Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat
Newfoundland and Labrador Region | Science Response 2020/045

2019 STOCK STATUS UPDATE FOR ATLANTIC SALMON IN NEWFOUNDLAND AND LABRADOR

Context

In 2014, Fisheries and Oceans Canada (DFO) implemented a five-year management plan for Atlantic Salmon (*Salmo salar*) in the Newfoundland and Labrador (NL) Region. Although management measures outlined in the plan were expected to remain the same over this five-year period, adjustments could be warranted if there was a dramatic change in salmon stocks, particularly declines (see Appendix 2 for specific triggers). In 2016, declines of total returns in the NL Region were significant enough to trigger revisiting the five-year salmon management plan, including full assessments of the status of Atlantic Salmon in 2016 (DFO 2017), 2017 (DFO 2018) and 2018. DFO decided to adopt a two-year management plan in the NL Region. This new management cycle for Atlantic Salmon began in 2019, therefore, the next scheduled full stock assessment will occur in 2021 for 2020 returns.

This Science Response Report results from the Science Response Process of March 4, 2020 on Stock Status Update for Atlantic Salmon in Newfoundland and Labrador. This Science Response Process provides an update on the status of Atlantic Salmon stocks with data from 2019 for SFAs 1, 2 and 14B (Labrador) and SFAs 3 to 14A (Newfoundland) (Figure 1). Fisheries Management will use advice from this Science Response Process to inform the 2020 Atlantic Salmon management plan.

Background

There are 15 Atlantic Salmon management areas, known as Salmon Fishing Areas (SFAs) 1 to 14B (Figure 1), in Newfoundland and Labrador (NL). Within these areas there are an estimated 394 rivers that contain wild Atlantic Salmon. Atlantic Salmon populations in NL are characterized by differences in life history traits, including freshwater residence time, timing of return migration, age at first spawning, and the extent of ocean migration. Juvenile Atlantic Salmon predominantly remain in freshwater habitats for three to four years in Newfoundland (95.8% of samples taken since 2000) and four to five years in Labrador (83.5% of samples taken since 2000) prior to undergoing smoltification and migrating to sea as smolts (Figure 2). Spawning populations in NL consist of varying proportions of small (fork length <63 cm) and large (fork length ≥63 cm) adult salmon (Figure 3). For the majority of rivers in Newfoundland (SFAs 3-12 and 14A), the small adult salmon population is predominantly grilse (one-sea-winter, 1SW salmon), that have spent one year at sea before returning to spawn for the first time. The large adult salmon population in Newfoundland rivers is composed mainly of repeat-spawning grilse which are either a consecutive or alternate spawning fish. In contrast, populations in Labrador (SFAs 1, 2 and 14B) and southwestern Newfoundland (SFA 13) consist of important large salmon components that contain maiden fish that have spent two (two-sea-winter, 2SW) or more years (multi-sea-winter, MSW) at sea before returning to spawn. Run timing for returning salmon is influenced by climate conditions on the NL Shelf, occurring earlier in warmer years and later in colder years with low water temperatures and high amounts of inshore sea ice (Dempson et al. 2017). For most monitored rivers in NL, small salmon are predominantly female (range of 60-92% across rivers).

Analysis and Response

Assessment Methods and Indicators of Stock Status

Since 2017, the status of Atlantic Salmon populations has been assessed relative to two reference points, defined on the basis of egg depositions, as per the *Fishery Decision-Making Framework Incorporating the Precautionary Approach* (DFO 2009). For each monitored river, the Limit Reference Point (LRP) is set at 100% of the previously defined conservation egg requirement (CER) (O'Connell and Dempson 1995, O'Connell et al. 1997, Reddin et al. 2006). Populations below the LRP fall in the Critical Zone, where management actions should promote stock growth and fisheries-related mortality should be kept to the lowest level possible. The interim Upper Stock Reference Point (USR) is set at 150% of the previously defined conservation egg deposition rate. Populations above the USR are considered to be in the Healthy Zone and are therefore available for exploitation at some predetermined maximum exploitation rate. Populations with a status between the LRP and USR fall within the Cautious Zone, in which management actions should promote stock rebuilding to the Healthy Zone.

Atlantic Salmon stocks within NL (SFAs 1-14B) are assessed using data collected from salmon monitoring facilities (fish counting fences and fishways; Figure 1), in-river snorkel surveys and catch and effort data from the recreational fishery. The Licence Stub Return System (O'Connell et al. 1996 and 1998, Dempson et al. 2012, Veinott and Cochrane 2015) provides river-specific recreational catch and effort data for SFAs 2-14B, except for Eagle River and Sand Hill River in SFA 2 where data provided by private fishing camps are used. Preliminary estimates of river-specific harvest and catch and release angling are currently unavailable for the 2019 fishery. For each monitored river, preliminary estimates of total returns and percent conservation achieved were calculated using the average catch data over the previous generations of 5 years for Newfoundland rivers and 6 years for Labrador rivers. Accordingly, results presented here related to total returns and percent conservation for assessed rivers in 2019 are considered preliminary and will be updated using the 2019 angler log returns and a follow-up phone survey of anglers who did not return their logs (non-respondents). The phone survey will be conducted in March 2020.

Twenty-four populations of Atlantic Salmon were monitored in 2019 (Figure 1). Adult salmon were counted on four rivers in Labrador and 18 rivers in Newfoundland. For two rivers in SFA 13, Middle Barachois Brook and Robinson's River, the abundance of adult Atlantic Salmon was estimated using in-river snorkel surveys (Porter *in prep*[1]). Atlantic Salmon abundance was estimated for Little Barachois Brook (SFA 13) using a combination of a counting fence operated throughout the adult migration and an in-river snorkel survey from the fence down to the river mouth in August (≈9km distance). Returns and percent conservation achieved for assessed NL rivers are compared to:

1. the previous generation average (2014-18 and 2013-18 for Newfoundland and Labrador, respectively), and
2. the previous three generation average (2004-18 and 2001-18 for Newfoundland and Labrador, respectively).

A minimum threshold of 10% difference between total returns in 2019 and each reference period is used to determine whether total returns on a monitored population had increased or

[1] Porter, R. In prep. Status of Atlantic Salmon Populations in Middle Barachois Brook and Robinsons River, Newfoundland in 2018. DFO Can. Sci. Advis. Sec. Res. Doc.

decreased. Final counts were adjusted for Conne River and Little Barachois Brook to account for a two-day washout event that occurred once on each river using a seven-day moving average. The final count on Sand Hill River was adjusted to account for salmon that migrated past the counting fence location up to 2.5 weeks prior to the fence installation.

The abundance of out-migrating Atlantic Salmon smolts was monitored on five rivers in Newfoundland in 2019 (Campbellton River [SFA 4], Rocky River [SFA 9], Conne River [SFA 11], Garnish River [SFA 11] and Western Arm Brook [SFA 14A]. From 1987-2018, the number of migrating smolts on Conne River has been estimated annually using mark-recapture. In 2019, DFO Science counted the number of migrating smolts on this river using a full counting fence. A significant majority of smolts from Newfoundland rivers spend only one year at sea, therefore, marine survival is estimated annually by comparing the smolt count in one year to the number of returning small salmon (<63 cm) the following year on these five rivers. For example, marine survival estimates for 2019 are based on 2018 smolt counts and corresponding small salmon returns in 2019.

Recreational Fishery Regulations

The recreational Atlantic Salmon fishery is managed according to a River Classification System, which is used to establish retention levels based on the health of individual salmon populations without jeopardizing conservation goals (Veinott and Cochrane 2015). The 2019 recreational angling season involved a seasonal retention limit of one fish on Class 2 rivers and two fish on Class 4, 6 and unclassified rivers, and daily catch and release limits of three fish on Class 2, 4, 6 and unclassified rivers. Preliminary estimates of river-specific effort and harvest are currently unavailable for 2019.

Indigenous/Subsistence Fishery

Indigenous Food, Social, and Ceremonial (FSC) fisheries for Atlantic Salmon occur in Labrador under communal licences. Labrador also has a resident subsistence fishery for Brook Trout (*Salvelinus fontinalis*) and Arctic Charr (*Salvelinus alpinus*) with a permitted retention of three salmon by-catch. In Newfoundland, Miawpukek First Nation (MFN) holds a FSC communal salmon fishing licence, but has chosen not to harvest salmon under this licence since 1997 due to conservation concerns.

Labrador FSC and subsistence fisheries harvests were inferred from logbook returns (74% overall return rate), and were estimated at 12,783 salmon in 2019 (7,064 small, 5,720 large), which was 5% less than the previous six-year mean (2013-18) of 13,449 salmon (8,053 small and 5,397 large). Mean harvest since the management change in 2011 (2011-18) was 13,984 salmon (8,699 small and 5,294 large), which was 9% less in 2019 (Figure 4, Table 1). Large salmon represented 45% of the harvest by number.

Total Returns

Total returns of small and large salmon in 2019 were lower on 14 of 18 (78%) assessed rivers relative to the previous generation average (2014-18 and 2013-18 for Newfoundland and Labrador rivers, respectively), and total returns on eight of these rivers (44%) declined by more than 30% (Figure 5, Table 2). Total returns in 2019 were higher on three rivers (17%) relative to the previous generation average and one river showed no change (difference of less than 10%). In comparison to the previous three generation average, total returns declined on 11 of 16 rivers (69%), six of which (38%) declined by ≥30% (Table 2). Consistent with recent declining trends for assessed rivers in SFA 11 (Figure 1), total returns to Conne River and Little River in 2019

were the lowest in the time series involving a 65% decline for Conne River and a 95% decline for Little River relative to the previous generation average (Figure 5). Significant declines were also observed on Western Arm Brook and Exploits River, where 2019 returns were the lowest observed since 1992 and 2000, respectively. Declines in the number of returning large salmon observed around NL in recent years continued on many monitored rivers in 2019 (lower on 11 of 18 rivers (61%) relative to the previous generation average, and 11 of 16 rivers (69%) relative to the previous three generation average [Table 4]). In contrast, record high returns were observed in 2019 on Terra Nova River (monitored since 1984) and Northwest River – Port Blandford (monitored from 2000-11 and 2017-19), and 2019 returns to Rocky River were the fourth highest on record (since 1987). Total returns in 2019, separated into small and large salmon returns, are presented in Figures 9 – 16 (see Appendix 1).

Percent Conservation Achieved

In 2019, the estimated Atlantic Salmon CER exceeded the USR (Healthy Zone) on eight of 24 rivers (33%), all of which are in Newfoundland (Figure 6, Table 5). The estimated CER fell between the USR and LRP (Cautious Zone) on two Labrador rivers (English River and Muddy Bay Brook) and one Newfoundland river (Corner Brook Stream). This is the first time English River fell below the USR since 2012. Estimated egg depositions were below the LRP (Critical Zone) on two (of four) Labrador rivers and 11 (of 20) Newfoundland rivers. Overall, 54% of all assessed rivers were below the LRP in 2019 (Table 5). Fourteen of the 18 rivers (78%) that have been assessed during the previous generation showed relative declines in CER in 2019 (Table 5). Ten of 16 NL rivers showed a decline in CER relative to the previous three generations (3 rivers in Labrador, 7 rivers in Newfoundland; Table 5).

Smolt Production and Marine Survival

Smolt production in 2019 was lower on Rocky River (-81%), Conne River (-49%) and Western Arm Brook (-17%) relative to the river-specific previous five-year averages (2014-18) (Figure 7). There was no change (difference of <10%) in smolt production on Campbellton River in 2019 relative to the previous generation (Figure 7). Smolt production on Garnish River was estimated for the third consecutive year in 2019 and showed a 47% increase over the previous two-year average (Figure 7).

