Chinook Salmon Assessment

Project RE-25-98

in the Fishing Branch River,

Yukon Territory, 1998

Prepared by:
P. Doehle - Vuntut Gwitchin First Nation
In consultation with I. Boyce - Fisheries and Oceans Canada

April 1999

ABSTRACT

An enumeration weir, generally used to enumerate chum salmon, was installed six weeks early on the Fishing Branch River in order to assess the utilisation of the area upstream by adult chinook salmon. No chinook were observed during the project. Daily water temperatures and levels were recorded. Temperatures ranged from 5°C to 8°C and water level fluctuated by 0.4 metres.

One aerial survey was conducted on August 25, during which zero (0) fish were enumerated.

INTRODUCTION

Located in the northern Yukon Territory, the south fork of the Fishing Branch River is a headwater tributary of the Porcupine River, itself a major tributary to the Yukon River. The Fishing Branch River flows northeast out of the Ogilvie Mountains, draining an area of approximately 1700 square kilometres (NTS 116 J.K E 1/2, Department of Mines and Technical Surveys 1959). The south fork joins the north fork near Bear Cave Mountain and flows the remaining 2600 km (Bergstrom 1992) to the Bering Sea via the Miner River, the Porcupine River and the Yukon River.

The Fishing Branch River weir, normally operational during the chum migration only (from late August through October), was installed six weeks early in 1998 in order to assess the number of chinook salmon migrating to the Bear Cave Mountain area on the south fork of the river. The maximum number of chinook observed at the weir site after late August is 23 fish (seen in 1994).

The specific objectives of the 1998 Fishing Branch chinook enumeration program were as follows:

1. Collect preliminary information on the abundance and run timing of chinook salmon on the Fishing Branch River.
2. Collect tissue samples for DNA analysis to determine unique genetic markers for this stock.
3. Information gathered may be used for recommendations for restoration and or enhancement activities as well as determining the contribution of Fishing Branch River chinook to the various Yukon River fisheries in Alaska and the Yukon.

Hourly, daily and cumulative migration patterns were recorded. As well daily water temperature and water levels were recorded.

One aerial survey was conducted on August 25.

METHODS

Enumeration

Weir construction was completed on July 14. Weir details are presented in Boyce, 1998 and Wilson, 1999. Enumeration commenced on July 15 at 1600 hours. Enumeration continued 24 hours per day until August 3. On August 4 monitoring was cut back to 12 hours per day from 0800 hours to 1900 hours. A high water event occurred between August 19 and August 23. During this period it was not possible to see a sufficient distance into the water column to determine presence or absence of salmon.

On August 25, the project supported by the Restoration and Enhancement (R&E) Fund was completed, and the annual chum enumeration project commenced. The results of the chum enumeration project are presented in Wilson, 1998.

An aerial survey was conducted on August 25. One observer enumerated from a Bell206 Jet Ranger helicopter. The observer wore polarised sunglasses. The Fishing Branch River between the weir and the Porcupine River was surveyed from an altitude of approximately 30m and an airspeed of about 30kph. The weather at the time of the aerial survey was partly overcast skies.

Physical parameters

Hydrological data (water temperatures (°C) and levels) was recorded from the sampling platform 6 times daily until August 3 when data was recorded 3 times daily. Temperature was taken with a hand held thermometer. The temperature within the top six inches of the water column was measured.

A staff gauge, positioned approximately five metres downstream from the weir, was used to measure water level fluctuation. The gauge was not placed in the deepest part of the river. It should be noted that placement of the staff gauge from year to year varies; levels recorded are not, therefore, comparable between different years of the program.

RESULTS

A total of zero (0) chinook salmon were counted at the weir.
A total of zero (0) chinook salmon were enumerated during the aerial survey.

Figure 1 shows the daily water temperatures recorded from July 15 to August 24, inclusive. The maximum temperature, 8°C, was recorded on July 15. The minimum temperature of 5°C was recorded on August 3 and August 16. The temperature range observed over the course of measurement was 3 °C.

