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Water quality of Catamaran Brook and the Little Southwest Miramichi River, N.B. (1990 - 1996).

Komadina-Douthwright, S.M., T. Pollock, D. Caissie, R.A.Cunjak and P. Hardie

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Canadian Data Report of Fisheries and Aquatic Sciences 1051

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1999

Water quality of Catamaran Brook and the Little Southwest Miramichi River, N.B. (1990 - 1996)[1]

by

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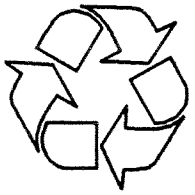

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ABSTRACT

Komadina-Douthwright, S.M., T. Pollock, D. Caissie, R.A. Cunjak, and P. Hardie. 1999. Water quality of Catamaran Brook and the Little Southwest Miramichi River, N.B. (1990 - 1996). Can. Data Rep. Fish. Aquat. Sci. 1051: 32 p.

The Catamaran Brook Habitat Research Project is a long-term (15 year) multidisiplinary study addressing ecosystem processes as well as the impacts of forestry practices on the habitat of stream fishes, in particular Atlantic salmon (*Salmo salar*). One important component of the project is to monitor the water quality of the brook before, during and after timber harvests. Since November of 1989 water samples have been collected on a monthly basis and analyzed for various water quality parameters. This report presents all of the water quality results from the five year pre-logging phase (1990 to 1994) of study and the first two years (1995-1996) of the five year impact phase.

RESUME

Komadina-Douthwright, S.M., T. Pollock, D. Caissie, R.A. Cunjak, and P. Hardie. 1999. Water quality of Catamaran Brook and the Little Southwest Miramichi River, N.B. (1990 - 1996). Can. Data Rep. Fish. Aquat. Sci. 1051: 32 p.

Le projet du ruisseau Catamaran est un projet pluridisciplinaire à long terme (15 années) visant à étudier les écosystèmes aquatiques ainsi que l'effet de la coupe du bois sur l'habitat du poisson, en particulier sur le saumon de l'Atlantique (Salmo salar). Une composante importante du projet est l'analyse de la chimie des eaux du ruisseau avant et après la coupe du bois. A partir de novembre 1989, des échantillons d'eau ont été recueillis sur une base mensuelle, et ils ont été analysés pour plusieurs paramètres chimiques. Le présent rapport présente les résultats de cette analyse de la chimie des eaux sur les premiers cinq années du projet, c'est-à-dire de 1990 à 1994, et pour les deux premières années (1995-1996) durant la coupe du bois.

1.0 INTRODUCTION:

The chemical properties of natural freshwaters are directly influenced by hydrological processes acting on the landscape/topography of their surrounding catchment basin (Moss, 1988). To get a better understanding of how human land use activities such as forestry practices can affect stream water quality and fish habitat one must also understand the associated chemical, physical and biological processes that take place in that ecosystem (Newson, 1994). By monitoring the water quality of streams before, during and after logging we can obtain a better understanding of both the short and long-term consequences of such practices on fish habitat.

The Catamaran Brook habitat research project is a long-term (15 year) multidisiplinary study addressing the impacts of forestry practices on stream habitat, (Cunjak et al. 1990). One component of the project is to monitor the water quality of Catamaran Brook and the Little Southwest Miramichi River, upstream from its confluence with Catamaran Brook, before (1990 - 1994), during (1995 - 1999) and after timber harvest (2000 - 2004). The purpose of this report is to present the mid-month water quality analyses obtained from the five year pre-impact study and the first two years (1995-1996) of the planned five year impact phase.

2.0 STUDY AREA:

Catamaran Brook and the Little Southwest Miramichi River are located in central New Brunswick (Figure 1). Catamaran Brook is a small third-order stream with a drainage basin of 52 km^2 that drains into the Little Southwest Miramichi River which has a drainage area of 1190 km^2 above this confluence. For a general descriptions of the basin see Cunjak et al. (1990) and Cunjak et al (1993).

3.0 METHOD:

Mid-month water samples were collected at two sites in Catamaran Brook: i) Middle Reach and ii) Lower Reach of the brook. The sampling site in the Little Southwest Miramichi was located approximately 75 m upstream of the mouth of Catamaran Brook (Figure 1).

A total of four clean sample bottles were used to collect water samples at each of the monitoring sites. A 1000 ml polyethylene bottle was used for major ions; a 500 ml polyethylene bottle for metals; a 125 ml glass bottle was used for phosphate samples; and, a 50 ml glass bottle for mercury analysis. All bottles and lids were rinsed two to three times with water from the collection site before the actual sample was taken. Samples were labeled and placed in a cooler and transported to Environment Canada's Laboratory (Moncton. NB) where they were stored at 4° C until analyzed and subsequently entered into Environment Canada's national water quality database ENVIRODAT (see Appendix A for analytical methods).

Extracts from ENVIRODAT of the mid-month water quality results for the two monitoring sites in Catamaran Brook and the one Little Southwest Miramichi River site are presented in Tables 1 through 3. Several parameters are duplicated in this table because of changes in methodology or instrumentation over the years.

A hydrometric station is located in the middle reach of Catamaran Brook that is operated by Environment Canada (Figure 1). Daily stream discharge, and, discharge at the time of water sampling were also obtained from Environment Canada and the results were plotted (Figure 2).

Related water quality parameters were grouped and graphed for each of the monitoring sites as follows; ***Physical*** parameters include: specific conductance - which reflects changes in ionic concentration; apparent colour - which reflects changes in the colour of water caused by organic debris and suspended matter; and, turbidity - which reflects changes in the amount of suspended particles in solution (Figure 3). ***Alkalinity and pH*** where alkalinity reflects changes in the water's capacity to accept hydrogen ions; and, pH reflects changes in hydrogen ion activity (Figure 4). Calcium was also added to this category to show how it changes relative to pH (Figure 4). ***Carbon*** parameters include: DOC (dissolved organic carbon) which reflects the changes in the concentration of organic matter within the water column; DIC (dissolved inorganic carbon) which reflects concentration changes in the available carbon compounds such as carbonate, bicarbonate or dissolved carbon dioxide. Those compounds are available to autotrophic organisms to convert light energy to chemical energy; total organic carbon includes dissolved and particulate organic matter; total inorganic carbon includes dissolved and particulate inorganic matter; and, total non-purgable carbon includes carbon substances that are persistent in the water environment (Figure 5). ***Nitrogen*** parameters analyzed are major nutrients that affect the productivity of freshwater ecosystems (Wetzel, 1983), and include: Dissolved nitrate+nitrite (NO_3 + NO_2); dissolved nitrogen nitrate reflects shifts in productivity (i.e. high values can indicate eutrophic conditions); and, total nitrogen reflects the combined forms of nitrogen in the water column (i.e. dissolved molecules, organic and humic compounds (Figure 6). ***Phosphorus***, ***Minor Metals*** such as Manganese, Iron, Copper and Zinc are essential micronutrients and were measured to provide an indication of the general health of the water (Figure 7 and Figure 8, respectively). ***Major Ions*** contribute to the total ionic salinity of freshwater and basically

are comprised of eight major elements; Sodium, Magnesium, Sulphate, Chloride, Potassium, Calcium and both Inorganic and Organic Carbon which the latter two were treated above (Figure 9). ***Heavy Metals*** were also analyzed to monitor toxicity of the water (Figure 10).

ACKNOWLEDGMENTS

The authors would like to thank Environment Canada for the analysis of these results and for their other contributions associated with the Catamaran Brook Habitat Research Project. We would also like to thank all the dedicated employees, students and volunteers who have assisted us with collecting the water samples.

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Table 1: Monthly water quality analyses of samples collected in the Middle Reach of Catamaran Brook, NB (1998 - 1996). L values are less than detection limit. Boxed alkalinity reported as total; other values in Gran units.

Year	Sample Date	Apparent Colour (Relative Units)	Specific Conductance (uSie/cm)	Turbidity (NTU)	Alkalinity (mg/l)	pH (pH Units)	Calcium Dissolved (mg/l)	Dissolved Organic Carbon (mg/l)	Dissolved Inorganic Carbon (mg/l)	Total Organic Carbon (mg/l)	Total Inorganic Carbon (mg/l)	Total Organic Non Purgable Carbon (mg/l)
1989	16-Nov-89	40	43	0.6	14.2	7.1	5.7	5	-	-	-	-
	20-Dec-89	10	64	0.2	25.4	7.1	7.6	2.6	-	-	-	-
1990	15-Jan-90	5	70	0.2	28.6	7.6	8.9	2.6	-	-	-	-
	15-Feb-90	10	62	0.3	24.9	7	7.2	2.4	-	-	-	-
	16-Mar-90	10	66.7	0.2	25.1	7.6	7.6	2.1	-	-	-	-
	19-Apr-90	40	31.3	0.6	9.1	6.9	3.6	6.5	-	-	-	-
	16-May-90	20	40.3	0.3	13.8	7.1	4.4	4.1	-	-	-	-
	13-Jun-90	10	55.2	0.3	22.1	7.4	6.3	2.8	-	-	-	-
	18-Jul-90	L 5	77.5	0.3	34	7.8	9.2	1.9	-	-	-	-
	15-Aug-90	70	35	0.6	12.4	7.1	4.7	9.7	-	-	-	-
	14-Sep-90	10	72	0.3	31.1	7.7	8.9	2.7	-	-	-	-
	16-Oct-90	40	43	0.5	13.5	7	5.2	7.8	-	-	-	-
	14-Nov-90	35	38.5	0.4	12	7.1	4.2	5.1	-	-	-	-
	18-Dec-90	20	48	0.3	17.2	7.2	5.1	2.8	-	-	-	-
1991	18-Jan-91	15	46	0.3	16.8	7.1	5.5	2.7	-	-	-	-
	14-Feb-91	20	68	0.2	27.1	7.6	8.1	2.1	-	-	-	-
	20-Mar-91	20	47	0.5	16.7	6.9	5.6	3.6	-	-	-	-
	16-Apr-91	30	35	0.3	12.6	7.1	4.1	3.6	-	-	-	-
	13-May-91	25	31	0.3	9	6.9	3.5	3.8	-	-	-	-
	15-Jul-91	25	71	0.4	32.3	7.4	9.2	3.1	-	-	-	-
	14-Aug-91	65	42	0.4	13.8	7.1	5.3	9.5	-	-	-	-
	16-Sep-91	15	69	0.3	29.8	7.5	8.4	2.7	-	-	-	-
	14-Oct-91	40	36	0.4	12.8	6.9	4.3	6.5	-	-	-	-
	13-Nov-91	20	45	0.4	17.2	7.3	5.5	3.4	4.9	-	-	-
	11-Dec-91	10	50	0.4	19.4	7.3	6.4	2.7	-	-	-	-
1992	21-Jan-92	10	48	0.3	17.1	7	5.7	3.7	-	-	-	-
	14-Feb-92	5	70	0.3	29.1	7.4	8.1	1.5	-	-	-	-
	13-Mar-92	5	60	0.3	23.5	7.3	7.2	2.3	-	-	-	-
	09-Apr-92	5	44	0.3	16.4	7.2	5.2	2.6	-	-	-	-
	19-May-92	25	40	0.3	14.3	7.3	4.6	1.3	-	-	-	-
	12-Jun-92	10	65	0.2	27.2	7.6	8.1	2.3	-	-	-	-
	20-Jul-92	40	47	-	19.1	7.2	7	4	-	-	-	-
	17-Aug-92	20	65	-	28.5	7.6	8.2	2.8	-	-	-	-
	18-Sep-92	20	74	-	31.5	7.7	9.1	2.8	-	-	-	-
	20-Oct-92	10	66	-	28.5	7.5	8.2	3	-	-	-	-
	14-Nov-92	55	35	0.4	11	7.1	4.3	6.8	-	7	-	-
	10-Dec-92	15	61	0.2	26.3	7.5	7.6	2.3	-	2.1	-	-
1993	21-Jan-93	10	73	0.2	31.8	7.8	9.1	2.1	-	-	-	-
	16-Feb-93	7	80	0.3	35.4	7.6	10.3	1.5	-	1.5	-	-
	24-Mar-93	10	81	0.2	36.1	7.6	9.9	2	-	-	-	-
	19-Apr-93	60	28	0.6	8.1	6.9	3	4.3	-	-	-	-
	20-May-93	20	41	0.2	15.8	7.3	5.2	3	-	-	-	-
	17-Jun-93	50	46.7	0.4	19.1	7.3	5.7	3.8	-	-	-	-
	20-Jul-93	20	63.9	0.3	27.6	7.7	7.9	2.7	-	-	-	-
	19-Aug-93	20	70	0.2	33	7.6	9.8	2.7	-	-	-	-
	16-Sep-93	20	73.5	0.2	33.2	7.7	8.8	3.4	-	-	9.3	-
	26-Oct-93	40	39	0.3	15.4	7.2	4.93	6.6	-	-	4	-
	19-Nov-93	25	46	0.6	18.2	7.4	6	3.9	-	-	4.7	-
	02-Dec-93	25	44	0.3	16.1	7.2	6.2	3.3	-	-	4.7	-
1994	25-Jan-94	15	62	0.4	24.6	7.5	7.9	-	-	2.9	7	-
	01-Mar-94	10	56	0.3	23.2	7.5	7.4	-	-	2.6	6.9	-
	24-Mar-94	15	54	0.3	20.8	7.4	6.5	-	-	2.9	6.4	-
	20-Apr-94	25	27	0.4	8.1	6.8	3.2	-	-	5.8	2.2	-
	18-May-94	20	30	0.3	9.9	7	3.45	-	-	5.4	2.9	-
	19-Jun-94	40	38	0.5	13.7	7	4.48	-	-	8.8	4.1	-
	15-Jul-94	15	62	0.2	25.3	7.4	7.33	-	-	3.2	7.2	-
	20-Aug-94	10	87	0.2	38.1	7.8	10	-	-	1.5	10.1	-
	16-Sep-94	10	80	0.2	33.3	7.7	10	-	-	2.8	8.7	-
	18-Oct-94	10	84	0.2	36.4	7.6	9.8	-	-	1.6	9.5	-
	19-Nov-94	15	66	0.4	24.2	7.4	7.5	-	-	4.6	6.1	-
	21-Dec-94	10	67	0.6	26.6	7.4	6.6	-	-	3.3	7	-
1995	21-Jan-95	20	46	0.3	15.9	7	5.7	-	-	4.8	4.6	-
	19-Feb-95	10	71	0.2	27.6	7.4	8.2	-	-	2.3	7.2	-
	21-Mar-95	15	61	0.2	23.8	7.1	7.2	-	-	3.9	6.5	-
	23-Apr-95	35	32	0.3	9.6	6.7	3.39	-	-	-	2.7	6.3
	16-May-95	35	28	0.3	9.5	6.9	3.3	-	-	-	2.5	4.9
	23-Jun-95	15	72	0.3	30.9	7.6	8.6	-	-	-	8.6	3.7
	21-Jul-95	15	83	0.3	35.4	7.6	10.02	-	-	-	10.5	3.5
	16-Aug-95	10	88	0.4	42.3	7.7	10.9	-	-	-	11.8	3.1
	19-Sep-95	15	90	0.2	40.8	7.8	10.7	-	-	-	11.4	3.8
	17-Oct-95	25	83	0.2	32.2	7.7	10.1	-	-	-	8.5	6.1
	16-Nov-95	67	29.6	0.8	7.2	6.6	3.65	-	-	-	1.7	12.4
	15-Dec-95	19	59.4	0.2	22.5	7.3	6.82	-	-	-	7.1	4
1996	19-Jan-96	20	54	0.2	18.1	7.1	6.11	-	-	-	5.4	5
	22-Feb-96	15	55	0.2	21.4	7.3	6.58	-	-	-	5.2	2.3
	14-Mar-96	20	52	0.2	18.9	7.2	5.59	-	-	-	4.7	2.8
	22-Apr-96	40	29	0.5	9	6.6	3.49	-	-	-	2.2	6.2
	17-May-96	60	30.6	0.2	10.5	6.9	3.85	-	-	-	2.5	4.2
	18-Jun-96	35	47.6	0.3	18.9	7	5.75	-	-	-	5.9	6.6
	21-Aug-96	15	71.7	0.1	31.9	7.7	8.99	-	-	-	8.3	3.7
	17-Sep-96	60	43.7	0.2	16	7.4	5.46	-	-	-	3.5	10.9
	16-Oct-96	45	52.2	0.2	18.6	7.5	5.94	-	-	-	4.2	7.6
	15-Nov-96	40	42.1	0.2	14.2	7.4	4.92	-	-	-	2.9	6.2
	18-Dec-96	45	52	0.2	15.1	7.5	4.86	-	-	-	3.4	4.6
	min	L 5	27	0.1	7.2	6.6	3.00	1.3	4.9	1.5	1.7	2.3
	max	70	90	0.8	42.3	7.8	10.90	9.7	4.9	8.8	11.8	12.4
	mean*	25	55	0.3	21.8	7.3	6.65	3.6	4.9	3.7	6.0	5.4
	std	16	17	0.1	8.8	0.3	2.11	1.9	0	2.0	2.7	2.5
	median	20	53	10.3	19.3	7.4	6.35	3.0	4.9	3.1	5.9	4.8

* mean of values above the detection limit (L) of instrument used for analysis.

Table 1: (continued). Monthly water quality analyses of samples collected in the Middle Reach of Catamaran Brook, NB (1998 - 1996). L values are less than detection limit.

