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Atlantic salmon from North America

Summary of the advice for 2017 and 2018

Management advice in the form of catch options is only provided by ICES for the non-maturing 1SW and maturing 2SW components, as they are the object of mixed-stock fisheries. The maturing 1SW component is not fished outside of home waters. In the 2015 advice, ICES indicated that there were no mixed-stock fishery catch options for 2015 to 2018 on 1SW non-maturing and 2SW salmon in North America consistent with the management objectives defined for this stock complex (ICES, 2015). The NASCO Framework of Indicators of North American stocks for 2016 did not indicate the need for a revised analysis of catch options for 2017 and no new management advice for 2017 is provided. The assessment was updated to 2016 and the stock status is consistent with the previous years' assessments and catch advice.

NASCO 3.1 Describe the key events of the 2016 fisheries (including the fishery at Saint Pierre and Miquelon), including details of catch, gear, effort, composition and origin of the catch, rates of exploitation, and location of the catch as in-river, estuarine, and coastal

The provisional harvest of Atlantic salmon in eastern North America in 2016 was estimated at 139.5 t, of which 134.8 t was reported from Canada, 4.7 t from France (the islands of Saint Pierre and Miquelon), and 0 t from USA (Table 2 and Figure 1). The dramatic decline in harvested tonnage since 1980 is in large part the result of the reductions in commercial fisheries effort, with closure of the insular Newfoundland commercial fishery in 1992, the Labrador commercial fishery in 1998, and the Québec commercial fishery in 2000. All commercial fisheries for Atlantic salmon remained closed in Canada in 2016.

France (the islands of Saint Pierre and Miquelon) reported a total harvest of 4.7 t in the professional and recreational fisheries in 2016 (Table 2). There were no commercial or recreational fisheries for Atlantic salmon in USA in 2016 (Table 2).

Unreported catch for Canada in 2016 was 27 t and 0 t for USA. France (the islands of Saint Pierre and Miquelon) did not provide an unreported catch value.

Three groups exploited salmon in Canada in 2016: aboriginal peoples, residents fishing for food in Labrador, and recreational fishers. Mandatory catch and release of small salmon was implemented in the 2015 and 2016 recreational fisheries for the Gulf region, and mandatory release of large salmon continued. Fishing regulations changed in Québec prior to the 2016 season, limiting the retention of large salmon to be allowed only on 20 of 114 rivers, retention of small salmon allowed on 75 rivers, and with 32 rivers closed to salmon fishing.

For Canada in 2016, 5% of the harvests were taken in coastal areas, entirely from Labrador. The harvest from France (the islands of Saint Pierre and Miquelon) is entirely from coastal areas. Overall for eastern North America in 2016, 67% of the harvests were from rivers, 26% from estuaries, and 8% from 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

Nominal catch of salmon in Canada decreased strongly from the early 1980s to the late 1990s, and has remained very low since then (Figure 1). Exploitation rates of both large salmon (2SW, 3SW, and previous spawners) and small salmon (mostly 1SW) remained relatively stable until 1984 and 1992, respectively, then declined sharply with the introduction of restrictive management measures (Figure 2). Declines continued in the 1990s. In the last few years, exploitation rates have remained among the lowest in the time-series.

In the recreational fisheries of Canada, about 69 600 salmon (38 300 small and 31 300 large) were caught and released, representing about 65% of the total number caught (including retained fish).

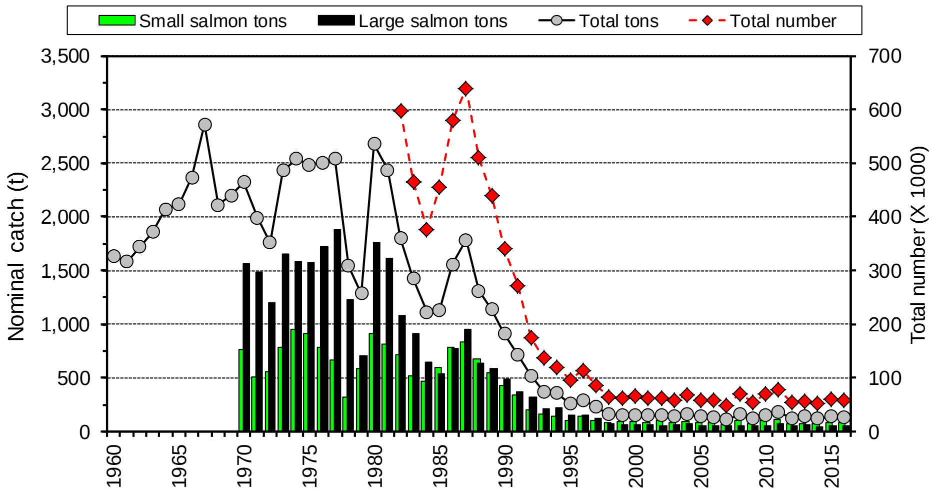

Figure 1 Nominal catch (harvest in tonnes) of salmon in Canada in the period 1960 to 2016. Combined catches in USA and Saint Pierre and Miquelon are ≤ 6 t in any year.

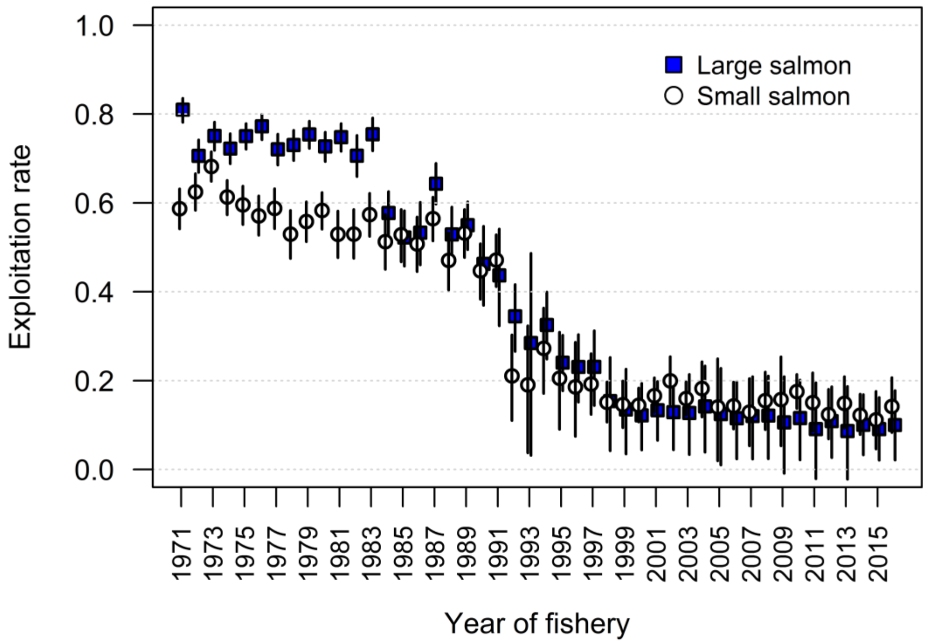

Figure 2 Exploitation rates in North America on small (mostly 1SW) and large (2SW, 3SW, and repeat spawners) salmon, 1971 to 2016.

