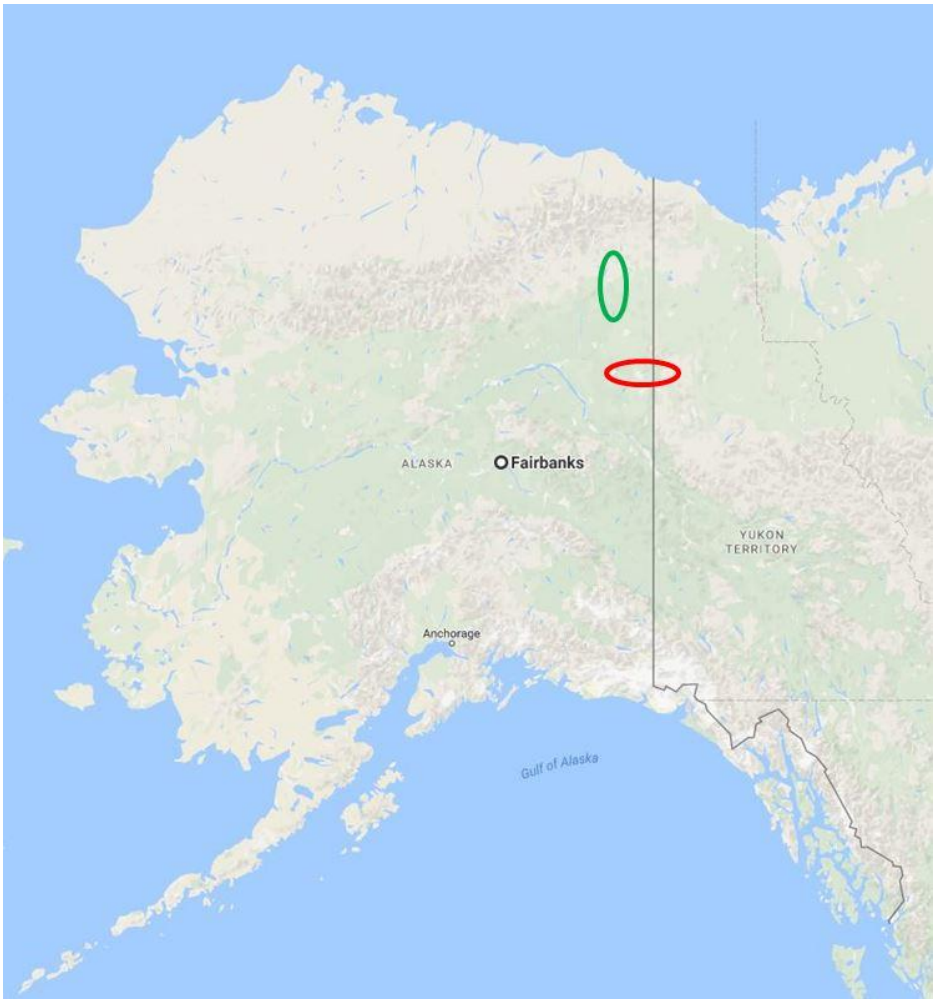
Tanana Chiefs Conference, Fisheries Program

Report of Activities for ADF&G FRP SF2017-165



Teedraanjik (Salmon Fork) and Coleen Rivers, Alaska.

Tanana Chiefs Conference, Fisheries Program
Fairbanks, Alaska
December, 2017

Tanana Chiefs Conference

The Tanana Chiefs Conference's Fisheries Program strives to continually build educational capacity and expertise in fisheries science and management throughout the TCC region, including the Yukon and Kuskokwim River drainages. Our goals are to utilize western science and traditional knowledge to enable sustainable fisheries, and to advocate for cultural and traditional fishing and hunting rights. We endeavor to accomplish these goals by partnering with other Tribal organizations, NGO's, and State and Federal agencies to better manage, protect, and preserve our fisheries resources.

http://www.tananachiefs.org/sustainability/fish-wildlife/

Author:

Brian C. McKenna
Tanana Chiefs Conference
Wildlife & Parks Department
201 First Avenue, Suite 300
Fairbanks, Alaska 99701
Phone: 907-452-8251 ext. 3318
Brian.mckenna@tananachiefs.org

Overview

The purpose of this project was to collect baseline data from Chinook and fall chum salmon populations spawning in the Teedraanjik (Salmon Fork) and Coleen River watersheds. We used a combination of aerial and float surveys of the spawning grounds to document and delineate the spatial extent of spawning activity for salmon species in both rivers. Stream temperature data loggers were placed near active spawning sites, and will be collected in 2018 to describe water temperature profiles during the incubation period. Baseline data such as age, sex, and length were collected to determine population structure, and tissue samples were collected for genetic stock identification. Analyses of the baseline data collections will be completed after the conclusion of the 2018 sampling season. Nominations to the anadromous waters catalog will also be completed after completion of the 2018 field season.

Objectives

1. Conduct aerial surveys of Chinook and fall chum salmon spawning in the Teedraanjik and Coleen rivers to determine spatial extent and distribution of spawning activity.

2. Submit nominations to the State of Alaska's Anadromous Waters Catalog (AWC) if/when salmon are positively identified in areas presently not included within the AWC.

3. Determine age, sex, and length composition of adult Chinook and fall chum salmon populations in the Teedraanjik and Coleen rivers.

4. Collect axillary process tissue samples appropriate for genetic (DNA) analyses from Chinook and fall chum salmon spawning in the Teedraanjik and Coleen rivers.

5. Deploy stream temperature loggers in the Teedraanjik and Coleen rivers to monitor and characterize spawning habitat for Chinook and fall chum salmon.

