



**SALMON SPAWNING GROUND
SURVEY, 1998**

**Pacific Salmon Treaty Program
Award No. NA97FP0325**

By:

Terry J. Elms-Cockrum, Senior Fishery Technician

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ABSTRACT

The numbers of spring and summer chinook salmon *Oncorhynchus tshawytscha* returning to waters within the State of Idaho in 1998 were indexed by counting chinook salmon redds in selected areas and by operating weirs. Surveys of spawner carcasses were also conducted while counting salmon redds. The purpose of the carcass surveys was to collect length data, estimate age composition and to determine sex composition of annual escapements. Adults intercepted at weirs were also sexed and measured.

Counts of spring chinook salmon redds increased from the 1997 numbers through most of the Salmon River drainage in 1998, while summer chinook redd numbers declined. The total number of chinook salmon redds counted in 1998 increased to 1,264, compared to the five-year average of 832 redds counted during 1993-1997. However, the 1998 count was still low compared to the historical five-year average of 6,891 redds counted during 1957-1966.

Numbers of spring chinook redds counted in the Clearwater River drainage decreased in 1998 compared to the 1997 count of 409. The total number of redds counted in 1998 was 107, compared to a five-year average of 176 counted during 1993-1997.

One male sockeye salmon *Oncorhynchus nerka* returned to the Redfish Lake Creek weir in 1998.

Author:

Terry J. Elms-Cockrum
Senior Fishery Technician

INTRODUCTION

Each year chinook *Oncorhynchus tshawytscha* and sockeye *O. nerka* salmon return from the ocean to spawn in Idaho. Snake River spring/summer chinook were listed in 1992 as threatened and sockeye salmon were listed as endangered in 1991 under the Endangered Species Act (ESA). Both have declined dramatically in recent years. The ESA listing pertains to native salmon populations in the Salmon River and Snake River tributaries in Oregon and Washington; the reintroduced populations in the Clearwater River are not listed.

Effective management of anadromous salmon requires annual monitoring of the escapement into spawning areas. In Idaho it is especially difficult to enumerate all salmon returning to each of the spawning areas due to the vast geographic area used by these fish and limited access to the spawning habitat. Because quantifying total spawner escapement to each tributary was impractical, the Idaho Department of Fish and Game (Department) developed a program to index annual spawning escapements by enumerating salmon redds in selected areas. The areas surveyed represent a large portion of available chinook salmon spawning habitat, and the number of redds counted in these areas provides an index of the annual spawning escapement. Time-series trends in escapement and production can be assessed from the redd count data. Spawner carcass surveys are conducted while making redd counts to collect length data to estimate age composition and to determine the sex composition of the annual escapement. Marked fish are noted, and the snouts of all adipose fin-clipped salmon are collected during the carcass surveys. For juvenile chinook released prior to 1993, the adipose fin-clip indicates the fish was coded wire-tagged (CWT). Beginning with juveniles released in 1993, all Idaho hatchery chinook salmon have an external mark, regardless of whether or not they are coded wire-tagged.

Chinook salmon redd counts in Idaho were made as early as 1947 (Zimmer 1950, Schoning 1953). However, consistent trend counts date back to 1957. Since 1957, the redd count program was expanded to include additional spawning areas to support expanded monitoring activities and management requirements.

Hassemer (1993a) summarized and critically reviewed the Idaho redd count data for the years 1957-1992. Subsequent spawning ground reports are updated on an annual basis. In this report, the 1998 redd counts, weir counts, and data on length; age, and sex are made available for trend analysis and management and research use.

OBJECTIVES

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

METHODS

Chinook Salmon

Areas where chinook salmon redds are counted have been established on streams in the Salmon River and Clearwater River drainages of Idaho. The purpose of counting redds is to provide an index of annual spawning escapement and to identify general trends in spawning escapements. Redd counts are reported for "trend areas," which are important production areas for various stocks and represent a large portion of available spawning habitat. A trend area may be divided into a number of separate transects, each of which is counted. Trend area and transect boundaries generally have remained constant from year to year. Count methods used and trend area boundary changes made from 1957 to 1992 are described by Hassemer (1993a).

The Department has developed and implemented standardized procedures for counting chinook salmon redds (Hassemer 1993b). Single peak-count surveys are made over each trend area each year. The surveys are timed to coincide with the period of maximum spawning activity on a particular stream, and each transect is therefore assigned a target count-time window based on historic observations. Redd count observations are made depending on the best visual technique for a particular trend area. Techniques include low-flying fixed-wing aircraft, helicopters, or ground surveys conducted on foot. The consistency and accuracy of redd counts can be maintained over time by following these standard procedures, and any variability or bias caused by observer changes and hydrologic events can be minimized.

Chinook salmon redd count trend areas are classified as either wild (not influenced by hatchery-reared fish), natural, or hatchery-influenced. This separation, based on the origin or rearing history of the fish, was first used for counts made in 1986 (Hall-Griswold and Cochnauer 1988). The Salmon River drainage contains five wild spring chinook and five wild summer chinook salmon trend areas. Hatchery-influenced generally indicates a consistent and continuing presence of hatchery juveniles and adults in the stream. The Clearwater River drainage contains non-endemic, reintroduced spring chinook salmon populations. In the Clearwater River drainage, the Selway drainage is classified as natural, and the Lochsa and South Fork Clearwater drainages are classified as hatchery-influenced.

In 1985, additional redd count transects were established in the Salmon River drainage, and categorized as nontraditional trend areas. Data from these transects are excluded from the historic trend area data. Counts from these areas will be used for comparisons in future years. The number of nontraditional trend areas may change in the future as dictated by management and research requirements.

Spawner carcass surveys are conducted on selected streams to determine the sex ratio and length-frequency distribution of returning adults. Length-frequency information is used to estimate the age composition of the run. Also, returning adults intercepted at hatchery weirs are sexed and measured. These weirs are located on the South Fork Salmon River, East Fork Salmon River, Pahsimeroi River, and the upper Salmon River (Sawtooth Hatchery) in the Salmon River drainage, as well as on Red River, Walton Creek (Powell Facility) and Crooked River in the Clearwater River drainage.

Sockeye Salmon

In response to the critical status of the Snake River sockeye salmon, a weir was installed on Redfish Lake Creek in 1991, and all returning sockeye salmon were trapped (1991-1998) for development of a captive broodstock program. Hassemer (1993a) reviews sockeye redd counts made before the species was listed. For further information on the captive broodstock program, refer to Pravacek and Kline (1998).

RESULTS

Salmon River Drainage

Counts of spring chinook salmon redds increased in 1998 over the 1997 counts. However, summer chinook redd counts declined compared to 1997. The total number of spring and summer chinook salmon redds counted in 1998 for traditional, classified trend areas was 1,264. Somewhat improved from 1,169 redds in 1997, this is a 52% increase over the previous five-year (1993-1997) average of 832. However, the 1998 count is only 18% of the 1957-1966 average of 6,891 (Tables 1-4; Figure 1).

The number of spring chinook salmon redds counted in wild trend areas in 1998 was higher than in 1997. The 359 redds counted increased by 95% over the 1993-1997 average of 184 (Table 2; Figure 2). Spring chinook redd counts in natural- and hatchery-influenced trend areas combined were 149% higher than the 1993-1997 average (Table 1, Figure 2), with 152 redds being counted. No redds were observed in the spring chinook trend area in Alturas Lake Creek (Table 1).

Counts of summer chinook redds in wild trend areas in 1998 increased by 40% over the 1993-1997 average, demonstrating a 12% decrease from the 1997 count. Counts in natural- and hatchery-influenced areas combined (565 redds) were a 14% decrease over the 1997 counts (Tables 3 and 4; Figure 3).

A total of 2,887 spring and summer chinook salmon (hatchery- and naturally-produced) were trapped at hatchery weirs in the Salmon River drainage (Sawtooth, East Fork, South Fork, Pahsimeroi and Rapid rivers) where salmon are passed upstream to spawn naturally (Table 5). This was a notable decrease from the 14,840 salmon trapped in 1997 (Elms-Cockrum 1998).

Table 1. Numbers of spring chinook salmon redds counted in Salmon River drainage natural (Lemhi River and Upper Valley Creek) and hatchery-influenced trend areas, 1957-1998. NC = no count.

YEAR	ALTURAS LAKE CREEK ^a	LEMHI RIVER	UPPER EAST FORK ^b	UPPER SALMON RIVER	UPPER VALLEY CREEK	UPPER YANKEE FORK	TOTALS	FIVE YEAR AVERAGE
1998	0	40	33	45	28	4	152	
1997	0	50	3	26	4	0	83	
1996	1	29	5	19	2	0	56	
1995	0	5	1	5	0	0	11	
1994	0	7	3	21	0	0	31	60
1993	6	23	21	65	7	0	122	
1992	2	15	10	51	1	1	80	
1991	3	55	21	83	2	0	164	
1990	0	80	NC	97	3	3	183	
1989	7	32	NC	102	23	7	171	243
1988	1	179	NC	146	12	1	339	
1987	9	155	NC	162	31	0	357	
1986	14	157	NC	134	13	15	333	
1985	7	93	NC	120	1	5	226	
1984	3	35	NC	71	6	NC	115	253
1983	27	46	121	161	8	0	363	
1982	9	149	28	42	1	0	229	
1981	4	115	76	404	2	4	605	
1980	7	25	6	47	6	0	91	
1979	29	146	57	205	25	18	480	1264
1978	303	703	841	1707	141	33	3728	
1977	85	443	168	698	18	6	1418	
1976	16	227	75	378	NC	40	736	
1975	60	365	348	509	189	60	1531	
1974	42	237	346	338	127	54	1144	1482
1973	153	433	665	411	125	104	1891	
1972	143	473	448	748	182	115	2109	
1971	50	392	370	619	89	57	1577	
1970	68	344	468	432	202	67	1581	
1969	41	328	174	313	35	53	944	1905
1968	110	572	622	637	330	234	2505	
1967	74	786	614	943	253	250	2920	
1966	119	738	511	581	219	112	2280	
1965	101	433	138	472	204	77	1425	
1964	80	1038	405	706	199	146	2574	2184
1963	86	364	646	638	141	128	2003	
1962	138	1309	334	638	157	60	2636	
1961	30	1720	618	723	227	192	3510	
1960	33	1262	122	579	87	43	2126	
1959	18	468	75	486	23	10	1080	2067
1958	96	555	141	469	63	38	1362	
1957	110	719	61	1101	219	47	2257	

^a Influenced by trapping at Sawtooth Hatchery site beginning 1981.

^b Influenced by trapping at East Fork Weir beginning 1984.

Table 2. Numbers of spring chinook salmon redds counted in Salmon River drainage wild trend areas, 1957-1998. NC = no count.

YEAR	BEAR VALLEY CREEK	ELK CREEK	MARSH CREEK DRAINAGE	SULPHUR CREEK	UPPER BIG CREEK	TOTAL	FIVE YEAR AVERAGE
1998	102	105	90	25	15	359	
1997	38	86	62	15	33	234	
1996	15	17	10	9 ^a	1	56	
1995	9	0	0	0	2	11	
1994	10	8	5	0	3	26	175
1993	148	242	120	25	56	591	
1992	41	57	65	5	22	190	
1991	47	54	40	26	13	180	
1990	62	42	57	22	20	203	
1989	15	35	44	2	30	126	386
1988	283	330	217	41	101	972	
1987	102	149	150	11	36	448	
1986	74	55	101	65	67	362	
1985	134	28	108	10	70	350	
1984	55	27	60	0	42	184	231
1983	56	38	33	8	27	162	
1982	39	9	40	3	7	98	
1981	60	23	63	7	22	175	
1980	15	8	9	2	4 ^b	38	
1979	69	49	47	15	15	195	311
1978	184	208	270	64	95	821	
1977	129	86	98	5	9	327	
1976	76	61	48	14	22	221	
1975	215	169	201	50	77	712	
1974	130	108	210	30	28	506	754
1973	387	375	518	78	96	1454	
1972	221	212	312	71	60	876	
1971	108	173	281	58	32	652	
1970	334	302	456	93	68	1253	
1969	356	349	222	138	65	1130	1301
1968	574	483	466	142	90	1755	
1967	445	420	650	134	67	1716	
1966	534	525	406	142	123	1730	
1965	301	203	404	32	73	1013	
1964	576	425	709	49	51	1810	1576
1963	460	654	372	140	148	1774	
1962	484	426	341	78	223	1552	
1961	675	581	526	121	377	2280	
1960	386	346	299	39	155	1225	
1959	381	458	88	41	88	1056	1575
1958	312	359	262	131	129	1193	
1957	661	398	458	381	225	2123	

^a Corrected from 13 in Elms-Crockrum (1997).

^b Corrected from NC in Hassemer (1992).

Table 3. Numbers of summer chinook salmon redds counted in Salmon River drainage wild trend areas, 1957-1998. NC = no count.

YEAR	LOON CREEK	SECESH RIVER LAKE CR.	LOWER SALMON RIVER	LOWER VALLEY CREEK	LOWER EAST FORK	TOTAL	FIVE YEAR AVERAGE
1998	42	89	31	9	19	188	
1997	22	131	48	8	5	214	
1996	1	67	16	1	5	90	
1995	0/NC ^a	28	6/NC ^b	0	4	38	
1994	1	38	9	9	5	62	130
1993	31	130	48	16	41	266	
1992	22	125	26	6	16	195	
1991	16	112	68	3	23	222	
1990	NC	55	52	9	19	135	
1989	16	78	77	26	51	248	300
1988	5	155	150	33	85	428	
1987	23	121	200	59	62	465	
1986	21	115	104	16	41	297	
1985	28	105	82	1	9	225	
1984	4	xx ^c	51	15	7	77	205
1983	7	98	111	28	27	271	
1982	23	65	39	8	19	154	
1981	30	53	75	17	43	218	
1980	9	20	11	4	0	44	
1979	NC	20	NC	15	33	68	282
1978	29	91	359	219	NC	698	
1977	62	27	94	63	136	382	
1976	31	17	44	43	39	174	
1975	32	10	45	80	38	205	
1974	47	21	40	45	49	202	402
1973	78	62	224	77	138	579	
1972	150	87	412	39	161	849	
1971	79	80	220	147	149	675	
1970	43	63	150	41	123	420	
1969	110	104	120	22	138	494	657
1968	135	58	223	63	235	714	
1967	164	140	365	79	234	982	
1966	49	140	390	184	216	979	
1965	166	134	201	57	131	689	
1964	361	181	415	71	306	1334	1030
1963	261	163	195	50	265	934	
1962	157	281	467	115	195	1215	
1961	131	191	356	158	559	1395	
1960	334	510	811	137	403	2195	
1959	123	240	352	70	240	1025	2058
1958	193	355	460	47	345	1400	
1957	425	328	2533	331	656	4273	

^a No count for WS-6, from Cabin Creek to Canyon at Falconberry.

^b No count for NS-22-24, from Lemhi River upstream to U.S. 93 Bridge.

^c "xx" = count not comparable to other years.

Table 4. Numbers of summer chinook salmon redds counted in Salmon River drainage natural (Johnson Creek) and hatchery-influenced (South Fork Salmon River) trend areas, 1957-1998.

YEAR	JOHNSON CREEK	S. FORK SALMON RIVER	TOTAL	FIVE YEAR AVERAGE
1998	48	517	565	
1997	94	544	638	
1996	23	159	182	
1995	9	97	106	
1994	20	239	259	478
1993	142	939	1081	
1992	76	685	761	
1991	64	393	457	
1990	56	386	442	
1989	42	217	259	567
1988	137	718	855	
1987	72	752	824	
1986	53	289	342	
1985	75	323	398	
1984	17	165	182	264
1983	63	185	248	
1982	37	111	148	
1981	45	126	171	
1980	24	116	140	
1979	36	115	151	227
1978	113	251	364	
1977	81	226	307	
1976	68	241	309	
1975	69	238	307	
1974	107	218	325	517
1973	271	586	857	
1972	220	567	787	
1971	183	421	604	
1970	130	527	657	
1969	273	636	909	800
1968	127	515	642	
1967	286	902	1188	
1966	110	980	1090	
1965	116	656	772	
1964	310	1124	1434	1301
1963	266	1057	1323	
1962	295	1589	1884	
1961	201	1058	1259	
1960	486	2290	2776	
1959	278	1305	1583	1991
1958	82	1206	1288	
1957	319	2732	3051	

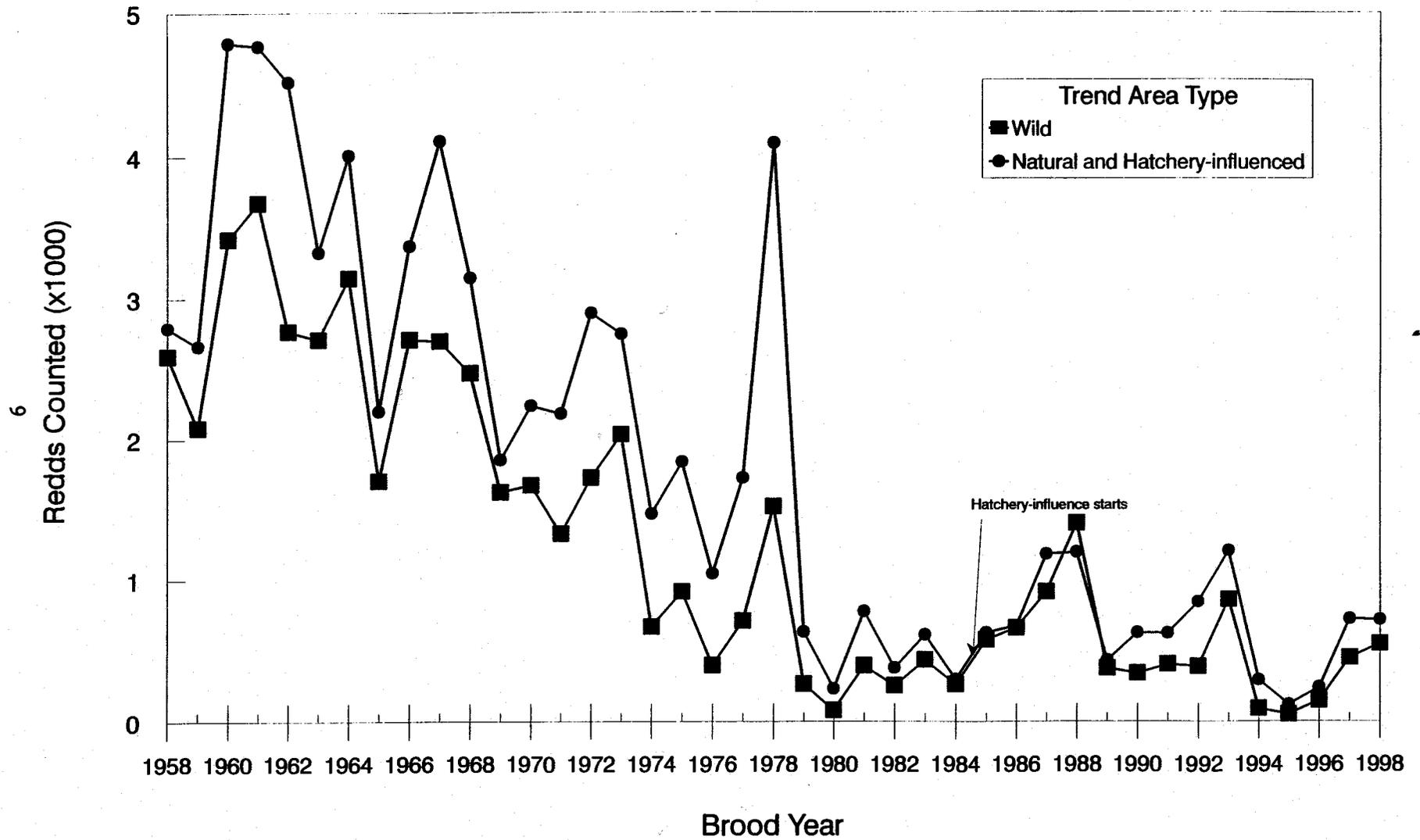


Figure 1. Numbers of combined spring and summer chinook salmon redds counted in Salmon River drainage wild and natural/hatchery influenced trend areas, 1958-1998. Hatchery influence in spring chinook salmon areas began in 1981, and in 1980 in summer chinook salmon trend areas.

