RAP Risk Assessment Program

UNDERSTANDING TIDAL STREAM ENERGY

BACKGROUND

Tidal energy holds enormous potential to reduce emissions and meet climate change targets. Exploring its potential responsibly requires a clear assessment of any potential risks tidal energy devices may pose to marine life, particularly fish. A risk assessment can help inform regulatory directions around monitoring, mitigation, offsets and/or other strategies.

OVERVIEW

The Risk Assessment Program (RAP) for tidal stream energy is designed to create a detailed, credible assessment tool to gauge the probability that fish will encounter a tidal device. The encounter probability will be determined by combining two real-world data sets:

Biological Data

RAP will build the largest multi-species, spatiotemporal data set of fish distribution in the Bay of Fundy (through the analysis of hydroacoustic tagging data for multiple species).

Physical Data

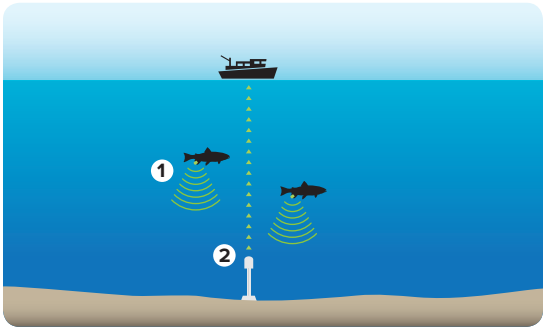
RAP will build a high-resolution radar network to create the first spatiotemporal flow atlas of the Minas Passage. This upgrades existing site data to deliver real-time hydrographic mapping of currents, eddies, and waves–important determinants of marine animal distribution.

OBJECTIVE

RAP's goal is a clearer understanding by regulators, rights holders, community stakeholders, and technology developers of any potential risks to marine life in advance of turbine deployment and monitoring. Long-term, direct turbine monitoring remains critical to measuring any potential environmental effects.

BIOLOGICAL DATA

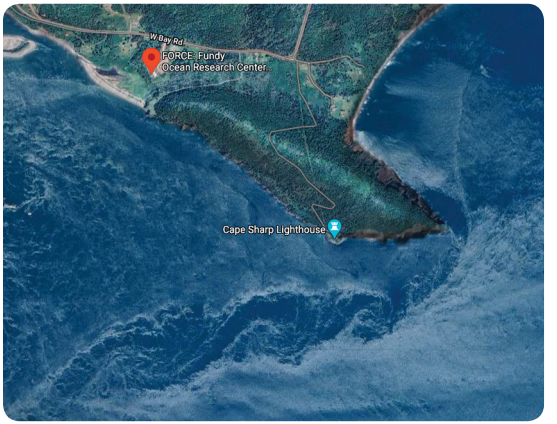
Over the last decade, hydroacoustic receivers deployed throughout the Bay of Fundy have collected movement data from a variety of fish species carrying acoustic tags. These data originate from a series of separate research programs in Canada and the United States, and provide a tremendous resource for understanding the spatiotemporal distributions of a number of fish species in the Bay of Fundy.



Acoustic tags (1) are small transmitters that allow researchers to track fish underwater; this data is captured by acoustic receivers (2).

PHYSICAL DATA

As part of the program, a high-resolution radar network will be established in the Minas Passage to generate spatiotemporal data on physical oceanographic features. This will be the basis for real-time mapping and a flow atlas for the Minas Passage.



Spiraling eddies generated during an ebb tide by Cape Sharp in the Minas Passage, Bay of Fundy. Oceanographic features like these can significantly impact the distribution of fish. (Image: Google, CNES/Airbus, Maxar Technologies)

PROJECT STAGES

1. **Biological data**: Conduct large scale integration of relevant resident and migratory fish tagging information.
2. **Physical data:** Establish a high-resolution radar network to create the first spatiotemporal flow atlas for Fundy.
3. **Baseline model:** A statistical model that combines physical habitat features with fish distribution.
4. **Turbine data:** Add turbine specific data to generate encounter rate probability.
5. **Graphical user interface:** Incorporate ability to change inputs (e.g., site features, time, turbine, fish species, etc.).
6. **Model validation:** Test and refine model predictions through field testing.
7. **Post-turbine deployment testing:** Deploy acoustic receivers around the turbine site to monitor fish movements.

Installing radar at the FORCE facility, overlooking the Minas Passage.

BENEFITS

A Single User Interface
Responsive to key variables such as type of turbine, location, and species of fish.

A Tool for Regulators
To quantify risk and inform parameters around authorization and potential conditions.

An Ecosystem-wide Approach
Making information from multiple projects accessible, and facilitating the collection of population-level information, for assessing potential impacts.

Species-specific Risk Assessment
To support evidence-based discussion around the concept of Netukulimk for Mi'kmaq, Wəlastəkwewiyik and Passamaquoddy communities.

Improving Accuracy
Ongoing fish data collection will serve to update and validate risk metrics, and to improve the integrity of the model with longer term data sets.

KEY PARTNERS

Acadia University
A leading academic institution conducting research in the Bay of Fundy as well as tidal energy research, training, education and outreach to promote responsible approaches to tidal energy development.

Fundy Ocean Research Centre for Energy (FORCE)
FORCE is Canada's leading research facility for tidal stream energy technology. FORCE provides offshore and onshore electrical equipment to connect devices to the power grid, and conducts monitoring and research to understand any potential environmental effects.

Marine Renewables Canada (MRC)
MRC is Canada's lead wave, tidal, river and offshore wind energy association, representing local and international developers, utilities, researchers, and suppliers. Since 2004, MRC has supported the development of the marine renewable energy industry with collaborative opportunities, information and outreach.

Mi'kmaw Conservation Group (MCG), Confederacy of Mainland Mi'kmaq
MCG's mandate is to restore the concept and practice of Netukulimk in the region's watersheds; Netukulimk is based on showing respect to the lands by taking only what is needed and wasting nothing. MCG endeavours to respond to watershed challenges such as commercial use, population growth, pollution and global warming.

Ocean Tracking Network (OTN), Dalhousie University
OTN is a global aquatic animal tracking, technology, data management and partnership platform. OTN and its partners are using electronic tags to track more than 240 keystone, commercially important, and endangered species worldwide.

FOR MORE INFORMATION

fundyforce.ca/risk-assessment-program

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