

CANADA-NEWFOUNDLAND and LABRADOR WATER QUALITY MONITORING AGREEMENT

Progress Report 2017-2018



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
Environnement Canada - Environnement Canada
Dartmouth, Nova Scotia

Introduction

The following progress report was prepared by NL MAE staff to document progress made on all activities under the *Canada-Newfoundland and Labrador Water Quality Monitoring Agreement* during 2017-2018. This document is formatted to reflect the same layout as the 2017-2018 Annual Work Schedule. Additionally, a table has been added to include activities completed solely by WRMD staff.

Work Shared Activities for Fiscal Year 2017-2018

Activity	Responsible Agency	Remarks
Cost Shared and Work-Shared Ambient Water Quality Monitoring and Data Management Activities	Newfoundland and Labrador Department of Municipal Affairs and Environment <u>and</u> Environment Canada	Refer to Table 1 for sampling details in Newfoundland Refer to Table 2 for sampling details in Labrador Refer to Table 3 for laboratory analysis details Refer to Table 4 for Shared Activities
Additional Cost-Shared Core Activities	Newfoundland and Labrador Department of Municipal Affairs and Environment <u>and</u> Environment Canada	Refer to Table 5 for Additional Shared Activities
Work-Shared Special Projects	Newfoundland and Labrador Department of Municipal Affairs and Environment <u>and</u> Environment Canada	Refer to Table 4 for shared activities related to ambient water quality monitoring and data management Special Projects Refer to Table 5 for cost shared core activities Refer to Table 6 for work-shared special projects
WRMD Activities	Newfoundland and Labrador Department of Municipal Affairs and Environment	Refer to Appendix A for WRMD tasks/projects

Ambient Water Quality Sampling

During 2017-2018, the ambient water quality grab sampling proceeded as outlined in the corresponding Annual Work Schedule. A comparison of the number of samples scheduled vs. the number of samples collected can be seen in **Table 1** and **Table 2**. In the majority of cases, the number of samples actually collected reflected the number of samples scheduled. In some instances, due to scheduling conflicts, human resource limitations and adverse weather conditions some samples were missed.

In the upcoming fiscal year, NL MAE staff will aim to ensure that the number of samples collected reflect the number of samples scheduled as outlined in the Annual Work Schedule 2018-2019.

Table 1: Provincial Samples Collected in 2017-2018 Fiscal Year in Newfoundland (Island Portion of the Province)

Station #	Description	Number of Samples Scheduled in 17-18	Number of Samples Collected in 17-18
<u>EASTERN REGION</u>			
NF02ZK0005	Northeast River near Placentia	4	4
NF02ZL0029	Goulds Brook near Makinsons	5	5
NF02ZM0004	Waterford River at Commonwealth Avenue	4	4
NF02ZM0009	Waterford River at Kilbride	4	4
NF02ZM0014	Virginia River at the Boulevard	4	4
NF02ZM0015	Quidi Vidi at Outlet	4	4
NF02ZM0016	Rennie's River at Carnell Drive	4	4
NF02ZM0020	Broad Cove Brook near St. Phillips	4	4
NF02ZM0098	Virginia River at Headwaters	4	4
NF02ZM0109	Mundy Pond at Outlet	4	4
NF02ZM0175	Waterford River at Brookfield Rd.	4	4
NF02ZM0176	South Brook at Mouth	4	4
NF02ZM0177	Rennie's River at Portugal Cove Road	4	4
NF02ZM0178	Learys Brook at Prince Phillip Drive	12	12
NF02ZM0179	Tributary to Virginia River at Guzwell Drive	4	4

