



HOUSE OF COMMONS  
CHAMBRE DES COMMUNES  
CANADA

# **WILD ATLANTIC SALMON IN EASTERN CANADA**

## **Report of the Standing Committee on Fisheries and Oceans**

**Scott Simms  
Chair**

**JANUARY 2017**

**42<sup>nd</sup> PARLIAMENT, 1<sup>st</sup> SESSION**

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# **THE STANDING COMMITTEE ON FISHERIES AND OCEANS**

has the honour to present its

## **FIFTH REPORT**

Pursuant to its mandate under Standing Order 108(2), the Committee has studied Wild Atlantic Salmon in Eastern Canada and has agreed to report the following:





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## INTRODUCTION

On 21 April 2016, the House of Commons Standing Committee on Fisheries and Oceans (the Committee) agreed to “undertake a comprehensive study on the conservation, restoration and socio-economic issues related to the Atlantic salmon in Canada.”<sup>1</sup>

The Committee convened six meetings between May and October 2016 to study the matter, hearing submissions and testimony from representatives of Fisheries and Oceans Canada (DFO), scientists, Indigenous communities, environmental and salmon conservation organizations, outfitters, and recreational fishers (a complete list is attached to this report). The Committee members would like to express their sincere thanks to the witnesses who appeared before them to share their knowledge, experience and recommendations over the course of this study. These contributions were invaluable in the preparation of the following report, and the Committee members acknowledge those involved with gratitude.

The Committee also traveled to Miramichi, New Brunswick, in September 2016 to hear from local environmental and salmon conservation organizations as well as the region’s First Nations. In South Esk, the Committee visited the Miramichi Salmon Conservation Centre, the oldest operating salmon hatchery in Canada, in order to speak with members of the Miramichi Salmon Association engaged in wild salmon conservation.

The Committee is pleased to present its report, in which it makes recommendations to the federal government. These recommendations are based on the testimony of witnesses as well as the Committee’s own analysis of the issues.

## BACKGROUND

### A. Previous Committee Studies

The Committee initiated a study on wild Atlantic salmon (*Salmo salar*) in April 2005 and held one meeting, during which it heard from salmon conservation groups in Nova Scotia.<sup>2</sup> The Committee had not yet determined its next steps when the 38<sup>th</sup> Parliament was dissolved.

### B. Life Cycle, Distribution of the Species and Populations Diversity

The wild Atlantic salmon is an anadromous fish, typically being born in freshwater, migrating to the sea to feed and grow after having spent two to six or seven years in freshwater as juveniles (smolt), and returning to its natal river to spawn after one to three years at sea (Figures 1 and 2).<sup>3</sup> Atlantic salmon reproduce in coastal rivers of

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1 House of Commons, Standing Committee on Fisheries and Oceans, [Minutes of Proceedings](#), 21 April 2016.

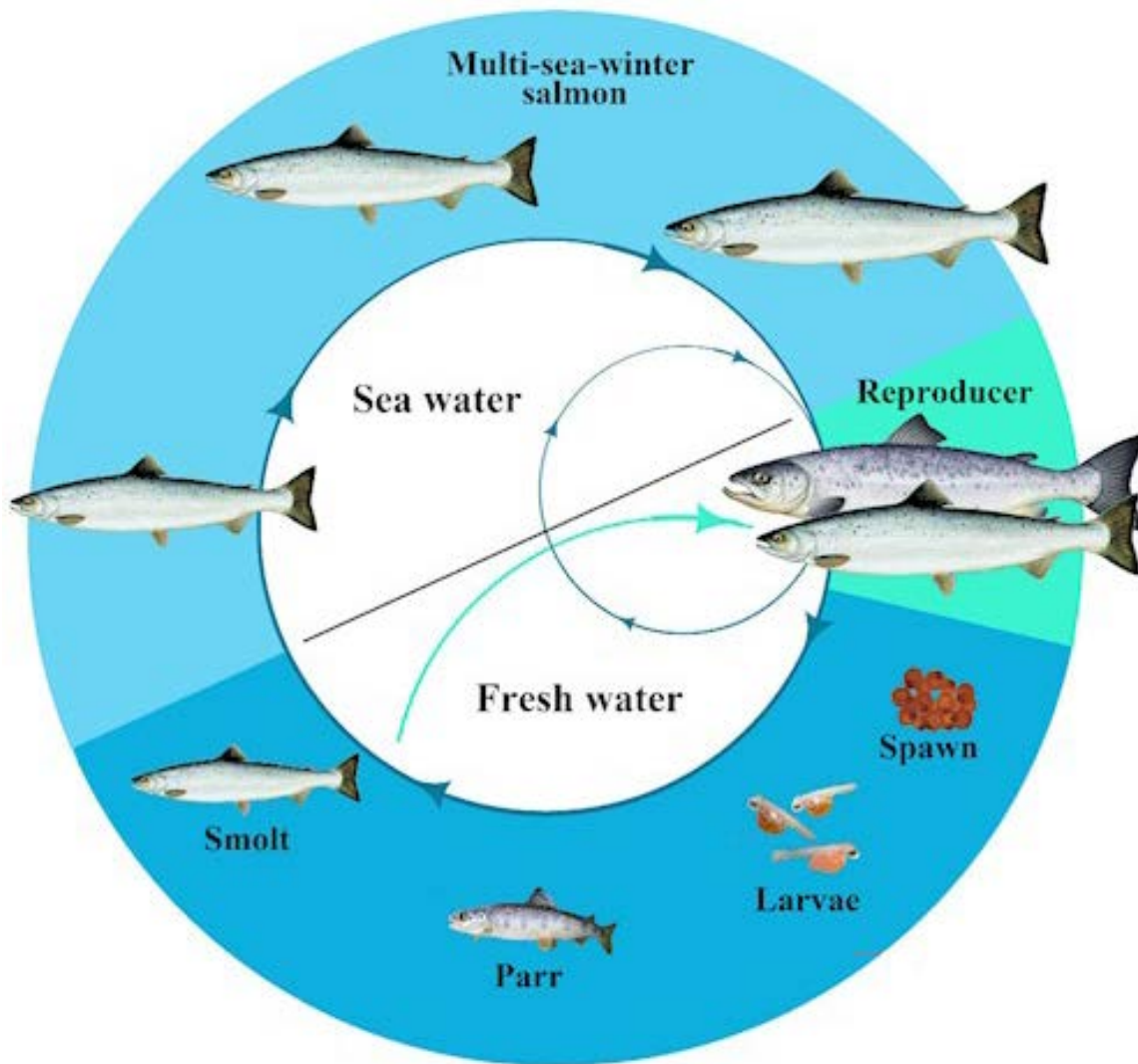
2 House of Commons, Standing Committee on Fisheries and Oceans, [Evidence](#), 14 April 2005.

3 Fisheries and Oceans Canada [DFO], [Our Atlantic Salmon Story](#).

northeastern North America, Iceland, Europe, and northwestern Russia and migrate long distances through various portions of the North Atlantic Ocean.<sup>4</sup>

During its hearing in Miramichi, the Committee learned that the Atlantic Salmon Federation's acoustic telemetry studies identified the Strait of Belle Isle as a critical passage zone for North American salmon travelling to Greenland.<sup>5</sup> European and North American populations of Atlantic salmon share similar summer feeding grounds off southwestern Greenland where they grow on a diet of crustaceans and small fish.<sup>6</sup>

**Figure 1 – Atlantic salmon's Life Cycle**



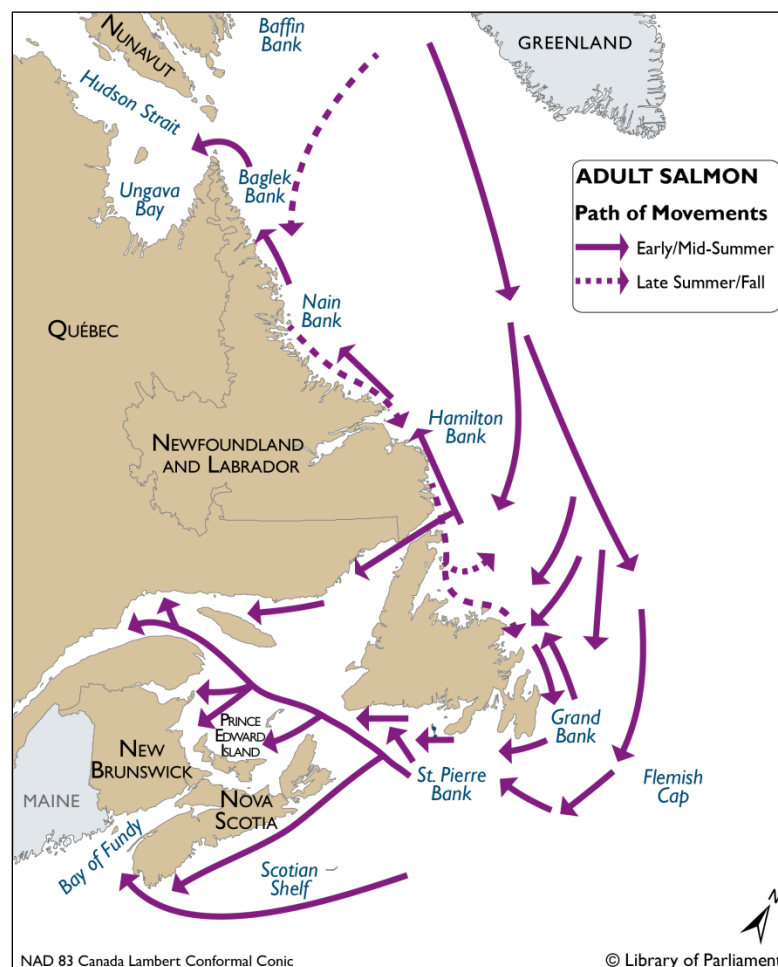
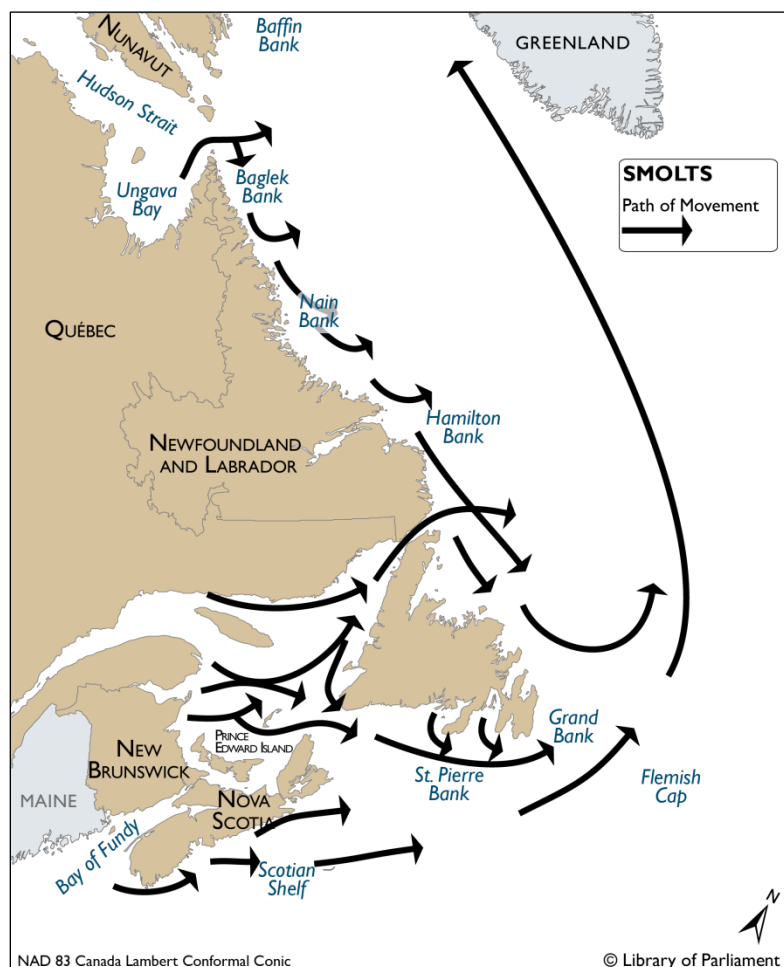
Source: [Saumon Quebec](#).

