

**Results of a Study to Evaluate the Feasibility of Using a Drifted Gill Net to Survey
Fish Species Present in the Minas Passage, Bay of Fundy**

Prepared for

Nova Scotia Power Inc.

By

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1. Background/Objective

Evaluation of the potential impact of tidal power turbines on fishes within the Minas Passage requires knowledge of the abundance and species composition of fish present during various times of the year. At present, estimates of fish biomass are underway using Femto echo-sounding technology in combination with trawl netting to identify species composition. An additional potential approach to collection and identification of fish species composition is by using drifted gill nets. Although some investigators have raised doubts about the feasibility of this approach in the highly turbulent environment of the Minas Passage, others having considerable experience in the use of drifted gill nets in other turbulent areas of the Minas Basin feel that this should not be a serious problem, and that it will in fact be more effective in capturing fish, and especially larger fish, than trawls considering that the latter are not usually effective in catching larger fish in midwater unless towing speed is very high or a very large net is used. The objective of this study was to evaluate the feasibility of using drifted gill nets to capture fish within the area of the Minas Passage being surveyed with the Femto echo-sounding technology.

2. Methodology

The basic approach was to use the same drift net techniques successfully employed by commercial shad fisherman working within the Minas Basin. This involved using gill nets deployed from a deep-sided skiff and periodically tended to ensure that the net did not fold in upon itself. The gill net employed in this study consisted of three 100 m long by 6 m deep sections, each with a different mesh size, tethered together to form one net 300 meters in length. The mesh sizes used were 7.6, 10.1 and 12.7 cm which were considered appropriate for fish species ranging in size from gaspereau to sturgeon and dogfish. The boat employed was a 7 metre Carolina Skiff powered by a 50 HP outboard motor.

3. Results

The study was carried out during a flood tide on 14 July 2010, one day after the first scheduled Femto survey.¹ The bi-weekly tidal cycle during this period was at the spring tide level.

¹ It was originally intended to arrange for this study to be carried out at the same time as one of the Femto surveys being carried out in the same area by others. However, the schedule for the Femto surveys was only made available to us on 12 July which, because of other commitments on our part, was on too short a notice to allow for this.

The boat departed from the Kingsport wharf at 12:25 and arrived within the Minas Passage at 12:50. Two drifts were carried out. The track covered by each drift is illustrated in Figure. 1.



Figure. 1. Area covered by each drift.

Track 1 began at 13:30 and traveled a distance of 5.4 km over a period of about 45 min. Track II began at 14:45 and traveled a distance of 8.8 km over a period of 58 min. Despite poor weather conditions caused by heavy fog and, at times, heavy rains, both drifts were carried out successfully. On both occasions the net required tending only once to ensure that it did not drift in upon itself. Of particular note is that no problems in controlling the drift net were encountered due to the strong currents or turbulent conditions within the passage.

Despite the successful drifts, no fish were captured. This, however, was not completely unexpected as this technique is typically most successful under conditions of neap tides and low

visibility within the water column resulting from either high turbidity or night time conditions, none of which occurred at the time of this survey.

Although an attempt was made to produce a video record of the drift net survey procedure, the required visibility was too limited due to the heavy fog and rains.

4. Conclusions

Based on this preliminary study there is little reason to believe that the high current velocities and turbulence within the Minas Passage preclude the use of drift net surveys to provide, along with other survey techniques, the much needed information on the times and areas of occurrences of fish species present within the Minas Passage.

5. Recommendations for Further Drift Net Surveys

Successful capture of fish using drift net procedures requires knowledge of where and when fish are present within a specified area, both within the specific geographic region of interest as well as the depths at which they occur within the water column. In addition, knowledge of the current patterns within the Minas Passage is necessary to establish the location of the most favourable areas to employ drift nets and this information can only be acquired with experience. At present, there is little information of this type available for the Minas Passage. However, this information should become available after the results of the planned Femto surveys and fish tracking studies using acoustic technologies are completed, and this would increase the success of drift net surveys.

It is also highly likely that drift net surveys carried out at night time and/or at low water and the neap tidal cycle would be considerably more successful than day time, spring tide, or high water surveys. The main fish species present within Minas Passage during summer are typically clupeids (Atlantic herring, shad and gaspereau) and sharks (dogfish and mackerel sharks) (Dadswell 2010). All these species are day-night vertical migratory species. They remain near bottom during day time and rise into the water column surface after sunset or when water turbidity is high.

6. References

Dadswell, M.J. 2010. Occurrence and migration of fishes in Minas Passage and their potential for tidal turbine interaction. Report prepared for FORCE. 34p.