

RECEIVED February 20, 2024

**NOVA SCOTIA AQUACULTURE REVIEW BOARD**

IN THE MATTER OF: *Fisheries and Coastal Resources Act*, SNS 1996, c 25

- and -

IN THE MATTER OF: An Application by KELLY COVE SALMON LTD. for a boundary amendment and two new finfish aquaculture licenses and leases for the cultivation of Atlantic salmon (*Salmon salar*) – AQ#1205x, AQ#1432, AQ#1433, in Liverpool Bay, Queens County

**Rebuttal Affidavit of Kurt Samways, PhD affirmed on February 16, 2024**

I affirm and give evidence as follows:

1. I am Kurt Samways, PhD of Saint John, New Brunswick. I am a Research Associate and Parks Canada Research Chair in Aquatic Restoration at the University of New Brunswick, Saint John in the Department of Biological Sciences and Canadian Rivers Institute
2. I have personal knowledge of the evidence affirmed in this affidavit except where otherwise stated to be based on information and belief.
3. I state, in this affidavit, the source of any information that is not based on my own personal knowledge, and I state my belief of the source.
4. I have received and reviewed the following reports:
  - (a) Report of Jonathan W. Carr attached as Exhibit A to his Affidavit affirmed on January 19, 2024 and filed in this proceeding by Intervenor Protect Liverpool Bay Association (the “**Carr Report**”); and
  - (b) Report of Dr. Edmund Halfyard attached as Exhibit B to his Affidavit affirmed on January 19, 2024 and filed in this proceeding by the Intervenor Protect Liverpool Bay Association (the “**Halfyard Report**”).
5. Kelly Cove Salmon (“**KCS**”) has requested my independent expert opinion in response to the opinions expressed in the Carr Report and the Halfyard Report.
6. My response to the Carr Report and the Halfyard Report is attached as **Exhibit A**.

7. My CV was previously filed in this proceeding and is located at Exhibit B of my Affidavit affirmed on January 19, 2024.

**AFFIRMED** before me virtually on MS Teams with Dr. Samways in Fredericton, New Brunswick and me in Halifax, Nova Scotia, on February 16, 2024.

[REDACTED]

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Sara D. Nicholson  
Barrister of the Supreme Court of Nova Scotia

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Kurt Samways, PhD

**KCS Application re AQ#1205X, AQ#1432,  
AQ#1433 in Liverpool Bay, Queens County**

This is Exhibit A referred to in the Affidavit  
of Kurt Samways, PhD virtually affirmed  
before me  
on February 16, 2024.



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Sara D. Nicholson  
Barrister of the Supreme Court of Nova Scotia

# Rebuttal to the Reports of Jonathan W. Carr and Dr. Ed Halfyard

Kurt Samways, PhD

February 16, 2024

## (1) Introduction

1. At the request of Kelly Cove Salmon Ltd. (“**KCS**”), I have reviewed the following reports:
  - (a) Report of Jonathan W. Carr attached as Exhibit A to his Affidavit affirmed on January 19, 2024 and filed in this proceeding by Intervenor Protect Liverpool Bay Association (the “**Carr Report**”); and
  - (b) Report of Dr. Edmund Halfyard attached as Exhibit B to his Affidavit affirmed on January 19, 2024 and filed in this proceeding by the Intervenor Protect Liverpool Bay Association (the “**Halfyard Report**”).
2. In this report, I provide my independent expert opinion in response to the opinions expressed in the Carr Report and the Halfyard Report (collectively, the “**Reports**”).

## (2) Response to the Reports

3. The Carr Report is based on three questions:
  - (a) What impacts, if any, will the proposed sites have on the survival of wild Atlantic salmon?
  - (b) Will the proposed expansion impede wild Atlantic salmon recovery efforts?
  - (c) Are there steps the applicant could take to avoid or mitigate impacts on wild salmon in the event the application is approved?
4. The summary of findings in the Carr Report includes:
  - (a) A substantial body of peer-reviewed scientific literature demonstrates the impacts of open net pen salmon aquaculture on wild salmon.
  - (b) Aquaculture has been implicated in the decline of salmon in the Bay of Fundy and Southern Uplands of Nova Scotia.
  - (c) KCS’s proposed new and expanded open net-pen sites will likely have significant adverse effects on the survival and recovery of wild Atlantic salmon.

