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REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

CLEARWATER REGION (Subprojects I-B, II-B)

PROJECT I.	SURVEYS AND INVENTORIES
Job a.	Clearwater Region Mountain Lakes Investigations
Job b.	Clearwater Region Lowland Lakes Investigations
Job c.	Clearwater Region Rivers and Streams investigations
PROJECT II.	TECHNICAL GUIDANCE

By

Ed Schriever, Regional Fishery Biologist
Jody Brostrom, Regional Fishery Biologist
Tim Cochnauer, Regional Fishery Manager

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JOB PERFORMANCE REPORT

State of: Idaho

Name: Fisheries Management F-71-R-18

Project I: Surveys and Inventories

Subproject I-B: Clearwater Region

Job: a

Title: Mountain Lakes Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Forest Service personnel and volunteers surveyed 36 lakes in the Clearwater Region in 1992 and 1993. Survey results indicate the regional stocking program is suitable in the lakes that were surveyed, and the stocking program is providing fishable populations of trout.

Author:

Ed Schriever
Regional Fishery Biologist

OBJECTIVES

1. Evaluate the success and suitability of the mountain lake stocking program in the Clearwater Region.

2. Modify stocking rate on species stocked to produce higher quality fisheries where necessary.

3. Collect lake-specific fish and fisheries related survey information upon which to base management decisions.

4. Train volunteers to survey lakes using standardized data collection form.

METHODS

We developed two standardized data collection forms; one for anglers visiting lakes during their backcountry excursions, and another more in-depth form for conservation officers and trained volunteers.

We had a training session for volunteers. We covered topics such as lake morphometry, determining spawning habitat suitability, fish identification, aquatic and terrestrial insect identification, and low impact camping.

RESULTS

Volunteers surveyed 17 lakes in the Clearwater Region in 1992-1993 (Table 1). Nine of these lakes are currently in the regional stocking program. Survey results show all of these lakes providing fishable populations of trout as a result of the stocking program.

Catch rates during lake sampling varied from 0.11 to 10 fish/h and fish size ranged from 150 mm to 450 mm.

Ice Lake is currently stocked with westslope cutthroat trout *Oncorhynchus clarki lewisi*. Survey information indicates brook trout *Salvelinus fontinalis* dominate Ice Lake.

Forest Service personnel surveyed 17 lakes in the Clearwater Region in 1992 and 1993 (Table 2). Four of the 17 lakes surveyed are in the regional stocking program. Valhalla and Neck Island lakes were removed from the stocking program in 1987 due to indications of natural reproduction. Survey results indicate no reproduction since stocking was discontinued. Of the 13 lakes not in the regional stocking program, 9 have naturally-reproducing populations of rainbow trout O. *mykiss*. The other four are barren. Gill net catch rates varied from 0.47 to 2.2 fish/gill net hour.

Table I. Results from mountain lake surveys performed by volunteers in the Clearwater Region in 1992-1993.

Lake	Catalog #	Date surveyed	Current stocking program	Spawning potential	Primary species'	Secondary species	Catch per hour	Size range (mm)	Comments
Mirror	07 0114	6/20/92	Y		CT		0.1	200-249	observed more fish
Parsons	06 0368	7/1/92	N		EBT		9.0	150-250	
Bills	06 0481	7/3/92	Y		CT		8.0	300-450	excellent fishing
Emerald	06 0480	7/3/92	Y		CT		2.5	300-400	good fishing
Goose Creek Lake	06 0196	7/7/92	N		NA		ND	ND	barren, many amphib., and moose
Walton #2	06 0267	7/8/92	N	Y	CT		0.4	150-249	
Cub	06 0490	9/1/92	Y		RB	CT	6.0	300-399	
Sting Ray	06 0488	9/2/92	N	N	NA		ND	ND	barren, too shallow
Brushy Fork	06 0488	9/2/92	N	Y	CT		7.0	300-349	
Bills	06 0481	9/3/92	Y		CT		4.0	300-349	
Emerald	06 0480	9/3/92	Y		CT		5.0	300-349	
Colt Lake #1	06 0281	8/9/92	N		NA		ND	ND	none caught
Colt Lake #2	06 0282	8/9/92	N		CT	CTxRB	2.0	200-349	
Colt Lake #3	06 0283	8/9/92	N		NA		ND	ND	none caught
Upper Post Office	06 0254	10/20/92	Y		CT		5.0	150-249	
Pete Ott Lake	06 0184	8/15/93	Y		CT		1.5	250-349	m-cycle tracks at lake
Ice Lake	06 0192	8/15/93	Y		EBT		10.0	150-200	heavy m-cycle traffic
Elizabeth Lake	06 0186	8/15/93	Y		CT		6.0	250-349	very good fishing
Ellie Lake	06 0189	8/15/93	Y		CT		3.0	150-249	

CT = cutthroat trout
EBT = Eastern brook trout
RBT = rainbow trout

Table 2. Results from mountain lake surveys performed by Forest Service employees in the Clearwater Region in 1992-1993.

Lake	Catalog k	Date surveyed	Current stocking program	Spawning potential	Primary specie?	Secondary species	Catch per hour	Size range (nun)	Comments
Gold Pan	06 0592	6/29/92	Y	Y	CT	RBxCT	5.0	132-365	
Elk Track Lakes	06 0596	7/2/92	N	N	barren				barren of fish, shallow
Swet Lake	06 0606	7/11/92	Y		CT		5.0	172-346	1.58 fish /gill net hour
Dennis Upper	07 0297	7/15/92	N	Y	barren				0 fish/16.5 gill net hours
Dennis Middle	07 0296	7/16/92	N	Y	RBT	grayling		90-290	2.2 fish /gill net hour
Dennis Lower	07 0298	7/18/92	N	N	barren				0 fish/16.5 gill net hours
Hamilton, South		7/19/92	N	N	barren				0 fish/18.0 gill net hours
Hamilton, North	07 0299	7/20/92	N	Y	CT			190-360	1.44 fish/gill net hour
Thirteen Lakes #1	06 0607	8/1/92	Y		CT			190-390	0.47 fish/gill net hour
Thirteen Lakes #2	06 0608	8/3/92	Y		CT			100-330	1.75 fish/gill net hour
Thirteen Lakes #3	06 0609	8/4/92	N		RBxCT	CT		100-320	1.33 fish/gill net hour
Thirteen Lakes #4	06 0610	8/6/92	N		RBxCT	CT		100-300	1.41 fish/gill net hour
Valhalla	06 0374	7/29/93	N	Y	CT		0.1	330-470	smaller fish observed
Neck Island	06 0373	7/30/93	N	N	CT		0.9	350-450	restocking needed
Coquina	06 0512	7/17/93	N	Y	RBT		0.5	150-350	nat'l reprod. adequate
Spruce	06 0471	7/18/93	N	Y	CT			200-300	1.0 fish/gill net hour
Upper Bear	06 0510	7/16/93	N	Y	RBT		0.5	200-400	2.0 fish/gill net hour

CT = cutthroat trout RBT
= rainbow trout

RECOMMENDATIONS

1. Return Valhalla and Neck Island lakes to the stocking program. Stock on a three-year rotation with 500 westslope cutthroat trout starting in 1997.

2. Survey 14 lakes on 1995 stocking schedule to determine level of natural recruitment.

3. Increase volunteer survey effort.

JOB PERFORMANCE REPORT

State of: Idaho

Name: Fisheries Management F-71-R-18

Project I: Surveys and Inventories

Subproject I-B: Clearwater Region

Job: b

Title: Lowland Lakes Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Idaho Department of Fish and Game personnel stocked 231,363 catchable rainbow trout *Oncorhynchus mykiss* in lowland lakes and ponds in the Clearwater Region in 1993.

A standard lake survey in Mann Lake indicated a healthy population of largemouth bass *Micropterus salmoides* and effective control on forage species. Game fish dominate the fish community with 94% of the fish and 86.4% of fish biomass. Annual water level fluctuations reducing littoral habitat and cover plan an important role in predator/prey interactions.

A standard lake survey in Spring Valley Reservoir indicated bluegill sunfish *Lepomis macrochirus* introduced as prey for largemouth bass are having a positive effect on growth rates and size structure. The survey sample was comprised totally of game fish.

Anglers spent an estimated 155,162 hours fishing to catch 176,570 fish from six lowland lakes in the Clearwater Region in 1993. Lowland lakes supported an average of 378 hours of angling effort per acre in 1993.

Authors:

Ed Schriever
Regional Fisheries Biologist

Monte Reid
Fisheries Biological Aide

OBJECTIVES

1. Perform standard lowland lake surveys on Mann Lake and Spring Valley Reservoir fish communities.

2. Evaluate growth, relative abundance, composition in the creel, and catch rates of fingerling rainbow trout stocked in lowland lakes.

3. Perform creel census on six lowland lakes in the Clearwater Region.

METHODS

We performed standard fish community surveys in Mann Lake and Spring Valley Reservoir using standard survey procedures (Appendix A).

We sampled fish in lowland lakes using pulsed D.C. current from a portable generator and a Coffelt VVP-2E pulsator. Booms and electrodes were mounted on a 16-foot john boat. All electrofishing took place between 2000 hours and 0200 hours. We sampled trout and kokanee *Oncorhynchus nerka kennerlyi* in lowland lakes with gill nets. We used standard floating experimental gill nets 150 ft long by 6 ft deep with six panels of different size mesh. Mesh sizes were 3/4 in, 1 in, 1-1/4 in, 2 in, and 2-1/2 in. One or two nets were set and fished from late afternoon until early morning. Total net hours were recorded with the catch.

Age and growth estimates were made from scale analysis. Scales were dried and cleaned. Impressions were made in acetate slides using a heated press. Impressions were read on a microfiche reader. Where possible, five scales from each centimeter of the length distribution were read. This age distribution was applied to the total length distribution sample to produce a population age frequency.

Creel survey checks were made by regional fishery management staff and conservation officers. We recorded the number of anglers, total hours fished, and species or type of fish caught. Lengths of species or types of fish were also recorded. We used the creel census computer program developed by Idaho Department of Fish and Game (IDFG) to calculate expanded estimates and confidence intervals.

To differentiate stocking groups in the creel, we marked Spokane strain rainbow trout with an adipose fin clip and domestic Kamloops rainbow trout with a left ventral fin clip prior to stocking. Early spawning kokanee and cutthroat/rainbow trout hybrids were identified by visual observation. Catchable rainbow trout were identified by sight, mostly by visible fm erosion. Wild/natural rainbow trout were also identified by sight, generally with no signs of fin deformity or erosion.

RESULTS

General

Department personnel stocked 195,508 catchable trout in lowland lakes in the Clearwater Region in 1993 (Table 1). We stocked 35,855 catchable trout in small ponds in the Clearwater Region in 1993.

Standard Lake Surveys

Mann Lake

Mann Lake is a 143-acre reservoir located in Nez Perce County, two miles east of Lewiston, Idaho. Mean depth is 21 feet with a maximum depth of 49 feet (Figure 1). Mann Lake is located at elevation 1,800 feet mean sea level and is the final storage basin in the Lewiston Orchards Irrigation District's (LOID) watershed (Figure 2).

The reservoir was originally constructed in 1907. Additional height was added to the dam in the 1950s. Mann Lake was most recently drained for repair in 1984.

Annual water level fluctuations are commonplace. Reductions in water level typically occur in summer months correlating to residential irrigation demand. The reservoir remains below full pool until refill in the following spring. The magnitude of annual fluctuations depends on water yield in the LOID-managed watershed and irrigation demand. Annual variations in water level fluctuation timing (up or down) can have major effects on spawning success of warmwater species.

Dropping water level late in the summer is beneficial to predator/prey interactions and has a positive benefit for largemouth bass production.

IDFG stocks catchable size rainbow trout in Mann Lake in spring and fall months. Fingerling trout are stocked in May or June. We stocked 6,300 lake trout *Salvelinus namaycush* in October 1992.

There are seven species of game fish in Mann Lake: rainbow trout, lake trout, largemouth bass, black crappie *Pomoxis nigromaculatus,* bluegill sunfish, pumpkinseed sunfish *Lepomis gibbosus,* and channel catfish *Ictalurus punctatus.* The only species of non-game fish documented is largescale sucker *Catostomus macrocheilus*.

Statewide general fishing regulations apply for all species in Mann Lake.

Six species of game fish combined to produce 94% of the total catch and 86.4% of the catch biomass. Rainbow trout were not included in the total catch.

Largemouth bass and black crappie represented 35.6% and 23.8% of the catch, respectively (Table 2). After rainbow trout, these are the two most highly sought after game fish in Mann Lake.

Table 1. Catchable trout stocking in Clearwater Region lowland lakes, 1993.

	Numbers of fish by month						
Water	April	May	June	July	August	October	Total
Elk Creek Reservoir		10,000	10,020	10,190	--	--	30,210
Mann Lake	10,260	11,990	10,040	--	--	10,000	42,290
Moose Creek Reservoir	5,540	5,000	5,110	--	--	5,000	20,650
Soldiers Meadow Reservoir	5,040	5,040	4,990	--	--	--	15,070
Spring Valley Reservoir	9,990	9,990	10,020	--	5,000	10,000	45,000
Winchester Lake	12,140	10,008	5,040	--	5,020	10,080	42,288
TOTAL	42,970	52,028	45,220	10,190	10,020	35,080	195,508

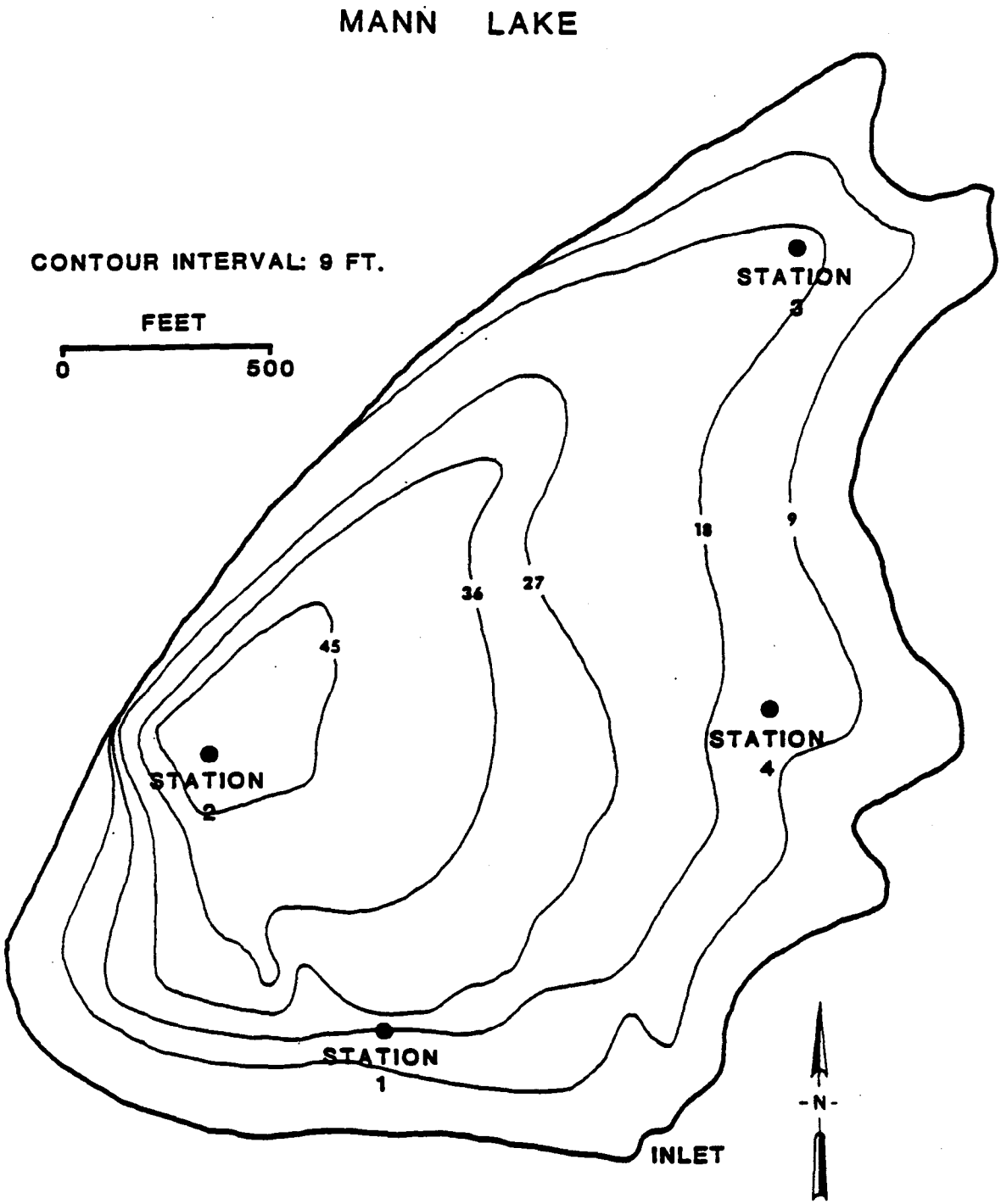

Figure 1. Bathymetric map of Mann Lake with lake and tributary sampling stations (1980 mapping).

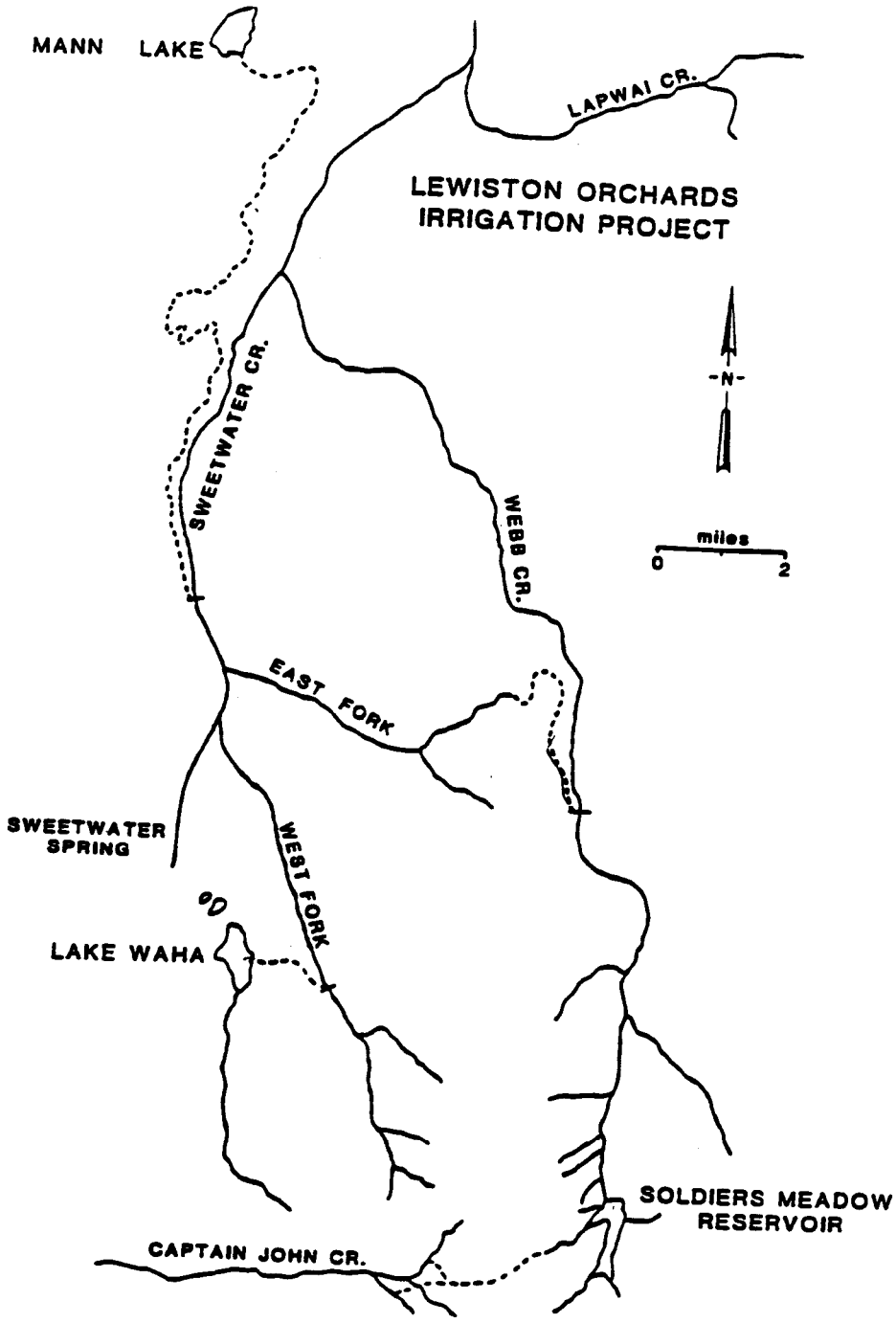

Figure 2. Lewiston Orchards Irrigation District watershed, Nez Perce County, Idaho.

Table 2. Mann Lake standard survey findings of fish community characteristics, May 18, 1993.

Species	Length-range (mm)	Catch per unit of combined gear sampling effort[s] No.	%	Weight (kg)	%
Game fish					
Largemouth bass	150-429	28.5	35.6	15.5	56.0
Bluegill sunfish	100-209	8.0	10.0	0.9	3.4
Black crappie	70-309	19.0	23.8	4.3	15.6
Pumpkinseed sunfish	80-239	11.5	14.4	0.8	2.8
Lake trout	290-419	6.5	8.1	1.6	5.8
Channel catfish	400-439	1.0	1.3	0.8	2.8
	Subtotal	75	94	24	86
Non-game fish					
Largescale sucker	400-460	5.5	6.0	3.5	12.7
All Species Total		80	100	27	100

'One hour electrofishing, one trap net night, and one combined floating and sinking gill net night.

Largemouth bass had a Proportional Stock Density (PSD) of 91. Approximately 70% of the largemouth bass sample was represented by legal size (12-in minimum) bass. Relative weights (W_r) for largemouth bass range from the high 80% to low 90% range (Table 3). Length at annuli back-calculated for largemouth bass (Table 4) was consistent with regional averages, requiring about five years to produce 12-in bass. Relative weights for black crappie generally fell in the 80 percentile range (Table 5). A 10-in crappie is four years old in Mann Lake (Table 6).

Bluegill sunfish represent 10.0% of the Mann Lake fish community sample. Bluegill sunfish are somewhat desirable to anglers as they attain lengths of 9.0 inches (230 mm) (Table 7). Bluegill sunfish display relative weights generally less than 100 (Table 7). Pumpkinseed sunfish represent 14.4% of the fish community and are not sought by anglers as their maximum size is 6 in (150 mm) (Table 8).

Bluegill and pumpkinseed sunfish are the preferred forage for largemouth bass in Mann Lake. Combined, these prey species represent nearly 25% of the fish community and 6.2% of the biomass. Length at annuli does not indicate stunting in either of these prey species (Tables 9 and 10).

Channel catfish represent the smallest segment of the game fish community and comprise only 1.3% of the total catch and 2.8% of the catch biomass.

The bass population in Mann Lake is unbalanced, weighted heavily to large fish. This is most likely a result of good recruitment following refill in 1985, followed by years of relatively poor recruitment. This is not uncommon among largemouth bass populations in this region. Water level fluctuations in Mann Lake appear to have a positive influence on predator/prey interactions, making small bluegill and pumpkinseed sunfish vulnerable to predation thus keeping prey numbers low.

