Errata sheet for Report: Water Quality in B.C. - Objectives Attainment in 1995

The following corrections are required for Bessette Creek:

page 75, in Table 12 under total chlorophenols in sediments, change the values at site E210219 in Harris Creek to be the same as at site E209072 and the conclusion to read "Objective met"

page 30, under Bessette Creek, third paragraph, omit from the list of objectives not met at times the statement "chlorophenols in sediments from Harris Creek" and add it to the list of objectives met.

WATER QUALITY SECTION

WATER MANAGEMENT BRANCH

MINISTRY OF ENVIRONMENT, LANDS AND PARKS

Water Quality in British Columbia

Objectives Attainment in 1995

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SUMMARY

The setting of water quality objectives in priority basins in British Columbia began in 1982. By the end of 1995, the Ministry had set water quality objectives in 43 bodies of water, both fresh and marine, throughout the Province. Annual monitoring to check the attainment of objectives started in 1987. This report presents the results of monitoring done in 1995 to check the attainment of objectives in 16 basins, a reduced program compared to previous years.

The results are summarized in a series of tables. For all Ministry Regions the objectives were met 83 percent of the time. This is slightly less than last year's 87 percent and also less than most previous years when attainment ranged from 94 percent in 1987 to 87 percent in 1993. There is not 100 percent compliance because objectives are set in areas where water quality problems may occur. Monitoring results therefore reflect the state of water quality in areas affected by human activity rather than in the Province as a whole.

Variables for which objectives were sometimes not met in three or more basins in 1995 included fecal coliforms, *E. coli*, suspended solids, chlorophyll-*a* (a measure of algal growth in lakes and streams), total phosphorus in lakes, and dissolved oxygen. The objective for dioxins and furans in fish to protect fish from chronic toxic effects was also not met at times in three basins, although the criterion for human consumption was always met and there is no restriction on eating fish from rivers and lakes.

The Ministry recently developed a water quality index to help interpret objectives attainment data. The index reduces the water quality information, as tabulated in this report, to a simple category or rank describing the state of water quality in a body of water. The index is applied to the 1995 data to rank some of the water bodies in this report. It was also applied to water bodies in 33 basins to produce the B.C. Water Quality Status Report. This report gives the public information on the suitability of specific bodies of water for a variety of uses, based on objectives monitoring from 1987 to 1993.

ACKNOWLEDGEMENTS

The regional staff of Environmental Protection carried out most of the monitoring, either directly or by using co-op students and contractors. Zenon Environmental Laboratories analyzed the samples for most variables except for microbiological indicators measured by J.R. Laboratories and biological communities measured by Fraser Environmental Services.

Information was also obtained from regional offices of B.C Environment, from the federal Department of Fisheries and Oceans, from RL & L Environmental Services on behalf of B.C. Hydro, from Hatfield Consultants Ltd., from Celgar Pulp Company, and from the Greater Vancouver Regional District.

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INTRODUCTION

In 1981, the Auditor General recommended that the Ministry develop a method of measuring its performance in safeguarding water quality. To fulfill this recommendation, the Ministry undertook to set water quality objectives for fresh and marine surface waters of British Columbia.

Water quality objectives are safe conditions or threshold levels of a substance which will protect the most sensitive water use of a specific body of water. They establish a reference against which the state of water quality at a specific site is checked, as recommended by the Auditor General. They are also used to prepare Waste Management Permits or Plans and to measure their effectiveness. They are thus a basic tool for use in maintaining a healthy aquatic environment.

We began work on water quality objectives in 1982. The Ministry has now published objectives on bodies of water in 43 areas or basins and updated them in one. In addition, objective-setting and updating is proceeding in a number of other basins. In each basin considered, we expected some type of water quality problem due to human activity. We set objectives for lakes, rivers, creeks, and marine areas covering all seven Environment Regions of the Ministry.

This report for 1995 is the tenth in a series of annual reports which began in 1986. Since 1987, the Ministry has been monitoring ambient water specifically to check the attainment of objectives. As a result, we have obtained an annual picture of how well objectives are being met since 1987. Each report is a condensation of monitoring data for use by managers of the water resource. It indicates where conditions are acceptable and provides a warning of where further evaluation may be needed to solve water quality problems. To keep this report to a reasonable length, we assume some reader familiarity with the detailed background reports on water quality objectives for each basin. Copies of these background reports may be obtained from the Water Management Branch of the Ministry in Victoria.

We usually choose the basins for setting water quality objectives on the basis of perceived water quality problems. Thus, results presented here indicate conditions in likely problem areas, but do not reflect the state of water quality in the Province as a whole. There are many bodies of water where water quality is relatively unaffected by humans and likely to remain so for the foreseeable future. Thus, reports in this series are a measure of the state of water quality in areas of British Columbia influenced by human activity.

To help the public and resource managers interpret the large amount of attainment data presented in this type of report, we recently developed a water quality index. This is a system of ranking which assigns a number and grade to a body of water to indicate its quality. The B.C. index is based on factors which measure the success of meeting water quality objectives. It thus compresses large quantities of data into a statement on the quality of water and its uses. A brochure describing this index is available from the Ministry as is a more detailed report explaining how to calculate the index from the monitoring data on objectives attainment.

The index has been applied in 33 water basins plus 5 groundwater aquifers in the Province to produce a B.C. Water Quality Status Report. This report, the first of its kind, is a user-friendly document intended to show the public how suitable the water is, in specific areas, for a variety of uses. The Status Report, which is based on objectives attainment data collected between 1987 and 1993, was released in July, 1996, and is available from the Ministry.

METHODS OF PRESENTING AND INTERPRETING THE DATA

Reports on Objectives

At the present time, the Ministry of Environment has completed 43 reports on water quality objectives. The complexity and size of the reports varies considerably, depending upon the body of water considered. These reports are distributed among the Environmental Regions of the Ministry as follows:

Vancouver Island	6
Skeena	5
Omineca-Peace	8
Cariboo	2
Southern Interior	11
Kootenay	3
Lower Mainland	8
Total	43

Work is in progress on a number of other water basins where objectives are either being set or updated.

Tables of Results

We have summarized the data collected in 1995 in Tables 2 to 17, with a separate table for each of the 16 water basins monitored. Because of funding limitations, fewer basins were monitored than in previous years.

In each table we list all the objectives that have been set, as they appear in the summary table of each report on objectives. We have updated a few of the objectives to reflect new water quality criteria and procedures. For example, we are now using chlorophyll-*a* instead of periphyton biomass and total ammonia-N instead of un-ionized ammonia-N. The 90th percentile of 400 MPN/100 mL for fecal coliform values is used when high fecal coliform values are recorded at bathing beaches. In some cases, such as Kitimat Arm, we have added some generalized water quality

criteria to allow for the fact that threats to water quality have changed or are better understood since publication of the objectives reports.

Five different concluding statements are used: objective met, objective not met, indefinite result, objective not checked, and omitted 1995. We consider the objective to have been met if the monitoring result equalled or was within the objective limit. We report the result as indefinite if there were insufficient data to check the objective, the data were suspect, or the minimum detectable concentration was too high. We report the objective as not checked if, for some reason, planned data collection did not take place. We report the objective as omitted if the plan was to not monitor because of low priority, taking into account past results. These tables are the most important part of this report since they summarize where, when, and by how much objectives were met in 1995.

Text

In the next section, the text presents the results of our 1995 quality assurance program to test the accuracy and precision of laboratory data. We then give a provincial overview of the monitoring results. Finally, we describe briefly the tabulated data for each body of water, by Region, mentioning the highlights and sometimes drawing some general conclusions. At this stage, we avoid qualifying statements such as: "...the objectives were nearly met, slightly exceeded or probably met..." . We consider them to be too speculative without the support of further evidence to explain them. Thus objectives not met by a wide margin are categorized equally with apparent borderline cases. Although a more detailed interpretation is desirable, this is not done here because it would require the presentation of much more data which is beyond the scope of this attainment report.

For the same reason, we do not attempt to explain what may have caused the results or to comment on the effect of objectives not being met. Such assessments would entail consideration of river flows, effluent discharges, whether objectives are long-term or short-term, the degree to which objectives are exceeded, quality assurance, and other factors.

In addition to a brief description of the tabulated data, we present the water quality index and rank for the bodies of water in each basin - when there are sufficient data to do so. The calculation of the index and rank for 1995 helps highlight those variables which had a detrimental effect on water quality in a particular water body.

The 1995 Attainment Report guides those involved in managing water quality by focusing on areas

of concern where further assessment or inspection may be needed. Since monitoring to check water quality objectives covers only a short time span, usually at most 30 days, we believe that any instance when objectives were not met could be significant and is worth a more detailed look. Further study could show whether objectives were not met because of natural phenomena or because there is a human cause to the problem.

Figures

A location map in Figure 1 shows the 43 basins where objectives have been set. Separate maps, Figures 2 to 17, illustrate the 16 water basins monitored in 1995 and show the sampling sites referred to in the tables. Each figure number corresponds to the table of the same number.

Guide to Ranking Future Monitoring

Due to limited funds, we cannot monitor all basins where objectives have been set each year. We have therefore proposed the following scheme to rank monitoring:

- **1st priority**: any basin with less than three years of complete monitoring or any basin the Ministry considers provincially or internationally significant. Examples of significant basins are the Fraser River due to fisheries, the Okanagan Valley lakes due to recreation, the lower Columbia River due to transboundary effects, and Burrard Inlet due to a federal-provincial plan.

- **2nd priority**: any basin in which, after at least three years monitoring, a number of objectives are not regularly attained and there is either a local expression of concern or a plan for short-term action.

- **3rd priority**: any basin as for the 2nd priority above, but where there is no known concern or plan of action.

- **4th priority**: any basin in which, after at least three years monitoring, most objectives are either being met or the situation is fairly well documented with no change in status expected in the short term.

QUALITY ASSURANCE PROGRAM

Introduction

This is the fifth year of our quality assurance program which describes the accuracy and precision of test results. Details on procedures and results are in a draft report available from the Water Management Branch (Quality Assurance / Quality Control for the 1995 Water Quality Objectives Program - December, 1995).

We present here results from testing 9 general variables plus 17 metals in water. In addition we tested 11 metals in marine sediments and 14 PAHs in river estuary sediments. We chose the variables based on important objectives most frequently exceeded as well as on availability of reference materials. For example, we could not include fecal coliforms due to the lack of standard references.

In an ideal situation one would aim to measure the accuracy and precision of the total monitoring process. This would include sample collection, handling in the field, shipping, storage, and laboratory analysis. In 1995, we measured the accuracy and precision of the laboratory analyses with some work on combined field plus laboratory precision. The results apply to the June to August operating period of the laboratory when most ambient sampling occurs.

Procedure

For general variables, we obtained standard reference solutions from an established laboratory which had certified the levels. Similar standard reference solutions were obtained for the metals. Marine sediments tested contained certified levels of metals and estuarine sediments tested were spiked with PAHs.

Where possible, we chose concentrations for these references that were usually close to the maximum criterion level to protect aquatic life for each substance. Results thus indicate the confidence one may have in laboratory data at levels where sensitive objectives are set. However, these levels were sometimes near or below laboratory detection limits and therefore could produce poor accuracy and precision.

We submitted all reference samples to the analyzing laboratory as if they were environmental samples. All variables were analyzed in their unfiltered or total state.

General variables in fresh water

The National Water Research Institute prepared 20 identical samples, each 500 mL, with certified values for 9 variables. These were pH, colour, specific conductance, turbidity, hardness, fluoride, ammonia, nitrate plus nitrite, and sulphate.

The samples were sent for analysis to Zenon Environmental Laboratories of Vancouver which was the laboratory generally used for objectives work. The samples were submitted five at a time in four separate batches between late June and early August for a total of 20 samples.

Metals in fresh water

The National Water Research Institute prepared 20 identical samples, each 100 mL, with certified values for elements and metals, 17 of which are reported on here. These are aluminum, arsenic, barium, calcium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, selenium, sodium, and zinc.

We submitted these samples to Zenon in four batches of five from June to August for a total of 20 samples.

Zenon analyzed for arsenic, cadmium, lead, and selenium using a low-level atomic absorption method. For the other metals, Zenon used a metals package with ICP emission spectroscopy which gives higher minimum detection levels then the low-level method.

Metals in marine sediments

The National Research Council (NRC) provided two reference sediment materials with certified metal concentrations. One was from the Gulf of St. Lawrence and one from Esquimalt Harbour. The Esquimalt Harbour sediment had generally much higher metal levels. The 11 elements of interest in each were arsenic, cadmium, cobalt, chromium, copper, lead, manganese, mercury, molybdenum, nickel, and zinc.

The freeze-dried sediment powders received from NRC were transferred to Zenon sample

containers. Samples were sent to Zenon, five at a time for each reference, in four batches between July and August. We submitted a total of 20 samples of each reference.

PAHs in estuarine sediments

The National Research Council (NRC) provided sediment collected from a Nova Scotia estuary and spiked with PAHs after processing. There were eight high molecular weight and five low molecular weight PAHs at given concentrations.

The reference values were not certified but represented the average of several measurements. We submitted a total of 20 samples to Zenon in four batches, each batch containing five samples.

Results

We calculated the accuracy and the precision of the laboratory measurements. The accuracy (also called bias or percent recovery) is a measure of how the analytical result differs from the true value. It is expressed as a percent by dividing the analytical result by the true concentration of the reference solution or material. The precision is a measure of the repeatability of the analysis. It is also expressed as a percent by dividing the standard deviation of the analytical results by their mean.

We present the mean result obtained by Zenon for all 20 samples submitted at a given value or concentration together with the equivalent reference concentration or value. We also show the average accuracy and precision of Zenon's results. We consider that acceptable limits for the average accuracy and precision are those provided for the reference material.

General variables in fresh water

pH

Zenon's mean pH was 7 compared to the reference pH of 7.15. Zenon's accuracy of 96% and its precision of 2.4% were both within acceptable limits.

Colour

Zenon's mean colour value was 5 TCU compared to the reference colour level of 6.9 TCU. Zenon's accuracy was 72% which is within acceptable limits. The precision was 0% since all Zenon's measurements were at the detection limit.

Specific conductance

Zenon's specific conductance value was 47 µS/cm compared to the reference level of 53.3 µS/cm. Zenon's accuracy was 89% and its precision was 5%. Although they were outside the acceptable range given for the reference, they were still within reasonable limits.

Turbidity

Zenon's mean turbidity was 0.18 NTU compared to the reference level of 0.19 NTU. The accuracy of 95% was high although the precision of 76% was not as good. However, the values were close to Zenon's minimum detection level of 0.1 NTU and below levels of environmental significance.

Hardness

Zenon's mean hardness value was 12 mg/L compared to the reference value of 21.27 mg/L. The accuracy of 58% was poor although the precision of 6.2% was reasonable.

Fluoride

The reference concentration for fluoride of 0.051 mg/L was below Zenon's minimum detection level of 0.1 mg/L We could therefore not calculate accuracy or precision, although all Zenon's values were reported correctly as below detection. The reference concentration was also below values considered toxic to aquatic life.

Ammonia nitrogen

Zenon's mean concentration was 0.043 mg/L compared to the reference value of 0.023 mg/L. As one would expect, Zenon's accuracy of 186% was outside the acceptable range although the precision of 27% was good. The reference concentration was low and below values considered toxic to aquatic life.

Nitrate + nitrite nitrogen

Zenon's mean concentration was 0.10 mg/L compared to the reference value of 0.085 mg/L. Zenon's accuracy of 118% and precision of 22% were reasonable, although these were very low concentrations for general water quality.

Sulphate

Zenon's mean concentration was 8.07 mg/L compared to the reference value of 8.38 mg/L. Zenon's accuracy of 96% was good but its precision of 57% was poor. The poor precision came from a batch of five samples giving a result below the detection level of 1 mg/L.

Metals and elements in fresh water

Aluminum

Zenon's mean concentration was 0.065 mg/L compared to the reference value of 0.067 mg/L. Zenon's accuracy of 103% was acceptable and the precision of 18% close to acceptable. Both improved once an outlier (0.11 mg/L) was removed from the data set. There were six results reported as below detection caused by Zenon's minimum detection level of 0.06 mg/L being close to the reference value.

Arsenic

Zenon's mean concentration was 0.0020 mg/L compared to the reference value of 0.0021 mg/L. Zenon's accuracy of 97% was good but its precision of 38% fell outside acceptable limits. One value out of the 20 results was below the detection level of 0.005 mg/L.

