

Executive Summary

This report presents the results of the Newfoundland Environment Precipitation Monitoring Network (NEPMoN) program for the period 1999 to 2000. During this period there were 6 operational acid rain sites.

In 1999 the acid rain network consisted of sites at Burgeo, Cormack, Loch Leven, Salmonier, Wooddale and Terra Nova. The site in Burgeo was closed in September, 2000 due to proximity to the federally operated site in Bay D'Espoir.

Each site is equipped with an automated precipitation sampler which collects wet deposition (i.e. rain, snow, hail etc.). Once a week an operator removes the collected precipitation from the sampler, weighs it and transfers a sample to a labelled polyethylene bottle for storage at 4 °C. Samples were analysed for a selection of parameters at Environment Canada's Environmental Quality Laboratory in St. John's up to the end of August 2000 and subsequently at Environment Canada's Environmental Quality Laboratory in Moncton, New Brunswick.

Site performance measures and overall data quality evaluations are provided for each site over most of the last decade. The Cormack, Wooddale and Terra Nova B sites have performed very consistently, producing good quality data. The performance of other sites has been somewhat erratic producing data that varied from good to "unacceptable for trend monitoring". A noted weakness with the sites has been the measurement of the precipitation. The Belfort rain gauges have given erratic results, particularly during winter. These Belfort gauges were replaced with standard rain and snow gauges in the fall of 2000 which are consistent with the Canadian Air and Precipitation Monitoring Network (CAPMoN).

The results from the various sites show a pronounced spatial variation in the deposition of sulphates and nitrates across the island. The largest depositions occur on the southwest corner of the island, with the quantity diminishing as one progresses to the north and to the east. There are indications that the rate of deposition of sulphate has been diminishing steadily over the last decade but the rate of deposition of nitrate has increased. It is difficult to say whether these trends have any relationship to emission abatement measures, or if they result from changes in weather patterns. These questions can only be answered in the context of a continued continental-wide monitoring program.

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)

Report on Activities 1999 - 2000

Table of Contents

The Report

Mission Statement	1
Objectives	1
The Network	1
Chemical Analysis	2
Evaluation of Data Quality	3
Results and Discussion	3
Conclusion	5

1999-2000 Precipitation Chemistry Tables

Rain Collection Statistics and

Ion Concentration for;

Burgeo 1999	8
Burgeo 2000	10
Burgeo Deposition and Annual Summary Tables	12
Cormack 1999	14
Cormack 2000	16
Cormack Deposition and Annual Summary Tables	18
Loch Leven 1999	20
Loch Leven 2000	22
Loch Leven Deposition and Annual Summary Tables	24
Terra Nova B 1999	26
Terra Nova B 2000	28
Terra Nova B Deposition and Annual Summary Tables	30
Wooddale 1999	32
Wooddale 2000	34
Wooddale Deposition and Annual Summary Tables	36
Salmonier 2000	38
Salmonier Deposition and Annual Summary Tables	40

Graphs:

Annual Excess Sulphate Deposition	41
Excess Sulphate Deposition (three year rolling average)	41
Excess Sulphate Concentration (three year rolling average)	42

Annual Nitrate Deposition	42
Nitrate Deposition (three year rolling average)	43
Nitrate Concentration (three year rolling average)	43
Annual pH	44
pH (three year rolling average)	44
Annual Precipitation	45
Appendix A - Acid Precipitation Collection Sites - Individual History Sheets	46
Bay D’Espoir	48
Burgeon	49
Cormack	50
Gros Morne	51
Hope Brook	52
Loch Leven	53
Salmonier	54
Terra Nova A	55
Terra Nova B	56
Wooddale	57
Appendix B - Network Siting Criteria	58
Appendix C - Data Completeness Statistics	60
Appendix D - Data Listings - Explanation of Terms	62
Appendix E - Determination of Sample Validity - Assignment of Data Validity Flags	70
Appendix F - Definition of Flags	75
Appendix G - Sea Salt Calculations	84

Since 1998, NEPMoN was able to continue operation and increase its number of monitoring sites through the generous financial contributions from industries in this province. Newfoundland and Labrador Department of Environment would like to thank the following companies for their valuable contributions.

North Atlantic Refining Limited
Newfoundland Hydro
Voisey's Bay Nickel Company Limited
Iron Ore Company of Canada
Wabush Mines
Corner Brook Pulp and Paper Mill
Abitibi-Consolidated Stephenville
Abitibi-Consolidated Grand Falls

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)

Mission Statement:

To determine the spatial and temporal variations in the long range transport of acidic pollutants into this province.

Objectives:

- (i) To ensure wet sulphate and nitrate deposition trends are monitored and evaluated according to the protocols of the Canadian Air and Precipitation Monitoring Network (CAPMoN).
- (ii) To ensure that a comprehensive, and integrated, sulphate and nitrate deposition monitoring and analysis program is continued in the Province of Newfoundland.
- (iii) To monitor other components of acid deposition which may have an impact on the Newfoundland and Labrador environment.
- (iv) To assist in any research efforts designed to obtain a better understanding of the effects of acid rain.
- (v) To provide reliable data to the National Atmospheric Chemistry (NATChem) Database and Analysis System.

The Network.

The network consists of a number of wet-only precipitation collectors located at sites around the island which have been specially selected to be representative of different regions (see Appendix B). Sampling sites are located strategically throughout the island portion of the Province so that a better estimate of the depositional loading pattern of sulphates and nitrates could be obtained. The number of sites reached a maximum in 1995 when seven collectors were in operation. Due to lack of funding, this number was reduced to two in 1996, but with generous financial support from provincial industries, the number was increased back up to six collectors during January, 2000. June, 2000 the Burgeo site was closed reducing the number of operational sites to 5. Site operators record the occurrence and type of precipitation on a daily basis, and collect the precipitation samples weekly. Individual site history sheets are provided in Appendix A. These include measures of the site's performance (see Appendix C). Figure 1 shows site locations.

Chemical Analysis

Environment Canada assists the Department to meet the program objectives by performing free chemical analysis for acid precipitation samples. The parameters measured are as follows:

Table 1

Parameter	Technique	MDL Value
pH	Electrometric	0.01
Conductivity	Conductivity Meter	0.1 μ S/cm
SO ₄ ²⁻	Ion Chromatography	0.02 mg/L
NO ₃ ⁻ -N	Ion Chromatography	0.008 mg/L
Cl ⁻	Ion Chromatography	0.02 mg/L
NH ₄ ⁺ -N	Auto Analyzer Ion Chromatography	0.009 mg/L 0.03 mg/L
Na ⁺	Atomic Absorption Ion Chromatography	0.02 mg/L 0.04 mg/L
Ca ²⁺	Atomic Absorption Ion Chromatography	0.06 mg/L 0.07 mg/L
Mg ²⁺	Atomic Absorption Ion Chromatography	0.002 mg/L 0.04 mg/L
K ⁺	Atomic Absorption Ion Chromatography	0.02 mg/L 0.03 mg/L
Alkalinity	Gran Titration	0.2 mg/L

MDL = Method Detection Limit

The use of ion chromatography for the determination of cations is a fairly recent introduction. The precision of the method compares quite favorably with that obtained by other techniques, and the results are more than adequate for our purposes.

A minimum of 60 mL of sample is required to do all the chemical parameters at least once. If the sample volume is less than 60 mL the analyses are done in the following order until the sample is

depleted: - SO_4^{2-} , NO_3^- -N, Cl: Na^+ , K^+ , Mg^{2+} , Ca^{2+} , NH_4^+ -N, pH, alkalinity, and conductivity. It has been noted that small samples usually have a high concentration of analytes, so these samples can be diluted before being run on the ion chromatograph. This means that the cation and anion contents can be determined on very small samples.

Evaluation of Data Quality

It is very easy for contamination to occur at any stage of the process, and a rigorous quality control procedure is followed to screen out any samples which could bias the results.

Operators are requested to comment on any unusual occurrence, such as the presence of extraneous material in the sample and on the performance of the collector.

Laboratory analysis follows standardized procedures that satisfy the requirements of the Canadian Association of Environmental Analytical Laboratories (CAEAL). These procedures include the use of Certified Reference Materials (CRMs), and repeatability verification. Once all the chemical parameters have been measured, an ionic balance is generated to verify that the anionic and cationic components are in equilibrium. Any samples falling outside experimental error tolerance levels are re-analyzed.

The final laboratory results for the individual samples are merged with the respective weekly rainfall collection data to give a spreadsheet file which is screened once more for outliers before the calculation of summary statistics for the year. This process is described in greater detail in Appendix E. The weekly rainfall collection statistics and the ion concentrations are published as separate tables. The annual statistics are collected onto a third report form. The latter are examined graphically to identify any trends within the data.

Results and discussion

In general the collection sites operated well over the last two years. The main concern with the system involved the rain gauge measurements. The Belfort rain gauges at the Loch Leven and Terra Nova sites have provided readings that did not correlate well with the collector data. These gauges have been replaced with standard rain and snow gauges which have been working well. Due to unacceptably high error in the results from the Belfort rain gauges at the Terra Nova and Loch Leven sites, data from these rain gauge measurements were discarded as erroneous. With the exception of Cormack, all precipitation data was obtained from co-located or nearby climate stations. Cormack had standard rain and snow gauges in place for the 1999 and 2000 calendar years and the data from these gauges is being used. There have also been some data issues with the change in laboratories used for the chemical analysis. Some data had been delayed due to the Moncton laboratory changing its LIMS (Laboratory Information Management System). All issues with this LIMS and the laboratory in general have been resolved.

Graphical display of the annual depositions at the different collector sites is restricted to the ones of greatest interest:

Excess Sulphate Deposition (Kg per hectare per year);
Nitrate Deposition (Kg per hectare per year);
pH;
Annual Rainfall.

Highlights of 1999 - 2000 NEPMoN Data with Sulphate

- There appears to be no concrete increase or decrease in the deposition of excess sulphate over the Province, with the exception of Loch Leven.
- The excess sulphate deposition for Wooddale, Cormack and Burgeo has increased slightly, but this is consistent with the increase in precipitation recorded during the period.
- Terra nova B has seen a slight decrease in the excess sulphate deposition.
- The Wooddale and Terra Nova B sites are below the 8 Kg/ha/year critical load limit.
- Loch Leven has seen a major increase in excess sulphate deposition between the 1999 and 2000 calendar years, almost doubling in deposition.

Highlights of 1999 - 2000 NEPMoN Data with Nitrate and pH

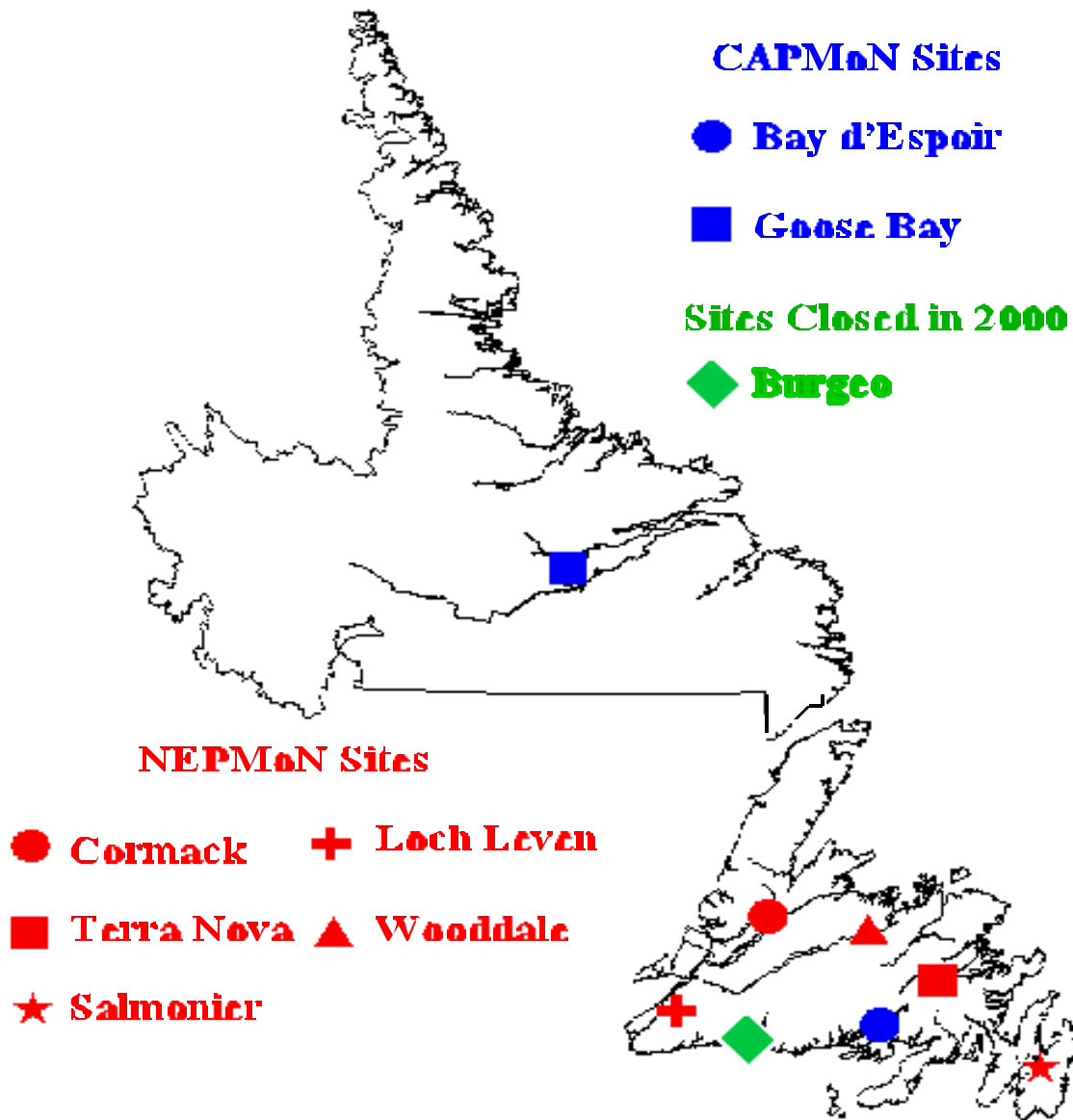
- Nitrate deposition has increased slightly over this time period.
- The pH values of the precipitation show signs of having reached a minimum, and are now increasing again, with the exception of Loch Leven. In other words, the rain is becoming less acidic.
- The 2000 calendar year for Loch Leven shows a decrease in pH (meaning an increase in acidity), which seems to be consistent with the increase in excess sulphate deposition for that time period and location.

Note: Given that the spatial distribution of deposition indicates that the greatest quantities fall onto the south-west corner of the island, it is clear that the major sources of pollution lie outside the province. This means that efforts to reduce acid precipitation will be dependant on the actions of other agencies. The data that NEPMoN supplies to the Meteorological Service of Canada is used to monitor actions taken in other parts of the continent. In other words, the onus is on the Department to follow nationally approved protocols. Generally speaking, the Department's protocols are compatible with CAPMoN standards.

Conclusion

In general there appears to be no significant changes in the deposition of sulphate and nitrate loadings to this Province during 1999 - 2000. Some areas have received an increase in excess sulphate deposition whereas other areas have received a decrease in excess sulphate deposition. Based on these results, further reductions are required to achieve the 8 kg/ha/yr critical loading necessary for the sensitive parts of the province. Nitrate deposition has increased at nearly all sites. It is important that the monitoring program be continued and improved in order to ensure that emission abatement projects continue to receive attention.

Acid Rain Sites Newfoundland and Labrador 2000



NB: The Salmonier site reopened in 1999, principally to assist in a research project monitoring the Salmonier River basin. The Burgeo site was closed in 2000 due to latitudinal redundancy with the federally operated site in Bay d'Espoir.

1999 - 2000 Precipitation Chemistry Listings

The 1999 - 2000 precipitation chemistry listings are presented in the following order:

- (a) Rain Collection Statistics (daily basis);
- (b) Ion Concentrations Table (weekly basis);
- (c) Deposition and Annual Summary Table.

Burgeo

Cormack

Loch Leven

Terra Nova B

Wooddale Tree Nursery

Salmonier Nature Park

An explanation of the terms and abbreviations used in the following tables is given in Appendix D. The data validity flags used by NEPMoN are defined in Appendix F.

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Burgeo Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
1036166	06-Jan-99	13-Jan-99	7	4020.0	62.6	87.0	72.0		M
1036173	13-Jan-99	20-Jan-99	7	4130.0	64.3	75.0	85.8		R
1036180	20-Jan-99	27-Jan-99	7	925.0	14.4	27.2	53.0		R
	27-Jan-99	03-Feb-99	7			35.6			N
1036194	03-Feb-99	10-Feb-99	7	6015.0	93.7	94.0	99.7		M
1036201	10-Feb-99	17-Feb-99	7	3465.0	54.0	48.4	111.5		M
1036208	17-Feb-99	24-Feb-99	7	5935.0	92.4	44.4	208.2		M
1036215	24-Feb-99	03-Mar-99	7	4840.0	75.2	35.4	212.5		M
1036222	03-Mar-99	10-Mar-99	7	1950.0	30.4	94.0	32.3		R
1036229	10-Mar-99	17-Mar-99	7	2970.0	46.3	63.0	73.4		M
1036236	17-Mar-99	24-Mar-99	7	1975.0	30.8	59.0	52.1		M
1036243	24-Mar-99	31-Mar-99	7	3040.0	47.4	46.4	102.1		M
1036250	31-Mar-99	07-Apr-99	7	5.0	0.1	29.2	0.3		M
1036257	07-Apr-99	14-Apr-99	7	3190.0	49.7	49.2	101.0		M
1036264	14-Apr-99	20-Apr-99	6	370.0	5.8	13.6	42.4		R
1036270	20-Apr-99	28-Apr-99	8	1970.0	30.7	32.4	94.7		R
1036278	28-Apr-99	05-May-99	7	1270.0	19.8			V1	R
1036285	05-May-99	12-May-99	7	2460.0	38.3	24.0	159.7		R
1036292	12-May-99	19-May-99	7	125.0	1.9			V1	R
1036299	19-May-99	26-May-99	7	6145.0	95.7	155.0	61.8		R
1036306	26-May-99	02-Jun-99	7	1970.0	30.7	0.6	5114.2		R
1036313	02-Jun-99	08-Jun-99	6	2470.0	38.5	41.6	92.5		R
1036319	08-Jun-99	16-Jun-99	8	430.0	6.7	5.2	128.8		R
1036327	16-Jun-99	22-Jun-99	6	920.0	14.3	5.8	247.1		R
1036333	22-Jun-99	30-Jun-99	8	1705.0	26.6	26.8	99.1		R
1036341	30-Jun-99	07-Jul-99	7	1210.0	18.8	26.8	70.3		R
1036348	07-Jul-99	13-Jul-99	6	2030.0	31.6	39.4	80.3		R
1036354	13-Jul-99	21-Jul-99	8	1865.0	29.0	3.2	907.8		R
1036362	21-Jul-99	27-Jul-99	6	990.0	15.4	85.6	18.0		R
1036368	27-Jul-99	04-Aug-99	8	2930.0	45.6	21.6	211.3		M
1036376	04-Aug-99	11-Aug-99	7	1095.0	17.1	29.4	58.0		R
1036383	11-Aug-99	19-Aug-99	8	5790.0	90.2	105.6	85.4		R
1036391	19-Aug-99	25-Aug-99	6	940.0	14.6	7.2	203.4		R
1036397	25-Aug-99	01-Sep-99	7	1910.0	29.8	17.0	175.0		M
1036404	01-Sep-99	08-Sep-99	7	300.0	4.7	18.8	24.9		M
1036411	08-Sep-99	15-Sep-99	7	4380.0	68.2	33.6	203.0		R
1036418	15-Sep-99	22-Sep-99	7	5980.0	93.1	76.0	122.6		R
1036425	22-Sep-99	29-Sep-99	7	800.0	12.5	38.4	32.5		M
1036432	29-Sep-99	06-Oct-99	7	3755.0	58.5	40.4	144.8		M
1036439	06-Oct-99	13-Oct-99	7	2990.0	46.6	59.8	77.9		M
1036446	13-Oct-99	20-Oct-99	7	4255.0	66.3	69.4	95.5		M
1036453	20-Oct-99	27-Oct-99	7	765.0	11.9	31.2	38.2		M
1036460	27-Oct-99	03-Nov-99	7	1105.0	17.2	25.6	67.2		R
1036467	03-Nov-99	10-Nov-99	7	1485.0	23.1	19.2	120.5		M
1036474	10-Nov-99	17-Nov-99	7	1015.0	15.8	18.0	87.8		M
1036481	17-Nov-99	24-Nov-99	7	1365.0	21.3	42.4	50.1		M
1036488	24-Nov-99	01-Dec-99	7	3615.0	56.3	39.4	142.9		R
1036495	01-Dec-99	08-Dec-99	7	6210.0	96.7	76.6	126.3		M
	08-Dec-99	15-Dec-99	7	340.0	5.3	11.0	48.1		M
1036509	15-Dec-99	22-Dec-99	7	3425.0	53.3	70.4	75.8		M
1036516	22-Dec-99	29-Dec-99	7	515.0	8.0	30.4	26.4		M
1036523	29-Dec-99	05-Jan-2000	7	4060.0	63.2	43.6	145.0		M

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Burgeo Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mg/l) flg	Cond. umhos flg	SO4 (mg/l) flg	XSO4 (mg/l) flg	NNO3 (mg/l) flg	Cl (mg/l) flg	NNH4 (mg/l) flg	Na (mg/l) flg	Ca (mg/l) flg	Mg (mg/l) flg	K (mg/l) flg	Alk CaCO3 (mg/l) flg
06-Jan-99	-0.80	4.66	.0221	50.10	2.19	.574	0.107	11.60	0.20	6.47	0.17	0.67	0.21	-1.50
13-Jan-99	-0.83	4.74	.0183	32.30	1.53	.546	0.118	7.00	0.12	3.94	0.13	0.41	0.13	-1.30
20-Jan-99	I1	I1	I1	84.50	4.28	1.633	0.236	18.30	<0.03	10.60	0.25	1.08	0.37	
27-Jan-99	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
03-Feb-99	I1	I1	I1	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6
10-Feb-99	-0.89	4.44	.0366	31.00	1.68	1.010	0.196	5.00	0.13	2.68	0.13	0.27	0.10	-2.00
17-Feb-99	-19.30	5.00	.0101	6.80	0.34	.187	0.021	1.05	0.06	0.61	0.09	0.12	0.05	-0.60
24-Feb-99	-5.18	4.94	.0116	16.70	0.69	.185	0.057	3.47	0.06	2.02	0.10	0.22	0.09	-0.80
03-Mar-99	-2.18	4.52	.0304	45.00	2.25	.979	0.128	8.90	0.16	5.09	0.13	0.56	0.20	-1.60
10-Mar-99	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6
17-Mar-99	-6.84	4.84	.0146	15.60	0.81	.398	0.071	2.74	0.08	1.65	0.10	0.18	0.08	-1.10
24-Mar-99	1.13	4.58	.0265	19.50	1.46	1.185	0.170	1.98	0.10	1.10	0.08	0.12	0.04	-1.81
31-Mar-99	I1	I1	I1	I1	0.62	.185 V4	I1	3.12	I1	I1	I1	I1	I1	
07-Apr-99	-1.35	4.73	.0188	20.90	1.15	.688	0.120	3.24	0.08	1.85	0.09	0.20	0.06	-1.45
14-Apr-99	-3.47	4.20	.0636	32.00	2.20	1.952	0.260	1.82	0.06	0.99	0.07	0.11	0.04	-3.36
20-Apr-99	1.96	4.78	.0167	7.81	0.52	.499 V3	0.100	0.23	0.04	0.06	<0.02	0.01	<0.01	-1.37
28-Apr-99	-43.36	5.31	.0049	I1	0.10	.080	0.017	0.19	<0.03	0.08	0.11	0.08	<0.03	-0.51
05-May-99	-8.34	4.88	.0133	I1	1.00	.790	0.066	1.47	0.13	0.84	0.11	0.16	0.06	-1.13
12-May-99	-5.39	4.49	.0326	I1	1.64	1.325	0.268	2.16	0.12	1.26	0.25	0.20	0.10	-2.07
19-May-99	I7	I7	I7	I1	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7
26-May-99	-7.57	4.81	.0156	I1	0.74	.640	0.098	0.77	0.06	0.40	0.11	0.09	0.05	-1.13
02-Jun-99	-2.11	4.54	.0291	I1	1.66	1.380	0.191	2.06	0.17	1.12	0.13	0.16	0.06	-2.05
08-Jun-99	0.24	4.08	.0838	I1	4.28	4.092	0.440	1.42	0.37	0.75	0.13	0.11	0.08	-5.20
16-Jun-99	-17.77	4.95	.0113	I1	0.30	.270	0.076	0.25	<0.03	0.12	0.10	0.04	0.04	-1.00
22-Jun-99	-4.08	4.62	.0242	I1	1.14	1.030	0.180	0.80	0.13	0.44	0.10	0.07	0.04	-1.82
30-Jun-99	-4.52	4.69	.0206	I1	0.89	.720	0.114	1.24	0.05	0.68	0.11	0.09	0.04	-1.72
07-Jul-99	-3.82	4.58	.0265	I1	1.30	1.155	0.160	1.03	0.13	0.58	0.09	0.08	0.04	-1.60
13-Jul-99	-14.48	4.90	.0127	I1	0.49	.445	0.051	0.32	0.03	0.18	0.08	0.04	0.03	-1.18
21-Jul-99	I1	I1	I1	I1	2.26	1.937 CB	0.312 CB	2.29	0.54 CB	1.29	0.18	0.18	0.41 CB	
27-Jul-99	I1	I1	I1	I1	1.29	1.187	0.199	0.75	0.12	0.41	<0.07	0.06	0.03	
04-Aug-99	I1	I1	I1	I1	3.30	2.386	0.400	6.67	0.33	3.66	0.23	0.46	0.15	
11-Aug-99	I1	I1	I1	I1	1.42	1.332 CB	0.207	0.66	0.13	0.35	<0.07	0.04	0.03	
19-Aug-99	I1	I1	I1	I1	0.59	.502	0.155	0.66	0.07	0.35	<0.07	0.04	<0.03	
25-Aug-99	I1	I1	I1	I1	0.70	.632	0.092	0.49	0.06	0.27	<0.07	0.05	<0.03	
01-Sep-99	I1	I1	I1	I1	4.80	3.481	0.454	9.82	0.45	5.28	0.29	0.54	0.21	
08-Sep-99	I1	I1	I1	I1	0.48	.235	0.026	1.59	0.07	0.98	0.10	0.13	0.08	
15-Sep-99	I1	I1	I1	I1	0.85	.535	0.044	2.39	0.09	1.26	0.07	0.18	0.10	
22-Sep-99	I1	I1	I1	I1	5.68	.262	0.134	37.70 CB	<0.03	21.70 CB	0.98 CB	2.59 CB	0.71 CB	
29-Sep-99	I1	I1	I1	I1	1.03	.912	0.097	0.83	0.09	0.47	<0.07	0.08	0.07	
06-Oct-99	I1	I1	I1	I1	1.59	.686	0.100	6.56	0.19	3.62	0.24	0.51	0.16	
13-Oct-99	I1	I1	I1	I1	1.97	.554	0.090	11.00	0.26	5.67	0.27	0.74	0.21	
20-Oct-99	I1	I1	I1	I1	3.12	1.227	0.220	14.20	<0.03	7.58	0.36	0.96	0.28	
27-Oct-99	I1	I1	I1	I1	3.03	2.353	0.252	4.90	0.35	2.71	0.14	0.34	0.15	
03-Nov-99	I1	I1	I1	I1	1.06	.353	0.110	4.86	0.14	2.83	0.15	0.38	0.14	
10-Nov-99	I1	I1	I1	I1	0.94	.553	0.082	2.79	0.12	1.55	0.10	0.23	0.10	
17-Nov-99	-3.72	4.63	.0236	26.30	1.84	1.338	0.230	3.41	0.23	2.01	0.22	0.23	0.21	-1.87
24-Nov-99	-2.30	4.63	.0236	29.10	1.65	.965	0.150	4.77	0.12	2.74	0.10	0.35	0.12	-1.85
01-Dec-99	-4.60	4.97	.0108	7.51	0.42	.310	0.070	0.77	0.03	0.44	0.02	0.07	<0.01	-1.39
08-Dec-99	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
15-Dec-99	-0.66	4.86	.0139	41.00	1.80	.521	0.100	9.11	0.00	5.12	0.22	0.65	0.18	-1.55
22-Dec-99	-2.76	4.56	.0278	101.90	4.17	.874	0.240	22.50	0.16	13.20	0.48	1.59	0.49	-2.24
29-Dec-99	-1.60	4.70	.0201	27.90	1.45	.758	0.140	4.84	0.08	2.77	0.11	0.34	0.11	-1.73

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Burgeo Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
1036530	05-Jan-2000	12-Jan-2000	7	3025.0	47.1	49.2	95.8		M
1036537	12-Jan-2000	18-Jan-2000	6	1015.0	15.8	23.2	68.1		M
1036543	18-Jan-2000	26-Jan-2000	8	3835.0	59.7	87.4	68.3		M
1036551	26-Jan-2000	02-Feb-2000	7	4860.0	75.7	35.6	212.6		M
1036558	02-Feb-2000	09-Feb-2000	7	460.0	7.2	36.4	19.7		S
1036565	09-Feb-2000	16-Feb-2000	7	5380.0	83.8	93.0	90.1		M
1036572	16-Feb-2000	23-Feb-2000	7	820.0	12.8	46.0	27.8		M
1036579	23-Feb-2000	01-Mar-2000	7	1090.0	17.0	4.2	404.2		M
1036586	01-Mar-2000	08-Mar-2000	7	1685.0	26.2	20.4	128.7		M
1036593	08-Mar-2000	15-Mar-2000	7	2900.0	45.2	92.2	49.0		M
1036600	15-Mar-2000	22-Mar-2000	7	2570.0	40.0	40.4	99.1		M
1036607	22-Mar-2000	29-Mar-2000	7	1415.0	22.0	90.0	24.5		M
1036614	29-Mar-2000	05-Apr-2000	7	4895.0	76.2	59.2	128.8		R
1036621	05-Apr-2000	12-Apr-2000	7	1015.0	15.8	42.0	37.6		R
1036628	12-Apr-2000	19-Apr-2000	7	3240.0	50.5	3.0	1682.2		M
1036635	19-Apr-2000	26-Apr-2000	7	2945.0	45.9	42.0	109.2		M
1036642	26-Apr-2000	03-May-2000	7	3780.0	58.9	68.6	85.8		M
1036649	03-May-2000	10-May-2000	7	1210.0	18.8	51.4	36.7		R
1036656	10-May-2000	17-May-2000	7	3390.0	52.8	47.4	111.4		R
1036663	17-May-2000	24-May-2000	7	1520.0	23.7	35.8	66.1		R
1036670	24-May-2000	31-May-2000	7	1095.0	17.1	27.6	61.8		R
1036677	31-May-2000	07-Jun-2000	7	1060.0	16.5	37.4	44.1		R
1036684	07-Jun-2000	14-Jun-2000	7	2385.0	37.1	11.6	320.3		R
	14-Jun-2000	17-Jun-2000							
	17-Jun-2000	20-Jun-2000							

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Burgeo Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mg/l) flg	Cond. umhos flg	SO4 (mg/l) flg	XSO4 (mg/l) flg	NNO3 (mg/l) flg	Cl (mg/l) flg	NNH4 (mg/l) flg	Na (mg/l) flg	Ca (mg/l) flg	Mg (mg/l) flg	K (mg/l) flg	Alk CaCO3 (mg/l) flg
05-Jan-2000	-0.79	4.74	.0183	40.20	1.93	.746	0.130	9.05	0.27	4.74	0.20	0.63	0.16	-1.40
12-Jan-2000	I1	4.56	.0278	79.40	3.51	1.108	0.230	17.60	I1	9.62	0.40	1.27	0.35	-1.61
18-Jan-2000	-1.46	5.21	.0062	15.90	0.63	.145	<0.20	3.51	<0.02	1.94	0.09	0.31	0.06	-0.78
26-Jan-2000	-2.61	5.02	.0096	14.95	0.64	.238	0.052	3.00	0.05	1.61	0.07	0.23	0.06	-0.87
02-Feb-2000	I1	4.40	.0401	136.30	5.41	1.215	0.440	29.80	I1	16.80	0.77 Q3	2.21 Q3	0.67	-2.11
09-Feb-2000	2.76	4.95	.0113	13.50	0.80	.492	0.062	2.48	0.07	1.23	0.05	0.16	0.03	-0.91
16-Feb-2000	I1	4.43	.0374	58.00	3.02	1.452	0.262	10.80	I1	6.28	0.25	0.79	0.22	-1.96
23-Feb-2000	0.40	4.31	.0494	64.50	3.98	2.581	0.580	10.20	0.47	5.60	0.30	0.75	0.23	-2.55
01-Mar-2000	-0.29	4.85	.0142	8.00	0.63	.567	0.050	0.42	0.02	0.25	<0.02	0.02	<0.01	-1.12
08-Mar-2000	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6
15-Mar-2000	0.25	4.06	.0878	60.90	3.68	2.960	1.030 Q3	5.00	0.33	2.88	0.39	0.38	0.12	-4.26
22-Mar-2000	-1.44	4.78	.0167	24.00	1.34	.758	0.140	4.11	0.10	2.33	0.13	0.30	0.08	-1.27
29-Mar-2000	-1.82	4.77	.0171	12.90	0.83	.662	0.170	1.13	0.11	0.67	0.05	0.08	0.02	-1.26
05-Apr-2000	-2.24	4.45	.0358	32.20	2.32	1.843	0.400	3.30	0.38	1.91	0.21	0.24	0.07	-1.87
12-Apr-2000	I1	4.64	.0231	40.50	1.98	.849	0.200	7.88	I1	4.53	0.19	0.56	0.15	-1.37
19-Apr-2000	5.13	5.15	.0071	6.14	0.37	.265	0.050	0.67	<0.02	0.42	<0.02	<0.01	0.01	-0.73
26-Apr-2000	-3.81	4.98	.0106	17.90	1.00	.473	0.060	3.38	<0.02	2.11	0.11	0.24	0.07	-0.81
03-May-2000	-2.10	4.69	.0206	26.30	1.76	1.145	0.190	4.11	0.15	2.46	0.18	0.29	0.09	-1.30
10-May-2000	-1.96	4.91	.0124	9.80	0.69	.525	0.100	1.12	0.07	0.66	0.05	0.08	<0.01	-0.94
17-May-2000	1.08	4.44	.0366	63.60	3.97	2.467	0.400	11.30	0.41	6.02	0.37	0.81	0.32	-1.99
24-May-2000	0.03	4.48	.0334	21.20	1.80	1.597	0.240	1.30	0.15	0.81	0.08	0.09	0.03	-1.85
31-May-2000	0.07	4.55	.0284	17.70	1.80	1.702	0.220	0.65	0.22	0.39	0.12	0.04	0.05	-1.75
07-Jun-2000	-1.63	4.62	.0242	28.90	1.82	1.155	0.160	4.54	0.11	2.66	0.12	0.33	0.10	-1.53