Spring Valley Reservoir

Spring Valley Reservoir is a 49-acre reservoir located in Latah County, eight miles east of Troy, Idaho. Mean depth is approximately 12 feet with a maximum depth of 29 feet (Figure 3). Spring Valley Reservoir is located at an elevation of 2,382 feet above sea level.

Spring Valley Reservoir was constructed in 1961 by IDFG to create a recreational fishery. The spillway was reconfigured in 1993 to meet Idaho Department of Water Resources dam safety specifications. Trout populations are maintained by stocking. IDFG stocks catchable and fingerling size rainbow trout in spring and fall months. Other species present are largemouth bass, bluegill sunfish, tiger muskie *Esox lucius x E. masquinongy,* smallmouth bass, and black crappie. Smallmouth bass and black crappie are recent illegal introductions.

Spring Valley Reservoir is open to fishing year-round with statewide general regulations applying to all fish species present.

Three species of game fish combined to produce 100% of the catch. Largemouth bass were the most abundant game fish accounting for 57.5% of the total catch and 71.8% of the catch biomass. Bluegill sunfish accounted for 41.6% of the total catch and 27.9% of the catch biomass. Black crappie represented less than 1% of the catch (Table 11). Rainbow trout were not included in the catch as stocking took place just prior to the survey.

Table 3. Catch composition of largemouth bass from Maim Lake standard survey, May 18, 1993.

Length range (nun)	No. per unit effort	Percent of sample	Mean weight (grams)	Relative weight	Ages
100	0	0	0	0	0
110	0	0	0	0	0
120	0	0	0	0	0
130	0	0	0	0	0
140	0	0	0	0	0
150	0.5	2.2	37.00	78	2+
160	2.5	10.9	49.20	86	2+
170	2.0	8.7	65.25	94	2+
180	0	0	0	0	0
190	0	0	0	0	0
200	0	0	0	0	0
210	0	0	0	0	0
220	0	0	0	0	0
230	0	0	0	0	0
240	0.5	2.2	150.00	74	2+
250	0	0	0	0	0
260	0.5	2.2	245.00	94	3+
270	0	0	0	0	0
280	0	0	0	0	0
290	0.5	2.2	322.00	88	3+
300	0.5	2.2	370.00	91	4+
310	1.5	6.5	383.33	85	4+
320	1.5	6.5	443.33	89	4+
330	1.5	6.5	463.33	84	5+
340	2.5	10.9	554.00	91	5+, 6+
350	1.5	6.5	593.33	89	6+
360	2.0	8.7	662.50	91	6+
370	1.5	6.5	746.67	94	6+, 7+
380	2.5	10.9	734.00	85	7+
390	1.5	6.5	833.33	89	7+
400	0	0	0	0	0

Age group	Number aged	---Back-calculated length (mm) at each annulus--- 1	2	3	4	5	6	7	Length at capture
1	0	0	0	0	0	0	0	0	0
2	11	74.3	165.1	0	0	0	0	0	172.4
3	3	91.7	181.9	281.0	0	0	0	0	291.3
4	5	81.8	129.2	230.6	301.3	0	0	0	312.0
5	6	71.8	109.3	183.1	262.7	329.2	0	0	336.3
6	9	83.1	123.3	176.9	237.1	294.7	347.4	0	357.2
7	12	71.9	108.1	151.6	205.3	261.1	320.5	381.0	391.0
Ave. length		77.0	132.0	185.9	240.0	287.5	332.0	381.0	
Number aged		46	46	35	32	27	21	12	

Table 5. Catch composition of black crappie from Mann Lake standard survey, May 18, 1993.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (grams)	Relative weight	Ages
50	0	0	0	0	0
60	0	0	0	0	0
70	0.5	2.6	4.00	89	1+
80	0	0	0	0	0
90	0	0	0	0	0
100	0.5	2.6	9.00	65	2+
110	0	0	0	0	0
120	0	0	0	0	0
130	0	0	0	0	0
140	0	0	0	0	0
150	0.5	2.6	38.00	74	2+
160	0	0	0	0	0
170	0.5	2.6	148.00	193	2+
180	0	0	0	0	0
190	0	0	0	0	0
200	0	0	0	0	0
210	0.5	2.6	110.00	72	3+
220	3.0	15.8	151.80	85	3+
230	2.5	13.2	188.80	92	3+
240	2.0	10.5	214.50	91	3+, 4+
250	1.0	5.3	235.50	87	4+
260	0.5	2.6	250.00	81	4+
270	2.0	10.5	297.50	85	5+
280	2.5	13.2	309.75	79	5+
290	1.5	7.9	316.67	72	5+
300	1.5	7.9	386.67	79	5+

Table 6. Back-calculated length at annuli of black crappie from Mann Lake, May 18, 1993.

Age group	Number aged	---Back-calculated length (mm) at each annulus--- 1	2	3	4	5	6	7	Length at capture
1	1	60.7	0	0	0	0	0	0	70.0
2	2	67.2	152.3	0	0	0	0	0	161.0
3	14	85.3	157.7	220.4	0	0	0	0	228.8
4	5	84.8	139.6	201.0	249.6	0	0	0	255.2
5	13	88.4	152.4	201.6	242.9	277.6	0	0	285.6
6	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	
Ave. length		84.6	152.7	209.7	231.9	277.6	0	0	
Number aged		35	34	32	19	13	0	0	

Table 7. Catch composition of bluegill sunfish from Mann Lake standard survey, May 18, 1993.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (grams)	Relative weight	Ages
100	0.5	5.9	21.00	99	2+
110	0	0	0	0	
120	0.5	5.9	41.00	108	2+
130	0.5	5.9	45.00	92	2+
140	0	0	0	0	
150	0	0	0	0	
160	0.5	5.9	60.00	63	3+
170	0.5	5.9	127.00	110	3+
180	2.0	23.5	117.75	85	3+
190	2.5	29.4	161.20	97	3+
200	1.0	11.8	160.00	82	3+
210	0	0	0	0	
220	0	0	0	0	
230	0.5	5.9	280.00	91	3+
240	0	0	0	0	
250	0	0	0	0	

Table 8. Catch composition of pumpkinseed sunfish from Mann Lake standard survey, May 18, 1993.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (grams)
50	0	0	0
60	0	0	0
70	0	0	0
80	1.5	13.0	11.00
90	0	0	0
100	2.5	21.7	20.00
110	0.5	4.3	28.00
120	1.0	8.7	44.00
130	2.0	17.4	43.25
140	0.5	4.3	65.00
150	0	0	0
160	0	0	0
170	0	0	0
180	1.5	13.0	110.00
190	1.5	13.0	159.60
200	0	0	0
210	0	0	0
220	0	0	0
230	0.5	4.3	200.00
240	0	0	0
250	0	0	0

Table 9. Back-calculated length at annuli of bluegill sunfish from Mann Lake, May 18, 1993.

Age group	Number aged	---Back-calculated length (mm) at each annulus--- 1	2	3	4	5	6	7	Length at capture
1	0	0	0	0	0	0	0	0	0
2	1	63.6	121.3	0	0	0	0	0	129.0
3	12	67.4	123.7	183.1	0	0	0	0	190.4
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0		0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
Ave. length		67.1	123.5	183.1	0	0	0	0	
Number aged		13	13	12	0	0	0	0	

Table 10. Back-calculated length at annuli of pumpkinseed sunfish from Mann Lake, May 18, 1993.

Age group	Number aged	---Back-calculated length (mm) at each annulus--- 1	2	3	4	5	6	7	Length at capture
1	3	77.3	0	0	0	0	0	0	82.3
2	8	64.3	118.6	0	0	0	0	0	124.5
3	5	76.0	140.9	180.2	0	0	0	0	188.2
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
Ave. length		70.4	127.2	180.2	0	0	0	0	
Number aged		16	13	5	0	0	0	0	

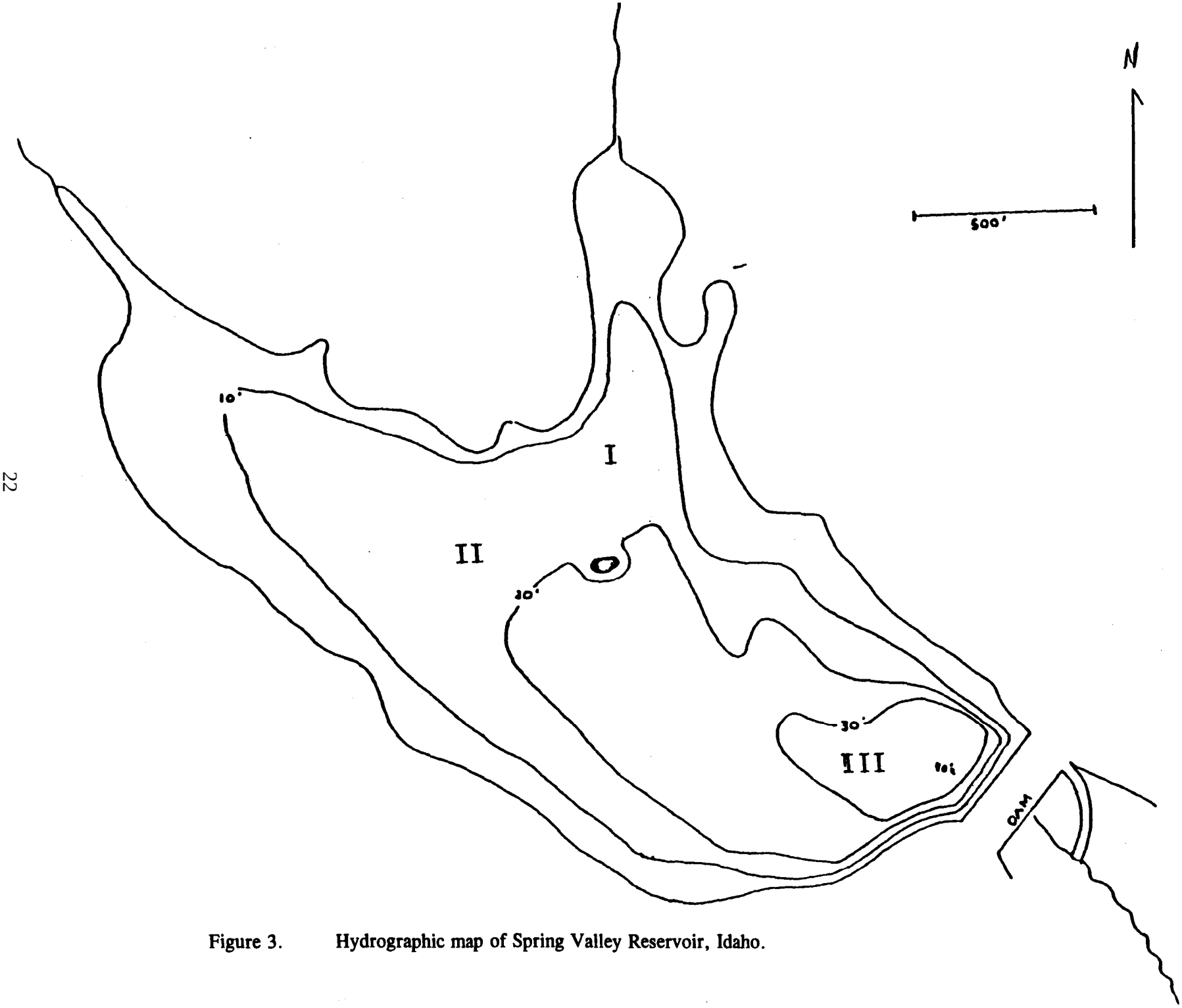

Figure 3. Hydrographic map of Spring Valley Reservoir, Idaho.

Table 11. Spring Valley Reservoir standard survey findings of fish community characteristics, May 21, 1993.

	Catch per unit of combined gear sampling effort'				
Species	Length-range (mm)	No.	%	Weigh (kg)	%
Game fish					
Largemouth bass	50-399	470	57.5	16.2	71.8
Bluegill sunfish	50-209	340	41.6	6.3	27.9
Black crappie	70-129	7	0.86	0.05	0.22
	Subtotal	817	100	22.55	100
Non-game fish	0	0	0	0	0
All Species Total		817	100	22.55	100

'One hour electrofishing, one trap net night, and one combined floating and sinking gill net night.

Relative weight of largemouth bass ranged from high 70s to low 100s (Table 12). Back-calculated length at annuli is similar to other regional waters (Table 13). However, this represents a 20% increase in incremental annual growth from 1987 data. PSD increased from 8 in 1992 to 91 in 1993. This is attributed to increased survival of larger bass (greater than 12 inches) and a weak year-class of bass in the 10- to 12-inch range.

Maximum size of bluegill sunfish was 190 mm (Table 14). This is a 30 mm increase from 1992 and indicates a full complement of year classes since introduction in 1990. Bluegill growth does not indicate stunting (Table 15); however, 1993 represents the first year that age 4 bluegill sunfish were present in Spring Valley Reservoir.

Creel Surveys

General

We estimated total angling effort on six lowland lakes in the Clearwater Region at 155,162 hours during 1993. Effort ranged from a high of 43,030 hours on Winchester Lake to a low of 14,080 hours on Moose Creek Reservoir. Annual effort per acre ranged from a high of 652 on Spring Valley Reservoir to a low of 148 on Soldiers Meadow Reservoir (Table 16).

Catch rate averaged 1.13 fish caught per hour and .96 fish kept per hour of fishing on regional lowland lakes (Table 16).

Winchester Lake

Effort

We estimated the total angling effort on Winchester Lake during 1993 at 43,030 hours. Effort consisted of 83% bank, 7% float tube or non-motorized boat, 5% electric motorized boat, and 5% ice anglers. Effort estimates ranged from a low of 40 hours during interval 5 (February 26 to March 11) to a high of 6,045 hours during interval 14 (July 2 to July 15) (Table 17). Winchester Lake supports the second heaviest use of regional lowland lakes with 574 hours of effort per acre annually (Table 16).

Catch Rate

Anglers caught an estimated 47,900 fish from Winchester Lake in 1993 (647 fish/acre) providing a catch rate throughout the census of 1.11 fish/h. Catch rate was zero prior to trout stocking during interval 7. Catch rate was highest during interval 23 (November 5 to November 18) at 2.89 fish/h. Anglers harvested an estimated 41,317 fish (558 fish/acre) resulting in a harvest rate of 0.96 fish kept/h fished in 1993 (Table 17).

Table 12. Catch composition of largemouth bass from Spring Valley Reservoir standard survey, May 21, 1993.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (grams)	Relative weight	Ages
50	16	3.4	ND	ND	ND
60	55	11.8	ND	ND	ND
70	89	19.0	ND	ND	ND
80	44	9.4	ND	ND	ND
90	6	1.3	ND	ND	ND
100	1	0.2	ND	ND	ND
110	0	0	0	0	0
120	16	3.4	ND	ND	ND
130	33	7.1	ND	ND	ND
140	61	13.0	42.00	110	2+
150	48	10.3	50.00	106	2+
160	31	6.6	60.75	106	2+
170	15	3.2	64.50	93	2+
180	7	1.5	80.50	97	2+
190	7	1.5	93.80	96	2+,3+
200	3	0.6	109.00	95	3+
210	5	1.1	123.20	92	3+
220	3	0.6	134.67	87	3+
230	5	1.1	140.20	79	3+
240	0	0	0	0	0
250	1	0.2	176.00	76	3+
260	0	0	0	0	0
270	0	0	0	0	0
280	0	0	0	0	0
290	1	0.2	260.00	71	4+
300	0	0	0	0	0
310	2	0.4	380.00	84	4+
320	1	0.2	430.00	86	4+
330	3	0.6	468.33	85	4+
340	3	0.6	512.50	85	4+
350	4	0.9	646.25	97	4+,5+,6+
360	5	1.1	677.00	93	5+,6+
370	1	0.2	750.00	95	6+
380	0	0	0	0	0
390	2	0.4	960.00	103	6+
400	0	0	0	0	0

Table 13. Back-calculated length at annuli of largemouth bass from Spring Valley Reservoir, May 21, 1993.

Age group	Number aged	1	---Back-calculated length (mm) at each annulus--- 2	3	4	5	6	7	Length at capture
1	0	0	0	0	0	0	0	0	0
2	33	85.3	155.9	0	0	0	0	0	160.0
3	20	71.6	147.6	205.7	0	0	0	0	211.2
4	11	83.1	151.5	225.9	319.1	0	0	0	329.3
5	4	78.1	135.7	190.8	255.3	353.3	0	0	361.5
6	7	73.0	120.6	173.3	233.1	291.8	365.4	0	369.9
7	0	0	0	0	0	0	0	0	0
Ave. length		79.8	148.7	204.2	280.1	314.1	365.4	0	
Number aged		75	75	42	22	11	7	0	

Table 14. Catch composition of bluegill sunfish from Spring Valley Reservoir standard survey, May 22, 1993.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (grams)	Relative weight	Ages
50	24	7.1	ND	ND	ND
60	0	0	0	0	0
70	9	2.6	ND	ND	ND
80	16	4.7	ND	ND	ND
90	41	12.1	ND	ND	ND
100	47	13.8	ND	ND	ND
110	50	14.7	ND	ND	ND
120	30	8.8	34.00	90	2+
130	19	5.6	48.00	98	2+,3+
140	26	7.6	61.40	99	3 +
150	26	7.6	75.20	97	3 +
160	19	5.6	91.40	96	3+,4+
170	21	6.2	107.00	92	4+
180	7	2.1	113.75	82	4 +
190	3	0.9	135.33	82	4 +
200	2	0.6	175.00	89	4+

Table 15. Back-calculated length at annuli of bluegill sunfish from Spring Valley Reservoir, May 22, 1993.

Age group	Number aged	---Back-calculated length (mm) at each annulus--- 1	2	3	4	5	6	7	Length at capture
1	0	0	0	0	0	0	0	0	0
2	24	40.2	98.3	0	0	0	0	0	107.3
3	13	33.6	74.4	146.1	0	0	0	0	151.8
4	20	40.4	110.1	142.4	170.9	0	0	0	175.5
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
Ave. length		38.8	97.0	143.8	170.9	0	0	0	
Number aged		57	57	33	20	0	0	0	

Table 16. Lowland lake creel survey findings, 1993.

Water	Effort hours	---Catch--- Caught	Kept	Catch rate --(f/hr)-- Caught	kept	Size (acres)	Hr/acre	Catch per acre	Harvest per acre
Winchester Lake	43,030	47,900	41,317	1.11	0.96	75	574	639	551
Mann Lake	30,994	31,885	28,471	1.03	0.92	100	310	319	285
Spring Valley Res.	35,226	34,164	27,417	0.97	0.78	54	652	633	508
Elk Creek Reservoir	16,859	22,155	17,027	1.31	1.01	48	351	462	355
Soldiers Meadow	14,973	22,385	17,620	1.50	1.18	101	148	222	174
Moose Creek Res.	14,080	18,081	16,990	1.28	1.21	33	427	548	515
Total/average	155,162	176,570	148,842	1.14	0.96	411	378	430	362

Table 17. Summary of angler effort, catch, and catch rate by interval on Winchester Lake, 1993. Hours +/- represent 95% confidence interval.

	Effort		Catch		Catch rate	
Interval	Total hours	Hours +/-	Fish caught	Fish kept	Fish/hr caught	Fish/hr kept
1	ND	--	--	--	--	--
2	228	48	0	0	0	0
3	209	382	0	0	0	0
4	114	228	0	0	0	0
5	40	0	0	0	0	0
6	ND	--	--	--	--	--
7	414	544	56	56	0.14	0.14
8	368	424	113	113	0.31	0.31
9	2,088	965	1,354	1,354	0.65	0.65
10	3,175	783	2,318	2,318	0.73	0.73
11	4,368	1,490	3,823	3,823	0.88	0.88
12	3,099	1,266	1,635	1,635	0.53	0.53
13	1,905	1,483	1,834	1,834	0.96	0.96
14	6,045	1,617	3,620	3,541	0.60	0.59
15	4,515	1,312	4,278	3,381	0.95	0.75
16	2,492	0	3,904	1,743	1.57	0.70
17	2,548	896	1,426	1,281	0.56	0.50
18	2,733	872	3,605	2,839	1.32	1.04
19	1,344	869	4,111	2,728	3.06	2.03
20	1,357	594	2,676	2,135	1.97	1.57
21	1,955	0	5,652	5,652	2.89	2.89
22	1,426	661	1,453	1,453	1.02	1.02
23	606	296	1,902	1,730	3.14	2.85
24	368	276	264	264	0.72	0.72
25	92	130	115	115	1.25	1.25
26	1,541	1,054	3,761	3,322	2.44	2.16
Total	43,030	4,121	47,900	41,317	1.11	0.96

Harvest and Catch Composition

Of the 47,900 fish caught from Winchester Lake during 1993, 6,584 were released and 41,317 were harvested (Table 18). Trout dominated the harvest, accounting for 98.6% of all fish kept. The remaining harvest is represented by 1.2% largemouth bass and 0.2% brown bullhead.

Of the 40,732 trout harvested from Winchester Lake during 1993, 62.7% were stocked as catchable size fish in 1993, 38.8% were stocked as 3-inch fingerlings in June 1993, and 2% were fmgerlings planted the previous fall (Table 19).

The majority of released fish were spring-stocked fingerlings returned between interval 15 through 20 because of their relatively small size (Table 17).

Yield

Fish yield from Winchester Lake in 1993 was estimated at 18,523 pounds, 250.3 pounds/acre. Trout accounted for 96.5% of the yield (Table 20).

Return Rate

We stocked 42,288 catchable size trout in Winchester Lake in 1993 (Table 1). Harvest of catchable trout was estimated at 25,573 (345/acre) resulting in an estimated return rate of 60.5% (Table 21). Estimated harvest of 13,061.2 pounds of trout from 18,227 pounds stocked equals 71.7% return by weight (Table 22). Catchable trout stocked in 1993 continue to return to the creel beyond the termination of this reporting period.

Spokane strain rainbow trout fingerlings were stocked on June 2, 1993. This fish began contributing to the creel in interval 14. A harvest estimate of 14,549 (210/acre) from 30,000 stocked provides an estimated return rate of 48.5% (Table 21).

Estimated harvest of 4,525.9 pounds of trout from 549 pounds stocked equals 830% return by weight (Table 22). Spokane strain trout continue to return to the creel beyond the termination of this reporting period.

Two groups of fingerling trout stocked in Winchester in October 1993, returned at relatively low rates, due primarily to a partial winter kill in Winchester Lake in December 1993. Rainbow x cutthroat hybrids returned at an estimated 5.1%, resulting in harvest of 254 fish (3.4/ acre) (Table 21). Estimated harvest of 181 pounds of trout from 83 pounds stocked equals 219% return by weight (Table 22). Domestic Kamloops returned at an estimated 3.6%, resulting in an estimated harvest of 356 fish (4.8/acre) (Table 21). Estimated harvest of 95 pounds of trout from 833 pounds stocked equals 11% return by weight (Table 22).

Table 18. Summary of total catch, fish harvested, and fish released in Winchester Lake, 1993. Low and high bounds represent 95% confidence intervals.

	Point estimate	Fish/ acre	---- 95 % confidence interval low bound	high bound
Catch	47,900	647	38,901	56,899
Harvest	41,317	558	33,368	49,428
Release	6,584	89	3,469	9,699

Table 19. Summary of trout harvest and contribution to creel by interval and stocking group in Winchester Lake, 1993.

