



North American Commission

NAC(17)8

Presentation of the ICES Advice to the North American Commission

sal.21.nac

Atlantic salmon from North America



Science for sustainable seas



Terms of Reference

- NASCO informed ICES that the results of the Framework of Indicators for the West Greenland Commission run in January 2017 did not indicate the need for a revised analysis of catch options and therefore no new management advice for the 2017 fishery is provided.

Revised terms of reference:

- describe the key events of the 2016 fisheries (including the fishery at St Pierre and Miquelon)
- update age-specific stock conservation limits based on new information as available including updating the time series of the number of river stocks with established CL's by jurisdiction
- describe the status of the stocks including updating the time series of trends in the number of river stocks meeting CL's by jurisdiction

3.1 Key events of the 2016 fisheries



- Reported catch in 2016 of 139.5 t (97% from Canada)
- Saint Pierre and Miquelon reported catch of 4.7 t
- 5% of catches from Canada in coastal areas, 100% of catches from Saint Pierre and Miquelon in coastal areas

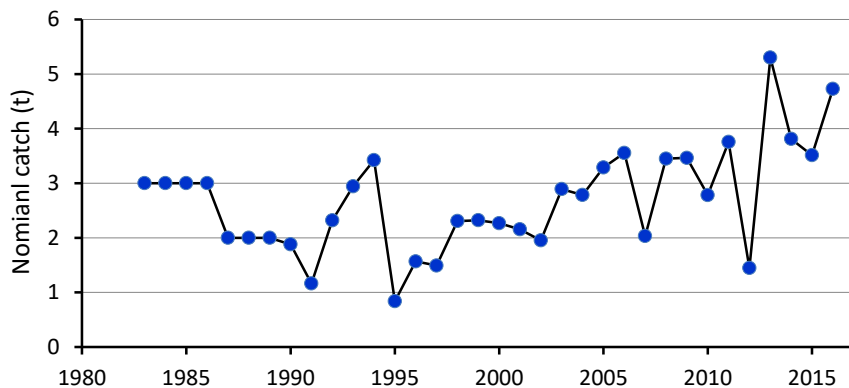
Table 1 2016 harvest of salmon by country and location.

	Canada					Saint Pierre and Miquelon	USA	North America
	Commercial	Aboriginal	Labrador resident	Recreational	Total			
2016 reported nominal catch (t)	0	63.9	1.6	69.3	134.8	4.7	0	139.5
% of NAC total	-	46	1	50	97	3	-	100
Unreported catch (t)	27					na	0	27
Location of catches								
% in-river					69	0	-	67
% in estuaries					26	0	-	26
% coastal					5	100	-	8

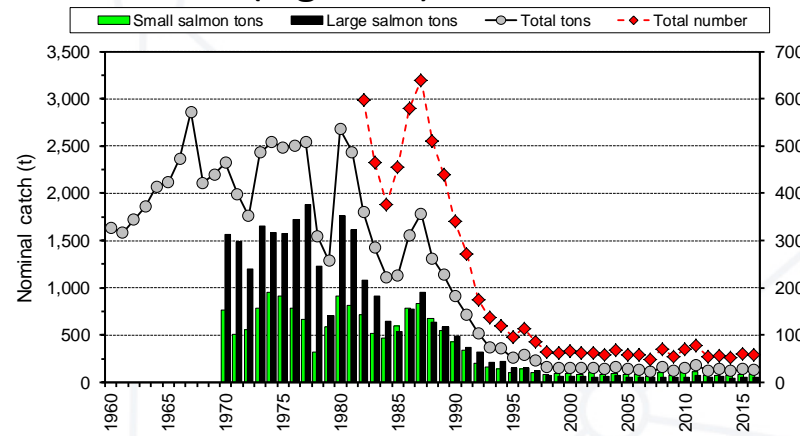
Key events of the 2016 fisheries

- Catches at Saint Pierre and Miquelon, although small, have increased.
- Dramatic decline in harvested tonnage in Canada since 1980 is in large part the result of the reductions in commercial fisheries effort and changes to recreational fisheries.
- Commercial fisheries for Atlantic salmon remained closed in Canada in 2016.
- Exploitation rates of both large salmon (MSW) and small salmon (mostly 1SW) declined sharply through 1990s; exploitation rates are currently among the lowest in the time-series.

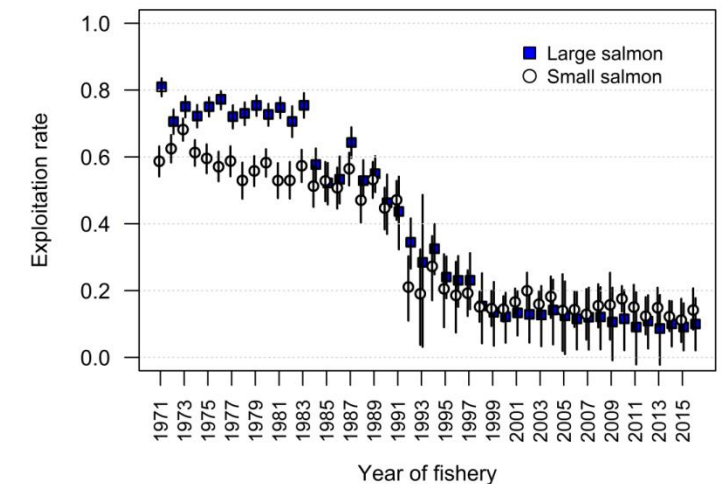
Saint Pierre and Miquelon (Table 2)