4 The Atlantic Salmon Trust, [The Salmon's Lifecycle, its Habitat, Threats and Concerns](#).

5 Jonathan Carr, Executive Director of Research, Atlantic Salmon Federation, [Evidence](#), 29 September 2016.

6 Malcolm L. Windsor et al., [Atlantic salmon at sea: Findings from recent research and their implications for management](#), North Atlantic Salmon Conservation Organization (NASCO) document CNL(12)60, May 2012.

Figure 2 – Atlantic salmon's Marine Migration Route in Eastern Canada



Sources: Map prepared by Library of Parliament, Ottawa, 2016, using data from Natural Resources Canada. [Boundary Polygons](#). In: *Atlas of Canada National Scale Data 1:5,000,000 Series*. Ottawa: Natural Resources Canada, 2013. Committee on the Status of Endangered Wildlife in Canada. [Assessment and Status Report on the Atlantic Salmon in Canada](#), Ottawa: Environment Canada, Species at Risk Public Registry, 2011. The following software was used: Esri, ArcGIS, version 10.3.1. Contains information licensed under [Open Government Licence – Canada](#).

In Newfoundland and Labrador, most of the salmon come back between April and November after spending one year at sea (grilse). In contrast, in the Maritime Provinces and in Quebec, many returning adults are multi-sea-winter salmon. Therefore, there are differences in life history, size, and proportion of females in salmon populations across rivers throughout Eastern Canada.<sup>7</sup>

### C. State of the Species

Table 1 provides information on the status of wild Atlantic salmon populations in Eastern Canada based on the 2010 assessment by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The Inner Bay of Fundy population is listed and protected under the *Species at Risk Act* (SARA). Therefore, DFO has developed a recovery strategy to arrest or reverse the decline of that population.<sup>8</sup>

**Table 1 – COSEWIC Assessment: *Salmo salar*, 2010**

Status	Population
Data deficient	Nunavik
Not at risk	Labrador, Northeast Newfoundland, Southwest Newfoundland, Northwest Newfoundland
Special concern	Quebec Eastern North Shore, Quebec Western North Shore, Inner St. Lawrence, Gaspé-Southern Gulf of St. Lawrence
Threatened	South Newfoundland
Endangered	Anticosti Island, Eastern Cape Breton, Nova Scotia Southern Upland, Inner Bay of Fundy, Outer Bay of Fundy
Extinct	Lake Ontario <sup>9</sup>

Source: Based on information from COSEWIC's [Species at Risk Public Registry](#), accessed 6 October 2016.

In Canada, the abundance of wild Atlantic salmon has declined from a peak of 1.8 million in 1975 to an average of 0.7 million from 2003 to 2012.<sup>10</sup> The large salmon component has been the most affected by this drop in population.<sup>11</sup> Many of the more than 1,000 spawning rivers no longer have any salmon return and the rivers that have suffered the greatest losses tend to be in southern areas.<sup>12</sup>

7 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

8 DFO, [Recovery Strategy for the Atlantic salmon \(\*Salmo salar\*\), inner Bay of Fundy populations](#), April 2010.

9 The [Lake Ontario Atlantic Salmon Restoration Program](#) was initiated in 2006 and is structured in five-year phases, with Phase 3 launched in 2016. The program is anticipated to take 10 to 15 more years to re-establish a self-sustaining population of Atlantic salmon in Lake Ontario.

10 Gerald Chaput, [Atlantic Salmon Stock Status in Eastern Canada](#), 6 May 2015, p. 34.

11 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

12 Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management, DFO, [Evidence](#), 10 May 2016.

In 2014, conservation limits were met in only 30% of the 60 assessed rivers, and 42% of assessed rivers achieved less than 50% of the conservation limits.<sup>13</sup> New Brunswick's Miramichi River, an important producer of salmon in North America, has not reached sustainable spawning levels for the past three years<sup>14</sup> and saw the lowest ever estimated return of adult salmon in 2014.<sup>15</sup>

In northern Newfoundland and Labrador (mainly in Labrador), returns were healthier. The situation in southern Newfoundland, however, was not as promising with one population assessed as threatened. Atlantic salmon fisheries across Europe have shown a similar decline, reinforcing the observed trend of southern populations being more affected than northern populations.<sup>16</sup>

#### **D. Harvest of Atlantic salmon in Eastern Canada**

A moratorium on commercial Atlantic salmon fishing in Canada has been in place since 2000.<sup>17</sup> However, three groups can still harvest wild salmon: Indigenous communities for food, social and ceremonial (FSC) purposes, residents fishing for food in Labrador, and recreational fishers in certain areas.<sup>18</sup> For many Indigenous communities of the region, Atlantic salmon is mainly used for food purposes and shared within the community, or between relatives, friends and elders.<sup>19</sup>

In 2015, landings of Atlantic salmon by all users (Indigenous communities, recreational fishers, and residents of Labrador) were just over 130 tonnes compared to 2,500 tonnes in the early 1970s.<sup>20</sup> Indigenous communities' catch was approximately 62 tonnes, the estimated catch for residents fishing for food in Labrador was 2 tonnes, and harvest in recreational fisheries totalled about 70 tonnes.<sup>21</sup>

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13 Gerald Chaput (2015), p. 44.

14 Jerry Doak, Owner, W.W. Doak Fishing Tackle Shop, As an Individual, [Evidence](#), 17 May 2016.

15 Rick Cunjack, Professor, Department of Biology, University of New Brunswick, As an Individual, [Evidence](#), 19 May 2016.

16 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

17 DFO and Québec Ministère des Ressources naturelles et de la Faune, [Conservation Status Report, Atlantic Salmon in Atlantic Canada and Québec: Part II– Anthropogenic Considerations](#), Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2870, 2009, p. 6.

18 DFO, [Stock Assessment of Newfoundland and Labrador Atlantic Salmon – 2013](#), Science Advisory Report 2014/023, Canadian Science Advisory Secretariat, December 2013, pp. 3-4.

19 Catherine Lambert, Executive Director, Mi'gmaq Maliseet Aboriginal Fisheries Management Association, [Evidence](#), 29 September 2016.

20 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

21 International Council for the Exploration of the Sea, [Report of the Working Group on North Atlantic Salmon \(WGNAS\)](#), ICES WGNAS Report 2016, Copenhagen, Denmark, 30 March-8 April 2016.

## E. Socio-Economic Importance of Wild Atlantic salmon

A study by Gardner Pinfold evaluated at \$166 million in 2010 all spending related to wild Atlantic salmon in Eastern Canada.<sup>22</sup> Most of the spending was attributable to recreational fishing (77%). The largest expenditures occurred in New Brunswick (43%), followed by Quebec (28%), and Newfoundland and Labrador (23%). The same study estimated that the 2010 spending related to wild salmon generated additional economic activity through direct and indirect impacts, including \$150 million in Gross Domestic Product (GDP), about 4,000 full time jobs and \$128 million in labour income.

Wild Atlantic salmon is especially important economically for rural areas in Eastern Canada. The Committee heard from Fred Parsons, Environment Resources Management Association, on the conversion of Newfoundland's Exploits River from a hydroelectricity producing river into a "world-class" salmon river after the closure of the pulp and paper mill in the region.<sup>23</sup> After a successful initial seeding program and the building of fishways, the recreational salmon fishery in the Exploits River now represents an estimated source of \$8 to \$10 million a year for the surrounding rural towns.

Given that the last comprehensive study evaluating the economic value of the Atlantic salmon fishery took place in 2010, the Committee recommends:

### **Recommendation 1**

**That Fisheries and Oceans Canada continue research to determine the economic value of the Atlantic salmon to First Nations and recreational fisheries at least every three years.**

Beyond the economic aspects, wild Atlantic salmon has an important cultural value for local communities. As historian Morris Green stated, this "species is, and has been, as much a part of our lives as the forests that surround the river valley, the river, and the air."<sup>24</sup> For Catherine Lambert, Mi'gmaq Maliseet Aboriginal Fisheries Management Association, Atlantic salmon is a species "at the heart of the identity of the Mi'kmaq and Maliseet peoples" and represents a "vital link with the culture, with a way of life, and even with survival on reserves."<sup>25</sup>

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22 Gardner Pinfold, [Economic Value of Wild Atlantic Salmon](#), prepared for the Atlantic Salmon Federation, September 2011, p. V.