Table 2 Total reported nominal catch (in tonnes, round fresh weight) of salmon in homewaters by country (Canada, USA, and France (Saint Pierre and Miquelon [SPM]), for the years 1980 to 2016 (2016 figures include provisional data).

Year	Canada			USA	SPM
	Small	Large	Total		
1980	917	1763	2680	6	-
1981	818	1619	2437	6	-
1982	716	1082	1798	6	-
1983	513	911	1424	1	3
1984	467	645	1112	2	3
1985	593	540	1133	2	3
1986	780	779	1559	2	3
1987	833	951	1784	1	2
1988	677	633	1310	1	2
1989	549	590	1139	2	2
1990	425	486	911	2	2
1991	341	370	711	1	1
1992	199	323	522	1	2
1993	159	214	373	1	3
1994	139	216	355	0	3
1995	107	153	260	0	1
1996	138	154	292	0	2
1997	103	126	229	0	2
1998	87	70	157	0	2
1999	88	64	152	0	2
2000	95	58	153	0	2
2001	86	61	148	0	2
2002	99	49	148	0	2
2003	81	60	141	0	3
2004	94	68	161	0	3
2005	83	56	139	0	3
2006	82	55	137	0	3
2007	63	49	112	0	2
2008	100	57	158	0	4
2009	74	52	126	0	3
2010	100	53	153	0	3
2011	110	69	179	0	4
2012	74	52	126	0	3
2013	72	66	137	0	5
2014	77	41	118	0	4
2015	86	54	140	0	4
2016	79	56	135	0	5

Origin and composition of catches

In the past, salmon from both Canada and USA were taken in the commercial fisheries of eastern Canada. Sampling programmes of current marine fisheries (Labrador subsistence and Saint Pierre and Miquelon [SPM]) are used to monitor salmon interceptions from other North American areas.

Recent genetic stock identification efforts provide an opportunity to identify the origin of North American salmon caught in the Labrador and SPM fisheries. The stock composition and variation in composition of salmon harvested in these mixed-stock fisheries has been determined using a North American genetic baseline for Atlantic salmon, which allows assignment to twelve regional groups (Bradbury *et al.*, 2014; Moore *et al.*, 2014) based on 15 microsatellite loci. Origin of salmon in the mixed-stock fisheries have been reported for the Labrador subsistence fishery (Bradbury *et al.,* 2015; ICES, 2015) and for the SPM fishery (ICES, 2015; Bradbury *et al.,* 2016). The accuracy of assignment in these analyses was very high (94.5%). The regional groups from the genetic assignments do not correspond directly to the ecoregions used by ICES to characterize stock status and to provide catch advice, but the genetic groups can be matched to the ICES groups.

Labrador fishery origin and composition of the catches

In 2015 and 2016, samples were collected from the Labrador aboriginal fisheries (a total of 880 samples in 2015 and 810 in 2016), representing 6% of the estimated harvest by number in both years. Based on the interpretation of the scale samples, the majority were 1SW salmon (77% in 2015, 69% in 2016), with lesser contributions from 2SW salmon (19% in 2015, 26% in 2016) and the remainder being primarily repeat spawners (4% in 2015, 5% in 2016). The 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) in the salmon samples, 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.

Table 3 Percentage of samples by river age within the three sampled areas in 2016.

Area	Number of samples	River age						
		1	2	3	4	5	6	7
Northern Labrador (SFA 1A)	234	0.0	0.0	20.0	60.0	20.0	0.0	0.0
Lake Melville (SFA 1B)	153	0.0	0.7	21.6	70.6	7.2	0.0	0.0
Southern Labrador (SFA 2)	369	0.0	0.5	24.9	57.5	15.7	1.4	0.0
All areas	756	0.0	0.5	22.1	62.0	14.7	0.7	0.0

Based on genetic analyses of tissue samples from 2015 and 2016, the Labrador Central (LAB) regional group represented the majority (98% in 2015, 99% in 2016) of the salmon sampled from the aboriginal fisheries, values slightly higher than the 92% to 96% contributions of the Labrador Central region in the subsistence fisheries prior to 2014 (Bradbury *et al.,* 2015; ICES, 2015). 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

Sampling of the salmon catches has been conducted in 2004, 2011, and annually since 2013. In 2016, 147 scale samples and 146 corresponding tissue samples (representing 9% of the harvest by number) were obtained from the fishery, covering the period 16 June to 12 July 2016. Salmon sampled in 2016 were predominantly river ages 2 (28%), 3 (43%), and 4 (25%), with the majority of the sampled fish being one-sea-winter maiden salmon (84%).

Table 4 Breakdown by river age and sea age of the 2016 salmon sampling at Saint Pierre and Miquelon (in numbers).

Sea age	River age					
	2	3	4	5	6	Total
1SW	27	56	32	2	2	119
2SW	10	5	3	2	0	20
Previous spawners	2	0	0	0	0	2
Total	39	61	35	4	2	141

Estimates of 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 (ICES, 2015; Bradbury *et al.,* 2016). Genetic analyses of 2015 tissue samples are planned and will be reported accordingly to ICES when completed. Genetic analyses of the 2016 samples indicated that, as in previous years, the majority of the salmon in the fishery samples originated from three of ICES geographic regions: Newfoundland, Québec, and Gulf of St. Lawrence (Figure 3).