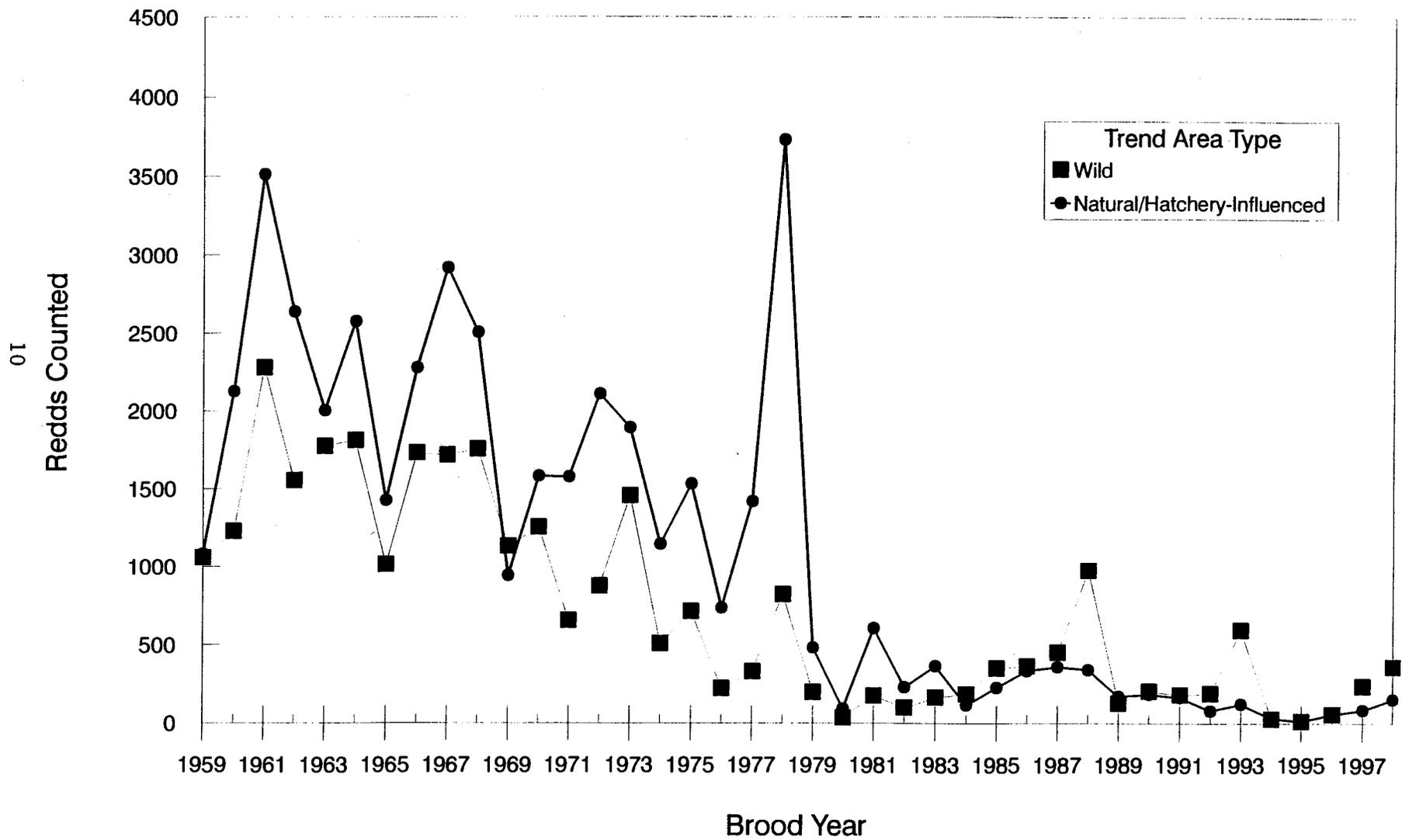


Figure 2. Numbers of spring chinook salmon redds counted in Salmon River drainage wild and natural/hatchery-influenced trend areas, 1958-1998. Hatchery influence began in 1981 at the Sawtooth hatchery weir and in 1984 at the East Fork Salmon River weir.

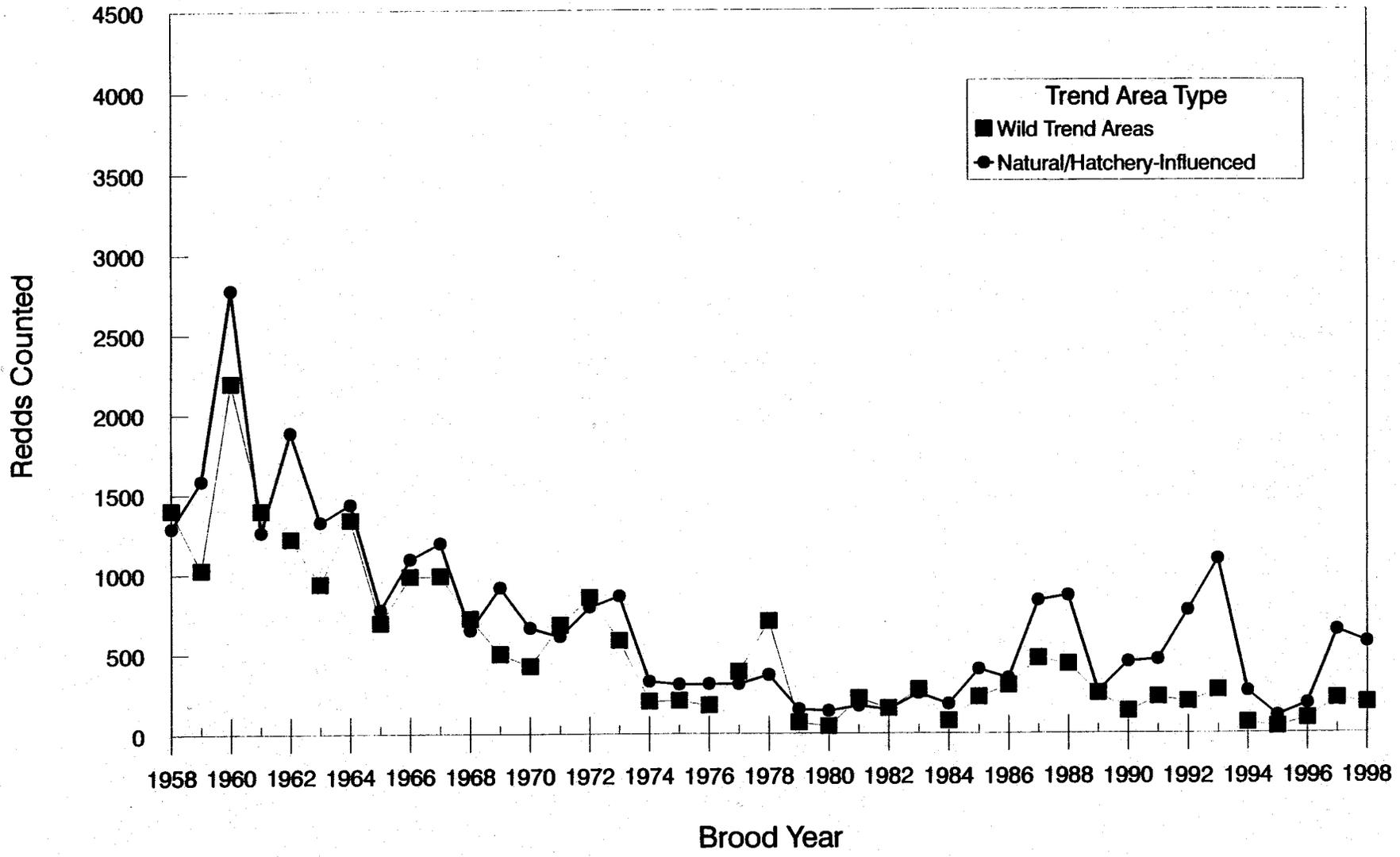


Figure 3. Numbers of summer chinook salmon redds counted in Salmon River drainage wild and natural/hatchery-influenced trend areas, 1958-1998. Hatchery influence began at the South Fork Salmon River weir in 1980.

Table 5. Numbers of adult females, adult males and jack spring and summer chinook salmon trapped at hatchery weirs on the Salmon River drainage from 1993-1998, and the number of salmon released above these weirs to spawn.

Weir	Run	Number trapped				Number released			
		Total	Females	Males	Jacks	Total	Females	Males	Jacks
Sawtooth	Spring Chinook								
1998		153	77	72	4	92	47	43	2
1997		254	101	144	9	112	43	64	5
1996		156	38	91	27	94	28	58	8
1995		37	4	17	16	20	2	8	10
1994		96	40	50	6	83	33	45	5
1993		587	280	278	29	423	209	207	7
E. Fk. Salmon	Spring Chinook								
1998 ^a									
1997		7	2	5	0	7	2	5	0
1996		10	2	5	3	10	2	5	3
1995 ^b		-	-	-	-	-	-	-	-
1994		15	4	11	0	15	4	11	0
1993		90	33	52	5	65	21	39	5
S. Fk. Salmon	Summer Chinook								
1998		974	498	400	76	314	150	164	-
1997		3659	1598	2061	45	2142	990	1152	-
1996		1199	181	280	738	175	51	89	35
1995		307	99	107	101	85	35	40	10
1994		527	266	191	70	205	104	98	3
1993		2703	1487	1188	28	1581	890	684	7
Pahsi meroi	Summer Chinook								
1998		127	53	56	18	80	36	33	11
1997		147	63	81	3	72	29	40	3
1996		89	31	49	9	51	13	29	9
1995		80	47	26	7	27	11	11	5
1994		36	16	11	9	36	16	11	9
1993		169	90	66	13	114	61	44	9
Rapid River ^c	Spring/Summer Chinook								
1998		1633	937	689	7		42	14	28
		0							
1997		10773	1843	1494	3		253	133	120
		0							
1996		1496 ^d	362	307	827	58	-	-	26
1995		133 ^e	43	65	60	4	0	4	0
1994		290 ^e	172	140	7	25	9	14	2
1993		5162	2226	2915	21		691	359	328
		0							

^a E.Fk. Trap not operated for spring chinook adults in 1998.

^b E.Fk. Trap was put into operation late on 7/27/95 due to unusually late snow runoff. No salmon were trapped and none were observed above the trap.

^c Procedure is to pond hatchery spring chinook and release natural summer chinook. Stock separation based on marks since 1995.

^d Includes 54 Oxbow Hatchery Hatchery fish.

^e Total trapped in 1995 does not include 35 fish from Oxbow which were included in sex composition; total trapped in 1994 does not include 29 fish from Oxbow included in sex composition.

In general, few redds were counted in nontraditional areas (Table 6). Counts in all areas either remained at levels similar to 1997 or increased. Redd counts in unclassified spring/summer chinook spawning areas generally remained at historic low levels although slight increases in some areas were noted (Table 7).

Length, age, and sex composition data are included in Appendix A for spring and summer chinook salmon trapped at the following hatchery weirs: Sawtooth, South Fork, Rapid River and Pahsimeroi. East Fork Trap was not operated in 1998 for spring chinook adults.

Length, sex and age composition data for spring and summer chinook salmon carcasses sampled during spawning ground surveys for the Salmon River drainage are listed in Appendix B.

Redd count maps for the Salmon River drainage are presented in Appendix C.

Clearwater River Drainage

The total number of spring chinook salmon redds counted in natural spawning areas of the Clearwater River drainage during 1998 was 31, a 72% increase over the number counted in 1997, and a 29% increase over the 1993-1997 average (Table 8, Figure 4). Redd counts in the hatchery-influenced spawning areas in 1998 were considerably lower than 1997 for both the Lochsa and the South Fork Clearwater drainages. The total number of redds counted in the hatchery-influenced areas were only 50% of the 1993-1997 average (Table 9, Figure 5).

The total number of redds counted in the nontraditional trend areas of the Clearwater River drainage during 1998 showed a marked decline. The number of redds decreased from 80 in 1997 to 21 in 1998 (Table 10).

Numbers of spring chinook salmon trapped at hatchery weirs in the Clearwater River drainage (Red River, Powell, Crooked River, and Kooskia National Fish Hatchery) totaled 1,316 (Table 11).

Length, age, and sex composition data for spring chinook salmon intercepted at the Red River, Crooked River, and Powell (Walton Creek) weirs are listed in Appendix A. The Red River and Crooked River length frequency information will be listed as the S.Fk. Clearwater River stock in future reports.

Length, age, and sex composition data for spring chinook salmon carcasses sampled during spawning ground surveys for the Clearwater River drainage are listed in Appendix B.

Redd count maps for the Clearwater River drainage are presented in Appendix C.

Table 6. Numbers of chinook salmon redds counted in Salmon River drainage nontraditional trend areas, 1987-1996. NC = no count, - = not routinely counted.

Stream	Section	Year										
		89	90	91	92	93	94	95	96	97	98	
<u>Upper Salmon River System</u>												
Al turas Lake Creek	Cabin Cr. bridge to diversion dam	1	0	0	2	0	0	0	0	0	0	
	Diversion dam to Al turas Lake	3	2	0	1	0	0	0	0	0	0	
	Al turas Lake inlet to Alpine Creek	0	0	0	2	0	1	0	1	0	0	
Salmon River	Breckenridge diversion dam to mouth of Pole Creek	0	NC	NC	0	4	0	0	0	0	2	
	Mouth of Pole Creek to headwaters	0	NC	NC	0	1	0	0	0	0	0	
Pole Creek	Mouth to diversion screen	0	2	0	0	0	0	0	0	0	0	
	Fish screen to road crossing at upper end of meadow.	-	3	0	0	0	0	0	0	0	0	
<u>North Fork Salmon River</u>												
N. Fk. Salmon R.	Mouth to Twin Creeks	NC	NC	NC	NC	NC	3	1	-	NC	NC	
<u>Middle Fork Salmon River System</u>												
Middle Fork Salmon River Sulphur Creek	Mouth to mouth of Loon Creek	0	0	0	0	0	0	NC	1	NC	NC	
	Ranch upstream to ISLAND	8	18	24	0	36	0	1	4	2	22	
<u>Main Salmon River Canyon</u>												
Chamberlain Creek	Mouth of West Fork to Flossie Creek	14	17	NC	17	12	10	4	4	8	2	
West Fork Chamberlain Creek	Mouth to Game Creek	30	35	NC	22	8	2	2	3	5	0	
<u>East Fork Salmon River System</u>												
Herd Creek	Bennett Ranch to mouth of East Pass Cr.	-	11	2	3	39	3	0	0 ^c	14	3 ^b	
<u>East Fork of South Fork Salmon River (EFSF)</u>												
Johnson Creek ^d	Mouth of Boulder Creek to head of canyon	15	0	12	16	40	1	0	1	5	0	
Sand Creek	Sand Creek from mouth to bridge	0	0	0	0	0	0	0	0	0	0	
EFSF	Yellow Pine to Sugar Creek	-	-	-	23	19	1	0	0	10	NC	
	Profile Creek to Tamarack Creek	-	-	-	9	14	6	0	0	NC	4	
	Profile Creek to Quartz Creek	-	-	6	NC	0	0	0	0	0	NC	
	Tamarack Creek to Salt Creek	-	-	-	-	21	0	NC	NC	NC	6	

^a Counts in 1988 and 1990-95 conducted by Shoshone-Bannock Tribe's Salmon River Habitat Enhancement Project.

^b Redds counted by Shoshone-Bannock personnel.

^c Mouth of Whiskey Creek to head of canyon prior to 1993.

Table 7. Numbers of chinook salmon redds counted in Salmon River drainage unclassified trend areas, 1960-1996. Camas Creek is defined as a wild stream and Yankee Fork as a hatchery-influenced system. Ground counting method was used except as indicated (A = air count, G = ground count for years where two methods were used). "NC" indicates transect was not counted.

YEAR	Camas Creek	Lower Yankee Fork ^a	West Fork Yankee Fork ^b
1998	16(A)	2(A)	2(A)
1997	7(A)	1(A)	3(A)
1996	1(A)	1(A)	1(A)
1995	0(A) ^c	0(A)	0(A)
1994	2(A)	0(A)	1(A)
1993	26(A)	5(A)	4(A)
1992	7(A)	9(A)	3(A)
1991	11(A)	6(A)	4(A)
1990	3(A)	10(A)	7(A)
1989	29(A)	0(A)	8(A)
1988	NC	2(A)	16(A)
1987	32(A)	5(A)	12(A)
1986	11(A)	2(A)	6(A)
1985	21(A)	0(A)	1(A)
1984	6(A)	NC	0(A)
1983	26(A)	0(A)	7(A)
1982	29(A)	1(A)	0(A)
1981	61	16(A)	19
1980	11	0(A)	2
1979	13	NC	13
1978	102	27	98
1977	65	12	37
1976	21	5	11
1975	98	35	55
1974	132	28	20
1973	176	71	86
1972	123	78	117
1971	69	41	31
1970	49	79	112
1969	50	44	17
1968	164	97	284
1967	109	65	283
1966	118	132	210
1965	22	63	93
1964	177	54	78
1963	151	92	142
1962	124(G), 61(A)	68(G), 32(A)	127(G), 33(A)

^a 1962: mouth to Jordan Creek; 1963-78: Pole Flat Forest Camp to Jordan Creek; 1980- 85: Pole Flat Forest Camp to West Fork Yankee Fork; 1986-95: Polecamp Creek to Jordan Creek.

^b 1960 and 1963-76: mouth to Lightning Creek; 1977-85: mouth to Deadwood Creek; 1961-62 and 1986-95: mouth to Cabin Creek.

^c Camas Creek: WS-8; mouth to Fly Creek = 0 redds, Hammer Creek to Castle Creek = 0 redds.

Table 8. Numbers of spring chinook salmon redds counted in Clearwater River drainage natural trend areas, 1966-1998. NC = no count.

YEAR	SELWAY RIVER	BEAR CREEK	RUNNING CREEK	WHI TECAP CREEK	MOOSE CREEK	TOTALS	FIVE YEAR AVERAGE
1998	13	11	0	1	6	31	
1997	13	2	0	0	3	18	
1996	10	1	0	0	0	11	
1995	4 ^a	2	0	0	4	10	
1994	10	9	0	2	0	21	26
1993	33	13	0	5	10	61	
1992	18	9	0	0	2	29	
1991	12	8	0	1	2	23	
1990	13	6	1	2	2	24	
1989	5	7	0	3	1	18	38
1988	38	10	2	5	7	62	
1987	36	9	4	6	8	63	
1986	30	10	NC	7	9	56	
1985	15	NC	NC	NC	NC	15	
1984	30	6	NC	6	7	49	44
1983	26	8	NC	4	7	44	
1982	38	8	NC	3	5	54	
1981	47	8	NC	4	6	65	
1980	40	7	1	3	4	55	
1979	21	3	0	2	4	30	90
1978		125	13	6	NC	19	161
1977	97	18	2	1	23	141	
1976	58	14	3	4	15	94	
1975	21	5	NC	1	4	31	
1974	66	10	4	2	15	97	160
1973	261	26	21	7	31	347	
1972	175	25	11	8	13	232	
1971	55	14	8	NC	NC	77	
1970	65	19	10	4	NC	98	
1969	57	6	21	NC	NC	84	63
1968	16	7	4	NC	NC	27	
1967	22	7	NC	NC	NC	29	
1966	36	8	NC	NC	NC	44	

^a Includes ground count for WC-7, from Magruder Crossing to Little Clearwater River.

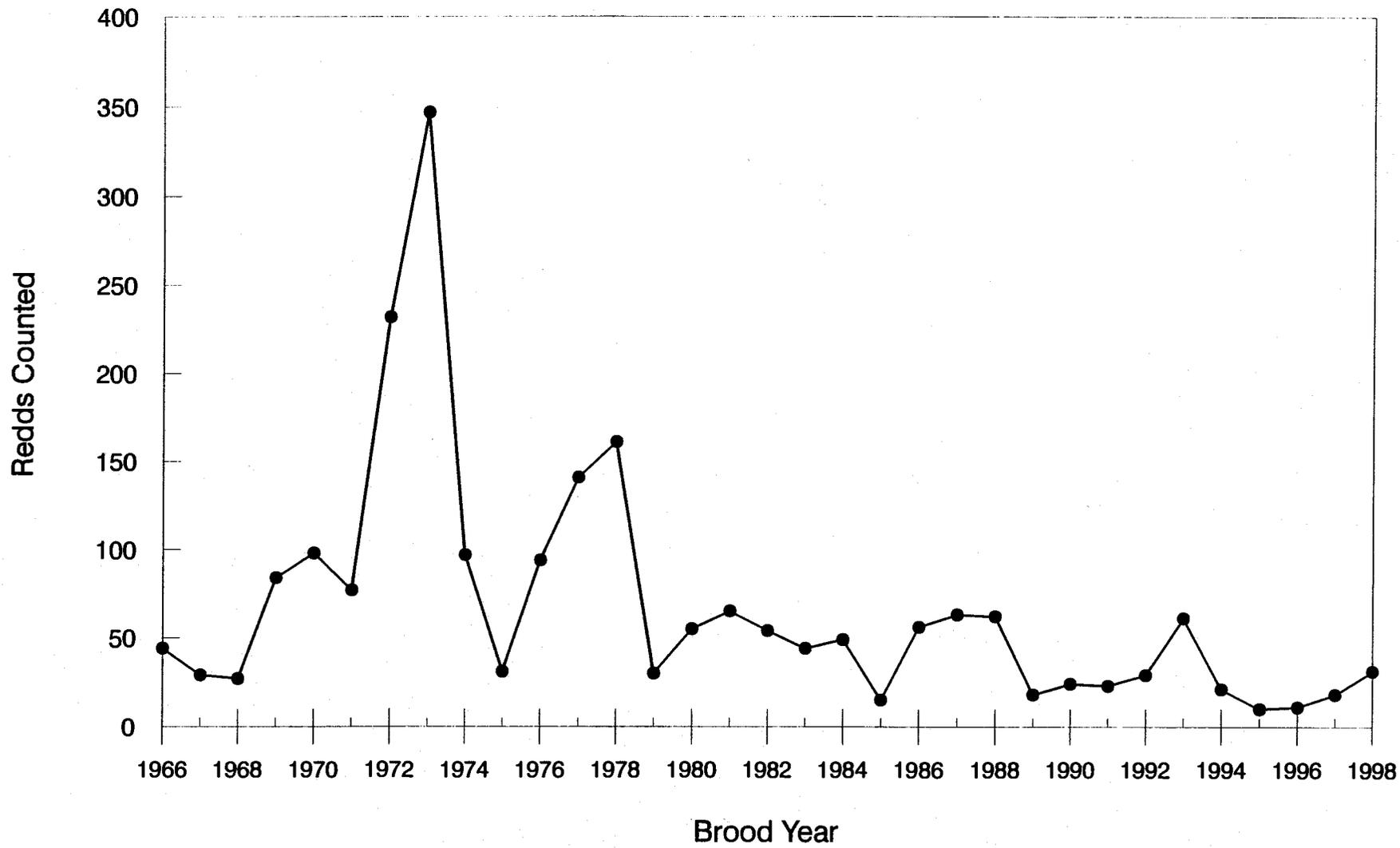


Figure 4. Numbers of spring chinook salmon redds counted in Clearwater River drainage natural trend areas, 1966-1998.

Table 9. Numbers of spring chinook salmon redds counted in Clearwater River drainage hatchery-influenced trend areas, 1967-1998. NC = no count, - = not routinely counted.