Study Area:

The Teedraanjik, also known as the Salmon Fork of the Black River, is a clear water tributary of the Draanjik (Black River) and Porcupine Rivers. The Teedraanjik is a trans-boundary river originating in the North Ogilvie Mountains of Yukon Territory, Canada (Yukon Ecoregions Working Group, 2004) (Figure 1). It flows southwesterly crossing the international border just south of the Arctic Circle. West of the international boundary, the Teedraanjik crosses the Porcupine Plateau and flows westerly for roughly 74 river miles to the confluence with the Draanjik. Within Alaska, the Teedraanjik drains large portions of the Bureau of Land Management's (BLM) Eastern Interior Region, as well as the Yukon Flats National Wildlife Refuge (YFNWR).

The Coleen River is a clear water tributary of the Porcupine River located in northeastern Alaska within the Arctic National Wildlife Refuge. It originates in the Davidson Mountains and drains a portion of the southern Brooks Range flowing for 186 river miles before emptying into the Porcupine River (Figure 1).

Methods:

In the Teedraanjik watershed we used a R44 helicopter to define the spatial extent of spawning activity, collect baseline samples, and to deploy stream temperature data loggers for both Chinook and fall chum salmon. In the Coleen River watershed we used a combination of methods including a fixed wing wheeled aircraft, a R44 helicopter, and an inflatable canoe. We used the fixed wing aircraft and R44 helicopter to define the spatial extent of spawning activity in the Coleen River watershed. We also utilized the fixed wing aircraft as a transport so we could float the Coleen River to collect baseline samples and deploy stream temperature data loggers.

Rod and reel capture technique was used to capture fish for sampling. Scales were collected for aging analysis, sex was determined by visual observations, mid-eye to fork length measurements were recorded, and tissue samples were collected. All captured fish were released alive immediately after being sampled. Fresh carcasses were also sampled, and returned to the river.

Live fish, or recently deceased fish with red gills, were sampled on the spawning grounds. Collections were accomplished using rod and reel. Tissue samples were collected by clipping approximately a ½ - 1" portion of the pelvic axillary process of each individual fish according to the ADF&G Gene Conservation Laboratory's (GCL) protocol (Appendix 1). Tissue samples were stored in bulk vials partially filled with anhydrous ethyl alcohol. The bulk vials were shipped to the ADF&G GCL. Samples were shared with the USFWS and with the DFO-Canada. The samples will be genotyped by the ADF&G GCL, and will be used to improve the existing genetic baseline.

Onset Tidbit V2 stream temperature loggers were deployed in Chinook and fall chum salmon spawning locations in the Teedraanjik and Coleen watersheds. Tidbits were anchored into the substrate using duckbill anchors with stainless steel cable. They were marked with pink surveyor markers and flagging tape. GPS data was recorded for each tidbit location. The data loggers will be collected in the summer of 2018.

Chinook Salmon:

The Coleen River was surveyed via a fixed wing wheeled aircraft on July 22, 2017. Sampling occurred on the Coleen River via a float trip using an inflatable Soar Pro Pioneer canoe; July 23 and 26, 2017. A R44 helicopter was also used for one day, August 5, 2017, to collect additional samples in the Coleen River. We did not use a fixed wing aircraft, nor did we float the Teedraanjik. A R44 helicopter was used exclusively to survey and sample the Teedraanjik watershed. Teedraanjik surveys and sampling occurred between August 2 and 5, 2017. The fixed wing flight on the Coleen originated in Fairbanks. For the R44 surveys, we based operation in Circle, and made daily departures between August 2 and 5, 2017.

Fall Chum Salmon:

A R44 was used to survey the Teedraanjik watershed on September 17, 2017. The R44 helicopter was also used to provide access to Kevinjik Creek within the Teedraanjik watershed for baseline sample collections on September 17 and 18, 2017. The R44 was also used to survey the Coleen River on September 19, 2017, and to collect baseline samples on September 20, 2017. R44 operations were based in Chalkyitsik, with daily departures between September 17 and 20, 2017.

Results and Discussion

In the Teedraanjik watershed, ASL and tissue samples were collected from 47 spawning Chinook salmon and 135 spawning fall chum salmon (Figures 2 & 3). The 47 Chinook salmon tissue samples collected from the Teedraanjik in 2018 bring the total number of Chinook salmon tissue samples for the Teedraanjik up to 98 (Table 1) (Personal Communication Sara Gilk-Baumer, October 2016). A total of 12 temperature loggers were deployed in the Teedraanjik watershed; 7 were deployed on the main stem of the Teedraanjik in Chinook salmon spawning locations, and 5 were deployed in the Kevinjik Creek in fall chum salmon spawning locations (Figure 4).

In the Coleen River, ASL and tissue samples were collected from 42 spawning Chinook salmon and 101 spawning fall chum salmon (Figures 5 & 6). The 42 Chinook salmon tissue samples collected from the Coleen River in 2017 bring the total number of tissue samples for Chinook salmon in the Coleen River up to 103 (Table 2) (Personal Communication, Sara Gilk-Baumer October 2016). A total of 9 temperature loggers were deployed in the Coleen River with 3 being placed in Chinook salmon spawning locations and 6 placed in fall chum salmon spawning locations (Figure 7).

All ASL data was sent to the ADF&G division of commercial fisheries for aging analyses and will be reported on after completion of the 2018 sampling season. Tissue samples were stored in bulk vials filled with anhydrous ethyl alcohol. The bulk vials were shipped to the ADF&G GCL. Samples will be shared with the USFWS and with the DFO-Canada. The samples will be genotyped by the ADF&G GCL, and will be used to improve the existing genetic baseline. Stream temperature data loggers will be collected during the 2018 field season. Nominations for the ADF&G AWC will be submitted after the completion of the 2018 field season.

