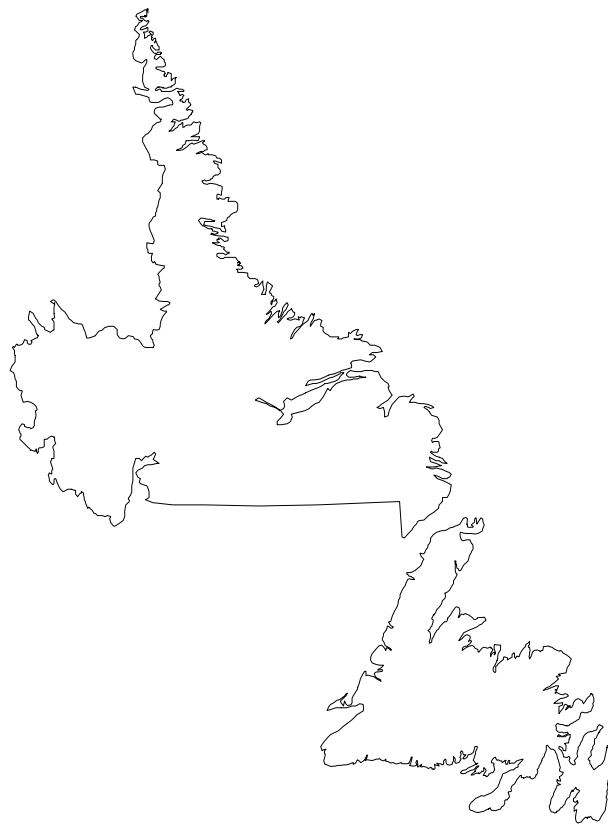


**CANADA-NEWFOUNDLAND and LABRADOR
WATER QUALITY MONITORING
AGREEMENT**

**ANNUAL WORK SCHEDULE
2019 - 2020**



Water Resources Management Division
Department of Municipal Affairs and
Environment
St. John's, Newfoundland and Labrador

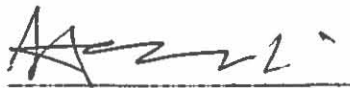
Atlantic Water Quality Monitoring - Surveillance de
la qualité de l'eau de l'Atlantique
Environment Canada - Environnement Canada
Dartmouth, Nova Scotia

**Canada-Newfoundland and Labrador
Water Quality Monitoring Agreement
Annual Work Schedule –
Resource Commitment & Work Shared Activities
2019-2020**

This document outlines cost and work shared activities to be carried out during the current fiscal year under the Canada-Newfoundland and Labrador Water Quality Monitoring Agreement. The document has been reviewed and approved by the Administrators of the Agreement.



Kevin Cash
Administrator, on behalf of
Environment and Climate Change Canada
Government of Canada



Haseen Khan
Administrator, on behalf of
Department of Municipal Affairs and Environment
Government of Newfoundland and Labrador

Schedule A
Agreement Committees

The following officials are named to administer this Agreement according to Article X under the Canada-Newfoundland and Labrador Water Quality Monitoring Agreement:

Mr. Kevin Cash Environment and Climate Change Canada, on behalf of Canada

Mr. Haseen Khan Department of Municipal Affairs and Environment, on behalf of Newfoundland & Labrador

The Administrators will be assisted by a Coordinating Committee consisting of the following:

Mr. Arash Shahsavarani Environment and Climate Change Canada (Water Quality Monitoring & Surveillance)

Mr. Vincent Mercier Environment and Climate Change Canada (Water Quality Monitoring and Surveillance)

Ms. Christine Garron Environment and Climate Change Canada (Water Quality Monitoring & Surveillance)

Ms. Annette Tobin Water Resources Management Division, Newfoundland & Labrador Department of Municipal Affairs and Environment

Schedule B

Shared Activities for Fiscal Year 2019-2020

Schedule B –Shared Activities 2019-2020

Activity	Responsible Agency	Remarks	Total Cost
Cost-Shared and Work-Shared Core Ambient Water Quality Monitoring and Data Management Activities	Newfoundland & Labrador Department of Municipal Affairs and Environment <u>and</u> Environment and Climate Change Canada	Refer to Table B.1 and Figure A-1 for sampling locations in Newfoundland	\$16,500 payable to NL (Labrador sampling)
		Refer to Table B.2 and Figure A-2 for sampling locations in Labrador	\$39,684.96 payable to ECCC Laboratory Services
		Refer to Table B.3 for laboratory analysis details	
		Refer to Table B.4 for Shared Activities	
Additional Cost-Shared Core Activities	Newfoundland & Labrador Department of Municipal Affairs and Environment <u>and</u> Environment and Climate Change Canada	Refer to Table B.5 for Shared Activities	\$47,500 payable to NL (CESI, CABIN, Data Management)
Work-Shared Special Projects	Newfoundland & Labrador Department of Municipal Affairs and Environment <u>and</u> Environment and Climate Change Canada	Refer to Table B.6 for work-shared special projects	\$0.00

Note: Details regarding NL efforts for all additional technical projects/activities and the scope of work is documented separately within the NL Water Resources Management Division – Divisional Work Plan 2019-2020.

