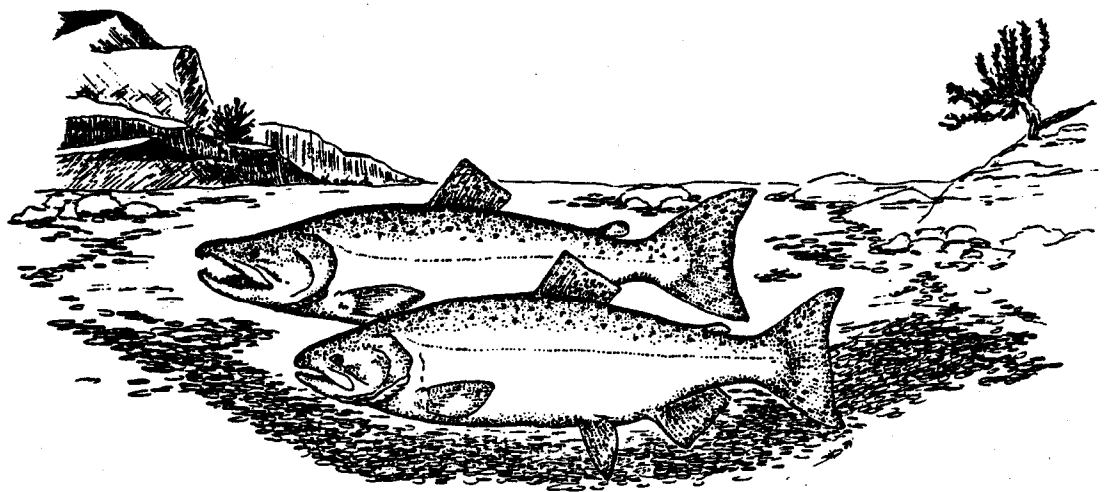


FISHERY RESEARCH



SALMON SPAWNING GROUND SURVEYS
Lower Snake River Compensation Plan
Fish Hatchery Evaluation Contract No.
14-16-0001-89501

Pacific Salmon Treaty Program
Award No. NA-88-ABH-00050



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June 1989

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ABSTRACT

Redd counts of chinook salmon Oncorhynchus tshawytscha in the Salmon River drainage have declined dramatically, down 961 from 1957 to 1980. However, since then redd count numbers have shown a sevenfold increase, and the downward trend appears to be reversing. Spring and summer chinook redd counts in both hatchery-influenced and wild and natural stream survey areas in the Salmon River drainage totaled 2,612 in 1988, up 23% from last year.

Salmon River redd count numbers showed the largest gain in wild and natural survey areas for both spring and summer chinook. Spring chinook redd counts in wild and natural areas more than doubled the 1987 total, and summer chinook redd counts were up slightly (31) from a year ago in wild areas.

The Clearwater River drainage experienced a 61 decrease in total spring chinook redd counts in 1988. Although natural chinook redd count numbers were down this year, the 1988 total was still above the latest five-year average and appears to be stabilizing at this reduced level.

Redd counts in hatchery-influenced streams of the Clearwater drainage also indicated a stabilization during the last seven years. Redd counts from the South Fork Clearwater River drainage continued to show the greatest impact in the drainage for hatchery-influenced areas. This is primarily due to the South Fork Clearwater River outplant program and the Red River rearing pond program. The South Fork Clearwater River contributed almost 59% of the total number of redds counted in the entire Clearwater River drainage for 1988.

Four sockeye salmon Oncorhynchus nerka were located on two redds near the Sandy Beach boat ramp on Redfish Lake. One sockeye was captured at the Sawtooth Hatchery weir and was released in Redfish Lake.

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INTRODUCTION

Each year, fishery biologists survey major chinook salmon Oncorhynchus tshawytscha spawning areas in their respective regions to count redds constructed in trend areas and to obtain length frequency, sex, and age composition data. Current redd counts and long-term trends are made available in this report for trend analysis and management and research use.

OBJECTIVES

To monitor chinook and sockeye salmon spawning escapements in trend areas and to obtain sex and age composition of selected individual runs'.

METHODS

Chinook salmon redd counts have been established on selected Clearwater and Salmon River drainage streams to index general trends in chinook salmon spawning escapement. Single peak count surveys are timed to coincide with the period of maximum spawning activity on a particular stream. Each survey transect is assigned a yearly target date based on historic observation and the most efficient observation method. Redd count observations use low flying, fixed-wing aircraft, helicopters, or ground surveys conducted on foot, depending on the best visual technique for a particular stream reach.

In recent years, new redd count areas have been added by fishery biologists. These sites have not been established for trend count purposes but are categorized as nontraditional trend count areas with which comparisons can be made in future years.

Carcass surveys of chinook salmon are conducted on selected streams to identify sex ratios and age compositions of various stocks.

Traditionally, sockeye salmon returning to Redfish Lake in the upper Salmon River drainage were counted from a small boat. The trend area on Redfish Lake includes approximately 0.8 km of shoal near Sandy Beach on the eastern shore.

Sockeye salmon were counted at a weir installed at Redfish Lake Creek from 1954 to 1966. Ground counts on Redfish Lake have been conducted since 1981. This year, no temporary weir was used at the lake outlet to count returning adult fish due to' extremely low, warm water.

In 1988, three surveys were conducted on Redfish Lake to observe natural spawning activity.

RESULTS

Salmon River Drainage

Spring and summer chinook salmon redd count numbers have dropped substantially in the Salmon River drainage, from a high of 9,635 redds (combined spring and summer chinook) in 1957 to a low of 335 redds in 1980. Counts have increased since then to 2,612 redds observed in 1988 (Tables 1-4). Both spring and summer chinook stocks have shown gradual increases in recent years (Figures 1 and 2).

In 1988, total spring chinook salmon redd counts increased 47% over the 1987 counts. Redd counts more than doubled the 1987 total in wild and natural areas, with increases shown in all five stream sections surveyed (Table 2). This year's total was the highest recorded count for the last 10 years. Salmon River redd counts in hatchery-influenced streams were down 16% from a year ago (Table 1).

Redd counts above the Sawtooth Hatchery weir have been affected by the removal of two-thirds of the run for artificial spawning since 1981. In 1988, 552 salmon were released above the trap to spawn naturally.

Summer chinook salmon redd counts were also up slightly (3%) in wild and natural Salmon River stream areas over the 1987 count (Table 3). This year's total in wild and natural areas was the highest number observed since 1978, even though the Loon Creek redd count was timed early.

Hatchery-influenced summer chinook salmon redd counts also rose slightly (4%) in the Salmon River drainage this year over 1987 (Table 4). After an all-time low of 140 redds counted in 1980 in hatchery-influenced streams, the trend appears to be reversing and indicates a steady increase during the last eight years (Figure 2).

Summer chinook redd counts above the adult trap on the South Fork Salmon River have been reduced due to adult fish being artificially spawned at the trap site since 1980. In 1988, 850 fish were released above the weir to spawn naturally.

Length frequency and age composition of 552 summer chinook salmon kelts recovered in the South Fork Salmon River drainage are reported in Tables 5, 6 and 7. Length frequency data on 48 chinook salmon kelts from Johnson Creek (Table 6) and another 108 salmon kelts from the Secesh River and Lake Creek (Table 7) were collected by members of the Nez Perce Tribe. Similarly, spring chinook salmon kelt information listed in Table 8 was compiled from data collected by Idaho Fish and Game personnel and members of the Nez Perce Tribe on tributaries of the Middle Fork Salmon River.

Redd counts in unclassified chinook salmon streams (Table 9) showed little change from 1987 totals, but a forest fire on the Middle Fork Salmon River prevented surveying redds in Camas Creek this year.

Table 1. Salmon River drainage hatchery-influenced spring chinook salmon redd counts, 1957-1988.

Year	Alturas Lake Creek	Lemhi River	Upper East Fork ^a	Upper Salmon River ^b	Upper Valley Creek	Upper Yankee Fork	Total	Five- year average
1988	1	179	27	191	12	1	411	
1987	9	155	59	237	31	0	491	
1986	14	157	NC	134	13	15	333	306
1985	7	93	NC	76	1	5	182	
1984	3	35	NC	71	6	NC	115	
1983	27	50	121	161	8	0	367	
1982	9	163	28	42	1	0	243	
1981	4	126	76	363	2	16	587	360
1980	7	47	6	47	6	0	113	
1979	29	154	57	205	25	18	488	
1978	303	796	841	1,707	141	33	3,821	
1977	85	474	168	698	18	6	1,449	
1976	16	241	75	378	NC	40	750	1,735
1975	60	366	348	509	189	60	1,532	
1974	42	215	346	338	127	54	1,122	
1973	153	485	665	414	125	104	1,946	
1972	143	507	448	748	182	115	2,143	
1971	50	407	370	619	89	57	1,592	1,716
1970	68	371	468	432	202	67	1,608	
1969	41	360	174	313	350	53	1,291	
1968	110	589	622	637	330	234	2,522	
1967	74	804	614	943	253	250	2,938	
1966	119	819	511	699	219	112	2,479	2,398
1965	101	454	138	472	204	77	1,446	
1964	80	1,151	405	706	199	146	2,607	
1963	86	364	646	638	141	128	2,003	
1962	138	1,455	334	638	157	60	2,782	
1961	30	1,871	818	813	227	192	3,951	2,494
1960	33	1,434	122	720	83	43	2,435	
1959	18	524	223	502	24	10	1,301	
1958	107	675	427	535	75	38	1,857	
1957	110	1,023	572	1,118	225	47	3,095	

^aReduced by trapping at East Fork weir, 1984-1988

^bReduced by trapping at Sawtooth Hatchery, 1981-1988

Table 2. Salmon River drainage wild and natural spring chinook salmon redd counts, 1957-1988.

Year	Bear Valley Creek	Elk Creek	Marsh Creek Drainage	Sulphur Creek	Upper Big Creek	Total	Five-year average
1988	283	330	217	41	101	972	
1987	102	149	150	11	36	448	
1986	74	55	101	65	67	362	463
1985	134	28	108	10	70	350	
1984	55	27	60	0	42	184	
1983	56	38	33	8	27	162	
1982	39	9	40	3	7	98	
1981	60	23	63	7	22	175	134
1980	15	8	9	2	4	38	
1979	69	49	47	15	15	195	
1978	184	208	270	64	95	821	
1977	129	86	98	5	9	327	
1976	76	61	48	14	22	221	517
1975	215	169	201	50	77	712	
1974	130	108	210	30	28	506	
1973	287	369	518	78	96	1,348	
1972	221	212	312	71	60	876	
1971	108	173	281	58	32	652	1,059
1970	334	302	456	93	68	1,253	
1969	356	349	235	138	90	1,168	
1968	574	483	466	142	90	1,755	
1967	445	420	650	134	67	1,716	
1966	534	525	406	142	127	1,734	1,618
1965	301	203	404	43	75	1,026	
1964	576	425	709	97	51	1,858	
1963	460	654	372	332	181	1,999	
1962	484	426	345	169	231	1,655	
1961	629	384	546	239	382	2,180	1,656
1960	386	346	316	79	159	1,286	
1959	381	516	95	100	69	1,161	
1958	341	410	262	131	140	1,284	
1957	791	398	458	381	233	2,261	

Table 3. Salmon River drainage wild and natural summer chinook salmon redd counts, 1957-1988.

Year	Loon Creek	Secesh River Lake Creek	Lower Salmon River	Lower Valley Creek	Lower East Fork	Total	Five-Year average
1988	5 ^a	155	106	33	76	375	
1987	23	121	118	59	42	363	
1986	21	115	104	16	70	326	291
1985	28	105	126	1	22	282	
1984	4	21	51	15	16	107	
1983	7	98	111	28	27	271	
1982	23	65	39	8	14	149	
1981	30	53	75	17	43	218	150
1980	9	20	11	4	0	44	
1979	NC	20	NC	15	33	68	
1978	29	91	349	219	NC	688	
1977	62	27	94	63	136	382	
1976	31	17	44	43	39	174	360
1975	32	10	45	80	38	205	
1974	34	21	200	45	49	349	
1973	78	74	224	77	138	591	
1972	150	87	412	39	161	849	
1971	79	80	220	47	149	575	586
1970	43	63	150	41	123	420	
1969	110	104	120	22	138	494	
1968	135	58	223	63	235	714	
1967	96	140	365	79	234	914	
1966	49	140	390	184	216	979	926
1965	166	134	201	57	131	689	
1964	361	181	415	71	306	1,334	
1963	261	163	195	50	265	934	
1962	157	292	467	115	195	1,226	
1961	131	198	356	162	198	1,045	1,266
1960	334	524	818	141	303	2,120	
1959	123	285	336	70	192	1,006	
1958	193	478	362	47	NC	1,080	
1957	425	344	2,406	331	183	3,689	

^aGround count timed early; forest fire prevented aerial survey count later.

Table 4. Salmon River drainage hatchery-influenced summer chinook salmon redd counts, 1957-1988.