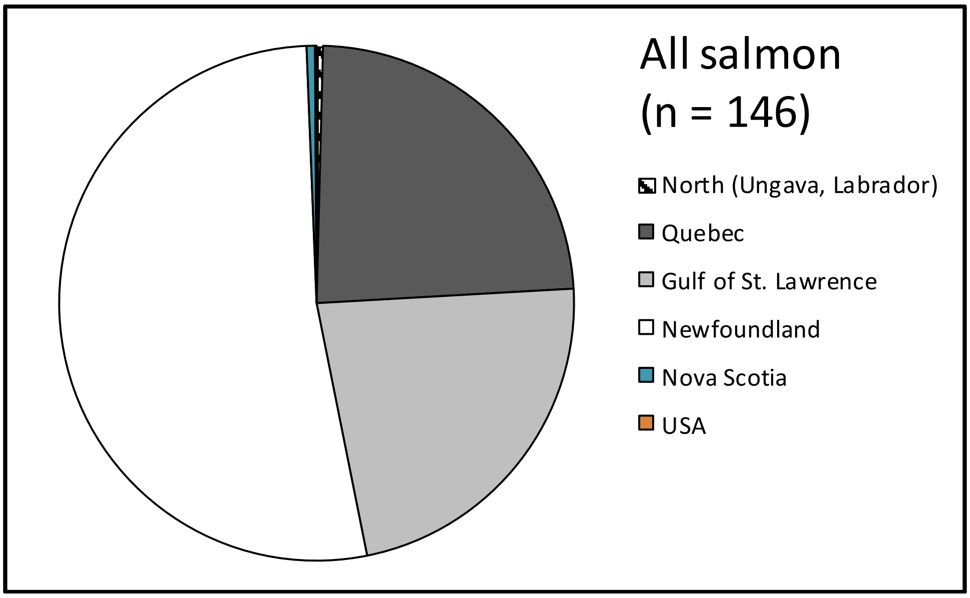

Figure 3 Assignment of Atlantic salmon samples from the 2016 fishery at France (the islands of Saint Pierre and Miquelon) to the larger ICES geographic regions of eastern North America.

NASCO 3.2 Review and report on the development of age-specific stock conservation limits, including updating the time-series of the number of river stocks with established CLs by jurisdiction

In Québec, reference points were reviewed and revisions implemented in the Atlantic salmon management plan for 2016–2026. A lower reference point, equivalent to a CL, was defined as the spawner abundance that, in terms of egg depositions, results in a risk of ≤ 25% of recruitment being less than 50% of the maximum recruitment. An upper reference point was set at a level equal to the 95th percentile of the posterior distribution of the spawner estimate that results in maximum sustainable yield. Conservation limits (CLs) for the mixed-stock fishery components by sea age have yet to be revised.

In Canada, CLs were first established in 1991 for 74 rivers. The number of rivers with defined CLs increased to 266 in 1997 and, since 2014, has increased to 476. CLs have been established for 33 river stocks in USA since 1995.

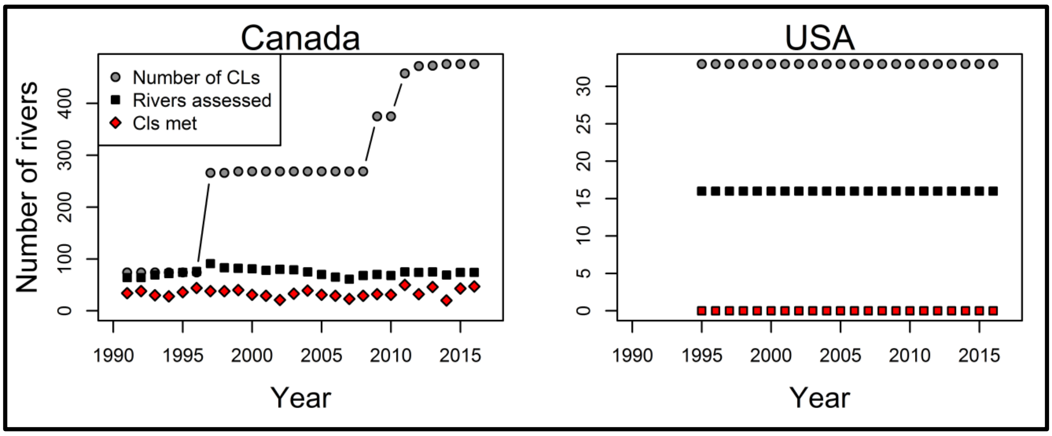

Figure 4 Time-series for Canada and the USA for the period 1991 to 2016, showing the number of rivers with established CLs, the number rivers assessed annually, and the number of annually assessed rivers meeting CLs.

There were no changes to the 2SW CLs for the regions in North America. Management objectives have been defined for Scotia–Fundy and USA. For Scotia–Fundy, the management objective is based on an increase of 25% in returns of 2SW salmon compared to the mean return in the base years 1992 to 1996. For USA, the management objective is to achieve 2SW adult returns of 4549 individuals or greater.

Table 5 2SW CLs and management objectives for 2016.

Country and commission area	Stock area	2SW conservation limit (no. of fish)	Management objective (no. of fish)
Canada	Labrador	34 746	
	Newfoundland	4 022	
	Gulf of St. Lawrence	30 430	
	Québec	29 446	
	Scotia–Fundy	24 705	10 976
	Total	123 349	
USA	USA	29 199	4 549
North American Commission	All	152 548	

NASCO 3.3 Describe the status of the stocks, including updating the time-series of trends in the number of river stocks meeting CLs by jurisdiction

Stock status is presented for six regions (Figure 5) and overall for North America.

Returns of small (1SW), large (MSW), and 2SW salmon (a subset of large) to each region are estimated by the methods reported by ICES (1993). The 2SW component of the large returns was determined using the sea age composition of one or more indicator stocks. Returns are the number of salmon that returned to the geographic region, including fish caught by homewater commercial fisheries, except in the case of the Newfoundland and Labrador regions where returns do not include landings in commercial and food fisheries.

The non-maturing component of 1SW salmon, destined to be 2SW returns (excluding 3SW and previous spawners) is the estimated number of salmon in the North Atlantic on August 1st of the second summer at sea. The pre-fishery abundance (PFA) estimates account for returns to rivers, fisheries at sea in North America, and fisheries at West Greenland, with estimates corrected for natural mortality. As the PFA estimate for potential 2SW salmon requires an estimate of returns to rivers, the most recent year for which an estimate of PFA is available is 2015. Maturing 1SW salmon are in some areas (particularly Newfoundland) a major component of salmon stocks, and their abundance when combined with that of the 2SW age group provides an index of the majority of a smolt cohort.

