

Aerial Enumeration Survey of Adult Chinook Salmon and Telemetry Tracking of Radio-
Tagged Chinook in Select Tributaries of the White River Sub-basin.

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ABSTRACT

An aerial survey was conducted on August 29, 2002 to track radio-tagged chinook salmon and enumerate chinook salmon spawners in selected watersheds of the White River sub-basin lying within the traditional territory of Kluane First Nation. Areas surveyed included sections of the Donjek, Klotassin and Nisling Rivers, the Tincup Lake drainage and upper reaches of the Kluane River. A total of 7 radio tagged chinook was located in the surveyed streams and rivers. These included 5 located in the Nisling River, one in Tincup Creek and one in the Donjek River near the confluence of the Kluane River. The radio-tagged fish located in Tincup Creek was alive and observed near a spawning redd. All remaining tagged fish were detected as inactive and presumed to be dead. A total of 21 chinook spawners was counted in Tincup Creek between the outlet of Tincup Lake and the mouth of the creek, although spawning activity appeared to be nearing completion. The Nuntaea Creek drainage between Dogpack Lake and Tincup Lake appeared to have limited chinook spawning potential and no chinook spawners were observed at the time of the survey. Upper reaches of the Kluane River showed good potential spawning habitat between the outlet of Kluane Lake and the confluence of the Duke River. However, there were no chinook spawners observed here and no sign of recent spawning activity at the time of the survey.

TABLE OF CONTENTS

ABSTRACT	ii
INTRODUCTION	1
STUDY AREA	1
METHODS	3
RESULTS	3
Radio telemetry tracking	3
Enumeration survey	4
Upper reaches of Kluane River	4
Tincup Lake watershed	4
Outlet of Dogpack Lake and Nuntaea Creek	4
Tincup Creek	4
Nisling & Klotassin Rivers	4
DISCUSSION	5
ACKNOWLEDGMENTS	5
REFERENCES	6

INTRODUCTION

In 2002, the United States National Marine Fisheries Services (NMFS) and the Alaska Department of Fish and Game (ADF&G) initiated a large scale radio telemetry program to determine the distribution and proportional abundance of chinook salmon in the Yukon River drainage. A total of 768 returning chinook salmon were captured throughout the run in the lower Yukon River near the Alaskan towns of Marshall and Russian Mission and implanted with radio transmitters. Radio-archival tags that record water depth and temperature every three minutes were applied to 23 of the chinook captured. Radio tagged fish were then tracked on selected tributaries in both Alaska and Canada using aerial tracking methods.

Various consultants contracted through the Yukon River Panel undertook aerial surveys to track radio tagged chinook in the Canadian drainage¹. This report summarizes the findings of an aerial survey conducted on selected tributaries of the White River sub-basin that lie within the traditional territory of Kluane First Nation. The purpose of this survey was twofold:

1. To determine the spawning distribution of radio tagged chinook in Kluane area watersheds of the White River sub-basin.
2. To enumerate chinook salmon spawners in identified spawning areas.

