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CANADA – NEWFOUNDLAND AND LABRADOR

**MEMORANDUM OF AGREEMENT
FOR
WATER QUANTITY SURVEYS**

**REPORT FOR FISCAL YEAR
2018-2019**

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LETTER OF TRANSMITTAL

TO: Jean-François Cantin
Administrator for Canada

Haseen Khan
Administrator for the Department of Municipal Affairs and Environment,
Newfoundland and Labrador

We hereby submit an annual report for the fiscal year 2018-2019 covering activities under the Memorandum of Agreement for Water Quantity Surveys for Newfoundland and Labrador.

Members
Coordinating Committee

Government of Canada

René Savoie
Environment and Climate Change
Canada

Government of Newfoundland and
Labrador

Paula Dawe
Paula V Dawe
Dept. of Environment and Conservation,
Newfoundland and Labrador

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. There a draft of a new bilateral agreement that has been develop but no discussions regarding its implementation have taken place in 2018-2019. The new Agreement will ensure the delivery of an efficient and effective hydrometric monitoring service.

During this reporting period, 5 precipitation station were closed, 1 provincial station closed, 4 provincial stations were added and 1 contributed site operated by the province was added. More details on these stations are given in section 4 of this report.

In addition to the regular hydrometric activities, several construction/upgrade projects have taken place during fiscal year 2018-2019.

Currently 113 stations, over 99% of the network, are equipped with satellite telemetry and 1 station has modem telemetry using standard phone lines which means that 98% of the network is reporting in real-time. Only 1 station has no telemetry.

The actual share of the province (\$988.3K) was 1.1% lower than the original estimate plus the provincial contribution in equipment (\$999.7K). Financial details are given in section 5 of this report.

1. INTRODUCTION

This report covers the activities under the Canada/Newfoundland and Labrador Memorandum of Agreement for Water Quantity Surveys for the fiscal year 2018-2019.

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 Municipal Affairs and Environment 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 2018-2019.

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 2018-2019

Appendix B SIGNED SCHEDULE D 2018-2019

2.0 HYDROLOGIC CONDITIONS

Streamflow and Water Level Conditions

Below are flow tables based on Apr-Dec 2018 approved data and Jan-Mar 2019 preliminary data for five major rivers in Newfoundland and Labrador. Historical Extremes updated to 2018 data. The final information can be found online for all monitored sites in Newfoundland and Labrador at: www.wateroffice.ec.gc.ca

Rocky River 02ZK001 (Eastern NL)

(Drainage Area 301 KM2)

| Year 2018/2019 | MEAN FLOW (M/3S) | FOR THE MONTH | | HISTORICAL EXTREMES ** | | | |
|-------------------|---------------------|------------------|------------------|------------------------|-------------------|-------------------|-------------------|
| | | MAXIMUM (DAY) | MINIMUM (DAY) | MONTHLY | | DAILY | |
| | | | | MAXIMUM (YEAR) | MINIMUM (YEAR) | MAXIMUM (YEAR) | MINIMUM (YEAR) |
| April 2018 | 10 D | 3.34 (26) | 44.7 (9) | 35.8 (1964) | 7.89 (1979) | 133 (2004) | 1.8 (1959) |
| May 2018 | 11.4 E | 78.9 (30) | 2.59 (20) | 25.7 (1985) | 3.51 (1962) | 91.6 (1985) | 1.5 (1962) |
| June 2018 | 11.3 E | 33.9 (1) | 2.59 (18) | 18.5 (1990) | 2.04 (1957) | 87.1 (1988) | 0.65 (1951) |
| July 2018 | 8.49 E | 23.3 (20) | 2.27 (14) | 13.8 (1981) | 0.81 (1949) | 93.9 (1988) | 0.42 (1949) |
| August 2018 | 4.28 D | 18.2 (20) | 1.2 (15) | 30.6 (1970) | 0.548 (1949) | 199 (2007) | 0.2 (1950) |
| September 2018 | 3.7 D | 17.4 (19) | 1.08 (11) | 19.6 (2004) | 0.628 (1961) | 216 (2004) | 0.24 (1961) |
| October 2018 | 12.8 E | 29.8 (17) | 2.45 (9) | 27.2 (1970) | 3.68 (1949) | 124 (1953) | 0.69 (1961) |
| November 2018 | 16.1 E | 31.8 (8) | 7.94 (27) | 25.8 (1956) | 3.95 (1948) | 125 (1956) | 1.9 (1948) |
| December 2018 | 11.5 E | 34.6 (23) | 5.13 (30) | 31.1 (1953) | 7.53 (1986) | 174 (1953) | 2.6 (1961) |
| January 2019 | 13.7 E | 28.4 (22) | 5.74 (1) | 28.7 (1952) | 4.77 (1988) | 146 (1951) | 1.8 (2010) |
| February 2019 | 8.7 E | 36.6 (7) | 2.52 (27) | 36.9 (1962) | 2.26 (1975) | 294 (1962) | 1.2 (1961) |
| March 2019 | 11 E | 45.1 (24) | 2.48 (5) | 39.8 (1994) | 3.2 (1963) | 200 (1994) | 0.93 (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)
(Drainage Area 4400 KM2)

