



Labrador Subsistence Fisheries in 2020: Mixed-Stock Fisheries Context

EXECUTIVE SUMMARY

- The Atlantic salmon subsistence fisheries in Labrador take place in estuaries and coastal areas using gillnets and are considered to be mixed-stock fisheries. The majority of salmon are harvested within estuaries where the potential for the interception of non-local stocks is reduced.
- The management of these fisheries includes a number of conditions related to gear, seasons, weekly fishery closures, limits on total harvest using carcass tags, logbook catch reporting, and prohibition on sales.
- Reported harvest in 2020 was 40.4 t (approximately 14,000 salmon by number). The reported harvest from 2000 to 2019 ranged from 15.6 t to 42.4 t.
- A catch sampling program has been conducted annually since 2006 by Indigenous community members and fisheries officers. The data and samples collected are shared with Fisheries and Oceans Canada. In 2020, 999 samples were collected, representing 7% of the total catch by number (10% of small salmon catch, 4% of large salmon catch).
- In 2020, emphasis was placed on genotyping all of the 741 tissue samples collected along the Labrador coast where interception of non-local stocks was most prevalent in the past. As in previous years, the estimated origin of the samples was dominated by the Labrador reporting groups (>95%).
- The performance of fisheries sampling programs to estimate catches of low proportions of non-local origin salmon in mixed stock fisheries indicated that a sampling rate of at least 10% of the fishery catches in Labrador would be required to achieve a relatively unbiased estimate of the catch of USA origin salmon.

INTRODUCTION

In support of the North American Commission agenda item to address mixed-stock fisheries in domestic waters of Commission member Parties, this document presents the following information regarding the 2020 Labrador subsistence fisheries:

- fisheries management measures
- catch by size group of salmon and location
- summary of the biological sampling program and genetic origin of samples

Fisheries for Atlantic salmon that occur at sea, along the coast, and in some cases in estuaries, have the potential to exploit salmon from multiple stock origins. The most important mixed-stock fisheries in Canada historically were the commercial fisheries which occurred in the marine coastal areas and in estuaries throughout eastern Canada. Since 2000, all commercial Atlantic salmon fisheries under Canadian jurisdiction have been closed and the sale of Canadian origin wild Atlantic salmon, regardless of fishery source, is prohibited.

There are currently three Atlantic salmon fisheries in Canada categorized as: Indigenous food, social and ceremonial (FSC), Labrador resident subsistence, and recreational. Recreational salmon fisheries are only permitted in rivers. FSC fisheries in Quebec and Maritime provinces generally occur in close proximity to rivers and within tidal waters. The Labrador subsistence fisheries (FSC and resident) occur in both estuaries and coastal waters adjacent to remote coastal communities. The Labrador subsistence fisheries have been shown to intercept salmon from other regions of eastern North America and are considered mixed-stock fisheries by NASCO.

As reported to ICES and NASCO, the majority of Canada's 2020 Atlantic salmon catch was from in-river (51% in 2020) and estuarine fisheries (42% in 2020). The remaining 7% of the 2020 catch was from coastal fisheries (Labrador subsistence).

LABRADOR SUBSISTENCE FISHERIES MANAGEMENT MEASURES

There are two types of subsistence net fisheries in Labrador that are authorized by Fisheries and Oceans Canada (DFO) to catch Atlantic salmon:

- Indigenous food, social, and ceremonial (FSC) directed fisheries for Atlantic salmon
- resident subsistence trout fisheries that permits bycatch of Atlantic salmon

In previous years, the fishing season and mesh sizes in the various fisheries were modified in an effort to reduce the capture of large salmon while at the same time providing an opportunity to harvest small salmon, trout, and Arctic charr.

General management measures:

- carcass tags are required to be placed on all harvested Atlantic salmon at time of capture
- catches are limited by the number of tags allocated to each group
- the number of fishers is limited to one designate or licence holder per household
- only nylon twine netting is permitted (monofilament not permitted)
- net must be set in a straight line
- gear must be clearly marked with the full name of the fisher and other group specific information as required

- nets must be removed from the water between 6:00 pm Sunday and 6:00 pm Monday
- nets are not to be left unattended for a period of more than 24 hours
- completed logbook of catch must be submitted to DFO at the end of season
- all sales of Atlantic salmon are prohibited

Resident Subsistence Trout Fishery

There is a long-standing tradition of trout net fishing in Labrador targeting Brook trout/Brook charr (*Salvelinus fontinalis*) and Arctic charr (*Salvelinus alpinus*). Following the 1998 closure of the commercial salmon fishery in Labrador, there was an increased dependency on the trout fishery for subsistence purposes. A subsistence trout net licence is required and provided to residents of Labrador to harvest trout. A limit on the number of resident licences has only been set for Central Labrador (includes Lake Melville) at 151. There is a recognized bycatch of Atlantic salmon in trout nets and management measures are in place to minimize this harvest.

- 275 licences were issued in 2020:
 - 7 in Northern Labrador (Salmon Fishing Area, SFA 1A)
 - 148 in Central Labrador (includes Lake Melville) (SFA 1B)
 - 120 in Southern Labrador (SFA 2)

Additional management measures:

- seasonal limit of 50 trout/charr
- maximum bycatch of three Atlantic salmon
- fishing must cease when either the three salmon bycatch or 50 trout/charr limits are taken
- licence holders are permitted to use a single net with a maximum length of 15 fathoms
- mesh size permitted is not less than 102 mm (4 inches)
- mesh size greater than 127mm (5 inches) is not permitted in Northern Labrador
- seasons in 2020 varied by location (Figure 1):
 - Northern Labrador (SFA 1A): 16 June to 17 July
 - Central Labrador (SFA 1B) (includes Lake Melville): 10 June to 1 July and 21 July to 13 August (Kenamu River closes 31 July)
 - Southern Labrador (SFA 2): 11 July to 29 July

Indigenous food, social, and ceremonial (FSC) fisheries

In response to the Supreme Court of Canada decision interpreting Section 35 of the Constitution Act of 1982, DFO provided resource access to Indigenous groups of Labrador for FSC purposes. Between 1999 and 2005, a FSC fishery was made available for members of the Labrador Inuit Association (LIA) in Northern Labrador (Salmon Fishing Area, SFA 1A) as well as the Lake Melville area (SFA 1B) (Figure 1). In 2006, with the signing of the LIA Land Claims Agreement, a subsistence fishery with the Nunatsiavut Government (NG) which is the successor organization to the LIA was negotiated within Upper Lake Melville (ULM) and the Labrador Inuit Settlement Area (LISA). The Innu Nation also fishes for salmon in Lake Melville from the community of Sheshatshiu and in Northern Labrador from Natuashish (Figure 1). The NunatuKavut Community Council (NCC) negotiated a subsistence salmon

fishery on the south coast of Labrador (SFA 2) in 2006 and ULM (SFA 1B) in 2013 (Figure 1). A total of 18,200 tags were allocated to Labrador FSC fisheries in 2020.