Barium

Zenon's mean concentration was 0.0071 mg/L compared to the reference value of 0.0086 mg/L. Zenon's accuracy of 83% and precision of 7.8% were within acceptable limits.

Calcium

Zenon's mean concentration was 3.59 mg/L compared to the reference value of 5.79 mg/L. Zenon's accuracy of 62% and precision of 6.1% were outside acceptable limits as one might expect with such low results, although the precision was reasonable. The results were also consistent with those obtained for hardness.

Cadmium

Zenon's mean concentration was 0.0009 mg/L compared to the reference value of 0.001 mg/L. Zenon's accuracy of 92% and precision of 22% were within acceptable limits. The reference concentration was relatively high, being about five times above levels considered toxic to aquatic life.

Chromium

Zenon's mean concentration was 0.0026 mg/L compared to the reference value of 0.0027 mg/L. Zenon's accuracy of 94% was well within acceptable limits and its precision of 27% was only slightly outside. There were eight results reported as below detection caused by Zenon's minimum detection level of 0.002 mg/L being close to the reference value.

Cobalt

Zenon's mean concentration of 0.0043 mg/L was equal to the reference value of 0.0043 mg/L. This result was due to Zenon's minimum detection level of 0.004 mg/L being virtually equal to the reference concentration. Fourteen of the 20 measurements were, in fact, reported as below detection.

Copper

Zenon's mean concentration was 0.033 mg/L compared to the reference value of 0.0355 mg/L. Zenon's accuracy of 94% was within acceptable limits while its precision of 15% was reasonable although outside the limits. Precision improved with removal of an outlier recorded at 0.053 mg/L. The copper levels involved were about ten times higher than the lowest levels considered toxic to aquatic life.

Iron

The reference concentration for iron of 0.0267 mg/L was below Zenon's minimum detection level of 0.05 mg/L We could therefore not calculate accuracy or precision, although all Zenon's values were reported correctly as below detection. The reference concentration was also below values considered toxic to aquatic life.

Lead

Zenon's mean concentration was 0.0067 mg/L compared to the reference value of 0.0048 mg/L. Zenon's accuracy of 138% was within acceptable limits while its precision of 29% was slightly outside. One measurement out of the 20 was below Zenon's minimum detection level of 0.003 mg/L.

Magnesium

Zenon's mean concentration was 0.82 mg/L compared to the reference value of 1.62 mg/L. Zenon's accuracy of 50% and precision of 7.9% were outside acceptable limits as one might expect with such low results, although the precision was reasonable. The results were also consistent with those obtained for calcium and hardness.

Manganese

Zenon's mean concentration was 0.0025 mg/L compared to the reference value of 0.0027 mg/L. Zenon's accuracy of 91% was within acceptable limits while its precision of 47% was outside the limits. Removal of an outlier (0.007 mg/L) improved the precision but reduced the accuracy somewhat. There were three results reported as below detection, caused by Zenon's minimum

detection level of 0.002 mg/L being close to the reference value. The reference concentration was well below values that could affect drinking water or aquatic life.

Molybdenum

The reference concentration for molybdenum of 0.0023 mg/L was below Zenon's minimum detection level of 0.004 mg/L We could therefore not calculate accuracy or precision, although three of Zenon's values out of 20 were reported as above detection (up to 0.009 mg/L). The reference concentration was also below values that could affect irrigation waters or aquatic life.

Nickel

The reference concentration for nickel of 0.0027 mg/L was below Zenon's minimum detection level of 0.01 mg/L We could therefore not calculate accuracy or precision, although all Zenon's values were reported correctly as below detection. The reference concentration was also below values considered toxic to aquatic life.

Selenium

Zenon's mean concentration was 0.0051 mg/L compared to the reference value of 0.0041 mg/L. Zenon's accuracy of 125% was within acceptable limits but the precision of 138% was well outside. Removal of an outlier (0.0347 mg/L) improved the precision to a reasonable level of 36% although it is still outside the acceptable range. Selenium levels above 0.001 mg/L may be toxic to aquatic life.

Sodium

Zenon's mean concentration was 1.8 mg/L compared to the reference value of 1.00 mg/L. Zenon's accuracy of 182% and precision of 18% were outside acceptable limits. Removal of an outlier (3.1 mg/L) improved accuracy only marginally but improved the precision to within the acceptable range.

Zinc

Zenon's mean concentration was 0.032 mg/L compared to the reference value of 0.022 mg/L. Zenon's accuracy of 145% and precision of 26% were outside acceptable limits. Removal of an outlier (0.06 mg/L) improved these results to only a limited extent. The concentrations involved were around the minimum values that are toxic to aquatic life.

Metals and elements in marine sediments

Arsenic

Zenon's mean concentrations were 18.6 µg/g and 85.6 µg/g compared to the reference values of 11.1

µg/g and 211 µg/g. Zenon's accuracy went from 168% at the low level to 41% at the high level. The precision went from 56% to 18%. In both cases, accuracy and precision were outside acceptable limits. There were 8 values out of 20 reported below detection at the lower concentration which was close to Zenon's minimum detection level of 10 µg/g. While the low level would not be toxic to aquatic life, the higher level would be toxic.

Cadmium

Zenon's mean concentration was 2.4 µg/g compared to the reference value of 2.38 µg/g. Zenon's accuracy of 99% and precision of 40% were good even though 5 of the 20 measurements were reported as below the minimum detection level of 1 µg/g. The reference concentration was at the low end of the scale for toxicity to aquatic life.

Cobalt

Zenon's mean concentrations were 10.3 µg/g and 11.7 µg/g compared to the reference values of 11.4 µg/g and 17.5 µg/g. Zenon's accuracy was 90% at the low level and 71% at the high level. The precision went from 4.3% to 6.8%. The accuracy and precision were acceptable at the low level but not at the higher level, an unexpected result. Because Zenon's minimum detection level was 10 µg/g, there were 8 measurements out of 20 reported as below detection at the low level.

Chromium

Zenon's mean concentrations were 41.0 µg/g and 44.6 µg/g compared to the reference values of 123 µg/g and 113 µg/g. Zenon's accuracy was 33% at the low level and 39% at the high level. The precision went from 34% to 28%. Accuracy and precision were well outside acceptable limits in both cases. The reference concentrations, which were well above Zenon's minimum detection level of 1 µg/g, were in the range that can be toxic to aquatic life.

Copper

Zenon's mean concentrations were 14.8 µg/g and 385.4 µg/g compared to the reference values of 18.5 µg/g and 452 µg/g. Zenon's accuracy was 80% at the low level and 85% at the high level. The precision went from 3.7% to 4.1%. Accuracy was outside the acceptable range while precision was reasonable. The reference concentrations, which were well above Zenon's minimum detection level of 1 µg/g, ranged from non-toxic to toxic to aquatic life.

Lead

Zenon's mean concentrations were 18.1 µg/g and 299 µg/g compared to the reference values of 22.7 µg/g and 404 µg/g. Zenon's accuracy was 80% at the low level and 74% at the high level. The

precision went from 9.8% to 4.7%. Accuracy and precision were outside the acceptable range in both cases. The reference concentrations, which were above Zenon's minimum detection level of 10 µg/g, ranged from slightly toxic to very toxic to aquatic life.

Manganese

Zenon's mean concentrations were 191 µg/g and 266 µg/g compared to the reference values of 229 µg/g and 470 µg/g. Zenon's accuracy was 83% at the low level and 57% at the high level. The precision went from 5.4% to 5.7%. Accuracy and precision were outside the acceptable range in both cases. The reference concentrations were well above Zenon's minimum detection level of 1 µg/g.

Mercury

Zenon analyzed only 15 samples at one concentration. The result was a mean of 4.16 µg/g compared to the reference of 4.57 µg/g. The accuracy was 91% and the precision was 8.3%. These were reasonable although outside the acceptable range for the reference. The reference concentration, which was well above Zenon's minimum detection level of 0.05 µg/g, would be toxic to aquatic life.

Molybdenum

Zenon's mean concentration was 5.0 µg/g compared to the reference value of 12.3 µg/g. The accuracy of 40% and precision of 14% were well outside acceptable limits, although the reference concentration was above Zenon's detection level of 1 µg/g.

Nickel

Zenon's mean concentrations were 48.5 µg/g and 33.2 µg/g compared to the reference values of 55.3 µg/g and 44.1 µg/g. Zenon's accuracy was 88% at the low level and 75% at the high level. The precision went from 4.9% to 5.1%. Accuracy and precision were close to, although outside, the acceptable range. The reference concentrations were well above Zenon's minimum detection level of 5 µg/g.

Zinc

Zenon's mean concentrations were 103 µg/g and 546 µg/g compared to the reference values of 119 µg/g and 824 µg/g. Zenon's accuracy was 86% at the low level and 66% at the high level. The precision went from 5.0% to 5.5%. Accuracy was poor, being well outside the acceptable range. The precision was reasonable. The reference concentrations, which were well above Zenon's minimum detection level of 1 µg/g, ranged from slightly toxic to very toxic to aquatic life.

PAHs in estuarine sediments

Results are presented below for 5 low molecular weight compounds followed by 8 high molecular weight compounds. The minimum detection level for each of these compounds was 0.001 µg/g which was well below any of the reference concentrations. All reference concentrations would be considered toxic to aquatic life except that of benzo(a)pyrene which was just below the criterion level. In all cases, Zenon's average result was less than the reference level and the accuracy and precision were well outside the acceptable range.

Acenaphthene
Zenon's mean concentration was 0.015 µg/g compared to the reference value of 0.59 µg/g. The accuracy was 25% and the precision 37%.

Anthracene
Zenon's mean concentration was 0.011 µg/g compared to the reference value of 0.02 µg/g. The accuracy was 55% and the precision 38%.

Fluorene
Zenon's mean concentration was 0.061 µg/g compared to the reference value of 0.55 µg/g. The accuracy was 11% and the precision 36%.

Naphthalene
Zenon's mean concentration was 0.30 µg/g compared to the reference value of 1.70 µg/g. The accuracy was 17% and the precision of 37%.

Phenanthrene
Zenon's mean concentration was 0.50 µg/g compared to the reference value of 1.05 µg/g. The accuracy was 48% and the precision 33%.

Benz(a)anthracene
Zenon's mean concentration was 0.074 µg/g compared to the reference value of 0.5 µg/g. The accuracy was 15% and the precision 27%.

Dibenz(a,h)anthracene
Zenon's mean concentration was 0.49 µg/g compared to the reference value of 0.60 µg/g. The accuracy was 82% and the precision 27%.

Chrysene

Zenon's mean concentration was 0.59 µg/g compared to the reference value of 1.10 µg/g. The accuracy was 53% and the precision 20%.

Benzo(g,h,i)perylene

Zenon's mean concentration was 0.56 µg/g compared to the reference value of 0.69 µg/g. The accuracy was 81% and the precision 22%.

Pyrene

Zenon's mean concentration was 0.58 µg/g compared to the reference value of 2.4 µg/g. The accuracy was 24% and the precision 24%.

Benzo(a)pyrene

Zenon's mean concentration was 0.039 µg/g compared to the reference value of 0.15 µg/g. The accuracy was 26% and the precision 18%.

Indeno(1,2,3-c,d)pyrene

Zenon's mean concentration was 0.52 µg/g compared to the reference value of 0.8 µg/g. The accuracy was 65% and the precision 32%.

Fluoranthene

Zenon's mean concentration was 0.75 µg/g compared to the reference value of 1.35 µg/g. The accuracy was 55% and the precision 26%.

PROVINCIAL OVERVIEW OF RESULTS

Presentation of Results

In the tables summarizing the monitoring data, there are five kinds of concluding statement. These are: objective met, objective not met, objective not checked, omitted 1995, and indefinite result.

To get an overview of performance for the Province, we totalled the number of occurrences of each conclusion for each water basin from the summary tables. In compiling these totals, we counted each instance of a maximum (or minimum) objective being met or not met plus all average and percentile values being met or not met.

Table 1 shows the results of this compilation. For each Region we give the sum of occurrences for each kind of conclusion and then total them for the whole Province. We also express the occurrences as a percent of the total of all occurrences, both by Region and for the Province as a whole.

Discussion of Results

Although the results apply to specific occurrences, we assume for this analysis that they are representative of the whole year. This simplification is a conservative approach to describing the state of water quality since we usually attempt to collect data during worst-case conditions.

Table 1 shows that the objectives were met 75% of the time in the Province as a whole in 1995. This result varied according to Region from 2% to 85%. Objectives were not met from between 2% to 53% of the time, with an overall average of 16%.

The occurrence of objectives not checked, omitted 1995, or indefinite results averaged 3%, 1%, and 5%, respectively. If we subtract these relatively minor instances of no result from the total, then the number of instances (or percent of time) that objectives were met overall becomes 83% and the number not met 17%.

We can therefore state that, in the Province as a whole, the objectives were met about 83% of the time in 1995. This is an approximate general statement at the best of times, but is especially so for 1995 because of the reduced monitoring that year. Factors which can affect the overall outcome

include the frequency at which particular objectives in any region are monitored, the completeness of monitoring in a basin, and the inclusion or omission of water basins with either serious or minor water quality problems.

The overall result for objectives met in 1995 was lower than in 1994 when it was 87% and also lower than results for previous years. The objectives were met 94% of the time in 1987, 93% in 1988, 92% in 1989, 93% in 1990, 90% in 1991, 89% in 1992, and 87% in 1993. The data show a downward trend. As the monitoring program is repeated in future years the trend could continue. This is because new basins with known problems will be added and, as monitoring costs increase, there will be a tendency to cease monitoring in areas where objectives are being met consistently by a wide margin.

If we wish to use objectives attainment data to describe the general state of water quality in developed areas, we will need to maintain monitoring in all areas where objectives have been set. If, as is likely, monitoring resources are scarce, we will need to concentrate on areas where the worst water quality problems occur. This will produce a more negative general result, although we would expect the situation to improve in subsequent years as corrective action is taken. The goal, of course, is for water quality objectives to be met 100% of the time in all areas. Monitoring in future years, followed by corrective action where required, will show how close we can get to this ideal situation.

VANCOUVER ISLAND REGION

Cowichan-Koksilah Rivers

The Cowichan River is the most important river on Vancouver Island for recreational and commercial fisheries. The Koksilah River is a major tributary of the Cowichan River near its mouth. Possible sources of contamination include treated municipal sewage, agriculture, urban development, and effluents from a fish hatchery and abandoned metal mines.

Objectives were not checked in 1995 and 1994. Monitoring carried out from 1988 to 1993 gave fairly consistent results. It showed that objectives were not met for microbiological contaminants in both rivers and for algal growth in the lower part of the Cowichan River. Monitoring to check objectives attainment should be resumed after these problems have been addressed.

Middle Quinsam Lake

Middle Quinsam Lake drains via the Quinsam River into the Campbell River near its estuary. The Middle Quinsam Lake sub-basin is a valuable habitat for trout and salmon but could be impacted by an open-pit coal mine operating in the area.

Measurements between 1989 and 1993 showed that objectives were generally met at all times. There was no monitoring to check objectives in 1994 and 1995. Further monitoring is not a priority in the immediate future unless there are changes at the mine or new developments in the watershed.

Oyster River

The Oyster River flows from the Forbidden Plateau area into the Strait of Georgia, south of Campbell River. The river and its tributaries are important habitat for several species of trout and salmon. The main threats to water quality are logging, agriculture, and mine exploration. We expect the latter to lead to active mining in the future, especially for coal.

Between 1990 and 1993, the objectives were usually always met. Since the situation is stable, we did not monitor in 1994 and 1995 and no further work to check objectives is planned at this time

unless development occurs in the watershed.

Elk and Beaver Lakes

Table 2 lists results and Figure 2 shows site locations.

Located near Victoria, these are the most important recreational fisheries lakes on southern Vancouver Island. Water-contact recreation is also very important in the lakes. Residential and agricultural development and the release of phosphorus from lake sediments are responsible for the present eutrophic state of the lakes.

This is the third year we monitored to check the attainment of objectives. As in previous years, objectives for dissolved oxygen, chlorophyll-*a*, and the phytoplankton community were not met, reflecting the eutrophic nature of the lakes. The water quality index gave ratings of fair (index = 38) for Elk Lake and poor (index = 87) for Beaver Lake in 1995. These ratings were due to many of the objectives not being met, especially those for algae growth. Monitoring in the future will be a lower priority until action is taken to improve water quality conditions.

Tsolum River

Table 3 lists results and Figure 3 shows site locations.