Year	Johnson Creek	South Fork Salmon River ^a	Total	Five-Year average
1988	137	717	854	
1987	72	752	824	
1986	53	289	342	520
1985	75	323	398	
1984	17	165	182	
1983	63	185	248	
1982	37	111	148	
1981	45	126	171	172
1980	24	116	140	
1979	36	115	151	
1978 ^b	113	251	364	
1977	81	226	307	
1976	68	241	309	322
1975	69	238	307	
1974	107	218	325	
1973	271	586	857	
1972	220	577	797	
1971	183	421	604	765
1970	130	527	657	
1969	273	636	909	
1968	127	515	642	
1967	286	902	1,188	
1966	110	980	1,090	1,025
1965	116	656	772	
1964	310	1,124	1,434	
1963	266	1,057	1,323	
1962	295	1,589	1,884	
1961	207	1,058	1,265	1,779
1960	517	2,306	2,823	
1959	294	1,305	1,599	
1958	269	1,236	1,505	
1957	349	2,812	3,161	

^aReduced by trapping at South Fork Salmon River weir site, 1980-1988.

^bOnset of hatchery influence.

Table 5. Length frequency of summer chinook salmon carcasses recovered on South Fork Salmon River spawning ground surveys, 1988^a.

Fork length (in)	Males			Fork length (in)	Females		
	Total number recovered	% total	Age class		Total number recovered	% total	Age class
19	0	0	Jacks	19	0	0	
20	1	0.6	N=6	20	0	0	N=1
21	2	1.3	3.8%	21	0	0	0.5%
22	2	1.3		22	0	0	
23	1	0.6		23	0	0	
24	0	0		24	1	0.5	
25	0	0		25	1	0.5	
26	0	0	4 Years	26	0	0	
27	2	1.3	Old	27	0	0	
28	6	3.8	N=19	28	0	0	N=10
29	1	0.6	12.3%	29	1	0.5	5.11
30	5	3.2		30	6	3.1	
31	5	3.2		31	2	1.0	
32	13	8.4		32	14	7.1	
33	5	3.2		33	14	7.1	
34	6	3.8		34	30	15.3	
35	18	11.7	5 Years	35	64	32.7	
36	16	10.4	Old	36	18	9.2	
37	16	10.4	N=129	37	33	16.8	N=185
38	12	7.8	83.4%	38	5	2.6	94.4%
39	20	13.0		39	6	3.1	
40	10	6.5		40	1	0.5	
41	9	5.8		41	0	0	
42	1	0.6		42	0	0	
43	3	1.9		43	0	0	
Total	154			Total	196		

^aOf the 350 kelts measured, 11 were adipose clipped and all were found below the South Fork weir in 1988.

Table 6. Length frequency of summer chinook salmon carcasses recovered on Johnson Creek spawning ground surveys, 1988^a.

Fork length (in)	Males			Fork length (in)	Females		
	Total number recovered	% total	Age class		Total number recovered	% total	Age class
19	1	2.4	Jacks	19	0	0	
20	1	2.4	N=4	20	0	0	N=0
21	1	2.4	9.8%	21	0	0	
22	1	2.4		22	0	0	
23	0	0		23	0	0	
24	0	0		24	0	0	
25	0	0		25	0	0	
26	0	0	4 Years	26	0	0	
27	0	0	Old	27	0	0	
28	3	7.3	N=8	28	0	0	N=1
29	1	2.4	19.5%	29	0	0	2.4%
30	3	7.3		30	1	2.4	
31	1	2.4		31	0	0	
32	2	4.8		32	3	7.1	
33	2	4.8		33	2	4.8	
34	2	4.8		34	5	11.9	
35	6	14.6	5 Years	35	11	26.2	
36	2	4.8	Old	36	7	16.7	
37	7	17.1	N=29	37	8	19.0	N=41
38	2	4.8	70.7%	38	5	11.9	97.6%
39	4	9.8		39	0	0	
40	2	4.8		40	0	0	
41	0	0		41	0	0	
42	0	0		42	0	0	
43	0	0		43	0	0	
Total	41			Total	42		

^aLength frequencies of 48 summer chinook salmon were collected by members of the Nez Perce Tribe (Kucera and Cowley 1988). The remainder were measured by Idaho Department of Fish and Game personnel (D. Anderson, IDFG, personal communication).

Table 7. Length frequency of summer chinook salmon carcasses recovered on Secesh River and Lake Creek spawning ground surveys, 1988^a.

Fork length (in)	Males			Fork length (in)	Females		
	Total no. recovered	% total	Age class		Total no. recovered	% total	Age class
19	0	0		19	0	0	
20	1	2.0	Jacks	20	0	0	
21	2	4.1	N=5	21	0	0	N=0
22	1	2.0	10.2%	22	0	0	
23	1	2.0		23	0	0	
24	0	0		24	0	0	
25	0	0		25	0	0	
26	1	2.0		26	2	2.9	
27	0	0	4 Years	27	0	0	
28	0	0	Old	28	0	0	
29	4	8.2	N=12	29	1	1.4	N=7
30	3	6.1	24.5%	30	2	2.9	10.0%
31	4	8.2		31	2	2.9	
32	4	8.2		32	5	7.1	
33	2	4.1	5 Years	33	3	4.3	
34	2	4.1	Old	34	12	17.1	
35	3	6.1	N=32	35	19	27.1	N=63
36	2	4.1	65.3%	36	12	17.1	90.0%
37	1	2.0		37	7	10.0	
38	3	6.1		38	3	4.3	
39	7	14.3		39	2	2.9	
40	5	10.2		40	0°	0	
41	2	4.1		41	0	0	
42	1	2.0		42	0	0	
Total	49		Total	70			

^aLength frequencies of 108 summer chinook salmon kelts were collected by members of the Nez Perce Tribe (Kucera and Cowley 1988). The remainder were measured by Idaho Fish and Game personnel (D. Anderson, IDFG, personal communication).

Table 8. Length frequency of spring chinook salmon carcasses recovered on Big Creek^a, Elk Creek, Sulphur Creek, and Bear Valley Creek (Middle Fork Salmon River) spawning ground surveys, 1988.

Fork length (in)	Males			Fork length (in)	Females		
	Total no. recovered	2 total	Age class		Total no. recovered	2 total	Age class
19	0	0		19	0	0	
20	0	0	Jacks	20	0	0	
21	0	0	N=1	21	0	0	N=0
22	0	0	0.9%	22	0	0	
23	0	0		23	0	0	
24	1	0.9		24	0	0	
25	1	0.9		25	0	0	
26	2	1.9		26	1	0.5	
27	0	0	4 Years	27	0	0	
28	1	0.9	Old	28	0	0	
29	3	2.9	N=11	29	4	1.9	N=12
30	3	2.9	10.62	30	4	1.9	5.8%
31	1	0.9		31	3	1.5	
32	1	0.9		32	8	3.9	
33	0	0		33	36	17.5	
34	4	3.8		34	42	20.4	
35	1	0.9	5 Years	35	46	22.3	
36	4	3.8	Old	36	33	16.0	
37	5	4.8	N=92	37	18	8.7	N=194
38	7	6.7	88.5%	38	9	4.4	94.2%
39	17	16.3		39	2	0.9	
40	14	13.5		40	0	0	
41	16	15.4		41	0	0	
42	10	9.6		42	0	0	
43	9	8.7		43	0	0	
44	2	1.9		44	0	0	
45	1	0.9		45	0	0	
46	1	0.9		46	0	0	
Total	104			Total	206		

^aData collected and reported by Kucera and Cowley, 1988.

Table 9. Salmon River drainage unclassified chinook salmon spawning ground surveys, 1972-1988. Camas Creek is defined as a wild stream and Yankee Fork as a hatchery-influenced system.

	Camas Creek	Lower Yankee Fork	West Fork Yankee Fork
1988	NC ^a	1	16
1987	32	5	12
1986	11	2	6
1985	21	0	1
1984	11	NC	0
1983	38	0	7
1982	33	1	0
1981	65	4	19
1980	17	0	2
1979	15	NC	13
1978	148	27	98
1977	84	12	37
1976	61	3	11
1975	128	35	55
1974	172	28	20
1973	358	71	86
1972	211	78	117

^aForest fire prevented ground count in 1988.

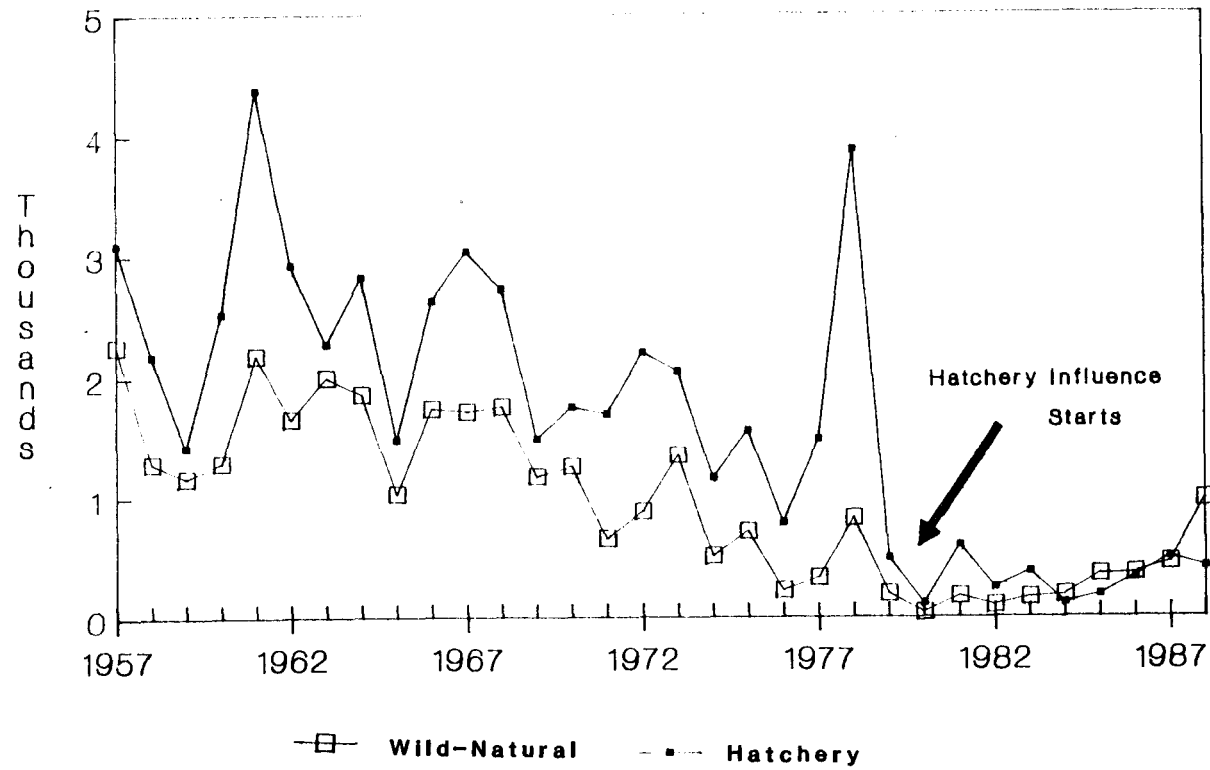


Figure 1. Salmon River spring chinook salmon redd counts from wild-natural and hatchery-influenced streams, 1957-1988.

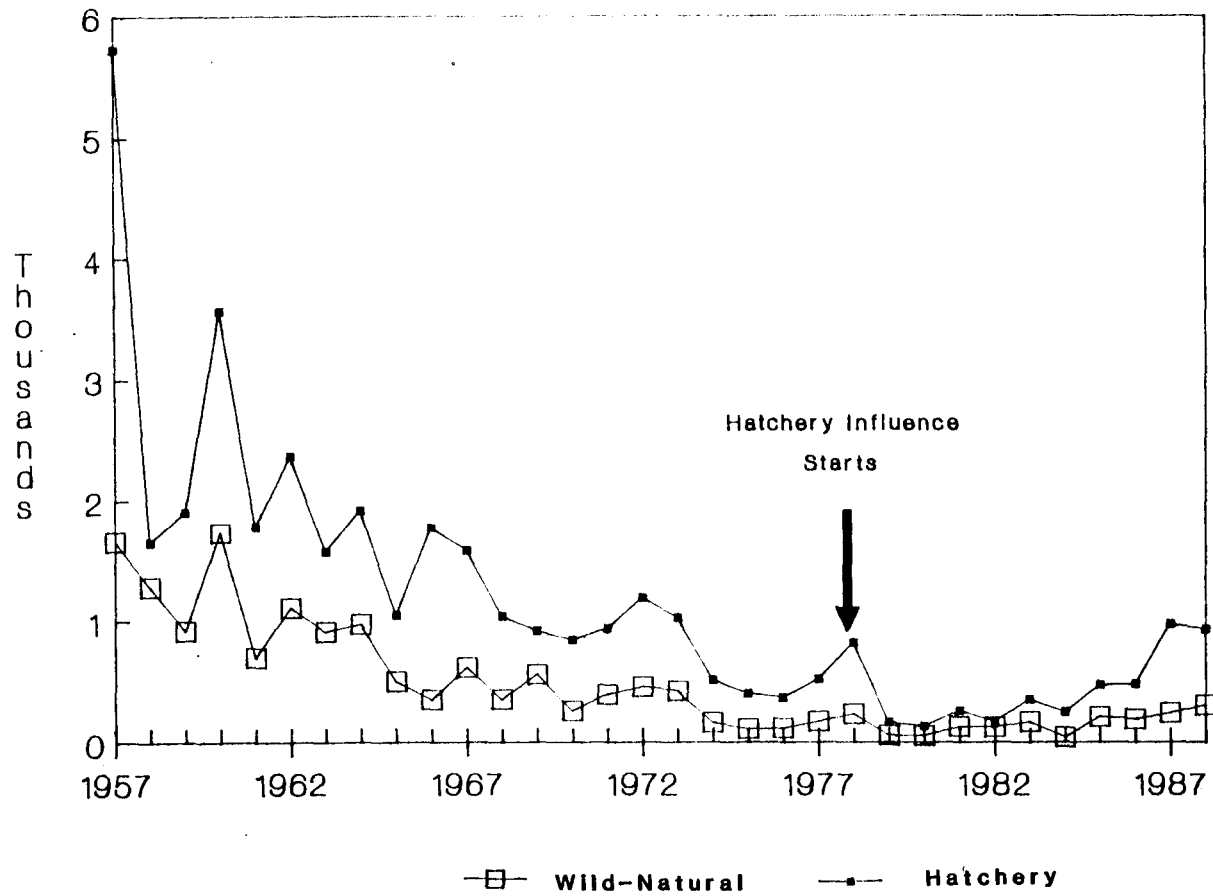


Figure 2. Salmon River summer chinook salmon redd counts from wild-natural and hatchery-influenced streams, 1957-1988.

