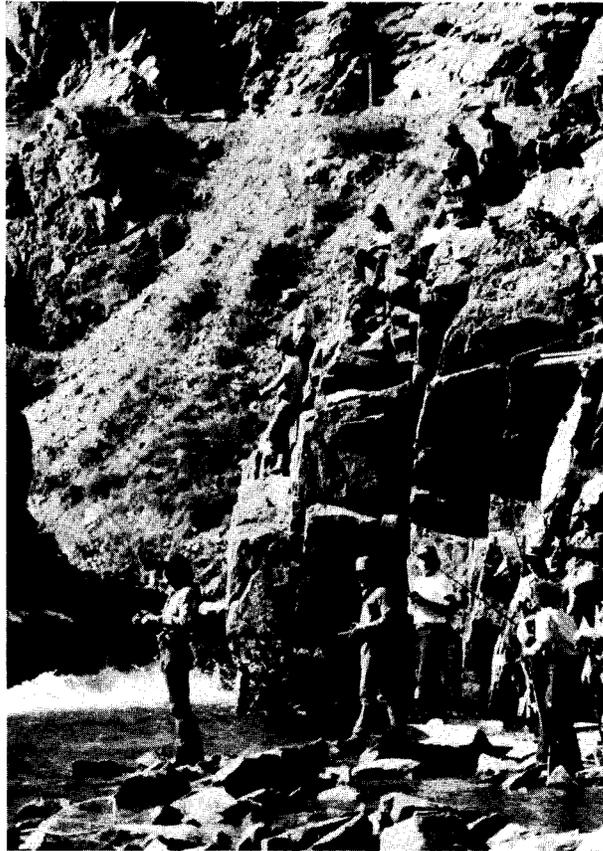


FISHERY RESEARCH



**Evaluation of the Hatchery - Wild Composition
of Idaho Salmon and Steelhead Harvest**

**Performed for U.S. Fish and Wildlife Service
Lower Snake River Fish and Wildlife Compensation Plan
Contract No. 14-16-0001-85067 (RWG)
Period covered: December 1, 1984 to September 30, 1985**



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ABSTRACT

Steelhead (Salmo gairdneri) harvest in Idaho was monitored to assess the hatchery-wild composition and distribution of the harvest. Coded wire tags were retrieved and harvest estimates calculated for each tag group by month and river section.

During the fall 1984 and spring 1985 seasons, 19,640 anglers were interviewed, and 2,791 steelhead were measured and examined for marks. For the fall season, 17,746 of the 18,474 steelhead harvested were of hatchery origin. In the spring season, 12,367 of the 13,506 fish harvested were of hatchery origin.

The 292 coded wire tags retrieved were from 24 tag groups. Steelhead returning from the Lower Snake River Compensation Plan hatchery program produced an estimated return of 2,485 fish to Idaho. In the Salmon River, 22% of the estimated harvest was from the Lower Snake compensation program.

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INTRODUCTION

The main purpose of this project is to determine, by field inspection, the hatchery-wild composition of the anadromous fish harvest. Tagging data are also recovered. Estimates of the number of fish harvested are obtained in a separate project.

Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Salmo gairdneri*) populations in Idaho are supplemented by hatchery stocks from several hatcheries. Hatchery production is a part of many programs designed to replace losses of anadromous fish caused by construction of hydroelectric dams.

Adults returning to hatcheries in Idaho are commingled with each other and with wild fish. In the Snake River, Idaho fish are commingled with adults returning to Washington and Oregon streams. Consequently, the hatchery and harvest evaluation has become increasingly complex.

Harvest management of steelhead trout in Idaho is being directed toward consumption of hatchery fish and protection of wild stocks. Currently, wild stocks are below adequate escapement levels, and protection is necessary in order to perpetuate these fish over the long run. Beginning in 1984, all hatchery-produced steelhead smolts released in Idaho rivers and streams have the adipose fin excised before release. Adults returning can then be identified to be of hatchery origin and selectively harvested.

The fall 1984 steelhead regulations for the Salmon River specified that "From the mouth of the Salmon River upstream to Deer Creek Bridge near Whitebird, only steelhead with dorsal fins measuring 2 inches or less in height may be reduced to possession. From Deer Creek Bridge upstream to Basin Creek, only steelhead with dorsal fins measuring 2 1/4 inches or less in height may be reduced to possession. Steelhead with dorsal fins measuring in excess of these limits must always be immediately released unharmed." The intent of these regulations was to minimize the harvest of wild steelhead. The majority of Salmon River hatchery steelhead (94-95%) have dorsal fins less than 2 1/4 inches in height (Ball 1985).

Regulations for the Snake River required release of fish with dorsal fins exceeding 2 inches in height until November 15. Regulations were relaxed in mid-November to allow anglers to harvest hatchery fish destined for the Clearwater River. These fish commonly overwinter in the Snake River between Lewiston and the Salmon River.

No differential fin height regulations were implemented in the Clearwater River. Hatchery fish there cannot be as easily separated from wild fish on the basis of fin height. Ball (1985) reported that only 54% of the B-stock hatchery fish he measured had dorsal fins less than 2 1/4 inches. Wild fish received protection by delaying the consumptive harvest season until October 13 and reducing the bag limit upstream of the Orofino Bridge.

The consumptive season opened September 1 on the Snake and Salmon rivers and October 13 on the Clearwater River. Bag limits were 2 per day, 4 in possession and 10 per season on the lower Clearwater and Snake rivers; 2 per day, 2 in possession and 4 per season on the South Fork Clearwater River; and 1 per day, 1 in possession and 3 per season on the upper Clearwater River (upstream of the Orofino Bridge). Salmon River limits were set at 4 per day, 10 in possession and 10 per season. On November 1, 1984, bag limits were reduced on the Salmon River to 2 per day, 4 in possession and 10 for the fall season.

Fall seasons end December 31 and spring seasons begin as of January 1, so the spring season is a continuation of the fall season in time. Bag limits, season length and special regulations for the spring season are adjusted to achieve harvest management goals. Water conditions during the spring season are a major factor in the location and number of fish harvested.

Special regulations established for the fall season on the Salmon River were continued in the spring. Bag, season and possession limits were 1, 2 and 3 fish, respectively, from the mouth to 400 yards downstream from the Pahsimeroi River. From 100 yards upstream of the Pahsimeroi River to Basin Creek, limits were catch-and-release only. The spring season closed March 15 downstream of Mackay Bar pack bridge; March 31 from Mackay Bar pack bridge to 400 yards downstream of the Pahsimeroi River; and April 15 from 100 yards upstream of the Pahsimeroi River to Basin Creek.

On the Snake River, special regulations for the spring season specified that "Only steelhead with dorsal fins measuring 2 inches or less in height may be reduced to possession from the Snake River between Redbird Creek (16 miles upstream from Lewiston on the Idaho shore) and Wild Sheep Rapids (6 miles downstream from Hells Canyon Dam)." From the state line at the confluence with the Clearwater River upstream to Redbird Creek and from Wild Sheep Rapids upstream to Hells Canyon Dam, the spring season ended April 30 and the bag limits were 4 per day, 10 in possession and 20 total for the spring season. Between Redbird Creek and Wild Sheep Rapids, the season ended March 30 and the bag limits were 2 per day, 4 in possession and 10 for the spring season.

Spring seasons on the Clearwater River were open until April 30 from the mouth to the bridge at Orofino and on the North Fork below Dworshak Dam. Bag limits on these two sections were 4 per day, 10 in possession and 20 for the spring season. From the bridge at Orofino upstream to the mouth of the South Fork and the South Fork upstream to the Mount Idaho bridge, the spring season was closed April 15. Bag, possession and season limits were 1, 1 and 3 from Orofino to the South Fork and 2, 4 and 10 on the South Fork.

