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CANADA – NEWFOUNDLAND AND LABRADOR

**MEMORANDUM OF AGREEMENT
FOR
WATER QUANTITY SURVEYS**

**REPORT FOR FISCAL YEAR
2012-2013**

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LETTER OF TRANSMITTAL

TO: Bill Appleby
Administrator for Canada

Martin Goebel
Administrator for the Department of Environment and Conservation,
Newfoundland and Labrador

We hereby submit an annual report for the fiscal year 2012-2013 covering activities under the Memorandum of Agreement for Water Quantity Surveys for Newfoundland and Labrador.

Government of Canada



René Savoie
Environment Canada

Government of Newfoundland and
Labrador



Haseen Khan
Department of Environment and
Conservation, Newfoundland and
Labrador

Members
Coordinating Committee

EXECUTIVE SUMMARY

In 1975, Canada and its provincial partners signed Memoranda of Agreement for Water Quantity Surveys. The purpose of the Agreement is to provide a mechanism to harmonize the hydrometric data collection, processing and distribution, as well as a procedure to cost-share the activities of the program. The evolution of the program has generated the need to renew the Agreement. Discussions on this new Agreement called Bilateral have taken place in 2012-13. The new Agreement will ensure the delivery of an efficient and effective hydrometric monitoring service.

During this reporting period, there was an increase of 6 stations to the hydrometric network; the new stations are all classified as provincial stations. More details on these stations are given in section 4 of this report. 1 provincial station (03PB002 Naskaupi River) was destroyed in a forest fire and there is no plan yet for reconstruction.

In addition to the regular hydrometric activities, several construction/upgrade projects have taken place during fiscal year 2012-2013. 14 Federal-Provincial, 3 Federal and 2 Provincial stations had loggers modernized to update the geostationary operational environmental satellite transmitter (GOES) frequency from low data rate to high data rate as a mandatory requirement imposed by the National Oceanic and Atmospheric Administration (NOAA). 3 stations received major building upgrade, 2 new roofs installed and one station was completely rebuilt.

Currently 105 stations, over 93% of the network, are equipped with satellite telemetry and 3 stations have modem telemetry using standard phone lines which means that 96.5% of the network is reporting in real-time. Only 4 stations have no telemetry.

The actual share of the province (804.5K) was less than 1% lower than the original estimate (\$806.8K). Financial details are given in section 5 of this report.

On the human resources side, the St. John's office welcomed the arrival of a new technologist. He is coming to us from our Calgary office and this addition was made possible thanks to the continual increase of the provincial network. Our office in St. John's now includes four technologists allowing us the opportunity to have two teams of two on the ground during the winter or during poor weather conditions.

Fiscal year 2012-2013 was the first full year that the new Hydrometric Workstation was in use. The technologists are transitioning well to the new technology, however there is still a steep learning curve as they adapt to new functionality and business rules.

During this fiscal year, new computer hardware (1 ruggedized laptop per technologist) was purchased in order to meet the technical requirement of the new Hydrometric Workstation.

1.0 INTRODUCTION

This report covers the activities under the Canada/Newfoundland and Labrador Memorandum of Agreement for Water Quantity Surveys for the fiscal year 2012-2013.

The operation of an integrated network of hydrometric stations in Newfoundland and Labrador is cost-shared between Water Survey Division, Meteorological Service of Canada, Environment Canada (DOE), and Newfoundland and Labrador, Department of Environment and Conservation under a Memorandum of Agreement (MOA).

The core of this report has been divided in 5 main sections:

The *Hydrologic Conditions* section provides a brief description of the hydrologic conditions that were encountered during 2012-2013.

The *Coordinators Meeting* section highlights the discussions undertaken during the year.

The *Network Characteristics* section includes a brief summary of the changes from the previous year. Also available is a breakdown of the responsibility classification for each category as well as a description of the other operational activities such as sediment, real-time, etc.

The *Operations* section includes a brief description of the operational activities for the year. This section lists the details of partner shares and invoices issued, as agreed to in Schedule D Estimates (Appendix B).

The report also includes a section on *Construction and Projects* which contains a brief description of the special projects.

In addition, the following Appendices have been included:

Appendix A SCHEDULE C STATION LISTING 2012-2013

Appendix B SIGNED SCHEDULE D 2012-2013

2.0 HYDROLOGIC CONDITIONS

Streamflow and Water Level Conditions

Below are preliminary flow tables for four major rivers in Newfoundland and Labrador. The final information can be found online for all 114 monitored sites in Newfoundland and Labrador at: www.wateroffice.ec.gc.ca

Rocky River 02ZK001 (Eastern NL)

Spring freshet on the eastern part of the island occurred in Mid Feb 2012, mainly in part to a mild period from Feb 12-17, as well as 2 significant rain events during this period, Feb 12 (65.2 mm) and Feb 16 (53.8 mm). This is not uncommon for the Eastern part of the province as mid-winter rain events occur often. These 2 precipitation events along with mild temperatures decimated the snow pack on the Eastern region of the Island. Rocky River's peak was recorded on Feb 13 2012. This peak was the highest recorded flow since Hurricane Igor Sept 21 2010. The monthly mean in Feb was 285% of Median and the max Daily was about 50% of the 1962 record. Due to the lack of snow pack and less than normal precipitation the rest of the spring was relatively non eventful with peaks in March less than 20% of the Feb peak.