The Tsolum River flows from Mount Washington to the Puntledge River at Comox on Georgia Strait. Acid-mine drainage from a closed copper mine in the headwaters creates high copper levels which are deleterious to fish. The river has the potential to support significant populations of salmonids.

Objectives for the Tsolum River were issued recently and their attainment was checked for the first time in 1994 in the river just downstream from the mine site. As in 1994, the objective for dissolved copper was often not met in 1995 indicating a continued threat to fish. The objective for percent steelhead survival will not be checked until water quality conditions improve substantially. The water quality index gave a rating of borderline (index = 46) due to high levels of dissolved copper.

We recommend continued objectives monitoring to track progress of reclamation work in the mine area as it occurs.

Holland Creek and Stocking Lake

The Holland Creek and Stocking Lake watersheds, located near Ladysmith, are used mainly as a source of drinking water with some use for recreation and fisheries. Water quality objectives were prepared and approved recently as part of a watershed management plan for the area. Logging and roadbuilding are the main influences on water quality.

Monitoring to check the attainment of water quality objectives has not yet been carried out.

SKEENA REGION

Bulkley River

The Bulkley River is a major tributary to the Skeena River. It is an important river for fisheries and has some drinking water use. The main influences on water quality are treated municipal effluent from Houston and Smithers, agriculture, urban runoff, and possible contamination in the headwaters from mining.

We have monitored the attainment of objectives since 1988 and obtained consistent data. Given these results, we consider objectives checking to be a relatively low priority at this time and have not monitored since 1992.

Kathlyn, Seymour, Round, and Tyhee Lakes

Table 4 lists results and Figure 4 shows site locations.

These four small lakes, in the Smithers area, are used for recreation, domestic water supply, and irrigation. The main influences on water quality are agriculture and residential development around the lakes.

Monitoring between 1987 and 1993 showed objectives for turbidity, colour, and phosphorus not being met due to the eutrophic nature of the lakes. Routine monitoring to check objectives ended after 1993 while plans to rehabilitate lake water quality were being prepared. Monitoring in 1995 was limited to checking the phosphorus objective in Kathlyn and Tyhee lakes and results were similar to those of the past. There were insufficient data to rate the water quality of the lakes in 1995 using the index. Once corrective action starts, more complete monitoring for objectives attainment should resume to document progress.

Lower Kitimat River and Arm

Table 5 lists results and Figure 5 shows site locations.

The river and arm are an important migration route for salmonids, and the water is also used for

recreation and for industrial and municipal supplies. A kraft pulp mill and a municipal treatment plant discharge to the river and an aluminum smelter and ammonia plant discharge at the head of the arm. The existing water quality objectives are being updated.

The only monitoring carried out in 1995 was the measurement of dioxins and furans in sediments. Results show that criteria to protect aquatic life were met in the river but were not met in the harbour area. In 1994, when more complete monitoring was done, objectives and criteria not met in the harbour included the objectives for cyanide, fluoride, and iron and the criteria for PAHs in sediments. Monitoring in 1995 was too incomplete to calculate a water quality index.

We recommend continued monitoring as the Ministry works with dischargers to upgrade effluent treatment facilities.

Lakelse Lake

Lakelse Lake drains into the Skeena River and is important for salmon spawning and rearing and for recreation. It is also used as a domestic water supply. The only threats to water quality are septic tanks around the shoreline, agriculture, and logging in watersheds that drain into the lake.

The objectives were last checked in 1992 and all were met. We have not monitored since then as we presently consider such monitoring to be a low priority.

Yakoun River

The Yakoun River is on Graham Island in the Queen Charlotte Islands. It flows north from the Queen Charlotte Ranges into Masset Inlet. An open pit gold mine within the drainage has been proposed and water quality objectives have been set accordingly. The river has valuable fish resources, contributing all five species of salmon. It is also important for wildlife and recreation.

The development of the gold mine is on hold. We recommend monitoring to check the attainment of water quality objectives when the project proceeds.

OMINECA-PEACE REGION

Charlie Lake

Charlie Lake is used as a drinking water supply and for recreation. Agriculture, residential development around the lake, and nutrients from lake sediments are factors affecting water quality.

Monitoring from 1987 to 1993 showed the main problem to be high phosphorus levels causing eutrophic conditions. Studies are underway to determine how to reduce nutrient input. Routine monitoring to check objectives should resume when corrective measures are undertaken.

Bullmoose Creek

Bullmoose Creek and its tributaries (West and South Bullmoose creeks) are important recreational fish habitat. The creeks are adjacent to an open pit coal mine.

The attainment of water quality objectives was documented by monitoring between 1987 and 1993 and there were no serious impacts. Further monitoring is a low priority at this time.

Nechako River

Table 6 lists results and Figure 6 shows site locations.

The Nechako River, a major tributary to the Fraser River at Prince George, has its flow controlled by dams for power generation. The river is an important route for migrating salmon. Water quality can be affected by treated municipal sewage and diffuse sources such as forestry and agriculture. Water temperature is influenced by the flow of water released from the dams and by the manner in which it is released.

In 1995, the fecal coliform objective was met in the Nechako River except immediately downstream from Vanderhoof, as has been the case in the past. The temperature objectives immediately downstream from Cheslatta Falls and at Vanderhoof were often not met in the summer. We have obtained similar results since 1987. Temperature objectives will presumably be met when a cold-water release structure, planned for the Kenney Dam upstream from Cheslatta Falls, is installed.

Objectives which were met included those for ammonia, nitrite, dissolved oxygen, and pH. The water quality index gave a rating of fair (index - 36) for the Nechako River in 1995, due mainly to high coliform levels downstream from Vanderhoof. Given the importance of the river, we recommend continued monitoring to check objectives.

Pine River

The Pine River, a tributary to the Peace River, supplies water to Chetwynd and supports significant sport fish populations. The water quality is considered to be mostly in a natural state with the major influence coming from forestry and from treated sewage from the Village of Chetwynd.

We presently consider monitoring to be a low priority for this basin and none was carried out after 1992. Past results show all objectives being met fairly consistently.

Pouce Coupe River and Dawson Creek

The Pouce Coupe River runs into the Peace River inside the Alberta Border. Dawson Creek is its major tributary. The waters are affected mainly by municipal discharges and agriculture.

The exact causes for objectives not being met need to be found. Since objectives were consistently not met up to 1992, we will not resume monitoring to check their attainment until measures are taken to correct the problem.

Peace River

We have set objectives for the Peace River between the Bennett Dam and the B.C.-Alberta Border. The water is important for aquatic life and irrigation and can be affected by municipal discharges, forestry, agriculture, a gas plant, and a pulp mill built in 1988 after the objectives were set. We first checked the objectives in 1988.

There was no monitoring in 1995 to check objectives. Objectives not met at times in 1994 included those for turbidity, suspended solids, temperature, and chromium.

Considering Alberta's interest in the quality of the water crossing the provincial border, we

recommend that monitoring of the Peace River be resumed.

Upper Finlay River

The Finlay River, located in the north east part of the Province, drains into the north end of Williston Lake. The area of the upper Finlay was the site of a gold and silver mine and mill, now closed. Objectives apply to Jock and Galen creeks which eventually flow into the upper Finlay River.

The objectives were checked in 1987. Since the area is remote and the operation is closed, no further monitoring has been carried out. Future monitoring or new objectives may be needed if development re-occurs in the area.

Fraser River from the Source to Hope

Table 7 lists results and Figure 7 shows site locations.

This is the most important river in the Province for fisheries. Most of the contamination to the river between Moose Lake (the source of the river) and Hope is from pulp and paper mills and municipal treatment plants at Prince George and places downstream. Water quality objectives have been prepared to protect aquatic life, wildlife, irrigation, livestock watering, and drinking water supplies.

The objectives were checked in the winter of 1995. The objective for fecal coliforms was not met at Prince George and Quesnel, a result partly confirmed by *E. coli* measurements. Other objectives not met at times included those for suspended solids, turbidity, dissolved oxygen (although no values were below 10 mg/L), and AOX. The objective for dioxins and furans to protect aquatic life against chronic effects was not met in one out of 17 fish sampled in late summer. However, the less stringent criterion for human consumption was always met and there are no restrictions on eating fish from the river.

Objectives that were met included those for colour, temperature, ammonia, nitrite, nitrate, pH, chlorophenols, and resin acids. Certain objectives remain to be checked, such as those for chlorine residual, chlorophyll-*a*, lead in fish, PCBs in fish, and dioxins and furans in water and sediments. The water quality index gave a rating of fair (index = 29), due mainly to the objective for AOX not being met. This objective requires no increase in AOX over background values above the pulp mills. We recommend continued monitoring to check objectives in this section of the Fraser River.

CARIBOO REGION

Williams Lake

Table 8 lists results and Figure 8 shows site locations.

Williams Lake drains to the Fraser River and is important for drinking water, recreation, and aquatic life. The water quality is affected by phosphorus which comes from lake sediments and traditional farming practices in the San Jose River drainage, the main inlet to the lake, and to a lesser extent from residential septic systems around the lake.

Objectives not met in 1995 included those for turbidity, total phosphorus at spring overturn, chlorophyll-*a*, and dissolved oxygen. These results reflect the current eutrophic state of the lake. The water quality index rated the quality of the lake as borderline (index = 53) in 1995 due to a high phosphorus level at spring overturn and several objectives not being met. We recommend continued monitoring of objectives to track the progress of corrective measures being undertaken in the watershed.

San Jose River

Table 9 lists results and Figure 9 shows site locations.

The San Jose River originates at Lac La Hache and is the main inlet to Williams Lake. It is used mainly for irrigation, livestock watering, and water storage. Ranching is the activity with the most influence on water quality.

The Ministry set only one objective for the San Jose River, namely the total annual loading of dissolved phosphorus entering Williams Lake. The Region has measured this loading since the seventies. The objective was met in 1995.

The annual load was based on a calendar year. It was derived by adding daily stream flows in Borland Creek and the San Jose River just upstream, multiplying the total daily flow by the dissolved phosphorus daily concentrations measured in the San Jose downstream from Borland, plotting these daily loads against time, and measuring the area under the curve to obtain annual load.

SOUTHERN INTERIOR REGION

Bonaparte River

The Bonaparte River is a tributary to the Thompson River. It is an important trout habitat and is affected by agricultural operations and municipal discharges. Its main tributaries are Clinton Creek and Loon Creek.

The water quality objectives were last checked in 1994. Objectives not met at times included those for fecal coliforms, suspended solids, turbidity, chlorophyll-*a*, and the objective for dissolved oxygen in Loon Lake.

There are plans to improve water quality and correct problems. Routine monitoring to check attainment of objectives should resume after improvements are made.

Okanagan Valley Lakes

Table 10 lists results and Figure 10 shows site locations.

To date, objectives have only been set in the five main lakes for phosphorus, which is the major factor controlling the trophic state of the lakes. The lakes are highly valued for recreation, fisheries, and as a source of drinking and irrigation water. The major inputs of phosphorus are from treated municipal sewage and from diffuse sources that include septic tanks, agriculture, and forestry. Phosphorus release from sediments also occurs in Wood Lake and Osoyoos Lake.

The short-term phosphorus objective was met in Wood Lake, as it has been since 1990. This is an improving trend compared to results obtained in 1987, 1988, and 1989 when the objective was not met. The phosphorus objective for Kalamalka Lake was met at the south and north ends as it has been most years except 1993 and 1994. The objective for Okanagan Lake was met except in Armstrong Arm as has been the case in the past. The objective was met in Skaha Lake, as it was for the first time in 1991 and also in 1992, indicating an improving trend. It was also met in Osoyoos Lake for the second year in a row indicating the start of another improving trend.

In 1995, the water quality index gave a rating of excellent (index = 0) for all the lakes except

Okanagan Lake for which the rating was good (index = 15). Because there is only the single phosphorus objective for each lake, the index gives only a rough idea of the state of water quality. Better estimates will be provided when a few more pertinent objectives have been set and checked. Given the environmental importance of these lakes, we recommend continued monitoring of phosphorus at spring overturn.

Similkameen River

The Similkameen River flows from Manning Park, east through the south Okanagan, then south across the U.S. border. It is important for fisheries, drinking water, and irrigation. Water quality can be affected by mining and municipal discharges. We updated the water quality objectives in 1990 because of an increase in mining activity in the Hedley Creek area.

Monitoring between 1987 and 1993 has given consistent results and was suspended in 1994 as a low priority. The main problem has been with fecal coliforms, possibly from agricultural operations, which did not always meet the drinking water objective requiring disinfection only.

Cahill Creek

Table 11 lists results and Figure 11 shows site locations.

Cahill Creek, its tributaries (Nickel Plate Mine Creek and Sunset Creek), and a parallel stream (Red Top Gulch Creek) enter the Similkameen River near Hedley. Fish from the Similkameen River use the creek near its mouth and the water is also used for irrigation. This watershed is the site of a gold mine and mill which began operating in 1987. Monitoring to check objectives began the same year.

Objectives not met at times in 1995 included those for dissolved solids, sulphate, nitrite, total aluminum, and dissolved iron.

Among objectives met were those for suspended solids, turbidity, cyanide (in weak-acid dissociable and cyanate forms), arsenic, nitrate, pH, selenium, and a number of heavy metals (cadmium, copper, lead, molybdenum, silver, and zinc).

In 1995, the water quality index gave a ranking of good (index = 9) for Cahill Creek, excellent (index = 0) for Sunset Creek, fair (index = 22) for Nickel Plate Mine Creek, and good (index = 14)

for Red Top Gulch Creek. The major influences on these rankings were occurrences of high dissolved solids and sulphate values. We recommend continuing routine monitoring to check objectives while work proceeds to improve the mine operation.

Bessette Creek

Table 12 lists results and Figure 12 shows site locations.

Bessette Creek, which flows into the Shuswap River, is formed by the joining of Harris and Duteau creeks near the town of Lumby. Lawson Creek, and its tributary Spider Creek, flow into Duteau Creek. These creeks provide spawning habitat for trout and four species of salmon. Activities that can affect water quality include a telephone pole treatment plant near Harris Creek, a woodwaste landfill along Duteau Creek, and agricultural operations generally.

Objectives not met at times in 1995 included those for microbiological indicators generally (fecal coliforms, *E. coli*,), dissolved and suspended solids and dissolved oxygen in Spider Creek, and chlorophenols in sediments from Harris Creek. Objectives met included those for turbidity, ammonia, nitrite, nitrate, chlorophyll-*a*, colour, pH, and resin acids.

In 1995, the water quality index ranked Bessette Creek (index = 31), Lawson Creek (index = 30), Spider Creek (index = 43), and Harris Creek (index = 23) as fair. These results were due mainly to some high chlorophenol levels in sediments from Harris Creek and high coliform levels in the other creeks. Continued monitoring is recommended as measures to improve water quality are carried out.

Tributaries to Okanagan Lake near Westbank

We set objectives for Peachland, Trepanier, and Westbank creeks which flow into Okanagan Lake in the Peachland-Westbank area. Peachland and Trepanier creeks support spawning populations of kokanee or trout, and all three creeks are used for irrigation and domestic water supplies. Peachland and Trepanier creeks can be affected by seepage from a molybdenum mine which closed recently. Westbank Creek is now influenced by urban runoff and agriculture.

The objectives have been checked for three years with results showing generally good water quality. Further monitoring was considered a low priority and was discontinued in 1994

Tributaries to Okanagan Lake near Kelowna

Mission, Kelowna, and Brandt's creeks are tributaries to Okanagan Lake on its east shore near Kelowna. Mission and Kelowna creeks support salmonids and the water is also used for irrigation and domestic supply. Brandt's Creek is used mainly for just irrigation. The creeks can be affected by urban stormwater runoff in their lower reaches and by logging or agriculture further upstream. Treated wastewater is discharged to Brandt's Creek.

The objectives were last checked in 1994. Then, as in previous years, the objectives for bacteriological indicators (fecal coliforms, *E. coli*, and enterococci) were generally not met. Continued monitoring will depend on action taken in the future to control stormwater and other diffuse sources of contamination.

Tributaries to Okanagan Lake near Vernon

Table 13 lists results and Figure 13 shows site locations.

Lower Vernon Creek and Deep Creek are tributaries to Okanagan Lake at its north end. The water is used for domestic and irrigation purposes and has some fisheries values, especially in lower Vernon Creek. Potential sources of contamination are a municipal sewage discharge, agricultural operations, and groundwater affected by spray irrigation of treated sewage.

In 1995, our third year of monitoring to check objectives, those not met at times were objectives for fecal coliform, *E. coli*, suspended solids, and dissolved oxygen. Among the objectives met were those for turbidity, ammonia, nitrite, nitrate, chlorophyll-*a*, and pH.

