WATER QUALITY OF LESSER SLAVE LAKE AND ITS TRIBUTARIES, 1991-93

Prepared by:

Leigh Noton, M.Sc., P. Biol.
Limnologist

Water Sciences Branch
Water Management Division
Natural Resources Service

March, 1998

W9804

Pub. No: T/746
ISBN: 0-7785-3186-4 (Printed Edition)
ISBN: 0-7785-3187-2 (On-Line Edition)
Web Site: http://www3.gov.ab.ca/env/info/infocentre/publist.cfm

Any comments, questions, or suggestions regarding the content of this document may be directed to:

Environmental Monitoring and Evaluation Branch
Alberta Environment
10th Floor, Oxbridge Place
9820 – 106th Street
Edmonton, Alberta T5K 2J6
Phone: (780) 427-6278
Fax: (780) 422-6712

Additional copies of this document may be obtained by contacting:

Information Centre
Alberta Environment
Main Floor, Oxbridge Place
9820 – 106th Street
Edmonton, Alberta T5K 2J6
Phone: (780) 427-2700
Fax: (780) 422-4086
Email: env.infocent@gov.ab.ca

EXECUTIVE SUMMARY

Lesser Slave Lake is the third largest lake in Alberta and supports important fisheries, provincial parks, recreation areas, water supplies, and other uses. The lake has been well investigated with respect to fisheries but a comprehensive water quality or limnological survey has not been carried out on it previously. To document existing water quality of the lake and its major inflows, particularly with regard to nutrient and algal conditions, a water quality survey was conducted in the 1991-93 period. The two main basins of the lake, five tributaries, and the lake's outflow were sampled monthly during the ice-free season, and additional sampling was done on the inflow and outflow of Buffalo Bay.

Lesser Slave Lake has a surface area of 1160 km^2 and a mean depth of 11.4 m. The lake is well mixed by wind action and thermal stratification is weak and transitory. It is well oxygenated, even in winter, and much of the water column contains more than 5 mg/L of dissolved oxygen year-round. Calcium and bicarbonate are the predominant ions, the lake water is slightly alkaline, and total dissolved solids are about 100 mg/L, which is somewhat lower than most central Alberta lakes. Turbidity can be high near shore due to silty tributary inflows, wave action, and algal blooms, but turbidity in the central areas of the lake is mainly due to algal blooms. Algal density reached high levels in mid- and late-summer of 1992 and 1993, with the blue-green alga *Aphanizomenon flos-aquae* forming dense blooms, particularly in the west basin. This reflects the moderately high nitrogen and phosphorus concentrations in the lake (eutrophic conditions). Concentrations of chlorophyll *a*, the main measure of algal density, were very high for the amount of phosphorus present.

Most metals were only occasionally detectable in the lake. Arsenic, barium, iron, and manganese were present at background levels, and lower in concentration than in the tributaries to the lake. Dissolved organic carbon was higher in the west basin than the east, and both were lower than in the tributaries. No pesticides or trace organic 'priority pollutants' were detected in the lake water. Bacterial densities in the main basin composite samples were typical of background conditions. Most water quality variables complied with Alberta and Canadian guidelines. Exceptions were Secchi visibility (water clarity) due to algal blooms, dissolved oxygen in near-bottom waters, nitrogen and phosphorus (reflecting the eutrophic nature of the lake), and occasionally some metals which appear to exceed the guidelines naturally. Lesser Slave Lake is a biologically productive, freshwater lake. The main concern with respect to water quality is the high nutrient and algal content, particularly in the west basin.

The five tributaries sampled during 1991-92 in this survey, the South Heart, Driftpile, Swan, and Assineau rivers, and Marten Creek, account for over three quarters of the inflow to Lesser Slave Lake. Water temperatures ranged from $0^{o}C$ in winter to 20-$22^{o}C$ in summer in these tributaries. All were near saturation with dissolved oxygen in the open-water season but some, particularly the South Heart River, had oxygen deficits in winter. Calcium and bicarbonate are the dominant ions, total dissolved solids are moderate in concentration, and ion and total dissolved solids concentrations increase in winter due to the greater proportion of groundwater in the river flow. Suspended solids fluctuate with discharge in these streams and can be quite high in

concentration. Dissolved organic carbon, colour, iron, and manganese were fairly high, and these variables are interrelated. Phosphorus and nitrogen were fairly high in these tributaries, particularly the South Heart River. Some metal and trace element concentrations appeared to be related to suspended solid and perhaps organic content, particularly iron, copper, and manganese. The Assineau River, followed by the South Heart River, often had highest metal concentrations. Some elements, namely beryllium, cadmium, and mercury, were essentially not detectable. All of the tributaries had a high organic content, typical of boreal streams, which was reflected in high values for organic carbon, tannin and lignin, and phenolics. No pesticides or trace organic 'priority pollutants' were detected in the four rivers sampled for these contaminants (the South Heart, Driftpile, Swan, and Lesser Slave rivers). Bacterial counts in the rivers were typical of background conditions.

Many of the water quality variables in these tributaries complied with the Alberta and Canadian guidelines. Notable exceptions were dissolved oxygen in winter, the nutrients nitrogen and phosphorus, and the metals iron and manganese. These tributaries to Lesser Slave Lake are brown-water, periodically turbid, somewhat alkaline, rich in iron, manganese, and organic compounds, and fairly typical of boreal streams. The outflow from the lake, the Lesser Slave River, differed notably from the lake's tributaries, being more stable in most variables, and much lower in concentration of nutrients, metals, and organic carbon.

A preliminary nutrient budget was prepared to evaluate Lesser Slave Lake's internal and external phosphorus sources. Phosphorus is the nutrient most often controlling the amount of algae present in lake water, and the nutrient and algal content is the main water quality concern for the lake. Tributary inputs were estimated to supply $99x10^3$ kg/yr and precipitation was estimated to supply $23x10^3$ kg/yr, for a total external load of $122x10^3$ kg/yr of total phosphorus (TP). The net internal release of TP from lake bottom sediments was estimated to be about $230x10^3$ kg/yr, nearly double the external supply. The theoretical TP supply from sewage, based on a per capita rate, was about 2% of the total supply to the lake. No obvious opportunities for significantly reducing the TP supply to Lesser Slave Lake are apparent. However, to avoid exacerbating nutrient and algal conditions, phosphorus inputs should not be allowed to increase.

The inflow and outflow of Buffalo Bay were sampled on 14 occasions in 1991-92 to assess the effect of this marshy water body on general water quality and the load of nutrients passing through it in the South Heart River. Some effects were apparent on variables such as pH, dissolved oxygen, ammonia-N, and total coliform bacteria, probably as a result of seasonal metabolism of the rich littoral community in this shallow water body. However, no net retention or release of suspended solids, phosphorus, total nitrogen, silica, or dissolved organic carbon was apparent. This may be a result of the fairly short residence time in the bay, and the presence of depositional areas upstream of Buffalo Bay which remove readily-settleable material.

ACKNOWLEDGEMENTS

Water quality sampling was carried out by D. LeClair, B. Jackson, J. Willis, and others of the Monitoring Branch, Water Management Division. N. Assmus and crews gauged stream flows. The Buffalo Bay component of the program was made possible by the sampling and general assistance of Mary-Lou McCue and students of the Alberta Vocational College, Grouard. Laboratory analyses were carried out at the Alberta Environmental Centre (D. Smillie), the Alberta Provincial Laboratory of Public Health, and the Mill Woods facility of the Water Management Division (M. Hussey). Electronic data processing was done by R. Tchir and K. Saffran, and tables and graphs were prepared by K. Saffran and B. Halbig. Flow estimates and compilations were prepared by A. DeBoer. D. Trew and P. Mitchell reviewed drafts of the report and B. Halbig formatted the final document.

ABBREVIATIONS

AEC	Alberta Environmental Centre (now Alberta Research Council, Vegreville)
AEP	Alberta Environmental Protection
AOX	Adsorbable Organic Halides
AWQG	Alberta Ambient Surface Water Quality Interim Guidelines
BOD	Biochemical Oxygen Demand
CWQG	Canadian Water Quality Guidelines
DL	Detection Limit
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DP	Dissolved Phosphorus
NAQUADAT	The water quality data base used by AEP until 1997
NFR	Non-filterable Residue
NTU	Nephelometric Turbidity Units
SS	Suspended Solids
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TP	Total Phosphorus

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

Lesser Slave Lake is the third largest lake in Alberta. It supports major sport, commercial, and domestic fisheries and two large provincial parks (Paetz and Zelt 1974). There are several beaches, campsites, recreation areas, docks, harbours, and cottages on the lake that receive considerable use. The lake has been the subject of aquatic investigations due to the collapse of the whitefish fishery in the 1960's, concern about sediment input from oil-field erosion in the Swan Hills after 1957, and regulation of the lake level in the 1970's and 1980's. Limnological measurements have been made from time to time by fisheries staff of the Alberta government, some of which have been compiled by Weisgerber (1977), and existing information on the lake has been assembled in the Atlas of Alberta Lakes (Mitchell and Prepas 1990). However, a comprehensive water quality or limnological survey had not been carried out on Lesser Slave Lake. Residents and other users of the lake are very interested and concerned about protecting the lake's water quality.

To address this information gap, a water quality survey was initiated in 1991 on Lesser Slave Lake and its major inflows. Unlike most recreational lakes in the province, Lesser Slave receives sizeable tributaries, and their water quality was considered pertinent to lake water quality. The objective of the survey was to document existing conditions in the lake and its major inflows, particularly with respect to nutrient and algal concentrations, the issue of main concern in most recreational lakes in the province.

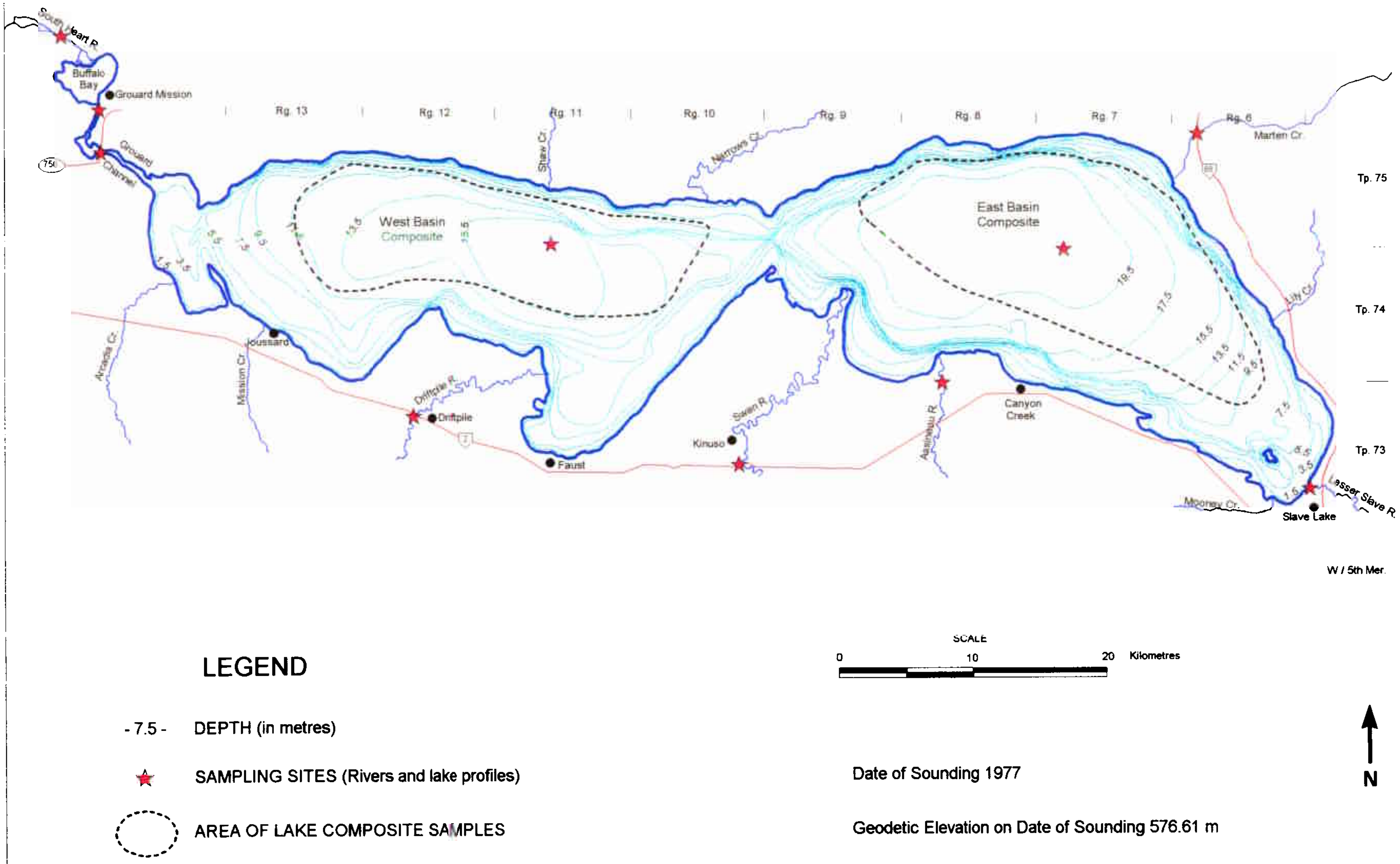
2.0 METHODS

The Lesser Slave Lake water quality survey was initiated in spring, 1991, and carried through to the fall of 1993. River sampling was completed in 1992, but sampling of the lake was extended into 1993 because rough weather had limited the number of samples collected in the early part of the survey. Sampling was generally done monthly during the open-water season, and once during winter. Field, lab, and office procedures are outlined below.

2.1 FIELD

The sampling sites are shown in Figure 2-1 and listed in Appendix A-1. To represent overall water quality in the two main basins of the lake, 10-point composite samples were collected

Figure 2-1. Water quality sampling sites, Lesser Slave Lake and tributaries.



from the euphotic zone in the areas indicated in Figure 2-1. The euphotic zone is the water stratum from the surface to the depth of 1% light penetration, and is the layer sampled in standard lake surveys in Alberta. As well as the composite samples, depth profiles of temperature, oxygen, light penetration, and grab samples of other variables, were taken at the 'profile' sites in the two basins.

River grab samples and *in situ* measurements were generally taken from the channel centre at the tributary sampling sites (Figure 2-1). The exception was the Grouard Channel site on the South Heart River where initial field measurements of conductance indicated that the river was not always well-mixed across the channel. This may reflect the inflow of the East Prairie River from the south, joining the main flow of the South Heart from Buffalo Bay. To obtain representative samples at this site, five-point, cross-channel, composite sampling was done from the bridge.

All field methods followed the standard procedures of Alberta Environmental Protection (AEP 1993). Replicate and field blank samples were collected periodically for analytical quality assurance. As well as the flow gauging records collected by gauging stations in the area, measurements of discharge were taken at the tributary sampling sites on most of the sampling occasions.

2.2 LABORATORY

The water quality variables analyzed during the survey and their method codes are listed in Appendix A-2. Oxygen, chlorophyll *a*, and phosphorus were analyzed at the McIntyre facility of AEP. Bacteria were analyzed at the Northern Alberta Provincial Laboratory of Public Health. All other samples were analyzed at the Alberta Environmental Centre, Vegreville. Phytoplankton samples collected in the euphotic composite sampling were preserved and archived at the McIntyre facility.

2.3 OFFICE

All data from field and lab measurements were inspected and verified before electronic transmission to the NAQUADAT database of AEP. Quality assurance data were reviewed regularly and any problems were taken up with field and lab staff in order to identify and correct the causes. Flow estimates for the 1991-93 period were computed for sampled and unsampled tributaries to

Lesser Slave Lake by utilizing gauging records, spot measurements from the sampling program, lake level records, precipitation records, drainage basin areas, and unit run-off values. The mass flux or transport of nutrients, often referred to as 'load', was estimated using the programs in FLUX 4.5 (Walker 1987), which is discussed further in Section 5.2.

3.0 LESSER SLAVE LAKE

3.1 INTRODUCTION

This section presents data for and describes the water quality conditions of Lesser Slave Lake in the 1991-93 period. Data from reconnaissance sampling in 1989 and 1990 are also included. Most of these data were collected at profile or composite sites in the central areas of the two main basins (Figure 2-1) and are compiled in Appendices B-1 and B-2.

The basic physical features of the lake have been described by Mitchell and Prepas (1990) and are summarized in Table 3-1. With a surface area of 1160 km^2, Lesser Slave is the third largest lake in Alberta. Its maximum depth is 20.5 m, with the east basin being generally deeper than the west basin (Figure 2-1). Separate volumetric calculations for the two basins were done as part of the nutrient budget in this study (Section 5.5) and are compiled in Appendix D-2.

Table 3-1. Characteristics of Lesser Slave Lake.

Elevation	576.6 m
Area (incl. Buffalo Bay)	1160 km^2
Volume (incl. Buffalo Bay)	13,200 x 10^6 m^3
Maximum depth	20.5 m
Mean depth	11.4 m
Shoreline length	241 km
Mean annual precipitation	472 mm
Mean annual surface inflow	1550 x 10^6 m^3
Mean water residence time	9.5 yr
Drainage basin area (excl. lake)	12,400 km^2

Note: Adapted from Mitchell and Prepas 1990.

3.2 TEMPERATURE AND OXYGEN

Temperature and oxygen data collected at the profile sites are compiled in Appendix B-2 and graphed in Figures 3-1 & 3-2. Water temperatures ranged up to 20°C in the east basin and 21°C in the west basin, with surface waters approaching these values more frequently in the west than the east. The west basin appears to be somewhat warmer in the summer, probably because it is shallower. This difference disappears or even reverses slightly in fall (Figures 3-1 & 3-2), when the lake is cooling down. Both basins showed only weak and temporary thermal stratification during the open-water season, with the vertical temperature difference rarely exceeding 5°C in the east basin, and always being less than 5°C in the west basin. Even the deeper east basin was virtually isothermal on some occasions in summer, e.g., 31 July 1991 and 12 August 1993 (Figure 3-2). The lack of distinct stratification at these central sites reflects the long fetch (ca. 50 km) and strong wave action in both basins. These temperature conditions are consistent with those found during earlier work by Miller (1941) and the former Fish and Wildlife Division (Weisgerber 1977; Fish & Wildlife Div. unpubl. data), i.e., that maximum surface temperatures are only slightly over 20°C and thermal stratification is transitory. Local conditions in protected bays and near shore may vary from this, of course.

In winter, inverse thermal stratification was observed in both basins during this study (Figures 3-1 & 3-2), with surface temperatures near 0°C and bottom temperatures near 3°C. The temperature profile of the east basin inflected at 10-13 m but the profile of the west basin showed a more even vertical gradient.

Dissolved oxygen (DO) profiles are also graphed in Figure 3-1 & 3-2. In the open-water seasons of 1991-93, the upper 8-10 m of the water column in the west basin and the upper 10-12 m in the east basin were well oxygenated and generally near saturation. Below those depths, some depletion occurred on occasions when thermal stratification was present, however, such depletion was not severe. In the west basin, DO was not observed to decline below 5 mg/L in the top 12 m of the water column and in the east basin, DO did not decline below 5 mg/L in the top 16 m (Figures 3-1 & 3-2). Note that at similar depths, the east basin was generally better oxygenated than the west basin. In July 1992 and August 1993 in the west basin, DO became supersaturated in near-surface waters. This was likely due to high algal photosynthesis during bloom conditions (see Section 3-4).

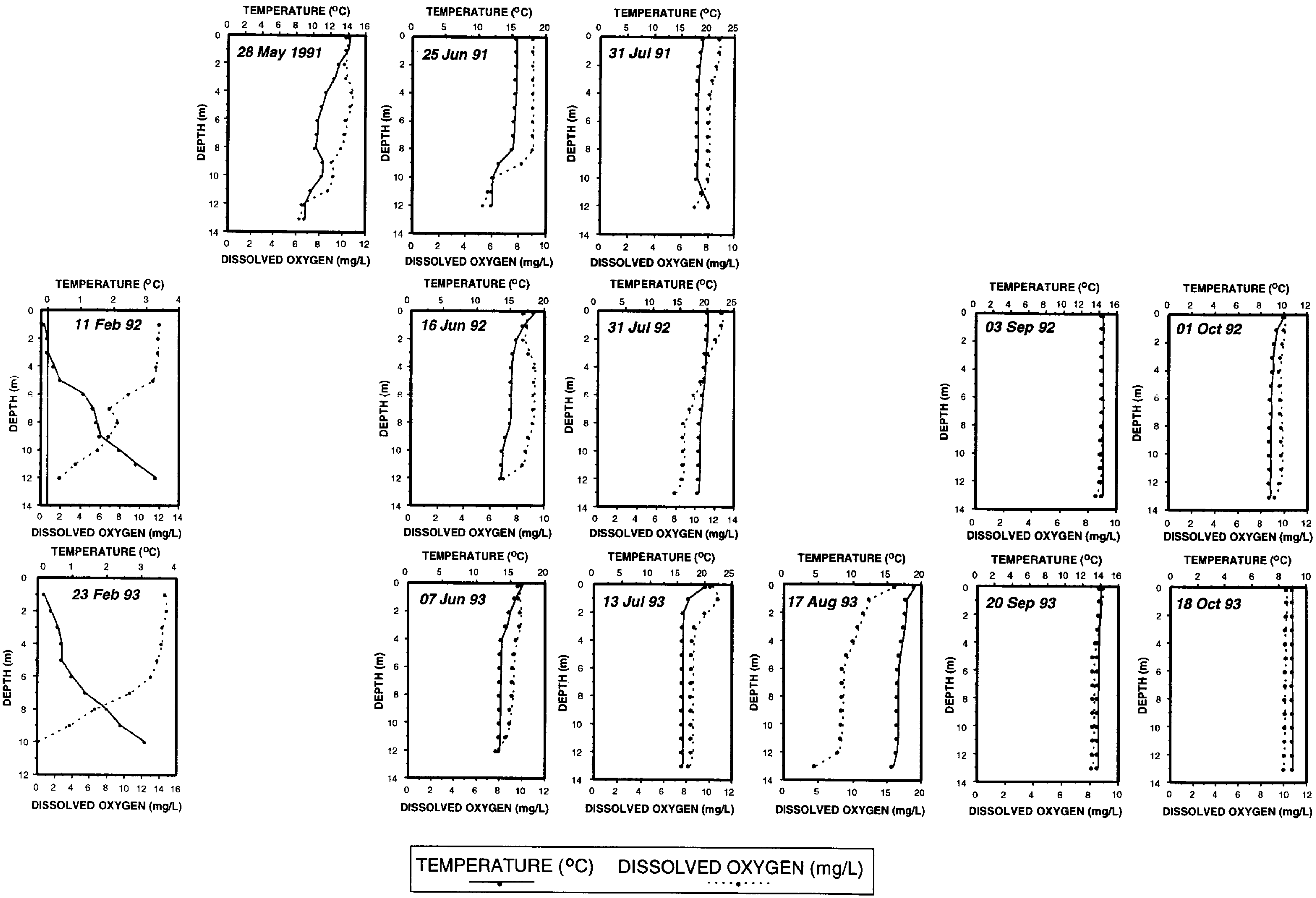


Figure 3-1. Temperature and dissolved oxygen profiles for Lesser Slave Lake west basin, 1991-1993.

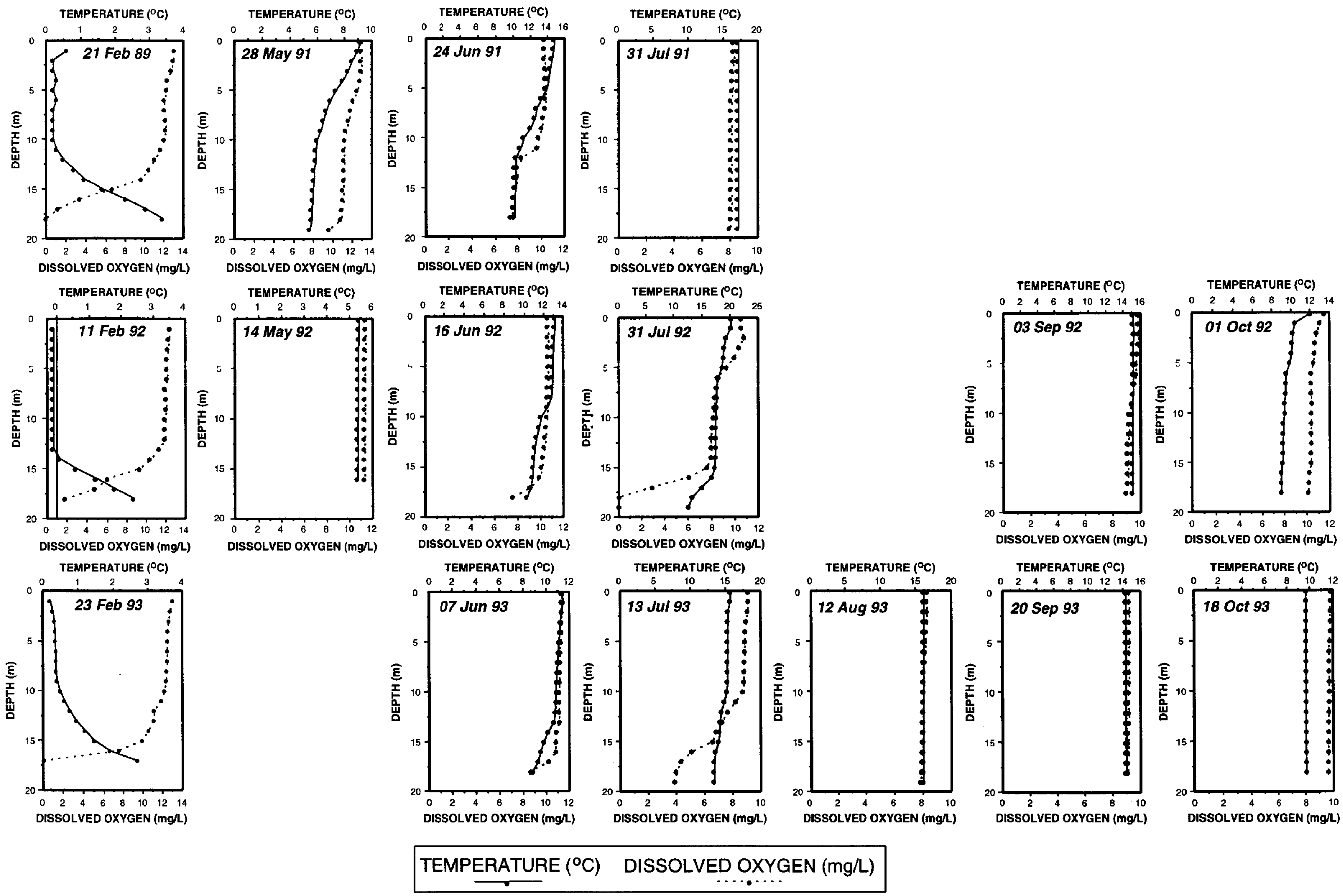


Figure 3-2. Temperature and dissolved oxygen profiles for Lesser Slave Lake east basin, 1989, 1991-1993.

In winter, the west basin was near saturation with respect to DO down to about 5-6 m, below which DO declined to 0-2 mg/L near the bottom. In the east basin, DO was near saturation in winter down to about 12 m. The greater depth of well-oxygenated water in winter in the east basin probably reflects the lower density of phytoplankton that occurs there in summer (Section 3-4) and the greater total depth of water, compared to the west basin.

When summer thermal stratification persists in Lesser Slave Lake, the deeper waters develop an oxygen deficit (i.e., DO is less than saturated). This was observed by Miller (1941) and Weisgerber (1977), is apparent from other measurements made by the Fish and Wildlife Division (Ash and Noton 1979), and is consistent with the data reported here. When a vertical gradient in water temperature is present in summer, a roughly parallel gradient in DO often develops. Oxygen deficits then occur which extend to varying heights in the water column. The cause of these deficits is a combination of the oxygen demand of bottom sediments and of settling organic material from the fairly productive euphotic zone. The occurrence and severity of DO deficits in the lake's deeper waters will vary with the degree of thermal stratification, which in turn will vary with wind mixing, season, and from year to year.

3.3 IONS AND GENERAL WATER CHEMISTRY

Data from the composite sites for major ions and general water quality variables for Lesser Slave Lake are summarized in Table 3-2. As with most central Alberta lakes, the dominant ions on a weight basis are calcium and bicarbonate, and the lake water is moderately alkaline. During 1991-93, the west basin was about 5% higher in concentration of dissolved ions and total dissolved solids (TDS). Lesser Slave is somewhat fresher than most of the central Alberta recreational lakes (Mitchell and Prepas 1990).

The turbidity of the lake water varies with the development of plankton populations and silt input from tributaries (Paetz and Zelt 1974; Weisgerber 1977). High turbidity occurs near river mouths at times of high inflows, but the general clarity of the lake as a whole is probably more controlled by the standing crop of plankton. The composite samples in this study were collected from central areas of the main basins (Figure 2-1) so as to avoid the high variability near shore. Turbidity and suspended solids were somewhat higher in the west basin than in the east (Table 3-2), corresponding to the generally greater amounts of phytoplankton there (as measured by chlorophyll *a*) and lower Secchi visibility (Table 3-3). Secchi disc visibility at the two profile sites ranged from 1.3 to 3.8 m in the east and from 0.7 to 3.2 m in the west (Appendix B-1). The greater amount of phytoplankton and turbidity in the west basin has been observed by previous workers as well (Miller 1941; Weisgerber 1977).

Table 3-2. Routine water quality variables from Lesser Slave Lake euphotic composite samples, 1991-93.

VARIABLE	WEST BASIN		EAST BASIN	
	MEAN	SE	MEAN	SE
pH (range)	7.6-8.5		7.7-8.4	
Total Alkalinity (as $CaCO_3$)	93	4	88	2
Total Dissolved Solids (calc.)	106	3	102	3
Conductance (μS/cm)	200	5	192	2
Hardness (as $CaCO_3$)	85	3	81	3
Sodium, diss.	7.7	0.8	7.4	0.8
Potassium, diss.	2.6	0.1	2.4	0.1
Calcium, diss.	24.6	1.2	23.3	1.1
Magnesium, diss.	5.8	0.4	5.6	0.6
Bicarbonate (HCO_3)	113	4	107	2
Carbonate (CO_3)	3.0	0	1.0	0
Chloride, diss.	1.0	0.3	1.0	0.2
Sulphate, diss.	9.7	1.8	9.6	3.6
Fluoride, diss.	0.09	<0.01	0.09	0.01
Manganese, total	0.055	0.03	0.058	0.04
Suspended Solids (NFR)	3.3	1.5	3.1	1.5
Turbidity (NTU)	3.3	0.6	2.7	0.6
Colour (true)	16	2	13	2
Dissolved Organic Carbon	11.4	1.5	9.6	0.8

Note: Results are mg/L unless noted. SE = standard error of the mean.

Mean values for true colour and dissolved organic carbon (DOC) are also somewhat higher in the west basin of Lesser Slave Lake (Table 3-2). The values for colour are close to the average reported for 19 'freshwater' Alberta lakes by Mitchell and Prepas (1990).

3.4 NUTRIENTS AND TROPHIC STATE

Detailed data for nutrients and trophic state variables are compiled in Appendices B-1 and B-2 and summarized in Table 3-3. Nitrogen and phosphorus are the main nutrients controlling the amount of phytoplankton occurring in lakes. The concentration of chlorophyll *a* in lake water is the variable normally used to measure the amount of algae suspended in the water (the phytoplankton). The amount of algae in turn influences the water's transparency, commonly measured as the depth of visibility of a Secchi disc. Iron and silica are also nutrients required by algae and are involved in nutrient-algal dynamics.

Table 3-3. Nutrients and related variables from Lesser Slave Lake euphotic composite samples, 1991-93.

VARIABLE	WEST BASIN		EAST BASIN	
	MEAN	SE	MEAN	SE
Nitrogen				
- NO_2+NO_3	0.007	0.01	0.008	0.01
- Ammonia	0.025	0.020	0.013	0.006
- Total Kjeldahl	1.06	0.63	0.63	0.38
Phosphorus (μg/L)				
- Total	48.5	23.4	28.2	16.2
- Dissolved	12.2	2.8	8.0	1.1
Iron, total	0.100	0.10	0.072	0.07
Silica, reactive	3.8	2.3	1.6	1.9
Secchi (m)	2.0	0.8	2.6	0.7
Chlorophyll *a* (μg/L)	54.3	59.6	27.0	30.4

Note: Results are mg/L unless noted. SE = standard error of the mean.

Mean data for the above variables are compiled in Table 3-3. As for ions, the west basin had higher concentrations of nutrients and chlorophyll *a*, with correspondingly lower Secchi visibility. The fluctuations of total phosphorus (TP), chlorophyll *a*, and Secchi visibility during the open-water season of the three study years (Figure 3-3) indicate that TP and chlorophyll *a* built up to peak levels in August in the west basin, but that the peak was later and lower in the east basin. The depth profile data for TP (Appendix B-2) show that higher concentrations occurred in the bottom waters in both basins in the early part of summer, indicating that phosphorus was being released from bottom sediments and contributing to the rise in concentrations in the euphotic composite samples later in the summer (Figure 3-3). This apparent sediment release began in June in the west basin but in July in the east basin, consistent with the later peak in euphotic TP in the east. The earlier peak, then decline, in the west basin, and the later rise in the east basin, are typical of shallow and deep central Alberta lakes, respectively. In surface waters, total phosphorus became more concentrated during July-September in the west basin (Appendix B-2), and during September-October in the east basin, probably due to surface accumulations of blue-green algae. Nutrient dynamics are considered further in Section 5.

The amount of phosphorus and chlorophyll *a* in the two basins of Lesser Slave Lake is ranked with that of other Alberta lakes in Figures 3-4 and 3-5, respectively. These province-wide comparisons are done with average 'summer' concentrations (May to September) and because only part of the summer of 1991 was sampled, only the more complete data from 1992 and 1993 were used for Lesser Slave Lake. As a result, the values in the graphs differ somewhat from those in Table 3-3, which include all 1991-93 data. Based on 1992-93 TP, the west basin falls into the eutrophic category and the east basin falls into the mesotrophic category. The average of the two would put Lesser Slave Lake near the mid-point of Alberta lakes in terms of phosphorus content. However, in terms of chlorophyll *a* content, Lesser Slave ranks much higher on the productivity scale, with the west basin being hypereutrophic and the east being eutrophic. That is to say, there is a relatively high amount of chlorophyll produced per unit phosphorus in the lake. The chlorophyll *a* : TP ratio for the 1992-93 summers was 1.01 in the west basin and 0.70 in the east basin. These are the highest and fourth highest ratios, respectively, of the 140 Alberta lakes for which reasonably complete summer data are available (Figure 3-6).

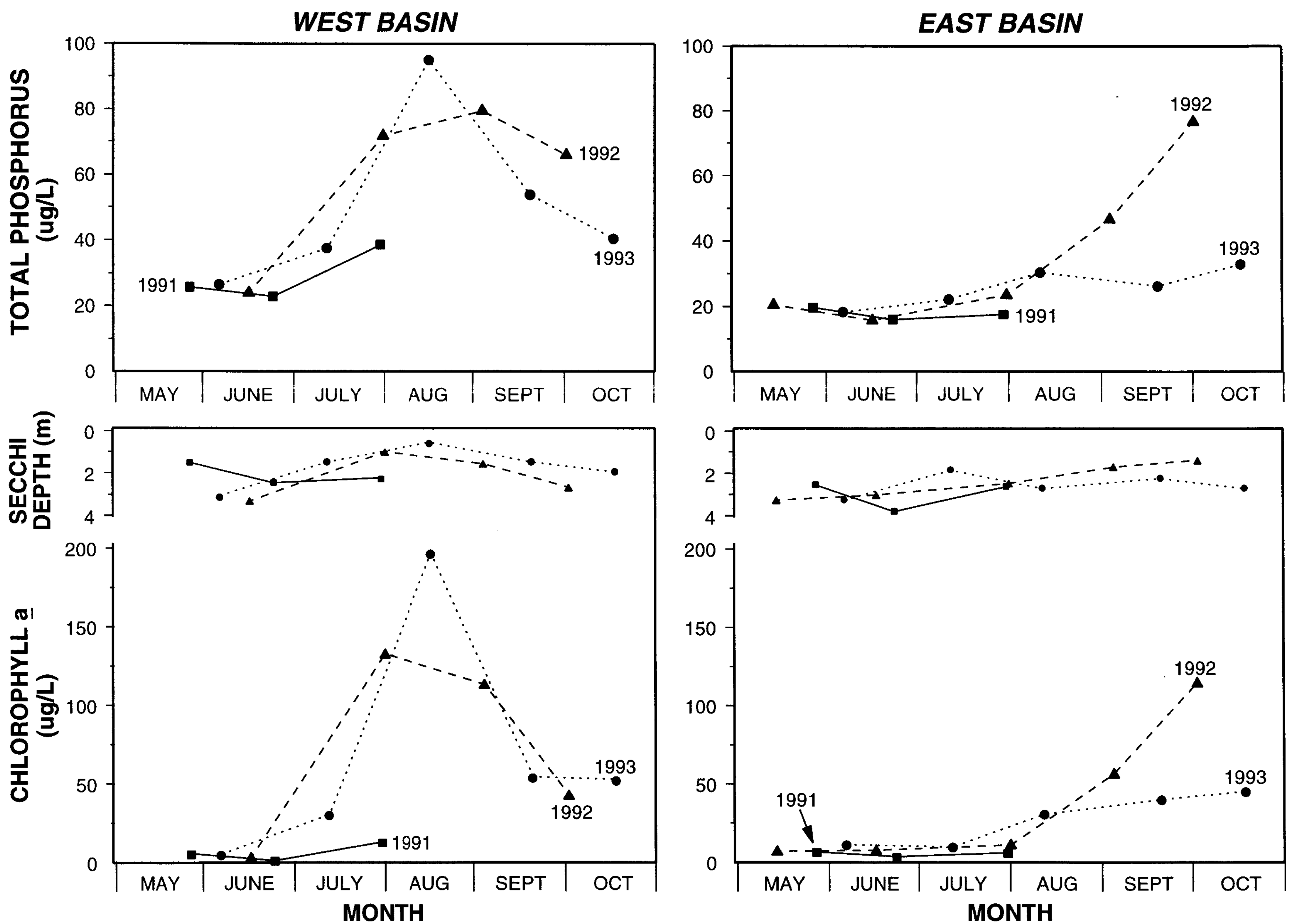


Figure 3-3. Total phosphorus, chlorophyll a, and Secchi visibility in Lesser Slave Lake, 1991-93.

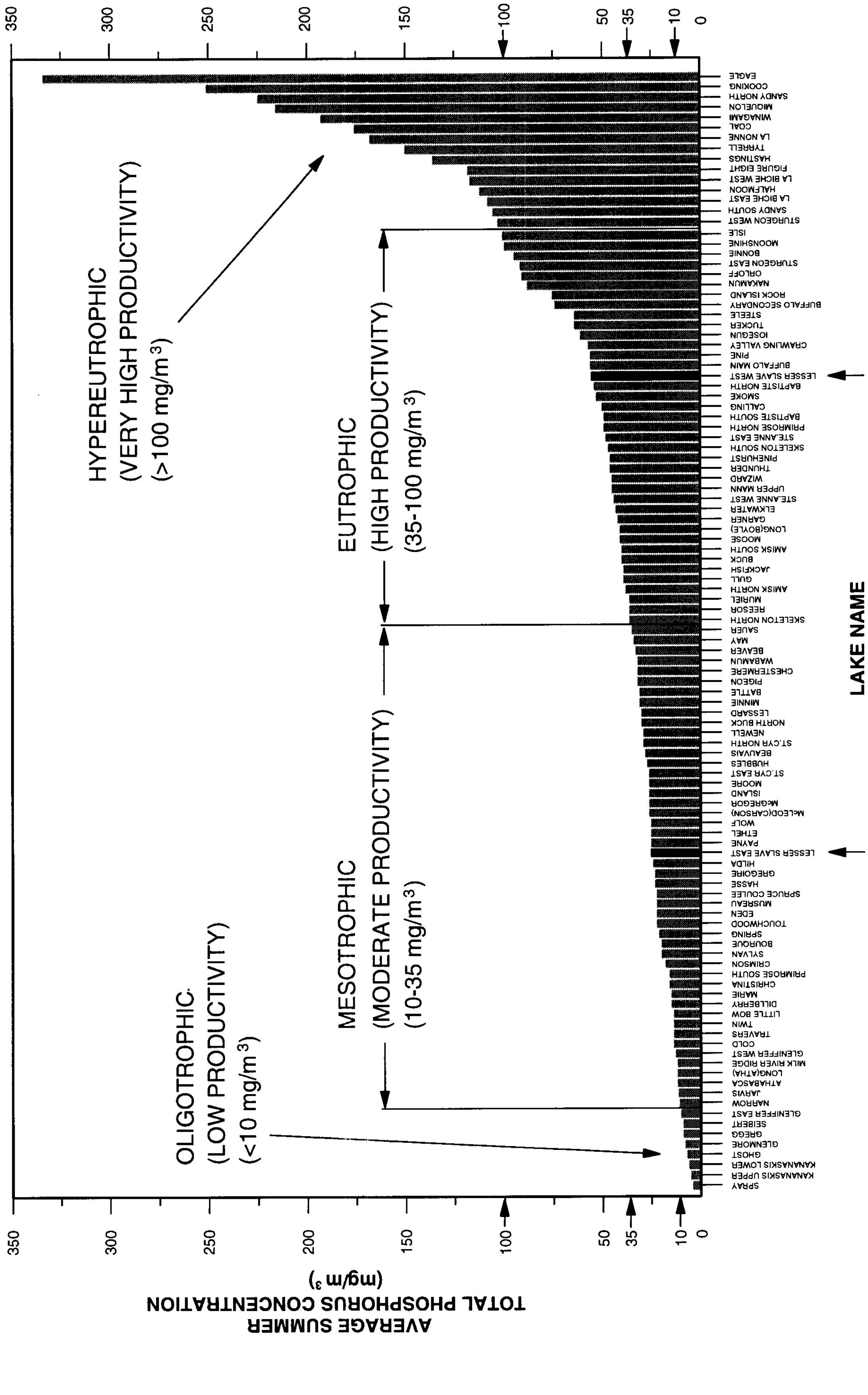


Figure 3-4. Concentration of total phosphorus in Lesser Slave Lake, 1992-93, compared with other Alberta lakes.

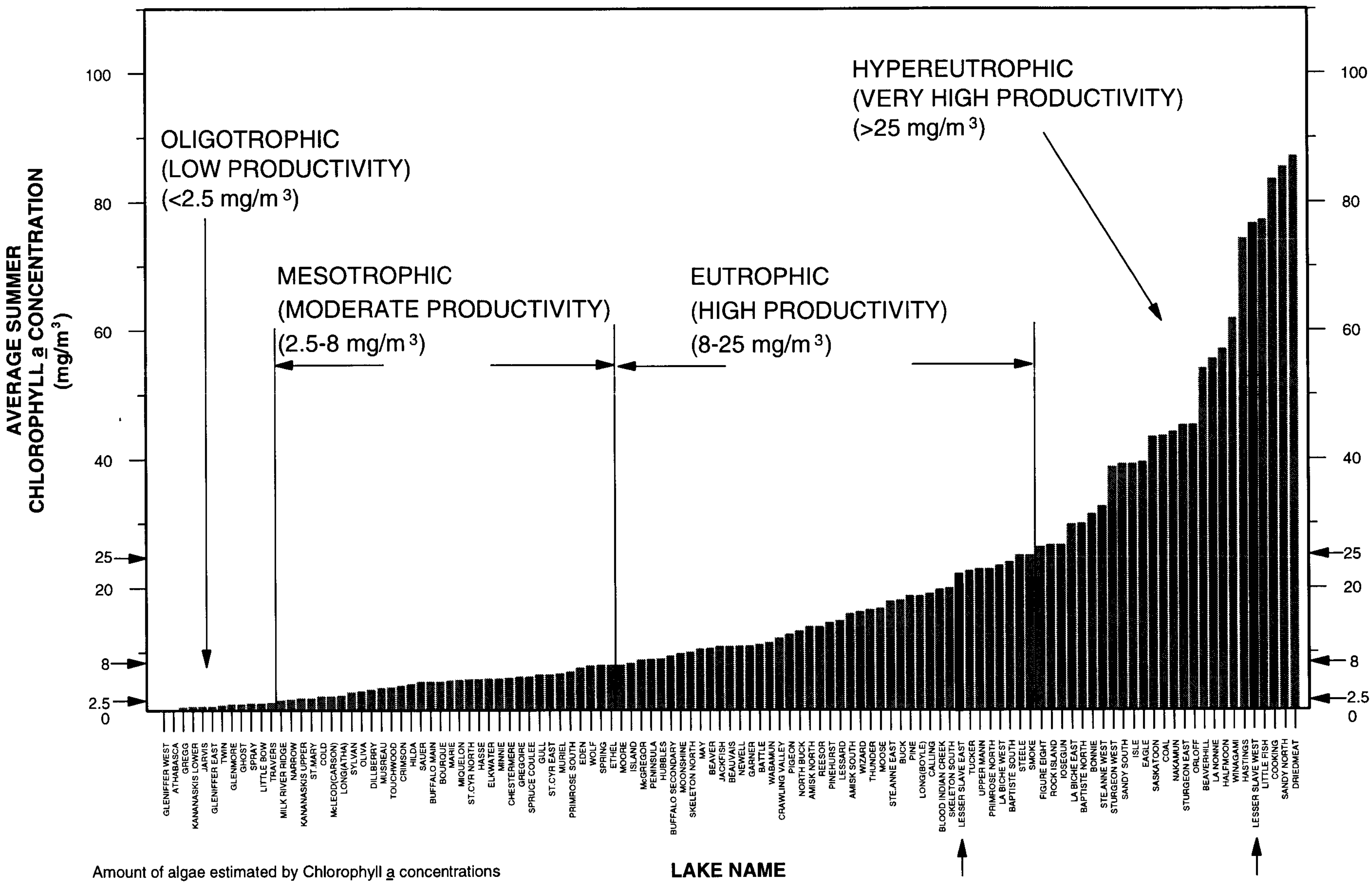


Figure 3-5. Concentration of chlorophyll a in Lesser Slave Lake, 1992-93, compared with other Alberta lakes.

