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*Assessment of Tidal Current Energy in Minas Passage, Bay of Fundy*

The Bay of Fundy has the world's highest tides. In particular, the Minas Basin has tides with a range of over 12m. The Minas Passage, which connects Minas Basin to the Bay of Fundy, has mean tidal currents of over 3m/s making it a promising location for tidal turbines. In this talk we examine the potential power that could be extracted from Minas Passage and the effect that extracting the power would have on the surrounding tides. A mathematical model is used to predict the effect of turbine drag on the flow through the Minas Passage and the tidal amplitude in the Minas Basin. The theory is compared to two-dimensional, finite-element numerical simulations of the Bay of Fundy-Gulf of Maine system. Together, they suggest that a maximum of 7 GW of power can be extracted by turbines. The simulations also show that any power extraction in Minas Passage pushes the Gulf of Maine-Bay of Fundy system closer to resonance with the forcing tides resulting in increased tidal amplitudes throughout the Gulf of Maine. While extraction of the maximum power will result in significant changes, over 2.5 GW of power can be extracted with less than a 5% change in the tidal amplitude at any location. Finally, we examine how isolated turbines and turbine fences might be best located in the Minas Passage by examining the fluid dynamics of flow past a turbine.