

December Investigations on the Upper Susitna River Watershed Between Devil Canyon and Chulitna River

INTRODUCTION

In December of 1974 the Division of Commercial Fisheries, contracted by the National Marine Fisheries Service, commenced a series of monthly winter investigations on the Upper Susitna River below Devil Canyon. Previous investigations denoted 21 relatively major and minor salmon spawning and rearing sloughs adjoining the Susitna River between Devil Canyon and the Chulitna River (Figure 1). Chum salmon were the primary spawning species and coho fry the dominate rearing species.

The presence of age 0.0 coho fry and the absence of adult coho spawners in the sloughs suggests that fry immigrate, in early spring, from the spawning streams to the Susitna River and enter the sloughs for rearing. Some emigration into the Susitna River was observed in the late fall of 1974 corresponding with partial slough dewatering. Rearing fry may inhabit both the Susitna River and the sloughs during winter months. Sloughs void of adult spawning populations may be due to their incapability to buffer winter conditions. The winter investigations are intended to provide qualitative information on fry distribution and abundance and winter conditions in the sloughs and in the Susitna River.

PROCEDURES

The first survey was conducted during the period of December 3 through 6 from a field station established at Gold Creek. Travel to the sloughs was achieved primarily through the use of two twin track snow vehicles. Sloughs that were accessible were sampled for D.O., pH, relative water height, ice thickness and cover, snow depth, temperature and flow. Minnow traps baited with salmon roe were fished in sloughs having sufficient water depth.

