

Cape Sharp Tidal Environmental Effects Monitoring Program (EEMP) Summary

EEMP Scope

The Cape Sharp Tidal Ventures' (CSTV – or 'the Project') Environmental Effects and Monitoring Program (EEMP) will be employed during the operational period of Phase 1 (two 2-MW turbines) and associated infrastructure (i.e., interconnection cable.) EEMP implementation will support CSTV's commitment to mitigating any possible near-field adverse environmental effects of the Project and to contribute to a growing body of knowledge about the potential near-field effects of tidal energy.

EEMP implementation will lead to better understanding of potential near-field (i.e., at the turbine) effects and interactions of instream tidal energy devices, and will build increasing knowledge, development of mitigation, and building capacity and relationships in the tidal industry in Nova Scotia.

The scope of the CSTV EEMP includes two components:

- 1 Marine fish and marine mammals; and
- 2 Operational sound

CSTV has established a set of general intentions under the scope to be met in the development and application of the EEMP:

- to ensure a complementary program scope to that which will be delivered by the Fundy Ocean Research Centre for Energy's (FORCE) EEMP;
- to identify information and data uncertainties and provide advice on addressing these uncertainties;
- to include relevant knowledge gained from discussions with stakeholders and input from Nova Scotia Mi'kmaq ;
- to assess the effectiveness of Project design features and mitigation measures;
- to assess any identified near-field effects of routine operations;
- to submit an annual monitoring report will to NSE and DFO, which FORCE and EMAC will also review; and
- to communicate results to stakeholders and Mi'kmaq groups.

Adaptive Management

The Project uses an adaptive management approach to evaluate data, and make informed, science-based decisions to modify monitoring and assess mitigation measures as necessary. This approach is necessary due to the unknowns and difficulties inherent with gathering data in turbid marine environments, such as the Minas Passage. It allows for adjustments and continual improvements as more becomes known about the system and the interaction.

The CSTV EEMP is complementary to the FORCE EEMP in that it will focus on potential near-field affects (i.e. at the turbine) on the marine environment, while the FORCE EEMP will study potential mid-field affects. The CSTV EEMP will be executed in conjunction with the FORCE EEMP.

Collaborations

The CSTV EEMP was developed with input from experts in the field of instream tidal energy, monitoring technology developers and with involvement from government agencies, including Fisheries and Oceans Canada (DFO), Nova Scotia Environment, and other instream tidal energy interests including the Offshore Energy Research Association of Nova Scotia (OERA), FORCE, and the associated FORCE Environmental Monitoring and Advisory Committee (EMAC).

Specifications of the EEMP build upon requests and recommendations provided from discussions, and review and feedback from scientific experts, government regulators and other stakeholders.

Guidance for the EEMP also includes regulatory and policy regimes of Nova Scotia as well as requirements contained in permits, approvals and/or letters of advice from regulatory bodies, including the [FORCE EA Approval](#). Additional guidance includes past CSTV experience, DFO feedback on previous monitoring programs completed at the site by FORCE, conversations with DFO as well as with technology and subject experts, academia, and research and published documents.

Methodology

1. Marine Fish and Marine Mammals

The CSTV EEMP involves an integrated environmental monitoring system that uses data analysis software and encompasses active and passive acoustic sensors, to provide real time detection, classification, localization and near-field tracking of fish and marine mammals.

The CSTV EEMP has a focus on fish and marine mammals as they are the ecosystem components on which there could be direct effects from a demonstration-scale project. The intent is also to focus on components of importance to the public from an environmental protection standpoint (i.e., species at risk) as well as those components that provide direct economic and social benefits to local stakeholders and Aboriginal communities (i.e., commercial fisheries.)

To understand interactions between marine mammals and fish, and the tidal energy devices, monitoring results will be used to:

- determine seasonal frequency and distribution, what, if any, near-field interactions may occur in response to turbine operation;
- and, if possible, to determine track trajectories of marine mammals within the detection field.

That data will be considered in describing evasion behaviour and subsequent incorporation into strike risk models.

The EEMP will be initiated with turbine installation and it is intended that data will be gathered over a long duration to ensure enough detections to provide an informed and valuable validation of the data.

2. Operational Sound

Acoustic measurement of tidal turbine operational sound is an important element in understanding potential effects of sound on marine life. Characterization of operational sound, how it changes with flow speed and how levels compare to those of levels of natural noise created in these high energy environments will inform CSTV on the types of effects (i.e., site avoidance, changes to feeding behaviour, changes in frequency) that may occur to fish and marine mammals, and will assist with

determining any population-level effects. The results will provide the basis by which future tidal energy projects can evaluate cumulative effects of turbine sound on the environment, which will facilitate the development of effective mitigation, if necessary.

The scope for this component involves:

- acoustic measurements using fixed sound recorders housed in high-flow moorings, and
- subsequent data analysis to characterize the tidal turbine sound.

The analysis will provide increased knowledge and understanding of the characteristics of flow noise in the Minas Passage, and the extent to which flow noise obscures the operational sound of the tidal turbines.

Data Collection

As soon as the first turbine is deployed, and grid-connected, data collection will begin. Data will be collected and analyzed for environmental objectives associated with routine operations.

Outcomes

Outcomes will be reviewed continuously with DFO, EMAC and others and, where required, approaches and methodologies will be revised on the basis of accumulated experience and observed progress toward achieving the monitoring objectives. This approach will assist with resolving gaps in the knowledge of the potential effects of the Project and usefulness of current mitigation. The approach will also facilitate the implementation of new or modified monitoring strategies.

Reporting

An annual Project Monitoring Report (the Report) will be submitted for the EEMP to NSE and DFO. FORCE and EMAC will also review the Report.

The report will discuss the results of the EEMP as well as mitigative measures implemented during operation to determine usefulness and success at avoidance of adverse effects, and to address environmental effect predictions of the EA. Recommendations for a follow-up EEMP as well as any new approach to mitigation will also be provided.

Interim updates will be provided to DFO and FORCE in order to inform future approval processes and will focus on the monitoring results up to that date.

DETAILED FORCE EEMP DOCUMENTS CAN BE FOUND AT:

FUNDYFORCE.CA/ENVIRONMENT/MONITORING .