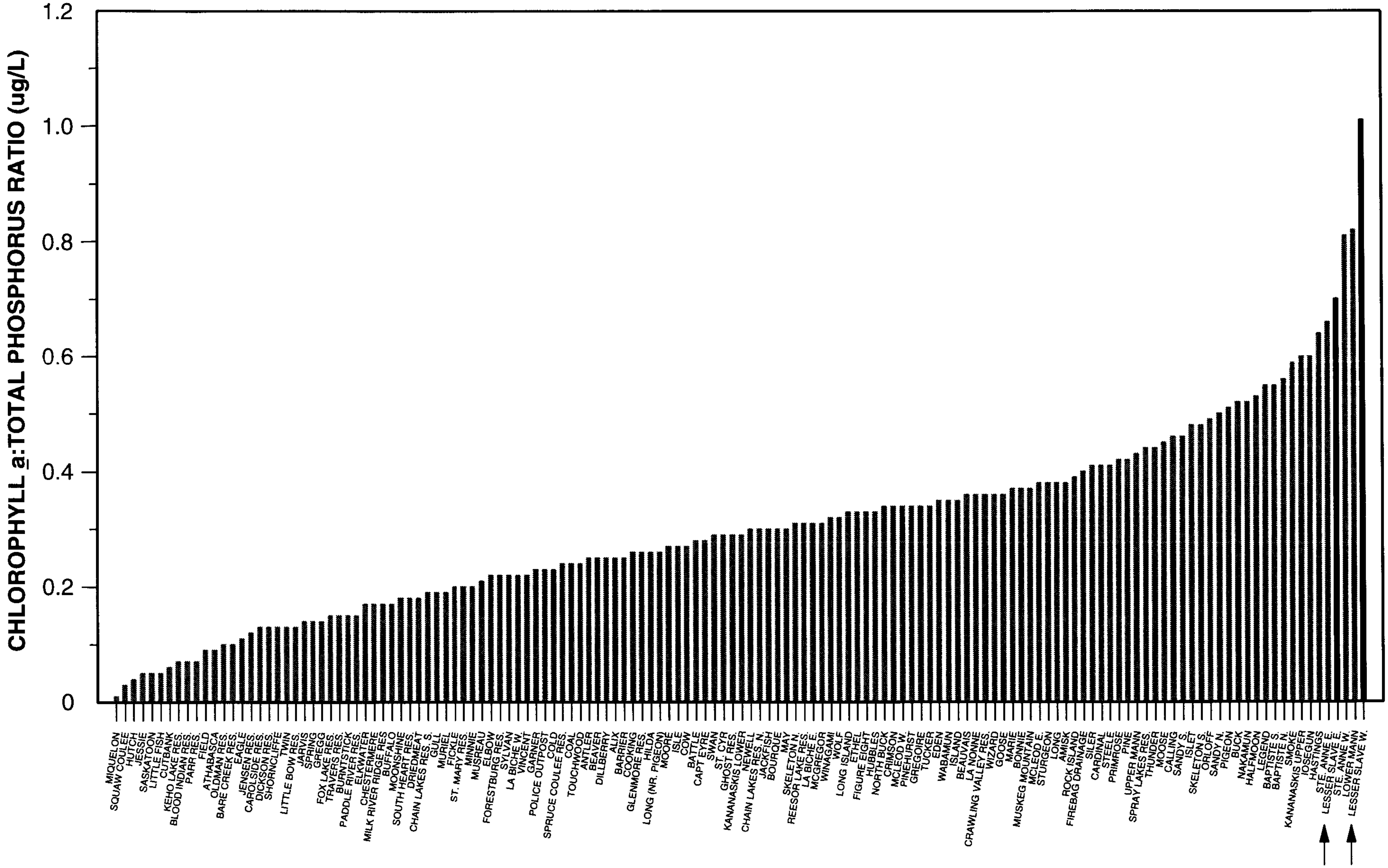


Figure 3-6. Chlorophyll a : total phosphorus ratios for Alberta lakes based on average summer concentrations. Data collected May-September, 1980-1993.

The reason for such high ratios is not clear. The dominance of the summer phytoplankton by *Aphanizomenon flos-aquae* may contribute to this because filamentous algae such as these can interfere with zooplankton grazing, thereby allowing higher biomass to accumulate (Chow-Fraser *et al.* 1994). However, lots of other Alberta lakes also have such algae, but have lower ratios. Year to year variability may also have contributed to the high ratio in 1992-93, since the ratio in the limited 1991 data (Appendix B-1) was lower than the ratio for the corresponding months in 1992 and 1993. The lower chlorophyll *a*:TP ratio in the east basin may be due to the greater mixing depth there, which would result in phytoplankton spending a greater proportion of time at greater depths with lower light, thereby reducing photosynthetic rates and biomass accumulation.

Total nitrogen (TN) is calculated as the sum of total Kjeldahl-N and (NO_2 + NO_3)-N. During this study Lesser Slave Lake had concentrations of TN of 1.067 and 0.638 mg/L in the west and east basins, respectively (Table 3-3). The mean TN of Alberta 'freshwater' lakes has been reported as 1.081 mg/L (Mitchell and Prepas 1990). Total inorganic nitrogen (TIN) includes the forms of N that are readily available for uptake by algae and other plants, and is calculated as $NH_3 + NO_2 + NO_3$, all as N. Concentrations of TIN in 1991-93 were 0.032 and 0.021 mg/L in the west and east basins, respectively, which is somewhat lower than the mean of about 0.050 mg/L reported for Alberta lakes by Mitchell and Prepas (1990).

Aquatic plants require nitrogen and phosphorus in a weight ratio of approximately 7:1, and if the ratio departs markedly and consistently from this in a lake, it can indicate which of these nutrients is limiting plant growth (Wetzel 1983). In Lesser Slave Lake, the TN:TP ratio was about 22 in both basins, based on the data in Table 3-3, suggesting that TP is the limiting nutrient overall. For the two forms most readily utilized by aquatic plants, TIN and dissolved phosphorus (DP), their ratio was 2.6 in both basins during 1991-93. This indicates that N may limit algal growth at least part of the time, and could favour the occurrence of blue-green algae that can fix gaseous nitrogen.

The possible temporary N limitation noted above is consistent with the type of algae that appear to dominate the summer phytoplankton of Lesser Slave Lake. In 1991-93, *Aphanizomenon flos-aquae* began to appear in June and built up to very dense accumulations (blooms) in July through September, particularly in the west basin. Noticeable amounts of this algae were still present in late fall. This species forms macroscopically-visible colonies which resemble small grass clippings, and is a recognized N-fixer. Previous investigators have also recorded the occurrence of blooms of blue-green algae (now generally classified as cyano-bacteria) in Lesser Slave Lake (Miller 1941; Weisgerber 1977). They also noted higher densities of algae in the west basin and the prevalence of *Aphanizomenon flos-aquae* in the blooms. Samples of phytoplankton were collected in 1991-93 along with the other composite water quality samples, and have been archived.

Iron and silica concentrations were also higher in the west basin than in the east basin of Lesser Slave Lake (Table 3-3). Silica is an important nutrient for diatom algae and it is probable that silica is taken up by these algae in the lake, with a net sedimentation of silica in diatom cells, since silica concentrations in the lake are much lower than in the tributary streams (Section 4). The concentrations of iron in Lesser Slave Lake are somewhat higher than the mean of about 0.067 mg/L reported for Alberta freshwater lakes by Mitchell and Prepas (1990).

3.5 METALS AND TRACE ELEMENTS

Composite samples from the two basins of Lesser Slave Lake were analyzed regularly for metals and trace elements (Appendix B-1 and Table 3-4). Several metals were undetectable, i.e., mercury, beryllium, cobalt, and vanadium. Several others were detected occasionally at levels only slightly above the detection limit, namely, aluminum, cadmium, chromium, molybdenum, nickel, lead, and selenium. Of the remainder, arsenic, barium, iron, and manganese are regularly present in surface waters at levels well above detection limits, and the concentrations found in Lesser Slave Lake were lower than in most of the tributaries to the lake (Section 4). This indicates these elements are subject to a net removal in the lake, through sedimentation of organic and inorganic particles.

Samples from discrete depths were also collected and analyzed for metals on some occasions, mainly in winter (Appendix B-2). These data indicate that arsenic, barium, iron, and manganese can occur in much higher concentrations in near-bottom waters. This may be partly as a result of sedimentation of particulate material from the overlying water column, with accumulation of the particles and these elements in them near the bottom.

Table 3-4. Metals and trace elements from Lesser Slave Lake euphotic composite samples, 1991-93.

VARIABLE	WEST BASIN		EAST BASIN	
	MEDIAN	RANGE	MEDIAN	RANGE
Aluminum, extr.	<0.01	<0.005-0.04	<0.01	<0.005-0.01
Arsenic	0.0014	0.0009-0.0017	0.0008	0.0007-0.0010
Barium	0.054	0.046-0.082	0.055	0.050-0.083
Beryllium, diss.	<0.001	all <0.001	<0.001	all <0.001
Cadmium	<0.001	<0.001-0.001	<0.001	<0.001-0.002
Cobalt	<0.001	all <0.001	<0.001	all <0.001
Chromium	0.001	<0.001-0.002	<0.001	<0.001-0.002
Copper	0.001	<0.001-0.011	0.001	<0.001-0.027
Iron	0.053	0.048-0.332	0.052	0.018-0.108
Mercury	<0.0001	all <0.0001	<0.0001	all <0.0001
Manganese	0.036	0.023-0.137	0.043	0.021-0.127
Molybdenum	<0.001	<0.001-0.002	<0.001	<0.001-0.003
Nickel	0.002	0.002-0.003	0.002	<0.001-0.004
Lead, extr.	<0.002	<0.002-0.003	<0.002	<0.002-0.003
Selenium	0.0001	<0.0001-0.0001	<0.0001	<0.0001-0.0001
Vanadium	<0.002	all <0.002	<0.002	all <0.002
Zinc	0.003	<0.001-0.008	0.001	<0.001-0.01

Note: Results are mg/L. Metals as 'total' unless noted.

3.6 ORGANIC CONSTITUENTS

This group of water quality variables includes several naturally occurring compounds or groups of compounds such as tannin and lignin, and phenolics, as well as synthetic organic contaminants. Dissolved organic carbon (DOC) is a measure of the total organic material dissolved in the water and has been discussed above (Section 3-3). The west basin contained higher concentrations of DOC than the east (Table 3-2), but both basins were lower in DOC than the inflows to the lake (see Section 4), indicating the lake is a site of net degradation of dissolved organic material. Particulate carbon is a measure of the organic material in suspended particles in the lake and this variable tended to be highest in concentration in late summer (Appendix B-1), probably as a result of the high phytoplankton densities that occurred at that time. Phenolic compounds ranged from 0.003 to 0.012 mg/L in the composite samples (Appendix B-1) and are probably of natural origin. Their concentration in surface waters in Alberta seems to be generally correlated with DOC concentrations (AEP unpubl. data). Tannins and lignins are also naturally occurring compounds and as for DOC, they were lower in concentration in the lake (range 0.18 to 0.52 mg/L) than in the tributaries to the lake (Section 4).

Two groups of synthetic man-made organic contaminants, pesticides and 'extractable priority pollutants', were investigated in the lake sampling program. The latter are a group of trace organic contaminants identified as being of concern by the United States Environmental Protection Agency (USEPA), and are analyzed together in one 'scan'. The pesticide and priority pollutant compounds and their analytical detection limits are listed in Appendix A-2. Euphotic composite samples from the west and east basins on 31 July 1991 were analyzed and no pesticides or extractable priority pollutants were detected. With the exception of pesticides in areas of moderate to high agricultural use, these contaminants are generally not detectable in surface waters in Alberta (AEP unpubl. data).

3.7 BACTERIA

The composite samples from both basins of Lesser Slave Lake were analyzed for total and fecal coliform bacteria. These groups are general indicators of sewage contamination, although they also occur naturally, particularly total coliforms (Greenberg *et al*. 1992). The numbers of total coliform bacteria in the west basin ranged from <4 to 1000/100 mL, with a median <10/100 mL, and from <4 to >800/100 mL, with a median <10/100 mL in the east basin. Fecal coliform bacteria were not detected (i.e., <10/100 mL) in the west and east basin composite samples (Appendix B-1). These concentrations are indicative of uncontaminated conditions and are similar to those often found in other uncontaminated surface waters in Alberta (AEP unpubl. data).

The composite samples represent conditions in the central portion of the two main basins of the lake. Conditions at individual locations and particularly near shore may differ, of course, and at sites where there is profuse macrophyte (aquatic weed) growth and/or abundant organic material densities of naturally occurring bacteria may be much higher. Of particular interest to lake users are conditions at recreational beaches. In co-operation with the Health Unit at Slave Lake, samples were collected on 14-15 August 1990 from beaches at Spruce Point Park, Sawridge Recreation Area, Devonshire Beach, Marten River Campground, Diamond Willow Resort, and Marten River Cottage Subdivision, and analyzed for total and fecal coliforms. In the 17 samples collected, total coliforms were <10-60/100 mL with a median value of 10/100 mL, and fecal coliforms were <10-30/100 mL with a median of <10/100 mL. These are fairly low levels, and indicate no problems of contamination at that time. Additional monitoring of beaches on Lesser Slave Lake has been carried out regularly by the Health Unit (now the Regional Health Authority) and Provincial Parks, in order to check that bacterial populations are within recreational water quality guidelines.

3.8 WATER QUALITY GUIDELINES

Lake water quality was evaluated by comparing it to the Alberta Ambient Surface Water Quality Interim Guidelines (AWQG) and the Canadian Water Quality Guidelines (CCREM 1987). Pertinent variables that have guidelines are listed in Table 3-5, along with the guidelines, the number of composite sample collected , and the number of samples that exceeded, i.e., did not comply with, the guidelines. Sodium, sulphate, flouride, TDS, and pH all complied with the guidelines. Secchi visibility did not meet the guideline of 1.2 m recommended for recreational use, on two occasions in the west basin (Table 3-5). This reflects the high algal populations that occurred there.

The AWQG for dissolved oxygen are 5 mg/L (acute) and 6.5 mg/L (chronic), while the CWQG is 5 or 6.5 mg/L, depending on the fish species of interest. Most of the water column at the profile sites complied with the 5 mg/L guideline on the sampling occasions in 1991-93 (Section 3.2). The upper approximately 8 m of the water column in the west basin, and the upper 15 m in the east basin, complied with the 6.5 mg/L guideline on all sampling occasions. Water closer to the bottom did not always meet these guidelines, but such non-compliance is common in Alberta lakes and Lesser Slave is actually fairly well oxygenated.

Total nitrogen (N) did not meet the AWQG of 1 mg/L on five of 11 occasions in the west basin, and on two of 12 in the east basin (Table 3-5). Total P exceeded the AWQG of 0.05 mg/L in

Table 3-5. Comparison of Lesser Slave Lake water quality to guidelines

STATION		PH	OXYGEN mg/L	SECCHI VISIBILITY m	TDS CALCD mg/L	Na DISS mg/L	SO_4 DISS mg/L	F DISS mg/L	NH_3-N DISS mg/L	NO_2-N DISS mg/L
	GUIDELINES									
	AWQG:	**6.5-8.5**	**5 & 6.5**					**1.5**		
	CWQG:	**6.5-9**	**5-6.5**	**1.2**	**500**	**200**	**500**		**varies**	**0.06**
L SLAVE L WEST COMP	No. of Samples	10	see	12	10	11	10	10	10	10
	No. Exceeding	0	text	2	0	0	0	0	0	0
L SLAVE L EAST COMP	No. of Samples	11	see	13	11	11	11	11	11	11
	No. Exceeding	0	text	0	0	0	0	0	0	0

STATION		N TOTAL mg/L	P TOTAL mg/L	Al EXT mg/L	As TOTAL mg/L	Ba TOTAL mg/L	Cd TOTAL mg/L	Cr TOTAL mg/L	Cu TOTAL mg/L	Fe TOTAL mg/L
	GUIDELINES									
	AWQG:	**1**	**0.05**		**0.01**	**1**	**0.01**	**0.05**	**0.02**	**0.3**
	CWQG:			**0.1(total)**	**0.05**		**.0008-.0018**	**0.002**	**.002-.004**	**0.3**
L SLAVE L WEST COMP	No. of Samples	11	11	7	7	7	7	7	7	7
	No. Exceeding	5	4	0	0	0	1	0	2	1
L SLAVE L EAST COMP	No. of Samples	12	13	8	8	8	8	8	8	8
	No. Exceeding	2	1	1	0	0	2	0	2	0

STATION		Hg TOTAL mg/L	Mn TOTAL mg/L	Ni TOTAL mg/L	Pb EXT mg/L	Se TOTAL mg/L	Zn TOTAL mg/L	COLI TOTAL No./dL	COLI FECAL No./dL
	GUIDELINES								
	AWQG:	**0.0001**	**0.05**		**0.05**	**0.01**	**0.05**	**2400**	
	CWQG:	**0.0001**		**.065-.15**	**.002-.007**	**0.001**	**0.03**		**200**
L SLAVE L WEST COMP	No. of Samples	7	7	7	7	7	7	11	11
	No. Exceeding	0	3	0	0	0	0	0	0
L SLAVE L EAST COMP	No. of Samples	8	8	8	8	8	8	12	12
	No. Exceeding	0	3	0	0	0	0	0	0

Note:
AWQG = Alberta Ambient Surface Water Quality Interim Guidelines: Alberta Environmental Protection 1994.
CWQG = Canadian Water Quality Guidelines: CCREM 1987 + Updates to 1994.

four of 11 samples in the west, and in one of 13 in the east basin. This reflects the generally eutrophic condition of Lesser Slave Lake.

The guideline for ammonia-N for the protection of aquatic life varies with the pH and temperature of the water. For example, at a temperature of 0^oC and pH of 8.0, the guideline is 1.53 mg/L. All composite samples and the profile samples (Appendix B-2) complied with the guidelines for the prevailing temperature and pH conditions. The majority of the metals analyzed also complied with guidelines (Table 3-5). One measurement for aluminum exceeded the guideline, but aluminum is commonly detected in surface waters and this is probably a natural occurrence. Three of 15 cadmium results exceeded the stringent CWQG, but the concentrations were very near the detection limit and such detections occur in numerous surface waters. They probably do not indicate anthropogenic contamination. Similarly, most of the non-compliant values for copper are probably natural, although the reason for the high values on 28 May 1991 (Appendix B-1) is not clear. Subsequent samples had lower concentrations. One sample exceeded the guideline for iron, which relates to aesthetic conditions of potable water. Such exceedences are common in Alberta surface waters and probably natural. Several samples were over the guideline for manganese, also set for aesthetic reasons. The manganese values probably reflect the organic content of the water rather than anthropogenic contamination. All of the composite samples met the guidelines for coliform bacteria (Table 3-5) as did the beach samples collected in August 1990. Overall, the main concern with respect to water quality is the high nutrient and algal content, particularly in the west basin.

4.0 TRIBUTARIES

4.1 INTRODUCTION

This section presents data and describes the water quality conditions of the major tributaries to Lesser Slave Lake for the 1991-93 survey. Data from reconnaissance sampling in 1989-90 are also included, as are data for the lake's outflow, the Lesser Slave River. The sampling sites are mapped in Figure 2-1 and the data are compiled in Appendix C-1. The sites on the South Heart River immediately upstream and downstream of Buffalo Bay are discussed in Section 6.

The inflow volumes and mean discharge rates for tributaries to Lesser Slave Lake during the study period were computed by A. DeBoer (1995) and are summarized in Table 4-1. The South Heart and Swan rivers are the two largest tributaries. These rivers along with the other streams sampled in this survey, the Driftpile River, Assineau River, and Marten Creek, account for over three quarters of the annual inflow volume to the lake. They are highly seasonal in their discharge, having very low or even non-detectable flows in winter, and much higher flows in spring and summer. Past discharge data for these streams (Environment Canada 1991) shows mean monthly flows ranging over nearly two orders of magnitude from lows in February to highs in May. Summer rainstorms can cause flooding in these tributaries.

Table 4-1. Computed inflows to Lesser Slave Lake, 1991-93.

TRIBUTARIES	ANNUAL INFLOW-dam^3			MEAN ANNUAL DISCHARGE-m^3/s		
	1991	1992	1993	1991	1992	1993
South Heart River	381415	297604	379501	12.1	9.4	12.0
Driftpile River	139958	85348	138461	4.4	2.7	4.4
Other inflow to West Basin	71834	136219	162906	2.3	4.3	5.2
Swan River	336113	293813	431335	10.7	9.3	13.7
Assineau River	13254	10367	16567	0.42	0.33	0.52
Marten Creek	35272	40827	37529	1.1	1.3	1.2
Other inflow to East Basin	39089	74126	88647	1.2	2.3	2.8
Total Lake Inflow	1016935	938304	1254946			

4.2 TEMPERATURE AND OXYGEN

During this survey, water temperatures in the tributaries to Lesser Slave Lake ranged up to 20-22^{o}C in July-August, with the smaller streams tending to be somewhat cooler (Figure 4-1). This may have been due to greater shading in smaller, narrower stream channels. Dissolved oxygen (DO) in all streams was at or near saturation in the open-water season, being in about the 8-13 mg/L

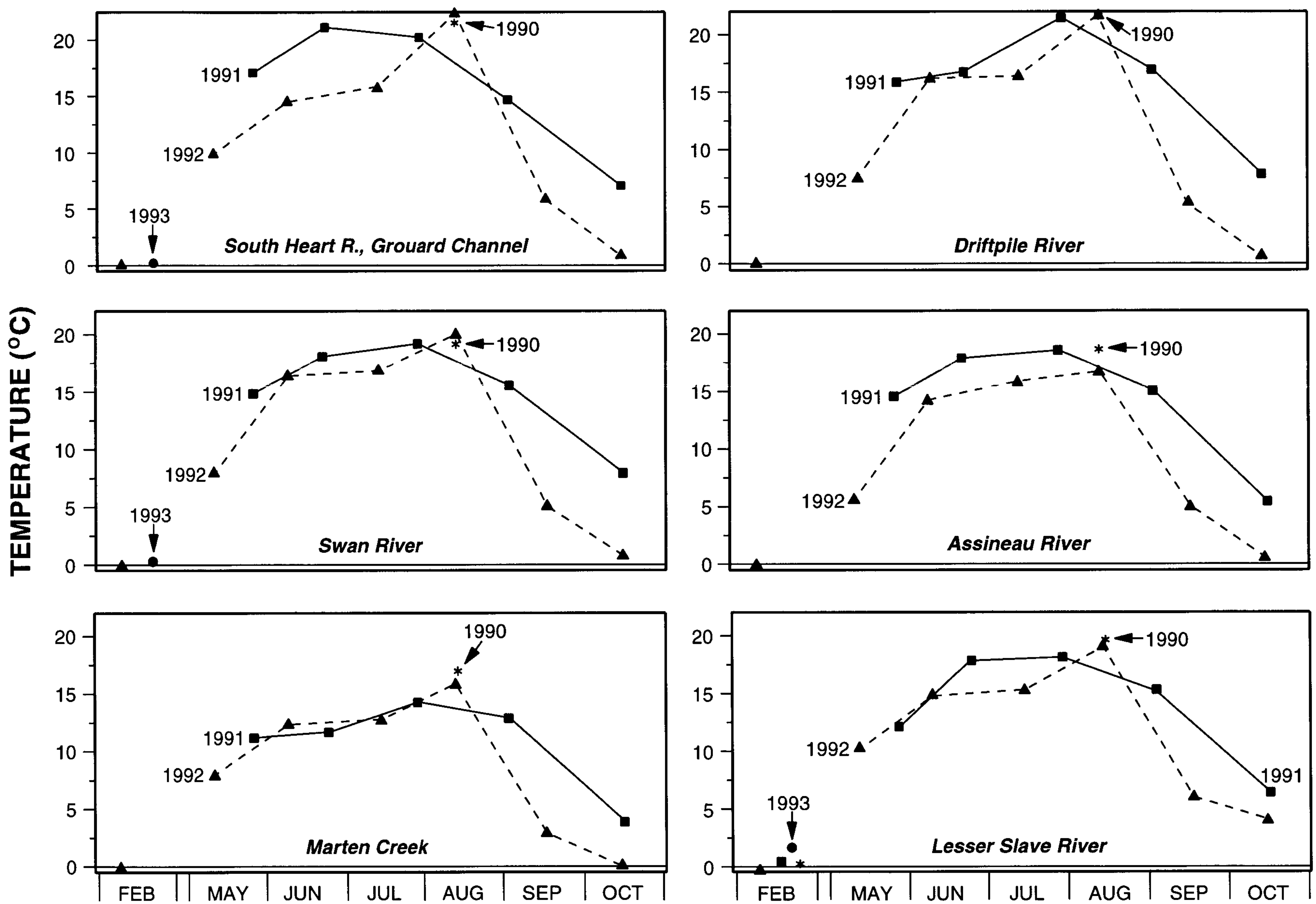


Figure 4-1. Temperature in tributaries and the outflow of Lesser Slave Lake, 1990-93.

range (Figure 4-2). Note that DO concentrations followed a pattern inverse to that of temperature during the summer, because of the inverse relationship of temperature and oxygen solubility in water. In winter DO varied from stream to stream, with the South Heart River having generally low DO and the Swan River varying between the two years. The other three tributaries were well oxygenated in the one winter that they were sampled (Figure 4-2).

4.3 IONS AND GENERAL WATER CHEMISTRY

General water quality variables for the tributaries to Lesser Slave Lake are compiled in Table 4-2 for both the open-water and ice-cover seasons. These seasons are treated separately because of the change in water quality that often occurs in streams between summer and winter in boreal regions.

In these streams, the major ions by weight were calcium and bicarbonate. The open-water means for total dissolved solids (TDS-calculated) ranged from 77 to 145 mg/L and mean total alkalinity ranged from 67 to 123 mg/L (Table 4-2). Marten Creek had the lowest TDS and alkalinity and the Assineau and South Heart rivers had the highest. Mean fluoride concentration ranged from 0.06 to 0.15 mg/L and was highest in the South Heart River. Major ions, TDS, and alkalinity all increased in winter (Table 4-2), probably due to a greater proportion of groundwater in the lower flows that occur then. Note that this did not occur in the Lesser Slave River and also that water quality there was much less variable than in the tributaries (as expressed by the standard error - Table 4-2). This reflects the dampening influence of the lake on water quality.

Suspended solids, also termed non-filterable residue, ranged over two orders of magnitude in concentration in the tributaries (Figure 4-3), reflecting the influence of fluctuating discharge. Suspended solids concentrations are positively correlated to discharge in these and most rivers, due to the greater scouring and turbulence of higher rates of flow (Choles 1996). In the two years of sampling in this survey, many of the tributaries had a low in summer with higher concentrations in spring and fall (Figure 4-3). Winter concentrations were generally lower (Table 4-2) although moderate levels also occurred in winter in some streams (Figure 4-3). The Lesser Slave River at the lake outflow contained much higher suspended solids concentrations than did the

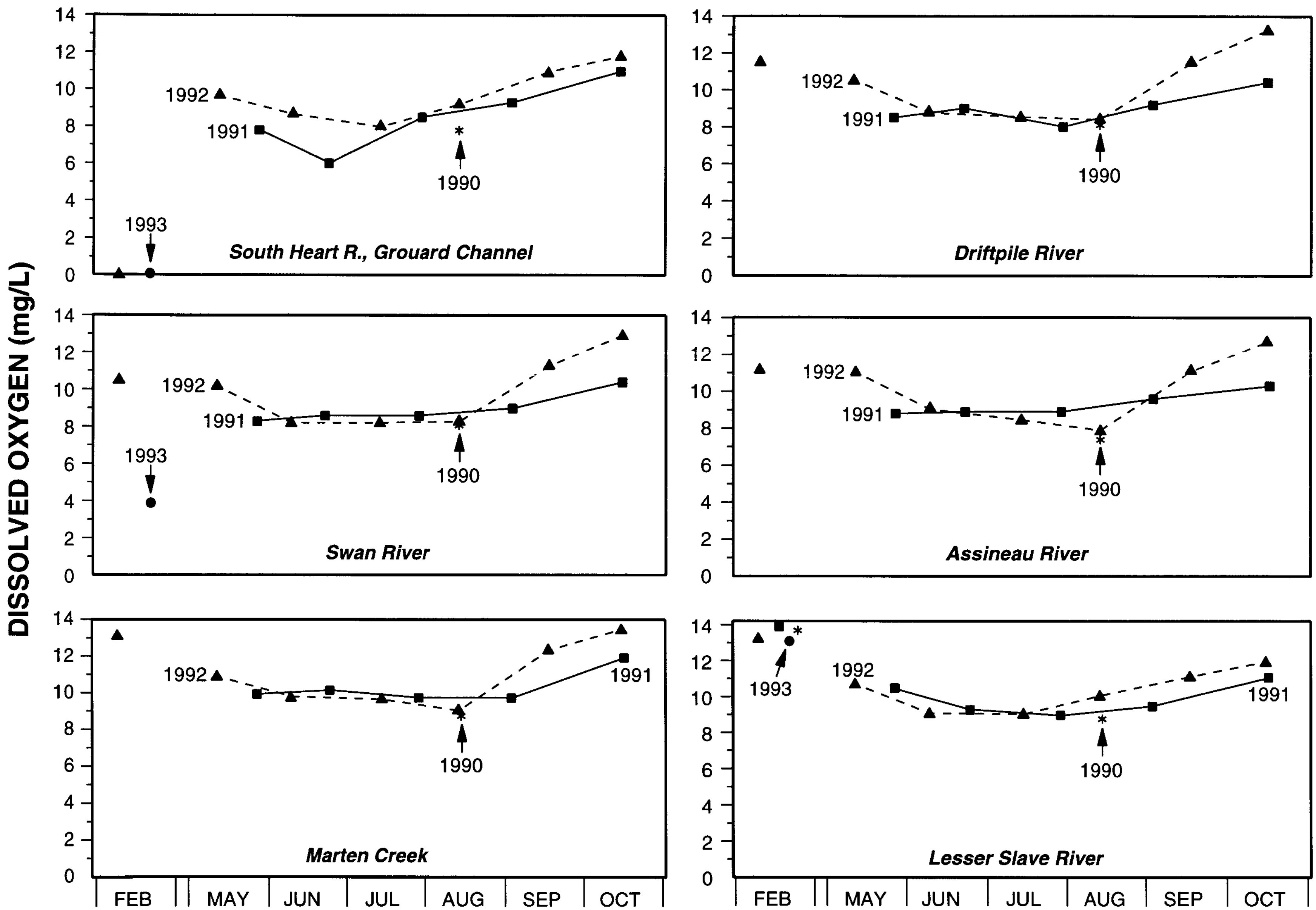


Figure 4-2. Dissolved oxygen in tributaries and the outflow of Lesser Slave Lake, 1990-93.

Table 4-2. General water quality of tributaries and the outflow of Lesser Slave Lake, 1990-1993

VARIABLE	S. HEART R. @ GROUARD CHANNEL		DRIFTPILE RIVER		SWAN RIVER	
	OPEN WATER	ICE COVER	OPEN WATER	ICE COVER	OPEN WATER	ICE COVER
	MEAN ± SE	MEAN ± SE	MEAN ± SE	MEAN ± SE	MEAN ± SE	MEAN ± SE
pH (range)	7.1 - 8.7	6.8	7.1 - 7.9	7.3	6.8 - 7.6	6.8 - 7.1
Total Alkalinity (as $CaCO_3$)	111 ± 20	243 ± 1	86 ± 41	151 ± 0	86 ± 31	176 ± 40
Total Dissolved Solids (Calc.)	145 ± 27	300 ± 22	100 ± 41	173 ± 0	96 ± 32	193 ± 41
Conductance (µS/cm)	260 ± 45	405 ± 120	178 ± 81	253 ± 0	177 ± 62	320 ± 72
Hardness (as $CaCO_3$)	117 ± 22	262 ± 24	81 ± 38	135 ± 0	75 ± 29	152 ± 38
Sodium, diss.	10.1 ± 2.4	16.0 ± 2.0	7.5 ± 1.9	15.0 ± 0	8.6 ± 1.7	17.0 ± 1.0
Potassium, diss.	2.8 ± 0.7	3.4 ± 0.5	1.7 ± 0.5	2.1 ± 0	1.7 ± 0.4	2.4 ± 0.5
Calcium, diss.	32 ± 6	75 ± 6	24 ± 11	41 ± 0	23 ± 8	46 ± 12
Magnesium, diss.	8.9 ± 2.3	18.5 ± 2.5	5.0 ± 2.5	8.0 ± 0	4.3 ± 1.9	9.0 ± 2.0
Bicarbonate (HCO_3)	132 ± 25	297 ± 2	105 ± 50	184 ± 0	105 ± 38	214 ± 49
Carbonate (CO_3)	6 ± 4	n/a	n/a	n/a	n/a	n/a
Chloride, diss.	1.1 ± 0.4	1.9 ± 0.05	0.8 ± 0.3	0.6 ± 0	1.2 ± 0.3	2.2 ± 0.4
Sulphate, diss.	23.3 ± 7.7	39.0 ± 15.0	8.7 ± 2.9	15.0 ± 0	5.8 ± 2.2	10.5 ± 0.5
Fluoride, diss.	0.11 ± 0.02	0.15 ± 0.02	0.07 ± 0.03	0.09 ± 0	0.08 ± 0.02	0.10 ± 0.01
Iron, total	2.4 ± 1.5	5.3 ± 2.5	2.0 ± 1.0	1.8 ± 0	2.6 ± 1.5	2.6 ± 1.0
Manganese, total	0.099 ± 0.053	0.899 ± 0.127	0.101 ± 0.038	0.132 ± 0	0.099 ± 7.514	0.505 ± 3.702
Suspended Solids (NFR)	40.8 ± 38.0	17.0 ± 1.0	30.1 ± 38.3	2.0 ± 0	44.1 ± 59.5	5.0 ± 4.0
Colour, true (Rel. Units)	78 ± 30	55 ± 23	134 ± 73	22 ± 0	92 ± 36	23 ± 1
Dissolved Organic Carbon	21.0 ± 2.5	25.7 ± 7.5	18.7 ± 6.4	7.1 ± 0	14.1 ± 3.9	7.8 ± 1.1

VARIABLE	ASSINEAU RIVER		MARTEN CREEK		LESSER SLAVE RIVER	
	OPEN WATER	ICE COVER	OPEN WATER	ICE COVER	OPEN WATER	ICE COVER
	MEAN ± SE	MEAN ± SE	MEAN ± SE	MEAN ± SE	MEAN ± SE	MEAN ± SE
pH (range)	7.1 - 7.9	7.4	7.2 - 8.2	7.5	7.5 - 8.6	7.6 - 8.8
Total Alkalinity (as $CaCO_3$)	123 ± 54	190 ± 0	67 ± 36	130 ± 0	88 ± 2	98 ± 3
Total Dissolved Solids (Calc.)	137 ± 56	203 ± 0	77 ± 36	138 ± 0	102 ± 2	115 ± 4
Conductance (µS/cm)	250 ± 105	281 ± 0	136 ± 70	232 ± 0	186 ± 6	207 ± 8
Hardness (as $CaCO_3$)	112 ± 52	158 ± 0	64 ± 32	118 ± 0	81 ± 2	93 ± 2
Sodium, diss.	10.8 ± 3.1	19.0 ± 0	5.2 ± 2.0	10.0 ± 0	7.5 ± 0.6	7.5 ± 1.0
Potassium, diss.	2.3 ± 0.6	2.2 ± 0	1.1 ± 0.5	1.2 ± 0	2.4 ± 0.1	2.8 ± 0.1
Calcium, diss.	32 ± 14	45 ± 0	18 ± 9	34 ± 0	23 ± 1	27 ± 1
Magnesium, diss.	7.7 ± 3.8	11.0 ± 0	4.5 ± 2.1	8.0 ± 0	5.7 ± 0.5	6.4 ± 0.5
Bicarbonate (HCO_3)	149 ± 65	232 ± 0	82 ± 44	159 ± 0	107 ± 2	120 ± 4
Carbonate (CO_3)	n/a	n/a	n/a	n/a	2 ± 1	n/a
Chloride, diss.	2.6 ± 2.1	2.7 ± 0	1.2 ± 1.0	1.2 ± 0	1.1 ± 0.1	1.2 ± 0.1
Sulphate, diss.	8.3 ± 2.2	8.0 ± 0	6.0 ± 1.8	5.0 ± 0	9.2 ± 1.1	11.4 ± 0.7
Fluoride, diss.	0.10 ± 0.03	0.10 ± 0	0.06 ± 0.02	0.08 ± 0	0.09 ± 0.01	0.10 ± 0.004
Iron, total	3.0 ± 1.7	3.2 ± 0	2.7 ± 1.3	2.7 ± 0	0.6 ± 0.6	0.1 ± 0.01
Manganese, total	0.261 ± 8.171	0.748 ± 0	0.184 ± 0.082	0.465 ± 0	0.063 ± 0.050	0.007 ± 0.003
Suspended Solids (NFR)	38.8 ± 64.5	4.0 ± 0	33.9 ± 49.7	1.0 ± 0	28.5 ± 27.5	1.0 ± 0.5
Colour, true (Rel. Units)	90 ± 44	20 ± 0	123 ± 46	39 ± 0	13 ± 2	15 ± 2
Dissolved Organic Carbon	15.7 ± 3.8	8.5 ± 0	15.5 ± 2.9	8.1 ± 0	9.8 ± 0.6	11.1 ± 0.4

Note:
Results are mg/L unless noted
SE = Standard error of the mean

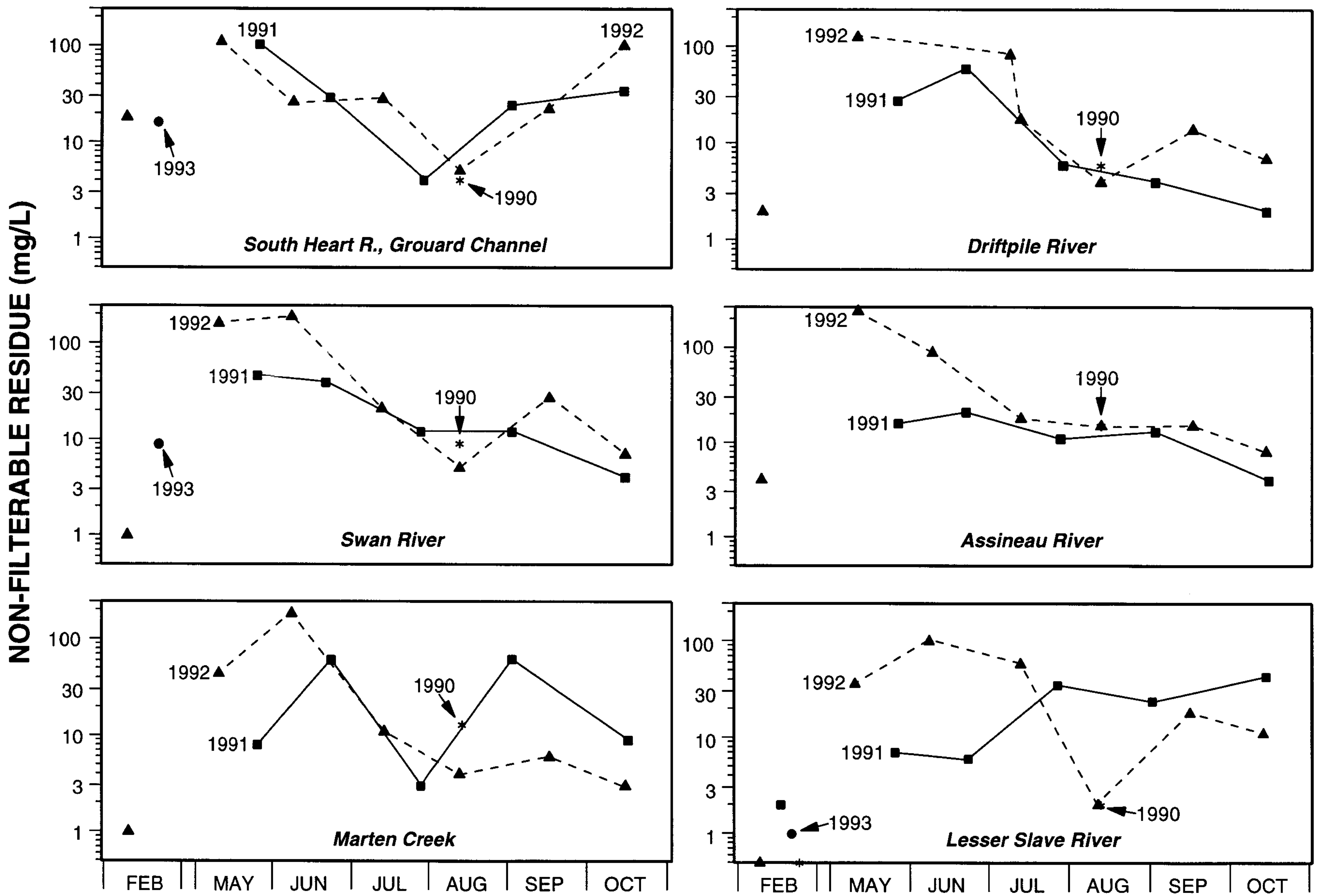


Figure 4-3. Suspended solids (non-filterable residue) in tributaries and the outflow of Lesser Slave Lake, 1990-93.

east basin of the lake overall (Table 3-2), probably as a result of wind-induced accumulation of algae and shoreline erosion.

Iron was high in the tributaries to Lesser Slave Lake, mean concentrations in the open-water season being 2.0 to 3.0 mg/L. These levels may be a result of the suspended solids levels, but iron was also high in winter when suspended solids were lower (Table 4-2). Manganese was also fairly high in these streams, with open-water means ranging from 0.099 to 0.261 mg/L. Concentrations of manganese were higher in winter. Iron and manganese may also be complexed with organic material in water and be positively correlated with organic content. The Lesser Slave River was much lower in iron and manganese than the tributaries, indicating these elements were being partly retained in the lake. Dissolved organic carbon (DOC) was fairly high in concentration in the tributaries, with open-water means ranging from 14.1 to 21 mg/L (Table 4-2). There was a general tendency for DOC to decline slightly from spring to fall, and winter concentrations were lower than open-water concentrations in four of the five tributaries (Figure 4-4). These streams were also highly coloured, ranging from 78 to 134 relative units in summer, with the Driftpile River being the highest. Colour was generally lower in winter (Table 4-2). As for iron and manganese, DOC and colour were notably lower in the outflow from the lake.

