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Yukon River Salmon Restoration and Enhancement Fund
Project Report
Black River Chum Salmon Aerial Survey

# Black River Chum Salmon Aerial Survey
# CATGNR Technical Document 00-01

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R&E - CATG - 99

# Black River Chum Salmon Aerial Survey

## Summary
Two aerial surveys of the upper Black River drainage in the Yukon Flats were conducted in September 1999. The survey area included the Salmon Fork drainage of the upper Black River including the Kevinjik and Tetthajik creeks. Survey conditions during the first survey were poor due to high sediment loading in the creeks due to a fire earlier in the summer in the area. The second survey consisted of finding radio tagged salmon.

## Objectives
1) To document spawning bed locations of chum salmon (*Oncorhynchus keta*) within the Black River Drainage.
2) To estimate relative salmon abundance within the Black River Drainage.
3) To estimate run timing of chum salmon within the Black River Drainage.
4) To document coho (*Oncorhynchus kisutch*) spawning within the Black River Drainage

## Background
The Black River drainage is known as a spawning area for chinook (*O. tshawytscha*), fall chum (*O. keta*), and possibly coho (*O. kisutch*) salmon. In the mid 1990's attempts were made to install a weir on the Black River to enumerate chinook and fall chum salmon. These attempts did not succeed due to weather problems. There is currently a data gap as to the actual escapement numbers and locations of spawning salmon within the Black River drainage. According to Yukon River Comprehensive Salmon Plan for Alaska, "Documenting use in these smaller tributaries by both juvenile and adult salmon is extremely important for protecting these habitats for future salmon use and assessing their contribution to overall salmon production."

This project intended to address the number of fall chum salmon spawning within the drainage as well as documenting coho spawning. Documenting the spawning beds would assist with any future development determinations.

Minimal information is available on the number of fall chum spawning within the drainage. The National Marine Fisheries Service (NMFS) currently has a satellite recording station at the village of Chalkyitsik to count the number of radio tagged salmon passing the village from fish tagged at the Rampart Rapids.

## Study Area
This project was located within the Black River drainage and centered on the Salmon Fork with the Kevinjik and Tetthajik creeks being surveyed intensively with cursory survey of the Black River above the Salmon Fork. A USGS map is included with this report.

## Methods

Two aerial surveys were flown in September 1999; a third survey was to be flown in October. The October survey was cancelled due to weather, pilot and observer constraints. Attempts were made to conduct a survey in November and December (listening for radio frequencies through the ice), but weather, pilot and observers scheduling did not coincide. A PA-18 (Super Cub) from Caribou Air Service and piloted by Dennis Miller was utilized for the surveys. Mr. Miller is familiar with the area flown and is also familiar with fisheries survey work. The Alaska Department of Fish & Game (ADF&G) A-Y-K Salmon Escapement Observation form utilized to record data.

The first survey occurred the week of September 6th, which was to coincide with the peak of the return. The first survey was conducted on the Salmon Fork and included the Kevinjik and Tetthajik Creeks. Dennis Miller piloted the aircraft and Tricia Waggoner; CATG Biologist flew as observer. Flying approximately 300- 400 AGL a visual search was conducted of the streams in areas where visibility allowed. The Kevinjik Creek was surveyed along the mainstem until it was decided the sediment load obscured the visibility too much to effectively survey. The creek leading to Kevinjik Springs was visually surveyed up to the springs. The Tetthajik Creek was visually surveyed until the substrata of the creek was larger than normal spawning habitat.

The second survey occurred on September 29th. This timeframe should have been after the majority of the fall chum salmon have returned. Dennis Miller piloted the aircraft and David James; CATG Natural Resources Director flew as observer. Prior to the second survey, radio frequencies of the 16 salmon, which had passed the Chalkyitsik satellite station, were obtained from USFWS. An ATS receiver with vertically oriented "H" antennas were used to locate the tagged salmon. The survey area started at Chalkyitsik and upstream along the Black River to the Salmon Fork including the Kevinjik, Tetthajik and Drifting Snow Creeks. Visual and telemetry surveys were conducted at about 300 – 400 feet AGL. Drifting Snow Creek was surveyed to a point where the substrata rocks were larger than normal spawning habitat. GPS locations are noted for locations of groups of salmon as well as radio tagged salmon. Discounting inherent GPS error the measurements should be accurate to 100 meters.

