For Immediate Release

Date: 11 Aug 2015

The Striped Bass Association is Opposed to Tidal In-Stream Energy Conversion Devices Installed in Minas Passage, Nova Scotia

The Striped Bass Association is opposed to the installation of Tidal In-Stream Energy Conversion (TISEC) devices within the Minas Passage, Nova Scotia, in both the Fundy Ocean Research Center for Energy (FORCE) test facility, and especially as large-scale commercial power arrays until such time that:

a) The risks to Striped Bass, its habitat, and its food sources are much better understood;
b) It is determined that TISEC devices will not negatively affect Striped Bass conservation; and
c) Regulations are put in place that limit deployment of, and trigger removal of TISEC devices if it is determined that they have a high risk of negatively affecting Striped Bass conservation.

The Striped Bass Association uses the following points to outline issues with the current state of in-stream tidal energy development, and, where applicable, calls upon the respective agencies, industry, and government to come to action in support of Striped Bass conservation.

1) The Bay of Fundy Striped Bass population is currently assessed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2012). Other species that frequent the Minas Passage and surrounding waters and are also assessed as at-risk include Inner and Outer Bay of Fundy populations of Atlantic Salmon (endangered); American Eel (threatened); Maritimes populations of Atlantic Sturgeon (threatened); Eastern Scotian Shelf – Newfoundland population of Winter Skate (endangered); and Thorny Skate (special concern). These species are included in the ecosystem within which Striped Bass live, and we know little about their use of Minas Passage.
2) Recent baseline studies of the movements of Striped Bass, conducted by the Acadia Centre for Estuarine Research, and funded by the Offshore Energy Research Association and FORCE, have identified that Striped Bass can be found in the Minas Passage and in the FORCE turbine test area year-round. Acoustic telemetry monitoring was conducted during the summer and fall of 2010 and 2011 and year-round during 2012 and 2013. Although the detection range and efficiency of the telemetry technology declined with increasing flow speed, the studies did show that, of the 165 tagged Striped Bass (38 – 87 cm in length), 59% were detected in the Minas Passage, and 33% in or near the FORCE test area. Striped Bass were mostly found in water depths ranging from 10 – 60 m. These multi-year studies indicate that there may be risk of fish-TISEC interactions when turbines are tested at FORCE and potentially if installed at other locations within Minas Passage. This risk may be heightened during the winter months because Striped Bass in Minas Passage are likely to be moving

passively with tidal flows in response to cold water temperatures. Additional research is needed to determine the winter use and activity levels of Striped Bass in the Minas Passage and the behaviour of Striped Bass at and near TISEC devices at FORCE.

3) The Minas Basin is identified as a known migration pathway of Striped Bass food fishes such as alewife, blueback herring, and Atlantic herring. Food fishes of various sizes migrate through the Minas Passage to their spawning grounds in great numbers for specific periods. Some species spawn multiple times and thus adults migrate through the Minas Passage multiple times. It is unknown where, when, and how early life stages (larvae and juveniles) of these species use the passage.
4) While TISEC devices are categorized as clean or green energy, these labels only mean that TISEC devices do not use fossil fuels. Clean or green does not mean that these devices are environmentally friendly or have no negative environmental impacts. Several designs are slated for installation in the FORCE test facility including open-center single rotor, floating dual rotor, semi-submerged arrays with 36 – 40 turbines, and single rotor. Potential deployment will have TISEC devices near to the surface and on the seabed. Current claims by FORCE documents and infographics state 2,500 MW of potential energy extraction "without significant threats to the natural environment". This claim is not supported by current evidence in regard to fishes within this 'environment'. Nova Scotia's goal for power generation in the Minas Passage is 300 MW stated to be installed by 2020. This roughly equates to 150+ turbines of 2 MW capacity each, which would cover 4.3% of the area of the Minas Passage (based on using 16m OpenHydro model TISECs). The probability of fish-TISEC interactions increases with each additional device and each tidal cycle. Striped Bass live up to 30-35 years further increasing the probability of fish-TISEC interactions.
5) The risk to Striped Bass and other fishes is currently unknown. Risk takes several forms such as proximity risk (being in the vicinity of TISEC devices), encounter risk (risk of encountering a TISEC device), mortality risk (if encountered, probability of death), and population-level risk (how do the additive effects of all risks affect Striped Bass populations). Most elements of information required to thoroughly assess Striped Bass population dynamics is unknown including: spawning stock biomass, sex ratios, spawning size and frequency, population size, mixing of Striped Bass from the USA population, recreational fishing mortality (both from retention and associated harm during catch-and-release) or commercial by-catch mortality, and so forth. Until this basic information on the Striped Bass population is known, there exists no baseline or framework for proper impact assessment making it very difficult to assess the impacts of TISEC devices to this population. The underlying principle of a precautionary approach used for managing fisheries by Fisheries and Oceans Canada (DFO) is not being employed adequately with regard to Striped Bass and TISEC devices.
6) Fish-TISEC interactions are poorly understood. Few studies demonstrate compelling or quantifiable evidence that fishes will avoid TISEC devices, or under what periods (e.g. day vs. night) or flow characteristics these interactions would be more or less probable. As well,

no studies to date adequately incorporate fish behavior into risk modelling except for one recent study that outlines the probability scope, and concludes that risk is greatest with larger turbine diameters, faster currents, and lower light conditions (Hammer et al. 2015); these conditions all exist in the Minas Passage. Further, studies that report avoidance behavior are not applicable or comparable to large-scale, in-stream TISEC devices operating in high flow conditions and under extreme mixing such as occurs in Minas Passage, nor to the species using Minas Passage. Fish that encounter turbine blades have a size-dependent risk of blade strike, but proximity to devices may also cause disruption or prevention of migration.

