Project Title: Kuskokwim River Harvest Prediction Tools

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Project Period: May 1, 2021 – August 1, 2023

Study Location: Kuskokwim River Watershed*

Abstract: Since 2016, harvest management of lower Kuskokwim River subsistence salmon fisheries has relied on in-season estimates of harvest and effort outcomes from periodic, short-duration fishing opportunities. There is little doubt that these data have been useful for their originally intended purpose: to track the cumulative harvest for determining how much harvest remains to be taken for the season. In this role, they reduce uncertainty in the outcomes of management actions already taken. However, after five years of rigorous monitoring, the time has come to evaluate their utility in reducing uncertainty with respect to outcomes that may occur from proposed future management actions. That is, managers may be able to look to the outcomes in previous years to reduce uncertainty in what will occur in the current year under alternative fishing schedules. Total harvest by species per day can be predicted as the product of total effort, total catch per effort, and species composition. There is reason to believe that these quantities vary in reasonably predictable ways, but rigorous analyses targeted at determining the best predictors and quantifying their reliability have yet to be conducted. This proposal presents a project designed to bring the historical data into greater focus for the in-season management process. The project will facilitate reproducible analyses of historical data by compiling them into an accessible and updatable data storage framework. Then, a complete analysis of variables that may predict the three critical quantities will be performed to determine which variables are most useful for predicting outcomes and their reliability (accuracy and precision) will be assessed. The final relationships that come out of this analysis will be non-trivial to implement without statistical training, so a user-friendly interactive predictive tool will be created in order to facilitate uptake of predictions into the management framework. The tool would accept inputs from the user in the form of predictor variables for the current season, and return predictions of the three critical quantities, their uncertainty, and the implied harvest. It will also include features for exploring the historical data and relationships and for performing sensitivity analyses. Biologists and managers in the region will be invited to provide input on the analyses and form and function of the tool to ensure the final products are as inclusive, informative, and user-friendly as possible. It is anticipated that these three key project components (data compilation, predictive analyses, and an interactive tool) will add substantial value to the in-season harvest monitoring program by making more complete use of the data it collects.

*The Kuskokwim River is 702 miles (1,130 km) long, in Southwest Alaska in the United States. It is the ninth largest river in the United States. It is the ninth largest river in the United States by average discharge volume.
Lat: 60.0830556
Long: -162.3338889