CANADA-NEWFOUNDLAND
WATER QUALITY MONITORING AGREEMENT

EXPLOITS RIVER SURVEY REPORT
1987-88

Surface Water Section
Water Resources Division
Department of Environment and Lands
St. John's, Newfoundland

Water Quality Branch
Inland Waters Directorate
Environment Canada
Moncton, New Brunswick

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EXPLOITS RIVER SURVEY REPORT

by

Sylvie Roussel[1]
Richard Arseneault[1]
Tony Blouin[2]

(1) Water Quality Branch
Environment Canada
Moncton, N.B.

(2) Water Resources Division
Dept. of Environment & Lands
St. John's, Nfld.

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LETTER OF TRANSMITTAL

Dr. Paul E. Belliveau
Dr. Wasi Ullah
Mr. Roy John
Dr. Tony Blouin
Coordinating Committee Members
Canada-Newfoundland Water Quality Monitoring Agreement

March 15, 1989

File #5352

Gentlemen:

In the fall of 1987 and in the spring of 1988, the Exploits River Survey was conducted under the Canada-Newfoundland Water Quality Monitoring Agreement. In the name of the Technical Subcommittee members, it is my pleasure to submit to you the final report for this survey.

Yours truly,

Richard Arseneault
Aquatic Scientist

Attach.

Members

Richard Arseneault, Environment Canada
Tony Blouin, Newfoundland Dept. of Environment and Lands

EXECUTIVE SUMMARY

The Exploits River Basin Recurrent Survey was conducted during the fall of 1987 (low flow) and the spring of 1988 (high flow), as part of the Canada-Newfoundland Water Quality Monitoring Agreement. It is the first of a series of intensive studies aimed at characterizing selected rivers of Newfoundland by sampling water, bottom sediments and biota in an integrated manner.

The results indicate that the pollution inputs from the abandoned mine at Buchans and effluents from Badger, Grand Falls/Windsor and Bishop's Falls are considerably diluted by the large water volume of the Exploits River system. In a previous study, high metal levels were measured in the bottom sediments of Red Indian Lake. However, these metals are likely unavailable to the fish community, since the fish sampled during this survey were not contaminated. Also, the tests done on bottom sediment samples collected in the lower Exploits River Basin revealed the presence of metals and PCBs. These contaminants originate from the many anthropogenic activities in that area.

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SUMMARY

The Exploits River Basin Survey was conducted in the fall of 1987 and the spring of 1988, as part of the Canada-Newfoundland Water Quality Monitoring Agreement. Testing of water, bottom sediments and fish (game and forage) for selected parameters was done to study the spatial heterogeneity of the river during both extremes of the hydrograph, and to study metal bioaccumulation in predatory fish of Red Indian Lake. The results strongly suggest that the Exploits River water quality is not impacted to any extent by the various pollution sources in the basin. According to the limited number of samples analyzed, metal accumulation in muscle tissue of landlocked salmon is very low, while some contaminants, including metals and PCBs, tend to be stored in bottom sediments.

RÉSUMÉ

Une étude de la rivière des Exploits a été effectuée durant l'automne 1987 et le printemps 1988. Cette étude a été réalisée dans le cadre de l'Accord Canada-Terre-Neuve relativement à la surveillance continue de la qualité des eaux. Des échantillons d'eau, de sédiments de fond et de poissons (prédateurs et de fourrage) ont été analysés pour une série de paramètres. Ceci a été accompli afin de vérifier l'hétérogénéité spatiale de l'eau de la rivière durant les conditions extrêmes de l'hydrogramme, et de mesurer le niveau de bioaccumulation de métaux dans les poissons prédateurs capturés dans le lac Red Indian. Nos résultats suggèrent fortement que la qualité des eaux de la rivière des Exploits n'est pas affectée par les diverses sources de pollution générées dans ce bassin. D'après un nombre limité d'échantillons analysés, l'accumulation de métaux dans les muscles de poissons prédateurs du lac Red Indian est très faible, tandis que les sédiments de fond ont tendance à emmagasiner des métaux et des BPC.

1. INTRODUCTION

The Exploits River drains an area of approximately 11 000 km^2 of central Newfoundland and has a reach of nearly 430 km. This basin is the largest on the Island of Newfoundland. It empties into the Bay of Exploits near Botwood. The headwaters of the Exploits River system are situated in a pristine, inaccessible region to the north of La Poile Bay in southwestern Newfoundland. The Exploits River drains numerous headwater and chain lakes, the largest of which is Red Indian Lake which has a surface area of 175 km^2. Anthropogenic activities in the Red Indian Lake catchment are limited due to poor access; however, from the early 1900's to 1984, a base metal mine located at Buchans was in operation. There are also some forest operations (pulp wood cutting) in this area.

The lower Exploits River is accessible by road, and thus, there are more anthropogenic activities in the lower part of the basin than in the headwater reaches. This is particularly apparent from the Town of Badger to the Bay of Exploits where there is considerable logging activity in the basin, and discharges from a pulp mill and several municipalities enter the river. The water discharge of the Exploits River is highly regulated by three dams located at Millertown, Grand Falls and Bishops Falls. In addition, some of the major inflows into the Exploits River also have controlled discharges.

The large drainage area of the Exploits River Basin coupled with the industrial and municipal development of the lower reaches, emphasize the socio-economic importance of this basin to the province of Newfoundland. For this reason, the Exploits River has been selected as the initial intensive basin study to be undertaken under the Canada-Newfoundland Water Quality Monitoring Agreement.

Objectives

The scope of this study encompassed two major objectives:

1) Spatial Heterogeneity and Predictive Modelling - The first objective was to gather data on the spatial heterogeneity of water quality parameters along the course of the Exploits River. These data can be used to help formulate and calibrate physical and chemical models of the Exploits River system, to meet the long-term goals of understanding the cause-and-effect relationships influencing water quality at a given point of the river.

2) Heavy Metals Accumulation - The second major objective of the study was to determine the extent of heavy metal accumulation in bottom sediments and fish populations of the Red Indian Lake system, as a follow-up to previous studies which documented metal accumulation in lake sediments and fish.

There were essentially three phases to this survey. The first, a metal accumulation study in the Red Indian Lake area, was dealt with during the fall of 1987 survey. The second phase consisted of an urban effect study in the Exploits River in the Badger area. Finally, the third component addressed urban development and industrial activity effects on water quality in the lower part of the basin (covering the Windsor/Grand Falls and Bishops Falls areas). These last two phases permitted attainment of the spatial heterogeneity and predictive modelling objective for the Exploits River Basin.

Finally, additional work was conducted at selected sites to extend and complement the overall scope of this study.

2. METHODOLOGY

2.1 Sampling Program

The Exploits River Basin Survey comprises data collected from different media within the river over two sampling periods. The first survey was conducted in the fall of 1987 during low flow conditions, while the other was done during the spring of 1988 at high flow conditions. Some additional sampling work took place in the basin during the Bottom Sediment Survey conducted in August 1988.

The sampling stations were located in three areas of the basin, referred to as Phase 1, Phase 2 and Phase 3 (Figure 1). Phase 1 includes the area of Buchans Brook - Red Indian Lake (Figure 2), Phase 2 surrounds the Badger area (Figure 3), and Phase 3 is located in the area of Windsor/Grand Falls and Bishop's Falls (Figure 4).

In 1987, samples of water, bottom sediment and fish (forage and game/predatory) were collected during the survey. At Phase 1, three water samples, one triplicate bottom sediment sample and one triplicate forage fish sample were taken from Buchans Brook. In addition, 30 game fish were sampled from Red Indian Lake at the mouth of Victoria River. The surface water sample collected at Buchans Lake was used to indicate background water quality conditions in the basin. Phase 2 involved the water sampling of two single and five cross-sectional sites. At Phase 3, three single, four opposite-bank pairs and eight cross-sectional sites were sampled for water. Also, one duplicate bottom sediment sample below Grand Falls, one duplicate and one triplicate bottom sediment samples, and one duplicate forage fish sample, all below Bishop's Falls, were taken at Phase 3. The stations established are listed in Table 1 and displayed in Figures 2 to 4.

In the spring of 1988, there were no water samples taken at Phase 1, while two single and five cross-sectional sites were sampled at Phase 2. At Phase 3, there were three single, three opposite-bank pairs, seven cross-sectional and one mid-river/right

bank samples collected. Also, one forage fish sample at Buchans Brook, one triplicate bottom sediment sample below Grand Falls and two triplicate bottom sediment samples below Bishop's Falls were taken in August 1988, to complement the survey. The stations visited in each phase were part of the 1987 station listing (Table 1 and Figures 2 to 4).

Water quantity data are available from three Water Survey of Canada hydrometric stations. One station is located on Lloyds River (02YN002), and the other two are on the Exploits River below Noel Pauls Brook (02YO011) and at Grand Falls (02YO005).

2.2 Parameters

The water samples collected during the Exploits River Basin Survey were analyzed for physical parameters, major ions, selected nutrients and heavy metals. The parameter list for the 1987 analyses, done at the National Laboratory, is given in Table 2, while the BOD (biochemical oxygen demand) measurements were done at the Environmental Protection laboratory in St.John's. The 1988 parameter list for samples analyzed at the Atlantic Region Water Quality Laboratory (later referred to as the regional laboratory) is presented in Table 3.

Bottom sediment samples were tested for heavy metals, OC-PCBs (organochlorine pesticides and polychlorinated biphenyls) and particulate organic carbon and nitrogen (Table 4). Game fish

muscle tissue and whole forage fish were analyzed for metals and percentage of lipid content (Table 5). Forage fish samples were also analyzed for OC-PCBs (Table 6).

2.3 Field Methodology

The field work done during the Exploits River Basin Survey involved field measurements of water characteristics and sampling of water, bottom sediments, and fish (forage and game).

Field measurements of water temperature, dissolved oxygen, specific conductance and pH were recorded at selected water sampling sites. Grab water samples were taken with either polyethylene or glass containers, according to the protocol described in "Sampling for Water Quality" (WQB, 1983). The sites were represented either by single, opposite-bank or cross-sectional samples. Cross-sectional work consisted of sampling the river at three locations (right shore-middle-left shore) at each site.

Bottom sediments were sampled with a 15 cm x 15 cm Ekman grab sampler, and then transferred to a glass tray. At the center of the grab sample, the first 2 cm of sediment were taken with an aluminum or plastic scoop, depending on the type of analysis required, and placed in a large plastic or stainless steel bowl. Duplicate or triplicate splits were prepared by repeating this procedure at least three times, homogenizing the three samples together to form a larger sample and then dividing it into two or

three different containers. These were sent to the National Water Quality Laboratory in Burlington, Ontario, for analysis. All apparatus were rinsed with river water before and after each use.

Minnow traps were placed at certain sites in the basin to collect forage fish. When sufficient fish were trapped, they were combined together prior to being homogenized and divided into duplicate or triplicate splits. However, staff members were not very successful in sampling forage fish. Only a few samples were collected, even though the traps were used during an entire week.

Finally, game fish were sampled with 1 cm gill nets. The whole fish were put into plastic bags and frozen upon arrival at the regional laboratory in Moncton, New Brunswick.

Field quality assurance/quality control procedures were followed as outlined in Arseneault and Howell (1987).

2.4 Laboratory Methodology

In 1987, the water and bottom sediment analyses were done at the National Laboratory in Burlington, while all fish analyses were done at the regional laboratory. The 1988 water samples were analyzed at the regional laboratory, while the 1988 bottom sediment and fish samples were sent for analyses at the National Laboratory.

Analytical methods used to test the water, sediment and fish samples are described in the Analytical Methods Manual (WQB, 1981). Intra-laboratory QA/QC practices are described in Agemian (1986). Comparability of both laboratories was verified and documented by Roussel and Arseneault (1988).

The game fish sampled were characterized by their total length, fork length, weight, sex and age. Age was determined by the fish scale method. Thereafter, the fish fillets were prepared for analysis. The muscle tissue of the first eight fish were discarded, because contamination was suspected during sample preparation. Thus, the other 22 fish were used, and provided 17 muscle tissue samples. Some had to be combined according to their length and weight to have sufficient matter for analysis (5 g for one sample). One larger fish was divided into two samples.

The forage fish samples were homogenized in a blender. Therefore, the chemical levels and lipid content in forage fish are representative of the fish in whole, while the game fish results are only representative of what is in the muscle tissue.

3. RESULTS AND DISCUSSION

Results of both fall 1987 and spring 1988 components of the Exploits River Basin Survey are presented herein. These results will be strengthened with results from regular monitoring programs, such as the LRTAP-Overview Network and the Canada-Newfoundland

Agreement Index Station Network. Hydrographs from Water Survey of Canada are also included.

3.1 Water Chemistry

The underlying volcanic and granitic formations of the Exploits River Basin contribute low levels of dissolved constituents to the water column, reflected in low conductance values. Previous studies have classified the Red Indian Lake/Exploits River system as unproductive because of low primary productivity. Fish and benthic invertebrate communities have also been shown to be limited in abundance and in diversity (Morry and Cole, 1977; Bailey, 1988).

Past mining activities at Buchans have caused copper, lead and zinc contamination in the Buchans Brook-Red Indian Lake area (Wilson, 1974; Morry and Cole, 1977). Bailey (1988) also studied the water quality of the same area, and determined that levels of certain metals exceeded the water quality quidelines established for the protection of freshwater life (CCREM, 1987). In this study, the results recorded were compared to these guidelines (Table 7) and to the findings of Bailey (1988).

3.1.1 Fall 1987 Survey

Table 8 presents the water quality data gathered during the fall 1987 survey. The data are grouped by the three phases, and

two preservation blank results are also shown. Also grouped together are the cross-sectional or opposite-bank stations within each phase, so that transverse water quality heterogeneity can be detected.

It appears that certain values in Table 8 were unusual, compared to others in the same cross-section. For instance, the field pH value of station 00NF02YO0030 was much lower than the other two readings in the same cross-section, but all three laboratory pH results were similar. Also, some problems were encountered for the field conductivity measurements of the brackish waters of stations 02NF02YO0002 and 02NF02YO0003, since field values were significantly higher than both the laboratory measured values and the theoretical conductivity values computed from major ion concentrations (Table 8). Another station in the same cross-section (02NF02YO0004) did not have these problems; however, measuring high salinity waters with a field meter calibrated for fresh water can cause some difficulties. The mid-river station of this cross-section (02NF02YO0003) had lower salt water influence compared to its lateral stations.

In Table 9, the mean and standard deviation of each parameter for each phase are given. However, some stations were excluded from these calculations because they did not represent ambient river water quality. For instance, stations 02NF02YO0002, 02NF02YO0003 and 02NF02YO0004 represent brackish water, while station 22NF02YO0001 is situated at the effluent outflow from the

pulp mill, station 22NF02YN0003 at the outflow of an abandoned mine pit at Buchans and station 00NF02YN0006 is situated downstream of the abandoned mine.

These last two stations show elevated metal and major ion concentrations compared to other visited stations (main stem) (Table 8), suggesting dilution effects downstream and deposition of some constituents in the bottom of Red Indian Lake (Bailey, 1988). Aluminum, copper, iron, lead and zinc concentrations at stations 22NF02YN0003 and 00NF02YN0006 exceeded the water quality guidelines (Table 7), and copper and zinc were at levels that could cause avoidance behavior in salmonids (Morry and Cole, 1977).

The high nutrient levels measured at station 00NF02YN0006 (Phase 1) are a result of sanitary sewer inputs from the Town of Buchans. Public sanitary and storm sewers are also inputting particulate matter, nutrients, major ions and some metals into the Exploits River in the Badger, Windsor/Grand Falls and Bishop's Falls areas. All total phosphorus concentrations measured, however, met the guideline set at 0.10 mg/L (US EPA, 1976), recommended to protect flowing waters from eutrophication. Fecal bacteria were not measured during this survey, but it is expected that they contribute to the pollution loads from the various municipal sewer inputs.

The effluent outflow from the pulp mill at Grand Falls (22NF02YO0001) showed high levels of sulphate, turbidity, colour,

dissolved organic carbon, total phosphorus and total iron. The biochemical oxygen demand (BOD) was also high (590 mg/L) at that site (Table 8), revealing another organic pollution source in the basin. All other samples from the Exploits River had low levels of BOD, that is less than 4 mg/L, a criterion set to determine if waters are relatively clean (McNeely, et al., 1979). However, due to logistical problems, the BOD tests were done more than 72 hours after the samples were taken. It is suggested that the delay before the analysis should not exceed 24 hours (American Public Health Association, et al., 1985). BOD tends to decrease rapidly in a water sample, so the BOD results of this survey are questionable.

As for the general river water quality, mean specific conductance in the waters sampled varied from 20.6 to 26.3 μs/cm in the first two phases, and up to 31.9 μs/cm in Phase 3 (Table 9). This is a good indication of the dilute nature of the waters in this basin. It is also a good indication of their spatial homogeneity, even if there are various inputs along the course of this river. Data given in Table 8 show that within a given cross-section, the water quality is very similar. Standard deviations shown in Table 9 are relatively small compared to mean values, indicating that all samples collected within Phase 2 or 3 had similar concentrations of studied parameters.

Aluminum occasionally exceeded the Canadian Water Quality Guidelines when pH was lower than 6.5, while zinc was always near

the guideline (either higher or lower) set at 0.03 mg/L for the protection of freshwater life (Table 7). Copper consistently exceeded the Canadian Water Quality Guideline of 0.002 mg/L (CCREM, 1987), since total copper means were 0.0087, 0.0121 and 0.0099 mg/L for Phase 1, 2 and 3 respectively. However, the two distilled water blank samples had total copper concentrations of 0.0086 and 0.0245 mg/L, meaning that confidence in the results for this parameter results is low. In addition, copper measurements of a sequential duplicate sample collected at station 00NF02YO0051 were highly variable. All of these observations point to sample bottle contamination with copper.

3.1.2 Spring 1988 Survey

The results of water analyses for the spring of 1988 component are displayed by phase in Table 10. The data are grouped by cross-sectional or opposite-bank samples, when available. The results of three preservation blanks are also given.

The water quality measurements at the stations sampled were characteristic of Newfoundland ambient surface waters, except for station 22NF02YO0001, which is at an effluent outflow for the Abitibi-Price pulp mill. At this station, higher concentrations of major ions, some nutrients and some metals were detected. Also, turbidity was measured to be 79 J.T.U. Preservation blanks showed neither total phosphorus nor metal contamination.

The results of Table 10 are summarized in Table 11, showing the calculated mean and standard deviation for each parameter at each phase. The means of Phase 2 and 3 are very similar and there is no apparent trend for any of the parameters. These results show that the river is very dilute and homogeneous, especially during the high flow in spring (Figures 5a and 5b). Also, the standard deviations are relatively small compared to the mean values, reflecting water quality homogeneity within each phase.

3.1.3 Comparison Between Fall 1987 and Spring 1988 Water Quality Data

The differences observed between the fall of 1987 and spring of 1988 data can be attributed mostly to the physical conditions of the river during the surveys. Figures 5a and 5b illustrate the changes in river discharge between the two sampling periods, showing a much higher flow in May 1988 than in September 1987. As can be expected, conductivity at each phase is lower in May 1988, meaning the waters are more dilute. However, even during low flow conditions, the water volume of the Exploits River is sufficient to dilute the various pollution inputs from the basin. Ionic dominance of major ions and metals at each phase for both years of the survey are illustrated in Figures 6 and 7. Low variability exists between each set of data analyzed.

Salt water did not affect stations close to the Bay of Exploits (02NF02YO0002, 02NF02YO0003 and 02NF02YO0004) during spring 1988, while it did during fall 1987.

Some of the metals measured in this survey were compared to the results reported by Bailey (1988) for Buchans Brook, Red Indian Lake and the Exploits River (Table 12). Our data were consistent with Bailey's (1988) data, except for copper in the fall of 1987, due most likely to bottle contamination. This was also suggested in the data evaluation report by Roussel and Arseneault (1988), when high levels of copper were measured in samples from the Index Station Network during the same period.

Regular monitoring conducted in the Exploits River Basin provide another database for some sites. As part of the Index Station Network, there are three stations located between Red Indian Lake and Bishop's Falls (00NF02YO0019, 00NF02YO0020 and 00NF02YO0021). Another station on Lloyds River (00NF02YN0001) gives an indication of the river water quality prior to entering Red Indian Lake. There is also one LRTAP-Overview station at Bishop's Falls (00NF02Y00001). Results of regular monitoring of these stations from June 1987 to June 1988 are shown in Tables 13 to 17. Variabilities between each station on the Exploits River is low, but conductivity was slightly higher and metals were lower on Lloyds River. In general, the results of regular monitoring were similar to those gathered under this survey.

This source of data also enabled us to observe the temporal trends of the Exploits River's water quality. The variabilities of some key parameters at one Index station on the Exploits River (00NF02YO0020) throughout the year are illustrated in Figures 8 to 13. In one year, pH varied by 0.8 pH unit, while specific conductance was stable. No drastic changes were observed for dissolved organic carbon (DOC), total phosphorus, total aluminum and total iron, although variations do exist.

3.2 Bottom Sediments

The analysis of contaminants in bottom sediment is an integral part of water quality studies because they may reveal information unavailable from water column samples. For instance, contaminants often accumulate in bottom sediment when particle-bound pollutants are deposited on the bottom. This removes contaminants from the water column, but represents a source of contamination long after the originating source has ceased (Salomons, 1985). This remobilization is caused by oxydation/reduction, bioturbation, resuspension and desorption. In this basin, bioturbation would be low because of the scarce benthic invertebrate community (Morry and Cole, 1977). Measurements of toxic constituents in bottom sediments not only indicate the source of contamination within the system, but also the potential risk for benthic communities (Salomons, 1985).

An important part of analyzing bottom sediment chemistry involves particle size analysis and the measurement of organic matter present. Higher adsorptive affinity for typical anthropogenic metals, such as copper, cadmium, lead and zinc, is found in finer grain size (clay, silt) and highly organic sediments (Forstner, 1982). Therefore, the levels of toxic metals in a river bed are highly dependent on the nature of the sediment itself.

The sediment-water column interactions of metals are also ruled by ambient pH levels. Andersson and Borg (1988) reported higher cadmium concentrations in sediment after the liming of a lake, while the levels in water decreased.

Due to the mining history of the Exploits River area, metal contamination in bottom sediment has been studied in this basin. Morry and Cole (1977) measured excessive levels of copper and zinc in sediments, 1500 and 3000 mg/kg respectively, as far as 40 km below Buchans Brook. They also concluded that the benthic community of Red Indian Lake was scarce and undiversified. Bailey (1988) also measured high concentrations of certain toxic metals in the bottom sediments of Red Indian Lake. The data mentioned above was compared with the results of this survey. The latter included analyses of OC-PCBs, which will also be discussed.

3.2.1 Fall 1987 Survey

The analytical results for heavy metals and OC-PCBs in bottom sediment samples taken at four sites in the Exploits River Basin are shown by phase in Table 18. There were no samples taken in the Badger area (Phase 2).

3.2.1.1 Heavy Metals

As anticipated, the bottom sediment of the Buchans Brook site (50NF02YN0007) above the abandoned mine pit had low levels of toxic metals and organic matter, but the sediments were rich in aluminum, iron and manganese (Table 18), reflecting local geological conditions. These characteristics are representative of background conditions.

Further downstream along the Exploits River, the station below Grand Falls (50NF02YO0052) and the one below Bishop's Falls (52NF02YO0004) had high particulate organic carbon and nitrogen. These were also the sites where toxic metals were most *concentrated. Mercury, cadmium, lead and zinc were particularly* high at site 52NF02YO0004, while mercury, cadmium and especially copper were high at site 50NF02YO0052. Upon collection of samples, it was observed that station 52NF02YO0004 was affected by decaying wood chips, more so than the site located on the other side of the river (52NF02YO0002). As for site 50NF02YO0052, the bottom was covered with slimy materials which originated from a sewer outfall

located upstream. At station 52NF02YO0002, the toxic metal concentrations were lower, as was the percentage of organic matter (Table 18).

3.2.1.2 OC-PCBs

The results of OC-PCBs parameter analyses of bottom sediments in the Exploits River Basin are shown in Table 18. Most values were lower than the detection limit of the analytical methods used. Total PCBs (Arochlor) were detected at all sites, except at Buchans Brook (background site), but there was high variability within the duplicate or triplicate samples (up to more than 100%). This variability is probably a result of the heterogeneity of replicate samples prepared in the field, along with the analytical precision of the method used for the analyses.

Similar to what was observed for metals, the control site (50NF02YN0007) displayed background conditions for OC-PCBs, with values lower than the analytical detection limits. The Grand Falls station (50NF02YO0052) located just downstream from a municipal sanitary sewer output, showed PCBs contamination, probably due to raw municipal sewage output (pop. ≈ 9000). The duplicate bottom sediment sample taken there had a mean PCBs concentration of 0.15 mg/kg. The pesticide p,p-methoxychlor, used for control of blackfly, was detected at that site, but does not represent a threat to water quality since it has low water solubility (CCREM, 1987).

Mean levels of PCBs detected at site 52NF02YO0004 and 52NF02YO0002 are 0.27 and 0.78 mg/kg respectively. These mean concentrations are higher than the ones measured at Grand Falls. The cause of these increases in concentration detected below Bishop's Falls is in part related to the loss of approximately 800 litres of PCB containing fluids during a major flood in January 1983, in the lower Exploits River Basin. Pierce and Power (1985) reported that 45% of the samples collected, during the survey they conducted following the flood in the lower Exploits River, had concentrations exceeding 0.1 mg/kg.

Based on information published by CCREM (1987), the bottom sediments analyzed in 1987, except for the site at Buchans Brook, were considered contaminated with PCBs.

3.2.2 Summer 1988 Survey

The same four sites sampled in the fall of 1987 were visited in the summer of 1988 during the Bottom Sediment Survey. Heavy metals and OC-PCBs measurements appear in Table 19.

3.2.2.1 Heavy Metals

In the August 1988 samples, particulate organic carbon and nitrogen were higher than the 1987 results at Buchans Brook

(50NF02YN0007), while the opposite occured for the downstream stations (Table 19).

The concentrations of metals measured in the 1988 survey were compared with the previous year's results and with the results recorded by Bailey (1988) in Red Indian Lake and the Bay of Exploits. A summary table was drawn up with data from both years of the recurrent survey and Bailey's (1988) results (Table 20).

Comparing the 1987 and 1988 data of certain toxic metals in sediments, some differences were observed. At Buchans Brook, the 1988 values of cadmium, copper, lead and zinc were two to three times higher than the previous year. The percentages of organic carbon and nitrogen also increased from 1.64% and <0.002% (mean concentrations) to 8.83% and 0.43% respectively. This observation corresponds to previous knowledge that the organic content of sediments has more affinity for toxic metals (Forstner, 1982). The levels of toxic metals in 1988 at Buchans Brook exceeded the baseline concentrations estimated for these parameters (Birge, et al., 1977; Cherry and Guthrie, 1977; Demayo, et al., 1980; Spear, 1981). However, such high metal concentrations in the Buchans area is not surprising since a base metal mine was operating there previously. The geological formation in the area is naturally rich in these metals. The overall differences between samples of 1987 and 1988 were due to spatial variabilities of bottom sediments within the same sampling area (50NF02YN0007).

At the other three stations downstream (52NF02YO0002, 52NF02YO0004 and 50NF02YO0052), slight variations between the two years were observed. Significant differences were observed at 50NF02YO0052, where the 1988 samples contained lower metal and organic carbon and nitrogen levels than the previous year.

Table 20 illustrates the general spatial variations that exist in the levels of metals in bottom sediments of the river basin. Background levels were observed above the abandoned mine site at Buchans, while high copper, zinc and lead levels were observed at five sites in the sediment bed of the receiving waters of Red Indian Lake (Bailey, 1988). The three other downstream sites at the Grand Falls and Bishop's Falls areas, with metal levels similar to the background site, did not show the influence of the mine effluents. There were no apparent spatial variations in metal distribution between the sites at Grand Falls, Bishop's Falls and the Bay of Exploits, although the latter site had much higher organic content (Bailey, 1988), a normal characteristic for estuarine sediments.

