Presentation of the ICES Advice on Atlantic Salmon at West Greenland to the West Greenland Commission

WGC(21)10

sal.wgc.all

Atlantic Salmon in the West Greenland Commission Area in 2020

Photo by Tim Sheehan

Terms of Reference

4. With respect to Atlantic salmon in the West Greenland Commission area:

4.1 describe the key events of the 2020 fisheries;

4.2 describe the status of the stocks;

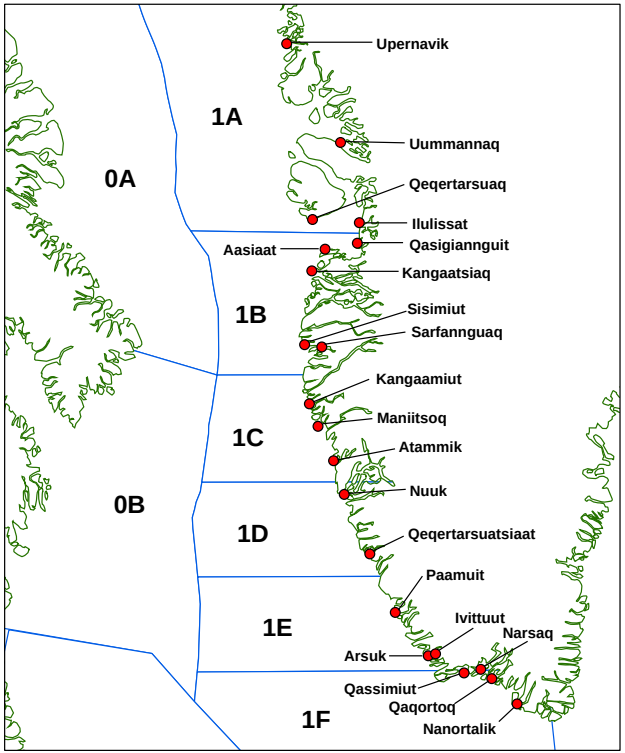
4.3 provide catch options or alternative management advice for 2021 – 2023 with an assessment of risk relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding; and

4.4 update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.

4.1 Key Events 2020 Fishery

- 2020 quota was 20.7 t
- No sales to factories allowed
- All fishers required to have a license and mandatory reporting requirements
- Private fishers restricted to one gillnet fixed to shore
- Driftnets banned from 2020
- Fishing season: 15 August to 31 October
- Actual season: 1 September to 20 September

Figure 1: sal.wgc.all



4.1 Key Events 2020 Fishery: Catch

- Reported catch was 31.7 t
  - 1.9 t increase from 2019
  - 69.5% for Commercial use (73% in 2019)
  - 30.5% for Private use (26% in 2019)
- Unreported Catch
  - no quantitative approach
  - 10 t, previously reported by the Greenlandic authorities to account for private fishers in smaller communities

Table 3: sal.wgc.all

Licence status	Landings type	Reported 2019 catch (t)	Reported 2020 catch (t)
Licensed	Commercial (from commercial fishers)	21.8	22.0
	Private use (from commercial fishers)	0.1	0
	Commercial use (from private fishers)	0.2	0
	Private use (from private fishers)	7.6	9.7
	Total commercial catch	22.0	22.0
	Total private use catch	7.7	9.7
	Total catch	29.8	31.7

4.1 Key Events 2020 Fishery: Catch

- 15 t of catch had been registered by 17 September
- Delay in reporting of catches, resulting in an overharvest of 11 t
- Catch peaked at approximately 2700 t in 1971