The total estimate of small salmon returns to North America in 2016 (430 900 fish) was 31% lower than in 2015 and in the mid-range of values of the 47-year time-series (Figure 6). Small salmon returns decreased in 2016 from the previous year in five of the six geographical regions (Labrador, Newfoundland, Québec, Gulf, and Scotia–Fundy), and increased in USA. Small salmon returns to Labrador (206 300 fish) and Newfoundland (164 200 fish) combined represent 86% of the 2016 total small salmon returns to North America (430 900 fish).

The total estimate of large salmon returns to North America in 2016 (174 100 fish) was 12% lower than in 2015 (196 800 fish) and in the lower third rank of the 47-year time-series (Figure 7). Large salmon returns in 2016 increased from the previous year in three of the six geographical regions (Québec, Gulf, and Scotia–Fundy) and decreased in the other three (Labrador, Newfoundland, and USA). Large salmon returns in 2016 were the second lowest on record for USA (392 fish), and the fourth lowest on record for Scotia–Fundy (1545 fish), whereas large salmon returns to Labrador (71 740 fish) in 2016 were the second highest on record. Large salmon returns to the Labrador, Québec, and Gulf regions collectively represented 85% of the total large salmon returns to North America in 2016.

The total estimate of 2SW salmon returns to North America in 2016 (107 400 fish) was 6% lower than in 2015 and ranks 25th (descending) out of the 47-year time-series (Figure 8). The regional trends in returns of 2SW salmon follow closely those of the large salmon as 2SW salmon are a relatively stable subset of the large salmon. Returns increased from the previous year in three of the six geographical regions (Québec, Gulf, and Scotia–Fundy) in 2016, and decreased in the other three (Labrador, Newfoundland, and USA). 2SW salmon returns in 2016 were the second lowest on record for USA (389 fish), and the sixth lowest on record for Scotia–Fundy (1494 fish), whereas 2SW salmon returns to Labrador (46 550 fish) in 2016 were the second highest on record. Three regions (Labrador, Québec, Gulf) collectively accounted for 95% of 2SW salmon returns to North America in 2016.

Estimates of recruitment (i.e. PFA, defined as the number of 1SW salmon on 1 August of the second summer at sea), suggest continued low abundance of North American salmon (Figure 9). The total population of 1SW and 2SW Atlantic salmon in the Northwest Atlantic has oscillated around a generally declining trend since the 1970s, with a period of persistent low abundance since the early 1990s. During 1993 to 2015, the total population of 1SW and 2SW Atlantic salmon was about 600 000 fish, about half of the average abundance during 1971 to 1992.

Recruitment of the 1SW cohort in 2015 was estimated at 827 700 fish. Abundance declined by 51% over the time-series from a peak of 1 705 000 fish in 1975 (Figure 9).

In 2016, the midpoints of the estimates of 2SW returns to rivers and 2SW spawners were below the 2SW CLs for all regions except Labrador, and the stocks are therefore suffering reduced reproductive capacity (Figures 8 and 10). The medians of the 2SW returns and spawners for Labrador exceeded the 2SW CL, but the 5th percentiles were below the CL and for this region the stock is at risk of suffering reduced reproductive capacity (Figure 10). Particularly large deficits relative to CLs are noted in the Scotia–Fundy and USA regions.

Egg deposition by all sea-ages combined in 2016 exceeded or equaled the river-specific CLs in 41 of the 70 (58%) assessed rivers, and was 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 has ranged from 26% to 67% (66% in 2016) with no temporal trend (Figure 4). Sixteen rivers in USA are assessed against CL attainment annually with none meeting CLs to date (Figure 4).

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 USA and the Scotia–Fundy regions have been, or are being considered for listing under the country-specific species-at-risk legislation. The continued low abundance of salmon stocks in 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 the abundance of Atlantic salmon.

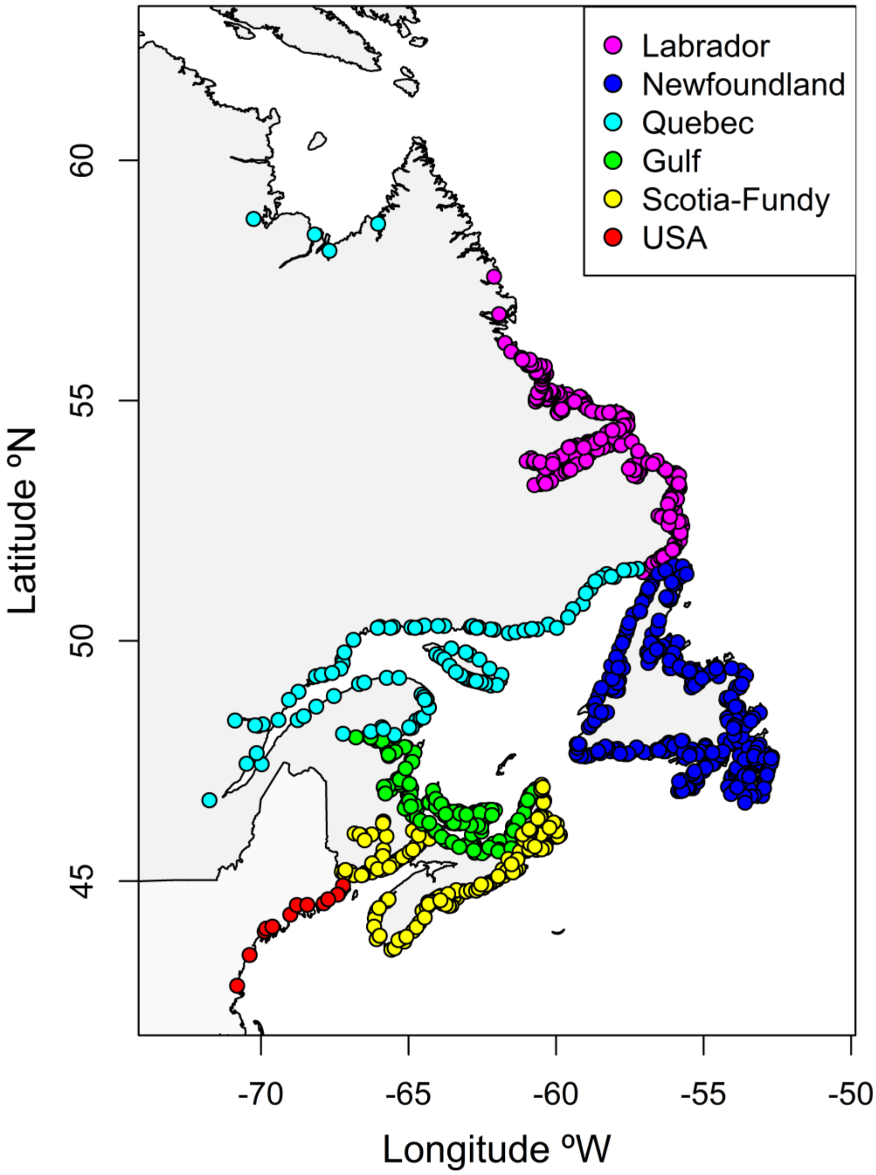

Figure 5 Regional groupings (colours) for assessment of Atlantic salmon in the North American Commission. Dots indicate locations of potential salmon rivers.