| Year 2018/2019 | MEAN FLOW (M/3S) | FOR THE MONTH | | HISTORICAL EXTREMES ** | | | |
|-------------------|---------------------|------------------|------------------|------------------------|-------------------|-------------------|-------------------|
| | | MAXIMUM (DAY) | MINIMUM (DAY) | MONTHLY | | DAILY | |
| | | | | MAXIMUM (YEAR) | MINIMUM (YEAR) | MAXIMUM (YEAR) | MINIMUM (YEAR) |
| April 2018 | 219 | 568 | 82.4 | 513 | 44.4 | 925 | 22.8 |
| | D | (30) | (1) | (1987) | (1967) | (1993) | (1950) |
| May 2018 | 255 | 637 | 90.3 | 451 | 90.3 | 761 | 50.4 |
| | | (1) | (24) | (1967) | (1958) | (2001) | (2006) |
| June 2018 | 168 | 288 | 94.2 | 198 | 37.7 | 336 | 18.1 |
| | E | (1) | (25) | (2009) | (1979) | (2010) | (1979) |
| July 2018 | 142 | 199 | 81 | 148 | 13.9 | 206 | 9 |
| | E | (2) | (31) | (2010) | (1975) | (2006) | (1975) |
| August 2018 | 36.4 | 76 | 16.8 | 179 | 6.92 | 378 | 4.8 |
| | | (1) | (31) | (1980) | (1987) | (1980) | (1987) |
| September 2018 | 12.5 | 16.5 | 10.5 | 196 | 4.16 | 527 | 2.8 |
| | D | (1) | (14) | (1984) | (1961) | (2004) | (1961) |
| October 2018 | 98.6 | 321 | 11.4 | 269 | 9.88 | 597 | 3.3 |
| | | (25) | (11) | (1981) | (1950) | (2003) | (1961) |
| November 2018 | 216 | 314 | 139 | 242 | 37.2 | 398 | 14.8 |
| | E | (1) | (28) | (1962) | (1961) | (2003) | (1961) |
| December 2018 | 121 | 186 | 70.9 | 272 | 36.9 | 549 | 28.4 |
| | | (3) | (22) | (2004) | (1985) | (1977) | (1985) |
| January 2019 | 119 | 278 | 63.7 | 352 | 36.3 | 1170 | 25.3 |
| | | (28) | (20) | (1983) | (1985) | (1983) | (1985) |
| February 2019 | 89 | 212 | 43.1 | 288 | 18.6 | 688 | 14.8 |
| | | (1) | (28) | (1969) | (1961) | (1984) | (1961) |
| March 2019 | 53.4 | 126 | 28 | 275 | 17.2 | 560 | 9.8 |
| | D | (29) | (15) | (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)
(Drainage Area 2110 KM2)

| Year 2018/2019 | MEAN FLOW (M/3S) | FOR THE MONTH | | HISTORICAL EXTREMES ** | | | |
|-------------------|---------------------|------------------|------------------|------------------------|-------------------|-------------------|-------------------|
| | | MAXIMUM (DAY) | MINIMUM (DAY) | MONTHLY | | DAILY | |
| | | | | MAXIMUM (YEAR) | MINIMUM (YEAR) | MAXIMUM (YEAR) | MINIMUM (YEAR) |
| April 2018 | 70.6 D | 545 (30) | 14.5 (16) | 288 (1934) | 19.2 (1967) | 749 (1987) | 9.2 (1955) |
| May 2018 | 274 E | 602 (1) | 106 (28) | 383 (1993) | 127 (1983) | 879 (1993) | 35.8 (1983) |
| June 2018 | 159 | 258 (21) | 66.5 (29) | 354 (1933) | 25.8 (1979) | 1010 (1984) | 8.5 (1951) |
| July 2018 | 37 | 111 (2) | 10.8 (26) | 140 (1939) | 9.3 (1987) | 555 (1933) | 3.9 (1986) |
| August 2018 | 53 | 198 (18) | 17.5 (29) | 103 (1973) | 3.91 (1940) | 447 (1973) | 1.6 (1940) |
| September 2018 | 71.4 | 223 (30) | 19.1 (5) | 162 (1944) | 15.2 (1946) | 504 (1955) | 1.6 (1940) |
| October 2018 | 159 | 436 (22) | 28.4 (14) | 167 (1977) | 24.7 (1948) | 530 (1957) | 8 (1954) |
| November 2018 | 131 | 392 (5) | 36.2 (24) | 177 (1962) | 42.6 (1986) | 813 (1935) | 8.8 (1948) |
| December 2018 | 30.6 | 91.2 (26) | 10.3 (21) | 156 (1954) | 11.4 (1986) | 736 (1935) | 6.8 (1986) |
| January 2019 | 54.3 E | 184 (27) | 20.7 (20) | 129 (1950) | 10.2 (1971) | 663 (1983) | 4 (1990) |
| February 2019 | 28.8 | 69.9 (1) | 18.1 (28) | 106 (1969) | 5.91 (1975) | 348 (1969) | 3.7 (1993) |
| March 2019 | 28.1 | 57.7 (26) | 15.7 (15) | 141 (1979) | 7.8 (1959) | 530 (1936) | 4 (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)

(Drainage Area 205 KM2)