YEAR	CROOKED FORK	BRUSHY FORK	LOCHSA RIVER DRAINAGE TOTAL FIVE YR.	NEWSOME CREEK	CROOKED RIVER	RED RIVER	AMERICAN RIVER	SOUTH FORK DRAINAGE TOTAL FIVE YR.	CLEARWATER RIVER DRAINAGE TOTAL FIVE YR.
1998	16	12	28	10	7	27	4	48	76
1997	47	30	77	48	18	95	153	314	391
1996	22	0	22	4	5	29	6	44	66
1995	1	5	6	0	2	4	0	6	12
1994	1	0	1	0	4	11	1	16	17
1993	34	29	63	64	27	43	75	209	272
1992	22	1	23	0	NC	46	1	47	70
1991	9	1	10	0	NC	5	1	6	16
1990	16	4	20	0		10	66	2	98
1989	8	9	17	4	3	45	1	53	70
1988	42	9	51	20	27	51	12	110	161
1987	28	10	38	15	17	81	31	144	182
1986	30	11	41	6	9	82	14	111	152
1985	47	14	61	7	10	92	23	132	193
1984	28	9	37	1	22	65	NC	88	125
1983	7	6	13	7	12	85	9	113	126
1982	34	17	51	5	4	82	21	112	163
1981	27	25	52	7	9	47	12	75	127
1980	16	10	26	7	6	31	7	51	77
1979	6	12	18	9	4	20	-	33	51
1978	37	25	62	22	17	52	-	91	153
1977	51	15	66	26	21	50	-	97	163
1976	33	13	46	5	13	15	-	33	79
1975	22	4	26	6	33	20	-	59	85
1974	22	6	28	-	5	12	-	17	45
1973	60	-	60	-	-	-	-	0	60
1972	32	31	63	-	-	-	-	0	63

Table 9. (cont). Numbers of spring chinook salmon redds counted in Clearwater River drainage hatchery-influenced trend areas, 1967-1998. NC = no count, - = not routinely counted

YEAR	CROOKED FORK	BRUSHY FORK	LOCHSA RIVER DRAINAGE		NEWSOME CREEK	CROOKED RIVER	RED RIVER	AMERICAN RIVER	SOUTH FORK DRAINAGE		CLEARWATER RIVER DRAINAGE	
			TOTAL	FIVE YR.					TOTAL	FIVE YR.	TOTAL	FIVE YR.
1971	1	-	1		-	-	-	-	0		1	
1970	34	-	34		-	-	-	-	0		34	
1969	112	-	112	32	-	-	-	-	0	0	112	32
1968	15	-	15		-	-	-	-	0		15	
1967	0	-	0		-	-	-	-	0		0	

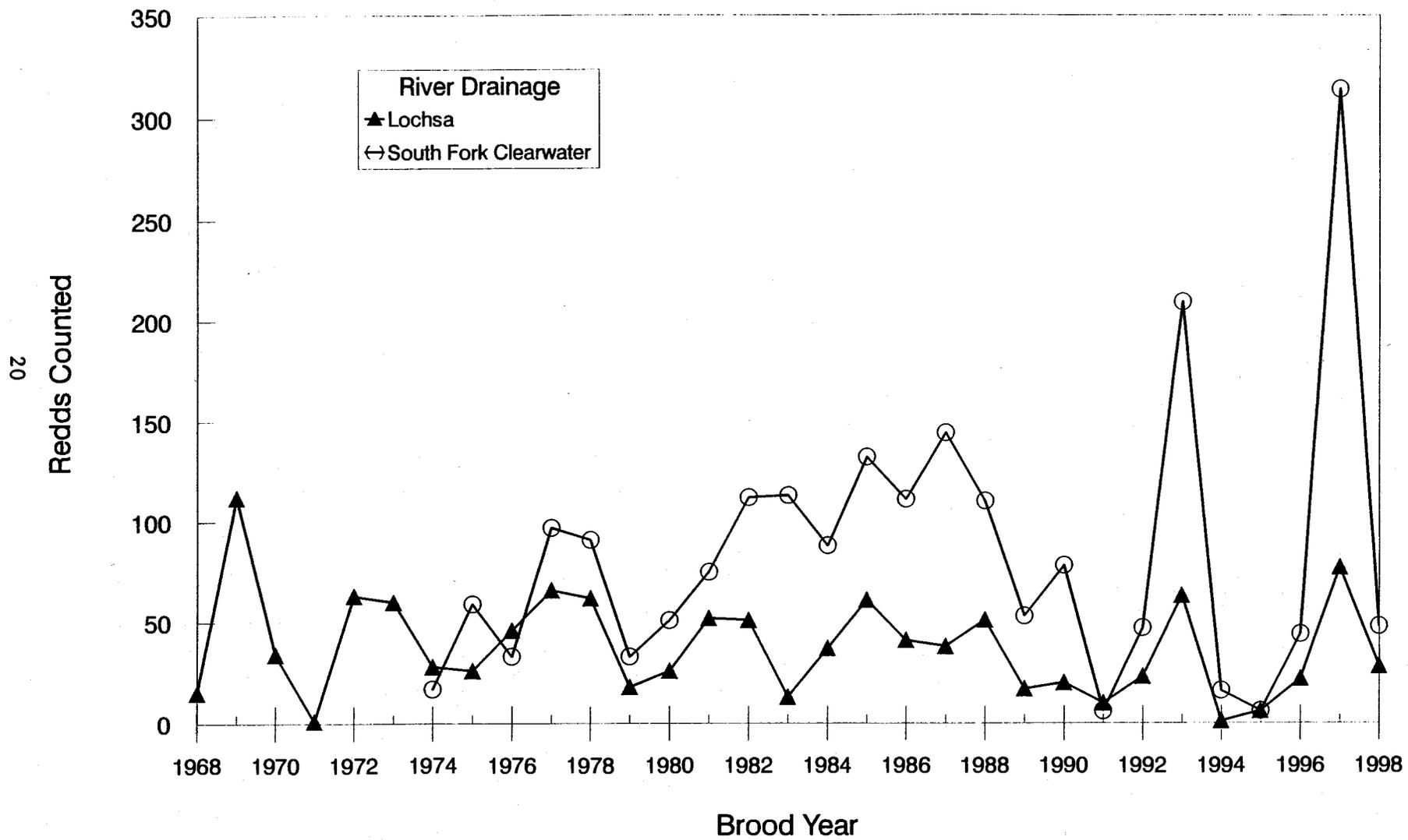


Figure 5. Numbers of spring chinook salmon redds counted in Clearwater River drainage hatchery-influenced trend areas, 1968-1998.

Table 10. Numbers of spring chinook salmon redds counted in Clearwater River drainage nontraditional trend areas, 1988-1998. NC = no count, - = not routinely counted.

Stream	Section	Year										
		1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
S. F. Red River		0	NC	NC	NC	NC	NC	2	0	0	0	0
Crooked Fork Cr.	Mouth to Brushy Fork	12	0	-	-	-	-	-	-	-	-	-
	Brushy Fk. to Shotgun Cr.	59	7	-	-	-	-	-	-	-	-	-
	Shotgun Cr. to Boulder Cr.	5	0	-	-	-	-	-	-	-	-	-
	Boulder Cr. to Hopeful Cr.	NC	NC	-	-	-	-	-	-	-	-	-
	Mouth to Hopeful Creek	-	-	6	10	32	49	7	4	31	39	9
Brushy Fork Cr	Mouth to Twin Cr.	10	0	-	-	-	-	-	-	-	-	-
	Twin Cr. to Spruce Cr.	19	6	-	-	-	-	-	-	-	-	-
	Mouth to Spruce Creek	-	-	6	5	9	28	4	6	6	36	12
White Sand Creek	Mouth to Big Flat Cr.	NC	NC	0	0	0	4	1	0	1	50	
Lolo Creek	White Cr. bridge to uppermost K-dam	31	15	27	11	14	-	-	-	N/C	N/C	N/C
Total		136	28	39	26	55	81	14	10	38	8021	

Table 11. Numbers of adult females, adult males and jack spring chinook salmon trapped at hatchery weirs on the Clearwater River drainage in 1991 - 1998, and the number of salmon released above these weirs to spawn.

Weir	Run	Number trapped				Number released			
		Total	Females	Males	Jacks	Total	Females	Males	Jacks
Powell	Spring Chinook								
1998		541	248	266	1	43	-	-	-
1997		618	311	305	2	115	55	60	^a
1996		186	70	71	45	5	0	5	0
1995		14	1	1	12	5	0	1	4
1994		86	55	30	1	0	0	0	0
1993		500	242	250	0	40	15	25	0
1992		270	133	131	6	0	0	0	0
1991		33	5	21	7	22	3	13	6
Red River	Spring Chinook								
1998		90	-	-	-	36	-	-	-
1997		280 ^b	-	-	-	57	23	34	-
1996		62	14	39	9	17	1	12	4
1995		4	^{2c}	0	2	2	1	0	1
1994		31	13	18	0	15	5	10	0
1993		139	65	73	1	91	42	49	0
1992		39	16	18	5	26	10	12	4
1991		18	7	10	1	7	3	4	0
Crooked River	Spring Chinook								
1998		277	-	-	-	79	-	-	-
1997		1034 ^b	-	-	-	126	74	52	-
1996		299	94	113	92	63	20	31	12
1995		6	0	0	6	0	0	0	0
1994		26	18	0	0	11	6	^{5d}	0
1993		402	211 ^e	185	6	152	75	77	0
1992		228	94	121	13	206	86	110	10
1991		20	5	13	2	19	5	12	2
Kooskia NFH	Spring Chinook								
1998		408	-	-	1	27	-	-	1
1997		1657 ^f	-	-	7	534 ^f	284	192	6
1996		202 ^g	65	41	86	32	N/A	N/A	N/A
1995		40	8	11	21	0	0	0	0
1994		232 ^h	111	89	1	25	N/A	N/A	N/A
1993		1180 ⁱ	565	498	9	91	N/A	N/A	N/A
1992		312 ^j	N/A	N/A	N/A	0	0	0	0
1991		467 ^j	N/A	N/A	N/A	0	0	0	0

^a Number of males released includes adults and jacks combined.

^b Sex undetermined.

^c Includes (1) one-ocean ad clipped female which was released above the weir.

^d Five adult males were spawned prior to release.

^e Includes (1) one-ocean female.

^f Sex undetermined. Total number released includes 52 fish with undetermined sex.

^g Includes (10) sex unknown.

^h Includes (31) sex unknown.

ⁱ Includes (108) sex unknown

^j Sex undetermined.

Sockeye Salmon

The Redfish Lake adult trap was operated from July 20 to October 14, 1998 and one male adult was trapped (J. Heindel, IDFG, pers. comm.).

Table 12 . (cont).

Redd counts conducted for purposes other than Idaho Department of Fish and Game standard redd count information, 1998.

Agency/Tribe	Study	Drainage	Stream
U.S. Forest Service - Intermountain Research Station	*g	M. Fk. Salmon River	Mainstem Bear Valley Big Creek Camas Creek Indian Creek Loon Creek Marble Creek Marsh Creek Pistol Creek Rapid River Sheep Creek Sulphur Creek Wilson Creek

^a Idaho Supplementation Study (ISS).

^b Intensive Smolt Monitoring (ISM).

^c Upper Clearwater fall chinook salmon Study (UCS), multiple air counts

^d Lower Snake River Compensation (LSRCP), multiple ground counts

^e Nez Perce Tribe Hatchery Monitoring and Evaluation (NPTH), multiple ground counts.

^f Salmon River Habitat Enhancement Project

^g Chinook Salmon Spatial Habitat Analysis Project.

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APPENDICES

APPENDIX A

Table A1. Length frequency and age composition of spring chinook salmon trapped at the Sawtooth Hatchery weir, 1998^a.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
40	0	0.0%		40	0	0.0%	
42	0	0.0%		42	0	0.0%	
44	0	0.0%		44	0	0.0%	
46	0	0.0%		46	0	0.0%	
48	0	0.0%	Jacks	48	0	0.0%	
50	2	2.6%	n=4	50	0	0.0%	n=0
52	0	0.0%	5.2%	52	0	0.0%	0.0%
54	0	0.0%		54	0	0.0%	
56	1	1.3%		56	0	0.0%	
58	0	0.0%		58	0	0.0%	
60	0	0.0%		60	0	0.0%	
62	0	0.0%		62	0	0.0%	
64	1	1.3%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%		68	0	0.0%	
70	3	4.0%	Age 4	70	1	1.3%	Age 4
72	1	1.3%	n=17	72	1	1.3%	n=16
74	3	4.0%	22.5%	74	3	3.9%	20.80%
76	1	1.3%		76	1	1.3%	
78	3	4.0%		78	4	5.2%	
80	3	4.0%		80	2	2.6%	
82	3	4.0%		82	4	5.2%	
84	4	5.3%		84	1	1.3%	
86	5	6.6%		86	3	3.9%	
88	5	6.6%		88	19	24.7%	
90	3	3.9%		90	7	9.0%	
92	2	2.6%	Age 5	92	15	19.5%	Age 5
94	4	5.3%	n=55	94	8	10.4%	n=61
96	5	6.6%	72.3%	96	3	3.9%	79.2%
98	8	10.5%		98	1	1.3%	
100	6	7.9%		100	4	5.2%	
102	2	2.6%		102	0	0.0%	
104	3	3.9%		104	0	0.0%	
106	2	2.6%		106	0	0.0%	
108	6	7.9%		108	0	0.0%	
Total	76				77		

^a Age break criteria: Sawtooth Hatchery Run Report 1998, IDFG, unpublished.

Table A2. Length frequency and age composition of spring chinook salmon trapped at the East Fork River weir, 1998^a.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
40	0	0.0%		40	0	0.0%	
42	0	0.0%		42	0	0.0%	
44	0	0.0%		44	0	0.0%	
46	0	0.0%		46	0	0.0%	
48	0	0.0%	Jacks	48	0	0.0%	
50	0	0.0%	n=0	50	0	0.0%	n=0
52	0	0.0%	0.0%	52	0	0.0%	0.0%
54	0	0.0%		54	0	0.0%	
56	0	0.0%		56	0	0.0%	
58	0	0.0%		58	0	0.0%	
60	0	0.0%		60	0	0.0%	
62	0	0.0%		62	0	0.0%	
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%		68	0	0.0%	
70	0	0.0%	Age 4	70	0	0.0%	Age 4
72	0	0.0%	n=0	72	0	0.0%	n=0
74	0	0.0%	0.0%	74	0	0.0%	0.0%
76	0	0.0%		76	0	0.0%	
78	0	0.0%		78	0	0.0%	
80	0	0.0%		80	0	0.0%	
82	0	0.0%		82	0	0.0%	
84	0	0.0%		84	0	0.0%	
86	0	0.0%		86	0	0.0%	
88	0	0.0%		88	0	0.0%	
90	0	0.0%		90	0	0.0%	
92	0	0.0%	Age 5	92	0	0.0%	Age 5
94	0	0.0%	n=0	94	0	0.0%	n=0
96	0	0.0%	0.0%	96	0	0.0%	0.0%
98	0	0.0%		98	0	0.0%	
100	0	0.0%		100	0	0.0%	
102	0	0.0%		102	0	0.0%	
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
Total	0				0		

^a East Fork Trap was not operated for spring chinook adults in 1998.

Table A3. Length frequency and age composition of summer chinook salmon trapped at the South Fork Salmon River weir, 1998^a.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
44	0	0.0%		44	0	0.0%	
46	0	0.0%		46	0	0.0%	
48	1	0.2%	Jacks n=76 16.0%	48	0	0.0%	n=0 0.0%
50	0	0.0%					
52	2	0.4%					
54	5	1.0%					
56	10	2.1%					
58	17	3.6%		58	0	0.0%	
60	17	3.6%		60	0	0.0%	
62	10	2.1%		62	0	0.0%	
64	9	1.9%		64	0	0.0%	
66	5	1.0%		66	0	0.0%	
68	3	0.6%	Age 4 n=124 26.0%	68	0	0.0%	Age 4 n=220 44.2%
70	1	0.2%					
72	1	0.2%					
74	7	1.5%					
76	2	0.4%					
78	14	2.9%					
80	11	2.3%					
82	14	2.9%		82	33	6.6%	
84	18	3.8%		84	25	5.0%	
86	25	5.3%		86	37	7.4%	
88	28	5.9%		88	64	12.8%	
90	20	4.2%	Age 5 n=276 58.0%	90	66	13.2%	Age 5 n=278 55.8%
92	22	4.6%					
94	38	8.0%					
96	31	6.5%					
98	32	6.7%					
100	31	6.5%					
102	40	8.4%					
104	26	5.5%					
106	19	4.0%		106	1	0.2%	
108	10	2.1%		108	0	0.0%	
110	5	1.0%		110	0	0.0%	
112	1	0.2%		112	0	0.0%	
116	1	0.2%		116	0	0.0%	
Total	476				498		

^a Age break criteria: McCall Hatchery Run Report 1998, IDFG, unpublished.

Table A4. Length frequency and age composition of spring and summer chinook salmon trapped at the Rapid River Hatchery weir, 1998^a.

Summers				Springs			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
40	0	0.0%		40	0	0.0%	
42	0	0.0%		42	0	0.0%	
44	0	0.0%		44	0	0.0%	
46	0	0.0%		46	0	0.0%	
48	0	0.0%	Jacks	48	2	0.1%	Jacks
50	0	0.0%	n=0	50	3	0.2%	n=7
52	0	0.0%	0.0%	52	1	0.1%	0.5%
54	0	0.0%		54	0	0.0%	
56	0	0.0%		56	0	0.0%	
58	0	0.0%		58	1	0.1%	
60	0	0.0%		60	0	0.0%	
62	0	0.0%		62	0	0.0%	
64	0	0.0%		64	1	0.1%	
66	1	2.4%	Age 4	66	10	0.6%	Age 4
68	1	2.4%	n=8	68	8	0.5%	n=261
70	1	2.4%	19.1%	70	35	2.2%	16.5%
72	0	0.0%		72	60	3.8%	
74	3	7.1%		74	65	4.1%	
76	2	4.8%		76	82	5.2%	
78	1	2.4%		78	22	1.4%	
80	4	9.5%		80	85	5.3%	
82	2	4.8%		82	111	7.0%	
84	3	7.1%		84	163	10.2%	
86	1	2.4%		86	185	11.6%	
88	6	14.3%		88	232	14.6%	
90	6	14.3%	Age 5	90	183	11.5%	Age 5
92	4	9.5%	n=34	92	145	9.1%	n=1321
94	3	7.1%	80.9%	94	98	6.2%	83.0%
96	2	4.8%		96	46	2.9%	
98	1	2.4%		98	30	1.9%	
100	1	2.4%		100	16	1.0%	
102	0	0.0%		102	5	0.3%	
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
Total	42				1591		

^a Age break criteria: Rapid River Hatchery Run Report 1998, IDFG, unpublished.

Table A5. Length frequency and age composition of spring chinook salmon trapped at the Red River/Crooked River weirs (S.Fk. Clearwater Stock), 1998^{a b c}.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
40	0	0.0%		40	0	0.0%	
42	0	0.0%		42	0	0.0%	
44	0	0.0%		44	0	0.0%	
46	1	0.7%		46	0	0.0%	
48	0	0.0%	Jacks	48	0	0.0%	
50	0	0.0%	n=2	50	0	0.0%	n=0
52	0	0.0%	1.4%	52	0	0.0%	0.0%
54	0	0.0%		54	0	0.0%	
56	0	0.0%		56	0	0.0%	
58	1	0.7%		58	0	0.0%	
60	0	0.0%		60	0	0.0%	
62	0	0.0%		62	0	0.0%	
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%		68	1	0.9%	
70	0	0.0%	Age 4	70	0	0.0%	Age 4
72	1	0.7%	n=8	72	1	0.9%	n=29
74	1	0.7%	5.6%	74	2	1.8%	25.7%
76	0	0.0%		76	1	0.9%	
78	2	1.4%		78	4	3.5%	
80	0	0.0%		80	9	8.0%	
82	4	2.8%		82	11	9.7%	
84	10	7.0%		84	18	15.9%	
86	8	5.6%		86	11	9.7%	
88	6	4.2%		88	26	23.0%	
90	15	10.6%		90	15	13.3%	
92	28	19.7%	Age 5	92	7	6.2%	Age 5
94	17	12.0%	n=132	94	5	4.4%	n=84
96	20	14.1%	93.0%	96	2	1.8%	74.3%
98	6	4.2%		98	0	0.0%	
100	11	7.8%		100	0	0.0%	
102	4	2.8%		102	0	0.0%	
104	5	3.5%		104	0	0.0%	
106	2	1.4%		106	0	0.0%	
Total	142				113		

^a Age break criteria: Clearwater Hatchery Run Report 1998, IDFG, unpublished.

^b A total of (90) fish were trapped at Red River and (277) at Crooked River.

^c An additional (112) fish were trapped, sex undetermined.

