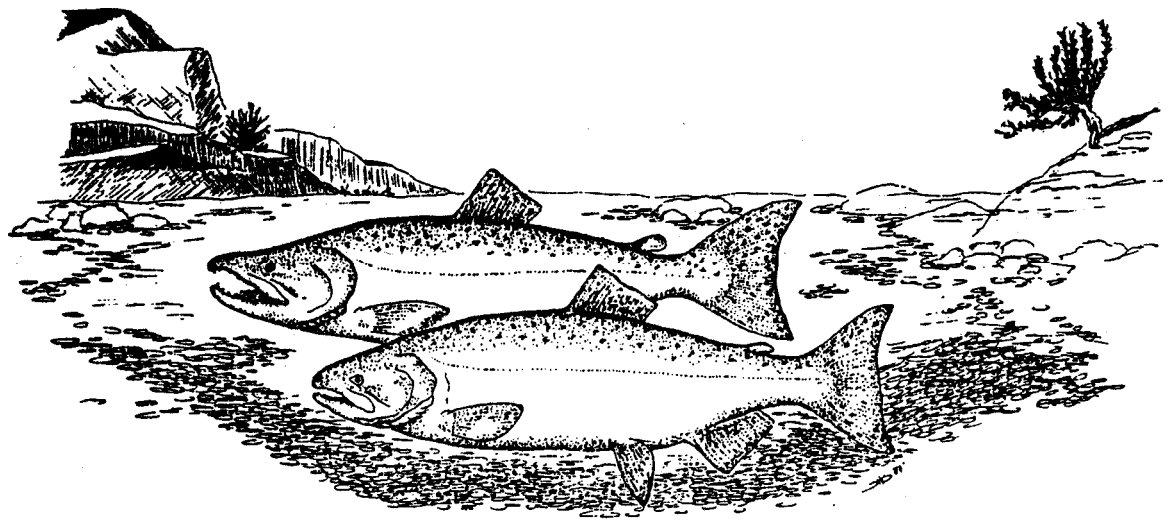




FEDERAL AID
IN
FISH RESTORATION†

Job Performance Report, Project .F-73-R-1'0
Subproject II: SALMON AND STEELHEAD INVESTIGATIONS
Study I: Salmon Spawning Ground Survey



By

Judy Hall-Griswold, Fishery Technician

Tim Cochnauer, Principal Fishery Research Biologist

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JOB PERFORMANCE REPORT

State of: Idaho

Name: SALMON AND STEELHEAD
INVESTIGATIONS

Project No.: F-73-R-10

Title: Salmon Spawning Ground Survey

Study No.: 1

Job No.: 2

Period Covered: March 1, 1987 to February 28, 1988

ABSTRACT

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

Chinook salmon redd counts in the Salmon River drainage have been declining for the past 30 years. This downward trend, however, appears to be reversing. Redd counts are beginning to stabilize as artificial programs are expanding. Spring and summer chinook salmon redd counts were up in both hatchery-influenced and wild and natural areas in 1987.

Total spring chinook salmon redd counts in the Clearwater River drainage were up 9X from 1986 counts. The South Fork Clearwater River drainage experienced a 12% increase in redd counts this year, and five-year averages show that a steady increase in redds has occurred there over the past 10 years. This trend is due primarily to the Red River rearing pond program. Total redd counts for the Lochsa River drainage declined in 1987 but equal the recent five-year average. Wild and natural chinook salmon spawning streams in the Selway River drainage experienced above-average redd counts in 1987 and appear to be stabilizing.

A temporary weir was installed on Redfish Creek in 1987 to count sockeye salmon returning to Redfish Lake. Due to low flows, however, sockeye were passed above the weir to allow natural spawning to occur in Redfish Lake. Redd count surveys indicated one potential redd at the Redfish Creek inlet.

Authors:

Judy Hall-Griswold
Fishery Technician

Tim Cochnauer
Principal Fishery Research Biologist

OBJECTIVES

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

RECOMMENDATIONS

In order to obtain sex and age composition of individual runs, kelt counts should be conducted three times during postspawning die-off each year in areas where spawning activity is most concentrated.

TECHNIQUES USED

Trend salmon redd counts have been established on selected Clearwater River and Salmon River drainage streams to establish trends in chinook salmon spawning escapement. The single peak count surveys are intended to coincide with the period of maximum spawning activity of a particular stream. Each stream or subbasin is assigned a yearly survey date based on historic observation and counting procedure. The redd counts are made from low flying, fixed-wing aircraft, helicopter, or on foot, depending on the technique best suited for a particular stream. On thirteen selected survey transects, redds were counted by more than one technique for comparative evaluations.

In recent years, new redd count areas have been added by 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.

Nine trend areas in the Salmon River drainage and five in the Clearwater River drainage are categorized as wild chinook areas; that is, not influenced by direct plants of hatchery-reared fish. All other areas in both drainages have received plants of hatchery reared chinook salmon.

Chinook salmon carcass surveys are made on selected streams to identify sex ratios and age composition of individual runs.

Traditionally, sockeye salmon returning to Redfish Lake in the upper Salmon River drainage have been counted from a small boat. The trend area on Redfish Lake is approximately 0.8 km of shoal on the eastern shore near Sandy Beach. During years of low sockeye numbers, a weir is installed on Redfish Creek to trap and count all adults returning to the lake.

FINDINGS

Salmon River Drainage

Since 1957, spring and summer chinook salmon redd counts have declined approximately 83% in the Salmon River drainage (Figures 1 and 2). Gradual increases for both stocks in wild and natural streams have been noted for the last couple of years.

In 1987, overall spring chinook salmon redd counts increased 35X over the 1986 total. This increase was primarily the result of the increase of hatchery-influenced redds in the upper Salmon River drainage (Table 1). Numbers of wild and natural spring chinook salmon redds were up 24% in 1987 (Table 2).

This year, summer chinook salmon redd counts were the highest on record since 1974. In wild areas, redd counts were up 26% over the 1986 counts (Table 3), and redd counts doubled in hatchery-influenced streams (Table 4).

Length frequency and age composition of summer chinook salmon kelts recovered in the South Fork Salmon River drainage are reported in Tables 5 and 6.

Table 7 reports information on spring chinook salmon carcasses recovered in tributaries of the Middle Fork Salmon River.

Unclassified chinook salmon spawning ground surveys for the Salmon River drainage are reported in Table 8.

Chinook salmon redd counts for nontraditional trend areas in the Salmon River drainage are listed in Table 9.

Clearwater River Drainage

Wild and natural spring chinook salmon redd counts in the Clearwater River drainage have decreased dramatically since the early 1970s (Table 10). The recent five-year average is the lowest on record for the past 20 years. However, redd counts since 1981 have more or less stabilized at the reduced level (Figure 3).

Redd counts in hatchery-influenced areas of the Clearwater River drainage were up 9X in 1987, resulting in the second highest count in ten years (Table 11). The five-year average increased by 791, and runs appear to be stabilized (Figure 3). Redd counts in the South Fork Clearwater River, particularly Red River, have made the greatest impact on the Clearwater River drainage numbers. The South Fork Clearwater River contributes 67.3% of all redds (including wild and natural) observed.

Length frequency distribution of 517 chinook salmon kelts recovered in Red River are listed in Table 12.

Nontraditional chinook salmon redd counts in the Clearwater River drainage for 1987 are listed in Table 13.

Techniques Evaluation

Overall, use of helicopter techniques allowed for the greater numbers of redds counted than fixed wing counts (Table 14). Ground counts were greater than helicopter counts in five of the eight comparable situations and greater than fixed wing counts in four of seven instances.

Sockeye Salmon

From 1954 to 1966, sockeye salmon were counted at the Redfish Creek weir. Ground counts of redds in Redfish Lake have been conducted since 1981. A temporary weir was placed in Redfish Creek from June 5 to September 29, 1987 to count sockeye salmon entering Redfish Lake. Due to low flows and elevated temperatures in the adult holding pond, sockeye salmon were passed above the weir to allow natural spawning to occur in Redfish Lake. A total of seven males and nine females entered Redfish Lake in 1987. Ground surveys were conducted on September 17 and 28, and October 8 and 20 to identify potential spawning redds. No adult sockeye were sited during the four surveys; however, one potential redd was observed near the upper Redfish Creek inlet. Funding for the Stanley Basin sockeye salmon enhancement project was discontinued following the 1987 sockeye spawning run.

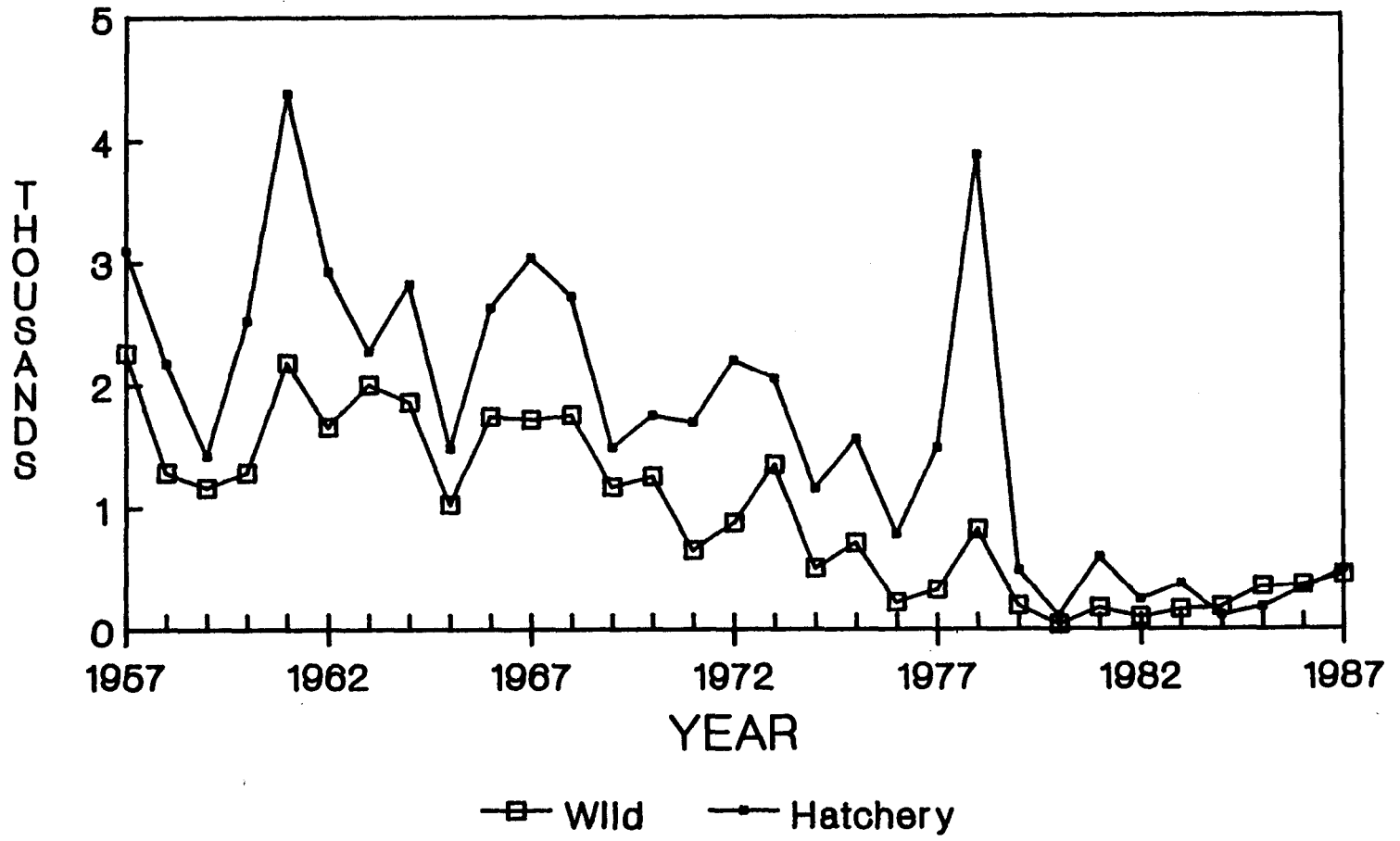


Figure 1. Salmon River spring chinook salmon redd counts from wild and natural and hatchery-influenced streams, 1957-1987.

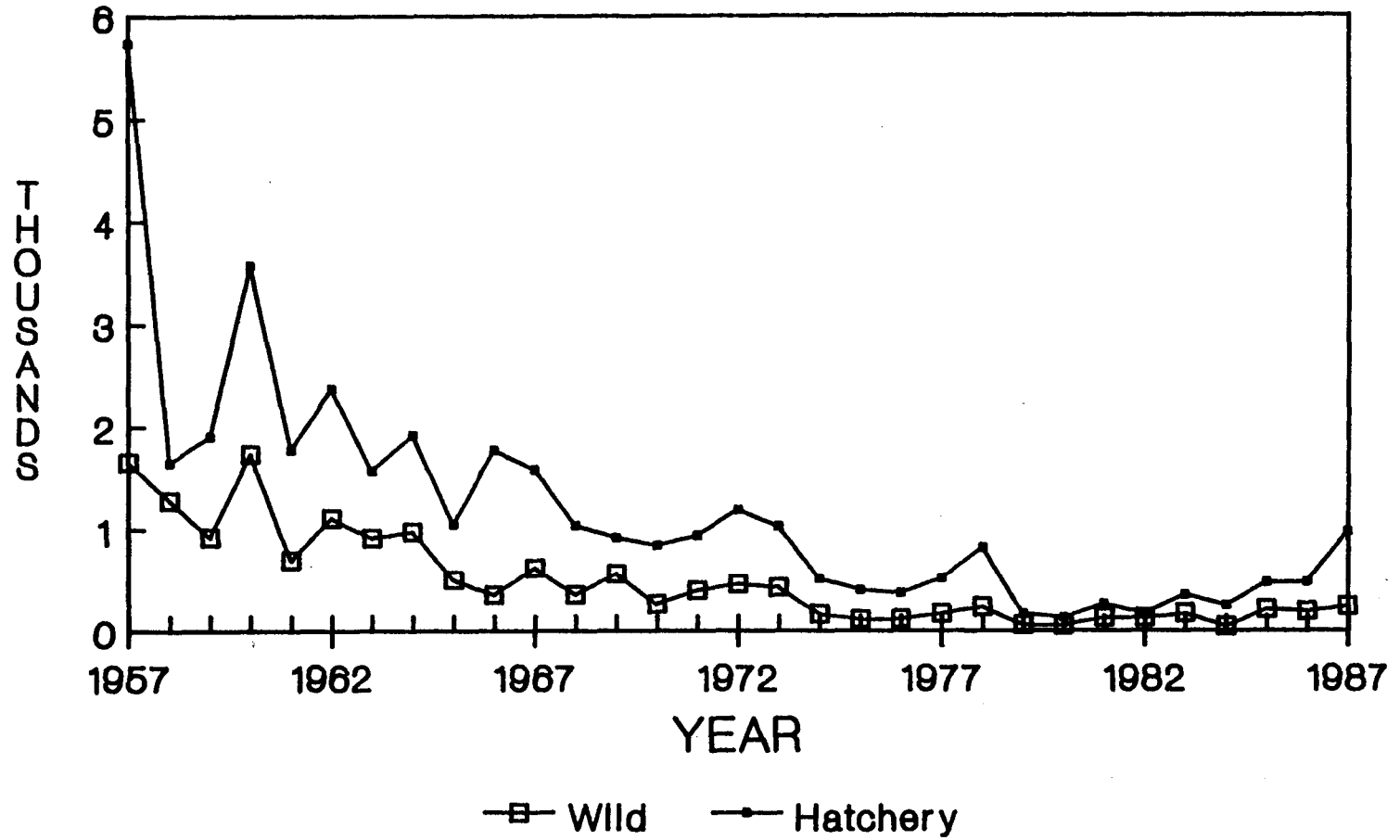


Figure 2. Salmon River summer chinook salmon redd counts from wild and natural and hatchery-influenced streams, 1957-1987.

