

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

**ANNUAL WORK SCHEDULE  
2012 - 2013**



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

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

**Canada-Newfoundland and Labrador  
Water Quality Monitoring Agreement  
Annual Work Schedule 2012-2013**

The attached Schedules A, B and C outline cost and work shared activities to be carried out during the current fiscal year under the Canada-Newfoundland and Labrador Water Quality Monitoring Agreement. The three schedules have been reviewed and approved by the Administrators of the Agreement.



David Boerner  
Administrator, on behalf of  
Environment Canada  
Government of Canada



Martin Goebel  
Administrator, on behalf of  
Department of Environment and 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. Darren Goetze	Environment Canada, 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:

Ms. Hélène Bouchard	Environment Canada (Water Quality Monitoring & Surveillance)
Mr. Vincent Mercier	Environment Canada (Water Quality Monitoring & Surveillance)
Mr. Denis Parent	Environment Canada (Water Quality Monitoring & Surveillance)
Ms. Christine Garron	Environment Canada (Water Quality Monitoring & Surveillance)
Mr. Art Cook	Environment Canada (Atlantic Laboratory for Environmental Testing)
Mr. Haseen Khan	Water Resources Management Division, Newfoundland & Labrador Department of Environment & Conservation
Ms. Renée Paterson	Water Resources Management Division, Newfoundland & Labrador Department of Environment & Conservation

**Schedule B**

**Work Shared Activities for Fiscal Year 2012-2013**

**Schedule B – Work Shared Activities 2012-2013**

<b>Activity</b>	<b>Responsible Agency</b>	<b>Remarks</b>
<b>Ambient Water Quality Sampling</b>	Newfoundland and Labrador Department of Environment and Conservation	Refer to <b>Table B.1 &amp; Figure 1</b> for sampling details in Newfoundland  Refer to <b>Table B.2 &amp; Figure 2</b> for sampling details in Labrador
<b>Ambient Water Quality Analysis</b>	Environment Canada – National Laboratory for Environmental Testing (NLET)	Refer to <b>Table B.3a &amp; B.3b</b> for laboratory analysis details
<b>Recurring Data Management Activities</b>	Newfoundland and Labrador Department of Environment and Conservation <u>and</u> Environment Canada	Refer to <b>Table B.4</b> for recurring data management activities
<b>Special Projects</b>	Newfoundland and Labrador Department of Environment and Conservation <u>and</u> Environment Canada	Refer to <b>Table B.5</b> for Special Projects (work shared activities)

**Note:** Details regarding NL efforts for all additional technical projects/activities and the scope of work is available in the 2012-2013 Divisional Work Plan.

**Table B.1: Index Station Location, Designation and Sampling Frequency 2012-2013 for Newfoundland Stations**

Station #	Description	Latitude	Longitude	Samples/year	Classification
<b>EASTERN REGION</b>					
NF02ZK0005	Northeast River	47 16 23	-53 50 25	8	CABIN site 09-10/ 11-12 & 12-13 / Hydrometric / Core CESI Station
NF02ZL0029	Goulds Brook	47 30 18	-53 17 28	5	CABIN site 09-10 / Core CESI Station
NF02ZM0004	Waterford River at Commonwealth Ave.	47 31 19	-52 48 29	4	Local CESI Station
NF02ZM0009	Waterford River at Kilbride	47 31 46	-52 44 34	4	RTWQ / Hydrometric / Local CESI Station / Chemical Management Plan
NF02ZM0014	Virginia River at The Boulevard	47 35 02	-52 41 29	4	Local CESI Station / CABIN site 10-11
NF02ZM0015	Quidi Vidi Lake at Outlet	47 35 02	-52 40 51	4	Local CESI Station
NF02ZM0016	Rennies River at Carnell Drive	47 34 40	-52 42 03	4	Local CESI Station
NF02ZM0020	Broad Cove Brook	47 35 53	-52 52 53	4	CABIN site 08-09 / Local CESI Station
NF02ZM0098	Virginia River at headwaters	47 35 56	-52 45 17	4	CABIN site 08-09 / Comp Guidelines Site / Local CESI Station
NF02ZM0109	Mundy Pond at Outlet	47 33 40	-52 44 38	4	Local CESI Station
NF02ZM0144	Kelly's Brook at Portugal Cove Rd.	47 34 28	-52 42 45	4	Local CESI Station
NF02ZM0175	Waterford River at Brookfield Rd.	47 31 34	-52 45 48	4	Local CESI Station
NF02ZM0176	South Brook at Mouth	47 31 41	-52 44 48	4	Local CESI Station
NF02ZM0177	Rennies River at Portugal Cove Rd.	47 34 28	-52 42 36	4	Local CESI Station
NF02ZM0178	Learys Brook at Clinch Cres.	47 34 21	-52 44 21	5	RTWQ / Hydrometric / Core CESI Station / CABIN site 11-12
NF02ZM0179	Virginia River at Guzzwell Drive	47 35 47	-52 42 06	4	Local CESI Station
NF02ZM0180	Virginia River at Newfoundland Dr.	47 35 59	-52 42 02	4	Local CESI Station
NF02ZM0181	Waterford River at Blackhead Road	47 32 53	-52 43 09	5	Core CESI Station
NF02ZM0182	Waterford River at Bremigans Pond	47 31 07	-52 51 21	4	Local CESI Station
NF02ZM0183	Kelligrews River at Kelliview Cres.	47 29 45	-53 01 03	4	Local CESI Station / CABIN site 11-12
NF02ZM0184	Learys Brook at Outer Ring Road	47 34 16	-52 47 29	4	Local CESI Station
NF02ZM0185	South Brook at Headwaters	47 29 37	-52 51 02	4	CABIN site 08-09 / Comp Guidelines Site / Local CESI Station
NF02ZM0294	Manuels River	47 31 11	-52 56 41	4	Archaeologically significant / Local CESI Station