Table A6. Length frequency and age composition of spring chinook salmon trapped at the Powell weir, 1998^{ab}.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
40	0	0.0%		40	0	0.0%	
42	0	0.0%		42	0	0.0%	
44	0	0.0%		44	0	0.0%	
46	0	0.0%		46	0	0.0%	
48	0	0.0%	Jacks	48	0	0.0%	
50	0	0.0%	n=1	50	0	0.0%	n=0
52	0	0.0%	0.4%	52	0	0.0%	0.0%
54	0	0.0%		54	0	0.0%	
56	0	0.0%		56	0	0.0%	
58	0	0.0%		58	0	0.0%	
60	0	0.0%		60	0	0.0%	
62	1	0.4%		62	0	0.0%	
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	2	0.7%		68	2	0.8%	
70	7	2.6%	Age 4	70	15	6.1%	Age 4
72	8	3.0%	n=75	72	19	7.7%	n=106
74	13	4.9%	28.1%	74	17	6.8%	42.7%
76	5	1.9%		76	25	10.1%	
78	9	3.4%		78	11	4.4%	
80	19	7.1%		80	9	3.6%	
82	12	4.5%		82	8	3.2%	
84	7	2.6%		84	11	4.4%	
86	4	1.5%		86	24	9.7%	
88	11	4.1%		88	32	12.9%	
90	21	7.9%		90	33	13.3%	
92	19	7.1%	Age 5	92	22	8.9%	Age 5
94	29	10.9%	n=191	94	8	3.3%	n=142
96	33	12.4%	71.5%	96	12	4.8%	57.3%
98	20	7.5%		98	0	0.0%	
100	24	9.0%		100	0	0.0%	
102	11	4.1%		102	0	0.0%	
104	10	3.7%		104	0	0.0%	
106	2	0.7%		106	0	0.0%	
Total	267			Total	248		

^a Age break criteria: Clearwater Hatchery Run Report 1998, IDFG, unpublished.

^b An additional (26) fish were trapped, sex undetermined.

Table A7. Length frequency and age composition of spring chinook salmon trapped at the Pahsimeroi Hatchery weir, 1998.^a

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
38	0	0.0%		38	0	0.0%	
40	0	0.0%		40	0	0.0%	
42	0	0.0%		42	0	0.0%	
44	0	0.0%		44	0	0.0%	
46	0	0.0%		46	0	0.0%	
48	1	1.3%	Jacks	48	0	0.0%	
50	1	1.3%	n=15	50	0	0.0%	n=0
52	2	2.7%	20.3%	52	0	0.0%	0.0%
54	2	2.7%		54	0	0.0%	
56	3	4.1%		56	0	0.0%	
58	2	2.7%		58	0	0.0%	
60	4	5.4%		60	0	0.0%	
62	3	4.1%		62	0	0.0%	
64	0	0.0%		64	0	0.0%	
66	1	1.3%		66	0	0.0%	
68	0	0.0%		68	0	0.0%	
70	0	0.0%	Age 4	70	0	0.0%	Age 4
72	0	0.0%	n=11	72	2	3.8%	n=12
74	1	1.3%	14.8%	74	0	0.0%	22.6%
76	2	2.7%		76	2	3.8%	
78	1	1.3%		78	4	7.5%	
80	1	1.3%		80	2	3.8%	
82	2	2.7%		82	2	3.8%	
84	2	2.7%		84	3	5.7%	
86	1	1.3%		86	1	1.9%	
88	1	1.3%		88	7	13.2%	
90	4	5.4%		90	15	28.3%	
92	10	13.5%	Age 5	92	7	13.2%	Age 5
94	8	10.8%	n=48	94	6	11.3%	n=41
96	4	5.4%	64.9%	96	1	1.9%	77.4%
98	5	6.8%		98	1	1.9%	
100	6	8.1%		100	0	0.0%	
102	2	2.7%		102	0	0.0%	
104	3	4.1%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	2	2.7%		108	0	0.0%	
Total	74				53		

^a Age break criteria: Pahsimeroi Hatchery Run Report 1998, IDFG, unpublished.

APPENDIX B

Table B1. Traditional spawning ground survey trend areas where carcass counts were conducted but no carcasses were sampled by Idaho Department of Fish and Game personnel, 1998.

Drainage	Stream
Clearwater River	Newsome Creek Brushy Fork
Selway	Whitecap Creek Bear Creek Moose Creek Running Creek
Salmon River (Lower)	Chamberlain Creek W. Fk. Chamberlain Creek
Salmon River (Upper)	E. Fk. Salmon River Herd Creek Valley Creek
M. Fk. Salmon River	Knapp Creek Beaver Creek

Table B2. Length frequency and age composition of spring chinook salmon carcasses recovered from Bear Valley Creek (M. Fk. Salmon River drainage) during spawning ground surveys, 1998. All carcasses were sampled by Idaho Department of Fish and Game personnel.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
48	0	0.0%	Jacks	48	0	0.0%	
58	0	0.0%	n=0	58	0	0.0%	n=0
60	0	0.0%	0.0%	60	0	0.0%	0.0%
62	0	0.0%		62	0	0.0%	
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%	Age 4	68	0	0.0%	Age 4
70	0	0.0%	n=0	70	0	0.0%	n=1
72	0	0.0%	6.7%	72	0	0.0%	10.0%
74	1	6.7%		74	0	0.0%	
76	0	0.0%		76	1	10.0%	
78	0	0.0%		78	0	0.0%	
80	0	0.0%		80	0	0.0%	
82	0	0.0%		82	0	0.0%	
84	0	0.0%		84	0	0.0%	
86	1	6.7%		86	0	0.0%	
88	0	0.0%		88	3	30.0%	
90	1	6.7%		90	4	40.0%	
92	4	26.6%	Age 5	92	0	0.0%	Age 5
94	1	6.7%	n=0	94	1	10.0%	n=9
96	1	6.7%	93.3%	96	1	10.0%	90.0%
98	2	13.3%		98	0	0.0%	
100	1	6.7%		100	0	0.0%	
102	0	0.0%		102	0	0.0%	
104	2	13.3%		104	0	0.0%	
106	1	6.7%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
Total	15				10 ^b		

^a Age break criteria: Kiefer et al. 1992.

^b An additional (2) 3-ocean females were observed but unmeasured.

Table B3. Length frequency and age composition of spring chinook salmon carcasses recovered from Big Creek (M. FK. Salmon River drainage) spawning ground surveys, 1998^B.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
48	0	0.0%		48	0	0.0%	
50	0	0.0%		50	0	0.0%	
52	0	0.0%	Jacks	52	0	0.0%	
54	0	0.0%	n=0	54	0	0.0%	n=0
56	0	0.0%	0.0%	56	0	0.0%	0.0%
58	0	0.0%		58	0	0.0%	
60	0	0.0%		60	0	0.0%	
62	0	0.0%		62	0	0.0%	
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%	Age 4	68	0	0.0%	Age 4
70	0	0.0%	n=0	70	0	0.0%	n=0
72	0	0.0%	0.0%	72	0	0.0%	0.0%
74	0	0.0%		74	0	0.0%	
76	0	0.0%		76	0	0.0%	
78	0	0.0%		78	0	0.0%	
80	0	0.0%		80	0	0.0%	
82	0	0.0%		82	0	0.0%	
84	0	0.0%		84	0	0.0%	
86	0	0.0%		86	0	0.0%	
88	0	0.0%		88	0	0.0%	
90	0	0.0%		90	0	0.0%	
92	0	0.0%	Age 5	92	0	0.0%	Age 5
94	0	0.0%	n=0	94	0	0.0%	n=0
96	0	0.0%	0.0%	96	0	0.0%	0.0%
98	0	0.0%		98	0	0.0%	
100	0	0.0%		100	0	0.0%	
102	0	0.0%		102	0	0.0%	
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
114	0	0.0%		114	0	0.0%	
116	0	0.0%		116	0	0.0%	
Total	0				1 ^b		

^a Age break criteria: Kiefer et al. 1992.

^b An additional female carcass was sampled by Nez Perce personnel: unmeasured.

Table B4. Length frequency and age composition of summer chinook salmon carcasses recovered from Elk Creek (M. Fk. Salmon River drainage) during spawning ground surveys, 1998^a.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
50	0	0.0%		50	0	0.0%	
58	0	0.0%	Jacks	58	0	0.0%	
60	0	0.0%	n=0	60	0	0.0%	n=0
62	0	0.0%	0.0%	62	0	0.0%	0.0%
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%		68	0	0.0%	
70	0	0.0%		70	0	0.0%	
72	0	0.0%		72	0	0.0%	
74	0	0.0%	Age 4	74	0	0.0%	Age 4
76	1	5.9%	n=1	76	1	2.9%	n=11
78	0	0.0%	5.90%	78	0	0.0%	32.4%
80	0	0.0%		80	0	0.0%	
82	0	0.0%		82	1	2.9%	
84	0	0.0%		84	0	0.0%	
86	0	0.0%		86	1	2.9%	
88	0	0.0%		88	8	23.5%	
90	1	5.9%		90	9	26.5%	
92	0	0.0%		92	5	14.7%	
94	0	0.0%		94	4	11.8%	
96	0	0.0%		96	2	5.9%	
98	1	5.9%	Age 5	98	3	8.8%	Age 5
100	2	11.8%	N=16	100	0	0.0%	n=23
102	3	17.6%	94.1%	102	0	0.0%	67.6%
104	3	17.6%		104	0	0.0%	
106	2	11.8%		106	0	0.0%	
108	1	5.9%		108	0	0.0%	
110	3	17.6%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
Total	17				34		

^a Age break criteria: Kiefer et al. 1992.

^b An additional (16) males, (1) female and (4) sex unknown were observed but not measured.

Table B5. Length frequency and age composition of summer chinook salmon carcasses recovered from Sulphur Creek (M. Fk. Salmon River drainage) during spawning ground surveys, 1998^a.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
50	0	0.0%		50	0	0.0%	
58	0	0.0%	Jacks n=0 0.0%	58	0	0.0%	
60	0	0.0%		60	0	0.0%	n=0
62	0	0.0%		62	0	0.0%	0.0%
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%		68	0	0.0%	
70	0	0.0%		70	0	0.0%	
72	0	0.0%		72	0	0.0%	
74	0	0.0%	Age 4 n=0 0.0%	74	0	0.0%	Age 4
76	0	0.0%		76	0	0.0%	n=1
78	0	0.0%		78	0	0.0%	50.0%
80	0	0.0%		80	0	0.0%	
82	0	0.0%		82	0	0.0%	
84	0	0.0%		84	0	0.0%	
86	0	0.0%		86	1	25.0%	
88	0	0.0%		88	1	25.0%	
90	0	0.0%		90	2	50.0%	
92	0	0.0%		92	0	0.0%	
94	0	0.0%		94	0	0.0%	
96	0	0.0%		96	0	0.0%	
98	1	25.0%	Age 5 n=4 0.0%	98	0	0.0%	Age 5
100	1	25.0%		100	0	0.0%	n=2
102	1	25.0%		102	0	0.0%	50.0%
104	0	0.0%		104	0	0.0%	
106	1	25.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
Total	4 ^b				4		

^a Age break criteria: Kiefer et al. 1992.

^b An additional 3-ocean male and (1) sex unknown were observed by not measured.

Table B6. Length frequency and age composition of summer chinook salmon carcasses recovered from S.Fk. Salmon River during spawning ground surveys, 1998^a.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
52	0	0.0%		52	0	0.0%	
54	0	0.0%		54	0	0.0%	
56	0	0.0%	Jacks	56	0	0.0%	
58	0	0.0%	n=0	58	0	0.0%	n=0
60	0	0.0%	0.0%	60	0	0.0%	0.0%
62	0	0.0%		62	0	0.0%	
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%		68	0	0.0%	
70	0	0.0%		70	0	0.0%	
72	0	0.0%		72	0	0.0%	
74	0	0.0%		74	0	0.0%	
76	0	0.0%	Age 4	76	0	0.0%	Age 4
78	0	0.0%	n=00	78	0	0.0%	n=000
80	0	0.0%	00.0%	80	0	0.0%	00.0%
82	0	0.0%		82	0	0.0%	
84	0	0.0%		84	0	0.0%	
86	0	0.0%		86	0	0.0%	
88	0	0.0%		88	0	0.0%	
90	0	0.0%		90	0	0.0%	
92	0	0.0%	Age 5	92	0	0.0%	Age 5
94	0	0.0%	n=00	94	0	0.0%	n=0
96	0	0.0%	00.0%	96	0	0.0%	0.0%
98	0	0.0%		98	0	0.0%	
100	0	0.0%		100	0	0.0%	
102	0	0.0%		102	0	0.0%	
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
Total	96 ^b			Total	109 ^b		

^a Age break criteria: Kiefer et al. 1992.

^b An additional male and 7 female carcasses were sampled by IDFG personnel; unmeasured. An additional male and 2 sex unknown were sampled by Nez Perce Tribe personnel; unmeasured.

Table B7. Length frequency and age composition of summer chinook salmon carcasses recovered from Lake Creek (S.Fk. Salmon River drainage) during spawning ground surveys, 1998^{a,b}.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
54	1	25.0%		54	0	0.0%	
58	0	0.0%		58	0	0.0%	
60	0	0.0%	Jacks	60	0	0.0%	
62	0	0.0%	n=1	62	0	0.0%	n=0
64	0	0.0%	25.0%	64	0	0.0%	0.0%
66	0	0.0%		66	0	0.0%	
68	0	0.0%		68	0	0.0%	
70	0	0.0%		70	0	0.0%	
72	0	0.0%		72	0	0.0%	
74	1	25.0%		74	1	25.0%	
76	0	0.0%	Age 4	76	0	0.0%	Age 4
78	1	25.0%	n=2	78	0	0.0%	n=2
80	0	0.0%	50.0%	80	1	25.0%	50.0%
82	0	0.0%		82	0	0.0%	
84	0	0.0%		84	0	0.0%	
86	0	0.0%		86	0	0.0%	
88	0	0.0%		88	0	0.0%	
90	0	0.0%		90	1	25.0%	
92	0	0.0%		92	1	25.0%	
94	1	25.0%		94	0	0.0%	
96	0	0.0%		96	0	0.0%	
98	0	0.0%	Age 5	98	0	0.0%	Age 5
100	0	0.0%	n=1	100	0	0.0%	n=2
102	0	0.0%	25.0%	102	0	0.0%	50.0%
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
Total	10 ^c				6		

^a Age break criteria: Kiefer et al. 1992.

^b Twenty-one carcasses were sampled by Nez Perce Tribe personnel.

Table B8. Length frequency and age composition of summer chinook salmon carcasses recovered from the Secesh River (S.Fk. Salmon River drainage) during spawning ground surveys, 1997^{ab}.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
54	0	0.0%		54	0	0.0%	
56	0	0.0%		56	0	0.0%	
58	0	0.0%	Jacks	58	0	0.0%	
60	0	0.0%	n=0	60	0	0.0%	n=0
62	0	0.0%	0.0%	62	0	0.0%	0.0%
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%		68	0	0.0%	
70	0	0.0%		70	0	0.0%	
72	0	0.0%		72	0	0.0%	
74	0	0.0%		74	0	0.0%	
76	0	0.0%	Age 4	76	0	0.0%	Age 4
78	0	0.0%	n=00	78	0	0.0%	n=00
80	0	0.0%	00.0%	80	0	0.0%	00.0%
82	0	0.0%		82	0	0.0%	
84	0	0.0%		84	0	0.0%	
86	0	0.0%		86	0	0.0%	
88	0	0.0%		88	0	0.0%	
90	0	0.0%		90	0	0.0%	
92	0	0.0%		92	0	0.0%	
94	0	0.0%		94	0	0.0%	
96	0	0.0%	Age 5	96	0	0.0%	Age 5
98	0	0.0%	n=0	98	0	0.0%	n=0
100	0	0.0%	0.0%	100	0	0.0%	00.0%
102	0	0.0%		102	0	0.0%	
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
Total	00				00		

^a Age break criteria: Kiefer et al. 1992.

^b Forty-four carcasses were sampled by Nez Perce Tribe personnel.

Table B9. Length frequency and age composition of summer chinook salmon carcasses recovered from Johnson Creek (S. Fk. Salmon River drainage) during spawning ground surveys, 1998^{a, b}.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
50	0	0.0%		50	0	0.0%	
58	0	0.0%	Jacks	58	0	0.0%	
60	0	0.0%	n=0	60	0	0.0%	n=0
62	0	0.0%	0.0%	62	0	0.0%	0.0%
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%		68	0	0.0%	
70	0	0.0%		70	1	2.1%	
72	0	0.0%		72	0	0.0%	
74	0	0.0%	Age 4	74	3	6.4%	Age 4
76	0	0.0%	n=00	76	7	14.9%	n=39
78	0	0.0%	00.00	78	14	29.8%	83.0%
80	0	0.0%		80	8	17.0%	
82	0	0.0%		82	3	6.4%	
84	0	0.0%		84	2	4.2%	
86	0	0.0%		86	1	2.1%	
88	0	0.0%		88	0	0.0%	
90	0	0.0%		90	2	4.2%	
92	0	0.0%		92	2	4.2%	
94	0	0.0%		94	0	0.0%	
96	0	0.0%		96	2	4.2%	
98	0	0.0%	Age 5	98	1	2.1%	Age 5
100	0	0.0%	n=0	100	0	0.0%	n=7
102	0	0.0%	0.0%	102	0	0.0%	14.9%
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
Total	105				47		

^a Age break criteria: Kiefer et al. 1992.

^B One hundred and fifty-three carcasses were sampled by Nez Perce Tribe personnel.

^c Two carcasses sampled not included in table: sex and length undetermined due to decomposition.

Table B10. Length frequency and age composition of summer chinook salmon carcasses recovered from Selway River during spawning ground surveys, 1998^a.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
58	0	0.0%	Jacks	58	0	0.0%	
60	0	0.0%	n=0	60	0	0.0%	n=0
62	0	0.0%	0.0%	62	0	0.0%	0.0%
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%	Age 4	68	0	0.0%	Age 4
70	0	0.0%	n=0	70	0	0.0%	n=0
72	0	0.0%	0.0%	72	0	0.0%	0.0%
74	0	0.0%		74	0	0.0%	
76	0	0.0%		76	0	0.0%	
78	0	0.0%		78	0	0.0%	
80	0	0.0%		80	0	0.0%	
82	0	0.0%		82	0	0.0%	
84	0	0.0%		84	0	0.0%	
86	0	0.0%		86	0	0.0%	
88	0	0.0%		88	0	0.0%	
90	0	0.0%		90	0	0.0%	
92	0	0.0%	Age 5	92	0	0.0%	Age 5
94	0	0.0%	n=0	94	0	0.0%	n=0
96	0	0.0%	0.0%	96	0	0.0%	0.0%
98	0	0.0%		98	0	0.0%	
100	0	0.0%		100	0	0.0%	
102	0	0.0%		102	0	0.0%	
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
Total	1				0		

^a Age break criteria: Kiefer et al. 1992.

Table B11. Length frequency and age composition of spring chinook salmon carcasses recovered from Crooked Fork (Lochsa River drainage) during spawning ground surveys, 1998^a. All carcasses were sampled by Idaho Department of Fish and Game personnel^b.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
58	0	0.0%	Jacks	58	0	0.0%	
60	0	0.0%	n=0	60	0	0.0%	n=0
62	0	0.0%	0.0%	62	0	0.0%	0.0%
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%	Age 4	68	0	0.0%	Age 4
70	0	0.0%	n=0	70	0	0.0%	n=2
72	0	0.0%	0.0%	72	0	0.0%	28.6%
74	0	0.0%		74	0	0.0%	
76	0	0.0%		76	0	0.0%	
78	0	0.0%		78	0	0.0%	
80	0	0.0%		80	1	14.3%	
82	0	0.0%		82	1	14.3%	
84	0	0.0%		84	1	14.3%	
86	0	0.0%		86	1	14.3%	
88	0	0.0%		88	1	14.3%	
90	2	33.3%		90	1	14.3%	
92	3	50.0%	Age 5	92	1	14.3%	Age 5
94	0	0.0%	n=6	94	0	0.0%	n=5
96	0	0.0%	100.0%	96	0	0.0%	71.4%
98	1	16.7%		98	0	0.0%	
100	0	0.0%		100	0	0.0%	
102	0	0.0%		102	0	0.0%	
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
Total	6				7		

^a Age break criteria: Kiefer et al. 1992.

^b Two carcasses were observed but length and sex were undetermined due to decomposition. Two additional females were observed but not measured and one additional carcass 84 cm in length, sex undetermined was also sampled.

Table B12. Length frequency and age composition of spring chinook salmon carcasses recovered from Red River (S. Fk. Clearwater River drainage) during spawning ground surveys, 1998. All carcasses were sampled by Idaho Department of Fish and Game personnel^b.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
44	0	0.0%		44	0	0.0%	
58	0	0.0%	Jacks	58	0	0.0%	
60	0	0.0%	n=0	60	0	0.0%	n=4
62	0	0.0%	0.0%	62	0	0.0%	0.0%
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%	Age 4	68	1	4.5%	Age 4
70	1	4.8%	n=5	70	0	0.0%	n=6
72	0	0.0%	23.7%	72	0	0.0%	27.3%
74	0	0.0%		74	1	4.5%	
76	0	0.0%		76	0	0.0%	
78	0	0.0%		78	0	0.0%	
80	4	19.00%		80	4	18.3%	
82	1	4.8%		82	4	18.3%	
84	0	0.0%		84	2	9.1%	
86	1	4.8%		86	3	13.6%	
88	1	4.8%		88	3	13.6%	
90	3	14.3%		90	2	9.1%	
92	1	4.8%	Age 5	92	0	0.0%	Age 5
94	4	19.0%	n=16	94	1	4.5%	n=16
96	4	19.0%	76.3%	96	1	4.5%	72.7%
98	0	0.0%		98	0	0.0%	
100	1	4.8%		100	0	0.0%	
102	0	0.0%		102	0	0.0%	
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
Total	21			Total	22		

^a Age break criteria: Kiefer et al. 1992.

^b Three additional males and one additional female were sampled but not measured. Also one additional fish at 102 cm in length, sex undetermined and five fish sex and length undetermined were sampled.

