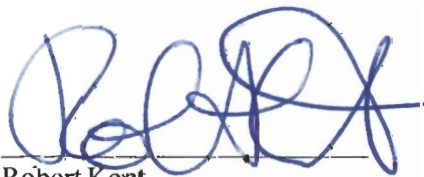
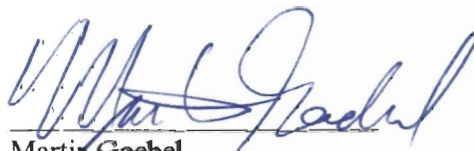


**Canada-Newfoundland and Labrador
Water Quality Monitoring Agreement
Annual Work Schedule 2009-2010**

The attached Schedules A, B, C, Di, Dii, E, and F outline work activities to be carried out during the current fiscal year under the Canada-Newfoundland and Labrador Water Quality Monitoring Agreement. All seven Schedules have been reviewed and approved by the Administrators of the Agreement.



Robert Kent
Administrator, on behalf of
Environment Canada
Government of Canada



Martin Goebel
Administrator, on behalf of
Department of Environment & Conservation
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. Jean-Francois Bibeault Environment Canada Atlantic Region, on behalf of Canada

Mr. Martin Goebel Department of Environment & Conservation, on behalf of
Newfoundland & Labrador

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

Mr. Joe Pomeroy Environment Canada Atlantic Region (Water Quality Monitoring
& Surveillance)

Mr. Art Cook Environment Canada Atlantic Region (Atlantic Laboratory for
Environmental Testing)

Mr. Haseen Khan Water Resources Management Division, Newfoundland &
Labrador Department of Environment & Conservation

Schedule B

Work Shared Activities for Fiscal Year 2009-2010

Schedule B – Work Shared Activities 2009-2010

Activity	Responsible Agency	Remarks
Ambient Water Quality Sampling	Newfoundland and Labrador Department of Environment and Conservation	Refer to Table B.1 & Figure 1 for sampling details
Ambient Water Quality Analysis	Environment Canada – National Laboratory for Environmental Testing (NLET)	Refer to Table B.2 for analysis details
Recreational Water Quality Sampling and Analysis	Newfoundland and Labrador Department of Environment and Conservation	This activity has been put on-hold for this fiscal year to address office activities related to the program
ENVIRODAT and Data Management/Reporting	Newfoundland and Labrador Department of Environment and Conservation <u>and</u> Environment Canada	Refer to Table B.3 for ENVIRODAT; Refer to Table B.4 for Data Management/Reporting

Table B.1: Index Station Location, Designation and Sampling Frequency 2009-2010

Station #	Description	Latitude	Longitude	Samples/year	Sampled By	Classification
<u>EASTERN REGION</u>						
NF02ZK0005	Northeast River	47 16 23	53 50 25	4	P	CABIN site 09-10 / Hydrometric
NF02ZL0029	Goulds Brook	47 30 18	53 17 28	4	P	CABIN site 09-10
NF02ZM0004	Waterford River at Commonwealth Ave.	47 31 19	52 48 29	4	P	
NF02ZM0009	Waterford River at Kilbride	47 31 46	52 44 34	4	P	Chemical Management Plan / RTWQ / Hydrometric / current CESI
NF02ZM0014	Virginia River at The Boulevard	47 35 02	52 41 29	4	P	current CESI
NF02ZM0015	Quidi Vidi Lake at Outlet	47 35 02	52 40 51	4	P	current CESI
NF02ZM0016	Rennies River at Carnell Drive	47 34 40	52 42 03	4	P	current CESI
NF02ZM0020	Broad Cove Brook	47 35 53	52 52 53	4	P	CABIN site 08-09
NF02ZM0098	Virginia River at headwaters	47 35 56	52 45 17	4	P	CABIN site 08-09 / Comp Guidelines Site
NF02ZM0109	Mundy Pond at Outlet	47 33 40	52 44 38	4	P	former CESI
NF02ZM0144	Kelly's Brook at Portugal Cove Rd.	47 34 28	52 42 45	4	P	current CESI
NF02ZM0175	Waterford River at Brookfield Rd.	47 31 34	52 45 48	4	P	
NF02ZM0176	South Brook at Mouth	47 31 41	52 44 48	4	P	
NF02ZM0177	Rennies River at Portugal Cove Rd.	47 34 28	52 42 36	4	P	
NF02ZM0178	Learys Brook at Clinch Cres.	47 34 21	52 44 21	4	P	RTWQ / Hydrometric / current CESI
NF02ZM0179	Virginia River at Guzzwell Drive	47 35 47	52 42 06	4	P	
NF02ZM0180	Virginia River at Newfoundland Dr.	47 35 59	52 42 02	4	P	
NF02ZM0181	Waterford River at Blackhead Road	47 32 53	52 43 09	4	P	current CESI
NF02ZM0182	Waterford River at Bremigans Pond	47 31 07	52 51 21	4	P	
NF02ZM0183	Kelligrews River at Kelliview Cres.	47 29 45	53 01 03	4	P	
NF02ZM0184	Learys Brook at Outer Ring Road	47 34 16	52 47 29	4	P	current CESI
NF02ZM0185	South Brook at Headwaters	47 29 37	52 51 02	4	P	CABIN site 08-09 / Comp Guidelines Site / former CESI
NF02ZM0294	Manuels River	47 31 11	52 56 41	4	P	Archaeological significant
NF02ZN0004	Salmonier River	47 10 54	53 23 56	4	P	
<u>CENTRAL REGION</u>						
NF02YM0003	Indian Brook	49 29 53	56 10 35	4	P	CABIN site 08-09 / Hydrometric

NF02YM0004	South West Brook at Baie Verte	49 55 15	56 13 45	4	P	Hydrometric
NF02YO0001	Exploits River at Grand Falls	48 55 27	55 39 21	4	P	current CESI
NF02YO0121	Peter's River	49 06 21	55 24 38	4	P	Hydrometric /Former RTWQ / current CESI
NF02YO0020	Exploits River at Aspen Brook	48 56 55	55 54 56	4	P	current CESI
NF02YO0107	Exploits River at Millertown Dam	48 45 34	56 35 32	4	P	Hydrometric / current CESI
NF02YR0001	Pound Cove Brook	49 11 11	55 55 24	4	P	Comp Guidelines Site
NF02YO0128	Exploits River below Grand Falls	48 56 12	55 37 03	4	P	former CESI
NF02YO0142	Corduoy Brook	48 56 21	55 39 47	4	P	current CESI
NF02YO0143	Exploits River at Bond Bridge	49 01 15	55 27 15	4	P	former CESI
NF02YO0189	Joe's Lake	49 01 43	56 04 01	4	P	current CESI
NF02YQ0006	North West Gander River	48 34 54	55 30 20	4	P	CABIN site 08-09 / current CESI / Comp Guidelines Site
NF02YQ0030	Gander River at Appleton	48 59 41	54 52 04	4	P	Hydrometric / current CESI
NF02YS0001	Terra Nova River at Terra Nova	48 30 27	54 12 43	4	P	current CESI
NF02YS0011	Terra Nova River at ES Spencer Bridge	48 38 27	54 02 11	4	P	Hydrometric / former CESI
NF02YS0083	Northwest River at Terra Nova	48 23 44	54 11 53	4	P	Hydrometric / National Park
<u>WESTERN REGION</u>						
NF02YE0005	Western Brook	49 49 49	57 51 23	4	P	CABIN site 08-09
NF02YE0004	Portland Creek	50 10 54	57 36 13	4	P	
NF02YG0001	Main River at Bridge	49 46 10	56 54 15	4	P	Canadian Heritage River / current CESI
NF02YG0009	Main River at Paradise Pool	49 48 46	57 09 24	4	P	RTWQ / Hydrometric / Canadian Heritage River
NF02YG0020	Eagle Mountain Brook	49 49 53	57 17 15	4	P	Current CESI
NF02YH0018	Lomond River	49 24 07	57 43 49	4	P	CABIN site 08-09
NF02YJ0004	Pinchgut Brook	48 47 51	58 03 43	4	P	CABIN site 08-09 / former CESI
NF02YK0022	Humber Canal	49 09 58	57 24 56	4	P	
NF02YL0011	Humber River at Little Falls	49 20 54	57 14 07	4	P	former CESI
NF02YL0012	Humber River at Humber Village Bridge	48 59 01	57 45 40	4	P	RTWQ / Hydrometric / current CESI
NF02YL0013	Corner Brook at Margaret Bowater Park	48 56 40	57 56 12	4	P	former CESI
NF02YL0029	Wild Cove Brook	48 58 28	57 53 02	4	P	former CESI
NF02YN0001	Lloyds River	48 18 16	57 43 07	4	P	
NF02YN0043	Peter Strides Lake	48 09 13	57 43 24	4	P	
NF02ZC0020	Buck Lake	48 00 48	57 39 59	4	P	
NF02ZA0006	Grand Codroy River	47 52 08	59 07 05	4	P	

P-Provincial

Notes:

1. A total of 56 stations will be sampled during 2009-2010 on the island portion of the province.
2. For statistical analysis it is important that **at least four samples are collected from each station** representing four seasons in a fiscal year.
3. Total number of samples to be collected is 224.

Figure 1 – Water Quality Stations 2009-2010 - Newfoundland

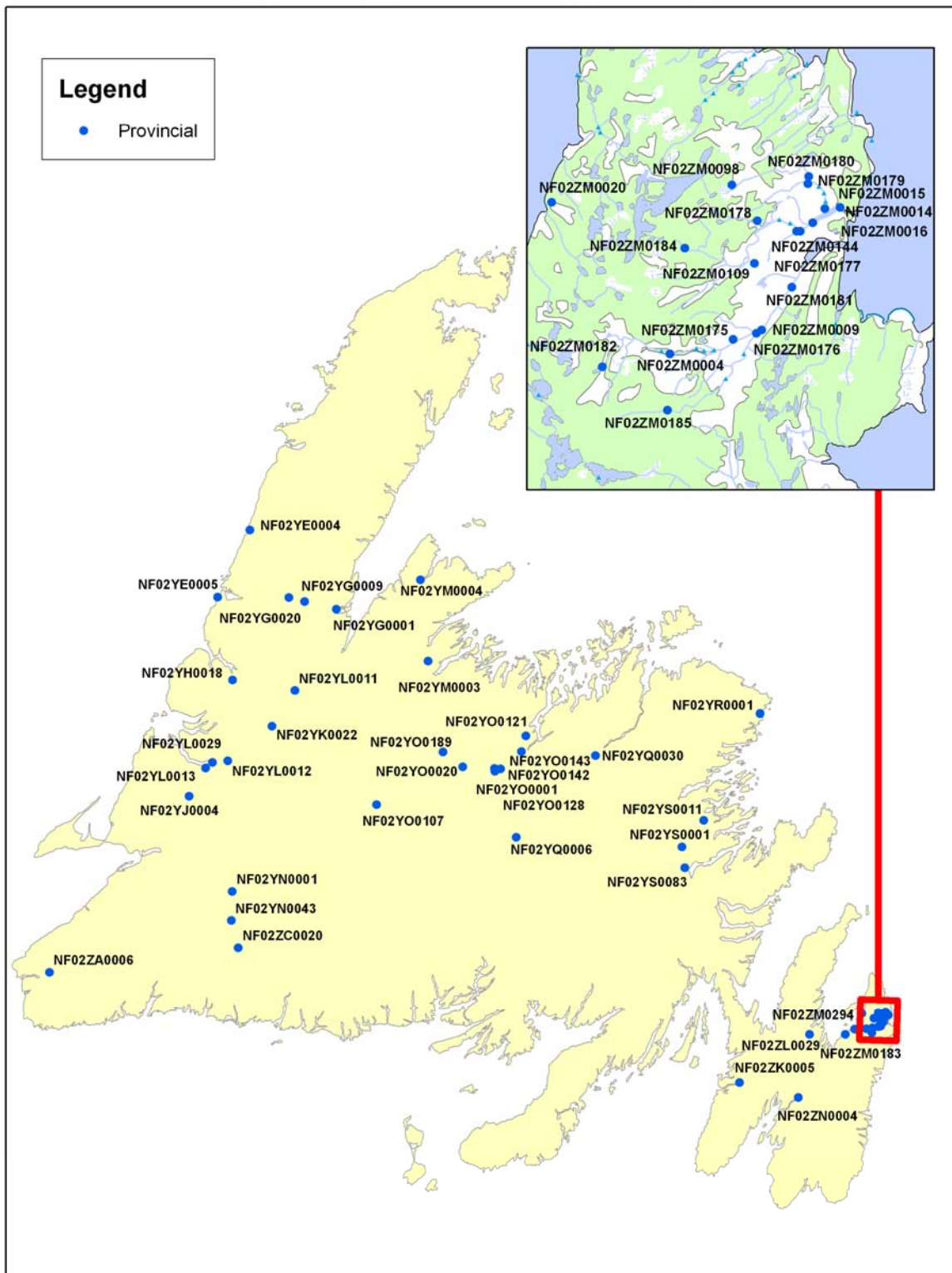


Table B.2: Analytical Parameters, Holding Times and Schemas for 2009-2010

Parameter	Holding Times (recommended by NLET)
MAJOR IONS	
Alkalinity	24 hours
Chloride	28 days
Sulphate	28 days
Calcium	8 weeks
Magnesium	8 weeks
Sodium	8 weeks
Potassium	8 weeks
PHYSICAL	
pH	24 hours
Conductivity	28 days
Colour	48 hours
Turbidity	24 hours
NUTRIENTS	
Nitrate	24 hours
Total Nitrogen	24 hours
Total Phosphorus	1 year
DIC/DOC	24 hours
METALS	
Total Metals-27 elements	6 months

Schema Number	Schema Name	Parameter/ Grouping
1	ALKPHCOND	alkalinity, pH, conductivity
2	MI4-U	Ca, Mg, Na, and K
5	NO3ATL-U	NO3 by IC
6	CLSO4-U	Cl and SO4 by IC
11	TP1-U	total phosphorus
12	TN1-U	total nitrogen
13	DIC/DOC1	dissolved inorganic and organic carbon
23	COL-APP	Colour-apparent (unfiltered sample)
24	TURBIDITY3	turbidity
31	TM2003/T27W	Total metals-27 elements