Canada (Figure 1)

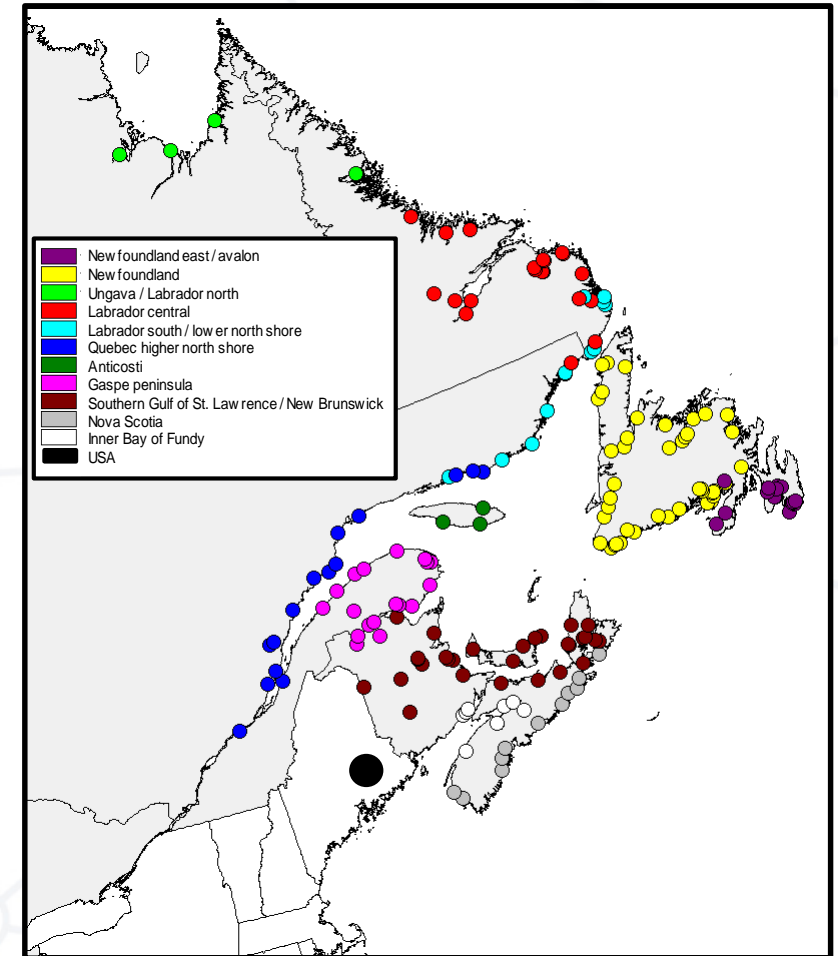


Canada (Figure 2)



Origin and composition of the catches

- Sampling programmes of marine fisheries (Labrador subsistence and Saint Pierre and Miquelon) were conducted in 2016.
- Stock composition and variation in composition of salmon harvested in these mixed-stock fisheries determined using a North American genetic baseline for Atlantic salmon, which allows assignment to twelve regional groups.



