



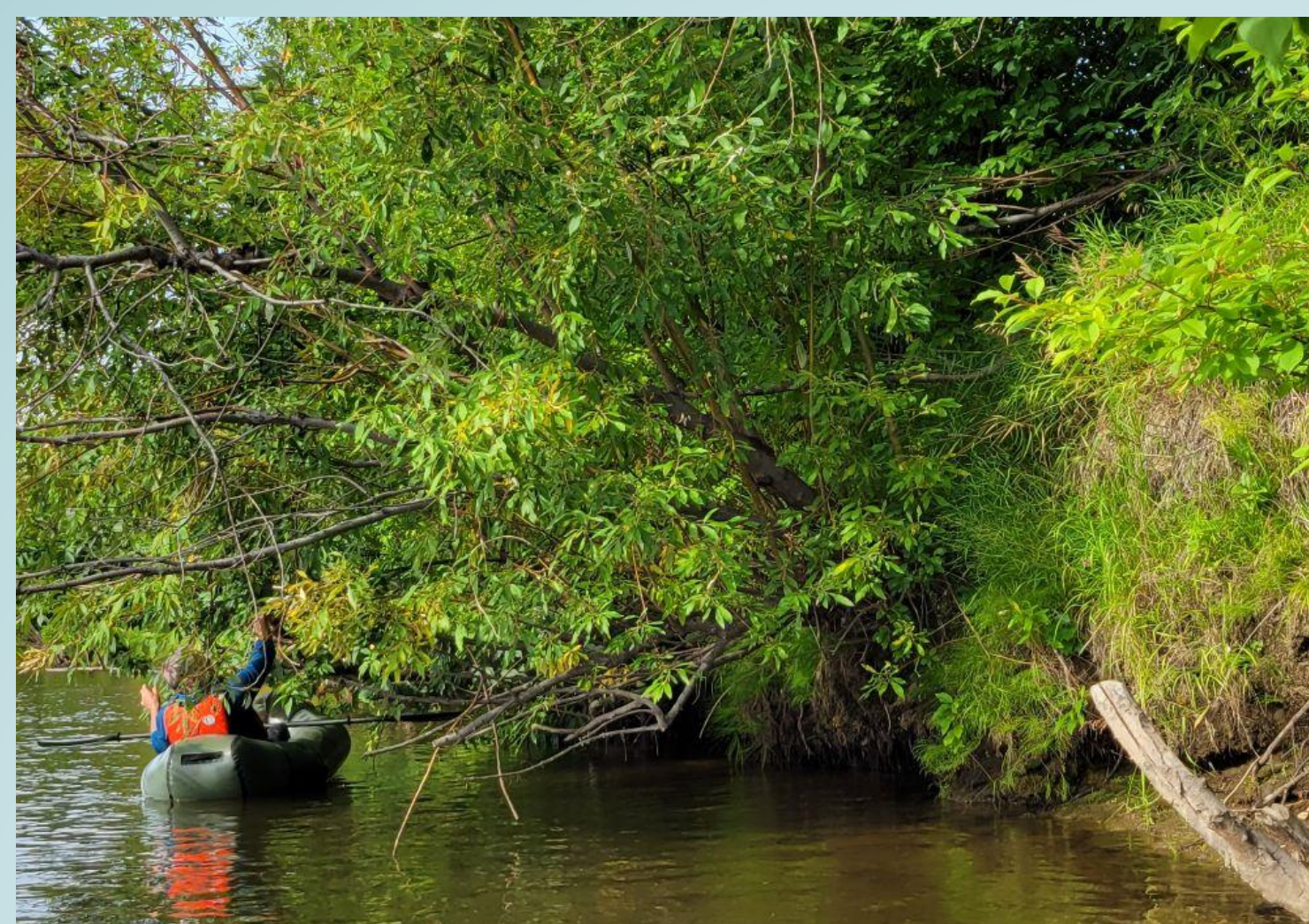
Assessing Salmon Habitats on the Banks of the Chena River in Fairbanks, Alaska

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Introduction

- Alaska's salmon population is invaluable to the economy, culture, and history of those living here.
- Salmon counts are declining and the state is not reaching its minimum biological escapement goals (Rabung and Rutz, 2022).
- Much of the natural riparian buffer along the Chena's banks has been stripped away or altered in favor of urbanization and infrastructure, cutting down typical salmon habitat considerably.
- This and the operation of the Moose Creek Dam have also removed much of the woody debris from the lower Chena, decreasing habitat for macroinvertebrate prey that juvenile salmon depend on.
- By learning how salmon respond to different bank types (natural and man-made) we can make more informed decisions to help bolster their populations in the future



(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 salmon and their macroinvertebrate prey found there after river break up.
- Juvenile salmon rely on cool, well oxygenated water and an abundance of macroinvertebrate prey in order to grow and spawn (Cline, 2019), so these are the variables we will use to compare banks, as well as salmon presence or absence.