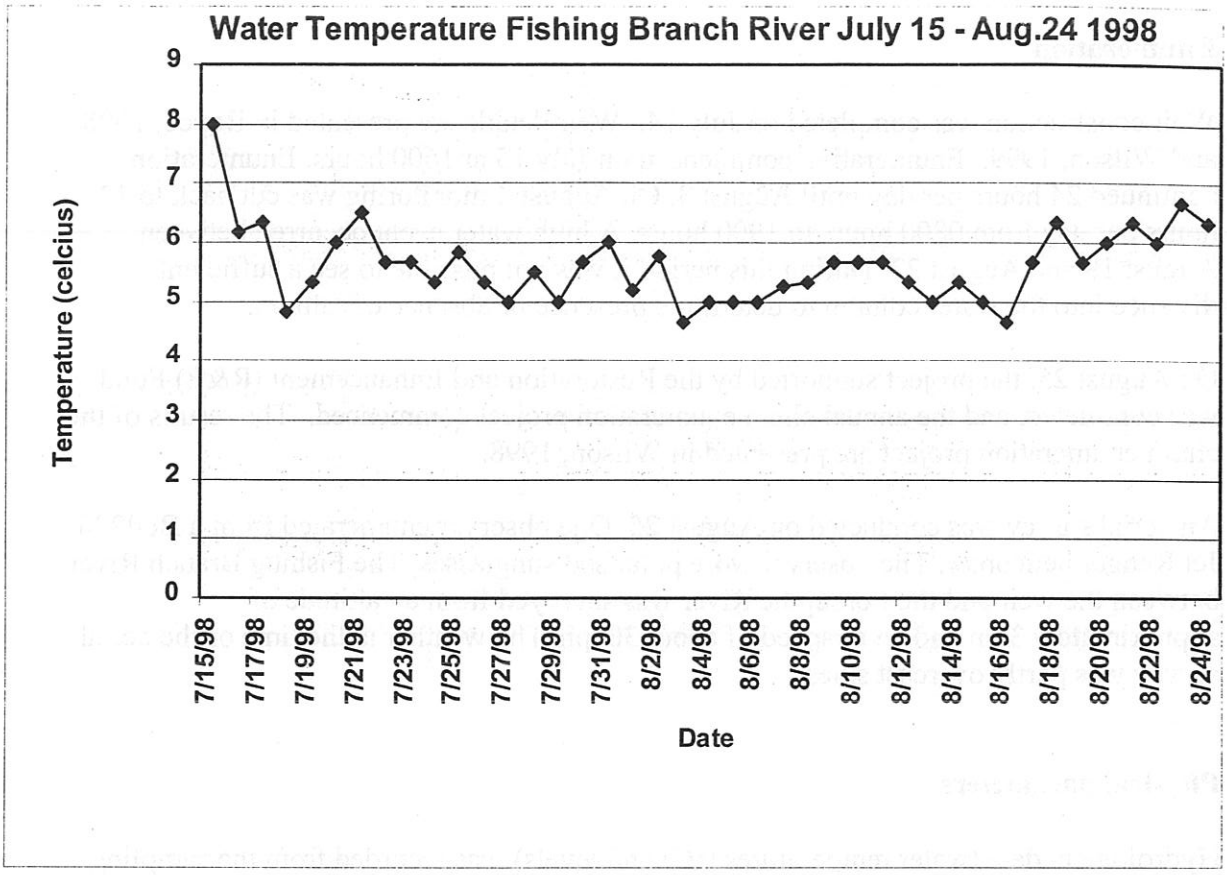
Water Temperature Fishing Branch River July 15 - Aug.24 1998
Temperature (celcius)
9
8
7
6
5
4
3
2
1
0
7/15/98
7/17/98
7/19/98
7/21/98
7/23/98
7/25/98
7/27/98
7/29/98
7/31/98
8/2/98
8/4/98
8/6/98
8/8/98
8/10/98
8/12/98
8/14/98
8/16/98
8/18/98
8/20/98
8/22/98
8/24/98
Date

Figure 1.