Table 1. Salmon River drainage hatchery-influenced spring chinook redd counts, 1957-1987.

Year	Alturas Lake Creek ^a	Lemhi River	Upper East Fork ^b	Upper Salmon River ^a	Upper Valley Creek	Upper Yankee Fork	Herd Creek	North Fk. Salmon River	Total	Five- year average
1987	9	155	59	237	31	0			491	
1986	14	157	NC	134	13	15	1	NC	334	
1985	7	93	NC	76	1	5	1	NC	183	299
1984	3	35	NC	71	6	NC	0	NC	115	
1983	27	50	121	161	8	0	7	NC	374	
1982	9	163	28	42	1	0	1	NC	244	
1981	4	126	76	363	2	16	9	NC	596	
1980	7	47	6	47	6	0	0	NC	113	1,064
1979	29	154	57	205	25	18	2	NC	490	
1978	303	796	841	1,707	141	33	26	29	3,876	
1977	85	474	168	698	18	6	6	31	1,486	
1976	16	241	75	378	NC	40	27	6	783	
1975	60	366	348	509	189	60	11	14	1,557	1,406
1974	42	215	346	338	127	54	13	18	1,155	
1973	153	485	665	414	125	104	47	55	2,048	
1972	143	507	448	748	182	115	28	31	2,202	
1971	50	407	370	619	89	57	49	53	1,694	
1970	68	371	468	432	202	67	47	95	1,750	1,972
1969	41	360	174	313	350	53	43	155	1,489	
1968	110	589	622	637	330	234	57	145	2,724	
1967	74	804	614	943	253	250	32	66	3,036	
1966	119	819	511	699	219	112	79	70	2,628	
1965	101	454	138	472	204	77	31	5	1,482	2,449
1964	80	1,151	405	706	199	146	49	86	2,822	
1963	86	364	646	638	141	128	202	71	2,276	
1962	138	1,455	334	638	157	60	58	84	2,924	
1961	30	1,871	818	813	227	192	283	144	4,378	
1960	33	1,434	122	720	83	43		91	2,526	2,686
1959	18	524	223	502	24	10		121	1,422	
1958	107	675	427	535	75	38		322	2,179	
1957	110	1,023	572	1,118	225	47			3,095	

^aReduced by trapping at Sawtooth Hatchery site, 1981-1987.

^bReduced by trapping at East Fork weir, 1984, 1985, 1986, and 1987.

^cOropped from survey.

Table 2. Salmon River drainage wild and natural spring chinook salmon redd counts, 1957-1987.

Year	Bear Valley Creek	Elk Creek	Marsh Creek drainage	Sulphur Creek	Upper Big Creek	Total	Five-year average
1987	102	149	150	11	36	448	
1986	74	55	101	65	67	362	
1985	134	28	108	10	70	350	301
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	
1980	15	8	9	2	4	38	265
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	
1975	215	169	201	50	77	712	623
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	
1970	334	302	456	93	68	1,253	1,141
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	
1965	301	203	404	43	75	1,026	1,667
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	
1960	386	346	316	79	159	1,286	1,513
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, 1957-1987.

Year	Loon Creek	Johnson Creek	Secesh River Lake Creek	Lower Big Creek	Total	Five-year average
1987	23	72	121	23	239	
1986	21	53	115	NC	189	
1985	28	75	105	NC	208	169
1984	4	17	21	NC	42	
1983	7	63	98	NC	168	_____
1982	23	37	65	NC	125	
1981	30	45	53	NC	128	
1980	9	24	20	NC	53	119
1979	NC	36	20	NC	56	
1978	29	113	91	NC	233	_____
1977	62	81	27	NC	170	
1976	31	68	17	NC	116	
1975	32	69	10	NC	111	196
1974	34	107	21	NC	162	
1973	78	271	74	NC	423	_____
1972	150	220	87	NC	457	
1971	79	183	80	52	394	
1970	43	130	63	23	259	404
1969	110	273	104	72	559	
1968	135	127	58	33	353	_____
1967	96	286	140	94	616	
1966	49	110	140	51	350	
1965	166	116	134	83	499	670
1964	361	310	181	121	973	
1963	261	266	163	220	910	_____
1962	157	295	292	360	1,104	
1961	131	207	198	160	696	
1960	334	517	524	352	1,727	1,145
1959	123	294	285	217	919	
1958	193	269	478,	338	1,278	_____
1957	425	349	344	535	1,653	

Table 4. Salmon River drainage hatchery-influenced summer chinook salmon redd counts, 1957-1987.

Year	Lower Salmon River	Lower Valley Cree	Lower East Fork	S. Fork Salmon River	Total	5-year average
1987	118	59	42	752	971	
1986	104	16	70	289	479	
1985	126	1	22	323	472	504
1984	51	15	16	165	247	
1983	111	28	27	185	351	
1982	39	8	14	111	172	
1981	75	17	43	126	261	
1980	11	4	0	116	131	309
1979	NC	15	33	115	163	
1978	349	219	NC	251	819	
1977	94	63	136	226	519	
1976	44	43	39	241	367	
1975	45	80	38	238	401	565
1974	200	45	49	218	512	
1973	224	77	138	586	1,025	
1972	412	39	161	577	1,189	
1971	220	47	149	421	937	
1970	150	41	123	527	841	984
1969	120	22	138	636	916	
1968	223	63	235	515	1,036	
1967	365	79	234	902	1,580	
1966	390	184	216	980	1,770	
1965	201	57	131	656	1,045	1,576
1964	415	71	306	1,112	1,916	
1963	195	50	265	1,057	1,567	
1962	467	115	195	1,589	2,366	
1961	356	162	198	1,058	1,774	
1960	818	141	303	2,306	3,568	2,251
1959	336	70	192	1,305	1,903	
1958	362	47		1,236	1,645	
1957	2,406	331	183	2,812	5,732	

Table 5. Length frequency of summer chinook salmon carcasses recovered on South Fork Salmon River and Johnson Creek spawning ground surveys, 1987^a.

Fork length (inch)	Males			Fork length (inch)	Females		
	Total number recovered	X total	Age class		Total number recovered	total	Age class
17	0	0.0		17	0	0.0	
18	0	0.0		18	0	0.0	
19	0	0.0	Jacks	19	0	0.0	
20	1	1.4	N=4	20	0	0.0	N=0
21	1	1.4	X=5.4	21	0	0.0	X=0.0
22	0	0.0		22	0	0.0	
23	0	0.0		23	0	0.0	
24	2	2.7		24	0	0.0	
25	1	1.4		25	1	2.3	
26	2	2.7	4-years-	26	1	2.3	
27	7	9.5	old	27	0	0.0	
28	16	21.6	N=54	28	5	11.6	N=22
29	13	17.6	1=73.0	29	2	4.7	X=51.2
30	9	12.2		30	7	16.3	
31	6	8.1		31	6	13.9	
32	5	6.8		32	1	2.3	
33	5	6.8		33	4	9.3	
34	4	5.4		34	1	2.3	
35	0	0.0	5-years-	35	6	13.9	
36	0	0.0	old	36	2	4.7	
37	0	0.0	N=16	37	3	7.0	N=21
38	1	1.4	Z=21.6	38	3	7.0	%=48.8
39	0	0.0		39	1	2.3	
40	0	0.0		40	0	0.0	
41	1	1.4		41	0	0.0	
Total	74			Total	43		

^aOf the kelts observed, six were adipose fin clipped and all were found below the South Fork Trap in 1987.

Table 6. Length frequency of summer chinook salmon carcasses recovered on Secesh River and Lake Creek spawning ground surveys, 1987.

Fork length (inch)	Males				Fork length (inch)	Females			
	Total no. recovered		Z	Age class		Total no. recovered		Z	Age class
	Lake	Secesh				Lake	Secesh		
19	0	1	2.1		19	0	0	0.0	
20	1	0	2.1	Jacks	20	0	0	0.0	
21	0	0	0.0	N=2	21	0	0	0.0	N=0
22	0	0	0.0	Z=4.2	22	0	0	0.0	Z=0.0
23	0	0	0.0		23	0	0	0.0	
24	0	0	0.0		24	0	0	0.0	
25	0	1	2.1		25	0	0	0.0	
26	0	2	4.2		26	0	0	0.0	
27	1	2	6.3	4-yrs-	27	0	0	0.0	
28	0	7	14.6	old	28	0	0	0.0	
29	1	5	12.5	N=33	29	0	2	7.7	N=10
30	3	6	18.8	Z=68.8	30	0	4	15.4	Z=38.5
31	0	5	10.4		31	0	4	15.4	
32	0	3	6.3		32	0	0	0.0	
33	0	3	6.3	5-yrs-	33	0	2	7.7	
34	0	3	6.3	old	34	0	2	7.7	
35	0	1	2.1	N=13	35	1	4	19.2	N=16
36	0	0	0.0	Z=27.0	36	0	4	15.4	Z=61.5
37	0	1	2.1		37	0	2	7.7	
38	0	0	0.0		38	0	0	0.0	
39	0	2	4.2		39	0	1	3.9	
Total	6	42			Total	1	25		

Table 7. Length frequency of spring chinook salmon carcasses recovered on Big Creek, Elk Creek, Sulphur Creek, and Bear Valley Creek (Middle Fork Salmon River) spawning ground surveys, 1987.

Fork length (inch)	Males			Fork length (inch)	Females		
	Total no. recovered	Age total	Age class		Total no. recovered	Age total	Age class
17	0	0.0		17	0	0.0	
18	0	0.0		18	0	0.0	
19	0	0.0	Jacks	19	0	0.0	
20	0	0.0	N=1	20	0	0.0	N=0
21	0	0.0	X=2.0	21	0	0.0	X=0.0
22	0	0.0		22	0	0.0	
23	0	0.0		23	0	0.0	
24	1	2.0		24	0	0.0	
25	0	0.0		25	0	0.0	
26	4	8.2		26	1	1.6	
27	2	4.1	4-years-	27	0	0.0	
28	4	8.2	old	28	0	0.0	
29	8	16.3	N=20	29	7	11.5	N=11
30	0	0.0	X=40.8	30	0	0.0	%=18.0
31	2	4.1		31	3	4.9	
32	1	2.0		32	0	0.0	
33	2	4.1		33	7	11.5	
34	3	6.1		34	6	9.8	
35	3	6.1	5-years-	35	7	11.5	
36	4	8.2	old	36	3	4.9	
37	3	6.1	N=28	37	13	21.3	N=50
38	1	2.0	%=57.2	38	9	14.8	%=82.0
39	2	4.1		39	2	3.3	
40	7	14.3		40	2	3.3	
41	1	2.0		41	0	0.0	
42	1	2.0		42	0	0.0	
43	0	0.0		43	0	0.0	
44	0	0.0		44	1	1.6	
Total	49			Total	61		

Table 8. Salmon River drainage unclassified chinook salmon spawning ground surveys, 1972-1987.

	Camas Cr.	Lower Yankee Fk.	W. Fk. Yankee Fk.	Total
1987	32	5	12	49
1986	11	2	6	19
1985	21	0	1	22
1984	11	NC	0	11
1983	38	0	7	45
1982	33	1	0	34
1981	65	4	19	88
1980	17	0	2	19
1979	15	NC	13	28
1978	148	27	98	273
1977	84	12	37	133
1976	61	3	11	75
1975	128	35	55	218
1974	172	28	20	220
1973	358	71	86	515
1972	211	78	117	406

Table 9. Nontraditional chinook salmon redd counts, Salmon River drainage, 1985-1987.

Stream	Section	Year		
		'85	'86	'87
<u>Salmon River</u>				
Alturas Lake Creek	Cabin Cr. Bridge to Diversion Dam	0	0	1
Alturas Lake Creek	Diversion Dam to Alturas Lake	0	0	0
Alturas Lake Creek	Alturas Lake Inlet to Alpine Creek	1	1	5
Salmon River	Breckenridge Diversion Dam to mouth of Pole Creek	4	0	1
Salmon River	Mouth of Pole Creek to headwaters	0	0	0
Pole Creek	Mouth to Diversion screen	1	0	0
Middle Fork Salmon River	Mouth of Loon Cr. to mouth of Big Cr.			1
<u>East Fork Salmon River</u>				
Herd Creek	Bennett Ranch to mouth of East Pass Creek ^a	1	6	NC
<u>East Fork of South Fork Salmon River</u>				
Johnson Creek	Mouth of Whiskey Cr. to head of canyon	-	-	0
Sand Creek	Sand Creek from mouth to bridge	-	-	0
Totals		7	7	8

^aSurvey dropped in 1987.

Table 10. Clearwater River drainage wild and natural chinook salmon redd counts, 1966-1987.

Year	Selway River	Bear Creek	Running Creek	Whitecap Creek	Moose Creek	Total	Five-year average
1987	36	9	4	6	8	63	
1986	31	10	NC	7	9	57	
1985	15 ^a	NC	NC	NC	NC	15	46
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	
1980	40	7	1	3	4	55	73
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	
1975	21	5	0	1	4	31	142
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	
1970	65	19	10	4	NC	98	104
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	

^aGround count only from Little Clearwater River upstream to Magruder Crossing.

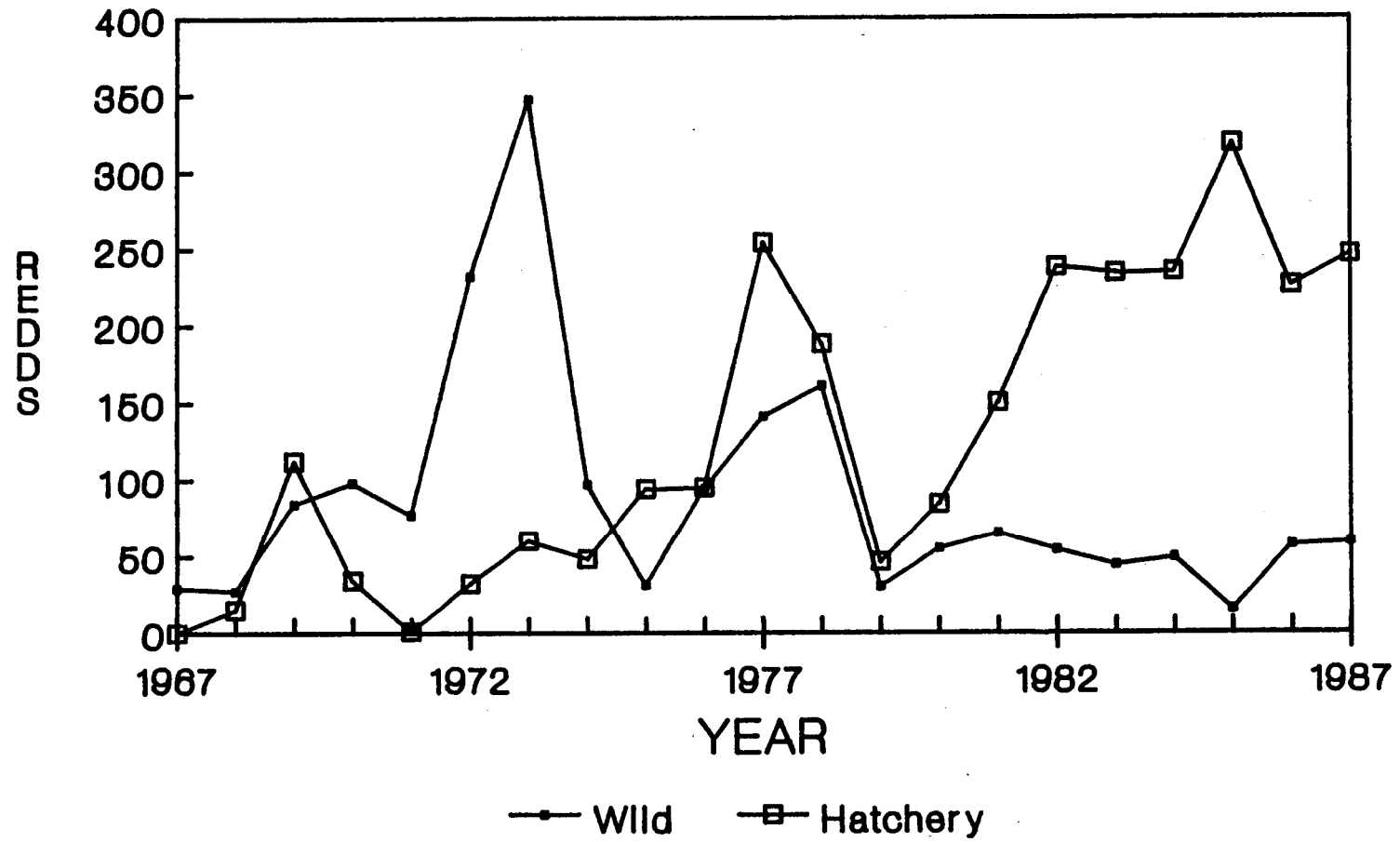


Figure 3. Clearwater River drainage chinook salmon redd counts from wild and natural and hatchery-influenced streams, 1957-1987.

