



Tanana Chiefs Conference

TCC Fisheries Program Report of Activities



Prepared for the Regional Advisory Council, August 2020

Abundance & Run Timing of Adult Salmon in Henshaw Creek:

Henshaw Creek, a tributary to the Koyukuk River, is located within the Kanuti National Wildlife Refuge (KNWR), and provides spawning and rearing habitat for Chinook Salmon *Oncorhynchus tshawytscha* and summer Chum salmon *O. keta*, as well as other resident fish species. Chinook and summer Chum salmon from Henshaw Creek contribute to the mixed-stock fisheries in the Yukon and Koyukuk rivers,



and escapements into Henshaw Creek have been monitored using a resistance board weir since 2000. Annual project objectives are to (1) determine daily escapement and run timing of adult salmon, (2) determine age, sex, and length compositions of adult salmon, (3) document upstream movement and presence of resident fishes, and (4) serve as an outreach platform for TCC and KNWR staff and local Elders to facilitate an onsite science and culture camp for youth from the surrounding villages.

Because of the global Covid-19 pandemic, the weir was not installed or operated in 2020. The decision was made not to go forward with the project due to health and safety concerns for both our staff members and the residents of Allakaket, Evansville, and Bettles. However, we were able to facilitate necessary repairs to the weir, which sustained severe damages at the end of the 2020 season due to flooding. This summer we fabricated a new bulkhead and winch stand to replace the old ones, which were destroyed in 2020. We also procured a new winch and base cable for securing the weir panels to the base rail. Finally, we rebuilt all of the resistance boards, and made repairs to broken weir panels. The weir is in great shape, and is now ready for operation next season in 2021.



Traditional Knowledge of Anadromous Fishes in the Yukon Flats:

TCC and the Yukon River Drainage Fisheries Association (YR DFA) have been working together to update the Catalog of Waters Important for the Spawning, Rearing, and Migration of Anadromous Fishes and its associated atlas of critical waters. Through this project, we are focusing on salmon species that spawn and rear within the Draanjik drainage (Chinook, Chum, & Coho). We are utilizing a combination of traditional knowledge, eDNA, minnow trapping, and on-the-ground observations to collect the required information for submitting nominations to update the Anadromous Waters Catalog to protect critical habitat for these salmon species.

TCC staff will be conducting an aerial survey of the Kevinjik Creek in the Teedraanjik drainage in October 2020 to identify and locate a Coho salmon spawning area (Nèhdlij Ni'inlii) that has not yet been added to the Anadromous Waters Catalog. This location has been identified by traditional knowledge and with positive eDNA analysis (Figure 1). TCC staff will travel to the spawning area in the fall of 2020 to document its location. While on site, we will collect age, sex, and length (ASL) samples as well as tissue samples for genetic analysis for this baseline population. Additional fieldwork is planned for the spring and summer of 2021 to document rearing juvenile and spawning adult Chinook and chum salmon.

