



Fundy Ocean Research Centre for Energy

## **FORCE Response to the EMAC Recommendations in relation to the Environmental Effects Monitoring Plan (EEMP) for 2010**

The FORCE Board thanks the members of the Environmental Monitoring Advisory Committee (EMAC) for their time and efforts in the review and discussion of background information associated with the proposed EEMP and in the preparation of recommendations to FORCE on the EEMP for 2010.

FORCE accepts all of the EMAC recommendations and related comments. The tables below show the response and intended follow-up to each recommendation. FORCE appreciates the general observations provided by EMAC. Most of these were captured in the EMAC Recommendations and have been incorporated, as appropriate, in the FORCE responses and follow-up activities for improving the EEMP.

Acquiring data on fish movement and behaviour is a key concern of both EMAC and FORCE. Monitoring of fish in the Minas Passage presents significant challenges given the lack of proven fish monitoring technologies and sampling methods/protocols for highly turbulent, high flow, mega-tidal environments. FORCE is committed to supporting fish monitoring research and the advancement of technologies to address the assessment of impacts on fish in the Minas Passage. FORCE will continue to work with EMAC and researchers in government and academia to investigate and apply the best possible EEM approaches for the Fundy Tidal Energy Demonstration Project.

FORCE looks forward to ongoing input from EMAC as they review the results of the studies completed in 2010. We are confident that it will lead to improved environmental effects monitoring capabilities in the Minas Passage and to a better understanding of the interactions between tidal in-stream energy conversion units and the Bay of Fundy environment.

### **EMAC Recommendations for Monitoring in 2010 and related FORCE Responses**

#### **Fish - Migration and Behaviour**

<b>Rec #</b>	<b>EMAC Recommendations</b>	<b>FORCE Responses</b>
1	Proceed with echo-sounder surveys to identify fish biomass, coupled with netting experiments to identify fish species. Surveys should be conducted when common species are known or expected to be present in the Minas Passage.	Agreed. Echo-sounder surveys (10-12 planned in 2010) will be conducted to detect fish biomass in the Minas Passage. Netting experiments will also be conducted to identify fish species. The echo sounder surveys and netting trials will begin in late Spring or early Summer, 2010. The selection of appropriate nets and vessels, and safety issues associated with sampling in mega-tidal waters with strong currents, is under discussion with commercial fishers and DFO. Other netting approaches are under consideration in cooperation with EMAC.

Rec #	EMAC Recommendations	FORCE Responses
2	Conduct a review of fish movements and migration in the Minas Channel/Passage and Minas Basin using the published literature and advice from fisheries experts, local fishers and the Mi'kmaq of Nova Scotia.	Agreed. FORCE has engaged the assistance of a recognized expert on fish migration in the Minas Channel/Basin; the review is scheduled to be completed by the end of June 2010. The review will be the basis for discussions with both local fishers and NS Mi'kmaq at a meeting proposed for the Summer of 2010. The review and outcomes from the discussions will be used to inform and modify the timing of fish sampling and echo-sounder surveys.
3	Engage local weir fishers and community groups in a cooperative monitoring program, where feasible.	Agreed. FORCE held initial discussions with weir fishers in April. The next steps in working with them will be discussed at the meeting identified above in the response to Rec #2.
4	Conduct a review of fish monitoring technologies and netting options, with an assessment of their suitability for use in the Minas Passage environment (as a means of identifying fish species and their "condition", both upstream and downstream of operating turbines).	Agreed. FORCE is in the process of developing a project to review fish monitoring technologies and netting approaches for application in high flow, mega-tidal environments like the Minas Passage. The review will act as the basis for a fish monitoring session at the planned Tidal Energy Workshop described below in response to Rec #5.
5	Host (or co-host) a 1-day workshop focused on technologies and sampling methods that have potential for use in monitoring fish and marine mammals in the Minas Passage (e.g. hydro-acoustics, netting).	Agreed. FORCE and the OEER have agreed to co-host a Tidal Energy Workshop in October 2010. A joint steering committee has been established to develop an agenda and identify speakers. A dedicated fish monitoring session, with presentations on the latest fish monitoring technologies, will be a key part of this workshop.
6	Enhance the acoustic fish tracking research program currently underway by providing additional support (e.g. acoustic tags, vessel time). This will allow a larger number of fish to be tracked as they move in and through the Minas Passage and Channel.	Agreed. FORCE has committed to providing funding to an OEER-sponsored fish tracking project to enable a larger number of fish (Atlantic sturgeon, American eel and striped bass) to be tagged (VEMCO transmitters) and acoustically tracked in the Project area.
7	Conduct shore-based observations of seabirds in and near the demonstration area as a potential indicator of fish presence (especially fish schools) and fish strikes/mortality. The Community Liaison Committee should be involved in discussions of any shore-based monitoring.	Agreed. Discussions were held with the CLC in April 2010 inviting their interest, and that of the community, in being part of an observational survey. Community feedback will inform the design of this survey. See section on Marine Birds for more detail.

