

A submission to the Ministerial Advisory Committee on Atlantic Salmon

- submitted by Thomas Pettigrew, March 18th 2015

Preamble :

Your committee has been tasked with providing recommendations to the Minister that will set the course for the future sound management of our Atlantic Salmon stocks by DFO. Much is riding on the outcome. Within this submission I will raise a few specific concerns relative to the Atlantic Salmon rivers of New Brunswick but will also draw your attention to some broader issues affecting how DFO approaches its management responsibilities. DFO's management process, its internal culture, and its public relations is something that also needs change if we are to see a positive result.

In closing this preamble, I would add that I was disappointed to see such limited participation of the First Nations communities on this committee. Hopefully your group will not shy away from the necessary discussions of the role of First Nations food fisheries in the management of the stocks. Recreational and food fisheries are interdependent and have to be managed as a whole.

My background:

Personal information;

Retired biologist residing in Seville New Brunswick on the banks of the Northwest Miramichi River. As an avid salmon angler I am familiar with all of New Brunswick's Atlantic Salmon rivers, and through continual contact with the various issues facing the Atlantic Salmon over the past 50 years** I have a broad understanding of the issues, needs, and nuances of Atlantic Salmon management.

For the past nine years I have been actively seeking to have DFO address the issue of low egg deposition on the Northwest Miramichi and Little Southwest Miramichi rivers due to the over exploitation of large salmon in the First Nations food fishery in the estuary.

I am presently unaffiliated with any of the NGO's associated with the sport fishery.

Work experience:

32 year career, 1972 to 2004, with the province of New Brunswick as a "Regional Biologist" for the Dept. of Natural Resources. First tenure in south eastern N.B. (Region 3 – 28 years), and then in central & eastern N.B. (Region 2 – 4 years).

Relevant experience re: Atlantic Salmon

April 1972 – Oct. 1972 - worked with DFO out of its Halifax office on Atlantic Salmon. Principal work undertaken was a survey of the recreational angling fishery for Atlantic Salmon on the Restigouche River with the subsequent analysis of data obtained and the writing of a report on same.

Mid 1970's through to early 2000's – served on numerous committees and various working groups dealing with various aspects of Atlantic Salmon management from the Petitcodiac causeway issue to regulatory reviews. Compiled a report on New Brunswick's Atlantic Salmon crown reserve system for the province (1998)

Through the 1980's and early 1990's - involved with the Inner Bay of Fundy Atlantic Salmon decline and recovery efforts

Late 1990's – involved with the assessment and debate dealing with the closure of Salmon angling throughout the Saint John River system.

Post retirement, I become involved with the MWMC (Miramichi Watershed Management Committee) for a two year term, during which time I drafted a management plan template for the group, co authored the Northwest Management Plan for Atlantic Salmon released in January 2011, and served as Chair of the “Implementation sub committee” for a year, after which I compiled a “year one” assessment report.

Lastly, for the past nine years I have stayed in touch with the data being generated on Atlantic Salmon for both the Southwest Miramichi system and for the Northwest Miramichi system, closely following developments and undertaking a fair amount of analysis of the numbers to assess the state of the stocks.

(** I state 50 years, since as a teenager I also fished salmon commercially via a family “stand” in the Bay of Chaleur, 1963 to 1969. and experienced the events of the closure of that four generation fishery in 1971)

Priority one for New Brunswick rivers: – the Northwest Miramichi system

i.e. the Northwest Miramichi River including its primary tributary, the Big Sevogle River and the Little Southwest Miramichi River including its two primary tributaries, the Lower North Branch and the North Pole Stream.

Both of these rivers need to be put on a recovery status footing. With the exception of 2011, spawning escapement has been chronically low for well over a decade as illustrated on the following page. (Note: the first graph, *figure 20*, depicts egg deposition levels for the Northwest Miramichi system (NW and LSW rivers) while the second, *figure 19*, shows the situation for the Southwest Miramichi system (SW and Renous rivers) and is presented here for comparison purposes.)