Year	Sample Date	Nitrogen Dissolved NO3 & NO2 (mg/l)	Nitrogen Dissolved Nitrate (mg/l)	Nitrogen Total (mg/l)	Phosphorous Total (mg/l)	Manganese Extractable (mg/l)	Manganese Extractable (mg/l)	Iron Extractable (mg/l)	Iron Extractable (mg/l)	Iron Extractable (mg/l)	Copper Extractable (mg/l)	Zinc Extractable (mg/l)
1989	16-Nov-89	L 0.01	-	0.22	0.009	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	20-Dec-89	0.08	-	0.18	0.002	L 0.01	-	-	0.041	-	L 0.002	L 0.01
1990	15-Jan-90	0.1	-	0.17	0.002	L 0.01	-	-	0.038	-	L 0.002	L 0.01
	15-Feb-90	0.1	-	0.18	0.001	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	16-Mar-90	0.11	-	0.21	0.001	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	19-Apr-90	0.04	-	0.21	0.004	0.01	-	0.08	-	-	L 0.002	L 0.01
	16-May-90	0.01	-	0.14	0.003	L 0.01	-	-	0.048	-	L 0.002	L 0.01
	13-Jun-90	L 0.01	-	0.09	0.004	L 0.01	-	-	0.05	-	L 0.002	L 0.01
	18-Jul-90	0.04	-	0.14	0.004	L 0.01	-	-	0.016	-	L 0.002	L 0.01
	15-Aug-90	0.03	-	0.22	0.004	L 0.01	-	0.11	-	-	L 0.002	L 0.01
	14-Sep-90	L 0.01	-	0.1	0.003	L 0.01	-	-	0.044	-	L 0.002	L 0.01
	16-Oct-90	0.01	-	0.18	0.007	L 0.01	-	0.1	-	-	L 0.002	L 0.01
	14-Nov-90	0.04	0.05	0.13	0.001	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	18-Dec-90	0.09	0.1	0.14	0.005	L 0.01	-	0.05	-	-	L 0.002	L 0.01
1991	18-Jan-91	0.16	0.14	0.22	0.003	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	14-Feb-91	0.15	0.146	0.18	0.003	L 0.01	-	-	0.049	-	L 0.002	L 0.01
	20-Mar-91	0.22	0.24	0.29	0.018	L 0.01	-	-	0.052	-	L 0.002	L 0.01
	16-Apr-91	0.05	0.07	0.17	0.007	L 0.01	-	-	0.043	-	L 0.002	L 0.01
	13-May-91	-	0.02	0.11	0.006	L 0.01	-	-	0.04	-	L 0.002	L 0.01
	15-Jul-91	-	0.063	0.14	0.005	-	-	-	-	-	-	-
	14-Aug-91	-	0.03	0.24	0.008	L 0.01	-	0.08	-	-	L 0.002	L 0.01
	16-Sep-91	-	L 0.01	0.13	0.001	-	-	-	-	-	-	-
	14-Oct-91	-	0.02	0.19	0.004	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	13-Nov-91	-	L 0.01	0.1	0.003	L 0.01	-	-	0.045	-	L 0.002	L 0.01
	11-Dec-91	-	0.1	0.18	0.001	0.01	-	0.05	-	-	0.004	L 0.01
1992	21-Jan-92	-	0.12	0.33	0.005	L 0.01	-	-	0.042	-	L 0.002	L 0.01
	14-Feb-92	-	0.14	0.17	L 0.001	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	13-Mar-92	-	0.09	0.25	0.004	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	09-Apr-92	-	0.1	0.18	0.009	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	19-May-92	-	0.05	-	0.009	L 0.01	-	-	0.031	-	L 0.002	L 0.01
	12-Jun-92	-	0.01	-	0.005	L 0.01	-	-	0.022	-	L 0.002	L 0.01
	20-Jul-92	-	0.06	0.18	0.008	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	17-Aug-92	-	0.03	0.12	0.003	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	18-Sep-92	-	0.06	0.12	0.004	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	20-Oct-92	-	L .0200	0.12	0.002	L 0.01	-	-	0.034	-	L 0.002	L 0.01
	14-Nov-92	-	0.06	-	0.006	L 0.01	-	0.08	-	-	L 0.002	L 0.01
	10-Dec-92	-	0.07	0.13	0.001	L 0.01	-	-	0.045	-	L 0.002	L 0.01
1993	21-Jan-93	-	0.13	0.18	0.008	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	16-Feb-93	-	0.13	0.22	L 0.001	L 0.01	-	-	0.019	-	L 0.002	L 0.01
	24-Mar-93	-	0.18	0.22	L 0.001	L 0.01	-	-	0.023	-	L 0.002	L 0.01
	19-Apr-93	-	0.03	0.14	0.013	0.01	-	0.08	-	-	L 0.002	L 0.01
	20-May-93	-	0.04	0.11	0.003	L 0.01	-	-	0.036	-	L 0.002	L 0.01
	17-Jun-93	-	0.01	0.12	0.004	L 0.01	-	-	0.046	-	L 0.002	L 0.01
	20-Jul-93	-	0.04	0.11	0.004	0.01	-	-	0.065	-	L 0.002	L 0.01
	19-Aug-93	-	0.06	0.14	0.011	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	16-Sep-93	-	0.04	0.12	0.002	0.01	-	-	0.041	-	L 0.002	L 0.01
	26-Oct-93	-	0.02	0.16	0.003	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	19-Nov-93	-	0.04	0.15	0.002	L 0.01	-	-	0.04	-	L 0.002	L 0.01
	02-Dec-93	-	0.05	0.11	0.006	L 0.01	-	-	0.047	-	L 0.002	L 0.01
1994	25-Jan-94	-	0.1	0.1	0.001	L 0.01	-	-	0.039	-	L 0.002	L 0.01
	01-Mar-94	-	0.11	0.14	0.006	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	24-Mar-94	-	0.08	0.13	0.003	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	20-Apr-94	-	0.03	0.08	0.006	0.01	-	0.06	-	-	L 0.002	L 0.01
	18-May-94	-	0.02	0.07	0.005	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	19-Jun-94	-	0.02	0.12	0.015	0.02	-	0.09	-	-	L 0.002	L 0.01
	15-Jul-94	-	0.03	0.12	0.006	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	20-Aug-94	-	0.08	0.13	0.017	L 0.01	-	-	0.029	-	L 0.002	L 0.01
	16-Sep-94	-	0.04	0.11	0.001	L 0.01	-	-	0.033	-	L 0.002	L 0.01
	18-Oct-94	-	0.03	0.07	0.003	L 0.01	-	-	0.063	-	L 0.002	L 0.01
	19-Nov-94	-	0.07	0.13	0.003	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	21-Dec-94	-	0.14	0.22	0.002	L 0.01	-	-	0.036	-	L 0.002	L 0.01
1995	21-Jan-95	-	0.17	0.26	0.005	L 0.01	-	-	0.056	-	L 0.002	L 0.01
	19-Feb-95	-	0.14	0.19	0.002	L 0.01	-	-	0.049	-	L 0.002	L 0.01
	21-Mar-95	-	0.13	0.15	0.005	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	23-Apr-95	-	0.04	0.12	0.006	0.01	-	0.06	-	-	L 0.002	L 0.01
	16-May-95	-	L .02	0.05	0.005	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	23-Jun-95	-	0.03	0.13	0.003	L 0.01	-	-	0.034	-	L 0.002	L 0.01
	21-Jul-95	-	0.06	0.17	0.005	L 0.01	-	-	0.04	-	L 0.002	L 0.01
	16-Aug-95	-	0.04	0.13	0.004	L 0.01	-	-	0.033	-	L 0.002	L 0.01
	19-Sep-95	-	0.04	0.08	0.004	L 0.01	-	-	0.041	-	L 0.002	L 0.01
	17-Oct-95	-	0.04	0.09	0.007	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	16-Nov-95	-	L .02	0.08	0.011	0.01	-	0.09	-	-	L 0.002	L 0.01
	15-Dec-95	-	0.209	0.13	0.005	L 0.01	-	-	0.043	-	L 0.002	L 0.01
1996	19-Jan-96	-	0.242	0.3	0.005	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	22-Feb-96	-	0.072	0.12	0.002	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	14-Mar-96	-	0.07	0.12	0.002	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	22-Apr-96	-	0.03	0.09	0.05	0.03	-	0.14	-	-	L 0.002	L 0.01
	17-May-96	-	L .02	0.04	0.006	-	L 0.01	-	-	0.03	L 0.002	-
	18-Jun-96	-	L .02	0.05	0.005	-	0.01	-	-	0.08	L 0.002	-
	21-Aug-96	-	0.02	0.11	0.0056	-	L 0.01	-	-	0.05	L 0.002	-
	17-Sep-96	-	L .02	0.18	0.0084	-	L 0.01	-	-	0.12	L 0.002	-
	16-Oct-96	-	L .02	0.09	0.0067	-	L 0.01	-	-	0.09	L 0.002	-
	15-Nov-96	-	0.03	0.11	0.0042	-	L 0.01	-	-	0.08	L 0.002	-
	18-Dec-96	-	0.04	0.13	0.0098	-	L 0.01	-	-	0.06	L 0.002	-
	min	L 0.01	L0.02	0.04	L 0.001	L 0.01	L 0.01	0.05	0.016	0.03	L 0.002	L 0.01
	max	0.22	0.24	0.33	0.0500	0.03	0.01	0.14	0.065	0.12	0.004	-
	mean*	0.08	0.07	0.14	0.0056	0.01	0.01	0.07	0.040	0.07	0.004	-
	std	0.06	0.05	0.06	0.0060	0.01	0.00	0.02	0.011	0.03	0	-
	median	0.05	0.06	0.13	0.0050	0.01	0.01	0.06	0.041	0.08	0.004	-

* mean of values above the detection limit (L) of instrument used for analysis.

Table 1: (continued). Monthly water quality analyses of samples collected in the Middle Reach of Catamaran Brook, NB (1998 - 1996). L values are less than detection limit.

Year	Sample Date	Zinc Extractable (mg/l)	Zinc Extractable (mg/l)	Calcium Dissolved (mg/l)	Flouride Dissolved (mg/l)	Sodium Dissolved (mg/l)	Magnesium Dissolved (mg/l)	Sulphate Dissolved (mg/l)	Sulphate Dissolved (mg/l)	Chloride Dissolved (mg/l)	Potassium Dissolved (mg/l)	Arsenic Total (mg/l)	Arsenic Total (mg/l)
1989	16-Nov-89	-	-	5.7	L 0.05	1.3	1.8	4.2	4.23	1.1	0.12	-	-
	20-Dec-89	-	-	7.6	-	1.8	2	4.5	4.44	0.9	0.14	-	-
1990	15-Jan-90	-	-	8.9	-	1.9	2.7	4.8	4.37	0.9	0.15	-	-
	15-Feb-90	-	-	7.2	L 0.05	1.7	2.2	4.5	4.51	0.9	0.17	-	-
	16-Mar-90	-	-	7.6	L 0.05	1.8	2.4	4.5	5.05	0.8	0.29	-	-
	19-Apr-90	-	-	3.6	L 0.05	1.1	1.1	3.7	4.08	0.6	0.26	-	-
	16-May-90	-	-	4.4	0.06	1.2	1.4	3.7	3.83	0.5	0.18	-	-
	13-Jun-90	-	-	6.3	L 0.05	1.4	2	3.2	4.49	0.5	0.19	-	-
	18-Jul-90	-	-	9.2	0.05	1.7	3.1	3.7	3.93	0.67	0.26	-	-
	15-Aug-90	-	-	4.7	L 0.05	1.2	1.2	3.2	3.97	0.5	0.13	-	-
	14-Sep-90	-	-	8.9	0.05	1.6	2.8	4.3	4	0.6	0.19	-	-
	16-Oct-90	-	-	5.2	L 0.05	1.4	1.5	4.1	4.5	1.4	0.21	-	-
	14-Nov-90	-	-	4.2	L 0.05	1.2	1.3	4.1	3.9	1.2	0.13	-	-
	18-Dec-90	-	-	5.1	L 0.05	1.4	1.6	3.6	3.5	0.7	0.16	-	-
1991	18-Jan-91	-	-	5.5	L 0.05	1.4	1.7	4.1	3.5	0.7	0.18	-	-
	14-Feb-91	-	-	8.1	0.05	1.7	2.7	4.8	4.4	0.9	0.22	-	-
	20-Mar-91	-	-	5.6	L 0.05	1.3	1.7	4.2	4.7	0.62	0.22	-	-
	16-Apr-91	-	-	4.1	L 0.05	1.1	1.2	3.7	3.6	0.6	0.2	-	-
	13-May-91	-	-	3.5	L 0.05	1	0.99	3.3	-	L 0.5	0.17	-	-
	15-Jul-91	-	-	9.2	0.05	1.6	2.8	3.7	-	0.6	0.16	-	-
	14-Aug-91	-	-	5.3	L 0.05	1.3	1.6	4.5	-	0.5	0.15	-	-
	16-Sep-91	-	-	8.4	0.05	1.6	2.73	2.8	-	1.3	0.22	-	-
	14-Oct-91	-	-	4.3	L 0.05	1.2	1.3	3.9	-	1.3	0.22	-	-
	13-Nov-91	-	-	5.5	-	1.4	1.8	3.3	-	0.7	0.23	L .0005	-
	11-Dec-91	-	-	6.4	L 0.05	1.5	2	4.4	-	1	0.18	-	-
1992	21-Jan-92	-	-	5.7	L 0.05	1.5	1.8	4.6	-	0.9	0.21	-	-
	14-Feb-92	-	-	8.1	L 0.05	1.8	2.8	4.7	-	1.7	0.27	-	-
	13-Mar-92	-	-	7.2	L 0.05	1.6	2.1	3.8	-	0.5	0.31	-	-
	09-Apr-92	-	-	5.2	L 0.05	1.3	1.6	3.2	-	0.9	0.26	-	-
	19-May-92	-	-	4.6	L 0.05	1.3	1.5	2.7	-	0.7	0.4	-	-
	12-Jun-92	-	-	8.1	L 0.05	1.5	2.5	3.4	-	0.8	0.24	-	-
	20-Jul-92	-	-	7	-	1.6	1.8	3.3	-	L 0.5	0.19	-	-
	17-Aug-92	-	-	8.2	-	1.5	2.4	4.1	-	0.5	0.2	-	-
	18-Sep-92	-	-	9.1	L 0.05	1.6	2.7	4.1	-	0.65	0.28	L .0005	-
	20-Oct-92	-	-	8.2	L 0.05	1.7	2.7	4.1	-	0.9	0.29	L .0005	-
	14-Nov-92	-	-	4.3	-	1.2	1.3	3.8	-	1	0.17	-	-
	10-Dec-92	-	-	7.6	-	1.7	2.6	4.8	-	0.8	0.21	-	-
1993	21-Jan-93	-	-	9.1	-	2	3.1	4.9	-	0.8	0.26	L .0005	-
	16-Feb-93	-	-	10.3	-	2	3.4	5.2	-	0.93	0.25	L .0005	-
	24-Mar-93	-	-	9.9	-	2.1	3.3	4.5	-	1	0.39	L .0005	-
	19-Apr-93	-	-	3	-	0.98	0.91	2.9	-	0.98	0.31	L .0005	-
	20-May-93	-	-	5.2	-	1.2	1.5	3.6	-	0.7	0.22	L .0005	-
	17-Jun-93	-	-	5.7	-	1.3	1.7	3.7	-	0.5	0.19	L .0005	-
	20-Jul-93	-	-	7.9	-	1.4	2.5	3.7	-	0.6	0.23	L .0005	-
	19-Aug-93	-	-	9.8	-	1.6	2.7	3.6	-	0.6	0.27	L .0005	-
	16-Sep-93	-	-	8.8	-	1.7	3.2	3.9	-	0.7	0.26	L .0005	-
	26-Oct-93	-	-	4.93	-	1.5	1.67	3.7	-	0.8	0.19	L .0005	-
	19-Nov-93	-	-	6	-	1.4	1.9	4.3	-	0.7	0.19	L .0005	-
	02-Dec-93	-	-	6.2	-	1.4	1.8	3.9	-	0.9	0.21	L .0005	-
1994	25-Jan-94	-	-	7.9	-	1.5	2.3	4.5	-	0.9	0.23	L .0005	-
	01-Mar-94	-	-	7.4	-	1.5	2	4	-	0.7	0.25	L .0005	-
	24-Mar-94	-	-	6.5	-	1.4	2	3.4	-	0.62	0.24	L .0005	-
	20-Apr-94	-	-	3.2	-	0.84	0.91	2.7	-	0.6	0.19	L .0005	-
	18-May-94	-	-	3.45	-	0.93	1.01	3.2	-	0.9	0.25	L .0005	-
	19-Jun-94	-	-	4.48	-	1.2	1.37	2.8	-	0.8	0.18	L .0005	-
	15-Jul-94	-	-	7.33	-	1.5	2.28	3.3	-	L 0.5	0.25	L .0005	-
	20-Aug-94	-	-	10	-	1.8	3.4	3.8	-	0.74	0.33	L .0005	-
	16-Sep-94	-	-	10	-	1.9	3.2	5.1	-	0.85	0.31	L .0005	-
	18-Oct-94	-	-	9.8	-	1.7	3.4	4.9	-	0.88	0.24	L .0005	-
	19-Nov-94	-	-	7.5	-	1.7	2.5	4.9	-	1	0.23	L .0005	-
	21-Dec-94	-	-	6.6	-	1.7	2.6	4.4	-	0.8	0.18	L .0005	-
1995	21-Jan-95	-	-	5.7	-	1.6	1.66	5.3	-	0.9	0.24	L .0005	-
	19-Feb-95	-	-	8.2	-	1.8	2.7	4.4	-	0.9	0.29	L .0005	-
	21-Mar-95	-	-	7.2	-	1.6	2.4	4.1	-	0.53	0.27	L .0005	-
	23-Apr-95	-	-	3.39	-	1.1	1	3	-	0.59	0.24	L .0005	-
	16-May-95	-	-	3.3	-	0.98	0.94	2.76	-	0.51	0.2	L .0005	-
	23-Jun-95	-	-	8.6	-	1.6	2.7	3.4	-	0.62	0.32	L .0005	-
	21-Jul-95	-	-	10.02	-	1.8	2.9	3.74	-	0.59	0.36	L .0005	-
	16-Aug-95	-	-	10.9	-	1.9	3.55	3.98	-	0.7	0.42	L .0005	-
	19-Sep-95	-	-	10.7	-	1.9	3.57	4.9	-	0.64	0.33	L .0005	-
	17-Oct-95	-	-	10.1	-	1.9	3.16	5.86	-	1.22	0.39	L .0005	-
	16-Nov-95	-	-	3.65	-	1.2	1.01	3.1	-	1.12	0.23	L .0005	-
	15-Dec-95	-	-	6.82	-	1.6	2.28	3.25	-	0.77	0.26	L .0005	-
1996	19-Jan-96	-	-	6.11	-	1.4	1.88	4.32	-	0.83	0.22	L .0005	-
	22-Feb-96	-	-	6.58	-	1.6	10	4.2	-	1	0.3	L .0005	-
	14-Mar-96	-	-	5.59	-	1.4	1.85	3.81	-	0.82	0.26	L .0005	-
	22-Apr-96	-	-	3.49	-	0.98	0.98	2.72	-	0.76	0.22	L .0005	-
	17-May-96	L 0.01	L 0.01	3.85	-	1	1.07	2.89	-	0.71	0.2	L .0005	-
	18-Jun-96	L 0.01	L 0.01	5.75	-	1.3	1.71	2.79	-	0.51	0.22	-	-
	21-Aug-96	L 0.01	L 0.01	8.99	-	1.5	2.72	3.48	-	0.6	0.22	-	-
	17-Sep-96	L 0.01	L 0.01	5.46	-	1.3	1.64	2.92	-	0.69	0.15	-	-
	16-Oct-96	L 0.01	L 0.01	5.94	-	1.4	1.89	3.09	-	1.32	0.19	-	-
	15-Nov-96	L 0.01	L 0.01	4.92	-	1.3	1.52	3.02	-	1.09	0.18	-	L .0001
	18-Dec-96	L 0.01	L 0.01	4.86	-	1.2	1.49	2.98	-	0.8	0.15	L .0005	-
	min	L 0.01	L 0.01	3.00	L 0.05	0.84	0.91	2.70	3.50	L 0.5	0.12	L 0.005	L .0001
	max	-	-	10.90	0.06	2.10	3.57	5.86	5.05	1.70	0.42	-	-
	mean*	-	-	6.65	0.05	1.47	2.08	3.86	4.17	0.80	0.23	-	-
	std	-	-	2.11	0.00	0.28	0.75	0.70	0.41	0.24	0.06	-	-
	median	-	-	6.35	0.05	1.50	1.90	3.77	3.95	0.76	0.22	-	-

* mean of values above the detection limit (L) of instrument used for analysis.

Table 1: (continued). Monthly water quality analyses of samples collected in the Middle Reach of Catamaran Brook, NB (1998 - 1996). L values are less than detection limit.