NF02ZM0359	Paddy's Pond at Outlet	47 29 17	-53 47 36	4	RTWQ stand-alone station
NF02ZN0004	Salmonier River	47 10 54	-53 23 56	4	Local CESI Station
<b>CENTRAL REGION</b>					
NF02YM0003	Indian Brook	49 29 53	-56 10 35	4	CABIN site 08-09 / Hydrometric / Local CESI Station
NF02YM0004	South West Brook at Baie Verte	49 55 15	-56 13 45	4	Hydrometric / Local CESI Station
NF02YO0001	Exploits River at Grand Falls	48 55 27	-55 39 21	4	Local CESI Station
NF02YO0121	Peter's River	49 06 21	-55 24 38	4	Hydrometric / Former RTWQ / Local CESI Station / CABIN site 12-13
NF02YO0020	Exploits River at Aspen Brook	48 56 55	-55 54 56	4	Local CESI Station
NF02YO0107	Exploits River at Millertown Dam	48 45 34	-56 35 32	5	Hydrometric / Core CESI Station
NF02YR0001	Pound Cove Brook	49 11 11	-55 55 24	4	Comp Guidelines Site / CABIN site 12-13 / Local CESI Station
NF02YO0128	Exploits River below Grand Falls	48 56 12	-55 37 03	4	Local CESI Station
NF02YO0142	Corduroy Brook	48 56 21	-55 39 47	4	Local CESI Station / CABIN site 11-12
NF02YO0143	Exploits River at Bond Bridge	49 01 15	-55 27 15	4	Local CESI Station
NF02YO0189	Joe's Lake	49 01 43	-56 04 01	4	
NF02YQ0006	Northwest Gander River	48 34 54	-55 30 20	4	CABIN site 08-09 / Comp Guidelines Site / Local CESI Station
NF02YQ0030	Gander River at Appleton	48 59 41	-54 52 04	8	Hydrometric / Core CESI Station
NF02YS0001	Terra Nova River at Terra Nova	48 30 27	-54 12 43	4	Local CESI Station
NF02YS0011	Terra Nova River at ES Spencer Bridge	48 38 27	-54 02 11	5	Hydrometric / Core CESI Station
NF02YS0083	Northwest River at Terra Nova	48 23 44	-54 11 53	4	Hydrometric / National Park / Local CESI Station
<b>WESTERN REGION</b>					
NF02YE0004	Portland Creek	50 10 54	-57 36 13	4	Local CESI Station
NF02YE0005	Western Brook @ Bridge	49 49 49	-57 51 23	5	CABIN site 08-09 / Core CESI Station
NF02YG0001	Main River at Bridge	49 46 10	-56 54 15	5	Canadian Heritage River / Core CESI Station
NF02YG0009	Main River at Paradise Pool	49 48 46	-57 09 24	4	Former RTWQ / Hydrometric / Canadian Heritage River / Local CESI Station
NF02YG0020	Eagle Mountain Brook	49 49 53	-57 17 15	4	Local CESI Station
NF02YH0018	Lomond River @ Bridge	49 24 07	-57 43 49	4	CABIN site 08-09 / Local CESI Station

