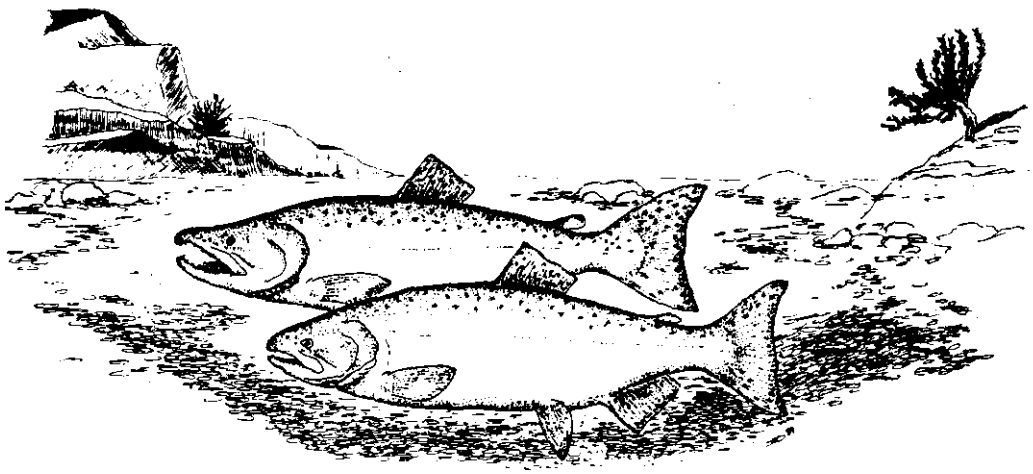
FISHERY RESEARCH

FEDERAL AID IN
FISH RESTORATION

Job Performance Report, Project F-73-R-9
Subproject II: SALMON AND STEELHEAD INVESTIGATIONS
Study I: Salmon Spawning Ground Surveys



By

Judy Hall-Griswold, Fishery Technician

Tim Cochnauer, Principal Fishery Research Biologist

February 1988

JOB PERFORMANCE REPORT

State of: Idaho

Name: SALMON AND STEELHEAD INVESTIGATIONS

Project No.: F-73-R-9

Title: Salmon Spawning Ground Survey

Study No.: 1

Job No.: 2

Period Covered: March 1, 1986 to February 28, 1987

ABSTRACT

Each year, regional fishery biologists survey major chinook salmon spawning areas in their respective regions to count the number of redds constructed in trend count 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. Both spring and summer chinook redd counts were up in hatchery-influenced areas in 1986. In wild areas, summer chinook redd counts decreased slightly, while spring chinook redd counts increased.

Total spring chinook redd counts in the Clearwater River drainage were down 15% from 1985 counts. The South Fork Clearwater River drainage experienced a 28% decline in redd counts this year, but 5-year averages show that a steady increase in redds has occurred 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 1986, 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 1986, and appear to be stabilizing.

A weir was installed on Redfish Lake Creek in 1986 to trap sockeye salmon returning to Redfish Lake. Hatchery personnel reported a total green egg take of 31,594.

Authors:

Judy Hall-Griswold
Fish and Wildlife Technician

Tim Cochnauer
Principal Fishery Research Biologist

OBJECTIVES

To monitor salmon spawning escapements in trend count 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 each year in areas where spawning activity is most concentrated and three times during postspawning die-off.

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.

In recent years, new trend 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.

This report will be the first attempt to separate chinook salmon by origin. 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 Lake Creek to trap and count all adults returning to the lake.

FINDINGS

Salmon River Drainage

For the past 30 years, chinook salmon redd counts have continued to decline in the Salmon River drainage for both spring and summer stocks (Figures 1 and 2). Slight increases for both stocks in wild and natural streams have been noted for the last couple of years.

In 1986, overall spring chinook redd counts increased 31% over the 1985 total. This increase was primarily the result of the doubling of hatchery-influenced redds in the upper Salmon River drainage (Table 1). Numbers of wild spring chinook redds were up only slightly in 1986 (Table 2).

Summer chinook redd counts decreased slightly in wild areas (Table 3) and increased slightly in the hatchery-influenced areas (Table 4).

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

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

Table 8 lists chinook redds counted in nontraditional chinook redd counting areas in the Salmon River drainage.

Clearwater River Drainage

Wild spring chinook salmon redd counts in the Clearwater River drainage have decreased dramatically since the early 1970s (Table 9). Five-year averages have shown a 751 reduction. Over the past five years the counts have more or less stabilized (Figure 3).

The five-year average for hatchery-influenced runs have shown a 74% increase (Table 10), but are relatively stable over the last couple of years (Figure 3). Redd counts in the South Fork Clearwater River, particularly Red River, have made the greatest impact on the Clearwater River drainage figure. This stream contributes 71.4% of all redds (including wild) observed. The 1986 count, however, is the lowest since 1981.

Length-frequency distribution of 82 chinook kelts recovered in Red River is listed in Table 11.

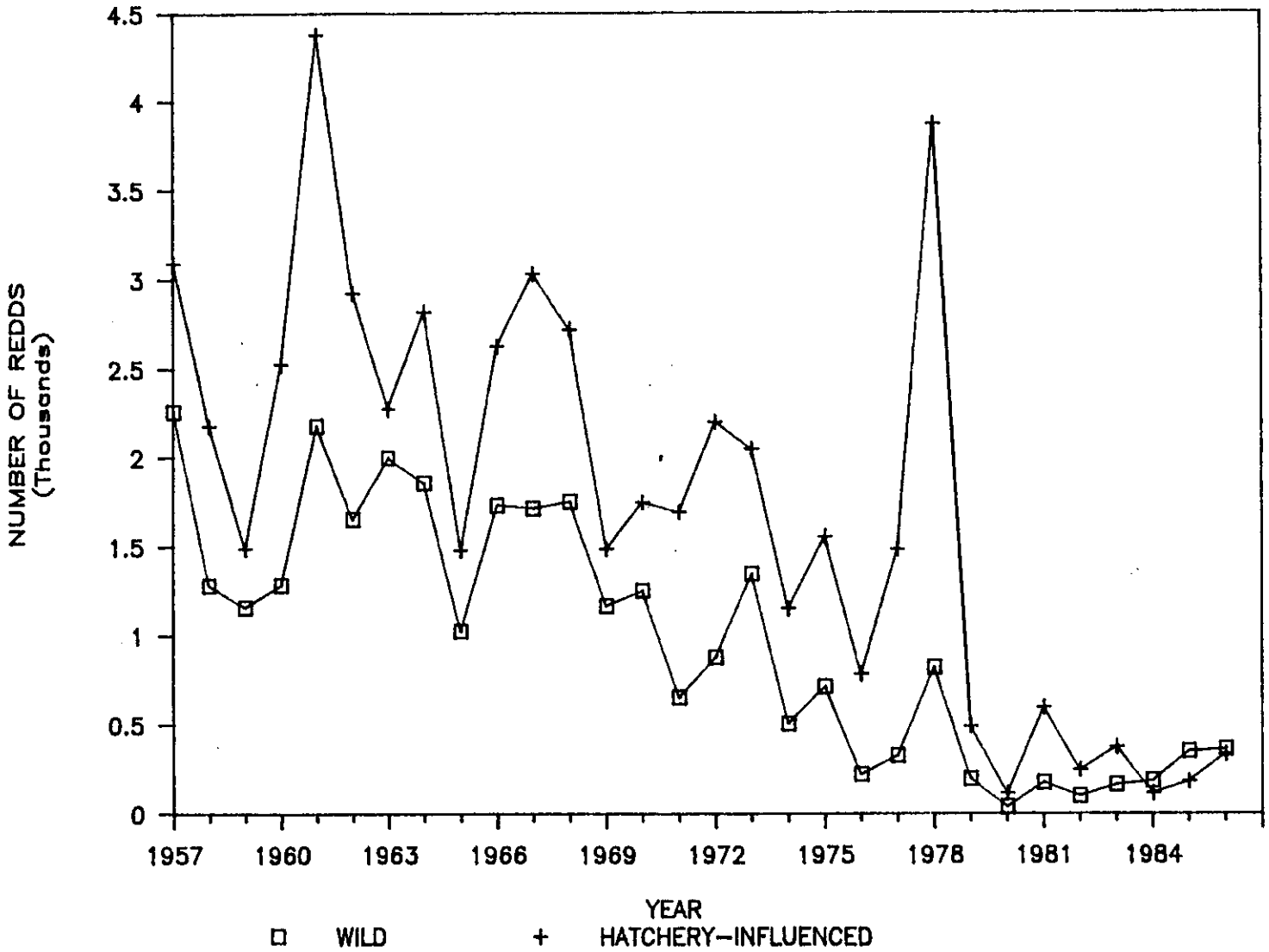


Figure 1. Salmon River spring chinook redd counts, 1957-1986.

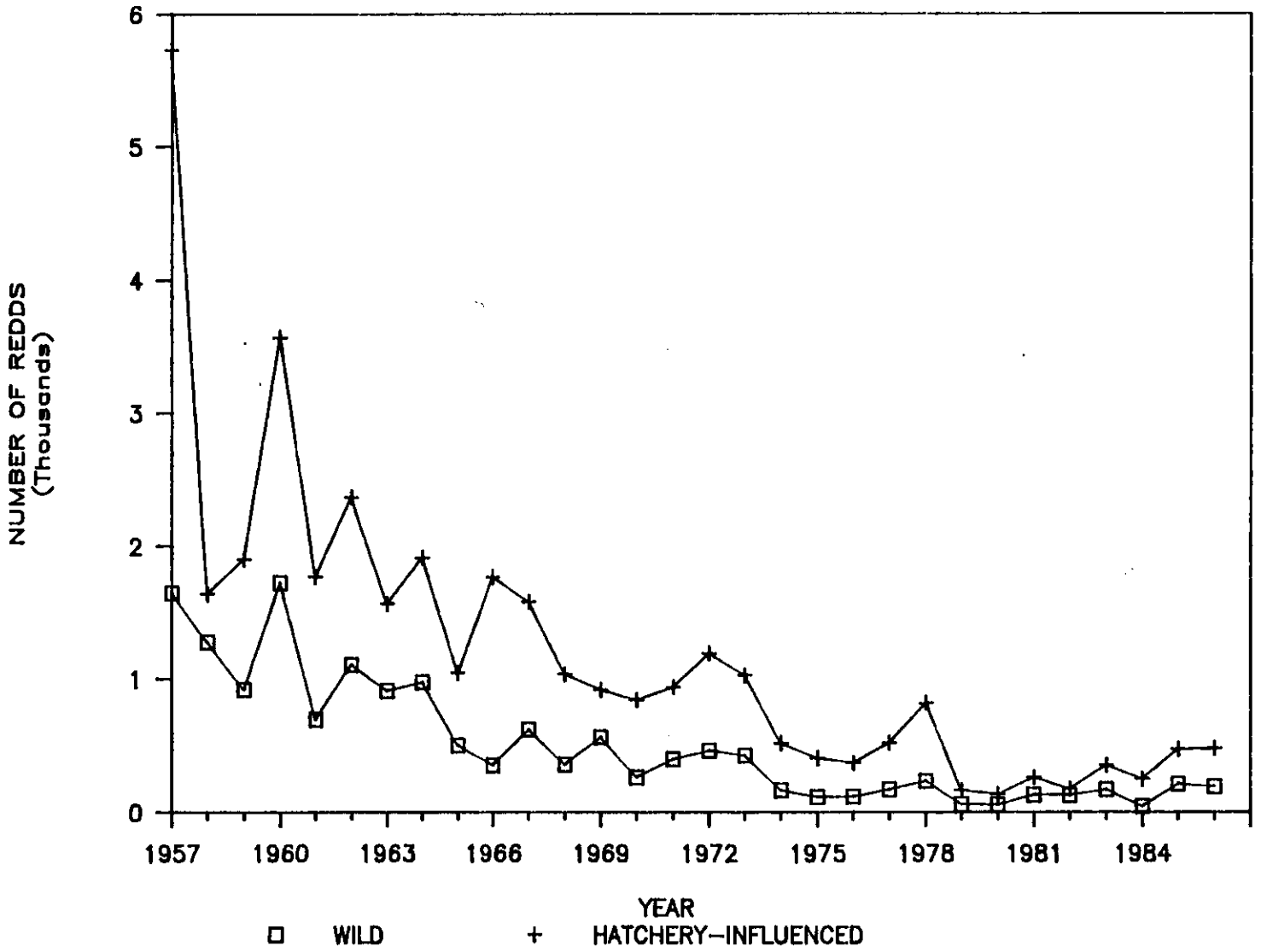


Figure 2. Salmon River summer chinook redd counts, 1957-1986.

Table 1. Salmon River drainage spring chinook redd counts, 1957-1986.

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	Five-year average
1986	14	157	NC	134	13	15	1	NC	
1985	7	93	NC	76	1	5	1	NC	
1984	3	35	NC	71	6	NC	0	NC	250
1983	27	50	121	161	8	0	7	NC	
1982	9	163	28	42	1	0	1	NC	
1981	4	126	76	363	2	16	9	NC	
1980	7	47	6	47	6	0	0	NC	
1979	29	154	57	205	25	18	2	NC	1,312
1978	303	796	841	1,707	141	33	26	29	
1977	85	474	168	698	18	6	6	31	
1976	16	241	75	378	NC	40	27	6	
1975	60	366	348	509	189	60	11	14	
1974	42	215	346	338	127	54	13	18	1,549
1973	153	485	665	414	125	104	47	55	
1972	143	507	448	748	182	115	28	31	
1971	50	407	370	619	89	57	49	53	
1970	68	371	468	432	202	67	47	95	
1969	41	360	174	313	350	53	43	155	2,139
1968	110	589	622	637	330	234	57	145	
1967	74	804	614	943	253	250	32	66	
1966	119	819	511	699	219	112	79	70	
1965	101	454	138	472	204	77	31	5	
1964	80	1,151	405	706	199	146	49	86	2,426
1963	86	364	646	638	141	128	202	71	
1962	138	1,455	334	638	157	60	58	84	
1961	30	1,871	818	813	227	192	283	144	
1960	33	1,434	122	720	83	43		91	
1959	18	524	223	502	24	10		121	2,720
1958	107	675	427	535	75	38		322	
1957	110	1,023	572	1,118	225	47			

[a]Reduced by trapping at Sawtooth Hatchery site, 1981-1986.
[b]Reduced by trapping at East Fork Weir, 1984, 1985, and 1986.

TABLE1

Table 2. Salmon River drainage wild and natural spring chinook redd counts, 1957-1986.