Nontraditional trend count areas in the Salmon River drainage surveyed for chinook salmon redds more than doubled the 1987 total (Table 10). Chamberlain Creek and West Fork Chamberlain Creek in the Middle Fork Salmon River drainage were surveyed annually in the late 1950s and early 1960s. The two surveys were dropped in 1966 but have been reinstated in recent years.

Clearwater River Drainage

Natural spring chinook salmon redd counts in the Clearwater River drainage have dropped in the last 15 years (Table 11). The recent five-year average is 66% lower than the five-year average for the 1969-1973 period. Redd count numbers since 1980 appear to have stabilized at a reduced level (Figure 3). Redd counts in natural areas totaled '58 in 1988, down 8% from last year.

Redd counts in hatchery-influenced Clearwater River streams was 6% lower than 1987 (Table 12). However, the recent overall five-year average is still the highest on record for the drainage.

The South Fork Clearwater River drainage continued to show the greatest benefit from hatchery influence. In 1988, the South Fork Clearwater River contributed almost 59% of all redds counted in the Clearwater River drainage for both hatchery-influenced and natural streams. Redd count numbers in hatchery-influenced areas indicated a stabilizing trend during the last seven years (Figure 3).

In 1987, a permanent trapping facility began operation on Red River just downstream of the South Fork Red River and has shown an impact on the number of redds observed above the weir. In 1988, 158 adults were released above the weir to spawn naturally.

Length frequency and age composition data of 394 spring chinook salmon kelts recovered from Red River's hatchery rack returns are listed in Table 13.

Nontraditional chinook salmon redd counts in the Clearwater River drainage totaled 136 in 1988, a 25% increase over last year (Table 14).

SOCKEYE SALMON

Three surveys were conducted on September 24, October 8, and October 29, 1988. Four adult sockeye (two males and two females) were observed on two redds near Sandy Beach.

One male sockeye salmon was captured at the Sawtooth Hatchery weir during the chinook salmon trapping season in the fall, 1988. This fish was transported and released in Redfish Lake. In October, another male sockeye was observed below the hatchery weir. Sawtooth Hatchery Superintendent Tom

Table 10. Nontraditional chinook salmon redd counts, Salmon River drainage, 1985-1988.

Stream	Section	Year			
		85	86	87	88
Salmon River					
Alturas Lake Creek	Cabin Cr. bridge to Diversion Dam	0	0	1	0
Alturas Lake Creek	Diversion Dam to Alturas Lake	0	0	0	2
Alturas Lake Creek	Alturas Lake Inlet to Alpine Creek	1	1	5	0
Salmon River	Breckenridge Diversion Dam to mouth of Pole Creek	4	0	1	2
Salmon River	Mouth of Pole Creek to headwaters	0	0	0	0
Pole Creek	Mouth to Diversion screen	1	0	0	0
Middle Fork Salmon River	Mouth of Loon Creek to mouth of Big Creek ^a	-	-	1	
Sulphur Creek	Ranch upstream to island	-	-	-	41
Chamberlain Creek	Mouth of West Fork to Flossie Creek	9	NC	12	20
West Fork Chamberlain Creek	Mouth to Game Creek	16	NC	12	6
<u>East Fork of South Fork Salmon River</u>					
Johnson Creek	Mouth of Whiskey Creek to head of canyon	-	-	0	0
Sand Creek	Sand Creek from mouth to bridge	-	-	0	0

^aForest fire prevented aerial survey in 1988.

Table 11. Clearwater River drainage natural spring chinook salmon redd counts, 1966-1988.

Year	Selway River	Bea Creek	Running Creek	Whitecap Creek	Moose Creek	Total	Five-Year average
1988	34	10	2	5	7	58	
1987	36	9	4	6	8	63	
1986	30 ^a	10	NC	7	9	56	57
1985	15 ^b	NC	NC	NC	NC	--	
1984	30	6	NC	6	7	49	_____
1983	26	8	NC	4	6	44	
1982	38	8	NC	3	5	54	
1981	47	8	NC	4	6	65	50
1980	40	7	1	3	4	55	
1979	21	3	0	2	4	30	_____
1978	125	13	6	NC	17	161	
1977	97	18	2	1	23	141	
1976	58	14	3	4	15	94	105
1975	21	5	0	1	4	31	
1974	66	10	4	2	15	97	_____
1973	261	26	21	7	32	347	
1972	175	25	11	8	13	232	
1971	55	14	8	NC	NC	77	168
1970	65	19	10	4	NC	98	
1969	57	6	21	NC	NC	84	_____
1968	16	7	4	NC	NC	27	
1967	22	7	NC	NC	NC	29	
1966	36	8	NC	NC	NC	44	

^aRedd count number corrected from previous report (Cochnauer and Hall-Griswold 1988).

^bGround count only from Little Clearwater River to Magruder Crossing.

Table 12. Clearwater River hatchery-influenced spring chinook salmon.

Year	Lochsa River drainage			South Fork drainage							Clearwater River drainage	
	Crooked Fork	Brushy Fork	Total	Five-year average	Newsome Creek	Crooked River	Red ^a River	American River	Total	Five-year average	Total	Five-year average
1988	42	14	61		20	27	111	12	170		231	
1987	28	10	38		20	17	140	31	208		246	
1986	30	11	41	48	7	9	155	14	185	204	226	251
1985	47	14	61		2	10	222	23	257		318	
1984	28	9	37	-----	1	22	175	NC	198	-----	235	-----
1983	7	6	13		7	12	193	9	221		234	
1982	34	17	51		5	2	159	21	187		238	
1981	27	25	52	32	3	3	80	12	98	118	150	150
1980	16	10	26		5	8	38	7	58		84	
1979	6	12	18	-----	6	2	20		28	-----	46	-----
1978	37	25	62		22	40	64		126		188	
1977	80	15	95		26	71	62		159		254	
1976	49	13	62	56	5	13	15		33	79	95	136
1975	31	4	35		6	33	20		59		94	
1974	22	6	28	-----	3	5	12		20	-----	48	-----
1973	60		60		-	-	-	-	-		-	
1972	32		32		-	-	-	-	-		-	
1971	1		1	48	-	-	-	-	-		-	
1970	34		34		-	-	-	-	-		-	
1969	112		112	-----	-	-	-	-	-		-	
1968	15		15		-	-	-	-	-		-	
1967	0		0		-	-	-	-	-		-	
1966	7		7	12 ^b	-	-	-	-	-		-	
1965	24		24		-	-	-	-	-		-	

^aReduced by adult trapping at Red River adult trap since 1987.

^b4 year average

Table 13. Length frequency of spring chinook salmon carcasses recovered from Red River adult trap, 1988.

Fork length (in)	Males			Fork length (in)	Females		
	Total no. recovered	% total	Age class		Total no. recovered	% total	Age class
15	0	0		15	0	0	
16	0	0		16	0	0	
17	0	0		17	0	0	
18	0	0	Jacks	18	0	0	
19	1	0.5	N=3	19	0	0	N=0
20	0	0	1.6%	20	0	0	0%
21	1	0.5		21	0	0	
22	0	0		22	0	0	
23	0	0		23	0	0	
24	1	0.5		24	0	0	
25	0	0		25	0	0	
26	1	0.5	4 Years	26	2	1.0	
27	1	0.5	Old	27	7	3.3	
28	3	1.6	N=41	28	13	6.2	N=61
29	8	4.3	22.2%	29	12	5.7	29.1%
30	10	5.4		30	15	7.2	
31	18	9.7		31	12	5.7	
32	16	8.6		32	14	6.7	
33	9	4.9	5 Years	33	23	11.0	
34	22	11.9	Old	34	25	12.0	
35	29	15.7	N=141	35	39	18.7	N=148
36	26	14.1	76.2%	36	25	12.0	70.9%
37	15	8.1		37	13	6.2	
38	11	5.9		38	5	2.4	
39	7	3.8		39	4	1.9	
40	4	2.2		40	0	0	
41	2	1.1		41	0	0	
Total	185				209		

Table 14. Nontraditional chinook salmon redd counts, Clearwater River drainage, 1988.

Stream	Section	1987	1988
<u>Clearwater River</u>			
S.F. Red River	Schooner Cr. to Red River R.S.	0	0
Crooked Fork Creek	Mouth to Brushy Fork	12	12
	Brushy Fk. to Shotgun Cr.	36	59
	Shotgun Cr. to Boulder Cr.	4	5
	Boulder Cr. to Hopeful Cr.	NC	NC
Brushy Fork Creek	Mouth to Twin Cr.	14	10
	Twin Cr. to Spruce Cr.	12	19
White Sand Creek	Mouth to Big Flat Cr.	NC	NC
Lolo Creek	White Cr. bridge to uppermost	31	31
	K-Dam		
	Total	109	135

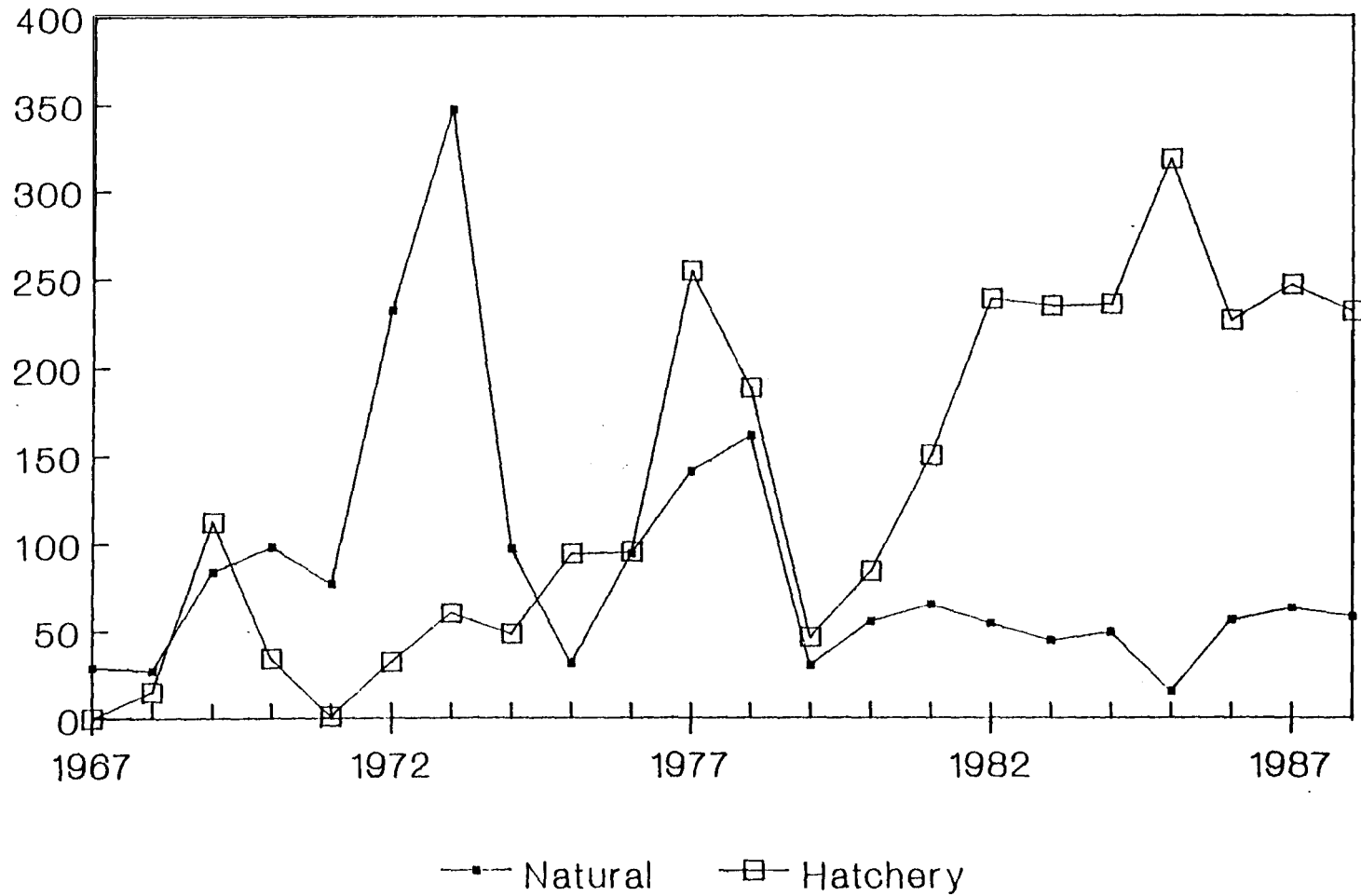


Figure 3. Clearwater River drainage chinook salmon redd counts from natural and hatchery-influenced streams, 1967-1988.