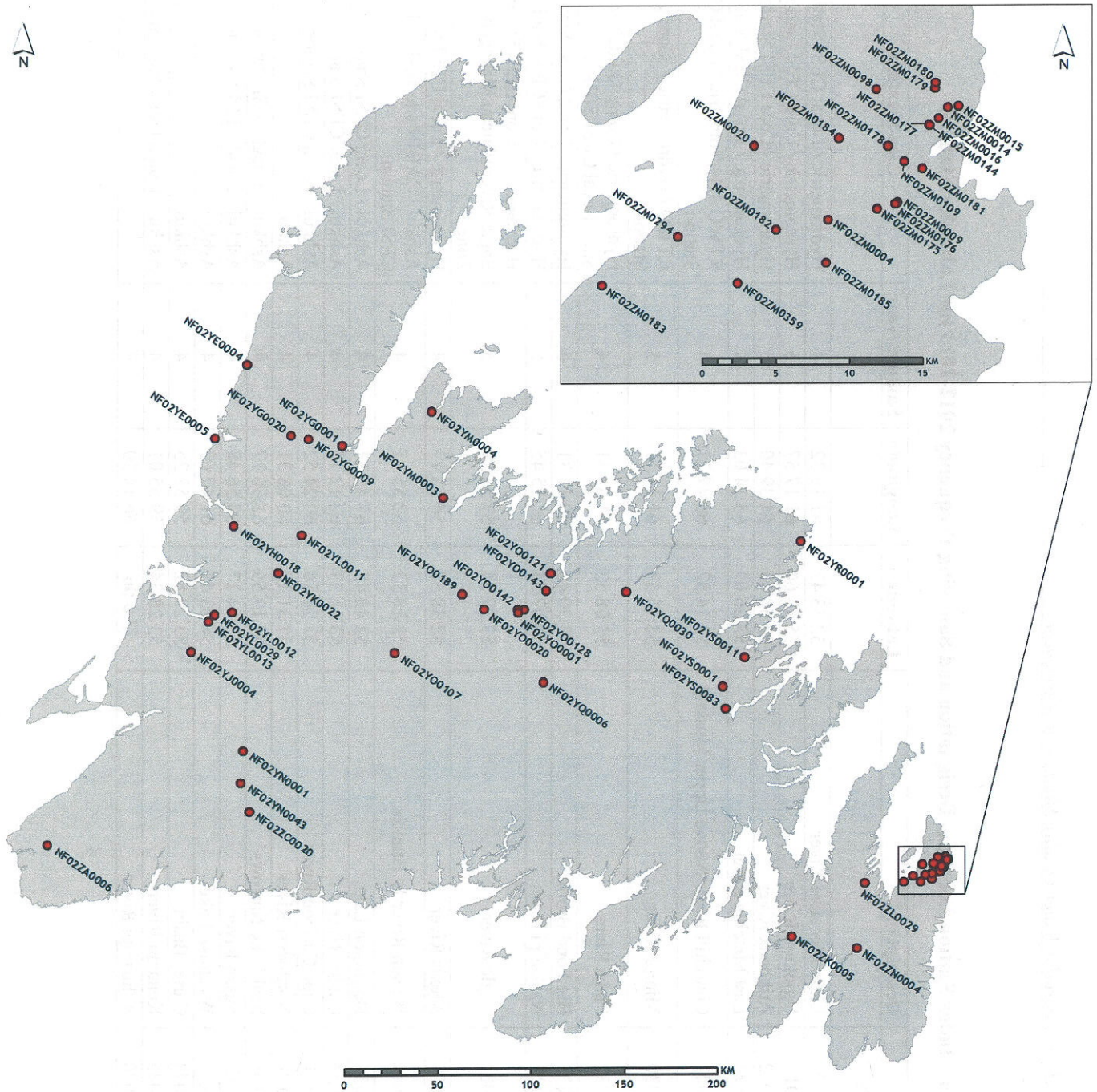


NF02YJ0004	Pinchgut Brook	48 47 51	-58 03 43	8	CABIN site 08-09/11-12 & 12-13 / Core CESI Station
NF02YK0022	Humber Canal	49 09 58	-57 24 56	4	Local CESI Station
NF02YL0011	Humber River at Little Falls	49 20 54	-57 14 07	4	Local CESI Station
NF02YL0012	Humber River at Humber Village Bridge	48 59 01	-57 45 40	5	RTWQ / Hydrometric / Core CESI Station
NF02YL0013	Corner Brook at Margaret Bowater Park	48 56 40	-57 56 12	4	Local CESI Station
NF02YL0029	Wild Cove Brook	48 58 28	-57 53 02	4	Local CESI Station / CABIN site 12-13
NF02YN0001	Lloyds River @ Bridge	48 18 16	-57 43 07	5	CABIN site 09-10 / Core CESI Station
NF02YN0043	Peter Strides Lake	48 09 13	-57 43 24	4	
NF02ZC0020	Buck Lake	48 00 48	-57 39 59	4	
NF02ZA0006	Grand Codroy River	47 52 08	-59 07 05	4	Local CESI Station

Notes:

1. A total of 57 stations will be sampled during 2012-2013 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 249 (this number does not include triplicate or blank samples).
4. All Core CESI stations being sampled 5 times per year.
5. Selected Core CESI stations being sampled 8 times per year to perform sensitivity analysis on frequency of sampling impact on CESI scores.
6. Sampling is carried out by provincial staff.

Figure 1 – Water Quality Sampling Sites 2012-2013 – Newfoundland



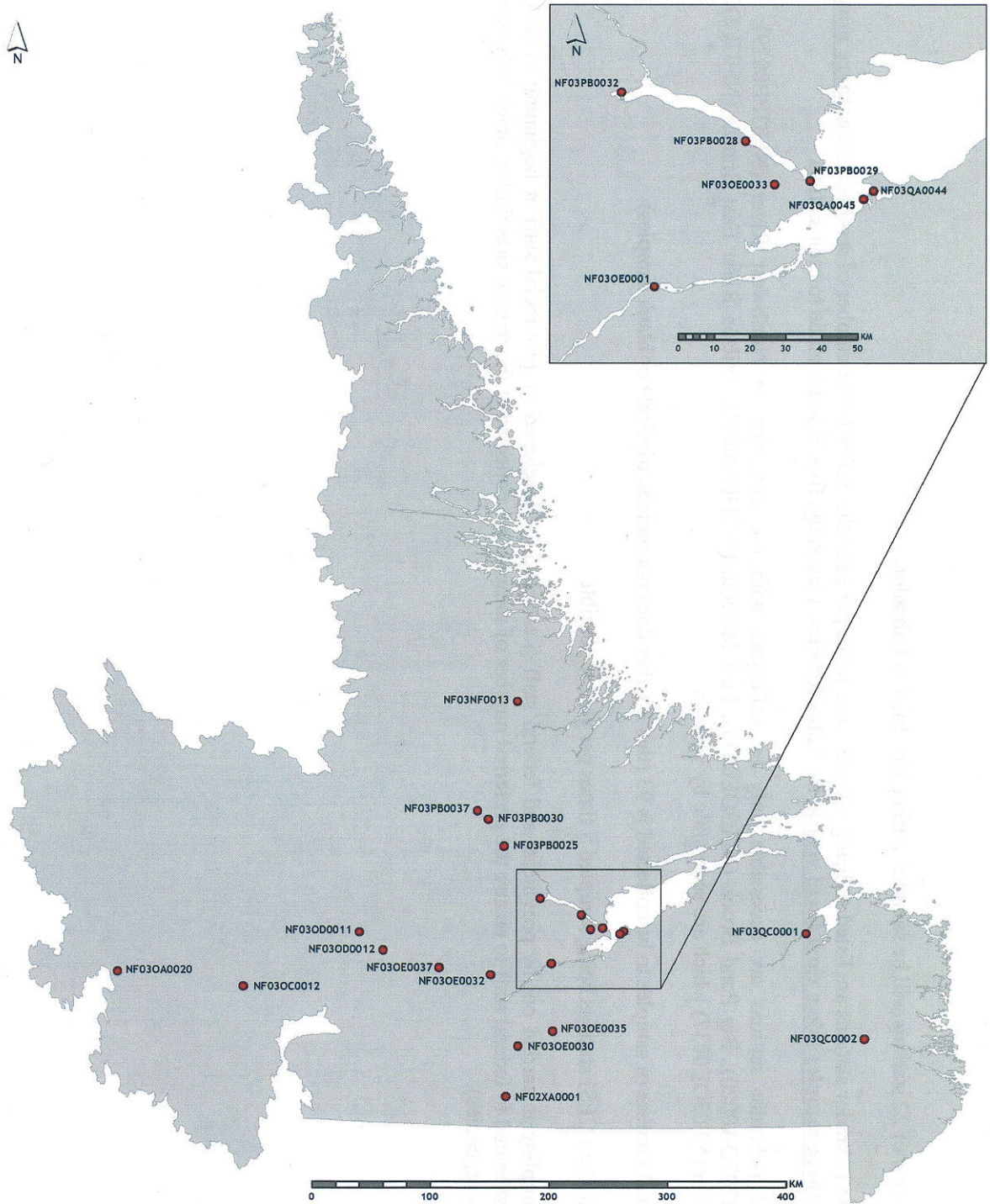
**Table B.2: Northern Index Station Location, Designation and Sampling Frequency 2012-2013 for Labrador Stations**

