



***Labrador Subsistence Food Fisheries – Mixed-Stock Fisheries Context Paper
(Tabled by Canada)***

EXECUTIVE SUMMARY

- Atlantic salmon fisheries in Labrador that take place in estuaries and coastal areas using gillnets are considered to be mixed-stock fisheries. 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.
- The majority of salmon harvested in these fisheries are within estuaries (82.4% in 2021) where the potential for the interception of non-local stocks is reduced.
- The logbook reporting rate (i.e., percentage of total tags reported) for the four user groups was 67% in 2021 (range 65% to 85%).
- The estimated total harvest (i.e., adjusted for non-reporting) in 2021 was 38.1 t (14 258 salmon by number, 9758 small salmon and 4500 large salmon). The reported harvest from 2010 to 2020 ranged from 32.5 t to 42.4 t.
- A sampling rate of at least 10% of the Labrador FSC and resident fisheries harvest is required to detect the low proportions of non-local stocks in these fisheries (ICES WGNAS 2021). Since 2020, sampling effort and genetic analyses were directed toward the northern and southern Labrador coasts where the interception of non-local stocks is most likely to occur.
- In 2021, the minimum sampling rate of 10% was achieved in the northern and southern Labrador harvests. In northern Labrador (SFA 1A), 200 tissue samples were collected representing 17.0% of the total harvest (18.1% of small harvest and 11.9% of large harvest). In southern Labrador (SFA 2), 636 samples were collected representing 9.9% of total harvest (10.2% of the small harvest and 8.2% of the large harvest). A total of 1096 tissue samples were collected from all areas, including central Labrador (SFA 1B) representing 7.7% of the total Labrador harvest.
- A total of 1079 tissue samples were successfully analysed for genetic origin. As in previous years, the majority of samples (>95%) assigned to Labrador genetic reporting groups. Three small salmon (< 63 cm fork length) harvested in southern Labrador assigned to the USA genetic reporting group.

In total, 11 Atlantic salmon (6 small salmon and 5 large salmon) that assigned to the USA genetic reporting group were sampled in the Labrador FSC and resident fisheries from 2006 to 2021. Over this time period, 9210 salmon samples have been successfully analysed for genetic region of origin (SFA 1A: 626 small and 612 large, SFA 1B: 2214 small and 893 large, SFA 2: 4063 small and 802 large).

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 2021 Labrador mixed-stock fisheries:

- fisheries management measures
- preliminary catch by salmon size (small < 63 cm fork length and large ≥ 63 cm fork length) and location of harvest categories (in-river, estuarine, and coastal)
- summary of the biological sampling program and genetic origin of samples

There are currently three Atlantic salmon fisheries in Canada: (1) Indigenous food, social and ceremonial (FSC) fishery, (2) Labrador resident trout/charr fishery that permits a salmon bycatch of 3 salmon, and (3) in-river recreational angling fishery. All commercial Atlantic salmon fisheries under Canadian jurisdiction have been closed since 2000 and the sale of Canadian wild Atlantic salmon, regardless of fishery source, is prohibited.

The majority (94%) of Canada's 2021 preliminary Atlantic salmon harvest (102.7 t) was in-river (50%) and estuarine (44%). The remaining 6% was coastal.

FSC fisheries in Quebec and the Maritime provinces generally occur in close proximity to rivers and within tidal waters. The Labrador FSC and resident fisheries occur in both estuaries and coastal waters adjacent to remote coastal communities. These two Labrador fisheries have been shown to intercept salmon from other regions of eastern North America and are considered mixed-stock fisheries by NASCO.

MANAGEMENT MEASURES

Labrador is divided geographically in three Salmon Fishing Areas (SFAs) for fisheries management purposes: northern Labrador SFA 1A, central Labrador SFA 1B and southern Labrador SFA 2 (Figure 1).

In previous years, the fishing season and mesh sizes in the Labrador FSC and resident net fisheries were modified in an effort to reduce the capture of large salmon while maintaining the opportunity to harvest small salmon, trout, and 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
- 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 catch logbook must be submitted to Fisheries and Oceans Canada (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. There is a recognized bycatch of Atlantic salmon in trout nets and management measures are in place to minimize harvest.

- 260 licences were issued in 2021 and the number varied by SFA:
 - 7 in northern Labrador SFA 1A
 - 151 in central Labrador SFA 1B
 - 102 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 2021 varied by SFA:
 - northern Labrador SFA 1A: 25 June to 21 July
 - central Labrador SFA 1B: 11 June to 2 July and 22 July to 14 August (Kenamu River area closes 31 July)
 - southern Labrador SFA 2: 10 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 (SFA 1A) as well as the Lake Melville area in central Labrador (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 in southern Labrador (SFA 2) in 2004 and ULM (SFA 1B) in 2013 (Figure 1). A total of 18200 tags were allocated to Labrador FSC fisheries in 2021.

Specific 2021 management measures by FSC group:

Nunatsiavut Government

- 7206 beneficiaries
- 733 designated fishers

- 8700 tags issued
 - Upper Lake Melville (ULM):
 - 4000 tags issued
 - 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)
 - 4700 tags issued
 - 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

- 2200 members
- 76 designated fishers
- 2500 tags issued
 - Sheshatshiu
 - 2000 tags issued
 - mesh size: minimum 3 inch to maximum 4 inch
 - maximum net length based on location: 225 feet or 37.5 fathoms
 - season extends from 15 June to 15 September
 - fishing in tidal waters does not occur outside ULM
 - Natuashish
 - 500 tags issued
 - 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

- 6000 members
- 1268 designated fishers
- 7000 tags issued
 - Southern Labrador
 - 6400 tags issued

- mesh size: minimum 3.5 inch to maximum 4 inch
- maximum length of net permitted per household is 25 fathoms
- season extends from 1 July to 8 August
- fishing is permitted in tidal waters
- Upper Lake Melville
 - 600 tags issued
 - 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
 - fishing permitted in tidal waters of the ULM area outside LISA

FISHERIES HARVEST

Labrador FSC and resident fishers are required to 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 (DFO) 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 issued and reported (used or unused). The 2021 logbook reporting rate (i.e., percentage of total tags reported) for the four user groups was 67% (range 65% to 85%).