Table 11. Clearwater River hatchery-influenced chinook salmon redd counts and five-year averages, 1965-1987.

Year	Crooked Fork	Brushy Fork	Lochsa River			Crooked	Red River	American River	South Fork drainage		Clearwater River	
			Total	Five-year average	Newsome Creek				Total	Five-year average	Total	Five-year average
1987	28	10	38		20	17	140	31	208		246	
1986	30	11	41		7	9	155	14	185		226	
1985	47	14	61	38	2	10	222	23	257	214	318	252
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		3	3	80	12	98		150	
1980	16	10	26	42	5	8	38	7	58	99	84	141
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		5	13	15		33		95	
1975	31	4	35	56	6	33	20		59		94	110
1974	22	6	28		3	5	12		20		48	
1973	60		60		-	-	-				60	
1972	32		32								32	
1971	1		1								1	
1970	34		34	39	-	-	-				34	39
1969	112		112								112	
1968	15		15		-						15	
1967	0		0		-						0	
1966	7		7								7	
1965	24		24		-						24	

18

Table 12. Length frequency of spring chinook salmon carcasses recovered from Red River spawning ground surveys during 1987.

Fork length (inches)	Total number of fish	Percent total	Age class breakdown
15	0	0.0	
16	0	0.0	
17	0	0.0	
18	0	0.0	Jacks
19	1	0.2	N=9
20	0	0.0	%=2.0
21	0	0.0	
22	2	0.4	
23	2	0.4	
24	4	0.8	
25	19	3.7	
26	23	4.5	
27	70	13.5	4-years-old
28	82	15.9	old
29	99	19.1	N=389
30	65	12.6	%=75.0
31	31	6.0	
32	24	4.7	
33	21	4.1	5-years-old
34	26	5.0	old
35	22	4.3	N=119
36	10	1.9	%=23.0
37	8	1.6	
38	2	0.4	
39	5	1.0	
40	1	0.2	
Total	517		

Table 13. Nontraditional chinook salmon redd counts, Clearwater River drainage, 1987.

Stream	Section	198
<u>Clearwater River</u>		
S. Fk. Red River	Schooner Cr. to Red River R.S.	0
Crooked Fork Creek	Mouth to Brushy Fork	12
	Brushy Fk. to Shotgun Cr.	36
	Shotgun Cr. to Boulder Cr.	4
	Boulder Cr. to Hopeful Cr.	NC
Brushy Fork Creek	Mouth to Twin Cr.	14
	Twin Cr. to Spruce Cr.	12
White Sand Creek	Mouth to Big Flat Cr.	NC
Lolo Creek	White Cr. Bridge to uppermost K-Dam	31

Table 14. Comparison of spawning ground survey techniques in selected Idaho streams, 1987. Dates are in parentheses.

River section	Helicopter	Fixed wing	Ground
<u>Bear Valley Creek</u>			
Marsh Creek to Elk Creek	63 (8/26)	63 (8/27)	54 (8/28)
Elk Creek to Cub Creek	38 (8/26)	33 (8/27)	54 (8/28)
Cub Creek to Cosner Creek	10 (8/26)	20 (8/27)	19 (8/28)
<u>Elk Creek</u>			
Mouth to Little Beaver Creek	68 (8/26)	70 (8/27)	68 (8/27)
Little Beaver Creek to W. Fk. Elk Creek	69 (8/26)	56 (8/27)	81 (8/27)
<u>Johnson Creek</u>			
	43 (8/26)	41 (8/27)	72 (9/8)
<u>Red River</u>			
	59 (9/10)	--	51 (9/13)
<u>Secesh River</u>			
Warm Springs to Long Gulch Bridge	55 (9/3)	52 (9/4)	64 (8/31)
Long Gulch Bridge to Loon Creek	23 (9/3)	27 (9/4)	
<u>S. Fk. Salmon River</u>			
E. Fk. S. Fk. to Miners Peak Bridge	44 (9/3)	38 (9/4)	
Miners Peak Bridge to Poverty Flat	204 (9/3)	174 (9/4)	
Poverty Flat to S. Fk. Trap	288 (9/3)	174 (9/4)	
S. Fk. Trap to Rice Creek	216 (9/3)	46 (9/4)	

A P P E N D I X A

LEGEND

Traditional Aerial-Ground
Trend Check Areas



Non-Traditional Trend Check
Areas (for BPA use only)



Ground Redd Counts



Fix-winged Airplane Redd
Counts



Helicopter Redd Counts



Road



Trail



Forest Service Stations



Pack Bridge



Highway Bridge



Chinook Salmon Trap Sites



Landing Strip



Dam



Campground



Rapids



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

SURVEY DATE 9/3/87
 MAP SCALE 0.40 cm = 1 mile
 OBSERVER Anderson
 REMARKS Helicopter

Holding mortality at South Fork Salmon Trap:

Males	141
Jacks	66
Females	136

Number of summer chinook released above the South Fork Salmon Trap:

Males	574
Females	<u>323</u>

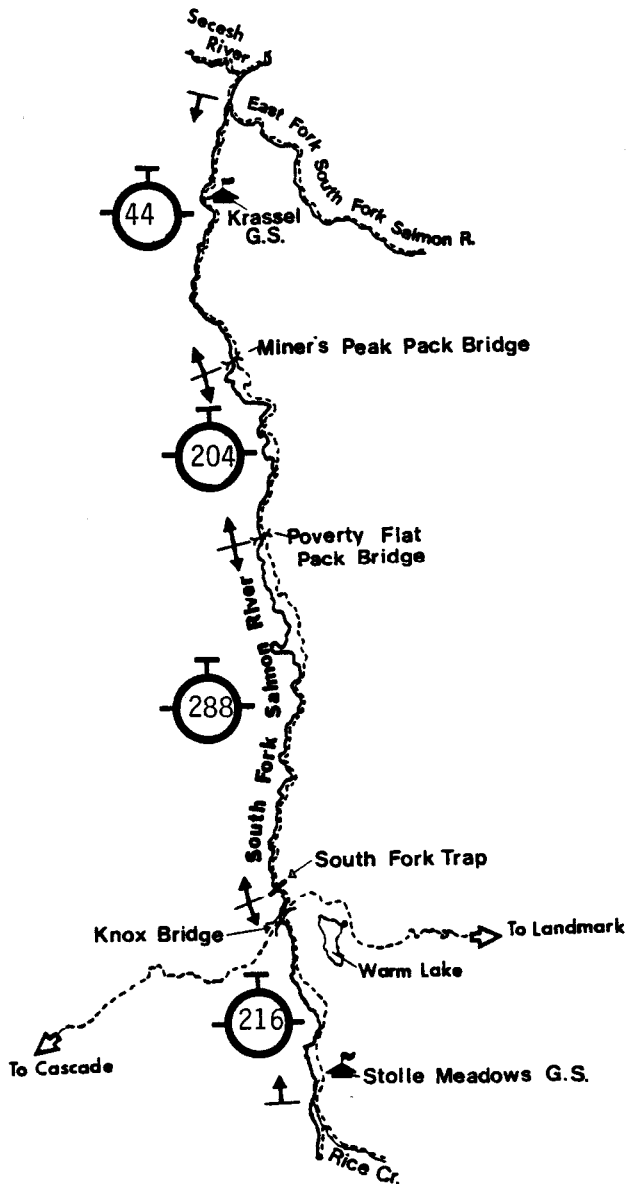
Total 897

Number of salmon spawned (killed) at trap site:

Males	638
Females	662

Total Trap count: 2,705

Total egg take: 3,110,200



DRAINAGE South Fork Salmon River

SURVEY DATE 8/24/87 & 9/3/87

STREAM Secesh and Lake Creek

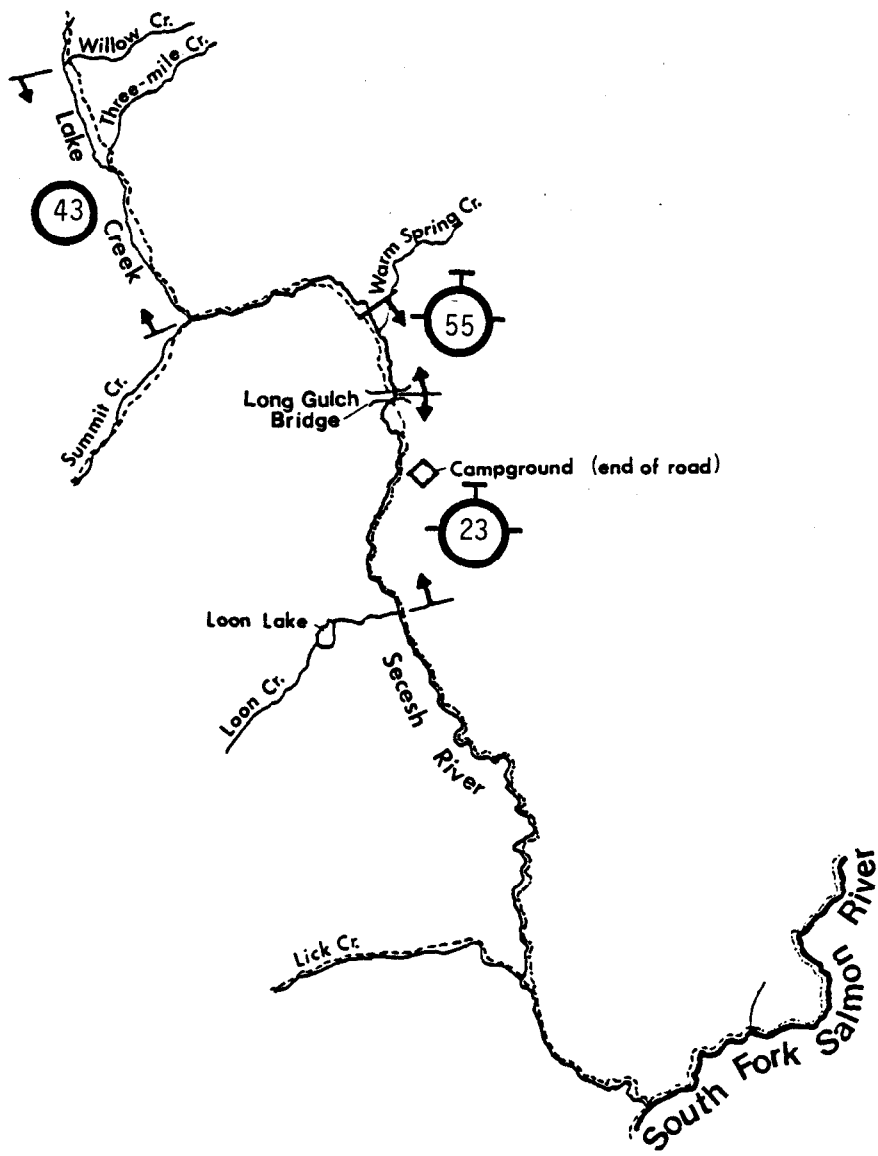
MAP SCALE 0.65 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Reid & Anderson