Interval	Dates	Total hours	Trout harvested	Catchable trout	%	Spokane rainbow	%	CT x RB hybrid	%	K1 1 vent	%
1	1/1 - 1/14	ND	--	--	--	--	--	--	--	--	--
2	1/15 - 1/28	228	0	0	0	0	0	0	0	0	0
3	1/29 - 2/11	209	0	0	0	0	0	0	0	0	0
4	2/12-2/25	114	0	0	0	0	0	0	0	0	0
5	2/26 - 3/11	40	0	0	0	0	0	0	0	0	0
6	3/12 - 3/25	ND	--	--	--	--	--	--	--	--	--
7	3/26 - 4/8	414	56	56	100	0	0	0	0	0	0
8	4/9 - 4/22	368	87	72	83	0	0	0	0	15	17
9	4/23 - 5/6	2,088	1,132	872	77	235	21	25	2	0	0
10	5/7 -5/20	3,175	2,299	1,958	85	0	0	21	1	320	14
11	5/21 - 6/3	4,368	3,825	3,690	96	0	0	135	4	0	0
12	6/4 - 6/17	3,099	1,635	1,635	100	0	0	0	0	0	0
13	6/18 - 7/1	1,905	1,727	1,727	100	0	0	0	0	0	0
14	7/2 - 7/15	6,045	3,514	3,445	98	69	2	0	0	0	0
15	7/16 - 7/29	4,515	3,224	2,906	90	276	9	21	1	21	1
16	7/30 - 8/12	2,492	1,744	1,003	58	741	42	0	0	0	0
17	8/13 - 8/26	2,548	1,272	1,004	79	268	21	0	0	0	0
18	8/27 - 9/9	2,733	2,816	1,691	60	1,125	40	0	0	0	0
19	9/10 - 9/23	1,344	2,728	760	28	1,968	72	0	0	0	0
20	9/24 - 10/7	1,357	2,135	991	46	1,144	54	0	0	0	0
21	10/8 - 10/21	1,955	5,652	427	8	5,225	92	0	0	0	0
22	10/22 - 11/4	1,426	1,453	1,009	69	444	31	0	0	0	0
23	11/5 - 11/18	606	1,730	1,290	75	440	25	0	0	0	0
24	11/19 - 12/2	368	264	88	33	176	67	0	0	0	0
25	12/3 - 12/16	130	115	69	60	46	40	0	0	0	0
26	12/17 - 12/31	1,541	3,324	880	26	2,392	72	52	2	0	0
	Total	43,030	40,732	25,573	62.7	14,549	35.8	254	0.6	356	0.9
	95% CI	±4,121	NA	±6,167		±4,471		±204		±330	

Group or species	Pounds	Lbs/acre	Percent of total
Catchable trout	13,061.2	176.5	70.5
Spokane strain	4,525.9	61.2	24.5
Domestic Kamloops	95.0	1.3	0.5
R x C hybrid	181.0	2.4	1.0
Trout subtotal	17,863.1	241.4	96.5
Largemouth bass	576.0	7.8	3.1
Brown bullhead	84.0	1.1	0.4
Subtotal	660.0	8.9	3.5
TOTAL	18,523.1	250.3	100.0

Table 21. Return rates (numerical) of various trout stocking groups in Winchester Lake, 1993.

Stocking group	Number stocked	Size (inches)	Number harvested'			Percent return'		
			estimate	low	high	estimate	low	high
Catchable	42,288	9-12	25,573	19,406	31,740	60.5	45.9	75.1
Spokane	30,000	3	14,549	10,078	19,020	48.5	33.6	63.4
Kamloops	10,000	5-7	356	26	680	3.6	0.3	6.8
Hybrids	5,000	3	254	50	458	5.1	1.0	9.2

'High and low estimates are based on 95% confidence interval.

Table 22. Return rates (by weight) of various trout stocking groups in Winchester lake, 1993.

Stocking group	Pounds stocked	Size (inches)	Pounds harvested	Percent return by weight
Catchable	18,227	9-12	13,061.2	72
Spokane	545	3	4,525.9	830
Kamloops	833	5-7	95.0	11
Hybrids	83	3	181.0	219

Spring Valley Reservoir

Effort

We estimated the total angling effort on Spring Valley Reservoir during 1993 at 35,226 hours. Effort consisted of 78.5% bank, 13.9% float tube or non-motorized boat, 2.3% electric motorized boat, and 5.3 % ice anglers. Effort estimates ranged from a low of 36 hours during interval 1 (January 1 to January 14) to a high of 5,628 hours during interval 12 (June 4 to June 17) (Table 23). Spring Valley Reservoir supports the heaviest use of regional lowland lakes with 652 hours of effort/acre annually (Table 16).

Catch Rate

Anglers caught an estimated 34,164 fish from Spring Valley Reservoir in 1993 (633 fish/acre), providing a catch rate throughout the census of 0.97 fish/h. Catch rate was zero during interval 1 and 7. Catch rate was highest during interval 19 (September 10 to September 23) at 4.59 fish/h. Anglers harvested an estimated 27,217 fish (508 fish/acre) resulting in a harvest rate of 0.78 fish kept/h fished in 1993 (Table 23).

Harvest and Catch Composition

Of the 34,164 fish caught from Spring Valley Reservoir during 1993, 6,747 were released and 27,417 were harvested (Table 24).

Trout dominated the harvest, accounting for 98.2% of all fish kept. The remaining harvest is represented by 0.8% largemouth bass and 1.0% bluegill.

Of the 24,965 trout harvested from Spring Valley Reservoir during 1993, 97.0% were stocked as catchable size fish in 1993, 2.8% were stocked as 3-inch fmgerlings in June 1993, and 0.2% were fingerlings planted the previous fall.

Yield

Fish yield from Spring Valley Reservoir in 1993 was estimated at 13,037 pounds, 241.2 pounds/acre. Trout accounted for 98.3% of the yield (Table 20).

Table 23. Summary of angler effort, catch, and catch rate by interval on Spring Valley Reservoir, 1993. Hours +/- represent 95% confidence interval.

	Interval	Effort		Catch		Catch rate	
		Total hours	Hours +/-	Fish caught	Fish kept	Fish/hr caught	Fish/hr kept
1	1/1 - 1/14	36		0	0	0	0
2	1/15 - 1/28	144	210	151	110	1.05	0.76
3	1/29 - 2/11	470	475	1,425	1,291	3.03	2.75
4	2/12 - 2/25	190	228	27	27	0.14	0.14
5	2/26 - 3/11	ND	--	--	--	--	--
6	3/12 – 3/25	315	--	570	210	1.81	0.67
7	3/26 – 4/8	184	--	0	0	0	0
8	4/9 - 4/22	1,986	1,363	2,168	611	1.09	0.31
9	4/23 - 5/6	3,232	1,257	2,150	1,759	0.67	0.54
10	5/7 - 5/20	2,150	1,616	1,762	1,762	0.82	0.82
11	5/21 - 6/3	4,121	1,140	4,848	4,848	1.18	1.18
12	6/4 - 6/17	5,628	1,453	4,983	4,983	0.89	0.89
13	6/18 - 7/1	2,910	934	2,440	2,440	0.84	0.84
14	7/2 - 7/15	5,322	1,610	3,081	2,876	0,58	0.54
15	7/16 - 7/29	2,730	--	2,409	993	0.88	0.36
16	7/30 - 8/12	1,078	140	305	237	0.28	0.22
17	8/13 - 8/26	1,209	692	1,468	513	1.21	0.42
18	8/27 - 9/9	625	206	659	296	1.05	0.47
19	9/10 - 9/23	492	360	2,259	1,401	4.59	2.85
20	9/24 - 10/7	598	524	544	145	0.91	0.24
21	10/8 - 10/21	564	115	723	723	1.28	1.28
22	10/22 - 11/4	230	460	544	544	2.37	2.37
23	11/5 - 11/18	161	138	303	303	1.88	1.88
24	11/19 - 12/2	138		138	138	1.00	1.00
25	12/3 - 12/16	115	230	207	207	1.80	1.80
26	12/17 - 12/31	598		1,000	1,000	1.67	1.67
Total		35,226	3,807	34,164	27,417	0.97	0.78

Table 24. Summary of total catch, fish harvested, and fish released in Spring Valley Reservoir, 1993. Low and high bounds represent 95% confidence intervals.

	Point estimate	Fish/ acre	95% Confidence interval	
			low bound	high bound
Catch	34,164	633	28,655	39,673
Harvest	27,417	508	22,785	32,049
Release	6,747	125	3,821	9,661

Return Rate

We stocked 45,000 catchable size trout in Spring Valley Reservoir in 1993 (Table 1). Harvest of catchable trout was estimated at 24,200 (448/acre) resulting in an estimated return rate of 53.8% (Table 25). Estimated harvest of 12,414.6 pounds of trout from 21,422 pounds stocked equals 57.9% return by weight (Table 26). Catchable trout stocked in 1993 continue to return to the creel beyond the termination of this reporting period.

Spokane strain rainbow trout fingerlings were stocked on June 2, 1993. This fish began contributing to the creel in interval 14. A harvest estimate of 578 (10.7/acre) from 20,000 stocked provides an estimated return rate of 2.9% (Table 25). Estimated harvest of 180.2 pounds of trout form 363.6 pounds stocked equals 49.5% return by weight (Table 26). Spokane strain rainbow trout stocked in May of 1992 were present in the harvest during intervals 2, 3, 9, and 10. Estimated harvest was 130 fish.

Domestic Kamloops rainbow trout returned at an estimated 0.6%, resulting in an estimated harvest of 57 fish (1.0/acre) (Table 25). Estimated harvest of 16 pounds of trout from 833 pounds stocked equals 1.9% return by weight (Table 26).

Mann Lake

Effort

We estimated the total angling effort on Mann Lake during 1993 at 30,994 hours. Effort consisted of 82% bank, 13.9% float tube or non-motorized boat, 3.5% electric motorized boat, and 0.6% ice anglers. Effort estimates ranged from a low of 0 hours during intervals 21, 24, and 26, to a high of 4,224 hours during interval 9 (Table 27). Mann Lake supports the second lowest use of regional lowland lakes with 310 hours of effort/acre annually (Table 16).

Catch Rate

Anglers caught an estimated 31,885 fish from Mann Lake in 1993 (319 fish/acre), providing a catch rate throughout the census of 1.03 fish/h. Catch rate was zero during interval 1. Catch rate was the highest during interval 20 (November 5 to November 18) at 3.40 fish/h. Anglers harvested an estimated 28,471 fish (285 fish/acre) resulting in a harvest rate of 0.92 fish kept/h fished in 1993 (Table 27).

Table 25. Return rates (numerical) of various trout stocking groups in Spring Valley Reservoir, 1993.

Stocking group	Number stocked	Size (inches)	Number harvested'			Percent return[a]		
			estimate	low	high	estimate	low	high
Catchable	45,000	10-12	24,200	20,007	28,393	53.8	44.6	63.1
Spokane	20,000	3	578	NA	NA	2.9	NA	NA
Kamloops	10,000	5-7	57	NA	NA	0.6	NA	NA

'High and low estimates are based on 95% confidence interval.

Table 26. Return rates (by weight) of various trout stocking groups in Spring Valley Reservoir, 1993.

Stocking group	Pounds stocked	Size (inches)	Pounds harvested	Percent return by weight
Catchable	21,422.0	10-12	12,414.6	57.9
Spokane	363.6	3	180.2	49.5
Kamloops	883.0	5-7	16.0	1.9

Table 27. Summary of angler effort, catch, and catch rate by interval on Mann Lake, 1993. Hours +/-represent 95% confidence interval.

	Interval	Effort		Catch		Catch rate	
		Total hours	Hours +/-	Fish caught	Fish kept	Fish/hr caught	Fish/hr kept
1	1/1 - 1/14	ND					
2	1/15 - 1/28	ND					
3	1/29 - 2/11	200	307	267	267	1.34	1.34
4	2/12 - 2/25	114	0	0	0	0	0
5	2/26 - 3/11	1,100	0	0	0	0	0
6	3/12 - 3/25	588	0	746	746	1.27	1.27
7	3/26 - 4/8	2,645	1,493	1,941	1,917	0.73	0.72
8	4/9 - 4/22	1,576	738	469	469	0.30	0.30
9	4/23 - 5/6	4,224	2,436	2,451	2,451	0.58	0.58
10	5/7 - 5/20	2,938	1,252	2,576	2,519	0.88	0.86
11	5/21 - 6/3	3,666	1,052	2,642	2,642	0.72	0.72
12	6/4 - 6/17	1,624	782	2,178	2,178	1.34	1.34
13	6/18 - 7/1	1,905	192	1,533	1,249	0.80	0.66
14	7/2 - 7/15	2,511	500	5,013	4,100	2.00	1.63
15	7/16 - 7/29	3,675	1,850	3,933	3,505	1.07	0.95
16	7/30 - 8/12	280	0	622	622	2.22	2.22
17	8/13 - 8/26	1,118	419	1,714	1,567	1.53	1.40
18	8/27 - 9/9	1,025	431	1,533	1,425	1.50	1.39
19	9/10 - 9/23	424	165	1,251	778	2.95	1.83
20	9/24 - 10/7	702	626	2,387	1,407	3.40	2.00
21	10/8 - 10/21	0	0	0	0	0	0
22	10/22 - 11/4	230	266	288	288	1.25	1.25
23	11/5 - 11/18	334	582	341	341	1.02	1.02
24	11/19 - 12/2	0	0	0	0	0	0
25	12/3 - 12/16	115	166	0	0	0	0
26	12/17 - 12/31	0	0	0	0	0	0
Total		30,994		31,885	28,471	1.03	0.92

Harvest and Catch Composition

Of the 31,885 fish caught from Mann Lake during 1993, 3,414 were released and 28,471 were harvested (Table 28).

Trout dominated the harvest, accounting for 95.3% of all fish kept. The remaining harvest is represented by 1.0% largemouth bass, 2.4% black crappie, and 0.1% channel catfish.

Of the 27,124 trout harvested from Mann Lake during 1993, 89.2% were stocked as catchable size fish in 1993, 0.6% were stocked as 3-inch fingerlings in June 1993, and 10.2% were 14-inch lake trout planted the previous fall.

Yield

Fish yield from Mann Lake in 1993 was estimated at 14,653.7 pounds; 138.1 pounds/acre. Trout accounted for 94.3% of the yield (Table 29).

Return Rate

We stocked 42,290 catchable size trout in Mann Lake in 1993 (Table 1). Harvest of catchable trout was estimated at 24,204 (242/acre) resulting in an estimated return rate of 57.2% (Table 30). Estimated harvest of 11,002 pounds of trout from 20,547 pounds stocked equals 53.5% return by weight (Fable 31). Catchable trout stocked in 1993 continue to return to the creel beyond the termination of this reporting period.

Spokane strain rainbow trout fingerlings were stocked on June 3, 1993. These fish began contributing to the creel in interval 15. A harvest estimate of 165 (1.6/acre) from 45,000 stocked provides an estimated return rate of 0.4% (Table 30). Estimated harvest of 55 pounds of trout from 818 stocked equals 6.7% return by weight (Table 31).

Lake trout were stocked in Mann Lake in October 1992. Considerable harvest occurred on these fish prior to the start of this creel census on January 1, 1993. The 2,755 lake trout harvested during 1993 represent 43% of the total stocked (Table 30) and 43% return by weight (Table 31).

Soldiers Meadow Reservoir

Effort

We estimated the total angling effort on Soldiers Meadow Reservoir during 1993 at 14,973 hours. Effort consisted of 84.9% bank, 1.2% float tube or non-motorized boat, 12.9% motorized boat, and 1.0%

Table 28. Summary of total catch, fish harvested, and fish released in Mann Lake, 1993. Low and high bounds represent 95% confidence intervals.

	Point estimate	Fish/ acre	95% Confidence interval low bound	95% Confidence interval high bound
Catch	31,885	319	25,405	38,365
Harvest	28,471	285	23,074	33,868
Release	3,414	34	668	6,160

Group or species	Pounds	Lbs./acre	Percent of total
Catchable trout	11,002	110.00	75.1
Spokane strain	55	0.65	0.4
Lake trout	2,755	27.60	18.8
Trout subtotal	13,812	138.25	94.3
Channel catfish	72	0.7	0.5
Largemouth bass	594	5.9	4.0
Black crappie	172	1.7	1.2
Subtotal	838	8.3	5.7
TOTAL	14,650	146.5	100

Table 30. Return rates (numerical) of various trout stocking groups in Mann Lake, 1993.

Stocking group	Number stocked	Size (inches)	Number harvested'			Percent return'		
			estimate	low	high	estimate	low	high
Catchable	42,490	10-12	24,204	18,861	29,547	57.2	44.6	69.7
Spokane	45,000	3	165	NA	NA	1.6	NA	NA
Lake trout	6,300	14	2,755[b]	1,631	3,879	43.7	25.9	61.6

[a]High and low estimates are based on 95% confidence interval.
[b]Additional harvest occurred prior to this survey.

Table 31. Return rates (by weight) of various trout stocking groups in Mann Lake, 1993.

Stocking group	Pounds stocked	Size (inches)	Pounds harvested	Percent return by weight
Catchable	20,547	10-12	11,002	53.5
Spokane	818	3	55	6.7
Lake trout	6,300	14	2,755	43.0

ice anglers. Effort estimates ranged from a low of 0 hours during interval 23, 24, and 25 to a high of 2,080 hours during interval 11 (Table 32). Soldiers Meadow Reservoir supports the lowest use of regional lowland lakes with 148 hours of effort/acre annually (Table 16).

Catch Rate

Anglers caught an estimated 22,385 fish from Soldiers Meadow Reservoir in 1993 (222 fish/acre), providing a catch rate throughout the census of 1.50 fish/h. Catch rate was lowest during interval 8 at 0.48 fish/h. Catch rate was highest during interval 5 at 11.5 fish/h. Anglers harvested an estimated 17,620 fish (174 fish/acre) resulting in a harvest rate of 1.18 fish kept/h fished in 1993 (Table 32).

Harvest and Catch Composition

Of the 22,385 fish caught from Soldiers Meadow Reservoir during 1993, 4,765 were released and 17,620 were harvested (Table 33). Trout dominated the harvest, accounting for 90.2% of all fish kept. The remaining harvest is represented by 5.0% kokanee and 4.8% black crappie.

Of the 15,888 trout harvested from Soldiers Meadow Reservoir during 1993, 74.8% were stocked as catchable size fish in 1993 and 25.2% were stocked as 3-inch fingerlings in June 1992 and 1993.

The majority of released fish were spring-stocked fingerlings returned between interval 14 through 19 because of their relatively small size.

Yield

Fish yield from Soldiers Meadow Reservoir in 1993 was estimated at 6,249.9 pounds, 61.9 pounds/acre. Salmonids accounted for 96.6% of the yield (Table 34).

Return Rate

We stocked 15,070 catchable size trout in Soldiers Meadow Reservoir in 1993 (Table 1). Harvest of catchable trout was estimated at 11,891 (118/acre) resulting in an estimated return rate of 78.9% (Table 35). Estimated harvest of 5,104.9 pounds of trout from 5,479 pounds stocked equals 93.2% return by weight (Table 36). Catchable trout stocked in 1993 continue to return to the creel beyond the termination of this reporting period.

Spokane strain rainbow trout fingerlings were stocked in June 1992 and 1993. A harvest estimate of 3,997 (39.5/acre) contains 1,667 fish from the 1992 stocking and 2,330 from the 1993 stocking. Return rates for the 1992 and 1993 groups were estimated at 5.9% and 9.3%, respectively (Table 35).

Table 32. Summary of angler effort, catch, and catch rate by interval on Soldiers Meadow Reservoir, 1993. Hours +/- represent 95% confidence interval.

	Interval	Effort		Catch		Catch rate	
		Total hours	Hours +/-	Fish caught	Fish kept	Fish/hr caught	Fish/hr kept
1	1/1 - 1/14	ND	--	--	--	--	--
2	1/15 - 1/28	18	36	90	90	5.00	5.00
3	1/29 - 2/11	ND	--	--	--	--	--
4	2/12 - 2/25	57	114	101	0	1.70	0
5	2/26 - 3/11	80	0	920	440	11.50	5.50
6	3/12 - 3/25	ND	--	--	--	--	--
7	3/26 - 4/8	ND	--	--	--	--	--
8	4/9 - 4/22	288	575	137	137	0.48	0.48
9	4/23 - 5/6	408	720	672	672	1.65	1.65
10	5/7 - 5/20	888	627	1,603	1,603	1.81	1.81
11	5/21 - 6/3	2,080	773	1,771	1,771	0.85	0.85
12	6/4 - 6/17	849	467	458	458	0.54	0.54
13	6/18 - 7/1	1,710	1,364	909	909	0.53	0.53
14	7/2 - 7/15	1,550	707	2,637	1,928	1.70	1.24
15	7/16 - 7/29	1,815	1,793	2,689	1,885	1.48	1.04
16	7/30 - 8/12	1,820	0	3,561	2,746	1.96	1.51
17	8/13 - 8/26	1,430	750	1,675	1,494	1.17	1.04
18	8/27 - 9/9	1,133	763	2,312	1,717	2.04	1.52
19	9/10 - 9/23	640	669	2,633	1,553	4.11	2.43
20	9/24 - 10/7	69	138	55	55	0.80	0.80
21	10/8 - 10/21	92	0	110	110	1.20	1.20
22	10/22 - 11/4	46	92	52	52	1.13	1.13
23	11/5 - 11/18	0	0	0	0	0	0
24	11/19 - 12/2	0	0	0	0	0	0
25	12/3 - 12/16	0	0	0	0	0	0
26	12/17 - 12/31	0	0	0	0	0	0
Total		14,973		22,385	17,620	1.50	1.18

Table 33. Summary of total catch, fish harvested, and fish released in Soldiers Meadow Reservoir, 1993. Low and high bounds represent 95% confidence intervals.

	Point estimate	Fish/ acre	95% Confidence interval	
			low bound	high bound
Catch	22,385	222	15,323	29,447
Harvest	17,620	174	12,918	22,322
Release	4,764	47	2,740	6,788

Table 34. Pounds of fish harvested and yield by fish group or species in Soldiers Meadow Reservoir, 1993.

Group or species	Pounds	Lbs/acre	Percent of total
Catchable trout	5,104.9	50.5	81.6
Spokane strain '92	293.4	2.9	4.7
Spokane strain '93	428.5	4.2	6.8
Early kokanee	211.1	2.1	3.4
Salmonid subtotal	6,037.9	59.8	96.6
Black crappie	212.0	2.1	3.4
TOTAL	6,249.9	61.9	100

Table 35. Return rates (numerical) of various trout stocking groups in Soldiers Meadow Reservoir, 1993.

Stocking group	Number stocked	Size (inches)	Number harvested[a]			Percent return2		
			estimate	low	high	estimate	low	high
Catchable	15,070	10-12	11,891	8,064	15,718	78.9	53.5	104.3
Spokane '92	28,000	3	1,667	NA	NA	5.9	NA	NA
Spokane '93	25,000	3	2,330	NA	NA	9.3	NA	NA
Kokanee '92	10,000	2	882	NA	NA	8.8	NA	NA

[a]High and low estimates are based on 95% confidence interval.

Table 36. Return rates (by weight) of various trout stocking groups in Soldiers Meadow Reservoir, 1993.