Acknowledgements

We would like to express our gratitude to the Pacific States Marine Fisheries Commission for administering the funding support for this project through the 2012 Yukon River Chinook Salmon Federal Fishery Disaster Fund. We would like to acknowledge the Chalkyitsik Village Council and the Circle Tribal Council for their support for this project. We would also like to thank Quintin Slade of InFlight Helicopters and Brian Lepping for their sampling and logistical support. We would like to thank the Canada Border Services Agency for authorizing this project to perform aerial surveys in the Yukon Territory. Finally, we also would like to thank the ADF&G division of commercial fisheries for future ASL analysis and the ADF&G GCL staff for their time in organizing sampling materials, intaking, processing, and future analysis of genetic samples.

References

Personal Communication with Sara Gilk-Baumer, October 2016.

Yukon Ecoregions Working Group, 2004. Yukon Coastal Plain. *In:* Ecoregions of the Yukon Territory: Biophysical properties of Yukon landscapes, C.A.S. Smith, J.C. Meikle and C.F. Roots (eds.), Agriculture and Agri-Food Canada, PARC Technical Bulletin No. 04-01, Summerland, British Columbia, p. 63-72. North Ogilvie Mountains, Taiga Cordillera Ecozone, Ecoregion 168, p. 123 – 130.

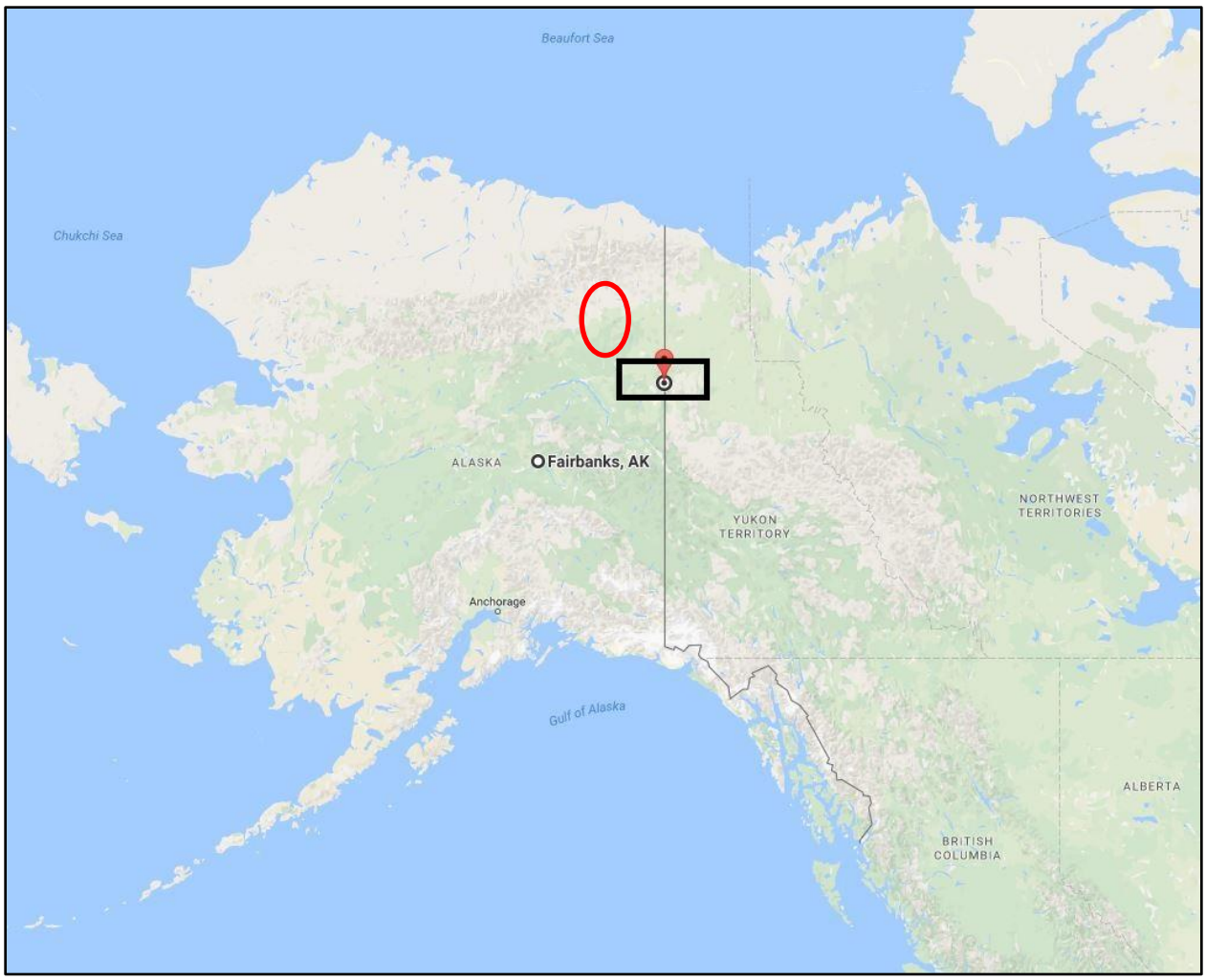


Figure 1 — Map illustrating the general location of the Teedraanjik and Coleen Rivers. The Teedraanjik is denoted by the black rectangle and is a transboundary river originating in Yukon Territory and flowing into Alaska. The Coleen River is denoted by the red oval and drains a portion of the southern Brooks Range in Alaska before emptying into the Porcupine River.

