

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. 14-16-0001-88501 (RWG)

Period Covered: October 1, 1987 to December 31, 1988



*Harvest  
Comp.*

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## ABSTRACT

Steelhead trout Oncorhynchus mykiss fisheries in Idaho are monitored to assess hatchery steelhead contribution, distribution, and return rates. Coded wire tags are retrieved from steelhead harvested by anglers, and harvest estimates are made by month and river section.

During the fall 1987 and spring 1988 seasons, 19,312 anglers were interviewed and 2,319 adult steelhead examined, which was 13.3% of the total estimated harvest. We retrieved 101 coded wire tags from 35 different tag groups. The total estimated harvest for the 1987-88 season was 17,395 hatchery and 20 wild fish. The total estimated harvest of steelhead reared by the Lower Snake River Compensation Plan (LSRCP) was 2,074, and an additional 1,630 returned to hatcheries and other release sites. In the Salmon River, LSRCP fish supported about 30% of the hatchery harvest.

The total return from 786,186 smolts released at Sawtooth Hatchery in 1985 was 11,898 (1.51%), of which 84% were harvested by Idaho fishermen. After two ocean-years, a total of 568 adult steelhead have returned from 270,207 smolts released into the East Fork Salmon River. The return rate after two ocean-years is 0.21% and the exploitation rate is 73%.

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## INTRODUCTION

Chinook salmon Oncorhynchus tshawytscha and steelhead trout O. mykiss are being raised in Idaho hatcheries to mitigate for losses caused by the construction of hydroelectric dams. Adults returning to hatcheries in the Salmon and Clearwater River basins are commingled with each other and with wild stocks. In the Snake River, fish destined for Idaho are also commingled with adults returning to Oregon and Washington streams.

The main purpose of this project is to determine the composition of the anadromous fish harvest in the Idaho fishery and to estimate the adult harvest contribution from juveniles produced in Lower Snake River Compensation Plan (LSRCP) hatcheries. Contribution to the Idaho fishery is one of the measures of performance of LSRCP fish. No harvest was allowed on chinook salmon, so this report pertains only to steelhead.

Harvest management of steelhead in Idaho is directed toward harvest of hatchery fish and protection of wild and naturally produced fish. Currently, wild stocks are below escapement goals, and protection is necessary to perpetuate these fish over the long run. Beginning in 1984, all hatchery-produced steelhead smolts released in Idaho rivers and streams had their adipose fins excised before release so returning adults could be selectively harvested.

In the fall 1987 and spring 1988 seasons, all age groups of hatchery steelhead fish returning to Idaho were marked by fin clips, and regulations stated that "only steelhead with a missing adipose fin (as evidenced by a healed scar) may be kept." Consequently, the harvest of any wild steelhead was illegal.

The Clearwater River was open to catch-and-release fishing from September 1 to October 14, 1987. The consumptive season on the Clearwater River opened October 15, with the bag, possession, and season limits set at 2, 4, and 10, respectively, and remained open until March 24, 1988, when it was closed to ensure adequate spawning escapement. Spawning escapement at Dworshak National Fish Hatchery was reached by April 8; the spring season was reopened and remained open until April 30, 1988.

On the Snake River, the fall season opened on September 1, with bag, possession, and season limits of 3, 6, and 12, respectively. The spring season limits were 2, 4, and 6 for bag, possession, and season limits, respectively, and continued until April 15.

The fall season on the Salmon River opened September 1, with bag, possession, and season limits of 3, 6, and 12, respectively. The fall season continued until December 31. On January 1, the spring season opened. Bag, possession, and season limits were originally set at 2, 2, and 4, respectively, with the season ending March 31. A special closure was included from the Watts Bridge upstream to the Highway 75 bridge. On January 26, the regulations were amended to change the closure to catch-and-release only until April 30. Other changes implemented were to extend the season upstream of the Highway 75 bridge

near the East Fork until April 30, and change the bag, possession, and season limits to 1, 2, and 3, respectively, in this section.

The Little Salmon River was not open for steelhead harvest during the fall season, and it was closed to fishing for **all** species on December 22, 1987 as a result of a toxic chemical spill. Consequently, the spring steelhead season and limits were not allowed to go into effect until February 26. The bag, possession, and season limits were 2, 3, and 6, respectively, and the season continued until April 30.

Representative groups of steelhead are marked with coded wire tags (CWT) prior to release. Anglers are interviewed in all major harvest areas to recover these tags from the fishery. Information is collected on timing, straying, exploitation, harvest distribution, and relative abundance for wild and hatchery stocks. Total harvested numbers are estimated by a statewide harvest survey, and the harvest contribution is derived from tag recoveries.

### **OBJECTIVES**

Identify in the Idaho sport fishery the number and proportion of the harvest that is produced by LSRCP hatcheries.

Determine the spawning escapement of LSRCP stocks in Idaho.

### **DESCRIPTION OF STUDY AREA**

There are three major river systems in Idaho where steelhead are harvested: the Snake, Clearwater, and Salmon Rivers (Figure 1 and Table 1). All of Idaho's steelhead harvest is included in this study, except the upper Snake (02) and the Boise River (28). These two sections are excluded because no steelhead produced by the LSRCP are harvested there. Steelhead are blocked from reaching the Boise River by the dams on the Snake River, but a portion of the fish returning to Hells Canyon Dam are transplanted and released there to be harvested. These fish are from the Idaho Power Company mitigation program.

### **METHODS**

#### **Creel Survey**

Angler interviews were conducted at check stations and from jet boats and roving vehicles. Techniques were tailored to sportsmen access and harvest methods. For example, on the Clearwater River, a major portion of the fall and winter harvest is taken by boat fishermen, so survey efforts concentrate on interviewing boat anglers. In late spring, the density of boats in a small area

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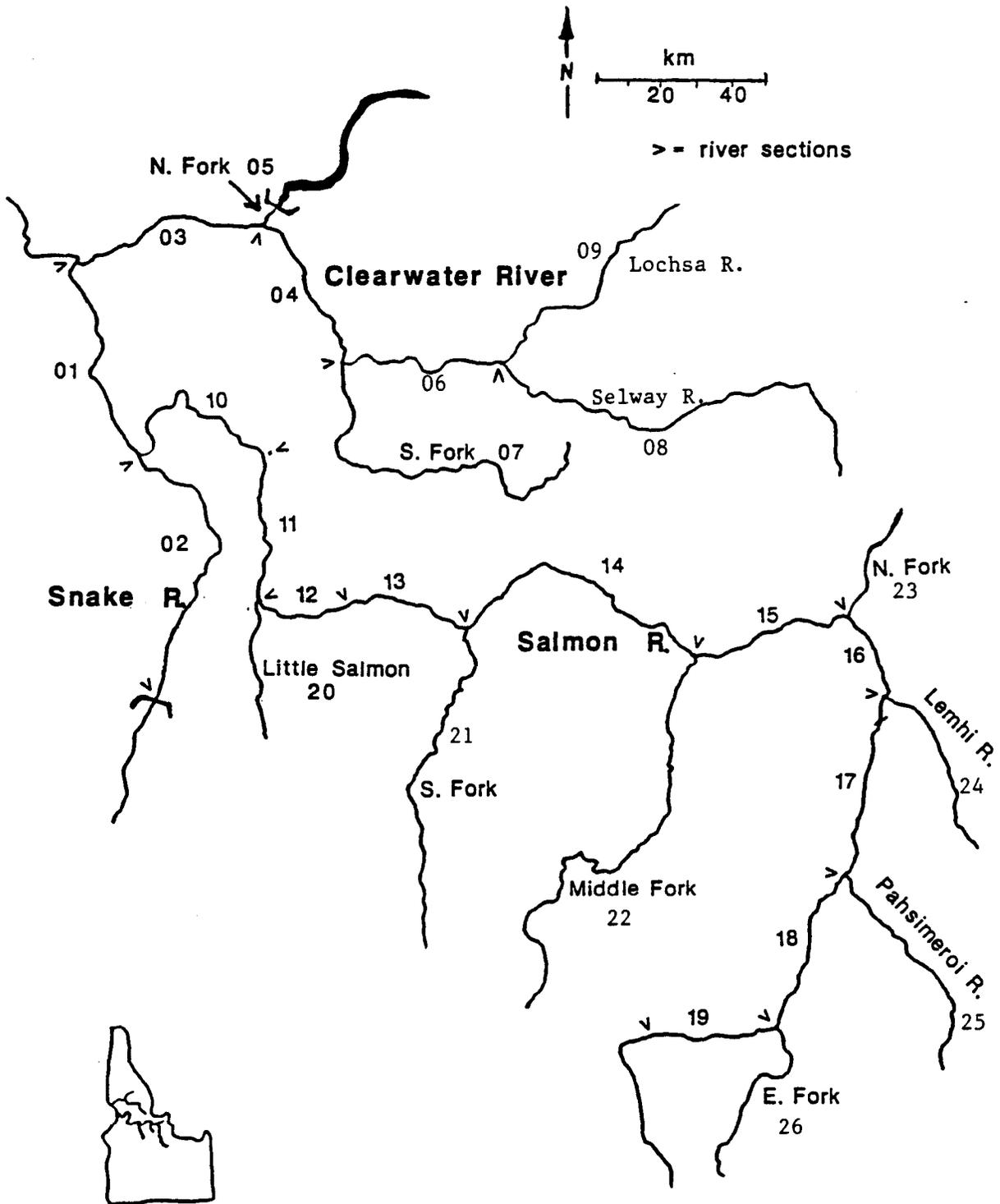