3.2.2.2 OC-PCBs

The 1988 OC-PCBs levels in bottom sediments of the Exploits River Basin are presented in Table 19. Of the 19 parameters analyzed, only total PCBs (Arochlor) were detected at one site located below Bishop's Falls (52NF02YO0002). The 1987 results had revealed the highest PCBs mean concentration at that same site.

However, the data are insufficient to make definite conclusions on toxic organics pollution in the Exploits River.

3.3 Fish

The use of biomonitoring techniques for evaluation of the aquatic environment is considered to be increasingly useful as the limitations associated with measuring only water chemistry become further understood (Campbell, 1983). Organisms are selected in respect to the objectives of the study, and certain analyses are done either on single organs or on the whole organism.

In our study, fish were chosen as the test organisms, since they have been extensively studied. Fish are also an excellent source of information on bioavailability and bioconcentration, since they are situated at the higher trophic levels (Campbell, 1983). For our purposes, both forage and game fish were tested. Forage fish have a restricted home range, and thus are good indicators of local pollution, whereas game fish analysis was conducted to compare analytical results to data reported by Bailey (1988).

3.3.1 Forage Fish

The use of minnow traps to collect forage fish did not generate much biomass. In 1987, only four samples were prepared for metal analyses and three samples for OC-PCBs analysis. In

1988, the amount of fish collected only allowed the preparation of one sample, even though the traps were placed in Buchans Brook for a week. The only species trapped were threespine sticklebacks (Gasterosteus aculeatus), a forage fish which feeds on worms, small crustaceans, aquatic insects, fish eggs and fry (Scott and Crossman, 1973). This strengthens the observations made by Morry and Cole (1977) concerning the low abundance and diversity of the Exploits River's fish community.

The 1987 results of metals and OC-PCBs in forage fish are shown in Table 21a and 21b. The metal values in the sole 1988 fish sample were also added. In the 1987 sample from Buchans Brook (90NF02YN0007), mercury, nickel and zinc levels were higher than the fish samples from the site below Bishop's Falls (92NF02YO0004), while chromium, copper, and lipids were higher at the latter site. Most of the differences mentioned were negligible, but according to Spear (1981), zinc in forage fish exceeded the usual concentrations observed in fish (4 to 20 mg/kg). Lead and cadmium were not detected.

A significant lead concentration was detected in the 1988 forage fish sample, but the other parameters were at levels similar to the 1987 samples. However, based on very few samples, it is impossible to draw any conclusions from this observation. The 1988 sample, as opposed to the 1987 samples, was analyzed at the National Water Quality Laboratory.

In terms of the OC-PCBs analyses in forage fish samples, only a trace amount of p,p-DDT was revealed at the site below Bishop's Falls (Table 21b).

3.3.2 Game Fish

The game fish caught for this survey in Red Indian Lake (90NF02YN0001) were all landlocked salmon (Salmo salar). Table 22 presents the results of heavy metals and lipid content analyses of the muscle tissue, with corresponding physical characteristics.

The ranges of values for parameters analyzed in game fish samples were compared with similar data from a study also conducted in Red Indian Lake (Bailey, 1988). Table 23 summarizes these results. The present survey revealed higher levels of copper and zinc and lower levels of mercury and lead. However, the metal levels, except for copper, were still within the ranges observed in the Labrador headwater lakes fish samples (Lockerbie, 1987), which included a much larger sample number. Chromium, lead and cadmium were not detected in this survey. Strictly from the limited number of results from this survey, it appears that metal accumulation, except for mercury, seems to be higher in forage fish than in game fish.

The small number of fish samples collected for the metal accumulation study in the Exploits River Basin does not permit any firm conclusion on the values recorded, except that the muscle

tissue of game fish tested (n=17) had acceptable levels of metals, based on comparisons with fish from pristine Labrador headwater lakes (Lockerbie, 1987). The high metal levels recorded in Red Indian Lake's bottom sediments by Bailey (1988), in addition to results reported here and by Bailey (1988) regarding metals in predatory fish, are indicative of the non-availability of these metals to the fish population. The metals are stored in the sediments. Morry and Cole (1977) also reported scarce invertebrate life in bottom sediment samples of Red Indian Lake. Thus, it is assumed that the fish are feeding on organisms in the water column, which does not usually exceed water quality guidelines for both metals and toxic organics.

Bailey (1988) also mentioned that the fish community of the Red Indian Lake area is more likely severely stressed by a widespread overburden of mine tailings and an annual drawdown of the reservoir of up to nine metres.

4. CONCLUSION

The 1987-1988 Exploits River Basin Survey studied the water quality of the river during low flow and high flow conditions through the analysis of water samples collected at various locations in the basin. Water sampled below pollution inputs, such as mine and pulp mill effluents, showed evidence of contamination. Downstream samples occasionally exceeded the water quality guidelines set for aluminum, copper and zinc only. Overall, since the water chemistry showed a relatively dilute and homogeneous water mass, a predictive model on spatial heterogeneity of the Exploits River is unnecessary.

Bottom sediments sampled above pollution sources had background parameter levels, but noticeable metal and PCB levels were detected in the developed regions (Grand Falls/Windsor and Bishop's Falls areas). High metal levels often occurred in sediments with high organic matter content.

The metal accumulation study in predatory fish revealed low levels. On the other hand, the number of forage fish samples was insufficient to help formulate any clear statement about the results obtained. It seems, though, that metals in the bottom sediments, of Red Indian Lake especially, were unavailable to the fish community.

The intensive study conducted on the Exploits River showed that the large water mass did dilute most pollution sources. However, the urbanized lower basin is subjected to anthropogenic pollution, as indicated by the detection of metals and PCBs in bottom sediments.

As for future work, since there was only a small number of forage fish collected under this survey, it was impossible to draw any conclusions on metal accumulation in this type of fish. Therefore, it is recommended that additional biomonitoring work using forage fish be conducted in this basin.

REFERENCES

American Public Health Association, et al., 1985. Standard Methods for Examination of Water and Wastewater. 16th Ed., Washington, D.C.

Andersson, P. and H. Borg. 1988. Effects of Liming on the Distribution of Cadmium in Water, Sediment, and Organisms in a Swedish Lake. Can. J. Fish. Aquat. Sci. 45:1154-1162.

Arseneault, R.A. and G.D. Howell. 1987. Water Quality Branch Atlantic Region Field Quality Assurance/Quality Control Program. Version 2. IW/L-AR-WQB-87-126, Water Quality Branch, Environment Canada, Moncton, N.B.

Bailey, H.S. 1988. A Heavy Metal Study of Three River Basins in Atlantic Canada Influenced by Mining Activities. IW/L-AR-WQB-88-138, Water Quality Branch, Environment Canada, Moncton, N.B.

Birge, W.J., J.A. Black and A.G. Westerman. 1977. Embryopathic Effects of Waterborne and Sediment-Accumulated Cadmium, Mercury and Zinc on Reproduction and Survival of Fish and Amphibian Populations in Kentucky. U.S. NTIS PB-264043. 33 pp.

Campbell, D. 1983. Water Quality Branch Forage Fish Monitoring. Water Quality Branch, Inland Waters Directorate, Ottawa, Ontario.

Canadian Council of Resource and Environment Ministers (CCREM). 1987. Canadian Water Quality Guidelines. Ottawa, Ontario.

Cherry, D.S. and P.K. Guthrie. 1977. Toxic Metals in Surface Waters from Coal Ash. Water Resour. Bull. 13(6):1227-1236.

Demayo, A., M.C. Taylor and S.W. Reeder. 1980. Guidelines for Surface Water Quality. Vol. 1. Inorganic Chemical Substances. Lead. Inland Waters Directorate, Water Quality Branch, Ottawa.

Forstner, V. 1982. Accumulative Phases for Heavy Metals in Limnic Sediments. Hydrobiologia, 91:269-284.

Lockerbie, D.M. 1987. Chemical Characterization of Water, Sediment and Biota from Five Labrador-Quebec Transboundary Basins. Tech. Report IW/L-AR-WQB-87-120, Environment Canada, Water Quality Branch, Moncton, N.B.

McNeely, R.N., V.P. Niemanis and L. Dwyer. 1979. Water Quality Sourcebook: A Guide to Water Quality Parameters. Water Quality Branch, Inland Waters Directorate, Ottawa.

Morry, C.J. and L.J. Cole. 1977. Limnology and Fish Populations of Red Indian Lake, a Multi-Use Reservoir. Tech. Rep. 691, Environment Canada, Fisheries and Marine Service.

Pierce, W. and B. Power. 1985. An Investigation of a PCB Spill into the Exploits River, Newfoundland. Environmental Protection Service, Environment Canada, Atlantic Region.

Roussel, S.C. and R.A. Arseneault. 1988. Canada-Newfoundland Water Quality Monitoring Agreement: First Year Monitoring Data Evaluation Report. Water Quality Branch, Atlantic Region, Moncton, N.B.

Salomons, W. 1985. Sediments and Water Quality. Environ. Techno. Letters, 6:315-326.

Scott, W.B. and E.J. Crossman. 1973. Freshwater Fishes of Canada, Fisheries Research Board of Canada, Ottawa.

Spear, P.A. 1981. Zinc in the Aquatic Environment: Chemistry, Distribution, and Toxicology. National Research Council of Canada, Associate Committee on Scientific Criteria for Environmental Quality No. 17589, Ottawa.

U.S. EPA. 1979. Polychlorinated Biphenyls. In Water-Related Environmental Fate of 129 Priority Pollutants. Vol. 1. Introduction, Technical Background, Metals and Inorganics, Pesticides, Polychlorinated Biphenyls. Office of Water Planning and Standards, U.S. Environmental Protection Agency, Washington, D.C. pp. 36-1 to 36-18.

U.S. EPA. 1976. Quality Criteria for Water. Environmental Protection Agency, EPA-440/9-76-023, Washington, D.C.

Water Quality Branch. In prep. Analytical Methods Manual. Environment Canada, Water Quality Branch, Ottawa.

Water Quality Branch. 1983. Sampling for Water Quality. Environment Canada, Water Quality Branch, Ottawa.

Wilson, R.C.H. 1974. A Report on the Pollution of the Exploits River Basin, Tech. Report EPS-5-AR-74-3, Environment Canada, Environmental Protection Service, St.John's, Newfoundland.

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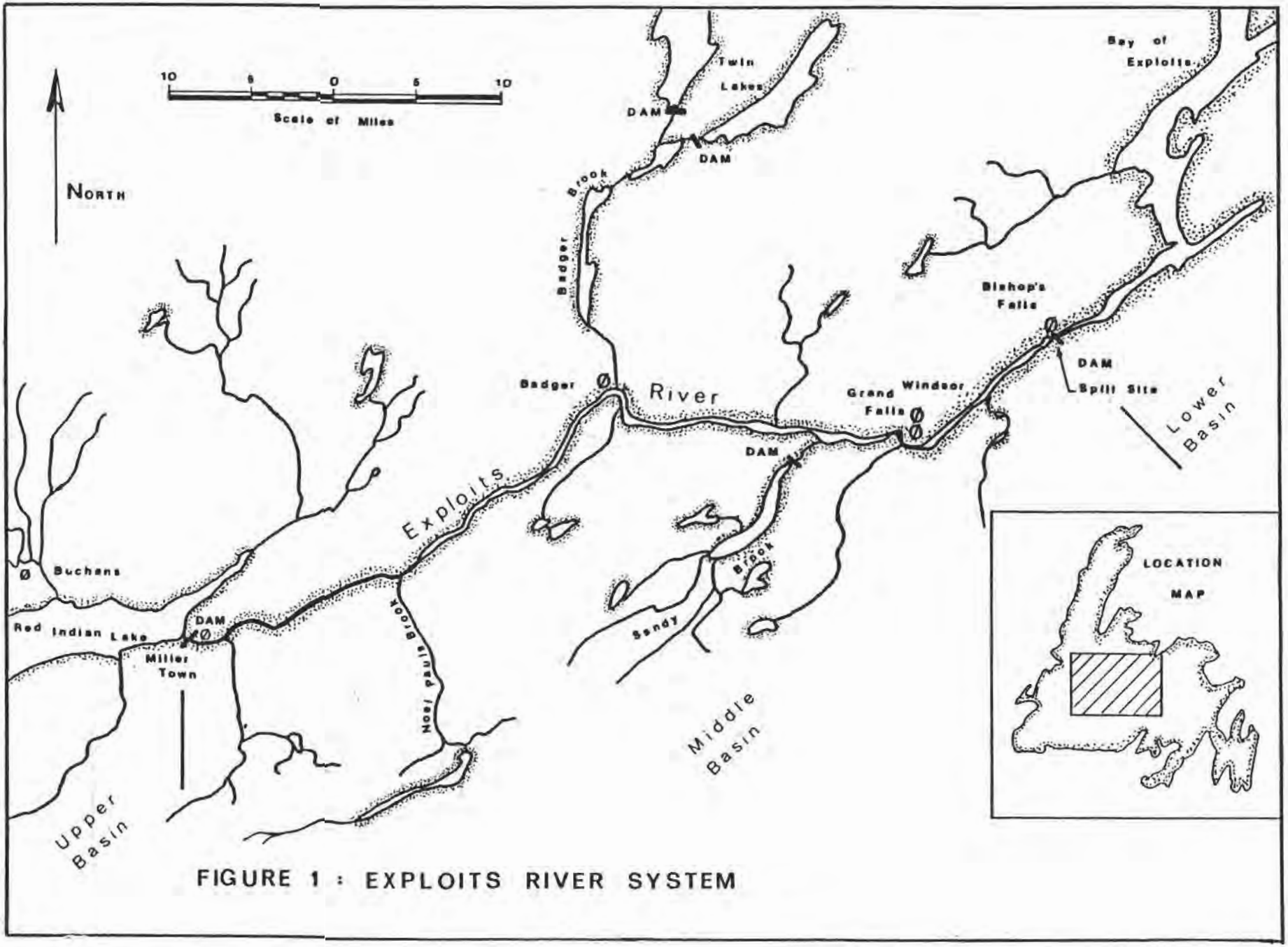