- (d) The existing regulatory framework is not sufficient to protect wild Atlantic salmon from the impacts of aquaculture.
- (e) There are several actions the applicant should take to avoid, mitigate, and monitor the impacts of the farm on wild Atlantic salmon.

**A. The Reports state that substantial body of peer-reviewed scientific literature demonstrates the impacts of open net pen salmon aquaculture on wild salmon**

- 5. There are little to no wild salmon left in the area. The Mersey River has been extirpated through the permitted installation of dams (many without fish passage).
- 6. They concede that the magnitude of impacts on wild populations is related to, among other factors, the size of wild populations (citing: Keyser et al. 2018, Tab 20; DFO 2021; Diserud et al. 2022). The fact remains that there is no wild population left in Mersey River, therefore there is minimal impact to any local population.

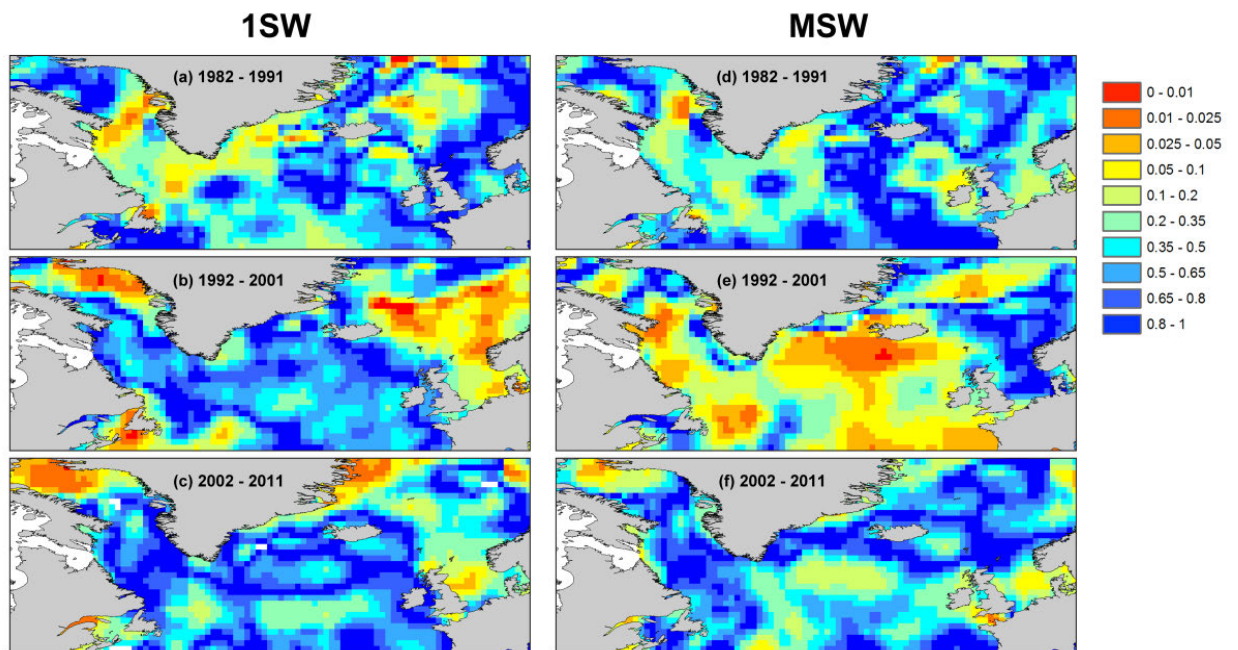
**B. The Reports state that aquaculture has been implicated in the decline of salmon in the Bay of Fundy and Southern Uplands of Nova Scotia**

- 7. There is no direct evidence that aquaculture has caused the decline of salmon in Bay of Fundy and Southern Uplands of Nova Scotia. Implications are circumstantial and/or correlative at best.
- 8. Industry (e.g., forestry, pulp/paper plants, lumber mills), construction of road/culvert barriers, construction of dams without fish passage, and the renewed licensing of dams and/or hydroelectric facilities without fish passage upgrades, have and continue to have a long, documented history of directly causing the decline and in some cases the complete extirpation of salmon. Yet, these industries/activities continue with little scrutiny to have a much greater impact to wild salmon survival and recovery.