Year	MEAN FLOW (M3/S)	FOR THE		HISTORICAL EXTREMES **			
		MONTH		MONTHLY		DAILY	
		MAXIMUM (DAY)	MINIMUM (DAY)	MAXIMUM (YEAR)	MINIMUM (YEAR)	MAXIMUM (YEAR)	MINIMUM (YEAR)
2012/2013							
April	10.5	21.3	4.74	35.8	7.9	133	1.8
2012	D	(13)	(1)	(1964)	(1979)	(2004)	(1959)
May	6.62	20.4	3	25.7	3.5	91.6	1.5
2012	D	(18)	(31)	(1985)	(1962)	(1985)	(1962)
June	2.67	8.27	0.93	18.5	2	87.1	0.65
2012	D	(29)	(24)	(1990)	(1957)	(1988)	(1951)
July	2.92	17.4	0.872	13.8	0.81	93.9	0.42
2012		(8)	(25)	(1981)	(1949)	(1988)	(1949)
August	2.49	8.92	0.83	30.6	0.55	199	0.2
2012	D	(21)	(3)	(1970)	(1949)	(2007)	(1950)
September	3.44	9.78	1.67	19.6	0.628	216	0.24
2012	D	(26)	(11)	(2004)	(1961)	(2004)	(1961)
October	7.08	13.1	2.65	27.2	3.68	124	0.69
2012	D	(14)	(1)	(1970)	(1949)	(1953)	(1961)
November	18.8	56.5	5.32	25.8	3.95	125	1.9
2012	E	(11)	(1)	(1956)	(1948)	(1956)	(1948)
December	14.9	44.7	6.08	31.1	7.53	174	2.6
2012		(12)	(22)	(1953)	(1986)	(1953)	(1961)
January	10.3	23.5	2.3	28.7	4.77	146	1.8
2013		(21)	(10)	(1952)	(1988)	(1951)	(2010)
February	17.6	91.6	5.44	36.9	2.26	294	1.2
2013	E	(1)	(28)	(1962)	(1975)	(1962)	(1961)
March	12.4	42.2	4.67	39.8	3.2	200	0.93
2013		(4)	(1)	(1994)	(1963)	(1994)	(1963)

Deficiency for the period or daily number. 25% are less than the lower quartile (below normal)

Excessive for the period or daily number. 25% are greater than the upper quartile (above normal)

Record for the period or daily number (Preliminary)

Gander River 02YQ001 (Central NL)

Spring Freshet in the Central Region of the province was in the normal time frame for this region. Gander River peaked Apr 14 2012 with another event on Apr 18 2012. This trend of 2 peaks (One slightly lower than the other) has been the trend during break-up for the last few years. The peak could be considered a low normal based on past spring runoffs. The mean flow was 43% of the median and peak was approx. 30% of the 2001 record max daily. There was a mild in mid Feb but snow cover in the region remained close to normal until the April melt.

Year	MEAN FLOW (M3/S)	FOR THE		HISTORICAL EXTREMES **			
		MONTH		MONTHLY		DAILY	
2012/2013		MAXIMUM (DAY)	MINIMUM (DAY)	MAXIMUM (YEAR)	MINIMUM (YEAR)	MAXIMUM (YEAR)	MINIMUM (YEAR)
April	306	545	66.2	513	44.4	925	22.8
2012		(14)	(3)	(1987)	(1967)	(1993)	(1950)
May	111	223	60.1	451	90.3	761	50.4
2012	D	(1)	(31)	(1967)	(1958)	(2001)	(2006)
June	58.6	91.4	33.9	183	37.7	306	18.1
2012	D	(10)	(30)	(1965)	(1979)	(1965)	(1979)
July	30.6	42.6	20.5	125	13.9	206	9
2012	D	(30)	(15)	(1980)	(1975)	(2006)	(1975)
August	37	60.6	28.5	179	6.9	378	4.8
2012		(31)	(12)	(1980)	(1987)	(1980)	(1987)
September	110	167	68.6	196	4.16	527	2.8
2012		(14)	(10)	(1984)	(1961)	(2004)	(1961)
October	99.7	111	87.6	269	9.88	597	3.3
2012		(29)	(8)	(1981)	(1950)	(2003)	(1961)
November	217	316	101	242	37.2	398	14.8
2012	E	(11)	(2)	(1962)	(1961)	(2003)	(1961)
December	148	204	109	272	36.9	549	28.4
2012		(1)	(30)	(2004)	(1985)	(1977)	(1985)
January	71	118	39	352	36.3	1170	25.3
2013		(2)	(30)	(1983)	(1985)	(1983)	(1985)
February	108	170	46.4	288	18.6	688	14.8
2013		(10)	(1)	(1969)	(1961)	(1984)	(1961)
March	266	444	64.7	275	17.2	560	9.8
2013	E	(18)	(1)	(1988)	(1950)	(1992)	(1961)

Deficiency for the period or daily number. 25% are less than the lower quartile (below normal)

Excessive for the period or daily number. 25% are greater than the upper quartile (above normal)

Record for the period or daily number (Preliminary)

Upper Humber River 02YL001 (Western NL)

Spring Freshet occurred approx. 1-2 weeks later than the past few years. Snowpack conditions in the region were significantly above normal and temperatures lower in the early part of the month, thus resulting in the lateness of the event. Humber River peaked on May 28 2012. The peak was high normal based on the last 5 years of data. The monthly Mean was 63% of the median and the Max Daily was approx. 50% of the 1993 record daily.