***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	

Table B.3: ENVIRODAT – Data Management

Management Activities		Lead Agency	NL Contribution*	EC Contribution*
Sample Submission	Laboratory procedures and quality control practices	Environment Canada – ALET		
	Design of field sheets and station identification sheets (administrative)	Environment Canada – CIOB ----- Newfoundland and Labrador Department of Environment and Conservation – staff		
	Entering field data onto field sheets; entering of information on station identification sheets; submission to laboratory (field)	Newfoundland and Labrador Department of Environment and Conservation – staff		
	Data entry of station identification information and sample submission information upon receipt at laboratory (laboratory)	Environment Canada – ALET		
Management of national water quality database (ENVIRODAT)	Processing, validating and loading of analytical results performed at NLET or ALET to ENVIRODAT	Environment Canada – CIOB		
	Backups, modifications, upgrades and additions to ENVIRODAT	Environment Canada – CIOB		
	Data audits, custody and transfer	Environment Canada – CIOB		
	Quality assurance and quality control of data	Environment Canada – CIOB		
	Activities relating to problem resolution, data modifications and additions, and requests for information	Environment Canada – CIOB		

	Resolving historical data issues	Environment Canada – CIOB ----- Newfoundland and Labrador Department of Environment and Conservation - staff		
Data Extraction Tool/Web Services	Availability of data outside the firewall for new data loaded to ENVIRODAT	Environment Canada – CIOB/WQMS		
	Consistent planning and coordinating of modifications to data extraction tools	Environment Canada – CIOB/WQMS		
	Development/Maintenance of ENVIRODAT Web Services	Environment Canada – CIOB/WQMS ----- Newfoundland and Labrador Department of Environment and Conservation – Paul Neary/Leona Hyde		
Current/Ongoing Projects of Importance	Storing and grouping of variable and method codes that facilitate data entry, data extraction and data interpretation.	Environment Canada - CIOB		
	Working towards controlled vocabulary within ENVIRODAT	Environment Canada - CIOB		
	Quality flagging of measurement data	Environment Canada - CIOB		
	Downloading of NL WQMA data from ENVIRODAT	Newfoundland and Labrador Department of Environment and Conservation - staff		
	Quality assurance/quality control and data validation of NL WQMA datasets	Newfoundland and Labrador Department of		

		Environment and Conservation - staff		
TOTAL:				

- * Activities listed in this table are work-shared activities
- **CIOB** – Chief Information Officer Branch (Cathy Cormier)
- **ALET** – Atlantic Laboratory for Environmental Testing (Art Cook/Mark Thibodeau)
- **WQMS** – Water Quality Monitoring and Surveillance (Dave Benoit/Ryan Alexander/Daniel Bastrache/Dennis Parent/Todd Smith)
- Please refer to **Annex I** for activity details

Table B.4: Technical Documents and Reporting

Project	Activity	Responsible Agency	NL Contribution*	EC Contribution*	Remarks
CANAL / Site Documentation Database / Bacteriological Database	On-going updating of CANAL webpage	Environment Canada – WQMS ----- Newfoundland and Labrador Department of Environment and Conservation – Paul Neary			
	On-going <u>maintenance</u> of the Site Documentation Database	Newfoundland and Labrador Department of Environment and Conservation - staff			
	On-going <u>populating</u> of the Site Documentation Database	Newfoundland and Labrador Department of Environment and Conservation – Paul Neary/Rob Holloway			
	On-going <u>maintenance</u> of the Bacteriological Database	Newfoundland and Labrador Department of Environment and Conservation - staff			
	On-going updating of the Water Quality Index scores	Newfoundland and Labrador Department of Environment and Conservation – Kyla Brake			
	On-going updating of the summary statistics	Newfoundland and Labrador Department of Environment and Conservation – Kyla Brake			
	Addition of CABIN sites to CANAL	Newfoundland and Labrador Department of			

		Environment and Conservation - staff			
	Delineation and digitization of all WQMA stations (Newfoundland and Labrador); including any new stations added (ie: CABIN: real-time)	Newfoundland and Labrador Department of Environment and Conservation - Keith Abbott			
Automatic Data Retrieval System (ADRS)	On-going Real-time Service Delivery (ADRS – reporting)	Newfoundland and Labrador Department of Environment and Conservation – Paul Neary/Leona Hyde			
	Development and Testing of ADRS Search Engine	Newfoundland and Labrador Department of Environment and Conservation – Paul Neary/Leona Hyde			
	Development and Testing of Inventory / Servicing Database	Newfoundland and Labrador Department of Environment and Conservation – Paul Neary/Leona Hyde/Renee Paterson			
	Installation/maintenance of camera technology at Leary’s Brook Real-Time Station	Environment Canada – WQMS ----- Newfoundland and Labrador Department of Environment and Conservation – Paul Neary/Renee Paterson			

WQMA Search Engine	Development and Testing of WQMA Search Engine (utilizing EC web services)	Newfoundland and Labrador Department of Environment and Conservation – Paul Neary			
Technical Documents – WQMA	Development of Fact Sheets for selected WQMA stations	Newfoundland and Labrador Department of Environment and Conservation – Kyla Brake			
	Water Quality Index – research and development / literature review	Newfoundland and Labrador Department of Environment and Conservation – Kyla Brake			
	Completion of NL-WQMA Sampling Manual	Newfoundland and Labrador Department of Environment and Conservation – Joanne Sweeney			
	Completion of Intensive Survey 2008-09 Report (Churchill River)	Environment Canada – WQMS ----- Newfoundland and Labrador Department of Environment and Conservation – Ian Bell			
	Completion of Intensive Survey 2009-10 Report (Bonne Bay Ponds)	Environment Canada – WQMS ----- Newfoundland and Labrador Department of Environment and Conservation – Joanne Sweeney			
	Updating of the	Newfoundland and			

	Trend Analysis Report	Labrador Department of Environment and Conservation – staff (TBD)			
	On-going updating of WQMA website	Newfoundland and Labrador Department of Environment and Conservation – Joanne Sweeney/Paul Neary			
Technical Documents - RTWQ	Real-Time Water Quality Deployment and Annual Reports	Newfoundland and Labrador Department of Environment and Conservation – staff			
	Planning for Real-Time Water Quality Monitoring for Mega-projects	Newfoundland and Labrador Department of Environment and Conservation – Renee Paterson			
	Revision of QA/QC protocols for Real-Time Water Quality data	Newfoundland and Labrador Department of Environment and Conservation – Renee Paterson			
	Development of new calibration forms and deployment forms	Newfoundland and Labrador Department of Environment and Conservation – Grace Gillis			
	Completion of Real-Time Water Quality Manual	Newfoundland and Labrador Department of Environment and Conservation – Renee Paterson/Grace Gillis			
	On-going updating of Real-Time	Newfoundland and Labrador Department of			

	Water Quality Website	Environment and Conservation – Renee Paterson/Paul Neary			
Education / Outreach	Educational Displays	Newfoundland and Labrador Department of Environment and Conservation – Kyla Brake			
	Fluvarium Project	Environment Canada – WQMS ----- Newfoundland and Labrador Department of Environment and Conservation – Kyla Brake			
	Updating of all posters	Newfoundland and Labrador Department of Environment and Conservation – Kyla Brake			
TOTAL:					

- * Activities listed in this table are work-shared activities
- **WQMS** – Water Quality Monitoring and Surveillance (Dave Benoit/Ryan Alexander/Daniel Bastrache/Dennis Parent/Todd Smith)
- Please refer to **Annex I** for activity details

Schedule C

Cost Shared Activities for Fiscal Year 2009-2010

Schedule C – Cost Shared Activities 2009-2010

Activity	NL Contribution	EC Contribution	Remarks
<p>Recurrent Survey on Bonne Bay Big Pond & Bonne Bay Little Pond - week of July 20th, 2009</p>		<p>Federal contribution paid to EC lab for analysis work</p>	<p>- Co-lead between NL and EC - NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</p>
<p>Real-time Water Quality Monitoring Network - Operation and maintenance of two federal real-time water quality stations (Main River; Minipi River) - Operation and maintenance of three provincially operated real-time water quality stations (Waterford River; Leary’s Brook; Humber River) - Operation and maintenance of one joint pilot project real-time station with the Miawpukek reservation (Southwest Brook) - Establishment, operation and maintenance of real-time station at Paddy’s Pond - Operation and maintenance of industry funded real-time water quality stations (5 stations at Voisey’s Bay; 3 station at Long Harbour (Vale Inco); 3 stations at Duck Pond Operations; 2 stations at IOC; 4 stations at Lower Churchill River)</p>		<p>\$20,000</p>	<p>- For station details see Table C.1 and Figures 2 & 3 - NL is the lead jurisdiction and responsible for the completion of work - EC will pay its share by March 31st, 2010 to NL Exchequer - NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</p>
<p>Northern Sampling and Analysis (Labrador)</p>		<p>Federal contribution paid to EC lab for analysis work</p>	<p>- Refer to Table C.2 and Figure 4 for sampling details - Labrador water samples are collected by both federal and provincial staff - Refer to Table C.3 for parameter analysis details</p>

			<p>- NL is the lead jurisdiction and responsible for the completion of work</p> <p>- NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</p>
Chemical Management Plan		\$4,000	<p>- Co-lead between NL and EC</p> <p>- EC will pay its share by March 31st, 2009 to NL Exchequer</p> <p>- NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</p>
Project WET		\$1,200	<p>- Co-lead between NL and EC</p> <p>- EC will pay its share by March 31st, 2009 to NL Exchequer</p> <p>- NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</p>
Total			

Please refer to Annex I for activity details

Table C.1 Real-time Water Quality Monitoring Stations for 2009-2010 fiscal year

Station #	Description	Latitude	Longitude	Accessibility	Remarks	Classification
<u>VOISEY'S BAY PROJECT (VALE INCO NL)</u>						
NF03NE0009	Reid Brook	56 22 22	62 09 43	HS	- These stations are fully industry funded	RTWQ / Hydrometric / former CESI / EA
NF03NE0010	Camp Pond Brook	56 20 32	62 06 24	HS		RTWQ / Hydrometric / former CESI / EA
NF03NE0011	Lower Reid Brook	56 18 18	62 05 34	HS		RTWQ / Hydrometric / EA
NF03NE0012	Tributary to Reid Brook	56 18 21	62 05 39	HS		RTWQ / Hydrometric / EA
NF03NE0008	Well after Tailings Dam (VBNC) *	56 19 42	62 00 17	VA	- This station is funded by DOEC	RTWQ / EA
<u>DUCK POND OPERATIONS – TECK</u>						
NF02YO0190	Gill's Pond Brook	48 38 26	56 31 44	VA	- These stations are fully industry funded	RTWQ / Hydrometric / EA
NF02YO0193	Well after Tailings Dam (Aur Resources)	48 39 18	56 28 55	VA		RTWQ / EA
NF02YO0192	East Pond Brook	48 40 55	56 30 39	VA		RTWQ / Hydrometric / EA
<u>IRON ORE COMPANY OF CANADA (IOCC)</u>						
NF03OA0019	Wabush Lake @ Dolomite Road	52 58 00	66 51 33	VA	- These stations are fully industry funded	RTWQ / Hydrometric / EA
NF03OA0017	Wabush Lake @ Julienne Narrows	53 09 05	66 47 08	BS		RTWQ / Hydrometric / EA
<u>LONG HARBOUR PROJECT (VALE INCO NL)</u>						
NF02ZK0023	Rattling Brook below Bridge	47 24 51	53 48 26	VA	- These stations are fully industry funded	RTWQ / Hydrometric / EA
NF02ZK0024	Rattling Brook Big Pond	47 24 07	53 47 37	VA		RTWQ / Hydrometric / EA
NF02ZK0025	Rattling Brook below Plant Discharge	47 25 07	53 48 36	VA		RTWQ / Hydrometric / EA

<u>NALCOR ENERGY (FORMERLY NL HYDRO)</u>						
NF03OD0013	Churchill River below Metchin River	53 14 22	63 17 06	HS	- These stations are fully industry funded	RTWQ / Hydrometric / EA
NF03OE0051	Churchill River below Grizzle Rapids	52 57 50	61 24 30	HS		RTWQ / Hydrometric / EA
NF03OE0050	Churchill River 6.15km below Lower Muskrat Falls	53 14 16	60 40 31	HS		RTWQ / Hydrometric / EA
NF03OE0001	Churchill River Above Upper Muskrat Falls**	53 14 52	60 47 21	HS	- This station is funded by DOEC	RTWQ / Hydrometric / current CESI / EA
<u>CANADA-NEWFOUNDLAND AND LABRADOR WATER QUALITY MONITORING AGREEMENT</u>						
NF02YG0009	Main River**	49 46 48	57 09 24	HS	- These stations are fully funded by the Canada /Newfoundland and Labrador Water Quality Monitoring Agreement	RTWQ / Hydrometric / Canadian Heritage River
NF03OE0030	Minipi River **	52 36 53	61 11 11	HS		RTWQ / Hydrometric / current CESI
NF02ZE0033	Water Supply Intake (Miawpukek watershed)	47 50 56	55 46 04	VA		RTWQ / Hydrometric / First Nations
NF02ZM0178	Learys Brook**	47 34 21	52 44 21	VA		RTWQ / Hydrometric / current CESI
NF02ZM0009	Waterford River**	47 31 46	52 44 34	VA		RTWQ / Hydrometric / current CESI / Chemical Management Plan
NF02YL0012	Humber River**	48 59 01	57 45 40	VA		RTWQ / Hydrometric / current CESI
NF02ZM0359	Paddy's Pond @ Outlet	47 25 07	53 48 36	VA		RTWQ / Hydrometric
<u>STATIONS UNDER DISCUSSION/NEGOTIATIONS</u>						
Labrador Iron Mines may be establishing two stations in Schefferville, NL						
Nalcor Energy may be establishing one station in the Rigolet area						
Central Waste Management Authority may be establishing two stations in Norris Arm at the new waste management facility						
Department of Environment and Conservation will be establishing two additional stations on the Churchill River (Goose Bay area; Lake Melville area); reconnaissance survey planned for summer '09						
City of St. John's /Town of Logy Bay may be establishing three stations on a river in Logy Bay that is						

downstream of a new residential development area and frequently floods	
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- * The well at Voisey's Bay is not in operation and will be relocated to a better location during 2009-10.
- * * These stations are also part of the ambient water quality index network where grab samples are collected 4 times per year.