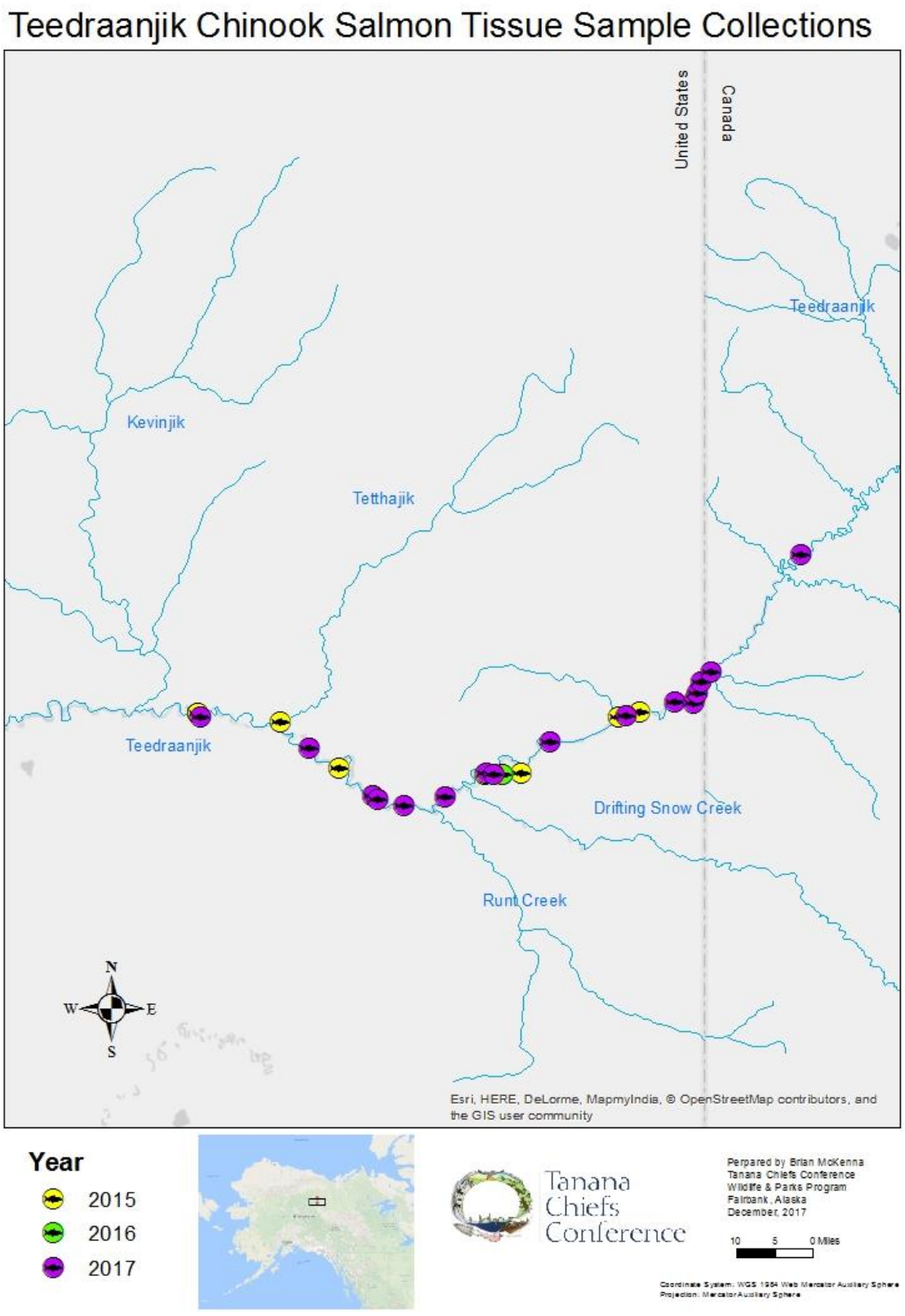


Figure 2 — Map illustrating the location of Chinook salmon samples collected in the Teedraanjik, 2015 - 2017.