Year	Sample Date	Aluminum Extract (mg/l)	Aluminum Extractable (mg/l)	Nickel Extractable (mg/l)	Chromium Dissolved (mg/l)	Cadmium Extractable (mg/l)	Mercury Extractable (mg/l)	Lead Extractable (mg/l)	Silica (mg/l)
1989	16-Nov-89	0.095	-	-	-	L 0.001	-	L 0.002	6
	20-Dec-89	0.1	-	-	-	L 0.001	L 0.02	L 0.002	5.2
1990	15-Jan-90	0.033	-	-	-	L 0.001	L 0.02	L 0.002	7.2
	15-Feb-90	0.04	-	-	-	L 0.001	L 0.02	L 0.002	6.9
	16-Mar-90	0.044	-	-	-	L 0.001	-	L 0.002	6.7
	19-Apr-90	0.14	-	-	-	L 0.001	-	L 0.002	4.4
	16-May-90	0.09	-	-	-	L 0.001	L 0.02	L 0.002	4.6
	13-Jun-90	0.046	-	-	-	L 0.001	L 0.02	L 0.002	4.5
	18-Jul-90	0.032	-	-	-	L 0.001	L 0.02	L 0.002	5.07
	15-Aug-90	0.21	-	-	-	L 0.001	L 0.02	L 0.002	5.5
	14-Sep-90	0.02	-	-	-	L 0.001	L 0.02	L 0.002	5.3
	16-Oct-90	0.15	-	-	-	L 0.001	L 0.02	L 0.002	5.4
	14-Nov-90	0.09	-	-	-	L 0.001	L 0.02	L 0.002	3.6
	18-Dec-90	0.059	-	-	-	L 0.001	L 0.02	L 0.002	6.2
1991	18-Jan-91	0.056	-	-	-	L 0.001	L 0.02	L 0.002	6.3
	14-Feb-91	0.04	-	-	-	L 0.001	L 0.02	L 0.002	7
	20-Mar-91	0.073	-	-	-	L 0.001	L 0.02	L 0.002	5.1
	16-Apr-91	0.077	-	-	-	L 0.001	L 0.02	L 0.002	5.1
	13-May-91	0.082	-	-	-	L 0.001	L 0.02	L 0.002	4.1
	15-Jul-91	-	-	-	-	-	L 0.02	-	5.3
	14-Aug-91	0.13	-	-	-	L 0.001	L 0.02	L 0.002	5
	16-Sep-91	-	-	-	-	-	-	-	4.6
	14-Oct-91	0.13	-	-	-	L 0.001	-	L 0.002	5.09
	13-Nov-91	0.065	-	-	-	L 0.001	-	L 0.002	5.6
	11-Dec-91	0.06	-	-	-	L 0.001	-	L 0.002	5.7
1992	21-Jan-92	0.068	-	-	-	L 0.001	L 0.02	L 0.002	6.5
	14-Feb-92	0.03	-	-	-	L 0.001	L 0.02	L 0.002	6.6
	13-Mar-92	0.041	-	-	-	L 0.001	L 0.02	L 0.002	6.2
	09-Apr-92	0.061	-	-	-	L 0.001	0.02	L 0.002	5.1
	19-May-92	0.055	-	-	-	L 0.001	L 0.02	L 0.002	2.9
	12-Jun-92	0.032	-	-	-	L 0.001	L 0.02	L 0.002	3.3
	20-Jul-92	0.097	-	-	-	L 0.001	L 0.02	L 0.002	4
	17-Aug-92	0.037	-	-	-	L 0.001	L 0.02	L 0.002	5.2
	18-Sep-92	0.025	-	L 0.002	-	L 0.001	L 0.02	L 0.002	4.8
	20-Oct-92	0.032	-	L 0.002	-	L 0.001	L 0.02	L 0.002	5.7
	14-Nov-92	0.14	-	-	-	L 0.001	L 0.02	L 0.002	-
	10-Dec-92	0.05	-	-	-	L 0.001	L 0.02	L 0.002	-
1993	21-Jan-93	0.022	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	16-Feb-93	0.018	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	24-Mar-93	0.021	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	19-Apr-93	0.11	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	20-May-93	0.064	-	L 0.002	0.0003	L 0.001	L 0.02	L 0.002	-
	17-Jun-93	0.065	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	20-Jul-93	0.063	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	19-Aug-93	0.028	-	L 0.002	-	L 0.001	L 0.02	0.002	-
	16-Sep-93	0.026	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	26-Oct-93	0.1	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	19-Nov-93	0.066	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	02-Dec-93	0.076	-	L 0.002	L .0002	L 0.001	L 0.02	L 0.002	-
1994	25-Jan-94	0.045	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	01-Mar-94	0.053	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	24-Mar-94	0.049	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	20-Apr-94	0.1	-	L 0.002	-	L 0.001	L 0.02	0.002	-
	18-May-94	0.087	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	19-Jun-94	0.14	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	15-Jul-94	0.042	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	20-Aug-94	0.014	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	16-Sep-94	0.016	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	18-Oct-94	0.029	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	19-Nov-94	0.039	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	21-Dec-94	0.034	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
1995	21-Jan-95	0.071	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	19-Feb-95	0.024	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	21-Mar-95	0.046	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	23-Apr-95	0.13	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	16-May-95	0.11	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	23-Jun-95	0.039	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	21-Jul-95	0.022	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	16-Aug-95	0.025	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	19-Sep-95	0.015	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	17-Oct-95	0.02	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	16-Nov-95	0.22	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	15-Dec-95	0.051	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
1996	19-Jan-96	0.056	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	22-Feb-96	0.044	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	14-Mar-96	0.06	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	22-Apr-96	0.17	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	17-May-96	0.093	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	18-Jun-96	0.075	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	21-Aug-96	0.03	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	17-Sep-96	0.14	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	16-Oct-96	0.1	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	15-Nov-96	0.11	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	18-Dec-96	0.078	-	L 0.002	-	L 0.001	L 0.02	L 0.002	-
	min	0.014	-	L 0.002	L 0.0002	L 0.001	L 0.02	L 0.002	2.9
	max	0.220	-	-	0.0003	-	-	0.002	7.2
	mean*	0.068	-	-	0.0003	-	-	0.002	5.3
	std	0.044	-	-	0	-	-	0	1.0
	median	0.058	-	-	0.0003	-	-	0.002	5.1

* mean of values above the detection limit (L) of instrument used for analysis.

Table 2: Monthly water quality analyses of samples collected in the Lower Reach of Catamaran Brook, NB (1998 - 1996). L values are less than detection limit. Boxed alkalinity reported as total; other values in Gran units.

Year	Sample Date	Apparent Colour (Relative Units)	Specific Conductance (uSie/cm)	Turbidity (NTU)	Alkalinity Gran (mg/l)	pH (pH Units)	Calcium Dissolved (mg/l)	Dissolved Organic Carbon (mg/l)	Dissolved Inorganic Carbon (mg/l)	Total Organic Carbon (mg/l)	Total Inorganic Carbon (mg/l)	Total Organic Non Purgable Carbon (mg/l)
1989	16-Nov-89	40	47	0.7	15	7.1	5.9	5.3	-	-	-	-
1990	16-May-90	25	40.3	0.4	13.3	7	4.6	4.4	-	-	-	-
	13-Jun-90	10	54.2	0.3	20.6	7.4	6.2	3.1	-	-	-	-
	18-Jul-90	L 5	74.1	0.4	30.5	7.7	8.7	1.9	-	-	-	-
	15-Aug-90	60	31	0.6	10.2	7	4	8.3	-	-	-	-
	14-Sep-90	5	70	0.2	30	7.7	8.9	2.3	-	-	-	-
	16-Oct-90	60	45	0.5	13.3	7.1	5.7	9.4	-	-	-	-
	14-Nov-90	35	38.5	0.6	11.7	7.1	4.3	5.6	-	-	-	-
	18-Dec-90	20	45	0.3	14.8	7.2	5	3.1	-	-	-	-
1991	18-Jan-91	15	47	0.4	15.8	7	5.5	3	-	-	-	-
	15-Feb-91	20	64	0.3	24.9	7.6	7.6	2.2	-	-	-	-
	21-Mar-91	20	43	0.9	13.5	6.8	4.9	4.3	-	-	-	-
	16-Apr-91	30	35	0.4	12.2	7.1	4.1	3.8	-	-	-	-
	13-May-91	30	31	0.4	10.4	7.1	3.6	4.3	-	-	-	-
	15-Jun-91	90	34	0.5	13.2	7	4.4	8.1	-	-	-	-
	15-Jul-91	20	67	0.4	29.2	7.5	8.4	2.7	-	-	-	-
	14-Aug-91	80	44	0.5	14.9	7	5.9	11.6	-	-	-	-
	16-Sep-91	10	68	0.3	29.8	7.6	8.4	2.2	-	-	-	-
	14-Oct-91	45	36	0.5	12.8	7	4.6	7.4	-	-	-	-
	13-Nov-91	20	42	0.4	15.9	7.3	5.2	3.9	-	-	-	-
	11-Dec-91	10	50	0.4	19	7.2	6.5	2.9	-	-	-	-
1992	21-Jan-92	5	51	0.4	18.2	7.2	6	3.5	-	-	-	-
	15-Feb-92	10	65	0.4	26.6	7.4	7.7	1.6	-	-	-	-
	12-Mar-92	L 5	66	0.5	25.3	7.4	8	1.5	-	-	-	-
	10-Apr-92	5	45	0.5	16.5	7.1	5.4	2.9	-	-	-	-
	19-May-92	35	38	0.4	13	7.2	4.2	1.3	-	-	-	-
	12-Jun-92	15	62	0.3	24.8	7.5	7.4	2.6	-	-	-	-
	20-Jul-92	40	46	-	18.6	7.2	7.2	5.2	-	-	-	-
	17-Aug-92	20	62	-	26.1	7.6	7.5	2.8	-	-	-	-
	18-Sep-92	15	72	-	30.9	7.7	9.1	2	-	-	-	-
	20-Oct-92	15	61	-	25.4	7.5	7.8	3.8	-		-	-
	14-Nov-92	50	37	0.5	11.7	7	4.5	6	-	7.3	-	-
	10-Dec-92	15	59	0.2	24	7.4	7.4	2.8	-	3.3	-	-
1993	21-Jan-93	10	69	0.2	28.6	7.5	8.6	1.8	-	-	-	-
	16-Feb-93	7	70	0.3	29.3	7.5	8.8	1.7	-	1.6	-	-
	19-Mar-93	15	66	1.3	26.3	7.4	7.6	1.8	-	-	-	-
	19-Apr-93	60	30	1.2	8.4	6.9	3.2	3.7	-	-	-	-
	15-May-93	80	34	1.7	10.6	7.1	4	4.7	-	-	-	-
	17-Jun-93	20	45	0.5	17.6	7.3	5.7	3.3	-	-	-	-
	20-Jul-93	25	60.1	0.2	25.3	7.7	7.6	2.9	-	-	-	-
	19-Aug-93	25	68	0.2	30.8	7.6	9	2.5	-	-	-	-
	16-Sep-93	25.3	68.1	0.2	30.4	7.6	8.6	3.7	-	-	8.4	-
	26-Oct-93	40	39	0.4	14.8	7.3	5.05	7.4	-	-	3.8	-
	19-Nov-93	25	46	0.6	16.7	7.4	5.8	4.3	-	-	4.5	-
1994	01-Mar-94	10	53	0.4	20.5	7.4	7.3	-	-	3.1	6.2	-
	24-Mar-94	15	52	0.3	18.9	7.4	6.4	-	-	3.3	5.6	-
	21-Apr-94	25	28	0.6	8.9	6.9	3.6	-	-	5.9	2.6	-
	19-May-94	20	31	0.4	10.2	7	3.76	-	-	5.6	3	-
	16-Jun-94	25	43	0.3	16.1	7.4	5.43	-	-	5.7	4.4	-
	15-Jul-94	15	63	0.2	25.7	7.5	7.66	-	-	3.2	7.1	-
	20-Aug-94	10	77	0.2	34.3	7.6	9.5	-	-	2	8.8	-
	16-Sep-94	10	76	0.3	30.2	7.6	9.7	-	-	2.9	8	-
	18-Oct-94	10	75	0.2	31.1	7.5	8.3	-	-	1.8	8	-
	19-Nov-94	15	64	0.5	22.4	7.3	7.3	-	-	4.5	5.7	-
	21-Dec-94	10	63	0.3	24.3	7.3	3.9	-	-	3.1	6.5	-
1995	21-Jan-95	25	44	0.5	15.3	7	5.7	-	-	6.2	3.6	-
	19-Feb-95	10	67	0.2	24.6	7.3	7.8	-	-	2.6	6.6	-
	21-Mar-95	15	58	0.2	21	7.3	6.9	-	-	3.5	5.9	-
	23-Apr-95	35	32	0.5	9.7	6.8	3.59	-	-	-	2.3	6.5
	16-May-95	35	28	0.4	9.5	6.9	3.5	-	-	-	2.8	5.5
	23-Jun-95	15	66	0.2	27	7.5	7.9	-	-	-	7.6	3.9
	21-Jul-95	15	76	0.3	32.3	7.6	8.96	-	-	-	9.1	4.2
	16-Aug-95	10	77	0.3	34.3	7.6	10.03	-	-	-	9.7	3.4
	19-Sep-95	10	80	0.2	34.4	7.6	9.05	-	-	-	9.8	3.9
	17-Oct-95	25	80	0.3	31.2	7.5	9.75	-	-	-	8.5	5.5
	16-Nov-95	70	31.3	0.65	7.6	6.6	4.1	-	-	-	1.8	12.7
	15-Dec-95	19	57	0.18	21.3	7.3	6.69	-	-	-	6.6	4.2
1996	19-Jan-96	20	54	0.3	18.4	7.2	6.25	-	-	-	5.3	5
	22-Feb-96	10	51	0.3	18.9	7	6.13	-	-	-	5	2.4
	14-Mar-96	15	51	0.3	17.8	7.1	5.77	-	-	-	4.7	2.6
	22-Apr-96	40	28	1.7	8.9	6.8	3.61	-	-	-	2.4	7.2
	17-May-96	65	30.8	0.2	10.9	7.1	4.14	-	-	-	2.5	4.7
	18-Jun-96	35	49.4	0.2	19.9	7.5	6.1	-	-	-	5.4	5.5
	21-Aug-96	10	68.8	0.1	30	7.8	8.14	-	-	-	8	3.4
	17-Sep-96	65	46.6	0.2	17.1	7.4	5.72	-	-	-	3.8	11.8
	16-Oct-96	45	54.3	0.2	19.4	7.5	6.39	-	-	-	4.3	7.8
	15-Nov-96	45	45.6	0.2	15	7.4	5.39	-	-	-	3	7.2
	18-Dec-96	45	52	0.2	16.2	7.5	5.22	-	-	-	3.9	4.5
	min	L5	28	0.1	7.6	6.6	3.2	1.3	-	1.6	1.8	2.4
	max	90	80	1.7	34.4	7.8	10.03	11.6	-	7.3	9.8	12.7
	mean*	26.9	52.8	0.42	20.18	7.3	6.39	3.95	-	3.86	5.55	5.6
	std	19.5	14.7	0.3	7.57	0.26	1.85	2.26	-	1.64	2.29	2.65
	median	20	51.5	0.35	18.9	7.3	6.17	3.2	-	3.3	5.4	4.85

*** mean of values above the detection limit (L) of instrument used for analysis.**

Table 2: (continued). Monthly water quality analyses of samples collected in the Lower Reach of Catamaran Brook, NB (1998 - 1996). L values are less than detection limit.