Table B.1: Index Station Location, Designation and Sampling Frequency 2019-2020 for Newfoundland Stations. Core CESI stations are shaded gray.

EASTERN REGION

STATION #	DESCRIPTION	LATITUDE	LONGITUDE	DESIGNATION	SAMPLES/ YEAR	CLASSIFICATION	CLASSIFICATION NETWORK
NF02ZK0005	NORTHEAST RIVER NEAR PLACENTIA	47 16 23	-53 50 25	Fed/Prov	5	CABIN Annual site since 2009 (except for 10-11)/ Hydrometric / Core CESI Station	
NF02ZL0029	GOULDS BROOK NEAR MAKINSONS	47 30 17	-53 17 27	Fed/Prov	5	CABIN site 09-10 / Core CESI Station	
NF02ZM0004	WATERFORD RIVER AT COMMONWEALTH AVENUE	47 31 19	-52 48 29	Provincial	4	Local CESI Station	
NF02ZM0009	WATERFORD RIVER AT KILBRIDE	47 31 44	-52 44 40	Fed/Prov	4	RTWQ / Hydrometric / Local CESI Station / Chemical Management Plan	
NF02ZM0014	VIRGINIA RIVER AT THE BOULEVARD	47 35 02	-52 41 29	Provincial	4	Local CESI Station / CABIN site 10-11	
NF02ZM0015	QUIDI VIDI LAKE AT OUTLET	47 35 04	-52 40 54	Provincial	4		
NF02ZM0016	RENNIE'S RIVER AT CARNELL DRIVE	47 34 40	-52 42 03	Provincial	4	Local CESI Station	
NF02ZM0020	BROAD COVE BROOK NEAR ST. PHILLIPS	47 34 16	-52 52 10	Provincial	4	CABIN site 08-09 / Local CESI Station	
NF02ZM0098	VIRGINIA RIVER AT HEADWATERS	47 35 56	-52 45 17	Provincial	4	CABIN site 08-09 / Comp Guidelines Site / Local CESI Station	
NF02ZM0109	MUNDY POND AT OUTLET	47 33 12	-52 44 07	Provincial	4		
NF02ZM0175	WATERFORD RIVER AT BROOKFIELD ROAD	47 31 34	-52 45 48	Provincial	4	Local CESI Station	
NF02ZM0176	SOUTH BROOK AT MOUTH	47 31 41	-52 44 48	Provincial	4	Local CESI Station	
NF02ZM0177	RENNIE'S RIVER AT PORTUGAL COVE ROAD	47 34 28	-52 42 36	Provincial	4	Local CESI Station	
NF02ZM0178	LEARYS BROOK AT PRINCE PHILIP DRIVE	47 33 50	-52 44 55	Fed/Prov	10	RTWQ / Hydrometric / Core CESI Station / CABIN site 11-12	
NF02ZM0179	TRIBUTARY TO VIRGINIA RIVER AT GUZZWELL DRIVE	47 35 47	-52 42 06	Provincial	4	Local CESI Station	

NF02ZM0180	VIRGINIA RIVER AT NEWFOUNDLAND DRIVE	47 35 59	-52 42 02	Provincial	4	Local CESI Station	
NF02ZM0181	WATERFORD RIVER AT BLACKHEAD ROAD	47 32 53	-52 43 09	Fed/Prov	10	Core CESI Station	
NF02ZM0182	WATERFORD RIVER AT BREMIGANS POND DAM	47 31 07	-52 51 21	Provincial	4	Local CESI Station	
NF02ZM0183	KELLIGREWS RIVER AT KELLIVIEW CRESCENT	47 29 37	-53 00 58	Provincial	4	Local CESI Station / CABIN site 11-12	
NF02ZM0185	SOUTH BROOK AT HEADWATERS	47 29 44	-52 48 47	Provincial	4	CABIN site 08-09 / Comp Guidelines Site / Local CESI Station	
NF02ZM0294	MANUELS RIVER ABOVE MANUELS ACCESS ROAD	47 31 11	-52 56 41	Provincial	4	Archaeologically significant / Local CESI Station	
NF02ZM0359	PADDYS POND AT OUTLET	47 29 17	-52 53 39	Provincial	4	RTWQ stand-alone station	
NF02ZN0004	SALMONIER RIVER AT ST. CATHERINES	47 11 29	-53 23 09	Provincial	4	Local CESI Station	