Year	Bear Valley Creek	Elk Creek	Marsh Creek drainage	Sulphur Creek	Upper Big Creek	Five-year average
1986	74	55	101	65	67	
1985	134	28	108	10	70	
1984	55	27	60	0	42	231
1983	56	38	33	8	27	
1982	39	9	40	3	7	
1981	60	23	63	7	22	
1980	15	8	9	2	4	
1979	69	49	47	15	15	311
1978	184	208	270	64	95	
1977	129	86	98	5	9	
1976	76	61	48	14	22	
1975	215	169	201	50	77	
1974	130	108	210	30	28	733
1973	287	369	518	78	96	
1972	221	212	312	71	60	
1971	108	173	281	58	32	
1970	334	302	456	93	68	
1969	356	349	235	138	90	1,309
1968	574	483	466	142	90	
1967	445	420	650	134	67	
1966	534	525	406	142	127	
1965	301	203	404	43	75	
1964	576	425	709	97	51	1,654
1963	460	654	372	332	181	
1962	484	426	345	169	231	
1961	629	384	546	239	382	
1960	386	346	316	79	159	
1959	381	516	95	100	69	1,634
1958	341	410	262	131	140	
1957	791	398	458	381	233	

Table 3. Salmon River drainage wild and natural summer chinook redd counts. 1957-1986.

Year	Loon Creek	Johnson Creek	Secesh River Lake Creek	Lower Big Creek	Five-year average
1986	21	53	115	NC	
1985	28	75	105	NC	
1984	4	17	21	NC	146
1983	7	63	98	NC	
1982	23	37	65	NC	
1981	30	45	53	NC	
1980	9	24	20	NC	
1979	NC	36	20	NC	128
1978	29	113	91	NC	
1977	62	81	27	NC	
1976	31	68	17	NC	
1975	32	69	10	NC	
1974	34	107	21	NC	254
1973	78	271	74	NC	
1972	150	220	87	NC	
1971	79	183	80	52	
1970	43	130	63	23	
1969	110	273	104	72	436
1968	135	127	58	33	
1967	96	286	140	94	
1966	49	110	140	51	
1965	166	116	134	83	
1964	361	310	181	121	767
1963	261	266	163	220	
1962	157	295	292	360	
1961	131	207	198	160	
1960	334	517	524	352	
1959	123	294	285	217	1,255
1958	193	269	478	338	
1957	425	349	344	535	

TABLE3

Table 4. Salmon River drainage hatchery-influenced summer chinook redd counts, 1957-1986.

Year	Lower Salmon River	Lower Valley Creek	Lower East Fork	S. Fork Salmon River	5-year average
1986	104	16	70	289	
1985	126	1	22	323	
1984	51	15	16	165	344
1983	111	28	27	185	
1982	39	8	14	111	
1981	75	17	43	126	
1980	11	4	0	116	
1979	NC	15	33	115	379
1978	349	219	NC	251	
1977	94	63	136	226	
1976	44	43	39	241	
1975	45	80	38	238	
1974	200	45	49	218	775
1973	224	77	138	586	
1972	412	39	161	577	
1971	220	147	149	421	
1970	150	41	123	527	
1969	120	22	138	636	1,062
1968	223	63	235	515	
1967	365	79	234	902	
1966	390	184	216	980	
1965	201	57	131	656	
1964	415	71	306	1,124	1,733
1963	195	50	265	1,057	
1962	467	115	195	1,589	
1961	356	162	198	1,058	
1960	818	141	303	2,306	
1959	336	70	192	1,305	2,924
1958	362	47	--	1,236	
1957	2,406	331	183	2,812	

Table 5. Length frequency of summer chinook carcasses recovered on South Fork Salmon River and Johnson Creek spawning ground surveys, 1986[a].

Males				Females			
Fork length (inch)	Total number recovered	% total	Age class	Fork length (inch)	Total number recovered	% total	Age class
17	1	2.9		17	0	0.0	
18	1	2.9		18	0	0.0	
19	0	0.0	Jacks	19	0	0.0	
20	1	2.9	N=6	20	0	0.0	N=0
21	1	2.9	%=17.6	21	0	0.0	
22	2	5.9		22	0	0.0	
23	0	0.0		23	0	0.0	
24	0	0.0		24	0	0.0	
25	0	0.0		25	1	3.3	
26	0	0.0	4-years-	26	0	0.0	
27	1	2.9	old	27	1	3.3	
28	1	2.9	N=9	28	2	6.7	N=7
29	0	0.0	%=26.5	29	0	0.0	%=23.3
30	3	8.8		30	2	6.7	
31	4	11.8		31	1	3.3	
32	4	11.8		32	0	0.0	
33	2	5.9		33	4	13.3	
34	4	11.8		34	5	16.7	
35	1	2.9	5-years-	35	12	40.0	
36	2	5.9	old	36	1	3.3	
37	2	5.9	N=19	37	1	3.3	N=23
38	3	8.8	%=55.9	38	0	0.0	%=76.7
39	0	0.0		39	0	0.0	
40	1	2.9		40	0	0.0	
Total	34			Total	30		

[a]All kelts observed were unmarked and found below the South Fork Trap in 1986.

Table 6. Length frequency of summer chinook carcasses recovered on Secesh River and Lake Creek spawning ground surveys, 1986[a].

Males					Females				
Fork length (inch)	Total no. recovered Lake	Total no. recovered Secesh	% total	Age class	Fork length (inch)	Total no. recovered Lake	Total no. recovered Secesh	% total	Age class
19	0	0	0.0		19	0	0	0.0	
20	0	0	0.0	Jacks	20	0	0	0.0	
21	0	0	0.0	N=1	21	0	0	0.0	N=0
22	0	0	0.0	%=7.1	22	0	0	0.0	
23	1	0	7.1		23	0	0	0.0	
24	0	0	0.0		24	0	0	0.0	
25	0	0	0.0		25	0	0	0.0	
26	0	0	0.0		26	0	0	0.0	
27	1	0	7.1	4-years-	27	0	0	0.0	
28	0	0	0.0	old	28	0	0	0.0	
29	1	3	28.6	N=9	29	2	1	23.1	N=7
30	1	1	14.3	%=64.3	30	0	3	23.1	%=53.8
31	1	1	14.3		31	0	1	7.7	
32	0	2	14.3		32	0	1	7.7	
33	0	0	0.0	5-years-	33	1	0	7.7	
34	1	0	7.1	old	34	1	0	7.7	
35	0	0	0.0	N=4	35	1	1	15.4	N=6
36	0	0	0.0	%=28.6	36	0	0	0.0	%=46.2
37	0	1	7.1		37	0	1	7.7	
Total	6	8			Total	5	8		

[a]All carcasses recovered in 1986 were unmarked.

Table 7. Length frequency of spring chinook carcasses recovered on Big Creek [a], Elk Creek, Sulphur Creek, and Bear Valley Creek (Middle Fork Salmon River) spawning ground surveys, 1986[b].

Males[c]				Females[c]			
Fork length (inch)	Total no. recovered	% total	Age class	Fork length (inch)	Total no. recovered	% total	Age class
17	1	1.6		17	0	0.0	
18	3	4.8		18	0	0.0	
19	1	1.6	Jacks	19	0	0.0	
20	1	1.6	N=6	20	0	0.0	N=0
21	0	0.0	%=9.4	21	0	0.0	
22	0	0.0		22	0	0.0	
23	0	0.0		23	0	0.0	
24	0	0.0		24	0	0.0	
25	0	0.0		25	0	0.0	
26	0	0.0		26	0	0.0	
27	4	6.3	4-years-	27	5	5.4	
28	5	7.9	old	28	1	1.1	
29	10	15.9	N=34	29	3	3.3	N=14
30	9	14.3	%=53.1	30	2	2.2	%=15.2
31	6	9.5		31	3	3.3	
32	5	7.9		32	5	5.4	
33	4	6.3		33	4	4.3	
34	2	3.2		34	17	18.5	
35	1	1.6	5-years-	35	14	15.2	
36	2	3.2	old	36	16	17.4	
37	2	3.2	N=24	37	16	17.4	N=78
38	4	6.3	%=37.5	38	1	1.1	%=84.8
39	0	0.0		39	4	4.3	
40	3	4.8		40	0	0.0	
41	1	1.6		41	1	1.1	
Total	64			Total	92		

[a]Kelt counts on Big Creek were collected by Nez Perce Tribe biologists; 12 males, 26 females.
[b]All carcasses recovered in 1986 were unmarked.
[c]NMFS reported 51 males and 60 females on Bear Valley Creek and Elk Creek (the remaining kelt counts reported by IDFG).

Table 8. Nontraditional chinook redd counts, Salmon River drainage, 1985-1986.

Stream	Section	1985	1986
Salmon River			
Alturas Lake Creek	Cabin Creek Bridge to Diversion Dam	0	0
Alturas Lake Creek	Diversion Dam to Alturas Lake	0	0
Alturas Lake Creek	Alturas Lake Inlet to Alpine Creek	1	1
Salmon River	Breckenridge Diversion Dam to mouth of Pole Creek	4	0
Salmon River	Mouth of Pole Creek to headwaters	0	0
Pole Creek	Mouth to diversion screen	1	0
East Fork Salmon River			
Herd Creek	Bennett Ranch to mouth of East Pass Creek	1	6
	Total	7	7

Table 9. Clearwater River drainage wild and natural chinook salmon redd counts, 1967-1986.

Year	Selway River	Bear Creek	Running Creek	Whitecap Creek	Moose Creek	Five-year average
1986	31	10	NC	7	9	
1985	15[a]	NC	NC	NC	NC	
1984	30	6	NC	6	7	44
1983	26	8	NC	4	6	
1982	38	8	NC	3	5	
1981	47	8	NC	4	6	
1980	40	7	1	3	4	
1979	21	3	0	2	4	90
1978	125	13	6	NC	17	
1977	97	18	2	1	23	
1976	58	14	3	4	15	
1975	21	5	0	1	4	
1974	66	10	4	2	15	160
1973	261	26	21	7	32	
1972	175	25	11	8	13	
1971	55	14	8	NC	NC	
1970	65	19	10	4	NC	
1969	57	6	21	NC	NC	63
1968	16	7	4	NC	NC	
1967	22	7	NC	NC	NC	

[a]Ground count only from Little Clearwater River upstream to Magruder Crossing.

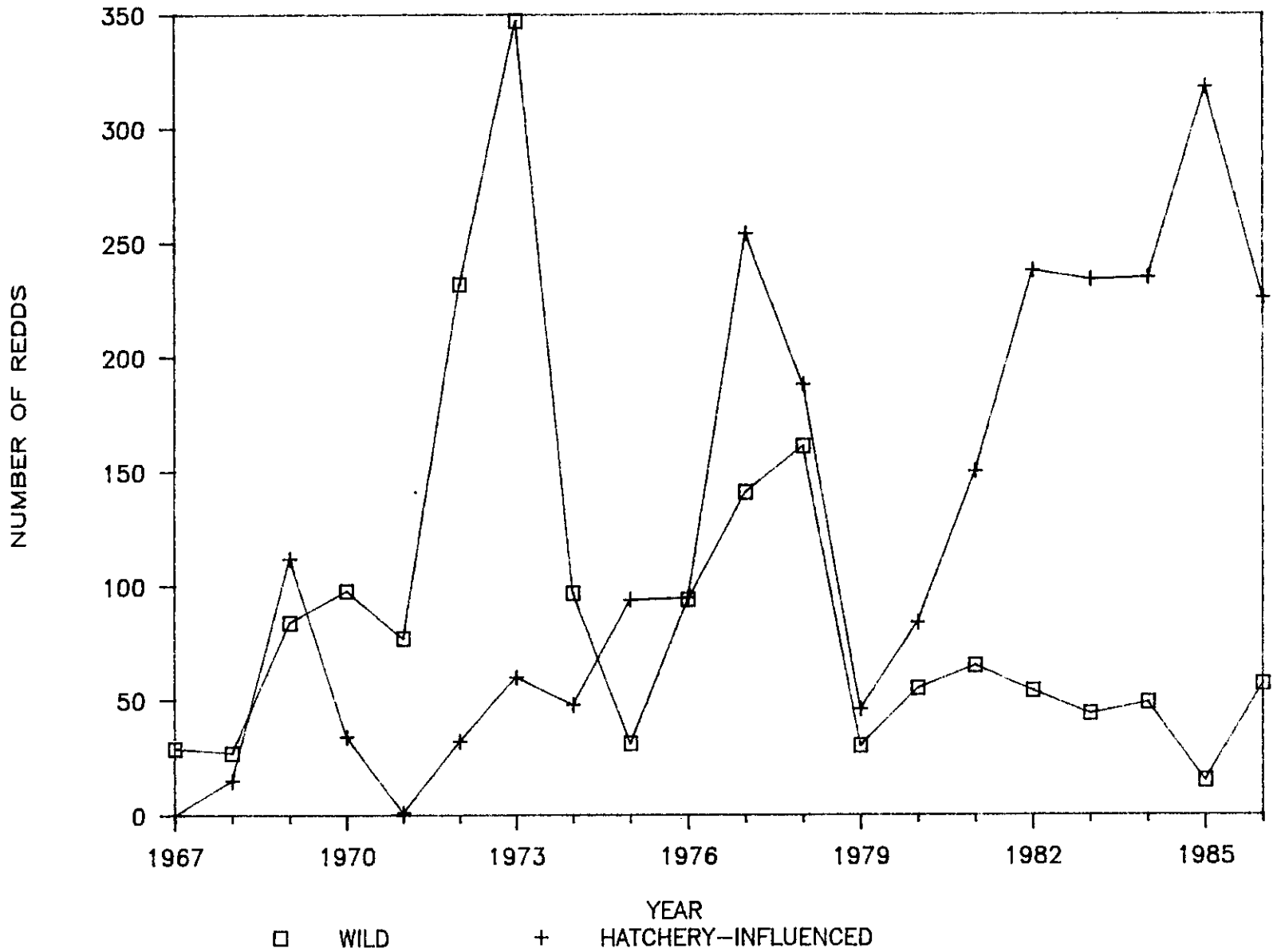


Figure 3. Clearwater River drainage chinook salmon redd counts, 1967-1986.

Table 10. Clearwater River hatchery-influenced chinook salmon redd counts and 5-year averages, 1967-1986.

	Lochsa River drainage								South Fork drainage		Clearwater River drainage	
Year	Crooked Fork	Brushy Fork	Total	Five-year average	Newsome Creek	Crooked River	Red River	American River	Total	Five-year average	Total	Five-year average
1986	30	11	41		7	9	155	14	185		226	
1985	47	14	61		2	10	222	23	257		318	
1984	28	9	37	41	1	22	175	NC	198	210	235	250
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		5	8	38	7	58		84	
1979	6	12	18	51	6	2	20		28	94	46	144
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		6	33	20		59		94	
1974	22	6	28	43	3	5	12		20		48	66
1973	60		60								60	
1972	32		32								32	
1971	1		1								1	
1970	34		34								34	
1969	112		112	32							112	32
1968	15		15								15	
1967	0		0								0	

TABLE10A

Table 11. Length frequency of spring chinook carcasses recovered from Red River spawning ground surveys during 1986.