Stocking group	Pounds stocked	Size (inches)	Pounds harvested	Percent return by weight
Catchable	5,479	10-12	5,104.9	93.2
Spokane '92	466	3	293.4	62.9
Spokane '93	454	3	428.5	94.4
Kokanee '92	50	2	211.1	422.0

Estimated harvest of 293.4 pounds of trout from 466 pounds stocked in 1992 equals 62.9% return by weight. Estimated harvest of 428.5 pounds of trout from 454 pounds stocked in 1993 equals 94.4% return by weight (Table 36). Spokane strain trout stocked in 1993 continue to return to the creel beyond the termination of this reporting period.

We estimated 882 kokanee were harvested from a plant of 11,000 in 1992. This represents a return rate of 8.8%. Estimated harvest of 211.1 pounds of kokanee from 50 pounds stocked equals 422% return by weight (Table 36).

Elk Creek Reservoir

Effort

We estimated the total angling effort on Elk Creek Reservoir during 1993 at 16,859 hours. Effort consisted of 69.3% bank, 2.7% float tube or non-motorized boat, 27.4% electric motorized boat, and 0.6% ice anglers. Effort estimates ranged from a low of 0 hours during intervals 1, 4, 5, 6, 7, 24, 25, and 26 to a high of 2,521 hours during interval 14 (Table 37). Elk Creek Reservoir supported 351 hours of effort/acre in 1993 (Table 16).

Catch Rate

Anglers caught an estimated 22,155 fish from Elk Creek Reservoir in 1993 (462 fish/acre), providing a catch rate throughout the census of 1.31 fish/h. Catch rate was lowest during interval 21. Catch rate was highest during interval 15 at 2.58 fish/h. Anglers harvested an estimated 17,027 fish (355 fish/acre) resulting in a harvest rate of 1.01 fish kept/h fished in 1993 (Table 37).

Harvest and Catch Composition

Of the 22,155 fish caught from Elk Creek Reservoir during 1993, 5,128 were released and 17,027 were harvested (Table 38). Trout dominated the harvest, accounting for 98.4% of all fish kept. The remaining harvest is represented by 0.7% largemouth and smallmouth bass, and 0.9% black bullhead *Ameiurus melas*.

Of the 16,629 trout harvested from Elk Creek Reservoir during 1993, 94.9% were stocked as catchable size fish in 1993, 0.6% were stocked as 3-inch fmgerlings in June 1992, and 4.5% were naturally-produced brook trout.

Table 37. Summary of angler effort, catch, and catch rate by interval on Elk Creek Reservoir, 1993. Hours +/- represent 95% confidence interval.

	Interval	Effort		Catch		Catch rate	
		Total hours	Hours +/-	Fish caught	Fish kept	Fish/hr caught	Fish/hr kept
1	1/1 - 1/14	ND	--	--	--	--	--
2	1/15 - 1/28	30	60	0	0	0	0
3	1/29 - 2/11	76	76	28	28	0.37	0.37
4	2/12 - 2/25	0	0	0	0	0	0
5	2/26-3/11	0	0	0	0	0	0
6	3/12 - 3/25	0	0	0	0	0	0
7	3/26 - 4/8	0	0	0	0	0	0
8	4/9 - 4/22	383	165	440	414	1.15	1.08
9	4/23 - 5/6	648	522	279	279	0.43	0.43
10	5/7 - 5/20	763	160	470	470	0.62	0.62
11	5/21 - 6/3	1,508	1,010	1,308	1,308	0.87	0.87
12	6/4 - 6/17	1,652	1,104	892	892	0.54	0.54
13	6/18 - 7/1	1,455	1,229	2,045	2,045	1.41	1.41
14	7/2 - 7/15	2,521	1,369	4,734	4,167	1.88	1.65
15	7/16 - 7/29	1,710	0	4,406	2,812	2.58	1.64
16	7/30 - 8/12	2,128	714	1,986	1,082	0.93	0.51
17	8/13 - 8/26	1,872	853	3,445	2,573	1.84	1.37
18	8/27 - 9/9	575	158	593	143	1.03	0.25
19	9/10 - 9/23	824	645	1,272	699	1.54	0.85
20	9/24 - 10/7	46	92	26	0	0.57	0
21	10/8 - 10/21	242	115	0	0	0	0
22	10/22 - 11/4	230	0	115	115	0.50	0.50
23	11/5 - 11/18	196	299	116	0	0.59	0
24	11/19 - 12/2	ND	--	--	--	--	--
25	12/3 - 12/16	ND	--	--	--	--	--
26	12/17 - 12/31	ND	--	--	--	--	--
Total		16,859		22,155	17,027	1.31	1.01

Table 38. Summary of total catch, fish harvested, and fish released in Elk Creek Reservoir, 1993. Low and high bounds represent 95% confidence intervals.

	Point estimate	Fish/ acre	95% Confidence interval	
			low bound	high bound
Catch	22,155	462	15,406	28,904
Harvest	17,027	355	11,546	22,508
Release	5,129	107	3,043	7,215

Yield

Fish yield from Elk Creek Reservoir in 1993 was estimated at 7,820 pounds, 162.9 pounds/acre. Trout accounted for 97.7% of the yield (Table 39).

Return Rate

We stocked 30,210 catchable size trout in Elk Creek Reservoir in 1993 (Table 1). Harvest of catchable trout was estimated at 15,785 (329/acre) resulting in an estimated return rate of 52.2% (Table 40). Estimated harvest of 7,419 pounds of trout from 13,040 pounds stocked equals 56.9% return by weight (Fable 41). Catchable trout stocked in 1993 continue to return to the creel beyond the termination of this reporting period.

Spokane strain rainbow trout fingerlings were stocked on May 2, 1992. A harvest estimate of 104 (2.2/acre) from 10,000 stocked provides an estimated return rate of 1.0% (Table 40).

Estimated harvest of 26 pounds of trout from 167 pounds stocked equals 15.6% return by weight (Table 41).

Moose Creek Reservoir

Effort

We estimated the total angling effort on Moose Creek Reservoir during 1993 at 14,080 hours. Effort consisted of 76.5% bank, 4.2% float tube or non-motorized boat, 16.7% electric motorized boat, and 2.6% ice anglers. Effort estimates reached a high of 2,294 hours during interval 14 (Table 42). Moose Creek Reservoir supported 427 hours of effort/acre in 1993 (Table 16).

Catch Rate

Anglers caught an estimated 18,082 fish from Moose Creek Reservoir in 1993 (548 fish/acre), providing a catch rate throughout the census of 1.28 fish/h. Catch rate was lowest during interval 21. Catch rate was highest during interval 6 at 13.17 fish/h. Anglers harvested an estimated 16,990 fish (515 fish/acre) resulting in a harvest rate of 1.21 fish kept/h fished in 1993 (Table 42).

Table 39. Pounds of fish harvested and yield by fish group or species in Elk Creek Reservoir, 1993.

Group or species	Pounds	Lbs/acre	Percent of total
Catchable trout	7,419	154.6	94.9
Spokane strain	35	0.7	0.4
Brook trout	185	3.8	2.3
Trout subtotal	7,639	159.1	97.7
Small & Largemouth bass	161	3.4	2.1
Brown bullhead	20	0.4	0.2
Subtotal	181	3.8	2.3
TOTAL	7,820	162.9	100

Table 40. Return rates (numerical) of various trout stocking groups in Elk Creek Reservoir, 1993.

Stocking group	Number stocked	Size (inches)	Number harvested[a] estimate	low	high	Percent return[a] estimate	low	high
Catchable	30,210	10-12	15,785	10,823	20,747	52.2	35.8	68.7
Spokane	10,000	3	104	NA	NA	1.0	NA	NA

[a] High and low estimates are based on 95% confidence interval.

Table 41. Return rates (by weight) of various trout stocking groups in Elk Creek Reservoir, 1993.

Stocking group	Pounds stocked	Size (inches)	Pounds harvested	Percent return by weight
Catchable	13,040	10-12	7,419	56.9
Spokane	167	3	26	15.6

Table 42. Summary of angler effort, catch, and catch rate by interval on Moose Creek Reservoir, 1993. Hours +/- represent 95% confidence interval.

	Interval	Effort		Catch		Catch rate	
		Total hours	Hours +/-	Fish caught	Fish kept	Fish/hr caught	Fish/hr kept
1	1/1 - 1/14	ND	--	--	--	--	--
2	1/15 - 1/28	ND	--	--	--	--	--
3	1/29 - 2/11	ND	--	--	--	--	--
4	2/12 - 2/25	ND	--	--	--	--	--
5	2/26 - 3/11	80	0	140	100	1.75	1.25
6	3/12 - 3/25	200	315	2,633	2,633	13.17	13.17
7	3/26 - 4/8	ND	--	--	--	--	--
8	4/9 - 4/22	104	147	155	72	1.49	0.69
9	4/23 - 5/6	752	646	1,438	1,438	1.91	1.91
10	5/7 - 5/20	1,783	391	1,850	1,850	1.04	1.04
11	5/21 - 6/3	1,794	1,158	2,288	2,288	1.28	1.28
12	6/4 - 6/17	1,652	451	832	832	0.50	0.50
13	6/18 - 7/1	1,500	816	1,352	1,352	0.90	0.90
14	7/2 - 7/15	2,294	826	2,788	2,492	1.22	1.09
15	7/16 - 7/29	1,080	0	1,653	1,653	1.53	1.53
16	7/30 - 8/12	504	560	883	796	1.75	1.58
17	8/13 - 8/26	741	480	679	273	0.92	0.37
18	8/27 - 9/9	225	335	75	38	0.33	0.17
19	9/10 - 9/23	416	322	466	350	1.12	0.84
20	9/24 - 10/7	92	130	26	0	0.28	0
21	10/8 - 10/21	58	115	0	0	0	0
22	10/22 - 11/4	368	276	381	381	1.04	1.04
23	11/5 - 11/18	345	476	289	289	0.84	0.84
24	11/19 - 12/2	ND	--	--	--	--	--
25	12/3 - 12/16	ND	--	--	--	--	--
26	12/17 - 12/31	92	0	153	153	1.66	1.66
Total		14,080		18,081	16,990	1.28	1.21

Harvest and Catch Composition

Of the 18,081 fish caught from Moose Creek Reservoir during 1993, 1,092 were released and 16,990 were harvested (Table 43). Trout dominated the harvest, accounting for 83.5% of all fish kept. The remaining harvest is represented by 16.5% panfish (crappie, bluegill, and pumpkinseed *Lepomis gibbosus).*

Of the 14,127 trout harvested from Moose Creek Reservoir during 1993, 100% were stocked as catchable size fish in 1993.

Yield

Fish yield from Moose Creek Reservoir in 1993 was estimated at 7,136 pounds, 216.2 pounds/acre. Trout accounted for 93% of the yield (Table 44).

Return Rate

We stocked 20,650 catchable size trout in Moose Creek Reservoir in 1993 (Table 1). Harvest of catchable trout was estimated at 14,127 (428/acre) resulting in an estimated return rate of 68.4%. Estimated harvest of 6,640 pounds of trout from 9,929 pounds stocked equals 66.8% return by weight. Catchable trout stocked in 1993 continue to return to the creel beyond the termination of this reporting period.

Table 43. Summary of total catch, fish harvested, and fish released in Moose Creek Reservoir, 1993. Low and high bounds represent 95% confidence intervals.

	Point estimate	Fish/ acre	95% Confidence interval	
			low bound	high bound
Catch	18,081	548	11,592	24,570
Harvest	16,990	515	10,527	23,453
Release	1,092	33	405	1,779

Table 44. Pounds of fish harvested and yield by fish group or species in Moose Creek Reservoir, 1993.

Group or species	Pounds	Lbs/acre	Percent of total
Catchable trout	6,640	201.1	93
Panfish	496	15.1	7
TOTAL	7,136	216.2	100

A P P E N D I C E S

Appendix A. Fish community survey procedures and guidelines.

LOWLAND LAKES AND RESERVOIRS
STANDARD FISH COMMUNITY SURVEY PROCEDURES, CORE DATA, AND REPORT GUIDELINES

I. Surveys will be conducted using the following standardized gear:

A. Gill Nets

Floating and sinking monofilament nets, 150'x 6', with six panels composed of 3/4", 1", 1-1/4", 2", and 2-1/2" bar mesh. One floating and one sinking net combined fished overnight equals one unit of gill net effort.

B. Trap Nets

75' lead, 3'x 6' frame, crowfoot throats on first and third of five hoops, 3/4" bar mesh, treated black. One trap net fished overnight equals one unit of trap net effort.

C. Electrofishing

A pulsed D.C. electrofishing boat with boom-mounted electrodes. One hour of current-on electrofishing equals one unit of electrofishing effort.

II. Surveys will be conducted using the following procedures.

A. Effort

Due to the selectivity of individual gear types, a combination of gill netting, trap netting, and electrofishing effort will be used to characterize the fish community. One unit of effort for each of the gear types combined, equals one unit of "sampling effort". The following table provides guidelines for the minimum amount of sampling effort and survey time needed for various size waters:

Lake size (ac)	*Units of sampling effort	Nights needed
1 - 25	1	1
26 - 100	2	1
101 -500	4	1-2
501 - 1,000	6	2
**1,000+	6+	2-3+

*one unit of "sampling effort" includes a pair of floating and sinking gill nets and one trap net fished overnight and one hour of electrofishing.
**use best judgement on sampling effort needed to sample various habitat zones.

JOB PERFORMANCE REPORT

State of: Idaho

Name: Fisheries Management F-71-R-18

Project I: Surveys and Inventories

Subproject I-B: Clearwater Region

Job: c

Title: Rivers and Streams Investigations

Contract Period: July 1, 1993 to June 30, 1994

ABSTRACT

Clearwater Region personnel snorkeled 73 stream transects within the Clearwater, Snake, and Salmon River drainages. We checked 111 anglers who fished 195.7 hours to catch 73 game fish from Clearwater Region rivers and streams.

We captured and tagged 51 white sturgeon *Acipenser transmontanus* in the Snake River below Hells Canyon Dam. Tagged sturgeon ranged from 63.5 cm to 259.1 cm total length.

We collected 50 smallmouth bass *Micropterus dolomieu* and 2 rainbow trout *Oncorhynchus mykiss* from the Salmon River. We collected 205 smallmouth bass and 44 rainbow trout from the Snake River. Stomach analysis of the 46 hatchery origin trout revealed one fish (sculpin *Cottus spp.)* in their diet.

Authors:

Tim Cochnauer
Regional Fishery Manager

Ed Schriever
Regional Fishery Biologist

Jody Brostrom
Regional Fishery Biologist

Larry Barrett
Senior Fishery Technician

OBJECTIVES

1. Develop long-term fish population database on selected streams throughout the Clearwater Region.

2. PIT tag white sturgeon *Acipenser transmontanus* in the Snake River below Hells Canyon Dam and the Salmon River below Riggins.

3. Assess diet of hatchery rainbow trout *Oncorhynchus mykiss* and residualized hatchery steelhead smolts in the Snake, Salmon, and Clearwater River drainages.

4. Collect juvenile chinook salmon O. *tshawytscha* from the Selway River to develop a captive broodstock program and collect adult steelhead trout to provide smolts for South Fork Clearwater River drainage.

5. Evaluate different white sturgeon fishing tackle.

6. Allocate catchable rainbow trout in streams within the region.

7. Determine kokanee salmon O. *nerka kennerlyi* spawning ground count trends in tributaries of Dworshak Reservoir.

SALMONID POPULATION TREND MONITORING

Methods

We used standard snorkeling techniques to monitor fish densities in regional rivers and streams. Snorkeling was done in late summer when streams were low, clear, and accessible. Small streams were snorkeled upstream with one or two observers depending on stream width. Larger streams and river corridors were snorkeled free-floating downstream with four to six observers depending on corridor width.

Thirteen transects on seven streams on the Idaho Department of Fish and Game's (IDFG) Craig Mountain Wildlife Management Area (WMA) were sampled by electrofishing to determine densities. A standard three-pass depletion procedure was used.

Results

Selway River Investigations

As in previous years, juvenile chinook salmon numbers remained low in the tributaries (Table 1) and mainstem river (Table 2). No adult chinook salmon were observed. A total of 48 chinook salmon

Table 1. Summary of fish densities (per 100 m^2) as determined by snorkeling the Selway River drainage, 1993.

Stream	Date	Steelhead trout total	Steelhead trout age 0	Steelhead trout age 1	Steelhead trout age 2	Steelhead trout age >2	Cutthroat trout total	Cutthroat trout <12"	Cutthroat trout >12"	Chinook salmon	Mountain whitefish	Bull trout
Otter Creek	8/2	16.24	7.02	7.46	1.32	0.44	2.19	2.19	0	0	0	0
E.F. Moose Creek	7/30	8.69	2.75	4.93	0.72	0.29	1.01	0.87	0.14	1.90	1.45	0
Moose Creek at mouth	7/30	7.53	0.16	5.13	1.56	0.23	1.10	0.99	0.11	0	1.96	0
Marten Creek	8/1	11.05	4.07	5.82	1.16	0	0	0	0	0	0	0
Selway R. at Hell's Half	7/26	0.51	0.11	0.38	0.02	0	0.16	0.16	0	0.38	0.22	0
N.F. Moose Creek, upper	7/30	4.01	0.93	2.69	0.93	0	0.79	0.64	0.15	0	1.61	0
Moose Creek at confluence	7/30	3.31	1.77	1.50	0.04	0	0.40	0.32	0.08	0	0.28	0
Three Links Creek, upper	8/1	11.97	2.64	7.46	1.55	0.32	0.47	0	0.47	0	0.16	0
Running Creek, lower	7/27	3.83	2.51	1.32	0	0	0.24	0.24	0	0	0.12	0
Running Creek, upper	7/27	3.72	0.31	3.10	0.31	0	0.62	0.62	0	0.31	0.93	0
Bear Creek at bridge	7/28	1.06	0.23	0.45	0.23	0.15	0.76	0.68	0.08	0.23	2.12	0
Bear Creek, upper	7/28	1.47	0.49	0.98	0	0	0.58	0.29	0.29	0	0.10	0
White Cap Creek, Upper	7/26	8.67	1.17	6.51	0.90	0.09	1.36	1.27	0.09	3.25	0	0
White Cap Creek, Middle	7/26	3.04	0	3.04	0	0	0.48	0.48	0	1.44	3.36	0
White Cap Creek, Lower	7/26	2.78	0.13	2.27	0.38	0	0.38	0.38	0	0.25	1.51	0

RIVSTRM.TAB

Table 2. Number of fish counted in snorkel transects (5 snorkelers) in the unroaded mainstem Selway River, 1992 and 1993.

Location	Year	----Cutthroat trout----		----------Steelhead trout----------				Chinook salmon	Mountain whitefish
		< 12 in.	>12 in.	age 0	age 1	age 2	> 2		
at Bad Luck Creek	1992	30	14	0	0	0	0	0	106
	1993	14	12	9	6	1	0	0	40
at North Star Creek	1992	22	2	0	0	0	0	0	56
	1993	28	5	0	0	0	0	0	45
at Osprey Island	1992	8	8	0	2	0	0	0	38
at Big Bend	1993	13	7	0	0	0	0	0	32
at Tango Creek	1992	15	26	0	16	9	0	14	50
	1993	28	1	3	32	2	0	0	26

juveniles were observed in 14 Selway River tributaries. No bull trout were observed in any Selway River drainage transect in 1993. Historic snorkeling comparisons are found in Appendix A.

A comparison (by year) of cutthroat trout O. *clarki* length groups is shown in Table 3. Length frequencies of steelhead/rainbow trout and cutthroat trout are shown in Figures 1 and 2. The back calculated length on each annulus for cutthroat trout captured in the Selway River is given in Table 4.

Lochsa River

Fish densities (per 100 m^2) as determined by snorkeling ten transects in the Lochsa River drainage are shown in Table 5. Historic snorkeling comparisons are found in Appendix A.

South Fork Clearwater River

No chinook salmon juveniles were observed in any of the eight transects snorkeled (Table 6). Bull trout *Salvelinus confluentus* were found in Moore's Creek and lower John's Creek. Historic snorkeling comparisons are found in Appendix A.

Snake River

Bull trout were observed in only one Snake River tributary (Granite Creek) snorkeled or electrofished in 1993 (Tables 7 and 8). Historic snorkeling comparisons are found in Appendix A. Chinook salmon juveniles were electrofished from lower Cottonwood Creek on the Craig Mountain WMA (Table 8). A length frequency of juvenile steelhead/rainbow trout sampled on Craig Mountain WMA is shown in Figure 3.

Salmon River

Chinook salmon juveniles were observed by snorkeling in only one tributary (John Day Creek). Chinook salmon juveniles were collected from lower China Creek by electrofishing. No bull trout were found in any Salmon River tributary snorkeled (Tables 8 and 9). Historic snorkeling comparisons are found in Appendix A.

Table 3. Percent of cutthroat trout by 50.8 mm (2 inch) size groups sampled in the Selway River by angling, 1975-1993.

Length (mm)	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990	1992	1993
102 to 151	8.7	2.2	8.7	0.8	4.6	2.8	4.2	2.4	12.4	0.1	4.3	2.7
152 to 202	31.3	16.4	20.9	20.7	13.6	19.0	22.2	15.8	14.0	22.7	23.3	13.0
203 to 253	27.0	24.8	24.5	15.7	22.2	25.2	28.2	23.3	25.1	16.5	23.6	20.2
254 to 304	21.0	35.7	27.0	34.1	30.7	31.2	24.7	27.1	24.3	26.2	30.6	36.8
305 to 355	11.2	18.4	17.0	23.2	25.3	18.9	16.8	28.0	21.0	25.7	15.7	22.8
356 to 405	0.8	2.5	1.3	5.1	3.4	2.3	3.8	3.1	3.0	4.7	2.7	4.5
Over 405	0	0	0.6	0.4	0.2	0.6	0	0.3	0.2	0.5	0	0
Number of cutthroat measured	233	238	229	470	352	549	429	322	506	816	301	377

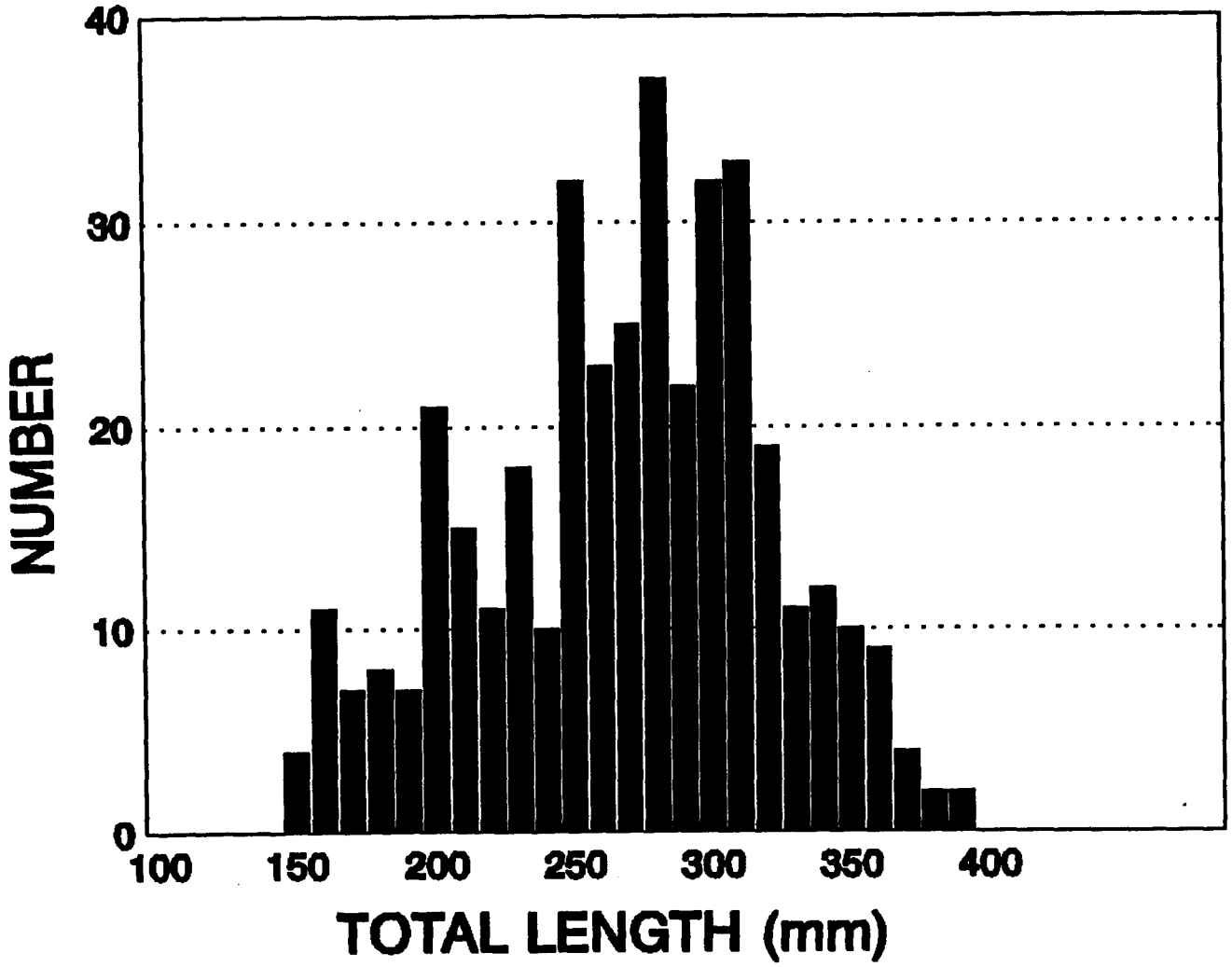

Figure 1. Length frequency of cutthroat trout captured by angling on the Selway River, 1993 (N = 390).