Labrador fishery origin and composition of the catches

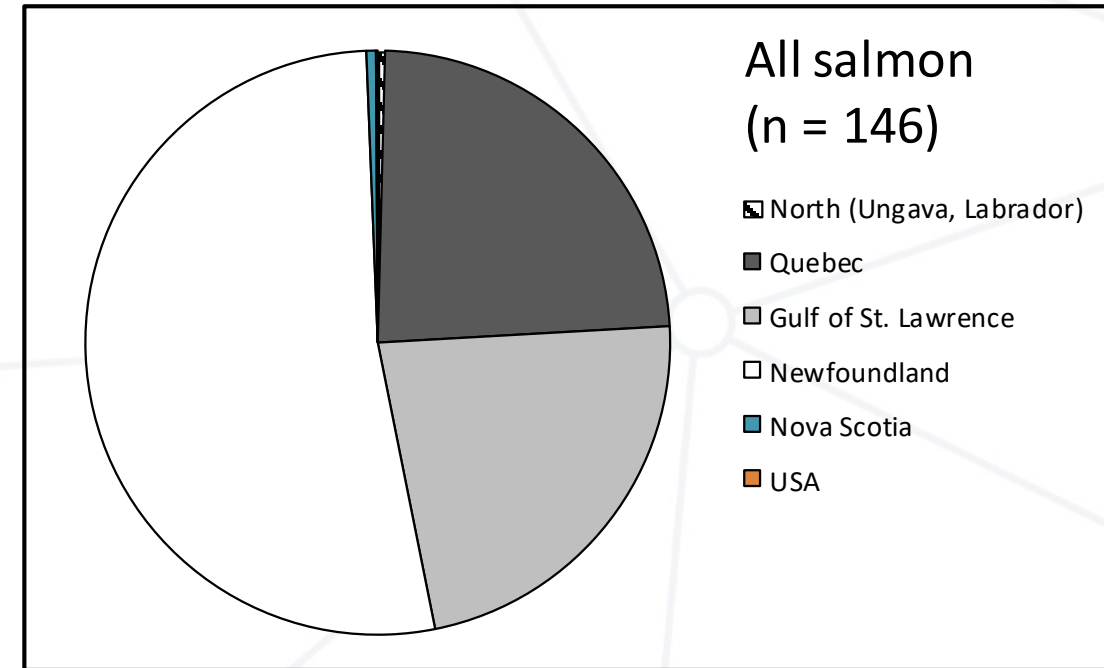


- Samples collected from the Labrador aboriginal fisheries (880 samples in 2015; 810 in 2016), representing 6% of the estimated harvest by number in both years.
- Majority of sampled salmon were 1SW salmon (77% in 2015, 69% in 2016), lesser contributions of 2SW salmon (19% in 2015, 26% in 2016).
- Majority (98% in 2015, 99% in 2016) of the sampled salmon were river ages 3 to 5 years (modal age 4). There were no river age 1 and only few river age 2 (0.5% in 2015, 0.3% in 2016) suggesting that, as in previous years (2006 to 2014), very few salmon from the southernmost stocks of North America (USA, Scotia–Fundy) were exploited in these fisheries.
- Based on genetic analyses of tissue samples, the Labrador Central (LAB) regional group represented the majority (98% in 2015, 99% in 2016) of the salmon sampled.
- In 2015 and 2016, no samples were assigned with greater than 1% probability to USA regional group.

Saint Pierre and Miquelon (SPM) fishery origin and composition of the catches



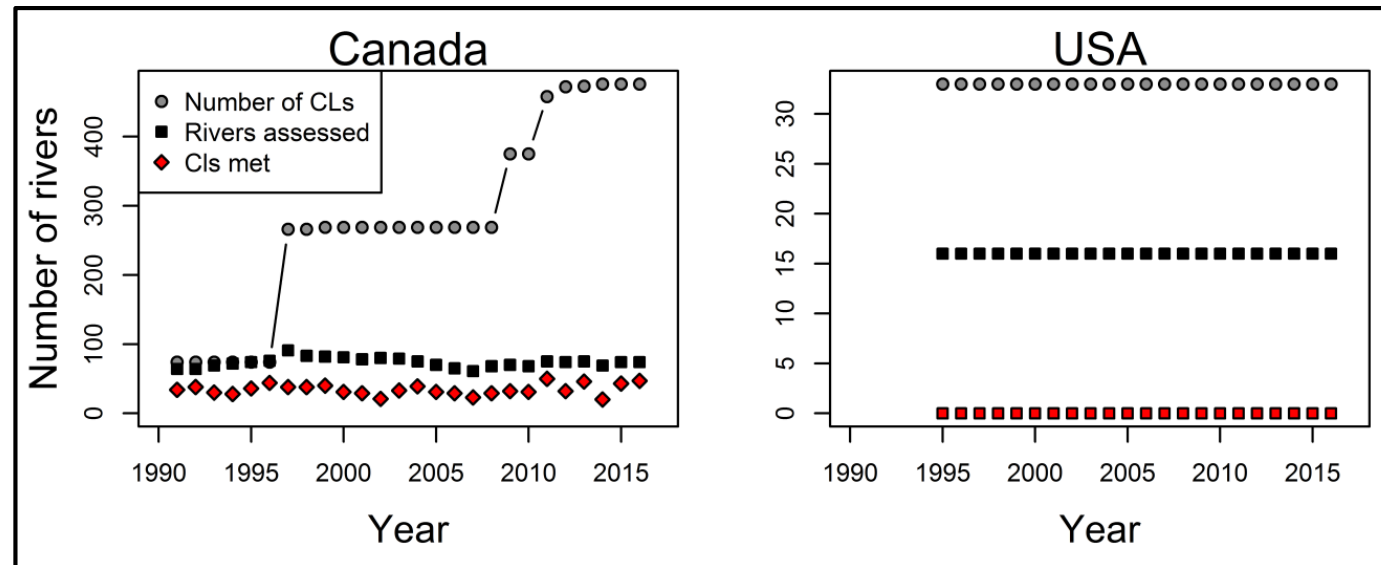
- Samples collected in 2015 and 2016.
- 84% of sampled salmon in 2016 were 1SW salmon.
- Predominantly river ages 2 (28%), 3 (43%), and 4 (25%).
- Stock composition based on genetic analysis up to 2014 showed consistent dominance of three regions: Gulf of St. Lawrence, Québec (primarily the Gaspé Peninsula), and Newfoundland.
- Genetic analyses of 2015 tissue samples will be reported when completed.
- In 2016, majority of the salmon in the samples were from three of ICES geographic regions: Newfoundland, Québec, and Gulf of St. Lawrence (Figure 3).



