

## Water temperature modelling at the local scale and characterization of the thermal regime of regulated and natural rivers



Audrey Maheu, PhD candidate, Institut national de la recherche scientifique

Supervisor: André St-Hilaire

Co-Supervisors: Daniel Caissie and Nassir El-Jabi

Project Code: 1.3.2



**Rationale:** Water temperature is an important determinant of the health of aquatic ecosystems. A good understanding of the thermal regime of rivers is essential to minimize the impacts of dam operations on key biological processes.

**Description:** Using microclimate data, I am developing a deterministic model to predict hourly water temperature to better understand the various energy fluxes controlling the thermal regime of rivers. Thermal loggers are also deployed on regulated and natural rivers across Canada. Using indices which describe important characteristics of the thermal regime of rivers such as magnitude, frequency, duration and timing of low and high temperature events, I compare regulated rivers to reference conditions on unregulated rivers. Emphasis is given to winter conditions and summer extremes.

### Outcomes:

- Understanding of river heat exchange processes
- Definition of indices to characterize the thermal regime of rivers
- Assessment of the degree of thermal modification as a function of the type of flow modification and environmental conditions.

### Benefits from this research

This research will allow a better understanding of the impacts of dams on water temperature and allow a better consideration of this variable in the definition of environmental flows.



Pêches et Océans  
Canada