**C. The Reports state that in the absence of information to demonstrate otherwise, KCS's proposed projects in Liverpool Bay will most likely have significant adverse impacts on the survival and recovery of Atlantic salmon**

- 9. The Reports claim that the proposed expansion of salmon aquaculture in Liverpool Bay poses a significant risk to wild salmon, particularly on those from the Medway River that are likely to have the greatest exposure to the open net-pens.

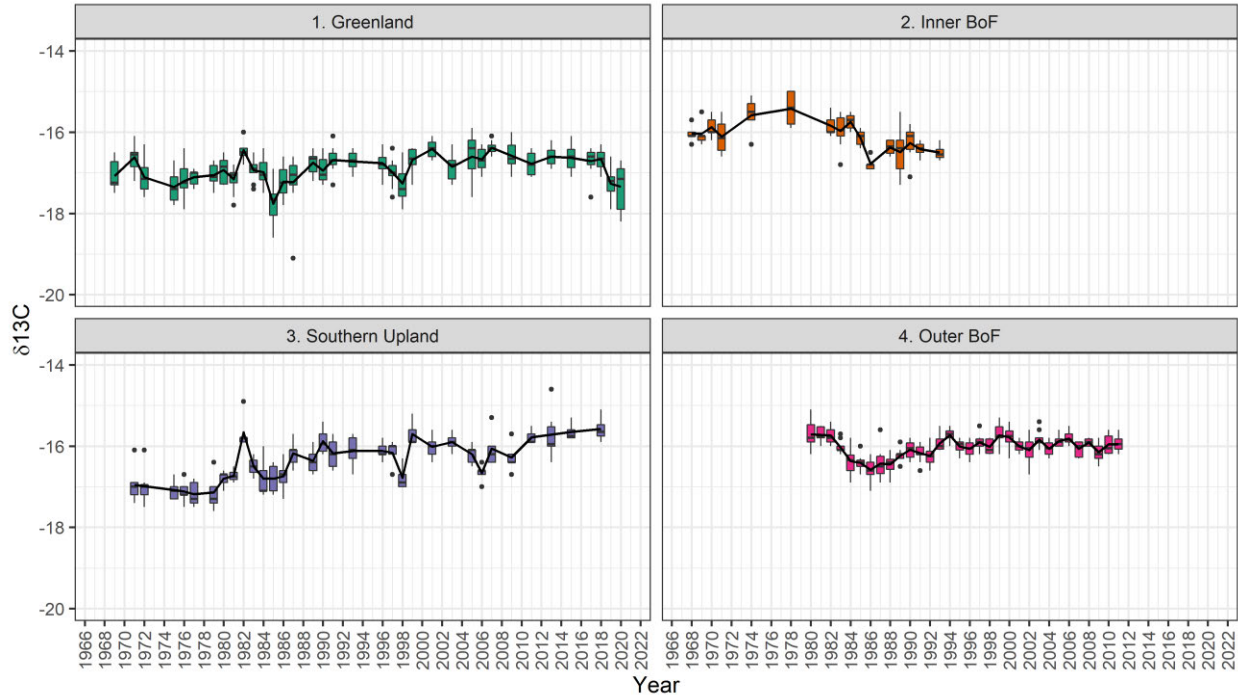
10. The general migration pattern of many Atlantic salmon populations, including the Southern Uplands population is well established. In general, salmon emigrate from their rivers and migrate to the north Atlantic off the coast of Greenland. A study by Soto et al. in 2024 demonstrated that Atlantic salmon from the Saint John River have shifted their migratory range and ocean feeding regions to increasingly more northern location over the past 3 decades (Figure 1).



**Figure 1.** Probable marine summer feeding locations derived from correlations of scale  $\delta^{13}\text{C}$  and yearly median sea surface temperature (SST) for 1SW (left) and MSW (right) Atlantic Salmon returning successfully to the Saint John River, Canada, during the period 1982–1991 (a and d), 1992–2001 (b and e), and 2002–2011 (c and f). Colors indicate the *P* - value of the correlation, adjusted for autocorrelation (Soto et al. 2024).