In 2019, estimated marine survival increased by 12% on Campbellton River relative to the previous generation average. Rocky River had the highest survival rate (15.5%) of all rivers over the entire time series (since 1991). This unusually high estimate of marine survival is a result of a record low smolt count on this river in 2018 followed by the fourth highest record number of returns in 2019. Survival was only 3.4% on Western Arm Brook in 2019, which represents a 57% decline relative to the previous generation average (Figure 8). Marine survival was 2.5% on Garnish River in 2019, and was very similar to the first estimate calculated for this river in 2018 (2.8%). There was no estimate of marine survival at Conne River in 2019 as there was no smolt estimate in 2018 due to significant washout events. However, similar to the total returns, marine survival on this river has been declining over time and was estimated at 0.8% in 2018 (Figure 8). As returns of small salmon include a small proportion of repeat spawners (8.6% in Newfoundland and <1% in Labrador), marine survival of smolt to maiden one-sea-winter salmon will be slightly less than the numbers reported here.

Sources of Uncertainty

Estimates of river-specific harvest and catch and release angling were unavailable for the 2019 fishery. Therefore, preliminary estimates of total returns and percent conservation achieved for

each monitored river were calculated using the average catch data over the previous generations of five years for Newfoundland rivers and six years for Labrador rivers.

Historical or estimated biological characteristics data (e.g. fecundity, sex ratio, female size) and extrapolated catch data used in the assessment add uncertainty to the conservation egg requirement values.

Estimates of recreational catch and effort data are dependent on the number and accuracy of angler licence stubs completed and returned each year. Similarly, FSC and subsistence harvest estimates in Labrador are dependent on the number and accuracy of logbooks compiled and returned. For all salmon fisheries, uncertainty exists where either inaccurate or incomplete information is provided.

No current assessments are available for salmon populations in SFAs 3, 6, 7, 12 and 14B.

Salmon populations in assessed rivers may be unique and are not necessarily representative of other rivers within an SFA.

Conclusions

- Twenty-four populations of Atlantic Salmon were monitored in 2019: 22 using counting fences and fishways, and two by snorkel surveys. All rivers monitored in 2019 are included in this assessment: four rivers in Labrador and 20 rivers in Newfoundland. Five of the 20 assessed rivers in Newfoundland also counted juvenile salmon (smolt) migrating to sea (Figure 1).
- In 2019, 13 of 24 assessed rivers were in the Critical Zone (two in Labrador and 11 in Newfoundland). In 2019, three rivers (two in Labrador and one in Newfoundland) were in the Cautious Zone. Eight rivers in 2019 were in the Healthy Zone (all in Newfoundland).
- In 2019, 14 assessed rivers showed declines in total returns, and eight of these involved declines of greater than 30% compared to their previous generation mean. Of the 16 assessed rivers for which there is information on returns over the previous three generations, total returns in 2019 were lower on all four rivers in Labrador and on seven of 12 rivers in Newfoundland. Of these, six rivers had declines greater than 30% (Table 1).
- For 14 of 18 rivers, egg deposition declined by an average of 43% (13% to 95%) in 2019 compared to the previous generation.
- Marine survival continues to be the major factor limiting the abundance of Atlantic Salmon in the NL Region. Inter-annual estimates of marine survival continue to fluctuate.
- Overall, multiple stock indicators show negative trends for Atlantic Salmon in NL. DFO Science remains concerned about the status of these stocks.
- The DFO Precautionary Approach Framework requires that removals from all sources must be kept at the lowest possible level until the stock clears the Critical Zone.

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Sources of Information

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Appendix I – Figures and Tables

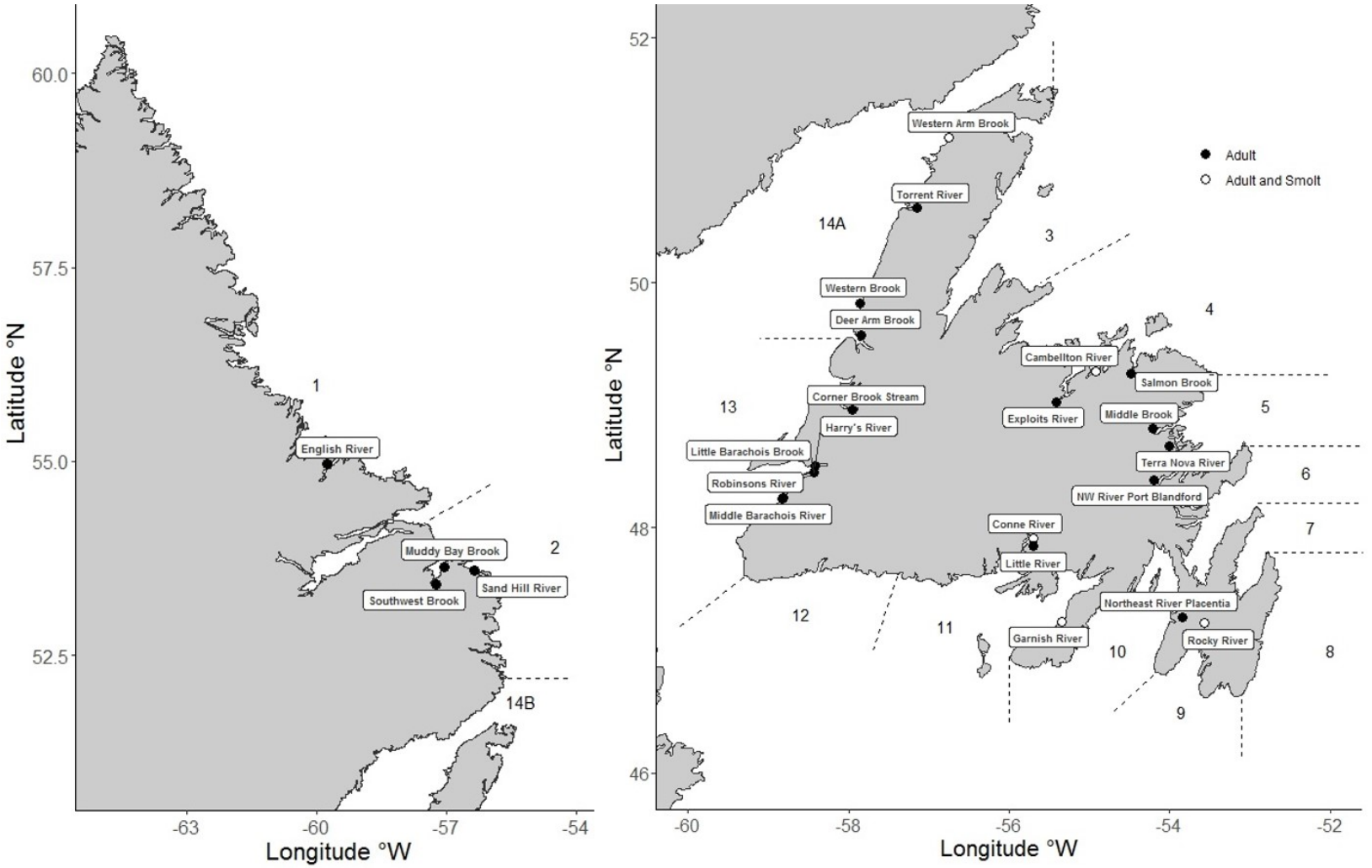

Figure 1. Map of the NL Region showing SFAs 1-14B and rivers where the number of out-migrating Atlantic Salmon smolts and/or returning adults were counted in 2019.

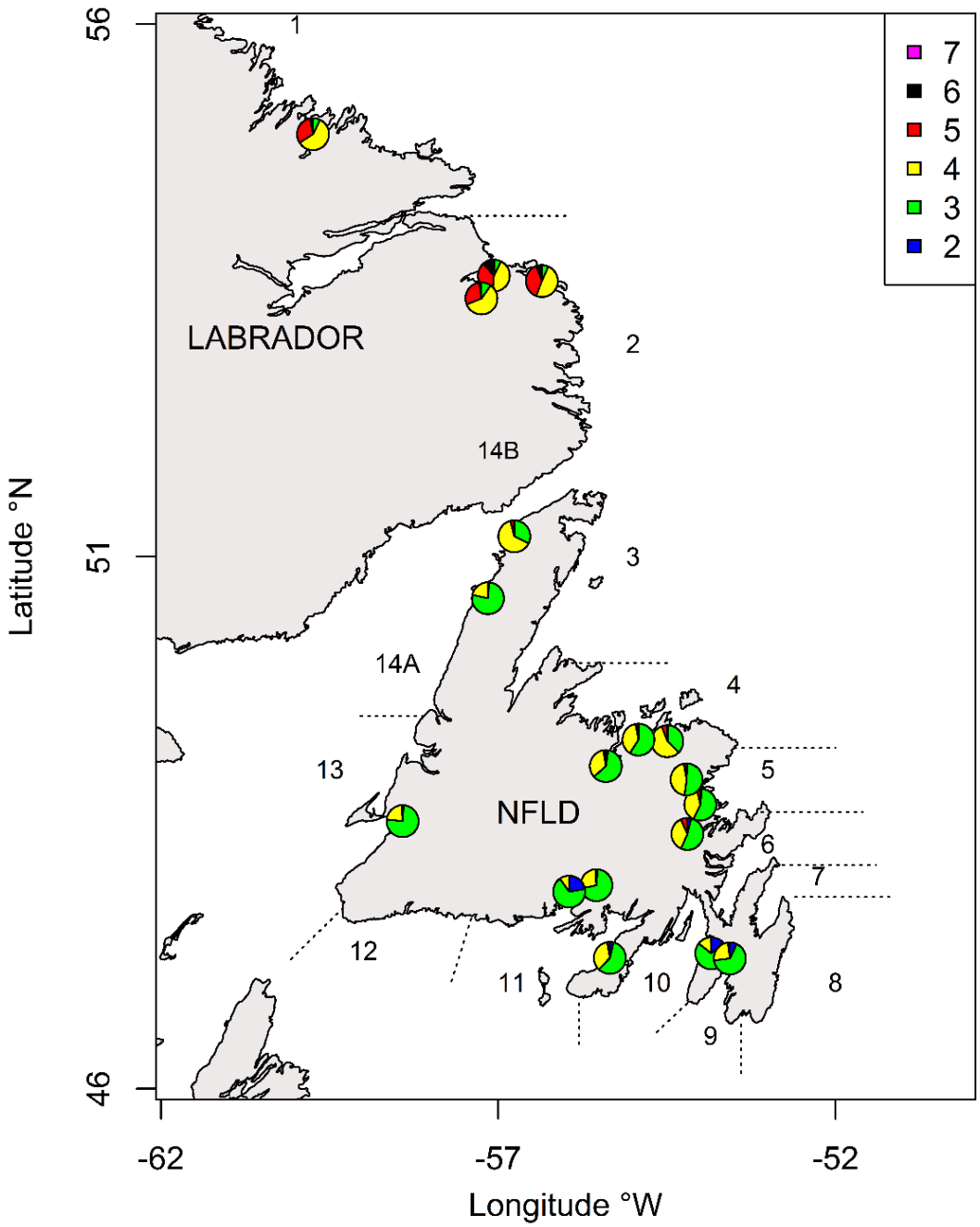

Figure 2. Smolt age distribution for 18 rivers assessed in NL in 2019. Average smolt age proportions were calculated for each river using smolt scale age data over the entire time series and only included years where sufficient sample sizes were available. Smolt age data were unavailable for Corner Brook Stream, Robinsons River, Middle Barachois Brook, Deer Arm Brook, Little Barachois Brook and Western Brook; therefore, these rivers are not represented. The boundary of each SFA is indicated by dotted lines.