4.4 NUTRIENTS

Detailed data for the nutrients nitrogen, phosphorus, and silica are compiled in Appendix C-1 and summarized in Table 4-3. Nutrient loads and budgets are addressed in Section 5. Total phosphorus (TP) was fairly high in concentration in the tributaries to Lesser Slave Lake, with the South Heart River being the highest. Generally, TP was highest in spring and declined through the open-water season (Figure 4-5). The exception was the South Heart River which had concentrations in fall and winter similar to those of spring and early summer. Dissolved phosphorus in the tributaries was about 1/3 to 1/4 of total P. The Lesser Slave River was lower in phosphorus than the tributaries to the lake (Table 4-3 and Figure 4-5), reflecting biological uptake and sedimentation in the lake.

Concentrations of (NO_2+NO_3)-N ('nitrates') and NH_3-N ('ammonia') were low to moderate in the tributaries (Table 4-3). Most nitrogen was in the organic form, reported as 'total

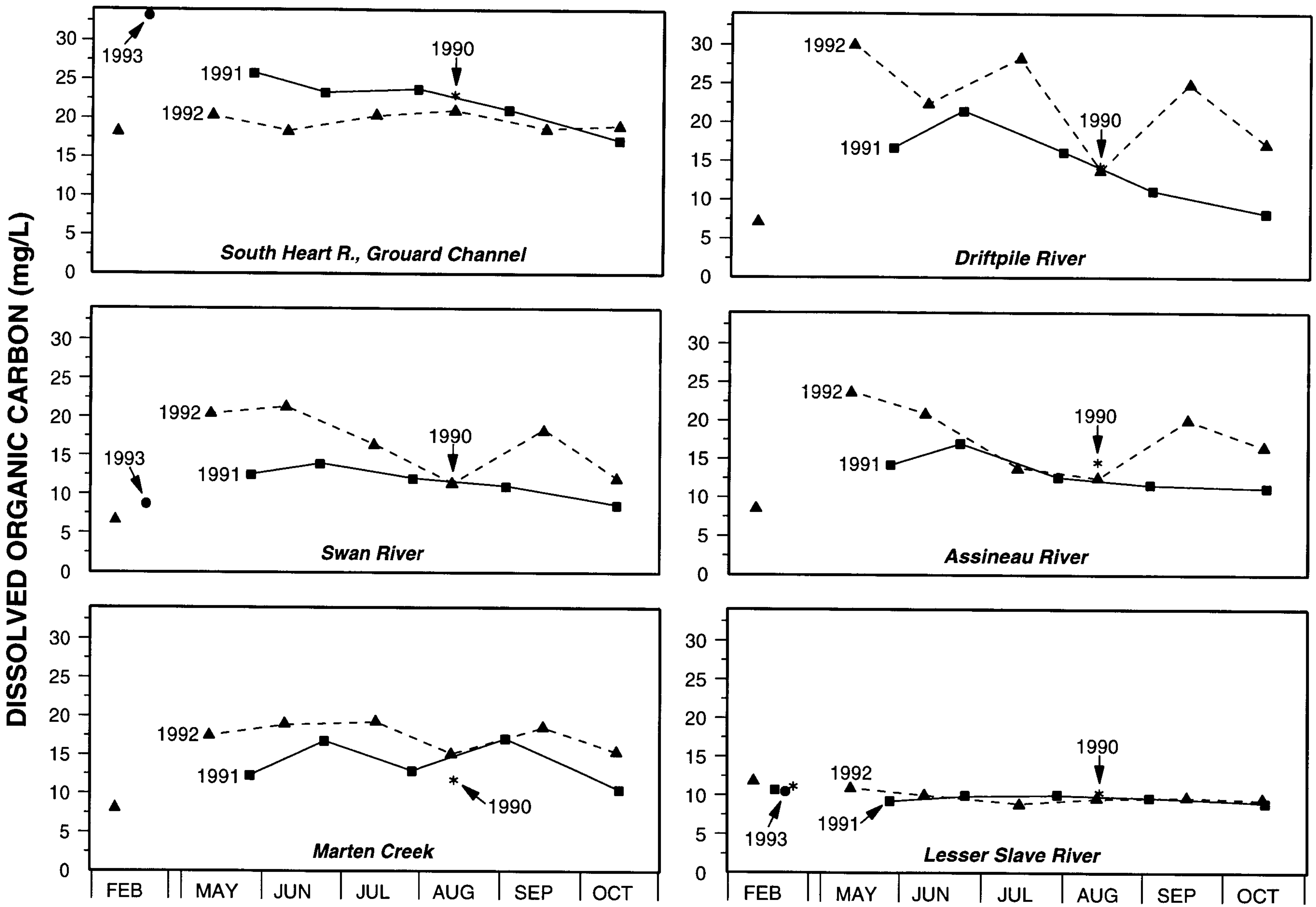


Figure 4-4. Dissolved organic carbon in tributaries and the outflow of Lesser Slave Lake, 1990-93.

Table 4-3. Nutrient data for tributaries and the outflow of Lesser Slave Lake, 1990-1993

VARIABLE	S. HEART R. @ GROUARD CHANNEL		DRIFTPILE RIVER		SWAN RIVER		ASSINEAU RIVER		MARTEN CREEK		LESSER SLAVE RIVER	
	OPEN WATER MEAN ± SE	ICE COVER MEAN ± SE	OPEN WATER MEAN ± SE	ICE COVER MEAN ± SE	OPEN WATER MEAN ± SE	ICE COVER MEAN ± SE	OPEN WATER MEAN ± SE	ICE COVER MEAN ± SE	OPEN WATER MEAN ± SE	ICE COVER MEAN ± SE	OPEN WATER MEAN ± SE	ICE COVER MEAN ± SE
Nitrogen												
NO_2+NO_3	0.011 ± 0.013	0.079 ± 0.026	0.005 ± 0.007	0.108 ± 0	0.006 ± 0.009	0.092 ± 0.010	0.023 ± 0.067	0.129 ± 0	0.003 ± 0.006	0.087 ± 0	0.003 ± 0.003	0.052 ± 0.019
Ammonia	0.050 ± 0.081	0.210 ± 0.040	0.015 ± 0.012	0.035 ± 0	0.010 ± 0.006	0.069 ± 0.028	0.019 ± 0.019	0.082 ± 0	0.008 ± 0.005	0.060 ± 0	0.011 ± 0.006	0.032 ± 0.024
Total Kjeldahl	0.97 ± 0.29	1.18 ± 0.34	0.54 ± 0.17	0.25 ± 0	0.46 ± 0.16	0.32 ± 0.06	0.63 ± 0.35	0.33 ± 0	0.50 ± 0.22	0.32 ± 0	0.56 ± 0.09	0.49 ± 0.07
Phosphorus (µg/L)												
Total	91.7 ± 47.6	91.0 ± 13.0	52.7 ± 31.6	30.0 ± 0	60.7 ± 44.5	38.5 ± 1.5	55.5 ± 44.5	29.0 ± 0	65.0 ± 50.5	30.0 ± 0	34.7 ± 18.5	11.1 ± 1.8
Dissolved	23.5 ± 8.4	23.4 ± 2.3	19.5 ± 5.9	11.1 ± 0	20.3 ± 5.2	12.8 ± 1.5	18.5 ± 4.9	8.1 ± 0	17.3 ± 3.8	14.8 ± 0	7.5 ± 0.8	7.8 ± 2.0
Silica, reactive	7.5 ± 2.1	13.5 ± 0.7	11.7 ± 2.5	16.5 ± 0	13.5 ± 1.4	19.6 ± 2.7	12.7 ± 1.8	14.2 ± 0	10.2 ± 1.0	12.2 ± 0	1.7 ± 2.0	0.4 ± 0.3

Note:
Results are mg/L unless noted
SE = Standard error of the mean

Table 4-4. Metal and trace element data for tributaries and the outflow of Lesser Slave Lake, 1990-1993

VARIABLE	S. HEART R. @ GROUARD CHANNEL		DRIFTPILE RIVER		SWAN RIVER		ASSINEAU RIVER		MARTEN CREEK		LESSER SLAVE RIVER	
	MEDIAN	RANGE	MEDIAN	RANGE	MEDIAN	RANGE	MEDIAN	RANGE	MEDIAN	RANGE	MEDIAN	RANGE
Aluminum, extr.	0.075	<0.002-0.53	0.15	<0.002-0.45	0.065	<0.002-0.36	0.06	0.009-0.51	0.06	0.02-0.45	0.04	0.002-0.25
Arsenic	0.0023	0.0013-0.0037	0.0014	0.0009-0.0024	0.0014	0.0008-0.0028	0.0013	0.0008-0.0028	0.0007	0.0005-0.0022	0.001	0.0006-0.0016
Barium	0.082	0.054-0.136	0.079	0.057-0.118	0.089	0.055-0.145	0.130	0.090-0.185	0.091	0.057-0.141	0.062	0.052-0.083
Beryllium, diss.	<0.001	all <0.001	<0.001	all <0.001	<0.001	all <0.001	<0.001	all <0.001	<0.001	all <0.001	<0.001	all <0.001
Cadmium	0.001	<0.001-0.003	<0.001	<0.001-0.001	<0.001	<0.001-0.001	0.001	<0.001-0.002	<0.001	<0.001-0.001	<0.001	<0.001-0.002
Cobalt	0.001	<0.001-0.003	<0.001	<0.001-0.003	0.001	<0.001-0.003	0.002	<0.001-0.005	0.001	<0.001-0.005	<0.001	<0.001-0.002
Chromium	0.003	0.002-0.006	0.003	0.001-0.004	0.002	0.001-0.005	0.003	0.002-0.007	0.002	0.001-0.007	0.002	<0.001-0.004
Copper	0.004	0.001-0.025	0.003	0.001-0.026	0.003	0.001-0.010	0.004	0.001-0.014	0.005	<0.001-0.017	0.002	<0.001-0.022
Iron	1.59	0.995-7.839	1.75	0.719-4.81	2.097	1.32-5.58	2.51	1.597-7.3	2.13	1.727-6.53	0.371	0.04-2.16
Mercury	<0.0001	<0.0001-0.0001	<0.0001	all <0.0001	<0.0001	all <0.0001	<0.0001	all <0.0001	<0.0001	all <0.0001	<0.0001	all <0.0001
Manganese	0.112	0.027-1.025	0.102	0.056-0.196	0.080	0.048-0.753	0.235	0.160-0.748	0.182	0.103-0.465	0.049	0.004-0.198
Molybdenum	0.002	<0.001-0.003	0.001	<0.001-0.003	0.001	<0.001-0.002	0.001	<0.001-0.004	<0.001	<0.001-0.002	0.001	<0.001-0.005
Nickel	0.006	0.001-0.015	0.007	0.002-0.011	0.006	0.004-0.011	0.008	<0.001-0.018	0.007	0.002-0.014	0.003	<0.001-0.011
Lead, extr.	0.003	<0.002-0.007	<0.002	<0.002-0.004	<0.002	<0.002-0.005	<0.002	<0.002-0.004	<0.002	<0.002-0.003	<0.002	<0.002-0.009
Selenium	0.0002	0.0001-0.0003	0.0002	<0.0001-0.0002	0.0001	<0.0001-0.0002	0.0002	<0.0001-0.0002	<0.0001	<0.0001-0.0002	<0.0001	<0.0001-0.0001
Vanadium	0.005	0.003-0.011	0.003	<0.002-0.008	0.004	<0.002-0.010	0.004	0.003-0.014	0.003	<0.002-0.012	<0.002	<0.002-0.005
Zinc	0.007	<0.001-0.028	0.005	<0.001-0.017	0.006	0.001-0.019	0.004	0.001-0.027	0.005	0.002-0.025	0.0035	<0.001-0.011

Note:
Results are mg/L, and as totals unless noted
Median = middle value in a data set.

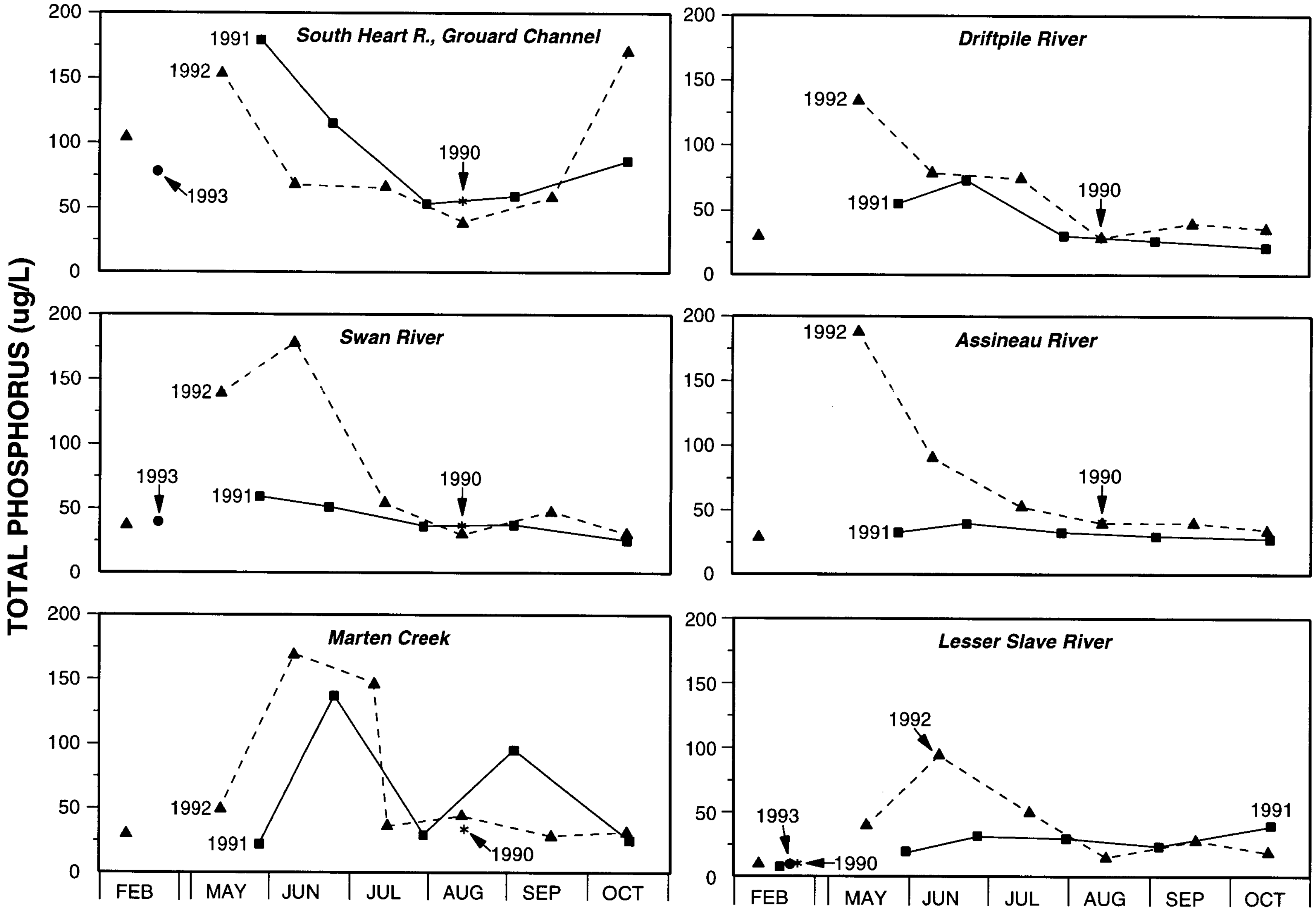


Figure 4-5. Total phosphorus in tributaries and the outflow of Lesser Slave Lake, 1990-93.

Kjeldahl' nitrogen (TKN). The South Heart River had the highest concentrations of TKN. The outflow from the lake, the Lesser Slave River, was somewhat lower than the tributaries in nitrates and ammonia, but not in TKN. Reactive silica was fairly high in the streams, and generally highest in concentration in winter (Table 4-3). Silica was an order of magnitude lower in the Lesser Slave River, probably as a result of biological uptake and sedimentation in the lake. The higher concentrations of N and P in the South Heart River may reflect the productive soils, extensive agriculture, and marshes and floodplains in its drainage.

4.5 METALS AND TRACE ELEMENTS

Grab samples from the tributaries to Lesser Slave Lake were analyzed regularly for metals and trace elements, and the data are compiled in Appendix C-1 and summarized in Table 4-4. These streams are fairly high in iron and manganese and slightly higher in arsenic, nickel, vanadium and zinc, as compared to mountain/foothill streams in Alberta. This may reflect the suspended solids and organic carbon content, which is also fairly high. Metal concentrations are often directly correlated to suspended solids concentrations because they sorb to the inorganic particles. Data in Appendix C-1 indicate this for iron, copper, lead, nickel, vanadium, and zinc. They may also form complexes with organic material such that metals are positively related to DOC.

For the 11 metals with sufficient numbers of detectable concentrations, five had the highest median values in the Assineau River (barium, cobalt, iron, manganese, nickel - Table 4-4) and three were highest in the South Heart River (arsenic, vanadium, zinc). Some elements, namely beryllium, cadmium, and mercury, were essentially not detectable (Table 4-4). The Lesser Slave River was lowest in concentration for nearly all metals, probably as a result of retention of organic and inorganic material in the lake.

4.6 ORGANIC VARIABLES

This group of water quality variables includes several naturally occurring constituents such as tannin and lignin, and phenolics (Table 4-5). In general, streams originating in the boreal region of Alberta have a higher organic content than those from the mountains and foothills, and this was the case for the tributaries to Lesser Slave Lake. Dissolved organic carbon (DOC) is a general

Table 4-5. Organic and biotic variables in tributaries and the outflow of Lesser Slave Lake, 1990-1993

VARIABLE	S. HEART R. @ GROUARD CHANNEL		DRIFTPILE RIVER		SWAN RIVER	
	MEDIAN	RANGE	MEDIAN	RANGE	MEDIAN	RANGE
Dissolved Organic Carbon	20.7	17.2-33.2	16.7	7.1-30.0	12.0	6.7-21.3
Tannin and Lignin	1.21	0.56-2.27	1.63	0.41-4.08	0.94	0.40-2.32
Phenolics	0.009	0.003-0.014	0.008	0.002-0.014	0.005	0.001-0.009
Oil and Grease	0.32	<0.05-0.40	<1.0	<0.05-0.82	<1.0	<0.05-0.42
Adsorbable Organic Halide (AOX)	0.013	0.008-0.021	0.010	0.004-0.020	0.009	0.004-0.011
Coliform Bacteria - no./100 mL						
Total	88	9-570	90	12-380	101	16-440
Fecal	8	<4-108	15	<4-200	52	4-200
Chlorophyll *a* - μg/L	3.4	0.2-13.5	1.4	<0.1-4.4	1.2	<0.1-3.8

VARIABLE	ASSINEAU RIVER		MARTEN CREEK		LESSER SLAVE RIVER	
	MEDIAN	RANGE	MEDIAN	RANGE	MEDIAN	RANGE
Dissolved Organic Carbon	14.2	8.5-23.6	15.4	8.1-19.3	10.1	8.8-11.8
Tannin and Lignin	1.11	0.65-2.25	1.91	0.68-2.78	0.29	0.21-0.52
Phenolics	0.007	0.003-0.010	0.008	0.002-0.011	0.005	0.002-0.006
Oil and Grease	<1.0	<0.05-0.47	0.29	<0.1-0.53	0.09	<0.05-0.80
Adsorbable Organic Halide (AOX)	n/a		n/a		0.008	0.003-0.026
Coliform Bacteria - no./100 mL						
Total	84	8-250	63	<4-140	10	<1-5900
Fecal	18	<4-220	<10	<4-140	<4	<1-48
Chlorophyll *a* - μg/L	1.5	0.3-3.8	0.6	<0.1-3.8	5.4	0.3-27.5

Note:
Results are mg/L unless noted.
Median = middle value in a data set.

measure of the total organic content and was discussed in Section 4.3. The South Heart River had the highest median DOC and the lake outflow had the lowest (Table 4-5, Figure 4-4). Tannin and lignin are components of plant material that are found in most aquatic systems. Marten Creek had the highest median concentration of tannin and lignin and the Lesser Slave River had the lowest (Table 4-5). Phenolics are a group which includes both natural compounds and anthropogenic contaminants. Phenolic concentrations were generally in the 0.002-0.014 mg/L range with the South Heart and Driftpile rivers having somewhat higher levels (Table 4-5). These values are typical of streams having relatively high DOC values, and are probably natural.

The oil and grease analysis includes petroleum compounds but also numerous naturally occurring compounds such as fats and chlorophyll. It can range up to 1-2 mg/L in unpolluted surface waters, and although mainly used in investigating situations of oil pollution, oil and grease was analyzed here to document existing conditions. Concentrations ranged from <0.05 to 0.82 mg/L (Table 4-5), and were probably indicative of natural conditions. Adsorbable organic halides (AOX) is a measure of the total amount of chlorinated organic material present and has come into use in the last decade to evaluate pulp mill effluents and raw and treated drinking water. It was sampled here for the three largest tributaries to Lesser Slave Lake as part of AEP's general characterization of surface waters for this variable. AOX occurs naturally as well as being formed by chlorine-based bleaching and disinfection. Median values for these tributaries ranged from 0.009 to 0.013 mg/L (Table 4-5) and probably reflect natural conditions.

4.7 TRACE ORGANIC CONTAMINANTS

These contaminants include pesticides and 'extractable priority pollutants' (EPP). The compounds involved and their analytical detection limits are listed in Appendix A-2. The pesticides include compounds such as aldrin, malathion, DDT, methoxychlor, 2,4-D, and also a general screening-level analysis of polychlorinated biphenyls (PCBs). The EPP group includes compounds such as chlorophenols, nitrophenols, polycyclic aromatic hydrocarbons (PAHs), chlorobenzenes, phthalates, and phenyl ethers. Samples for these contaminants were collected from the main tributaries to Lesser Slave Lake for the dates shown in Table 4-6. A total of 26 EPP and 23 pesticide samples from the tributaries were analyzed over a period of 2 ½ years, with all samples having no

Table 4-6. Trace organic contaminant sampling of tributaries and the outflow of Lesser Slave Lake, 1990-93

DATE	S. HEART R. @ GROUARD CHANNEL		DRIFTPILE RIVER		SWAN RIVER		LESSER SLAVE RIVER	
D M Y	PESTICIDES	EPP	PESTICIDES	EPP	PESTICIDES	EPP	PESTICIDES	EPP
14 08 90	ND	ND	ND	ND	ND	ND		
15 08 90							ND	ND
29 05 91			ND	ND	ND	ND	ND	ND
25 06 91	ND	ND						
26 06 91							ND	ND
30 07 91					ND	ND	ND	ND
31 07 91	ND	ND	ND	ND				
15 10 91	ND	ND	ND	ND	ND	ND		
16 10 91							ND	ND
11 02 92		ND		ND		ND		ND
13 05 92	ND	ND	ND	ND	ND	ND	ND	ND
10 06 92							ND	ND
14 07 92	ND	ND	ND	ND	ND	ND		
15 07 92							ND	ND
14 10 92	ND	ND	ND	ND	ND	ND	ND	ND
23 02 93	ND	ND			ND	ND		ND

Note:
EPP = extractable 'priority pollutants'
ND = not detected
Blanks indicate not sampled

Compounds and detection limits are listed in Appendix A2. Pesticide detection limits ranged from 0.005 to 2 μg/L depending on the compound. Extractable priority pollutant detection limits ranged from 1 to 5 μg/L for most compounds.

detectable amount of these contaminants. In addition, no pesticides nor EPP compounds were detected in the Lesser Slave River at the lake outflow (Table 4-6).

4.8 BIOTIC VARIABLES

The biotic variables analyzed in this survey were coliform bacterial counts and chlorophyll *a* concentration. The latter is a measure of the amount of algae suspended in the water. Median chlorophyll concentrations were about 1-5 μg/L with the South Heart River having the highest, and Marten Creek the lowest, levels of the tributaries (Table 4-5). Concentrations were generally higher in summer, reflecting the growing season (Appendix C-1). The Lesser Slave River had higher concentrations of chlorophyll *a* than the tributaries to the lake, as a result of growth of phytoplankton in the lake.

Total and fecal coliform bacteria are indicators of sewage contamination although both groups, and particularly the total coliforms, also occur naturally (Greenberg *et al*. 1992). Median counts were approximately 60-100/100 mL for total coliforms and 10-50/100 mL for fecal coliforms, for the tributaries to Lesser Slave Lake (Table 4-5). There was high variability in individual samples (Appendix C-1) and the tributaries did not appear to differ notably in bacterial densities. These densities are typical of background conditions for streams of the organic content described above.

4.9 WATER QUALITY GUIDELINES

The water quality of the tributaries was evaluated by comparison with the Alberta Ambient Surface Water Quality Interim Guidelines (AWQG) and the Canadian Water Quality Guidelines (CWQG). Water quality variables that have guidelines are listed in Table 4-7, along with the guideline value, the number of samples for the river in question, and the number of samples that exceeded, i.e., did not comply with, the guideline.

Many variables complied with the relevant water quality guideline in all samples collected. This was the case for TDS, sodium, sulphate, flouride, sulphide, nitrite, and the metals or trace elements arsenic, barium, mercury, nickel, lead, selenium, and zinc (Table 4-7). The guideline for ammonia (NH_3-N) varies with the pH and temperature of the water. All samples complied with the guideline for the pH and temperature conditions prevailing during the sampling.

Table 4-7. Comparison of tributary and Lesser Slave River water quality to guidelines

STATION		pH (pH units)	OXYGEN O2	TDS CALCD	Na DISS	SO4 DISS	F DISS	S- DISS	N DISS NH_3	N DISS NO_2	N TOTAL CALCD	P TOTAL	Al EXT	As TOTAL
	GUIDELINES													
	AWQG:	**6.5-8.5**	**5**				**1.5**	**0.05**			**1**	**0.05**		**0.01**
	CWQG:	**6.5-9**	**5-6.5**	**500**	**200**	**500**			**varies**	**0.06**			**0.1 (total)**	**0.05**
S. HEART R., GROUARD CHAN	No. of Samples	14	14	14	14	14	14	0	14	14	14	14	14	14
	No. Exceeding	1 (AW)	2(AW) 3(CW)	0	0	0	0		0	0	5	3	5	0
DRIFTPILE R AT HWY 42	No. of Samples	13	13	13	13	13	13	0	13	13	13	13	13	13
	No. Exceeding	0	0	0	0	0	0		0	0	0	5	6	0
SWAN R AT HWY 2	No. of Samples	14	14	14	14	14	14	0	14	14	14	14	14	14
	No. Exceeding	0	1	0	0	0	0		0	0	0	5	5	0
ASSINEAU R NR MOUTH	No. of Samples	13	13	13	13	13	13	1	13	13	13	13	13	13
	No. Exceeding	0	0	0	0	0	0	0	0	0	1	3	4	0
MARTEN CK AT HWY 88	No. of Samples	13	13	13	13	13	13	0	13	13	13	14	13	13
	No. Exceeding	0	1(CW)	0	0	0	0		0	0	1	4	5	0
LESSER SLAVE R AT SLAVE LAKE	No. of Samples	18	19	17	19	19	17	5	19	17	17	18	18	17
	No. Exceeding	2 (AW)	0	0	0	0	0	0	0	0	0	1	3	0

STATION		Ba TOTAL	Cd TOTAL	Cr TOTAL	Cu TOTAL	Fe TOTAL	Hg TOTAL	Mn TOTAL	Ni TOTAL	Pb EXT	Se TOTAL	Zn TOTAL	COLI TOTAL NO/DL	COLI FECAL NO/DL
	GUIDELINES													
	AWQG:	**1.0**	**0.01**	**0.05**	**0.02**	**0.3**	**0.0001**	**0.05**		**0.05**	**0.01**	**0.05**	**2400**	
	CWQG:		**.0008-.0018**	**0.002**	**.002-.004**	**0.3**	**0.0001**		**.065-.15**	**.002-.007**	**0.001**	**0.03**		**200**
S. HEART R., GROUARD CHAN	No. of Samples	14	14	14	14	14	14	14	14	14	14	14	14	14
	No. Exceeding	0	5 (CW)	10 (CW)	1(AW) 5(CW)	14	0	11	0	0	0	0	0	0
DRIFTPILE R AT HWY 42	No. of Samples	13	13	13	13	13	13	13	13	13	13	13	13	13
	No. Exceeding	0	0	0 (6 CW)	1 (4 CW)	13	0	13	0	0	0	0	0	0
SWAN R AT HWY 2	No. of Samples	14	14	14	14	14	14	14	14	14	14	14	14	14
	No. Exceeding	0	0	0 (6 CW)	0 (5 CW)	14	0	14	0	0	0	0	0	0
ASSINEAU R NR MOUTH	No. of Samples	13	13	13	13	13	13	13	13	13	13	13	13	12
	No. Exceeding	0	0 (2 CW)	0 (7 CW)	0 (5 CW)	13	0	13	0	0	0	0	0	1
MARTEN CK AT HWY 88	No. of Samples	13	13	13	13	13	13	13	13	13	13	13	13	13
	No. Exceeding	0	0	0 (7 CW)	0 (6 CW)	13	0	13	0	0	0	0	0	0
LESSER SLAVE R AT SLAVE LAKE	No. of Samples	18	18	18	18	18	17	18	18	18	17	18	18	19
	No. Exceeding	0	0 (1 CW)	0 (4 CW)	0 (2 CW)	6	0	6	0	0	0	0	1	0

Note:
AWQG = Alberta Ambient Surface Water Quality Interim Guidelines: Alberta Environmental Protection 1994.
CWQG = Canadian Water Quality Guidelines: Canadian Council of Ministers of the Environment 1987 + updates to 1994.

Guidelines as mg/L unless noted
No. Exceeding: Brackets indicate Alberta or Canadian guideline used for comparison

Guidelines also exist for many of the pesticides and extractable priority pollutants, but none of these compounds were detected in any of the samples from the tributaries (Table 4-6).

A few variables exceeded guidelines in a small number of samples. This included pH in the South Heart River and the Lesser Slave River, likely a natural condition, and dissolved oxygen during winter, mainly in the South Heart River (Table 4-7). Bacteria exceeded guidelines in one sample in each of the Assineau and Lesser Slave rivers, probably for natural reasons. Cadmium complied with the AWQG in all samples but not with the more stringent CWQG (which varies according to the hardness of the water). The reported concentrations of cadmium (Table 4-4 and Appendix C-1) are very near the detection limit and it is uncertain whether these are real and consistent exceedences.

Seven variables exceeded guidelines in many of the samples from the tributaries. Total nitrogen was non-compliant in about a third of samples from the South Heart River and total phosphorus was non-compliant in most samples from there. Other tributaries also exceeded guidelines for these two nutrients, but at a lower frequency (Table 4-7). Nutrients are discussed further in Section 5. Iron and manganese exceeded guidelines in most samples from the tributaries, and aluminum, chromium, and copper also frequently exceeded guidelines. These non-compliances probably reflect the high organic and suspended solids content of these streams rather than anthropogenic point-source inputs. The iron and manganese guidelines are set for aesthetic quality of potable water.

5.0 NUTRIENT BUDGET

5.1 INTRODUCTION

The nutrient and algal content of Lesser Slave Lake are probably the main water quality concerns for the lake's users (Section 3). As in most lakes, phosphorus appears to be the nutrient limiting algal growth. To evaluate the sources of phosphorus, a nutrient budget was prepared which compiles measured or estimated inputs from sources both external and internal to the lake. This budget is preliminary, and should be considered intermediate between a 'desk level' budget, which would extrapolate literature values from other areas, and a diagnostic study, which would measure external inputs by very frequent, direct sampling.

5.2 TRIBUTARIES

Phosphorus inputs to the lake from the main tributaries were calculated from the phosphorus measurements and flow data for each tributary using the estimation programs in FLUX 4.5 (Walker 1987). Briefly, FLUX calculates mass load with six techniques which map the flow/concentration relationship developed from the sample record onto the entire flow record. Error statistics are provided for each of the six estimates, and a stratification routine allows the data to be analyzed in more than one group in order to reduce error. For most of the tributaries, the 'flow-weighted mean' method, with data stratified at the mean annual flow, gave the most consistent estimates and best precision, and was selected to estimate loads.

Tributary loads of phosphorus for 1991 and 1992, in kg/yr, are compiled in Table 5-1. The measured phosphorus concentrations are plotted on the 1991-92 hydrographs in Appendix D-1. The South Heart River had both the highest load and the highest flow-weighted mean concentration, while the Driftpile River had the lowest concentration. However, with the exception of the Driftpile, all the measured tributaries were similar in their flow-weighted mean concentration. Unsampled inflows to the west and east basins were assigned a flow-weighted mean concentration based on the values for the measured tributaries in their basins (Table 5-1). The assigned concentrations and the computed inflows (Table 4-1) were then used to estimate loads from these other inflows. Total tributary loads were estimated to be 99×10^3 kg/yr of total phosphorus and 23×10^3 kg/yr of dissolved phosphorus (Table 5-1).

5.3 ATMOSPHERIC DEPOSITION

Nutrients are present in rain, snow, and dry dustfall. These sources can supply a significant load of phosphorus directly to a lake. Phosphorus in precipitation was not measured during this survey but it has been measured at a number of other locations in Alberta. The best data are those of Shaw *et al.* (1989), collected at Narrow Lake near Athabasca, which gave an average rate of atmospheric deposition of total phosphorus of 20 mg/m^2/yr, about 3/4 of which was in the soluble fraction. When applied to Lesser Slave Lake, these rates result in loads of 23×10^3 kg/yr of TP and 17×10^3 kg/yr of DP (Table 5-1). These may be overestimates since dust concentrations are

Table 5-1. Lesser Slave Lake phosphorus budget, 1991-93

	TOTAL PHOSPHORUS			
	Load kg/yr	FW Mean mg/L	Drainage Area km^2	Export kg/ha/yr
EXTERNAL INPUTS -1991-1992:				
- South Heart	36655	0.108	6834	0.054
- Driftpile	8876	0.079	840	0.11
- Other, West Basin	10403	0.1 *	1623	
- Swan	32809	0.104	1903	0.17
- Assineau	1210	0.103	144	0.08
- Marten	3492	0.092	201	0.17
- Other, East Basin	5378	0.095 *	885	
Total Tributaries:	98822	0.102 **		0.084 **
Precipitation (est.)	23109			
TOTAL EXTERNAL LOAD:	121931			
Est. Areal Ext. Load - $g/m^2/yr$	0.11			
OUTFLOW - Lesser Slave R.	26829	0.034		
% Retention in lake	78			
INTERNAL LOAD:	Load	Net Release Rate		
Summers, 1992 and 1993	kg/yr	$mg/m^2/d$		
- West Basin	122239	2.45		
- East Basin	106653	2.14		
TOTAL INTERNAL LOAD:	228892			
MEAN ANNUAL TP LOAD:	**350823**			

	DISSOLVED PHOSPHORUS	
	Load	FW Mean
EXTERNAL INPUTS -1991-1992:	kg/yr	mg/L
- South Heart	9695	0.0286
- Driftpile	2523	0.0225
- Other, West Basin	2393	
- Swan	6031	0.0192
- Assineau	253	0.0215
- Marten	625	0.0164
- Other, East Basin	1132	
Total Tributaries:	22652	
Precipitation (est.)	17332	
TOTAL EXTERNAL LOAD:	39984	
OUTFLOW - Lesser Slave R.	5572	0.0071

Note:
Non-significant digits retained.
* = assigned concentration.
** = for measured tributaries.

FW Mean = flow weighted mean concentration.
External inputs and outflow are for annual conditions.
Internal loads are for the ice-free season.

probably lower over large lakes, which would result in lower phosphorus deposition. However, a more appropriate rate for Lesser Slave Lake is not known.

5.4 SEWAGE

Sewage is rich in nutrients and can be an important source of both nitrogen and phosphorus for lakes. Sewage originates from several towns and hamlets in the Lesser Slave Lake basin including High Prairie, Grouard, Joussard, Faust, Kinuso, and Canyon Creek-Widewater-Wagner. Most of these communities have sewage lagoons which have licenced discharges once or twice per year. Sewage will also come from individual residences. The town of Slave Lake discharges sewage to Sawridge Creek - Lesser Slave River, outside the lake's basin.

Sewage was not sampled as part of this survey, however, it is possible to estimate the load of total phosphorus that may originate from sewage so as to evaluate its potential importance in the total supply to the lake. Investigations as part of the Baptiste Lake study (Trew *et al.* 1978) have indicated that phosphorus in sewage is released at a rate of about 0.9 kg/person/yr. Based on population data in the lake atlas (Mitchell and Prepas, 1990), the 1992 population of High Prairie of 2,932 (Stats. Can. Annual Demographic Statistics), and allowing for subsequent population increases and people living outside of towns and hamlets, the basin population was estimated as about 8,000 people. This would result in a potential annual load of TP in sewage of 7,200 kg, which is about 6% of the estimated external load of TP to Lesser Slave Lake (Table 5-1). This was not added to the external load because some of this may be present in the tributaries sampled in this survey and therefore already measured as part of their load, and because some of the sewage load will not reach the lake as a result of retention in soils and small water bodies near the point of discharge.

5.5 INTERNAL RELEASE

Phosphorus is returned from lake bottom sediments to the overlying water column as a result of decomposition, chemical reactions, diffusion, and physical mixing. This input to the water column is termed 'internal release' and it can be a major factor in the supply of phosphorus to many productive Alberta lakes. Internal release is difficult to measure directly, but it can be estimated from the increase in mass of P in the lake water during the open-water season. Since there will also be loss of P via sedimentation of particulate material during the same period, the calculated internal release is a net value. Also, any groundwater inputs of P would be manifested as internal release.

Phosphorus profile data (Appendix B-2) were used with lake depth-volume data to estimate the mass of phosphorus in the water column in each basin during the open-water period. Because depth-volume data were only available for the lake as a whole, they were re-calculated from the original planimetry to obtain separate volumes for the west and east basins (Appendix D-2). Net internal release of TP was calculated as the difference between the maximum and minimum mass in the water column in the open-water season, minus external inputs (tributary+local inflow+precipitation inputs), plus outflow mass during the same period. There were insufficient lake data for 1991 to estimate P release. Both tributary and lake data were available for 1992, but only lake data were available for 1993. To prepare an estimate for 1993, the tributary phosphorus-flow relationship for 1991-92 was projected onto the 1993 flow record using FLUX, to estimate P loads in the tributaries and the Lesser Slave River. Local inflows were assigned the P concentration from Table 5-1. Flow between the two basins was calculated from the tributary flow, precipitation, evaporation, and storage change data. Such flow represents an outflow from the west basin, and an input to the east basin and was needed to estimate processes in the east basin. Outflow from the east basin was the Lesser Slave River. Phosphorus in precipitation was obtained from the monthly estimates of Shaw *et al*. (1989). Appendix D-3 contains the internal release calculations.

The estimated net internal TP release for the whole lake as an annual average for 1992-93, was 23×10^4 kg/yr (Table 5-1). Expressed as a daily rate per unit area of lake (Table 5-1), the net release rates of 2.1-2.5 mg/m^2/d are in the mid-range of rates calculated for 28 other central Alberta recreational lakes (AEP unpubl. data). There was considerable variation in net release between the two years, mainly in the east basin. The reason for this is not known, although considering that the values are based on monthly sampling, they must be viewed as rough estimates. In the east basin, the greater depth will contribute to less frequent mixing of the bottom waters which contain higher P concentrations. Annual variation in wind and physical mixing could therefore be more significant to P release in the east than in the west basin, and could account for some of the annual variability in the east basin.

5.6 DISCUSSION

The external and internal P loads for Lesser Slave Lake are summarized in Figure 5-1. As with most Alberta lakes investigated so far (Sosiak and Trew 1996), the internal P load in Lesser Slave exceeds the external inputs. Estimated sewage loads are a small fraction of the external inputs and an even smaller fraction of the total P supply. However, phosphorus in sewage is generally more available for biological uptake than P from natural sources, such that it may be somewhat greater in importance than the percentages indicate. About 4/5 of the external load is retained in the lake, as indicated by the amount of TP in the outflow from the lake, the Lesser Slave River (Table 5-1).

No clear opportunities for significantly reducing the TP inputs to the lake are apparent, especially in view of the apparent predominance of the internal supply. The estimated sewage load is a small fraction of the total so that reducing it would likely not have any immediate effect on the lake's trophic state. However, this should not be taken to mean sewage control is not necessary, because sewage still can have local impacts and because it would be undesirable to allow P inputs to the lake to increase.

The existing effects, if any, of agriculture, forestry, oil and gas extraction, and other land uses on P loads are uncertain without detailed stream-specific investigations. The flow-weighted mean TP concentrations (Table 5-1), which can be indicative of abnormal P sources, are higher than those of two forested streams in the Whitecourt area (Munn and Prepas 1986), but lower than those of forested streams in the Wabamun Lake basin (Mitchell 1985) and in the Baptiste Lake basin (Trew *et al.* 1978). They are also much lower than those of streams draining agricultural areas in Alberta, even though there is some agriculture in most of the tributary drainages here. This implies that land use in these basins was not causing widespread increases in P export, although local increases may have been present. The lower TP export coefficient of the South Heart River (Table 5-1) appears to result from the lower runoff in this basin since the flow-weighted mean concentration of TP in the South Heart River was very similar to that of the other tributaries.

The possibility of using wetlands or marshes to trap P from rivers has been considered for the South Heart, which flows through a large flood plain. However, sampling upstream and downstream of Buffalo Bay, a shallow marshy lake, indicates that it does not greatly affect the load

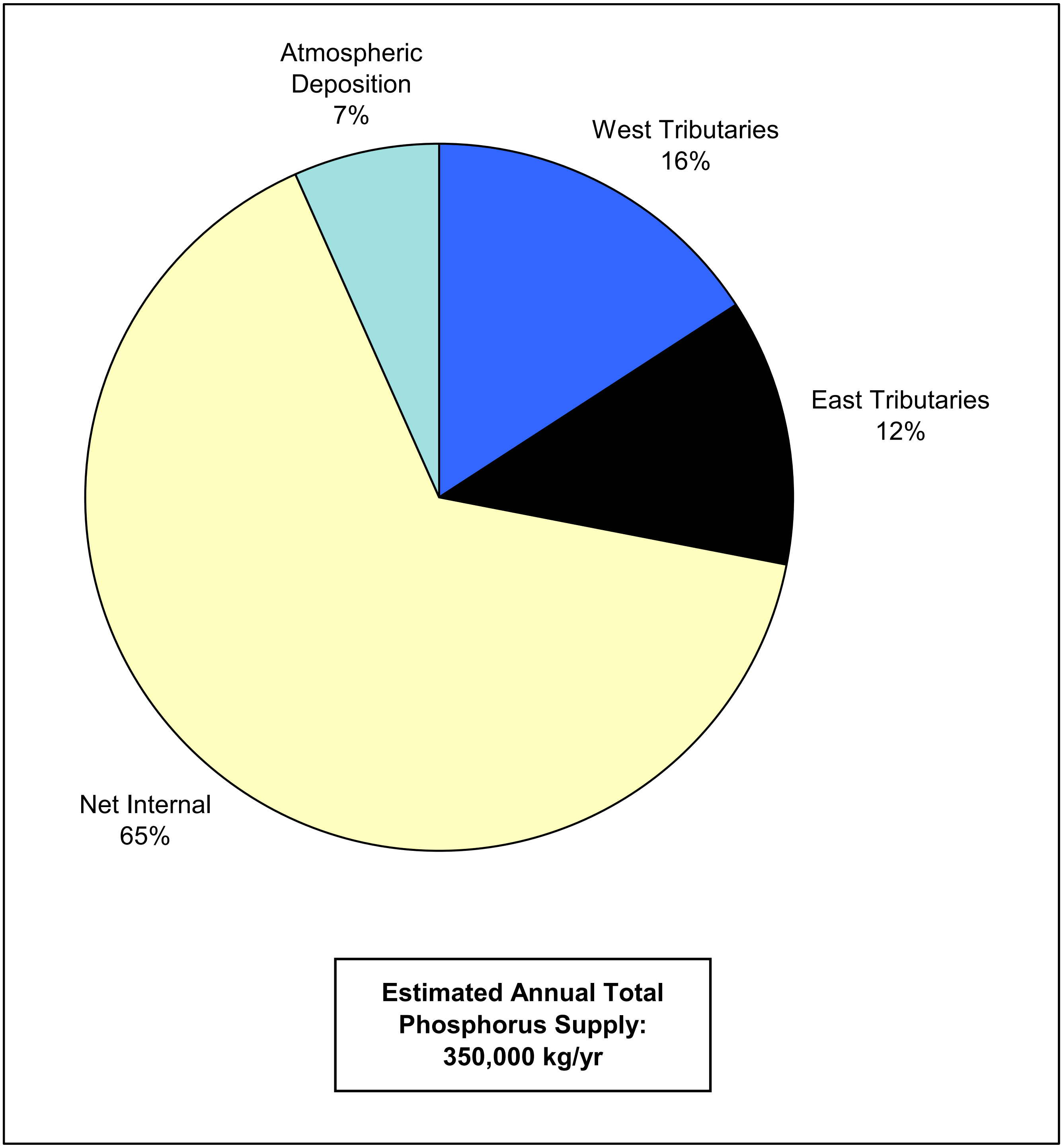


Figure 5-1. Lesser Slave Lake phosphorus budget estimates, 1991-93

of TP flowing through it (Section 6). The potential for this technique to reduce TP loads is therefore uncertain as yet.