Year	MEAN FLOW (M3/S)	FOR THE		HISTORICAL EXTREMES **			
		MONTH		MONTHLY		DAILY	
		MAXIMUM (DAY)	MINIMUM (DAY)	MAXIMUM (YEAR)	MINIMUM (YEAR)	MAXIMUM (YEAR)	MINIMUM (YEAR)
2012/2013							
April	190	589	26.2	288	19.2	749	9.2
2012	E	(28)	(3)	(1934)	(1967)	(1987)	(1955)
May	164	423	41.4	383	127	879	35.8
2012	D	(13)	(31)	(1993)	(1983)	(1993)	(1983)
June	17.7	36.5	7.02	354	25.8	1010	8.5
2012	DR	(1)	(26) R	(1933)	(1979)	(1984)	(1951)
July	15.8	29	8.78	140	9.3	555	3.9
2012	D	(28)	(16)	(1939)	(1987)	(1933)	(1986)
August	38.4	74.4	9.16	103	3.9	447	1.6
2012		(15)	(12)	(1973)	(1940)	(1973)	(1940)
September	148	543	39.2	162	15.2	504	1.6
2012	E	(12) R	(10)	(1944)	(1946)	(1955)	(1940)
October	87.1	149	40.7	167	24.7	530	8
2012		(18)	(31)	(1977)	(1948)	(1957)	(1954)
November	106	309	35.2	177	42.6	813	8.8
2012		(11)	(24)	(1962)	(1986)	(1935)	(1948)
December	49.5	76.5	23.8	156	11.4	736	6.8
2012		(7)	(21)	(1954)	(1986)	(1935)	(1986)
January	21.6	30.3	14.9	129	10.2	663	4
2013		(1)	(30)	(1950)	(1971)	(1983)	(1990)
February	64.5	199	16.8	106	5.91	348	3.7
2013	E	(4)	(28)	(1969)	(1975)	(1969)	(1993)
March	71.5	137	15.5	141	7.8	530	4
2013	E	(6)	(1)	(1979)	(1959)	(1936)	(1992)

Deficiency for the period or daily number. 25% are less than the lower quartile (below normal)

Excessive for the period or daily number. 25% are greater than the upper quartile (above normal)

Record for the period or daily number (Preliminary)

02ZB001 Isle Aux Morts River (South Western NL)

Peak flows at Isle aux Morts River was recorded on Apr 25 2012. Due to the location of the station on the southwest tip of the island, peak flows can occur at any time during the year, as it is usually a rain event and not normal spring runoff. The magnitude of the peak was in line with peaks of the last few years (although not always in the spring). The 2012 monthly mean at this location was 167% of median and the peak flow was approx. 60% of the 2003 record max daily flow.

Year	MEAN FLOW (M3/S)	FOR THE MONTH		HISTORICAL EXTREMES **			
		MAXIMUM (DAY)	MINIMUM (DAY)	MONTHLY		DAILY	
2012/2013				MAXIMUM (YEAR)	MINIMUM (YEAR)	MAXIMUM (YEAR)	MINIMUM (YEAR)
April	39.3	189	1.79	46.3	3.6	325	0.696
2012	E	(25)	(1)	(1994)	(1967)	(2003)	(2004)
May	17.4	148	1.43	51.1	6.2	226	2.3
2012	D	(10)	(31) R	(1994)	(1986)	(1972)	(1986)
June	1.94	14.1	0.124	34.7	2.6	259	0.79
2012	DR	(28)	(24) R	(1972)	(1976)	(1985)	(1976)
July	4.91	33.2	0.396	22.7	1.2	102	0.35
2012		(26)	(16)	(1981)	(1989)	(1993)	(1989)
August	5.58	29.2	1.08	17.9	1.4	124	0.34
2012		(20)	(6)	(2007)	(1978)	(1990)	(1978)
September	26.7	124	2.79	23.7	3.53	176	0.71
2012	ER	(23)	(9)	(1998)	(1973)	(2005)	(1969)
October	17.3	62.8	3.68	31	5.65	178	1.13
2012		(16)	(31)	(1972)	(1963)	(1977)	(2001)
November	11.6	37.2	2.22	38.3	7.7	348	1.6
2012	D	(4)	(23)	(1967)	(2000)	(2006)	(1970)
December	21	90.3	3.33	43	3.13	434	0.83
2012	E	(23)	(21)	(1990)	(1994)	(1990)	(2007)
January	3.21	28.2	1.31	24	1.22	219	0.57
2013		(31)	(30)	(1986)	(1991)	(1986)	(1991)
February	13.3	69	1.11	31.1	0.923	243	0.41
2013	E	(1)	(28)	(1996)	(1975)	(1996)	(1991)
March	12.9	66.8	0.794	38.9	0.737	410	0.34
2013	E	(15)	(1)	(1979)	(2004)	(1996)	(1987)

Deficiency for the period or daily number. 25% are less than the lower quartile (below normal)

Excessive for the period or daily number. 25% are greater than the upper quartile (above normal)

Record for the period or daily number (Preliminary)

03QC001 Eagle River (Labrador)

The spring Freshet in Labrador region of the province was around the normal time with Eagle River peaking on May 18 2012. This Peak was the highest in magnitude since the 1999 freshet. The mean flow for the month of June was 199% of Median and the max daily recorded was Approx. 90% of the 1971 record max daily. As normal spring freshet in the Labrador region, the rise in water level occurs as a snow melt event based on rising temperatures rather than precipitation.

Year	MEAN FLOW (M3/S)	FOR THE MONTH		HISTORICAL EXTREMES **			
		MAXIMUM (DAY)	MINIMUM (DAY)	MONTHLY		DAILY	
				MAXIMUM (YEAR)	MINIMUM (YEAR)	MAXIMUM (YEAR)	MINIMUM (YEAR)
2012/2013							
April	70.3	332	33.4	285	8.33	2460	7.2
2012		(30)	(1)	(1986)	(1993)	(1983)	(1993)
May	1490	2370	435	1400	106	2690	11.8
2012	ER	(18)	(1)	(1971)	(1967)	(1971)	(1975)
June	287	786	118	1810	265	2990	127
2012	D	(1)	(27) R	(1985)	(2005)	(1985)	(2005)
July	272	377	125	638	119	1330	71.4
2012		(21)	(1)	(1985)	(1976)	(1980)	(1976)
August	102	201	71.5	495	102	1320	66
2012	D	(1)	(31)	(1989)	(1988)	(1967)	(1984)
September	76.8	130	7.03	521	84.1	827	59
2012	DR	(30)	(15) R	(1976)	(1984)	(1976)	(1984)
October	370	747	124	515	100	705	78.4
2012	E	(25) R	(1)	(1978)	(1973)	(1966)	(1973)
November	255	445	173	488	65.3	695	51
2012		(1)	(30)	(1995)	(2002)	(1980)	(1974)
December	152	173	134	218	36.3	410	27.5
2012	E	(1)	(31)	(1995)	(1974)	(2005)	(1974)
January	93.5	114	76.1	98.9	22.4	108	19
2013	E	(1) R	(31)	(1969)	(1975)	(1969)	(1993)
February	63.4	75.1	53.2	86.2	14.9	90.6	11.8
2013	E	(1)	(28)	(1969)	(1993)	(1969)	(1993)
March	47.2	52.7	42.1	78.7	9.64	119	8.2
2013	E	(1)	(31)	(1969)	(1993)	(1979)	(1993)