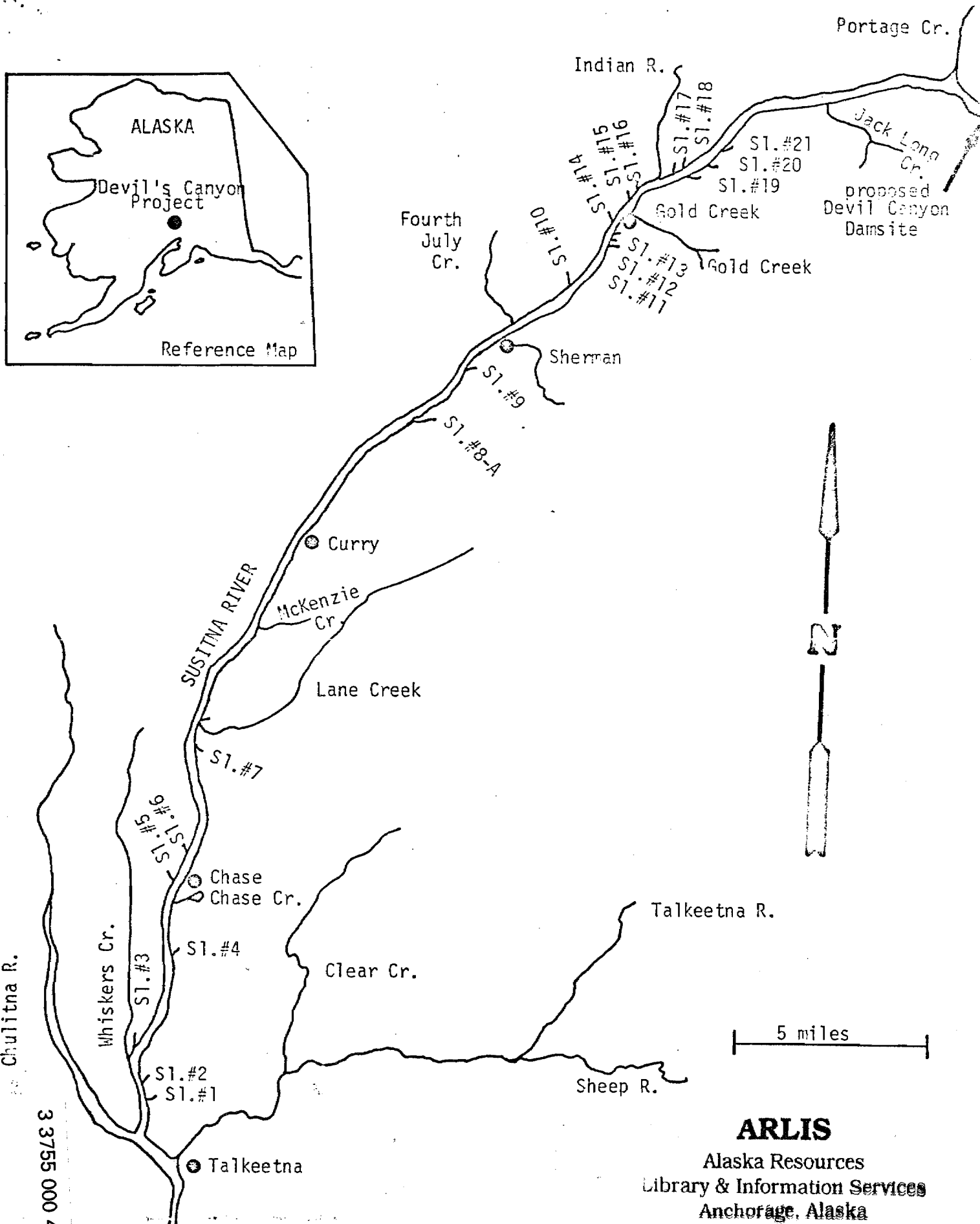


Figure 1. Map of the area encompassed in the Devil Canyon investigations on the upper Susitna River Watershed, Devil's Canyon Winter Project, 1974.

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A Ryan thermograph was installed at Gold Creek and at Chase on the Susitna River. Water samples were collected for suspended sediment analysis and pH and D.O. levels were monitored at the thermograph sites and at the Fairbanks-Anchorage highway crossing.

RESULTS

Sloughs No. 8, No. 9, No. 11, No. 12, No. 13, No. 14, No. 15, were accessible by track machine or by foot. Table 1 presents a summary of the survey results. Aside from Slough No. 14 and No. 15, sloughs west of the Susitna River were inaccessible due to instability of the river ice.

A major portion of Slough No. 8 was dewatered; the remaining portion was approximately 70 percent ice free. The dissolved oxygen level was 13.6 ppm. Insufficient water depth prohibited the employment of a fry trap. Rearing fry were not observed.

Slough No. 9 was 20 percent ice free. Water temperatures and dissolved oxygen level was 34°F. and approximately 11ppm, respectively. Water depth averaged approximately 17 inches. No fry were observed, but with the employment of two minnow traps, 10 age 0.0 coho fry were caught during a 25.5 hour period. Their mean length, weight and condition factor was 64.3 centimeters, 31.1 grams and 1.166 (Table 2).

Slough No. 11 was approximately 20 percent clear of ice. Dissolved oxygen level was 9.6 ppm and water temperature was 34°F. Two minnow traps, fished twenty yards apart, caught eight age 0.0 coho fry. The mean length, weight and condition factor of the fry was 61.0 centimeters, 2.8 grams and 1.242, respectively (Table 2).

Slough No. 12 was completely ice covered except for a relatively small portion located approximately 130 yards above its mouth. Three sites were sampled. Anchor ice was observed at two sites. Water temperature was 34°F.

Table 1. Survey of winter conditions and rearing fry distribution in Sloughs No. 8, No. 8A, No. 9, No. 11, No. 12, No. 13, No. 14 and No. 15, Devil's Canyon Winter Project, 1974.

Slough No.	Survey Site	Date	Time (military)	Temperature (°F)		Dissolved Oxygen (ppm)	pH	Ice Thickness (inches)	Ice Cover (%)	Snow Depth On Ice (inches)	Water		Anchor Ice Present	No. Hours Fished	Minnow Trap Catch Fish Species		
				Air	Water						Depth (inches)	Flow Detectable			Coho	Grayling	Whitefish
8	A	12/6/74	1530	28	35	13.6	5.1	0.3-0.5	30	0.5-24	3.0	Yes	No	0.0			
8A	A	12/6/74	1200	26	34	12.8	5.4	0.5-1.0	20	0.5-24	5.0	Yes	No	0.0			
	B	12/6/74	1215	26	34	11.7	5.5	0.3-1.0	20	1.0-24	7.0	Yes	No	0.0			
9	A	12/5/74	0930	30	34	11.0	5.5	2.0	80	0.0-36	16.5	Yes	No	25.5	4	0	0
	B	12/5/74	1000	30	34	10.5	5.3	2.5	80	0.5-2.0	17.3	Yes	No	25.5	6	0	0
11	A	12/4/74	1300	15	34	9.6	5.6	0.5	80	1.0-2.0	14.5	Yes	No	43.5	2	0	0
	B	12/4/74	1320	-	-	-	-	-	-	-	-	Yes	No	43.2	6	0	0
12	A	12/4/74	1330	15	32.5	5.0	6.0	4.6	95	0.1	7.8	No	Yes	0.0			
	B	12/4/74	1345	15	32.5	-	-	4.3	95	2.0-36	5.8	No	Yes	0.0			
	C	12/4/74	1400	15	34	5.2	5.8	1.0-2.0	95	0.1	2.0	Yes	No	0.0			
13	A	12/4/74	1440	15	33	6.8	5.6	0.8	95	0.3-48	1.9	Yes	No	0.0			
	B	12/4/74	1500	15	33	5.2	5.6	1.0	95	1.0	7.6	Yes	No	0.0			
14	A	12/5/74	1530	25	34	11.8	5.4	1.0	50	8.0-36	3.3	Yes	No	0.0			
15	A	12/4/74	1000	10	-	-	-	9.8	100	19.5	0.0	No	No	0.0			
	B	12/4/74	1015	10	34	12.4	5.2	9.0	100	11.0	7.3	Yes	No	0.0			

Table 3. Survey of winter conditions in the Susitna River at Gold Creek, Chase and Anchorage-Fairbanks Highway crossing, Devil's Canyon Winter Project, 1974.