This study is designed to monitor the major anadromous fish harvest areas in Idaho and collect information on the timing, distribution, exploitation and relative abundance of the various hatchery and wild stocks. The database produced is combined with statewide harvest survey results and coded wire tag recoveries.

Steelhead harvest for September through November, 1984 was reported previously (Ball 1986). Summary statistics from that report are incorporated with data for December, 1984 through April, 1985 to consolidate the findings for the whole fish run.

No harvest opportunity was allowed for chinook salmon in Idaho during 1984, so this report pertains only to steelhead.

OBJECTIVES

1. Identify in the fishery the proportion of the harvest that is produced by LSRCP hatcheries.
2. Determine the spawning escapement of Lower Snake River Compensation Plan stocks.

RECOMMENDATIONS

Sufficient numbers of LSRCP steelhead need to be marked prior to release in order to separate them from other groups.

DESCRIPTION OF STUDY AREA

There are three major river systems in Idaho where steelhead are harvested: the Snake, Clearwater and Salmon rivers (Figs. 1 and 2). The system for identifying rivers and river sections was changed at the beginning of the 1985 spring season. The new system assigns each river section a number and refines some sections of the Salmon River. In order to simplify the results for this year, the spring season data was converted to the river sections used through 1984. Subsequent reports will use the new numbering system.

Clearwater River

The Clearwater River is divided into the lower (mouth to Orofino Bridge) and upper (Orofino Bridge to South Fork) sections. The North Fork below Dworshak Dam receives light fishing effort in the fall season, so it is included with the lower Clearwater River. The South Fork of the Clearwater River has little or no harvest in the fall season. All other tributaries are closed to steelhead harvest.

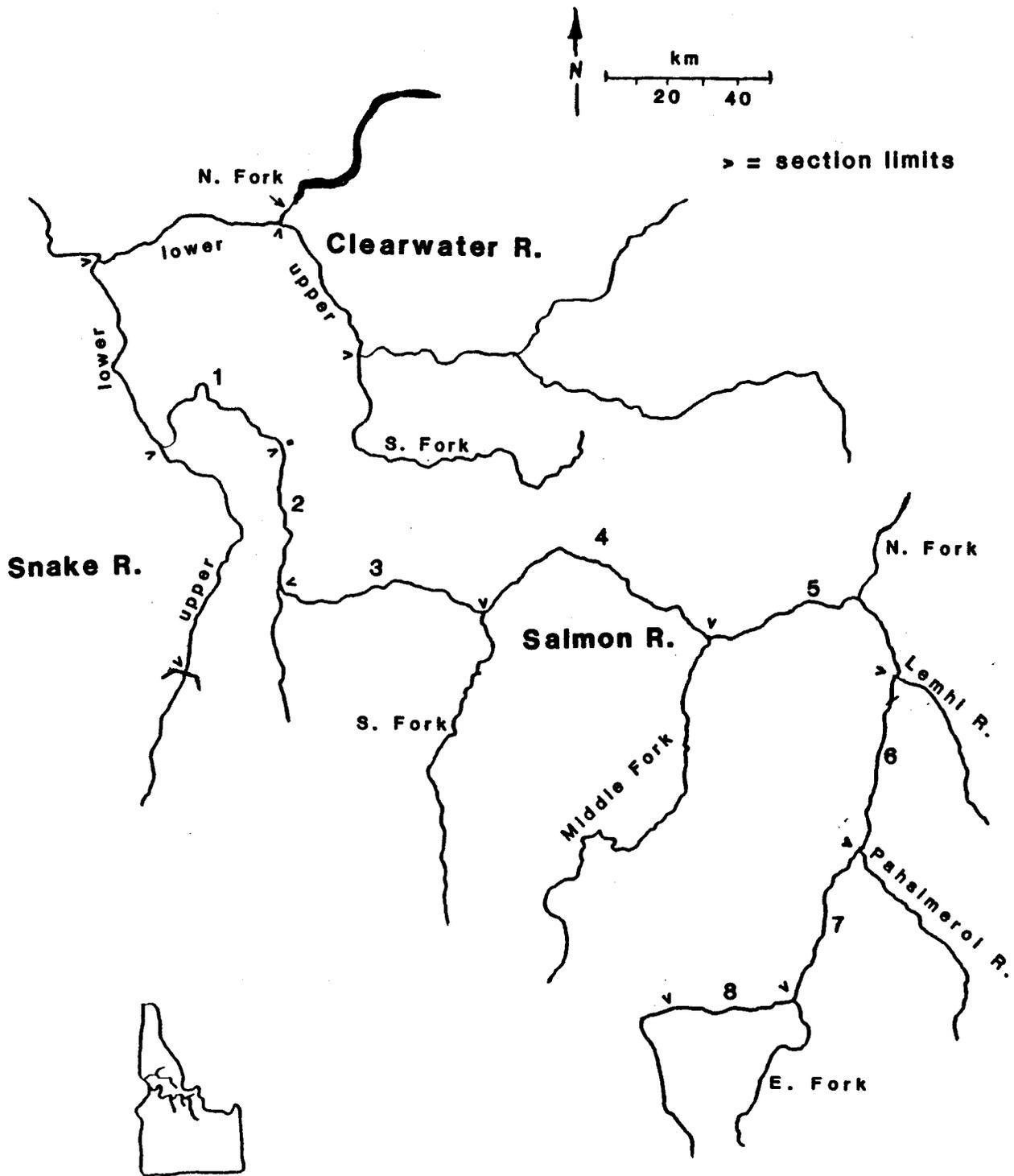


Figure 1. Map of the steelhead harvest areas in Idaho, fall, 1984.

