Chinook salmon redds using visual ground count methods. Additionally, portions of Wright, Bray, and West Fork Hayden creeks were surveyed as suggested by telemetry study. The survey transects, located upstream of the mouth of Bear Valley Creek, were conducted September 8, 2006. The transects total 34.5 km in length. UTM coordinates for the Hayden Creek transects start at NAD27, zone 12, 285350mE, 4958731mN,

and end at 283236mE, 4953428mN. Expanded survey coordinates for Wright Creek begin at NAD27, zone 12, 282139mE, 4962397mN, and end at 279340mE, 4960128mN; survey coordinates for Bray Creek begin at NAD27, zone 12, 281455mE, 4953870mN, and end at 278716mE, 4951611mN; and coordinates for West Fork Hayden Creek begin at NAD27, zone 12, 281607mE, 4953701mN, and end at 277410mE, 4953161mN.

Alpine and Fishhook Creeks

Two counts are conducted annually about two weeks apart on both Alpine and Fishhook creeks to monitor the timing and numbers of bull trout spawning redds. Redd counts were conducted by IDFG research personnel on Alpine Creek on August 29 and September 12, 2006. Fishhook Creek was surveyed on August 29 and September 13, 2006. All redds in progress or redds that had been completed were counted during the first survey and flagged for later identification. On the second survey, additional redds were counted and included with the number of flagged redds to provide a total number of redds counted for each stream. Coordinates for the Alpine Creek survey transect start at NAD27, zone 11, 666259mE, 4863406mN, and end at 665656mE, 4863195mN. Coordinates for the Fishhook Creek survey start at NAD27, zone 11, 662581mE, 4888855mN, and end at 661766mE, 4888863mN.

Fourth of July Creek

The Fourth of July Creek bull trout redd count was conducted September 6, 2006 using visual ground count methods. Coordinates for the Fourth of July Creek survey start at NAD27, zone 11, 679680mE, 4878679mN, and end at 684992mE, 4879856mN.

Pahsimeroi, East Fork, Squaw Pond, and Sawtooth weirs and traps

Pahsimeroi, East Fork, Squaw Pond, and Sawtooth Fish Hatchery personnel annually provide results of resident salmonids encountered during trapping operations for reporting and analysis by regional fisheries staff.

RESULTS AND DISCUSSION

Wild Trout Population Studies

Salmonids and other non-target fish were found in 64 (93%) of 69 streams surveyed in 2006 (Tables 1-3). Numerically, rainbow trout (N = 2,011) was the most often encountered salmonid species during this year's investigations. Rainbow trout were found in 30 (47%) of the 64 fish-bearing streams and ranged in size from 23 - 270 mm total length (Tables 1 and 2). The highest densities of rainbow trout were found in Colson and Fourth of July creeks. Westslope cutthroat trout (N = 1,346) were observed in 42 (66%) of fish-bearing streams and had total lengths ranging from 25 to 317 mm. The highest densities of Westslope cutthroat trout occurred

Table 1. Combined salmonid population estimates including fry, 95% confidence intervals (CI), and species composition for selected streams in the upper Salmon River basin, 2006.

Stream	Transect ^a	Sample Date	Transect Area (m ²)	No. of Fish Sampled	Population Estimate (95% CI)	Fish/100 m ²	Species Composition % ^b						
							CT	RBT	BU	RBT xCT	EBT	CK	GN
Agency	U	08/07/2006	155.0	45	45 (43, 47)	29.0	56	44					
Arnett Creek	L	09/28/2006	464.0	56	59 (53, 65)	12.1		62				38	
Big Boulder	L	08/07/2006	ND ^c	12	--	--	75	25					
Big Boulder	M	08/03/2006	ND	16	--	--	50		50				
Big Boulder	M	08/09/2006	ND	10	10 (7, 13)	--	50	20	30				
Big Boulder	U	08/02/2006	ND	9	--	--	100						
Big Boulder	U	08/02/2006	ND	10	--	--	60	40					
Big Eightmile	U	08/08/2006	541.0	27	28 (24, 32)	5.0			100				
Blacktail	L	07/28/2006	234.0	0	--	--							
Boulder	M	08/14/2006	372.0	30	34 (24, 44)	8.1			100				
Cabin	L	07/11/2006	ND	13	13 (11, 15)	--	31					69	
Cabin	M	07/10/2006	ND	27	--	--	44					56	
Cabin	M	07/11/2006	ND	16	--	--	50					50	
Cabin	U	07/12/2006	ND	24	--	--	4					96	
Cabin	U	07/12/2006	ND	15	--	--	13					87	
Camp	L	08/22/2006	269.0	66	72 (62, 82)	24.5		9				91	
Carmen	L	07/08/2006	560.0	25	29 (18, 40)	4.5		100					
Carmen	L	07/08/2006	692.0	18	--	2.6		94					6
Carmen	L	07/11/2006	466.0	29	33 (23, 43)	6.2		55					45
Carmen	L	07/11/2006	556.0	55	62 (51, 73)	9.9		100					
Carmen	L	07/12/2006	612.0	113	126 (112, 140)	18.5		100					
Carmen	M	07/06/2006	367.2	42	43 (40, 46)	11.4		100					
Carmen	M	07/12/2006	634.0	87	93 (85, 101)	13.7		100					
Carmen	M	07/25/2006	478.0	93	-- ^d	19.5		100					
Carmen	M	07/26/2006	632.0	38	--	6.0			100				
Carmen	U	07/25/2006	655.6	64	--	9.8			100				
Carmen	U	07/26/2006	528.0	62	--	11.7			100				
Carmen	U	09/27/2006	384.0	70	72 (67, 77)	18.2			100				

8

Table 1. Continued.

Stream	Transect ^a	Sample Date	Transect Area (m ²)	No. of Fish Sampled	Population Estimate (95% CI)	Fish/100 m ²	Species Composition % ^b							
							CT	RBT	BU	RBT xCT	EBT	CK	GN	
Champion	M	08/08/2006	ND	26	-- ^d	--						100		
Champion	U	08/09/2006	ND	0	--	--								
Colson	L	08/28/2006	242.0	74	81 (70, 92)	30.6		100						
Colson	M	08/28/2006	231.0	53	56 (49, 63)	22.9	100							
Cow	L	07/31/2006	430.0	64	89 (53, 125)	14.9	1	97					2	
Cow	L	07/31/2006	410.4	22	25 (16, 34)	5.4		100						
Cow	L	08/01/2006	442.0	25	29 (19, 39)	5.8	8	80	12					
Cow	M	08/01/2006	482.0	42	46 (38, 54)	8.7	14		86					
Cow	M	08/02/2006	384.0	25	29 (18, 40)	6.5			100					
Cow	U	06/28/2006	360.0	7	7 (6, 8)	1.9			100					
Cow (Unnamed tributary)	M	06/28/2006	55.5	0	--	--								
Dahlonega	L	08/17/2006	402.0	318	346 (318, 346)	79.1	1	73				25	1	
Dahlonega	M	08/23/2006	494.0	68	--	13.8	3	93				4		
Dahlonega	M	08/30/2006	344.0	152	161 (151, 171)	44.2	7	80				13		
Dahlonega	U	08/30/2006	272.0	14	--	5.1	71					29		
Dairy	L	08/08/2006	272.0	11	--	4.0		55	45					
Davis Canyon	M	07/07/2006	270.0	50	--	18.5	100							
Deep	L	08/16/2006	433.0	25	27 (21, 33)	5.8		100						
Deer	L	09/07/2006	197.0	1	--	0.5	100							
East Fork Kenney	U	08/30/2006	161.0	0	--	--								
Everson	M	07/27/2006	ND	5	5 (2, 8)	--	20		80					
Fisher	L	07/18/2006	ND	18	--	--	17					83		
Fisher	M	07/17/2006	ND	18	--	--	78					22		
Fisher	M	07/17/2006	ND	21	--	--	95					5		
Fisher	M	07/18/2006	ND	14	--	--	79					21		
Fishhook	L	08/14/2006	ND	8	--	--				100				
Fishhook	L	08/15/2006	ND	18	19 (14, 24)	--	5	17	50			28		
Fishhook	L	08/15/2006	ND	7	--	--				100				
Fishhook	M	08/14/2006	ND	6	--	--				83				17
Flume	L	08/03/2006	259.0	45	48 (41, 55)	17.4	82	18						
Fourth of July	M	08/23/2006	ND	36	37 (34, 40)	--	14		86					

Table 1. Continued.

Stream	Transect ^a	Sample Date	Transect Area (m ²)	No. of Fish Sampled	Population Estimate (95% CI)	Fish/100 m ²	Species Composition % ^b						
							CT	RBT	BU	RBT xCT	EBT	CK	GN
Fourth of July	L	07/17/2006	464.0	45	--	9.7		100					
Fourth of July	L	07/18/2006	486.0	71	73 (69, 77)	14.6		100					
Fourth of July	L	07/18/2006	469.3	75	81 (72, 90)	16.0		100					
Fourth of July	L	07/19/2006	518.0	135	151 (135, 167)	26.1		99				1	
Fourth of July	M	07/13/2006	460.0	66	71 (63, 79)	14.3	76		24				
Fourth of July	M	07/19/2006	394.0	30	39 (18, 60)	7.6		90	10				
Fourth of July	M	07/20/2006	540.0	54	56 (51, 61)	10.0	39	2	59				
Fourth of July	U	07/17/2006	360.0	45	53 (38, 68)	12.5			100				
Fourth of July	U	07/26/2006	552.0	76	109 (61, 157)	13.8	7		93				
Fourth of July	U	08/23/2006	ND	45	46 (43, 49)	--	53		47				
Fourth of July	U	09/27/2006	310.0	44	49 (39, 59)	14.2			100				
Freeman	L	07/05/2006	374.0	87	97 (85, 109)	23.3		100					
Freeman	L	07/06/2006	504.0	56	-- ^d	11.1		100					
Freeman	M	07/10/2006	277.8	40	44 (35, 53)	14.4	100						
Freeman	M	07/11/2006	418.0	0	--	--							
Garland	L	08/30/2006	ND	31	36 (25, 47)	--	71		29				
Garland	L	08/30/2006	ND	3	--	--			100				
Golway Gulch	L	07/10/2006	224.0	19	19 (17, 21)	8.5	68	32					
Hammerean	M	08/29/2006	170.0	63	66 (60, 72)	37.1	100						
Hat	U	08/31/2006	364.0	70	75 (67, 83)	19.2	51		49				
Hood Gulch	L	08/06/2006	170.0	20	20 (18, 22)	11.8		100					
Horse	U	09/14/2006	148.0	11	11 (8, 14)	7.4			100				
Jefferson	L	08/22/2006	41.0	0	--	--							
Jesse	L	03/30/2006	ND	11	--	--	45		55				
Kadletz	L	09/07/2006	261.0	-- ^e	--	--							
Lee	U	07/27/2006	196.0	77	--	39.3	100						
Little Boulder	M	08/08/2006	ND	17	--	--	94		6				
Little Boulder	M	08/08/2006	ND	17	--	--	76		24				
Little Boulder	M	08/09/2006	ND	6	--	--	83		17				
Little Boulder	U	08/08/2006	ND	7	--	--	14		86				
Little Fourth of July	L	07/13/2006	140.0	2	--	1.4		100					
Martin	L	08/28/2006	ND	5	-- ^d	--			100				

Table 1. Continued.

Stream	Transect ^a	Sample Date	Transect Area (m ²)	No. of Fish Sampled	Population Estimate (95% CI)	Fish/100 m ²	Species Composition % ^b						
							CT	RBT	BU	RBT xCT	EBT	CK	GN
Martin	L	08/29/2006	ND	7	--	--	100						
Mill	M	09/07/2006	394.0	34	49 (18, 80)	8.6	24			76			
Moose	L	08/24/2006	214.0	59	61 (56, 66)	27.6	92			8			
Moose	M	08/22/2006	276.0	63	71 (58, 84)	22.8		100					
Napias	M	09/25/2006	342.0	54	64 (49, 79)	15.8		70		2		28	
Nez Perce	L	08/31/2006	193.6	23	26 (17, 35)	11.9	100						
North Fork Cow	L	06/29/2006	237.0	10	--	4.2	100						
North Fork Cow	M	06/26/2006	324.0	0	--	--							
North Fork Cow	M	06/27/2006	200.0	37	38 (34, 42)	18.5	100						
North Fork Cow	M	06/27/2006	328.0	0	--	--							
North Fork Cow	U	06/27/2006	314.1	0	--	--							
Panther	U	08/16/2006	446.0	17	18 (13, 23)	3.8	5	24				71	
Pattee	U	08/03/2006	192.0	89	101 (85, 117)	46.4	100						
Pattee (Unnamed tributary)	L	08/07/2006	128.0	30	31 (27, 35)	23.4	100						
Patterson	L	10/25/2006	740.9	72	86 (66, 106)	9.7		44				46	10
Phelan	L	08/21/2006	293.0	80	82 (77, 87)	27.3		58				42	
Pigtail	L	08/28/2006	ND	17	20 (11, 29)	--	53			47			
Pigtail	L	08/28/2006	ND	3	-- ^d	--	33			67			
Pollard	M	02/03/2006	ND	10	--	--	100						
Sage	M	08/01/2006	134.0	1	--	0.7	100						
Salmon River	U	07/26/2006	ND	6	--	--						100	
Salmon River	U	07/26/2006	ND	3	--	--						100	
Salmon River	U	07/26/2006	ND	3	--	--						100	
Salmon River	U	07/26/2006	ND	35	--	--	3					97	
Salmon River	U	07/27/2006	ND	9	10 (4, 16)	--						100	
Salmon River	U	07/27/2006	ND	5	--	--						100	
Sheep	L	08/08/2006	706.0	13	--	1.8	8	85		7			
Sheep	L	08/08/2006	578.0	27	41 (4, 78)	4.7	19	48		33			
Sheep	L	08/09/2006	747.6	27	30 (23, 37)	3.6	11	78		4		4	3
Sheep	L	08/09/2006	782.0	24	26 (19, 33)	3.1	29	4		67			
Sheep	M	08/10/2006	737.2	45	57 (37, 77)	6.1	11			89			

Table 1. Continued.

Stream	Transect ^a	Sample Date	Transect Area (m ²)	No. of Fish Sampled	Population Estimate (95% CI)	Fish/100 m ²	Species Composition % ^b						
							CT	RBT	BU	RBT xCT	EBT	CK	GN
Sheep Short	M	08/22/2006	598.0	51	-- ^d	8.5	2		98				
Silver Rule	L	09/07/2006	100.0	0	--	--							
Slate	L	07/25/2006	ND	6	--	--	100						
Slate	L	07/25/2006	ND	30	36 (22, 50)	--		67	10			23	
Slate	L	07/25/2006	ND	5	--	--		80	20				
Slate	M	07/24/2006	ND	0	--	--							
Slate	U	07/24/2006	ND	0	--	--							
Smout	L	07/05/2006	252.0	8	--	3.2		100					
Smout	M	07/07/2006	ND	47	51 (44, 58)	--	100						
Stroud	M	08/08/2006	257.0	28	29 (25, 33)	10.9		7	93				
Threemile	L	08/07/2006	204.0	52	58 (47, 69)	25.5	17	33				50	
Threemile	L	08/07/2006	ND	32	-- ^d	--	100						
Threemile	L	08/29/2006	203.0	40	40 (39, 41)	19.7	15	50		2		33	
Vat (Unnamed tributary)	L	07/20/2006	ND	16	--	--						31	69
Vat (Unnamed tributary)	L	07/20/2006	ND	0	--	--							
Vat (Unnamed tributary)	M	07/18/2006	ND	1	--	--							100
Wagonhammer	L	09/26/2006	104.0	10	--	9.6	100						
Wagonhammer	M	09/26/2006	130.0	37	45 (29, 61)	28.5	100						
Wagonhammer	M	09/26/2006	122.4	53	53 (51, 55)	43.3	100						
Wagonhammer	M	09/26/2006	138.0	26	27 (23, 31)	18.8	100						
West Fork Nez Perce	L	08/31/2006	73.2	3	--	4.1	100						
West Fork North Fork Salmon River	L	08/02/2006	260.0	52	59 (48, 70)	20.0	58			42			
West Pass	L	07/31/2006	ND	1	--	--				100			
West Pass	L	07/31/2006	ND	4	--	--		25		75			
West Pass	M	08/01/2006	ND	8	8 (6, 10)	--				100			
West Pass	M	08/01/2006	ND	3	--	--				100			
West Pass	M	08/01/2006	ND	0	--	--							
Williams	L	07/17/2006	ND	46	53 (41, 65)	--						7	93

Table 1. Continued.

Stream	Transect ^a	Sample Date	Transect Area (m ²)	No. of Fish Sampled	Population Estimate (95% CI)	Fish/100 m ²	Species Composition % ^b							
							CT	RBT	BU	RBT xCT	EBT	CK	GN	
Williams	M	07/13/2006	ND	3	--	--						100		
Williams	M	07/13/2006	ND	8	--	--						100		
Williams	U	07/13/2006	ND	3	--	--						100		
Withington	U	07/31/2006	259.0	2	--	0.8	50	50						
Wood	L	09/14/2006	122.0	34	34 (32, 36)	27.9	3	79	18					
Woodtick	M	08/09/2006	241.0	32	34 (28, 40)	13.3				100				
Wright	L	09/07/2006	328.0	- ^f	--	--				100				

^a L = transect's lower reach, M = middle reach, and U = upper reach.

^b CT = Westslope cutthroat trout, RBT = Rainbow trout/steelhead, BU = Bull trout, RBTxCT = Rainbow trout/steelhead x Westslope cutthroat trout hybrid, EBT = Brook trout, CK = Chinook salmon, and GN = Golden trout.

^c ND = No data.

^d Population estimate calculation returned a negative value for the 95% confidence interval and was not reported.

^e Presence/absence sampling; bull trout, Westslope cutthroat trout, and rainbow trout identified but not enumerated.

^f Presence/absence sampling; bull trout identified but not enumerated.

Table 2. Salmonid species, number of fish observed, mean total length (mm), and size range (total length mm) for selected streams in the upper Salmon River basin, 2006.

Stream	No. of Fish Observed	Salmonid Species ^a	Mean Total Length (mm)	Size Range (Total Length mm)
Agency	25	CT	128.0	85-200
Agency	20	RBT	162.5	100-205
Arnett Creek	35	RBT	102.7	40-225
Arnett Creek	21	EBT	140.2	65-220
Big Boulder	11	BU	219.3	71-244
Big Boulder	37	CT	155.1	71-317
Big Boulder	9	RBT	168.8	106-226
Big Eightmile	27	BU	169.6	85-260
Boulder	30	BU	121.2	40-210
Cabin	27	CT	159.7	68-235
Cabin	68	EBT	119.4	63-186
Camp	6	RBT	137.5	125-160
Camp	60	EBT	106.1	50-180
Carmen	234	BU	141.0	35-270
Carmen	14	CK	85.0	85
Carmen	448	RBT	124.7	40-240
Champion	26	EBT	134.5	78-213
Colson	53	CT	101.5	25-200
Colson	74	RBT	100.7	35-200
Cow	71	BU	134.5	15-205
Cow	1	CK	ND ^b	ND
Cow	9	CT	154.4	70-225
Cow	104	RBT	97.2	35-225
Dahlonaga	3	CK	ND	ND
Dahlonaga	25	CT	145.0	85-240
Dahlonaga	104	EBT	87.7	35-235
Dahlonaga	420	RBT	94.5	30-195
Dairy	5	BU	137.5	80-240
Dairy	6	RBT	136.7	105-210
Davis Canyon	50	CT	99.9	45-170
Deep	25	RBT	121.6	40-220
Deer	1	CT	ND	ND
Everson	4	BU	167.5	150-170
Everson	1	CT	170.0	170
Fisher	48	CT	120.8	71-230
Fisher	23	EBT	163.8	96-210
Fishhook	30	BU	238.8	83-610
Fishhook	1	CT	211.0	211
Fishhook	5	EBT	154.8	114-198
Fishhook	3	RBT	155.0	148-162
Flume	37	CT	128.9	65-230
Flume	8	RBT	148.1	110-185
Fourth of July	263	BU	138.7	40-379

Table 2. Continued.