Figure 1. Map of the steelhead harvest area and River Location Codes in Idaho.

Table 1. River location codes for Idaho's anadromous fisheries.

River section	Location code
Snake River, below Salmon River	01
Snake River, above Salmon River	02
Clearwater River, below Orofino Bridge	03
Clearwater River, above Orofino Bridge	04
North Fork Clearwater River	05
Middle Fork Clearwater River	06
South Fork Clearwater River	07
Selway River	08
Lochsa River	09
Salmon River, below Whitebird Creek	10
Salmon River, Whitebird Creek to Little Salmon	11
Salmon River, Little Salmon to Vinegar Creek	12
Salmon River, Vinegar Creek to South Fork	13
Salmon River, South Fork to Middle Fork	14
Salmon River, Middle Fork to North Fork	15
Salmon River, North Fork to Lemhi River	16
Salmon River, Lemhi River to Pahsimeroi River	17
Salmon River, . Pahsimeroi River to East Fork	18
Salmon River, above East Fork	19
Little Salmon River	20
South Fork Salmon River	21
Middle Fork Salmon River	22
North Fork Salmon River	23
Lemhi River	24
Pahsimeroi River	25
East Fork Salmon River	26
Snake River, Oxbow	27
Boise River	28

TABLE1

is so high it is prohibitive to sample anglers on the water; therefore, survey efforts are divided between major boat ramps. 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. Anglers are contacted by census clerks in jet boats or at check stations located at major egress points.

During angler interviews, data are collected on number of hours fished, number of fish kept or released, wild or hatchery origin of fish kept or released, total length of fish kept, and date and river section where fish were caught. Each fish observed is inspected for tags and fin clips. Snouts are removed from any fish with an abnormality of the left ventral fin for coded wire tag retrieval, except when anglers desire to keep their fish intact.

Water conditions during the fall season are usually conducive to harvest 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 with Washington Department of Wildlife personnel and at boat ramps on alternating weekends for ten weekends during the fall and six weekends during the spring season.

Lower Clearwater River and North Fork (03 and 05) - by roving vehicle one day each week and by jet boat three 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 07) - by roving vehicle on the Upper Clearwater in the fall and on both rivers in the spring, for two weekends and two weekdays per week, for eight weeks in the fall and 10 weeks in the spring.

### Salmon River

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

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

Section 12 - by **a** check station at the old lumber mill near Riggins for ten weekends in the fall and eight weekends in the spring season.

Section 13 - by jet boat between Vinegar Creek and the South Fork on six weekends in the fall and five weekends in the spring.

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

Section 15 - by a check station at North Fork for ten weekends in the fall and eight weekends in the spring season.

Section 16 - by roving vehicle for six weekends in the fall and six weekends in the spring season.

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

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

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

Section 20 - by roving vehicle for six weekends in the spring season.

### Data Analysis

Harvest estimates for each river section were obtained from statewide telephone survey results (McArthur 1989).

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. Harvested fish that were not seen during the interviews were not included when expressing the proportion of the estimated harvest that was marked.

During field interviews, hatchery-wild proportions were reported for fish kept and for total catch, including released fish when their origin could be determined. The harvest of hatchery fish is the product of the hatchery proportion observed in anglers' creels and the estimated harvest from statewide surveys by month. Seasonal numbers of hatchery fish reported are the summation of monthly statistics. Harvest estimates for months when harvest was low and no fish were checked were calculated using the hatchery proportion calculated from the last month that data was available. These methods were applied during winter when fish movement was minimal and the proportion of hatchery fish was constant. Harvest estimates of fish marked with coded wire tags were calculated by dividing the number of tags recovered by the sampling rate expressed as a decimal and then rounded to whole numbers. Harvest estimates for unmarked groups were made from representative mark groups or companion groups.

Hatchery returns were classified by strain (A or B) and ocean-age using lengths of previous known-age coded wire tag returns. Marked returns to hatchery racks were subtracted from total returns by strain and ocean-age. Total harvest of unmarked groups was assumed to parallel the performance of unmarked hatchery rack returns. Where more than one unmarked group was returning to a release site, the estimates of harvest and hatchery return were calculated on the total of the unmarked fish and assumed to apply equally to each group. No return estimates were attempted for the unmarked groups returning to Allison Creek or Slate Creek.

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Exploitation rates are the harvest estimates divided by the sum of the harvest estimates and the number of fish that returned to the hatchery. No attempts were made to include mortality from causes other than angler harvest.

## RESULTS

During the fall 1987 and spring 1988 seasons, we contacted 19,312 anglers that had harvested 2,489 hatchery and 9 wild fish (Tables 2-15). We physically examined 2,319 hatchery fish for marks and removed 142 snouts from fin-clipped fish for retrieval of coded wire tags (Table 16). Of the total harvest estimate from both seasons that was reported by McArthur (1989), we inspected 13.3% (Table 16).

The hatchery steelhead harvest composition by river section and season is compiled in Table 17. All river sections are included except 02 and 28 (Table 1). Total harvest for river sections listed was 17,415 steelhead, of which only 20 (0.1%) were of wild/natural origin and were illegally possessed.

From the anglers' catch, we recovered 101 coded wire tags. The proportion of tags recovered from the number of fish checked for marks was 4.4%. Coded wire tags were recovered from 35 tag groups. The number of tags recovered, the estimated harvest by month and river section, and the total estimated harvest for the fall and spring seasons are listed in Appendix A. Of the 35 tag groups that yielded coded wire tags, 19 were from releases in Idaho (Appendices A, B and C).

Coded wire tags were also recovered from ten Washington releases: 4 from the Grand Ronde River, 2 from the Tucannon River, and 4 from Lyons Ferry Hatchery; five Oregon releases: 1 from the Imnaha River (Little Sheep Creek), 4 from Wallowa Hatchery, and 1 National Marine Fisheries Service transported release at Bonneville Dam (Appendix D).