CENTRAL REGION

STATION #	DESCRIPTION	LATITUDE	LONGITUDE	DESIGNATION	SAMPLES/ YEAR	CLASSIFICATION	CLASSIFICATION NETWORK
NF02YO0001	EXPLOITS RIVER AT GRAND FALLS	48 55 27	-55 39 35	Provincial	4	Local CESI Station	
NF02YO0020	EXPLOITS RIVER AT ASPEN BROOK	48 56 56	-55 54 45	Provincial	4	Local CESI Station	
NF02YO0107	EXPLOITS RIVER NEAR MILLERTOWN	48 45 38	-56 34 56	Fed/Prov	4	Hydrometric / Core CESI Station	
NF02YO0128	EXPLOITS RIVER BELOW GRAND FALLS	48 56 12	-55 37 03	Provincial	4	Local CESI Station	
NF02YO0142	CORDUROY BROOK NEAR CENTENNIAL PARK	48 56 24	-55 39 43	Provincial	4	Local CESI Station / CABIN site 11-12	
NF02YO0143	EXPLOITS RIVER AT BOND BRIDGE	49 01 24	-55 26 56	Provincial	4	Local CESI Station	
NF02YQ0030	GANDER RIVER AT APPLETON	48 59 40	-54 52 00	Fed/Prov	4	Hydrometric / Core CESI Station	
NF02YQ0072	CARELESS BROOK AT RESOURCE ROAD STEEL BRIDGE	48 54 08	-54 59 38	Fed/Prov	4	CABIN Annual site since 2010 /Local CESI Station	

NF02YS0001	TERRA NOVA RIVER AT TERRA NOVA	48 30 24	-54 12 36	Provincial	4	Local CESI Station	
NF02YS0011	TERRA NOVA RIVER AT SPENCER BRIDGE	48 38 26	-54 02 11	Fed/Prov	4	Hydrometric / Core CESI Station	
NF02YS0083	NORTHWEST RIVER AT TERRA NOVA NATIONAL PARK	48 23 50	-54 11 56	Provincial	4	Hydrometric / National Park / Local CESI Station	

WESTERN REGION

STATION #	DESCRIPTION	LATITUDE	LONGITUDE	DESIGNATION	SAMPLES/ YEAR	CLASSIFICATION	CLASSIFICATION NETWORK
NF02YE0004	PORTLAND CREEK AT ROUTE 430	50 10 57	-57 36 04	Provincial	4	Local CESI Station	
NF02YE0005	WESTERN BROOK AT ROUTE 430	49 49 44	-57 51 18	Fed/Prov	5	CABIN site 08-09 / Core CESI Station	
NF02YG0001	MAIN RIVER AT ROUTE 420	49 46 15	-56 54 33	Fed/Prov	5	Canadian Heritage River /Core CESI Station	
NF02YL0106	SOUTH BROOK BELOW TCH	49 01 06	-57 37 04	Provincial	4	Hydrometric	
NF02YG0020	EAGLE MOUNTAIN BROOK BELOW EAGLE MOUNTAIN POND	49 49 54	-57 17 14	Provincial	4		
NF02YH0018	LOMOND RIVER AT ROUTE 431	49 24 08	-57 43 48	Provincial	4	CABIN site 08-09 / Local CESI Station	
NF02YJ0004	PINCHGUT BROOK AT TCH	48 47 49	-58 03 42	Fed/Prov	10	CABIN Annual site since 2008 (except for 09-10 and 10-11) / Core CESI Station	
NF02YK0022	HUMBER CANAL AT MAIN DAM ROAD	49 09 59	-57 24 53	Provincial	4	Local CESI Station	
NF02YL0011	HUMBER RIVER AT LITTLE FALLS BRIDGE	49 20 52	-57 14 08	Provincial	4	Local CESI Station	
NF02YL0012	HUMBER RIVER AT HUMBER VILLAGE BRIDGE	48 59 01	-57 45 37	Fed/Prov	10	RTWQ / Hydrometric / Core CESI Station	
NF02YL0013	CORNER BROOK AT MARGARET BOWATER PARK	48 56 34	-57 55 55	Provincial	4	Local CESI Station	
NF02YL0029	WILD COVE BROOK AT	48 58 26	-57 52 60	Provincial	4	Local CESI Station / CABIN site	

	ROUTE 440					12-13	
NF02YN0001	LLOYDS RIVER AT ROUTE 480	48 18 28	-57 42 10	Fed/Prov	5	CABIN site 09-10 / Core CESI Station	
NF02YN0043	PETER STRIDES LAKE AT ROUTE 480	48 09 13	-57 43 23	Provincial	4		
NF02ZA0006	GRAND CODROY RIVER BELOW OVERFALL BROOK	47 52 08	-59 07 05	Provincial	4	Local CESI Station	
NF02ZC0020	BUCK LAKE ON ROUTE 480	48 00 49	-57 39 59	Provincial	4		