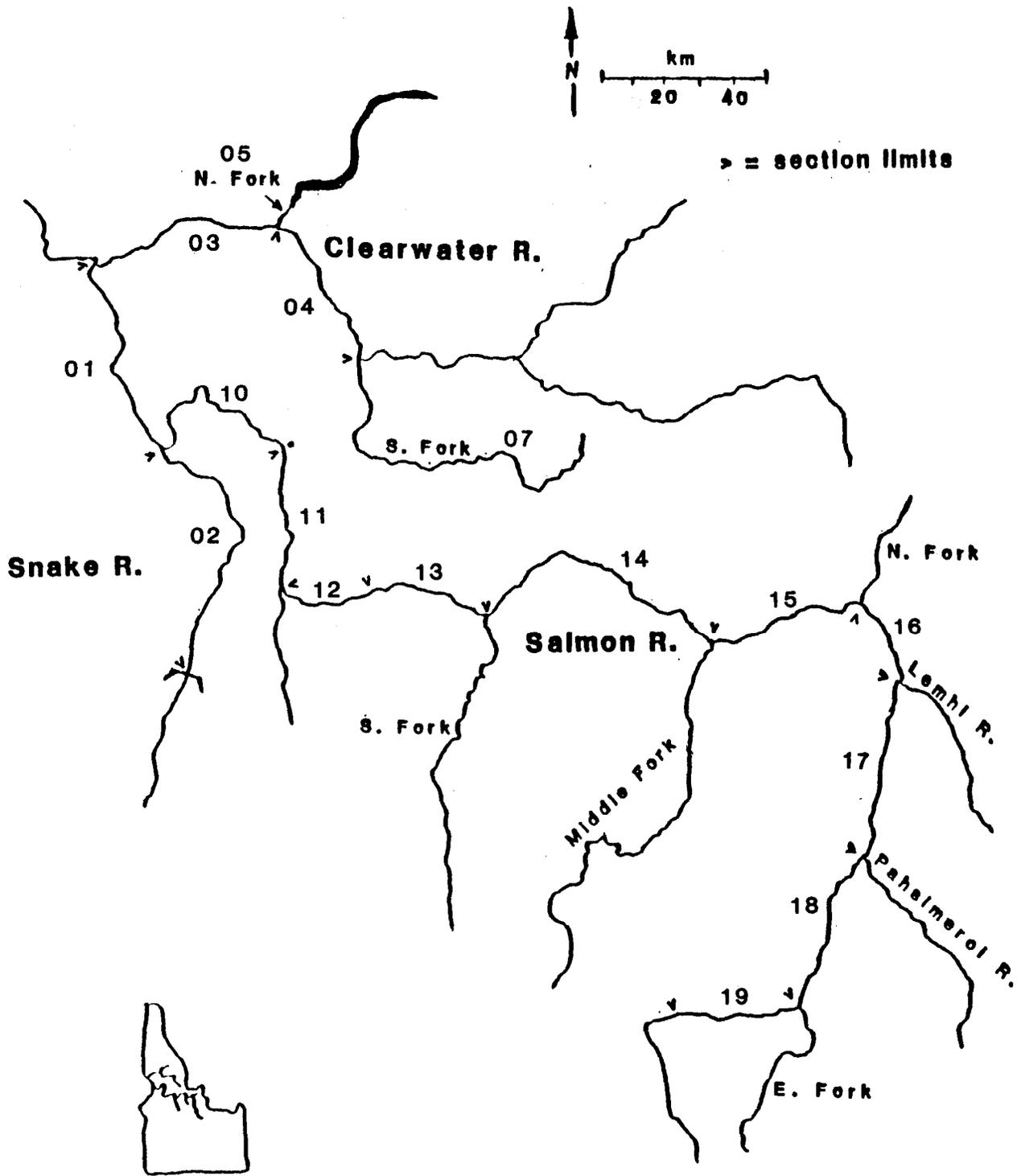


Figure 2. Map of the steelhead harvest area in Idaho, spring, 1985.

Snake River

The Snake River is divided into upper and lower sections. The lower section is from the mouth of the Clearwater River to the mouth of the Salmon River. The upper section extends upstream to Hells Canyon Dam, but is not included in this study.

Salmon River

The Salmon River has eight study sections:

- Section 1 - mouth to Whitebird Creek.
- Section 2 - Whitebird Creek to Little Salmon River.
- Section 3 - Little Salmon River to South Fork Salmon River.
- Section 4 - South Fork Salmon River to Middle Fork Salmon River.
- Section 5 - Middle Fork Salmon River to Lemhi River.
- Section 6 - Lemhi River to Pahsimeroi River.
- Section 7 - Pahsimeroi River to East Fork Salmon River.
- Section 8 - East Fork Salmon River to Basin Creek.

Study Section Comparison

<u>River and Section</u>	<u>Section Number</u>
Lower Snake River	01
Upper Snake River	02
Lower Clearwater River	03
Upper Clearwater River	04
North Fork Clearwater R.	05
South Fork Clearwater R.	06
Salmon River	
1	10
2	11
3	12 & 13 ^a
4	14
5	15 & 16 ^b
6	17
7	18
8	19

- ^a Section 12=Little Salmon River to Vinegar Creek.
13=Vinegar Creek to South Fork Salmon River.
- ^b Section 15=Middle Fork Salmon River to North Fork Salmon River.
16=North Fork Salmon River to Lemhi River.

METHODS

Creel Census

Angler interviews were conducted at check stations and from jet boats and roving vehicles. Techniques were tailored to access and harvest methods which vary considerably in Idaho. For example, on the Clearwater River, a major portion of the harvest is taken by boat fishermen, so census efforts are by boat. In late spring, however, the density of boats in a small area is so high it is prohibitive to try to sample anglers on the water. Census effort is then applied to major boat access areas. In the roadless area of the Salmon River, almost all of the angler access is by boat, but most of the fishing effort is from shore.

Water conditions during the fall season are usually acceptable and the interview schedule can be followed. During the spring season, high turbid flows can reduce harvest to near zero. Anglers are not interviewed during periods of very low harvest.

Interview Schedule

Lower Snake River (01) - by jet boat, six weekends during the fall and five weekends during the spring season.

Lower Clearwater River and North Fork (03 and 05) - by roving vehicle two days each week and by jet boat two days each week for 15 weeks in the fall and 10 weeks in the spring season. Interview from boat ramps for the last six weeks of the spring season.

Upper Clearwater River and South Fork Clearwater River (04 and 06) - by roving vehicle on the upper Clearwater in the fall and on both rivers in the spring for two weekend days and one weekday per week for eight weeks in the fall and ten weeks in the spring.

Salmon River

Section 1 (10) - by jet boat six weekends in the fall and five weekends in the spring season.

Section 2 (11) - interview by roving vehicle ten weekends in the fall and eight weekends in the spring season.

Section 3 (12 & 13) - by a checking station at the old Lumber mill near Riggins for ten weekends in the fall and eight weekends in the spring season and by jet boat between Vinegar Creek and the South Fork on six weekends in the fall and five weekends in the spring.

Section 4 (14) - by jet boat for six weekends in the fall and five weekends in the spring season.

Section 5 (15 & 16) - by a checking station at North Fork for ten weekends in the fall and eight weekends in the spring season.

Section 6 (17) - by roving vehicle for six weekends in the fall and six weekends in the spring season.

Section 7 (18) - by roving vehicle for six weekends in the spring season.

Section 8 (19) - by roving vehicle for six weekends in the spring season.

Data Analysis

Harvest estimates for each river section are obtained on Federal Aid in Fish Restoration projects (Cochnauer 1986 and Pitman 1986).

The number of fish checked for marks from each river section divided by the harvest estimate yields the sampling rate for each river section by month. Fish that were not seen during the interviews were deleted from the data in order to accurately express the correct proportion of the estimated harvest that were marked.

Hatchery-wild proportions are reported for fish kept and for total catch, including fish released when their origin could be assessed by anglers. The harvest of hatchery fish is the product of the hatchery proportion observed in anglers' creels and the estimated harvest from the statewide surveys by month. Seasonal numbers of hatchery fish reported are the summation of monthly statistics. Harvest estimates of fish marked with coded wire tags are calculated by dividing the number of tags recovered by the sampling rate expressed as a decimal. Results of fish groups without coded wire tags were estimated by using the rate of return to the river for comparable marked groups that were of the same strain and ocean age. Although some of these mark groups were returning to the Pahsimeroi Hatchery, there should not have been significantly different return rates as the upper Salmon River was catch-and-release only during the spring season. Exploitation rates of the mark groups were calculated from harvest estimates and hatchery returns and these rates applied to the comparable unmarked groups. For one-ocean A-strain fish that were unmarked, the returns of mark groups 5/13/33 and 5/13/34 were combined to estimate returns. For two-ocean unmarked A-strain groups, returns were estimated from the combined returns of mark groups 10/24/4, 10/24/50 and 5/10/20. No estimated returns were attempted for the unmarked groups of one-ocean B-strain fish returning to Allison Creek or Slate Creek. Returns of the one-ocean B-strain group marked with 10/24/60 was applied to the other unmarked groups. For the unmarked group of two-ocean B-strain fish

returning to the East Fork, the return rate for the comparable group returning to the Pahsimeroi and marked with coded wire tags 5/10/21 was applied.

RESULTS

From December 1984 through April 1985, 8,564 anglers were interviewed (Tables 1-12). During these interviews, a total of 1,561 steelhead were checked for hatchery-wild origin and snouts removed from marked fish for extraction of coded wire tags.

For the fall 1984 and spring 1985 seasons, the total number of anglers interviewed was 19,640 and the number of fish checked for hatchery-wild origin was 2,791. The overall sampling rate was 8.7% of total estimated harvest reported in the statewide harvest surveys (Cochnauer 1986 and Pitman 1986). For the fall 1984 season the sampling rate was 7.8%, and for the spring 1985 season the sampling rate was 10.0%.