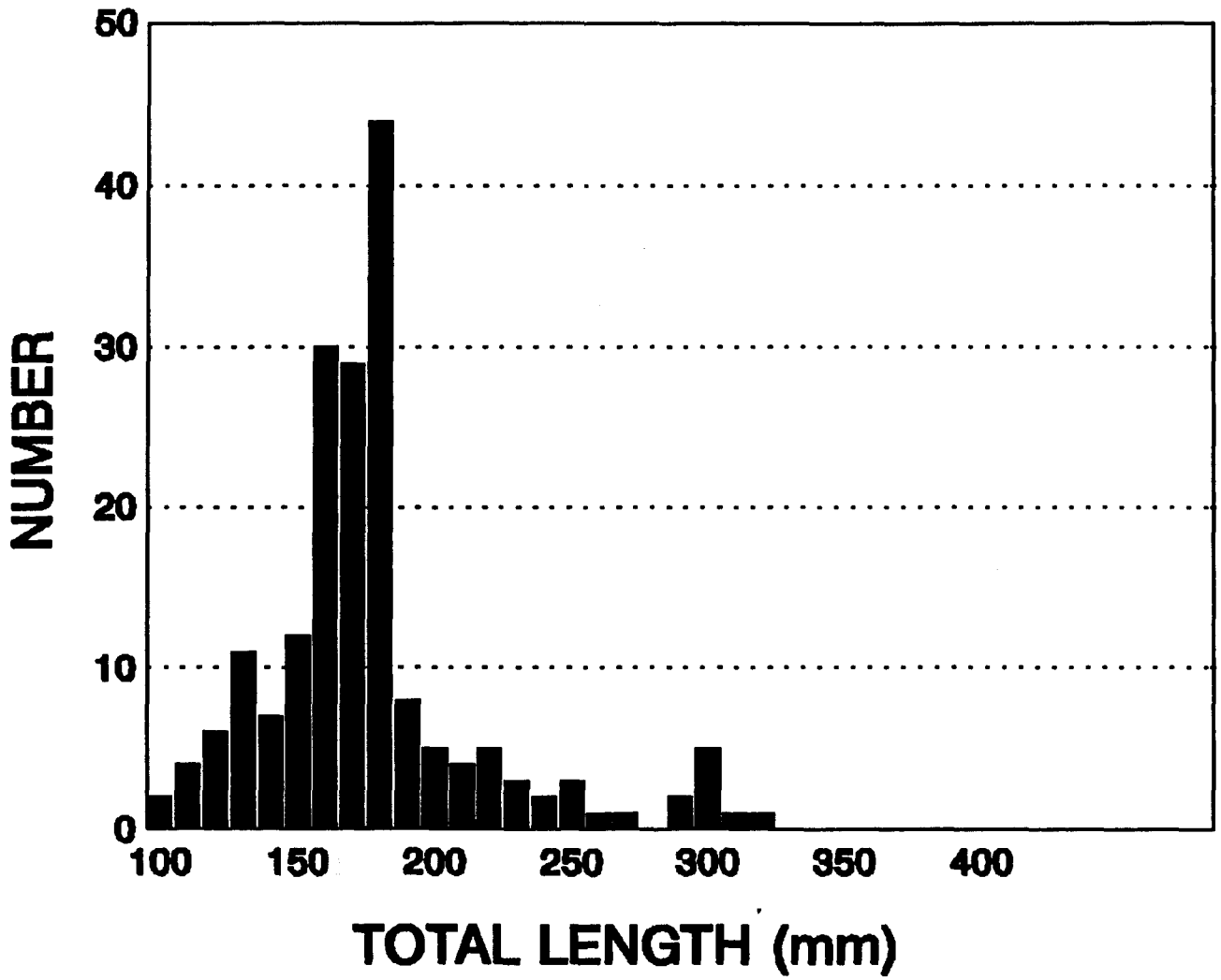

Figure 2. Length frequency of steelhead/rainbow trout captured by angling in the Selway River, 1993 (N = 168).

Table 4. Back-calculated length at age for cutthroat trout captured in the Selway River, 1993.

Age group	Number aged	--Back-calculated length (mm) at each annulus-- 1	2	3	4	5	6	7	Length at capture
1	0	0	0	0	0	0	0	0	--
2	34	92.4	0	0	0	0	0	0	163.9
3	21	74.2	151.7	0	0	0	0	0	215.0
4	17	89.1	172.1	260.4	0	0	0	0	316.6
5	1	79.3	144.3	235.4	352.5	0	0	0	385.0
6	0	0	0	0	0	0	0	0	--
7	0	0	0	0	0	0	0	0	--
Ave. lgth.		86.2	160.4	259.0	352.5	--	--	--	
Number aged		73	39	18	1	0	0	0	

Table 5. Summary of fish densities (per 100 m') as determined by snorkeling the Lochsa River drainage, 1993.

Stream	Date	Steelhead trout					Cutthroat trout			Chinook salmon	Mountain whitefish	Bull trout
		total	age 0	age 1	age 2	age >2	total	<12"	>12"			
Fish Creek, lower	8/16	11.67	7.13	6.70	4.00	0.97	0	0	0	0	0.11	0
Fish Creek, upper	8/16	22.08	11.27	11.93	9.08	1.57	0.63	0.63	0	0	0.31	0
Warm Springs Creek	8/17	1.15	0.53	0.09	1.06	0	0.97	0.88	0.09	0.18	0	0
Lochsa R. at Papoose Creek	8/26	0.47	0.26	0.21	0	0	0.45	0.05	0.40 `	0	1.49	0
Lochsa R. at Warm Springs Creek	8/26	0	0	0	0	0	0	0	0	0	0	0
Lochsa R. at Fish Creek	8/26	0	0	0	0	0	0.10	0.04	0.06	0	0.61	0
Lochsa R. at Pete King Creek	8/26	0	0	0	0	0	0	0	0	0	0	0
Old Man Creek	8/17	35.65	3.24	8.10	22.69	4.86	0	0	0	0	0	0
Fire Creek, lower	8/3	1.50	0	0.90	0.60	0	1.20	1.20	0	0	0	0
Fire Creek, upper	8/3	1.25	0	0.47	0.78	0	2.98	2.98	0	0.16	0	0.16
Split Creek, lower	8/3	3.49	0.30	1.52	1.52	0.15	5.15	5.15	0	0	0	0
Split Creek, upper	8/3	1.59	0.53	0.53	0.53	0	9.99	9.99	0	0	0	0

Table 6. Summary of fish densities (per 100 m') as determined by snorkeling the S.F. Clearwater River drainage in the Clearwater Region, 1993.

Stream	Date	Steelhead trout total	Steelhead trout age 0	Steelhead trout age 1	Steelhead trout age 2	Steelhead trout age >2	Cutthroat trout total	Cutthroat trout <12"	Cutthroat trout >12"	Chinook salmon	Mountain whitefish	Bull trout
S.F. Clearwater												
John's Creek, lower #1	9/1	3.93	0.18	3.21	0.54	0	0	0	0	0	0.18	0.18
John's Creek, lower #2	9/1	14.38	0.86	8.00	5.58	0	0.53	0.53	0	0	0.53	0
John's Creek, upper #3	8/11	13.29	8.73	3.19	0.91	0.46	0.46	0.46	0	0	0	0
John's Creek, upper #4	8/11	4.13	1.44	1.97	0.72	0	0.18	0.18	0	0	0	0
Ten Mile Creek, upper	8/5	4.78	2.23	2.55	0	0	0	0	0	0	0	0
Ten Mile Creek, lower	8/5	4.11	3.77	0.34	0	0	0	0	0	0	0	0
Moore Creek, upper	8/11	9.26	2.81	4.30	2.15	0	1.07	1.07	0	0	0	1.79
Moore Creek, lower	8/11	12.35	0	6.68	5.67	0	3.78	3.78	0	0	0	0.95

Table 7. Summary of fish densities (per 100 m^2) as determined by snorkeling the Snake River drainage, 1993.

Stream	Date	Steelhead trout					Cutthroat trout			Chinook salmon	Mountain whitefish	Bull trout
		total	age 0	age 1	age 2	age >2	total	<12"	>12"			
Granite Creek (Lower)	9/9	7.83	0.95	2.73	3.08	1.07	0	0	0	0	0	0
Granite Creek (Middle)	9/9	15.33	10.82	2.70	1.80	0	0	0	0	0	0	0
Granite Creek (Upper)	8/19	13.41	3.35	6.37	2.35	1.34	0	0	0	0	0	0.34
Sheep Creek (Upper)	8/17	19.23	6.92	8.46	1.54	2.31	0	0	0	0	0	0
Sheep Creek (Lower)	8/17	37.94	12.50	12.05	3.57	9.82	0	0	0	0	0	0

Table 8. Fish densities as determined by electrofishing (3 pass) in streams on IDFG Craig Mountain WMA, 1993.

Stream	Date	Drainage	Area (m^2)	------Steelhead/rainbow trout---------- Age 0	Age 1	Age 2	Chinook salmon	Brook trout	Smallmouth bass	Bull trout
Eagle Creek, upper	6/30	Salmon	149	0	3.36	0	0	0	0	0
Eagle Creek, lower	6/30	Salmon	145	5.04	36.65	0.72	0	0	0	0
China Creek, lower	6/29	Salmon	72	0	22.39	0	2.80	0	0	0
China Creek, upper	7/1	Salmon	151	0.67	1.33	0	0	0	0	0
Deer Creek, upper	7/7	Salmon	84	0	0	0	0	35.7	0	0
Deer Creek, lower	6/30	Salmon	135	16.31	12.6	0.74	0	0	0.74	0
Wapshilla Creek, upper	7/1	Salmon	DRY	--	--	--	--	--	--	--
Wapshilla Creek, lower	6/29	Salmon	43	2.35	2.35	0	0	0	0	0
Cottonwood Creek, upper	7/1	Snake	DRY	--	--	--	--	--	--	--
Cottonwood Creek, lower	7/8	Snake	55	0	7.33	0	3.66	0	0	0
S.F., Capt. John Creek	7/9	Snake	51	13.72	9.80	3.92	0	0	0	0
Capt. John Crk., upper	7/9	Snake	68	39.49	10.24	4.39	0	0	0	0
Capt. John Crk., lower	7/9	Snake	94	11.69	12.76	3.19	0	0	0	0

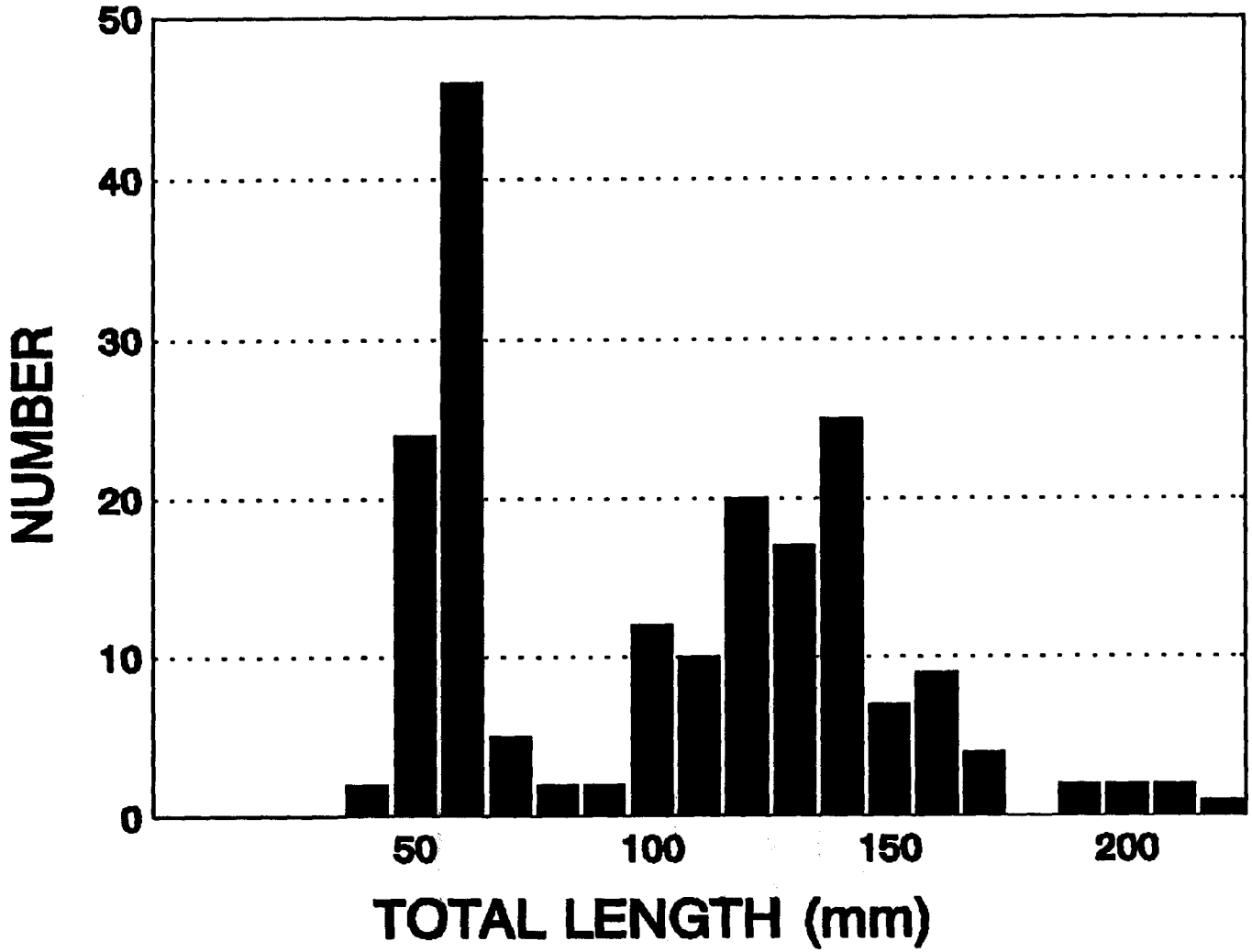

Figure 3. Length frequency of steelhead/rainbow trout captured by electrofishing in Craig Mountain WMA streams, 1993 (N = 192).

Table 9. Summary of fish densities (per 100 m^2) as determined by snorkeling the Salmon River drainage, 1993.

Stream	Date	Steelhead trout total	Steelhead trout age 0	Steelhead trout age 1	Steelhead trout age 2	Steelhead trout age >2	Cutthroat trout total	Cutthroat trout <12"	Cutthroat trout > 12"	Chinook salmon	Mountain whitefish	Bull trout
Salmon River												
White Bird Creek	8/5	10.72	4.17	5.36	1.19	0.60	0	0	0	0	0	0
S.F. White Bird Creek (Lower)	8/5	10.41	4.46	4.84	1.11	0	0	0	0	0	0	0
S.F. White Bird Creek (Upper)	8/5	9.94	3.22	3.80	2.63	0.29	0	0	0	0	0	0
Race Creek	8/6	7.96	1.17	4.92	1.64	0.23	0	0	0	0	0	0
John Day Creek (Upper#1 J	8/6	37.82	10.59	19.67	6.05	1.51	3.03	3.03	0	0	1.51	0
John Day Creek (Upper#2)	8/6	14.34	10.48	4.19	4.19	1.40	0.07	0.07	0	0	0	0
John Day Creek (Lower)	8/6	8.36	2.09	6.27	0	0	0	0	0	1.39	0	0
Skookumchuck Creek (Lower)	8/5	14.81	4.26	8.72	1.42	0.41	0	0	0	0	0	0
Crooked Creek (Lower)	7/13	4.62	0.71	2.68	0.71	0.42	0.14	0.14	0	0	1.84	0
Crooked Creek (Upper)	7/13	4.81	1.89	2.58	0.34	0	0	0	0	0	0	0
Jersey Creek	7/12	4.87	1.49	2.38	0	0	0	0	0	0	0	0
Indian Creek	7/13	2.09	0.70	1.39	0	0	0	0	0	0	0	0

North Fork Clearwater River

Eight transects were snorkeled in four streams in the North Fork Clearwater River drainage (Table 10). No bull trout were observed in any of these streams.

Potlatch River

No bull trout or chinook salmon were observed in any of the transects snorkeled in the Potlatch River drainage (Table 11).

CREEL CENSUS

Methods

Clearwater Region fish management personnel and conservation officers performed spot check creel surveys throughout the region in 1993. Fish were separated by species or differentiated by marks on the creel form. Fish species or mark groups were also recorded by 2 cm size groups.

Results

We checked 111 anglers who fished 195.8 hours on rivers and streams in the Clearwater Region. Anglers reportedly caught 73 game fish and averaged 0.37 fish/h (Table 12).

SNAKE RIVER

Smallmouth Bass

Methods

We sampled smallmouth bass in the Snake River using pulsed D.C. current from a portable generator and a Coffelt VVP-2E pulsator. Booms and electrodes were mounted on a 5.5-m aluminum boat. Sampling took place during daylight hours to avoid safety hazards.

Bass were collected and tagged between the Washington/Oregon state line (rkm 280) and Pittsburg Landing (rkm 343) to add to information from the previous field season.

Table 10. Summary of fish densities (per 100 m^2) as determined by snorkeling the North Fork Clearwater River drainage, 1993.

Stream	Date	Rainbow trout					Cutthroat trout			Mountain whitefish	Bull trout
		total	age 0	age 1	age 2	age >2	total	<12"	>12"		
Hemlock Creek (Upper)	8/21	0.60	1.81	0	0	0	0	0	0	0	0
Hemlock Creek (Lower)	8/21	13.05	0	8.39	4.66	0	1.86	0.93	0.93	1.86	0
Middle Creek (Upper)	8/20	11.23	0	9.62	1.61	0	0	0	0	0	0
Middle Creek (Lower)	8/20	5.19	0	5.19	0	0	1.73	0	1.73	0	0
Weitas Creek (Upper)	8/20	2.84	0	1.26	1.58	0	1.42	0.95	0.47	9.77	0
Weitas Creek (Lower)	8/19	0.07	0	0.07	0	0	0.07	0.07	0	0.22	0
Little Weitas Creek (Upper)	8/20	7.34	0.49	5.38	0	1.47	1.47	1.47	0	0	0
Little Weitas Creek (Lower)	8/20	6.68	3.34	3.34	0	0	0.56	0.56	0	0	0

Table 11. Summary of fish densities (per 100 m^2) as determined by snorkeling in miscellaneous streams, 1993.

Stream	Date	Steelhead/Rainbow trout					Cutthroat trout			Bull trout	Brook trout
		total	age 0	age 1	age 2	age >2	total	<12"	>12"		
E.F. Potlatch River (mouth)	6/30	6.02	5.74	0.29	0.86	0.57	0.29	0.29	0	0	0
E.F. Potlatch River (Middle)	6/30	2.87	2.29	0.29	0.29	0	0	0	0	0	1.72
E.F. Potlatch River (Upper)	6/30	9.35	3.34	5.34	0.67	0	0	0	0	0	20.01
Elk Creek	6/30	0.20	0	0	0	0.20	0	0	0	0	4.08
Potlatch River	6/30	0.69	0.57	0.08	0.04	0	0	0	0	0	0.28

Table 12. Summary of impromptu creel surveys in Clearwater Region rivers, 1993.

Date	Anglers	TTL hours	CTT	RBT	K1	SHS	BKT	BULL	KOK	WF	SMB	CAT	STR	TTL	CPUE
Crooked River															
5/29	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Elk Creek															
5/29	12	21.75	0	18	0	0	2	3	0	0	0	0	0	23	1.06
Lochsa River (lower)															
5/29	6	15.0	6	0	0	0	0	1	0	0	0	0	0	7	0.47
5/30	8	10.0	10	0	0	0	0	0	0	0	0	0	0	10	1.00
M.F. Red River															
5/30	2	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mill Creek															
5/29	5	4.5	0	0	0	1	0	0	0	0	0	0	0	1	0.22
Newsome Creek															
5/29	5	31.0	0	0	0	10	0	0	0	0	0	0	0	10	0.32
6/12	15	35.5	0	0	0	0	0	0	0	0	0	0	0	0	0
N.F. Red River															
5/30	4	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0

RIVSTRM.TAB

Table 12. Continued.

Date	Anglers	TTL hours	CTT	RBT	K1	SHS	BKT	BULL	KOK	WF	SMB	CAT	STR	TTL	CPUE
Red River															
5/29	5	3.5	0	0	0	0	0	0	0	0	0	0	0	0	0
Santiam Creek															
6/13	1	1.0	1	0	0	0	0	0	0	0	0	0	0	1	1.00
Selway River (lower)															
5/29	16	27.0	0	0	0	0	0	0	0	0	0	0	0	0	0
5/30	6	6.0	0	0	0	0	0	0	0	0	0	0	0	0	0
S.F. Clearwater River															
5/29	7	19.0	2	3	0	1	0	0	0	1	0	0	0	7	0.37
7/25	10	12.0	0	1	0	7	0	1	0	0	0	0	0	9	0.75
7/31	5	5.0	0	0	0	2	0	0	0	0	0	0	0	2	0.40
9/8	2	1.0	0	1	0	0	0	2	0	0	0	0	0	3	3.00
TOTAL	111	195.8	19	23	0	21	2	7	0	1	0	0	0	73	0.37

CTT = cutthroat trout
SHS = steelhead smolt
KOK = kokanee
CAT = catfish

RBT = rainbow trout
BKT = Eastern brook trout
WF = mountain whitefish
STR = sturgeon

K1 = domestic Kamloops rainbow trout
BULL = bull trout
SMB = smallmouth bass

RIVSTRM.TAB

We duplicated 1991 and 1992 electrofishing efforts in an area temporarily dewatered during the 1992 drawdown test in Lower Granite Reservoir. We used the same boat, the same number of netters (2), and fished 1 hour and 15 minutes both years. The sampling area was on the Idaho shore of the slackwater reach of the Snake River between the U.S. Highway 12 bridge and the Lewiston Grain Growers elevators.