| Year 2018/2019 | MEAN FLOW (M/3S) | FOR THE MONTH | | HISTORICAL EXTREMES ** | | | |
|-------------------|---------------------|------------------|------------------|------------------------|-------------------|-------------------|-------------------|
| | | MAXIMUM (DAY) | MINIMUM (DAY) | MONTHLY | | DAILY | |
| | | | | MAXIMUM (YEAR) | MINIMUM (YEAR) | MAXIMUM (YEAR) | MINIMUM (YEAR) |
| April 2018 | 18.7 D | 98.5 (29) | 3.97 (12) | 46.3 (1994) | 3.62 (1967) | 325 (2003) | 0.696 (2004) |
| May 2018 | 26.8 | 46.9 (1) | 10.5 (10) | 51.1 (1994) | 6.16 (1986) | 226 (1972) | 2.18 (2010) |
| June 2018 | 16.1 E | 57.9 (29) | 4.65 (17) | 34.7 (1972) | 2.58 (1976) | 259 (1985) | 0.79 (1976) |
| July 2018 | 6.18 | 20.3 (1) | 1.24 (17) | 22.7 (1981) | 1.17 (1989) | 102 (1993) | 0.35 (1989) |
| August 2018 | 5.9 | 22.3 (8) | 1.26 (30) | 17.9 (2007) | 1.39 (1978) | 124 (1990) | 0.34 (1978) |
| September 2018 | 9.65 | 44.2 (22) | 0.946 (3) | 23.7 (1998) | 3.53 (1973) | 176 (2005) | 0.71 (1969) |
| October 2018 | 28.6 E | 126 (25) | 5.04 (9) | 31 (1972) | 5.65 (1963) | 178 (1977) | 1.13 (2001) |
| November 2018 | 11.3 D | 41.4 (7) | 3.13 (27) | 38.3 (1967) | 7.7 (2000) | 348 (2006) | 1.6 (1970) |
| December 2018 | 7.95 | 71.3 (23) | 2.08 (17) | 43 (1990) | 3.13 (1994) | 434 (1990) | 0.83 (2007) |
| January 2019 | 7.42 | 41.6 (22) | 1.27 (31) | 24 (1986) | 1.22 (1991) | 219 (1986) | 0.57 (1991) |
| February 2019 | 5.46 | 20.3 (17) | 1.33 (7) | 31.1 (1996) | 0.923 (1975) | 243 (1996) | 0.41 (1991) |
| March 2019 | 9.16 | 38.9 (23) | 1.33 (10) | 38.9 (1979) | 0.737 (2004) | 410 (1996) | 0.34 (1987) |

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

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

RRecord for the period or daily number (Preliminary)

03QC001 Eagle River (Labrador)

(Drainage Area 10900 KM2)

| Year 2018/2019 | MEAN FLOW (M/3S) | FOR THE MONTH | | HISTORICAL EXTREMES ** | | | |
|-------------------|---------------------|------------------|------------------|------------------------|-------------------|-------------------|-------------------|
| | | MAXIMUM (DAY) | MINIMUM (DAY) | MONTHLY | | DAILY | |
| | | | | MAXIMUM (YEAR) | MINIMUM (YEAR) | MAXIMUM (YEAR) | MINIMUM (YEAR) |
| April 2018 | 28.4 | 150 | 15.7 | 311 | 8.33 | 2460 | 7.2 |
| | D | (30) | (23) | (2010) | (1993) | (1983) | (1993) |
| May 2018 | 136 | 796 | 14 | 1400 | 106 | 2690 | 11.8 |
| | D | (31) | (19) | (1971) | (1967) | (1971) | (1975) |
| June 2018 | 1180 | 1720 | 782 | 1810 | 265 | 2990 | 127 |
| | E | (5) | (30) | (1985) | (2005) | (1985) | (2005) |
| July 2018 | 530 | 901 | 257 | 638 | 119 | 1330 | 71.4 |
| | E | (29) | (22) | (1985) | (1976) | (1980) | (1976) |
| August 2018 | 485 | 752 | 241 | 495 | 102 | 1320 | 64 |
| | E | (1) | (27) | (1989) | (1988) | (1967) | (2008) |
| September 2018 | 224 | 402 | 132 | 521 | 84.1 | 827 | 59 |
| | | (2) | (23) | (1976) | (1984) | (1976) | (1984) |
| October 2018 | 180 | 219 | 145 | 515 | 100 | 705 | 78.4 |
| | | (31) | (16) | (1978) | (1973) | (1966) | (1973) |
| November 2018 | 131 | 136 | 126 | 488 | 65.3 | 695 | 51 |
| | D | (1) | (30) | (1995) | (2002) | (1980) | (1974) |
| December 2018 | 112 | 126 | 97.9 | 218 | 36.3 | 410 | 27.5 |
| | | (1) | (31) | (1995) | (1974) | (2005) | (1974) |
| January 2019 | 72.7 | 80.8 | 65.1 | 98.9 | 22.4 | 108 | 19 |
| | | (1) | (31) | (1969) | (1975) | (1969) | (1993) |
| February 2019 | 55.6 | 64.5 | 47.6 | 86.2 | 14.9 | 90.6 | 11.8 |
| | E | (1) | (28) | (1969) | (1993) | (1969) | (1993) |
| March 2019 | 23.7 | 27.5 | 21.2 | 78.7 | 9.64 | 119 | 8.2 |
| | D | (1) | (31) | (1969) | (1993) | (1979) | (1993) |

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

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

RRecord for the period or daily number (Preliminary)

COORDINATORS MEETINGS

The coordinators met in person once and frequent e-mail correspondence and conference calls took place in 2018-2019. Discussions range from operating cost, capital plan, and bilateral agreement.

3.0 NETWORK CHARACTERISTICS

Water Survey of Canada operates 113 hydrometric stations in Newfoundland and Labrador. The station classifications are listed in the next Table.