3.2 Development of age-specific stock conservation limits, update of time-series of the number of river stocks with established CLs by jurisdiction

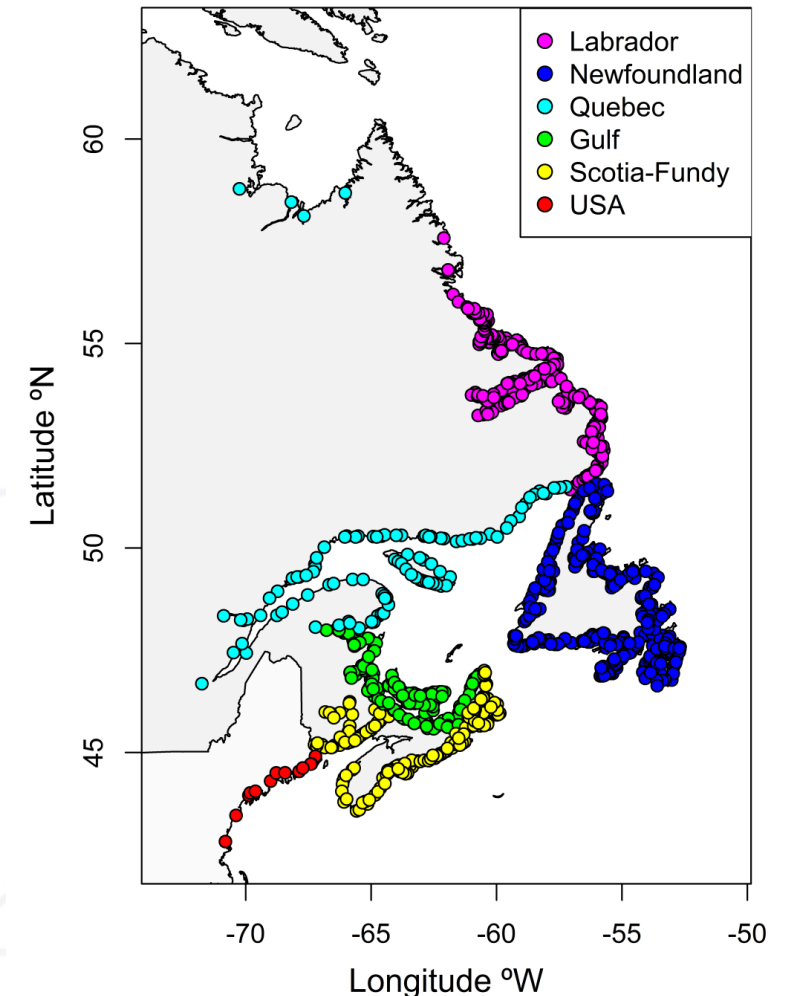


- In Quebec, reference points were reviewed and revisions implemented in the Quebec Atlantic salmon management plan for 2016–2026. Conservation limits (CLs) for the mixed-stock fishery components by sea age have yet to be revised.
- Canada: CLs first established in 1991 for 74 rivers. Number of rivers with defined CLs increased to 266 in 1997 and, since 2014, has been 476.
- CLs have been established for 33 river stocks in USA since 1995.

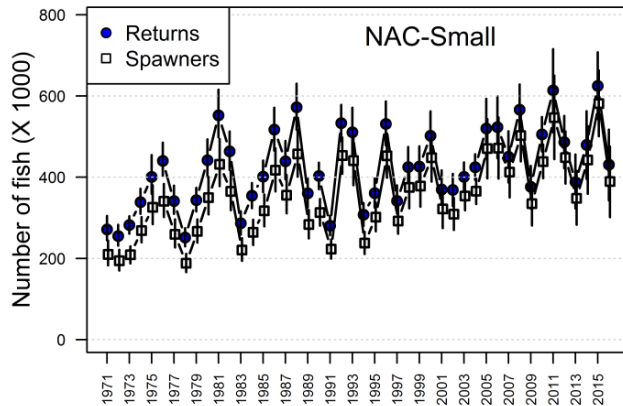


3.3 Status of stocks, update of time-series of trends in the number of river stocks meeting CLs by jurisdiction

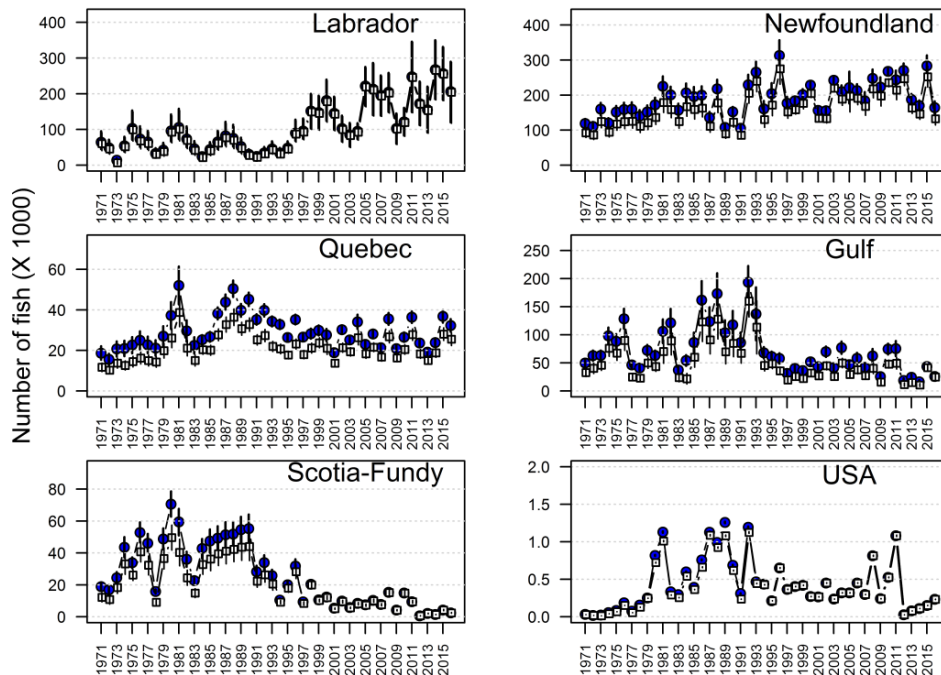
- Stock status is presented for six regions and overall for North America.
- Size groups: small (1SW), large (MSW), and 2SW salmon (a subset of large).
- Returns: include fish caught by homewater commercial fisheries, except Newfoundland and Labrador.
- Pre-fishery abundance (PFA; recruitment): non-maturing 1SW salmon (destined to be 2SW returns) on August 1st of the second summer at sea. Accounts for returns to rivers, fisheries at sea in North America, fisheries at West Greenland, and corrected for natural mortality.