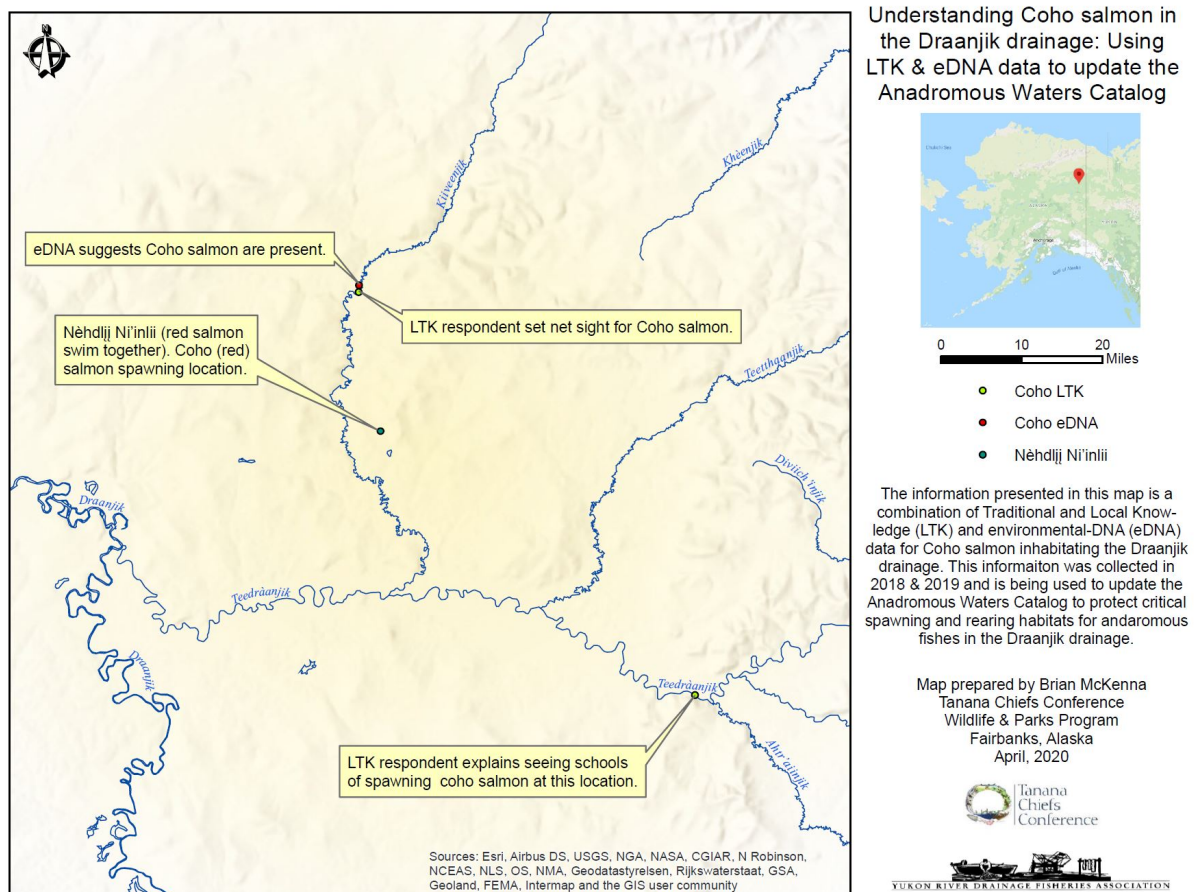


Figure 1. Map of potential Coho salmon spawning and rearing areas within the Draanjik drainage.

Short-term Effects of Wildfire on Rearing Chinook Salmon in the Chena River:

TCC is collaborating with Dr. Erik Schoen (UAF) to conduct a pilot study this summer and fall examining the effects of wildfires on rearing habitat for Chinook salmon in the Chena River. The effects of wildfires on salmon habitats and productivity are not well understood. Wildfires can lead to increased erosion and sedimentation that can negatively affect spawning habitat. Wildfires can also lead to increased water temperatures, a changing food-base, and increased turbidity and debris load.

The Chena River is one of the largest producers of Chinook salmon within the Yukon River drainage, and it experienced a major burn event in the summer of 2019 via the Nugget Creek Fire with over 18,000 acres burned. The objectives of this study are to (1) measure short-term effects of the Nugget Creek Fire on the rearing habitat quality and juvenile growth rates of Chinook salmon in the Chena River, (2) measure wildfire effects on prey communities and detritus loading from feeder streams that influence downstream Chinook habitats, and (3) investigate the feasibility of using drone-based aerial imagery to estimate important characteristics of habitat quality for rearing Chinook salmon (e.g., turbidity, fine-scale debris loads), as a step toward development of a rapid-assessment tool for estimating effects of fires on habitat quality for salmon.