Estimates of total returns of LSRCP-reared fish are summarized in Table 18. All Idaho returns from the LSRCP program that returned in 1987-88 were from releases in the Salmon River drainage. However, they were also recovered from the fishery in the Snake and Clearwater rivers. The total estimated return of adult steelhead to Idaho in 1987-88 from the LSRCP program, which includes harvest by Idaho anglers, hatchery returns, and off-site escapement was 3,704. Contribution to Idaho's total hatchery steelhead harvest (except Sections 02 and 28) in 1987-88 was 11.9%. In the Salmon River, LSRCP-reared fish supported about 30% of the estimated hatchery harvest.

Adult steelhead returning to Sawtooth Hatchery and East Fork Salmon River trap were exploited at 53% and 73%, respectively, based on coded wire tag recoveries. In the Little Salmon River, exploitation is not quantified, but is estimated at 50% (Table 18).

Table 2. Steelhead fishery interview data (unexpanded) from lower Snake River (01), October 1987-March 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/ fish	% Hatchery (total catch)
			Hatchery	Wild	Hatchery	Wild			
October	763	2,979	49	0	3	31	83	36	63
November	521	2,416	74	0	0	59	133	18	56
December	428	1,508	48	0	1	63	112	13	44
Fall subtotal	1,712	6,903	171	0	4	153	328		
Average								21	53
January	424	1,409	28	0	0	28	56	25	50
February	165	399	12	0	1	13	26	15	50
March	18	40	1	0	0	2	3	13	33
Spring subtotal	607	1,848	41	0	1	43	85		
Average								22	49
Total	2,319	8,751	212	0	5	196	413		
Average								21	53

TABLE2

Table 3. Steelhead fishery interview data (unexpanded) from lower Clearwater River (03) and North Fork (05), October 1987-April 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/fish	% Hatchery {total catch}
			Hatchery	Wild	Hatchery	Wild			
October	387	2,080	69	0	1	47	117	18	60
November	700	3,040	100	0	0	40	140	22	71
December	1,279	5,068	180	0	3	91	274	18	67
Fall subtotal	2,366	10,188	349	0	4	178	531		
Average								19	66
January	572	1,765	43	0	1	31	75	24	59
February	1,120	4,081	178	0	4	48	230	18	79
March	1,538	7,231	276	0	31	69	376	19	82
April	240	1,237	61	5	19	7	92	13	87
Spring subtotal	3,470	14,314	558	5	55	155	773		
Average								19	79
Total	5,836	24,502	907	5	59	333	1,304		
Average								19	74

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TABLE2

Table 4. Steelhead fishery interview data (unexpanded) from upper Clearwater River (04) and Middle Fork (06), December 1987-April 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/ fish	% Hatchery total catch)
			Hatchery	Wild	Hatchery	Wild			
December	15	46	0	0	0	0	0	0	0
Fall subtotal	15	46	0	0	0	0			
Average							0	0	
February	93	308	4	0	0	5	9	34	44
March	272	974	15	0	5	14	34	29	59
April	24	87	2	0	1	2	5	17	60
Spring subtotal	389	1,369	21	0	6	21	48		
Average							29	56	
Total	404	1,415	21	0	6	21	48		
Average							29	56	

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Table 5. Steelhead fishery interview data (unexpanded) from South Fork Clearwater River (07), March-April 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/	% Hatchery fish (total)
			Hatchery	Wild	Hatchery	Wild			
March	203	672	17	0	0	9	26	26	65
April	91	267	6	0	0	5	11	24	55
Spring total	294	939	23	0	0	14	37		
Average								25	62

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Table 6. Steelhead fishery interview data (unexpanded) from Salmon River Section 10, October 1987-March 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/ fish	% Hatchery (total catch)
			Hatchery	Wild	Hatchery	Wild			
October	284	2,470	61	0	0	86	147	17	41
November	137	832	16	0	1	10	27	31	63
Fall subtotal	421	3,302	77	0	1	96	174		
Average								19	45
February	30	78	0	0	0	2	2	39	0
March	12	31	0	0	0	1	1	31	0
Spring subtotal	42	109	0	0	0	3	3		
Average								36	0
Total	463	3,411	77	0	1	99	177		
Average								19	44

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Table 7. Steelhead fishery interview data (unexpanded) from Salmon River Section 11, October 1987-March 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/	% Hatchery Fish (Total
			Hatchery	Wild	Hatchery	Wild			
October	356	2,405	23	0	0	47	70	34	33
November	444	2,392	36	1	0	49	86	28	42
Fall subtotal	800	4,797	59	1	0	96	156		
Average								31	38
February	140	325	13	0	0	11	24	14	54
March	120	342	4	0	1	16	21	16	24
Spring subtotal	260	667	17	0	1	27	45		
Average								15	40
Total	1,060	5,464	76	1	1	27	201		
Average								27	38

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Table 8. Steelhead fishery interview data (unexpanded) from Salmon River Section 12, October 1987-March 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/	% Hatchery fish (total)
			Hatchery	Wild	Hatchery	Wild			
October	417	2,476	75	0	6	62	143	17	57
November	839	6,027	81	2	3	63	149	40	56
Fall subtotal	1,256	8,503	156	2	9	125	292		
Average								29	57
February	154	533	3	0	0	5	8	67	38
March	93	294	5	0	0	4	9	33	56
Spring subtotal	247	827	8	0	0	9	17		
Average								49	47
Total	1,503	9,330	164	2	9	134	309		
Average								30	56

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Table 9. Steelhead fishery interview data (unexpanded) from Salmon River Section 13, October 1987-March 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/ fish	% Hatchery (total)
			Hatchery	Wild	Hatchery	Wild			
October	72	878	21	0	0	34	55	16	38
November	81	1,040	20	0	0	40	60	17	33
Fall subtotal	153	1,918	41	0	0	74	115		
Average								17	36
February	1	1	0	0	0	0	0	0	0
March	15	144	1	0	0	10	11	13	9
Spring subtotal	16	145	1	0	0	10	11		
Average								13	9
Total	169	2,063	42	0	0	84	126		
Average								16	33

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Table 10. Steelhead fishery interview data (unexpanded) from Salmon River Section 14, September 1987-March 1988.

Dates	No. anglers	Total hours fished	Steelhead Kept		Steelhead Released		Total	Hours/ Fish	% Hatchery (Total Catch)
			Hatchery	Wild	Hatchery	Wild			
September	15	159	0	0	0	7	7	23	0
October	125	2,104	25	0	0	124	149	14	17
November	239	4,762	66	0	3	146	215	22	32
Fall subtotal	379	7,025	91	0	3	277	371		
Average								19	25
February	36	353	11	0	3	24	38	9	37
March	201	3,093	47	0	10	111	168	18	34
Spring subtotal	237	3,446	58	0	13	135	206		
Average								17	34
Total	616	10,471	149	0	16	412	577		
Average								18	29

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TABLE2

Table 11. Steelhead fishery interview data (unexpanded) from Salmon River Section 15, September 1987-March 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/ fish	% Hatchery (total)
			Hatchery	Wild	Hatchery	Wild			
September	69	419	5	0	0	18	23	18	22
October	1,011	10,983	127	0	3	251	381	29	34
November	1,258	16,212	230	1	6	246	483	34	49
Fall subtotal	2,338	27,614	362	1	9	515	887		
Average								31	42
February	405	2,921	51	0	6	57	114	26	50
March	1,710	14,422	227	0	48	252	527	27	52
Spring subtotal	2,115	17,343	278	0	54	309	641		
Average								27	52
Total	4,453	44,957	640	1	63	824	1,528		
Average								29	46