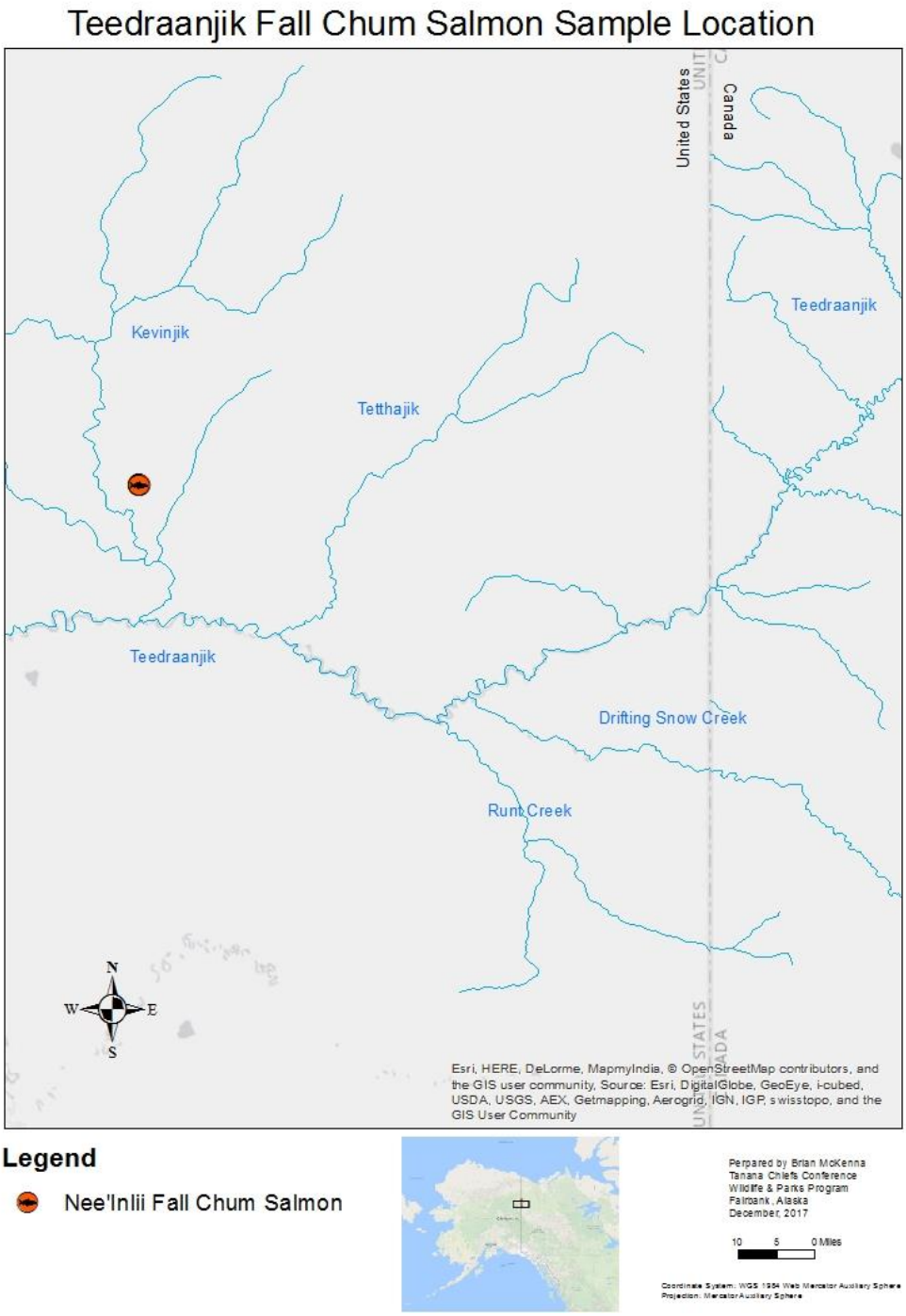


Figure 3 — Map illustrating the location of fall chum salmon samples collected in the Teedraanjik, 2017.

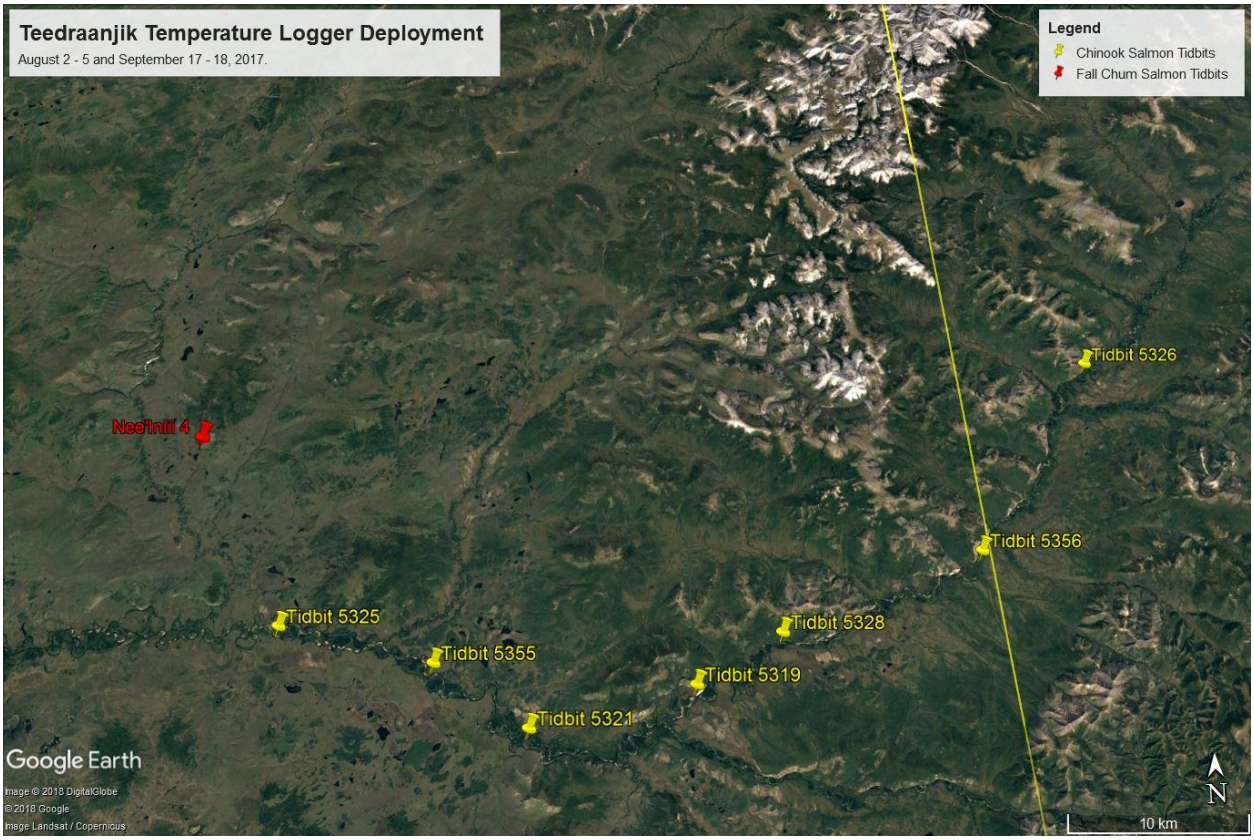


Figure 4 — Map illustrating the location of stream temperature data logger deployments in the Teedraanjik, 2017.

