Assessing Salmon Habitats on the Banks of the Chena River in Fairbanks, Alaska

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Introduction

Alaska's salmon population is invaluable to the economy, culture, and history of those living here, but salmon counts have been declining and the state has not been reaching its minimum biological escapement goals (Rabung and Rutz, 2022).

Much of the natural riparian buffer along the Chena's banks has been altered in favor of urbanization and infrastructure, removing much of the typical salmon habitat. Operation of the Moose Creek Dam also prevents much woody debris from reaching the lower Chena, decreasing habitat for macroinvertebrate prey that is essential to juvenile salmon. Homeowners and agencies such as the ADFG and USFWS have installed bioengineered (green) infrastructure to provide habitat for growing salmon. By learning how salmon respond to different bank types (natural, unnatural, and bioengineered), better informed decisions can be made to improve habitat for Alaska's salmon.

Bank Types
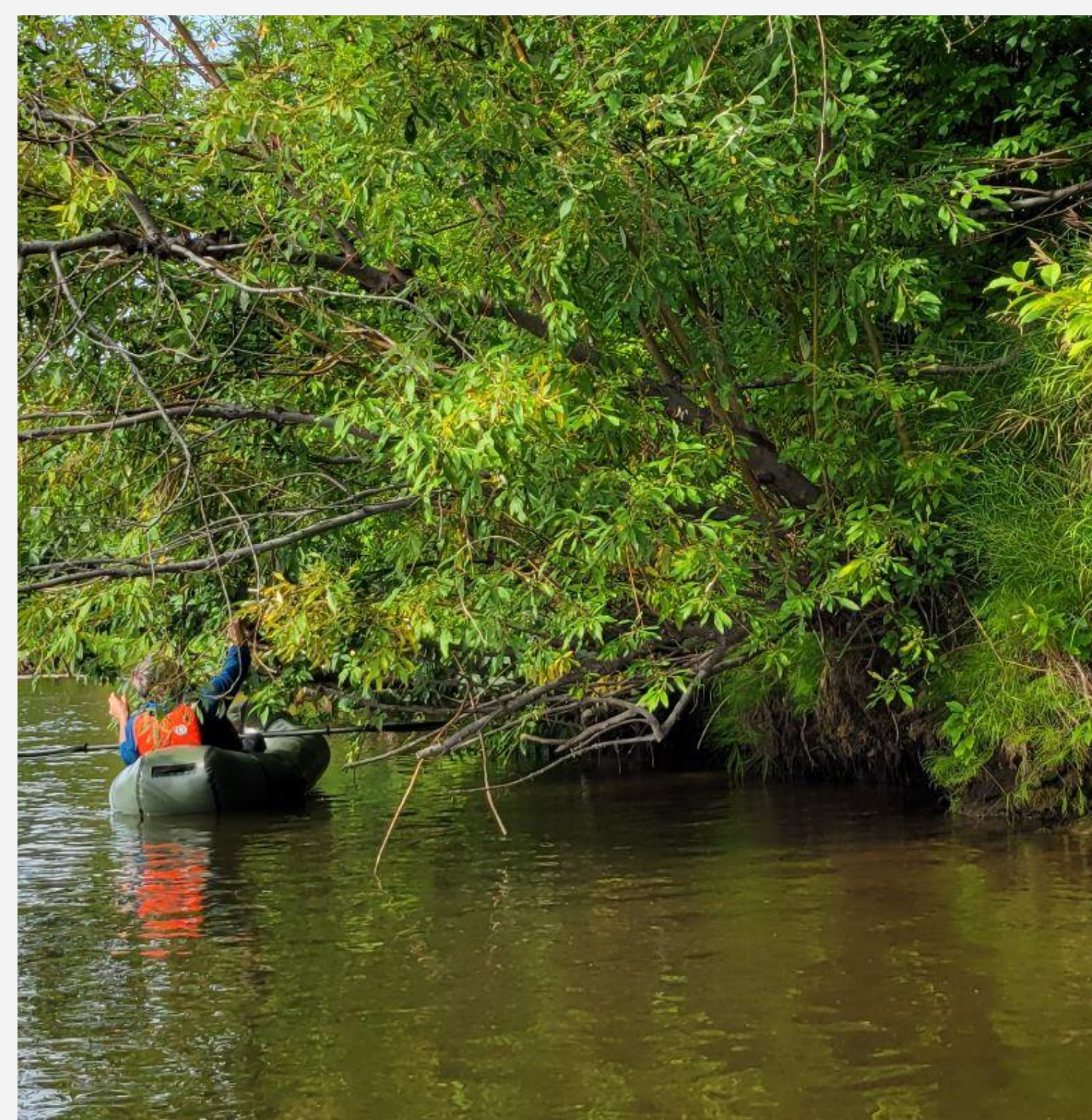
(Left) Natural riparian buffer providing shade and woody debris
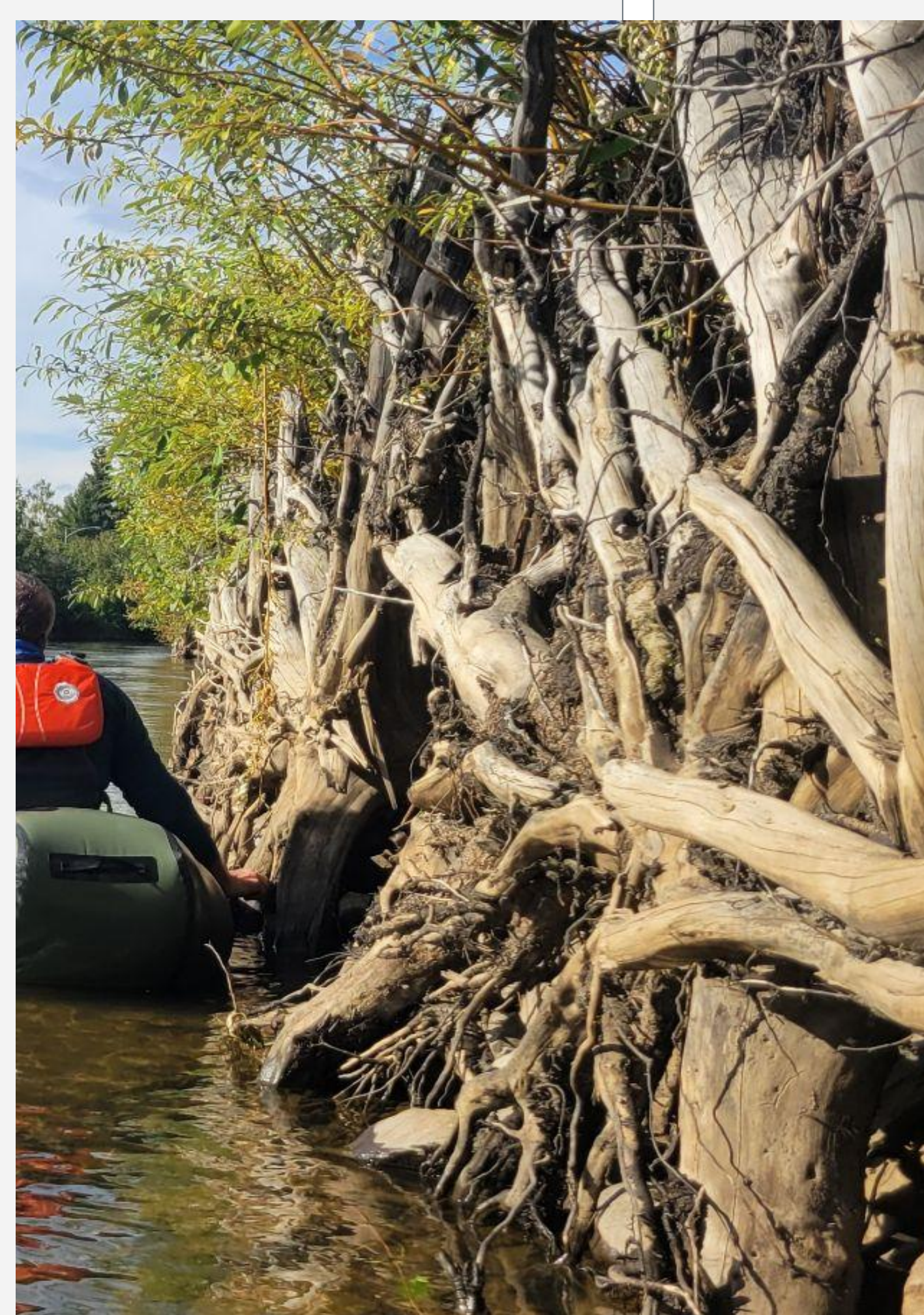
(Right) Root wads placed to prevent erosion and provide habitat


(Left) Bank reinforced with riprap

*Photos courtesy of Christina Buffington

Research Question

- My research question is to what extent, comparatively, a given bank type helps or hinders the abundance of Chinook and Chum salmon and their macroinvertebrate prey found there.
- Juvenile salmon rely on cool, well oxygenated water and an abundance of macroinvertebrate prey in order to grow and spawn (Cline, 2019), we will look at how different bank types contribute to or detract from these conditions.