Station #	Description	Latitude	Longitude	Samples/year	Classification
<b>LABRADOR REGION</b>					
NF02XA0001	Little Mecatina River	52 13 42	61 19 32	4	Hydrometric / Local CESI Station
NF03NF0013	Ugjoktok River	55 13 60	61 17 57	5	Hydrometric / Core CESI Station
NF03OC0012	Atikonak River	52 58 03	64 39 40	5	Hydrometric / Core CESI Station
NF03OD0011	East Metchim River	53 26 07	63 14 03	4	Hydrometric / Local CESI Station
NF03OE0001	Churchill River Above Upper Muskrat	53 14 52	60 47 21	4	RTWQ / Hydrometric / Local CESI Station
NF03OE0030	Mimipi River	52 36 53	61 11 11	5	RTWQ / Hydrometric / Core CESI Station
NF03OE0032	Pinus River	53 08 52	61 33 31	4	Hydrometric / Comp Guidelines Site / Local CESI Station
NF03OE0033	Big Pond Brook	53 30 43	60 17 31	4	Hydrometric / Local CESI Station
NF03PB0025	Naskaupi River	54 07 54	61 25 45	5	Hydrometric / Core CESI Station
NF03QC0001	Eagle River	53 27 54	57 33 29	5	Hydrometric / Core CESI Station / Eagle River Plateau Management Zone
NF03QC0002	Alexis River	52 38 57	56 52 17	4	Hydrometric / Local CESI Station
NF03OD0012	Wilson River E. Branch	53 18 33	62 55 11	4	Ashkui / CABIN site 10-11 / Local CESI Station
NF03OE0035	Dominion Lake	52 43 45	61 45 17	4	Ashkui / Local CESI Station
NF03OE0037	Cache River	53 11 33	62 12 11	4	Ashkui / Local CESI Station
NF03PB0028	Cape Caribou River	53 37 16	60 24 52	4	Ashkui / Local CESI Station
NF03PB0029	Northwest River	53 31 18	60 08 31	4	Ashkui
NF03PB0030	Seal Lake Narrows	54 19 55	61 38 27	4	Ashkui / Local CESI Station
NF03PB0032	Susan River	53 44 17	60 56 48	4	Ashkui / Local CESI Station
NF03PB0037	Wuchusk Lake	54 23 43	61 47 09	4	Ashkui
NF03QA0044	Carter Basin	53 29 52	59 52 25	4	Ashkui
NF03QA0045	Kenamu River	53 28 34	59 55 01	4	Ashkui / Comp Guidelines Site
NF03OA0020	Ashuanipi River	53 0 06	66 14 30	4	

Notes:

1. A total of 22 stations will be sampled during 201-2013 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 93 (this number does not include triplicate or blank samples).
5. All Core CESI stations being sampled 5 times per year if possible.
6. Sampling is carried out by provincial and federal staff (i.e. schedule developed by provincial staff at beginning of sampling season and distributed to federal staff to ensure the preferred number of samples are collected at the remote sites during field visits between either of the two agencies).

Figure 2 – Water Quality Sampling Sites 2012-2013 – Labrador



**Table B.3a: Analytical Parameters, Holding Times and Schemas for 2012-2013**

Parameter	Holding Times (recommended by NLET)	Schema Number	Schema Name	Parameter/ Grouping
<b>MAJOR IONS</b>		<b>1</b>	ALKPHCOND	alkalinity, pH, conductivity
Alkalinity	24 hours*	<b>2</b>	MI4-U	Ca, Mg, Na, and K
Chloride	28 days	<b>5</b>	ANION1-U	NO3 by IC
Sulphate	28 days	<b>6</b>	ANION2-U	Cl and SO4 by IC
Calcium	8 weeks	<b>11</b>	TP1-U	total phosphorus
Magnesium	8 weeks	<b>12</b>	TN2-U	total nitrogen
Sodium	8 weeks	<b>13</b>	DIC/DOC1	dissolved inorganic and organic carbon
Potassium	8 weeks	<b>22</b>	HARDNESS1	Calculation derived from Ca and Mg
<b>PHYSICAL</b>		<b>23</b>	COL-APP	Colour-apparent (unfiltered sample)
pH	24 hours*	<b>24</b>	TURBIDITY3	turbidity
Conductivity	28 days	<b>31</b>	TM2004/T27W	Total metals-27 elements
Colour	48 hours*			
Turbidity	24 hours*			
<b>NUTRIENTS</b>				
Nitrate	24 hours*			
Total Nitrogen	24 hours*			
Total Phosphorus	1 year - according to Standard Methods this is 28 days, which we will be adopting			
DIC/DOC	24 hours*			
<b>METALS</b>				
Total Metals-27 elements	6 months			