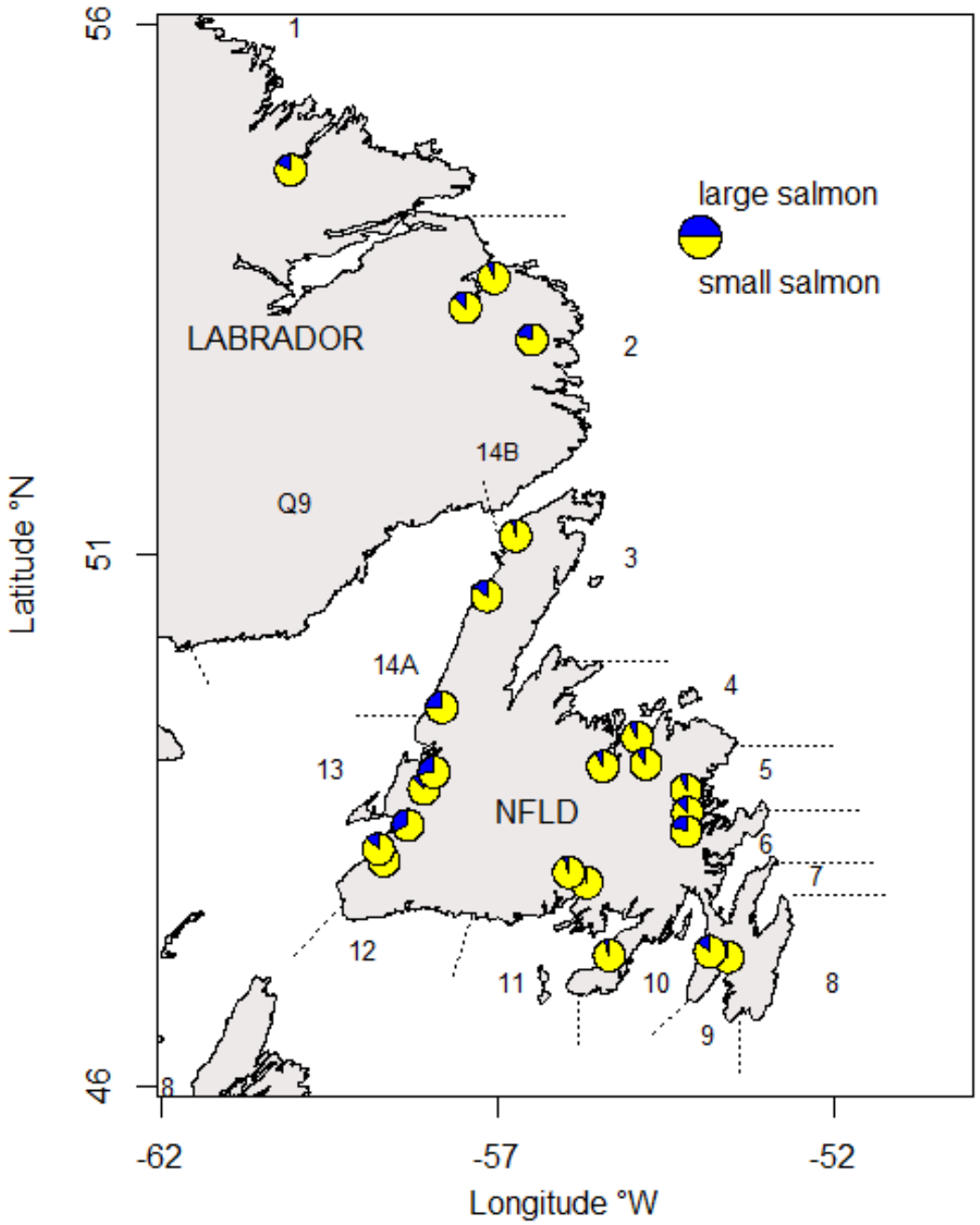

Figure 3. Average proportion of small (fork length <63 cm) and large (fork length ≥63 cm) Atlantic Salmon over the each river-specific time series for Newfoundland and Labrador rivers assessed in 2019. The boundary of each SFA is indicated by dotted lines.

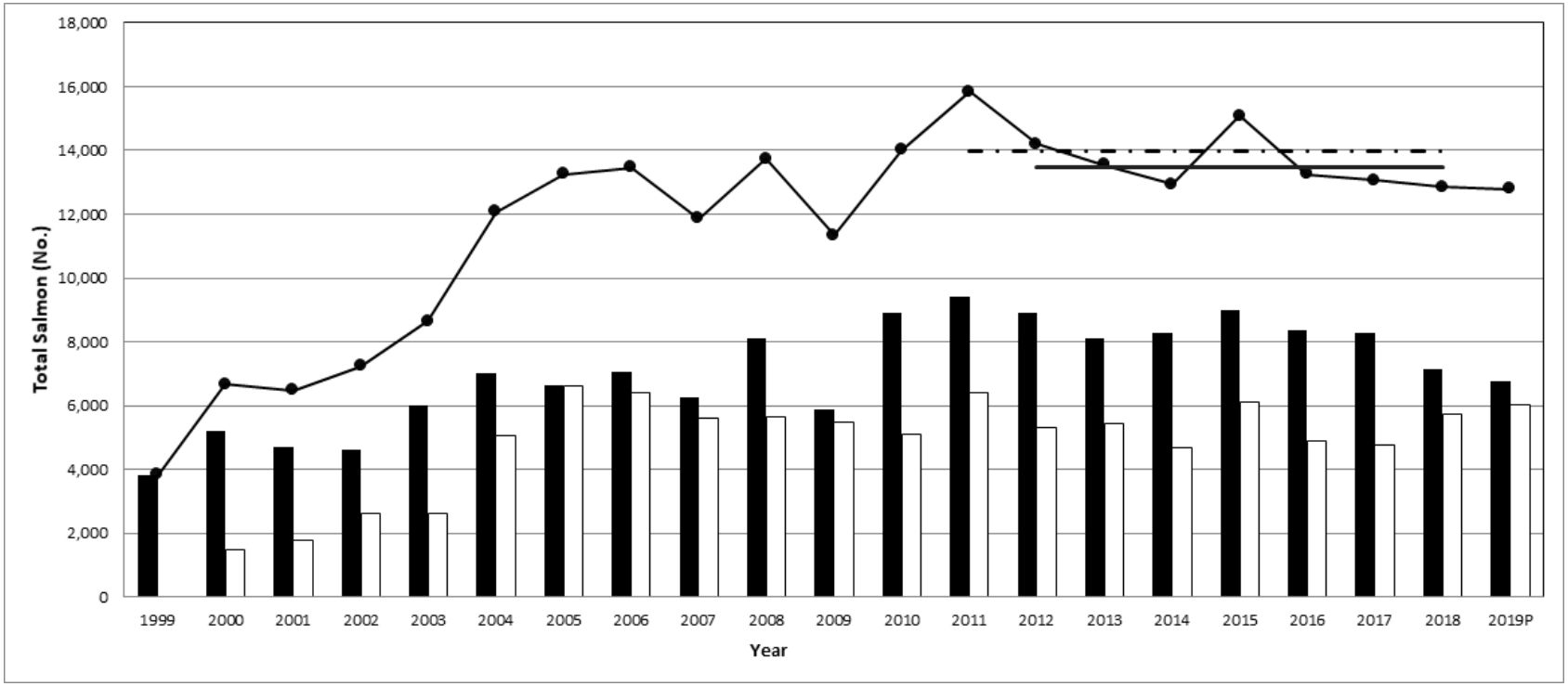

Figure 4. Estimated numbers of Atlantic Salmon harvested in Labrador Indigenous and subsistence fisheries in SFA 1 (black bars), SFA 2 (white bars) and total harvest (black circles) from 1999 to 2019 (2019 data is preliminary). Horizontal dash dot line represents the management mean of total harvest (2011-18). Horizontal solid line represents the previous six year mean of total harvest (2013-18).

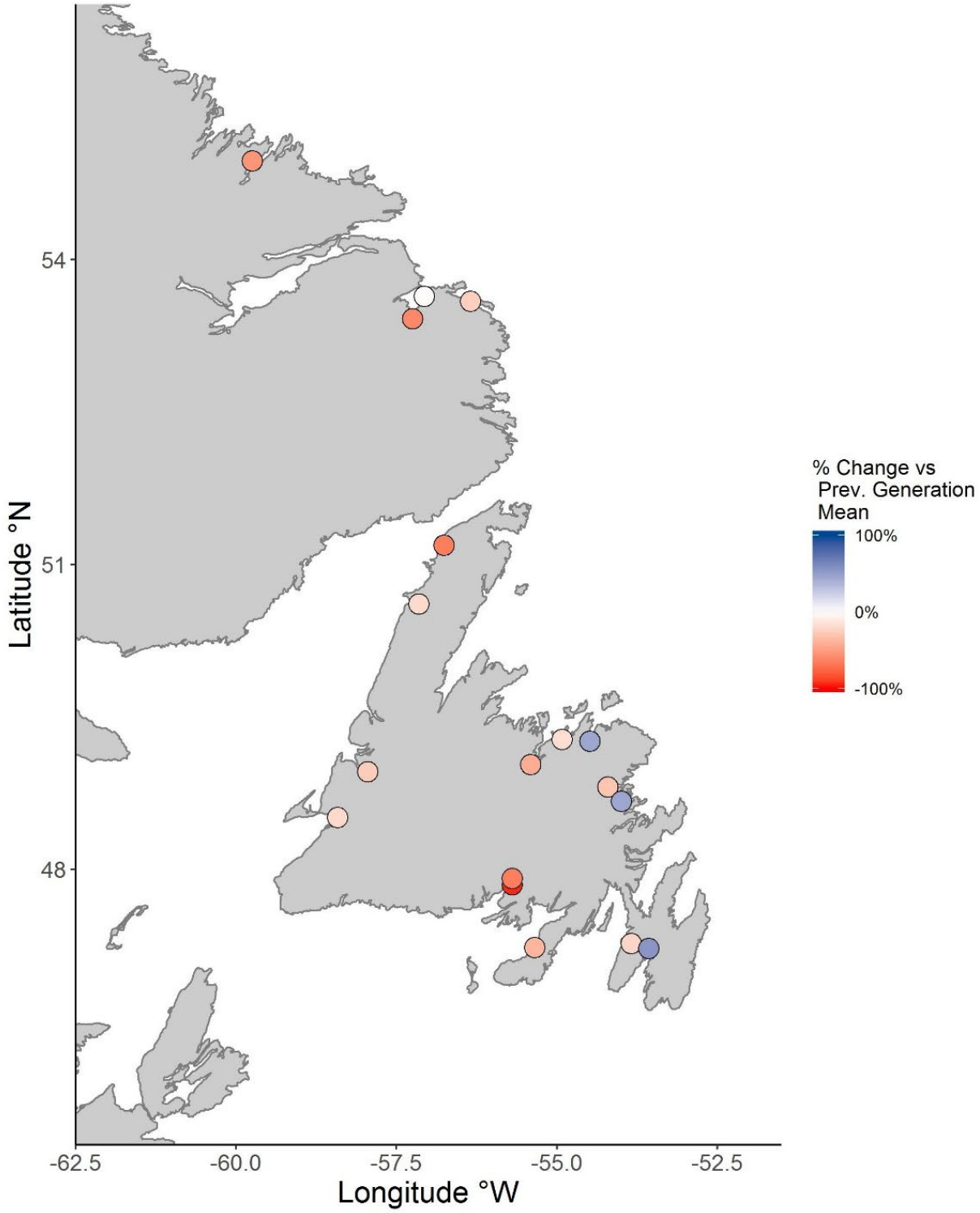

Figure 5. Map of Atlantic Salmon rivers monitored in 2019 with colour scaled to the percent change comparing 2019 total returns to the previous generation average. The rivers shown are limited to those which have information available to calculate a previous generation average (2014-18 and 2013-18 for rivers in Newfoundland and Labrador, respectively).