The water quality index rated Lower Vernon Creek (index = 24) and Deep Creek (index = 31) as fair in 1995, due mainly to high fecal coliform levels. Further monitoring of these creeks should be considered as measures to improve water quality are carried out.

Hydraulic Creek

Hydraulic Creek flows into Okanagan Lake via Mission Creek about 10 km upstream from the lake. Hydraulic Creek is an important source of drinking water relying on disinfection only. The creek also supports recreational fish and is used for irrigation. Commercial logging in the watershed can

affect these water uses.

Monitoring between 1991 and 1993 to check objectives showed that fecal coliform contamination was the main problem. Monitoring was discontinued in 1994 as results were fairly predictable.

Thompson River

Table 14 lists results and Figure 14 shows site locations.

We set objectives in 1992 for the South Thompson which drains Little Shuswap Lake, the North Thompson which joins the South Thompson at Kamloops, Kamloops Lake, and the lower Thompson which is a major tributary to the Fraser River. This river system is very important for fish, especially salmon and trout. It is used extensively for recreation and is also a source of water for drinking, irrigation, and industrial use.

Between the North Thompson River and Kamloops Lake, the river receives treated effluents from a bleached kraft pulp mill and the from the City of Kamloops. There are also diffuse discharges from agriculture and forestry. All these discharges can affect Kamloops Lake and the Thompson River downstream.

Objectives not met in 1995 included those for chlorophyll-*a* and, in some instances, for dioxins and furans in fish. The dioxin and furan levels in water were calculated from pulp mill effluent levels assuming complete mixing of effluent with the lower Thompson River and the objective was met. Although the dioxin and furan objective to protect aquatic life against chronic effects was not met in three fish, the less stringent criterion for human consumption was always met and there is no restriction on eating fish from the river.

The water quality index gave a ranking of fair (index = 35) for the lower Thompson in 1995, due largely to growth of attached algae. We recommend continued monitoring to check Thompson River objectives.

Christina Lake

Christina Lake, located in south central B.C., drains into the Kettle River which joins the Columbia River in Washington State. The lake is important for recreation, domestic water supply and sport

fish. The potential sources of contamination are residential development, agriculture, and logging.

Objectives were not checked in 1995. Objectives were checked for the first time in 1994 and those not met included objectives for phytoplankton distribution, periphyton distribution, dissolved oxygen, and periphyton chlorophyll-*a*.

We recommend resuming sampling until objectives have been checked for at least two more years to obtain a reasonable data base.

KOOTENAY REGION

Columbia and Windermere Lakes

The two lakes are important for fisheries, recreation, and as a source of drinking water. Residential development around the lakes is the main potential influence on water quality.

We monitored to check objectives between 1987 and 1992. Since the objectives have been met fairly consistently, we discontinued monitoring in 1993.

Toby Creek and Upper Columbia River

Toby Creek enters the Upper Columbia River just downstream from Windermere Lake. Both streams are important for aquatic life and recreation. Toby Creek can be affected by indirect discharges of domestic sewage and by drainage from an abandoned mine. The Upper Columbia River receives an indirect discharge of treated sewage from Radium Hot Springs.

All objectives have generally been met except, on occasion, those for fecal coliforms. We did not monitor after 1989 in Toby Creek and 1992 in the Upper Columbia River. We consider future monitoring a low priority at this time.

Columbia River from Keenleyside to Birchbank

Table 15 lists results and Figure 15 shows site locations.

The Columbia River is one of the major rivers in British Columbia and in Washington State further downstream. In B.C., this section of the river is important for aquatic life, sport fishing, recreation and, to a lesser extent, as a drinking water supply. In the U.S., it supports a food fishery, major salmon runs, and irrigation and drinking water supplies. Between the Hugh Keenleyside Dam and Birchbank, the main influence is a kraft pulp mill which recently expanded production and upgraded its effluent treatment to secondary. There are also small discharges of secondary-treated municipal effluent and urban runoff.

Objectives not met at times in 1995 were those for dissolved oxygen (although the minimum was

not below 7 mg/L), organic carbon in sediments, dissolved gases, and dioxins and furans in fish and sediments. Although the dioxin and furan objective to protect aquatic life against chronic effects was not met in several fish, the less stringent criterion for human consumption was always met and there is no restriction on eating fish from the river.

Objectives met in 1995 included those for pH, colour, suspended solids, turbidity, fecal coliforms, *E. coli*, pulp mill toxicity in the river, chlorophenols, resin acids, chlorinated resin acids, and periphyton chlorophyll-*a*.

The water quality index gave a rating of fair (index = 35) in 1995. This result is based on about one third of the objectives not being met on average about one third of the time. Considering the international significance of the river and its importance to aquatic life, continued monitoring to check the attainment of objectives is recommended.

Elk River

The Elk River and its main tributaries, the Fording River, Line Creek and Michel Creek, are located in the south-eastern part of the province. The Elk River is a tributary to Lake Koocanusa on the east side. We have set provisional objectives for suspended solids and substrate sedimentation to protect aquatic life against the potential effects of coal mining operations in the basin.

The objectives for suspended solids apply to base flow, or the non-freshet period, in the Elk River basin. They were generally met at all sites in 1993. Further monitoring to check these objectives was considered a low priority.

LOWER MAINLAND REGION

Fraser River from Hope to Kanaka Creek

We have set objectives for the Fraser River between Hope and Kanaka Creek, for tributaries entering from the south, and for all major water courses between the Fraser River and the International Border. The Fraser River is a major salmon migration route and the tributaries are important spawning areas. The major discharges to the Fraser River in this section are of treated municipal sewage.

Monitoring to check objectives was carried out in 1987,1988, 1990, 1992, and 1993. The objectives are being updated and we recommend checking the revised objectives when they are finalized.

Fraser River from Kanaka Creek to the Mouth

Table 16 lists results and Figure 16 shows site locations.

The river downstream from Kanaka Creek and the outer estuary are very important for salmon migration and rearing. The water is used for irrigation and certain beaches are heavily used for recreation. Water quality can be affected by industry, treated sewage, and agriculture.

We have monitored to check objectives annually since 1987. Due to the provincial importance of this river and the threats to water quality that exist in this section, we recommend that such monitoring be continued annually. We plan to publish updated objectives in 1996.

Among objectives not met at times in 1995 were those for fecal coliforms in the Main Arm and dissolved oxygen in the bottom of sloughs (although the minimum was not less than 5 mg/L).

Objectives met included those for fecal coliforms at all bathing beaches, suspended solids, ammonia, dissolved oxygen in the main reaches of the river, pH, metals (copper, lead, and zinc), chlorophenols in water, sediments, and fish, and PCBs in sediments and fish.

In 1995, the water quality index gave a ranking of fair (index = 23) for the Main Arm, good (index = 10) for the North Arm, and excellent (index = 0) for the Main Stem, the Middle Arm, and

Tsawwassen Beach. The major influence was high levels of fecal coliforms in the Main Arm and a few low dissolved oxygen values in the North Arm sloughs. While these results indicate an improvement in water quality compared to previous years, we cannot be certain they are truly representative because monitoring was incomplete.

Boundary Bay

Boundary Bay sustains a crab and herring fishery and is important for recreation. The Little Campbell River, the Serpentine River, and the Nicomekl River are tributaries to Boundary Bay on the east side. They provide important habitat for trout and salmon and are used for irrigation. The main influences on water quality are from sewage pumping stations, stormwater, and septic tanks in Boundary Bay and from agriculture in the tributaries.

Objectives were checked from 1988 to 1993 giving consistent results. Since the situation is stable and fairly well documented, further monitoring was considered a low priority except where required at bathing beaches for human health reasons.

Burrard Inlet

Table 17 lists results and Figure 17 shows site locations.

Burrard Inlet includes Port Moody Arm, Indian Arm, Vancouver Harbour, False Creek, and English Bay. The water is designated for aquatic life and wildlife in all areas and for primary-contact recreation in most areas, except in False Creek. There are several municipal and industrial discharges to Burrard Inlet which can affect water quality. These include primary-treated sewage, combined sewer overflows, stormwater, bulk-loading terminals, a sugar refinery, a sodium chlorate plant, a chlor-alkali plant, and oil depots.

In 1995, the only objective checked was the one for fecal coliforms at bathing beaches. This objective was not met at times at Deep Cove, Cates Park, Brockton Point, and Ambleside. There were insufficient data to calculate a water quality index.

In the past, objectives have not been met for a number of other variables including metals in sediments, phenol in water, and PCBs and PAHs in sediments. Considering the importance of Burrard Inlet and the number of instances that objectives have not been met, we recommend

continued monitoring to check all objectives.

Burrard Inlet Tributaries

We have set objectives for the following three tributaries to Burrard Inlet: School House Brook which discharges to Port Moody Arm and could be influenced by a chemical polymer plant, Lynn Creek which discharges to Vancouver Harbour and could be affected by a municipal landfill, and the Capilano River which discharges to outer Burrard Inlet and may also be affected by a municipal landfill. The main uses of these tributaries are recreation, aquatic life, and wildlife.

The water quality objectives were not checked in 1995. In 1994, objectives were not met at times for phenols, temperature, chromium, iron, zinc, and chlorophenols in water.

Although we have data for four years, we recommend resuming monitoring because the past record is rather incomplete.

North Shore Lower Fraser Tributaries

Objectives have been set for the following four tributaries to the north shore of the lower Fraser River in the Lower Mainland: Kanaka Creek, the Pitt River, the Coquitlam River, and the Brunette River. All these streams, and their tributary streams and lakes, support salmon and trout fisheries to varying degrees. Most are important for recreation and some are sources of drinking water requiring treatment. Discharges which can affect water quality include stormwater, agricultural runoff, treated sewage, landfill leachates, wastewaters from gravel operations, and a wood preservation plant.

Objectives were not checked in 1995 or 1994. Monitoring from 1990 to 1993 gave fairly consistent results, and we consider future monitoring to be a relatively low priority until some of the water quality problems, caused mainly by non-point sources, are addressed.

Pender Harbour

Pender Harbour, a small coastal inlet on the Sechelt Peninsula, is important for recreational boating and fishing. It also supports commercial fishing and some commercial shellfish harvesting. The main influences on water quality are from diffuse sources such as septic tanks, some agriculture, and sewage discharges from boats.

Objectives were not checked in 1995. In 1994, the third year of monitoring, objectives were often not met for copper, lead, and zinc in both water and sediments and for iron in water. Objectives for tributyl tin in water and PAHs in sediments were also not met. These results were similar to those of past years. Since the situation is stable and reasonably well defined, monitoring is a lower priority in the immediate future.

Sechelt Inlet

Sechelt Inlet is located on the mainland coast about 80 km northwest of Vancouver. It is important for fisheries, especially fish farming, and recreation and has potential for shellfish harvesting. Potential sources of contamination include residential development, marinas, logging and minor discharges from gravel washing, a fish hatchery, and mariculture.

Objectives were not checked in 1995. Monitoring for the second time in 1994 showed that objectives for suspended solids, copper, lead, and zinc were not met at times, mostly near a dock in Porpoise Bay at the south end of the inlet.

We recommend continuing the program for at least one more year to obtain a reasonable data base.

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Water Quality Section
Water Management Branch

TABLE 1

PROVINCIAL OVERVIEW OF WATER QUALITY OBJECTIVES - 1995

REGION	NUMBER OF OCCURRENCES					
	OBJECTIVES MET	OBJECTIVES NOT MET	OBJECTIVES NOT CHECKED	OMITTED 1995	INDEFINITE RESULT	TOTALS
Vancouver Island	22	26	0	1	0	49
	45%	53%	0%	2%	0%	100%
Skeena	2	6	49	21	0	78
	2%	8%	63%	27%	0%	100%
Omineca Peace	1220	293	13	2	75	1603
	76%	18%	1%	0%	5%	100%
Cariboo	18	6	1	0	2	27
	67%	22%	4%	0%	7%	100%
Southern Interior	921	94	9	23	41	1088
	85%	8%	1%	2%	4%	100%
Kootenay	867	352	3	0	1	1223
	71%	29%	0%	0%	0%	100%
Lower Mainland	647	17	91	1	113	869
	74%	2%	11%	0%	13%	100%
All Regions	3697	794	166	48	232	4937
	75%	16%	3%	1%	5%	100%
All Regions less occurrences with no result	3967	794				4761
	83%	17%				100%

TABLE 2

ELK AND BEAVER LAKES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Temperature 15°C max in hypolimnion	Elk Lake 1100844 at centre	Jun 29 - Sep 28	4	9.5 - 14.4 °C at 7 to 9 m (start of hypolimnion)	Objective met
	Beaver Lake E207470 at centre	Jun. 29	1 1	16.2 °C at 5 m 13.2 °C at 6 m	Obj. not met Obj. met
		Jul. 27	1	17.6 °C at 5 m	Obj. not met
		Aug. 30	1 1	17.8 °C at 5 m 15.0 °C at 6 m	Obj. not met Obj. met
		Sep. 28	1	17.8 °C at 5 m 15.0 °C at 6 m	Obj. not met Obj. met
Dissolved Oxygen 5 mg/L min 1 m above sediment May - August	Elk Lake 1100844 at centre	Jun 29 - Aug 30	3	< 2 - 2.2 mg/L at 9 m	Objective not met
	Beaver Lake E207470 at centre	Jun 29 - Aug 30	3	1 - 4 mg/L at 5 to 6 m	Objective not met
Chlorophyll-a 1.5 - 2.5 ug/L av of duplicates at 0,2,4,6 m May - August	Elk Lake 1100844 at centre	Jun 29 - Sep 28	16	< 0.5 - 4.2 ug/L duplicates at 0,2,4,6 m av = 2.2 ug/L	Objective met
	Beaver Lake E207470 at centre	Jun 29 - Sep 28	12	2.3 - 19.9 ug/L duplicates at 0,2,4 m av = 9.6 ug/L	Objective not met
Water Clarity 1.9 m min Secchi disc reading	Elk Lake 1100844 at centre	Jun 29 - Sep 28	4	4.6 - 5.5 m	Objective met
	Beaver Lake E207470 at centre	Jun. 29 Jul 27 - Sep 28	1 3	3.8 m 1.1 - 1.7 m	Obj. met Obj. not met
Phytoplankton Community < 50 % Cyanophytes (cells/mL at surface) May - August	Elk Lake 1100844 at centre	Jun. 29 Jul. 27 Aug. 30 Sep. 28	1 1 1 1	53.5 % Cyanophytes 6.3 % Cyanophytes 24.9 % cyanophytes 68.3 % Cyanophytes	Obj. not met Obj. met Obj. met Obj. not met
	Beaver Lake E207470 at centre	Jun. 29 Jul. 27 Aug. 30 Sep. 28	1 1 1 1	83.4 % Cyanophytes 37.3 % Cyanophytes 81.7 % cyanophytes 42.9 % Cyanophytes	Obj. not met Obj. met Obj. not met Obj. met

TABLE 3

TSOLUM RIVER WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Copper < 0.007 mg/L av 0.011 mg/L max	Tsolum River: E207826 500m d/s Murex Creek	Apr 19 - May 31	5	0.006 - 0.043 mg/L av = 0.028 mg/L	Average not met
		Apr 19, May 3	2	0.006 - 0.009 mg/L	Max obj. met
		May 17 - May 31	3	0.041 - 0.043 mg/L	Max not met
		Jun 21 - Nov 8	4	0.013 - 0.037 mg/L	Max not met
		Sep 29 - Nov 1	3	0.006 - 0.010 mg/L	Max obj. met
% steelhead egg survival no difference between test & control (at 95% confidence)	Tsolum River	1995	0	no in situ bioassay data collected	Omitted 1995