Results

At Lewiston, we collected 205 smallmouth bass in 1993 as compared to 134 in 1992 and 90 in 1991. We sampled over 50% more bass in 1993 than 1992 (Table 13). No reward tags were recovered either by our sampling or anglers.

Sturgeon

Methods

We sampled white sturgeon with traditional hook-and-line methods. Fish were measured for fork and total length. Spaghetti tags were inserted at the posterior base of the dorsal fin and tied in a loose loop. Passive Integrated Transponder (PIT) tags were inserted in the left side of the fish, just below the base of the dorsal fin. Fish were inspected for previous marks, tags, and hook scars.

Results

Clearwater Region fisheries management personnel captured and tagged 88 white sturgeon on the Snake River below Hells Canyon Dam during the 1991-1993 field seasons (Table 14). Length of tagged sturgeon ranged from 63.5 to 259 cm. The size category break down of tagged sturgeon is shown in Table 15.

Seven PIT-tagged sturgeon were recaptured in 1993 (Table 16). A sturgeon captured on July 3 had moved 105 km from its initial capture site.

Salmonid Sampling and Diet Analysis

Methods

As in 1992, we sampled residualized hatchery steelhead smolts and wild rainbow trout in the Snake and Salmon rivers using pulsed D.C. current from a portable generator and a Coffelt WP-2E

Table 13. Comparison of length frequency, number, and size distribution of smallmouth bass collected by electrofishing 1.25 hours in the same location on the Snake River at Lewiston, Idaho, in 1991, 1992, and 1993.

Length (mm)	June 4, 1991	June 10, 1992	June 4, 1993
50	0	0	0
60	0	0	0
70	0	10	0
80	0	11	2
90	0	8	6
100	0	8	2
110	2	6	1
120	1	7	3
130	5	6	13
140	15	10	16
150	11	20	21
160	7	9	11
170	2	7	10
180	3	3	15
190	9	3	29
200	13	3	29
210	13	3	26
220	5	3	8
230	2	3	4
240	2	4	2
250	0	3	3
260	0	2	0
270	0	2	1
280	0	1	0
290	0	2	1
300	0	0	2
310	0	0	0
320	0	0	1
Total	90	134	206
PSD	0	9	3
CPUE	72.0	107.2	164.0

Table 14. Fork and total length, tag numbers, and date and location of white sturgeon tagged in the Snake River below Hells Canyon Dam during the 1991-1993 field seasons.

Date	Fork length (cm)	Total length (cm)	PIT tag #	Floy tag #	River km
10/8/91	173	191	--	1636	296
3/5/92	198	213	7F7F427941	1637	381
3/27/92	103	115	7F7F441E72	1638	362
3/28/92	126	140	7F7F42600A	1639	365
3/28/92	64	71	7F7F427702	1640	365
3/29/92	159	175	7F7F42797C	1641	302
3/29/92	167	185	7F7F42711B	1642	302
4/6/92	86	97	7F7F427B05	1643	260
4/9/92	119	129	7F7F42767D	1644	290
4/11/92	93	104	7F7F3D494F	1645	291
4/11/92	121	133	7F7F427528	1646	302
4/11/92	218	244	7F7F45774D	1647	302
4/12/92	120	137	7F7F427125	1648	264
4/20/92	213	231	7F7F425C58	1649	302
5/7/92		155	7F7F426555	1650	302
6/14/92	193	213	7F7F443219	1651	302
6/17/92	243	259	7F7F427963	1654	291
6/17/92	101	113	7F7F443351	1653	290
6/17/92	218	243	7F7F426044	1652	296
6/23/92	112	123	7F7F427B26	1655	336
6/23/92	105	117	7F7F427512	1656	331
6/24/92	126	138	7F7F3F6459	1657	319
6/28/92	168	191	7F7F441F6E	1659	381
6/29/92	166	187	7F7F426071	1658	290
6/29/92	221	251	7F7F442A0D	1660	381
6/30/92	187	206	--	1661	365
8/8/92	135	151	7F7D0D6739	--	339
8/9/92	145	162	7F7D0D657E	--	310
8/10/92	110	119	7F7D0D776C	--	339
8/10/92	129	141	7F7DOD6DOF	--	349
8/18/92	96	110	7F7D0D6A15	--	296
8/18/92	193	213	7F7DOD6D01	--	290
8/31/92	91	107	7F7DOD5D 10	--	325
9/3/92	154	173	7F7DOA2DOF	--	283
9/3/92	122	133	7F7D0D695A	--	283
9/3/92	86	93	7F7D0O0014	--	296
9/18/92	189	208	7F7D0D742C	--	267
4/26/93	119	137	7F7D0D6052	--	266
4/29/93	65	72	7F7D0D5E04	--	301
4/29/93	64	72	7F7D0D6113	--	301
4/29/93	86	99	7F7D0D6744	--	266
4/29/93	81	89	7F7D0D650A	--	266
4/29/93	76	86	7F7DOD7722	--	266
4/29/93	70	76	7F7D0B7824	--	266
5/10/93	231	259	7F7D0D5F69	--	337
5/11/93	163	183	7F7D0D6528	--	382

Table 14. Continued.

Date	Fork length (cm)	Total length (cm)	PIT tag #	Floy tag #	River km
5/11/93	213	224	7F7D0D7B06	--	382
5/26/93	83	95	7F7D0D623F	--	360
5/31/93	113	126	7F7D075B7D	--	313
6/7/93	n/a	249	7F7D0D662D	--	381
6/7/93	107	122	7F7D0D6735	--	382
6/8/93	61	70	7F7D0B7440	--	313
6/21/93	170	183	7F7D0C192F	--	387
6/23/93	64	71	7F7D0D7768	--	366
6/25/93	75	84	7F7D0D5C48	--	310
6/25/93	89	99	7F7D0D650L	--	312
6/26/93	61	70	7F7D0D6417	--	328
7/3/93	66	76	7F7D0D7314	--	292
7/3/93	70	79	7F7D0D6D29	--	301
7/3/93	69	76	7F7D0D731B	--	301
7/3/93	90	97	7F7D0B7272	--	286
7/3/93	71	78	7F7D0D785A	--	286
7/3/93	72	81	7F7D0D775E	--	286
7/5/93	69	76	7F7D0D6202	--	296
7/5/93	67	76	7F7DOD6C3F	--	292
7/5/93	57	64	7F7D052A7B	--	292
7/5/93	74	84	7F7D0D6A50	--	292
7/5/93	81	91	7F7D0B677F	--	296
7/5/93	114	125	7F7D0D6813	--	296
7/5/93	65	74	7F7D0D704E	--	296
7/9/93	188	208	7F7DOD7BOO	--	294
7/9/93	81	88	7F7D0D7530	--	286
7/9/93	81	91	7F7D0D7427	--	290
7/16/93	75	84	7F7D0D6012	--	266
7/16/93	n/a	79	7F7D0D650E	--	266
7/17/93	76	**86**	7F7DOD7B3E	--	296
7/17/93	74	84	7F7D0D6L25	--	302
7/17/93	72	81	7F7D0D7E32	--	296
7/18/93	193	211	7F7D0D7716	--	299
7/18/93	71	79	7F7D0D6706	--	296
7/19/93	236	252	7F7D0D794C	--	296
8/11/93	81	89	7F7D0D735E	--	296
8/11/93	69	79	7F7DOD7DOD	--	302
8/11/93	79	89	7F7D0D6C66	--	302
8/17/93	66	74	7F7D0B622D	--	302
8/22/93	66	74	7F7D0B687F	--	292
9/14/93	64	70	7F7D0D5C04	--	296
10/10/93	56	64	7F7D0B7541	--	302

Table 15. Breakdown of size category of white sturgeon tagged in the Snake River below Hells Canyon Dam, 1991-1993.

Length (cm)	< 91	91 to 183	> 183
No. of sturgeon	40	42	29
Percent of catch	36.0	38.0	26.0

Table 16. Sturgeon PIT tag recaptures in the Snake River below Hells Canyon Dam, 1993.

Date	PIT #	TL (cm)	Length increase	rkm captured	km moved	Days at large
5/15/93	7F7F402C31	195.6	4.6	366.1	4.1	691
7/3/93	7F7D016018	157.5	n/a[a]	301.6	104.6	804
7/18/93	7F7DOD7B3E	86.4	0	296.1	0	1
7/20/93	7F7DOD6DOF	151.1	10	351.6	2.6	344
9/5/93	7F7D0B677F	90.2	0	296.1	0	62
9/14/93	7F7F42711B	190.5	5.5	306.9	4.9	534
9/14/93	7F7D0B677F	90.2	0	296.1	0	71

[a] University of Idaho study fish.

pulsator. Booms and electrodes were mounted on a 5.5-m aluminum boat. Steelhead smolts were also collected using traditional hook-and-line methods.

All trout were measured for length. Residualized hatchery steelhead smolts were sacrificed and their stomachs dissected for diet analysis. Wild rainbow trout were released unharmed. Hatchery steelhead smolts were identified by a missing adipose fin.

Results

We have collected 170 rainbow trout (44 in 1993) (Table 17) from the Snake River between Hells Canyon Dam and the Salmon River in 1992 and 1993. Hatchery steelhead smolt diet consisted of insects, mostly caddis fly adults and some green algae. Of the 170 stomachs analyzed for both years, only one contained fish (a sculpin). This trout was captured in the Snake River in 1993 and was 432 mm in total length.

SALMON RIVER

Methods

We sampled smallmouth bass and rainbow trout in the Salmon River using pulsed D.C. current from a portable generator and a Coffelt VVP-2E pulsator. Booms and electrodes were mounted on a 5.5-m aluminum boat.

Stomachs of known hatchery-origin rainbow trout were examined by dissection.

Results

Smallmouth Bass

We collected 50 smallmouth bass in the Salmon River between Riggins and White Bird (roaded section) with electrofishing gear on September 8 and 9 (Table 18). PSD of this sample was 40. Of the fish 200 mm and larger, 11% were 305 mm and larger (legal size). No reward tags from previous years were turned in by anglers or captured in our sampling.

Rainbow Trout

We sampled two rainbow trout in the Salmon River using electrofishing techniques on September 8 and 9 (Table 19).

Table 17. Length frequencies of hatchery steelhead trout smolts captured in the Snake River below Hells Canyon Dam, 1993.

Length (mm)	Hook & line June 20-22	Hook & line Sept. 16-17	Total hatchery steelhead
100	0	0	0
110	0	0	0
120	0	0	0
130	0	0	0
140	0	0	0
150	0	0	0
160	0	0	0
170	0	0	0
180	0	0	0
190	0	0	0
200	0	0	0
210	2	0	2
220	0	0	0
230	0	0	0
240	1	0	1
250	1	0	1
260	3*	0	3
270	3	3	6
280	1	1	2
290	0	1	1
300	1	3	4
310	5	0	5
320	0	2	2
330	2*	2	4
340	1	0	1
350	0	2	2
360	0	0	0
370	1	1	2
380	0	0	0
390	0	0	0
400	1	0	1
410	0	0	0
420	1	0	1
430	1	0	1
440	1*	0	1
450	0	0	0
460	0	1	1
470	1	1	2
480	0	0	0
490	1*	0	1
Total	27	17	44

* Gas bubble disease observed in four of these trout (one per length group).

Table 18. Length frequency of smallmouth bass collected by electrofishing in the Salmon River between Riggins and White Bird on September 8 and 9, 1993.

Length (mm)	No. of SMB
100	0
110	0
120	0
130	0
140	0
150	0
160	0
170	0
180	3
190	1
200	1
210	3
220	4
230	3
240	2
250	2
260	4
270	7
280	7
290	7
300	1
310	1
320	2
330	1
340	0
350	0
360	1
370	0
380	0
390	0
400	0
Total	50
PSD	40

Table 19. Length frequencies of rainbow trout collected by electrofishing in the Salmon River between Riggins and White Bird, September 8 and 9, 1993.

Length (mm)	Adipose clipped	RV clipped	LV clipped	Wild RBT
100	0	0	0	0
110	0	0	0	0
120	0	0	0	0
130	0	0	0	0
140	0	0	0	0
150	0	0	0	0
160	0	0	0	0
170	0	0	0	0
180	0	0	0	0
190	0	0	0	0
200	0	0	0	0
210	0	0	0	0
220	0	0	0	0
230	0	0	0	0
240	0	0	0	0
250	0	0	0	0
260	0	0	0	0
270	0	0	0	0
280	0	0	0	0
290	0	0	1	0
300	0	0	0	0
310	0	0	0	0
320	0	0	0	0
330	0	0	0	0
340	0	0	0	0
350	1	0	0	0
360	0	0	0	0
370	0	0	0	0
380	0	0	0	0
390	0	0	0	0
400	0	0	0	0
410	0	0	0	0
Total	1	0	1	0

Adipose-clipped rainbow trout were either residualized hatchery steelhead or Spokane strain rainbow trout stocked in 1990. One rainbow trout with an adipose clip was sampled.

A left ventral clip was used to mark domestic Kamloops rainbow trout stocked in 1990. One of these fish was sampled.

All stomachs of hatchery-origin trout were examined by dissection. Diet consisted of aquatic and terrestrial insects and green algae. No fish have been found in 29 hatchery trout stomachs examined in 1992 and 1993. We did not examine the stomachs of wild fish.

JUVENILE CHINOOK SALMON AND STEELHEAD TROUT COLLECTION

A cooperative effort between the Idaho Department of Fish and Game and the Nez Perce Tribe was initiated in 1992 to collect juvenile chinook salmon from the Selway River to begin an experimental broodstock program. The use of net seines in the upper Selway River near Paradise was successful in capturing 80 individuals in 1992 and 200 individuals in 1993. Those fish are presently being reared at the Clearwater Fish Hatchery.

In the spring of 1993, a rotary screen trap was installed by the Nez Perce Tribe at the O'Hara Bridge on the lower Selway River. Fifty-four juvenile chinook salmon outmigrants were captured over a six-week period (Table 20). These fish were transported to the Clearwater Hatchery.

In addition, the capture of 361 juvenile steelhead trout provided length frequency information for outmigrants (Figure 4).

WHITE STURGEON HOOK EVALUATION

Methods

As part of the Clearwater Region white sturgeon fishing education endeavor, a hook exchange program was initiated to evaluate circle hooks as an alternative tackle. Apperson and Anders (1990) switched to circle hooks (instead of standard "J" hooks) for their sturgeon work on the Kootenai River because J-type hooks were occasionally straightened. Apperson also noted that J-type hooks were occasionally swallowed while circle hooks always caught sturgeon in the mouth, making release less stressful.

Results

During 1992 and 1993, 66 sturgeon anglers were given sizes 14/0 and 16/0 circle hooks. At the end of each season, a short questionnaire was sent to each participant to evaluate primarily hooking efficiency, hooking location, and ease of removal.

Table 20. Summary of chinook salmon and steelhead trout juvenile outmigrants captured in rotary screen trap on lower Selway River, 1993. (Grant Walker, Nez Perce Tribe, personal communication).

Date	Chinook salmon	Steelhead trout	Ave. daily CFS	Morning water temp. °F	Hours in operation
4/14	0	1	3,536	47	9
4/15	1	0	3,417	44	10
4/16	1	0	3,295	47	9
4/17	0	0	3,326	47	9
4/18	1	0	3,739	45	10
4/19	3	8	3,753	43	24
4/20	0	0	3,508	43	24
4/21	2	9	3,515	43	24
4/22	5	8	3,699	44	24
4/23	6	11	3,872	44	24
4/24	1	15	3,821	43	24
4/25	2	18	3,842	44	24
4/26	2	25	4,078	44	24
4/27	9	28	4,001	45	24
4/28	0	30	3,885	44	24
4/29	0	29	4,058	49	24
4/30	6	42	5,025	47	24
5/1	5	75	5,348	46	24
5/2	0	37	6,073	50	24
5/3	1	5	7,165	50	24
5/4	0	21	7,669	48	24
5/5	0	4	7,392	47	24
5/6	0	0	8,072	50	24
5/7	0	0	9,011	43	6
5/8	0	0	8,424	43	6
5/9	0	6	7,775	46	24
5/10	3	1	7,669	49	24
5/11	0	0	9,935	48	4
5/12-20	0	0	15,182	47	0
5/21	0	0	23,400	46	6
5/22	2	0	20,239	45	24
5/23	1	0	16,204	45	24
5/24	0	0	13,060	46	24
5/25	3	2	13,198	48	24
5/26	0	0	21,910	49	0
TOTALS	54	375			

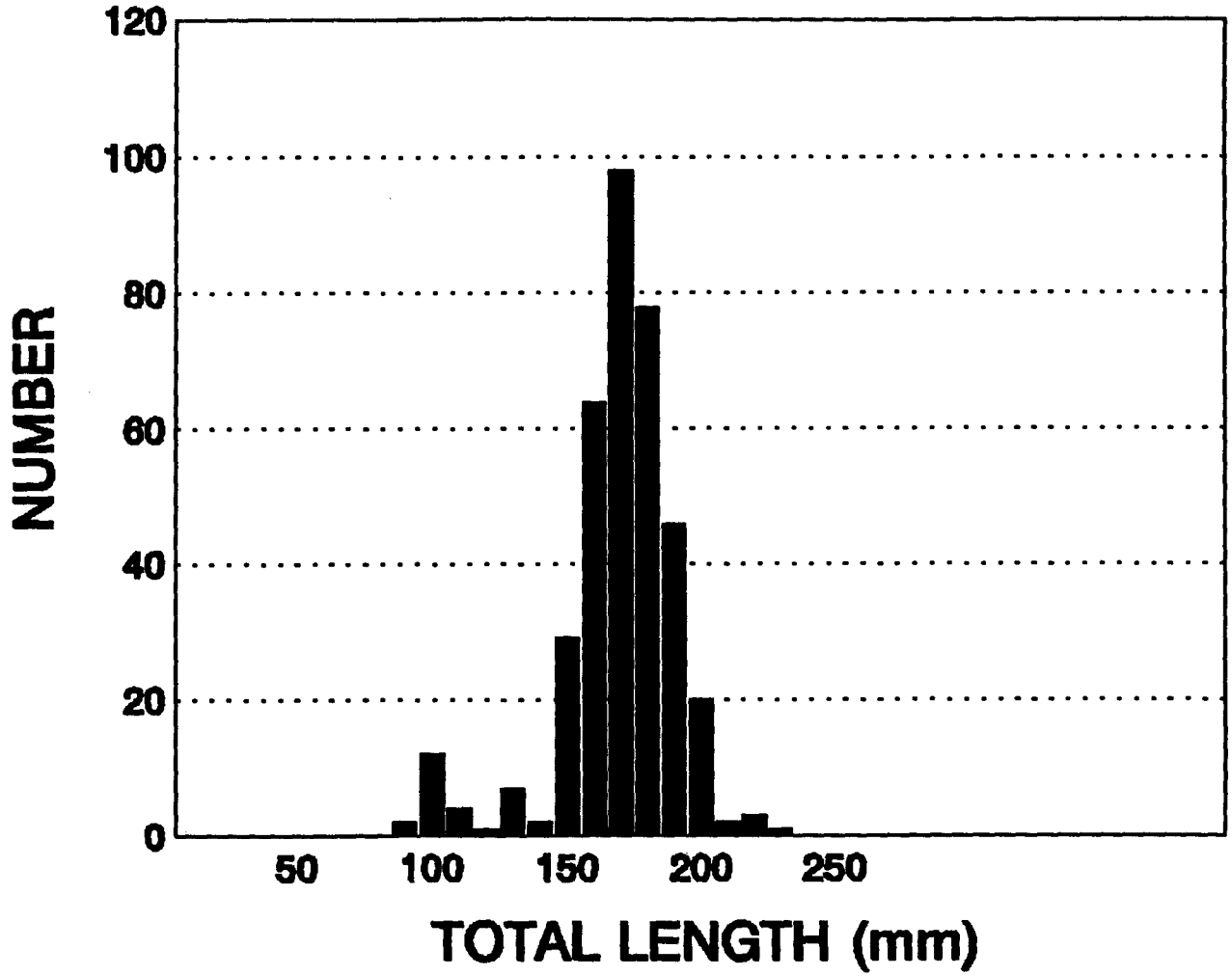

Figure 4. Length frequency of steelhead trout outmigrants captured in a rotary screen trap on the lower Selway River, 1993 (N = 369). (Grant Walker, Nez Perce Tribe)

Half of the participants returned the questionnaire (Table 21). Of those who fished, less than half caught sturgeon. Seventy-one sturgeon were captured, of which none were hooked deep and three were hooked in the mouth rather than the outer lips.

About half of the anglers stated the circle hooks were more efficient in hooking sturgeon. About 62% of the anglers stated the barbless circle hooks are easier to remove.

CATCHABLE TROUT INTRODUCTIONS

Over 14,000 catchable rainbow trout were stocked in nine streams in the Clearwater Region in 1993 (Table 22).

KOKANEE SALMON SPAWNING GROUND COUNTS

Methods

Since 1981, four to six tributaries to Dworshak Reservoir are surveyed in late September to estimate the size of the kokanee salmon spawning run from the reservoir. The survey is conducted by enumerating fish from the mouth of each water upstream until kokanee are no longer observed.

Results

Four streams were surveyed in 1993 (Table 23). The total for Isabella, Skill, and Quartz creeks are the highest of any year counted. This high number is also correlated with small size spawners (Figure 5).

Table 21. Responses of participants in evaluation of circle hooks used for white sturgeon, 1992-1993.

Number in sample	66
Number returning questionnaires	34
Number who did not fish	8
Fished but did not catch sturgeon	14
Total sturgeon caught	71
Number hooked in outer lips	68
Number hooked in mouth	3
Anglers who believed circle hooks are easier to remove than J-type hooks	61.7%
Anglers who believed circle hooks were as, or more efficient in catching sturgeon	55.9%

Table 22. Catchable trout stocked in Clearwater Region streams in 1993.

Water	April	May	June	July	August	September	Total
American River	---	---	---	1,000	--	--	1,000
Big Elk Creek	--	990	1,020	--	--	--	2,010
Lawyers Creek	--	500	510	--	--	--	1,010
Orofino	--	500	530	--	--	--	1,030
Palouse River	--	2,500	530	--	--	--	3,030
Potlatch River	1,290	750	1,020	--	--	--	3,060
Quartz Creek	--	500	250	250	--	--	1,000
Red River	--	--	--	1,000	--	500	1,500
Rhodes Creek	--	500	250	250	--	--	1,000
TOTALS	1,290	6,240	4,110	2,500	0	500	14,640

Table 23. Number of spawning kokanee observed in selected tributaries to Dworshak Reservoir, Idaho, 1981-1993.