FIGURE 1 : EXPLOITS RIVER SYSTEM

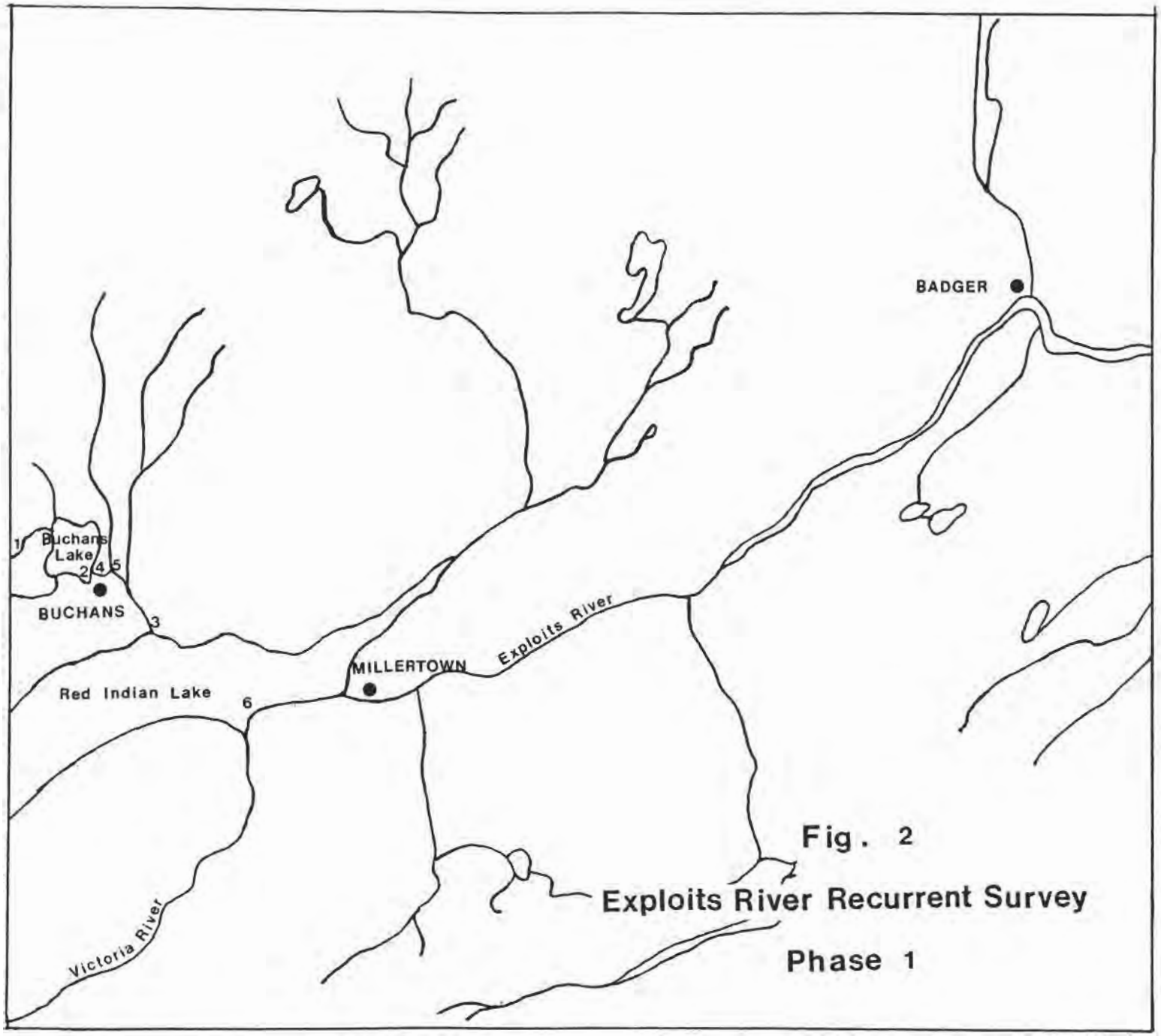

Fig. 2

Exploits River Recurrent Survey

Phase 1

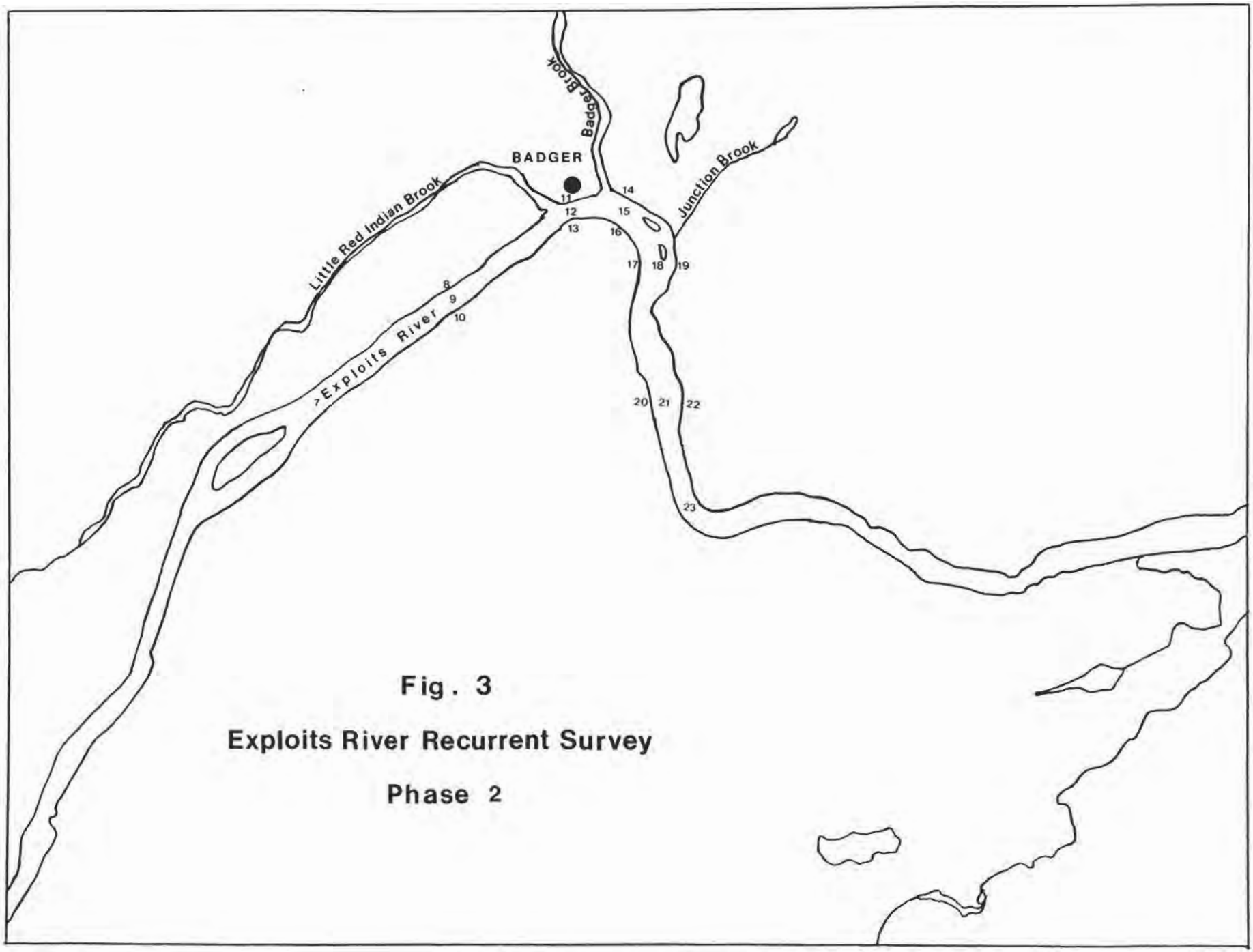

Fig. 3

Exploits River Recurrent Survey

Phase 2

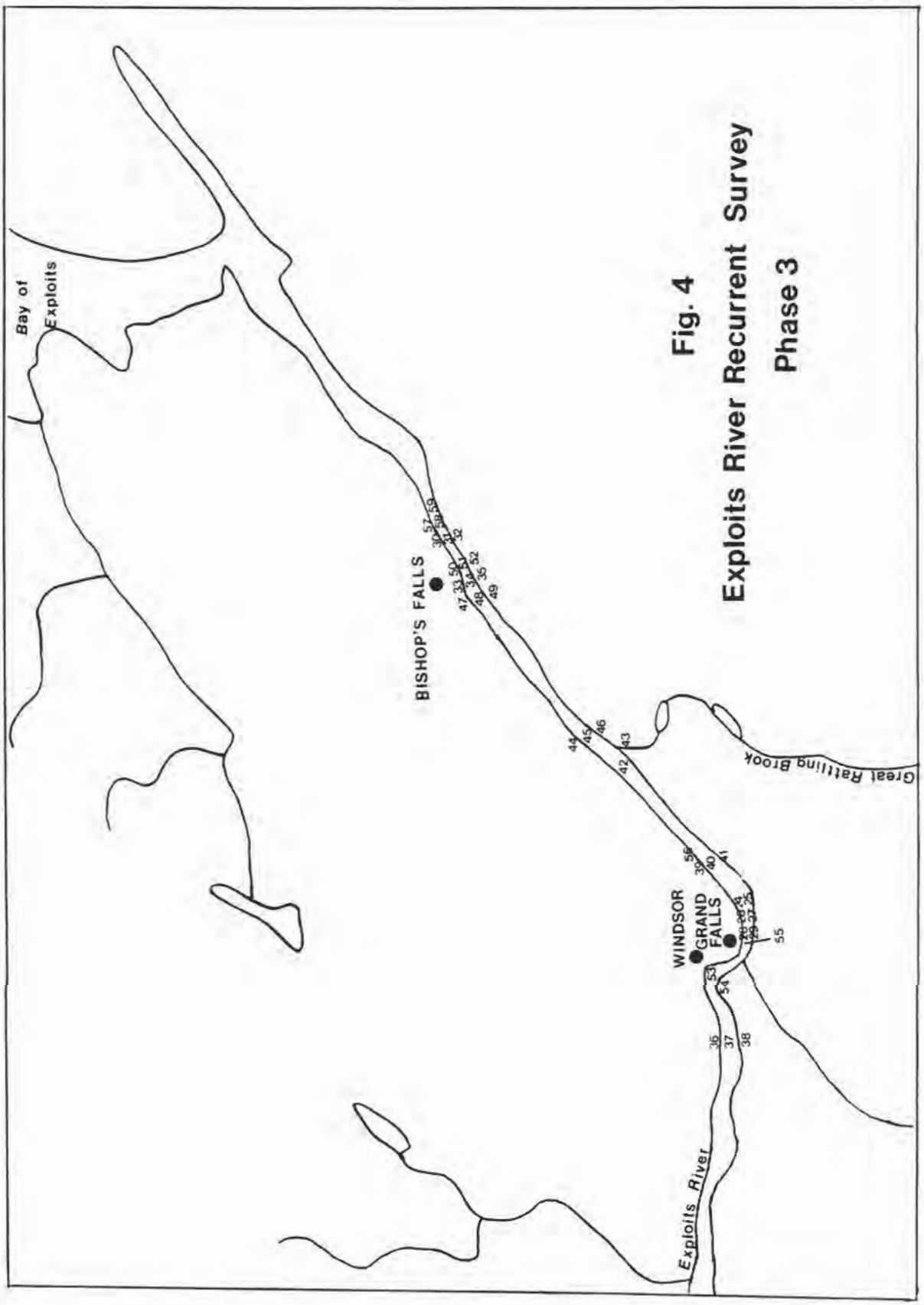

Fig. 4

Exploits River Recurrent Survey

Phase 3

FIG. 5a. DISCHARGE VALUES (M**3/S) AT THREE LOCATIONS ON THE EXPLOITS-LLOYDS RIVER BASIN IN FALL 1987

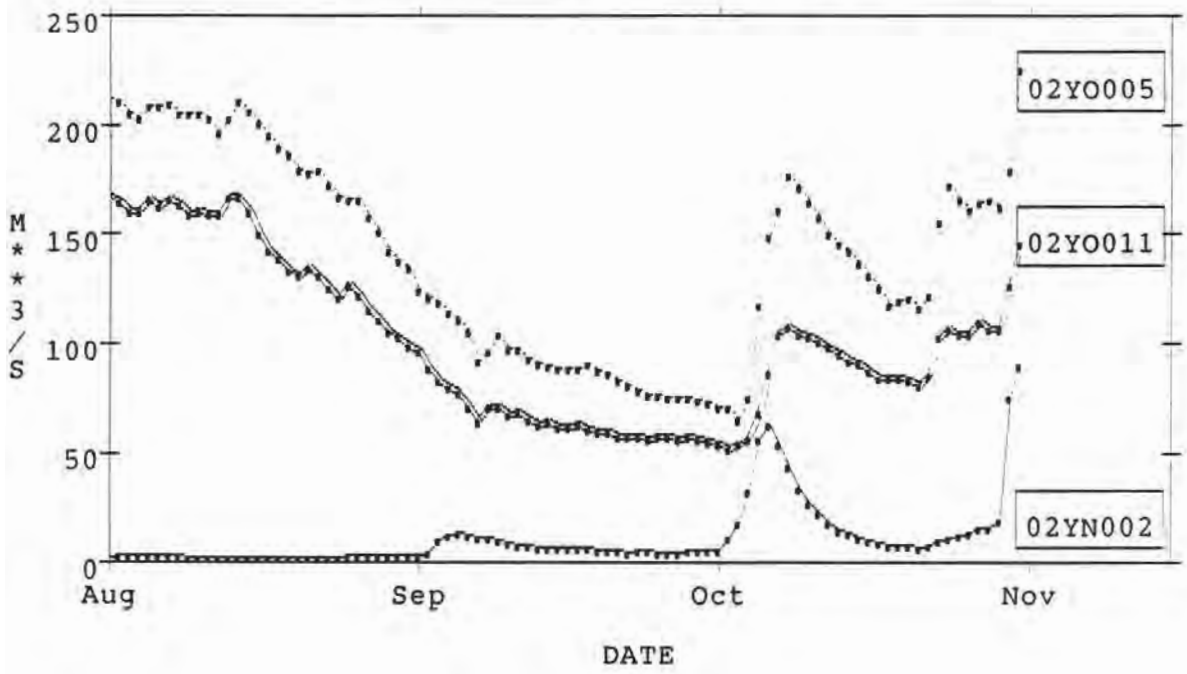

FIG. 5b. DISCHARGE VALUES (M**3/S) AT THREE LOCATIONS ON THE EXPLOITS-LLOYDS RIVER BASIN IN SPRING AND SUMMER 1988

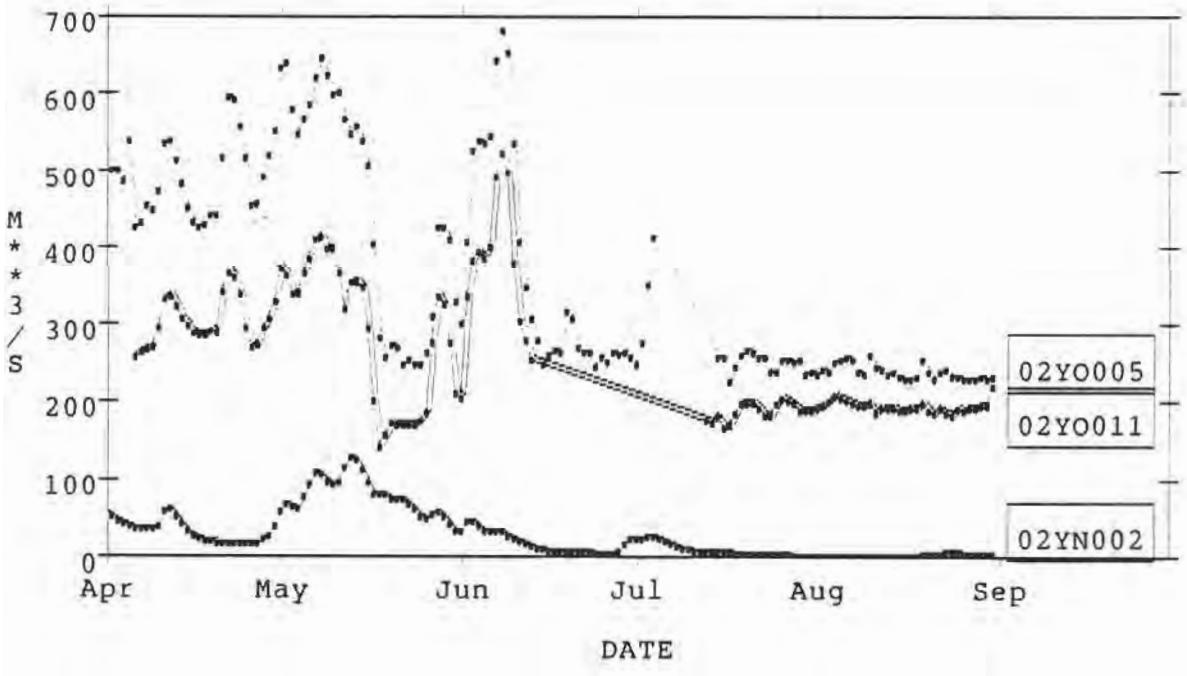

FIG. 6a. MAJOR ION DOMINANCE OF EXPLOITS RIVER WATER - 1987

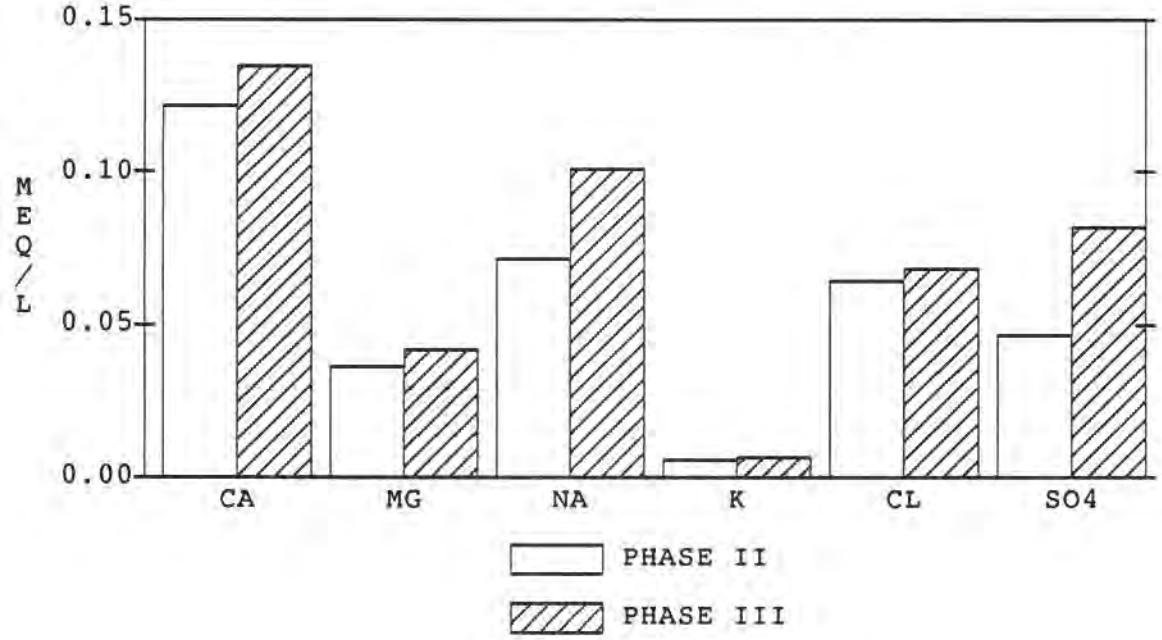

FIG. 6b. METAL DOMINANCE OF EXPLOITS RIVER WATER - 1987

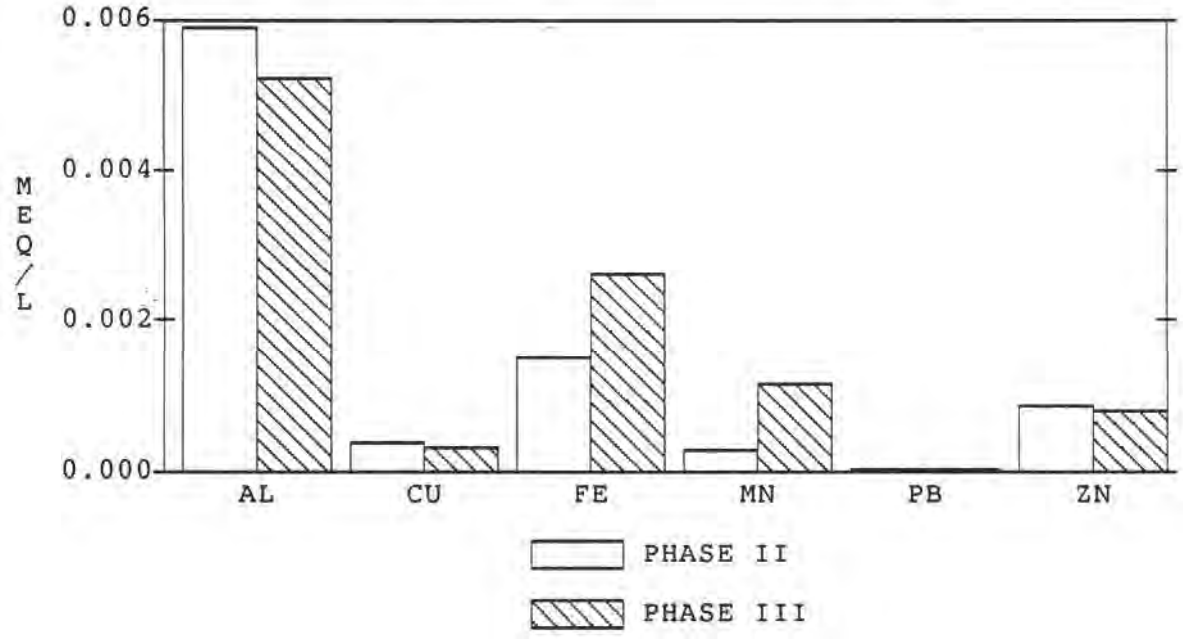

FIG. 7a. MAJOR ION DOMINANCE OF EXPLOITS RIVER WATER - 1988

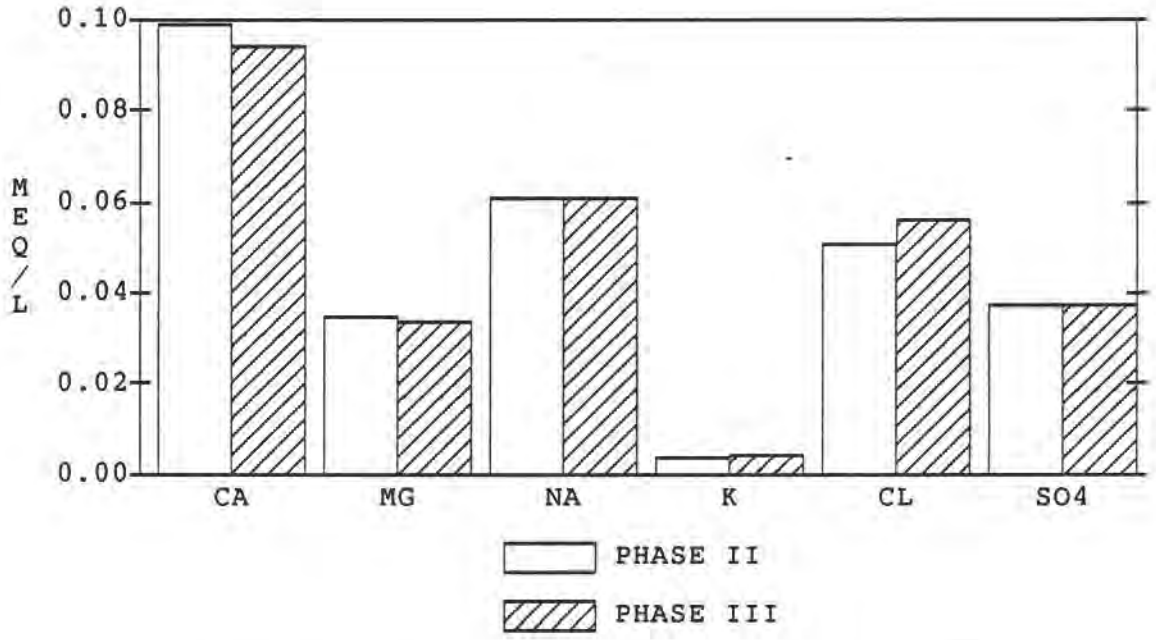

FIG. 7b. METAL DOMINANCE OF EXPLOITS RIVER WATER - 1988

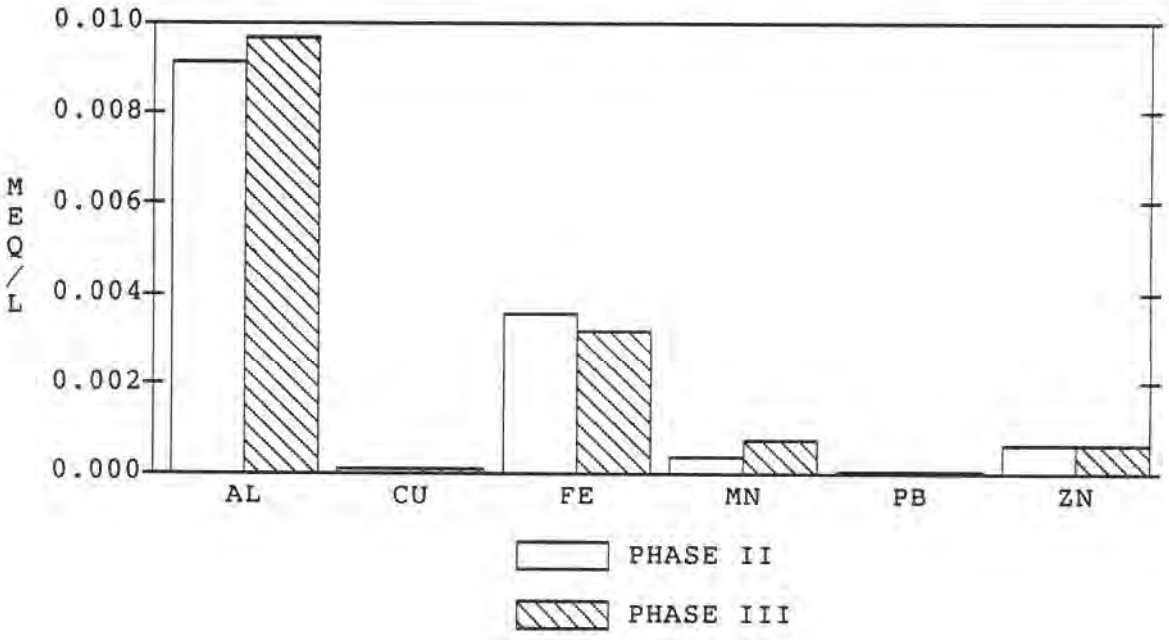

FIG. 8. TEMPORAL VARIATIONS OF PH AT INDEX STATION ON EXPLOITS RIVER (00NF02YO0020): 1987-1988

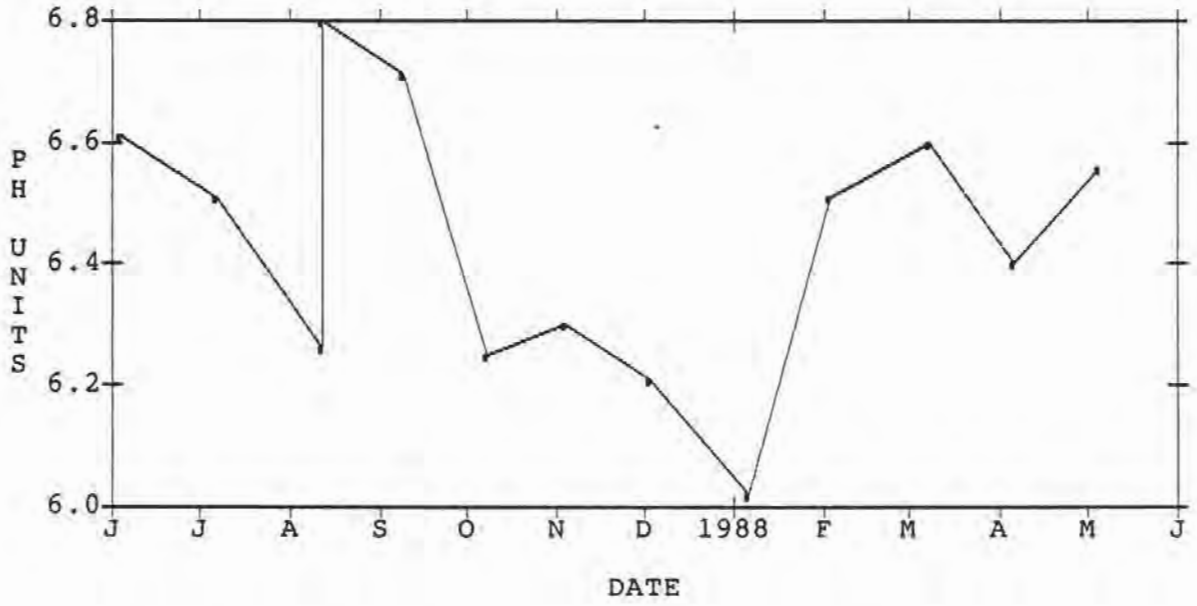

FIG. 9. TEMPORAL VARIATIONS OF SPECIFIC CONDUCTANCE AT INDEX STATION ON EXPLOITS RIVER (00NF02YO0020): 1987-1988

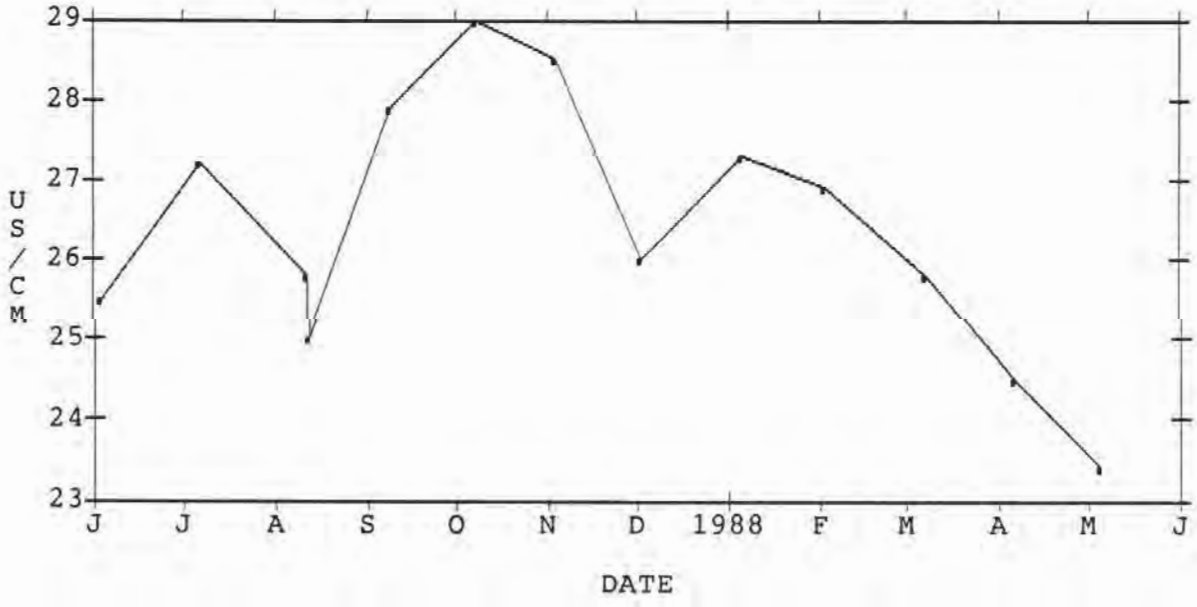

FIG. 10. TEMPORAL VARIATIONS OF TOTAL ALUMINUM AT INDEX STATION ON EXPLOITS RIVER (00NF02YO0020): 1987-1988

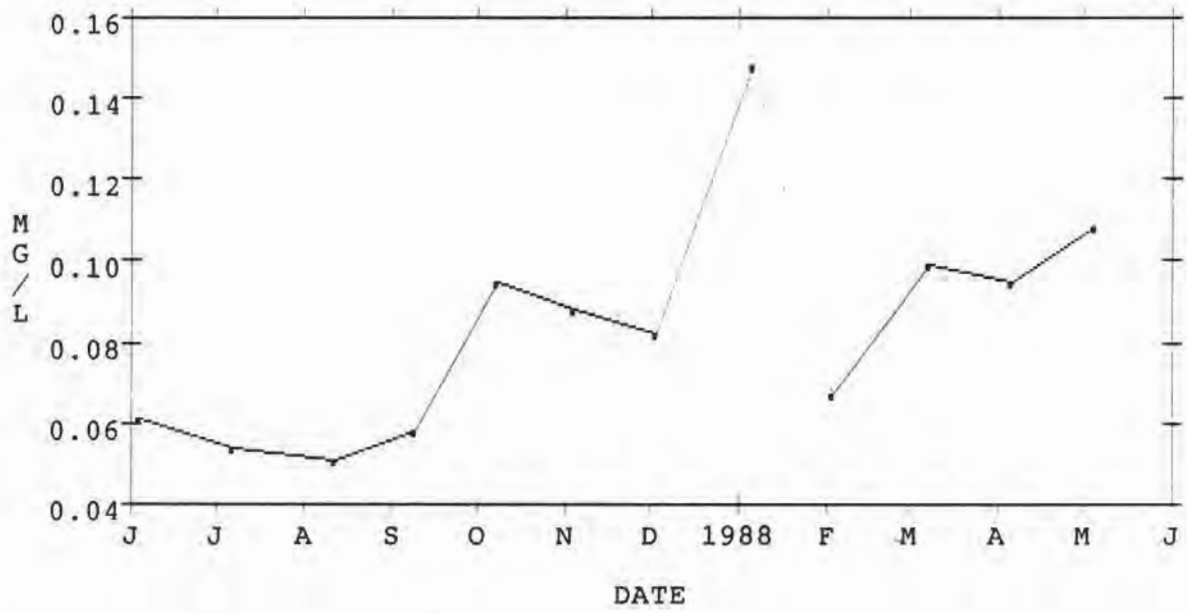

FIG. 11. TEMPORAL VARIATIONS OF TOTAL IRON AT INDEX STATION ON EXPLOITS RIVER (00NF02YO0020): 1987-1988

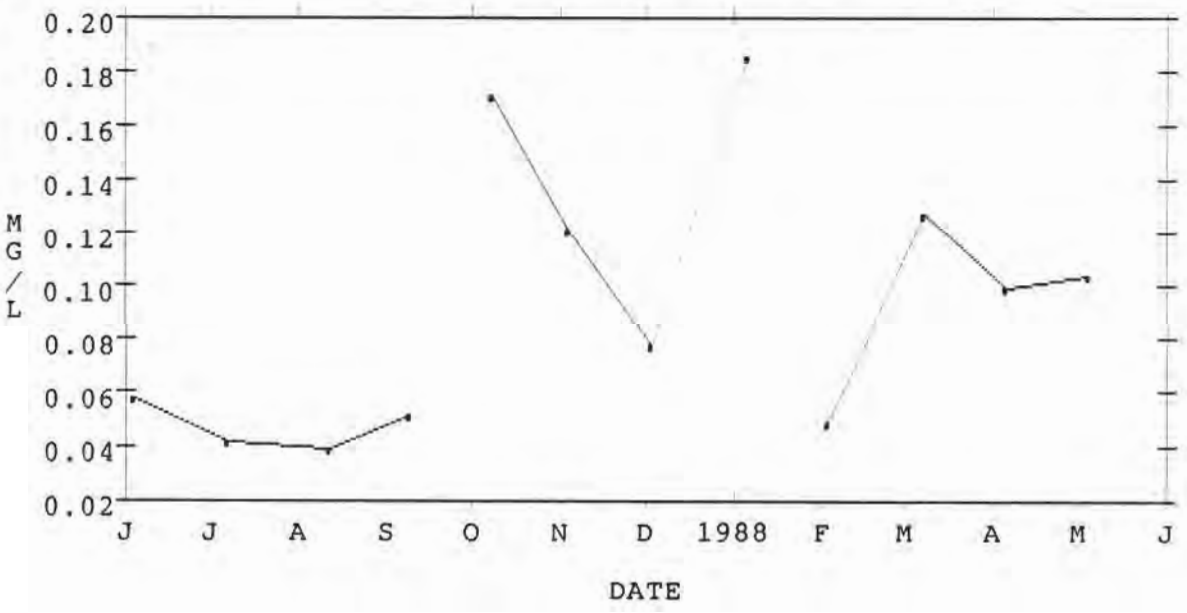

FIG. 12. TEMPORAL VARIATIONS OF D.O.C. AT INDEX STATION ON EXPLOITS RIVER (00NF02YO0020): 1987-1988

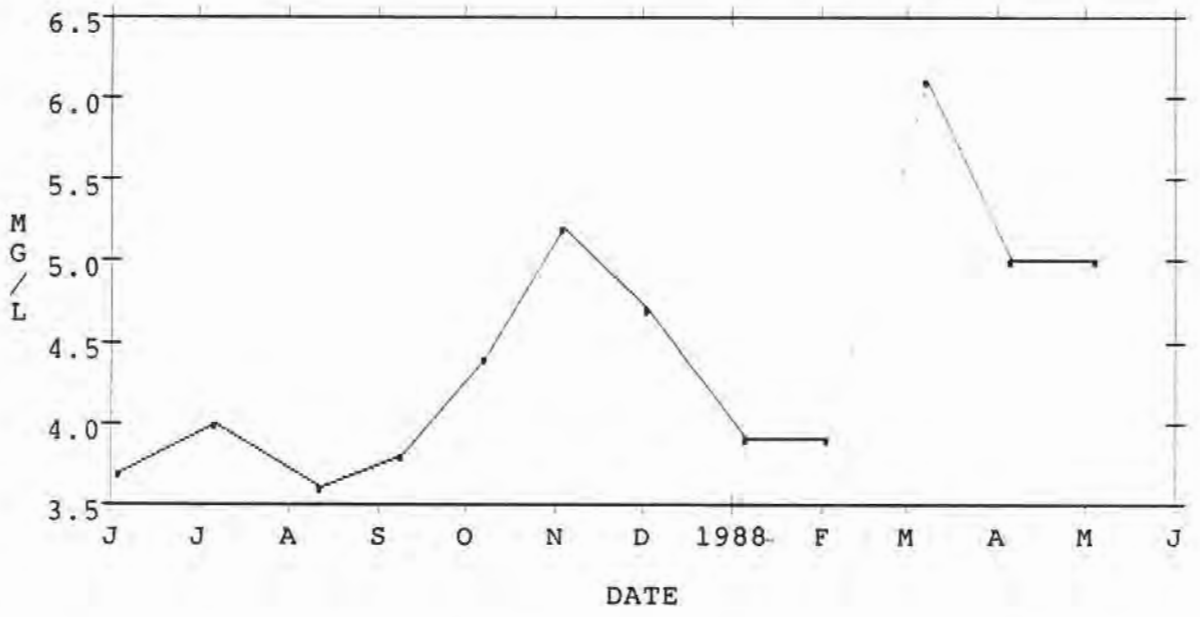

FIG. 13. TEMPORAL VARIATIONS OF TOTAL PHOSPHORUS AT INDEX STATION EXPLOITS RIVER (00NF02YO0020): 1987-1988

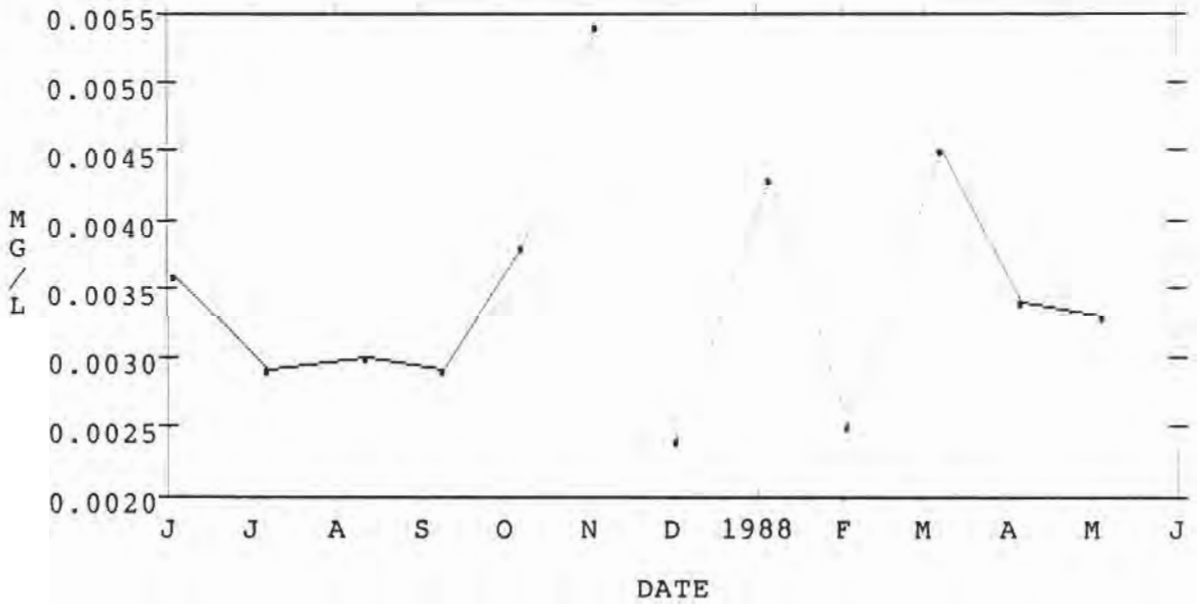

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TABLE 1: EXPLOITS RIVER BASIN RECURRENT SURVEY SAMPLING STATIONS[a]

a) Phase 1: Red Indian Lake Metal Accumulation

1. 00NF02YN0006 Lat. 48D 49M 10S Long. 56D 59M 02S
Buchans Brook approximately 150 m below middle branch confluence