TABLE 4

KATHLYN, SEYMOUR, ROUND & TYHEE LAKES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms: < 10/100 mL 90th perc. (np) at water intakes < 200/100 mL geometric mean (gm) < 400/100 mL 90th perc. (np) at beaches	Kathlyn Lake Seymour Lake Round Lake Tyhee Lake	1995	0	no data collected	Omitted 1995
Turbidity < 1 NTU av 5 NTU max	Kathlyn Lake Seymour Lake Round Lake Tyhee Lake	1995	0	no data collected	Omitted 1995
Total P < 0.015 mg/L av at spring overturn	Kathlyn Lake 1131007 North Basin	May. 9	1 1 1 1 1	0.0 m: 0.012 mg/L 2.5 m: 0.021 mg/L 5.0 m: 0.018 mg/L 7.5 m: 0.019 mg/L 10.0 m: 0.047 mg/L av = 0.023 mg/L	Objective not met
	Tyhee Lake 1131009 North Basin	May. 8	1 1 1 1 1 1 1 1 1 1	0.0 m: 0.008 mg/L 2.5 m: 0.026 mg/L 5.0 m: 0.026 mg/L 7.5 m: 0.025 mg/L 10.0 m: 0.030 mg/L 12.5 m: 0.034 mg/L 15.0 m: 0.037 mg/L 17.5 m: 0.040 mg/L 20.0 m: 0.399 mg/L av from 2.5 to 7.5 m: 0.031 mg/L	Objective not met
	E216924 South Basin	May. 7	1 1 1 1 1 1 1 1 1 1 1	2.5 m: 0.027 mg/L 5.0 m: 0.030 mg/L 7.5 m: 0.029 mg/L 10.0 m: 0.029 mg/L 12.5 m: 0.031 mg/L 15.0 m: 0.033 mg/L 17.5 m: 0.039 mg/L 20.0 m: 0.044 mg/L 22.5 m: 0.056 mg/L 24.0 m: 0.181 mg/L av from 2.5 to 22.5 m: 0.035 mg/L	Objective not met
	Round Lake	1995	0	no data collected	Omitted 1995

TABLE 4 continued

KATHLYN, SEYMOUR, ROUND & TYHEE LAKES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Colour 15 TCU max near water intakes	Kathlyn Lake Seymour Lake Round Lake Tyhee Lake	1995	0	no data collected	Omitted 1995

TABLE 5

LOWER KITIMAT RIVER AND ARM WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 200/100 mL geometric mean (gm)	Kitimat River	1995	0	no data collected	Objective not checked
Fecal Coliforms < 14/100 mL median (med) < 43/100 mL 90th percentile (np)	Kitimat Arm	1995	0	no data collected	Objectives not checked
Suspended Solids max. increase 10 mg/L or 10%	Kitimat River	1995	0	no data collected	Objective not checked
Turbidity max. increase: 5 NTU or 10%	Kitimat River	1995	0	no data collected	Objective not checked
WAD Cyanide 0.001 mg/L max.	Kitimat Harbour & Arm	1995	0	no data collected	Objective not checked
Fluoride 1.5 mg/L max	Kitimat Harbour & Arm	1995	0	no data collected	Objective not checked
H2S 0.002 mg/L max.	Kitimat River	1995	0	no data collected	Objective not checked
Chlorophyll - a 50 mg/m2 av	Kitimat River	1995	0	no data collected	Objective not checked
Ammonia-N < 1.8 mg/L av 14.0 mg/L max (pH = 7.4 temp = 13 °C)	Kitimat River	1995	0	no data collected	Objectives not checked
Ammonia-N < 2.4 mg/L av 11.0 mg/L max (pH = 7.8 temp = 15 °C sal. = 30g/kg)	Kitimat Arm	1995	0	no data collected	Objectives not checked
Nitrite-N < 0.020 mg/L av 0.060 mg/L max	Kitimat River	1995	0	no data collected	Objectives not checked
Dissolved Oxygen 7.8 mg/L min.	Kitimat River	1995	0	no data collected	Objective not checked

TABLE 5 continued

LOWER KITIMAT RIVER AND ARM WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
pH 6.5 - 9.0	Kitimat River	1995	0	no data collected	Objective not checked
Total Al 20% max increase	Kitimat Harbour & Arm:	1995	0	no data collected	Objective not checked
Total Cd < 0.012 mg/L av 0.038 mg/L max	Kitimat Harbour & Arm	1995	0	no data collected	Objectives not checked
Total Cu < 0.002 mg/L av 0.003 mg/L max or 20% increase	Kitimat Harbour & Arm	1995	0	no data collected	Objectives not checked
Total Fe 0.3 mg/L max	Kitimat Harbour & Arm	1995	0	no data collected	Objective not checked
Total Pb < 0.009 mg/L av 0.22 mg/L max or 20% increase	Kitimat Harbour & Arm	1995	0	no data collected	Objectives not checked
Colour (criterion) 15 TCU max	Kitimat River	1995	0	no data collected	Criterion not checked
Toxicity % mill effluent in river < 0.05 of the 96-h LC50	Kitimat River	1995	0	no data collected	Objective not checked
PAHs in water (max criteria) naphtha 1 ug/L acenaphe 6 ug/L fluorene 12 ug/L chrysene 0.1 ug/L bz-a-py 0.01 ug/L	Kitimat Harbour & Arm	1995	0	no data collected	Criteria not checked
L-PAH in sediments (max criteria) naphtha 0.2 ug/g acenphyl 0.06 ug/g acenaphe 0.05 ug/g fluorene 0.05 ug/g phenant 0.15 ug/g anthrac 0.10 ug/g total 0.5 ug/g	Kitimat River Kitimat Harbour & Arm	1995	0	no data collected	Criteria not checked

TABLE 5 continued

LOWER KITIMAT RIVER AND ARM WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
H-PAH in sediments (max criteria) fluorant 0.17 ug/g pyrene 0.26 ug/g bz-a-an 0.13 ug/g chrysene 0.14 ug/g bz-bk-fl 0.32 ug/g bz-a-py 0.16 ug/g ind-pyr 0.06 ug/g dibz-an 0.06 ug/g bz-pery 0.07 ug/g total 1.2 ug/g	Kitimat River Kitimat Harbour & Arm	1995	0	no data collected	Criteria not checked
Dioxins and Furans (criterion) < 0.25pg/g TCDD-TEQ av in sediment	Kitimat River: E207569 u/s Eurocan	Feb. 8	1	0.07 pg/g TCDD-TEQ	Criterion met
	E207570 d/s Eurocan	Feb. 8	1	0.19 pg/g TCDD-TEQ	Criterion met
	Kitimat Harbour & Arm 0400510 Ocelot Dock, N end	Feb. 8	1	3.5 pg/g TCDD-TEQ	Criterion not met
	E218985 Scow Grid	Feb. 8	1	5.4 pg/g TCDD-TEQ	Criterion not met
	E218983 Yacht Basin North	Feb. 8	1	4.88 pg/g TCDD-TEQ	Criterion not met

TABLE 6

NECHAKO RIVER WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms <100/100ml 90th perc. (np)	Nechako River: 0400629 200 m u/s Fort Fraser	Feb 9 - Mar 7	5	0 - 4/100 mL	Objective met
	0400631 200 m d/s Fort Fraser	Feb 9 - Mar 7	5	0 - 6/100 mL	Objective met
	0400449 u/s Vanderhoof	Feb 7 - Mar 8	5	2 - 300/100 mL np = 150/100 mL	Objective not met
	0400450 100 d/s Vanderhoof	Feb 7 - Mar 8	5	9000 - 19000/100 mL np = 15000/100 mL	Objective not met
	E207450 0.5 km d/s Vanderhoof	Feb 7 - Mar 8	5	10 - 61/100 mL np = 45/100 mL	Objective met
	E207451 2 km d/s Vanderhoof	Feb 7 - Mar 8	10	24 - 80/100 mL np = 77/100 mL	Objective met
	Chilako River	1995	0	no data collected	Objective not checked
Fecal Coliforms <10/100ml 90th perc (np)	Stuart River: 0400488 E bank at Highway 27	Feb 8 - Mar 6	5	0 - 167/100 mL np = 95/100 mL	Objective not met
	0920101 W bank at Highway 27	Feb 8 - Mar 6	5	all = 0/100 mL	Objective met
Fecal Coliforms <200/100ml geometric mean (gm) <400/100ml 90 perc. (np)	Necoslie River: 0400801 d/s Fort St James 20 m u/s Highway 27	Feb 8 - Mar 6	5	2 - 6/100 mL	Objectives met
Total Cl2 Res. 0.002 mg/L max	Nechako & Stuart Rivers	1995	0	no data collected	Omitted 1995
Ammonia-N <2.05 mg/L av 14.1 mg/L max at pH = 7.5 temp = 1 °C	Nechako River: 0400629 200 m u/s Fort Fraser	Feb 9 - Mar 7	5	<0.005 - 0.009 mg/L	Objectives met
	0400631 200 m d/s Fort Fraser	Feb 9 - Mar 7	5	all < 0.005 mg/L	Objectives met
	0400449 u/s Vanderhoof	Feb 7 - Mar 8	5	all < 0.005 mg/L	Objectives met
	0400450 100 m d/s Vanderhoof	Feb 7 - Mar 8	5	0.391 - 0.970 av = 0.723 mg/L	Objectives met

TABLE 6 continued

NECHAKO RIVER WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Ammonia-N <2.05 mg/L av 14.1 mg/L max at pH = 7.5 temp = 1 °C	Neckako River: E207450 0.5 km d/s Vanderhoof	Feb 7 - Mar 8	5	<0.005 - 0.005 mg/L av = 0.005 mg/L	Objectives met
	E207451 2 km d/s Vanderhoof	Feb 7 - Mar 8	10	<0.005 - 0.017 mg/L av = 0.016 mg/L	Objectives met
Ammonia-N <1.24 mg/L av 6.46 mg/L max at pH = 8.0 temp = 1 °C	Stuart River: 0400488 E bank at Highway 27	Feb 8 - Mar 6	5	0.070 - 0.165 mg/L av = 0.119 mg/L	Objectives met
	0920101 W bank at Highway 27	Feb 8 - Mar 6	5	<0.005 - 0.006 mg/L av = 0.005 mg/L	Objectives met
	Chilako River: 0400039 ~30 km from mouth	Feb. 14	1	<0.005 mg/L	Max objective met Av not checked
Nitrite-N < 0.02 mg/L av 0.06 mg/l max	Nechako River: 0400629 200 m u/s Fort Fraser	Feb 9 - Mar 7	5	<0.001 - 0.002 mg/L	Objectives met
	0400631 200 m d/s Fort Fraser	Feb 9 - Mar 7	5	<0.001 - 0.002 mg/L	Objectives met
	0400449 u/s Vanderhoof	Feb 7 - Mar 8	5	<0.001 - 0.002 mg/L	Objectives met
	0400450 100 m d/s Vanderhoof	Feb 7 - Mar 8	5	all < 0.005 mg/L	Objectives met
	E207450 0.5 km d/s Vanderhoof	Feb 7 - Mar 8	5	<0.001 - 0.002 mg/L	Objectives met
	Stuart River: 0400488 E bank at Highway 27	Feb 8 - Mar 6	5	<0.001 - 0.004 mg/L	Objectives met
	0920101 W bank at Highway 27	Feb 8 - Mar 6	5	<0.001 - 0.001 mg/L	Objectives met
	Chilako River: 0400039 ~30 km from mouth	Feb. 14	1	0.003 mg/L	Max obj. met Av not checked
Chlorophyll - a < 50 mg/L av	Nechako River	1995	0	no data collected	Objective not checked
	Stuart River	1995	0	no data collected	Objective not checked
Chlorophyll - a < 100 mg/L av	Chilako River	1995	0	no data collected	Objective not checked

TABLE 6 continued

NECHAKO RIVER WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Oxygen 7.75 - 11.2 mg/L min depending on fish egg stage	Nechako River: 0400629 200 m u/s Fort Fraser	Feb 8 - Mar 7	5	11.6 - 12.0 mg/L	Objective met
	0400631 200 m d/s Fort Fraser	Feb 9 - Mar 7	5	11.7 - 12.0 mg/L	Objective met
	0400449 u/s Vanderhoof	Feb 7 - Mar 8	5	11.1 - 11.7 mg/L	Objective met
	0400450 100 m d/s Vanderhoof	Feb 7 - Mar 8	5	10.8 - 11.4 mg/L	Objective met
	E207450 0.5 km d/s Vanderhoof	Feb 7 - Mar 8	5	11.1 - 11.6 mg/L	Objective met
	E207451 2 km d/s Vanderhoof	Feb 7 - Mar 8	5	11.1 - 11.8 mg/L	Objective met
	Chilako River: 0400039 ~30 km from mouth	Feb. 14	1	9.8 mg/L	Objective met
	Stuart River: 0400488 E bank at Highway 27	Feb 2 - Mar 6	5	10.5 - 11.4 mg/L	Objective met
	0920101 W bank at Highway 27	Feb 8 - Mar 6	5	10.4 - 11.8 mg/L	Objective met
pH 6.5 - 8.5	Nechako River 0400629 200 m u/s Fort Fraser	Feb 9 - Mar 7	5	7.5 - 7.8	Objective met
	0400631 200 m d/s Fort Fraser	Feb 9 - Mar 7	5	7.2 - 7.6	Objective met
	0400449 u/s Vanderhoof	Feb 7 - Mar 8	5	7.1 - 7.6	Objective met
	0400450 100 m d/s Vanderhoof	Feb 7 - Mar 8	5	7.2 - 7.9	Objective met
	E207450 0.5 km d/s Vanderhoof	Feb 7 - Mar 8	5	6.9 - 7.5	Objective met
	E207451 2 km d/s Vanderhoof	Feb 7 - Mar 8	10	6.9 - 7.5	Objective met
	Stuart River 0400488 E bank at Highway 27	Feb 8 - Mar 6	5	7.5 - 7.9	Objective met
	0920101 W bank at Highway 27	Feb 8 - Mar 6	5	7.6 - 7.8	Objective met

TABLE 6 continued

NECHAKO RIVER WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
pH 6.5 - 8.5	Chilako River 0400039 ~30 km from mouth	Feb. 14	1	8.1	Objective met
Temperature < 15 °C av ~ 100 m d/s Cheslatta Falls	Nechako River: immediately d/s Cheslatta Falls (DFO's Cheslatta Falls site)	Jan 1 - Jun 19	170	0.4 - 15 ° C	Objective met
		Jun 20 - Aug 25	167	15.1 - 18.5 ° C	Objective not met
	10 km d/s Cheslatta Falls (DFO's B. Irvine site)	Jan 1 - Jun 19	170	0.1 - 14.9 ° C	Objective met
		June 20 - Sep 17	90	15.1 - 18.4 ° C	Objective not met
		Sep 18 - Dec 30	100	0.1 - 14.7 ° C	Objective met
Temperature < 20 °C Jul - Aug. < 18 °C Sep - Jun. ~ 100 m u/s Stuart River	Nechako River: at Vanderhoof ~40 km u/s Stuart R. confl. (DFO's Vanderhoof site)	May 3 - Jun 26	43	6.6 - 17.9 ° C	Objective met
		May 24,30,31, Jun 2-7, 20-22, Jun 27-30	16	18.2 - 20.9 ° C	Objective not met
		Jul 1 - Aug 31	61	13.8 - 19.2 ° C	Objective met
		Jul. 6	1	20.1 ° C	Objective not met
Total Gas Pressure 109 % max	Nechako River: 0400631 200 m d/s Fort Fraser	Feb 9 - Feb 21	2	99.8 - 100 %	Objective met
	E207451 2 km d/s Vanderhoof	Feb 7 - Mar 8	3	96 - 100 %	Objective met

TABLE 7

FRASER RIVER (FROM THE SOURCE TO HOPE) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms <100/100 mL 90th percentile (np)	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	0 - 20/100 mL np = 10/100 mL	Objective met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Feb 27 - Mar 20	6	0 - 90/100 mL np = 55/100 mL	Objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	20 - 400/100 mL np = 370/100 mL	Objective not met
	E221566 at Longbar u/s Quesnel	Feb 22 - Mar 22	5	51 - 95/100 mL np = 80/100 mL	Objective met
	0600011 at Marguerite d/s Quesnel	Feb 15 - Mar 15	6	17 - 1000/100 mL np = 530/100 mL	Objective not met
	E206581 at Hope	Mar 6 - Mar 22	4	4 - 43/100 mL	Indefinite result
E. coli <100/100 mL 90th percentile (np)	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	0 - 2/100 mL np = 1/100 mL	Objective met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Feb 27 - Mar 20	6	0 - 2/100 mL np = 1/100 mL	Objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	30 - 300/100 mL np = 280/100 mL	Objective not met
	E221566 at Longbar u/s Quesnel	Feb 22 - Mar 28	3	22 - 56/100 mL	Indefinite result
	0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 8	3	10 - 12/100 mL	Indefinite result
Chlorine Residual < 2ug/L av	Fraser River	1995	0	no data collected	Objective not checked
Suspended Solids 10 mg/L or 10% max increase	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	< 4 - 9/100 mL	Control site 1
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	5 - 12/mg/L max inc. = 3 mg/L	Objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	< 4 - 13 mg/L max inc. = 6 mg/L	Objective met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	43 - 332 mg/L	Control site 2
	0600011 at Marguerite d/s Quesnel	Jan 5 - Feb 15 Mar 1,8, Apr 11, Nov 26 Mar. 15 Mar. 22	4 4 1 1	< 4 - 8 mg/L < 4 - 8 mg/L 78 mg/L, inc = 35 mg/L 186 mg/L, inc. = 0 mg/L	Obj. met Obj. met Obj. not met Obj. met