**\*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	

\* Due to the logistics involved in sample shipment from NL to NLET in ON, the shorter holding times of 24 and 48 hours are continuously exceeded; a “Stability Study” report prepared by NL ENVC and reviewed/approved by EC addresses this issue. This report is available on the ENVC Departmental web page.

**Table B.3b – Work-Shared Activities – Analytical Credits**

<b>Water Quality Sampling and Water Quality Analysis</b>	<p>Water samples from WQMA network are collected primarily by provincial staff. Analysis is completed by federal lab to ensure consistency.</p> <p>Additional lab credits beyond what is required for core CESI stations are used to partially offset provincial sampling costs associated with sample collection at these sites (e.g. travel costs, field personnel time, etc.)</p> <p>\$55,000 contribution from EC to cover analysis costs.</p>	<p><b>342</b> samples to be collected in 2012-2013 (no triplicate or blanks are included in the above noted total)</p>	<p>- Co-lead between NL and EC</p> <p>-EC will provide the analytical services (according to Tables B.1, B.2, and B.3a) by March 31, 2013.</p>
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**Table B.4: Recurring Data Management Activities** (accounts for \$15,000 in-kind contribution from EC)

<b>Sample Submission</b>	<b>Management Activities</b>	<b>Lead Agency</b>	<b>Remarks</b>
	Laboratory Procedures and Quality Control Processes	Environment Canada	Laboratory analyses are completed according to ISO 17025. Detection limits for all required parameters are mutually agreed upon between EC and NL ENVC. Analyses of all parameters for NL WQMA samples are currently being done at NLET. A laboratory comparison study will be carried out to provide an assessment of the implications of a switchover in labs (from NLET to ALET).
	Entering field data onto field sheets and subsequent submission to laboratory	Newfoundland and Labrador Department of Environment and Conservation – staff	NL field staff is responsible for entering all field data onto specified field sheets and submitting them to ALET regularly.
	Sample/Project/Station Initialization and Modifications	Environment Canada	ALET will receive components of the client package (sample submission, project/parameter submission or modification, and new station submission) and input/update EcoLIMS as required. Copies will be retained for future reference. Even though sample analyses are performed at NLET, ALET will initialize the samples to facilitate sample processing and validation.
<b>Management of National Water Quality Database (ENVIRODAT)</b>	Processing and Loading of NLET Data	Environment Canada	Samples are analyzed by NLET, transferred to a holding file in Burlington, and retrieved for loading to Atlantic ENVIRODAT. Samples are validated for date, time, station, and number of parameters. Any errors are identified and corrected. Sample and measurement information is transferred to ENVIRODAT in bulk every 2-3 months. A summary (data audit) report is generated once all samples for a fiscal year are validated and finalized.
	ENVIRODAT Ongoing Management	Environment Canada	Management of ENVIRODAT is recognized as an on-going function. Data is backed up daily and off-site backups are kept for disaster-recovery purposes. All modifications/upgrades/additions to the NL ENVC dataset are communicated through one contact (Alexandra Audet) to ensure consistency.

	<p>The majority of missing data issues has been resolved for previous years of data. Periodically issues do still arise and these are managed and resolved on an on-going basis through email to Alexandra Audet &amp; Vincent Mercier. EC must ensure that problem resolution is timely and collaborative.</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation - staff</p>	<p>Historical Data Issues and Problem Resolution</p>	
<p><b>Data Extraction Tool/Web Services</b></p>	<p>EC must ensure that the NL WQMA dataset is accessible on an external server for download. To facilitate this, a data transformation package has been designed and will be maintained that will provide a filtered copy of ENVIRODAT outside the EC firewall. The NL WQMA dataset is part of this filtered copy. This information can be requested from external clients (e.g. through access of information legislation from either EC or NL).</p>	<p>Environment Canada</p>	<p>Accessibility/Availability of NL WQMA Dataset</p>	
	<p>EC provides several web services that NL ENVC and others can use for extracting ENVIRODAT data and water quality indicators data. EC will be required to provide additional services and update existing services from time to time.</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Paul Neary/Leona Hyde</p>	<p>ENVIRODAT Web Services</p>	
	<p>NL will regularly request the archived NL WQMA dataset from EC (on DVD) to ensure there is an updated back-up with the province; each new requested archive dataset will be reviewed, QA/QCed and will replace the former dataset.</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Shibly Rahman</p>	<p>Regular request of archived NL WQMA data from ENVIRODAT</p>	



Table B.5: Work-shared Special Projects

Project	Activity	Responsible Agency	Remarks
<p><b>Data Management Special Projects</b></p>	<p>Data Verification and Validation of Sample/Measurement Data</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation - staff</p>	<p>EC must provide a mechanism that will enable project leaders and data reviewers to flag both sample and measurement data as to quality. A national WQMS quality-flagging system has been chosen and a prototype application has been designed that is currently part of the Atlantic EcoLIMS. To further develop this project, the application must be moved to a stand-alone version that will have the capability to connect to either the ENVIRODAT database or an Access database. This will allow EC to distribute the application and a client's dataset for review and flagging. Once this has been done, a user training session will be developed. NL ENVC will act as the development user for this project, providing feedback/comments/ suggestions as the project unfolds. This application will also contain the functionality to compare an analytical value to historical data for the station and perform an ion balance on the sample. Should the roll-out of this application be delayed, EC will provide a guidance document that outlines the quality flagging system so that NL ENVC can flag their data using an approach consistent with that used by other projects within ENVIRODAT.</p> <p>\$2,000 in-kind from EC for programming, QA/QC procedures and training.</p>