Notes:

1. A total of 50 stations (including 12 core CESI stations) will be sampled during 2019-2020 on the island portion of the province.
2. For statistical analysis it is important that at least four (4) samples are collected from each station representing four seasons in a fiscal year.
3. All Core CESI stations should be sampled five (5) times per year, if possible (or more often where indicated). All local CESI stations will be sampled at least four (4) times per year. Note Core CESI stations in central are scheduled for 4 samples per year due to staffing limitations and to avoid additional trips. However the target for 4 samples per year has consistently been met in the past.
4. Total number of samples to be collected from all NL stations is 265 (this includes QA/QC samples); it also includes 77 samples from Core CESI stations. Total number of QA/QC samples to be collected is 36 (this is based on 12 duplicates per year in eastern region, four (4) duplicates per year in central region, eight (8) duplicates per year in western region, and 4 blanks per year in each of these regions).
5. All sampling is carried out by provincial Water Resources Management Division staff.
6. Sampling frequency for select stations in eastern and western regions were increased in 2016-17 to 12 times per year (monthly) based on results of Fresh Water Quality Monitoring and Surveillance Power Analysis, which indicated that quarterly sampling is generally not sufficient for trend analysis. That increased sampling frequency for select stations has decreased from 12 to 10 samples per site in 2019-20.
7. Sampling at all Core CESI sites will include field measurements for pH, conductivity, turbidity, dissolved oxygen and water temperature.

Table B.2: Northern Index Station Location, Designation and Sampling Frequency 2019-2020 for Labrador Stations. Core CESI stations are shaded gray.

LABRADOR REGION

STATION #	DESCRIPTION	LATITUDE	LONGITUDE	DESIGNATION	SAMPLES/ YEAR	CLASSIFICATION	CLASSIFICATION NETWORK
NF02XA0001	LITTLE MECATINA RIVER ABOVE LAC FOURMONT	52 13 42	-61 19 32	Fed/Prov	4	Hydrometric / Transboundary / Local CESI Station	
NF03NF0013	UGJOKTOK RIVER BELOW HARP LAKE	55 13 60	-61 17 57	Fed/Prov	4	Hydrometric / Core CESI Station	
NF03OA0020	ASHUANIPI RIVER AT FERGUSON BAY	53 00 06	-66 14 30	Provincial	4	Local CESI Station	
NF03OC0012	ATIKONAK RIVER ABOVE PANCHIA LAKE	52 58 03	-64 39 40	Fed/Prov	4	Hydrometric / Core CESI Station	
NF03OD0011	EAST METCHIN RIVER AT TLH	53 26 05	-63 14 02	Provincial	4	Former Hydrometric / Local CESI Station	
NF03OD0012	WILSON RIVER EAST BRANCH	53 18 33	-62 55 11	Provincial	4	Ashkui / CABIN 10-11 / Local CESI Station	
NF03OE0001	CHURCHILL RIVER ABOVE UPPER MUSKRAT FALLS	53 14 52	-60 47 21	Fed/Prov	4	RTWQ / Hydrometric / Local CESI Station / River turned reservoir site (Muskrat Falls)	
NF03OE0050	CHURCHILL RIVER 6.15KMS BELOW LOWER MUSKRAT FALLS	53 14 16	-60 40 31	Fed/Prov	4	RTWQ/ Hydrometric	
NF03OE0029	CHURCHILL RIVER ABOVE GRIZZLE RAPIDS	52 58 12	-61 26 43	Fed/Prov	4	RTWQ/ Hydrometric	
NF03OE0030	MINIPI RIVER BELOW MINIPI LAKE	52 36 54	-61 11 01	Fed/Prov	4	Former RTWQ / Former Hydrometric / Core CESI Station	
NF03OE0032	PINUS RIVER ABOVE TLH	53 08 52	-61 33 31	Provincial	4	Hydrometric / Comp Guidelines Site / Local CESI Station	
NF03OE0033	BIG POND BROOK BELOW BIG POND	53 30 51	-60 17 39	Provincial	4	Hydrometric / Local CESI Station	
NF03OE0035	DOMINION LAKE OUTFLOW	52 43 44	-61 45 14	Provincial	4	Ashkui / Local CESI Station	
NF03OE0037	CACHE RIVER AT TLH	53 11 34	-62 12 35	Provincial	4	Ashkui / Local CESI Station	
NF03PB0025	NASKAUPI RIVER BELOW	54 07 54	-61 25 45	Fed/Prov	4	Core CESI Station	