The total catch of Atlantic salmon in 2021 from the Labrador FSC and resident fisheries was 38.1 t. The proportion of catch from estuarine and coastal areas is based on fixed estimates for each community (Table 1). These estimates have been used since 2007 and were provided by the local Nunatsiavut Conservation Officers in northern Labrador (SFA 1A), DFO 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 review and update the proportion of catches attributed to estuarine and coastal areas in all communities based on current knowledge in 2022.

The majority of the Labrador FSC and resident fisheries catch, 31.5 t (82.4%), were harvested from estuaries (Tables 2 and 3). From 2000 to 2020, the percentage of salmon taken from coastal areas ranged from 15% to 26%. Details of the 2021 Atlantic salmon catch (by weight and number) within each Salmon Fishing Area (SFA) by salmon size category (small < 63 cm fork length and large \geq 63 cm fork length) are provided in Table 4. 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 47.1% by weight and 31.6% by number of the 2021 harvest.

The Labrador resident fishery harvest 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 3.2 t, with large salmon representing between 23% and 67% of the total harvest of salmon by weight and 13% to 51% of the total by number. In 2021, the total harvest was 1.8 t (0.94 t small salmon and 0.825 t large salmon) and 662 salmon by number (448 small salmon and 214 large salmon) (Table 5).

In 2021, the Labrador FSC fisheries harvest was 36.4 t (19.3 t small salmon and 17.1 t large salmon) and 13 596 salmon by number (9310 small salmon and 4286 large salmon) (Table 6). The Labrador FSC harvest between 2004 and 2020 ranged from 24.8 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.

SAMPLING PROGRAM

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

In 2021, a total of 1126 harvested salmon were sampled (7.9% of harvest by number): 222 from northern Labrador (SFA 1A), 265 from central Labrador (SFA 1B), and 639 from southern Labrador (SFA 2).

Sampling was conducted in 15 communities (4 in SFA 1A, 2 in SFA 1B, and 9 in SFA 2) throughout the fishing season. Details of the distribution of the samples and bi-weekly harvest can be found in Table 7 and Figure 2. Sample and catch by salmon size category are presented in Table 8.

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=1066), percentage sea age composition was 80% 1SW, 17% 2SW, 2.0% 3SW and 1.0% previously spawned salmon. All salmon samples interpreted for river age (n=1051) were 2 to 6 years (modal age 4, 55%) (Table 9). There was no river age 1 and few river age 2 (n=13) salmon sampled, suggesting, as in previous years (2006 to 2020), that very few salmon from southern stocks of North America (USA, Scotia-Fundy) are exploited in these fisheries.

Genetic origin of harvest

In 2021, 1079 harvested Atlantic salmon tissue samples were successfully analysed for genetic origin using the SNP panel with 31 range-wide reporting groups (Table 10 and 12, Figure 3 and 4).

The estimated percent contributions (and associated 95% credible interval) to each reporting group in 2021 are shown in Table 12 and summarized in Figure 5. As in previous years (2006–2020), the estimated origin of the samples from the Labrador FSC harvest were dominated (>95%) by the three Labrador reporting groups. Furthermore, samples from each SFA (SFA 1A, SFA 1B, and SFA 2) assigned to the corresponding genetic reporting groups suggesting largely local harvest.

Three small salmon (< 63 cm fork length) harvested in southern Labrador (SFA 2) in 2021 assigned to the USA genetic reporting group. In total, 11 Atlantic salmon (6 small salmon and 5 large salmon) that assigned to the USA genetic reporting group were sampled in the Labrador FSC and resident fisheries from 2006 to 2021 (Figure 6). Over this time period, 9210 salmon samples have been successfully analysed for genetic region of origin (SFA 1A: 626 small and 612 large, SFA 1B: 2214 small and 893 large, SFA 2: 4063 small and 802 large).

FUTURE MANAGEMENT CONSIDERATIONS

Prior to the 2022 fishing season, Fisheries and Oceans Canada and the Indigenous groups will negotiate management measures for the Food Social and Ceremonial Atlantic salmon fisheries. Mitigation measures to reduce the interception of USA salmon will be discussed during these negotiations with the intent of implementing them for the 2022 fishing season. Potential mitigation measures may include adjustments to season, area fished and/or type of gear used.

LITERATURE CITED

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Table 1. The proportion of the Labrador FSC and resident fisheries harvest from estuarine and coastal areas is based on fixed estimates for each community.

Area/Community	Proportion harvest	
	Estuarine	Coastal
<u>Northern SFA 1A</u>		
Makkovik	0.75	0.25
Postville	0.90	0.10
Hopedale	0.10	0.90
Nain	0.00	1.00
<u>Central SFA 1B</u>		
Lake Melville	1.00	0.00
Rigolet	0.85	0.15
<u>Southern SFA 2</u>		
Sandwich Bay	0.85	0.15
Black Tickle	0.01	0.99
Charlottetown to Lodge Bay	0.70	0.30

Table 2. Labrador FSC and resident fisheries Atlantic salmon harvest (t) by geographic location from 2000 to 2021 preliminary (2021P).