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Burgeo Acid Rain Report

Part (c): Deposition & Summary Table

Start:	6-Jan-99	Days:	364
End:	5-Jan-00	Weeks:	52

	Sample	Gauge														
	Depth	Depth	Ionbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
Total Sample Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Trace Precipitation Periods	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Non-Trace Precipitation Periods	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
# of Valid Samples	52	52	28	28	28	18	47	47	46	47	46	46	46	46	46	47
% of Valid Samples	100%	100%	54%	54%	54%	35%	90%	90%	88%	90%	88%	88%	88%	88%	88%	90%
Mean	38.91	43.46	-5.88	4.63	0.0237	33.11	1.67	0.98	0.16	4.97	0.133	2.82	0.15	0.344	0.13	NA
Standard Deviation	27.91	30.29	8.81	0.24	0.016	24.56	1.27	0.81	0.1	6.8	0.115	3.93	0.15	0.458	0.14	NA
Minimum	0.08	0.6	-43.36	4.08	0.0049	6.8	0.1	0.08	0.02	0.19	0.015	0.06	0.01	0.01	0.01	NA
Maximum	96.73	155	1.96	5.31	0.0838	101.9	5.68	4.09	0.45	37.7	0.54	21.7	0.98	2.59	0.71	NA
Precipitation Weighted Conc. (mg/l)				4.67	0.0217	32.01	1.69	0.9	0.15	5.64	0.143	3.19	0.15	0.381	0.15	0
Total Gauge Depth (mm)		2172.8	2172.8	2172.8	2172.8	2172.8	2172.8	2172.8	2172.8	2172.8	2172.8	2172.8	2172.8	2172.8	2172.8	2172.8
Deposition (kg / Ha / Period)				0.4708		36.73	19.56	3.17	122.53	3.105	69.29	3.34	8.28	3.18	0	
Deposition (365 Day, kg / Ha / Yr)				0.4721		36.83	19.61	3.18	122.86	3.113	69.48	3.35	8.303	3.19	0	
Coll. Effic. - Period	96.3%	% VSL - Period	100.0%		% PCL - Period	100.0%		% TP - Period	87.8%		% VSMP -Period	98.0%				
Coll. Effic. - Winter	107.2%	% VSL -Qtr. 1	100.0%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	86.7%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	81.9%	% VSL -Qtr. 2	100.0%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	59.3%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	91.1%	% VSL -Qtr. 3	100.0%		% PCL - Qtr. 3	100.0%		% TP - Qtr. 3	100.0%		% VSMP -Qtr. 3	100.0%				
Coll. Effic. - Autumn	96.7%	% VSL -Qtr. 4	100.0%		% PCL - Qtr. 4	100.0%		% TP - Qtr. 4	98.0%		% VSMP -Qtr. 4	100.0%				
Coll. Effic. - Level	1	% VSL -Level	1		% PCL - Level	1		% TP - Level	3		% VSMP -Level	1				
Sea Salt Correction	46.8%															
Sea Salt Corr. - Level	2															
				Data Completeness	Level	3		Overall Data	Quality Level	3						

Newfoundland Environment Precipitation Monitoring Network(NEPMoN)
 Burgeo Acid Rain Report

Part (c): Deposition & Summary Table

Start:	5-Jan-00	Days:	167
End:	20-Jun-00	Weeks:	24

	Sample	Gauge	Ionbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
	Depth	Depth														
Total Sample Periods	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Trace Precipitation Periods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Trace Precipitation Periods	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
# of Valid Samples	25	25	20	24	24	24	24	24	24	24	20	24	24	24	24	24
% of Valid Samples	100%	100%	80%	96%	96%	96%	96%	96%	96%	96%	80%	96%	96%	96%	96%	96%
Mean	37.65	45.39	-0.58	4.59	0.0258	36.04	2	1.13	0.24	6.15	0.163	3.45	0.19	0.446	0.13	NA
Standard Deviation	22.21	25.91	2.04	0.28	0.0179	30.22	1.35	0.77	0.22	6.71	0.144	3.74	0.17	0.496	0.15	NA
Minimum	7.17	3	-3.81	4.06	0.0062	6.14	0.37	0.15	0.05	0.42	0.01	0.25	0.01	0.005	0.01	NA
Maximum	83.8	93	5.13	5.21	0.0878	136.3	5.41	2.96	1.03	29.8	0.47	16.8	0.77	2.21	0.67	NA
Precipitation Weighted Conc. (mg/l)				4.66	0.0221	30.55	1.68	0.95	0.2	5.23	0.131	2.93	0.16	0.38	0.11	0
Total Gauge Depth (mm)		1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044
Deposition (kg / Ha / Period)				0.2308		17.59	9.95	2.12	54.55	1.363	30.6	1.71	3.971	1.14	0	
Deposition (365 Day, kg / Ha / Yr)				0.5045		38.44	21.74	4.63	119.23	2.979	66.88	3.74	8.678	2.49	0	
Coll. Effic. - Period	86.2%	% VSL - Period	92.0%		% PCL - Period	100.0%		% TP - Period	91.2%		% VSMP -Period	95.7%				
Coll. Effic. - Winter	85.1%	% VSL -Qtr. 1	100.0%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	86.4%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	87.0%	% VSL -Qtr. 2	100.0%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	100.0%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	ERR	% VSL -Qtr. 3	ERR		% PCL - Qtr. 3	ERR		% TP - Qtr. 3	ERR		% VSMP -Qtr. 3	ERR				
Coll. Effic. - Autumn	ERR	% VSL -Qtr. 4	ERR		% PCL - Qtr. 4	ERR		% TP - Qtr. 4	ERR		% VSMP -Qtr. 4	ERR				
Coll. Effic. - Level	ERR	% VSL -Level	ERR		% PCL - Level	ERR		% TP - Level	ERR		% VSMP -Level	ERR				
Sea Salt Correction	43.4%															
Sea Salt Corr. - Level	2															
				Data Completeness Level		ERR		Overall Data Quality Level			ERR					

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Cormack Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
8936166	06-Jan-99	13-Jan-99	7	1891.2	29.5	62.0	47.5	SG	M
8936173	13-Jan-99	20-Jan-99	7	910.9	14.2	25.0	56.8	SG	M
8936180	20-Jan-99	27-Jan-99	7	3941.6	61.4	70.8	86.7	SG	M
8936187	27-Jan-99	03-Feb-99	7	340.0	5.3	7.6	69.7	SG	S
8936194	03-Feb-99	10-Feb-99	7	2308.3	36.0	40.2	89.4	SG	M
8936201	10-Feb-99	17-Feb-99	7	1561.5	24.3	31.2	78.0	SG	M
8936208	17-Feb-99	24-Feb-99	7	2998.0	46.7	69.4	67.3	SG	M
8936215	24-Feb-99	03-Mar-99	7	1423.9	22.2	33.4	66.4	SG	M
8936222	03-Mar-99	10-Mar-99	7	183.2	2.9	4.6	62.0	SG	M
8936229	10-Mar-99	17-Mar-99	7	543.5	8.5	26.4	32.1	SG	S
8936236	17-Mar-99	24-Mar-99	7	604.2	9.4	12.0	78.4	SG	M
8936243	24-Mar-99	31-Mar-99	7	1104.4	17.2	36.6	47.0	SG	M
8936250	31-Mar-99	07-Apr-99	7	702.3	10.9	16.6	65.9	RG	M
8936257	07-Apr-99	14-Apr-99	7	963.4	15.0	27.6	54.4	RG	M
	14-Apr-99	21-Apr-99	7	5.2	0.1	0.2	40.5	RG	R
	21-Apr-99	28-Apr-99	7			1.5		RG	S
8936278	28-Apr-99	05-May-99	7	185.2	2.9	18.4	15.7	RG	M
8936285	05-May-99	12-May-99	7	788.4	12.3	13.2	93.0	RG	M
8936292	12-May-99	19-May-99	7	661.3	10.3	11.6	88.8	RG	M
8936299	19-May-99	26-May-99	7	2651.9	41.3	42.2	97.9	RG	R
8936306	26-May-99	02-Jun-99	7	16.7	0.3	1.8	14.5	RG	R
8936313	02-Jun-99	09-Jun-99	7	1122.5	17.5	20.2	86.6	RG	R
8936320	09-Jun-99	16-Jun-99	7	403.2	6.3	7.4	84.9	RG	R
8936327	16-Jun-99	23-Jun-99	7	10.5	0.2	0.6	27.3	RG	R
8936334	23-Jun-99	30-Jun-99	7	254.2	4.0	4.2	94.3	RG	R
8936341	30-Jun-99	07-Jul-99	7	500.2	7.8	10.4	74.9	RG	R
8936348	07-Jul-99	14-Jul-99	7	1890.8	29.5	33.4	88.2	RG	R
8936355	14-Jul-99	21-Jul-99	7	222.7	3.5	4.4	78.8	RG	R
8936362	21-Jul-99	28-Jul-99	7	1082.9	16.9	18.4	91.7	RG	M
8936369	28-Jul-99	04-Aug-99	7	409.0	6.4	7.6	83.8	RG	M
8936376	04-Aug-99	11-Aug-99	7	4009.9	62.5	62.6	99.8	RG	M
8936383	11-Aug-99	18-Aug-99	7	5157.5	80.3	80.2	100.2	RG	R
8936390	18-Aug-99	25-Aug-99	7	1351.6	21.1	22.4	94.0	RG	M
8936397	25-Aug-99	01-Sep-99	7	1160.1	18.1	20.6	87.7	RG	M
8936404	01-Sep-99	08-Sep-99	7	579.9	9.0	10.2	88.6	RG	M
8936411	08-Sep-99	15-Sep-99	7	3461.5	53.9	55.6	97.0	RG	M
8936418	15-Sep-99	22-Sep-99	7	3125.1	48.7	52.8	92.2	RG	M
8936425	22-Sep-99	29-Sep-99	7	2308.9	36.0	40.2	89.5	RG	M
8936432	29-Sep-99	06-Oct-99	7	1563.6	24.4	26.6	91.6	RG	M
8936439	06-Oct-99	13-Oct-99	7	2958.0	46.1	50.6	91.1	RG	M
8936446	13-Oct-99	20-Oct-99	7	3460.8	53.9	72.8	74.0	RG	M
8936453	20-Oct-99	27-Oct-99	7	1252.7	19.5	21.8	89.5	RG	M
8936460	27-Oct-99	03-Nov-99	7	855.4	13.3	9.8	136.0	RG	M
8936467	03-Nov-99	10-Nov-99	7	2218.2	34.6	36.2	95.4	RG	M
8936474	10-Nov-99	17-Nov-99	7	1996.1	31.1	34.2	90.9	RG	M
8936481	17-Nov-99	24-Nov-99	7	1013.6	15.8	16.6	95.1	RG	M
8936488	24-Nov-99	01-Dec-99	7	2996.4	46.7	45.8	101.9	RG	M
8936495	01-Dec-99	08-Dec-99	7	2126.8	33.1	38.4	86.3	SG	M
8936502	08-Dec-99	15-Dec-99	7	218.2	3.4	4.2	80.9	SG	M
8936509	15-Dec-99	22-Dec-99	7	1710.9	26.6	39.4	67.6	SG	M
8936516	22-Dec-99	29-Dec-99	7	928.4	14.5	21.8	66.3	SG	M
8936523	29-Dec-99	05-Jan-2000	7	3555.3	55.4	42.9	129.1	SG	M

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Cormack Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mg/l) flg	Cond. umhos flg	SO4 (mg/l) flg	XSO4 (mg/l) flg	NNO3 (mg/l) flg	Cl (mg/l) flg	NNH4 (mg/l) flg	Na (mg/l) flg	Ca (mg/l) flg	Mg (mg/l) flg	K (mg/l) flg	Alk CaCO3 (mg/l) flg
06-Jan-99	-23.76	5.06	.0088	I1	0.17	.132	0.046	0.29	<0.03	0.15	0.08	0.04	0.03	-0.45
13-Jan-99	-5.22	4.62	.0242	I1	0.73	.370	0.216	2.61	0.06	1.44	0.12	0.21	0.06	-1.37
20-Jan-99	-25.18	5.11	.0078	I1	0.21	.180	0.029	0.24	<0.03	0.12	0.08	0.04	0.03	-0.38
27-Jan-99	-5.66	5.00	.0101	I1	0.73	.138	0.056	4.27	0.06	2.37	0.17	0.34	0.10	-0.64
03-Feb-99	-29.07	5.20	.0064	I1	0.12	.080	0.029	0.30	<0.03	0.16	0.09	0.05	0.03	-0.41
10-Feb-99	-3.76	4.54	.0291	I1	0.95	.882	0.173	0.52	0.08	0.27	<0.07	<0.04	0.03	-1.66
17-Feb-99	4.19	5.21	.0062	3.2	0.18	.169 V3	0.030	0.13	<0.02	0.02	<0.02	<0.01	<0.01	-1.10
24-Feb-99	-10.59	4.92	.0121	I1	0.45	.360	0.066	0.60	0.04	0.36	0.07	0.04	0.04	-0.76
03-Mar-99	-4.42	4.22	.0607	I1	3.22	2.211	0.295	6.80	0.18	4.04	0.19	0.53	0.15	-3.08
10-Mar-99	-15.27	5.17	.0068	I1	0.25	.195	0.024	0.39	0.03	0.22	0.07	<0.04	0.03	-0.42
17-Mar-99	-15.96	4.73	.0188	I1	0.41	.365	0.169	0.27	0.05	0.18	0.12	<0.04	0.05	-0.99
24-Mar-99	-6.54	4.52	.0304	I1	1.31	1.265	0.149	0.29	0.11	0.18	0.08	<0.04	0.04	-1.68
31-Mar-99	-17.47	5.28	.0053	I1	0.22	.157	0.028	0.44	0.04	0.25	0.08	0.04	0.03	-0.50
07-Apr-99	-9.42	4.92	.0121	I1	0.50	.457	0.070	0.31	0.04	0.17	0.09	<0.04	0.03	-1.06
14-Apr-99		I2	I2	I2	I2	.I2	I2	I2	I2	I2	I2	I2	I2	I2
21-Apr-99		I2	I2	I2	I2	.I2	I2	I2	I2	I2	I2	I2	I2	I2
28-Apr-99		I7	I7	I7	I7	.I7	I7	I7	I7	I7	I7	I7	I7	I7
05-May-99		I6	I6	I6	I6	.I6	I6	I6	I6	I6	I6	I6	I6	I6
12-May-99	-8.99	5.68	.0021	I1	1.01	.935	0.101	0.52	0.33	0.30	0.19	0.05	0.03	0.14
19-May-99	-21.39	5.50	.0032	I1	0.26	.235	0.029	0.22	0.08	0.10	0.10	<0.04	0.05	-0.09
26-May-99		I1	I1	I1	I1	13.05	12.74	2.080	2.42	3.03	1.23	5.90 G3	0.39	1.74
02-Jun-99	0.44	4.11	.0782	I1	3.39	3.348 V3	0.540	0.26	0.37	0.08	0.10	<0.04	0.05	-4.33
09-Jun-99	-0.04	4.30	.0505	I1	2.76	2.717	0.315	0.35	0.29	0.17	0.16	<0.04	0.08	-2.91
16-Jun-99		I1	I1	I1	I1	.110 V2	0.022	0.19	0.14	0.40	1.50	0.16	0.38	
23-Jun-99	2.54	4.16	.0697	I1	3.32	3.312 V2	0.500	0.13	0.36	0.03	0.08	<0.04	0.05	-3.85
30-Jun-99	2.62	4.30	.0505	I1	2.46	2.335	0.340	0.90	0.23	0.50	0.08	<0.04	0.07	-2.89
07-Jul-99	-5.01	4.68	.0211	I1	0.94	.920	0.136	0.16	0.12	0.08	<0.07	<0.04	0.04	-1.23
14-Jul-99	-11.18	5.30	.0051	I1	0.35	.190	0.028	1.10	0.07	0.64	0.09	0.08	0.06	-0.23
21-Jul-99	-5.23	4.66	.0221	I1	0.74	.727	0.165	0.09	0.06	0.05	<0.07	<0.04	0.05	-1.31
28-Jul-99	-6.12	4.60	.0253	I1	0.98	.965	0.176	0.10	0.12	0.06	<0.07	<0.04	0.03	-1.40
04-Aug-99	-3.19	5.10	.0080	I1	0.55	.372	0.054	1.27	0.07	0.71	0.07	0.05	0.12 G3	-0.53
11-Aug-99	0.03	4.82	.0153	6.8	0.56	.549 V3	0.080	0.10	0.05	<0.02	<0.02	<0.01	<0.01	-1.55
18-Aug-99	-0.25	4.47	.0342	15.1	1.21	1.199 V3	0.190	0.10	0.09	<0.02	<0.02	<0.01	<0.01	-2.41
25-Aug-99	0.33	4.91	.0124	5.6	0.67	.659 V3	0.060	0.10	0.10	<0.02	<0.02	<0.01	<0.01	-1.40
01-Sep-99	1.70	4.79	.0163	9.6	0.88	.859 V3	0.150	0.34	0.21	0.05	0.06	0.01	<0.01	-1.59
08-Sep-99	-8.04	5.16	.0070	3.1	0.26	.249 V3	0.030	<0.10	0.03	<0.02	<0.02	<0.01	<0.01	-1.13
15-Sep-99		I7	I7	I7	I7	.I7	I7	I7	I7	I7	I7	I7	I7	I7
22-Sep-99	5.02	4.61	.0247	12.8	1.36	1.339 V3	0.160	0.21	0.18	0.03	0.02	0.01	0.03	-1.87
29-Sep-99	9.09	5.18	.0067	3.5	0.29	.279 V3	0.040	0.15	0.04	<0.02	<0.02	<0.01	<0.01	-1.05
06-Oct-99	-0.64	5.04	.0092	6.8	0.46	.370	0.040	0.71	0.04	0.36	0.02	0.05	<0.01	-1.23
13-Oct-99		I1	I6	I6	I6	.I6	I6	I6	I1	I6	I6	I6	I6	I6
20-Oct-99	4.69	5.32	.0048	3.3	0.10	.082 V2	0.020	0.36	0.05	0.07	<0.02	<0.01	<0.01	-10.50
27-Oct-99	-0.09	4.11	.0782	69.3	4.45	3.254	0.790	8.24	0.39	4.79	0.36	0.55	0.20	-4.13
03-Nov-99	-0.55	4.80	.0160	19.0	0.91	.485	0.130	3.04	0.06	1.70	0.08	0.19	0.06	-1.65
10-Nov-99	4.08	5.16	.0070	5.3	0.26	.182	0.040	0.67	<0.02	0.31	<0.02	0.04	<0.01	-1.24
17-Nov-99	-1.84	4.30	.0505	32.4	2.07	1.640	0.390	3.07	0.18	1.72	0.10	0.22	0.10	-2.99
24-Nov-99	-4.75	4.93	.0118	8.3	0.45	.345	0.070	0.77	0.03	0.42	0.02	0.07	0.03	-1.38
01-Dec-99	-0.85	4.52	.0304	14.9	0.91	.842	0.230	0.54	0.06	0.27	0.02	0.05	<0.01	-2.23
08-Dec-99	-5.91	4.99	.0103	8.5	0.29	.127	0.070	1.17	<0.02	0.65	0.04	0.10	<0.01	-1.24
15-Dec-99	-2.67	4.83	.0149	19.6	0.87	.343	0.120	3.65	0.02	2.11	0.09	0.27	0.08	-1.60
22-Dec-99	-1.51	4.87	.0136	30.5	1.36	.423	0.070	6.65	0.03	3.75	0.15	0.46	0.14	-1.59
29-Dec-99	-2.97	4.92	.0121	6.9	0.43	.357	0.060	0.56	0.02	0.29	<0.02	0.05	<0.01	-1.47

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Cormack Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
8936530	05-Jan-2000	12-Jan-2000	7	1445.1	22.5	32.6	69.0	SG	M
8936537	12-Jan-2000	19-Jan-2000	7	585.4	9.1	13.6	67.0	SG	M
8936544	19-Jan-2000	26-Jan-2000	7	2025.5	31.5	60.6	52.1	SG	M
8936551	26-Jan-2000	02-Feb-2000	7	1414.7	22.0	26.6	82.8	SG	M
8936558	02-Feb-2000	09-Feb-2000	7	593.0	9.2	15.4	60.0	SG	S
8936565	09-Feb-2000	16-Feb-2000	7	2047.5	31.9	86.8	36.7	SG	M
8936572	16-Feb-2000	23-Feb-2000	7	947.8	14.8	19.2	76.9	SG	S
8936579	23-Feb-2000	01-Mar-2000	7	967.9	15.1	27.0	55.8	SG	M
8936586	01-Mar-2000	08-Mar-2000	7	607.7	9.5	21.4	44.2	SG	M
8936593	08-Mar-2000	15-Mar-2000	7	1889.1	29.4	29.8	98.7	SG	M
8936600	15-Mar-2000	22-Mar-2000	7	1616.3	25.2	57.4	43.9	SG	M
8936607	22-Mar-2000	29-Mar-2000	7	594.3	9.3	9.2	100.6	SG	M
8936614	29-Mar-2000	05-Apr-2000	7	3169.8	49.4	48.4	102.0	SG	M
8936621	05-Apr-2000	12-Apr-2000	7	756.9	11.8	12.2	96.6	RG	M
8936628	12-Apr-2000	19-Apr-2000	7	1332.7	20.8	20.4	101.8	RG	M
8936635	19-Apr-2000	26-Apr-2000	7	1943.7	30.3	26.8	113.0	RG	M
8936642	26-Apr-2000	03-May-2000	7	1819.9	28.3	43.2	65.6	RG	M
8936649	03-May-2000	10-May-2000	7	2067.4	32.2	36.6	88.0	RG	M
8936656	10-May-2000	17-May-2000	7	3490.0	54.4	51.8	104.9	RG	M
8936663	17-May-2000	24-May-2000	7	1851.4	28.8	28.2	102.3	RG	R
8936670	24-May-2000	31-May-2000	7	1508.8	23.5	26.6	88.4	RG	M
8936677	31-May-2000	07-Jun-2000	7	1371.3	21.4	23.2	92.1	RG	R
8936684	07-Jun-2000	14-Jun-2000	7	1480.5	23.1	27.0	85.4	RG	M
8936691	14-Jun-2000	21-Jun-2000	7	135.2	2.1	2.6	81.0	RG	R
8936698	21-Jun-2000	28-Jun-2000	7	976.6	15.2	15.6	97.5	RG	R
8936705	28-Jun-2000	05-Jul-2000	7	2258.7	35.2	37.4	94.1	RG	R
8936712	05-Jul-2000	12-Jul-2000	7	2713.6	42.3	45.6	92.7	RG	R
8936719	12-Jul-2000	19-Jul-2000	7	2879.3	44.8	45.0	99.7	RG	R
8936726	19-Jul-2000	26-Jul-2000	7	1034.8	16.1	17.6	91.6	RG	M
	26-Jul-2000	02-Aug-2000	7			1.4		RG	D
8936740	02-Aug-2000	09-Aug-2000	7	628.2	9.8	11.6	84.4	RG	R
8936747	09-Aug-2000	16-Aug-2000	7	2574.6	40.1	43.6	92.0	RG	M
8936754	16-Aug-2000	23-Aug-2000	7	3218.8	50.1	52.0	96.4	RG	M
8936761	23-Aug-2000	30-Aug-2000	7	277.8	4.3	6.6	65.6	RG	M
8936768	30-Aug-2000	06-Sep-2000	7	2269.6	35.4	36.4	97.1	RG	M
8936775	06-Sep-2000	13-Sep-2000	7	109.3	1.7	3.4	50.1	RG	M
8936782	13-Sep-2000	20-Sep-2000	7	1924.1	30.0	29.3	102.3	RG	M
8936789	20-Sep-2000	27-Sep-2000	7	1599.4	24.9	27.0	92.3	RG	M
8936796	27-Sep-2000	04-Oct-2000	7	282.9	4.4	6.8	64.8	RG	M
8936803	04-Oct-2000	11-Oct-2000	7	4226.6	65.8	71.4	92.2	RG	M
8936810	11-Oct-2000	18-Oct-2000	7	1586.1	24.7	25.4	97.3	RG	M
8936817	18-Oct-2000	25-Oct-2000	7	4033.0	62.8	71.2	88.2	RG	M
8936824	25-Oct-2000	01-Nov-2000	7	754.6	11.8	42.2	27.9	RG	M
8936831	01-Nov-2000	08-Nov-2000	7	1027.1	16.0	17.6	90.9	RG	R
8936838	08-Nov-2000	15-Nov-2000	7	390.4	6.1	6.4	95.0	RG	M
8936845	15-Nov-2000	22-Nov-2000	7	1557.6	24.3	28.0	86.6	RG	M
8936852	22-Nov-2000	29-Nov-2000	7	458.3	7.1	10.0	71.4	RG	M
8936859	29-Nov-2000	06-Dec-2000	7	100.9	1.6	3.6	43.7	RG	M
8936866	06-Dec-2000	13-Dec-2000	7	1375.5	21.4	31.0	69.1	SG	M
8936873	13-Dec-2000	20-Dec-2000	7	1789.7	27.9	37.4	74.5	SG	M
8936880	20-Dec-2000	27-Dec-2000	7	1702.4	26.5	54.2	48.9	SG	M
8936887	27-Dec-2000	03-Jan-2001	7	369.1	5.7	19.6	29.3	SG	S

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Cormack Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mg/l) flg	Cond. umhos flg	SO4 (mg/l) flg	XSO4 (mg/l) flg	NNO3 (mg/l) flg	Cl (mg/l) flg	NNH4 (mg/l) flg	Na (mg/l) flg	Ca (mg/l) flg	Mg (mg/l) flg	K (mg/l) flg	Alk CaCO3 (mg/l) flg
05-Jan-2000	-0.06	4.65	.0226	18.80	0.89	.555	0.227	2.42	0.07	1.34	0.06	0.16	0.05	-1.38
12-Jan-2000	0.72	4.70	.0201	10.60	0.33	.257	0.212	0.55	0.03	0.29	<0.02	0.02	<0.01	-1.33
19-Jan-2000	-10.56	5.41	.0039	4.60	0.18	.072	<0.02	0.76	<0.02	0.43	0.04	0.08	<0.01	-0.54
26-Jan-2000	-2.63	4.94	.0116	6.90	0.38	.307	0.068	0.51	0.02	0.29	<0.02	0.03	<0.01	-0.94
02-Feb-2000	-2.22	4.88	.0133	13.80	0.56	.237	0.072	2.37	<0.02	1.29	0.06	0.16	0.05	-0.99
09-Feb-2000	0.16	4.87	.0136	10.00	0.50	.357	0.119	1.04	0.04	0.57	0.03	0.06	0.02	-1.10
16-Feb-2000	-2.22	5.00	.0101	11.40	0.52	.262	0.058	1.86	<0.02	1.03	0.06	0.13	0.05	-0.92
23-Feb-2000	0.89	4.38	.0420	23.50	1.85	1.810	0.380	0.33	0.25	0.16	0.07	0.01	0.11	-2.47
01-Mar-2000	-11.12	5.12	.0076	4.00	0.22	.192	0.035	0.19	0.03	0.11	<0.02	<0.01	<0.01	-0.83
08-Mar-2000	0.36	4.90	.0127	7.00	0.69	.665	0.080	0.18	0.07	0.10	0.05	<0.01	<0.01	-1.00
15-Mar-2000	I1	4.41	.0392	19.70	1.50	1.489 Q3	0.290 Q3	0.12	0.17	I1	<0.02	<0.01	<0.01	-2.03
22-Mar-2000	-2.03	4.68	.0211	12.00	1.00	.947	0.130	0.37	0.09	0.21	0.08	0.02	<0.01	-1.22
29-Mar-2000	3.32	4.62	.0242	13.20	1.09	1.042	0.190	0.35	0.10	0.19	0.04	0.02	<0.01	-1.43
05-Apr-2000	1.32	4.60	.0253	15.90	1.48	1.362	0.160	0.87	0.13	0.47	0.09	0.06	0.03	-1.47
12-Apr-2000	2.26	4.62	.0242	14.50	1.09	.972	0.170	0.92	0.08	0.47	0.05	0.06	0.02	-1.32
19-Apr-2000	-3.54	4.83	.0118	6.46	0.38	.365 V2	0.110	0.15	0.05	0.06	0.06	<0.01	<0.01	-0.85
26-Apr-2000	-2.28	5.05	.0090	5.00	0.41	.392	0.060	0.15	0.04	0.07	0.05	<0.01	<0.01	-0.74
03-May-2000	-1.15	4.91	.0124	7.50	0.76	.712	0.070	0.33	0.07	0.19	0.07	0.02	<0.01	-0.92
10-May-2000	-4.54	5.03	.0094	5.00	0.33	.320	0.080	0.11	0.05	0.04	0.04	<0.01	<0.01	-0.79
17-May-2000	-18.40	4.75	.0179	8.80	0.48	.457	0.070	0.16	0.05	0.09	0.05	<0.01	<0.01	-1.03
24-May-2000	-1.48	4.82	.0153	8.20	0.64	.627	0.130	0.12	0.09	0.05	0.05	<0.01	<0.01	-1.18
31-May-2000	-16.45	5.27	.0054	4.00	0.44	.430	0.050	<0.10	0.12	0.04	0.07	<0.01	<0.01	-0.59
07-Jun-2000	-8.33	5.04	.0092	5.40	0.42	.385	0.050	0.24	0.05	0.14	0.04	0.02	<0.01	-0.72
14-Jun-2000	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7
21-Jun-2000	0.01	4.40	.0401	19.50	1.69	1.682	0.270	<0.10	0.15	0.03	0.07	<0.01	<0.01	-2.11
28-Jun-2000	-0.20	4.34	.0461	22.20	2.06	2.055 V2	0.230	<0.10	0.18	0.02	0.02	<0.01	<0.01	-2.42
05-Jul-2000	-8.22	5.08	.0084	4.20	0.25	.237	0.050	0.10	0.03	0.05	<0.02	<0.01	<0.01	-2.42
12-Jul-2000	-10.88	5.04	.0092	4.40	0.20	.190	0.080	<0.10	0.03	0.04	<0.02	<0.01	<0.01	-0.70
19-Jul-2000	-2.43	4.46	.0350	17.00	1.07	1.027	0.240	0.34	0.09	0.17	0.04	0.01	<0.01	-1.85
26-Jul-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
02-Aug-2000	-1.62	4.64	.0231	12.80	1.46	1.442	0.180	0.13	0.23	0.07	0.09	0.01	0.03	-1.30
09-Aug-2000	-3.81	4.72	.0192	9.70	0.73	.722	0.160	<0.10	0.11	0.03	0.03	<0.01	<0.01	-1.17
16-Aug-2000	-13.45	4.99	.0103	5.04	0.40	.390 V2	0.050	0.15	0.04	0.04	0.04	0.04	0.04	-1.28
23-Aug-2000	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7
30-Aug-2000	-22.78	4.80	.0160	7.20	0.69	.657	0.060	0.22	0.05	0.13	0.10	0.09	0.08	-1.53
06-Sep-2000	11.37	4.70	.0201	10.60	3.57	3.322	0.360	1.71	0.41	0.99	0.20	0.16	0.10	-1.47
13-Sep-2000	-11.52	4.90	.0127	7.60	0.58	.507	0.070	0.53	0.02	0.29	0.10	0.10	<0.04	-1.38
20-Sep-2000	-16.14	5.00	.0101	6.90	0.44	.332	0.040	0.76	<0.02	0.43	0.10	0.12	0.08	-1.15
27-Sep-2000	-5.58	4.70	.0201	23.60	1.89	1.540	0.370	2.46	0.53	1.40	0.20	0.22	0.17	-1.62
04-Oct-2000	-26.42	5.10	.0080	4.00	0.27	.227	0.040	0.28	<0.02	0.17	0.10	0.08	<0.04	-1.09
11-Oct-2000	-5.40	4.90	.0127	13.60	0.79	.477	0.070	2.15	0.03	1.25	0.10	0.18	0.10	-1.30
18-Oct-2000	-22.79	5.60	.0025	4.30	0.35	.290	0.060	0.42	0.13	0.24	0.10	0.10	0.07	-0.71
25-Oct-2000	-10.03	4.80	.0160	10.80	0.98	.897	0.130	0.60	0.15	0.33	0.10	0.11	0.08	-1.38
01-Nov-2000	-24.96	5.20	.0064	4.10	0.18	.120	0.040	0.43	<0.02	0.24	0.10	0.10	<0.04	-1.03
08-Nov-2000	-35.83	5.30	.0051	2.10	<0.10	.046 V2	0.030	<0.10	<0.01	<0.03	<0.10	<0.02	<0.03	-0.85
15-Nov-2000	-10.38	4.60	.0253	12.50	0.84	.717	0.140	0.90	0.04	0.49	0.10	0.11	0.07	-1.88
22-Nov-2000	-5.65	4.40	.0401	19.50	1.57	1.440	0.170	1.01	0.05	0.52	0.10	0.11	0.08	-2.25
29-Nov-2000	-3.64	4.90	.0127	10.80	0.95	.465	0.150	3.36	0.05	1.94	0.20	0.26	0.11	-1.33
06-Dec-2000	-1.63	4.80	.0160	27.60	1.32	.553	0.110	5.45	0.02	3.07	0.20	0.37	0.16	-1.53
13-Dec-2000	-3.26	4.90	.0127	17.50	0.84	.385	0.080	3.20	<0.02	1.82	0.10	0.25	0.12	-1.31
20-Dec-2000	-11.40	5.10	.0080	7.90	0.42	.245	0.030	1.24	<0.02	0.70	0.10	0.14	0.08	-0.96
27-Dec-2000	-6.03	4.50	.0319	15.20	0.58	.442	0.190	1.16	<0.02	0.55	<0.10	0.08	0.02	-2.26