	NASKAUI LAKE						
NF03PB0028	CAPE CARIBOU RIVER AT GRAND LAKE	53 37 16	-60 24 52	Provincial	4	Ashkui / Local CESI Station	
NF03PB0029	GRAND LAKE OUTFLOW AT NORTH WEST RIVER	53 31 26	-60 08 45	Provincial	4	Ashkui	
NF03PB0030	SEAL LAKE AT NARROWS	54 19 55	-61 38 27	Provincial	4	Ashkui	
NF03PB0032	SUSAN RIVER NORTH OF BEAVER RIVER	53 44 17	-60 56 48	Provincial	4	Ashkui / Local CESI Station	
NF03PB0037	WUCHUSK LAKE AT NASKAUI RIVER INFLOW	54 23 43	-61 47 09	Provincial	4	Ashkui	
NF03QA0044	CARTER BASIN OUTFLOW	53 29 55	-59 52 11	Provincial	4	Ashkui	
NF03QA0045	KENAMU RIVER NEAR MOUTH	53 28 34	-59 55 01	Provincial	4	Ashkui / Comp Guidelines Site	
NF03QC0001	EAGLE RIVER ABOVE FALLS	53 32 03	-57 29 37	Fed/Prov	4	Hydrometric / Core CESI Station / Eagle River Plateau Management Zone	
NF03QC0002	ALEXIS RIVER NEAR PORT HOPE SIMPSON	52 38 57	-56 52 17	Provincial	4	Hydrometric / Local CESI Station	
NF02XB0018	TRIBUTARY TO ST. AUGUSTIN RIVER	52 33 06	-59 19 39	Fed/Prov	4	Transboundary/CABIN sampling in 2012	

Notes:

1. A total of 25 stations (including five (5) core CESI stations) will be sampled during 2019-2020 in Labrador.
2. The Labrador stations are listed as being sampled four (4) times per year; this refers to the number of samples taken; **there must be a minimum of three (3) samples taken each fiscal year** at the provincial Labrador sites. Generally, four trips are made to each station.
3. Total number of samples to be collected is 109 (this includes QA/QC samples); it also includes 20 samples from Core CESI stations. Total number of QA/QC samples to be collected is nine (9) (this is based on six (6) duplicates and three (3) blanks per year).
4. All five (5) Core CESI stations in Labrador are accessible only by helicopter.
5. All Core CESI stations should be sampled four (4) times per year, if possible, and at least three (3) times per year.
6. Sampling at all Core CESI sites will include field measurements for pH, conductivity, turbidity, dissolved oxygen and water temperature.

7. Sampling is carried out by provincial and federal staff (i.e., a schedule is developed by provincial staff at beginning of sampling season and distributed to federal staff to ensure the preferred number of samples are collected at the remote sites during field visits between both agencies).

Table B.3 Analytical Parameters, Holding Times and Schemas for 2019-2020

Parameter	Holding Times (recommended by ALET Lab Services)	Schema Name	Parameter/ Grouping
Major Ions		M_pH auto, M_Alkalinity, M_Conductivity	alkalinity, pH, conductivity
Alkalinity	14 days	M_Metals_TR ICP-OES	Ca, Mg, Na, and K and Li
Chloride	28 days	M_Anions_PKG	Cl, SO4, NO2, NO3, F and Bromide by IC
Sulphate	28 days		
Calcium	28 days	M_TP	total phosphorus
Magnesium	28 days	M_TN	total nitrogen
Sodium	28 days	M_TOC	dissolved inorganic and organic carbon
Potassium	180 days	M_Hardness	Calculation derived from Ca and Mg
Bromide	48 hours	M_Colour	Colour-apparent (unfiltered sample)
Fluoride	48 hours	M_Turbidity	turbidity
Physical		B_Metals_TR_ICP-MS	Total Recoverable Metals by ICP-MS*
pH	48 hours		
Conductivity	28 days		
Colour	48 hours		
Turbidity	48 hours		
Nutrients			
Nitrate	24 hours		
Total Nitrogen	28 days		
Total Phosphorus	28 days		
DIC/TOC	28 days		
Metals*			
Total Metals-27 elements	6 months (NLET)		

***27 Metals include:**

aluminum	bismuth	iron	nickel	uranium
antimony	cadmium	lanthanum	rubidium	vanadium
arsenic	cobalt	lead	selenium	zinc
barium	copper	lithium	silver	
beryllium	chromium	manganese	strontium	
boron	gallium	molybdenum	thallium	

Additional metals analyzed but not required by NL MAE:
yttrium, niobium, tin, cesium, cerium, tungsten, platinum, titanium

Table B.4 Core Ambient Water Quality Monitoring and Data Management Activities 2019-2020 (Cost-Shared and Work-Shared)