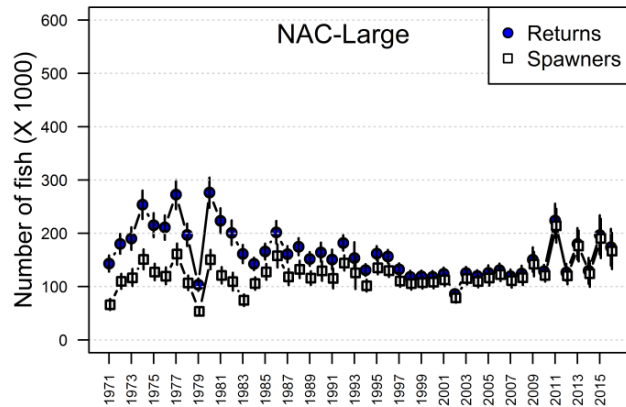
Status of stocks



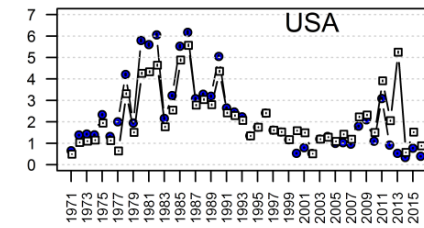
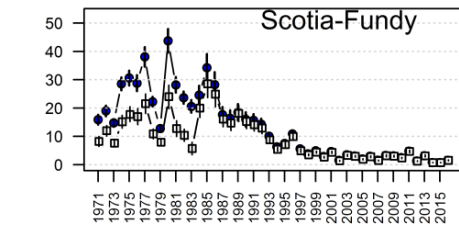
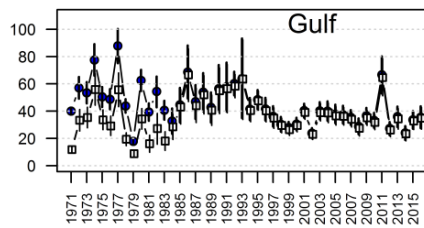
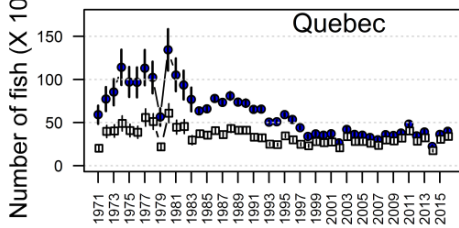
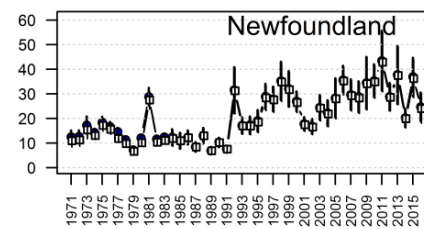
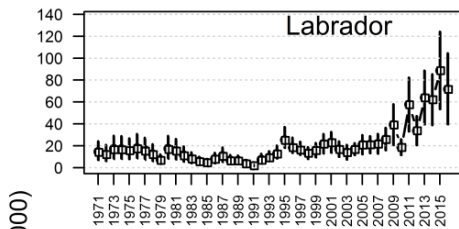
- Small salmon returns to North America in 2016 (430 900), 31% lower than in 2015 and in the mid range of values of the 47 year time series (Figure 6). Returns decreased in 2016 from the previous year in five of the six geographical regions.
- Small salmon returns to Labrador and Newfoundland combined represent 86% of the 2016 total small salmon returns to North America (430 900) in 2016.