Specific management measures by FSC group:

Nunatsiavut Government

- 7,206 beneficiaries
- 766 designated fishers
- 8,700 tags were issued in 2020
 - Upper Lake Melville (ULM):
 - 4,000 tags were issued in 2020
 - mesh size: minimum 3 inch to maximum 4 inch
 - maximum length of net permitted per household is 25 fathoms
 - season extends from 15 June to 8 July and 20 July to 1 September
 - fishing permitted in tidal waters of the ULM area outside LISA
 - Labrador Inuit Settlement Area (LISA)
 - 4,700 tags were issued in 2020
 - various minimum mesh size requirements from 3 to 5 inches
 - maximum length of net permitted per household is 25 fathoms
 - season extends from 15 June to 31 August
 - fishing permitted in tidal waters in various locations close to communities

Innu Nation

- 2,200 members
- 76 designated fishers
- 2,500 tags were issued in 2020
 - Sheshatshiu
 - 2,000 tags were issued in 2020
 - mesh size: minimum 3 inch to maximum 4 inch
 - maximum net length based on location: 25 fathoms or 37.5 fathoms
 - season extends from 15 June to 15 September
 - fishing in tidal waters does not occur outside ULM
 - Natuashish
 - 500 tags were issued in 2020
 - mesh size: minimum 3.5 inch to maximum 5 inch
 - maximum length of net permitted per household is 25 fathoms
 - season extends from 15 May to 31 August

- fishing permitted in the tidal waters near the community

NunatuKavut Community Council

- 6,000 members
- 1,287 designated fishers
- 7,000 tags were issued in 2020
 - Southern Labrador
 - 6,400 tags issue in 2020
 - mesh size: minimum 3.5 inch to maximum 4 inch
 - maximum length of net permitted per household is 25 fathom
 - season extends from 1 July to 15 August
 - fishing is permitted in tidal waters
 - Upper Lake Melville
 - 600 tags issued in 2020
 - mesh size: minimum 3.5 inch to maximum 4 inch
 - maximum length of net permitted per household is 25 fathoms
 - season extends from 15 June to 8 July, and 20 July to 1 September
 - ishing permitted in tidal waters of the ULM area outside LISA

LABRADOR SUBSISTENCE FISHERIES CATCH

FSC and resident subsistence fishers use logbooks to record catch and effort information, including no effort (i.e. did not fish) or the number of unused tags. Data from returned logbooks are compiled by each user group and submitted to Fisheries and Oceans Canada at the end of each season. Total catch for each user group is estimated by raising the reported catches proportionately based on the number of tags reported (used or unused) divided by the total tags issued. The logbook reporting rate (i.e. percentage of total tags reported) for the four user groups was 63% in 2020 (range 55% to 80%).

The total catch of Atlantic salmon in 2020 from all Labrador subsistence fisheries was 40.4 t. The proportion of catch from estuarine and coastal areas is based on fixed estimates for each community. These estimates have been used since 2007 and were provided by the local Nunatsiavut Conservation Officers in northern Labrador (SFA 1A) and Fisheries and Oceans Canada Fishery Officers and Nunatukavut Community Council Guardians in southern Labrador (SFA 2). Catches from the Lake Melville estuary area (SFA 1B) include catches from the community of Rigolet where 15% of the catch was attributed to the coastal area (Figure 1). However, recent tagging studies and details provided within catch logs suggest the proportion of coastal catch in Rigolet is currently less than 15%. Canada will update the proportion of catches attributed to estuarine and coastal areas in all communities based on current knowledge in 2022.

Community Fished	Proportion Catch	
	Estuarine	Coastal
SFA 1		
Lake Melville	1.00	0.00
Rigolet	0.85	0.15

Makkovik	0.75	0.25
Postville	0.90	0.10
Hopedale	0.10	0.90
Nain	0.00	1.00
SFA 2		
Sandwich Bay	0.85	0.15
Black Tickle	0.01	0.99
Charlottetown to Lodge Bay	0.70	0.30

The majority of the Labrador subsistence fisheries catch, 32.3 t (80.0%), were harvested from estuaries (Tables 1 and 2). From 2000 to 2019, the percentage of salmon taken from coastal areas ranged from 15% to 26%. Details of the 2020 Atlantic salmon catch (by weight and number) within each Salmon Fishing Area (SFA) by salmon size group (small and large) are provided in Table 3. In Labrador, small salmon (< 63 cm fork length) are predominantly maiden one-sea winter (1SW) and large salmon (\geq 63 cm fork length) are maiden two-sea winter (2SW) or repeat spawners (1SW and 2SW). The large salmon comprised 65% by weight and 45% by number of the total 2020 catch.

The catch of Atlantic salmon in the Labrador resident fisheries decreased after 2003 as many individuals fishing under the Labrador resident licence began fishing and reporting under the NCC negotiated subsistence fishery. Since 2004, the harvest of Atlantic salmon in the resident fishery has varied between 1.4 t and 2.9 t. In 2020, the total harvest was 1.7 t (395 small salmon and 239 large salmon) (Table 4).

In 2020, the Labrador FSC fisheries catch was 38.7 t (13.5 t small salmon and 25.2 t large salmon) and 13,079 salmon by number (7,163 small salmon and 5,916 large salmon) (Table 5). The FSC catch between 2004 and 2019 ranged from 24.7 t to 40.4 t, with large salmon representing between 34% and 67% of the total harvest of salmon by weight and 21% to 48% of the total by number.

LABRADOR SUBSISTENCE FISHERIES SAMPLING PROGRAM

Salmon harvested in the Labrador subsistence fisheries (SFAs 1 and 2, Figure 1) were sampled opportunistically for length, weight, sex, scales (for age analysis), and tissue (genetic analysis). Fish were also examined for the presence of external tags or marks.

In 2020, a total of 1000 samples (7% of harvest by number) were collected from the Labrador subsistence fisheries: 29 from Northern Labrador (SFA 1A), 254 from Lake Melville (SFA 1B), and 717 from Southern Labrador (SFA 2).

Sampling in 2020 was conducted in 12 communities (3 in SFA 1A, 4 in SFA 1B, and 5 in SFA 2) (Figure 1) throughout the fishing season (Table 6 and Figure 2). Details of the distribution of the samples and catches by week can be found in Table 6 and Figure 2. Sample and catch by salmon size group are presented in Table 7.