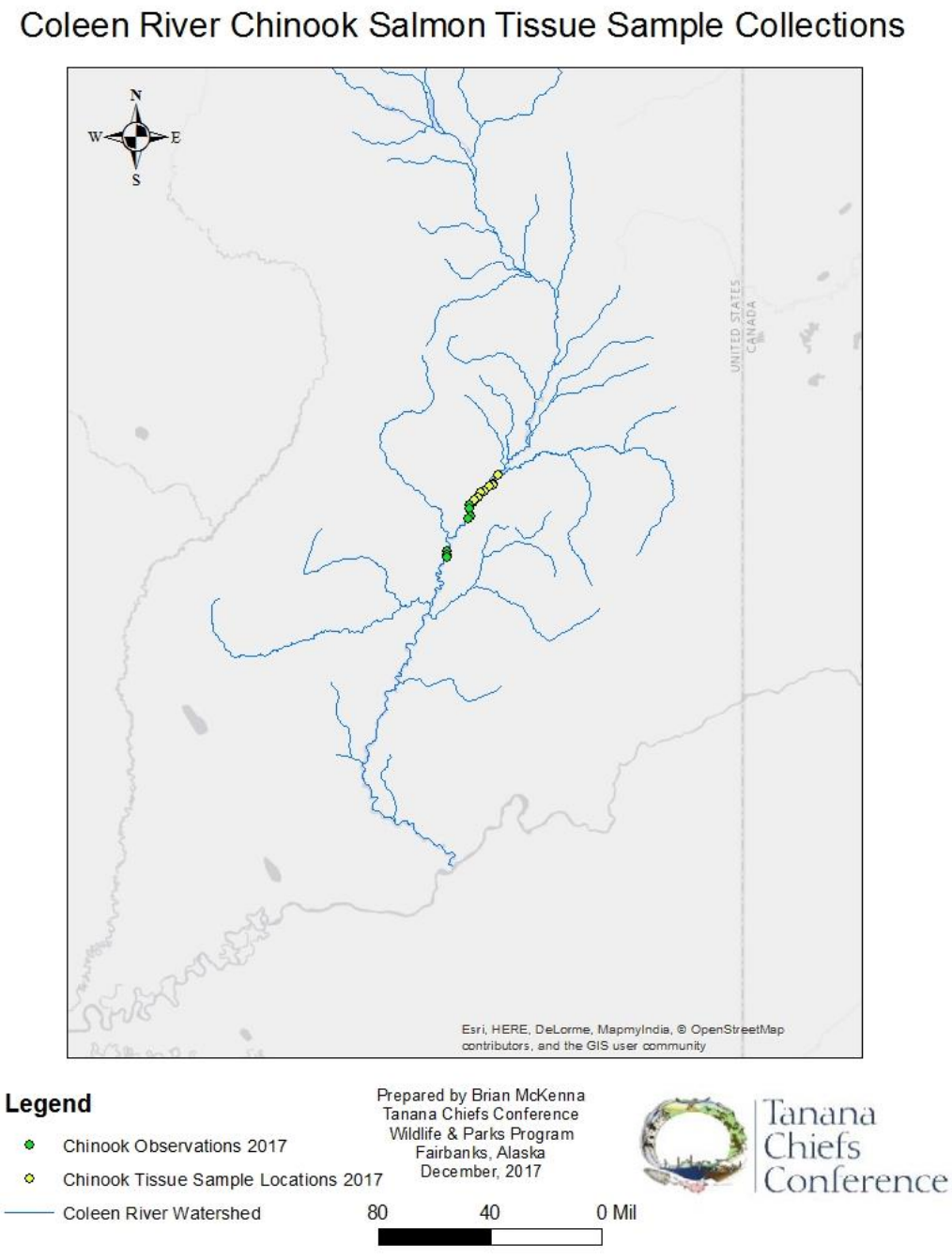


Figure 5 — Map illustrating the location of spawning Chinook salmon ASL and tissue samples collections in the Coleen River, 2017.