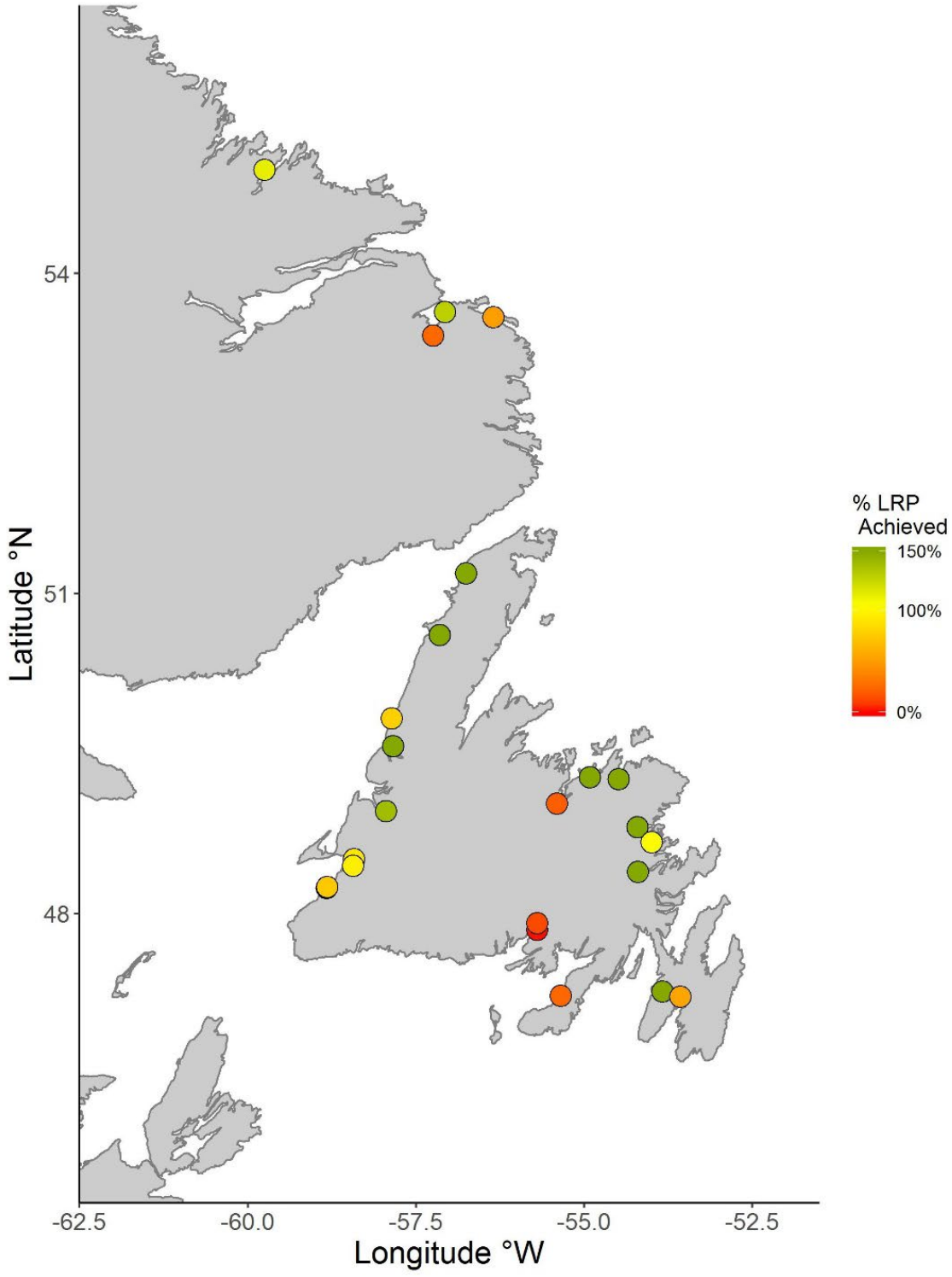

Figure 6. Map of Atlantic Salmon rivers monitored in 2019 with colour scaled by the % LRP achieved representing the stock status zones as indicated in the Precautionary Approach (DFO, 2009): red = Critical Zone (0-99%), yellow = Cautious Zone (100-149%), green = Healthy Zone (≥150%). Rivers in the Healthy Zone (N = 8) are all scaled to 150% for this figure. For actual % LRP achieved values for these rivers, see Table 5.

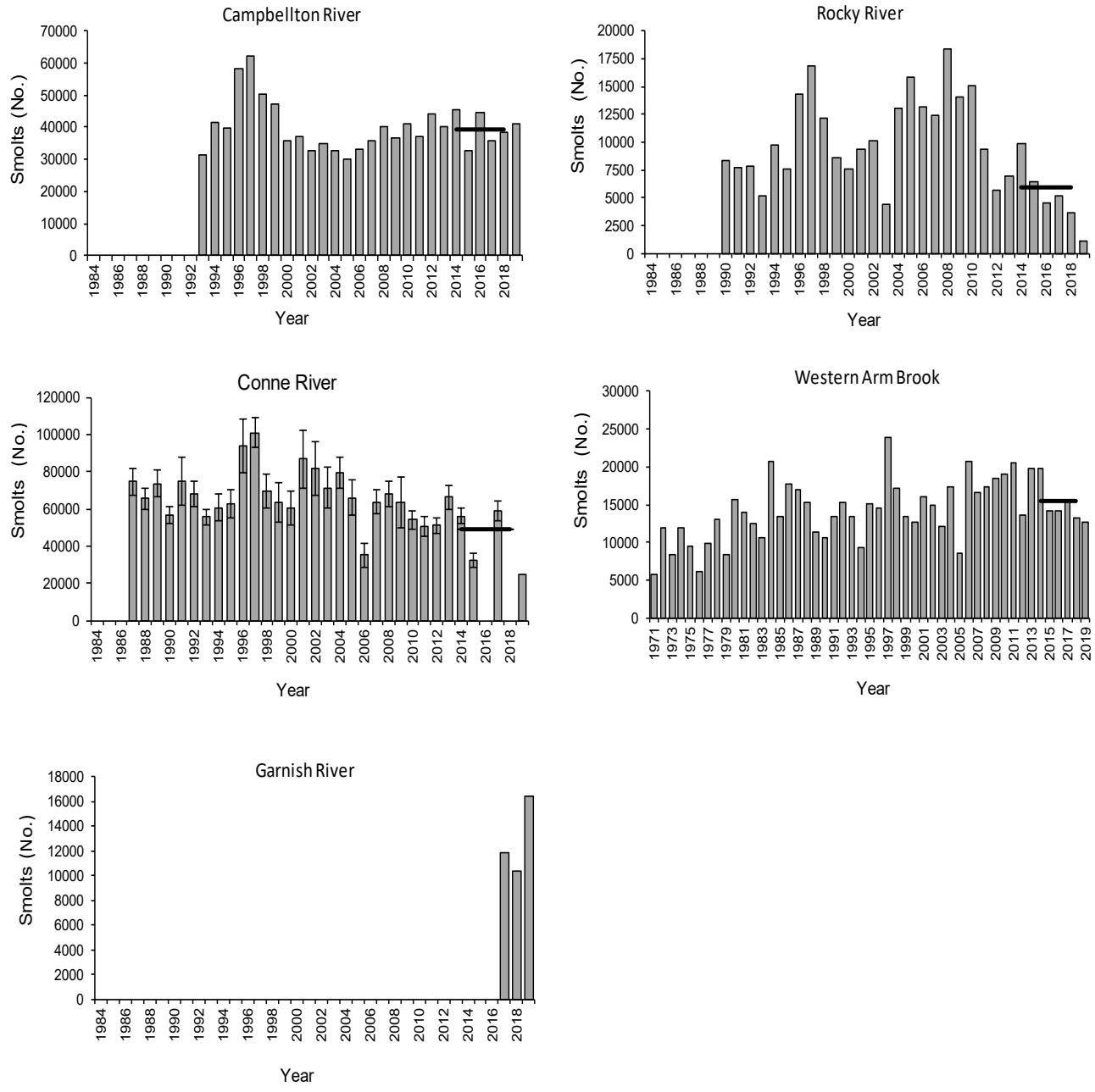

Figure 7. Smolt production on monitored Newfoundland Atlantic Salmon rivers in 2019. Horizontal solid line illustrates the previous five-year mean (2014-18). For Conne River, the error bars represent 95% confidence intervals for the annual smolt production estimates obtained from a mark-recapture program in all years with the exception of 2019 when smolt were counted for the first time.

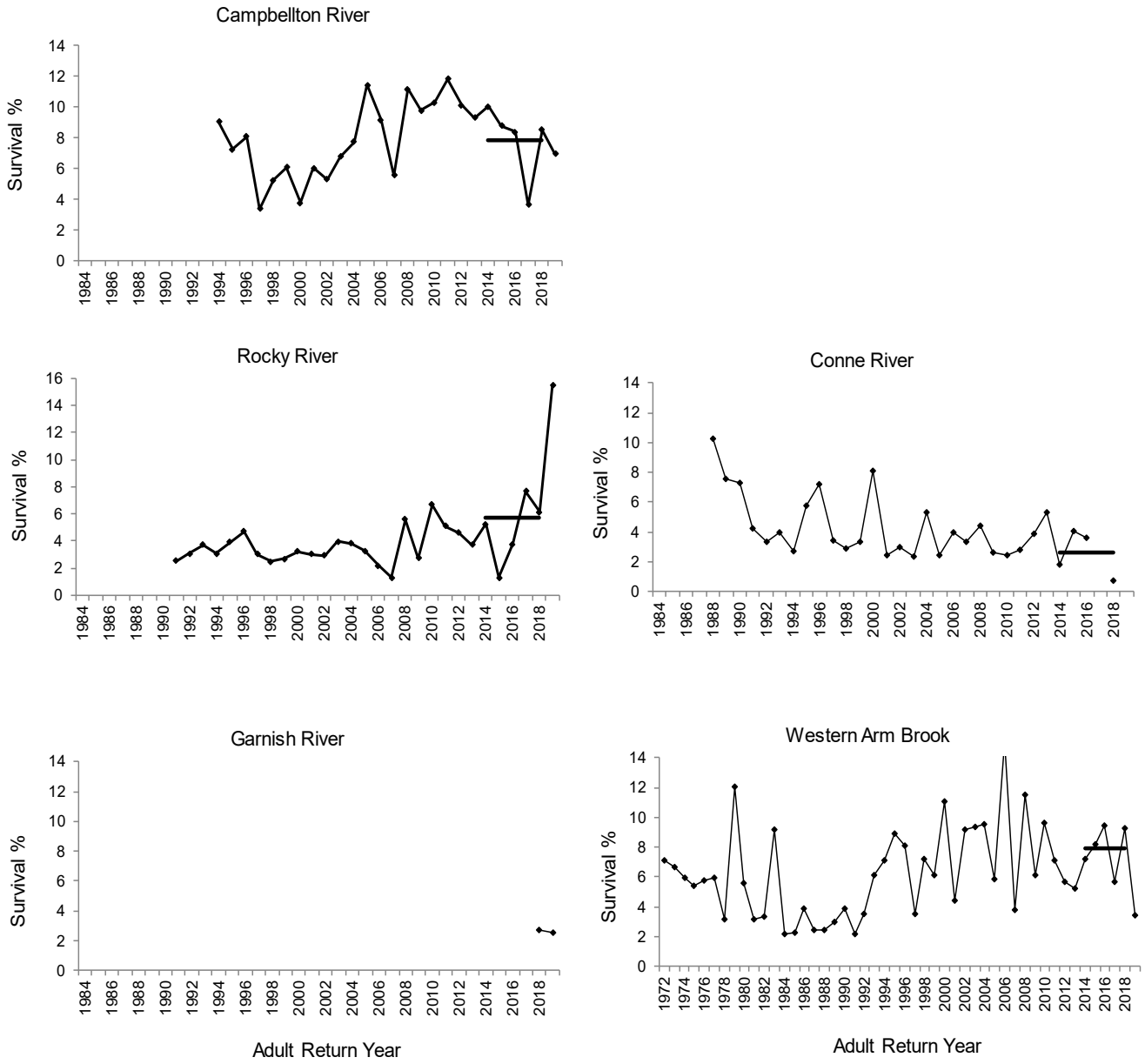

Figure 8. Marine survival of smolt to adult small salmon (%) for monitored Newfoundland rivers. Survival rates have not been adjusted for marine exploitation during the commercial salmon fishery (prior to 1992) thus values represent survival of salmon back to the river. Horizontal solid line illustrates the previous five-year mean (2014-18).