Deficiency for the period or daily number. 25% are less than the lower quartile (below normal)

Excessive for the period or daily number. 25% are greater than the upper quartile (above normal)

Record for the period or daily number (Preliminary)

3.0 COORDINATORS MEETINGS

The coordinators met in person three times and frequent e-mail correspondence and conference calls took place in 2012-13. Discussions range from operating cost, capital plan, and bilateral agreement. The 2012 National Administrator's meeting that was held in St. John's in September 2012.

4.0 NETWORK CHARACTERISTICS

Water Survey of Canada operates 114 hydrometric stations in Newfoundland and Labrador. The station classifications are listed in the next Table. 6 provincial stations were added to the network in 2012-2013.

New Stations Established in 2012-2013

02ZM023 Outer Cove Brook at Clovelly Golf Course

Downstream water quantity/quality station located on Outer Cove Brook (in partnership with the City of St. John's) to monitor impacts (both quantity and quality) from major construction site in the Torbay Road North Development Area.

02ZM024 Outer Cove Brook below Airport

Upstream water quantity/quality station located on Outer Cove Brook (in partnership with the City of St. John's) to monitor baseline water quantity and quality coming from the airport area before the stream enters the Torbay Road North Development Area.

03NE007 Mistastin River below Mistastin Lake

Water quantity station located on Mistastin River in Labrador (in partnership with VALE) to investigate potential energy source to supply the underground expansion of the Vale mine in Voisey's Bay.

03NE013 Kogaluk River below Cabot Lake

Water quantity station located on Kogaluk River in Labrador (in partnership with VALE) to investigate potential energy source to supply the underground expansion of the Vale mine in Voisey's Bay.

03OA015 Flora Creek below Trans Labrador Highway

Water quantity station located on Flora Creek (in partnership with Wabush Mines) to provide needed water quantity information for improved operations and environmental monitoring/response.

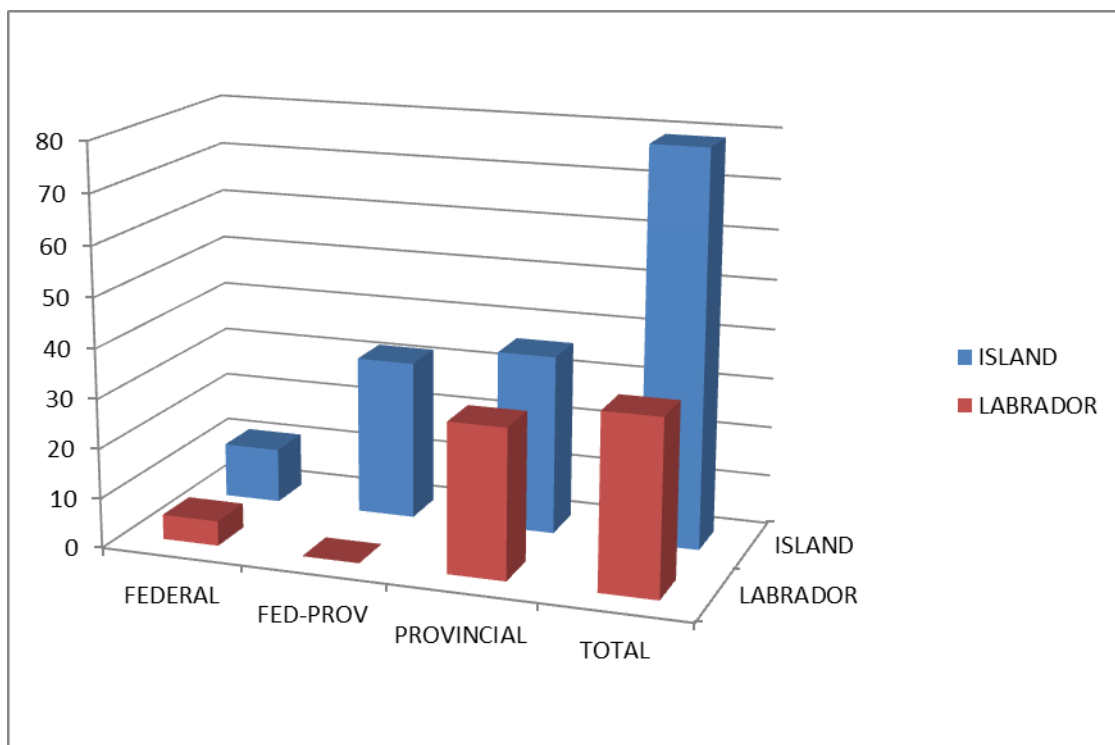
03QC003 St Lewis River above St Lewis Inlet

Water quantity station located on St. Lewis River in Labrador (in partnership with Nalcor Energy) to investigate potential energy source for coastal Labrador.

Water Survey of Canada also operates 5 precipitations stations and takes water samples at 7 different sites for water quality purpose on behalf of the Newfoundland and Labrador Department of Environment and Conversation. These sites are converted in station units in order to have their cost calculated under this agreement.