Stream	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Isabella Creek	4,000	5,000	2,250	9,000	10,000	--	3,520	10,960	11,830	10,535	4,053	7,085	29,171
Skull Creek	3,220	4,500	135	2,200	8,000	--	1,351	5,780	5,185	3,219	1,249	4,299	7,574
Quartz Creek	850	1,076	66	1,000	2,000	--	1,477	5,080	2,970	1,702	693	1,808	2,476
TOTAL	8,070	10,576	2,451	12,200	20,000	--	6,348	21,820	19,985	15,456	5,995	13,192	39,221
Dog Creek	--	--	--		--	--	700	1,720	1,720	1,875	590	1,120	6,780
Breakfast Creek	--	--	--		--	--	23	14,760	14,402	1,149	3,557	--	--
Elk Creek	--	--	--		--	--	30	--	--	--	--	--	--

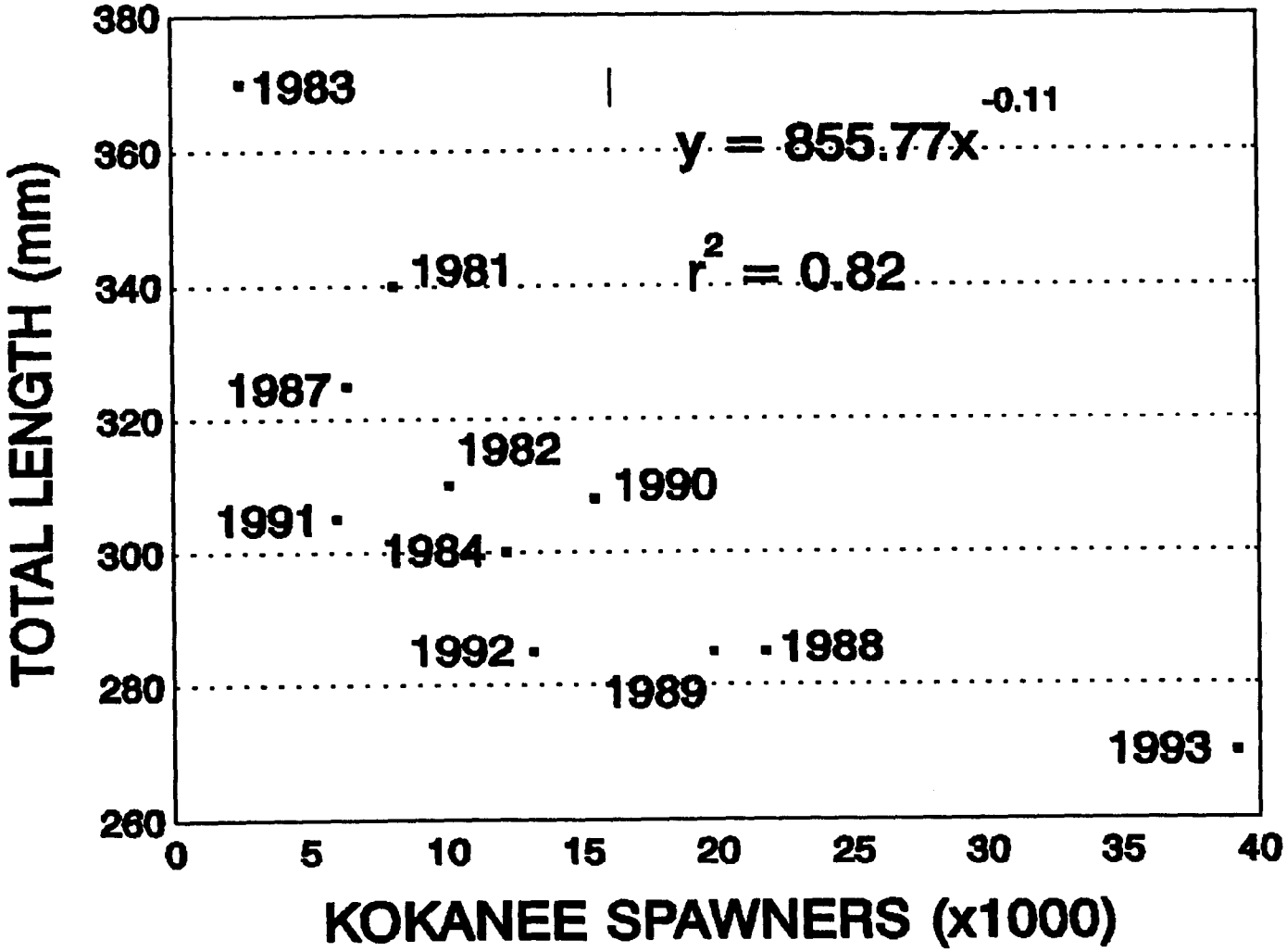

Figure 5. Relation between numbers of kokanee salmon spawners counted in Isabella, Skull, and Quartz creeks (by year) and mean total length.

LITERATURE CITED

Apperson, K. and P. Anders. 1990. Kootenai River white sturgeon investigations and experimental culture. Idaho Department of Fish and Game, Boise.

A P P E N D I C E S

Table A1. Summary of snorkeling observations (fish/100 m sq) in Lochsa River drainage, 1988-93.

Stream	Area (m sq)	Steelhead Trout				Chinook Salmon				Bull Trout	Mountain Whitefish
		Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in		
Brushy Fork (lower)											
1988	308	8.13	5.19	0.97	2.27	12.69	0	1.62	0	0	0
1989	370	2.43	6.48	3.51	0	9.46	0.54	0	0	0	0
1990	317	1.3	6.9	**3.5**	3.5	1.6	3.8	0.3	0	0	0.9
1991	317	2.84	5.36	1.89	3.15	0	0	0	0	0	0
1992	329	0	0.91	0.91	0.3	0.6	0	0	0.6	0	0.3
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Brushy Fork (upper)											
1988	326	3.51	0.64	1.6	1.92	20.45	0	2.23	0	0	0
1989	367	3.27	3.81	2.79	0	11.98	1.1	0	0	0	0.27
1990	335	3.6	9.5	**5.1**	7.2	10.1	4.5	0	0	0	0.6
1991	335	3.58	1.79	1.19	0.89	0.3	0	0	0	0	0
1992	349	0.29	2.86	1.43	0	0.29	0	0	0	0	0.29
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Crooked Fork Crk (Lower)											
1988	919	24.09	4.18	1.87	2.09	13.2	0	0.33	0.11	0.11	0
1989	1058	5.67	2.93	2.93	0	16.16	0.76	2.08	0.09	0.28	0.01
1990	1016	5	7.2	4.1	4.9	1.7	2.2	2.2	0.5	0.2	1
1991	1735	0.26	0	0	0	0.96	0.18	0	0.27	0.54	0
1992	523	7.8	0.4	0	0	0.8	0	0.2	0	0	0.2
1993	635	7.24	2.36	2.51	0	6.14	0	0.78	0	0	0.62
Crooked Fork Crk (Upper)											
1988	386	16.87	3.12	3.37	2.34	7.79	0.26	1.04	0	0.25	0
1989	648	2.47	6.33	3.7	0	25.32	0.62	0.62	0.45	0	0.15
1990	NA	11.7	**2.5**	1.6	1.8	10.1	0.1	0.4	0.1	0.1	0
1991	741	0.26	0	0	0	0.97	0.18	0	0	0	0
1992	331	4.8	0.3	0.9	0	1.5	0	2.2	0	0	0.9
1993	380	6.05	0.79	1.58	1.05	12.34	0.26	1.31	0.78	0.26	0.79
Fire Crk (lower)											
1990	390	7.69	17.44	5.9	0.77	0	0	1.54	0	0.26	0.26
1991	591	12	6.93	2.87	0.68	0	0.17	1.86	0	0	0
1992	493	6.89	11.35	2.84	0	0	0	0.4	0	0	0.2
1993	333	0	0.9	0.6	0	0	0	1.2	0	0	0
Fire Crk (upper)											
1990	423	6.38	14.42	8.51	0.24	0.71	0	0.24	0	0	0
1991	411	8.52	10.23	8.77	2.93	0	0	2.93	0	0	0
1992	600	4.33	6.83	2.5	0.5	0	0	0.5	0	0	0.33
1993	637	0	0.47	0.78	0	0	0.16	2.98	0	0.16	0

Table A1 (Can't). Summary of snorkeling observations (fish/100 m sq) in Lochsa River, 1988-93.

Stream	Area (m sq)	Steelhead Trout				Chinook Salmon				Bull Trout	Mountain Whitefish
		Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in		
Fish Crk (lower)											
1988	1565	10.18	7.44	3.59	0	0.06	0	0	0	0	0
1989	2252	6.61	5.99	2.53	0.04	0.04	0	0	0	0	0
1990	2208	11.1	6.5	1.6	0.2	0	0	0	0	0	0
1991	2857	7.21	5.56	1.75	0	0	0	0	0	0	0
1992	1587	9.4	9.2	0.38	0	0.32	0	0	0	0	0
1993	925	7.13	6.7	4	0.97	0	0	0	0	0	0.11
Fish Crk (upper)											
1988	550	13.55	12.27	3.71	0.32	0	0	0	0	0	0
1989	725	11.43	6.06	4.27	0	0	0	0.69	0	0	0
1990	727	19.4	12.2	1.7	0.1	0	0	0	0	0	0
1991	777	7.33	9.26	3.99	0	0	0	0	0	0	0
1992	645	16.3	15.2	3.1	0	0.78	0	0	0.15	0	0
1993	639	11.27	11.43	9.08	1.57	0	0	0.63	0	0	0.31
Lochsa River (@ Pete King Crk)											
1988	10527	0.02	0	0	0.01	0	0	0.02	0.04	0	0.75
1989	11795	0.03	0.04	0.02	0.01	0	0	0.02	0.03	0	0.16
1990	10784	0	0.02	0.01	0.02	0	0	0	0	0	0.5
1991	11085	0.01	0.01	0	0.01	0.03	0.01	0.01	0	0	0.38
1992	11442	0	0	0	0	0	0	0	0	0	0.22
1993	12563	0.01	0.6	0.01	0	0	0	0.01	0.02	0	0.48
Lochsa River (@ Fish Crk)											
1988	4310	1.15	0.34	0.04	1.17	0	0	0	0	0	0
1989	5595	0.02	0.09	0.13	0.01	0	0	0	0	0	0
1990	6238	0.1	0	0	0	0	0	0	0	0	0
1991	5847	0.74	0.48	0.43	0.15	0.14	0.21	0.14	0.1	0	1.83
1992	3378	0.09	0.09	0.02	0	0	0	0.03	0.03	0	0
1993	5415	0	0	0	0	0	0	0.04	0.06	0	0.61
Lochsa River (@ Saddle Camp)											
1988	5582	0.45	0	0	0	0.05	0	0.11	0.54	0	0.67
1989	6430	0.34	0	0	0	0.4	0	0.18	0.47	0	0.83
1990	6568	1.2	0.4	0.3	0.06	0.1	0	0.06	0.05	0	0.4
1991	6859	0.67	0.48	0.48	0.06	0.28	0.39	0.16	0.09	0	1.24
1992	5927	0.05	0.07	0.02	0	0	0.05	0.51	0.06	0	0
1993	4881	0.16	0.08	0.08	0	0.02	0	0.07	0.18	0	1.8

Table A1 (Con't). Summary of snorkeling observations (fish/100 m sq) in Lochsa River, 1988-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Cutthroat Trout <12 in	Cutthroat Trout >12 in	Bull Trout	Mountain Whitefish
Lochsa River (@ Papoose Crk)											
1988	6522	1.6	0.42	0.09	0.04	0.02	0	0.48	0.64	0	2.44
1989	7237	0.25	0.02	0.03	0	0.02	0.02	0.16	0.09	0	3.22
1990	7384	1.2	0.3	0.04	0.04	0.8	0.05	0.3	0.3	0	0.5
1991	7341	0.97	0.18	0.16	0.05	0.22	0.19	0.25	0.44	0.01	0.98
1992	3859	0.13	0	0	0	0	0.03	0.05	0.42	0	0
1993	7977	0.26	0.21	0	0	0	0	0.05	0.4	0	1.49
Old Man Crk											
1988	142	19.56	41.69	3.31	0	0	0	0	0	0	0
1989	164	0.61	27.44	1.22	0	0	0	0	0	0	0
1990	169	1.2	53.3	3.6	0	0	0	1.8	0	0	0
1991	169	5.92	16.57	14.2	4.14	0	0	2.37	0	0	0
1992	103	19.1	56.4	0	0	0	0	0.79	0.79	0	0
1993	185	3.23	8.1	22.69	4.86	0	0	0	0	0	0
Post Office Crk (lower)											
1988	169	20.26	1.04	0	0	0	0	0	0	0.52	0
1989	254	11.45	1.18	0	0	0	0	0.39	0	0	0
1990	248	32.2	4	0.8	0	0	0	3.2	0	0.4	0
1991	184	10.33	3.26	1.09	0	0	0	0	0	0	0
1992	123	7.29	0.81	4.86	1.62	0	0	22.69	0	0	0
1993	178	5.61	0	1.12	0	0	0	6.17	0	0	0
Post Office Crk (upper)											
1988	465	18.9	0.68	0	0	0	0	0	0	0	0
1989	400	23.77	4	1.5	0	0	0	0.75	0	0	0
1990	614	24.7	4.2	0.7	0.2	0	0	0.7	0	0.2	0
1991	763	4.58	1.57	0.39	0	0	0	0	0	0	0
1992	346	1.44	6.35	0.57	0	0	0	0	0	0	0
1993	168	22.84	0	0	0	0	0	13.7	0	0	0
Split Crk (lower)											
1990	548	10.03	4.92	3.1	0.55	1.64	0	0.18	0	0	0.91
1991	540	9.33	2.98	3.17	0.37	0	0	1.3	0	0	0
1992	519	13.1	15.02	4.24	0.4	0	0	0.4	0	0	0.2
1993	660	0.3	1.52	1.52	0.15	0	0	5.15	0	0	0
Split Crk (upper)											
1990	506	7.12	10.68	3.95	1.19	0	0	1.19	0	0	0.4
1991	504	9.33	2.98	3.17	0.4	0	0	1.39	0	0	0.4
1992	421	6.6	8.49	8.73	0	0	0	1.5	0	0	0.48
1993	380	0.53	0.53	0.53	0	0	0	9.97	0	0	0

Table A1 (Con't). Summary of snorkeling observations (fish/100 m sq) in Lochsa River, 1988-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Cutthroat Trout <12 in	Cutthroat Trout >12 in	Bull Mountain Trout	Bull Mountain Whitefish
Warm Springs Creek											
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1989	879	1.36	0.57	0	0	0.34	0	0	0.11	0	0
1990	957	7.1	2.4	1.16	0.58	0	0.23	0.23	0	0.23	0.35
1991	854	3.5	2.92	0.93	0.58	0.58	0.23	0.23	0.35	0	0
1992	803	1	1.74	0.87	0	0	0	1.24	0.75	1	0
1993	1136	0.53	0.09	1.06	0	0.18	0	0.88	0	0	0.26

Table A2. Summary of snorkeling observations (fish/100m sq) in Salmon River drainage, 1985-93

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Cutthroat Trout < 12 in	Cutthroat Trout >12 in	Bull Trout	Mountain Whitefish
Bargamin Crk (lower)											
1985	303	1.98	1.32	4.3	0.66	0	0	0.33	0	0	0.99
1986	248	0	6.05	4.44	0.4	0	0	0	0	0	3.23
1987	248	0	8.87	6.05	0.4	0	0	0	0	0	1.61
1988	482	0.41	2.9	2.28	0	0	0	0	0	0	0.42
1989	714	0	4.2	1.68	0.14	0	0	0.28	0	0	0.42
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	250	0	4.4	3.2	1.2	0	0	1.2	0	0	5.2
1992	377	0	2.92	2.65	0	0	0	0.53	0	0	0.8
1993	632	0	3.16	2.06	0.16	0	0	0.16	0.16	0	0
Bargamin Crk (upper)											
1985	491	0.81	1.22	2.65	0.2	0	0	0.2	0	0	0.6
1986	403	0	3.72	4.96	0.74	0	0	0	0	0	3.23
1987	403	0	5.96	8.44	0.49	0	0	0.49	0	0	2.73
1988	537	0.56	3.17	2.42	0.19	0	0.56	0	0	0.19	0.56
1989	601	0	3.49	1.5	0.33	0	0	0	0	0.17	0.5
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	1058	0.95	1.32	0.76	0	0	0	0.47	0	0.09	0.95
1992	556	0	5.75	2.88	0	0	0	1.08	0.18	0	0.54
1993	530	0	2.64	2.64	0	0	0	0	0.19	0	0.37
Crooked Crk (lower)											
1993	708	0.71	2.68	0.71	0.04	0	0	0.4	0	0	1.83
Crooked Crk (upper)											
1993	581	1.89	2.58	0.34	0.86	0	0	0	0	0	0
Jersey Crk											
1993	336	1.49	2.37	0	0	0	0	0	0	0	0
John Day Crk (lower)											
1991	148	0	4.05	0	0	0	0	0	0	0	0
1992	172	4.06	1.74	0	0	0	0	0	0	0	0
1993	143	2.09	6.27	0	0	1.39	0	0	0	0	0
John Day Crk (upper)											
1991	139	1.04	8.01	0.35	0	0	0	0	0	0	0
1992	120	1.17	1.77	0.59	0	0	0	0	0	0	0
1993	67	10.6	19.7	6.05	1.51	0	0	3.02	0	1.51	0

Table A2 (Can't). Summary of snorkeling observations (fish/100 m sq) in Salmon River drainage, 1985-93.

Stream	Area (m sq)	Steelhead Trout				Chinook Salmon			Cutthroat	Bull Trout	Mountain Whitefish
		Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	< 12 in	> 12 in		
Indian Cr											
1993	144	0.7	1.39	0	0	0	0	0	0	0	0
Race Crk											
1991	232	6.47	6.47	0	0	0	0	0	0	0	0
1992	286	18.91	8.4	2.8	0	0	0	0	0	0	0
1993	427	1.17	4.92	1.64	0	0	0	0	0	0	0
Sheep Crk (lower)											
1986	257	0	1.95	2.33	0	0	0	0	0	0	2.33
1987	310	0	0	1.94	0	0.32	0	0	0	0	4.21
1988	361	1.11	0.83	0.83	0	0	0	0.28	0	0.55	4.99
1989	357	0	2.8	1.96	0	0.84	0	0.56	0	0	1.4
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	315	0.32	5.4	3.17	0	1.27	0	0.63	0	0.32	3.49
1992	307	0.65	2.93	0.65	0	0	0	0.3	0	0	3.33
1993	838	1.91	2.86	0.47	0	0	0	0	0	0.12	0.59
Sheep Creek (upper)											
1986	92	1.09	10.87	16.3	0	0	0	0	0	0	5.43
1987	92	0	10.87	18.48	0	0	0	0	0	0	3.26
1988	75	18.67	10.67	5.33	0	0	0	4	0	1.33	20
1989	200	0	5.5	4	1.5	0.5	0	0	0	0	4.5
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	103	0	8.72	4.84	0	0	0	4.85	0.97	0.97	4.85
1992	188	0	0	3.72	0	0	0	0	0	0	3.62
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Skookumchuck Crk (lower)											
1991	290	8.79	2.49	1.34	0	0	0	0	0	0	0
1992	322	10.87	7.45	0.62	0	0	0	0	0	0	0
1993	492	2.86	6.74	4.9	0.41	0	0	0	0	0	0
Skookumchuck Crk (upper)											
1991	233	0.85	1.29	2.14	0	0	0	0	0	0	0
1992	278	5.03	1.07	0.35	0	0	0	0	0	0	0
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A2 (Con't). Summary of snorkeling observations (fish/100 m sq) in Salmon River drainage, 1985-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Cutthroat <12 in	Cutthroat > 12 in	Bull Trout	Mountain Whitefish
Slate Crk (RM 4.3)											
1988	688	6.48	12.95	10.22	0.58	0	0	0	0	0	0
1989	785	0	3.95	9.3	0.38	0	0	0	0	0	0.38
1990	816	5.4	4.9	0.7	0	1.2	1.6	0	0	0	0
1991	742	13.7	7.94	2.02	0.27	0	1.08	0	0	0	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slate Crk (RM6.7)											
1988	877	11.92	7.86	3.97	0.32	1.05	0.4	0	0	0	0.08
1989	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1990	733	22.4	8.3	2.6	0.5	1.1	1.8	0	0	0	0
1991	1137	19.79	5.63	2.55	1.5	0	2.81	0.09	0.18	0	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slate Crk (RM 8.1)											
1988	242	2.89	16.12	8.26	0	0	1.24	0	0	0	0.41
1989	311	2.89	15.1	7.07	0.32	0	0	0	0	0	0
1990	318	12.6	5	2.5	1.9	2.2	1.3	0	0	1.6	0.3
1991	733	18.67	14.86	3.81	2.67	1.52	1.14	0	0	0	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slate Crk (RM 12.1)											
1988	621	8.41	6.3	4.73	1.05	0	0	0	0	0	0
1989	595	0.17	5.54	2.52	0	0.17	0	0	0	0	0
1990	636	7.1	2.8	0.6	0.3	1.3	0.5	0	0	0.3	0
1991	262	0.76	4.25	1.2	0.33	0.98	0.22	0	0	0.11	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
S.F. Skookumchuck Crk											
1991	51.8	0	1.93	0	0	0	0	0	0	0	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A2 (Con't). Summary of snorkeling observations (fish/100 m sq) in Salmon River drainage, 1985-93.