In 2018-2019 One provincial station was decommissioned:

- 03OE015 Churchill River at Mid Pool

In 2018-2019 All provincial precipitation stations were decommissioned

- Adies Lake
- Glover Island
- Howley Road
- Burgeo Road
- Hinds Lake

In 2018-2019 4 provincial stations were added:

- 03OE019 Churchill River Below Outlet of Traverspine River
- 03OE018 Churchill River at End of Mud Lake Road
- 03PD003 Churchill River Outlet at Rabbit Island
- 03OE016 Churchill River at Happy Valley

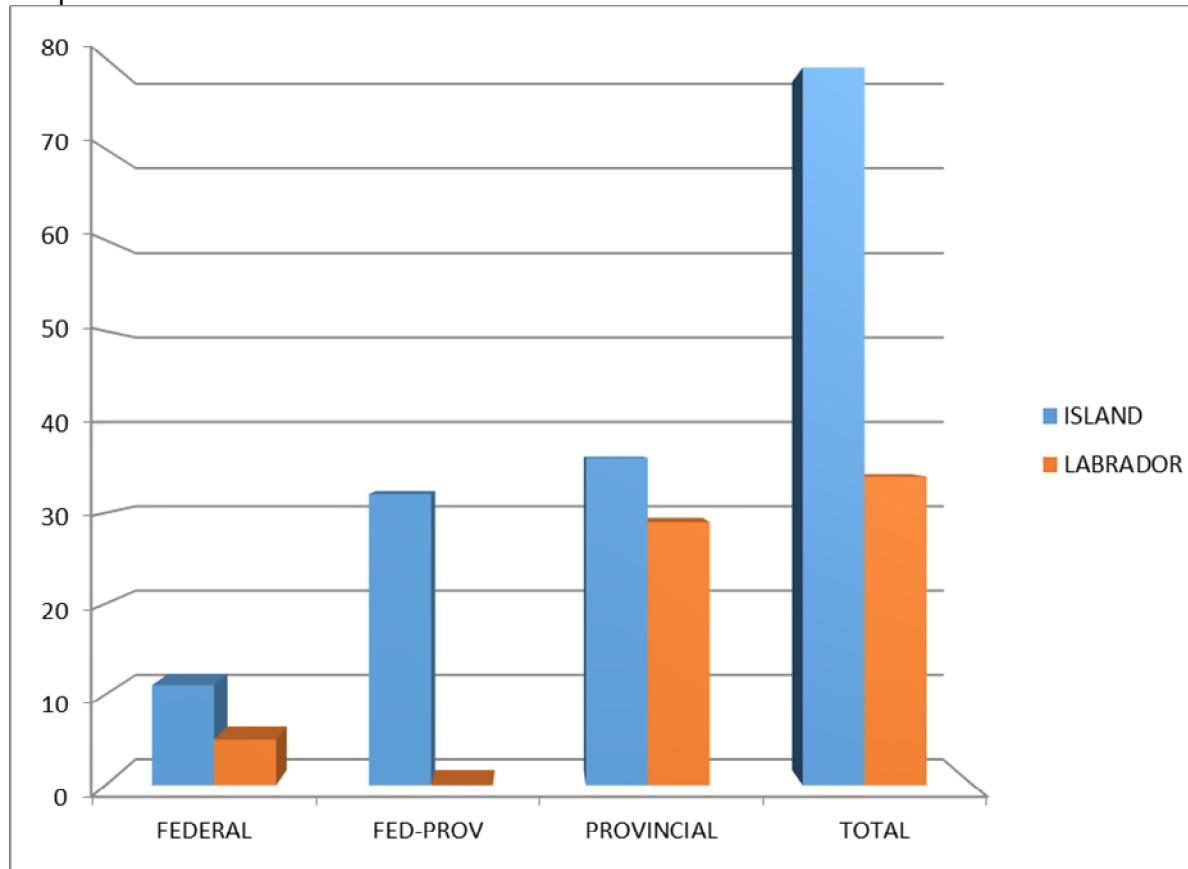
Water Survey of Canada also takes water samples at 7 different sites for water quality purpose on behalf of the Newfoundland and Labrador Department of Environment and Conversation. These sites are converted in station units in order to have their cost calculated under this agreement.

Under the Canada–Newfoundland and Labrador Memorandum of Agreement, 113 stations were operated in 2018-2019. The complete station list is available in Appendix A. The stations classifications are as follow:

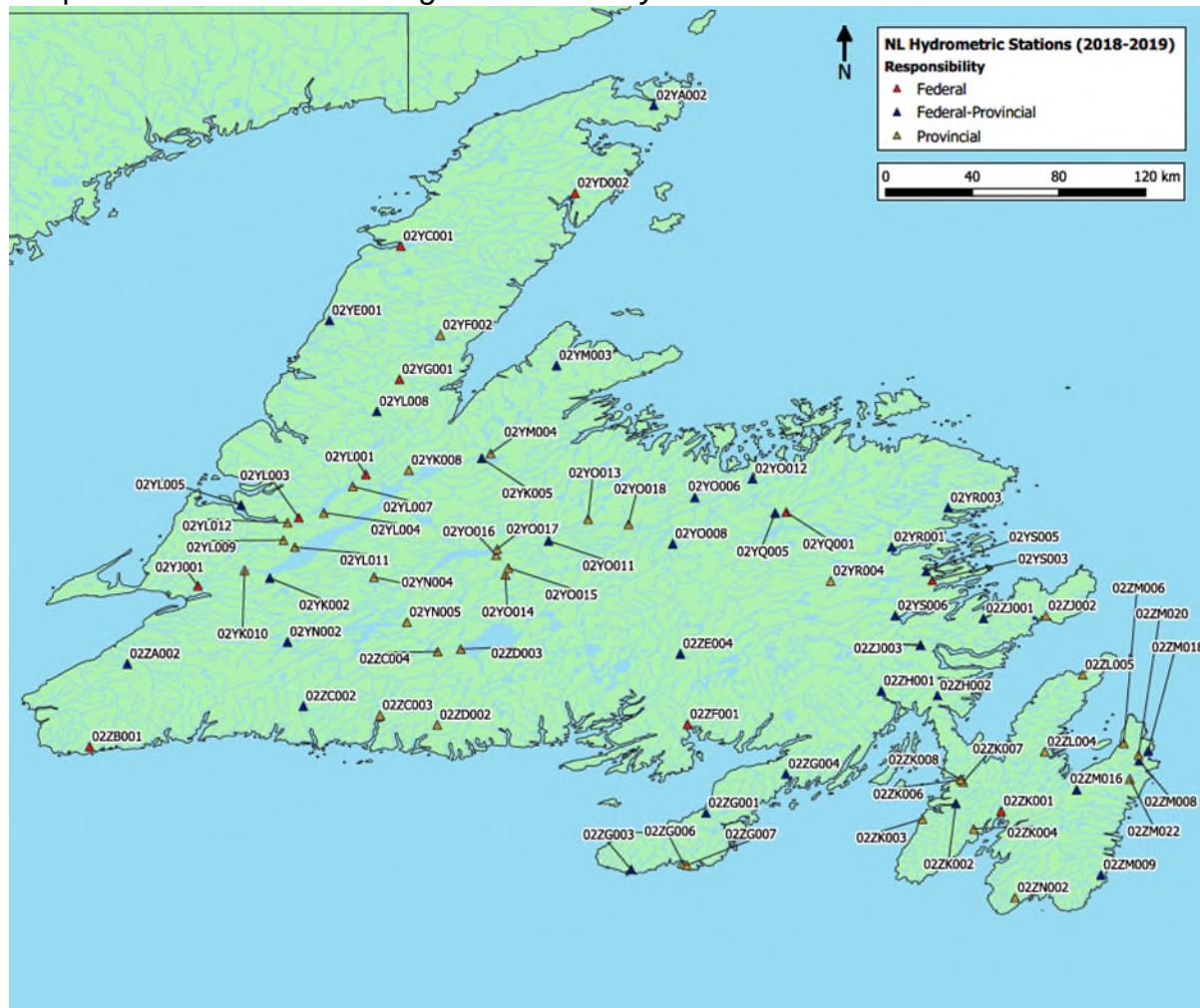
Table 3.1: *Station classification based on Newfoundland and Labrador*

| NEWFOUNDLAND AND LABRADOR | | | |
|---------------------------|--------|----------|-------|
| CLASSIFICATION | ISLAND | LABRADOR | TOTAL |
| FEDERAL | 11 | 5 | 16 |
| FED-PROV | 32 | 0 | 32 |
| PROVINCIAL | 36 | 29 | 65 |
| TOTAL | 79 | 34 | 113 |

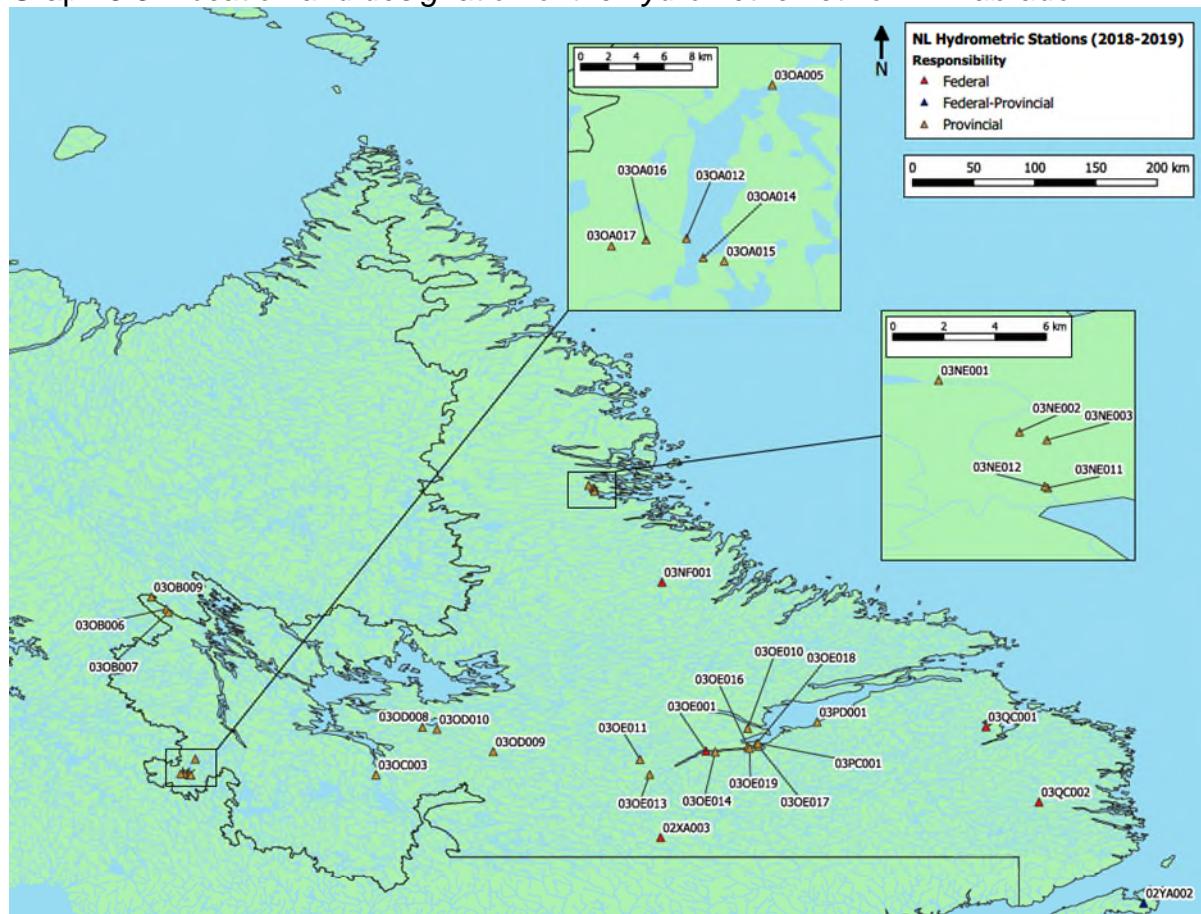
Graph 3.1: *Distribution of station classification for Newfoundland and Labrador*



Graph 3.2: *Location and designation of the hydrometric network in Newfoundland*



Graph 3.3: *Location and designation of the hydrometric network in Labrador*



4.0 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 Municipal Affairs and Environment was credited with the total amount of \$21,255 for the contribution to the Partnership. The details of those contributions are listed in the next table.