2. 01NF02YN0026 Lat. 48D 50M 17S Long. 56D 51M 24S
Buchans Lake from western end of dam

3. 22NF02YN0003 Lat. 48D 49M 36S Long. 56D 50M 11S
Outflow at southern end of abandoned pit furthest east from Buchans Brook

4. 50NF02YN0007 Lat. 48D 50M 10S Long. 56D 51M 19S
Buchans Brook 200 m below Buchans Lake Dam

5. 90NF02YN0007 Lat. 48D 50M 10S Long. 56D 51M 19S
Buchans Brook 200 m below Buchans Lake Dam (forage fish)

6. 90NF02YN0001 Lat. 48D 45M 48S Long. 56D 37M 08S
Red Indian Lake 1.5 km west of Millertown Dam

b) Phase 2: Urban Development - Badger

7. 00NF02YO0015 Lat. 48D 57M 19S Long. 56D 04M 35S
Exploits River 3.5 km upstream of Badger (100 m below island)

8. 00NF02YO0023 Lat. 48D 57M 58S Long. 56D 03M 09S
Exploits River 1.3 km above Little Red Indian Brook 50 m above island mid-river

9. 00NF02YO0024 Lat. 48D 57M 56S Long. 56D 03M 06S
Exploits River 1.3 km above Little Red Indian Brook 50 m above island approximately 5 m from right bank

10. 00NF02YO0066 Lat. 48D 58M 01S Long. 56D 03M 11S
Exploits River 1.3 km above Little Red Indian Brook 50 m above island approximately 5 m from left bank

11. 00NF02YO0025 Lat. 48D 58M 28S Long. 56D 02M 16S
Exploits River below Little Red Indian Brook confluence approximately 5 m from left bank

12. 00NF02YO0026 Lat. 48D 58M 26S Long. 56D 02M 15S
Exploits River below Little Red Indian Brook confluence mid-river

13. 00NF02YO0027 Lat. 48D 58M 23S Long. 56D 02M 14S
Exploits River below Little Red Indian Brook confluence approximately 5 m from right bank

14. 00NF02YO0028 Lat. 48D 58M 29S Long. 56D 01M 54S
Exploits River below Badger Brook confluence approximately 5 m from left bank

15. 00NF02YO0029 Lat. 48D 58M 25S Long. 56D 01M 56S
Exploits River below Badger Brook confluence mid-river

16. 00NF02YO0030 Lat. 48D 58M 23S Long. 56D 01M 58S
Exploits River below Badger Brook confluence approximately 5 m from right bank

17. 00NF02YO0031 Lat. 48D 58M 16S Long. 56D 01M 27S
Exploits River below Junction Brook confluence approximately 5 m from left bank 10 m NNE of island

18. 00NF02YO0032 Lat. 48D 58M 14S Long. 56D 01M 35S
Exploits River below Junction Brook confluence mid-river

19. 00NF02YO0033 Lat. 48D 58M 11S Long. 56D 01M 42S
Exploits River below Junction Brook confluence approximately 5 m from right bank

20. 00NF02YO0034 Lat. 48D 57M 53S Long. 56D 00M 48S
Exploits River below First Rapids below Badger approximately 5 m from left bank

21. 00NF02YO0035 Lat. 48D 57M 54S Long. 56D 00M 51S
Exploits River below First Rapids below Badger mid-river

22. 00NF02YO0036 Lat. 48D 57M 55S Long. 56D 00M 56S
Exploits River below First Rapids below Badger approximately 5 m from right bank

23. 00NF02YO0037 Lat. 48D 56M 44S Long. 56D 01M 17S
Exploits River below Forth Rapids downstream of Badger above bend in river 2.5 km below Junction Brook confluence

c) Phase 3: Urban/Industrial Development - Windsor/Grand Falls/Bishop's Falls

24. 00NF02YO0038 Lat. 48D 55M 20S Long. 55D 39M 10S
Exploits River at Grand Falls 50 m above confluence of Green Woods Brook 1 m from right bank

25. 00NF02YO0039 Lat. 48D 55M 26S Long. 55D 39M 10S
Exploits River at Grand Falls 50 m above confluence of Green Woods Brook 1 m from left bank

26. 00NF02YO0040 Lat. 48D 55M 26S Long. 55D 39M 24S
Exploits River at Grand Falls 300 m above confluence of Green Woods Brook 1 m from right bank

27. 00NF02YO0041 Lat. 48D 55M 32S Long. 55D 39M 09S
Exploits River at Grand Falls 300 m above confluence of Green Woods Brook 1 m from left bank

28. 00NF02YO0042 Lat. 48D 55M 24S Long. 55D 39M 46S
Exploits River at Grand Falls 50 m below bridge 1 m from right bank

29. 00NF02YO0043 Lat. 48D 55M 26S Long. 55D 39M 46S
Exploits River at Grand Falls 50 m below bridge 1 m from left bank

30. 02NF02YO0002 Lat. 49D 01M 53S Long. 55D 25M 30S
Exploits River approximately 2 km below Trans Canada Highway Bridge 200 m above island 5 m from left bank

31. 02NF02YO0003 Lat. 49D 01M 51S Long. 55D 25M 29S
Exploits River approximately 2 km below Trans Canada Highway Bridge 200 m above Island mid-river

32. 02NF02YO0004 Lat. 49D 01M 49S Long. 55D 25M 28S
Exploits River approximately 2 km below Trans Canada Highway Bridge 200 m above island 5 m from right bank

33. 00NF02YO0021 Lat. 49D 00M 40S Long. 55D 28M 58S
Exploits River at Bishop's Falls approximately 0.6 km below railway bridge 1 m from left bank

34. 00NF02YO0047 Lat. 49D 00M 34S Long. 55D 28M 55S
Exploits River at Bishops Falls approximately 0.6 km downstream of railway bridge mid-river

35. 00NF02YO0048 Lat. 49D 00M 28S Long. 55D 28M 53S
Exploits River at Bishops Falls approximately 0.6 km downstream of railway bridge 5 m from right bank

36. 00NF02YO0049 Lat. 48D 56M 11S Long. 55D 43M 54S
Exploits River below Wigwam Brook confluence 25 m from left bank

37. 00NF02YO0050 Lat. 48D 56M 07S Long. 55D 43M 56S
Exploits River below Wigwam Brook confluence 250 m downstream of island mid-river

38. 00NF02YO0051 Lat. 48D 56M 03S Long. 55D 43M 57S
Exploits River below Wigwam Brook confluence 150 m from right bank

39. 00NF02YO0052 Lat. 48D 56M 12S Long. 55D 37M 04S
Exploits River 3.8 km downstream of Grand Falls Bridge approximately 10 m below municipal sewage outfall 5 m from left bank

40. 00NF02YO0053 Lat. 49D 56M 08S Long. 55D 36M 54S
Exploits River 3.8 km downstream of Grand Falls Bridge approximately 30 m below municipal sewage outfall mid-river

41. 00NF02YO0054 Lat. 48D 56M 07S Long. 55D 36M 48S
Exploits River 3.8 km downstream of Grand Falls Bridge approximately 10 m below municipal sewage outfall 5 m from right bank

42. 00NF02YO0055 Lat. 48D 58M 00S Long. 55D 33M 43S
Exploits River approximately 400 m upstream of Great Rattling Brook confluence

43. 00NF02YO0056 Lat. 48D 58M 1=01S Long. 55D 32M 46S
Great Rattling Brook 600 m from confluence at falls

44. 00NF02YO0057 Lat. 48D 58M 18S Long. 55D 33M 10S
Exploits River approximately 150 m below Great Rattling Brook confluence 20 m from right bank

45. 00NF02YO0058 Lat. 48D 58M 19S Long. 55D 33M 15S
Exploits River approximately 150 m below Great Rattling Brook confluence mid-river

46. 00NF02YO0059 Lat. 48D 58M 20S Long. 55D 33M 20S
Exploits River approximately 150 m below Great Rattling Brook confluence 20 m from left bank

47. 00NF02YO0060 Lat. 48D 59M 48S Long. 55D 30M 45S
Exploits River at Bishops Falls approximately 2.1 km upstream of railway bridge 10 m from left bank

48. 00NF02YO0061 Lat. 48D 59M 43S Long. 55D 30M 41S
Exploits River at Bishops Falls approximately 2.1 km upstream of railway bridge mid-river

49. 00NF02YO0062 Lat. 48D 59M 40S Long. 55D 30M 38S
Exploits River at Bishops Falls approximately 2.1 km upstream of railway bridge 10 m from right bank

50. 00NF02YO0063 Lat. 49D 01M 23S Long. 55D 27M 00S
Exploits River at Trans Canada Highway Bridge 1 m from left bank

51. 00NF02YO0064 Lat. 49D 01M 20S Long. 55D 27M 01S
Exploits River at Trans Canada Highway Bridge mid-river

52. 00NF02YO0065 Lat. 49D 01M 17S Long. 55D 26M 55S
Exploits River at Trans Canada Highway Bridge 1 m from right bank

53. 01NF02YO0021 Lat. 48D 56M 10S Long. 55D 40M 27S
Grand Falls Headpond approximately 200 m below rapids 5 m from south shore

54. 01NF02YO0022 Lat. 48D 56M 13S Long. 55D 40M 22S
Grand Falls Headpond approximately 200 m below rapids 5 m south of Boom

55. 22NF02YO0001 Lat. 48D 55M 29S Long. 55D 39M 35S
Abitibi-Price waste water outfall 100 m below bridge at Grand Falls

56. 50NF02YO0052 Lat. 48D 56M 12S Long. 55D 37M 04S
Exploits River 3.8 km downstream of Grand Falls bridge approximately 10 m below municipal sewage outfall 2 m from left bank

57. 52NF02YO0002 Lat. 49D 01M 55S Long. 55D 25M 26S
Exploits River approximately 2.5 km below Trans Canada Highway Bridge north of island 3 m from left bank

58. 52NF02YO0004 Lat. 49D 01M 45S Long. 55D 25M 11S
Exploits River approximately 2.5 km below Trans Canada Highway Bridge south of island 3 m from right bank

59.	92NF02YO0004	Lat. 49D 01M 55S Long. 55D 25M 26S Exploits River approximately 2.5 km below Trans Canada Highway Bridge south of Island 3 m from right bank (forage fish)

a - See Figures 2 to 4 for location of sampling sites

TABLE 2: Listing of parameters analyzed in water samples collected during the Fall 1987 Exploits River Basin Recurrent Survey (National Laboratory)

Parameter	NAQUADAT Code	Det.Limit(Units)
Water Temperature	02061S	- °C
pH	10301F	- pH units
Dissolved Oxygen	08102S	- mg/L
Specific Conductance	02042S	2 µS/cm
Calcium, Dissolved	20103L	0.05 mg/L
Magnesium, Dissolved	12102L	0.01 mg/L
Sodium, Dissolved	11103L	0.1 mg/L
Potassium, Dissolved	19103L	0.02 mg/L
Chloride, Dissolved	17209L	0.01 mg/L
Sulphate, Dissolved (MTB)	16306L	0.2 mg/L
Sulphate, Dissolved (IC)	16309L	0.01 mg/L
Alkalinity, Total	10111L	0.25 mg/L
Alkalinity, Gran	10110L	- mg/L
Silica, Reactive	14102L	0.1 mg/L
Aluminum, Total	13009P	0.002 mg/L
Barium, Total	56009P	0.0002 mg/L
Beryllium, Total	04010P	0.05 µg/L
Cadmium, Total	48009P	0.0001 mg/L
Cobalt, Total	27009P	0.0001 mg/L
Chromium, Total	24009P	0.0002 mg/L
Copper, Total	29009P	0.0002 mg/L
Iron, Total	26009P	0.0004 mg/L
Lithium, Total	03009P	0.0001 mg/L
Manganese, Total	25010P	0.0001 mg/L
Molybdenum, Total	42009P	0.0001 mg/L
Nickel, Total	28009P	0.0002 mg/L
Lead, Total	82009P	0.0002 mg/L
Strontium, Total	38009P	0.0001 mg/L
Vanadium, Total	23009P	0.0001 mg/L
Zinc, Total	30009P	0.0002 mg/L

TABLE 3: Listing of parameters analyzed in water samples collected during the Spring 1988 Exploits River Basin Recurrent Survey (regional laboratory)

Parameter	NAQUADAT Code	Det.Limit(Units)
Water Temperature	02061S	- °C
pH	10301F;10301L	- pH units
Dissolved Oxygen	08102S	- mg/L
Specific Conductance	02042S	2 µS/cm
	02041L	0.1 µS/cm
Turbidity	02073L	0.1 JTU
Colour, Apparent	02011L	5 R.U.
Alkalinity, Total	10101L	0.5 mg/L
Alkalinity, Gran	10110L	-
Calcium, Dissolved	20110L	0.1 mg/L
Magnesium, Dissolved	12107L	0.1 mg/L
Potassium, Dissolved	19103L	0.1 mg/L
Sodium, Dissolved	11103L	0.1 mg/L
Chloride, Dissolved	17209L	0.01 mg/L
Sulphate, Dissolved	16304L	1 mg/L
Sulphate, Dissolved	16309L	0.01 mg/L
Phosphorus, Total	15413L	0.001 mg/L
Copper, Extractable	29305P	0.002 mg/L
Zinc, Extractable	30304P	0.01 mg/L
Cadmium, Extractable	48302P	0.001 mg/L
Lead, Extractable	82302P	0.002 mg/L
Aluminum, Extractable	13305P	0.01 mg/L
Iron, Extractable	26304P	0.05 mg/L
Manganese, Extractable	25304P	0.01 mg/L
Carbon, Dissolved Organic	06107L	0.4 mg/L
Nitrogen, Dissolved NO_3 + NO_2	07110L	0.01 mg/L
Nitrogen, Total	07601L	0.1 mg/L
Silica, Reactive	14102L	0.1 mg/L
Mercury, Extractable	80315L	0.02 µg/L

TABLE 4: Listing of parameters analyzed in bottom sediment samples collected during the Exploits River Basin Recurrent Survey

Parameter	NAQUADAT Code	Det.Limit(mg/kg)
Mercury, Total	80050L	0.02
Aluminum, Non-residual	13054L	2.0
Cadmium, Non-residual	48054L	0.2
Chromium, Non-residual	24054L	0.5
Copper, Non-residual	29054L	0.2
Iron, Non-residual	26054L	1.0
Manganese, Non-residual	25054L	0.1
Lead, Non-residual	82054L	1.0
Zinc, Non-residual	30054L	0.2
Hexachlorobenzene	17816L	0.004
Alpha-BHC	18074L	0.004
Lindane (Gamma-BHC)	18079L	0.004
Heptachlor	18043L	0.004
Aldrin	18133L	0.004
Heptachlor Epoxide	18048L	0.004
Gamma-Trans Chlordane	18068L	0.004
Alpha-(Cis) Chlordane	18063L	0.004
Alpha-Endosulphan	18054L	0.004
p,p-DDE	18026L	0.004
Dieldrin	18153L	0.004
Endrin	18143L	0.004
o,p-DDT	18008L	0.004
p,p'-DDD (p,p'-TDE)	18012L	0.004
p,p-DDT	18009L	0.004
Beta-Endosulphan	18058L	0.004
Mirex	18128L	0.004
p,p-Methoxy Chlor	18034L	0.004
Arochlor	18177L	0.09
Carbon, Part. Organic	06912L	- %
Nitrogen, Part. Organic	07912L	- %

TABLE 5: Listing of heavy metal parameters measured in fish samples collected during the Exploits River Basin Recurrent Survey

Parameter	NAQUADAT Code	Det.Limit(mg/kg)
Mercury, Total	80602L	0.02
Chromium, Total	24601L	0.2
Nickel, Total	28601L	0.05
Lead, Total	82601L	0.05
Copper, Total	29601L	0.2
Zinc, Total	30601L	0.2
Cadmium, Total	48601L	0.02
Iron, Total	26601L	0.02
Lipid Content	99506L	- %

TABLE 6: Listing of OC-PCBs parameters measured in forage fish samples collected during the Exploits River Basin Recurrent Survey

Parameter	NAQUADAT Code	Det.Limit(mg/kg)
p,p'-DDT	18602L	0.001
o,p'-DDT	18606L	0.001
p,p-DDD (p,p'-TDE)	18611L	0.001
Mirex	18629L	0.001
p,p-Methoxychlor	18631L	0.05
Aldrin	18632L	0.001
Heptachlor	18641L	0.001
Endrin	18642L	0.01
Heptachlor Epoxide	18646L	0.001
HEOD (Dieldrin)	18652L	0.01
Beta-Endosulphan	18656L	0.01
Alpha-(Cis) Chlordane	18661L	0.005
Gamma-(Trans) Chlordane	18666L	0.005
Arochlor (T. PCBs)	18669)	0.005
Gamma-BHC (Lindane)	18671L	0.001
Alpha-BHC	18676L	0.001

TABLE 7: Total metals' water quality guidelines for the protection of freshwater life (CCREM, 1987).

Parameter	Guideline	
Aluminum	0.005 mg/L	if pH<6.5; $[Ca^{2+}]$<4.0 mg/L; DOC<2.0 mg/L
	0.1 mg/L	if pH>6.5; $[Ca^{2+}]$>4.0 mg/L; DOC>2.0 mg/L
Arsenic	0.05 mg/L	
Cadmium	0.2 µg/L	if Hardness 0-60 mg/L ($CaCO_3$)
	0.8 µg/L	if Hardness 60-120 mg/L ($CaCO_3$)
	1.3 µg/L	if Hardness 120-180 mg/L ($CaCO_3$)
	1.8 µg/L	If Hardness>180 mg/L ($CaCO_3$)
Copper	0.002 mg/L	if Hardness 0-120 mg/L ($CaCO_3$)
	0.003 mg/L	if Hardness 120-180 mg/L ($CaCO_3$)
	0.004 mg/L	if Hardness>180 mg/L ($CaCO_3$)
Iron	0.3 mg/L	
Lead	0.001 mg/L	if Hardness 0-60 mg/L ($CaCO_3$)
	0.002 mg/L	if Hardness 60-120 mg/L ($CaCO_3$)
	0.004 mg/L	if Hardness 120-180 mg/L ($CaCO_3$)
	0.007 mg/L	if Hardness>180 mg/L ($CaCO_3$)
Zinc	0.03 mg/L	

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

	STATION #	DATE	TEMP. WAT. C	PH FIELD	COND. F US/CM	DO MG/L	CA DIS. MG/L	MG DIS. MG/L	NA DIS. MG/L	K DIS. MG/L
	00NF000BLANK	27-SEP-87	-	-	-	-	L.05	0.03	L.02	L.02
	00NF000BLANK	27-SEP-87	-	-	-	-	L.05	L.01	L.02	L.02
PHASE I										
	00NF02YN0006	22-SEP-87	11.2	6.8	92	-	11.70	1.51	3.96	0.39
	01NF02YN0026	22-SEP-87	12.0	7.0	20	-	1.97	0.36	1.37	0.16
	22NF02YN0003	22-SEP-87	12.0	6.1	2200	-	407.00	44.50	87.90	3.20
PHASE II										
	00NF02YD0015	23-SEP-87	10.6	7.1	26	-	2.68	0.46	1.61	0.19
	00NF02YD0023	23-SEP-87	10.6	7.1	26	-	2.60	0.44	1.55	0.18
	00NF02YD0024	23-SEP-87	10.7	7.1	26	-	2.60	0.45	1.53	0.18
	00NF02YD0066	23-SEP-87	10.6	7.1	26	-	2.65	0.45	1.61	0.18
	00NF02YD0025	23-SEP-87	10.2	7.1	26	-	2.64	0.44	1.55	0.18
	00NF02YD0026	23-SEP-87	10.9	7.1	25	-	2.66	0.45	1.55	0.18
	00NF02YD0027	23-SEP-87	10.9	7.1	26	-	2.56	0.45	1.56	0.18
	00NF02YD0028	23-SEP-87	10.8	7.0	26	-	1.78	0.42	1.87	0.29
	00NF02YD0029	23-SEP-87	10.7	7.1	26	-	2.31	0.44	1.86	0.25
	00NF02YD0030	23-SEP-87	10.8	6.5	26	-	2.65	0.45	1.55	0.18
	00NF02YD0031	23-SEP-87	11.0	6.6	25	-	1.80	0.41	1.89	0.29
	00NF02YD0032	23-SEP-87	12.6	6.6	23	-	1.95	0.43	1.90	0.28
	00NF02YD0033	23-SEP-87	11.5	6.7	26	-	2.65	0.44	1.56	0.18
	00NF02YD0034	23-SEP-87	10.2	6.8	26	-	2.23	0.44	1.77	0.23
	00NF02YD0035	23-SEP-87	11.2	6.8	26	-	2.64	0.45	1.57	0.18
	00NF02YD0036	23-SEP-87	11.2	6.9	26	-	2.47	0.45	1.55	0.18
	00NF02YD0037	23-SEP-87	11.5	6.9	26	-	2.62	0.45	1.57	0.18
PHASE III										
	00NF02YD0038	24-SEP-87	12.3	6.4	31	10.2	2.78	0.49	2.47	0.29
	00NF02YD0039	24-SEP-87	12.5	6.8	34	10.4	2.76	0.49	2.67	0.33
	00NF02YD0040	24-SEP-87	12.5	6.8	32	10.2	2.72	0.48	2.47	0.28
	00NF02YD0041	24-SEP-87	12.6	6.8	34	10.2	2.78	0.51	2.74	0.33
	00NF02YD0042	24-SEP-87	12.6	6.8	35	10.3	2.77	0.49	2.65	0.36
	00NF02YD0043	24-SEP-87	12.6	6.8	34	10.3	2.74	0.49	2.38	0.29
	00NF02YD0047	27-SEP-87	11.6	6.3	34	8.7	2.75	0.53	2.61	0.28
	00NF02YD0048	27-SEP-87	11.7	6.2	34	8.9	2.74	0.53	2.58	0.28
	00NF02YD0021	27-SEP-87	11.5	6.1	34	8.6	2.70	0.52	2.56	0.27

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

STATION #	DATE	TEMP. WAT. C	PH FIELD	COND. F US/CM	DO MG/L	CA DIS. MG/L	MG DIS. MG/L	NA DIS. MG/L	K DIS. MG/L
00NF02YD0049	28-SEP-87	8.4	6.8	25	10.7	2.49	0.45	1.67	0.19
00NF02YD0050	28-SEP-87	8.3	6.8	24	10.9	2.48	0.44	1.67	0.19
00NF02YD0051	28-SEP-87	8.4	6.8	24	10.8	2.49	0.44	1.64	0.20
00NF02YD0051	28-SEP-87	8.4	6.8	24	10.8	2.50	0.44	1.64	0.21
00NF02YD0052	28-SEP-87	9.6	6.8	34	-	2.65	0.46	2.24	0.26
00NF02YD0053	28-SEP-87	9.5	6.8	30	-	2.67	0.47	2.25	0.25
00NF02YD0054	28-SEP-87	10.2	6.8	31	-	2.63	0.47	2.33	0.25
00NF02YD0055	28-SEP-87	9.5	6.7	33	-	2.59	0.47	2.75	0.25
00NF02YD0056	28-SEP-87	9.6	7.0	43	-	3.79	1.25	2.28	0.28
00NF02YD0057	28-SEP-87	9.3	7.0	30	-	2.66	0.48	2.46	0.27
00NF02YD0058	28-SEP-87	9.4	7.1	28	-	2.65	0.47	2.49	0.26
00NF02YD0059	28-SEP-87	9.4	7.1	26	-	2.64	0.48	2.59	0.27
00NF02YD0060	28-SEP-87	11.0	7.1	34	-	2.70	0.49	2.57	0.28
00NF02YD0061	28-SEP-87	11.0	7.0	32	-	2.72	0.49	2.55	0.28
00NF02YD0062	28-SEP-87	10.8	7.1	31	-	2.72	0.49	2.58	0.28
00NF02YD0063	28-SEP-87	11.6	7.1	32	-	2.88	0.53	2.67	0.30
00NF02YD0064	28-SEP-87	11.5	7.1	27	-	2.87	0.53	2.60	0.29
00NF02YD0065	28-SEP-87	11.4	7.1	34	-	2.78	0.52	2.66	0.31
01NF02YD0021	26-SEP-87	-	6.7	-	-	2.61	0.47	1.69	0.21
01NF02YD0022	26-SEP-87	12.0	6.8	27	11.1	2.57	0.46	1.67	0.20
02NF02YD0002	28-SEP-87	11.5	6.3	3400	-	18.10	44.80	368.00	13.60
02NF02YD0003	28-SEP-87	11.0	6.5	3000	-	6.05	10.80	80.60	3.18
02NF02YD0004	28-SEP-87	-	6.4	2000	-	14.00	34.00	277.00	10.20
22NF02YD0001	24-SEP-87	24.5	6.2	100	-	4.84	0.88	15.20	1.69

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

	STATION #	DATE	CL DIS. MG/L	SO4 MTB MG/L	SO4 IC MG/L	ALK TOT MG/L	ALK GR MG/L	SI REA. MG/L	PH LAB	COND. L US/CM
	00NF000BLANK	27-SEP-87	0.09	L.2	0.07	-	0.1	L.02	5.71	1.28
	00NF000BLANK	27-SEP-87	L.01	L.2	0.05	-	-0.1	L.02	5.61	1.50
PHASE I										
	00NF02YN0006	22-SEP-87	4.84	24.3	21.70	13.7	-	7.03	6.62	102.00
	01NF02YN0026	22-SEP-87	1.48	2.4	1.05	5.4	-	2.27	6.50	20.60
	22NF02YN0003	22-SEP-87	99.60	1361.0	1120.00	57.6	-	13.86	6.55	2372.00
PHASE II										
	00NF02YD0015	23-SEP-87	2.19	3.1	2.26	5.3	-	2.09	6.46	27.50
	00NF02YD0023	23-SEP-87	2.12	3.4	2.91	5.4	-	2.07	6.46	26.50
	00NF02YD0024	23-SEP-87	2.11	3.2	2.63	4.4	-	2.05	6.43	26.50
	00NF02YD0066	23-SEP-87	2.29	3.6	3.20	4.7	-	2.08	6.43	27.40
	00NF02YD0025	23-SEP-87	2.14	3.1	2.66	5.4	-	2.06	6.51	26.80
	00NF02YD0026	23-SEP-87	2.12	3.1	2.62	5.5	-	2.05	6.48	27.00
	00NF02YD0027	23-SEP-87	2.12	3.0	2.50	4.5	-	2.04	6.53	26.80
	00NF02YD0028	23-SEP-87	2.64	2.3	1.24	3.9	-	1.94	6.41	23.70
	00NF02YD0029	23-SEP-87	2.63	2.7	2.18	4.8	-	2.10	6.53	26.70
	00NF02YD0030	23-SEP-87	2.14	3.0	2.23	5.2	-	2.05	6.43	26.80
	00NF02YD0031	23-SEP-87	2.61	2.3	1.38	3.7	-	1.94	6.50	23.60
	00NF02YD0032	23-SEP-87	2.64	2.4	1.47	4.0	-	1.97	6.46	24.60
	00NF02YD0033	23-SEP-87	2.13	2.9	2.21	4.9	-	2.04	6.47	26.90
	00NF02YD0034	23-SEP-87	2.44	2.7	1.79	4.2	-	1.94	6.51	25.70
	00NF02YD0035	23-SEP-87	2.09	2.9	2.25	5.1	-	2.04	6.43	26.70
	00NF02YD0036	23-SEP-87	2.13	3.0	2.23	5.1	-	2.04	6.44	26.70
	00NF02YD0037	23-SEP-87	2.19	2.9	2.20	5.1	-	2.03	6.44	26.70
PHASE III										
	00NF02YD0038	24-SEP-87	2.47	4.8	4.03	5.2	-	1.95	6.31	33.20
	00NF02YD0039	24-SEP-87	2.61	5.4	4.47	5.3	-	1.93	6.32	34.90
	00NF02YD0040	24-SEP-87	2.41	4.8	4.08	5.7	-	1.94	6.39	32.20
	00NF02YD0041	24-SEP-87	2.55	5.5	4.70	5.3	-	1.93	6.31	33.90
	00NF02YD0042	24-SEP-87	2.49	5.2	4.22	5.8	-	1.91	6.32	34.00
	00NF02YD0043	24-SEP-87	2.35	4.9	3.95	5.3	-	1.92	6.35	32.80
	00NF02YD0047	27-SEP-87	2.47	5.1	4.48	-	4.9	2.00	-	-
	00NF02YD0048	27-SEP-87	2.52	5.1	4.73	4.9	-	2.00	-	-
	00NF02YD0021	27-SEP-87	2.55	5.1	4.53	-	4.7	2.00	-	-