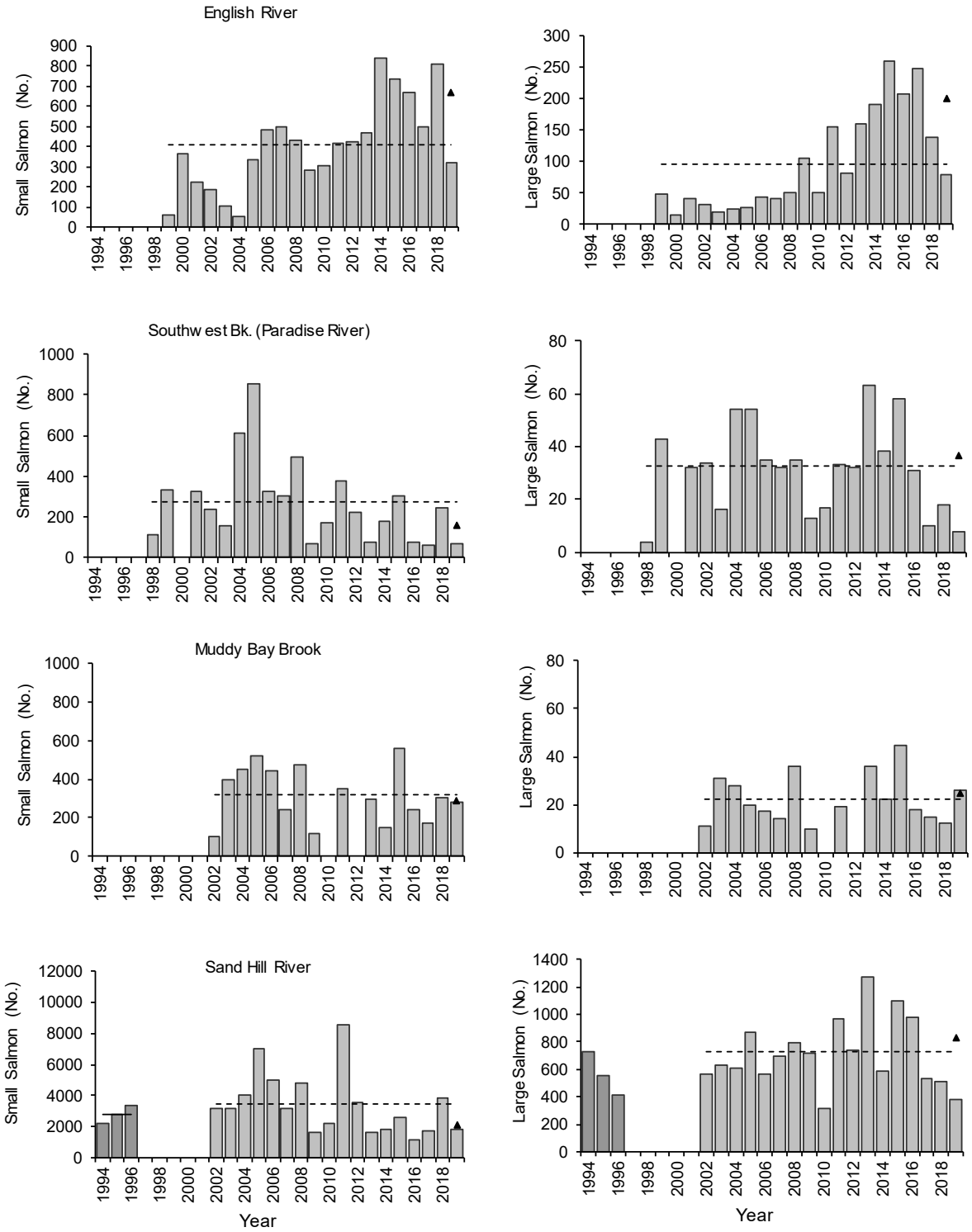

Figure 9. Total returns of small and large salmon to monitored rivers in Labrador: English River (SFA 1), Southwest Brook (SFA 2), Paradise River (SFA 2), Muddy Bay Brook (SFA 2) and Sand Hill River (SFA 2), 1994-2019. The black triangles represent the previous generation average (6 years). The horizontal dotted line represents the moratorium average.

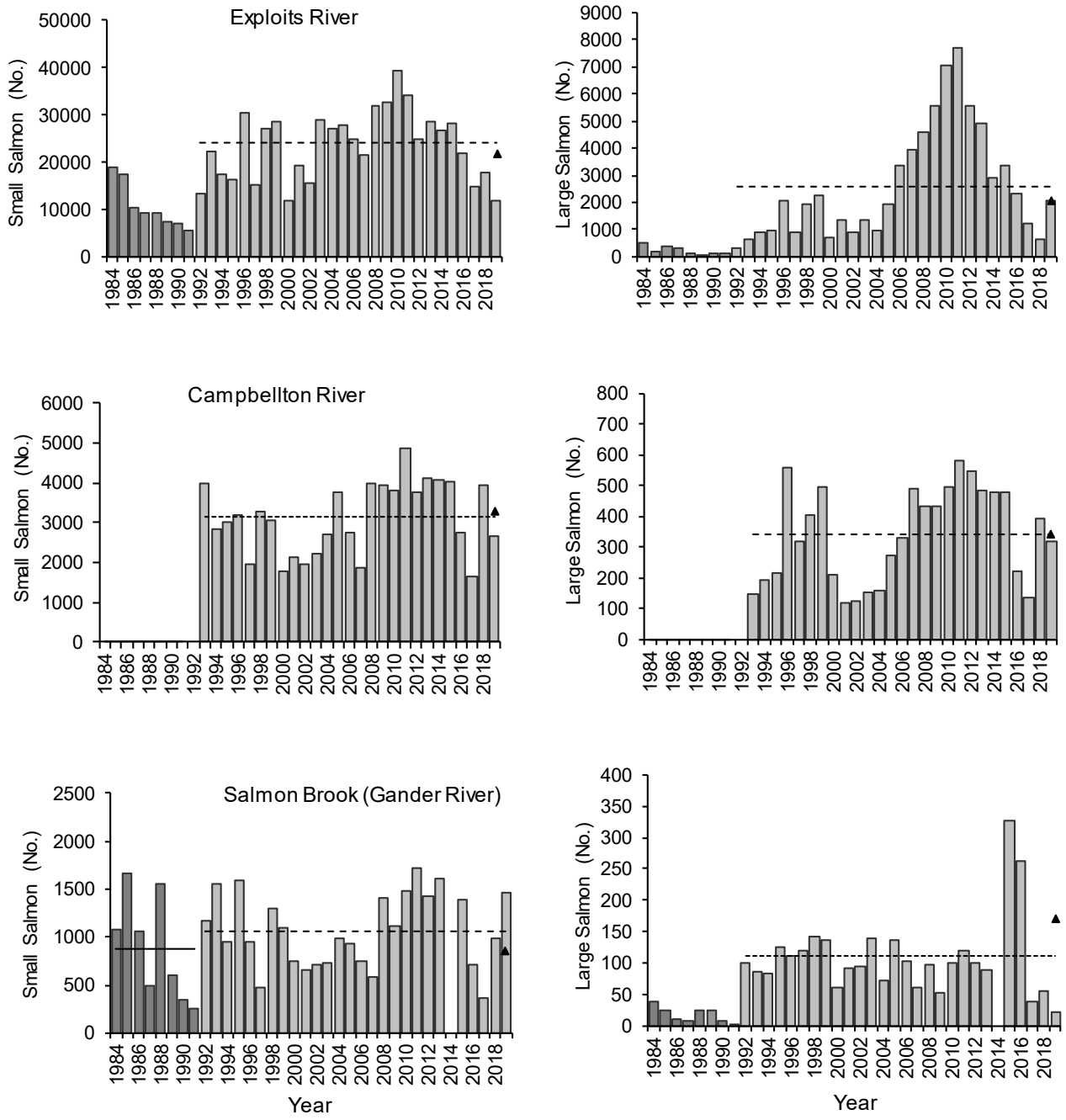

Figure 10. Total returns of small and large salmon to monitored rivers in SFA 4 on the northeast coast of Newfoundland, 1984-2019. The black triangles represent the previous generation average (five years). The horizontal dotted line represents the moratorium average. The horizontal dotted line represents the pre-moratorium average.

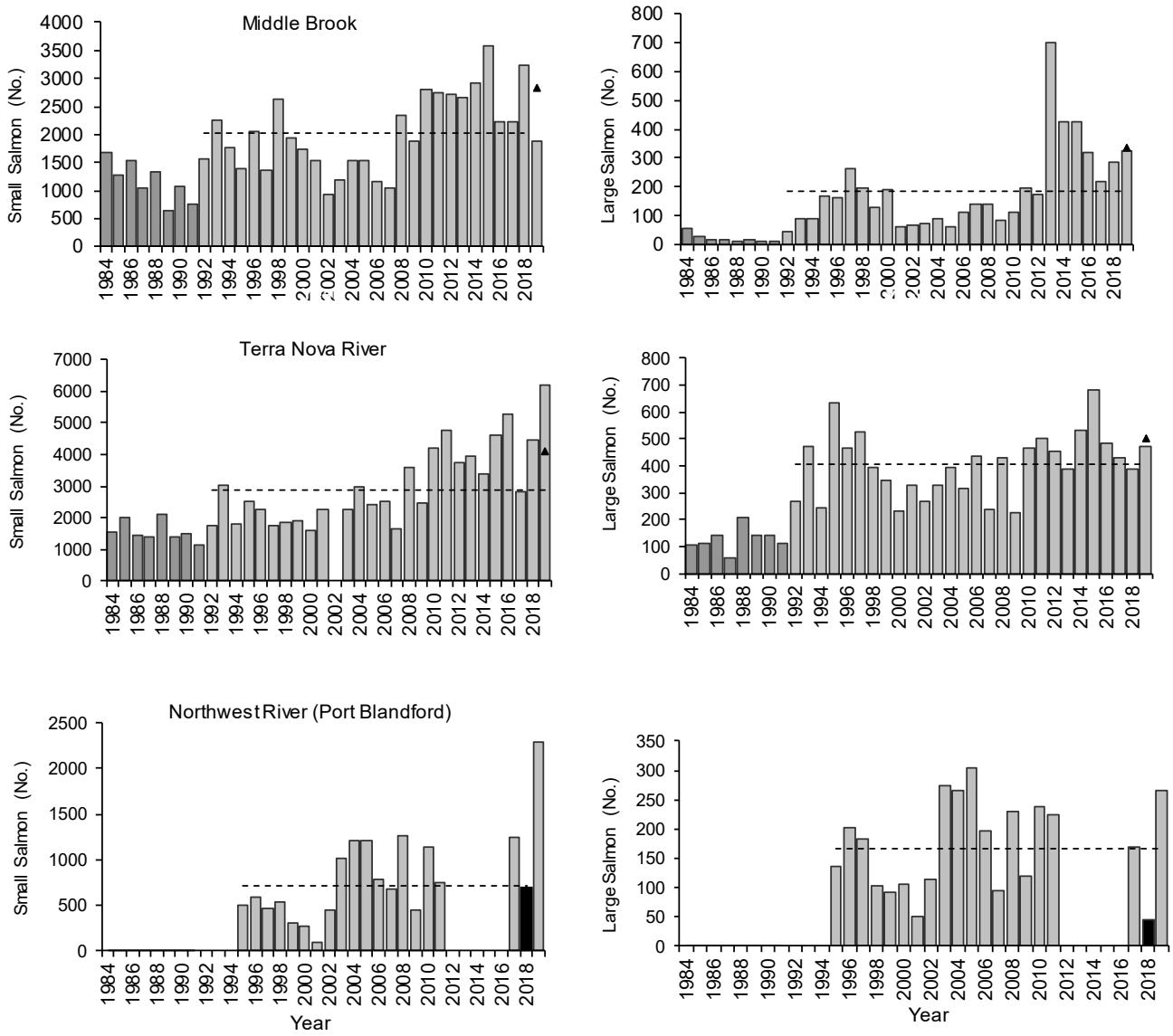

Figure 11. Total returns of small and large salmon to monitored rivers in SFA 5 on the northeast coast of Newfoundland, 1984-2019. The black triangles represent the previous generation average (five years). Black bars for Northwest River (Port Blandford) indicate partial count in 2018. The horizontal dotted line represents the moratorium average.