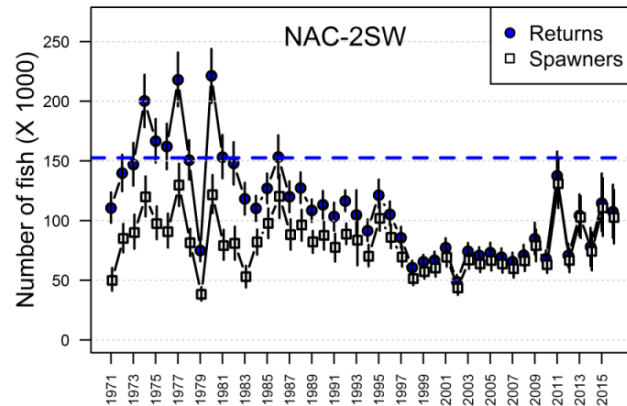
Status of stocks



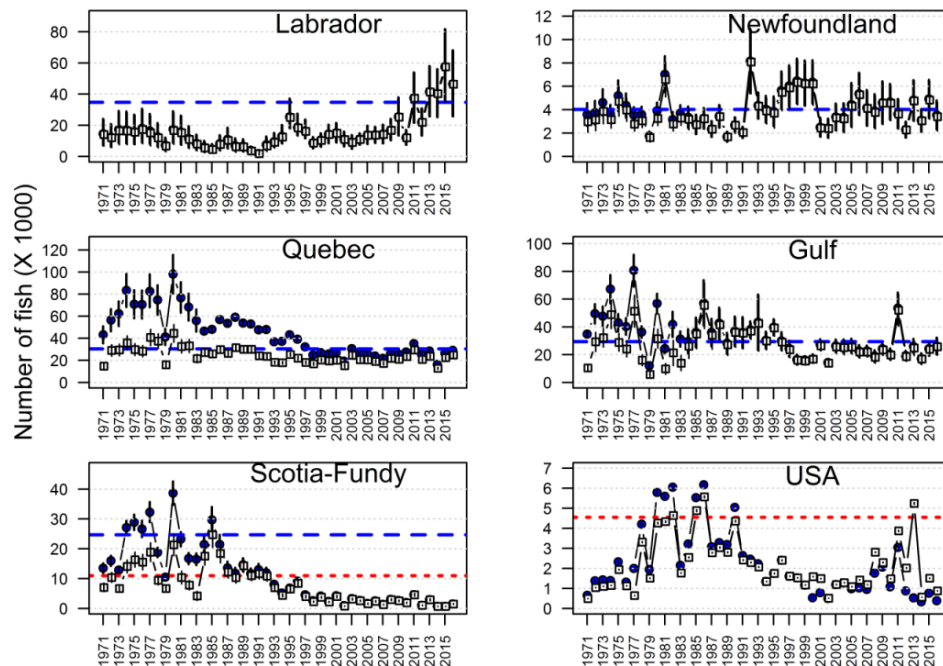
- Large salmon return to North America in 2016 (174 100) was 12% lower than in 2015 and in the lower third rank of the 47 year time-series (Figure 7). Returns increased from the previous year in three (Quebec, Gulf, and Scotia-Fundy) of the six regions. Returns in 2016 were the second lowest on record for USA and the fourth lowest on record for Scotia-Fundy.
- Large salmon returns to Labrador, Quebec, and Gulf regions collectively represent 85% of the total large salmon returns to North America in 2016.



Status of stocks

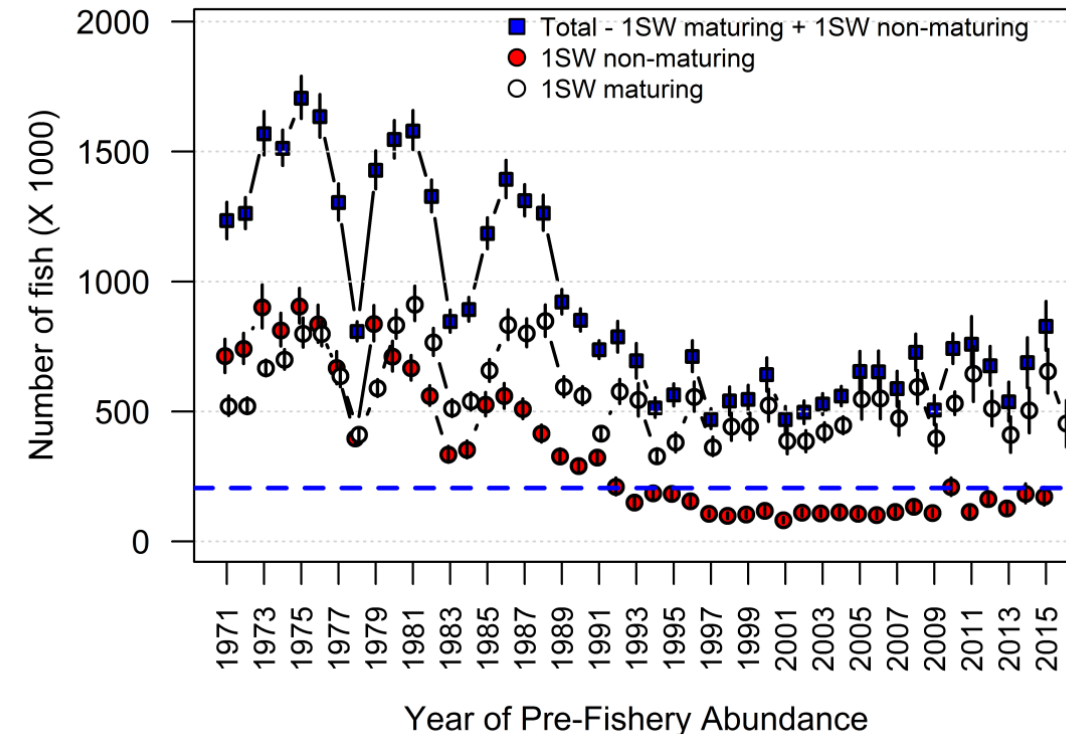


- 2SW salmon return to North America in 2016 (107 400) was 6% lower than in 2015 and ranks 25th (descending) out of the 47 year time-series (Figure 8). Returns increased from previous year in three (Quebec, Gulf, and Scotia-Fundy) of the six regions.
- 2SW salmon returns were second lowest on record for USA and sixth lowest on record for Scotia-Fundy.
- Three regions (Labrador, Quebec, Gulf) collectively account for 95% of 2SW salmon returns to North America in 2016.