Newfoundland Environment Precipitation Monitoring Network(NEPMoN)
Cormack Acid Rain Report

Part (c): Deposition & Summary Table

Start: 6-Jan-99 Days: 364
End: 5-Jan-00 Weeks: 52

	Sample	Gauge	Ionbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
Total Sample Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Trace Precipitation Periods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Trace Precipitation Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
# of Valid Samples	52	52	44	44	44	20	46	46	46	46	46	46	46	46	46	46
% of Valid Samples	100%	100%	85%	85%	85%	38%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
Mean	23.73	28.17	-5.2	4.67	0.0216	14.22	1.24	1.08	0.19	1.21	0.166	0.67	0.23	0.095	0.09	0.14
Standard Deviation	19.18	20.95	8.36	0.38	0.02	15.12	2.02	1.95	0.32	1.89	0.439	1.09	0.87	0.142	0.25	0
Minimum	0.08	0.2	-29.07	4.11	0.0021	3.1	0.1	0.08	0.02	0.05	0.01	0.01	0.01	0.005	0.01	0.14
Maximum	80.33	80.2	9.09	5.68	0.0782	69.3	13.05	12.74	2.08	8.24	3.03	4.79	5.9	0.55	1.74	0.14
Precipitation Weighted Conc. (mg/l)				4.8	0.016	10.66	0.71	0.59	0.11	0.85	0.071	0.45	0.07	0.061	0.04	0
Total Gauge Depth (mm)		1464.6	1464.6	1464.6	1464.6	1464.6	1464.6	1464.6	1464.6	1464.6	1464.6	1464.6	1464.6	1464.6	1464.6	1464.6
Deposition (kg / Ha / Period)					0.2346		10.34	8.65	1.54	12.38	1.04	6.65	0.95	0.899	0.56	0.02
Deposition (365 Day, kg / Ha / Yr)					0.2352		10.37	8.67	1.55	12.42	1.043	6.66	0.96	0.902	0.56	0.02
Coll. Effic. - Period	83.1%	% VSL - Period	100.0%		% PCL - Period	100.0%		% TP - Period	94.1%		% VSMP -Period	97.9%				
Coll. Effic. - Winter	76.6%	% VSL -Qtr. 1	100.0%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	100.0%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	64.5%	% VSL -Qtr. 2	100.0%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	79.1%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	93.6%	% VSL -Qtr. 3	100.0%		% PCL - Qtr. 3	100.0%		% TP - Qtr. 3	87.9%		% VSMP -Qtr. 3	100.0%				
Coll. Effic. - Autumn	91.4%	% VSL -Qtr. 4	100.0%		% PCL - Qtr. 4	100.0%		% TP - Qtr. 4	100.0%		% VSMP -Qtr. 4	100.0%				
Coll. Effic. - Level	1	% VSL -Level	1		% PCL - Level	1		% TP - Level	1		% VSMP -Level	1				
Sea Salt Correction	16.4%															
Sea Salt Corr. - Level	1															
					Data Completeness Level	1		Overall Data Quality Level	1							

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Cormack Acid Rain Report

Part (c): Deposition & Summary Table

Start: 5-Jan-00 Days: 364
End: 3-Jan-01 Weeks: 52

	Sample	Gauge	Ionbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
	Depth	Depth														
Total Sample Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Trace Precipitation Periods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Trace Precipitation Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
# of Valid Samples	52	52	48	49	49	49	49	49	49	49	49	48	49	49	49	49
% of Valid Samples	100%	100%	92%	94%	94%	94%	94%	94%	94%	94%	94%	92%	94%	94%	94%	94%
Mean	23.76	29.69	-6.89	4.76	0.0173	10.96	0.82	0.71	0.13	0.84	0.082	0.47	0.07	0.073	0.04	NA
Standard Deviation	15.4	19.12	8.86	0.27	0.0107	6.19	0.64	0.62	0.09	1.07	0.099	0.61	0.05	0.081	0.04	NA
Minimum	1.57	1.4	-35.83	4.34	0.0025	2.1	0.05	0.05	0.01	0.05	0.005	0.01	0.01	0.005	0.01	NA
Maximum	65.83	86.8	11.37	5.6	0.0461	27.6	3.57	3.32	0.38	5.45	0.53	3.07	0.2	0.37	0.17	NA
Precipitation Weighted Conc. (mg/l)				4.81	0.0157	9.96	0.69	0.59	0.11	0.71	0.067	0.4	0.06	0.066	0.03	0
Total Gauge Depth (mm)		1543.9	1543.9	1543.9	1543.9	1543.9	1543.9	1543.9	1543.9	1543.9	1543.9	1543.9	1543.9	1543.9	1543.9	1543.9
Deposition (kg / Ha / Period)					0.2423		10.62	9.11	1.69	10.92	1.04	6.24	0.96	1.019	0.53	0
Deposition (365 Day, kg / Ha / Yr)					0.243		10.65	9.14	1.7	10.95	1.043	6.25	0.96	1.022	0.53	0
Coll. Effic. - Period	78.6%	% VSL - Period	100.0%		% PCL - Period	100.0%		% TP - Period	99.3%		% VSMP -Period	98.0%				
Coll. Effic. - Winter	56.1%	% VSL -Qtr. 1	100.0%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	100.0%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	86.0%	% VSL -Qtr. 2	100.0%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	99.3%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	94.1%	% VSL -Qtr. 3	100.0%		% PCL - Qtr. 3	100.0%		% TP - Qtr. 3	97.5%		% VSMP -Qtr. 3	100.0%				
Coll. Effic. - Autumn	82.1%	% VSL -Qtr. 4	100.0%		% PCL - Qtr. 4	100.0%		% TP - Qtr. 4	100.0%		% VSMP -Qtr. 4	100.0%				
Coll. Effic. - Level	1	% VSL -Level	1		% PCL - Level	1		% TP - Level	1		% VSMP -Level	1				
Sea Salt Correction	14.2%															
Sea Salt Corr. - Level	1															
					Data Completeness Level	1		Overall Data Quality Level	1							

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Loch Leven Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
9436166	06-Jan-99	13-Jan-99	7	3095.0	48.2	56.0	86.1		M
9436173	13-Jan-99	20-Jan-99	7	2925.0	45.6	52.6	86.6		M
9436180	20-Jan-99	27-Jan-99	7	1560.0	24.3	36.0	67.5		M
9436187	27-Jan-99	03-Feb-99	7	65.0	1.0	32.0	3.2		M
9436194	03-Feb-99	10-Feb-99	7	360.0	5.6	13.0	43.1		M
9436201	10-Feb-99	17-Feb-99	7			7.0			M
9436208	17-Feb-99	24-Feb-99	7	2600.0	40.5	27.0	150.0		M
9436215	24-Feb-99	03-Mar-99	7	2100.0	32.7	10.4	314.5		M
9436222	03-Mar-99	10-Mar-99	7	1120.0	17.4	57.2	30.5		M
9436229	10-Mar-99	17-Mar-99	7	1190.0	18.5	28.8	64.4		M
	17-Mar-99	24-Mar-99	7			9.0			M
9436243	24-Mar-99	31-Mar-99	7	1810.0	28.2			V1	M
9436250	31-Mar-99	07-Apr-99	7	520.0	8.1			V1	M
9436257	07-Apr-99	14-Apr-99	7	800.0	12.5	9.0	138.5		M
9436264	14-Apr-99	21-Apr-99	7	1000.0	15.6	5.0	311.5		M
9436271	21-Apr-99	28-Apr-99	7	200.0	3.1	13.6	22.9		M
9436278	28-Apr-99	05-May-99	7	65.0	1.0			V1	M
9436285	05-May-99	12-May-99	7	1175.0	18.3	18.4	99.5		M
9436292	12-May-99	19-May-99	7	360.0	5.6	3.2	175.2		M
9436299	19-May-99	26-May-99	7	3165.0	49.3	83.3	59.2		M
9436306	26-May-99	02-Jun-99	7	40.0	0.6	1.0	62.3		M
9436313	02-Jun-99	09-Jun-99	7	590.0	9.2	34.2	26.9		M
9436320	09-Jun-99	16-Jun-99	7	245.0	3.8	2.6	146.8		R
9436327	16-Jun-99	23-Jun-99	7	260.0	4.0	3.4	119.1		R
9436334	23-Jun-99	30-Jun-99	7	860.0	13.4	7.6	176.3		M
9436341	30-Jun-99	07-Jul-99	7	555.0	8.6	15.0	57.6		R
9436348	07-Jul-99	14-Jul-99	7	1560.0	24.3	41.6	58.4		R
	14-Jul-99	21-Jul-99	7			1.0			N
9436362	21-Jul-99	28-Jul-99	7	2585.0	40.3	50.0	80.5		M
9436369	28-Jul-99	04-Aug-99	7	305.0	4.8	10.0	47.5		M
9436376	04-Aug-99	11-Aug-99	7	2880.0	44.9	39.2	114.4		M
9436383	11-Aug-99	18-Aug-99	7	4705.0	73.3	74.4	98.5		R
9436390	18-Aug-99	25-Aug-99	7	1090.0	17.0	15.2	111.7		M
9436397	25-Aug-99	01-Sep-99	7	1045.0	16.3	36.4	44.7		M
9436404	01-Sep-99	08-Sep-99	7	445.0	6.9	17.8	38.9		M
9436411	08-Sep-99	15-Sep-99	7	1580.0	24.6	24.0	102.5		M
9436418	15-Sep-99	22-Sep-99	7	1650.0	25.7	24.8	103.6		M
9436425	22-Sep-99	29-Sep-99	7	4085.0	63.6	48.2	132.0		M
9436432	29-Sep-99	06-Oct-99	7	1590.0	24.8	33.4	74.2		M
9436439	06-Oct-99	13-Oct-99	7	4075.0	63.5	63.4	100.1		R
9436446	13-Oct-99	20-Oct-99	7	3895.0	60.7	82.0	74.0		R
9436453	20-Oct-99	27-Oct-99	7	529.0	8.2	10.0	82.4		M
9436460	27-Oct-99	03-Nov-99	7	3190.0	49.7	36.4	136.5		M
9436467	03-Nov-99	10-Nov-99	7	860.0	13.4	10.8	124.0		M
9436474	10-Nov-99	17-Nov-99	7	660.0	10.3	19.8	51.9		M
9436481	17-Nov-99	24-Nov-99	7	855.0	13.3	26.4	50.4		M
9436488	24-Nov-99	01-Dec-99	7	745.0	11.6	32.0	36.3		M
9436495	01-Dec-99	08-Dec-99	7	965.0	15.0	45.0	33.4		M
9436502	08-Dec-99	15-Dec-99	7	555.0	8.6	5.8	149.0		M
9436509	15-Dec-99	22-Dec-99	7	3315.0	51.6	32.0	161.4		M
9436516	22-Dec-99	29-Dec-99	7	1400.0	21.8	40.8	53.4		M
9436523	29-Dec-99	05-Jan-2000	7	1810.0	28.2	57.8	48.8		S

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Loch Leven Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mol/l) flg	Cond. umhos flg	SO4 (mol/l) flg	XSO4 (mol/l) flg	NNO3 (mol/l) flg	Cl (mol/l) flg	NNH4 (mol/l) flg	Na (mol/l) flg	Ca (mol/l) flg	Mg (mol/l) flg	K (mol/l) flg	Alk CaCO3 (mol/l) flg	
06-Jan-99	-3.46	4.38	.0420	I1	1.85	1.265	0.380 CB	4.00	0.160	2.34	0.15	0.320	0.10	-2.56	
13-Jan-99	-3.72	4.52	.0304	I1	1.33	.828	0.300 CB	3.52	0.150	2.01	0.13	0.270	0.11	-1.74	
20-Jan-99	-6.65	4.78	.0167	I1	1.70	.601	0.098	7.30	0.150	4.40	0.22	0.600	0.18	-1.18	
27-Jan-99	-4.50	4.61	.0247	I1	4.56 CB	.865	0.137	24.70 CB	0.140	14.80 CB	0.80	1.760	0.54	-1.50	
03-Feb-99	-4.09	4.78	.0167	I1	1.52	.908	0.190	4.26	0.110	2.45	0.29	0.360	0.17	-1.17	
10-Feb-99	-2.41	4.12	.0765	I1	3.55	3.018	0.380	3.77	0.200	2.13	0.17	0.280	0.13	-4.45	
17-Feb-99	-3.92	4.78	.0167	I1	1.97	.986	0.106	6.50	<0.03	3.94	0.25	0.550	0.16	-1.16	
24-Feb-99	-8.94	5.44	.0037	I1	0.31	.112	<0.008	1.34	<0.03	0.79	0.08	0.090	0.11	-0.38	
03-Mar-99	-5.20	4.90	.0127	I1	0.97	.435	0.092	3.80	0.090	2.14	0.17	0.310	0.10	-0.92	
10-Mar-99				I1	1.16	.788	0.237	2.62	0.180	1.49	0.23	0.170	0.17		
17-Mar-99	I1	I1	I1	I1											
24-Mar-99	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	
31-Mar-99	I1	I1	I1	I1	2.57	1.121	0.068	8.50	<0.03	5.80	0.73	0.690	0.25		
07-Apr-99	I1	I1	I1	I1	0.68	.637	0.067	0.32	0.060	0.17	0.07	<0.04	0.05		
14-Apr-99	I1	I1	I1	I1	0.70	.367	0.083	2.33	0.030	1.33	0.08	0.170	0.04		
21-Apr-99	I1	I1	I1	I1	0.73	.397	0.078	2.36	0.030	1.33	0.08	0.170	0.05		
28-Apr-99	I1	I1	I1	I1	0.68	.572	0.134	0.73	0.030	0.43	<0.07	0.040	<0.03		
05-May-99	I1	I1	I1	I1	0.70	.575	0.140	0.85	0.030	0.50	0.07	0.050	<0.03		
12-May-99	I1	I1	I1	I1	2.38	1.695	0.065	4.82	3.440 CB	2.74	0.60	0.490	0.62		
19-May-99	I1	I1	I1	I1	2.59	1.853	0.089	5.10	3.730	2.95	0.58	0.500	0.65		
26-May-99	I1	I1	I1	I1	0.12	.115 V2	0.012	0.05	0.030	<0.04	0.10	0.030	0.04		
02-Jun-99	I1	I1	I1	I1	10.10	10.06 V2	1.030	1.37	1.700	0.14	1.69	0.400	0.90		
09-Jun-99	I1	I1	I1	I1	5.93 CB	5.602 CB	0.338	2.18	0.000	1.31	0.39	0.200	2.85 CB		
16-Jun-99	I1	I1	I1	I1	3.98	3.912	0.534	0.50	0.450	0.27	0.14	0.060	0.12		
23-Jun-99	I1	I1	I1	I1	0.79	.772 V2	0.220	0.21	0.070	0.07	0.08	<0.04	0.05		
30-Jun-99	I1	I1	I1	I1	5.83	5.328 V3	0.220	3.48	0.000	0.24	0.76	0.240	5.21		
07-Jul-99	I1	I1	I1	I1	1.06	1.010	0.237	0.36	0.080	0.20	0.09	<0.04	0.06		
14-Jul-99	I2	I2	I2	I2	0.60	.577	0.088	0.16	0.040	0.09	<0.07	<0.04	0.05		
21-Jul-99	I1	I1	I1	I1											
28-Jul-99	I1	I1	I1	I1	0.82	.802	0.174	0.11	0.100	0.07	<0.07	<0.04	0.05		
04-Aug-99	2.89	5.13	.0075	I1	11.80	0.66	.241 V3	0.050	2.63	0.070	1.20	0.07	0.200	0.07	-1.23
11-Aug-99	-38.75	5.37	.0043	I1	2.01	0.12	.117 V2	0.020	0.04	0.080	0.01	<0.02	<0.01	<0.01	-1.14
18-Aug-99	1.04	4.16	.0697	I1	32.70	3.08	3.032	0.400	0.37	0.240	0.19	0.06	0.040	<0.01	-4.11
25-Aug-99	-4.23	4.71	.0197	I1	10.70	1.04	1.002	0.130	0.26	0.150	0.15	0.03	0.040	<0.01	-1.67
01-Sep-99	-3.37	4.58	.0265	I1	15.90	1.24	1.107 V2	0.190	1.01	0.170	0.53	0.06	0.080	0.06	-1.94
08-Sep-99	-5.84	4.69	.0206	I1	10.28	0.68	.610	0.110	0.51	0.050	0.28	<0.02	0.050	<0.01	-1.65
15-Sep-99	-19.31	5.33	.0047	I1	2.54	0.16	.137	0.020	0.18	0.040	0.09	<0.02	0.030	<0.01	-1.12
22-Sep-99	-7.97	5.97	.0011	I1	20.20	1.00	.368	0.030	4.49	0.300	2.53	0.13	0.400	0.14	-0.69
29-Sep-99	-1.01	4.60	.0253	I1	12.40	1.07	1.020	0.147	0.39	0.090	0.20	0.02	0.040	<0.01	-1.90
06-Oct-99	-2.99	4.85	.0142	I1	23.90	1.09	.433	0.080	4.56	0.030	2.63	0.10	0.340	0.12	-1.75
13-Oct-99		5.13	.0075	I1	14.80	0.61	.183	0.040		0.030	1.71	0.09	0.240	0.09	-1.17
20-Oct-99		4.76	.0175	I1	75.80	3.23	.633	0.080	I1	0.090	10.40	0.48	1.290	0.41	-1.72
27-Oct-99	-2.59	4.49	.0326	I1	24.40	2.06	1.772	0.350	2.02	0.300	1.15	0.25	0.160	0.08	-2.55
03-Nov-99	0.22	4.36	.0440	I1	58.20	2.97	1.566	0.660	10.20	0.310	5.62	0.42	0.700	0.24	-2.82
10-Nov-99	1.19	4.37	.0430	I1	57.40	2.96	1.576	0.660	10.00	0.300	5.54	0.35	0.650	0.22	-2.76
17-Nov-99	-0.90	4.42	.0383	I1	26.50	1.81	1.418	0.280	2.89	0.160	1.57	0.11	0.200	0.08	-2.51
24-Nov-99	-2.56	4.94	.0116	I1	10.29	0.59	.385	0.070	1.47	0.040	0.82	0.03	0.110	0.05	-13.00
01-Dec-99	-5.74	4.83	.0149	I1	11.06	0.57	.367	0.060	1.45	0.030	0.81	0.03	0.110	0.05	-1.45
08-Dec-99	-1.60	4.93	.0118	I1	10.60	0.57	.370	0.070	1.48	0.030	0.80	0.03	0.110	0.05	-1.39
15-Dec-99	1.58	4.58	.0265	I1	96.10 CB	4.20 CB	1.029	0.240	23.90 CB	0.130	12.70 CB	0.55	1.540	0.48	-2.18
22-Dec-99	-0.93	4.79	.0163	I1	28.00	1.39	.613	0.100	5.57	0.040	3.11	0.13	0.400	0.12	-1.79
29-Dec-99	-0.90	4.81	.0156	I1	27.00	1.35	.598	0.110	5.31	0.040	3.01	0.11	0.380	0.12	-1.70

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Loch Leven Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
9436530	05-Jan-2000	12-Jan-2000	7	600.0	9.3	32.4	28.8		M
9436537	12-Jan-2000	19-Jan-2000	7	1500.0	23.4	18.0	129.8		S
9436544	19-Jan-2000	26-Jan-2000	7	1795.0	28.0	48.8	57.3		M
9436551	26-Jan-2000	02-Feb-2000	7	502.0	7.8	9.2	85.0		M
9436558	02-Feb-2000	09-Feb-2000	7	330.0	5.1	34.0	15.1		S
9436565	09-Feb-2000	16-Feb-2000	7	985.0	15.3	42.8	35.8		S
9436572	16-Feb-2000	23-Feb-2000	7	1545.0	24.1	35.2	68.4		M
9436579	23-Feb-2000	01-Mar-2000	7	20.0	0.3	7.8	4.0		M
9436586	01-Mar-2000	08-Mar-2000	7	1525.0	23.8	15.4	154.2		M
9436593	08-Mar-2000	16-Mar-2000	8	2810.0	43.8	38.8	112.8		M
9436601	16-Mar-2000	22-Mar-2000	6	1375.0	21.4	15.0	142.8		M
9436607	22-Mar-2000	29-Mar-2000	7	1000.0	15.6	30.0	51.9		M
9436614	29-Mar-2000	05-Apr-2000	7	2185.0	34.0	26.4	128.9		M
9436621	05-Apr-2000	12-Apr-2000	7	315.0	4.9	24.0	20.4		M
9436628	12-Apr-2000	19-Apr-2000	7	265.0	4.1	2.0	206.4		M
	19-Apr-2000	26-Apr-2000	7			10.0			M
9436642	26-Apr-2000	03-May-2000	7	1398.0	21.8	19.4	112.2		M
9436649	03-May-2000	10-May-2000	7	545.0	8.5	17.0	49.9		M
9436656	10-May-2000	17-May-2000	7	1825.0	28.4	29.0	98.0		M
9436663	17-May-2000	24-May-2000	7	1440.0	22.4	31.2	71.9		M
9436670	24-May-2000	31-May-2000	7	1695.0	26.4	35.9	73.5		M
9436677	31-May-2000	07-Jun-2000	7	1835.0	28.6	23.0	124.3		M
9436684	07-Jun-2000	14-Jun-2000	7	605.0	9.4	25.8	36.5		M
9436691	14-Jun-2000	21-Jun-2000	7	485.0	7.6	6.4	118.0		M
9436698	21-Jun-2000	28-Jun-2000	7	140.0	2.2	19.6	11.1		M
9436705	28-Jun-2000	05-Jul-2000	7	1285.0	20.0	38.6	51.9		M
9436712	05-Jul-2000	12-Jul-2000	7	1210.0	18.8	15.6	120.8		M
9436719	12-Jul-2000	19-Jul-2000	7	1805.0	28.1	36.0	78.1		M
9436726	19-Jul-2000	26-Jul-2000	7	445.0	6.9	14.2	48.8		M
9436733	26-Jul-2000	02-Aug-2000	7	135.0	2.1	5.0	42.1		M
9436740	02-Aug-2000	09-Aug-2000	7	75.0	1.2	12.2	9.6		M
9436747	09-Aug-2000	16-Aug-2000	7	4525.0	70.5	45.2	155.9		M
9436754	16-Aug-2000	23-Aug-2000	7	1220.0	19.0	21.8	87.2		R
9436761	23-Aug-2000	31-Aug-2000	8	1855.0	28.9	25.6	112.9		M
9436769	31-Aug-2000	06-Sep-2000	6	1325.0	20.6	12.2	169.2		M
	06-Sep-2000	13-Sep-2000	7	25.0	0.4	7.2	5.4		M
9436782	13-Sep-2000	20-Sep-2000	7	380.0	5.9	8.8	67.3		M
9436789	20-Sep-2000	27-Sep-2000	7	1670.0	26.0	36.0	72.3		M
9436796	27-Sep-2000	04-Oct-2000	7	260.0	4.0	3.4	119.1		M
9436803	04-Oct-2000	11-Oct-2000	7	3020.0	47.0	44.4	105.9		M
9436810	11-Oct-2000	18-Oct-2000	7	1135.0	17.7	22.4	78.9		M
9436817	18-Oct-2000	25-Oct-2000	7	5985.0	93.2	71.2	130.9		M
9436824	25-Oct-2000	01-Nov-2000	7	3265.0	50.9	60.6	83.9		M
9436831	01-Nov-2000	08-Nov-2000	7	1065.0	16.6	13.2	125.7		R
9436838	08-Nov-2000	15-Nov-2000	7	240.0	3.7	6.6	56.6		R
9436845	15-Nov-2000	22-Nov-2000	7	2400.0	37.4	34.8	107.4		M
9436852	22-Nov-2000	27-Nov-2000	5	1495.0	23.3	16.0	145.5		M
	27-Nov-2000	31-Dec-2000	34			164.2			M

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Loch Leven Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mg/l) flg	Cond. umhos flg	SO4 (mg/l) flg	XSO4 (mg/l) flg	NNO3 (mg/l) flg	Cl (mg/l) flg	NNH4 (mg/l) flg	Na (mg/l) flg	Ca (mg/l) flg	Mg (mg/l) flg	K (mg/l) flg	Alk CaCO3 (mg/l) flg
05-Jan-2000	I1	I1	I1	I1	1.84	1.602 V4	0.152	1.71	I1	I1	I1	I1	I1	I1
12-Jan-2000	I1	I1	I1	I1	1.66	1.335 V4	0.035	2.33	I1	I1	I1	I1	I1	I1
19-Jan-2000	I1	I1	I1	I1	2.59	2.306 Q3	0.068	2.04	I1	I1	I1	I1	I1	I1
26-Jan-2000	I1	I1	I1	I1	2.61	2.340 V4	0.068	1.94	I1	I1	I1	I1	I1	I1
02-Feb-2000	I1	I1	I1	I1	2.47	2.198 V4	0.064	1.95	I1	I1	I1	I1	I1	I1
09-Feb-2000	I1	I1	I1	I1	5.81 Q3	5.572 Q3	0.083	1.71	I1	I1	I1	I1	I1	I1
16-Feb-2000	I1	I1	I1	I1	6.48 Q3	4.002 Q3	0.560 Q3	17.80 Q3	I1	I1	I1	I1	I1	I1
23-Feb-2000	I1	I1	I1	I1	6.48	4.128	0.560	17.80	0.52	9.42	0.60	1.20	0.46	I1
01-Mar-2000	-1.40	4.93	.0118	6.60	0.43	.377	0.048	0.39	<0.02	0.21	0.03	0.01	<0.01	-0.88
08-Mar-2000	-0.90	4.28	.0529	29.00	2.05	1.905	0.520 Q3	1.01	0.32	0.58	0.07	0.06	0.05	-2.81
16-Mar-2000	0.28	4.05	.0898	44.30	3.02	2.855	0.740	1.13	0.28	0.66	0.07	0.06	0.02	-4.27
22-Mar-2000	0.20	4.63	.0236	13.50	1.37	1.340	0.180	0.20	0.17	0.12	0.11	<0.01	<0.01	-1.33
29-Mar-2000	1.85	4.66	.0221	12.20	0.84	.785	0.210	0.41	0.09	0.22	0.07	0.01	0.01	-1.26
05-Apr-2000	I1	4.15	.0714	55.40	5.11	4.496 Q3	0.650 Q3	4.41	I1	I1	I1	I1	I1	-3.35
12-Apr-2000	I1	4.60	.0253	34.90	2.10	1.337 V4	0.330	5.48	I1	I1	I1	I1	I1	-1.41
19-Apr-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
26-Apr-2000	-2.30	4.77	.0171	13.10	1.09	.927	0.120	1.11	0.14	0.65	0.08	0.07	0.02	-1.32
03-May-2000	-1.97	4.78	.0167	13.10	1.09	.930	0.120	1.11	0.15	0.64	0.09	0.06	0.02	-1.21
10-May-2000	-2.38	4.86	.0139	7.60	0.59	.572	0.120	0.14	0.07	0.07	0.07	<0.01	0.01	-1.04
17-May-2000	-0.23	4.51	.0311	15.90	1.30	1.255	0.210	0.39	0.14	0.18	0.07	0.01	0.01	-1.71
24-May-2000	2.75	4.76	.0175	8.38	0.46	.450	0.150	0.10	<0.02	0.04	0.03	<0.01	<0.01	-1.38
31-May-2000	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7
07-Jun-2000	0.33	4.24	.0580	26.30	2.48	2.438 V3	0.300	0.29	0.18	0.13	0.05	0.02	0.02	-3.03
14-Jun-2000	-2.38	4.05	.0898	50.20	4.64	4.562	0.810	0.60	0.70	0.31	0.27	0.06	0.34	-4.54
21-Jun-2000	-0.78	4.16	.0697	35.20	3.04	3.010 V2	0.560	0.34	0.24	0.12	0.25	0.07	0.19	-3.31
28-Jun-2000	1.21	4.18	.0666	31.00	2.67	2.657	0.390 Q3	0.15	0.20	0.05	0.05	<0.01	<0.01	-3.52
05-Jul-2000	6.77	5.01	.0099	5.14	0.28	.269 V3	0.070	0.18	0.03	0.01	0.02	<0.01	<0.01	-0.85
12-Jul-2000	-1.97	4.88	.0133	6.44	0.39	.375	0.100	0.13	0.04	0.06	<0.02	<0.01	<0.01	-1.08
19-Jul-2000	0.76	4.35	.0450	21.20	1.83	1.765	0.340	0.48	0.15	0.26	0.11	0.03	<0.01	-2.41
26-Jul-2000	-6.52	4.96	.0111	6.37	0.15	.100	0.110	0.36	0.03	0.20	<0.02	0.02	<0.01	-0.88
02-Aug-2000	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6
09-Aug-2000	-1.66	4.90	.0127	6.31	0.59	.577	0.090	<0.10	0.07	0.05	<0.02	<0.01	<0.01	-0.98
16-Aug-2000	-8.85	4.90	.0127	9.70	0.58	.417	0.070	1.15	0.02	0.65	0.12	0.11	0.07	-1.28
23-Aug-2000	-6.35	4.30	.0505	23.90	2.17	2.110	0.250	0.44	0.26	0.24	<0.10	0.04	0.03	-2.59
31-Aug-2000	-4.62	4.60	.0253	19.50	1.69	1.435	0.130	1.80	0.18	1.02	0.15	0.15	0.09	-1.75
06-Sep-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
13-Sep-2000	-3.88	4.60	.0253	17.40	1.15	.895	0.170	1.84	0.06	1.02	0.15	0.14	0.09	-1.65
20-Sep-2000	-5.67	5.00	.0101	11.90	0.70	.475	0.070	1.62	0.03	0.90	0.15	0.14	0.11	-1.06
27-Sep-2000	-1.50	4.30	.0505	46.80	3.71	2.998	0.670	4.77	0.55	2.85	0.34	0.39	0.20	-2.99
04-Oct-2000	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7
11-Oct-2000	-2.49	4.60	.0253	27.20	1.84	1.275	0.160	4.08	0.17	2.26	0.21	0.29	0.13	-1.69
18-Oct-2000	-3.68	4.90	.0127	15.00	0.89	.545	0.100	2.46	0.06	1.38	0.15	0.19	0.09	-1.46
25-Oct-2000	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7
01-Nov-2000	-20.09	5.00	.0101	4.80	0.23	.202	0.050	0.22	<0.01	0.11	<0.09	0.05	<0.03	-1.09
08-Nov-2000	-8.32	4.50	.0319	17.10	2.28	2.205 V2	0.120	0.40	0.23	0.30	0.17	0.09	0.10	-2.14
15-Nov-2000	-0.91	4.40	.0401	49.20	2.51	1.359	0.330	8.16	0.10	4.61	0.26	0.55	0.23	-2.52
22-Nov-2000	-7.48	5.20	.0064	8.50	0.46	.265	0.030	1.38	<0.01	0.78	0.11	0.13	0.08	-0.89
27-Nov-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2

Newfoundland Environment Precipitation Monitoring Network(NEPMoN)
Loch Leven Acid Rain Report

Part (c): Deposition & Summary Table

Start: 6-Jan-99 Days: 364
End: 5-Jan-00 Weeks: 52

	Sample	Gauge														
	Depth	Depth	Ionbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
Total Sample Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Trace Precipitation Periods	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Non-Trace Precipitation Periods	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
# of Valid Samples	52	52	0	31	31	22	50	50	50	48	50	50	50	50	50	50
% of Valid Samples	100%	100%	0%	60%	60%	42%	96%	96%	96%	92%	96%	96%	96%	96%	96%	96%
Mean	23.22	28.64	-4.64	4.78	0.023	26.48	1.87	1.31	0.19	3.63	0.291	2.19	0.22	0.3	0.31	NA
Standard Deviation	18.97	21.52	7.62	0.38	0.0175	23.77	1.81	1.71	0.19	5.02	0.73	3.07	0.3	0.369	0.82	NA
Minimum	0.62	1	-38.75	4.12	0.0011	2.01	0.12	0.11	0	0.04	0.015	0.01	0.01	0.005	0.01	NA
Maximum	73.29	83.3	2.89	5.97	0.0765	96.1	10.1	10.07	1.03	24.7	3.73	14.8	1.69	1.76	5.21	NA
Precipitation Weighted Conc. (mg/l)				4.85	0.0191	21.9	1.4	0.86	0.15	3.73	0.153	2.14	0.15	0.287	0.21	0
Total Gauge Depth (mm)		1403.5	1403.5	1403.5	1403.5	1403.5	1403.5	1403.5	1403.5	1403.5	1403.5	1403.5	1403.5	1403.5	1403.5	1403.5
Deposition (kg / Ha / Period)					0.2688		19.64	12.05	2.06	52.38	2.144	30.06	2.16	4.024	2.93	0
Deposition (365 Day, kg / Ha / Yr)					0.2695		19.69	12.08	2.07	52.52	2.15	30.14	2.17	4.035	2.93	0
Coll. Effic. - Period	81.6%	% VSL - Period	100.0%		% PCL - Period	100.0%		% TP - Period	99.3%		% VSMP -Period	98.0%				
Coll. Effic. - Winter	77.8%	% VSL -Qtr. 1	100.0%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	97.3%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	81.2%	% VSL -Qtr. 2	100.0%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	100.0%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	78.8%	% VSL -Qtr. 3	100.0%		% PCL - Qtr. 3	100.0%		% TP - Qtr. 3	99.8%		% VSMP -Qtr. 3	100.0%				
Coll. Effic. - Autumn	87.7%	% VSL -Qtr. 4	100.0%		% PCL - Qtr. 4	100.0%		% TP - Qtr. 4	100.0%		% VSMP -Qtr. 4	100.0%				
Coll. Effic. - Level	2	% VSL -Level	1		% PCL - Level	1		% TP - Level	1		% VSMP -Level	1				
Sea Salt Correction	38.6%															
Sea Salt Corr. - Level	2															
					Data Completeness Level	2		Overall Data Quality Level	2							