	Variable Grouping	Environment Canada Newfoundland and Labrador Department of Environment and Conservation - staff	<p>The current design of EC's variable and method tables makes it difficult to group variables for data extraction and interpretation purposes. Also, for lab purposes, additional information must now be retained on variable methods and variable comparability so that data can be merged together from all national water quality labs. EC staff (Julie Boyer) has begun the initial phase of the variable grouping process. In addition to this work, EC plans to initiate a contract that will secure a chemist that can review existing variables and methods with the aim to facilitate variable grouping and comparability and at the same time build on the work already completed by EC. Redesign of the variable and method tables will be part of this process. These changes should greatly expedite the development of associated applications.</p> <p>\$2,000 in-kind from EC for replacing temporary VMV codes.</p>
	Laboratory Comparison Study	Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Joanne Sweeney	<p>Analyses of all parameters for NL WQMA samples are currently being done at NLET. Due to proposed changes within EC relating to the laboratory assignments on a national scale, the option of having the NL WQMA samples analyzed at ALET is being investigated.</p> <p>\$4,000 in-kind from EC for chemical analyses and assessment.</p>

	<p>ENVIRODAT Data Extraction Tools/Testing &amp; Evaluation of GENIE</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – staff</p>	<p>EC must ensure that modifications to ENVIRODAT data extraction tools will not adversely affect NL ENVC's ability to extract data. Where possible, any modifications will be presented to NL ENVC for review and feedback. Out of necessity EC WQMS will need to move to a national tool (from its current three regional tools). EC has proposed a temporary extraction tool, GENIE, which will replace the three regional extraction tools until a new national extraction tool has been developed. This will affect the extraction of NL ENVC data and therefore all efforts will be made by EC in consultation with NL ENVC to maintain the same level of extraction ability as the old extraction tool. Select NL ENVC staff will test the GENIE tool and provide feedback to EC. GENIE is expected to be launched in 2012-2013.</p>
	<p>Structural changes/modifications to CANAL webpage</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Paul Neary/ Leona Hyde/Kyla Brake</p>	<p>\$5,000 in-kind from EC for programming to improve functionality and migration to GENIE.</p> <p>Structural changes to the CANAL web page are necessary; however, this task will not be initiated until the updating of the Site Documentation Database is complete. At this point, the CANAL update project will be assigned to NL ENVC staff sometime within the next two years. Assistance from EC may be needed to better understand the code utilized to create CANAL as well as how CANAL will link to GENIE for data extraction purposes. This is a multiyear project that will carry over into the next two years.</p> <p>\$200 in-kind from EC to provide technical advice.</p>

<p><b>Monitoring Network Evaluation and Optimization</b></p>	<p>This on-going project focuses on evaluating the network on a regular basis to ensure that the partner's monitoring objectives are being met and that the network will be sustainable in the long-term.</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – staff</p>	<p>EC is developing a science-based methodology for characterizing WQA related monitoring stations and assessing risk at the station level and this has been presented to NL ENVC for their review and feedback. Initial RB scores will be presented by EC and there will be opportunity for NL ENVC to provide expert opinion and scientific data to refine the RB station scores. This work will be done in conjunction with reviewing CESI core vs local site designation in context of national and provincial reporting.</p> <p>In addition to the sensitivity analysis work identified under the CESI reporting project, it is proposed to develop a plan to evaluate sampling frequencies for trend detection using power analysis. This will complement the trend analysis work being completed by NL ENVC.</p> <p>In parallel, there will be discussion on federal, federal-provincial and provincial sites designation based on respective and joint roles and responsibilities. Similar discussion will occur with other federal and provincial partners.</p> <p>Additionally, NL ENVC is investigating various statistical approaches that can be used to optimize the monitoring network.</p> <p>This is a multi-year project that will carry over into 2013-2014.</p> <p>\$5,000 in-kind from EC for analysis and assessment (NL portion of the overall exercise)</p>
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<p><b>Intensive Survey Technical Report</b></p>	<p>Completion of Intensive Survey 2009-10 Report (Bonne Bay Ponds)</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Ian Bell</p>	<p>NL ENVC staff is responsible for obtaining the data collected during the 2009-2010 intensive survey of the Bonne Bay ponds from EC, analyzing the data and compiling the results in a comprehensive report. EC will support report review. The report is to be made available on the Divisional web page. This report will be finalized by the end of fiscal year 2012-2013.</p>
<p><b>Site-specific Guidelines Project</b></p>	<p>Development of site-specific guidelines for select NL water bodies in partnership with industry</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Kyla Brake/ Joanne Sweeney</p>	<p>\$500 in-kind from EC for review and revisions to report.</p> <p>NL utilizes the national <i>CCME Protection of Aquatic Life Guidelines</i> in the majority of cases. However, in some instances the national guidelines are not applicable due to high background concentrations of select parameters. This project will aim to develop site-specific guidelines for select parameters at select NL water bodies in partnership with industry where deemed appropriate (i.e. beneficial from an operational standpoint; regional perspective; etc.). The SSGs will better reflect the actual characteristics of the water body. This is a multiyear project that will carry over into 2013-2014.</p> <p>\$1,000 in-kind from EC for technical advice and review.</p>