Information requested for the Labrador Subsistence Fisheries Sampling Program includes data on community fished as well as “Specific Area Fished”. This information was provided for the samples from northern Labrador (SFA 1A) but the majority of samples from southern Labrador did not include the specific catch location in 2020 and these samples could not be assigned to estuarine or coastal areas. Canada will work with the fisheries samplers in 2021 to ensure this information is collected. The proportion of samples collected in northern Labrador communities (SFA 1A) from estuarine and coastal areas was similar to that assigned to the catch, except for the 3 samples from Hopedale that were all estuarine.

Community SFA 1A	Proportion Catch		Proportion Samples		Number of Samples	
	Estuarine %	Coastal %	Estuarine %	Coastal %	Estuarine	Coastal
Nain	0.00	1.00	0.00	0.00	0	0
Hopedale	0.10	0.90	1.00	0.00	3	0
Postville	0.90	0.10	1.00	0.00	13	0
Makkovik	0.75	0.25	0.77	0.23	10	3

Not all scales can be interpreted for sea age and/or river age. Based on the interpretation of the scale samples for sea age (n=990), percentage sea age composition was 0.2% 0SW, 75.9% 1SW, 19.5% 2SW, 0.3% 3SW and 4.2% previously spawned salmon. All of the salmon samples interpreted for river age (n=979) were 2 to 6 years (modal age 4, 51%) (Table 8). There were no river age 1 and few river age 2 (n=6) salmon sampled, suggesting, as in previous years (2006 to 2019), that very few salmon from the most southern stocks of North America (USA, Scotia-Fundy) were exploited in these fisheries.

Genetic origin of catches

In 2020, only tissue samples collected from the Labrador subsistence fisheries along the coast (SFA 1A and 2), where interception of non-local stocks was most prevalent in the past, were analyzed for genetic origin. Samples from the estuarine portion of Labrador located in Lake Melville (SFA 1B) were excluded as catches in this area were previously assigned as local origin. Tissue samples collected for stock origin made up from 1.8 (Northern Labrador) to 10.8% (Southern Labrador) of the fish caught in the Labrador subsistence fisheries (Table 9). A total of 741 tissue samples were analysed using the SNP panel with 31 range-wide reporting groups (Table 10; Figure 3 and 4).

The estimated percent contributions (and associated 95% credible interval) to each reporting group in 2020 are shown in Table 11 and summarized in Figure 6. As in previous years (2006–2019), the estimated origin of the samples from the Labrador subsistence fisheries were dominated (>95%) by the three Labrador reporting groups. Furthermore, samples from the two coastal Labrador areas (SFA 1A and SFA 2) assigned to the corresponding genetic reporting groups (Labrador Central and Labrador South) suggesting largely local harvest.

No samples in 2020 assigned to the USA reporting group.

Performance of fisheries sampling programs to estimate catches of low proportions of non-local origin salmon in mixed stock fisheries

Particular concern has been expressed regarding the interception of US origin salmon in the Labrador fisheries because of the low abundance and endangered population status of salmon in the eastern USA. The detection of USA origin salmon in the samples from the Labrador fisheries is a rare event. Genetic analyses of samples using microsatellites initially and Single Nucleotide Polymorphism (SNPs) since 2017 have assigned a total of 6 out of more than 6000 samples to the USA reporting group over the 14 years of sampling, 2006 to 2020.

The performance of sampling programs was examined by simulation of catches, varying proportions of non-local origin salmon, and variations in sampling rates. Only two types (local, non-local) of fish in the fishery were considered with the non-local origin group comprising

very low proportions of the total pool of fish available to harvest, as is assumed the case for US origin salmon in the Labrador fishery.

It was difficult to attain estimates of catch of non-local origin salmon with a low variation when catches were low or proportion non-local origin were low even at sampling rates of 20% of the catch. A sampling rate of at least 10% of the fishery catches in Labrador would be required to achieve a relatively unbiased estimate of the catch of USA origin salmon.

Table 1. Labrador subsistence fisheries harvest (weight in t; FSC and resident food) by geographic location from 2000 to 2020.

Year	Harvest (t)			Harvest (%)	
	Estuarine	Coastal	Total	Estuarine	Coastal
2000	13.3	2.3	15.6	85.0	15.0
2001	13.5	2.8	16.3	82.9	17.1
2002	14.0	3.6	17.6	79.6	20.4
2003	17.5	4.6	22.1	79.1	20.9
2004	24.8	6.8	31.5	78.6	21.4
2005	24.7	7.2	31.9	77.5	22.5
2006	25.0	7.8	32.7	76.3	23.7
2007	20.5	6.0	26.5	77.3	22.7
2008	26.9	9.4	36.3	74.1	25.9
2009	22.6	7.2	29.8	75.9	24.1
2010	29.7	6.8	36.5	81.4	18.6
2011	34.2	7.8	42.0	81.5	18.5
2012	28.9	7.6	36.6	79.1	20.9
2013	31.8	8.1	40.0	79.7	20.3
2014	26.3	6.2	32.5	80.9	19.1
2015	34.2	8.2	42.4	80.6	19.4
2016	32.7	6.9	39.6	82.5	17.5
2017	30.3	9.0	39.4	77.1	22.9
2018	26.1	6.7	32.8	79.5	20.5
2019	31.3	6.5	37.8	82.7	17.3
2020	32.3	8.1	40.4	80.0	20.0

Table 2. Percent of the Atlantic salmon catch (by weight) from all Labrador subsistence fisheries taken in coastal areas from 2009 to 2020. All other catch is taken in estuaries. Salmon Fishing Areas (SFAs) are shown in Figure 1.

Year	SFA 1A	SFA 1B	SFA 1 Total	SFA 2	Labrador Total
	Northern Labrador	Lake Melville		Southern Labrador	
2009	44.7%	5.4%	14.7%	35.6%	24.1%
2010	40.1%	3.4%	11.9%	32.2%	18.6%
2011	38.5%	1.7%	11.9%	33.4%	18.5%
2012	47.5%	5.5%	16.5%	30.1%	20.9%
2013	45.8%	4.8%	13.4%	32.8%	20.3%
2014	43.7%	5.0%	12.8%	32.2%	19.1%
2015	43.8%	4.5%	13.3%	30.4%	19.4%
2016	45.4%	3.5%	11.9%	31.1%	17.5%
2017	63.4%	6.2%	19.9%	30.0%	22.9%
2018	44.2%	5.0%	13.7%	31.9%	20.5%
2019	39.6%	2.4%	8.2%	31.3%	17.3%
2020	44.1%	3.1%	12.5%	29.8%	20.0%

Table 3. All Labrador subsistence fisheries (FSC and resident) Atlantic salmon catch (by weight and number) within each Salmon Fishing Area (SFA) by salmon size group (small < 63 cm and large ≥ 63 cm) in 2020. The percent large salmon by weight and number are also provided.