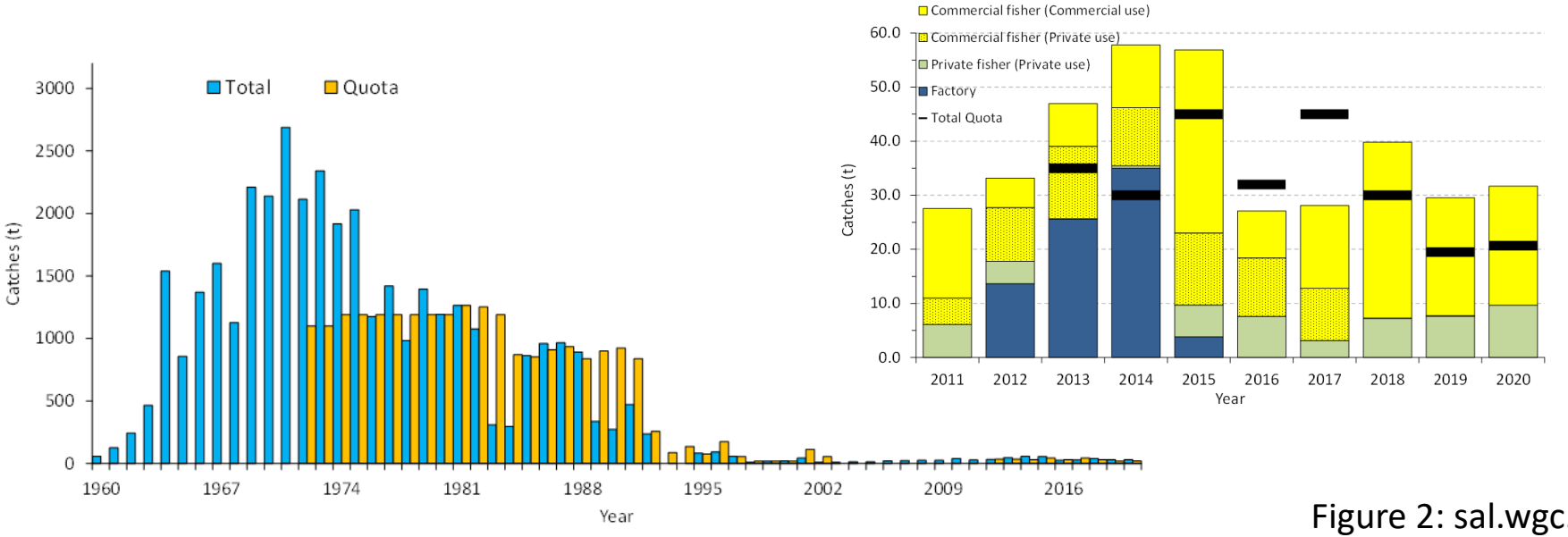


Figure 2: sal.wgc.all

4.1 Catch: Continent of Origin

- No sampling programme in 2020 due to pandemic
- 2019 samples:
  - 1119 samples from four communities representing four of the six NAFO divisions
  - Continent of Origin: North American: 72% European: 28%

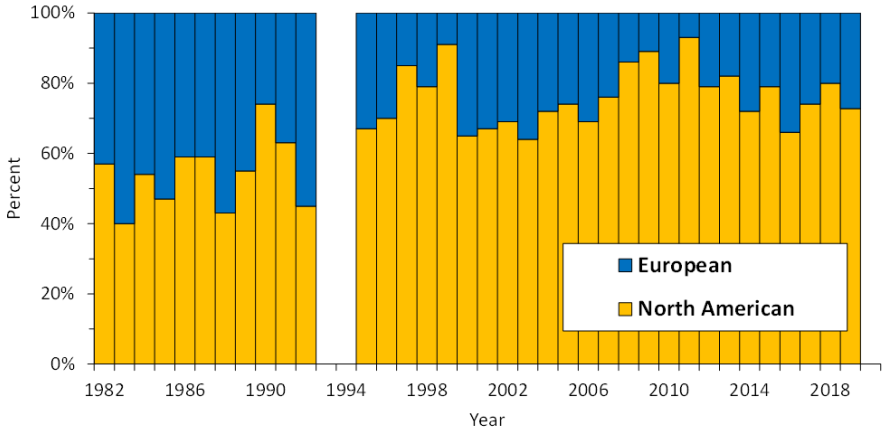


Figure 4: sal.wgc.all

4.1 Catch: Continent of Origin

- Estimated number of salmon harvested at West Greenland (5-year mean used in 2020) from PFA model

  Number of Salmon = Total Catch kg ÷ Average Weight of Individual Salmon Harvested kg

