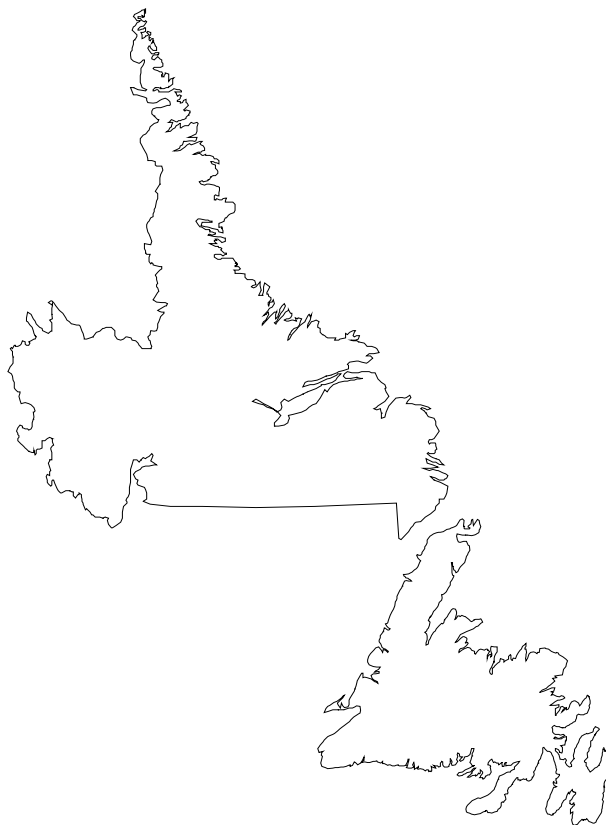


CANADA-NEWFOUNDLAND and LABRADOR WATER QUALITY MONITORING AGREEMENT

Progress Report 2020-2021



Water Resources Management Division
Department of Environment, Climate Change and Municipalities
St. John's, Newfoundland and Labrador

Atlantic Water Quality Monitoring - Surveillance de
la qualité de l'eau de l'Atlantique
Environment and Climate Change Canada -
Environnement et Changement climatique Canada
Dartmouth, Nova Scotia

Introduction

The following progress report was prepared by NL ECCM staff to document progress made on all activities under the *Canada-Newfoundland and Labrador Water Quality Monitoring Agreement* during 2020-2021. This document is formatted to reflect the same layout as the 2020-2021 Annual Work Schedule. Additionally, a table has been added to include activities completed solely by WRMD staff.

Work Shared Activities for Fiscal Year 2020-2021

Activity	Responsible Agency	Remarks
Cost Shared and Work-Shared Ambient Water Quality Monitoring and Data Management Activities	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities <u>and</u> Environment and Climate Change 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 Environment, Climate Change and Municipalities <u>and</u> Environment and Climate Change Canada	Refer to Table 5 for additional shared activities
Work-Shared Special Projects	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities <u>and</u> Environment and Climate Change 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 Environment, Climate Change and Municipalities	Refer to Appendix A for WRMD tasks/projects

Ambient Water Quality Sampling

During 2020-2021, the ambient water quality grab sampling proceeded as outlined in the corresponding Annual Work Schedule amendment. Quarter One sampling was not scheduled due to the Covid-19 restrictions and the ECCC laboratories being shutdown. 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, scheduling conflicts, human resource limitations, helicopter issues and adverse weather conditions some samples were missed.

In the upcoming fiscal year, NL ECCM staff will aim to ensure that the number of samples collected reflect the number of samples scheduled as outlined in the Annual Work Schedule 2021-2022.

Table 1: Provincial Samples Collected in 2020-2021 Fiscal Year in Newfoundland (Island Portion of the Province)

Station #	Description	Number of Samples Scheduled in 20-21	Number of Samples Collected in 20-21
<u>EASTERN REGION</u>			
NF02ZK0005	Northeast River near Placentia	4	4
NF02ZL0029	Goulds Brook near Makinsons	4	4
NF02ZM0004	Waterford River at Commonwealth Avenue	3	3
NF02ZM0009	Waterford River at Kilbride	3	3
NF02ZM0014	Virginia River at the Boulevard	3	3
NF02ZM0015	Quidi Vidi at Outlet	3	3
NF02ZM0016	Rennie's River at Carnell Drive	3	3
NF02ZM0020	Broad Cove Brook near St. Phillips	3	3
NF02ZM0098	Virginia River at headwaters	3	3
NF02ZM0109	Mundy Pond at Outlet	3	3
NF02ZM0175	Waterford River at Brookfield Rd.	3	3
NF02ZM0176	South Brook at Mouth	3	3
NF02ZM0177	Rennie's River at Portugal Cove Road	3	3
NF02ZM0178	Learys Brook at Prince Phillip Drive	7	7
NF02ZM0179	Tributary to Virginia River at Guzzwell Drive	3	3