<p><b>Real-time/Web camera Technology Special Projects</b></p>	<p>In-situ water quality/quantity/climate monitoring using a mobile environmental monitoring platform (MEMP) on a need-basis across the province</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Ryan Pugh</p>	<p>The MEMP is a rapidly-deployable, trailer-mounted, water quantity, quality and weather station combined. The MEMP is also equipped with a refrigeration system to ensure grab samples collected by the autosamplers remain cool and resistant to degradation throughout the holding time. This platform has been fully equipped, functional and utilized at a station on Outer Cove Brook from 2010-2012. EC provided capital costs for the MEMP as part of the Atlantic Monitoring Capital Plan during fiscal year 2010-2011. ENVC contributed the truck as well as some additional equipment during fiscal year 2010-2011. The MEMP will be continuously utilized, upgraded and improved in upcoming years. EC and ENVC will continue to work together to share expertise in this area. ENVC will continue to dedicate one staff (Ryan Pugh) as the custodian of this unit.</p>
<p>Maintenance of camera technology at Leary's Brook Real-Time Station</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Paul Neary/Leona Hyde/Ryan Pugh</p>	<p>Throughout the past two years, improvements have been made to the web camera images at Leary's Brook (i.e. archiving photographs; production of video clips; adjustment of camera position; improved image resolution; etc.). EC will continue to provide in-kind support (\$1,200) in context of new technologies/development tool, exploring possibility of using such technology as part of web reporting.</p>	<p>\$15,000 in-kind from EC for capital equipment loan.</p>
<p>Collaboration / transfer of knowledge on: 1) set up and deployment of UV sensor owned by EC 2) set up and deployment of buoys owned by EC</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Ryan Pugh</p>	<p>NL ENVC staff will share testing results with EC since this technology may be used more broadly throughout the Atlantic region.</p>	<p>\$1,200 in-kind from EC for equipment (i.e. modem). \$200 in-kind from EC for knowledge transfer.</p>

	<p>Instrumentation to monitor water quality at key joint monitoring sites</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Renee Paterson/Tara Clinton/Ryan Pugh</p>	<p><b>See Annex I - EC-shared Instrumentation Inventory</b></p> <p>EC in-kind contribution based on annual value of \$3,000 per instrument for a life cycle of 5 years (each instrument totals \$15,000 over 5 years); 4 instruments are outdated and in need of replacement.</p> <p>ENVC will provide in-kind contribution for regular servicing and performance checks (performed by ENVC) on shared instruments at the newly renovated lab.</p> <p>EC and ENVC will cost share the amount required for sensor replacement to the shared instruments (with EC paying a maximum of \$5,000 per year).</p> <p>Supports work at real-time stations located in conjunction with core CESI stations and/or CMP stations (i.e. Minipi River; Leary's Brook; Waterford River; Humber River).</p>
<p>Comparison Study between Various Turbidity Monitoring Instrumentation</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Ryan Pugh</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Ryan Pugh</p>	<p>There is a variety of instrumentation that is capable of monitoring turbidity available from several manufacturers. An in-depth study will be undertaken to look at how each instrument functions in relation to NL waters. A report documenting the findings will be generated and sent for internal and external review. EC will support review of the study. When finalized, the document will be posted to the Departmental web page. Recommendations from the report will be implemented throughout the program where deemed appropriate. This is a multiyear project that will carry over into 2013-2014.</p> <p>\$500 in-kind from EC for technical advice and review.</p>

	<p>Statistical project to determine extrapolation of non-measured data at select real-time stations</p>	<p>Environment Canada Newfoundland and Labrador Department of Environment and Conservation – Shibly Rahman</p>	<p><b><u>Report on Comparison of Total Suspended Solids (TSS) Concentration vs. Real-time Turbidity Readings</u></b> Regression models have been built to establish the relationship between TSS concentration and the associated real-time turbidity readings for the following stations: 1) Leary's Brook; 2) Rattling Brook below bridge. There are not a sufficient number of grab sample TSS results to be confident in the model at this time, As additional TSS results become available throughout 2012-2013, the models will continue to be tested and verified. Additionally, models will be developed for other stations (i.e. Churchill River stations; etc.). A report will document the results when enough information is available.</p> <p><b><u>Report on the Comparison of Ion Concentration vs. Real-time Specific Conductivity Readings</u></b> Regression models have been built to establish the relationship between ion concentrations (i.e. chloride; sulphate; sodium; calcium) and the associated real-time specific conductivity readings for the following stations: 1) Leary's Brook; 2) Long Harbour stations; 3) Humber River; 4) Waterford River. A draft report was prepared and is currently under review and will be finalized by the end of the 2012-2013 fiscal year. The results of this report will be published in a peer-reviewed journal. Research will also begin on how to implement the predictions into the real-time web page reporting.</p> <p>EC will provide support on reviewing the approach, considering its national applicability. This is a multiyear project that will carry over into 2013-2014.</p> <p>\$1,000 in-kind from EC for technical advice and review.</p>
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**Schedule C**