6.0 BUFFALO BAY INFLOW AND OUTFLOW

6.1 INTRODUCTION

Buffalo Bay is a shallow, marshy, water body at Grouard through which the South Heart River flows en route to Lesser Slave Lake (Figure 2-1). Because lakes and marshes have the potential to alter the quality of water flowing through them, especially with regard to nutrients, and because nutrient input to Lesser Slave Lake is of concern, the effect of this water body on the nutrient content of the South Heart River was of interest. Coincidentally, staff of the Alberta Vocational College, Grouard, approached AEP for involvement in water quality sampling and this presented the opportunity to gather data on this question. As a result, the inflow and outflow (Figure 2-1) were sampled on several occasions in 1991-92 to assess this. The outflow site is close to the Grouard water intake such that these data are also pertinent to the Grouard raw water supply. Most of the sampling was carried out by staff and students of the Alberta Vocational College, as an environmental project. Instruction and equipment were provided by AEP and all sampling was done following AEP methods.

6.2 GENERAL WATER QUALITY

The data collected from the two sites are compiled in Appendix E-1. The South Heart River upstream and downstream of Buffalo Bay is a brown-water, periodically turbid stream, somewhat alkaline, rich in iron, manganese, organic compounds and nutrients, not unlike many boreal streams in Alberta. A more complete characterization of water quality for this overall reach of the South Heart River is provided by the data from the site on Grouard Channel (Figure 2-1 and Section 4).

The main focus of this work was on nutrients, specifically phosphorus and nitrogen. However, other data were also collected which provide some insight into the effect of this marshy water body on the quality of water passing through it. Data for pH indicate that the outflow from Buffalo Bay was higher in pH than the inflow on some occasions during summer (Appendix E-1), probably as a result of photosynthesis by the high biomass of macrophytes in the Bay. Photosynthesis consumes CO_2 and HCO_3, causing a shift in pH towards the more alkaline end of the scale. In winter, dissolved oxygen was somewhat lower in the outflow than in the inflow, probably as a result of decomposition of the fairly high littoral biomass in Buffalo Bay.

Turbidity and suspended solids (non-filterable residue) were fairly high in both the inflow and outflow. Concentrations of suspended solids were not significantly different in the two (Wilcoxon's signed rank test; $p>0.05$), at least in this set of samples. As well, the estimated loads of suspended solids in the inflow and outflow were similar, at approximately 11,000 and 13,000 t/yr, respectively (Table 6-1). The difference between the two is probably within the error of the estimation methods. These findings indicate that Buffalo Bay had little effect on the amount of suspended solids passing through it in the South Heart River. This may result in part from the fairly short residence time of the water in the bay - about three days for a mean annual flow and mean water level. The residence time would be even shorter during higher flows when the river would be carrying higher concentrations of suspended solids. Also, by the time the river gets to Buffalo Bay, some of the flow has already traversed the South Heart Reservoir, a floodplain, and the Horse Lakes wetland, all of which would tend to remove the readily-settleable solids (Choles 1996).

Dissolved organic carbon was very similar in concentration (Appendix E-1) and load (Table 6-1), upstream and downstream of Buffalo Bay. Fecal coliform bacteria did not appear to be consistently different in the inflow and outflow, however, total coliform bacteria, which in this case

Table 6-1. Estimated load of selected constituents in the inflow and outflow of Buffalo Bay, 1991-92.

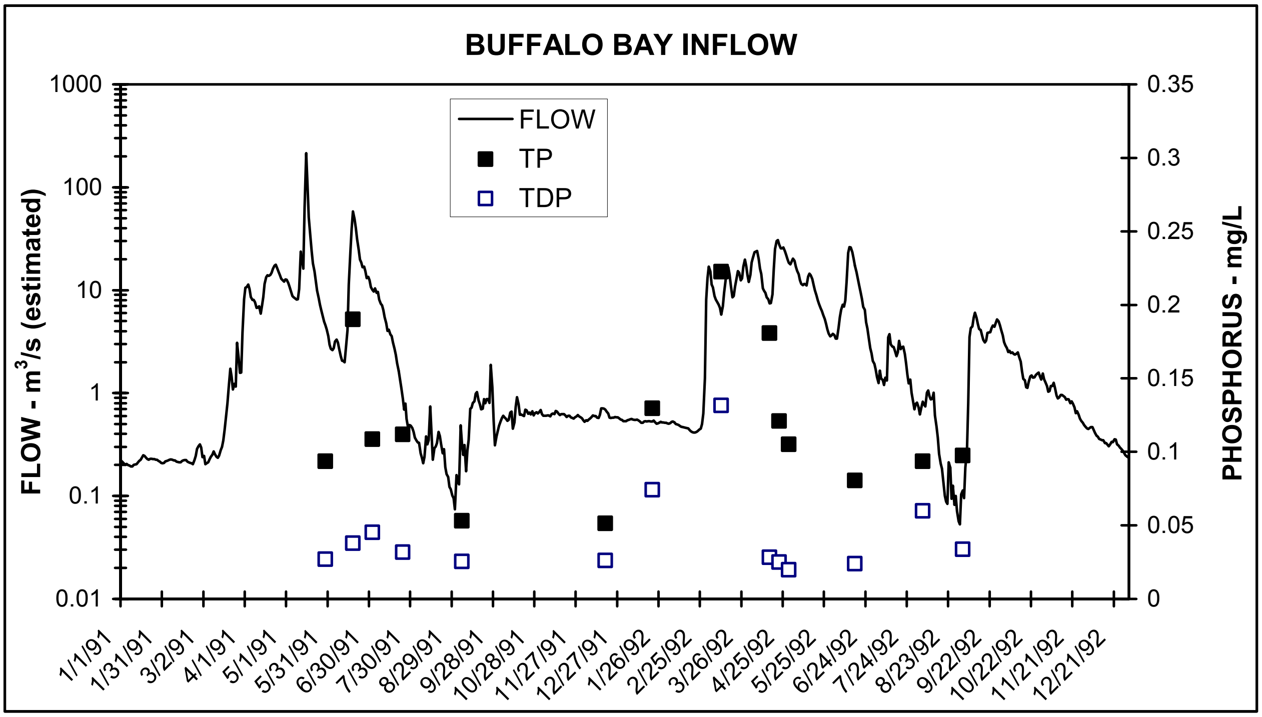
VARIABLE	INFLOW - tonnes/yr	OUTFLOW - tonnes/yr
Suspended solids	11,000	13,000
Dissolved organic carbon	3500	3500
Total phosphorus	22.1	25.6
Dissolved phosphorus	5.5	5.3
Total nitrogen	184	191
Silica	970	920

Note: Loads were estimated with FLUX 4.5 (see Section 5.6) are probably of natural origin, were often higher in the outflow than the inflow (Appendix E-1). This may reflect the productive, marshy environment of the Bay which could be expected to have generally higher densities of bacteria and many other organisms than the upstream river.

6.3 NUTRIENT TRANSPORT

The flux or load of nutrients entering and leaving Buffalo Bay was estimated with the routines in FLUX 4.5 (see Section 5.2). The estimates (Table 6-1) indicate that differences in inflow versus outflow loads ranged from about 3 to only 12%. In view of the wide variability in concentrations and flow, and the fact only 14 samples were collected during the 1991-92 survey (see Figure 6-1), these differences are not likely significant. Further, concentrations of TP were not significantly different in the inflow and outflow (Wilcoxon's signed rank test; $p>0.05$). That is to say, no net retention or release of these nutrients in Buffalo Bay was apparent at this level of investigation. Individual nutrient fractions may differ from this, however, as a result of metabolism of the littoral community. For example, ammonia and nitrates were lower in the outflow during summer (Appendix E-1), probably as a result of uptake of these compounds by photosynthetic plants. Conversely, ammonia was higher in the outflow than the inflow during winter, probably as a result of ammonification from the decomposition of biomass in that season.

The lack of a measurable effect of Buffalo Bay on nutrient flux may be for the same reason as for suspended solids: short residence time of the river in the Bay, and the influence of upstream depositional areas on readily-settleable particulate nutrients. Others have also noted that natural wetlands are not necessarily effective as nutrient sinks (e.g., Howard-Williams 1985), and may already be 'saturated' with nutrients such that they can not retain any further net amount on an annual basis.



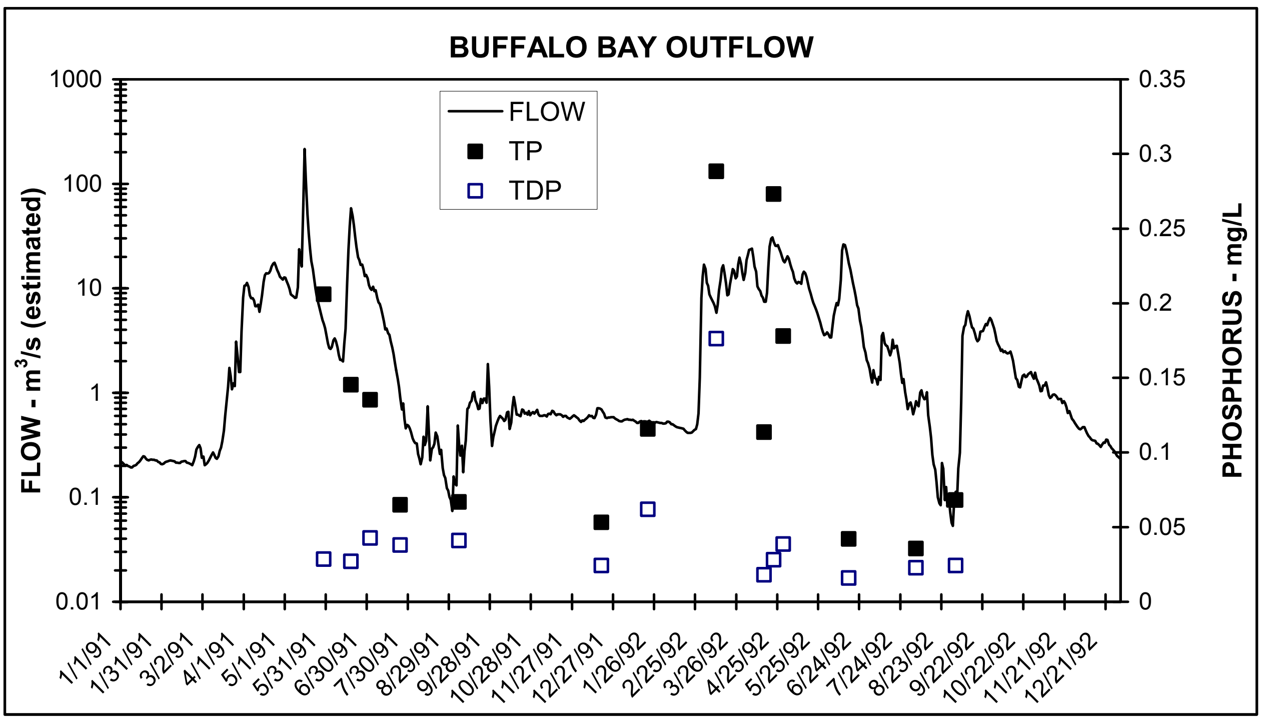


Figure 6-1. Buffalo Bay hydrograph and phosphorus concentrations, 1991-92

7.0 REFERENCES

Alberta Environmental Protection. 1993. Water quality sampling methods for surface waters. Water Management Division. 64 pp.

Alberta Environmental Protection. 1994. Alberta Ambient Surface Water Quality Interim Guidelines. Environmental Assessment Division, AEP. 4 pp; and updates.

Ash, G.R. and L.R. Noton. 1979. Lesser Slave Lake study - fisheries impact study final report. Prep. For Alta Envir., Planning Division by R.L.&L. Envir. Serv. Ltd. 133 pp.

Choles, J. 1996. Sediment sources and movement in Lesser Slave Lake. Unpubl. Report. River Engineering Branch, Water Management Div., AEP. 19 pp + app.

Chow-Fraser, P., D.O. Trew, D. Findlay, and M. Stainton. 1994. A test of hypotheses to explain the sigmoidal relationship between total phosphorus and chlorophyll *a* concentrations in Canadian lakes. Can. J. Fish. Aquat. Sci. 51: 2052-2065.

CCREM. 1987. (Canadian Council of Resource and Environment Ministers) Canadian Water Quality Guidelines and updates.

DeBoer, A. 1995. Personal communication. Hydrologist, Water Sciences Branch, Water Management Div. AEP.

Dieken, F.P., F. Skinner, A. Wharmby, and S. Wu. 1996. Methods manual for chemical analysis of water and wastes. Alberta Environmental Centre, Vegreville. AECV96-M1.

Environment Canada. 1991. Historical streamflow summary, Alberta, to 1990. Water Survey of Canada. 629 pp.

Howard-Williams, C. 1985. Cycling and retention of nitrogen and phosphorus in wetlands: a theoretical and applied perspective. Freshwater. Biol. 15: 391-431.

Greenberg, A.E., L.S. Clesceri, and A.D. Eaton. Eds. 1992. Standard methods for the examination of water and wastewater. 18th ed. Amer. Publ. Health Assoc., Amer. Water Works Assoc., Water Pollut. Contr. Fed.

Miller, R.B. 1941. The Lesser Slave Lake investigation. Dept. Zoology, University of Alberta. Unpubl. Rep.

Mitchell, P.A. 1985. Preservation of water quality in Lake Wabamun. Lake Wabamun Eutrophication Study. Alta. Envir. 26 pp.

Mitchell, P.A. and E. Prepas. (eds.) 1990. Atlas of Alberta lakes. University Of Alberta Press. 675 pp.

Munn, N., and E. Prepas. 1986. Seasonal dynamics of phosphorus partitioning and export in Alberta, Canada. Can. J. Fish. Aquat. Sci. 43: 2464-2471.

Paetz, M.J. & K.A. Zelt. 1974. Studies of northern Alberta lakes and their fish populations. J. Fish. Res. Bd. Can. 31: 1007-1020.

Shaw, R.D., A.M. Trimbee, A. Minty, H. Fricker, and E.E. Prepas. 1989. Atmospheric deposition of phosphorus and nitrogen in central Alberta with emphasis on Narrow Lake. Water, Air, and Soil Pollut. 43: 119-134.

Smillie, R.D. (ed.) 1992. Methods manual for the chemical analysis of trace organics and pesticides in environmental samples. Trace Analysis Program, Physical and Engineering Sciences Division, Alberta Environmental Centre, Vegreville.

Sosiak, A.J. and D.O. Trew. 1996. Pine Lake restoration project: diagnostic study (1992). Technical Services & Monitoring Division, AEP. 119 pp.

Trew, D.O., D.J. Beliveau, and E.I. Yonge. 1978. The Baptiste Lake study. Summary and Technical Reports. Pollution Control Division, Alta. Envir.

Walker, W.W. 1987. Empirical methods for predicting eutrophication in impoundments; Report 4, Phase III: Applications manual. Tech. Report E-81-9. U.S. Army Corps of Engineers, Waterways Exp. Station, Vicksburg, Miss. and updates.

Weisgerber, J. 1977. A preliminary report on the limnology of Lesser Slave Lake. Alberta Fish & Wildlife Division. Unpubl. Report. 115 pp.

Wetzel, R.G. 1983. Limnology. 2nd ed. Saunders College Publishing. New York. 767 pp.

8.0. APPENDICES

Appendix A-1. Sampling sites.

STATION NO.	STATION NAME	STATION DESCRIPTION	NAQUADAT NO.	LATITUDE	LONGITUDE
AB07BG0030	LESSER SLAVE LAKE-WEST BASIN	LESSER SLAVE LAKE WEST BASIN EUPHOTIC COMPOSITE SAMPLE	01AL07BG0100	553157	1155325
AB07BG0040	LESSER SLAVE LAKE-WEST BASIN	LESSER SLAVE LAKE WEST BASIN PROFILE SAMPLE	01AL07BG0101	553157	1155325
AB07BJ0040	LESSER SLAVE LAKE-EAST BASIN	LESSER SLAVE LAKE - EAST BASIN EUPHOTIC COMPOSITE SAMPLE	01AL07BJ0100	552640	1150111
AB07BJ0050	LESSER SLAVE LAKE-EAST BASIN	LESSER SLAVE LAKE - EAST BASIN PROFILE SAMPLE	01AL07BJ0101	552640	1150111
AB07BF0030	SOUTH HEART RIVER	SOUTH HEART RIVER APPROX. 3 KM. U/S OF BUFFALO BAY GRAB SAMPLE	00AL07BF1450	553530	1161232
AB07BF0080	BUFFALO BAY	BUFFALO BAY OUTFLOW AT GROUARD (GRAB)	00AL07BF1550	553222	1160928
AB07BF0040	GROUARD CHANNEL	GROUARD CHANNEL AT HIGHWAY #750 BRIDGE RIGHT BANK SAMPLE	00AL07BF1490	553049	1160954
AB07BF0050	GROUARD CHANNEL	GROUARD CHANNEL AT HIGHWAY # 750 BRIDGE CENTRE OF RIVER SAMPLE	00AL07BF1500	553049	1160954
AB07BF0060	GROUARD CHANNEL	GROUARD CHANNEL AT HIGHWAY #750 BRIDGE LEFT BANK SAMPLE	00AL07BF1510	553049	1160954
AB07BF0070	GROUARD CHANNEL	GROUARD CHANNEL AT HIGHWAY #750 BRIDGE 5 POINT CROSS CHANNEL - COMPOSITE	00AL07BF1520	553049	1160954
AB07BH0010	DRIFTPILE RIVER	DRIFTPILE RIVER AT HIGHWAY # 2 NEAR DRIFTPILE	00AL07BH1000	552042	1154746
AB07BH0020	DRIFTPILE RIVER	DRIFTPILE RIVER NEAR MOUTH	00AL07BH1200	552020	1154720
AB07BJ0010	SWAN RIVER	SWAN RIVER AT HIGHWAY # 2 NEAR KINUSO	00AL07BJ1000	551857	1152455
AB07BJ0020	SWAN RIVER	SWAN RIVER AT MOUTH	00AL07BJ1200	551850	1152450
AB07BJ0030	ASSINEAU RIVER	ASSINEAU RIVER NEAR THE MOUTH	00AL07BJ1500	552229	1151124
AB07BG0020	MARTEN CREEK	MARTEN CREEK AT HIGHWAY # 88	00AL07BG1500	553157	1145325
AB07BG0010	NARROWS CREEK	NARROWS CREEK NEAR THE MOUTH (BEFORE ENTERING LESSER SLAVE LAKE)	00AL07BG1000	552933	1152746
AB07BK0010	LESSER SLAVE RIVER	LESSER SLAVE RIVER AT BRIDGE NEAR OUTFLOW FROM LESSER SLAVE LAKE CENTER OF RIVER	00AL07BK2100	551822	1144535

Note: Station numbers used in data appendices are the Naquadat station numbers

Appendix A-2. Water quality variables and analytical methods.
1. Conventional variables.

VARIABLE	CONTAINER	PRESERVATION	ANALYTICAL CODE	ANALYTICAL METHOD OR INSTRUMENT
		IN SITU MEASUREMENTS		
Temperature			02061F	Field meter
pH			10301F	Field meter
Conductance			02041F	Field meter
Dissolved Oxygen			08102F	Field meter
		LABORATORY ANALYSIS		
True Colour			02024L	Klett-Somerson Spectrophotometric method
Conductance	P	Cool to 4 °C	02041L	Conductivity meter
Turbidity			02073L	Turbidity meter
Total Dissolved Solids			00201/5L	Calculated
Total Dissolved Solids			00207L	Difference
Alkalinity, total	P	Cool to 4 °C	10101L	Potentiometric tritration
pH	P	Cool to 4 °C	10301L	Electrometric method
Suspended Solids	P	Cool to 4 °C	10401L	Gravimetric method
Total Solids			10453L	Evaporation
Hardness, total			10602L	Calculated
Ca, dissolved	P	Cool to 4 °C	20103/7L	Atomic absorption
Mg, dissolved	P	Cool to 4 °C	12102/5L	Atomic absorption, direct aspiration
Na, dissolved	P	Cool to 4 °C	11103L	Flame photometry
K, dissolved	P	Cool to 4 °C	19103L	Flame photometry, internal standard
HCO_3			06201L	Calculated
CO_3			06301L	Calculated
Cl, dissolved	P	Cool to 4 °C	17206L	Colourimetry on autoanalyzer
SO_4, dissolved	P	Cool to 4 °C	16306L	Colourimetry on autoanalyzer
F, dissolved	P	Cool to 4 °C	09107L	Automated potentiometric method
Dissolved Oxygen	G	'Fix'; Cool	08101L	Winkler method (Azide modification)
Biochemical Oxygen Demand	G	Cool to 4 °C	08202L	5 day, 20 °C, Winkler on incubated sample
Chemical Oxygen Demand	G	H_2SO_4	08304L	Oven digestion, colourimetry
Al, total	P	0.5% HNO_3	13003/30L	Atomic absorption, solvent extraction
As, total	P	0.5% H_2SO_4	33011L	Atomic absorption, hydride generation
Ba, total	P	0.5% HNO_3	56009L	ICAP
Be, dissolved	P	0.5% HNO_3	04103L	Atomic absorption, direct aspiration
Cd, total	P	0.5% HNO_3	48009L	ICAP
Co, total	P	0.5% HNO_3	27009L	ICAP
Cr, total	P	0.5% HNO_3	24009L	ICAP
Cu, total	P	0.5% HNO_3	29009L	ICAP
Fe, total	P	Cool to 4 °C	26009L	ICAP
Fe, extractable	P	Cool to 4 °C	26304L	Atomic absorption, direct aspiration
Hg, total	P	HNO_3-$K_2CR_2O_7$	80015L	Flameless atomic absorption on autoanalyzer
Mn, total	P	0.5% HNO_3	25003L	ICAP
Mo, total	P	0.5% HNO_3	42009L	ICAP
Ni, total	P	0.5% HNO_3	28009L	ICAP
Pb, extractable	P	0.5% HNO_3	82302L	Atomic absorption, solvent extraction
Se, total	P	0.5% H_2SO_4	34011L	Atomic absorption, hydride generation
V, total	P	0.5% HNO_3	23009L	ICAP
Zn, total	P	0.5% HNO_3	30009L	ICAP
$(NO_2^-+NO_3^-)$-N	P	Cool to 4 °C	07111L	Colourimetry
NO_2^--N	P	Cool to 4 °C	07205/6L	Colourimetry on autoanalyzer
NH_3-N	P	0.08% H_2SO_4	07561/2L	Colourimetry on autoanalyzer
Total Kjeldahl Nitrogen	P	0.08% H_2SO_4	07021L	Colourimetry on autoanalyzer
Total Phosphorus	P	0.08% H_2SO_4	15421L	Colourimetry on autoanalyzer
Total Phosphorus	G	Cool to 4 °C	15422L	Colourimetry on autoanalyzer
Dissolved Phosphorus	P	0.08% H_2SO_4	15105L	Colourimetry on autoanalyzer
Dissolved Phosphorus	G	Cool to 4 °C	15144L	Colourimetry on autoanalyzer
Particulate Phosphorus			15901L	Calculated
Silica, reactive	P	Cool to 4 °C	14105/6/7L	Heteropoly blue colourimetry
Dissolved Organic Carbon	P	Cool to 4 °C	06107L	Persulphate-UV digestion; Colourimetry
Phenols	G	0.25% H_2SO_4	06536/7L	Automated 4-aminoantipyrine colourimetry
Tannin and Lignin	G	Cool to 4 °C	06551L	Acid colourimetry
Oil and Grease	G	0.25% H_2SO_4	06521L	Partition-gravimetric
Adsorbable Organic Halides (AOX)	P	HNO3	95080L	Activated carbon adsorption, microcoulometry
Total Coliforms	G	Cool to 4 °C	36001L	Tube dilution
Fecal Coliforms	G	Cool to 4 °C	36011L	Tube dilution
Chlorophyll *a* , planktonic	P	Cool to 4 °C	06715L	Fluorometry of acetone extract

Note:
P = Plastic, G = Glass, ICAP = Inductively Coupled Argon Plasma
All samples kept in dark. Reference: AEP NAQUADAT detailed dictionary; Dieken et al. 1996.

Appendix A-2. Analytical methods - continued.
2. Pesticides.

ANALYTICAL CODE	COMPOUND	MDL µg/L	ANALYTICAL CODE	COMPOUND	MDL µg/L
93038	2,4,5-T	0.20	93037	2,4-D	0.20
93043	2,4-DB	0.30	93044	2,4-DP	0.20
18130	Aldrin	0.01	93012	Dieldrin	0.01
94026	Diazanon	0.05	93016	Endrin	0.01
94007	Disulfoton (Di-Syston)	0.30	94012	Guthion	1.50
94008	Ethion	0.20	93018	Heptachlor Epoxide	0.01
93017	Heptachlor	0.01	18521	MCPA	2.00
93019	Hexachlorobenzene	0.005	94014	Methyl Parathion	0.30
94013	Malathion	0.30	18158	PCBs	0.05
93025	Mirex	0.02	94020	Phorate (Thimet)	0.20
94019	Parathion	0.15	94021	Fenchlorphos (Ronnel)	0.15
18075	alpha-BHC	0.01	93001	alpha-Chlordane	0.02
93014	alpha-Endosulfan	0.01	93015	beta-Endosulfan	0.01
18070	gamma-BHC	0.01	93002	gamma-Chlordane	0.005
93009	o,p'-DDT	0.02	93006	p,p'-DDD	0.01
93008	p,p'-DDE	0.01	93010	p,p'-DDT	0.02
93024	p,p'-Methoxychlor	0.03			

Note:
MDL: Method detection limit, for most surface waters.
Reference: Smillie 1992.

Appendix A-2. Analytical methods - concluded.
3. Trace Organic "Priority Pollutants".

NAQUADAT CODE	COMPOUND	MDL µg/L	NAQUADAT CODE	COMPOUND	MDL µg/L
	a. Extractables				
95000	Benzoic acid	2	95028	Phenanthrene	1
95001	4-Chloro-3-methylphenol	1	95029	Pyrene	1
95002	2-Chlorophenol	2	95030	Isophorone	1
92003	2,4-Dichlorophenol	1	93031	Benzo(b)fluoranthene	1
95004	2,4-Dimethylphenol	2	95032	2-Chloronapthalene	1
95005	2-Methyl-4,6-dinitrophenol	1	95033	Hexachlorobenzene	1
95006	2,4-Dinitrophenol	1	95034	Hexachlorobutadiene	5
95007	Hexadecanoic acid	3	95035	Hexachlorocyclopentadiene	1
95008	2-Nitrophenol	1	95036	Hexachloroethane	5
95009	4-Nitrophenol	1	95037	1,2,4-Trichlorobenzene	1
95010	Pentachlorophenol	1	95038	Benzidine	2
95011	Phenol	1	95039	2,4-Dinitrotoluene	1
95012	2,4,5-Trichlorophenol	1	95040	2,6-Dinitrotoluene	1
95013	2,4,6-Trichlorophenol	1	95041	1,2-Diphenylhydrazine	1
95014	Acenaphthene	1	95042	Nitrobenzene	1
95015	Acenaphthylene	1	95043	n-Nitrosodiphenylamine	1
95016	Anthracene	1	95044	n-Nitroso-di-n-propylamine	2
95017	Benzo(a)anthracene	1	95045	4-Bromophenyl phenyl ether	1
95018	Benzo(k)fluoranthene	1	95046	Bis(2-chloroethoxy)methane	1
95019	Benzo(ghi)perylene	2	95047	Bis(2-chloroethyl)ether	1
95020	Benzo(a)pyrene	1	95048	Bis(2-chloroisopropyl)ether	1
95021	Chrysene	1	95049	4-Chlorophenyl phenyl ether	1
95022	Dibenzo(ah)anthracene	5	95050	Butylbenzylphthalate	1
95023	Fluoranthene	1	95051	Dibutylphthalate	1
95024	Fluorene	1	95052	Diethylphthalate	1
95025	Indeno(1,2,3-cd)pyrene	1	95053	Dimethylphthalate	1
95026	Naphthalene	1	95054	Di-n-octylphalate	1
95027	Perylene	1	95055	Bis(2-ethylhexyl)phthalate	1
	b. Volatiles				
95200	Benzene	1	95229	Trichlorofluoromethane	1
95201	Bromodichloromethane	1	95231	Trichloroethylene	1
95202	Bromoform	5	95232	Vinyl chloride	30
95203	Bromomethane	1	95233	o-Xylene	1
95204	Carbontetrachloride	1	95234	m,p-Xylene	1
95205	Chlorobenzene	1	95299	Methylene chloride	1
95206	Chloroethane	1	95704	1,1,1,2-Tetrachloroethane	1
95207	2-Chloroethoxyethylene	4	95800	1,1-Dichloropropylene	1
95208	Chloroform	1	95803	1,2,3-Trichloropropane	1
95209	Dibromochloromethane	1	95806	1,3-Dichloropropane	1
95210	Dibromomethane	1	95809	1,2-Dibromo-3-chloropropane	3
95211	1,2-Dichlorobenzene	1	95812	2,2-Dichloropropane	1
95212	1,3-Dichlorobenzene	1	95815	4-Chlorotoluene	1
95213	1,4-Dichlorobenzene	1	95818	p-Isopropyltoluene	1
95214	1,1-Dichloroethane	1	95821	2-Chlorotoluene	1
95215	1,2-Dichloroethane	1	95824	cis-1,2-Dichloroethylene	1
95216	1,1-Dichloroethylene	1	95827	n-Propylbenzene	1
95217	trans-1,2-Dichloroethylene	1	95830	n-Butylbenzene	1
95218	1,2-Dichloropropane	1	95833	sec-Butylbenzene	1
95219	cis-1,3-Dichloropropylene	3	95836	tert-Butylbenzene	1
95220	trans-1,3-Dichloropropylene	3	95839	1,2,3-Trichlorobenzene	1
95221	Ethylbenzene	1	95841	Bromobenzene	1
95222	Methylene chloride	20	95842	1,3,5-Trimethylbenzene	1
95223	Styrene	1	95843	Isopropylbenzene	1
95224	1,1,2,2-Tetrachloroethane	1	95846	1,2,4-Trimethylbenzene	1
95225	Tetrachloroethylene	3	95851	1,2-Dibromoethane	1
95226	Toluene	3	95859	Napthalene	1
95227	1,1,1-Trichloroethane	1	NA	Hexachlorobutadiene	3
95228	1,1,2-Trichloroethane	1	NA	1,2,4-Trichlorobenzene	1

Note:
MDL: Method detection limit, for most surface waters. NA: not assigned yet
Reference: Smillie 1992

Appendix B-1. Lesser Slave Lake water quality survey, 1991-1993: composite samples.

Results are mg/L unless noted. F = field measurement; L = lab analysis

STATION	CODE	D	M	Y	PH 103**L	COND US/CM 020**L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	SECCHI 20 CM. M 020**L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 106**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L
L SLAVE L WEST COMP	01AL07BG0100	28	5	91	8.2	196	7.1	17	1.6	105	140	6	146	87	82	7	2.4	23	6
L SLAVE L WEST COMP	01AL07BG0100	25	6	91	8.2	194	2.5	14	2.5	103	142	2	144	87	82	7	2.5	23	6
L SLAVE L WEST COMP	01AL07BG0100	31	7	91	8.0	197	0.2	14	2.2	101	147	3	150	88	85	6	2.5	24	6
L SLAVE L WEST COMP	01AL07BG0100	16	6	92	8.2	204	2.3	13	3.2	106	142	L1.	142	93	87	8	2.5	25	6
L SLAVE L WEST COMP	01AL07BG0100	31	7	92	7.6	196	4.2	20	1.0	112	175	5	180	96	87	8	2.7	25	6
L SLAVE L WEST COMP	01AL07BG0100	3	9	92	7.8	210	2.4	16	1.7	112	148	4	152	96	88	8	2.7	27	5
L SLAVE L WEST COMP	01AL07BG0100	1	10	92	7.9	208	3.3	18	2.8	106	135	3	138	95	81	8	2.6	24	5
L SLAVE L WEST COMP	01AL07BG0100	7	6	93					3.1										
L SLAVE L WEST COMP	01AL07BG0100	13	7	93	8.2	200	3.2	17	1.5	107	131	3	134	93	87	8	2.5	25	6
L SLAVE L WEST COMP	01AL07BG0100	17	8	93	7.7	200	3.9		0.7	109	170	4	174	97	87	8	2.5	25	6
L SLAVE L WEST COMP	01AL07BG0100	20	9	93	8.5	203	4.0	18	1.5	106	140	2	142	94	84	8	2.5	24	6
L SLAVE L WEST COMP	01AL07BG0100	18	10	93	8.3	204	3.0	12	2.0	103	177	7	184	99	90	9	2.7	26	6
L SLAVE L EAST COMP	01AL07BJ0100	28	5	91	8.1	190	3.3	13	2.5	101	130	4	134	86	80	7	2.4	22	6
L SLAVE L EAST COMP	01AL07BJ0100	24	6	91	8.3	190	4.2	14	3.8	98	125	1	126	86	80	6	2.3	22	6
L SLAVE L EAST COMP	01AL07BJ0100	31	7	91	8.0	191	0.2	13	2.6	110	140	2	142	86	84	6	2.5	22	7
L SLAVE L EAST COMP	01AL07BJ0100	14	5	92	7.7	195	2.9	8	3.2	100	160	6	166	88	82	8	2.5	23	6
L SLAVE L EAST COMP	01AL07BJ0100	16	6	92	8.2	193	1.6	11	3.0	98.9	130	2	132	88	78	8	2.4	23	5
L SLAVE L EAST COMP	01AL07BJ0100	31	7	92	8.3	192	0.7	10	2.5	101	162	2	164	88	85	8	2.5	24	6
L SLAVE L EAST COMP	01AL07BJ0100	3	9	92	7.8	196	2.0	11	1.8	103	138	4	142	90	83	7	2.5	25	5
L SLAVE L EAST COMP	01AL07BJ0100	1	10	92	7.8	200	7.2	17	1.3	103	131	5	136	91	78	8	2.5	23	5
L SLAVE L EAST COMP	01AL07BJ0100	7	6	93					3.2										
L SLAVE L EAST COMP	01AL07BJ0100	13	7	93	8.2	190	2.4	17	1.9	102	125	3	128	88	81	7	2.4	24	5
L SLAVE L EAST COMP	01AL07BJ0100	12	8	93	8.3	191	2.8	16	2.8	105				88	87	8	2.4	25	6
L SLAVE L EAST COMP	01AL07BJ0100	20	9	93	8.4	192	2.8	16	2.2	102	114	2	116	89	79	8	2.4	23	5
L SLAVE L EAST COMP	01AL07BJ0100	18	10	93	8.2	194	1.9	15	2.8	99.5	154	4	158	89	80	8	2.4	23	5

STATION	CODE	D	M	Y	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	N PARTIC 079**L	N TKN 070**L	N DISS NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO2 072**L	P TOTAL 15421L	P TOTAL 15422L	P DISS 15105L	P DISS 15114L	Al EXT 130**L	As TOTAL 330**L	Ba TOTAL 560**L
L SLAVE L WEST COMP	01AL07BG0100	28	5	91	106		1.0	13	0.09	1.4	0.1	0.58	0.012	0.032	0.002	0.0300	0.0257	0.006	0.0091	0.04	0.0009	0.082
L SLAVE L WEST COMP	01AL07BG0100	25	6	91	106		L0.5	12	0.09	3.9	0.04	0.45	0.021	0.002	L.001	0.0150	0.0229	0.004	0.0107			
L SLAVE L WEST COMP	01AL07BG0100	31	7	91	107		1.0	8	0.09	6.9	0.19	0.51	0.020	0.003	0.001	0.0270	0.0386	0.010	0.0108	L.01	0.0012	0.055
L SLAVE L WEST COMP	01AL07BG0100	16	6	92	113		1.1	8	0.09	0.2		0.48	0.009	L.001	L.001	0.0200	0.0240	0.007	0.0091	0.01	0.0009	0.058
L SLAVE L WEST COMP	01AL07BG0100	31	7	92	118		1.2	11	0.08	3.9		1.82	0.009	0.001	L.001	0.0600	0.0718	0.011	0.0116	L.01	0.0014	0.050
L SLAVE L WEST COMP	01AL07BG0100	3	9	92	117		1.1	11	0.10	7.0		1.48	0.010	0.003	L.001	0.0730	0.0795	0.012	0.0160			
L SLAVE L WEST COMP	01AL07BG0100	1	10	92	115		1.0	9	0.09	5.7		1.18	0.062	0.023	L.001	0.0600	0.0659	0.014	0.0135	L.01	0.0017	0.046
L SLAVE L WEST COMP	01AL07BG0100	7	6	93													0.0265		0.0116			
L SLAVE L WEST COMP	01AL07BG0100	13	7	93	114		1.0	9	0.09	1.0	0.24	0.68	0.015	0.002	0.001	0.0350	0.0376	0.006	0.0084			
L SLAVE L WEST COMP	01AL07BG0100	17	8	93	118		1.0	8	0.09	2.9	0.69	2.40	0.064	L.001	0.001	0.1000	0.0951	0.016	0.0175	L.005	0.0014	0.054
L SLAVE L WEST COMP	01AL07BG0100	20	9	93	111	3	1.0	8	0.09	4.9	0.25	1.06	0.030	0.006	0.002	0.0530	0.0538	0.013	0.0156	L.005	0.0017	0.052
L SLAVE L WEST COMP	01AL07BG0101	18	10	93	111	1	1.0	5	0.09	2.1		0.79	0.008	0.006	L.001	0.0390	0.0404	0.015	0.0123			
L SLAVE L EAST COMP	01AL07BJ0100	28	5	91	105		1.0	11	0.09	7.0	0.08	0.47	0.006	0.009	0.002	0.018	0.0197	0.005	0.0081	0.23	0.0009	0.083
L SLAVE L EAST COMP	01AL07BJ0100	24	6	91	105		L0.5	10	0.09	0.2	0.04	0.40	0.005	0.002	L.001	0.014	0.0160	0.006	0.0076			
L SLAVE L EAST COMP	01AL07BJ0100	31	7	91	104		1.0	20	0.12	1.8	0.1	0.16	0.019	0.003	0.001	0.023	0.0176	0.007	0.0075	L.01	0.0008	0.057
L SLAVE L EAST COMP	01AL07BJ0100	14	5	92	107		1.0	6	0.09	1.8		0.45	0.018	0.046	0.002	0.017	0.0205	0.003	0.0079	L.01	0.0010	0.054
L SLAVE L EAST COMP	01AL07BJ0100	16	6	92	107		1.1	7	0.09	0.2		0.49	0.010	L.001	L.001	0.015	0.0157	0.007	0.0068	0.01	0.0007	0.060
L SLAVE L EAST COMP	01AL07BJ0100	31	7	92	107		1.1	7	0.08	1.3		0.55	0.006	0.001	L.001	0.017	0.0235	0.008	0.0070	L.01	0.0007	0.056
L SLAVE L EAST COMP	01AL07BJ0100	3	9	92	110		1.0	8	0.09	2.9		1.05	0.015	0.003	L.001	0.043	0.0466	0.005	0.0080			
L SLAVE L EAST COMP	01AL07BJ0100	1	10	92	111		1.0	9	0.09	0.1		1.65	0.022	0.002	L.001	0.075	0.0766	0.011	0.0100	L.01	0.0008	0.050
L SLAVE L EAST COMP	01AL07BJ0100	7	6	93													0.0183		0.0103			
L SLAVE L EAST COMP	01AL07BJ0100	13	7	93	108		1.0	9	0.09	0.4	0.18	0.48	0.009	0.002	L.001	0.018	0.0222	0.006	0.0065			
L SLAVE L EAST COMP	01AL07BJ0100	12	8	93	107		1.0	10	0.09	1.8	0.25	0.67	0.015	0.017	0.002	0.028	0.0304	0.005	0.0087	L.005	0.0008	0.056
L SLAVE L EAST COMP	01AL07BJ0100	20	9	93	107	1	1.1	9	0.09	0.6	0.21	0.62	0.020	L.001	L.001	0.023	0.0262	0.004	0.0076	L.005	0.0009	0.055
L SLAVE L EAST COMP	01AL07BJ0100	18	10	93	109		1.0	6	0.09	L0.1		0.72	0.015	0.005	L.002	0.027	0.0329	0.006	0.0081			

STATION	CODE	D	M	Y	Be DISS 041**L	Cd TOTAL 480**L	Co TOTAL 270**L	Cr TOTAL 240**L	Cu TOTAL 290**L	Fe TOTAL 260**L	Fe EXT 263**L	Hg TOTAL 800**L	Mn TOTAL 250**L	Mo TOTAL 420**L	Ni TOTAL 280**L	Pb EXT 823**L	Se TOTAL 340**L	V TOTAL 230**L	Zn TOTAL 300**L	CARBON PARTIC TOTAL 06905L	CARBON DISS ORG 061**L	CARBON DISS INORG 061**L
L SLAVE L WEST COMP	01AL07BG0100	28	5	91	L.001	L.001	L.001	0.001	0.009	0.332		L.0001	0.032	L.001	0.003	L.002	0.0001	L.002	0.006	1.51	9.6	
L SLAVE L WEST COMP	01AL07BG0100	25	6	91							0.07									0.62	10.1	
L SLAVE L WEST COMP	01AL07BG0100	31	7	91	L.001	L.001	L.001	L.001	L.001	0.085		L.0001	0.057	L.001	0.002	0.003	0.0001	L.002	0.003	0.94	10.6	
L SLAVE L WEST COMP	01AL07BG0100	16	6	92	L.001	0.001	L.001	0.001	0.004	0.052		L.0001	0.137	L.001	0.002	L.002	L.0001	L.002	0.003		10.3	
L SLAVE L WEST COMP	01AL07BG0100	31	7	92	L.001	L.001	L.001	0.001	0.001	0.053		L.0001	0.046	0.001	0.003	L.002	0.0001	L.002	0.002	3.44	13.2	
L SLAVE L WEST COMP	01AL07BG0100	3	9	92							0.09									2.53	11.2	
L SLAVE L WEST COMP	01AL07BG0100	1	10	92	L.001	L.001	L.001	0.002	L.001	0.056		L.0001	0.023	L.001	0.002	L.002	0.0001	L.002	L.001	2.57	11.8	
L SLAVE L WEST COMP	01AL07BG0100	7	6	93																		
L SLAVE L WEST COMP	01AL07BG0100	13	7	93							0.06									1.61	10.8	20.0
L SLAVE L WEST COMP	01AL07BG0100	17	8	93	L.001	L.001	L.001	0.002	0.011	0.048		L.0001	0.036	0.002	0.002	L.002	L.0001	L.002	0.008	3.79	15.0	19.2
L SLAVE L WEST COMP	01AL07BG0100	20	9	93	L.001	L.001	L.001	L.001	L.001	0.072		L.0001	0.055	L.001	0.002	L.002	0.0001	L.002	0.002	1.36	11.2	20.1
L SLAVE L WEST COMP	01AL07BG0101	18	10	93							0.05									1.83	11.6	
L SLAVE L EAST COMP	01AL07BJ0100	28	5	91	L.001	L.001	L.001	L.001	0.027	0.237		L.0001	0.127	L.001	0.004	L.002	L.0001	L.002	0.010	0.48	9.4	
L SLAVE L EAST COMP	01AL07BJ0100	24	6	91							L.01									0.26	9.5	
L SLAVE L EAST COMP	01AL07BJ0100	31	7	91	L.001	L.001	L.001	L.001	L.001	0.038		L.0001	0.036	0.001	0.003	0.003	0.0001	L.002	0.003	0.46	10.6	
L SLAVE L EAST COMP	01AL07BJ0100	14	5	92	L.001	0.001	L.001	L.001	0.002	0.108		L.0001	0.123	0.001	L.001	L.002	L.0001	L.002	L.001		9.5	
L SLAVE L EAST COMP	01AL07BJ0100	16	6	92	L.001	0.002	L.001	0.002	0.007	0.059		L.0001	0.025	0.002	0.003	L.002	L.0001	L.002	0.004		9.7	
L SLAVE L EAST COMP	01AL07BJ0100	31	7	92	L.001	L.001	L.001	0.001	0.001	0.018		L.0001	0.029	0.002	0.002	L.002	0.0001	L.002	0.001	0.70	9.2	
L SLAVE L EAST COMP	01AL07BJ0100	3	9	92							0.02									1.88	7.4	
L SLAVE L EAST COMP	01AL07BJ0100	1	10	92	L.001	L.001	L.001	0.001	0.001	0.032		L.0001	0.021	L.001	0.003	L.002	0.0001	L.002	0.001	5.89	10.5	
L SLAVE L EAST COMP	01AL07BJ0100	7	6	93																		
L SLAVE L EAST COMP	01AL07BJ0100	13	7	93							0.03									1.44	9.7	19.0
L SLAVE L EAST COMP	01AL07BJ0100	12	8	93	L.001	L.001	L.001	L.001	L.001	0.052		L.0001	0.050	0.003	L.001	L.002	L.0001	L.002	0.001	1.41	9.7	18.4
L SLAVE L EAST COMP	01AL07BJ0100	20	9	93	L.001	L.001	L.001	L.001	L.001	0.035		L.0001	0.057	0.002	L.001	L.002	L.0001	L.002	0.001	1.17	9.9	18.6
L SLAVE L EAST COMP	01AL07BJ0101	18	10	93							L.01									1.56	10.1	

STATION	CODE	D	M	Y	COD TOTAL 083**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	FECAL STREP NO/DL 361**L	CHLORO PHYLLa MG/M3 067**L	ADSORB ORGANIC HALIDE 95086L
L SLAVE L WEST COMP	01AL07BG0100	28	5	91	28	0.010	0.41	L10.	L10.		5.7	
L SLAVE L WEST COMP	01AL07BG0100	25	6	91		0.003	0.34	L10.	L10.	L10.	1.3	
L SLAVE L WEST COMP	01AL07BG0100	31	7	91		0.005	0.34	L10.	L10.		13.0	0.001
L SLAVE L WEST COMP	01AL07BG0100	16	6	92		0.012	0.29	L4.	L4.		3.2	
L SLAVE L WEST COMP	01AL07BG0100	31	7	92		0.006	0.52				132.8	
L SLAVE L WEST COMP	01AL07BG0100	3	9	92		0.004	0.37	4	L4.		113.2	
L SLAVE L WEST COMP	01AL07BG0100	1	10	92		0.004	0.31	30	L10.		42.7	
L SLAVE L WEST COMP	01AL07BG0100	7	6	93				1000	L10.		5.2	
L SLAVE L WEST COMP	01AL07BG0100	13	7	93		0.005	0.37	4	L4.		30.5	
L SLAVE L WEST COMP	01AL07BG0100	17	8	93		0.005	0.43	L4.	L4.		196.9	
L SLAVE L WEST COMP	01AL07BG0100	20	9	93		0.005	0.34	40	L4.		54.3	
L SLAVE L WEST COMP	01AL07BG0100	18	10	93		0.005	0.41	L10.	L10.		52.5	
L SLAVE L EAST COMP	01AL07BJ0100	28	5	91	28	0.010	0.34	L10.	L10.		6.7	
L SLAVE L EAST COMP	01AL07BJ0100	24	6	91		0.010	0.32	L10.	L10.		3.6	
L SLAVE L EAST COMP	01AL07BJ0100	31	7	91		0.011	0.29	10	L10.		6.1	0.006
L SLAVE L EAST COMP	01AL07BJ0100	14	5	92		0.004	0.18	L4.	L4.		7.1	
L SLAVE L EAST COMP	01AL07BJ0100	16	6	92		0.011	0.25	L4.	L4.		7.8	
L SLAVE L EAST COMP	01AL07BJ0100	31	7	92		0.005	0.28				11.2	
L SLAVE L EAST COMP	01AL07BJ0100	3	9	92		0.004	0.28	L4.	L4.		56.5	
L SLAVE L EAST COMP	01AL07BJ0100	1	10	92		0.003	0.38	L10.	L10.		114.6	
L SLAVE L EAST COMP	01AL07BJ0100	7	6	93				G800.	L10.		11.4	
L SLAVE L EAST COMP	01AL07BJ0100	13	7	93		0.004	0.33	8	L4.		10.0	
L SLAVE L EAST COMP	01AL07BJ0100	12	8	93		0.006	0.29	160	L4.		30.9	
L SLAVE L EAST COMP	01AL07BJ0100	20	9	93		0.004	0.34	L4.	L4.		40.2	
L SLAVE L EAST COMP	01AL07BJ0100	18	10	93		0.004	0.38	L10.	L10.		45.3	

Appendix B-2. Lesser Slave Lake water quality survey, 1989, 1991-1993: profile samples.