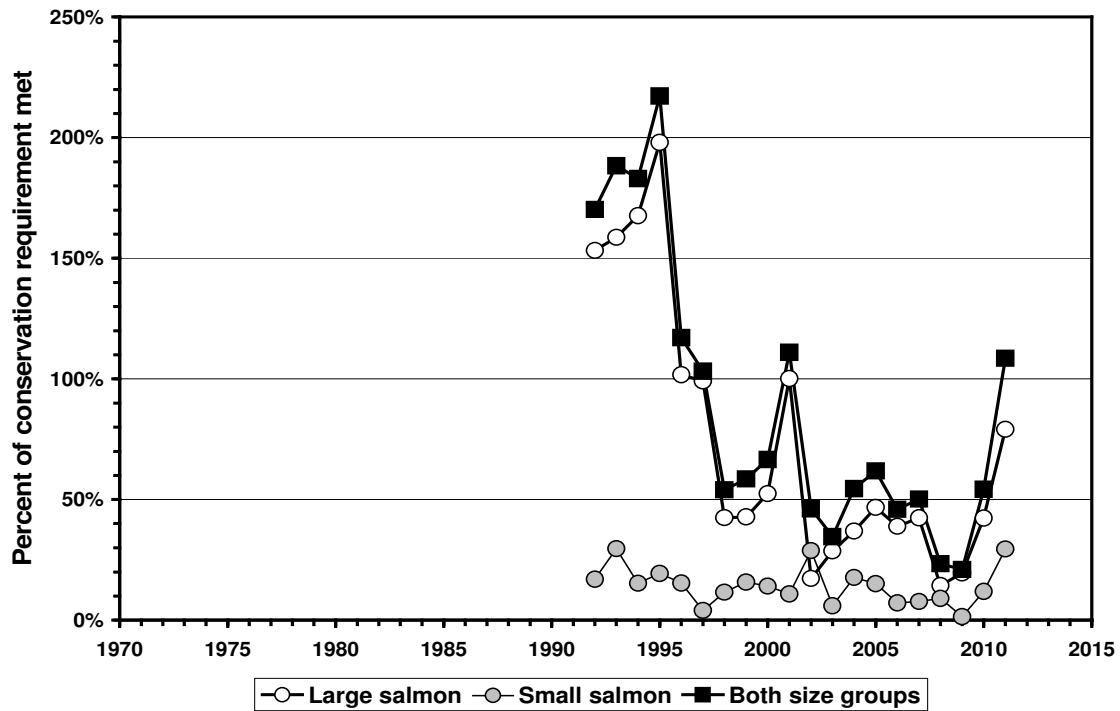


Figure 20. The number of eggs relative to the conservation requirement for Atlantic salmon on the Northwest Miramichi River system, 1992-2011.