The following table summarizes the estimated and the actual costs to operate the provincial share of the stream gauging network in Newfoundland and Labrador for 2018-2019.

STREAMFLOW AND WATER LEVEL COSTS FOR NEWFOUNDLAND AND LABRADOR

| | 2018/19 | 2018/19 |
|---------------------------------------|------------------|------------------|
| OPERATIONAL | Planned | Actuals |
| Salaries (Including benefits 20%) | \$608,752 | \$ 629,352 |
| Hydrometric Operations O&M | \$366,161 | \$343,762 |
| Capital | \$27,484 | \$36,451 |
| Real Property Credit | -\$9,600 | -\$9,600 |
| Real Time Web Cam | -\$7,350 | -\$7,350 |
| Weather Station | -\$4,305 | -\$4,305 |
| Equipment purchased by the province * | \$18,594 | |
| TOTALS | \$999,736 | \$988,310 |

* The equipment purchased by the province was not part of the signed schedule D but it accounted as a provincial contribution to the program.

SUMMARY OF TOTAL EXPENDITURES 2018-2019

| CATEGORY | FEDERAL | NEWFOUNDLAND AND LABRADOR | TOTAL |
|-----------------------------------|------------------|---------------------------|--------------------|
| Hydrometric operations (O&M) | \$147,327 | \$343,762 | \$491,089 |
| Capital (Hydroacoustic Equipment) | \$15,622 | \$36,451 | \$52,073 |
| Capital (Vehicles) | \$46,473 | \$0 | \$46,473 |
| Salaries + 20% | \$271,436 | \$ 629,352 | \$900,788 |
| TOTAL | \$480,858 | \$1,009,565 | \$1,490,423 |

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

O&M Expenditures Details

| ITEM | ACTUAL EXPENDITURES (FISCAL YEAR 18/19) |
|--|--|
| 025 - TRAVEL-PUBLIC SERVANTS | \$ 60,256 |
| 082 - SPECIAL FEES AND SERVICES | \$ 84 |
| 021 - POSTAGE, FREIGHT, EXPRESS, AND CARTAGE | \$ 3,728 |
| 044 - TRAINING AND EDUCATIONAL SERVICES | \$ 210 |
| 117 - MISCELLANEOUS GOODS AND PRODUCTS | \$ 4,599 |
| 026 - TRAVEL-NON-PUBLIC SERVANTS | \$ 1,688 |
| 325 - MISCELLANEOUS EXPENDITURES | \$ 127 |
| 123 - ACQUISITION OF OFFICE EQUIPMENT | \$ 1,482 |
| 121 - ACQUISITION OF MACHINERY AND MACHINERY PARTS | \$ 944 |
| 115 - PERSONAL GOODS | \$ 4,023 |
| 070 - UTILITY SERVICES | \$ 1,649 |
| 040 - BUSINESS SERVICES | \$ 2,436 |
| 043 - SCIENTIFIC AND RESEARCH SERVICES | \$ 6,895 |
| 065 - REPAIR OF MACHINERY AND EQUIPMENT | \$ 35,201 |
| 112 - MINERAL PRODUCTS | \$ 41,593 |
| 046 - PROTECTION SERVICES | \$ 833 |
| 124 - ACQUISITION OF EQUIPMENT | \$ 21,575 |
| 022 - TELECOMMUNICATION SERVICES | \$ 2,594 |
| 063 - REPAIR OF BUILDINGS | \$ 66 |
| 056 - RENTAL OF AIRCRAFT AND SHIPS | \$ 140,850 |
| 122 - ACQUISITION OF INFORMATICS EQUIPMENT | \$ 6,998 |
| 116 - METALS AND METAL PRODUCTS | \$ 128 |
| 126 - ACQUISITION OF OTHER VEHICLES AND PARTS | \$ 5,803 |
| TOTAL | \$ 343,762 |

5.0 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 Municipal Affairs and Environment on a case by case basis. Annual maintenance was conducted to ensure minimal data loss and maintain data quality.

The week of September 17, 2018, National headquarter held a training session in Newfoundland with the local St John's office and the Provincial partners. From the session, the province selected several sites to further collect CVGD2013 datum conversion for the 2018-2019 year. The sites selected for CVGD2013 datum conversion where:

- Waterford River at Kilbride (02ZM008)- undertaken as part of training
- Virginia River at Pleasantville (02ZM018)- undertaken as part of training
- Raymond Brook at Outlet of Bay Bulls Big Pond (02ZM022)- undertaken as part of training
- Great Rattling Brook above Tote River Confluence (02YO008)- undertaken by WSC
- Exploits River below Noel Pauls Brook (02YO011)- undertaken by WSC
- Exploits River near Millertown (02YO016)- undertaken by WSC
- Churchill River English Point (03PC001)- Surveyor hired to undertake
- Rabbit Island at the Outlet of the Churchill River (03PD002)- Surveyor hired to undertake

The field data was collected and surveyed to the local datum and the field data was post processed to obtain the correct conversion.