Results are mg/L unless noted. F = field measurement; L = lab analysis

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	LIGHT INTEN FT CAN 020**L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	0.1	14.2	8.0		190		10.4				3200				
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	1	14.0	8.0		190		10.4				330				
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	2	13.0	8.0		189		10.3				38				
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	3	12.5	8.0		190		10.4				6.1				
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	4	11.6	8.1		193		10.9								
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	5	11.1	8.0		192		10.8								
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	6	10.6	7.9		191		10.4								
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	7	10.5	7.8		191		10.3								
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	8	10.3	7.8		191		10.0								
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	9	11.2	7.8		184		9.2								
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	10	11.1	7.8		190		9.3								
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	11	9.8	7.6		192		8.9								
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	12	9.1	7.5		192		6.6								
L SLAVE L WEST PROF	01AL07BG0101	28	5	91	13	9.1	7.4		191		6.4								
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	0.1	15.7	8.1		188		9.1				2200				
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	1	15.7	8.1		188		9.1				820				
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	2	15.7	8.1		188		9.1				330				
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	3	15.6	8.1		188		9.1				120				
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	4	15.6	8.1		188		9.1				72				
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	5	15.5	8.1		188		9.1				34				
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	6	15.4	8.1		188		9.1				13				
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	7	15.3	8.1		188		9.1								
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	8	15.1	8.1		188		9.1								
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	9	13.2	7.9		188		8.3								
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	10	12.2	7.4		187		6.2								
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	11	12.1	7.3		187		5.8								
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	12	12.1	7.3		187		5.4								
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	0.1	19.1	7.9		195		8.9				6000				
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	1	18.7	7.9		206		8.9				2000				
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	2	18.4	7.9		196		8.7				700				
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	3	18.2	7.8		196		8.4				260				
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	4	18.1	7.7		196		8.2				100				
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	5	18.1	7.7		197		8.1				46				
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	6	18.1	7.7		197		8.1								
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	7	18.1	7.7		196		8.1								
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	8	18.1	7.7		197		8.1								
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	9	18.0	7.7		197		8.1								
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	10	18.0	7.7		196		8.1								
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	11	19.0	7.6		189		7.7								
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	12	20.3	7.6		184		7.1								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	1	-0.1	7.8	8.2	217	215	12.0	11.92	0.5	16		116	142	L1.000	142
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	2	0.0	7.8		214		11.9								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	3	0.0	7.8		213		11.9								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	4	0.2	7.8		212		11.7								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	5	0.4	7.8		210		11.4								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	6	1.1	7.7		215		8.9								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	7	1.4	7.6	7.8	221	219	7.0	7.48	2.1	18		115	158	L1.000	158
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	8	1.5	7.5		223		7.8								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	9	1.6	7.3		224		6.9								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	10	2.2	7.2		224		5.8								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	11	2.7	7.2		228		3.6								
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	12	3.3	7.1	7.6	228	235	2.0	1.62	10.5	25		126	178	2	180
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	0.025														
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	0.1	18.5	8.0		199		8.5								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	1	17.0	8.0		198		8.8								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	2	15.9	7.9		198		8.5								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	3	15.5	8.0		197		8.9								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	4	15.2	8.2		197		9.4								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	5	15.2	8.1		197		9.3								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	6	15.2	8.1		197		9.3								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	7	15.2	8.1		197		9.3								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	8	15.1	8.1		197		9.2								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	9	14.4	8.0		197		8.9								

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	LIGHT INTEN FT CAN 020**L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	10	13.9	7.9		196		8.7								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	11	13.8	7.9		197		8.5								
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	12	13.7	7.6		198		7.1								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	0.025														
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	0.1	20.2	9.0		191		12.9								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	1	20.2	9.0		191		12.9								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	2	20.1	9.0		191		12.3								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	3	19.9	8.9		192		11.5								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	4	19.8	8.9		193		11.1								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	5	19.7	8.8		193		10.7								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	6	19.3	8.8		195		10.0								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	7	19.2	8.7		194		9.6								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	8	18.9	8.6		195		8.9								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	9	18.8	8.6		195		8.9								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	10	18.8	8.6		197		8.9								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	11	18.8	8.6		194		8.9								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	12	18.7	8.6		194		8.8								
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	13	18.6	8.4		195		8.1								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	0.025														
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	0.1	14.5	8.8		187		9.1								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	1	14.5	8.8		190		9.1								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	2	14.5	8.8		188		9.1								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	3	14.5	8.8		189		9.0								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	4	14.5	8.8		190		9.1								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	5	14.5	8.8		189		9.0								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	6	14.5	8.8		195		9.1								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	7	14.5	8.8		194		9.1								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	8	14.5	8.8		195		9.0								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	9	14.5	8.8		193		9.0								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	10	14.5	8.8		198		8.9								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	11	14.5	8.8		199		8.9								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	12	14.5	8.8		199		8.9								
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	13	14.5	8.8		200		8.7								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	0.025														
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	0.1	10.0	8.4		196		10.2								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	1	9.5	8.3		197		10.1								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	2	9.2	8.3		197		10.0								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	3	9.1	8.2		197		9.8								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	4	9.1	8.2		197		9.7								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	5	9.0	8.2		198		9.7								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	6	8.9	8.2		198		9.8								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	7	9.0	8.2		198		9.8								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	8	8.9	8.2		198		9.9								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	9	8.9	8.2		198		9.9								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	10	8.9	8.2		198		9.9								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	11	8.9	8.2		198		9.9								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	12	8.8	8.2		198		9.7								
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	13	8.9	8.1		198		9.3								
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	1	0.2	8.4	8.6	208	236	14.7		0.6	18		126	160	L1.	160
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	2	0.4	8.5		210		14.9								
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	3	0.6	8.4		209		14.4								
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	4	0.7	8.5		208		14.3								
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	5	0.7	8.5		209		13.8								
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	6	1.0	8.4		207		13.1								
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	7	1.4	8.0	8.1	208	220	10.7		1.7	17		119	148	L1.	148
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	8	2.0	7.5		214		6.7								
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	9	2.4	7.2		217		3.8								
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	10	3.1	7.1	7.5	225	246	0.2		14.7	20		130	164	8	172
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	0.025														
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	0.1	16.8	8.1		203		9.8								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	1	15.8	8.1		202		9.8								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	2	15.0	8.1		201		10.0								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	3	14.5	8.1		201		9.9								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	4	13.8	8.0		201		9.6								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	5	13.7	7.9		203		9.4								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	6	13.7	7.9		201		9.3								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	7	13.6	7.9		202		9.3								

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	LIGHT INTEN FT CAN 020**L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	8	13.6	7.9		202		9.3								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	9	13.6	7.8		200		9.1								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	10	13.6	7.8		202		9.1								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	11	13.5	7.8		201		8.7								
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	12	13.5	7.6		202		7.9								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	0.025														
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	0.1	20.6	8.8		198		10.3								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	1	17.4	8.8		195		10.9								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	2	16.4	8.7		194		9.8								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	3	16.3	8.5		194		8.9								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	4	16.2	8.4		195		8.7								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	5	16.2	8.4		196		8.6								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	6	16.2	8.4		197		8.6								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	7	16.2	8.4		198		8.6								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	8	16.2	8.4		187		8.6								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	9	16.2	8.4		199		8.6								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	10	16.2	8.4		196		8.6								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	11	16.2	8.4		198		8.6								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	12	16.2	8.4		190		8.6								
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	13	16.2	8.4		201		8.4								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	0.025														
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	0.1	19.2	9.2		187		16.3								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	0.5														
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	1	17.9	8.7		191		12.5								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	1.5														
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	2	17.9	8.6		190		11.7								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	3	17.6	8.6		191		10.9								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	4	17.3	8.6		188		10.2								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	5	17.0	8.5		190		9.3								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	6	16.7	8.5		195		8.6								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	7	16.7	8.5		194		8.6								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	8	16.7	8.5		191		8.6								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	9	16.7	8.5		193		8.6								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	10	16.6	8.5		193		8.5								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	11	16.6	8.5		193		8.4								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	12	16.5	8.4		193		8.0								
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	13	15.9	7.7		199		4.7								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	0.025														
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	0.1	14.1	8.2		193		9.0								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	1	14.1	8.2		194		8.9								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	2	14.0	8.2		193		8.7								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	3	13.9	8.2		194		8.7								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	4	13.9	8.1		194		8.5								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	5	13.8	8.1		193		8.3								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	6	13.8	8.1		194		8.3								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	7	13.8	8.1		195		8.3								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	8	13.8	8.1		191		8.3								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	9	13.8	8.1		196		8.3								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	10	13.8	8.1		192		8.3								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	11	13.8	8.1		189		8.3								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	12	13.8	8.1		187		8.3								
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	13	13.8	8.1		200		8.2								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	0.025														
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	0.1	9.0	8.1		194		10.3								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	1	9.0	8.1		194		10.3								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	2	9.0	8.1		194		10.3								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	3	9.0	8.1		194		10.2								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	4	9.0	8.1		194		10.2								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	5	9.0	8.1		194		10.2								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	6	9.0	8.1		194		10.2								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	7	9.0	8.1		194		10.2								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	8	9.0	8.1		194		10.1								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	9	9.0	8.1		194		10.2								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	10	9.0	8.1		194		10.1								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	11	9.0	8.1		194		10.1								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	12	9.0	8.1		194		10.1								
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	13	9.0	8.1		194		10.0								

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	LIGHT INTEN FT CAN 020**L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	1	0.6	7.7	7.98	192	211	13.1					110		L1.000	
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	2	0.2	7.8		201		13								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	3	0.2	7.8		199		12.8								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	4	0.3	7.7		195		12.4								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	5	0.2	7.7		195		12.3								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	6	0.3	7.6	8.01	195	203	12.1					102		L1.000	
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	7	0.2	7.6		181		12.1								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	8	0.2	7.6		181		12.2								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	9	0.2	7.6		180		12.2								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	10	0.2	7.5		181		12.1								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	11	0.3	7.5		180		11.7								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	12	0.5	7.4	7.92	183	201	11.1					103		L1.000	
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	13	0.8	7.2		181		10.5								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	14	1.1	7.1		179		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	15	1.6	6.9		178		6.7								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	16	2.3	6.7		180		3.4								
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	17	2.9	6.5	7.5	190	221	1.2					112		2	
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	18	3.4	6.5		201		0								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	0.1	9.2	8.2		193		13.0				6000				
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	1	9.0	8.2		192		13.0				2700				
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	2	8.6	8.2		192		13.0				1000				
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	3	8.3	8.2		191		13.0				450				
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	4	7.9	8.1		191		12.9				200				
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	5	7.4	8.1		191		12.6				60				
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	6	7.0	8.0		190		12.2				45				
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	7	6.7	7.8		190		11.9								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	8	6.5	7.8		190		11.7								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	9	6.3	7.8		190		11.4								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	10	6.0	7.7		189		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	11	5.9	7.7		189		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	12	5.9	7.7		188		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	13	5.8	7.7		188		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	14	5.8	7.7		187		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	15	5.7	7.7		187		11.1								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	16	5.7	7.7		186		11.1								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	17	5.6	7.6		186		11.0								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	18	5.6	7.6		186		10.9								
L SLAVE L EAST PROF	01AL07BJ0101	28	5	91	19	5.5	7.6		187		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	0.1	14.9	8.4		184		10.3				4000				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	1	14.8	8.4		184		10.3				1800				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	2	14.6	8.4		183		10.3				980				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	3	14.4	8.4		184		10.4				540				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	4	14.2	8.4		184		10.4				320				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	5	14.0	8.4		184		10.4				170				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	6	13.4	8.4		184		10.4				110				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	7	12.8	8.3		184		10.4				93				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	8	12.6	8.2		184		10.2				64				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	9	12.1	8.1		184		10.1				34				
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	10	11.3	8.0		184		9.8								
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	11	10.9	7.9		184		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	12	10.4	7.6		184		8.3								
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	13	10.3	7.5		184		7.9								
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	14	10.3	7.5		184		7.9								
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	15	10.3	7.5		184		7.8								
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	16	10.2	7.5		184		7.6								
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	17	10.2	7.5		184		7.6								
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	18	10.2	7.4		183		7.4								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	0.1	17.2	7.6		190		8.3				1000				
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	1	17.2	7.6		190		8.3				500				
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	2	17.2	7.6		190		8.3				230				
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	3	17.2	7.6		190		8.2				95				
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	4	17.2	7.6		190		8.2				47				
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	5	17.2	7.6		190		8.2				25				
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	6	17.2	7.7		190		8.1				10				
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	7	17.2	7.6		191		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	8	17.2	7.6		191		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	9	17.2	7.6		191		8.1								

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	LIGHT INTEN FT CAN 020**L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	10	17.2	7.6		191		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	11	17.2	7.6		191		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	12	17.2	7.6		190		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	13	17.2	7.6		190		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	14	17.2	7.6		191		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	15	17.2	7.6		190		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	16	17.2	7.6		190		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	17	17.2	7.6		190		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	18	17.2	7.6		190		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	19	17.2	7.6		190		8.0								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	1	-0.1	8.3	8.0	189	204	12.5	12.25	0.4	13		108	164	L1.000	164
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	2	-0.1	8.2		194		12.4								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	3	-0.1	8.1		192		12.3								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	4	-0.1	8.2		194		12.2								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	5	-0.1	8.1		195		12.2								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	6	-0.1	8.1		197		12.2								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	7	-0.1	8.0		200		12.0								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	8	-0.1	8.0		200		12.1								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	9	-0.1	8.0		200		12.1								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	10	-0.1	8.0	8.1	200	200	12.0	12.36	0.5	14		104	133	L1.000	134
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	11	-0.1	8.0		200		12.0								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	12	-0.1	8.0		199		12.0								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	13	-0.1	8.0		198		11.4								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	14	0.1	7.9		198		10.5								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	15	0.6	7.8		198		9.4								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	16	1.2	7.6		206		6.1								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	17	1.8	7.4		213		4.8								
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	18	2.4	7.3	7.5	225	225	1.9	1.33	11.1	17		118	156	2	158
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	0.1														
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	0.025										2000				
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	0.1	5.4	7.6		180		11.4				1900				
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	1	5.4	7.6		181		11.4				900				
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	2	5.4	7.6		180		11.4				400				
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	3	5.4	7.6		179		11.4				150				
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	4	5.4	7.6		178		11.4				100				
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	5	5.4	7.6		178		11.4				55				
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	6	5.4	7.6		182		11.4				28				
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	7	5.4	7.6		179		11.4				16				
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	8	5.4	7.6		180		11.4								
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	9	5.4	7.6		177		11.4								
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	10	5.4	7.6		179		11.4								
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	11	5.4	7.6		179		11.4								
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	12	5.4	7.6		181		11.4								
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	13	5.4	7.6		182		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	14	5.4	7.6		176		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	15	5.4	7.6		181		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	16	5.4	7.6		180		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	0.025														
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	0.1	13.2	8.3		185		10.7								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	1	13.2	8.3		186		10.7								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	2	13.1	8.3		185		10.7								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	3	13.0	8.3		185		10.7								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	4	13.0	8.3		185		10.7								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	5	12.9	8.3		186		10.7								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	6	12.9	8.3		184		10.7								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	7	12.9	8.3		184		10.7								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	8	12.8	8.3		184		10.6								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	9	12.4	8.3		187		10.6								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	10	11.8	8.2		187		10.6								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	11	11.6	8.2		186		10.6								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	12	11.3	8.1		187		10.5								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	13	11.1	8.1		186		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	14	11.0	8.1		191		10.3								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	15	11.0	8.0		180		10.2								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	16	10.9	8.0		189		10.0								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	17	10.6	7.8		180		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	18	10.3	7.6		189		7.7								

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	LIGHT INTEN FT CAN 020**L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	0.025														
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	0.1	20.2	8.5		183		10.6								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	1	20.2	8.5		184		10.6								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	2	19.3	8.6		183		10.8								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	3	18.9	8.5		183		10.3								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	4	18.8	8.4		183		10.0								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	5	18.6	8.3		183		9.3								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	6	17.9	8.0		184		8.5								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	7	17.6	8.0		183		8.4								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	8	17.6	7.9		184		8.3								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	9	17.6	7.9		185		8.3								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	10	17.5	7.9		184		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	11	17.4	7.9		184		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	12	17.4	7.8		184		8.0								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	13	17.4	7.8		183		8.0								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	14	17.4	7.8		183		8.0								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	15	17.2	7.8		185		7.6								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	16	16.7	7.6		186		6.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	17	15.0	7.2		184		2.9								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	18	13.3	7.1		189		0.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	19	12.6	7.1		201		0.1								
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	18			7.3		200						100			
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	0.025														
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	0.1	15.2	8.5		181		9.9								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	1	15.2	8.6		182		9.9								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	2	15.3	8.6		181		9.9								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	3	15.2	8.6		182		9.9								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	4	15.2	8.6		182		9.8								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	5	15.2	8.6		181		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	6	15.2	8.5		180		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	7	15.2	8.5		186		9.6								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	8	15.2	8.5		183		9.5								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	9	15.1	8.5		182		9.4								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	10	15.1	8.4		186		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	11	15.1	8.4		185		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	12	15.1	8.4		184		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	13	15.1	8.4		186		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	14	15.1	8.4		189		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	15	15.1	8.4		188		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	16	15.1	8.4		188		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	17	15.1	8.4		187		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	18	15.1	8.4		189		9.0								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	0.025														
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	0.1	12.0	8.8		186		11.6								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	1	10.5	8.7		186		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	2	10.2	8.7		186		10.9								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	3	10.1	8.6		187		10.8								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	4	10.1	8.6		186		10.7								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	5	9.9	8.6		187		10.6								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	6	9.5	8.5		187		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	7	9.5	8.5		185		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	8	9.5	8.5		186		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	9	9.4	8.5		188		10.5								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	10	9.4	8.5		184		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	11	9.2	8.5		189		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	12	9.2	8.5		184		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	13	9.2	8.5		187		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	14	9.2	8.5		186		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	15	9.2	8.5		186		10.4								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	16	9.0	8.5		186		10.2								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	17	9.0	8.5		187		10.2								
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	18	9.0	8.5		187		10.1								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	1	0.2	7.7	8.2	199	218	13.1		0.5	13		116	144	L1.	144
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	2	0.3	7.8		202		12.8								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	3	0.3	7.8		198		12.7								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	4	0.4	7.8		190		12.6								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	5	0.4	7.8		192		12.5								

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	LIGHT INTEN FT CAN 020**L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	6	0.4	7.8		190		12.5								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	7	0.4	7.8		190		12.5								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	8	0.4	7.8		190		12.4								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	9	0.4	7.8		190		12.4								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	10	0.5	7.8	8.1	190	208	12.2		0.5	13		111	134	L1.	134
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	11	0.6	7.8		194		11.9								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	12	0.8	7.6		190		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	13	1.0	7.6		190		11.1								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	14	1.2	7.5		200		10.6								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	15	1.5	7.4		190		10.0								
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	16	1.9	7.2	7.7	190	220	7.6		1.3	13		119	146	L1.	146
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	17	2.7	7.0		226		0.1								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	0.025														
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	0.1	11.4	8.1		188		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	1	11.5	8.2		187		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	2	11.3	8.2		187		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	3	11.2	8.2		188		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	4	11.2	8.1		190		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	5	11.1	8.1		187		11.3								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	6	11.1	8.1		188		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	7	11.0	8.1		188		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	8	10.9	8.1		189		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	9	10.9	8.1		186		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	10	10.9	8.1		187		11.1								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	11	10.8	8.1		188		11.1								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	12	10.8	8.0		184		11.1								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	13	10.7	8.0		186		11.2								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	14	10.2	7.9		189		10.9								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	15	9.8	7.9		188		10.8								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	16	9.5	7.9		187		10.8								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	17	9.3	7.7		187		10.2								
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	18	8.8	7.4		188		8.6								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	0.025														
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	0.1	15.7	8.1		181		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	1	15.7	8.1		181		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	2	15.4	8.1		182		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	3	15.3	8.1		180		9.0								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	4	15.3	8.1		184		8.9								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	5	15.3	8.1		178		8.9								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	6	15.3	8.1		180		8.9								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	7	15.3	8.1		178		8.8								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	8	15.3	8.1		185		8.8								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	9	15.3	8.1		181		8.8								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	10	15.2	8.1		178		8.7								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	11	14.8	7.9		187		8.2								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	12	14.4	7.8		186		7.7								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	13	14.2	7.7		182		7.3								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	14	14.1	7.6		189		6.8								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	15	14.0	7.5		182		6.6								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	16	13.5	7.4		186		5.1								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	17	13.4	7.3		193		4.4								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	18	13.4	7.3		189		4.0								
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	19	13.3	7.3		187		3.9								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	0.025														
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	0.1	16.2	7.9		187		8.3								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	1	16.2	7.9		186		8.3								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	2	16.2	7.9		187		8.3								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	3	16.2	7.9		187		8.3								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	4	16.2	7.9		186		8.3								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	5	16.1	7.9		185		8.2								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	6	16.1	7.9		188		8.2								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	7	16.1	7.9		190		8.2								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	8	16.1	7.9		191		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	9	16.1	7.9		182		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	10	16.1	7.9		184		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	11	16.1	7.9		187		8.1								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	12	16.1	7.9		181		8.0								

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	LIGHT INTEN FT CAN 020**L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	13	16.1	7.9		187		8.0								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	14	16.1	7.9		187		8.0								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	15	16.1	7.9		187		8.0								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	16	16.1	7.9		187		8.0								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	17	16.1	7.9		187		8.0								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	18	16.1	7.9		187		7.9								
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	19	16.1	7.9		187		7.9								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	0.025														
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	0.1	14.4	8.3		181		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	1	14.4	8.3		181		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	2	14.4	8.3		182		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	3	14.4	8.3		182		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	4	14.4	8.3		180		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	5	14.4	8.3		182		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	6	14.4	8.3		180		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	7	14.4	8.3		182		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	8	14.4	8.3		182		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	9	14.4	8.3		179		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	10	14.4	8.3		180		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	11	14.4	8.3		188		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	12	14.4	8.3		180		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	13	14.4	8.3		186		9.2								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	14	14.4	8.3		182		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	15	14.4	8.3		188		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	16	14.4	8.3		178		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	17	14.4	8.3		179		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	18	14.4	8.3		188		9.1								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	0.025														
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	0.1	9.7	7.9		185		9.8								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	1	9.7	7.9		185		9.8								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	2	9.7	7.9		185		9.8								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	3	9.7	7.9		185		9.8								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	4	9.7	7.9		185		9.8								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	5	9.7	7.9		185		9.8								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	6	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	7	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	8	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	9	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	10	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	11	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	12	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	13	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	14	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	15	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	16	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	17	9.7	8.0		185		9.7								
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	18	9.7	8.0		185		9.7								

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 106**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	N PARTIC 079**L	N TKN 070**L	N DISS NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO2 072**L
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	1	99	90	9	2.7	26	6	120		1.2	12	0.10	L.1		0.56	0.086	0.045	0.028
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	4														0.52	0.066	0.053	
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	7	98	90	9	2.7	26	6	119		1.1	11	0.09	1.6		0.46	0.006	0.181	0.001
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	10														0.54	0.076	0.185	
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	12	112	105	9	2.8	29	8	136		1.3	8	0.10	7.0		0.65	0.194	0.165	0.002
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	1	109	101	9	2.9	29	7	129	3	1.1	12	0.10	0.2	0.05	0.55	0.045	0.001	0.002
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	4														0.53	0.038	0.011	
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	7	101	92	8	2.7	27	6	123		1.0	13	0.10	1.1	0.06	0.51	0.032	0.039	0.003
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	10	117	106	9	2.9	31	7	143		1.3	9	0.10	7.6	0.05	0.66	0.152	0.014	0.003
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	1	93	90	6	2.8	26	6	113		1.5	12	0.1	0.2	L.02	0.48	0.037	0.06	0.02
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	6	90	80	6	2.7	22	6	110		1.3	10	0.1	0.2	L.02	0.45	0.032	0.06	0.021
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	12	88	85	6	2.7	23	6.6	107		1.5	10	0.1	0.5	L.02	0.42	0.045	0.08	0.004

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 106**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	N PARTIC 079**L	N TKN 070**L	N DISS NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO2 072**L
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	17	100	90	6	2.7	26	6.2	122		1.5	9	0.1	9.1	L.02	0.53	0.115	0.13	0.002
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	1	92	87	8	2.6	25	6	112		1.1	9	0.09	0.2		0.41	0.023	L.001	0.001
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	4														0.36	0.016	0.059	
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	7														0.34	0.010	0.056	
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	10	90	85	8	2.6	24	6	110		1.1	8	0.09	0.2		0.38	0.008	0.060	L.001
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	13														0.37	0.020	0.067	
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	16														0.55	0.210	0.067	
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	18	106	95	8	2.8	28	6	130		1.5	7	0.09	9.8		0.73	0.350	0.042	0.006
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	18	89	85	8	2.6	24	6	108		1.1	5	0.08	10.8		0.65	0.220	0.002	0.002
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	1	99	92	9	2.8	27	6	121		1.0	11	0.10	0.1	L.02	0.46	0.017	0.102	L.001
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	4														0.46	0.006	0.100	
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	7														0.46	0.008	0.098	
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	10	95	90	8	2.6	26	6	116		1.1	10	0.09	0.2	0.05	0.44	0.006	0.099	L.001
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	13														0.57	0.008	0.105	
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	16	100	99	9	2.8	28	7	122		1.1	11	0.10	1.4	0.05	0.46	0.007	0.110	0.001

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	P TOTAL 15421L	P TOTAL 15422L	P DISS 15105L	P DISS 15114L	Al EXT 130**L	As TOTAL 330**L	Ba TOTAL 560**L	Be DISS 041**L	Cd TOTAL 480**L	Co TOTAL 270**L	Cr TOTAL 240**L	Cu TOTAL 290**L	Fe TOTAL 260**L	Fe EXT 263**L	Hg TOTAL 800**L	Mn TOTAL 250**L	Mo TOTAL 420**L	Ni TOTAL 280**L
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	2		0.0326		0.0118														
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	4		0.0222																
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	6		0.0219																
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	8		0.0205		0.0121														
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	10		0.0376																
L SLAVE L WEST PROF	01AL07BG0101	25	6	91	12		0.0472		0.0181														
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	0.1		0.0393																
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	2		0.0310		0.0087														
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	4		0.0258																
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	6		0.0242		0.0113														
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	8		0.0230																
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	10		0.0208																
L SLAVE L WEST PROF	01AL07BG0101	31	7	91	12		0.0211		0.0111														
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	1	0.016	0.0172	0.013	0.0139	L.01	0.0014	0.051	L.001	L.001	L.001	0.001	L.001	0.047		L.0001	0.008	L.001	0.003
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	4	0.016	0.016	0.013	0.0134														
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	7	0.018	0.0166	0.011	0.0154	0.01	0.0013	0.058	L.001	0.001	L.001	0.001	0.002	0.056		L.0001	0.248	L.001	0.004
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	10	0.036	0.0334	0.027	0.0286														
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	12	0.055	0.0569	0.038	0.0420	0.01	0.0043	0.087	L.001	0.001	L.001	0.002	L.001	0.698		L.0001	1.841	L.001	0.003
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	0.1		0.0149		0.0091														
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	2		0.0189		0.0095														
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	4		0.0173																
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	6		0.0158																
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	8		0.0186		0.0095														
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	10		0.0178																
L SLAVE L WEST PROF	01AL07BG0101	16	6	92	12		0.0212		0.0106														
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	0.1		0.0558																
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	2		0.0506		0.0102														
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	4		0.0257																
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	6		0.0203																
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	8		0.0176		0.0119														
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	10		0.0176																
L SLAVE L WEST PROF	01AL07BG0101	31	7	92	12		0.0201		0.0129														
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	0.1		0.0496																
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	2		0.0551		0.0135														
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	4		0.0532																
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	6		0.0493																
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	8		0.0415		0.0134														
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	10		0.0387																
L SLAVE L WEST PROF	01AL07BG0101	3	9	92	12		0.0379		0.0125														
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	0.1		0.0283																
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	2		0.0345		0.0129														
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	4		0.0303																
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	6		0.0304																
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	8		0.0306		0.0132														
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	10		0.0283																

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F		P TOTAL 15421L 15422L	P DISS 15105L	P DISS 15114L	Al EXT 130**L	As TOTAL 330**L	Ba TOTAL 560**L	Be DISS 041**L	Cd TOTAL 480**L	Co TOTAL 270**L	Cr TOTAL 240**L	Cu TOTAL 290**L	Fe TOTAL 260**L	Fe EXT 263**L	Hg TOTAL 800**L	Mn TOTAL 250**L	Mo TOTAL 420**L	Ni TOTAL 280**L
L SLAVE L WEST PROF	01AL07BG0101	1	10	92	12		0.0284		0.0145														
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	1	0.012	0.015	0.009	0.0115	0.02	0.0009	0.058	L.001	0.001	0.002	0.003	0.002	0.036		L.0001	0.007	0.003	0.003
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	4	0.012	0.0139																
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	7	0.017	0.0154	0.010	0.0120	L.005	0.0008	0.059	L.001	0.001	0.002	0.004	0.002	0.062		L.0001	0.202	0.003	0.004
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	10	0.021	0.0254	0.011		L.005	0.0035	0.117	L.001	0.001	0.002	0.004	0.002	0.442		L.0001	3.160	0.004	0.004
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	0.2		0.0186																
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	2		0.0239		0.0080														
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	4		0.0205																
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	6		0.0223																
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	8		0.0210		0.0079														
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	10		0.0232																
L SLAVE L WEST PROF	01AL07BG0101	7	6	93	12		0.0299		0.0094														
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	0.1		0.0800																
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	2		0.0406		0.0077														
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	4		0.0370																
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	6		0.0324																
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	8		0.0323		0.0074														
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	10		0.0296																
L SLAVE L WEST PROF	01AL07BG0101	13	7	93	12		0.0275		0.0095														
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	0.1		0.1165																
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	2		0.0479		0.0129														
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	4		0.0236																
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	6		0.0193																
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	8		0.0209		0.0132														
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	10		0.0193																
L SLAVE L WEST PROF	01AL07BG0101	17	8	93	12		0.0206		0.0130														
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	0.1		0.0646																
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	2		0.0721		0.0197														
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	4		0.0470																
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	6		0.0465																
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	8		0.0345		0.0198														
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	10		0.0352																
L SLAVE L WEST PROF	01AL07BG0101	20	9	93	12		0.0343		0.0197														
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	0.1		0.0369																
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	2		0.0420		0.0120														
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	4		0.0337																
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	6		0.0354																
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	8		0.0387		0.0126														
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	10		0.0335																
L SLAVE L WEST PROF	01AL07BG0101	18	10	93	12		0.0335		0.0126														
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	1	0.008	0.0109	0.0095												L.0001			
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	6	0.007	0.0111	0.0091		0.015	0.0012	0.06	L.001	L.001	L.001	0.004	0.001	0.037	L.01	L.0001	0.003	0.001	0.002
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	12	0.013	0.012	0.0103												L.0001			
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	17	0.039	0.0451	0.0224		0.01	0.0017	0.099	L.001	L.001	0.001	0.004	0.001	0.423	L.01	L.0001	2.804	0.002	0.004
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	2		0.0185		0.0091														
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	4		0.0186																
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	6		0.0178																
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	8		0.0165																
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	10		0.0171		0.0066														
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	12		0.0195																
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	14		0.0264																
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	16		0.0299																
L SLAVE L EAST PROF	01AL07BJ0101	24	6	91	18		0.0322		0.0094														
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	0.1		0.0164																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	2		0.0166		0.0078														
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	4		0.0160																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	6		0.0225																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	8		0.0173																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	10		0.0161		0.0076														
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	12		0.0161																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	14		0.0163																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	16		0.0165																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	91	28		0.0190		0.0082														
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	1	0.010	0.0121	0.008	0.0095	0.02	0.0010	0.055	L.001	0.001	L.001	0.001	0.001	0.020		L.0001	0.009	L.001	0.003
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	4	0.007	0.0122	0.004	0.0092														
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	7	0.005	0.0112	0.004	0.0093														

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	P TOTAL 15421L	P TOTAL 15422L	P DISS 15105L	P DISS 15114L	Al EXT 130**L	As TOTAL 330**L	Ba TOTAL 560**L	Be DISS 041**L	Cd TOTAL 480**L	Co TOTAL 270**L	Cr TOTAL 240**L	Cu TOTAL 290**L	Fe TOTAL 260**L	Fe EXT 263**L	Hg TOTAL 800**L	Mn TOTAL 250**L	Mo TOTAL 420**L	Ni TOTAL 280**L
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	10	0.006	0.0114	0.004	0.0094	0.02	0.0010	0.054	L.001	L.001	L.001	0.001	0.002	0.022		L.0001	0.008	L.001	0.003
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	13	0.007	0.0125	0.005	0.0099														
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	16	0.020	0.0235	0.015	0.0226														
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	18	0.060	0.0504	0.028	0.0375	0.01	0.0040	0.096	L.001	L.001	0.001	0.002	0.001	0.431		L.0001	3.424	0.002	0.004
L SLAVE L EAST PROF	01AL07BJ0101	14	5	92	0.1		0.0198																
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	0.1		0.0129																
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	2		0.0131		0.0067														
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	4		0.0144																
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	6		0.0134																
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	8		0.0131																
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	10		0.0133		0.0066														
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	12		0.0132																
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	14		0.0133																
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	16		0.0132																
L SLAVE L EAST PROF	01AL07BJ0101	16	6	92	18		0.0180		0.0073														
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	0.1		0.0167																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	2		0.0200		0.0072														
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	4		0.0165																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	6		0.0121																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	8		0.0117																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	10		0.0109		0.0074														
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	12		0.0111																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	14		0.0121																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	16		0.0327																
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	18		0.0745		0.0432														
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	18	0.076		0.042		L.01	0.0024	0.098	L.001	L.001	L.001	0.002	L.001	0.299		L.0001	2.390	0.001	0.003
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	0.1		0.0462																
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	2		0.0414		0.0086														
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	4		0.0412																
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	6		0.0383																
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	8		0.0332																
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	10		0.0322		0.0082														
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	12		0.0313																
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	14		0.0269																
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	16		0.0409																
L SLAVE L EAST PROF	01AL07BJ0101	3	9	92	18		0.0215		0.0099														
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	0.1		0.0381																
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	2		0.0245		0.0088														
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	4		0.0326																
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	6		0.0277																
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	8		0.0265																
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	10		0.0267		0.0075														
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	12		0.0284																
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	14		0.0197																
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	16		0.0293																
L SLAVE L EAST PROF	01AL07BJ0101	1	10	92	18		0.0263		0.0084														
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	1	0.008	0.0112	0.007	0.0082	L.005	0.0008	0.059	L.001	L.001	L.001	0.002	L.001	0.026		L.0001	0.009	0.002	0.002
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	4	0.009	0.0104																
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	7	0.007	0.0104																
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	10	0.008	0.0105	0.006	0.0086	0.01	0.0007	0.050	L.001	L.001	L.001	0.002	0.001	0.024		L.0001	0.009	L.001	0.002
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	13	0.024	0.0116																
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	16	0.012	0.0137	0.009	0.0101	L.005	0.0007	0.058	L.001	L.001	L.001	0.002	0.001	0.037		L.0001	0.098	0.001	0.002
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	0.1		0.0160																
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	2		0.0168		0.0069														
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	4		0.0184																
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	6		0.0175																
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	8		0.0171																
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	10		0.0170		0.0068														
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	12		0.0173																
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	14		0.0180																
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	16		0.0161																
L SLAVE L EAST PROF	01AL07BJ0101	7	6	93	18		0.0194		0.0073														
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	0.1		0.0185																
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	2		0.0194		0.0067														
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	4		0.0187																
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	6		0.0195																
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	8		0.0191																

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	P TOTAL 15421L 15422L	P DISS 15105L	P DISS 15114L	Al EXT 130**L	As TOTAL 330**L	Ba TOTAL 560**L	Be DISS 041**L	Cd TOTAL 480**L	Co TOTAL 270**L	Cr TOTAL 240**L	Cu TOTAL 290**L	Fe TOTAL 260**L	Fe EXT 263**L	Hg TOTAL 800**L	Mn TOTAL 250**L	Mo TOTAL 420**L	Ni TOTAL 280**L
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	10	0.0184		0.0060														
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	12	0.0194																
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	14	0.0238																
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	16	0.0375																
L SLAVE L EAST PROF	01AL07BJ0101	13	7	93	18	0.0453		0.0187														
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	0.1	0.0216																
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	2	0.0222		0.0078														
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	4	0.0210																
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	6	0.0209																
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	8	0.0213																
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	10	0.0207		0.0089														
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	12	0.0208																
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	14	0.0207																
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	16	0.0204																
L SLAVE L EAST PROF	01AL07BJ0101	12	8	93	18	0.0198		0.0082														
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	0.1	0.0264																
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	2	0.0261		0.0074														
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	4	0.0272																
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	6	0.0281																
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	8	0.0245																
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	10	0.0279		0.0073														
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	12	0.0262																
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	14	0.0322																
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	16	0.0269																
L SLAVE L EAST PROF	01AL07BJ0101	20	9	93	18	0.0255		0.0076														
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	0.1	0.0270																
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	2	0.0258		0.0086														
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	4	0.0259																
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	6	0.0236																
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	8	0.0231																
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	10	0.0214		0.0091														
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	12	0.0233																
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	14	0.0233																
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	16	0.0204																
L SLAVE L EAST PROF	01AL07BJ0101	18	10	93	18	0.0300		0.0078														

STATION	CODE	D	M	Y	DEPTH SAMPLE M 972**F	Pb EXT 823**L	Se TOTAL 340**L	V TOTAL 230**L	Zn TOTAL 300**L	CARBON PARTIC TOTAL 06905L	CARBON DISS ORG 061**L	CARBON DISS INORG 061**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	CHLORO PHYLLa MG/M3 067**L
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	1	L.002	L.0001	L.002	L.001		10.6		0.002	0.33			L0.1
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	4						10.3						
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	7	L.002	0.0001	L.002	0.002		10.2		0.002	0.29			L0.1
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	10						10.3						
L SLAVE L WEST PROF	01AL07BG0101	11	2	92	12	L.002	0.0001	0.003	L.001		10.4		0.002	0.32			L0.1
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	1	L.002	0.0001	0.003	L.001	0.18	12.3	24.5	0.006	0.35	L4.	L4.	0.8
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	7	L.002	L.0001	0.003	L.001	0.24	10.4	19.8	0.005	0.29	L4.	L4.	L0.1
L SLAVE L WEST PROF	01AL07BG0101	23	2	93	10	L.002	0.0001	0.006	L.001	0.25	10.8	28.5	0.005	1.17	L4.	L4.	L0.1
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	1					0.04	10.1						0.6
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	6	L.002	L.0001	L.002	0.003	0.06	11.6						0.3
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	12					0.08	10						0.2
L SLAVE L EAST PROF	01AL07BJ0101	21	2	89	17	L.002	L.0001	0.002	0.005	0.24	10.7						
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	1	L.002	L.0001	L.002	L.001		10.0		0.002	0.30			0.3
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	4						9.8						
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	7						9.6						
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	10	L.002	L.0001	L.002	L.001		9.5		0.002	0.30			L0.1
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	13						9.6						
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	16						9.8						
L SLAVE L EAST PROF	01AL07BJ0101	11	2	92	18	0.004	0.0001	0.005	L.001		10.1		0.002	0.87			0.1
L SLAVE L EAST PROF	01AL07BJ0101	31	7	92	18	0.002	L.0001	0.003	0.002	0.40	9.3						
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	1	L.002	L.0001	L.002	L.001	0.14	10.2	23.2	0.005	0.22	L4.	L4.	1.6
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	10	L.002	L.0001	L.002	0.001	0.42	10.2	22.0	0.004	0.24	L4.	L4.	L0.1
L SLAVE L EAST PROF	01AL07BJ0101	23	2	93	16	L.002	L.0001	L.002	L.001	0.27	10.1	24.2	0.005	0.24	L4.	L4.	L0.1

Appendix C-1. Tributary water quality data - Lesser Slave Lake survey.