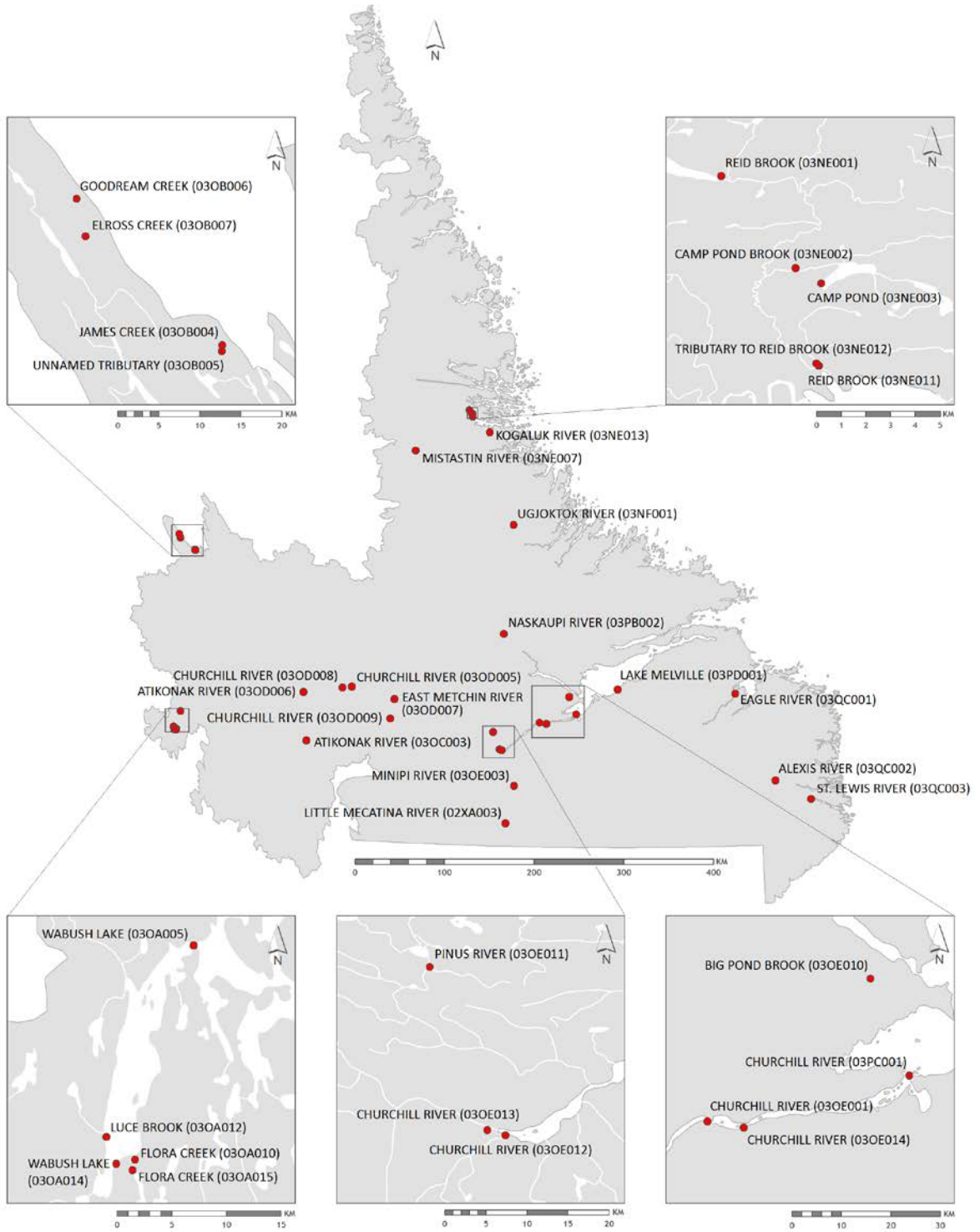
Under the Canada–Newfoundland and Labrador Memorandum of Agreement, 114 stations were operated in 2012-2013. The complete station list is available in Appendix A. The stations classifications are as follow:

CLASSIFICATION	ISLAND	LABRADOR	TOTAL
FEDERAL	11	5	16
FED-PROV	32	0	32
PROVINCIAL	36	30	66
TOTAL	79	35	114



Stations Classification

Hydrometric network on the Island



Hydrometric network in Labrador

5.0 OPERATIONS

A true costing approach has been utilized to derive the station costs for this fiscal year in accordance with the agreement. The costs were apportioned based on the station classification and then totaled to determine each parties share. Employee benefit costs on salary and data management costs have been included and attributed to all parties as agreed on by the National Administrator’s meeting in Quebec City, October 1999.

The Newfoundland and Labrador Department of Environment and Conservation was credited with the total amount of \$23,435 for the contribution to the Partnership. The details of those contributions are listed in the next table.

During fiscal year 2012-2013, the Newfoundland and Labrador Department of Environment and Conservation produced and released two reports in collaboration with Environment Canada.

The first one is entitle *Hydrologic Modeling Study to Estimate Hurricane Igor Flows*. The purpose od this study was to estimate the hydrologic impact that hurricane Igor had on areas exposed to its largest and most intense precipitation. Through a hydrotechnical analysis, the flows resulting from Hurricane Igor for three hydrometric stations were estimated.

The second one is entitle *Hydrology of the Transboundary Rivers of Southern Labrador*. This report summaries the hydrotechnical and climate information available for the 7 watersheds that are shared with the province of Quebec, 14 hydrometric stations are located in these 7 watersheds.. All data sources used in the analysis for this report are where possible derived from federal data sets.

The following table summarizes the estimated and the actual costs to operate the provincial share of the stream gauging network of 114 stations in Newfoundland and Labrador for 2012-2013. The cost of operating the precipitation stations and the grab samples stations is also capture in this table.