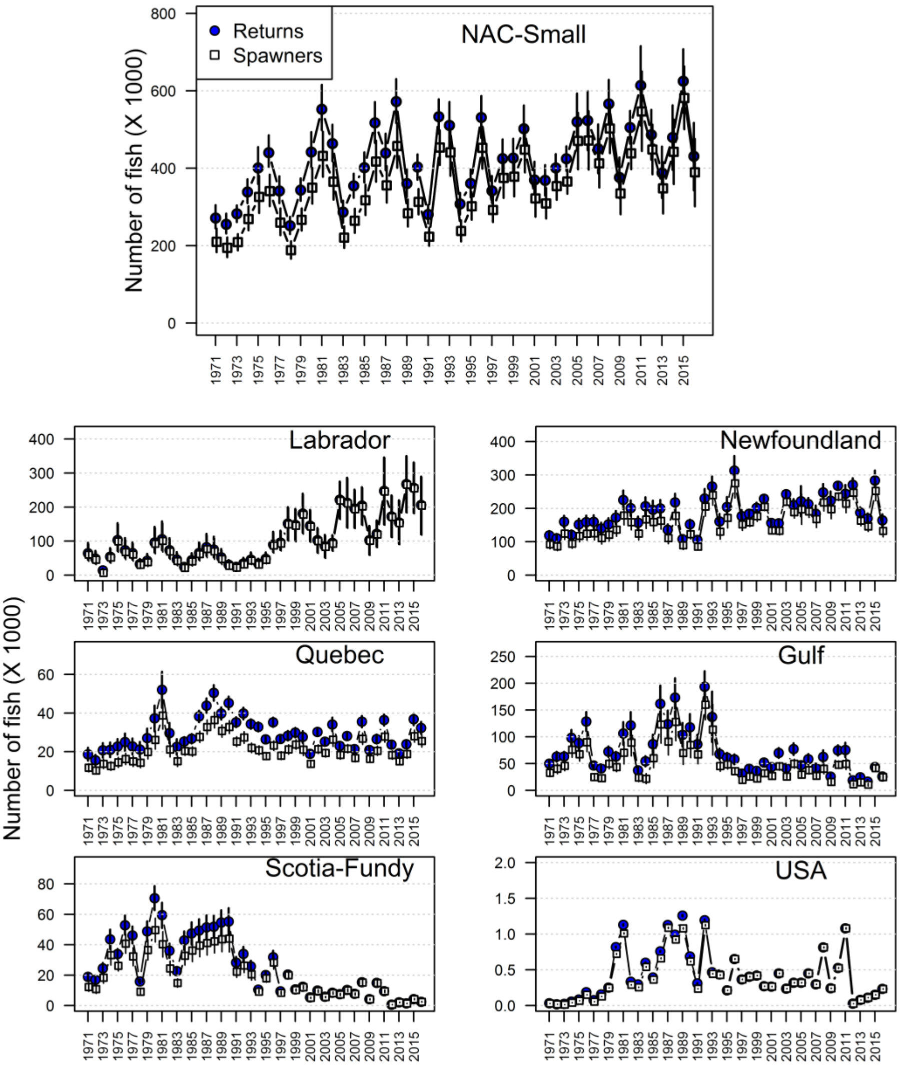

Figure 6 Estimated (median, 5th to 95th percentile range) returns (shaded circles) and spawners (open squares) of small salmon (primarily 1SW maturing), for eastern North America overall (top panel) and for each of the six regions.