Stream	Area Bull Mountain (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Chinook Salmon <12 in	Chinook Salmon >12 in	Cutthroat Trout Trout	Cutthroat Trout Whitefish
S.F. White Bird Crk (lower)											
1988	93	68.66	34.88	2.18	0	0	0	0	0	0	0
1989	125	10.36	19.92	0	0	0	0	0	0	0	0
1990	95	9.45	7.35	2.1	0	0	0	0	0	0	0
1991	96	8.28	9.32	4.14	1.04	0	0	0	0	0	0
1992	295	1.02	4.4	0	0	0	0	0	0	0	0
1993	269	4.46	4.84	1.12	0	0	0	0	0	0	0
S.F. White Bird Crk (upper)											
1988	118	30.25	15.97	14.92	2.52	0.84	0	0	0	0	0
1989	125	4.8	30.43	0.8	0	0	0	0	0	0	0
1990	94	8.46	16.93	2.12	4.23	0	0	0	0	0	0
1991	138	20.23	10.84	5.06	1.44	0	0	0	0	0	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	342	3.22	3.8	2.63	0.29	0	0	0	0	0	0
White Bird Crk											
1988	175	60.83	33.86	25.82	4.02	0	0	0	0	0	0
1989	259	15	21.93	9.23	0.38	0	0	0	0	0	0
1990	122	29.53	26.96	5.78	0	0	0	0	0	0	0
1991	207	16.88	20.74	6.75	0.48	0	0	0	0	0	0
1992	445	1.35	4.27	1.79	0	0	0	0	0	0	0
1993	167	4.17	5.36	1.19	0.6	0	0	0	0	0	0

Table A3. Summary of snorkeling observations (fish/100 m sq) in Selway River drainage streams, 1988-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Chinook Salmon <12 in	Chinook Salmon >12 in	Bull Trout	Mountain Whitefish
Bear Crk. (lower)											
1986	1238	0.09	0.48	0	0	3.31	0	1.3	0.75	0	3.25
1987	1238	0	2.34	0.32	0	0	1.37	0.65	0.32	0	0.21
1988	1341	2.31	2.24	1.64	0.22	2.61	0.15	0.91	0.37	0	2.25
1989	1252	2.95	1.2	0.08	0	0.72	0.08	0.48	0.16	0	1.36
1990	1357	5.97	2.51	0.15	0	2.95	0.07	0.6	0.3	0	1.7
1991	974	0	0	0.21	0.1	0	0	1.6	0.1	0.1	4.21
1992	1128	0.09	0.44	0.09	0	0	0	0.62	0	0.09	0.18
1993	1319	0.23	0.45	0.23	0.15	0.23	0	0.68	0.08	0	2.11
Bear Crk. (upper)											
1986	994	2.92	0.2	0	0	1.01	0	0.61	0.21	0.1	0.3
1987	986	0	2.74	1.22	0	0	0	0.5	0.2	0	0.2
1988	1074	1.12	2.33	0.84	0.14	0.19	0.09	0	0	0	0.98
1989	1903	1.73	2	0.58	0	0	0	0.52	0	0.05	0
1990	1096	6.02	2.28	0	0	0.82	0	0.3	0.2	0	0.9
1991	962	0.62	0	0	0	0.31	0.21	0.52	0.1	0	0.21
1992	1017	0.1	0.1	0.29	0	0.39	0	0.69	0.1	0	16
1993	1017	0.49	0.98	0	0	0	0	0.29	0.29	0	0.1
Deep Crk (lower											
1987	556	2.16	2.69	1.08	0.72	0	0	0.86	0.43	0	1.26
1988	594	3.37	6.56	1.18	0	0.34	0	0.33	0.18	0	0.74
1989	543	0	4.97	1.47	0.18	0	0	0.85	0.44	0	0.74
1990	585	3.59	3.42	1.03	1.17	0.17	0	0.22	0.12	0	0
1991	407	1.96	1.23	0.74	0	0	0	1.5	0.5	0	0
1992	417	4.55	3.35	0	0	0	0	1.92	0	0	0
1993	417	9.55	3.35	0	0	0	0	3.35	0	1.19	0
Deep Crk (upper)											
1987	383	0	2.35	1.83	0.78	0	1.04	1.1	0.47	0	0
1988	495	11.72	3.23	0.61	0	0	0	1.22	0.61	0	0
1989	571	0.18	2.45	0.7	0	0.18	0	1.4	0	0.18	0
1990	462	4.98	5.2	1.52	0	1.08	0	0	0	0	0
1991	462	4.33	4.97	0.87	0	1.51	0	1.1	0.2	0	0
1992	351	5.98	3.17	3.7	0	0	0	3.98	0	0	0
1993	353	5.95	3.12	3.68	0	0	0	2.26	0	0	0
E.F. Moose Creek											
1988	785	9.39	4.57	2.03	0.26	1.27	0	0	0.13	0	0.25
1989	888	3.6	0.22	0	0	0.34	0.11	0.56	0.11	0	0.56
1990	828	5.9	4.34	2.29	0	0.72	2.41	0	0.12	0	2.9
1991	911	3.92	3.24	1.6	0.19	0.15	0.44	1.02	0.19	0	0.39
1992	1388	0.14	3.75	1.15	0.14	0.79	0	1.37	0.36	0	1
1993	691	2.75	4.93	0.72	0.29	1.45	1.45	0.87	0.15	0	1.43

Table A3 (Con't). Summary of snorkeling observations (fish/100 m sq) in Selway River drainage, 1988-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Cutthroat Trout <12 in	Cutthroat Trout >12 in	Bull Trout	Mountain Whitefish
Marten Crk											
1992	294	7.82	11.9	1.71	0.68	0	0	1.02	0	0	1.61
1993	171	4.07	5.82	1.16	0	0	0	0	0	0	0
Moose Crk. (@Mouth)											
1988	1539	0.06	0.26	0.2	0	0	0	0.46	0.13	0.06	6.09
1989	1629	0.06	0.25	0.43	0	0	0	0.8	0.06	0	6.51
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1992	2181	0	0.92	0.28	0.18	0.41	0	0.83	0.09	0	27
1993	2634	0.39	2.64	4.18	0.39	0	0	0.99	0.12	0	2.05
Moose Crk. (@Confluence of NF and EF)											
1988	3480	1.27	0.47	0	0	0.15	0	0.24	0	0	0.06
1989	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1990	2525	0.63	0.12	0	0	0.16	0	0	0	0	0
1991	2065	1.86	1.21	0.55	0	0	2.3	0.55	0.11	0	0.22
1992	NA	0.82	0.21	0.02	0.04	0.25	0	0.51	0	0	10
1993	2536	1.97	1.5	0.04	0	0	0	0.32	0.08	0	0.27
N.F. Moose Crk.											
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1989	3059	0.1	0	0	0	0.03	0	0.1	0.06	0	1.34
1990	2263	0.84	1.94	1.15	0.44	0.09	0	0.4	0.04	0	0.22
1991	2165	1.53	2.41	1.99	0.19	0	2.13	1.39	0.19	0	1.02
1992	2764	1.34	1.48	0.7	0.07	0.22	0	1.09	0.29	0.07	80
1993	2042	0.93	2.7	0.39	0	0	0	0.64	0.15	0	0
Otter Crk.											
1988	178	10.11	5.05	0	11.79	0	0	3.37	1.12	0	0
1989	194	14.92	5.14	5.14	0.51	0	0	3.09	0.51	0	0
1990	195	11.28	11.79	4.1	2.56	0	0	0	1.54	0	0
1991	214	5.61	8.42	2.81	0.94	0	0	0.47	0	0	0
1992	176	9.08	9.08	2.28	1.7	0	0	0.57	0.57	0	0
1993	228	7.02	7.46	1.32	0.44	0	0	2.19	0	0	0

Table A3 (Con't). Summary of snorkeling observations (fish/100 m sq) in Selway River drainage, 1988-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Chinook Salmon <12 in	Chinook Salmon >12 in	Bull Trout	Mountain Whitefish
Running Crk. (lower)											
1985	572	2.8	0.7	0	0.18	0	0	0.36	0	0	0.36
1986	870	2.99	1.03	0	0	2.18	0	0.58	0	0	0.12
1987	875	0	2.17	1.83	0	0.57	0	1.24	0	0	0
1988	869	6.68	2.19	0.12	0	0	0	0.69	0	0	0.8
1989	823	1.33	0.49	0	0	0	0.12	0.49	0	0	0.12
1990	986	2.94	0.81	0.1	0	0	0	0.61	0	0.1	0.2
1991	834	1.8	0.48	0.6	0	0.6	0	0.84	0	0.12	0.24
1992	994	0.1	0.8	0.5	0	0	0	1.11	0.3	0	0.2
1993	834	2.52	1.32	0	0	0	0	0.24	0	0	0.12
Running Crk. (upper)											
1985	366	2.46	1.64	0.27	0	0	0	0	0	0	0
1986	730	1.78	0.41	0	0	0.27	0	0.28	0	0	0.14
1987	781	0	1.66	1.54	0	0.26	0	1.1	0	0.26	0.39
1988	830	3.25	4.7	0.36	0	0	0	1.09	0	0	0.24
1989	841	3.8	2.02	1.3	0	0	0	0.47	0	0	0.11
1990	891	1.46	0.45	0	0	0	0	0.22	0	0	0
1991	1177	0.51	1.36	0	0	0	0	0.42	0	0	0.51
1992	514	2.53	2.91	0	0	0	0	2.14	0.19	0	0.19
1993	324	0	2.77	0.92	0	0.31	0	0.62	0.24	0	0.12
Selway River at Hells Half Acre											
1985	1426	1.33	0.28	1.54	0.28	1.4	0	0.56	0.14	0	0.21
1986	1552	0	1.29	1.16	0.13	0.26	0	0.71	0.06	0.06	0.84
1987	1552	0	1.03	1.55	0.45	0.71	0.13	0.64	0.06	0	0.52
1988	1629	0.37	0.68	1.04	0.61	0.74	0.06	0.31	0	0	0.18
1989	1395	0.07	0.29	0.22	0	0.36	0	0.25	0.06	1.36	0.43
1990	1637	0.12	1.1	0.42	0	1.53	0.24	0.65	0	0	0.43
1991	1043	0.19	2.78	0.96	0	1.44	0.29	0.12	0	0.1	0.77
1992	1355	0.07	1.62	0.44	0	0.89	0.07	0.37	0	0	0.59
1993	1372	0	1.24	0.36	0.07	1.24	0	0.51	0	0	0.73
Selway River at Little Clearwater R.											
1985	1897	1.95	1.05	0.11	0	0.42	0	0.11	0.11	0	0.05
1986	1512	0.4	0.73	0.13	0	8.99	0	0.07	0.07	0.07	0.4
1987	1512	0.26	0.07	0.13	0	1.65	0	0	0.13	0	0.07
1988	1741	2.01	0.34	0.11	0.11	2.53	0	0	0	0	0
1989	1573	4.2	0.95	0.19	0	2.23	0	0.45	0	0.06	0.13
1990	1600	0.06	0.63	0.13	0	8.07	0.19	0.31	0	0.06	0.19
1991	2223	2.97	0.18	0.09	0	1.39	0	0	0	0.04	0
1992	893	0	1.23	0.78	0.11	1.79	0	0.89	0.22	0	1.34
1993	1653	0	0.18	0.06	0	1.09	0	0	0.12	0.06	0
Selway River above Beaver Point											
1987	2698	1.33	0.52	0.7	0.04	19.45	0.56	0.15	0	0.15	0.74
1988	2683	1.49	1.12	0.41	0	25.57	0.45	0.11	0.07	0	0.93
1989	4134	0.6	1.43	1.09	0.07	23.85	0.1	0.34	0.15	0.24	0.75
1990	4226	5.37	1.59	0.5	0.28	8.54	0.78	0.78	0	0.19	0.35
1991	3031	2.87	0.82	0.92	0.2	9.57	0.73	0.82	0.16	0	0.13
1992	2312	0.13	0.69	0.39	0.04	4.28	0	0.26	0.13	0	0
1993	2145	0.61	0.47	0	0	0.05	0	0.19	0	0	0

Table A3 (Con't). Summary of snorkeling observations (fish/100 m sq) in Selway River drainage, 1988-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Chinook Salmon <12 in	Chinook Salmon >12 in	Bull Trout	Mountain Whitefish
Three Links Crk											
1988	264	6.44	12.13	8.72	3.03	0	0	1.52	0	0	0
1989	276	8.33	7.24	3.98	0	4.78	0	1.45	0.36	0	0
1990	261	6.9	17.2	9.6	1.9	0	0	0.8	0.8	0	0
1991	294	1.7	11.88	2.71	0.34	0	0	1.7	0.68	0	0.34
-BB2- - -	-326_ _	____ 4.9	3.7	0	0	0	0	2.75	0	0	0
1993	672	2.64	7.46	1 W	32-	D_ _	Q	0.24	0	0	0.12
White Cap Crk (lower)											
1985	365	1.12	0	1.12	0	0	0	0.28	0	0	0.56
1986	430	0.23	1.16	0.23	0	0.7	0	0	0	0	0.23
1987	1364	0	0.95	1.03	0.15	3.15	0.22	0.35	0.16	0	1.47
1988	1266	0	1.58	1.74	0	0.39	0	0.48	0.23	0	1.58
1989	1479	0	1.01	1.49	0.07	0.14	0.07	0.86	0.43	0.2	1.42
1990	1412	0	2.12	1.49	0.14	0.14	0.21	1.61	0.73	0.14	1.2
1991	867	0	0.92	3.46	0	0	0.35	0	1.15	0	1.04
1992	867	1.38	3.81	0.69	0	0.12	0	1.5	0	0	1.04
1993	795	0.13	2.27	0.38	0	0	0.25	0.38	0	0	0
White Cap Crk (middle)											
1985	923	0	0.11	0.65	0	0.76	0	0.36	0.18	0	0.33
1986	923	0	0	0	0	0.11	0	0.11	0	0	0.33
1987	1432	0	0.35	1.19	0.14	0.14	0.21	0.28	0.14	0	0.98
1988	1366	0	0.59	0.44	0	0.15	0	0.1	0.05	0	0.95
1989	1534	0	0.52	1.04	0.13	0.2	0	0.2	0	0	0.65
1990	1715	0.06	1.11	0.52	0.23	0.58	0	0.24	0.11	0.06	0.29
1991	1363	0	0.37	0.73	0.15	0	0.66	0.07	0.88	0	0.22
1992	1363	0	1.69	0.44	0	0	0	1.28	0	0	0.43
1993	624	0	3.04	0	0	0	1.44	0.48	0	0	3.36
White Cap Crk (upper)											
1987	2198	0	0.09	0.23	0.27	0.91	0.09	0.3	0.14	0	0.82
1988	1820	1.54	0.99	0.88	0.11	2.53	0	0.51	0.26	0	1.92
1989	2055	0	1.12	1.7	0.05	0.78	0	0.69	0.38	0	0.73
1990	2235	0	0.98	0.72	0.13	0.4	0.04	0.14	0.08	0.04	0.22
1991	1287	0.1	1.17	1.32	0.31	0	0.7	0.23	0.86	0	1.32
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	1106	1.17	6.51	0.9	0.09	0.18	3.07	1.26	0.09	0	0

Table A4. Summary of snorkeling observations (fish/100 m sq) in Snake River drainage, 1985-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Chinook Salmon <12 in	Chinook Salmon >12 in	CBull Trout	Mountain Whitefish
Captain John Crk (lower)											
1985	291	5.5	7.56	3.09	0.34	0	0	0	0	0	0
1986	291	29.21	20.96	2.41	0	0	4.12	0	0	0	0
1987	320	18.12	10.31	0.94	0	0	0	0	0	0	0
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1989	320	13.12	1.56	0	0	0	0	0	0	0	0
1990	320	1.56	11.25	5.62	0						
1991	320	13.3	1.67	0	0	0	0	0	0	0	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993*	104	10.6	10.6	3.89	0	0	0	0	0	0	0
Captain John Crk (upper)											
1985	180	11.67	10.56	5	0	0	0	0	0	0	0
1986	180	17.78	23.89	5.56	0.56	0	0	0	0	0	0
1987	180	14.98	9.98	1.66	1.66	0	0	0	0	0	0
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1989	180	24.96	3.88	1.11	0	0	0	0	0	0	0
1990	180	1.67	13.3	0	0	0	0	0	0	0	0
1991	180	0.56	2.24	5.05	1.12	0	0	0	0	0	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993*	69	28.74	5.75	0	0	0	0	0	0	0	0
Granite Crk (lower)											
1985	191	12.57	16.75	2.62	0	0	0	0	0	0	0
1986	191	3.66	8.38	5.76	1.05	0	0	0	0	0	0
1987	230	13.91	5.65	5.65	1.3	0	0	0	0	0	0
1988	230	16.09	17.83	6.96	0	0	0	0	0	0	0
1989	459	6.96	7.18	4.79	0.28	0	0	0	0	0	0
1990	362	12.99	6.91	5.53	0	0	0	0	0	0	0
1991	312	3.21	10.9	2.88	3.02	0	0	0.32	0	0.32	0
1992	406	5.17	4.68	1.97	1.48	0	0	0	0	0	0
1993	876	0.91	2.62	2.97	0.91	0	0	0	0	0	0
Granite Crk (middle)											
1985	192	7.3	18.24	4.17	0	0	0	0	0	0	0
1986	145	11.03	8.28	1.38	0	0	0	0	0	0	0
1987	184	13.59	4.89	3.26	0.54	0	0	0	0	0	0
1988	234	15.22	11.41	4.35	0.43	0	0	0	0	0	0
1989	180	5.98	10.26	3.85	0	0	0	0	0	0	0
1990	180	11.65	6.66	6.1	0.56	0	0	0	0	0	0
1991	200	4.62	6.15	1.15	0	0	0	0.5	0	0	0
1992	183	4.92	9.29	6.56	0.55	21.3	0	0	0	0	0
1993	211	0	5.68	1.42	0.95	0	0	0	0	0	0

*Electrofishing

Table A4 (Con't). Summary of snorkeling observations (fish/100 m sq) in Snake River drainage, 1985-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Cutthroat Trout <12 in	Cutthroat Trout >12 in	Bull Trout	Mountain Whitefish
Granite Crk (upper)											
1985	200	7.5	6.5	6	1.5	0	0	0	0	0	0
1986	200	5.5	14.5	9.5	7.5	0	0	0.5	0	0	0
1987	200	0	4.5	3.5	5	0	0	0	0	1	0
1988	200	2	19	17	1	0	0	0	0	0	0
1989	576	0.35	6.6	1.74	0	0	0	0	0	0.17	0
1990	550	2.36	7.44	2.36	0.18	0	0	0	0	0.36	0
1991	550	0	1.09	1.27	0.18	0	0	0	0	0.36	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	298	3.35	6.36	2.34	1.34	0	0	0	0	0.34	0
Sheep Crk (lower)											
1985	122	13.93	5.74	15.57	3.28	0	0	0	0	0	0
1986	122	7.38	14.75	17.21	7.38	0	0	0	0	0	0
1987	312	11.54	5.13	6.73	4.48	0	0	0	0	0.32	0
1988	122	20.49	15.57	6.56	0.82	0	0	0	0	0	0
1989	256	12.5	7.81	8.2	0.78	0	0	0	0	0	0
1990	204	5.87	4.41	1.96	0.49	0	0	0	0	0	0
1991	213	10.8	12.7	3.8	0.5	0	0	0	0	0	0
1992	241	33.6	13.7	14.5	4.15	0	0	0.42	0.42	0	0
1993	224	12.5	12.05	3.57	9.82	0	0	0	0	0	0
Sheep Crk (upper)											
1985	468	3.63	3.85	2.78	0.43	0	0	0	0	0	0
1986	468	2.99	4.91	2.78	1.07	0	0	0	0	0.64	0
1987	549	1.27	3.64	0.91	0.18	0	0	0	0	0.36	0
1988	468	7.69	4.06	2.56	1.07	0	0	0	0	0	0
1989	437	7.31	4.34	5.03	0.69	0	0	0	0	0.23	0
1990	495	5.25	2.42	0.81	0.4	0	0	0	0	0	0
1991	481	10.8	4.16	0.41	0	0	0	0	0	0	0
1992	190	42.1	22.63	13.68	4.74	0	0	0	0	0	0
1993	260	6.92	8.46	1.54	2.31	0	0	0	0	0	0
Wolf Creek											
1985	342	34.8	9.65	7.89	2.05	0	0	0	0	0	0
1986	180	99.44	7.78	1.11	0	0	0	0	0	0	0
1987	428	18.24	3.27	1.87	0	0	0	0	0	0	0
1988	180	0	5.56	0	0	0	0	0	0	0	0
1989	160	5.71	11.43	0	0	0	0	0	0	0	0
1990	164	0	0.61	0	0	0	0	0	0	0	0
1991	173	0	0	0	0	0	0	0	0	0	0
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A5. Summary of snorkeling observations (fish/100 m sq) in the South Fork Clearwater River drainage, 1988-93. 1985-93.

Stream	Area (m sq)	Steelhead Trout Age 0	Steelhead Trout Age 1	Steelhead Trout Age 2	Steelhead Trout Age >2	Chinook Salmon Age 0	Chinook Salmon Age 1	Cutthroat Trout <12 in	Cutthroat Trout >12 in	Bull Trout	Mountain Whitefish
Johns Crk (@ Mouth)											
1988	372	7.19	4.26	2.66	0	0.27	0	0	0	0	0
1989	653	6.89	6.13	1.38	0	0	0	0	0.15	0.15	0
1990	387	3.1	6.7	0.3	0	0	0	0	0	0	0.5
1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1992	411	0	6.32	1.85	0.67	0	0	0	0	0	0
1993	560	0.17	3.21	0.54	0	0	0	0	0	0	0
Johns Crk (rm 1.0)											
1988	353	7.14	4.26	2.66	0	1.19	0	0	0	0	0.6
1989	356	14.62	9.27	1.97	0	0	0.56	0	0	0	0.56
1990	303	4.9	14.5	3.3	0	1	0	0	0	0.3	1.3
1991	323	7.1	9.6	2.8	0	0	0.3	0	0	0	0.6
1992	303	0	7.92	1.98	0.66	0	0	0.33	0.33	0	1.65
1993	377	0.79	7.97	5.58	0	0	0	0.53	0	0	0.53
Johns Crk (@ Open Crk)											
1988	1466	0.96	3.63	1.72	0	0	0	0.19	0	0	0
1989	1903	1.73	2	0.58	0	0	0	0.52	0	0.05	0
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	461	0.87	5	1.95	0	0.21	0	0	0	0.43	0
1992	557	0.72	3.23	0.72	0	0	0	0.18	0	0	0
1993	557	1.44	1.97	0.72	0	0	0	0.18	0	0	0
Johns Crk (upper)											
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1989	1362	0.59	0.59	0.44	0	0.51	0	0	0	0	0
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	176	0	3.98	2.27	0	0	0	0	0	1.14	0
1992	399	0	2.76	1.5	1	0	0	0.25	0	0	0
1993	219	8.74	3.19	0.91	0.46	0	0	0.46	0	0	0
Moores Crk (lower)											
1992	127	0	0.78	0	0	0	0	4.72	0	0	0
1993	105	0	6.69	5.67	0	0	0	0	0	0.95	0
Moores Crk (upper)											
1992	149	0	0	0	0	0	0	16.1	0	2.01	0
1993	279	2.51	4.3	2.15	0	0	0	1.07	0	1.79	0

Table A5. Summary of snorkeling observations (fish/100 m sq) in the South Fork Clearwater River drainage, 1985-93.

Stream	Area (m sq)	Steelhead Trout				Chinook Salmon				Cu Bull Trout	Mountain Whitefish
		Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in		
Ten Mile Crk (lower)											
1985	643	6.07	1.71	4.35	0.16	0	0	0	0	0	0.62
1986	643	1.87	2.49	0.78	0.47	35.3	0	0	0	1.09	0.78
1987	688	2.03	0.58	1.31	**0.58**	0.15	0	0.15	0	0.15	0
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1989	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1992	261	0	3.44	0.38	0	0	0	0	0	0	0
1993	292	3.77	0.34	0	0	0	0	0	0	0	0
Ten Mile Crk (upper)											
1992	258	0	5.82	6.21	0	0	0	0	0	0	0
1993	314	2.23	2.55	0	0	0	0	0	0	0	0

JOB PERFORMANCE REPORT

State of: Idaho

Name: Fisheries Management F-7-R-18

Project II: Technical Guidance

Subproject I-B: Clearwater Region

Contract Period: July 1, 1993 to June 30. 1994

ABSTRACT

Clearwater Region fish management personnel offered technical guidance to 18 other agencies and 41 private parties during this report period.

We sponsored or co-sponsored 12 childrens fishing clinics throughout the region on Free Fishing Day. We also sponsored educational clinics on fly fishing and steelhead fishing.

We produced and printed informational brochures on fishing the Selway River and the Lochsa River.

Authors :

Tim Cochnauer
Regional Fishery Manager

Ed Schriever
Regional Fishery Biologist

Submitted by:

Ed Schriever
Regional Fishery Biologist

Jody Brostrom
Regional Fishery Biologist

Tim Cochnauer
Regional Fishery Manager

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Steven M. Huffaker, Chief
Regional Supervisor

Bill Hutchinson
State Fisheries Manager