STREAMFLOW AND WATER LEVEL COSTS FOR NEWFOUNDLAND AND LABRADOR

	2012/13	2012/13
OPERATIONAL	Planned	Actuals
Salaries (Including benefits 21%)	\$455,786	\$468,172
Hydrometric Operations O&M	\$338,587	\$323,921
Real Property Credit	-\$7,750	-\$7,750
Real Time Web Cam	-\$7,350	-\$7,350
Weather Station	-\$4,305	-\$4,305
Basin Delineation	-\$4,030	-\$4,030
Igor Study Modeling	\$14,423	\$14,423
Capital (Field Vehicle)	\$21,465	\$21,465
TOTALS	\$806,826	\$804,546

SUMMARY OF TOTAL EXPENDITURE 2012-2013

CATEGORY	FEDERAL	Newfoundland and Labrador	TOTAL
Hydrometric Operations (O&M)	\$549,680	\$323,921	\$873,601
Capital (Hydro acoustic Equipment)	\$100,795	0	\$100,795
Capital (Vehicles)	\$17,735	\$21,465	\$39,200
Salaries +21%	\$185,244	\$468,172	\$653,416
Total	\$853,454	\$813,558	\$1,667,012

The signed version of the Schedule D can be found in the Appendix B

6.0 CONSTRUCTION & SPECIAL PROJECTS

All construction projects and hydrometric station equipment purchases (data loggers, transducers, GOES transmitter upgrades) for life cycle management (LCM) are authorized in advance by the Newfoundland and Labrador Department of Environment and Conservation on a case by case basis.

As mentioned in the executive summary, 14 Federal-Provincial, 3 Federal and 2 Provincial stations had their equipment modernized which was mostly done by installing new data logger with HDR capability.

The following construction projects have been completed in 2012-13. Projects which have been approved have their costs distributed to the respective parties.

02ZM008 Waterford River at Kilbride

A new roof was installed on the gauge house at that location. The station is classified Federal-Provincial and the cost of the repair was equally divided between both parties. The total cost of this project was 1K.

02ZJ001 Southern Bay River

A new roof was installed on the gauge house at that location. The station is classified Federal-Provincial and the cost of the repair was equally divided between both parties. The total cost of this project was 1K.

02YA002 Bartlett's River

The Shelter at that station needed to be replaced due to a car accident which completely destroyed the existing station. The station is classified Federal-Provincial and the cost of the repair was equally divided between both parties. The monitoring equipment inside the gauge house was not damaged and was re-installed in the new station; the total cost of this project was 5.3K. The following 2 pictures are before and after the reconstruction.



Bartlett's River after the accident



Bartlett's River after the reconstruction

Appendix A SCHEDULE C 2012-2013 – STATION LIST

Station #	Station Name	Location	Class	Date
02ZF001	BAY DU NORD RIVER AT BIG FALLS	NFLD	Federal 4	1950
02YQ001	GANDER RIVER AT BIG CHUTE	NFLD	Federal 4	1949
02YJ001	HARRYS RIVER BELOW HIGHWAY BRIDGE	NFLD	Federal 4	1968
02YL003	HUMBER RIVER AT HUMBER VILLAGE BRIDGE	NFLD	Federal 4	1982
02ZB001	ISLE AUX MORTS RIVER BELOW HIGHWAY BRIDGE	NFLD	Federal 1	1962
02YG001	MAIN RIVER AT PARADISE POOL	NFLD	Federal 4	1986
02YD002	NORTHEAST BROOK NEAR RODDICKTON	NFLD	Federal 4	1959
02ZK001	ROCKY RIVER NEAR COLINET	NFLD	Federal 1	1948
02YS003	SOUTHWEST BROOK AT TERRA NOVA NATIONAL PARK	NFLD	Federal 1	1967
02YC001	TORRENT RIVER AT BRISTOL'S POOL	NFLD	Federal 4	1980
02YL001	UPPER HUMBER RIVER NEAR REIDVILLE	NFLD	Federal 1	1928
03QC002	ALEXIS RIVER NEAR PORT HOPE SIMPSON	LAB	Federal 4	1978
03OE001	CHURCHILL RIVER ABOVE UPPER MUSKRAT FALLS	LAB	Federal 4	1948
03QC001	EAGLE RIVER ABOVE FALLS	LAB	Federal 4	1966
02XA003	LITTLE MECATINA RIVER ABOVE LAC FOURMONT	LAB	Federal 2	1979
03NF001	UGJOKTOK RIVER BELOW HARP LAKE	LAB	Federal 4	1979
02YA002	BARTLETTS RIVER NEAR ST. ANTHONY	NFLD	Fed-Prov 3	1986
02ZH002	COME-BY-CHANCE RIVER NEAR GOOBIES	NFLD	Fed-Prov 3	1961
02ZE004	CONNE RIVER AT OUTLET OF CONNE POND	NFLD	Fed-Prov 3	1988
02YO011	EXPLOITS RIVER BELOW NOEL PAULS BROOK	NFLD	Fed-Prov 3	1985
02ZG001	GARNISH RIVER NEAR GARNISH	NFLD	Fed-Prov 3	1958
02ZC002	GRANDY BROOK BELOW TOP POND BROOK	NFLD	Fed-Prov 3	1982
02YO008	GREAT RATTILING BROOK ABOVE TOTE RIVER CONFLUENCE	NFLD	Fed-Prov 3	1984
02YE001	GREAVETT BROOK ABOVE PORTLAND CREEK POND	NFLD	Fed-Prov 3	1983
02ZA002	HIGHLANDS RIVER AT TRANS CANADA HIGHWAY	NFLD	Fed-Prov 3	1982
02YR003	INDIAN BAY BROOK NEAR NORTHEAST ARM	NFLD	Fed-Prov 3	1981
02YK002	LEWASSECHJEECH BROOK AT LITTLE GRAND LAKE	NFLD	Fed-Prov 3	1952
02YN002	LLOYDS RIVER BELOW KING GEORGE IV LAKE	NFLD	Fed-Prov 3	1980
02YR001	MIDDLE BROOK NEAR GAMBO	NFLD	Fed-Prov 3	1959
02ZK002	NORTHEAST RIVER NEAR PLACENTIA	NFLD	Fed-Prov 3	1979
02YS006	NORTHWEST RIVER AT TERRA NOVA NATIONAL PARK	NFLD	Fed-Prov 3	1994
02YO006	PETERS RIVER NEAR BOTWOOD	NFLD	Fed-Prov 3	1981
02ZH001	PIPERS HOLE RIVER AT MOTHERS BROOK	NFLD	Fed-Prov 3	1952
02ZG004	RATTLE BROOK NEAR BOAT HARBOUR	NFLD	Fed-Prov 3	1981
02YL005	RATTLER BROOK NEAR MCIVERS	NFLD	Fed-Prov 3	1985
02YQ005	SALMON RIVER NEAR GLENWOOD	NFLD	Fed-Prov 3	1987