Estimates of hatchery fish harvested by month and river section are consolidated by season in Table 13. For the fall season, 17,746 of the 18,474 harvest estimate were of hatchery origin. In the spring season, 12,367 of the 13,506 fish harvested were of hatchery origin. For all river sections, 85% of total harvest during the fall and spring seasons were classified as hatchery fish.

Fish snouts collected during the regular interviews were dissected and the coded wire tags removed and read. A total of 292 coded wire tags were recovered from the 2,791 (10.5%) fish checked for marks. The number of tags recovered, the harvest estimate for each tag code by month for December 1984 through April 1985; and totals for the 1984-85 seasons are listed in Table 14. Coded wire tags were recovered from 24 separate tag groups. An additional 12 tag groups were expected to return, but only in small numbers during the sampling period (Appendices A and B).

Estimates of returns to the hatcheries and harvest of steelhead reared by Lower Snake River Compensation Plan (LSRCP) are summarized in Table 15. All returns from the LSRCP in 1984-85 were destined for the Salmon River drainage. Of the 1,264 fish harvested, 90 were caught from the Snake and Clearwater rivers. The 1,174 fish caught from the Salmon River is 22% of the total estimated hatchery harvest taken from the Salmon River.

Exploitation rates for LSRCP-reared steelhead were 57% for one-ocean A-strain, 54% for two-ocean A-strain and 45% for two-ocean B-strain fish. Although 22 one-ocean B-strain were projected to return to the hatcheries, we did not pick up any marked fish from the one group of fish carrying coded wire tags.

Table 1. Steel head fishery interview data (unexpanded) from Lower Snake River (01), December 1984 - March 1985.

Dates	No. anglers	Total hours fished	Steel head				Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	kept Wild	released Hatchery	Wild			
December									
Clwtr. -Heller Bar	146	362	20	7	0	0	27	13	74
January									
Clwtr. -Heller Bar	79	271	10	1	0	0	11	25	91
Heller Bar-Salmon	6	11	0	0	0	0	0	0	0
Subtotal	85	282	10	1	0	0	11		
Average								26	91
February									
Heller Bar-Salmon	22	49	0	1	3	4	8	6	38
March									
Heller Bar-Salmon	15	40	0	1	0	8	9	4	0
Clwtr. -Heller Bar	9	24	1	0	0	0	1	24	100
Subtotal	24	64	1	1	0	8	10		
Average								6	10
Total	277	757	31	10	3	12	56		
Average								14	61

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Table 2. Steel head fishery interview data (unexpanded) from Lower Clearwater River (03) and North Fork (05), December 1984 - April 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	Wild	Hatchery	Wild			
December									
Boat	617	2,221	118	19	2	0	139	16	86
Shore	358	884	27	0	0	2	29	30	93
Subtotal	975	3,105	145	19	2	2	168		
Average								18	88
January									
Boat	787	3,103	119	19	0	0	138	22	86
Shore	302	789	14	2	0	0	16	48	88
Subtotal	1,089	3,892	133	21	0	0	154		
Average								25	86
February									
Boat	744	3,300	151	14	4	3	172	19	90
Shore	270	966	20	1	0	0	21	46	95
Subtotal	1,014	4,266	171	15	4	3	193		
Average								22	91
March									
Boat	1,311	8,480	545	15	12	3	575	15	97
Shore	1,023	5,629	246	1	5	1	253	22	99
Subtotal	2,334	14,109	791	16	17	4	828		
Average								17	98

Table 2. (continued).

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/ fish	Percent hatchery (Total catch) _
			Hatchery	Wild	Hatchery	Wild			
April									
Boat	310	2,089	126	2	5	3	136	15	96
Shore	401	2,055	58	0	0	1	59	35	98
Subtotal	711	4,144	184	2	5	4	195		
Average								21	97
Total	6,123	29,516	1,424	73	28	13	1,538		
Average								19	94

Table 3. Steelhead fishery interview data (unexpanded) from Upper Clearwater River (04), December 1984 - April 1985.

Dates	No. anglers	Total -- hours fished	Steel head				Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	kept Wild	Hatchery	Wild			
December	49	152	7	2	0	4	13	12	54
March	341	815	47	6	7	12	72	11	75
April	67	165	1	0	0	1	2	83	50
Total	457	1,132	55	6	7	17	87		
Average								13	71

Table 4. Steel head fishery interview data (unexpanded) from South Fork of the Clearwater River (07),
 March - April, 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	Wild	Hatchery	Wild			
March	334	945	59	0	1	0	60	16	100
April	161	379	15	1	0	0	16	24	94
Total	495	1,324	74	1	1	0	76		
Average								17	99

Table 5. Steel head fishery interview data (unexpanded) from Salmon River Section 10, January - March, 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	Wild	Hatchery	Wild			
January	14	13	1	0	0	4	5	3	20
February	14	41	0	1	3	3	7	6	43
March	4	16	0	0	0	0	0	0	0
Total	32	70	1	1	3	7	12		
Average								6	33

Table 6. Steel head fishery interview data (unexpanded) from Salmon River Section 11, February - March, 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	Wild	Hatchery	Wild			
February	129	312	6	0	0	15	21	15	40
March	162	388	2	0	0	1	3	129	67
Total	291	700	8	0	0	16	24		
Average								29	33

Table 7. Steel head fishery interview data (unexpanded) from Salmon River Section 14, March, 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	Wild	Hatchery	Wild			
March	83	998	2	0	7	42	51	20	18

Table 8. Steel head fishery interview data (unexpanded) from Salmon River Section 15, February - March, 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	Wild	Hatchery	Wild			
February	25	103	0	0	0	1	1	103	0
March	327	1,834	42	0	8	25	75	24	67
Total	352	1,937	42	0	8	26	76		
Average								25	66

Table 9. Steel head fishery interview data (unexpanded) from Salmon River Section 16, March, 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/fish	Percent (Total catch)
			Hatchery	Wild	Hatchery	Wild			
March	34	95	3	0	0	0	3	32	100

Table 10. Steel head fishery interview data (unexpanded) from Salmon River Section 17, February - March, 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	Wild	Hatchery	Wild			
February	44	108	0	0	0	0	0	0	
March	297	738	3	0	0	2	5	148	60
Total	341	846	3	0	0	2	5		
Average								169	60

Table 11. Steel head fishery interview data (unexpanded) from Salmon River Section 18, March - April, 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/ fish	Percent hatchery (Total catch)
			Hatchery	Wild	Hatchery	Wild			
March	11	13	Catch & release	0	0	0			
April	23	35	Catch & release	0	0	0			
Total	34	48							

Table 12. Steel head fishery interview data (unexpanded) from Salmon River Section 19, March - April, 1985.

Dates	No. anglers	Total hours fished	Steel head kept		Steel head released		Total	Hours/fish	Percent hatchery (Total catch)
			Hatchery	Wild	Hatchery	Wild			
March	9	27	0	0	0	0	0	0	
April	36	92	0	0	2	5	7	11	29
Total	45	119	0	0	2	5	7		
Average								17	29

Table 13. Estimated number of steel head harvested in the Lower Snake, Clearwater and Salmon rivers during the 1984-85 seasons.