Rogers feels the fish may have been the same male trying to return to Alturas Lake Creek. No redd count surveys were conducted on either Redfish Lake Creek or Alturas Lake Creek in 1988.

APPENDIX A

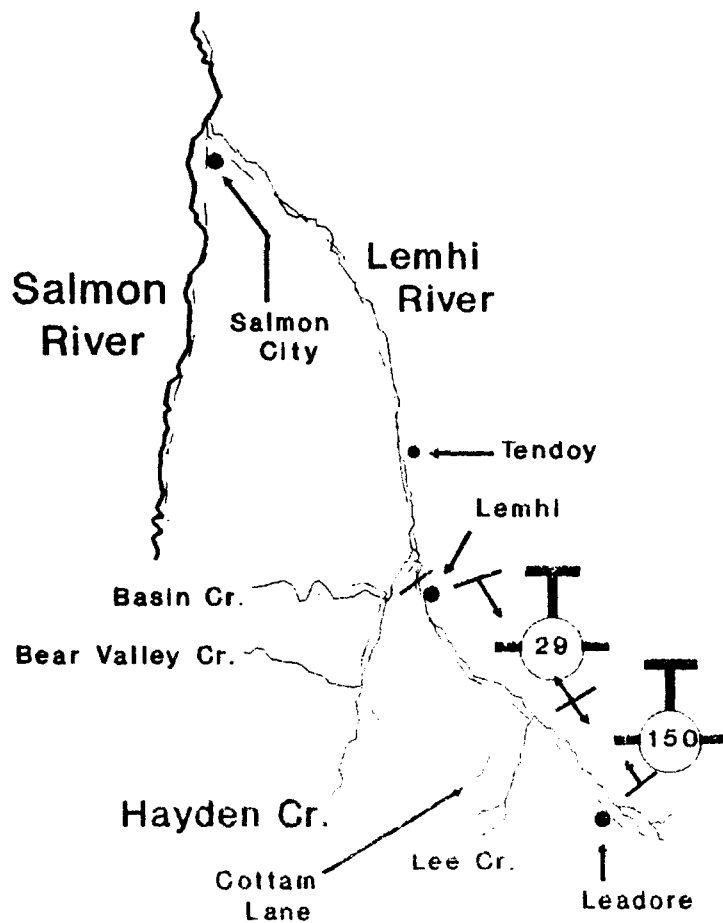
Appendix A. Salmon River drainage historic chinook salmon redd counts that are no longer included in official counts.

Year	Lower Big Creek	North Fork Salmon River	Herd Cree
1988	-	-	-
1987	23	-	-
1986	-	-	1
1985	-	-	1
1984	-	-	0
1983	-	-	7
1982	-	-	1
1981	-	-	9
1980	-	-	0
1979	-	-	2
1978	-	29	26
1977	-	31	6
1976	-	6	27
1975	-	14	11
1974	-	18	13
1973	-	55	47
1972	-	31	28
1971	52	53	49
1970	23	95	47
1969	72	155	43
1968	33	145	57
1967	94	66	32
1966	51	70	79
1965	83	5	31
1964	121	86	49
1963	220	71	202
1962	360	84	58
1961	160	144	283
1960	352	91	-
1959	217	121	-
1958	338	322	-
1957	535	-	-

APPENDIX

DRAINAGE Salmon River
STREAM Lemhi River
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 9/7/88
MAP SCALE 0.40 cm = 1 mile
OBSERVER Davis
REMARKS Helicopter



DRAINAGE Salmon River
 STREAM East Fork Salmon River
 OBSERVATION CONDITIONS Good
 TIMING Early On Time Late

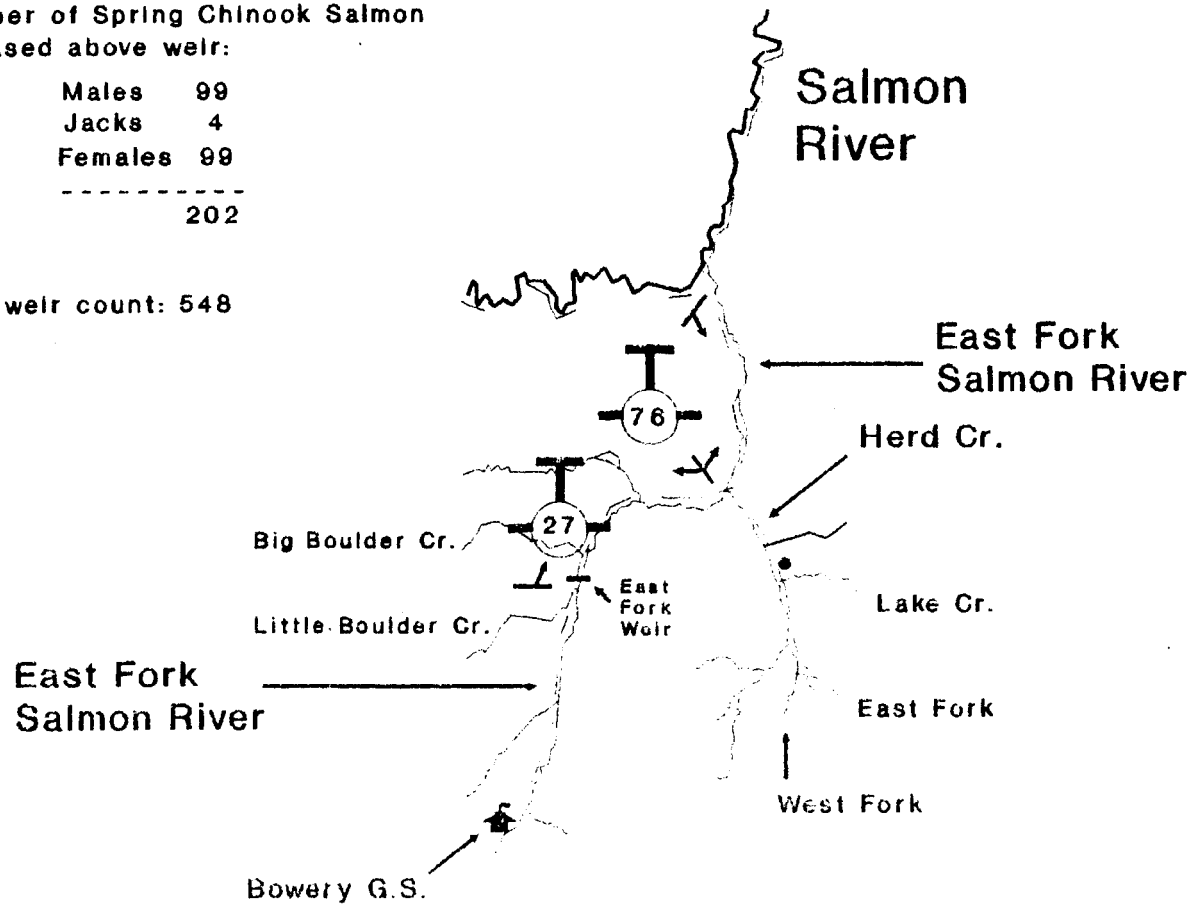
SURVEY DATE 9/7/88
 MAP SCALE 0.6 cm = 1 mile
 OBSERVER Davis
 REMARKS Helicopter

Number of Spring Chinook Salmon released above weir:

Males	99
Jacks	4
Females	99

	202

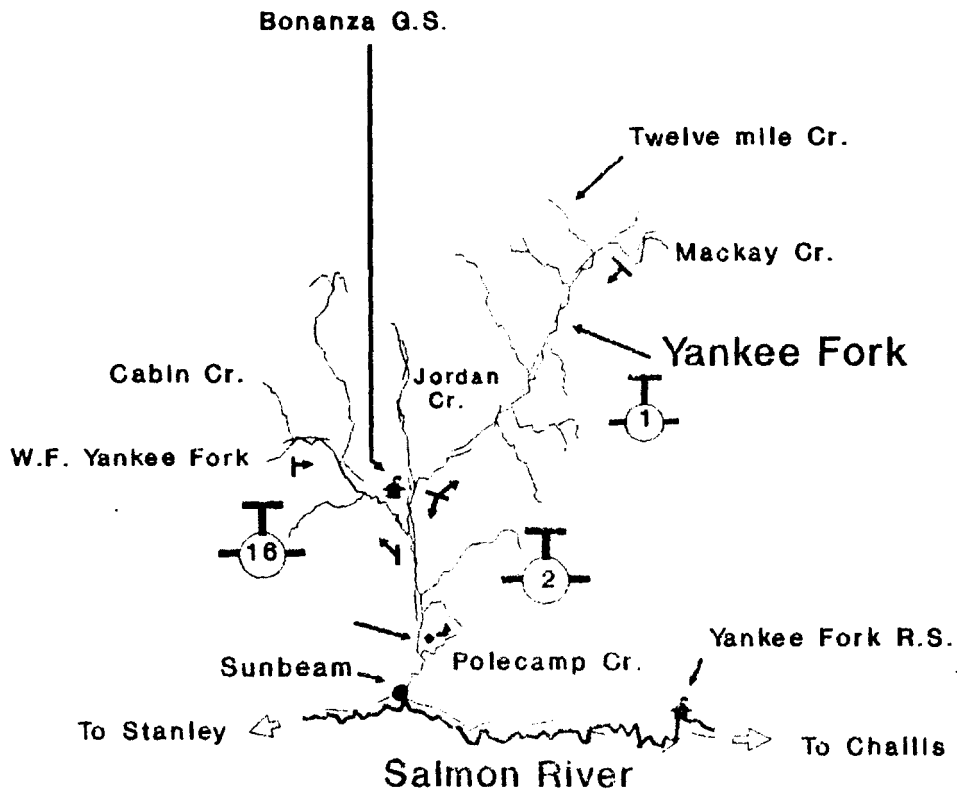
Total weir count: 548



DRAINAGE Salmon River
STREAM Yankee Fork
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

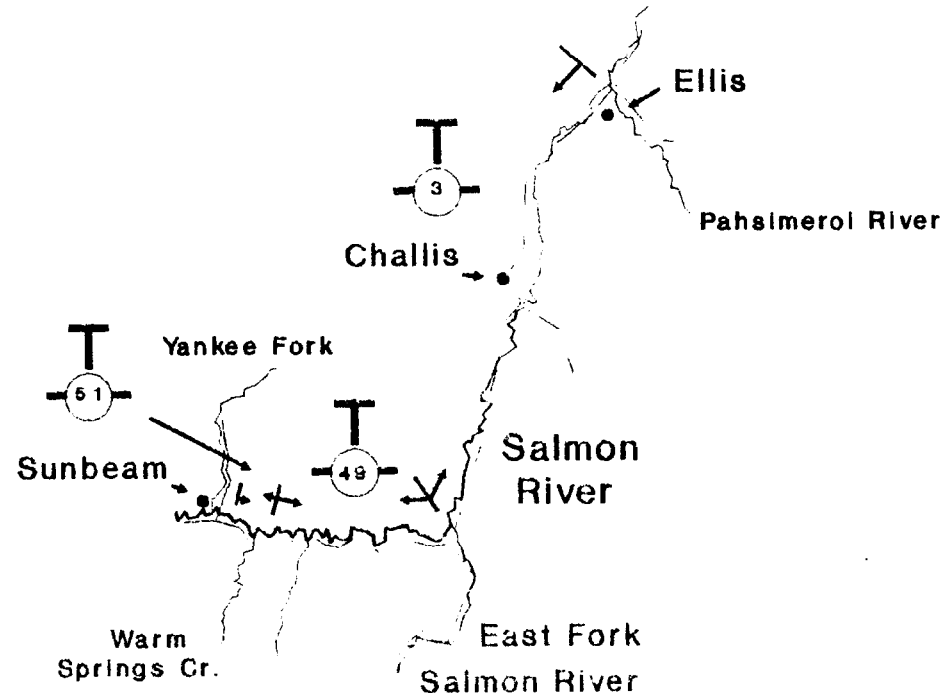
SURVEY DATE 9/7/88
MAP SCALE 0.70 cm = 1 mile
OBSERVER Davis
REMARKS Helicopter

