2017 ATLANTIC SALMON MID-SEASON REVIEW FOR THE NEWFOUNDLAND AND LABRADOR REGION

Context

Declines in total returns (>30%) of Atlantic Salmon on more than half of monitored rivers in 2016 warranted conducting a full stock assessment for Atlantic Salmon in the Newfoundland and Labrador (NL) Region in February 2017 (Fisheries and Oceans Canada [DFO] 2017). In March 2017, the Salmonid Advisory Committee (SAC) recommended that DFO Science conduct a mid-season review of the status of Atlantic Salmon in the NL Region to determine whether the 2016 declines were an outlier in the observed annual variability of salmon returns, or the result of a declining trend in the abundance of salmon stocks.

Based on this recommendation from SAC, DFO Resource Management requested DFO Science to provide advice on the following questions:

1. Are the 2017 environmental conditions having an effect on Atlantic Salmon returns?
2. If there are environmental conditions influencing returns, can we anticipate an increase in Atlantic Salmon returns before mid-August?
3. When could it be reasonably certain that marine survival is much lower and returns will be significantly lower than previous generation returns?
4. What would be the impact of reducing catch and reducing effort?
5. Given it is a late year for returns, would it be reasonable to keep counting fences in place for an extended period?

This Science Response Report results from the Science Response Process of July 19, 2017 on the 2017 Atlantic Salmon mid-season review for the Newfoundland and Labrador Region.

Analysis and Response

1. Are the 2017 environmental conditions having an effect on Atlantic Salmon returns?

Research has shown that climate can affect migration timing of adult Atlantic Salmon with earlier runs associated with overall warmer climate conditions on the NL Shelf (Dempson et al. 2017). Conversely, during years of heavy ice and cold ocean conditions in the spring, salmon returns to the island are generally delayed (Colbourne et al. 2002). Returns during these years tend to be lower than average and this appears to be the case this year.

2. If there are environmental conditions influencing returns, can we anticipate an increase in Atlantic Salmon returns before mid-August?

There is no evidence of late summer or fall runs in NL's salmon stocks. Based on long-term trends, most monitored rivers have peak runs between late-June and mid-July (Dempson et al. 2017). After mid-July, daily counts decline. There is no reason to expect runs in 2017 to increase in late-July as a result of any delay that may have been caused by heavy ice or cold ocean conditions during the spring of 2017.

3. When could it be reasonably certain that marine survival is much lower and returns will be significantly lower than previous generation returns?

The week ending July 16, 2017 is when it can be reasonably assumed that marine survival is much lower and returns will be significantly lower than previous generation returns. Based on average returns over the past five and six years (one generation of salmon for the island and Labrador, respectively), salmon returns to NL as of July 16, 2017 are far less than expected (Table 1). On the island, average returns are 48% lower (range: 8% to 88% lower) compared with the previous five-year mean, with all monitored rivers showing a decline. In Labrador, average returns are 65% lower (range: 60% to 70% lower). Again, compared to the previous five-year mean for the island, and six-year mean for Labrador, approximately 60% of the returning salmon would be expected in Newfoundland rivers (i.e. through our counting facilities) at this time of the year, while approximately 26% of salmon would be expected in Labrador rivers.

Given the counts to date and the average percentage of the run in freshwater, projections of total returns for the end of the salmon season were made (Table 1). Based on those projections it is estimated that in 2017, 75% (9 of 12) of monitored rivers on the island will once again realize declines of total returns of >30% compared to the previous five-year mean with five rivers potentially having declines of >60%. Year-end returns for Labrador are projected to be, on average, >60% lower on all four rivers in 2017 compared with the previous six-year mean. However, it is important to note that since returns to Labrador rivers commence at a later date, a lower percentage of the total run is in the rivers as of July 16, 2017 compared to the island. As such, there is less certainty in the Labrador year-end projections.

4. What would be the impact of reducing catch and reducing effort?

Angling catch can only be reduced by reducing angling effort. Angling data show that there is a high positive correlation between effort and catch, and therefore the only way to reduce catch is to reduce effort. Between 25,000 and 30,000 salmon are harvested in NL each year (DFO 2017), and over 95% of anglers who report some catch also report retaining at least one salmon (Veinott and Cochrane 2015). In fact, the average harvest per angler is approximately 1.5 salmon per year. Reclassifying all rivers as Class 1 (retention of one fish) at the beginning of the season would be expected to reduce total harvest by 33% or approximately 8,000 to 10,000 salmon.

Approximately 30,000 salmon are caught and released annually in NL's recreational fishery. Assuming there is 10% mortality from catch and release practices (Dempson et al. 2002), then this would result in a loss of approximately 3,000 salmon annually. As NL anglers are primarily harvest oriented (Veinott and Cochrane 2015), under a catch-and-release fishery it is expected that effort would be greatly reduced.

A complete closure of the fishery to all angling would reduce the legal harvest to zero but also result in few individuals on the rivers. In the absence of anglers, the potential for illegal harvesting increases. When anglers are engaged in the fishery and present on the rivers, there is a higher likelihood of compliance with regulations, cooperation with DFO Science and interest in stewardship (McCullin et al. 2007).

If rivers remain open to retention in Salmon Fishing Areas (SFAs) where monitored rivers are expected to achieve conservation (e.g. SFA 14A), research suggests that anglers will shift their effort to these rivers (Veinott et al. 2013), thereby possibly subjecting them to overexploitation.