Stream	No. of Fish Observed	Salmonid Species ^a	Mean Total Length (mm)	Size Range (Total Length mm)
Fourth of July	1	CK	ND	ND
Fourth of July	105	CT	132.4	50-290
Fourth of July	353	RBT	109.3	30-240
Freeman	40	CT	103.3	45-195
Freeman	143	RBT	105.6	25-235
Garland	12	BU	145.2	134-171
Garland	22	CT	139.0	88-216
Golway Gulch	62	CT	104.5	45-185
Golway Gulch	6	RBT	104.2	75-165
Hammerean	63	CT	99.0	30-160
Hat	34	BU	119.9	50-200
Hat	36	CT	139.2	80-220
Hood Gulch	20	RBT	110.0	60-150
Horse	11	BU	97.7	60-165
Jesse	6	BU	95.3	48-289
Jesse	5	CT	124.8	88-177
Lee	77	CT	108.2	50-190
Little Boulder	12	BU	125.4	52-206
Little Boulder	35	CT	150.3	74-233
Little Fourth of July	2	RBT	24.5	23-26
Martin	5	BU	137.6	119-153
Martin	7	CT	177.9	167-188
Mill	26	BU	120.6	40-195
Mill	8	CT	171.9	110-260
Moose	5	BU	132.0	115-140
Moose	54	CT	104.1	65-185
Moose	63	RBT	110.9	30-195
Napias	1	BU	130.0	130
Napias	15	EBT	121.0	50-170
Napias	38	RBT	105.4	50-200
Nez Perce	23	CT	108.5	70-175
North Fork Cow	47	CT	115.6	50-220
Panther	1	CT	140.8	55-195
Panther	12	EBT	160.0	160
Panther	4	RBT	133.8	80-200
Pattee	89	CT	111.3	60-195
Pattee (Unnamed tributary)	30	CT	119.2	50-195
Patterson	7	CK	120.0 ^c	120
Patterson	33	EBT	144.5	70-230
Patterson	32	RBT	97.2	60-270
Phelan	34	EBT	89.1	50-175
Phelan	46	RBT	93.6	40-200
Pigtail	10	BU	138.2	102-223
Pigtail	10	CT	125.6	82-180
Pollard	10	CT	98.6	70-157
Sage	1	CT	140.0	140

Table 2. Continued.

Stream	No. of Fish Observed	Salmonid Species ^a	Mean Total Length (mm)	Size Range (Total Length mm)
Salmon River	1	CT	227.0	227
Salmon River	60	EBT	137.6	84-215
Sheep	117	BU	119.8	35-320
Sheep	1	CK	115.0	115
Sheep	22	CT	184.3	70-280
Sheep	1	EBT	150.0	150
Sheep	46	RBT	124.5	40-215
Silver Rule	6	CT	78.0	60-105
Slate	4	BU	231.3	175-275
Slate	7	CK	79.0	62-93
Slate	24	RBT	126.1	85-201
Smout	47	CT	120.4	65-235
Smout	8	RBT	118.1	105-140
Stroud	26	BU	151.7	70-200
Stroud	2	RBT	182.5	170-195
Threemile	47	CT	98.9	40-165
Threemile	39	EBT	75.8	40-190
Threemile	37	RBT	86.1	30-195
Threemile	1	RBTxCT	145.0	145
Vat (Unnamed tributary)	12	CK	45.6	35-56
Vat (Unnamed tributary)	5	EBT	108.5	94-135
Wagonhammer	126	CT	82.4	25-235
West Fork Nez Perce	3	CT	100.0	90-120
West Fork North Fork Salmon River	52	BU	108.9	80-250
West Fork North Fork Salmon River	53	CT	118.3	60-180
West Pass	15	BU	208.6	85-500
West Pass	1	RBT	116.0	116
Williams	19	EBT	105.5	64-160
Williams	43	CK	68.3	55-76
Withington	1	CT	240.0	240
Withington	1	RBT	205.0	205
Wood	6	BU	94.2	65-135
Wood	1	CT	185.0	185
Wood	27	RBT	108.0	55-171
Woodtick	32	BU	127.3	90-175
Wright	ND ^c	BU	ND	ND

^a CK = Chinook salmon, CT = Westslope cutthroat trout, BU = Bull trout, EBT = Brook trout, RBT = Rainbow trout/steelhead, RBTxCT = Rainbow trout/steelhead x Westslope cutthroat trout hybrid.

^b ND = No data. Only one fish measured in sample.

^c Only one fish measured from sample.

^d Presence/absence sampling; bull trout detected but not enumerated.

Table 3. Combined non-target fish population densities, and species composition for selected streams surveyed in the upper Salmon River Basin, 2006.

Stream	Transect ^a	Sample Date	Transect Area (m ²)	No. of Fish Sampled	Fish/100 m ²	Species Composition (%) ^b					
						SCU	DAC	SUC	MWF	MSC	RSS
Big Eightmile	U	08/08/2006	541.0	1	0.2	100					
Carmen	L	07/08/2006	560.0	23	4.1	22	52		26		
Carmen	L	07/11/2006	466.0	31	6.7	100					
Carmen	L	07/08/2006	692.0	33	4.8	94			6		
Carmen	L	07/11/2006	556.0	25	4.5	96			4		
Carmen	L	07/12/2006	612.0	29	4.7	100					
Carmen	M	07/06/2006	367.2	32	8.7	100					
Carmen	M	07/12/2006	634.0	31	4.9	100					
Carmen	M	07/25/2006	478.0	31	6.5	100					
Cow	L	07/31/2006	430.0	16	3.7	100					
Cow	L	07/31/2006	410.4	27	6.6	100					
Cow	L	08/01/2006	442.0	17	3.8	100					
Dahlonaga	L	08/17/2006	402.0	35	8.7	100					
Dahlonaga	M	08/23/2006	494.0	31	6.3	100					
Dahlonaga	M	08/30/2006	344.0	33	9.6	100					
Dahlonaga	U	08/30/2006	272.0	31	11.4	100					
Dairy	L	08/08/2006	272.0	1	0.4	100					
Deep	L	08/16/2006	433.0	-- ^c	--	100					
Fisher	L	07/18/2006	ND	-- ^c	--	100					
Fishhook	L	08/14/2006	ND	-- ^c	--	100					
Fishhook	L	08/15/2006	ND	-- ^c	--	100					
Flume	L	08/03/2006	259.0	10	3.9	100					
Fourth of July	M	08/23/2006	ND	-- ^c	--	100					
Fourth of July	L	07/17/2006	464.0	47	10.1	68	21		11		
Fourth of July	L	07/18/2006	486.0	33	6.8	100					
Fourth of July	L	07/18/2006	469.3	33	7	100					
Fourth of July	L	07/19/2006	518.0	32	6.2	100					

Table 3. Continued.

Stream	Transect ^a	Sample Date	Transect Area (m ²)	No. of Fish Sampled	Fish/100 m ²	Species Composition (%) ^b					
						SCU	DAC	SUC	MWF	MSC	RSS
Fourth of July	M	07/19/2006	394.0	33	8.4	100					
Freeman	L	07/05/2006	374.0	28	7.5	100					
Freeman	L	07/06/2006	504.0	32	6.3	100					
Golway Gulch	L	07/10/2006	224.0	6	2.7	100					
Hood Gulch	L	08/06/2006	170.0	-- ^c	--	100					
Jesse	L	03/30/2006	ND	7	--	100					
Moose	L	08/14/2006	214.0	1	0.5	100					
Nez Perce	L	08/31/2006	193.6	32	16.5	100					
Patterson	L	10/25/2006	740.9	40	5.4	100					
Pollard	M	02/03/2006	ND	2	--	100					
Salmon River	U	07/27/2006	ND	-- ^c	--	100					
Salmon River	U	07/27/2006	ND	-- ^c	--	100					
Sheep	L	08/08/2006	706.0	30	4.2	100					
Sheep	L	08/08/2006	578.0	32	5.5	100					
Sheep	L	08/09/2006	747.6	35	4.7	100					
Sheep	L	08/09/2006	782.0	25	3.2	100					
Sheep	M	08/10/2006	737.2	33	4.5	100					
Sheep	M	08/22/2006	598.0	1	0.2	100					
Slate	L	07/25/2006	ND	-- ^d	--	-- ^d				-- ^d	
Slate	L	07/25/2006	ND	-- ^c	--	100					
Slate	M	07/24/2006	ND	-- ^c	--	100					
Threemile	L	08/07/2006	204.0	30	14.7	100					
Threemile	L	08/07/2006	ND	32	--	100					
Threemile	L	08/29/2006	203.0	-- ^c	--	100					
West Fork Nez Perce	L	08/31/2006	73.2	12	16.4	100					
West Fork North Fork Salmon River	L	08/02/2006	260.0	2	0.8	100					
West Pass	L	07/31/2006	ND	-- ^c	--	100					
West Pass	M	08/01/2006	ND	-- ^c	--	100					
West Pass	M	08/01/2006	ND	-- ^c	--	100					

Table 3. Continued.

Stream	Transect ^a	Sample Date	Transect Area (m ²)	No. of Fish Sampled	Fish/100 m ²	Species Composition (%) ^b					
						SCU	DAC	SUC	MWF	MSC	RSS
Williams	L	07/17/2006	ND	-- ^d	--	-- ^d				-- ^d	
Williams	M	07/13/2006	ND	1	--	100					

^a L = stream transect's lower reach, M = middle reach, and U = upper reach.

^b SCU = Sculpin, DAC = Dace, SUC = Sucker, MWF = Mountain whitefish, MSC = Mottled sculpin, and RSS = Redside shiner.

^c Sculpin detected but not enumerated.

^d Sculpin and mountain whitefish detected but not enumerated.

in Pattee and Wagonhammer creeks. Bull trout (N = 1,048) were found in 27 (42%) of the fish-bearing streams and had total lengths ranging from 15 to 379 mm. Carmen and Fourth of July creeks had the highest densities of bull trout. Brook trout *S. fontinalis* (N = 525) were found in 15 (23%) fish-bearing streams and had total lengths ranging from 35 to 235 mm. The highest density of brook trout were found in Dahlenega and Threemile creeks. Juvenile Chinook salmon (N = 89) were found in nine (14%) fish-bearing streams. Carmen and Patterson creeks had the highest densities of juvenile Chinook salmon. Apparent hybrid rainbow/cutthroat trout *O. mykiss x O. clarkii lewisi* was found in only one (2%) of the 64 fish-bearing tributary streams. The apparent hybrid rainbow/cutthroat trout was 145 mm total length. Fish were not found in five of the 69 streams surveyed: Blacktail, Cow (Unnamed tributary), East Fork Kenney, Jefferson, and Short creeks.

Non-target species recorded during 2006 surveys included sculpin *Cottus sp*, mountain whitefish *Prosopium williamsoni*, and dace *Rhinichthys sp* (Table 3). Sculpin were found in 26 (41%) tributaries surveyed with fish present. The number of sculpin shown in Table 3 should be considered very low since non-game species were not targeted during surveys by the cooperating agency and the number of sculpin and other non-target species were not enumerated on some surveys. The highest abundance of sculpin enumerated during surveys was found in Nez Perce and Threemile creeks. Mountain whitefish were found in six (11%) streams surveyed with fish present, while dace were encountered in two (4%) streams. In future surveys, cooperating agencies will be asked to enumerate and account for non-target fish as is currently done for salmonids.

Standard stream survey protocol was followed on all streams surveyed in 2006 except for Jesse, Kadletz, Pollard, and Wright creeks, which were sampled for presence/absence. More detailed information on stream survey sites is located in Appendix A, which lists stream transects surveyed, sampling dates, transect measurements, sub-basin, and UTM coordinates.

Fluvial Trout Monitoring

Big Springs Creek

We observed a total of 233 rainbow trout redds in two BSC transects and one transect in the upper Lemhi River (Table 4 and Figure 1). One hundred sixty-three redds were counted in the Neibaur Ranch transect while 62 redds were observed in the Tyler Ranch transect. Eight redds were counted in the Beyeler Ranch transect in the upper Lemhi River. This year's increase in the number of redds observed may be a ramification of increasing bank stability as a result of fencing projects implemented within the transect areas.

Reviewing redd counts from the three reaches over time suggests there may be alternate year spawning occurring. Should alternate year spawning be occurring, this year (2007) would be the expected lesser count year, but in fact, the number of redds increased. The 233 redds counted this year were higher than the 215 redds counted in 2006. Figure 1 shows a modest increase in the total number of redds counted during the last three years. To date, the total number of redd counts have fluctuated from 39 to 556 annually and may indicate other unknown influences are affecting resident rainbow trout spawning.

These sites will continue to be monitored and trends evaluated in the rainbow trout population in future years. Habitat changes will be monitored over the next 10 years to document improvements in the riparian areas.

Table 4. Number of resident rainbow trout redds counted in Big Springs Creek (BSC) and Lemhi River, 1994 to 2007.

Date	Lemhi River (Beyeler Ranch ^a)	BSC (Neibaur Ranch ^b)	BSC (Tyler Ranch ^c)	Total
4/26/1994	-	-	-	40 ^d
5/3/1995	-	57	-	57
5/3/1996	7	32	-	39
4/21/1997- 5/3/1997	8	44	45	97
5/3/1998	18	93	124	235
4/29/1999	29	39	71	139
4/20/2000	23	160	123	306
4/5/2001	2	95	186	283
4/25/2002	3	360	193	556
4/22/2003	56	128	103	287
4/22/2004	15	174	45	234
4/26/2005	3	75	43	121
4/27/2006	9	63	143	215
4/26/2007	8	163	62	233

^a Habitat improvement project implemented in spring 1995.

^b Habitat improvement project completed in 2003.

^c Habitat improvement project implemented in spring 1998.

^d Incidental count taken during a Lemhi Model Watershed Project habitat survey; includes all of Big Springs Creek.

Bear Valley Creek

Regional fishery staff counted 24 bull trout redds in the Bear Valley Creek transect in 2006, compared with 34 bull trout redds observed in 2005 (Figure 2). The number of bull trout redds in this transect has been declining for the last two seasons. We are concerned about the possible effects of catch and release angling in this reach. However, other natural factors could be at work. The population of bull trout that uses Bear Valley Creek for spawning appears to be a fluvial population in that relatively large adults have been observed during yearly spawning counts (Esselman et al. 2008). Results from a regional, on-going fluvial bull trout telemetry study indicate these fish may spend part of their lives in the main stem Salmon and Lemhi rivers, and then migrate on the descending limb of the hydrograph upstream through

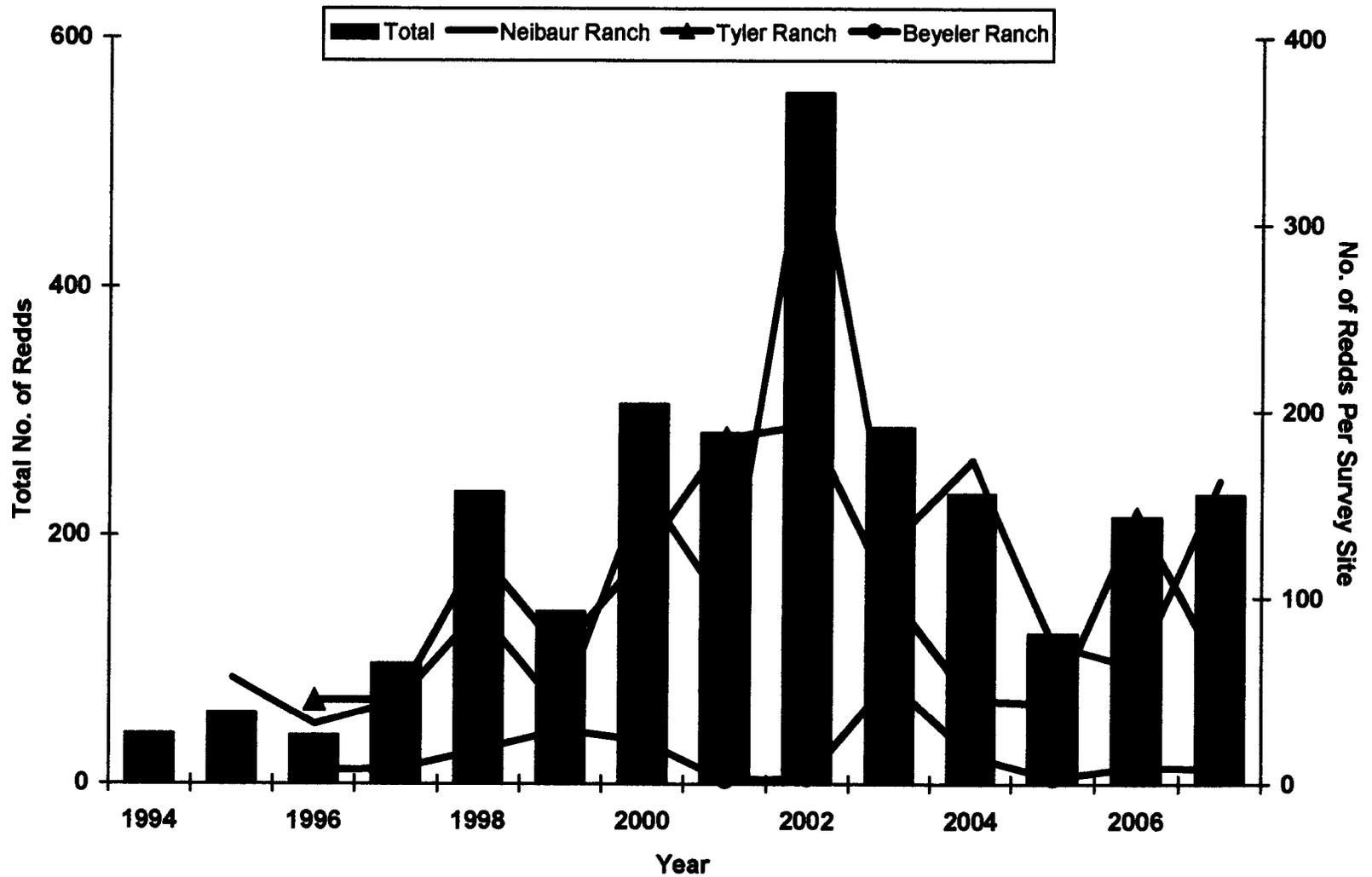


Figure 1. Resident rainbow trout spawning redds counted during ground surveys in the upper Lemhi River (Beyeler Ranch) and Big Springs Creek (Neibaur and Tyler ranches), 1994 to 2007.