Year	Sample Date	Nitrogen Dissolved NO3 & NO2 (mg/l)	Nitrogen Dissolved Nitrate (mg/l)	Nitrogen Total (mg/l)	Phosphorous Total (mg/l)	Manganese Extractable (mg/l)	Manganese Extractable (mg/l)	Iron Extractable (mg/l)	Iron Extractable (mg/l)	Iron Extractable (mg/l)	Copper Extractable (mg/l)	Zinc Extractable (mg/l)
1989	16-Nov-89	L 0.01	-	0.22	0.002	L 0.01	-	0.11	-	-	L 0.002	0.01
1990	16-May-90	0.01	-	0.11	0.003	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	13-Jun-90	L 0.01	-	0.1	0.002	L 0.01	-	-	0.046	-	L 0.002	L 0.01
	18-Jul-90	0.05	-	0.16	0.004	L 0.01	-	-	0.013	-	L 0.002	L 0.01
	15-Aug-90	0.03	-	0.21	0.006	L 0.01	-	0.09	-	-	L 0.002	L 0.01
	14-Sep-90	L 0.01	-	0.07	0.001	L 0.01	-	-	0.033	-	L 0.002	L 0.01
	16-Oct-90	0.01	-	0.2	0.006	L 0.01	-	0.13	-	-	L 0.002	L 0.01
	14-Nov-90	0.04	0.06	0.12	0.002	L 0.01	-	0.09	-	-	L 0.002	L 0.01
	18-Dec-90	0.08	0.09	0.13	0.002	L 0.01	-	0.05	-	-	L 0.002	L 0.01
1991	18-Jan-91	0.16	0.16	0.22	0.002	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	15-Feb-91	0.15	0.13	0.19	0.001	L 0.01	-	-	0.042	-	L 0.002	L 0.01
	21-Mar-91	0.22	0.2	0.26	0.005	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	16-Apr-91	0.05	0.07	0.18	0.004	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	13-May-91	-	0.02	0.11	0.005	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	15-Jun-91	-	0.01	0.15	-	-	-	-	-	-	-	-
	15-Jul-91	-	0.06	0.14	0.001	-	-	-	-	-	-	-
	14-Aug-91	-	0.06	0.29	0.009	L 0.01	-	0.13	-	-	L 0.002	L 0.01
	16-Sep-91	-	L 0.01	0.12	-	-	-	-	-	-	-	-
	14-Oct-91	-	0.03	0.18	0.003	L 0.01	-	0.09	-	-	L 0.002	L 0.01
	13-Nov-91	-	0.01	0.1	0.004	L 0.01	-	0.09	-	-	L 0.002	L 0.01
	11-Dec-91	-	0.15	0.17	L 0.001	L 0.01	-	0.06	-	-	L 0.002	L 0.01
1992	21-Jan-92	-	0.11	0.21	0.003	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	15-Feb-92	-	0.16	0.18	0.001	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	12-Mar-92	-	0.16	0.22	0.003	L 0.01	-	0.08	-	-	L 0.002	L 0.01
	10-Apr-92	-	0.1	0.16	0.007	L 0.01	-	0.09	-	-	L 0.002	L 0.01
	19-May-92	-	0.06	-	0.009	L 0.01	-	-	0.043	-	0.004	L 0.01
	12-Jun-92	-	0.04	-	0.004	0.01	-	-	0.086	-	L 0.002	L 0.01
	20-Jul-92	-	0.05	0.17	0.006	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	17-Aug-92	-	0.02	0.11	0.002	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	18-Sep-92	-	0.05	0.09	0.004	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	20-Oct-92	-	L 0.02	0.14	0.003	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	14-Nov-92	-	0.06	-	0.006	L 0.01	-	0.09	-	-	L 0.002	L 0.01
	10-Dec-92	-	0.08	0.14	0.001	L 0.01	-	0.06	-	-	L 0.002	L 0.01
1993	21-Jan-93	-	0.14	0.18	0.001	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	16-Feb-93	-	0.14	0.18	L 0.001	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	19-Mar-93	-	0.21	0.31	0.005	L .0000	-	0.07	-	-	L 0.002	L 0.01
	19-Apr-93	-	0.02	0.13	0.019	L 0.01	-	0.13	-	-	L 0.002	L 0.01
	15-May-93	-	0.04	0.12	0.005	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	17-Jun-93	-	L 0.01	0.14	0.003	L 0.01	-	-	0.052	-	L 0.002	L 0.01
	20-Jul-93	-	0.04	0.11	0.006	L 0.01	-	-	0.04	-	L 0.002	L 0.01
	19-Aug-93	-	0.08	0.13	0.002	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	16-Sep-93	-	0.03	0.12	0.001	L 0.01	-	-	0.04	-	L 0.002	L 0.01
	26-Oct-93	-	0.02	0.17	0.008	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	19-Nov-93	-	0.04	0.14	0.003	L 0.01	-	0.06	-	-	L 0.002	L 0.01
1994	01-Mar-94	-	0.1	0.15	0.003	L 0.01	-	0.05	-	-	0.018	0.01
	24-Mar-94	-	0.09	0.12	0.003	L 0.01	-	-	0.045	-	L 0.002	L 0.01
	21-Apr-94	-	0.03	0.08	0.008	0.01	-	0.11	-	-	L 0.002	L 0.01
	19-May-94	-	0.02	0.07	0.004	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	16-Jun-94	-	L 0.02	0.13	0.003	L 0.01	-	-	0.048	-	L 0.002	L 0.01
	15-Jul-94	-	0.05	0.13	0.002	L 0.01	-	-	0.042	-	L 0.002	L 0.01
	20-Aug-94	-	0.05	0.08	0.017	L 0.01	-	-	0.023	-	L 0.002	L 0.01
	16-Sep-94	-	0.03	0.08	L 0.001	L 0.01	-	-	0.03	-	L 0.002	L 0.01
	18-Oct-94	-	L 0.02	0.04	0.002	L 0.01	-	-	0.023	-	L 0.002	L 0.01
	19-Nov-94	-	0.06	0.09	0.002	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	21-Dec-94	-	0.14	0.21	0.003	-	-	0.05	-	-	L 0.002	L 0.01
1995	21-Jan-95	-	0.17	0.29	0.005	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	19-Feb-95	-	0.14	0.17	0.003	L 0.01	-	-	0.053	-	L 0.002	L 0.01
	21-Mar-95	-	0.11	0.11	0.004	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	23-Apr-95	-	0.02	0.07	0.008	0.01	-	0.09	-	-	L 0.002	L 0.01
	16-May-95	-	L 0.02	0.05	0.005	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	23-Jun-95	-	0.02	0.11	0.004	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	21-Jul-95	-	0.02	0.12	0.005	L 0.01	-	0.04	-	-	L 0.002	L 0.01
	16-Aug-95	-	0.05	0.13	0.002	L 0.01	-	-	0.031	-	L 0.002	L 0.01
	19-Sep-95	-	0.03	0.07	0.002	L 0.01	-	-	0.046	-	L 0.002	L 0.01
	17-Oct-95	-	L 0.02	0.05	0.005	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	16-Nov-95	-	L 0.02	0.08	0.011	0.01	-	0.13	-	-	L 0.002	L 0.01
	15-Dec-95	-	0.0625	0.11	0.003	L 0.01	-	0.05	-	-	L 0.002	L 0.01
1996	19-Jan-96	-	0.219	0.24	0.005	L 0.01	-	0.08	-	-	L 0.002	L 0.01
	22-Feb-96	-	0.046	0.09	0.004	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	14-Mar-96	-	0.07	0.11	0.004	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	22-Apr-96	-	0.03	0.11	0.08	0.06	-	0.51	-	-	L 0.002	L 0.01
	17-May-96	-	L 0.02	0.04	0.005	-	L 0.01	0.05	-	-	L 0.002	-
	18-Jun-96	-	L 0.02	0.06	0.007	-	L 0.01	-	-	0.09	L 0.002	-
	21-Aug-96	-	0.04	0.11	0.003	-	L 0.01	-	-	0.03	L 0.002	-
	17-Sep-96	-	L 0.02	0.18	0.0088	-	L 0.01	-	-	0.12	L 0.002	-
	16-Oct-96	-	L 0.02	0.09	0.008	-	L 0.01	-	-	0.13	L 0.002	-
	15-Nov-96	-	0.03	0.11	0.0059	-	L 0.01	-	-	0.1	L 0.002	-
	18-Dec-96	-	0.03	0.1	0.0115	-	L 0.01	-	-	0.08	L 0.002	-
	min	L 0.01	L 0.01	0.04	L 0.001	L 0.01	L 0.01	0.04	0.013	0.03	L 0.002	L 0.01
	max	0.22	0.22	0.31	0.08	0.06	-	0.51	0.086	0.13	0.018	0.01
	mean*	0.08	0.074	0.138	0.0056	0.02	-	0.079	0.0409	0.092	0.011	0.01
	std	0.068	0.055	0.059	0.0094	0.02	-	0.065	0.0151	0.032	0.007	0
	median	0.05	0.06	0.13	0.004	0.01	-	0.06	0.042	0.095	0.011	0.01

* mean of values above the detection limit (L) of instrument used for analysis.

Table 2: (continued). Monthly water quality analyses of samples collected in the Lower Reach of Catamaran Brook, NB (1998 - 1996). L values are less than detection limit.

Year	Sample Date	Zinc Extractable (mg/l)	Calcium Dissolved (mg/l)	Flouride Dissolved (mg/l)	Sodium Dissolved (mg/l)	Magnesium Dissolved (mg/l)	Sulphate Dissolved (mg/l)	Sulphate Dissolved (mg/l)	Chloride Dissolved (mg/l)	Potassium Dissolved (mg/l)	Arsenic Total (mg/l)	Arsenic Total (mg/l)
1989	16-Nov-89	-	5.9	L 0.05	1.3	1.8	4.5	4.6	1.2	0.14	-	
1990	16-May-90	-	4.6	0.05	1.3	1.3	4	3.98	0.6	0.19	-	
	13-Jun-90	-	6.2	L 0.05	1.5	1.8	3.4	5.32	0.6	0.22	-	
	18-Jul-90	-	8.7	0.05	1.9	2.7	3.7	4.09	0.76	0.36	-	
	15-Aug-90	-	4	L 0.05	1.1	1.1	3.4	3.88	L 0.5	0.1	-	
	14-Sep-90	-	8.9	L 0.05	1.8	2.5	3.9	3.6	1.4	0.24	-	
	16-Oct-90	-	5.7	L 0.05	1.4	1.5	4.1	4.9	1.5	0.26	-	
	14-Nov-90	-	4.3	L 0.05	1.2	1.2	3.8	3.9	1.2	0.15	-	
	18-Dec-90	-	5	L 0.05	1.4	1.9	3.6	3.8	0.7	0.17	-	
1991	18-Jan-91	-	5.5	L 0.05	1.4	1.7	4.4	4.1	0.9	0.18	-	
	15-Feb-91	-	7.6	0.05	1.8	2.4	4.6	4.7	0.7	0.2	-	
	21-Mar-91	-	4.9	L 0.05	1.2	1.4	4.4	4.5	0.7	0.19	-	
	16-Apr-91	-	4.1	L 0.05	1.1	1.2	4.1	4.2	0.5	0.18	-	
	13-May-91	-	3.6	L 0.05	1	0.94	3.3	-	L 0.5	0.17	-	
	15-Jun-91	-	4.4	L 0.05	1.1	1.1	2.8	-	L 0.5	0.14	-	-
	15-Jul-91	-	8.4	0.05	1.8	2.5	4	-	0.7	0.23	-	-
	14-Aug-91	-	5.9	L 0.05	1.3	1.6	4.9	-	0.5	0.18	-	-
	16-Sep-91	-	8.4	0.05	1.7	2.58	4.2	-	1.2	0.23	-	-
	14-Oct-91	-	4.6	L 0.05	1.2	1.1	3.7	-	1.5	0.18	-	-
	13-Nov-91	-	5.2	L 0.05	1.5	1.5	4.1	-	1.2	0.28	-	-
	11-Dec-91	-	6.5	L 0.05	1.8	1.9	3.3	-	L 0.5	0.38	-	-
1992	21-Jan-92	-	6	L 0.05	1.5	1.8	5	-	0.9	0.2	-	-
	15-Feb-92	-	7.7	L 0.05	1.8	2.3	5	-	1.7	0.24	-	-
	12-Mar-92	-	8	L 0.05	1.8	2.4	4.4	-	0.8	0.29	-	-
	10-Apr-92	-	5.4	L 0.05	1.3	1.5	3.5	-	1	0.26	-	-
	19-May-92	-	4.2	L 0.05	1.3	1.2	2.9	-	0.7	0.44	-	-
	12-Jun-92	-	7.4	L 0.05	1.6	2.4	3.4	-	0.8	0.29	-	-
	20-Jul-92	-	7.2	-	1.6	1.7	3.4	-	L 0.5	0.28	-	-
	17-Aug-92	-	7.5	-	1.6	2.1	4.1	-	0.5	0.23	-	-
	18-Sep-92	-	9.1	L 0.05	1.8	2.5	4	-	0.76	0.28	-	L .0005
	20-Oct-92	-	7.8	L 0.05	1.7	2.4	4.3	-	1.2	0.31	-	L .0005
	14-Nov-92	-	4.5	-	1.3	1.3	3.9	-	1	0.22	-	-
	10-Dec-92	-	7.4	-	1.8	2.2	5.2	-	1	0.26	-	-
1993	21-Jan-93	-	8.6	-	2	2.6	5.3	-	0.9	0.27	-	L .0005
	16-Feb-93	-	8.8	-	1.9	2.7	5.2	-	0.95	0.26	-	L .0005
	19-Mar-93	-	7.6	-	2	2.4	4.8	-	1.3	0.36	-	L .0005
	19-Apr-93	-	3.2	-	1	0.9	3.1	-	1	0.31	-	L .0005
	15-May-93	-	4	-	1.1	1.1	3.4	-	0.8	0.26	-	L .0005
	17-Jun-93	-	5.7	-	1.4	1.5	3.8	-	0.6	0.21	-	L .0005
	20-Jul-93	-	7.6	-	1.6	2	3.7	-	0.7	0.26	-	L .0005
	19-Aug-93	-	9	-	1.9	2.3	3.5	-	0.6	0.29	-	L .0005
	16-Sep-93	-	8.6	-	1.9	2.7	3.8	-	0.9	0.27	-	L .0005
	26-Oct-93	-	5.05	-	1.4	1.54	3.8	-	1	0.22	-	L .0005
	19-Nov-93	-	5.8	-	1.5	1.8	4.5	-	0.8	0.26	-	L .0005
1994	01-Mar-94	-	7.3	-	1.5	1.8	4.2	-	0.7	0.24	-	L .0005
	24-Mar-94	-	6.4	-	1.4	1.8	3.9	-	0.8	0.22	-	L .0005
	21-Apr-94	-	3.6	-	0.89	0.89	3	-	0.7	0.21	-	L .0005
	19-May-94	-	3.76	-	0.91	1.01	3.4	-	0.7	0.17	-	L .0005
	16-Jun-94	-	5.43	-	1.3	1.52	3.3	-	0.8	0.21	-	L .0005
	15-Jul-94	-	7.66	-	1.6	2.18	3.3	-	0.5	0.26	-	L .0005
	20-Aug-94	-	9.5	-	2	2.7	3.5	-	0.95	0.34	-	L .0005
	16-Sep-94	-	9.7	-	2.1	3.3	5.4	-	1	0.41	-	L .0005
	18-Oct-94	-	8.3	-	2.2	2.8	4.8	-	1.3	0.36	-	L .0005
	19-Nov-94	-	7.3	-	1.7	2.3	5.1	-	1.2	0.24	-	L .0005
	21-Dec-94	-	3.9	-	1.8	2.2	5	-	1	0.22	-	L .0005
1995	21-Jan-95	-	5.7	-	1.5	1.45	5.4	-	0.9	0.27	-	L .0005
	19-Feb-95	-	7.8	-	1.9	2.3	5	-	1	0.29	-	L .0005
	21-Mar-95	-	6.9	-	1.6	2.13	4.5	-	0.67	0.25	-	L .0005
	23-Apr-95	-	3.59	-	1	0.97	3.08	-	0.51	0.22	-	L .0005
	16-May-95	-	3.5	-	0.82	0.9	2.84	-	0.58	0.19	-	L .0005
	23-Jun-95	-	7.9	-	1.7	2.3	3.6	-	0.78	0.33	-	L .0005
	21-Jul-95	-	8.96	-	1.9	2.65	3.36	-	1.88	0.38	-	L .0005
	16-Aug-95	-	10.03	-	2	2.7	3.84	-	1.06	0.4	-	L .0005
	19-Sep-95	-	9.05	-	2.1	2.85	4.45	-	1.05	0.33	-	L .0005
	17-Oct-95	-	9.75	-	2.1	2.91	5.18	-	1.57	0.39	-	L .0005
	16-Nov-95	-	4.1	-	1.1	1.02	3.24	-	1.27	0.24	-	L .0005
	15-Dec-95	-	6.69	-	1.6	2.06	4.43	-	0.9	0.25	-	L .0005
1996	19-Jan-96	-	6.25	-	1.5	1.84	4.49	-	0.96	0.23	-	L .0005
	22-Feb-96	-	6.13	-	1.6	1.8	4.4	-	1.2	0.27	-	L .0005
	14-Mar-96	-	5.77	-	1.4	1.75	4.09	-	0.96	0.24	-	L .0005
	22-Apr-96	-	3.61	-	0.95	0.92	2.8	-	0.8	0.23	-	L .0005
	17-May-96	L 0.01	4.14	-	1.1	1.05	2.97	-	0.78	0.22	-	L .0005
	18-Jun-96	L 0.01	6.1	-	1.4	1.77	2.97	-	0.63	0.27	-	-
	21-Aug-96	L 0.01	8.14	-	1.6	2.49	3.47	-	0.84	0.25	-	-
	17-Sep-96	L 0.01	5.72	-	1.3	1.65	3.12	-	0.77	0.18	-	-
	16-Oct-96	L 0.01	6.39	-	1.6	1.84	3.24	-	1.45	0.25	-	-
	15-Nov-96	L 0.01	5.39	-	1.3	1.53	3.34	-	1.29	0.2	L .0001	-
	18-Dec-96	L 0.01	5.22	-	1.3	1.56	3.22	-	1	0.19	-	L .0005
	min	L 0.01	3.2	L 0.05	0.82	0.89	2.8	3.6	L 0.5	0.11	L 0.0001	L 0.0005
	max	-	10.03	0.05	2.2	3.3	5.4	5.32	1.86	0.44	-	-
	mean*	-	6.388	0.05	1.518	1.872	3.95	4.275	0.935	0.2512	-	-
	std	-	1.848	0	0.331	0.599	0.708	0.477	0.298	0.067	-	-
	median	-	6.17	0.05	1.5	1.8	3.87	4.1	0.9	0.24	-	-

*** mean of values above the detection limit (L) of instrument used for analysis.**

Table 2: (continued). Monthly water quality analyses of samples collected in the Lower Reach of Catamaran Brook, NB (1998 - 1996). L values are less than detection limit.

Year	Sample Date	Aluminum Extract (mg/l)	Aluminum Extractable (mg/l)	Nickel Extractable (mg/l)	Cadmium Extractable (mg/l)	Mercury Extractable (mg/l)	Lead Extractable (mg/l)	Silica (mg/l)
1989	16-Nov-89	0.095	-	-	L 0.001	-	L 0.002	6.3
1990	16-May-90	0.09	-	-	L 0.001	L 0.02	L 0.002	4.9
	13-Jun-90	0.044	-	-	L 0.001	L 0.02	L 0.002	4.8
	18-Jul-90	0.04	-	-	L 0.001	L 0.02	L 0.002	5.5
	15-Aug-90	0.18	-	-	L 0.001	L 0.02	L 0.002	5
	14-Sep-90	0.02	-	-	L 0.001	L 0.02	L 0.002	5.3
	16-Oct-90	0.16	-	-	L 0.001	L 0.02	L 0.002	5.7
	14-Nov-90	0.097	-	-	L 0.001	L 0.02	L 0.002	3.3
	18-Dec-90	0.056	-	-	L 0.001	L 0.02	L 0.002	6
1991	18-Jan-91	0.067	-	-	L 0.001	L 0.02	L 0.002	6.1
	15-Feb-91	0.037	-	-	L 0.001	L 0.02	L 0.002	6.7
	21-Mar-91	0.084	-	-	L 0.001	L 0.02	L 0.002	5.4
	16-Apr-91	0.083	-	-	L 0.001	L 0.02	L 0.002	5
	13-May-91	0.12	-	-	L 0.001	L 0.02	L 0.002	4.4
	15-Jun-91	-	-	-	-	-	-	4.33
	15-Jul-91	-	-	-	-	L 0.02	-	5.2
	14-Aug-91	0.14	-	-	L 0.001	L 0.02	L 0.002	5
	16-Sep-91	-	-	-	-	-	-	4.5
	14-Oct-91	0.13	-	-	L 0.001	-	L 0.002	5.7
	13-Nov-91	0.072	-	-	L 0.001	-	L 0.002	5.8
	11-Dec-91	0.058	-	-	L 0.001	-	L 0.002	5.9
1992	21-Jan-92	0.058	-	-	L 0.001	L 0.02	L 0.002	6.1
	15-Feb-92	0.029	-	-	L 0.001	L 0.02	L 0.002	6.5
	12-Mar-92	0.057	-	-	L 0.001	L 0.02	L 0.002	6.1
	10-Apr-92	0.067	-	-	L 0.001	0.02	L 0.002	4.9
	19-May-92	0.07	-	-	L 0.001	L 0.02	L 0.002	2.8
	12-Jun-92	0.082	-	-	L 0.001	L 0.02	L 0.002	3.2
	20-Jul-92	0.065	-	-	L 0.001	L 0.02	L 0.002	4.7
	17-Aug-92	0.047	-	-	L 0.001	L 0.02	L 0.002	5.4
	18-Sep-92	0.023	-	L 0.002	L 0.001	L 0.02	L 0.002	5
	20-Oct-92	0.036	-	L 0.002	L 0.001	L 0.02	L 0.002	5.8
	14-Nov-92	0.14	-		L 0.001	L 0.02	L 0.002	-
	10-Dec-92	0.053	-		L 0.001	L 0.02	L 0.002	-
1993	21-Jan-93	0.024	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Feb-93	0.032	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Mar-93	0.053	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Apr-93	0.12	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	15-May-93	0.1	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	17-Jun-93	0.064	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	20-Jul-93	0.048	-	L 0.002	L 0.001	0.02	L 0.002	-
	19-Aug-93	0.022	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Sep-93	0.023	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	26-Oct-93	0.1	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Nov-93	0.078	-	L 0.002	L 0.001	L 0.02	L 0.002	-
1994	01-Mar-94	0.04	-	L 0.002	L 0.001	0.06	L 0.002	-
	24-Mar-94	0.048	-	L 0.002	L 0.001	0.21	L 0.002	-
	21-Apr-94	0.14	-	L 0.002	L 0.001	L 0.02	0.002	-
	19-May-94	0.086	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Jun-94	0.078	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	15-Jul-94	0.04	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	20-Aug-94	0.016	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Sep-94	0.021	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	18-Oct-94	0.013	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Nov-94	0.041	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	21-Dec-94	0.037	-	L 0.002	L 0.001	L 0.02	L 0.002	-
1995	21-Jan-95	0.086	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Feb-95	0.033	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	21-Mar-95	0.053	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	23-Apr-95	0.14	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-May-95	0.11	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	23-Jun-95	0.057	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	21-Jul-95	0.023	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Aug-95	0.02	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Sep-95	0.017	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	17-Oct-95	0.028	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Nov-95	0.23	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	15-Dec-95	0.057	-	L 0.002	L 0.001	L 0.02	L 0.002	-
1996	19-Jan-96	0.083	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	22-Feb-96	0.061	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	14-Mar-96	0.067	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	22-Apr-96	0.26	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	17-May-96	0.1	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	18-Jun-96	0.056	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	21-Aug-96	0.027	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	17-Sep-96	0.13	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Oct-96	0.11	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	15-Nov-96	0.11	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	18-Dec-96	0.072	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	min	0.013		L 0.002	L 0.001	L 0.02	L 0.002	2.8
	max	0.26		-	-	0.21	0	6.7
	mean*	0.0727		-	-	0.078	0.002	5.2042
	std	0.0477		-	-	0.078	0	0.9179
	median	0.061		-	-	0.04	0.002	5.3

*** mean of values above the detection limit (L) of instrument used for analysis.**

Table 3: Monthly water quality result of samples collected in the Little Southwest Miramichi River, NB (1998 - 1996). L values are less than detection limit. Boxed alkalinity reported as total; other values in Gran units.