23 Fred Parsons, Environment Resources Management Association, [Evidence](#), 5 October 2016.

24 Morris Green, Author, Historian, As an Individual, [Evidence](#), 19 May 2016.

25 Catherine Lambert, Executive Director, Mi'gmaq Maliseet Aboriginal Fisheries Management Association, [Evidence](#), 29 September 2016.



## F. Report of the Ministerial Advisory Committee on Atlantic salmon and Government's Response

In response to the continued decline of salmon returns, a Ministerial Advisory Committee on Atlantic salmon was established in March 2015. The Advisory Committee completed its final report in July 2015 comprising 61 recommendations.<sup>26</sup> On 20 June 2016, DFO released a *Departmental Forward Plan for Atlantic Salmon* describing strategies to advance the recommendations of the report prepared by the Ministerial Advisory Committee on Atlantic salmon.<sup>27</sup>

### CHALLENGES FACING THE WILD ATLANTIC SALMON

The Committee heard extensive evidence about environmental and anthropogenic challenges that influence the health of the salmon resource. Key factors include freshwater environment issues, marine survival, predation and the commercial harvest of adult salmon by Greenland.

#### A. Freshwater Environment Issues

##### Habitat Quality

Atlantic salmon require healthy rivers throughout its distribution for optimal survival and fish that grow in healthier freshwater environments are fitter ones that have better marine survival probability.<sup>28</sup> Disruptions to freshwater habitat such as hydroelectric dams contributed to the decline of the Atlantic salmon.<sup>29</sup> Invasive species (such as smallmouth bass in Miramichi Lake),<sup>30</sup> stocking methods, habitat fragmentation, and warming of rivers due to cumulative effects of climate change and damaging forestry practices were also mentioned as threats to salmon.<sup>31</sup>

Catherine Lambert emphasized that, to preserve the salmon's freshwater habitat, forestry practices leading to siltation in resting pools and spawning areas, and to flash flooding, need to undergo significant improvements.<sup>32</sup> Harry Collins, Miramichi River Environmental Assessment Committee, indicated to the Committee that increased forestry activities resulted in a greater input of warmer water into the Miramichi river system

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26 DFO, [A Special Report on Wild Atlantic Salmon in Eastern Canada](#), Minister's Advisory Committee on Atlantic Salmon, July 2015.

27 DFO, [Departmental Forward Plan for Atlantic Salmon](#), 20 June 2016.

28 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

29 Greg Roach, Chair, Minister's Advisory Committee on Wild Atlantic Salmon, [Evidence](#), 12 May 2016.

30 Mark Hambrook, President, Miramichi Salmon Association, [Evidence](#), 17 May 2016.

31 Brooke Nodding, Executive Director, Bluenose Coastal Action Foundation, [Evidence](#), 12 May 2016.

32 Catherine Lambert, Executive Director, Mi'gmaq Maliseet Aboriginal Fisheries Management Association, [Evidence](#), 29 September 2016.

already affected by climate change. There are now pool closures throughout the watershed even during the fishing season.<sup>33</sup>

Climate change and its effects on the freshwater environment also represent an issue in Newfoundland and Labrador, in the northern range of Atlantic salmon. Fred Parsons indicated that, compared to last year, salmon numbers are down 25% to 35% in 2016 due to very hot summers in 2013 and 2014 affecting the number of smolts going to sea.<sup>34</sup>

Acid rain is another factor that has had a large impact on Atlantic salmon's spawning success. The quality of spawning areas in Nova Scotia, for example, is particularly vulnerable.<sup>35</sup> Although DFO monitors water temperatures at its facilities and participates in the Water Temperatures Network for Atlantic salmon Rivers in Eastern Canada to create a database of freshwater temperatures, water quality monitoring is undertaken by the provinces, and, in the case of federal jurisdiction, by Environment and Climate Change Canada.

### **Unreported Fishing**

DFO informed the Committee that unreported harvests of Atlantic salmon were estimated to be about 24 tonnes in 2013 and 21 tonnes in 2014.<sup>36</sup> In the view of Jeffrey Hutchings, even if the absolute numbers of salmon that are illegally fished are small, the proportional effects on the depleted populations can be quite large.<sup>37</sup> For his part, historian Morris Green observed that the “virtual elimination” of federal and provincial fisheries officers along salmon rivers allowed poachers the “freedom to illegally harvest large numbers of salmon from cold-water pools, reducing substantially the number of large multi-winter spawners that lay their eggs.”<sup>38</sup>

## **B. Marine Survival**

The Committee learned that despite several conservation measures put in place over the years in freshwater habitat, Atlantic salmon abundance has continued to decline. Francois Caron indicated that, in general, “rivers continue to produce a relatively constant number of smolts, but the number of salmon that returned declined significantly.”<sup>39</sup> The decline has now affected the Miramichi River, a river that has:

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33 Harry Collins, Executive Director, Miramichi River Environmental Assessment Committee, [Evidence](#), 29 September 2016

34 Fred Parsons, Environment Resources Management Association, [Evidence](#), 5 October 2016.

35 Trevor Swerdfager, Assistant Deputy Minister, Ecosystems and Oceans Science, DFO, [Evidence](#), 10 May 2016.

36 Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management, DFO, [Evidence](#), 10 May 2016.

37 Jeffrey Hutchings, Professor of Biology, Canada Research Chair in Marine Conservation and Biodiversity, Dalhousie University, As an Individual, [Evidence](#), 12 May 2016.

38 Morris Green, Author, Historian, As an Individual, [Evidence](#), 19 May 2016.

39 Francois Caron, Biologist, Ministerial Advisory Committee on Atlantic Salmon, As an Individual, [Evidence](#), 19 May 2016.

no dams in the watershed, very little agriculture, no operating mines, and no large industrial polluters. The watershed is sparsely populated and is mostly forest land, so water quality is good, and if salmon can't thrive here, there's no hope for other rivers in the Maritimes that have far more problems.<sup>40</sup>

Marine survival is, therefore, seen by witnesses as a major constraint on salmon recovery. The return rate from the ocean is currently only approximately 1%, down from 5% to 6% years ago.<sup>41</sup>

### **Changing Ocean Conditions Driven by Climate Change**

Ocean conditions driven by climate, such as temperatures, are changing in a significant way affecting its biological productivity. However, according to DFO, more studies are needed to draw a linear relation between ocean conditions and the low marine survival of Atlantic salmon.<sup>42</sup> Gerald Chaput, DFO's Centre for Science Advice, also mentioned to the Committee that northern salmon populations seem to be less affected by changing ocean conditions compared to the southern populations.<sup>43</sup>

According to Jeffrey Hutchings, however, the marine environment might not have changed to the extent that is sometimes hypothesized. Rather, what has changed is the "ability of the depleted salmon populations to persist in the face of environmental conditions to which considerably larger populations might have been able to persist in the past."<sup>44</sup> Therefore, small populations are extremely vulnerable to unexpected natural and human-induced changes.

Witnesses noted a lack of knowledge about the fate and behaviour of the salmon once they get to the ocean. Consequently, increased monitoring of the environment and tracking of the species is critical to providing a link between salmon productivity and environmental conditions.<sup>45</sup>

Therefore, the Committee recommends:

#### **Recommendation 2**

**That Fisheries and Oceans Canada, in collaboration with Environment and Climate Change Canada, conduct comprehensive research into the effects of climate change on the full lifecycle of wild Atlantic salmon.**

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40 Mark Hambrook, President, Miramichi Salmon Association, [Evidence](#), 17 May 2016.

41 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

42 Trevor Swerdfager, Assistant Deputy Minister, Ecosystems and Oceans Science, DFO, [Evidence](#), 10 May 2016.

43 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

44 Jeffrey Hutchings, Professor of Biology, Canada Research Chair in Marine Conservation and Biodiversity, Dalhousie University, As an Individual, [Evidence](#), 12 May 2016.

45 Trevor Swerdfager, Assistant Deputy Minister, Ecosystems and Oceans Science, DFO, [Evidence](#), 10 May 2016.

## Open Net-Pen Salmon Aquaculture

The viability and recovery of depleted wild Atlantic salmon populations can be negatively affected by open net-pen salmonid aquaculture in coastal marine areas. The threats to wild Atlantic salmon populations include interbreeding between wild salmon and farmed escapees and the potential exchange of pathogens and diseases.<sup>46</sup>

The Committee heard evidence that, based on scientific studies, there is a much steeper decline in wild salmon populations in rivers close to salmon farms. Jonathan Carr gave the example of the Magaguadavic River, in southwestern New Brunswick, where unreported escapees from salmon farms have bred with wild salmon and “destroyed” the wild population.<sup>47</sup> The Committee was also told by Fred Parsons about a DFO study confirming extensive interbreeding between farmed and wild salmon in 17 out of the 18 rivers in southern Newfoundland.<sup>48</sup> Bill Taylor, Atlantic Salmon Federation, added that DFO’s recovery potential assessments for endangered and threatened wild salmon populations in the inner Bay of Fundy, along the Atlantic coast of Nova Scotia and on the south coast of Newfoundland, identified open net-pen salmon aquaculture as a “high-level” threat.<sup>49</sup>

## Genetically Modified Salmon

On 19 May 2016, Canada became the first country in the world to authorize the growth and sale for human consumption of a genetically engineered animal.<sup>50</sup> The AquaBounty AquAdvantage Atlantic salmon would be grown up to the eyed egg stage in Prince Edward Island in land-based facilities, and moved to Panama for grow-out. The salmon would then be brought back to Canada for sale as non-living organisms.

Robert Devlin informed the Committee that, according to a DFO risk assessment, in the event of escapement of the genetically modified fish, the potential risk to the environment, including wild Atlantic salmon, was assessed to be “very high.”<sup>51</sup> However, due to the “negligible” risk of such escapement, it was determined that the genetically modified salmon represents a “low risk” of environmental damage.

In the opinion of Susanna Fuller, Ecology Action Centre, however, even with a low risk of escapement, successful mating with the wild salmon, in small runs with few returning fish, can endanger the survival of the entire wild population.<sup>52</sup> Robert Devlin conceded that:

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46 Jeffrey Hutchings, Professor of Biology, Canada Research Chair in Marine Conservation and Biodiversity, Dalhousie University, As an Individual, [Evidence](#), 12 May 2016.