VA – Vehicle Access Site
HS – Helicopter Access Site
BS – Boat Access Site

Notes:

1. All real-time water quality stations have grab samples collected on a monthly basis for QA/QC purposes; all analysis is completed at the same lab as that used for the analysis of the samples under the drinking water program and the cost is covered by DOEC.
2. Presently, the grab samples collected at Leary's Brook and Humber River real-time stations are being used to develop statistical equations for regression analysis
3. There will be an approximately 180 grab samples taken for RTWQ stations as part of the QA/QC procedures. The samples will be sent to a private laboratory due to required turnaround times. Laboratory costs will be covered by NL Department of Environment and Conservation.

Figure 2 – Real-Time Water Quality Stations 2009-2010 – Newfoundland

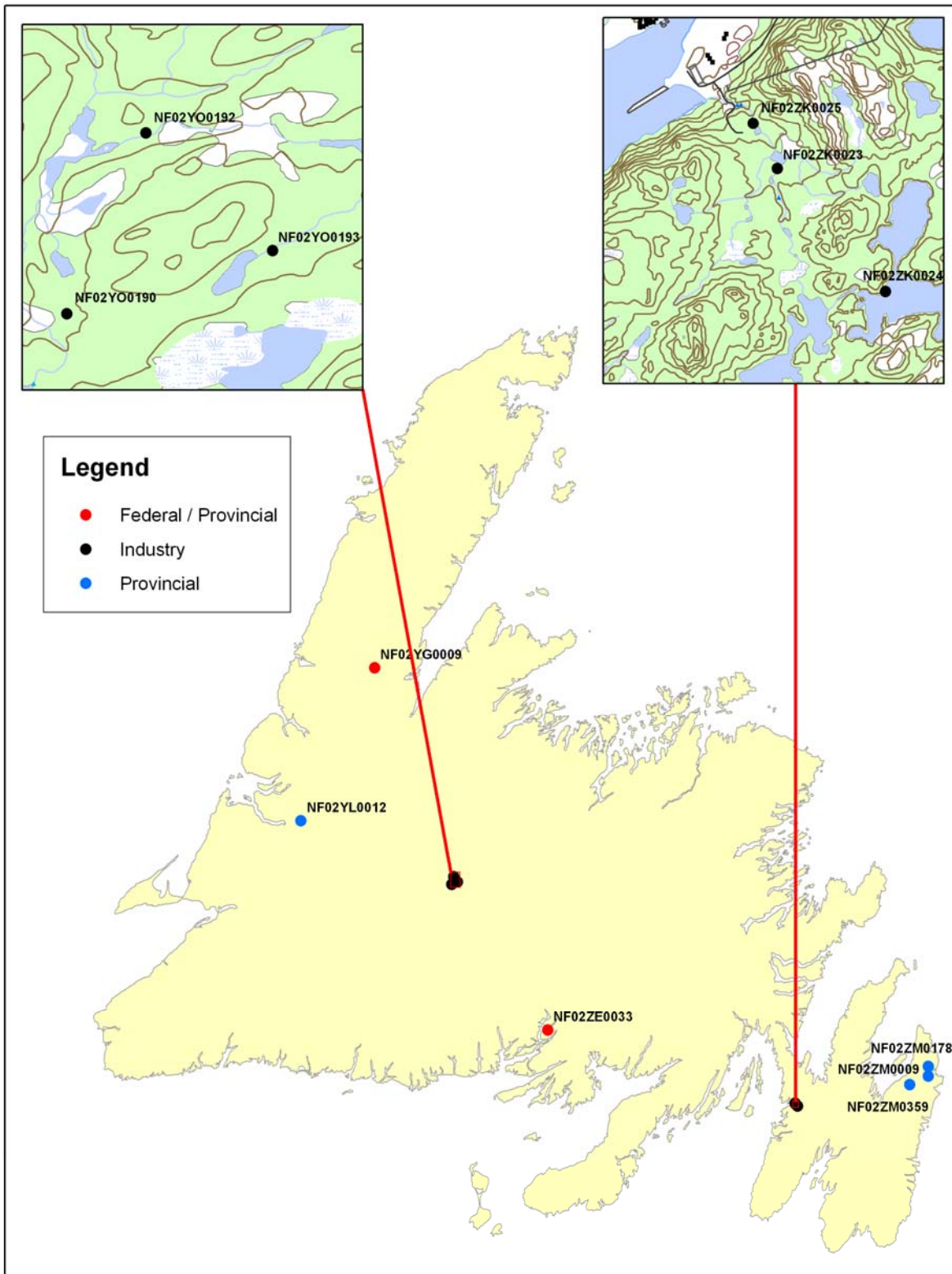


Figure 3 – Real-Time Water Quality Stations 2009-2010 – Labrador

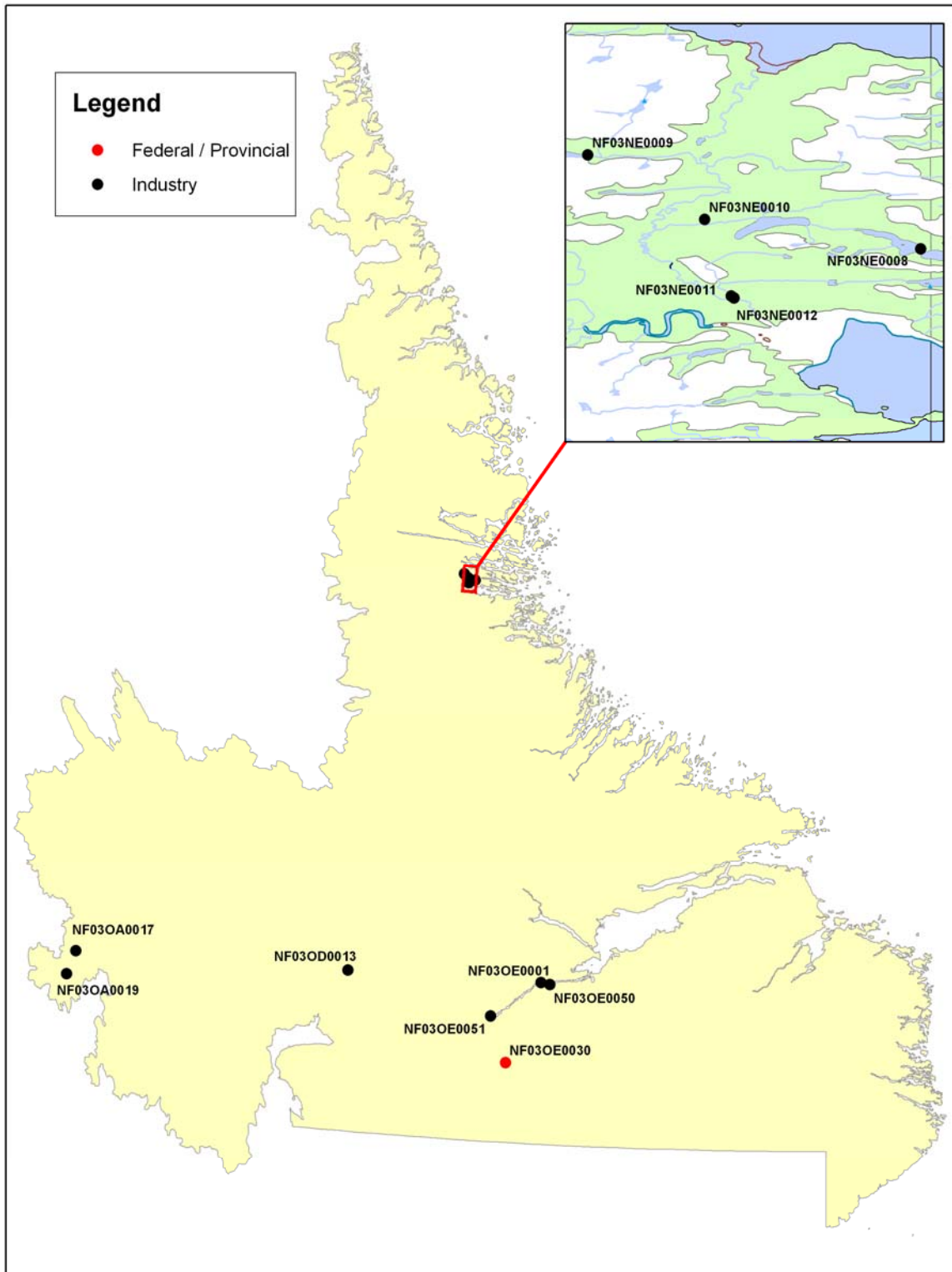


Table C.2: Northern Index Station Location, Designation and Sampling Frequency 2009-2010

Station #	Description	Latitude	Longitude	Samples/year	Sampled By	Classification
LABRADOR REGION						
NF02XA0001	Little Mecatina River	52 13 42	61 19 32	4	F/P	Hydrometric
NF03NF0013	Ugjoktok River	55 13 60	61 17 57	4	F/P	Hydrometric
NF03OC0012	Atikonak River	52 58 03	64 39 40	4	F/P	Hydrometric
NF03OD0011	East Metchin River	53 26 07	63 14 03	4	F/P	Hydrometric / current CESI
NF03OE0001	Churchill River Above Upper Muskrat	53 14 52	60 47 21	4	F/P	RTWQ / Hydrometric / current CESI
NF03OE0030	Minipi River	52 36 53	61 11 11	4	F/P	RTWQ / Hydrometric / current CESI
NF03OE0032	Pinus River	53 08 52	61 33 31	4	F/P	Hydrometric / current CESI / Comp Guidelines Site
NF03OE0033	Big Pond Brook	53 30 43	60 17 31	4	F/P	Hydrometric
NF03PB0025	Naskaupi River	54 07 54	61 25 45	4	F/P	Hydrometric / current CESI
NF03QC0001	Eagle River	53 27 54	57 33 29	4	F/P	Hydrometric
NF03QC0002	Alexis River	52 38 57	56 52 17	4	F/P	Hydrometric / current CESI
NF03NG0034	Shipiskan Lake East	54 37 24	62 12 58	4	F/P	Ashkui
NF03OD0012	Wilson River E. Branch	53 18 33	62 55 11	4	F/P	Ashkui
NF03OE0035	Dominion Lake	52 43 45	61 45 17	4	F/P	Ashkui
NF03OE0037	Cache River	53 11 33	62 12 11	4	F/P	Ashkui
NF03PB0028	Cape Caribou River	53 37 16	60 24 52	4	F/P	Ashkui
NF03PB0029	Northwest River	53 31 18	60 08 31	4	P	Ashkui
NF03PB0030	Seal Lake Narrows	54 19 55	61 38 27	4	F/P	Ashkui
NF03PB0032	Susan River	53 44 17	60 56 48	4	F/P	Ashkui
NF03PB0037	Wuchusk Lake	54 23 43	61 47 09	4	F/P	Ashkui
NF03QA0044	Carter Basin	53 29 52	59 52 25	4	F/P	Ashkui
NF03QA0045	Kenamu River	53 28 34	59 55 01	4	F/P	Ashkui / Comp Guidelines Site
NF03OA0020	Ashuanipi River	53 0 06	66 14 30	4	P	

P-Provincial

F-Federal

Notes:

1. A total of 23 stations will be sampled during 2009-2010 in Labrador.

2. The Labrador stations are listed as being sampled four times per year; this refers to the number of samples taken; **there must be a minimum of three samples taken each fiscal year** at the Labrador sites. Generally, five trips are made to each station.
3. All Labrador stations are accessible only by helicopter with the exception of Northwest River (NF03PB0029); Ashuanipi River (NF03OA0020); Big Pond Brook (NF03OE0033); East Metchin (NF03OD0011); Wilson River East Branch (NF03OD0012) and Cache River (NF03OE0037) which are accessible by vehicle.
4. Total number of samples to be collected is 92.

Figure 4 – Water Quality Stations 2009-2010 – Labrador

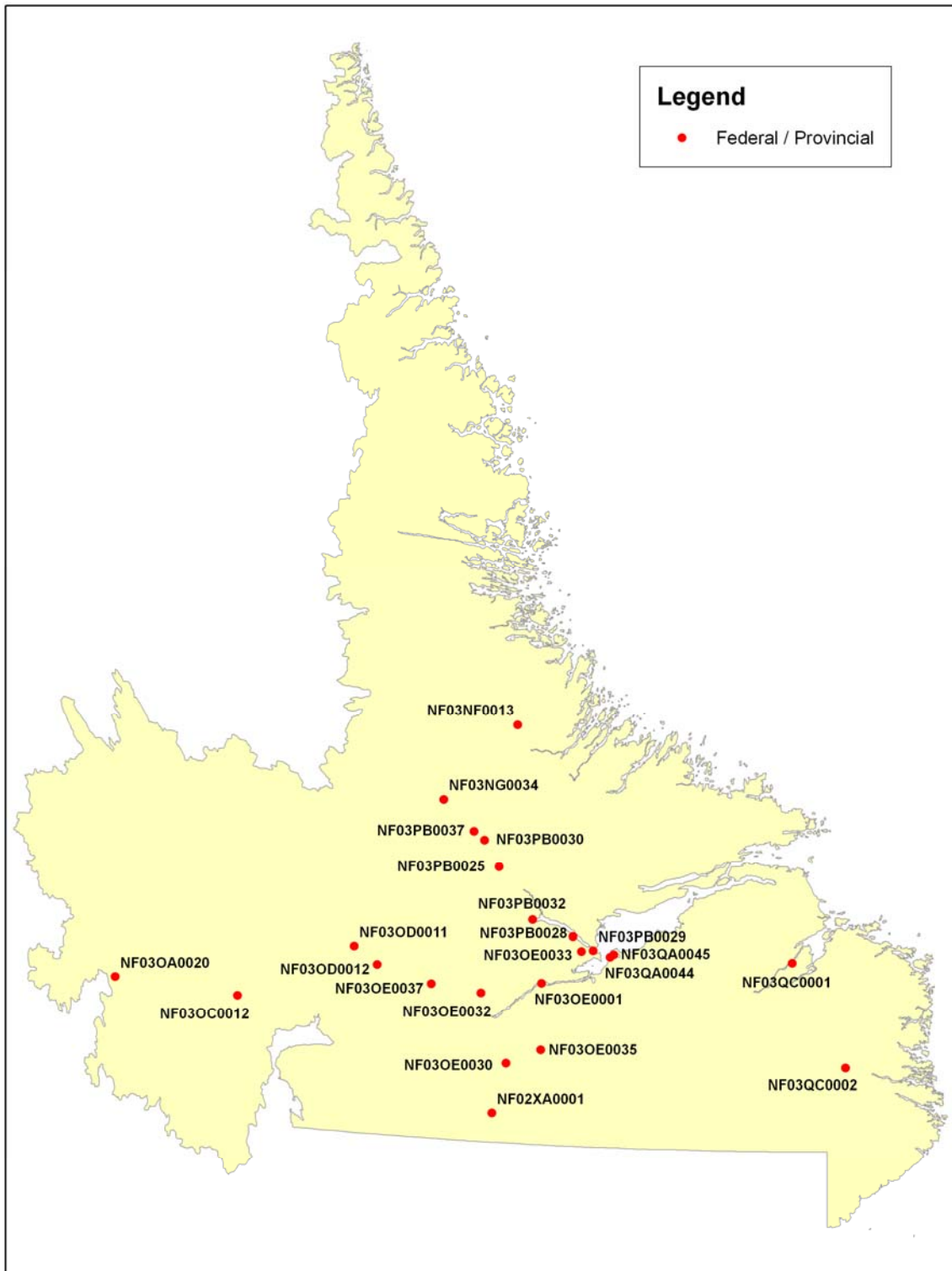


Table C.3: Analytical Parameters, Holding Times and Schemas for 2009-2010 for Labrador Stations