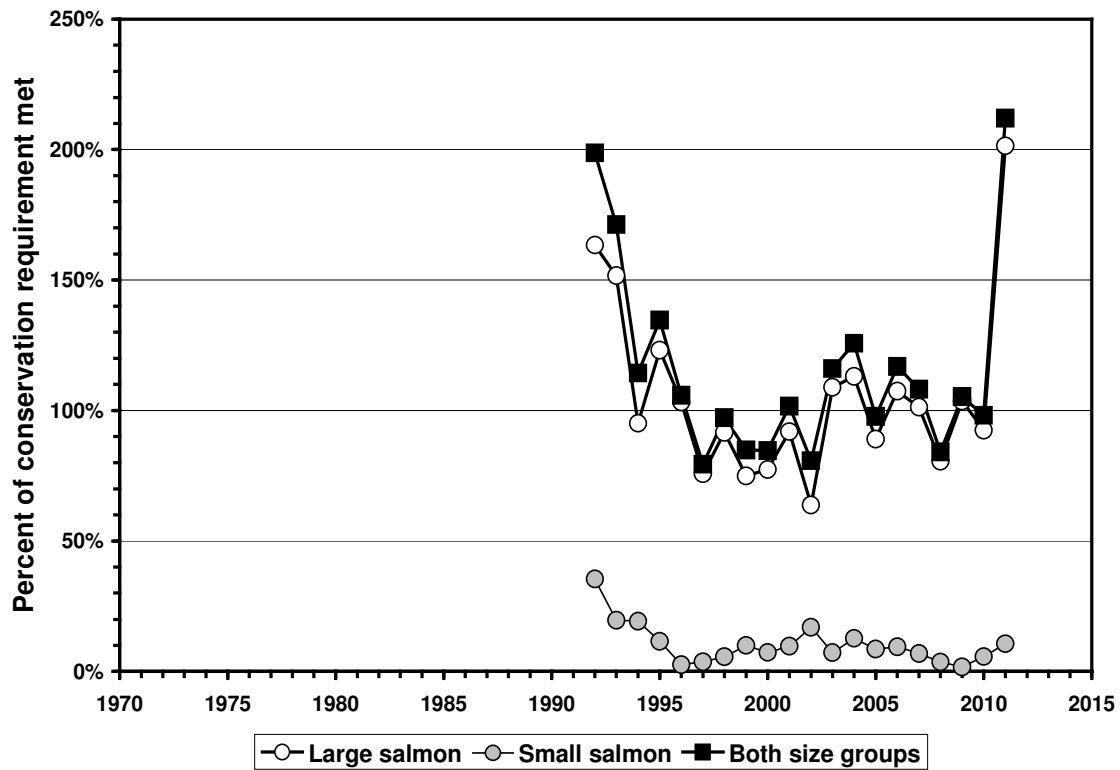


Figure 19. The number of eggs relative to the conservation requirement for Atlantic salmon on the Southwest Miramichi River system, 1992-2011

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These graphs were taken from DFO's 2011 stock assessment report. The numbers for the Northwest Miramichi system in 2012 and 2013 were 42% and 39% respectively, with egg deposition falling even further in **2014** to a dismal figure of just **21%** of conservation requirements. Continuing the comparison, the numbers for the Southwest Miramichi system for 2012, 2013, and 2014 were 81%, 80% and 69% respectively.

So the bottom line here is that the Northwest Miramichi system (NW & LSW rivers) is in crisis, and given that MSW salmon numbers are the principal determinate of whether or not a river system meets its conservation (egg deposition) target, DFO must act this season to place these two rivers in recovery mode. Having failed to adjust either food fishery allocation levels or harvest methodology over these many years DFO has done a major disservice to both of the First Nation communities involved as well as to the angling community. Stocks have declined relative to those in the adjacent system, and while many factors may come in to play in the determination of the strength of future runs; the situation on the Northwest Miramichi system cannot be downplayed by simply saying that problems with recruitment are due to factors at sea.

We must start the rebuilding by ensuring that egg deposition is maximized from whatever large salmon returns occur over the next number of years. To that end I would ask your committee to recommend to the Minister that

1) the angling fishery on the Northwest Miramichi system be maintained as a hook and release fishery (i.e. no Grilse harvest) and 2) that the First Nation's food fishery be maintained as well but that it be conducted with trap nets only and that it be restricted to a Grilse only harvest with an allocation appropriate to the anticipated returns.

Simply put the Northwest Miramichi system cannot afford an unselective gill net food fishery nor the harvest of any MSW's, but both a grilse only trap net food fishery and a recreational catch and release angling fishery can occur while the stock recovers, given that it is the egg deposition potential of the large salmon component that is most critical to that recovery.

Also, FYI, appended to this submission is a table (excel file) which was first circulated in August of 2013 in an attempt to move people to action prior to the 2014 season. It provides a different perspective on how the NW system has fared under DFO's management relative to the SW system, in terms of large salmon returns. Annual large salmon returns (DFO median estimates) were run against habitat quantity to provide a common denominator and hence enable a direct comparison. It has been updated to include the return estimates for both 2013 and 2014. What is sad here is that so many people have been aware of this issue of large salmon over exploitation on the Northwest Miramichi for so long, be they DFO managers, DFO scientists, NGO's or provincial fisheries staff, and that its resolution has not been actively or successfully pursued to the obvious detriment of the stock.

Other issues :

1) The need for DFO to recognise catch and release angling as a conservation measure and not view it as an allocation.