**Cost Shared Activities for Fiscal Year 2012-2013**

Schedule C – Cost Shared Activities 2012-2013

Project	Activity	Amount Payable to NL	Remarks
<p><b>Canadian Aquatic Biomonitoring Network (CABIN)</b></p>	<p><b>NL:</b> Monitoring of benthic invertebrates of selected water bodies, such as reference sites and core CESI sites, to better assess the aquatic ecosystem health in complement to physical-chemical work.</p> <p><b>EC:</b> Development of data organization tool for Atlantic Model Input (\$10,000 – not payable to NL).</p> <p><b>EC:</b> Investigation into new research and development in the field of aquatic biomonitoring, notably in context of new decision tools (\$5,000 – not payable to NL).</p> <p><b>NL/EC:</b> Completion of Baseline Report on Reference Invertebrate Assemblages in NL, as part of initial investment for long term effect based monitoring (\$5,000 – payable to NL).</p>	<p><b>\$5,000</b></p>	<p>- Co-lead between NL and EC</p> <p>- EC will pay its share by March 31<sup>st</sup>, 2013 to NL Exchequer</p> <p>- NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</p> <p>- In-kind contribution in CABIN reference model development and associated assessment tools</p>
<p><b>Canadian Environmental Sustainability Indicators (CESI)</b></p>	<p><b>Provincial Input to National CESI Reporting</b></p> <p><b>NL:</b> Site selection, water quality data extraction, and manipulation (\$10,000 – payable to NL).</p> <p><b>NL:</b> Decision on WQI inputs and calculation of ratings for core CESI stations (\$2,000 – payable to NL).</p>	<p><b>\$20,000</b></p>	<p>- NL is the lead jurisdiction and responsible for the completion of work – Kyla Brake</p> <p>- EC will pay its share by March 31<sup>st</sup>, 2013 to NL Exchequer</p> <p>- NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</p>

	<p><b>NL:</b> Overview interpretation of results (short document on parameters &amp; issues driving the ratings and spatial trends; issues encountered; etc.) (\$3,000 – payable to NL).</p> <p><b>NL:</b> Data analysis and report preparation. NL will validate/contribute to CESI core stations review for longer term WQI national reporting (\$5,000 – payable to NL).</p> <p>Sensitivity analysis of sampling frequency on WQI score study using selected core CESI stations. (<b>Note:</b> This study requires three years of data which will be completed in 2012-2013).</p>		<p>- EC in-kind contribution for lab analysis for sensitivity analysis project as well as travel to Winnipeg in January 2013</p> <p>- CESI 2012 Report</p>
	<p><b>Modifications / Improvements to CESI WQI Calculator</b></p> <p><b>NL:</b> Provision of fixes/solutions to issues encountered with calculator (\$8,000 – payable to NL).</p> <p><b>NL:</b> Documentation of issues/fixes (\$1,000 – payable to NL).</p> <p><b>NL:</b> Improvements to the Help Manual (\$1,000 – payable to NL).</p> <p><b>EC/NL:</b> Publish a paper documenting the development and application of the CESI WQI Calculator in a peer-reviewed journal (work shared project).</p> <p><b>EC/NL:</b> Initiate investigation into how to make the product accessible to CCME (i.e. convert from CESI to CCME Calculator) (work shared project).</p>	<p><b>\$10,000</b></p>	<p>- NL is the lead jurisdiction and responsible for the completion of work – Shibly Rahman</p> <p>- NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</p> <p>- EC will pay its share by March 31<sup>st</sup>, 2013 to NL Exchequer</p>

	<p><b>Northern Sampling and Analysis (Labrador)</b></p> <p>Labrador water samples are collected by both federal and provincial staff in support of CESI reporting (for more remote core sites). (\$15,000 – payable to NL).</p>	<p><b>\$15,000</b></p>	<ul style="list-style-type: none"> <li>- NL is the lead jurisdiction and responsible for the completion of work</li> <li>- EC will pay its share by March 31<sup>st</sup>, 2013 to NL Exchequer</li> <li>- NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</li> <li>- Refer to Table B.2 and Figure 2 for sampling details</li> </ul>
<p><b>Chemical Management Plan</b></p>	<p>Perform water and sediment sampling at a select location on the Waterford River. (\$2,500 – payable to NL).</p>	<p><b>\$2,500</b></p>	<ul style="list-style-type: none"> <li>- NL is the lead jurisdiction and responsible for the completion of work – Joanne Sweeney</li> <li>- EC will pay its share by March 31<sup>st</sup>, 2013 to NL Exchequer</li> <li>- NL equivalent financial contribution is part of the Water Quality Monitoring Agreement budget</li> </ul>
	<p><b>TOTAL:</b></p>	<p><b>\$52,500</b></p>	

Therefore Environment Canada will transfer to Newfoundland Exchequer the sum of \$52,500 by March 31<sup>st</sup>, 2013.

**Annex I - EC-shared Instrumentation Inventory**

Serial No.	Model	ID No.	Customer	Station Name	Date of Manufacture	Year of Life Cycle (2012=Year 1)
60392	Datasonde 5	H60392	EC (Dartmouth NS)	QA/QC	2011	(Year 2 of 5)
60393	Datasonde 5	H60393	EC (Dartmouth NS)	QA/QC	2011	(Year 2 of 5)
60394	Datasonde 5	H60394	EC (Dartmouth NS)	MEMP	January 2011	(Year 2 of 5)
81200047384	Datasonde 5X	H47384	EC (Dartmouth NS)	Environment Canada #3	December 2008	(Year 5 of 5)
44998	Minisonde	H44998	EC (in Gatineau QC) - First Nations Project	Conne River Minisonde	February 2007	(Year 6 of 5) Overdue for replacement
44422	Datasonde 5X	H44422	EC (in Gatineau QC) - First Nations Project	Southwest Brook below Southwest Pond	March 2006	(Year 7 of 5) Overdue for replacement
60300043806	Datasonde 5X	H43806	EC (Dartmouth NS)	Environment Canada #1	March 2006	(Year 7 of 5) Overdue for replacement
60300043820	Datasonde 5X	H43820	EC (Dartmouth NS)	Environment Canada #2	March 2006	(Year 7 of 5) Overdue for replacement