Appendix A

SCHEDULE C 2018-2019 – STATION LIST

FEDERAL

| | |
|---------|---|
| 02ZF001 | BAY DU NORD RIVER AT BIG FALLS |
| 02YQ001 | GANDER RIVER AT BIG CHUTE |
| 02YJ001 | HARRYS RIVER BELOW HIGHWAY BRIDGE |
| 02YL003 | HUMBER RIVER AT HUMBER VILLAGE BRIDGE |
| 02ZB001 | ISLE AUX MORTS RIVER BELOW HIGHWAY BRIDGE |
| 02YG001 | MAIN RIVER AT PARADISE POOL |
| 02YD002 | NORTHEAST BROOK NEAR RODDICKTON |
| 02ZK001 | ROCKY RIVER NEAR COLINET |
| 02YS003 | SOUTHWEST BROOK AT TERRA NOVA NATIONAL PARK |
| 02YL001 | UPPER HUMBER RIVER NEAR REIDVILLE |
| 02YC001 | TORRENT RIVER AT BRISTOL'S POOL |
| 03QC002 | ALEXIS RIVER NEAR PORT HOPE SIMPSON |
| 03OE001 | CHURCHILL RIVER ABOVE UPPER MUSKRAT FALLS |
| 03QC001 | EAGLE RIVER ABOVE FALLS |
| 02XA003 | LITTLE MECATINA RIVER ABOVE LAC FOURMONT |
| 03NF001 | UGJOKTOK RIVER BELOW HARP LAKE |

FEDERAL - PROVINCIAL

| | |
|---------|--|
| 02YA002 | BARTLETT'S RIVER NEAR ST. ANTHONY |
| 02ZH002 | COME-BY-CHANCE RIVER NEAR GOOBIES |
| 02ZE004 | CONNE RIVER AT OUTLET OF CONNE POND |
| 02YO011 | EXPLOITS RIVER BELOW NOEL PAULS BROOK |
| 02ZG001 | GARNISH RIVER NEAR GARNISH |
| 02ZC002 | GRANDY BROOK BELOW TOP POND BROOK |
| 02YO008 | GREAT RATTLING BROOK ABOVE TOTE RIVER CONFLUENCE |
| 02YE001 | GREAVETT BROOK ABOVE PORTLAND CREEK POND |
| 02ZA002 | HIGHLANDS RIVER AT TRANS CANADA HIGHWAY |
| 02YR003 | INDIAN BAY BROOK NEAR NORTHEAST ARM |
| 02YK002 | LEWASSEECHJEECH BROOK AT LITTLE GRAND LAKE |
| 02YN002 | LLOYDS RIVER BELOW KING GEORGE IV LAKE |
| 02YR001 | MIDDLE BROOK NEAR GAMBO |
| 02ZK002 | NORTHEAST RIVER NEAR PLACENTIA |
| 02YO006 | PETERS RIVER NEAR BOTWOOD |
| 02ZH001 | PIPER'S HOLE RIVER AT MOTHERS BROOK |
| 02ZG004 | RATTLE BROOK NEAR BOAT HARBOUR |
| 02YL005 | RATTLER BROOK NEAR MCIVERS |
| 02YQ005 | SALMON RIVER NEAR GLENWOOD |

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| 02ZG003 | SALMONIER RIVER NEAR LAMALINE |
| 02ZM009 | SEAL COVE BROOK NEAR CAPPAHAYDEN |
| 02YK005 | SHEFFIELD BROOK NEAR TRANS CANADA HIGHWAY |
| 02ZJ003 | SHOAL HARBOUR RIVER NEAR CLARENVILLE |
| 02ZM016 | SOUTH RIVER NEAR HOLYWOOD |
| 02ZJ001 | SOUTHERN BAY RIVER NEAR SOUTHERN BAY |
| 02YO012 | SOUTHWEST BROOK AT LEWISPORTE |
| 02YM003 | SOUTH WEST BROOK NEAR BAIE VERTE |
| 02YS005 | TERRA NOVA RIVER AT GLOVERTOWN |
| 02YL008 | UPPER HUMBER RIVER ABOVE BLACK BROOK |
| 02ZM018 | VIRGINIA RIVER AT PLEASANTVILLE |
| 02YS006 | NORTHWEST RIVER AT TERRA NOVA NATIONAL PARK |
| 02ZM008 | WATERFORD RIVER AT KILBRIDE |

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| 02ZL005 | BIG BROOK AT LEAD COVE |
| 02YK008 | BOOT BROOK AT TRANS-CANADA HIGHWAY |
| 02YL009 | CORNER BROOK LAKE AT LAKE OUTLET |
| 02YL007 | DEER LAKE NEAR GENERATING STATION |
| 02YO015 | EAST POND BROOK BELOW EAST POND |
| 02YO014 | TRIBUTARY TO GILL'S POND BROOK |
| 02YK010 | GRAND LAKE EAST OF GRAND LAKE BROOK |
| 02YO013 | EXPLOITS RIVER AT BADGER |
| 02YO016 | EXPLOITS RIVER NEAR MILLERTOWN |
| 02YO018 | EXPLOITS RIVER at Charlie Edwards Point |
| 02YO017 | Red Indian Lake at Indian Point |
| 02ZC004 | GRANITE LAKE AT EAST END |
| 02ZD002 | GREY RIVER NEAR GREY RIVER |
| 02YM004 | INDIAN BROOK DIVERSION ABOVE BIRCHY LAKE |
| 02ZM020 | LEARYS BROOK AT PRINCE PHILIP DRIVE |
| 02ZK003 | LITTLE BARACHOIS RIVER NEAR PLACENTIA |
| 02ZK004 | LITTLE SALMONIER RIVER NEAR NORTH HARBOUR |
| 02ZK007 | RATTLING BROOK BIG POND |
| 02ZK006 | RATTLING BROOK BELOW BRIDGE |
| 02ZK008 | Rattling Brook below Plant Discharge |
| 02ZM006 | NORTHEAST POND RIVER AT NORTHEAST POND |
| 02ZM022 | RAYMOND BROOK AT OUTLET OF BAY BULLS BIG POND |
| 02ZJ002 | SALMON COVE RIVER NEAR CHAMPNEYS |
| 02ZL004 | SHEARSTOWN BROOK AT SHEARSTOWN |
| 02YL004 | SOUTH BROOK AT PASADENA |
| 02YL012 | Steady Book above Confluence of Humber river |