Station #	Description	Number of Samples Scheduled in 17-18	Number of Samples Collected in 17-18
NF02ZM0180	Virginia River at Newfoundland Drive	4	4
NF02ZM0181	Waterford River at Blackhead Road	12	12
NF02ZM0182	Waterford River at Bremigans Pond Dam	4	4
NF02ZM0183	Kelligrews River at Kelliview Crescent	4	4
NF02ZM0185	South Brook at Headwaters	4	4
NF02ZM0294	Manuals River above Manuels Access Road	4	4
NF02ZM0359	Paddy's Pond at Outlet	4	4
NF02ZN0004	Salmonier River at St. Catherines	4	4
<u>CENTRAL REGION</u>			
NF02YO0001	Exploits River at Grand Falls	4	4
NF02YO0020	Exploits River at Aspen Brook	4	4
NF02YO0107	Exploits River at Millertown	4	4
NF02YO0128	Exploits River below Grand Falls	4	4
NF02YO0142	Corduroy Brook near Centennial Park	4	4
NF02YO0143	Exploits River at Bond Bridge	4	4
NF02YQ0030	Gander River at Appleton	4	4
NF02YQ0072	Careless Brook at Resource Road Steel Bridge	4	4
NF02YS0001	Terra Nova River at Terra Nova	4	4
NF02YS0011	Terra Nova River at Spencer Bridge	4	4
NF02YS0083	Northwest River at Terra Nova National Park	4	4
<u>WESTERN REGION</u>			
NF02YE0004	Portland Creek at Route 430	4	4
NF02YE0005	Western Brook at Route 430	5	5
NF02YG0001	Main River at Route 420	5	6
NF02YG0020	Eagle Mountain Brook below Eagle Mountain Pond	4	3

Station #	Description	Number of Samples Scheduled in 17-18	Number of Samples Collected in 17-18
NF02YH0018	Lomond River at Route 431	4	4
NF02YJ0004	Pinchgut Brook at TCH	12	11
NF02YK0022	Humber Canal at Main Dam Road	4	4
NF02YL0011	Humber River at Little Falls Bridge	4	3
NF02YL0012	Humber River at Humber Village Bridge	12	11
NF02YL0013	Corner Brook at Margaret Bowater Park	4	4
NF02YL0029	Wild Cove Brook at Route 440	4	4
NF02YL0106	South Brook near Pasadena Beach	4	4
NF02YN0001	Lloyds River at Route 480	5	5
NF02YN0043	Peter Stride's Lake at Route 870	4	3
NF02ZA0006	Grand Codroy River below Overfall Brook	4	4
NF02ZC0020	Buck Lake on Route 480	4	3

Notes:

1. Total number of samples collected in 2017-18 does include duplicates samples. The total does not include bottle blanks.
2. Total number of samples planned for 2017-18 for Eastern region was 109; 109 were sampled plus 11 duplicates and 4 trip blanks.
3. Total number of samples planned for 2017-18 for Central region was 44; 44 were sampled plus 4 duplicates and 4 trip blanks.
4. Total number of samples planned for 2017-18 for Western region was 83; 78 were sampled plus 6 duplicates and 4 trip blanks.

Table 2: Northern Samples Collected in 2017-2018 Fiscal Year in Labrador

Station #	Description	Number of Samples Scheduled in 17-18	Number of Samples Collected in 17-18
<u>LABRADOR REGION</u>			
NF02XA0001	Little Mecatina River above Lac Fourmont	4	4
NF03NF0013	Ugjoktok River below Harp Lake	5	3
NF03OC0012	Atikonak River above Panchia Lake	5	4
NF03OD0011	East Metchin River at TLH	4	3
NF03OE0001	Churchill River Above Upper Muskrat Falls	4	0 ³
NF03OE0030	Minipi River below Minipi Lake	5	4
NF03OE0032	Pinus River above TLH	4	4
NF03OE0033	Big Pond Brook below Big Pond	4	4
NF03PB0025	Naskaupi River below Naskaupi Lake	5	3
NF03QC0001	Eagle River above Falls	5	3
NF03QC0002	Alexis River near Port Hope Simpson	4	3
NF03OD0012	Wilson River East Branch	4	3
NF03OE0035	Dominion Lake Outflow	4	4
NF03OE0037	Cache River at TLH	4	3
NF03PB0028	Cape Caribou River at Grand Lake	4	4
NF03PB0029	Grand Lake Outflow at North West River	4	4
NF03PB0030	Seal Lake at Narrows	4	4
NF03PB0032	Susan River North of Beaver River	4	3
NF03PB0037	Wuchusk Lake at Naskaupi River Inflow	4	4
NF03QA0044	Carter Basin Outflow	4	4
NF03QA0045	Kenamu River near Mouth	4	4
NF03OA0020	Ashuanipi River at Ferguson Bay	4	4

Notes:

1. Total number of samples collected in 2017-18 does not include duplicates samples. The total does not include bottle blanks.
2. Total number of samples planned for 2017-18 for Labrador region was 93; 76 were sampled plus 4 duplicates and 2 trip blanks.
3. NF03OE0001 was not sampled as the hydrological conditions and accessibility at this site have changed due to construction work on the Muskrat Falls hydroelectric project.