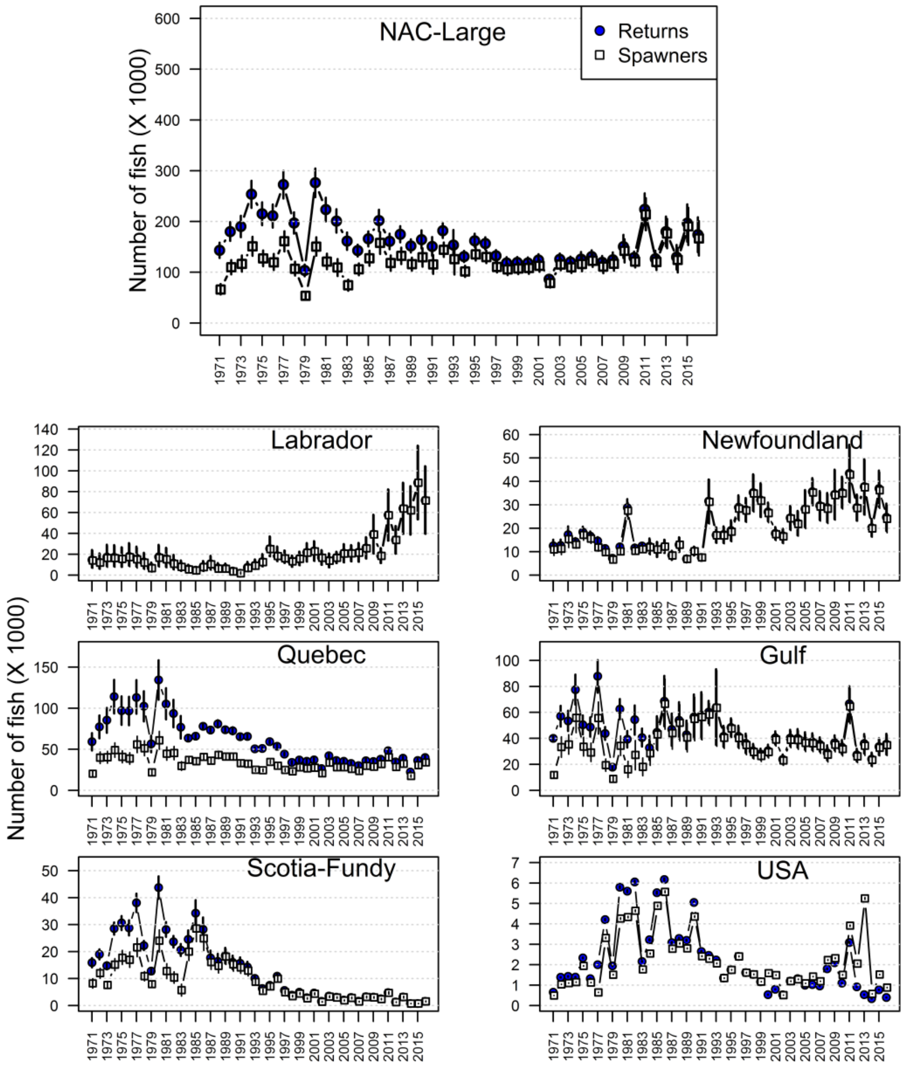

Figure 7 Estimated (median, 5th to 95th percentile range) returns (shaded circles) and spawners (open squares) of large salmon (primarily 1SW maturing), for eastern North America overall (top panel) and for each of the six regions.

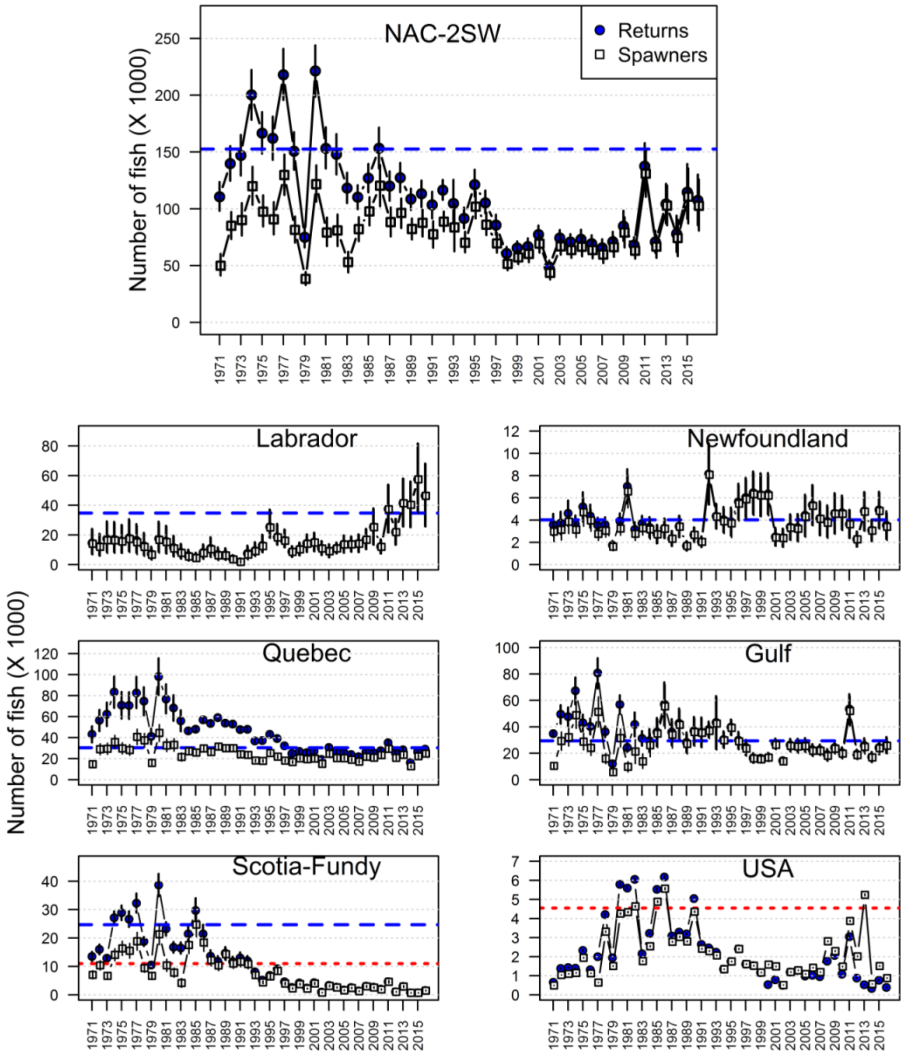

Figure 8 Estimated (median, 5th to 95th percentile range) returns (shaded circles) and spawners (open squares) of 2SW salmon, for eastern North America overall (top panel) and for each of the six regions. The blue dashed line is the corresponding 2SW CL; the 2SW CL (29 199 fish) is off the scale in the plot for USA. The red dotted lines in the Scotia–Fundy and USA panels are the region-specific management objectives. For USA, estimated spawners exceed the estimated returns in some years because of adult stocking restoration efforts.

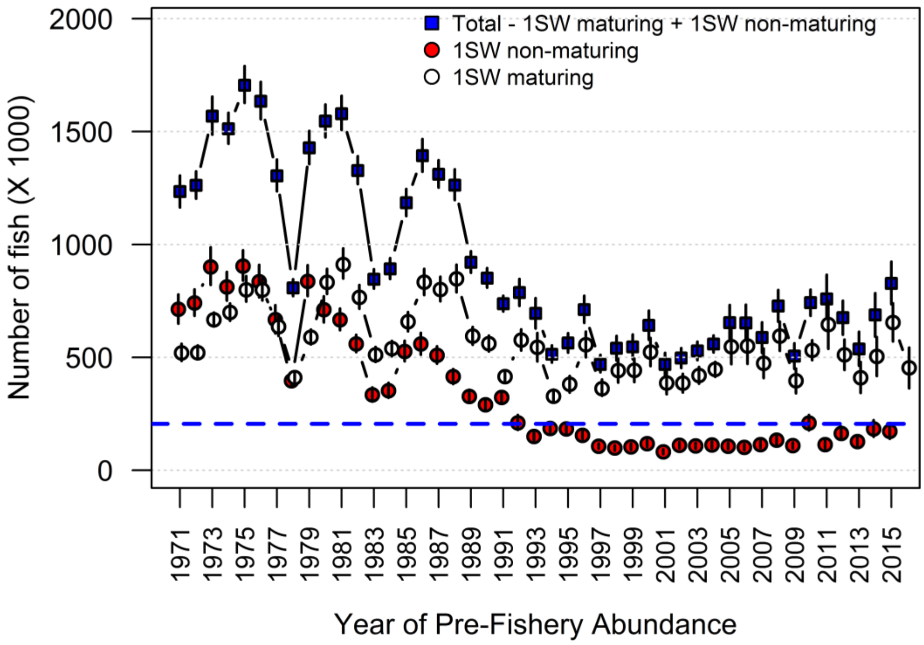

Figure 9 Estimated (median, 5th to 95th percentile range) pre-fishery abundance (PFA) for 1SW maturing, 1SW non-maturing, and total cohort of 1SW salmon for North America. The dashed blue horizontal line is the corresponding sum of the 2SW conservation limits for North America, corrected for 11 months of natural mortality (spawner escapement reserve), against which 1SW non-maturing abundance is assessed.