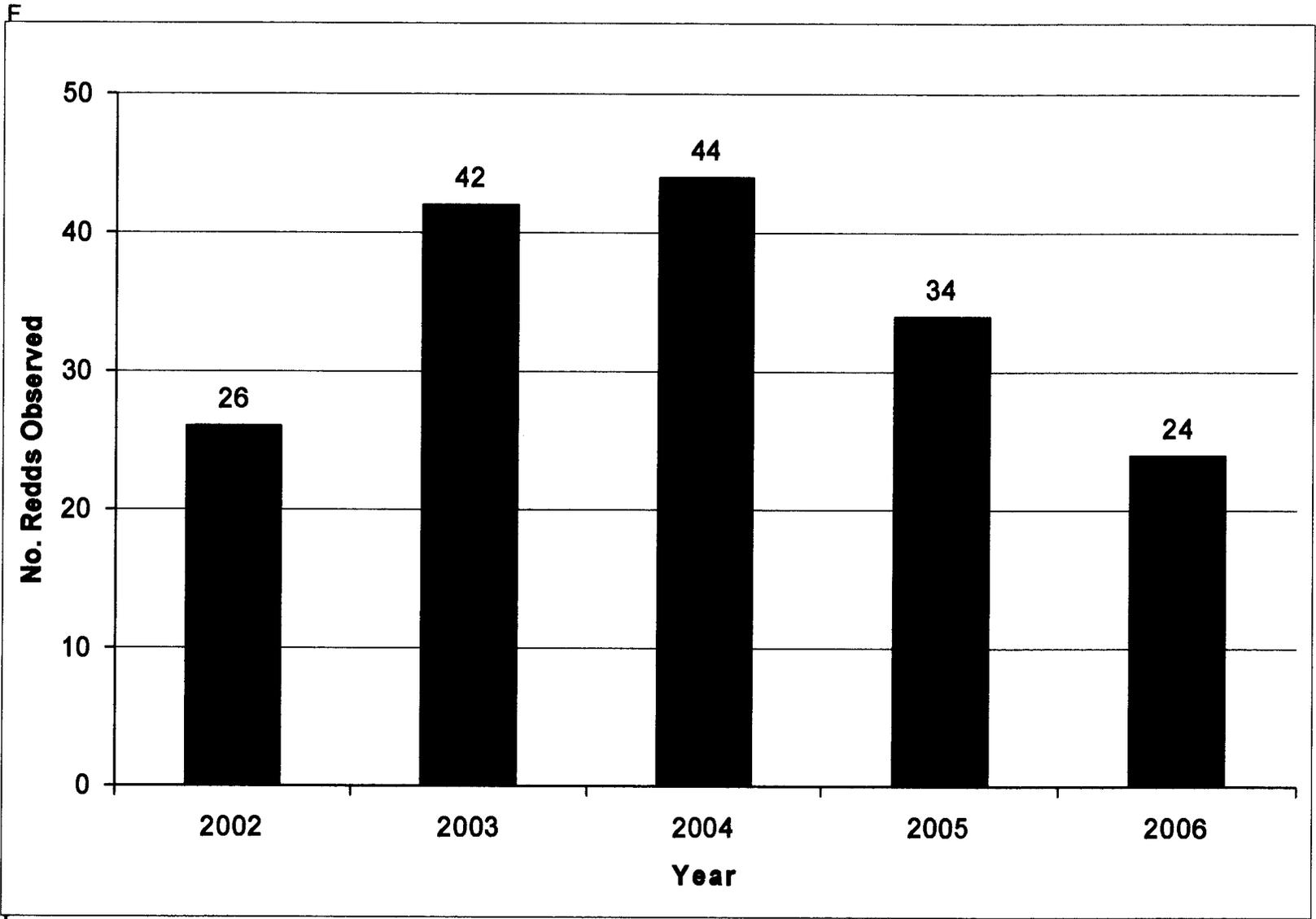


Figure 2. Bear Valley bull trout redd counts, 2002 to 2006.

Hayden Creek into Bear Valley Creek to spawn (Schoby 2006). In 2006, 282 redds were counted in expanded transects in addition to the traditional count sites. The combination of redd counts and telemetry relocations suggest that a larger area of the Bear Valley Creek watershed is utilized by fluvial bull trout than was previously thought.

East Fork Hayden Creek

Forty-nine bull trout redds were observed in East Fork Hayden Creek, an increase of eight redds from the 2005 count (Figure 3). Bull trout redds in this transect have been increasing for the last four years. This population appears to be solely a resident population with individuals being appreciably smaller in size than the fluvial bull trout population in Bear Valley Creek (Esselman et al. 2008).

Hayden Creek

Thirty-nine bull trout redds were counted in the upper Hayden Creek index site in 2006 compared to 22 bull trout redds counted in 2005. New transects upstream of the historic Hayden Creek bull trout redd count site shows a total of 267 bull trout redds. A total of 306 bull trout redds were observed in Hayden Creek in 2006 (Table 5). Both resident and fluvial-sized bull trout were observed spawning in the same transect of Hayden Creek, marking the second consecutive year when this behavior was observed. The observation of both life histories in the same reach is considered unique (G. Schoby, IDFG, personal communication).

Table 5. Hayden Creek bull trout redd count summary, 2006.

Stream	Transect	Transect Length (km)	Total No. of Redds
Hayden Creek	From mouth to West Fork Hayden Cr.	25.5	63
West Fork Hayden Creek	From mouth upstream 5.0 km	5.0	31
East Fork Hayden Creek	Trend transect; ~0.8 km in middle 1/3 of creek	0.9	49
Bray Creek	From mouth up 4.0 km	4.0	56
Bear Valley Creek	0.2 km above Kadletz Cr. to Buck Cr.	8.2	86
Wright Creek	From mouth up 4.0 km	4.0	21
Total		47.6	306

Alpine and Fishhook Creeks

Thirteen bull trout redds were observed in Alpine Creek (Table 4) and 25 redds in Fishhook Creek in 2006 (Table 5). By comparison, 13 redds were counted in Alpine Creek and 23 redds were counted in Fishhook Creek last year. Historical redd count trend data for Alpine

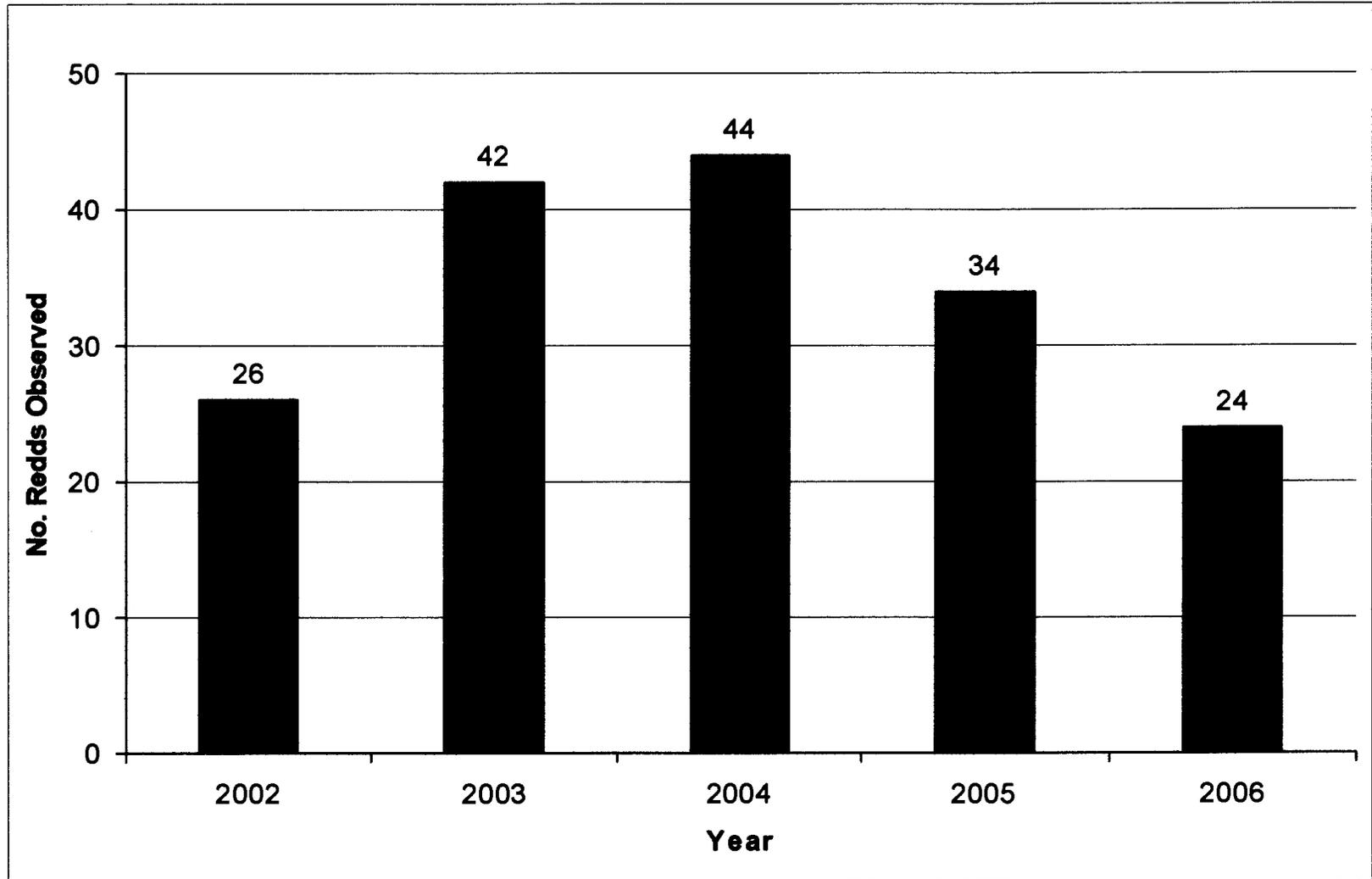


Figure 3. Bull trout redd counts in East Fork Hayden Creek, 2002 to 2006.

and Fishhook creeks for the last eight years are shown in Tables 6 and 7, respectively. The Alpine Creek counts have remained relatively stable since 2000, varying from 9 to 15 redds counted each year. This year's number of redds counted on Fishhook Creek represents the highest count recorded in the last nine years and is more than double the 2004 count of 11 redds. However, since bull trout may spawn every year or on alternating years, redd count numbers may vary from year to year (Willard et al. 2005).

Fourth of July Creek

Seventy-one completed bull trout redds were counted on Fourth of July Creek (Figure 4) in 2006. This marks the fourth year of counts for this survey location. Since counts were initiated in 2003, there has been a noteworthy upward trend in redd counts. This population is likely responding to improved passage conditions and screening facilities on irrigation ditches within the watershed that protect juvenile fish and provide increased flows during the fall migration. A fire immediately after the 2005 survey has changed the characteristics of the watershed. The long-term impacts to the bull trout population are yet to be determined.

Pahsimeroi, Squaw Pond, East Fork, and Sawtooth weirs and traps

Overall, there has been a relatively stable trend in the number of resident rainbow trout migrating past the Pahsimeroi Fish Hatchery weir since 1997. Forty-two adult rainbow trout were counted in 2006 (Figure 5). This year's number of resident rainbow trout represents a stable trend when compared to the previous ten-year average of 41 rainbow trout (Table 8). It is interesting to note the skewed male to female sex ratio, which has been consistent over the recorded period (Table 8). Also of note was the first encounter of a Westslope cutthroat trout counted at the trap on August 4, 2006. East Fork trapping resulted in 262 bull trout, one Westslope cutthroat, two rainbow trout, and 122 mountain whitefish encountered. Generally, bull trout numbers are increasing (Figure 6), as are mountain whitefish (Table 9). Sawtooth Fish Hatchery fish trap encountered 25 bull trout, 3 Westslope cutthroat trout, 18 rainbow trout, and 35 mountain whitefish (Table 10). Bull trout numbers, although variable, have been increasing since the late 1990's (Figure 7). Westslope cutthroat trout numbers at the Sawtooth trap remain stable but low. The 18 rainbow trout represent the most fish trapped since 1984, and the number of mountain whitefish encountered appears to be increasing. The Squaw Creek trap has not trapped any resident fish since its inception in 2002. Biologists have determined that the adult weir is not designed to encounter resident fish sizes.

Table 6. Bull trout redd counts observed in trend survey sections of Alpine Creek, 1998 to 2006.

Year	Survey Dates	No. of Redds
1998	8/23, 9/11	0, 1
1999 ^a	8/26	3
2000	8/30, 9/15	6, 9
2001 ^b	8/28, 9/11	11, 15
2002	8/30, 9/12	8, 14
2003	8/27, 9/8	11, 14
2004	8/30, 9/9	6, 9
2005	8/30, 9/12	9, 13
2006	8/29, 9/12	6, 13

^a Only one count completed.

^b Counts done independently, not cumulatively.

Table 7. Bull trout redd counts observed in trend survey sections of Fishhook Creek, 1998 to 2006.

Year	Survey Dates	No. of Redds
1998	8/22, 9/10	5, 11
1999	8/22, 8/26	0, 15
2000	8/31, 9/14	12, 18
2001 ^a	8/28, 9/11	15, 11
2002	9/4, 9/11	6, 17
2003	8/27, 9/8	6, 17
2004	8/30, 9/9	10, 11
2005	8/30, 9/12	12, 23
2006	8/29, 9/13	16, 25

^a Counts done independently, not cumulatively.

Fluvial Bull Trout Redds counted in Fourth of July Creek (SNRA) from 2003-2006.

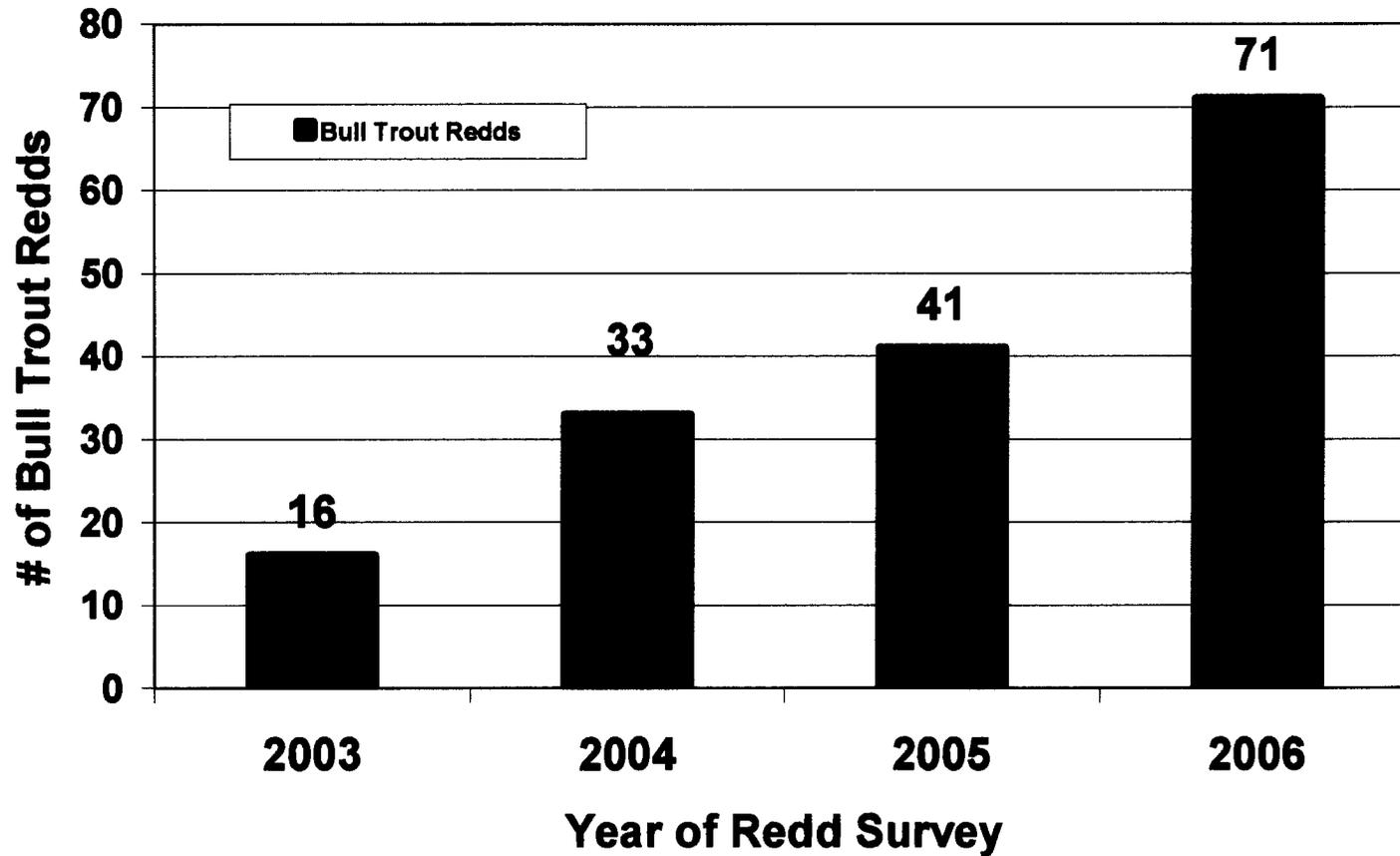


Figure 4. Annual counts of completed fluvial bull trout redds observed in Fourth of July Creek (SNRA), 2003 to 2006.

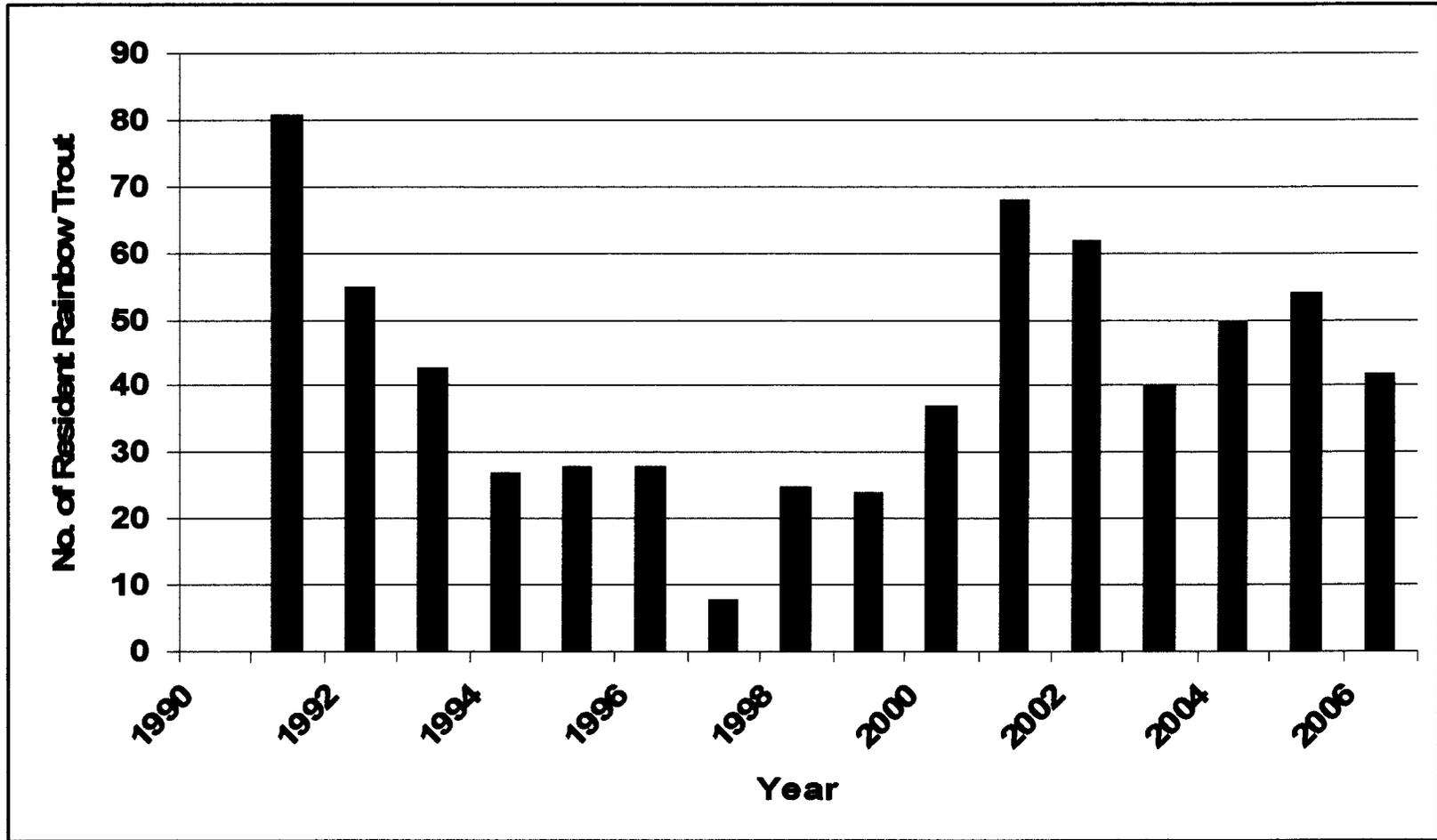


Figure 5. Annual count of resident rainbow trout trapped at the Pahsimeroi Fish Hatchery, 1990 to 2006.

Table 8. Resident trout trapping summary at the Pahsimeroi Fish Hatchery, 1990 to 2006.