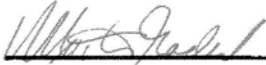
02ZG003	SALMONIER RIVER NEAR LAMALINE	NFLD	Fed-Prov 3	1980
02ZM009	SEAL COVE BROOK NEAR CAPPAHAYDEN	NFLD	Fed-Prov 3	1979
02YK005	SHEFFIELD BROOK NEAR TRANS CANADA HIGHWAY	NFLD	Fed-Prov 3	1972
02ZJ003	SHOAL HARBOUR RIVER NEAR CLARENVILLE	NFLD	Fed-Prov 3	1985
02ZM016	SOUTH RIVER NEAR HOLYWOOD	NFLD	Fed-Prov 3	1983
02ZJ001	SOUTHERN BAY RIVER NEAR SOUTHERN BAY	NFLD	Fed-Prov 3	1976
02YO012	SOUTHWEST BROOK AT LEWISPORTE	NFLD	Fed-Prov 3	1989
02YM003	SOUTH WEST BROOK NEAR BAIE VERTE	NFLD	Fed-Prov 3	1980
02YS005	TERRA NOVA RIVER AT GLOVERTOWN	NFLD	Fed-Prov 3	1985
02YL008	UPPER HUMBER RIVER ABOVE BLACK BROOK	NFLD	Fed-Prov 3	1988
02ZM018	VIRGINIA RIVER AT PLEASANTVILLE	NFLD	Fed-Prov 3	1984
02ZM008	WATERFORD RIVER AT KILBRIDE	NFLD	Fed-Prov 3	1974
02ZL005	BIG BROOK AT LEAD COVE	NFLD	Prov 1	1985
02YK008	BOOT BROOK AT TRANS-CANADA HIGHWAY	NFLD	Prov 1	1985
02YL011	COPPER POND BROOK NEAR CORNER BROOK LAKE	NFLD	Prov 1	1994
02YL009	CORNER BROOK LAKE AT LAKE OUTLET	NFLD	Prov 1	1990
02YL007	DEER LAKE AT DEER LAKE	NFLD	Prov 1	1987
02YO015	EAST POND BROOK BELOW EAST POND [Duck Pond]	NFLD	Prov 1	2006
02YO014	TRIBUTARY TO GILL'S BROOK [Duck Pond]	NFLD	Prov 1	2006
02YK010	GRAND LAKE EAST OF GRAND LAKE BROOK	NFLD	Prov 1	1988
02YO013	EXPLOIT RIVER NEAR BADGER	NFLD	Prov 1	2003
02YO016	EXPLOITS RIVER NEAR MILLERTOWN	NFLD	Prov 1	2006
02YO018	EXPLOITS RIVER at Charlie Edwards Point (above Goodyears Dam)	NFLD	Prov1	2009
02YO017	Red Indian Lake at Indian Point	NFLD	Prov1	2009
02ZC004	GRANITE LAKE AT EAST END	NFLD	Prov2	2001
02ZD002	GREY RIVER NEAR GREY RIVER	NFLD	Prov2	1969
02YM004	INDIAN BROOK DIVERSION ABOVE BIRCHY LAKE	NFLD	Prov 1	1990
02ZM020	LEARY BROOK AT PRINCE PHILIP DRIVE	NFLD	Prov 1	1985
02ZK003	LITTLE BARACHOIS RIVER NEAR PLACENTIA	NFLD	Prov 1	1983
02ZK004	LITTLE SALMONIER RIVER NEAR NORTH HARBOUR	NFLD	Prov 1	1983
02ZK007	RATTLING BROOK BIG POND	NFLD	Prov2	2006
02ZK006	RATTLING BROOK BELOW BRIDGE	NFLD	Prov2	2006
02ZK008	Rattling Brook below Plant Discharge	NFLD	Prov1	2009
02ZM006	NORTHEAST POND RIVER AT NORTHEAST POND	NFLD	Prov 1	1953
02ZM022	RAYMOND BROOK AT OUTLET OF BAY BULLS BIG POND	NFLD	Prov 1	1988
02ZJ002	SALMON COVE RIVER NEAR CHAMPNEYS	NFLD	Prov 1	1983
02ZL004	SHEARSTOWN BROOK AT SHEARSTOWN	NFLD	Prov 1	1983
02YL004	SOUTH BROOK AT PASADENA	NFLD	Prov 1	1983
02ZE005	SOUTHWEST BROOK BELOW SOUTHWEST POND	NFLD	Prov 1	2006
02ZN002	ST. SHOTTS RIVER NEAR TREPASSEY	NFLD	Prov 1	1985
02YN004	STAR BROOK ABOVE STAR LAKE	NFLD	Prov	2000