Methods

- Field work will be conducted throught the month of April.
- Sites are being being selected by grouping one of each bank type, creating two to three groups of sites.
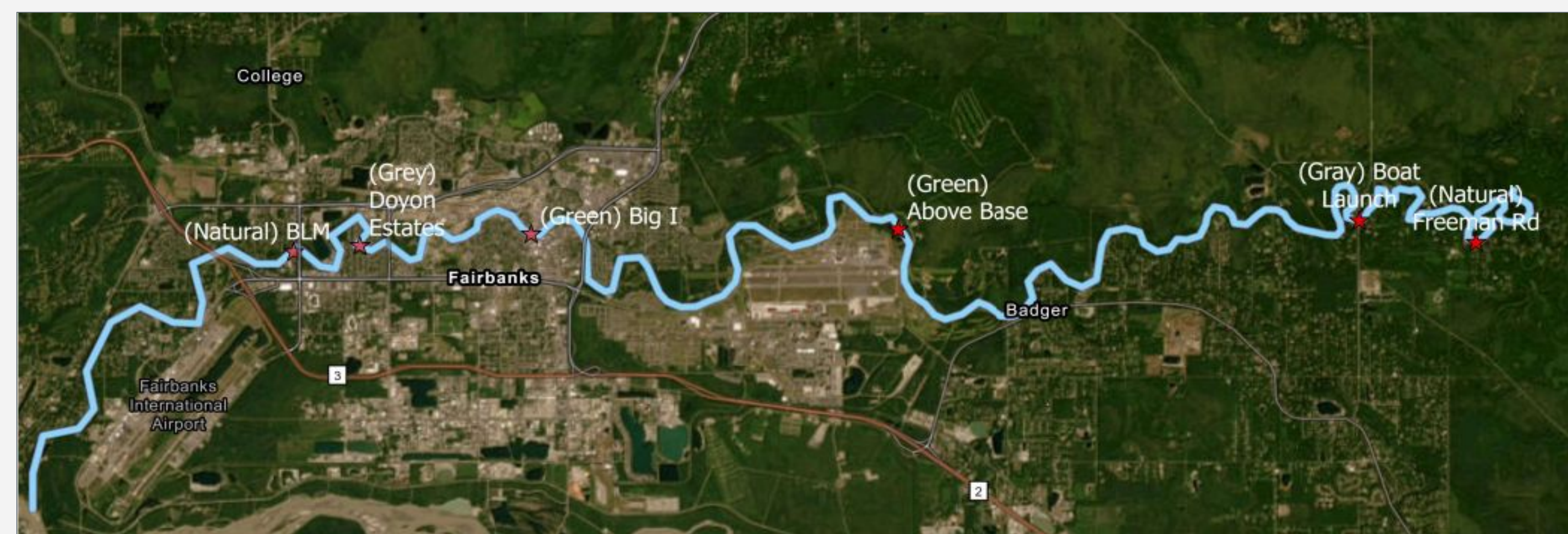
Potential groups of sites

- We will primarily measure dissolved oxygen, water temperature, macroinvertebrate abundance, and juvenile salmon presence or absence.
- Dissolved oxygen will be measured each visit using either a DO Probe kit or a sensor.
- Water temperature will be recorded at 15 minute intervals for the duration of field work.
- Sites will be added to GLOBE along with collected water temperature and dissolved oxygen data.
- Macroinvertebrate abundance will be measured one time at each site towards the end of field work using a D-net. Samples will be preserved in ethanol and taken to a lab for counting and identification.

- Juvenile salmon presence or absence will be determined using GoPro cameras provided by the USFWS.
- Recorded GoPro footage will be analyzed for visual juvenile salmon presence.

GoPro trial setup

Goals

- Gather sufficient data to compare the viability of each bank type as salmon habitat.
- Establish replicable methodology to continue this research in the summer and onwards.
- Gather data and information on durability and effectiveness of unnatural and bioengineered erosion control infrastructure.
- Build community awareness of challenges and threats to salmon.

Bob Henszey (USFWS) and Cory Whiteley (TVWA) engage UAF watershed students at Big I root wad on the Chena River before a class float trip.

Next Steps

- After field work is carried out, data will be compiled and analyzed, at which point we will review our results and discuss possible conclusions.
- All data and the completed report will be published to GLOBE.
- Additionally, work will be shared with the ADFG, USFWS, TVWA and UAF
- This summer, I hope to receive funding to continue or expand my research as part of a TVWA internship.

Citations

Rabung, S, Rutz, D. 2022. Memorandum: Alaska Peninsula/Aleutian Islands and Chignik Stock of Concern Recommendations. The State of Alaska Department of Fish and Game.

Cline, T., Ohlberger, J., Schindler, D. 2019. Effects of Warming Climate and Competition in the Ocean for Life-Histories of Pacific Salmon. Nature Ecology and Evolution.