TABLE 7 continued

FRASER RIVER (FROM THE SOURCE TO HOPE) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Turbidity 1 - 5 NTU max increase (control: 5 - 50 NTU)	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	1.1 - 5.9 NTU	Control site 1
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar.13	1	3.2 NTU, inc. - 1.3 NTU	Obj. not met
		Mar. 20	1	4.3 NTU, inc. = 0 NTU	Obj. met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	4	1.9 - 3.1 NTU max inc. = 1.0 NTU	Objective met
		Mar. 13	1	5.2 NTU inc. = 3.3 NTU	Objective not met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	62 - 76 NTU	Control site 2
	0600011 at Marguerite d/s Quesnel	Mar 15 - Mar 22	2	31 - 45 NTU max inc. = 0 NTU	Objective met
Colour 15 TCU max Jun - Sep 75 TCU max Oct - May	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	< 5 - 14 SWU	Objective met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	27 - 32 SWU	Objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	26 39 SWU	Objective met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	10 - 28 SWU	Objective met
	0600011 at Marguerite d/s Quesnel	Jan 5 - May 24 Jun 7 - Sep 26 Oct 9 - Dec 19	9 8 6	16 - 51 TAC 4 - 13 TAC 6 - 24 TAC	Obj. met Obj. met Obj. met
	E206581 at Hope	Mar 6 - Mar 29	5	14 - 26 SWU	Objective met
Temperature 1 °C max increase	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	0 °C at sampling depth 0.5 m	Control site 1
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	0 °C at sampling depth 0.5 m	Objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	0 °C at sampling depth 0.5 m	Objective met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	0 °C at sampling depth 0.5 m	Control site 2
	0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 22	5	0 °C at sampling depth 0.5 m	Objective met

TABLE 7 continued

FRASER RIVER (FROM THE SOURCE TO HOPE) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Ammonia-N < 1.78 mg/L av 9.26 mg/L max at pH = 7.8 temp = 0 °C	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	< 0.005 - 0.005 mg/L	Objectives met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	< 0.005 - 0.012 mg/L	Max objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	< 0.005 - 0.032 mg/L	Objectives met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	0.023 - 0.029 mg/L	Max objective met
	0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 22	5	< 0.005 - 0.029 mg/L	Objectives met
		Jan 5 - Feb 15 Mar 27 - Dec 19	4 16	0.006 - 0.041 mg/L < 0.005 - 0.010 mg/L	Max obj. met Max obj. met
	E206581 at Hope	Mar 6 - Mar 29	5	< 0.005 - 0.013 mg/L	Objectives met
Nitrite-N < 0.04 mg/L av 0.12 mg/L max at chloride 2-4 mg/L	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	all < 0.005 mg/L	Objectives met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	< 0.005 - 0.007 mg/L	Max objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	all < 0.005 mg/L	Objectives met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	< 0.005 - 0.005 mg/L	Max objective met
	0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 22	5	all < 0.005 mg/L	Objectives met
	E206581 at Hope	Mar 6 - Mar 29	5	< 0.005 - 0.008 mg/L	Objectives met
Nitrate+Nitrite-N 10 mg/L max	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	0.10 - 0.14 mg/L	Objective met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	0.11 - 0.15 mg/L	Objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	0.07 - 0.11 mg/L	Objective met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	0.09 - 0.11 mg/L	Objective met

TABLE 7 continued

FRASER RIVER (FROM THE SOURCE TO HOPE) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Nitrate+Nitrite-N 10 mg/L max	Fraser River: 0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 22	5	0.10 - 0.12 mg/L	Objective met
	E206581 at Hope	Mar 6 - Mar 29	5	0.08 - 0.11 mg/L	Objective met
Chlorophyll-a 50 mg/m2 max	Fraser River	1995	0	no data collected	Objective not checked
pH 6.5 - 8.5	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	7.6 - 7.9	Objective met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	7.7 - 7.8	Objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	7.4 - 7.9	Objective met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	7.5 - 7.8	Objective met
	0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 22	5	6.9 - 7.8	Objective met
	E206581 at Hope	Mar 6 - Mar 29	5	7.7 - 8.0	Objective met
Dissolved Oxygen 8.0 mg/L min May to Oct 11.0 mg/L min Nov to Apr	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 27 - Mar 20	4	12.4 - 12.8 mg/L	Objective met
		Feb. 20	1	10.8 mg/L	Objective not met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	11.6 - 12.9 mg/L	Objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 27 - Mar 20	4	12.6 - 13.7 mg/L	Objective met
		Feb. 20	1	10.8 mg/L	Objective not met
	E221566 at Longbar u/s Quesnel	Feb 22 - Mar 22	4	13.0 - 13.4 mg/L	Objective met
	0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 22	4	12.8 - 13.2 mg/L	Objective met
Total Lead 0.8 ug/g max in fish muscle	Fraser River	1995	0	no data collected	Objective not checked
Total PCBs 2.0 ug/g max in fish muscle 0.1 ug/g max in whole fish	Fraser River	1995	0	no data collected	Objectives not checked

TABLE 7 continued

FRASER RIVER (FROM THE SOURCE TO HOPE) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Chlorophenols max TCPs pH 7.8: 2,3,4-: 0.1 ug/L 2,3,5-: 0.08 ug/L 2,3,6-: 0.32 ug/L 2,4,5-: 0.08 ug/L 2,4,6-: 0.5 ug/L 3,4,5-: 0.06 ug/L tot: 1.14 ug/L max TTCPs pH 7.8: 2,3,4,5-: 0.2 ug/L 2,3,4,6-: 0.3 ug/L tot: 0.6 ug/L max PCP pH 7.8: 0.1 ug/L	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	2,3,4-TCP < 0.1 ug/L	Objective met
			5	2,3,5-TCP < 0.1 ug/L	Indefinite result
			5	2,3,6-TCP < 0.1 ug/L	Objective met
			5	2,4,5-TCP < 0.1 ug/L	Indefinite result
			5	2,4,6-TCP < 0.1 ug/L	Objective met
			5	3,4,5-TCP < 0.1 ug/L	Indefinite result
			5	tot TCP < 0.1 ug/L	Objective met
			5	2,3,4,5-TTCP < 0.1 ug/L	Objective met
			5	2,3,4,6 -TTCP <0.1 ug/L	Objective met
			5	tot TTCP < 0.1 ug/L	Objective met
			5	PCP < 0.1 ug/L	Objective met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	2,3,4-TCP < 0.1 ug/L	Objective met
			2	2,3,5-TCP < 0.1 ug/L	Indefinite result
			2	2,3,6-TCP < 0.1 ug/L	Objective met
			2	2,4,5-TCP < 0.1 ug/L	Indefinite result
			2	2,4,6-TCP < 0.1 ug/L	Objective met
			2	3,4,5-TCP < 0.1 ug/L	Indefinite result
			2	tot TCP < 0.1 ug/L	Objective met
			2	2,3,4,5-TTCP < 0.1 ug/L	Objective met
			2	2,3,4,6 -TTCP <0.1 ug/L	Objective met
			2	tot TTCP < 0.1 ug/L	Objective met
			2	PCP < 0.1 ug/L	Objective met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	2,3,4-TCP < 0.1 ug/L	Objective met
			5	2,3,5-TCP < 0.1 ug/L	Indefinite result
			5	2,3,6-TCP < 0.1 ug/L	Objective met
			5	2,4,5-TCP < 0.1 ug/L	Indefinite result
			5	2,4,6-TCP < 0.1 ug/L	Objective met
			5	3,4,5-TCP < 0.1 ug/L	Indefinite result
			5	tot TCP < 0.1 ug/L	Objective met
			5	2,3,4,5-TTCP < 0.1 ug/L	Objective met
			5	2,3,4,6 -TTCP <0.1 ug/L	Objective met
			5	tot TTCP < 0.1 ug/L	Objective met
			5	PCP < 0.1 ug/L	Objective met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	2,3,4-TCP < 0.1 ug/L	Objective met
			2	2,3,5-TCP < 0.1 ug/L	Indefinite result
			2	2,3,6-TCP < 0.1 ug/L	Objective met
			2	2,4,5-TCP < 0.1 ug/L	Indefinite result
			2	2,4,6-TCP < 0.1 ug/L	Objective met
			2	3,4,5-TCP < 0.1 ug/L	Indefinite result
			2	tot TCP < 0.1 ug/L	Objective met
			2	2,3,4,5-TTCP < 0.1 ug/L	Objective met
			2	2,3,4,6 -TTCP <0.1 ug/L	Objective met
			2	tot TTCP < 0.1 ug/L	Objective met
			2	PCP < 0.1 ug/L	Objective met
	0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 22	5	2,3,4-TCP < 0.1 ug/L	Objective met
			5	2,3,5-TCP < 0.1 ug/L	Indefinite result
			5	2,3,6-TCP < 0.1 ug/L	Objective met
			5	2,4,5-TCP < 0.1 ug/L	Indefinite result
			5	2,4,6-TCP < 0.1 ug/L	Objective met
			5	3,4,5-TCP < 0.1 ug/L	Indefinite result
			5	tot TCP < 0.1 ug/L	Objective met

TABLE 7 continued

FRASER RIVER (FROM THE SOURCE TO HOPE) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Chlorophenols max TCPs pH 7.8: 2,3,4-: 0.1 ug/L 2,3,5-: 0.08 ug/L 2,3,6-: 0.32 ug/L 2,4,5-: 0.08 ug/L 2,4,6-: 0.5 ug/L 3,4,5-: 0.06 ug/L tot: 1.14 ug/L max TTCPs pH 7.8: 2,3,4,5-: 0.2 ug/L 2,3,4,6-: 0.3 ug/L tot: 0.6 ug/L max PCP pH 7.8: 0.1 ug/L	Fraser River: 0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 22	5 5 5 5	2,3,4,5-TTCP < 0.1 ug/L 2,3,4,6 -TTCP <0.1 ug/L tot TTCP < 0.1 ug/L PCP < 0.1 ug/L	Objective met Objective met Objective met Objective met
	E206581 at Hope	Mar 6 - Mar 29	5 5 5 5 5 5 5 5 5 5 5	2,3,4-TCP < 0.1 ug/L 2,3,5-TCP < 0.1 ug/L 2,3,6-TCP < 0.1 ug/L 2,4,5-TCP < 0.1 ug/L 2,4,6-TCP < 0.1 ug/L 3,4,5-TCP < 0.1 ug/L tot TCP < 0.1 ug/L 2,3,4,5-TTCP < 0.1 ug/L 2,3,4,6 -TTCP <0.1 ug/L tot TTCP < 0.1 ug/L PCP < 0.1 ug/L	Objective met Indefinite result Objective met Indefinite result Objective met Indefinite result Objective met Objective met Objective met Objective met Objective met
AOX no increase over control at 95% confidence	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	all < 0.01 mg/L	Control site 1
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	0.05 - 0.07 mg/L inc. = 400 - 600 %	Objective not met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	0.04 - 0.11 mg/L inc. = 300 - 1000 %	Objective not met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	0.03 - 0.04 mg/L	Control site 2
	0600011 at Marguerite d/s Quesnel	Mar 15 - Mar 22	2	0.03 - 0.05 mg/L inc. = 0 - 25 %	Objective met
Resin Acids 12 ug/L max DHA 45 ug/L max total at pH 7.5	Fraser River: 0400023 at Hansard (u/s Pr. Ge.)	Feb 20 - Mar 20	5	DHA: all < 1 ug/L total: all < 7 ug/L	Objectives met
	E221565 at Pr. Ge. CNR bridge (d/s Pr. Ge. mills)	Mar 13 - Mar 20	2	DHA: < 1 -1 ug/L total: < 7 - 7 ug/L	Objectives met
	E206182 at Stoner (d/s Pr. Ge. mills)	Feb 20 - Mar 20	5	DHA: <1 - 3 ug/L total: < 7 - 5 ug/L	Objectives met
	E221566 at Longbar u/s Quesnel	Mar 15 - Mar 22	2	DHA: <1 - 1 ug/L total: < 7 - 1 ug/L	Objectives met
	0600011 at Marguerite d/s Quesnel	Feb 22 - Mar 22	5	DHA: < 1 - 11 ug/L total: < 7 - 43 ug/L	Objectives met
	E206581 at Hope	Mar 6 - Mar 29	5	DHA: all < 1 ug/L total: all < 7 ug/L	Objectives met

TABLE 7 continued

FRASER RIVER (FROM THE SOURCE TO HOPE) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dioxins and Furans in water 0.06 pg/L max TCDD-TEQ	Fraser River	1995	0	no data collected	Objective not checked
Dioxins and Furans in sediments 0.25 pg/g max TCDD-TEQ	Fraser River	1995	0	no data collected	Objective not checked
Dioxins and Furans in fish lipids 50 pg/g TCDD-TEQ	Fraser River: R4 at Stoner	Sep. 7	6	0 - 17 pg/g TCDD-TEQ in lipid of mountain whitefish muscle	Objective met
	R7 below Quesnel	Sep. 10	7	4.2 - 26.1 pg/g TCDD-TEQ in lipid of mountain whitefish muscle	Objective met
			1	527 pg/g TCDD-TEQ in lipid of mountain whitefish muscle	Objective not met
	R10 below Lillooet	Sep. 10	2	5.2 - 5.5 pg/g TCDD-TEQ in lipid of mountain whitefish muscle	Objective met
	R16 above Hope	Oct. 11	2	24.1 - 24.6 pg/g TCDD-TEQ in lipid of mountain whitefish muscle	Objective met

TABLE 8

WILLIAMS LAKE WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliform < 200/100 mL geometric mean (gm) < 400/100 mL 90th percentile (np) at beaches	Williams Lake: E221221 Scout Island Beach	Jun 8 - Aug 31	4	5 - 25/100 mL	Indefinite results
Fecal Coliform < 10/100 mL 90th percentile at water intakes	Williams Lake water intake sites	1995	0	no data collected	Objective not checked
Turbidity < 1 NTU av 5 NTU max.	Williams Lake: 0603019 at lake centre	Apr. 11	5	0.5-18 m: 1.5 - 3.0 NTU	Max obj. met
		Aug 3 - Aug 26	5	0 m: 1.8 - 3.2 NTU	Av not met Max. obj. met
		Sep. 5	1	0 m: 1.5 NTU	Max obj. met
Total P < 0.020 mg/L av at spring overturn	Williams Lake: 0603019 at lake centre	Apr. 11	1 1 1 1	0.5 m : 0.082 mg/L 5 m : 0.086 mg/L 10 m : 0.086 mg/L 18 m : 0.076 mg/L av = 0.083 mg/L	Objective not met
Chlorophyll-a < 5 ug/L av (May to Aug)	Williams Lake: 0603019 at lake centre	May 13 - Aug 9	4	5.1 - 12.4 ug/L av = 7.5 ug/L	Objective not met
Dissolved Oxygen 4.0 mg/L min 5 m above sed.	Williams Lake: 0603019 at lake centre	May 13 - Jun 12	2	14.5 m: 5.3 - 5.8 mg/L	Objective met
		Aug 9 - Oct 1	3	14.5 m: 0.5 - 1.3 mg/L	Objective not met
Water Clarity 1.2 m min Secchi reading (May to August)	Williams Lake: 0603019 at lake centre	May 13 - Aug 9	4	2.0 - 4.2 m	Objective met

TABLE 9

SAN JOSE RIVER WATER QUALITY OBJECTIVE - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved P 2500 kg/year max. loading at the inlet to Williams Lk	San Jose River: 08MC040 (near 0600317) u/s Borland Creek	Jan 15 - Nov 21	41	0.144 - 1.91 m3/s river flow	Objective met
	Borland Creek: 08MC039 (near 0600105) at the mouth	Jan 15 - Nov 21	41	0.006 - 0.078 m3/s creek flow	
	San Jose River: 0600316 d/s Borland Creek	Jan 15 - Nov 21	41	0.022 - 0.631 mg/L dissolved P 0.699 - 13.568 kg/day dissolved P total = 1293 kg/year dissolved P	