Year	Sample Date	Apparent Colour (Relative Units)	Specific Conductance (uSie/cm)	Turbidity (NTU)	Alkalinity (mg/l)	pH (pH Units)	Calcium Dissolved (mg/l)	Dissolved Organic Carbon (mg/l)	Dissolved Inorganic Carbon (mg/l)	Total Organic Carbon (mg/l)	Total Inorganic Carbon (mg/l)	Total Organic Non Purgable Carbon (mg/l)
1990	13-Jun-90	15	26.1	0.3	7.5	7	2.6	3.5	-	-	-	-
	18-Jul-90	5	31.2	0.5	10.5	7.4	3.4	2.3	2.1	-	-	-
	15-Aug-90	110	20.6	0.7	4.2	6.3	3	14.4	-	-	-	-
	14-Sep-90	15	30	0.3	10	7.2	3.3	2.7	2	-	-	-
	16-Oct-90	80	26	0.6	5.5	6.6	2.9	8.1	0.5	-	-	-
	14-Nov-90	45	24.5	0.6	5.1	6.8	2.4	5.4	-	-	-	-
	18-Dec-90	25	27	0.3	7	6.9	2.8	2.8	-	-	-	-
1991	18-Jan-91	15	29	0.3	8.2	6.9	3	2	-	-	-	-
	15-Feb-91	20	36	0.4	11.3	7	3.9	1.8	-	-	-	-
	21-Mar-91	20	30	0.5	8.3	6.9	3.2	3.1	-	-	-	-
	16-Apr-91	40	22	0.4	5.3	6.8	2.3	3.9	-	-	-	-
	13-May-91	45	15	0.7	0.5	5.3	1.4	5.3	-	-	-	-
	15-Jul-91	30	28	0.5	9.9	6.9	3.2	3.1	-	-	-	-
	14-Aug-91	95	27	0.7	7.7	6.6	3.2	9	-	-	-	-
	14-Oct-91	65	22	0.6	5.2	6.4	2.5	8.2	-	-	-	-
	13-Nov-91	25	25	0.6	7.6	6.8	2.7	3.3	-	-	-	-
	11-Dec-91	15	30	0.5	9.1	7	3.6	2.8	-	-	-	-
1992	21-Jan-92	5	28	0.3	12	7.2	4.4	2.6	-	-	-	-
	15-Feb-92	10	34	0.3	11.3	7	3.8	1.6	-	-	-	-
	12-Mar-92	5	35	0.3	11.3	7	4.1	1.7	-	-	-	-
	10-Apr-92	15	25	0.5	8.2	6.9	2.7	2.9	-	-	-	-
	19-May-92	40	20	0.5	4.5	6.7	2.3	4.2	-	-	-	-
	12-Jun-92	40	28	0.3	8.6	7.1	3	0.5	-	-	-	-
	20-Jul-92	45	24	-	7.3	6.8	2.5	3.6	-	-	-	-
	17-Aug-92	25	28	-	8.9	7.1	3.6	2.9	-	-	-	-
	18-Sep-92	15	34	-	11.4	7.1	3.7	1.5	-	-	-	-
	20-Oct-92	30	30	-	10.1	7	3.6	3.8	-	-	-	-
	14-Nov-92	45	25	0.6	6.8	6.7	2.8	4.6	-	5.4	-	-
	10-Dec-92	20	35	0.4	11.1	7.1	3.8	2.3	-	2.8	-	-
1993	21-Jan-93	15	39	0.2	13.3	7.2	4.3	2	-	-	-	-
	16-Feb-93	10	39	0.3	13.4	7.2	4.8	1.4	-	2	-	-
	19-Mar-93	15	38	0.4	13	7.1	4.1	1.1	-	-	-	-
	19-Apr-93	80	18	0.7	3.3	6.4	1.8	4.7	-	-	-	-
	15-May-93	115	21	1.2	4.6	6.6	2.2	6.1	-	-	-	-
	17-Jun-93	25	21	0.4	5.7	6.8	2.3	3.5	-	-	-	-
	20-Jul-93	25	26.7	0.3	8.9	7.3	3	2.8	-	-	-	-
	19-Aug-93	35	29	0.3	11.2	7.2	3.9	2.6	-	-	-	-
	16-Sep-93	30	30.5	0.3	11.1	7.3	3.5	3.3	-	-	3	-
1994	25-Jan-94	15	33	0.3	10.3	6.9	3.7	-	-	2.7	3.1	-
	01-Mar-94	20	39	0.5	10.6	7	3.9	-	-	3.4	2.6	-
	24-Mar-94	20	33	0.3	9.6	7.1	3.7	-	-	2.8	3	-
	21-Apr-94	30	17.4	1.5	3.1	6.3	1.9	-	-	6.6	1.5	-
	19-May-94	35	17	0.4	3.6	6.5	1.74	-	-	5.9	1.1	-
	16-Jun-94	40	21	0.3	5.6	6.8	2.32	-	-	7	1.6	-
	15-Jul-94	20	28	0.3	8.9	7	3.12	-	-	3.5	2.6	-
	20-Aug-94	15	34	0.2	11.7	7.3	3.7	-	-	2.1	3.2	-
	16-Sep-94	10	35	0.3	12.8	7.3	3.9	-	-	2.4	3.3	-
	18-Oct-94	10	36	0.2	12.2	7.3	4	-	-	2.2	3.3	-
	19-Nov-94	30	33	0.7	9.7	7	3.7	-	-	5.4	2.4	-
	21-Dec-94	10	38	0.4	11.6	7	4.27	-	-	2.5	3.2	-
1995	21-Jan-95	35	31	0.7	9.2	6.5	3.7	-	-	7.1	2.2	-
	19-Feb-95	10	45	0.5	12.8	6.7	4.2	-	-	2.7	3.5	-
	23-Mar-95	20	30	0.3	8.4	6.8	3.3	-	-	4.7	2.5	-
	23-Apr-95	45	21	0.6	4.2	6.4	2.08	-	-	-	1.3	7.9
	16-May-95	45	17	0.5	3.3	6.4	1.8	-	-	-	1.1	5.6
	23-Jun-95	20	28	0.3	8.4	7.1	3	-	-	-	2.6	3.7
	21-Jul-95	15	34	0.3	11.3	7.2	3.88	-	-	-	3.4	2.6
	15-Aug-95	10	34	0.3	12.7	7.2	3.91	-	-	-	3.7	2.6
	19-Sep-95	15	36	0.2	13.3	7.3	4.27	-	-	-	3.7	2.2
	17-Oct-95	20	38	0.3	12.7	7.3	4.21	-	-	-	3.4	3.8
	16-Nov-95	80	23.2	1.2	6.1	6.5	2.76	-	-	-	1.3	12.9
	15-Dec-95	25	32.4	0.15	8.9	6.9	3.44	-	-	-	2.8	4.1
1996	19-Jan-96	20	35	0.2	9.9	6.9	3.8	-	-	-	2.8	4.4
	22-Feb-96	20	28	0.2	7.8	6.9	3.02	-	-	-	2.1	2.4
	14-Mar-96	20	29	0.2	7.7	6.9	2.98	-	-	-	2.1	2.4
	22-Apr-96	50	20	1.5	4.6	6.4	2.43	-	-	-	1.2	6.3
	17-May-96	65	18.8	0.2	4.3	6.5	2	-	-	-	0.9	4.7
	18-Jun-96	25	26.9	0.3	7.6	6.9	2.87	-	-	-	2.5	4.3
	21-Aug-96	20	31.7	0.1	10.5	7.1	3.54	-	-	-	2.7	3.5
	17-Sep-96	65	29.8	0.1	9	7.1	3.73	-	-	-	1.9	8.3
	16-Oct-96	50	32.7	0.2	9.5	7.2	3.74	-	-	-	2.1	7.2
	15-Nov-96	70	26.3	0.2	5.4	6.9	2.99	-	-	-	0.8	9.1
	18-Dec-96	50	33	0.2	7.4	7.1	2.91	-	-	-	1.5	3.6
	min	5	15.0	0.1	0.5	5.3	1.4	0.5	0.5	2	0.8	2.2
	max	115	45.0	1.5	13.4	7.4	4.8	14.4	2.1	7.1	3.7	12.9
	mean*	32	28.8	0.43	8.54	6.89	3.207	3.72	1.53	3.96	2.39	5.08
	std	24	6.3	0.28	3	0.34	0.747	2.58	0.73	1.76	0.85	2.71
	median	25	29.0	0.3	8.9	6.9	3.2	3	2	3.1	2.55	4.2

* mean of values above the detection limit (L) of instrument used for analysis.

Table 3: Monthly water quality result of samples collected in the Little Southwest Miramichi River, NB (1998 - 1996). L values are less than detection limit.

Year	Sample Date	Nitrogen Dissolved NO3 & NO2 (mg/l)	Nitrogen Dissolved Nitrate (mg/l)	Nitrogen Total (mg/l)	Phosphorous Total (mg/l)	Manganese Extractable (mg/l)	Manganese Extractable (mg/l)	Iron Extractable (mg/l)	Iron Extractable (mg/l)	Iron Extractable (mg/l)	Copper Extractable (mg/l)	Zinc Extractable (mg/l)
1990	13-Jun-90	L 0.01	-	0.1	0.005	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	18-Jul-90	L 0.01	-	0.11	0.005	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	15-Aug-90	0.04	-	0.24	0.01	0.01	-	0.22	-	-	L 0.002	L 0.01
	14-Sep-90	L 0.01	-	0.07	0.003	L 0.01	-	-	0.04	-	L 0.002	L 0.01
	16-Oct-90	0.06	-	0.22	0.006	L 0.01	-	0.17	-	-	L 0.002	L 0.01
	14-Nov-90	0.07	0.11	0.2	0.002	L 0.01	-	0.09	-	-	L 0.002	L 0.01
	18-Dec-90	0.17	0.16	0.21	0.008	L 0.01	-	0.06	-	-	L 0.002	0.01
1991	18-Jan-91	0.2	0.18	0.24	0.002	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	15-Feb-91	0.21	0.2	0.3	0.003	L 0.01	-	-	0.053	-	L 0.002	L 0.01
	21-Mar-91	0.21	0.19	0.25	0.002	L 0.01	-	0.08	-	-	L 0.002	L 0.01
	16-Apr-91	0.15	0.16	0.24	0.007	L 0.01	-	0.09	-	-	0.003	L 0.01
	13-May-91	-	0.06	0.14	0.009	L 0.01	-	0.08	-	-	L 0.002	L 0.01
	15-Jul-91	-	0.02	0.14	L 0.001	-	-	-	-	-	-	-
	14-Aug-91	-	0.08	0.26	0.014	0.01	-	0.19	-	-	L 0.002	L 0.01
	14-Oct-91	-	0.06	0.23	0.005	0.01	-	0.18	-	-	L 0.002	L 0.01
	13-Nov-91	-	0.08	0.16	0.5	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	11-Dec-91	-	0.16	0.23	0.001	0.01	-	0.06	-	-	L 0.002	L 0.01
1992	21-Jan-92	-	0.19	0.29	0.001	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	15-Feb-92	-	0.2	0.23	0.001	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	12-Mar-92	-	0.2	0.25	0.001	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	10-Apr-92	-	0.14	0.21	0.006	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	19-May-92	-	0.06	-	0.009	0.01	-	0.05	-	-	L 0.002	L 0.01
	12-Jun-92	-	0.01	-	0.004	L 0.01	-	-	0.059	-	L 0.002	L 0.01
	20-Jul-92	-	0.04	0.13	0.008	L 0.01	-	0.1	-	-	L 0.002	L 0.01
	17-Aug-92	-	0.01	0.1	0.003	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	18-Sep-92	-	0.04	0.07	0.005	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	20-Oct-92	-	0.04	0.15	0.002	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	14-Nov-92	-	0.13	-	0.006	L 0.01	-	0.11	-	-	L 0.002	L 0.01
	10-Dec-92	-	0.18	0.21	0.055	0.01	-	0.09	-	-	L 0.002	L 0.01
1993	21-Jan-93	-	0.23	0.22	0.002	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	16-Feb-93	-	0.23	0.23	0.005	L 0.01	-	-	0.029	-	L 0.002	L 0.01
	19-Mar-93	-	0.23	0.22	0.007	L 0.01	-	0.09	-	-	L 0.002	L 0.01
	19-Apr-93	-	0.09	0.23	0.019	L 0.01	-	0.11	-	-	L 0.002	L 0.01
	15-May-93	-	0.06	0.13	0.006	L 0.01	-	0.08	-	-	L 0.002	L 0.01
	17-Jun-93	-	0.04	0.14	0.005	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	20-Jul-93	-	0.01	0.1	0.005	0.02	-	-	0.051	-	L 0.002	L 0.01
	19-Aug-93	-	0.05	0.12	0.019	L 0.01	-	0.09	-	-	L 0.002	L 0.01
	16-Sep-93	-	L 0.02	0.11	0.002	L 0.01	-	0.05	-	-	L 0.002	L 0.01
1994	25-Jan-94	-	0.21	0.2	0.002	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	01-Mar-94	-	0.45	0.47	0.002	L 0.01	-	0.07	-	-	0.002	0.01
	24-Mar-94	-	0.19	0.22	0.002	L 0.01	-	0.04	-	-	0.002	L 0.01
	21-Apr-94	-	0.09	0.15	0.023	0.02	-	0.21	-	-	L 0.002	L 0.01
	19-May-94	-	0.05	0.15	0.008	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	16-Jun-94	-	0.02	0.09	0.006	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	15-Jul-94	-	0.02	0.11	0.004	L 0.01	-	0.06	-	-	L 0.002	L 0.01
	20-Aug-94	-	L 0.02	0.08	0.004	L 0.01	-	-	0.035	-	L 0.002	L 0.01
	16-Sep-94	-	L 0.02	0.06	0.003	L 0.01	-	-	0.03	-	L 0.002	L 0.01
	18-Oct-94	-	0.03	0.08	0.002	L 0.01	-	-	0.033	-	L 0.002	L 0.01
	19-Nov-94	-	0.14	0.18	0.005	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	21-Dec-94	-	0.22	0.29	0.002	L 0.01	-	-	0.048	-	L 0.002	L 0.01
1995	21-Jan-95	-	0.33	0.45	0.009	0.01	-	0.12	-	-	L 0.002	L 0.01
	19-Feb-95	-	0.28	0.8	0.022	0.02	-	0.16	-	-	0.002	0.02
	23-Mar-95	-	0.18	0.21	0.004	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	23-Apr-95	-	0.13	0.21	0.013	0.02	-	0.14	-	-	L 0.002	L 0.01
	16-May-95	-	0.11	0.11	0.007	L 0.01	-	0.07	-	-	L 0.002	L 0.01
	23-Jun-95	-	0.03	0.1	0.004	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	21-Jul-95	-	0.03	0.13	0.005	L 0.01	-	-	0.038	-	L 0.002	L 0.01
	15-Aug-95	-	L 0.02	0.1	0.004	L 0.01	-	-	0.032	-	L 0.002	L 0.01
	19-Sep-95	-	L 0.02	0.05	0.003	L 0.01	-	-	0.032	-	L 0.002	L 0.01
	17-Oct-95	-	0.03	0.06	0.004	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	16-Nov-95	-	0.112	0.2	0.014	0.02	-	0.23	-	-	L 0.002	L 0.01
	15-Dec-95	-	0.243	0.26	0.003	L 0.01	-	0.05	-	-	L 0.002	L 0.01
1996	19-Jan-96	-	0.253	0.32	0.005	L 0.01	-	0.05	-	-	L 0.002	L 0.01
	22-Feb-96	-	0.17	0.22	0.001	L 0.01	-	-	0.037	-	L 0.002	L 0.01
	14-Mar-96	-	0.19	0.24	0.002	L 0.01	-	-	0.035	-	L 0.002	L 0.01
	22-Apr-96	-	0.11	0.19	0.07	0.06	-	0.41	-	-	L 0.002	L 0.01
	17-May-96	-	0.04	0.09	0.006	-	L 0.01	0.1	-	-	L 0.002	-
	18-Jun-96	-	L 0.02	0.06	0.006	-	L 0.01	-	-	0.07	L 0.002	-
	21-Aug-96	-	0.04	0.14	0.0054	-	L 0.01	-	-	0.04	L 0.002	-
	17-Sep-96	-	0.04	0.16	0.0082	-	L 0.01	-	-	0.13	L 0.002	-
	16-Oct-96	-	0.07	0.15	0.0089	-	L 0.01	-	-	0.12	L 0.002	-
	15-Nov-96	-	0.21	0.29	0.0067	-	L 0.01	-	-	0.12	L 0.002	-
	18-Dec-96	-	0.16	0.24	0.0084	-	L 0.01	-	-	0.06	L 0.002	-
	min	L 0.01	L 0.02	0.05	L 0.001	L 0.01	L 0.01	0.04	0.029	0.04	L 0.002	L 0.01
	max	0.21	0.45	0.8	0.05	0.06	-	0.41	0.059	0.13	0.003	0.02
	mean*	0.139	0.126	0.191	0.01438	0.018	-	0.094	0.0394	0.09	0.0023	0.013
	std	0.067	0.09	0.111	0.05857	0.013	-	0.065	0.0091	0.035	0.0004	0.005
	median	0.16	0.111	0.195	0.005	0.01	-	0.07	0.036	0.095	0.002	0.01

* mean of values above the detection limit (L) of instrument used for analysis.

Table 3: Monthly water quality result of samples collected in the Little Southwest Miramichi River, NB (1998 - 1996). L values are less than detection limit.

