

Is the Future of Shubenacadie River at Risk?

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They spawn at the bridge because it is freshwater there."

"The brine would only affect spawning if it penetrates upstream any distance. I was under the impression they would release it during falling tide and not at all during spawning season", Dadswell concluded.

Darren Porter, an outspoken weir fisherman and consultant from Bramber, Hants County has studied several aspects of the fishery in the Bay of Fundy and its estuaries for years. He is

concerned about the future of the Striped Bass as it's an important part of the economy as a recreational fishery along the Bay from Parrsboro to Truro, then down through hants County to the Annapolis Valley. His concern is Alton Gas salt brine could destroy the habitat of many species. "If you change the eco-system, you will destroy the Shubenacadie and Stewiacke Rivers forever", he stated.

Several biologists at Acadia University have done a multitude of studies over

the years. Trevor Avery, an associate professor of biology, mathematics and statistics at Acadia, is also involved with the Striped Bass Association, is well versed on the situation. Avery is also quoted of saying, Alton gas have been using legal remedies to move their initiative forward.

Refer to additional article in this issue concerning several studies of the Shubenacadie River.

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Striped Bass on Endangered List

By Maurice Rees

"Only two estuaries in Atlantic Canada are known to support the successful spawning of Striped Bass, the Miramichi River, which runs eastward into the Gulf of Saint Lawrence and the Shubenacadie River draining into the inner Bay of Fundy" was the opening statement in an article, entitled Striped Bass Early Life History in the Macrotidal Shubenacadie River detailing a 9-year study from 2008-2016.

The article continues, the Shubenacadie River population has increased dramatically following high recruitment, but the species is considered endangered by COSEWEC (2012) because the only other known

spawning areas, the Saint John River and Annapolis rivers have shown no evidence of recruitment for over 20 years.

This study was received on March 21, 2018 and accepted on May 14, 2018. A number of studies into the Shubenacadie and Stewiacke Rivers have been conducted since 2007, which included a May 24, 2007 request when DFO Maritimes Science Branch was asked by the Habitat Protection and Sustainable Development (HPSD) Division to review the Province of Nova Scotia's Environmental Assessment Registration Document for the Alton Natural Gas Storage Proposal. A paper outlining results of the study were completed in August 2007.

The more recent "early life article" further states, the Shubenacadie estuary is a shallow and fully mixed and is the only Striped Bass nursery habitat dominated by a tidal bore. Spawning mostly occurs in the Stewiacke River, the main tributary of the Shubenacadie. The long-term study, starting in 2008 was part of a pre-construction environmental monitoring of an underground salt cavern development by Alton Gas, who will discharge up to 3,000 tonnes of salt brine daily. The article acknowledged Alton Gas Storage paid for the research.

Most of the spawning occurs in the Stewiacke River around high tides between the Highway 2 bridge and the CN Rail bridge. Spawning occurred as early as May 7 in 2010 and May 29 in 2012 with the duration of spawning season ranging from 31 to 49 days.

The abundance of larvae in 2012 was the highest recorded was associated with warm dry weather, the estuary remaining stable at 16-18C post spawning and the main site remaining brackish throughout the tidal cycle for all of June. The larvae started to grow around June 7, at least two weeks earlier than all other years. Water temperatures in May and June were 1.2C and 1.6C degrees higher than average.

Conversely, the latest onset of feeding was July 11, 2015, when May and June temperatures were 0.9C and 1.3C degrees below average. The thermal range for spawning of striped Bass in the Shubenacadie-Stewiacke Rivers is 12-20C. The accumulation of 11-20

degree-days above 12C leading up to the first major spawning episodes in 7 of 9 years was similar to spawning in the Stewiacke River in 1994 at 18C.

Overall the 20 page article was so full of technical details only a biologist could comprehend. The Shoreline Journal tried to capture some of the more important understandable facts.

In a science response in May 2016 highlighting Striped Bass Spawning in the Shubenacadie River contributors, Rod Bradford, Peter Comeau, Kristand Curran and Lottie Bennett all from DFO Science, Maritimes Region, which was approved by Alain Vezina, Regional Director of Science, DFO Maritimes Region stated, "In light of uncertainties concerning the potential for brine release infrastructure and effluent to negatively influence Striped Bass productivity (DFO 2007), Alton Natural Gas LP has proposed to cease brining operations during peak Striped Bass spawning events. However, no definition for "peak spawning events" for Shubenacadie River Striped Bass has been developed (Conestoga-Rovers & Associates 2015)".

Conclusions

The first part of the conclusion of the scientific response stated, "Available information indicates that while there is a general association of principle spawning activity with water temperatures and local weather, the ability to predict the onset of large spawning events of Shubenacadie River Striped Bass on the basis of environmental conditions alone may be uncertain. Presence of eggs (onset of annual spawning activity) in the river as a trigger to cease the release of brine has potential to be a means to eliminate the risk of both exposure of eggs to brine and entrainment during the period of principle annual spawning activity; large spawning events appear to be preceded by low level, but detectable, spawning activity in most years. Cessation of brine release for a two week (14 day) period could, however, potentially expose significant proportions of the eggs to brine once brining resumes. Available data indicates a time period up to 24 days would protect 95% of eggs produced. Thus, the risk of exposure of eggs to brine would be greatly reduced if brining activities were to cease for 24 days following first detection of eggs".

Reply from Fisheries and Ocean Canada

By Maurice Rees

With Alton Gas inching closer to starting carving out caverns to store Natural Gas, by flushing 3,000 tonnes of salt brine per day into the Shubenacadie River, the Shoreline Journal submitted a series of questions to DFO.