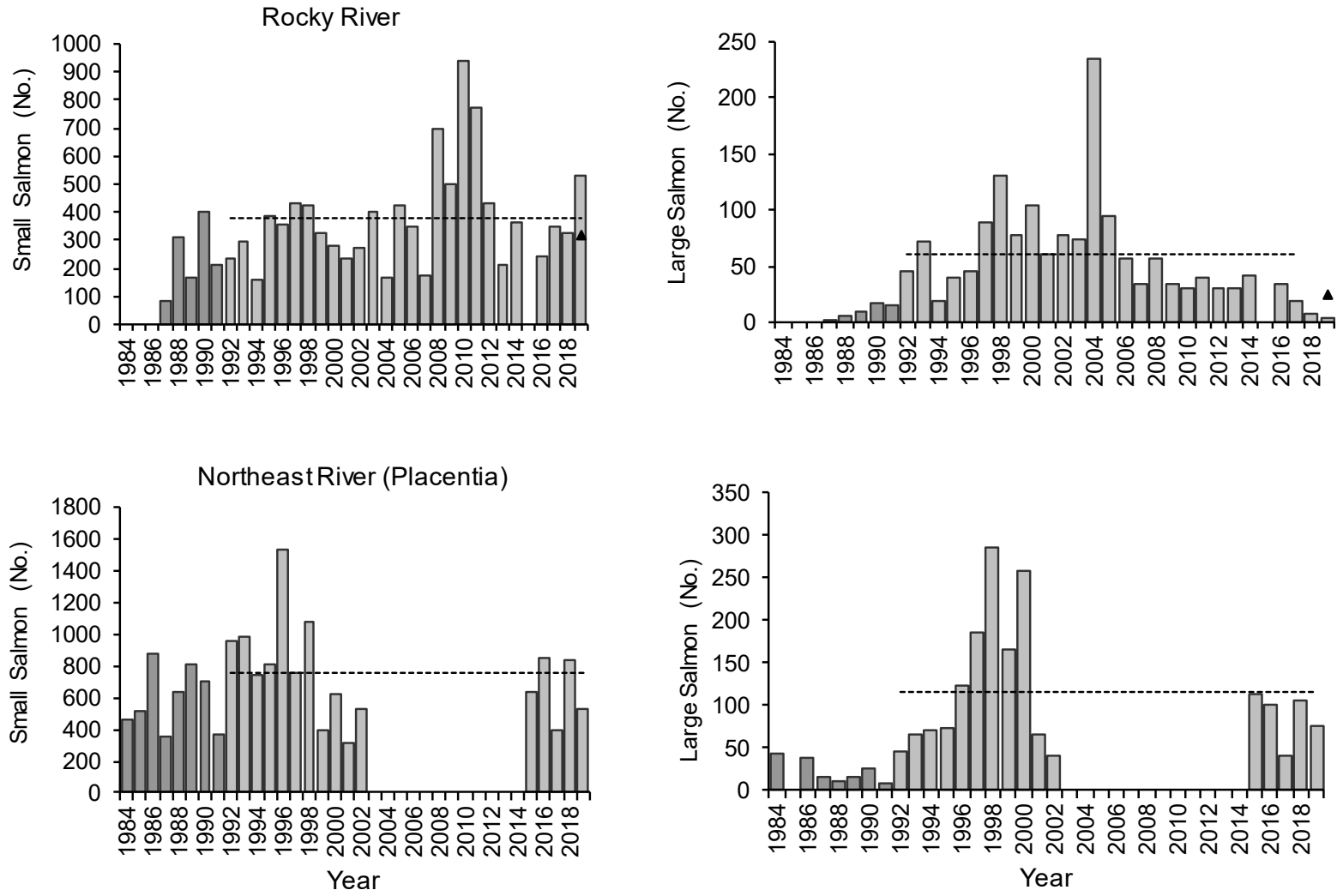

Figure 12. Total returns of small and large salmon to monitored rivers on the southeast coast of Newfoundland, 1984-2019: Rocky River (SFA 9) and Northeast River (Placentia Bay) (SFA 10). The black triangles represent the previous generation average (five years). The horizontal dotted line represents the moratorium average.

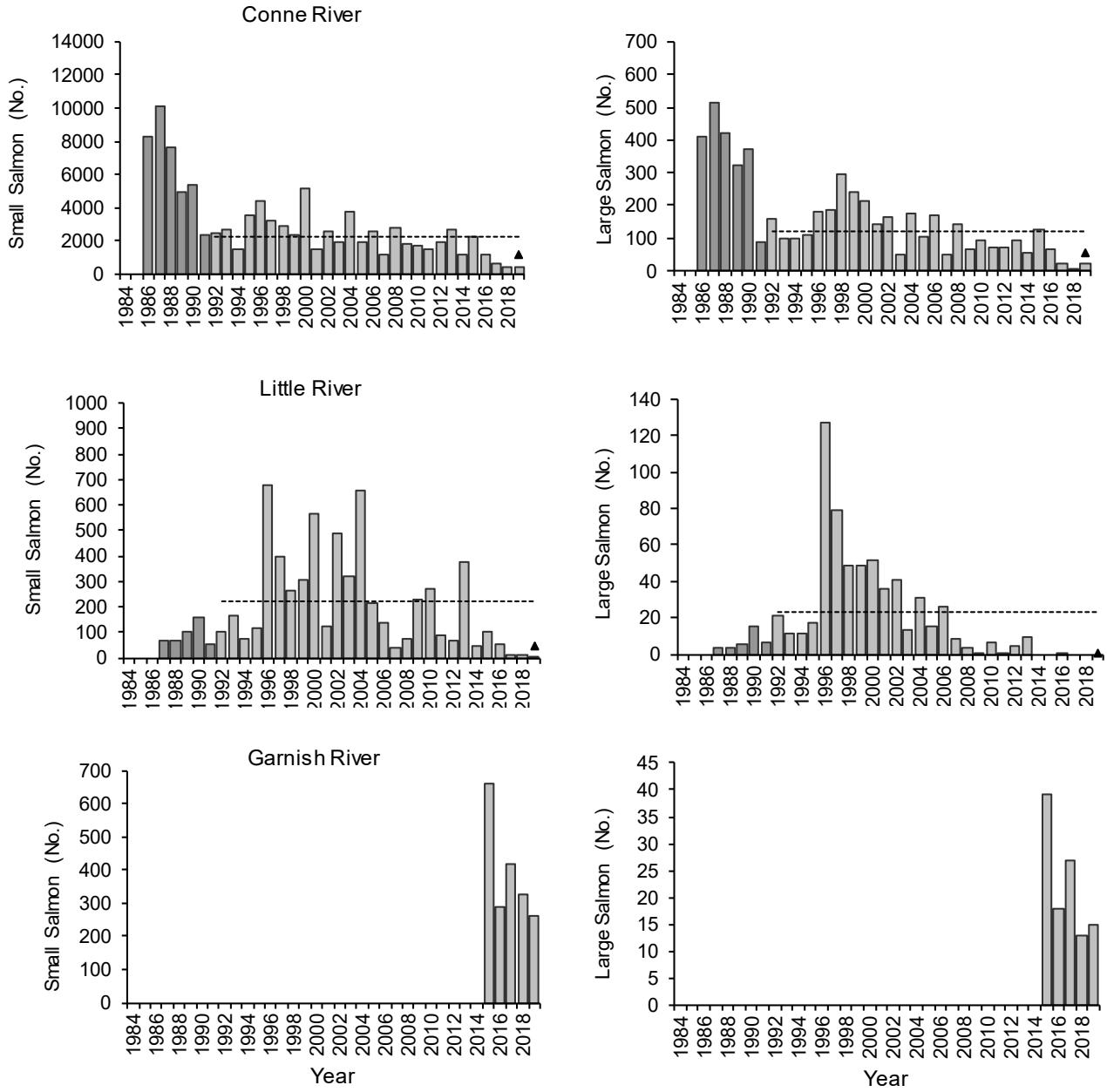

Figure 13. Total returns of small and large salmon to monitored rivers in SFA 11 on the south coast of Newfoundland, 1984-2019. The black triangles represent the previous generation average (five years). The horizontal dotted line represents the moratorium average.

