

OERA Research on Tidal Marine Energy

Application of drifters with suspended hydrophone arrays to assess harbour porpoise use of the water column and spatial overlap with MRE devices in the Minas Passage

**FINAL REPORT – 30 April 2019
Summary of Activities, Budget & Employment**

Submitted by
Brian Sanderson & Anna Redden
Acadia University

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Final Report – Summary of Activities, Budget & Employment (see separate Technical Report for public access)

1 Summary of activities

Please see attached research report for details on objectives, description of progress, achievements and preliminary results under each activity proposed. Status of each activity is shown below.

Activity 1:

Analysis of porpoise detections/observations made during the June 2017 hydrophone-drifter study (Honours) thesis study of Mike Adams, supervised by Redden and Sanderson).

Expected outcome and deliverable:

- (1) Application of recently developed porpoise click detection software (Coda) to assess temporal and spatial patterns in porpoise behaviour (feeding and navigation) on both flood and ebb tides in Minas Passage/Channel during annual peak presence (June). Completed.
- (2) Comparison of the performance of 2 icListen hydrophones, using Coda software, with porpoise detections recorded by 2 co-located C-PODs. Completed. *Presented at the 2018 MRC Conference Research Forum; also being published in Journal of Ocean Technology (Adams et al. 2019)*
- (3) Comparisons of hydrophone records with visual sightings of porpoises and boat traffic (anthropogenic noise). The analysis is supplemented with a video animation of drifter tracks and porpoise detections along those tracks. Completed.
- (4) Determination of porpoise use of the water column, based on detected clicks from above/below the mid-level depth (15 m) of the hydrophones, in relation to turbine depth range (e.g. Cape Sharp Tidal's OH turbine). Completed.

Activity 2:

Minas Passage drifter field test with 4 synchronized hydrophones for assessments of porpoise depth in the water column and their detection range (distance from hydrophone).

Expected outcome and deliverable:

A high value dataset containing detections of porpoise clicks that can be used to obtain range and depth of the porpoise. Includes visual porpoise observations and records of boat activity

that might influence the sound scape. The field test was informed by the learnings from Activity 1. The drifting hydrophone measurements were made over 3 days (1 day more than proposed) during spring 2018. A preliminary analysis of these measurements is provided as a project deliverable. Completed. *Presented at the 2018 MRC Conference Research Forum; also being published in Journal of Ocean Technology (Sanderson et al. 2019)*

Activity 3:

Activity 3: Deploy two satellite-tracked drifters, with suspended C-PODS and with high sample rate location transmitted at <1 hr intervals), and track for a month or more. Drifters will be deployed in Minas Passage in summer/fall 2017. Given the contract start date (mid-October 2017) and unfavorable weather conditions in late 2017, the drifter tracks were conducted over 13 days in June 2018. See report for modifications that allowed a fortuitous collaboration with Mike Stokesbury (Acadia; OERA funded fish tracking project).

Expected outcome and deliverable:

- (1) Visualizations of high resolution tracks and C-POD detections of porpoises (video animation). Completed.
- (2) Synthesis of all drifter tracks from both the 2017 and 2018 field campaigns for an empirical determination of the probability that drifters released in Minas Passage will continue to cycle through the Passage for useful measurement periods (days to months) and remain clear of high risk (shallow) areas. Completed.
- (3) Report with recommendations for use of drifters as marine life monitoring platforms. Completed.