Station #	Description	Number of Samples Scheduled in 20-21	Number of Samples Collected in 20-21
NF02ZM0180	Virginia River at Newfoundland Drive	3	3
NF02ZM0181	Waterford River at Blackhead Road	7	7
NF02ZM0182	Waterford River at Bremigans Pond Dam	3	3
NF02ZM0183	Kelligrews River at Kelliview Crescent	3	3
NF02ZM0185	South Brook at Headwaters	3	3
NF02ZM0294	Manuels River above Manuels Access Road	3	3
NF02ZM0359	Paddy's Pond at Outlet	3	3
NF02ZN0004	Salmonier River at St. Catherines	3	3
<u>CENTRAL REGION</u>			
NF02YO0001	Exploits River at Grand Falls	3	3
NF02YO0020	Exploits River at Aspen Brook	3	3
NF02YO0107	Exploits River near Millertown	4	4
NF02YO0128	Exploits River below Grand Falls	3	3
NF02YO0142	Corduroy Brook near Centennial Park	3	3
NF02YO0143	Exploits River at Bond Bridge	3	3
NF02YQ0030	Gander River at Appleton	4	4
NF02YQ0072	Careless Brook at Resource Road Steel Bridge	3	3
NF02YS0001	Terra Nova River at Terra Nova	3	3
NF02YS0011	Terra Nova River at Spencer Bridge	4	4
NF02YS0083	Northwest River at Terra Nova National Park	3	3
<u>WESTERN REGION</u>			
NF02YE0004	Portland Creek at Route 430	3	3
NF02YE0005	Western Brook at Route 430	4	4
NF02YG0001	Main River at Route 420	4	4

Station #	Description	Number of Samples Scheduled in 20-21	Number of Samples Collected in 20-21
NF02YL0106	South Brook below TCH	3	3
NF02YG0020	Eagle Mountain Brook below Eagle Mountain Pond	3	3
NF02YH0018	Lomond River at Route 431	3	3
NF02YJ0004	Pinchgut Brook at TCH	7	7
NF02YK0022	Humber Canal at Main Dam Road	3	4
NF02YL0011	Humber River at Little Falls Bridge	3	4
NF02YL0012	Humber River at Humber Village Bridge	7	7
NF02YL0013	Corner Brook at Margaret Bowater Park	3	4
NF02YL0029	Wild Cove Brook at Route 440	3	4
NF02YN0001	Lloyds River at Route 480	4	4
NF02YN0043	Peter Stride's Lake at Route 780	3	3
NF02ZA0006	Grand Codroy River below Overfall Brook	3	3
NF02ZC0020	Buck Lake on Route 480	3	3

Notes:

1. Total number of samples collected in 2020-21 does include duplicate samples. The total does not include bottle blanks.
2. Total number of samples planned for 2020-21 for Eastern region was 79; 79 were sampled, plus 6 duplicates and 0 trip blanks.
3. Total number of samples planned for 2020-21 for Central region was 36; 36 were sampled, plus 2 duplicates and 0 trip blanks.
4. Total number of samples planned for 2020-21 for Western region was 59; 63 were sampled, plus 6 duplicates and 0 trip blanks.

Table 2: Northern Samples Collected in 2020-2021 Fiscal Year in Labrador

Station #	Description	Number of Samples Scheduled in 20-21	Number of Samples Collected in 20-21
NF02XA0001	Little Mecatina River above Lac Fourmont	3	3
NF03NF0013	Ugjoktok River below Harp Lake	3	3
NF03OA0020	Ashuanipi River at Ferguson Bay	3	1
NF03OC0012	Atikonak River above Panchia Lake	3	3
NF03OD0011	East Metchin River at TLH	3	3
NF03OD0012	Wilson River East Branch	3	3
NF03OE0001	Churchill River Above Upper Muskrat Falls	3	0
NF03OE0050	Churchill River 6.15kms below Lower Muskrat Falls	3	3
NF03OE0029	Churchill River above Grizzle Rapids	3	3
NF03OE0030	Minipi River below Minipi Lake	3	3
NF03OE0032	Pinus River above TLH	3	3
NF03OE0033	Big Pond Brook below Big Pond	3	3
NF03OE0035	Dominion Lake Outflow	3	3
NF03OE0037	Cache River at TLH	3	3
NF03PB0025	Naskaupi River below Naskaupi Lake	3	2
NF03PB0028	Cape Caribou River at Grand Lake	3	3
NF03PB0029	Grand Lake Outflow at North West River	3	3
NF03PB0030	Seal Lake at Narrows	3	2
NF03PB0032	Susan River North of Beaver River	3	2
NF03PB0037	Wuchusk Lake at Naskaupi River Inflow	3	2
NF03QA0044	Carter Basin Outflow	3	3
NF03QA0045	Kenamu River near Mouth	3	3
NF03QC0001	Eagle River above Falls	3	3
NF03QC0002	Alexis River near Port Hope Simpson	3	3
NF03XB0018	Tributary to St. Augustin River	3	3