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	33.0	7.9	40.9	80.7	19.3
2021P	31.4	6.7	38.1	82.4	17.6

Table 3. Percent of the Labrador FSC and resident fisheries Atlantic salmon harvest taken in coastal areas by area from 2009 to 2021 preliminary (2021P).

Year	Percent coastal harvest			
	Northern SFA 1A	Central SFA 1B	Southern SFA 2	Labrador Total
2009	44.7	5.4	35.6	24.1
2010	40.1	3.4	32.2	18.6
2011	38.5	1.7	33.4	18.5
2012	47.5	5.5	30.1	20.9
2013	45.8	4.8	32.8	20.3
2014	43.7	5.0	32.2	19.1
2015	43.8	4.5	30.4	19.4
2016	45.4	3.5	31.1	17.5
2017	63.4	6.2	30.0	22.9
2018	44.2	5.0	31.9	20.5
2019	39.6	2.4	31.3	17.3
2020	44.1	2.9	30.3	19.3
2021P	39.8	2.8	30.3	17.6

Table 4. Preliminary 2021 Labrador FSC and resident fisheries Atlantic salmon harvest by weight (kg) and number for each area and salmon size category (small < 63 cm and large ≥ 63 cm). The percent large salmon harvest by weight and number are also provided.

Area	Weight (kg)			Number of fish			Percent Large	
	Small	Large	Total	Small	Large	Total	By weight	By number
Northern SFA 1A	1303	2234	3537	614	564	1178	63.2	47.9
Central SFA 1B	8176	10 636	18 812	4034	2629	6663	56.5	39.5
Southern SFA 2	10 710	5080	15 790	5110	1307	6417	32.2	20.4
Labrador Total	20 189	17 950	38 139	9758	4500	14 258	47.1	31.6

Table 5. Preliminary 2021 Labrador resident fisheries Atlantic salmon harvest by weight (kg) and number for each area and salmon size category (small < 63 cm and large ≥ 63 cm). The percent large salmon harvest by weight and number are also provided.

Area	Weight (kg)			Number of fish			Percent Large	
	Small	Large	Total	Small	Large	Total	By weight	By number
Northern SFA 1A	10	52	62	4	8	12	83.9	66.7
Central SFA 1B	491	502	993	222	127	349	50.6	36.4
Southern SFA 2	442	271	713	222	79	301	38.0	26.3
Labrador Total	943	825	1768	448	214	662	46.7	32.3

Table 6. Preliminary 2021 Labrador FSC fisheries Atlantic salmon harvest by weight (kg) and number for each area and salmon size category (small < 63 cm and large ≥ 63 cm). The percent large salmon harvest by weight and number are also provided.

Area	Weight (kg)			Number of fish			Percent Large	
	Small	Large	Total	Small	Large	Total	By weight	By number
Northern SFA 1A	1293	2182	3475	610	556	1166	62.8	47.7
Central SFA 1B	7685	10 134	17 819	3812	2502	6314	56.9	39.6
Southern SFA 2	10 268	4809	15 077	4888	1228	6116	31.9	20.1
Labrador Total	19 246	17 125	36 371	9310	4286	13 596	47.1	31.5

Table 7. Bi-weekly Atlantic salmon harvest and samples collected from the 2021 Labrador FSC and resident fisheries. Note: 57 samples with incomplete data were not included in the table.

Harvest	SFA 1A		SFA 1B		SFA 2		Total	
	Number	% of Harvest	Number	% of Harvest	Number	% of Harvest	Number	% of Harvest
Jun 15-30	18	1.5	1312	19.7	CLOSED		1330	9.3
Jul 1-15	414	35.1	1627	24.4	4922	76.7	6963	48.8
Jul 16-31	451	38.3	3127	46.9	1390	21.7	4968	34.8
Aug 1-15	193	16.4	542	8.1	105	1.6	840	5.9
Aug 16-31	102	8.7	55	0.8	0	0	157	1.1
Sept 1-15	CLOSED		0	0.0	CLOSED		0	0.0
Total	1178		6663		6417		14 258	

Samples	SFA 1A		SFA 1B		SFA 2		Total	
	Number	% Sampled	Number	% Sampled	Number	% Sampled	Number	% Sampled
Jun 15-30	3	1.7	4	1.5	CLOSED		7	0.7
Jul 1-15	103	57.9	130	49.2	497	79.3	730	68.3
Jul 16-31	50	28.1	105	39.8	115	18.3	270	25.3
Aug 1-15	7	3.9	25	9.5	15	2.4	47	4.4
Aug 16-31	15	8.4	0	0.0	0	0.0	15	1.4
Sept 1-15	CLOSED		0	0.0	CLOSED		0	0.0
Total	178		264		627		1069	

Table 8. Percent of the 2021 Labrador FSC fisheries harvest sampled by size category (small < 63 cm and large ≥ 63 cm). Note: 31 samples did not have size data.

	Small salmon			Large salmon			Unknown Size	Total		
	Samples	Harvest	% of Harvest	Samples	Harvest	% of Harvest	Samples	Samples	Harvest	% of Harvest
Northern SFA 1A	128	614	20.8	68	564	12.1	26	222	1178	18.8
Central SFA 1B	199	4034	4.9	66	2629	2.5	0	265	6663	4.0
Southern SFA 2	526	5110	10.3	108	1307	8.3	5	639	6417	10.0
Total	853	9758	8.7	242	4500	5.4	31	1126	14258	7.9

Table 9. River age of Atlantic salmon sampled from the 2021 Labrador FSC fisheries sampling program. Note: 75 samples could not be interpreted for river age.