Year	Sample Date	Zinc Extractable (mg/l)	Calcium Dissolved (mg/l)	Flouride Dissolved (mg/l)	Sodium Dissolved (mg/l)	Magnesium Dissolved (mg/l)	Sulphate Dissolved (mg/l)	Sulphate Dissolved (mg/l)	Chloride Dissolved (mg/l)	Potassium Dissolved (mg/l)	Arsenic Total (mg/l)	Arsenic Total (mg/l)
1990	13-Jun-90	-	2.6	0.07	1.5	0.46	2.3	3.06	0.6	0.36	-	-
	18-Jul-90	-	3.4	0.09	1.9	1.9	2	2.73	0.65	0.44	L 0.0005	-
	15-Aug-90	-	3	0.06	1	0.46	4	4.15	L 0.5	0.26	-	-
	14-Sep-90	-	3.3	0.08	1.7	0.58	2.8	2.6	0.7	0.37	-	-
	16-Oct-90	-	2.9	0.06	1.4	0.54	3.1	3.9	1	0.44	-	-
	14-Nov-90	-	2.4	0.06	1.4	0.45	3.2	3.7	1.2	0.28	-	-
	18-Dec-90	-	2.8	0.07	1.6	0.5	3.2	2.9	0.7	0.37	-	-
1991	18-Jan-91	-	3	0.07	1.7	0.54	3.1	2.9	0.8	0.39	-	-
	15-Feb-91	-	3.9	0.09	2.1	0.68	3.2	3	0.9	0.55	-	-
	21-Mar-91	-	3.2	0.06	1.6	0.58	3.2	3.5	0.63	0.34	-	-
	16-Apr-91	-	2.3	L 0.05	1.2	0.4	3.2	3	0.5	0.32	-	-
	13-May-91	-	1.4	0.05	0.9	0.23	2.4	-	L 0.5	0.39	-	-
	15-Jul-91	-	3.2	0.08	1.6	0.51	2.7	-	0.5	0.35	-	-
	14-Aug-91	-	3.2	0.07	1.5	0.6	3.1	-	0.5	0.33	-	-
	14-Oct-91	-	2.5	0.06	1.3	0.47	2.9	-	0.8	0.37	-	-
	13-Nov-91	-	2.7	0.07	1.9	0.5	3	-	0.7	0.58	-	-
	11-Dec-91	-	3.6	0.07	1.9	0.66	3.5	-	L 0.5	0.48	-	-
1992	21-Jan-92	-	4.4	0.08	2.1	0.78	3.7	-	1	0.48	-	-
	15-Feb-92	-	3.8	0.08	2	0.64	3.2	-	1.7	0.44	-	-
	12-Mar-92	-	4.1	0.08	1.9	0.66	2.5	-	2.4	0.46	-	-
	10-Apr-92	-	2.7	0.06	1.4	0.48	2.9	-	1	0.39	-	-
	19-May-92	-	2.3	L 0.05	1.2	0.3	2.5	-	0.7	0.49	-	-
	12-Jun-92	-	3	0.07	1.7	0.45	2.6	-	0.6	0.42	-	-
	20-Jul-92	-	2.5	-	1.7	0.46	2.5	-	L 0.5	0.35	-	-
	17-Aug-92	-	3.6	-	1.7	0.5	2.8	-	0.5	0.37	-	-
	18-Sep-92	-	3.7	0.08	1.9	0.6	2.8	-	0.64	0.41	L 0.0005	-
	20-Oct-92	-	3.6	0.07	1.9	0.62	2.8	-	0.7	0.49	L 0.0005	-
	14-Nov-92	-	2.8	-	1.5	0.52	3	-	1	0.41	-	-
	10-Dec-92	-	3.8	-	1.9	0.81	3.7	-	0.9	0.51	-	-
1993	21-Jan-93	-	4.3	-	2.2	0.74	3.5	-	0.8	0.53	L 0.0005	-
	16-Feb-93	-	4.8	-	2.1	0.79	3.6	-	0.92	0.5	L 0.0005	-
	19-Mar-93	-	4.1	-	2.1	0.73	3.2	-	0.8	0.49	L 0.0005	-
	19-Apr-93	-	1.8	-	0.97	0.37	2.4	-	0.8	0.59	L 0.0005	-
	15-May-93	-	2.2	-	1.1	0.38	2.6	-	0.5	0.42	L 0.0005	-
	17-Jun-93	-	2.3	-	1.4	0.39	2.7	-	0.5	0.34	L 0.0005	-
	20-Jul-93	-	3	-	1.7	0.52	2.6	-	0.6	0.43	L 0.0005	-
	19-Aug-93	-	3.9	-	2	0.48	2.7	-	0.5	0.46	L 0.0005	-
	16-Sep-93	-	3.5	-	1.9	0.64	2.6	-	0.7	0.39	L 0.0005	-
1994	25-Jan-94	-	3.7	-	1.9	0.6	3.2	-	0.8	0.41	L 0.0005	-
	01-Mar-94	-	3.9	-	3.1	0.6	3.1	-	2.7	0.68	0.0026	-
	24-Mar-94	-	3.7	-	1.7	0.6	2.9	-	0.6	0.39	L 0.0005	-
	21-Apr-94	-	1.9	-	0.84	0.36	2.3	-	0.7	0.37	L 0.0005	-
	19-May-94	-	1.74	-	0.92	0.3	2.5	-	0.6	0.34	L 0.0005	-
	16-Jun-94	-	2.32	-	1.3	0.42	2.4	-	0.8	0.36	L 0.0005	-
	15-Jul-94	-	3.12	-	1.7	0.5	2.4	-	L 0.5	0.39	L 0.0005	-
	20-Aug-94	-	3.7	-	2	0.57	2.5	-	0.79	0.47	L 0.0005	-
	16-Sep-94	-	3.9	-	2	0.64	2.7	-	0.69	0.45	L 0.0005	-
	18-Oct-94	-	4	-	2.1	0.57	3	-	0.97	0.45	L 0.0005	-
	19-Nov-94	-	3.7	-	1.8	0.63	3.1	-	0.8	0.41	L 0.0005	-
	21-Dec-94	-	4.27	-	2	0.72	2.2	-	0.8	0.44	L 0.0005	-
1995	21-Jan-95	-	3.7	-	1.7	0.58	3.6	-	0.8	0.47	L 0.0005	-
	19-Feb-95	-	4.2	-	2.5	0.7	3	-	1.8	0.83	L 0.0005	-
	23-Mar-95	-	3.3	-	1.6	0.58	2.9	-	0.33	0.34	L 0.0005	-
	23-Apr-95	-	2.08	-	1	0.39	2.46	-	0.38	0.33	L 0.0005	-
	16-May-95	-	1.8	-	0.99	0.3	2.34	-	L 0.5	0.31	L 0.0005	-
	23-Jun-95	-	3	-	1.7	0.48	2.3	-	0.63	0.4	L 0.0005	-
	21-Jul-95	-	3.88	-	2.1	0.6	2.66	-	0.68	0.51	L 0.0005	-
	15-Aug-95	-	3.91	-	2.2	0.63	2.66	-	0.78	0.53	L 0.0005	-
	19-Sep-95	-	4.27	-	2.2	0.656	2.95	-	0.7	0.48	L 0.0005	-
	17-Oct-95	-	4.21	-	2.1	0.689	3.04	-	1.18	0.51	L 0.0005	-
	16-Nov-95	-	2.76	-	1.2	0.496	2.66	-	1	0.42	L 0.0005	-
	15-Dec-95	-	3.44	-	1.9	0.614	2.02	-	5.11	0.48	L 0.0005	-
1996	19-Jan-96	-	3.8	-	1.7	0.638	3.26	-	0.78	0.38	L 0.0005	-
	22-Feb-96	-	3.02	-	1.7	0.53	3.2	-	0.79	0.41	L 0.0005	-
	14-Mar-96	-	2.98	-	1.6	0.55	3.04	-	0.75	0.4	L 0.0005	-
	22-Apr-96	-	2.43	-	0.98	0.41	2.26	-	0.67	0.34	L 0.0005	-
	17-May-96	L 0.01	2	-	1.1	0.34	2.28	-	0.72	0.38	L 0.0005	-
	18-Jun-96	L 0.01	2.87	-	1.6	0.49	2.42	-	0.66	0.45	-	-
	21-Aug-96	L 0.01	3.54	-	1.8	0.59	2.44	-	0.68	0.37	-	-
	17-Sep-96	L 0.01	3.73	-	1.6	0.61	2.31	-	0.7	0.35	-	-
	16-Oct-96	L 0.01	3.74	-	1.8	0.62	2.37	-	0.96	0.41	-	-
	15-Nov-96	L 0.01	2.99	-	1.4	0.5	2.36	-	0.9	0.43	-	L .0001
	18-Dec-96	L 0.01	2.91	-	1.5	0.51	2.32	-	0.74	0.33	L 0.0005	-
	min	L 0.01	1.4	L 0.05	0.84	0.23	2	2.6	L 0.5	0.26	L 0.0005	L 0.0001
	max	-	4.8	0.09	3.1	1.9	4	4.15	5.11	0.83	0.0026	-
	mean*	-	3.207	0.071	1.67	0.561	2.808	3.222	0.887	0.425	0.0026	-
	std	-	0.747	0.01	0.41	0.199	0.43	0.485	0.648	0.089	0	-
	median	-	3.2	0.007	1.7	0.55	2.8	3	0.74	0.41	0.0026	-

*** mean of values above the detection limit (L) of instrument used for analysis.**

Table 3: Monthly water quality result of samples collected in the Little Southwest Miramichi River, NB (1998 - 1996). L values are less than detection limit.

Year	Sample Date	Aluminum Extract (mg/l)	Aluminum Extractable (mg/l)	Nickel Extractable (mg/l)	Cadmium Extractable (mg/l)	Mercury Extractable (mg/l)	Lead Extractable (mg/l)	Silica (mg/l)
1990	13-Jun-90	0.072	-	-	L 0.001	-	0.004	6.6
	18-Jul-90	0.05	-	-	L 0.001	-	L 0.002	7.2
	15-Aug-90	0.29	-	-	L 0.001	-	L 0.002	6.7
	14-Sep-90	0.032	-	-	L 0.001	-	L 0.002	7.8
	16-Oct-90	0.2	-	-	L 0.001	L 0.02	L 0.002	7.1
	14-Nov-90	0.1	-	-	L 0.001	L 0.02	L 0.002	7.1
	18-Dec-90	0.064	-	-	L 0.001	L 0.02	L 0.002	7.9
1991	18-Jan-91	0.052	-	-	L 0.001	L 0.02	L 0.002	9.3
	15-Feb-91	0.037	-	-	L 0.001	L 0.02	L 0.002	10.7
	21-Mar-91	0.073	-	-	L 0.001	L 0.02	L 0.002	8.1
	16-Apr-91	0.11	-	-	L 0.001	L 0.02	L 0.002	6.45
	13-May-91	0.14	-	-	L 0.001	L 0.02	L 0.002	5
	15-Jul-91	-	-	-	-	L 0.02	-	7.1
	14-Aug-91	0.16	-	-	L 0.001	L 0.02	L 0.002	6.8
	14-Oct-91	0.18	-	-	L 0.001	-	L 0.002	7.6
	13-Nov-91	0.068	-	-	L 0.001	-	L 0.002	8.1
	11-Dec-91	0.055	-	-	L 0.001	-	L 0.002	8.9
1992	21-Jan-92	0.052	-	-	L 0.001	L 0.02	L 0.002	11.1
	15-Feb-92	0.038	-	-	L 0.001	L 0.02	L 0.002	10.3
	12-Mar-92	0.03	-	-	L 0.001	L 0.02	L 0.002	10.1
	10-Apr-92	0.072	-	-	L 0.001	0.02	L 0.002	4.77
	19-May-92	0.092	-	-	L 0.001	L 0.02	L 0.002	3.3
	12-Jun-92	0.058	-	-	L 0.001	L 0.02	L 0.002	5
	20-Jul-92	0.087	-	-	L 0.001	L 0.02	L 0.002	6.9
	17-Aug-92	0.048	-	-	L 0.001	L 0.02	L 0.002	7.7
	18-Sep-92	0.025	-	L 0.002	L 0.001	L 0.02	L 0.002	7.2
	20-Oct-92	0.062	-	L 0.002	L 0.001	L 0.02	L 0.002	8.1
	14-Nov-92	0.14	-	-	L 0.001	L 0.02	L 0.002	-
	10-Dec-92	0.09	-	-	L 0.001	L 0.02	L 0.002	-
1993	21-Jan-93	0.033	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Feb-93	0.025	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Mar-93	0.053	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Apr-93	0.11	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	15-May-93	0.13	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	17-Jun-93	0.085	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	20-Jul-93	0.059	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Aug-93	0.033	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Sep-93	0.046	-	L 0.002	L 0.001	L 0.02	L 0.002	-
1994	25-Jan-94	0.052	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	01-Mar-94	0.057	-	L 0.002	L 0.001	L 0.02	0.003	-
	24-Mar-94	0.054	-	L 0.002	L 0.001	0.26	L 0.002	-
	21-Apr-94	0.19	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-May-94	0.11	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Jun-94	0.11	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	15-Jul-94	0.056	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	20-Aug-94	0.018	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Sep-94	0.022	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	18-Oct-94	0.019	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Nov-94	0.062	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	21-Dec-94	0.04	-	L 0.002	L 0.001	L 0.02	L 0.002	-
1995	21-Jan-95	0.13	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Feb-95	0.1	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	23-Mar-95	0.082	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	23-Apr-95	0.18	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-May-95	0.13	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	23-Jun-95	0.046	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	21-Jul-95	0.031	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	15-Aug-95	0.021	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	19-Sep-95	0.015	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	17-Oct-95	0.022	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Nov-95	0.31	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	15-Dec-95	0.066	-	L 0.002	L 0.001	L 0.02	L 0.002	-
1996	19-Jan-96	0.058	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	22-Feb-96	0.057	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	14-Mar-96	0.054	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	22-Apr-96	0.25	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	17-May-96	0.15	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	18-Jun-96	0.057	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	21-Aug-96	0.042	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	17-Sep-96	0.13	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	16-Oct-96	0.11	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	15-Nov-96	-	0.25	L 0.002	L 0.001	L 0.02	L 0.002	-
	18-Dec-96	0.071	-	L 0.002	L 0.001	L 0.02	L 0.002	-
	min	0.015	0.25	L 0.002	L 0.001	L 0.02	L 0.002	3.3
	max	0.31	-	-	-	0.26	0.004	11.1
	mean*	0.0838	-	-	-	0.14	0.004	7.516
	std	0.0612	-	-	-	0.12	0	1.785
	median	0.062	-	-	-	0.14	0.004	7.2

* mean of values above the detection limit (L) of instrument used for analysis.

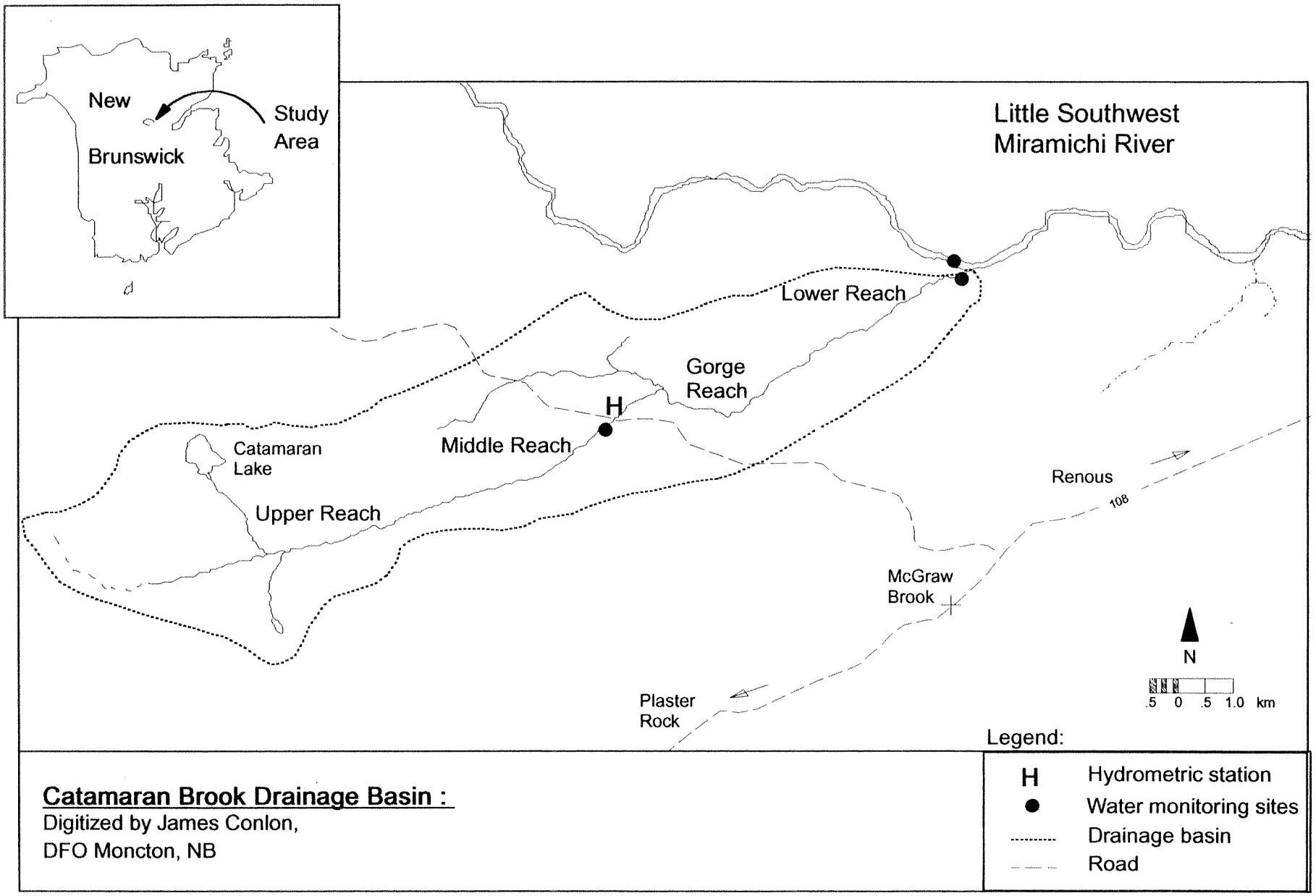

Figure 1. Water quality monitoring sites located in the Catamaran Brook Watershed.