- North American:
  - ~9600
- European:
  - ~3200

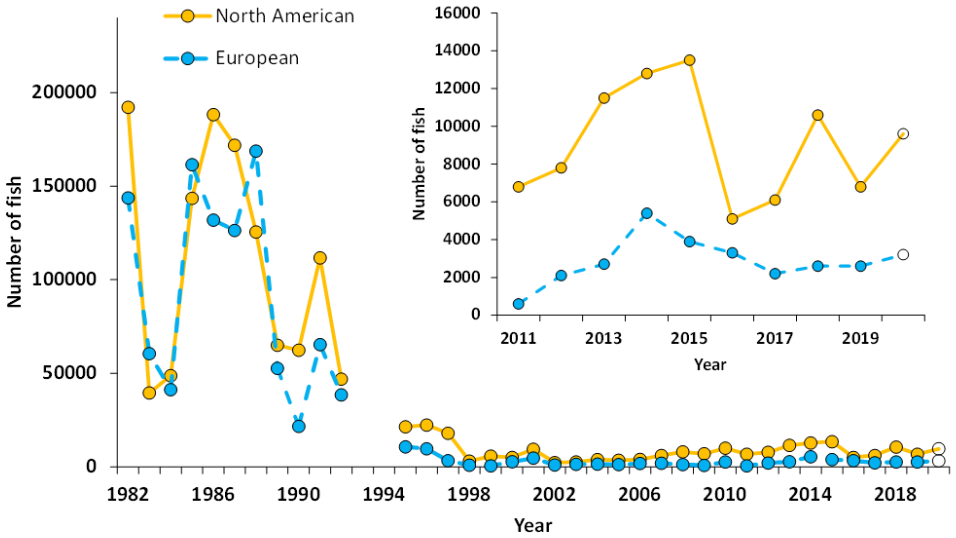


Figure 5: sal.wgc.all

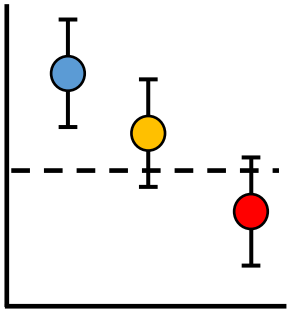
4.1 Catch: Region of Origin

- No 2020 samples available due to Covid-19 pandemic

4.2 Status of Stocks: Risk Assessment Framework

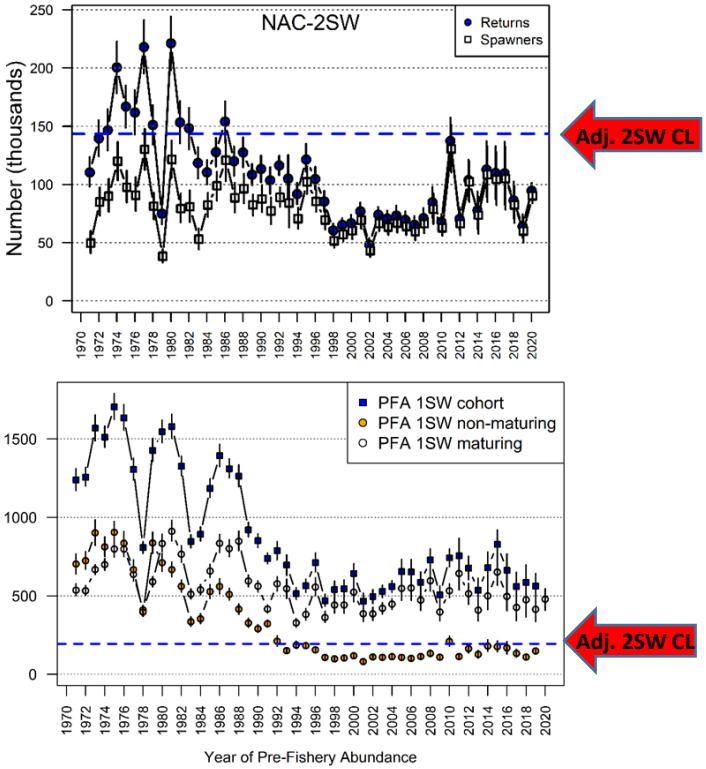
- Management advice for West Greenland fishery based on non-maturing 1SW salmon (return as 2SW/MSW) from North America (NAC) and Southern-Northeast Atlantic (S-NEAC)
  - Pre-Fishery Abundance (PFA) relative to Spawner Escapement Reserve (SER)
    - SERs - CLs adjusted for natural mortality (3% per month at sea)
  - Spawners (2 SW NAC and MSW S-NEAC) relative to Conservation Limits (CLs)