River and section	Fall season - 1984			Spring season - 1985			Total harvest
	Estimated Harvest ^a	Percent hatchery	No. hatchery fish	Estimated Harvest ^a	Percent hatchery	No. hatchery fish	No. hatchery fish
Lower Snake River	2,539	79	2,005	784	63	494	2,499
Lower Clearwater R. and North Fork	9,778	81	7,885	10,882	95	10,338	18,223
Upper Clearwater R.	828	58	476	536	80	429	905
S. Fork Clearwater R.	--	--	--	285	99	282	282
Total Clearwater	10,606		8,361	11,703		11,049	19,410
Average		79			95		
Salmon River							
	1,062	75	800	299	ND	224 ^b	1,024
2	540	77	414	192	ND	148 ^b	562
3	414	77	317	57	ND	44 ^b	361
4	846	79	665	44	ND	35 ^b	700
5	2,071	96	1,986	258	ND	248 ^b	2,234
6	252	79	198	156	ND	123 ^b	321
7	36	ND	36 ^c	13	ND	13 ^c	49
8	108	ND	108 ^c	0	ND	--	108
Total Salmon River	5,329		4,524	1,019		835 ^b	5,359
Average		83			81		
Total	18,474		14,890	12,378		12,365	27,268

^a From statewide surveys.

^b Estimate prorated from fall hatchery proportions.

^c Assumed to be of hatchery origin.

Table 14. Coded wire tag recoveries, December 1984 - April 1985; harvest estimates by month and river section; and total harvest estimates for the 1984-1985 seasons.^a

TAG CODE 10/22/43

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 10/22/43 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	1	2
Lower Clearwater	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 10/22/51

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 10/22/51 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	1	14
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 10/23/41

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 10/23/41 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	1	7
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 10/24/04

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	1	--	--	--	--	--	1	--
2	--	--	--	1	5	20	--	--	--	--	3	--
3	--	--	--	--	32	--	--	--	--	--	32	--
4	--	--	--	--	27	--	--	--	--	--	3	--
5	--	--	--	--	55	--	--	--	--	1	55	2
6	1	2	45	--	6	--	--	--	--	--	6	--

TAG CODE 10/24/04 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	2	32
2	--	--	--	1	20	2	39
3	--	--	--	--	--	2	8
4	--	--	--	--	--	1	8
5	--	--	--	1	2	1	2
6	--	--	--	1	45	1	45

Table 14. (continued).

TAG CODE 10/24/50

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

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TAG CODE 10/24/50 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	1	19
3	--	--	--	--	--	2	7
4	--	--	--	--	--	2	12
5	--	--	--	--	--	9	52
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 05/10/20

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

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TAG CODE 05/10/20 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	1	3
4	--	--	--	--	--	1	4
5	--	--	--	--	--	12	53
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 05/10/21

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	1	3	37	--	--	--	--	--	--	--	1	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	1	13	8
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	1	--	--	1	--
2	--	--	--	--	--	--	1	10	10	--	3	--
3	--	--	--	--	--	--	--	32	--	--	32	--
4	--	--	--	--	--	--	--	3	--	--	3	--
5	--	--	--	--	--	--	--	55	--	1	55	1
6	--	--	--	--	--	--	--	6	--	--	6	--

TAG CODE 05/10/21 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	1	37	1	37
Lower Clearwater	--	--	--	1	8	1	8
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	1	10	5	86
2	--	--	--	--	--	2	29
3	--	--	--	--	--	4	14
4	--	--	--	--	--	--	--
5	--	--	--	1	1	9	35
6	--	--	--	--	--	--	--

Table 14. (continued).

River section	TAG CODE <u>05/10/24</u>											
	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	3	--	--	--	--	--	1	--	--	1	--
Lower Clearwater	2	9	22	--	--	--	2	8	24	5	13	38
Upper Clearwater	--	13	--	--	--	--	--	17	--	--	17	--
Salmon												
1	--	--	--	1	1	167	--	--	--	--	--	--
2	--	--	--	--	5	--	--	--	--	--	--	--
3	--	--	--	--	32	--	--	--	--	--	--	--
4	--	--	--	--	27	--	--	--	--	--	--	--
5	--	--	--	--	30	--	--	--	--	--	--	--
6	--	--	--	--	2	--	--	--	--	--	--	--

TAG CODE 05/10/24 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	--	--	--	--
Lower Clearwater	2	10	19	11	105	12	117
Upper Clearwater	--	3	--	--	--	--	--
Salmon							
1	--	--	--	1	167	1	167
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 05/10/25

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	3	--	--	--	--	--	1	--	--	1	--
Lower Clearwater	2	9	22	--	--	--	4	8	48	25	13	188
Upper Clearwater	--	13	--	--	--	--	--	17	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

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TAG CODE 05/10/25 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	--	--	1	16
Lower Clearwater	1	10	10	32	268	37	340
Upper Clearwater	--	3	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 05/10/26

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	1	3	37	--	3	--	--	1	--	--	1	--
Lower Clearwater	3	9	33	1	9	11	7	8	83	17	13	128
Upper Clearwater	--	13	--	--	13	--	--	17	--	--	17	--
S. Fk. Clearwater	--	--	--	--	--	--	--	--	--	2	25	8
Salmon												
1	--	--	--	--	--	--	--	--	--	--	1	--
2	--	--	--	--	--	--	--	--	--	--	3	--
3	--	--	--	--	--	--	--	--	--	--	32	--
4	--	--	--	--	--	--	--	--	--	--	3	--
5	--	--	--	--	--	--	--	--	--	1	55	2
6	--	--	--	--	--	--	--	--	--	--	6	--

TAG CODE 05/10/26 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	1	37	2	53
Lower Clearwater	1	10	10	29	265	33	323
Upper Clearwater	--	3	--	--	--	--	--
S. Fk. Clearwater	--	26	--	2	8	2	8
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	1	2	1	2
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 05/10/27

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	2	3	74	--	3	--	--	1	--	--	1	--
Lower Clearwater	1	9	11	5	9	56	8	8	95	20	13	150
Upper Clearwater	--	13	--	--	13	--	--	17	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 05/10/27 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	2	74	3	90
Lower Clearwater	1	10	10	25	322	39	380
Upper Clearwater	--	3	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 05/10/29

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	1	--
2	--	--	--	--	--	--	--	--	--	--	3	--
3	--	--	--	--	--	--	--	--	--	--	32	--
4	--	--	--	--	--	--	--	--	--	--	3	--
5	--	--	--	--	--	--	--	--	--	--	55	--
6	--	--	--	--	--	--	--	--	--	1	6	16

TAG CODE 05/10/29 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	1	16	1	16

Table 14. (continued).

TAG CODE 05/13/33

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 05/13/33 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	--	--	--	--
Lower Clearwater	1	10	10	1	10	1	10
Upper Clearwater	--	3	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	1	3
3	--	--	--	--	--	1	3
4	--	--	--	--	--	--	--
5	--	--	--	--	--	3	10
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 05/13/34

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

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TAG CODE 05/13/34 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	2	7
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/06/06

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	1	3	37	--	3	--	--	1	--	--	1	--
Lower Clearwater	1	9	11	1	9	11	1	8	12	12	13	90
Upper Clearwater	--	13	--	--	13	--	--	17	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	2	32	6
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 23/06/06 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	1	37	2	53
Lower Clearwater	--	10	--	15	124	20	198
Upper Clearwater	--	3	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	2	6	2	6
4	2	3	61	2	61	2	61
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/06/07

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	3	--	--	1	--	--	1	--
Lower Clearwater	--	--	--	1	9	11	1	8	12	2	13	15
Upper Clearwater	--	--	--	--	13	--	--	17	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 23/06/07 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	4	38	4	38
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	1	3	30	1	30	1	30
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/16/01

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	1	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	1	13	8
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 23/16/01 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	--	--	--	--
Lower Clearwater	--	10	--	1	8	1	8
Upper Clearwater	--	3	--	--	--	--	--
Salmon							
1	--	1	--	--	--	--	--
2	1	3	30	1	30	1	30
3	--	32	--	--	--	--	--
4	--	3	--	--	--	--	--
5	--	55	--	--	--	1	3
6	--	6	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/16/02