Newfoundland Environment Precipitation Monitoring Network(NEPMoN)
Loch Leven Acid Rain Report

Part (c): Deposition & Summary Table

Start: 5-Jan-00 Days: 371
End: 10-Jan-01 Weeks: 53

	Sample	Gauge	Ionbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
	Depth	Depth														
Total Sample Periods	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Trace Precipitation Periods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Trace Precipitation Periods	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
# of Valid Samples	48	48	0	33	33	33	41	41	41	41	32	32	32	32	32	41
% of Valid Samples	100%	100%	0%	69%	69%	69%	85%	85%	85%	85%	67%	67%	67%	67%	67%	85%
Mean	20.84	27.34	-2.65	4.61	0.0324	21	2.04	1.72	0.24	2.29	0.163	0.94	0.12	0.125	0.08	NA
Standard Deviation	18.17	24.96	4.59	0.32	0.0238	14.66	1.65	1.35	0.22	3.89	0.164	1.79	0.12	0.227	0.1	NA
Minimum	0.31	2	-20.09	4.05	0.0064	4.8	0.15	0.1	0.03	0.05	0.005	0.01	0.01	0.005	0.01	NA
Maximum	93.22	164.2	6.77	5.2	0.0898	55.4	6.48	5.57	0.81	17.8	0.7	9.42	0.6	1.2	0.46	NA
Precipitation Weighted Conc. (mg/l)				4.63	0.0303	19.45	1.99	1.69	0.21	2.17	0.128	0.78	0.1	0.101	0.06	0
Total Gauge Depth (mm)		1312.3	1312.3	1312.3	1312.3	1312.3	1312.3	1312.3	1312.3	1312.3	1312.3	1312.3	1312.3	1312.3	1312.3	1312.3
Deposition (kg / Ha / Period)					0.3978		26.08	22.14	2.8	28.41	1.679	10.21	1.35	1.322	0.76	0
Deposition (365 Day, kg / Ha / Yr)					0.4022		26.37	22.38	2.83	28.73	1.697	10.32	1.36	1.337	0.77	0
Coll. Effic. - Period	82.9%	% VSL - Period	95.8%		% PCL - Period	100.0%		% TP - Period	76.4%		% VSMP -Period	97.7%				
Coll. Effic. - Winter	49.7%	% VSL -Qtr. 1	100.0%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	100.0%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	89.8%	% VSL -Qtr. 2	100.0%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	88.3%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	84.6%	% VSL -Qtr. 3	100.0%		% PCL - Qtr. 3	100.0%		% TP - Qtr. 3	97.0%		% VSMP -Qtr. 3	100.0%				
Coll. Effic. - Autumn	107.3%	% VSL -Qtr. 4	77.8%		% PCL - Qtr. 4	100.0%		% TP - Qtr. 4	37.9%		% VSMP -Qtr. 4	100.0%				
Coll. Effic. - Level	2	% VSL -Level	1		% PCL - Level	1		% TP - Level	400.0%		% VSMP -Level	1				
Sea Salt Correction	15.1%															
Sea Salt Corr. - Level	1															
					Data Completeness Level	4		Overall Data Quality Level	4							

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Terra Nova - B Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
3236164	04-Jan-99	11-Jan-99	7	3770.0	58.7	36.8	159.6	RG	M
3236171	11-Jan-99	18-Jan-99	7	1285.0	20.0	32.4	61.8	RG	M
3236178	18-Jan-99	25-Jan-99	7	765.0	11.9	12.4	96.1	RG	M
3236185	25-Jan-99	01-Feb-99	7	735.0	11.4	14.7	77.9	RG	M
3236192	01-Feb-99	08-Feb-99	7	1695.0	26.4	19.6	134.7	RG	M
3236199	08-Feb-99	15-Feb-99	7	1475.0	23.0	25.1	91.5	RG	M
3236206	15-Feb-99	22-Feb-99	7	2235.0	34.8	65.1	53.5	RG	R
3236213	22-Feb-99	01-Mar-99	7	695.0	10.8	30.1	36.0	RG	M
3236220	01-Mar-99	08-Mar-99	7	1525.0	23.8	3.9	609.1	RG	M
3236227	08-Mar-99	15-Mar-99	7	1660.0	25.9	23.3	111.0	RG	M
3236234	15-Mar-99	22-Mar-99	7	2145.0	33.4	18.4	181.6	RG	M
3236241	22-Mar-99	29-Mar-99	7	895.0	13.9	3.0	464.7	RG	R
3236248	29-Mar-99	05-Apr-99	7	3250.0	50.6	37.1	136.5	RG	M
3236255	05-Apr-99	12-Apr-99	7	1725.0	26.9	47.3	56.8	RG	M
3236262	12-Apr-99	19-Apr-99	7	460.0	7.2	4.0	179.1	RG	R
3236269	19-Apr-99	26-Apr-99	7	1540.0	24.0	37.2	64.5	RG	S
3236276	26-Apr-99	03-May-99	7	2030.0	31.6	85.5	37.0	RG	R
	03-May-99	10-May-99	7					V1	I1
3236290	10-May-99	17-May-99	7	2455.0	38.2	3.9	980.5	RG	N
3236297	17-May-99	24-May-99	7	2115.0	32.9	45.3	72.7	RG	R
3236304	24-May-99	31-May-99	7	3735.0	58.2	25.1	231.8	RG	M
3236311	31-May-99	07-Jun-99	7	290.0	4.5	3.3	136.9	RG	R
3236318	07-Jun-99	14-Jun-99	7	490.0	7.6	2.2	346.9	RG	R
3236325	14-Jun-99	21-Jun-99	7	1700.0	26.5	33.9	78.1	RG	R
	21-Jun-99	28-Jun-99	7			14.2		RG	N
3236339	28-Jun-99	05-Jul-99	7	515.0	8.0	1.9	422.2	RG	R
3236346	05-Jul-99	12-Jul-99	7	1460.0	22.7	18.2	125.0	RG	R
3236353	12-Jul-99	19-Jul-99	7	485.0	7.6	31.3	24.1	RG	R
3236360	19-Jul-99	26-Jul-99	7	1075.0	16.7	1.9	881.3	RG	R
	26-Jul-99	02-Aug-99	7	755.0	11.8	27.7	42.5	RG	R
3236374	02-Aug-99	09-Aug-99	7	350.0	5.5	9.4	58.0	RG	R
3236381	09-Aug-99	16-Aug-99	7	2905.0	45.2	67.3	67.2	RG	R
3236388	16-Aug-99	23-Aug-99	7	920.0	14.3	4.4	325.7	RG	R
3236395	23-Aug-99	30-Aug-99	7	1335.0	20.8	32.8	63.4	RG	R
3236402	30-Aug-99	06-Sep-99	7	2840.0	44.2	2.2	2010.8	RG	R
3236409	06-Sep-99	13-Sep-99	7	1765.0	27.5	13.2	208.3	RG	R
3236416	13-Sep-99	20-Sep-99	7	5112.0	79.6	68.5	116.2	RG	R
3236423	20-Sep-99	27-Sep-99	7	610.0	9.5	15.7	60.5	RG	R
3236430	27-Sep-99	04-Oct-99	7	1395.0	21.7	22.7	95.7	RG	R
3236437	04-Oct-99	11-Oct-99	7	1480.0	23.1	27.5	83.8	RG	R
3236444	11-Oct-99	18-Oct-99	7	2100.0	32.7	92.6	35.3	RG	R
3236451	18-Oct-99	25-Oct-99	7	1600.0	24.9	3.3	755.2	RG	M
3236458	25-Oct-99	01-Nov-99	7	1250.0	19.5	14.4	135.2	RG	R
3236465	01-Nov-99	08-Nov-99	7	1380.0	21.5	22.1	97.3	RG	R
3236472	08-Nov-99	15-Nov-99	7	2160.0	33.6	43.8	76.8	RG	M
3236479	15-Nov-99	22-Nov-99	7	1100.0	17.1	14.0	122.4	RG	M
3236486	22-Nov-99	29-Nov-99	7	1125.0	17.5	14.1	124.3	RG	M
3236493	29-Nov-99	06-Dec-99	7	1575.0	24.5	30.5	80.4	RG	M
3236500	06-Dec-99	13-Dec-99	7	1890.0	29.4	14.7	200.3	RG	M
3236507	13-Dec-99	20-Dec-99	7	2770.0	43.1	31.9	135.3	RG	M
3236514	20-Dec-99	27-Dec-99	7	500.0	7.8	3.6	216.3	RG	S
3236521	27-Dec-99	03-Jan-2000	7	870.0	13.6	30.5	44.4	RG	S

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Terra Nova - B Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mg/l) flg	Cond. umhos flg	SO4 (mg/l) flg	XSO4 (mg/l) flg	NNO3 (mg/l) flg	Cl (mg/l) flg	NNH4 (mg/l) flg	Na (mg/l) flg	Ca (mg/l) flg	Mg (mg/l) flg	K (mg/l) flg	Alk CaCO3 (mg/l) flg			
04-Jan-99	-2.53		4.74	.0183	11.05	0.50	.352	0.150	1.03	0.04	0.59	0.02	0.06	<0.01	-1.42		
11-Jan-99		I7															
18-Jan-99	1.09		4.82	.0153	12.85	0.77	.545	0.060	1.68	<0.02	0.90	0.04	0.10	0.04	-1.39		
25-Jan-99	-4.69		5.44	.0037	6.51	0.29	.140	<0.02	1.12	0.04	0.60	0.04	0.09	<0.01	-1.05		
01-Feb-99	-3.54		5.12	.0076	6.54	0.41	.292	0.040	0.78	0.02	0.47	<0.02	0.07	<0.01	-1.18		
08-Feb-99	2.53		5.13	.0075	6.55	0.41	.305	0.040	0.78	0.03	0.42	<0.02	0.04	<0.01	-1.18		
15-Feb-99	1.34		5.14	.0073	6.42	0.41	.302	0.040	0.81	0.03	0.43	0.02	0.05	<0.01	-1.06		
22-Feb-99	0.42		5.01	.0099	8.72	0.51	.342	0.050	1.23	<0.02	0.67	0.03	0.08	0.03	-1.29		
01-Mar-99	-0.43		5.00	.0101	8.80	0.51	.345	0.040	1.21	<0.02	0.66	0.03	0.08	0.02	-1.25		
08-Mar-99	-0.68		5.05	.0090	10.20	0.60	.372	0.040	1.66	0.04	0.91	0.05	0.11	<0.01	-1.24		
15-Mar-99	-1.47		5.05	.0090	10.27	0.60	.370	0.050	1.64	0.05	0.92	0.05	0.11	<0.01	-1.14		
22-Mar-99	0.36		5.04	.0092	10.30	0.59	.360	0.050	1.66	0.04	0.92	0.03	0.10	0.02	-1.23		
29-Mar-99	-2.75		4.81	.0156	10.90	0.67	.515	0.080	1.15	0.05	0.62	0.05	0.07	0.03	-1.42		
05-Apr-99		I7															
12-Apr-99		I1															
19-Apr-99		I1															
26-Apr-99		I1															
03-May-99		I2															
10-May-99		I1															
17-May-99		I1															
24-May-99		I1															
31-May-99	-2.63		4.97	.0108	4.75	0.31	.299	V3	0.070	0.10	0.04	<0.02	<0.01	<0.01	-1.36		
07-Jun-99	-0.10		4.94	.0116	5.49	0.47	.460	V2	0.070	0.12	<0.02	0.04	0.05	0.02	<0.01	-1.41	
14-Jun-99		I1															
21-Jun-99		I2															
28-Jun-99	-3.99		4.94	.0116	5.58	0.48	.470	V2	0.070	0.11	<0.02	0.04	0.06	0.02	0.04	-1.43	
05-Jul-99	-14.92		5.47	.0034	3.19	0.33	.315	0.050	0.13	0.11	0.06	0.02	0.02	0.10	-0.95		
12-Jul-99		I6															
19-Jul-99	-4.52		4.65	.0226	9.71	0.31	.295	V2	0.220	0.15	0.04	0.06	<0.02	<0.01	-2.22		
26-Jul-99		I2															
02-Aug-99	-0.77		4.42	.0383	17.60	1.39	1.370	V2	0.210	0.22	0.10	0.08	<0.02	0.02	<0.01	-2.87	
09-Aug-99	0.28		4.42	.0383	17.70	Q3	1.400	Q3	0.220	Q3	0.21	0.10	0.08	<0.02	0.02	<0.01	-2.80
16-Aug-99	-2.71		4.62	.0242	11.17	1.04	1.012	0.130	0.23	0.10	0.11	0.02	0.03	<0.01	-1.82		
23-Aug-99	-3.32		4.62	.0242	11.40	1.07	1.040	0.130	0.23	0.11	0.12	0.02	0.03	<0.01	-1.80		
30-Aug-99	-2.41		4.62	.0242	11.40	1.07	1.042	0.130	0.24	0.11	0.11	0.02	0.03	<0.01	-1.87		
06-Sep-99	-2.20		4.62	.0242	11.30	1.02	.992	V2	0.130	0.27	0.11	0.11	<0.02	0.03	<0.02	-1.89	
13-Sep-99	-10.53		5.09	.0082	3.64	0.31	.287	0.040	0.21	0.04	0.09	<0.02	0.04	<0.01	-1.24		
20-Sep-99	-7.39		4.77	.0171	15.60	0.83	.490	0.070	2.31	0.05	1.36	0.08	0.19	0.08	-1.77		
27-Sep-99	-9.71		5.00	.0101	5.34	0.46	.422	0.050	0.27	0.06	0.15	0.02	0.04	<0.01	-1.33		
04-Oct-99	-11.10		4.88	.0133	8.43	0.76	.665	0.090	0.58	0.07	0.38	0.12	0.07	0.07	-1.58		
11-Oct-99	-4.68		4.96	.0111	7.83	0.59	.500	0.100	Q3	0.65	0.09	0.36	0.04	0.05	0.09	-1.44	
18-Oct-99	-7.41		4.85	.0142	9.55	0.63	.500	0.110	0.86	0.06	0.52	0.05	0.09	0.06	-1.59		
25-Oct-99	-8.77		5.10	.0080	6.28	0.42	.317	0.060	0.72	0.04	0.41	0.06	0.08	0.06	-1.19		
01-Nov-99	-13.63		5.27	.0054	2.58	0.16	.145	0.030	0.14	0.03	0.06	<0.02	0.02	<0.01	-1.12		
08-Nov-99	-5.84		5.04	.0092	5.75	0.37	.287	0.040	0.59	<0.02	0.33	<0.02	0.07	<0.01	-1.16		
15-Nov-99	-19.95		5.27	.0054	2.68	0.14	.110	0.020	0.24	0.03	0.12	<0.02	0.04	<0.01	-1.11		
22-Nov-99	-1.83		5.01	.0099	21.40	0.99	.365	0.050	4.41	<0.02	2.50	0.11	0.32	0.12	-1.41		
29-Nov-99	-2.97		5.18	.0067	5.55	0.28	.185	0.030	0.70	<0.02	0.38	<0.02	0.06	<0.01	-1.21		
06-Dec-99	-3.76		4.90	.0127	8.11	0.53	.430	0.060	0.74	0.03	0.40	0.02	0.07	<0.01	-1.56		
13-Dec-99	-6.70		5.20	.0064	3.55	0.19	.152	0.040	0.29	<0.02	0.15	0.02	0.03	<0.01	-1.15		
20-Dec-99	-0.84		5.01	.0099	20.90	1.02	.405	0.050	4.42	0.02	2.46	0.11	0.31	0.11	-1.40		
27-Dec-99	-2.90		5.05	.0090	5.87	0.37	.275	0.060	0.66	0.02	0.38	<0.02	0.06	<0.01	-1.18		

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Terra Nova - B Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
3236528	03-Jan-2000	10-Jan-2000	7	2570.0	40.0	25.5	157.0		M
3236535	10-Jan-2000	17-Jan-2000	7	1165.0	18.1	14.7	123.4		M
3236542	17-Jan-2000	24-Jan-2000	7	2720.0	42.4	76.1	55.7		M
3236549	24-Jan-2000	31-Jan-2000	7	1440.0	22.4	50.4	44.5		M
3236556	31-Jan-2000	07-Feb-2000	7	1865.0	29.0	3.8	764.5		S
3236563	07-Feb-2000	14-Feb-2000	7	1055.0	16.4	10.6	155.0		M
3236570	14-Feb-2000	21-Feb-2000	7	1530.0	23.8	5.4	441.3		M
3236577	21-Feb-2000	28-Feb-2000	7	980.0	15.3	1.3	1174.2		M
3236584	28-Feb-2000	06-Mar-2000	7	1790.0	27.9	44.7	62.4		M
3236591	06-Mar-2000	13-Mar-2000	7	1080.0	16.8	21.7	77.5		M
3236598	13-Mar-2000	20-Mar-2000	7	2245.0	35.0	50.7	69.0		M
3236605	20-Mar-2000	27-Mar-2000	7	775.0	12.1	8.3	145.4		S
3236612	27-Mar-2000	03-Apr-2000	7	1735.0	27.0	17.7	152.7		M
3236619	03-Apr-2000	10-Apr-2000	7	385.0	6.0	12.7	47.2		R
3236626	10-Apr-2000	17-Apr-2000	7	1080.0	16.8	9.4	179.0		M
3236633	17-Apr-2000	24-Apr-2000	7	770.0	12.0	8.2	146.3		S
3236640	24-Apr-2000	01-May-2000	7	2440.0	38.0	31.7	119.9		M
3236647	01-May-2000	08-May-2000	7	1020.0	8.7	17.9	48.7		M
3236654	08-May-2000	15-May-2000	7	560.0	7.3	27.5	26.6		M
3236661	15-May-2000	22-May-2000	7	570.0	24.0	0.6	3997.9		R
3236668	22-May-2000	29-May-2000	7	1540.0	26.5	19.0	139.4		R
3236675	29-May-2000	05-Jun-2000	7	1700.0	11.8	10.3	114.2		R
3236682	05-Jun-2000	12-Jun-2000	7	755.0	8.3	16.3	51.1		R
3236689	12-Jun-2000	19-Jun-2000	7	535.0	7.8	30.6	25.5		R
	19-Jun-2000	26-Jun-2000	7			0.5			N
3236703	26-Jun-2000	03-Jul-2000	7	1715.0	26.7	13.3	200.9		N
3236710	03-Jul-2000	10-Jul-2000	7	2090.0	26.7	22.2	120.3		R
3236717	10-Jul-2000	17-Jul-2000	7	565.0	32.6	4.9	664.4		R
3236724	17-Jul-2000	24-Jul-2000	7	1335.0	8.8	17.5	50.3		R
3236731	24-Jul-2000	31-Jul-2000	7	755.0	20.8	0.7	2970.6		R
	31-Jul-2000	07-Aug-2000	7			5.8			N
3236745	07-Aug-2000	14-Aug-2000	7	2700.0	42.1	27.8	151.3		R
3236752	14-Aug-2000	21-Aug-2000	7	1735.0	27.0	45.3	59.7		R
3236759	21-Aug-2000	28-Aug-2000	7	2275.0	35.4	13.3	266.4		R
3236766	28-Aug-2000	04-Sep-2000	7	1085.0	16.9	15.0	112.7		R
3236773	04-Sep-2000	11-Sep-2000	7	555.0	8.6	4.1	210.9		R
3236780	11-Sep-2000	18-Sep-2000	7	1680.0	26.2	27.6	94.8		R
3236787	18-Sep-2000	25-Sep-2000	7	795.0	12.4	10.2	121.4		R
3236794	25-Sep-2000	02-Oct-2000	7	1105.0	17.2	17.7	97.2		R
3236801	02-Oct-2000	09-Oct-2000	7	3370.0	52.5	66.4	79.1		R
3236808	09-Oct-2000	16-Oct-2000	7	3785.0	59.0	31.3	188.4		R
3236815	16-Oct-2000	23-Oct-2000	7	1780.0	27.7	24.2	114.6		R
3236822	23-Oct-2000	30-Oct-2000	7	3025.0	47.1	45.1	104.5		R
3236829	30-Oct-2000	06-Nov-2000	7	885.0	13.8	23.9	57.7		R
3236836	06-Nov-2000	13-Nov-2000	7	1680.0	26.2	35.4	73.9		R
3236843	13-Nov-2000	20-Nov-2000	7	1660.0	25.9	22.5	114.9		R
3236850	20-Nov-2000	27-Nov-2000	7	215.0	3.3	10.0	33.5		M
3236857	27-Nov-2000	04-Dec-2000	7	345.0	5.4	18.2	29.5		S
3236864	04-Dec-2000	11-Dec-2000	7	685.0	10.7	12.2	87.5		S
3236871	11-Dec-2000	18-Dec-2000	7	2350.0	36.6	56.6	64.7		M
3236878	18-Dec-2000	25-Dec-2000	7	1815.0	28.3	33.3	84.9		M
3236885	25-Dec-2000	01-Jan-2001	7	1055.0	16.4	14.2	115.7		S

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Terra Nova - B Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mg/l) flg	Cond. umhos flg	SO4 (mg/l) flg	XSO4 (mg/l) flg	NNO3 (mg/l) flg	Cl (mg/l) flg	NNH4 (mg/l) flg	Na (mg/l) flg	Ca (mg/l) flg	Mg (mg/l) flg	K (mg/l) flg	Alk CaCO3 (mg/l) flg
03-Jan-2000	1.35	5.11	.0078	6.40	0.32	.225	0.060	0.67	<0.02	0.38	<0.02	0.04	0.01	-0.84
10-Jan-2000	-4.68	5.23	.0059	5.40	0.21	.112	0.030	0.71	0.02	0.39	<0.02	0.05	0.01	-0.62
17-Jan-2000	-0.92	5.05	.0090	21.50 QB	0.96	.345	0.050	4.44 QB	<0.02	2.46 QB	0.12	0.33 QB	0.07	-0.65
24-Jan-2000	-2.58	5.03	.0094	7.80	0.41	.292	0.070	0.80	0.04	0.47	<0.02	0.05	0.03	-0.68
31-Jan-2000	-2.26	5.03	.0094	7.40	0.42	.315	0.070	0.71	0.04	0.42	<0.02	0.05	0.01	-0.72
07-Feb-2000	0.22	4.99	.0103	7.60	0.42	.317	0.080	0.79	0.03	0.41	0.04	0.05	0.01	-0.74
14-Feb-2000	-1.76	4.96	.0111	8.20	0.56	.460	0.100	0.65	0.04	0.40	0.07	0.03	0.05	-0.71
21-Feb-2000	-0.48	5.00	.0101	7.00	0.41	.307	0.070	0.74	0.04	0.41	<0.02	0.04	0.01	-0.68
28-Feb-2000	-5.14	5.21	.0062	4.70	0.20	.127	0.040	0.50	<0.02	0.29	<0.02	0.04	<0.01	-0.60
06-Mar-2000	2.20	4.90	.0127	7.80	0.57	.515	0.100	0.39	0.06	0.22	<0.02	0.02	<0.01	-0.90
13-Mar-2000	2.74	4.89	.0130	7.70	0.57	.520	0.100	0.38	0.06	0.20	<0.02	0.02	<0.01	-0.94
20-Mar-2000	2.73	5.03	.0094	6.10	0.54	.485	0.050	0.42	0.05	0.22	0.02	0.02	<0.01	-0.70
27-Mar-2000	0.25	4.67	.0216	12.00	0.79	.705	0.180	0.59	0.07	0.34	0.02	0.04	0.01	-1.35
03-Apr-2000	3.80	4.76	.0175	8.40	0.68	.670	0.110	0.10	0.04	0.04	<0.02	<0.01	<0.01	-1.11
10-Apr-2000	3.46	4.78	.0167	11.40	0.74	.615	0.140	0.91	0.05	0.50	0.03	0.05	<0.01	-1.17
17-Apr-2000	3.73	4.94	.0116	6.80	0.55	.502	0.060	0.38	0.04	0.19	0.02	0.01	<0.01	-0.82
24-Apr-2000	-3.98	4.94	.0116	7.00	0.54	.485	0.060	0.35	0.04	0.22	0.02	0.03	<0.01	-0.84
01-May-2000	-0.55	5.13	.0075	4.00	0.28	.262 V2	0.050	0.17	0.04	0.07	<0.02	<0.01	<0.01	-0.68
08-May-2000	3.23	4.78	.0167	9.40	0.76	.702	0.120	0.39	0.07	0.23	<0.02	0.01	0.01	-1.16
15-May-2000	2.40	4.77	.0171	8.80	0.76	.707	0.120	0.37	0.07	0.21	0.02	0.01	0.01	-1.27
22-May-2000	3.16	4.77	.0171	9.60	0.76	.707	0.120	0.37	0.07	0.21	<0.02	0.01	0.01	-1.27
29-May-2000	4.53	4.77	.0171	9.60	0.77	.720	0.120	0.38	0.07	0.20	<0.02	0.01	0.01	-1.21
05-Jun-2000	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6
12-Jun-2000	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6
19-Jun-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
26-Jun-2000	2.08	4.53	.0297	14.90	1.33	1.302	0.190	0.21	0.13	0.11	<0.02	<0.01	0.03	-1.69
03-Jul-2000	-6.71	6.45 QB	.0004	18.80	1.12	.550	0.160	3.45	0.29	2.28	0.22	0.02	0.97 QB	0.58
10-Jul-2000	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6
17-Jul-2000	3.52	4.69	.0206	10.50	0.78	.730	0.130	0.36	0.02	0.20	<0.02	<0.01	0.07	-1.21
24-Jul-2000	-3.62	4.68	.0211	10.70	0.77	.722	0.130	0.35	0.08	0.19	<0.02	<0.01	0.08	-1.25
31-Jul-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
07-Aug-2000	3.92	4.69	.0206	10.60	0.77	.720	0.130	0.35	<0.02	0.20	<0.02	<0.01	0.07	-1.21
14-Aug-2000	2.55	4.71	.0197	10.50	0.78	.725	0.130	0.37	0.03	0.22	<0.02	<0.01	0.08	-1.10
21-Aug-2000	-8.65	4.90	.0127	9.90	0.99	.920	0.140	0.49	0.19	0.28	0.12	0.06	0.14	-1.51
28-Aug-2000	-8.61	5.00	.0101	9.20	0.94	.872	0.160	0.48	0.23	0.27	0.12	0.06	0.15	-1.28
04-Sep-2000	-22.84	5.00	.0101	4.50	0.28	.252	0.060	0.19	<0.01	0.11	0.10	0.05	<0.03	-0.96
11-Sep-2000	I1	5.20	.0064	2.10	0.11	.106 V2	<0.02	<0.10	<0.01	<0.03	I1	<0.02	<0.03	-1.02
18-Sep-2000	-7.60	4.70	.0201	11.30	0.93	.847	0.140	0.59	0.08	0.33	0.11	0.07	0.09	-1.75
25-Sep-2000	-9.45	4.70	.0201	10.50	0.83	.747	0.120	0.60	0.06	0.33	0.10	0.08	0.06	-1.46
02-Oct-2000	-26.24	5.10	.0080	3.70	0.27	.250	0.040	0.14	<0.01	0.08	0.10	0.05	<0.03	-1.07
09-Oct-2000	-10.08	4.80	.0160	8.20	0.71	.652	0.130	0.40	0.06	0.23	0.14	0.07	<0.03	-1.59
16-Oct-2000	-7.34	4.70	.0201	18.50	1.44	1.115	<0.02	2.22	<0.01	1.30	0.25	0.20	0.09	-1.32
23-Oct-2000	-4.56	5.10	.0080	11.70	0.60	.312	0.060	2.07	0.04	1.15	0.11	0.17	0.08	-0.98
30-Oct-2000	-3.74	5.10	.0080	11.40	0.51	.210	0.040	2.15	<0.01	1.20	0.10	0.15	0.08	-0.93
06-Nov-2000	-22.63	5.20	.0064	3.40	0.14	.105	0.040	0.25	<0.01	0.14	<0.09	0.06	<0.03	-1.15
13-Nov-2000	-8.23	5.00	.0101	8.10	0.48	.302	0.040	1.26	<0.01	0.71	0.10	0.11	0.07	-1.03
20-Nov-2000	-4.97	5.50	.0032	11.10	0.47	.147	0.040	2.33	0.07	1.29	0.11	0.17	0.11	-0.64
27-Nov-2000	-3.91	5.20	.0064	11.60	0.47	.145	0.040	2.32	<0.01	1.30	0.11	0.16	0.10	-1.09
04-Dec-2000	-17.32	5.20	.0064	6.90	0.36	.202	0.040	0.93	<0.01	0.63	0.13	0.11	0.09	-1.01
11-Dec-2000	-23.32	5.00	.0101	5.00	0.31	.237 V2	0.060	0.39	<0.01	0.29	0.09	0.06	0.10	-1.13
18-Dec-2000	-5.22	5.00	.0101	10.40	0.56	.332	0.070	1.58	<0.01	0.91	<0.09	0.17	0.07	-1.09
25-Dec-2000	-13.02	5.20	.0064	5.80	0.38	.262	0.040	0.76	<0.01	0.47	<0.09	0.13	0.07	-0.92

Newfoundland Environment Precipitation Monitoring Network(NEPMoN)

Terra Nova - B Acid Rain Report

Part (c): Deposition & Summary Table

Start: 4-Jan-99 Days: 364
 End: 3-Jan-00 Weeks: 52

	Sample	Gauge	lonbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
Total Sample Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Trace Precipitation Periods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Non-Trace Precipitation Periods	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51
# of Valid Samples	52	52	39	39	39	39	46	46	46	46	45	45	45	45	45	46
% of Valid Samples	100%	100%	75%	75%	75%	75%	88%	88%	88%	88%	87%	87%	87%	87%	87%	88%
Mean	24.92	25.18	-4.25	4.89	0.0131	9.01	0.58	0.47	0.07	0.83	0.049	0.47	0.03	0.067	0.03	NA
Standard Deviation	15.2	21.14	4.77	0.24	0.0081	4.63	0.32	0.32	0.05	0.94	0.035	0.54	0.03	0.065	0.03	NA
Minimum	4.52	1.9	-19.95	4.42	0.0034	2.58	0.13	0.1	0	0.1	0.01	0.01	0.01	0.005	0.01	NA
Maximum	79.63	92.6	2.53	5.47	0.0383	21.4	1.42	1.4	0.22	4.42	0.13	2.5	0.12	0.32	0.12	NA
Precipitation Weighted Conc. (mg/l)				4.89	0.0131	8.48	0.56	0.47	0.08	0.67	0.053	0.38	0.03	0.056	0.03	0
Total Gauge Depth (mm)		1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284	1284
Deposition (kg / Ha / Period)					0.1676		7.23	6.05	0.96	8.56	0.681	4.84	0.38	0.724	0.36	0
Deposition (365 Day, kg / Ha / Yr)					0.168		7.25	6.07	0.97	8.58	0.683	4.86	0.38	0.726	0.37	0
Coll. Effic. - Period	104.3%	% VSL - Period	100.0%			% PCL - Period	100.0%			% TP - Period	88.1%			% VSMP -Period	97.9%	
Coll. Effic. - Winter	95.3%	% VSL -Qtr. 1	100.0%			% PCL - Qtr. 1	100.0%			% TP - Qtr. 1	89.9%			% VSMP -Qtr. 1	100.0%	
Coll. Effic. - Spring	118.7%	% VSL -Qtr. 2	100.0%			% PCL - Qtr. 2	100.0%			% TP - Qtr. 2	79.8%			% VSMP -Qtr. 2	100.0%	
Coll. Effic. - Summer	121.5%	% VSL -Qtr. 3	100.0%			% PCL - Qtr. 3	100.0%			% TP - Qtr. 3	81.3%			% VSMP -Qtr. 3	100.0%	
Coll. Effic. - Autumn	92.3%	% VSL -Qtr. 4	100.0%			% PCL - Qtr. 4	100.0%			% TP - Qtr. 4	100.0%			% VSMP -Qtr. 4	100.0%	
Coll. Effic. - Level	1.00%	% VSL -Level	1			% PCL - Level	1			% TP - Level	1			% VSMP -Level	1	
Sea Salt Correction	16.3%															
Sea Salt Corr. - Level	1.00%															
						Data Completeness Level	1			Overall Data Quality Level	1					

Newfoundland Environment Precipitation Monitoring Network(NEPMoN)