Results are mg/L unless noted. F = field measurement; L = lab analysis

STATION	CODE	D	M	Y	DISCHG M3/S 97160F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	ODOUR THRESH NO 02001L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
SOUTH HEART RIVER:																			
GROUARD CH @ BR - R	00AL07BF1490	25	6	91		20.8	7.0		160		5.2								
GROUARD CH @ BR - R	00AL07BF1490	31	7	91		20.5	8.4		243		8.6								
GROUARD CH @ BR - R	00AL07BF1490	3	9	91		15.1	8.5		241		9.3								
GROUARD CH @ BR - R	00AL07BF1490	15	10	91		7.0	7.7		335		10.9								
GROUARD CH @ BR - R	00AL07BF1490	13	5	92		11.1	7.7		205		9.9								
GROUARD CH @ BR - R	00AL07BF1490	10	6	92		15.8	7.5		184		8.2								
GROUARD CH @ BR - R	00AL07BF1490	14	7	92		15.9	8.0		204		9.6								
GROUARD CH @ BR - R	00AL07BF1490	13	8	92		22.5	8.6		279		9.1								
GROUARD CH @ BR - R	00AL07BF1490	16	9	92		7.0	7.7		170		11.0								
GROUARD CH @ BR - C	00AL07BF1500	14	8	90		21.5	8.2	7.84	276	266	7.8		7	80		144	218	4	222
GROUARD CH @ BR - C	00AL07BF1500	29	5	91		17.1	7.4	7.6	227	223	7.8		124.0	126		121	211	103	314
GROUARD CH @ BR - C	00AL07BF1500	25	6	91		21.1	7.1		166		6.0								
GROUARD CH @ BR - C	00AL07BF1500	31	7	91		20.2	8.5		243		8.5								
GROUARD CH @ BR - C	00AL07BF1500	3	9	91		14.7	8.2		240		9.3								
GROUARD CH @ BR - C	00AL07BF1500	15	10	91		7.1	8.3		332		11.0								
GROUARD CH @ BR - C	00AL07BF1500	11	2	92		-0.1	6.8	7.2	285	498	0.0	L0.1	39.0	32		278	345	18	363
GROUARD CH @ BR - C	00AL07BF1500	13	5	92		9.9	8.0		329		9.7	9.88							
GROUARD CH @ BR - C	00AL07BF1500	10	6	92		14.5	8.2		297		8.7	8.71							
GROUARD CH @ BR - C	00AL07BF1500	14	7	92		15.7	8.2		250		8.0								
GROUARD CH @ BR - C	00AL07BF1500	13	8	92		22.3	8.7		289		9.2	9.29							
GROUARD CH @ BR - C	00AL07BF1500	16	9	92		5.9	8.1		228		10.9	10.68							
GROUARD CH @ BR - C	00AL07BF1500	14	10	92		0.9	7.1	7.9	243	265	11.8	11.21	113.0	79		144	220	100	320
GROUARD CH @ BR - C	00AL07BF1500	23	2	93		0.2	6.8	7.3	524	555	0.1	0.08	26.0	78		322	410	16	426
GROUARD CH @ BR - L	00AL07BF1510	25	6	91		21.1	7.4		170		7.7								
GROUARD CH @ BR - L	00AL07BF1510	31	7	91		19.8	8.7		235		8.8								
GROUARD CH @ BR - L	00AL07BF1510	3	9	91		15.0	8.8		237		9.7								
GROUARD CH @ BR - L	00AL07BF1510	15	10	91		7.0	7.9		333		11.1								
GROUARD CH @ BR - L	00AL07BF1510	13	5	92		10.0	8.0		333		9.6								
GROUARD CH @ BR - L	00AL07BF1510	10	6	92		15.2	8.4		347		9.7								
GROUARD CH @ BR - L	00AL07BF1510	14	7	92		15.6	8.9		304		8.9								
GROUARD CH @ BR - L	00AL07BF1510	13	8	92		22.5	8.8		292		9.2								
GROUARD CH @ BR - L	00AL07BF1510	16	9	92		6.3	8.0		268		11.7								
GROUARD CH@BR X-CH -COMP	00AL07BF1520	25	6	91				7.6		170			73.0	131		92	205	29	234
GROUARD CH@BR X-CH -COMP	00AL07BF1520	31	7	91				8.6		244			7.2	94		136	228	4	232
GROUARD CH@BR X-CH -COMP	00AL07BF1520	3	9	91				8.4		253			22.0	53		142	186	24	210
GROUARD CH@BR X-CH -COMP	00AL07BF1520	15	10	91				8.2		362			38.0	28		205	256	34	290
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	5	92				8.1		320			83.0	39		176	258	110	368
GROUARD CH@BR X-CH -COMP	00AL07BF1520	10	6	92				8.2		275			28.0	59		154	222	26	248
GROUARD CH@BR X-CH -COMP	00AL07BF1520	14	7	92				8.6		263			23.0	87		143	218	28	246
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	8	92				8.9		280			6.4	67		159	233	5	238
GROUARD CH@BR X-CH -COMP	00AL07BF1520	16	9	92				8.1		230			27.0	88		124	194	22	216
NARROWS CK NR MOUTH	00AL07BG1000	15	8	90		18	7.7	7.4	277	270	5.8		2.2	135		148	261	3	264
MARTEN CK AT HWY 88	00AL07BG1500	15	8	90		17	8.2	8.06	315	317	8.7		14.5	38		170	215	13	228
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91		11.2	7.7	7.7	158	151	9.9		4.3	90		83	116	8	124
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91				7.7		151			1.6	90		79	129	7	136
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91				7.7		151			9.5	90		78	119	7	126
MARTEN CK AT HWY 88	00AL07BG1500	26	6	91		11.7	7.4	7.4	84	87	10.1		35.0	119		44	103	61	164
MARTEN CK AT HWY 88	00AL07BG1500	30	7	91		14.3	7.5	7.9	182	185	9.7		6.5	90		98	163	3	166
MARTEN CK AT HWY 88	00AL07BG1500	3	9	91		12.9	8.0	7.4	87	94	9.7		45.0	119		50	110	62	172
MARTEN CK AT HWY 88	00AL07BG1500	16	10	91		3.9	7.5	7.9	190	202	11.9		6.7	68		108	148	9	157
MARTEN CK AT HWY 88	00AL07BG1500	11	2	92		-0.1	7.5	7.8	232	261	13.1	13.00	8.4	39		138	187	1	188
MARTEN CK AT HWY 88	00AL07BG1500	13	5	92		7.9	7.2	7.3	69	78.1	10.8		32.0	111		41	120	44	164
MARTEN CK AT HWY 88	00AL07BG1500	10	6	92		12.3	7.5	7.6	77	83.8	9.7	9.42	80.0	130		48.9	163	183	346

STATION	CODE	D	M	Y	DISCHG M3/S 97160F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	ODOUR THRESH NO 02001L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
MARTEN CK AT HWY 88	00AL07BG1500	15	7	92		12.7	7.6	7.6	95	103	9.6		12.2	191		51	119	11	130
MARTEN CK AT HWY 88	00AL07BG1500	13	8	92		15.8	7.7	8.0	185	186	9.0	9.00	6.8	166		99.5	164	4	168
MARTEN CK AT HWY 88	00AL07BG1500	16	9	92		2.9	7.2	7.6	81	91.2	12.3	11.94	6.0	176		55.9	106	6	112
MARTEN CK AT HWY 88	00AL07BG1500	14	10	92		0.1	7.5	7.7	113	127	13.4	13.26	4.9	181		70.1	123	3	126
DRIFTPILE R AT HWY 2	00AL07BH1000	14	8	90		21.7	7.9	7.75	328	320	8.1	8.46	4.3	51		172	226	6	232
DRIFTPILE R AT HWY 2	00AL07BH1000	29	5	91		15.9	7.3	7.6	185	179	8.5		19.0	122		94	150	28	178
DRIFTPILE R AT HWY 2	00AL07BH1000	24	6	91		16.8	7.3	7.5	113	117	9.0		24.0	165		61	134	60	194
DRIFTPILE R AT HWY 2	00AL07BH1000	31	7	91		21.5	7.4	7.9	248	250	8.0		4.3	96		133	204	6	210
DRIFTPILE R AT HWY 2	00AL07BH1000	3	9	91		17.0	7.7	8.1	293	303	9.2		4.1	39		164	192	4	196
DRIFTPILE R AT HWY 2	00AL07BH1000	15	10	91		7.9	7.1	7.8	229	244	10.4		4.3	46		134	170	2	172
DRIFTPILE R AT HWY 2	00AL07BH1000	11	2	92		0.0	7.3	7.5	253	317	11.5	10.94	7.0	22		173	224	2	226
DRIFTPILE R AT HWY 2	00AL07BH1000	13	5	92		7.5	7.2	7.3	79	88.4	10.5		83.0	154		50	152	128	280
DRIFTPILE R AT HWY 2	00AL07BH1000	10	6	92		16.2	7.5		101		8.8	8.53							
DRIFTPILE R AT HWY 2	00AL07BH1000	10	7	92				7.6		106			58.0	145		65.2	158	84	242
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92		16.4	7.7	7.6	101	106	8.5	8.30	15.7	293		57.8	154	18	172
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92				7.6		107			15.3	293		58.5	139	17	156
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92				7.6		106			15.8	293		58.3	158	20	178
DRIFTPILE R AT HWY 2	00AL07BH1000	13	8	92		21.7	7.8	8.1	217	215	8.4	8.34	3.9	96		115	166	4	170
DRIFTPILE R AT HWY 2	00AL07BH1000	16	9	92		5.4	7.1	7.6	97	107	11.5	10.95	9.8	220		57.8	140	14	154
DRIFTPILE R AT HWY 2	00AL07BH1000	14	10	92		0.7	7.7	7.8	149	168	13.2	13.06	6.4	185		90.6	155	7	162
DRIFTPILE RIVER NR MOUTH	00AL07BH1200	3	9	91		15.6	7.7		346		9.0	9.18	5.3					5	
SWAN R AT HWY 2	00AL07BJ1000	14	8	90		19.2	7.6	7.43	308	301	8.1		5	35		159	223	9	232
SWAN R AT HWY 2	00AL07BJ1000	29	5	91		14.9	7.3	7.5	168	161	8.3		27.0	81		85	144	46	190
SWAN R AT HWY 2	00AL07BJ1000	24	6	91		18.1	7.3	7.6	132	137	8.6		21.0	86		70	125	39	164
SWAN R AT HWY 2	00AL07BJ1000	30	7	91		19.2	7.2	7.8	222	225	8.6		8.6	74		119	182	12	194
SWAN R AT HWY 2	00AL07BJ1000	3	9	91		15.6	7.6	8.0	218	228	9.0		9.8	61		120	166	12	178
SWAN R AT HWY 2	00AL07BJ1000	15	10	91		8.0	6.8	8.1	208	220	10.4		8.2	47		119	160	4	164
SWAN R AT HWY 2	00AL07BJ1000	11	2	92		-0.1	7.1	7.5	248	284	10.5	10.54	11.6	22		152	235	1	236
SWAN R AT HWY 2	00AL07BJ1000	13	5	92		8.0	7.2	7.4	101	111	10.2		101.0	97		58	148	160	308
SWAN R AT HWY 2	00AL07BJ1000	10	6	92		16.4	7.3	7.8	96	101	8.2	8.12	72.0	120		56.8	199	187	386
SWAN R AT HWY 2	00AL07BJ1000	14	7	92		16.9	7.6	7.8	144	149	8.2		18.0	153		79.6	155	21	176
SWAN R AT HWY 2	00AL07BJ1000	13	8	92		20.0	7.5	8.0	246	245	8.3	8.32	4.5	79		130	183	5	188
SWAN R AT HWY 2	00AL07BJ1000	16	9	92		5.1	7.2	7.8	112	123	11.3	10.88	14.8	150		62.8	151	27	178
SWAN R AT HWY 2	00AL07BJ1000	16	9	92				7.8		123			16.8	134		59.9	153	47	200
SWAN R AT HWY 2	00AL07BJ1000	16	9	92				7.7		123			16.8	160		67.3	143	33	176
SWAN R AT HWY 2	00AL07BJ1000	14	10	92		0.8	7.6	7.9	168	183	12.9	12.79	8.2	126		98.3	155	7	162
SWAN R AT HWY 2	00AL07BJ1000	23	2	93		0.3	6.8	7.1	392	428	3.9	3.86	16.8	24		233	277	9	286
SWAN RIVER NR MOUTH	00AL07BJ1200	30	7	91		20.4	7.4		233		8.7		9.6					10	
ASSINEAU R NR MOUTH	00AL07BJ1500	14	8	90		18.7	7.6	7.89	445	441	7.4		15.1	44		236	309	15	324
ASSINEAU R NR MOUTH	00AL07BJ1500	29	5	91		14.6	7.5	7.7	225	218	8.8		14.1	86		117	174	16	190
ASSINEAU R NR MOUTH	00AL07BJ1500	24	6	91		17.9	7.5	7.8	163	169	8.9		23.0	103		88	145	21	166
ASSINEAU R NR MOUTH	00AL07BJ1500	30	7	91		18.6	7.5	8.1	320	324	8.9		17.2	42		170	239	11	250
ASSINEAU R NR MOUTH	00AL07BJ1500	3	9	91		15.1	7.9	8.2	320	332	9.6		12.7	40		181	217	13	230
ASSINEAU R NR MOUTH	00AL07BJ1500	16	10	91		5.5	7.4	7.9	305	327	10.3		11.2	61		177	220	4	224
ASSINEAU R NR MOUTH	00AL07BJ1500	11	2	92		-0.1	7.4	7.7	281	381		11.14	25.0	20		203	252	4	256
ASSINEAU R NR MOUTH	00AL07BJ1500	13	5	92		5.6	7.1	7.3	84	94	11.0		141.0	143		49	159	241	400
ASSINEAU R NR MOUTH	00AL07BJ1500	10	6	92		14.2	7.5	7.8	130	137	9.1	8.93	65.0	114		72.6	200	89	288
ASSINEAU R NR MOUTH	00AL07BJ1500	14	7	92		15.8	7.7	8.0	247	252	8.4		29.0	86		134	198	18	216
ASSINEAU R NR MOUTH	00AL07BJ1500	13	8	92		16.7	7.6	8.0	399	396	7.8	7.87	22.0	43		215	275	15	290
ASSINEAU R NR MOUTH	00AL07BJ1500	16	9	92		5.0	7.2	7.8	168	180	11.1	10.86	21.0	156		96.2	161	15	176
ASSINEAU R NR MOUTH	00AL07BJ1500	14	10	92		0.6	7.5	7.8	192	208	12.7	12.57	11.7	164		110	174	8	182
LSR AT BR NR L OUTF-C	00AL07BK2100	17	1	89		0.8	8.3		203		13.4	13.11	1	19				1	
LSR AT BR NR L OUTF-C	00AL07BK2100	17	1	89								13.08							
LSR AT BR NR L OUTF-C	00AL07BK2100	6	2	89		0	8		201		13.5	13.14	0.9	18				1	
LSR AT BR NR L OUTF-C	00AL07BK2100	6	2	89								13.43							
LSR AT BR NR L OUTF-C	00AL07BK2100	21	2	89		0.8	8	7.97	200	217	13.5	13.02	0.7	12		114		1	
LSR AT BR NR L OUTF-C	00AL07BK2100	21	2	89								13.01							
LSR AT BR NR L OUTF-C	00AL07BK2100	26	2	90		0.3	7.7	8.15	209	213	13.7	13.5	0.6	13	1	111	144	L1.000	144
LSR AT BR NR L OUTF-C	00AL07BK2100	15	8	90		19.6	8.5	7.87	202	189	8.8		2.2	9		100	142	2	144

STATION	CODE	D	M	Y	DISCHG M3/S 97160F	TEMP DEG.C 020**F	PH 103**F	PH 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	ODOUR THRESH NO 02001L	TDS CALCD 00205L	TDS (DIFF) 00207L	NON FILT RES 104**L	RES TOTAL 104**L
LSR AT BR NR L OUTF-C	00AL07BK2100	19	2	91		0.5	8.8	7.5	223	221	13.9	13.24	0.6	15	1	116	150	2	152
LSR AT BR NR L OUTF-C	00AL07BK2100	19	2	91								13.27							
LSR AT BR NR L OUTF-C	00AL07BK2100	29	5	91		12.1	7.9	8.1	195	189	10.5	10.89	2.9	12		98	131	7	138
LSR AT BR NR L OUTF-C	00AL07BK2100	26	6	91		17.8	8.1	8.2	185	190	9.3		3.1	16		102	136	6	142
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91		18.1	7.8	7.9	189	193	9.0		7.4	11		101	145	35	180
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91				7.9		193			7.7	12		100	144	28	172
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91				8.0		192			8.3	10		101	146	34	180
LSR AT BR NR L OUTF-C	00AL07BK2100	3	9	91		15.3	8.2	8.2	182	191	9.5	9.79	11.5	13		98	136	24	160
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91		6.4	7.7	7.9	186	195	11.1		17.6	12		103	169	43	212
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91				8.0		195			16.1	13		102	206	36	242
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91				7.8		195			18.8	13		102	96	32	128
LSR AT BR NR L OUTF-C	00AL07BK2100	11	2	92		-0.3	7.6	8.1		212	13.2	12.54	0.7	14	1	114	176	L1.000	176
LSR AT BR NR L OUTF-C	00AL07BK2100	11	2	92								12.62							
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92		10.2	7.9	8.1	179	190	10.7		21.0	13		99	146	36	182
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92				7.9		190			19.3	13		99	140	30	170
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92				7.9		190			19.8	15		100	141	35	176
LSR AT BR NR L OUTF-C	00AL07BK2100	10	6	92		14.8	8.1	8.2	186	194	9.1	9.38	33.0	13		105	158	100	258
LSR AT BR NR L OUTF-C	00AL07BK2100	15	7	92		15.2	8.1	8.2	184	194	9.0		24.0	12		102	138	58	196
LSR AT BR NR L OUTF-C	00AL07BK2100	13	8	92		19.0		8.5		192	10.0	10.11	1.9	12		102	140	2	142
LSR AT BR NR L OUTF-C	00AL07BK2100	16	9	92		6.0	7.5	8.0	182	197	11.1	10.82	11.7	14		105	134	18	152
LSR AT BR NR L OUTF-C	00AL07BK2100	14	10	92		4.0	8.6	8.4	181	195	11.9	12.21	5.2	15		104	129	11	140
LSR AT BR NR L OUTF-C	00AL07BK2100	22	2	93	13														
LSR AT BR NR L OUTF-C	00AL07BK2100	23	2	93		1.7	7.8	8.2	206	227	13.1	13.15	0.6	13	1	122	149	1	150
LSR AT BR NR L OUTF-C	00AL07BK2100	23	2	93								13.12							

STATION	CODE	D	M	Y	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 106**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	S- DISS 161**L	N PARTIC 079**L	N TKN 070**L
SOUTH HEART RIVER:																			
GROUARD CH @ BR - C	00AL07BF1500	14	8	90	125	122	9	2.3	34	9	152		1.1	14	0.13	7.7		L.02	0.88
GROUARD CH @ BR - C	00AL07BF1500	29	5	91	79	94	6.0	3.1	26.0	7	96		2.0	29.0	0.09	9.6		0.33	1.22
GROUARD CH @ BR - C	00AL07BF1500	11	2	92	242	238	18.0	2.9	69.0	16	295		1.9	24.0	0.13	14.1			0.84
GROUARD CH @ BR - C	00AL07BF1500	14	10	92	115	114	10.0	2.8	34.0	7	140		1.1	19.0	0.09	8.7			1.60
GROUARD CH @ BR - C	00AL07BF1500	23	2	93	244	286	14.0	3.8	80.0	21	298		1.8	54.0	0.17	12.8		0.13	1.51
GROUARD CH@BR X-CH -COMP	00AL07BF1520	25	6	91	69	76	6.0	1.8	22.0	5	84		L.5000	16.0	0.08	11.1		0.22	0.86
GROUARD CH@BR X-CH -COMP	00AL07BF1520	31	7	91	106	117	9.0	2.0	32.0	9	109	10	1.0	20.0	0.12	9.0		0.05	0.35
GROUARD CH@BR X-CH -COMP	00AL07BF1520	3	9	91	107	112	11.0	2.2	30.0	9	128	1	1.0	24.0	0.13	5.0			0.85
GROUARD CH@BR X-CH -COMP	00AL07BF1520	15	10	91	143	164	15.0	4.2	46.0	12	174		1.0	41.0	0.12	2.9			1.07
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	5	92	131	147	10.0	3.6	39.0	12	160		1.4	31.0	0.13	6.3			1.28
GROUARD CH@BR X-CH -COMP	00AL07BF1520	10	6	92	110	122	11.0	2.6	34.0	9	135		1.4	30.0	0.10	6.1			0.85
GROUARD CH@BR X-CH -COMP	00AL07BF1520	14	7	92	115	119	11.0	3.2	31.0	10	135	4	1.0	18.0	0.12	8.3			0.94
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	8	92	127	127	13.0	3.5	31.0	12	144	10	1.0	22.0	0.13	7.4			0.98
GROUARD CH@BR X-CH -COMP	00AL07BF1520	16	9	92	102	95	10.0	2.3	28.0	6	124		0.9	16.0	0.09	8.4			0.78
NARROWS CK NR MOUTH	00AL07BG1000	15	8	90	137	134	9	1.1	37	10	167		1.1	8	0.1	3.1		0.06	1.28
MARTEN CK AT HWY 88	00AL07BG1500	15	8	90	162	149	9	1.7	43	10	197		0.9	8	0.13	11.4		0.09	0.38
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91	70	66	7.0	2.4	18.0	5	85		1.0	8.0	0.07	8.7		0.02	0.35
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91	68	66	5.0	1.1	18.0	5	83		1.0	8.0	0.07	8.7		0.04	0.33
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91	69	66	5.0	1.1	18.0	5	84		1.0	7.0	0.07	8.7		0.03	0.32
MARTEN CK AT HWY 88	00AL07BG1500	26	6	91	37	37	2.0	0.7	10.0	3	45		1.0	5.0	0.05	11.4		0.12	1.15
MARTEN CK AT HWY 88	00AL07BG1500	30	7	91	88	85	6.0	1.2	24.0	6	107		1.0	7.0	0.07	11.1		0.03	0.36
MARTEN CK AT HWY 88	00AL07BG1500	3	9	91	41	40	4.0	0.9	11.0	3	50		1.0	6.0	0.06	10.5			0.55
MARTEN CK AT HWY 88	00AL07BG1500	16	10	91	97	90	7.0	1.2	26.0	6	119		1.0	8.0	0.06	10.9			0.29
MARTEN CK AT HWY 88	00AL07BG1500	11	2	92	130	118	10.0	1.2	34.0	8	159		1.2	5.0	0.08	12.2			0.32
MARTEN CK AT HWY 88	00AL07BG1500	13	5	92	33	33	3.0	0.6	10.0	2	41		0.8	4.0	0.05	9.0			0.44
MARTEN CK AT HWY 88	00AL07BG1500	10	6	92	37	42	4.0	0.7	12.0	3	45		0.9	6.0	0.05	8.9			0.70
MARTEN CK AT HWY 88	00AL07BG1500	15	7	92	47	42	4.0	0.7	12.0	3	58		0.9	L3.	0.04	9.3			0.44
MARTEN CK AT HWY 88	00AL07BG1500	13	8	92	92	85	7.0	1.1	24.0	6	112		0.8	6.0	0.07	10.3			0.41

STATION	CODE	D	M	Y	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 106**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	S- DISS 161**L	N PARTIC 079**L	N TKN 070**L
MARTEN CK AT HWY 88	00AL07BG1500	16	9	92	43	45	4.0	0.8	13.0	3	52		4.5	5.0	0.04	9.8			0.50
MARTEN CK AT HWY 88	00AL07BG1500	14	10	92	61	59	5.0	0.7	17.0	4	74		0.8	7.0	0.05	11.0			0.38
DRIFTPILE R AT HWY 2	00AL07BH1000	14	8	90	159	147	10	2.5	44	9	194		1.2	10	0.12	8.1		0.04	0.48
DRIFTPILE R AT HWY 2	00AL07BH1000	29	5	91	78	73	6.0	1.8	21.0	5	95		1.0	12.0	0.07	12.9		0.10	0.56
DRIFTPILE R AT HWY 2	00AL07BH1000	24	6	91	51	50	4.0	1.2	15.0	3	62		L.5000	7.0	0.05	12.1		0.08	0.53
DRIFTPILE R AT HWY 2	00AL07BH1000	31	7	91	120	115	8.0	2.2	33.0	8	146		1.0	8.0	0.09	15.0		0.05	0.39
DRIFTPILE R AT HWY 2	00AL07BH1000	3	9	91	149	142	10.0	2.4	42.0	9	182		1.0	10.0	0.11	6.4			0.45
DRIFTPILE R AT HWY 2	00AL07BH1000	15	10	91	115	105	10.0	2.1	32.0	6	141		0.5	14.0	0.08	12.5			0.28
DRIFTPILE R AT HWY 2	00AL07BH1000	11	2	92	151	135	15.0	2.1	41.0	8	184		0.6	15.0	0.09	16.5			0.25
DRIFTPILE R AT HWY 2	00AL07BH1000	13	5	92	35	33	6.0	1.2	10.0	2	43		1.0	9.0	0.05	11.0			0.95
DRIFTPILE R AT HWY 2	00AL07BH1000	10	6	92	46	47	7.0	1.3	14.0	3	56		0.8	12.0	0.05	12.3			0.65
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92	48	47	6.0	1.2	14.0	3	59		1.2	4.0	0.05	12.9			0.78
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92	48	47	6.0	1.1	14.0	3	59		1.0	5.0	0.03	12.8			0.70
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92	48	47	6.0	1.2	14.0	3	59		1.0	4.0	0.05	12.8			0.78
DRIFTPILE R AT HWY 2	00AL07BH1000	13	8	92	106	97	9.0	2.0	29.0	6	129		0.5	5.0	0.09	8.8			0.42
DRIFTPILE R AT HWY 2	00AL07BH1000	16	9	92	49	41	6.0	1.1	13.0	2	59		0.7	6.0	0.04	13.3			0.48
DRIFTPILE R AT HWY 2	00AL07BH1000	14	10	92	80	71	8.0	1.4	22.0	4	98		0.6	7.0	0.06	14.6			0.46
DRIFTPILE RIVER NR MOUTH	00AL07BH1200	3	9	91															0.40
SWAN R AT HWY 2	00AL07BJ1000	14	8	90	149	130	10	2.4	39	8	182		1.8	8	0.13	10.4		0.05	0.41
SWAN R AT HWY 2	00AL07BJ1000	29	5	91	71	57	9.0	1.7	18.0	3	86		1.0	10.0	0.08	13.7		0.08	0.44
SWAN R AT HWY 2	00AL07BJ1000	24	6	91	62	52	6.0	1.4	16.0	3	75		1.0	5.0	0.07	13.5		0.09	0.40
SWAN R AT HWY 2	00AL07BJ1000	30	7	91	107	100	10.0	2.1	30.0	6	130		1.0	5.0	0.09	15.7		0.09	0.34
SWAN R AT HWY 2	00AL07BJ1000	3	9	91	110	95	10.0	1.9	28.0	6	134		1.0	7.0	0.10	13.6			0.34
SWAN R AT HWY 2	00AL07BJ1000	15	10	91	105	97	10.0	1.8	29.0	6	128		1.0	8.0	0.08	14.3			0.27
SWAN R AT HWY 2	00AL07BJ1000	11	2	92	136	114	16.0	1.9	34.0	7	165		1.8	10.0	0.09	16.8			0.26
SWAN R AT HWY 2	00AL07BJ1000	13	5	92	47	36	8.0	1.5	11.0	2	58		1.6	6.0	0.06	12.5			0.80
SWAN R AT HWY 2	00AL07BJ1000	10	6	92	48	41	6.0	1.3	13.0	2	59		1.3	4.0	0.05	12.8			0.78
SWAN R AT HWY 2	00AL07BJ1000	14	7	92	70	61	8.0	1.3	18.0	4	86		1.2	5.0	0.06	15.1			0.48
SWAN R AT HWY 2	00AL07BJ1000	13	8	92	121	105	11.0	2.0	32.0	6	148		1.7	4.0	0.09	12.0			0.38
SWAN R AT HWY 2	00AL07BJ1000	16	9	92	57	48	6.0	1.1	16.0	2	70		1.1	L3.	0.06	13.5			0.50
SWAN R AT HWY 2	00AL07BJ1000	16	9	92	57	41	6.0	1.1	13.0	2	70		1.0	L3.	0.05	13.8			0.53
SWAN R AT HWY 2	00AL07BJ1000	16	9	92	57	48	6.0	1.1	16.0	2	70		1.5	6.0	0.05	13.8			0.50
SWAN R AT HWY 2	00AL07BJ1000	14	10	92	88	76	9.0	1.4	24.0	4	108		1.1	6.0	0.08	14.7			0.38
SWAN R AT HWY 2	00AL07BJ1000	23	2	93	216	190	18.0	2.9	58.0	11	263		2.5	11.0	0.11	22.3		0.13	0.38
SWAN RIVER NR MOUTH	00AL07BJ1200	30	7	91														0.06	0.36
ASSINEAU R NR MOUTH	00AL07BJ1500	14	8	90	216	207	12	3.3	58	15	263		7.8	10	0.14	15.4		0.07	0.55
ASSINEAU R NR MOUTH	00AL07BJ1500	29	5	91	98	90	9.0	2.2	26.0	6	120		2.0	13.0	0.09	12.1		0.05	0.42
ASSINEAU R NR MOUTH	00AL07BJ1500	24	6	91	75	68	7.0	1.8	19.0	5	91		1.0	10.0	0.07	13.5		0.07	0.52
ASSINEAU R NR MOUTH	00AL07BJ1500	30	7	91	156	146	11.0	2.7	42.0	10	190		4.0	7.0	0.11	14.4		0.05	0.46
ASSINEAU R NR MOUTH	00AL07BJ1500	3	9	91	166	153	14.0	2.6	43.0	11	202		1.0	10.0	0.13	8.7			0.42
ASSINEAU R NR MOUTH	00AL07BJ1500	16	10	91	161	146	15.0	2.7	42.0	10	196		2.0	9.0	0.11	12.8			0.36
ASSINEAU R NR MOUTH	00AL07BJ1500	11	2	92	190	158	19.0	2.2	45.0	11	232		2.7	8.0	0.10	14.2			0.33
ASSINEAU R NR MOUTH	00AL07BJ1500	13	5	92	38	33	6.0	1.6	10.0	2	46		1.1	5.0	0.06	11.6			1.73
ASSINEAU R NR MOUTH	00AL07BJ1500	10	6	92	62	56	7.0	1.5	16.0	4	75		0.9	6.0	0.06	11.4			0.78
ASSINEAU R NR MOUTH	00AL07BJ1500	14	7	92	119	110	12.0	2.4	31.0	8	146		2.9	6.0	0.10	14.9			0.58
ASSINEAU R NR MOUTH	00AL07BJ1500	13	8	92	197	179	16.0	2.9	52.0	12	240		5.6	8.0	0.13	11.3			0.52
ASSINEAU R NR MOUTH	00AL07BJ1500	16	9	92	84	69	10.0	1.8	21.0	4	102		1.3	8.0	0.08	12.9			0.68
ASSINEAU R NR MOUTH	00AL07BJ1500	14	10	92	100	83	10.0	1.7	25.0	5	122		1.5	7.0	0.08	12.9	L.001		0.56
LSR AT BR NR L OUTF-C	00AL07BK2100	17	1	89			7						1	11			0.004	L.02	0.44
LSR AT BR NR L OUTF-C	00AL07BK2100	6	2	89			7						1	11				L.02	0.52
LSR AT BR NR L OUTF-C	00AL07BK2100	21	2	89	96	90	7	2.9	26	6	117		1.3	13	0.1	0.3	0.001	L.02	0.64
LSR AT BR NR L OUTF-C	00AL07BK2100	26	2	90	96	91	6.5	2.6	25	7	117		1	11	0.1	0.2	L.001	L.02	0.44
LSR AT BR NR L OUTF-C	00AL07BK2100	15	8	90	86	81	7	2.4	24	5	105		1	9	0.1	1.8		0.07	0.47
LSR AT BR NR L OUTF-C	00AL07BK2100	19	2	91	100	96	7.0	2.9	27.0	7	122		1.3	11.0	0.10	0.9		L.02	0.49
LSR AT BR NR L OUTF-C	00AL07BK2100	29	5	91	86	77	7.0	2.4	21.0	6	104		1.0	9.0	0.09	7.7		0.10	0.48
LSR AT BR NR L OUTF-C	00AL07BK2100	26	6	91	86	82	7.0	2.4	23.0	6	105		1.0	11.0	0.09	0.5		0.12	0.43
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	87	85	7.0	2.4	24.0	6	106		1.0	8.0	0.08	1.4		0.14	0.47
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	87	85	7.0	2.5	24.0	6	106		1.0	7.0	0.08	1.4		0.09	0.47
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	87	85	7.0	2.4	24.0	6	106		1.0	8.0	0.08	1.4		0.16	0.47

STATION	CODE	D	M	Y	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 106**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	S- DISS 161**L	N PARTIC 079**L	N TKN 070**L
LSR AT BR NR L OUTF-C	00AL07BK2100	3	9	91	86	82	6.0	2.4	23.0	6	105		1.0	8.0	0.09	2.0			0.57
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	88	85	8.0	2.5	24.0	6	107		1.0	9.0	0.08	L.1			0.60
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	88	85	7.0	2.5	24.0	6	107		1.0	9.0	0.08	L.1			0.57
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	88	85	7.0	2.5	24.0	6	107		1.0	9.0	0.08	L.1	L.001		0.57
LSR AT BR NR L OUTF-C	00AL07BK2100	11	2	92	96	92	9.0	2.7	27.0	6	117		1.3	11.0	0.09	0.3			0.45
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	87	78	8.0	2.4	23.0	5	107		1.2	7.0	0.09	1.5			0.56
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	86	78	8.0	2.5	23.0	5	105		1.2	8.0	0.09	1.6			0.57
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	86	82	8.0	2.5	23.0	6	105		1.1	8.0	0.09	1.6			0.59
LSR AT BR NR L OUTF-C	00AL07BK2100	10	6	92	88	82	8.0	2.4	23.0	6	108		1.2	11.0	0.08	0.4			0.64
LSR AT BR NR L OUTF-C	00AL07BK2100	15	7	92	87	82	8.0	2.4	23.0	6	106		1.1	9.0	0.09	0.9			0.62
LSR AT BR NR L OUTF-C	00AL07BK2100	13	8	92	88	80	8.0	2.6	22.0	6	105	3	1.2	9.0	0.08	2.4			0.50
LSR AT BR NR L OUTF-C	00AL07BK2100	16	9	92	91	81	8.0	2.5	24.0	5	111		1.1	10.0	0.10	1.5			0.78
LSR AT BR NR L OUTF-C	00AL07BK2100	14	10	92	90	81	8.0	2.4	24.0	5	109	1	1.0	10.0	0.09	L.1			0.57
LSR AT BR NR L OUTF-C	00AL07BK2100	23	2	93	104	95	9.0	2.8	28.0	6	127		1.2	12.0	0.10	0.2	L.001	0.11	0.46

STATION	CODE	D	M	Y	N DISS NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO2 072**L	P TOTAL 15421L	P TOTAL 15422L	P DISS 15105L	P DISS 15114I	Al EXT 130**L	As TOTAL 330**L	Ba TOTAL 560**L	Be DISS 041**L	Cd TOTAL 480**L	Co TOTAL 270**L	Cr TOTAL 240**L	Cu TOTAL 290**L
SOUTH HEART RIVER:																			
GROUARD CH @ BR - C	00AL07BF1500	14	8	90	0.018	0.002	0.001		0.0553		0.0353	L.002	0.0022	0.06	L.001	L.001	L.001	0.002	0.003
GROUARD CH @ BR - C	00AL07BF1500	29	5	91	0.012	0.019	0.005	0.179	0.0933	0.025	0.0292	0.53	0.0037	0.136	L.001	0.001	0.003	0.006	0.025
GROUARD CH @ BR - C	00AL07BF1500	11	2	92	0.170	0.053	0.007	0.104		0.014	0.0210	L.01	0.0033	0.125	L.001	0.002	0.003	0.003	0.001
GROUARD CH @ BR - C	00AL07BF1500	14	10	92	0.107	0.045	0.004	0.170	0.1364	0.014 .	0.0143	0.21	0.0031	0.109	L.001	L.001	0.002	0.005	0.006
GROUARD CH @ BR - C	00AL07BF1500	23	2	93	0.250	0.105	0.008	0.078		0.021	0.0257	0.03	0.0017	0.106	L.001	0.002	0.002	0.004	0.004
GROUARD CH@BR X-CH -COMP	00AL07BF1520	25	6	91	0.016	0.012	0.003	0.115	0.1315	0.028	0.0439	0.21	0.0028	0.088	L.001	L.001	0.002	0.003	0.007
GROUARD CH@BR X-CH -COMP	00AL07BF1520	31	7	91	0.023	0.003	0.001	0.053	0.0483	0.028	0.0283	0.03	0.0025	0.054	L.001	0.002	0.001	0.003	0.005
GROUARD CH@BR X-CH -COMP	00AL07BF1520	3	9	91	0.304	0.003	0.001	0.059	0.0662	0.019	0.0217	0.03	0.0020	0.062	L.001	L.001	L.001	0.002	0.003
GROUARD CH@BR X-CH -COMP	00AL07BF1520	15	10	91	0.056	0.026	0.002	0.086	0.0807	0.017	0.0190	0.13	0.0013	0.108	L0.001	0.001	0.001	0.003	0.003
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	5	92	0.020	0.016	0.005	0.153		0.027	0.0282	0.28	0.0024	0.099	L.001	0.003	0.002	0.004	0.006
GROUARD CH@BR X-CH -COMP	00AL07BF1520	10	6	92	0.009	L.001	0.002	0.065	0.0675	0.015	0.0196	0.08	0.0017	0.076	L.001	0.002	0.001	0.002	0.004
GROUARD CH@BR X-CH -COMP	00AL07BF1520	14	7	92	0.012	0.004	0.002	0.066	0.0604	0.017	0.0181	0.09	0.0021	0.064	L.001	0.001	L.001	0.004	0.003
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	8	92	0.018	0.002	0.002	0.038		0.020		0.02	0.0023	0.056	L.001	0.001	L.001	0.002	0.003
GROUARD CH@BR X-CH -COMP	00AL07BF1520	16	9	92	0.009	0.004	L.001	0.058	0.0629	0.013	0.0187	0.07	0.0013	0.061	L.001	L.001	L.001	0.003	0.004
NARROWS CK NR MOUTH	00AL07BG1000	15	8	90	0.02	0.001	0.001		0.0535		0.0328	0.005	0.0007	0.023	L.001	L.001	L.001	0.002	0.002
MARTEN CK AT HWY 88	00AL07BG1500	15	8	90	0.016	0.001	0.001		0.0338		0.0065	0.022	0.0012	0.141	L.001	0.001	0.001	0.003	0.002
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91	0.004	L.001	L.001	0.022	0.0240	0.009	0.0143	0.05	0.0006	0.092	L.001	L.001	L.001	0.003	0.013
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91	0.002	L.001	L.001	0.022	0.0235	0.010	0.0131	0.05	0.0006	0.091	L.001	L.001	L.001	0.002	0.012
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91	0.002	L.001	L.001	0.021	0.0221	0.010	0.0127	0.05	0.0006	0.093	L.001	L.001	0.001	0.002	0.017
MARTEN CK AT HWY 88	00AL07BG1500	26	6	91	0.015	0.024	0.002	0.137	0.0646	0.013	0.0199	0.23	0.0011	0.073	L.001	L.001	0.002	0.003	0.005
MARTEN CK AT HWY 88	00AL07BG1500	30	7	91	0.016	L.001	0.004	0.029	0.0307	0.029	0.0213	0.03	0.0009	0.091	L.001	L.001	L.001	0.003	0.003
MARTEN CK AT HWY 88	00AL07BG1500	3	9	91	0.008	L.001	0.002	0.095	0.0924	0.023	0.0217	0.14	0.0020	0.088	L.001	L.001	0.002	0.003	0.005
MARTEN CK AT HWY 88	00AL07BG1500	16	10	91	0.001	L.001	0.001	0.025	0.0281	0.010	0.0165	0.05	0.0007	0.084	L.001	L.001	L.001	0.002	0.002
MARTEN CK AT HWY 88	00AL07BG1500	11	2	92	0.060	0.087	0.002	0.030		0.004	0.0148	0.02	0.0006	0.107	L.001	L.001	0.002	0.002	0.007
MARTEN CK AT HWY 88	00AL07BG1500	13	5	92	0.004	0.005	0.003	0.049	0.0512	0.006	0.0106	0.20	0.0008	0.062	L.001	0.001	0.002	0.002	0.005
MARTEN CK AT HWY 88	00AL07BG1500	10	6	92	0.014	L.001	0.002	0.146	0.1687	0.009	0.0126	0.45	0.0022	0.121	L.001	0.001	0.005	0.007	0.010
MARTEN CK AT HWY 88	00AL07BG1500	15	7	92	0.003	L.001	0.003	0.036	0.0375	0.015	0.0171	0.10	0.0007	0.069	L.001	L.001	L.001	0.003	0.004
MARTEN CK AT HWY 88	00AL07BG1500	13	8	92	0.005	L.001	L.001	0.044		0.022		0.06	0.0012	0.097	L.001	L.001	0.001	0.002	0.002
MARTEN CK AT HWY 88	00AL07BG1500	16	9	92	0.007	0.001	L.001	0.028	0.0338	0.013	0.0182	0.13	0.0005	0.057	L.001	L.001	L.001	0.001	0.001
MARTEN CK AT HWY 88	00AL07BG1500	14	10	92	0.006	L.001	0.001	0.031	0.0322	0.018	0.0217	0.07	0.0006	0.070	L.001	L.001	L.001	0.001	L.001
DRIFTPILE R AT HWY 2	00AL07BH1000	14	8	90	0.014	0.001	0.001		0.0293		0.0106	L.002	0.0014	0.118	L.001	0.001	L.001	0.002	0.003
DRIFTPILE R AT HWY 2	00AL07BH1000	29	5	91	0.046	0.013	0.004	0.056	0.0499	0.020	0.0332	0.16	0.0015	0.107	L.001	L.001	0.001	0.003	0.026
DRIFTPILE R AT HWY 2	00AL07BH1000	24	6	91	0.006	L.001	0.003	0.074	0.0823	0.016	0.0293	0.27	0.0016	0.077	L.001	L.001	0.002	0.003	0.006
DRIFTPILE R AT HWY 2	00AL07BH1000	31	7	91	0.020	L.001	0.001	0.031	0.0359	0.015	0.0171	0.03	0.0018	0.104	L.001	0.001	0.002	0.003	0.004
DRIFTPILE R AT HWY 2	00AL07BH1000	3	9	91	0.014	0.001	L.001	0.027	0.0260	0.007	0.0098	L.01	0.0009	0.109	L.001	0.001	L.001	0.001	0.002
DRIFTPILE R AT HWY 2	00AL07BH1000	15	10	91	0.002	0.001	0.001	0.022	0.0257	0.012	0.0159	L.01	0.0011	0.080	L.001	L.001	L.001	0.002	0.002
DRIFTPILE R AT HWY 2	00AL07BH1000	11	2	92	0.035	0.108	0.002	0.030		0.009	0.0111	L.01	0.0009	0.103	L.001	0.001	L.001	0.002	0.002