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	3	--	--	--	--	--	1	--	--	1	--
Lower Clearwater	2	9	22	--	--	--	2	8	24	3	13	23
Upper Clearwater	--	13	--	--	--	--	--	17	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

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TAG CODE 23/16/02 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	--	--	--	--
Lower Clearwater	--	10	--	7	69	9	100
Upper Clearwater	--	3	--	--	--	--	--
Salmon							
1	--	1	--	--	--	--	--
2	1	3	30	1	30	1	30
3	--	32	--	--	--	--	--
4	--	3	--	--	--	--	--
5	--	55	--	--	--	--	--
6	--	6	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/16/03

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 23/16/03 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	--	--	--	--
Lower Clearwater	--	10	--	--	--	--	--
Upper Clearwater	--	3	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	1	3	30	1	30	1	30
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/16/04

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	1	3	37	2	3	59	--	1	--	--	1	--
Lower Clearwater	--	9	--	--	9	--	3	8	36	15	13	113
Upper Clearwater	--	13	--	--	13	--	--	17	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

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TAG CODE 23/16/04 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	1	--	3	96	5	123
Lower Clearwater	4	10	39	22	188	22	188
Upper Clearwater	5	3	179	5	179	5	179
Salmon							
1	--	1	--	--	--	--	--
2	--	3	--	--	--	--	--
3	2	32	6	2	6	2	6
4	3	3	91	3	91	3	91
5	--	55	--	--	--	--	--
6	--	6	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/16/05

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	3	--	--	--	--	--	--	--	--	1	--
Lower Clearwater	1	9	11	--	--	--	--	--	--	1	13	8
Upper Clearwater	--	13	--	--	--	--	--	--	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 23/16/05 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	2	19	2	19
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/16/17

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	--	--	--	--	--	--	1	--
Lower Clearwater	--	--	--	--	--	--	--	--	--	1	13	8
Upper Clearwater	--	--	--	--	--	--	--	--	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 23/16/17 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	1	8	1	8
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/16/19

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	3	--	--	--	--	--	--	--	--	1	--
Lower Clearwater	2	9	22	--	--	--	--	--	--	1	13	8
Upper Clearwater	--	13	--	--	--	--	--	--	--	--	17	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

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TAG CODE 23/16/19 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	3	30	3	30
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

Table 14. (continued).

TAG CODE 23/16/38

River section	December			January			February			March		
	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.	No. tags	Sample rate	Est. harv.
Lower Snake	--	--	--	--	3	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	1	9	11	--	--	--	--	--	--
Upper Clearwater	--	--	--	--	13	--	--	--	--	--	--	--
Salmon												
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--

TAG CODE 23/16/38 (continued)

River section	April			Total		1984-85 Total	
	No. tags	Sample rate	Est. harv.	No. tags	Est. harv.	No. tags	Estimated harvest
Lower Snake	--	--	--	--	--	--	--
Lower Clearwater	--	--	--	1	11	2	27
Upper Clearwater	--	--	--	--	--	--	--
Salmon							
1	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--

^a September-November 1984, harvest reported by Ball, 1986.

Table 15. Summary of 1984-85 harvest estimates and hatchery returns of steel head produced by LSRCP hatcheries.

Release year	Strain & ocean age	No. of fish released	Release site	Hatchery rearing	Marks	Estimated number of fish		
						Harvested	Hatchery return	Total
1983	A-I	84,194	Pahsi meroi R.	HNFH ^a	None	33	27	60
1983	A-I	40,681	Pahsi merol R.	MVSH ^b	None	16	13	29
1983	A-I	40,573	Decker Flat	HNFH	CWT 5/13/33	26	21	47
1983	A-I	40,548	Decker Flat	HNFH	CWT 5/13/34	7	4	11
1983	A-I	31,348	East Fork	HNFH	LV fin clip	<u>12</u>	<u>10</u>	22
Subtotal		237,344				94	75	169
1982	A-II	121,016	Hell Roaring	HNFH	None	221	181	402
1982	A-II	243,600	M. P. 181	HNFH	None	445	364	809
1982	A-II	60,784	Pahsi merol R.	HNFH	CWT 5/10/20	<u>86</u>	<u>71</u>	<u>157</u>
Subtotal		425,400				752	616	1,368
1983	B-I	11,340	Allison Creek	MVSH	None			
1983	B-I	32,200	Slate Creek	MVSH	None			
1983	B-I	26,173	Decker Flat	HNFH	RV fin clip	0	2	2
1983	B-I	38,864	E. Fk. Salmon R.	HNFH	CWT 10/24/60	0	3	3
1983	B-I	49,140	E. Fk. Salmon R.	MVSH	None	0	4	4
1983	B-I	<u>162,723</u>	E. Fk. Salmon R.	HNFH	None	<u>0</u>	13	13
Subtotal		320,440				0	22	22
1982	B-II	58,384	E. Fk. Salmon R.	HNFH	None	209	254	463
1982	B-II	<u>58,281</u>	Pahsi meroi R.	HNFH	CWT 5/10/21	<u>209</u>	<u>253</u>	462
Subtotal		116,665				418	507	925
1981	B-III	39,200	Pahsi meroi R	HNFH	CWT 10/22/40	<u>0</u>	<u>1</u>	<u>1</u>
Total		1,139,049				1,264	1,221	2,485

^a HNFH=Hagerman National Fish Hatchery

^b MVSH=Magi c Valley Steel head Hatchery

The only mark groups of one-ocean A-strain fish returning to the Salmon River in 1984-85 were destined for Sawtooth Hatchery. There were no comparison groups of marked fish returning elsewhere. Nor were there comparison groups of one or two-ocean B-strain fish available. There were three mark groups of two-ocean A-strain fish returning to the Pahsimeroi Hatchery. Tag group 5/10/20 was from the LSRCF program and 10/24/04 and 10/24/50 were fish raised and released by Idaho Power Company. The fish from 5/10/20 were caught at 38% while the other groups were exploited at 69% and 51%, respectively.

In addition to fish released from Idaho hatcheries, there were also fish returning to Oregon and Washington hatcheries or streams from their LSRCF program. No data are available on fish tagged in Oregon. In October, 1984, two coded wire tags were picked up in our lower Snake River census from fish tagged at Lyons Ferry Hatchery (Mendel and Aufforth 1985). One tag was from a group released at Lyons Ferry and tagged with 63/28/38. The other tag (63/28/40) recovered was released in the Grande Ronde River at Enterprise, Oregon. The sampling rate for the lower Snake River was 10%, so the estimated harvest is 10 fish for each of these tag groups.

DISCUSSION

Adult returns from steelhead juveniles released by the LSRCF program are already contributing a significant portion of the harvest in Idaho as well as in other fisheries downstream. The program is still in the developmental phase, so major increases in fish runs are forthcoming. Changes in exploitation rates, harvest distribution and stock composition are also anticipated.

In the Salmon River, harvest distribution may already be different from when the steelhead were pure wild stocks. Prior to the development of a hatchery program, about 60% of the Salmon River harvest came from below the South Fork of the Salmon River. For example, in 1970-71, 57% of the Salmon River harvest occurred below the South Fork. In 1983-84, harvest below the South Fork was 17%, and in 1982-83 it was 27% (Cochner 1986). During 1984-85, 40% of the Salmon River harvest was taken below the South Fork of the Salmon River. Part of the renewed increase in the lower river harvest is due to the increased proportion of B-strain fish in the run. The B-strain fish returning to the Salmon River were all raised by the LSRCF program. In addition, there were an estimated 303 B-strain fish released in the Clearwater drainage as part of a National Marine Fisheries Service study that were caught from the Salmon River (Table 14). Returns from LSRCF releases in the Little Salmon River drainage are expected to contribute to the fishery below the South Fork beginning in 1985-86.