28



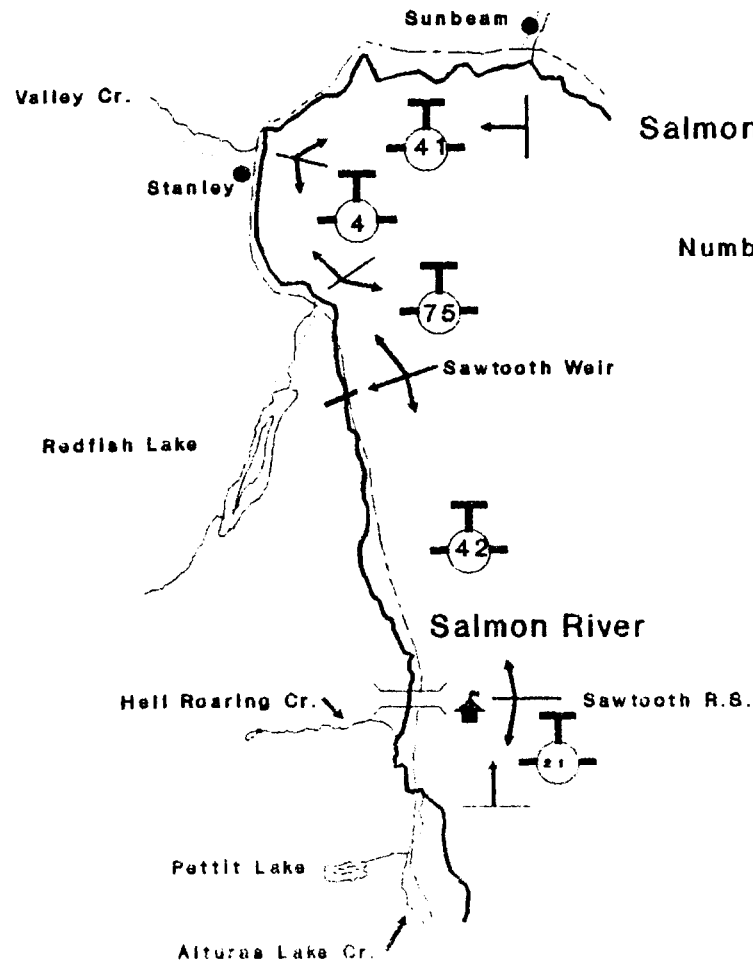
DRAINAGE Salmon River
STREAM Salmon River
OBSERVATION CONDITIONS Good
TIMING Early On Time Late
.....

SURVEY DATE 9/7/88
MAP SCALE 0.36 cm = 1 mile
OBSERVER Davis
REMARKS Helicopter



DRAINAGE Salmon River
 STREAM Salmon River
 OBSERVATION CONDITIONS Good
 TIMING Early On Time Late

SURVEY DATE 9/7/88
 MAP SCALE 0.78 cm = 1 mile
 OBSERVER Davis
 REMARKS Helicopter



Number of Spring Chinook released
above Sawtooth weir:

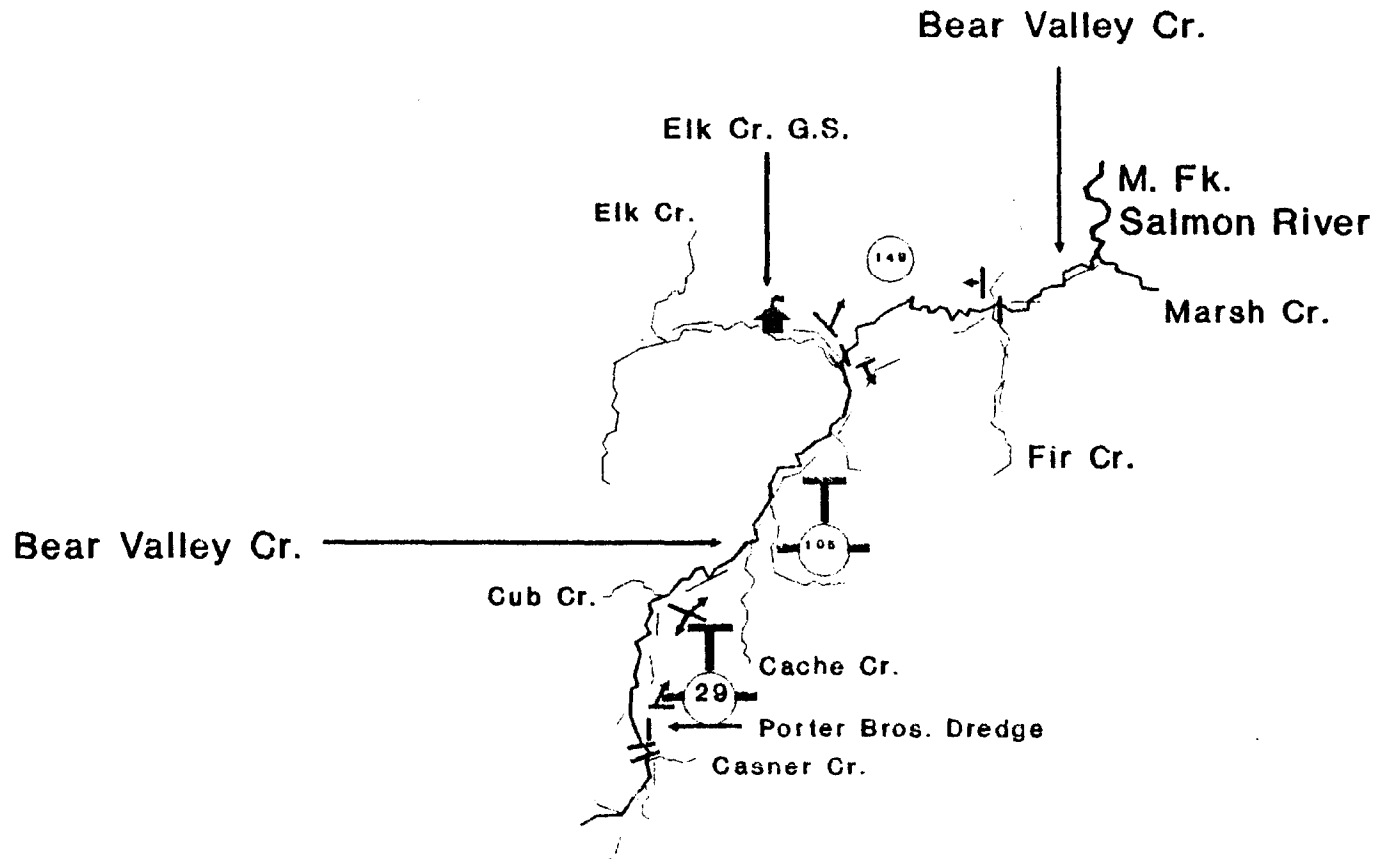
Males	218
Jacks	29
Females	305

	552

Total weir count: 1,485

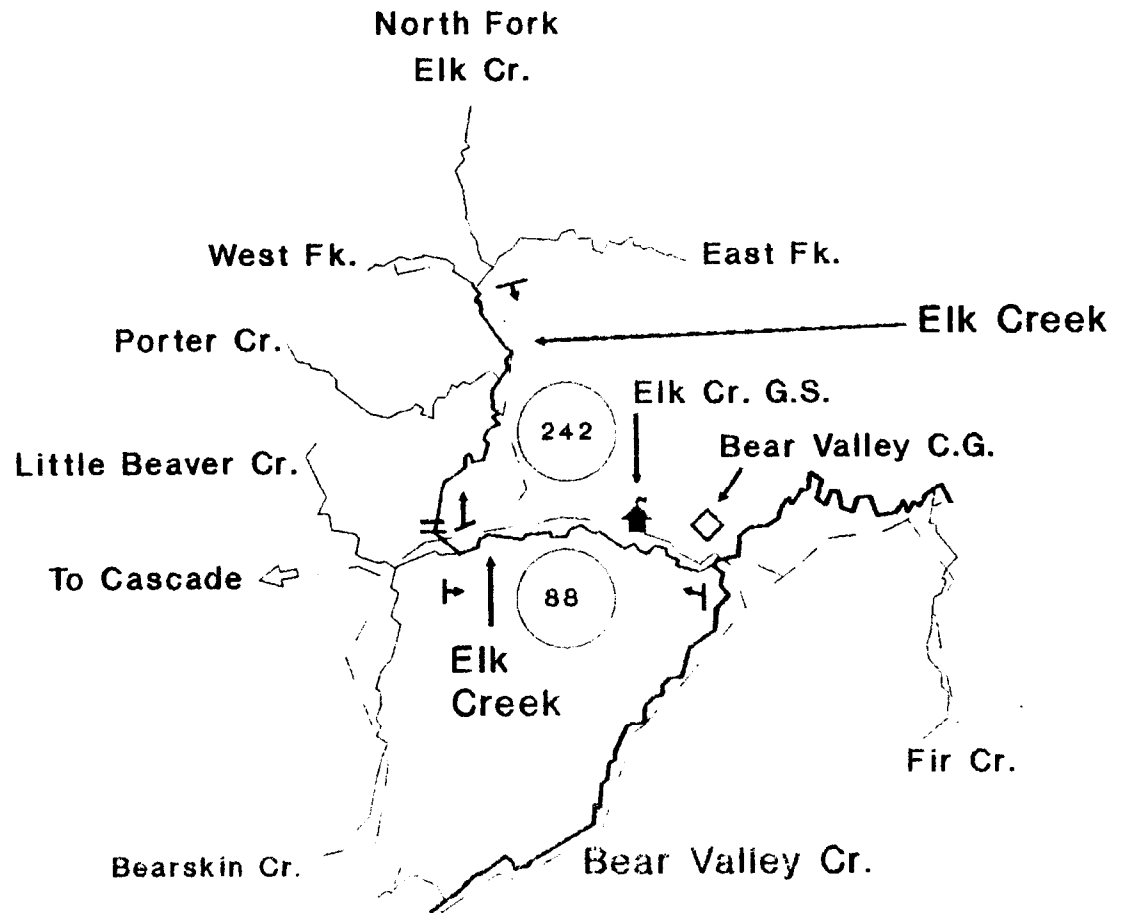
DRAINAGE Middle Fork Salmon River
STREAM Bear Valley Creek
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 8/25-29/88
MAP SCALE 0.90 cm = 1 mile
OBSERVER Anderson and Holubetz
REMARKS Helicopter and Ground



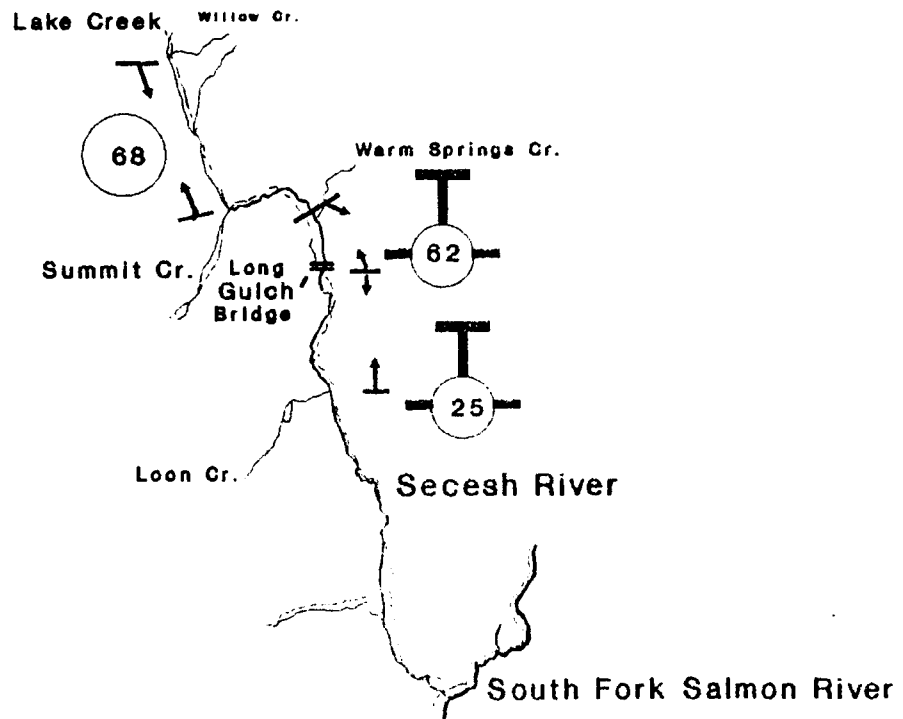
DRAINAGE M.F. Salmon River
STREAM Elk Creek
OBSERVATION CONDITIONS Excellent
TIMING Early On Time Late

SURVEY DATE 8/24-25/88
MAP SCALE 1.3 cm = 1 mile
OBSERVER Holubetz
REMARKS Ground



DRAINAGE South Fork Salmon River
STREAM Lake Creek - Secesh River
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