Ambient Water Quality Analysis

During 2017-2018 analytical service for major ions, physical-chemical, and major ions analyses were transferred from NLET to ALET due to increased demand for NLET service by other Environment Canada programs. A laboratory comparability study was conducted by Environment Canada and Newfoundland and Labrador's Department of Municipal Affairs and Environment to assure data continuity. Metals analyses will remain at NLET. All shipping/analysis were carried out as agreed upon in the Annual Work Schedule 2017-2018 as seen in **Table 3**.

Table 3: Analytical Parameters, Holding Times and Schemas for 2017-2018

Schema Name	Parameter	Holding Times (recommended by ALET)
MAJOR IONS		
M_Alkalinity	Alkalinity	14 days
M_Anions	Chloride	28 days
	Sulphate	28 days
M_Metals_TR ICO-OES	Calcium	180 days
	Magnesium	180 days
	Sodium	180 days
	Potassium	180 days
PHYSICAL		
M_pH auto	pH	24 hours
M_Conductivity	Conductivity	28 days
M_Colour	Colourv - apparent	48 hours*
M_Turbidity	Turbidity	48 hours
NUTRIENTS		
M-Anions	Nitrate	24 hours*
M_TN	Total Nitrogen	28 days
M_TP	Total Phosphorus	28 days
M_DOC	DOC	28 days
METALS		
TM2004/T27W	Total Metals-27 elements*	6 months (analyzed at 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	

Ambient Water Quality Monitoring and Data Management/Reporting

During 2017-2018, significant effort from both EC and NL MAE was put into ensuring the Agreement data was accessible in a timely manner to any potential end-users of this water quality information. Numerous products were developed to help make the water quality information more user-friendly. Status of each task can be seen in **Table 4 & 5**.

Table 4: Ambient Water Quality Monitoring and Data Management Activities (Cost-Shared and Work-Shared)

Management Activities		Lead Agency	Progress Evaluation
Water Quality Sampling and Analysis	Collection of water samples under WQMA program and field data submission to laboratory	Newfoundland and Labrador Department of Municipal Affairs and Environment	See Table 1 and 2 for list of samples scheduled and collected.
	Laboratory Analysis and Quality Control Processes	Environment and Climate Change Canada	307 discrete + 25 QA/QC samples were analysed for 54/55 separate analytes. All data were verified at the time of sample reception and upon insertion to NAQUA.
Data Management	Processing and Loading of WQ analytical data	Environment and Climate Change Canada	This has been completed and up to date for 2017-2018.
	Accessibility/Availability of NL WQMA Dataset	Environment and Climate Change Canada	Data from NAQUA was provided to NL in September 2017 and March 2018.
Data Management Special Projects	Data Verification and Validation of Sample/Measurement Data	Environment and Climate Change Canada Newfoundland and Labrador Department of Municipal Affairs and Environment	Completion of Verification /Validation Protocol Document for the WQMA Manual based on reviews and comments received.
	Data extraction tools development and updates	Environment and Climate Change Canada	ECCC added Newfoundland and Labrador provincial data to the Government of Canada's Open

		Newfoundland and Labrador Department of Municipal Affairs and Environment	Data portal (data from 2006 to 2018)
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Table 5: Additional Core Activities 2017-2018 (Cost-Shared)