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

STATION #	DATE	CL DIS. MG/L	SO4 MTB MG/L	SO4 IC MG/L	ALK TOT MG/L	ALK GR MG/L	SI REA. MG/L	PH LAB	COND. L US/CM
00NF02Y00049	28-SEP-87	2.29	4.4	2.15	5.6	-	1.93	6.74	27.10
00NF02Y00050	28-SEP-87	2.26	2.9	2.37	5.2	-	1.92	6.44	27.10
00NF02Y00051	28-SEP-87	2.22	2.9	2.21	5.4	-	1.91	6.43	27.70
00NF02Y00051	28-SEP-87	2.22	2.8	2.28	5.2	-	1.91	6.46	26.80
00NF02Y00052	28-SEP-87	2.41	4.3	3.65	5.6	-	1.91	6.28	30.70
00NF02Y00053	28-SEP-87	2.41	4.3	3.73	5.7	-	1.91	6.27	31.10
00NF02Y00054	28-SEP-87	2.35	4.6	4.02	5.5	-	0.56	6.26	31.10
00NF02Y00055	28-SEP-87	2.40	6.1	5.37	4.7	-	1.92	6.24	33.70
00NF02Y00056	28-SEP-87	2.50	4.6	3.76	11.2	-	3.29	6.53	42.20
00NF02Y00057	28-SEP-87	2.40	5.1	4.36	4.9	-	1.93	6.26	32.50
00NF02Y00058	28-SEP-87	2.43	5.2	4.67	5.5	-	1.92	6.23	32.50
00NF02Y00059	28-SEP-87	2.46	5.6	4.41	5.2	-	1.91	6.24	33.30
00NF02Y00060	28-SEP-87	2.43	5.5	4.81	4.9	-	1.97	6.23	33.30
00NF02Y00061	28-SEP-87	2.46	5.6	4.84	5.2	-	1.98	6.30	33.30
00NF02Y00062	28-SEP-87	2.46	5.6	4.97	5.2	-	1.97	6.32	33.10
00NF02Y00063	28-SEP-87	2.65	5.5	4.90	5.9	-	2.04	6.25	35.20
00NF02Y00064	28-SEP-87	2.51	5.5	4.66	5.6	-	2.02	6.32	34.10
00NF02Y00065	28-SEP-87	2.57	5.6	4.42	5.7	-	2.02	6.34	34.40
01NF02Y00021	26-SEP-87	2.27	3.0	2.32	5.3	-	1.94	6.61	27.90
01NF02Y00022	26-SEP-87	2.30	3.2	2.37	5.1	-	1.94	6.42	26.80
02NF02Y00002	28-SEP-87	686.00	103.5	98.70	9.2	-	1.92	6.95	2417.00
02NF02Y00003	28-SEP-87	146.00	24.6	23.80	6.4	-	1.96	6.34	576.00
02NF02Y00004	28-SEP-87	507.00	74.0	76.00	8.6	-	1.95	6.32	1825.00
22NF02Y00001	24-SEP-87	2.95	40.8	30.20	-	4.5	2.27	5.88	123.00

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

	STATION #	DATE	TURB. JTU	COLOUR R.U.	DOC MG/L	NO3-NO2 MG/L	P TOT. MG/L	N TOT. MG/L	BOD MG/L	AL TOT. MG/L
	00NF000BLANK	27-SEP-87	0.29	5	L.1	L.005	0.0007	L.016	-	0.019
	00NF000BLANK	27-SEP-87	0.05	5	L.1	L.005	0.0003	L.016	-	0.003
PHASE I										
	00NF02YN0006	22-SEP-87	0.26	5	2.5	0.123	0.0212	0.281	-	0.079
	01NF02YN0026	22-SEP-87	0.28	20	4.0	0.010	0.0080	0.156	-	0.047
	22NF02YN0003	22-SEP-87	0.50	L5	6.3	0.020	0.0022	-	-	0.053
PHASE II										
	00NF02Y00015	23-SEP-87	0.07	10	3.3	0.078	0.0024	0.179	L1.0	0.043
	00NF02Y00023	23-SEP-87	0.08	10	3.4	0.079	0.0021	0.173	L1.0	0.044
	00NF02Y00024	23-SEP-87	0.12	10	3.4	0.073	0.0019	0.177	L1.0	0.044
	00NF02Y00066	23-SEP-87	0.15	10	3.3	0.078	0.0022	0.173	L1.0	0.042
	00NF02Y00025	23-SEP-87	0.08	20	3.4	0.078	0.0059	0.173	L1.0	0.044
	00NF02Y00026	23-SEP-87	0.08	10	3.4	0.079	0.0040	0.171	L1.0	0.044
	00NF02Y00027	23-SEP-87	0.15	10	3.4	0.070	0.0028	0.175	L1.0	0.051
	00NF02Y00028	23-SEP-87	0.12	20	4.5	0.040	0.0024	0.172	L1.0	0.074
	00NF02Y00029	23-SEP-87	0.12	20	3.9	0.055	0.0031	0.185	L1.0	0.065
	00NF02Y00030	23-SEP-87	0.08	10	3.4	0.070	0.0012	0.176	L1.0	0.044
	00NF02Y00031	23-SEP-87	0.17	20	4.4	0.040	0.0027	0.169	L1.0	0.071
	00NF02Y00032	23-SEP-87	0.15	20	4.2	0.045	0.0020	0.184	L1.0	0.069
	00NF02Y00033	23-SEP-87	0.12	10	3.5	0.068	0.0013	0.167	L1.0	0.054
	00NF02Y00034	23-SEP-87	0.15	20	4.0	0.056	0.0018	0.175	L1.0	0.059
	00NF02Y00035	23-SEP-87	0.12	20	3.3	0.071	0.0013	0.178	L1.0	0.045
	00NF02Y00036	23-SEP-87	0.12	20	3.4	0.069	0.0009	0.171	L1.0	0.047
	00NF02Y00037	23-SEP-87	0.10	20	3.4	0.078	0.0009	0.175	L1.0	0.057
PHASE III										
	00NF02Y00038	24-SEP-87	0.80	20	4.7	0.006	0.0192	0.144	1.5	0.056
	00NF02Y00039	24-SEP-87	0.75	20	5.3	L.005	0.0256	0.167	1.0	0.067
	00NF02Y00040	24-SEP-87	0.55	20	4.7	L.005	0.0120	0.149	1.1	0.050
	00NF02Y00041	24-SEP-87	0.98	20	5.9	0.005	0.0212	0.160	1.9	0.054
	00NF02Y00042	24-SEP-87	0.50	20	5.1	L.005	0.0276	0.184	1.8	0.048
	00NF02Y00043	24-SEP-87	0.50	20	5.1	L.005	0.0204	0.184	1.6	0.052
	00NF02Y00047	27-SEP-87	-	-	-	-	0.0102	-	-	0.045
	00NF02Y00048	27-SEP-87	-	-	-	-	0.0115	-	-	0.051
	00NF02Y00021	27-SEP-87	-	-	-	-	0.0111	-	1.5	0.056

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

STATION #	DATE	TURB. JTU	COLOUR R.U.	DOC MG/L	NO3-NO2 MG/L	P TOT. MG/L	N TOT. MG/L	BOD MG/L	AL TOT. MG/L
00NF02YD0049	28-SEP-87	0.15	20	3.5	0.059	0.0039	0.166	L1.0	0.049
00NF02YD0050	28-SEP-87	0.12	20	3.5	0.059	0.0032	0.167	L1.0	0.051
00NF02YD0051	28-SEP-87	0.16	20	3.5	0.058	0.0035	0.170	L1.0	0.045
00NF02YD0051	28-SEP-87	0.12	10	3.4	0.060	0.0032	0.167	L1.0	0.045
00NF02YD0052	28-SEP-87	0.27	20	3.9	0.006	0.0148	0.139	1.3	0.051
00NF02YD0053	28-SEP-87	0.32	20	3.9	L.005	0.0119	0.132	3.8	0.055
00NF02YD0054	28-SEP-87	0.32	20	4.1	L.005	0.0142	0.127	L1.0	0.050
00NF02YD0055	28-SEP-87	0.55	20	4.8	L.005	0.0107	0.137	L1.0	0.044
00NF02YD0056	28-SEP-87	0.22	10	3.5	0.046	0.0032	0.179	L1.0	0.018
00NF02YD0057	28-SEP-87	0.37	20	4.3	0.005	0.0109	0.135	L1.0	0.042
00NF02YD0058	28-SEP-87	0.32	20	4.3	L.005	0.0118	0.128	L1.0	0.043
00NF02YD0059	28-SEP-87	0.30	20	4.2	L.005	0.0136	0.141	1.2	0.044
00NF02YD0060	28-SEP-87	0.26	20	4.3	L.005	0.0131	0.139	L1.0	0.043
00NF02YD0061	28-SEP-87	0.24	20	4.3	L.005	0.0111	0.144	3.6	0.043
00NF02YD0062	28-SEP-87	0.22	20	4.3	L.005	0.0096	0.159	3.1	0.043
00NF02YD0063	28-SEP-87	0.29	20	4.2	L.005	0.0147	0.167	1.8	0.043
00NF02YD0064	28-SEP-87	0.25	20	4.3	L.005	0.0118	0.135	1.1	0.041
00NF02YD0065	28-SEP-87	0.40	20	4.4	L.005	0.0111	0.148	L1.0	0.042
01NF02YD0021	26-SEP-87	0.13	20	3.7	0.060	0.0032	0.166	-	0.046
01NF02YD0022	26-SEP-87	0.10	20	3.8	0.060	0.0039	0.163	-	0.044
02NF02YD0002	28-SEP-87	0.28	10	4.2	L.005	0.0121	0.103	L1.0	0.040
02NF02YD0003	28-SEP-87	0.26	20	4.6	L.005	0.0098	0.131	L1.0	0.039
02NF02YD0004	28-SEP-87	0.43	20	4.4	L.005	0.0105	0.112	L1.0	0.042
22NF02YD0001	24-SEP-87	76.00	120	80.7	0.025	0.3516		590.0	0.355

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

	STATION #	DATE	BA TOT. MG/L	BE TOT. UG/L	CD TOT. MG/L	CO TOT. MG/L	CR TOT. MG/L	CU TOT. MG/L	FE TOT. MG/L	LI TOT. MG/L
	00NF000BLANK	27-SEP-87	L.0002	L.05	L.0001	L.0001	L.0002	0.0086	0.0012	L.0001
	00NF000BLANK	27-SEP-87	L.0002	0.41	L.0001	L.0001	0.0007	0.0245	0.0030	L.0001
PHASE I										
	00NF02YN0006	22-SEP-87	0.0250	L.05	0.0019	0.0004	0.0013	0.0413	0.1610	0.0008
	01NF02YN0026	22-SEP-87	0.0137	L.05	L.0001	L.0001	0.0009	0.0087	0.2420	0.0003
	22NF02YN0003	22-SEP-87	0.0406	0.24	0.0200	0.0577	0.0077	0.0257	5.8500	0.0500
PHASE II										
	00NF02YD0015	23-SEP-87	0.0801	L.05	0.0001	L.0001	0.0014	0.0144	0.0273	0.0002
	00NF02YD0023	23-SEP-87	0.0792	L.05	L.0001	L.0001	0.0011	0.0253	0.0237	L.0001
	00NF02YD0024	23-SEP-87	0.0782	L.05	0.0001	L.0001	0.0008	0.0148	0.0241	0.0001
	00NF02YD0066	23-SEP-87	0.0789	L.05	L.0001	L.0001	L.0002	0.0029	0.0268	L.0001
	00NF02YD0025	23-SEP-87	0.0809	L.05	0.0001	L.0001	0.0011	0.0241	0.0249	0.0001
	00NF02YD0026	23-SEP-87	0.0791	L.05	L.0001	L.0001	0.0003	0.0068	0.0265	0.0001
	00NF02YD0027	23-SEP-87	0.0791	L.05	L.0001	L.0001	0.0003	0.0088	0.0264	L.0001
	00NF02YD0028	23-SEP-87	0.0026	L.05	L.0001	L.0001	L.0002	0.0003	0.0908	0.0001
	00NF02YD0029	23-SEP-87	0.0298	L.05	L.0001	L.0001	0.0003	0.0014	0.0741	0.0002
	00NF02YD0030	23-SEP-87	0.0781	L.05	0.0001	L.0001	0.0006	0.0204	0.0244	0.0001
	00NF02YD0031	23-SEP-87	0.0031	L.05	L.0001	L.0001	0.0002	L.0002	0.0854	0.0003
	00NF02YD0032	23-SEP-87	0.0136	L.05	L.0001	L.0001	0.0015	0.0209	0.0848	0.0001
	00NF02YD0033	23-SEP-87	0.0784	L.05	0.0001	L.0001	0.0004	0.0079	0.0266	L.0001
	00NF02YD0034	23-SEP-87	0.0409	L.05	L.0001	L.0001	0.0008	0.0215	0.0616	0.0002
	00NF02YD0035	23-SEP-87	0.0806	L.05	L.0001	L.0001	L.0002	0.0164	0.0251	0.0002
	00NF02YD0036	23-SEP-87	0.0798	L.05	L.0001	L.0001	0.0008	0.0119	0.0257	L.0001
	00NF02YD0037	23-SEP-87	0.0755	L.05	L.0001	L.0001	0.0006	0.0080	0.0323	L.0001
PHASE III										
	00NF02YD0038	24-SEP-87	0.0659	L.05	L.0001	L.0001	0.0004	0.0102	0.0834	L.0001
	00NF02YD0039	24-SEP-87	0.0640	L.05	0.0002	L.0001	0.0007	0.0151	0.0808	L.0001
	00NF02YD0040	24-SEP-87	0.0641	L.05	L.0001	L.0001	0.0007	0.0210	0.0643	0.0001
	00NF02YD0041	24-SEP-87	0.0663	L.05	L.0001	L.0001	0.0008	0.0089	0.0890	0.0003
	00NF02YD0042	24-SEP-87	0.0646	L.05	0.0001	0.0001	0.0005	0.0079	0.0679	0.0002
	00NF02YD0043	24-SEP-87	0.0641	L.05	0.0001	L.0001	0.0009	0.0148	0.0845	0.0002
	00NF02YD0047	27-SEP-87	0.0498	L.05	L.0001	L.0001	0.0010	0.0068	0.0765	0.0001
	00NF02YD0048	27-SEP-87	0.0616	L.05	0.0001	0.0002	0.0018	0.0326	0.0823	0.0003
	00NF02YD0021	27-SEP-87	0.0626	L.05	L.0001	0.0001	0.0010	0.0132	0.0804	0.0002

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

STATION #	DATE	BA TOT. MG/L	BE TOT. UG/L	CD TOT. MG/L	CO TOT. MG/L	CR TOT. MG/L	CU TOT. MG/L	FE TOT. MG/L	LI TOT. MG/L
00NF02YD0049	28-SEP-87	0.0642	L.05	0.0001	0.0001	0.0003	0.0025	0.0468	0.0002
00NF02YD0050	28-SEP-87	0.0634	L.05	0.0001	L.0001	0.0004	0.0022	0.1140	0.0002
00NF02YD0051	28-SEP-87	0.0664	L.05	L.0001	L.0001	0.0005	0.0137	0.0430	L.0001
00NF02YD0051	28-SEP-87	0.0653	L.05	L.0001	L.0001	L.0002	0.0023	0.0422	L.0001
00NF02YD0052	28-SEP-87	0.0630	L.05	L.0001	L.0001	0.0006	0.0139	0.0726	0.0002
00NF02YD0053	28-SEP-87	0.0197	L.05	0.0001	L.0001	0.0134	0.0223	0.0719	0.0001
00NF02YD0054	28-SEP-87	0.0670	L.05	L.0001	L.0001	0.0004	0.0024	0.0743	0.0002
00NF02YD0055	28-SEP-87	0.0622	L.05	L.0001	L.0001	0.0002	0.0030	0.0592	0.0002
00NF02YD0056	28-SEP-87	0.0028	L.05	L.0001	0.0001	0.0004	0.0034	0.1130	0.0003
00NF02YD0057	28-SEP-87	0.0628	L.05	L.0001	L.0001	0.0003	0.0029	0.0629	0.0001
00NF02YD0058	28-SEP-87	0.0644	L.05	L.0001	L.0001	0.0002	0.0031	0.0642	0.0002
00NF02YD0059	28-SEP-87	0.0644	L.05	0.0001	0.0001	0.0003	0.0034	0.0674	0.0002
00NF02YD0060	28-SEP-87	0.0605	L.05	L.0001	L.0001	0.0003	0.0050	0.0760	L.0001
00NF02YD0061	28-SEP-87	0.0619	L.05	0.0002	0.0002	0.0007	0.0034	0.0776	0.0004
00NF02YD0062	28-SEP-87	0.0605	L.05	L.0001	0.0002	0.0003	0.0029	0.0781	0.0003
00NF02YD0063	28-SEP-87	0.0611	L.05	L.0001	0.0002	0.0011	0.0178	0.1090	0.0003
00NF02YD0064	28-SEP-87	0.0609	L.05	L.0001	0.0001	0.0007	0.0084	0.0966	0.0003
00NF02YD0065	28-SEP-87	0.0615	L.05	0.0001	0.0002	0.0013	0.0130	0.0943	0.0003
01NF02YD0021	26-SEP-87	0.0656	L.05	0.0001	0.0001	0.0006	0.0094	0.0465	0.0001
01NF02YD0022	26-SEP-87	0.0639	L.05	L.0001	L.0001	0.0009	0.0271	0.0473	L.0001
02NF02YD0002	28-SEP-87	0.0600	L.05	0.0002	0.0007	0.0007	0.0046	0.1390	0.0079
02NF02YD0003	28-SEP-87	0.0548	L.05	L.0001	0.0003	0.0008	0.0099	0.0936	0.0018
02NF02YD0004	28-SEP-87	0.0602	L.05	0.0002	0.0005	0.0010	0.0085	0.1770	0.0052
22NF02YD0001	24-SEP-87	0.1490	L.05	0.0007	0.0042	0.0160	0.0557	4.3600	0.0005

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

	STATION #	DATE	MN TOT. MG/L	MO TOT. MG/L	NI TOT. MG/L	PB TOT. MG/L	SR TOT. MG/L	VA TOT. MG/L	ZN TOT. MG/L	HG TOT. UG/L
	00NF000BLANK	27-SEP-87	L.0001	L.0001	L.0002	0.0004	L.0001	L.0001	0.0017	L.02
	00NF000BLANK	27-SEP-87	0.0001	0.0002	L.0002	0.0008	L.0001	0.0003	0.0032	L.02
PHASE I										
	00NF02YN0006	22-SEP-87	0.1600	0.0004	0.0003	0.0169	0.0337	0.0002	1.1500	L.02
	01NF02YN0026	22-SEP-87	0.0370	L.0001	L.0002	0.0003	0.0089	L.0001	0.1170	L.02
	22NF02YN0003	22-SEP-87	12.8000	L.0001	0.0343	0.0072	1.8700	L.0001	67.0000	L.02
PHASE II										
	00NF02YD0015	23-SEP-87	0.0074	L.0001	L.0002	0.0033	0.0091	L.0001	0.0396	L.02
	00NF02YD0023	23-SEP-87	0.0064	L.0001	L.0002	0.0031	0.0088	L.0001	0.0360	L.02
	00NF02YD0024	23-SEP-87	0.0065	L.0001	L.0002	0.0026	0.0088	L.0001	0.0353	L.02
	00NF02YD0066	23-SEP-87	0.0078	L.0001	L.0002	0.0024	0.0089	L.0001	0.0370	L.02
	00NF02YD0025	23-SEP-87	0.0068	L.0001	L.0002	0.0031	0.0091	L.0001	0.0369	L.02
	00NF02YD0026	23-SEP-87	0.0064	L.0001	L.0002	0.0030	0.0089	L.0001	0.0359	L.02
	00NF02YD0027	23-SEP-87	0.0067	L.0001	L.0002	0.0027	0.0089	L.0001	0.0357	L.02
	00NF02YD0028	23-SEP-87	0.0087	0.0003	L.0002	0.0006	0.0074	L.0001	0.0023	L.02
	00NF02YD0029	23-SEP-87	0.0100	L.0001	L.0002	0.0010	0.0085	L.0001	0.0136	L.02
	00NF02YD0030	23-SEP-87	0.0065	L.0001	L.0002	0.0032	0.0088	L.0001	0.0349	L.02
	00NF02YD0031	23-SEP-87	0.0091	L.0001	L.0002	0.0004	0.0074	0.0002	0.0017	L.02
	00NF02YD0032	23-SEP-87	0.0096	L.0001	L.0002	0.0007	0.0079	L.0001	0.0060	L.02
	00NF02YD0033	23-SEP-87	0.0067	L.0001	L.0002	0.0028	0.0089	L.0001	0.0344	L.02
	00NF02YD0034	23-SEP-87	0.0080	L.0001	L.0002	0.0017	0.0084	0.0002	0.0175	L.02
	00NF02YD0035	23-SEP-87	0.0063	L.0001	L.0002	0.0033	0.0091	L.0001	0.0357	L.02
	00NF02YD0036	23-SEP-87	0.0066	L.0001	L.0002	0.0025	0.0091	L.0001	0.0347	L.02
	00NF02YD0037	23-SEP-87	0.0065	L.0001	L.0002	0.0026	0.0089	L.0001	0.0331	
PHASE III										
	00NF02YD0038	24-SEP-87	0.0417	L.0001	0.0004	0.0017	0.0101	0.0007	0.0295	L.02
	00NF02YD0039	24-SEP-87	0.0454	L.0001	L.0002	0.0016	0.0099	0.0006	0.0288	L.02
	00NF02YD0040	24-SEP-87	0.0339	L.0001	L.0002	0.0012	0.0098	0.0005	0.0281	L.02
	00NF02YD0041	24-SEP-87	0.0510	L.0001	0.0004	0.0019	0.0103	0.0007	0.0295	L.02
	00NF02YD0042	24-SEP-87	0.0453	L.0001	L.0002	0.0017	0.0099	0.0005	0.0288	L.02
	00NF02YD0043	24-SEP-87	0.0436	L.0001	0.0005	0.0022	0.0099	0.0009	0.0280	L.02
	00NF02YD0047	27-SEP-87	0.0352	L.0001	0.0003	0.0012	0.0101	0.0004	0.0255	L.02
	00NF02YD0048	27-SEP-87	0.0359	0.0001	0.0004	0.0026	0.0102	0.0007	0.0262	0.18
	00NF02YD0021	27-SEP-87	0.0364	0.0002	0.0003	0.0024	0.0103	0.0005	0.0267	L.02

TABLE 8: RESULTS OF THE WATER SAMPLES OF THE EXPLOITS RIVER RECURRENT SURVEY OF THE CANADA-NEWFOUNDLAND AGREEMENT: SEPTEMBER 1987

STATION #	DATE	MN TOT. MG/L	MO TOT. MG/L	NI TOT. MG/L	PB TOT. MG/L	SR TOT. MG/L	VA TOT. MG/L	ZN TOT. MG/L	HG TOT. UG/L
00NF02YD0049	28-SEP-87	0.0143	L.0001	L.0002	0.0022	0.0090	0.0002	0.0274	L.02
00NF02YD0050	28-SEP-87	0.0118	L.0001	L.0002	0.0019	0.0089	L.0001	0.0273	L.02
00NF02YD0051	28-SEP-87	0.0107	L.0001	L.0002	0.0014	0.0090	L.0001	0.0290	L.02
00NF02YD0051	28-SEP-87	0.0107	L.0001	L.0002	0.0015	0.0089	L.0001	0.0289	L.02
00NF02YD0052	28-SEP-87	0.0275	L.0001	0.0004	0.0023	0.0094	0.0009	0.0272	L.02
00NF02YD0053	28-SEP-87	0.0294	0.0003	0.0002	0.0012	0.0091	0.0012	0.0271	L.02
00NF02YD0054	28-SEP-87	0.0294	L.0001	0.0004	0.0019	0.0097	0.0009	0.0279	L.02
00NF02YD0055	28-SEP-87	0.0282	L.0001	L.0002	0.0012	0.0094	0.0006	0.0277	L.02
00NF02YD0056	28-SEP-87	0.0308	L.0001	L.0002	0.0002	0.0176	L.0001	0.0007	L.02
00NF02YD0057	28-SEP-87	0.0304	L.0001	0.0002	0.0015	0.0096	0.0006	0.0280	L.02
00NF02YD0058	28-SEP-87	0.0322	L.0001	0.0006	0.0014	0.0097	0.0007	0.0306	L.02
00NF02YD0059	28-SEP-87	0.0328	L.0001	0.0002	0.0014	0.0097	0.0007	0.0291	L.02
00NF02YD0060	28-SEP-87	0.0357	L.0001	L.0002	0.0006	0.0099	0.0006	0.0257	L.02
00NF02YD0061	28-SEP-87	0.0359	L.0001	0.0007	0.0017	0.0099	0.0010	0.0263	L.02
00NF02YD0062	28-SEP-87	0.0357	L.0001	0.0004	0.0010	0.0098	0.0008	0.0259	L.02
00NF02YD0063	28-SEP-87	0.0548	L.0001	0.0005	0.0015	0.0108	0.0006	0.0255	L.02
00NF02YD0064	28-SEP-87	0.0464	L.0001	0.0003	0.0007	0.0105	0.0005	0.0253	L.02
00NF02YD0065	28-SEP-87	0.0432	L.0001	0.0006	0.0016	0.0104	0.0006	0.0255	L.02
01NF02YD0021	26-SEP-87	0.0128	0.0003	0.0005	0.0022	0.0091	0.0001	0.0279	L.02
01NF02YD0022	26-SEP-87	0.0132	L.0001	L.0002	0.0015	0.0090	L.0001	0.0258	L.02
02NF02YD0002	28-SEP-87	0.0866	0.0002	0.0004	0.0012	0.2920	0.0005	0.0268	L.02
02NF02YD0003	28-SEP-87	0.0526	L.0001	0.0004	0.0014	0.0764	0.0006	0.0245	L.02
02NF02YD0004	28-SEP-87	0.0774	0.0004	0.0006	0.0017	0.1990	0.0007	0.0273	L.02
22NF02YD0001	24-SEP-87	0.6370	0.0005	0.0167	0.0075	0.0211	0.0049	0.1030	L.02

TABLE 9: Means and standard deviations of water quality parameters for stations in the three phases of the Exploits River Basin Recurrent Survey: Fall 1987

Parameter	Phase 1 (n=1)	Phase 2 (n=17)	Phase 3[1] (n=29)
pH (pH units)	6.50	-	-
Sp. Cond (μS/cm)	20.60	26.27±1.18	31.93±3.48
Turbidity (JTU)	0.28	0.12±0.03	0.34±0.22
Colour App. (R.U.)	20	15 ± 5	20 ± 5
Ca. Diss. (mg/L)	1.97	2.44±0.31	2.71±0.23
Mg. Diss. (mg/L)	0.36	0.44±0.01	0.51±0.14
Na. Diss. (mg/L)	1.37	1.65±0.14	2.32±0.40
K. Diss. (mg/L)	0.16	0.21±0.04	0.26±0.04
Cl. Diss. (mg/L)	1.48	2.28±0.22	2.42±0.11
SO_4 Diss. -MTB(mg/L)	2.4	2.9±0.4	4.7±1.0
SO_4 Diss. -IC(mg/L)	1.05	2.23±0.53	3.92±1.00
Alk. Tot. (mg/L)	5.4	4.8±0.6	5.6±1.1
Alk. Gr. (mg/L)	-	-	-
Si Reac. (mg/L)	2.27	2.03±0.05	1.95±0.37
DOC (mg/L)	4.0	3.6±0.4	4.2±0.6
NOX (mg/L)	0.010	0.066±0.014	0.021±0.025
N Tot (mg/L)	0.156	0.175±0.005	0.154±0.017
P Tot (mg/L)	0.0080	0.0023±0.0012	0.0115±0.0066
Al Tot (mg/L)	0.047	0.053±0.011	0.047±0.008
Ba Tot (mg/L)	0.0137	0.0610±0.0299	0.0597±0.0137
Be Tot (μg/L)	<.05	<0.05	<0.05
Cd Tot (mg/L)	<.0001	0.0001±0	0.0001±0
Co Tot (mg/L)	<.0001	<0.0001	0.0001±0
Cr Tot (mg/L)	0.0002	0.0006±0.0004	0.0010±0.0024
Cu Tot (mg/L)	0.0087	0.0121±0.0084	0.0099±0.0080
Fe Tot (mg/L)	0.2420	0.0418±0.0257	0.0738±0.0199
Li Tot (mg/L)	0.0003	0.0001±0.0001	0.0002±0.0001
Mn Tot (mg/L)	0.0370	0.0074±0.0012	0.0315±0.0128
Mo Tot (mg/L)	<.0001	0.0001±0	0.0001±0
No Tot (mg/L)	<.0002	0.0002±0	0.0003±0.0002
Pb Tot (mg/L)	0.0003	0.0023±0.0010	0.0016±0.0006
Sr Tot (mg/L)	0.0089	0.0086±0.0006	0.0100±0.0015
Va Tot (mg/L)	<.0001	0.0001±0	0.0005±0.0003
Zn Tot (mg/L)	0.1170	0.0277±0.0135	0.0266±0.0051
Hg Tot (μg/L)	<.02	0.02±0	0.03±0.03

1 The values of stations 02NF02YO0002, 02NF02YO0003, 02NF02YO0004 and 22NF02YO0001 were not included in the calculation of the means and standard deviations of Phase 3.