7) Evidence of avoidance is required. Currently **there is no evidence that fish can or will avoid TISEC devices in this environment**, yet, many, if not all, news articles, reports, and answers to questions posed to FORCE and government Ministers assert that the environmental assessment is complete and proper, and that environmental monitoring is planned and covers, essentially, all matters. On several occasions reference is made to the "fish hole" in the center of some TISEC device designs. This "fish hole" is acclaimed to be designed to allow fish to swim through a turbine unharmed. This reporting is misleading; the central hole is an engineering design characteristic to increase turbine efficiency. There is absolutely no evidence that fish will swim through this hole or that somehow fish will be funneled through unharmed. Insufficient data is currently being used to fast-track decisions. Basically, **nothing with regard to environmental impacts to fish has yet been demonstrated!**
8) The Fundy Advanced Sensor Technology (FAST) underwater monitoring platforms are in their infancy, are untested in general, and the technology currently does not exist to monitor fish-TISEC interactions despite claims by FORCE that they will be "measuring any effects on the marine ecosystem". FORCE claims that their current marine animal related research "provides baseline information…to address environmental effects of turbines installed at FORCE.", but this information is inadequate to properly assess impacts to Striped Bass, and nonexistent to assess other fishes especially small, schooling species. The current plan appears to be to install TISEC devices and then use an adaptive management strategy to monitor environmental impacts (on fishes). The FAST platforms and the current monitoring plan are inadequate to answer questions on fish-TISEC interactions, and there is apparently no plan to correct this failure in the short term or provide research funding to collect the necessary information. The environmental monitoring moniker is simply a ruse with regard to fishes.
9) Developers are responsible to assess near-field effects of TISEC devices. Near-field affects should obviously include monitoring fish-TISEC interactions. FORCE is responsible for monitoring mid-field effects (proximity risk). There appears to be very few regulations as to the expected level of monitoring. Thus, the term 'environmental monitoring' is not used consistently and does not cover all aspects of the environment. As well, there is apparently no agency responsible for identifying and determining population-level risk. DFO would be an obvious agency, but they have supported the current monitoring plan. The plan is

inadequate for fishes and calls into question the role of DFO in conserving fisheries resources for **all Canadian citizens**.

10) Regulations do not exist to guarantee discontinuation and removal of TISEC devices if they cause unacceptable risk or harm to the conservation of Striped Bass (or other fishes). There is no confidence that if negative environmental impacts do occur that any action will be taken to remove TISEC devices, limit their design or deployment, discontinue their use, or otherwise mitigate damages. Government agencies apparently have the power to remove TISEC devices, but under whose decision and for what reasons is unclear and not part of the current regulatory framework.
11) There is an inadequate system for concerned citizens, community groups, scientists, or others to engage with the various bodies associated with tidal energy. FORCE has an Environmental Monitoring Advisory Committee that should be both gathering input from citizens and providing feedback on monitoring activities, providing monitoring data to third parties for independent review, and so forth. The various government agencies simply point to FORCE as the centre for all answers, yet these same agencies foster the ideas of large-scale tidal energy arrays which is not the mandate of FORCE. The government needs to play a larger role in developing clear regulations around the deployment and removal of TISEC devices, and to create proper and useful consultation avenues for community input and information exchange.
12) Greater than 7,000 anglers participate in Striped Bass fishing in the province of Nova Scotia and this fishery is worth an estimated $9.8 million per year to the economy of the Province. There are also commercial fishers in the Minas Basin that contribute much more to the economy and are an integral part of the history and culture of Nova Scotia. There are definite ecosystem links to recreational fisheries, commercial fisheries, and Striped Bass that are not understood adequately to assess far-field economic impacts of TISEC energy extraction.
13) This recreational fishing resource and its economic, cultural, and community importance should not be traded for any development that has a high potential to harm Striped Bass or its ecosystem especially when based on unquantifiable risk, and untested monitoring. Nova Scotia is labelled as Canada's Ocean Playground, not Canada's Ocean Powerplant. Tourism is a big part of Nova Scotia. Regulators need to properly address any risk to recreational angling and what a decline in it will mean to tourism. The installation of the causeway and tidal barrage turbine in the Annapolis River ultimately destroyed the world-class Striped Bass fishery on that river. Let history not repeat itself.

The Striped Bass Association

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