Notes:

1. Total number of samples collected in 2020-21 does include duplicate samples. The total does not include bottle blanks.
2. Total number of samples planned for 2020-21 for Labrador region was 75; 66 were sampled, plus 2 duplicates and 0 trip blanks.

Ambient Water Quality Analysis

During 2020-2021 analytical service for major ions, physic-chemical, and major ions analyses were conducted at a private laboratory and metals were preserved in the field and analyzed at NLET in 2021. ALET and NLET were both closed for the entirety of 2020-21. All shipping/analysis were carried out as agreed upon in the Annual Work Schedule 2020-2021 as seen in **Table 3**.

Table 3: Analytical Parameters, Holding Times and Schemas for 2020-2021

Schema Name	Parameter	Holding Times (recommended by private laboratory)
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	0 hours
M_Conductivity	Conductivity	28 days
M_Colour	Colourv - apparent	2 days
M_Turbidity	Turbidity	2 days
NUTRIENTS		
M-Anions	Nitrate	3 days
M_TN	Total Nitrogen	28 days
M_TP	Total Phosphorus	28 days
M_TOC	TOC	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 2020-2021, significant effort from both EC and NL ECCM 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	NL ECCM	See Table 1 and 2 for list of samples scheduled and collected.
	Entering field data onto field sheets and subsequent submission to laboratory	NL ECCM	This has been completed and up to date for 2020-2021.
	Laboratory Analysis and Quality Control Processes	ECCC	Due to Covid-19 restrictions, ALET and NLET were shutdown for the entirety of 2020-21. Alternate arrangements were made with a private laboratory for analysis normally conducted at ALET. Metals normally analyzed at NLET were preserved in the field and analyzed in 2021.
Data Management	Processing and Loading of WQ analytical data	ECCC	This has been completed and up to date for 2020-2021.
	Accessibility/Availability of NL WQMA Dataset	ECCC	ECCC provided complete data to NL ECCM in September 2020 and March 2021.
Data Management Special Projects	Data Verification and Validation of Sample/Masurement Data	ECCC _____ NL ECCM	Data validation completed in 2020-2021. Data verification protocols will be developed by WRMD in 2021-2022.
	Data extraction tools development and updates	ECCC _____ NL ECCM	No advances or updates made due to upcoming purchase of new Data Management Solution.

Table 5: Additional Core Activities 2020-2021 (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	NL ECCM	Three annual CABIN sites were sampled in 2020.
	Baseline Report on Reference Invertebrate Assemblages in NL	ECCC	Progress made on Report. Draft to be completed and shared for review in 2022-2023.
		NL ECCM	
	Share spatial data with EC, for use in the reference model	NL ECCM	This task is ongoing as new data becomes available each year.
	Field certification and training (as needed)	NL ECCM	No training permitted due to COVID-19 restrictions. New staff will be field trained in 2021-22.
	Develop CABIN reference model and associated tools	ECCC	ECCC's Watershed Hydrology and Ecology Research Division – Updated Atlantic Reference Model and DNA model being reviewed. Will be available in 2022-2023.
Continued calibration and testing of Atlantic Canada model by EC, WRMD and partners.			
Prepare course/presentation on how to look at data in Atlantic	ECCC	Plans have changed: Normal Ranges metric calculations package document will be shared in 2022.	
Canadian Environmental Sustainability	Compile, analyse and interpret water quality data at core CESI stations according to CESI protocols	NL ECCM	This has been completed and up to date for 2020-2021.