## Marine Mammals

Rec #	EMAC Recommendations	FORCE Responses
1	Undertake observer surveys of marine mammals from vessels in the July/August period and opportunistic surveys from vessels during other times.	Agreed. FORCE will undertake marine mammal observations from vessels in July/August. These trips will also include seabird observations. Opportunistic marine mammal and seabird surveys will be undertaken in conjunction with other surveys, when feasible (e.g. echo-sounder surveys). FORCE continues to monitor the Marine Animal Response Society (MARS) system and its own Concerns/Questions Number for reports of mammal mortalities or strandings in the area.
2	Conduct shore-based observation surveys of marine mammals in and near the demonstration area.	Agreed. FORCE has discussed this recommendation with the CLC and invited their involvement in beach walk and shore-based surveys. The design of the beach walk survey will incorporate sites identified as potential depositional areas for injured or dead mammals.
3	Seek direction on survey protocols from the DFO Mammal Division.	Agreed. The marine mammal surveys completed for FORCE used DND MARLANT protocols. Advice will be requested from DFO regarding protocols for shore-based observations and studies completed to date.
4	Deploy Passive Acoustic Monitoring devices (e.g. C-POD) for the detection and identification of marine mammals in the turbine demonstration area and at a reference location.	Agreed. FORCE has committed to support a passive acoustic monitoring project for the detection of marine mammals (largely porpoises, dolphins and seals) in the Passage and Project area. The placement of the monitoring devices is anticipated in early Summer 2010.

## Lobsters

Rec #	EMAC Recommendation	FORCE Response
1	Continue the lobster catch rate studies, including a study in Spring 2010 (May/June) using 2 traps per line (where safe to do so) and one reference site; evaluate results, and if required for an adequate record of seasonal abundance, undertake a Fall 2010 survey.	Agreed. FORCE completed additional lobster catch studies in April and May, and incorporated modifications recommended by EMAC, where feasible. An evaluation will be undertaken to determine if additional surveys are necessary. The results of lobster catch studies will be shared with the local fishers.

## Marine Birds

Rec #	EMAC Recommendations	FORCE Responses
1	Conduct regular shore-based surveys of sea-birds, commencing in spring, and opportunistic collection of data on seabirds when boat charter work is conducted at the site.	Agreed. FORCE will undertake shore-based surveys for shore birds and seabirds in May and June, in late Summer and in early Fall, based on consultation with the Canadian Wildlife Service (CWS) of Environment Canada. As noted above in the response to Marine Mammals - Rec #1, sea bird observations will also be made during vessel surveys.
2	Consult with the Canadian Wildlife Service regarding survey protocols and training.	Agreed. Prior observational surveys of seabirds from vessels used CWS protocols. FORCE is in discussion with CWS regarding protocols and the training of community members for shore-based surveys.
3	Engage, where possible, local community groups or members to assist with shore-based seabird monitoring.	Agreed. FORCE has invited the CLC and the broader community to participate in shore-based surveys. FORCE will continue to work with the community, with the assistance of CWS, in putting this activity in place, but due to timing issues this will not likely occur until late summer or early fall.

## Benthic Habitat and Scour

Rec #	EMAC Recommendations	FORCE Responses
1	Conduct an evaluation of the benefits and limitations of methodologies used for assessing bottom conditions.	Agreed. FORCE will undertake a review to evaluate methodologies for assessing bottom conditions.
2	Use side-scan sonar to detect the direct impact of the turbine and gravity base (i.e. scour at feet and around base) following the removal of the NSPI (OpenHydro) demonstration unit.	Agreed. FORCE and NSPI have committed to undertake a cooperative side-scan sonar study at the Reference site and at the NSPI turbine site, following the removal of the demonstration unit (turbine and gravity base).
3	Undertake a description and classification of the benthic communities in the Passage using the existing set of photographic records of the bottom and information from side scan sonar and/or multi-beam surveys.	Agreed. FORCE considered this to be a longer term project, which does not need to be delivered in 2010, and could be linked to the project identified in Rec #1 above. Further discussion on the next steps related to the analysis of existing data will be held with EMAC.

## Acoustic Environment

Rec #	EMAC Recommendations	FORCE Responses
1	Complete data analysis of existing acoustic survey data as soon as possible.	Agreed. The data analysis for existing acoustic data is underway; it is anticipated that the report will be available in late June or early July. This information will be provided to EMAC for further direction.
2	FORCE should investigate, in cooperation with NSPI, the use of other passive and fixed hydrophone techniques for acoustic monitoring at the Reference site and the site of turbine deployment.	Agreed. The application of drifting ear (passive) monitoring is being evaluated by NSPI. The results of different technologies employed will provide direction on the use of acoustic devices to assess noise associated with demonstration units.

## Currents and Waves; Conductivity and Temperature (CTD); Suspended Particulate Matter

Rec #	EMAC Recommendations	FORCE Responses
1	Consult with DFO scientists regarding information gaps, if any, and ADCP/wave data collection and processing needs prior to undertaking additional surveys in 2010.	Agreed. ADCP data, spanning all seasons, have been collected by FORCE and DFO. In consultation with DFO, it was agreed that there was no need for additional ADCP data collection in 2010. Future data collections will be based on data gaps identified by monitoring and research needs (i.e. modeling projects).
2	Investigate the feasibility of attaching a CTD and a turbidity sensor to deployed platforms, and where possible, conduct additional CTD profiles and suspended sediment sample collections during scheduled day trips to the Passage (i.e. opportunistic data / sample collection).	Agreed. FORCE will investigate opportunities to undertake such surveys whenever feasible. FORCE will also undertake additional analysis of the available CTD data to determine the added value of additional measurements and report back to EMAC.

FORCE will update the EEMP to reflect the recommendations and responses above. The revised EEMP will be provided to EMAC and the federal and provincial regulators.

Submitted  
June 2010