Table B13. Length frequency and age composition of summer chinook salmon carcasses recovered from American River (S.Fk. Clearwater drainage) during spawning ground surveys, 1998^a.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
50	0	0.0%		50	0	0.0%	
58	0	0.0%	Jacks n=0 0.0%	58	0	0.0%	n=0 0.0%
60	0	0.0%		60	0	0.0%	
62	0	0.0%		62	0	0.0%	
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	0	0.0%	
68	0	0.0%	Age 4 n=4 23.5%	68	1	3.0%	Age 4 n=30 91.0%
70	0	0.0%		70	1	3.0%	
72	0	0.0%		72	1	3.0%	
74	0	0.0%		74	1	3.0%	
76	0	0.0%		76	2	6.1%	
78	0	0.0%		78	3	9.1%	
80	1	5.9%		80	3	9.1%	
82	0	0.0%		82	10	30.3%	
84	1	5.9%		84	6	18.2%	
86	2	11.8%		86	2	6.1%	
88	0	0.0%	88	0	0.0%		
90	2	11.8%	Age 5 n=13 76.5%	90	1	3.0%	Age 5 n=3 9.0%
92	1	5.9%		92	1	3.0%	
94	2	11.8%		94	1	3.0%	
96	7	41.2%		96	0	0.0%	
98	1	5.9%		98	0	0.0%	
100	0	0.0%		100	0	0.0%	
102	0	0.0%		102	0	0.0%	
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%		110	0	0.0%	
112	0	0.0%		112	0	0.0%	
Total	17				33		

^a Age break criteria: Kiefer et al. 1992.

^b Two additional fish were sampled, but not sexed or measured due to decomposition.

Table B14. Length frequency and age composition of summer chinook salmon carcasses recovered from Crooked River (S.Fk. Clearwater River drainage) during spawning ground surveys, 1998^a.

Males				Females			
Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class	Fork Length (cm)	Total Number Recovered	Percent of Total	Age Class
50	0	0.0%		50	0	0.0%	
58	0	0.0%	Jacks n=0 0.0%	58	0	0.0%	
60	0	0.0%		60	0	0.0%	n=1
62	0	0.0%		62	0	0.0%	4.4%
64	0	0.0%		64	0	0.0%	
66	0	0.0%		66	1	4.4%	
68	1	4.8%	Age 4 n=21 100.0%	68	2	8.7%	
70	1	4.8%		70	3	13.0%	
72	4	19.0%		72	3	13.0%	
74	2	9.5%		74	3	13.0%	Age 4
76	4	19.5%		76	7	30.4%	n=19
78	2	9.5%		78	0	0.0%	82.6%
80	4	19.0%		80	1	4.4%	
82	0	0.0%		82	0	0.0%	
84	0	0.0%		84	0	0.0%	
86	3	14.3%		86	0	0.0%	
88	0	0.0%	88	0	0.0%		
90	0	0.0%	Age 5 n=0 0.0%	90	2	8.7%	
92	0	0.0%		92	1	4.3%	
94	0	0.0%		94	0	0.0%	
96	0	0.0%		96	0	0.0%	
98	0	0.0%		98	0	0.0%	Age 5
100	0	0.0%		100	0	0.0%	n=3
102	0	0.0%		102	0	0.0%	13.0%
104	0	0.0%		104	0	0.0%	
106	0	0.0%		106	0	0.0%	
108	0	0.0%		108	0	0.0%	
110	0	0.0%	110	0	0.0%		
112	0	0.0%	112	0	0.0%		
Total	21			Total	23		

^a Age break criteria: Kiefer et al. 1992.

APPENDIX C

Appendix C. Maps showing 1998 chinook salmon redd count transects and numbers of redds counted.

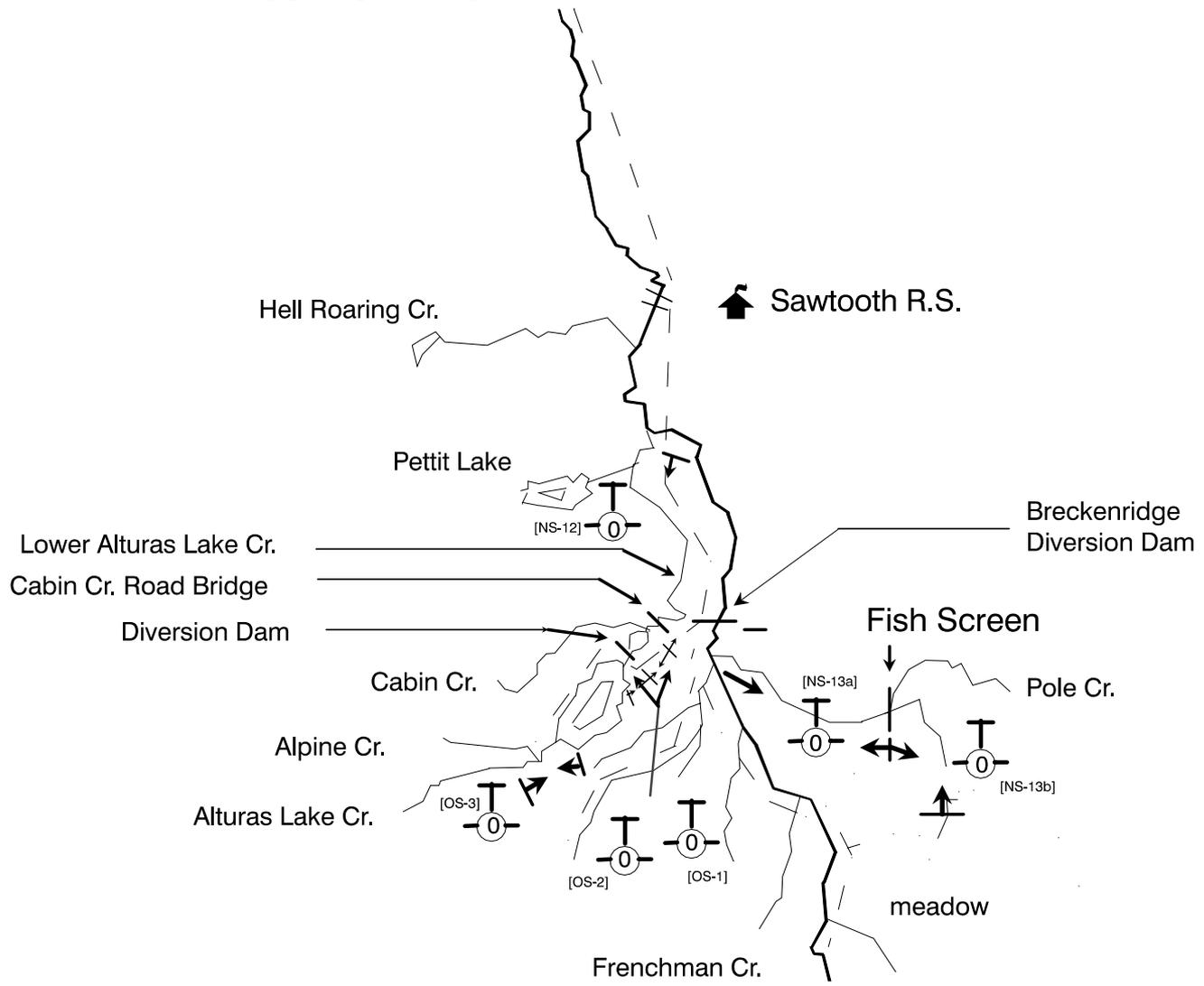
LEGEND

Transect Boundaries	
Ground Redd Counts	
Helicopter Redd Counts	
Road	
Trail	
Forest Service Station	
Campground	
Road or Highway Bridge	
Pack Bridge	
Transect Codes	[WS-##], [NS-##], [WC-##], etc.

DRAINAGE Salmon River
STREAM Alturas Lake Creek/Pole Creek
OBSERVATION CONDITIONS Poor/Moderate
TIMING Early On Time Late

SURVEY DATE 9/4/98, 9/5/98
MAP SCALE 0.78 cm = 1 mile
OBSERVER Liter & Struhs
REMARKS Helicopter

Salmon River

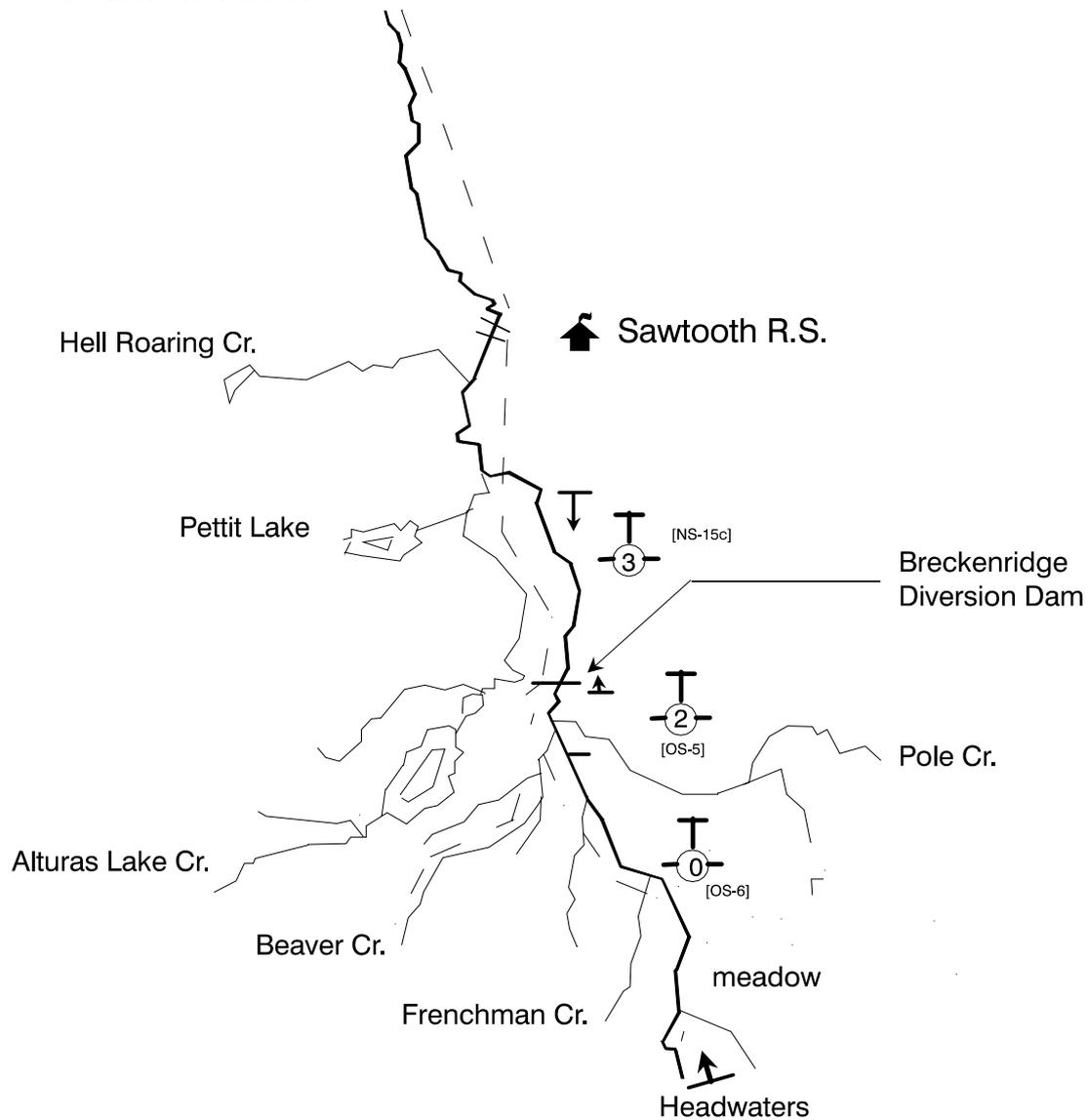


B-24

DRAINAGE Salmon River
STREAM Upper Salmon River
OBSERVATION CONDITIONS Poor/Moderate
TIMING Early On Time Late

SURVEY DATE 9/4/98, 9/5/98
MAP SCALE 0.78 cm = 1 mile
OBSERVER Liter & Struhs
REMARKS Helicopter

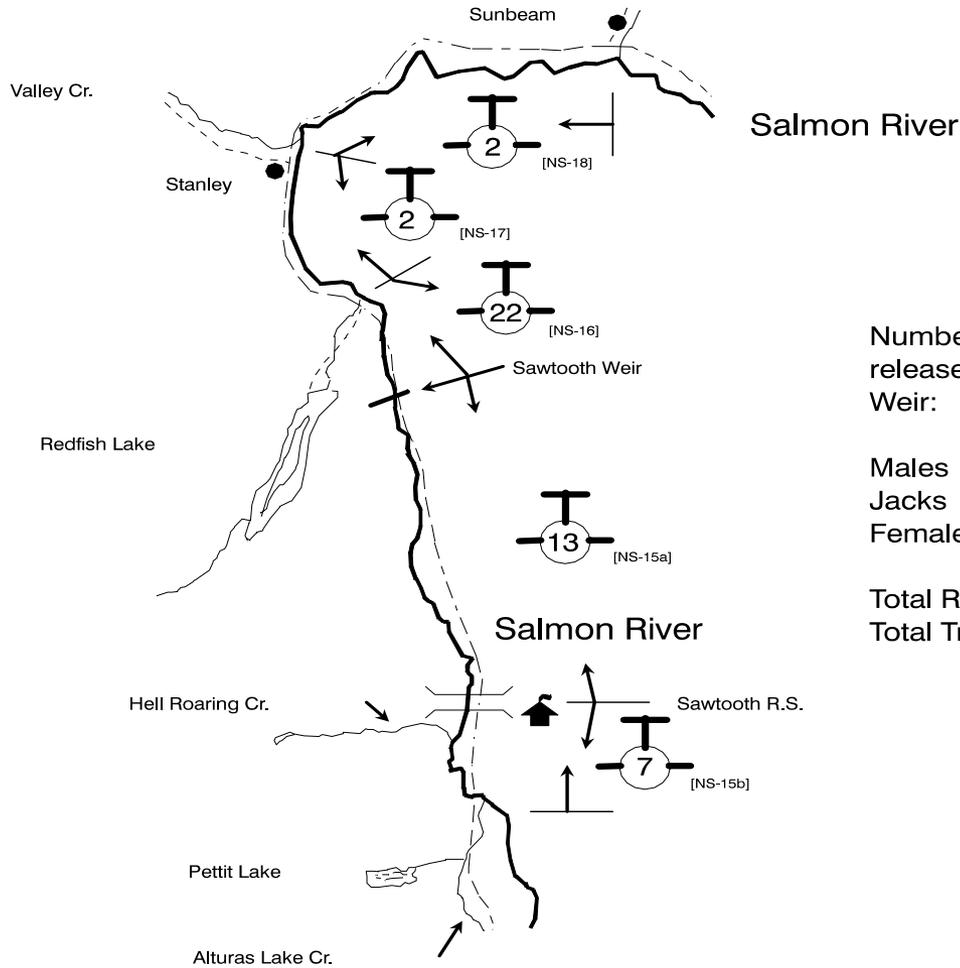
Salmon River



B-24

DRAINAGE Salmon River
 STREAM Salmon River
 OBSERVATION CONDITIONS Poor/Moderate
 TIMING Early On Time Late

SURVEY DATE 9/4/98, 9/5/98
 MAP SCALE 0.78 cm = 1 mile
 OBSERVER Liter & Struhs
 REMARKS Helicopter



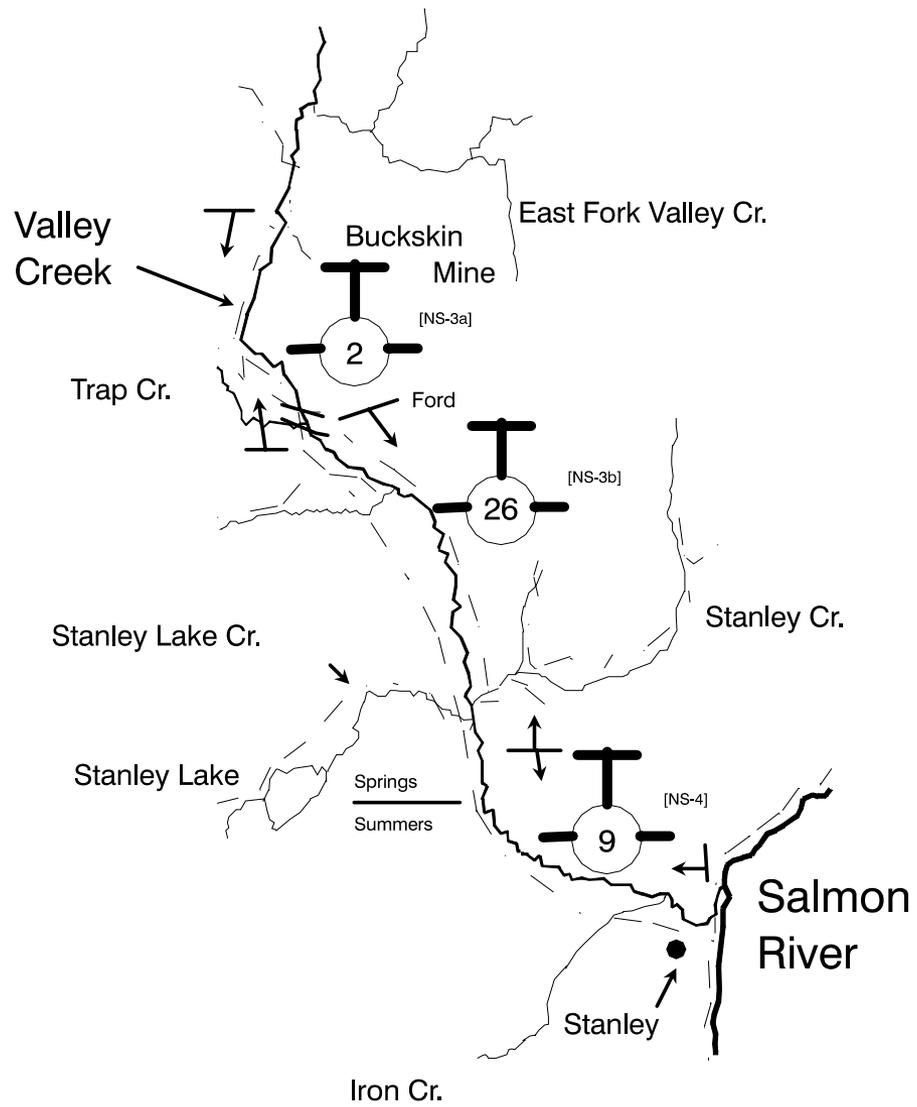
Number of Spring Chinook released above Sawtooth Weir:

Males	43
Jacks	2
Females	47

Total Released:	92
Total Trap Count:	153

DRAINAGE Salmon River
STREAM Valley Creek
OBSERVATION CONDITIONS Poor/Moderate
TIMING Early On Time Late

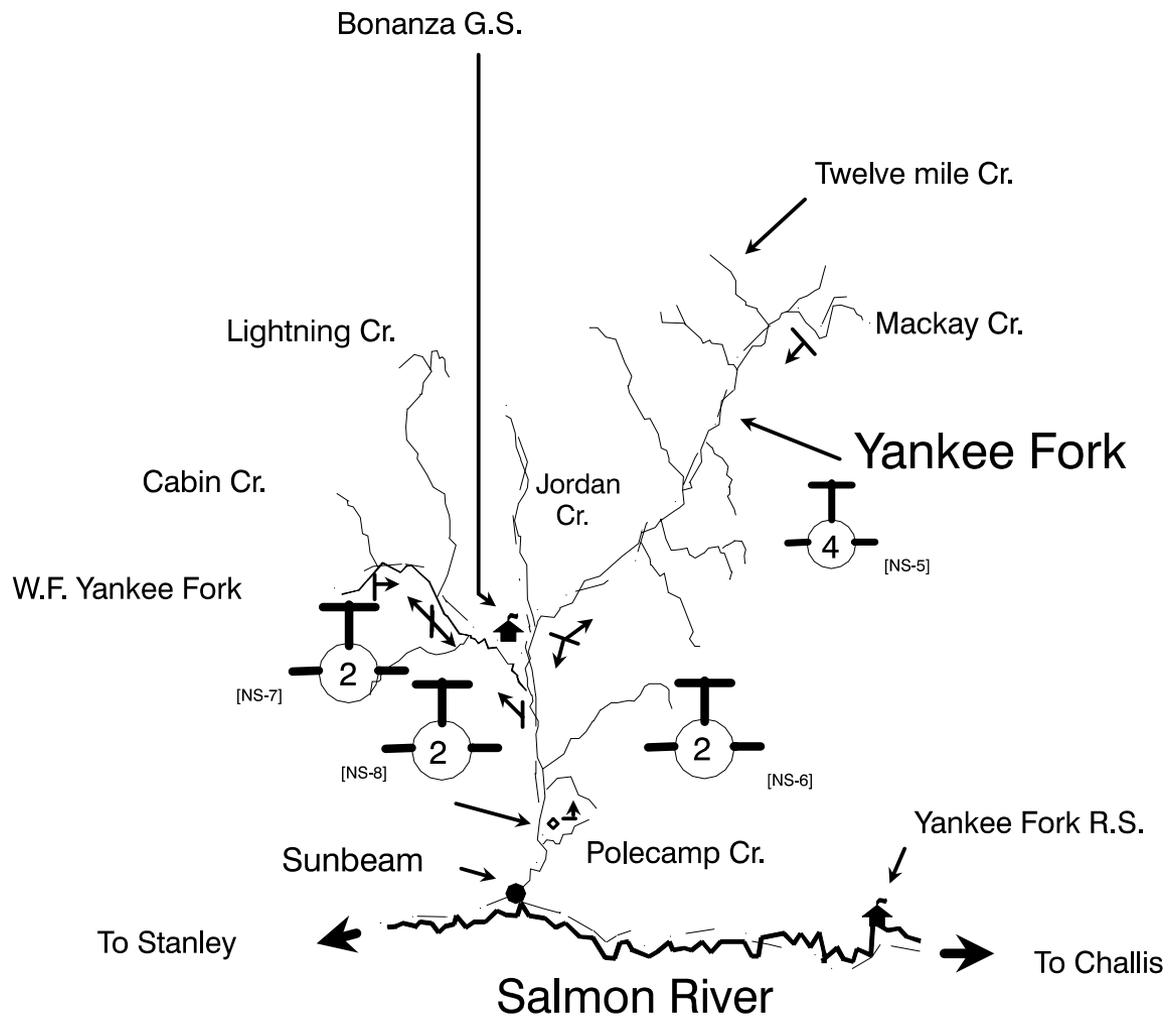
SURVEY DATE 9/4/98, 9/5/98
MAP SCALE 1.6 cm = 1 mile
OBSERVER Liter & Struhs
REMARKS Helicopter