Parameter	Holding Times (recommended by NLET)
MAJOR IONS	
Alkalinity	24 hours
Chloride	28 days
Sulphate	28 days
Calcium	8 weeks
Magnesium	8 weeks
Sodium	8 weeks
Potassium	8 weeks
PHYSICAL	
pH	24 hours
Conductivity	28 days
Colour	48 hours
Turbidity	24 hours
NUTRIENTS	
Nitrate	24 hours
Total Nitrogen	24 hours
Total Phosphorus	1 year
DIC/DOC	24 hours
METALS	
Total Metals-27 elements	6 months

Schema Number	Schema Name	Parameter/ Grouping
1	ALKPHCOND	alkalinity, pH, conductivity
2	MI4-U	Ca, Mg, Na, and K
5	NO3ATL-U	NO3 by IC
6	CLSO4-U	Cl and SO4 by IC
11	TP1-U	total phosphorus
12	TN1-U	total nitrogen
13	DIC/DOC1	dissolved inorganic and organic carbon
23	COL-APP	Colour-apparent (unfiltered sample)
24	TURBIDITY3	turbidity
31	TM2003/T27W	Total metals-27 elements

***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	

Schedule D(i)

**Special Projects for Fiscal Year 2009-2010
(excluding CESI)**

Schedule D(i) – Special Projects for Fiscal Year 2009-2010 (excluding CESI)

Project	Activity	Remarks	NL Contribution*	EC Contribution*
1. Comparative Guidelines Project	Comparative assessment of site-specific objective methodology	- NL is the lead jurisdiction and responsible for the completion of work – Kyla Brake		
2. Stability Study with NLET	Study to determine if the duration of time between water sample collection and analysis is affecting parameter concentration	- NL is the lead jurisdiction and responsible for the completion of work – Joanne Sweeney		
3. Mobile Environmental Monitoring Platform	In-situ water quality monitoring using a mobile environmental monitoring platform on a need-basis across the province	- NL is the lead jurisdiction and responsible for the completion of work – Ryan Pugh		
4. Blue-green Algae Monitoring	Monitoring of blue-green algae on a need basis (Paddy's Pond and surrounding water bodies)	- NL is the lead jurisdiction and responsible for the completion of work – Joanne Sweeney		
5. Real-Time related projects	Host and organize the 2 nd national Real-Time Water Quality Monitoring Workshop 2009 (June '09)	- NL is the lead jurisdiction and responsible for the completion of work – Renee Paterson		
	Comparison Study between various water quality monitoring equipment (Hydrolab; YSI; S::CAN)	- NL is the lead jurisdiction and responsible for the completion of work – Ryan Pugh		
	Bio-fouling Experiment	- NL is the lead jurisdiction and responsible for the completion of work – Tara Clinton		
	Statistical project to determine extrapolation of non-measured data	- NL is the lead jurisdiction and responsible for the completion of work – Renee Paterson/Paula Dawe		

	Establishment of Standalone Station on Paddy's Pond (testing of communication equipment; testing of instrumentation)	- NL is the lead jurisdiction and responsible for the completion of work – Ryan Pugh		
	LCD Screen Display	- NL is the lead jurisdiction and responsible for the completion of work – Renee Paterson/Paul Neary		
	Definition of parameter limits for email alert system; implementation of email alert system	- NL is the lead jurisdiction and responsible for the completion of work – Tara Clinton		
	Testing and implementation of autosampler technology	- NL is the lead jurisdiction and responsible for the completion of work – Tara Clinton/Ryan Pugh		
	Testing, implementation and integration of S::CAN technology into real-time program	- NL is the lead jurisdiction and responsible for the completion of work – Ryan Pugh		
	Research and development of new technologies	- NL is the lead jurisdiction and responsible for the completion of work – Renee Paterson		
6. Application of Earth Observation for Water Quality Monitoring	Assessing if Earth Observation can be used to monitor the impact of development projects on water resources	- NL is the lead jurisdiction and responsible for the completion of work – Keith Abbott		
	Building knowledge in using high resolution data/imagery to extract water resources related information such as land cover, wetlands and water bodies	- NL is the lead jurisdiction and responsible for the completion of work – Keith Abbott		

7. Aquatic Biomonitoring (CABIN)	Monitoring of benthic invertebrate of selected water bodies to better understand the aquatic ecosystem health	- NL is the lead jurisdiction and responsible for the completion of work – Kyla Brake		
Total:				

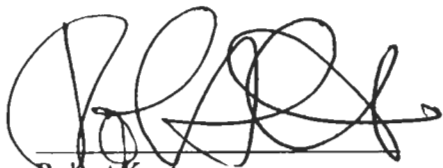
*** Activities listed in this table are work-shared activities
Please refer to Annex I & II for activity details**

Schedule D(ii)

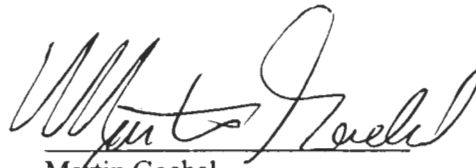
**Special Projects for Fiscal Year 2009-2010
(CESI related projects)**

**Canada-Newfoundland and Labrador
Water Quality Monitoring Agreement
Canadian Environmental Sustainability Indicators (CESI)**

The attached table outlines work activities to be carried out during the current fiscal year under the Canada-Newfoundland and Labrador Water Quality Monitoring Agreement in part with Environment Canada - Canadian Environmental Sustainability Indicators (CESI). This table have been reviewed and approved by the Administrators of the Agreement.



Robert Kent
Administrator, on behalf of
Environment Canada
Government of Canada



Martin Goebel
Administrator, on behalf of
Department of Environment & Conservation
Government of Newfoundland and Labrador

Schedule D(ii) - Special Projects for Fiscal Year 2009-2010 under CESI

Project	Activity	Remarks	NL Contribution	EC Contribution
1. Canadian Environmental Sustainability Indicators (CESI)	Site selection, water quality data extraction, and manipulation	- NL is the lead jurisdiction and responsible for the completion of work – Kyla Brake	\$20,000	\$20,000
	Decision on WQI inputs and calculation of ratings for each station			
	Overview interpretation of results (2 pager on parameters & issues driving the ratings and spatial trends)	- EC will pay its share by March 31 st , 2010 to NL Exchequer		
	Data analysis and report preparation	- CESI 2010 Report		
2. CESI WQI Calculator	Development of CESI WQI Calculator for use nationally	- NL is the lead jurisdiction and responsible for the completion of work – Shibly Rahman - EC will pay its share by March 31 st , 2010 to NL Exchequer	\$30,000*	\$30,000*
3. Northern Sampling and Analysis (Labrador)	Labrador water samples are collected by both federal and provincial staff in support of CESI reporting	- NL is the lead jurisdiction and responsible for the completion of work - EC will pay its share by March 31 st , 2010 to NL Exchequer	\$30,000	\$30,000
Total:			\$80,000	\$80,000

* Additional funds may be provided for this project after in-depth review in October 2009.

Please refer to Annex for activity details.

Schedule E
Samples Collected in 2008-2009 Fiscal Year

Table E.1: Provincial Samples Collected in 2008-09 Fiscal Year

Station #	Description	Number of Samples Scheduled in 08-09	Number of Samples Collected in 08-09
<u>EASTERN REGION</u>			
NF02ZK0005	Northeast River	4	4
NF02ZL0029	Goulds Brook	4	4
NF02ZM0004	Waterford River	4	4
NF02ZM0009	Waterford River	4	5
NF02ZM0014	Virginia River	4	4
NF02ZM0015	Quidi Vidi Outlet	4	4
NF02ZM0016	Rennies River	4	4
NF02ZM0020	Broad Cove Brook	4	4
NF02ZM0098	Virginia River	4	5
NF02ZM0109	Mundy Pond	4	4
NF02ZM0144	Kelly's Brook	4	4
NF02ZM0175	Waterford River	4	4
NF02ZM0176	South Brook	4	4
NF02ZM0177	Rennies River	4	4
NF02ZM0178	Learys Brook	4	6
NF02ZM0179	Virginia River	4	5
NF02ZM0180	Virginia River	4	5
NF02ZM0181	Waterford River	4	4
NF02ZM0182	Waterford River	4	5
NF02ZM0183	Kelligrews River	4	4
NF02ZM0184	Learys Brook	4	5
NF02ZM0185	South Brook	4	5
NF02ZN0004	Salmonier River	4	4
NF02ZM0294	Manuals River	4	4
<u>CENTRAL REGION</u>			
NF02YM0004	South West Brook	4	4
NF02YM0003	Indian Brook	4	4
NF02YO0189	Joe's Lake	4	4

Station #	Description	Number of Samples Scheduled in 08-09	Number of Samples Collected in 08-09
NF02YO0107	Exploits River	4	4
NF02YO0020	Exploits River	4	3
NF02YO0001	Exploits River	4	4
NF02YO0128	Exploits River	4	4
NF02YO0142	Corduoy Brook	4	4
NF02YO0143	Exploits River	4	4
NF02YR0001	Pound Cove Brook	4	4
NF02YO0121	Peter's River	4	4
NF02YQ0006	North West Gander River	4	4
NF02YQ0030	Gander River	4	4
NF02YS0001	Terra Nova River	4	4
NF02YS0011	Terra Nova River	4	4
NF02YS0083	Northwest River	4	4
<u>WESTERN REGION</u>			
NF02YE0004	Portland Creek	4	4
NF02YE0005	Western Brook	4	4
NF02YG0001	Main River	4	4
NF02YG0020	Eagle Mountain Brook	4	4
NF02YH0018	Lomond River	4	4
NF02YJ0004	Pinchgut Brook	4	4
NF02YK0022	Humber Canal	4	4
NF02YL0011	Humber River	4	4
NF02YL0012	Humber River	4	4
NF02YL0013	Corner Brook	4	4
NF02YL0029	Wild Cove Brook	4	4
NF02YN0001	Lloyds River	4	4
NF02ZA0006	Grand Codroy River	4	4
NF02ZC0020	Buck Lake	4	4
NF02YN0043	Peter Stride's Lake	4	4
NF02ZB0001	Isle aux Morts River	4	0
NF02YC0001	Torrent River	4	0

Station #	Description	Number of Samples Scheduled in 08-09	Number of Samples Collected in 08-09
NF02YJ0006	Harry's River	4	0
<u>LABRADOR REGION</u>			
NF02XA0001	Little Mecatina River	4	2
NF03NF0013	Ugjoktok River	4	3
NF03OC0012	Atikonak River	4	3
NF03OD0011	East Metchin River	4	3
NF03OE0001	Churchill River	4	3
NF03OE0030	Minipi River	4	3
NF03OE0032	Pinus River	4	3
NF03OE0033	Big Pond Brook	4	3
NF03PB0025	Naskaupi River	4	3
NF03QC0001	Eagle River	4	3
NF03QC0002	Alexis River	4	3
NF03NG0034	Shipiskan Lake East	4	3
NF03OD0012	Wilson River E. Branch	4	3
NF03OE0035	Dominion Lake	4	3
NF03OE0037	Cache River	4	3
NF03PB0028	Cape Caribou River	4	3
NF03PB0029	Northwest River	4	3
NF03PB0030	Seal Lake Narrows	4	3
NF03PB0032	Susan River	4	3
NF03PB0037	Wuchusk Lake	4	3
NF03QA0044	Carter Basin	4	3
NF03QA0045	Kenamu River	4	3

Notes:

1. Total number of samples collected in 2008-09 does not include triplicate samples or bottle blanks.
2. Total number of samples planned for 2008-09 for Eastern region was 96; but 105 were actually sampled.
3. Total number of samples planned for 2008-09 for Central region was 64; but 63 were actually sampled.
4. Total number of samples planned for 2008-09 for Western region was 72; but 60 were actually sampled.
5. Total number of samples planned for 2008-089for Labrador region was 88; but 65 were actually sampled.

Schedule F
Meeting Minutes

Federal / Provincial WQMA Meeting
Meeting Minutes
Dec 2nd and 3rd, 2008
St. John's, NL
Main Boardroom (Dept. of Environment and Conservation)

Attendance:

Joe Pomeroy (Day 1 & 2)

Amir Ali Khan (Day 2)

Haseen Khan (Day 1 & 2)

Micheal Colbert (Day 2)

Renee Paterson (Day 1& 2)

1. Welcome/General Items:

- Haseen welcomed Joe to NL for the meeting.
- Joe explained that the focus is shifting slightly from the federal government perspective with more emphasis being placed on biomonitoring, real-time water quality monitoring and transboundary water issues; while emphasis is being reduced on chemical and physical water quality monitoring.
- Haseen and Joe agreed that it is important to maintain a very balanced program and not let the shifting focus of any one government agency drastically alter the focus of the Agreement. We will continue to do what we need to do, however, the Agreement is flexible and the funds can be shifted to reflect emphasis on certain activities and priorities.
- Haseen explained that we finally were able to establish an office in Happy Valley-Goose Bay, Labrador. The new employee's name is Grace Gillis reporting to Renee. She will be an asset to the program.
- **Action Item:** Renee will email Joe introducing the new employee (Grace Gillis) in Labrador; Joe will forward this information to his group.
- Joe explained that there is a significant amount of water quality equipment in Goose Bay that needs to be sorted through and kept or disposed of.
- **Action Item:** Grace will get in contact with Harry Martin (Wildlife) to gain access to this equipment and sort it.
- **Action Item:** Joe to provide contact number of Harry Martin to Renee.
- A number of additional items were added to the agenda by both Haseen and Joe to be discussed at the end of the meeting.