47 Jonathan Carr, Executive Director of Research, Atlantic Salmon Federation, [Evidence](#), 29 September 2016.

48 Fred Parsons, Environment Resources Management Association, [Evidence](#), 5 October 2016.

49 Bill Taylor, President, Atlantic Salmon Federation, [Evidence](#), 12 May 2016.

50 Robert Devlin, Engineering Research Scientist, DFO, [Evidence](#), 19 May 2016.

51 Robert Devlin, Engineering Research Scientist, DFO, [Evidence](#), 19 May 2016.

52 Susanna Fuller, Coordinator, Marine Conservation, Ecology Action Centre, [Evidence](#), 17 May 2016.

depending on the numbers of animals that escape, there is potential, particularly, as we've heard, in small populations, for those introgressions, or hybridizations events, to cause genetic damage and fitness damage to those smaller populations.<sup>53</sup>

While in Miramichi, the Committee also noted similar concerns expressed by Catherine Lambert regarding the risk presented by the potential escapement of genetically modified fish to the wild salmon and the lack of consultation with Indigenous communities during the authorization process.<sup>54</sup>

### C. Predation

Several witnesses expressed concerns regarding changing species balance related to the growing abundance of predators such as grey seals (*Halichoerus grypus*) and striped bass (*Morone saxatilis*) in the wild salmon's habitat. Bill Taylor, for example, pointed out that the survival rate of the smolt from the Grand Cascapedia and Restigouche rivers ranges from 60% to 70%. Yet, due to the increasing striped bass population in the estuary since 2011, the smolt survival rate leaving the Miramichi Bay is currently down to about 25% to 30%.<sup>55</sup> David LeBlanc, Restigouche River Watershed Management Council, also confirmed to the Committee that, in 2016, striped bass were caught for the first time in the Matapedia and Restigouche rivers.<sup>56</sup>

DFO observed, however, that Atlantic salmon populations in rivers without striped bass have also declined. In addition, striped bass and Atlantic salmon have always co-evolved together in the Miramichi River. Gerald Chaput mentioned to the Committee that diet and predation studies regarding striped bass and salmon in the Miramichi River are being conducted to assert the predation effects on salmon.<sup>57</sup>

Regarding predation by grey seals, DFO pointed out that the relation is not as clear as it is between grey seals and cod in the southern Gulf Region. Science reports indicate that the increasing abundance of grey seals has an impact on the recovery of cod but it is not the case for Atlantic salmon.<sup>58</sup> However, Francois Caron noted that, although the quantity of salmon predated by grey seals could be very low, if each seal eats only one salmon in a given year, the damage can be quite large given the grey seals' increasing population and the decline of the salmon.<sup>59</sup>

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53 Robert Devlin, Engineering Research Scientist, DFO, [Evidence](#), 19 May 2016.

54 Catherine Lambert, Executive Director, Mi'gmaq Maliseet Aboriginal Fisheries Management Association, [Evidence](#), 29 September 2016.

55 Bill Taylor, President, Atlantic Salmon Federation, [Evidence](#), 12 May 2016.

56 David LeBlanc, Chief Executive Officer, Restigouche River Watershed Management Council, [Evidence](#), 29 September 2016.

57 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

58 Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management, DFO, [Evidence](#), 10 May 2016.

59 Francois Caron, Biologist, Ministerial Advisory Committee on Atlantic Salmon, As an Individual, [Evidence](#), 19 May 2016.

## D. Greenland's Commercial Harvest

As the Atlantic salmon is a migratory species, Canada works with other [North Atlantic Salmon Conservation Organization](#) (NASCO) members to implement NASCO Regulations, Agreements and Guidelines geared towards the protection, restoration and enhancement of Atlantic salmon habitat. At the international level, Greenland's commercial harvest of Atlantic salmon has been a subject of concern in recent years.

Greenland harvests salmon originating from North America and Europe. It is the only fishery where catch has been increasing over the last 10 years. In addition, as the grilse do not migrate there, Greenland fishes large salmon, fish that would return to Canada as two-sea-winter and three-sea-winter salmon.<sup>60</sup> According to the 2016 International Council for the Exploration of the Sea (ICES) report, the total catch in Greenland has steadily increased over last ten years from 15 tonnes in 2005 to 57 tonnes in 2015.<sup>61</sup> Of the total Greenlandic harvest, 79% were North American salmon.

Witnesses called for a reduction of Greenland's commercial harvest levels and support Canada's continued engagement with Greenland bilaterally and through NASCO. Bill Taylor also indicated that improved management of Canadian Atlantic salmon fisheries is essential in negotiating a reduced salmon harvest in Greenland. It was pointed out to the Committee that all of Greenland's fishers must now report their catch, while, in Canada, reporting is still inadequate. In New Brunswick, for example, less than 10% of anglers actually report their catch.<sup>62</sup>

The Committee recommends:

### **Recommendation 3**

**That the Minister of Fisheries, Oceans and the Canadian Coast Guard lead a delegation of Canadian officials to meet with their counterparts from Greenland to address the detrimental overfishing of Atlantic salmon by Greenland and report results back to the Standing Committee on Fisheries and Oceans.**

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60 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

61 International Council for the Exploration of the Sea, [Report of the Working Group on North Atlantic Salmon \(WGNAS\)](#), ICES WGNAS Report 2016, Copenhagen, Denmark, 30 March-8 April 2016.

62 Bill Taylor, President, Atlantic Salmon Federation, [Evidence](#), 12 May 2016.

## ATLANTIC SALMON FISHERIES MANAGEMENT IN CANADA

In Eastern Canada, there are 34 Atlantic Salmon Fishing Areas or SFAs.<sup>63</sup> DFO manages 23 of them, with an annual budget in the range of \$12 million to \$15 million, whereas the management of the other 11 SFAs (usually referred to as Q1 to Q11) has been delegated to Quebec.<sup>64</sup> DFO and Quebec respond to declining wild Atlantic salmon populations with a number of measures varying from region to region:

- reducing daily or season bag limits;
- instituting mandatory catch and release fishing,<sup>65</sup> especially of large salmon;<sup>66</sup>
- closing of rivers where conservation limits were not met;
- putting restrictions on commercial fisheries to stop or minimize bycatch of Atlantic salmon, including requirements to modify fishing gear; and
- enhancing freshwater habitat protection in partnership with local conservation groups through the Atlantic Salmon Conservation Fund, the Recreational Fisheries Partnerships Program, and the Habitat Stewardship of the Species at Risk Program.<sup>67</sup>

### A. Catch-and-Release Fishing

Catch-and-release is a very common practice in recreational fisheries in Eastern Canada. In fact, 90% of the large salmon that are angled are released and almost 50% of the small salmon were returned to the river.<sup>68</sup> The policy of mandatory catch-and-release of salmon in the Maritime Provinces is supported by many salmon conservation groups including the Atlantic Salmon Federation and the Miramichi Salmon Association.<sup>69</sup>

According to Deborah Norton, Miramichi Watershed Management Committee, extensive studies were completed on catch-and-release fishing effects showing that there is only 3% to 5% resulting fish mortality.<sup>70</sup> Rene Aucoin, Nova Scotia Salmon Association,

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63 DFO, [Development of Reference Points for Atlantic Salmon \(\*Salmo salar\*\) that Conform to the Precautionary Approach](#), Canadian Scientific Advisory Secretariat, Report 2015/058, December 2015, p. 1.

64 Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management, DFO, [Evidence](#), 10 May 2016.

65 Since 2015, mandatory catch-and-release fishing was established for all three Maritime provinces. In Newfoundland and Labrador, fishers can only keep small salmon.

66 Large salmon can only be retained in Quebec and only in 37 of its 110 rivers.

67 Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management, DFO, [Evidence](#), 10 May 2016.

68 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

69 Bill Taylor, President, Atlantic Salmon Federation, [Evidence](#), 12 May 2016.

70 Deborah Norton, President, Miramichi Watershed Management Committee, [Evidence](#), 29 September 2016.

also mentioned the case of the Cheticamp River, where catch-and-release fishing was instituted 28 years ago with no known fish mortalities.<sup>71</sup>

However, in Catherine Lambert's point of view, catch-and-release fishing is a major cause of mortality, illness and vulnerability for salmon.<sup>72</sup> Sydney Paul, speaking on behalf of the six Maliseet communities in New Brunswick, also argued that, even if fish mortality is low with best practices, catch-and-release fishing is not an adequate conservation measure.<sup>73</sup> The Supreme Court of Canada's Sparrow Decision in 1990 was cited as a basis on which Indigenous rights to fish for FSC purposes, should take priority, after conservation, over all other uses of the resource.

For his part, Jerry Doak, owner of W.W. Doak Fishing Tackle Shop in New Brunswick, indicated to the Committee that no study has been conducted to date to quantify the benefits of mandatory catch-and-release fishing for the recovery of Atlantic salmon. In his view, this policy has produced an "exodus" of local anglers from the Miramichi River, a fact reflected by a 44% decline in resident salmon fishing licence sales in 2015.<sup>74</sup> Jerry Doak added that this policy resulted in a reduced level of local surveillance and protection of the river by anglers. It was argued that angling interception rates are very low and the percentage of retained female grilse is even lower, underlying the minimal impact of permitting a grilse retention fishery.

Historian Morris Green also mentioned to the Committee that, on the Main Southwest Miramichi River, there is a large and healthy grilse population, and 90% of them are male.<sup>75</sup> Therefore, it was suggested to allow retention of one or two grilse per fisher in order to preserve local involvement in the protection of that river.

The Committee noted a similar point of view from David LeBlanc. In his opinion, mandatory catch-and-release fishing in the Maritimes, and the release of large salmon policy in most of Quebec's rivers led to a reduction in sport fishing activities with accompanying revenue shortfalls for local organizations and businesses, which, in turn, risk reducing their investments in research and protection.<sup>76</sup> It appears, however, that the decline in participation rate due to the mandatory catch-and-release policy could be short-term. In Miramichi, for example, Deborah Norton indicated that, although mandatory catch-and-release led to a decline in licence sales in 2015, the number of recreational fishers is "up quite dramatically in 2016."<sup>77</sup>

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71 Rene Aucoin, President, Nova Scotia Salmon Association, [Evidence](#), 29 September 2016.