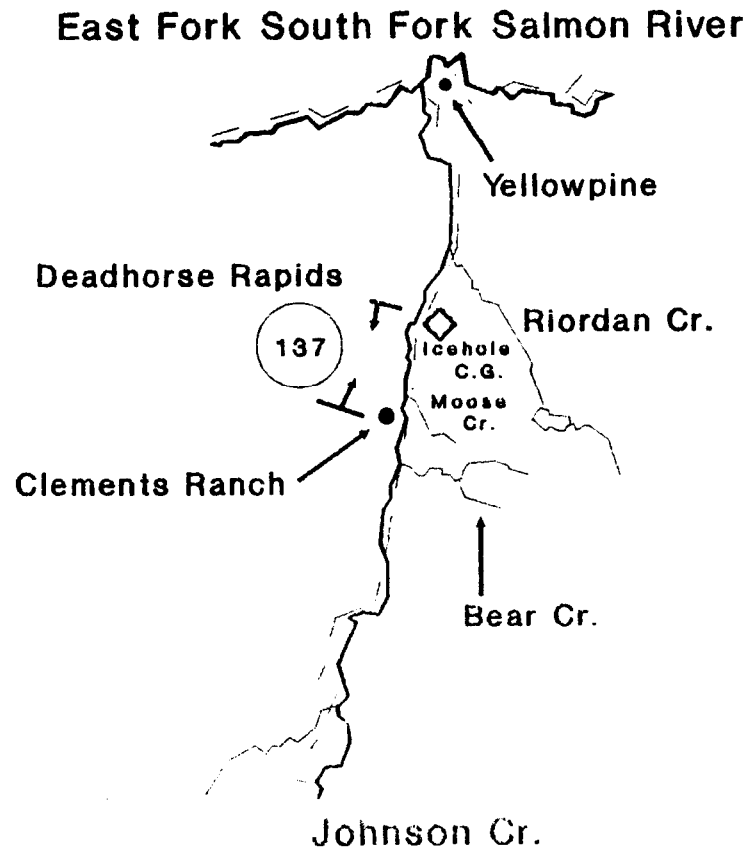
SURVEY DATE 8/24/88 - 9/10/88
MAP SCALE 0.65 cm = 1 mile
OBSERVER Anderson, Evans - Anderson
REMARKS Ground - Helicopter



DRAINAGE E.F. of South Fork Salmon
STREAM Johnson Creek
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

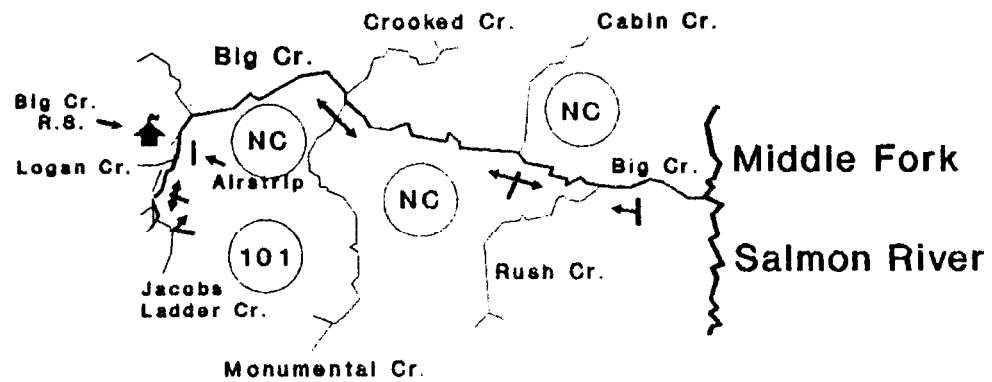
SURVEY DATE 8/29/88
MAP SCALE 0.95 cm = 1 mile
OBSERVER Anderson
REMARKS Ground

34



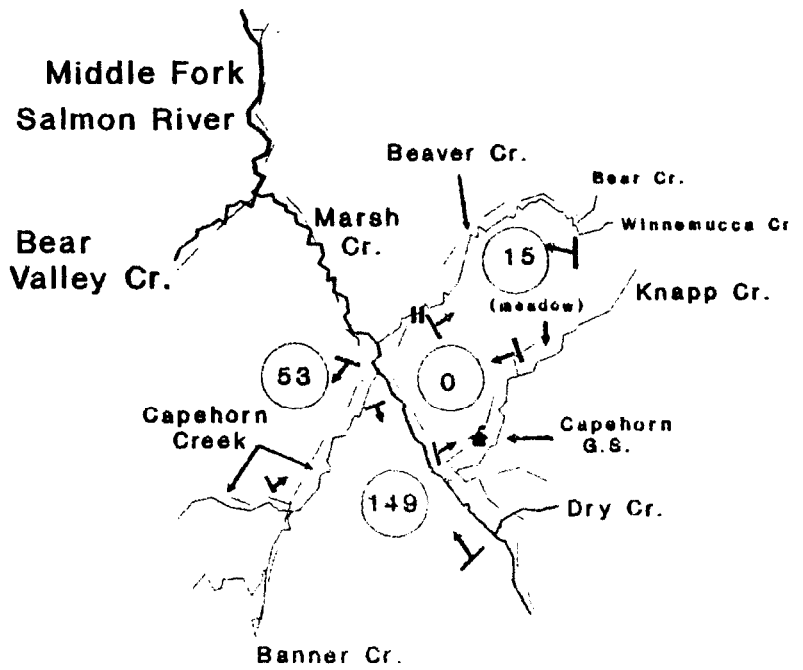
DRAINAGE Middle Fork Salmon River
STREAM Big Creek
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 8/25/88
MAP SCALE 0.45 cm = 1 mile
OBSERVER Anderson
REMARKS Ground



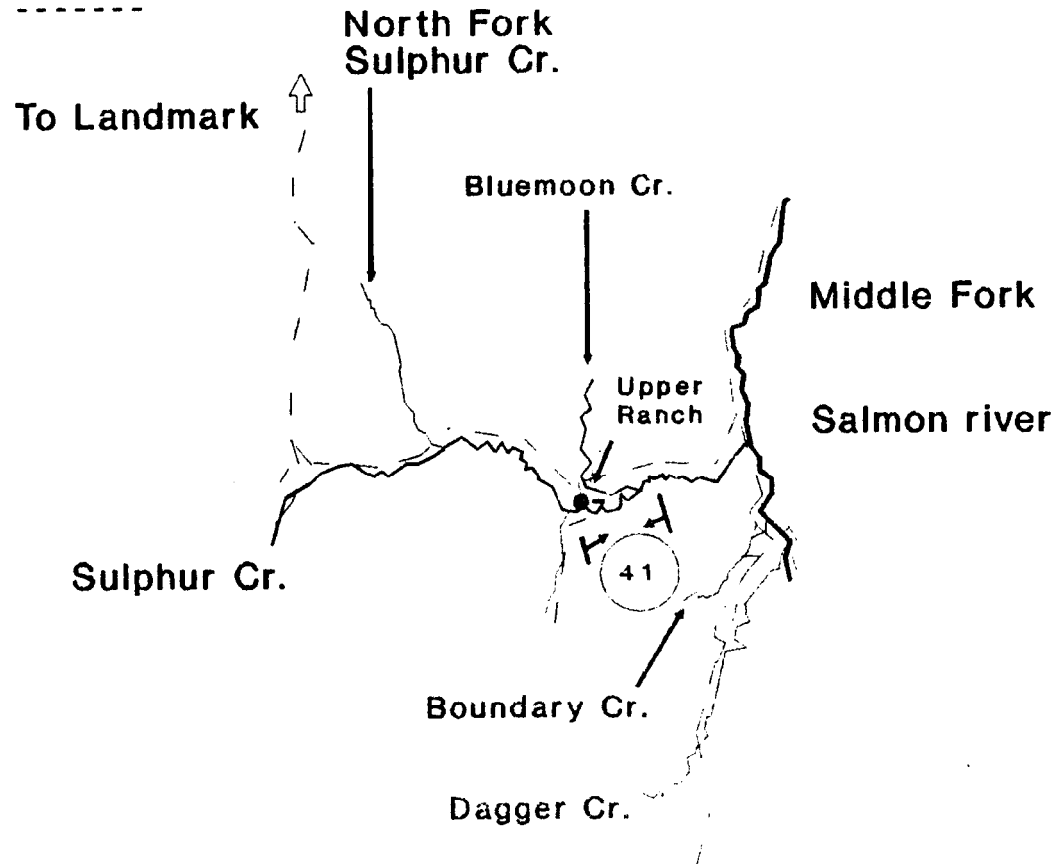
DRAINAGE Middle Fork Salmon River
 STREAM Marsh, Beaver, Knapp, and Capehorn Cks.
 OBSERVATION CONDITIONS Good
 TIMING Early On Time Late

SURVEY DATE 8/15-16/88
 MAP SCALE 1.15 cm = 1 mile
 OBSERVER Davis
 REMARKS Ground



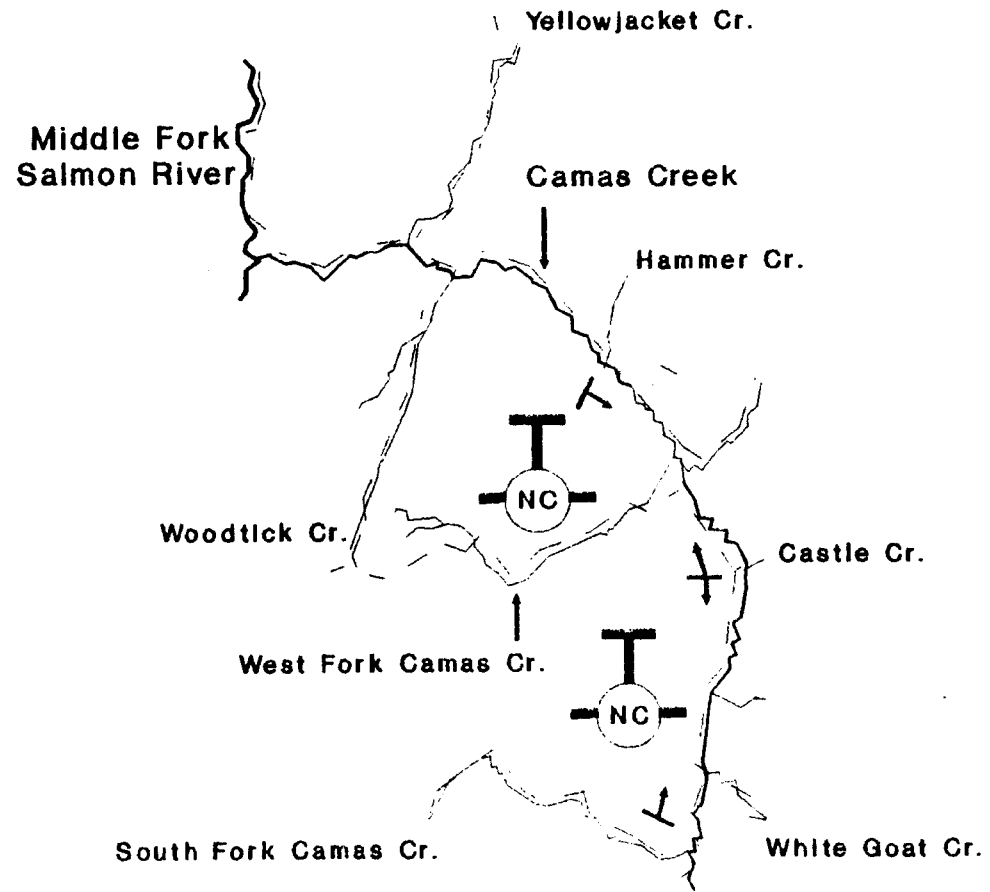
DRAINAGE M.F. Salmon River
STREAM Sulphur Creek
OBSERVATION CONDITIONS Excellent
TIMING Early On Time Late

SURVEY DATE 8/21/88
MAP SCALE 1.3 cm = 1 mile
OBSERVER Holubetz
REMARKS Ground



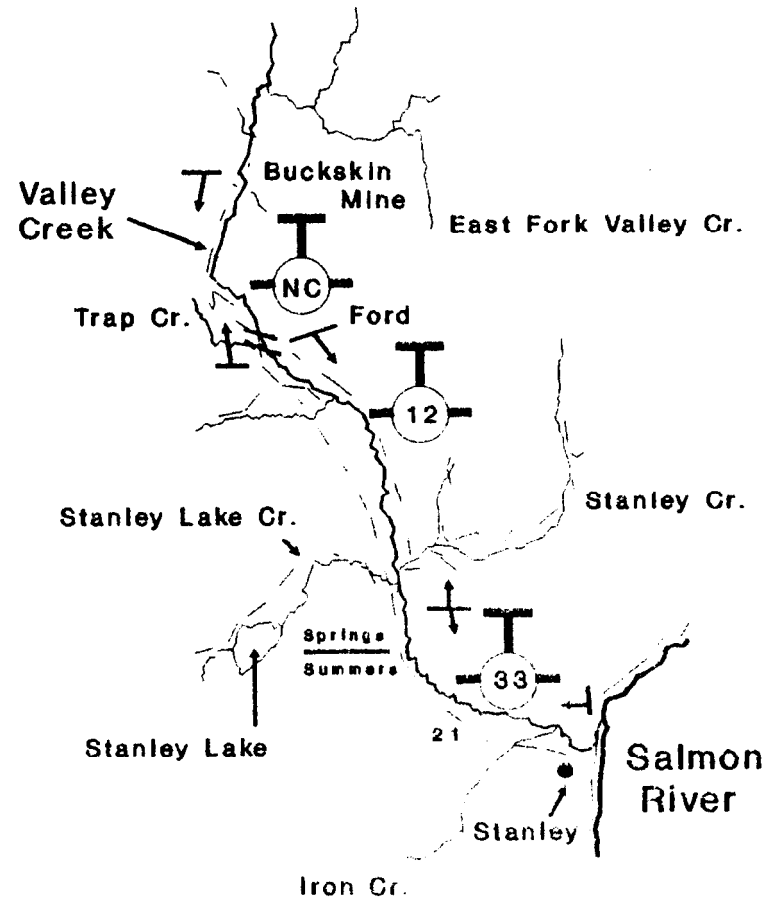
DRAINAGE Middle Fork Salmon River
STREAM Camas Creek
OBSERVATION CONDITIONS _____
TIMING Early On Time Late

SURVEY DATE _____
MAP SCALE 1.10 cm = 1 mile
OBSERVER _____
REMARKS Forest fire prevented
1988 survey.