Methods for Proposed Project

- In the Spring, I plan to work with TVWA to update a GIS map of bank types, and then we will label sites into each of the three categories.
- I will then begin previewing the sites to see if banks are free of ice.
- When the river banks are ice-free, I will take measurements including dissolved oxygen, water temperature, macroinvertebrate abundance, and visual salmon presence or absence.
- To monitor for juvenile salmon, I will use GoPro cameras provided by the US Fish and Wildlife Service office, Fairbanks (right)



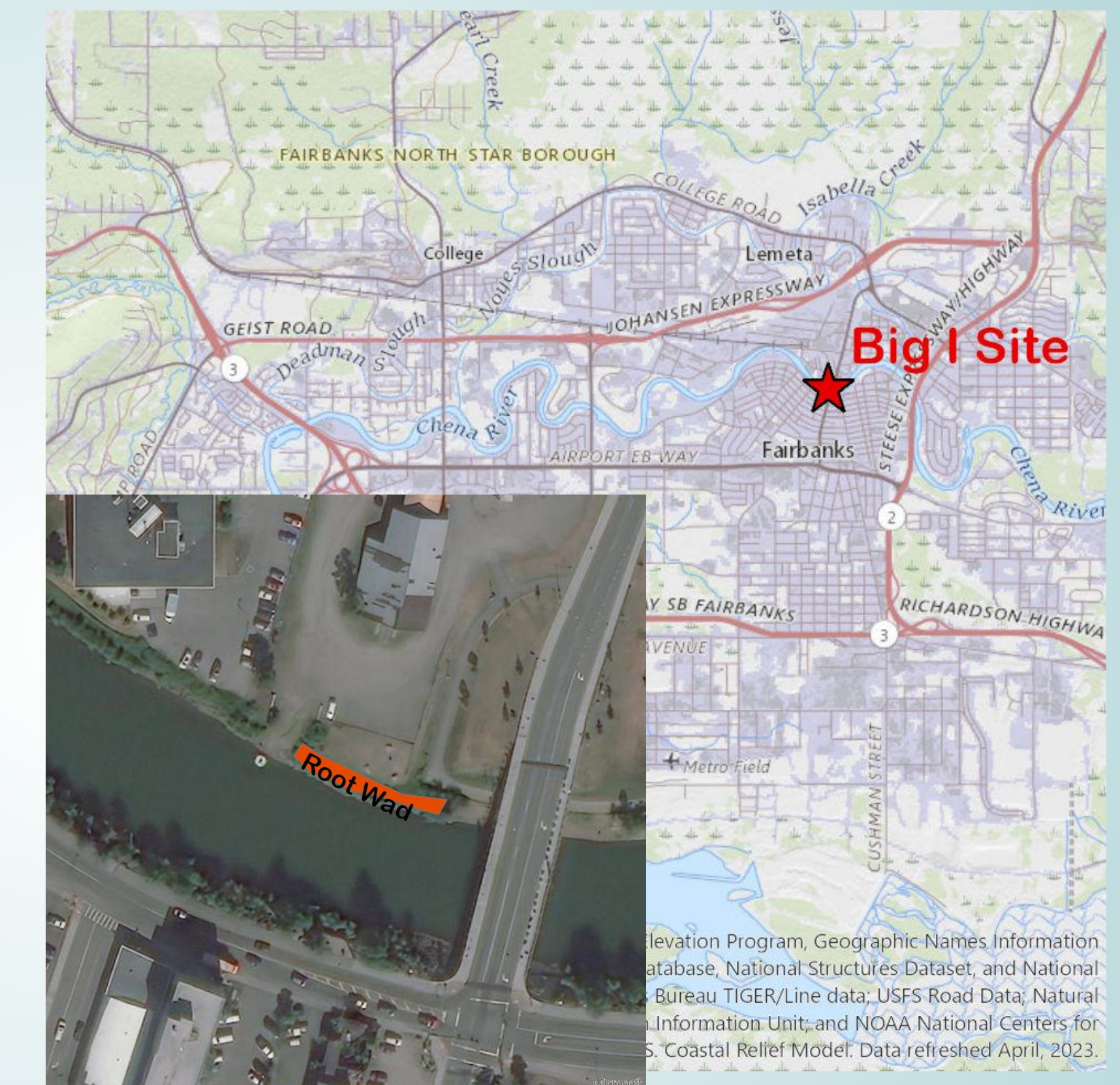
- I will spend time analyzing GoPro footage to record salmon presence and absence.
- Dissolved oxygen and temperature will both be measured using a Vernier DO Probe kit.
- Macroinvertebrate abundance will be measured according to Global Learning and Observations to Benefit the Environment (GLOBE) international protocols using a kick net and the EPA rapid bioassessment method.

Acknowledgements

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Methods for Observational Study

- I conducted an observational study of a local root wad bank.
- I used a Vernier probe kit to measure dissolved oxygen and repeated three times.
- I hung a liquid filled thermometer at breast height to measure air temperature and measured three times.
- I used a ruler to measure snowpack in five different places along the bank.



Results

Variable	10/17/2023	10/24/2023	10/29/2023
Average Dissolved Oxygen (mg/L)	11.70	--	11.44
Average Air Temperature (C)	1.8	-3.5	-2.5
Average Snow Depth (mm)	88	165	134

Conclusion and Next Steps

Clearly, the observational study did not produce sufficient data to draw any conclusions in relation to my research question. In order to do that, I would have had to take many more measurements at different bank types, as well as observe salmon and measure macroinvertebrates, all of which I hope to be able to do in the Spring after break-up.

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.