

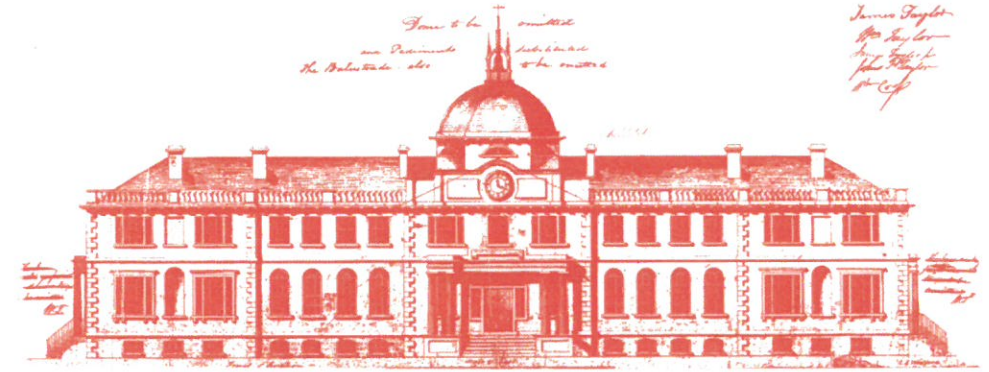
RESTORATION POTENTIAL FOR REPRODUCTION BY STRIPED BASS (*Morone saxatilis*) IN THE SAINT JOHN RIVER, NEW BRUNSWICK

Abstract

In 2012 the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed the Striped Bass (*Morone saxatilis*) of the Saint John River, New Brunswick as endangered as part of the Bay of Fundy designatable unit. This listing was due to an apparent rapid collapse and subsequent absence of presumed native origin Striped Bass, juvenile recruitment, and spawning by the species following the completion of the large Mactaquac Dam in 1968. Expert reports hypothesized that alteration in the river flow and temperature regime imposed upon the Saint John River downstream from the Mactaquac Dam were responsible for the disappearance, however, no recovery efforts or exploratory studies were conducted, and the native Striped Bass population was deemed extinct. This thesis dissertation explored the collapse of the Saint John River Striped Bass starting with a complete historic perspective of the species in the Saint John River and concluded with a possible means to recover the population that was once believed to be lost.

Within the chapters of this thesis I first summarize the history of Striped Bass in the Saint John River and explore why the current understanding of the species status needs to be updated. I locate and sample juvenile Striped Bass within the Saint John River for the first time since 1979, prove their native ancestry, and monitor their year class success. Native adult Striped Bass matching juvenile ancestry are tagged and tracked to determine the timing and location of their upstream spawning migration and the migrations of non-native adult Striped Bass within the Saint John River are also explored. I summarize information on Striped Bass winter ecology in Canada, then locate and describe four key winter habitats used by Striped Bass in the Saint John River. Finally, I draw a possible connection between the regulated discharges at the Mactaquac Generating Station to the success of Striped Bass juvenile recruitment observed in the Saint John River over six consecutive years of sampling.

My general conclusion is spawning by native Striped Bass in the Saint John River downstream of the Mactaquac Dam has been severely impacted, though not eliminated by the regulated discharges resulting for power production. These discharge regimes have resulted in infrequently successful year classes, poor recruitment and possible spawning failures; however, spawning by surviving native origin Striped Bass may be recovered through the management of spring discharges. Managing for extended periods of moderate, sustained flow of sufficient volume and duration to keep Striped Bass eggs in suspension during the incubation period may restore successful Striped Bass spawning and juvenile recruitment in the Saint John River, New Brunswick.



Home of the School of Graduate Studies, Sir Howard Douglas Hall was designed by J.E. Woolford in 1825 and is the oldest university building in Canada still in use.

The University of New Brunswick recognizes that the university sits on traditional Wolastoqey territory. The river that runs right by our university – the St. John River – is also known as Wolastoq, along which live the Wolastoqiyik -- the people of the beautiful and bountiful river.

UNIVERSITY OF NEW BRUNSWICK SCHOOL OF GRADUATE STUDIES

ORAL EXAMINATION

Samuel Nelson Andrews

**IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF**

DOCTOR OF PHILOSOPHY

Ph.D. Candidate

Samuel Nelson Andrews

Graduate Academic Unit

Biology

October 22, 2019

1:00 p.m.

**Loring Bailey Hall
Common Room B27**

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Dr. Tillmann Benfey (Biology/Aquaculture)

Dr. Scott Pavey (Biological Sciences/Genetics, UNBSJ)

Dr. R. Allen Curry (Biology/Forestry)

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Publications:

S. N. Andrews, T. Linnansaari, R. A. Curry & M. J. Dadswell (2017) The Misunderstood Striped Bass of the Saint John River, New Brunswick: Past, Present, and Future, North American Journal of Fisheries Management. 37:1, 235-254, DOI:10.1080/02755947.2016.1238424

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S. N. Andrews, T. Linnansaari, N. Leblanc, S. Pavey & R. A. Curry (2019) Winter Ecology of Striped Bass (*Morone saxatilis*) Near their Northern Limit of Distribution in the Saint John River, New Brunswick. (in review)

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