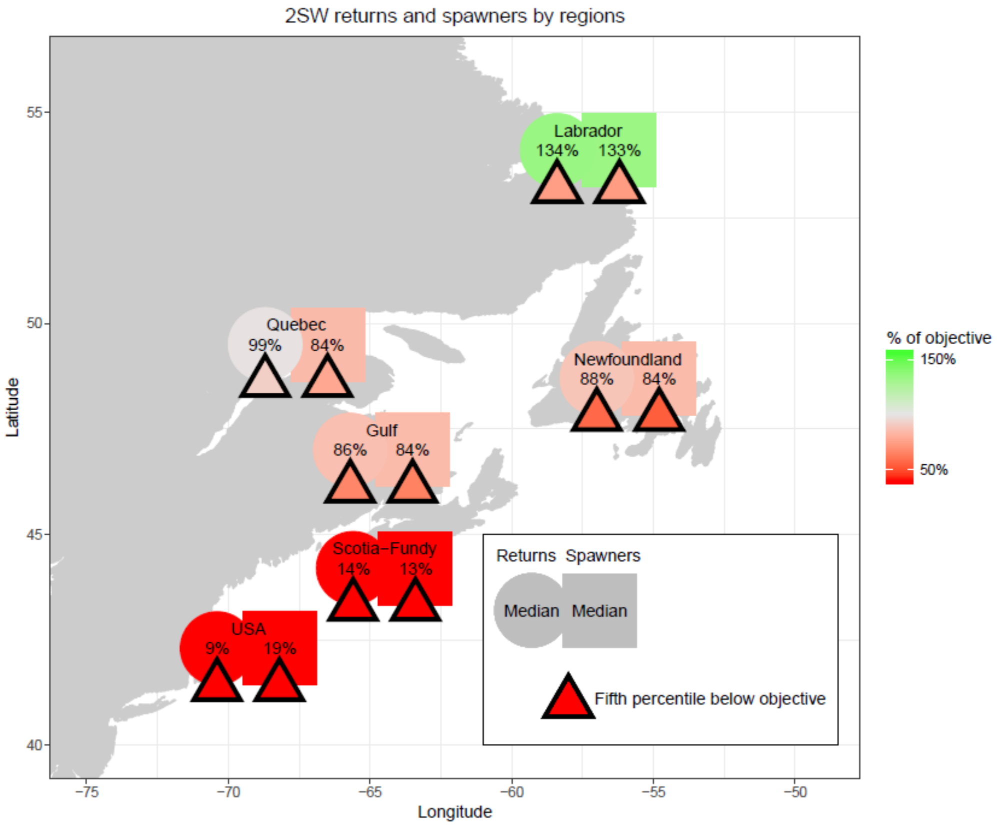

Figure 10 Medians of the estimated returns (circle) and spawners (square) of 2SW salmon in 2016 to six regions of North America, expressed as a percentage of the 2SW CLs for the four northern regions and to the rebuilding management objectives for the two southern areas. The colour shading of the symbols represents the percentage of the CL or rebuilding objective attained, with red indicating less than 100% and green greater than 100%. The triangles accompanying the respective returns and spawners symbols indicate when the 5th percentiles of the estimates are below the CLs or management objective, i.e. when the stocks are at risk of or suffering from reduced reproductive capacity.