Indicators (CESI)	Update CANAL metadata website for current year's CESI data	NL ECCM	Drivers of WQI scores and rankings updated every year to CANAL WQI Comments section.
	Final report validating/contributing to CESI core stations review for longer term WQI national reporting	NL ECCM	This was completed for 2020-2021.
	QA/QC of submitted data/results and report to the public on the web page	ECCC	This has been completed and up to date for 2020-2021.
Modifications/Improvements to CESI WQI Calculator	Troubleshooting support and corresponding update in CESI Calculator coding.	NL ECCM	Updates to CESI WQI calculator were documented in the ongoing Excel spreadsheet maintained and updated by WRMD.
	Update of CESI Calculator Help Manual as required	NL ECCM	Added Equation Builder into the Calculator. Modified Help Manual to add Equation Builder and Error Fact sheet into a single manual – Review in progress of both the above tasks.
	Investigate how Trends Analysis can be incorporated into the CESI calculator.	ECCC	This activity is still on hold for ECCC, due to workload for other priorities.
	Inclusion of French version of CESI Help Manual.	ECCC	Carried over to 2021-2022.
Chemical Management Plan	Special water sampling at a select station on the Waterford River	NL ECCM	CMP water samples were collected twice for Alkylphenols and PFOS from Waterford River from April 1, 2020 to March 31, 2021.
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).	ECCC	Northern sampling and analysis proceeded as outlined in the Annual Work Schedule 2020-2021. See Table 2.
		NL ECCM	

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.	ECCC _____ NL ECCM	<u>Environment and Climate Change Canada</u> - ECCC continued to provide guidance and advice as required and work with NL ECCM to optimize approach for NL waters. - Sampling frequencies were evaluated on an on-going basis. <u>NL Department of Environment, Climate Change and Municipalities</u> - NL ECCM updated Risk-Based Assessment results to each station profile page on CANAL as required. Results have been shared on the Departmental main webpage. - NL ECCM finalized the Phase 2 Trend Analysis Report for NL stations.
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.	ECCC _____ NL ECCM	MEMP was not deployed in 2020-2021 due to staff vacancies and COVID-19 limitations.
	Sharing of instrumentation purchase, deployment and maintenance expenses for monitoring stations of joint interest.	ECCC _____ NL ECCM	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	ECCC _____ NL ECCM	<u>NL Department of Environment, Climate Change and Municipalities</u> - Regression models to compare total suspended solids (TSS) concentration vs. real-time turbidity measurements at stations once enough grab samples (at least 30) data is being collected to develop the model and additional three years of samples to validate the models. - Phase two of the technical report of TSS-Turbidity regression models currently developed (Churchill River sites) and currently under review.

			<u>Environment and Climate Change Canada</u> - ECCC will continue to provide technical advice and review on the approach considering its national applicability.
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In fiscal year 2020-2021, select WRMD staff attended and presented at many conferences and training initiatives. They are as follow:

- UAV: pilot certificate advanced operations from Transport Canada – July 2020
- GOES DCS Training – April 2020

Table 7: Industry Monthly and Annual Real-Time Water Quality Reports Completed for 2020-2021

Partners	Monthly Deployment Reports	Annual Deployment Reports
Canada Fluorspar Inc	May 2020 – Jul 2020 Jul 2020 – Aug 2020 Aug 2020 – Dec 2020 *Removed Winter Months	May 2020 – Dec 2020
Duck Pond Operations (TECK)	Dec 2019 – May 2020 May 2020 – Jul 2020 Jul 2020 – Aug 2020 Aug 2020 – Oct 2020 Oct 2020 – Nov 2020 Nov 2020 – May 2021	Jan 2020 – Dec 2020
Nalcor	Jun 2020 – Sep 2020 Aug 2020-Sep 2020 Sep 2020 – Nov 2020 *Removed Winter Months	Jun 2020 – Nov 2020
Northern Harvest Smolt Ltd	n/a	Jan 2020 – Dec 2020
IOC	Jul 2020 – Sep 2020 Sep 2020 – Oct 2020 *Removed Winter Months	Jul 2020 – October 2020
Rambler Metals and Mining Inc	May 2020 – Jul 2020 Jul 2020 – Aug 2020 Aug 2020 – Nov 2020 *Removed Winter Months	May 2020 – Nov 2020
Tacora Resources (formally Wabush Mines)	Jul 2020 – Sep 2020 Sep 2020 – Oct 2020 *Removed Winter Months	Jul 2020 – Oct 2020
Tata Steel Minerals Canada Limited (TSMC)	Instrument was installed for one month period in 2020. *Removed Winter Months	Jun 2020 – Oct 2020
Vale (Long Harbor)	Jan 2020 – Mar 2020 Mar 2020 – Apr 2020 Apr 2020 – Jun 2020 Jun 2020 – Jul 2020 Jul 2020 – Aug 2020 Aug 2020 – Sep 2020 Sep 2020 – Nov 2020 Nov 2020 – Dec 2020 Dec 2020 – Jan 2021 Jan 2021 – Mar 2021 Mar 2021 – Apr 2021	Jan 2020– Dec 2020
Vale (Voisey's Bay)	Jun 2020 – Aug 2020 Aug 2020 – Sep 2020 Sep 2020 – Oct 2020 *Removed Winter Months	Jun 2020 – Oct 2020

