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PROGRESS REPORT

Salmon and Steelhead Downstream Migrant Studies

Idaho Fish and Game Department

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Introduction:

Personnel of the Idaho Fish and Game Department trapped, marked, and released downstream migrant chinook salmon on the upper and lower portions of the Salmon River during the fall of 1964 under a contract with the Bureau of Commercial Fisheries. Juvenile chinook salmon and steelhead trout were also trapped, marked, and released as part of the studies being conducted by the Department in the Lemhi River drainage.

Lemhi River-Lower Collection Facility:

During the spring and early summer of 1964 a fish weir was constructed in the Lemhi River approximately 30 miles upstream from the mouth. Approximately 90 percent of the chinook salmon and steelhead trout spawn in the river upstream from the weir. A louver guidance and trapping facility was incorporated into the weir facility to permit sampling of the downstream migrant salmon and steelhead juveniles. The louver collection facility was operated from June through most of December; however, marking of chinook salmon with thermal-dermal marks did not begin until October.

The louver collection facility was operated five days out of each week during the period October 1 through December 16. Information on the trapping period, number of chinook salmon juveniles captured and marked, thermal-dermal mark applied, chinook caught per night, and the estimated number of chinook migrating past the weir site are summarized in the following table:

Lemhi River-Lower Trap

Trapping period	Days trap operated	Number of chinook trapped & marked	Thermal-dermal marks applied	Chinook caught per/night	Estimated number passing weir site
October 1-2	2	94	Left Anterior Y	47	940
October 5-9	5	124	Left Posterior Y	25	1750
October 12-16	5	320	Right Anterior Y	64	4480
October 19-23	5	318	Right Posterior Y	64	4480
October 26-30	5	373	Left Anterior L	75	5250
November 2-6	5	287	Left Posterior L	57	3990
November 9-13	5	156	Right Anterior L	31	2170
November 16-20	5	115	Right Posterior L	23	1610
November 23-27	5	138	Left Anterior Z	28	1960
November 30- December 4	5	56	Left Posterior Z	11	770
December 7-11	5	82	Right Anterior Z	16	1190
December 14-16	<u>3</u>	<u>25</u>	Right Posterior Z	8	<u>400</u>
TOTALS	55	2088			28,990

The number of chinook salmon migrating downstream past the weir site can be estimated in two ways. The louver collection facility samples approximately 10 percent of the flow in the Lemhi River. By assuming that the fish are evenly distributed throughout the river and that the collection facility is 100 percent efficient, approximately 10 percent of the fish migrating downstream would be collected in the louver trap. Thus, the mean number of chinook caught per night during each trapping would be multiplied by the number of days in each period and by 10 to obtain an estimate of the number of downstream migrants passing the weir site. This is the procedure followed to obtain the

estimate presented in the table.

The assumptions mentioned above are not completely valid. The efficiency of the louver in diverting fish into the trap is unknown at present; however, it is probably between 80 and 100 percent. The distribution of downstream migrating salmon in the river at the weir site has not been determined. Prior studies both upstream and downstream from the weir site did not reveal any evidence of a nonuniform distribution; however, it may exist.

The second method of estimating the number of downstream migrants passing the weir involves the use of marked fish recaptured at the louver. During the October 1 to December 16 period, 403 chinook salmon fingerlings were marked with a thermal-dermal mark and released approximately five miles upstream from the louver collection facility. In addition, 141 chinook fingerlings were marked with a thermal-dermal mark, tagged with a thread tag and released in the same area. Of the 544 marked fish released upstream from the louver, 18 were subsequently recaptured. Eight of the thread-tagged fish were recovered with six having recognizable thermal-dermal marks and two with no recognizable marks. Assuming that a similar percentage of all the marked fish retained a recognizable thermal-dermal mark, approximately 23 marked fish should have been recaptured, with five of the fish having unrecognizable marks. Assuming further that all marked fish survived, migrated past the weir site, and were uniformly distributed throughout the stream, an estimated 4.23 percent (23 fish) of the marked fish were recaptured at the louver. If the louver facility captured 4.23 percent of the chinook salmon migrating past the weir, the estimated total number of fish passing the weir would be 49,277. 1964

Upper Salmon River-Screen Trap S-14:

A fish trap attached to the bypass pipe of an irrigation screen located approximately five miles up the Salmon River from the town of Salmon was operated during the months of October and November. A comparatively small

number of fish were captured during the period of trap operation due to the small flow of water being diverted from the river (see the following table). Prior to the spring migration season, water control structures will be installed in the irrigation ditch so that a maximum volume of water can be screened regardless of the amount of water needed by the farmers. With the increased volume of water diverted down the ditch and through the screen an increased number of fish can be collected.

<u>Trapping period</u>	<u>Days trap operated</u>	<u>Number of chinook trapped &amp; marked</u>	<u>Thermal-dermal mark applied</u>
October 5-23	15	105	Left Anterior S
October 26- November 16	16	130	Left Posterior S
November 17-20	3	74	Right Anterior S

Lower Salmon River-Whitebird Barge Trap:

A floating barge-type scoop trap was installed in the lower portion of the Salmon River near Whitebird, Idaho, by the Bureau of Commercial Fisheries and operated by Department personnel during the months of September through December. The trap was operated during the fall of 1964 to determine if juvenile chinook salmon were migrating down the Salmon River during the fall and if they could be caught in a barge trap. Although it was known that a fall season downstream migration of juvenile chinook salmon occurs in many of the smaller tributaries of the Salmon River, it was not known whether a downstream movement of chinook salmon occurred in the main stem of the Salmon River, particularly near its mouth.

The data collected indicates that there is some downstream movement of juvenile chinook salmon in the main stem of the Salmon River during the

fall months (see the table below). The largest number of fish were caught during November, indicating that the peak of the movement in this area may occur at that time. The peak movement in the Lemhi River occurred during the month of October.

Month	Days trap operated	Number of chinook caught	Number of chinook marked
September	3 <sup>1</sup> / <sub>1</sub>	0	-
October	9 <sup>2</sup> / <sub>2</sub>	138	0
November	9 <sup>3</sup> / <sub>3</sub>	359	143
December	4 <sup>4</sup> / <sub>4</sub>	149	58

- 1/ One night time and two day time periods of trapping.
- 2/ Seven night time and two day time periods of trapping.
- 3/ Eight night time and two day time periods of trapping.
- 4/ All trapping done during night time.

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