Year	<u>No. of resident rainbow trout</u>			Trapping Dates	No. of Bull Trout	No. of Other Salmonids
	Males	Females	Total			
1990	-- ^a	--	--	2/22 - 4/24	--	--
1991	--	--	81	2/13 - 5/15	--	--
1992	--	--	55	2/7 - 4/30	--	--
1993	7	36	43	2/19 - 5/4	--	--
1994	10	17	27	2/15 - 5/6	--	--
1995	11	17	28	2/20 - 5/16	--	--
1996	5	23	28	3/1 - 5/25	--	--
1997	1	7	8	3/1 - 5/9	--	--
1998	8	17	25	3/1 - 5/8	--	--
1999	7	17	24	2/19 - 5/3	--	--
2000	10	27	37	2/25 - 5/1	--	--
2001	27	41	68	3/1 - 3/17	--	--
2002	19	43	62	3/1 - 5/5	--	--
2003	9	31	40	2/28 - 5/2	--	--
2004	11	39	50	3/5 - 4/29	1	0
2005	4	50	54	3/2 - 5/12	1	1 CTxRBT ^b
2006	13	29	42	3/3 - 4/26	0	1 CT ^{c,d}

^a -- = No data.

^b CTxRBT = Cutthroat-rainbow trout hybrid.

^c CT = Westslope cutthroat trout.

^d Westslope cutthroat trout encountered outside range of steelhead trapping dates.

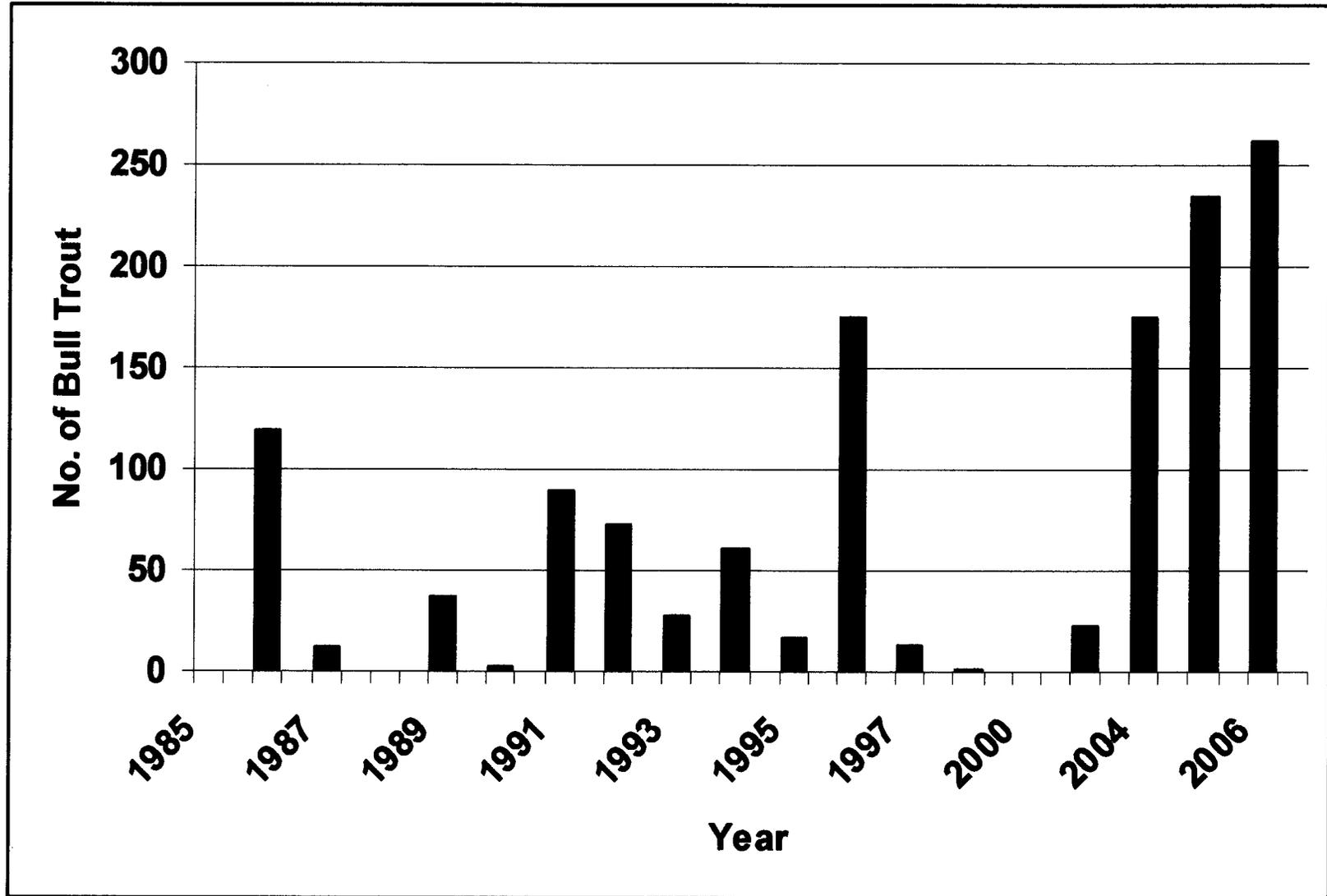


Figure 6. Annual count of bull trout trapped at East Fork Satellite Facility, 1985 to 2006

Table 9. Non-target fish encountered during steelhead and chinook salmon trapping dates at the East Fork Satellite Facility, 1984 to 2006.

Non-target species ^a								
Year	Trapping Dates	BU	CT	RBT	EBT	MWF	SUC	Total
1984	6/20-8/7 ^b	49	3	316	0	1,872		2,240
1985	03/15-05/22, 06/11-09/04	ND ^c	ND	ND	ND	ND	ND	--
1986	03/17-04/27, 05/27-09/09	119	0	0	0	49	0	168
1987	03/12-04/30, 05/11-09/03	12	0	0	0	60	0	12
1988	03/15-05/02, 06/01-09/01	0	1	0	0	677	0	678
1989	03/20-05/03, 06/07-09/07	37	0	3	3	200	0	243
1990	3/22-4/30, 06/04-09/14	2	0	0	0	0	0	2
1991	03/01-05/10, 06/03-09/05	89	0	0	0	0	0	89
Non-target species ^a								
Year	Trapping Dates	BU	CT	RBT	EBT	MWF	SUC	Total
1993	03/30-05/12, 06/18-09/06	27	1	0	0	0	0	28
1994	04/05-05/04, 06/06-09/08	61	0	0	0	0	0	61
1995	04/04-05/01, 07/27-08/31	17	0	0	0	0	0	17
1996	03/22-05/10, 06/25-08/30	175	0	1	0	63	0	239
1997	03/28-05/25, 07/08-09/08	13	0	1	0	4	0	18
1998	04/06-05/11 ^c	1	1	1	0	117	0	120
1999	04/02-05/03 ^c	0	0	2	0	29	0	31
2000	03/29-05/03 ^c	0	1	1	1	108	0	111
2001	03/23-05/11 ^c	ND	ND	ND	ND	ND	0	--
2002	03/26-05/21 ^c	23	0	3	0	8	26	60
2003	03/25-05/09 ^c	0	2	4	0	0	0	6
2004	03/29-04/25, 05/11-09/10	175	8	5	0	359	0	547
2005	03/23-05/17, 06/07-08/30	235	11	1	0	194	0	441
2006	03/23-05/18, 06/21-09/26	262	1	2	0	122	0	387

^a Non-target species: BU = Bull trout, CT = Westslope cutthroat trout; RBT = Rainbow trout, EBT = Brook trout, MWF = Mountain whitefish, and SUC = Sucker.

^b Trap not operated for steelhead.

^c -- = No data.

^d Trap not operated for chinook salmon.

Table 10. Non-target fish encountered during steelhead and chinook salmon trapping dates at Sawtooth Fish Hatchery, 1984 to 2006.

Non-target species ^a								
Year	Trapping Dates	BU	CT	RBT	EBT	MWF	SUC	Total
1984	07/07-09/06 ^b	1	0	0	0	0	0	1
1985	03/14-05/10, 06/14-09/15	ND ^c	ND	ND	ND	ND	ND	--
1986	03/13-04/23, 06/20-09/09	3	0	0	0	0	0	3
1987	03/07-05/01, 05/13-09/08	ND	ND	ND	ND	ND	ND	--
1988	03/03-05/03, 05/23-09/06	ND	ND	ND	ND	ND	ND	--
1989	03/13-05/03, 06/07-09/11	ND	ND	ND	ND	ND	ND	--

Non-target species ^a								
Year	Trapping Dates	BU	CT	RBT	EBT	MWF	SUC	Total
1990	03/02-05/07 05/21-09/14	7	0	0	0	1	0	8
1991	02/28-05/14, 06/07-09/15	17	0	0	0	0	0	17
1992	03/02-04/30, 05/28-09/18	24	0	0	0	0	0	24
1993	03/18-05/12, 06/18-09/06	5	0	0	0	0	0	5
1994	03/16-05/09, 05/31-10/26	38	0	0	0	0	0	38
1995	03/15-05/10, 06/12-09/06	6	0	0	0	0	0	6
1996	03/20-05/13, 06/20-09/11	4	1	1	0	9	226	241
1997	03/20-05/12, 06/16-09/04	5	0	6	0	1	116	11
1998	03/23-05/08, 06/10-09/14	4	4	5	0	12	252	277
1999	03/23-05/06, 06/28-09/07,	8	4	10	0	34	97	153
2000	03/20-05/04, 05/30-09/25	27	1	3	0	1	0	32
2001	03/19-05/03, 05/24-09/14	31	0	0	0	0	0	31
2002	03/20-05/02, 05/28-09/09	0	12	4	0	150	0	166
2003	03/28-05/05, 06/12-09/09	29	0	2	0	1	8	40
2004	03/15-04/29, 05/25-09/15	8	0	2	0	5	14	29
2005	03/25-05/05 06/05-09/19	33	1	2	0	15	5	56
2006	03/27-05/01, 06/19-09-15	25	3	18	0	35	0	81

^a Non-target species: BU = Bull trout, CT = Westslope cutthroat trout, RBT = Rainbow trout, EBT = Brook trout, MWF = Mountain whitefish, and SUC = Sucker.

^b -- = Trap not in operation during steelhead season.

^c -- = No data.

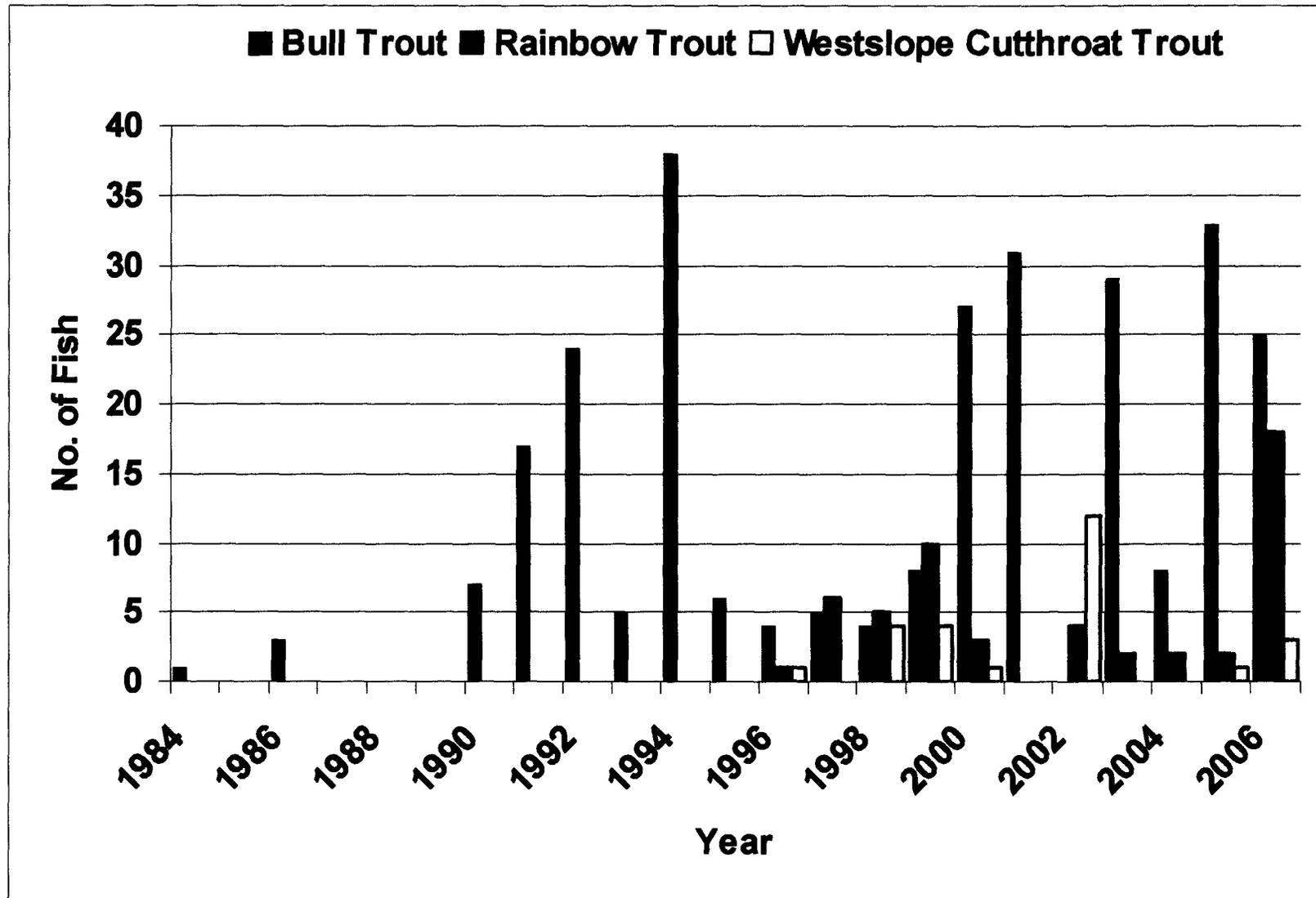


Figure 7. Annual count of non-target salmonids trapped at Sawtooth Fish Hatchery, 1985 to 2006.

LITERATURE CITED

- Esselman, B., M. White, T. Curet, and A. Brimmer. 2007. Regional fishery management investigations, Salmon Region 2005. Federal Aid in Fish Restoration, F-71-R-30, Job Performance Report, Idaho Department of Fish and Game, Boise.
- Esselman, B., K. Andrews, T. Curet, and A. Brimmer. 2008. Fishery management annual report, Salmon Region 2004, Idaho Department of Fish and Game, Boise.
- Lamperth, J., C. Claire, and J. Lutch. 2007. Fluvial bull trout migratory dynamics and life history in the Lemhi River sub-basin, Idaho. Idaho Department of Fish and Game, Boise.
- Schoby, Greg. Senior fishery technician, Salmon Region, Idaho Department of Fish and Game. Personal communication (e-mail and interview), Feb. 7, 2006.
- Schoby, G. 2006. Home range analysis of bull trout *Salvelinus confluentus* and Westslope cutthroat trout *Oncorhynchus clarkii lewisi* in the upper Salmon River basin, Idaho. Master's thesis. Idaho State University, Pocatello.
- Van Deventer, J. S. and W. S. Platts. 1989. Microcomputer software system for generating population statistics from electrofishing data – Users guide for Microfish 3.0. General Technical Report: INT 254. U. S. Department of Agriculture, U. S. Forest Service, Intermountain Research Station, Boise, Idaho.
- Willard, C., K. Plaster, J. Castillo, and P. Kline. 2005. Snake River Sockeye Salmon Captive Broodstock Program Research Element, Annual Progress Report January 1, 2003 – December 31, 2003, Idaho Department of Fish and Game, Boise.

LITERATURE CITED

- Esselman, B., M. White, T. Curet, and A. Brimmer. 2007. Regional fishery management investigations, Salmon Region 2005. Federal Aid in Fish Restoration, F-71-R-30, Job Performance Report, Idaho Department of Fish and Game, Boise.
- Esselman, B., K. Andrews, T. Curet, and A. Brimmer. 2008. Fishery management annual report, Salmon Region 2004, Idaho Department of Fish and Game, Boise.
- Lamperth, J., C. Claire, and J. Lutch. 2007. Fluvial bull trout migratory dynamics and life history in the Lemhi River sub-basin, Idaho. Idaho Department of Fish and Game, Boise.
- Schoby, G. 2006. Home range analysis of bull trout Salvelinus confluentus and Westslope cutthroat trout Oncorhynchus clarkii lewisi in the upper Salmon River basin, Idaho. Master's thesis. Idaho State University, Pocatello.
- Van Deventer, J. S. and W. S. Platts. 1989. Microcomputer software system for generating population statistics from electrofishing data – Users guide for Microfish 3.0. General Technical Report: INT 254. U. S. Department of Agriculture, U. S. Forest Service, Intermountain Research Station, Boise, Idaho.
- Willard, C., K. Plaster, J. Castillo, and P. Kline. 2005. Snake River Sockeye Salmon Captive Broodstock Program Research Element, Annual Progress Report January 1, 2003 – December 31, 2003, Idaho Department of Fish and Game, Boise.

APPENDIX

Appendix A. Site characteristics of streams surveyed in the upper Salmon River in 2006.

Stream	Transect ^a	Sample Date	Water Temp. (C°)	Transect Length (m)	Transect Mean Width (m)	Transect Area (m ²)	Sub-basin	Zone	NAD 27 UTM	
									Easting	Northing
Agency	U	8/7/2006	13.3	100	1.55	155.0	Lemhi River	12	305339	4983393
Arnett	L	9/26/2006	1.7	100	4.64	464.0	Horse Creek to North Fork	11	725139	5009608
Big Boulder	L	8/7/2006	ND	103	ND	--	East Fork Salmon River	11	704536	4887844
Big Boulder	M	8/3/2006	ND	99	ND	--	East Fork Salmon River	11	697332	4888161
Big Boulder	M	8/9/2006	ND	100	ND	--	East Fork Salmon River	11	699898	4888938
Big Boulder	U	8/2/2006	ND	104	ND	--	East Fork Salmon River	11	695431	4886939
Big Eightmile	U	8/8/2006	11.1	100	5.41	541.0	Lemhi River	12	296748	4944349
Blacktail	L	7/28/2006	5.0	100	2.34	234.0	North Fork to Headwaters	12	277816	5034671
Boulder	M	8/14/2006	5.6	100	3.72	372.0	Horse Creek to North Fork	11	707775	5032395
Cabin	L	7/11/2006	ND	109	ND	--	North Fork to Headwaters	11	672423	4866559
Cabin	M	7/10/2006	ND	85	ND	--	North Fork to Headwaters	11	670886	4866816
Cabin	M	7/11/2006	ND	99	ND	--	North Fork to Headwaters	11	670637	4866447
Cabin	U	7/11/2006	ND	101	ND	--	North Fork to Headwaters	11	669292	4864865
Cabin	U	7/12/2006	ND	105	ND	--	North Fork to Headwaters	11	669741	4865495
Camp	L	8/22/2006	11.1	100	2.69	269.0	Horse Creek to North Fork	11	726489	5011649
Carmen	M	7/6/2006	13.0	60	6.12	367.2	North Fork to Headwaters	12	279222	5017581
Carmen	L	7/8/2006	15.0	100	5.60	560.0	North Fork to Headwaters	12	273040	5014169
Carmen	L	7/8/2006	17.0	100	6.92	692.0	North Fork to Headwaters	12	275471	5014778
Carmen	L	7/11/2006	14.0	100	4.66	466.0	North Fork to Headwaters	12	274344	5014061
Carmen	L	7/11/2006	15.0	100	5.56	556.0	North Fork to Headwaters	12	277093	5015850
Carmen	L	7/12/2006	14.0	100	6.12	612.0	North Fork to Headwaters	12	278335	5013721
Carmen	M	7/6/2006	13.0	60	6.12	367.2	North Fork to Headwaters	12	279222	5017581
Carmen	M	7/12/2006	12.0	100	6.34	634.0	North Fork to Headwaters	12	279887	5019248
Carmen	M	7/25/2006	13.0	100	4.78	478.0	North Fork to Headwaters	12	280204	5020964
Carmen	M	7/26/2006	12.0	100	6.32	632.0	North Fork to Headwaters	12	280963	5022672
Carmen	U	7/25/2006	12.5	110	5.96	655.6	North Fork to Headwaters	12	281920	5025550
Carmen	U	7/26/2006	9.0	100	5.28	528.0	North Fork to Headwaters	12	281406	5024094
Carmen	U	9/27/2006	7.2	100	3.84	384.0	North Fork to Headwaters	11	282353	5025997
Champion	M	8/8/2006	ND	95	ND	--	North Fork to Headwaters	11	677559	4875623
Champion	U	8/9/2006	ND	97	ND	--	North Fork to Headwaters	11	683970	4876091
Colson	L	8/28/2006	12.2	100	2.42	242.0	Horse Creek to North Fork	11	693196	5020605

Appendix A. Continued.