- Full Reproductive Capacity :
  - lower bound of the 90% confidence interval of the estimate above reference point
  - equivalent to a probability of at least 95% of meeting reference point
- At Risk of Suffering Reduced Reproductive Capacity:
  - lower bound of the confidence interval is below reference point, but the midpoint is above
- Suffering Reduced Reproductive Capacity:
  - midpoint is below reference point



4.2 Status of Stocks: Pre-Fishery Abundance (PFA)

Figure 6: sal.wgc.all



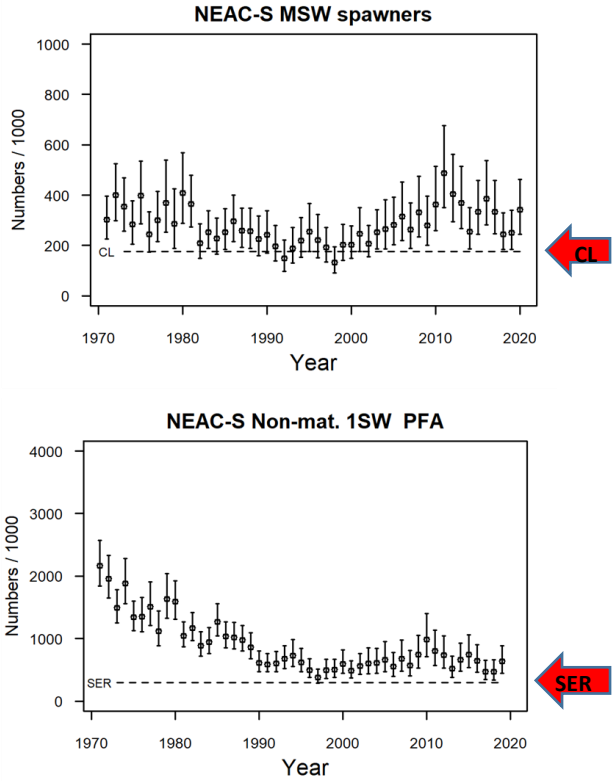


Figure 7: sal.wgc.all

- NAC PFA non-mat 1SW: suffering reduced reproductive capacity
- Southern-NEAC non-mat 1SW: full reproductive capacity
- Note adjusted CLs for UK (Scotland) in 2020

4.2 Status of Stocks: Spawners

- 2020 spawners were improvement on 2019
- All regions/stock components suffering recued reproductive capacity,
- except for Gulf region in Canada and Southern NEAC

Figure 8: sal.wgc.all

Full reproductive capacity

Risk suffering reduced reproductive capacity

Suffering reduced reproductive capacity

4.2 Status of Stocks: Exploitation Rate

- Exploitation rate = Greenland Catch ÷ Pre-Fishery Abundance (PFA)
  - North America: 6.0% Southern NEAC: 0.7%
    - among lowest in time series (1971-2019)
- Exploitation rate estimates are only available up to 2019, as 2020 exploitation rates are dependent on 2021 returns.