Management Activities		Leads/Commitments
<p>Water Quality Sampling and Analysis (Cost-shared activity)</p>	<p>Water samples are collected by provincial staff.</p> <ul style="list-style-type: none"> - Field data submitted regularly to ECCC <p>Analysis is completed by federal lab to ensure consistency.</p> <ul style="list-style-type: none"> - ISO standards adhered to - Detection limits mutually agreed upon 	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - NL will collect 374 samples in 2019-2020, including duplicate and blank samples. <p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - ECCC will provide the analytical service for all samples (according to Table B.3) by March 31, 2020. - ECCC analysis is valued at \$39, 684.96. The cost for ECCC to collect samples from 12 core CESI sites in NL alone would exceed that amount. - ECCC will pay \$16,500 to NL for costs associated with sampling remote Labrador CESI stations, which are accessible only by helicopter. <p>\$16,500 payable to NL (included in cost-shared Table B5) \$39, 684.96 payable to ECCC Laboratory Services (For Internal Purposes Only)</p>
<p>Data Management (Work-shared activity)</p>	<p>Processing and Loading of WQ analytical data</p> <ul style="list-style-type: none"> - Conducted by Environment and Climate Change Canada <p>Accessibility/Availability of NL WQMA Dataset</p> <ul style="list-style-type: none"> - Maintained by Environment and Climate Change Canada 	<p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - Verifies and corrects data. - Transfers data to database. - Ensures NL WQMA dataset is available on external server for download. - Maintains database. - Provides a copy of NL WQMA dataset every six months to NL MAE. <p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Responsible for reviewing, validating, and reporting to ECCC any corrections required of the data. - Replacing former dataset.

Data Management Special Projects (Work-shared activity)	Data Verification and Validation of Sample/Measurement Data using Developed Tools	<p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - ECCC will continue to work with NL MAE to ensure all data are receiving the same verification and validation. <p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - NL MAE will continue to use an in-house tool (Envirotrend) to apply to the NL WQMA dataset in an approach consistent with that used by other projects within ECCC Database. This is to be used as an interim data validation tool until ECCC's validation tool can be used and integrated.
	Data extraction tools development and updates	<p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - ECCC will continue to release water chemistry agreement data on the Open Data portal on a monthly basis, within 30 days of receipt of the data from Environmental Science and Technology Laboratories.

Table B.5 Additional Core Activities 2019-2020(Cost-Shared)

Project	Activity / In-kind Contributions	Amount Payable to NL Exchequer
<p>Canadian Aquatic Biomonitoring Network (CABIN)</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Monitoring of benthic invertebrates at selected water bodies (three sites) for maintenance of the long-term reference network in support of the Atlantic Reference Approach Model. - Finalize a Baseline Report on Reference Invertebrate Assemblages in NL with ECCC. - Share spatial data with ECCC, for use in the reference model. - CABIN field certification and training (as needed). - Participate in sample collection for special projects as needed. <p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - Develop CABIN reference model and associated tools. - Maintains database. - Prepare course/presentation on how to look at data in Atlantic. 	<p>\$5,000 Invoice to be provided to ECCC by November 30, 2019 (matched by NL from annual budget)</p>
<p>Canadian Environmental Sustainability Indicators (CESI)</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Compile, analyse and interpret water quality data at Core and Local CESI stations according to CESI protocols. - Provide input to ECCC review of core sites - Update CANAL metadata website with current year's CESI data. - Review CESI final report from ECCC for accuracy. - CESI WQI Fact Sheet. <p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - QA/QC of submitted data/results and report to the public on the web. - Evaluation of core network of sites using new risk-based information to ensure representivity within Pease basins. - Use of Risk-based Adaptive Management Framework (RBAMF) to categorize NL core sites for CESI reporting. 	<p>\$20,000 Invoice to be provided to ECCC by November 30, 2019 (matched by NL from annual budget)</p>

<p>Modifications / Improvements to CESI WQI Calculator</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Regular troubleshooting support and corresponding update in the CESI Calculator coding as required. - Update of CESI WQI Calculator Help Manual as required. <p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - Investigate how Trend Analysis can be incorporated into the CESI Calculator. - Inclusion of French version of CESI Help Manual. 	<p>\$5,000 Invoice to be provided to ECCC by September 30, 2019</p> <p>(matched by NL from annual budget)</p>
<p>Modifications / Improvements to CESI WQI Calculator</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Create an additional module to the WQI calculator to allow users to modify equations. Front end forms will allow users to enter equations. Back end code shall perform computation to integrate these equations based on which guidelines for parameters shall be modified. Additional testing shall be performed to ensure accuracy of the results. 	<p>\$8,000 Invoice to be provided to ECCC by November 30, 2019</p>
<p>Modifications / Improvements to CESI WQI Calculator</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Upgrade the calculator to the 2017 Visual studio. The existing calculator is developed using Visual Studio 2013. This shall be upgraded to Visual studio 2017 to ensure smooth incorporation of the calculator with newer computer system. This involves porting all forms, codes and database into the newer Visual Studio. Additional testing shall be performed to ensure accuracy of the results. 	<p>\$7,000 Invoice to be provided to ECCC by September 30, 2019</p>
<p>Chemical Management Plan</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Quarterly sampling at Waterford River @ Kilbride for Alkylphenols and PFOS 	<p>\$2,500 Invoice to be provided to ECCC by November 30, 2019</p>
<p>Labrador Remote Station Sampling (see Table B4)</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Remote station sampling in Labrador 	<p>\$16,500 Invoice to be provided to ECCC by September 30, 2019</p>
	<p>TOTAL:</p>	<p>\$64,000</p>

