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WHITEHORSE FISHWAY KING SALMON ESCAPEMENT STUDIES

1974

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Introduction

The Whitehorse dam fishway is located on the Yukon River, 1,745 river miles upstream from the mouth (Figure 4). It is just outside the city of Whitehorse and is one of the farthest upstream king salmon escapement monitoring sites on the Yukon River. Since 1969 the annual fishway counts and the age and sex composition of the run have been used as a possible indicator of the effects of the downriver fishery on king salmon escapement in the Canadian portion of the Yukon drainage. As part of a cooperative data exchange and assistance program with the Canadian Department of Fisheries, the Alaska Department of Fish and Game supplied a technician to monitor the fishway in 1970-71 and 1973-74. The objectives of the study during these years have been to: (1) obtain a daily and seasonal count of king salmon escapement through the fishway and (2) determine the age, sex and size composition of the Whitehorse escapement.

The Whitehorse facility is a weir and pool-type fishway. It is a trough-like timber structure with baffles to create a series of elevated pools which the fish must negotiate to reach the impoundment above the dam. About two-thirds of the way upstream a holding pool with a gate and viewing window are built into the fishway. Salmon are counted and sampled at this point before being released to continue through the fishway.

Methods and Materials

The holding pool was checked three times each day. Each time the pool was checked, the number and sex of king salmon in it was recorded. At least once a day all the kings in the pool were sampled as follows: each fish was removed with a dip net, the length (mid-eye to fork of tail) measured, and a scale sample removed for age determination. The sex of all the king salmon in the sample was determined from external morphological characteristics. A record was kept of all salmon which showed evidence of gill net marks. After sampling the salmon were released and allowed to complete passage of the fishway.

Results

Two-hundred and seventy-three king salmon were enumerated at the Whitehorse fishway in 1974. These fish were composed of 168 males (62 per-

cent) and 105 females (38 percent). Annual cumulative counts for 1965-1974 are shown in Appendix Table 13.

Ninety-one king salmon were sampled for age, sex and size. Eighty-six of the scale samples were legible. Age classes 4_2 through 7_2 were represented with age class 6_2 comprising 55 percent of the sample (Table 15). This sample was 60% male. Comparative data on the age and sex composition of the Whitehorse run since 1970 is presented in Appendix Table 14.

Thirty-seven (41 percent) of the kings sampled had injuries from lampreys or predators, but none showed evidence of net marks.

Discussion

In 1974, the escapement of 273 king salmon through the fishway was the second lowest on record and was far below the 16-year annual average of 652. An examination of the annual escapement counts since 1959 indicates that the Whitehorse run has experienced a gradual decline. Possible reasons for the decline are discussed in detail in the 1973 Yukon River Anadromous Fish Investigations Report (Trasky, 1973).

The 1974 Whitehorse escapement sample was composed of a greater percentage of 4_2 and 5_2 age class kings than the commercial catch sample from Emmonak (Appendix Table 11). This has been characteristic of the age structure of the Whitehorse escapement since 1970. Two possible explanations for this are: (1) the age and sex composition of downstream catch samples from 8-1/2 inch gill nets is not completely representative of the actual age and sex composition of the king salmon run as the fishery is selective for the larger 6_2 and 7_2 age class kings; (2) in some years large numbers of king salmon mature early (lower River approximately 80% age 6_2 and 7_2) and join the spawning run in the 4th or 5th year of life, a high percentage of these may be upper Yukon stocks.

In 1970 and also in 1972-1974, the Whitehorse escapement samples were composed of a greater percentage of 5_2 and 6_2 age class kings and a smaller percentage of 4_2 age class king than the Salcha River sample (Appendix Table 11). A plausible reason for this difference may be inherent genetic differences in the stocks involved.

Table 15. Age, sex and size composition of king salmon escapement sample, Whitehorse, 1974.

	Age group					Total
	3_2	4_2	5_2	6_2	7_2	
Males						
Number	-	12	19	19	2	52
Percent	-	14.0	22.0	22.0	2.0	60.0
Mean length (mm) 1/	-	600	670	790	910	710
Females						
Number	-	-	3	28	3	34
Percent	-	-	4.0	33.0	3.0	40.0
Mean length	-	-	790	800	930	810
Combined						
Number	-	12	22	47	5	86
Percent	-	14.0	26.0	55.0	5.0	100.0
Mean length	-	600	700	800	920	750

1/ All lengths mid-eye to fork of tail.