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	0	0.0	N=5
20	0	0.0	%=6.1
21	0	0.0	
22	1	1.3	
23	0	0.0	
24	4	4.9	
25	3	3.6	
26	5	6.1	
27	12	14.6	4-years-
28	17	20.7	old
29	14	17.1	N=66
30	9	11.0	%=80.5
31	6	7.3	
32	2	2.4	
33	2	2.4	5-years-
34	3	3.6	old
35	2	2.4	N=11
36	1	1.3	%=13.4
37	1	1.3	
Total	82		

Sockeye Salmon

From 1954 to 1966, sockeye salmon were counted at the Redfish Lake Creek weir. Ground counts of redds in Redfish Lake have been conducted since 1981. This year, two ground count surveys were made on Redfish Lake, including Stanley Lake Creek and Alturas Lake Creek. No adult sockeye or redds were observed. From July 20 to September 15, 1986, a temporary weir was placed in Redfish Lake Creek to count sockeye salmon entering Redfish Lake. A total of 29 sockeye were counted at the weir. Hatchery personnel artificially spawned 13 females and 3 males. The total green egg take was 31,594.

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

SURVEY DATE 8/26/86

STREAM South Fork Salmon River

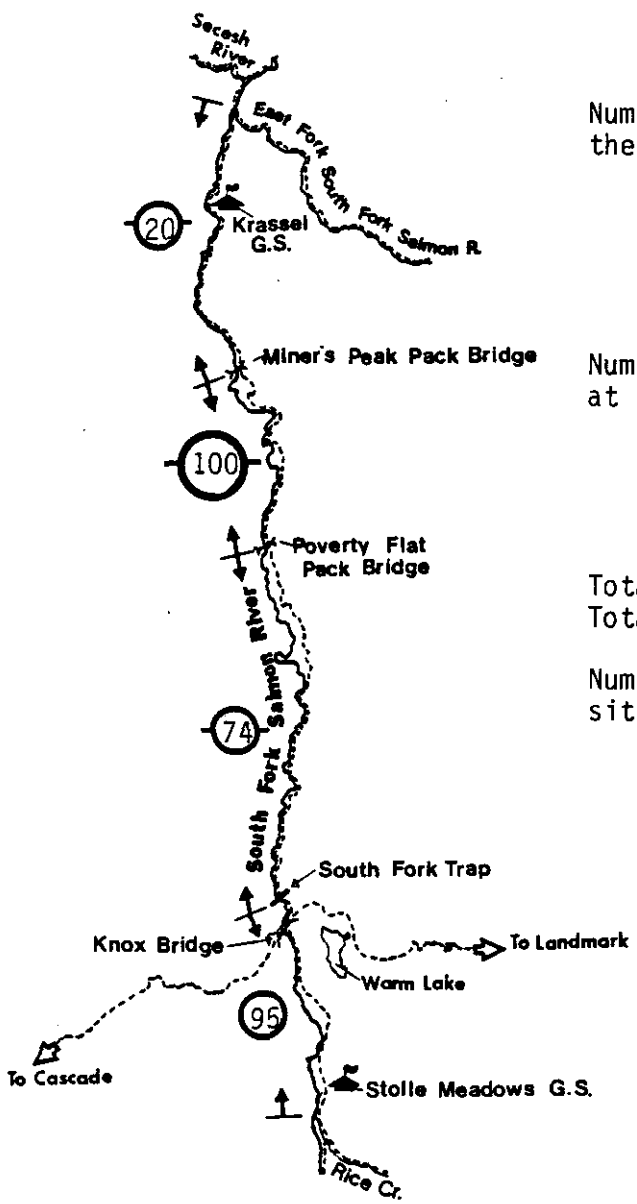
MAP SCALE 0.40 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Anderson

TIMING Early **On Time** Late

REMARKS



Holding mortality at South Fork trap:

Males	186
Jacks	59
Females	60

Number of salmon released above the South Fork Salmon trap:

Males	257
Jacks	97
Females	212
Total	566

Number of salmon spawned (killed) at trap site:

Males	314
Jacks	6
Females	428

Total trap count: 2,690
Total green egg take: 2,148,727

Number of salmon discarded at trap site:

Females	5(had BKD)
	6(not ripe)
	11

DRAINAGE South Fork Salmon River

SURVEY DATE 8/26/86

STREAM Secesh and Lake Creek

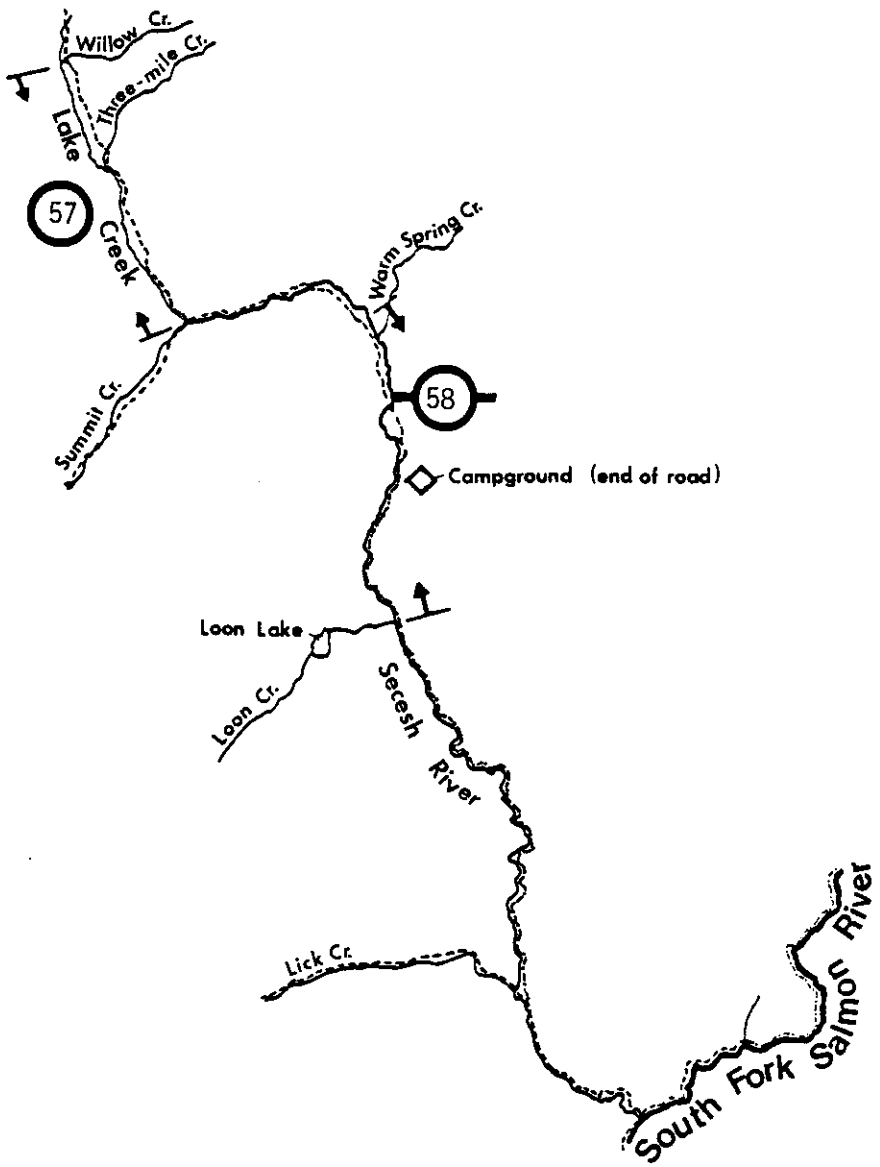
MAP SCALE 0.65 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Anderson/Scully

TIMING Early On Time Late

REMARKS



DRAINAGE E.F. of South Fork Salmon

SURVEY DATE 9/4/86

STREAM Johnson Creek

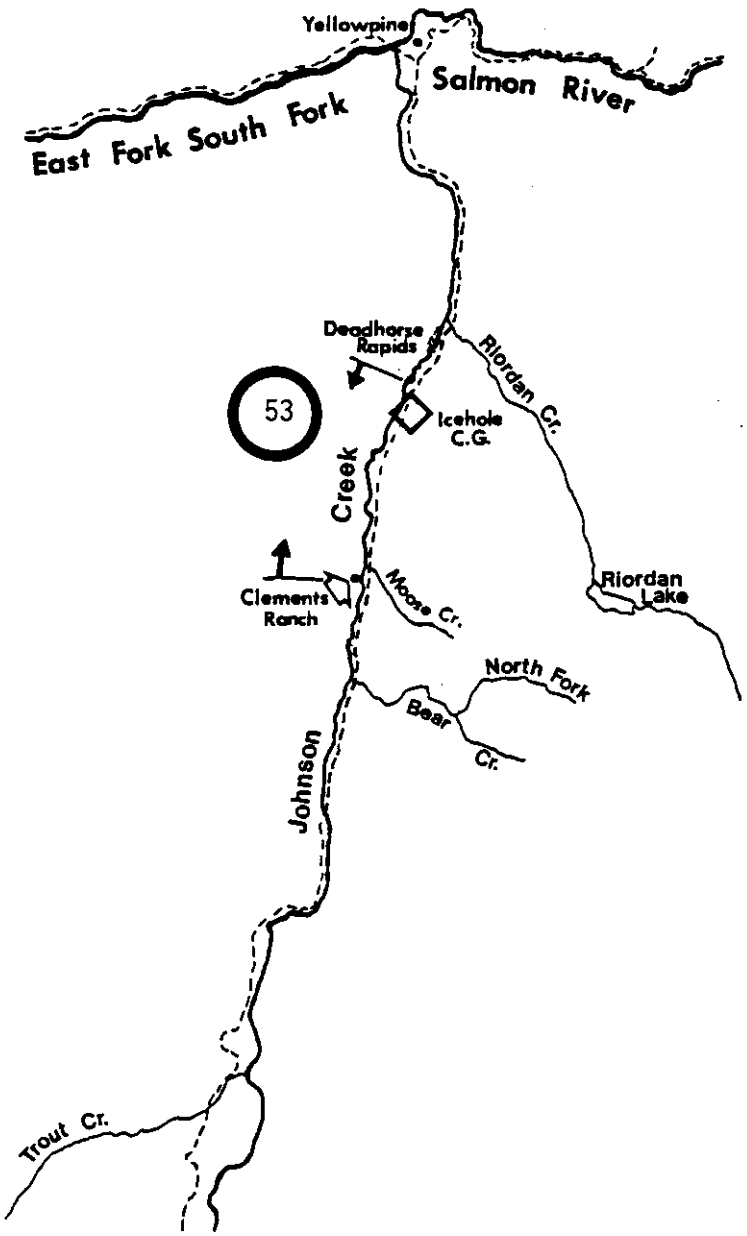
MAP SCALE 0.95 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Will Reid

TIMING Early On Time Late

REMARKS



DRAINAGE Middle Fork Salmon River

SURVEY DATE 8/25/86

STREAM Bear Valley Creek

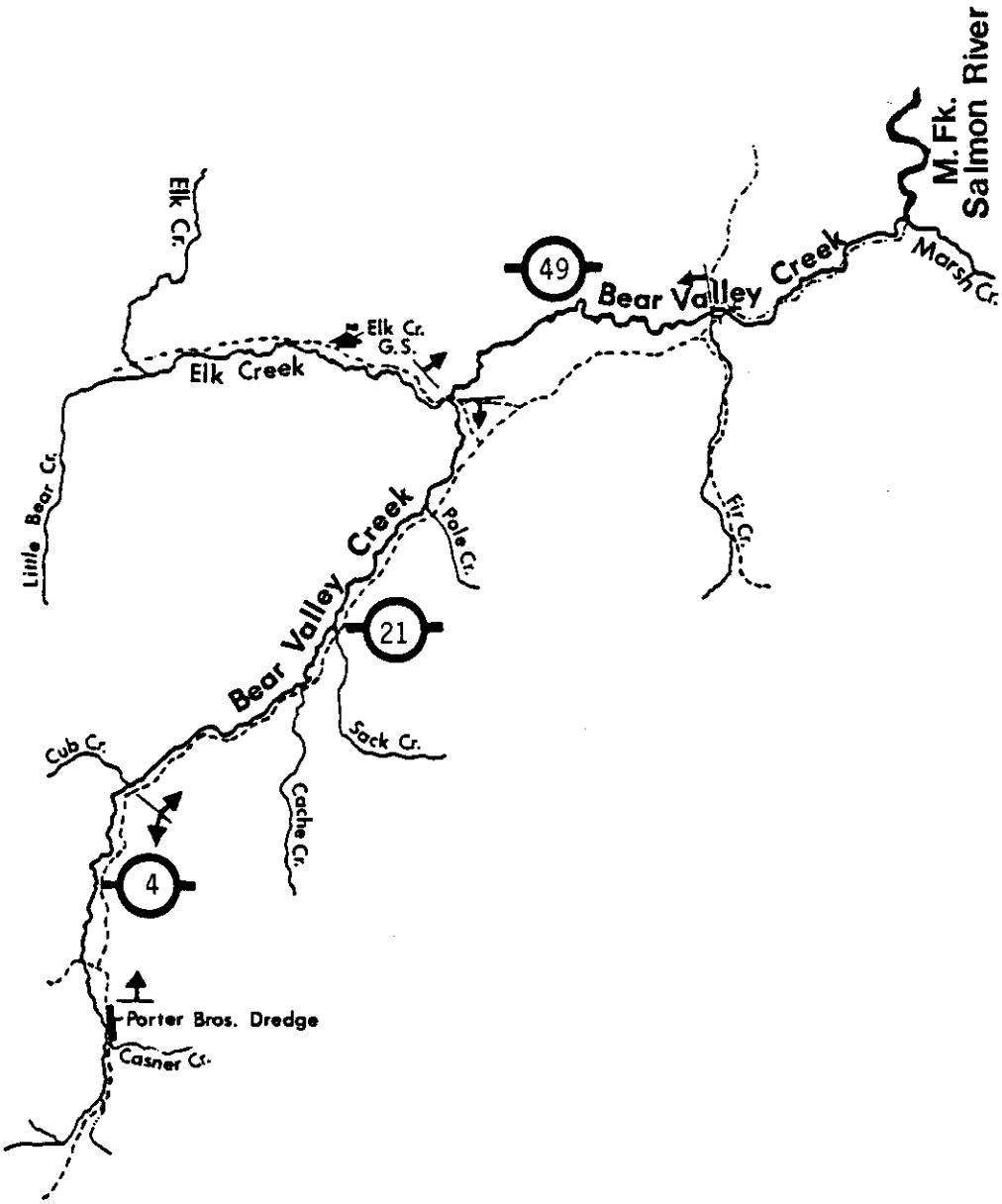
MAP SCALE 0.90 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Anderson/Scully