Stream	Transect ^a	Sample Date	Water Temp. (C°)	Transect Length (m)	Transect		Sub-basin	Zone	NAD 27 UTM	
					Mean Width (m)	Area (m ²)			Easting	Northing
Colson	M	8/28/2006	8.3	100	2.31	231.0	Horse Creek to North Fork	11	693177	5023249
Cow	L	7/31/2006	8.0	100	4.30	430.0	North Fork to Headwaters	11	737321	4958055
Cow	L	7/31/2006	10.0	95	4.32	410.4	North Fork to Headwaters	12	263810	4958161
Cow	L	8/1/2006	7.0	100	4.42	442.0	North Fork to Headwaters	12	265466	4958070
Cow	M	8/1/2006	8.0	100	4.82	482.0	North Fork to Headwaters	12	267824	4957011
Cow	M	8/2/2006	5.0	100	3.84	384.0	North Fork to Headwaters	12	269006	4958495
Cow	U	6/28/2006	7.0	100	3.60	360.0	North Fork to Headwaters	12	271324	4959167
Cow (Unnamed tributary)	M	6/28/2006	6.0	74	0.75	55.5	North Fork to Headwaters	12	271628	4958436
Dahlonaga	L	8/17/2006	12.0	100	4.02	402.0	North Fork Salmon River	12	271510	5047321
Dahlonaga	M	8/23/2006	11.0	100	4.94	494.0	North Fork Salmon River	12	274154	5048655
Dahlonaga	M	8/30/2006	9.5	100	3.44	344.0	North Fork Salmon River	12	275980	5048979
Dahlonaga	U	8/30/2006	10.0	100	2.72	272.0	North Fork Salmon River	12	277194	5049246
Dairy	L	8/8/2006	9.4	100	2.72	272.0	Lemhi River	12	297436	4945591
Davis Canyon	M	7/7/2006	11.0	100	2.70	270.0	North Fork to Headwaters	12	282283	5019852
Deep	L	8/16/2006	11.7	100	4.33	433.0	Horse Creek to North Fork	11	719101	5000500
Deer	L	9/7/2006	6.7	100	1.97	197.0	Lemhi River	12	280324	4963374
East Fork										
Kenney	U	8/30/2006	5.6	100	1.61	161.0	Lemhi River	12	301419	4993295
Everson	M	7/27/2006	11.7	100	ND	--	Lemhi River	12	297000	4946915
Fisher	L	7/18/2006	ND	85	ND	--	North Fork to Headwaters	11	676436	4879450
Fisher	M	7/17/2006	ND	100	ND	--	North Fork to Headwaters	11	677989	4880761
Fisher	M	7/17/2006	ND	107	ND	--	North Fork to Headwaters	11	679490	4881009
Fisher	M	7/18/2006	ND	99	ND	--	North Fork to Headwaters	11	677247	4880370
Fishhook	L	8/14/2006	ND	94	ND	--	North Fork to Headwaters	11	663938	4889648
Fishhook	L	8/15/2006	ND	103	ND	--	North Fork to Headwaters	1	665990	4890153
Fishhook	L	8/15/2006	ND	105	ND	--	North Fork to Headwaters	11	665069	4890288
Fishhook	M	8/14/2006	ND	99	ND	--	North Fork to Headwaters	11	662548	4888847
Flume	L	8/3/2006	ND	100	2.59	259.0	Lemhi River	12	303392	4984383
Fourth Of July	L	7/17/2006	16.5	100	4.64	464.0	North Fork to Headwaters	12	269594	5027412
Fourth Of July	L	7/18/2006	15.0	75	6.48	486.0	North Fork to Headwaters	12	271443	5028781

Appendix A. Continued.

Stream	Transect ^a	Sample Date	Water Temp. (C°)	Transect Length (m)	Transect Mean Width (m)	Transect Area (m ²)	Sub-basin	Zone	NAD 27 UTM	
									Easting	Northing
Fourth Of July	L	7/18/2006	16.0	95	4.94	469.3	North Fork to Headwaters	12	273808	5029335
Fourth Of July	L	7/19/2006	13.0	100	5.18	518.0	North Fork to Headwaters	12	272767	5028793
Fourth Of July	M	7/13/2006	10.5	100	4.60	460.0	North Fork to Headwaters	12	276057	5031476
Fourth Of July	M	7/19/2006	13.0	100	3.94	394.0	North Fork to Headwaters	12	275162	5030839
Fourth Of July	M	7/20/2006	8.0	100	5.40	540.0	North Fork to Headwaters	12	276401	5032990
Fourth Of July	M	8/23/2006	ND	98	ND	--	North Fork to Headwaters	11	679469	4878575
Fourth Of July	U	7/26/2006	5.5	100	5.52	552.0	North Fork to Headwaters	12	276894	5033799
Fourth Of July	U	7/17/2006	9.0	100	3.60	360.0	North Fork to Headwaters	12	278281	5034206
Fourth Of July	U	8/23/2006	ND	98	ND	--	North Fork to Headwaters	11	685361	4879554
Fourth Of July	U	9/27/2006	4.4	100	3.10	310.0	North Fork to Headwaters	12	278312	5034213
Freeman	L	7/5/2006	11.0	100	3.74	374.0	North Fork to Headwaters	12	281619	5017292
Freeman	L	7/6/2006	15.0	100	5.04	504.0	North Fork to Headwaters	12	279258	5017552
Freeman	M	7/10/2006	10.0	92	3.02	277.8	North Fork to Headwaters	12	283356	5016239
Freeman	M	7/11/2006	9.0	100	4.18	418.0	North Fork to Headwaters	12	284814	5016434
Garland	L	8/30/2006	ND	102	ND	--	North Fork to Headwaters	11	682448	4894064
Garland	L	8/30/2006	ND	100	ND	--	North Fork to Headwaters	11	681736	4893789
Golway Gulch	L	7/10/2006	12.0	100	2.24	224.0	North Fork to Headwaters	12	282648	5016536
Hammerean	M	8/29/2006	9.4	100	1.70	170.0	North Fork Salmon River	12	267085	5051186
Hat	U	8/31/2006	8.9	100	3.64	364.0	North Fork to Headwaters	11	726830	4971720
Hood Gulch	L	8/6/2006	12.8	100	1.70	170.0	Lemhi River	12	321139	4960381
Horse	U	9/14/2006	3.0	100	1.48	148.0	Horse Creek to North Fork	11	704744	5040252
Jefferson	L	8/22/2006	9.4	100	0.41	41.0	Horse Creek to North Fork	11	726195	5011422
Jesse	L	03/30/2006	ND	ND	ND	--	North Fork to Headwaters	12	269167	5007278
Kadletz	L	9/7/2006	8.3	100	2.61	261.0	Lemhi River	12	282857	4961040
Lee	U	7/27/2006	9.4	100	1.96	196.0	Lemhi River	12	295421	4949887
Little Boulder	M	8/8/2006	ND	102	ND	--	East Fork Salmon River	11	699456	4883831
Little Boulder	M	8/8/2006	ND	99	ND	--	East Fork Salmon River	11	698869	4882927
Little Boulder	M	8/9/2006	ND	99	ND	--	East Fork Salmon River	11	701315	4884474
Little Boulder	U	8/8/2006	ND	130	ND	--	East Fork Salmon River	11	696748	4881699

Appendix A. Continued.

Stream	Transect ^a	Sample Date	Water Temp. (C°)	Transect Length (m)	Transect Mean Width (m)	Transect Area (m ²)	Sub-basin	Zone	NAD 27 UTM	
									Easting	Northing
Little Fourth of July	L	7/13/2006	14.0	100	1.40	140.0	North Fork to Headwaters	12	271770	5029213
Martin	L	8/28/2006	ND	97	ND	--	North Fork to Headwaters	11	681536	4889314
Martin	L	8/29/2006	ND	97	ND	--	North Fork to Headwaters	12	680798	4889268
Mill	M	9/7/2006	7.8	100	3.94	394.0	Lemhi River	12	294604	4953326
Moose	L	8/24/2006	7.2	100	2.14	214.0	Horse Creek to North Fork	12	268598	5059715
Moose	M	8/22/2006	11.1	100	2.76	276.0	Horse Creek to North Fork	11	732165	5021926
Napias	M	9/25/2006	5.6	100	3.42	342.0	Horse Creek to North Fork	11	725115	5009812
Nez Perce	L	8/31/2006	8.0	80	2.42	193.6	Lemhi River	12	277985	5049968
North Fork Cow	L	6/29/2006	12.0	100	2.37	237.0	North Fork to Headwaters	12	266453	4959290
North Fork Cow	M	6/26/2006	9.0	100	3.24	324.0	North Fork to Headwaters	12	268704	4961505
North Fork Cow	M	6/27/2006	12.0	100	2.00	200.0	North Fork to Headwaters	12	267224	7960646
North Fork Cow	M	6/27/2006	5.0	100	3.28	328.0	North Fork to Headwaters	12	270212	4961041
North Fork Cow	U	6/27/2006	6.5	104	3.02	314.1	North Fork to Headwaters	12	271850	4961217
Panther	U	8/16/2006	7.8	100	4.46	446.0	Horse Creek to North Fork	11	711983	4974806
Pattee	U	8/3/2006	11.1	100	1.92	192.0	Lemhi River	12	303683	4992047
Pattee	L	8/7/2006	9.4	100	1.28	128.0	Lemhi River	11	303656	4992025
(Unnamed tributary)										
Patterson	L	10/25/2006	6.5	84	8.82	740.9	Pahsimeroi River	12	266856	4941941
Phelan	L	8/21/2006	11.7	100	2.93	293.0	Horse Creek to North Fork	11	723381	500534
Pigtail	L	8/28/2006	ND	97	ND	--	Horse Creek to North Fork	11	681115	4887602
Pigtail	L	8/28/2006	ND	100	ND	--	Horse Creek to North Fork	11	680348	4887586
Pollard	M	02/03/2006	ND	ND	ND	--	North Fork to Headwaters	12	268831	5006303
Sage	M	8/1/2006	11.1	100	1.34	134.0	Horse Creek to North Fork	11	727720	5032614
Salmon River	U	7/26/2006	ND	104	ND	--	North Fork to Headwaters	11	680704	4859032
Salmon River	U	7/26/2006	ND	91	ND	--	North Fork to Headwaters	11	680543	4856593
Salmon River	U	7/26/2006	ND	98	ND	--	North Fork to Headwaters	11	680449	4856449
Salmon River	U	7/26/2006	ND	104	ND	--	North Fork to Headwaters	11	680718	4854667
Salmon River	U	7/27/2006	ND	100	ND	--	North Fork to Headwaters	11	679942	4861024
Salmon River	U	7/27/2006	ND	101	ND	--	North Fork to Headwaters	11	680318	4860521

Appendix A. Continued.

Stream	Transect ^a	Sample Date	Water Temp. (C°)	Transect Length (m)	Transect Mean Width (m)	Transect Area (m ²)	Sub-basin	Zone	NAD 27 UTM	
									Easting	Northing
Sheep	L	8/8/2006	6.0	100	7.06	706.0	North Fork Salmon River	12	271214	5042363
Sheep	L	8/8/2006	7.0	100	5.78	578.0	North Fork Salmon River	12	272912	5042325
Sheep	L	8/9/2006	7.0	105	7.12	747.6	North Fork Salmon River	12	269716	5042503
Sheep	L	8/9/2006	8.0	100	7.82	782.0	North Fork Salmon River	12	274345	5042296
Sheep	M	8/10/2006	5.0	95	7.76	737.2	North Fork Salmon River	12	275287	5041049
Sheep	M	8/22/2006	5.0	100	5.98	598.0	North Fork Salmon River	12	276586	5039989
Short	L	9/7/2006	7.2	100	1.00	100.0	Lemhi River	12	281033	4962885
Silver Rule	L	7/25/2006	ND	96	ND	--	North Fork to Headwaters	11	692231	4897129
Slate	L	7/25/2006	ND	104	ND	--	North Fork to Headwaters	11	694530	4902814
Slate	L	7/25/2006	ND	97	ND	--	North Fork to Headwaters	11	693876	4901444
Slate	M	7/24/2006	ND	94	ND	--	North Fork to Headwaters	11	691022	4895106
Slate	U	7/24/2006	ND	106	ND	--	North Fork to Headwaters	11	689588	4891570
Smout	L	7/5/2006	14.0	100	2.52	252.0	North Fork to Headwaters	12	281826	5017368
Smout	M	7/7/2006	9.0	100	ND	--	North Fork to Headwaters	12	282833	5018962
Stroud	M	8/8/2006	ND	100	2.57	257.0	Lemhi River	12	296346	4947636
Threemile	L	8/7/2006	11.0	100	2.04	204.0	North Fork Salmon River	12	276014	5048948
Threemile	L	8/7/2006	10.0	100	ND	--	North Fork Salmon River	12	276458	5050651
Threemile	L	8/29/2006	12.2	100	2.03	203.0	North Fork Salmon River	12	276157	5049124
Vat (Unnamed tributary)	L	7/20/2006	ND	98	ND	--	North Fork to Headwaters	11	672153	4870075
Vat (Unnamed tributary)	M	7/18/2006	ND	98	ND	--	North Fork to Headwaters	11	672133	4869167
Wagonhammer	L	9/26/2006	ND	100	1.04	104.0	North Fork to Headwaters	12	270052	5031232
Wagonhammer	M	9/26/2006	6.1	100	1.30	130.0	North Fork to Headwaters	12	270479	5031882
Wagonhammer	M	9/26/2006	5.6	90	1.36	122.4	North Fork to Headwaters	12	270335	5031867
Wagonhammer	M	9/26/2006	5.6	100	1.38	138.0	North Fork to Headwaters	12	270565	5032134
West Fork Nez Perce	L	8/31/2006	9.0	60	1.22	73.2	Lemhi River	12	277757	5050150
West Fork North Fork Salmon R.	L	8/2/2006	10.6	100	2.60	260.0	North Fork Salmon River	12	268431	5059766
West Pass	L	7/31/2006	ND	105	ND	--	East Fork Salmon River	11	701601	4873032

Appendix A. Continued.

Stream	Transect ^a	Sample Date	Water Temp. (C°)	Transect Length (m)	Transect Mean Width (m)	Transect Area (m ²)	Sub-basin	Zone	NAD 27 UTM	
									Easting	Northing
West Pass	L	7/31/2006	ND	103	ND	--	East Fork Salmon River	11	703718	4871782
West Pass	M	8/1/2006	ND	103	ND	--	East Fork Salmon River	11	704248	4871196
West Pass	M	8/1/2006	ND	101	ND	--	East Fork Salmon River	11	704651	4870326
West Pass	M	8/1/2006	ND	92	ND	--	East Fork Salmon River	11	704797	4867390
Williams	L	7/17/2006	ND	100	ND	--	North Fork to Headwaters	11	671293	4884840
Williams	L	7/17/2006	ND	97	ND	--	North Fork to Headwaters	11	672148	4884473
Williams	M	7/13/2006	ND	100	ND	--	North Fork to Headwaters	11	673325	4884476
Williams	M	7/13/2006	ND	99	ND	--	North Fork to Headwaters	11	673901	4884041
Williams	U	7/13/2006	ND	1	ND	--	North Fork to Headwaters	11	675572	4883288
Withington	U	7/31/2006	12.8	100	2.59	259.0	Lemhi River	12	279026	4990097
Wood	L	9/14/2006	ND	100	1.22	122.0	Horse Creek to North Fork	11	698681	5042132
Woodtick	M	8/9/2006	7.8	100	2.41	241.0	Horse Creek to North Fork	11	717339	4987842
Wright	L	9/7/2006	7.8	100	3.28	328.0	Lemhi River	12	281652	4962033

^a L = transect's lower reach, M = middle reach, and U = upper reach.

SALMON REGION 2006 FISHERY MANAGEMENT ANNUAL REPORT

Lowland Lakes Investigations

ABSTRACT

In 2006, 32 tiger muskellunge (northern pike *Esox lucius* x muskellunge *E. masquinongy*) were stocked in Carlson Lake in a continuing effort to manipulate the size structure of a stunted brook trout *Salvelinus fontinalis* population. Survey results in 2006 demonstrated that total lengths of brook trout ranged from 127-301 mm with a mean total length of 216 mm. Comparison of the range of total lengths and mean total lengths following tiger muskellunge introduction indicate that brook trout are getting longer and weights of individuals are increasing. The mean relative weight of brook trout increased from 89.6 in 2002 to 113.6 in 2006.

The fish community in Herd Lake was surveyed using experimental variable mesh gillnets. Species composition consisted entirely of rainbow trout *Oncorhynchus mykiss*. Four gillnets were fished a total of 165.8 hours, had a capture rate of 4.1 fish/gillnet hour, and caught a total of 682 rainbow trout. The mean total length and average weight of fish collected in the sample were 192 mm and 78.9 g, respectively. In 2006 the captured rainbow trout had a relative weight of 86.9. In an effort to manipulate the size structure of the stunted rainbow trout population, 72 tiger muskellunge were stocked. The tiger muskellunge averaged 289.6 mm total length and 1.5 kg. Zooplankton quality index (ZQI) results of 0.02 suggest zooplankton forage is limiting.

In 2006 the fish community in Jimmy Smith Lake was surveyed with four experimental variable mesh gillnets. Rainbow trout comprised 100% of the catch. The nets were fished a total of 181.5 hours and had a capture rate of 4.3 fish/hour. Rainbow trout ranged in size from 133-419 mm total length with a mean length of 221.8 mm. ZQI results of 0.15 indicate competition for zooplankton as food may be occurring.

Lake Creek, an inlet tributary to Williams Lake, was electro-fished to collect 48 adult rainbow trout for broodstock. The adults were spawned and the resulting eggs were incubated at a facility downstream of the lake. Approximately 40,000 fry were subsequently released back into Lake Creek as part of an on-going program contributing to the Williams Lake fishery.

The fish community in Yellowbelly Lake was surveyed with experimental variable mesh gillnets in 2006. A total of 157 fish were captured, comprised of brook trout, Westslope cutthroat trout *O. clarkii lewisi*, northern pikeminnow *Ptychocheilus oregonensis*, and suckers *Catostomus* sp. The number and proportion of salmonids in Yellowbelly Lake has decreased substantially in recent years. Salmonids comprised 5.8% of the catch and non-game species 94.2%. Of the salmonids, brook trout and westslope cutthroat trout comprised 3.8% and 2%, respectively. Suckers and northern pikeminnow comprised 82% and 12% of the total catch, respectively.

Authors:

Tom Curet, Regional Fishery Manager
Bob Esselman, Regional Fishery Biologist
Marsha White, Regional Fishery Technician
Arnie Brimmer, Regional Fishery Biologist

INTRODUCTION

Carlson Lake

Carlson Lake is a two hectare, sub-alpine lake located in the Pahsimeroi River drainage (NAD27, zone 12, 280334mE, 4906829mN) and is situated at 2,438 m in elevation. Subterranean flow from the lake drains into Double Springs Creek, a tributary of the Pahsimeroi River. There appears to be a historical surface outlet. However, there has been no indication of surface flow in the outlet channel for 32 years (M. Armbruster, Idaho Department of Fish and Game, personal communication). Historically, Idaho Department of Fish and Game (IDFG) stocked brook trout *Salvelinus fontinalis* in Carlson Lake. Additionally, lake stocking records indicate rainbow trout *Oncorhynchus mykiss* were stocked in 1975 and 1993. Currently brook trout is the only naturally reproducing fish species found in Carlson Lake.