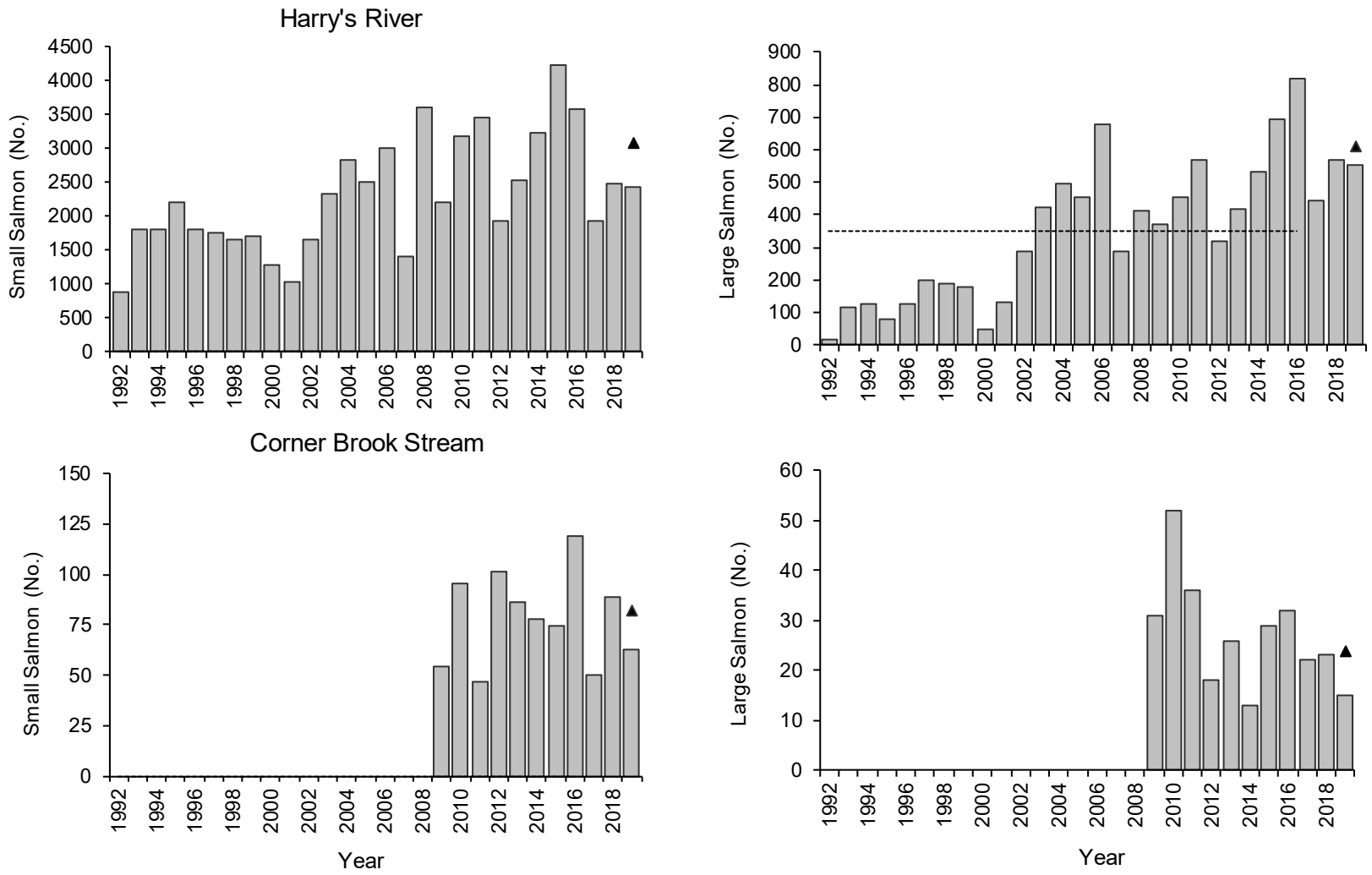

Figure 14. Total returns of small and large salmon to monitored rivers in SFA 13 on the west coast of Newfoundland, 1992-2019. The black triangles represent the previous generation average (five years). The horizontal dotted line represents the moratorium average. Atlantic Salmon are counted on Harry's River is carried out using a DIDSON camera. The number of large salmon is estimated based on the percent large on sonar images analyzed in a subsample of the run.

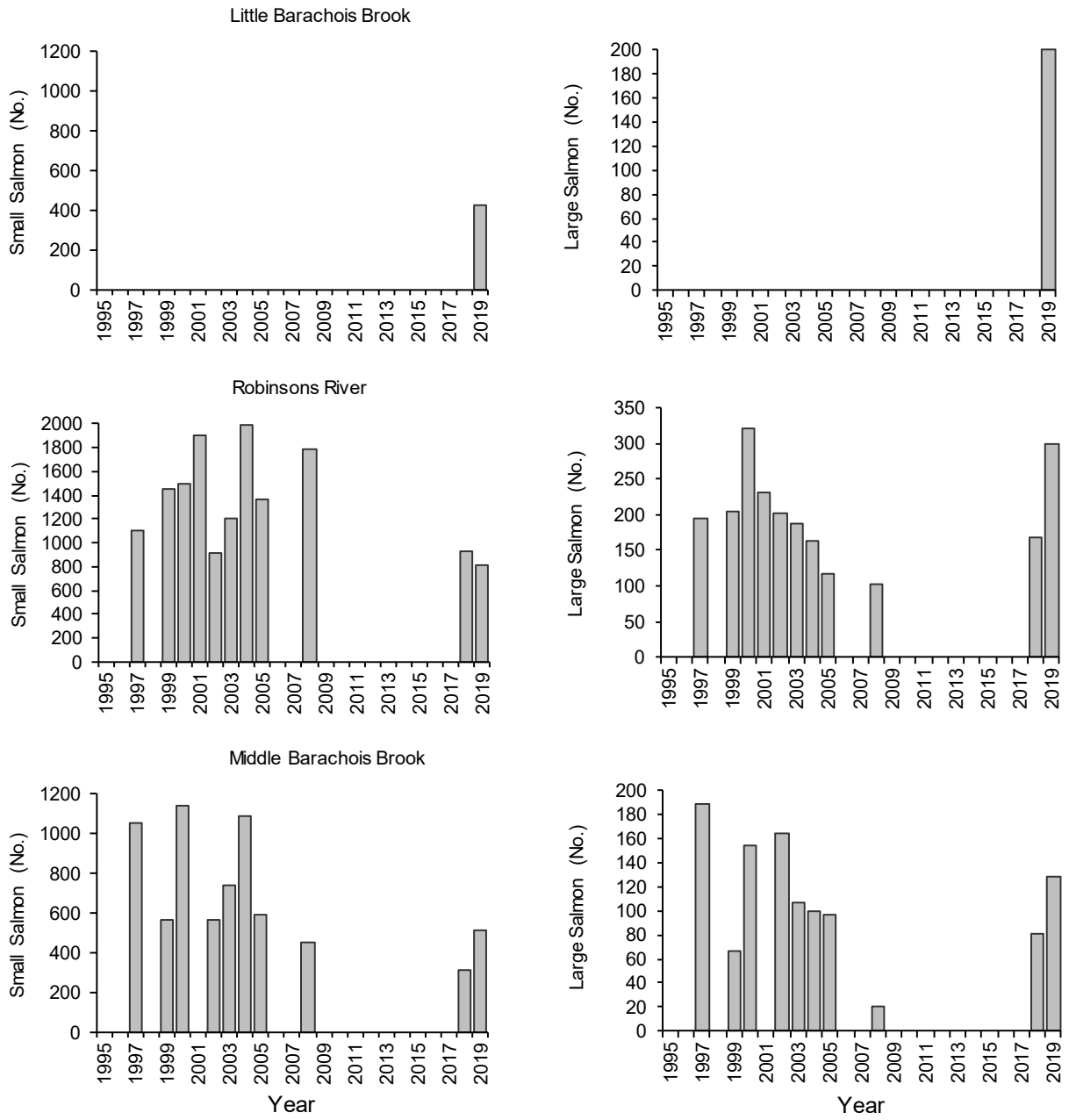

Figure 15. Estimated total returns of small and large salmon based on in-river snorkel surveys in SFA 13 on the southwest coast of Newfoundland, 1995-2019. Previous generation averages are unavailable for these three rivers. Total return estimates for Little Barachois Brook are based on the combination of a counting fence that ran throughout the Atlantic Salmon migration and an in-river snorkel survey conducted in late August from the counting fence down to the river mouth (≈9km distance).

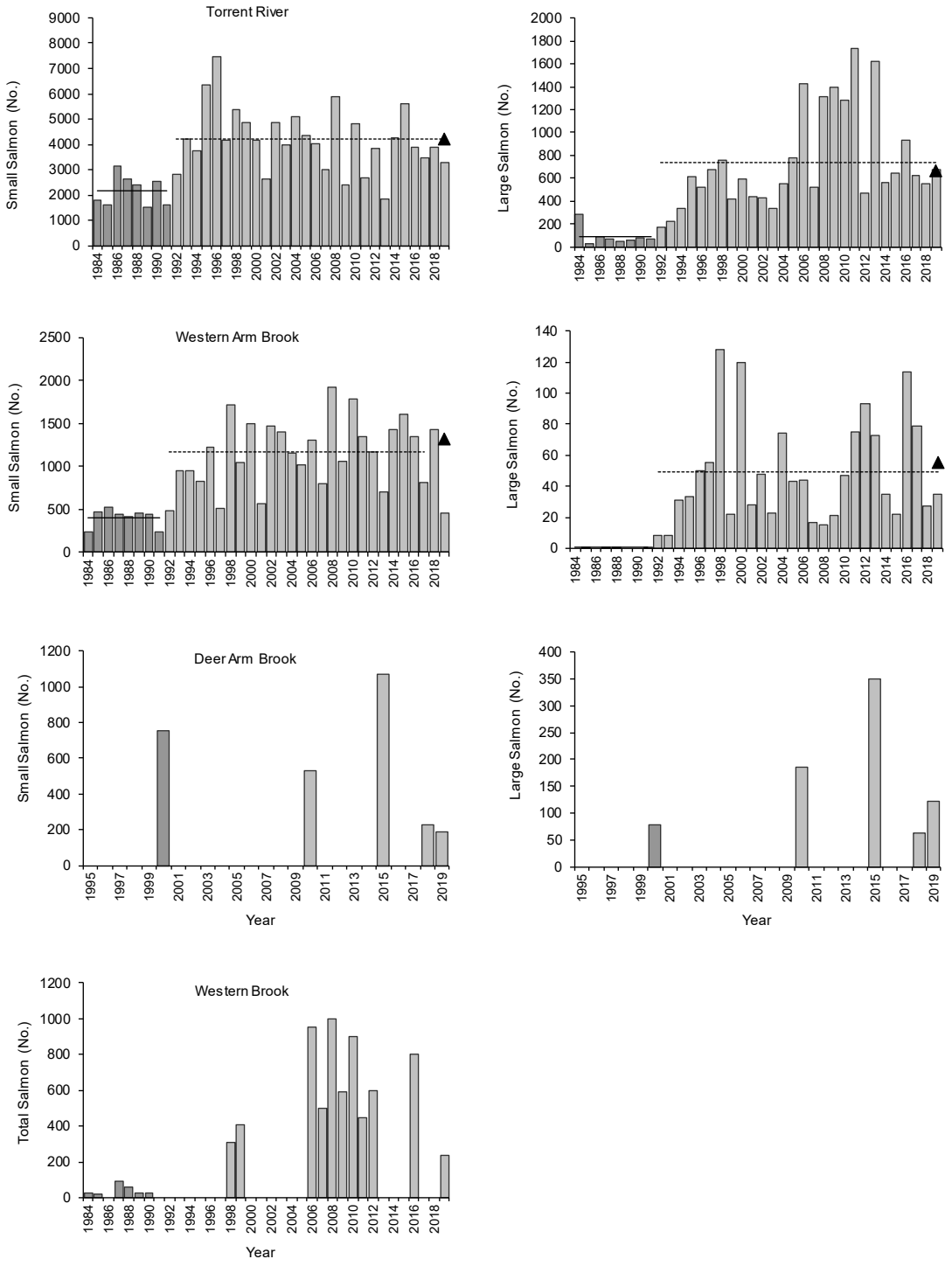

Figure 16. Total returns of small and large salmon to monitored rivers in SFA 14A on the west coast of Newfoundland, 1984-2019. The black triangles represent the previous generation average (five years). The horizontal dotted line represents the moratorium average.

Table 1. Harvests of Atlantic Salmon in the subsistence and FSC Fisheries in Labrador (SFA 1 and 2 combined), 1999-2019. Estimates for 2019 are compared to a management mean (2011-18) and previous six year mean (2013-18).