## Results

The first survey was conducted on September 9, 1999. Survey conditions were poor in the Kevinjik Creek due to a high sediment load. During the summer a large fire had burned through most of the Kevinjik watershed. Just prior to the survey there had been a couple of days of heavy rain. The heavy sediment loading in the Kevinjik obscured the Salmon Fork and Black River below the Kevinjik. On the date of the survey the main channel of the Kevinjik was completely obscured due to high sediment loading. Weather was good for surveying with direct sunlight but shadows in tree lined areas of the creeks. Three chum salmon were located at Kevinjik Springs at 66° 37' 25" North and 142° 05'25" West. The location of the area surveyed and Kevinjik Springs area is denoted in Figure 1.

The second aerial survey occurred on September 29, 1999. Prior to the survey radio frequencies for the 16 radio tagged fish which had passed the Chalkyitsik tower were

obtained. During the second survey the Kevinjik Creek was still muddy and Drifting Snow Creek had a fair amount of flowing ice. Dennis Miller submitted a report to the CATG Natural Resources Department, which is attached. The survey located six of sixteen radio tagged salmon, which were all in the Salmon Fork above the mouth of Tetthajik Creek. As the survey plane flew upstream they were still hearing transmitters about 5 miles into Canada along Rice Gulch Creek. Drifting Snow Creek was also surveyed about 5 miles into Canada. No salmon were seen or heard. The plane had to return due to fuel and time constraints. Transmitter reception range is 1 ½ to 2 miles. During a reverse route back to Fort Yukon no new transmitters were heard. Groups of salmon seen during the second survey are listed in Table 1. Most salmon appeared to be moving upstream and no redds were seen below the mouth of Tetthajik Creek. Table 2 indicates the frequencies and GPS locations of those salmon, which were tracked. No coho salmon were seen in either survey.

## Discussion

Very little information regarding spawning of chum or coho salmon has been documented in the Black River Drainage. Aerial survey conditions to determine abundance and location of spawning chum salmon is marginal due to sediment loading in streams, run timing versus river ice formation as well as daylight constraints on flying time. Location of spawning beds in the system can be documented through aerial telemetry surveys throughout the spawning time frame. Abundant spawning habitat appears available for chum salmon in the creeks and mainstem of the Salmon Fork. Additional time and clearance for flying in Canadian airspace is needed for the next surveys.

There is discussion of placing a counting tower on the Black River below the Salmon Fork to enumerate salmon. This information along with documentation through traditional knowledge of the area and telemetry surveys would provide an overall picture of escapement levels and spawning locations.

## Acknowledgements

We would like to express our thanks to Dennis Miller of Caribou Air Service who provided plane and pilot for the project. Mr. Miller's knowledge of aerial fisheries surveys and the area of the Upper Black River contributed greatly to the outcome of the project. We would also like to thank Monte Millard and Randy Brown of USFWS, John Eiler of NMFS and Keith Schultz of ADF&G for their time and knowledge that went into providing technical assistance and background information to the project.