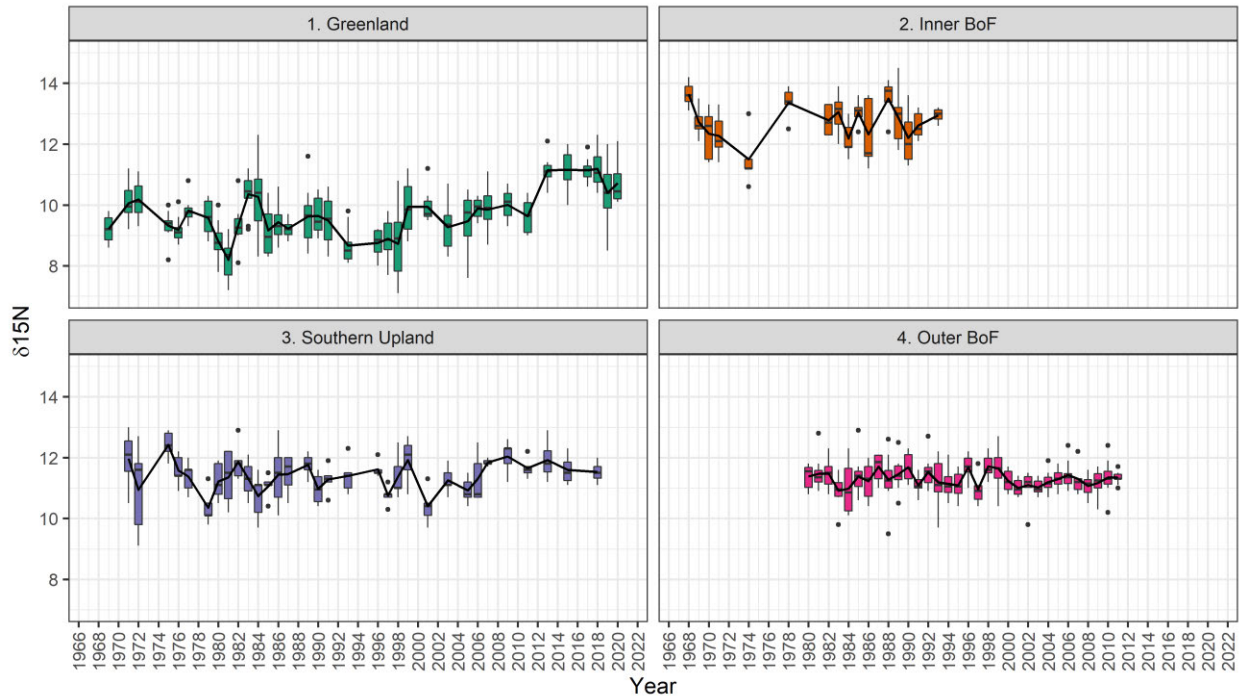
11. Using stable isotope analysis, we demonstrated that marine feeding of salmon off the coast of Greenland has not changed their diet since the 1960's, nor have salmon returning to their natal rivers to spawn (Figures 2-5) (Emily Weigum, University of New Brunswick, unpublished data). This shows that neither out migrating smolts nor returning adult salmon are spending any significant time around marine cages to feed.

12. Atlantic salmon from the LaHave River (DFO's Southern Uplands Population index river), which do migrate north past the Liverpool Bay site, also show no indication of spending time feeding near marine aquaculture areas (Figures 2-5) (Emily Weigum, University of New Brunswick, unpublished data).