2. Annual Work Schedule 2008-09

Schedule B – Work Shared Activities

Ambient Water Quality Sampling

- Haseen and Renee explained that the ambient water quality sampling is still a major component of the WQMA; it is being completed by Agreement staff routinely and consistently.
- Joe raised the question as to whether a “Network Evaluation” is necessary.
- Haseen explained that a “Network Evaluation” was done just a few years ago using information from the “Trend Analysis” report; the network was evaluated in detail and a number of stations were dropped and others were added; the sampling frequency was

reduced to sampling 4 times per year at all stations; the 2008-09 Annual Work Schedule was the second schedule whereby these changes were incorporated; we will continue sampling the network as it is presently, but in a few years the “Trend Analysis” and “Network Evaluation” will need to be repeated.

Ambient Water Quality Analysis

- Joe explained that all our Agreement water samples go to the Burlington lab (through credits); recurrent survey samples sometimes go to Burlington and sometimes go to Moncton (depending on credits available).
- Joe explained that the federal government is trying to streamline services to ensure efficiency; many of the national labs received new equipment (including the Moncton lab); Marc Bernier is currently the head of all national labs.
- Joe explained that it would be nice to see inorganic samples being analyzed at provincial laboratories while the national Moncton lab would then be freed-up to perform the more high-end organics analysis, etc; with respect to the WQMA samples from NL things would continue as normal.
- Haseen raised the issue of “holding times”; he explained that it was brought to his attention during our section meetings last week that the holding times are being exceeded and there is no way to meet these holding times; as an action item from the section meeting, Haseen had contacted Sharon Carrier at the Burlington lab asking the following questions:
 - What are our options to meet the holding times and be in compliance?
 - How are the results affected by not complying with holding times?
 - Are we the only ones in this situation across the country? How are you dealing with this issue from other jurisdictions?
 - What is our path forward?

Sharon provided a very honest response email agreeing that this is definitely a problem but that there is no straightforward answer; Haseen provided Joe with a copy of the emails explaining this issue.

- **Action Item:** Joe will check into the holding times issue and provide a response to Haseen.

Recreational Water Quality Sampling and Analysis

- Haseen and Renee explained that we picked up this recreational water quality sampling simply to fill a void (no jurisdiction was doing rec sampling); there are two types of sites being sampled for bacteriological analysis: 1) regular Agreement sites that are scheduled to be visited 4 times per year where some form of recreational activities are common; 2) special Agreement sites that are only visited 2 times per year in July and August specifically because these areas are common swimming areas; there is no great special effort being made with this sampling; the results are being reported through CANAL.

Lake Water Quality Sampling and Analysis & LRTAP

- Haseen explained that as part of the “Network Evaluation” performed a few years ago, it was decided that we needed a better representation of lakes in our Agreement network; therefore, it was decided to have approximately two lakes sampled in each

- region; it not true lake profiling that is taking place but rather grab sampling (using same procedures as river grab sampling).
- Joe explained that LRTAP is on the table; the region is pushing to take it over; it is a worthwhile program that collects very meaningful information; Joe will continue to monitor this issue.

ENVIRODAT (Table B.5)

- Haseen explained how the improvements to ENVIRODAT have given new life to the program; now the data is up-to-date with a very short time lag in receiving data.
- Haseen asked Joe to express his gratitude towards Cathy for working hard to bring ENVIRODAT from an outdated database to a fully functional and worthwhile database; Cathy should be given credit for getting ENVIRODAT back in order; partners are very appreciative of her work.
- Haseen suggested there should be a collective custodianship of ENVIRODAT by all users.
- Haseen explained that during our section meeting last week it was decided that we would implement some additional in-house QA/QC of the field sheets to ensure problems are caught before they get to Cathy; any issues that Cathy raises to our staff will be addressed efficiently.
- Joe explained that Cathy is now part of a small national committee and that she is the “go-to-person” for ENVIRODAT.
- Haseen suggested that Cathy should make a presentation at the Moncton workshop on the “Past, Present and Future of ENVIRODAT” (background; went into hibernation; implications; resumed ownership; what has been done in past two years; path forward)
- **Action Item:** Renee will ensure that Paul Neary and Cathy Cormier have input into Table B.5 when developing the next Annual Work Schedule.
- Haseen suggested that it would be good for users to be able to provide feedback on ENVIRODAT (ie: future ideas, etc.).

Technical Documents and Reporting (Table B.6)

- **Management of Provincial Water Quality Database:** Haseen explained that in the past it was necessary for DOEC to go through the laborious process of batch data downloads from ENVIRODAT and then QA/QC the data and process this data into separate excel spreadsheets for each Agreement station; this process was labor intensive and the data was out-of-date. With recent improvements to ENVIRODAT, we will no longer be maintaining a separate provincial water quality database but rather will be downloading directly from ENVIRODAT on a need basis through CANAL. This will allow much more efficient use of time and resources.
- **Update of CANAL Webpage:** Haseen expressed the importance that work needs to continue on the updating and improving of CANAL; presently Paul, Dave and Ryan have a very good working relationship and are continuing to improve the CANAL web page; they have taken ownership of this project and should be given due credit.
- **Action Item:** Renee will check with Paul Neary to determine where the work supporting CANAL can be documented in the upcoming Annual Work Schedule.

- **On-going updating of the Site Documentation Database:** This issue was raised in the section meeting last week; the Agreement staff is committed to regularly updating the Site Documentation database (~2 times per year) to ensure the information on CANAL is relatively current.
- **On-going updating of the Bacteriological Database:** This issue was raised in the section meeting last week; the Agreement staff is committed to regularly updating the Bacteriological database to ensure the bacteriological data on CANAL is relatively current.
- **On-going updating of the Water Quality Index Scores:** One of DOEC contract staff (Kyla Brake) is working on this project; she will ensure the CESI scores and WQI scores on CANAL are compatible.
- **On-going updating of the Summary Statistics:** Currently underway.
- **Real-time Service Delivery (ADRS – Reporting):** Renee explained that there has been a lot of work in this area completed by Paul and Leona; this work has made the data reporting component of real-time monitoring much more efficient; there is significant work planned in this area for the upcoming fiscal year (ie: servicing/warranty tracking tool; automated QA/QC...).
- **Addition of CABIN sites to CANAL:** Haseen and Renee explained that it was decided in the section meeting last week that all CABIN sites will be assigned a proper WQMA station number therefore being updated regularly in the Site Documentation Database; Rob will enter the data into the CABIN database in the winter months.
- **On-going updating of the OGC GIS web services:** Dave and Ryan continue to work on this project with Paul Neary; they have a very good working relationship and are producing interesting outcomes.
- **Fact sheets on CANAL sites:** One of DOEC contract staff (Kyla Brake) is working on this project; she is developing a template that will be populated with information for many of the Agreement sites; the fact sheets will be available through CANAL.
- **Water Quality Index – Research and Development:** Ali explained that there is a significant amount of work currently being done by his section on improving the WQI calculator; Ali is interested in doing some testing to determine if the WQI scores correlate with the biota situation (ie: good WQI scores for reference sites; etc.) now that we are involved in biomonitoring.
- **Completion of NL-WQMA Sampling Manual:** Joanne Sweeney is working on this project and aims to have the manual completed in the spring.
- **Create and maintain Recreational Water Quality Monitoring Website:** Joanne Sweeney is the lead on this project.
- **On-going updating of WQMA website:** Joanne Sweeney is the lead on this project and has agreed to regularly update the website.
- **Real-Time Water Quality Deployment and Annual Reports:** Renee explained that the importance of completing these reports was discussed in length at the section meeting last week; all staff are striving to complete the deployment reports within three weeks after removal/reinstallation events; the annual reports will be completed for industry stations at the end of the calendar year.
- **Planning for Real-Time Water Quality Monitoring for Mega-projects:** Renee explained that any projects that enter the Department through the EA process are looked at to determine if RTWQ monitoring is a viable option; if it is decided to

- implement RTWQ monitoring, an Agreement is developed and signed by parties involved.
- **Development of Real-Time Water Quality inventory/servicing database:** Renee and Paul will be working on major improvements to the ADRS system including inventory/servicing tracking options throughout the next couple of years; Joe suggested that Dan Bastrache has developed an impressive tracking database for EC, therefore, it would be a good idea to contact him to discuss; he can be used as a resource person.
 - **Revision of QA/QC Protocols for Real-Time Water Quality Data:** Renee explained that in preparation for the section meetings last week, much effort was put into documenting the current protocols and procedures; some revisions were incorporated; Renee will review QA/QC procedures from other agencies (ie: BC; USGS; EC...) in the month of January and incorporate any new ideas into the current procedures.
 - **Completion of Real-Time Water Quality Manual:** Renee explained this is a work in progress; a draft version will be available for review by February with the final version ready by the spring; aim is to ensure the document is completed and being used prior to the RTWQ Monitoring Workshop.
 - **On-going updating of Real-Time Water Quality Website:** Renee is responsible for updating the RTWQ web site; this task will be performed regularly throughout the year.
 - **Project WET:** Haseen explained that Project WET is completed for this year; there were successful meetings held in Labrador; Jennifer was the lead on this project but with her departure another person will be assigned to this task.
 - **Fluvarium Project:** This project is progressing slowly; Jennifer was the departmental lead on this project but with her departure, Renee will now take over this task;
 - **Action Item:** Renee will talk to Todd Smith to find out the status of this project.

Schedule C – Cost Shared Activities

Recurrent Survey on Churchill River

- Haseen explained that the Recurrent Survey on the Churchill River was a great success; Ian, Denis and Donald enjoyed the work and learned a lot in the process; it was suggested that the recurrent survey should definitely continue on an annual basis.
- Haseen explained that we talked about possible upcoming recurrent surveys during our section meeting last week; it was decided that there is very little research (water monitoring) done in areas with significant cabin/cottage development; all WQMA staff are going to identify some areas of concern and submit to Haseen;
- **Action Item:** Haseen and Joe will discuss possible options and make final decision on Recurrent Survey location.

Real-Time Water Quality Monitoring Network

- Renee explained that the Real-time Water Quality Monitoring is going good especially with individuals in each position across the island and in Labrador; will be able to keep the stations/reporting up-to-date.
- Annette and Renee explained that the Minipi River station seems to work fine, however, the water level changes greatly therefore we should keep an eye on this station and move it if necessary.
- **Action Item:** Grace will keep an eye on this station and suggest changes if necessary.

- **Action Item:** Joe will check out his inventory of probes and send a replacement /switchout probe for Minipi River to maximize our helicopter time.
- Haseen explained that in the section meeting last week it was brought to his attention by Rob that the individuals at Conne River are not performing regular maintenance and calibration on their instrument; Rob has documented the information in an email; Haseen gave the email to Joe.
- **Action Item:** Joe will contact the chief and discuss this matter; keep Haseen posted of outcome.

Northern Sampling and Analysis (Labrador)

- Renee and Annette explained that with a new position in Labrador, the northern sampling should run much more smoothly and minimize the work of the Water Survey of Canada staff.
- Water Survey of Canada staff (in association with Grace) will continue to collect ambient agreement samples three times per year; Grace will prepare the bottles and take care of shipping the bottles for them
- Grace will arrange a helicopter to collect ambient agreement samples two times per year (solely DOEC); thus there will be five samples taken at most Labrador sites.
- **Action Item:** Grace will purchase a helicopter helmet for safety.

Biomonitoring

- Joe explained that more focus is being placed on biomonitoring within the federal government; Lesley Carter has taken over the lead on biomonitoring; it may be worthwhile for NL to look into getting a staff person trained/certified to perform sample analysis so that the Agreement funds are used more effectively.
- **Action Item:** Renee will email Rob with the name of the Canadian Rivers Institute; a place that will analyze samples.
- Haseen suggested that Lesley should try to come to NL (one region) to assist with the biomonitoring; this was done successfully last year whereby the staff benefited greatly from her expertise.
- Haseen stated that we will continue to respond to the federal priority being placed on biomonitoring; however, we absolutely do not want to lose sight of the “reporting” aspect.
- On the second day, Ali joined the conversation on CABIN data management and emphasized the importance of developing an interface between CANAL and CABIN so that the biomonitoring data can be accessed easily; Ali and Lesley had some communication on this issue in the past; Ali suggested that this be achieved in the form of a web service. It is not necessary to recreate a database or to enter data twice.
- **Action Item:** Ali will get in touch with Lesley to resume conversation on this issue and plan a path forward for this project.
- **Action Item:** Joe will follow-up with Lesley to discuss if national parks data should be included.
- There was some talk that Lesley may be able to do a “mock” version of the web service for the Moncton workshop that could be used as a pilot for other regions.
- Haseen suggested that Joe should pursue this under the veil of “CESI II”.

Schedule D – Special Projects

CESI

- Joe stated that there would be a federal CESI meeting sometime in December; the normal CESI meeting will follow.
- Haseen explained that Jennifer was the lead staff on this project but that Michael will take over lead on the project since he was involved in the calculations last year.

Comparative Guidelines under CCME

- Haseen and Joe spoke about how the national guidelines are not always good benchmarks for certain parameters; as is the case with aluminum in NL; the objective is to put closure to this project; this project will set a protocol for battling other similar issues.
- Haseen suggested that he will appoint Kyla to this project; this project will continue to benefit from Donald's work.