This point may well be the most significant aspect of current Atlantic Salmon management that the Committee will address. Such a “sea change” in DFO’s mindset would have far reaching positive effects for management and create the opportunity to reopen recreational angling fisheries. Anglers on a river provide the impetus for management and without them there is no future for a stock – the Saint John situation is a case in point.

This position that catch & release angling is an allocation is what drove the closure of the angling fishery on Saint John, the Nashwaak, the Hammond, and the other forgotten rivers of the estuary. In later years it was the basis for the closure of the Northumberland Strait rivers as well. As I understand it, the position is based simply on an opinion from DFO’s legal department and has no basis within court decisions on aboriginal food fisheries.

The courts have been clear that First Nations have “first access” and that is not in dispute, but the interpretation DFO has taken needs to be changed. This stance, that food fisheries cannot be constrained if any other fisheries are in place, if condoned and continued will ultimately force further closures over time. There is a need to distinguish between “harvest” and “no kill” fisheries. A “no kill” recreational angling fishery is just that – incidental mortality should not be considered an allocation. Consider catch and release as a conservation measure and the future for Atlantic Salmon holds promise. Insist that it is an allocation, close recreational fisheries because of it, and you destroy the value of the resource with only the poacher as beneficiary.

As for the impact of catch and release angling on a stock; a provincial report compiled in 1998 utilising data from the Saint John recreational fishery found that the impact of catch and release angling on potential egg deposition was less than 1%

2) The need for DFO to clearly distinguish between grilse and large salmon, both in terms of First Nation food fisheries and in the management of salmon generally.

With the recognition by DFO that catch and release angling fisheries are a conservation measure, the department can then move towards management regimes that maintain both recreational and aboriginal fisheries while meeting its mandate for conservation. To do this DFO has to be up front in distinguishing between the value of Grilse versus the value of MSW’s in terms of egg deposition potential.

People need to realize that a female MSW weighing in at 12 lbs is worth 15 grilse in terms of egg deposition potential (assuming a stock where 20% of grilse are females and their average weight is four pounds) With this consideration in mind the case can be made that given the relatively low contribution of grilse to egg deposition for Atlantic salmon stocks within the Maritimes; a selective First Nations food fishery for grilse can be sustained when stocks are low and at the same time anglers can pursue their sport via catch and release

where warranted. There is no need to close fisheries or foster divisions if DFO sets out management regimes that both protect MSW's and provides some harvest of grilse.

It is often forgotten that anglers have been releasing MSW's for some 30 years now and that this fact alone has probably contributed more to the preservation of our stocks than any of the grilse measures enacted since 1984. With some stocks now well below conservation levels it is time for DFO to implement a similar strategy for First Nation food fisheries.

The Northwest Miramichi system will be the test case for this approach in 2015.

3) The need for regulatory change decisions to pass the “benefit test” – i.e. demonstrate a positive and substantial impact on stock recruitment

Of late years much press, public consternation, and distracted debate has occurred on the question of grilse harvest by anglers with the result that we seem obsessed with our focus on grilse while often ignoring other factors of much more consequence to the future of our salmon stocks. (e.g. large salmon over exploitation at sea and at home, excessive smolt losses in some estuaries, aquaculture impacts, etc.)

- catch and release every where, cut the tags in half, barbless hooks are the salvation, and on it goes with the implication that if only the angler, and in particular the resident angler, would comply all would be well.

This year, for example, I understand that the Restigouche Watershed Management Council has called for all of the Restigouche and its tributaries to be 100% catch and release; never mind that all large salmon caught by anglers are currently released and that the vast majority of anglers fishing these private and crown reserve waters practice catch and release as a matter of course. So taking into account that Restigouche grilse are 90% male what will be the benefit to the stock in terms of egg deposition and is it significant. If the genetics argument is offered up, then fine, but again is there a significant benefit or is it more of a social, philosophical, or even a political issue.

Similarly the Miramichi Salmon Association has called for a moratorium on the killing of any Atlantic Salmon in 2015. Certainly this can be supported on the Northwest Miramichi system where egg deposition levels were at 21% of conservation last year and the prospects for any kind of quick turn around are poor given the low spawning escapement of previous years, but how significant or how necessary is it for the Southwest Miramichi system where the egg deposition rates remain comparatively high (2014 being the exception).