Table 12. Steelhead fishery interview data (unexpanded) from Salmon River Section 16, October 1987-March 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/ Fish	% Hatchery (Total Catch)
			Hatchery	Wild	Hatchery	Wild			
October	10	39	0	0	0	0	0	0	0
November	152	663	15	0	1	15	31	21	52
Fall subtotal	162	702	15	0	1	15	31		
Average								23	52
February	151	612	8	0	1	16	25	24	36
March	332	1,008	10	0	2	20	32	32	38
Spring subtotal	483	1,620	18	0	3	36	57		
Average								28	37
Total	645	2,322	33	0	4	51	88		
Average								26	42

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TABLE2

Table 13. Steelhead fishery interview data (unexpanded) from Salmon River Section 17, February-March 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/ fish	% Hatchery (total catch)
			Hatchery	Wild	Hatchery	Wild			
February	106	296	1	0	0	3	4	74	25
March	456	1,856	21	0	1	4	26	71	85
Spring subtotal	562	2,152	22	0	1	7	30		
Average								72	77

Table 14. Steelhead fishery interview data (unexpanded) from Salmon River Section 19, March-April 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/	% Hatchery fish (total
			Hatchery	Wild	Hatchery	Wild			
March	122	398	6	0	2	6	14	28	57
April	375	1,808	32	0	38	71	141	13	50
Spring subtotal	497	2,206	38	0	40	77	155		
Average								14	50

Table 15. Steelhead fishery interview data (unexpanded) from Salmon River Section 20, February-April 1988.

Dates	No. anglers	Total hours fished	Steelhead kept		Steelhead released		Total	Hours/ fish	% Hatchery (total catch)
			Hatchery	Wild	Hatchery	Wild			
February	26	42	0	0	0	0	0	0	0
March	250	608	45	0	2	17	64	10	73
April	215	651	40	0	7	11	58	11	81
Spring subtotal	491	1,301	85	0	9	28	122		
Average								11	77

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

River Section	No. Fish Checked	Estimated Harvest <sup>a</sup>	Sample Rate %
01	207	1,666	12.4
03 & 05	856	7,450	11.5
04 & 06	15	1,084	1.4
07	17	232	7.3
10	63	682	9.2
11	74	1,036	7.1
12	161	695	23.2
13	36	366	9.8
14	142	661	21.5
15	578	2,021	28.6
16	30	479	6.3
17	22	328	6.7
18	— <sup>b</sup>	127	--
19	33	150	22.0
20	85	439	19.4
Total	2,319	17,415	
Average			13.3

<sup>a</sup>Data from telephone survey (McArthur 1989).

<sup>b</sup>Catch and release during spring 1988 fishery.

TABLE1

Table 17. Estimated number of hatchery steelhead harvested in the lower Snake, Clearwater, and Salmon Rivers during the 1987-88 seasons.

River and section	— Fall season —			Spring season —			Total harvest
	Estimated harvest <sup>a</sup>	Percent hatchery	No. fish	Estimated harvest <sup>a</sup>	Percent hatchery	No. hatchery fish	hatchery fish
Lower Snake River	1,227	100	1,227	439	100	439	1,666
Lower Clearwater R. and North Fork	3,865	100	3,865	3,585	100	3,585	7,450
Upper Clearwater R.	653	--b	653	431	100	431	1,084
S. Fork Clearwater R.	9	--b	9	223	100	223	232
Total Clearwater R.	4,527		4,527	4,239		4,239	8,766
Average		100			100		
Salmon River							
10	591	100	591	91	--b	91	682
11	821	98	805	215	100	215	1,020
12	529	99	524	166	100	166	690
13	300	100	300	66	100	66	366
14	512	100	512	149	100	149	661
15	1,085	100	1,085	936	100	936	2,021
16	247	100 <sup>b</sup>	247	232	100	232	479
17	71	--b	71	257	100 <sup>b</sup>	257	328
18	44		44	83		83	127
19	9	--b	9	141	100	141	150
20	0		0	439	100	439	439
Total Salmon River	4,209		4,188	2,774		2,774	6,963
Average		99.5			100		
Total	9,963		9,942	7,452		7,452	17,415

<sup>a</sup>From statewide surveys.

<sup>b</sup>Assumed to be of hatchery origin.

Table 18. Summary of 1987-88 harvest estimates and hatchery returns of steelhead produced by LSRCP hatcheries.

Release year	Strain & ocean-age	No. of Fish released	Release site	Hatchery rearing	Marks	Estimated number of fish		
						Harvest	Hatchery return <sup>a</sup>	Total
1986	A-I	39,125	Decker Flat	HNFH <sup>b</sup>	CWT 10/28/44	31	31	62
1986	A-I	9,450	Decker Flat	HNFH	CWT 10/28/01	10	6	16
1986	A-I	651,140	Decker Flat	HNFH	None	630	575	1,205
1986	A-I	8,650	Little Salmon R.	HNFH	CWT 10/28/05	0	0	0
1986	A-I	35,475	Little Salmon R.	HNFH	CWT 10/28/42	52	52	104
1986	A-I	258,178	Little Salmon R.	HNFH	None	378	378	756
Subtotal		1,002,018				1,101	1,042	2,143
1985	A-II	40,475	Decker Flat	HNFH	CWT 10/26/30	15	12	27
1985	A-II	745,711	Decker Flat	HNFH	None	296	237	533
1985	A-II	39,175	Little Salmon	HNFH	CWT 10/26/32	19	19	38
1985	A-II	268,928	Little Salmon R.	HNFH	None	130	130	260
Subtotal		1,094,289				460	398	858
1986	B-I	25,325	E. Fk. Salmon R.	HNFH	CWT 10/28/20	0	0	0
1986	B-I	499,991	E. Fk. Salmon R.	HNFH	None	170	63	233
Subtotal		525,316				170	63	233
1985	B-II	127,607	E. Fk. Salmon	HNFH	None	216	80	296
1985	B-II	39,375	E. Fk. Salmon R.	HNFH	CWT 10/26/31	32	3	35
1985	B-II	35,225	E. Fk. Salmon R.	HNFH	CWT 10/26/36	23	10	33
1985	B-II	17,425	E. Fk. Salmon R.	HNFH	CWT 10/28/55	6	6	12
1985	B-II	16,950	E. Fk. Salmon R.	HNFH	CWT 10/28/03	15	11	26
1985	B-II	8,100	E. Fk. Salmon R.	HNFH	CWT 10/28/02	4	8	12
1985	B-II	25,525	E. Fk. Salmon R.	HNFH	CWT 10/28/54	47	9	56
Subtotal		270,207				343	127	470
1984	B-III	393,452	E. Fk. Salmon R.	HNFH	None	0	0	0
1984	B-III	54,625	Little Salmon R.	HNFH	CWT 10/28/06	0	0	0
1984	B-III	37,175	Little Salmon R.	HNFH	CWT 10/28/07	0	0	0
1984	B-III	3,154	Little Salmon R.	HNFH	None	0	0	0
1984	B-III	31,920	Slate Creek	MVSH <sup>c</sup>	None	--	--	--
1984	B-III	10,764	Allison Creek	MVSH	None	--	--	--
Subtotal		531,760				0	0	0

<sup>a</sup>Includes off-site escapement.

<sup>b</sup>HNFH = Hagerman National Fish Hatchery.

<sup>c</sup>MVSH = Magic Valley Steelhead Hatchery.

Included in the Salmon River coded wire tag recoveries are two fish that apparently reared for an additional year after release. These fish were released in 1984 from the Pahsimeroi Hatchery and tagged with 10/27/45 and 10/27/46 (Appendix A).

