Research Proposal Draft

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Using a Coupled Model Approach to Predict Concentrations of Organic Mercury and Quantify the Impact on Fish Habitat for Penobscot River

Abstract

Introduction

Research Tasks

To address the research gaps, three tasks will be completed as following: (1) evaluate transport characteristics of sediment throughout the Penobscot Estuary to link hydrodynamic conditions to the circulation of mercury-contaminated sediment and concentrations of methylmercury, (2) develop an updated suite of habitat indices linking hydrodynamic conditions to habitat quality for ten diadromous fish species native to the Penobscot River, and (3) estimate the geographic range and location of diadromous fish habitat throughout the Penobscot River and identify habitat areas with high levels of transport for mercury-contaminated sediment or high concentrations of methylmercury.

Task I. Evaluate transport characteristics of sediment throughout the Penobscot River to link hydrodynamic conditions to the movement of mercury-contaminated sediment and production of methylmercury

Hypothesis I.

Task II. Develop an updated suite of habitat indices linking hydrodynamic conditions to habitat quality for ten diadromous fish species and estimate the geographic range and location of spawning and juvenile fish habitat throughout the Penobscot River

Hypothesis II.

Task III. Numerically evaluate the transportion of mercury-contaminated sediment and concentrations of methylmercury for diadromous fish habitat in the Penobscot River.

Hypothesis III.

Preliminary Results

Dissertation Timeline

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## Warning: package 'ggplot2' was built under R version 4.1.3
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## Warning: package 'scales' was built under R version 4.1.3
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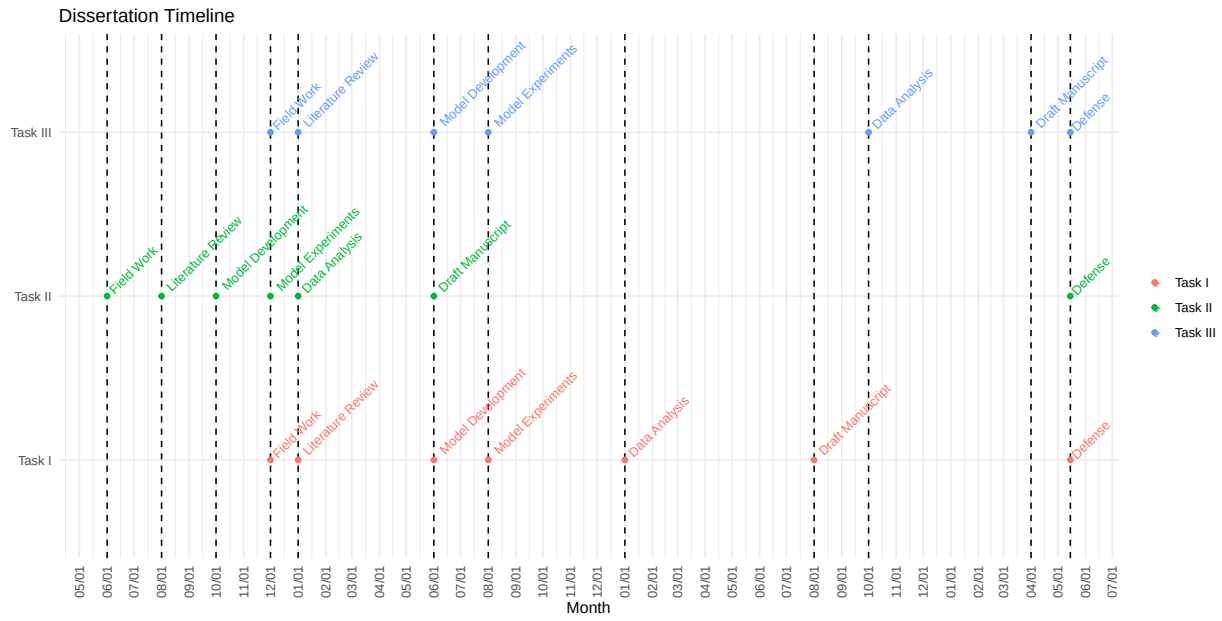

Figure 1: Dissertation Timeline

Planned Research Products

Publications

- Habitat Suitability Models for ten diadromous fish in the Northeastern United States

Conference Publications

Misc. Publishable Products

- Grain Size Distribution dataset for the Penobscot River
- R-Package containing suitability models, processing functions, and mapping functions

References