Salmon Area	Fishing	Weight (kg)			Number of fish			Percent Large	
		Small	Large	Total	Small	Large	Total	By weight	By number
SFA Northern Labrador	1A	901	4,344	5,244	466	1,009	1,475	83%	68%
SFA Lake Melville	1B	5,336	12,346	17,682	2,885	2,758	5,642	70%	49%
SFA Southern Labrador	2	8,011	9,500	17,512	4,207	2,388	6,595	54%	36%
Total		14,249	26,189	40,438	7,558	6,154	13,712	65%	45%

Table 4. Labrador resident subsistence Atlantic salmon catch (by weight and number) within each Salmon Fishing Area (SFA) by salmon size group (small < 63 cm and large ≥ 63 cm) in 2020. The percent large salmon by weight and number are also provided.

Salmon Area	Fishing	Weight (kg)			Number of fish			Percent Large	
		Small	Large	Total	Small	Large	Total	By weight	By number
SFA Northern Labrador	1A	0	42	42	0	8	8	60%	43%
SFA Lake Melville	1B	349	558	907	175	124	299	76%	59%
SFA Southern Labrador	2	419	372	792	220	106	326	53%	35%
Resident Total		768	972	1,741	395	239	633	56%	38%

Table 5. Labrador Indigenous food, social, and ceremonial fisheries (FSC) Atlantic salmon catch (by weight and number) within each Salmon Fishing Area (SFA) by salmon size group (small < 63 cm and large ≥ 63 cm) in 2020. The percent large salmon by weight and number are also provided.

Salmon Area	Fishing	Weight (kg)			Number of fish			Percent Large	
		Small	Large	Total	Small	Large	Total	By weight	By number
SFA Northern Labrador	1A	901	4,302	5,202	466	1,001	1,467	83%	68%
SFA Lake Melville	1B	4,987	11,787	16,775	2,710	2,633	5,343	70%	49%

SFA Southern Labrador	2	7,592	9,128	16,720	3,987	2,282	6,269	55%	36%
FSC Total		13,480	25,217	38,697	7,163	5,916	13,079	65%	45%

Table 6. Labrador subsistence fisheries sampling program: bi-weekly catch and samples by number for

Catches	SFA 1A		SFA 1B		SFA 2		Total	
	Number	% of Catch	Number	% of Catch	Number	% of Catch	Number	% of Catch
May 15-Jun 14	0	0%	CLOSED		CLOSED		0	0%
Jun 15-Jun 30	1	0%	978	17%	5	0%	984	7%
Jul 1-Jul 15	416	28%	1976	35%	5073	77%	7464	54%
Jul 16-Jul 31	753	51%	2008	36%	1359	21%	4120	30%
Aug 1-Aug 15	199	13%	583	10%	147	2%	929	7%
Aug 16-Aug 31	106	7%	97	2%	11	0%	214	2%
Sept 1-Sept 15	0	0%	0	0%	CLOSED		0	0%
Total	1,475	100%	5,642	100%	6,595	100%	13,712	100%
Samples	SFA 1A		SFA 1B		SFA 2		Total	
	Number	% of Samples	Number	% of Samples	Number	% of Samples	Number	% of Samples
May 15-Jun 14	0	0%	CLOSED		CLOSED		0	0%
Jun 15-Jun 30	0	0%	3	1%	0	0%	3	0%
Jul 1-Jul 15	2	7%	163	64%	519	72%	684	68%
Jul 16-Jul 31	15	54%	56	22%	179	25%	250	25%
Aug 1-Aug 15	11	39%	27	11%	19	3%	57	6%
Aug 16-Aug 31	0	0%	5	2%	0	0%	5	1%
Sept 1-Sept 15	0	0%	0	0%	CLOSED		0	0%
Total	28	100%	254	100%	717	100%	999	100%

Table 7. Labrador subsistence fisheries sampling program 2020: catch and sample number by size group (small < 63 cm and large ≥ 63 cm). Note: one sample did not have size data.

Size group	Statistics	2020
Small salmon	Samples (#)	758
	Catch (#)	7558
	% of catch	10.0%
Large salmon	Samples (#)	241
	Catch (#)	6154
	% of catch	3.9%
Total	Samples (#)	999
	Catch (#)	13 712
	% of catch	7.3%

Table 8. Labrador subsistence fisheries sampling program 2020: river age.

Salmon Fishing Area	Number of scale samples	River age (%)						
		1	2	3	4	5	6	7
Northern Labrador (SFA 1A)	27	0.0	0.0	3.7	59.3	37.0	0.0	0.0
Lake Melville (SFA 1B)	244	0.0	1.6	20.5	56.6	21.3	0.0	0.0
Southern Labrador (SFA 2)	708	0.0	0.3	16.7	48.6	30.8	3.7	0.0
All areas	979	0.0	0.6	17.3	50.9	28.6	2.7	0.0

Table 9. Labrador Sampling Program: Summary of tissue samples collected that were analysed for stock origin by size group and Salmon Fishing Area in 2020. * One fish with missing biological information included in total for SFA 1A.

Area	Size group	Number tissue samples collected	Number with origin	% Samples with origin	Catch by number	% tissue samples collected of catch	% of catch with origin
SFA 1A Northern Labrador	Small	21	20	95	466	4.5	4.3
	Large	7	7	100	1009	0.7	0.7
	Total*	29	28	97	1,475	2.0	1.9
SFA 1B Lake Melville	Small	173	0	0	2,885	6.0	0.0
	Large	81	0	0	2,758	2.9	0.0
	Total	254	0	0	5,642	4.5	0.0
SFA 2 Southern Labrador	Small	565	562	99	4,207	13.4	13.4
	Large	152	151	99	2,388	6.4	6.3
	Total	717	713	99	6,595	10.9	10.8
All areas		1000	741	74	13,712	7.3	5.4

Table 10. Reporting groups and acronyms defined from the range wide single nucleotide polymorphism (SNP) genetic baseline for Atlantic salmon in the North Atlantic.

Reporting group	Group acronym
Ungava	UNG
Labrador Central	LAC
Lake Melville	MEL
Labrador South	LAS
St. Lawrence North Shore Lower	OLS
Anticosti	ANT
Gaspé Peninsula	GAS
Quebec City Region	OUE
Gulf of St. Lawrence	GUL
Inner Bay of Fundy	IBF
Eastern Nova Scotia	ENS
Western Nova Scotia	WNS
Saint John River & Aquaculture	SJR
Northern Newfoundland	NNF
Western Newfoundland	WNF
Newfoundland 1	NF1
Newfoundland 2	NF2
Fortune Bay	FTB
Burin Peninsula	BPN
Avalon Peninsula	AVA
Maine, United States	USA
Spain	SPN
France	FRN
European Broodstock	EUB
United Kingdom/Ireland	BRI
Barents-White Seas	BAR
Baltic Sea	BAL
Southern Norway	SNO
Northern Norway	NNO
Iceland	ICE
Greenland	GL

Table 11. Genetic mixture analysis of Labrador subsistence fisheries for 2020 using the SNP range wide baseline (Jeffrey et al., 2018). Mean percent values (and 95% credible interval) by range wide reporting groups (Figures 3 and 4) for small and large salmon (small < 63 cm and large ≥ 63 cm). Note that credible intervals with a lower bound including zero indicate little support for the mean assignment value. Samples were not analysed in 2020 in SFA 1B.