Salmon Fishing Area	Number of scale samples interpreted	River age (%)						
		1	2	3	4	5	6	7
Northern SFA 1A	195	0.0	1.5	11.3	47.2	33.8	6.2	0.0
Central SFA 1B	253	0.0	0.4	14.6	63.6	20.2	0.8	0.4
Southern SFA 2	603	0.0	1.5	11.8	54.2	28.7	3.8	0.0
All areas	1051	0.0	1.2	12.4	55.2	27.6	3.5	0.1

Table 10. Atlantic salmon tissue samples collected from the Labrador FSC and resident fisheries the were analysed for stock origin by area and size category (small < 63 cm and large \geq 63 cm) in 2021.

Area	Size Category	Tissue samples collected	Tissue samples successfully genotyped	% Samples analysed	Harvest by number	% Harvest sampled	% Harvest analysed
Northern SFA 1A	Small	111	107	96.4	614	18.1	17.4
	Large	67	64	95.5	564	11.9	11.4
	Unknown	22	22	100.0			
	SFA 1A Total	200	193	95.5	1178	17.0	16.4
Central SFA 1B	Small	193	191	99.0	4034	4.8	4.7
	Large	66	65	98.5	2629	2.5	2.5
	Unknown	1	1	100.0			
	SFA 1B Total	260	257	98.8	6663	3.9	3.9
Southern SFA 2	Small	523	516	98.7	5110	10.2	10.1
	Large	107	107	100.0	1307	8.2	8.2
	Unknown	6	6	100.0			
	SFA 2 Total	636	629	98.9	6417	9.9	9.8
All areas	Small	827	814		9758	8.5	8.3
	Large	240	236		4500	5.3	5.2
	Unknown	29	29				
	All areas Total	1096	1079	98.4	14258	7.7	7.6

Table 11. Reporting groups and acronyms defined from the range wide single nucleotide polymorphism (SNP) genetic baseline for Atlantic salmon in the North Atlantic. See Bradbury *et al.* (2021) for baseline details and performance evaluation.

Reporting group	Group acronym
Ungava	UNG
Labrador Central	LAC
Lake Melville	MEL
Labrador South	LAS
St. Lawrence North Shore Lower	QLS
Anticosti	ANT
Gaspé Peninsula	GAS
Quebec City Region	QUE
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 and Ireland	BRI
Barents-White Seas	BAR
Baltic Sea	BAL
Southern Norway	SNO
Northern Norway	NNO
Iceland	ICE
Greenland	GL

Table 12. Genetic mixture analysis of Atlantic salmon harvested in the 2021 Labrador FSC and resident fisheries using the SNP range wide baseline (Bradbury *et al.* 2021). Mean percent values (and 95% credible interval) by range wide genetic reporting groups (Figures 3 and 4) and salmon size category (small < 63 cm and large ≥ 63 cm). Note: reporting group mixture estimates with limited significant support for any individual assignments (Probability < 0.80) have been replaced with 0. Note: 29 samples did not have size data.

Reporting Group	Total	Small	Large	Northern SFA 1A	Central SFA 1B	Southern SFA 2
Spain	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)
European Brood stock	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)
UK and Ireland	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)
Baltic Sea	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)
Northern Norway	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)
Greenland	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)
Maine, USA	0 (0, 0.01)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.01 (0, 0.01)
Western Nova Scotia	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)
Inner Bay of Fundy	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)
Gulf of St Lawrence	0.01 (0, 0.01)	0 (0, 0.01)	0.03 (0.01, 0.05)	0.01 (0, 0.02)	0 (0, 0)	0.01 (0, 0.02)
Saint John River Aquaculture	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, 0.01)
Gaspé Peninsulas	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)
Anticosti	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)
St Lawrence North Shore	0.01 (0, 0.01)	0.01 (0, 0.01)	0.01 (0, 0.01)	0.01 (0, 0.01)	0 (0, 0)	0.01 (0, 0.01)
Newfoundland 2	0 (0, 0.01)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0.01)
Fortune Bay	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)
Avalon Peninsula	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)
Newfoundland 1	0 (0, 0.01)	0 (0, 0.01)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.01 (0, 0.01)
Western Newfoundland	0 (0, 0.01)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0.01)
Northern Newfoundland	0 (0, 0.01)	0.02 (0.01, 0.03)	0.01 (0, 0.03)	0 (0, 0)	0 (0, 0)	0 (0, 0.01)
Labrador South	0.51 (0.48, 0.55)	0.57 (0.53, 0.61)	0.33 (0.26, 0.40)	0 (0, 0)	0 (0, 0)	0.87 (0.84, 0.90)
Lake Melville	0.26 (0.24, 0.29)	0.26 (0.23, 0.29)	0.30 (0.24, 0.37)	0.07 (0.03, 0.12)	0.97 (0.93, 1)	0.05 (0.03, 0.07)
Labrador Central	0.19 (0.16, 0.22)	0.14 (0.11, 0.17)	0.30 (0.23, 0.37)	0.90 (0.83, 0.95)	0.02 (0, 0.06)	0.03 (0.01, 0.05)
Ungava	0 (0, 0.01)	0 (0, 0.1)	0.01 (0, 0.02)	0 (0, 0)	0 (0, 0.01)	0.01 (0, 0.01)
Total	1079	814	236	193	257	629