STATION	CODE	D	M	Y	N DISS NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO2 072**L	P TOTAL 154**L	P TOTAL 154**L	P DISS 151**L	P DISS 151**L	Al EXT 130**L	As TOTAL 330**L	Ba TOTAL 560**L	Be DISS 041**L	Cd TOTAL 480**L	Co TOTAL 270**L	Cr TOTAL 240**L	Cu TOTAL 290**L
DRIFTPILE R AT HWY 2	00AL07BH1000	13	5	92	0.010	0.026	0.004	0.135	0.1294	0.025	0.0166	0.45	0.0024	0.092	L.001	L.001	0.003	0.004	0.006
DRIFTPILE R AT HWY 2	00AL07BH1000	10	6	92	0.012	L.001	0.003	0.078	0.0794	0.011	0.0148	0.19	0.0020	0.076	L.001	L.001	0.002	0.003	0.006
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92	0.008	0.005	0.004	0.075	0.0537	0.020	0.0216	0.18	0.0015	0.063	L.001	L.001	L.001	0.003	0.003
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92	0.006	0.007	0.005	0.060	0.0548	0.020	0.0215	0.16	0.0014	0.063	L.001	L.001	L.001	0.003	0.003
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92	0.007	0.006	0.005	0.053	0.0663	0.018	0.0185	0.17	0.0014	0.064	L.001	L.001	L.001	0.003	0.003
DRIFTPILE R AT HWY 2	00AL07BH1000	13	8	92	0.029	L.001	L.001	0.029		0.016		0.03	0.0018	0.079	L.001	L.001	L.001	0.001	0.002
DRIFTPILE R AT HWY 2	00AL07BH1000	16	9	92	0.007	0.002	0.002	0.040	0.0478	0.015	0.0245	0.15	0.0011	0.057	L.001	L.001	L.001	0.002	0.003
DRIFTPILE R AT HWY 2	00AL07BH1000	14	10	92	0.006	0.003	0.003	0.036	0.0453	0.021	0.0260	0.06	0.0014	0.066	L.001	L.001	L.001	0.001	0.001
DRIFTPILE RIVER NR MOUTH	00AL07BH1200	3	9	91	0.004			0.028											
SWAN R AT HWY 2	00AL07BJ1000	14	8	90	0.01	0.002	0.001		0.0379		0.0121	L.002	0.0013	0.11	L.001	0.001	L.001	0.002	0.003
SWAN R AT HWY 2	00AL07BJ1000	29	5	91	0.021	0.019	0.002	0.060	0.0655	0.015	0.0164	0.25	0.0016	0.106	L.001	L.001	0.002	0.003	0.010
SWAN R AT HWY 2	00AL07BJ1000	24	6	91	0.007	0.002	0.002	0.052	0.0787	0.020	0.0325	0.20	0.0015	0.076	L.001	L.001	0.001	0.003	0.005
SWAN R AT HWY 2	00AL07BJ1000	30	7	91	0.010	0.002	0.004	0.037	0.0406	0.015	0.0250	0.04	0.0018	0.093	L.001	0.001	L.001	0.002	0.003
SWAN R AT HWY 2	00AL07BJ1000	3	9	91	0.003	0.002	0.001	0.038	0.0427	0.013	0.0158	0.01	0.0016	0.090	L.001	L.001	0.001	0.002	0.002
SWAN R AT HWY 2	00AL07BJ1000	15	10	91	0.003	0.005	0.001	0.026	0.0299	0.010	0.0148	0.02	0.0011	0.073	L.001	L.001	L.001	0.002	0.002
SWAN R AT HWY 2	00AL07BJ1000	11	2	92	0.041	0.101	0.002	0.037		0.009	0.0113	L.01	0.0008	0.097	L.001	L.001	L.001	0.002	0.002
SWAN R AT HWY 2	00AL07BJ1000	13	5	92	0.008	0.032	0.003	0.140	0.1305	0.012	0.0181	0.36	0.0026	0.104	L.001	0.001	0.003	0.005	0.008
SWAN R AT HWY 2	00AL07BJ1000	10	6	92															
SWAN R AT HWY 2	00AL07BJ1000	10	6	92	0.020	0.001	0.003	0.173	0.1787	0.011	0.0158	0.33	0.0028	0.103	L.001	0.001	0.003	0.005	0.008
SWAN R AT HWY 2	00AL07BJ1000	14	7	92	0.005	0.006	0.002	0.055	0.0531	0.016	0.0206	0.09	0.0017	0.066	L.001	L.001	L.001	0.004	0.004
SWAN R AT HWY 2	00AL07BJ1000	13	8	92	0.020	0.003	0.002	0.031		0.015		0.01	0.0014	0.088	L.001	L.001	L.001	0.001	0.002
SWAN R AT HWY 2	00AL07BJ1000	16	9	92	0.005	0.001	L.001	0.048	0.0525	0.015	0.0200	0.11	0.0013	0.055	L.001	L.001	0.002	0.002	0.003
SWAN R AT HWY 2	00AL07BJ1000	16	9	92	0.005	0.001	L.001	0.045	0.0592	0.018	0.0202	0.11	0.0013	0.059	L.001	L.001	0.001	0.002	0.004
SWAN R AT HWY 2	00AL07BJ1000	16	9	92	0.005	0.001	L.001	0.040	0.0536	0.018	0.0176	0.10	0.0013	0.060	L.001	L.001	L.001	0.002	0.005
SWAN R AT HWY 2	00AL07BJ1000	14	10	92	0.008	0.001	0.002	0.031	0.0374	0.014	0.0204	0.03	0.0014	0.067	L.001	L.001	L.001	0.002	0.001
SWAN R AT HWY 2	00AL07BJ1000	23	2	93	0.096	0.082	0.002	0.040	0.0468	0.007	0.0143	L.005	0.0009	0.145	L.001	L.001	0.002	0.003	0.002
SWAN RIVER NR MOUTH	00AL07BJ1200	30	7	91	0.008	L0.001		0.041	0.0467	0.016	0.0208								
ASSINEAU R NR MOUTH	00AL07BJ1500	14	8	90	0.044	0.002	0.001		0.0416		0.0135	0.009	0.0016	0.185	L.001	0.002	0.002	0.003	0.003
ASSINEAU R NR MOUTH	00AL07BJ1500	29	5	91	0.006	0.005	L.001	0.033	0.0387	0.009	0.0141	0.12	0.0012	0.149	L.001	L.001	L.001	0.004	0.014
ASSINEAU R NR MOUTH	00AL07BJ1500	24	6	91	0.006	0.002	0.002	0.040	0.0521	0.016	0.0284	0.13	0.0012	0.113	L.001	0.001	0.001	0.004	0.007
ASSINEAU R NR MOUTH	00AL07BJ1500	30	7	91	0.014	L.001	0.003	0.033	0.0330	0.009	0.0188	0.04	0.0016	0.144	L.001	L.001	L.001	0.002	0.008
ASSINEAU R NR MOUTH	00AL07BJ1500	3	9	91	0.004	0.002	0.001	0.030	0.0337	0.009	0.0120	0.01	0.0013	0.130	L.001	0.001	0.002	0.002	0.002
ASSINEAU R NR MOUTH	00AL07BJ1500	16	10	91	0.003	0.002	L.001	0.028	0.0322	0.016	0.0189	0.01	0.0009	0.119	L.001	L.001	L.001	0.002	0.002
ASSINEAU R NR MOUTH	00AL07BJ1500	11	2	92	0.082	0.129	0.003	0.029		0.004	0.0081	L.01	0.0008	0.134	L.001	0.002	0.002	0.003	0.001
ASSINEAU R NR MOUTH	00AL07BJ1500	13	5	92	0.046	0.245	0.005	0.188		0.011	0.0258	0.51	0.0028	0.138	L.001	0.001	0.005	0.007	0.013
ASSINEAU R NR MOUTH	00AL07BJ1500	10	6	92	0.014	0.001	0.003	0.105	0.0906	0.009	0.0160	0.30	0.0020	0.115	L.001	0.001	0.003	0.004	0.008
ASSINEAU R NR MOUTH	00AL07BJ1500	14	7	92	0.011	0.006	0.002	0.053	0.0500	0.014	0.0147	0.09	0.0020	0.125	L.001	0.001	0.002	0.004	0.004
ASSINEAU R NR MOUTH	00AL07BJ1500	13	8	92	0.063	0.001	0.001	0.040		0.007		0.06	0.0013	0.170	L.001	0.001	0.001	0.002	0.003
ASSINEAU R NR MOUTH	00AL07BJ1500	16	9	92	0.007	0.002	L.001	0.040	0.0445	0.010	0.0174	0.09	0.0012	0.090	L.001	L.001	0.002	0.002	0.004
ASSINEAU R NR MOUTH	00AL07BJ1500	14	10	92	0.009	0.002	0.002	0.034	0.0381	0.017	0.0192	0.04	0.0011	0.099	L.001	L.001	0.001	0.002	0.002
LSR AT BR NR L OUTF-C	00AL07BK2100	17	1	89	0.05	0.043			0.0136		0.0102								
LSR AT BR NR L OUTF-C	00AL07BK2100	6	2	89	0.03	0.051			0.0126		0.0092	0.017		0.062	L.001	L.001	L.001	0.003	0.001
LSR AT BR NR L OUTF-C	00AL07BK2100	21	2	89	0.03	0.07	0.02		0.0126		0.0095	0.01	0.0013	0.064	L.001	L.001	L.001	0.004	0.002
LSR AT BR NR L OUTF-C	00AL07BK2100	26	2	90	0.02	0.026	0.002		0.0106		0.0074	0.005	0.001	0.058	L.001	0.001	L.001	0.001	0.002
LSR AT BR NR L OUTF-C	00AL07BK2100	15	8	90	0.014	0.001	L.001		0.0146		0.0064	0.005	0.0007	0.054	L.001	L.001	L.001	0.002	0.001
LSR AT BR NR L OUTF-C	00AL07BK2100	19	2	91	0.080	0.034	0.004	0.008		0.004		0.00	0.0009	0.061	L.001	0.002	L.001	0.003	0.005
LSR AT BR NR L OUTF-C	00AL07BK2100	29	5	91	0.004	0.002	L.001	0.020	0.0250	0.005	0.0065	0.03	0.0007	0.068	L.001	L.001	L.001	0.002	0.022
LSR AT BR NR L OUTF-C	00AL07BK2100	26	6	91	0.007	0.002	0.002	0.032	0.0229	0.006	0.0075	0.04	0.0006	0.057	L.001	L.001	L.001	0.001	0.002
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	0.018	L.001	0.003	0.030	0.0492	0.004	0.0084	0.09	0.0008	0.061	L.001	0.001	L.001	0.003	0.004
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	0.008	0.001	0.003	0.026	0.0375	0.005	0.0069	0.08	0.0008	0.062	L.001	L.001	L.001	L.001	0.003
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	0.010	0.002	0.002	0.031	0.0335	0.005	0.0076	0.08	0.0009	0.062	L.001	L.001	L.001	L.001	0.002
LSR AT BR NR L OUTF-C	00AL07BK2100	3	9	91	0.005	0.004	0.001	0.024	0.0291	0.006	0.0071	0.02	0.0010	0.062	L.001	L.001	L.001	L.001	0.001
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	0.005	0.003	0.001	0.040	0.0409	0.007	0.0095	0.09	0.0010	0.064	L.001	L.001	L.001	0.002	0.002
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	0.007	0.003	0.001	0.043	0.0414	0.006	0.0082	0.07	0.0010	0.062	L.001	L.001	L.001	0.002	0.002
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	0.005	0.004	L.001	0.039	0.0435	0.006	0.0084	0.08	0.0012	0.063	L.001	L.001	L.001	0.002	0.002
LSR AT BR NR L OUTF-C	00AL07BK2100	11	2	92	L0.01	0.055	0.003	0.010		0.006		0.01	0.0010	0.057	L.001	L.001	L.001	0.001	0.001
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	0.005	0.003	0.002	0.040	0.0448	0.003	0.0076	0.12	0.0011	0.067	L.001	0.001	L.001	0.002	0.003
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	0.007	0.002	0.001	0.039	0.0398	0.006	0.0074	0.14	0.0011	0.069	L.001	0.001	L.001	0.002	0.003
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	0.007	0.002	L.001	0.041	0.0407	0.008	0.0068	0.11	0.0010	0.064	L.001	0.001	L.001	0.001	0.002
LSR AT BR NR L OUTF-C	00AL07BK2100	10	6	92	0.015	L.001	L.001	0.084	0.0945	0.006	0.0073	0.25	0.0016	0.083	L.001	0.001	0.002	0.003	0.004

STATION	CODE	D	M	Y	N DISS NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO2 072**L	P TOTAL 15421L	P TOTAL 15422L	P DISS 15105L	P DISS 15114L	Al EXT 130**L	As TOTAL 330**L	Ba TOTAL 560**L	Be DISS 041**L	Cd TOTAL 480**L	Co TOTAL 270**L	Cr TOTAL 240**L	Cu TOTAL 290**L
LSR AT BR NR L OUTF-C	00AL07BK2100	15	7	92	0.004	L.001	L.001	0.050	0.0553	0.008	0.0073	0.13	0.0012	0.073	L.001	L.001	L.001	0.003	0.003
LSR AT BR NR L OUTF-C	00AL07BK2100	13	8	92	0.013	L.001	L.001	0.015		0.006		0.01	0.0008	0.052	L.001	L.001	L.001	L.001	0.001
LSR AT BR NR L OUTF-C	00AL07BK2100	16	9	92	0.019	0.003	L.001	0.028	0.0448	0.005	0.0075	0.04	0.0009	0.060	L.001	L.001	L.001	L.001	L.001
LSR AT BR NR L OUTF-C	00AL07BK2100	14	10	92	0.017	0.012	L.001	0.019	0.0263	0.002	0.0076	0.02	0.0009	0.053	L.001	L.001	L.001	0.002	L.001
LSR AT BR NR L OUTF-C	00AL07BK2100	23	2	93	0.010	0.087	0.001	0.010		0.008		0.02	0.0007	0.061	L.001	L.001	L.001	0.001	L.001

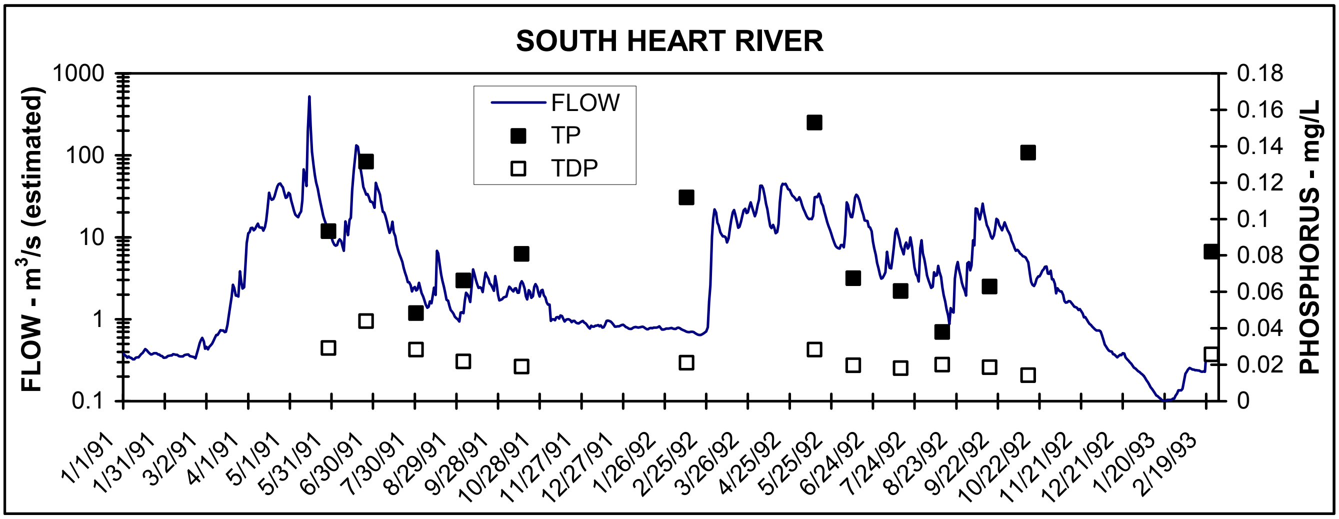
STATION	CODE	D	M	Y	Fe TOTAL 260**L	Hg TOTAL 800**L	Mn TOTAL 250**L	Mo TOTAL 420**L	Ni TOTAL 280**L	Pb EXT 823**L	Se TOTAL 340**L	V TOTAL 230**L	Zn TOTAL 300**L	CARBON TOTAL ORG 060**L	CARBON PARTIC TOTAL 06905L	CARBON DISS ORG 061**L	CARBON DISS INORG 061**L
SOUTH HEART RIVER:																	
GROUARD CH @ BR - C	00AL07BF1500	14	8	90	1.149	L.0001	0.097	0.003	0.003	0.003	0.0002	0.003	L.001		0.2	23.1	
GROUARD CH @ BR - C	00AL07BF1500	29	5	91	5.74	L.0001	0.183	0.003	0.015	0.005	0.0003	0.011	0.028		0.99	25.8	
GROUARD CH @ BR - C	00AL07BF1500	11	2	92	7.84	L.0001	1.025	0.002	0.006	L.002	0.0001	0.006	0.003			18.2	
GROUARD CH @ BR - C	00AL07BF1500	14	10	92	4.83	L.0001	0.196	0.003	0.008	0.007	0.0002	0.009	0.016		4.35	19.0	
GROUARD CH @ BR - C	00AL07BF1500	23	2	93	2.86	L.0001	0.772	0.002	0.008	L.002	0.0001	0.005	0.008		1.33	33.2	61.20
GROUARD CH@BR X-CH -COMP	00AL07BF1520	25	6	91	3.62	L.0001	0.134	0.002	0.009	0.003	0.0003	0.006	0.013		2.00	23.3	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	31	7	91	1.00	L.0001	0.057	L.001	0.007	0.004	0.0003	0.004	0.007		0.33	23.8	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	3	9	91	1.40	L.0001	0.103	0.001	0.005	0.005	0.0002	0.003	0.003			21.1	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	15	10	91	1.23	0.0001	0.129	0.003	0.006	0.002	0.0002	0.004	0.006			17.2	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	5	92	3.42	L.0001	0.120	0.002	0.007	0.003	0.0002	0.008	0.012			20.4	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	10	6	92	1.55	L.0001	0.055	0.001	0.006	0.004	0.0002	0.004	0.008			18.3	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	14	7	92	1.58	L.0001	0.047	0.002	0.005	0.004	0.0002	0.004	0.007			20.4	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	8	92	1.34	L.0001	0.027	0.001	0.003	L.002	0.0002	0.003	0.003		L.02	21.0	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	16	9	92	1.60	L.0001	0.040	0.002	0.001	L.002	0.0002	0.005	0.007		0.86	18.6	
NARROWS CK NR MOUTH	00AL07BG1000	15	8	90	0.356	L.0001	0.058	L.001	0.003	L.002	0.0001	0.002	0.001		0.6	38	
MARTEN CK AT HWY 88	00AL07BG1500	15	8	90	3.27	L.0001	0.39	L.001	0.005	L.002	0.0001	0.003	0.003		0.46	11.8	
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91	1.75	L.0001	0.184	0.002	0.009	0.002	L.0001	0.003	0.006		0.06	12.3	
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91	1.73	L.0001	0.182	0.002	0.008	0.002	L.0001	0.003	0.004		0.15	12.4	
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91	1.77	L.0001	0.186	L.001	0.006	L.002	L.0001	0.002	0.009		0.04	12.5	
MARTEN CK AT HWY 88	00AL07BG1500	26	6	91	2.52	L.0001	0.143	0.001	0.009	L.002	0.0001	0.005	0.009		1.30	16.8	
MARTEN CK AT HWY 88	00AL07BG1500	30	7	91	1.81	L.0001	0.129	L.001	0.009	L.002	L.0001	0.002	0.005		0.40	12.9	
MARTEN CK AT HWY 88	00AL07BG1500	3	9	91	3.82	L.0001	0.279	0.002	0.009	0.002	0.0001	0.005	0.009			17.1	
MARTEN CK AT HWY 88	00AL07BG1500	16	10	91	2.11	L.0001	0.103	0.001	0.005	L.002	L.0001	0.002	0.003			10.5	
MARTEN CK AT HWY 88	00AL07BG1500	11	2	92	2.71	L.0001	0.465	L.001	0.008	L.002	L.0001	0.003	0.007			8.1	
MARTEN CK AT HWY 88	00AL07BG1500	13	5	92	2.13	L.0001	0.113	L.001	0.007	L.002	0.0001	0.003	0.006			17.5	
MARTEN CK AT HWY 88	00AL07BG1500	10	6	92	6.53	L.0001	0.222	0.002	0.014	0.003	0.0002	0.012	0.025			19.0	
MARTEN CK AT HWY 88	00AL07BG1500	15	7	92	1.89	L.0001	0.131	L.001	0.007	L.002	0.0001	0.002	0.003			19.3	
MARTEN CK AT HWY 88	00AL07BG1500	13	8	92	2.99	L.0001	0.121	0.001	0.007	L.002	0.0001	0.003	0.002		L.02	15.1	
MARTEN CK AT HWY 88	00AL07BG1500	16	9	92	1.79	L.0001	0.150	L.001	0.002	L.002	L.0001	L.002	0.002		0.32	18.6	
MARTEN CK AT HWY 88	00AL07BG1500	14	10	92	2.17	L.0001	0.247	L.001	0.005	L.002	L.0001	L.002	0.003		0.45	15.4	
DRIFTPILE R AT HWY 2	00AL07BH1000	14	8	90	1.105	L.0001	0.137	0.002	0.007	0.003	0.0002	0.003	L.001		0.23	14.4	
DRIFTPILE R AT HWY 2	00AL07BH1000	29	5	91	2.06	L.0001	0.109	0.003	0.010	0.002	0.0001	0.004	0.012		0.74	16.7	
DRIFTPILE R AT HWY 2	00AL07BH1000	24	6	91	2.15	L.0001	0.070	0.001	0.008	L.002	0.0002	0.004	0.009		0.61	21.5	
DRIFTPILE R AT HWY 2	00AL07BH1000	31	7	91	1.58	L.0001	0.120	L.001	0.008	0.004	0.0002	0.003	0.006		0.26	16.2	
DRIFTPILE R AT HWY 2	00AL07BH1000	3	9	91	0.72	L.0001	0.121	0.002	0.004	L.002	0.0002	L.002	L.001			11.2	
DRIFTPILE R AT HWY 2	00AL07BH1000	15	10	91	1.25	L.0001	0.056	0.002	0.005	0.002	L.0001	L.002	0.002			8.3	
DRIFTPILE R AT HWY 2	00AL07BH1000	11	2	92	1.77	L.0001	0.132	0.001	0.005	L.002	L.0001	0.003	0.003			7.1	
DRIFTPILE R AT HWY 2	00AL07BH1000	13	5	92	4.81	L.0001	0.196	0.002	0.011	0.003	0.0002	0.008	0.017			30.0	
DRIFTPILE R AT HWY 2	00AL07BH1000	10	6	92	3.07	L.0001	0.102	0.001	0.008	0.004	0.0002	0.006	0.011			22.4	
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92	1.75	L.0001	0.068	0.001	0.007	L.002	0.0002	0.003	0.006			28.3	
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92	1.68	L.0001	0.065	0.002	0.007	0.003	0.0002	0.003	0.005			29.3	
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92	1.75	L.0001	0.068	L.001	0.007	L.002	0.0002	0.003	0.006			28.3	
DRIFTPILE R AT HWY 2	00AL07BH1000	13	8	92	1.32	L.0001	0.063	0.001	0.004	L.002	0.0002	0.002	0.002		L.02	13.8	
DRIFTPILE R AT HWY 2	00AL07BH1000	16	9	92	1.72	L.0001	0.071	L.001	0.002	L.002	0.0002	0.004	0.004		0.42	24.9	
DRIFTPILE R AT HWY 2	00AL07BH1000	14	10	92	2.06	L.0001	0.102	L.001	0.006	L.002	L.0001	0.003	0.003		0.39	17.2	
DRIFTPILE RIVER NR MOUTH	00AL07BH1200	3	9	91												11.3	

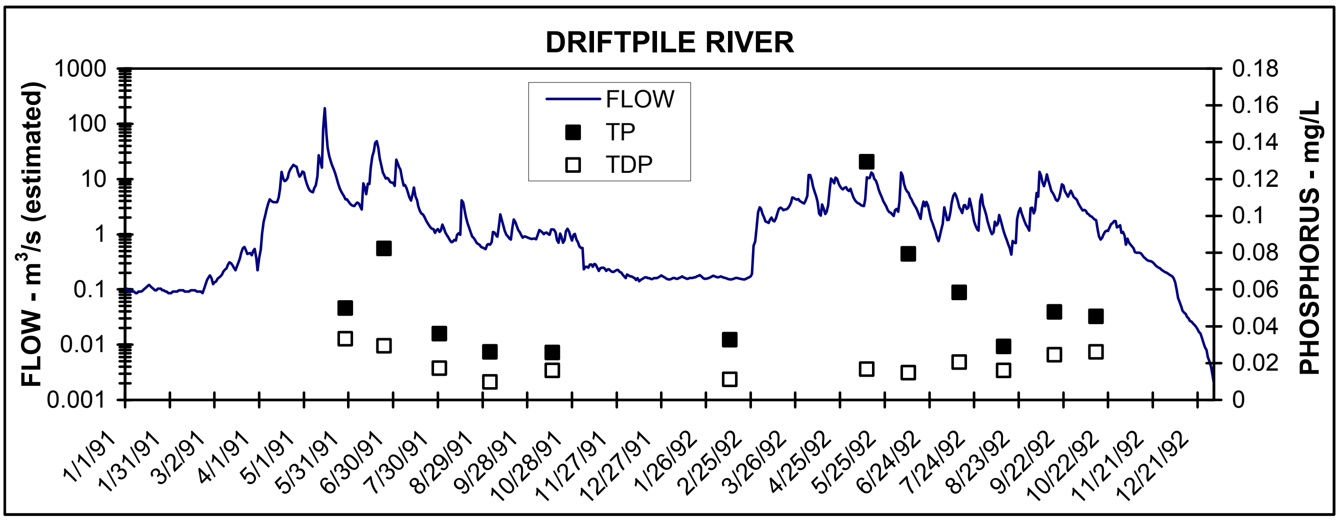
STATION	CODE	D	M	Y	Fe TOTAL 260**L	Hg TOTAL 800**L	Mn TOTAL 250**L	Mo TOTAL 420**L	Ni TOTAL 280**L	Pb EXT 823**L	Se TOTAL 340**L	V TOTAL 230**L	Zn TOTAL 300**L	CARBON TOTAL ORG 060**L	CARBON PARTIC TOTAL 06905L	CARBON DISS ORG 061**L	CARBON DISS INORG 061**L
SWAN R AT HWY 2	00AL07BJ1000	14	8	90	1.32	L.0001	0.174	0.002	0.006	L.002	0.0002	0.003	0.002		0.23	11.5	
SWAN R AT HWY 2	00AL07BJ1000	29	5	91	2.68	L.0001	0.111	0.002	0.007	L.002	0.0002	0.004	0.011		0.65	12.5	
SWAN R AT HWY 2	00AL07BJ1000	24	6	91	2.11	L.0001	0.062	0.001	0.007	L.002	0.0001	0.004	0.007		1.08	13.9	
SWAN R AT HWY 2	00AL07BJ1000	30	7	91	2.09	L.0001	0.090	0.001	0.007	0.002	0.0001	0.002	0.006		0.64	12.0	
SWAN R AT HWY 2	00AL07BJ1000	3	9	91	2.11	L.0001	0.080	0.002	0.006	0.003	0.0001	0.002	0.002			11.0	
SWAN R AT HWY 2	00AL07BJ1000	15	10	91	1.82	L.0001	0.071	0.001	0.005	L.002	L.0001	L.002	0.002			8.6	
SWAN R AT HWY 2	00AL07BJ1000	11	2	92	2.61	L.0001	0.257	0.001	0.005	L.002	L.0001	0.003	0.006			6.7	
SWAN R AT HWY 2	00AL07BJ1000	13	5	92	5.58	L.0001	0.166	0.002	0.011	0.003	0.0002	0.010	0.019			20.4	
SWAN R AT HWY 2	00AL07BJ1000	10	6	92	4.79	L.0001	0.173	0.002	0.011	0.005	0.0002	0.008	0.018			21.3	
SWAN R AT HWY 2	00AL07BJ1000	14	7	92	2.06	L.0001	0.048	0.002	0.006	L.002	0.0001	0.003	0.007			16.4	
SWAN R AT HWY 2	00AL07BJ1000	13	8	92	1.85	L.0001	0.078	L.001	0.004	L.002	0.0001	0.002	0.001		L.02	11.4	
SWAN R AT HWY 2	00AL07BJ1000	16	9	92	1.93	L.0001	0.060	L.001	0.004	L.002	0.0001	0.004	0.003		0.62	18.2	
SWAN R AT HWY 2	00AL07BJ1000	16	9	92	2.06	L.0001	0.064	0.001	0.005	L.002	0.0001	0.004	0.006		0.51	18.0	
SWAN R AT HWY 2	00AL07BJ1000	16	9	92	2.08	L.0001	0.062	L.001	0.005	L.002	0.0001	0.004	0.008		0.56	18.0	
SWAN R AT HWY 2	00AL07BJ1000	14	10	92	2.49	L.0001	0.080	0.002	0.006	L.002	L.0001	0.003	0.003		0.35	12.0	
SWAN R AT HWY 2	00AL07BJ1000	23	2	93	2.51	L.0001	0.753	0.001	0.005	L.002	L.0001	0.004	0.002		0.67	8.8	59.00
SWAN RIVER NR MOUTH	00AL07BJ1200	30	7	91											0.37	12.1	
ASSINEAU R NR MOUTH	00AL07BJ1500	14	8	90	1.597	L.0001	0.384	L.001	0.008	L.002	0.0002	0.004	0.001		0.47	14.6	
ASSINEAU R NR MOUTH	00AL07BJ1500	29	5	91	2.51	L.0001	0.235	0.004	0.011	L.002	0.0002	0.004	0.010		0.35	14.2	
ASSINEAU R NR MOUTH	00AL07BJ1500	24	6	91	2.12	L.0001	0.160	0.001	0.013	L.002	0.0001	0.005	0.008		0.20	17.0	
ASSINEAU R NR MOUTH	00AL07BJ1500	30	7	91	2.37	L.0001	0.233	L.001	L.001	0.002	0.0001	0.003	0.006		0.30	12.6	
ASSINEAU R NR MOUTH	00AL07BJ1500	3	9	91	1.89	L.0001	0.212	0.001	0.007	L.002	0.0001	0.003	0.002			11.6	
ASSINEAU R NR MOUTH	00AL07BJ1500	16	10	91	2.35	L.0001	0.175	0.001	0.006	0.002	0.0001	0.003	0.003			11.2	
ASSINEAU R NR MOUTH	00AL07BJ1500	11	2	92	3.18	L.0001	0.748	0.002	0.007	L.002	L.0001	0.004	0.003			8.5	
ASSINEAU R NR MOUTH	00AL07BJ1500	13	5	92	7.30	L.0001	0.342	0.003	0.018	0.003	0.0002	0.014	0.027			23.6	
ASSINEAU R NR MOUTH	00AL07BJ1500	10	6	92	4.28	L.0001	0.184	0.002	0.012	0.004	0.0002	0.008	0.015			20.8	
ASSINEAU R NR MOUTH	00AL07BJ1500	14	7	92	3.25	L.0001	0.241	0.002	0.009	L.002	0.0002	0.005	0.006			13.7	
ASSINEAU R NR MOUTH	00AL07BJ1500	13	8	92	2.09	L.0001	0.439	L.001	0.008	L.002	0.0002	0.004	0.003		0.33	12.5	
ASSINEAU R NR MOUTH	00AL07BJ1500	16	9	92	2.73	L.0001	0.230	L.001	0.006	L.002	0.0002	0.004	0.004		0.56	20.0	
ASSINEAU R NR MOUTH	00AL07BJ1500	14	10	92	3.00	L.0001	0.293	L.001	0.006	0.003	L.0001	0.003	0.003		0.49	16.5	
LSR AT BR NR L OUTF-C	00AL07BK2100	17	1	89											0.06	11.6	
LSR AT BR NR L OUTF-C	00AL07BK2100	6	2	89	0.04		0.005	0.001	0.004	L.002		L.002	L.001		0.1	10.9	22
LSR AT BR NR L OUTF-C	00AL07BK2100	21	2	89	0.065	L.0001	0.005	L.001	0.003	L.002	L.0001	L.002	0.004		0.12	10.8	
LSR AT BR NR L OUTF-C	00AL07BK2100	26	2	90	0.064	L.0001	0.004	0.002	0.005	L.002	L.0001	L.002	0.003		0.15	11.2	
LSR AT BR NR L OUTF-C	00AL07BK2100	15	8	90	0.087	L.0001	0.015	L.001	0.002	L.002	0.0001	L.002	L.001		0.48	10.4	
LSR AT BR NR L OUTF-C	00AL07BK2100	19	2	91	0.08	L.0001	0.011	L.001	0.003	0.005	0.0001	L.002	0.004		L.02	10.7	
LSR AT BR NR L OUTF-C	00AL07BK2100	29	5	91	0.19	L.0001	0.058	0.005	0.004	0.002	L.0001	L.002	0.007		0.63	9.3	
LSR AT BR NR L OUTF-C	00AL07BK2100	26	6	91	0.24	L.0001	0.021	L.001	0.003	L.002	0.0001	L.002	0.002		1.30	10.0	
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	0.51	L.0001	0.058	L.001	0.006	0.002	L.0001	0.002	0.011		1.06	10.1	
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	0.48	L.0001	0.054	L.001	L.001	0.004	L.0001	L.002	0.005		0.74	9.6	
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	0.47	L.0001	0.055	L.001	L.001	0.003	L.0001	L.002	0.005		3.71	9.5	
LSR AT BR NR L OUTF-C	00AL07BK2100	3	9	91	0.23	L.0001	0.044	L.001	0.003	0.004	0.0001	L.002	0.002			9.7	
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	0.73	L.0001	0.066	0.001	0.003	L.002	0.0001	0.002	0.004			9.0	
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	0.67	L.0001	0.063	0.002	0.004	0.002	L.0001	0.002	0.004			9.3	
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	0.64	L.0001	0.062	0.001	0.011	0.003	L.0001	L.002	0.003			8.9	
LSR AT BR NR L OUTF-C	00AL07BK2100	11	2	92	0.04	L.0001	0.010	L.001	0.003	L.002	L.0001	L.002	0.002	11.9		11.8	
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	1.00	L.0001	0.073	0.001	0.004	L.002	L.0001	0.002	0.003			10.9	
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	1.17	L.0001	0.085	0.001	0.004	0.009	0.0001	0.003	0.004			10.1	
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	0.86	L.0001	0.067	0.001	0.003	L.002	0.0001	L.002	0.003			10.4	
LSR AT BR NR L OUTF-C	00AL07BK2100	10	6	92	2.16	L.0001	0.130	0.002	0.006	0.003	0.0001	0.005	0.011			10.0	
LSR AT BR NR L OUTF-C	00AL07BK2100	15	7	92	1.03	L.0001	0.198	0.001	0.005	0.004	L.0001	0.003	0.005			8.8	
LSR AT BR NR L OUTF-C	00AL07BK2100	13	8	92	0.06	L.0001	0.024	L.001	0.002	L.002	L.0001	L.002	0.001		0.07	9.6	
LSR AT BR NR L OUTF-C	00AL07BK2100	16	9	92	0.47	L.0001	0.035	L.001	L.001	L.002	0.0001	L.002	0.002		L.02	9.7	
LSR AT BR NR L OUTF-C	00AL07BK2100	14	10	92	0.28	L.0001	0.032	L.001	0.004	L.002	L.0001	L.002	0.005		2.96	9.5	
LSR AT BR NR L OUTF-C	00AL07BK2100	23	2	93	0.05	L.0001	0.009	0.002	0.002	L.002	L.0001	L.002	L.001		0.17	10.5	24.00

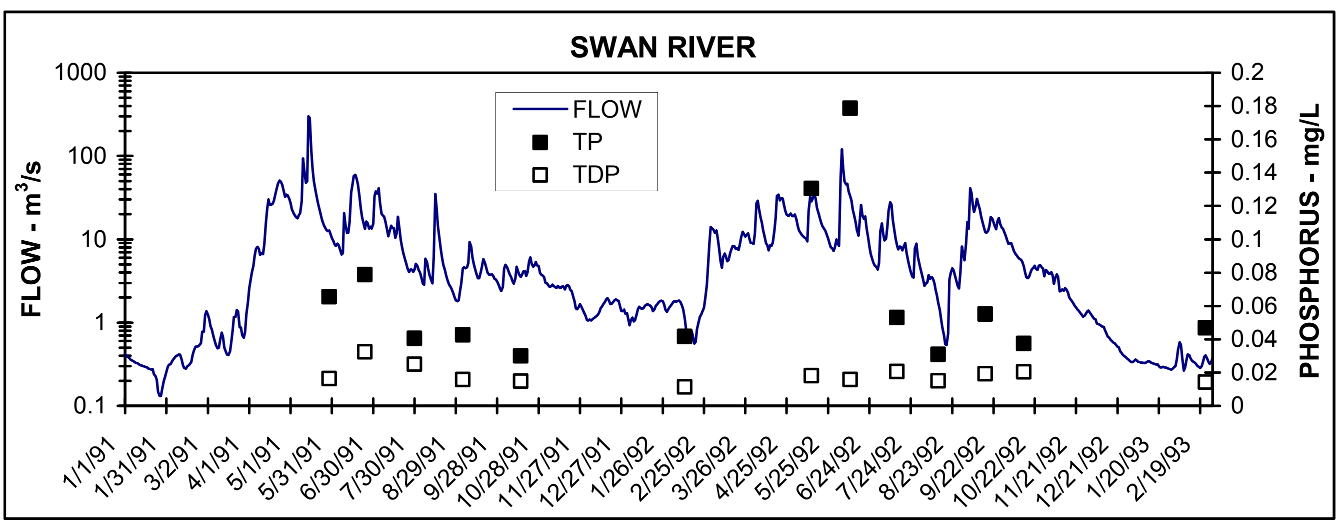
STATION	CODE	D	M	Y	BOD 5 DAY 082**L	COD TOTAL 083**L	OIL AND GREASE 065**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	STD PLT COUNT NO/DL 369**L	CHLORO PHYLLa MG/M3 067**L	ADSORB ORGAN HALID 95080L
SOUTH HEART RIVER:														
GROUARD CH @ BR - C	00AL07BF1500	14	8	90		56	0.19	0.01	1.31	30	L10.		3.4	0.0155
GROUARD CH @ BR - C	00AL07BF1500	29	5	91		79	L1.000	0.012	2.05	15	6		11.7	
GROUARD CH @ BR - C	00AL07BF1500	11	2	92			0.20	0.003	0.83	44	12		0.2	0.013
GROUARD CH @ BR - C	00AL07BF1500	14	10	92			L.1	0.005	1.30	160	36		13.5	
GROUARD CH @ BR - C	00AL07BF1500	23	2	93			0.13	0.014	2.13	39	L4.		0.7	0.019
GROUARD CH@BR X-CH -COMP	00AL07BF1520	25	6	91			L1.000	0.013	2.27	39	8		3.3	0.021
GROUARD CH@BR X-CH -COMP	00AL07BF1520	31	7	91			0.23	0.012	1.06	92	6		2.4	0.008
GROUARD CH@BR X-CH -COMP	00AL07BF1520	3	9	91			L.05	0.007	0.90	230	108		1.6	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	15	10	91			L0.1	0.008	0.56	84	8		12.5	0.009
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	5	92			0.40	0.007	1.00	9	L4.		10.3	0.018
GROUARD CH@BR X-CH -COMP	00AL07BF1520	10	6	92				0.009	1.18	570	24		4.0	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	14	7	92			0.38	0.010	1.24	450	57		2.8	0.008
GROUARD CH@BR X-CH -COMP	00AL07BF1520	13	8	92				0.006	1.03	180	8		1.5	
GROUARD CH@BR X-CH -COMP	00AL07BF1520	16	9	92			L.1	0.009	1.30	180	32		3.6	0.013
GROUARD CH@BR X-CH -COMP	00AL07BF1520	14	10	92										
NARROWS CK NR MOUTH	00AL07BG1000	15	8	90		99	L.05	0.014	2.29	140	10		3.5	
MARTEN CK AT HWY 88	00AL07BG1500	15	8	90		29	0.08	0.005	0.92	10	L10		2.1	
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91		35	L1.000	0.009	1.15	88	16		0.4	
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91		36	L1.000	0.009	1.20	60	24		0.5	
MARTEN CK AT HWY 88	00AL07BG1500	29	5	91		35	L1.000	0.009	1.16	141	12		0.5	
MARTEN CK AT HWY 88	00AL07BG1500	26	6	91			L1.000	0.006	2.61	57	12		0.4	
MARTEN CK AT HWY 88	00AL07BG1500	30	7	91			0.07	0.006	1.06	23	8		0.9	
MARTEN CK AT HWY 88	00AL07BG1500	3	9	91			0.11	0.010	2.16	140	140		3.8	
MARTEN CK AT HWY 88	00AL07BG1500	16	10	91			L.1	0.008	0.99	L4.	L4.		0.4	
MARTEN CK AT HWY 88	00AL07BG1500	11	2	92			L.1	0.002	0.68	52	L4.		L0.1	
MARTEN CK AT HWY 88	00AL07BG1500	13	5	92			0.53	0.009	2.15	72	L4.		1.1	
MARTEN CK AT HWY 88	00AL07BG1500	10	6	92		57		0.011	2.47	70	L4.		2.3	
MARTEN CK AT HWY 88	00AL07BG1500	15	7	92			0.35	0.011	2.63	72	39		0.6	
MARTEN CK AT HWY 88	00AL07BG1500	13	8	92				0.006	1.80	63	4		1.4	
MARTEN CK AT HWY 88	00AL07BG1500	16	9	92			0.31	0.008	2.78	60	12		0.5	
MARTEN CK AT HWY 88	00AL07BG1500	14	10	92			L.1	0.006	1.91	88	L4.		0.5	
DRIFTPILE R AT HWY 2	00AL07BH1000	14	8	90		36	0.1	0.006	1.03	300	30		2.6	0.004
DRIFTPILE R AT HWY 2	00AL07BH1000	29	5	91		49	L1.000	0.011	1.63	114	L4.		1.5	0.013
DRIFTPILE R AT HWY 2	00AL07BH1000	24	6	91			L1.000	0.013	3.03	380	56		0.4	
DRIFTPILE R AT HWY 2	00AL07BH1000	31	7	91			0.11	0.008	1.10	68	8		2.8	0.010
DRIFTPILE R AT HWY 2	00AL07BH1000	3	9	91			L.05	0.004	0.75	28	15		4.4	
DRIFTPILE R AT HWY 2	00AL07BH1000	15	10	91			L.1	0.006	0.64	12	8		0.6	0.004
DRIFTPILE R AT HWY 2	00AL07BH1000	11	2	92			L.1	0.002	0.41	12	L4.		L0.1	0.007
DRIFTPILE R AT HWY 2	00AL07BH1000	13	5	92			0.22	0.012	2.83	290	200		3.0	0.018
DRIFTPILE R AT HWY 2	00AL07BH1000	10	7	92				0.010	2.59	90	56		1.4	
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92			0.82	0.014	4.08	120	36		0.5	0.020
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92			0.65	0.016	3.95	54	27		0.4	0.017
DRIFTPILE R AT HWY 2	00AL07BH1000	14	7	92			0.25	0.014	4.11	130	12		0.4	0.017
DRIFTPILE R AT HWY 2	00AL07BH1000	13	8	92				0.003	1.18	30	8		2.3	
DRIFTPILE R AT HWY 2	00AL07BH1000	16	9	92			L.1	0.009	3.01	190	20		0.5	
DRIFTPILE R AT HWY 2	00AL07BH1000	14	10	92			0.11	0.008	1.71	56	8		0.2	0.010
DRIFTPILE RIVER NR MOUTH	00AL07BH1200	3	9	91						16	16			
SWAN R AT HWY 2	00AL07BJ1000	14	8	90		25	0.2	0.005	0.8	100	20		3.8	0.004
SWAN R AT HWY 2	00AL07BJ1000	29	5	91		38	L1.000	0.006	0.99	230	48		2.1	0.011
SWAN R AT HWY 2	00AL07BJ1000	24	6	91			L1.000	0.007	1.65	440	20		1.0	
SWAN R AT HWY 2	00AL07BJ1000	30	7	91			L.05	0.005	0.80	96	68		2.3	0.005
SWAN R AT HWY 2	00AL07BJ1000	3	9	91			L.05	0.003	0.78	200	200		3.2	
SWAN R AT HWY 2	00AL07BJ1000	15	10	91			L.1	0.005	0.65	124	60		0.6	0.007
SWAN R AT HWY 2	00AL07BJ1000	11	2	92			0.10	0.001	0.40	44	8		0.1	0.011
SWAN R AT HWY 2	00AL07BJ1000	13	5	92			0.12	0.009	1.85	102	93		2.9	0.011
SWAN R AT HWY 2	00AL07BJ1000	10	6	92				0.009	2.32	150	60		1.4	
SWAN R AT HWY 2	00AL07BJ1000	14	7	92			0.42	0.009	1.68	110	72		0.7	0.010