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| 02ZN002 | ST. SHOTTS RIVER NEAR TREPASSEY |
| 02YN004 | STAR BROOK ABOVE STAR LAKE |
| 02YR004 | TRITON BROOK ABOVE GAMBO POND |
| 02YN005 | VICTORIA LAKE AT NORTHEAST CONTROL STRUCTURE |
| 02ZD003 | R.R. POND NEAR GRANITE LAKE |
| 02YF002 | CAT ARM RESERVOIR NEAR SPILLWAY |
| 02ZC003 | WHITE BEAR RIVER ABOVE BIG INDIAN BROOK |
| 02ZG006 | OUTFLOW OF GREBES NEST POND |
| 02YO019 | Badger Brook Below Foot Bridge |
| 02ZG007 | OUTFLOW OF UNNAMED POND SOUTH OF LONG POND |
| 03OC003 | ATIKONAK RIVER ABOVE PANCHIA LAKE |
| 03NE003 | CAMP POND AT SOUTHWEST END |
| 03NE002 | CAMP POND BROOK BELOW CAMP POND |
| 03OA012 | Luce Brook below Tinto Pond |
| 03OA014 | Wabush Lake at Dolomite Rd |
| 03OA005 | Wabush Lake at Lake Outlet |
| 03OE011 | PINUS RIVER |
| 03NE011 | REID BROOK Below Tributary |
| 03NE001 | REID BROOK AT OUTLET OF REID POND |
| 03NE012 | TRIBUTARY to Reid Brook |
| 03OE013 | CHURCHILL RIVER ABOVE GRIZZLE RAPIDS |
| 03OE014 | CHURCHILL RIVER 6.15KMS BELOW MUSKRAT FALLS |
| 03PD001 | Lake Melville East of Little River |
| 03PC001 | Churchill River at English Point |
| 03OB006 | Goodream Creek 2KM Northwest of Timmins 6 |
| 03OB007 | Elross Creek below Pinette Lake Inflow |
| 03OA015 | Flora Creek below Trans Labrador Highway |
| 03OE015 | Churchill River at Mid Pool |
| 03OB009 | Joan Brook below outlet of Joan Lake |
| 03OA016 | Dumbell stream above Dumbell Lake |
| 03OD008 | Churchill River Above Churchill Falls Tailrace |
| 03OD009 | Churchill River below Metchin River |
| 03OD010 | Churchill River Below Churchill Falls Tailrace |
| 03OE017 | Mud Lake at outlet tributary at Mud Lake |
| 03OA017 | Pumphouse Stream above Drum Lake |
| 03OE019 | Churchill River Below Outlet of Traverspine River |
| 03OE018 | Churchill River at End of Mud Lake Road |
| 03PD002 | Churchill River Outlet at Rabbit Island |
| 03OE016 | Churchill River at Happy Valley |

Appendix B SIGNED SCHEDULE D 2018-2019

| NEWFOUNDLAND AND LABRADOR 2018-2019 | | | | |
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| <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 2018-2019 TO BE PAID TO THE RECEIVER GENERAL FOR CANADA BY THE PROVINCE OF NEWFOUNDLAND AND LABRADOR | | | | |
| NEWFOUNDLAND and LABRADOR SHARE | | | | |
| | O&M | Salary | Capital | Total |
| a) Streamflow and Water Level Installations - Island | \$97,808 | \$373,868 | \$17,795 | \$489,471 |
| b) Streamflow and Water Level Installations - Labrador | \$268,353 | \$234,683 | \$0,683 | \$512,926 |
| c) Construction & Major Maintenance (LCM) | \$0 | \$0 | \$0 | \$0 |
| d) Station Decommissioning | \$0 | \$0 | \$0 | \$0 |
| e) Hydrometric Workstation | \$0 | \$0 | \$0 | \$0 |
| f) Real Property Credit for Federal stations on Provincial Crown Land | (\$9,600) | \$0 | \$0 | -\$9,600 |
| g) Real Time Webcam | (\$7,350) | \$0 | \$0 | -\$7,350 |
| h) Weather Stations | (\$4,306) | \$0 | \$0 | -\$4,306 |
| i) Basin Delineation & Information | \$0 | \$0 | \$0 | \$0 |
| j) Special Projects* | \$0 | \$0 | \$0 | \$0 |
| TOTAL | \$344,907 | \$608,762 | \$27,484 | \$981,142 |
| <i>Haseen Khan, P.Eng.</i> <i>Oct 23 2018</i> | <i>Alain Pietroniro</i> <i>Oct 31/18</i> | | | |
| Director Water Resources Management Division Department of Environment and Climate Change Administrator for Province of Newfoundland and Labrador | Executive Director National Hydrological Service Meteorological Service of Canada Environment and Climate Change Canada | | | |

* Special Projects that contribute to the ongoing integrity of the program will be credited upon agreement by both parties