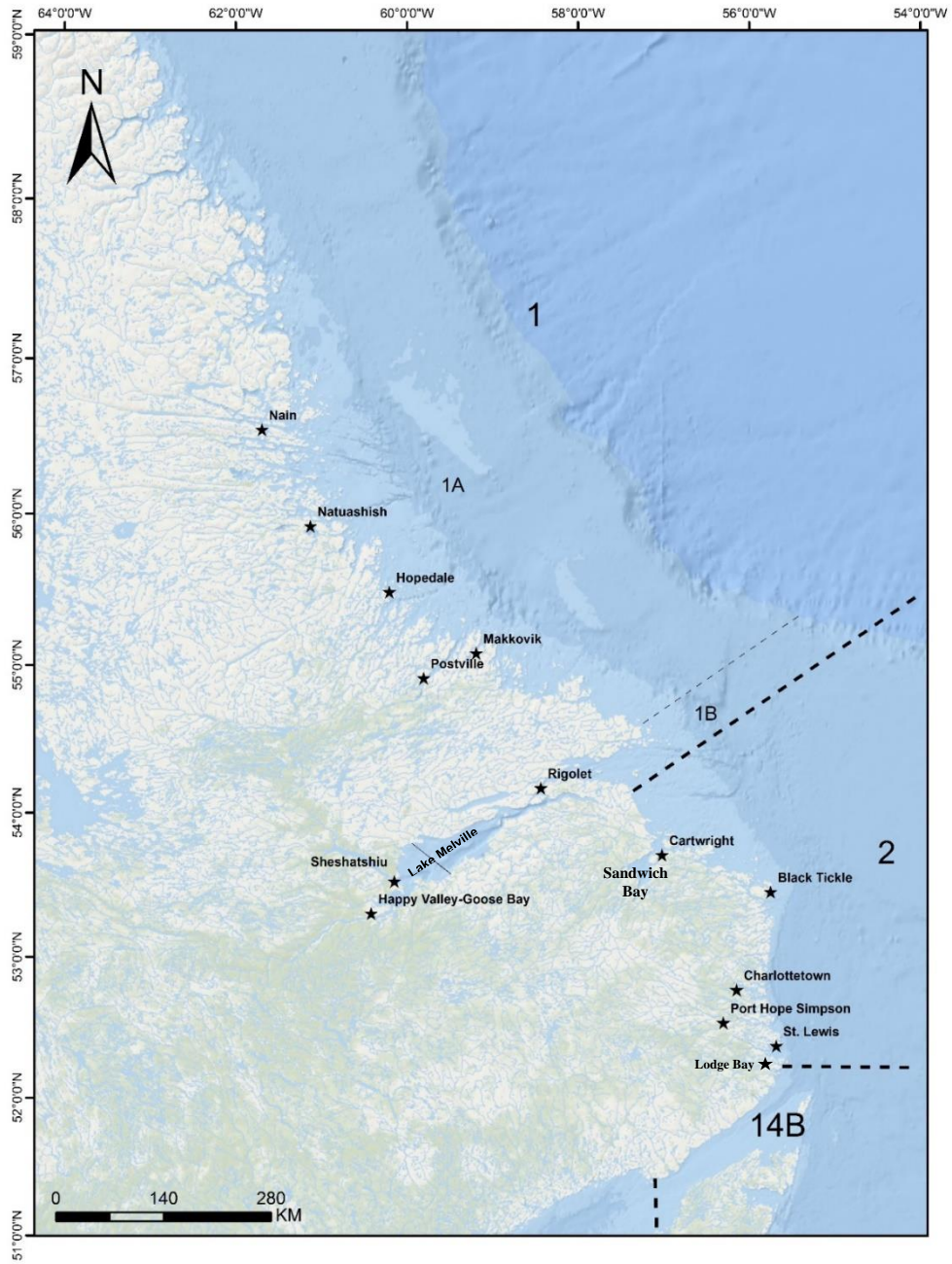


Figure 1. Map of Salmon Fishing Areas (SFAs 1A, 1B, 2 and 14B) and local communities in Labrador. Line across Lake Melville marks the division between Upper Lake Melville and the Labrador Inuit Settlement Area (LISA).