Reporting Group	Total	Small	Large	SFA 1A	SFA 2
Spain	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
France	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
European Brood stock	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)

Reporting Group	Total	Small	Large	SFA 1A	SFA 2
United Kingdom / Ireland	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Barents-White Seas	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Baltic Sea	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Southern Norway	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Northern Norway	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Iceland	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Greenland	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Maine, United States	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Western Nova Scotia	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Eastern Nova Scotia	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Inner Bay of Fundy	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Gulf of St Lawrence	0.2 (0.0, 0.6)	0.2 (0.0, 0.8)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.2 (0.0, 0.6)
Saint John River Aquaculture	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Québec City Region	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Gaspe Peninsulas	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)

Reporting Group	Total	Small	Large	SFA 1A	SFA 2
Anticosti	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
St Lawrence North Shore Lower	1.2 (0.4, 2.4)	1.1 (0.3, 2.3)	1.2 (0.1, 3.4)	0.0 (0.0, 0.0)	1.3 (0.4, 2.5)
Newfoundland 2	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Fortune Bay	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Burin Peninsula	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Avalon Peninsula	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Newfoundland 1	0.4 (0.0, 1.1)	0.2 (0.0, 0.8)	1.0 (0.0, 3.3)	0.0 (0.0, 0.0)	0.4 (0.0, 1.1)
Western Newfoundland	0.4 (0.0, 1.1)	0.3 (0.0, 0.9)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.4 (0.1, 1.0)
Northern Newfoundland	1.4 (0.7, 2.5)	1.7 (0.8, 3.0)	0.6 (0.0, 2.3)	0.0 (0.0, 0.0)	1.5 (0.7, 2.6)
Labrador South	84.9 (81.4, 88.0)	87.5 (83.8, 90.8)	77.1 (68.9, 84.3)	0.0 (0.0, 0.0)	88.7 (85.6, 91.5)
Lake Melville	1.7 (0.8, 3.1)	2.3 (0.9, 4.1)	1.4 (0.0, 4.0)	0.0 (0.0, 0.0)	1.7 (0.8, 2.8)
Labrador Central	8.9 (6.2, 12.0)	6.3 (3.5, 9.5)	15.0 (8.5, 22.6)	95.3 (82.3, 99.9)	5.0 (2.9, 7.6)
Ungava	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	2.4 (0.6, 5.3)	0.0 (0.0, 0.0)	0.4 (0.0, 1.0)
Total	741	582	158	28	713

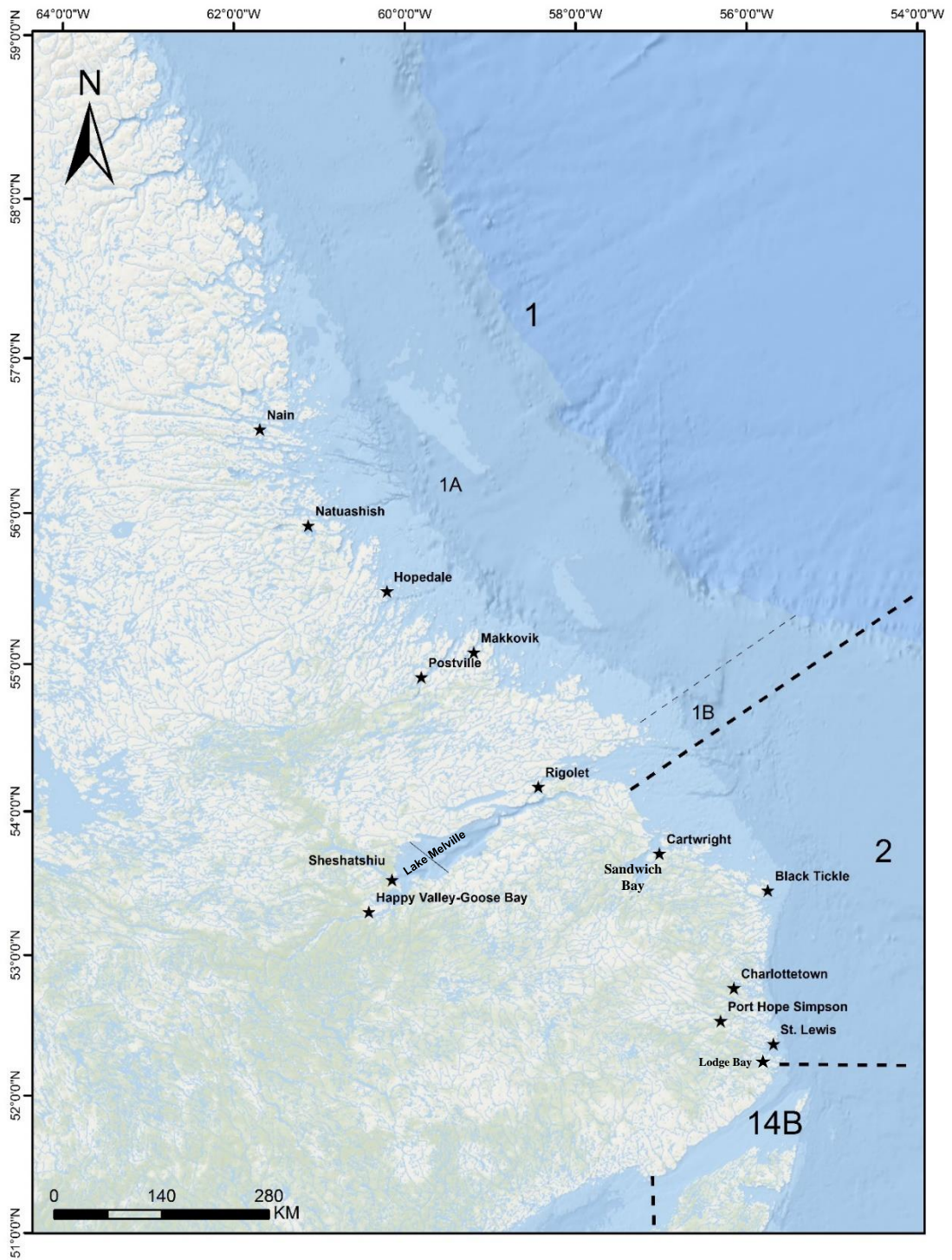


Figure 1. Map of Salmon Fishing Areas (SFAs 1A, 1B, 2 and 14B) and local communities in Labrador. Line across Lake Melville marks the division between Upper Lake Melville and the Labrador Inuit Settlement Area (LISA).