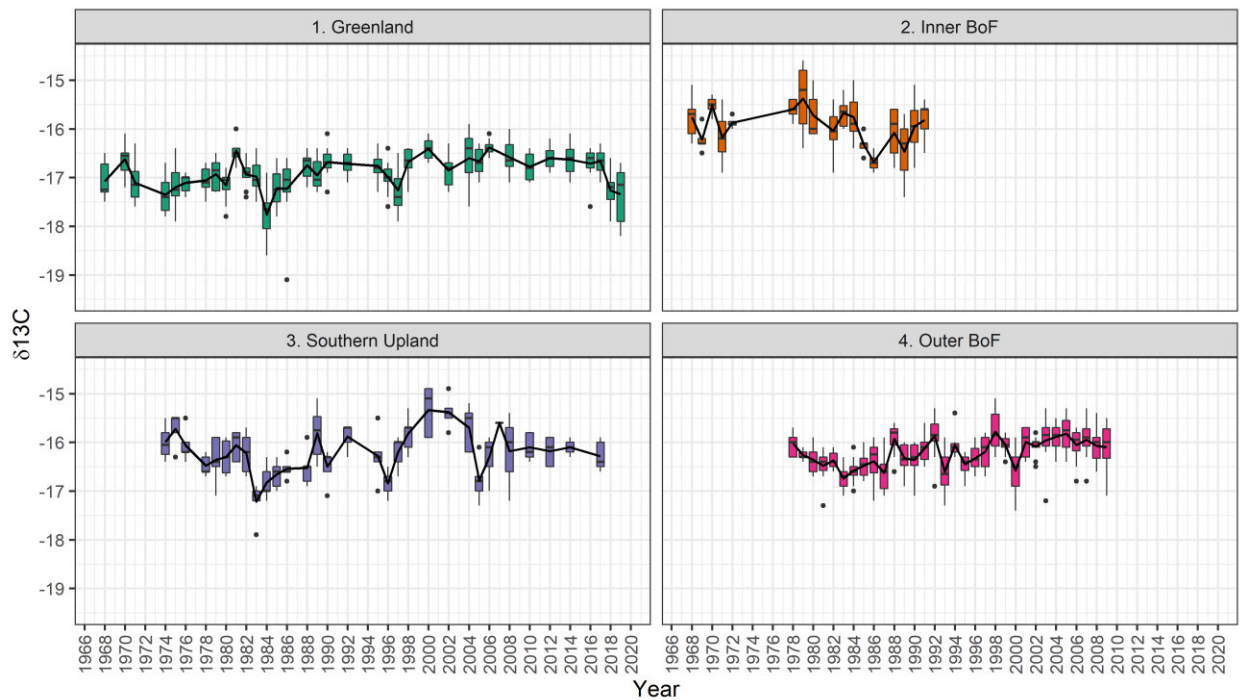


**Figure 2.** Carbon isotope values of 1SW Atlantic salmon.



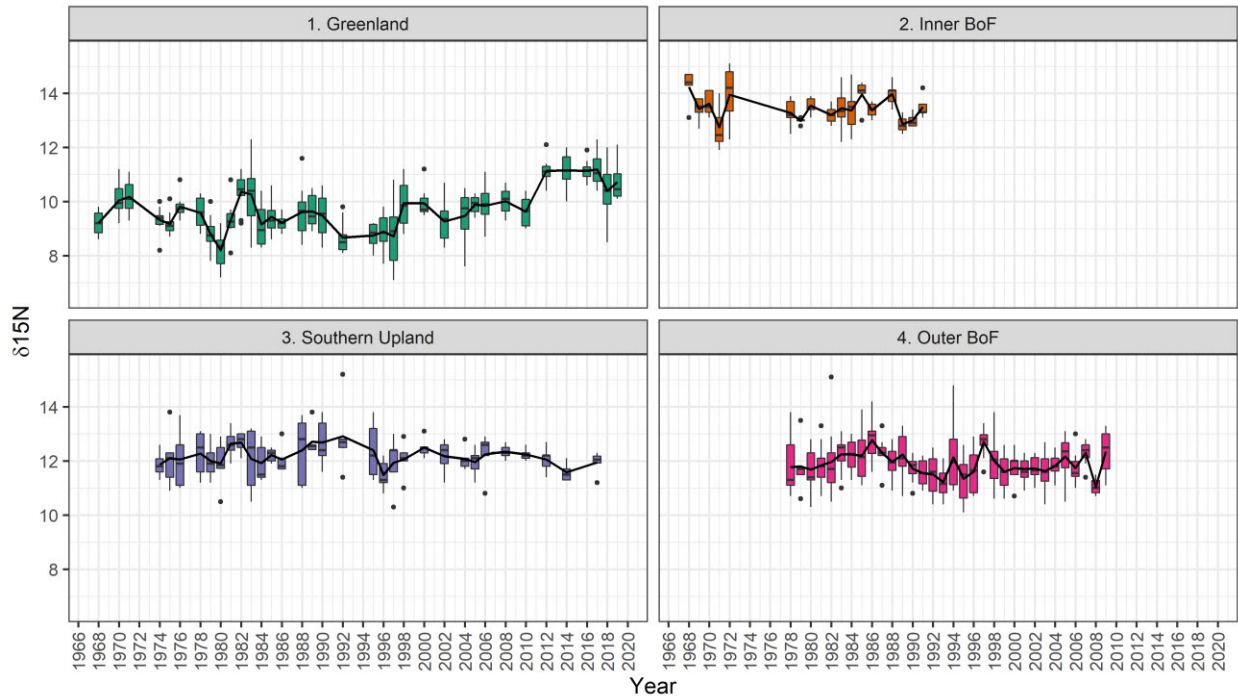


**Figure 3.** Nitrogen isotope values of 1SW Atlantic salmon.



**Figure 4.** Carbon isotope values of MSW Atlantic salmon.



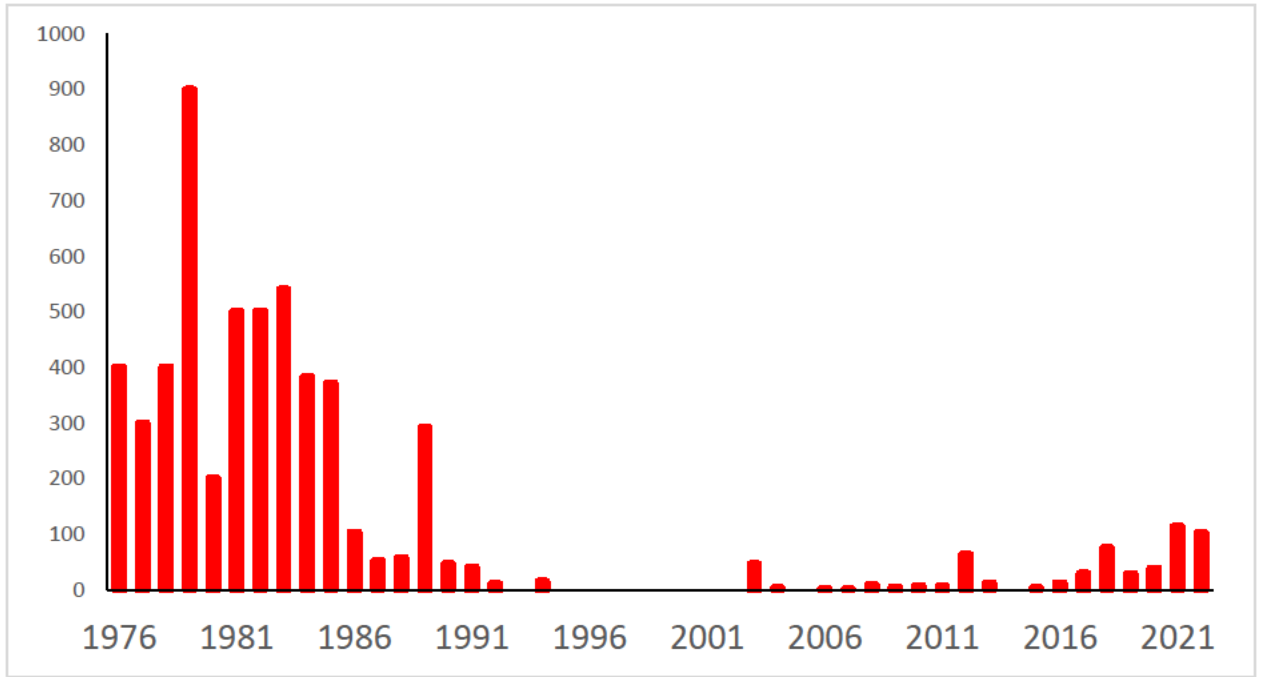


**Figure 5.** Nitrogen isotope values of MSW Atlantic salmon.

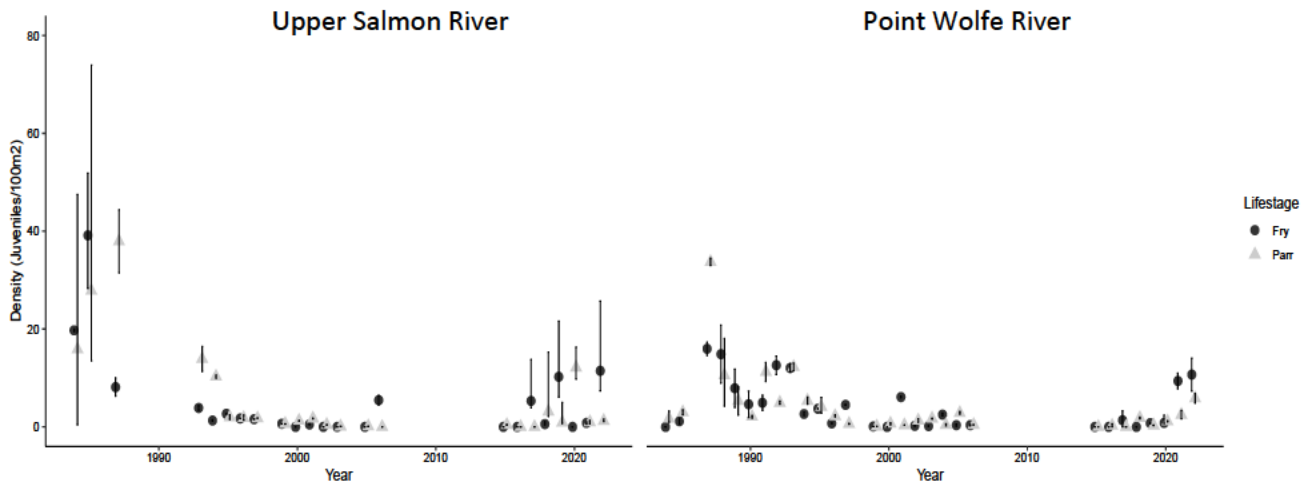
13. If salmon were spending time in the areas around marine cages during their migration from or returning to their natal river, their isotope values would be in the range of -15.6 to -14.8 and 7.7 to 8.8 for  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  respectively (Kurt Samways, University of New Brunswick, unpublished data). Although,  $\delta^{13}\text{C}$  values of returning one and two sea-winter fish to the LaHave River (-17.6 to -14.6 and -17.0 to -14.9; respectively) do overlap with aquaculture site values, their broad range relative to aquaculture sites suggests feeding is unlikely. With  $\delta^{15}\text{N}$  values of one and two sea-winter fish (9.1 to 13.0 and 10.3 to 15.2; respectively) being well outside those found in aquaculture sites, this is strong evidence that migrating LaHave River fish are spending little time in the vicinity of aquaculture sites feeding.
14. Based on the evidence of migratory patterns and ocean feeding (see above), there is little evidence to support that fish leaving/returning to the Medway River would venture south along the coast before migrating to the north Atlantic. Therefore, there would be no interaction with the proposed Liverpool Bay Finfish Marine Aquaculture Development Plan.

**D. The Reports state that KCS has not sufficiently assessed the impacts of the proposed farms on ongoing recovery efforts**