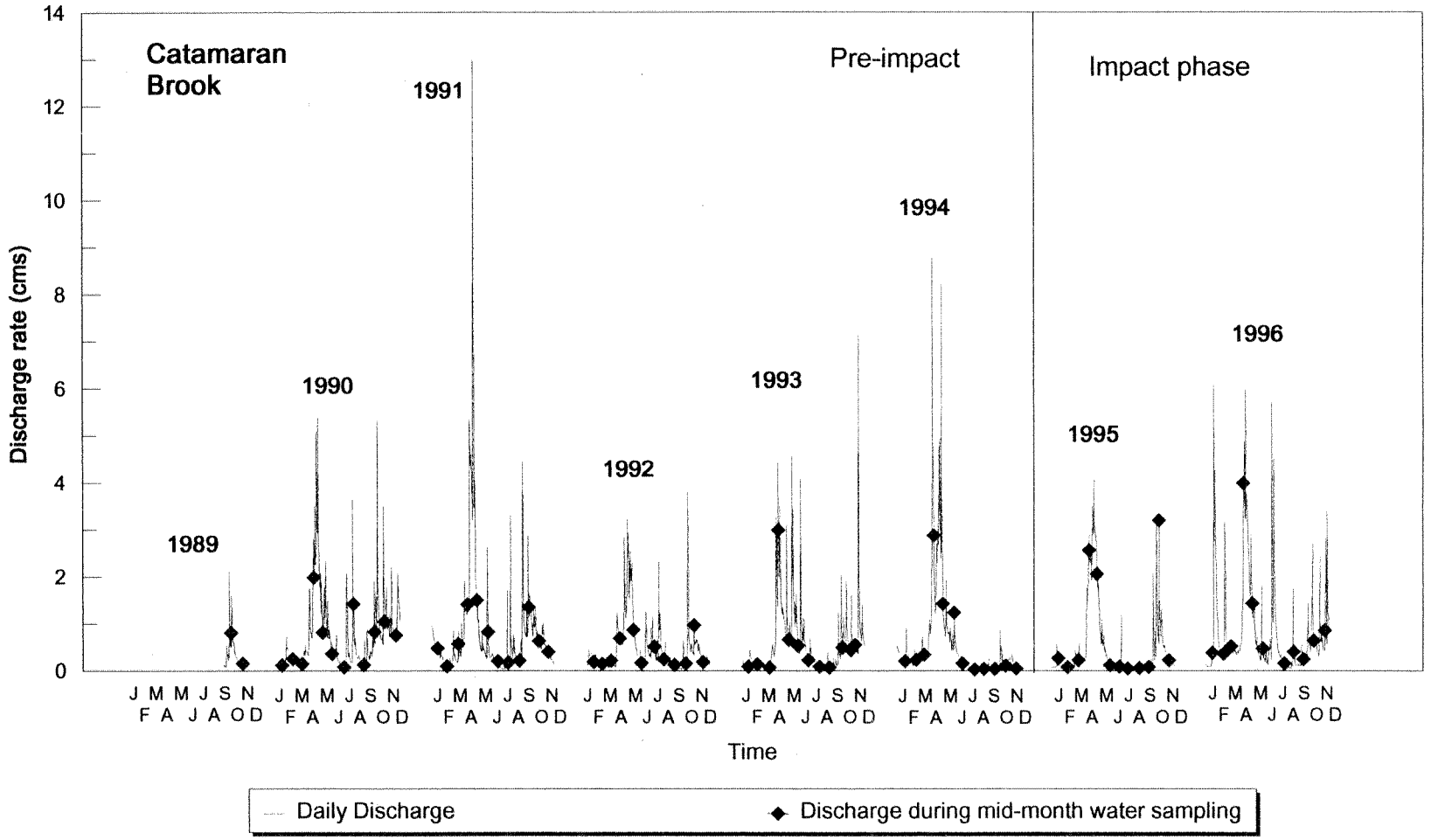

Figure 2. Mean daily Catamaran Brook discharge (cms) measured in Middle Reach and discharge at time of water sample colection for 1990 to 1996.

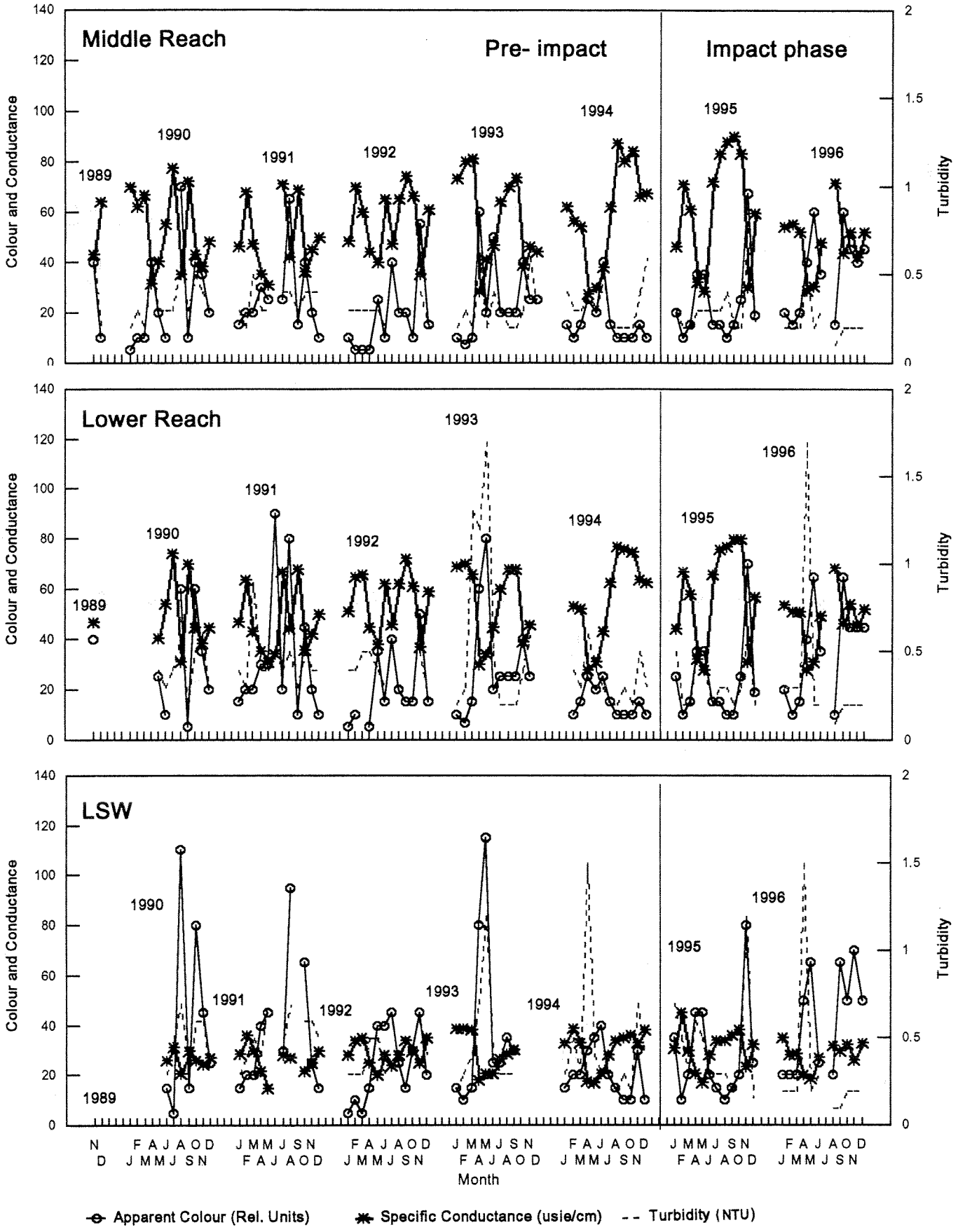

Figure 3. (1989 - 1996) Monthly results of physical water quality parameters measured in the Middle, Lower Reaches of Catamaran Brook and the Little Southwest Miramichi River, N.B.

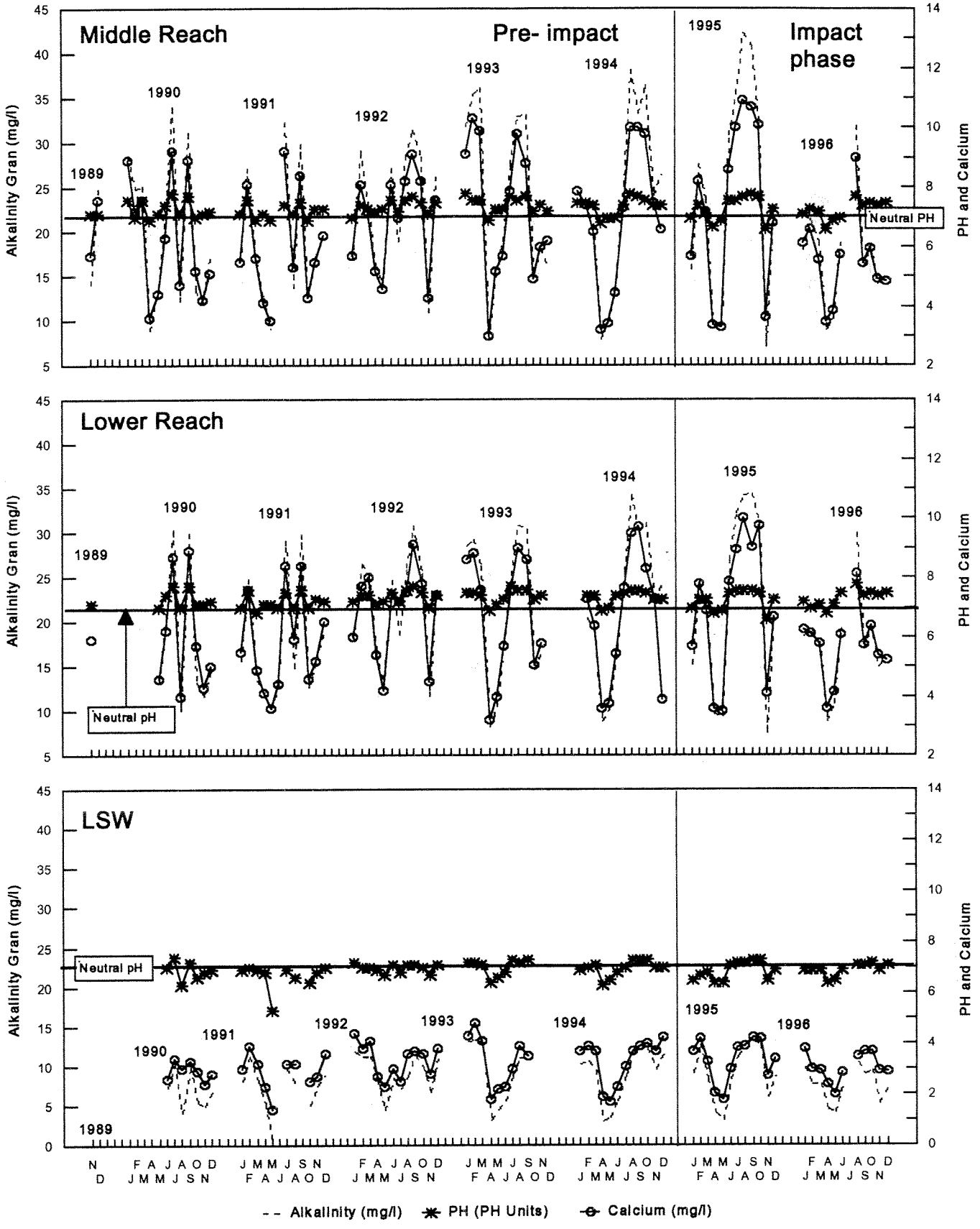

Figure 4. (1989 - 1996) Monthly results of Alkalinity, pH and Calcium water quality parameters measured in the Middle, Lower Reaches of Catamaran Brook and the Little Southwest Miramichi River, N.B.

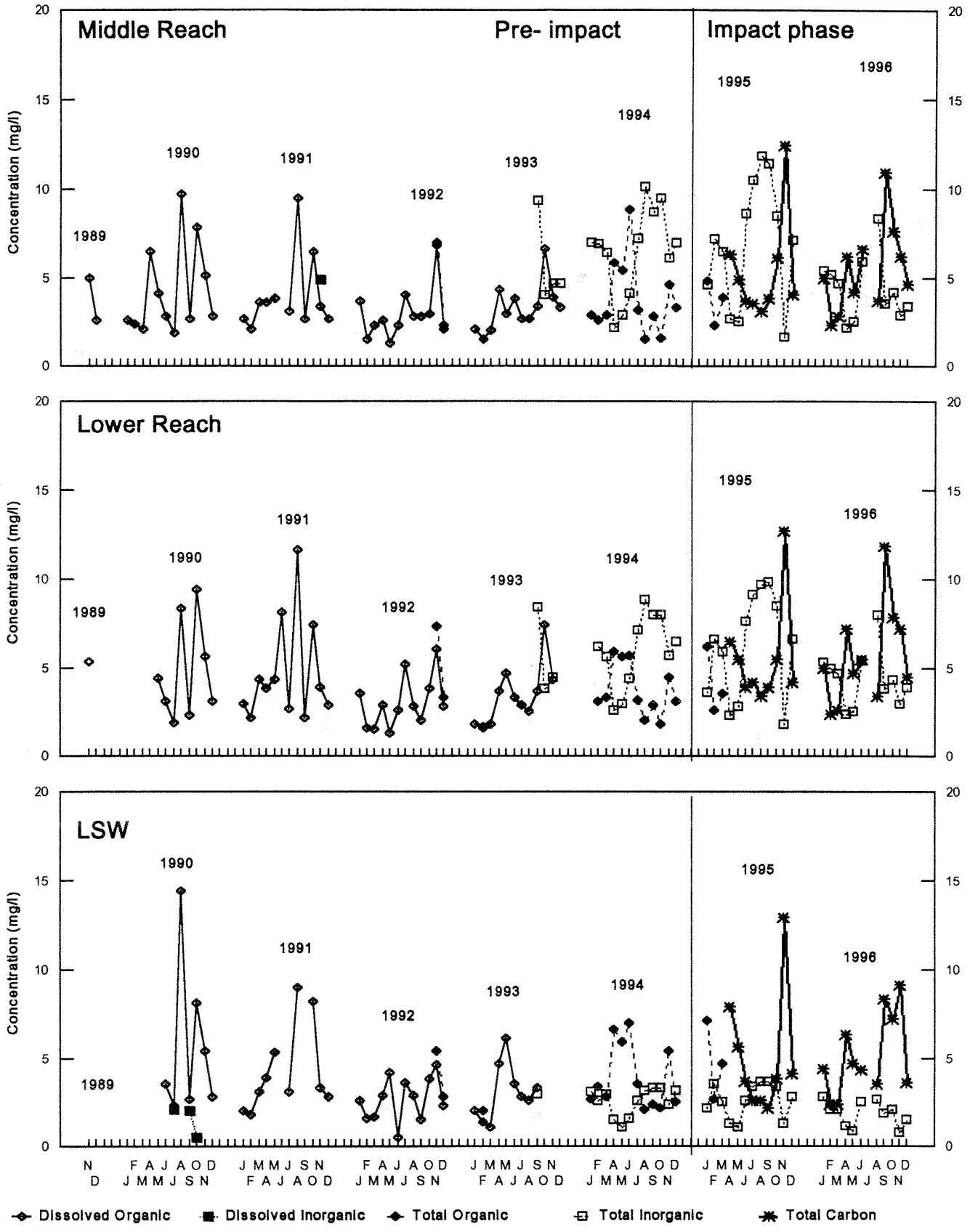

Figure 5. (1989 - 1996) Monthly results of carbon concentrations as a water quality parameters measured in the Middle, Lower Reaches of Catamaran Brook and the Little Southwest Miramichi River, N.B.

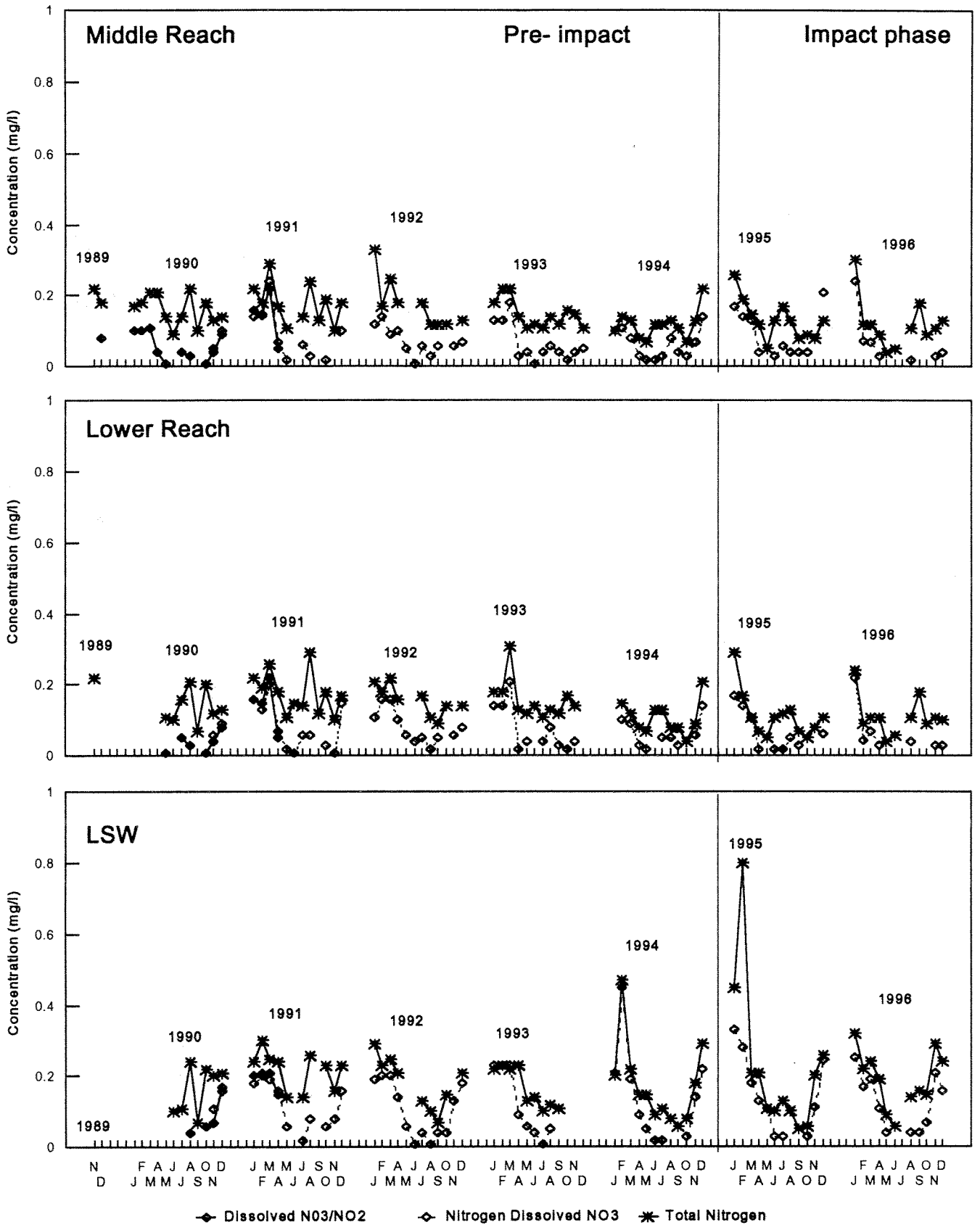

Figure 6. (1989 - 1996) Monthly results of nitrogen as a water quality parameters measured in the Middle, Lower Reaches of Catamaran Brook and the Little Southwest Miramichi River, N.B.