**Table 1 – Survey Results from 9/29/99**

| Approximate Number | GPS Location | Location Description | Comments |
|---|---|---|---|
| 150 | *66° 43' 44" N 142° 33'78" W | Salmon Fork | Near confluence with Black River |
| 40 | *66° 30' 23" N 142°23'88" W | Salmon Fork | |
| 200 | 66° 31' 20" N 142° 09'18" W | Salmon Fork | Near mouth of Kevinjik |
| 75 | 66° 37' 20" N 142° 09'25" W | Kevinjik Springs | Upstream of Kevinjik |
| 65 | 66° 31' 12" N 142° 01'26" W | Salmon Fork | Upstream of Kevinjik |
| 100 | 66° 30' 00" N 141° 41'12" W | Salmon Fork | Upstream of Tetthajik |
| 30 | 66° 32' 82" N 142° 55'88" W | Salmon Fork | On Redds |
| **660** | **Total** | | |

* Indication in the Dennis Miller report, included, was 63°, however that latitude is out of the survey area, further discussion with Dennis Miller indicated the 66° assumption is correct.

Table 2 – Radio Tagged Salmon Locations

| Frequency | Fish No. | Sex | Location | Latitude | Longitude | Activity | Travel Time – Rapids to Chalkyitsik (days) | Capture Date | Date Pass Chalkyitsik |
|---|---|---|---|---|---|---|---|---|---|
| 0.685 | 140 | F | | | | | | | |
| 0.705 | 3 | F | | | | | | | |
| 0.764 | 494 | F | | | | | | | |
| 0.805 | 146 | F | Salmon Fork | 66° 29' 20" N | 141° 44'14" W | 3 | 23.88 | 08/14/00 | 09/07/00 |
| 0.904 | 430 | F | Salmon Fork | 66° 27' 61" N | 141° 26'62" W | 3 | 18.71 | 08/25/00 | 09/14/00 |
| 0.944 | 292 | M | | | | | | | |
| 1.014 | 154 | F | | | | | | | |
| 1.035 | 715 | F | Salmon Fork | 66° 27' 42" N | 141° 38'71" W | 1 | 15.17 | 09/03/00 | 09/19/00 |
| 1.094 | 88 | F | | | | | | | |
| 1.294 | 29 | M | Salmon Fork | 66° 28' 63" N | 141° 20'33" W | 3 | | | |
| 1.333 | 519 | F | Salmon Fork | 66° 27' 66" N | 141° 40'07" W | 2 | 17.04 | 08/27/00 | 09/13/00 |
| 1.774 | 593 | M | | | | | | | |
| 2.003 | 387 | F | Salmon Fork - Canada | 66° 33' 69" N | 140° 55'92" W | 3 | 16.79 | 08/24/00 | 09/10/00 |
| 2.344 | ** | F/M* | | | | | | | |
| 2.403 | ** | F/M* | | | | | | | |

NOTES: Activity Code: 1=Active, 2=Inactive, 3=Inactive 24hr. Sex **=where different sex fish has different transponder codes on the same frequency.