STATION	CODE	D	M	Y	BOD 5 DAY 082**L	COD TOTAL 083**L	OIL AND GREASE 065**L	PHENOL 065**L	TANNIN AND LIGNIN 065**L	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	STD PLT COUNT NO/DL 369**L	CHLORO PHYLLa MG/M3 067**L	ADSORB ORGAN HALID 95080L
SWAN R AT HWY 2	00AL07BJ1000	13	8	92				0.002	0.90	75	32		3.6	
SWAN R AT HWY 2	00AL07BJ1000	16	9	92			0.21	0.005	1.98	81	24		0.7	
SWAN R AT HWY 2	00AL07BJ1000	16	9	92			L.1	0.007	2.04	190	21		0.7	
SWAN R AT HWY 2	00AL07BJ1000	16	9	92			L.1	0.006	2.00	40	6		0.7	
SWAN R AT HWY 2	00AL07BJ1000	14	10	92			L.1	0.004	0.97	100	56		0.6	0.009
SWAN R AT HWY 2	00AL07BJ1000	23	2	93			L.1	0.004	0.76	16	4		L0.1	0.006
SWAN RIVER NR MOUTH	00AL07BJ1200	30	7	91						104	60			
ASSINEAU R NR MOUTH	00AL07BJ1500	14	8	90		34	0.09	0.007	1.12	250	160		2.6	
ASSINEAU R NR MOUTH	00AL07BJ1500	29	5	91		48	L1.000	0.008	1.11	72	12			
ASSINEAU R NR MOUTH	00AL07BJ1500	24	6	91			L1.000	0.010	1.79	68	16		0.5	
ASSINEAU R NR MOUTH	00AL07BJ1500	30	7	91			L.05	0.006	0.74	31	12		1.5	
ASSINEAU R NR MOUTH	00AL07BJ1500	3	9	91			L.05	0.004	0.82	60	46		3.8	
ASSINEAU R NR MOUTH	00AL07BJ1500	16	10	91			L.1	0.009	0.77	57	9		0.3	
ASSINEAU R NR MOUTH	00AL07BJ1500	11	2	92			0.20	0.004	0.65	8	L4.		0.7	
ASSINEAU R NR MOUTH	00AL07BJ1500	13	5	92			0.47	0.009	2.25	190	104		2.4	
ASSINEAU R NR MOUTH	00AL07BJ1500	10	6	92				0.009	2.04	240	220		2.7	
ASSINEAU R NR MOUTH	00AL07BJ1500	14	7	92			0.39	0.006	0.93	100	72		1.5	
ASSINEAU R NR MOUTH	00AL07BJ1500	13	8	92				0.003	1.11	110			2.1	
ASSINEAU R NR MOUTH	00AL07BJ1500	16	9	92			0.22	0.006	1.93	120	20		1.1	
ASSINEAU R NR MOUTH	00AL07BJ1500	14	10	92			L.1	0.007	1.38	84	8		0.6	
LSR AT BR NR L OUTF-C	00AL07BK2100	17	1	89	1	26	0.07	0.005	0.42	L1.000	L1.000	L1.000	1	
LSR AT BR NR L OUTF-C	00AL07BK2100	6	2	89	0	30	0.19	0.005	0.33	L1.000	L1.000	100		
LSR AT BR NR L OUTF-C	00AL07BK2100	21	2	89	0.4	28	0.23	0.005	0.32	10	L1.000	L1.000	0.5	
LSR AT BR NR L OUTF-C	00AL07BK2100	26	2	90	0.6	22		0.004	0.52	L4.	L4.		1.4	
LSR AT BR NR L OUTF-C	00AL07BK2100	15	8	90	1.2	25	0.17	0.003	0.26	10	L10.		4.2	0.003
LSR AT BR NR L OUTF-C	00AL07BK2100	19	2	91	0.5			0.002	0.29	L4.	L4.		1.7	0.026
LSR AT BR NR L OUTF-C	00AL07BK2100	29	5	91	2.4	36	L1.000	0.006	0.36	4	L4.		4.3	0.021
LSR AT BR NR L OUTF-C	00AL07BK2100	26	6	91	1.2	29	L1.000	0.004	0.37	8	L4.		1.6	0.006
LSR AT BR NR L OUTF-C	00AL07BK2100	26	6	91										0.011
LSR AT BR NR L OUTF-C	00AL07BK2100	26	6	91										0.021
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91	1.5	29	0.24	0.006	0.24		4		6.4	0.011
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91			L.05	0.006	0.25	16	4		5.4	0.008
LSR AT BR NR L OUTF-C	00AL07BK2100	30	7	91			L.05	0.006	0.22	8	8		5.6	0.007
LSR AT BR NR L OUTF-C	00AL07BK2100	3	9	91	3.5	35	L.05	0.003	0.28	5900	4		13.8	
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	1.9	32	L.1	0.005	0.25	66	48		27.5	0.011
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	1.8	30	L.1	0.005	0.25	64	16		29.8	0.005
LSR AT BR NR L OUTF-C	00AL07BK2100	16	10	91	2.4	31	L.1	0.005	0.23	32	16		27.5	0.006
LSR AT BR NR L OUTF-C	00AL07BK2100	11	2	92	0.3		L.1	0.002	0.30	L4.	L4.		0.3	0.008
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92	1.9	28	0.70	0.004	0.27	36	6		9.1	0.008
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92			0.75	0.004	0.33	36	4		9.2	0.014
LSR AT BR NR L OUTF-C	00AL07BK2100	13	5	92			0.20	0.004	0.29	57	4		8.8	0.011
LSR AT BR NR L OUTF-C	00AL07BK2100	10	6	92	2.3	38	0.72	0.005	0.30	120	48		7.1	0.006
LSR AT BR NR L OUTF-C	00AL07BK2100	15	7	92	2.0	24	0.80	0.005	0.38	48	16		8.8	0.009
LSR AT BR NR L OUTF-C	00AL07BK2100	13	8	92	2.4	26		0.003	0.28		L4.		26.5	
LSR AT BR NR L OUTF-C	00AL07BK2100	16	9	92	2.7	28	0.10	0.005	0.29	39	24		22.2	
LSR AT BR NR L OUTF-C	00AL07BK2100	14	10	92	2.0	27	L.1	0.003	0.25	64	36		22.2	0.006
LSR AT BR NR L OUTF-C	00AL07BK2100	23	2	93	1.3		L.1	0.005	0.21	4	L4.		1.8	0.005

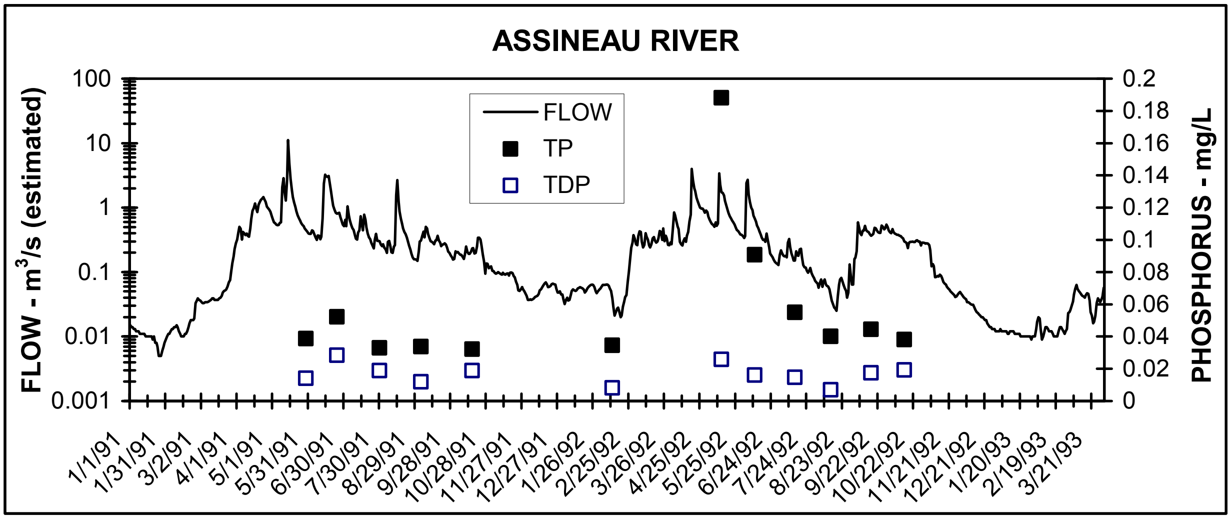
Appendix D-1. Tributary hydrographs and phosphorus concentrations.

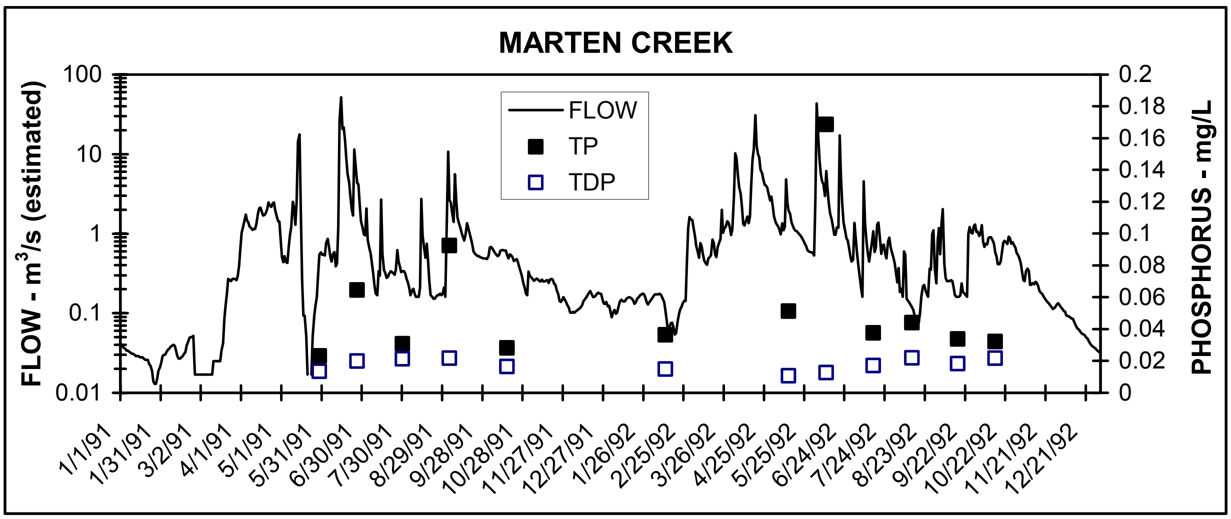


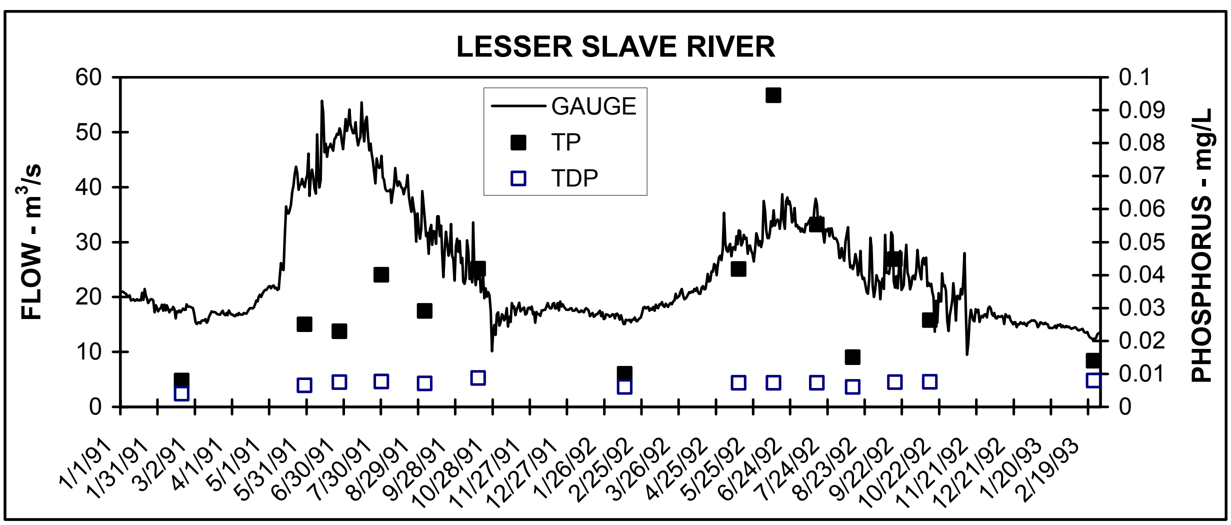




Appendix D-1. Continued.





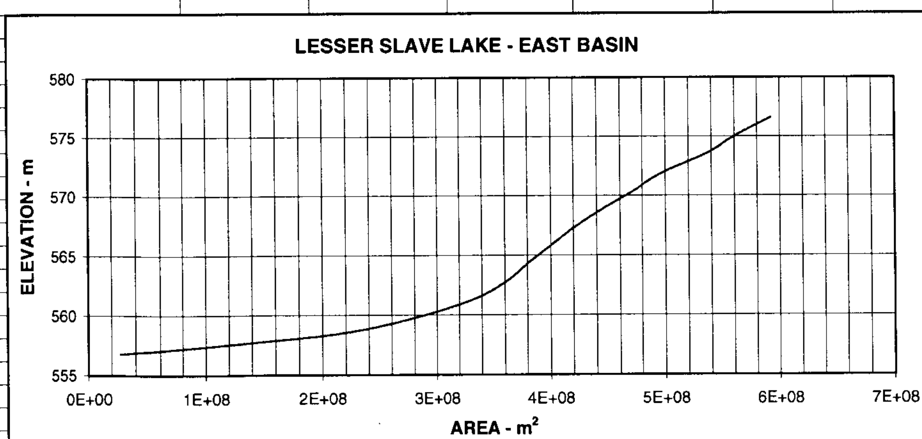


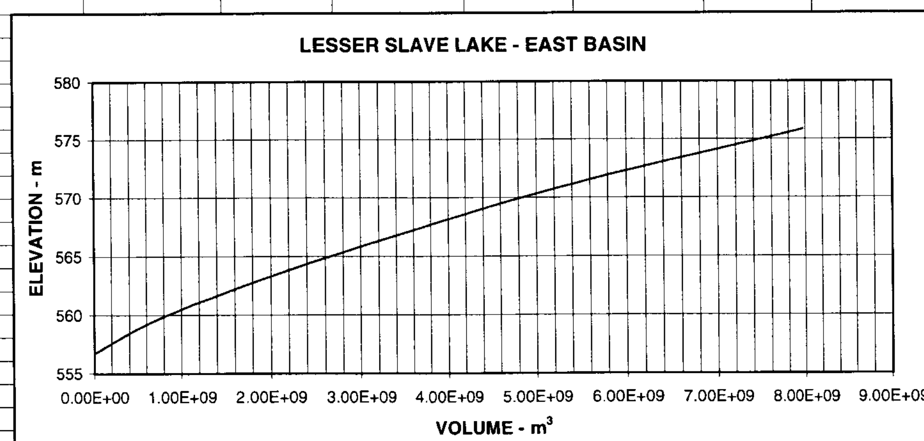
Appendix D-2. Lesser Slave Lake morphometry - basin breakdown.

Planimetry from area-capacity sheet of M.Kaiser, Oct 1972. Whole-lake metric areas and volumes from sheet of Nov 1988.

Excludes Buffalo Bay. L. Noton, 1 Nov 1995.

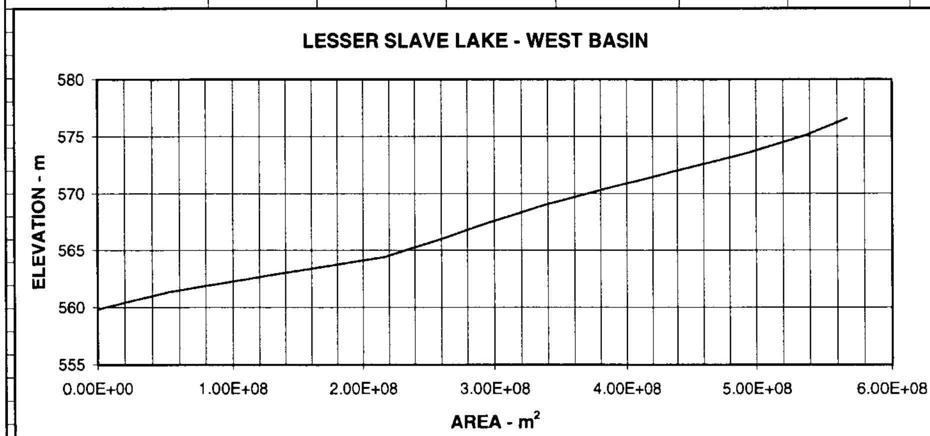
Depth-ft	WL		5		10		15		20		25		30	
Elevation-m	576.61		575.09		573.56		572.04		570.51		568.99		567.47	
Planim rdg 1 (East)	228.8		216.85		206.95		192.95		183		172.63		163.15	
Planim rdg 2 (West)	218.95		207.05		190.34		169.9		148.95		130.05		114.4	
Area-m2 (whole)	1159708320		1097934912		1029012888		939810528		859777056		783965414		718876704	
Area-m2 (East)	592610304		561658848		536017058.5		499755936		473984640		447125510		422571552	
Area-m2 (West)	567098016		536276064		492995829.5		440054592		385792416		336839904		296305152	
Vol of Disc-m3 (whole)		1720263058		1620676671		1500190169		1371237047		1252487288		1145125032		1050354158
Vol of Disc-m3 (East)		879521862.9		836399339		789230995.1		741963972.1		701861012.3		662685630.3		628088932.5
Vol of Disc-m3 (West)		840741195.1		784277332		710959173.9		629273074.9		550626275.7		482439401.7		422265225.5
Mid-disc Elevation-m		575.85		574.325		572.8		571.275		569.75		568.23		566.705
Cumulative Vol-m3 (East)		7970897542		7091375679		6254976340		5465745345		4723781373		4021920361		3359234730
Cumulative Vol-m3 (West)		5229666797		4388925602		3604648270		2893689096		2264416021		1713789745		1231350344
Cumulative Vol-m3 (whole)		13200564339		11480301281		9859624610		8359434441		6988197394		5735710106		4590585074
Note: non-significant digits retained.														
VALUES FOR GRAPHS:														
Area-m2 (East)	592610304	561658848	536017058.5	499755936	473984640	447125510.2	422571552	401721408.1	381907296	362481696	333602304	282396422	203450784	27454848
Elevation-m	576.61	575.09	573.56	572.04	570.51	568.99	567.47	565.94	564.42	562.89	561.37	559.85	558.32	556.8
Volume -m3 (East)	7970897542	7091375679	6254976340	5465745345	4723781373	4021920361	3359234730	2731145798	2134041928	1566837657	1036440483	567066121	196863695	20919851
Elevation-m	575.85	574.325	572.8	571.275	569.75	568.23	566.705	565.18	563.655	562.13	560.61	559.085	557.56	556.8
Area-m2 (West)	567098016	536276064	492995829.5	440054592	385792416	336839903.8	296305152	257868364.9	216530688	132612096	52837632	0	0	0
Elevation-m	576.61	575.09	573.56	572.04	570.51	568.99	567.47	565.94	564.42	562.89	561.37	559.85	558.32	556.8
Volume-m3 (West)	5229666797	4388925602	3604648270	2893689096	2264416021	1713789745	1231350344	809085118	447605876	181568520.9	40260845.9	0	0	0
Elevation-m	575.85	574.325	572.8	571.275	569.75	568.23	566.705	565.18	563.655	562.13	560.61	559.085	557.56	556.8

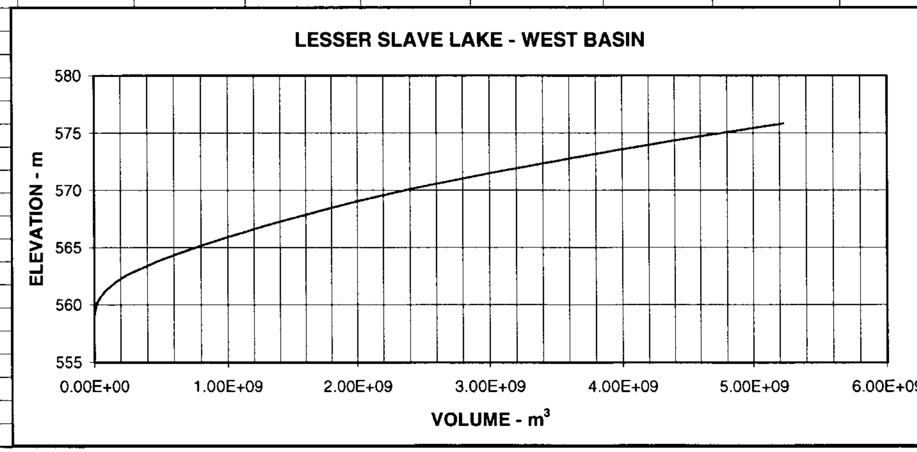




Appendix D-2. Continued.

Depth-ft	35		40		45		50		55		60		65	
Elevation-m	565.94		564.42		562.89		561.37		559.85		558.32		556.8	
Planim rdg 1 (East)	155.1		147.45		139.95		128.8		109.03		78.55		10.6	
Planim rdg 2 (West)	99.56		83.6		51.2		20.4		0					
Area-m2 (whole)	659589773		598437984		495093792		386439936		282396422		203450784		27454848	
Area-m2 (East)	401721408		381907296		362481696		333602304		282396422		203450784		27454848	
Area-m2 (West)	257868365		216530688		132612096		52837632		0		0		0	
Vol of Disc-m3 (whole)		958583112		833241626		671704849		509635208		370202426		175943844		20919851
Vol of Disc-m3 (East)		597103869.7		567204271.2		530397174		469374362		370202426		175943844		20919851
Vol of Disc-m3 (West)		361479242.3		266037354.8		141307675		40260845.9						
Mid-disc Elevation-m		565.18		563.655		562.13		560.61		559.085		557.56		556.8
Cumulative Vol-m3 (East)		2731145798		2134041928		1566837657		1036440483		567066121		196863695		20919851
Cumulative Vol-m3 (West)		809085118		447605875.7		181568520.9		40260845.9		0		0		0
Cumulative Vol-m3 (whole)		3540230916		2581647804		1748406178		1076701329		567066121		196863695		20919851





Appendix D-3. Summer internal phosphorus release

A - WEST BASIN

Water Surface Assumed - 576.6 m

	Z - m	STRATA Elevation	STRATA Volume - m3	Minimum - 16 June 92 TP - mg/L	Minimum - 16 June 92 TP - kg	Maximum - 3 Sept 92 TP - mg/L	Maximum - 3 Sept 92 TP - kg
1992	0.1	576.6-576	336029405	0.0149	5006.838135	0.0496	16667.05849
	2	576-573.6	1295000000	0.0189	24475.5	0.0551	71354.5
	4	573.6-571.6	960000000	0.0173	16608	0.0532	51072
	6	571.6-569.6	840000000	0.0158	13272	0.0493	41412
	8	569.6-567.6	660000000	0.0186	12276	0.0415	27390
	10	567.6-565.6	620000000	0.0178	11036	0.0387	23994
	12	565.6-560	550000000	0.0212	11660	0.0379	20845
		TOTALS:	**5261029405**		**94334.33813**		**252734.5585**
					1992 Mass Increase =		**158400.2204**

	Z - m	STRATA Elevation	STRATA Volume - m3	Minimum - 7June 93 TP - mg/L	Minimum - 7June 93 TP - kg	Maximum - 20 Sept 93 TP - mg/L	Maximum - 20 Sept 93 TP - kg
1993	0.1	576.6-576	336029405	0.0186	6250.146933	0.0646	21707
	2	576-573.6	1295000000	0.0239	30950.5	0.0721	93370
	4	573.6-571.6	960000000	0.0205	19680	0.0470	45120
	6	571.6-569.6	840000000	0.0223	18732	0.0465	39060
	8	569.6-567.6	660000000	0.0210	13860	0.0345	22770
	10	567.6-565.6	620000000	0.0232	14384	0.0352	21824
	12	565.6-560	550000000	0.0299	16445	0.0343	18865
		TOTALS:	**5261029405**		**120301.6469**		**262715.9996**
					1993 Mass Increase =		**142414.3526**

Estimated External Inputs:

1992 - 16 June to 3 Sept		TP - kg
S Heart	1/2 of June	2232
	July	1498.7
	Aug	591.3
	1/10 of Sept	387
Driftpile	1/2 of June	405
	July	630.1
	Aug	275.1
	1/10 of Sept	135
Local inflow	24406	2441
in dam^3. FWMean TP 0.1		
outflow to E basin:		
negligible in this period due to evap		
Precip	@ 8.66 mg/m^2	
West area = 567 km^2		4910
NET EXT INPUT-kg =		**13505.2**

1993 - 7 June to 20 Sept		TP - kg
S Heart	3/4 of June	8127
	July	11846.7
	Aug	4130.6
	2/3 of Sept	999.6
Driftpile	3/4 of June	2147
	July	3074.4
	Aug	1515.5
	2/3 of Sept	436
Local inflow	113266	11326.6
in dam^3. FWMean TP 0.1		
Precip	@ 8.66 mg/m^3	4910
East area = 567 km^3		
Total:		48513
Outflow to E basin: 94688 dam^3		
at .06 mg/L		5681
NET EXT INPUT-kg =		**42832**

1993 West to East Net Flow: 7 June to 20 Sept		hm^3
S Heart	3/4 of June	72.6
	August	104.117
	Sep	38.466
	2/3 of Sept	11.85
Driftpile	3/4 of June	26.76
	August	37.596
	Sep	18.533
	2/3 of Sept	5.33
Local W		113.266
Total inflow		428.518
Net precip-evap, W basin		
= -.0512 m, x west area		-29.035418
Storage (an incr):		-304.795
NET FLOW, hm^3:		94.687582

INTERNAL P RELEASE (mass increase minus net external input)

	1992		1993
	144895 kg		**99582 kg**
rate =	**3.2 mg/m^2/d**	**rate =**	**1.7 mg/m^2/d**

Appendix D-3. Continued.

B - EAST BASIN

Water Surface Assumed - 576.6 m

	Z - m	STRATA Elevation	STRATA Volume - m^3	Minimum -16 June 92 TP - mg/L	TP - kg	Maximum - 3 Sept 92 TP - mg/L	TP - kg
1992	0.1	576.6-576	351783091	0.0129	4538	0.0462	16252
	2	576-573.6	1287000000	0.0131	16860	0.0414	53282
	4	573.6-571.6	1040000000	0.0144	14976	0.0412	42848
	6	571.6-569.6	980000000	0.0134	13132	0.0383	37534
	8	569.6-567.6	910000000	0.0131	11921	0.0332	30212
	10	567.6-565.6	840000000	0.0133	11172	0.0322	27048
	12	565.6-563.6	780000000	0.0132	10296	0.0313	24414
	14	563.6-561.6	740000000	0.0133	9842	0.0269	19906
	16	561.6-559.6	640000000	0.0132	8448	0.0409	26176
	18	559.6-556.8	400000000	0.0180	7200	0.0215	8600
		TOTALS:	**7968783091**		**108384.7019**		**286272.179**
						1992 Mass Increase =	**177887.477**

	Z - m	STRATA Elevation	STRATA Volume - m^3	Minimum - 7 June 93 TP - mg/L	TP - kg	Maximum - 20 Sept 93 TP - mg/L	TP - kg
1993	0.1	576.6-576	351783091	0.0160	5629	0.0264	9287
	2	576-573.6	1287000000	0.0168	21622	0.0261	33591
	4	573.6-571.6	1040000000	0.0184	19136	0.0272	28288
	6	571.6-569.6	980000000	0.0175	17150	0.0281	27538
	8	569.6-567.6	910000000	0.0171	15561	0.0245	22295
	10	567.6-565.6	840000000	0.0170	14280	0.0279	23436
	12	565.6-563.6	780000000	0.0173	13494	0.0262	20436
	14	563.6-561.6	740000000	0.0180	13320	0.0322	23828
	16	561.6-559.6	640000000	0.0161	10304	0.0269	17216
	18	559.6-556.8	400000000	0.0194	7760	0.0255	10200
		TOTALS:	**7968783091**		**138255.1295**		**216114.774**
						1993 Mass Increase =	**77860**

Estimated External Inputs:

1992 - 16 June to 3 Sept:		TP - kg	1993 - 7 June to 20 Sept:		TP - kg
Swan	1/2 of June	3749	Swan	3/4 of June	8541
	July	2382.8		July	16075.3
	Aug	336.9		Aug	6433.8
	1/10 of Sept	561		2/3 of Sept	1147
Assineau	1/2 of June	86.8	Assineau	3/4 of June	422
	July	17.2		July	381.8
	Aug	6.2		Aug	160.7
	1/10 of Sept	12.5		2/3 of Sept	94
Marten	1/2 of June	635	Marten	3/4 of June	634
	July	138.8		July	391.4
	Aug	23.3		Aug	132.4
	1/10 of Sept	9.7		2/3 of Sept	26
Local inflow	13280.8896	1261.7	Local inflow	61634.9088	5855.3
in dam^3. FWMean TP .095			in dam^3. FWMean TP .095		
from W basin:			from W basin:94688 dam^3		
negligible in this period due to evap			at .06 mg/L		5681
Precip	@ 8.66 mg/m^2	5132	Precip	@ 8.66 mg/m^3	5133
East area = 592 km^2			East area = 592 km^3		
Total:		14353	Total:		51109
Outflow (LSR)	1/2 of June	1788	Outflow (LSR)	3/4 of June	1578
	July	3545		July	5006.3
	Aug	2513.8		Aug	5255.7
	1/10 of Sept	195		2/3 of Sept	3138
	Sum	8041.8		Sum	14978
NET EXT INPUT-kg:		**6311**	**NET EXT INPUT-kg:**		**36131**

1993 West to East Net Flow: 7 June to 20 Sept

		hm^3
S Heart	3/4 of June	72.6
	August	104.117
	Sep	38.466
	2/3 of Sept	11.85
Driftpile	3/4 of June	26.76
	August	37.596
	Sep	18.533
	2/3 of Sept	5.33
Local W		113.266
Total inflow		428.518
Net precip-evap, W basin =-.0512 m, x west area		-29.035418
Storage(an incr):		-304.795
	Net flow, hm^3:	94.687582

Note 1992 ext input is fairly small due to the low inflows but relatively high outflows, during the June-Sept period.

INTERNAL P RELEASE (mass increase minus net external input)

	1992	1993
	171576 kg	**41729 kg**
rate =	**3.6 $mg/m^2/d$**	**0.67 $mg/m^2/d$**

Appendix E-1. Buffalo Bay water quality data.

Results are mg/L unless noted. F = field measurement; L = lab analysis

STATION	CODE	D	M	Y	TEMP DEG.C 020**F	pH pH units 103**F	pH pH units 103**L	COND US/CM 020**F	COND US/CM 020**L	OXYGEN METER O2 081**F	OXYGEN WINKLR O2 08101L	TURB NTU 020**L	COLOUR TRUE REL UN 020**L	TDS CALCD 00205L	NON FILT RES 104**L
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	29	5	91	18.0	7.4	7.5	231	229	7.3				124	78
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	18	6	91	15.0		7.7		309			135.0	80	170	132
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	2	7	91	21.5		7.7		198			60.0	152	107	26
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	24	7	91	21.4		7.7		294			38.0	101	160	9
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	5	9	91	13.5		8.0		359			9.8	50	199	8
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	18	12	91	-0.2	7.5	7.6	405	466	3.9	4.14	9.7	48	263	6
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	21	1	92	-0.2	6.7	7.5	480	466	2.2	2.41		49	264	9
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	11	3	92	-0.2	7.7	7.3	262	259	5.0	5.09	15.6	78	140	13
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	15	4	92	8.3	7.8	7.6	224	243	11.2	11.23	56.0	62	130	52
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	22	4	92	10.0		7.8		292			41.0	67	163	38
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	29	4	92	12.0		7.6		271			46.0	70	147	43
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	16	6	92			8.1		310			19.0	75	172	8
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	4	8	92	26.0		8.3		375			8.8	58	213	5
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	2	9	92	13.0		8.0		347			14.4	55	193	10
BUFFALO BAY OUTFLOW	00AL07BF1550	29	5	91	20.9	7.5	7.5	246	239	8.3				131	85
BUFFALO BAY OUTFLOW	00AL07BF1550	18	6	91	16.0		8.0		378			118.0	63	214	78
BUFFALO BAY OUTFLOW	00AL07BF1550	2	7	91	26.0		7.9		204			47.0	142	109	11
BUFFALO BAY OUTFLOW	00AL07BF1550	24	7	91	21.0		7.8		262			14.2	112	138	5
BUFFALO BAY OUTFLOW	00AL07BF1550	5	9	91	14.0		8.2		241			16.5	67	133	17
BUFFALO BAY OUTFLOW	00AL07BF1550	18	12	91	0.0	7.2	7.6	517	576	1.6	2.61	13.2	50	333	21
BUFFALO BAY OUTFLOW	00AL07BF1550	21	1	92	0.0	6.5	7.5	521	505	1.1	1.39		48	281	4
BUFFALO BAY OUTFLOW	00AL07BF1550	11	3	92	-0.1	8.1	7.4	270	377	4.7	4.91	15.1	69	209	13
BUFFALO BAY OUTFLOW	00AL07BF1550	15	4	92	7.2	8.1	7.8	211	227	11.2	11.26	32.0	32	120	27
BUFFALO BAY OUTFLOW	00AL07BF1550	22	4	92	8.5		7.5		300			240.0	37	169	241
BUFFALO BAY OUTFLOW	00AL07BF1550	29	4	92	12.5		7.7		291			80.0	64	161	68
BUFFALO BAY OUTFLOW	00AL07BF1550	16	6	92	21.0		8.9		364			5.0	55	212	4
BUFFALO BAY OUTFLOW	00AL07BF1550	4	8	92	25.5		9.8		254			3.3	57	144	2
BUFFALO BAY OUTFLOW	00AL07BF1550	2	9	92	10.0		9.3		260			27.0	55	151	23

STATION	CODE	D	M	Y	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 106**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	N PARTIC 079**L	N TKN 070**L
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	29	5	91	80	96	6.0	3.2	27.0	7	98		2.0	30.0	0.09	9.1	0.26	1.17
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	18	6	91	106	131	12.0	2.5	36.0	10	129		2.0	44.0	0.09	8.0	0.49	1.15
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	2	7	91	78	86	6.0	2.1	26.0	5	95		2.0	19.0	0.08	9.1	0.16	1.02
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	24	7	91	122	134	9.0	2.9	37.0	10	148		1.1	27.0	0.12	9.6	0.17	1.40
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	5	9	91	150	170	10.0	3.2	45.0	14	183		2.0	35.0	0.14	1.0		0.98
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	18	12	91	206	226	14.0	3.8	61.0	18	252		4.0	38.0	0.15	4.9		1.36
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	21	1	92	207	233	14.0	4.3	62.0	19	252		4.0	36.0	0.16	7.2		1.48
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	11	3	92	96	112	7.0	6.8	30.0	9	117		4.1	23.0	0.09	5.2		1.28
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	15	4	92	88	100	10.0	3.4	27.0	8	107		2.7	27.0	0.08	4.3		1.07
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	22	4	92	107	129	13.0	3.3	35.0	10	130		3.5	34.0	0.10	3.3		1.06
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	29	4	92	103	117	10.0	3.1	32.0	9	126		1.8	29.0	0.09	4.7		1.03
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	16	6	92	126	148	9.0	3.3	41.0	11	154		1.3	31.0	0.12	4.6		1.02
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	4	8	92	157	170	13.0	6.6	40.0	17	190	L1.	1.9	39.0	0.16	3.5		1.66
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	2	9	92	150	164	10.0	4.4	41.0	15	183		1.5	31.0	0.15	3.5		1.88

STATION	CODE	D	M	Y	ALK TOTAL CaCO3 101**L	HARDNS TOTAL CaCO3 106**L	Na DISS 111**L	K DISS 191**L	Ca DISS 201**L	Mg DISS 121**L	HCO3 LAB CALCD 06202L	CO3 LAB CALCD 06302L	Cl DISS 172**L	SO4 DISS 163**L	F DISS 091**L	SILICA REACT SIO2 141**L	N PARTIC 079**L	N TKN 070**L
BUFFALO BAY OUTFLOW	00AL07BF1550	29	5	91	81	99	8.0	3.3	28.0	7	98		2.0	35.0	0.10	9.3	0.29	1.22
BUFFALO BAY OUTFLOW	00AL07BF1550	18	6	91	114	166	13.0	3.6	45.0	13	139		4.0	67.0	0.11	7.3	0.45	1.10
BUFFALO BAY OUTFLOW	00AL07BF1550	2	7	91	79	90	6.0	2.0	26.0	6	97		2.0	19.0	0.08	8.9	0.17	1.03
BUFFALO BAY OUTFLOW	00AL07BF1550	24	7	91	126	120	9.0	1.8	35.0	8	153		L 0.5	8.0	0.11	14.2	0.04	0.70
BUFFALO BAY OUTFLOW	00AL07BF1550	5	9	91	85	102	12.0	2.3	26.0	9	104		2.0	31.0	0.14	1.5		1.25
BUFFALO BAY OUTFLOW	00AL07BF1550	18	12	91	250	276	20.0	4.2	76.0	21	304		5.0	56.0	0.17	6.1		1.45
BUFFALO BAY OUTFLOW	00AL07BF1550	21	1	92	221	214	16.0	4.2	66.0	12	270		4.0	45.0	0.16	7.4		1.43
BUFFALO BAY OUTFLOW	00AL07BF1550	11	3	92	125	153	16.0	7.3	40.0	13	152		10.7	44.0	0.10	6.3		1.85
BUFFALO BAY OUTFLOW	00AL07BF1550	15	4	92	82	90	7.0	3.1	26.0	6	100		2.0	26.0	0.09	2.6		0.82
BUFFALO BAY OUTFLOW	00AL07BF1550	22	4	92	101	134	9.0	4.2	37.0	10	123		2.4	45.0	0.10	4.9		1.45
BUFFALO BAY OUTFLOW	00AL07BF1550	29	4	92	106	136	8.0	3.3	38.0	10	129		1.5	37.0	0.10	4.9		1.10
BUFFALO BAY OUTFLOW	00AL07BF1550	16	6	92	125	168	12.0	3.9	44.0	14	143	9	1.7	62.0	0.13	1.4		1.06
BUFFALO BAY OUTFLOW	00AL07BF1550	4	8	92	85	99	14.0	4.1	20.0	12	76	27	1.2	42.0	0.15	2.2		1.34
BUFFALO BAY OUTFLOW	00AL07BF1550	2	9	92	98	115	11.0	3.7	23.0	14	89	15	1.3	39.0	0.14	1.0		1.58

STATION	CODE	D	M	Y	N DISS NH3 075**L	N DISS NO2 NO3 071**L	N DISS NO2 072**L	P TOTAL 154**L	P TOTAL 154**L	P DISS 151**L	P DISS 151**L	Fe EXT 263**L	CARBON PARTIC TOTAL 06905L	CARBON DISS ORG 061**L	COLI TOTAL NO/DL 360**L	COLI FECAL NO/DL 360**L	CHLORO PHYLLa MG/M3 067**L
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	29	5	91	0.031	0.039	0.004	0.163	0.0936	0.029	0.0270	1.80	1.81	26.4	40	20	8.0
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	18	6	91	0.027	0.047	0.005	0.207	0.1902	0.028	0.0379	3.61	0.49	21.6		264	9.2
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	2	7	91	0.028	0.031	0.008	0.109	0.1086	0.033	0.0453	2.19	1.01	27.5	30	8	4.8
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	24	7	91	0.074	0.039	0.021	0.115	0.1117	0.015	0.0317	1.71	1.62	27.0		57	2.8
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	5	9	91	0.071	0.033	0.003	0.050	0.0531	0.024	0.0255	0.41		21.3	72	52	1.1
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	18	12	91	0.288	0.115	0.004	0.052		0.024	0.0262	0.88		26.4	15	4	0.8
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	21	1	92	0.250	0.202	0.003	0.112		0.057	0.0742	1.40		27.0	20	L4.	0.6
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	11	3	92	0.310	0.530	0.031	0.192		0.109	0.1316	2.00		18.2	48	L4.	1.6
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	15	4	92	0.100	<.001	0.001	0.134	0.1808	0.026	0.0283	1.65		18.3	8	4	23.7
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	22	4	92	0.007	<.001	0.002	0.121		0.025		1.46		20.9	12	4	21.7
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	29	4	92	0.006	<.001	0.002	0.110	0.1050	0.015	0.0198	1.42		22.8	4	4	11.3
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	16	6	92	0.038	0.012	0.003	0.079	0.0805	0.024	0.0239	1.04		21.9			4.1
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	4	8	92	0.230	0.083	0.019	0.083	0.0935	0.058	0.0598	0.33	0.64	25.1	30	20	3.5
SOUTH HEART RIVER u/s BUF BAY	00AL07BF1450	2	9	92	0.250	0.075	0.011	0.088	0.0975	0.032	0.0337	0.79	1.74	27.5	760	15	12.5
BUFFALO BAY OUTFLOW	00AL07BF1550	29	5	91	0.007	0.008	0.008	0.164	0.2060	0.026	0.0285	1.80	2.07	26.8	L4.	L4.	10.4
BUFFALO BAY OUTFLOW	00AL07BF1550	18	6	91	0.019	0.013	0.002	0.155	0.1454	0.022	0.0270	3.77	2.34	22.2	G40.	4	44.5
BUFFALO BAY OUTFLOW	00AL07BF1550	2	7	91	0.009	0.015	0.004	0.106	0.1353	0.029	0.0426	1.94	1.30	27.5	27	4	5.8
BUFFALO BAY OUTFLOW	00AL07BF1550	24	7	91	0.054	0.010	0.009	0.065		0.034	0.0380	2.09	0.07	21.7	68	4	1.9
BUFFALO BAY OUTFLOW	00AL07BF1550	5	9	91	0.102	0.007	0.002	0.085	0.0668	0.040	0.0410	0.60		24.4	290000	590	2.4
BUFFALO BAY OUTFLOW	00AL07BF1550	18	12	91	0.319	0.103	0.005	0.060		0.022	0.0242	1.13		29.0	970	52	10.6
BUFFALO BAY OUTFLOW	00AL07BF1550	21	1	92	0.280	0.204	0.003	0.094		0.048	0.0619	1.29		27.0	52	L4.	0.5
BUFFALO BAY OUTFLOW	00AL07BF1550	11	3	92	0.590	0.520	0.030	0.260		0.155	0.1761	2.02		19.9	1800	3	2.1
BUFFALO BAY OUTFLOW	00AL07BF1550	15	4	92	0.004	L.001	L.001	0.088	0.1135	0.017	0.0181	0.98		12.7	L4.	L4.	20.6
BUFFALO BAY OUTFLOW	00AL07BF1550	22	4	92	0.082	0.024	0.004	0.273		0.028		5.20		19.8	36	28	14.0
BUFFALO BAY OUTFLOW	00AL07BF1550	29	4	92	0.025	0.003	0.003	0.130	0.1779	0.031	0.0386	2.34		22.8	40	8	15.6
BUFFALO BAY OUTFLOW	00AL07BF1550	16	6	92	0.019	0.001	L.001	0.041	0.0421	0.015	0.0158	0.28		22.4			4.0
BUFFALO BAY OUTFLOW	00AL07BF1550	4	8	92	0.017	0.002	0.001	0.032	0.0355	0.021	0.0228	0.10	0.38	26.5	48	L4.	1.7
BUFFALO BAY OUTFLOW	00AL07BF1550	2	9	92	0.024	0.008	0.001	0.068	0.0682	0.021	0.0243	0.55	1.69	27.5	72	48	4.7