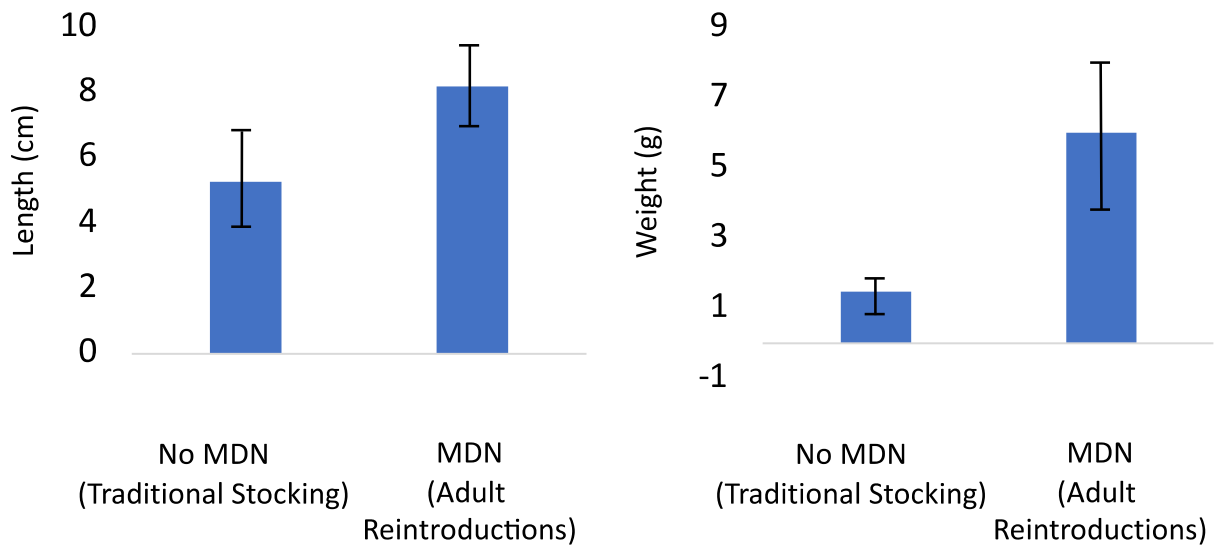
15. The Reports make the claim there is no evidence from their existing program that wild salmon production has increased due to their (i.e., Fundy Salmon Recovery) efforts, citing Roth 2023.
16. Roth 2023 is a YouTube video of a presentation based on Mr. Roth's PhD dissertation for a two-year smolt-to-adult supplementation study in a small isolated section of the Mill Stream, which is a tributary of the Miramichi River and not the Fundy Salmon Recovery Program being carried out on two rivers in Fundy National Park and the Petitcodiac River as cited in Dr. Samways' affidavit.
17. Empirical evidence does in fact show that wild salmon production has increased through the Fundy Salmon Recovery efforts, including:
  - (a) Numbers of adult returns has increased from zero in 2015, when the Fundy Salmon Recovery Program began, to a 30 year high in 2022 (Figure 7) (John Robinson, Fundy National Park, unpublished data);
  - (b) Juvenile densities have increased in both the Upper Salmon and Point Wolfe Rivers in Fundy National Park (Figure 8) (John Robinson, Fundy National Park, unpublished data); and
  - (c) Parr produced from natural spawning of the adults released from the Fundy Salmon Recovery Program are on average 3 cm longer and 5 grams heavier than parr produced from stocked hatchery produced unfed fry (Figure 9) (Kurt Samways, University of New Brunswick, unpublished data).



**Figure 7.** Number of Atlantic salmon returning to Fundy National Park.



**Figure 8.** Juvenile densities in the Upper Salmon and Point Wolfe Rivers in Fundy National Park.



**Figure 9.** Comparison of the length and weight of salmon parr in Fundy National Park. Parr originated from either hatchery produced unfed fry stocked into Fundy National Park rivers, or the result of natural spawning from adults released into the Upper Salmon River.

18. The Reports also make the claim that all stocking programs are likely to do more harm to the wild salmon population than help.
19. Without human intervention, the Inner Bay of Fundy Atlantic salmon population would have gone extinct (DFO 2010). As with anything there are good practices and bad practices and using only bad practices as evidence is not objectivity.
20. I agree with Dr. Halfyard in that the Medway River catchment contains an abundance of suitable habitat supporting populations of wild Atlantic salmon. Should salmon and/or habitat restoration initiatives be implemented on the Medway River, the proposed Liverpool Bay Finfish Marine Aquaculture Development Plan would not impede those efforts.
21. It is clear from the study by Gibson and Bowlby (2013), that without human intervention or a change in vital rates (e.g., increased freshwater production or at sea survival), the Southern Uplands population will go extinct. In my opinion, human intervention is needed to make the necessary changes to the vital rates influencing population dynamics.

**D. The Reports state that potential for escapes and harmful genetic introgression is significant and has not been adequately assessed**

22. It is well acknowledged that escapes can impact wild salmon through introgression. However, the Reports fail to acknowledge that there are no salmon in the area.
23. The Magaguadavic River did not have a wild Atlantic salmon population due to the natural falls barrier. Magaguadavic River population was created through stocking Outer Bay of Fundy Atlantic salmon above the falls by the DFO (Brian Glebe, retired DFO Scientist, Per. Comm).

**New References**

Soto, David, Michael Dadswell, Kurt Samways, Rick Cunjak, and Tom McDermott. 2024. Climate-driven Oceanic Range Shift of Saint John River Atlantic Salmon Revealed by Multidecadal Stable Isotope Trends. *Northeastern Naturalist*. 30(4):521-539.