B-10

DRAINAGE Salmon River
STREAM Yankee Fork
OBSERVATION CONDITIONS Poor/Moderate
TIMING Early On Time Late

SURVEY DATE 9/4/98, 9/5/98
MAP SCALE 0.70 cm = 1 mile
OBSERVER Liter & Struhs
REMARKS Helicopter

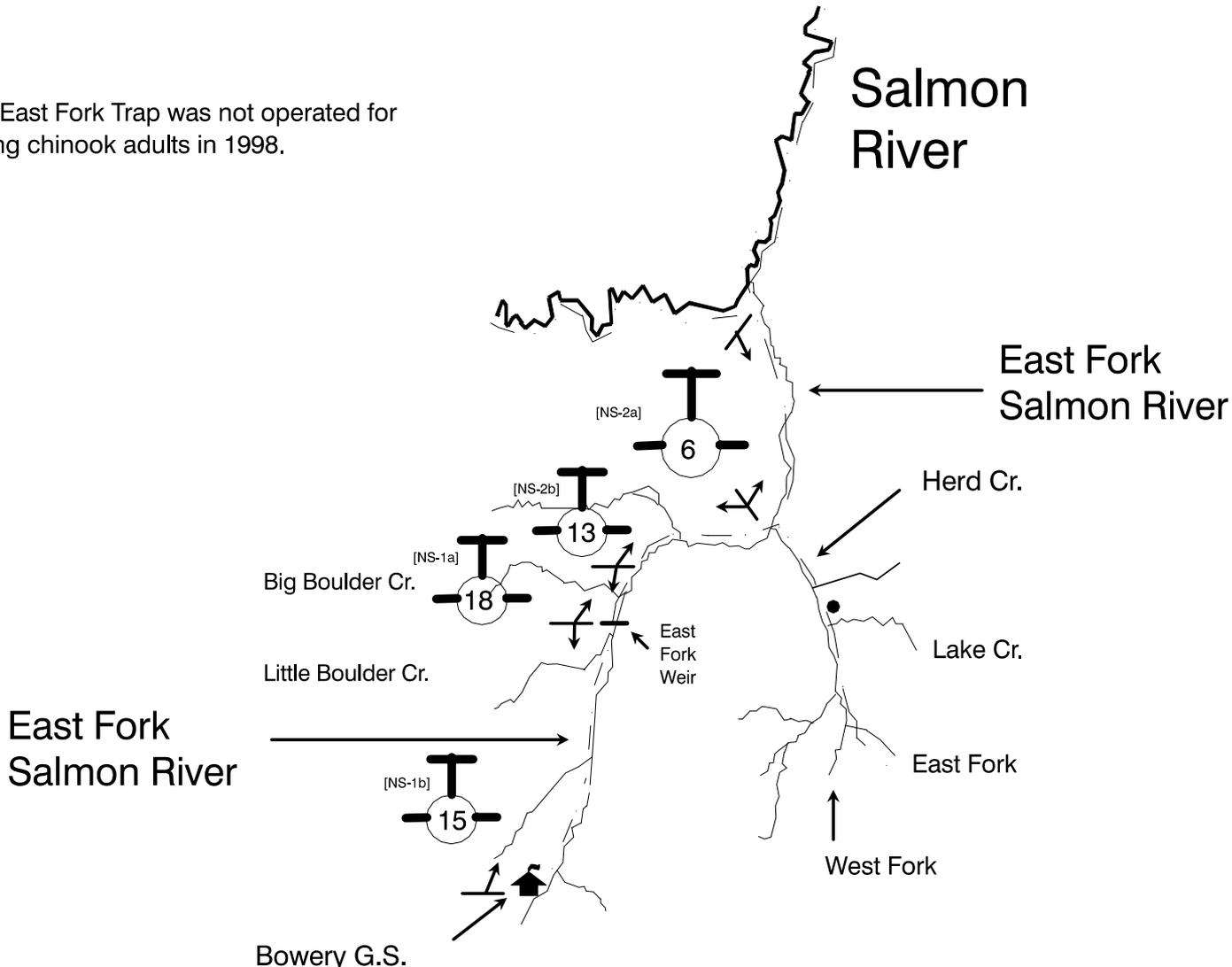


DRAINAGE Salmon River
 STREAM East Fork Salmon River
 OBSERVATION CONDITIONS Poor/Moderate
 TIMING Early On Time Late

SURVEY DATE 9/4/98, 9/5/98
 MAP SCALE 0.6 cm 1 = mile
 OBSERVER Liter & Struhs
 REMARKS Helicopter

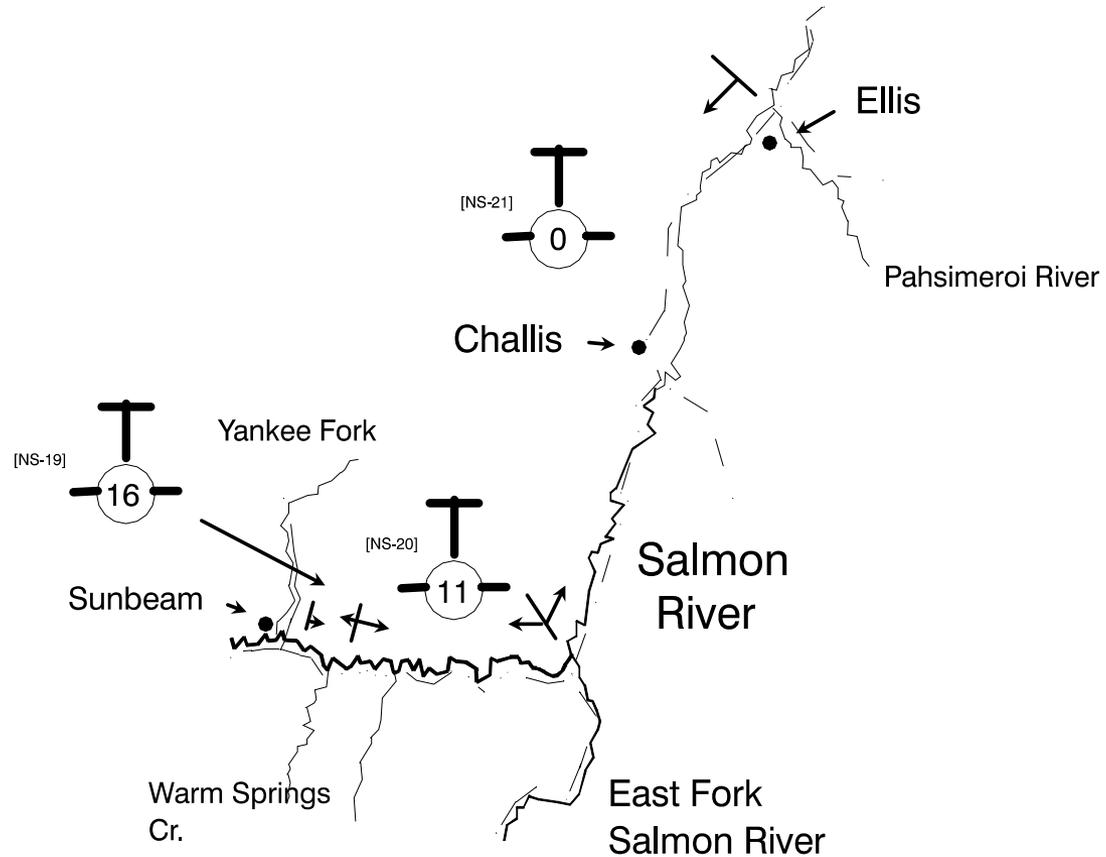
The East Fork Trap was not operated for spring chinook adults in 1998.

B-13



DRAINAGE Salmon River
STREAM Salmon River
OBSERVATION CONDITIONS Poor/Moderate
TIMING Early On Time Late

SURVEY DATE 9/4/98, 9/5/98
MAP SCALE 0.35 cm = 1 mile
OBSERVER Liter & Struhs
REMARKS Helicopter

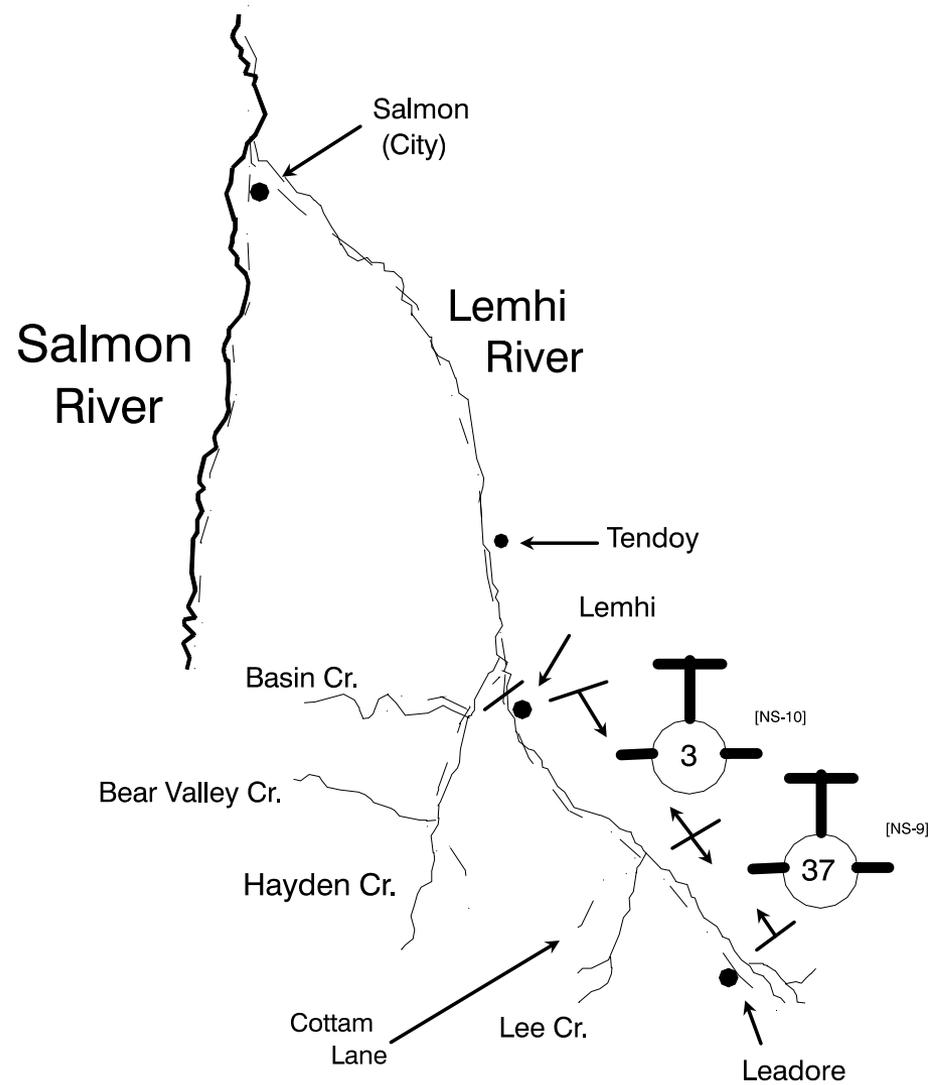


B-11

DRAINAGE Salmon River
 STREAM Lemhi River
 OBSERVATION CONDITIONS Poor/Moderate
 TIMING Early On Time Late

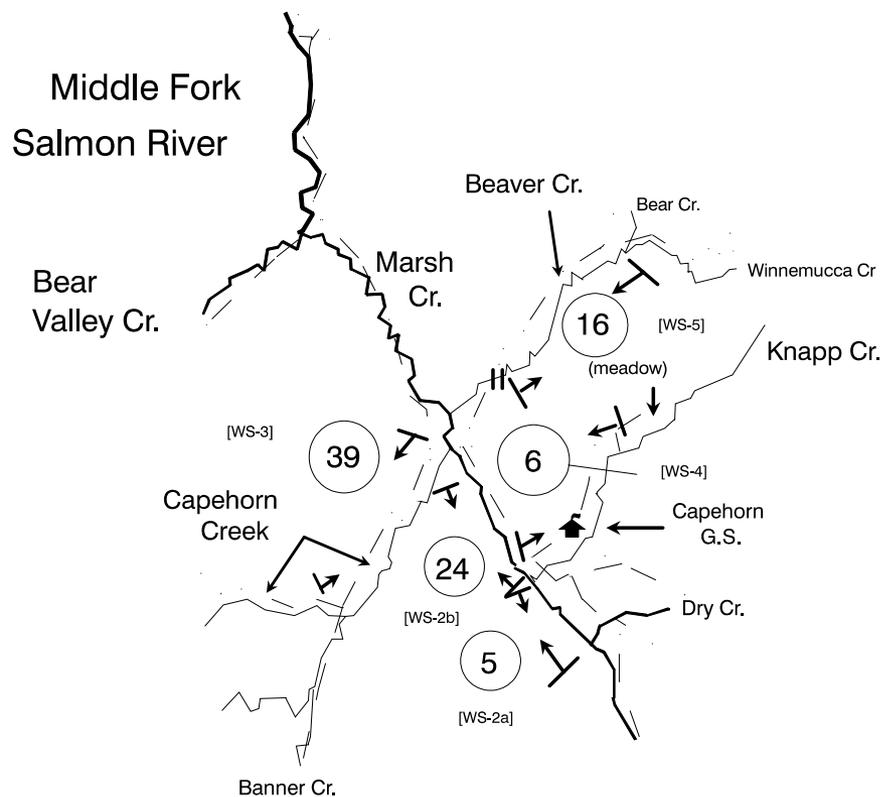
SURVEY DATE 9/4/98, 9/5/98
 MAP SCALE 0.40 cm = 1 mile
 OBSERVER Liter & Rabe
 REMARKS Helicopter

B-14



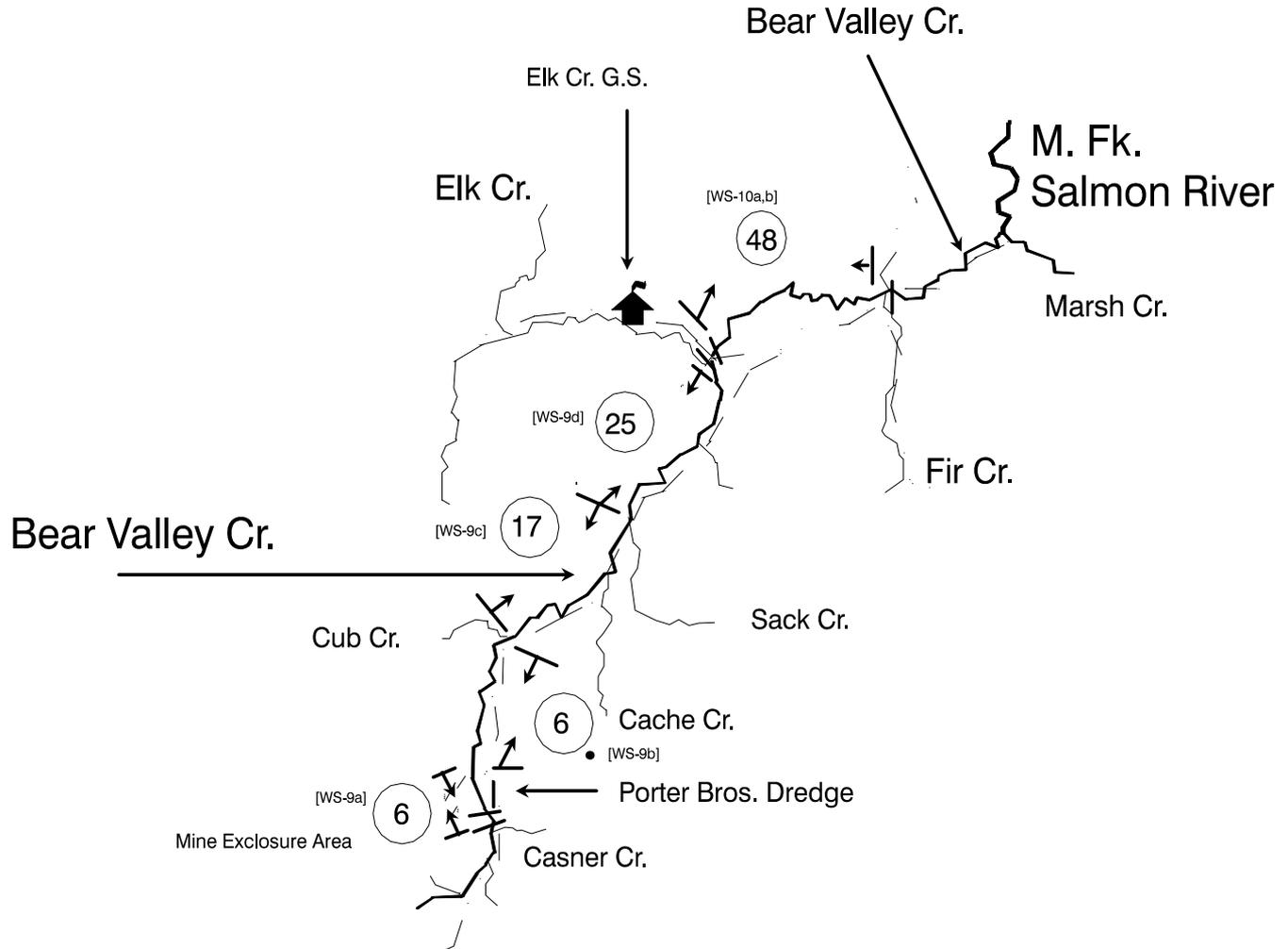
DRAINAGE Middle Fork Salmon River
 STREAM Marsh, Beaver, Knapp, and Capehorn Creeks
 OBSERVATION CONDITIONS Excellent
 TIMING Early On Time Late

SURVEY DATE 8/13, 18, 19, 20/98
 MAP SCALE 1.15 cm = 1 mile
 OBSERVER Leth & Apperson
 REMARKS Ground



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

SURVEY DATE 8/24, 25, 30/98
 MAP SCALE 0.90 cm = 1 mile
 OBSERVER Yundt
 REMARKS Ground