Terra Nova - B Acid Rain Report

Part (c): Deposition & Summary Table

Start: 3-Jan-00 Days: 364
 End: 1-Jan-01 Weeks: 52

	Sample	Gauge	Ionbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
	Depth	Depth														
Total Sample Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Trace Precipitation Periods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Trace Precipitation Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
# of Valid Samples	52	52	46	47	47	47	47	47	47	47	47	47	46	47	47	47
% of Valid Samples	100%	100%	88%	90%	90%	90%	90%	90%	90%	90%	90%	90%	88%	90%	90%	90%
Mean	22.95	21.81	-4.23	4.91	0.0123	9.02	0.61	0.49	0.09	0.84	0.049	0.48	0.06	0.062	0.06	0.58
Standard Deviation	12.74	16.98	7.83	0.29	0.0059	3.84	0.29	0.28	0.05	0.89	0.057	0.52	0.06	0.066	0.14	0
Minimum	3.35	0.5	-26.24	4.53	0.0004	2.1	0.11	0.11	0.01	0.05	0.005	0.01	0.01	0.005	0.01	0.58
Maximum	58.96	76.1	4.53	6.45	0.0297	21.5	1.44	1.3	0.19	4.44	0.29	2.46	0.25	0.33	0.97	0.58
Precipitation Weighted Conc. (mg/l)				4.94	0.0115	9.26	0.58	0.44	0.08	1.02	0.039	0.59	0.06	0.079	0.06	0.01
Total Gauge Depth (mm)		1134.3	1134.3	1134.3	1134.3	1134.3	1134.3	1134.3	1134.3	1134.3	1134.3	1134.3	1134.3	1134.3	1134.3	1134.3
Deposition (kg / Ha / Period)					0.1303		6.61	4.96	0.88	11.58	0.442	6.64	0.73	0.896	0.73	0.14
Deposition (365 Day, kg / Ha / Yr)					0.1307		6.63	4.97	0.88	11.62	0.443	6.66	0.73	0.898	0.73	0.14
Coll. Effic. - Period	102.1%	% VSL - Period	100.0%		% PCL - Period	100.0%		% TP - Period	94.9%		% VSMP -Period	97.9%				
Coll. Effic. - Winter	93.9%	% VSL -Qtr. 1	100.0%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	100.0%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	102.7%	% VSL -Qtr. 2	100.0%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	76.1%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	131.8%	% VSL -Qtr. 3	100.0%		% PCL - Qtr. 3	100.0%		% TP - Qtr. 3	95.0%		% VSMP -Qtr. 3	100.0%				
Coll. Effic. - Autumn	96.6%	% VSL -Qtr. 4	100.0%		% PCL - Qtr. 4	100.0%		% TP - Qtr. 4	100.0%		% VSMP -Qtr. 4	100.0%				
Coll. Effic. - Level	1	% VSL -Level	1		% PCL - Level	1		% TP - Level	1		% VSMP -Level	1				
Sea Salt Correction	25.1%															
Sea Salt Corr. - Level	2															
					Data Completeness Level	1		Overall Data Quality Level	1							

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Wooddale Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
8936166	06-Jan-99	13-Jan-99	7	2930.8	45.7	62.0	73.6	SG	M
8936173	13-Jan-99	20-Jan-99	7	1950.5	30.4	25.0	121.5	SG	M
8936180	20-Jan-99	27-Jan-99	7	4981.2	77.6	70.8	109.6	SG	M
8936187	27-Jan-99	03-Feb-99	7	1379.6	21.5	7.6	282.8	SG	S
8936194	03-Feb-99	10-Feb-99	7	3347.9	52.1	40.2	129.7	SG	M
8936201	10-Feb-99	17-Feb-99	7	2601.1	40.5	31.2	129.9	SG	M
8936208	17-Feb-99	24-Feb-99	7	4037.6	62.9	69.4	90.6	SG	M
8936215	24-Feb-99	03-Mar-99	7	2463.5	38.4	33.4	114.9	SG	M
8936222	03-Mar-99	10-Mar-99	7	1222.8	19.0	4.6	414.1	SG	M
8936229	10-Mar-99	17-Mar-99	7	1583.1	24.7	26.4	93.4	SG	S
8936236	17-Mar-99	24-Mar-99	7	1643.8	25.6	12.0	213.4	SG	M
8936243	24-Mar-99	31-Mar-99	7	2144.0	33.4	36.6	91.2	SG	M
8936250	31-Mar-99	07-Apr-99	7	1741.9	27.1	16.6	163.4	RG	M
8936257	07-Apr-99	14-Apr-99	7	2003.0	31.2	27.6	113.0	RG	M
8936264	14-Apr-99	21-Apr-99	7	1044.8	16.3	0.2	8137.1	RG	R
8936271	21-Apr-99	28-Apr-99	7		11	1.5	11	RG	S
8936278	28-Apr-99	05-May-99	7	1224.8	19.1	18.4	103.7	RG	M
8936285	05-May-99	12-May-99	7	1828.0	28.5	13.2	215.7	RG	M
8936292	12-May-99	19-May-99	7	1700.9	26.5	11.6	228.4	RG	M
8936299	19-May-99	26-May-99	7	3691.5	57.5	42.2	136.3	RG	R
8936306	26-May-99	02-Jun-99	7	1056.3	16.5	1.8	914.1	RG	R
8936313	02-Jun-99	09-Jun-99	7	2162.1	33.7	20.2	166.7	RG	R
8936320	09-Jun-99	16-Jun-99	7	1442.8	22.5	7.4	303.7	RG	R
8936327	16-Jun-99	23-Jun-99	7	1050.1	16.4	0.6	2726.1	RG	R
8936334	23-Jun-99	30-Jun-99	7	1293.8	20.2	4.2	479.8	RG	R
8936341	30-Jun-99	07-Jul-99	7	1539.8	24.0	10.4	230.6	RG	R
8936348	07-Jul-99	14-Jul-99	7	2930.4	45.6	33.4	136.7	RG	R
8936355	14-Jul-99	21-Jul-99	7	1262.3	19.7	4.4	446.9	RG	R
8936362	21-Jul-99	28-Jul-99	7	2122.5	33.1	18.4	179.7	RG	M
8936369	28-Jul-99	04-Aug-99	7	1448.6	22.6	7.6	296.9	RG	M
8936376	04-Aug-99	11-Aug-99	7	5049.5	78.7	62.6	125.6	RG	M
8936383	11-Aug-99	18-Aug-99	7	6197.1	96.5	80.2	120.4	RG	R
8936390	18-Aug-99	25-Aug-99	7	2391.2	37.2	22.4	166.3	RG	M
8936397	25-Aug-99	01-Sep-99	7	2199.7	34.3	20.6	166.3	RG	M
8936404	01-Sep-99	08-Sep-99	7	1619.5	25.2	10.2	247.3	RG	M
8936411	08-Sep-99	15-Sep-99	7	4501.1	70.1	55.6	126.1	RG	M
8936418	15-Sep-99	22-Sep-99	7	4164.7	64.9	52.8	122.9	RG	M
8936425	22-Sep-99	29-Sep-99	7	3348.5	52.2	40.2	129.7	RG	M
8936432	29-Sep-99	06-Oct-99	7	2603.2	40.5	26.6	152.4	RG	M
8936439	06-Oct-99	13-Oct-99	7	3997.6	62.3	50.6	123.1	RG	M
8936446	13-Oct-99	20-Oct-99	7	4500.4	70.1	72.8	96.3	RG	M
8936453	20-Oct-99	27-Oct-99	7	2292.3	35.7	21.8	163.8	RG	M
8936460	27-Oct-99	03-Nov-99	7	1895.0	29.5	9.8	301.2	RG	M
8936467	03-Nov-99	10-Nov-99	7	3257.8	50.7	36.2	140.2	RG	M
8936474	10-Nov-99	17-Nov-99	7	3035.7	47.3	34.2	138.3	RG	M
8936481	17-Nov-99	24-Nov-99	7	2053.2	32.0	16.6	192.7	RG	M
8936488	24-Nov-99	01-Dec-99	7	4036.0	62.9	45.8	137.3	RG	M
8936495	01-Dec-99	08-Dec-99	7	3166.4	49.3	38.4	128.4	SG	M
8936502	08-Dec-99	15-Dec-99	7	1257.8	19.6	4.2	466.5	SG	M
8936509	15-Dec-99	22-Dec-99	7	2750.5	42.8	39.4	108.7	SG	M
8936516	22-Dec-99	29-Dec-99	7	1968.0	30.7	21.8	140.6	SG	M
8936523	29-Dec-99	05-Jan-2000	7	4594.9	71.6	42.9	166.9	SG	M

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Wooddale Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mol/l) flg	Cond. umhos flg	SO4 (mol/l) flg	XSO4 (mol/l) flg	NNO3 (mol/l) flg	Cl (mol/l) flg	NNH4 (mol/l) flg	Na (mol/l) flg	Ca (mol/l) flg	Mg (mol/l) flg	K (mol/l) flg	Alk CaCO3 (mol/l) flg
06-Jan-99	-23.76	5.06	.0088	I1	0.17	0.132	0.046	0.29	<-0.03	0.15	0.08	0.04	0.03	-0.45
13-Jan-99	-5.22	4.62	.0242	I1	0.73	0.370	0.216	2.61	0.06	1.44	0.12	0.21	0.06	-1.37
20-Jan-99	-25.18	5.11	.0078	I1	0.21	0.180	0.029	0.24	<-0.03	0.12	0.08	0.04	0.03	-0.38
27-Jan-99	-5.66	5.00	.0101	I1	0.73	0.138	0.056	4.27	0.06	2.37	0.17	0.34	0.10	-0.64
03-Feb-99	-29.07	5.20	.0064	I1	0.12	0.080	0.029	0.30	<-0.03	0.16	0.09	0.05	0.03	-0.41
10-Feb-99	-3.76	4.54	.0291	I1	0.95	0.882	0.173	0.52	0.08	0.27	<-0.07	<0.04	0.03	-1.66
17-Feb-99	4.19	5.21	.0062	3.2	0.18	0.169V3	0.030	0.13	<-0.02	0.02	<-0.02	<0.01	<0.01	-1.10
24-Feb-99	-10.59	4.92	.0121	I1	0.45	0.360	0.066	0.60	0.04	0.36	0.07	0.04	0.04	-0.76
03-Mar-99	-4.42	4.22	.0607	I1	3.22	2.211	0.295	6.80	0.18	4.04	0.19	0.53	0.15	-3.08
10-Mar-99	-15.27	5.17	.0068	I1	0.25	0.195	0.024	0.39	0.03	0.22	0.07	<0.04	0.03	-0.42
17-Mar-99	-15.96	4.73	.0188	I1	0.41	0.365	0.169	0.27	0.05	0.18	0.12	<0.04	0.05	-0.99
24-Mar-99	-6.54	4.52	.0304	I1	1.31	1.265	0.149	0.29	0.11	0.18	0.08	<0.04	0.04	-1.68
31-Mar-99	-17.47	5.28	.0053	I1	0.22	0.157	0.028	0.44	0.04	0.25	0.08	0.04	0.03	-0.50
07-Apr-99	-9.42	4.92	.0121	I1	0.50	0.457	0.070	0.31	0.04	0.17	0.09	<0.04	0.03	-1.06
14-Apr-99	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1	I1
21-Apr-99	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
28-Apr-99	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7
05-May-99	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6
12-May-99	-8.99	5.68	.0021	I1	1.01	0.935	0.101	0.52	0.33	0.30	0.19	0.05	0.03	0.14
19-May-99	-21.39	5.50	.0032	I1	0.26	0.235	0.029	0.22	0.08	0.10	0.10	<0.04	0.05	-0.09
26-May-99	I1	I1	I1	I1	13.05	12.740	2.080	2.42	3.03	1.23	5.90 C3	0.39	1.74	
02-Jun-99	0.44	4.11	.0782	I1	3.39	3.348 V3	0.540	0.26	0.37	0.08	0.10	<0.04	0.05	-4.33
09-Jun-99	-0.04	4.30	.0505	I1	2.76	2.717	0.315	0.35	0.29	0.17	0.16	<0.04	0.08	-2.91
16-Jun-99	I1	I1	I1	I1	0.21	0.110 V2	0.022	0.19	0.14	0.40	1.50	0.16	0.38	
23-Jun-99	2.54	4.16	.0697	I1	3.32	3.312 V2	0.500	0.13	0.36	0.03	0.08	<0.04	0.05	-3.85
30-Jun-99	2.62	4.30	.0505	I1	2.46	2.335	0.340	0.90	0.23	0.50	0.08	<0.04	0.07	-2.89
07-Jul-99	-5.01	4.68	.0211	I1	0.94	0.920	0.136	0.16	0.12	0.08	<-0.07	<0.04	0.04	-1.23
14-Jul-99	-11.18	5.30	.0051	I1	0.35	0.190	0.028	1.10	0.07	0.64	0.09	0.08	0.06	-0.23
21-Jul-99	-5.23	4.66	.0221	I1	0.74	0.727	0.165	0.09	0.06	0.05	<-0.07	<0.04	0.05	-1.31
28-Jul-99	-6.12	4.60	.0253	I1	0.98	0.965	0.176	0.10	0.12	0.06	<-0.07	<0.04	0.03	-1.40
04-Aug-99	-3.19	5.10	.0080	I1	0.55	0.372	0.054	1.27	0.07	0.71	0.07	0.05	0.12 C3	-0.53
11-Aug-99	0.03	4.82	.0153	6.8	0.56	0.549 V3	0.080	0.10	0.05	<0.02	<-0.02	<0.01	<0.01	-1.55
18-Aug-99	-0.25	4.47	.0342	15.1	1.21	1.199 V3	0.190	0.10	0.09	<0.02	<-0.02	<0.01	<0.01	-2.41
25-Aug-99	0.33	4.91	.0124	5.6	0.67	0.659 V3	0.060	0.10	0.10	<0.02	<-0.02	<0.01	<0.01	-1.40
01-Sep-99	1.7	4.79	.0163	9.6	0.88	0.859 V3	0.150	0.34	0.21	0.05	0.06	0.01	<0.01	-1.59
08-Sep-99	-8.04	5.16	.0070	3.1	0.26	0.249 V3	0.030	<0.10	0.03	<0.02	<-0.02	<0.01	<0.01	-1.13
15-Sep-99	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7	I7
22-Sep-99	5.02	4.61	.0247	12.8	1.36	1.339 V3	0.160	0.21	0.18	0.03	0.02	0.01	0.03	-1.87
29-Sep-99	9.09	5.18	.0067	3.5	0.29	0.279 V3	0.040	0.15	0.04	<0.02	<-0.02	<0.01	<0.01	-1.05
06-Oct-99	-0.64	5.04	.0092	6.8	0.46	0.370	0.040	0.71	0.04	0.36	0.02	0.05	<0.01	-1.23
13-Oct-99	I1	I6	I6	I6	I6	I6	I6	I6	I1	I6	I6	I6	I6	I6
20-Oct-99	4.69	5.32	.0048	3.3	0.10	0.082 V2	0.020	0.36	0.05	0.07	<-0.02	<0.01	<0.01	-10.50
27-Oct-99	-0.09	4.11	.0782	69.3	4.45	3.254	0.790	8.24	0.39	4.79	0.36	0.55	0.20	-4.13
03-Nov-99	-0.55	4.80	.0160	19.0	0.91	0.485	0.130	3.04	0.06	1.70	0.08	0.19	0.06	-1.65
10-Nov-99	4.08	5.16	.0070	5.3	0.26	0.182	0.040	0.67	<-0.02	0.31	<-0.02	0.04	<0.01	-1.24
17-Nov-99	-1.84	4.30	.0505	32.4	2.07	1.640	0.390	3.07	0.18	1.72	0.10	0.22	0.10	-2.99
24-Nov-99	-4.75	4.93	.0118	8.3	0.45	0.345	0.070	0.77	0.03	0.42	0.02	0.07	0.03	-1.38
01-Dec-99	-0.85	4.52	.0304	14.9	0.91	0.842	0.230	0.54	0.06	0.27	0.02	0.05	<0.01	-2.23
08-Dec-99	-5.91	4.99	.0103	8.5	0.29	0.127	0.070	1.17	<-0.02	0.65	0.04	0.10	<0.01	-1.24
15-Dec-99	-2.67	4.83	.0149	19.6	0.87	0.343	0.120	3.65	0.02	2.11	0.09	0.27	0.08	-1.60
22-Dec-99	-1.51	4.87	.0136	30.5	1.36	0.423	0.070	6.65	0.03	3.75	0.15	0.46	0.14	-1.59
29-Dec-99	-2.97	4.92	.0121	6.9	0.43	0.357	0.060	0.56	0.02	0.29	<-0.02	0.05	<0.01	-1.47

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Wooddale Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
7536529	04-Jan-2000	11-Jan-2000	7	871.0	13.6	16.2	83.7		S
7536536	11-Jan-2000	18-Jan-2000	7	633.0	9.9	35.2	28.0		M
7536543	18-Jan-2000	25-Jan-2000	7	1626.0	25.3	58.0	43.7		M
7536550	25-Jan-2000	01-Feb-2000	7	1739.0	27.1	31.4	86.3		M
7536557	01-Feb-2000	08-Feb-2000	7	87.0	1.4	9.0	15.1		M
7536564	08-Feb-2000	15-Feb-2000	7	1787.0	27.8	27.2	102.3		M
7536571	15-Feb-2000	22-Feb-2000	7	585.0	9.1	13.6	67.0		M
7536578	22-Feb-2000	29-Feb-2000	7	16.0	0.2	1.0	24.9		M
7536585	29-Feb-2000	07-Mar-2000	7	1211.0	18.9	24.4	77.3		R
7536592	07-Mar-2000	14-Mar-2000	7	728.0	11.3	15.0	75.6		M
7536599	14-Mar-2000	21-Mar-2000	7	703.0	11.0	44.0	24.9		M
7536606	21-Mar-2000	28-Mar-2000	7	2384.0	37.1	19.8	187.5		M
7536613	28-Mar-2000	04-Apr-2000	7	1582.0	24.6	27.4	89.9		R
7536620	04-Apr-2000	11-Apr-2000	7	231.0	3.6	4.0	90.0		R
7536627	11-Apr-2000	18-Apr-2000	7	410.0	6.4	7.0	91.2		M
7536634	18-Apr-2000	25-Apr-2000	7	900.0	14.0	17.2	81.5		R
7536641	25-Apr-2000	02-May-2000	7	1779.0	27.7	45.8	60.5		S
7536648	02-May-2000	09-May-2000	7	1147.0	17.9	10.0	178.7		M
7536655	09-May-2000	16-May-2000	7	869.0	13.5	14.1	96.0		R
7536662	16-May-2000	23-May-2000	7	426.0	6.6	8.2	80.9		R
7536669	23-May-2000	30-May-2000	7	2493.0	38.8	37.8	102.7		R
7536676	30-May-2000	06-Jun-2000	7	1890.0	29.4	28.2	104.4		R
7536683	06-Jun-2000	13-Jun-2000	7	1587.0	24.7	19.6	126.1		M
7536690	13-Jun-2000	20-Jun-2000	7	969.0	15.1	14.0	107.8		R
	20-Jun-2000	27-Jun-2000	7	3.0	0.0			V1 I7	N
7536704	27-Jun-2000	04-Jul-2000	7	710.0	11.1	17.0	65.1		R
7536711	04-Jul-2000	11-Jul-2000	7	3697.0	57.6	54.4	105.9		R
7536718	11-Jul-2000	19-Jul-2000	8	1221.0	19.0	21.8	87.2		R
7536726	19-Jul-2000	25-Jul-2000	6	394.0	6.1	7.0	87.7		R
	25-Jul-2000	01-Aug-2000	7					V1 I1	N
	01-Aug-2000	08-Aug-2000	7			4.0			N
7536746	08-Aug-2000	15-Aug-2000	7	1951.0	30.4	39.0	77.9		R
7536753	15-Aug-2000	22-Aug-2000	7	2502.0	39.0	29.0	134.4		R
7536760	22-Aug-2000	29-Aug-2000	7	987.0	15.4	15.6	98.6		R
7536767	29-Aug-2000	05-Sep-2000	7	1429.0	22.3	27.2	81.8		R
	05-Sep-2000	12-Sep-2000	7	242.0	3.8	1.2	314.1		R
7536781	12-Sep-2000	19-Sep-2000	7	1782.0	27.8	28.6	97.1		R
7536788	19-Sep-2000	26-Sep-2000	7	887.0	13.8	14.6	94.6		R
7536795	26-Sep-2000	03-Oct-2000	7	946.0	14.7	17.8	82.8		M
7536802	03-Oct-2000	11-Oct-2000	8	3276.0	51.0	105.4	48.4		R
7536810	11-Oct-2000	17-Oct-2000	6	4530.0	70.6	15.8	446.6		M
7536816	17-Oct-2000	24-Oct-2000	7	2610.0	40.7	52.0	78.2		R
7536823	24-Oct-2000	31-Oct-2000	7	2802.0	43.6	49.8	87.6		R
7536830	31-Oct-2000	07-Nov-2000	7	3467.0	54.0	56.4	95.8		R
7536837	07-Nov-2000	14-Nov-2000	7	2120.0	33.0	37.6	87.8		R
7536844	14-Nov-2000	21-Nov-2000	7	1140.0	17.8	31.8	55.8		R
7536851	21-Nov-2000	28-Nov-2000	7	380.0	5.9	11.2	52.8		M
7536858	28-Nov-2000	05-Dec-2000	7	88.0	1.4	10.0	13.7		M
7536865	05-Dec-2000	12-Dec-2000	7	352.0	5.5	21.0	26.1		M
7536872	12-Dec-2000	19-Dec-2000	7	1263.0	19.7	28.2	69.8		M
7536879	19-Dec-2000	26-Dec-2000	7	857.0	13.3	41.0	32.6		M
7536886	26-Dec-2000	02-Jan-2001	7	1186.0	18.5	16.0	115.5		S

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Wooddale Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mg/l) flg	Cond. umhos flg	SO4 (mg/l) flg	XSO4 (mg/l) flg	NNO3 (mg/l) flg	Cl (mg/l) flg	NNH4 (mg/l) flg	Na (mg/l) flg	Ca (mg/l) flg	Mg (mg/l) flg	K (mg/l) flg	Alk CaCO3 (mg/l) flg
04-Jan-2000	4.86	5.40	.0040	2.90	0.22	.202	0.020	0.13	<0.02	0.07	<0.02	<0.01	<0.01	-0.39
11-Jan-2000	-6.03	4.90	.0127	6.50	0.41	.335	0.070	0.51	0.03	0.30	0.02	0.03	0.01	-0.87
18-Jan-2000	-10.28	5.30	.0051	3.60	0.12	.060	0.020	0.42	<0.02	0.24	<0.02	0.03	0.01	-0.60
25-Jan-2000	-13.08	5.20	.0064	2.70	0.12	.100	0.030	0.15	<0.02	0.08	<0.02	<0.01	<0.01	-0.51
01-Feb-2000	-13.26	5.10	.0080	5.60	0.36	.285	0.060	0.49	0.03	0.30	0.13	0.04	0.02	-0.68
08-Feb-2000	-10.98	5.20	.0064	3.00	0.19	.172	0.030	0.12	0.02	0.07	<0.02	<0.01	<0.01	-0.75
15-Feb-2000	-15.70	5.10	.0080	3.80	0.21	.187	0.040	0.13	0.02	0.09	0.02	<0.01	0.01	-0.59
22-Feb-2000	I1	I1	I1	I1	1.80	1.702	0.320	0.56	0.06	0.39	0.50	0.16	0.16	
29-Feb-2000	-6.91	5.20	.0064	4.30	0.24	.172	0.040	0.47	0.03	0.27	<0.02	0.04	0.01	-0.67
07-Mar-2000	-3.50	4.70	.0201	10.60	1.03	.947	0.100	0.54	0.10	0.33	0.04	0.04	0.01	-1.26
14-Mar-2000	1.54	4.30	.0505	23.00 QB	1.11 QB	1.050 QB	0.530 QB	0.46	0.11	0.24	0.03	0.02	<0.01	-2.70
21-Mar-2000	-8.86	5.10	.0080	4.10	0.35	.325	0.030	0.15	0.04	0.10	<0.02	<0.01	0.01	-0.87
28-Mar-2000	0.97	4.60	.0253	13.90	1.05	.962 V2	0.220	0.58	0.12	0.35	0.02	0.03	0.02	-1.48
04-Apr-2000	-5.07	4.70	.0201	12.50	0.94	.835	0.190	0.68	0.13	0.42	0.09	0.05	0.07	-1.16
11-Apr-2000	-7.64	5.20	.0064	3.30	0.29	.282	0.040	<0.10	0.04	0.03	0.02	<0.01	<0.01	-0.72
18-Apr-2000	-4.89	5.00	.0101	4.40	0.31	.295	0.060	0.12	0.02	0.06	0.02	<0.01	<0.01	-0.82
25-Apr-2000	-1.52	5.30	.0051	2.70	0.22	.202	0.040	0.14	0.03	0.07	0.02	<0.01	<0.01	-0.59
02-May-2000	5.03	4.87	.0136	7.83	0.69	.670	0.140	0.14	0.08	0.08	0.04	<0.01	0.02	-0.98
09-May-2000	4.82	4.72	.0192	10.60	0.88	.847	0.170	0.26	0.12	0.13	<0.02	<0.01	<0.01	-1.25
16-May-2000	-1.50	4.94	.0116	8.70	0.54	.455	0.140	0.57	0.10	0.34	0.03	0.04	0.01	-0.91
23-May-2000	0.35	4.84	.0146	7.70	0.58	.555	0.090	0.18	0.05	0.10	<0.02	<0.01	<0.01	-1.03
30-May-2000	-2.60	5.17	.0068	4.70	0.48	.457 V2	0.060	0.12	0.07	0.09	0.03	<0.01	0.04	-0.68
06-Jun-2000	-0.19	5.07	.0086	4.50	0.37	.360	0.040	0.10	0.03	0.04	<0.02	<0.01	<0.01	-0.66
13-Jun-2000	0.89	4.35	.0450	28.70	2.65	2.602 QB	0.420	0.32	0.34	0.19	0.11	0.02	0.32 QB	-2.77
20-Jun-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
27-Jun-2000	0.73	4.63	.0236	11.40	1.00	.995 V2	0.120	<0.10	0.07	0.02	<0.02	<0.01	<0.01	-1.36
04-Jul-2000	-3.83	5.22	.0061	3.30	0.20	.182	0.040	0.13	0.02	0.07	<0.02	<0.01	<0.01	-0.65
11-Jul-2000	-7.28	4.78	.0167	8.40	0.56	.537	0.090	0.17	0.06	0.09	<0.02	<0.01	0.03	-1.06
19-Jul-2000	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6	I6
25-Jul-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
01-Aug-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
08-Aug-2000	1.50	4.53	.0297	15.50 QB	1.36 QB	1.342 QB	0.210	0.14	0.17	0.07	<0.02	<0.01	0.01	-1.66
15-Aug-2000	-4.93	5.20	.0064	6.00	0.75	.715	0.060	0.28	0.13	0.14	0.13 QB	<0.03	0.05	-0.88
22-Aug-2000	-14.54	4.90	.0127	6.70	0.59	.552	0.080	0.24	0.06	0.15	<0.09	0.07	0.07	-1.34
29-Aug-2000	-21.76	4.80	.0160	6.60	0.60	.582 V2	0.080	0.10	0.06	0.07	<0.09	0.07	0.06	-1.30
05-Sep-2000	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2	I2
12-Sep-2000	-19.25	5.00	.0101	4.70	0.39	.365 V2	0.050	0.14	<0.01	0.10	<0.09	0.07	<0.03	-1.30
19-Sep-2000	-32.42	5.10	.0080	3.30	0.25	.230 V2	0.040	0.10	<0.01	0.08	<0.09	0.07	0.06	-0.94
26-Sep-2000	-7.53	4.90	.0127	6.70	0.64	.615 V2	0.120	0.19	0.14	0.10	<0.10	<0.03	0.04	-1.25
03-Oct-2000	-12.31	5.00	.0101	4.40	0.35	.335	0.060	0.10	<0.03	0.06	<0.10 QB	<0.03	0.04 QB	-1.28
11-Oct-2000	-10.92	5.20	.0064	3.40	0.29	.258 V3	0.040	0.28	<0.03	0.19	<0.10	<0.03	0.06	-1.01
17-Oct-2000	-2.53	4.60	.0253	10.90 QB	1.05 QB	1.025 QB	0.160	0.19	0.09	0.10	<0.10	<0.03	0.04	-1.60
24-Oct-2000	-1.65	5.00	.0101	9.10	0.60	.420	0.050	1.24	<0.03	0.72	<0.10	0.08	0.05	-0.98
31-Oct-2000	-3.94	5.00	.0101	5.30	0.41	.362	0.050	0.36	<0.03	0.19	<0.10	<0.03	0.04	-1.24
07-Nov-2000	-21.39	5.30	.0051	3.00	0.12	.072	0.030	0.32	<0.03	0.19	<0.10	0.03	0.07	-0.89
14-Nov-2000	-31.86	5.10	.0080	3.00	0.18	.170 V2	0.040	<0.10	<0.03	0.04	<0.10	<0.03	0.04	-0.72
21-Nov-2000	-4.24	4.90	.0127	8.80	0.52	.362	0.080	1.07	<0.03	0.63	<0.10	0.07	0.06	-1.17
28-Nov-2000	-0.43	4.80	.0160	67.60 QB	1.69	.673	0.140	7.56 QB	0.10	4.07 QB	0.27	0.52 QB	0.17	-1.31
05-Dec-2000	-1.50	4.90	.0127	10.20	0.53	.342	0.130	1.29	0.04	0.75	<0.10	0.08	0.05	-1.13
12-Dec-2000	-5.11	4.80	.0160	8.00	0.49	.400 V2	0.130	0.56	<0.03	0.36	<0.10	0.03	0.06	-1.27
19-Dec-2000	-7.38	5.00	.0101	6.50	0.40	.292	0.050	0.73	<0.03	0.43	<0.10	0.05	0.05	-1.07
26-Dec-2000	-16.63	5.30	.0051	3.70	0.17	.102	0.020	0.49	<0.03	0.27	<0.10	0.06	0.04	-0.83

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Wooddale Acid Rain Report

Part (c): Deposition & Summary Table

Start: 6-Jan-99 Days: 363
 End: 4-Jan-00 Weeks: 52

	Sample	Gauge	Ionbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
	Depth	Depth														
Total Sample Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Trace Precipitation Periods	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Non-Trace Precipitation Periods	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51
# of Valid Samples	52	52	34	34	34	34	50	50	50	50	51	50	50	51	51	51
% of Valid Samples	100%	100%	65%	65%	65%	65%	96%	96%	96%	96%	98%	96%	96%	98%	98%	98%
Mean	16.03	22.11	-2.61	4.69	0.0204	12.2	0.76	0.66	0.12	0.78	0.146	0.43	0.07	0.062	0.06	NA
Standard Deviation	14.36	18.45	5.92	0.33	0.0176	11.39	0.64	0.6	0.14	1.94	0.56	1.11	0.12	0.156	0.15	NA
Minimum	0.37	1.6	-19.3	4.11	0.0043	2.13	0.08	0.05	0	0.05	0.01	0.01	0.01	0.005	0.01	NA
Maximum	73.71	77.4	7.28	5.37	0.0782	56.8	2.42	2.38	0.73	13.9	4.08	7.88	0.83	1.02	0.88	NA
Precipitation Weighted Conc. (mg/l)				4.85	0.0142	7.94	0.51	0.45	0.08	0.47	0.072	0.24	0.04	0.035	0.03	0
Total Gauge Depth (mm)		1127.8	1127.8	1127.8	1127.8	1127.8	1127.8	1127.8	1127.8	1127.8	1127.8	1127.8	1127.8	1127.8	1127.8	1127.8
Deposition (kg / Ha / Period)				0.1601		5.76	5.07	0.92	5.26	0.811	2.71	0.41	0.39	0.35	0	0
Deposition (365 Day, kg / Ha / Yr)				0.161		5.79	5.1	0.93	5.29	0.816	2.72	0.41	0.392	0.35	0	0
Coll. Effic. - Period	79.3%	% VSL - Period	100.0%		% PCL - Period	100.0%		% TP - Period	100.0%		% VSMP -Period	98.1%				
Coll. Effic. - Winter	64.5%	% VSL -Qtr. 1	100.0%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	100.0%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	75.9%	% VSL -Qtr. 2	100.0%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	100.0%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	82.2%	% VSL -Qtr. 3	100.0%		% PCL - Qtr. 3	100.0%		% TP - Qtr. 3	100.0%		% VSMP -Qtr. 3	100.0%				
Coll. Effic. - Autumn	73.2%	% VSL -Qtr. 4	100.0%		% PCL - Qtr. 4	100.0%		% TP - Qtr. 4	100.0%		% VSMP -Qtr. 4	100.0%				
Coll. Effic. - Level	2	% VSL -Level	1		% PCL - Level	1		% TP - Level	1		% VSMP -Level	1				
Sea Salt Correction	12.0%															
Sea Salt Corr. - Level	1															
				Data Completeness Level		2		Overall Data Quality Level			2					

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Wooddale Acid Rain Report

Part (c): Deposition & Summary Table

Start:	4-Jan-00	Days:	364
End:	2-Jan-01	Weeks:	52

	Sample	Gauge	Ionbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
	Depth	Depth														
Total Sample Periods	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Trace Precipitation Periods	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Non-Trace Precipitation Periods	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
# of Valid Samples	52	52	46	46	46	46	47	47	47	47	47	47	47	47	47	47
% of Valid Samples	100%	100%	88%	88%	88%	88%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Mean	21.02	25.63	-7.02	4.88	0.0133	8.61	0.6	0.53	0.1	0.49	0.057	0.28	0.05	0.04	0.04	NA
Standard Deviation	15.77	18.75	8.51	0.25	0.0095	10.17	0.49	0.46	0.1	1.08	0.06	0.58	0.08	0.077	0.05	NA
Minimum	0.05	1	-32.42	4.3	0.004	2.7	0.12	0.06	0.02	0.05	0.005	0.02	0.01	0.005	0.01	NA
Maximum	70.56	105.4	5.03	5.4	0.0505	67.6	2.65	2.6	0.53	7.56	0.34	4.07	0.5	0.52	0.32	NA
Precipitation Weighted Conc. (mg/l)				4.88	0.0131	7.48	0.52	0.47	0.09	0.38	0.048	0.22	0.04	0.029	0.03	0
Total Gauge Depth (mm)		1281.5	1281.5	1281.5	1281.5	1281.5	1281.5	1281.5	1281.5	1281.5	1281.5	1281.5	1281.5	1281.5	1281.5	1281.5
Deposition (kg / Ha / Period)					0.1685		6.71	6.02	1.19	4.9	0.617	2.8	0.49	0.371	0.42	0
Deposition (365 Day, kg / Ha / Yr)					0.169		6.73	6.03	1.19	4.91	0.619	2.81	0.49	0.372	0.42	0
Coll. Effic. - Period	82.0%	% VSL - Period	100.0%		% PCL - Period	100.0%		% TP - Period	99.0%		% VSMP -Period	97.9%				
Coll. Effic. - Winter	59.0%	% VSL -Qtr. 1	100.0%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	100.0%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	86.9%	% VSL -Qtr. 2	100.0%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	100.0%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	98.7%	% VSL -Qtr. 3	100.0%		% PCL - Qtr. 3	100.0%		% TP - Qtr. 3	95.3%		% VSMP -Qtr. 3	100.0%				
Coll. Effic. - Autumn	86.8%	% VSL -Qtr. 4	100.0%		% PCL - Qtr. 4	100.0%		% TP - Qtr. 4	100.0%		% VSMP -Qtr. 4	100.0%				
Coll. Effic. - Level	1	% VSL -Level	1		% PCL - Level	1		% TP - Level	1		% VSMP -Level	1				
Sea Salt Correction	10.4%															
Sea Salt Corr. - Level	1															
					Data Completeness Level	1		Overall Data Quality Level	1							

