ACADIA Tidal Energy INSTITUTE

REDUCING FISH-TURBINE COLLISION RISK UNCERTAINTY IN MINAS PASSAGE, BAY OF FUNDY

NRCan Funding Contribution: $2.6 M

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Project Objectives

This project will apply tagging technology advanced for high flow sites to build strong datasets on the temporal and spatial presence of fish passing through the Minas Passage and FORCE tidal energy development area. This data, coupled with fish movement and tidal turbine models, will inform assessments of fish-turbine collision risk.

Summary Description

Acadia University has a long and proud history of leading environmental research in the Bay of Fundy, including at and near tidal energy developments sites. Acadia's new NRCan-funded project (2025-2028) builds on our prior fish tracking studies in the upper Bay of Fundy and expertise in hydrodynamic modelling of high flow areas.

The project will employ Innovasea's high-residency tag and receiver technology, advanced for noisy, high flow sites, to enhance detection of six fish species of current interest - Atlantic salmon, Atlantic sturgeon, American eel, Atlantic herring, Alewife (also known as Gaspereau), and Striped bass. The project will generate high quality data from a sufficiently large number of tagged fish (~500) to determine the probability of these species encountering tidal stream energy devices.

Left: Acadia University Master student, Liz Bateman, releasing an acoustically tagged spiny dogfish in Minas Basin, NS.
Right: Minas Passage during a flood tide. The box designates the FORCE development area. Dots indicate the receiver line.

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The utility of fish detection data for determining fish-turbine encounter rates will be extended using measurements of currents and modelling. Project activities will employ the regional hydrodynamic model (FVCOM), computational fluid dynamics, tidal turbine modelling, and data from the tagging program, current profilers, and drifter studies. Our field program and model simulations of fish-turbine interactions will collectively serve to reduce uncertainties in the risk of fish collision with stand-alone tidal turbines. It will also contribute to the development of guidelines for environmental effects monitoring at tidal stream energy development sites.

The project is collaborative! Our primary partners include the Fundy Ocean Research Centre for Energy (FORCE), the Ocean Tracking Network, Fisheries and Oceans Canada – Science Branch, and international researchers from the University of Edinburg and the University of the Highlands and Islands. Our extended team of scientists, a local fisher with significant experience with Acadia's fish tagging programs, and numerous research students, including Mi'kmaq students, will contribute to project activities and outcomes.

We will also re-ignite the Fundy Energy Research Network, which Acadia spearheaded in 2009, as a vehicle for enhancing research synergy and communication among a broad range of tidal energy stakeholders and knowledge holders. The network, hosted by Acadia, will foster the sharing of knowledge and data, and will invite collaboration in creating new knowledge products.

As a trusted leader with a focus on supporting regional research needs, Acadia University will provide critical data, models and insights that will aid regulators in making decisions that are environmentally sustainable and based on clear, defensible evidence. The aim is to help Canada, the province and the tidal energy sector move forward with greater confidence.

Main Benefits

The project will provide stakeholders, knowledge holders, and regulators with a better understanding of the likelihood of interactions between fish and tidal stream energy devices deployed in the Minas Passage. Rich datasets and modelling efforts will reduce collision risk uncertainty by informing assessments of the potential effects of operational tidal turbines on migratory fish moving through Minas Passage.

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Fundy Energy Research Network fern.acadiau.ca
Fundy Ocean Research Centre for Energy fundyforce.ca

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