TIMING Early **On Time** Late

REMARKS



DRAINAGE M.F. Salmon River

STREAM Elk Creek

OBSERVATION CONDITIONS Good

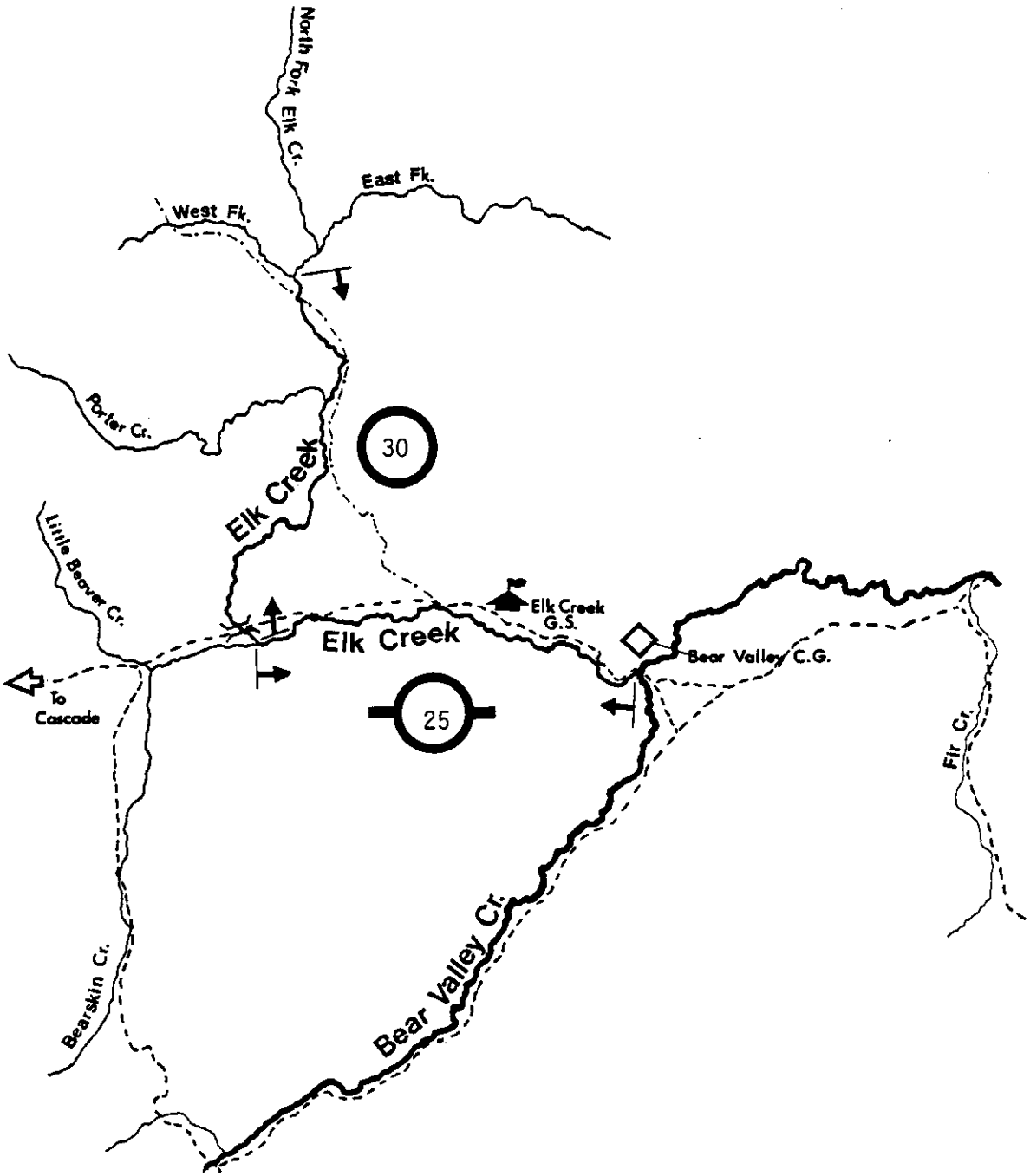
TIMING: Early On Time Late

SURVEY DATE 8/25/86

MAP SCALE 1.3 cm = 1 mile

OBSERVER Mabbot - ground
Don Anderson - air

REMARKS W.Fk. to Twin Bridges is a mandatory ground count



DRAINAGE Middle Fork Salmon River

STREAM Marsh, Beaver, Knapp and Capehorn Creeks

OBSERVATION CONDITIONS Good

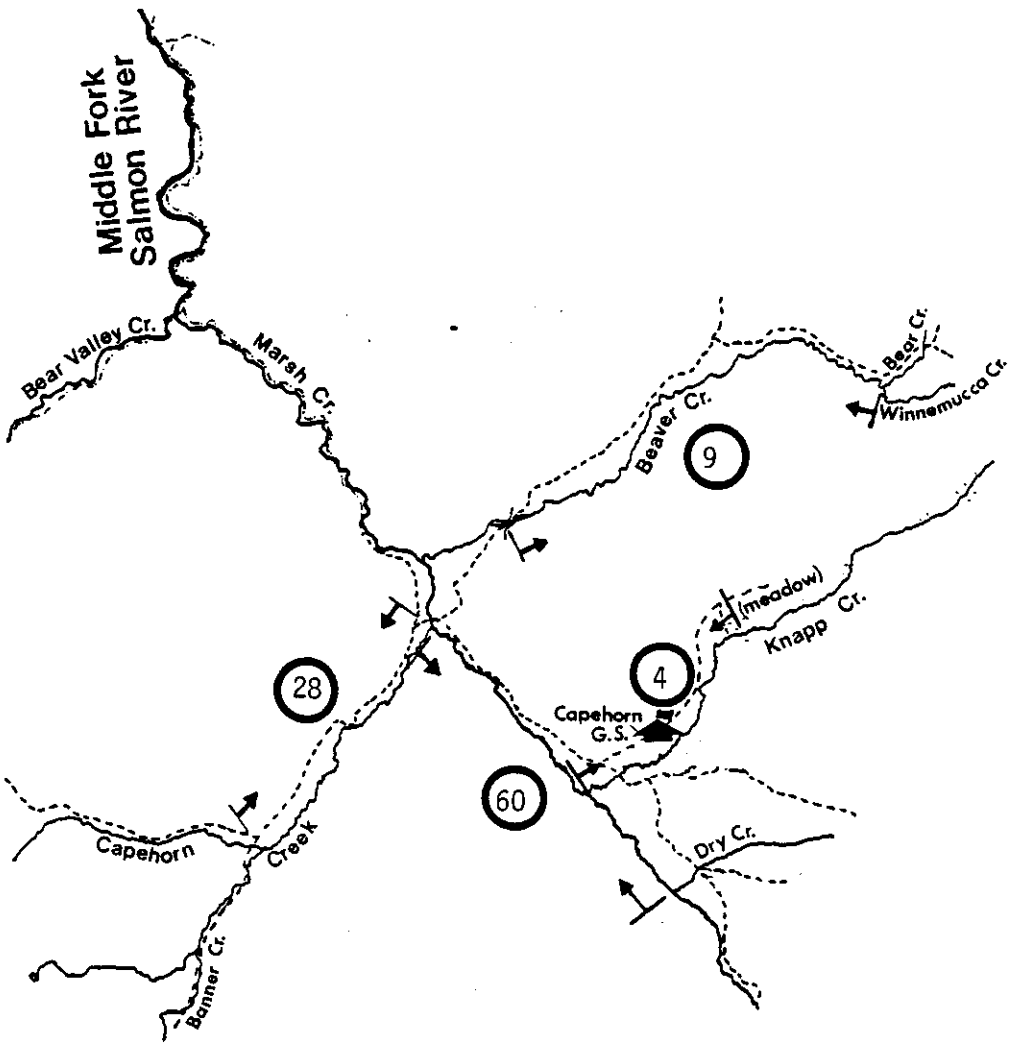
TIMING Early On Time Late

SURVEY DATE 8/16/86

MAP SCALE 1.15 cm = 1 mile

OBSERVER Reingold, Bell, Davis, Gadwa and Somes

REMARKS Ground Count



DRAINAGE M.F. Salmon River

SURVEY DATE 8/21/86

STREAM Sulphur Creek

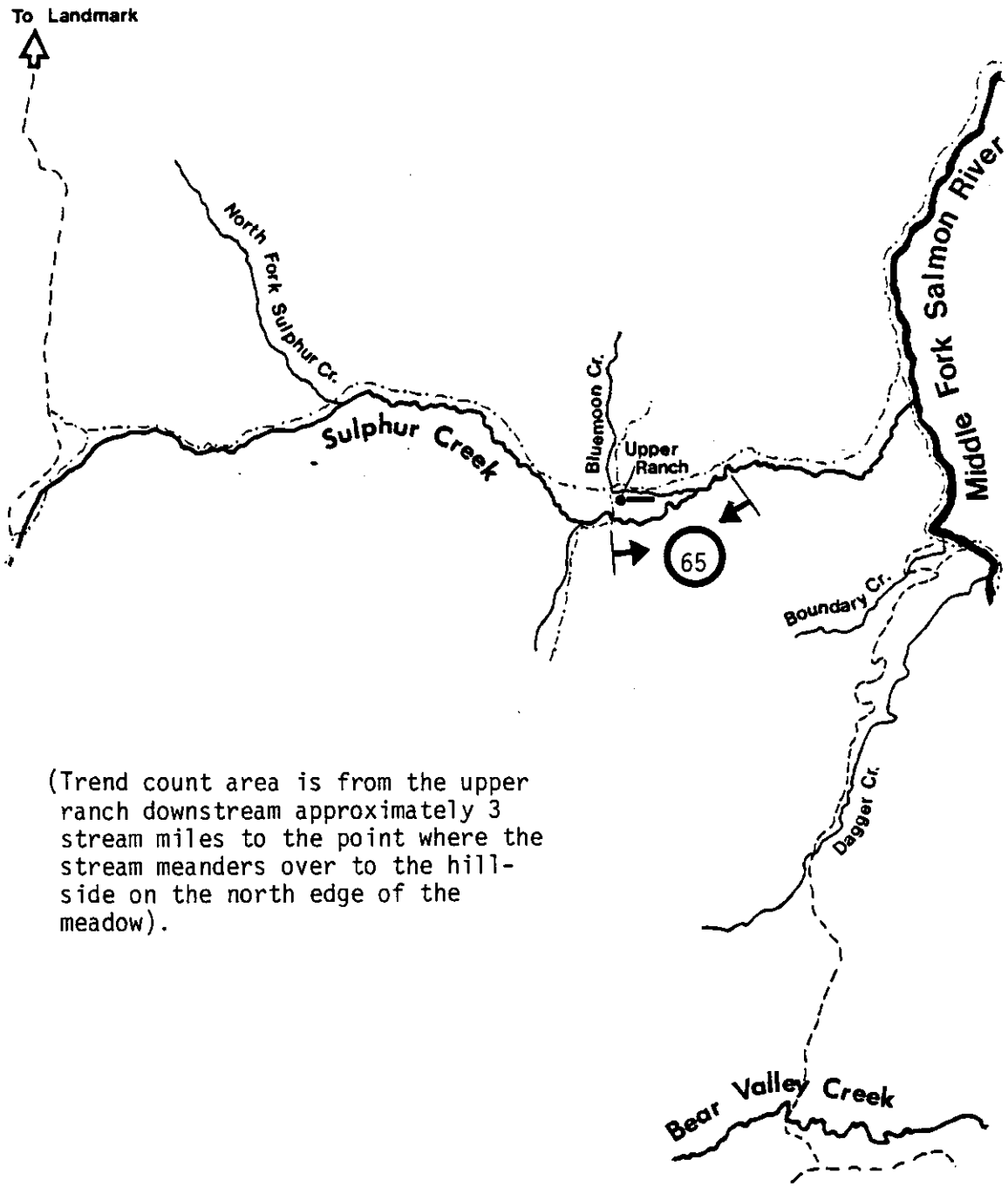
MAP SCALE 1.3 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Holubetz

TIMING: Early On Time Late

REMARKS ground count only



(Trend count area is from the upper ranch downstream approximately 3 stream miles to the point where the stream meanders over to the hill-side on the north edge of the meadow).

DRAINAGE Middle Fork Salmon River

SURVEY DATE 9/5/86

STREAM Loon Creek

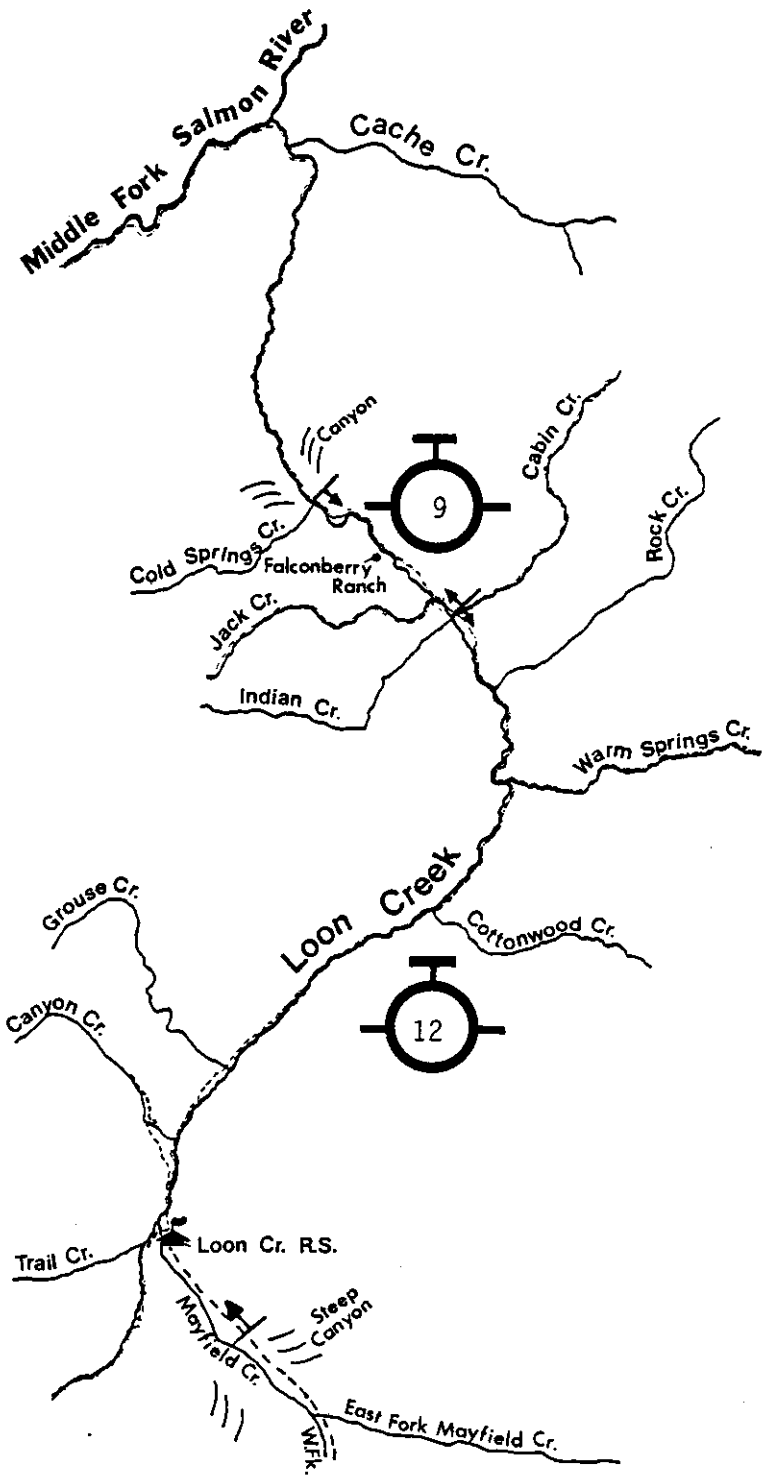
MAP SCALE 0.85 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Reingold