The bottom line on this item is that DFO needs to clearly lay out the benefits of a regulatory change if it expects to get public buy in and support. A further point here is that it is the support of the resident angler that is critical to the success of any measure implemented. Also, I understand that the ASF is promoting a no harvest philosophy in order to gain the high ground in its efforts to reduce the Greenland harvest of MSW's. That may be all well and good but if that is the rational then we need to be up front about it and not sell the grilse harvest restriction as some sort of biological imperative to stock recovery.

Going back to the Restigouche situation; if your Committee really wants to deliver a solid recommendation to the Minister for the enhancement of these stocks, then look at having the start up of the First Nations food fishery delayed until July 1st. Again, we are not talking closure here but simply a delay in harvest to increase the numbers of that unique stock of 3SW maidens that usually run the river in late May and June. This was the stock of fish that made the Restigouche famous for large salmon and it deserves some special management consideration.

In 1972, 32% of the angling catch for the Kedgwick and Restigouche rivers was comprised of 3SW salmon (n = 1,011) – what would it be today ?

4) The need for river by river management (and coincidentally the need for DFO and others to recognise estuaries for what they are)

River by river management should be the goal of DFO, as was touted in the 1980's, and we should manage on as fine a scale as possible. For example we have two data sets within the river systems of the Miramichi - one for the Southwest Miramichi system, and one for the Northwest Miramichi system, so at a minimum we should manage at that scale. DFO's practice of rolling their data together and talking about the Miramichi as though it were one river has been problematic. Given that the SW system is twice the size of the NW system it has been used to obscure what was happening on the Northwest.

Another example would be the Saint John where all the rivers that flow to the estuary were swept up in the angling restrictions imposed in 1998 even though the issue was primarily on the Saint John itself. Here, as with the Miramichi, part of the problem is the lack of recognition of estuaries. One frequently hears how the Hammond, for example, is a tributary of the Saint John or how the Northwest Miramichi is a branch of the Miramichi River, when in fact both flow individually to tide water and as such are separate rivers.

This error in terminology is common but it has ramifications. Be it DFO, the ASF, or the MSA, when professionals fail to recognize the nature of estuaries and talk about them as though they were rivers in the sense of a flowing stream they do a disservice to the management of Atlantic Salmon. Estuaries link our salmon rivers to the sea but they are separate pass through, or staging habitats, and not spawning or production areas. For consistency and clarity fisheries professionals be they scientists or managers need to address individual rivers; the flowing streams that support the populations.

Individual river management plans are doable items and have been talked about for years. They have been set as objectives within any number of DFO strategy or planning documents but if you asked to see one today you would be disappointed. I would hope that one of your recommendations to the Minister be that comprehensive individual river management plans be drafted and subsequently implemented. I expect most people would find it unconscionable to learn that well into the 21st century there is still no focused management plan in existence for New Brunswick's premier Atlantic Salmon river – the Restigouche.

This needs to be rectified, and a significant benefit of such an undertaking would be the recognition it would provide for many of our forgotten rivers. Not only would we have meaningful documents addressing our major rivers such as the Restigouche, the Southwest Miramichi, the Nepisiguit, and the Northwest Miramichi among others, but also plans for the Canaan, the Salmon, the Gaspereau, and the Kennebecasis all of which like the Hammond flow individually to tidewater. These rivers should not be forgotten simply because of angling closures. The angling opportunities they once provided for Atlantic Salmon, while modest, can be again, with DFO's recognition of catch and release as a conservation measure.

5) The need to link harvest to abundance

Linking harvest to abundance is the most basic of fisheries management principals, and it has to be the underlying principal that directs all fisheries for Atlantic Salmon, be they First Nation food fisheries, or recreational angling fisheries.

Had DFO followed this basic principal in the past, the current situation on the Northwest Miramichi system could have been avoided. First Nation food fishery allocations should reflect run strengths and be stated as an agreed upon proportion of anticipated returns not a fixed number.

Similarly, potential grilse harvest by anglers should reflect run strengths on a river by river basis. Large rivers with strong runs numbering in the thousands provide more opportunity for harvest than do small rivers with runs numbering only in the hundreds.