TABLE 10: RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES FROM THE SPRING 1988 EXPLOITS RIVER BASIN RECURRENT SURVEY

	STATION #	DATE	PH FIELD	DO MG/L	COND F US/CM	TEMP C	PH LAB	COND L US/CM	TURB. JTU	ALK.T. MG/L	ALK.G. MG/L
	00NF02Y09900	10-MAY-88	-	-	-	-	-	-	-	-	-
	00NF02Y09900	10-MAY-88	-	-	-	-	-	-	-	-	-
	00NF02Y09900	10-MAY-88	-	-	-	-	-	-	-	-	-
PHASE II											
	00NF02Y00015	12-MAY-88	6.7	12.2	20.0	7.3	6.6	23	0.6	3.4	-
	00NF02Y00015	12-MAY-88	6.7	12.2	20.0	7.3	6.6	22	0.5	3.6	-
	00NF02Y00015	12-MAY-88	6.7	12.2	20.0	7.3	6.7	23	0.5	3.5	-
	00NF02Y00023	12-MAY-88	6.6	12.1	22.0	7.6	6.6	23	0.5	3.6	-
	00NF02Y00024	12-MAY-88	6.6	11.7	21.0	8.3	6.6	22	0.5	3.4	-
	00NF02Y00066	12-MAY-88	6.6	12.2	22.0	7.2	6.6	23	0.4	3.5	-
	00NF02Y00025	12-MAY-88	6.6	12.2	22.0	7.2	6.6	22	0.6	3.5	-
	00NF02Y00027	12-MAY-88	6.5	11.4	22.0	8.8	6.6	23	0.6	3.6	-
	00NF02Y00028	12-MAY-88	6.3	11.8	21.0	6.9	6.5	22	0.5	3.5	-
	00NF02Y00030	12-MAY-88	6.6	11.5	22.0	8.6	6.5	22	0.4	3.5	-
	00NF02Y00031	12-MAY-88	6.3	11.8	20.0	7.0	6.4	21	0.4	2.5	-
	00NF02Y00033	12-MAY-88	6.6	11.6	22.0	8.7	6.5	22	0.5	3.5	-
PHASE III											
	00NF02Y00038	10-MAY-88	6.5	13.4	25.0	7.0	6.6	23	0.7	3.6	-
	00NF02Y00039	10-MAY-88	6.6	13.5	24.1	6.6	6.5	21	0.6	3.3	-
	00NF02Y00040	10-MAY-88	6.5	13.5	24.8	6.9	6.6	23	0.6	3.5	-
	00NF02Y00041	10-MAY-88	6.6	13.5	24.3	6.6	6.5	22	0.6	3.6	-
	00NF02Y00042	10-MAY-88	6.5	13.3	25.1	7.2	6.6	23	0.7	3.6	-
	00NF02Y00043	10-MAY-88	6.6	13.8	24.4	6.7	6.5	22	0.7	3.5	-
	00NF02Y00043	10-MAY-88	6.6	13.8	24.4	6.7	6.5	22	0.6	3.5	-
	00NF02Y00043	10-MAY-88	6.6	13.9	24.4	6.7	6.6	22	0.6	3.4	-
	00NF02Y00047	10-MAY-88	6.5	11.8	22.0	7.9	6.5	23	0.7	3.6	-
	00NF02Y00048	10-MAY-88	6.5	11.2	22.0	8.4	6.5	22	0.7	3.4	-
	00NF02Y00021	10-MAY-88	6.5	11.9	22.0	7.9	6.4	22	0.8	3.3	-
	00NF02Y00049	11-MAY-88	6.5	12.0	20.0	8.7	6.6	23	0.5	3.6	-
	00NF02Y00049	11-MAY-88	6.5	12.0	20.0	8.7	6.6	21	0.6	3.2	-
	00NF02Y00049	11-MAY-88	6.5	12.0	20.0	8.7	6.5	22	0.5	3.1	-
	00NF02Y00050	11-MAY-88	6.5	12.4	22.0	7.6	6.5	22	0.5	3.1	-
	00NF02Y00051	11-MAY-88	6.6	12.4	22.0	7.4	6.6	22	0.5	3.4	-
	00NF02Y00055	10-MAY-88	6.6	11.7	22.0	8.0	6.5	21	0.6	3.3	-

TABLE 10: RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES FROM THE SPRING 1988 EXPLOITS RIVER BASIN RECURRENT SURVEY

STATION #	DATE	PH FIELD	DO MG/L	COND F US/CM	TEMP C	PH LAB	COND L US/CM	TURB. JTU	ALK.T. MG/L	ALK.G. MG/L
00NF02YD0056	10-MAY-88	6.5	9.5	17.0	13.4	6.5	23	0.7	3.3	-
00NF02YD0057	10-MAY-88	6.6	10.0	18.0	12.0	6.5	18	0.4	2.7	-
00NF02YD0058	10-MAY-88	6.5	11.5	23.0	8.2	6.5	24	0.7	3.5	-
00NF02YD0059	10-MAY-88	6.5	11.4	23.0	8.1	6.5	24	0.7	3.2	-
00NF02YD0060	10-MAY-88	6.6	11.4	23.0	8.3	6.5	18	0.6	2.9	-
00NF02YD0061	10-MAY-88	6.6	11.0	21.0	8.8	6.6	23	0.7	3.6	-
00NF02YD0062	10-MAY-88	6.5	10.6	20.0	9.6	6.6	22	0.7	3.4	-
00NF02YD0063	10-MAY-88	6.5	12.7	23.7	8.0	6.6	23	0.7	3.5	-
00NF02YD0064	10-MAY-88	6.5	12.5	23.8	8.5	6.6	23	0.7	3.5	-
00NF02YD0065	10-MAY-88	6.6	-	23.6	9.0	6.6	22	0.7	3.5	-
02NF02YD0002	10-MAY-88	6.5	11.7	22.0	7.9	6.5	22	0.7	3.5	-
02NF02YD0003	10-MAY-88	-	-	-	-	6.5	22	0.6	3.5	-
02NF02YD0004	10-MAY-88	6.5	11.6	21.5	8.4	6.5	22	0.7	3.3	-
01NF02YD0021	10-MAY-88	6.5	12.1	20.0	6.7	6.5	21	0.5	3.5	-
01NF02YD0022	10-MAY-88	6.5	11.6	21.0	6.2	6.6	22	0.5	3.4	-
22NF02YD0001	10-MAY-88	6.5	8.1	40.4	21.3	6.2	43	79.0	3.9	-

TABLE 10: RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES FROM THE SPRING 1988 EXPLOITS RIVER BASIN RECURRENT SURVEY

	STATION #	DATE	COLOUR R.U.	CA DIS. MG/L	MG DIS. MG/L	K DIS. MG/L	NA DIS. MG/L	CL DIS. MG/L	SO4 M MG/L	SO4 IC MG/L	P TOT. MG/L
	00NF02YD9900	10-MAY-88	-	-	-	-	-	-	-	-	L.001
	00NF02YD9900	10-MAY-88	-	-	-	-	-	-	-	-	L.001
	00NF02YD9900	10-MAY-88	-	-	-	-	-	-	-	-	L.001
PHASE II											
	00NF02YD0015	12-MAY-88	35	2.1	0.44	0.17	1.6	2.2	2.6	1.8	0.004
	00NF02YD0015	12-MAY-88	30	2.3	0.42	0.15	1.3	1.8	2.6	1.9	0.002
	00NF02YD0015	12-MAY-88	30	2.3	0.42	0.15	1.3	1.8	2.6	1.9	0.002
	00NF02YD0023	12-MAY-88	30	2.3	0.43	0.14	1.4	1.8	2.6	2.0	0.002
	00NF02YD0024	12-MAY-88	30	2.2	0.43	0.14	1.3	1.8	2.5	1.9	0.003
	00NF02YD0066	12-MAY-88	30	2.2	0.43	0.16	1.4	1.9	2.6	2.0	0.003
	00NF02YD0025	12-MAY-88	30	2.2	0.43	0.14	1.3	1.7	2.5	1.8	0.003
	00NF02YD0027	12-MAY-88	30	2.3	0.43	0.14	1.3	1.8	2.6	2.0	0.003
	00NF02YD0028	12-MAY-88	30	2.1	0.42	0.14	1.3	1.7	2.5	1.8	0.003
	00NF02YD0030	12-MAY-88	30	2.2	0.43	0.14	1.3	1.7	2.5	1.8	0.003
	00NF02YD0031	12-MAY-88	40	1.6	0.40	0.21	1.7	2.4	2.2	1.3	0.007
	00NF02YD0033	12-MAY-88	30	2.2	0.43	0.14	1.3	1.7	2.5	1.8	0.003
PHASE III											
	00NF02YD0038	10-MAY-88	35	2.2	0.41	0.17	1.4	1.9	2.6	1.9	0.005
	00NF02YD0039	10-MAY-88	40	1.8	0.45	0.18	1.4	2.1	2.4	1.5	0.006
	00NF02YD0040	10-MAY-88	35	2.2	0.41	0.17	1.5	2.0	2.5	2.2	0.006
	00NF02YD0041	10-MAY-88	35	2.2	0.41	0.17	1.4	1.9	2.5	1.9	0.006
	00NF02YD0042	10-MAY-88	35	2.2	0.41	0.17	1.4	2.0	2.6	2.0	0.004
	00NF02YD0043	10-MAY-88	35	2.2	0.40	0.17	1.5	2.0	2.5	1.9	0.006
	00NF02YD0043	10-MAY-88	30	2.2	0.41	0.17	1.4	1.9	2.5	1.9	0.006
	00NF02YD0043	10-MAY-88	30	2.2	0.41	0.17	1.5	1.9	2.5	1.9	0.006
	00NF02YD0047	10-MAY-88	35	2.2	0.41	0.17	1.5	2.2	2.6	2.0	0.006
	00NF02YD0048	10-MAY-88	35	2.1	0.39	0.17	1.4	2.1	2.5	1.8	0.006
	00NF02YD0021	10-MAY-88	40	2.1	0.41	0.17	1.5	2.0	2.5	1.8	0.006
	00NF02YD0049	11-MAY-88	30	2.2	0.42	0.15	1.4	2.0	2.6	2.0	0.004
	00NF02YD0049	11-MAY-88	30	2.0	0.38	0.18	1.5	2.0	2.4	1.7	0.003
	00NF02YD0049	11-MAY-88	30	2.0	0.41	0.19	1.5	2.0	2.4	1.7	0.004
	00NF02YD0050	11-MAY-88	30	1.9	0.38	0.19	1.5	2.0	2.4	1.7	0.002
	00NF02YD0051	11-MAY-88	30	2.2	0.41	0.16	1.5	1.9	2.4	1.9	0.002
	00NF02YD0055	10-MAY-88	40	2.0	0.43	0.18	1.4	1.9	2.5	1.7	0.005

TABLE 10: RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES FROM THE SPRING 1988 EXPLOITS RIVER BASIN RECURRENT SURVEY

STATION #	DATE	COLOUR R.U.	CA DIS. MG/L	MG DIS. MG/L	K DIS. MG/L	NA DIS. MG/L	CL DIS. MG/L	SO4 M MG/L	SO4 IC MG/L	P TOT. MG/L
00NF02YD0056	10-MAY-88	35	2.2	0.40	0.17	1.5	1.9	2.7	2.3	0.005
00NF02YD0057	10-MAY-88	50	1.5	0.43	0.20	1.3	1.9	2.1	1.0	0.005
00NF02YD0058	10-MAY-88	35	2.2	0.40	0.17	1.6	2.2	2.7	2.2	0.006
00NF02YD0059	10-MAY-88	35	2.2	0.40	0.17	1.7	2.0	3.3	2.9	0.005
00NF02YD0060	10-MAY-88	50	1.6	0.45	0.20	1.3	1.8	2.2	1.1	0.006
00NF02YD0061	10-MAY-88	40	2.2	0.44	0.17	1.5	2.3	2.6	2.1	0.005
00NF02YD0062	10-MAY-88	40	2.0	0.44	0.18	1.4	2.0	2.5	1.7	0.005
00NF02YD0063	10-MAY-88	35	2.2	0.41	0.17	1.4	1.9	2.6	2.0	0.006
00NF02YD0064	10-MAY-88	35	2.2	0.44	0.17	1.5	2.0	2.6	1.9	0.010
00NF02YD0065	10-MAY-88	35	2.1	0.44	0.17	1.4	1.9	2.6	1.8	0.004
02NF02YD0002	10-MAY-88	35	2.2	0.41	0.18	1.5	2.1	2.6	1.9	0.003
02NF02YD0003	10-MAY-88	35	2.1	0.43	0.17	1.5	2.1	2.5	1.9	0.004
02NF02YD0004	10-MAY-88	40	2.1	0.41	0.17	1.5	2.1	2.5	1.8	0.006
01NF02YD0021	10-MAY-88	30	2.2	0.40	0.15	1.3	2.0	2.7	1.9	0.003
01NF02YD0022	10-MAY-88	35	2.2	0.40	0.16	1.3	1.9	2.7	1.9	0.002
22NF02YD0001	10-MAY-88	-	2.8	0.52	0.53	4.2	3.0	8.4	7.3	-

TABLE 10: RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES FROM THE SPRING 1988 EXPLOITS RIVER BASIN RECURRENT SURVEY

	STATION #	DATE	CU EXT. MG/L	ZN EXT MG/L	CD EXT MG/L	PB EXT MG/L	AL EXT MG/L	FE EXT MG/L	MN EXT MG/L	DOC MG/L
	00NF02YD9900	10-MAY-88	L.002	L.01	L.001	L.002	L.010	-	L.01	-
	00NF02YD9900	10-MAY-88	0.002	L.01	L.001	L.002	L.010	-	L.01	-
	00NF02YD9900	10-MAY-88	L.002	L.01	L.001	L.002	L.010	-	L.01	-
PHASE II										
	00NF02YD0015	12-MAY-88	0.004	0.03	L.001	0.002	0.076	0.09	0.01	5.3
	00NF02YD0015	12-MAY-88	0.003	0.03	L.001	0.005	0.076	0.08	0.02	5.0
	00NF02YD0015	12-MAY-88	0.004	0.03	L.001	0.005	0.075	0.05	0.02	5.0
	00NF02YD0023	12-MAY-88	0.003	0.03	L.001	0.005	0.072	0.13	0.01	4.6
	00NF02YD0024	12-MAY-88	0.003	0.02	L.001	0.003	0.082	0.15	L.01	4.6
	00NF02YD0066	12-MAY-88	0.004	0.03	L.001	0.005	0.074	0.07	0.02	4.6
	00NF02YD0025	12-MAY-88	0.003	0.03	L.001	0.005	0.073	0.09	0.01	4.9
	00NF02YD0027	12-MAY-88	0.003	0.03	L.001	0.003	0.083	0.08	0.01	4.5
	00NF02YD0028	12-MAY-88	L.002	L.01	L.001	L.002	0.110	0.14	0.01	4.7
	00NF02YD0030	12-MAY-88	0.003	0.02	L.001	0.003	0.081	0.07	0.01	4.7
	00NF02YD0031	12-MAY-88	L.002	L.01	L.001	L.002	0.110	0.11	0.01	5.4
	00NF02YD0033	12-MAY-88	0.003	0.03	L.001	0.004	0.077	0.08	0.01	4.7
PHASE III										
	00NF02YD0038	10-MAY-88	0.004	0.02	L.001	0.004	0.091	0.08	0.02	4.7
	00NF02YD0039	10-MAY-88	0.003	0.02	L.001	0.004	0.086	0.11	0.02	5.4
	00NF02YD0040	10-MAY-88	0.004	0.02	L.001	0.004	0.090	0.06	0.02	4.7
	00NF02YD0041	10-MAY-88	0.003	0.02	L.001	0.003	0.090	0.05	L.01	4.7
	00NF02YD0042	10-MAY-88	0.004	0.02	L.001	0.004	0.086	0.08	0.02	4.9
	00NF02YD0043	10-MAY-88	0.002	0.02	L.001	0.004	0.093	0.11	0.02	4.7
	00NF02YD0043	10-MAY-88	0.003	0.02	L.001	0.004	0.096	0.10	0.02	4.7
	00NF02YD0043	10-MAY-88	0.003	0.02	L.001	0.003	0.088	0.09	0.02	4.7
	00NF02YD0047	10-MAY-88	0.002	0.01	L.001	0.002	0.077	0.10	L.01	5.4
	00NF02YD0048	10-MAY-88	0.002	0.01	L.001	0.002	0.083	0.11	0.02	5.7
	00NF02YD0021	10-MAY-88	0.003	0.02	L.001	0.004	0.078	0.07	0.01	5.7
	00NF02YD0049	11-MAY-88	0.002	0.02	L.001	0.004	0.090	0.07	0.01	5.0
	00NF02YD0049	11-MAY-88	0.002	0.02	L.001	0.002	0.092	0.11	L.01	5.0
	00NF02YD0049	11-MAY-88	0.002	0.02	L.001	0.003	0.092	0.06	L.01	4.7
	00NF02YD0050	11-MAY-88	0.003	0.03	L.001	0.005	0.083	0.06	0.01	5.0
	00NF02YD0051	11-MAY-88	0.003	0.03	L.001	0.005	0.074	0.06	0.01	4.7
	00NF02YD0055	10-MAY-88	0.003	0.02	L.001	0.004	0.074	0.08	0.02	5.9

TABLE 10: RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES FROM THE SPRING 1988 EXPLOITS RIVER BASIN RECURRENT SURVEY

STATION #	DATE	CU EXT. MG/L	ZN EXT MG/L	CD EXT MG/L	PB EXT MG/L	AL EXT MG/L	FE EXT MG/L	MN EXT MG/L	DOC MG/L
00NF02Y00056	10-MAY-88	L.002	L.01	L.001	L.002	0.096	0.11	L.01	5.6
00NF02Y00057	10-MAY-88	0.004	0.02	L.001	0.004	0.083	0.10	0.02	5.4
00NF02Y00058	10-MAY-88	0.003	0.02	L.001	0.005	0.085	0.10	0.02	4.9
00NF02Y00059	10-MAY-88	0.002	L.01	L.001	L.002	0.110	0.12	L.01	5.0
00NF02Y00060	10-MAY-88	0.003	0.02	L.001	0.004	0.085	0.10	0.02	5.8
00NF02Y00061	10-MAY-88	0.004	0.01	L.001	0.003	0.082	0.07	0.01	4.7
00NF02Y00062	10-MAY-88	L.002	L.01	L.001	0.002	0.086	0.12	0.02	5.3
00NF02Y00063	10-MAY-88	0.004	0.02	L.001	0.003	0.093	0.08	0.02	5.0
00NF02Y00064	10-MAY-88	0.004	0.02	L.001	0.003	0.087	0.08	0.02	4.9
00NF02Y00065	10-MAY-88	0.002	0.02	L.001	0.003	0.088	0.09	0.02	5.1
02NF02Y00002	10-MAY-88	0.002	0.02	L.001	0.004	0.090	0.11	0.02	5.6
02NF02Y00003	10-MAY-88	0.002	0.02	L.001	0.004	0.080	0.06	0.01	5.6
02NF02Y00004	10-MAY-88	0.002	0.02	L.001	0.004	0.083	0.10	0.02	6.4
01NF02Y00021	10-MAY-88	0.002	0.02	L.001	0.003	0.091	0.10	0.01	5.7
01NF02Y00022	10-MAY-88	0.004	0.02	L.001	0.004	0.084	0.09	0.02	5.4
22NF02Y00001	10-MAY-88	0.011	0.04	L.001	0.003	0.090	0.19	0.13	25.0

TABLE 10: RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES FROM THE SPRING 1988 EXPLOITS RIVER BASIN RECURRENT SURVEY

	STATION #	DATE	NOX MG/L	N TOT. MG/L	SI REAC MG/L	HG EXT UG/L
	00NF02Y09900	10-MAY-88	-	-	-	-
	00NF02Y09900	10-MAY-88	-	-	-	-
	00NF02Y09900	10-MAY-88	-	-	-	-
PHASE II						
	00NF02Y00015	12-MAY-88	0.04	0.10	2.54	L.02
	00NF02Y00015	12-MAY-88	0.06	0.13	2.40	L.02
	00NF02Y00015	12-MAY-88	0.06	0.14	2.37	L.02
	00NF02Y00023	12-MAY-88	0.06	0.11	2.40	L.02
	00NF02Y00024	12-MAY-88	0.06	0.11	2.40	L.02
	00NF02Y00066	12-MAY-88	0.06	0.12	2.54	L.02
	00NF02Y00025	12-MAY-88	0.05	0.11	2.26	L.02
	00NF02Y00027	12-MAY-88	0.06	0.11	2.37	L.02
	00NF02Y00028	12-MAY-88	0.05	0.11	2.30	L.02
	00NF02Y00030	12-MAY-88	0.05	0.11	2.33	L.02
	00NF02Y00031	12-MAY-88	0.03	0.10	3.05	L.02
	00NF02Y00033	12-MAY-88	0.05	0.11	2.26	L.02
PHASE III						
	00NF02Y00038	10-MAY-88	0.03	0.11	2.58	L.02
	00NF02Y00039	10-MAY-88	0.02	L.1	2.21	L.02
	00NF02Y00040	10-MAY-88	0.04	0.11	1.89	L.02
	00NF02Y00041	10-MAY-88	0.04	0.10	2.36	L.02
	00NF02Y00042	10-MAY-88	0.02	0.11	2.58	-
	00NF02Y00043	10-MAY-88	0.04	0.11	2.34	L.02
	00NF02Y00043	10-MAY-88	0.03	0.11	2.36	L.02
	00NF02Y00043	10-MAY-88	0.03	0.11	2.36	L.02
	00NF02Y00047	10-MAY-88	0.04	L.1	2.29	L.02
	00NF02Y00048	10-MAY-88	0.02	0.10	2.29	L.02
	00NF02Y00021	10-MAY-88	L.01	L.1	2.25	L.02
	00NF02Y00049	11-MAY-88	0.06	0.14	2.37	L.02
	00NF02Y00049	11-MAY-88	0.05	0.12	2.58	L.02
	00NF02Y00049	11-MAY-88	0.04	0.11	2.47	L.02
	00NF02Y00050	11-MAY-88	0.04	0.11	2.47	L.02
	00NF02Y00051	11-MAY-88	0.06	0.13	2.63	L.02
	00NF02Y00055	10-MAY-88	0.02	0.10	2.23	L.02

TABLE 10: RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES FROM THE SPRING 1988 EXPLOITS RIVER BASIN RECURRENT SURVEY

STATION #	DATE	NOX MG/L	N TOT. MG/L	SI REAC MG/L	HG EXT UG/L
00NF02Y00056	10-MAY-88	0.02	0.10	2.26	L.02
00NF02Y00057	10-MAY-88	L.01	L.1	2.02	L.02
00NF02Y00058	10-MAY-88	0.03	L.1	2.29	L.02
00NF02Y00059	10-MAY-88	0.03	L.1	2.29	-
00NF02Y00060	10-MAY-88	L.01	L.1	2.07	L.02
00NF02Y00061	10-MAY-88	L.01	0.10	2.36	L.02
00NF02Y00062	10-MAY-88	0.02	L.1	2.21	-
00NF02Y00063	10-MAY-88	L.01	L.1	2.72	L.02
00NF02Y00064	10-MAY-88	0.04	0.11	2.54	L.02
00NF02Y00065	10-MAY-88	0.03	0.11	2.53	L.02
02NF02Y00002	10-MAY-88	0.02	L.1	2.42	L.02
02NF02Y00003	10-MAY-88	L.01	L.1	2.41	0.02
02NF02Y00004	10-MAY-88	0.02	0.10	2.46	-
01NF02Y00021	10-MAY-88	0.04	L.1	2.34	L.02
01NF02Y00022	10-MAY-88	0.03	0.11	2.44	L.02
22NF02Y00001	10-MAY-88	0.03	0.11	2.58	L.02

TABLE 11: Means and standard deviations of water quality parameters for stations in the last two phases of the Exploits River Basin Recurrent Survey: Spring 1988.