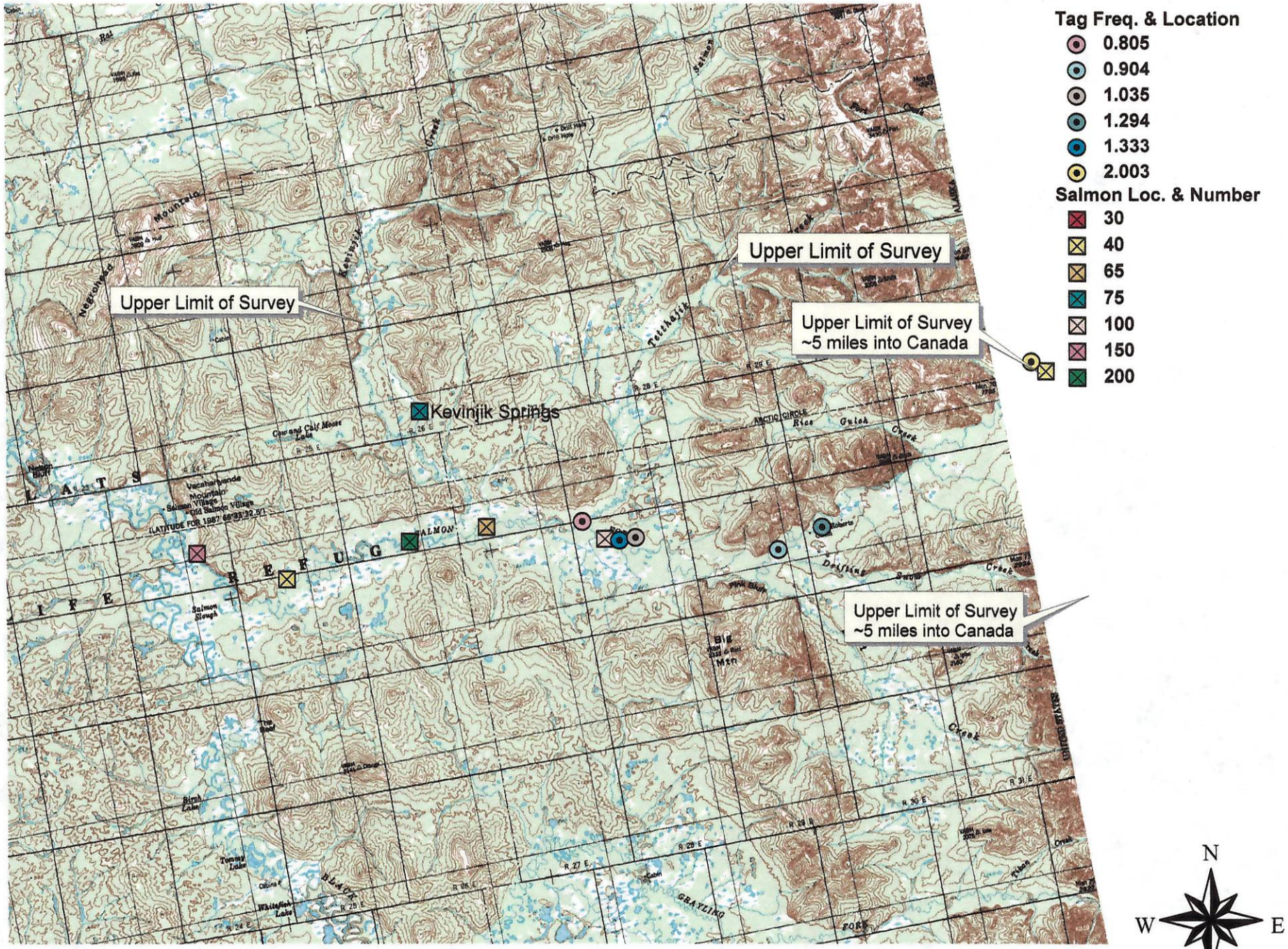


**Figure 1 - Upper Black River Aerial Survey**
**Locations not to scale**

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TO: Trisha Waggoner, CATG
John Eiler/Randy Brown, NMFS
Keith Shultz/Louis Barton, ADF&G

SUBJECT: Salmon Fork Black River fall chum salmon survey+ radio telemetry, 9/29/99

On September, 29, 1999, David James(CATG) and I flew the Salmon Fork of the Black River, visually looking for fall chum salmon, and listening for 16 radio-tagged salmon which had passed upstream from Chalkyitsik. There was direct sunlight, with some rippling on the river due to a 15 mph NE wind.

I was using my ATS receiver, with vertically oriented "H" antennas. We began listening at Chalkyitsik. and flew the Salmon Fork, Kevinjik Creek, Tetthajik Creek, and Drifting Snow Creek upstream to the areas indicated on the attached map. We flew at about 3-400 ft AGL, combining a visual search with telemetry. We heard 6 of the 16 tagged salmon, all on the Salmon Fork upstream from the mouth of Tetthajik Creek. We were still hearing new transmitters when we had to turn back(fuel and time constraints), about 5 miles into Canada. Transmitter reception range was 1½ to 2 miles. We reversed our route back to Ft. Yukon and didn't pick any new transmitters, so I'm sure we didn't miss any tagged salmon in the areas we flew.