This principal is also why I have concerns with the current call for all sport fisheries to be catch and release only for the 2015 season. While it has been argued that since all rivers are currently below conservation levels the case can be made to go with a province wide grilse harvest restriction, to do so would be to set aside any progress that has been made on what has been termed "river classification" here in New Brunswick. As you are likely aware this is essentially a system of allocating tags by river (stock strength), similar to what has been done in NFLD & Labrador.

We need to be careful about the precedents that "knee jerk" reactions tend to set. I believe for example, that a case can be made to allow some harvest of Grilse on both the Southwest Miramichi and the Restigouche in 2015 and would much prefer to see the benefits of "river classification" brought into being and incorporated into specific river management plans, than to go with the "broad brush" approach.

6) The need to clarify who owns the fish

For some this may seem an odd question, but it has to do with proprietary responsibility, stewardship of the resource, and ensuring there are no misconceptions out there. Like the point on recognizing estuaries for what they are, to leave the question unsettled has ramifications. Ask the question of a number of anglers and you will get a variety of answers – the "feds" do, the province does, the riparian rights landowner does, nobody does "they're wild", etc.. Quite often you will hear "we do – we live here, its our river" for even though they may not be landowners they see the salmon much the same as they see New Brunswick's crown lands, i.e. as their resource - owned by the people of the province.

In fact the answer to the question is, that it is the province of New Brunswick who owns the fish by virtue of legislation. Section 3(1) of the province's Fish and Wildlife Act reads as follows;

3(1) The property of all wildlife and fish within the Province, while in the state of nature, is hereby declared to be vested in the Crown in right of the Province, and no person shall acquire any right or property therein otherwise than in accordance with this Act and the regulations.

The responsibility for management of the resource however falls to the federal government by virtue of its legislation dating back to the BNA Act. This is where some of the confusion starts. The public often hears the province say that Atlantic Salmon is not their responsibility, yet their authority to license the angling fishery flows from ownership of the resource and with that the province has what is known as proprietary or ownership responsibility.

Ownership responsibility requires that you ensure your managers (DFO) are doing a good job on your behalf and that you contribute to the management and protection of the resource in a meaningful way. By declining to be actively engaged in salmon management and in fact looking to ever reduce their involvement and costs, the province is not living up to its responsibilities. The point here is that it is unacceptable for the province to essentially sit on the sidelines while stocks are in decline, and the recommendation for the Committee is that you raise this issue with the minister. The province needs to publicly acknowledge ownership, and clear the air on this question to ensure good stewardship of the resource going forward.

Misconceptions such as “the feds make the rules so they must own the resource” or “fish in private waters are under private ownership” need to be dispelled, as it is that sense of ownership which underlies the desire for good stewardship.

On the subject of stewardship, if we go back to that sentiment of “we live here, it’s our river”, this is where the ramifications of not addressing the ownership question start to surface. Everything from the need to insure that resident anglers are not excluded from angling opportunities, to the reality that it is the value that the people of the province assign to the resource that will make or break its future. No access or utilization equates to no value. No value, no stewardship. No stewardship, no resource. Without sufficient fish in the water to provide angling opportunities there is no angling industry, no value to leases, no value in riparian rights, etc. etc.

Information, education, and regulations that foster stewardship is where Atlantic Salmon management needs to go and that applies to all parties, First Nations included.

7) The need for DFO to mitigate smolt losses to Striped Bass within the estuaries of the Northwest Miramichi, and the Southwest Miramichi systems.

This is a recent phenomena but one that needs to be dealt with, particularly for the depressed stocks of the Northwest Miramichi system. The best data available on the issue is Jon Carr’s (ASF) smolt implant pinger tag information for 2013 and 2014. Hopefully the Committee will have a presentation on his work and if so I would suggest you ask him to focus on losses within the estuaries. While his work may not be definitive as to just what the mortality factors are, it certainly illustrates that not only are smolts from the NW and SW Miramichi systems faring poorly of late years when compared with those from the Restigouche but that the NW smolts are being particularly hard hit within the NW estuary proper. (61% survival rate from Red Bank to Nelson versus a 92% survival rate from Quarryville to Nelson for the two years of detection data combined)

So what is the difference between the two estuaries? One notable difference is in the concentration of spawning Striped Bass at the time the smolts are heading to sea. Overall survival rates for the two groups of tagged smolts through the estuary and into Miramichi Bay using the data from the Loggieville detector as the outer point was 78% for SW tagged smolts and 39% for NW tagged smolts. Subsequent losses in the bay were also significant.