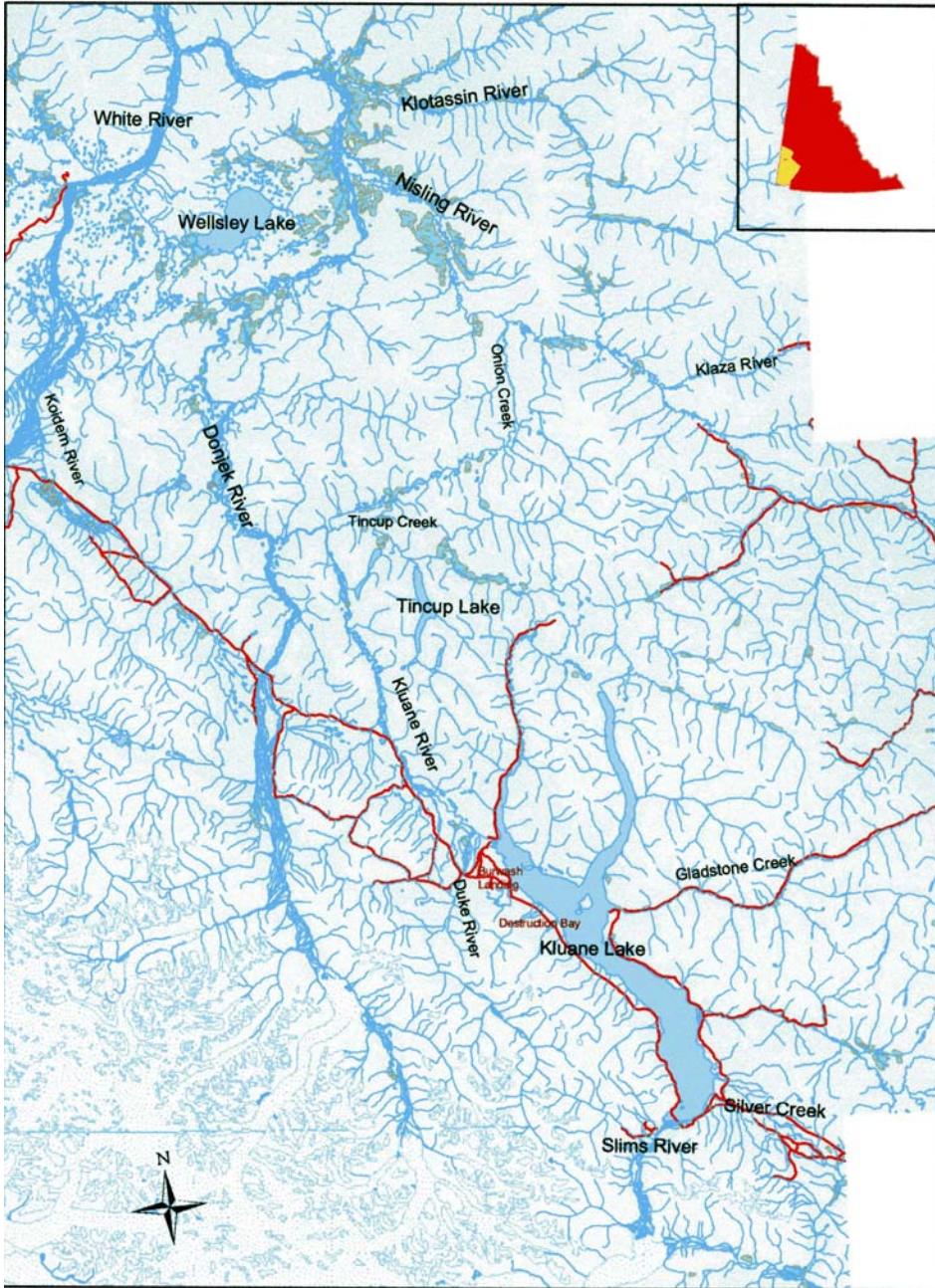
STUDY AREA

The White River sub-basin is one of 6 major watersheds identified in the Canadian portion of the Yukon River drainage basin. It drains an area of approximately 38,100 square kilometres. The sub-basin is primarily located within the traditional lands of the Kluane and White River First Nations and straddles the Alaska/Yukon border. The sub-basin supports a significant chum salmon spawning population and a small population of chinook salmon.

The area covered in this study included streams and rivers lying entirely or partially within the traditional territory of Kluane First Nation including: the Donjek, Klotassin and Nisling Rivers, the Tincup Lake drainage and upper reaches of the Kluane River (Figure 1).

¹ Funding for these programs was provided by the Yukon River Panel Salmon Restoration & Enhancement (R&E) Fund under the U.S./Canada Yukon River Agreement of the Pacific Salmon Treaty. In 2002, R&E funding was provided for tracking projects on the Porcupine River drainage, the north mainstem Yukon/Klondike, the White River drainages lying within the traditional territory of the White River First Nation, and the Stewart, Big Salmon and Teslin River drainages. The results of these surveys are presented in separate R&E reports.

Fig.1 Kluane Region Watersheds



Scale
1:900,000



Data Source: NTDB250
NAD 83, UTM Zone 7
Map produced by Kluane First Nation.
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METHODS

The aerial survey was conducted on August 29 using a Bell 206B Jet-Ranger helicopter piloted by Doug Makonnen out of Haines Junction. The helicopter was flown at low level starting at the outlet of Kluane Lake and continuing downstream over the Kluane River to the Duke River confluence. From here, the helicopter was flown overland to the upper Tincup Lake drainages and the survey resumed from the outlet of Dogpack Lake to the mouth of Tincup Creek. The survey was continued on the Kluane River from the Tincup Creek confluence to the Donjek River and on the Donjek River to the Nisling River confluence. The Nisling River was flown upstream from the mouth to the Klaza River confluence and the Klotassin River downstream from the confluence of Colorado Creek to the mouth.

An “H” type stainless steel receiving antenna was fitted to the external fuselage of the helicopter forward to the flight path and connected to a radio receiver using coaxial cable and coaxial splitter. The receiver (ATS model R4500) recorded the date, time, signal strength, radio tag frequency and code, activity of the fish (live or dead) and the GPS coordinates. Data stored by the receiver was downloaded to a computer after the survey was completed. Radio tracking methods and receiver capabilities are described in detail in a report prepared by Haldane Environmental Services and B. Mercer & Associates in 2002 on chinook salmon radio telemetry tracking in the north mainstem Yukon/Klondike, Teslin, Stewart and Big Salmon drainages (Osborne, Mercer, 2003).