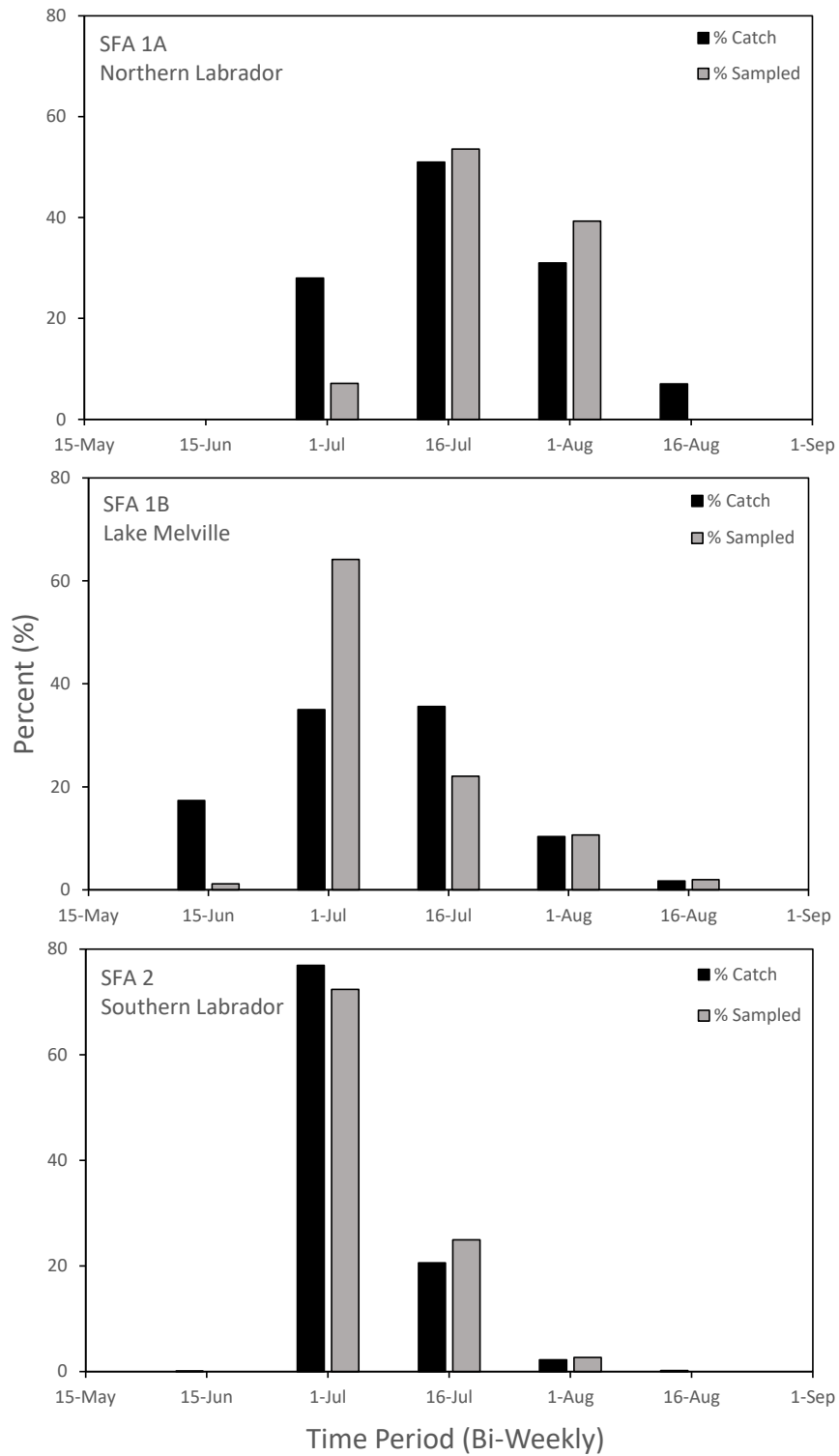


Figure 2. Bi-weekly distribution (%) of the total catch and biological samples collected by Salmon Fishing Area (SFA).