TABLE 10

OKANAGAN VALLEY LAKES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total-P < 0.040 mg/L av at spring overturn (short-term)	Wood Lake: 0500848 lake centre	Feb. 23	1 1 1 1	1 m: 0.068 mg/L 15 m: 0.031 mg/L 20 m: 0.019 mg/L 30 m: 0.019 mg/L av = 0.034 mg/L	Objective met
Total-P < 0.008 mg/L av overturn	Kalamalka Lake: 0500246 south end	Apr. 24	1 3	1 m: <0.003 mg/L 20 m: <0.003-0.005 mg/L av = 0.003 mg/L	Objective met
	0500461 north end	Apr. 24	1 1	1 m: 0.007 mg/L 20 m: <0.003 mg/L av = 0.005 mg/L	Objective met
Total-P < 0.010 mg/L av at spring overturn	Okanagan Lake: 0500239 Armstrong Arm	Apr. 11	1 4	1 m: 0.009 mg/L 20 m: 0.008-0.018 mg/L av = 0.013 mg/L	Objective not met
	0500238 Vernon Arm	Mar. 14	1 1 1	1 m: 0.007 mg/L 15 m: 0.003 mg/L 20 m: <0.003 mg/L av = 0.004 mg/L	Objective met
	0500730 north basin	Mar. 14	1 3 1	1 m: 0.013 mg/L 15 m: <0.003-0.004 mg/L 20 m: <0.003 mg/L av = 0.005 mg/L	Objective met
	0500236 central basin	Feb. 22	1 1	15 m: <0.003 mg/L 20 m: 0.009 mg/L av = 0.006 mg/L	Objective met
	0500729 south basin	Mar. 12	5 4 1 1	0 m: <0.003-0.004 mg/L 1 m: all <0.003 mg/L 15 m: 0.004 mg/L 20 m: <0.003 mg/L av = 0.003 mg/L	Objective met
Total-P < 0.015 mg/L av at spring overturn	Skaha Lake: 0500615 at centre	Mar.3	1 1	1m: <0.003 mg/L 15 m: 0.004 mg/L 20 m: 0.007 mg/L av = 0.005 mg/L	Objective met
	Osoyoos Lake: 0500249 north end	Feb. 28	1 2 1	0 m: 0.005 mg/L 1 m: all = 0.009 mg/L 15 m: 0.007 mg/L av = 0.007 mg/L	Objective met

TABLE 11

CAHILL CREEK AND TRIBUTARIES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Suspended Solids 10 mg/L or 10% max. increase	Cahill Creek: E206636 d/s tailings	Jan 24 - Aug 8	6	< 4 - 21 mg/L	Control site
	E206637 at highway	Jan 24 - Aug 8	6	< 4 - 19 mg/L increase = 0 - 6 mg/L	Objective met
	Red Top Gulch: E206638 at Highway	Jan 24 - Aug 8	6	all < 4 mg/L	Objective met
Susp. Solids 20 mg/L or 10% max. increase	Cahill Creek: E206635 u/s confluence	Jan. 25	1	< 4 mg/L	Control site
	E206636 d/s tailings	Jan 24 - Aug 1	5	< 4 - 8 mg/L	Objective met
		Aug. 8	1	21 mg/L	Indefinite result
	Nickel Plate Mine Creek: E206633 d/s pit	Jan. 24	1	< 4 mg/L	Objective met
	Sunset Creek: E206634 u/s confluence	Jan. 24	1	< 4 mg/L	Objective met
Turbidity 5 NTU or 10% max. increase	Cahill Creek: E206635 u/s confluence	Jan 25 - Aug 8	6	0.2 - 3.4 NTU	Control site
	E206636 d/s tailings	Jan 24 - Aug 8	6	0.2 - 4.4 NTU increase = 0 - 1.0 NTU	Objective met
	E206637 at highway	Jan 24 - Aug 8	6	0.2 - 4.1 NTU increase = 0.1 - 1.0 NTU	Objective met
	Red Top Gulch: E206638 at highway	Jan 24 - Aug 8	6	0.1 - 0.7 NTU	Objective met
Turbidity 10 NTU or 20% max. increase	Sunset Creek: E215954 u/s Canty Pit	Jul. 10 - Aug. 8	5	0.2 - 1.6 NTU	Control site
	E215955 d/s Canty Pit	Jul. 10 - Aug. 8	5	0.4 - 1.8 NTU increase = 0 - 1.0 NTU	Objective met
	E206634 u/s confluence	Jan. 24	1	0.8 NTU	Objective met
	Nickel Plate Mine Creek: E206633 d/s pit	Jan 24 Aug 8	6	< 0.1 - 0.5 NTU	Objective met

TABLE 11 continued

CAHILL CREEK AND TRIBUTARIES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Solids 500 mg/L max	Cahill Creek: E206635 u/s confluence	Jan. 25	1	76 mg/L	Objective met
	E206636 d/s tailings	Jan. 24	1	156 mg/L	Objective met
	E206637 at highway	Jan. 24	1	156 mg/L	Objective met
	Red Top Gulch: E206638 at highway	Jan. 24	1	576 mg/L	Objective not met
	Nickel Plate Mine Creek: E206633 d/s pit	Jan. 24	1	1130 mg/L	Objective not met
Sulphate < 50 mg/L av 150 mg/L max.	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	< 1.0 - 12.0 mg/L av = 7.1 mg/L	Objectives met
		Jan. 25	1	11.5 mg/L	Max obj. met
	E206636 d/s tailings	Jul 10 - Aug 8	5	27.8 - 59.6 mg/L av = 37.3 mg/L	Objectives met
		Jan 24, Sep 19	2	19.9, 71.1 mg/L	Max obj. met
	E206637 at highway	Jul 10 - Aug 8	5	30.4 - 52.6 mg/L av = 40.5 mg/L	Objectives met
		Jan 24, Nov 19	2	25.8, 72.6 mg/L	Max obj. met
	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	121 - 126 mg/L av = 125 mg/L	Max. obj. met Av. not met
		Jan. 24	1	136 mg/L	Max obj. met
	Nickel Plate Mine Creek: E206633 d/s pit	Jul 10 - Aug 8	5	175 - 384 mg/L av = 332 mg/L	Objectives not met
		Jan 24, Nov 1	2	262 - 404 mg/L	Max not met
WAD-CN < 0.005 mg/L av 0.010 mg/L max	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	all < 0.001 mg/L	Objectives met
	E206636 d/s tailings	Jul 10 - Aug 8	5	all < 0.001 mg/L	Objectives met
	E206637 at highway	Jul. 10 - Aug. 8	5	all < 0.001 mg/L	Objectives met
	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	all < 0.001 mg/L	Objectives met

TABLE 11 continued

CAHILL CREEK AND TRIBUTARIES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
SAD-CN + Thiocyanate as CN 0.20 mg/L max	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	Thiocyanate: all < 0.025 mg/L (SAD-CN not checked)	Indefinite result
	E206636 d/s tailings	Jul. 10 - Aug. 8	5	Thiocyanate: all < 0.025 mg/L (SAD-CN not checked)	Indefinite result
	E206637 at highway	Jul. 10 - Aug. 8	5	Thiocyanate: all < 0.025 mg/L (SAD-CN not checked)	Indefinite result
	Red Top Gulch: E206638 at Highway	Jul. 10 - Aug. 8	5	Thiocyanate: all < 0.025 mg/L (SAD-CN not checked)	Indefinite result
Cyanates as CN 0.45 mg/L max	Cahill Creek: E206637 at highway	Jul. 25 - Aug. 8	3	all < 0.05 mg/L	Objective met
		Jul 10 - Jul 18	2	all < 0.50 mg/L	Indefinite result
	Red Top Gulch: E206638 at Highway	Jul. 25 - Aug. 8	2	all < 0.05 mg/L	Objective met
		Jul 10 - Aug 1	3	< 0.50 - < 5.00 mg/L	Indefinite result
Total As 0.05 mg/L max.	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	all < 0.04 mg/L	Objective met
	E206636 d/s tailings	Jul 10 - Aug 8	5	< 0.04 - 0.04 mg/L	Objective met
	E206637 at highway	Jul. 10 - Aug. 8	5	all < 0.0005 mg/L	Objective met
	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	all < 0.0005 mg/L	Objective met
Total As 0.5 mg/L max	Nickel Plate Mine Creek: E206633 d/s pit	Jul. 10 - Aug. 8	5	< 0.04 - 0.06 mg	Objective met
Ammonia-N < 1.11 mg/L av 5.78 mg/L max at pH = 8.0 temp = 12 °C	Cahill Creek: E206637 at highway	Jan. 24	1	< 0.005 mg/L	Max obj. met Av not chkd.
	Red Top Gulch: E206638 at highway	Jan. 24	1	< 0.005 mg/L	Max obj. met Av not chkd.
Nitrite-N < 0.02 mg/L av 0.06 mg/L max	Cahill Creek: E206637 at highway	Jul 10 - Aug 8 Jul 10 - Aug 8 Jul. 18	5 4 1	av = 0.027 mg/L < 0.005 - 0.026 mg/L 0.086 mg/L	Av not met Max obj. met Max not met
		Jan 24, Sep 19	2	0.015, < 0.005 mg/L	Max objective met

TABLE 11. continued

CAHILL CREEK AND TRIBUTARIES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Nitrite-N < 0.02 mg/L av 0.06 mg/L max	Red Top Gulch: E206638 at highway	Jul 10 - Aug 8	5	<0.005 - 0.023 mg/L av = 0.013 mg/L	Objectives met
		Jan. 24	1	0.007 mg/L	Max obj. met
Nitrite-N 1 mg/L max	Cahill Creek: E206635 u/s confluence	Jan. 25	1	0.010 mg/L	Max obj. met Av not chkd.
	E206636 d/s tailings	Jan 24, Sep, 19	2	0.027, < 0.005 mg/L	Max obj. met
Nitrite-N 10 mg/L max	Nickel Plate Mine Creek E206633 d/s pit	Jan 24, Nov 1	2	0.049, 0.007 mg/L	Max obj. met
Nitrate-N 10 mg/L max	Cahill Creek: E206635 u/s confluence	Jan 25 - Auh 8	6	<0.02 - 0.06 mg/L	Objective met
	E206636 d/s tailings	Jan 24 - Sep 19	7	2.05 - 9.53 mg/L	Objective met
	E206637 at highway	Jan 24 - Sep 19	7	2.35 - 9.02 mg/L	Objective met
	Red Top Gulch: E206638 at highway	Jan 24 - Aug 8	6	5.57 - 6.07 mg/L	Objective met
Nitrate-N 100 mg/L max	Nickel Plate Mine Creek E206633 d/s pit	Jan 24 - Nov 1	7	59.0 - 95.6 mg/L	Objective met
pH 6.5 - 8.5	Cahill Creek: E206635 u/s confluence	Jan 25 - Aug 8	6	6.8 - 7.5	Objective met
	E206636 d/s tailings	Jan 24 - Aug 8	6	7.6 - 7.9	Objective met
	E206637 at highway	Jan 24 - Aug 8	6	7.5 - 7.8	Objective met
	Red Top Gulch: E206638 at highway	Jan 24 - Aug 8	6	8.0 - 8.2	Objective met
	Nickel Plate Mine Creek: E206633 d/s pit	Jan 24 - Nov 1	7	7.8 - 8.1	Objective met
Total Al 0.30 mg/L max or 20% increase at pH > 7	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	0.08 - 0.18 mg/L	Control site

TABLE 11 continued

CAHILL CREEK AND TRIBUTARIES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Al 0.30 mg/L max or 20% increase at pH > 7	Cahill Creek: E206637 at highway	Jul 10 - Aug 1	4	0.18 - 0.24 mg/L	Objective met
		Aug. 8	1	0.43 mg/L increase = 139%	Objective not met
Total Al 0.30 mg/L max at pH > 7	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	0.05 - 0.14 mg/L	Objective met
Total Cd 0.0002 mg/L max	Cahill Creek: E206637 at highway	Jul. 10 - Aug. 8	5	all < 0.0001 mg/L	Objective met
	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	all < 0.0001 mg/L	Objective met
Total Cd 0.005 mg/L	Cahill Creek: E206635 u/s Confluence	Jul. 10 - Aug. 8	5	all < 0.002 mg/L	Objective met
	E206636 d/s tailings	Jul 10 - Aug 8	5	all < 0.002 mg/L	Objective met
Total Cd 0.02 mg/L max	Nickel Plate Mine Creek: E206633 d/s pit	Jul. 10 - Aug. 8	5	all < 0.002 mg/L	Objective met
Total Cu < 0.005 mg/L av 0.007 mg/L max or 20% max. increase	Cahill Creek: E206637 at highway	Jul. 10 - Aug. 8	5	<0.002 - 0.003 mg/L av = 0.002 mg/L	Objectives met
Total Cu < 0.005 mg/L av 0.007 mg/L max	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	all < 0.002 mg/L	Objectives met
Total Cu 0.2 mg/L max	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	< 0.002 - 0.003 mg/L	Objective met
	E206636 d/s tailings	Jul 10 - Aug 8	5	< 0.002 - 0.003 mg/L	Objective met
Total Cu 0.3 mg/L max	Nickel Plate Mine Creek: E206633 d/s pit	Jul 10 - Aug 8	5	< 0.002 - 0.006 mg/L	Objective met
Dissolved Fe 0.3 mg/L max	Cahill Creek: E206635 u/s confluence	Jul 10 - Aug. 4	5	0.07 - 0.22 mg/L	Objective met

TABLE 11 continued

CAHILL CREEK AND TRIBUTARIES WATER QUALITY OBJECTIVES - 1994

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Fe 0.3 mg/L max	Cahill Creek: E206636 d/s tailings	Jul 10 - Aug 1	4	0.09 - 0.17 mg/L	Objective met
		Aug. 8	1	0.41 mg/L	Objective not met
	E206637 at highway	Jul 10 - Aug 1	4	0.16 - 0.26 mg/L	Objective met
		Aug. 8	1	0.45 mg/L	Objective not met
	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	all < 0.05 mg/L	Objective met
	Nickel Plate Mine Creek: E206633 d/s pit	Jul. 10 - Aug. 8	5	all < 0.05 mg/L	Objective met
Total Pb < 0.005 mg/L av 0.015 mg/L max or 20% increase	Cahill Creek: E206637 at highway	Jul. 10 - Aug. 8	5	all < 0.003 mg/L	Objectives met
Total Pb < 0.005 mg/L av 0.015 mg/L max	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	all < 0.003 mg/L	Objectives met
Total Pb 0.05 mg/L max	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	all < 0.03 mg/L	Objective met
	E206636 d/s tailings	Jul 10 - Aug 8	5	all < 0.03 mg/L	Objective met
Total Pb 0.1 mg/L max	Nickel Plate Mine Creek: E206633 d/s pit	Jul. 10 - Aug. 8	5	all < 0.03 mg/L	Objective met
Total Hg 0.1 ug/L max	Cahill Creek at hwy Red Top Gulch at hwy	1995	0	no data collected	Omitted 1995
Total Hg 1 ug/L max	Cahill Creek u/s hwy Red Top Gulch Ck u/s hwy	1995	0	no data collected	Omitted 1995
Total Hg 3 ug/L	Nickel Plate Mine Creek	1995	0	no data collected	Omitted 1995
Total Hg in fish muscle 0.5 ug/g max wet wt	Cahill Creek at hwy Red Top Gulch at hwy	1995	0	no data collected	Omitted 1995
Total Mo 0.01 mg/L av 0.05 mg/L max (May - Sep)	Red Top Gulch: E206638 at highway	Jan. 24	1	< 0.004 mg/L (dissolved Mo)	Indefinite result