Project	Activity	Responsible Agency	Progress Evaluation
Canadian Aquatic Biomonitoring Network (CABIN)	Monitoring of benthic invertebrates at selected water bodies (reference sites, core CESI sites and annual sites) for maintenance of the long-term reference network in support of the Atlantic Reference Approach Model	Newfoundland and Labrador Department of Municipal Affairs and Environment	The three Annual CABIN sites were sampled in 2017: Northeast River (Eastern), Careless Cove Brook (Central) and Pinchgut Brook (Western).
	Share spatial data with EC/UNB, for use in the reference model	Newfoundland and Labrador Department of Municipal Affairs and Environment	This task is ongoing as new data becomes available each year.
	Baseline Report on Reference Invertebrate Assemblages in NL	Environment and Climate Change Canada	This has been deferred until fiscal year 2019-2020.
		Newfoundland and Labrador Department of Municipal Affairs and Environment	
	Develop CABIN reference model and associated tools and maintains database	Environment and Climate Change Canada	The Atlantic Reference Model is currently being updated by the WHERD. It will be available end of 2021.
Field Training	Newfoundland and Labrador Department of Municipal Affairs and Environment	NL MAE provides CABIN field training in NL as required. In 2017-2018. Field training was provided to four students from three ENGOs.	

Canadian Environmental Sustainability Indicators (CESI)	Compile, analyse and interpret water quality data at core CESI stations according to CESI protocols	Newfoundland and Labrador Department of Municipal Affairs and Environment	This has been completed and up to date for 2017-2018.
	Update CANAL metadata website with current year's CESI data	Newfoundland and Labrador Department of Municipal Affairs and Environment	Drivers of WQI scores and rankings updated every year to CANAL WQI Comments section.
	Review CESI final report from EC for accuracy	Newfoundland and Labrador Department of Municipal Affairs and Environment	This was completed for 2017-2018.
	QA/QC of submitted data/results and report to the public on the web page	Environment and Climate Change Canada	This has been completed and up to date for 2017-2018.
Modifications/ Improvements to CESI WQI Calculator	Re-coding to draw former web services data from static Access data table	Newfoundland and Labrador Department of Municipal Affairs and Environment	The calculator was recoded to provide access to the metadata using Access data table instead of web services.
	Reprogramming of the calculator to avail of the web services from new server location	Newfoundland and Labrador Department of Municipal Affairs and Environment	New web services links provided by ECCC were tested. All web services except one were found functional. However storing the metadata as access data tables were preferred due to some partners having firewall issues with web services and as a result usage of web services in the calculator were discontinued.
	Regular troubleshooting support	Newfoundland and Labrador Department of Municipal Affairs and Environment	All regular troubleshooting support was documented into and Excel file for the 2017-2018 fiscal year.
Chemical Management Plan	Special water sampling at a select station on the Waterford River	Newfoundland and Labrador Department of Municipal Affairs and Environment	CMP water samples were collected quarterly for Triclosan, Bisphenyl-A (BPA), Dysprosium (DY3), Nonylphenols and Nonylphenol Ethoxylates (NP-NPE) and Perfluorochemicals (PFC) from Waterford River in April 2017.

Labrador Remote Station Sampling	Labrador water samples are collected by both federal and provincial staff in support of CESI reporting (for more remote core sites).	Environment and Climate Change Canada Newfoundland and Labrador Department of Municipal Affairs and Environment	Northern sampling and analysis proceeded as outlined in the Annual Work Schedule 2017-2018. See Table 2.
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Table 6: Special Projects (Work Shared)

Project	Activity	Responsible Agency	Progress Evaluation
Monitoring Network Evaluation and Optimization	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.	Environment and Climate Change Canada Newfoundland and Labrador Department of Municipal Affairs and Environment	<p>Risk-Based Assessment (station level): The RBA provincial website was created after internal reviews. Individual station results files were generated to be integrated into the CANAL website. The updated website link was shared with ECCC.</p> <p>Risk-Based Assessment (basin level): No progress in 2017-2018</p> <p>Power Analysis / Trend Analysis: Envirotrend - Sample Time is added in the output data. All metal data is converted to microgram/litre from mg/L Power Analysis R-code added into Envirotrend.</p>
Climate Change Impacts and Adaptation	Review existing data from large rivers in Labrador to assess water quality trends related to climate change	Environment and Climate Change Canada Newfoundland and Labrador Department of Municipal Affairs and Environment	This activity was deferred to 2018-19.