5. Given it is a late year for returns, would it be reasonable to keep counting fences in place for an extended period?

There would be little benefit in keeping counting fences in beyond their normal operating period (late August-September). There is no evidence of large late season runs of salmon in the NL populations. It should be noted that all of the counting facilities currently operate well beyond the normal peak run times.

Table 1. Summary of total salmon returns to July 16, 2017 and projected % year-end change.

Newfoundland and Labrador Counting Facilities	Total Returns to July 16, 2017	% Change to July 16, 2017 (Previous Generation*)	Avg. % of run in river to July 16, 2017 (Previous Generation*)	Year End Projected Total Returns	Year End Avg. Total Returns (Previous Generation*)	Year End Projected % Change (Previous Generation*)
Exploits River (Bishop's Falls)	7,264	-57%	62%	11,716	29,416	-60%
Campbellton River	866	-66%	62%	1,397	4,181	-67%
Salmon Brook	93	-88%	50%	186	1,865	-90%
Middle Brook	928	-29%	44%	2,109	2,992	-30%
Terra Nova River	1,138	-34%	37%	3,076	4,599	-33%
Rocky River[1]	169	-38%	47%	376	575	-35%
Northeast River (Placentia)[2]	65	-80%	51%	130	656	-80%
Garnish River	333	N/A	N/A	N/A	N/A	N/A
Conne River	681	-63%	96%	709	1,865	-62%
Harry's River	2,125	-32%	86%	2,471	3,645	-32%
Torrent River	1,194	-31%	42%	2,843	4,136	-31%
Western Arm Brook	627	-8%	51%	1,229	1,319	-7%
English River	8	-70%	4%	200	766	-74%
Sand Hill River	849	-60%	52%	1,633	4,135	-61%
Muddy Bay Brook	33	-67%	15%	220	652	-66%
Southwest Brook	32	-62%	34%	94	247	-62%

* Previous Generation is five years on the island and six years in Labrador.

[1] Years 2010-14 was used to calculate previous generation mean owing to operational challenges with fishway in 2015-16.

[2] Years 1999-2000, 2002, 2015-16 used. Fence not operational in other years.

Conclusions

Based on the expected widespread declines in total returns of adult Atlantic Salmon in the NL Region for the past two years, it is the recommendation of Science that all rivers on the island be closed to retention angling until there is evidence of improved returns.

It is recommended that no change be made to the management of the salmon rivers in Labrador until a greater percentage of the total run is in the rivers. Labrador rivers should be re-assessed once >50% of the expected returns are in the river.

It is recommended that catch-and-release angling be permitted to promote angler engagement and continued stewardship.

Contributors

Name	Affiliation
Brian Dempson	DFO Science
Carole Grant	DFO Science
Geoff Veinott	DFO Science
Erin Dunne	DFO Resource Management
Erika Parrill	Centre for Science Advice – NL Region
James Meade	Meeting Chair

Approved by

Ben Davis
A/Regional Director Science, NL Region
Fisheries and Oceans Canada
July 19, 2017

Sources of information

Colbourne, E.B., Dawe, E.G., Parsons, D.G., Murphy, E.F., Bowring, W.R., Dalley, E.L., Anderson, J.T., Dempson, J.B., Orr, D., Stansbury, D.E., and Ennis, G. P. 2002. A preliminary review of environmental-stock relationships for some species of marine organisms in NAFO waters of the Northwest Atlantic. NAFO Scientific Document 02/34. Serial No. N4645. 21 p.

Dempson, B., Schwartz, C.J., Bradbury, I. R., Robertson, M.J., Veinott, G., Poole, R., and Colbourne, E. 2017. Influence of climate and abundance on migration timing of adult Atlantic Salmon (*Salmo salar*) among rivers in Newfoundland and Labrador. Ecol. Freshwat. Fish. 26: 247-259.

Dempson, J.B., Furey, G., and Bloom, M. 2002. Effects of catch and release angling on Atlantic Salmon, *Salmo salar* L., of the Conne River, Newfoundland. Fisheries Management and Ecology. 9: 139-147.

DFO. 2017. Stock Assessment of Newfoundland and Labrador Atlantic Salmon – 2016. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/035.

McCullin, S.L., Hockett, K.S., and McClafferty, J.A. 2007. Does angling or boating improve the stewardship ethic of participants? Amer. Fisher. Sym. 55:145-155.

Veinott, G., and Cochrane, N. 2015. Characteristics of the Newfoundland and Labrador Atlantic Salmon (*Salmo salar*) Recreational Fishery based on Angler Logs and Phone Surveys (1994-2013). Can. Manuscr. Rep. Fish. Aquat. Sci. 3082: vii + 51 p.

Veinott, G., Cochrane, N., and Dempson, J. B. 2013. Evaluation of a river classification system as a conservation measure in the management of Atlantic Salmon in Insular Newfoundland. Fisheries Management and Ecology. 20: 454-459.

This Report is Available from the

Center for Science Advice (CSA)
Newfoundland and Labrador Region
Fisheries and Oceans Canada
PO Box 5667
St. John's, NL A1C 5X1

Telephone: 709-772-3332
E-Mail: DFONLCentreforScienceAdvice@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs/

ISSN 1919-3769

Correct Citation for this Publication:

DFO. 2017. 2017 Atlantic Salmon Mid-Season Review for the Newfoundland and Labrador Region. DFO Can. Sci. Advis. Sec. Sci. Resp. 2017/036.

Aussi disponible en français :

MPO. 2017. Examen de mi-saison du saumon de l'Atlantique de 2017 pour la région de Terre-Neuve-et-Labrador. Secr. can. de consult. sci. du MPO. de consult. des Sci. 2017/036.