The boom in Striped Bass numbers began in 2011 and concerns have been raised as to the impact on Atlantic salmon. At a public meeting in May of 2014 DFO was asked what their intentions were for this population. To the audiences dismay the answer given by the DFO spokesman in a rather flippant manner was that they had none at the moment, hadn't given it much thought, and "who knows maybe we can have more bass". Certainly a more reasonable and professional answer should be forthcoming in 2015. I would ask that you raise this point with the Minister – that on the strength of the ASF research data, a mitigation plan is required. Objectives need to be set for Striped Bass numbers and the cost to the Atlantic salmon resource determined for sound management planning.

8) The need for an information feedback loop and much better PR on the part of DFO

This is an issue that speaks to the need to build understanding and subsequently public support for the successful implementation of management measures. DFO needs to develop a mechanism for providing quality information out to interested parties. This could include a website dedicated to Atlantic Salmon management, and the regular use of news media, particularly print, to not only announce regulatory changes but to provide background data and to lay out the rationale for the change. Other means such as organizing public information sessions in key communities on an annual basis should also be part of the process. There is a thirst out there for information on why things are happening and what DFO's intentions are going forward. People should not have to drag this sort of information out of DFO by going the political route and forcing them to attend public sessions as has happened all too frequently in the recent past. The point that DFO often makes in response to calls for more open and frequent PR work is that they consult annually with NGO's and expect that those groups will relay the information. This is viewed as inadequate by many anglers for example as these groups do not have a mandate for PR work on DFO's behalf and secondly their membership reach is relatively low. To reach the broad scope of interested parties DFO needs to undertake the task itself.

One example of a feedback loop would be for DFO, in concert with the province, to post the results of the annual drive for anglers to return creel census reports. Every year great fuss is made over encouraging anglers to keep and return creel data but no one ever sees the results of that effort, and every year DFO complains that inadequate creel data is an unacceptable limitation in their effort to monitor harvest. Post the raw data obtained, even though it may not be statistically adequate to project total catch and effort it does reflect angling quality, release and harvest rates, etc. for those who did respond and it will draw more participation in subsequent years. Don't ask for something and give nothing back.

9) The need for internal change within DFO- its processes and its culture

In my preamble I raised this topic and will end my submission with a couple of comments and an example of the need for change. The very fact that your Ministerial Advisory Committee was created speaks to the need for change; had DFO been more effective in its management of the resource and communicating its forward planning, there likely would not have been a call for action raised and no need for the committee. DFO says it concerns itself with conservation and science as though somehow the concept of management is foreign to them. Management of the resource and the fisheries that depend on it should be in the forefront; even the minister's directive to your committee doesn't include the term "management". Conservation is the goal and science is one tool, as is protection, but management is the means of reaching the goal and using the tools.

Within DFO there are those that have this sense that they can operate with impunity. That they have no obligation to the public to be accountable for their actions. Their focus is on

the internal workings of the department, not its mandate for conservation. What matters most is the data, the reports, and “getting by” troublesome issues. Science says it is not their role to advise managers, but simply to provide answers to questions posed. As a reason for inaction DFO managers often say that science has not raised any concern on a particular issue so things must be alright – a classic case of “don’t ask and don’t tell”.

An example of the need for a shift in culture from an internalized department to one providing a public outreach is the situation whereby in 2011 DFO imposed a 3 year restriction on grilse harvest by anglers for parts of the Northwest Miramichi system. The press release at the time stated that *“at the end of the 2013 season, these measures would be subject to a review to determine if they continue to be adequate”* At the end of this time period anglers asked about the review. They wanted to know what the impact of the restriction had been. DFO simply said they had not done one, didn’t intend to do one, and in 2014 extended and expanded the restriction without ever providing any feedback to the very people whose support and compliance were critical for the success of the initiative.