Real-time Instrumentation Special Projects	In-situ water quality/quantity/climate monitoring using a mobile environmental monitoring platform (MEMP) on a need-basis across the province.	Environment and Climate Change Canada Newfoundland and Labrador Department of Municipal Affairs and Environment	During the Spring and Summer of 2017, renovations, programming and testing continued on the MEMP to add all required components. The MEMP was deployed November 2017 to June 2018 at Northwest Pond – drinking water supply for Ramea in response to concerns over salt water intrusion from wave inundation due to berm damage.
	Sharing of instrumentation purchase and maintenance expenses for real-time monitoring stations of joint interest	Environment and Climate Change Canada Newfoundland and Labrador Department of Municipal Affairs and Environment	Continuous water quality instrumentation belonging to EC, being used at select NL real time stations, was evaluated, assessed and repaired as necessary by NL MAE Staff.
Extrapolation of non-measured data at select real-time stations	Development of regression models to extrapolate water quality parameters from real-time measurements of related parameters.	Newfoundland and Labrador Department of Municipal Affairs and Environment	Conductivity Vs Ionic Concentration Continual collection and analysis of Ionic Concentration Vs Sodium, Calcium, Chloride and Sulphate parameters across the province. Turbidity vs TSS Continual collection and analysis of the Turbidity and TSS data across the province to ensure sufficient samples are obtained to develop model.
Real-time water quality monitoring products	Technical reports for real-time and automated water quality monitoring activities	Newfoundland and Labrador Department of Municipal Affairs and Environment	Report on review of long-term continuous monitoring results (IOC – 10 years) was deferred to 2018-2019. No RTWQ station audits were conducted for 2017-2018.
Progress Reporting	Progress reports for auditing purposes	Newfoundland and Labrador Department of Municipal Affairs and Environment	Reports deferred to 2018-2019.

In fiscal year 2017-2018, select WRMD staff attended and presented at many conferences and training initiatives. They are as follow:

- Session on draft amendments to WHMIS regulations – April 2017
- Water Monitoring Webinar Series: Long-term Look at Changes in the Quality of our Nation's Rivers and Streams – June 2017
- Swift Water Rescue – October 2017
- CESI Freshwater Quality Indicator Webinar – October 2017
- Real-Time Data Grooming: Multi-Station Data-Fix It – October 2017
- NewLeaf Conference 2017 – October 2017
- Standard First Aid/CPR – February 2018
- Certified UAV pilot – February 2017
- Hydrolab & Exo Refresher – March 2018
- GOES DC User Training – March 2018
- International Forum on Hydrogeology and Water Monitoring (Colombia) – March 2018
- Marine Institute Water Quality Program Presentations

Table 7: Industry Monthly and Annual Real-Time Water Quality Reports by WRMD Completed for 2017-2018

Partners	Monthly Deployment Reports	Annual Deployment Reports
Vale (Voisey's Bay)	Jun 2017 – Jul 2017 Jul 2017 – Aug 2017 Aug 2017 – Oct 2017 *Removed Winter Months	Jun 2017 – Oct 2017
Vale (Long Harbor)	Apr 2017 – Jun 2017 Jun 2017 – Jul 2017 Jul 2017 – Aug 2017 Sep 2017 – Nov 2017 Nov 2017 – Dec 2017 Dec 2017 – Jan 2018 Jan 2018 – Mar 2018 Mar 2018 – Apr 2018	Jan 2017 – Dec 2017
Duck Pond Operations (TECK)	Nov 2016 – May 2017 May 2017 – Jul 2017 Jul 2017 – Aug 2017 Aug 2017 – Nov 2017 Nov 2017 – May 2018	Jan 2017 – Dec 2017
Tacora Resources (formally Wabush Mines)	Jun 2017 – Jul 2017 Jul 2017 – Sep 2017 Sep 2017 – Oct 2017 *Removed Winter Months	Jun 2017 – Oct 2017
IOC	Jun 2017 – Jul 2017 Jul 2017 – Sep 2017 Sep 2017 – Oct 2017 *Removed Winter Months	Jun 2017 – Oct 2017
Tata Steel Minerals Canada Limited (TSMC)	Jun 2017 – Jul 2017 Jul 2017 – Aug 2017 Aug 2017 – Sep 2017 Sep 2017 – Oct 2017 *Removed Winter Months	Jun 2017 – Oct 2017
Nalcor	May 2017 – Jul 2017 Jul 2017 – Aug 2017 Aug 2017 – Sep 2017 Sep 2017 – Nov 2017 *Removed Winter Months	May 2017 – Nov 2017
Canada Fluorspar Inc	May 2017 – Jun 2017 Jun 2017 – Jul 2017 Jul 2017 – Sep 2017 Sep 2017 – Oct 2017 Oct 2017 – Nov 2017 *Removed Winter Months	Nov 2016 – Jan 2018