## DISCUSSION

Adult steelhead migrating upstream in 1987 were adversely affected by unusually low streamflow in the Snake River during the fall migration (Koski et al. 1988). No attempt is made here to explain the quantitative effects of these environmental parameters. However, the fish losses in McNary Reservoir were too significant to ignore when discussing return rates.

After passing McNary Dam, the majority of adult steelhead either pass Priest Rapids Dam on the Columbia River or Ice Harbor Dam on the Snake River. However, in 1987, 60,300 fewer fish were counted at the two upstream facilities than were counted at McNary Dam (Table 19). This was the highest number in the past five years and represents 40.5% of the number of steelhead past McNary. This contrasts with 13.2% in 1985 and 13.9% in 1986. If 1985 and 1986 are averaged and used as an indication of what could realistically have been "expected" in 1987, we would "expect" to account for all but 13.5% of 148,800 steelhead; i.e. 20,200 fish. In other words, losses over and above the 1985-86 average were 40,100 fish, and since 84% of the fish accounted for passed Ice Harbor, we could reasonably "expect" the same proportion of the unaccounted fish ( $0.84 \times 40,100 = 33,700$ ) to be Snake River fish. If the previous four years were used to estimate the 1987 expected numbers, the unaccountable numbers would be even higher.

Although coded wire tags are a valuable tool in identifying harvest composition, they cannot be used to quantify the losses of LSRCP-raised fish that occurred in 1987. It's reasonable to assume that an important portion of the fish lost in 1987 were produced by the LSRCP hatcheries in Idaho and Washington. Although the numbers cannot be quantified, any conclusions about returns should include qualification of these significant losses.

Passive Integrated Transponders (PIT tags) have been proposed as a tool to quantify the numbers of LSRCP steelhead reaching Lower Granite Dam (Ball 1989). When adult detection equipment is installed at other dams, such as Bonneville and McNary, losses such as occurred in 1987 can be quantified. PIT tags have distinct advantages over conventional methodology in yielding results from individuals without handling the fish (Prentice et al. 1987).

### Harvest of Sawtooth Hatchery Releases

Returns of steelhead released from Sawtooth Hatchery in 1985 are now complete. From a total release of 786,186 smolts, an estimated 11,898 adults were either harvested by Idaho fishermen or returned to their release sites.

Table 19. Difference between the number of steelhead passing McNary Dam that can be accounted for upriver at Ice Harbor and Priest Rapids dams, 1983-87.

Year	No. of Fish (000's)				Difference
	McNary Dam	Ice Harbor Dam	Priest Rapids Dam	Ice Harbor + Priest Rapids Total	
1983	125.2	88.5	31.1	119.6	5.6
1984	135.5	94.0	26.0	120.0	15.5
1985	188.2	128.8	34.5	163.3	24.9
1986	193.5	144.3	22.4	166.7	26.8
1987	148.8	74.5	14.0	88.5	60.3

TABLE1

The total return rate for this group is 1.51%, and 95% returned after one ocean-year. The proportion returning after one ocean-year is unusually high because of the losses downriver that severely reduced the two-ocean component. Without these downstream losses, the 1987 release would likely have returned about 2% of the released numbers to Idaho as adults.

In 1986, a total of 699,715 smolts were released at Sawtooth Hatchery, and after one ocean-year, an estimated 1,283 (0.18%) adults were either caught by Idaho fishermen or returned to Sawtooth Hatchery (Table 18). As previously stated, this group was also severely reduced by downstream losses.

The exploitation rate during 1987-88 was lower than has been measured in previous years for both age groups. One ocean-year returns were harvested at 52.3% and two ocean-year returns at 55.6%. This compares with exploitation rates of 80% or greater the previous two years (Ball 1988, 1989). In the spring of 1988, no harvest was allowed in Section 18 of the Salmon River, which may have reduced the overall exploitation of fish returning to Sawtooth Hatchery. Another possible explanation is spatial distribution of steelhead during the fishery with less time spent in the river sections with high harvest rates.

#### **Harvest of East Fork Salmon River Releases**

Returns of 393,452 smolts released in 1984 were 1,550 after two ocean-years (Ball 1989). No additional recoveries were made in the fishery or at the hatchery after the third ocean-year. The return rate was 0.39%, of which 74% were harvested by Idaho fishermen.

In 1985, there were 270,207 smolts released from the East Fork, of which 142,600 were marked with coded wire tags. This was the first comprehensive mark group(s) from the East Fork. After two ocean-years, a total of 470 fish returned and 343 (73%) were harvested. Unfortunately, this return group was also affected by losses during upstream migration. Total return to date after two ocean-years was 568 (0.21%), of which 74% were harvested by Idaho fishermen (Table 18, Ball 1989).

From 525,316 smolts released into the East Fork in 1986, 233 were harvested by Idaho fishermen or returned to the adult collection facility (Table 18). The exploitation rate was 73%. This group was also reduced by losses during upstream migration.

#### **Harvest of Little Salmon River Releases**

In 1984, 96,425 A-strain fish and 95,624 B-strain fish were marked and released in the Little Salmon River to compare their performance. Through two ocean-years, the A-strain group returned nine times as many adults as the B-strain group (Ball 1989). No additional recoveries of B-strain fish were observed in 1987-88, so the returns reported last year are complete (Ball 1989).

8788LSRC

A total of 308,103 smolts were released in 1986 and all were A-strain (Appendix B). Estimated returns were 790 after one ocean-year and 298 after two ocean-years (Table 18, Ball 1989). The total return of 1,288 fish (0.42%) includes an off-site escapement estimate of 50% for both years. Of the number harvested, 10% were from the Snake River, 52% from the Salmon River downstream of the Little Salmon River, 28% from the Salmon River upstream of the Little Salmon River, and 10% from the Little Salmon River (Appendix A and Ball 1989).

Returns after one ocean-year of 302,303 smolts released in 1986 are 860, of which 430 were harvested and an equal amount escaped past the fishery (Table 18). The return after one ocean-year is 0.28%, which is very similar to the return rate of 0.26% observed for the 1985 release.

### Sources of Error

The primary sources of error involved in the harvest estimates were discussed by Ball (1986). The quality control of adipose fin clipping has also been discussed (Ball 1989). Adults returning to hatchery racks in 1988 were inspected to ascertain the proportion of the hatchery fish that did not have adipose fin clips. From the Salmon River hatcheries (which includes the LSRCP releases), only 13 of 2,121 fish checked (0.6%) had intact adipose fins. Considering the large number of fish clipped, the quality control is very good and should not be a significant cause of error. However, the adult return should be sampled each year to insure that the quality control is maintained at an acceptable level.

Left ventral fin clips, which are used to identify the presence of coded wire tags, regenerate but usually leave the fin deformed. Since there is a high proportion of hatchery fish with deformed ventral fins, we attempt to take the snouts from all fish with deformed left ventral fins. Although we take additional snouts with these methods, we don't believe we miss many snouts. In 1987-88 we recovered coded wire tags from 71% of the snouts we removed.

### Straying

Adult steelhead returning to Idaho rivers in the fall are several months away from spawning and commonly wander into streams other than where they were released. It's not unusual for these wandering fish to spend time in several rivers that are not their natal drainage. Adults observed or harvested during the wandering phase should not be considered strays.

In 1988, there were 230 coded wire tags recovered from adults that returned to hatchery racks in Idaho. From National Marine Fisheries Service research studies, there were 37 tag recoveries from 10 tag codes at the hatchery racks. These fish were tagged at Lower Granite Dam and released in the Snake River below Little Goose Dam or transported to the Columbia River at Beacon Rock or below

8788LSRC

Bonneville Dam (Johnson and Longwill, 1988). Only one of these tag codes (CWT 23/18/11) was recovered in the Idaho fishery (Appendix A).