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Salmonier Acid Rain Report

Part (a): Rain Collection Statistics

Sample Id No	Start Date	End Date	No. of Days	Sample Volume (ml)	Sample Depth (mm) flq	Gauge Depth (mm) flq	Coll. Effic. (%) flq	Gauge Type	Prec Type
1736531	06-Jan-2000	12-Jan-2000	6	1794.0	27.9	21.2	131.8		M
1736537	12-Jan-2000	19-Jan-2000	7	1172.0	18.3	58.2	31.4		M
1736544	19-Jan-2000	26-Jan-2000	7	5690.0	88.6	68.0	130.3		M
1736551	26-Jan-2000	01-Feb-2000	6	1983.0	30.9	22.0	140.4		S
1736557	01-Feb-2000	10-Feb-2000	9	1033.0	16.1	25.4	63.3		S
1736566	10-Feb-2000	17-Feb-2000	7	974.0	15.2	22.2	68.3		M
1736573	17-Feb-2000	24-Feb-2000	7	643.0	10.0	3.0	333.9		S
1736580	24-Feb-2000	02-Mar-2000	7	456.0	7.1	26.8	26.5		S
1736587	02-Mar-2000	09-Mar-2000	7	1698.0	26.4	17.2	153.8		S
1736594	09-Mar-2000	16-Mar-2000	7	1431.0	22.3	45.4	49.1		S
1736601	16-Mar-2000	22-Mar-2000	6	6163.0	96.0	62.2	154.3		S
1736607	22-Mar-2000	30-Mar-2000	8	1118.0	17.4	19.8	88.0		M
1736615	30-Mar-2000	06-Apr-2000	7	2589.0	40.3	47.4	85.1		M
1736622	06-Apr-2000	13-Apr-2000	7	1219.0	19.0	21.4	88.7		M
1736629	13-Apr-2000	20-Apr-2000	7	835.0	13.0	17.4	74.7		S
1736636	20-Apr-2000	28-Apr-2000	8	1779.0	27.7	15.0	184.7		M
1736644	28-Apr-2000	04-May-2000	6	2730.0	42.5	46.0	92.4		M
1736650	04-May-2000	11-May-2000	7	466.0	7.3	7.6	95.5		R
1736657	11-May-2000	18-May-2000	7	2007.0	31.3	31.0	100.8		R
1736664	18-May-2000	26-May-2000	8	1888.0	29.4	14.4	204.2		R
1736672	26-May-2000	05-Jun-2000	10	1543.0	24.0	23.8	101.0		R
1736682	05-Jun-2000	20-Jun-2000	15	2028.0	31.6	55.2	57.2		R
1736697	20-Jun-2000	29-Jun-2000	9	93.0	1.4	6.4	22.6		R
1736706	29-Jun-2000	06-Jul-2000	7	3413.0	53.2	40.6	130.9		R
1736713	06-Jul-2000	11-Jul-2000	5	2246.0	35.0	39.6	88.3		R
1736718	11-Jul-2000	19-Jul-2000	8	2192.0	34.1	7.8	437.7		R
1736726	19-Jul-2000	25-Jul-2000	6	1095.0	17.1	13.6	125.4		R
1736732	25-Jul-2000	02-Aug-2000	8	1058.0	16.5	27.2	60.6		R
1736740	02-Aug-2000	16-Aug-2000	14	2526.4	39.4	39.8	98.9		R
1736754	16-Aug-2000	25-Aug-2000	9	1509.0	23.5	39.2	60.0		R
1736763	25-Aug-2000	01-Sep-2000	7	4344.5	67.7	46.2	146.5		R
	01-Sep-2000	11-Sep-2000	10			12.0			R
1736780	11-Sep-2000	18-Sep-2000	7	2069.0	32.2	34.2	94.2		R
1736787	18-Sep-2000	25-Sep-2000	7	2311.0	36.0	39.6	90.9		R
1736794	25-Sep-2000	02-Oct-2000	7	940.0	14.6	17.8	82.3		R
1736801	02-Oct-2000	09-Oct-2000	7	3209.2	50.0	58.0	86.2		R
1736808	09-Oct-2000	16-Oct-2000	7	3890.0	60.6	53.8	112.6		M
1736815	16-Oct-2000	23-Oct-2000	7	2002.0	31.2	33.0	94.5		M
1736822	23-Oct-2000	31-Oct-2000	8	4116.3	64.1	67.2	95.4		R
1736830	31-Oct-2000	06-Nov-2000	6	1379.0	21.5	27.0	79.6		R
1736836	06-Nov-2000	14-Nov-2000	8	2142.0	33.4	46.6	71.6		R
1736844	14-Nov-2000	21-Nov-2000	7	3345.5	52.1	41.2	126.5		M
	21-Nov-2000	29-Nov-2000	8			42.9			M
1736859	29-Nov-2000	04-Dec-2000	5	976.0	15.2	15.2	100.0	Q1	S
1736864	04-Dec-2000	11-Dec-2000	7	1747.0	27.2	27.2	100.0	Q1	M
1736871	11-Dec-2000	18-Dec-2000	7	3436.5	53.5	53.5	100.0	Q1	R
	18-Dec-2000	02-Jan-2001	15					Q1	M

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
Salmonier Acid Rain Report

Part (b): Ion Concentrations

Start Date	Ion Bal. flg	pH flg	H (mg/l) flg	Cond. umhos flg	SO4 (mg/l) flg	XSO4 (mg/l) flg	NNO3 (mg/l) flg	Cl (mg/l) flg	NNH4 (mg/l) flg	Na (mg/l) flg	Ca (mg/l) flg	Mg (mg/l) flg	K (mg/l) flg	Alk CaCO3 (mg/l) flg	
06-Jan-2000	-4.25	5.17	.0068	5.40	0.25	.170	0.060	0.59	0.04	0.32	0.03	0.04	<0.01	-0.66	
12-Jan-2000	-3.47	4.98	.0106	8.57	0.39	.252	0.060	0.98	0.03	0.55	<0.02	0.07	<0.01	-0.71	
19-Jan-2000	-1.73	5.18	.0067	16.30	0.64	.138	0.020	3.61 QB	<0.02	2.01 QB	0.06	0.26 CB	0.06	-0.72	
26-Jan-2000	3.16	4.72	.0192	20.70	1.18	.725	0.120	3.41	<0.02	1.82	0.04	0.23	0.06	-1.19	
01-Feb-2000	1.28	4.56	.0278	39.20	1.97	.978	0.250	7.32	<0.02	3.97	0.25	0.50	0.16	-1.58	
10-Feb-2000	2.30	4.84	.0146	13.70	0.82	.580	0.110	1.85	0.06	0.96	0.05	0.12	0.03	-1.12	
17-Feb-2000	2.77	4.72	.0192	15.40	0.92	.652	0.100	2.02	<0.02	1.07	0.02	0.13	0.03	-1.16	
24-Feb-2000	2.05	4.48	.0334	15.90	1.63	1.560	0.050	0.48	0.02	0.28	<0.02	0.02	<0.01	-1.75	
02-Mar-2000	-1.43	4.98	.0106	6.70	0.38	.300	0.036	0.60	<0.02	0.32	<0.02	0.03	<0.01	-0.73	
09-Mar-2000	-0.10	4.42	.0383	21.00	1.84	1.712	0.220	0.87	0.20	0.51	0.03	0.03	0.01	-1.94	
16-Mar-2000	-2.31	4.84	.0146	10.40	0.61	.457	0.090	1.04	0.05	0.61	0.02	0.06	0.01	-1.00	
22-Mar-2000	-2.31	4.82	.0153	16.70	0.93	.585	0.090	2.41	0.06	1.38	0.07	0.17	0.05	-1.10	
30-Mar-2000	-4.31	5.14	.0073	4.20	0.23	.207	0.050	0.17	0.03	0.09	<0.02	<0.01	<0.01	-0.79	
06-Apr-2000	-2.63	4.88	.0133	9.60	0.73	.617	0.080	0.75	0.08	0.45	0.03	0.05	0.01	-0.90	
13-Apr-2000	0.46	4.44	.0366	19.60	1.37	1.242	0.250	0.90	0.12	0.51	<0.02	0.04	0.01	-1.76	
20-Apr-2000	-0.53	4.88	.0133	8.50	0.51	.427	0.110	0.58	0.05	0.33	0.03	0.03	<0.01	-1.01	
28-Apr-2000	0.40	4.80	.0160	11.00	0.77	.642	0.110	0.89	0.07	0.51	<0.02	0.06	<0.01	-1.14	
04-May-2000	-6.60	5.03	.0094	6.60	0.39	.317	0.060	0.48	0.05	0.29	0.03	0.03	<0.01	-0.63	
11-May-2000	3.02	4.78	.0167	10.50	0.99	.932	0.130	0.40	0.15	0.23	<0.02	0.01	<0.01	-1.18	
18-May-2000	-1.12	4.86	.0139	8.20	0.61	.555	0.100	0.38	0.09	0.22	<0.02	0.01	<0.01	-0.99	
26-May-2000	-0.43	4.62	.0242	12.70	1.18	1.112	0.160	0.45	0.16	0.27	0.02	0.01	<0.01	-1.30	
05-Jun-2000	1.65	4.61	.0247	14.30	1.23	1.137	0.160	0.63	0.13	0.37	<0.02	0.03	<0.01	-1.30	
20-Jun-2000		I1	3.95	.1131	54.20	4.08	3.985 V4	0.800	0.68		I1		I1	I1	-5.07
29-Jun-2000	1.95	4.91	.0124	6.20	0.50	.487	0.060	0.13	0.03	0.05	<0.02	<0.01	<0.01	-0.89	
06-Jul-2000	-15.39	4.96	.0111	7.10	0.45	.387 V3	0.070	0.55	0.13	0.38	0.02	0.03	0.02	-0.91	
11-Jul-2000	0.66	4.38	.0420	20.90	1.88	1.830	0.240	0.38	0.19	0.20	0.03	<0.01	0.01	-2.11	
19-Jul-2000	0.08	4.74	.0183	8.90	0.65	.630	0.120	0.16	0.04	0.08	0.03	<0.01	<0.01	-1.20	
25-Jul-2000	-3.64	4.84	.0146	12.60	0.63	.380	0.110	1.64	<0.02	1.00	0.06	0.12	0.03	-0.93	
02-Aug-2000	1.24	4.65	.0226	10.50	0.91	.899 V3	0.130	0.10	0.09	<0.02	<0.02	<0.01	<0.01	-1.85	
16-Aug-2000	1.41	4.70	.0201	10.80	0.70	.640	0.160	0.50	0.07	0.24	0.02	0.03	<0.01	-1.68	
25-Aug-2000	-19.00	5.00	.0101	5.50	0.34	.282	0.040	0.39	0.01	0.23	<0.09	0.09	<0.03	-1.06	
01-Sep-2000		I2													
11-Sep-2000	-43.53	5.00	.0101	6.10	0.17	.147	0.020	0.14	<0.01	0.09	<0.09	0.07	<0.03	-1.17	
18-Sep-2000	-11.05	4.80	.0160	11.30	0.57	.477	0.110	0.63	0.04	0.37	<0.09	0.10	0.06	-1.47	
25-Sep-2000	-18.00	5.00	.0101	6.00	0.29	.215	0.050	0.53	0.02	0.30	<0.09	0.10	<0.03	-1.15	
02-Oct-2000	-4.99	4.80	.0160	11.60	0.81	.665	0.120	1.00	0.06	0.58	<0.09	0.12	0.07	-1.45	
09-Oct-2000	-9.67	4.90	.0127	8.00	0.50	.392	0.070	0.76	0.02	0.43	<0.09	0.10	0.06	-1.18	
16-Oct-2000	-1.02	5.00	.0101	50.10	1.93	.287	0.050	11.78 QB	<0.01	6.58 QB	0.25 QB	0.83 QB	0.25	-1.15	
23-Oct-2000	-13.20	5.10	.0080	6.60	0.37	.257	0.030	0.78	<0.01	0.45	<0.09	0.12	0.06	-0.91	
31-Oct-2000	-8.04	4.90	.0127	10.50	0.57	.340	0.040	1.62	<0.01	0.92	<0.09	0.17	0.07	-1.26	
06-Nov-2000	-14.80	4.80	.0160	7.30	0.57	.512	0.040	0.41	<0.01	0.23	<0.09	0.08	<0.03	-1.56	
14-Nov-2000	-9.59	5.10	.0080	8.50	0.45	.262	0.030	1.32	0.03	0.75	<0.09	0.15	0.07	-1.01	
21-Nov-2000		I2													
29-Nov-2000	-26.80	5.20	.0064	5.40	0.16	.107	0.020	0.36	<0.01	0.21	<0.09	0.09	<0.03	-1.30	
04-Dec-2000	-3.92	4.80	.0160	13.20	0.78	.552	0.110	1.57	0.03	0.91	<0.09	0.15	0.07	-1.52	
11-Dec-2000	-9.73	5.00	.0101	10.10	0.39	.220	0.050	1.18	<0.01	0.68	<0.09	0.13	0.07	-1.11	
18-Dec-2000		I2													

Newfoundland Environment Precipitation Monitoring Network (NEPMoN)
 Salmonier Acid Rain Report

Part (c): Deposition & Summary Table

Start:	6-Jan-00	Days:	362
End:	2-Jan-01	Weeks:	52

	Sample	Gauge	lonbal	pH	H	Cond.	SO4	XSO4	NNO3	Cl	NNH4	Na	Ca	Mg	K	Alk
	Depth	Depth														
Total Sample Periods	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Trace Precipitation Periods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Trace Precipitation Periods	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
# of Valid Samples	47	47	43	44	44	44	44	44	44	44	43	43	43	43	43	44
% of Valid Samples	100%	100%	91%	94%	94%	94%	94%	94%	94%	94%	91%	91%	91%	91%	91%	94%
Mean	32.31	32.61	-5.14	4.74	0.0184	13.33	0.85	0.67	0.11	1.31	0.052	0.74	0.04	0.103	0.03	NA
Standard Deviation	20.19	17.15	8.99	0.24	0.0167	10.43	0.69	0.65	0.12	2.01	0.052	1.13	0.05	0.143	0.05	NA
Minimum	1.45	3	-43.53	3.95	0.0064	4.2	0.16	0.11	0.02	0.1	0.005	0.01	0.01	0.005	0.01	NA
Maximum	96	68	3.16	5.2	0.1131	54.2	4.08	3.99	0.8	11.78	0.2	6.58	0.25	0.83	0.25	NA
Precipitation Weighted Conc. (mg/l)				4.81	0.0156	12.09	0.74	0.56	0.09	1.3	0.049	0.74	0.04	0.107	0.04	0
Total Gauge Depth (mm)		1500.2	1500.2	1500.2	1500.2	1500.2	1500.2	1500.2	1500.2	1500.2	1500.2	1500.2	1500.2	1500.2	1500.2	1500.2
Deposition (kg / Ha / Period)					0.2345		11.17	8.43	1.36	19.57	0.741	11.03	0.61	1.604	0.54	0
Deposition (365 Day, kg / Ha / Yr)					0.2365		11.26	8.5	1.38	19.73	0.747	11.12	0.62	1.617	0.54	0
Coll. Effic. - Period	98.4%	% VSL - Period	78.7%		% PCL - Period	100.0%		% TP - Period	96.3%		% VSMP -Period	97.8%				
Coll. Effic. - Winter	90.0%	% VSL -Qtr. 1	92.3%		% PCL - Qtr. 1	100.0%		% TP - Qtr. 1	100.0%		% VSMP -Qtr. 1	100.0%				
Coll. Effic. - Spring	107.6%	% VSL -Qtr. 2	72.7%		% PCL - Qtr. 2	100.0%		% TP - Qtr. 2	100.0%		% VSMP -Qtr. 2	100.0%				
Coll. Effic. - Summer	101.2%	% VSL -Qtr. 3	63.6%		% PCL - Qtr. 3	100.0%		% TP - Qtr. 3	96.2%		% VSMP -Qtr. 3	100.0%				
Coll. Effic. - Autumn	94.8%	% VSL -Qtr. 4	83.3%		% PCL - Qtr. 4	100.0%		% TP - Qtr. 4	90.8%		% VSMP -Qtr. 4	100.0%				
Coll. Effic. - Level	1	% VSL -Level	2		% PCL - Level	1		% TP - Level	1		% VSMP -Level	1				
Sea Salt Correction	24.5%															
Sea Salt Corr. - Level	1															
					Data Completeness Level	2		Overall Data Quality Level	2							