TIMING Early On Time Late

REMARKS _____



DRAINAGE E.F. of South Fork Salmon

SURVEY DATE 9/8/87

STREAM Johnson Creek

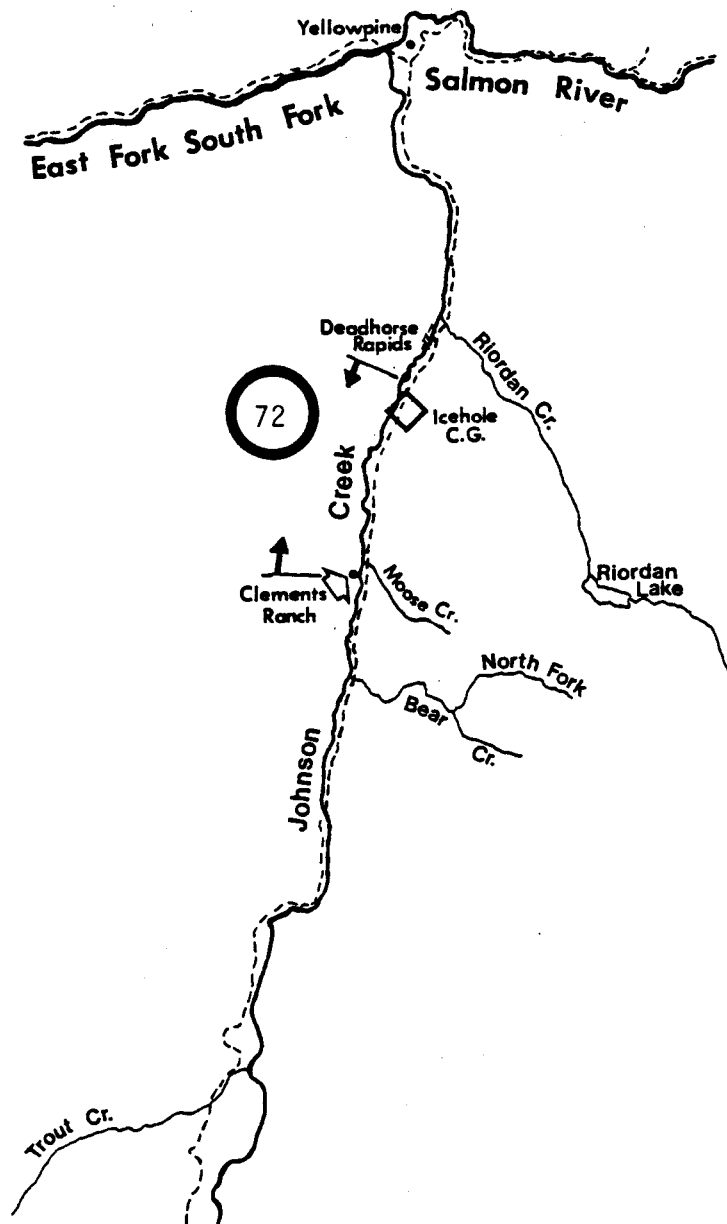
MAP SCALE 0.95 cm = 1 mile

OBSERVATION CONDITIONS -

OBSERVER Reid

TIMING Early, On Time, Late

REMARKS Ground



DRAINAGE Middle Fork Salmon River

SURVEY DATE 8/26/87 & 8/28/87

STREAM Bear Valley Creek

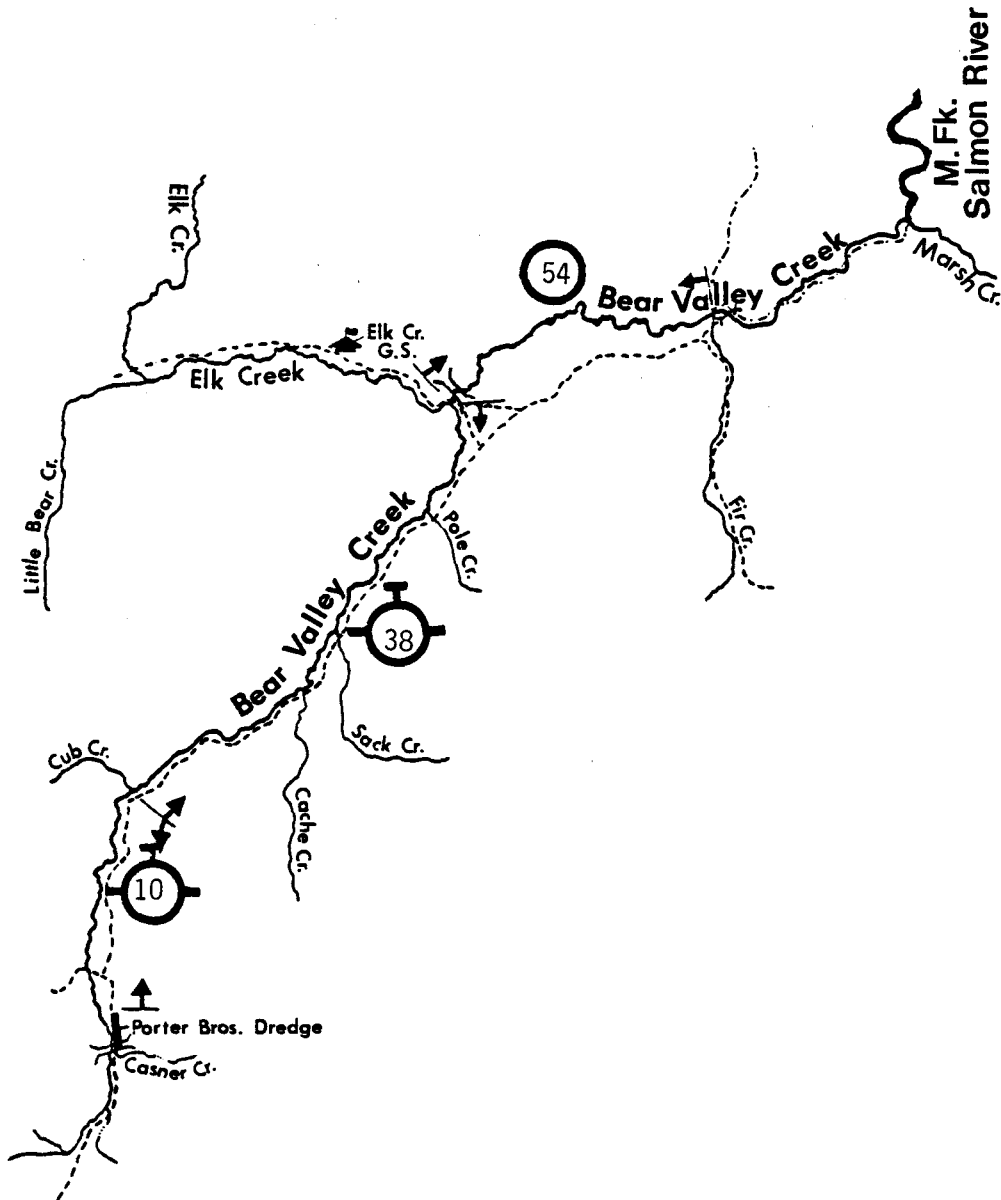
MAP SCALE 0.90 cm = 1 mile

OBSERVATION CONDITIONS Fair-Good

OBSERVER Reid & Anderson

TIMING Early On Time Late

REMARKS _____



DRAINAGE M.F. Salmon River

SURVEY DATE 8/27/87

STREAM Elk Creek

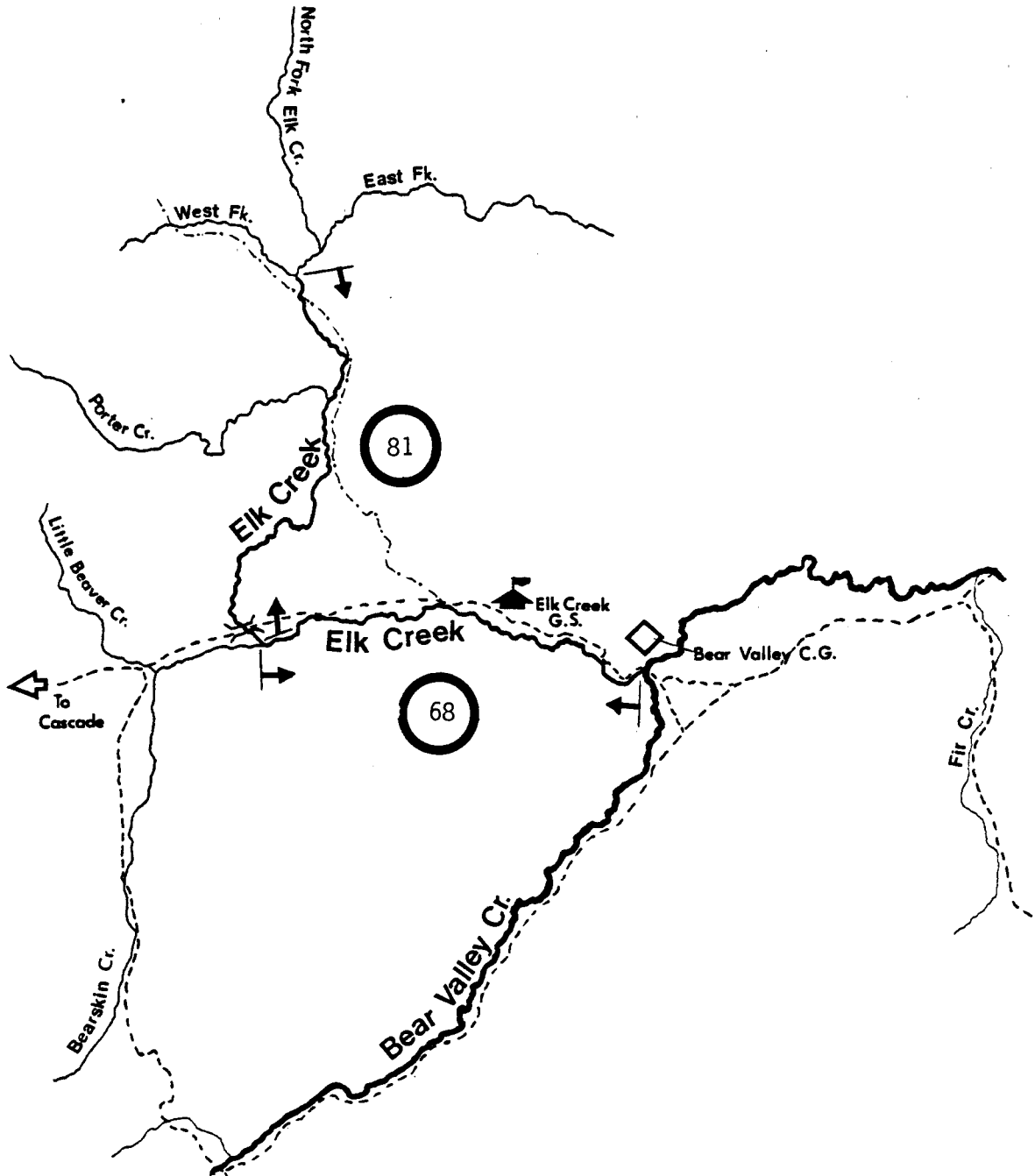
MAP SCALE 1.3 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Reid

TIMING: Early On Time Late

REMARKS Ground



DRAINAGE Middle Fork Salmon River
Marsh, Beaver, Knapp
STREAM and Capehorn Creeks

SURVEY DATE 8/15-16/87

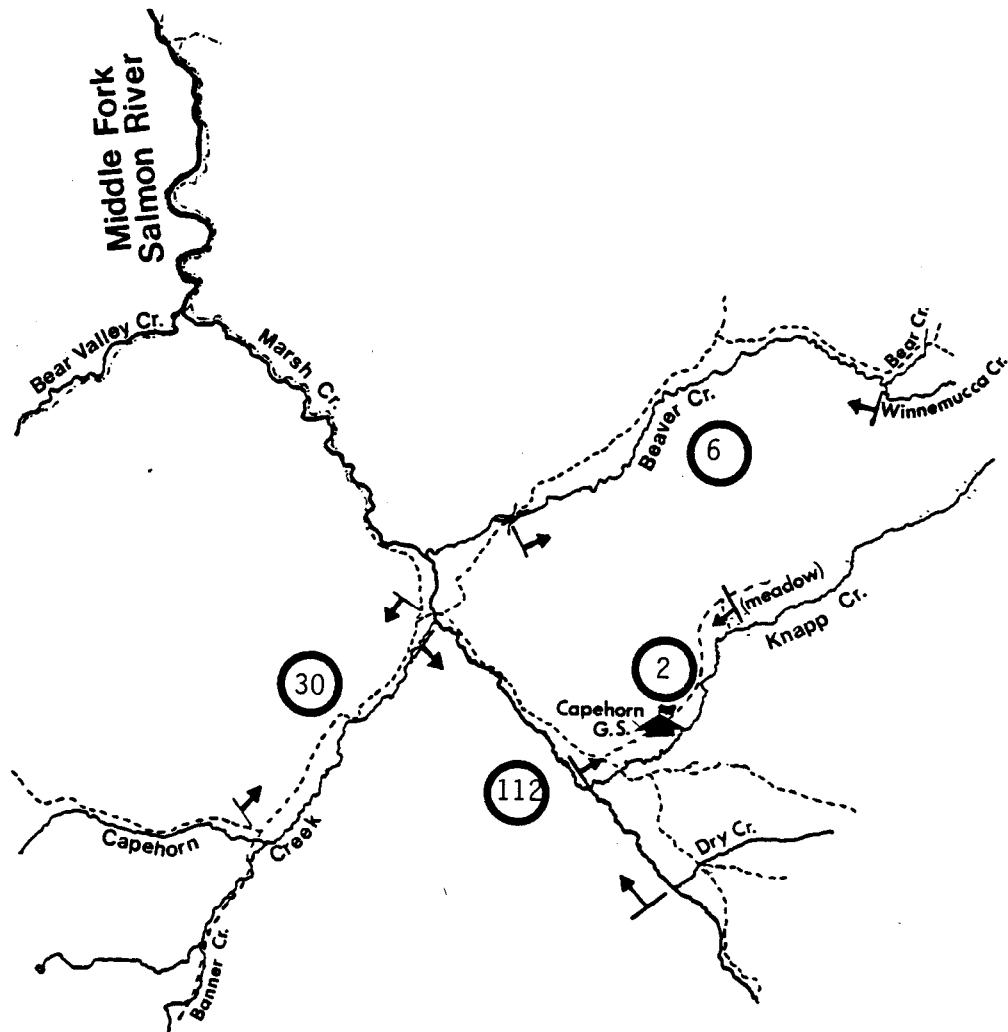
MAP SCALE 1.15 cm = 1 mile

OBSERVATION CONDITIONS very good

OBSERVER Gadwa, Ball
Reingold, Davis

TIMING Early On Time Late

REMARKS low water



DRAINAGE M.F. Salmon River

SURVEY DATE 8/20/87

STREAM Sulphur Creek

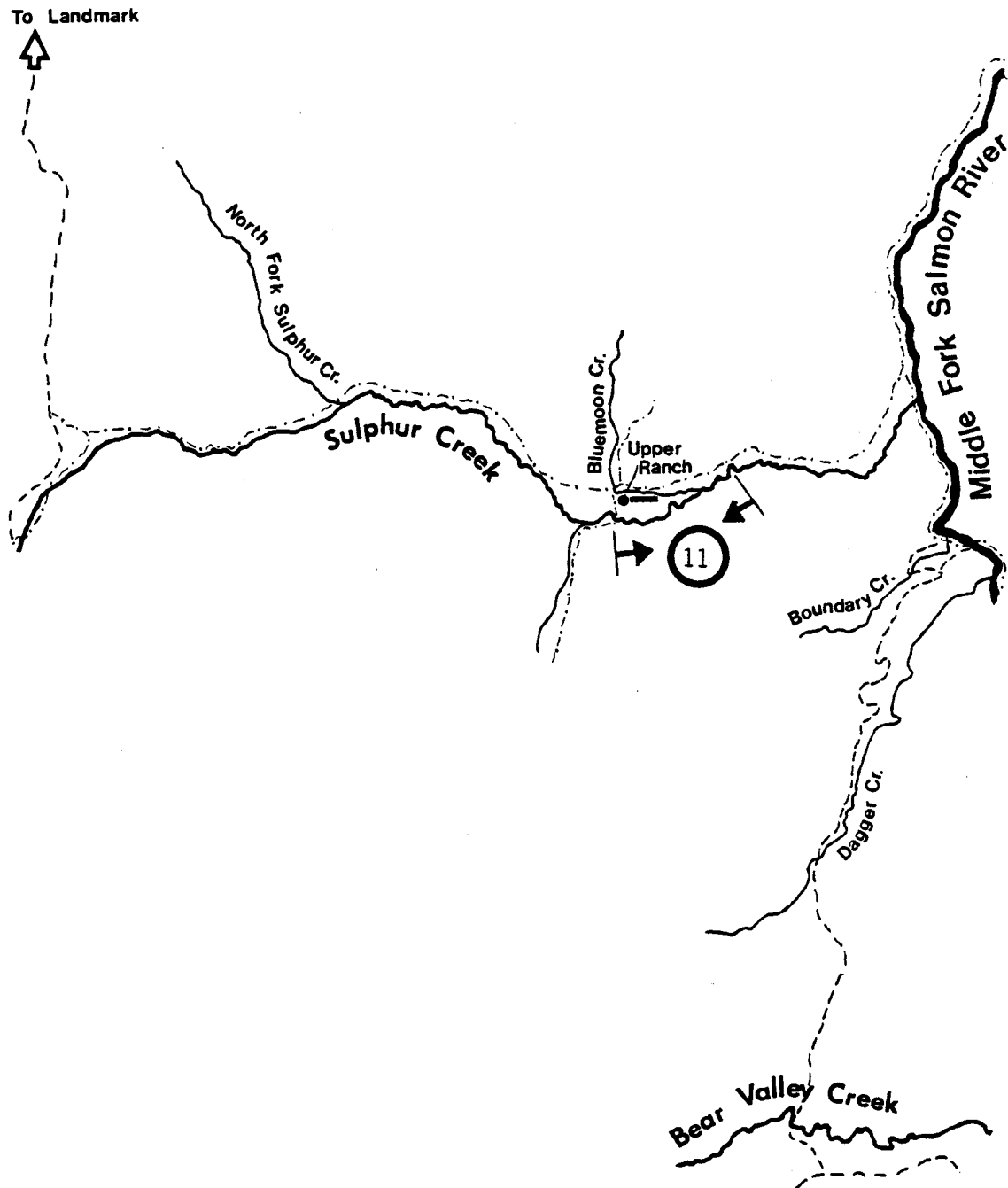
MAP SCALE 1.3 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Anderson & Scully