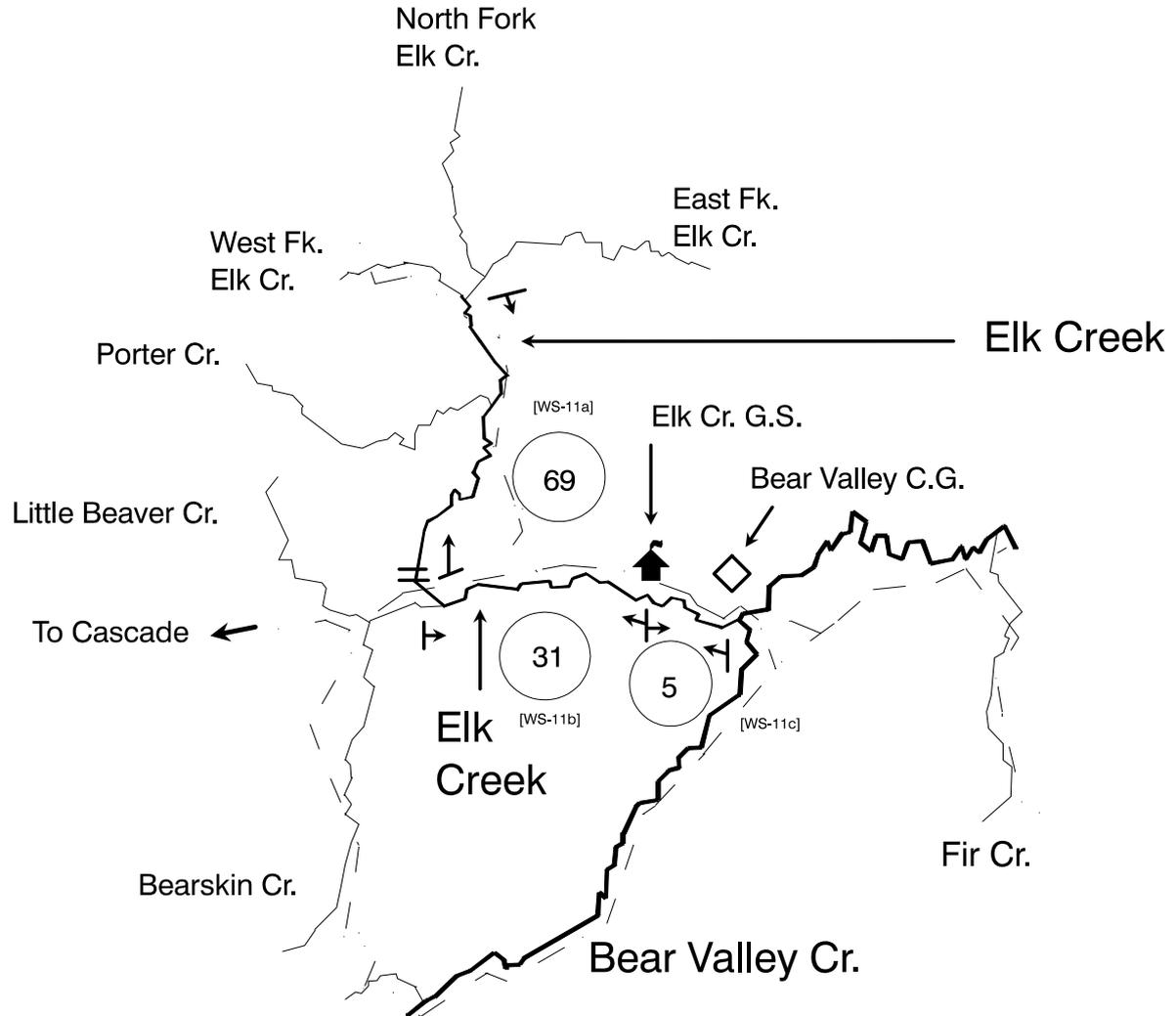


B-21

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

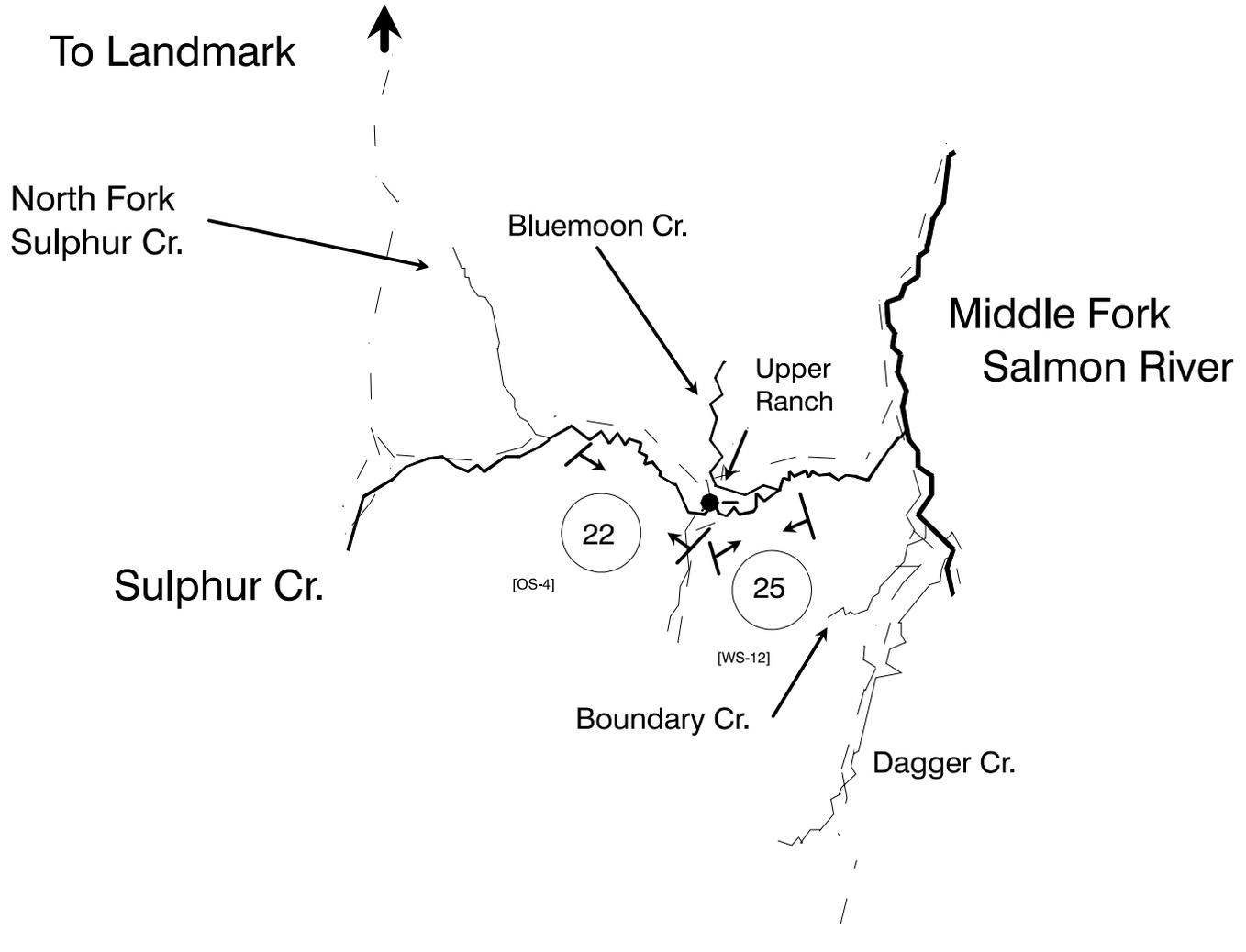
SURVEY DATE 8/25/98
 MAP SCALE 1.3 cm = 1 mile
 OBSERVER Yundt
 REMARKS Ground

B-23



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

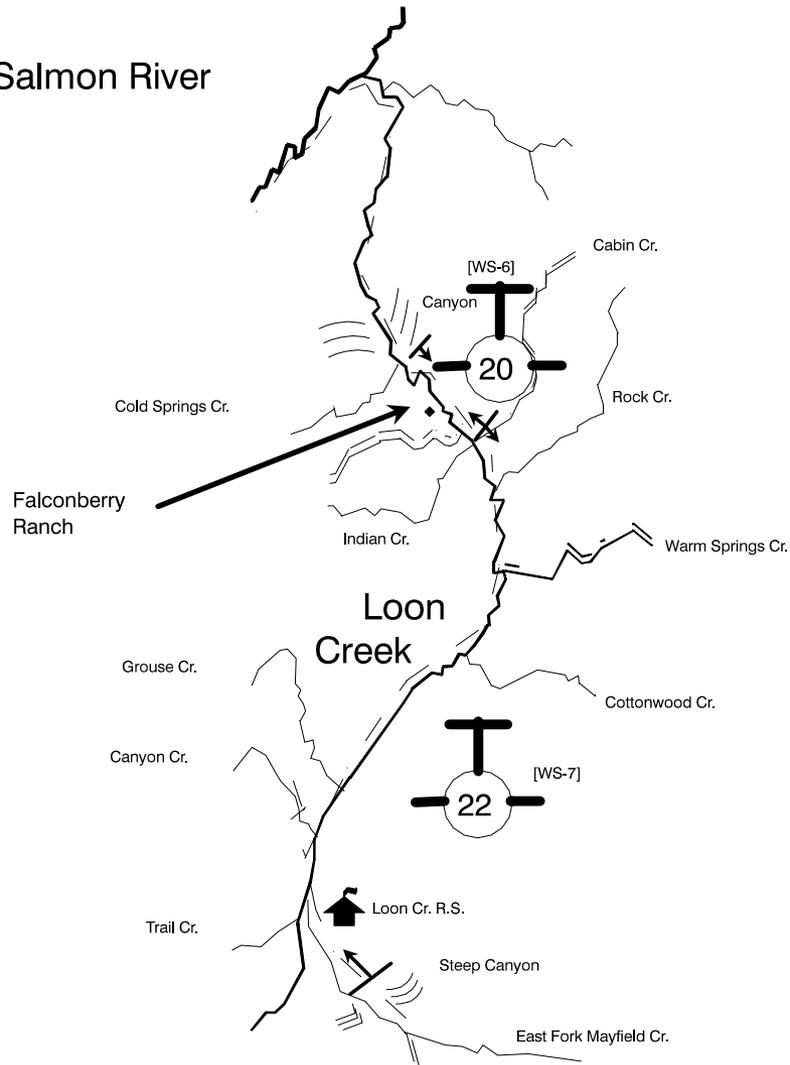
SURVEY DATE 8/26/98
MAP SCALE 1.3 cm = 1 mile
OBSERVER Yundt
REMARKS Ground



DRAINAGE Middle Fork Salmon River
STREAM Loon Creek
OBSERVATION CONDITIONS Poor/Moderate
TIMING Early On Time Late

SURVEY DATE 9/4/98, 9/5/98
MAP SCALE 0.85 cm = 1 mile
OBSERVER Liter & Struhs
REMARKS Helicopter

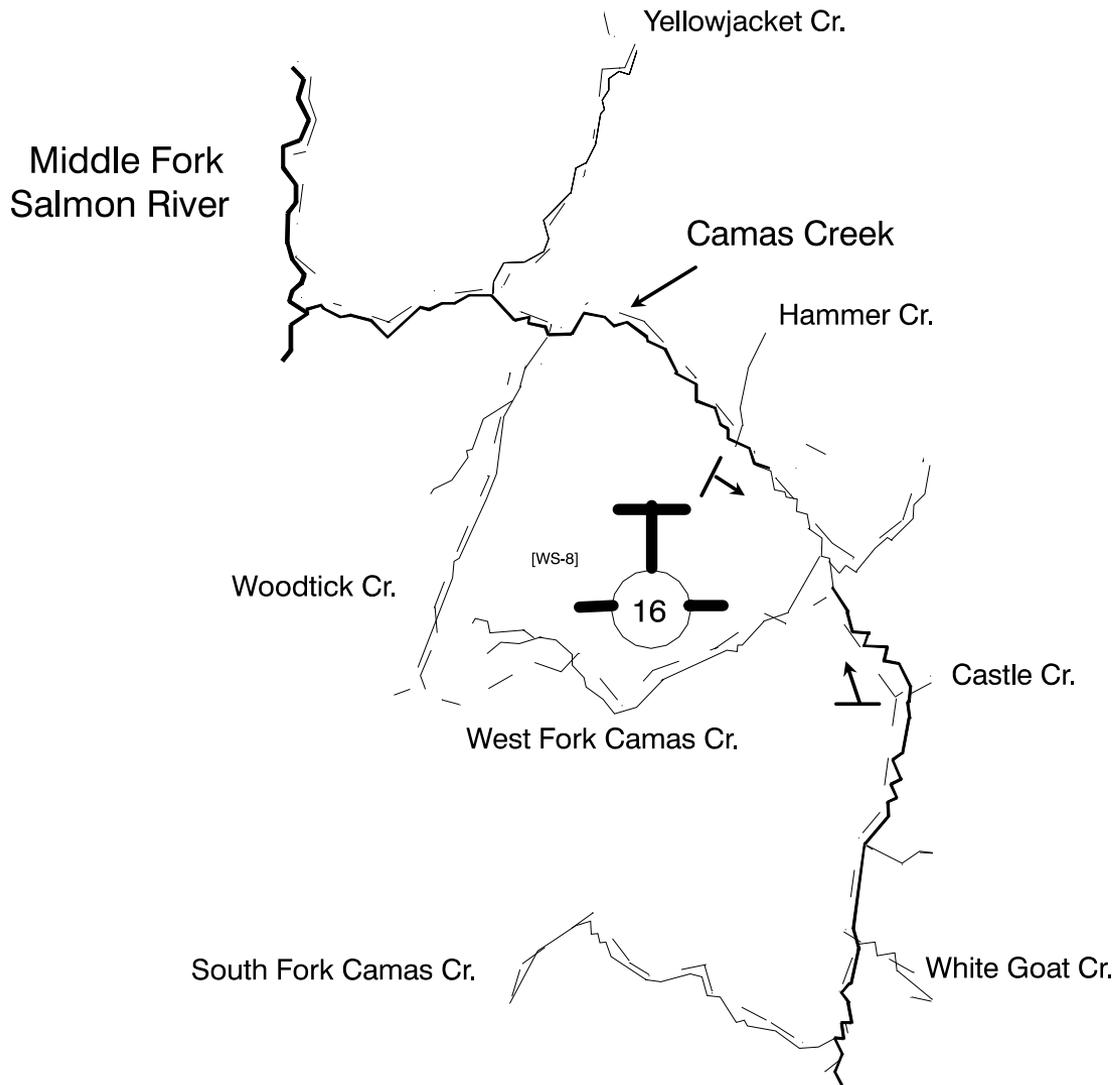
Middle Fork Salmon River



B-3

DRAINAGE Middle Fork Salmon River
STREAM Camas Creek
OBSERVATION CONDITIONS Poor/Moderate
TIMING Early On Time Late

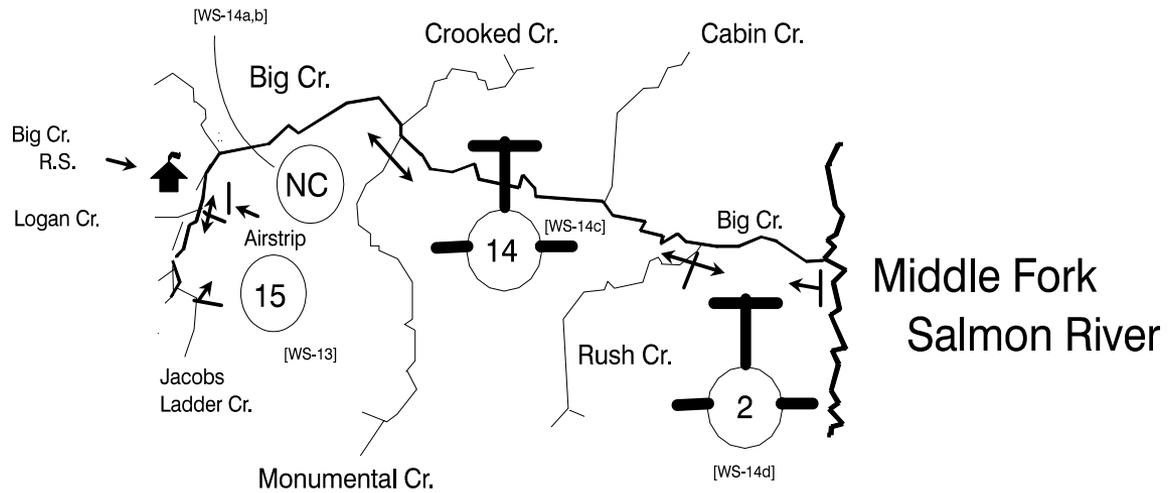
SURVEY DATE 9/4/98, 9/ 5/98
MAP SCALE 1.10 cm = 1 mile
OBSERVER Liter & Rabe
REMARKS Helicopter



B-9

DRAINAGE Middle Fork Salmon River
 STREAM Big Creek
 OBSERVATION CONDITIONS Poor/Moderate
 TIMING Early On Time Late

SURVEY DATE 8/28/97, 9/4/98, 9/5/98
 MAP SCALE 0.45 cm = 1 mile
 OBSERVER Apperson, Litter & Rabe
 REMARKS Ground, Helicopter



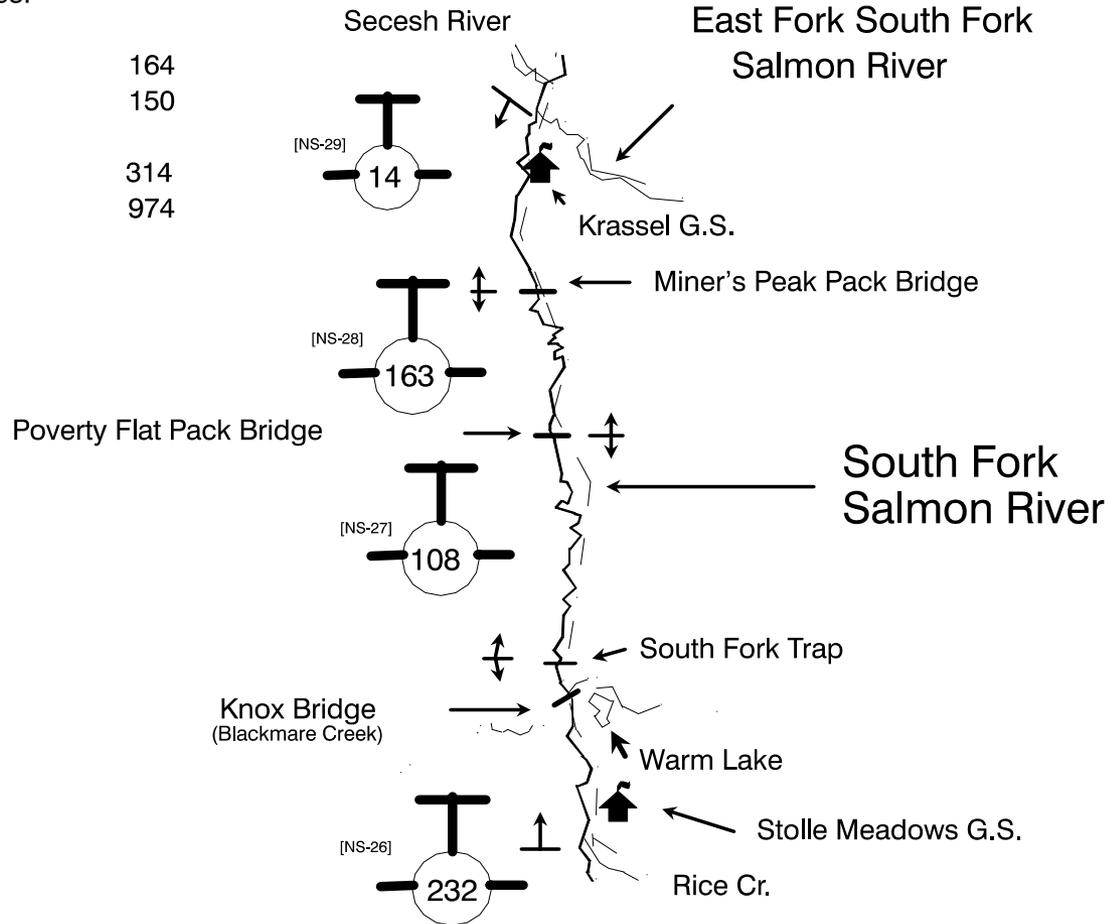
B-6

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

SURVEY DATE 8/26/98, 9/9/98
 MAP SCALE 0.40 cm = 1 mile
 OBSERVER Apperson & Anderson
 REMARKS Helicopter

Number of Chinook Salmon released
 from South Fork Salmon Trap;
 excluding re-releases:

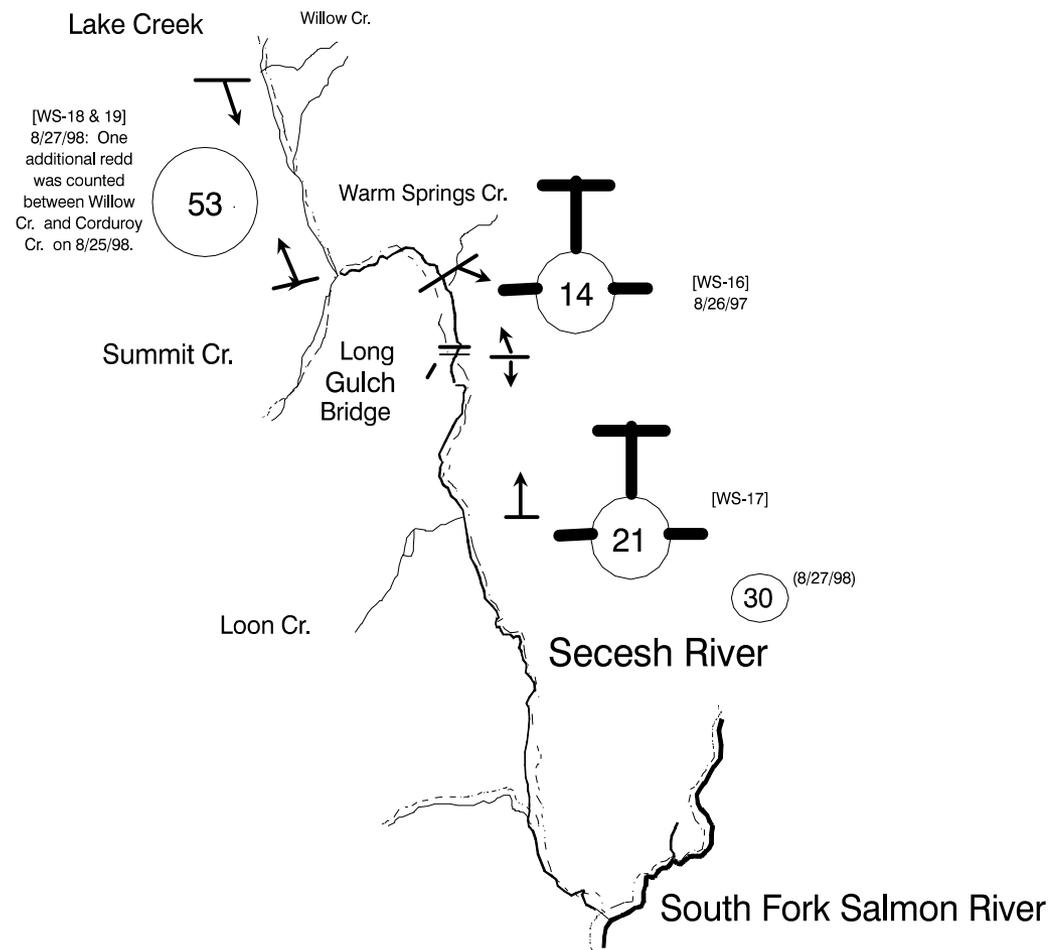
Males (incl. jacks)	164
Females	150
Total Released:	314
Total Trap Count	974