Year	Small salmon Number	Small salmon Weight (kg)	Large salmon Number	Large salmon Weight (kg)	Total Number	Total Weight (kg)
1999	2,739	5,580	1,084	4,220	3,824	9,800
2000	5,323	10,353	1,352	5,262	6,675	15,613
2001	4,789	9,789	1,673	6,499	6,478	16,288
2002	5,806	11,581	1,437	5,990	7,243	17,572
2003	6,477	13,196	2,175	8,912	8,653	22,108
2004	8,385	17,379	3,696	14,167	12,081	31,546
2005	10,436	21,038	2,817	10,876	13,253	31,914
2006	10,377	21,198	3,090	11,523	13,467	32,721
2007	9,208	17,070	2,652	9,386	11,860	26,456
2008	9,838	19,396	3,905	16,944	13,743	36,340
2009	7,988	16,130	3,344	13,681	11,332	29,810
2010	10,156	20,945	3,840	15,511	13,996	36,456
2011	11,301	23,442	4,533	18,535	15,834	41,978
2012	9,977	18,738	4,228	17,821	14,204	36,560
2013	7,164	14,674	6,374	25,299	13,539	39,973
2014	8,953	17,550	3,991	14,847	12,944	32,397
2015	8,923	17,500	6,146	24,935	15,069	42,435
2016	7,645	14,579	5,595	25,022	13,240	39,601
2017	6,868	13,255	6,193	26,118	13,060	39,373
2018	8,762	16,691	4,081	16,357	12,843	33,049
2019	7,064	13,300	5,720	24,121	12,783	37,420
2011-2018	8,699	17,106	5,294	21,797	13,984	38,903
% Change	-19	-22	8	11	-9	-4
2013-2018	8,053	15,708	5,397	22,097	13,449	37,805
% Change	-12	-15	6	9	-5	-1

Table 2. Total returns of small (<63 cm) and large (≥63 cm) Atlantic Salmon to monitored NL rivers in 2019 in comparison to the average returns (and percent change) during the previous generation (2014-18 for Newfoundland, 2013-18 for Labrador) and previous three generations (2004-18, 2001-18). Percent change of <10% is considered no change.

River Name	SFA	2019 Total Returns	Previous Generation Average	Previous 3 Generation Average	% Change Previous Generation	% Change Previous 3 Generations
Exploits River	4	13,881	24,013	30,638	-42%	-55%
Campbellton River	4	2,998	3,619	3,859	-17%	-22%
Salmon Brook	4	1,491	1,030 [1]	1,220	+45%	+22%
Middle Brook	5	2,211	3,179	2,541	-30%	-13%
Terra Nova River	5	6,691	4,619	3,958	+45%	+69%
Northwest River, Port Blandford	5	2,551	NA	NA	NA	NA
Rocky River	9	533	347[1]	478	+54%	+12%
Northeast River Placentia	10	603	768[1]	NA	-21%	NA
Garnish River	11	279	449[1]	NA	-38%	NA
Conne River	11	424	1,223	1,937	-65%	-78%
Little River	11	2	43	165	-95%	-99%
Middle Barachois Brook	13	644	NA	NA	NA	NA
Robinsons River	13	1,114	NA	NA	NA	NA
Little Barachois Brook	13	631	NA	NA	NA	NA
Harry's River	13	2,984[2]	3,699	3,306	-19%	-10%
Corner Brook Stream	13	78	106	NA	-26%	NA
Torrent River	14A	3,960	4,878	4,894	-19%	-19%
Deer Arm Brook	14A	310	NA	NA	NA	NA
Western Brook	14A	238	NA	NA	NA	NA
Western Arm Brook	14A	489	1,380	1,311	-65%	-63%
English River	1	399	869	536	-54%	-25%
Southwest Brook (Paradise River)	2	78	193	317	-60%	-76%
Muddy Bay Brook	2	306	311	343	-2%	-11%
Sand Hill River	2	2,227	2,964	4,212	-25%	-47%
Summary	-	N = 24	N = 18	N = 16	Declines ≥30% 8 (44%)	Declines ≥30% 6 (38%)

[1] 4-year average
[2] preliminary – will be adjusted following DIDSON review.

Table 3. Total returns of small (<63 cm) Atlantic Salmon to monitored NL rivers in 2019 in comparison to the average returns (and percent change) during the previous generation (2014-18 for Newfoundland, 2013-18 for Labrador) and previous three generations (2004-18, 2001-18). Percent change of <10% is considered no change.

River Name	SFA	2019 Returns	Previous Generation Average	Previous 3 Generation Average	% Change Previous Generation	% Change Previous 3 Generations
Exploits River	4	11,827	21,921	26,896	-46%	-56%
Campbellton River	4	2,678	3,277	3,464	-18%	-23%
Salmon Brook	4	1,469	859[1]	1,104	+71%	+33%
Middle Brook	5	1,885	2,845	2,309	-34%	-18%
Terra Nova River	5	6,218	4,115	3,532	+51%	+76%
Northwest River, Port Blandford	5	2,284	NA	NA	NA	NA
Rocky River	9	530	321[1]	425	+65%	+25%
Northeast River Placentia	10	527	678	NA	-22%	NA
Garnish River	11	264	424	NA	-38%	NA
Conne River	11	404	1,169	1,850	-65%	-78%
Little River	11	2	43	158	-95%	-99%
Middle Barachois Brook	13	516	NA	NA	NA	NA
Robinsons River	13	815	NA	NA	NA	NA
Little Barachois Brook	13	430	NA	NA	NA	NA
Harry's River	13	2,429	3,088	2,805	-21%	-13%
Corner Brook Stream	13	63	82	NA	-23%	NA
Torrent River	14A	3,286	4,214	3,933	-22%	-16%
Deer Arm Brook	14A	187	NA	NA	NA	NA
Western Brook	14A	188	NA	NA	NA	NA
Western Arm Brook	14A	454	1,325	1,259	-66%	-64%
English River	1	320	668	431	-52%	-26%
Southwest Brook (Paradise River)	2	70	157	283	-55%	-76%
Muddy Bay Brook	2	280	286	321	-2%	-13%
Sand Hill River	2	1,842	2,135	3,480	-14%	-47%
Summary	-	N = 24	N = 18	N = 16	Declines ≥30% 8 (44%)	Declines ≥30% 6 (38%)

[1] 4-year average

Table 4. Total returns of large (≥63 cm) Atlantic Salmon to monitored NL rivers in 2019 in comparison to the average returns (and percent change) during the previous generation (2014-18 for Newfoundland, 2013-18 for Labrador) and previous three generations (2004-18, 2001-18). Percent change of <10% is considered no change.

River Name	SFA	2019 Large Returns	Previous Generation Average	Previous 3 Generation Average	% Change Previous Generation	% Change Previous 3 Generations
Exploits River	4	2,054	2,092	3,742	-2%	-45%
Campbellton River	4	320	342	396	-6%	-19%
Salmon Brook	4	22	171[1]	116	-87%	-81%
Middle Brook	5	326	334	232	-2%	+40%
Terra Nova River	5	473	504	425	-6%	+11%
Northwest River, Port Blandford	5	267	NA	NA	NA	NA
Rocky River	9	3	26[1]	53	-88%	-94%
Northeast River Placentia	10	76	91[1]	NA	-16%	NA
Garnish River	11	15	24[1]	NA	-38%	NA
Conne River	11	20	55	87	-64%	-77%
Little River	11	0	<1	7	-100%	-100%
Middle Barachois Brook	13	128	NA	NA	NA	NA
Robinsons River	13	299	NA	NA	NA	NA
Little Barachois Brook	13	201	NA	NA	NA	NA
Harry's River	13	555	611	501	-9%	11%
Corner Brook Stream	13	15	24	NA	-37%	NA
Torrent River	14A	674	664	961	+2%	-30%
Deer Arm Brook	14A	122	NA	NA	NA	NA
Western Brook	14A	48	NA	NA	NA	NA
Western Arm Brook	14A	35	55	52	-36%	-33%
English River	1	79	201	104	-61%	-24%
Southwest Brook (Paradise River)	2	8	36	34	-78%	-76%
Muddy Bay Brook	2	26	25	22	+4%	+17%
Sand Hill River	2	384	829	732	-54%	-48%
Summary	-	N = 24	N = 18	N = 16	Declines ≥30% 10 (56%)	Declines ≥30% 9 (56%)

[1] 4-year average

Table 5. Summary of Atlantic Salmon stock status (Percent Conservation Achieved) in NL rivers in 2019 and percent change from the previous generation (2014-18 for Newfoundland, 2013-18 for Labrador) and previous three generations (2004-18, 2001-18).

River Name	SFA	Conservation Egg Requirement (LRP) Achieved (%)	2019 Status	Previous Generation Average	Previous 3 Generation Average	% Change Previous Generation	% Change Previous 3 Generations
Exploits River	4	20%	Critical	39%	51%	-49%	-60%
Campbellton River	4	278%	Healthy	318%	335%	-13%	-17%
Salmon Brook	4	157%	Healthy	118%	136%	+33%	+15%
Middle Brook	5	240%	Healthy	330%	257%	-27%	-7%
Terra Nova River	5	99%	Critical	71%	60%	+40%	+65%
Northwest River, Port Blandford	5	159%	Healthy	NA	62%	NA	+155%
Rocky River	9	52%	Critical	35%	49%	+49%	+6%
Northeast River Placentia	10	284%	Healthy	372%	NA	-24%	NA
Garnish River	11	24%	Critical	40%	NA	-40%	NA
Conne River	11	13%	Critical	36%	53%	-64%	-76%
Little River	11	1%	Critical	18%	70%	-95%	-99%
Middle Barachois Brook	13	55%	Critical	NA	NA	NA	NA
Robinsons River	13	71%	Critical	NA	NA	NA	NA
Little Barachois Brook	13	91%	Critical	NA	NA	NA	NA
Harry's River	13	89%	Critical	117%	101%	-24%	-12%
Corner Brook Stream	13	138%	Cautious	194%	NA	-29%	NA
Torrent River	14A	585%	Healthy	716%	774%	-18%	-24%
Deer Arm Brook	14A	253%	Healthy	NA	NA	NA	NA
Western Brook	14A	75%	Critical	NA	NA	NA	NA
Western Arm Brook	14A	152%	Healthy	412%	425%	-63%	-64%
English River	1	109%	Cautious	250%	155%	-56%	-30%

River Name	SFA	Conservation Egg Requirement (LRP) Achieved (%)	2019 Status	Previous Generation Average	Previous 3 Generation Average	% Change Previous Generation	% Change Previous 3 Generations
Southwest Brook	2	24%	Critical	64%	97%	-62%	-75%
Muddy Bay Brook	2	127%	Cautious	121%	132%	+5%	-4%
Sand Hill River	2	49%	Critical	72%	96%	-32%	-49%
Summary	-	24	8 Healthy 3 Cautious 13 Critical	18	16	Declines ≥30% 8 (44%)	Declines ≥30% 7 (44%)

Appendix II – Assessment Triggers

There are two scenarios where DFO Science would trigger an assessment (outside of current 2-year schedule).

1. ≥30% decline in total returns on ≥50% of rivers in a given year, relative to two reference periods:
    a. previous generation average (5 and 6 years for Newfoundland and Labrador, respectively)
    b. previous two generations average (10 and 12 years for Newfoundland and Labrador, respectively)
2. ≥25% decline in total returns on ≥50% of rivers over two consecutive years, relative to two reference periods:
    a. previous generation average (5 and 6 years for Newfoundland and Labrador, respectively)
    b. previous two generations average (10 and 12 years for Newfoundland and Labrador, respectively)

Analysis of 2019 returns indicate no trigger for either of the above criteria. Of 18 rivers with information over the previous generation (2014-18, 2013-18), **8 rivers (44%)** declined by ≥30% in 2019 (Table 2). Of 16 rivers with information over the previous two generations, **6 rivers (38%)** declined by ≥30% in 2019 (Table 2).

Consecutive years (2018 and 2019) returns were compared to the previous one and two generations.

Relative to the previous generation:

> Year 1 (2018 returns) 19% of rivers declined by ≥25% (3 of 16) and in Year 2 (2019 returns) 56% of rivers (10 of 18) declined by ≥25%.

Relative to the previous two generations:

> Year 1 (2018 returns) 31% of rivers (5 of 16) declined by ≥25% and in Year 2 (2019 returns) 63% of rivers (10 of 16) declined by ≥25%.

This Report is Available from the:

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