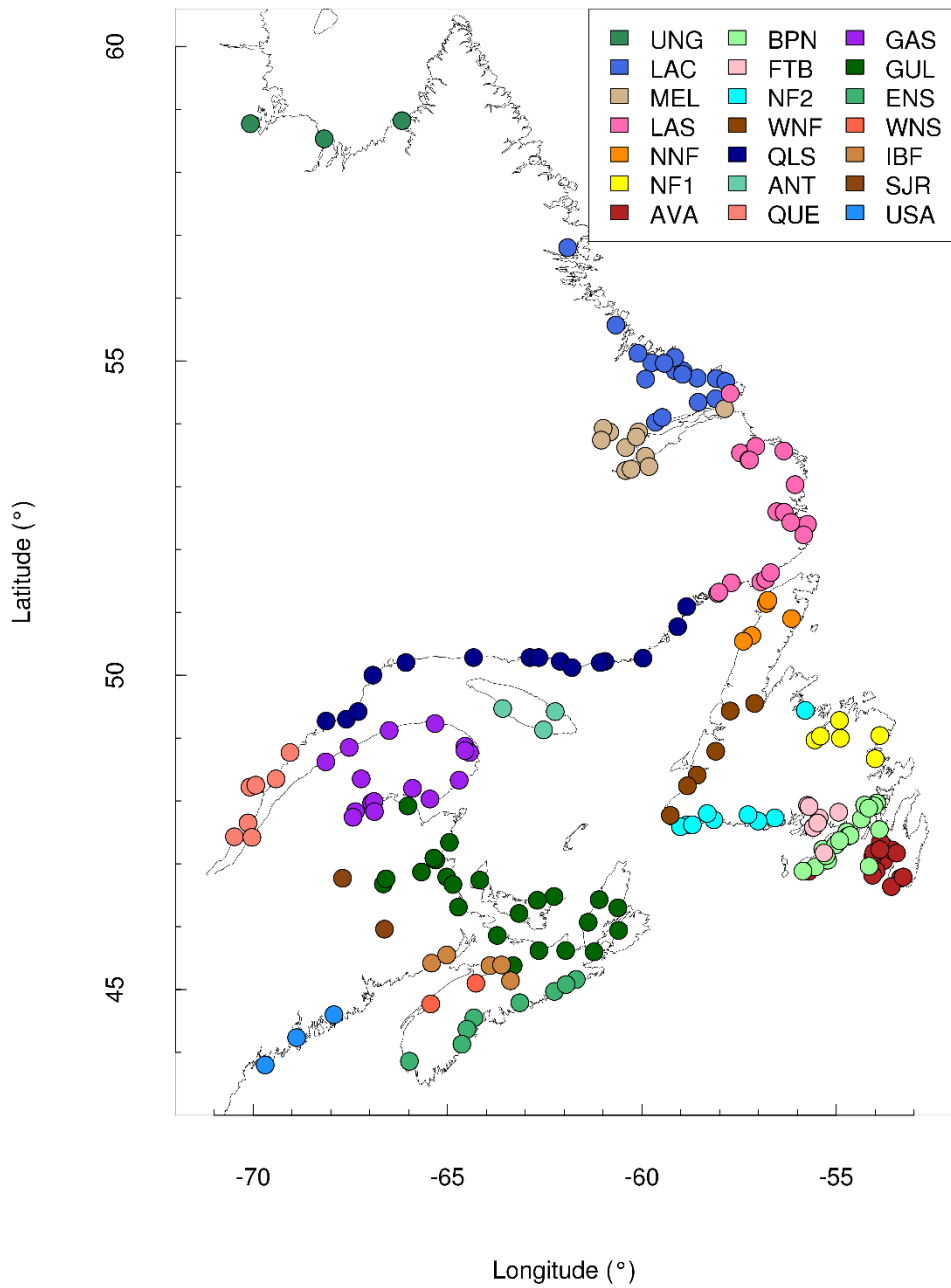


Figure 3. Map of North American sample locations used in the SNP baseline for Atlantic salmon. The 21 North American reporting groups are labelled and identified by colour. See Figure 4 for the remaining 9 North Atlantic baseline sampling locations (note: no location provided for the European Broodstock reporting group).

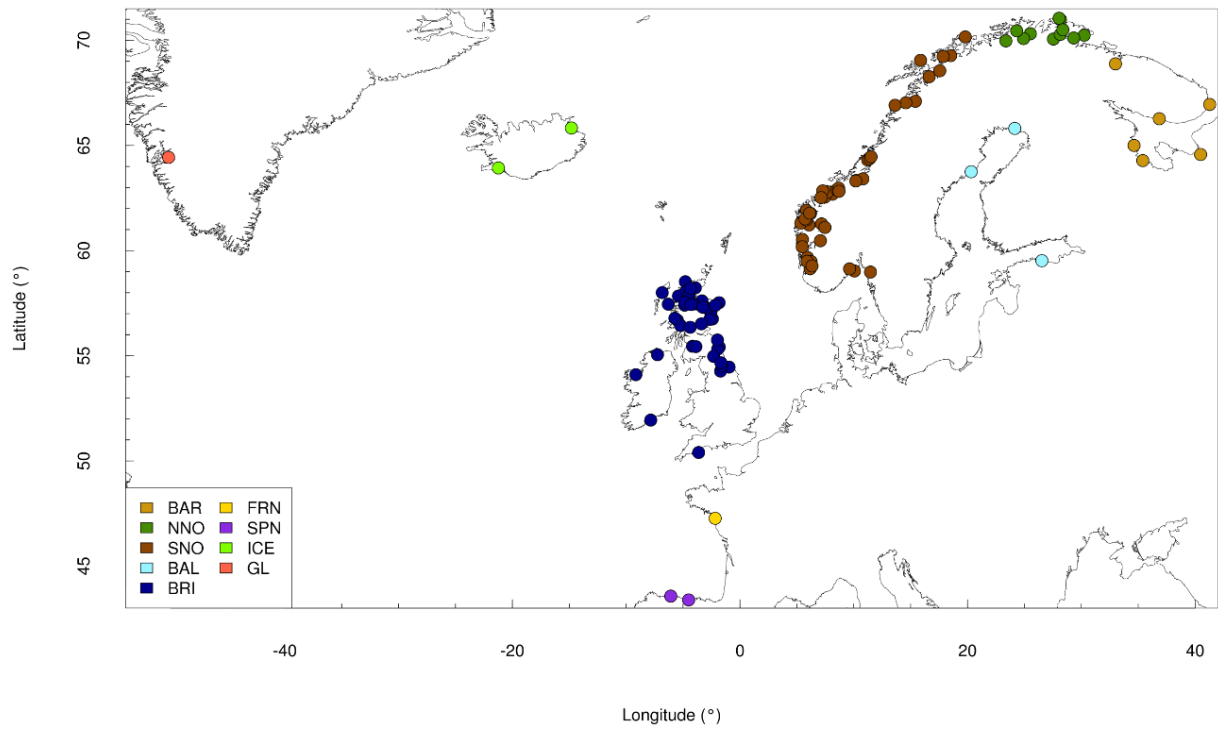


Figure 4. Map sample locations from Greenland, Iceland and Europe used in the SNP baseline for Atlantic salmon and the 9 defined reporting groups (labelled and identified by colour). See Figure 3 for North American locations (note: no location provided for the European Broodstock reporting group).