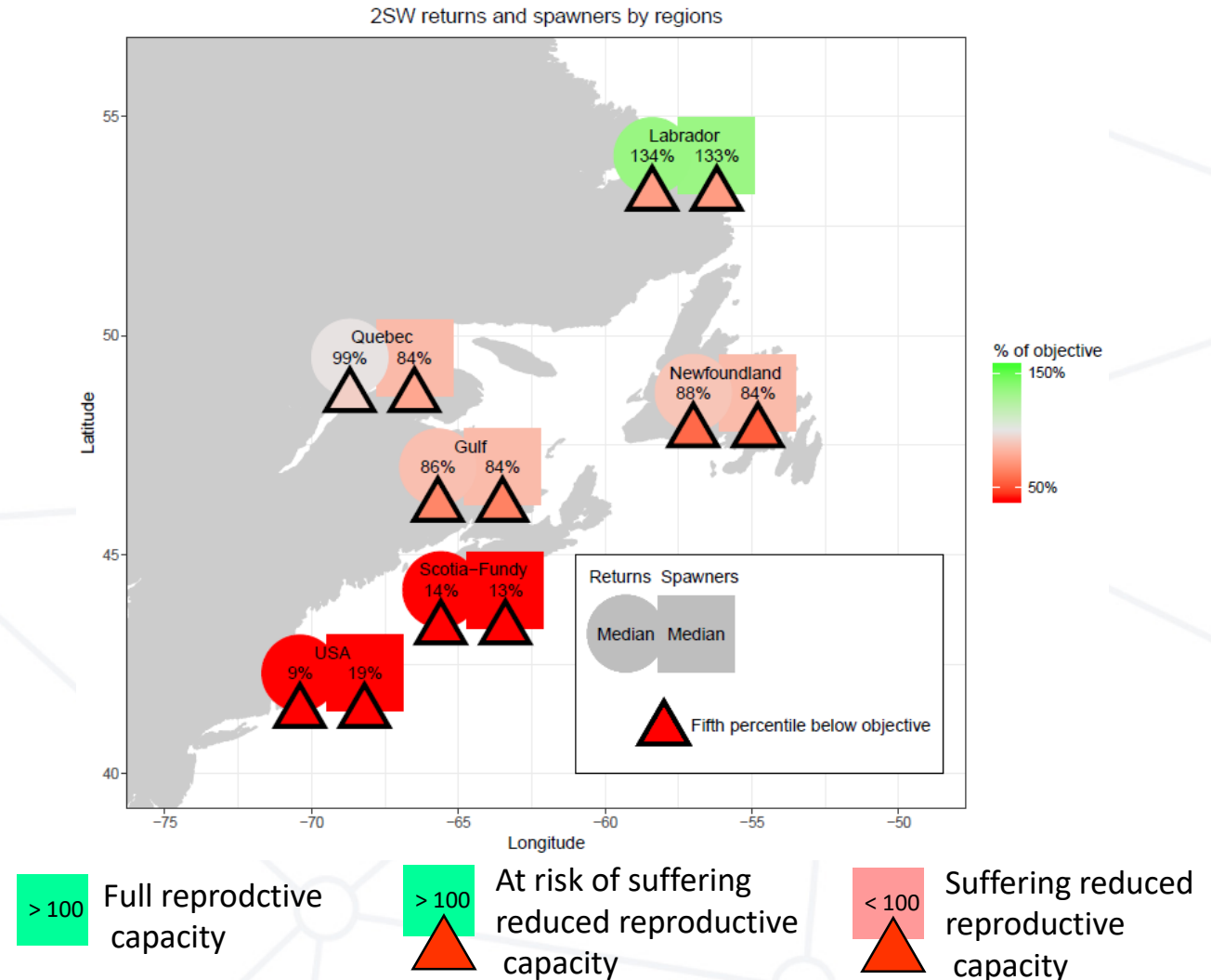
Status of stocks

- Estimates of recruitment (PFA) suggest continued low abundance of North American salmon (Figure 9).
- Total population of Atlantic salmon in Northwest Atlantic oscillated around a generally declining trend since the 1970s with a period of persistent low abundance since the early 1990s; during 1993 to 2015, total population of ~ 600 000 fish, half of average abundance during 1971 to 1992.
- Recruitment of the 1SW cohort for the 2015 PFA year of 827 700 fish; abundance declined by 51% over the time-series from peak in 1975 of 1 705 000 fish.