Table 8: WRMD Monthly Real-Time Water Quality Reports Completed for 2017-2018

WRMD Network	Monthly Deployment Reports
Leary's Brook at Prince Philip Drive	Apr 2017 – May 2017 May 2017 – Jun 2017 Jun 2017 – Aug 2017 Sep 2017 – Oct 2017 Oct 2017 – Nov 2017 Nov 2017 – Dec 2017 Dec 2017 – Feb 2018 Feb 2018 – Mar 2018 Mar 2018 – Apr 2018
Humber River at Humber Village Bridge	Apr 2017 – Jun 2017 Jun 2017 – Jul 2017 Jul 2017 – Sep 2017 Sep 2017 – Jan 2018 Jan 2018 – Nov 2018
Paddys Pond	Apr 2017 – Jun 2017 Jun 2017 Jul 2017 – Sep 2017 Sep 2017 – Nov 2017 Nov 2017 – Dec 2017 Dec 2017 – Mar 2018
Waterford River at Kilbride	Apr 2017 – May 2017 May 2017 – Jun 2017 Jun 2017 – Aug 2017 Aug 2017 – Nov 2017 Nov 2017 – Jan 2018 Jan 2018 – Apr 2018

Conclusion

A significant amount of work took place under the *Canada-Newfoundland and Labrador Water Quality Monitoring Agreement* for fiscal year 2017-2018. The number of available products from this program continues to grow annually. Activities for 2018-2019 will be clearly outlined in the upcoming Annual Work Schedule and Divisional Work Plan.

NL MAE would like to take this opportunity to thank our federal counterparts (EC Atlantic Region) for their on-going support and commitment in ensuring the delivery of the outcomes/products under the *Canada-Newfoundland and Labrador Water Quality Monitoring Agreement*.



Appendix A
Additional WRMD Activities 2017-2018

Project	Activity	Responsible Agency	Progress Evaluation
CANAL/Site Documentation Database/Bacteriological Database	Updating of the Site Documentation Database	Newfoundland and Labrador Department of Municipal Affairs and Environment	Updates to the Site Documentation Database are completed as needed.
	Calculation of the Water Quality Index scores	Newfoundland and Labrador Department of Municipal Affairs and Environment	In 2017-2018, CESI reporting was completed on 2014-2016 data, with updated scores added to CANAL along with relevant interpretive comments.
Ambient Monitoring Activities	Blue-Green Algae Monitoring	Newfoundland and Labrador Department of Municipal Affairs and Environment	Data is collected each summer on a “needs basis”, in response to public requests. Monitoring was conducted at Millers Pond (PCSP) in 2017. A BGA report was prepared for 2017. The report is on the NL MAE webpage.
Technical Documents (WQMA)	Updating of WQMA Sampling Manual	Newfoundland and Labrador Department of Municipal Affairs and Environment	Significant work was completed on this manual in 2017-2018. Manual will be completed and posted to MAE webpage in early 2018-2019.
	Updating of Contour Maps	Newfoundland and Labrador Department of Municipal Affairs and Environment	Two versions of 43 contour maps were created and submitted for quality review in June 2017 and January 2018. A 50-page user manual describing the mapping process was created in June 2017. Maps are undergoing a data review for accuracy and will be completed in 2018-2019.
	Delineation of Watersheds Upload to Portal	Newfoundland and Labrador Department of Municipal Affairs and Environment	Four new ambient water monitoring sites and seven new hydrometric stations had their watersheds delineated. These watersheds have not been uploaded to the internal and external web portals.
	Water Quality Calculator	Newfoundland and Labrador Department	CCME Water Quality Index Calculator work was completed and the CCME WQI 2.0 was uploaded