TIMING Early On Time Late

REMARKS Helicopter



DRAINAGE Middle Fork Salmon River

SURVEY DATE 9/5/86

STREAM Camas Creek

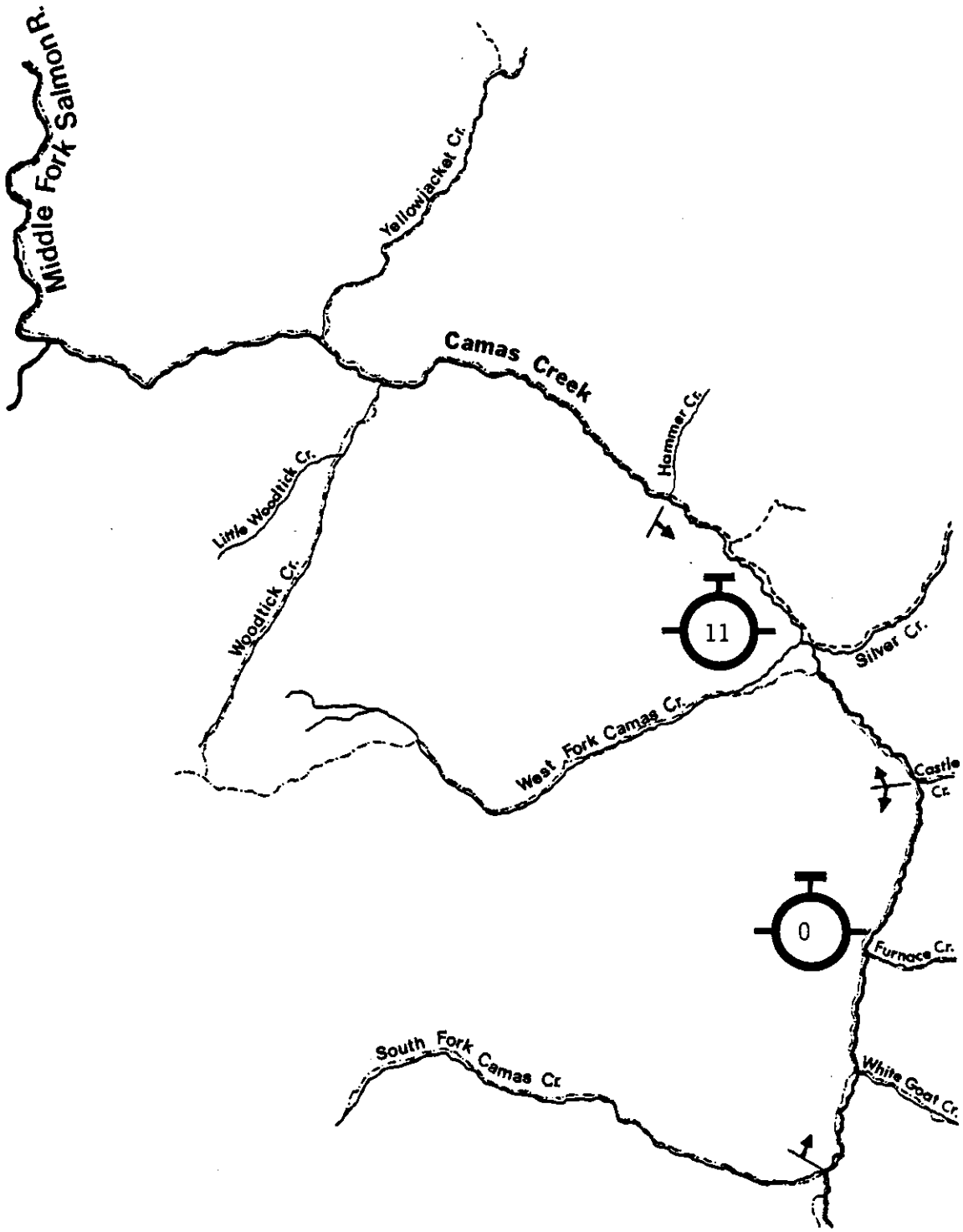
MAP SCALE 1.10 cm = 1 mile

OBSERVATION CONDITIONS clear/sunny

OBSERVER Mel Reingold

TIMING Early <u>On Time</u> Late

REMARKS Helicopter



DRAINAGE Middle Fork Salmon River

SURVEY DATE 8/27/86

STREAM Big Creek

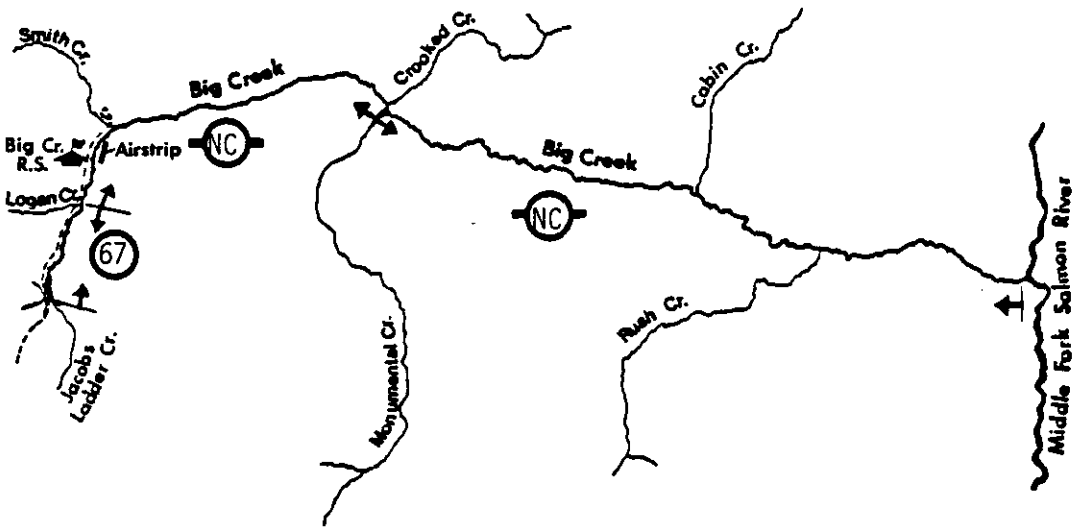
MAP SCALE 0.45 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Don Anderson

TIMING Early <u>On Time</u> Late

REMARKS



DRAINAGE Salmon River

SURVEY DATE 9/6/86

STREAM Salmon River

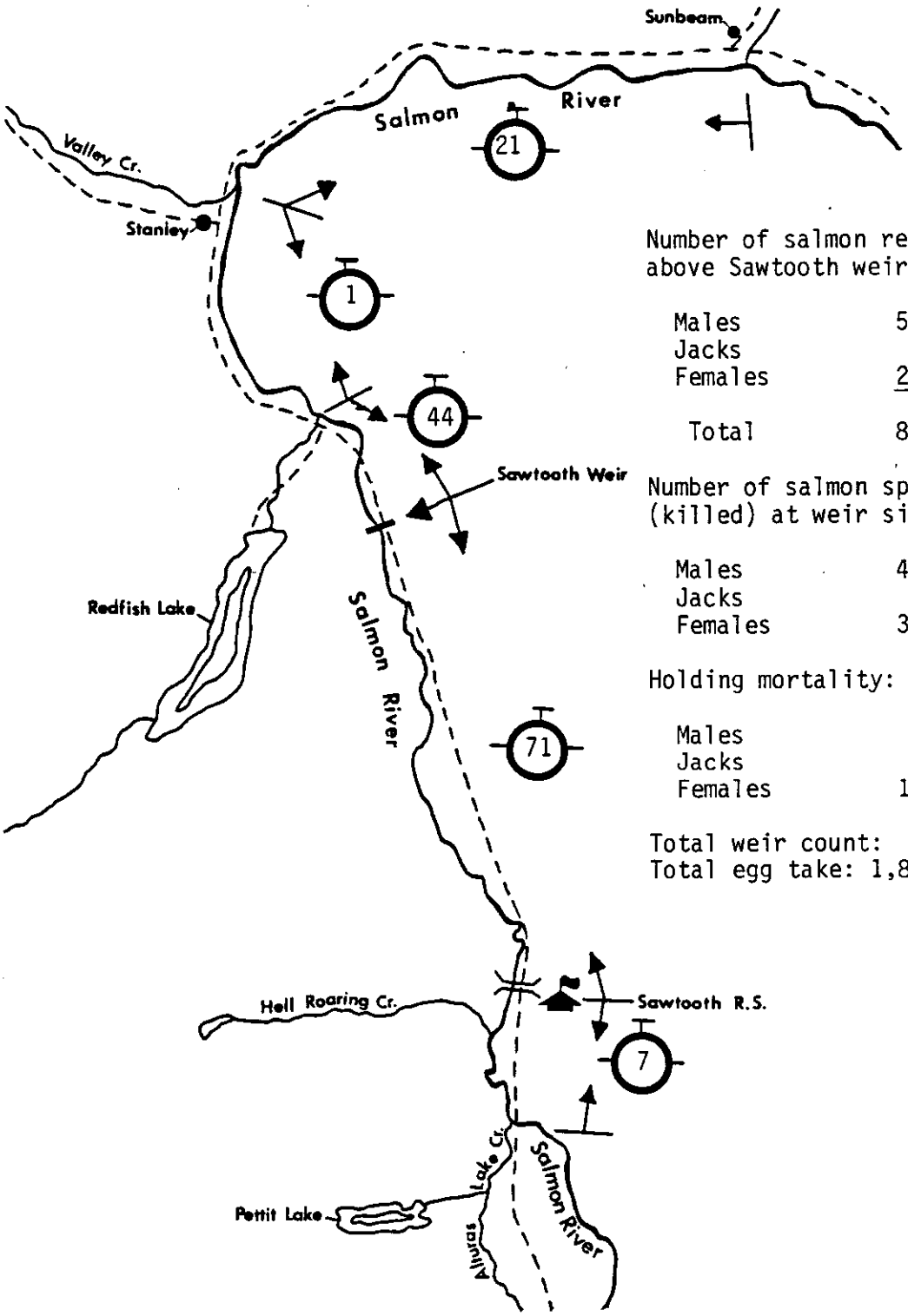
MAP SCALE 0.78 cm = 1 mile

OBSERVATION CONDITIONS clear/sunny

OBSERVER Mel Reingold

TIMING Early On Time Late

REMARKS Helicopter



Number of salmon released above Sawtooth weir:

Males	592
Jacks	36
Females	248
Total	879

Number of salmon spawned (killed) at weir site:

Males	400
Jacks	15
Females	360

Holding mortality:

Males	46
Jacks	6
Females	115

Total weir count: 1,769
Total egg take: 1,800,000

DRAINAGE Salmon River

SURVEY DATE 9/6/86

STREAM Salmon R. & tributaries

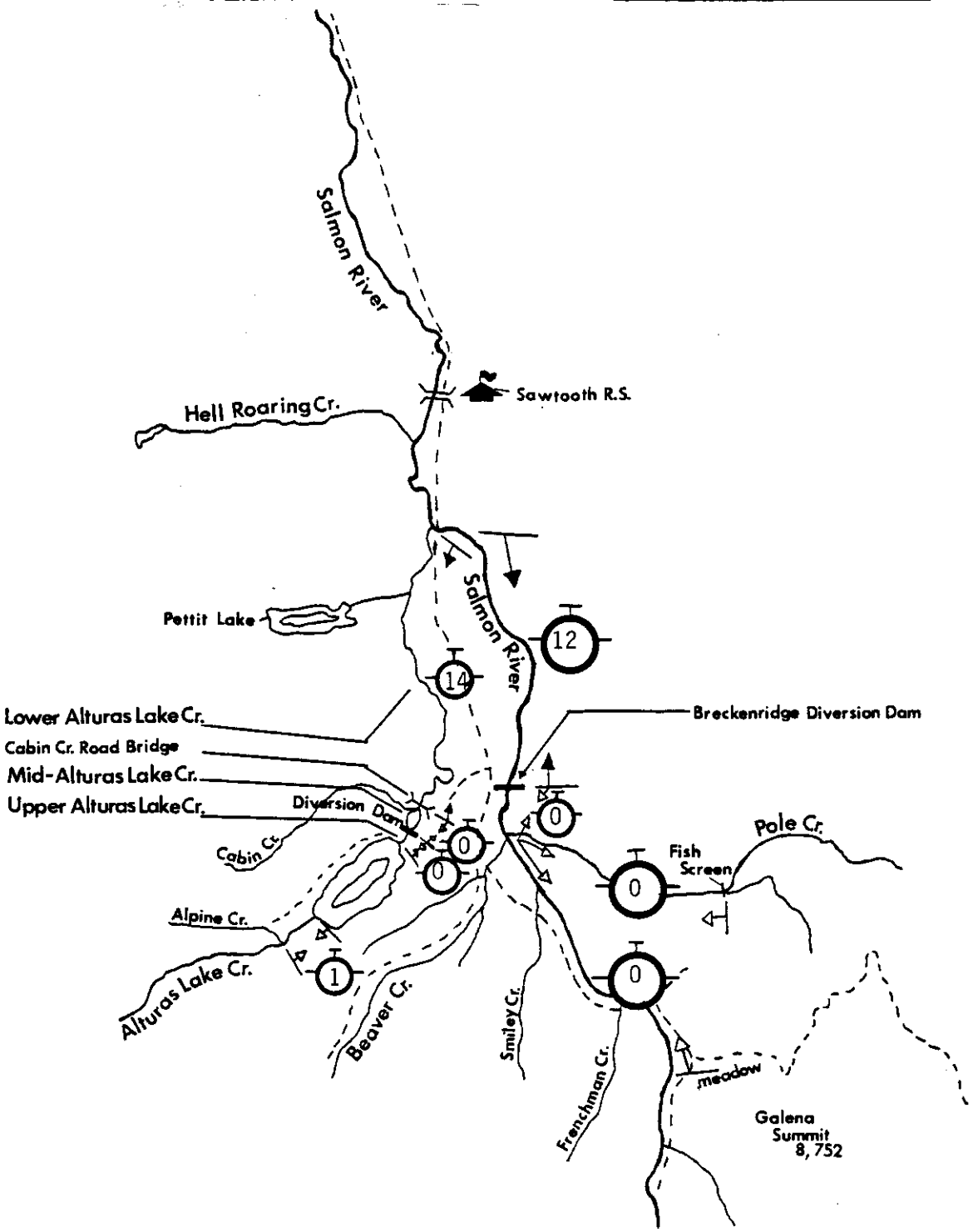
MAP SCALE 0.78 cm = 1 mile

OBSERVATION CONDITIONS clear/sunny

OBSERVER Mel Reingold

TIMING Early On Time Late

REMARKS Helicopter



DRAINAGE Salmon River

SURVEY DATE 9/6/86

STREAM Valley Creek

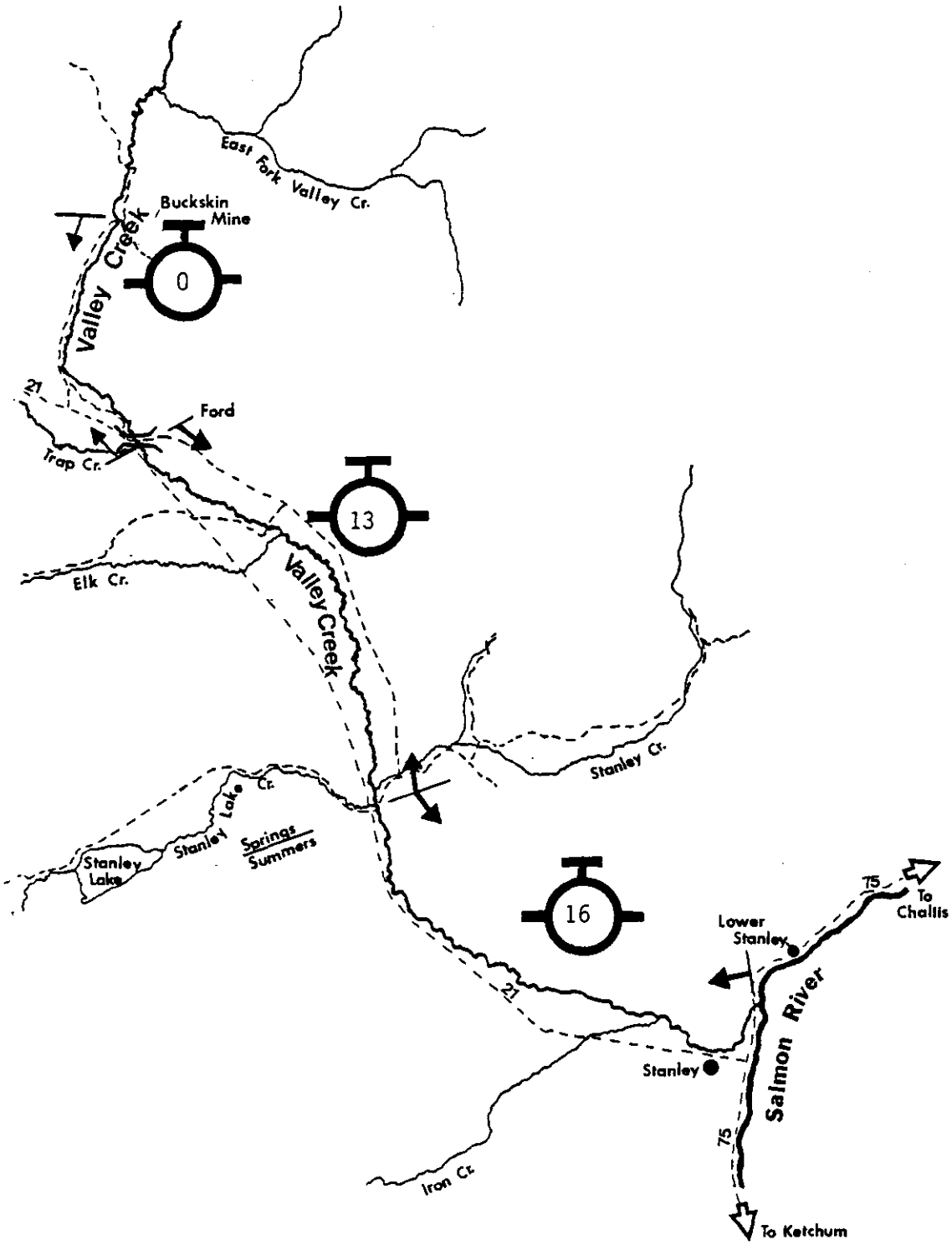
MAP SCALE 1.6 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Reingold

TIMING Early On Time Late

REMARKS Helicopter



DRAINAGE Salmon River

STREAM Salmon River

OBSERVATION CONDITIONS clear/sunny

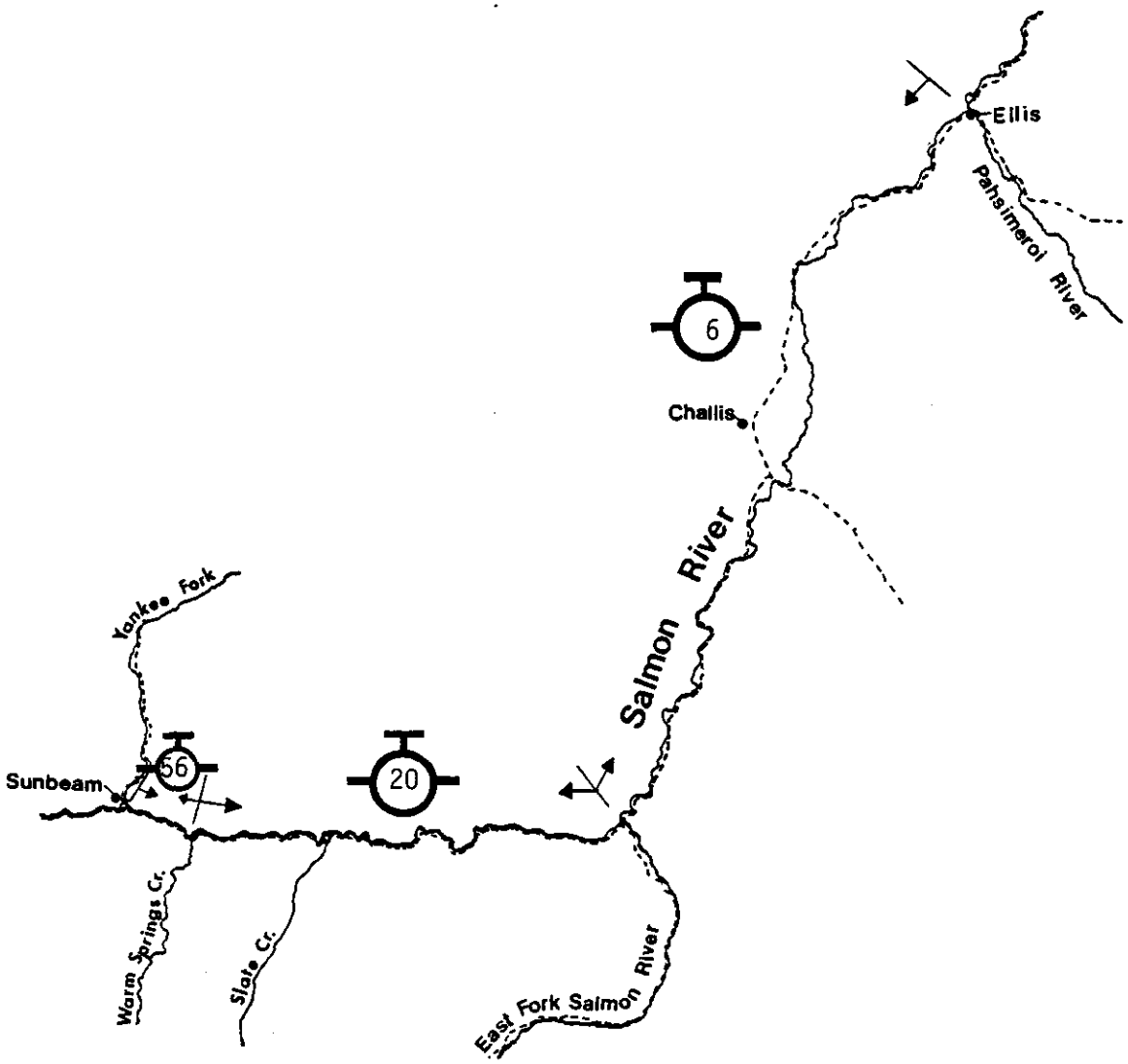
TIMING Early **On Time** Late

SURVEY DATE 9/6/86

MAP SCALE 0.35 cm = 1 mile

OBSERVER Mel Reingold

REMARKS Helicopter



DRAINAGE Salmon River

SURVEY DATE 9/5/86

STREAM Yankee Fork

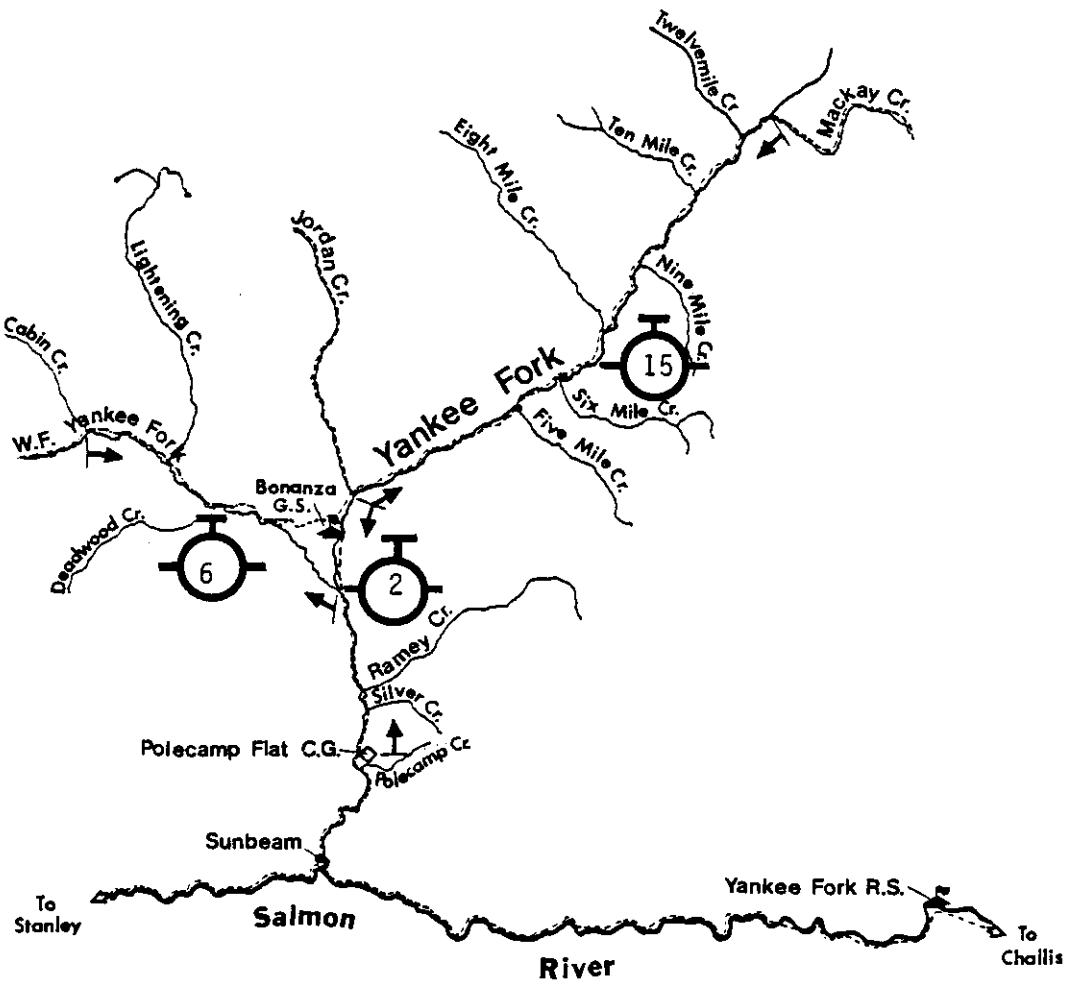
MAP SCALE 0.70 cm = 1 mile

OBSERVATION CONDITIONS Fair

OBSERVER Reingold

TIMING Early On Time Late

REMARKS Helicopter



DRAINAGE Salmon River

SURVEY DATE 9/6/86

STREAM East Fork Salmon River

MAP SCALE 0.6 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Reingold, Davis

TIMING: Early On Time Late

REMARKS Helicopter

Number of salmon released above East Fork weir:

Males	96
Jacks	5
Females	25
Total	126

Number of salmon spawned (killed) at weir site:

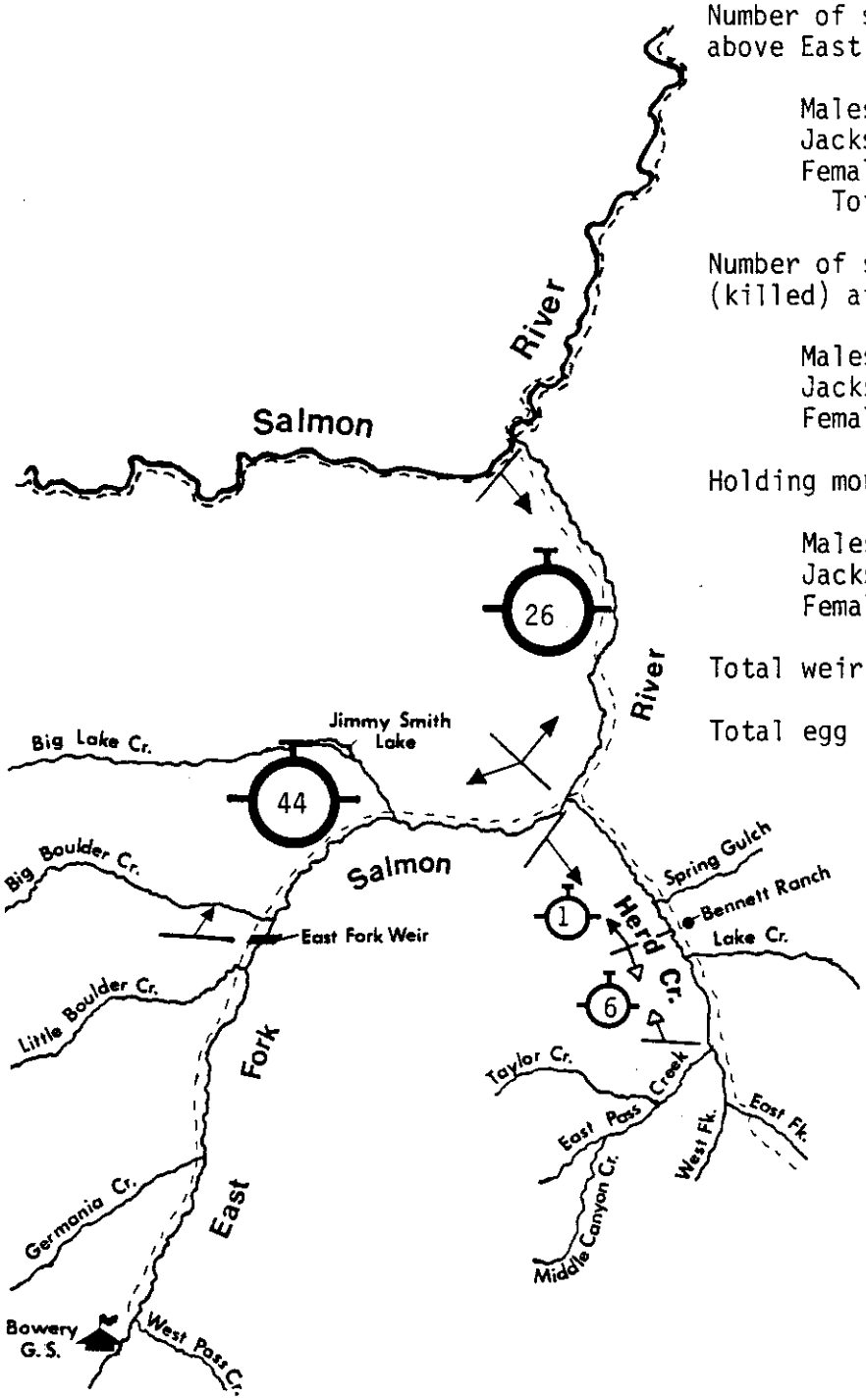
Males	73
Jacks	3
Females	48

Holding mortality:

Males	2
Jacks	0
Females	4

Total weir count: 194

Total egg take: 300,438



DRAINAGE Salmon River

SURVEY DATE 9/5/86

STREAM Lemhi River

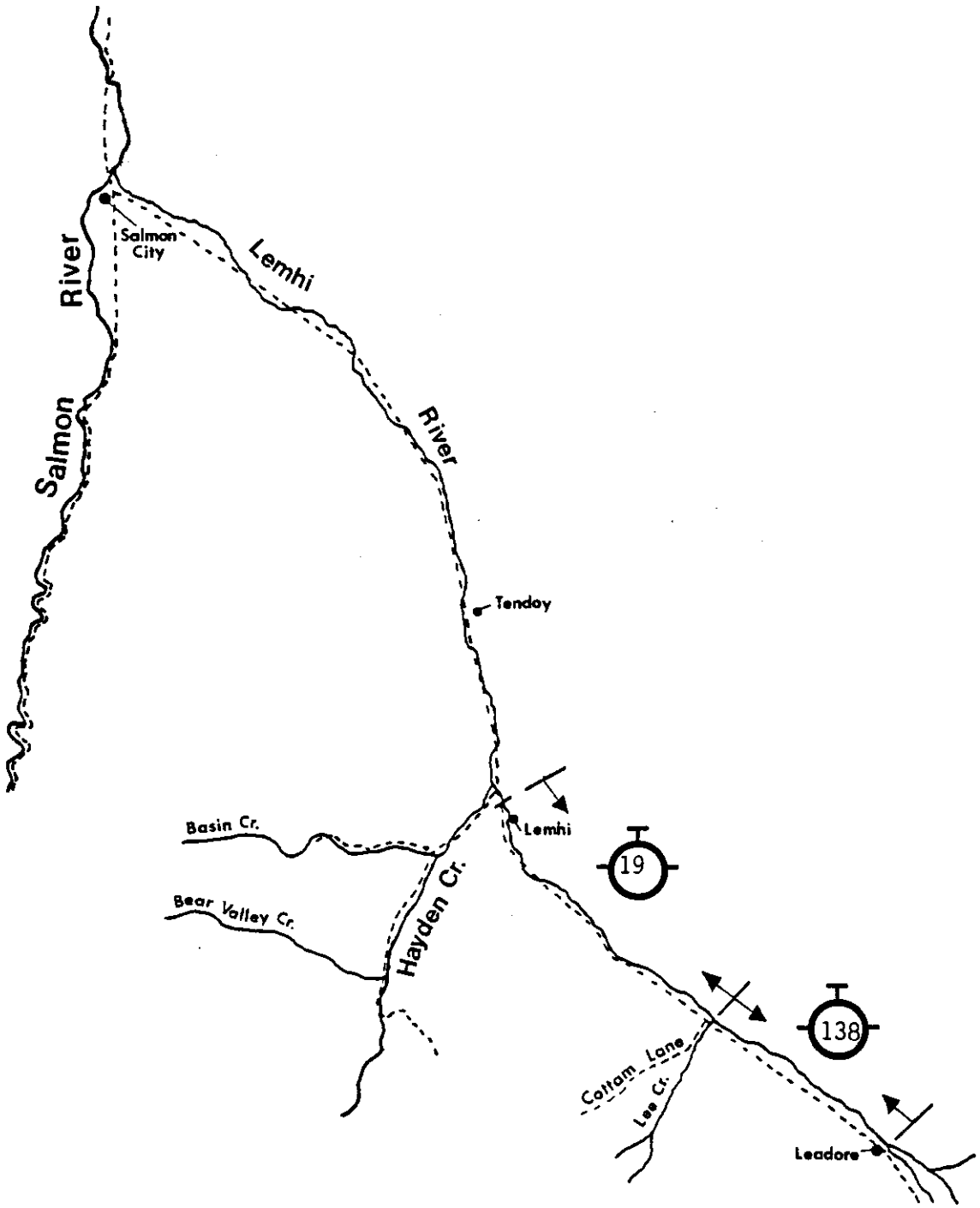
MAP SCALE 0.40 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Reingold

TIMING Early On Time Late

REMARKS Helicopter



DRAINAGE Salmon River

SURVEY DATE

STREAM North Fork Salmon River

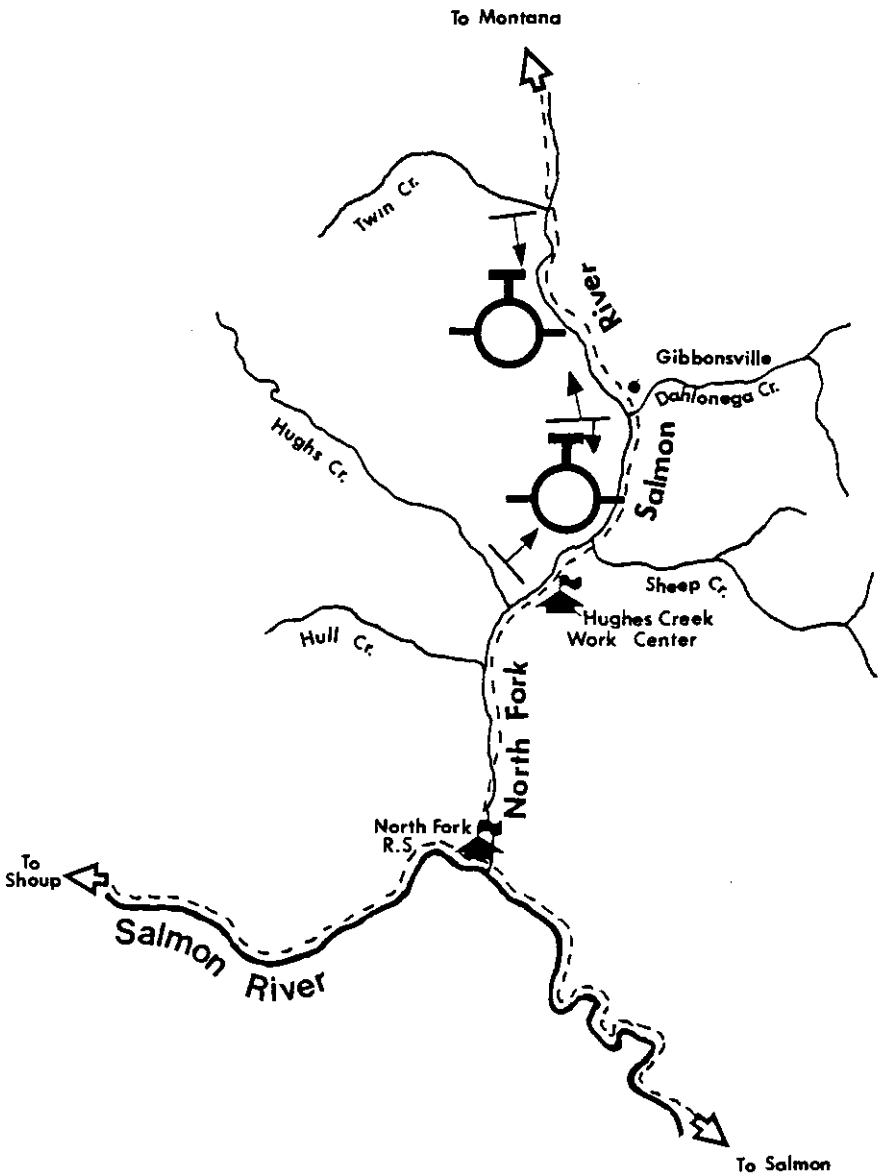
MAP SCALE 0.6 cm = 1 mile

OBSERVATION CONDITIONS

OBSERVER

TIMING: Early On Time Late

REMARKS No Count



A P P E N D I X B

DRAINAGE Clearwater River

SURVEY DATE 9/10/86

STREAM Crooked River & Newsome Creek

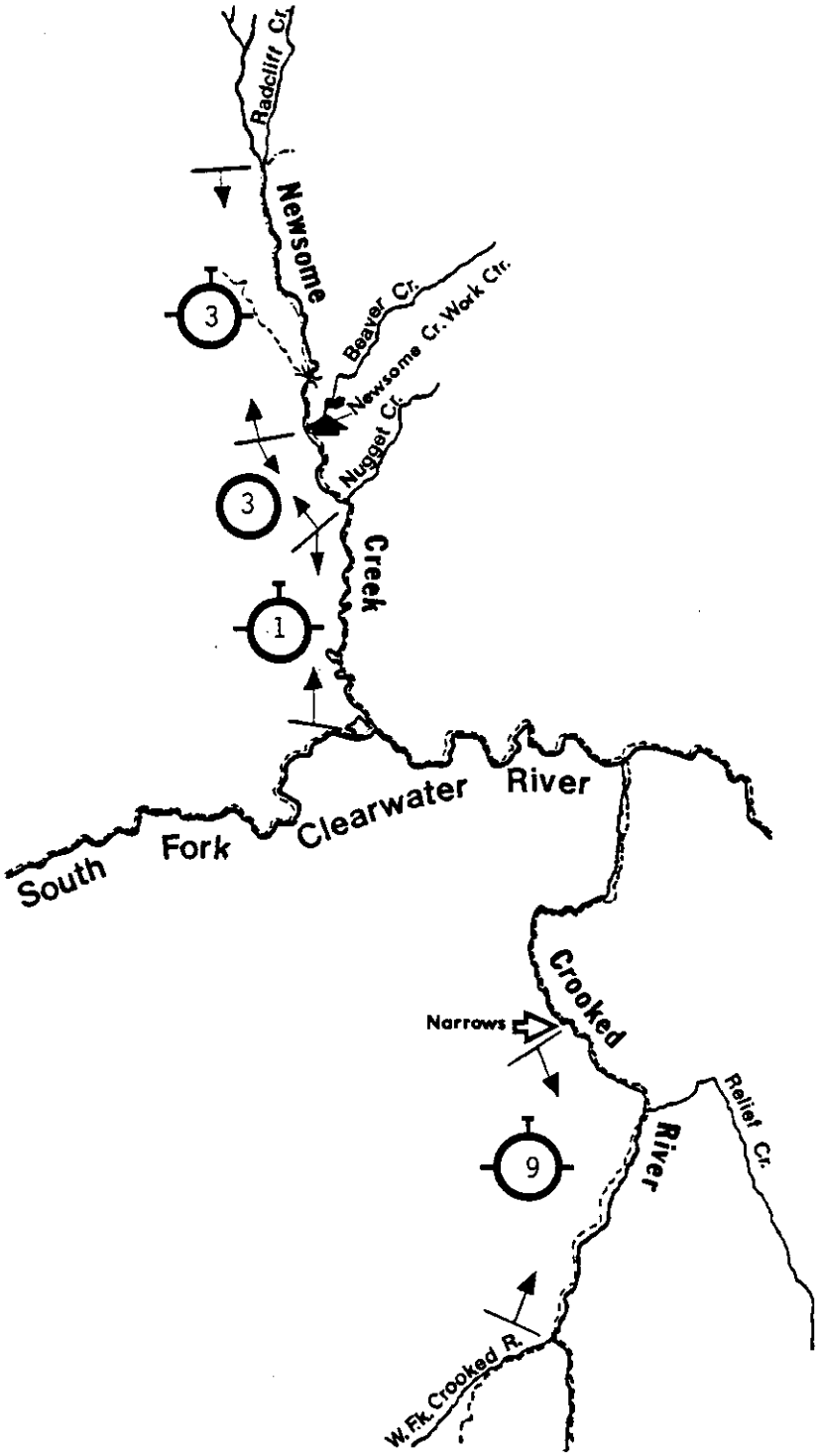
MAP SCALE 0.85 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Lindland