The 1996 survey revealed a stunted brook trout population in Carlson Lake (Liter et al. 1997). Beginning in 1993, we initiated various population control measures to manipulate the brook trout population and its size structure. Efforts included removal by gillnet, use of explosives, and introduction of salmonid predators. By 2002, no measurable response had been observed in the brook trout population (Brimmer et al. 2003). In 2002, 41 tiger muskellunge (northern pike *Esox lucius* x muskellunge *E. masquinongy*) were introduced into Carlson Lake in an effort to increase the size structure of the brook trout population.

Herd Lake

Herd Lake is a landslide lake located in Custer County at 2,187m elevation (UTM coordinates NAD27, zone 11, 726324mE, 4885654mN). The surface area is 6.9 hectares. It is a coldwater rainbow trout fishery under general fishing rules. The inlet to Herd Lake is Lake Creek, a tributary to Herd Creek, in the East Fork Salmon River drainage.

There were repeated reports that the rainbow trout population in Herd Lake was dense and stunted. In an effort to limit reproduction in the lake in the mid-1990's, IDFG constructed a fish barrier in Lake Creek to limit upstream migration.

Jimmy Smith Lake

Jimmy Smith Lake is a landslide lake located in north central Custer County at 1,948 m elevation with a surface area of 26 hectares (UTM coordinates NAD27, zone 11, 707474mE, 4894112mN). The lake has one outlet and two inlet streams. The outlet stream is located at the north end of the lake and two inlet streams are located at the west and south ends of the lake.

The lake supports a naturally reproducing population of rainbow trout that may have originated from 184,600 rainbow trout stocked from Mackay Hatchery between 1927 and 1938. The lake has not been stocked since.

Williams Lake

Williams Lake, an early eutrophic lake, is located in central Lemhi County (UTM coordinates NAD27, zone 12, 265427mE, 4989077mN) at 1,600 m elevation. The lake has a surface area of 73 hectares, a maximum depth of 58 m, and a mean depth of 23 m. The principle in-flow is provided by Lake Creek, with other water sources originating from springs and intermittent streams. The lake supports a naturally reproducing rainbow trout population that includes trophy sized fish. Bull trout *S. confluentus* is the only other fish species recorded inhabiting the lake.

A rainbow trout spawning project has been implemented annually in Lake Creek since 2002 in an effort to address the request of Williams Lake property owners and anglers that stocking is needed to increase the lake's fish population.

Yellowbelly Lake

Yellowbelly Lake, an oligotrophic lake, is located in southern Custer County at 690 m elevation. It is 82 hectares with a maximum depth of 24.5 m. The lake also has 8.42 km of shoreline. The principle in-flow is provided by Yellowbelly Lake Creek. Yellowbelly Lake is managed as a catch and release Westslope cutthroat trout fishery. Documented fish species in the lake are brook trout, Westslope cutthroat trout *O. clarkii lewisi*, rainbow trout, bull trout, northern pikeminnow *Ptychocheilus oregonensis*, and suckers *Catostomus sp.* In an effort to reestablish native fish populations, this lake was treated with Rotenone in 1990. Additionally, a fish barrier located at the outlet of Yellowbelly Lake was removed in 2000 by the Sawtooth National Recreation Area (SNRA) to reestablish connectivity with the main stem Salmon River.

OBJECTIVES

Carlson Lake

Assess the effects of a tiger muskellunge introduction on the brook trout population. Stock tiger muskellunge to continue size structure improvement of brook trout following the initial 2002 tiger muskellunge introduction.

Herd Lake

Monitor the rainbow trout population status in Herd Lake prior to tiger muskellunge introduction. Stock tiger muskellunge to improve size structure of the rainbow trout population.

Jimmy Smith Lake

Monitor Jimmy Smith Lake's rainbow trout population to determine whether management action is necessary to improve the size structure.

Williams Lake

Spawn rainbow trout collected from Lake Creek, the inlet tributary to Williams Lake, and release progeny back into Lake Creek to alleviate public pressure to stock Williams Lake from an outside source.

Yellowbelly Lake

Monitor the population to determine the success of recent Westslope cutthroat trout introductions. Assess population changes since the removal of a barrier at the outlet.

METHODS

Carlson Lake

On the afternoon of June 19, 2006, four experimental variable mesh gillnets were set, fished overnight, and checked the following morning. All brook trout were measured to the nearest mm total length and weighed (g). Captured tiger muskellunge were measured in fork and total length (mm), and then released. Total fishing time for each net was recorded. Brook trout length and weight data was used to calculate relative weights using formulas developed by Murphy et al. 1991. Otolith samples were collected from brook trout in 2006 and stored in individually labeled vials of alcohol.

Herd Lake

Four experimental variable mesh gillnets, two sinking and two floating, were deployed the evening of June 13 for two overnight sets. Gillnets were set perpendicular to the shore. Captured fish were identified, measured for total length (mm), and weighed (g). Rainbow trout lengths and weights were used to calculate relative weights using formulas developed by Murphy et al., 1991, and Simpkins and Hubert, 1996. Otolith samples were taken from 35 rainbow trout for age and growth analysis.

Jimmy Smith Lake

Four experimental variable mesh gillnets, two floating and two sinking, were deployed on June 13, 2006 for two overnight sets. Gillnets were set perpendicular to the shore at four locations approximately equidistant from each other. Captured fish were identified by species, measured for total length (mm) and weighed (g).

Williams Lake

Each spring, approximately twenty pairs of adult rainbow trout from Lake Creek are electro-fished and spawned. To accurately represent the spawning run, two spawning sessions utilize approximately ten pairs of fish during each event. Fish are spawned and the embryos are transported to a small facility below the lake's outlet, incubated, and the resultant fry are released back into Lake Creek. Ovarian fluid samples are collected from all female rainbow trout and sent to the Department's Eagle Fish Health Lab for pathogen testing.

Yellowbelly Lake

On June 21-22, 2006, eight experimental variable mesh gillnets, four sinking and four floating, were used to sample the fish community in Yellowbelly Lake. Project personnel set gillnets perpendicular to the shoreline with the large mesh end positioned towards the middle of the lake. Nets were set and checked every two hours throughout the night and pulled the next day. All salmonids captured were identified to species, measured for total length (mm), and weighed (g). Non-game fish were measured for total length.

RESULTS AND DISCUSSION

Carlson Lake

A total of 156 fish were captured during 64.75 hours of gillnetting effort. Brook trout comprised 97% (N=151) of the gillnetted fish with an incidental catch of five tiger muskellunge. The tiger muskellunge averaged 735 mm total length. In 2006, catch per unit effort (CPUE) for brook trout was 2.3 fish/gillnet hour, compared to 1.6 fish/gillnet hour in 2005 (Table 1). Since the introduction of tiger muskellunge, there has been a general decline in CPUE values.

Table 1. Comparison of brook trout sampling efforts in Carlson Lake, 1998 to 2006

Year	Sample Date	No. Fish Removed	Total length (mm)	Mean Total Length (mm)	Mean Weight (g)	Total Gillnet Hours	Fish/Net Hour (CPUE)	Relative Weight	Population Estimate
1998	5/22-23	818	120-292	196.0	--	488.3	1.7	--	--
1999	5/27-29	1,151	112-300	198.0	--	386.1	3.0	--	--
2000	10/8-9	665	108-270	191.0	--	270.9	2.5	--	--
2002	6/13-14	546	102-266	191.8	77.3	147.8	3.7	89.6	9,900
2003	6/13-14	562	96-270	209.0	78.1	416.9	1.4	89.8	9,064
2004	6/15-16	48	156-251	223.9	96.1	60.5 ^a	0.4	85.9	--
2005	6/22-24	599	145-290	230.5	127.3	369.5	1.6	98.5	6,024
2006	6/19-20	151	127-301	216.0	129.5	160.7	2.3	113.6	--

^a Hoop net survey in 2004.

Relative weight calculations of 151 brook trout collected in 2006 resulted in a mean relative weight of 113.6, compared to a pre-introduction mean relative weight of 89.6 in 2002 (Table 1). A value of 100 is considered average for North American populations. We compared the relative weights of Carlson Lake brook trout for 2002 and 2006 using a T-test. The results indicated a significant difference between years ($p = 0.000$; $\alpha = 0.05$) with the 2006 brook trout relative weight value being higher than 2002.

The mean total length of brook trout sampled in 2006 was 216.0 mm compared with a mean total length of 230.5 mm in 2005 (Table 1 and Figure 1). Comparison of the four post-introduction years of tiger muskellunge (2003 to 2006) with the four pre-introduction years shown in Table 1 indicates that brook trout mean weights and relative weights are increasing. Reports are being received by IDFG that anglers are now targeting Carlson Lake because of the increased size in the brook trout population.

Herd Lake

We captured 682 fish during 165.8 gillnet hours on Herd Lake with rainbow trout comprising 100% of the species netted. Fish sizes ranged from 141-268 mm total length with a mean total length of 192 mm. This compares to a size range of 163-292 mm total length and a mean total length of 207 mm in 2005 (Figure 2 and Table 2). The mean gillnet CPUE was 4.1 fish/hour. This represents an increasing trend in catch rates observed during the last six sample events (Table 2). The CPUE increase of approximately 2.2 fish/gillnet hour between 2003 and 2006 suggest that the population may have doubled in the last two years.

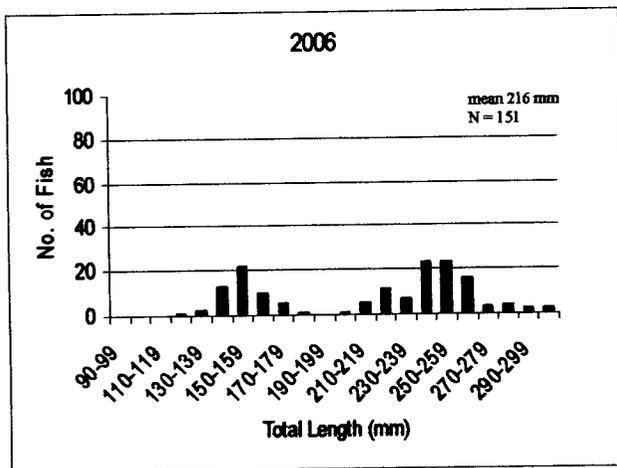
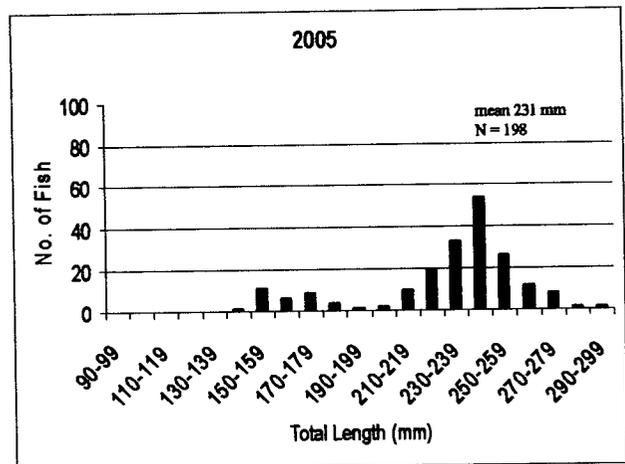
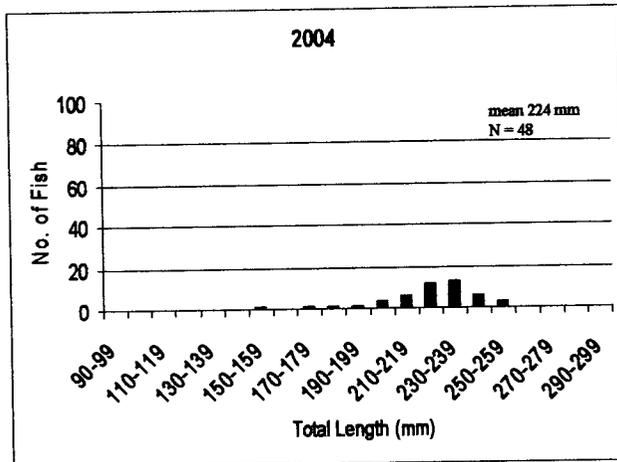
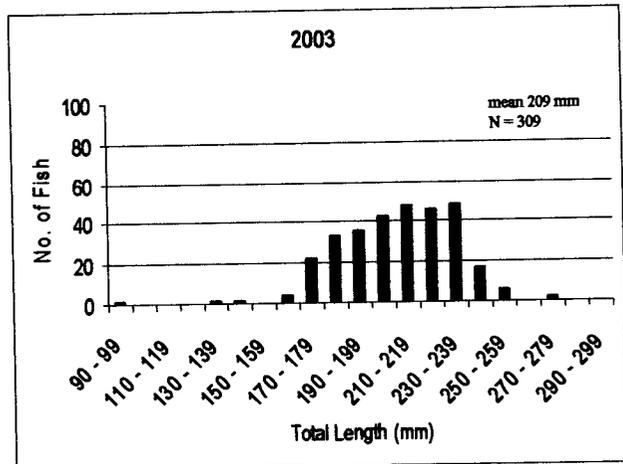
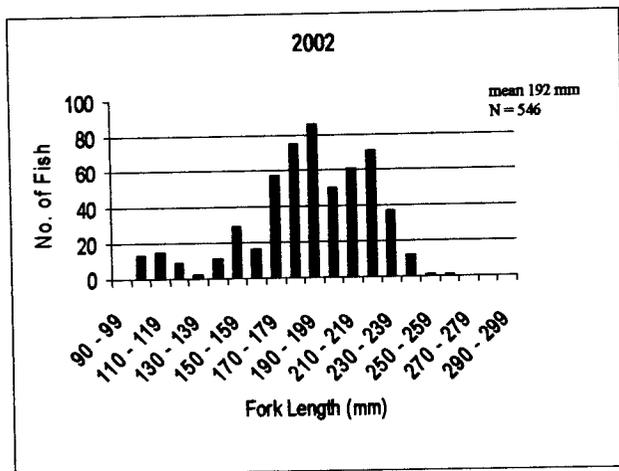


Figure 1. Length frequency histograms for Carlson Lake brook trout, 2002 to 2006.

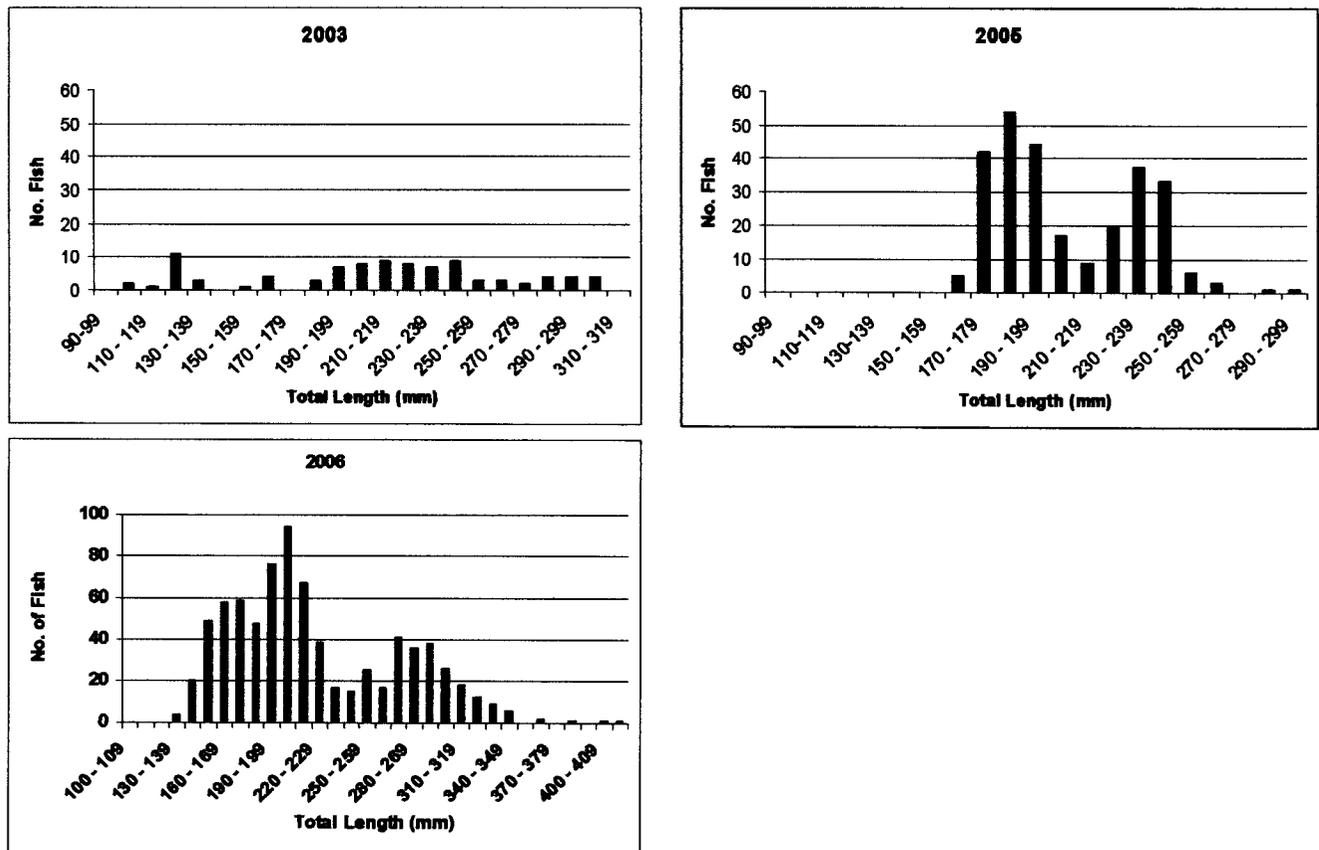


Figure 2. Comparison of rainbow trout length frequencies in Herd Lake, 2003, 2005, and 2006.

Year	Sample Date	Sample Size	Size Range (Total length mm)	Mean Total Length (mm)	Mean Weight (g)	Total Gillnet hours	Fish/Net Hour (CPUE)	Relative Weight
1994	8/1-2	113	140-260	199	--	30.0	3.8	--
1996	6/11-12	15	160-292	258	--	16.0	0.9	--
2001	6/21-22	30	95-280	178	49.1	32.6	0.9	--
2002	6/6-7	81	97-350	200	106.7	51.2	1.6	--
2003	7/31-8/1	93	107-308	212	101.6	49.3	1.9	73.8
2005	6/27-28	272	163-292	207	82.7	65.2	4.2	72.3
2006	6/13-14	682	141-268	192	78.9	165.8	4.1	86.9

Table 2. Comparison of rainbow trout sampling efforts at Herd Lake, 1994 to 2006.

Although there has been an improvement since 2003, a relative weight value of 86.9 in 2006 indicates a continued poor weight to length relationship for rainbow trout in Herd Lake (Table 2). The low relative weights observed in Herd Lake rainbow trout may be a function of density dependent factors and limited available forage. Previous studies suggested that zooplankton resources were likely limited (Brimmer et al. 2002, 2003).

A robust sample in 2006, along with decreasing total lengths, relatively high catch rates, and consistent low relative weights adds credibility to our management action of tiger muskellunge introduction to the lake. On June 29, 2006, 72 tiger muskellunge were stocked into Herd Lake. These tiger muskellunge averaged 289.6 mm in length. Sampling in 2009 will evaluate the effectiveness of the tiger muskellunge introduction to improve the size structure of the rainbow trout population.

Jimmy Smith Lake

We captured 779 rainbow trout during 181.5 gillnet hours. Catch rates averaged 7.3 fish/hour for the sinking nets and 3.9 fish/hour for the floating nets. The 2006 overall catch rate of 4.3 fish/hour was less than the 2005 rate of 5.5 fish/hour (Esselman et al. 2007). Total lengths of rainbow trout sampled in 2006 were similar in observations to previous years, with a size range of 133-419 (mm) and a mean length of 222 mm (Figure 3). These results are similar to 2005 when sampled rainbow trout had a size range of 138-412 total length (mm) and a mean of 238 mm recorded in 2005 (Table 3). The mean total length and apparent demonstration of multiple year classes of rainbow trout shown in Figure 3 for recent years suggest that the population is stabilizing after a severe fish kill in July 2000 (Brimmer 2000). Mean relative weight remained constant at 107.5 this year compared to 107.8 in 2005. Both values are above the established average identified by Simpkins and Hubert (1996) indicating better than average condition.