Table 8: WRMD Monthly Real-Time Water Quality Reports Completed for 2020-2021

WRMD Network	Monthly Deployment Reports
Leary's Brook at Prince Philip Drive	Mar 2020 – Apr 2020 Apr 2020 – Jun 2020 Jun 2020 – Jul 2020 Jul 2020 – Sep 2020 Sep 2020 – Nov 2020 Nov 2020 – Dec 2020 Dec 2021 – Feb 2021 Feb 2021 – Mar 2021 Mar 2021 – May 2021
Humber River at Humber Village Bridge	May 2020 – Sep 2020 Sep 2020 – Oct 2020 Oct 2020 – Dec 2020 Jan 2021 – May 2021 May 2021 – Jul 2021 Jul 2021 – Nov 2021
Paddys Pond	Instrument was not installed in 2020.
Waterford River at Kilbride	May 2020 – Sep 2020 Sep 2020 – Oct 2020 Oct 2020 – Dec 2020 Dec 2020 – Jan 2021 Jan 2021 – Aug 2021

Conclusion

A significant amount of work took place under the *Canada-Newfoundland and Labrador Water Quality Monitoring Agreement* for fiscal year 2020-2021. The number of available products from this program continues to grow annually.

NL ECCM 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 2020-2021

Project	Activity	Responsible Agency	Progress Evaluation
CANAL/Site Documentation Database/Bacteriological Database	Updating of the Site Documentation Database	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	Updates to the Site Documentation Database are completed as needed.
	Calculation of the Water Quality Index scores	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	In 2020-2021, CESI reporting was completed on 2017-2019 data.
Ambient Monitoring Activities	Blue-Green Algae Monitoring	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	Data is collected each summer on a “needs basis”, in response to public requests. Monitoring was conducted at Millers Pond (PCSP) in 2020. A BGA report was prepared for 2020. The report is on the NL ECCM webpage.
Technical Documents (WQMA)	Updating of Water Quality Monitoring Sampling Manual	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	Updated as required.
	Field Sampling Tablet Application	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	An application for digital field sheets using a tablet was piloted in the Labrador region in 2020-21.
	Updating of Contour Maps	Newfoundland and Labrador Department of Environment, Climate	Finalized and posted on the ECCM webpage in 2020-2021.

		Change and Municipalities	
	Water Quality Trends Report	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	Report was finalized and posted on ECCM webpage in 2020-21.
	Water Index (Quality/Quantity) Calculator	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	Added code behind to include multi guideline base (drinking, aquatic, recreation, irrigation etc using WQMA and Drinking Water Guideline) computation on single or multiple stations. Added the code behind to include Forestry Water Quality Index Calculator.
	Network Evaluation	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	Updated all classification and prioritization result obtained from R code and completed the Network evaluation report on hydrometric station. A corresponding analysis was performed on climate stations using temperature and precipitation data.
Real-Time Related Projects	Negotiating/renewals of Memorandum of Agreements with industry – New MOAs and Renewals	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	Iron Ore Company of Canada renewed MOA to March 31, 2026. Vale Long Harbour renewed MoA to March 31, 2022. Canada Fluorspar Inc renewed MoA to March 31, 2022.
	Piloting of Drone Technology	Newfoundland and Labrador Department of	Six flights completed for dam and hydrometric hut.

		Environment, Climate Change and Municipalities	New drone purchased to increase flight frequency better capacity for weather conditions.
	Redeployment of Buoy System in Lake Melville	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	Buoy was not deployed in 2020-21. Repair parts were purchased to replace solar panels, datalogger, and cellular modem.
	Real-time Instrumentation in-house Testing and Servicing	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	This is an on-going task. Testing and evaluation generally takes place from Jan to April/May and involves a complete review of every water quality instruments in the network. There were 70 repairs conducted in 2020.
	Training of Industry Partners	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	No industry training was requested in 2020-2021 due to COVID-19 restrictions.
Education/Outreach	Outreach	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities	No education/outreach was conducted in 2020-21 due to COVID-19 restrictions.