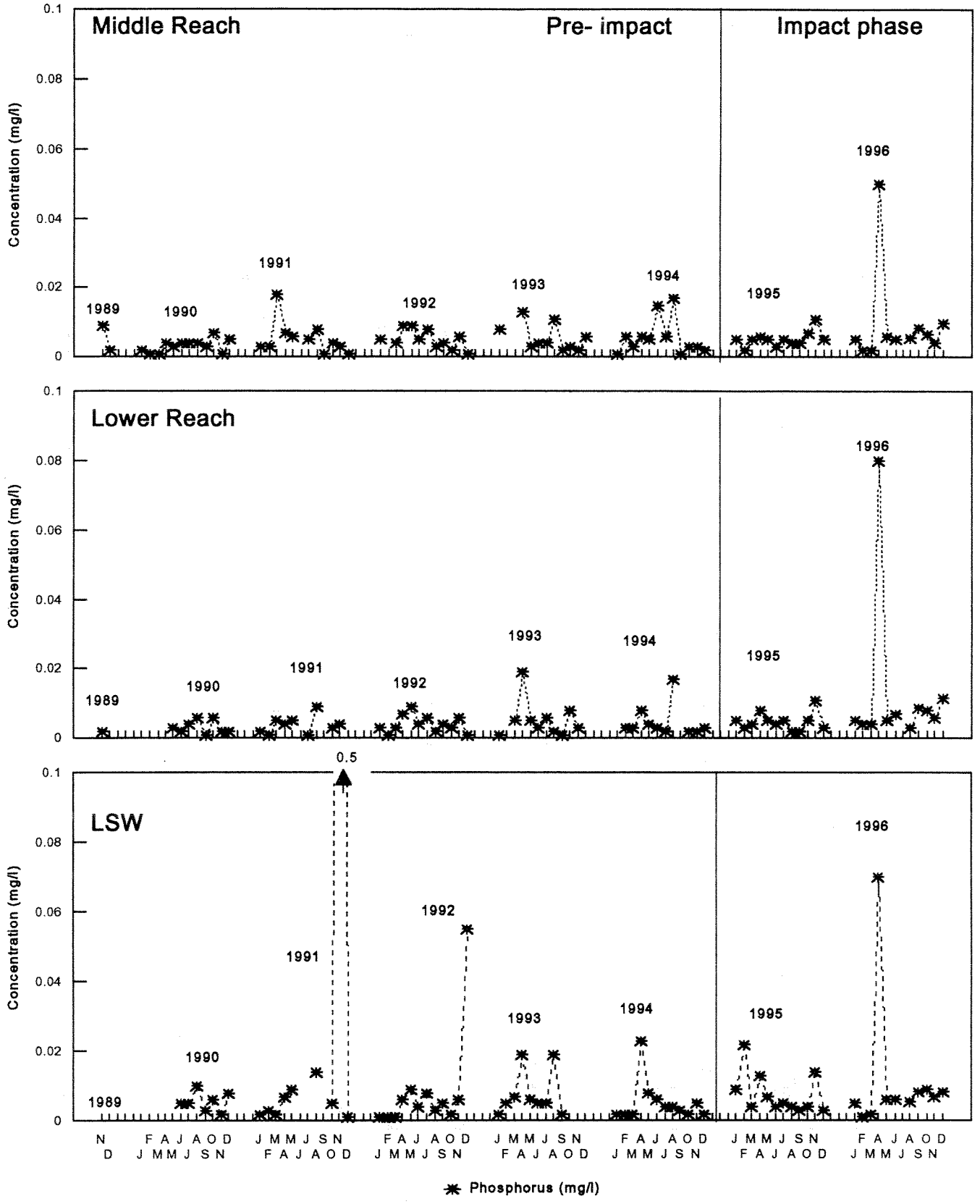

Figure 7. (1989 - 1996) Monthly results of phophorus concentrations as a water quality parameters measured in the Middle, Lower Reaches of Catamaran Brook and the Little Southwest Miramichi River, N.B.

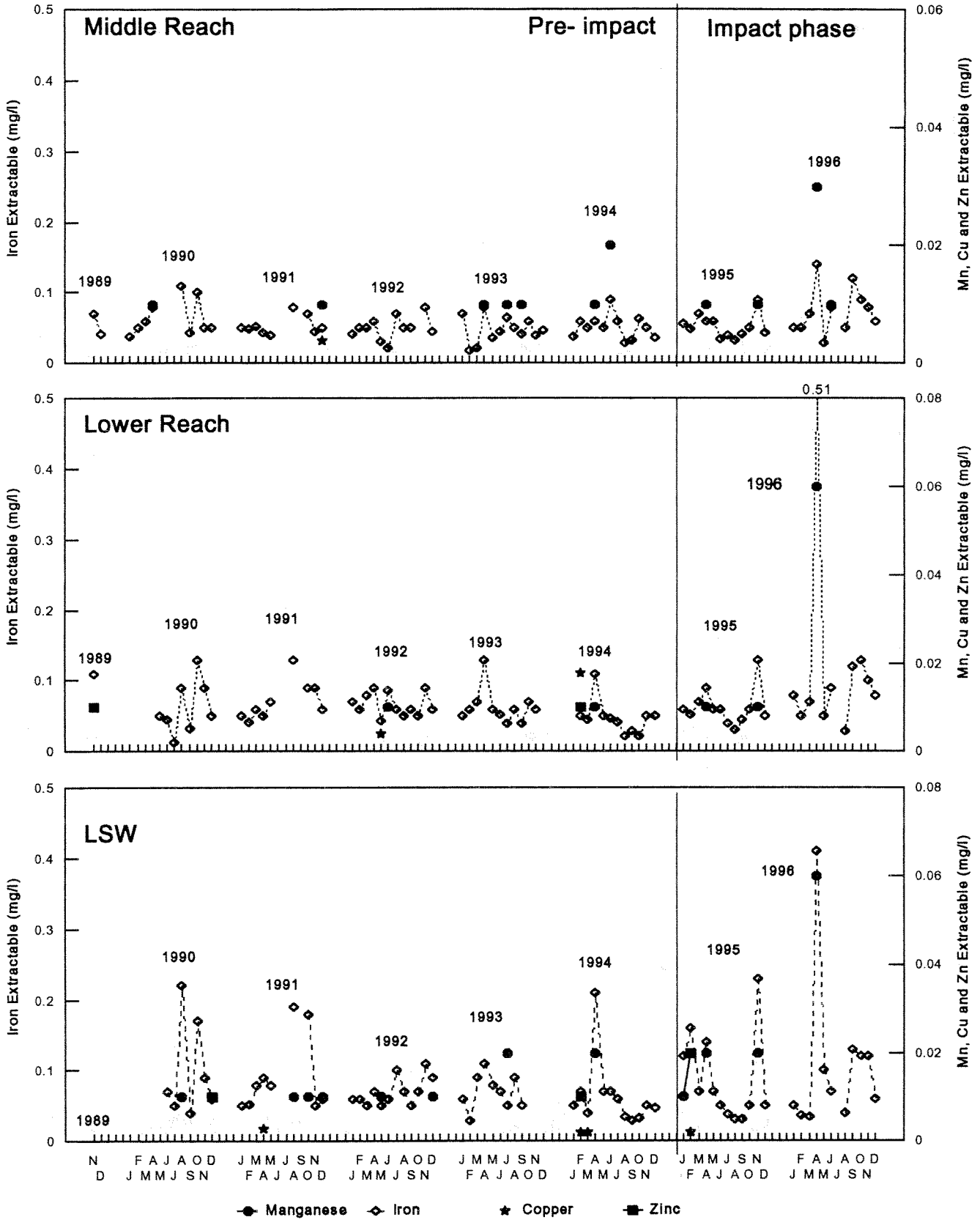

Figure 8. (1989 - 1996) Monthly results of minor metal or micronutrient levels as a water quality parameters measured in the Middle, Lower Reaches of Catamaran Brook and the Little Southwest Miramichi River, N.B.

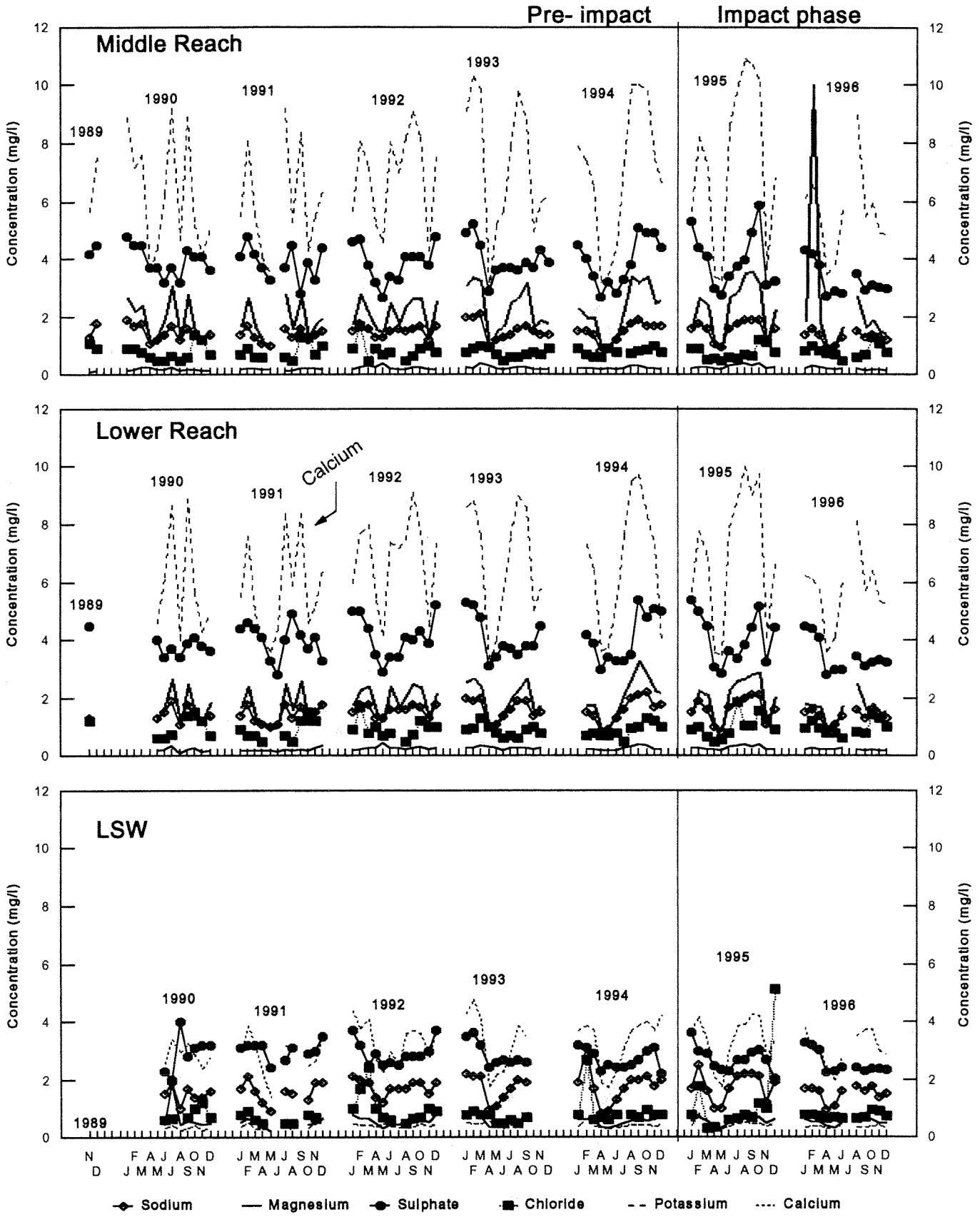

Figure 9. (1989 - 1996) Monthly results of major ions concentrations as a water quality parameters measured in the Middle, Lower Reaches of Catamaran Brook and the Little Southwest Miramichi River, N.B.

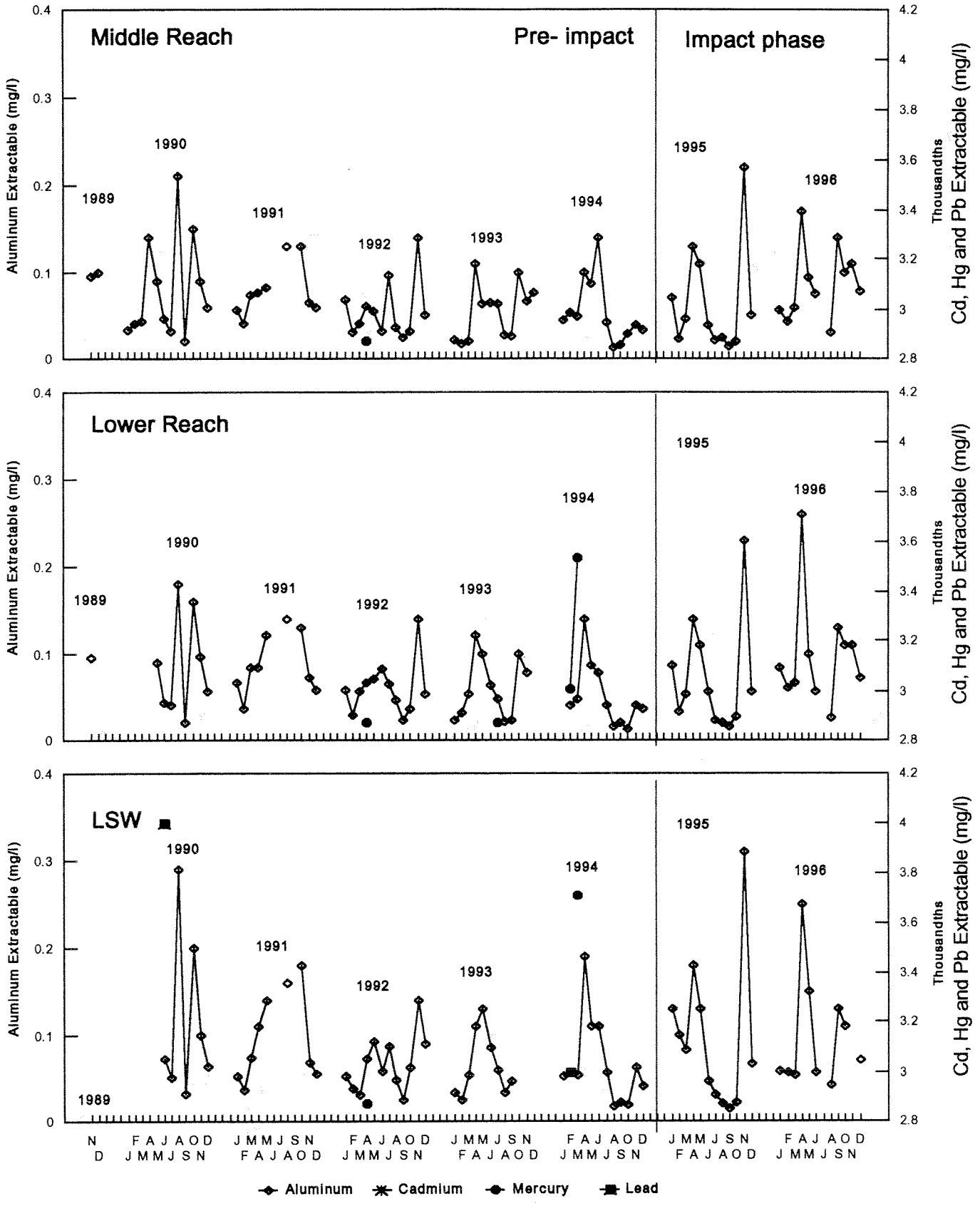

Figure 10. (1989 - 1996) Monthly results of heavy metal concentrations as a water quality parameters measured in the Middle, Lower Reaches of Catamaran Brook and the Little Southwest Miramichi River, N.B.

Analytic Methods Manual 1979 Inland Water Directorate, Water Quality Branch, Ottawa, Canada, August 1979

PART 1- PHYSICAL PARAMETERS IN WATER

Parameter	Method
Colour	Visual Comparison
Conductance. specific	Wheatstone bridge, conductance cell
Residue	Gravimetric
Turbidity	Turbidimetric

PART 2-INORGANIC CONSTITUENTS IN WATER

Parameter	Method
Acidity	Electrometric titration
	to pH 4.5 and pH 8.3
Alkalinity	Electrometric titration
	phenolphthalein alkalinity
	total alkalinity
Aluminum	Colorimetric-ferron
	Atomic absorption
Antimony	Atomic absorption
Arsenic	Colorimetric-silver diethyldithio-
	carbamate
	Flameless atomic absorption
Barium	Atomic absorption
Beryllium	Atomic absorption
Boron	Colorimetric-curcumin
	Automated carminie acid
	Automated fluorometric
Cadmium	Atomic absorption
Calcium	EDTA titration
	Atomic absorption
Chloride	Automated-thiocyanate
Chromium	Atomic absorption
Cobalt	Atomic absorption
Copper	Atomic absorption
Cyanide	Colorimetric pyridine-pyrazolone
	Automated pyridine-pyrazolone
Fluoride	Specific ion electrode
Hardness, total	EDTA titration Calculation from
	calcium and magnesium data
Iodine	Colorimetric-ceric
Iron	Atomic absorption
	Automated TPTZ
Lead	Atomic absorption
Lithium	Atomic absorption
Magnesium	Atomic absorption
Manganese	Atomic absorption
	Spot test
Mercury	Cold vapour atomic absorption
Metals:General	Atomic absorption
Molybdenum	Atomic absorption
Nickel	Atomic absorption
Nitrogen, ammonia	Automated o-tolidine

PART 2-CONTINIUED

Parameter	Method
Nitrogen, nitrate+nitrite	Automated cadmium reduction
pH	Electrometric
Oxygen, dissolved	Winkler titration-azide modification
Phosphorus, inorganic	Colorimetric-stannous chloride
Phosphorus, orthophosphate	Colorimetric-stannous chloride
Phosphorus, total	Colorimetric-stannous chloride
Phosphorus, all forms	Colorimetric-ascorbic acid
Potassium	Automated flame photometric
Selenium	Flameless atomic absorption
Silica, reactive	Automated heteropoly blue/ANSA
Silver	Atomic absorption
Sodium	Automated flame photometric
Strontium	Atomic absorption
Sulphate	Titrimetric-barium chloride
	Automated methylthymol blue
Vanadium	Atomic absorption
Zinc	Atomic absorption

PART 3- ORGANIC CONSTITUENT IN WATER

Parameter	Method
Carbon, total and organic	Carbon analyzer-IR
Carbon, orgainc particulate	CHN Anayzer
Carbamate pesticides.	
N-methyl	Gas chromatographic
Chlorophyll	Spectrophotometric
Fecal sterols	Gas chromatographic
MCPA and MCPB	Gas chromatographic
Nitrilotriacetic acid (NTA)	Polargraphic
	Gas chromatographic
Nitrogen, organic	Automated ultraviolet digestion
Nitrogen, organic-particulate	CHN Analyzer
Nitrogen, total Kjeldahl and	Steam distillation
organic	
Oxygen, consumed	Potassium permanganate digestion
Oxygen demand, biochemical (BOD	Five-day BOD
Oxygen demand, chemical (COD)	Dichromate digestion
Oil and grease	Gravimetric
Organochlorinated pesticides	Gas Chromatographic XAD resin
and PCB's	extraction and HPLC clean-up
Organophosphorus pesticides	Gas Chromatographic-Method A
	Gas Chromatographic-Method B
Pentachlorophenol	Gas chromatographic
Phenolics	Automated 4-aminoantipyrine
Phenoxy acid herbicides	Gas Chromatographic
	Detivatiozation with
	BCl3/2-chloroethanol
Sugar	Automated phenol/hydrazine sulphate