Sources of Error

There are several possibilities for error when using the recovery of tags and harvest surveys for estimating harvest composition.

In order for the expansion techniques to be acceptable, it is essential to obtain accurate telephone survey estimates. The results of these surveys can under or overestimate harvest, or they can be biased. Variability is a function of sample size. River sections or months with low harvest estimates are probably less accurate and more variable than river sections or months with higher harvest estimates. Sample size needs to be large enough to produce estimates at similar accuracy during seasons with low or high harvest. Hopefully, the degree of accuracy will be assessed.

After harvest estimates are generated, the proportion of the harvest that is of hatchery origin depends on correct identification of hatchery fish in the creel. This should only be a problem in 1984-85 and 1985-86. Beginning with the fall of 1986, all hatchery fish, except three-ocean B-strain, will be recognizable by the absence of adipose fins. Generally, in 1984-85, if errors were made in identification they were in classifying a few hatchery fish as wild. It is highly unlikely any wild fish were erroneously classified as hatchery. In the Salmon River, it is unusual to see a fish return to the hatcheries that does not show evidence of hatchery origin. Eroded dorsal, pectoral, or pelvic fins are present on nearly every fish. Short opercula are also common. Steelhead raised at Dworshak National Fish Hatchery have a lower incidence of fin erosion, but it is still possible to identify hatchery origin with a good degree of accuracy.

During time periods or in river sections when the sampling rate is low, there is a larger expansion factor than where or when the sampling rate is high. This results in higher variability for fish caught in the winter months or in minor harvest sections. This is not a serious problem when there are large numbers of a tag group returning, but should be considered for small groups. In 1984-85, the total estimated harvest of tagged fish was 3,319. This estimate was derived from the recovery of 292 tags, which indicates that we sampled tagged fish at 8.8%. Of the total harvest of 31,980 fish, we checked 2,791 for marks, which is a similar rate of 8.7%. Therefore, the sampling rate of all marked fish agrees with the sampling rate for the total harvest.

Another concern and possible source of error is the degree of straying. Strays are fish that return to some location other than their natal stream, or, for hatchery fish, straying is not returning to the location where they were released. During the many months that steelhead are migrating or overwintering in the rivers, they commonly wander to rivers other than where they were released. During the 1984-85 harvest seasons, I compared the incidence of wandering between the Clearwater and Salmon rivers. The Snake River was not included, as fish from the Salmon River pass through the lower Snake, and Clearwater fish commonly winter there. From the Salmon River, the estimated harvest of fish with coded wire tags from the Clearwater River was 335 fish (Table 14). Most of these fish were from National Marine Fisheries Service tag groups. Conversely, an estimated eight fish from Salmon River tag groups were caught from the Clearwater River.

In the spring of 1985, there were 1,496 coded wire tags retrieved from adult steelhead at all hatcheries combined. One tag group, 5/10/26, was originally released in the South Fork Clearwater River, and of the 70 hatchery returns, one fish came in to the Pahsimeroi Hatchery and 69 entered Dworshak Hatchery. There apparently was a problem with the fish imprinting on South Fork water. With the exception of 5/10/26, there were only six other fish out of 1,425 tag returns (0.42%) that strayed to hatcheries other than where they were released. From the LSRCP program, there was one fish from 5/13/34 that strayed into the Pahsimeroi Hatchery (instead of Sawtooth) and two fish that strayed into Dworshak Hatchery (instead of the Pahsimeroi).

Tag Loss

Loss of coded wire tags from the fish or in the techniques of snout removal and tag extraction can create a negative bias in all estimates that are derived from tag recoveries. Tag loss in steelhead while the fish are in the hatchery has been as high as 5.7% but is usually less than 3% (Duke 1980, 1981, 1982, 1984). The rate of tag loss for each group in the hatchery along with mortality is calculated to produce an estimate of the total number of tags released. The first question is: What is the rate of tag loss (or migration to the rear of the head) between the time the juvenile fish are released and adults recovered? If there is a rate of tag loss over time, then fish spending two years in the ocean should have a higher rate of tag loss than fish spending only one year.

The guideline for removing a snout for coded wire tag retrieval is to cut off the snout behind the eye. In the past, when workers cut the snouts too short an unusually high rate of tag loss was observed. With large numbers of people cutting snouts, there is always a chance that some will be cut short. There could also be problems with mechanical equipment, etc., during the actual extraction of the tags, or problems with decoding the tags. The overall tag loss observed for steelhead and spring and summer chinook salmon has been about 15% (R. Duke, personal communication). Because several tag groups from more than one release year are returning together, it is impossible to relate tag loss to one particular group.

In the spring of 1985, there were only two tag groups (5/13/33 and 5/13/34) returning to Sawtooth Hatchery after one ocean year. There were 29 snouts excised and sent to the laboratory for tag extraction. Recovered from the snouts were one tag with no. 23/16/03, three with tag no. 5/13/34, and 21 with tag no. 5/13/33. Four (13.8%) of the 29 snouts did not yield a tag.

If tag loss between when the juveniles are released and the adults recovered is as high as 14-15%, a correction factor should be applied to compensate for the loss. However, at this time we can not be sure that it applies to all mark groups. In 1985-86, fish carrying coded wire tags will be identified by both adipose and left ventral fin

clips, so we expect to see a large number of snouts taken that will not yield tags. In 1986-87, it may be possible to determine the tag loss with a better degree of accuracy. If tag loss is greater than 10%, estimates should be corrected.

Sampling and Marking Rates

The best way to accurately assess the performance of a group of hatchery fish is to include a representative mark group in the release. The mark group should represent the total release in fish size, health, time of release and location of release. Assuming equal survival rates of marked and unmarked fish after release, subsequent recovery of tags from the mark group should reflect the numbers of the whole group. Advance planning between managers and hatchery staff should include provisions to provide representative tag groups within all major releases.

Because all steelhead juveniles are already being adipose fin clipped, it is important to also minimize the number of fish to be marked with coded wire tags and an additional fin clip. For harvest evaluation, there are three important factors in planning for the number of fish to mark: rate of adult returns to the river, exploitation rate and sampling rate of the harvest. In 1984-85, the overall sampling rate was 8.7%, but varied from 2.5 to 23.5% between river sections (Table 16). Because 1984-85 was a relatively low harvest period, the sampling rate may be higher than during a year when the harvest is much greater. There can also be great differences between river sections (Table 16). Exploitation rates for the past several years have usually been between 50 and 60%. For planning how many fish to mark, we can assume a 60% exploitation rate and 8% sampling rate.

When survival rates are expected to approximate 1% return, then 50,000 fish should be a minimum, yet adequate number of fish to mark for releases away from a hatchery rack. For groups released at the hatcheries, 25,000 or 30,000 marked fish should suffice as long as they are representative of the whole. If survival rates are expected to vary from 1%, the number of fish to be marked should be adjusted.