B-22

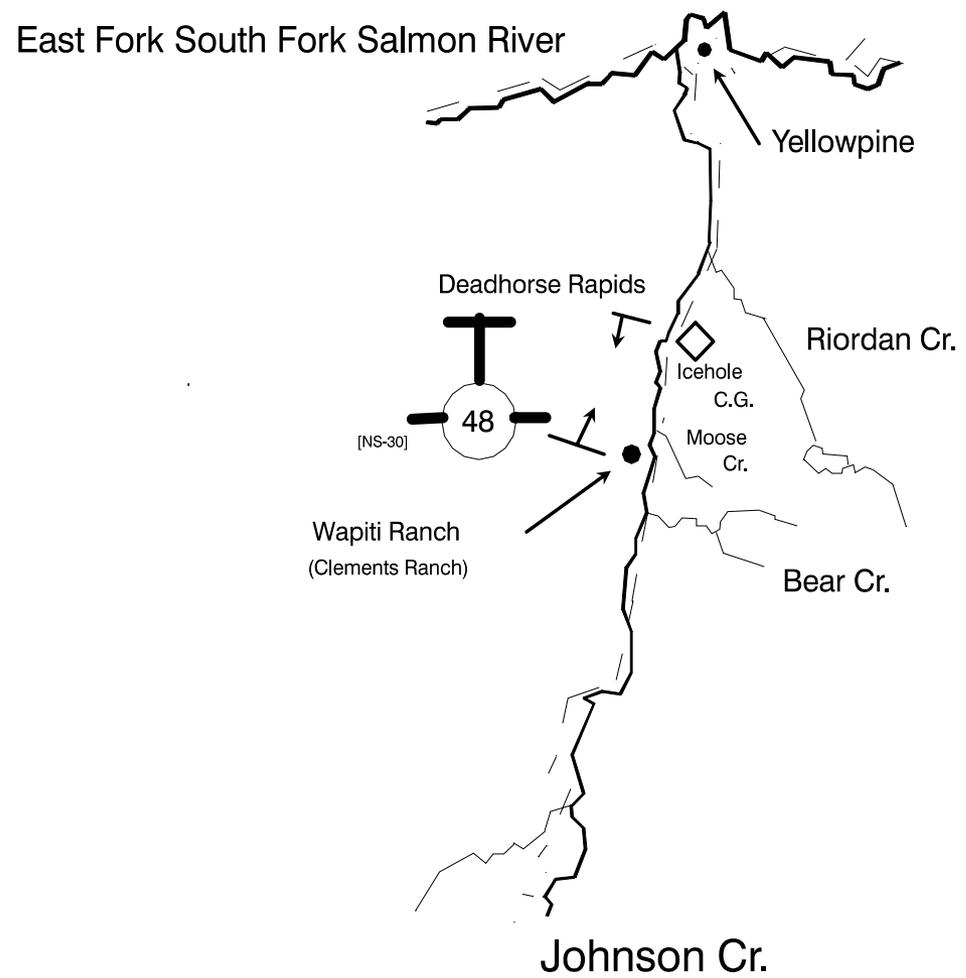
DRAINAGE South Fork Salmon River
STREAM Lake Creek - Secesh River
OBSERVATION CONDITIONS Good
TIMING Early On Time Late

SURVEY DATE 8/26/98, 8/27/98
MAP SCALE 0.65 cm = 1 mile
OBSERVER Anderson & Apperson
REMARKS Ground - Helicopter



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

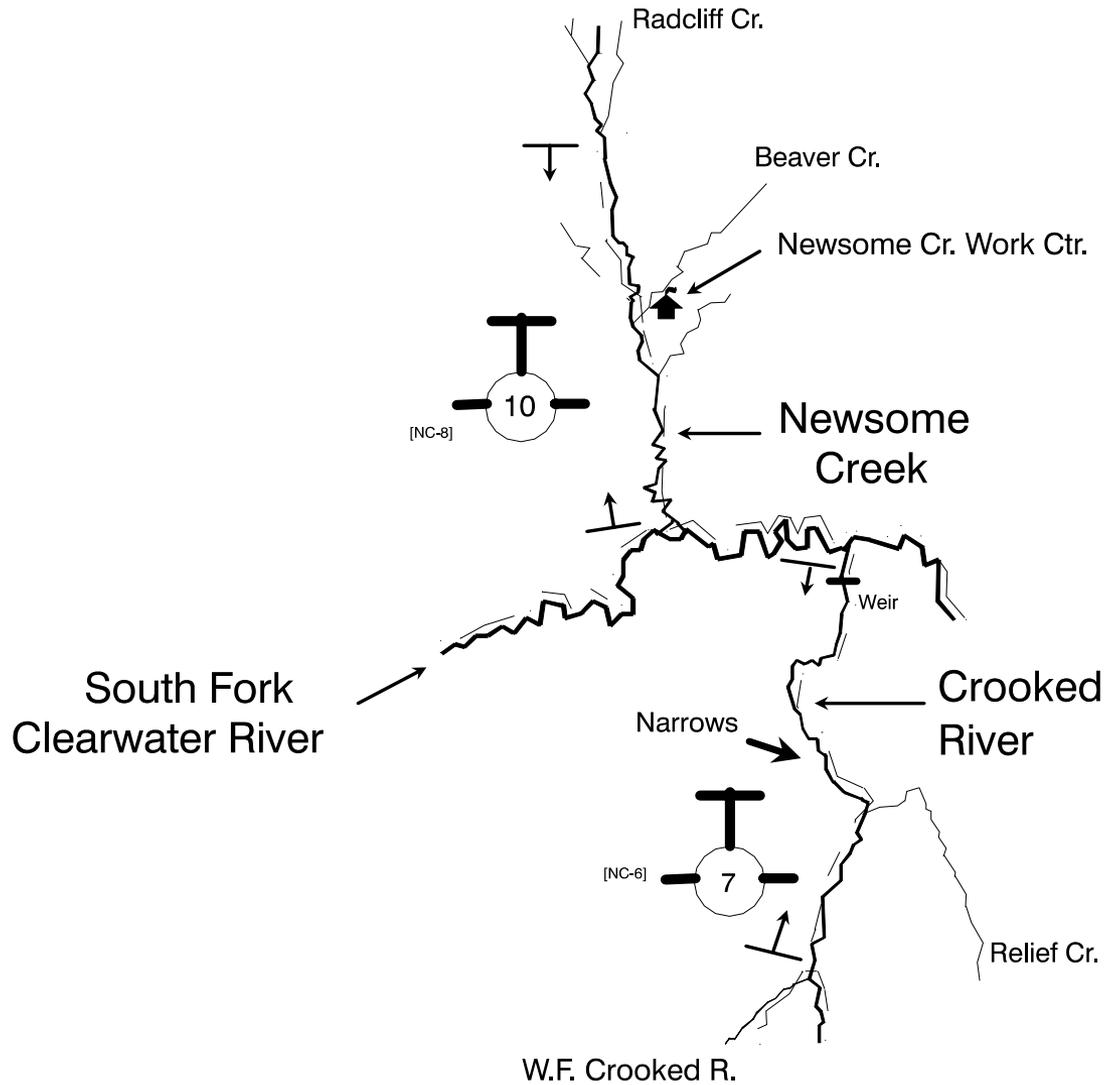
SURVEY DATE 8/26/98
 MAP SCALE 0.95 cm = 1 mile
 OBSERVER Anderson & Apperson
 REMARKS Helicopter



B-5

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

SURVEY DATE 9/15/98
 MAP SCALE 0.85 cm = 1 mile
 OBSERVER Brostrom
 REMARKS Helicopter



B-16

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

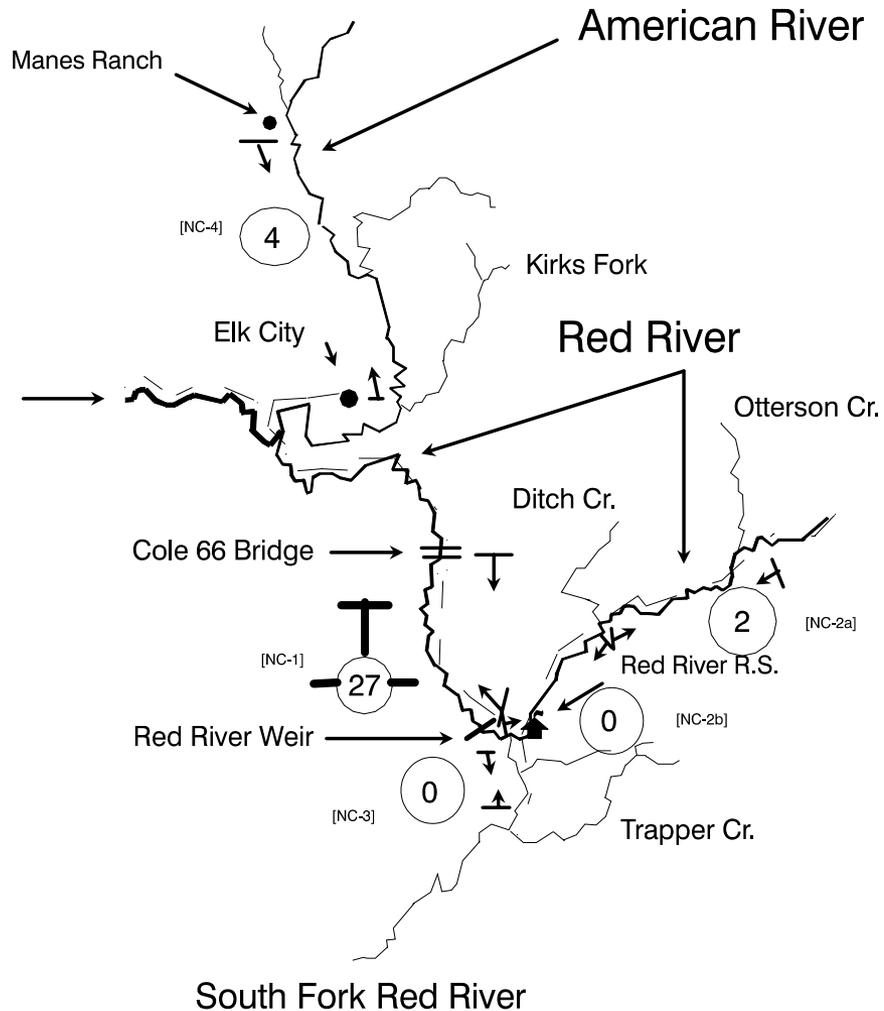
SURVEY DATE 9/12, 13, 15, 22/98
 MAP SCALE 0.75 cm = 1 mile
 OBSERVER Brostrom
 REMARKS Helicopter - Ground

B-17

South Fork
Clearwater R.

Number of Chinook Salmon released above weir; In the past chinook were held until first sort, this year a decision was made to release at time of trapping, therefore many were released before sex determination:

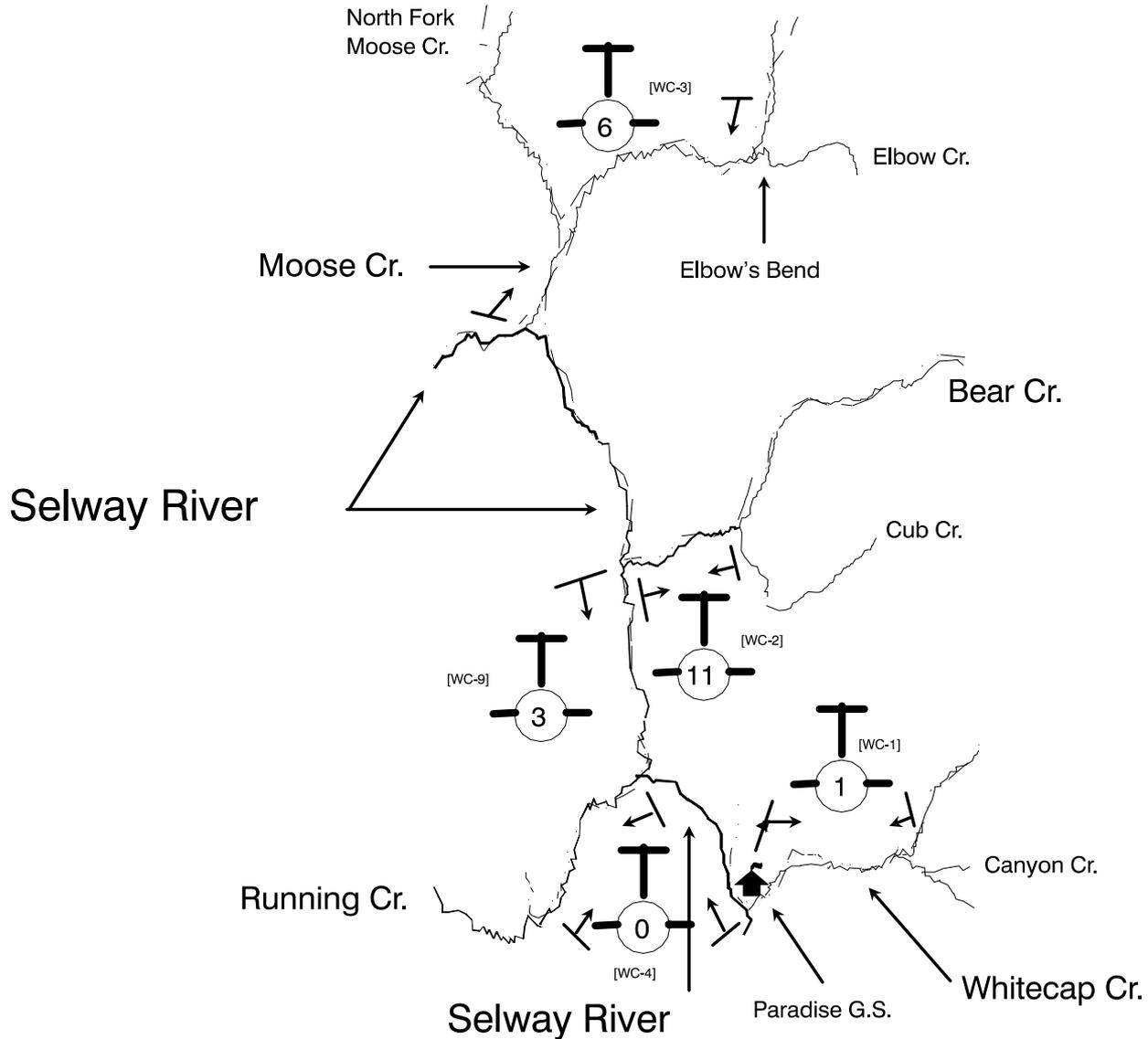
Total Released: 36
 Total Trap Count: 90



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

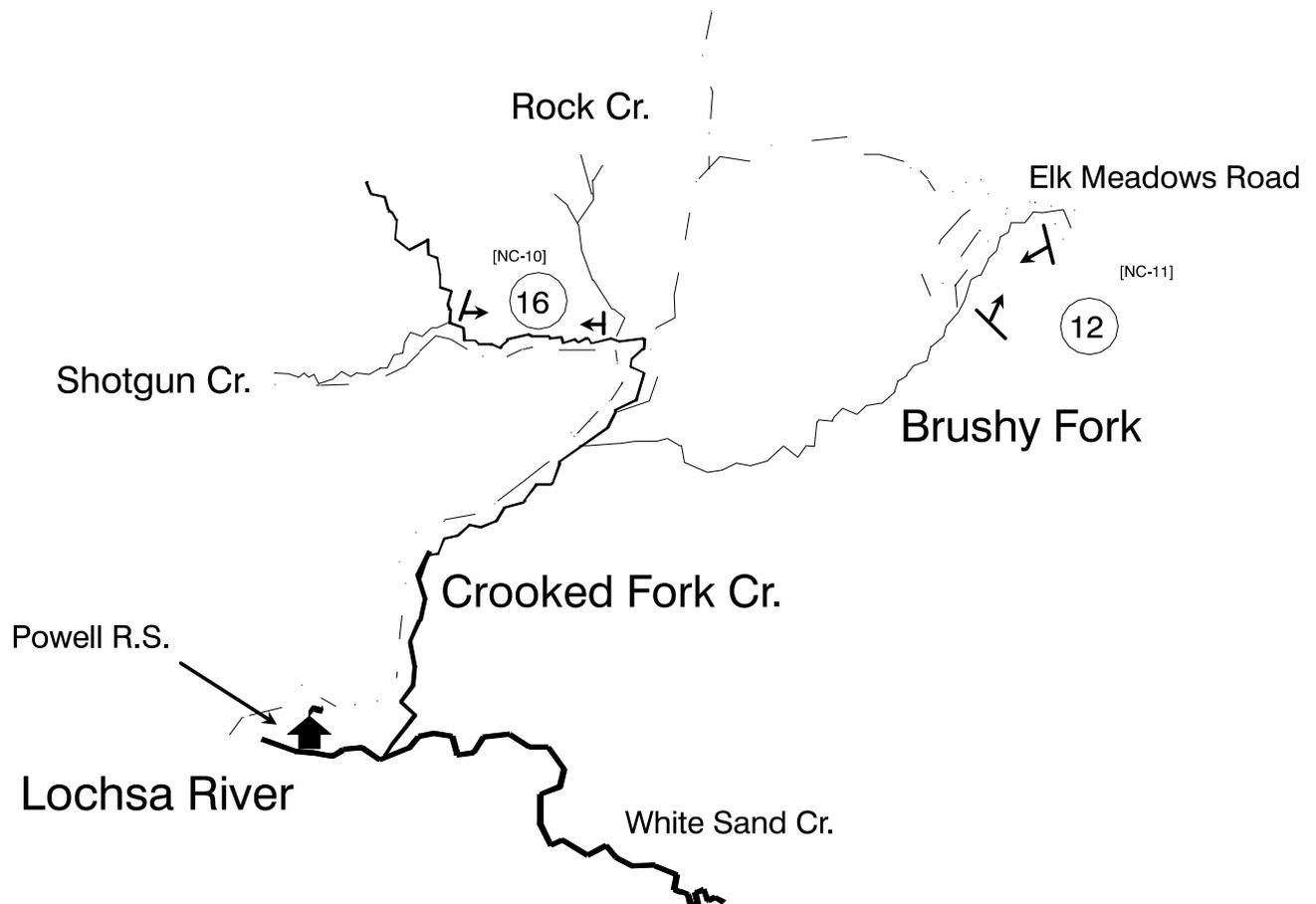
SURVEY DATE 9/16/98
 MAP SCALE 0.65 cm = 1 mile
 OBSERVER Brostrom
 REMARKS Helicopter

B-19



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

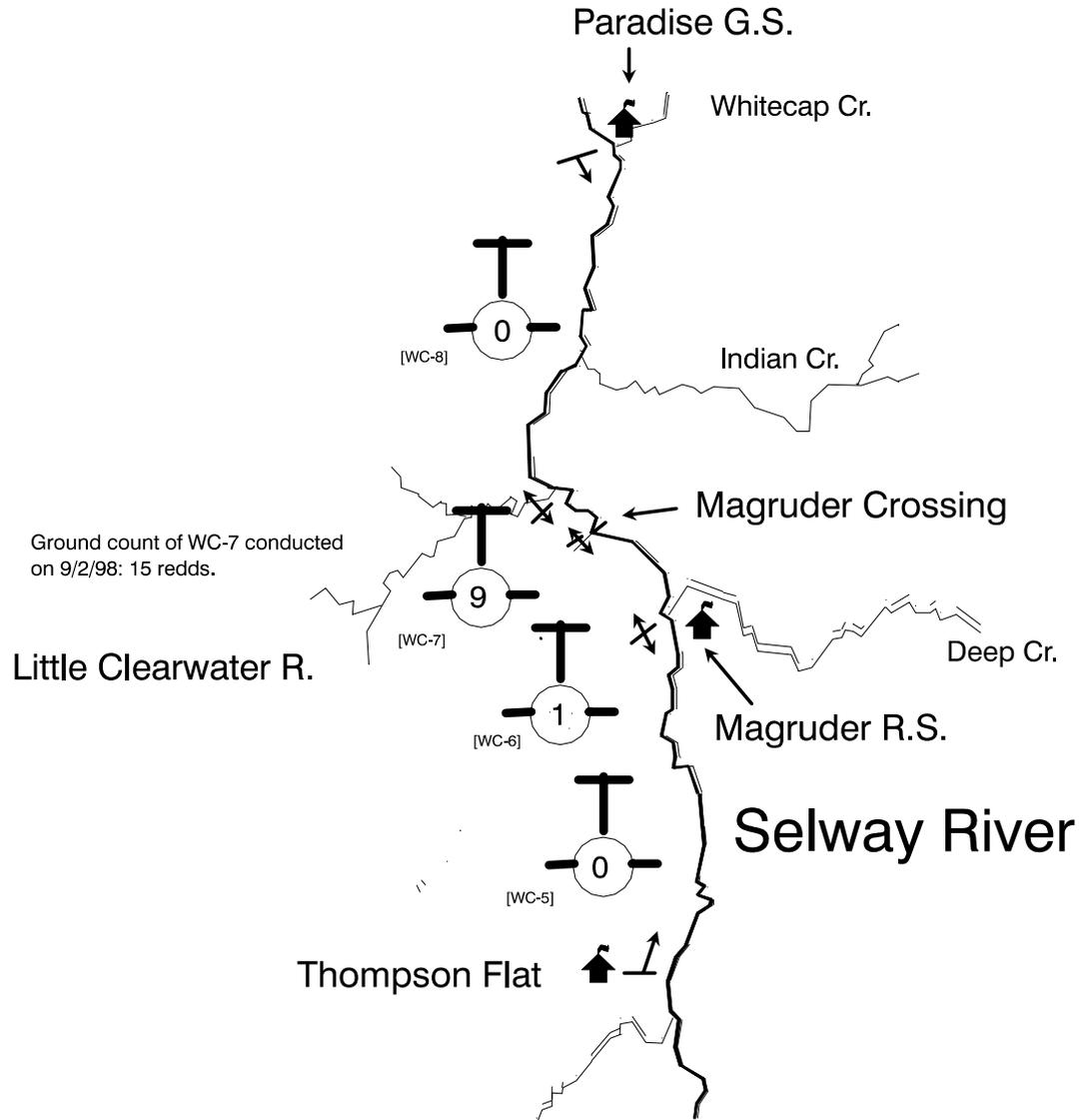
SURVEY DATE 9/3/98
MAP SCALE 0.95 cm = 1 mile
OBSERVER Leth & Walters
REMARKS Ground



B-20

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

SURVEY DATE 9/16/98
 MAP SCALE 0.85 cm = 1 mile
 OBSERVER Brostrom
 REMARKS Helicopter & Ground



B-18

Submitted by:

Terry J. Elms-Cockrum
Senior Fishery Technician

Approved by:

Virgil K. Moore, Chief
Bureau of Fisheries

Edward C. Bowles
Anadromous Fishery Manager