From the 180 coded wire tag recoveries that were from Idaho marked groups, only six fish (3.3%) returned to sites other than where they were released. Three fish (CWT 05/17/29) released in the South Fork Clearwater River were collected at Dworshak National Fish Hatchery; one fish released in the East Fork Salmon River (CWT 10/28/02) was collected at the Pahsimeroi Hatchery and another (CWT 10/28/54) at Dworshak; and one fish released at Sawtooth Hatchery (CWT 10/28/16) was recovered at the East Fork Salmon River trap. Because of the close proximity of Dworshak Hatchery to the mouth of the North Fork Clearwater River, it's not uncommon for fish released into the South Fork to be collected at Dworshak Hatchery (Ball, 1986). With the exception of these South Fork Clearwater fish, the three other fish are only 1.7% of the hatchery returns.

There were 13 hatchery recoveries of fish carrying coded wire tags from the LSRCP in Washington. All of these fish returned to Dworshak National Fish Hatchery. From releases in the Tucannon River in Washington, there was one tag recovery from CWT 62/16/30, two from CWT 63/32/14, and two from CWT 63/33/51. From releases at Lyons Ferry Hatchery, there were two from CWT 62/16/45, two from CWT 63/33/03, and four from CWT 63/33/04.

#### **RECOMMENDATIONS**

Sample the adult returns at each hatchery rack to ascertain the quality control of adipose clips.

Continue to include coded wire tags in each major smolt release that are representative in size, time of release, and fish health.

Install an adult steelhead counting weir on the Little Salmon River or Slate Creek to evaluate adult returns and spawning escapement of Lower Salmon River smolt releases.

Estimate the number of steelhead that are rearing an additional year before emigration.

Analyze scales from adult returns to the East Fork Salmon River trap for size distribution at each ocean-age.

Develop techniques for estimating angler response bias to queries on the number and origin of fish released.

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## LITERATURE CITED

- Ball, K. 1986. Evaluation of hatchery-wild steelhead harvest December 1, 1984 to September 30, 1985. U.S. Fish and Wildlife Service Contract No. 14-16-0001-85067 (RWG). Idaho Dept. of Fish and Game.
- Ball, K. 1988. Evaluation of hatchery-wild steelhead harvest October 1, 1985 to December 31, 1986. U.S. Fish and Wildlife Service Contract No. 14-16-0001-85068 (RWG). Idaho Dept. of Fish and Game.
- Ball, K. 1989. Evaluation of hatchery-wild steelhead harvest October 1, 1986 to December 31, 1987. U.S. Fish and Wildlife Service Contract No. 14-16-0001-87501 (RWG). Idaho Dept. of Fish and Game.
- Johnson, K. and J. Longwill. 1988. Pacific Salmonid Coded Wire Tag Releases Through 1987. Regional Mark Processing Center. Pacific Marine Fisheries Commission.
- Koski, C.H., S.W. Pettit, J.B. Athearn, and A.L. Heindl. 1988. Fish Transportation Oversight Team Annual Report - FY 1987 Transport Operations on the Snake and Columbia Rivers. NOAA Technical Memorandum NMFS F/NWR-22.
- McArthur, T. 1989. Salmon and Steelhead Investigations, Job 1: Estimate 1987-88 Steelhead Season Harvest and Effort (Telephone Survey). Idaho Dept. of Fish and Game, Job Performance Report, Project No. F-73-R-11.
- Prentice, E.F., T.A. Flagg, and S. McCutcheon. 1987. A Study to Determine the Biological Feasibility of a New Fish Tagging System, 1986-1987. U.S. Dept. of Comm., Nat'l Oceanic and Atmos. Admin., Nat'l Marine Fish. Serv., Northwest and Alaska Fish. Cent., Seattle, Wa. 113 p.
- U.S. Army Corps of Engineers, North Pacific Division. 1988. Annual Fish Passage Report, Columbia and Snake Rivers for Salmon, Steelhead and Shad. U.S. Army Engineer Districts, Portland and Walla Walla.

**APPENDICES**

Appendix A. Coded wire tag recoveries and fin clips identified September 1987 - April 1988; harvest estimated by month and river section; and total harvest estimates for the 1987-88 season.

TAG CODE - 07/37/61

RELEASE SITE - Little Sheep Creek

NUMBER RELEASED - 27,162

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01				1	0.134	7						
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

34

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													1	7
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

7

Appendix A. Continued.

TAG CODE - 07/37/62

RELEASE SITE - Wallowa Hatchery

NUMBER RELEASED - 26,908

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01							2	0.142	14			
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

35

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													2	14
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

14

Appendix A. Continued.

TAG CODE - 07/37/63

RELEASE SITE - Wallowa Hatchery

NUMBER RELEASED - 28,094

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01										2	0.183	11
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

36

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													2	11
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

11

Appendix A. Continued.

TAG CODE - 07/38/01

RELEASE SITE - Mallowa Hatchery

NUMBER RELEASED - 26,316

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01				1	0.134	7						
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

37

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													1	7
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

7

Appendix A. Continued.

TAG CODE - 07/38/02

RELEASE SITE - Wallowa Hatchery

NUMBER RELEASED - 26,117

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Est. Rate	Est. Harv.	No. Tags	Sample Est. Rate	Est. Harv.	No. Tags	Sample Est. Rate	Est. Harv.	No. Tags	Sample Est. Rate	Est. Harv.
01				1	0.134	7						
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

38

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Est. Rate	Est. Harv.	No. Tags	Sample Est. Rate	Est. Harv.	No. Tags	Sample Est. Rate	Est. Harv.	No. Tags	Sample Est. Rate	Est. Harv.	No. Tags	Est. Harv.
01													1	7
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

7

Appendix A. Continued.

TAG CODE - 10/25/21

RELEASE SITE - Bruno's Bridge

NUMBER RELEASED - 45,800

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

39

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15							1	0.385	3				1	3
16														
17														
18														
19														
20														

Total estimated harvest

3

Appendix A. Continued.

TAG CODE - 10/26/30

RELEASE SITE - Sawtooth

NUMBER RELEASED - 40,475

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15				1	0.296	3	1	0.408	2			
16												
17												
18												
19												
20												

40

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13														
14							1	0.426	2				1	2
15							1	0.385	3				3	8
16														
17														
18														
19										1	0.191	5	1	5
20														
Total estimated harvest														15

Appendix A. Continued.

TAG CODE - 10/26/31

RELEASE SITE - East Fork Salmon R.

NUMBER RELEASED - 39,375

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10							1	0.084	12			
11												
12												
13				1	0.157	6						
14												
15							3	0.408	7			
16												
17												
18												
19												
20												

41

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10													1	12
11														
12														
13													1	6
14							1	0.426	2				1	2
15							2	0.385	5				5	12
16														
17														
18														
19														
20														

Total estimated harvest

32

Appendix A. Continued.

TAG CODE - 10/26/32

RELEASE SITE - Little Salmon R.

NUMBER RELEASED - 39,175

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.
01												
03/05												
04/06												
07												
10												
11				1	0.094	11						
12												
13												
14							1	0.272	4			
15												
16												
17												
18												
19												
20												

42

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12													1	11
13														
14														
15													1	4
16														
17														
18														
19														
20							1	0.260	4				1	4
Total estimated harvest														19

Appendix A. Continued.

TAG CODE - 10/26/36

RELEASE SITE - East Fork Salmon R.

NUMBER RELEASED - 35,225

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12				1	0.638	2						
13												
14							1	0.272	4			
15							2	0.408	5			
16												
17												
18												
19												
20												

43

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12													1	2
13														
14							1	0.426	2				2	6
15							4	0.385	10				6	15
16														
17														
18														
19														
20														

Total estimated harvest

23

Appendix A. Continued.