72 Catherine Lambert, Executive Director, Mi'gmaq Maliseet Aboriginal Fisheries Management Association, [Evidence](#), 29 September 2016.

73 Sydney Paul, Consultation Coordinator, Kingsclear First Nation, [Evidence](#), 29 September 2016.

74 Jerry Doak, Owner, W.W. Doak Fishing Tackle Shop, As an Individual, [Evidence](#), 17 May 2016.

75 Morris Green, Author, Historian, As an Individual, [Evidence](#), 19 May 2016.

76 David LeBlanc, Chief Executive Officer, Restigouche River Watershed Management Council, [Evidence](#), 29 September 2016.

77 Deborah Norton, President, Miramichi Watershed Management Committee, [Evidence](#), 29 September 2016.



## B. Closing of Rivers to Fishing

The closing of rivers to angling when conservation levels were not met is a management measure that was criticized by a few witnesses. Mark Hambrook, Miramichi Salmon Association, gave examples of closed rivers adjacent to the Miramichi River and indicated that there has been “little if any effort on the part of DFO to do anything to restore the [salmon] population” there.<sup>78</sup> He added that “DFO has become a regulator only and has lost its capacity to direct recovery strategies.” Mark Hambrook also stated that:

local citizens can become detached from the river and the stewardship of that resource is lost. People will work for a cause if there is hope for success, and they look to government for the leadership to plan a recovery strategy.<sup>79</sup>

## C. Precautionary Approach for the Management of Salmon Fisheries

The Committee was struck by the realization that, given the long decline of Atlantic salmon populations since the 1990s and the fact that the Fishery Decision-Making Framework Incorporating the Precautionary Approach became government policy since 2003, DFO has still not implemented the precautionary approach for the management of salmon fisheries. Implementation of such approach was also recommended by the Minister’s Advisory Committee on Wild Atlantic salmon report. The Committee was briefed by DFO’s representatives on the Department’s progress in implementing the precautionary approach and its plan to establish a limit reference point and harvesting rules for key index rivers in the southern Gulf Region.<sup>80</sup>

At present, DFO does not assess the population number for every salmon river but uses key rivers as indexes to manage an area. The Department assesses about 60 to 90 rivers and develops conservation requirements for approximately 500 rivers out of the total 1,000 salmon rivers.<sup>81</sup>

The Committee recommends:

### Recommendation 4

**That Fisheries and Oceans Canada consult with local communities on the most appropriate fishing regulations and that those regulations be reviewed on an annual basis in conjunction with provincial regulators, where applicable.**

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78 Mark Hambrook, President, Miramichi Salmon Association, [Evidence](#), 17 May 2016.

79 Mark Hambrook, President, Miramichi Salmon Association, [Evidence](#), 17 May 2016.

80 Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management, DFO, [Evidence](#), 10 May 2016.

81 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

## STRATEGIES TO ADDRESS SALMON CONSERVATION AND RESTORATION

### A. River-by-River and Management Areas Approach

Quebec manages its salmon resource according to a river-by-river management system. Francois Caron indicated that, in Quebec, local conservation organizations collect a daily fee from fishers and, with this money, hire conservation officers to ensure the protection of salmon.<sup>82</sup> The Minister's Advisory Committee on Atlantic salmon report also indicates that the "best option for salmon conservation is river by river assessments and fishing plans, with population objectives for salmon throughout its life stages."<sup>83</sup> For his part, Bill Taylor encouraged DFO to introduce a river-by-river management approach, perhaps on a pilot basis, for one or two key rivers in Atlantic Canada.<sup>84</sup> As put by Jerry Doak:

The Miramichi is not well served by a management strategy that lump all rivers together under a blanket policy. It both needs and deserves a more targeted approach tailored to its particular set of unique characteristics.<sup>85</sup>

Deborah Norton also supported a river-by-river harvest management based on abundance, and further indicated that mid-season reviews, counting fish from May to mid-July, are necessary control tools.<sup>86</sup> Such reviews, currently carried out in Quebec for large salmon, allow managers to adjust retention levels based on fish abundance for a particular river instead of setting a harvest level at the beginning of the fishing season.<sup>87</sup>

According to DFO, a river-by-river management system is complex and "would not be inexpensive."<sup>88</sup> Gerald Chaput pointed out that DFO's SFAs correspond to different biological units and are already managed differently from each other. However, the Department indicated that it could look at implementing a river-by-river management system for large rivers with significant numbers of salmon and fishing activities. Regarding the issue of cost, historian Morris Green pointed out that anglers are devoted to the species and many river management groups are willing to step forward to shoulder the effort. Therefore, the cost factor may not be as great as DFO speculated.<sup>89</sup>

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82 Francois Caron, Biologist, Ministerial Advisory Committee on Atlantic Salmon, As an Individual, [Evidence](#), 19 May 2016.

83 Minister's Advisory Committee on Atlantic Salmon, [A Special Report on Wild Atlantic Salmon in Eastern Canada](#), July 2015, p. 26.

84 Bill Taylor, President, Atlantic Salmon Federation, [Evidence](#), 12 May 2016.

85 Jerry Doak, Owner, W.W. Doak Fishing Tackle Shop, As an Individual, [Evidence](#), 17 May 2016.

86 Deborah Norton, President, Miramichi Watershed Management Committee, [Evidence](#), 29 September 2016.

87 David LeBlanc, Chief Executive Officer, Restigouche River Watershed Management Council, [Evidence](#), 29 September 2016.

88 Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management, DFO, [Evidence](#), 10 May 2016.

89 Morris Green, Author, Historian, As an Individual, [Evidence](#), 19 May 2016.

Apart from Quebec's approach, the Committee also learned that salmon is managed according to a river classification system in Newfoundland.<sup>90</sup> This model is not recognized as a river-specific management system but there are area-specific variations in the management regime in response to stock status.

The Committee recommends:

### **Recommendation 5**

**That Fisheries and Oceans Canada consider aspects of the river-by-river management system utilized in Quebec, and the river classification system utilized in Newfoundland and Labrador, in the development of a new cost-effective management system to be implemented across the rest of the Atlantic region.**

## **B. Freshwater Habitat Restoration and Protection**

Freshwater habitat restoration and protection is among the important strategies devised by the federal government and local conservation groups to address salmon conservation and recovery. To date, there have been investments of about \$4.8 million through the Recreational Fisheries Partnerships Program. The Miramichi Salmon Association, for example, received \$33,000 to create large cool refugia for salmon in the Miramichi River.<sup>91</sup>

According to Bill Taylor, until the issues in the marine environment are elucidated, freshwater habitat restoration and protection are critical to ensure the greatest numbers possible of salmon going out to sea.<sup>92</sup> Rick Cunjack proposed to prioritize salmon management and freshwater habitat restoration and protection with a "realistic view to what is likely to occur within 10 to 25 years, including more emphasis on northern rivers where stocks are stable or increasing but poorly monitored."<sup>93</sup> For Rene Aucoin, support for acid rain mitigation projects is imperative for salmon rivers in Nova Scotia.<sup>94</sup> Witnesses also pointed out to the importance of enhancing partnerships with local conservation groups.

Regarding the Recreational Fisheries Conservation Partnerships Program, Brooke Nodding, Bluenose Coastal Action Foundation, called for a review of the program since, currently, it does not allow funding for monitoring activities and is "extremely strict" regarding funding allocated for planning activities.<sup>95</sup> In addition, the limited scope of the

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90 Gerald Chaput, Coordinator, Centre for Science Advice, Gulf Region, DFO, [Evidence](#), 10 May 2016.

91 Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management, DFO, [Evidence](#), 10 May 2016.

92 Bill Taylor, President, Atlantic Salmon Federation, [Evidence](#), 12 May 2016.

93 Rick Cunjack, Professor, Department of Biology, University of New Brunswick, As an Individual, [Evidence](#), 19 May 2016.

94 Rene Aucoin, President, Nova Scotia Salmon Association, [Evidence](#), 29 September 2016.

95 Brooke Nodding, Executive Director, Bluenose Coastal Action Foundation, [Evidence](#), 12 May 2016.

program makes it “unrealistic” for many of the acid mitigation projects. Witnesses also insisted on increased accountability for “DFO and all parties who receive federal funding, highlighting clear, measurable objectives, with annual reporting on progress.”<sup>96</sup>

Therefore, the Committee recommends:

### **Recommendation 6**

**That the Recreational Fisheries Conservation Partnerships Program be fully funded to allow local Atlantic salmon conservation and enhancement organizations to continue with beneficial Atlantic salmon conservation projects.**

## **C. Enforcement and Co-Management**

The Committee has heard over and over about the lack of DFO’s enforcement capacity in the field. In Miramichi, the need to equip DFO’s fishery officers with modern technology, such as satellite telephones, was also mentioned.<sup>97</sup> Deborah Norton pointed out to the training of First Nations’ guardians for joint patrols as opportunities for increased collaboration with local Indigenous communities.

Fred Parsons indicated to Committee members that, in recent years, all regional habitat protection offices were closed down in Newfoundland and DFO’s habitat protection activities for the province are now managed from St. John’s.<sup>98</sup> David LeBlanc added that the lack of resources for protection and conservation is a major challenge for the Restigouche River watershed:

Since the DFO conservation and protection office in Kedgwick was closed, and its resources were moved outside the area, no fisheries officers have been assigned to our watershed. As a result, very few patrols are deployed, and the response times, which are several hours, result in losses of spawners to poachers.<sup>99</sup>

Therefore, David LeBlanc recommended to the Committee that DFO establishes a conservation and protection office on the territory of each watershed of an important salmon river, like the Restigouche. Partnerships with Indigenous communities and local salmon conservation organizations should also be prioritized to ensure a greater presence of fishery officers in the field.<sup>100</sup>

The Committee believes that the case of the Restigouche River could constitute a good model for other watersheds in terms of co-management with local Indigenous

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96 James Irving, Co-Chief Executive Officer, Director, Atlantic Salmon Federation, J.D. Irving Ltd., [Evidence](#), 17 May 2016.

