



“Fishing for Innovation in the Natural Sciences”

Abstract: Dr. Anna Redden, Acadia University

Evaluating Potential Risks to Fish and Marine Mammals: Approaches, Challenges and Revelations

(Anna Redden, Jeremy Broome, Freya Keyser, Kaycee Morrison, Peter Porskamp, Mike Stokesbury, Rod Bradford, Jamie Gibson, Jason Wood)

Tidal energy developments at the FORCE (Fundy Ocean Research Center for Energy) test site in Minas Passage, Bay of Fundy, have necessitated research on the potential for turbine – marine biota interactions. This presentation highlights research results from a recent multi-year study which acoustically detected movements of tagged migratory fish and lobster, in and near the FORCE test facility. The 2010-2013 dataset includes detections of tagged lobster and selected migratory fish species, including those listed as endangered (striped bass, iBoF Atlantic salmon) and threatened (Atlantic sturgeon, American eel). Detection results show migration of lobster and fish through the FORCE site as well as other regions of the passage. Only one species (striped bass) made frequent non-migratory passes through and within the Minas Passage and FORCE turbine test area, including during winter. Fish travel rates, assisted by tidal currents, often exceeded critical swimming speeds. Turbine avoidance ability when travelling at very high speed (>3m/s) remains unknown.

Harbour porpoises are the most commonly occurring marine mammal in Minas Passage. They were monitored in and around the FORCE site during 2010-2012 using a series of C-POD hydrophones (autonomous cetacean echolocation click detectors). Porpoises were present year-round; peak detections occurred at FORCE during spring and fall. The biggest challenges faced in sensing marine mammals and fish have been: 1) bedload transport noise and effects on receiver and hydrophone detections when depth-averaged current speeds exceed 2 m/s; 2) flow noise around acoustic sensors; 3) stresses on moored infrastructure; and 4) timely recovery of instrumentation.