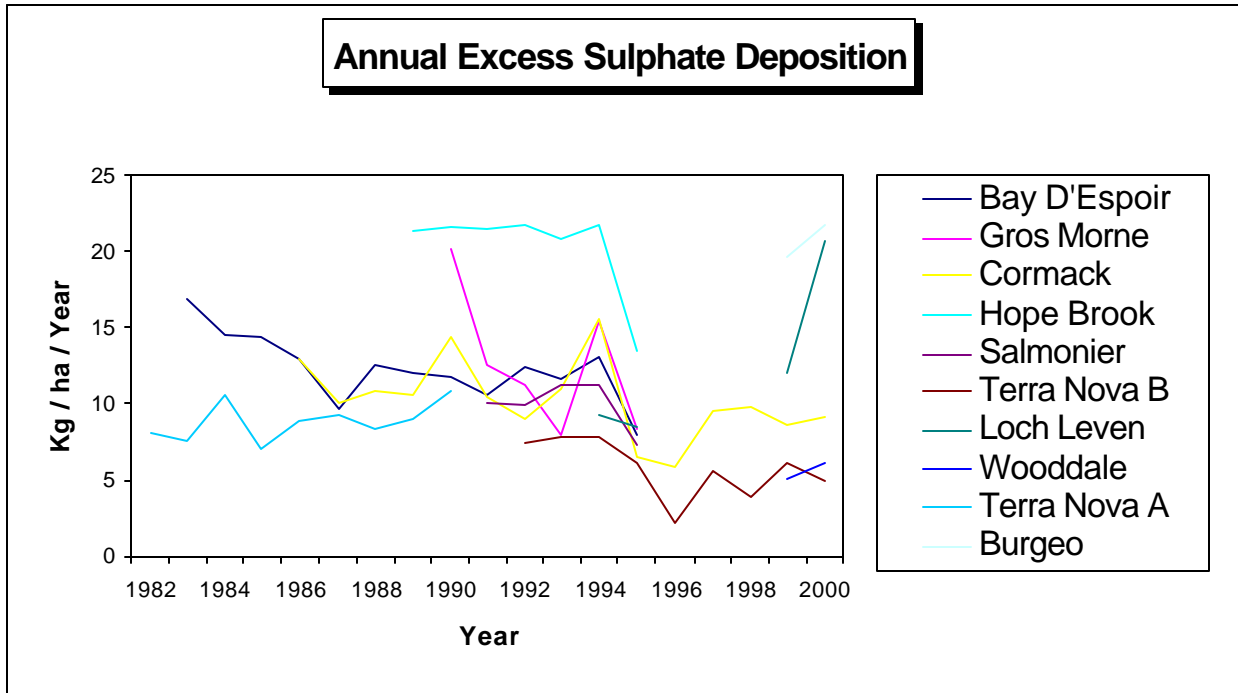


Figure 1

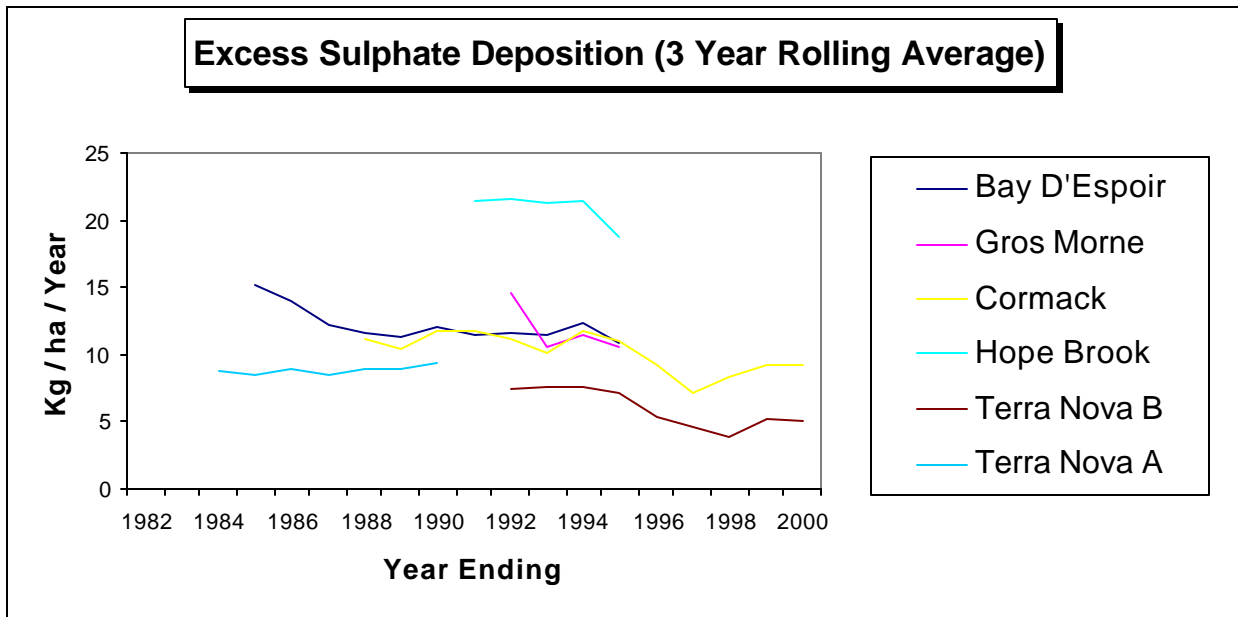


Figure 2

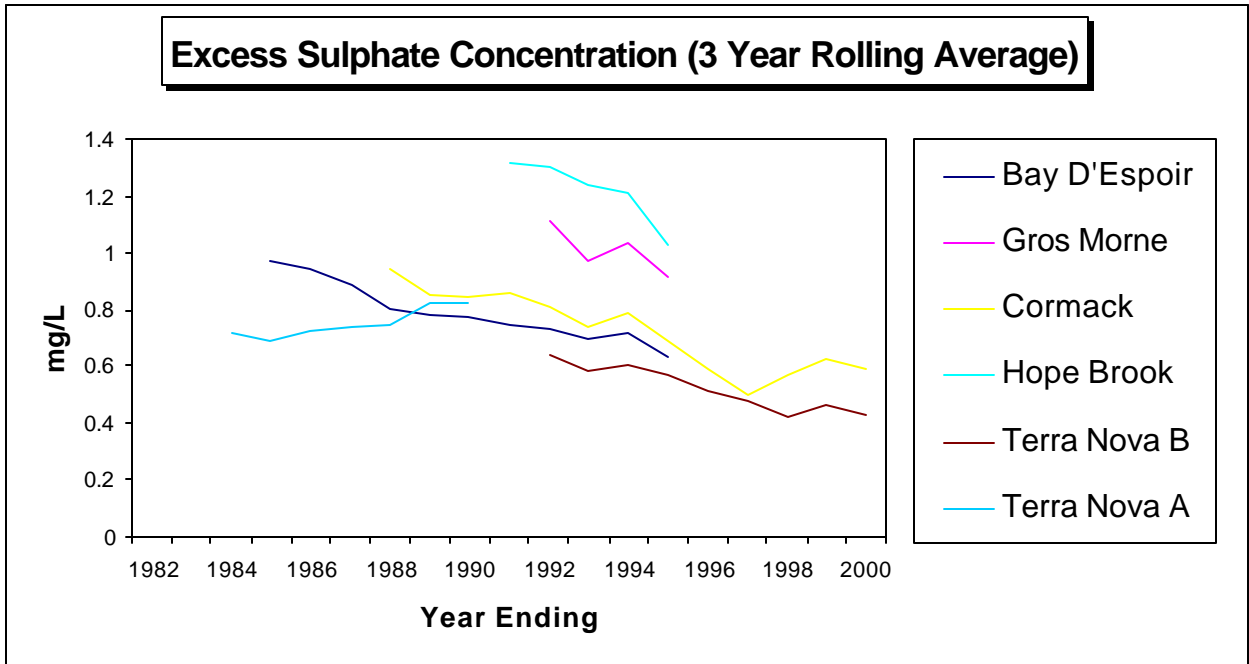


Figure 3

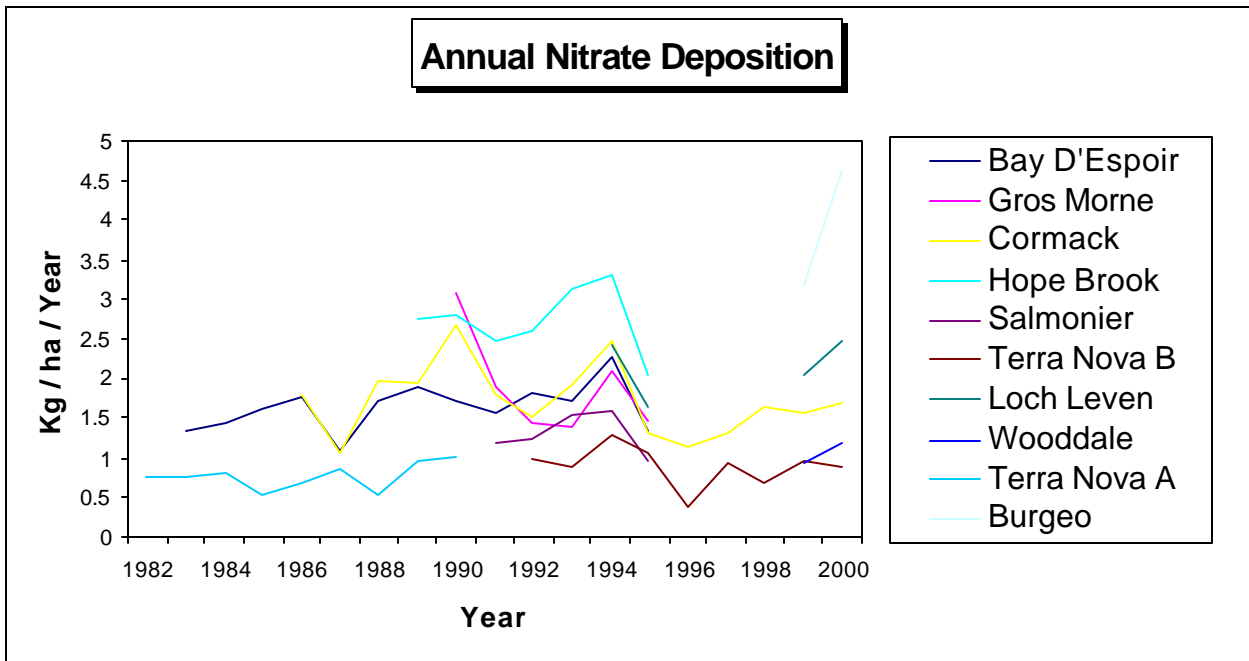


Figure 4

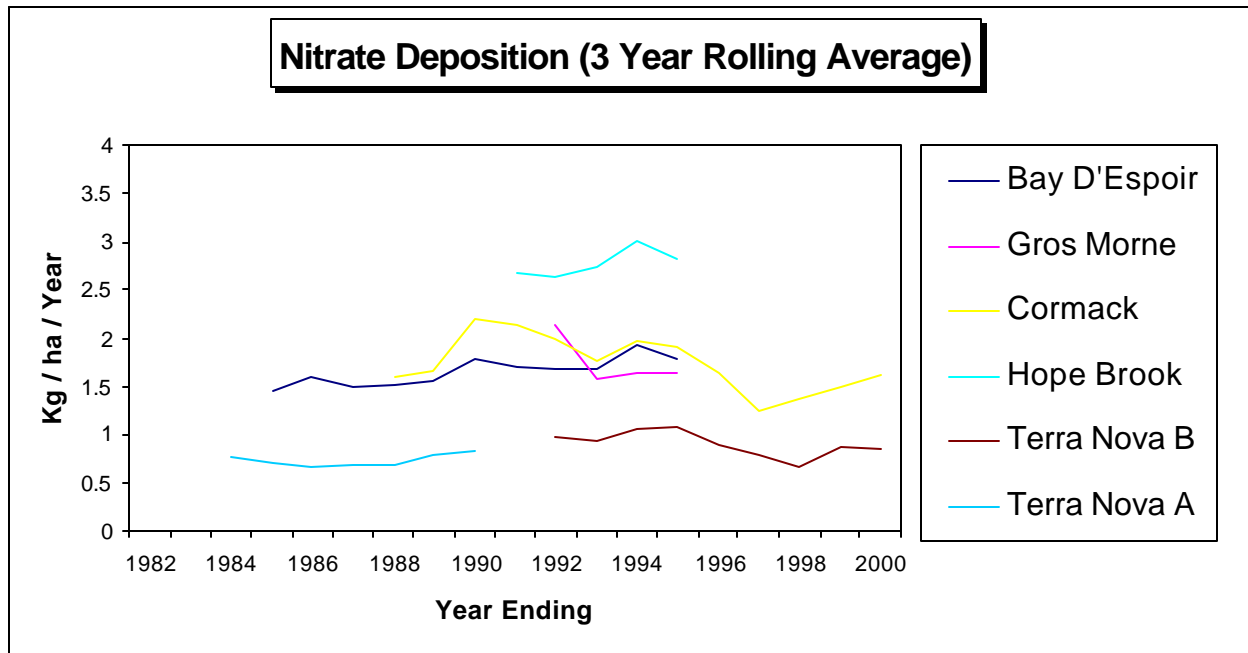


Figure 5

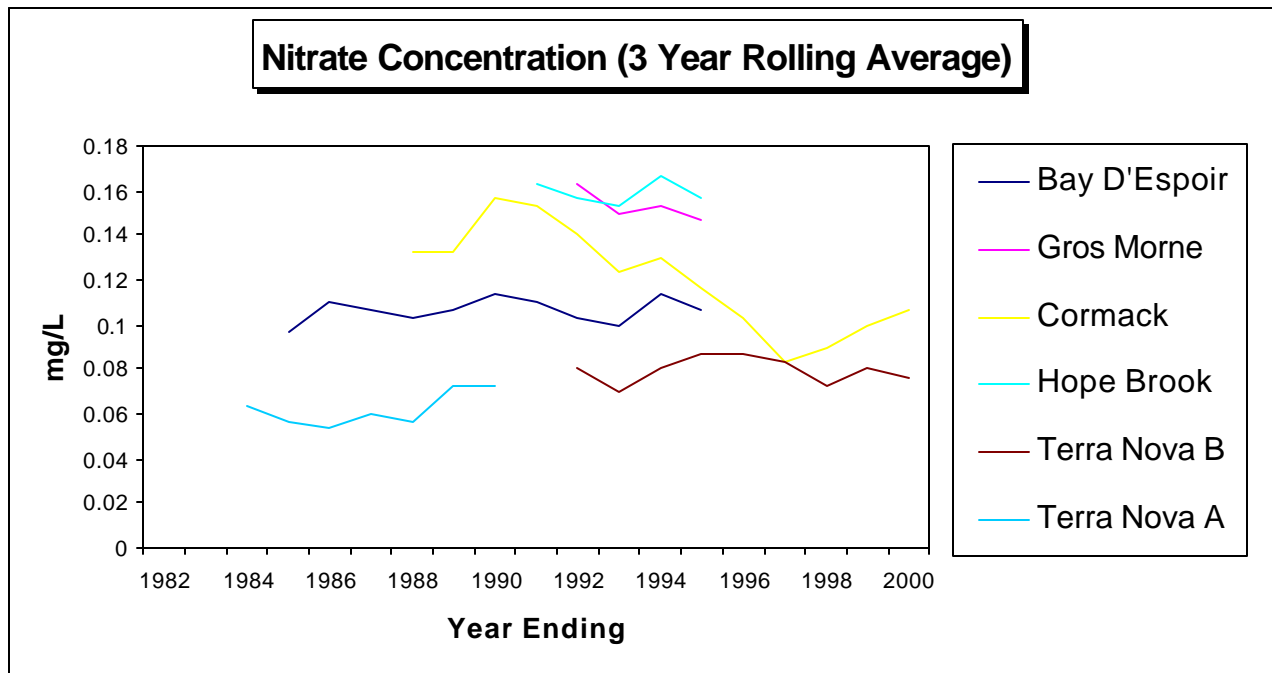


Figure 6

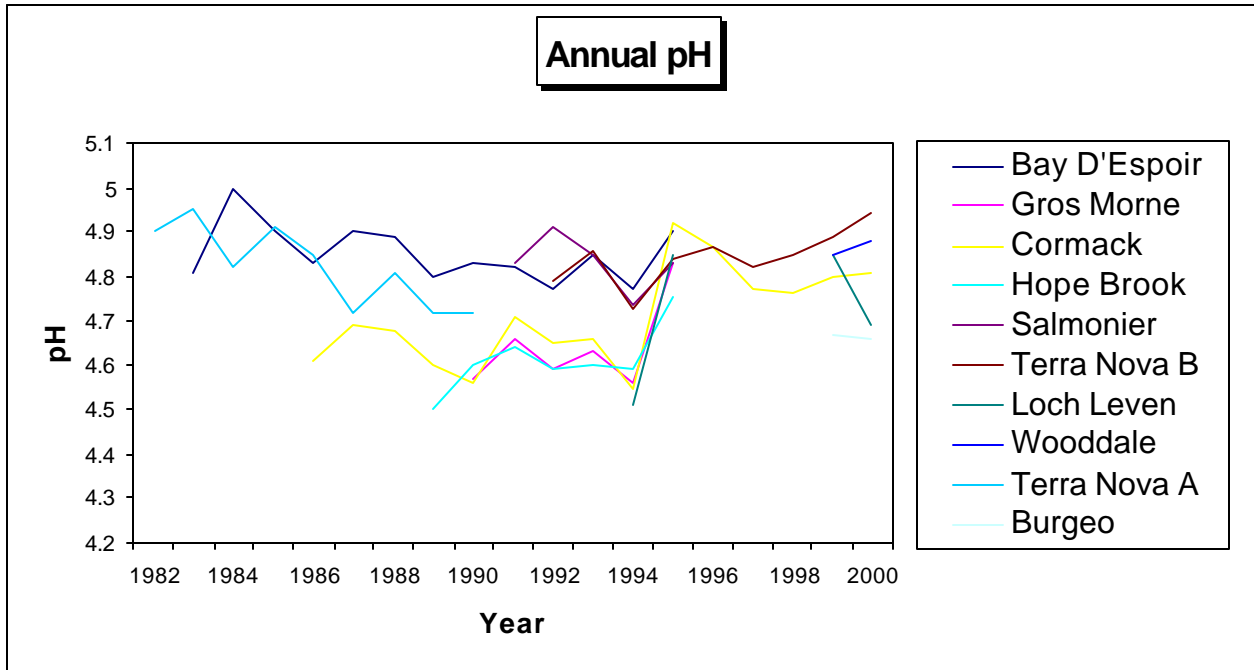


Figure 7

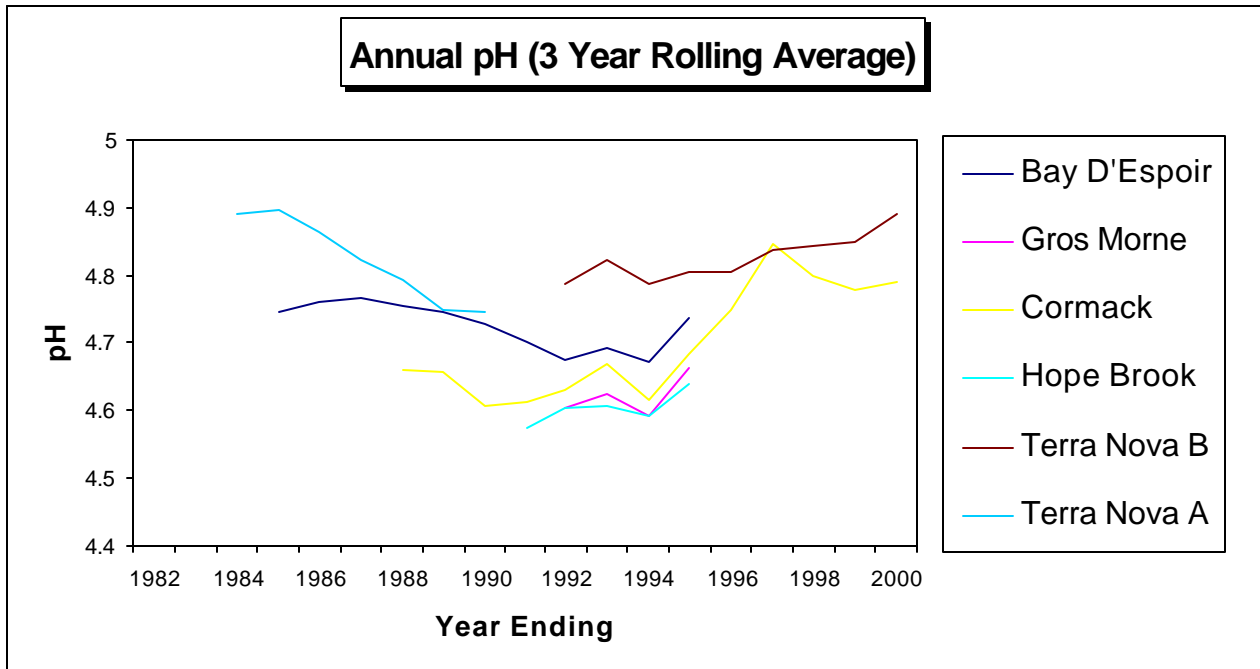


Figure 8

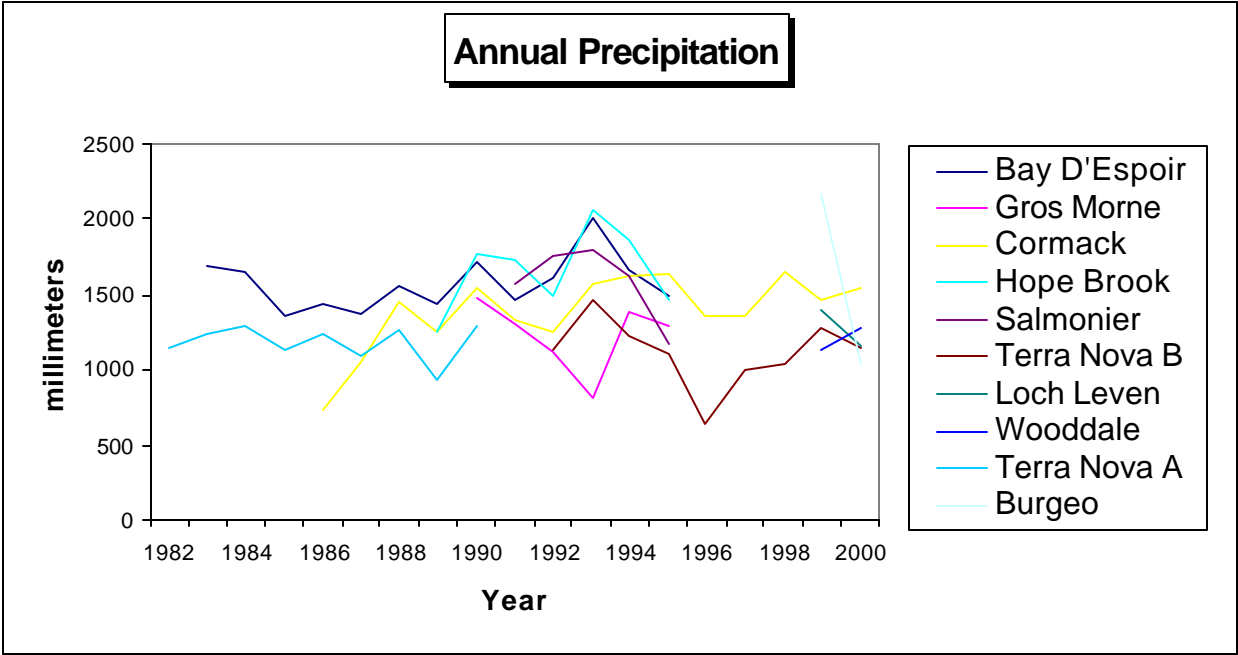


Figure 9

APPENDIX A

Acid Precipitation Collection Sites

Location:

Sites are located according to a set of criteria originally developed by the Canadian Air and Precipitation Monitoring Network (CAPMoN) (see Appendix B). Each site is rated as to how well it meets these criteria and is assigned a Site Representativeness Level which is used to assess the overall data quality level. Individual site characteristics are given below.

Equipment:

a) Precipitation Collectors

Precipitation samples are collected using an automated, wet-only precipitation collector. Two types of collectors were used in the years 1999 -2000 - the M.I.C. Type AU collector and its successor the M.I.C. Type AUC collector.

These collectors have four major components: (1) two heated sensor boards which detect the occurrence of precipitation, (2) a bucket to collect the precipitation, (3) a moveable roof which uncovers the bucket when activated by the sensors during precipitation, and (4) a housing which contains the electronic control circuitry and motor. The Type AUC collector features improvements to the electronic circuitry, but is otherwise identical to the Type AU machine.

At each of the sites plastic bags are used to line the collection bucket. These bags are made of a 3 mil CIL virgin polyethylene inner film and a 0.48 mil CIL polyester outer film. The two films are laminated together using an alcohol primer.

b) Rain Gauges:

The Belfort rain gauges were removed from Terra Nova and Loch Leven in the fall of 2000. Since that time, all sites, with the exception of Salmonier, have Type B rain gauges and nipher shielded snow gauges.

c) Balances

Balances are used at all sites. The balance is used to weigh the amount of precipitation collected, so that the volume can be calculated. Given the bucket orifice area, a sample depth can be calculated for comparison to the measured gauge depth.

d) Dustbuster

A dustbuster is used to aid in securely seating the bag in the bucket by removing the air trapped between the bag and bucket.

Protocol:

The sample collection and handling procedures are covered by the “Field Operators Manual - Newfoundland Environment Precipitation Monitoring Network - Revised 1995.”

In brief, a sample is collected once a week at a set time. Inside the sample handling area, a new sample bag is placed inside the spare bucket. The bucket is weighed and the mass recorded. A lid is placed on the bucket, and the covered bucket is taken to the collector where the fresh bucket is exchanged with the one on the collector. The bucket and sample are covered with the lid to protect the sample from contamination. The sample bucket is then taken back to the sample handling area where the bucket and sample are weighed and the mass recorded on the operator worksheet. A clean 250mL polyethylene bottle is filled from the sample and any excess discarded. The stoppered bottle is stored on site at 4°C until collected during a quarterly maintenance visit by a member of the department. Where the site is remote, the sample is mailed into the department (eg: Burgeo). As well as collecting the sample, the operator is required to log daily observations of the occurrence of precipitation on the worksheet.

Individual Site Characteristics: Bay D'Espoir

Latitude: 47^E59'32" N Longitude: 55^E49'02" W
UTM (N): 5315900 m UTM (E): 588250 m
Elevation: 168 m
(Relocated 1km from original site: Sept 27/89)

Site Representative Rating: 1

Deviations from Siting Criteria:

2 - less than 40km to open seawater.

First Opened: 1983 02

Closed: 1996 05

Equipment:

Collector: Type A (1983 03) replaced by Type AU (1989 06)

Rain Gauge: Type B (1983)

Snow Gauge: Nipher (1983)

Bags: First used 1989 06

Balance: First used 1987 01

Dustbuster: First used 1989 06

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1990	100	94	100	92.3	79.9	17	1
1991	100	99.7	100	94.3	71.1	10	1
1992	100	87.8	100	94.4	84.1	14.9	2
1993	100	91.3	100	86.8	91.5	20.8	1
1994	100	98.9	98	96.2	81.5	16.1	1
1995	100	96.3	100	88.7	88	23.1	1

Individual Site Characteristics: Burgeo

Latitude: 47°37'44" N Longitude: 57°27'54" W
UTM (N): 5274950 m UTM (E): 465055 m
Elevation: 10 m

Site Representative Rating: 1
Deviations from Siting Criteria:
2 - less than 40km to open seawater

First Opened: 1998 06

Closed:

Equipment:

Collector: Type AU (1998 06)
Rain Gauge:
Snow Gauge:
Bags: First used 1998 06
Balance: First used 1998 06
Dustbuster: First used 1998 06

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1998	N/A	N/A	N/A	N/A	N/A	N/A	Part Yr
1999	100.0	87.8	100.0	98.0	96.3	46.8	3
2000	100.0	91.2	92.0	95.7	86.2	43.4	Part Yr

NB. Insufficient data were recorded in 1998 to evaluate the performance of the site.

Individual Site Characteristics: Cormack

Latitude: 49°19'18.1" N Longitude: 57°23'33.8" W
UTM (N): 5463291 m UTM (E): 471460 m
Elevation: 180 m

Site Representative Rating: 1

Deviations from Siting Criteria:

4 - collector 300m from a dirt road - traffic is light and site is sheltered by trees. Some agricultural activity - fertilizer is applied to the surrounding hay field twice a year.

First Opened: 1986 05

Closed:

Equipment:

Collector: Type AM (1984 08) replaced by Type AU (1995 09)
Rain Gauge: Type B (1984)
Snow Gauge: Nipher (1984)
Bags: First used 1984 08
Balance: First used 1984 08
Dustbuster: First used 1984 08

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1990	100	100	100	92.3	74.2	13	1
1991	100	96.4	100	94.3	64.4	9.1	1
1992	100	90.3	100	92.5	60.2	15.5	4
1993	100	91.7	100	92.5	66.9	15.3	3
1994	100	90.9	100	88.7	76.6	7.3	3
1995	100	94.8	100	92.5	71.6	14.4	2
1996	100	91	100	88.7	79.7	14	2
1997	100	89.9	100	86.8	74	9.2	2
1998	100	85.9	100	83.3	72	17.6	2
1999	100	94.1	100	97.9	83.1	16.4	1
2000	100	99.3	100	98.8	78.6	14.2	1

Individual Site Characteristics: Gros Morne

Latitude: 49°34'56" N Longitude: 57°54'20" W
UTM (N): 5492350 m UTM (E): 434540 m
Elevation: 12 m

(Location moved 40m from original site 1990 07 17 - too close to trees; too close to building {representativeness rating 3})

Site Representative Rating: 2b

Deviations from Siting Criteria:

- 2 - less than 40km to open seawater.
- 3 - less than 5km from village of Rocky Harbour.
- 4 - collector 50m from a parking lot - sheltered by trees

First Opened: 1982 01

Closed: 1996 06

Equipment:

Collector: Type A (1982 01) replaced by Type AU (1990 07)
Rain Gauge: Type B (1982)
Snow Gauge: Nipher (1982)
Bags: First used 1990 07
Balance: First used 1992 12
Dustbuster: First used 1992 12

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1990	100	65.2	53.3	50	N/A	31	4
1991	100	86.5	84.3	78.8	N/A	15.3	3
1992	100	95.8	60.6	91.2	96.2	20.8	4
1993	100	94.6	45.8	72	98.4	24.9	4
1994	100	84.3	41.2	91.4	N/A	19.8	4
1995	100	100	74.5	97.9	89.9	34.9	4

Individual Site Characteristics: Hope Brook

Latitude: 47^E44'42" N Longitude: 58^E04'41" W
UTM (N): 5288290 m UTM (E): 419180 m
Elevation: 118 m

Site Representative Rating: 2a

Deviations from Siting Criteria:

- 2 - less than 40km to open seawater.
- 4 - less than 500m from a dirt road - light traffic
- 8 - site is located in a barren area.

First Opened: 1989 02

Closed: 1996 05

Equipment:

Collector: Type AU (1989 01) replaced by Type AUC (1993 11)
Rain Gauge: Type B (1989)
Snow Gauge: Nipher (1989)
Bags: First used 1989 01
Balance: First used 1989 01
Dustbuster: First used 1989 01

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1990	100	86.2	82.5	75.6	70	24	2
1991	100	85.6	82.4	82.7	71.3	11.5	4
1992	100	78.4	91.5	64.6	71	15.7	4
1993	100	83.7	91.7	71.4	92.3	19	4
1994	100	83.5	98	80.8	100.3	21.1	2
1995	100	96.2	88.2	90.4	N/A	29.7	1

Individual Site Characteristics: Loch Leven

Latitude: 48^E10'04.3" N Longitude: 58^E51'26.0" W
UTM (N): 5336627 m UTM (E): 361912 m
Elevation: 58 m

Site Representative Rating: 1

Deviations from Siting Criteria:

2 - less than 40km to open seawater (4.1km)

First Opened: 1994 10

Closed: 1996 06

Reopened : 1998 06

Closed:

Equipment:

Collector: Type AU (1994 10)

Rain Gauge: Belfort (1994)

Snow Gauge: Nipher Style (1994)

Bags: First used 1994 10

Balance: First used 1994 10

Dustbuster: First used 1994 10

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1994	N/A	N/A	N/A	N/A	N/A	N/A	Part Yr
1995	100	56.4	92	64.7	N/A	36.6	4
1996	N/A	N/A	N/A	N/A	N/A	N/A	Closed
1999	100	99.3	100	98.0	81.6	38.6	2
2000	100	76.4	95.8	97.7	82.9	15.1	4

NB. Insufficient data were recorded in 1994 & 1996 to evaluate the performance of the site.

Individual Site Characteristics: Salmonier

Latitude: 47^E15'51.7" N Longitude: 53^E16'28.8" W
UTM (N): 5237052 m UTM (E): 327926 m
Elevation: 131 m

Site Representative Rating: 2b

Deviations from Siting Criteria:

- 1 - less than 50km from a SO₂ source with emissions > 10,000 t/y.
- 2 - less than 40km to open seawater.

First Opened: 1991 01

Closed: 1996 04

Reopened : 1999 11

Closed:

Equipment:

Collector: Type AU (1991 01)
Rain Gauge: Type B (1991)
Snow Gauge: Nipher (1991)
Bags: First used 1991 01
Balance: First used 1991 01
Dustbuster: First used 1991 01

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1991	100	96.4	100	94.3	64.4	9.1	1
1992	100	82.5	79.2	87.8	85.1	21.3	4
1993	100	81.8	80	87.9	95	22.6	3
1994	100	89.8	67.6	92.1	N/A	17.6	4
1995	100	91.3	85	90.2	N/A	24.8	1
1996	N/A	N/A	N/A	N/A	N/A	N/A	Part Yr
2000	100	96.3	78.7	97.8	98.4	24.5	2

NB. Insufficient data were recorded in 1996 to evaluate the performance of the site.

Individual Site Characteristics: Terra Nova A

Latitude: 48^E27'05" N Longitude: 54^E01'02" W
UTM (N): 5370550 m UTM (E): 720550 m
Elevation: 122

Site Representative Rating: 2a

Deviations from Siting Criteria:

- 2 - less than 40km to open seawater.
- 4 - collector 50m from Trans Canada Highway.
- 5 - collector too close to trees.
- 6 - collector too close to a shed.

First Opened: 1981 01

Closed: 1991 01

Equipment:

Collector: Type A (1981 01)
Rain Gauge: 13km away
Snow Gauge: 13km away - Ruler
Bags: not used
Balance: not used
Dustbuster: not used

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1990	100	94	100	92.3	79.9	17	4
1991	N/A	N/A	N/A	N/A	N/A	N/A	Closed

Individual Site Characteristics: Terra Nova B

Latitude: 48^E29'41.9" N Longitude: 54^E14'38.4" W
UTM (N): 5374985 m UTM (E): 703600 m
Elevation: 112 m

Site Representative Rating: 1

Deviations from Siting Criteria:

2 - less than 40km to open seawater.

4 - less than 100m from a dirt road - light traffic

First Opened: 1992 01

Closed:

Equipment:

Collector: Type AU (1992 01)

Rain Gauge: Belfort

Snow Gauge: Nipher style

Bags: First used 1992 02

Balance: First used 1992 02

Dustbuster: First used 1992 02

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1992	100	92.4	96	86.3	95.4	11.9	2
1993	100	91.8	100	94.3	97.2	13.4	2
1994	100	98	100	90.6	86.3	11.2	1
1995	100	89.3	100	92.5	100	14.9	1
1996	100	87.4	100	86.8	100	18.8	1
1997	100	88.8	100	70.7	73.9	15.7	3
1998	100	85.3	100	72.2	90.1	19	2
1999	100	88.1	100	97.9	104.3	16.3	1
2000	100	94.9	100	97.9	102.1	25.1	1

Individual Site Characteristics: Wooddale

Latitude: 49^E01'28.4" N Longitude: 55^E32'56.8" W
UTM (N): 5431199 m UTM (E): 606067 m
Elevation: 62 m

Site Representative Rating: 1

Deviations from Siting Criteria:

2 - less than 40km to open seawater.

First Opened: 1998 11

Closed:

Equipment:

Collector: Type AU
Rain Gauge:
Snow Gauge:
Bags: First used 1998 11
Balance: First used 1998 11
Dustbuster: First used 1998 11

Annual Data Completeness Measures

Year	%PCL	%TP	%VSL	%VSMP	%COLEFF	%SEASALT	Overall
1998	N/A	N/A	N/A	N/A	N/A	N/A	Part Yr
1999	100	100	100	98.1	79.3	12.0	2
2000	100	99.0	100	97.9	82	10.4	1

NB. Insufficient data was recorded in 1998 to evaluate the performance of the site.

APPENDIX B

Network Siting Criteria

The quality of the data obtained from the acid precipitation program varies from site to site. A major factor in assessing the overall data quality is the site representativeness ranking, which estimates the extent to which precipitation collected in that location typifies precipitation in that area of the province. The Newfoundland Department of Environment and Labour has adopted the Canadian Air and Precipitation Monitoring Network (CAPMoN) siting criteria. The site representative ranking is determined by just how well the location is judged to meet the siting criteria listed in Table B.1.

Table B1 Siting Criteria

<u>Newfoundland Department of Environment Ideal Acid Rain Siting Criteria</u>	
<u>1</u>	No continuous single point source or area source of emissions greater than 10,000 t/y SO ₂ or NO _x should exist within 50 km of the site.
<u>2</u>	Sites should be located 40 to 50 km from the shoreline of salt water bodies.
<u>3</u>	Sites should be located no closer than 5 km from the edge of small villages (population less than 5,000), 10 km from the edge of towns (population less than 10,000), and 40 km from the edge of cities.
<u>4</u>	Within 500 m of the site, there should be (a) no moving sources of pollution such as air, water and surface transportation; (b) no surface storage of pollutants (e.g. salt piles); (c) no wind activated sources of pollution such as exposed soil and (d) no intensive agricultural activity.
<u>5</u>	On-site obstructions (e.g. trees, towers, poles) should be located at least 2.5 times their height away from the precipitation collector.
<u>6</u>	On site buildings should be located at least 4 to 5 times their height away from the sampler.
<u>7</u>	The site should be flat, grass or moss covered and surrounded by trees.
<u>8</u>	The site should be sheltered from roads and fields by rows of trees.

Note The site must be near a 120 volt AC source and easily accessible to the operator at least on a weekly basis.

Site Representativeness Ranking

The CAPMoN siting criteria were established with the objective of selecting sites that would map the spatial distribution of pollutants across Canada in an unbiased manner. An evaluation of how well each site meets the siting criteria is obviously a measure of the quality of the data produced by the collector and is defined as the site representativeness. This measure is divided into four levels as defined in Table B.2. The determination of site representativeness level often requires a judgement call on the part of the network manager.

Table B.2

Site Representativeness Level	Definition
<u>1</u> Regionally Representative	site does not deviate seriously from the siting criteria.
<u>2a</u> Potentially Regionally Representative	site fails to meet one, or more, of the siting criteria but the local influences are judged to be small.
<u>2b</u> Potentially Regionally Unrepresentative	site fails to meet one, or more, of the siting criteria, but the local influences are judged not to be severe enough for the data to be considered Level 3.
<u>3</u> Regionally Unrepresentative	site is influenced significantly by local factors.

APPENDIX C

Data Completeness Statistics

Due to sampler malfunction or improper sampling procedures, some days are not represented in the data set. Six data completeness statistics are used to describe how effective the collection site was in generating valid data. These statistics are defined in Table C.1

Table C.1

Data Completeness Statistic	Definition
% PCL	<u>Percent coverage length</u> is the percent of the summary period for which information on whether or not precipitation occurred is available.
% TP	<u>Percent total precipitation</u> is the percent of the total precipitation depth measured during the sample period which is associated with valid samples.
% VSL	<u>Percent valid sample length</u> is the percentage of days during the summary period that are associated with valid sample periods. A valid sample period is \$ 6 days and # 8 days.
% VSMP	Percent of wet deposition samples that have <u>valid sample concentration measurements</u> .
% COLEFF	<u>Percent collection efficiency</u> is the ratio (converted to percent) of the total sample volume (converted to depth) to the total precipitation depth for qualifying samples, i.e. samples that have (a) a co-located standard gauge and sample volume measurement and (b) that have a valid sample concentration measurement.
% SEASALT	<u>Percent sea salt correction</u> is the percent of the average sulphate concentration that is estimated to have come from sea salt, using sodium as a tracer of sea salt.

Data Completeness Level

Each of the above statistics is assigned a rating between 1 and 4 depending on its value (see Table C.2). This rating is the data completeness level for that particular statistic. Level 1 has the highest degree of data completeness and provides the best information. Less confidence is placed in a data summary with a data completeness level of 2, and still less in level 3 data. Level 4 data summaries are seen as failing to provide adequately representative values for the particular summary period and are deemed to be of the lowest quality.

Table C.2

Data Completeness Statistic	Level 1	Level 2	Level 3	Level 4
%PLC				
Annual	\$95%	\$90%	\$90%	<90%
Each Quarter	\$75%	\$60%	\$50%	<50%
% TP,% VSL,% VSMP				
Annual	\$80%	\$70%	\$60%	<60%
Each quarter	\$70%	\$60%	\$50%	<50%
% COLEFF				
Annual	\$70%	\$40%	\$30%	<30%
Winter	\$50%	\$40%	\$30%	<30%
Spring,summer, autumn	\$80%	\$60%	\$60%	<60%
%SEASALT	#25%	#50%	#75%	>75%

Overall Data Quality Levels

An overall Data Quality rating for a particular summary period is obtained by merging the poorest of the six Data Completeness levels with the Site Representativeness ranking (see Table C.3). It should be noted that the Overall Data Quality rating cannot be better than the rating assigned to the Site Representativeness. Level 1 data meets the most rigorous screening criteria and is considered to be of the best quality and most suitable for model evaluation and trend analysis. Level 3 represents what is considered to the minimum acceptable quality for model evaluation.

Table C.3 Overall Data Quality Levels

Site Representativeness Level	Annual Data Completeness Level			
	1	2	3	4
1	1	2	3	4
2a	2	2	3	4
2b	2	2	3	4
3	3	3	3	4

APPENDIX D

DATA LISTINGS

Explanation of terms - Weekly Rain Collection Statistics

- 1. SITE LOCATION:** Area where site is located
- 2. YEAR:** Sample Year covered by the listing.
- 3. SAMPLE ID:** A seven character label is used to identify uniquely a particular sample. The first two characters specify the acid rain site and the remaining five characters constitute the sample start date using the Julian dating system. Precipitation gauge samples will use the same numbering system:

94 = Loch Leven (active)
89 = Cormack (active)
10 = Burgeo (closed)
17 = Salmonier (reopened 1999 - active)
32 = Terra Nova B (active)
75 = Wooddale (active)
53 = Red Bay (new - active)

- 4. START DATE:** The month and day on which sampling began.
- 5. END DATE:** The month and day on which sampling ended.
- 6. # DAYS:** The number of days from Start Date to End Date. Normally seven (7).
- 7. SMPL VOL :** The volume of the precipitation sample in mL as determined from the field weight. The field operator weighs the bucket with a bag in it before installing it on the collector. Then the bucket and bag with the sample are weighed after the bucket is changed at the end of the week. The difference between the two weights gives the weight of the sample collected. The volume is then calculated by the following formula:

$$SMPL\ VOL = \frac{W}{\bar{n}} \quad (1)$$

Where ;

SMPL VOL = sample volume

W = weight of precipitation sample (g)

\bar{n} = density of water @ 20EC = 1g/cm³

- 8. SMPL DEPTH:** Depth of the precipitation sample. Calculated as:

$$SMPL\ DEPTH = \frac{(SMPL\ VOL) \times 10\ (mm/cm)}{A} \quad (2)$$

Where: SMPL DEPTH = sample depth
 SMPL VOL = sample volume in cm³ from equation (1).
 A = area of bucket orifice (642 cm²).

- 9. GAUGE DEPTH:** Depth of precipitation collected over the sampling period in the standard rain gauge or the shielded snow gauge. Reported as mm equivalents of water. NB. With the exception of Salmonier, all acid rain sites have the same types of equipment
- 10. COLL EFF (%):** Collection efficiency of the precipitation chemistry collector as compared to the rain or snow gauge.

$$COLL\ EFF = \frac{SMPL\ DEPTH}{GAUGE\ DEPTH} \times 100\% \quad (3)$$

Where: SMPL DEPTH = sample depth in mm as calculated from Equation (2).
 GAUGE DEPTH = depth of precipitation in mm from rain or snow gauge.

- 11. GAUGE TYPE:** Type of precipitation gauge used to measure the gauge depth. The types of gauges are as follows:

RG = rain gauge
 SG = shielded nipher snow gauge
 RC = recording gauge
 SR = snow ruler
 UN = unknown

- 12. PREC TYPE:** Type of precipitation collected in the precipitation collector during the week:

R = Rain
 S = Snow
 F = Freezing rain
 M = Mixed (any combination of R,S,F)
 D = Dew or Frost
 U = Uncertain

Explanation of terms - Weekly Precipitation Ion Concentrations

- 13. ION BAL:** The Ion Balance is the percent difference between cation and anion sums for a particular precipitation sample. The ion balance in µeq/L is calculated as follows:

$$\text{ION BAL} = \frac{(\sum \text{ANIONS} - \sum \text{CATIONS})}{(\sum \text{ANIONS} + \sum \text{CATIONS})} \times 100\% \quad (4)$$

Where: $\sum \text{ANIONS}$ = the anion sum and is calculated as follows:

$$\sum \text{ANIONS} = \left(2 \times \frac{[\text{SO}_4^{2-}]}{96.06} + \frac{[\text{NO}_3^- \text{N}]}{14.01} + \frac{[\text{Cl}^-]}{35.45} + 2 \times \frac{[\text{GranAlk}]}{100.09} \right) \times 1000 \quad (5)$$

And where:

$\sum \text{CATIONS}$ = the cation sum and is calculated as follows:

$$\sum \text{CATIONS} = \left(10^{-\text{pH}} + \frac{[\text{NH}_4^+ \text{N}]}{14.01} + \frac{[\text{K}^+]}{39.10} + 2 \times \frac{[\text{Ca}^{2+}]}{40.08} + 2 \times \frac{[\text{Mg}^{2+}]}{24.31} + \frac{[\text{Na}^+]}{22.99} \right) \times 1000 \quad (6)$$

Where square brackets [] indicates concentration in mg/L; [GranAlk] is gran alkalinity in mg of CaCO₃ per litre

14. pH: pH of the sample as measured in the laboratory.

15. H⁺ (mg/L): Hydrogen ion concentration calculated from the pH measurement as follows:

$$[\text{H}^+] = 10^{-\text{pH}} \times 1010 \quad (7)$$

Where: 10^{-pH} = the hydrogen ion concentration in mol/L.

1010 = the factor to convert from mol/L to mg/L of H⁺. (1.01 g/mol of H⁺ times 1000 mg/g.)

16. Cond.: Conductivity in μmhos as measured in the lab.

17. SO₄²⁻: Sulphate ion concentration in mg/L as measured in the lab.

18. XSO₄²⁻: Excess sulphate concentration in mg/L or sulphate concentration corrected for sea-salt. The sulphate concentration is corrected for sea-salt by using one of three equations (see below), the choice of which is determined by a computerized algorithm (see Appendix G). The algorithm computes the ratios of Mg²⁺/Na⁺, Na⁺/Cl⁻, Mg²⁺/Cl⁻ and compares these ratios to those in seawater.

$$[SO_4^{2-}] + [SO_4^{2-}] + 0.25[Na] \quad (8)$$

$$[SO_4^{2-}] + [SO_4^{2-}] + 2.09[Mg^{2+}] \quad (9)$$

$$[SO_4^{2-}] + [SO_4^{2-}] + 0.14[Cl] \quad (10)$$

- 19. NO₃⁻-N:** Nitrate ion concentration expressed in mg/L as nitrogen.
- 20. Cl⁻:** Chloride ion concentration expressed in mg/L.
- 21. NH₄⁺-N:** Ammonium ion concentration expressed in mg/L as nitrogen.
- 22. Na⁺:** Sodium ion concentration expressed in mg/L.
- 23. Ca²⁺:** Calcium ion concentration expressed in mg/L.
- 24. Mg²⁺:** Magnesium ion concentration expressed in mg/L.
- 25. K⁺:** Potassium ion concentration expressed in mg/L.
- 26. ALK:** Gran alkalinity expressed in mg of calcium carbonate per litre.

Explanation of terms - Annual Summary Statistics

1. **SITE LOCATION:**

The acid rain site location is identified by the **SITE** name, latitude (**LAT (N)**) and longitude (**LONG (W)**), and Universal Transverse Mercator coordinates (**UTM (N)** and **UTM (W)**).

2. **ACID RAIN YEAR:**

The sample year covered by the listing. It is specified by the calendar **YEAR**, the **START** and **END** dates, and the number of **DAYS** and **WEEKS** in the acid rain year.

3. **TOTAL SAMPLE PERIODS:**

The total number of sample periods. A sample period encompasses the time from the start date to the end date of the collection of one acid rain sample. For the NEPMoN program, a valid sample period should be not be less than six (6) days or greater than eight (8) days. For a complete and valid listing for a site, there should be 52 periods.

4. **TRACE PRECIPITATION PERIODS:**

The number of periods in the sampling year in which have trace amounts (i.e. less than 1 mm) of precipitation was collected. Not enough precipitation was collected to have enough sample to do the chemical analysis.

5. **NON-TRACE PRECIPITATION PERIODS:**

The number of periods in the sampling year in which enough precipitation fell to collect a sample large enough for chemical analysis (i.e. greater than 1 mm of precipitation).