Susitna River Site	Date	Time (Military)	Temperature (°F)		D.O. (ppm)	pH	Sample Size (l)	Suspended Solids			Water Depth (inches)	Ice Cover (%)	Ice Thickness (inches)	Snow Depth On Ice (inches)	Anchor Ice Present
			Air	Water				Settleable (mg/l)	Non-Filterable (mg/l)	Total Suspended (mg/l)					
Gold Cr.	12/5/74	1400	30	33.5	6.4	5.6	2.0	21	4	25	48	30	4-6	0.5-6	No
Chase	12/6/74	1700	28	34	14.8	6.7	2.0	6	6	12	>96	95	7-12	1.0-24	No
Fair.-Anch.	12/19/74	1440	16	32.5	14.2	6.8	2.0	2	2	4	>96	75	8-10	9.7-13	-

Table 2. Age and length samples of coho fry collected at Sloughs No. 9 and No. 11, Devil's Canyon Winter Project, 1974.

Slough No.	Date	Sample Size	Percent Composition	0.0 Age Class				Condition Factor	Brood Year
				Length (mm)	Standard Deviation	Mean Weight (g)	Standard Deviation		
9	11/6/74	10	100.0	64.3	5.8	3.1	1.1	1.166	1973
11	11/6/74	8	100.0	61.0	6.5	2.8	0.9	1.242	1973

Table 4. Survey of winter conditions in Indian River, Lane Creek and Gold Creek, Devil's Canyon Winter Project, 1974.

Stream	Survey Site	Date	Time (military)	Temperature (°F)		Ice Thickness (Inches)	Ice Cover (%)	Snow Depth On Ice (Inches)	Water		Anchor Ice Present
				Air	Water				Depth (Inches)	Flow (C.F.S.)	
Indian River	3.0	12/6/74	0930	21	34	1.5-3.5	50	4.0-24	12-14	+	No
Lane Cr.	0.1	12/6/74	1500	28	35.5	0.5-1.0	90	6.0-24	8-12	7.21	No
Gold Cr.	0.3	12/6/74	0830	21	32.5	12-14	98	24-48	6-9	+	No

at the ice free station and at the other two stations the temperature was 32.5 °F. Dissolved oxygen levels were approximately 5 ppm. Fry were not observed. Insufficient water depth prevented use of minnow traps.

The surface of Slough No. 13 was approximately 3 percent ice free. Fry were not observed. Water temperature was 33°F. and the D.O. levels ranged from 5.2 to 6.8 ppm. Water depth averaged approximately eight inches and anchor ice was not observed.

Slough No. 15 was completely ice covered and its water temperature was 31°F. Dissolved oxygen level exceeded twelve ppm. Mean water depth was 7.25 inches. Water flow was undetectable at the two sampling stations. At the confluence of the slough with the Susitna River only subsurface (inter-gravel) water was present.

Slough No. 14 was approximately 50 percent ice free and mean water depth was 3.3 inches. The water temperature and dissolved oxygen level was 34°F. and 11.8 ppm. Fry were not observed.

A slough (No. 8A) paralleling the Alaska Railroad at Mile 254 was located and identified for the first time (Figure 2). cursory observations of the slough suggest that it may be a significant spawning and rearing area. Water temperature was 34°F. and dissolved oxygen levels ranged from 11.7 to 12.8 ppm. Approximately 80 percent of the slough was ice free. No fry were observed and minnow traps were not fished due to time limitations.

Susitna River water collected at Gold Creek averaged 25 mg/l (ppm) of suspended solids. The settling rate was approximately 50 percent at 24 hours. Samples at Chase contained an average of 12 mg/l of suspended solids; the settling rate was approximately 50 percent at 24 hours. River samples collected at the Anchorage-Fairbanks Highway crossing contained 4 mg/l of suspended solids with a 50 percent settling rate at 24 hours.

Indian River, Lane Creek, and Gold Creek were surveyed. The results are presented in Table 4.