TAG CODE - 10/27/45

RELEASE SITE - Pahsimeroi

NUMBER RELEASED - 40,122

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15							1	0.408		2		
16												
17												
18												
19												
20												

44

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

2

Appendix A. Continued.

TAG CODE -- 10/27/46

RELEASE SITE - Pahsimeroi

NUMBER RELEASED - 41,019

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15							1	0.408		2		
16												
17												
18												
19												
20												

45

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16													1	2
17														
18														
19														
20														

Total estimated harvest

2

Appendix A. Continued.

TAG CODE - 10/28/01

RELEASE SITE- Sawtooth

NUMBER RELEASED - 9,450

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15							2	0.408		5		
16												
17												
18												
19												
20												

46

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-89 Total</u>	
	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15													2	5
16														
17														
18														
19									1	0.191		5	1	5
20														

Total estimated harvest 10

Appendix A. Continued.

TAG CODE - 10/28/02

RELEASE SITE - East Fork Salmon R.

NUMBER RELEASED - 8,100

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13												
14							1	0.272		4		
15												
16												
17												
18												
19												
20												

47

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13														
14													1	4
15														
16														
17														
18														
19														
20														

Total estimated harvest

4

Appendix A. Continued.

TAG CODE - 10/28/03

RELEASE SITE - East Fork Salmon R.

NUMBER RELEASED - 16,950

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12							1	0.245	4			
13												
14							1	0.272	4			
15							2	0.408	5			
16												
17												
18												
19												
20												

48

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13													1	4
14							1	0.426	2				2	6
15													2	5
16														
17														
18														
19														
20														

Total estimated harvest

15

Appendix A. Continued.

TAG CODE - 10/28/16

RELEASE SITE - Pahsimeroi

NUMBER RELEASED - 17,200

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11				1	0.094	11						
12												
13												
14												
15				1	0.296	3	1	0.408	2			
16												
17												
18												
19												
20												

49

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11													1	11
12														
13														
14							2	0.426	5				2	5
15							1	0.385	3				3	8
16														
17														
18														
19														
20														

Total estimated harvest

24

Appendix A. Continued.

TAG CODE - 10/28/17

RELEASE SITE - Pahsimeroi

NUMBER RELEASED - 17,775

River Section	September			October			November			December		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13												
14							1	0.272		4		
15												
16							1	0.173		6		
17												
18												
19												
20												

50

River Section	January			February			March			April			1987-88 Total	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13														
14													1	4
15														
16													1	6
17														
18														
19														
20														

Total estimated harvest

10

Appendix A. Continued.

TAG CODE - 10/28/18

RELEASE SITE - Panther Creek

NUMBER RELEASED - 27,575

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10				1	0.145	7						
11				1	0.094	11						
12												
13												
14							1	0.272	4			
15												
16												
17												
18												
19												
20												

51

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10													1	7
11													1	11
12														
13														
14													1	4
15														
16														
17														
18														
19														
20														

Total estimated harvest

22

Appendix A. Continued.

TAG CODE - 10/28/41

RELEASE SITE - Hell's Canyon

NUMBER RELEASED - 35,800

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10							1	0.084		12		
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

52

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10													1	12
11														
12														
13														
14														
15														
16														
17														
18														
19														
20										1	0.151	7	1	7

Total estimated harvest

19

Appendix A. Continued.

TAG CODE - 10/28/42

RELEASE SITE - Little Salmon R.

NUMBER RELEASED - 35,475

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10				3	0.145	21						
11							1	0.074	14			
12				1	0.638	2	1	0.245	4			
13												
14												
15												
16												
17												
18												
19												
20												

53

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10													3	21
11													1	14
12													2	6
13														
14														
15														
16														
17														
18														
19														
20							1	0.260	4	1	0.151	7	2	11
Total estimated harvest														52

Appendix A. Continued.

TAG CODE - 10/28/44

RELEASE SITE - Sawtooth

NUMBER RELEASED - 39,125

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13							1	0.156	6			
14							1	0.272	4			
15				1	0.296	3	4	0.408	10			
16												
17												
18												
19												
20												

54

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13													1	6
14													1	4
15							1	0.385	3				6	16
16														
17														
18														
19										1	0.191	5	1	5
20														

Total estimated harvest

31

Appendix A. Continued.

TAG CODE - 10/28/53

RELEASE SITE - Pahsimeroi

NUMBER RELEASED - 23,400

55

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Sample Est. Rate	Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16							1	0.385	3				1	3
17														
18														
19														
20														

Total estimated harvest

3

Appendix A. Continued.

TAG CODE - 10/28/54

RELEASE SITE - East Fork Salmon R.

NUMBER RELEASED - 25,525

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10							1	0.084	12			
11							1	0.074	14			
12												
13							1	0.156	6			
14												
15							2	0.408	5			
16												
17												
18												
19												
20												

56

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10													1	12
11													1	14
12														
13													1	6
14							1	0.426	2				1	2
15							3	0.385	8				5	13
16														
17														
18														
19														
20														

Total estimated harvest

47

Appendix A. Continued.

TAG CODE - 10/28/55

RELEASE SITE - East Fork Salmon R.

NUMBER RELEASED - 17,425

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12				1	0.638	2	1	0.245	4			
13												
14												
15												
16												
17												
18												
19												
20												

57

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12													2	6
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

6

Appendix A. Continued.

TAG CODE - 23/18/11

RELEASE SITE - Columbia R., Bonneville

NUMBER RELEASED - 7,640

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

58

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17							1	0.111	9				1	9
18														
19														
20														

Total estimated harvest

9

Appendix A. Continued.

TAG CODE - 62/16/27

RELEASE SITE - Grand Ronde R.

NUMBER RELEASED - 41,028

River Section	September			October			November			December		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01							1	0.142	7			
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

59

River Section	January			February			March			April			1987-88 Total	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													1	7
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

7

Appendix A. Continued.

TAG CODE - 62/16/28

RELEASE SITE - Grand Ronde R.

NUMBER RELEASED - 40,201

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01										1	0.183	5
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

09

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													1	5
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

5

Appendix A. Continued.

TAG CODE - 62/16/44

RELEASE SITE - Lyons Ferry Hatchery

NUMBER RELEASED - 28,191

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01				1	0.134	7	1	0.142	7			
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

T9

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													2	14
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

14

Appendix A. Continued.

TAG CODE - 63/33/06

RELEASE SITE - Grand Ronde R.

NUMBER RELEASE - 20,038

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01							1	0.142	7			
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

62

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>		<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	
01												1 7	
03/05													
04/06													
07													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

Total estimated harvest

7

Appendix A. Continued.

TAG CODE - 63/33/49

RELEASE SITE - Grand Ronde R.

NUMBER RELEASED - 20,234

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01							1	0.142	7	1	0.183	5
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

63

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													2	12
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

12

Appendix A. Continued.

TAG CODE - 63/33/50

RELEASE SITE - Tucannon R.

NUMBER RELEASED - 20,244

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05				1	0.068	15						
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

64

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05													1	15
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

15

Appendix A. Continued.

TAG CODE - 63/33/51

RELEASE SITE - Tucannon R.

NUMBER RELEASED - 20,250

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01							1	0.142	7			
03/05												
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

65

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													1	7
03/05														
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

7

Appendix A. Continued.

TAG CODE - 63/38/36

RELEASE SITE - Lyons Ferry Hatchery

NUMBER RELEASED - 20,136

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01				1	0.134	7						
03/05				1	0.068	15	1	0.063	16			
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

99

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01													1	7
03/05													2	31
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest



Appendix A. Continued.