Therefore Environment and Climate Change Canada will transfer to Newfoundland Exchequer the sum of \$28,500 by October 31, 2019 and \$35,500 by December 31, 2019.

Table B.6. Special Projects 2019-2020 (Work-Shared)

<p>Monitoring Network Evaluation and Optimization (Work-shared activity)</p>	<p>This on-going project focuses on evaluating the network on a regular basis to ensure that the partner's monitoring objectives are being met and that the network will be sustainable in the long-term.</p> <p>Select sites in NL will be considered for inclusion in the ECCC national networks (e.g. Large Rivers, High Risk, Reference, Priority Lakes and Transboundary Networks) using the results of the RBA, RBBA, and site specific knowledge.</p> <p>This is a multi-year project that will carry over into 2019-2020.</p>	<p>Risk-Based Adaptive Management Approach (station level, basin level, statistical tools): <u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - ECCC will continue provide guidance and advice as required and work with NL MAE to optimize approach for NL waters. - ECCC will work towards providing access to the data and tools for use by external partners. - Power analysis report will be completed and provided to NL. - Sampling frequencies will be evaluated on an on-going basis. - Update NL MAE on Network of Networks design. <p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - NL MAE will add Risk-Based Assessment results to each station profile page on CANAL. Results have been shared on the Departmental main webpage. - NL MAE will continue to investigate statistical approaches to optimize the monitoring network within the province – hierarchal clustering (for classification) and Entropy analysis (for prioritization being done for quantity sites and then quality sites). - NL MAE will publish the Trend Analysis Report for NL stations, comparing results of older data with more recent data. Additional trend analysis will be carried out and documented for other stations that have the required amount of data available. - ECCC and NL MAE will collaboratively review all results and the possible publications will be explored. - Investigate how the water quantity indicator can be combined with the water quality indicator to provide a more integrated and holistic approach to assessing waterbodies.
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<p>Real-time Instrumentation Special Projects (Work-shared activity)</p>	<p>In-situ water quality/quantity/climate monitoring using a mobile environmental monitoring platform (MEMP) on a need-basis across the province.</p> <p>Sharing of instrumentation purchase, deployment and maintenance expenses for real-time monitoring stations of joint interest.</p>	<p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - ECCC will continue to loan the Mobile Environmental Monitoring Platform (MEMP) to NL MAE until March 31, 2020. - ECCC and NL MAE will continue to work together to share expertise on various new technologies associated with the MEMP. - ECCC will continue to loan the camera and modem to NL MAE for Leary's Brook. ECCC will continue to loan sonde to NL MAE. <p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - NL MAE will maintain in good condition the MEMP and all loaded equipment therein. - NL MAE will acknowledge ECCC in all publications arising from the collection of data using the unit. - NL MAE will provide in-kind contribution for regular servicing and performance checks on shared instruments at core CESI sites. - NL MAE continues to set up and deploy water quality equipment throughout the province. - NL MAE will continue to dedicate one staff (Ryan Pugh) as the custodian of the MEMP. - NL MAE will continue to share testing results of new technologies with ECCC (i.e., drone technology; buoy technology; real-time instrumentation; etc.).
<p>Extrapolation of non-measured data at select real-time stations (Work-shared activity)</p>	<p>Development of regression models to extrapolate water quality parameters from real-time measurements of related parameters. Results may be applicable to the national program, reducing sampling and analytical costs at some stations.</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Regression models to compare total suspended solids (TSS) concentration vs. real-time turbidity measurements. - Grab sample data is being collected to validate the models. - Finalize technical report of models currently developed (Churchill River sites). - Graphs for extrapolated parameters will be added for selected sites to NL MAE data management systems and real time web page reporting. - Research on forecasting of real-time water temperature to obtain 7-day daily temperatures. <p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - ECCC will continue to provide technical advice and review on the approach considering its national applicability.