97 Deborah Norton, President, Miramichi Watershed Management Committee, [Evidence](#), 29 September 2016.

98 Fred Parsons, Environment Resources Management Association, [Evidence](#), 5 October 2016.

99 David LeBlanc, Chief Executive Officer, Restigouche River Watershed Management Council, [Evidence](#), 29 September 2016.

100 George Ginnish, Chief, Eel Ground First Nation, [Evidence](#), 29 September 2016.

communities. David LeBlanc alluded to a service contract between DFO, the Government of Quebec and local Indigenous communities on the Restigouche River. The contract enables the funding for equipment and training for Indigenous rangers in managing local fisheries. The Listuguj Mi'gmaq First Nation currently has 40 rangers in the field, "more human power than all protection officers on the whole Gaspé coast."<sup>101</sup> However, the rangers' fishery protection activities are concentrated only in the estuary where the community is fishing.

Jerry Doak observed, furthermore, that there is a decline in targeted enforcement effort on real issues, such as the interception of large egg-bearing female salmon.<sup>102</sup> DFO indicated, however, that it is attempting to move to different types of enforcement, including electronic and forensic, requiring less fishery officers on the ground.<sup>103</sup>

The Committee recommends:

### **Recommendation 7**

**That the federal government, through Fisheries and Oceans Canada, increase capacity for regulatory enforcement and data collection relating to Atlantic salmon, through increased funding and collaboration with stakeholder groups.**

Regarding co-management efforts with Indigenous communities, Committee members were presented with the example of First Nations in the Miramichi River area moving to trap nets fishing instead of gillnets. The use of fish traps was recommended by the Minister's Advisory Committee on Wild Atlantic salmon report in order to properly select the species and size of the fish and to keep the fish alive before harvesting.<sup>104</sup>

Catherine Lambert also pointed out that some First Nations communities, such as the Mi'kmaq of Gesgapegiag, agreed to temporarily stop fishing for FSC purposes to facilitate salmon population survival. For these Indigenous communities, efforts are required by the federal government to facilitate the resumption of their traditional fishing activity.<sup>105</sup> Given their active river and fishery stewardship activities, Sydney Paul recommended that the federal government include Indigenous communities in decision-making processes of Atlantic salmon management.<sup>106</sup>

Accordingly, the Committee recommends:

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101 David LeBlanc, Chief Executive Officer, Restigouche River Watershed Management Council, [Evidence](#), 29 September 2016.

102 Jerry Doak, Owner, W.W. Doak Fishing Tackle Shop, As an Individual, [Evidence](#), 17 May 2016.

103 Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management, DFO, [Evidence](#), 10 May 2016.

104 Greg Roach, Chair, Minister's Advisory Committee on Wild Atlantic Salmon, [Evidence](#), 12 May 2016.

105 Catherine Lambert, Executive Director, Mi'gmaq Maliseet Aboriginal Fisheries Management Association, [Evidence](#), 29 September 2016.

106 Sydney Paul, Consultation Coordinator, Kingsclear First Nation, [Evidence](#), 29 September 2016.

### **Recommendation 8**

**That regulatory enforcement and surveillance capacities protecting Atlantic salmon be assessed and bolstered through funding and the building of partnerships with First Nations, Atlantic salmon conservation organizations, and other non-governmental organizations for enhanced stewardship and management of Atlantic salmon habitats to improve salmon recruitment and survival year over year.**

### **D. Science Capacity**

Several witnesses pointed to DFO's lack of capacity in science and leadership in providing a comprehensive salmon recovery plan as an issue that needs to be addressed. Although he is encouraged by the recent federal investments in ocean and freshwater science, Rick Cunjack observed that, currently, DFO is able to do little more than annual stock assessments and there is little opportunity for DFO to conduct research on topical issues such as aquaculture or predation impacts.<sup>107</sup>

Therefore, the Committee recommends:

### **Recommendation 9**

**That the Government of Canada, through Fisheries and Oceans Canada, develop and execute a recovery plan to rebuild wild Atlantic salmon stocks to, at minimum, 1975 levels. The plan must require annual reporting with precise and measurable objectives.**

Jerry Doak also questioned the accuracy of DFO's salmon population assessments and deplored the fact that the cost of new electronic counters had to be underwritten by the private sector.<sup>108</sup> He added that, in recent years, most Atlantic salmon research was left to a variety of non-governmental organisations such as the Atlantic Salmon Federation, the Miramichi Salmon Association, and the Restigouche River Watershed Management Council.

### **Watershed Environmental Assessment**

In addition to species-specific research, the Committee also heard from Fred Parsons on the importance of river systems science. In his opinion, increasing the number of scientists on the ground and investment in watersheds research are among necessary tools for effective salmon recovery strategies.<sup>109</sup>

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107 Rick Cunjack, Professor, Department of Biology, University of New Brunswick, As an Individual, [Evidence](#), 19 May 2016.

108 Jerry Doak, Owner, W.W. Doak Fishing Tackle Shop, As an Individual, [Evidence](#), 17 May 2016.

109 Fred Parsons, Environment Resources Management Association, [Evidence](#), 5 October 2016.

Harry Collins indicated that, for the Miramichi watershed specifically, there was no significant science activity by the federal government for the last decade.<sup>110</sup> Funding towards an updated assessment of the Miramichi River ecosystem is, therefore, recommended as the last environmental report for this watershed was completed in 2007. The need for increased DFO river science activities was also mentioned by Sonja Wood, Friends of the Avon River. A comprehensive environmental assessment was called for Nova Scotia's Avon River, the "only river in Canada that has zero fish passage", as well as for the Shubenacadie River.<sup>111</sup>

The Committee recommends:

#### **Recommendation 10**

**That Atlantic salmon stocks and habitat assessments be conducted in rivers that are facing significant decline in stocks, and data be shared with other areas facing similar problems (for example, the Avon River, the LaHave River, and the Shubenacadie River).**

In addition, the Committee recommends:

#### **Recommendation 11**

**That comprehensive assessments be undertaken of the interspecific interactions within the fish communities in important and significant Atlantic salmon waters. These assessments will consider predation, invasive species, competitors for food, species changes and any other factors that affect wild Atlantic salmon stocks.**

#### **Data Collection**

Regarding data collection, Greg Roach indicated that there are a lot of data that can be captured from tags. Tags data may not cost DFO additional money but, currently, there is very little information gathered from tags.<sup>112</sup> Bill Taylor also insisted on the importance of being able to track Atlantic salmon "all the way to Greenland and back."<sup>113</sup> Such a scientific endeavour may be an effective way to determine the relative impact of Greenland's harvest on fish originating from Canadian rivers and would require partnerships and a pooling of resources from a multitude of stakeholders including academia, non-governmental organisations, and NASCO.<sup>114</sup>

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110 Harry Collins, Executive Director, Miramichi River Environmental Assessment Committee, [Evidence](#), 29 September 2016.

111 Sonja Wood, Chair, Friends of the Avon River, [Evidence](#), 29 September 2016.

112 Greg Roach, Chair, Minister's Advisory Committee on Wild Atlantic Salmon, [Evidence](#), 12 May 2016.

113 Bill Taylor, President, Atlantic Salmon Federation, [Evidence](#), 12 May 2016.

114 James Irving, Co-Chief Executive Officer, Director, Atlantic Salmon Federation, J.D. Irving Ltd., [Evidence](#), 17 May 2016.

Jonathan Carr mentioned to Committee members that, since 2003, the Atlantic Salmon Federation has been using acoustic telemetry to track salmon and to identify critical habitats, migration zones and feedings areas.<sup>115</sup> Such tracking exercises can also help determining the impact of predators and prey during the marine life stage of the salmon and correlating the fish movement with environmental variables such as water temperatures. Witnesses agreed on the need for the federal government to increase research and innovation funding in order to expand tracking efforts in the marine environment.

### **Broad Scientific Approach and Data Sharing**

Jeffrey Hutchings shared the above points of view and called for a broad scientific approach incorporating all available information on Atlantic salmon throughout its range in order to identify survival bottlenecks at various regional and population scales. Such a modelling exercise would strengthen the science advice associated with potential mitigation strategies and identify areas of focus.<sup>116</sup> Susanna Fuller concurred by mentioning that recovery efforts can only be focused once the relative impact from different factors affecting the survival of the salmon can be quantified for each river or each management area.<sup>117</sup>

Greg Roach further recommended the establishment of an Atlantic salmon scientific research and development group that would coordinate scientific activities and facilitate the sharing of data and information.<sup>118</sup> The Committee also heard from Catherine Lambert and Chief George Ginnish on the importance of an ecosystem management approach and the inclusion of traditional indigenous knowledge in DFO's scientific activities.<sup>119</sup>

Accordingly, the Committee recommends:

### **Recommendation 12**

**That Fisheries and Oceans Canada make a strong effort to encourage data sharing between the Department, the scientific and academic communities, First Nations, Atlantic salmon conservation organizations, and other stakeholder groups to ensure all parties have access to the most up to date information. That Fisheries and Oceans Canada deploy an adequate number of the new scientists to be hired by the Department to work full-time on the conservation and enhancement of Atlantic salmon and achieve the population goals outlined in Recommendation 9**

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115 Jonathan Carr, Executive Director of Research, Atlantic Salmon Federation, [Evidence](#), 29 September 2016.

116 Jeffrey Hutchings, Professor of Biology, Canada Research Chair in Marine Conservation and Biodiversity, Dalhousie University, As an Individual, [Evidence](#), 12 May 2016.

117 Susanna Fuller, Coordinator, Marine Conservation, Ecology Action Centre, [Evidence](#), 17 May 2016.

118 Greg Roach, Chair, Minister's Advisory Committee on Wild Atlantic Salmon, [Evidence](#), 12 May 2016.

119 Catherine Lambert, Executive Director, Mi'gmaq Maliseet Aboriginal Fisheries Management Association, [Evidence](#), 29 September 2016.



