

24 January 2020

(By Email)

The Honourable Bernadette Jordan  
Minister of Fisheries, Oceans and the Canadian Coast Guard  
200 Kent Street  
Ottawa, ON K1A 0E6

Subject: Fish passage concerns related to the Avon River Aboiteau Project (Windsor, Nova Scotia)

Dear Minister,

The purpose of this letter is to inform your Department of concerns we have recently discovered whilst reviewing the proposed Avon River Aboiteau Project in Windsor. These are detailed in the attached Statement, prepared by retired DFO Habitat Manager Denis Haché, a professional engineer with 30 years of work experience with DFO in Atlantic Canada. Mr. Haché worked on fish passage issues in the Inner Bay of Fundy, including over 10 years specifically on the Petitcodiac River Causeway Project.

The concerns raised in his statement lead us to believe that the final option selected for this project, unveiled in late November 2019, will not achieve acceptable fish passage at this structure. This opinion is in line with studies conducted on several estuaries in the Inner Bay of Fundy, including the ground-breaking research carried out by your staff in Atlantic Canada during many decades.

These concerns were first brought to our attention last month by Mrs. Sonja Wood, Chair of the Friends of the Avon River (FAR). Nation Prospère, the Canadian registered charity that I direct, has amongst its mandates the “protection of l’Acadie’s natural environment”. As the founding Petitcodiac Riverkeeper involved for several decades in the effort to resolve this complex fish passage issue in New Brunswick, I am very familiar with and sensitive to the concerns raised by the FAR.

Your Department has the administrative responsibility to require the proponent to achieve safe fish passage in the Avon River. You also have the authority and the opportunity to correct a mistake and a terrible injustice that was done to this River and to its nearby First Nations people and residents over 50 years ago. I therefore urge you to act on behalf of the Avon’s best interests by offering it the same duty of care given by your predecessors to its sister rivers in the Inner Bay of Fundy.

Sincerely,



Daniel M. LeBlanc  
Executive Director & Administrator of the *Sentinelle de la côte acadienne* Project

cc: The Hon. Jonathan Wilkinson, Minister of Environment; The Hon. Dominic LeBlanc, President of the Queen’s Privy Council; Chief Sydney Peters, Glooscap First Nation; Gord Johns, NDP Critic for Fisheries and Oceans & Avon River Petition Sponsor; Sonja E. Wood, Chair, Friends of the Avon River

## Minister / Ministre (DFO/MPO)

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**From:** Assemblée nationale de l'Acadie <admin@anacadie.ca>  
**Sent:** Friday, January 24, 2020 7:46 AM  
**To:** Minister / Ministre (DFO/MPO); Bernadette.Jordan@parl.gc.ca  
**Cc:** ec.ministre-minister.ec@canada.ca; Jonathan.Wilkinson@parl.gc.ca;  
dominic.leblanc@parl.gc.ca; speters@glooscapfirstnation.com; Gord.Johns@parl.gc.ca;  
'Sonja E. Wood'  
**Subject:** Fish passage concerns related to Avon River Aboiteau Project (Windsor, Nova Scotia)  
**Attachments:** Letter from Nation Prospère to DFO (24 January 2020).pdf; Windsor Statement by Denis Haché on Avon River Aboiteau Project (January 2020).pdf

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The purpose of this letter is to inform your Department of concerns we have recently discovered whilst reviewing the proposed Avon River Aboiteau Project in Windsor. These are detailed in the attached Statement, prepared by retired DFO Habitat Manager Denis Haché, a professional engineer with 30 years of work experience with DFO in Atlantic Canada. The concerns raised in his statement lead us to believe that the final option selected for this project, unveiled in late November 2019, will not achieve acceptable fish passage at this structure.

We urge you to act on behalf of the Avon River's best interests in this matter.