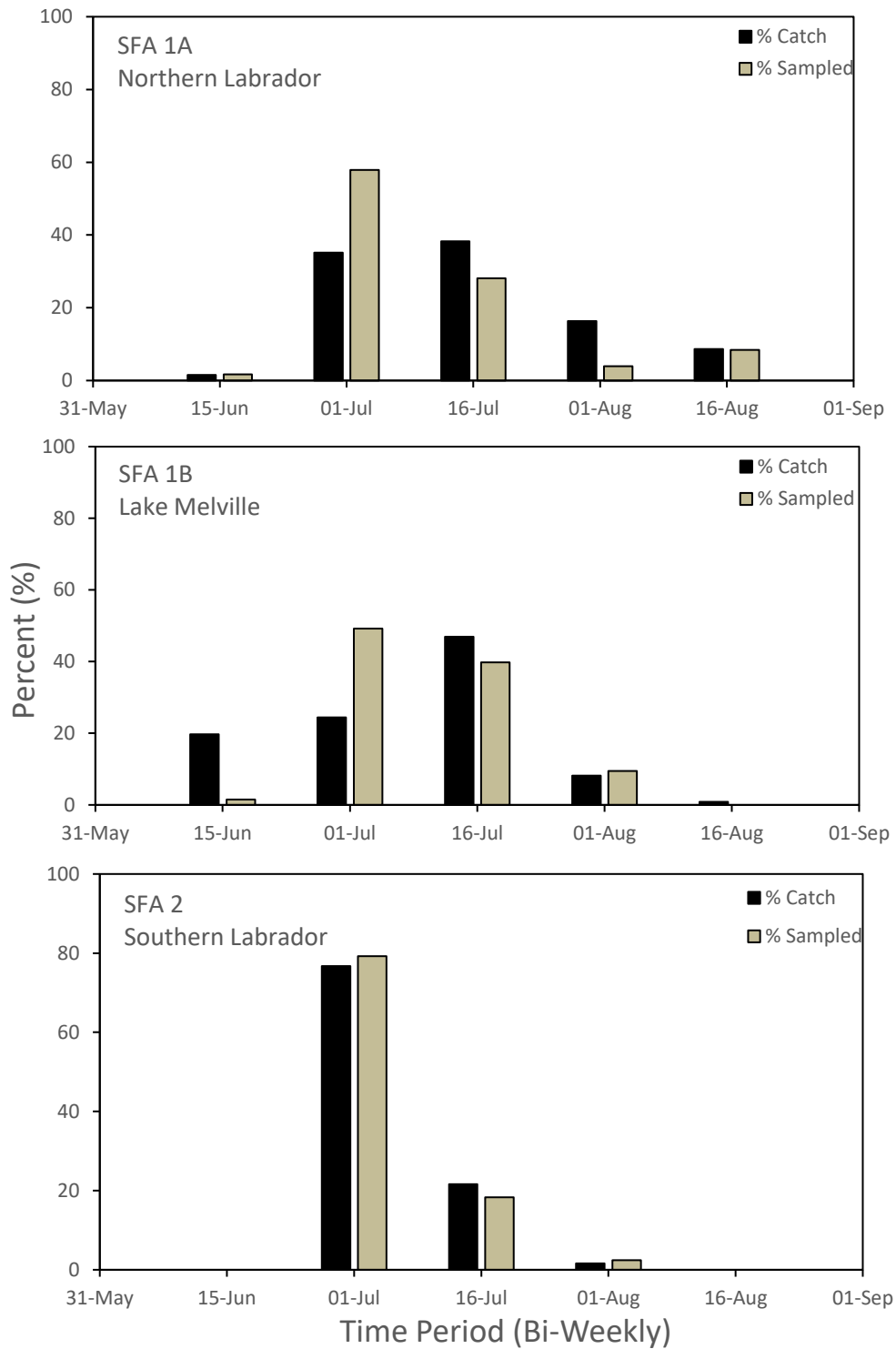


Figure 2. Bi-weekly distribution (%) of the Labrador FSC and resident fisheries Atlantic salmon harvest and sampling by area.

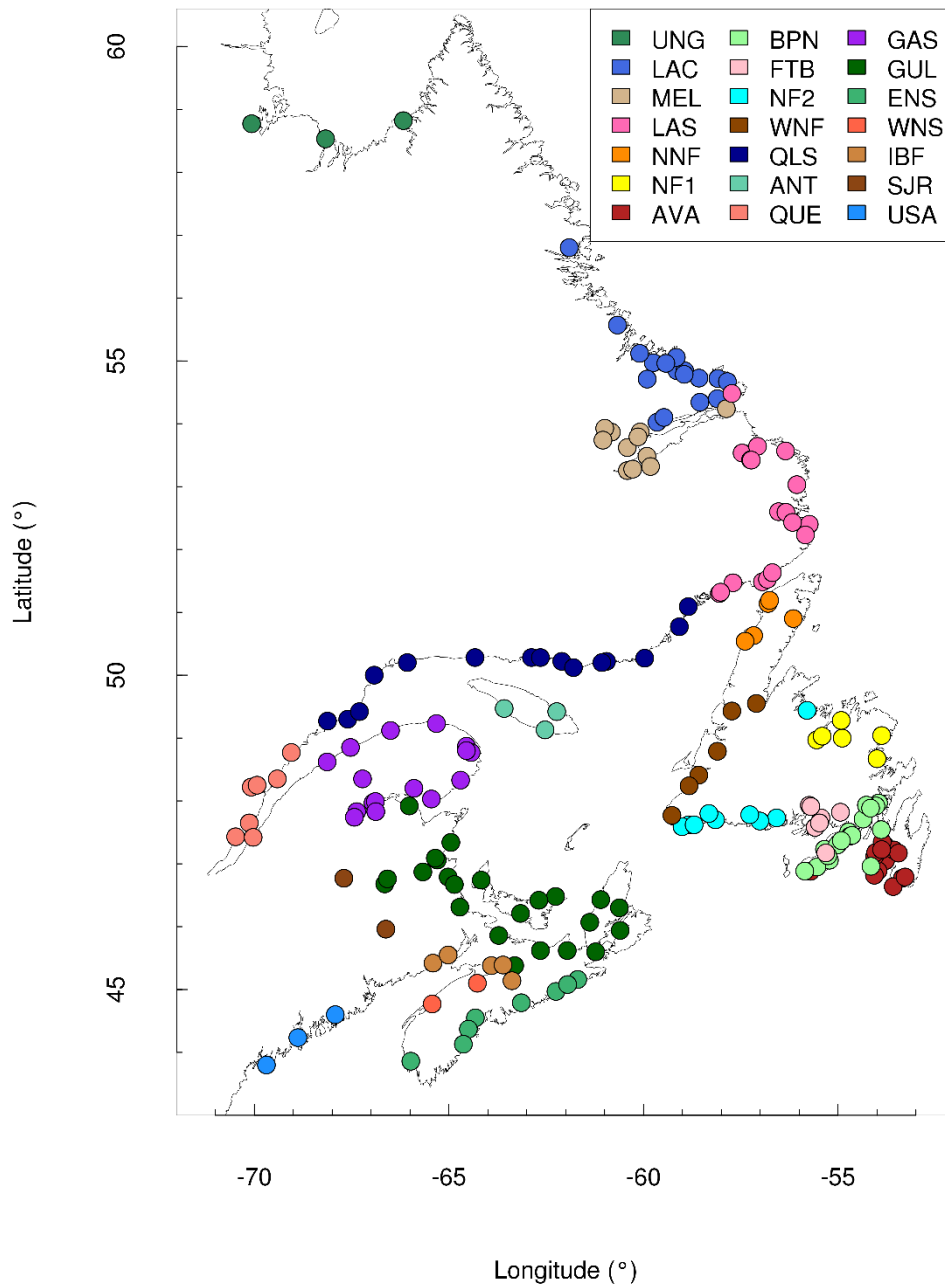


Figure 3. Map of North American sample locations used in the SNP baseline for Atlantic salmon. The 21 North American genetic reporting groups are labelled and identified by colour. See Figure 4 for the remaining 9 North Atlantic baseline sampling locations (note: no location provided for the European Broodstock reporting group). See Bradbury *et al.* (2021) for baseline details and performance evaluation.