Parameter	Phase 2 (n=12)	Phase 3 (n=54)
Water Temp. (°C)	7.7±0.7	7.9±1.2
pH -Field (pH units)	-	-
Sp. Cond. -Field (µS/cm)	21.2±0.9	22.4±1.8
pH -Lab (pH units)	-	-
Sp. Cond. -Lab (µS/cm)	22 ± 1	22 ± 1
Turbidity (JTU)	0.5±0.1	0.6±0.1
Colour App. (R.U.)	30 ± 5	35 ± 5
Ca Diss. (mg/L)	2.2±0.2	2.1±0.2
Mg Diss. (mg/L)	0.42±0.01	0.41±0.02
Na Diss. (mg/L)	1.4±0.1	1.4±0.1
K Diss. (mg/L)	0.15±0.02	0.17±0.01
Cl Diss. (mg/L)	1.8±0.2	2.0±0.1
SO_4 Diss -MTB (mg/L)	2.5±0.1	2.5±0.2
SO_4 Diss -IC (mg/L)	1.8±0.2	1.8±0.3
Alk. Tot. (mg/L)	3.4±0.3	3.4±0.2
Si React. (mg/L)	2.44±0.21	2.37±0.18
DOC (mg/L)	4.8±0.3	5.2±0.4
NO3-NO2 (mg/L)	0.05±0.01	0.03±0.01
N Tot. (mg/L)	0.11±0.01	0.11±0.01
P Tot. (mg/L)	0.003±0.001	0.005±0.002
Al Tot. (mg/L)	0.082±0.013	0.087±0.007
Cd Tot. (mg/L)	<.001	<0.001
Cu Tot. (mg/L)	0.003±0.001	0.003±0.001
Fe Tot. (mg/L)	0.10±0.03	0.09±0.02
Mn Tot. (mg/L)	0.01±0.00	0.02±0.00
Pb Tot. (mg/L)	0.004±0.001	0.004±0.001
Zn Tot. (mg/L)	0.02±0.01	0.02±0.00
Hg Tot. (µg/L)	<0.02	<0.02

1. The values of station 22NF02YO0001 were not included in the calculation of the means and standard deviations of Phase 3.

TABLE 12: Comparisons between water samples' metal results of the 1987-1988 Exploits River Recurrent Survey and the study by Bailey (1988) (Results reported in mg/L)

Site-Survey	Al	Cu	Fe	Pb	Mn	Zn
Bailey (1988)						
Buchans Brook	0.08-0.13	0.009-0.012	0.22-0.35	0.015-0.045	0.03-0.04	0.25-0.44
Red Indian Lake (5 st)	0.04-0.09	0.002-0.007	L.05-0.19	L.002-0.009	L.01-0.05	0.03-0.07
Exploits R. (5 st.)	0.05-0.07	L.002-0.003	0.03-0.08	L.002-0.002	L.01-0.03	0.02-0.03
1987 Survey						
Buchans Brook	0.047	0.0087	0.242	0.0003	0.035	0.117
Phase 2	0.053	0.0121	0.0418	0.0023	0.0074	0.0277
Phase 3	0.047	0.0099	0.0738	0.0016	0.0315	0.0266
1988 Survey						
Phase 2	0.082	0.003	0.10	0.004	0.01	0.02
Phase 3	0.087	0.003	0.09	0.004	0.02	0.02

TABLE 13: RESULTS OF WATER SAMPLES FROM THE INDEX STATION AT LLOYDS RIVER (00NF02YN0001): JUNE 1987 TO JUNE 1988

STATION #	DATE	PH LAB	SP COND US/CM	TURB JTU	COL APP R.U.	CA DIS MG/L	MG DIS MG/L	K DIS MG/L	NA DIS MG/L	ALK T MG/L	CL DIS MG/L	SO4 MTB MG/L
00NF02YN0001	15-JUN-87	6.60	25.0	0.20	25			0.19	1.80		3.30	
00NF02YN0001	15-JUN-87	6.55	25.4	0.26	30	1.91	0.43	0.25	2.13	4.1	3.10	2.2
00NF02YN0001	22-JUL-87	6.62	32.8	0.28	20	2.88	0.56	0.29	2.29	7.3	3.32	2.7
00NF02YN0001	20-AUG-87	6.99	37.4	0.19	20	3.52	0.63	0.30	2.38	9.4	3.62	2.4
00NF02YN0001	22-SEP-87	6.48	32.0	0.13	20	2.68	0.53	0.30	2.39	6.8	3.59	3.1
00NF02YN0001	20-OCT-87	6.44	30.8	2.10	30	2.59	0.55	0.30	2.44	6.3	3.55	2.8
00NF02YN0001	17-NOV-87	6.28	28.3	0.18	50	2.08	0.53	0.28	2.42	4.3	3.65	3.2
00NF02YN0001	15-DEC-87	6.21	26.1	0.50	50	1.94	0.49	0.24	2.31	3.8	3.47	3.5
00NF02YN0001	12-JAN-88	6.12	28.6	1.50	50	2.38	0.54	0.26	2.34	4.3	3.61	3.3
00NF02YN0001	19-FEB-88	6.44	31.6	0.13	50	2.63	0.56	0.27	2.40	4.9	3.67	2.7
00NF02YN0001	18-MAR-88	6.55	34.0	0.65	50	2.57	0.63	0.30	2.77	4.7	4.23	3.1
00NF02YN0001	18-MAR-88	6.58	34.0	0.40	50	2.62	0.62	0.32	2.77	4.4	4.20	3.0
00NF02YN0001	18-MAR-88	6.67	33.8	0.33	50	2.59	0.62	0.30	2.75	4.7	4.11	2.8
00NF02YN0001	13-APR-88	6.48	26.5	0.25	50	1.63	0.46	0.25	2.37	2.1	3.57	3.9
00NF02YN0001	16-MAY-88	6.37	18.4	0.42	40	1.24	0.32	0.21	1.62	1.3	2.25	2.4

SO4 IC MG/L	DOC MG/L	N TOT MG/L	NOX MG/L	P TOT MG/L	LI TOT MG/L	BE TOT MG/L	AL TOT MG/L	VA TOT MG/L	CR TOT MG/L	MN TOT MG/L	FE TOT MG/L	CO TOT MG/L
1.50			L.01	0.0060								
1.41	3.8	0.140	0.025	0.0031	L.0001	L.05	0.069	0.0001	0.0004	0.0044	0.0553	L.0001
1.87	3.7	0.110	0.011	0.0044	0.0002	L.05	0.047	0.0001	0.0006	0.0039	0.0425	L.0001
1.93	2.7	0.113	0.014	0.0028	0.0002	L.05	0.040	0.0003	L.0002	0.0057	0.0539	L.0001
2.23	3.1	0.143	0.031	0.0031	0.0003	L.05	0.049	L.0001	L.0002	0.0089	0.0924	0.0001
1.71	4.6	0.174	0.025	0.0039	0.0002	L.05	0.081	0.0003	0.0003	0.0073	0.1170	0.0001
1.66	6.0	0.193	0.024	0.0043	0.0003	L.05	0.140	0.0003	L.0002	0.0074	0.1630	L.0001
1.61	5.6	0.177	0.008	0.0067	0.0002	L.05	0.116	L.0001	L.0002	0.0047	0.1110	L.0001
1.71	6.2	0.204	0.031	0.0031	0.0005	L.05	0.161	0.0003	L.0002	0.0022	0.1140	L.0001
1.04	5.4	0.180	0.050	0.0036	0.0003	L.05	0.124	0.0002	0.0003	0.0031	0.1120	L.0001
1.94	5.4	0.206	0.054	0.0033	0.0002	L.05	0.105	0.0002	L.0002	0.0073	0.1560	L.0001
1.98	5.5	0.211	0.054	0.0033	0.0002	L.05	0.107	0.0002	L.0002	0.0071	0.1570	L.0001
1.92	5.5	0.178	0.054	0.0033	0.0004	L.05	0.104	0.0004	0.0003	0.0070	0.1540	L.0001
1.63	5.1	0.194	0.060	0.0037	L.0001	L.05	0.123	0.0001	L.0002	0.0101	0.1820	L.0001
1.12	4.5	0.146	0.030	0.0036	L.0001	L.05	0.120	0.0002	L.0002	0.0147	0.1420	0.0001

TABLE 13: RESULTS OF WATER SAMPLES FROM THE INDEX STATION AT LLOYDS RIVER (00NF02YN0001): JUNE 1987 TO JUNE 1988

STATION #	DATE	NI TOT MG/L	CU TOT MG/L	ZN TOT MG/L	SR TOT MG/L	MO TOT MG/L	CD TOT MG/L	BA TOT MG/L	HG TOT UG/L	PB TOT MG/L
00NF02YN0001	15-JUN-87									
00NF02YN0001	15-JUN-87	L.0002	0.0049	0.0006	0.0070	L.0001	L.0001	0.0026	L.02	0.0005
00NF02YN0001	22-JUL-87	0.0004	0.0007	0.0003	0.0092	L.0001	L.0001	0.0042	L.02	L.0002
00NF02YN0001	20-AUG-87	L.0002	0.0008	0.0004	0.0109	0.0002	L.0001	0.0025	L.02	0.0007
00NF02YN0001	22-SEP-87	L.0002	0.0003	0.0007	0.0096	L.0001	L.0001	0.0025	L.02	L.0002
00NF02YN0001	20-OCT-87	L.0002	0.0003	0.0005	0.0096	0.0002	L.0001	0.0030	L.01	0.0002
00NF02YN0001	17-NOV-87	L.0002	0.0038	0.0018	0.0081	L.0001	L.0001	0.0032	L.02	0.0010
00NF02YN0001	15-DEC-87	L.0002	0.0003	0.0013	0.0073	L.0001	L.0001	0.0029	L.01	L.0002
00NF02YN0001	12-JAN-88	L.0002	0.0006	0.0011	0.0083	L.0001	L.0001	0.0035	L.01	L.0002
00NF02YN0001	19-FEB-88	L.0002	0.0005	0.0062	0.0090	L.0001	L.0001	0.0035	L.01	L.0002
00NF02YN0001	18-MAR-88	L.0002	0.0012	0.0015	0.0097	L.0001	0.0002	0.0039	L.01	0.0004
00NF02YN0001	18-MAR-88	L.0002	0.0008	0.0014	0.0098	L.0001	0.0001	0.0039	L.01	0.0004
00NF02YN0001	18-MAR-88	0.0005	0.0007	0.0012	0.0097	L.0001	0.0001	0.0039	L.01	0.0006
00NF02YN0001	13-APR-88	L.0002	0.0004	0.0014	0.0069	L.0001	L.0001	0.0033	0.01	0.0004
00NF02YN0001	16-MAY-88	L.0002	0.0018	0.0012	0.0048	L.0001	L.0001	0.0028	L.01	L.0002

TABLE 14: RESULTS OF WATER SAMPLES FROM THE INDEX STATION ON EXPLOITS RIVER (00NF02YD0019): JUNE 1987 TO JUNE 1988

STATION #	DATE	PH LAB	SP COND US/CM	TURB JTU	COL APP R.U.	CA DIS MG/L	MG DIS MG/L	K DIS MG/L	NA DIS MG/L	ALK T MG/L	CL DIS MG/L	SO4 MTB MG/L
00NF02YD0019	04-JUN-87	6.62	25.2	0.29	20	2.40	0.39	0.17	1.43	4.0	1.98	2.9
00NF02YD0019	04-JUN-87	6.60	25.1	0.24	20	2.26	0.39	0.17	1.43	4.3	1.94	3.0
00NF02YD0019	04-JUN-87	6.57	25.0	0.25	20	2.25	0.39	0.17	1.43	3.9	1.92	3.0
00NF02YD0019	07-JUL-87	6.61	25.8	0.23	20	2.39	0.40	0.19	1.48	4.2	2.04	2.8
00NF02YD0019	12-AUG-87	6.32	25.8	0.12	20	2.48	0.41	0.18	1.52	4.0	2.14	3.0
00NF02YD0019	12-AUG-87	6.90	25.0	0.50	20			0.16	1.40		2.10	
00NF02YD0019	09-SEP-87	6.61	25.7	0.15	20	2.52	0.41	0.17	1.57	4.1	2.23	3.0
00NF02YD0019	08-OCT-87	6.36	25.7	0.17	20	2.52	0.40	0.18	1.54	5.1	2.03	3.2
00NF02YD0019	03-NOV-87	6.48	27.4	1.50	20	2.80	0.45	0.17	1.52	5.1	2.26	3.7
00NF02YD0019	03-DEC-87	6.39	25.2	0.17	20	2.58	0.42	0.16	1.49	4.1	2.14	3.2
00NF02YD0019	06-JAN-88	5.62	26.6	1.50	20	2.73	0.46	0.17	1.52	4.3	2.17	4.6
00NF02YD0019	03-FEB-88	6.57	26.7	0.25	20	2.64	0.44	0.18	1.55	4.3	2.14	2.9
00NF02YD0019	08-MAR-88	6.60	30.5	0.38	30	3.33	0.56	0.15	1.46	5.4	2.02	2.5
00NF02YD0019	06-APR-88	6.52	25.4	0.38	20	2.34	0.41	0.16	1.47	4.1	1.99	2.7
00NF02YD0019	06-APR-88	6.52	25.3	0.45	20	2.46	0.41	0.16	1.47	3.6	1.99	2.8
00NF02YD0019	06-APR-88	6.55	25.2	0.55	30	2.52	0.41	0.16	1.45	3.6	1.98	2.8
00NF02YD0019	03-MAY-88	6.64	25.4	0.25	30	2.39	0.41	0.16	1.40	3.5	1.92	3.6

SO4 IC MG/L	DOC MG/L	N TOT MG/L	NOX MG/L	P TOT MG/L	LI TOT MG/L	BE TOT MG/L	AL TOT MG/L	VA TOT MG/L	CR TOT MG/L	MN TOT MG/L	FE TOT MG/L	CO TOT MG/L
2.24	3.7	0.205	0.084	0.0026	L.0001	L.05	0.064	L.0001	L.0002	0.0214	0.0508	L.0001
2.26	3.7	0.203	0.086	0.0027	0.0001	L.05	0.062	0.0001	L.0002	0.0212	0.0507	L.0001
2.30	3.6	0.203	0.093	0.0024	0.0002	L.05	0.063	0.0002	L.0002	0.0214	0.0514	L.0001
2.10	4.1	0.166	0.076	0.0213	L.0001	L.05	0.066	0.0001	0.0005	0.0146	0.0462	L.0001
2.55	3.6	0.166	0.076	0.0022	0.0001	L.05	0.058	L.0001	L.0002	0.0091	0.0314	L.0001
2.30			0.080	0.0030								
2.27	3.4	0.169	0.084	0.0026	0.0002	L.05	0.062	0.0004	L.0002	0.0099	0.0368	L.0001
2.55	3.2	0.193	0.088	0.0032	L.0001	L.05	0.090	0.0001	L.0002	0.0166	0.1090	0.0001
2.74	3.9	0.216	0.090	0.0025	0.0002	L.05	0.062	0.0003	0.0002	0.0151	0.0583	0.0001
2.43	3.8	0.192	0.090	0.0021	L.0001	L.05	0.072	0.0001	L.0002	0.0110	0.0501	L.0001
2.66	4.0	0.212	0.084	0.0040	0.0003	L.05	0.177	0.0003	L.0002	0.0229	0.1910	L.0001
2.92	3.9	0.180	0.091	0.0024	0.0001	L.05	0.070	0.0003	0.0003	0.0084	0.0364	L.0001
2.57	5.1	0.415	0.298	0.0051	0.0002	L.05	0.068	0.0002	L.0002	0.0196	0.0832	L.0001
2.18	4.3	0.222	0.110	0.0031	0.0003	L.05	0.077	0.0003	0.0003	0.0119	0.0753	0.0001
2.19	4.2	0.214	0.110	0.0029	0.0004	L.05	0.077	0.0004	0.0004	0.0118	0.0730	0.0001
2.22	4.1	0.212	0.110	0.0029	0.0002	L.05	0.072	0.0002	0.0003	0.0120	0.0774	0.0001
2.38	4.1	0.205	0.087	0.0028	L.0001	L.05	0.072	L.0001	L.0002	0.0357	0.0677	L.0001

TABLE 14: RESULTS OF WATER SAMPLES FROM THE INDEX STATION ON EXPLOITS RIVER (00NF02YD0019): JUNE 1987 TO JUNE 1988

STATION #	DATE	NI TOT MG/L	CU TOT MG/L	ZN TOT MG/L	SR TOT MG/L	MO TOT MG/L	CD TOT MG/L	BA TOT MG/L	HG TOT UG/L	PB TOT MG/L
00NF02YD0019	04-JUN-87	L.0002	0.0045	0.0445	0.0082	L.0001	0.0001	0.0784	L.02	0.0068
00NF02YD0019	04-JUN-87	L.0002	0.0044	0.0441	0.0081	L.0001	0.0002	0.0778	L.02	0.0071
00NF02YD0019	04-JUN-87	L.0002	0.0048	0.0445	0.0082	L.0001	0.0002	0.0782	L.02	0.0069
00NF02YD0019	07-JUL-87	0.0002	0.0038	0.0382	0.0081	L.0001	0.0001	0.0684	L.02	0.0037
00NF02YD0019	12-AUG-87	L.0002	0.0038	0.0398	0.0084	L.0001	0.0001	0.0783	L.02	0.0053
00NF02YD0019	12-AUG-87									
00NF02YD0019	09-SEP-87	0.0004	0.0046	0.0396	0.0084	0.0002	0.0002	0.0879	L.02	0.0065
00NF02YD0019	08-OCT-87	L.0002	0.0053	0.0533	0.0106	0.0001	0.0002	0.2470	L.02	0.0186
00NF02YD0019	03-NOV-87	L.0002	0.0043	0.0441	0.0096	0.0002	0.0002	0.1030	L.01	0.0112
00NF02YD0019	03-DEC-87	L.0002	0.0042	0.0463	0.0088	L.0001	0.0001	0.1050	L.01	0.0094
00NF02YD0019	06-JAN-88	L.0002	0.0053	0.0444	0.0092	L.0001	0.0001	0.1180	L.01	0.0092
00NF02YD0019	03-FEB-88	0.0002	0.0073	0.0480	0.0089	0.0001	0.0002	0.0975	L.01	0.0127
00NF02YD0019	08-MAR-88	0.0004	0.0018	0.0080	0.0089	L.0001	L.0001	0.0174	L.01	0.0017
00NF02YD0019	06-APR-88	0.0004	0.0032	0.0351	0.0079	0.0002	0.0002	0.0703	L.01	0.0072
00NF02YD0019	06-APR-88	0.0004	0.0040	0.0349	0.0079	0.0003	0.0002	0.0695	L.01	0.0077
00NF02YD0019	06-APR-88	0.0003	0.0069	0.0364	0.0079	L.0001	0.0002	0.0705	0.01	0.0073
00NF02YD0019	03-MAY-88	L.0002	0.0068	0.0417	0.0081	L.0001	L.0001	0.0706	L.01	0.0076

TABLE 15: RESULTS OF WATER SAMPLES FROM THE INDEX STATION ON EXPLOITS RIVER (00NF02YD0020): JUNE 1987 TO JUNE 1988

STATION #	DATE	PH LAB	SP COND US/CM	TURB JTU	COL APP R.U.	CA DIS MG/L	MG DIS MG/L	K DIS MG/L	NA DIS MG/L	ALK T MG/L	CL DIS MG/L	SO4 MTB MG/L
00NF02YD0020	04-JUN-87	6.61	25.5	0.27	20	2.41	0.41	0.17	1.53	4.5	2.10	2.9
00NF02YD0020	07-JUL-87	6.51	27.2	0.23	20	2.39	0.41	0.21	1.55	4.4	2.16	2.8
00NF02YD0020	12-AUG-87	6.26	25.8	0.18	20	2.41	0.41	0.19	1.58	4.2	2.21	2.8
00NF02YD0020	12-AUG-87	6.80	25.0	0.50	20			0.17	1.50		2.20	
00NF02YD0020	09-SEP-87	6.71	27.9	0.22	20	2.52	0.46	0.20	1.91	5.0	2.77	3.0
00NF02YD0020	08-OCT-87	6.25	29.0	0.34	20	2.77	0.52	0.23	1.87	5.0	2.26	3.7
00NF02YD0020	04-NOV-87	6.30	28.5	1.00	30	2.47	0.53	0.22	1.82	5.1	2.74	3.4
00NF02YD0020	03-DEC-87	6.21	26.0	0.21	20	2.48	0.47	0.16	1.71	4.2	2.50	3.3
00NF02YD0020	06-JAN-88	6.02	27.3	1.90	20	2.45	0.47	0.19	1.64	4.1	2.32	4.6
00NF02YD0020	03-FEB-88	6.51	26.9	0.40	20	2.61	0.45	0.17	1.56	4.3	2.14	2.9
00NF02YD0020	08-MAR-88	6.60	25.8	0.74	40	2.34	0.50	0.19	1.76	3.5	2.36	2.6
00NF02YD0020	06-APR-88	6.40	24.5	0.67	40	2.25	0.42	0.17	1.68	3.0	2.34	2.8
00NF02YD0020	05-MAY-88	6.56	23.4	0.33	40	1.99	0.40	0.17	1.60	2.8	2.22	3.1

SO4 IC MG/L	DOC MG/L	N TOT MG/L	NOX MG/L	P TOT MG/L	LI TOT MG/L	BE TOT MG/L	AL TOT MG/L	VA TOT MG/L	CR TOT MG/L	MN TOT MG/L	FE TOT MG/L	CO TOT MG/L
2.17	3.7	0.198	0.076	0.0036	0.0001	L.05	0.061	0.0001	L.0002	0.0102	0.0574	L.0001
2.05	4.0	0.159	0.069	0.0029	0.0002	L.05	0.054	L.0001	0.0004	0.0089	0.0411	L.0001
2.29	3.6	0.147	0.059	0.0030	0.0001	L.05	0.051	L.0001	L.0002	0.0107	0.0384	L.0001
2.30			0.070	0.0030								
2.33	3.8	0.174	0.068	0.0029	0.0001	0.05	0.058	0.0003	0.0002	0.0085	0.0513	L.0001
2.67	4.4	0.251	0.086	0.0038	L.0001	L.05	0.095	L.0001	L.0002	0.0223	0.1710	0.0001
2.53	5.2	0.234	0.063	0.0054	0.0003	L.05	0.088	0.0004	0.0004	0.0166	0.1210	0.0002
2.35	4.7	0.218	0.090	0.0024	0.0002	L.05	0.082	0.0002	L.0002	0.0112	0.0775	L.0001
2.57	3.9	0.204	0.087	0.0043	0.0004	L.05	0.148	0.0004	0.0007	0.0340	0.1850	L.0001
2.28	3.9	0.191	0.106	0.0025	0.0003	L.05	0.067	0.0002	0.0002	0.0060	0.0485	0.0002
2.00	6.1	0.282	0.111	0.0045	0.0002	L.05	0.099	0.0003	0.0003	0.0148	0.1270	L.0001
1.92	5.0	0.232	0.090	0.0034	L.0001	L.05	0.095	L.0001	L.0002	0.0131	0.0995	L.0001
1.78	5.0	0.215	0.093	0.0033	0.0003	L.05	0.108	0.0003	L.0002	0.0165	0.1040	0.0001

TABLE 15: RESULTS OF WATER SAMPLES FROM THE INDEX STATION ON EXPLOITS RIVER (00NF02Y00020): JUNE 1987 TO JUNE 1988

STATION #	DATE	NI TOT MG/L	CU TOT MG/L	ZN TOT MG/L	SR TOT MG/L	MO TOT MG/L	CD TOT MG/L	BA TOT MG/L	HG TOT UG/L	PB TOT MG/L
00NF02Y00020	04-JUN-87	L.0002	0.0051	0.0323	0.0082	L.0001	0.0001	0.0633	L.02	0.0042
00NF02Y00020	07-JUL-87	0.0002	0.0034	0.0286	0.0083	L.0001	L.0001	0.0628	L.02	0.0027
00NF02Y00020	12-AUG-87	L.0002	0.0031	0.0303	0.0084	L.0001	L.0001	0.0714	L.02	0.0022
00NF02Y00020	12-AUG-87									
00NF02Y00020	09-SEP-87	0.0003	0.0036	0.0259	0.0091	0.0002	0.0002	0.0619	L.02	0.0028
00NF02Y00020	08-OCT-87	L.0002	0.0021	0.0244	0.0101	L.0001	L.0001	0.0644	L.02	0.0035
00NF02Y00020	04-NOV-87	0.0004	0.0018	0.0186	0.0094	0.0001	0.0002	0.0411	L.01	0.0033
00NF02Y00020	03-DEC-87	0.0003	0.0022	0.0242	0.0089	L.0001	L.0001	0.0558	L.01	0.0040
00NF02Y00020	06-JAN-88	0.0004	0.0057	0.0480	0.0094	L.0001	0.0002	0.1050	L.01	0.0134
00NF02Y00020	03-FEB-88	L.0002	0.0069	0.0397	0.0090	L.0001	0.0002	0.0780	L.01	0.0070
00NF02Y00020	08-MAR-88	0.0005	0.0021	0.0151	0.0081	L.0001	L.0001	0.0295	L.01	0.0029
00NF02Y00020	06-APR-88	L.0002	0.0023	0.0207	0.0078	L.0001	L.0001	0.0418	L.01	0.0032
00NF02Y00020	05-MAY-88	0.0003	0.0020	0.0179	0.0073	L.0001	L.0001	0.0328	L.01	0.0030

TABLE 16: RESULTS OF WATER SAMPLES FROM THE INDEX STATION ON EXPLOITS RIVER AT BISHOPS FALLS (00NF02Y00021): JUNE 1987 TO JUNE 1988

STATION #	DATE	FE TOT MG/L	CO TOT MG/L	NI TOT MG/L	CU TOT MG/L	ZN TOT MG/L	SR TOT MG/L	MO TOT MG/L	CD TOT MG/L	BA TOT MG/L	HG TOT UG/L	PB TOT MG/L
00NF02Y00021	09-JUN-87	0.1030	L.0001	L.0002	0.0042	0.0264	0.0088	L.0001	L.0001	0.0587	L.02	0.0025
00NF02Y00021	09-JUN-87	0.0791	L.0001	L.0002	0.0045	0.0263	0.0088	L.0001	L.0001	0.0587	L.02	0.0027
00NF02Y00021	09-JUN-87	0.0819	L.0001	L.0002	0.0038	0.0263	0.0088	L.0001	0.0001	0.0584	L.02	0.0027
00NF02Y00021	07-JUL-87	0.0667	L.0001	0.0004	0.0076	0.0250	0.0090	0.0006	L.0001	0.0636	L.02	0.0021
00NF02Y00021	13-AUG-87	0.0649	L.0001	L.0002	0.0034	0.0279	0.0089	L.0001	L.0001	0.0745	L.02	0.0017
00NF02Y00021	13-AUG-87											
00NF02Y00021	10-SEP-87	0.0857	L.0001	0.0004	0.0034	0.0267	0.0096	0.0002	0.0001	0.0688	L.02	0.0018
00NF02Y00021	08-OCT-87	0.1400	0.0002	0.0003	0.0022	0.0240	0.0129	L.0001	L.0001	0.0579	L.02	0.0015
00NF02Y00021	04-NOV-87	0.1140	0.0002	0.0004	0.0029	0.0247	0.0115	L.0001	0.0001	0.0557	L.01	0.0028
00NF02Y00021	03-DEC-87	0.0863	L.0001	0.0004	0.0024	0.0198	0.0100	0.0001	L.0001	0.0445	L.01	0.0032
00NF02Y00021	08-JAN-88	0.0680	0.0002	L.0002	0.0048	0.0330	0.0098	L.0001	0.0001	0.0652	L.01	0.0028
00NF02Y00021	04-FEB-88	0.0722	L.0001	0.0002	0.0044	0.0393	0.0104	L.0001	0.0001	0.0706	L.01	0.0047
00NF02Y00021	04-FEB-88	0.0726	L.0001	0.0003	0.0043	0.0368	0.0103	L.0001	0.0001	0.0694	L.01	0.0045
00NF02Y00021	04-FEB-88	0.0709	L.0001	L.0002	0.0046	0.0387	0.0104	L.0001	L.0001	0.0703	L.01	0.0046
00NF02Y00021	09-MAR-88	0.1540	L.0001	0.0005	0.0023	0.0205	0.0106	0.0002	L.0001	0.0296	L.01	0.0025
00NF02Y00021	06-APR-88	0.1300	L.0001	L.0002	0.0022	0.0187	0.0087	L.0001	0.0001	0.0373	L.01	0.0041
00NF02Y00021	02-MAY-88	0.1350	0.0001	L.0002	0.0049	0.0182	0.0083	L.0001	L.0001	0.0325	L.01	0.0033
00NF02Y00021	03-MAY-88	0.1360	0.0002	0.0003	0.0050	0.0180	0.0081	L.0001	L.0001	0.0318	L.01	0.0038
00NF02Y00021	04-MAY-88	0.1180	0.0002	L.0002	0.0027	0.0186	0.0083	L.0001	L.0001	0.0327	L.01	0.0033
00NF02Y00021	05-MAY-88	0.1130	0.0001	L.0002	0.0028	0.0188	0.0079	L.0001	0.0001	0.0325	L.01	0.0035
00NF02Y00021	06-MAY-88	0.1090	0.0002	0.0005	0.0030	0.0192	0.0080	L.0001	0.0002	0.0346	L.01	0.0031