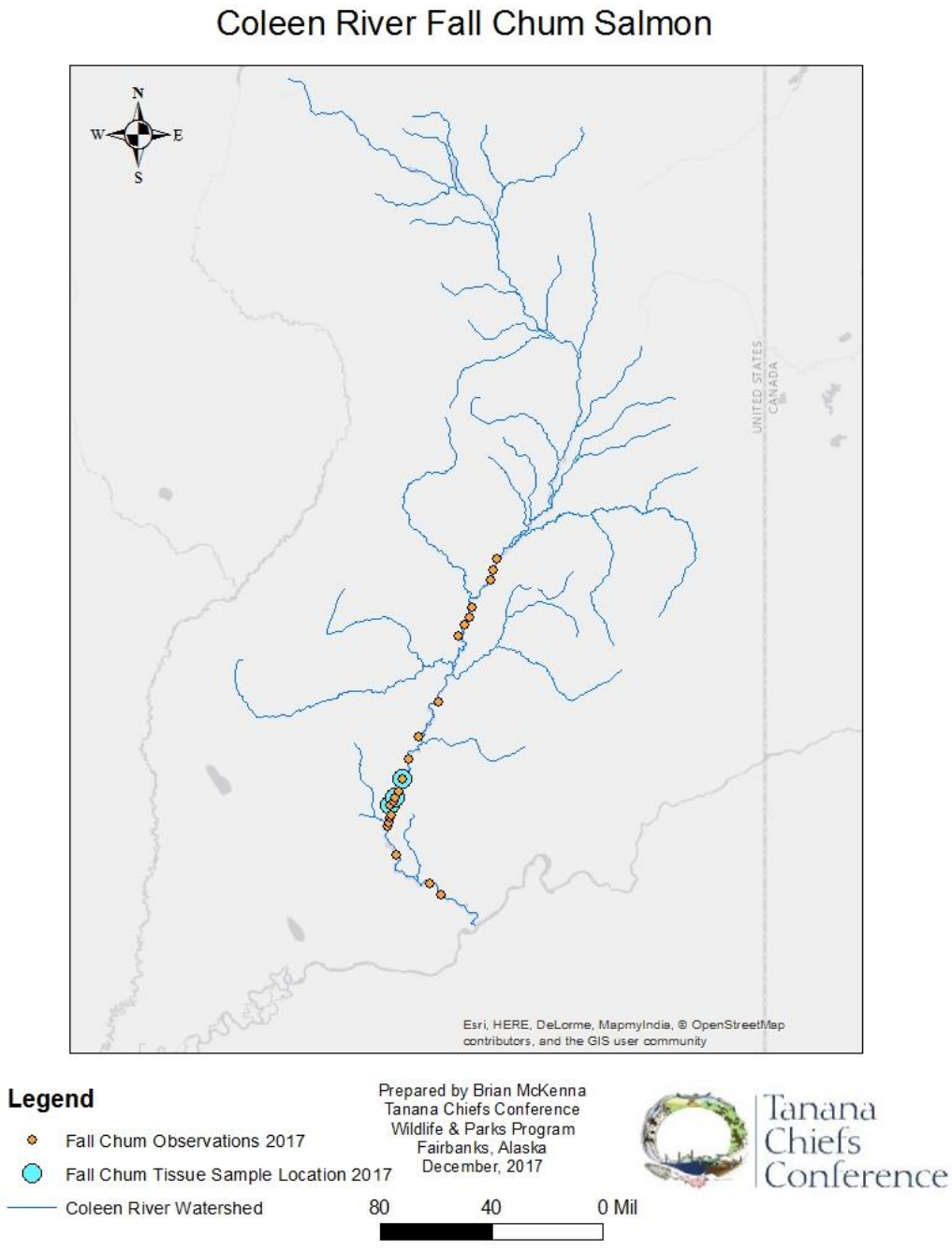


Figure 6 — Map illustrating the location of spawning fall chum salmon ASL and tissue samples collections in the Coleen River, 2017.

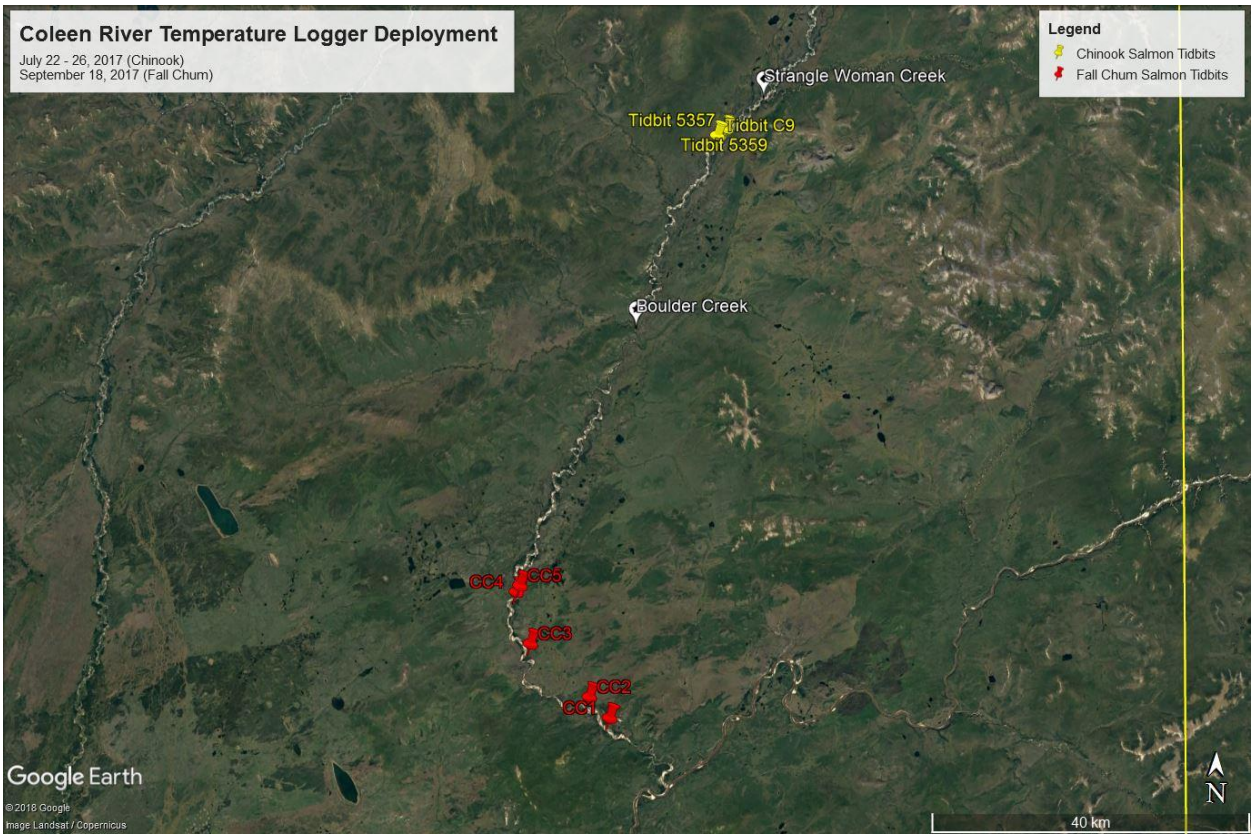


Figure 7 — Map illustrating the location of stream temperature data logger deployments in the Coleen River, 2017.

