

# Behavioral thermoregulation of sea-run brook trout (*Salvelinus fontinalis*) in the East River of Pictou, Nova Scotia

Anders M. Hoffmann

Dr. Emma Cooke, Colin Buhariwalla, Paris Mastrodimitropoulos, Dr. Robert Lennox



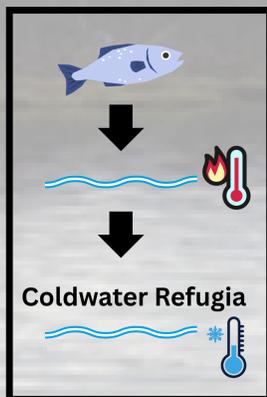
## Background

### Brook Trout

- Cold water salmonid species native to Nova Scotia
- Facing threats of warming river temperatures over summer months



### Behavioural Thermoregulation



- Cold water species actively seek out cooler water when water temperatures rise
- Habitats can include: lakes, cold springs, and tributary confluences
- Brook trout seek refuge below 20°C under thermal stress and have an upper incipient lethal temperature of 25.3°C

### Research Question

Do sea-run brook trout exhibit behavioral thermoregulation over the summer following their upstream migration?

### Objectives

1. Analyze whether the fish have lower body temperatures than the ambient river at high temperatures
2. Determine probabilities of fish holding at specific cold-water refugia

## Results

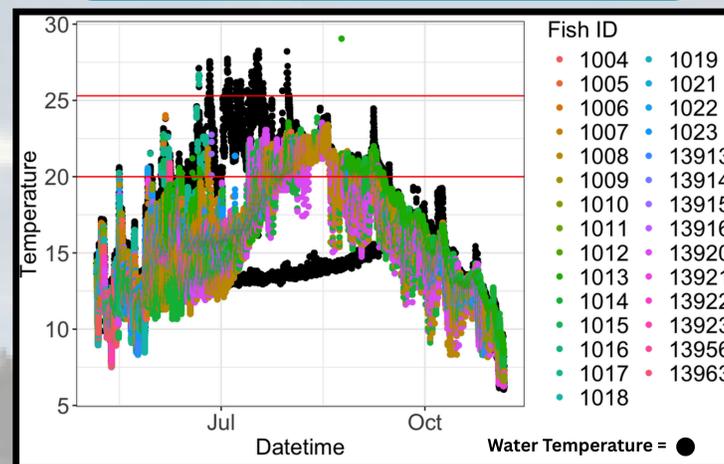


Figure 1. Individual fish temperature and water temperature (°C) from May to November 2025. Horizontal lines at expected thermoregulation temperature (20°C) and upper incipient lethal temperature (25.3°C)

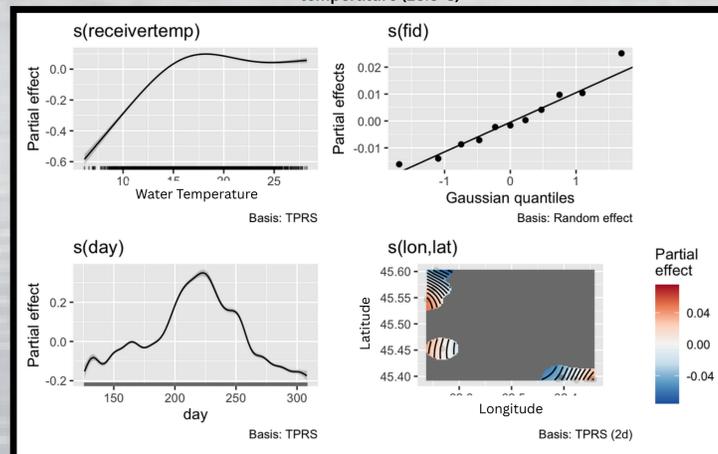


Figure 2. Generalized Additive Model (GAM) predicting fish temperature as a function of water temperature, including spatial and temporal effects.

### Key Results

- Fish appear to be thermoregulating during the hot summer months!
- Preliminary models show that once water temperatures reach between 15-20°C, fish temperatures do not continue rising with associated water temperatures

## Methods

### Study Area

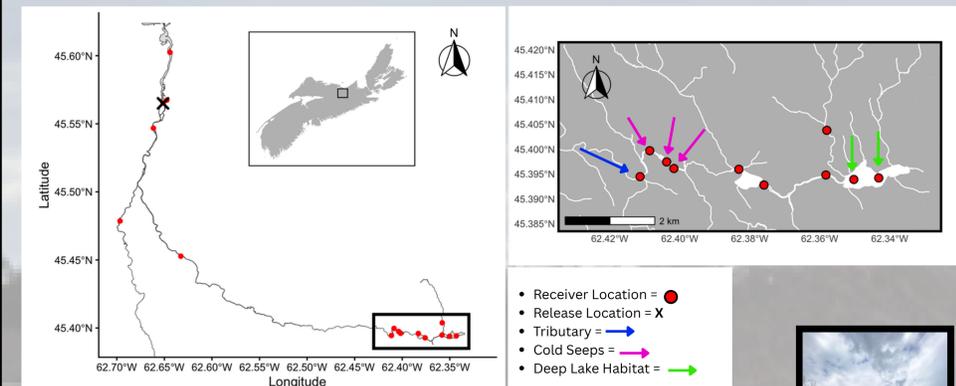


Figure 3. Map of receiver locations and fish release sites in the East River of Pictou. Inset map shows thermoregulation sites of interest.

### Receiver Deployment and Tagging



- Receivers (n=16) were deployed throughout the East River of Pictou
- Fish movements were monitored between May and November 2025
- Sea-run brook trout (n=30) were angled upon their upstream migration and tagged with Innovasea v9t acoustic transmitter tags

## Next Steps

- Work on spatial modelling to predict the distribution of fish along their upstream migration
- Analyze the use of specific refuge sites throughout the study site over the summer months

### Acknowledgements



### References