6. **# OF VALID SAMPLES:**

The number of samples, determined for sample depth, gauge depth and the chemical parameters including ion balance, $[H^+]$ and excess $[SO_4^{2-}]$, that have been excepted as valid. For an explanation of the determination of whether a sample is valid or invalid, refer to Appendix E.

7. **% OF VALID SAMPLES:**

The percent of the total number of periods for which valid samples were collected.

$$\% \text{ OF VALID SAMPLES} = \frac{\text{VALID SAMPLES}}{\text{TOTAL SAMPLES}} \times 100 \quad (11)$$

Where: VALID SAMPLES = # OF VALID SAMPLES (number 6 above).
TOTAL SAMPLES = # OF TOTAL SAMPLE PERIODS
(number 3 above).

8. MEAN: As calculated for the sample depth, gauge depth and ion concentrations including ion balance, $[H^+]$ and excess $[SO_4^{2-}]$, is the average of all valid samples for the summary year.

$$\bar{X} = \frac{\sum_{i=1}^n X_i}{n} \quad (12)$$

Where: \bar{X} = average for all valid samples for the summary year
 X_i = the value for the i^{th} sample
n = the total number of valid samples for the summary year.

9. STANDARD DEVIATION:

As calculated for the sample depth, gauge depth and ion concentrations including ion balance, $[H^+]$ and excess $[SO_4^{2-}]$, is the average absolute difference of each data point from the mean value. Only data from valid samples for the summary year are included in the calculation.

$$s = \sqrt{\frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n-1}} \quad (13)$$

Where: s = the standard deviation for all valid samples for the summary year
 X_i = the value for the i^{th} sample
 \bar{X} = the mean of all valid samples for the summary year.
n = the total number of valid samples for the summary year.

10. MINIMUM: The lowest value of all the valid samples for the summary year.

11. MAXIMUM: The highest value of all the valid samples for the summary year.

12. PRECIPITATION WEIGHTED CONC. (mg/L):

The precipitation weighted mean concentration in mg/L over the summary period using the standard gauge depth as the weighting factor.

$$\bar{C}_{STND} = \frac{\sum_{i=1}^n C_i P_i}{\sum_{i=1}^n P_i} \quad (14)$$

Where: C_{STND} = precipitation weighted mean concentration based on the standard gauge depth.

C_i = the valid concentration for sample i.

P_i = the standard gauge depth for the same sample i with valid concentration.

n = the total number of valid samples for the summary period.

13. TOTAL GAUGE DEPTH: The total precipitation amount for summary period measured in mm of precipitation.

$$TGD = \sum_{i=1}^n P_i \quad (15)$$

Where: TGD = total gauge depth.

P_i = the standard gauge depth for sample i.

n = the total number of valid samples for the summary year.

14. DEPOSITION (kg/ha/period):

The deposition in kg/ha for the summary period based on the precipitation weighted concentration and the total gauge depth.

$$Dep_n = \frac{(\bar{C}_{STND}) \times (TGD)}{100} \quad (16)$$

Where: Dep'n = deposition

C_{STND} = precipitation weighted mean concentration (see number 12 above)

TGD = total gauge depth (see number 13 above)

15. DEPOSITION (kg/ha/year):

The yearly deposition based on the precipitation weighted mean, the total gauge depth and the ratio of days in a calendar year to the number of days in the summary period.

$$Dep'n = \frac{(\overline{C}_{STND}) \times (TGD)}{100} \times \frac{365}{No. Days(Summary)} \quad (17)$$

Where: Dep'n = deposition

\overline{C}_{STND} = precipitation weighted mean concentration (see number 12 above)

TGD = total gauge depth (see number 13 above)

No. Days (Summary) = number of days in the summary period (see number 2 above)

16. COLL. EFFIC. (% COLEFF), %VSL, %PCL, %TP, %VSMP:

Data completeness **measures** (refer to Appendix C) that are defined for each of the seasons as well as the entire summary period. Based on the lowest data completion measure for each assay for the year, an annual data completeness **level** is assigned for each data completeness assay.

17. SEA SALT CORRECTION:

The percent of the average sulphate concentration that is estimated be derived from sea salt, using sodium, magnesium or chloride as a tracer of sea salt.

$$\% \text{ sea salt correction} = \frac{(SO_4) \cdot (XSO_4)}{(SO_4)} \times 100 \quad (18)$$

Where: SO_4 = sulphate deposition in kg/ha/year (see number 15 above)

XSO_4 = excess sulphate deposition in kg/ha/year

18. SEA SALT CORR.- LEVEL:

Based on the % sea salt correction, a sea salt correction level is assigned to the site for the summary period.

19. DATA COMPLETENESS LEVEL:

Annual data completeness level based on the poorest rating of the six data completeness levels.

20. OVERALL DATA QUALITY LEVEL:

The overall data quality data level for the site for the summary period. It is obtained by coupling the annual data completeness level with the site representativeness level.

APPENDIX E

Determination of Sample Validity - Assignment of Data Validity Flags.

The sample data set is scrutinised in order to remove items that were collected under conditions that might bias the values, and consequently skew the summary statistics. The process is conducted in two stages. The initial stage consists of a manual inspection of the sample history form and the relevant laboratory results. The second stage involves the identification of possible outliers using a computer routine.

(1) ASSESSMENT OF SAMPLE HISTORY FORMS AND LAB DATA

i) Sample Depth/Volume

Both the Sample Depth and Volume will be flagged INVALID if the following conditions pertain:

- (I1) - the sample is missing;
- (I2) - the sample has spilled or leaked;
- (I4) - is otherwise known to be in error;
- (I5) - the sample is a bulk sample (i.e. a sample which has been exposed to the atmosphere before or after the precipitation event);
- (I6) - the sample is confirmed as being an outlier.

If a sample represents only part of the precipitation that fell during the sample period, then the Sample Depth and Volume will be flagged VALID BUT QUALIFIED (Q1 or Q2). This means that the sample is not 100% representative of the precipitation that fell.

Any samples not having one of the flags mentioned above are assumed to be VALID (V0).

ii) Gauge Depth

The Standard Gauge Depth will be flagged INVALID (I1) if the datum is missing.

The Standard Gauge Depth will be flagged VALID BUT QUALIFIED in the following circumstances:

- (Q1 - Q4) - an estimated value was used as there was no gauge measurement; or
- (Q5 - Q7) - a corrected value was used; or
- (Q9) - an error is suspected, but the measurement is accepted as the best estimate available.

In addition to the VALID flag (V0), there is a VALID - TRACE VALUE flag (V1) used when the gauge registers a trace amount (ie <0.2mm water equivalent) for the collection period.

iii) Collection Efficiency

The Collection Efficiency is flagged INVALID if:

- (I1) - the sample is missing;
- (I2) - the sample has been spilled or leaked;
- (I4) - the sample is known to be in error;
- (I5) - the sample is a bulk sample;
- (I6) - the sample is confirmed as being an outlier;
- (I7) - the standard gauge depth is less than 0.2 mm (“Trace”); or
- (I8) - the standard gauge depth has been set equal to the sample depth.

The Collection Efficiency is labeled VALID BUT QUALIFIED if:

- (Q1,Q2) - the sample represents only part of the precipitation that fell;
- (Q5) - the gauge depth had to be estimated;
- (Q6) - the gauge depth had to be corrected;
- (Q7) - the gauge depth was known to be in error but accepted as the best estimate.

iv) Ion Balance

The Ion Balance is labeled INVALID and not calculated if:

- (I1) - the sample was insufficient;
- (I2) - the sample is missing;
- (I3) - the sample was too contaminated to analyze;
- (I4) - the sample was contaminated in the laboratory;
- (I5) - the sample was contaminated in the field;
- (I6) - one or more concentration values were determined to be an outlier;
- (I7) - one or more concentration values were invalidated because of poor ion balance; or
- (I8) - the sample was invalidated because it was a bulk sample

The Ion Balance is flagged as VALID BUT QUALIFIED in the following circumstances:

- (Q5) - the sample is suspected of being contaminated based on one or more suspect concentrations but there is no corroborating evidence;
- (Q6) - the sample is known to have leaked.

v) Concentrations

The flags for the Concentrations are similar to those for the Ion Balance with the addition of the following flags:

The Ion Balance is flagged as VALID BUT QUALIFIED in the following circumstances;

- (Q1) - the sample represents a non standard collection period ie it is not 7 days;
- (Q3) - the particular ion is considered a statistical outlier.

The Ion Balance is flagged as VALID (V2) when the datum represents a LESS THAN DETECTION LIMIT value.

vi) **Excess SO_4^{2-} (XSO_4^{2-})**

The flags for the excess sulphate data are similar to those for the ion concentrations with the addition of a number of VALID flags:

- (V0) - the “best case calculation” whereby sea salt ratios close to bulk seawater ratios;
- (V1) - less than detection limit for sulphate;
- (V2) - sea salt calculation based on sodium;
- (V3) - sea salt calculation based on magnesium;
- (V4) - sea salt ratio based on chloride;
- (V5) - excess sulphate set equal to the sulphate value as no valid indicator of sea salt was found.

(2) **COMPUTERIZED ASSESSMENT OF DATA**

After the manual input of the data validity flags mentioned above, the laboratory results are inspected using a computer program to determine if there are any statistical outliers. The outlier result is then flagged (Q3).

An individual data point is flagged as a outlier if it meets one of the following criteria:

- (a) If the $\text{pH} > 6$, then the pH value is qualified as an outlier. The value of 6 was used based on the authors’ experience and the chemistry of Newfoundland precipitation.
- (b) If the alkalinity > 0.9 , then the alkalinity is qualified as an outlier. The value of 0.9 was used to identify outliers based on the 95% confidence interval for alkalinity.
- (c) For all other ions, the ion concentration in mg/L is multiplied by the Gauge depth. If this value is outside the 99% one-tailed interval for that ion, the ion is a statistical outlier. A statistical outlier is a datum whose value exceeds the value of the mean, plus or minus three standard deviations, estimated from all samples collected at that site over the entire existence of that site.

To determine if a value is an statistical outlier a z value is calculated as follows:

$$z_i = \frac{X_i - \bar{X}}{s} \quad (19)$$

where; z_i is the i^{th} z value

X_i is the value of the gauge depth multiplied by the ion concentration

\bar{X} is the sample mean (i.e. mean of all gauge depth multiplied by ion concentrations)

s is the sample standard deviation

The calculated z_i value is compared to the value of $z(A) = 2.326$ at the selected percentile of 0.99 (99%). If the calculated z_i value is greater than 2.326, then that result is deemed an outlier.

Determination of Sample Validity

Once each parameter of the sample has been identified as being **VALID**; **VALID BUT QUALIFIED** or **INVALID**, the computer program will continue to determine the validity of the entire sample. A sample will be invalidated if it meets one of the following criteria:

- (a) If a sample is missing, compromised, bulk or has a poor ion balance, the sample is immediately invalidated.
- (b) In the samples that have an ion sum ≤ 50 Feq/L, a sample will be invalidated if each of the three sea salt ratios (a, b, and c) and the acid ratio (d) fail to fall within the range 0.75 to 1.25. (Refer to Appendix G for a definition of these ratios). Samples invalidated for this reason are identified in the database by an I6 flag.
- (c) If $\geq 50\%$ of the components of the sample have Q flags associated with them, then the sample as a whole is invalidated. These samples are also identified in the database by an I6 flag.

All data that is invalidated by the screening procedure is flagged invalid and the values are not reported or used in the deposition calculations. All data that is valid, or qualified, is reported and is used in the calculation of deposition.

Figure 1 is a flow chart which summarizes the sample screening procedure.

Data Screening Flow Chart

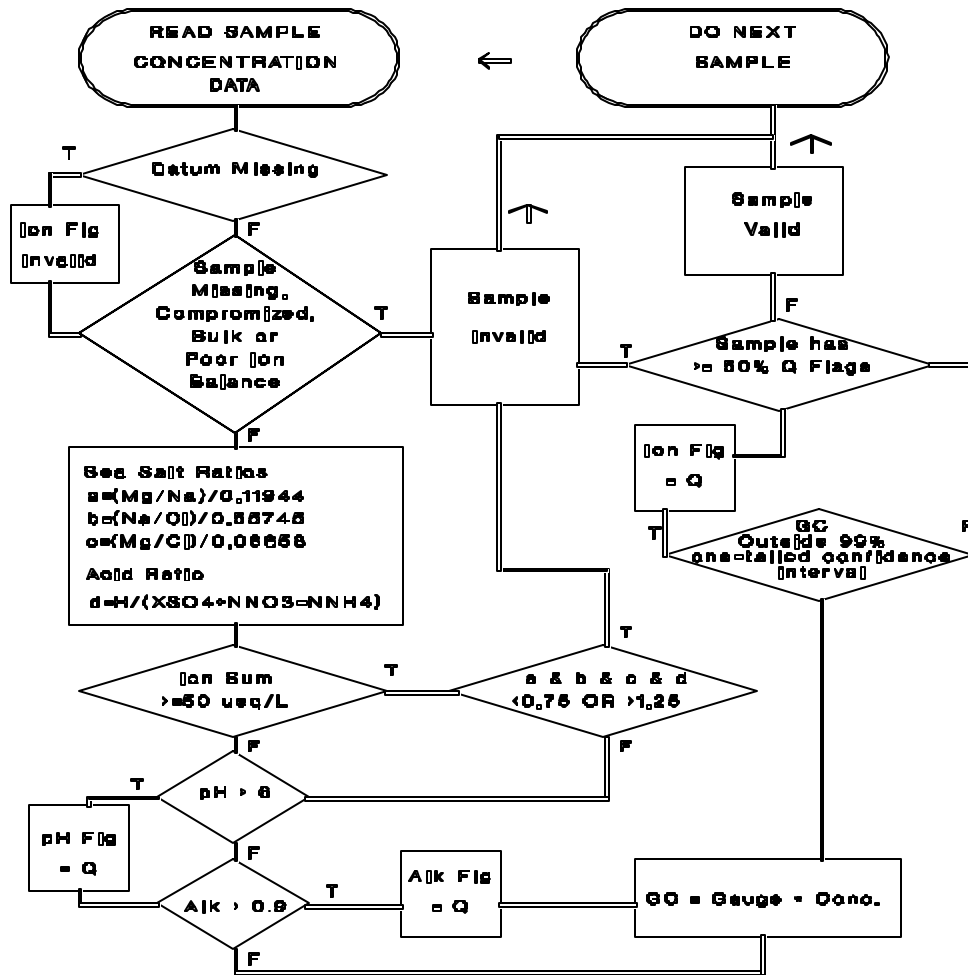


Figure 1

APPENDIX F

DEFINITION OF FLAGS

The system of flags used in this precipitation chemistry listing is a subset of the flags used in the CAPMoN Precipitation Chemistry Listing Summary - 1987. Any CAPMoN flag not used by NEPMoN is listed as NOT APPLICABLE.

Sample Volume (SMPL VOL) and Sample Depth (SMPL DEPTH) Flags

<u>Flag</u>	<u>Description</u>
-------------	--------------------

INVALID

- | | |
|-----------|---|
| I1 | MISSING / NOT VALID - No field weight reported and therefore no sample volume or sample depth available. |
| I2 | INCORRECT - SAMPLE LEAKED OR SPILLED BEFORE WEIGHING -The sample volume and sample depth are incorrect because the sample leaked or was spilled before it was weighed. |
| I3 | NOT APPLICABLE. |
| I4 | INCORRECT - OTHER REASONS - The sample volume and depth are known to be in error for other reasons. e.g. malfunctioning balance or improper use of balance. |
| I5 | BULK SAMPLE - A bulk sample is defined as a sample which has been exposed to the atmosphere before or after the precipitation event. |
| I6 | OUTLIER CONFIRMED - INVALID |

VALID BUT QUALIFIED

- | | |
|-----------|--|
| Q1 | PARTIAL EVENT COLLECTED (i.e. PARTIAL SAMPLE VOLUME) - The sample volume and sample depth represents only part of the precipitation which fell during the week. Such cases generally correspond to collector malfunction or power failures. |
| Q2 | POOR HOOD TO BUCKET SEAL ON COLLECTOR (POTENTIAL EVAPORATION) - The calculated volume and depth may be lower than actual because the bucket was not sealed tightly by the collector hood. Sample evaporation may have occurred. |
| Q3 | NOT APPLICABLE. |
| Q4 | NOT APPLICABLE. |

Q5 NOT APPLICABLE.

Q6 NOT APPLICABLE.

VALID

V0 **VALID - NO PROBLEMS** - The sample volume and sample depth have no apparent problems and are considered to be valid.

Gauge Depth Flags

Flag **Description**

INVALID

I1 **MISSING/NOT AVAILABLE** - No value available. This occurs only in exceptional circumstances when measurements or estimates cannot be made.

VALID BUT QUALIFIED

Q1 **ESTIMATED VALUE - EQUAL TO SAMPLE DEPTH** - No standard gauge measurement was available so an estimated value equal to the sample depth was inserted for the standard gauge depth. This is done only when the standard gauge datum is not available.

Q2 **ESTIMATED VALUE - EQUAL TO CO-LOCATED CLIMATE SITE VALUE** - No standard gauge value was available so an estimated value equal to the co-located Climate Network Station's standard gauge value was inserted. This is done whenever standard gauge data are missing at sites with co-located Climate Station measurements. Note that Climate Station typically use snow rulers for snow depth measurements. In such cases, the Standard Gauge Type is coded accordingly.

Q3 **ESTIMATED VALUE - EQUAL TO NEARBY CLIMATE STATION VALUE** - No standard gauge value was available so an estimated value equal to the value from a nearby Climate Network site was inserted. (This gauge would not be co-located but located typically with 5 km of the collector site). This flag is used when neither a sample depth nor a co-located gauge value is available.

Q4 **ESTIMATED VALUE - EQUAL TO SNOW RULER MEASUREMENT** - No standard gauge value was available so an estimated value based on the on-site snow ruler measurements was inserted, i.e. the difference in snow depth between sample start time and end time divided by snow density factor of 10.

Q5 **CORRECTED VALUE - EQUAL TO SAMPLE DEPTH** - The standard gauge depth was detected to be in error and was corrected (i.e. replaced) by the sample depth value.

- Q6** **CORRECTED VALUE - EQUAL TO CO-LOCATED CLIMATE STATION VALUE** - The standard gauge depth was detected to be in error and was corrected (i.e. replaced) by a co-located Climate Station value.
- Q7** **CORRECTED VALUE - EQUAL TO NEARBY CLIMATE STATION VALUE** - The standard gauge depth was detected to be in error and was corrected (i.e. replaced) by a nearby (typically <5 km) climate station value.
- Q8** **NOT APPLICABLE**
- Q9** **VALUE KNOWN OR SUSPECTED TO BE IN ERROR BUT BEST ESTIMATE AVAILABLE** - The standard gauge depth was known or suspected to be in error (e.g. spilled) but was accepted as the best available estimate of precipitation depth.

VALID

- V0** **VALID DATUM - NO PROBLEMS** - No problems were apparent and the datum was considered valid.
- V1** **VALID - TRACE VALUE** - The standard gauge was TRACE, i.e. less than 0.2 mm water equivalent.

Collection Efficiency (COLL EFF) Flags

Flag **Description**

INVALID

- I1** **MISSING/NOT AVAILABLE** - Collection efficiency could not be calculated because the SAMPLE DEPTH was missing or unavailable.
- I2** **INVALID - SAMPLE SPILLED OR LEAKED BEFORE WEIGHING** - Collection efficiency invalid because the SAMPLE DEPTH was incorrect due to sample spilling or leaking before being weighed (see SAMPLE DEPTH FLAG = I2)
- I3** **NOT APPLICABLE**
- I4** **INVALID - OTHER REASON(S)** - Collection efficiency invalid because the SAMPLE DEPTH was known to be in error for other reasons (see SAMPLE DEPTH FLAG = I4).
- I5** **INVALID - BULK SAMPLE** - Collection efficiency invalid because it applies to bulk sample with potential evaporative or snow escape losses (see SAMPLE DEPTH FLAG = I5).

I6 OUTLIER CONFIRMED INVALID

I7 INDETERMINATE VALUE - STANDARD GAUGE DEPTH EQUALS TRACE
- Collection efficiency could not be calculated because the GAUGE DEPTH = TRACE (<0.2mm).

I8 INVALID CALCULATION - STANDARD GAUGE DEPTH = SAMPLE DEPTH
- Invalid collection efficiency calculation because the STANDARD GAUGE DEPTH was set equal to the SAMPLE DEPTH (i.e. STANDARD GAUGE DEPTH FLAG = Q1 OR Q5).

VALID BUT QUALIFIED

Q1 PARTIAL SAMPLE - Collection efficiency for a partial sample only (see SAMPLE DEPTH FLAG = Q1).

Q2 POOR HOOD-TO-BUCKET SEAL ON COLLECTOR (POTENTIAL EVAPORATION) - Collection efficiency susceptible to negative bias due to possible evaporation of sample.

Q3 NOT APPLICABLE

Q4 NOT APPLICABLE.

Q5 ESTIMATED GAUGE DEPTH - The standard gauge depth was estimated from Climate Station or snow ruler data (see GAUGE DEPTH FLAGS Q2 TO Q4).

Q6 CORRECTED GAUGE DEPTH - The standard gauge depth was corrected based on Climate Station or snow ruler data (See GAUGE DEPTH FLAGS Q6 TO Q7).

Q7 GAUGE DEPTH IN ERROR BUT BEST AVAILABLE ESTIMATE - The standard gauge depth was known, or suspected, to be in error but was accepted as the best available estimate.

VALID

V0 VALID DATUM - NO PROBLEMS - No problems were apparent and the datum is considered to be valid.

Ion Balance (IONBAL) Flags

<u>Flag</u>	<u>Description</u>
INVALID	
I1	NOT CALCULATED - INSUFFICIENT SAMPLE - One or more concentration values missing due to insufficient sample volume (see CONCENTRATION FLAG = I1).
I2	NOT CALCULATED - NO SAMPLE - Concentration data not available because sample was missing (see CONCENTRATION FLAG = I2).
I3	NOT CALCULATED - TOO CONTAMINATED TO ANALYZE - No concentration data available -- lab discarded sample because it was too contaminated to analyze (see CONCENTRATION FLAG = I3.)
I4	NOT CALCULATED - LAB CONTAMINATION - One or more concentration values invalid due to known laboratory contamination (see CONCENTRATION FLAG = I4).
I5	NOT CALCULATED - FIELD CONTAMINATION - One or more concentration values invalid due to known field contamination (see CONCENTRATION FLAG = I5).
I6	NOT CALCULATED - OUTLIER DETECTED - One or more concentration values were determined to be an outlier.
I7	POOR ION BALANCE - One or more concentrations invalid because of poor ion balance (see CONCENTRATION FLAG = I7).
I8	NOT CALCULATED - BULK SAMPLE - All concentrations are invalid because the sample was known to be a bulk sample (see CONCENTRATION FLAG = I8).
I9	NOT APPLICABLE
VALID BUT QUALIFIED	
Q0	NOT APPLICABLE
Q1	NOT APPLICABLE
Q2	NOT APPLICABLE
Q3	NOT APPLICABLE
Q4	NOT APPLICABLE

- Q5** **ONE OR MORE CONCENTRATION SUSPECTED CONTAMINATE BUT NO PHYSICAL EVIDENCE AVAILABLE** - (see CONCENTRATION FLAG =Q5).
- Q6** **SAMPLE LEAKED - CONCENTRATIONS MAY BE AFFECTED** - (see CONCENTRATION FLAG - Q6).

VALID

- V0** **VALID CALCULATION** - Calculation considered valid because all concentration data valid.
- V1** **NOT APPLICABLE**

Concentration Flags

Concentrations are reported in mg/l for SO_4^{2-} , XSO_4^{2-} , NO_3^- -N, Na^+ , Ca^{2+} , Mg^{2+} , K^+ and in pH units for pH. The flags provide information on the validity of the concentration data.

Flag **Description**

INVALID

- I1** **MISSING DATUM - INSUFFICIENT SAMPLE** - No concentration datum available because the sample volume was insufficient for complete analysis.
- I2** **MISSING DATUM - NO SAMPLE** - No concentration datum available because a sample was not collected or a sample was collected but not submitted to the laboratory.
- I3** **MISSING DATUM - TOO CONTAMINATED TO ANALYZE** - no concentration datum available because laboratory personnel considered the sample to be too contaminated with visible particles or debris to be analyzed.
- I4** **REJECTED DATUM - KNOWN LABORATORY CONTAMINATION OF ONE OR MORE IONS** - The datum reported by the laboratory was deemed INVALID because the sample was contaminated in the laboratory.
- I5** **REJECTED DATUM - FIELD CONTAMINATION AND/OR NONCONFORMING OPERATION PROCEDURES** - The concentration datum was deemed invalid because of: (1) evidence of field contamination (e.g. hair in sample); and/or (2) evidence that the operator was not following standard operating procedures so sample integrity may have been compromised.
- I6** **ENTIRE SAMPLE CONFIRMED AS INVALID** - An entire sample can be determined to be invalid in two ways: (1) In samples with an ion sum $\leq 50 \mu\text{eq/L}$, failure to have a sea salt or acid ratio within the range $0.75 \leq \text{X} \leq 1.25$ will result in the sample

being invalidated. (2) If 50% or greater of the ion concentrations of a sample were considered to be statistical outliers, then the entire sample is invalidated (see Appendix E).

I7 REJECTED - POOR ION BALANCE - Concentration datum was considered invalid because it corresponded to a sample which had a very large ion balance and very inconsistent concentration values.

I8 REJECTED - BULK SAMPLE - Sampler cover was open before or after a precipitation event possibly allowing dry deposition to collect in the sample bucket.

I9 NOT APPLICABLE

VALID BUT QUALIFIED

Q1 NON-STANDARD SAMPLE PERIOD - The sample represents a non-standard week (sample period not 7 days), non-bulk sample. Multi-day, wet-only samples are deemed Valid but Qualified because they are not collected using standard operating procedures.

Q2 NOT APPLICABLE

Q3 ION IS CONSIDERED A STATISTICAL OUTLIER - A statistical outlier is a datum whose value exceeded the value of the mean plus three standard deviations of all concentrations for that site for a year.

Q4 NOT APPLICABLE

Q5 CONTAMINATION SUSPECTED BUT NO PHYSICAL EVIDENCE AVAILABLE - The data is suspected because of potential but no supporting evidence is available on the sample history form.

Q6 SAMPLE LEAKED - The sample leaked in the field or in transit.

VALID

V0 VALID DATUM - NO PROBLEMS - The concentration datum was above the detection limit and appeared to have no problems.

V1 NOT APPLICABLE

V2 LESS THAN DETECTION LIMIT VALUE - The concentration datum represents a LESS THAN DETECTION LIMIT (LDL) value where LDL is defined as the analytical detection limit equal to three standard deviations of the baseline noise level. Actual LDL values are presented in the database with a 'less than' sign and are summarized in Table 1.

V3 NOT APPLICABLE

5.9 Excess SO₄²⁻ (XSO₄²⁻) Flags

<u>Flag</u>	<u>Description</u>
INVALID	
I1	NO CALCULATION - SO ₄ ²⁻ Missing due to insufficient sample (See CONCENTRATION FLAG =I1)
I2	NO CALCULATION - SO ₄ ²⁻ Missing due to missing sample (See CONCENTRATION FLAG = I2).
I3	NO CALCULATION - SO ₄ ²⁻ Missing because sample was too contaminated to analyze (see CONCENTRATION FLAG =I3)
I4	NO CALCULATION - SO ₄ ²⁻ Invalid due to lab contamination. (See CONCENTRATION FLAG I4).
I5	NO CALCULATION - SO ₄ ²⁻ Invalid due to field contamination or nonconforming operating procedures (See CONCENTRATION FLAG = I5)
I6	OUTLIER - CONFIRMED INVALID - Datum failed all of the sea-salt and acid ratios (see Appendix A).
I7	NO CALCULATION - SO ₄ ²⁻ Invalid because of poor ion balance (see CONCENTRATION FLAG =I7)
I8	NO CALCULATION - SO ₄ ²⁻ Invalid because of bulk Sample (See CONCENTRATION FLAG = I8)
I9	NOT APPLICABLE
VALID BUT QUALIFIED	
Q1	SO₄²⁻ QUALIFIED - Non-standard sample period (See CONCENTRATION FLAG = Q1)
Q2	NOT APPLICABLE
Q3	ION IS CONSIDERED A STATISTICAL OUTLIER - Datum's value exceeded the value of the mean plus three standard deviations of all concentrations for that site for a year.
Q4	NOT APPLICABLE

Q5 **SO₄²⁻ QUALIFIED** - Contamination suspected but no evidence (See CONCENTRATION FLAG = Q5)

Q6 **SO₄²⁻ QUALIFIED** - SAMPLE LEAKED (see CONCENTRATION FLAG = Q6)

VALID

V0 **"BEST CASE CALCULATION" WHEREBY SEA SALT PARAMETERS APPEAR IN RATIOS CLOSE TO BULK SEAWATER RATIOS** - XSO₄²⁻ was calculated using sodium as the sea salt indicator since this ratio to magnesium was within ±25% of the Na⁺/Mg²⁺ ratio in bulk seawater.

V1 **LESS THAN DETECTION LIMIT OR NON DETECTABLE VALUE OF XSO₄²⁻**
- The measured SO₄²⁻ concentration was LDL or ND so the excess sulphate value was assigned LDL or ND.

V2 **CALCULATION BASED ON SODIUM** - The constituent ratios in the sample were not within ±25% of the bulk seawater ratios but sodium was still the best indicator and the calculation was therefore based on sodium.

V3 **CALCULATION BASED ON MAGNESIUM** - magnesium appeared to be the best indicator of seasalt and excess sulphate was calculated based on magnesium.

V4 **CALCULATION BASED ON CHLORIDE** - chloride appeared to be the best indicator of seasalt and excess sulphate was calculated based on chloride.

V5 **XSO₄²⁻ SET EQUAL TO SO₄²⁻** - No valid indicator of sea salt was found; XSO₄²⁻ was set equal to the measured sulphate in the sample.

APPENDIX G

Calculation of Sea Salt Ratios and Sea Salt Correction

The sea salt ratios are the ratios of Mg^{2+}/Na^+ , Na^+/Cl^- and Mg^{2+}/Cl^- as compared to these ratios in seawater. For each sample the following values are calculated:

$$a \frac{\left(\frac{[Mg^{2+}]}{[Na^+]} \right)_{sample}}{\left(\frac{[Mg^{2+}]}{[Na^+]} \right)_{seawater}} \quad (20)$$

$$b \frac{\left(\frac{[Na^+]}{[Cl^-]} \right)_{sample}}{\left(\frac{[Na^+]}{[Cl^-]} \right)_{seawater}} \quad (21)$$

$$c \frac{\left(\frac{[Mg^{2+}]}{[Cl^-]} \right)_{sample}}{\left(\frac{[Mg^{2+}]}{[Cl^-]} \right)_{seawater}} \quad (22)$$

where all ion concentrations are in mg/L

The acid ratio is the ratio of hydrogen ion to the excess sulphate plus the nitrate minus the ammonia. This acid ratio, d, is calculated as follows:

$$d \frac{[H^+]}{[XSO_4^{2-}] + [NNO_3] - [N NH_4^+]} \quad (23)$$

where all concentrations are in $\mu\text{eq/L}$

Ratios a, b, c, and d should theoretically all equal one. Each ratio is evaluated and if the total ion sum for the sample is $\leq 50 \mu\text{g/L}$ and (a) and (b) and (c) and (d) are all <0.75 or > 1.25 , the entire sample is invalidated and it is flagged as I6. The evaluation of the salt and acid ratios is intended to eliminate samples which are contaminated and no other supporting evidence of contamination exists.

ALGORITHM TO DETERMINE WHICH ION CONCENTRATION TO USE IN THE SEA-SALT CORRECTION:

* Calculation of excess sulphate

Do if (cla > 0).

Do if (naa > 0 and mga > 0).

Do if (a >=0.75 and a <=1.25).

Compute xso4a = (so4a - (0.24966 * naa)).

Else if ((b <=0.75 or b >=1.25) and (c >=0.75 and c <=1.25)).

Compute xso4a = (so4a - (2.09015 * mga)).

Compute xso4flg = "V3".

Else if ((b >=0.75 and b <=1.25) and (c <=0.75 or c >=1.25)).

Compute xso4a = (so4a - (0.24966 * naa)).

Else if (abs(b-1) < abs(c-1)).

Compute xso4a = (so4a - (0.24966 * naa)).

Compute xso4flg = "V2".

Else.

Compute xso4a = (so4a - (2.09015 * mga)).

Compute xso4flg = "V3".

End if.

End if.

If (cla > 0 & naa > 0 & sysmis (mga)) xso4a = (so4a - (0.24966 * naa)).

If (cla > 0 & mga > 0 & sysmis (naa)) xso4a = (so4a - (2.09015 * mga)).

If (cla > 0 & sysmis (mga) & sysmis (naa)) xso4a = (so4a - (0.13917 * cla)).

If (cla > 0 & naa > 0 & sysmis (mga)) xso4flg = "V2".

If (cla > 0 & mga > 0 & sysmis (naa)) xso4flg = "V3".

If (cla > 0 & sysmis (mga) & sysmis (naa)) xso4flg = "V4".

End if.

Do if (sysmis(cla)).

If (mga > 0) xso4a = (so4a - (2.09015 * mga)).

If (naa > 0) xso4a = (so4a - (0.24966 * naa)).

If (naa > 0 and mga > 0) xso4a = (so4a - (0.24966 * naa)).

End if.

Execute.

Compute xso4e = xso4a/48.033.

Compute d = he/(xso4e + nno3e - nnh4e).

If (xso4a < 0) xso4flg = "I6".

* Derive I6 based on salt ratios

Do if (ions >= .05).

If ((a<.75 | a>1.25) & (b<.75 | b>1.25) & (c<.75 | c>1.25) & (d<.75 | d>1.25)) ionflg = "I6".

End if

.Execute.