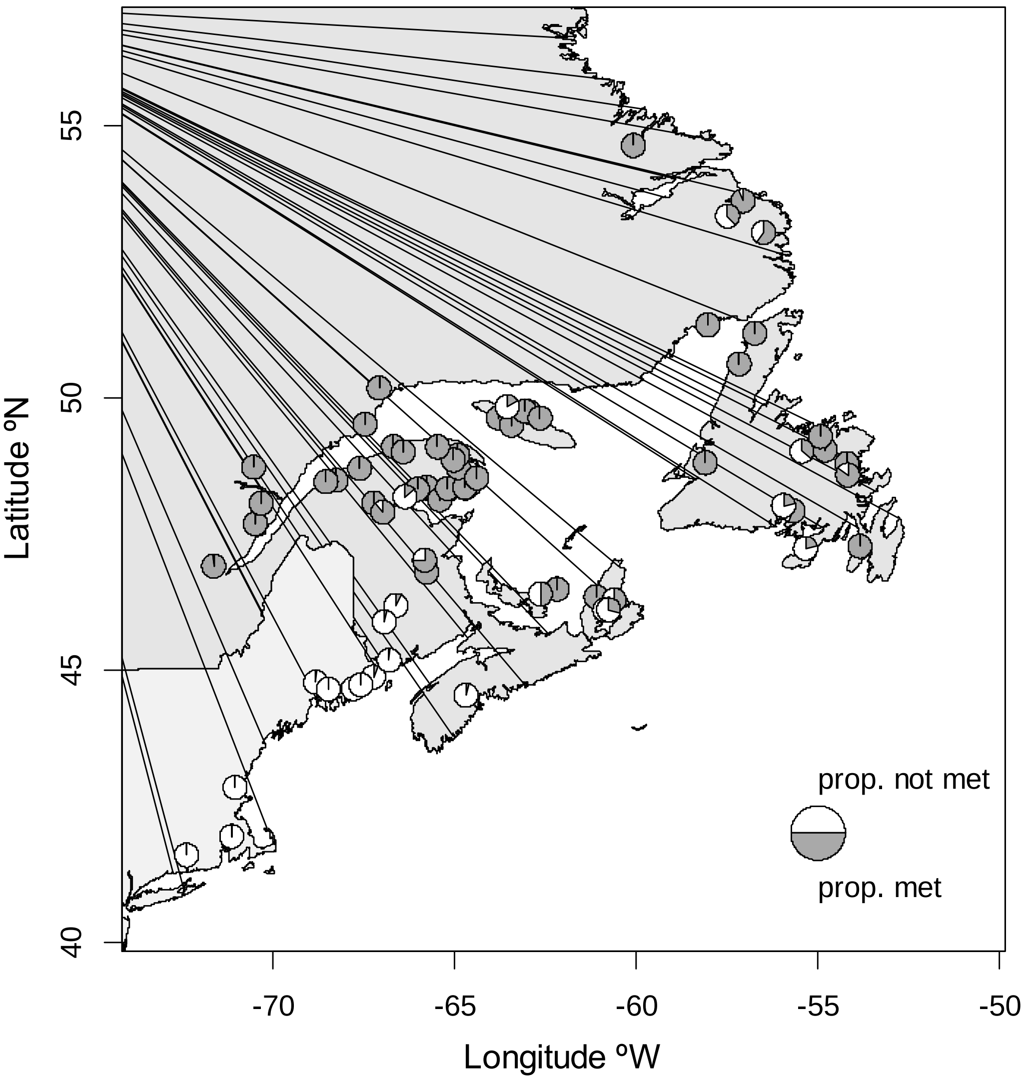

Figure 11 Proportion of the conservation egg requirement attained in the 70 rivers of the North American Commission area assessed in 2016.

NASCO 3.4 Identify relevant data deficiencies, monitoring needs, and research requirements

The following relevant data deficiencies, monitoring needs, and research requirements of relevance to the North American Commission were identified.

1) 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.
2) 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.

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Annex 1 Glossary of acronyms and abbreviations

1SW *(one-sea-winter).* Maiden adult salmon that has spent one winter at sea.
2SW *(two-sea-winter).* Maiden adult salmon that has spent two winters at sea.
3SW *(three-sea-winter).* Maiden adult salmon that has spent three winters at sea.
CL, i.e. S_{lim} *(conservation limit).* Demarcation of undesirable stock levels or levels of fishing activity; the ultimate objective when managing stocks and regulating fisheries will be to ensure that there is a high probability that undesirable levels are avoided.
FWI *(Framework of Indicators).* The FWI is a tool used to indicate if any significant change in the status of stocks used to inform the previously provided multi-annual management advice has occurred.
ICES (*International Council for the Exploration of the Sea*).
NAC (*North American Commission*). A commission under NASCO.
NASCO (*North Atlantic Salmon Conservation Organization*).
PFA *(pre-fishery abundance).* The numbers of salmon estimated to be alive in the ocean from a particular stock at a specified time.
SPM (*the islands of Saint Pierre and Miquelon [France]*).

Annex 2 General considerations

Management plans

The North Atlantic Salmon Conservation Organization (NASCO) has adopted an Action Plan for Application of the Precautionary Approach which stipulates that management measures should be aimed at maintaining all stocks above their conservation limits through the use of management targets. NASCO has adopted the region-specific CLs as limit reference points (S_{lim}); having populations fall below these limits should be avoided with high probability. Within the agreed management plan, a risk level (probability) of 75% for attainment of management objectives simultaneously in all regions has been agreed for the provision of catch advice on 2SW salmon exploited at West Greenland (as non-maturing 1SW fish) and in North America (as non-maturing 1SW and 2SW salmon). For the North American Commission, the management objectives are the 2SW CLs in the four northern regions (Labrador, Newfoundland, Québec, Gulf), aimed at achieving a 25% increase in regional returns relative to a baseline period (average returns in 1992–1996) for the Scotia–Fundy region, and to achieve 2SW adult returns of 4549 fish or greater for USA. A framework of indicators has been developed in support of the multiannual catch options.

Biology

Atlantic salmon (*Salmo salar*) is an anadromous species found in rivers of countries bordering the North Atlantic. In the Northwest Atlantic they range from the Connecticut River (USA, 41.6°N) northward to the Ungava Bay rivers (58.8°N; Québec, Canada). Juveniles emigrate to the ocean at ages of one to eight years (dependent on latitude) and generally return after one or two years at sea. Long-distance migrations to ocean feeding grounds are known to take place, with adult salmon from both the North American and Northeast Atlantic stocks migrating to West Greenland to feed in their second summer and autumn at sea. Recent genetic information has demonstrated that fish from North America were also exploited in the historical Faroes fishery.

Environmental influence on the stock

Environmental conditions in both freshwater and marine environments have a marked effect on the status of salmon stocks. Across the North Atlantic, a range of problems in the freshwater environment play a significant role in explaining the poor status of stocks. In many cases river damming and habitat deterioration have had a devastating effect on freshwater environmental conditions. In the marine environment, return rates of adult salmon have declined through the 1980s and are now at the lowest levels in the time-series for some stocks, even after closure of marine fisheries. Climatic factors modifying ecosystem conditions and predator fields of salmon at sea are considered to be the main contributory factors to lower productivity, which is expressed almost entirely in terms of lower marine survival.

Effects of the fisheries on the ecosystem

The current salmon fisheries probably have no or only minor influence on the marine ecosystem. However, the exploitation rate on salmon may affect the riverine ecosystem through changes in species composition. Knowledge on the magnitude of these effects is limited.

Quality considerations

Uncertainties in input variables to the stock status and stock forecast models are incorporated in the assessment. Recreational catch statistics for Atlantic salmon are not collected regularly in Canada and there is no mechanism in place that requires anglers to report their catch statistics, except in Québec. The reliability of recreational catch statistics could be improved in all areas of Canada. Estimates of abundance of adult salmon in some areas, in particular Labrador, are based on a small number of counting facilities raised to a large production area.

Basis of the assessment

ICES stock data category	1 (ICES, 2016).
Assessment type	Run-reconstruction models and Bayesian forecasts, taking into account uncertainties in the data.
Input data	Nominal catches (by sea-age class) for commercial, aboriginal, and recreational fisheries. Estimates of unreported/illegal catches. Estimates of exploitation rates. Natural mortalities (from earlier assessments).
Discards and bycatch	It is illegal to retain salmon that are incidentally captured in fisheries not directed at salmon (no by-catch). In the directed recreational fishery, mortality from catch and release is accounted for in the regional assessments to estimate spawners. There is no accounting of discarding mortality in non-salmon directed fisheries.
Indicators	The Framework of Indicators is used to indicate whether a significant change has occurred in the status of stocks in intermediate years where multiannual management advice applies.
Other information	Advice subject to annual review. A stock annex was developed in 2014 and updated to 2016.
Working group	Working Group on North Atlantic Salmon (WGNAS) (ICES, 2017).