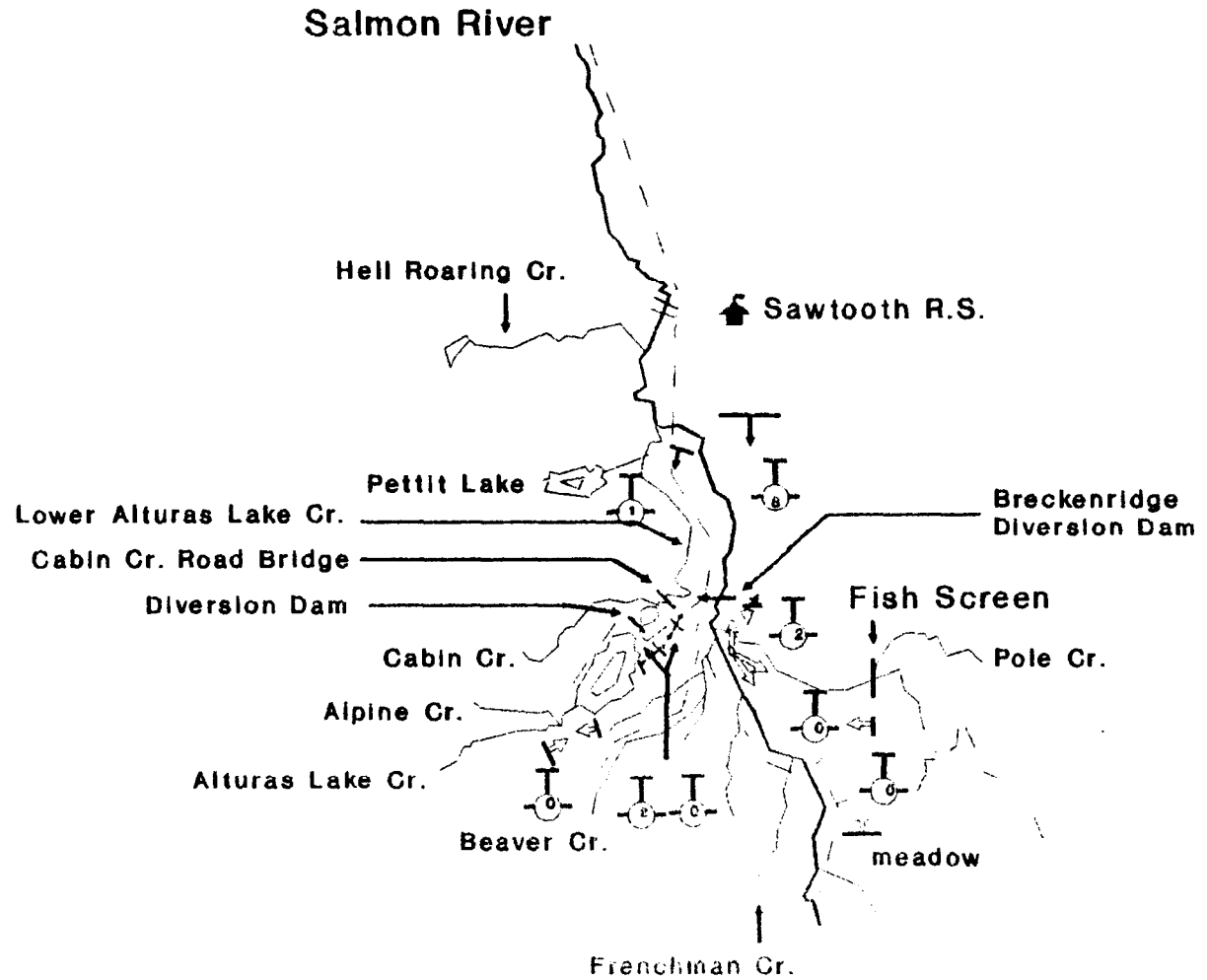
DRAINAGE Salmon River
STREAM Valley Creek
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 9/7/88
MAP SCALE 1.6 cm = 1 mile
OBSERVER Davis
REMARKS Helicopter



DRAINAGE Salmon River
 STREAM Salmon R. & Tributaries
 OBSERVATION CONDITIONS Good
 TIMING Early On Time Late

SURVEY DATE 9/7/88
 MAP SCALE 0.78 cm = 1 mile
 OBSERVER Davis
 REMARKS Helicopter



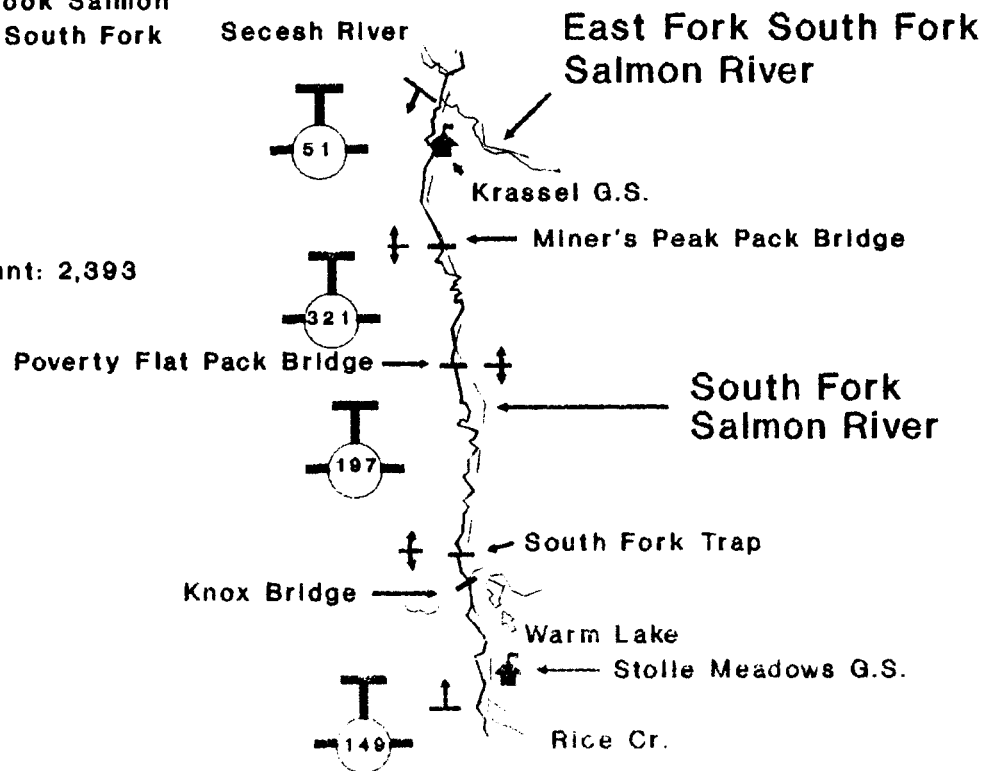
DRAINAGE Salmon River
STREAM South Fork Salmon River
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 9/10/88
MAP SCALE 0.40 cm = 1 mile
OBSERVER Anderson
REMARKS Helicopter

Number of Chinook Salmon
 released above South Fork
 Salmon Trap:

Males	385
Jacks	14
Females	451
-----	850

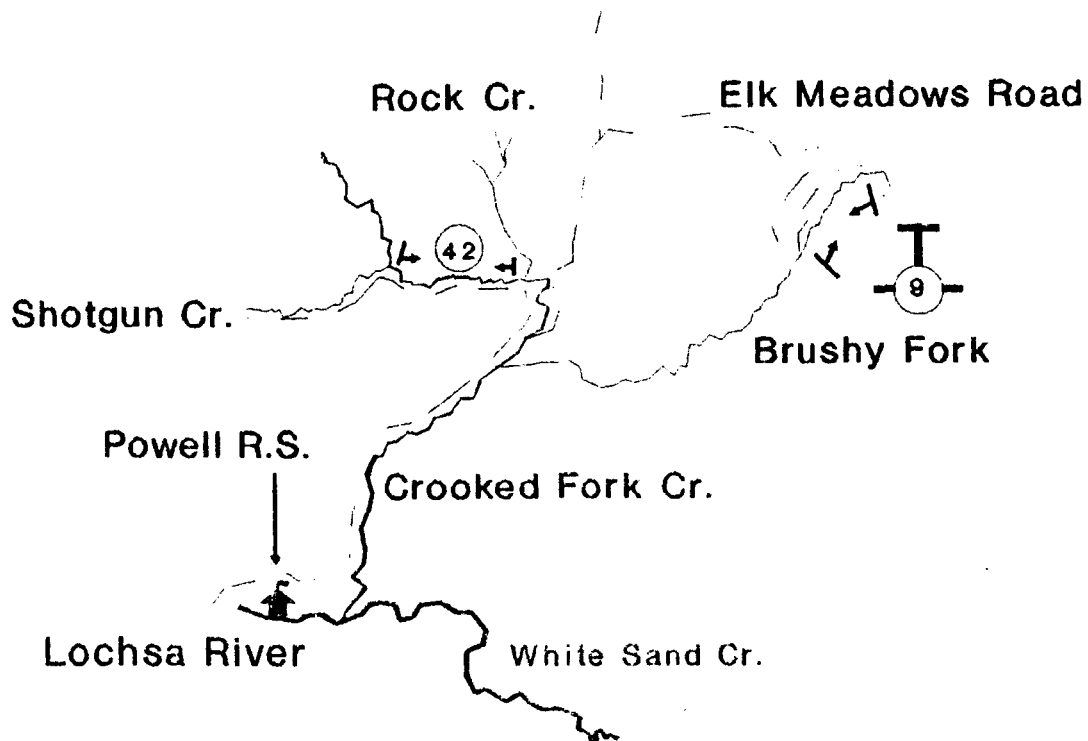
Total trap count: 2,393



APPENDIX C

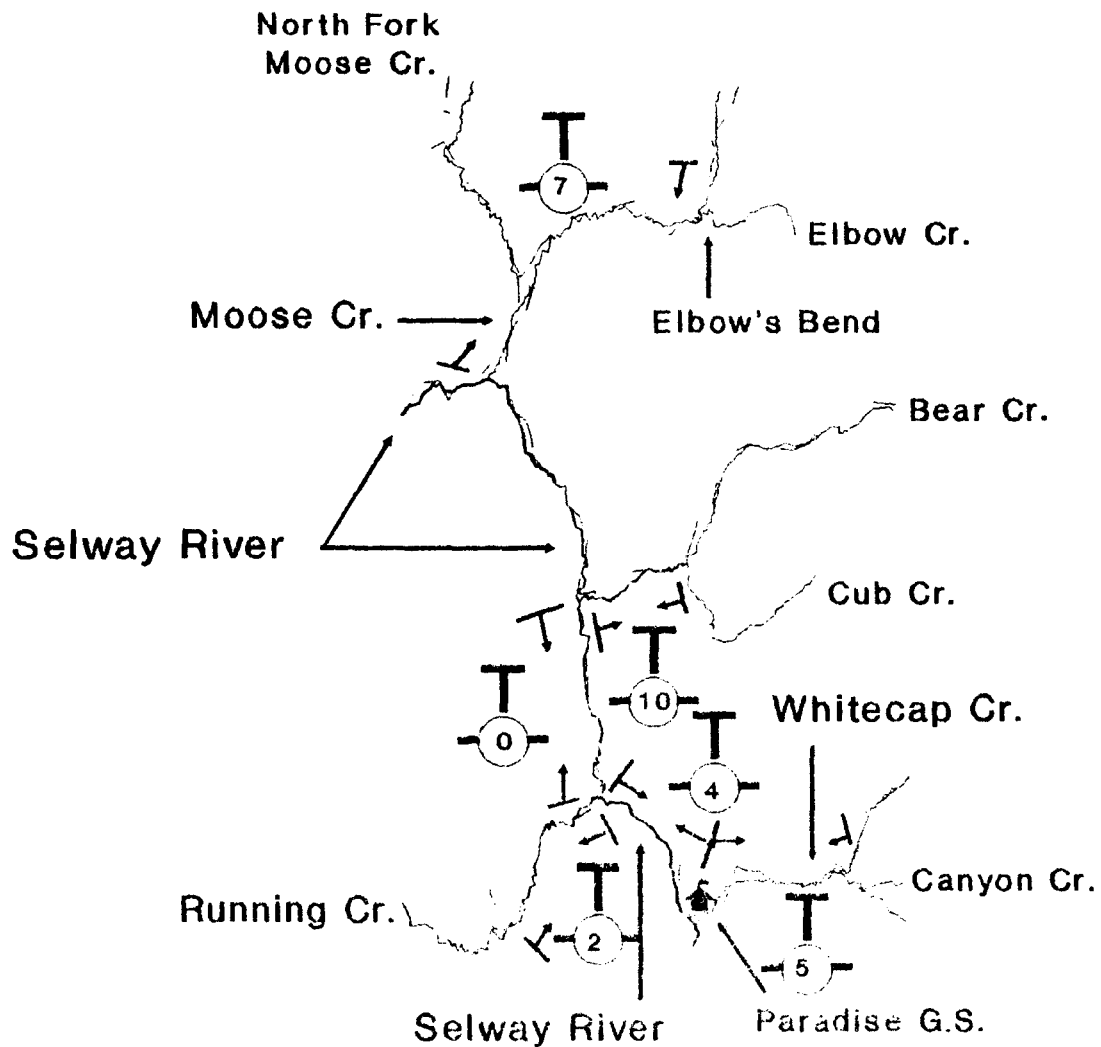
DRAINAGE Clearwater River
STREAM Crooked Fork & Brushy Fork
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 8/30,9/1/88
MAP SCALE 0.95 cm = 1 mile
OBSERVER Lindland
REMARKS Helicopter and Ground



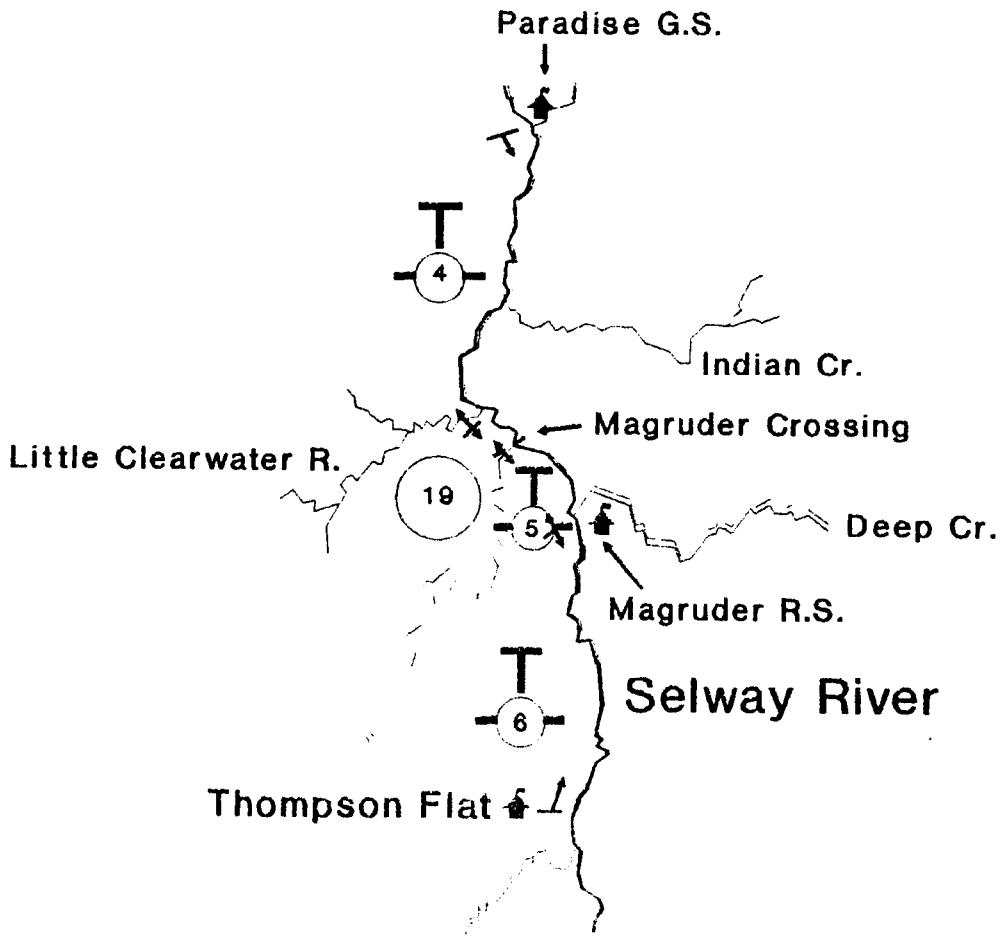
DRAINAGE Clearwater River
STREAM Selway River & tributaries
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 9/13/88
MAP SCALE 0.65 cm = 1 mile
OBSERVER Lindland
REMARKS Helicopter



DRAINAGE Clearwater River
STREAM Upper Selway River
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 9/2,13/88
MAP SCALE 0.85 cm = 1 mile
OBSERVER Lindland
REMARKS Helicopter and Ground



DRAINAGE Clearwater River
STREAM Red R. and American River
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

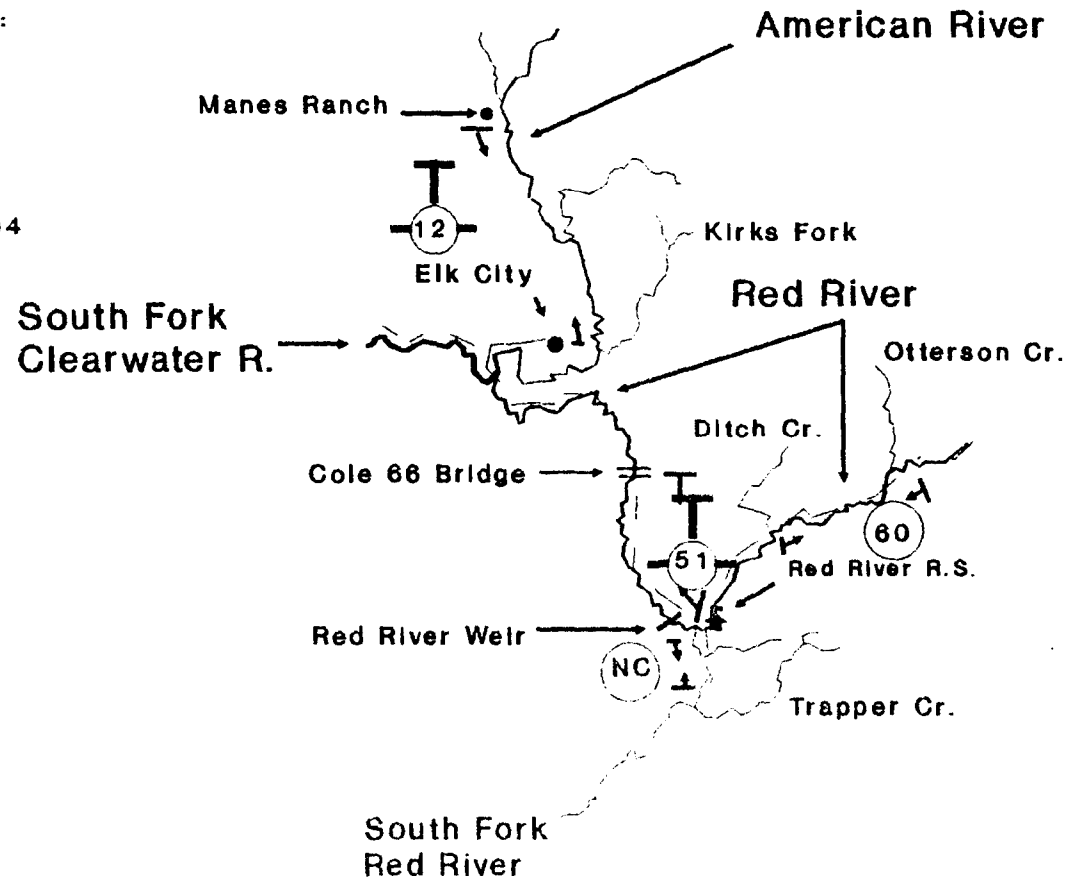
SURVEY DATE 9/12,19/88
MAP SCALE 0.75 cm = 1 mile
OBSERVER Lindland and Anders
REMARKS Helicopter and Ground

Number of Chinook Salmon
released above weir:

Males	81
Jacks	2
Females	75

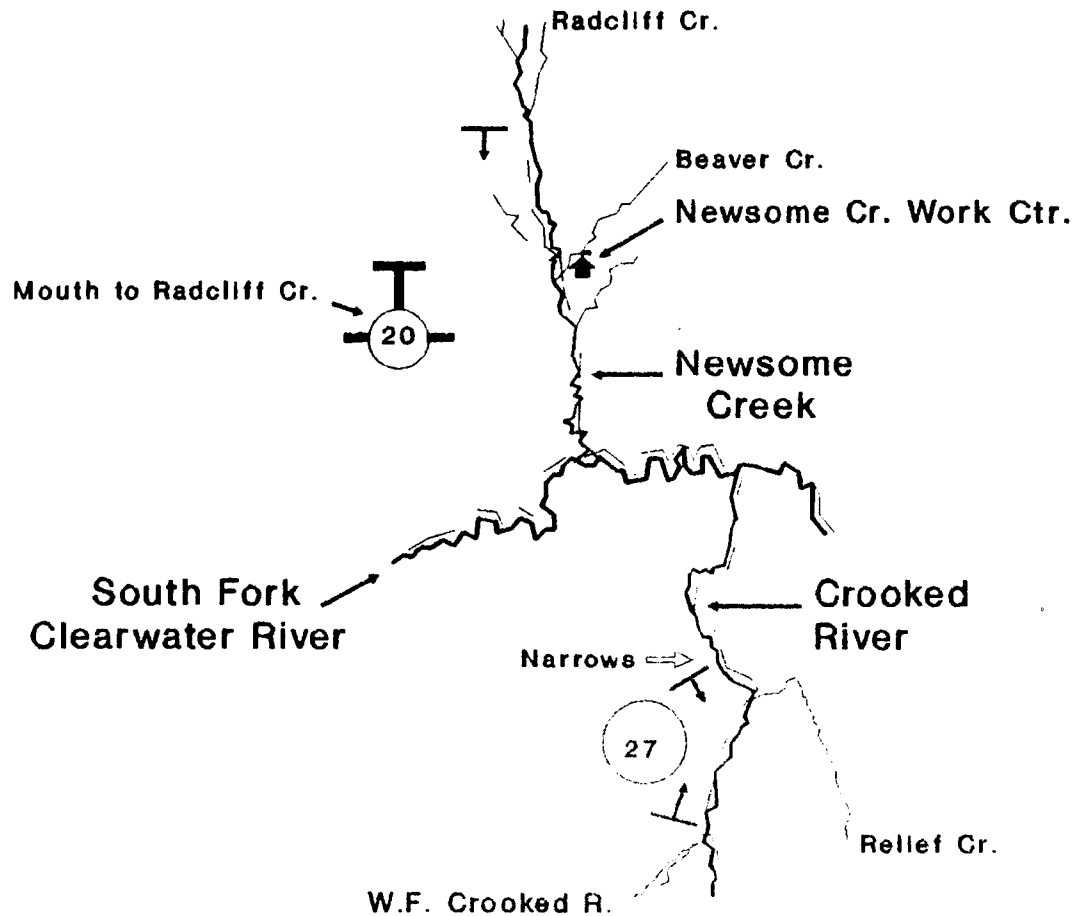
	158

Total trap count: 394



DRAINAGE Clearwater River
STREAM Crooked River & Newsome Creek
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 9/9/88 - 9/12/88
MAP SCALE 0.85 cm = 1 mile
OBSERVER Linland
REMARKS Ground - Helicopter



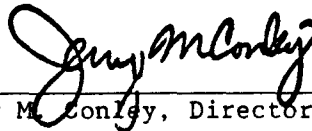
Submitted by:

Marsha White
Fishery Technician

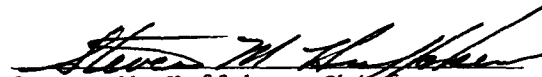
Tim Cochnauer
Principal Fishery Research Biologist

Approved by:

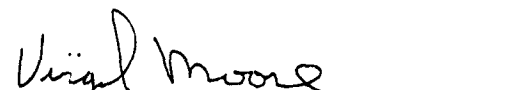
IDAHO DEPARTMENT OF FISH AND GAME



Jerry M. Conley, Director



Steven M. Huffaker, Chief
Bureau of Fisheries



Virgil K. Moore
Fishery Research Manager