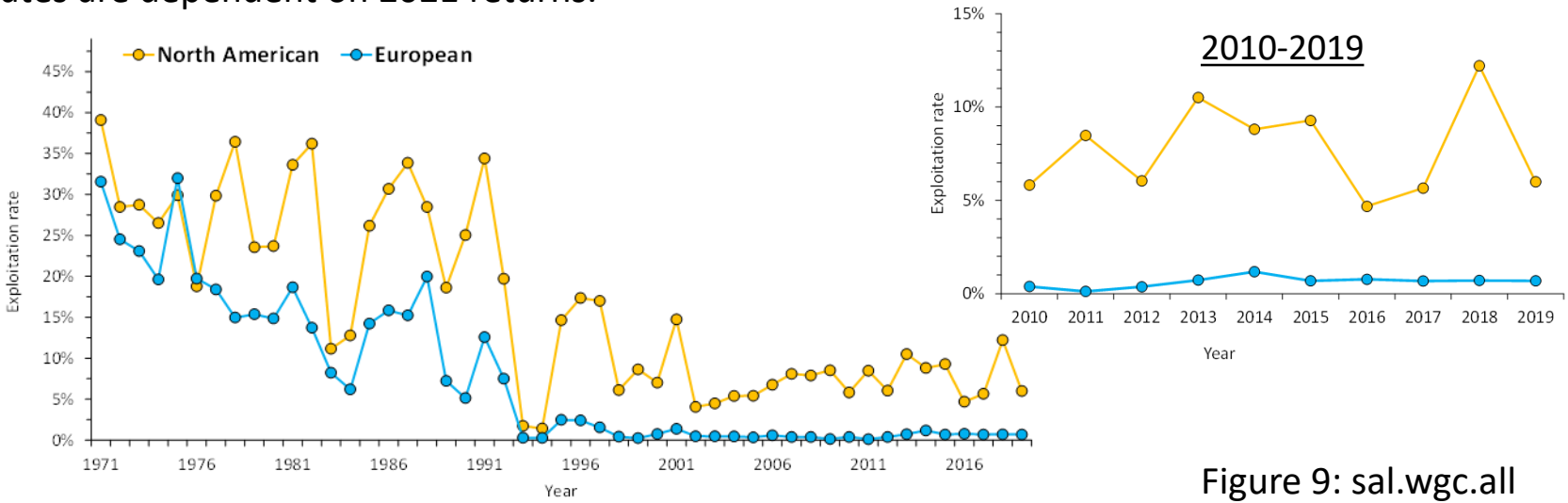


Figure 9: sal.wgc.all

4.3 Catch options or alternative management advice for 2021 – 2023

- No catch options

- No probabilities (close to 0) that the returns of 2SW salmon to the six regions of NAC or MSW to S NEAC will meet or exceed the objectives for these areas simultaneously

	Probability of meeting or exceeding region-specific management objectives							
	Labrador	Newfoundland	Québec	Gulf	Scotia-Fundy	US	Southern NEAC	Simultaneous
2021 Catch options								
0	0.75	0.51	0.60	0.92	0.01	0.11	0.93	0.004
10	0.73	0.49	0.58	0.91	0.01	0.10	0.93	0.004
20	0.72	0.47	0.55	0.90	0.01	0.10	0.93	0.004
30	0.70	0.45	0.52	0.88	0.01	0.09	0.92	0.004
40	0.68	0.44	0.50	0.87	0.01	0.09	0.92	0.004
50	0.67	0.42	0.47	0.86	0.01	0.08	0.92	0.003
60	0.65	0.40	0.45	0.84	0.01	0.08	0.92	0.003
70	0.63	0.38	0.42	0.83	0.01	0.08	0.92	0.003
80	0.61	0.36	0.40	0.81	0.01	0.07	0.91	0.003
90	0.59	0.34	0.37	0.79	0.01	0.07	0.91	0.003
100	0.57	0.32	0.35	0.77	0.01	0.07	0.91	0.003
2022 Catch options								
0	0.73	0.44	0.47	0.90	0.03	0.15	0.83	0.006
10	0.72	0.42	0.44	0.88	0.03	0.15	0.82	0.006
20	0.70	0.40	0.42	0.87	0.03	0.15	0.82	0.005
30	0.68	0.39	0.40	0.86	0.03	0.14	0.81	0.004
40	0.67	0.37	0.38	0.85	0.03	0.14	0.81	0.004
50	0.65	0.35	0.37	0.83	0.03	0.13	0.81	0.004
60	0.63	0.34	0.35	0.82	0.03	0.13	0.80	0.004
70	0.62	0.32	0.33	0.80	0.02	0.12	0.80	0.004
80	0.60	0.31	0.31	0.78	0.02	0.12	0.79	0.004
90	0.58	0.29	0.30	0.76	0.02	0.12	0.79	0.004
100	0.57	0.28	0.28	0.74	0.02	0.11	0.78	0.004
2020 Catch options								
0	0.67	0.30	0.46	0.83	0.03	0.23	0.75	0.005
10	0.66	0.28	0.44	0.82	0.03	0.22	0.74	0.005
20	0.64	0.27	0.43	0.80	0.03	0.22	0.74	0.005
30	0.63	0.26	0.41	0.79	0.03	0.21	0.74	0.005
40	0.61	0.25	0.39	0.77	0.03	0.21	0.73	0.005
50	0.60	0.24	0.37	0.76	0.02	0.20	0.73	0.004
60	0.58	0.23	0.35	0.73	0.02	0.19	0.72	0.004
70	0.56	0.22	0.34	0.72	0.02	0.19	0.72	0.004
80	0.55	0.20	0.32	0.70	0.02	0.18	0.71	0.004
90	0.53	0.19	0.30	0.69	0.02	0.18	0.71	0.004
100	0.51	0.18	0.29	0.67	0.02	0.17	0.70	0.003