TIMING Early On Time Late

REMARKS



DRAINAGE Clearwater River

SURVEY DATE 9/10/86

STREAM Red R. and American River

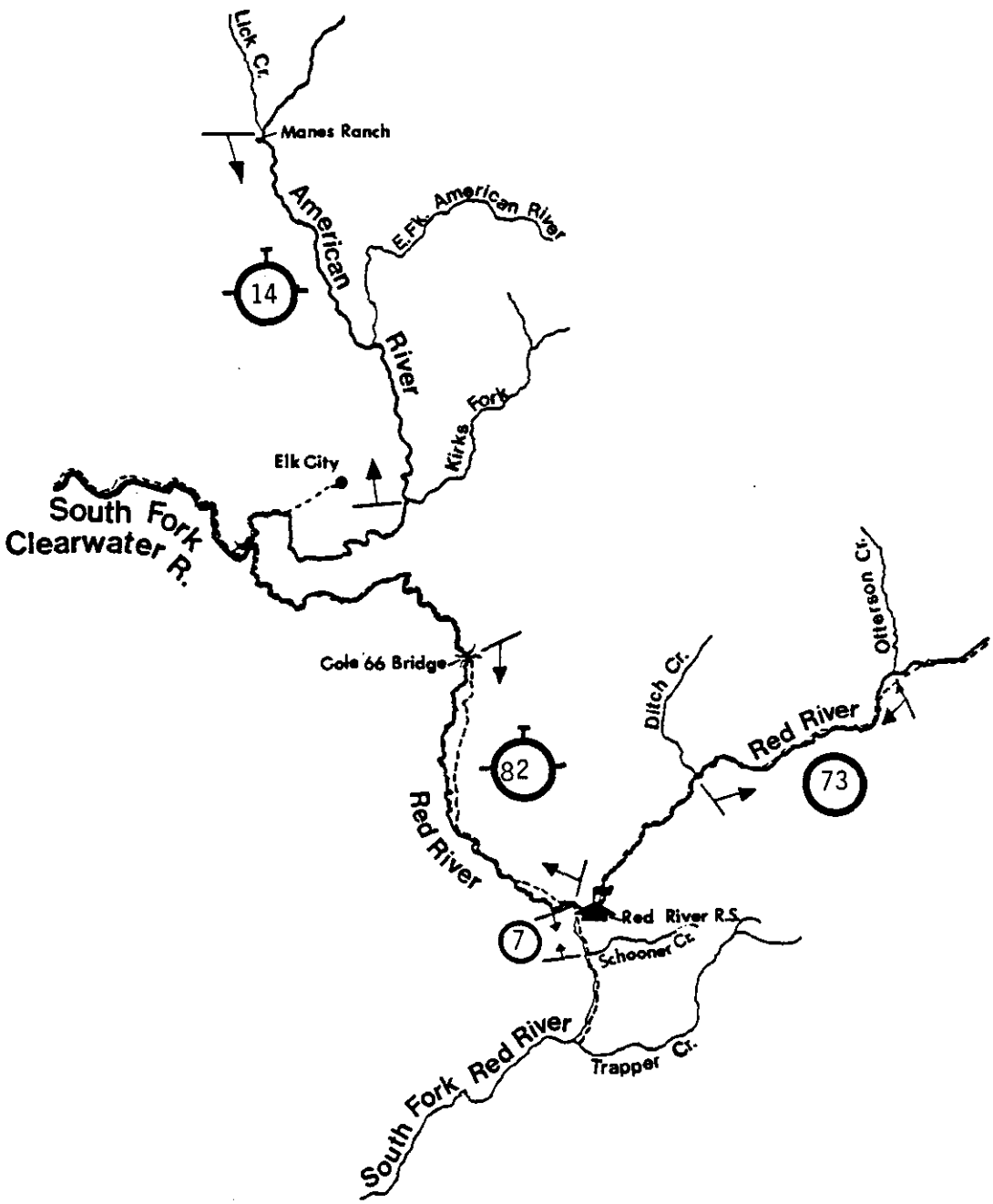
MAP SCALE 0.75 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Lindland

TIMING Early **On Time** Late

REMARKS



DRAINAGE Clearwater River

SURVEY DATE 9/5/86

STREAM Upper Selway River

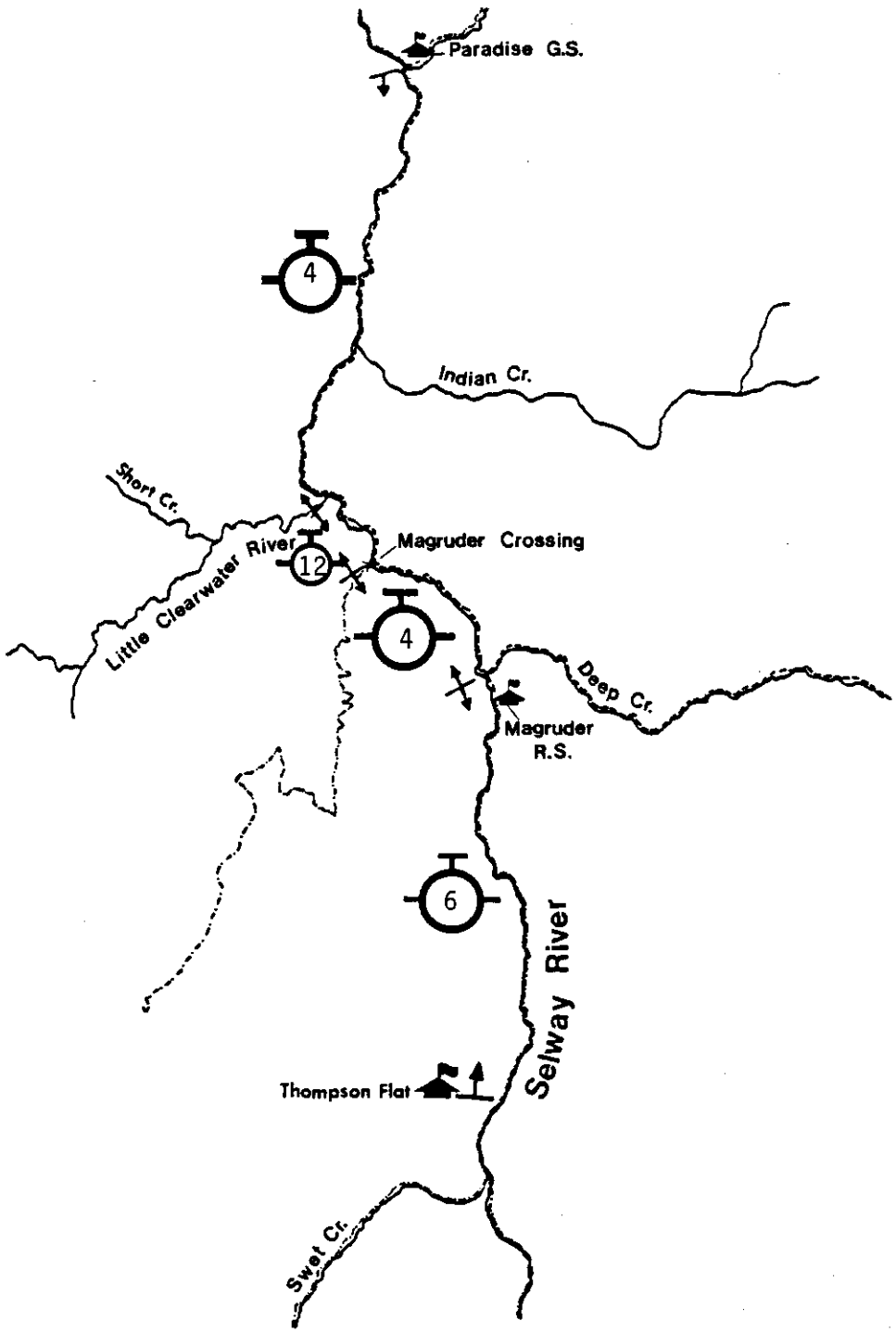
MAP SCALE 0.85 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Lindland

TIMING Early **On Time** Late

REMARKS



DRAINAGE Clearwater River

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

SURVEY DATE 9/5/86

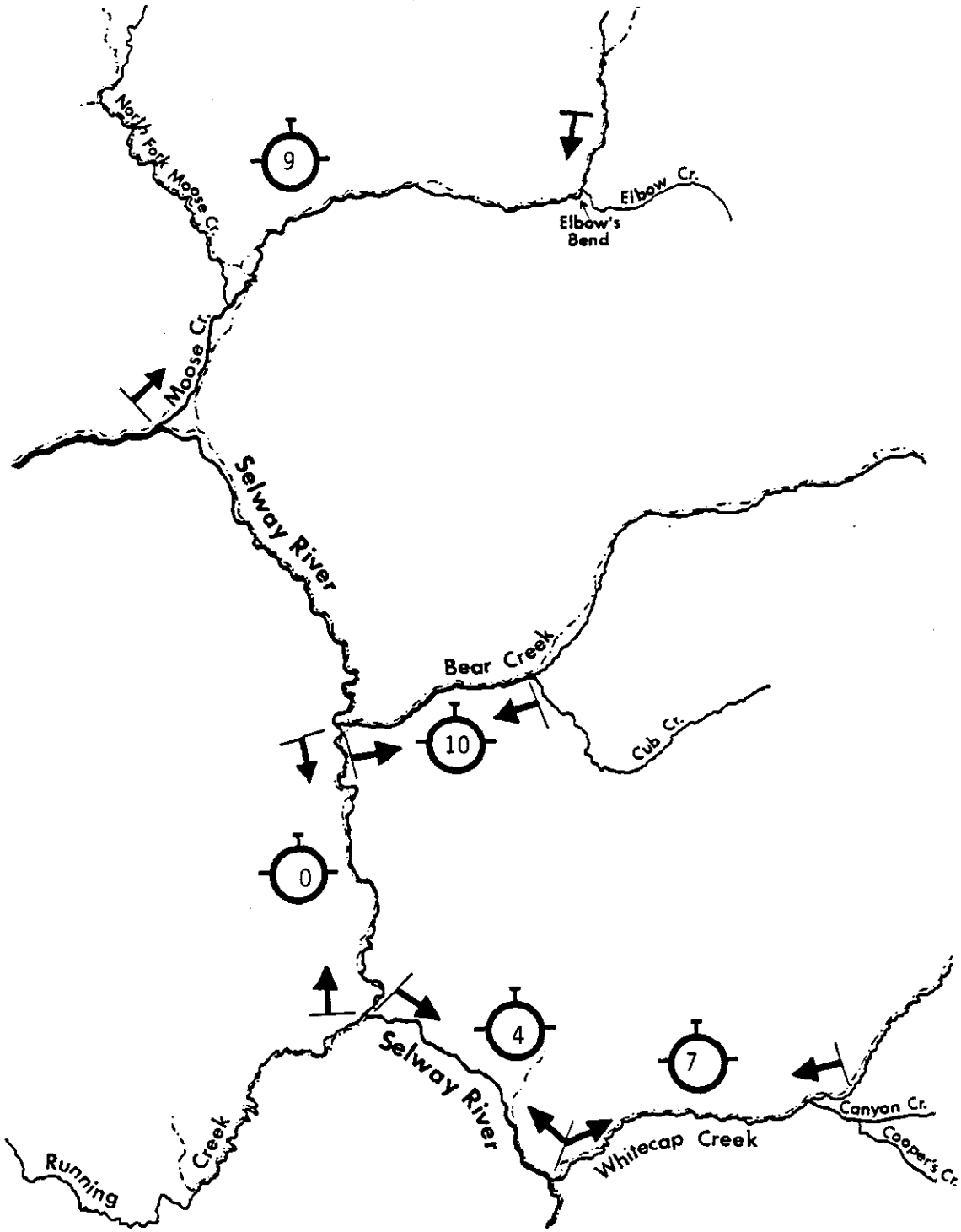
MAP SCALE 0.65 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Lindland

TIMING Early On Time Late

REMARKS



DRAINAGE Clearwater River

SURVEY DATE 8/26-27/86

STREAM Crooked Fork & Brushy Fork

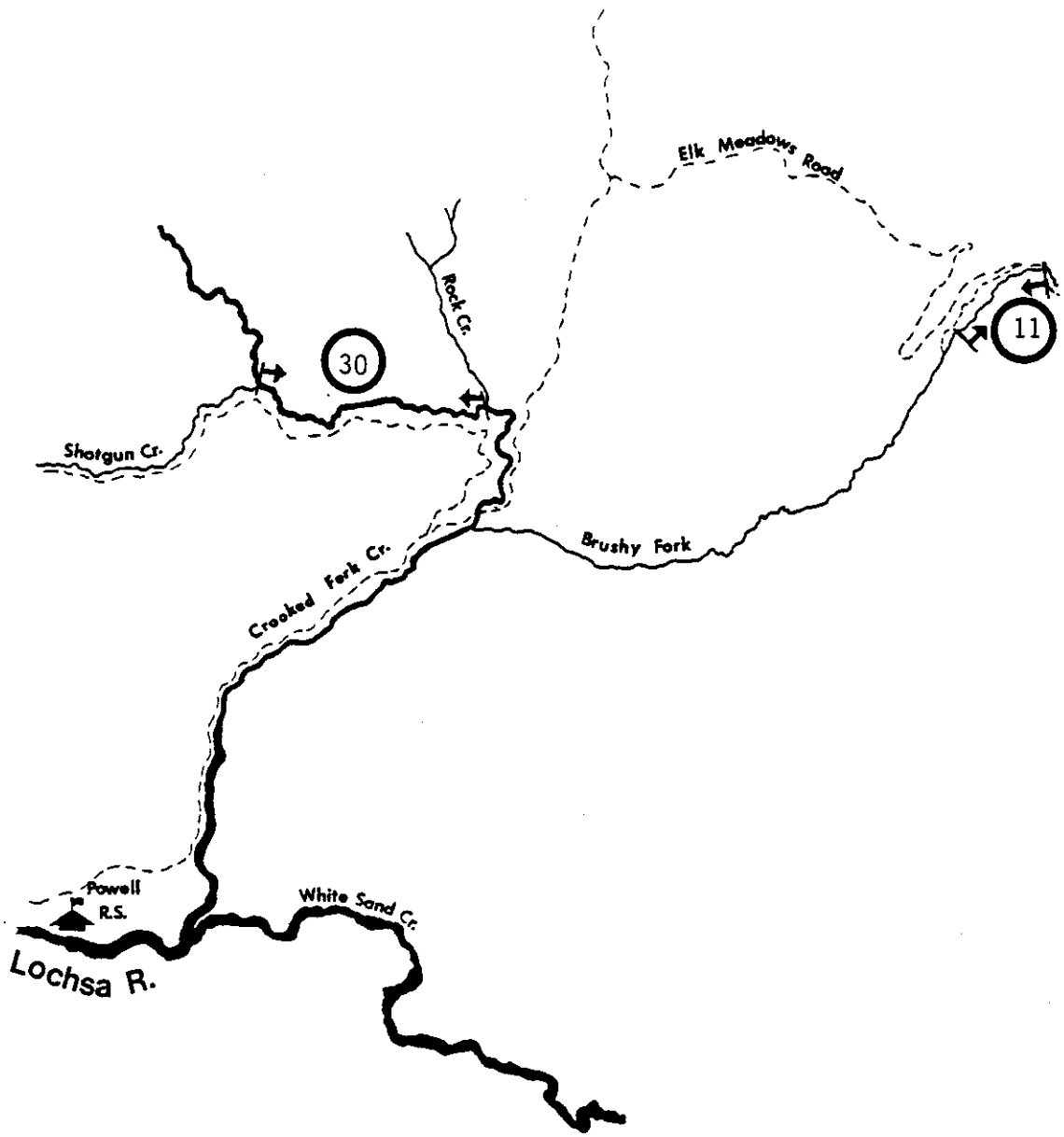
MAP SCALE 0.95 cm = 1 mile

OBSERVATION CONDITIONS Good

OBSERVER Lindland

TIMING Early On Time Late

REMARKS



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