Sincerely,

Daniel M. LeBlanc  
Executive Director & Administrator of the *Sentinelle de la côte acadienne* Project

cc: The Hon. Jonathan Wilkinson, Minister of Environment  
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Sonja E. Wood, Chair, Friends of the Avon River

[admin@anacadie.ca](mailto:admin@anacadie.ca)  
<https://nationprospere.ca/>

NATION  
PROSPÈRE

## Statement on the Avon River Aboiteau Project

To: Daniel LeBlanc, Sentinelle de la côte acadienne

From: Denis Haché, P.Eng., retired DFO Habitat Manager

Date: 22 January 2020

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### Introduction

1. As a follow up to our recent conversations regarding the Windsor causeway and the Avon River aboiteau replacement, please find below my opinion on the matter.
2. This opinion is based on my 30 years of work with the Department of Fisheries and Oceans in Atlantic Canada, including over 10 years devoted specifically to the Petitcodiac River Causeway. As the DFO Habitat Manager responsible for this file, I was directly involved in initially developing and overseeing the gate management plan for the Petitcodiac Causeway from the mid-1990's to 2007. During those years I was also directly responsible for reviewing the proponent's (Province of New Brunswick) proposed options to achieve fish passage at this structure. I worked in this capacity on average 10 hours a week for over 10 years, leading to the permanent opening of the causeway gates in April 2010. Key findings include:
  - a. There was a fishway constructed in the Petitcodiac Causeway /gate structure. This fishway was designed by DFO engineers in Halifax. The engineers responsible had years of successful experiences on hundreds of fishway design in the Atlantic Provinces. The fishway did not work and salmon migration above the gate structures went from over 2000 before 1968 to less than 100 within a few years. Over the years, the fishway was modified to improve its efficiency without success.
  - b. During this review process and in the 1990's, the DFO (Fisheries and Oceans) provided over 2 million dollars in support of an environmentally and socially acceptable solution. This did not include in-kind services.
    - i. tidal gages were installed at numerous locations downstream of the causeway;
    - ii. permanent electronic headpond monitoring was also done on a continuous basis;
    - iii. water temperature was measured above the headpond, at the fishway and downstream in the tidal waters;
    - iv. silt and salinity were measured as required for modelling purposes;

- v. fish passage was monitored downstream , through the gates and through the headpond;
  - vi. fish passage through the fishway could not be improved.
- c. A gate management plan for fish passage was approved and implemented up to the completed gate opening in 2010. This required a gate opening protocol to create the ideal downstream estuarine conditions (temperature/salinity) to achieve upstream fish passage for the species of concern, and the lowering of the impoundment to achieve downstream fish passage during juvenile and adult migrations. This was done for years with limited success.
3. The expertise that I gained during those years revolved around the operation of aboiteau and causeway gates to achieve optimal fish passage conditions at a number of sites in the Inner Bay of Fundy, including the Petitcodiac, Shepody, Memramcook and Tantramar Rivers. This required an in-depth understanding of the migration patterns of all anadromous fish species in the Inner Bay and the unique conditions related to these tidal estuaries, including its water salinity, temperature, sediment deposition and seasonal variances. During these year I was also responsible for developing or reviewing fishway and fish passage designs for hundreds of sites under fresh water conditions in the Gulf Region of the three Maritime Provinces.
4. While several engineers and experts in Canada were qualified to develop or review fish passage and fishway designs in fresh water ecosystems, very few had the unique knowledge necessary to properly assess recommendations on fish passage impacting the types of estuaries that are found in the Inner Bay of Fundy. This was true not only in the academic and private sectors but within DFO. The opinion provided in this statement is therefore based on this direct hands on experience and knowledge gained over the years in the Inner Bay of Fundy.

#### **Avon River and Petitcodiac River similarities**

5. I would begin by stating that , in my professional opinion, there are essentially no major contextual or ecological differences between the two ecosystems of the Avon River in Nova Scotia and the Petitcodiac River in New Brunswick. Both rivers are Inner Bay of Fundy macro-tidal estuaries that share the same characteristics of tidal variations of over 6 meters occurring twice daily, sediment loads and an identical list of anadromous fish species historically present. The purpose of the Windsor Causeway, acting as a giant aboiteau to protect farmland while creating a headpond, produced similar conditions that were present in the Petitcodiac, Memramcook and Tantramar , resulting in similar impacts on fish migrations.

6. All rivers in the Inner Bay of Fundy that were impacted by these causeway-aboiteaux structures suffered similar fates in the months and years following their construction. The result was the obstruction to fish passage and the loss of native habitat for all fish species. The evidence to support these facts in the above rivers, including in the Avon River, have been well documented over the years. The main difference between the Avon River and the other mentioned rivers is that a number of remedial measures were developed and implemented in New Brunswick beginning in the 1990's with the aim to restore fish passage. These measures were partially or fully achieved by a combination of gate management plans and, in the case of the Petitcodiac, a solution to fish passage that required the replacement of the structure with a partial bridge.
7. Having familiarised myself with the final option proposed to restore fish passage in the Avon River and based on my years of experience with similar conditions in the Inner Bay of Fundy, I strongly believe that the criteria chosen for the design of this final option will result in unacceptable fish passage at this control structure. I will elaborate further on this in the next pages and explain why I believe this type of design is inappropriate and will not achieve the desired outcome.