Figure 2 below shows the 1998 daily water levels from July 15 to August 24, inclusive. Levels ranged from 0.5 meters on July 15 through July 27 to 0.9 m on August 20. No water level data was available for August 18 and August 19; these were the 2 days prior to the high water event. Extrapolation was used to complete the graph.

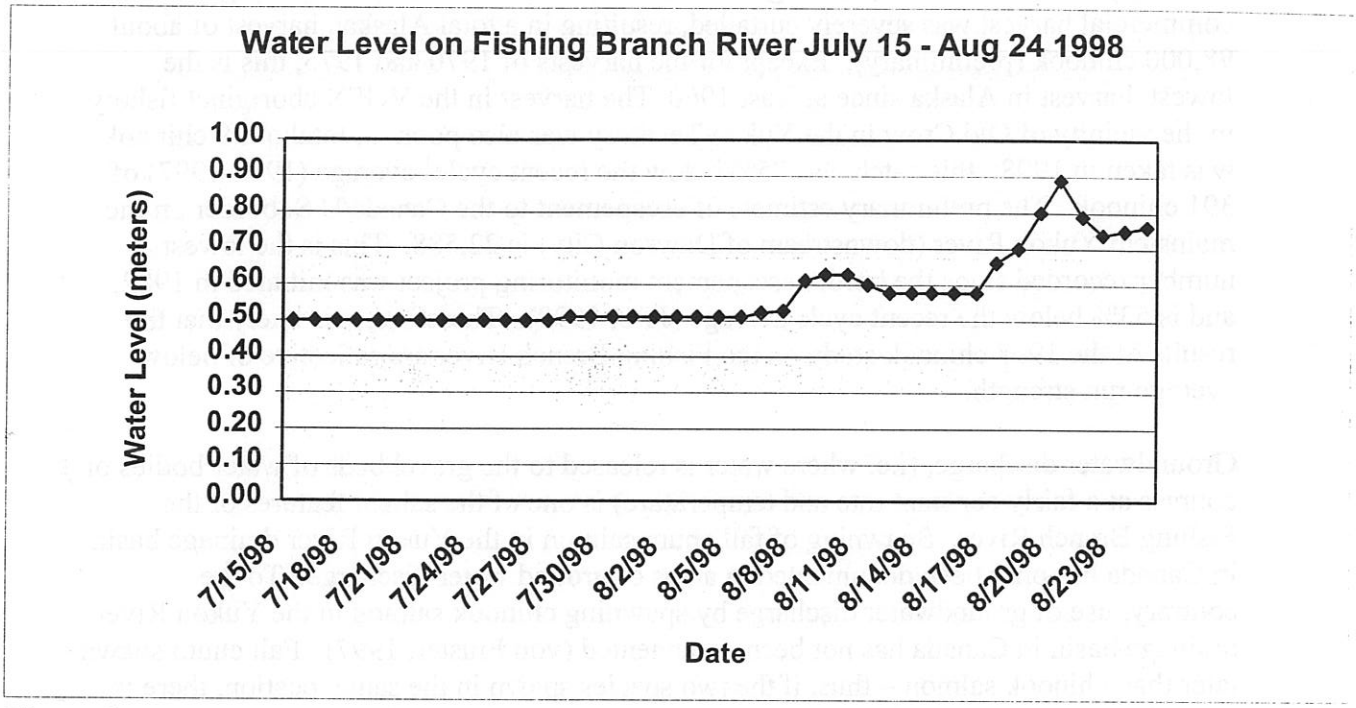

Figure 2.