Mobile Water Quality Testing Lab

- Joe brought along engineer drawings of the trailer for the Mobile Water Quality Testing Lab; Joe was able to obtain funding through the Chemical Management Plan to purchase four trailers in the upcoming months.
- Joe described that the plan is to have the unit functioning as a mobile water monitoring station containing dataloggers, water quality monitoring instrumentation that can be deployed in-situ, meteorological instruments, automated samplers, cameras, etc; the trailer is being built to spec with a refrigeration unit that will start and stop as needed;
- The purpose of this unit is to allow staff to park alongside a water body and deploy the instruments then leave it to monitor; the instrumentation will be able to trigger the automated samplers; the refrigeration unit will keep the samples cool until they are picked up by staff; the unit will be able to be moved from site to site as needed.
- This will be an excellent tool to be able to respond to emergencies (ie: blue-green algae; accidental discharges; flooding; etc.); once the unit is in operation, numerous applications will be determined; since it was obtained through the CMP, there is a potential use within the veil of monitoring MWWE.
- Joe hopes to have the trailers in hand by March; then they will go through the process of furnishing the trailers with equipment.
- **Action Item:** Joe will share his specs for furnishing the unit with Ali;
- **Action Item:** Ali will provide feedback to Joe on the setup drawing from knowledge gained in setting up the weather stations using Campbell Scientific equipment.
- Joe stated that the aim would be to have one of the units furnished in time for the Real-time Water Quality Monitoring Workshop (tentatively set for June 2009) so that it can be displayed.
- Haseen suggested that when DOEC receives the unit, we will brainstorm to determine what additional items can go into the lab and how it can be used to respond to provincial issues (still ensuring that it fits in the “big plan” conceived by EC).
- Haseen explained that DOEC will purchase a truck to pull this trailer (our contribution).
- **Action Item:** Joe will provide Haseen with a memo about the federal contribution of the trailer.

Pharmaceuticals and pesticide monitoring

- Joe explained that the Moncton lab has been doing work in this area by purchasing the by-products standards and doing some testing.
- Joe stated that there is a student working on her PhD (in pharmaceuticals) and will be needing samples from the Gander River; NL will accommodate if possible.
- **Action Item:** Haseen will forward an email about sampling municipal wastewater sites (from Kevin Power) to Joe (for his information).

Chemical Management Plan

- Joe explained that this project is gaining momentum and will receive more funding in the upcoming years.
- Joanne Sweeney is currently collecting samples from the Waterford River; the analysis is looking at a variety of compounds that would not normally be investigated.

Miscellaneous Items

Section/Technical Meeting Update:

- Haseen explained that there was an in-depth technical meeting held last week; it was an orientation meeting for all staff; its main objective was to review the current procedures and protocols used for all work under the Agreement to ensure all staff are being consistent; there were a number of presentations given that can be used as reference material.

Upcoming Moncton Meeting:

- Haseen agreed that DOEC will be giving two presentations (1. Canada-NL WQMA Past, Present & Future; 2. Real-Time Water Quality Monitoring: From Deployment to Data Management)
- Joe explained that there will be approximately 40 people in attendance; representatives from EC, NL, NS, NB, PEI.; there will be three groups of individuals (lab group; project group; manager group); the aim of the meeting is to facilitate the sharing of information and projects; possibly work towards a regional project.
- The attendees from NL DOEC are as follows: Haseen; Ali; Renee; Paul.

RTWQ Success Stories:

- Joe suggested that it would be a nice idea to have some “quick blips” documenting the successful response of RTWQ monitoring to real-world issues; this can be used in a number of applications.
- **Action Item:** Renee will ask staff to document isolated episodes of minimizing impacts to the environment.
- **Action Item:** Renee will prepare short paragraphs on a number of “success stories” and send to Joe.

2nd Real-Time Water Quality Monitoring Workshop 2009:

- Renee will be organizing this workshop again; the tentative date will be June 2009; the aim is to try to get a nice balance between managers and technical individuals.
- **Action Item:** Renee will contact Joe and ask him to provide a list of people he would like to see invited to attend the workshop from the federal side.

Transboundary Water Governance:

- Joe explained that transboundary water issues are gaining more interest from the federal side.
- Haseen explained that he has been working in this area through his international capacity building projects (ie: use of earth observation systems and real-time water quality monitoring).
- Haseen explained that the integration of both technologies can help explain the cause/effect relationships; this will help to make informed decisions.
- Both Haseen and Joe agreed that there is potential for this issue in Labrador.

Hydrometric Agreement Meeting:

- Haseen gave a brief update on the hydrometric meeting that took place last week; it was agreed that the water quality monitoring will continue as normal with no changes; will be getting 5 samples from Labrador stations; good to keep the partnership continuing.
- Haseen has already emailed the meeting minutes to Joe.
- Haseen suggested that the helicopter flight over the Churchill River that was scheduled for last summer and then cancelled should be rescheduled for the week of Aug.24th; a meeting should also be planned for this time as well (Attendees: Haseen, Joe, Howie, Jean-Guy, Renee; Grace).
- **Action Item: Haseen to arrange this meeting and flight.**

Regional Updates:

- Joe explained that he doesn't expect any substantial movement on the MOU of Environmental Cooperation
- Haseen commented that NB has come a long way.

Upcoming Meetings:

- Joe suggested that we should aim to have quarterly update meetings (ie: short conference calls or face-to-face); next short update meeting in mid-April.
- It was agreed by both Haseen and Joe that the next technical meeting should be sometime in June around the dates of the RTWQ workshop.

WQI Web Portal:

- Ali explained that NL DOEC has been wanting to do this for a long time but the timing has not been right; this should go in as a project for the upcoming fiscal year
- Ali suggested that we come up with a time frame that will work for everyone; clearly define what is needed; will break it up into small projects and work on it; may come up with a "toolbox" approach.
- Haseen suggested that the players should try to sit together (lunch or supper) and scope out the project during the Moncton visit; this should then be followed by a full meeting here in St. John's.
- **Action Item: Ali and Haseen will take the lead with arranging this initial meeting.**

Cameras:

- EC has received the cameras
- **Action Item: Joe will send one to Ali for testing.**

LCD Screens:

- Joe showed pictures of the screens that are placed in their department showing the RTWQ graphs.
- **Action Item:** Joe will talk to Dave Benoit and ask him to contact Ali to explain what is needed to initially setup the screens.
- **Action Item:** Renee will add LCD screen to “wish list”.

3. Demonstration of New Technology – s::can

- Micheal Colbert and Amir Ali Khan were in attendance on Dec. 3rd to provide a presentation on s::can technology.
- Ali explained that the technology is now at “a tipping point”; it was difficult to get answers to our questions through the distributor so Ali, Mike and Renee traveled to Vienna for a face-to-face meeting with the manufacturers of the instrumentation.
- The presentation demonstrated that NL DOEC received solutions to all the questions prepared prior to the trip; the company was impressed with the work done by NL DOEC and agree to provide a solutions package (valued at approximately 4000 Euros) for free to help develop and understand the instrument; a representative of s::can may attend the RTWQ workshop.
- The presentation detailed the s::can instrument; the various parameters it can monitor; the communication challenges encountered; the cleaning issues; some preliminary data; and potential applications (ie: blue-green algae; pesticides; hydrocarbons; etc.).
- Ali explained that this is a very promising technology that he foresees will some into widespread use in North America.
- Haseen suggested that we move with caution and in partnership with EC; it is important to share the knowledge base so that EC can progress in this area.

4. Closing Remarks

- The meeting adjourned approximately 1:00pm on Dec. 3rd.

Canada-Newfoundland Water Quality Monitoring Agreement
Annual Meeting
Gros Morne National Park
May 13th and 14th, 2009

Attendance:

Joe Pomeroy	(EC)	Haseen Khan	(DOEC)
Robert Kent	(EC)	Renée Paterson	(DOEC) (attended Day One)
Art Cook	(EC)	Paula Dawe	(DOEC) (attended Day Two)
Howie Wills	(EC)	Ian Bell	(DOEC) (attended Day One)
Jean Guy Deveau	(EC)		

1) Welcome and Introductions

2) New Directions in EC's Water Quality Monitoring Program (Rob Kent)

- Rob Kent explained that there have been significant changes within Environment Canada; they are going through a “strategic review”.
- Work under the Agreement will need to focus on federal priorities (ex: CEPA; CESI: Transboundary Waters, etc.)
- Need to review the monitoring efforts in detail and prioritize the sites.
- **Action Item: Rob will send Renee the classification options.**
- Need to bring balance to the program and integrate biomonitoring with the phys/chem grab sampling.
- It would be best to achieve this incrementally over the next 2-3 years.
- Most EC budgets are tied to specific projects with time lines.
- As a result of the associated decline in phys/chem sampling the direction is to add more to real-time water quality monitoring programs.
- There is still a lot of work to do; aim to reach for stability.
- Rob spoke about the integration of water quality and quantity in some detail as well.

3) Meeting and Agreement Objectives (Haseen Khan)

- The objective of this meeting is for information exchange (ie: what is happening on federal and provincial levels; where water initiative fits in).
- The Annual Work Schedule (AWS) is a document that is very much supported by senior managers on federal and provincial levels (used in audits; outcome-based).
- There are copies of the AWS that go back to 1996 on the web page; it has evolved over time.
- Constantly evaluating this document; it is outcome-based and we aim to make use of the resources that are available to us.
- Use these meetings to bring together the water quantity and water quality people to convey the message that these programs are integrated at the operational level.
- Had a meeting in December 2008 (Joe and Haseen) to put some thought into this upcoming AWS.
- Haseen briefly discussed the current executive and our headquarters and regional offices.

- It was discussed that directions and priorities change from time to time, however, it is essential to align new initiatives with the core operational program.
- Need to maintain ownership of these programs.
- Need to be able to state how the outcome aligns with the “new” initiatives.
- Need to continuously evaluate by asking the following questions:
 - How are we using this data?
 - How are the outcomes being used by managers or the general public?
 - Are these new technologies bringing effectiveness and efficiency?
 - How are we responding to the mandate to monitor water resources?
- Haseen pointed out that the network for NL looks bigger with many stations being sampled; however, they are only being sampled 4 times per year; therefore the total number of samples has decreased in the past couple of years.
- Haseen pointed out that our real-time water quality monitoring program is working mainly because of our industry partners and contribution; there is very small provincial contribution.

4) Annual Work Schedule 2009-10

- The meeting progressed through each “Schedule” of the AWS; there was much discussion on each component of the AWS recorded on a “working draft copy”.
- **Action Item:** Renee will finalize the AWS and send it around for review.

5) Miscellaneous Items/Action Items

- **Action Item:** Haseen will write an email regarding the fact that ENVIRODAT is core to our program; recent past work in this area is being well received by NL DOEC.
- **Action Item:** Renee will arrange a conference call with Cathy, Paul, Leona and Dave to go through the ENVIRODAT related items in AWS.
- **Action Item:** Renee will ask Kyla to ensure CABIN is incorporated into the new Fluvarium display.
- **Action Item:** Rob will provide the new sampling protocol to Renee/Haseen; to be passed along to WQMA staff.
- **Action Item:** Joe will work at incorporating the NL real-time graphs on the LCD screens.
- **Action Item:** Ian will identify the trans-boundary waters in Labrador; pass along this info to Haseen.
- **Action Item:** Renee and Joe will investigate the possibility of placing an additional probe on Northwest River in Terra Nova National Park.
- **Action Item:** Ian will discuss the possibility of sharing helicopter time with the Parks staff and EC staff (for Main River real-time visits); Ian will pass along this info to Renee.
- **Action Item:** Renee will send the NL government logo to Joe for Mobile Environmental Monitoring Platform.
- **Action Item:** Joe will further investigate the design of a float to deploy the instruments in conjunction with the Mobile Environmental Monitoring Platform.

- **Action Item:** NL DOEC will begin the purchasing process for the truck to pull the Mobile Environmental Monitoring Platform.
- **Action Item:** Joe and Haseen will inform all staff (EC and DOEC) of the new streamline communication process whereby all correspondence should go through Haseen and Joe (main contacts of Agreement)
- **Action Item:** Renee will provide details of follow-up meeting in Labrador – August '09.
- **Action Item:** Grace will contact Harry Martin about potential EC supplies in Goose Bay.

Annex I
Activity Details for Fiscal Year 2009-2010

Annex I

Table B.3 – ENVIRODAT – Data Management

Laboratory procedures and quality control practices: Laboratory analyses are done to ISO guidelines 17025 specifications. Detection limits for all parameters must be mutually agreed upon between EC and NL DOEC.

Design of field sheets and station identification sheets (administrative): Design of field sheets and station identification sheets are implemented in coordination with NL DOEC. Proposed changes are vetted by NL DOEC as part of consultation process.

Entering field data onto field sheets; entering of information on station identification sheets; submission to laboratory (field): NL DOEC are responsible for ensuring the field data is accurately entered on the correct field sheets and submitted to the laboratory; NL DOEC staff is responsible for entering accurate information on the station identification sheets as new stations are established.

Data entry of station identification information and sample submission information upon receipt at laboratory (laboratory): EC(ALET) staff is responsible for entering the data/information from the station identification sheets and sample submission forms into the existing database. Station identification sheets are checked to ensure that geo-coordinates and station identification are valid. Sample submission sheets are checked to ensure correct information is identified and initialized. Inconsistencies are resolved through communication with NL DOEC.

Processing, validating and loading of analytical results performed at NLET or ALET to ENVIRODAT: Data from the laboratories is checked monthly to determine when new data is ready for transfer. Data is validated as to sample number, station ID, sample date, sample time, and field parameters to ensure that sample data matches expected data collected for sample. Inconsistencies are resolved through communication with NL DOEC.

Backups, modifications, upgrades and additions to ENVIRODAT: Databases are backed up daily for recovery purposes. Off-site backups are kept for disaster recovery purposes. Database management is an important on-going function requiring dedicated resources. Modifications/upgrades/additions to ENVIRODAT are managed through one-point of contact to ensure consistent approach.

Data audits, custody and transfer: Data is audited yearly to identify trends in errors and re-occurring issues. NL DOEC agreement data will be housed within the EC ENVIRODAT database. Relevant data transfers to ENVIRODAT will be carried out by EC. An extraction tool is provided to allow NL DOEC staff to extract data for purposes of review and interpretation.

Quality assurance and quality control of datasets: Datasets are checked to ensure that sample locations, parameter suites, results, etc. are accurate and representative of the sampled station.

Activities relating to problem resolution, data modifications and additions, and requests for information: A one-point of contact for data management issues is provided to ensure problem resolution is timely and well-communicated.

Resolving historical data issues: Missing data are addressed for previous years as required. Erroneous sample information is corrected as needed and changes are tracked and communicated between EC(CIOB) staff and NL DOEC staff.