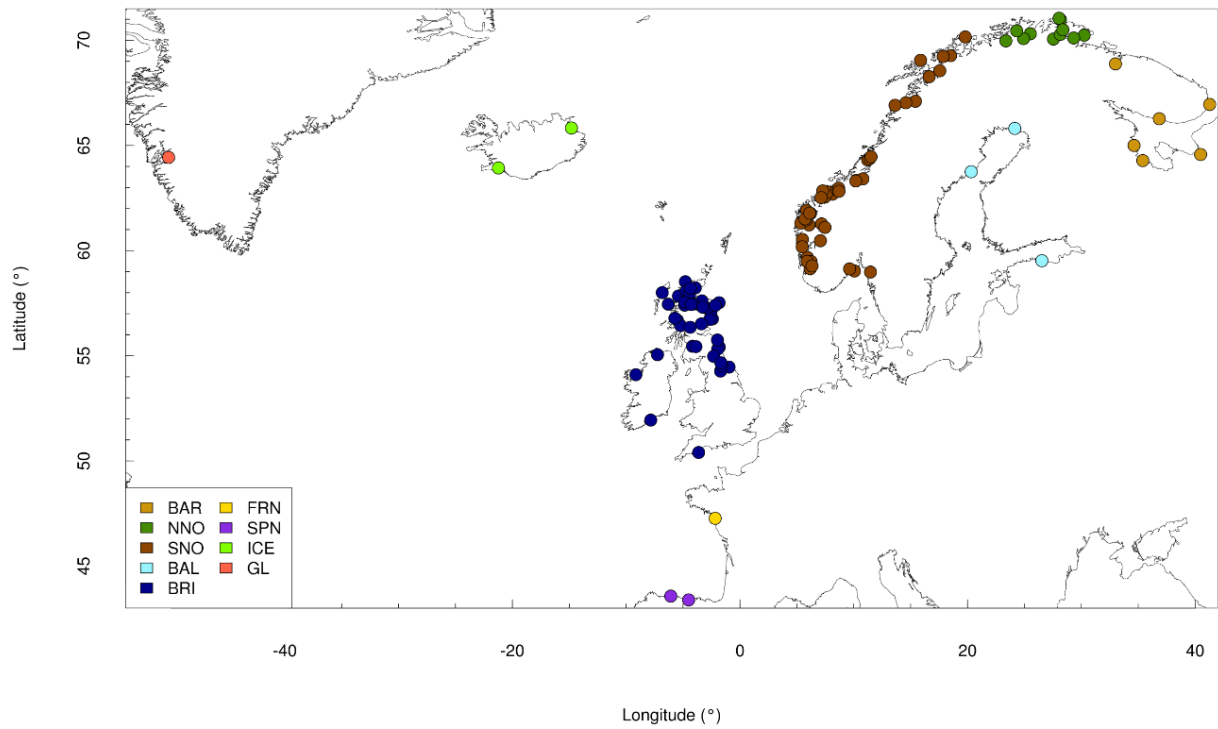


Figure 4. Map of sample locations from Greenland, Iceland and Europe used in the SNP baseline for Atlantic salmon and the 9 defined genetic reporting groups (labelled and identified by colour). See Figure 3 for North American locations (note: no location provided for the European Broodstock reporting group). See Bradbury *et al.* (2021) for baseline details and performance evaluation.