Jimmy Smith Lake continues to meet the direction of the Fisheries Management Plan, which is to provide a fishery supported by natural production.

Williams Lake

On May 9, 2006, 12 female and 12 male rainbow trout were collected and spawned. On May 16, 2006, an additional 11 females and 11 male rainbows were collected and spawned. An IDFG cooperator tended the fertilized eggs until "button up." Approximately 40,000 fry were released into Lake Creek on June 21, 2006. The ovarian fluid samples tested negative for all tested pathogens. Of note, this is the third season of negative test results for pathogens from samples of Lake Creek rainbow trout females.

Yellowbelly Lake

A total of 157 fish were captured in the gillnet effort (Table 10). Salmonids comprised 5.7% (N=9) of the catch and non-game species 94.3% (N=148). Sampled brook trout had a mean total length of 291.5 mm, Westslope cutthroat trout 388.0 mm, northern pikeminnow 239.5 mm, and suckers 292.8 mm. The eight experimental gill nets were fished a total of 160.7 hours and had a capture rate of 1.0 fish/hour.

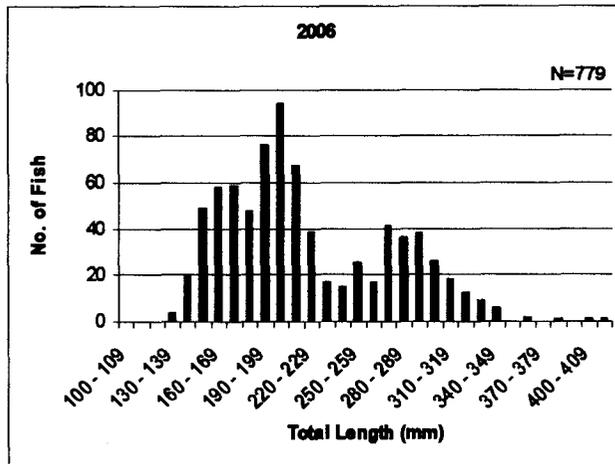
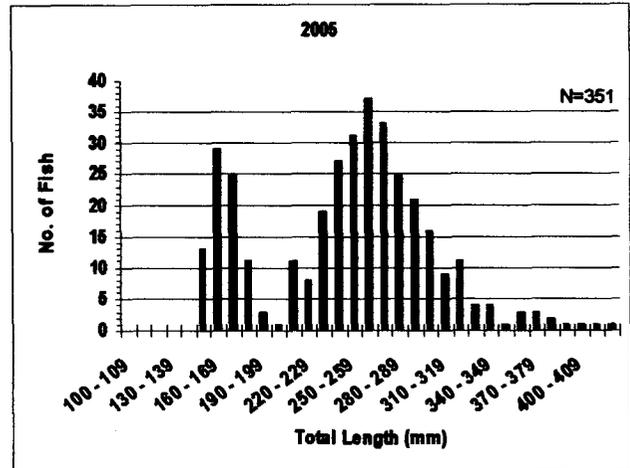
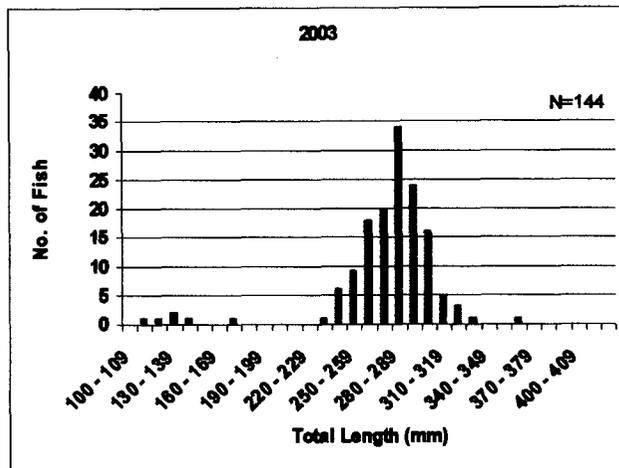


Figure 3. Comparison of rainbow trout length frequencies in Jimmy Smith Lake, 2003, 2005, and 2006.

Table 3. Comparison of rainbow trout sampling efforts in Jimmy Smith Lake, 1996, 2001, 2003, 2005, and 2006.

	Year				
	1996	2001	2003	2005	2006
Survey dates	6/11	6/21-22	7/21	6/7-8	6/14-15
Sample size	157	113	144	351	779
Size range (Total length mm)	155-332	110-370	112-368	138-412	133-419
Mean total length (mm)	213	203	277	238	222
Mean weight (g)	ND ^a	ND	283.3	311.4	162.7
No. of gillnets	1	1	4	4	4
Total gillnet hours	15.0	16.5	62.2	65.2	181.5
Fish/Net hour (CPUE)	10.1	6.9	2.3	5.5	4.3
Relative weight	ND	ND	105.5	107.8	107.5

^a ND = No data.

The 2006 results in Table 4 indicate a decrease in the number of salmonids (6% from 39%) compared to 2005 (Esselman et al. 2007). Of note this year was the lack of bull trout in the sample. Likewise, rainbow trout were completely absent in this year's gillnet samples compared to nine rainbow trout encountered in 2004 (Table 4). Westslope cutthroat trout numbers remained stable with three fish counted this year compared to five in 2005. As noted by Esselman et al. (2008), the removal of the migration barrier at the outlet may be contributing to the movement and/or colonization of different species from the main stem Salmon River. Survey efforts should be continued to determine if observed changes persist over time.

Survey results in Table 4 indicate the continued dominance of non-game species, particularly sucker species, despite chemical renovations applied in 1961 and 1990. Stocking of Westslope cutthroat trout fry and fingerlings every year since 2002 apparently has been unsuccessful in establishing a Westslope cutthroat trout population in Yellowbelly Lake (Table 5). The above efforts help illustrate the serious challenge of attempting manipulation of species composition within this lake system.

Table 4. Summary of Yellowbelly Lake gillnetting efforts, 1961, 1978, 2001, and 2004 to 2006.

Date	No. of Nets	Total Catch	Salmonid species ^a					Total Salmonids (%)	Other species ^b			
			RBT	CT	Hybrids	EBT	BU		RSS	SUC	NPM	MWF
June 2006	8	157	0	3	0	6	0	9 (6)	0	129	19	0
June 2005	8	240	0	5	2	20	12	39 (16)	0	166	35	0
July 2004	8	376	9	4	4	36	0	53 (14)	0	296	27	0
June 2001	4	96	0	1	0	56	0	57 (59)	0	39	0	0
October 1978	2	58	0	1	0	4	0	5 (9)	2	50	1	0
Year 1961	1	57	0	0	0	0	2	2 (3)	0	43	9	3

^a Salmonids: RBT = Rainbow trout, CT = Westslope cutthroat trout, EBT = Brook trout, and BU = Bull trout.

^b Other species: RSS = Redside shiner, SUC = Sucker, NPM = Northern pikeminnow, and MWF = Mountain whitefish.

Table 5. Yellowbelly Lake fish stocking history from 1968 to 2006, listing most recent to earliest.

Date Stocked	Species Type	Size ^a	Number Stocked
10/12/06	Westslope cutthroat	Fry	4,000
09/07/05	Westslope cutthroat	Fingerling	2,492
09/06/04	Westslope cutthroat	Fry	6,640
09/02/03	Westslope cutthroat	Fry	2,500
07/15/03	Unspecified cutthroat	Fry	1,256
08/10/02	Westslope cutthroat	Fry	384
06/25/02	Westslope cutthroat	Fry	1,084
09/03/99	Westslope cutthroat	Fry	5,000
Date Stocked	Species Type	Size ^a	Number Stocked
07/26/95	Westslope cutthroat	Fry	3,000
07/20/93	Westslope cutthroat	Catchable	2,025
07/01/92	Westslope cutthroat	Fingerling	5,015
08/30/87	Golden trout	Fingerling	2,750
08/27/86	Henrys Lake cutthroat	Fry	9,959
09/18/76	Unspecified cutthroat	Fry	16,848
08/29/72	Unspecified cutthroat	Fry	73,899
09/13/71	Unspecified cutthroat	Fry	52,896
09/04/69	Unspecified cutthroat	Fry	76,000
08/14/68	Unspecified cutthroat	Fry	79,640

^a Fry = 0-76.1 mm total length, fingerling => 76.2-152.3 mm total length, and catchable => 152.4 mm total length.

RECOMMENDATIONS

Carlson Lake

Continue evaluation of tiger muskellunge introduction on the brook trout population in the future. We learned after the 2002 introduction to wait for at least two seasons prior to sampling to avoid impacting predator populations. Carlson Lake will be sampled in 2009 to continue to assess the impact of tiger muskellunge introduction on the size structure of the brook trout population.

In the event that lake levels reach bank full condition, hoop nets or electrofishing will be utilized in lieu of gillnetting to determine the effects of tiger muskellunge on brook trout populations.

Herd Lake

In 2009, monitor Herd Lake to determine the effects of tiger muskellunge introduction on the size structure of the rainbow trout population.

Jimmy Smith Lake

Monitor the fish population in Jimmy Smith Lake to determine whether management action is necessary to improve size structure.

Williams Lake

Participate in collaborative efforts with interested parties to develop a long-term strategy for improving water quality in Williams Lake.

As funds and personnel are available, continue to monitor dissolved oxygen levels and water temperatures at specified locations and depths on a three-year cycle to provide a long-term dataset of water quality parameters in Williams Lake.

Continue rainbow trout trapping and spawning operations in Lake Creek. Stock the resulting fry in Lake Creek.

Yellowbelly Lake

The goal of a wild, quality Westslope cutthroat trout fishery is proving difficult to achieve at Yellowbelly Lake. The drainage is dominated by brook trout and the lake is primarily populated with non-game species. The species composition continues to favor non-game species despite past chemical treatments. Future management direction should be focused on one of three options: determine the cost versus benefit ratio of continuing to stock Westslope cutthroat trout fry and fingerlings, consider the introduction of a biological predator to reduce non-game fish biomass, or do nothing.

LITERATURE CITED

- Brimmer, A. 2000. Jimmy Smith Lake Fish-Kill Investigation. Intra-departmental memo, Idaho Department of Fish and Game, Salmon.
- Brimmer, A, K. Andrews, B. Esselman, and T. Curet. 2002. Federal Aid in Fish Restorations, 2002 Job Performance Report, Program F-71-R-26, Regional Fisheries Management Investigations, Salmon Region. Idaho Department of Fish and Game, Boise.
- Brimmer, A., K. Andrews, B. Esselman, and T. Curet. 2003. Federal Aid in Fish Restorations, 2003 Job Performance Report, Program F-71-R-27, Regional Fisheries Management Investigations, Salmon Region. Idaho Department of Fish and Game, Boise.
- Esselman, B., M. White, T. Curet, and A. Brimmer. 2007. Regional fishery management investigations, Salmon Region 2005. Federal Aid in Fish Restoration, F-71-R-30, Job Performance Report, Idaho Department of Fish and Game, Boise.
- Esselman, B., K. Andrews, T. Curet, and A. Brimmer. 2008. Fishery management annual report, Salmon Region 2004, Idaho Department of Fish and Game, Boise.
- Liter, M., T. Curet, and M. Larkin. 1997. Federal Aid in Fish Restorations, 1996 Job Performance Report, Program F-71-R-21, Regional Fisheries Management Investigations. Idaho Department of Fish and Game, Boise.
- Murphy, B. R., D. W. Willis, and T. A. Springer. 1991. The relative weight index in fisheries management: Status and needs. *Fisheries* 16:30-38.
- Simpkins, D. G. and W. A. Hubert. 1996. Proposed Revision of the Standard-Weight Equation for Rainbow Trout, *Journal of Freshwater Ecology*, Vol. 11, No. 3, pp. 319-325.

SALMON REGION 2006 FISHERY MANAGEMENT ANNUAL REPORT

Mountain Lake Activities

ABSTRACT

The Idaho Department of Fish & Game stocked 125 mountain lakes to maintain angler satisfaction in the Salmon-Challis National Forest (SCNF), Sawtooth National Recreation Area (SNRA), and Sawtooth Wilderness Area (SWA) by airplane during the summer of 2006. Eighty-six lakes were stocked with 34,900 Westslope cutthroat trout *Oncorhynchus clarkii lewisi* fry. Thirteen lakes were stocked with 8,125 triploid Hayspur rainbow trout *O. mykiss* (T9) fry. Twenty mountain lakes were stocked with 12,260 arctic grayling *Thymallus arcticus* fry. Six lakes were stocked with 6,375 golden trout *O. aquabonita*.

Regional fishery staff surveyed 102 mountain lakes as part of development of a statewide management plan and to better understand alpine lake resources within the SCNF, SNRA, and SWA during the summer of 2006. We assessed fish status visually, by hook and line, and by gillnetting, evaluated lake use, natural recruitment potential, and presence of amphibians by species, and reviewed past stocking efforts. Twenty-three of the 102 lakes surveyed were previously stocked. Of the 23 lakes previously stocked, 16 had fish in them at the time of the surveys. The crew determined that fish stocking should be curtailed in four lakes surveyed because a naturally reproducing fish population was present. Seventy lakes surveyed were likely fishless. Of these 70 lakes, all should remain fishless to provide refugia for native fauna. Twenty-seven lakes had amphibians present. Six of 27 lakes with amphibians also had fish present. All but one of the 102 surveyed lakes showed campsite impact rates of low to none in the use category.

Authors:

Tom Curet
Regional Fishery Manager

Bob Esselman
Regional Fishery Biologist

Marsha White
Regional Fishery Technician

Amie Brimmer
Regional Fishery Biologist

INTRODUCTION

The Salmon Region has approximately one thousand mountain lakes. Some of these lakes have never been inventoried or have not been surveyed in decades. Development of an alpine lake management plan, concern for sensitive species, high levels of angler satisfaction, and increased requests for information on alpine lake angling opportunities led the Salmon Region to increase the priority of mountain lake surveys. In 2000, the Salmon Region began conducting mountain lake surveys to rapidly assess regional alpine lakes and increase the number of lakes surveyed annually. The information collected from these surveys is stored in a regional database. The database is used to provide alpine lake information for the angling public, regional planning, and government agencies.

OBJECTIVES

Mountain Lake Stocking

Maintain a viable and diverse alpine lake fishery in the Salmon Region.

Mountain Lake Surveys

Assess the status of all fish and amphibian populations by surveying all stocked and unstocked mountain lakes within the Salmon Region. Surveys will document fish and amphibian populations, determine spawning potential of inlets and outlets, and record status of angler/camper use.

METHODS

Mountain Lake Stocking

Salmon Region alpine lakes were stocked using a Cessna – 185 fixed-wing airplane during 2006. Sawtooth Fish Hatchery personnel stocked Westslope cutthroat *Oncorhynchus clarkii lewisi*. McCall Fish Hatchery personnel stocked triploid Hayspur rainbow trout *O. mykiss* (T9), arctic grayling *Thymallus arcticus* and golden trout *O. aquabonita* fry by fixed wing aircraft in the Salmon Region.

Mountain Lake Surveys

Regional fishery staff conducted surveys by backpacking into 102 mountain lakes in the Salmon-Challis National Forest (SCNF), Sawtooth National Recreational Area (SNRA), and

Sawtooth Wilderness Area (SWA) during the summer of 2006. We documented fish presence and species by visual observation, gillnetting, and by angling. Fish were identified by species, measured to the nearest mm total length, and weighed (g). The presence or absence of amphibians was determined by a modification of the timed visual encounter survey (VES) methodology of the lake's shoreline perimeter reported by Crump et al. (1994). The main deviation from the VES methodology was that a fisheries crew performed a full perimeter search without accounting for various habitat types. Each lake's physical profile and basic water chemistry was recorded, including depth profile, aspect, pH, conductivity, and surface temperature. Campsite impacts for each lake were documented. Shoreline areas were visually surveyed for campsites and signs of human use, and the difficulty of access to the lake was assessed. We used Bahls (1992) campsite impact rating shown in Table 1 to assess the condition of areas surrounding the lakes. All survey data was entered into the Salmon Region alpine lake Microsoft Access database for future analysis. Data sheets were archived at the Salmon Region office.

Table 1. Bahls Total Campsite Impact Rating for Lakes.

Impact Rating	No. of Campsites Observed
None	0
Low	1 - 4
Moderate	5 - 7
High	> 7

RESULTS AND DISCUSSION

Mountain Lake Stocking

In 2006, Sawtooth Fish Hatchery personnel stocked a total of 34,900 Westslope cutthroat trout fry into 85 mountain lakes (Tables 2 and 3). The average number of fish stocked in 2006 was 5.9 fish per gram. The total flight cost was \$4,452.50, or an average of \$45.90 per lake. An additional 12 lakes were stocked this year because they were not stocked in 2005 as planned because of wildfires (Table 3).

A total of 20,750 rainbow trout, golden trout, and grayling fry were stocked into 27 lakes by McCall Fish Hatchery staff in 2006 (Table 4). The grayling, golden trout, and rainbow trout fry averaged 3.9, 6.0, and 3.2 fish per gram, respectively,. McCall Fish Hatchery staff stocked an additional six lakes that were to be stocked in 2005, but fry were not available; Table 5 shows 3,175 arctic grayling and 400 golden trout fry stocked in these six lakes. Likewise, six more lakes were stocked in 2006 that were scheduled for stocking in 2004, but were not stocked due to the unavailability of a fish hatchery source. These six lakes received 1,010 arctic grayling and 1,425 golden trout fry (Table 6). A total of 39 lakes were stocked by McCall Fish Hatchery staff during August and September at a total cost of \$2,059, or \$52.79 per lake.

Table 2. Salmon Region alpine lakes stocked in 2006 by Sawtooth Fish Hatchery personnel.

Lake Name	Catalog No.	Land Area ^a	Species ^b	No. of Fish Stocked
Alpine Lake Creek #2	7-1784	SWA	C2	375
Alpine Lake Creek #6	7-1789	SWA	C2	300
Alpine Lake Creek #7	7-1790	SWA	C2	350
Alpine Lake Creek #12	7-1798	SWA	C2	50
Baldwin Creek	7-1007	SWA	C2	350
Bear Creek #1	7-1137	Capehorn	C2	200
Cabin Creek #3	7-1503	SCNF	C2	100
Cabin Creek #4	7-1504	SCNF	C2	600
Cabin Creek #7	7-1508	SCNF	C2	200
Cabin Creek Peak #1	7-1487	SCNF	C2	150
Cliff Creek #1	7-1144	Capehorn	C2	150
Cliff Creek #4	7-1146	Capehorn	C2	75
Collie Creek #1	7-1111	Capehorn	C2	1,075
Decker Creek #1	7-1659	SWA	C2	575
Elizabeth	7-1570	Capehorn	C2	500
Elk	7-1163	Capehorn	C2	675
Finger #3	7-1094	Capehorn	C2	475
Fishhook Creek #2	7-1607	SWA	C2	75
Fishhook Creek #3	7-1610	SWA	C2	75
Goat #1	7-1530	SWA	C2	2,225
Goat #4	7-1535	SWA	C2	425
Goat #5	7-1536	SWA	C2	50
Hanson #1	7-1555	SWA	C2	225
Hanson #3	7-1558	SWA	C2	725
Hanson #5	7-1561	SWA	C2	125
Harlan #1	7-0980	SCNF	C2	300
Harlan #2	7-0983	SCNF	C2	250
Hasbrook #1	7-0992	SCNF	C2	375
Helldiver	7-0989	SCNF	C2	550
Hidden	7-1573	Capehorn	C2	250
Hindman #1	7-1495	Capehorn	C2	500
Imogene #2	7-1714	SWA	C2	200
Imogene #3	7-1715	SWA	C2	625
Imogene #4	7-1717	SWA	C2	100
Imogene #6	7-1719	SWA	C2	525
Iris #1	7-1074	SCNF	C2	225
Iris #3	7-1077	SCNF	C2	350
Kidney #2	7-1033	SCNF	C2	150
Knapp #7	7-1169	Capehorn	C2	200
Lola #2	7-1148	Capehorn	C2	500
Lola #3	7-1149	Capehorn	C2	500
Loon #3	7-0904	Capehorn	C2	150
Loon #11	7-0917	Capehorn	C2	175
Loon #13	7-0919	Capehorn	C2	225

Table 2. Continued.