Summary : 10 recommendations

- 1) No fishery closures on the Northwest Miramichi system. First Nation food fishery to be via trap net only and grilse harvest only. Angling season to be catch and release only.
- 2) DFO to change its perspective on catch and release angling from it being considered an allocation to it being considered a conservation measure
- 3) DFO to clearly distinguish between grilse fisheries and large salmon fisheries in terms of their impact on stocks, and to adopt a focus on grilse for First Nation food fisheries.
- 4) Regulatory changes proposed by DFO must pass the “benefit test”. For example, delaying the First Nation food fishery on the Restigouche until July 1st would do far, far more for stock recruitment than any additional grilse harvest restrictions for anglers.
- 5) Draft and implement “river by river” management plans
- 6) Adopt the principal of linking harvest to abundance as the primary driver for river-by-river plans. Bring in “river classification” to direct angler grilse harvests, and set First Nation food fishery allocations via a proportional percentage based on run strengths. Avoid the broad brush approach to management.
- 7) Clarify the question of who owns the fish, ensure the province participates actively on behalf of the owners, and foster a sense of stewardship among all parties
- 8) Implement a plan to mitigate smolt predation losses from the currently high population of Striped Bass within the estuaries of the Northwest and Southwest Miramichi river systems.
- 9) Develop an effective mechanism to provide a feedback loop for data and proposals such that all fishery participants have access to information. Consider PR as part of the job.
- 10) Change DFO’s internal culture, its “way of doing business” so that information and initiatives, flow freely between divisions. Acrimony between DFO, NGO’s and the public is counterproductive. Intransigent, should not be a word use to describe DFO.

Thank you.

A look at how the Northwest Miramichi system (LSW and NW rivers) compares with the Southwest Miramichi system (SW and Renous rivers) in terms of large salmon return rates per 10,000 sq. meters of habitat (i.e. a common denominator)

data utilized - DFO's large salmon return estimates for the SW Miramichi, and the NW Miramichi River systems (**median #'s**, 1998 to 2012, data taken from DFO's Science Response document 2013/009)

Habitat quantity for each system - data taken from the 2007 DFO stock assessment report:

The SW Miramichi system has 35.35 million sq. meters of stream habitat or 353,500 habitat units (100 sq.m.)

The NW Miramichi system has 16.30 million sq. meters of stream habitat or 163,000 habitat units (100 sq.m.)
(10,000 sq. m. = 100 habitat units)

year	SW Mir. System large salmon returns	Large salmon return per 100 habitat units	NW Mir. System large salmon returns	Large salmon return per 100 habitat units	NW performance for large salmon returns relative to the SW performance
1998	13490	3.8	3058	1.9	-51%
1999	12350	3.5	3668	2.3	-36%
2000	13170	3.7	4264	2.6	-30%
2001	15080	4.3	7824	4.8	13%
2002	10510	3.0	1676	1.0	-65%
2003	17480	4.9	2767	1.7	-66%
2004	17010	4.8	3318	2.0	-58%
2005	14670	4.1	3873	2.4	-43%
2006	17240	4.9	3198	2.0	-60%
2007	14520	4.1	3292	2.0	-51%
2008	11840	3.3	1432	0.9	-74%
2009	16750	4.7	2095	1.3	-73%
2010	13450	3.8	4042	2.5	-35%
2011	25900	7.3	5334	3.3	-55%
2012	10790	3.1	2680	1.6	-46%
2013	10120	2.9	2388	1.5	-49%
2014	8940	2.5	1235	0.8	-70%

large salmon return rates per 100 habitat units by 5 yr. period

	<u>SW Mir. System</u>	<u>NW Mir. System</u>
5 yr. average return rate for the period 1998 to 2002	3.7	2.5
5 yr. average return rate for the period 2003 to 2007	4.6	2.0
5 yr. average return rate for the period 2008 to 2012	4.5	1.9
2013	2.9	1.5
2014	2.5	0.8