**of this report. These new scientists would be in addition to those already working on the conservation and enhancement of Atlantic salmon.**

## **E. Predation Management**

### **Grey seals**

The Atlantic Salmon Federation's acoustic telemetry studies revealed that the survival of smolts is quite high through the Gulf of St. Lawrence suggesting that marine survival issues take place once the fish gets out into the Labrador Sea and off the coast of Greenland.<sup>120</sup> Therefore, further predation and stomach analyses are required to ascertain the impacts of grey seals predation on salmon.<sup>121</sup>

While the Committee recognizes the need for more comprehensive predation studies, we agree with the majority of witnesses and believe that seals' predation represents an issue in localized areas, such as the Miramichi estuary. Greg Roach reminded the Committee that the Minister's Advisory Committee on Wild Atlantic salmon report proposed a harvest of grey seals through First Nations partnerships that would target areas where predation by grey seals may be more problematic for the recovery of Atlantic salmon.<sup>122</sup>

The Committee learned that Maritime Seal Management Inc. and Aboriginal Conservation Ecology have jointly proposed to DFO an indigenous subsistence harvest that would target seals one year of age or older in localized areas.<sup>123</sup> Such a harvest would be consistent with "internationally accepted standards for the humane harvest of animals" and includes monitoring by an international panel of independent scientists. The group also put forward plans for achieving an accurate and broad public understanding of the cultural, social, and ecosystem benefits of the seal harvest.

The Committee recommends:

### **Recommendation 13**

**That Fisheries and Oceans Canada support a grey seal harvest program that emphasizes full utilization of the seal to provide economic opportunities with an aim to significantly reduce the seal populations and enhance the recovery of wild Atlantic salmon populations.**

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120 Jonathan Carr, Executive Director of Research, Atlantic Salmon Federation, [Evidence](#), 29 September 2016.

121 Bill Taylor, President, Atlantic Salmon Federation, [Evidence](#), 12 May 2016.

122 Greg Roach, Chair, Minister's Advisory Committee on Wild Atlantic Salmon, [Evidence](#), 12 May 2016.

123 Suju Mahendrappa, Director, Maritime Seal Management Inc., [Evidence](#), 29 September 2016.

## Striped bass

Regarding the issue of striped bass predation in the estuary of the Miramichi River, confirmed by the Atlantic Salmon Federation's acoustic telemetry studies,<sup>124</sup> Rick Cunjack recommended field experiments involving the reduction of that fish population and studies on the impacts of increased striped bass harvest on the local salmon population.<sup>125</sup> The Committee also heard from Deborah Norton emphasizing the need for harvest based on abundance with a recommendation for local First Nations to be allowed a sustainable commercial harvest of striped bass and grey seals.<sup>126</sup>

Chief George Ginnish reminded Committee members that local First Nations, affected by food security issues and under pressure to reduce their salmon FSC fishery, have only been allowed a very limited striped bass food fishery.<sup>127</sup> The Supreme Court of Canada's Marshall Decision in 1999 re-affirmed the principle that, after conservation objectives are met, Indigenous communities fishing is to be given priority over the interests of other user groups. Yet, as Chief George Ginnish pointed out, DFO has permitted a striped bass recreational fishery while ignoring the local Mi'kmaq communities' requests for an Indigenous commercial fishery.

The work of DFO in recovering the striped bass population from near extinction is a great success story but the importance of managing ecosystems in equilibrium was advocated by various witnesses. Mark Hambrook shared his concerns regarding widespread unreported harvesting of striped bass in the Miramichi River. In his view, it is not surprising that DFO's cautious approach regarding striped bass is challenged by local recreational fishers given their different perception on the state of that species in the water. As suggested by Jonathan Carr, it is critical for DFO to "develop management measures to balance and protect both wild Atlantic salmon and striped bass."<sup>128</sup> Such measures should involve a comprehensive tracking of catch by all fishers.

Therefore, the Committee recommends:

### **Recommendation 14**

**That Fisheries and Oceans Canada allow a significant increase in the harvest of striped bass by the recreational fishery by lengthening the retention season and increasing catch limits, where striped bass populations warrant it.**

Furthermore, the Committee recommends:

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- 124 Jonathan Carr, Executive Director of Research, Atlantic Salmon Federation, [Evidence](#), 29 September 2016.
- 125 Rick Cunjack, Professor, Department of Biology, University of New Brunswick, As an Individual, [Evidence](#), 19 May 2016.
- 126 Deborah Norton, President, Miramichi Watershed Management Committee, [Evidence](#), 29 September 2016.
- 127 George Ginnish, Chief, Eel Ground First Nation, [Evidence](#), 29 September 2016.
- 128 Jonathan Carr, Executive Director of Research, Atlantic Salmon Federation, [Evidence](#), 29 September 2016.

## **Recommendation 15**

**That Fisheries and Oceans Canada investigate the opportunity for a First Nations striped bass commercial fishery.**

### **F. Salmon Aquaculture Management**

Bill Taylor advocated for a moratorium on the expansion of open net-pen salmon aquaculture and moving the salmon aquaculture industry to land-based closed containment as one alternative. He also called for the standardization of regulations regarding containment, disease treatment, and pollution control. The Norwegian model and the Aquaculture Stewardship Council certification were mentioned as inspiration sources for best practices in the aquaculture industry.<sup>129</sup>

In Miramichi, the Committee heard recommendations that would enhance the open net-pen salmon aquaculture industry's transparency: better reporting mechanism related to escapes and diseases and parasites levels, external marker on farmed fish allowing identification of escapees, and a pan-Atlantic approach to regulations and farm management practices.<sup>130</sup>

Stricter regulations for open net-pen salmon aquaculture were also called for by Susanna Fuller. She indicated that:

70% of Atlantic salmon in the Magaguadavic River in New Brunswick are escapees, while in the State of Maine, which has much stricter regulations through its containment protocol, only 0.2% of its river salmon originate from those farms.<sup>131</sup>

Susanna Fuller mentioned that "Atlantic Canadian farms use 204 times and 241 times, respectively, more antibiotics than comparable farms in Norway and Scotland, and six times more than farms in B.C." Therefore, witnesses such as the Atlantic Salmon Federation and the Eel Ground First Nation support a transition towards land-based closed containment aquaculture.<sup>132</sup>

Consequently, the Committee recommends:

## **Recommendation 16**

**That Fisheries and Oceans Canada revisit the feasibility of closed containment salmon aquaculture in areas with endangered or threatened wild Atlantic salmon populations.**

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129 Bill Taylor, President, Atlantic Salmon Federation, [Evidence](#), 12 May 2016.

130 Jonathan Carr, Executive Director of Research, Atlantic Salmon Federation, [Evidence](#), 29 September 2016.

131 Susanna Fuller, Coordinator, Marine Conservation, Ecology Action Centre, [Evidence](#), 17 May 2016.

132 Devin Ward, Science Officer, North Shore Micmac District Council Fisheries Centre, Eel Ground First Nation, [Evidence](#), 29 September 2016.

## G. Collaboration for Atlantic Salmon Tomorrow (CAST)

[Collaboration for Atlantic Salmon Tomorrow](#) (CAST) is a coalition of stakeholders formed in 2014 to share ideas and find the best path forward to support the recovery of Atlantic salmon. The group proposed six research themes with 25 associated projects to be trialled primarily on the Miramichi River system over the next five years.<sup>133</sup> Projects include adult supplementation, the development of a population and habitat data warehouse, sonar fish counting, predation studies, ocean tracking of salmon, and thermal imaging of rivers to identify cold-water habitat to be enhanced.

CAST determined that the most effective stocking strategies for salmon on the Miramichi River would be an adult captive reared supplementation. The adult supplementation involves collecting wild smolts on their way out to the ocean, raising them in captivity until almost ready to spawn as adults and, bypassing the high marine mortality, releasing them to travel up the river to the area they were born.<sup>134</sup>

According to DFO, this stocking practice is “not yet proven” and there are no “experimental data to suggest that [it] will work.” DFO expressed concerns about the possibility that this practice will affect the fish fitness for survival in the wild. It argued that there will be behavioural changes that occur in captivity for fish fed on man-made feed and this could pose a risk for existing wild salmon. In addition, DFO indicated that the “ocean is filtering the fish and is letting the ones that have the right package to come back and spawn,” but by cutting out the ocean, “fish that don’t have the right fitness” are spawning in the river and their juveniles are competing for space with the fit wild ones. DFO proposed instead to work with CAST to conduct a smaller scale experimental design before proceeding with a full-scale project of reintroduction.<sup>135</sup>

The concern about competition between stocked and wild fish appeared to be shared by Francois Caron. He indicated that a “river can receive a limited number of salmon, since the young ones have to be able to feed themselves during three, four and sometimes even five years in the river before they leave it.”<sup>136</sup> Furthermore, according to Robert Devlin, breeding strategies can have effects on wild populations if they are not controlled carefully. He added that there is “emerging evidence from the United States that rearing in hatchery conditions and other conditions can change the genetics of the fish population in one generation.”<sup>137</sup>

Therefore, the Committee recommends:

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133 James Irving, Co-Chief Executive Officer, Director, Atlantic Salmon Federation, J.D. Irving Ltd., [Evidence](#), 17 May 2016.

134 Jonathan Carr, Executive Director of Research, Atlantic Salmon Federation, [Evidence](#), 29 September 2016.

135 Trevor Swerdfager, Assistant Deputy Minister, Ecosystems and Oceans Science, DFO, [Evidence](#), 10 May 2016.

136 Francois Caron, Biologist, Ministerial Advisory Committee on Atlantic Salmon, As an Individual, [Evidence](#), 19 May 2016.

137 Robert Devlin, Engineering Research Scientist, DFO, [Evidence](#), 19 May 2016.

## Recommendation 17

**That Fisheries and Oceans Canada prioritize further study on Atlantic salmon stock enhancement, and develop monitoring systems to detect and mitigate genetic and health risks posed by the practice of augmenting wild Atlantic salmon stocks with hatchery fish.**

Jonathan Carr reminded the Committee, however, that the adult supplementation aspect of CAST is innovative since this initiative minimizes the time salmon spend in the hatchery. The adult supplementation is also, for the moment, an experiment, not a full-fledge stocking program:

We're going to be looking at how well those fish are interacting in the hatchery, from the time they go into the hatchery to the time they leave the hatchery. There's going to be a lot of tracking involved with these fish, too, to see how they develop mate choices with the true wild fish, how their offspring interact, and all the way back from the offspring leaving the river and coming back to the adult stage. We want to make sure that it's done in an experimental fashion, a controlled fashion, because we don't know what the outcomes would be for this. We want to make sure there's no harm done to the river during this phase.<sup>138</sup>

During its visit to the Miramichi Salmon Conservation Centre, the Committee is encouraged to learn from Shirley Roach-Albert, Executive Director of CAST, that CAST has had the opportunity to present its case to DFO during a science review session. CAST plans to start its projects in 2017.