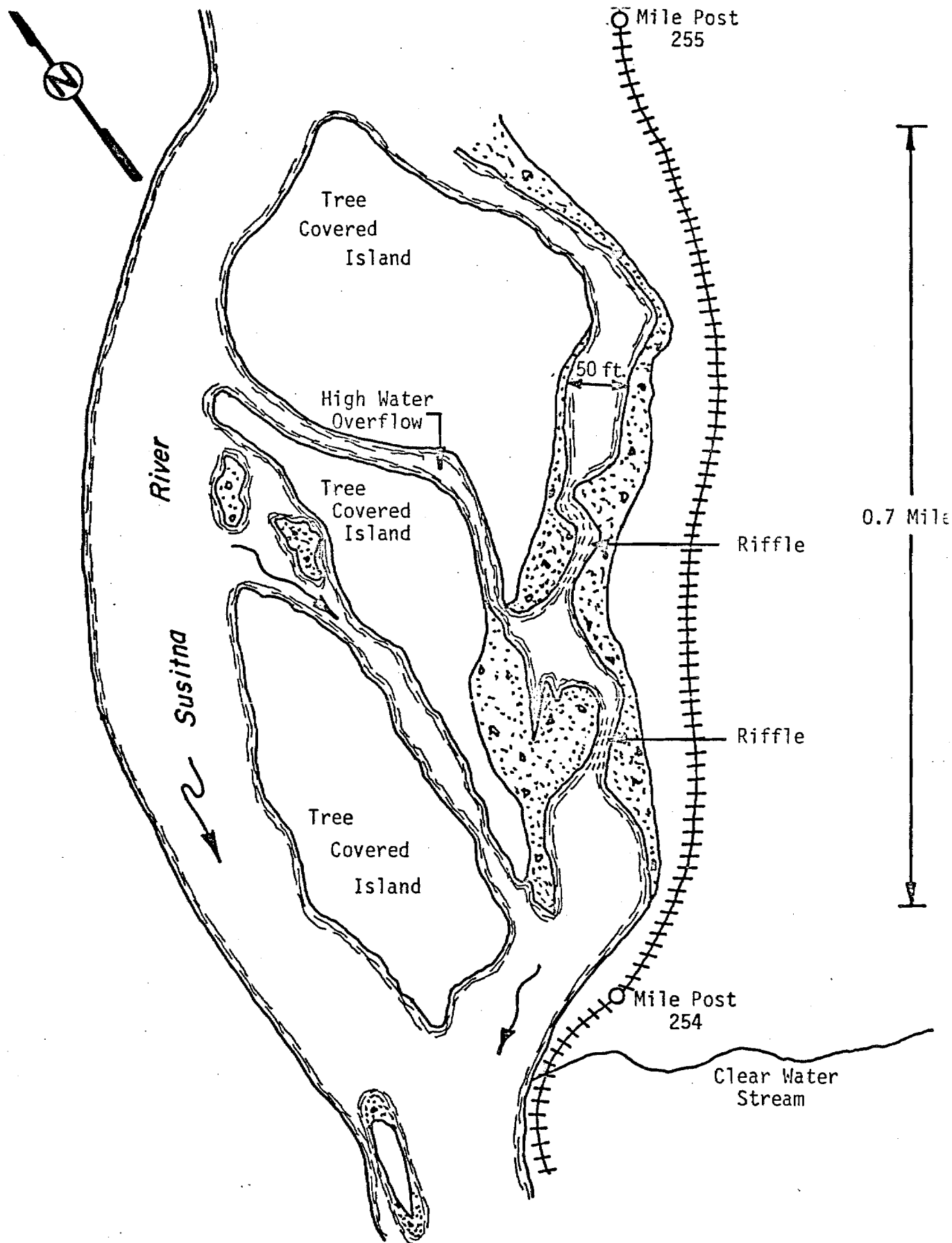


Figure 2. Map of Slough No. 8-A as composed on December 6, Devil's Canyon Winter Project, 1974.

DISCUSSION

Coho fry were rearing in Sloughs No. 9 and No. 11 and possibly in Slough No. 8A. An analysis of length and weight samples indicate that the fry were in "good" condition. Sloughs No. 12, No. 13, No. 14 and No. 15 can probably be considered sub-quality rearing habitat primarily due to their extreme dewatered state.

The Susitna River was clear with a suspended load of less than 26 ppm. At Gold Creek approximately 70 percent of the Susitna River was open, although 70 percent of the open flow was slush ice. Mid-river depth exceeded five feet at Gold Creek and the river substrate was visibly clear from the railroad trestle. At Chase, approximately 5 percent of the river was ice free with 40 percent of the open flow being slush ice, and the Susitna River below the confluence of the Chulitna and Talkeetna Rivers was 25 percent open with surface flow comprised of approximately 30 percent slush ice.

RECOMMENDATIONS

Sloughs No. 19, No. 20 and No. 21 may be accessible with the aid of a ski aircraft and if permissible at least one winter survey should be conducted on them. Minnow trapping should be initiated in the Susitna River.