Table 16. Proportion of estimated harvest by river section that was examined for marks

River section	No. fish checked	Estimated harvest	Sample rate %
Lower Snake	124	3,323	3.7
Lower Clearwater and North Fork	1,743	20,660	8.8
Upper Clearwater	121	1,414	8.6
South Fork Clearwater	67	285	23.5
Salmon 1	40	1,361	2.9
2	45	732	6.2
3	106	471	22.5
4	107	890	12.0
5	428	2,329	18.4
6	10	408	2.5
7	0	49	---
8	0	108	--
Average			8.7

ACKNOWLEDGEMENTS

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LITERATURE CITED

- Ball, K. 1985. Evaluation of Transplanting Snake River Steelhead Trout to the Pahsimeroi River, 1983. Project IPC-26. Idaho Department of Fish and Game.
- Ball, K. 1986. Evaluation of Hatchery-Wild Steelhead Harvest, September 1, 1984 through November 30, 1984. U.S. Fish and Wildlife Service Contract No. 14-16-0001-84133 (RWG). Idaho Department of Fish and Game.
- Cochnauer, T. 1986. Salmon and Steelhead Investigations, Study 1: Estimates of the 1984 harvest of salmon and steelhead (survey). Idaho Department of Fish and Game, Job Performance Report F-73-R-7.
- Duke, R. 1980. Columbia Basin Salmon and Steelhead Identification and Modeling. Idaho Department of Fish and Game.
1981. Columbia Basin Salmon and Steelhead Identification and Modeling. Idaho Department of Fish and Game.
1982. Salmon and Steelhead Investigations, Study IV: Anadromous Fish Marking and Recovery. Idaho Department of Fish and Game, Job Performance Report F-73-R-4.
1984. Salmon and Steelhead Investigations, Study IV: Anadromous Fish Marking and Recovery. Idaho Department of Fish and Game, Job Performance Report F-73-R-5.
- Mendel, G.,
and
K. Aufforth 1985. Fall 1984 and Spring 1985 Steelhead Creel Surveys for the Snake and Lower Grande Ronde Rivers. Part 1: Annual Report, Lyons Ferry Hatchery Evaluation Project, Contract No. 14-16-0001-84096184. Washington Department of Fish and Game.
- Ortmann, D. 1978. Annual Survey of the Salmon and Steelhead Sport Fishery Harvest in Idaho. Job 1. Estimates of the 1977 harvest of salmon and steelhead (Survey). Idaho Department of Fish and Game, Job Performance Report F-18-R-24.

Pitman, D. 1986. Salmon and Steel head Investigations, 1: Estimates Study and steel head of the 1985 harvest of salmon Fish and Game, (Survey). Idaho Department of (in press). Job Performance Report F-73-R-8,

A P P E N D I C E S

Appendix A. Steel head groups returning to the Salmon River, 1984-85.

Strain	Ocean age	No. of fish released	Release site	Hatchery rearing	Marks
A		496, 140	Pahsi meroi	NSPR ^a	None
A		84, 194	Pahsi meroi	HNFH ^b	None
A		40, 681	Pahsi meroi	MVSH ^c	None
A		40, 573	Decker Flat	HNFH	CWT 5/13/33
A		40, 548	Decker Flat	HNFH	CWT 5/13/34
A		31, 348	East Fork	HNFH	LV fin clip
		(Total -733, 484)			
A	II	121, 016	Hell Roaring	HNFH	None
A	II	243, 600	M. P. 181	HNF H	None
A	II	94, 700	Pahsi meroi	NSPR	CWT 10/24/4
A	it	94, 290	Pahsi meroi	NSPR	CWT 10/24/50
A	II	806, 210	Pahsi meroi	NSPR	None
A	II	60, 784	Pahsi meroi	HNF H	CWT 5/10/20
		(Total -1, 420, 600)			
B		11, 340	Allison Cr./ Little Salmon	MVSH	None
B		32, 200	Slate Creek/ Little Salmon	MVSH	None

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Appendix A. (continued).

Strain	Ocean age	No. of fish released	Release site	Hatchery rearing	Marks
B	I	26,173	Decker Flat	HNFH	RV fin clip
B	I	38,864	East Fork	HNFH	CWT 10/24/60
B	I	49,140	East Fork	MVSH	None
B	I	162,723	East Fork	HNFH	None
B	I	46,250	East Fork	NSPR	?
		(Total 366,690)			
B	II	58,384	East Fork	HNFH	None
B	II	58,281	Pahsimeroi	HNFH	CWT 5/10/21
		(Total -116,665)			
B	III	39,200	Pahsimeroi	HNFH	CWT 10/22/40
		(Total -			

^a NSPR-Niagara Springs Fish Hatchery
^b HNFH-Hagerman National Fish Hatchery
^c MVSH-Magic Valley Steelhead Hatchery

Appendix B. Steel head groups returning to the Clearwater River, 1984-85.

Strain	Ocean No. age	of fish released	Release site	Hatchery rearing	Marks
B		33,178	Clearwater R.	DNFH ^a	CWT 23/16/38
B		32,236	Clearwater R.	DNFH	CWT 23/16/16
B		30,751	Clearwater R.	DNFH	CWT 23/16/20
B		8,460	Clearwater R.	DNFH	None
B		30,000	North Fork	DNFH	CWT 5/13/50
B		32,500	North Fork	DNFH	CWT 5/13/52
B		24,575	North Fork	DNFH	CWT 5/13/49
B		29,825	North Fork	DNFH	CWT 5/13/51
B		31,956	North Fork	DNFH	CWT 23/16/19
B		1,015,853	North Fork	DNFH	None
B		250,488	Clear Creek	DNFH	None
B		496,471	South Fork	DNFH	None
B		30,341	Col umbi a R.	DNFH	CWT 23/16/40
B		28,658	Col umbi a R.	DNFH	CWT 23/16/39
B		32,456	Col umbi a R.	DNFH	CWT 23/16/17
B		31,906	Col umbi a R.	DNFH	CWT 23/16/18
B		5,243	Col umbi a R.	DNFH	None
(Total -2,144,897)					
B	I	42,500	Clearwater R.	DNFH	CWT 5/10/25
B	I	39,225	Clearwater R.	DNFH	CWT 5/10/27
B	II	41,400	Clearwater R.	DNFH	CWT 5/10/24
B	t	29,838	Clearwater R.	DNFH	CWT 23/6/6/
B	II	31,048	Clearwater R.	DNFH	CWT 23/16/4
B	I	31,714	Clearwater R.	DNFH	CWT 23/16/2
B	II	1,901,575	Clearwater R.	DNFH	None
B	I	42,225	South Fork	DNFH	CWT 5/10/26
B	I	339,586	South Fork	DNFH	None
B	I	33,012	Col umbi a R.	DNFH	CWT 23/68
B	I	32,185	Col umbi a R.	DNFH	CWT 23/6/7

Appendix B. (continued).

Strain	Ocean age	No. of fish released	Release site	Hatchery rearing	Marks
B	I	32,911	Col umbi a R.	DNFH	CWT 23/ 16/ 5
B	II	29,456	Col umbi a R.	DNFH	CWT 23/16/3
B	I	31,915	Col umbi a R.	DNFH	CWT 23/ 16/ 1
B	II	19,907	Col umbi a R.	DNFH	None
		(Total -2,678,497)			
B	III	41,300	Cl earwater R.	DNFH	CWT 10/22/53
B	III	38,200	Cl earwater R.	DNFH	CWT 10/22/51
B	III	39,300	Cl earwater R.	DNFH	CWT 10/22/52
B	III	1,884,560	Cl earwater R.	DNFH	None
B	III	41,350	Cl ear Creek	DNFH	CWT 10/23/41
B	III	31,863	Cl ear Creek	DNFH	None
B	III	360,259	South Fork	DNFH	None
		(Total -2,436,832)			

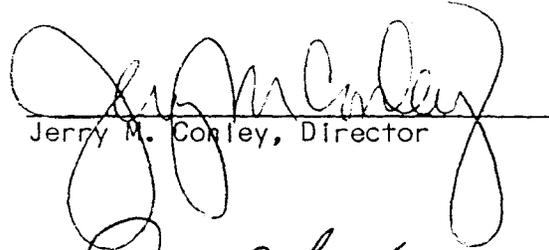
^a DNFH-Dworshak National Fish Hatchery

Submitted by:

Kent Ball
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Approved by:

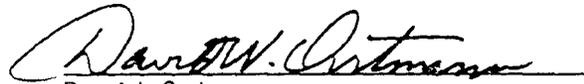
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