Lake Name	Catalog No.	Land Area ^a	Species ^b	No. of Fish Stocked
Loon #15	7-0923	Capehom	C2	175
Lost	7-0988	SCNF	C2	200
Lower Island	7-1129	Capehom	C2	550
Lower Valley Creek	7-1584	SNRA	C2	550
Lucille	7-1708	SWA	C2	775
Marshall #2	7-1525	SWA	C2	500
Martha	7-1569	Capehom	C2	200
McGown #3	7-1565	SWA	C2	250
P 38	7-1160	Capehom	C2	325
Parks Peak #1	7-1745	SWA	C2	500
Profile	7-1710	SWA	C2	775
Rocky	7-1135	Capehom	C2	450
Saddleback #1	7-1618	SWA	C2	775
Saddleback #2	7-1619	SWA	C2	325
Soldier #4	7-1050	SCNF	C2	975
Soldier #7	7-1055	SCNF	C2	250
Soldier #8	7-1057	SCNF	C2	250
Soldier #10	7-1059	SCNF	C2	250
Soldier #11	7-1060	SCNF	C2	250
Tango #4	7-0893	Capehom	C2	675
Tango #5	7-0894	Capehom	C2	250
Tango #6	7-0895	Capehom	C2	900
Thompson Cirque	7-1604	SWA	C2	900
Upper Cramer	7-1657	SWA	C2	500
Upper Hell Roaring #1	7-1687	SWA	C2	275
Upper Hell Roaring #2	7-1688	SWA	C2	275
Upper Redfish #2	7-1635	SWA	C2	425
Upper Redfish #3	7-1636	SWA	C2	625
Valley Creek #2	7-1587	Capehom	C2	400
Vanity #5	7-1015	Capehom	C2	125
Total				29,450

^a SWA = Sawtooth Wilderness Area, SCNF = Salmon-Challis National Forest, SNRA = Sawtooth National Recreation Area.

^b C2 = Westslope cutthroat trout fry.

Table 3. Salmon Region alpine lakes stocked in 2006 by Sawtooth Fish Hatchery personnel due to the 2005 Valley Road wildfire that prevented stocking.

Lake Name	Catalog No.	Land Area ^a	Species ^b	No. Fish
Fourth of July	7-1685	White Clouds	C2	725
Garland #1	7-1468	SNRA	C2	500
Garland #2	7-1469	SNRA	C2	500
Garland #3	7-1470	SNRA	C2	350
Lightning	7-1680	White Clouds	C2	275
Phyllis	7-1683	White Clouds	C2	375
Pipe	7-1732	White Clouds	C2	200
Rainbow	7-1727	White Clouds	C2	200
Six #1	7-1672	White Clouds	C2	475
Swimm	7-1467	White Clouds	C2	875
Thunder	7-1679	White Clouds	C2	475
Washington #2	7-1444	White Clouds	C2	750
Total				5,450

^a SNRA = Sawtooth National Recreation Area.

^b C2 = Westslope cutthroat trout fry.

Table 4. Salmon Region alpine lakes stocked during the summer of 2006 by McCall Fish Hatchery personnel.

Lake Name	Catalog No.	Land Area ^a	Species ^b	No. Stocked
Alpine Creek #4	7-1787	SWA	GR	2,375
Alpine Creek #5	7-1788	SWA	T9	125
Alpine Creek #11	7-1797	SWA	T9	425
Alpine Creek #11	7-1797	SWA	GR ^c	400
Alpine Creek #13	7-1800	SWA	GR	1,250
Alpine Creek #14	7-1802	SWA	GR	400
Alpine Creek #15	7-1804	SWA	GR	925
Alpine	7-1540	SWA	GN	3,850
Imogene #1	7-1713	SWA	T9	1,850
Iron Creek #6	7-1547	SWA	T9	75
Iron Creek #7	7-1548	SWA	T9	75
Island	7-1127	White Clouds	T9	1,575
Knapp #14	7-1179	Capehorn	GR	250
Langer #1	7-1133	Capehorn	T9	1,000
MacRae	7-1450	White Clouds	GR	600
Martindale #1	7-0815	Sleeping Deer	GR	250
Muskeg #1	7-1043	SCNF	T9	500
Muskeg #3	7-1046	SCNF	T9	500
Nelson #2	7-0873	SCNF	GR	500
Rainbow	7-1153	White Clouds	GR	250
Ruffneck	7-1130	Capehorn	T9	1,250
Seafoam #6	7-1005	SCNF	GR	600
Upper Redfish #1	7-1634	SWA	GR	725
Lake Name	Catalog No.	Land Area ^a	Species ^b	No. Stocked
Vanity Creek #1	7-1009	Capehorn	T9	300
Vanity Creek #4	7-1014	Capehorn	T9	250
Vanity Creek #7	7-1017	Capehorn	T9	200
Vanity Creek #13	7-1027	Capehorn	GR	250
Total				20,750

^a SWA = Sawtooth Wilderness Area, SCNF = Salmon-Challis National Forest.

^b GR = Arctic grayling, T9 = Triploid Hayspur rainbow trout, GN = Golden trout.

^c Rainbow trout fry accidentally stocked with grayling fry.

Table 5. Salmon Region alpine lakes stocked during the summer of 2006 by McCall Fish Hatchery personnel from 2005s stocking rotation list due to availability of fish.

Lake Name	Catalog No.	Land Area ^a	Species ^b	No. Fish
Cache Creek #3	7-0845	Sleeping Deer	GR ^d	250
Cache Creek #5	7-0848	Sleeping Deer	GR ^d	375
China #3	7-0885	SCNF	GN ^d	400
Feldspar	7-1380	White Clouds	GR ^d	550
Hope	7-1430	White Clouds	GR ^d	650
Tin Cup	7-1349	White Clouds	GR ^d	1,350
Total				3,575

^a SCNF = Salmon-Challis National Forest.

^b GR = Arctic grayling, GN = Golden trout.

Table 6. Salmon Region alpine lakes stocked during the summer of 2006 by McCall Fish Hatchery personnel from 2004s stocking rotation list due to availability of fish.

Lake Name	Catalog No.	Land Area ^a	Species ^b	No. Fish
Crater	7-1185	Bighorn Crags	GR ^e	700
Glacier	7-1189	Bighorn Crags	GN ^e	275
Golden Trout	7-1201	Bighorn Crags	GN ^e	950
Gooseneck	7-1187	Bighorn Crags	GN ^e	200
M F Hat Creek #2	7-1288	SCNF	GR ^e	180
S F Moyer Creek	7-1205	SCNF	GR ^e	130
Total				2,435

^a SCNF = Salmon-Challis National Forest.

^b GR = Arctic grayling, GN = Golden trout.

Mountain Lake Surveys

Salmon Region fishery personnel surveyed 102 mountain lakes in 2006 in the SCNF, SNRA, and SWA (Tables 7). Twenty-three of the 102 lakes surveyed this year were previously stocked. Of the 23 previously stocked lakes, we determined that stocking should be curtailed in four lakes because fish were naturally reproducing. Fish were documented in 32 of the 102 lakes surveyed. The presence of fish in unstocked lakes needs to be investigated to determine the origin of these fish. Of the lakes with fish, 16 had Westslope cutthroat trout, 12 had rainbow trout, 1 contained seemingly rainbow/cutthroat hybrids, and 3 supported brook trout. Twenty-seven lakes had amphibians present. Amphibians and fish were found to co-exist in six lakes. No fish were encountered in 70 lakes surveyed in 2006. All of the previously unstocked lakes (N=79) should remain fishless to provide refugia for native fauna.

Using Bahls (1992) campsite impact rating in Table 1, all but one of the 102 lakes surveyed this year showed a campsite impact rate of low use. Only Walker Lake was classified with a high campsite impact rating with eight campsites observed.

Table 7. Salmon Region alpine lakes surveyed in 2006.

LLID	IDFG Catalog No.	Lake Name	Survey Date	Primary Fish Species Observed	Amphibian Species Observed
1146391440582	0	Ant Basin Pond	8/9/2006	Fishless	None
1138485448501	0700001238.00	Basin Creek Lake	7/22/2006	Fishless	None
1144034444124	0700001338.00	Bayhorse Lake #1	8/16/2006	Fishless	Columbian Spotted Frog
1143900444122	0700001339.00	Bayhorse Lake #2	8/16/2006	Rainbow trout	Columbian Spotted Frog and Pacific Chorus Frog
1146083441044	0700001365.00	Big Boulder Lake #10	8/4/2006	Fishless	Western Toad
ND ^a	0700001365A	Big Boulder Lake #10A	8/4/2006	Fishless	Western Toad
1145875440912	0700001379.00	Big Boulder Lake #19	8/3/2006	Rainbow trout	None
1145864440918	0700001379A	Big Boulder Lake #19A	8/3/2006	Fishless	None
1145849440918	0700001379B	Big Boulder Lake #19B	8/3/2006	Fishless	None
1146182440575	0700001475.00	Born Lake #2	8/9/2006	Westslope cutthroat trout	None
1146187440594	0700001475B	Born Lake #2B	8/9/2006	Fishless	None
1146191440621	0700001475C	Born Lake #2C	8/9/2006	Fishless	None
1146182440575	0700001477.00	Born Lake #3	8/8/2006	Westslope cutthroat trout	None
1146110440622	0700001478.00	Born Lake #4	8/8/2006	Fishless	Long-Toed Salamander
1146089440610	0700001478A	Born Lake #4A	8/8/2006	Westslope cutthroat trout	None
1146202440577	0700001474.00	Born Lake#1	8/9/2006	Westslope cutthroat trout	None
1146170440592	0700001475A	Born Lake#2A	8/9/2006	Westslope Cutthroat trout	None
1141306437982	0700001373.00	Boulder Lake	8/4/2006	Fishless	None
1145368451306	0700001203.00	Cathedral Lake	8/30/2006	Rainbow X Cutthroat trout	None
1146208441064	0700001369.00	Cirque Lake	8/4/2006	Westslope cutthroat trout	None
1146179441063	0700001369A	Cirque Lake #A	8/4/2006	Fishless	None
1146173441060	0700001369B	Cirque Lake #B	8/4/2006	Fishless	None
1143178448420	0700001209.00	Cougar Lake	8/21/2006	Fishless	Long-Toed Salamander
1146124441265	0700001353.00	Dyke Lake	8/5/2006	Fishless	None
1136134446256	0700001257.00	Everson Lake	8/7/2006	Rainbow Trout	None
1145904440905	0700001380.00	Feldspar Lake	8/3/2006	Rainbow Trout	None
1134952445490	0700001270.00	Genevieve Lake	7/21/2006	Fishless	None

Table 7. Continued.

LLID	IDFG Catalog No.	Lake Name	Survey Date	Primary Fish Species Observed	Amphibian Species Observed
1134911445507	0700001270A	Genevieve Lake #A	7/21/2006	Fishless	None
1146122440972	0700001370.00	Gentian Lake	8/4/2006	Westslope cutthroat trout	None
1146076441271	0700001350.00	Gunsight Lake	8/5/2006	Westslope cutthroat trout	None
1146040441276	0700001350A	Gunsight Lake #A	8/5/2006	Fishless	None
1146130441259	0700001350B	Gunsight Lake #B	8/5/2006	Fishless	None
1137332449988	0700001230.00	Haynes Creek Reservoir	7/19/2006	Rainbow Trout	None
1138195447425	0	Kadletz Creek Lake	7/23/2006	Fishless	None
1138203447394	0	Kadletz Creek Lake #A	7/23/2006	Fishless	None
1137002452677	0700001223.00	Kirtley Lake	7/14/2006	Fishless	None
1135455445564	0700001300.00	Lake Fork Lake	7/14/2006	Westslope cutthroat trout	None
1141567447547	0	Little Hat Creek Lake #1	8/16/2006	Fishless	None
1145361441038	0700001347.00	Little Redfish Lake	8/2/2006	Rainbow trout	Columbian Spotted Frog
1145426440931	0700001347A	Little Redfish Lake #A	8/2/2006	Fishless	Western Toad
1135321445506	0700001271.00	M F Little Timber Lake #1	7/20/2006	Westslope cutthroat trout	None
1135348445508	0700001271A	M F Little Timber Lake #1A	7/20/2006	Fishless	None
1138488448272	0700001236.00	McNutt Lake	8/26/2006	Westslope cutthroat trout	Western Toad
1136642446454	0700001255.00	Mill Creek Reservoir #2	7/23/2006	Fishless	None
1136591446465	0700001255A	Mill Creek Reservoir #2A	7/23/2006	Fishless	None
1136598446465	0700001255B	Mill Creek Reservoir #2B	7/23/2006	Fishless	None
1136608446470	0700001255C	Mill Creek Reservoir #2C	7/23/2006	Fishless	None
1135300445844	0700001266.00	N F Little Timber Lake	7/24/2006	Fishless	Long-Toed Salamander
1135415445768	0700001267.00	N F Timber Creek Lake #2	7/24/2006	Fishless	Columbian Spotted Frog
1135419445754	0700001267A	N F Timber Creek Lake #2A	7/24/2006	Fishless	Long-Toed Salamander
1146166441136	0700001360.00	Neck Lake	8/3/2006	Fishless	None
1133965444988	0700001272.00	Nez Perce Lake #1	8/8/2006	Rainbow trout	None
1133896444992	0700001272A	Nez Perce Lake #1A	8/8/2006	Fishless	Long-Toed Salamander
1133871444964	0700001272B	Nez Perce Lake #1B	8/8/2006	Fishless	None

Table 7. Continued.

LLID	IDFG Catalog No.	Lake Name	Survey Date	Primary Fish Species Observed	Amphibian Species Observed
1133832444923	0700001272C	Nez Perce Lake #1C	8/8/2006	Fishless	None
1146638440043	0700001732.00	Pipe Lake	8/19/2006	Fishless	Long-Toed Salamander
1146062441235	0	Quartzite Lake	8/5/2006	Westslope cutthroat trout	None
1136089445899	0700001264.00	R F Big Eightmile Lake	7/21/2006	Westslope cutthroat trout	None
1136133445917	0700001264A	R F Big Eightmile Lake #A	7/21/2006	Fishless	None
1131268447055	0700001275.00	Reservoir Creek Lake	7/19/2006	Westslope cutthroat trout	None
1147799441897	0700001512A	Rough #A	8/18/2006	Fishless	None
1147935441852	0700001512B	Rough #B	8/18/2006	Fishless	Columbian Spotted Frog and Long-Toed Salamander
1147927441816	0700001512C	Rough #C	8/18/2006	Fishless	None
1147981441842	0700001512D	Rough #D	8/18/2006	Fishless	Long-Toed Salamander
1148012441839	0700001512.00	Rough Lake	8/18/2006	Brook trout	Long-Toed Salamander
1149741440658	0700001618.00	Saddleback Lake #1	7/13/2006	Brook trout	None
1149691440598	0700001619.00	Saddleback Lake #2	7/13/2006	Brook trout	None
1149618440574	0700001620.00	Saddleback Lake #3	7/14/2006	Fishless	None
1149678440560	0700001620A	Saddleback Lake #3A	7/14/2006	Fishless	None
1149688440558	0700001620B	Saddleback Lake #3B	7/14/2006	Fishless	None
1149695440564	0700001620C	Saddleback Lake #3C	7/14/2006	Fishless	None
1149618440574	0700001623.00	Saddleback Lake #4	7/14/2006	Fishless	Columbian Spotted Frog
1149600440576	0700001624.00	Saddleback Lake #5	7/14/2006	Fishless	Columbian Spotted Frog
1146152441033	0700001367.00	Sapphire Lake	8/4/2006	Westslope cutthroat trout	None
1146111441133	0700001356.00	Sheep Lake	8/3/2006	Rainbow trout	None
1146766440245	0700001673.00	Six Lake #2	8/19/2006	Fishless	None
1146722440245	0700001674.00	Six Lake #3	8/19/2006	Fishless	Long-Toed Salamander
1146739440229	0700001675.00	Six Lake #4	8/19/2006	Fishless	Long-Toed Salamander
1146714440200	0700001676.00	Six Lake #5	8/19/2006	Fishless	Long-Toed Salamander
1146714440190	0700001677.00	Six Lake #6	8/19/2006	Fishless	Long-Toed Salamander
1146198441124	0700001363.00	Slide Lake	8/3/2006	Fishless	None
1146138440957	0700001374.00	Snow Lake	8/4/2006	Fishless	None
1136218446424	0700001256.00	Stroud Lake	7/25/2006	Rainbow trout	None

Table 7. Continued.

LLID	IDFG Catalog No.	Lake Name	Survey Date	Primary Fish Species Observed	Amphibian Species Observed
1136306446440	0700001256A	Stroud Lake #A	7/25/2006	Fishless	None
1136332446439	0700001256B	Stroud Lake #B	7/25/2006	Fishless	Long-Toed Salamander
1136354446435	0700001256C	Stroud Lake #C	7/25/2006	Fishless	None
1144440442222	0	Sullivan Lake	8/16/2006	Fishless	None
1146214441030	0	The Kettles Lake #1	8/4/2006	Fishless	None
1146215441099	0	The Kettles Lake #2	8/4/2006	Fishless	None
1146232441025	0	The Kettles Lake #3	8/4/2006	Fishless	None
1146074441246	0700001349A	Tin Cup Lake #A	8/5/2006	Fishless	None
1137764449844	0700001233.00	Tule Lake	7/19/2006	Fishless	None
1145977441063	0700001355.00	Walker Lake	8/4/2006	Rainbow trout	Columbian Spotted Frog and Western Toad
1145897441057	0700001355A	Walker Lake #A	8/3/2006	Rainbow trout	Columbian Spotted Frog
1145912441061	0700001355B	Walker Lake #B	8/3/2006	Rainbow trout	Columbian Spotted Frog
1146257440241	0700001443.00	Washington Lake #1	8/19/2006	Fishless	None
1138377447461	0700001246.00	Wright Lake	8/22/2006	Fishless	None
1138317447534	0700001246A	Wright Lake #A	8/22/2006	Fishless	None
1138377447461	0700001246B	Wright Lake #B	8/22/2006	Fishless	None
1138389447454	0700001246C	Wright Lake #C	8/22/2006	Fishless	None
1138288447376	0700001246D	Wright Lake #D	8/22/2006	Fishless	None
1135408445340	0700001298.00	Yellow Peak Lake	7/20/2006	Westslope cutthroat trout	None

* ND = No data.

RECOMMENDATIONS

Continue stocking alpine lakes using Rotation C in 2007.

Continue surveys of alpine lakes to determine the current status of fish and amphibian populations, human use, and the success of current stocking strategies.

Stock all arctic grayling and golden trout lakes in 2007 that were not stocked in 2005 and 2006. Coordinate with the Department's Fisheries Bureau to find a reliable, consistent source of arctic grayling and golden trout fry.

LITERATURE CITED

- Bahls, P. 1992. A Survey Methodology for High Mountain Lakes, High Lake Fisheries Project 1991. Nez Perce National Forest, U. S. Forest Service, Grangeville, Idaho, and Idaho Fish and Game, Boise.
- Crump, M.L. and N.J. Scott, Jr., Heyer, W.R., M.A. Donnelly, R.W. McDiarmid, L.C. Hayek, and M.S. Foster (Editors). 1994. Visual Encounter Surveys in Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians. Smithsonian Institution Press, Washington, D.C.

Submitted by:

**Tom Curet
Regional Fishery Manager**

**Bob Esselman
Regional Fishery Biologist**

**Marsha White
Regional Fisheries Technician**

**Arnie Brimmerf
Regional Fishery Biologist**

Approved by:



**Bill Hutchinson, Acting Chief
Fisheries Bureau**



**William D. Horton
State Fishery Manager**