TIMING: Early On Time Late

REMARKS Ground



DRAINAGE Middle Fork Salmon River

SURVEY DATE 9/5/87

STREAM Loon Creek

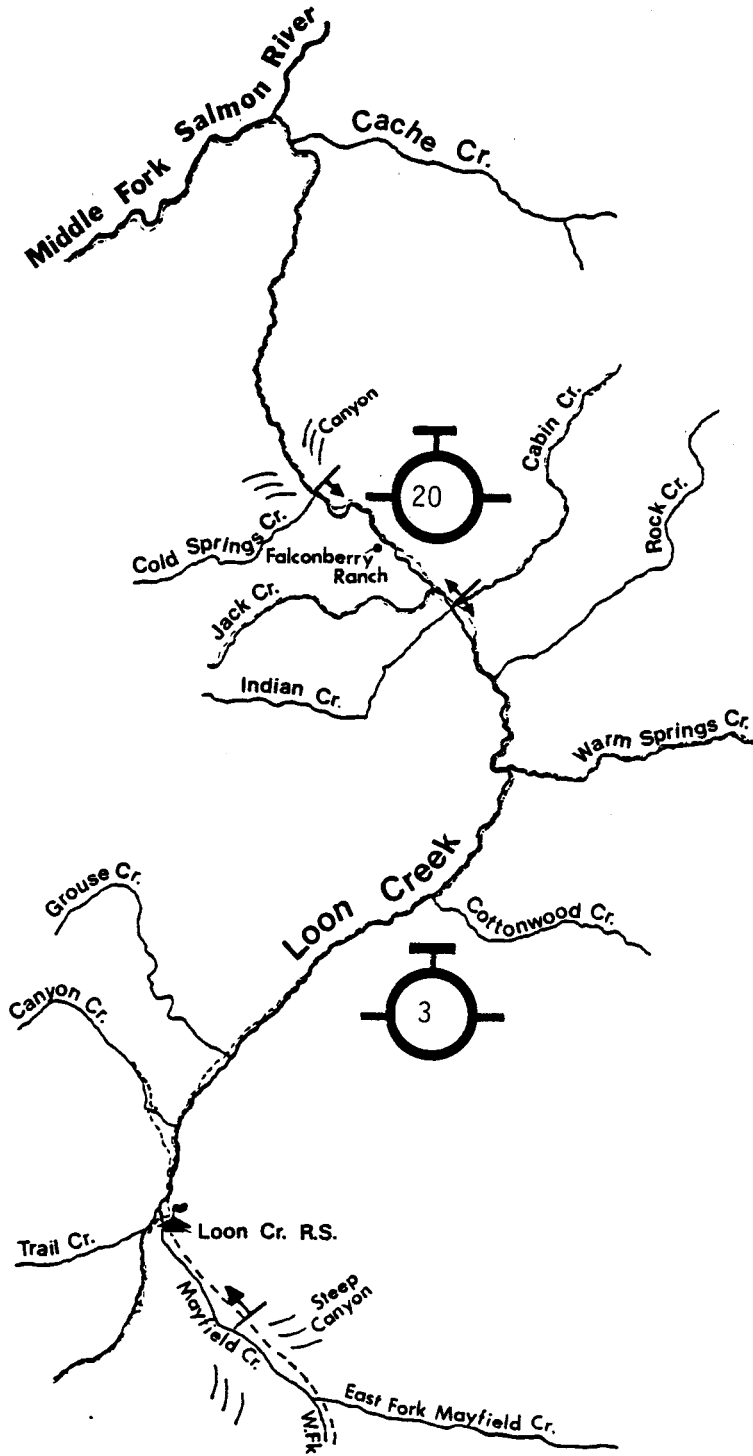
MAP SCALE 0.85 cm = 1 mile

OBSERVATION CONDITIONS excellent

OBSERVER Reingold

TIMING Early On Time Late

REMARKS _____



DRAINAGE Middle Fork Salmon River

SURVEY DATE 9/5/87

STREAM Camas Creek

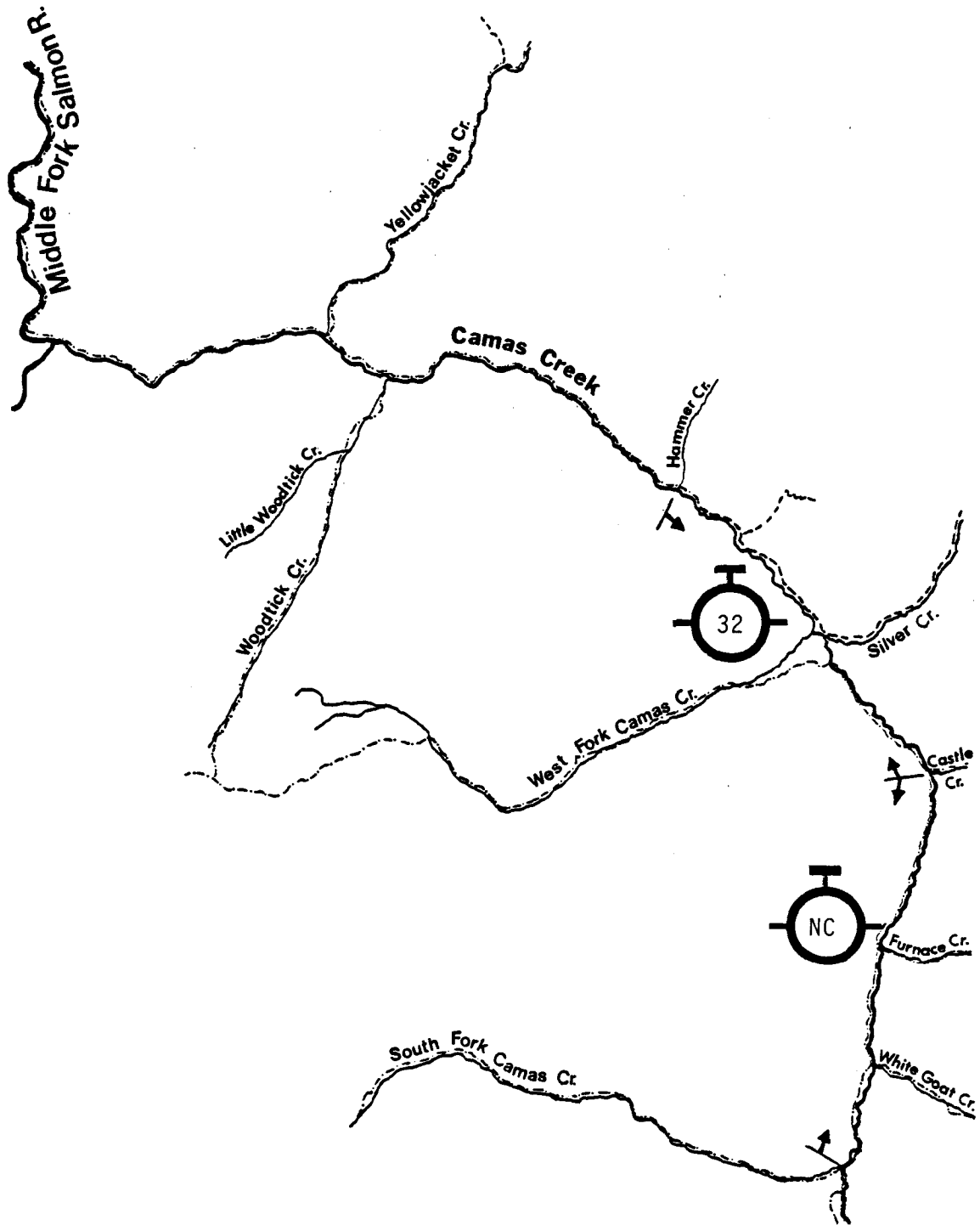
MAP SCALE 1.10 cm = 1 mile

OBSERVATION CONDITIONS excellent

OBSERVER Reingold

TIMING Early On Time Late

REMARKS no fish on redds



DRAINAGE Middle Fork Salmon River

SURVEY DATE 8/28/87 & 9/5/87

STREAM Big Creek

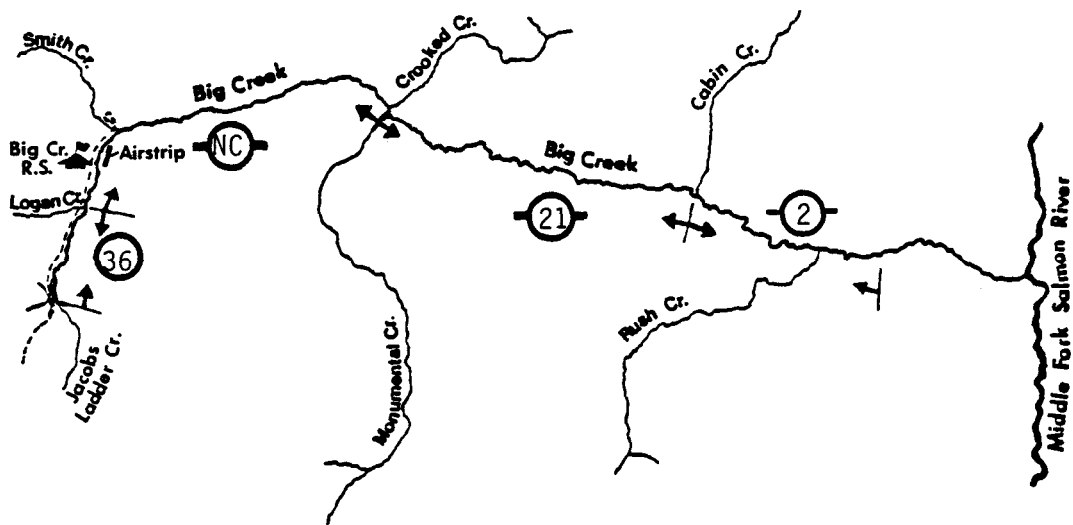
MAP SCALE 0.45 cm = 1 mile

OBSERVATION CONDITIONS excellent

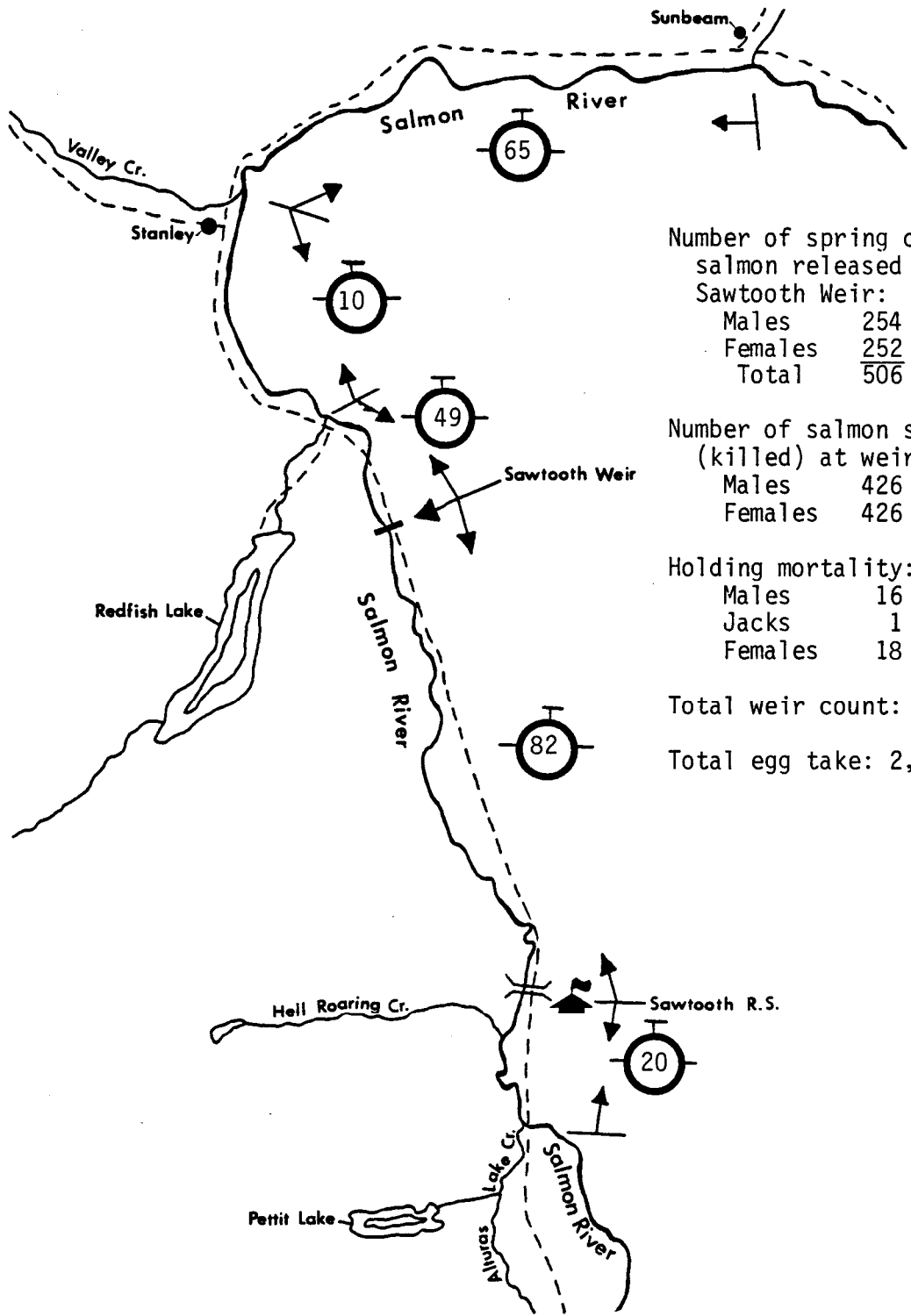
OBSERVER Reingold & Anderson

TIMING Early On Time Late

REMARKS _____



DRAINAGE Salmon River SURVEY DATE 9/4/87
 STREAM Salmon River MAP SCALE 0.78 cm = 1 mile
 OBSERVATION CONDITIONS excellent OBSERVER Reingold & Davis
 TIMING Early On Time Late REMARKS Helicopter



Number of spring chinook salmon released above Sawtooth Weir:
 Males 254
 Females 252
 Total 506