<p>Real-time water Quality Monitoring products</p> <p>(Work-shared activity)</p>	<p>Technical reports for real-time and automated water quality monitoring activities.</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Report on review of long-term continuous monitoring results from industry partnerships (IOC-10 years). - NL MAE will finalize station audit procedures and share with Fresh Water Quality Monitoring and Surveillance. <p><u>Environment and Climate Change Canada</u></p> <ul style="list-style-type: none"> - ECCC will continue to provide technical advice and review on the technical reports considering its national applicability; may adapt manuals to reflect national program. - ECCC will continue to share products and information developed by, and associated with the Automated Fresh Water Quality Monitoring and Surveillance Task Group.
<p>Progress Reporting</p>	<p>Progress reports for auditing purposes.</p>	<p><u>NL Department of Municipal Affairs and Environment</u></p> <ul style="list-style-type: none"> - Finalize 2014-2015, 2015-2016, & 2016-2017, 2017-2018 Progress Reports, provide to ECCC for report, and post to the NL MAE Departmental webpage. - Begin Progress Report.

Appendix A

Figure A-1 – Water Quality Sampling Sites 2019-2020 – Newfoundland

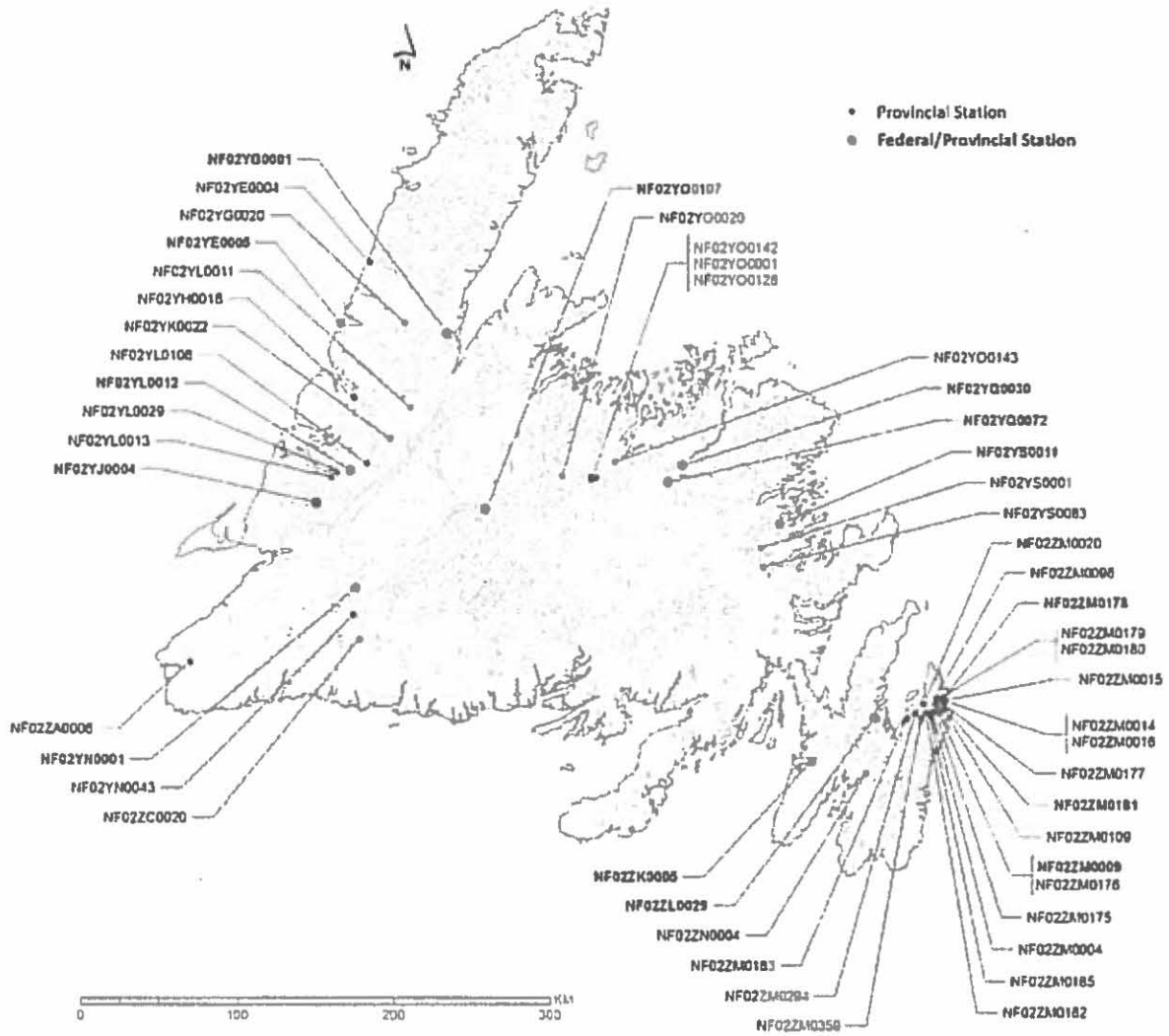


Figure A-2 – Water Quality Sampling Sites 2019-2020 – Labrador