A crew of three people; two as observers and a member of Kluane First Nation conducted the survey. Spawner counts were made from the back seat of the helicopter by one of the observers while the second observer operated the receiving equipment.

RESULTS

Radio telemetry tracking

A total of 7 radio tagged chinook was located in the surveyed streams and rivers. No archival radio tagged fish were detected during the survey. Of the total radio tagged fish, 5 were located in the Nisling River between the mouth and the confluence of the Klaza River. All 5 fish were detected as inactive and presumed to be dead. One radio tagged fish was found in Tincup Creek approximately 4.8 km upstream of the mouth. This fish was alive and observed from the air near a spawning redd. One radio tagged fish was located in the Donjek River approximately 3.6 km downstream of the Kluane River confluence and was detected as inactive and presumed to be dead.

Enumeration survey

Upper reaches of Kluane River

Viewing conditions in the Kluane River between the outlet of Kluane Lake and the Duke River were excellent due to the clarity of the water and absence of glare. Extremely turbid water discharging from the Duke River obscured vision beyond this point. The section of river surveyed was characterised as a wide and relatively straight run/glide. Substrates of gravel and cobble were uniformly distributed throughout. There were no chinook salmon observed in this area, however, and no observed indications of redd development at the time of the survey.

Tincup Lake watershed

Outlet of Dogpack Lake and Nuntaea Creek

The survey was initiated at the outlet of Dogpack Lake and continued downstream on Nuntaea Creek to Tincup Lake. Visibility was good in the outlet stream and upper reaches of Nuntaea Creek surveyed and fair in the lower reaches due to shading by trees and a dark stream bottom.

There were no chinook observed in the entire area surveyed and no indication of recent or old spawning activity. Substrates in the outlet stream appeared unsuitable for spawning being comprised of mainly muck/silt and boulders. Nuntaea Creek downstream of the outlet stream flowed rapidly over a boulder substrate for approximately 2 km. The lower 2 km of the creek was characterised by pools/riffles/runs and substrates of cobble and gravel.

Tincup Creek

Weather and water conditions were excellent for viewing fish in Tincup Creek resulting in most, if not all, chinook salmon spawners present in the creek being counted. A total of 21 live chinook salmon was observed scattered throughout the length of the creek. No chinook carcasses were observed, although there were a number of vacant redds and unpaired fish suggesting that peak spawning activity was over. The highest concentration of redds was observed approximately 1.5 km downstream of the lake; a number of which were vacant.

Nisling & Klotassin Rivers

Viewing conditions in both the Nisling and Klotassin rivers were very poor due to the dark colour of the water. As a result, these rivers were flown only to locate radio tagged fish.

DISCUSSION

With one exception, the radio-tagged chinook concurred with documented spawning areas in the White River watershed. The one exception was a radio tagged fish located in the Donjek River near the Kluane River confluence. This fish was dead and had not likely spawned in the Donjek River because of the high silt levels but had drifted downstream from a clear water spawning area. Its proximity to the Kluane River suggests that this fish may have drifted downstream from a spawning location in Tincup Creek. Of the remaining radio-tagged fish, the majority were located in the Nisling River suggesting that this river supports a significant chinook spawning population.

Kluane River near the outlet of Kluane Lake has been identified as a chinook salmon spawning area through traditional knowledge (Horler, 1994). Although there was no indication that chinook spawning activity had occurred there this year, the habitat appeared to be suitable for a limited spawning population. There have been no sightings of chinook spawners reported in this area in recent years by local people or scientific agencies and it is very likely that this population has been decimated through fishing pressure.

There was a limited amount of suitable habitat for chinook spawning observed in the outlet stream of Dogpack Lake and reaches of Nuntaea Creek downstream of its confluence. This drainage has been considered a possible spawning destination of chinook salmon, although investigations to date have failed to verify this (Connor et al., 1999; Wilson, 2002). Adult chinook salmon have been observed at the south end of Tincup Lake, but it is not known if they spawned in the Nuntaea Creek drainage. At the time of the survey this year, chinook spawning in Tincup Creek was nearing completion, hence it is possible that a small chinook population in the Nuntaea Creek drainage could have been missed and carcasses removed from the system. It is recommended that future aerial surveys be conducted at an earlier date to verify chinook salmon utilisation in the Nuntaea drainage.

ACKNOWLEDGMENTS

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