TAG CODE - 63/38/38

RELEASE SITE - Lyons Ferry Hatchery

NUMBER RELEASED - 20,506

River Section	<u>September</u>			<u>October</u>			<u>November</u>			<u>December</u>		
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.
01												
03/05							1	0.063	16			
04/06												
07												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

89

River Section	<u>January</u>			<u>February</u>			<u>March</u>			<u>April</u>			<u>1987-88 Total</u>	
	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Sample Rate	Est. Harv.	No. Tags	Est. Harv.
01														
03/05													1	16
04/06														
07														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Total estimated harvest

16

Appendix B. Steelhead groups returning to the Salmon river, 1987-88.

	Ocean	No. of fish		Hatchery	
A	I	8,650	Little Salmon A.	HNFHa	CWT 10/28/05
A	l	35,475	Little Salmon P.	HNFH	CWT 10/2B/42
H	I	258,178	Little Salmon A.	HNFH	None
R	I	17,200	Pahsimerbi	NSPPb	CWT 10/28/16
H	l	17,775	Pahsimeroi	NSPR	CWT 10/28/17
A	I	579,063	Pahsimeroi	NSPR	None
H	I	27,575	Panther Creek	NSPP	CWT 10/28/18
R	l	218,745	Panther Creek	NSPR	None
A	l	9,450	Decker Flat	HNFH	CWT 10/28/01
H	I	39,125	Decker Flat	HNFH	CWT 10/28/44
A	I	651,140	Decker Flat	HNFH	None
	Subtotal	1,862,376			
H	Il	268,928	Little Salmon A.	HNFH	None
H	Il	39,175	Little Salmon P.	HNFH	CWT 10/26/32
H	II	855,130	Pehsimeroi	NSPR	None
H	Il	23,400	Pahsimeroi	NSPP	CWT 10/28/53
H	Il	189,409	Panther Creek	NSPR	None

Appendix B. Continued.

Strain	Ocean	No. of fish	Release site	Hatchery rearing	
A	II	23,900	Panther Creek	NSPP	CWT 10/28/51
A	II	24,600	Panther Creek	NSPR	CWT 10/28/52
A	II	110,942	Bruno"s Bridge	NSPP	None
A	II	45,800	Bruno's Bridge	NSPP	CWT 10/25/21
A	II	745,711	Decker Flat	HNFH	None
A	II	40,475	Decker Flat	HNFH	CWT 10/26/30
	Subtotal	2,367,470			
B		25,325	East Fork	HNFH	CWT 10/28/20
B	I	499,991	East Fork	HNFI-i	None
	Subtotal	525,316			
B	II	127,608	East Fork	HNFH	None
B	II	39,375	East Fork	HNFH	CWT 10/26/31
B	II	35,225	East Fork	HNFH	CWT 10/26/36
B	II	17,425	East Fork	HNFH	CWT 10/28/55
B	II	16,950	East Fork	HNFH	CWT 10/28/03
B	II	8,100	East Fork	HNFH	CWT 10/28/02

Appendix B. Continued.

<u>Strain</u>	<u>Ocean Age</u>	<u>No. of fish Released</u>	<u>Release site</u>	<u>Hatchery Rearing</u>	<u>Marks</u>
B	II	25,525	East Fork	HNFH	CWT 10/20/54
	Subtotal	270,208			
B	11I	54,625	Little Salmon R.	HNFH	CWT 10/28/06
B	111	97,175	Little Salmon R.	HNFH	CWT 10/28/07
B	11I	3,154	Little Salmon A.	HNFH	None
B	111	31,920	Slate Creek	MVSHc	None
B	III	10,764	Allison Creek	MVSH	None
B	11I	393,452	East Fork	HNFH	None
	Subtotal	531,090			

a HNFH=Hagerman National Fish Hatchery.

b NSPP=Niagara Springs Fish Hatchery.

Appendix C. Steelhead groups returning to the Clearwater River, 1987-88.

Strain	Ocean age	No. of fish released	Release site	Hatchery Rearing	Marks
B	1	23,350	Clearwater A.	ONFHa	CWT 10/28/56
B	[	24,275	Clearwater R.	ONFH	CWT 05/17/53
B	[	24,000	Clearwater Q.	ONFH	CWT 05/17/54
B	[	1,178,071	Clearwater A.	DNFH	None
B	1	49,675	South Fork	ONFH	CWT 05/17/29
B	1	1,306,516	South Fork	DNFH	None
B	[	204,662	Eldorado Creek	ONFH	None
B		165,483	Clear Creek	ONFH	None
	Subtotal	2,976,032			
B	1[	1,035,573	Clearwater R.	D ~ H	None
B	I[	145,206	Clear Creek	ONFH	None
B	I[	95,286	Newsome Creek	ONFH	None
B	II	42,235	Crooked River	ONFH	None
B	II	162,111	American River	ONFH	None
B	1[	121,284	Eldorado Creek	DNFH	None
	Subtotal	1,601,695			

Appendix C. Continued.

Str2in	Ocean <u>age</u>	No. of fish released .	<u>Release site</u>	Hatchery rearing	<u>Marks</u>
B	[11	40,325	Clearwater P.	DNFH	CWT 10/25/16
B	[1I	37,325	Clearwater A.	ONFH	CWT 10/25/17
B	[I1	39,525	Clearwater Q.	ONFH	CWT 05/13/35
B	[I1	1,088,701.	Clearwater ~.	ONFH	None
B	[11	2,363	Clearwater P.	ONFH	L <sup>i</sup> d clip, no CWT
B	[I1	506,930	South Fork	DNFH	None
B	[I1	246,123	South Fork	ONFH	none
	Subtotal	1,961,372			

73

a DNFH=Dworshak National Fish Hatchery

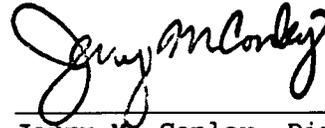
Appendix D. Coded wire tag tealhead groups released by Oregon Department of Fish and Wildlife, Washington Department of Wildlife and National Marine Fisheries Service, and recovered by Idaho anglers.

		Ocean No. of fish		OAt'fLEM	
H	1	27,162	Little Shee <sup>P</sup> Creek	OOFW	CWT 07/37/61
H	I	26,908	Wallowa Hatchery	00FW	CWT 07/37/62
H	I	28,094	Wallowa Hatchery	00FW	CWT 07/37/69
R	1	26,316	Wallowa Hatchery	[0FW	CWT 07/38/U1
H	I	26,117	Wallowa Hatchery	OOFW	CWT 07/38/02
R	I	20,038	Grand Ronda P.	WOW	CWT 69/33/06
R	I	20,234	Grand Ronde P.	WOW	CWT 63/33/49
A	I	20,244	Tucannon Q.	WOW	CWT 63/33/50
R	1	20,250	Tucannon Q.	WOW	CWT 63/33/51
A	I	20,136	Lyons Ferry Hatchery	WOW	CWT 63/38/36
R	I	20,639	Lyons Ferry Hatchery	WOW	CWT 69/38/37
H	I	20,506	Lyons Ferry Hatchery	WOW	CWT 63/38/38
A	1I	41,028	Grand Ponde P.	WOW	CWT 62/16/27
A	11	40,201	Grand Ronde P.	HUH	CWT 62/16/28
R	11	28,191	Lyons Ferry Hatchery	WOW	CWT 62/16/44
B	11	7,640	Columbia Q., Bonneville	NMFS	CWT 23/18/11

Submitted by:

Kent Ball  
Senior Fisheries Research Biologist

Approved by:



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Jerry M. Conley, Director



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Steven M. Huffaker, Chief  
Bureau of Fisheries



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Dexter Pitman  
Anadromous Fisheries Manager