Table 1 —Chinook salmon tissue samples collected from the Teedraanjik between 2015 and 2017.

		Number of Samples			
Tributary (main)	**Branch Tributary**	**2015**	**2016**	**2017**	**All years**
Porcupine River					
	Teedraanjik (Salmon Fork)	50	1	47	98
Totals		**50**	**1**	**47**	**98**

Table 2 —Chinook salmon tissue samples collected from the Coleen River between 2011 and 2017.

		Number of Samples			
Tributary (main)	**Branch Tributary**	**2011**	**2013**	**2017**	**All years**
Porcupine River					
	Coleen River	24	37	42	103
Totals		**24**	**37**	**42**	**103**

Collections in 2011 and 2013 were not conducted by the Tanana Chiefs Conference.

Appendix 1 — Non-lethal Bulk Sampling Finfish Tissues for DNA Analysis (ADF&G Gene Conservation Laboratory, Anchorage, Alaska).

Non-lethal Bulk Sampling Finfish Tissues for DNA Analysis

ADF&G Gene Conservation Lab, Anchorage

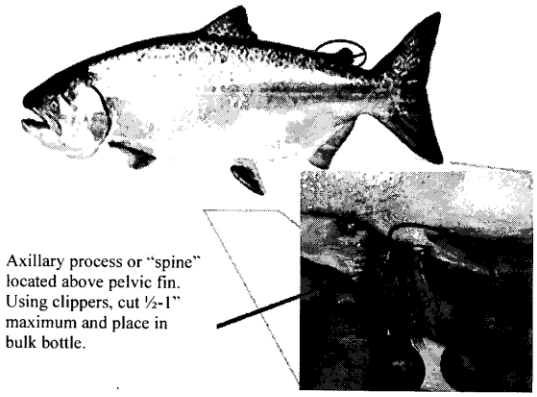
I. General Information

We use axillary process samples from individual fish to determine the genetic characteristics and profile of a particular run or stock of fish. This is a non-lethal method of collecting tissue samples from adult fish for genetic analysis. The most important thing to remember in collecting samples is that **only quality tissue samples give quality results**. If sampling from carcasses: tissues need to be as "fresh" and as cold as possible and recently moribund, do not sample from fungal fins.

II. Sampling Method

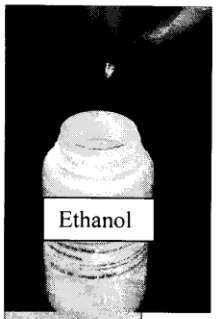
Preservative used: Isopropanol/Methanol/Ethanol (EtOH) preserves tissues for later DNA extraction. Avoid extended contact with skin.

Sampling instructions are written for (N=100 fish/125ml) bulk bottle. <u>Steps for collecting axillary process tissues:</u>



Axillary process or "spine" located above pelvic fin. Using clippers, cut ½-1" maximum and place in bulk bottle.

- Wipe dry the axillary process "spine" prior to sampling to avoid getting excess water or fish slime into the 125ml bottle (see diagram).
- Clip off the axillary "spine" using dog nail clippers or scissors to get roughly a **½ - 1" inch maximum** piece and/or about the size of a small fingernail.
- Place each tissue piece into bulk bottle **(place only one piece of axillary from each fish)**.
- Repeat: **up to 100 fish /125ml bulk bottle** (into same bottle). If you don't reach this number of fish per location, that's ok. Maximum storage capacity 125ml bulk for proper preservation of axillary tissue is (N=100).
- Record on **each label:** Location, sampling date (mm/dd/yyyy), sampler's name(s), total number of fish sampled, latitude/longitude, and field notes (if any). Use pencil. This insures correct data with each collection bottle.
- If collection occurs over 4~5 day period, "refresh" EtOH at end of the collection.
- After the collection is complete and 24 hours have passed, "refresh" the axillary tissues as follows: carefully pour off ¾ EtOH and then pour fresh EtOH into sample bottle containing axillary clips. Cap and invert bottle twice mixing EtOH and tissue.
- Freezing not required, store sample bottle in upright cool location for good tissue quality.



SILLY: _____
Location: _____
Sample Date(s):___/___/___
Sampler's name:_____
Total # fish sampled:_____
Latitude:_____
Longitude:_____
Species:_____
Comments:_____
ADF&G:Preserved in EtOH

<u>Supplies included in sampling kit</u>:

1. Clipper- used to cut a portion of **one** axillary process per fish.
2. Sample target: 100 axillary clips/125ml bulk bottle.
3. Labels on bulk sample bottles: Location, Sample date, Sampler, Total # fish sampled and comments (if any).
4. **1:125ml** wide mouth bottle(s) for EtOH "refresh" step.
5. Sampling instructions

Return to ADF&G Anchorage lab:	ADF&G – Genetics 333 Raspberry Road Anchorage, Alaska 99518	Lab staff: 907-267-2247 Judy Berger: 907-267-2175 Freight code: _____