We saw groups of fall chum salmon as indicated below. All were along the Salmon Fork. Except where indicated, most salmon seemed to be still moving upstream. I didn't see any redds until upstream from the mouth of Tetthajik Creek. GPS coordinates are WGS 84 map datum. Discounting the inherent GPS error, coordinates should be accurate to 100 meters.

| Approximate number | GPS coordinates |
|---|---|
| 150 | 63-32.44, 142-33.78 |
| 40 | 63-30.23, 142-23.88 |
| 200 | 66-31.20, 142-09.18 |
| 75 | 66-37.25, 142-05.25("Kevinjik Springs") |
| 65 | 66-31.12, 142-01.26 |
| 100 | 66-30.00, 141-41.12 |
| 30 | 66-32.82, 140-55.88(on redds) |
| 660 total | |

The salmon associated with the attached "Aerial Tracking Form" were either single carcasses or in groups of only a few salmon and carcasses

MISC.
We didn't see any coho salmon.

Kevinjik Creek was muddy/murky, probably still being affected by the large fire that burned much of its drainage this summer.

Drifting Snow Creek had a fair amount of flowing ice, and the rocks on the bottom were a bit larger that the usual spawning habitat. We did see a low-flying bald eagle at 66-25.05, 141-11.48(a typical indication of salmon presence), but I couldn't see any salmon.

Below are some miscellaneous coordinates:

| | |
|---|---|
| Drifting Snow Cr. mouth | 66-27.60, 141-27.80 |
| Kevinjik Cr. mouth | 66.30-90, 142-05.73 |
| Salmon Fk. Black mouth | 66-33.11, 142-34.31 |
| Tetthajik Cr. mouth | 66-30.46, 141-49.20 |
| Runt Cr. mouth | 66-26-33, 141-30.81 |
| "Kevinjik Springs" | 66-37.25, 142-05.25 |

We plan to do two more days of telemetry/visual searching after October 14.

Dennis Miller

D:\Letters\C.A.S\Salmon survey, Black River system 9-29-99.wpd

# AERIAL TRACKING FORM



Dennis Miller
Caribou Air Service
1446 Hans Way
Fairbanks, AK 99709

REC
RDL

Method aerial; ATS Receiver Super Cub N83904
Name Dennis Miller/CATS

Date 9/29/99
Page 1

| Fishno | Hour | Freq | Code | Area | Lat | Long | Act |
|---|---|---|---|---|---|---|---|
| | | 0.685 | | | | | |
| | | 0.705 | | | | | |
| | | 0.764 | | | | | 30 |
| | | 0.805 | | Salmon FK Black | 66-29.20 | 141-44.14 | 3 25 |
| | | 0.904 | | " | 66-27.61 | 141-26.62 | 3 28 |
| | | 0.944 | | | | | 27 |
| | | 1.014 | | | | | 26 |
| | | 1.035 | | " | 66 27.42 | 141-38.71 | 1 25 |
| | | 1.094 | | | | | 24 |
| | | 1.294 | | " | 66-28.63 | 141-20.33 | 3 23 |
| | | 1.333 | | " | 66-27.66 | 141-40.07 | 2 22 |
| | | 1.774 | | | | | 21 |
| | | 2.003 | | " | 66 33.69 | 140 55.92 | 3 20 |
| | | 2.344 | | | | | 19 |
| | | 2.403 | | | | | |
| | | | | | | | 30 |
| | | | | | | | 27.5 |
| | | | | | | | 25 |
| | | | | | | | 22.5 |
| | | | | | | | 20 |
| | | | | | | | 17.5 |
| | | | | | | | 15 |
| | | | | | | | 12.5 |
| | | | | | | | 10 |
| | | | | | | | 7.5 |
| | | | | | | | 5 |
| | | | | | | | 2.5 |

Act: 1 - Active (3 beat w/ motion sensor) | 2 - Inactive (3 beat pulse) | 3 - Inactive 24 hr (5 beat pulse)