02YR004	TRITON BROOK ABOVE GAMBO POND	NFLD	Prov 1	2002
02YN005	VICTORIA LAKE AT NORTHEAST CONTROL STRUCTURE	NFLD	Prov2	2003
02ZD003	R.R. POND NEAR GRANITE LAKE	NFLD	Prov2	2003
02YF002	CAT ARM RESERVOIR NEAR SPILLWAY	NFLD	Prov2	1994
02ZC003	WHITE BEAR RIVER ABOVE BIG INDIAN BROOK	NFLD	Prov2	1996
02ZM023	Outer Cove Brook at Clovelly Golf Course	NFLD	Prov	2012
02ZM024	Outer Cove Brook Below Airport	NFLD	Prov	2012
03OC003	ATIKONAK RIVER ABOVE PANCHIA LAKE	LAB	Prov2	1972
03OE010	BIG POND BROOK BELOW BIG POND	LAB	Prov 1	1993
03NE003	CAMP POND AT SOUTHWEST END	LAB	Prov	2002
03NE002	CAMP POND BROOK BELOW CAMP POND	LAB	Prov	2002
03OD007	EAST METCHIN RIVER BELOW HIGHWAY BRIDGE	LAB	Prov	1998
03OA005	Wabush Lake at Lake Outlet	LAB	Prov	2006
03OA010	Flora Creek below Flora Lake	LAB	Prov	2006
03OA012	Luce Brook below Tinto Pond	LAB	Prov	2006
03OA014	Wabush Lake at Dolomite Rd	LAB	Prov	2006
03OE003	MINIPI RIVER BELOW MINIPI LAKE	LAB	Prov	1979
03PB002	NASKAUPI RIVER BELOW NASKAUPI LAKE	LAB	Prov	1978
03OE011	PINUS RIVER	LAB	Prov	1998
03NE011	REID BROOK (below Tributary) ABOVE RAPIDS	LAB	Prov	2003
03NE001	REID BROOK AT OUTLET OF REID POND	LAB	Prov	2002
03NE012	TRIBUTARY (to Reid Brok) ABOVE RAPIDS	LAB	Prov	2003
03OD008	CHURCHILL RIVER ABOVE CHURCHILL FALLS TAILRACE	LAB	Prov	2008
03OD009	CHURCHILL RIVER BELOW METCHIN RIVER	LAB	Prov	2008
03OE013	CHURCHILL RIVER ABOVE GRIZZLE RAPIDS	LAB	Prov	2008
03OE012	CHURCHILL RIVER BELOW GRIZZLE RAPIDS	LAB	Prov	2008
03OE014	CHURCHILL RIVER 6.15KMS BELOW MUSKRAT FALLS	LAB	Prov	2008
03PD001	Lake Melville East of Little River	LAB	Prov1	2010
03PC001	Churchill River at English Point (near Mud Lake)	LAB	Prov1	2010
03OB004	James Creek above Bridge (Shefferville)	LAB	Prov2	2010
03OB005	Unnamed Tributary below Settling Pond (Shefferville)	LAB	Prov2	2010
03OB006	Goodream Creek 2km Northwest of Timmins 6	LAB	Prov2	2011
03OB007	Elross Creek below Pinette Lake Inflow	LAB	Prov2	2011
03NE007	Mistastin River Below Mistastin Lake	LAB	Prov2	2012
03NE013	Kogaluk River below Cabot Lake	LAB	Prov2	2012
03OA015	Flora Creek Below Trans Labrador Highway	LAB	Prov2	2012
03QC003	St Lewis River above St Lewis Inlet	LAB	Prov2	2012

PRECIP STATIONS				
	ADIES LAKE	NFLD	Prov	
	BURGEO ROAD	NFLD	Prov	
	GLOVER ISLAND	NFLD	Prov	
	HINDS LAKE	NFLD	Prov	
	HOWLEY ROAD	NFLD	Prov	
ASHKUI WATER QUALITY SAMPLING SITES, GRAB SAMPLES 3 TIMES PER YEAR BY WSC				
	CARTER BASIN	LAB	Prov	
	CAPE CARIBOU RIVER	LAB	Prov	
	Dominion Lake	LAB	Prov	
	Kenamu River	LAB	Prov	
	Seal Lake Narrows	LAB	Prov	
	Susan River	LAB	Prov	
	Wuchusk lake	LAB	Prov	

Appendix B SIGNED SCHEDULE D 2012-2013

NEWFOUNDLAND AND LABRADOR 2012-2013				
<u>SCHEDULE D</u>				
This schedule provides a summary of the annual payment. The details of the calculations for operation and construction are available and have been jointly reviewed by the officers of each party.				
ANNUAL PAYMENT FOR 2012-2013 TO BE PAID TO THE RECEIVER GENERAL FOR CANADA BY THE PROVINCE OF NEWFOUNDLAND and LABRADOR				
	O&M	Salary	Capital	TOTAL
a) Streamflow and water level installations: Island	\$129,953	\$282,947	\$19,411	\$432,311
b) Streamflow and water level installations: Labrador	\$198,651	\$172,839	\$2,054	\$373,545
c) Humber Met Stations	\$9,983	\$0	\$0	\$9,983
d) Construction & Major Maintenance	\$0	\$0	\$0	\$0
g) Station Decommissioning	\$0	\$0	\$0	\$0
h) Hydrometric Workstation	\$0	\$0	\$0	\$0
e) Real Property Credit for Federal stations or	-\$7,750	\$0	\$0	-\$7,750
f) Real Time Web Cam	-\$7,350	\$0	\$0	-\$7,350
g) Weather Stations	-\$4,305	\$0	\$0	-\$4,305
h) Basin Delineation & Information	-\$4,030	\$0	\$0	-\$4,030
i) Igor Modelling Study (reimbursement)	\$14,423	\$0	\$0	\$14,423
j) Special Projects*	\$0	\$0	\$0	\$0
TOTAL	\$329,575	\$455,786	\$21,465	\$806,826

 _____ M. G. Goebel Assistant Deputy Minister Environment Branch Department of Environment and Conservation Administrator for Province of Newfoundland & Labrador	DEC 19 2012 _____ B. Appleby Director, Meteorological Service of Canada Operations - Atlantic Atlantic Region Administrator for Canada
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* Special Projects that contribute to the ongoing integrity of the program will be credited upon agreement by both parties.