## CONCLUSION

Although there is no single factor explaining the continued decline of wild Atlantic salmon populations in Eastern Canada, the Committee determines that there are overarching factors affecting the health of the salmon resource: freshwater habitat quality, climate change affecting both river systems and the marine environment, and Greenland's commercial harvest. The Committee also believes that issues such as predation and open net-pen salmon aquaculture represent important factors to consider in localized areas.

Therefore, the Committee agrees with the necessity of strengthening DFO's science capacity to further the understanding of Atlantic salmon and enhancing the decision-making process for recovery strategies. In our view, DFO needs to devise a broad scientific approach incorporating all available information on Atlantic salmon throughout its range and identifying survival bottlenecks at various regional and population scales.

The Committee is encouraged by the federal government's 6 October 2016 announcement providing more than \$600,000 for Atlantic salmon science.<sup>139</sup> We believe that the establishment of the Atlantic Salmon Research Joint Venture, recommended by the Ministerial Advisory Committee on Atlantic salmon's report and by many witnesses

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138 Jonathan Carr, Executive Director of Research, Atlantic Salmon Federation, [Evidence](#), 29 September 2016.

139 Government of Canada, "[Government of Canada is funding collaborative research to support Atlantic salmon recovery](#)," *News release*, 6 October 2016.

during the course of this study, is a good step towards improved scientific collaboration and data sharing between DFO, Indigenous communities, environmental and salmon conservation organizations and academic institutions.

The Committee emphasizes the importance for DFO to build partnerships with Indigenous communities and conservation organizations for enhanced enforcement and protection of Atlantic salmon habitats. We also encourage DFO to consult all stakeholders in the development of fishing regulations and the implementation of the precautionary approach for the management of Atlantic salmon fisheries.

# LIST OF RECOMMENDATIONS

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## Recommendation 1

That Fisheries and Oceans Canada continue research to determine the economic value of the Atlantic salmon to First Nations and recreational fisheries at least every three years..... 6

## Recommendation 2

That Fisheries and Oceans Canada, in collaboration with Environment and Climate Change Canada, conduct comprehensive research into the effects of climate change on the full lifecycle of wild Atlantic salmon. .... 9

## Recommendation 3

That the Minister of Fisheries, Oceans and the Canadian Coast Guard lead a delegation of Canadian officials to meet with their counterparts from Greenland to address the detrimental overfishing of Atlantic salmon by Greenland and report results back to the Standing Committee on Fisheries and Oceans. .... 12

## Recommendation 4

That Fisheries and Oceans Canada consult with local communities on the most appropriate fishing regulations and that those regulations be reviewed on an annual basis in conjunction with provincial regulators, where applicable. .... 15

## Recommendation 5

That Fisheries and Oceans Canada consider aspects of the river-by-river management system utilized in Quebec, and the river classification system utilized in Newfoundland and Labrador, in the development of a new cost-effective management system to be implemented across the rest of the Atlantic region. .... 17

## Recommendation 6

That the Recreational Fisheries Conservation Partnerships Program be fully funded to allow local Atlantic salmon conservation and enhancement organizations to continue with beneficial Atlantic salmon conservation projects..... 18

**Recommendation 7**

**That the federal government, through Fisheries and Oceans Canada, increase capacity for regulatory enforcement and data collection relating to Atlantic salmon, through increased funding and collaboration with stakeholder groups..... 19**

**Recommendation 8**

**That regulatory enforcement and surveillance capacities protecting Atlantic salmon be assessed and bolstered through funding and the building of partnerships with First Nations, Atlantic salmon conservation organizations, and other non-governmental organizations for enhanced stewardship and management of Atlantic salmon habitats to improve salmon recruitment and survival year over year. .... 20**

**Recommendation 9**

**That the Government of Canada, through Fisheries and Oceans Canada, develop and execute a recovery plan to rebuild wild Atlantic salmon stocks to, at minimum, 1975 levels. The plan must require annual reporting with precise and measurable objectives..... 20**

**Recommendation 10**

**That Atlantic salmon stocks and habitat assessments be conducted in rivers that are facing significant decline in stocks, and data be shared with other areas facing similar problems (for example, the Avon River, the LaHave River, and the Shubenacadie River)..... 21**

**Recommendation 11**

**That comprehensive assessments be undertaken of the interspecific interactions within the fish communities in important and significant Atlantic salmon waters. These assessments will consider predation, invasive species, competitors for food, species changes and any other factors that affect wild Atlantic salmon stocks..... 21**



**Recommendation 12**

**That Fisheries and Oceans Canada make a strong effort to encourage data sharing between the Department, the scientific and academic communities, First Nations, Atlantic salmon conservation organizations, and other stakeholder groups to ensure all parties have access to the most up to date information. That Fisheries and Oceans Canada deploy an adequate number of the new scientists to be hired by the Department to work full-time on the conservation and enhancement of Atlantic salmon and achieve the population goals outlined in Recommendation 9 of this report. These new scientists would be in addition to those already working on the conservation and enhancement of Atlantic salmon. .... 22**

**Recommendation 13**

**That Fisheries and Oceans Canada support a grey seal harvest program that emphasizes full utilization of the seal to provide economic opportunities with an aim to significantly reduce the seal populations and enhance the recovery of wild Atlantic salmon populations..... 23**

**Recommendation 14**

**That Fisheries and Oceans Canada allow a significant increase in the harvest of striped bass by the recreational fishery by lengthening the retention season and increasing catch limits, where striped bass populations warrant it. .... 24**

**Recommendation 15**

**That Fisheries and Oceans Canada investigate the opportunity for a First Nations striped bass commercial fishery. .... 25**

**Recommendation 16**

**That Fisheries and Oceans Canada revisit the feasibility of closed containment salmon aquaculture in areas with endangered or threatened wild Atlantic salmon populations. .... 25**

**Recommendation 17**

**That Fisheries and Oceans Canada prioritize further study on Atlantic salmon stock enhancement, and develop monitoring systems to detect and mitigate genetic and health risks posed by the practice of augmenting wild Atlantic salmon stocks with hatchery fish. .... 27**



# APPENDIX A LIST OF WITNESSES

Organizations and Individuals	Date	Meeting
<p><b>Department of Fisheries and Oceans</b></p> <p>Gérald Chaput, Coordinator, Centre for Science Advice, Gulf Region</p> <p>Bhagwant Sandhu, Executive Director, Ecosystems and Fisheries Management</p> <p>Kevin Stringer, Senior Assistant Deputy Minister, Ecosystems and Fisheries Management</p> <p>Trevor Swerdfager, Assistant Deputy Minister, Ecosystems and Oceans Science</p>	2016/05/10	12
<p><b>As individuals</b></p> <p>Jeffrey A. Hutchings, Professor of Biology, Canada Research Chair in Marine Conservation and Biodiversity, Dalhousie University</p> <p>Greg Roach, Chair, Minister's Advisory Committee on Wild Atlantic Salmon</p>	2016/05/12	13
<p><b>Atlantic Salmon Federation</b></p> <p>Bill Taylor, President</p>		
<p><b>Bluenose Coastal Action Foundation</b></p> <p>Brooke Nodding, Executive Director</p>		
<p><b>As an individual</b></p> <p>Jerry Doak, Owner, W.W. Doak Fishing Tackle Shop</p>	2016/05/17	14
<p><b>Ecology Action Centre</b></p> <p>Susanna Fuller, Coordinator, Marine Conservation</p>		
<p><b>J.D. Irving, Limited</b></p> <p>James D. Irving, Co-Chief Executive Officer, Director, Atlantic Salmon Federation</p>		
<p><b>Miramichi Salmon Association Inc.</b></p> <p>Mark Hambrook, President</p>		
<p><b>As individuals</b></p> <p>François Caron, Biologist, Ministerial Advisory Committee on Atlantic Salmon</p> <p>Rick Cunjak, Professor Department of Biology, University of New Brunswick</p> <p>Morris Green, Author, Historian</p>	2016/05/19	15

<b>Organizations and Individuals</b>	<b>Date</b>	<b>Meeting</b>
<b>Department of Fisheries and Oceans</b> Robert Devlin, Engineering Research Scientist, Deputy Minister's Office	2016/05/19	15
<b>As individuals</b> Gordon Grey, Consultation Liaison, Kingsclear First Nation Chris Mansky, Friends of the Avon River Minas Basin Sydney Paul, Consultation Coordinator, Kingsclear First Nation Sonja Wood, Chair, Friends of the Avon River Minas Basin	2016/09/29	24
<b>Atlantic Salmon Federation</b> Jonathan Carr, Executive Director of Research		
<b>Eel Ground First Nation</b> George Ginnish, Chief Devin Ward, Science Officer, North Shore Micmac District Council Fisheries Centre		
<b>Maritime Seal Management Inc.</b> Suju Mahendrappa, Director		
<b>Mi'gmaq Maliseet Aboriginal Fisheries Management Association</b> Catherine Lambert Koizumi, Executive Director		
<b>Miramichi River Environmental Assessment Committee</b> Harry Collins, Executive Director		
<b>Miramichi Watershed Management Committee Inc.</b> Deborah Norton, President		
<b>Nova Scotia Salmon Association</b> R�n� Aucoin, President		
<b>Restigouche River Watershed Management Council Inc.</b> David LeBlanc, Chief Executive Officer		
<b>Environment Resources Management Association</b> Fred Parsons, General Manager	2016/10/05	26

# **APPENDIX B LIST OF BRIEFS**

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## **Organizations and Individuals**

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**Collaboration For Atlantic Salmon Tomorrow**



# REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the Committee requests that the government table a comprehensive response to this Report.

A copy of the relevant *Minutes of Proceedings* ([Meetings N<sup>os</sup> 12 to 15, 24, 26, 30 and 41](#)) is tabled.

Respectfully submitted,

Scott Simms  
Chair