Availability of data outside the firewall for new data loaded to ENVIRODAT:

Mechanism exists to ensure data is ported to external EC server on a weekly basis.

Consistent planning and coordinating of modifications to data extraction tools: Modifications to ENVIRODAT data extraction tools are coordinated in consultation with NL DOEC. Modifications will not adversely affect the ability of partners to extract data.

Development/Maintenance of ENVIRODAT Web Services: EC to coordinate design of web services; NL DOEC to test and provide feedback on web services.

Storing and grouping of variable and method codes that facilitate data entry, data extraction and data interpretation: Variables and methods are grouped in a fashion that provides efficiency and ease-of-use for data extraction tools. Variables and methods are grouped so that data user can easily identify like variables for data interpretation.

Working towards controlled vocabulary within ENVIRODAT: EC (with input from NL DOEC) is working towards providing controlled vocabulary within ENVIRODAT to ensure consistency among users.

Quality flagging of measurement data: Identify confidence levels. Integrate quality flagging into web service and data extraction tools.

Downloading of NL WQMA data from ENVIRODAT: NL DOEC will download WQMA data regularly from ENVIRODAT using data extraction tool.

Quality assurance/quality control and data validation of NL WQMA datasets: NL DOEC will review WQMA data and ensure its validity.

Table B.4: Technical Documents and Reporting

On-going updating of CANAL webpage: Continual updating of the CANAL webpage to reflect all new or changed information; joint effort between EC(WQMS) and NL DOEC staff.

On-going maintenance of the Site Documentation Database: NL DOEC staff responsible for regularly updating the station profiles for all existing stations and adding any new stations to the site documentation with required information.

On-going populating of the Site Documentation Database: NL DOEC staff responsible for populating fields of the database utilizing GIS components from various sources.

On-going maintenance of the Bacteriological Database: NL DOEC staff responsible for regularly updating the bacteriological data as new data becomes available from the recreational and WQMA bacteriological monitoring programs; recreational monitoring on-hold for 2009-10 fiscal year.

On-going updating of the Water Quality Index scores: NL DOEC staff responsible for regularly updating the Water Quality Index scores using the most recent data from ENVIRODAT.

On-going updating of the summary statistics: NL DOEC staff responsible for updating the summary statistics using the most recent data from ENVIRODAT.

Addition of CABIN sites to CANAL: NL DOEC staff responsible for regularly upgrading the site documentation database and CANAL to reflect the new stations monitored under the CABIN program.

Delineation and digitization of all WQMA stations (Newfoundland and Labrador); including any new stations added (ie: CABIN: real-time): NL DOEC staff responsible for ensuring all WQMA stations are delineated and digitized; task should be done regularly to ensure any new stations added to the program are included.

On-going Real-time Service Delivery (ADRS – reporting): Upgrades and development of new applications for the ADRS software.

Development and Testing of ADRS Search Engine: NL DOEC will develop and test a Windows application to allow many more options for downloading, graphing and utilizing the real-time ADRS data; this Windows application will address the performance limitations of the ADRS web application due to high volumes of data.

Development and Testing of Inventory / Servicing Database: A database/spreadsheet to be developed to track all real-time equipment under the NL network and any servicing on each piece of equipment. This database will be used to track issues with equipment and/or stations.

Installation/ maintenance of camera technology at Leary's Brook Real-Time Station: EC in conjunction with NL DOEC will jointly install a web camera on the Leary's Brook Real-Time station to improve river monitoring capabilities; this station will be used as a test station to gain a better understanding of the technology.

Development and Testing of WQMA Search Engine (utilizing EC web services): NL DOEC to develop an internal web application that is an ENVIRODAT search engine that consumes web services provided by EC.

Development of Fact Sheets for selected WQMA stations: Development of fact sheets that depict the watershed characteristics, water quality, WQI scores, trend analysis and other relevant information for each station on the CANAL website.

Water Quality Index – research and development / literature review: On-going research/development and literature review to assess new and innovative uses for the water quality index.

Completion of NL-WQMA Sampling Manual: NL DOEC to adopt a national water sampling manual developed through CCME; additions pertinent to water sampling technique in NL will be included in the existing manual. Distribute to all field staff for implementation.

Completion of Intensive Survey 2008-09 Report (Churchill River): NL DOEC staff responsible for completing the Intensive Survey 2008-09 report and posting to the web page; report prepared in consultation with EC(WQMS) staff.

Completion of Intensive Survey 2009-10 Report (Bonne Bay Ponds): NL DOEC staff responsible for completing the Intensive Survey 2008-09 report and posting to the web page; report prepared in consultation with EC(WQMS) staff.

Updating of the Trend Analysis Report: NL DOEC will update the Trend Analysis Report using the most recent available data.

On-going updating of WQMA website: Updating the WQMA website with any changes for the 2009-2010 fiscal year.

Real-Time Water Quality Deployment and Annual Reports: On-going development of deployment reports after each deployment period for all stations. Annual report to be completed at the end of each calendar year for all stations that are industry funded.

Planning for Real-Time Water Quality Monitoring for Mega-projects: Review all projects that enter the provincial environmental assessment process to assess the project's impact on water quality. Provide input and recommendations for real-time water quality monitoring where deemed appropriate.

Revision of QA/QC protocols for Real-Time Water Quality data: Review all current protocols/procedures and revise as necessary; apply the USGS standards where applicable.

Development of new calibration forms and deployment forms: Review and revise the existing forms to make the process more automated and user-friendly.

Completion of Real-Time Water Quality Manual: Prepare a Real-Time Water Quality Manual and post to web page. Distribute to all field staff for implementation.

On-going updating of Real-Time Water Quality Website: Updating the RTWQ website with any changes for the 2009-2010 fiscal year.

Educational Displays: Set-up displays on water quality at various educational institutions as requested.

Fluvarium Project: The Suncore Energy Fluvarium in St. John's is in the process of renovating its 2nd floor exhibition area. The exhibit will focus on water: its composition, uses, importance to life, ecological significance, and the effects humans have on water. WRMD staff are members on the revitalization planning committee. WRMD staff will work with EC staff to design a display for Water Monitoring activities conducted by the WRMD, with a focus on the Real-Time Water Quality Monitoring Program, and the Canada-Newfoundland and Labrador Water Quality Monitoring Agreement stations located throughout the province. Data from a number of real-time stations will be viewable as part of the display. The revitalization project is set to be completed and open to the public by Fall 2009.

Updating of all posters: NL DOEC will update posters for education and awareness opportunities.

Schedule C – Cost Shared Activities 2009-2010

Intensive Survey on Bonne Bay Big Pond & Bonne Bay Little Pond: The 2009-10 Intensive Survey of the Bonne Bay Big Pond and Bonne Bay Little Pond system is designed as a general investigation of the water quality of both ponds with an emphasis on the sections most heavily developed for recreational cottages. This investigation will include profiling all regions of both ponds using a geo-referenced YSI water quality probe. This profiling should display general water quality trends throughout the system. A geo-referenced depth survey will also be carried out which will enable the preparation of rough bathymetric maps of the ponds in order to estimate the volume of water in each pond. The sampling program will include general water chemistry samples at approximately 11 sampling sites, including multi depth samples at several locations. Water quality depth profiles will be measured with a YSI water quality probe to evaluate changes with depth and the characteristics of the thermocline. For several sample locations water quality samples will be collected both above and below the thermocline. The sampling program will also include sediment samples at several locations as well as the analysis of fish tissue samples. The intensive survey is scheduled to take place during summer 2009 with staff from both WRMD and EC. Additionally, at least one CABIN sample will be collected from a tributary stream in the system in early Fall 2009. The report documenting the results of this study will be compiled by WRMD staff in consultation with EC staff.

Real-time Water Quality Monitoring Network: Operation and maintenance of two federal real-time water quality stations (Main River; Minipi River). Operation and maintenance of one joint pilot project

station with the Miawpukek reservation (Southwest Brook). Operation and maintenance of three provincially operated real-time water quality stations (Waterford River; Leary's Brook; Humber River). Operation and maintenance of 17 industry funded real-time water quality stations (5 stations at Vale Inco (Voisey's Bay); 3 stations at Vale Inco (Long Harbour); 3 stations at Duck Pond Operations (Teck); 2 stations at IOC; 4 stations at Lower Churchill River (Nalcor Energy)). Establishment of provincially-owned and operated stand-alone station at Paddy's Pond.

Northern Sampling and Analysis (Labrador): There will be 23 agreement locations in the Labrador portion of the province sampled a minimum of 3 times per year between May and October.

Chemical Management Plan: Bisphenol A (BPA) is a high-volume (> 6-billion pounds per year) production chemical used to make epoxy resins and polycarbonate plastic. Of particular concern is the use of BPA in plastic containers used to store and heat food and beverages, and to line metal cans. In addition, potential environmental sources of BPA contamination are due to: its use in myriad applications ranging from polycarbonate casings for cell phones and computers to dental fillings, car parts, CDs, and thermal inks used to print receipts; losses at production sites, leaching from landfill, and presence in indoor air due to releases from products. As a result of its wide range of uses, BPA is found throughout the environment.

Environmental monitoring is being conducted in Canada to improve our understanding of BPA and to guide management actions and policy decisions that will support the safe management of BPA in this country. The province of Newfoundland and Labrador is participating in the BPA monitoring program through the monthly collection and submission of water samples from Waterford River.

Project WET: The goal of the Project WET program is to facilitate and promote the awareness, appreciation, knowledge and stewardship of water resources through the development and dissemination of classroom ready teaching aids and the establishment of international and provincial/territorial sponsored Project WET programs. Project WET believes that informed people are more likely to participate in the decision making process and to make a difference through their actions. Project WET invites educators, resource managers, community leaders and concerned citizens to join Project WET in educating people about one of the most precious resources on the planet - water.

WRMD is partnering with Environment Canada to promote and deliver workshops to teachers and other educators within the province – workshops which are linked to the NL provincial curriculum. The purpose of this training will be to show educators the resources available to them through Project WET, how to utilize these resources, and to further the goals of the Project WET program by promoting the stewardship of our water resources in Atlantic Canada. Training sessions are planned for October 2009 and will be conducted by Environment Canada staff in conjunction with WRMD staff.

Schedule D(i) – Special Projects for Fiscal Year 2009-2010 (excluding CESI)

Comparative Guidelines Project: This project, which will provide locally relevant site-specific guidelines (SSGs) for use in provincial and national reporting such as Water Quality Index (WQI) reporting under the Canadian Environment and Sustainability Indicators (CESI) projects, is in its third year. Newfoundland and Labrador currently uses national guidelines (Canadian Council of Ministers of the Environment Guidelines for the Protection of Aquatic Life) that are not necessarily appropriate for sites in the province because of naturally occurring elevated concentrations of certain metals. As biologically based SSGs are considered the gold standard of guideline development, this project seeks to compare the guidelines developed using the Water Effects Ratio (WER) method to those developed using the Background Concentration (BC) procedure. Aluminum was selected for SSG development as natural background levels at the majority of lakes and rivers in Newfoundland and Labrador exceed the current national guideline. Elevated levels of

naturally occurring Aluminum are also present in other Atlantic Provinces (NS, NB). Work conducted for this project should help the development of SSGs in those provinces as well.

In the 2007-08 fiscal year, planning and background research for the project was initiated. In the 2008-2009 fiscal year, two sites in the central and western regions of the province were selected and water was analyzed for toxicological effects at a laboratory in Ontario (contract won via tender). In the 2009-2010 fiscal year, two additional sites in the eastern and central regions will undergo the same toxicological testing that was completed on the two existing project sites in the last fiscal year. Also during 2009-2010, 8 sites with high aluminum levels (2 from each region) will be sampled to determine the amount of free/monomeric aluminum available to aquatic life. This chemical analysis will be performed by the Environment Canada's lab in Moncton (ALET).

Les Swain, a nationally recognized expert in the development of SSGs, will continue to be involved in this project as a consultant to assist and train WRMD staff in this area. The SSGs that are developed using the WER will be compared to simpler, more cost-effective guideline generation methods to establish their applicability for the province of Newfoundland and Labrador. This project also aims to establish whether or not a relationship exists between monomeric aluminum levels in NL rivers and their actual toxicity.

Stability Study with NLET: A "Parameter Stability Study" will be conducted in cooperation with NLET in Burlington, to determine if the duration of time between water sample collection and analysis is affecting parameter concentration. Two rounds of sampling will be conducted, one in winter and one in summer, to identify whether or not water temperature has an impact on parameter stability. Five sets of water samples will be collected concurrently from one station in each region and shipped to NLET immediately after collection. Laboratory analysis will be conducted according to the following intervals:

- 1st set: same day as received at lab
- 2nd set: 3 days after received
- 3rd set: 7 days after received
- 4th set: 10 days after received
- 5th set: 21 days after received

The parameters to be analyzed are: alkalinity, pH, conductivity, colour, turbidity, nitrate, total nitrogen, total phosphorus, DIC/DOC. The findings of this study will be included in a report that will be prepared by WRMD staff.

Mobile Environmental Monitoring Platform: Water quality issues can arise anywhere – in an urban setting like St. John's or deep in a hidden forested region accessible by only a rough woods road. Water quality events can arise quickly without regard for the lead time needed to install a real-time water quality station. With that in mind, Environment Canada and the Department of Environment and Conservation have teamed up to provide a rapidly-deployable, trailer-mounted, water quality and weather station under the Canada-Newfoundland and Labrador Water Quality Monitoring Agreement. The Mobile Environmental Monitoring Platform (MEMP) is an entire real-time water quality and weather station, combined. Capable of monitoring the standard suite of real-time parameters, the Platform is also equipped with a refrigeration system to ensure grab samples collected by the four autosamplers remain cool and resistant to degradation throughout the holding time.