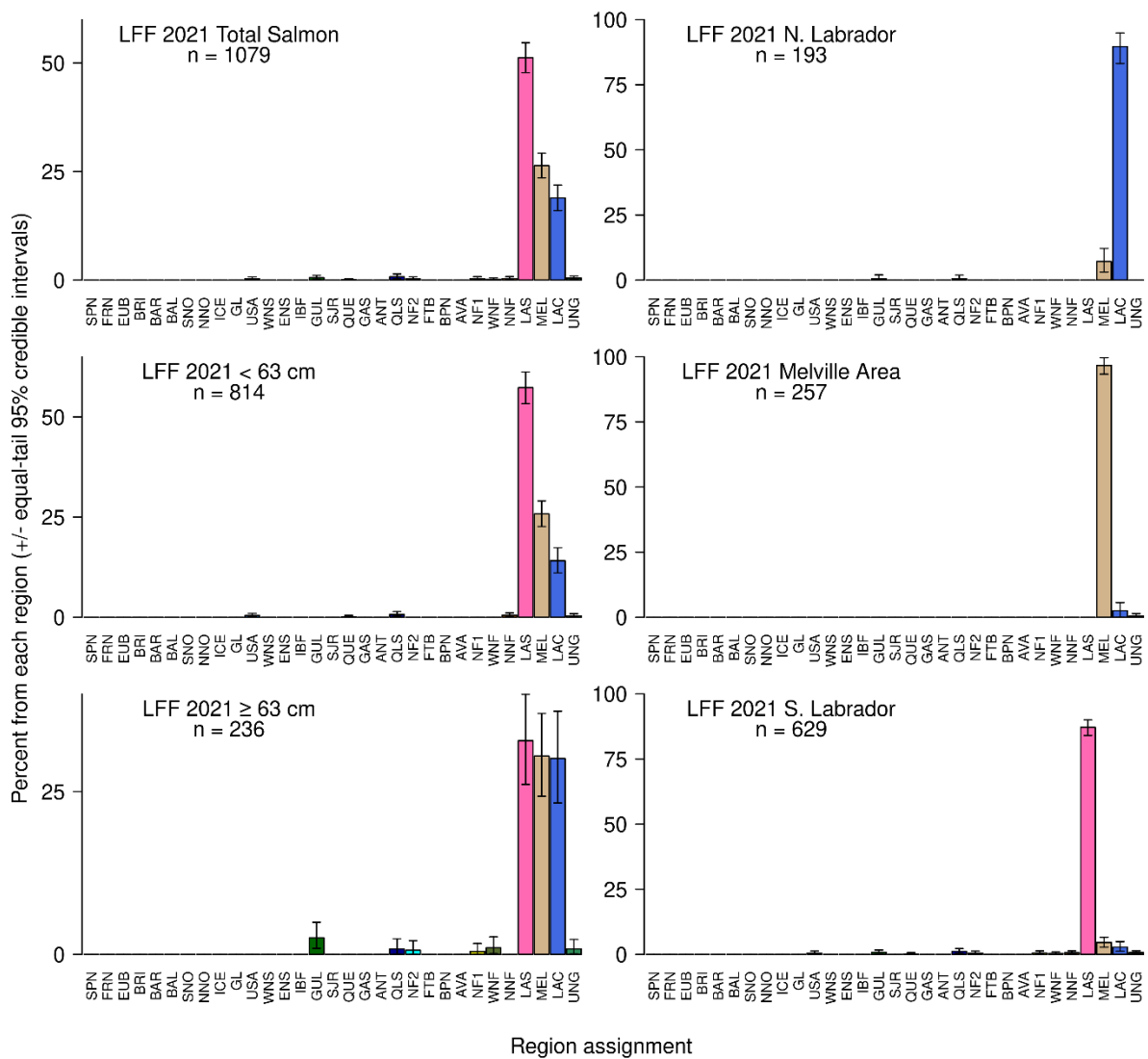


Figure 5. Bayesian estimate of the genetic mixture composition of Atlantic salmon samples from the 2021 Labrador FSC and resident fisheries by size category (small <63 cm and large \geq 63 cm) and area using the SNP range wide baseline for Atlantic salmon. Baseline locations refer to genetic reporting groups identified in Figures 3 and 4. Genetic reporting group assignment acronyms are explained in Table 11. Notes: 29 samples did not have salmon size data. Credible intervals with a lower bound including zero indicate little support for the mean assignment value.

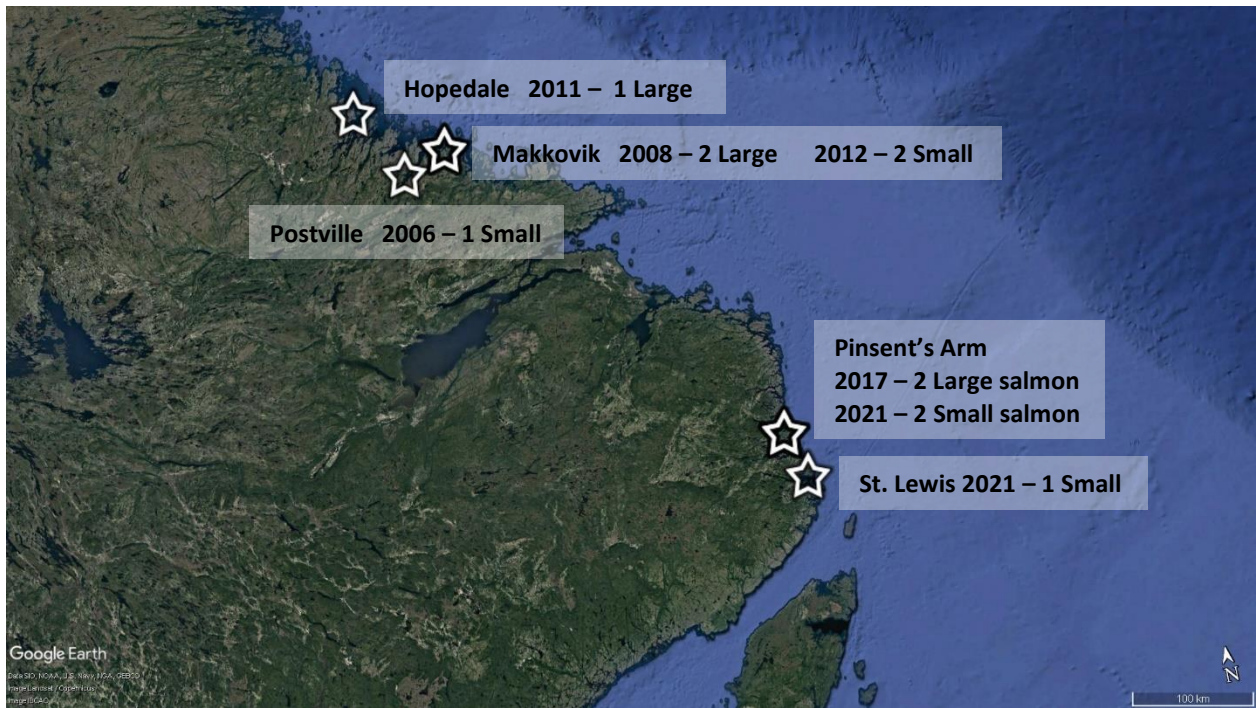


Figure 6. Map of the locations where 11 Atlantic salmon that assigned to the USA genetic reporting group were sampled in the Labrador FSC and resident fisheries from 2006 to 2021.