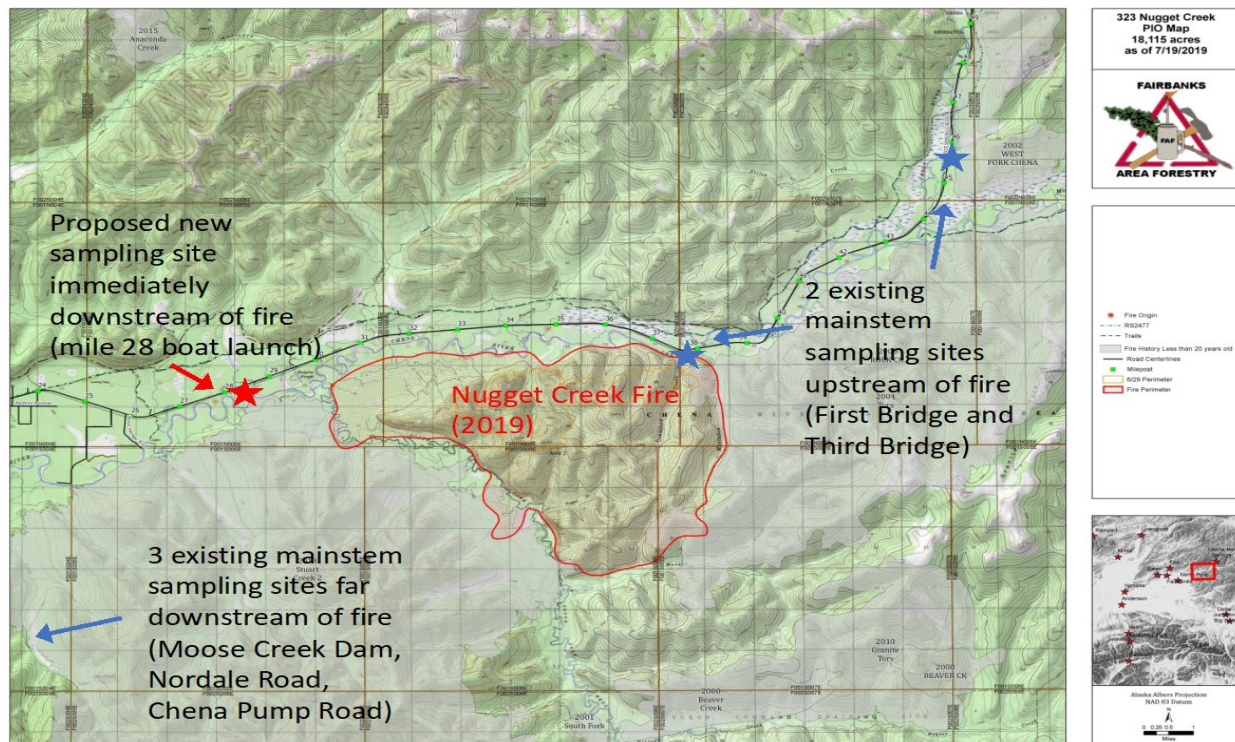
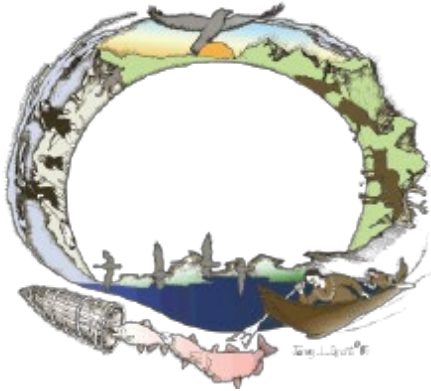


Figure 2. Map of existing and proposed sampling sites near the Nugget Creek Fire burned area in the Chena River watershed. Not shown are four additional existing sampling sites on tributaries and sloughs of the Chena River (Wegner Creek, First Bridge Slough, Little Chena River, and Cripple Creek). Map courtesy of the BLM Alaska Fire Service.

TCC staff will be primarily focused on objective three, exploring the ability of using drone-based, remotely sensed data to measure important habitat quality characteristics such as turbidity and debris load. TCC will collect imagery with a drone at two sampling sites upstream and downstream of the Nugget Creek Fire burned area during a subset of the drift sampling events associated with objective one (Figure 2). Imagery will be captured in the visible (red/green/blue) and near infrared spectra and analyzed to derive metrics such as the Normalized Difference Water Index (NDWI) for each sampling site and date. If logistically feasible, we may collect additional imagery and UAF may collect additional *in-situ* measurements on the Salcha River upstream and downstream of the 2019 Ninety-eight Mile Creek Fire and/or on the Chatanika River upstream and downstream of the Shovel Creek Fire to broaden the scope of the study.

The aerial imagery will be analyzed to determine if turbidity, fine-scale debris densities, or other important characteristics of salmon habitat quality can be estimated based on metrics derived from the aerial imagery. In particular, the relationship between NDWI and turbidity will be investigated, as predictive relationships between these variables have been identified in other rivers. Based on these results, the feasibility of using remotely sensed images (aerial or satellite-based) as a rapid-assessment tool for estimating wildfire impacts to other Chinook salmon populations across the region will be evaluated, and recommendations for further research will be proposed. (Below photos: Nugget Creek Fire scar, drift sampling, and drone-based recon)





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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 collaborating with other Tribal organizations, NGO's, Academia, and State and Federal agencies to better manage, protect, and preserve our fisheries resources.

For more information, please visit our website, <https://www.tananachiefs.org/services/fish-wildlife/>. We can also be reached via telephone at 907-452-8251.

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