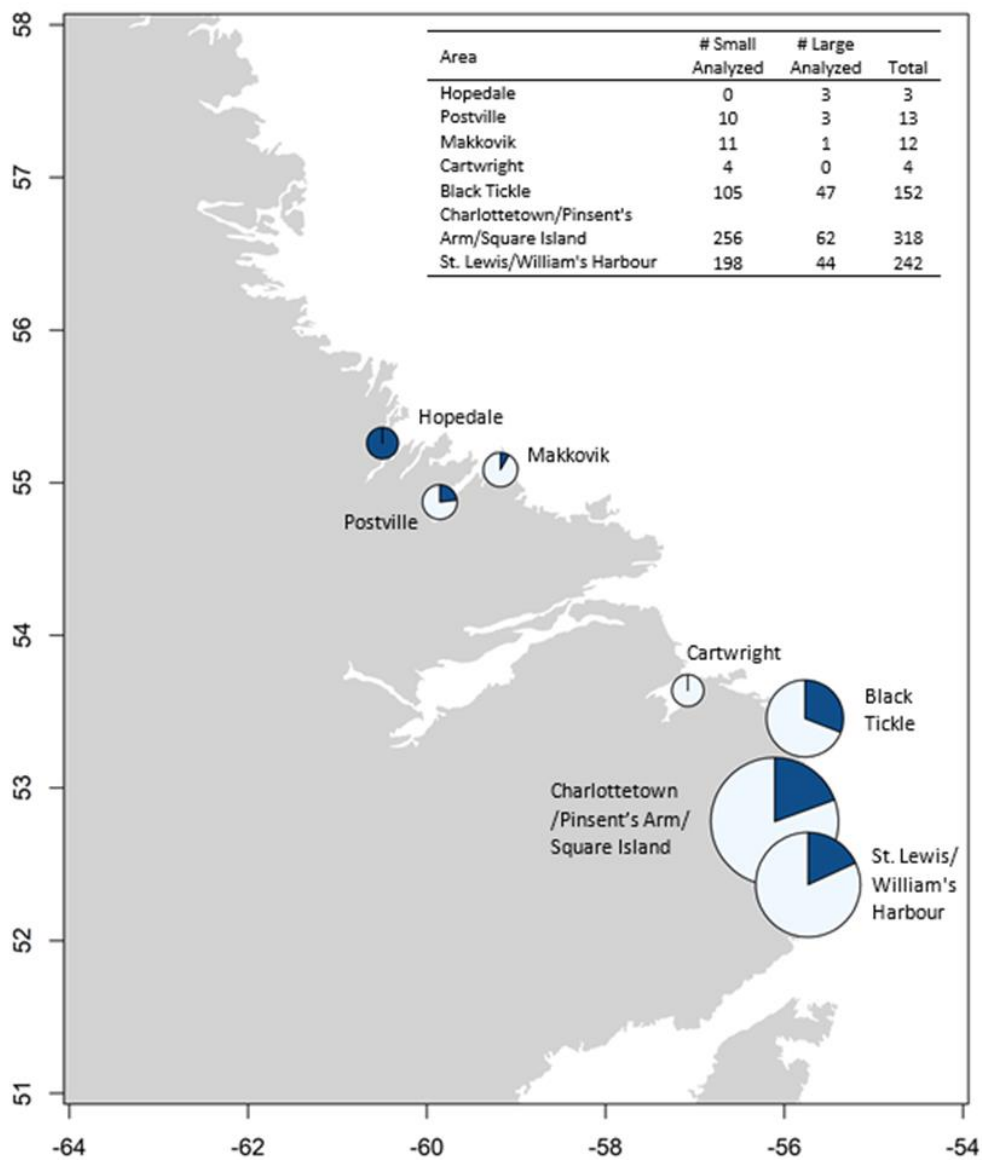


Figure 5. Number of tissue samples collected and analysed for genetic origin in 2020 from communities participating in the Labrador Atlantic salmon subsistence fisheries. Each pie chart is scaled to the number of samples collected (small salmon: light blue, large salmon: dark blue). Details on the number of samples are provided in the figure inset.

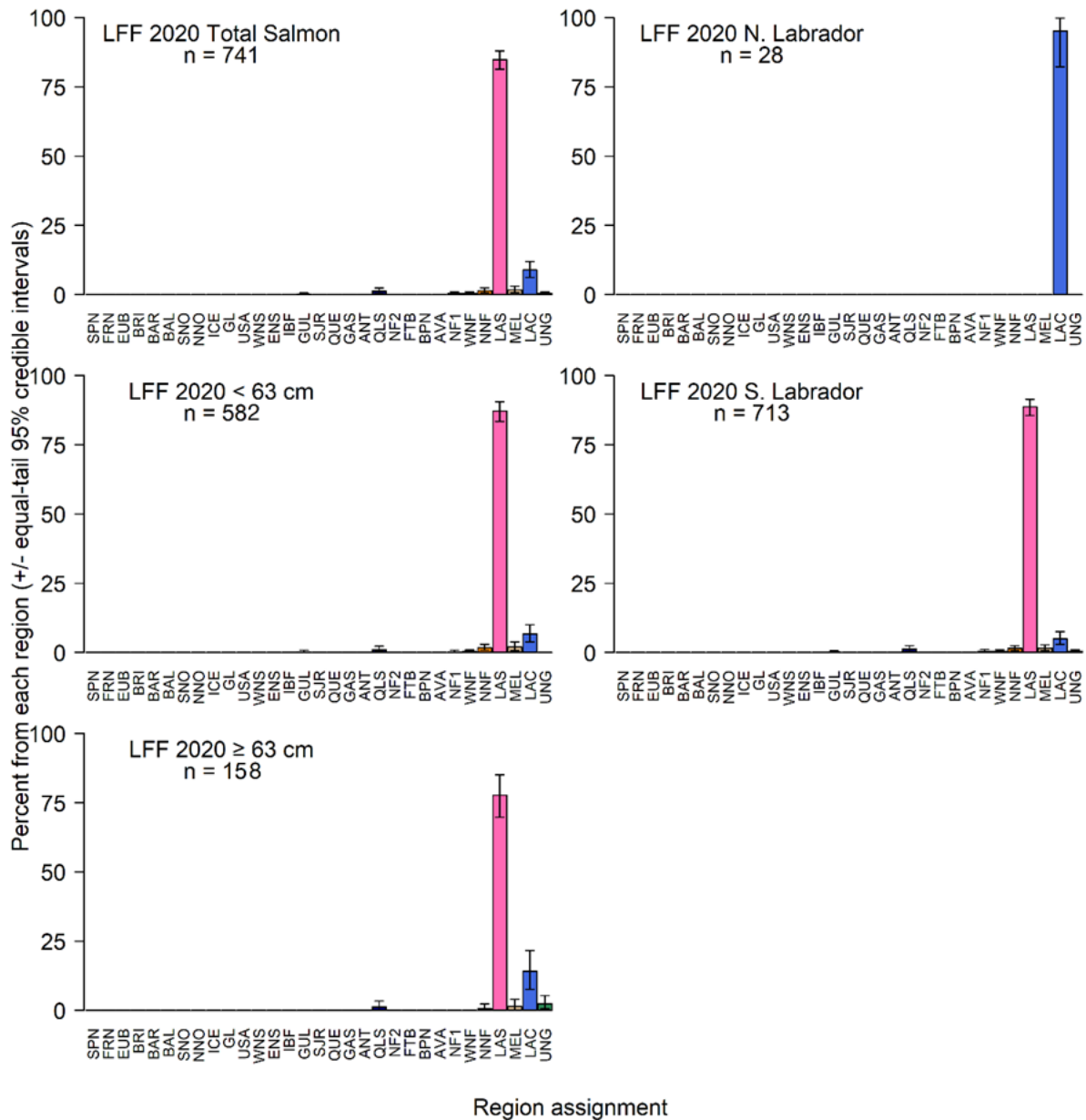


Figure 6. Bayesian estimate of mixture composition of samples from the 2020 Labrador Atlantic salmon subsistence fisheries by salmon size group (small <63 cm and large \geq 63 cm) and geographic region (Northern N. Labrador – SFA 1B and Southern S. Labrador SFA 2) using the SNP range wide baseline for Atlantic salmon. Baseline locations refer to reporting groups identified in Figures 3 and 4. Reporting group assignment acronyms are explained in Table 8. Note that credible intervals with a lower bound including zero indicate little support for the mean assignment value.