

# Towards reducing fish-turbine collision risk uncertainty in the Bay of Fundy

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A key outcome of Canada's Task Force on the Sustainable Development of Tidal Energy in the Bay of Fundy was identification of the need for industry enabling activities that more accurately quantify the risks of fish-turbine encounters. Multi-pronged, multi-year, collaborative research programs to address collision risk uncertainty are being led by FORCE and Acadia University, in collaboration with the University of the Highlands and Islands, University of Edinburgh, the Ocean Tracking Network, and tidal energy developers. This includes the integrated and comprehensive use of optical and acoustic sensing technologies and novel sensor platforms, tracking of fish movements through Minas Passage for fish species of concern, and modelling and measuring forces acting on fish that pass through the FORCE tidal energy development site. The research underway has been designed to test the performance of marine life sensing technologies and sensor system applications, using both sea-surface and sub-sea sensor platforms. It also involves the tagging and tracking of six fish species of interest (Atlantic salmon, Atlantic sturgeon, Atlantic herring, American eel, striped bass, and alewife), using High Residency (HR) acoustic tags and HR receiver arrays, to inform predictive models of the probability of fish encountering the swept area. Collision risk assessments for different deployment scenarios (surface and bottom tidal stream devices) will be informed by multiple data sources, including from 'Sensor Fish' experiments, integrated optical cameras and acoustic sensors, tag transmission detections, drifter track trajectories, FVCOM outputs, and CFD models which include simulations conducted for different flow speeds and varying turbine designs and operating states. The results will serve to reduce collision risk uncertainties and inform best practices in environmental effects monitoring (fish-focused) and associated data analysis methods for monitoring plans of tidal developers.