Blue-green Algae Monitoring: The first blue-green algae (also called cyanobacteria) bloom recorded in Newfoundland and Labrador occurred in the summer/fall of 2007. The bloom was isolated to a series of inter-linked ponds in the Eastern region of the province that are used for a wide range of recreational purposes. Water analysis results from samples collected during the 2007 bloom identified the presence of two cyanobacterial genera, *Anabaena* and *Oscillatoria*, as well as the associated toxin, microcystin-LR,

which was present in very low concentrations. If present in significant concentrations, microcystin-LR has the potential to cause adverse health effects in humans, animals and waterfowl, usually through the pathway of ingestion, and can negatively impact aquatic life. Blue-green algae occur naturally at low levels in fresh and marine waters, but when conditions become favorable, such as the increased availability of nitrogen and phosphorus; their numbers can increase exponentially, creating a BGA bloom. A BGA monitoring plan was developed for this pond system in 2007, and continued to be implemented in 2008 and 2009, to increase our understanding of BGA and the precursors that may lead to blooms, and to quantitatively monitor the presence of microcystin-LR and assess the associated risks. Results from BGA monitoring in 2008 identified the presence of cyanobacteria from the genera *Anabaena* and *Chroococcus*, with only trace levels of microcystin-LR being detected. A BGA bloom was identified in a small area of one of the ponds in 2008, but was of much less intensity and persistence than the BGA bloom that occurred in 2007. Preliminary results from analysis conducted in 2009 indicate the presence of natural levels of BGA. Results from the BGA monitoring program from 2007 to present indicate that the concentrations of microcystin-LR identified in water samples pose no risk to recreational users, therefore BGA monitoring will be continued on a needs basis.

Real-Time related projects:

- **Real-Time Water Quality Monitoring Workshop 2009:** WRMD will be hosting its second national Real-Time Water Quality Monitoring Workshop in June 2009. The objective of this workshop is to bring together various jurisdictions, institutions, organizations, suppliers and industry that are using or interested in applying this technology in their respective water quality monitoring programs. The workshop will be a vehicle for the exchange of information, ideas and expertise and to discuss a path forward for real-time water quality monitoring.
- **Comparison Study between various water quality monitoring equipment:** Despite the fact that equipment used in the Real-Time Network in Newfoundland and Labrador may come from several equipment manufacturers, we must be assured that the data gathered through a myriad of makes and models is representative of the actual conditions exhibited by the water body of interest. Currently, the Department of Environment and Conservation employs the use of equipment from Hach Environmental, YSI Inc, S::can Liquid Monitoring Networks and grab sample analysis by Maxxam Analytics. To establish a reasonable comfort level, a simultaneous deployment of all monitoring equipment at the same location leaves only equipment as a variable. Ideally, all reported values should be equal, regardless of equipment manufacturer; in reality, however, an amount of discrepancy is to be expected. The purpose of this work is to ensure that the discrepancy is sufficiently low so as to provide high-quality data regardless of the make and model of the deployed sonde.
- **Bio-fouling Experiment:** Over the summer of 2009 a bio-fouling project was conducted as part of a student work-term report on Leary's Brook, St. John's. The project provided an insight into how much of the drift in the data is related to calibration drift vs. bio-fouling drift at a specific location. Bio-fouling in this experiment was determined by finding the difference between sensor measurements before field cleaning and after field cleaning. This project included two monitoring events for a Datasonde and one monitoring event for a Minisonde
During Phase I of the project, a deployment period of 50 days was used to provide an insight into the length of time an instrument has before bio-fouling becomes a problem. Weekly checks were completed to ensure functionality with the instrument and to capture any bio-fouling growth visually with photos. The weekly checks included comparing the Minisonde with a freshly calibrated QA sonde to document any drifting or change in the data over this time. This identified whether the data was actually drifting from 'true' readings. During phase II a Datasonde was deployed into Leary's Brook. Approximately every 28 days a reading was taken before a field cleaning and a reading was taken after a

field cleaning. This identified the bio-fouling errors that may be occurring. The field cleaning involved a brisk scrub with a toothbrush in the brook; this was to remove any bio-fouling that may alter the probes sensitivity. The readings were compared against a QA reading. The instrument was then removed from Leary's Brook for complete cleaning and calibration in the WRMD laboratory. Processes during calibration assisted in determining the calibration errors that may be occurring on the data. A report documenting the findings was prepared as part of the work-term requirements.

- **Statistical project to determine extrapolation of non-measured data:** This is an area of research that is moving forward through work being completed by the USGS; WRMD staff will look at the potential of utilizing statistical procedures (using existing real-time data) to extrapolate non-measured water quality parameters. This project is very technical in nature and will be multi-phased. Some preliminary work has been done in this field using NL real-time water quality data by a master's student at MUN.
- **Establishment of Standalone Station:** The Canada-Newfoundland and Labrador Water Quality Monitoring Agreement has built a large and successful real-time network based on the expertise and cooperation of the Water Resources Management Division and Environment Canada. As a result of such close partnership, WMRD has never endeavored to establish a station without the aid of another party. In an attempt to become familiar with the process, WRMD is constructing a station on Paddy's Pond near St. John's. The site has been chosen and construction of the building shall commence in October, 2009. Shortly thereafter, datalogging equipment will be installed with the appropriate telemetry devices. A location close to St. John's allows for this station to function as a test bed for new techniques and technologies, in addition to providing valuable information on the Paddy's Pond watershed.
- **LCD Screen Display:** Development of a LCD screen that will be placed in a public location with all real-time graphs being displayed.
- **Definition of parameter limits for email alert system; implementation of email alert system:** On a site-by-site basis, WRMD staff is working on defining the parameter limits that need to be implemented to trigger the email alert system. Background work is being completed for Vale Inco (Long Harbour project) in order to be able to utilize the email alert system during the time of heavy construction.
- **Testing and implementation of autosampler technology:** WRMD staff is working to implement the original set-up whereby the water quality multi-probe triggers when a grab sample is collected via an autosampler; testing to take place at Leary's Brook; site-specific trigger values will need to be determined.
- **Testing, implementation and integration of S::CAN technology into real-time program:** WRMD staff is continuing to test the s::can equipment and determine how to integrate the equipment into our existing infrastructure; s::can equipment will be in use at the Paddy's Pond stand alone station.
- **Research and development of new technologies:** WRMD staff is continuing to research new technologies that may be able to be incorporated into the real-time program (ie: fiber-sensor system; etc.).

Application of Earth Observation for Water Quality Monitoring: WRMD is working to assess if Earth Observation can be used to monitor the impact of development projects on water resources. Additionally, WRMD staff is continuing to build knowledge in using high resolution data/imagery to extract water resources related information such as land cover, wetlands and water bodies.

Aquatic Biomonitoring (CABIN): See Annex II

Schedule D(ii) - Special Projects for Fiscal Year 2009-2010 under CESI

Canadian Environmental Sustainability Indicators (CESI): The Newfoundland and Labrador Water Resources Management Division (WRMD) has been involved in the CESI Reporting initiative since 2005. For the past 4 years, WRMD has contributed calculations and interpretation of water chemistry data from a number of Federal and Provincial stations toward national water reporting. For the 2009-10 fiscal year, the Province will again be responsible for collating the data, validating the data through standard QA/QC procedures, undertaking variable analyses and selection, defining appropriate guidelines for use in the calculator, calculating the WQI, and providing a regional interpretive summary for the WQI scores. Environment Canada will provide support to the Provincial managers during the calculation of the index, selection of the variables and interpretation of results. Environment Canada will provide review of the results prior to submission to the National CESI coordinating committee to ensure the data meets the minimum reporting requirements for national reporting. Environment Canada will also be the liaison between the Provincial project and the National CESI coordinating committee.

CESI WQI Calculator: WRMD has significant experience in the development and implementation of a variety of WQI calculators. Therefore, WRMD staff is responsible for developing a CESI WQI Calculator for use nationally. The final product will be available by fiscal year end (March 31st, 2010).

Northern Sampling and Analysis (Labrador): There will be 23 agreement locations in the Labrador portion of the province sampled a minimum of 3 times per year between May and October. The results will be utilized to strengthen the number of CESI scores calculated for northern stations.

Annex II – Aquatic Biomonitoring

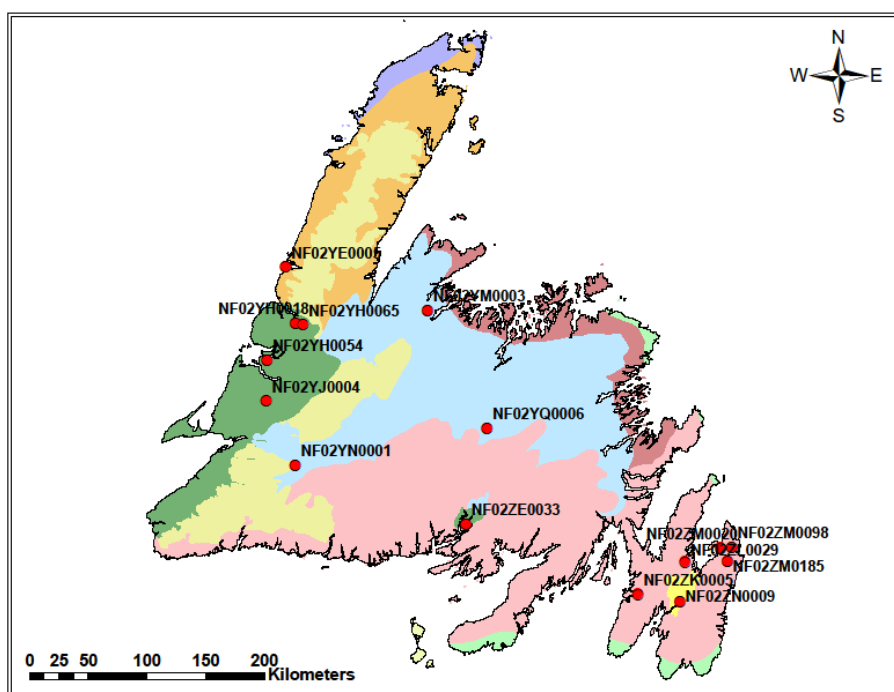
Under the *Canada-Newfoundland and Labrador Water Quality Monitoring Agreement*, implementation of CABIN sampling began in 2008. In keeping with CABIN’s use of the Reference Condition Approach, sampling sites were chosen from relatively pristine or low impact locations where sampling could be collocated with either an active or inactive WQMA site. In order to add to the CABIN network’s goal of collecting reference sites to represent as many different geographic regions and stream sizes as possible, NL staff aimed to collect samples from different ecoregions of the province. This would provide useful information for a national model, as well as provide a variety of reference collections representing different ranges of natural habitats in the province.

In keeping with the protocols set out for the CABIN program, NL WRMD staff have been field trained by Environment Canada staff to ensure uniformity in sampling procedures. Currently, there are five staff members trained across the province for CABIN field collection.

During the initial sampling season in 2008, three sites were chosen from each region of the island (eastern, central, western) for CABIN sampling, for a total of nine sites in 2008. Sampling was conducted with assistance from colleagues with ACAP and Environment Canada. Samples were analyzed at an accredited lab, with results added to the national CABIN database.

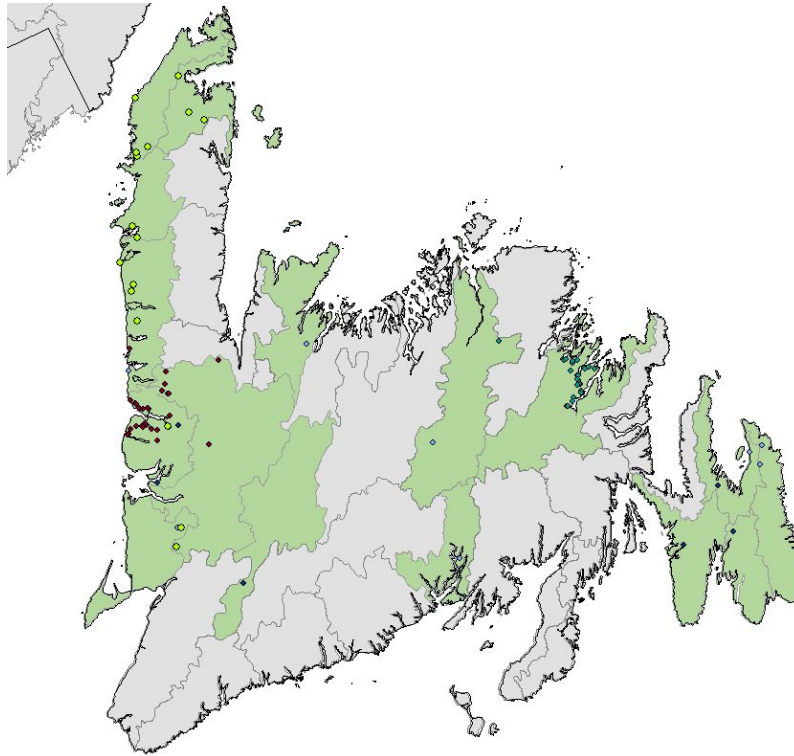
The initial plan for the 2009 CABIN sampling season was to again collect samples from three different stations in each region of the province. The addition of NL staff to the Labrador office in late 2008 allowed sampling to be initiated in the northern locations. Overall, twelve stations representing various ecoregions across NL were to be sampled. However, due to an unsafe sampling conditions and busy workloads, Labrador and central regions could not be sampled. Thus in 2009 six new CABIN sites, three each from eastern and western, were sampled and added to the network. These samples represented four ecoregions, allowing advancement of the national CABIN model. All 2009 samples are currently undergoing taxonomic analysis at an accredited laboratory.

The following map illustrates all CABIN sampling stations established through DOEC to date.



In accordance with the CABIN Network agreement, NL WRMD will continue to follow the standard set of field protocols as outlined in training provided by EC. NL will continue to provide the results of all CABIN data collected to the national network, maintain reference collections of organisms, and participate in CABIN's quality assurance and control program, with assistance from EC.

CABIN sampling in NL has also been conducted by Parks Canada and Environment Canada since 2002. In 2009, EC conducted sampling on the northern peninsula, sampling a total of 16 sites and adding to the NL total. The following map is from Lesley Carter (EC Atlantic) depicting all the CABIN reference sites in NL to date.



In 2010, NL WRMD will strive to continue adding reference sites to the CABIN database which will fill in any existing gaps with respect to benthic communities in different ecoregions. We hope to establish reference locations for industrial sites, such as Duck Pond Mines, Voisey's Bay and Vale Inco - Long Harbour, allowing any impacts these industries may have on benthic communities to be fully assessed in the future.

In addition, EC in British Columbia are developing a method to combine CABIN biological results with water chemistry to produce an integrated evaluation of aquatic health at a location. The two must be incorporated to ensure that water quality conditions undetected by either indicator are not overlooked. NL WRMD will review this method for possible adaptation in the province.