DISCUSSION

Subsequent to the completion of this project, one chinook was observed at the weir site during the chum enumeration project conducted by Fisheries and Oceans Canada. This male chinook was observed on September 1.

The dearth of chinook observed at the weir site suggests that the section of the Fishing Branch River from Bear Cave Mountain upstream is of limited importance for chinook spawning. The fact that no chinook were observed in August also suggests that the number of chinook observed during prior years' chum enumeration projects is reflective of the total number migrating past the weir site. In other words, the observations of 1998 do not support the hypothesis that the weir project (which starts near the end of August annually) misses the bulk of the chinook run.

The lack of chinook sightings during the aerial survey suggests that the weir escapement is reflective of the size of the run to the mouth of the Fishing Branch River. However, single surveys rarely capture entire chinook escapements since runs are usually protracted – early spawners disappear before late ones arrive. Weather and water conditions, as

well as observer experience and bias can affect accuracy (JTC 1998). The fact that no fish were observed on the aerial survey should not, therefore, be taken to mean that no chinook spawned in the lower reaches of the Fishing Branch River in 1998.

It should be noted that the run of chinook into the Yukon River system in 1998 was extremely weak. In Alaska, although the subsistence harvest was about average, the commercial harvest was severely curtailed, resulting in a total Alaskan harvest of about 98,000 chinook (preliminary). Except for the harvests of 1970 and 1975, this is the lowest harvest in Alaska since at least 1960. The harvest in the VGFN aboriginal fishery in the vicinity of Old Crow in the Yukon Territory was also poor. A total of 99 chinook was taken in 1998; this catch was 75% below the recent cycle[1] average (1992-1997) of 391 chinook. The preliminary estimate of escapement to the Canada/U.S. border on the mainstem Yukon River (downstream of Dawson City) is 22,588. This is the lowest number recorded since the border escapement monitoring project was initiated in 1982, and is 53% below the recent cycle average (JTC, 1998). Therefore, it is likely that the results of the 1998 chinook study on the Fishing Branch River are reflective of below average run strength.

Groundwater discharge, (i.e. where water is released to the gravel beds of water bodies or courses at a fairly constant rate and temperature) is one of the salient features of the Fishing Branch River. Spawning of fall chum salmon in the Yukon River drainage basin in Canada has only been documented in areas of ground water discharge. To the contrary, use of groundwater discharge by spawning chinook salmon in the Yukon River drainage basin in Canada has not been documented (von Finster, 1997). Fall chum spawn later than chinook salmon – thus, if the two species spawn in the same location, there is potential for superimposition of chum redds upon those of chinook, and an accompanying decrease in survivability of chinook eggs. The favourable hydrological conditions for fall chum, their relative abundance, and timing of spawning may confer a significant advantage over chinook in the Fishing Branch River, particularly from the Bear Cave Mountain area upstream.

ACKNOWLEDGEMENTS

Thanks are due to Vuntut Gwitchin weir staff: Isaac Thomas, John Blake and Moses Lord and to Ian Boyce of Fisheries and Oceans Canada for his technical contributions to this project.

REFERENCES

Boyce, I., M.E. Jarvis, and B. Waugh. 1998. Enumeration of Adult Chum Salmon (*Onchorhyncus keta*) in the Fishing Branch River, Yukon Territory, 1993.

JTC (Canada/U.S. Yukon River Joint Technical Committee). 1998. Yukon River Salmon Season Review for 1998 and Technical Committee Report.

[1] The predominant age of spawning Yukon River chinook salmon is six-years. Thus, six-years represents a chinook cycle.

von Finster, Al. 1997. Utilisation and Status of Habitats by Chinook and Chum Salmon in the Yukon River Basin in Canada. Fisheries and Oceans Canada memorandum.

Wilson, Brad. 1998. Enumeration of Adult Chum Salmon (*Onchorhynchus keta*) in the Fishing Branch River, Yukon Territory, 1998. In Prep.