Table 7: sal.wgc.all

4.4 Framework of Indicators

Used to identify any significant change in the previously provided multi-annual management advice

Used in NAC (only NAC indicators used) and WGC

✓Updating indicator variables

✓Running the objective function spreadsheet for each indicator variable and the variable of interest relative to the management objectives

✓Quantifying the threshold values for the indicator variables

✓Revising/adding the indicator variables

✓Providing the spreadsheet for FWI assessment

✓19 variables, 13 rivers

Catch Advice	Catch option > 0 (Yes = 1, No = 0)

Overall Recommendation
No Significant Change Identified by Indicators

Geographic Area	River/ Indicator	2020 Value*	Ratio Value to Threshold	Threshold	True Low	True High	Indicator State	Probability of Correct Assignment	Indicator Score	Management Objective Met?
USA	Penobscot 2SW Returns	998	46%	2 167	100%	100%	-1	1,00	-1,00	
	Penobscot 2SW Survival (%)	0,002	18%	0,011	100%	60%	-1	1,00	-1,00	
	possible range				*-1,00*	*0,80*				
	Average		32%						**-1,00**	**No**
Scotia-Fundy	Saint John Return Large	115	3%	3 329	97%	100%	-1	0,97	-0,97	
	Lahave Return Large	22	8%	285	82%	85%	-1	0,82	-0,82	
	North Return Large	226	36%	626	96%	75%	-1	0,96	-0,96	
	Saint John Return Small	241	11%	2 276	90%	80%	-1	0,90	-0,90	
	LaHave Return Small	278	17%	1 679	96%	67%	-1	0,96	-0,96	
	possible range				*-0,92*	*0,81*				
	Average		15%						**-0,92**	**No**
Gulf	Miramichi Return 2SW	4746	57%	8 366	100%	98%	-1	1,00	-1,00	
	Miramichi Return 1SW	8792	36%	24 287	58%	92%	-1	0,58	-0,58	
	possible range				*-0,79*	*0,95*				
	Average		46%						**-0,79**	**No**
Quebec	Bonaventure Return Large	1531	68%	2 243	73%	100%	-1	0,73	-0,73	
	Grande Rivière Return Large	426	96%	442	100%	83%	-1	1,00	-1,00	
	Saint-Jean Return Large	814	80%	1013	79%	100%	-1	0,79	-0,79	
	Dartmouth Return Large	889	118%	756	86%	75%	1	0,75	0,75	
	Madeleine Return Large	922	137%	672	94%	74%	1	0,74	0,74	
	Sainte-Anne Return Large	780	134%	584	82%	60%	1	0,60	0,60	
	Mitis Return Large	873	237%	369	89%	50%	1	0,50	0,50	
	De la Trinité Return Large	113	29%	385	88%	100%	-1	0,88	-0,88	
	De la Trinité Return Small	150	26%	578	90%	85%	-1	0,90	-0,90	
	De la Trinité 2SW Survival	0,28	57%	0,49	100%	68%	-1	1,00	-1,00	
	possible range				*-0,88*	*0,80*				
	Average		98%						**-0,27**	**No**
Newfoundland										
	possible range									
	Average								**NA**	**Unknown**
Labrador										
	possible range									
	Average								**NA**	**Unknown**
Southern NEAC										
	possible range									
	Average								**NA**	**Unknown**

* 2020 value: or if not available, the latest value of the time-series.

Figure 10: sal.wgc.all