TABLE 16: RESULTS OF WATER SAMPLES FROM THE INDEX STATION ON EXPLOITS RIVER AT BISHOPS FALLS (00NF02YD0021): JUNE 1987 TO JUNE 1988

STATION #	DATE	PH LAB	SP COND US/CM	TURB JTU	COL APP R.U.	CA DIS MG/L	MG DIS MG/L	K DIS MG/L	NA DIS MG/L	ALK T MG/L	CL DIS MG/L	SO4 MTB MG/L
00NF02YD0021	09-JUN-87	6.61	27.4	0.29	20	2.50	0.43	0.22	1.73	5.2	2.12	3.2
00NF02YD0021	09-JUN-87	6.56	27.5	0.35	20	2.51	0.44	0.21	1.73	5.0	2.14	3.2
00NF02YD0021	09-JUN-87	6.44	27.5	0.26	20	2.54	0.44	0.21	1.74	5.4	2.23	3.3
00NF02YD0021	07-JUL-87	6.37	29.6	0.23	20	2.58	0.45	0.25	1.86	5.5	2.35	3.6
00NF02YD0021	13-AUG-87	6.26	28.3	0.12	20	2.48	0.43	0.22	1.89	4.3	2.21	3.7
00NF02YD0021	13-AUG-87	6.50	28.0	0.80	25			0.19	1.80		2.30	
00NF02YD0021	10-SEP-87	6.60	29.5	0.34	20	2.62	0.47	0.24	1.96	5.6	2.47	3.5
00NF02YD0021	08-OCT-87	6.15	37.0	0.34	30	3.28	0.67	0.33	2.47	5.4	2.56	6.3
00NF02YD0021	04-NOV-87	6.11	35.7	3.40	30	3.01	0.62	0.26	2.32	5.2	2.94	5.3
00NF02YD0021	03-DEC-87	6.27	29.4	0.32	20	2.79	0.55	0.19	1.97	5.0	2.68	4.0
00NF02YD0021	08-JAN-88	6.18	31.7	1.20	30	2.94	0.53	0.23	2.10	5.2	2.70	4.4
00NF02YD0021	04-FEB-88	6.20	32.5	0.63	20	2.87	0.51	0.22	2.15	4.9	2.65	3.8
00NF02YD0021	04-FEB-88	6.23	32.7	1.00	20	2.94	0.53	0.20	2.15	4.8	2.70	3.9
00NF02YD0021	04-FEB-88	6.19	32.5	0.50	20	2.89	0.53	0.20	2.14	5.0	2.70	3.9
00NF02YD0021	09-MAR-88	6.43	35.1	0.41	50	2.90	0.62	0.22	2.64	4.4	3.83	3.2
00NF02YD0021	06-APR-88	6.47	29.9	0.85	40	2.49	0.49	0.19	2.28	3.5	2.93	3.4
00NF02YD0021	02-MAY-88	6.48	26.4	0.50	40	2.16	0.45	0.19	1.90	3.2	2.52	3.5
00NF02YD0021	03-MAY-88	6.54	25.1	0.53	40	2.11	0.44	0.18	1.70	3.0	2.31	3.5
00NF02YD0021	04-MAY-88	6.47	26.6	0.62	40	2.20	0.45	0.20	1.90	3.1	2.44	3.8
00NF02YD0021	05-MAY-88	6.50	25.8	0.65	40	2.15	0.43	0.18	1.80	3.1	2.30	3.6
00NF02YD0021	06-MAY-88	6.54	24.6	0.44	40	2.02	0.43	0.21	1.70	3.2	2.13	3.6

TABLE 16: RESULTS OF WATER SAMPLES FROM THE INDEX STATION ON EXPLOITS RIVER AT BISHOPS FALLS (00NF02YD0021): JUNE 1987 TO JUNE 1988

STATION #	DATE	SO4 IC MG/L	DOC MG/L	N TOT MG/L	NOX MG/L	P TOT MG/L	LI TOT MG/L	BE TOT MG/L	AL TOT MG/L	VA TOT MG/L	CR TOT MG/L	MN TOT MG/L
00NF02YD0021	09-JUN-87	2.40	3.9	0.174	0.049	0.0104	0.0001	L.05	0.074	0.0002	L.0002	0.0223
00NF02YD0021	09-JUN-87	2.49	4.0	0.157	0.049	0.0086	0.0002	L.05	0.060	L.0001	L.0002	0.0204
00NF02YD0021	09-JUN-87	2.44	3.9	0.178	0.050	0.0082	0.0001	L.05	0.061	0.0002	L.0002	0.0200
00NF02YD0021	07-JUL-87	2.89	4.2	0.117	0.032	0.0107	0.0003	L.05	0.049	0.0003	0.0005	0.0226
00NF02YD0021	13-AUG-87	3.41	3.6	0.119	0.009	0.0071	0.0002	L.05	0.044	0.0002	L.0002	0.0263
00NF02YD0021	13-AUG-87	3.20			L.01	0.0070						
00NF02YD0021	10-SEP-87	2.72	3.6	0.147	0.011	0.0110	0.0002	L.05	0.053	0.0006	L.0002	0.0252
00NF02YD0021	08-OCT-87	4.69	5.5	0.251	0.059	0.0136	0.0001	L.05	0.079	0.0003	L.0002	0.0352
00NF02YD0021	04-NOV-87	4.52	3.6	0.249	0.050	0.0125	0.0003	L.05	0.077	0.0004	0.0003	0.0246
00NF02YD0021	03-DEC-87	2.93	4.9	0.211	0.057	0.0090	0.0003	L.05	0.079	0.0003	0.0003	0.0216
00NF02YD0021	08-JAN-88	3.38	4.6	0.206	0.061	0.0075	0.0004	L.05	0.068	0.0002	L.0002	0.0259
00NF02YD0021	04-FEB-88	3.55	4.6	0.198	0.092	0.0062	0.0003	L.05	0.064	0.0003	0.0003	0.0232
00NF02YD0021	04-FEB-88	3.50	4.6	0.183	0.093	0.0061	L.0001	L.05	0.070	0.0002	L.0002	0.0230
00NF02YD0021	04-FEB-88	3.49	4.6	0.194	0.094	0.0064	0.0002	L.05	0.064	0.0002	0.0002	0.0228
00NF02YD0021	09-MAR-88	2.83	6.7	0.337	0.109	0.0083	0.0002	L.05	0.101	0.0004	0.0003	0.0289
00NF02YD0021	06-APR-88	2.72	5.6	0.244	0.080	0.0084	L.0001	L.05	0.099	0.0001	L.0002	0.0294
00NF02YD0021	02-MAY-88	1.99	5.8	0.239	0.061	0.0070	0.0001	L.05	0.130	0.0005	L.0002	0.0261
00NF02YD0021	03-MAY-88	1.87	5.5	0.217	0.058	0.0052	L.0001	L.05	0.116	0.0004	L.0002	0.0249
00NF02YD0021	04-MAY-88	2.18	5.6	0.215	0.054	0.0053	L.0001	L.05	0.112	0.0002	L.0002	0.0238
00NF02YD0021	05-MAY-88	2.33	5.4	0.234	0.057	0.0049	L.0001	L.05	0.100	0.0002	L.0002	0.0222
00NF02YD0021	06-MAY-88	2.02	5.2	0.217	0.060	0.0054	0.0003	L.05	0.116	0.0005	0.0003	0.0216

TABLE 17: RESULTS OF WATER SAMPLES FROM THE LRTAP-OVERVIEW STATION ON EXPLOITS RIVER (00NF02Y00001): JUNE 1987 TO JUNE 1988

STATION #	SAMPLE #	DATE	TIME	PH LAB	SP COND US/CM	TURB JTU	COLOUR R.U.	CA DIS MG/L	MG DIS MG/L	K DIS MG/L	NA DIS MG/L	ALK T MG/L
00NF02Y00001	701759	30-JUL-87	1105	6.4	27	0.8	20	2.6	0.49	0.21	1.6	4.5
00NF02Y00001	702529	10-SEP-87	1645	6.6	28	0.7	10	2.7	0.49	0.23	1.8	4.6
00NF02Y00001	702530	10-SEP-87	1647	6.6	28	0.9	10	2.6	0.49	0.23	1.8	4.6
00NF02Y00001	702531	10-SEP-87	1649	6.6	28	0.9	10	2.6	0.47	0.23	1.8	4.5
00NF02Y00001	703008	19-OCT-87	1620	6.5	31	1.9	15	2.9	0.53	0.21	1.8	4.7
00NF02Y00001	703218	04-NOV-87	1545	6.6	32	1.2	25	3.1	0.63	0.25	1.8	4.6
00NF02Y00001	703780	16-DEC-87	1520	6.5	31	1.8	25	2.9	0.60	0.15	1.8	5.2
00NF02Y00001	704133	14-JAN-88	1600	6.5	30	0.8	20	2.9	0.52	0.20	1.7	4.6
00NF02Y00001	704557	24-FEB-88	1025	7.0	44	0.8	20	4.7	1.10	0.21	2.1	10.4
00NF02Y00001	704777	17-MAR-88	1201	6.5	27	0.7	35	2.5	0.51	0.18	1.8	3.8
00NF02Y00001	800416	26-APR-88	915	6.4	25	0.5	35	2.2	0.46	0.18	1.6	3.4

CL DIS MG/L	SO4 MTB MG/L	SO4 IC MG/L	DOC MG/L	N TOT MG/L	NOX MG/L	P TOT MG/L	AL EXT MG/L	SI REAC MG/L	MN EXT MG/L	FE EXT MG/L	CU EXT MG/L	ZN EXT MG/L	CD EXT MG/L
2.2	3.1	2.5	4.1	L.1	0.03	0.008	0.042	2.01	0.02	0.06	L.002	0.03	L.001
2.3	3.2	2.6	4.2	0.10	0.01	0.005	0.045	2.11	0.02	0.06	0.003	0.02	L.001
2.3	3.2	2.7	4.1	0.11	0.05	0.005	0.045	2.11	0.02	0.05	0.003	0.03	L.001
2.3	3.2	2.6	4.2	0.11	0.03	0.007	0.046	2.11	0.02	0.07	0.003	0.03	L.001
2.2	4.1	3.8	4.3	L.1	0.01	0.011	0.057	2.18	0.02	0.08	L.002	0.03	L.001
2.7	4.0	3.3	5.9	0.18	0.09	0.008	0.079	2.57	0.01	0.11	0.002	0.03	L.001
2.4	3.3	3.2	5.4	0.11	0.01	0.004	0.088	2.67	0.02	0.07	0.003	0.03	L.001
2.4	3.3	3.1	4.0	0.12	0.05	L.001	0.055	2.56	0.03	0.06	0.004	0.04	L.001
3.1	4.5	3.9	4.8	0.14	0.03	0.004	0.072	3.03	0.02	0.11	0.006	0.04	L.001
2.2	3.3	2.6	7.7	0.11	0.08	0.006	0.160	3.19	0.04	0.28	0.002	0.02	L.001
2.4	2.8	2.3	5.5	0.11	0.07	0.002	0.087	2.34	0.02	0.07	0.002	0.02	L.001

HG TOT UG/L
0.002
0.002
0.002
L.002
0.003
0.003
0.003
0.006
0.005
0.004
0.005

TABLE 18: RESULTS OF BOTTOM SEDIMENT SAMPLES COLLECTED DURING THE EXPLOITS RIVER SURVEY: SEPTEMBER 1987 (REPORTED IN MG/KG, UNLESS OTHERWISE NOTED)

	STATION #	DATE	HG TOT.	AL EXT.	CD EXT.	CR EXT.	CU EXT.	FE EXT.	MN EXT.	PB EXT.	ZN EXT.	HCB
PHASE I												
	50NF02YN0007	22-SEP-87	0.09	4340	0.89	1.71	21.5	7940	2260	185	187	L.004
	50NF02YN0007	22-SEP-87	0.09	5410	0.87	1.93	21.5	7960	2100	182	179	L.004
	50NF02YN0007	22-SEP-87	0.09	4950	0.92	2.08	21.8	8670	2160	183	186	L.004
PHASE III												
	52NF02YD0002	29-SEP-87	0.14	3110	1.58	3.97	23.3	6590	226	177	190	L.004
	52NF02YD0002	29-SEP-87	0.17	3150	1.58	3.72	22.0	6610	230	175	199	L.004
	52NF02YD0004	26-SEP-87	0.21	3680	3.10	3.15	37.9	6410	235	271	360	L.004
	52NF02YD0004	26-SEP-87	0.26	3540	3.00	2.57	38.4	5940	220	265	323	L.004
	52NF02YD0004	26-SEP-87	0.25	3490	2.80	2.76	34.5	6590	226	258	319	L.004
	50NF02YD0052	29-SEP-87	0.19	2770	2.33	3.54	82.8	6390	288	205	297	L.004
	50NF02YD0052	29-SEP-87	0.21	2830	2.09	3.98	86.4	6290	293	203	294	L.004

	a-BHC	LINDANE g-BHC	HEPTA CHLOR	ALDRIN	HEPTACHLOR EPOXIDE	g-TRANS CHLORDANE	a-(CIS) CHLORDANE	a-ENDO SULPHAN	P,P-DDE
PHASE I									
	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004
	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004
	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004
PHASE III									
	0.010	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004
	0.014	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004
	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004
	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004
	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004
	0.016	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004
	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004

TABLE 18: RESULTS OF BOTTOM SEDIMENT SAMPLES COLLECTED DURING THE EXPLOITS RIVER SURVEY: SEPTEMBER 1987 (REPORTED IN MG/KG, UNLESS OTHERWISE NOTED)

	STATION #	DATE	DIELDRIN	ENDRIN	O,P-DDT	P,P-DDD	P,P-DDT	b-ENDO SULPHAN	MIREX	P,P-METHOXY CHLOR	AROCHLOR
PHASE I											
	50NF02YN0007	22-SEP-87	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.09
	50NF02YN0007	22-SEP-87	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.09
	50NF02YN0007	22-SEP-87	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.004	L.09
PHASE III											
	52NF02YD0002	29-SEP-87	L.004	L.004	L.004	L.004	L.004	L.004	L.004	0.010	1.28
	52NF02YD0002	29-SEP-87	L.004	0.006	0.004	L.004	L.004	L.004	L.004	0.051	0.27
	52NF02YD0004	26-SEP-87	L.004	L.004	0.005	L.004	0.005	L.004	L.004	L.004	0.58
	52NF02YD0004	26-SEP-87	L.004	L.004	L.004	L.004	L.004	L.004	L.004	0.020	0.13
	52NF02YD0004	26-SEP-87	L.004	L.004	0.004	L.004	L.004	0.006	L.004	L.004	0.09
	50NF02YD0052	29-SEP-87	L.004	L.004	0.004	L.004	L.004	L.004	L.004	L.004	0.21
	50NF02YD0052	29-SEP-87	L.004	L.004	0.006	L.004	L.004	0.017	L.004	L.004	0.09

	C PART. ORG. %	N PART. ORG. %
PHASE I		
	1.96	L.002
	1.71	L.002
	1.24	L.002
PHASE III		
	16.90	0.376
	11.50	0.250
	18.50	0.396
	36.20	0.618
	31.40	0.653
	30.10	0.552
	31.10	0.498

TABLE 19: RESULTS OF BOTTOM SEDIMENT SAMPLES COLLECTED IN THE EXPLOITS RIVER BASIN: AUGUST 1988 (REPORTED IN NG/G, UNLESS OTHERWISE NOTED)

	STATION #	DATE	AL EXT. MG/KG	CD EXT. MG/KG	CO EXT. MG/KG	CR EXT. MG/KG	CU EXT. MG/KG	FE EXT. MG/KG	NI EXT. MG/KG	PB EXT. MG/KG	ZN EXT. MG/KG	HG TOT. MG/KG
PHASE I												
	50NF02YN0007	23-AUG-88	4630	2.70	4.31	3.30	63.8	10800	1.24	405	379	0.15
	50NF02YN0007	23-AUG-88	4590	2.73	4.01	1.23	64.4	10900	L.600	415	382	0.13
	50NF02YN0007	23-AUG-88	4710	3.07	3.68	2.11	64.3	10600	L.600	411	390	0.13
PHASE III												
	52NF02YD0002	23-AUG-88	1820	1.87	1.27	1.41	28.2	3090	2.37	193	184	0.17
	52NF02YD0002	23-AUG-88	1830	1.86	1.49	1.12	28.4	3110	1.82	194	188	0.12
	52NF02YD0002	23-AUG-88	1880	1.99	1.52	1.22	27.9	3030	2.62	187	190	0.12
	52NF02YD0004	23-AUG-88	2470	2.29	4.65	1.85	33.7	6400	3.08	305	224	0.14
	52NF02YD0004	23-AUG-88	2420	2.35	4.65	2.02	33.9	6360	3.87	321	227	0.15
	52NF02YD0004	23-AUG-88	2620	2.38	5.16	1.71	34.3	6590	3.98	313	227	0.16
	50NF02YD0052	23-AUG-88	1560	1.17	2.19	1.89	42.8	3650	2.54	125	120	0.11
	50NF02YD0052	23-AUG-88	1540	1.14	2.07	1.72	41.4	3480	2.29	121	119	0.09
	50NF02YD0052	23-AUG-88	1630	1.18	1.86	2.82	41.7	3640	1.96	119	123	0.12

	HBC	a-BHC	g-BHC	HEPTA CHLOR	ALDRIN	HEPTACHLOR EPOXIDE	g-CHLOR DANE	a-CHLOR DANE	a-ENDO SULFAN	P,P-DDE
PHASE I										
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
PHASE III										
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6
	L6.3	L2.3	L2.9	L1.4	L1.6	L1.9	L1.5	L2.3	L1.4	L5.6

TABLE 19: RESULTS OF BOTTOM SEDIMENT SAMPLES COLLECTED IN THE EXPLOITS RIVER BASIN: AUGUST 1988 (REPORTED IN NG/G, UNLESS OTHERWISE NOTED)

	STATION #	DATE	HEOD	ENDRIN	O,P-DDT	P,P-TDE	P,P-DDT	b-ENDO SULFAN	MIREX	P,P-METHO XYCHLOR	PCB'S
PHASE I											
	50NF02YN0007	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	L77
	50NF02YN0007	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	L77
	50NF02YN0007	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	L77
PHASE III											
	52NF02YD0002	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	220
	52NF02YD0002	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	350
	52NF02YD0002	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	130
	52NF02YD0004	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	L77
	52NF02YD0004	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	L77
	52NF02YD0004	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	L77
	50NF02YD0052	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	L77
	50NF02YD0052	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	L77
	50NF02YD0052	23-AUG-88	L3.2	L2.9	L7.0	L6.0	L7.5	L2.9	L4.3	L18	L77

	C PART. ORG. %	N PART. ORG. %
PHASE I		
	10.30	0.50
	6.72	0.29
	9.46	0.49
PHASE III		
	5.57	0.28
	17.60	0.75
	8.72	0.29
	10.20	0.51
	14.10	0.60
	12.50	0.50
	4.80	0.50
	6.10	0.33
	1.42	0.13

TABLE 20: Comparison of summary results (means) recorded for certain metals in the Exploits River Basin's bottom sediments (Results reported in mg/kg).

Site	Year	Cr	Cd	Cu	Pb	Hg	Zn
Buchans Brook	1987	1.91	0.89	21.6	183	0.09	184
(50NF02YN0007)	1988	2.21	2.83	64.2	410	0.14	384
Red Indian Lake st.1	1984[1]	-[2]	6.2	306	1900	0.88	910
st.2	1984[1]	-[2]	4.1	310	2000	0.92	700
st.3	1984[1]	-[2]	3.2	330	2500	0.59	680
st.4	1984[1]	-[2]	4.2	360	2600	0.54	870
st.5	1984[1]	-[2]	6.9	310	2400	0.42	1170
Exploits River							
52NF02YO0002	1987	3.85	1.58	22.6	176	0.16	195
	1988	1.25	1.91	28.2	191	0.14	187
52NF02YO0004	1987	2.83	2.97	36.9	265	0.24	334
	1988	1.86	2.34	34.0	313	0.15	226
50NF02YO0052	1987	3.76	2.21	84.6	204	0.20	296
	1988	2.14	1.16	42.0	122	0.11	121
Bay of Exploits st.1	1984[1]	-[2]	2.0	39	200	0.44	200
st.2	1984[1]	-[2]	2.0	55	300	0.26	270

1. Bailey (1988)
2. Test not done

TABLE 21A: RESULTS OF HEAVY METALS CONCENTRATIONS IN FORAGE FISH (GASTEROSTEUS ACULEATUS) FROM EXPLOITS RIVER BASIN: AUGUST 1987 AND AUGUST 1988

	STATION #	DATE	HG MG/KG	CR MG/KG	NI MG/KG	PB MG/KG	CU MG/KG	ZN MG/KG	CD MG/KG	FE MG/KG	LIPID CONT. %
PHASE I											
	90NF02YN0007	25-SEP-87	0.07	0.20	0.57	L0.05	1.70	48.0	L0.02	16	4.0
	90NF02YN0007	24-AUG-88	0.05	-	-	0.24	1.33	57.8	0.06	-	-
PHASE III											
	92NF02Y00004	28-SEP-87	0.03	0.53	0.36	L0.05	1.80	36.0	L0.02	17	6.1
	92NF02Y00004	28-SEP-87	0.03	0.53	0.38	L0.05	1.90	35.0	L0.02	13	6.2
	92NF02Y00004	28-SEP-87	0.04	0.20	0.23	L0.05	1.90	32.0	L0.02	21	5.5

TABLE 21B: RESULTS OF OC-PCB'S CONCENTRATIONS IN FORAGE FISH (GASTEROSTEUS ACULEATUS) FROM EXPLOITS RIVER: AUGUST 1987

	STATION #	DATE	P,P'-DDT MG/KG	O,P'-DDT MG/KG	P,P-DDD MG/KG	MIREX MG/KG	P,P-METHOX. MG/KG	ALDRIN MG/KG	HEPTACHLOR MG/KG	ENDRIN MG/KG
PHASE I										
	90NF02YN0007	28-SEP-87	L.001	L.001	L.001	L.001	L.05	L.001	L.001	L.01
PHASE III										
	92NF02YD0004	28-SEP-87	0.004	L.001	L.001	L.001	L.05	L.001	L.001	L.01
	92NF02YD0004	28-SEP-87	0.004	L.001	L.001	L.001	L.05	L.001	L.001	L.01

	HEPT.EPOX. MG/KG	HEOD MG/KG	B-ENDOSU. MG/KG	A-CIS-CHLO. MG/KG	G-CHLORD. MG/KG	T. PCBS MG/KG	G-BHC MG/KG	A-BHC MG/KG
PHASE I								
	L.001	-	L.01	L.005	L.005	L.005	L.001	L.001
PHASE III								
	L.001	-	L.01	L.005	L.005	L.005	L.001	L.001
	L.001	-	L.01	L.005	L.005	L.005	L.001	L.001

TABLE 22: RESULTS OF PHYSICAL CHARACTERISTICS AND HEAVY METALS CONCENTRATIONS IN THE TISSUES OF LANDLOCKED SALMON (SALMO SALAR) OF RED INDIAN LAKE: AUGUST 1987

SAMPLE #	SEX	TOTAL LENGHT CM	TOTAL WEIGHT G	FORK LENGHT CM	AGE YRS	HG MG/KG	CR MG/KG	NI MG/KG	PB MG/KG	CU MG/KG	ZN MG/KG	CD MG/KG	FE MG/KG	LIPID CONT %
703646	F	31.3	303	2.9	6	0.09	L.2	0.10	L.05	0.58	9	L.02	4.1	2.4
703647	M	29.2	211	2.4	5	0.12	L.2	0.05	L.05	0.61	15	L.02	3.2	1.8
	M	28.8	189	2.8	5									
703648	M	28.5	198	3.0	6	0.07	L.2	0.05	L.05	0.60	13	L.02	5.5	2.8
703649	M	28.5	192	3.1	6	0.07	L.2	0.05	L.05	0.45	12	L.02	4.8	2.8
703650	M	31.0	213	2.6	5	0.11	L.2	0.05	L.05	0.34	11	L.02	4.4	1.3
	M	29.5	230	2.5	4									
703651	F	21.6	82	2.2	3	0.13	L.2	0.40	L.05	1.00	19	L.02	5.4	1.5
	M	22.0	112	-	4									
	F	24.9	130	2.2	-									
703652	F	28.8	203	3.0	5	0.10	L.2	0.05	L.05	0.51	13	L.02	4.0	2.3
	F	27.4	165	2.7	5									
703653	M	28.7	216	2.5	5	0.11	L.2	0.05	L.05	0.43	12	L.02	4.6	1.9
	F	28.6	221	2.8	-									
703654	F	28.6	221	2.8	-	0.28	L.2	0.05	L.05	0.41	11	L.02	3.4	1.3
703655	F	28.2	202	3.0	4	0.28	L.2	0.05	L.05	0.46	11	L.02	3.4	1.3
703656	F	31.4	250	2.8	6	0.16	L.2	0.05	L.05	0.52	13	L.02	4.1	1.1
703657	M	29.7	218	2.5	5	0.28	L.2	0.05	L.05	0.97	20	L.02	4.9	3.0
703658	F	30.0	213	2.8	5	0.19	L.2	0.05	L.05	0.62	17	L.02	5.1	1.7
703659	F	29.0	205	2.6	5	0.21	L.2	0.05	L.05	0.83	19	L.02	5.1	1.2
703660	M	27.8	204	2.8	5	0.06	L.2	0.06	L.05	0.57	15	L.02	6.4	3.0
703661	F	37.0	370	3.4	7	0.36	L.2	0.05	L.05	0.39	17	L.02	4.3	1.3
703662						0.35	L.2	0.05	L.05	0.38	17	L.02	4.1	1.3

TABLE 23: Summary table - Ranges of selected metals in landlocked salmon (*Salmo salar*) from Red Indian Lake (1984 and 1987), as compared to game fish from Labrador headwater lakes (Reported in mg/kg)

Parameter	1987 Survey	1984 Survey[1]	Labrador Lakes[2]
Chromium	<.02	Test not done	<.2
Cadmium	<.02	<.02-0.05	<.025-0.07
Copper	0.34-1.00	0.32-0.47	<.20-0.83
Lead	<.05	0.07-0.15	<.05-0.34
Zinc	9.-20	6.0-12.0	4.5-57.0
Mercury	0.06-0.36	0.24-0.62	0.020-1.93
Lipid Content (%)	1.1-3.0	1.45-2.64	-

1 Bailey (1988)

2 Lockerbie (1987)