Number of salmon spawned (killed) at weir site:
 Males 426
 Females 426

Holding mortality:
 Males 16
 Jacks 1
 Females 18

Total weir count: 1,344

Total egg take: 2,721,400

DRAINAGE Salmon River

SURVEY DATE 9/4/87

STREAM Salmon R. & tributaries

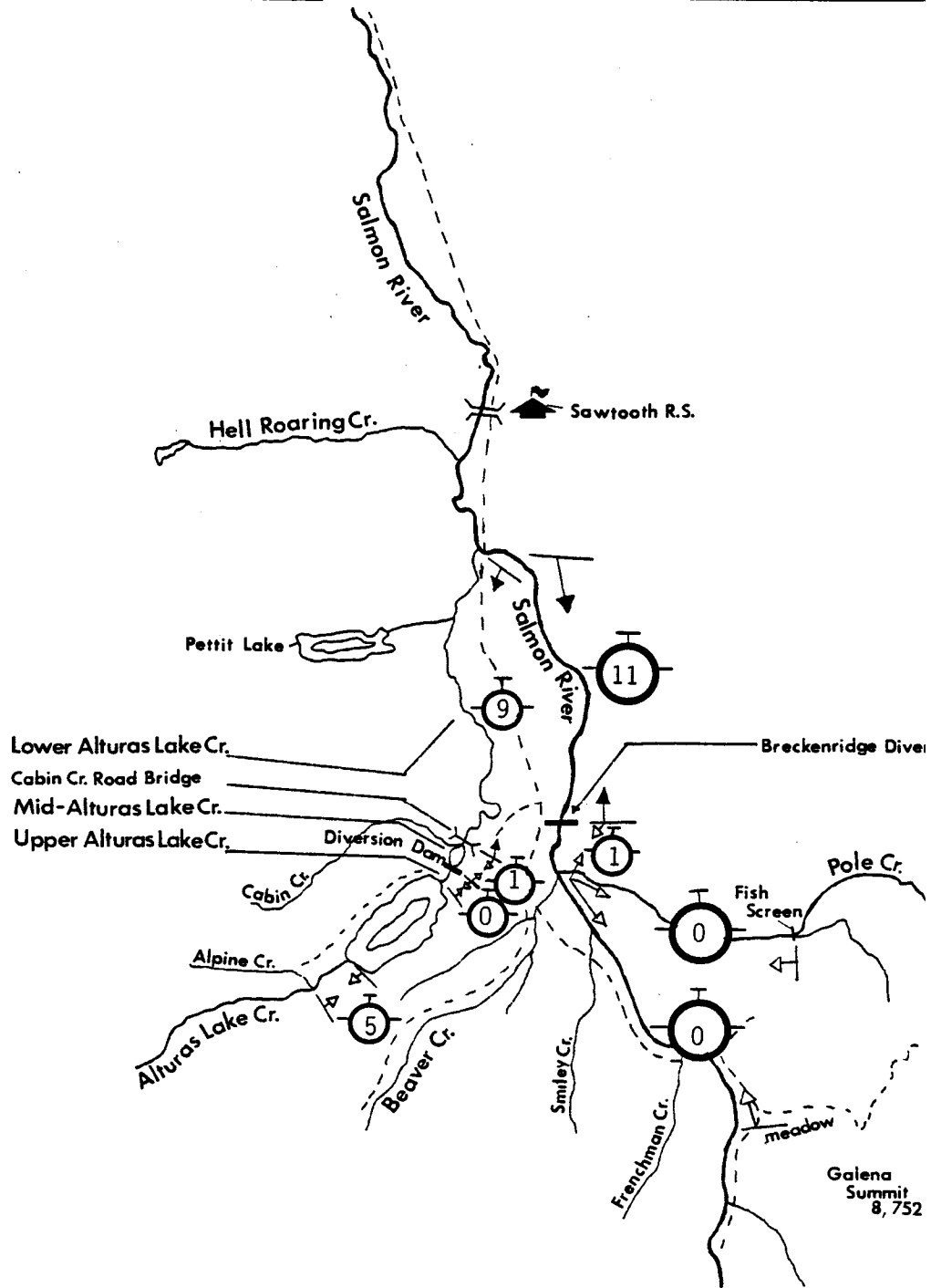
MAP SCALE 0.78 cm = 1 m

OBSERVATION CONDITIONS excellent

OBSERVER Reingold & Davi

TIMING Early, On Time, Late

REMARKS Helicopter



DRAINAGE Salmon River

SURVEY DATE 9/4/87

STREAM Valley Creek

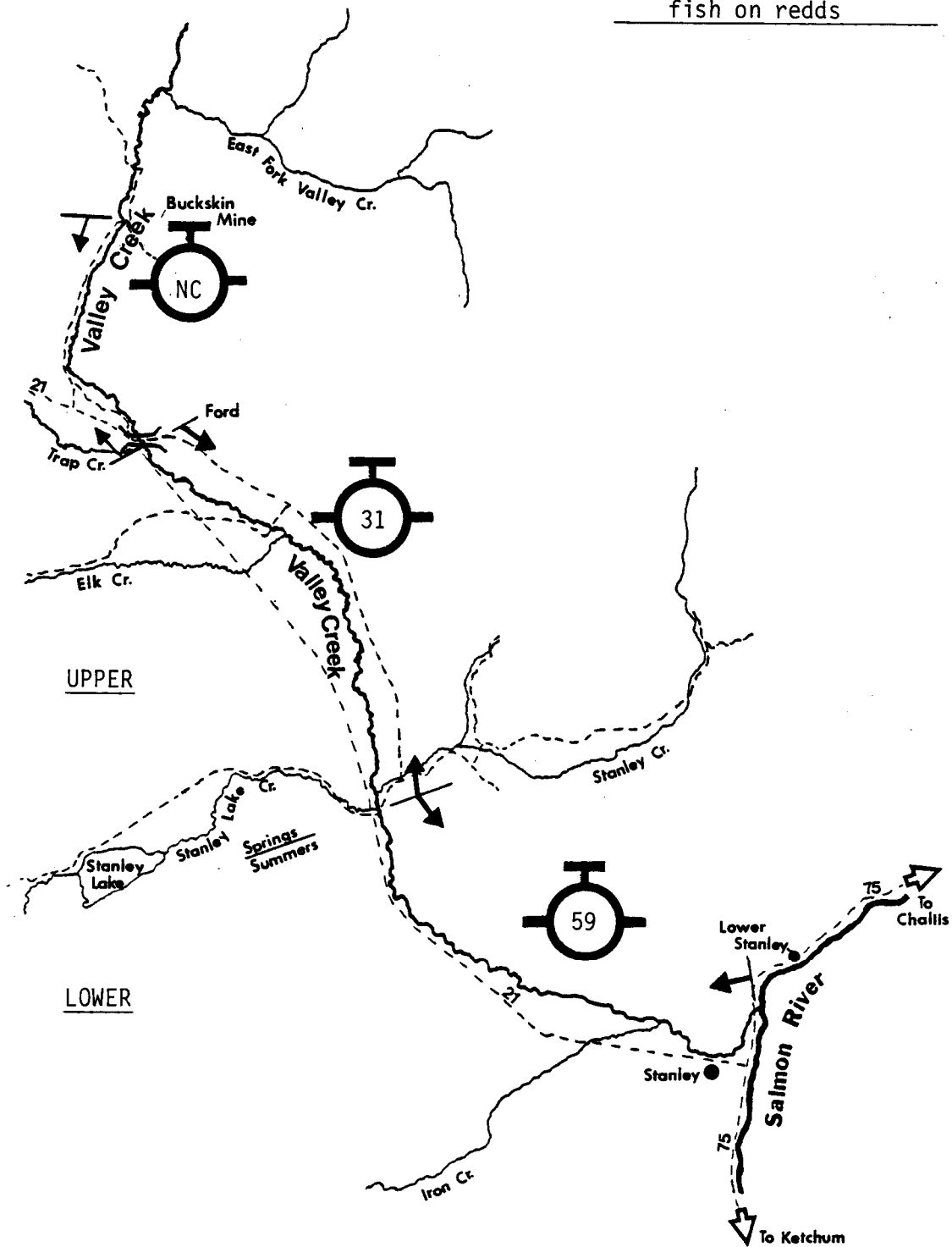
MAP SCALE 1.6 cm = 1 mile

OBSERVATION CONDITIONS excellent

OBSERVER Reingold & Davis

TIMING Early, On Time, Late

REMARKS Slightly early - all fish on redds



DRAINAGE Salmon River

SURVEY DATE 9/4/87

STREAM Salmon River

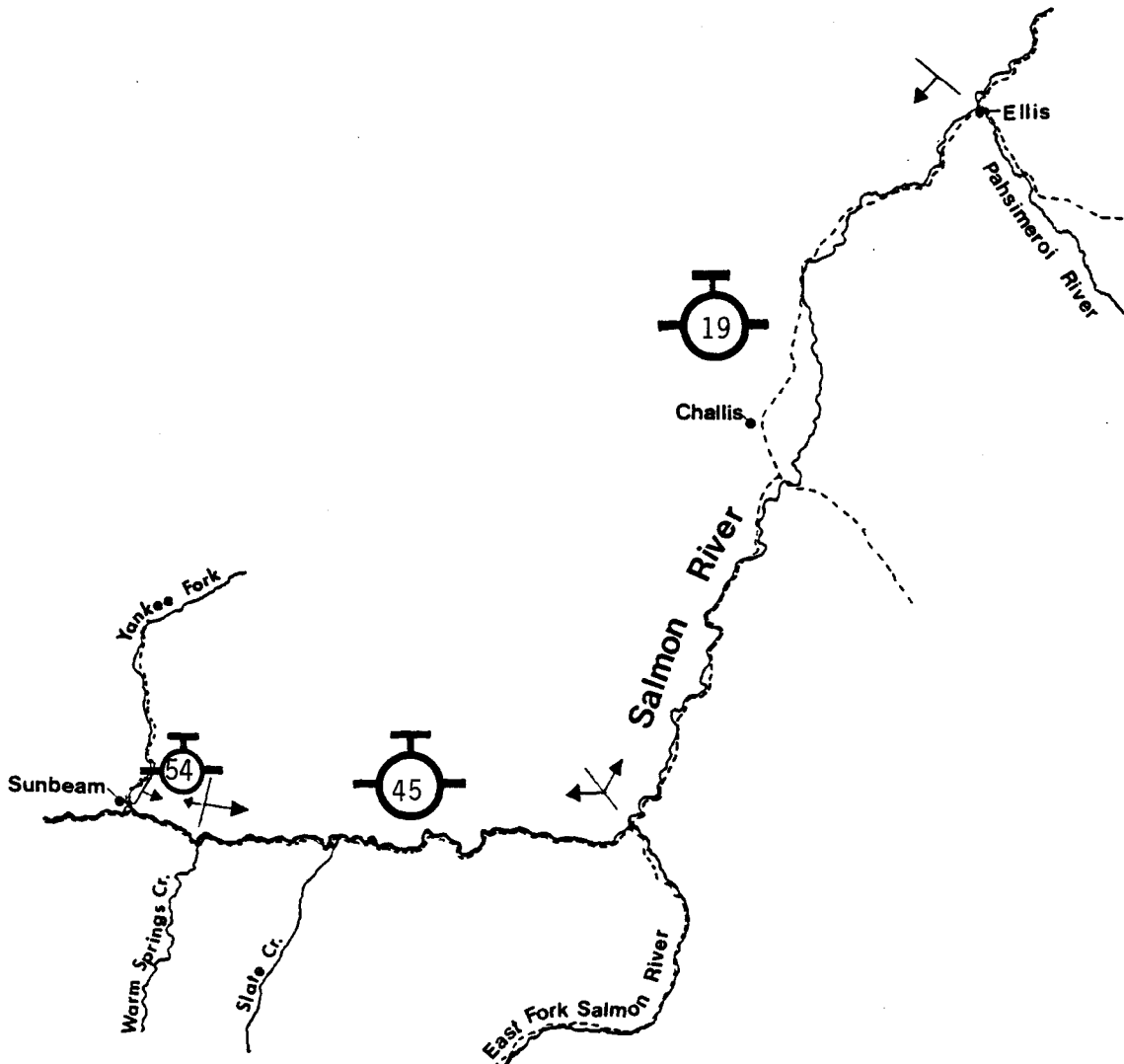
MAP SCALE 0.35 cm = 1 mile

OBSERVATION CONDITIONS excellent

OBSERVER Davis

TIMING Early On Time Late

REMARKS Slightly early, but all
fish on redds



DRAINAGE Salmon River

SURVEY DATE _____

STREAM Yankee Fork

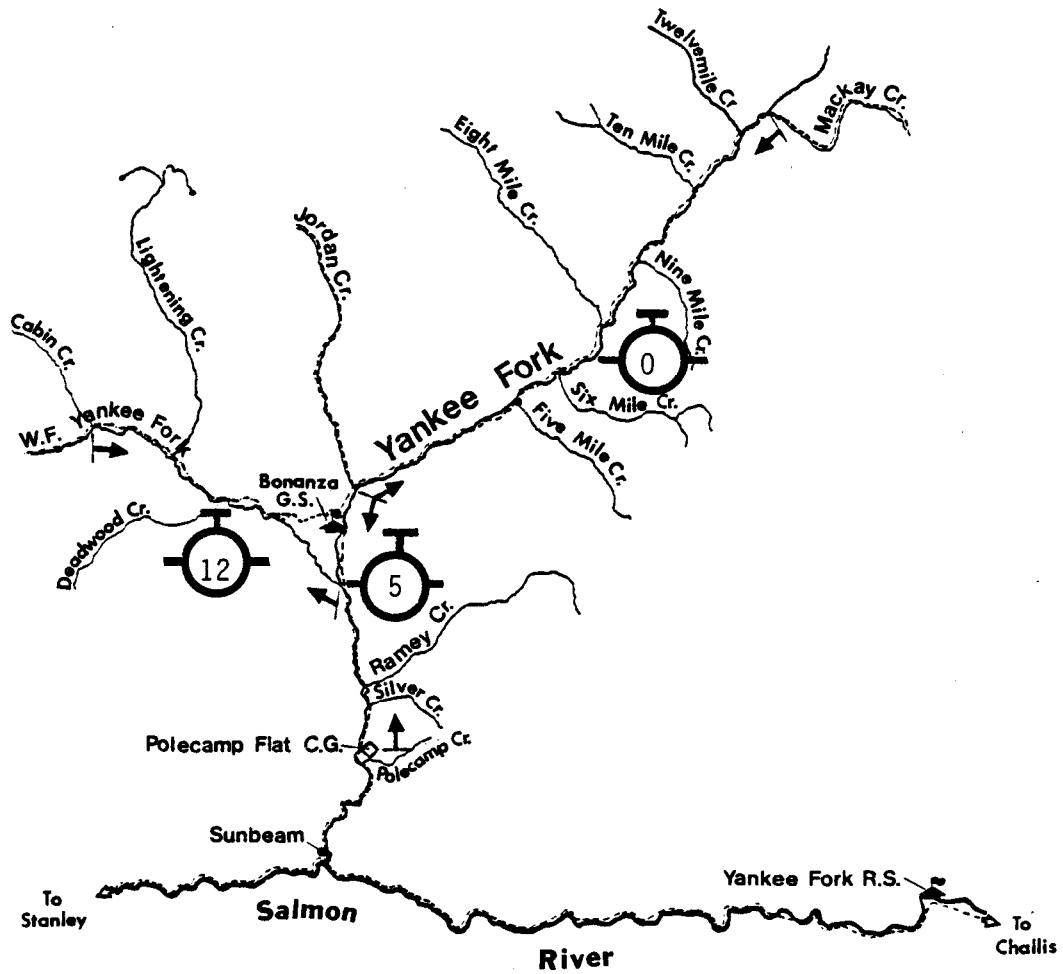
MAP SCALE 0.70 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Davis