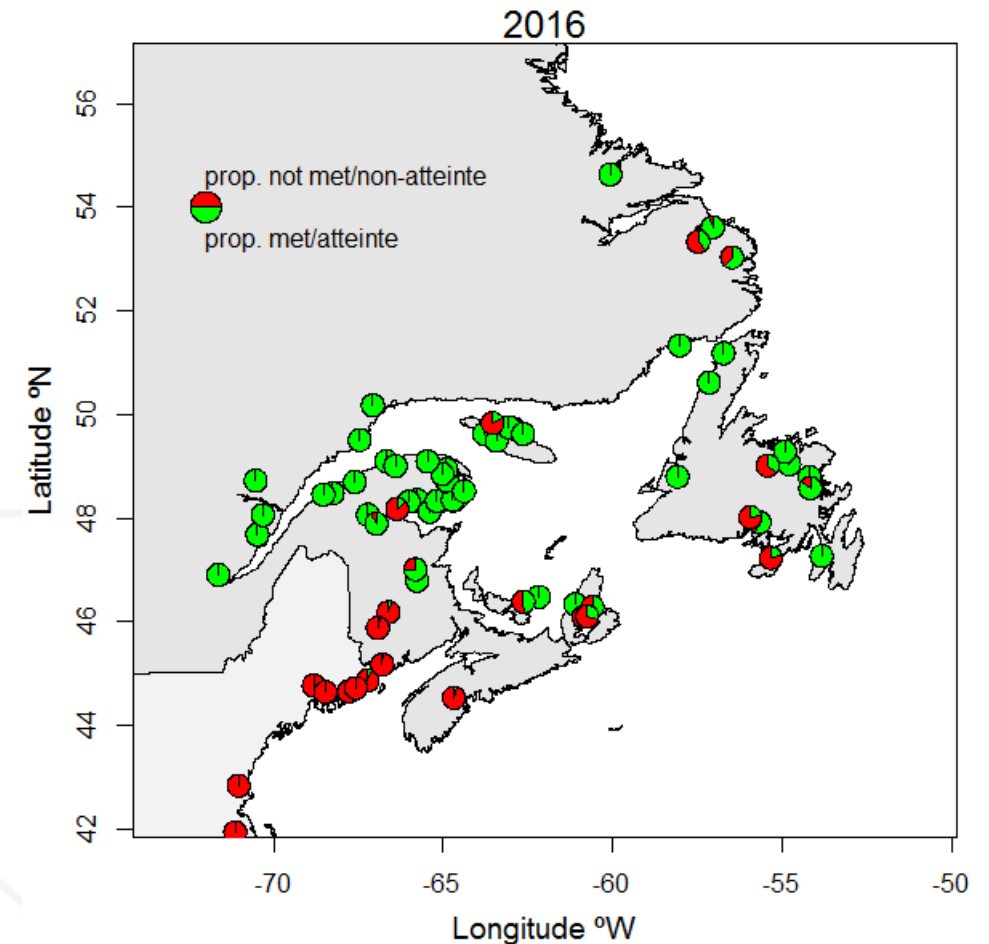
Status of stocks

- In 2016, estimates of 2SW returns and 2SW spawners were below the 2SW CLs for all regions except Labrador, and the stocks are therefore suffering reduced reproductive capacity (Figure 10). The 2SW returns and spawners for Labrador are at risk of suffering reduced reproductive capacity.
- Particularly large deficits relative to CLs are noted in the Scotia–Fundy and USA regions.



Status of stocks

- Egg depositions in 2016 by sea-ages combined exceeded or equaled the river-specific CLs in 41 of the 70 (58%) assessed rivers and were less than 50% of CLs in 21 rivers (30%) (Figure 11).
- In Canada, the number of rivers assessed annually has ranged from 61 to 91 and the annual percentages of these rivers achieving CL ranged from 26% to 67% (66% in 2016) with no temporal trend (Figure 4).
- Sixteen rivers in the USA are assessed against CL attainment annually with none meeting CLs to date.



Status of stocks - conclusion



- Despite major changes in fisheries management two to three decades ago, and increasingly more restrictive fisheries measures since then, returns have remained near historical lows, except for returns to Labrador and Newfoundland.
- All salmon populations within the USA and the Scotia-Fundy regions have been or are being considered for listing under country specific species at risk legislation.
- The continued low abundance of salmon stocks in the USA and in three regions of Canada (Scotia–Fundy, Gulf, and Québec), despite significant fishery reductions and generally sustained smolt production, strengthens the conclusions that factors acting on survival in the first and second years at sea are constraining abundance of Atlantic salmon.

3.4 Relevant data deficiencies, monitoring needs, and research requirements



- Sampling and supporting descriptions of the Labrador and Saint Pierre and Miquelon mixed-stock fisheries should be continued and expanded (i.e. sample size, geographic coverage, tissue samples, seasonal distribution of the samples) in future years to improve the information on biological characteristics and stock origin of salmon harvested in these mixed-stock fisheries.
- Additional monitoring should be considered in Labrador to estimate stock status for that region including evaluation of the utility of other available data sources (e.g. Aboriginal and recreational catches and effort) to describe stock status in Labrador.

Annexes

- Annex 1: references cited
- Annex 2: glossary of terms
- Annex 3: general considerations, as per standard ICES advice

Acknowledgements

- Members of the ICES Working Group on North Atlantic salmon from 17 countries in the North Atlantic, and supporting scientific staff