#### **The presentation of the available options to restore fish passage in the Avon River**

8. I refer to the following document presented on the [hwy101windsor.ca/library](http://hwy101windsor.ca/library) project website and entitled "Communication with the Public and the Mikmaq", comparing four design options and alternatives to the Highway 101 Avon River crossing and dated December 2017:  
  
[http://hwy101windsor.ca/wp-content/uploads/2017/12/EA-TC-4.1\\_Communication-with-the-Public-and-Mikmaq\\_6Dec2017\\_standard.pdf](http://hwy101windsor.ca/wp-content/uploads/2017/12/EA-TC-4.1_Communication-with-the-Public-and-Mikmaq_6Dec2017_standard.pdf)
9. The document presents in Table 1 the four options that were originally considered for the project, which include the following:
  - Option 1 - An upgraded aboiteau and causeway with improved fish passage costed at \$20 million.
  - Option 2 - A 120 metre long bridge to replace the current gate structure, along with the construction of 15 kms of dikes and aboiteaux upstream, costed at \$85 million.
  - Option 3 - A 240 metre long bridge to replace the current gate structure, along with the construction of 15 kms of dikes and aboiteaux upstream, costed at \$150 million.

- Option 4 - A 16 km highway bypass option, along with the construction of 15 kms of dikes and aboiteaux upstream, costed at \$190 million.
10. Options 2, 3 and 4 have a note mentioning that they include "No cost estimate for loss of business & properties on Windsor waterfront and upstream of the Sangster Bridge. No cost estimate for upgrades to Trunk 1 bridge-causeway, likely removal of Sangster Bridge or protection/demolition of other at-risk infrastructure". These three options were subsequently eliminated from the review process, with variations of Option 1 moving forward to the next stage of the selection process.
  11. It is important to point out here that in this document, it is stated that the cost of the construction of 15 kms of dikes and aboiteaux to protect farmland (presented in Options 2, 3 and 4) is in the order of \$50 million. For a point of comparison (information from the New Brunswick engineer managing similar projects), the cost of the construction of dykes and aboiteaux above the Petitcodiac Causeway bridge were in the order of \$6 million for 23 km in 2008, or approximately 250 000 \$ per km. That included surveying, engineering, design, tender construction, supervision and follow up. It would be reasonable to assume that the cost of construction above the causeway at Windsor for the same purpose would be significantly lower than \$50 million (averaged at 3.33 million \$ per km). A more accurate estimate might be in the range of \$5 to \$6 million (between 350 000 and 400 000 \$ per km).
  12. Finally, the document also refers to the potential "loss of business and property in Windsor and upstream" without specifying what this loss entails should a protective dike system be in place. A comparison of the "before and after" conditions in the Petitcodiac might shed light on this perceived loss on businesses and properties.
  13. The above numbers and assumptions developed to justify the option chosen were questionable, in my opinion, but were still presented to the public and to the Mikmaq. This led to the selection of the "fishway option" to pursue the process of the environmental assessment even though, as I will explain, no fishway design exists to allow the safe passage of fish in the Avon River or Inner Bay of Fundy. It is my opinion that a very costly mistake will be made if this option is pursued.

### **The fishway option**

14. To the best of my understanding, three options (A, B and C) were presented to the public and to the Mikmaq in September 2018 to achieve fish passage in the proposed new structure. No costing is available with that presentation. Option A and Option B had as their main objective the maintenance of the fresh water

headpond. Option C was presented as having fish passage as its priority and involved a controlled tidal exchange. The presentation concluded by stating that “we heard strong community interest in keeping the lake high in the summer, and we are now in the process of exploring a new Option D” (page 42). Here is a link to this presentation, with the design of the options presented on page 11:

<http://hwy101windsor.ca/wp-content/uploads/2018/09/AvonRiverAboiteauSept19-Presentation-CLC.pdf>

15. It is my understanding that the final design concept for this “Option D” was presented on 27 November 2019, the details of which can be found in the following document. This design is presented on page 23 and involves the construction of a large dike and gate control structure with a fishway located downstream of two highway bridges. No cost of this dike-aboiteau-gate structure is provided:

<http://hwy101windsor.ca/wp-content/uploads/2019/12/CLC-Meeting-Presentation-Nov2019.pdf>

#### **Fishway design and commercial fisheries assumptions**

16. I was also able to review a document on a public presentation about the fishway design and the criteria used for this design. Design criteria mainly included water velocity and water depths. What struck me was that there were no references to the critical factors in the Inner Bay of Fundy related to salinity, temperature differences between the tidal waters and the headpond or the issue of turbidity. No reference as well to the requirement of attracting fish through the fishway by means of gates/headpond level manipulations. There are also no references to the need to manipulate the gates/headpond levels in order to achieve downstream migration. Here is a link to this presentation:

<http://hwy101windsor.ca/wp-content/uploads/2018/10/Avon-River-Aboiteau-Open-House-Boards.pdf>

17. On page 10 of this presentation, a list of fish species is presented as having recovery potential should tidal conditions return to the Avon River if this project is completed in 2022. These include Gaspereau, American Shad and Sturgeon. Since a number of fish species such as Gaspereau have an established commercial value, a dollar value (direct to fishermen and indirect) on the increase in productivity from the restoration of fish passage should be presented.

18. It's important to mention here that there were tangible commercial fishery benefits as a result of the causeway gate management plan at the Tantramar Causeway and as a result of the opening of the gates at the Petitcodiac Causeway in 2010. There are records of Sturgeon reaching the headwaters at both sites. That was an unexpected benefit. Sturgeon have a very long lifespan and have been documented as being present in the Minas Basin. They only mature for spawning around the age of 25 years, meaning that juveniles born before the construction of the causeway in 1968 could still return to the Avon River if given a chance.
19. Also, at the Tantramar Causeway, there was a major rise in the American Shad population following the gate management plan for fish passage, increasing from a few hundred fish a year to over 50,000 (conversations with fishermen).
20. Finally, the value of Gaspereau has increased significantly in recent years. This is due to a significant increase in the demand for bait for the lobster fishery and a diminution of other fish populations such as mackerel and herring. I have been told that the cost of bait is in the order of 1 dollar per pound (personal conversation with the president of the fishermen association). I, however, do not have specific knowledge of the habitat and fish passage needs upstream of the causeway and cannot therefore comment on the specific potential of this fishery.

## **Conclusion**

21. As I stated earlier, I am certain that the fishway design proposed will not result in acceptable and assumed fish passage. At the Petitcodiac Causeway, the fishway did not work because of the great differences in salinity, temperature and turbidity. There is also the critical factor of the difficulty in attracting fish if the priority is focused on keeping the headpond at a certain level. We worked with such a gate management plan on the Petitcodiac River for years with no tangible results. The same would occur in the Avon River. This is because the very large Fundy tides basically bury the freshwater flows. There are also many issues with downstream migration of adult and juvenile fish. As examples:
  - The lack of headpond fluctuation will not provide the trigger required for the downstream migration of fish from the headwaters to the gate structure (same issue happens at the Mactaquac Dam for downstream salmon, adult and smolt).
  - The very high temperature in the headpond from late June to early October (as much as 25 C) might be lethal to juveniles including salmonid.

- If the fish reach the structure, the downstream movement through the fishway and to the Bay might also be lethal due to high temperature difference (in the Petitcodiac in late May/early June, temperatures regularly used to reach 25 C in the headpond, while the tidal water temperatures registered as low as 7 C).

22. I therefore strongly believe that the criteria and assumptions chosen for the project design are incomplete, insufficiently thorough and will result in unacceptable fish passage at this control structure, the exception possibly being for smelt in the spring due to high freshwater flow (freshet). Their return migration to sea is however another matter.
23. The documents presented to the public and to the Mikmaq to describe the option of restoring free tidal flow to the Avon River also suggested expensive remediation items such as a \$50 million cost item to rebuild the dikes and aboiteau. This number is most likely incorrect and it would be more practical for stakeholders to be able to compare the full cost of "Option D" (the proposed new dike-control gates-fishway structure) with one that would achieve free tidal flow (an "Option E").
24. Cost comparisons aside, the matter before DFO and this project revolves around the requirement to achieve safe fish passage. The only way to achieve unobstructed fish passage in the Avon River, in my professional opinion, is to restore free tidal flow. A fishway added to the proposed tidal control structure will not accomplish this, as abundantly demonstrated in similar Inner Bay of Fundy estuaries.