TIMING Early On Time Late

REMARKS Slightly late - fish
gone



DRAINAGE Salmon River

SURVEY DATE 9/4/87

STREAM East Fork Salmon River

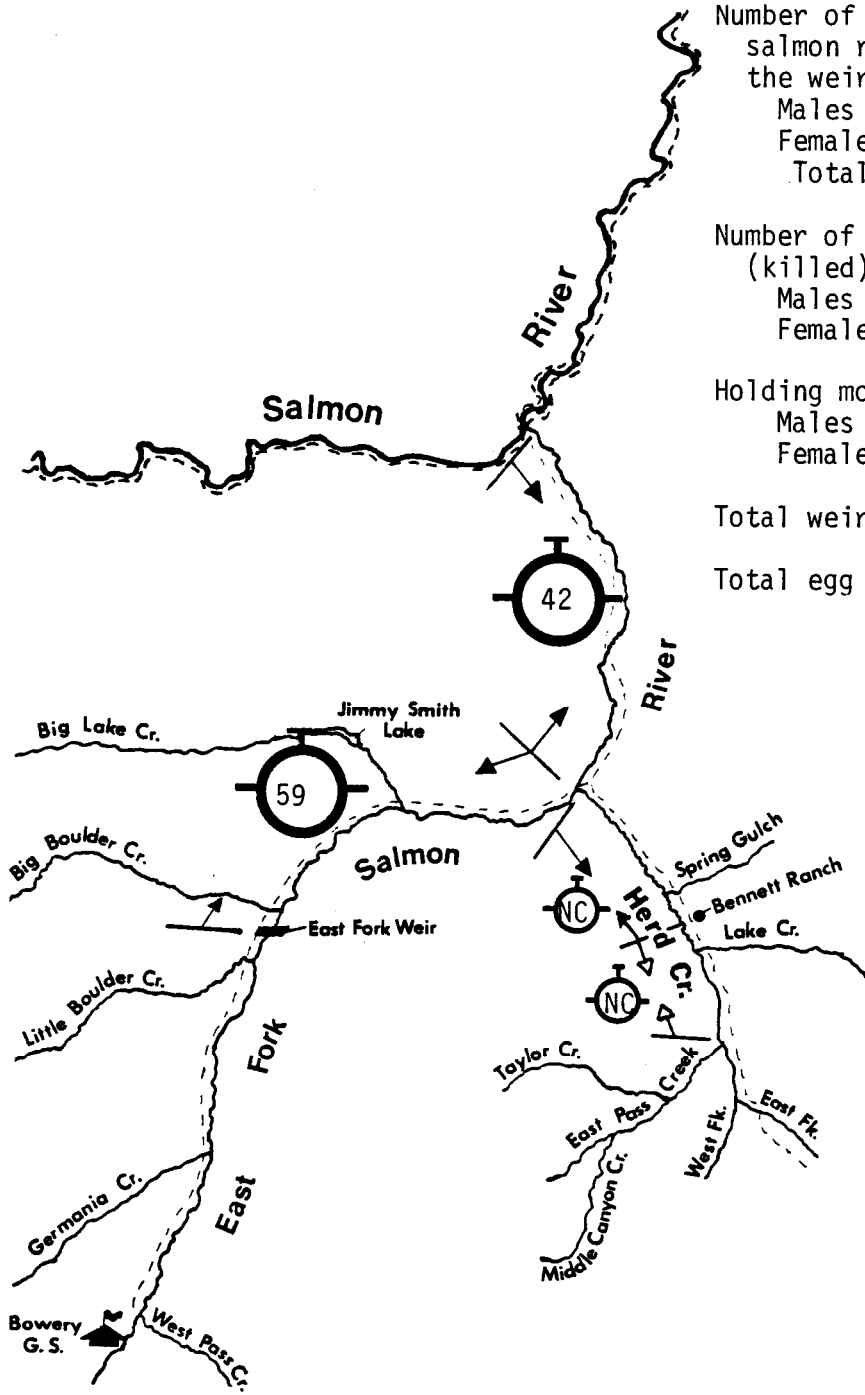
MAP SCALE 0.6 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Davis

TIMING: Early On Time Late

REMARKS _____



Number of spring chinook salmon released above the weir:

Males	61
Females	37
Total	<u>98</u>

Number of salmon spawned (killed) at weir site:

Males	61
Females	66

Holding mortality:

Males	1
Females	7

Total weir count: 272

Total egg take: 419,600

DRAINAGE Salmon River

SURVEY DATE 9/5/87

STREAM Lemhi River

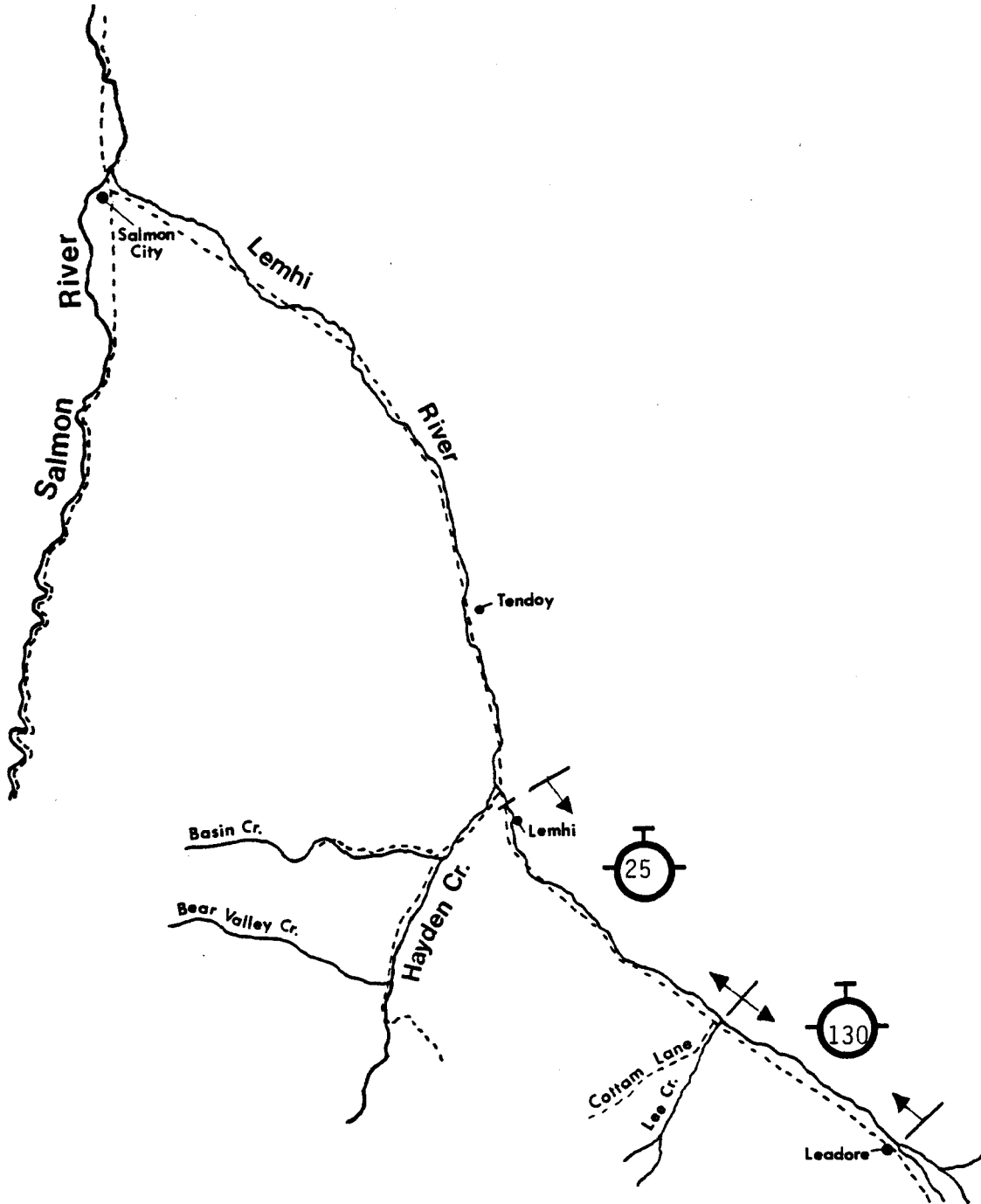
MAP SCALE 0.40 cm = 1 mile

OBSERVATION CONDITIONS excellent

OBSERVER Davis

TIMING Early On Time Late

REMARKS _____



DRAINAGE Salmon River

SURVEY DATE _____

STREAM North Fork Salmon River

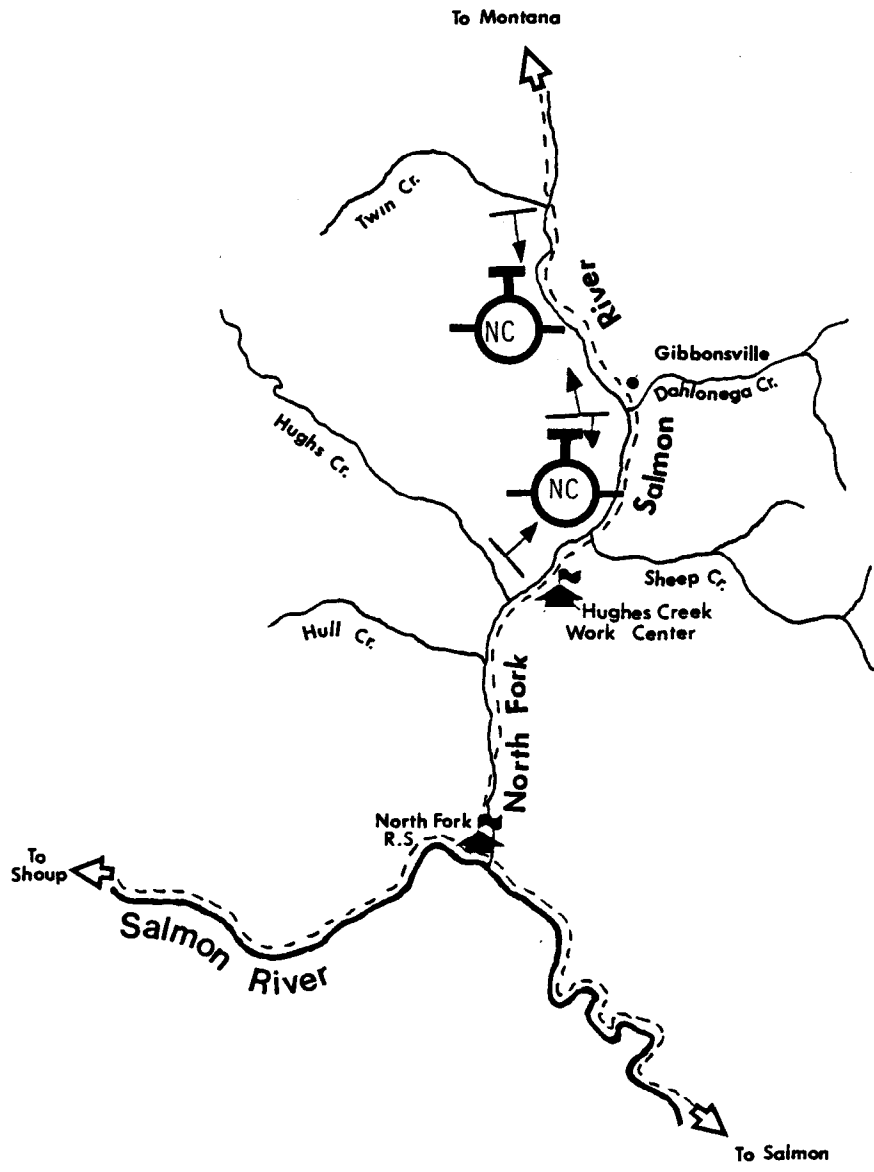
MAP SCALE 0.6 cm = 1 mile

OBSERVATION CONDITIONS _____

OBSERVER _____

TIMING: Early On Time Late

REMARKS Dropped from survey



A P P E N D I X B

DRAINAGE Clearwater River

SURVEY DATE 9/10/87

STREAM Crooked River & Newsome Creek

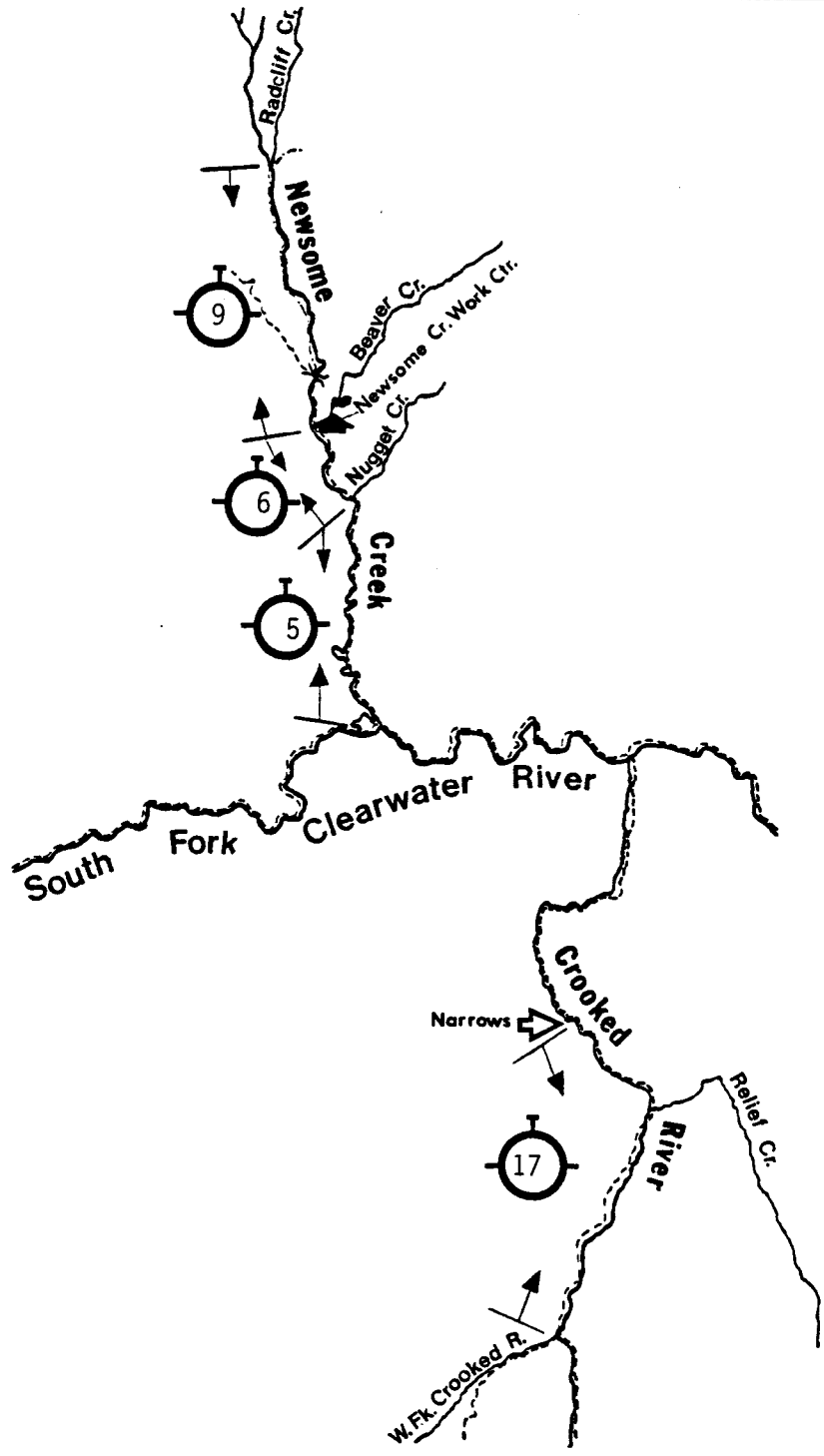
MAP SCALE 0.85 cm = 1 mile

OBSERVATION CONDITIONS excellent

OBSERVER Lindland

TIMING Early On Time Late

REMARKS extreme low flows



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

SURVEY DATE 9/10/87
 MAP SCALE 0.75 cm = 1 mile
 OBSERVER Lindland
 REMARKS extreme low flows

Holding mortality at Red River weir:

Males	86
Females	60

Number of salmon released above the Red River weir:

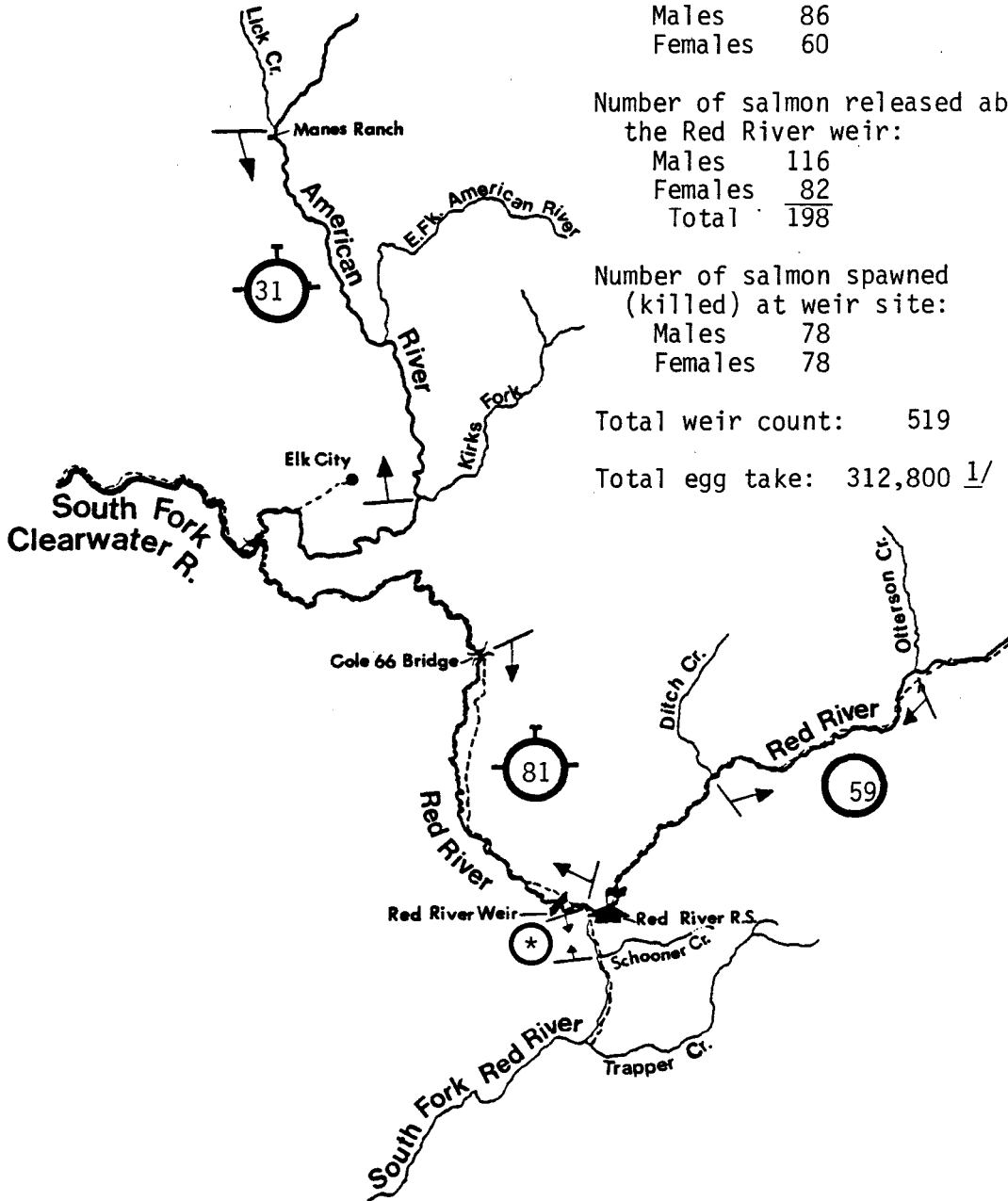
Males	116
Females	82
Total	198

Number of salmon spawned (killed) at weir site:

Males	78
Females	78

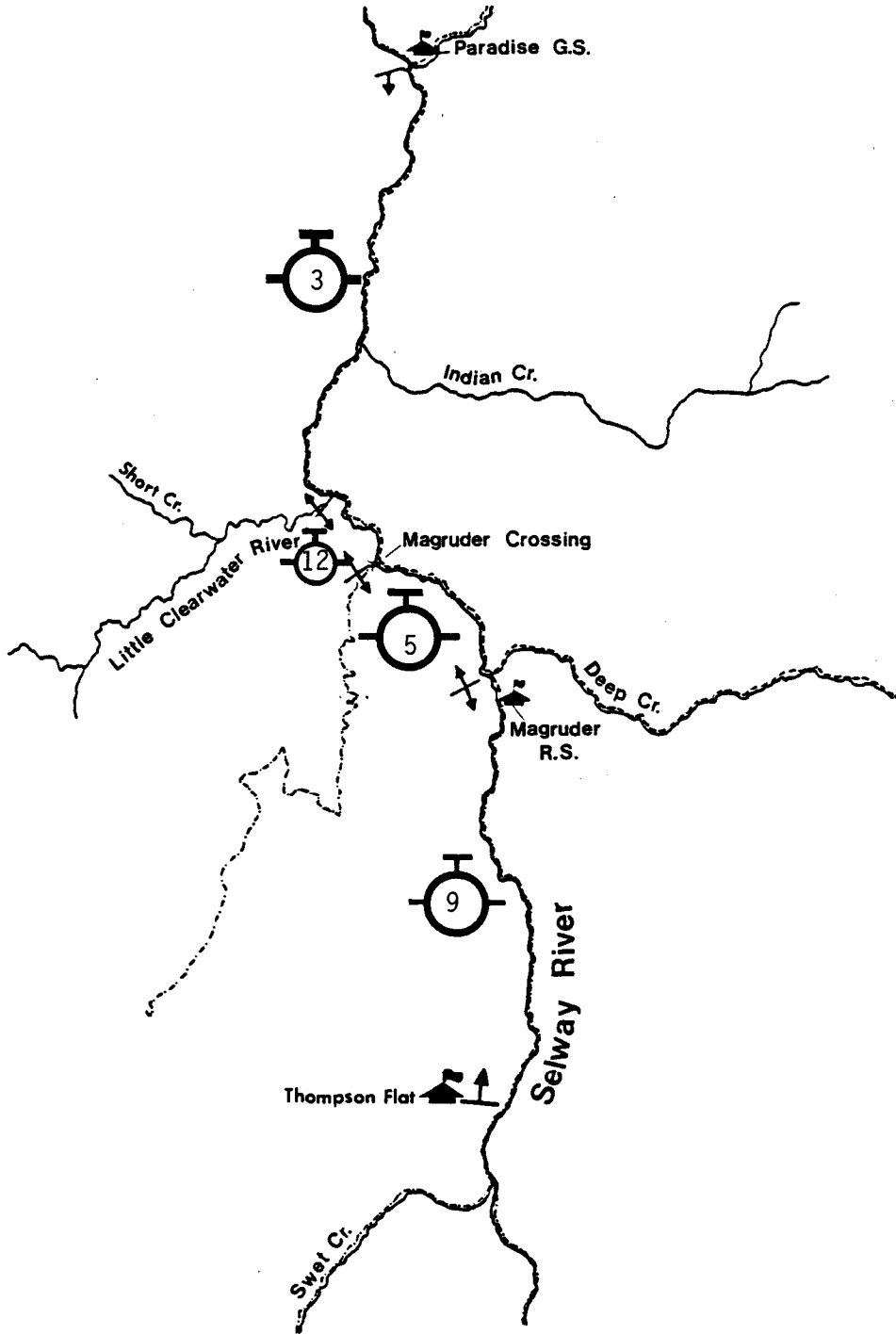
Total weir count: 519

Total egg take: 312,800 1/



* no fish because of low water
1/All eggs destroyed because of BKD

DRAINAGE Clearwater River SURVEY DATE 9/9/87
 STREAM Upper Selway River MAP SCALE 0.85 cm = 1 mile
 OBSERVATION CONDITIONS excellent OBSERVER Lindland
 TIMING Early On Time ~~Late~~ REMARKS Extreme low flows



DRAINAGE Clearwater River
Selway River and Running, Bear,
STREAM Moose and Whitecap Creeks

SURVEY DATE 9/9/87

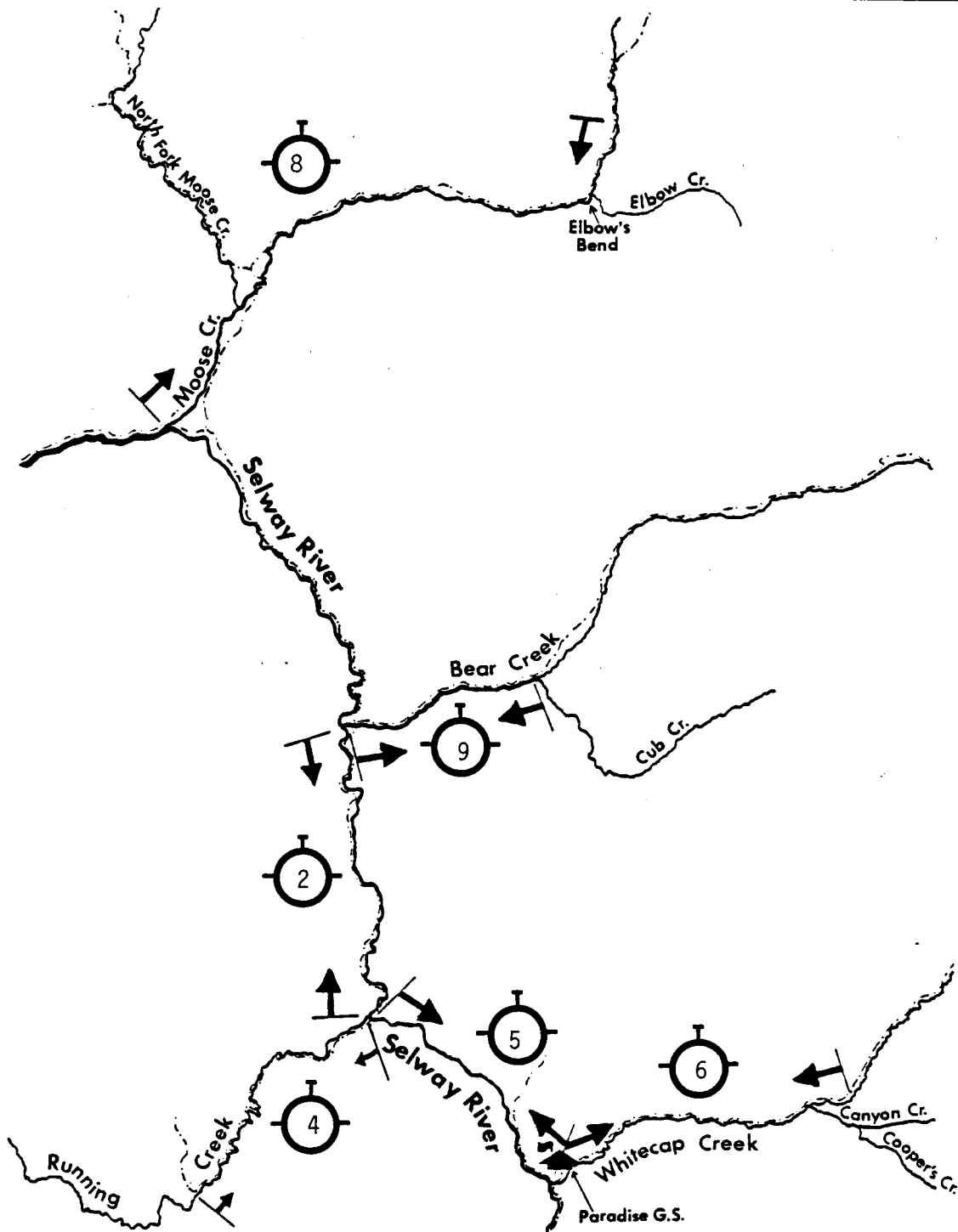
MAP SCALE 0.65 cm = 1 mile

OBSERVATION CONDITIONS excellent

OBSERVER Lindland

TIMING Early, On Time, Late

REMARKS extreme low flows



DRAINAGE Clearwater River

SURVEY DATE 9/8/87

STREAM Crooked Fork & Brushy Fork

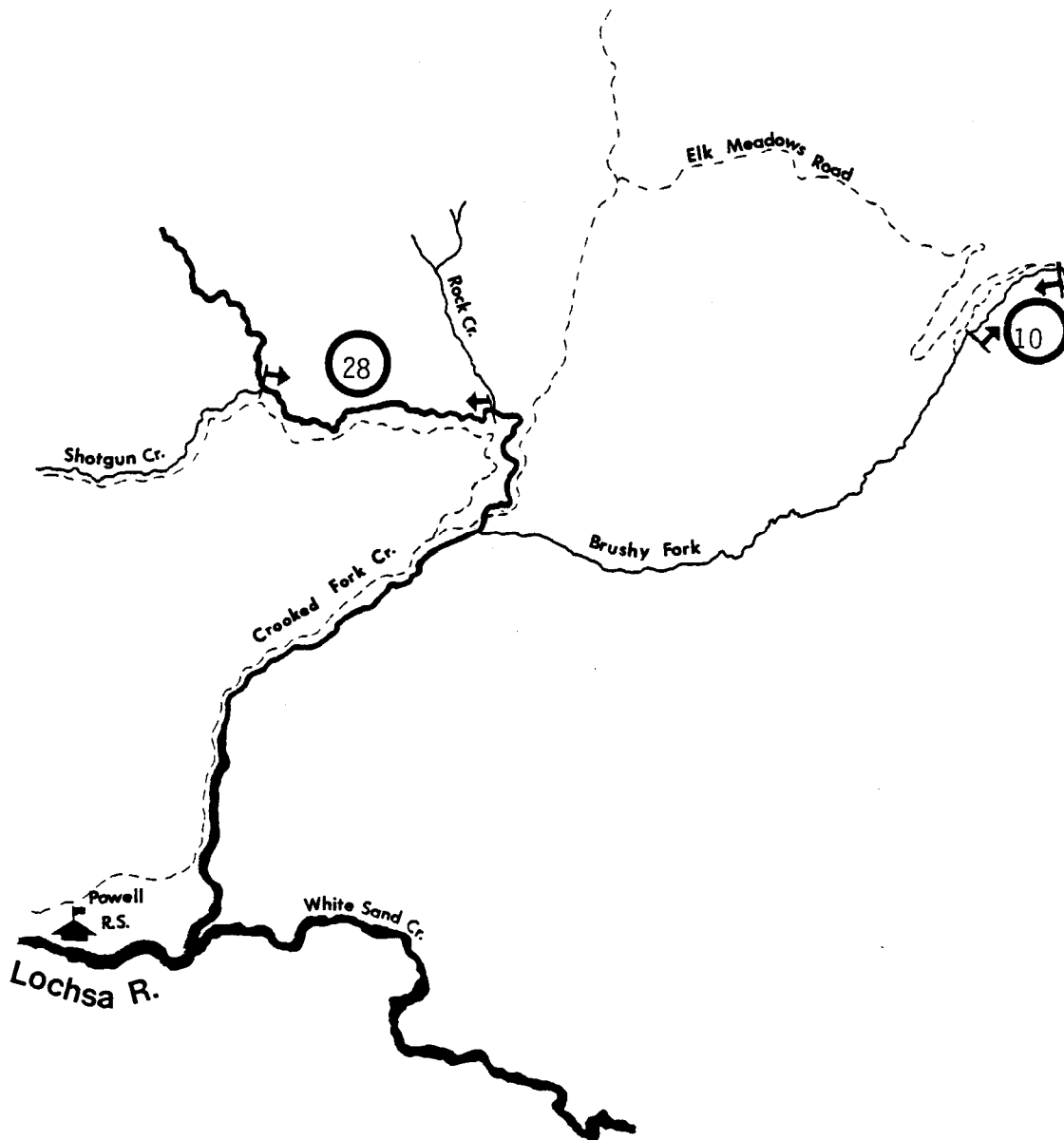
MAP SCALE 0.95 cm = 1 mile

OBSERVATION CONDITIONS excellent

OBSERVER Lindland

TIMING Early, On Time, Late

REMARKS extreme low flows



Submitted by:

Judy Hall-Griswold
Fishery Technician

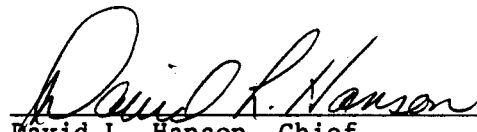
Tim Cochnauer
Principal Fishery Research Biologist

Approved by:

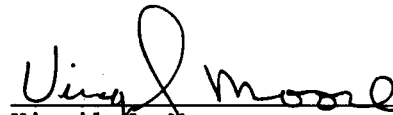
IDAHO DEPARTMENT OF FISH & GAME



Jerry M. Conley, Director



David L. Hanson, Chief
Bureau of Fisheries



Virgil K. Moore
Fishery Research Manager