		of Municipal Affairs and Environment	in the CCME website. Many queries and reviews from CCME group was responded during the process.
	Water Quality Trends Report	Newfoundland and Labrador Department of Municipal Affairs and Environment	Update the initial trend report based on internal reviews. The updated report was submitted to ECCC for comments.
	Water Index (Quality/Quantity) Calculator	Newfoundland and Labrador Department of Municipal Affairs and Environment	Using Visual Studio.Net 2013 front end forms and functions were developed to initiate the Water Quality/Quantity Calculator development.
Real-Time Related Projects	Negotiating/renewals of Memorandum of Agreements with industry – New MOAs and Renewals	Newfoundland and Labrador Department of Municipal Affairs and Environment	<ul style="list-style-type: none"> - TSMC signed an amendment/extension in March 2018. - Churchill Falls (Labrador) Corporation Limited (CFLCo) signed an extension of the MOA in October 2017. - Wabush Mines signed an extension in April 2017. Tacora Resources Inc took over the mine and signed a MoA in February 2018. - Nalcor Energy (Muskrat Falls Corp) agreed to installation of an expanded monitoring network due to flooding in May 2017. MoA negotiations incorporating the expanded network will continue into 2018-2019.
	Research and Development of New Technologies	Newfoundland and Labrador Department of Municipal Affairs and Environment	<p>One MAE staff became a certified drone operator in February 2018. Multiple training flights were completed.</p> <p>Began beta testing of Hach HL-7 sonde. Testing will continue into 2018-2019 field season.</p> <p>The Shiny App Data Fix-it tool was expanded to include multi-station functionality and staff were trained in its usage.</p>

	Development of ADRS Console	Newfoundland and Labrador Department of Municipal Affairs and Environment	Multi-year project to initiate development of an ADRS console. Will proceed in a phase approach over the next three years.
	Quarterly Update of Temperature Probes	Newfoundland and Labrador Department of Municipal Affairs and Environment	Quarterly updates of temperature probes were conducted and information for prioritization of replacements was relayed to WSC.
	Real-time Instrumentation in-house Testing and Servicing	Newfoundland and Labrador Department of Municipal Affairs and Environment	This is an on-going task. Testing and evaluation generally takes place from Jan to April/May and involves a complete review of each water quality instrument in the network. There were 72 repairs conducted in 2017.
	Training of Industry Partners	Newfoundland and Labrador Department of Municipal Affairs and Environment	Training is provided to industry partners as needed. No training sessions were conducted in 2017-2018.
Technical Documents (RTWQ)	Updating of RTWQ Sampling Manual	Newfoundland and Labrador Department of Municipal Affairs and Environment	This is updated annually as required.
	10 year RTWQ report for Iron Ore Company of Canada, Newfoundland and Labrador	Newfoundland and Labrador Department of Municipal Affairs and Environment	Report has been delayed until 2018-2019.
	Report on the Comparison of TSS Concentration vs Real-time Turbidity Readings	Newfoundland and Labrador Department of Municipal Affairs and Environment	Presented Turbidity-TSS model on Lower Churchill sites to Nalcor. Included count of turbidity alerts at 15 and 30 NTU. Additional validation data added till 2016 for the model in the presentation.
Application of Earth Observation for Water Quality Monitoring	Monitor Changes in Turbidity and TSS along the Churchill River	Newfoundland and Labrador Department of Municipal Affairs and Environment	A draft methodology was developed to map turbid waters at the mouth of Churchill River and southern portion of Lake Melville using bathymetric data and satellite imagery.

Wetlands Inventory Partnership	Inventory and classification project with multiple partners to aid in wetlands inventory and classification systems	Newfoundland and Labrador Department of Municipal Affairs and Environment	Wetlands survey fieldwork was done for the Avalon pilot sites in 2017-2018. Meetings with the steering committee twice in 2017-2018.
Education/Outreach	Educational Displays	Newfoundland and Labrador Department of Municipal Affairs and Environment	Participated in Take Kids to Work Day 2017 demonstration.
	Webinar/Recorded Presentation Series	Newfoundland and Labrador Department of Municipal Affairs and Environment	It was discussed to develop: (1) a series of videos/webinars that cover the essential processes of RT work i.e. calibrations/basic repairs/instrument installations and other miscellaneous items that are part of working with RT. These videos/webinars would also be used for refresher training with industry partners when in-person sessions are not possible; and (2) Hosting a Webinar Series in lieu of the Real Time Workshop which is overdue. This project is ongoing.