We contacted Debbie Buott-Matheson, BA, BPR, A/Manager, Strategic Communications, Communications Branch/Maritimes Region Fisheries and Oceans Canada/Government of Canada to provide the answers. Her response to the questions is provided below:

Q1: When were baseline studies conducted prior to any significant changes on the three river systems as a spawning habitat?

A: Studies of striped bass spawning populations in the Bay of Fundy have been conducted in all three rivers many times over the last 30 years, including: Investigations concerning striped bass spawning activity in the Annapolis River began in 1975: Jessop, B. M.; 1976- Physical and biological survey of the Annapolis River, 1975. Department of Environment, Fish. Mar. Serv., Res. Br. Data Record Ser. No. MAR/D-76-8.

Search efforts to confirm spawning locations in the Saint John River began in 1992: <https://waves-vagues.dfo-mpo.gc.ca/Library/183364.pdf> Baseline data collections of spawning activity in the Stewiacke River began in 2000, monitoring of juvenile and adult striped bass began in 1999: http://publications.gc.ca/collections/collection_2013/mpo-dfo/Fs70-5-2012-021-eng.pdf

Q2: What role did DFO have in conducting actual studies?

A: Please see the answer to question 1.

Q3: What was DFO's mandate to ensure the populations were protected by insisting baseline studies be conducted prior to any changes in habitat on the river systems?

A: Fisheries and Oceans Canada is the federal lead for safeguarding our waters and managing Canada's fisheries, oceans and freshwater resources. Studies of striped bass populations in all three rivers have been conducted many times over the last 30 years.

Striped bass currently receive protection through the federal Fisheries Act via sections 35 and 36, and the associated regulations. There are no commercial fisheries for striped bass in Maritimes Region waters, but they may be retained (one striped bass per day, 68 cm in length or longer) by licence condition in a few commercial fisheries, such as gaspereau, shad and low head brush weirs in the upper Bay of Fundy. The Maritime Provinces Fishery Regulations establish daily bag limits, gear restrictions, minimum length restrictions and fishing seasons.

Q4: To what degree has spawning been reduced in the Saint John River system? Time frame, and when were studies conducted.

A: Historically, three rivers draining into the Bay of Fundy supported striped bass spawning populations, but repeated spawning failures led to the disappearance of the Annapolis and Saint John River populations.

These disappearances are thought to be due to changes in the water's flow, and degrading water quality. The Saint John River has supported both a recreational and commercial fishery. A commercial fishery in Belleisle Bay was conducted in winter from 1930 to 1978, when it was determined that there was an absence of recruitment and the population was in decline. The last evidence of spawning in the Saint John River was in 1979.

Q5: What affect might the Annapolis Tidal Power plant had on enhancing or reducing the ability of the Annapolis River to continue its contribution as a spawning ground for Striped Bass?

A: The Annapolis River has shown no evidence of spawning or recruitment since 1976. Concerns are that agricultural pollution, pesticides or changes in pH have affected egg and larval survival. The construction of the Annapolis Royal causeway, near the mouth of the river, may also have altered incubation and rearing habitat, further affecting recruitment.



**Fisheries and Oceans
Canada**

Q6: What recent baseline studies have been conducted relevant to Striped Bass spawning ground importance on Shubenacadie River?

A: A Canadian Science Advisory Secretariat (CSAS) Report on the striped bass population of the Shubenacadie River Estuary was conducted in 2016. The report was prepared to help inform regulatory decisions of Nova Scotia Environment and Environment and Climate Change Canada.

The full report, "Review of a Method for Identifying a Window of Principle Striped Bass (Morone Saxatilis) Spawning in the Shubenacadie River Estuary", can be found here: <https://waves-vagues.dfo-mpo.gc.ca/Library/366064.pdf>.

Q7: A brief explanation as to DFO's mandate, and responsibilities concerning protection of the Striped Bass populations in the Bay of Fundy?

A: DFO's mandate flows from the Fisheries Act and the authority to make regulations, among other things, for the proper management and control of the sea-coast and inland fisheries, as well as the conservation and protection of fish and fish habitat.

The Species at Risk Act (SARA) provides protection for those species listed as extirpated, endangered or threatened under Schedule 1 of the Act. The striped bass, Bay of Fundy population was assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2004 as threatened, and again in 2012 as endangered, but is not currently listed under SARA. It is anticipated that consultations on the potential listing of this population under the SARA will begin in 2020.

Q8: Has there been any study or analysis by DFO - over and above the scientific importance - on the contribution the "Striped Bass - as an industry" contributes to the Nova Scotia economy, particularly highlighting the size and magnitude of the recreational industry in Cumberland and Colchester Counties?

A: Every five years, DFO conducts a Survey of Recreational Fishing in Canada. The socio-economic impact of recreational fisheries on local economies is part of the data collected.

The results of the 2010 survey can be found here:

<http://www.dfo-mpo.gc.ca/stats/rec/can/2010/section4-eng.htm>

The results of the 2015 survey can be found here:

<http://www.dfo-mpo.gc.ca/stats/rec/can/2015/index-eng.html#4-4-1>

With regards to your questions about Alton Gas:

The release of brine associated with the Alton Gas project is regulated by Nova Scotia Environment as well as Environment and Climate Change Canada under Section 36 of the Fisheries Act. DFO's role is to provide information to Nova Scotia Environment and Environment and Climate Change Canada on issues related to the presence and abundance of fish species in the area, such as the DFO Science report on striped bass: http://www.dfo-mpo.gc.ca/csas-sccs/Publications/Scr-RS/2016/2016_026-eng.html.

For people who are interested contact the ECCC media relations group at ec.media.ec@canada.ca or 819-938-3338 for more information.

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