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**Title: Testing of Temporal Monitoring Techniques for Benthic Habitat Impacts of Tidal Energy Development in the Bay of Fundy**

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**Category: Environment**

Deployment of Tidal in Stream Energy Conversion (TISEC) devices, including turbines and cables, may impact different benthic habitats through the alteration of environmental conditions (i.e. changes in physical processes, scour etc.) with subsequent impacts on benthic productivity and diversity. In situ sampling methods including sediment sampling, quadrats and scuba divers have been traditionally used to monitor marine habitats with respect to human impacts. However, these methods lack data density and spatial coverage to accurately define habitat heterogeneity and variability across meso- (10 m<sup>2</sup> – 1 km<sup>2</sup>) and broad-scales (>1 km<sup>2</sup>). This highlights the need to develop methods across greater spatial scales in order to monitor both physical and biological characteristics of the seafloor environment as a whole. The objective of this study is to develop standardized acoustic monitoring procedures for assessing the impact of TISEC devices on marine benthic habitats in terms of structure and associated benthic assemblages resulting from bed-form movement and scour formation.

Acoustic mapping devices including multibeam echosounders (MBES) and side-scan sonars (SSS) can ensonify broad scale areas with 100% spatial coverage at resolutions finer than 1 m<sup>2</sup>. Acoustic classification methodologies may be a cost-effective alternative to assess seabed roughness, sediment type, small-scale detail of the benthic habitat and community structure. There is great potential to use this approach in broad-scale monitoring of marine habitats as biological data from sediment samples collected can be linked to defined seabed features.

In the spring of 2012 repeat inter-tidal surveys will be conducted over 3 case study areas to assess physical changes in seafloor features over short temporal time-frames. Where substrate conditions permit, repeat replicate grab samples will be conducted to sample both epifaunal and infaunal assemblage characteristics and community composition from target sampling stations in 2012 and 2013. Infauna will be extracted from the samples and processed in the laboratory. Taxa will be identified and enumerated, and multivariate statistical methods will be used to determine inter-annual changes in community composition. Repeat epifaunal surveys will also be conducted using the drop-down camera system, fitted with underwater video and stills. A number of repeat ground-truthing transects will be selected within each case study area, and data will be collected over these transects in both 2012 and 2013. Epifaunal community data will be extracted from a large number of still images each year, and multivariate statistical techniques will be used to determine inter-annual shifts in community structure.