TABLE 11 continued

CAHILL CREEK AND TRIBUTARIES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Mo < 0.01 mg/L av 0.05 mg/L max or 20% max. increase (May - Sep)	Cahill Creek: E206635 u/s confluence	Jul 10 - Aug 8	5	all < 0.004 mg/L	Control site
	E206636 d/s tailings	Jul 10 - Aug 8	5	all < 0.004 mg/L	Objectives met
	E206637 at highway	Jan. 24	1	< 0.004 mg/L (dissolved Mo)	Indefinite result
Total Mo 0.05 mg/L max	Nickel Plate Mine Creek: E206633 d/s pit	Jul. 10 - Aug. 8	5	all < 0.004 mg/L	Objective met
Total Se 1 ug/L max or 20% max inc.	Cahill Creek: E206637 at highway	Jul. 10 - Aug. 8	5	all < 0.5 ug/L	Objective met
Total Se 1 ug/L max	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	all < 0.5 ug/L	Objective met
Total Se 10 ug/L max	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	all < 0.5 ug/L	Objective met
	E206636 d/s tailings	Jul. 10 - Aug. 8	5	all < 0.5 ug/L	Objective met
Total Se 50 ug/L max	Nickel Plate Mine Creek: E206633 d/s pit	Jul. 10 - Aug. 8	5	all < 0.5 ug/L	Objective met
Total Ag 0.0001 mg/L max or 20% max. increase	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	all < 0.03 mg/L	Control site
	E206637 u/s confluence at highway	Jul. 10 - Aug. 8	4	all < 0.0001 mg/L	Objective met
		Jul. 25	1	0.0002 mg/L	Indefinite result
	Red Top Gulch: E206638 at highway	Jul 10 - Aug 8	5	all < 0.0001 mg/L	Objective met
Total Ag 0.05 mg/L max or 20% max. increase	Cahill Creek: E206635 u/s Confluence	Jul. 10 - Aug. 8	5	all < 0.03 mg/L	Objective met
	E206636 d/s tailings	Jul 10 - Aug 8	5	all < 0.03 mg/L	Objective met
	Nickel Plate Mine Creek: E206633 d/s pit	Jul 10 - Aug 8	5	all < 0.03 mg/L	Objective met

TABLE 11 continued

CAHILL CREEK AND TRIBUTARIES WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Zn 0.05 mg/L max	Cahill Creek: E206635 u/s confluence	Jul. 10 - Aug. 8	5	all < 0.01 mg/L	Objective met
	E206636 d/s tailings	Jul. 10 - Aug. 8	5	< 0.01 - 0.02 mg/L	Objective met
	E206637 at highway	Jul. 10 - Aug. 8	5	all < 0.01 mg/L	Objective met
	Red Top Gulch: E206638 at highway	Jul. 10 - Aug. 8	5	all < 0.01 mg/L	Objective met
	Nickel Plate Mine Creek: E206633 d/s pit	Jul. 10 - Aug. 8	5	all < 0.01 mg/L	Objective met

TABLE 12

BESSETTE CREEK WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms <100/100 mL 90th perc. (np) 200/100 mL max	Bessette Creek: 0500293 u/s Lumby	Jul 6 - Aug 2	5	160 - 570/100 mL np = 500/100 mL	np not met
		Jul 6 - Jul 20	3	160 - 200/100 mL	Max obj. met
		Jul 25 - Aug 2	2	430 - 570/100 mL	Max not met
	0500294 d/s Lumby STP	Jul 6 - Aug 2	5	90 - 700/100 mL np = 610/100 mL	np not met
		Jul 6 - Jul 20	3	90 - 170/100 mL	Max obj. met
		Jul 25 - Aug 2	2	530 - 700/100 mL	Max not met
	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Aug 2	5	250 - 3300/100 mL np = 1900/100 mL	Objectives not met
	0500646 d/s Riverside mill	Jul 6 - Aug 2	5	400 - 3200/100 mL np = 2100/100 mL	Objectives not met
	Spider Creek: 0500643 u/s Riverside Mill	Jul 6 - Aug 2	5	300 - 4100/100 mL np = 3400/100 mL	Objectives not met
	0500644 near mouth	Jul 6 - Aug 2	5	36 - 1500/100 mL np = 870/100 mL	np not met
		Jul 6 - Aug 2	3	36 - 100/100 mL	Max obj. met
		Jul 12 - Jul 25	2	240 - 1500/100 mL	Max not met
E. coli <100/100 mL 90th perc. (np) 200/100 mL max	Bessette Creek: 0500293 u/s Lumby	Jul 6 - Aug 2	5	10 - 360/100 mL np = 230/100 mL	np not met
		Jul 6 - Aug 2	4	10 - 100/100 mL	Max obj. met
		Jul. 25	1	360/100 mL	Max not met
	0500294 d/s Lumby STP	Jul 6 - Aug 2	5	8 - 100/100 mL np = 95/100 mL	Objectives met
	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Aug 2	5	5 - 540/100 mL np = 330/100 mL	np not met
		Jul 6 - Aug 2	4	5 - 130/100 mL	Max obj. met
		Jul. 25	1	540/100 mL	Max not met
	0500646 d/s Riverside mill	Jul 6 - Aug 2	5	6 - 500/100 mL np = 310/100 mL	np not met
		Jul 6 - Aug 2	4	6 - 120/100 mL	Max obj. met
		Jul. 12	1	500/100 mL	Max not met
	Spider Creek: 0500643 u/s Riverside Mill	Jul 6 - Aug 2	5	40 - 2600/100 mL np = 1450/100 mL	np not met
		Jul 6 - Jul 26	3	40 - 200/100 mL	Max obj. met
		Jul 20 - Aug 2	2	300 - 2600/100 mL	Max not met
	0500644 near mouth	Jul 6 - Aug 2	5	7 - 580/100 mL np = 370/100 mL	np not met
		Jul 6 - Aug 2	4	7 - 160/100 mL	Max obj. met
		Jul. 25	1	580/100 mL	Max not met
Enterococci <25/100 mL 90th percentile 50/100 mL max	Bessette Creek Lawson Creek Spider Creek	1995	0	no data collected	Omitted 1995

TABLE 12 continued

BESSETTE CREEK WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Solids 500 mg/L max or 20% increase	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Jul 26	4	368 - 400 mg/L	Control site
	0500646 d/s Riverside mill	Jul 6 - Jul 26	4	410 - 450 mg/L	Objective met
	Spider Creek: 0500643 u/s Riverside Mill	Jul 6 - Aug 2	5	376 - 466 mg/L	Control site
	0500644 near mouth	Jul. 6 Jul 12 - Jul 26	1 3	500 mg/L 502 - 750 mg/L (increase = 22 - 80%)	Obj. met Obj. not met
Suspended Solids 10 mg/L or 10% maximum increase	Bessette Creek: 0500293 u/s Lumby	Jul 6 - Aug 2	5	all < 4 mg/L	Control site
	0500294 d/s Lumby STP	Jul 6 - Aug 2	5	all < 4 mg/L	Objective met
	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 Jul 26	4	< 4 - 21 mg/L	Control site
	0500646 d/s Riverside mill	Jul 6 - Jul 26	4	5 - 13 mg/L max. inc. = 6 mg/L	Objective met
	Spider Creek: 0500643 u/s Riverside Mill	Jul 6 - Aug 2	5	7 - 17 mg/L	Control site
	0500644 near mouth	Jul 6 - Jul 26	3	10 - 19 mg/L max. inc. = 2 mg/L	Objective met
		Jul. 20	1	25 mg/L max inc. = 18 mg/L	Objective not met
	Harris Creek: E209072 u/s Bell Pole	Jul 6 - Aug 2	5	all < 4 mg/L	Control site
	E210219 at Bell Pole	Jul 6 - Aug 2	5	< 4 - 4 mg/L	Objective met
Substrate Sedimentation no increase in weight of particles <3 mm diameter	Bessette Creek Lawson Creek Spider Creek Harris Creek	1995	0	no data collected	Omitted 1995
Turbidity 5 NTU or 10% max. increase	Bessette Creek: 0500293 u/s Lumby	Jul 6 - Aug 2	5	0.4 - 1.6 NTU	Control site

TABLE 12 continued

BESSETTE CREEK WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Turbidity 5 NTU or 10% max increase	Bessette Creek 0500294 d/s Lumby STP	Jul 6 - Aug 2	5	0.4 - 1.1 NTU	Objective met
	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Jul 26	4	0.3 - 3.0 NTU	Control site
	0500646 d/s Riverside mill	Jul 6 - Jul 26	4	0.3 - 2.3 NTU	Objective met
	Spider Creek: 0500643 u/s Riverside Mill	Jul 6 - Aug 2	5	0.6 - 3.7 NTU	Control site
	0500644 near mouth	Jul 6 - Jul 26	4	0.9 - 5.4 NTU max. inc. = 1.7 NTU	Objective met
	Harris Creek: E207072 u/s Bell Pole	Jul 6 - Aug 2	5	0.3 - 0.7 NTU	Control site
	E210219 at Bell Pole	Jul 6 - Aug 2	5	0.3 - 1.0 NTU	Objective met
Ammonia-N < 1.66mg/L av 12.2 mg/L max at pH = 7.5 temp = 16 °C	Bessette Creek Lawson Creek Spider Creek	1995	0	no data collected	Omitted 1995
	Harris Creek E209072 u/s Bell Pole	Jul 6 - Aug 2	5	< 0.005 - 0.006 mg/L	Objectives met
	E210219 at Bell Pole	Jul 6 - Aug 2	5	all < 0.005 mg/L	Objectives met
Nitrite-N < 0.04 mg/L av 0.12 mg/L max av Cl = 2 - 4 mg/L	Bessette Creek: 0500293 u/s Lumby	Jul 6 - Aug 2	5	< 0.005 - 0.011 mg/L	Objectives met
	0500294 d/s Lumby STP	Jul 6 - Aug 2	5	< 0.005 - 0.009 mg/L	Objectives met
Nitrite-N < 0.20 mg/L av 0.60 mg/L max av Cl > 10 mg/L	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Jul 26	4	0.011 - 0.026 mg/L	Max obj. met av not checked
	0500646 d/s Riverside mill	Jul 6 - Jul 26	4	< 0.005 - 0.032 mg/L	Max obj. met

TABLE 12 continued

BESSETTE CREEK WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Nitrite-N < 0.20 mg/L av 0.60 mg/L max av Cl > 10 mg/L	Spider Creek: 0500644 near mouth	Jul 6 - Jul 26	4	< 0.005 - 0.007 mg/L	Max obj. met av not checked
Nitrite-N < 0.02 mg/L av 0.06 mg/L max av Cl < 2 mg/L	Spider Creek: 0500643 u/s Riverside Mill	Jul 6 - Aug 2	5	< 0.005 - 0.013 mg/L	Objectives met
	Harris Creek: E209072 u/s Bell Pole	Jul 6 - Aug 2	5	all < 0.005 mg/L	Objectives met
	E210219 at Bell Pole	Jul 6 - Aug 2	5	all < 0.005 mg/L	Objectives met
Nitrate-N 10 mg/L max	Bessette Creek: 0500293 u/s Lumby	Jul 6 - Aug 2	5	< 0.02 - 0.04 mg/L	Objective met
	0500294 d/s Lumby STP	Jul 6 - Aug 2	5	< 0.02 - 0.10 mg/L	Objective met
	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Jul 26	4	0.68 - 0.86 mg/L	Objective met
	0500646 d/s Riverside mill	Jul 6 - Jul 26	4	0.57 - 0.66 mg/L	Objective met
	Spider Creek: 0500643 u/s Riverside Mill	Jul 6 - Aug 2	5	all < 0.02 mg/L	Objective met
	0500644 near mouth	Jul 6 - Jul 26	4	all < 0.02 mg/L	Objective met
	Harris Creek: E207072 u/s Bell Pole	Jul 6 - Aug 2	5	all < 0.02 mg/L	Objective met
	E210219 at Bell Pole	Jul 6 - Aug 2	5	all < 0.02 mg/L	Objective met
Chlorophyll-a 100 mg/m2 max	Bessette Creek: 0500294 d/s Lumby STP	Aug. 2	6	7.9 - 63.8 mg/m2 av = 36 mg/m2	Objective met
	Harris Creek: E210219 at Bell Pole	Aug. 2	6	16.8 - 33.9 mg/m2 av = 28 mg/m2	Objective met

TABLE 12 continued

BESSETTE CREEK WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Chlorophyll-a 100 mg/m2 max	Lawson Creek Spider Creek	1995	0	no data collected	Omitted 1995
Colour 15 TCU max. or 20% increase	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Jul 26	4	5 - 20 TCU	Control site
	0500646 d/s Riverside mill	Jul 6 - Jul 26	4	5 - 20 TCU (no inc. over obj.)	Objective met
	Spider Creek: 0500643 u/s Riverside mill	Jul 6 - Aug 2	5	all = 5 TCU	Control site
	0500644 near mouth	Jul 6 - Jul 26	4	5 - 10 TCU	Objective met
Temperature 1°C max. increase	Duteau Creek	1995	0	no data collected	Omitted 1995
pH 6.5 - 8.5 or 0.2 max. increase at pH > 8.5	Bessette Creek: 0500293 u/s Lumby	Jul 6 - Aug 2	4	7.5 - 7.7	Objective met
	0500294 d/s Lumby STP	Jul 6 - Aug 2	4	7.3 - 7.8	Objective met
pH 6.5 - 8.5	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Jul 26	4	7.7 - 8.0	Objective met
	0500646 d/s Riverside mill	Jul 6 - Jul 26	4	7.5 - 7.8	Objective met
	Spider Creek: 0500643 u/s Riverside Mill	Jul 6 - Aug 2	5	8.0 - 8.2	Objective met
	0500644 near mouth	Jul 6 - Jul 26	4	7.0 - 7.4	Objective met
	Harris Creek: E209072 u/s Bell Pole	Jul 6 - Aug 2	5	7.3 - 7.5	Objective met
	E210219 at Bell Pole	Jul 6 - Aug 2	5	7.1 - 7.5	Objective met
Dissolved Oxygen 8 - 11 mg/L min	Bessette Creek: 0500293 u/s Lumby	Jul 6 - Aug 2	5	10.2 - 10.8 mg/L	Objective met
	0500294 d/s Lumby STP	Jul 6 - Aug 2	5	10.0 - 10.8 mg/L	Objective met

TABLE 12 continued

BESSETTE CREEK WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Oxygen 8 - 11 mg/L min	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Aug 2	5	9.6 - 10.3 mg/L	Objective met
	0500646 d/s Riverside mill	Jul 6 - Aug 2	5	8.0 - 9.6 mg/L	Objective met
	Spider Creek: 0500643 u/s Riverside Mill	Jun. 27 - Jul. 25	5	8.8 - 11.0 mg/L	Objective met
	0500644 near mouth	Jul 12 - Jul 20 Jul 6 - Aug 2	2 3	8.6 - 9.0 mg/L 5.6 - 7.9 mg/L	Objective met Obj. not met
	Harris Creek: E209072 u/s Bell Pole	Jul 6 - Aug 2	5	10.0 - 10.8 mg/L	Objective met
	E210219 at Bell Pole	Jul 6 - Aug 2	5	10.2 - 10.8 mg/L	Objective met
Resin Acids DHA: 0.012 mg/L max. Total: 0.045 mg/L max at pH = 7.5	Lawson Creek: 0500645 u/s Riverside mill	Jul 6 - Jul 26	4	DHA: all < 0.001 mg/L Total: all < 0.007 mg/L	Objectives met
	0500646 d/s Riverside mill	Jul 6 - Jul 26	4	DHA: < 0.001 - 0.001 mg/L Total: all < 0.007 mg/L	Objectives met
	Spider Creek: 0500644 near mouth	Jul 6 - Jul 26	4	DHA: all < 0.001 mg/L Total: all < 0.007 mg/L	Objectives met
	Harris Creek:	1995	0	no data collected	Omitted 1995
Total Chlorophenols in sediments 0.005 ug/g max dry weight (av of 3 reps)	Harris Creek E209072 u/s Bell Pole	Aug. 2 (3 reps)	3	TCP: 0.0025 ug/g av TTCP: 0.0025 ug/g av PCP: < 0.005 ug/g av	Objective met
	E210219 at Bell Pole	Jul. 26	1	TCP: 0.08 ug/g TTCP: 0.01 ug/g PCP: 0.03 ug/g	Objective not met
Total Chlorophenols in fish: 0.1 ug/g max wet weight	Harris Creek:	1995	0	no data collected	Omitted 1995
Mono-CP 0.5 ug/L max	Harris Creek	1995	0	no data collected	Objective not checked
Di-CP 0.1 ug/L max	Harris Creek	1995	0	no data collected	Objective not checked

TABLE 12 continued

BESSETTE CREEK WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Tri-CP 0.05 ug/L max	Harris Creek E209072 u/s Bell Pole	Jul 6 - Aug 2	5	all < 0.1 ug/L total & for for each isomer	Objective met
	E210219 at Bell Pole	Jun 27 - Jul 25	5	all < 0.1 ug/L total & for for each isomer	Objective met
Tetra-CP 0.1 ug/L max	Harris Creek E209072 u/s Bell Pole	Jun 27 - Jul 25	5	all < 0.1 ug/L total & for for each isomer	Objective met
	E210219 at Bell Pole	Jun 27 - Jul 25	5	all < 0.1 ug/L total & for for each isomer	Objective met
Penta-CP 0.05 ug/L max	Harris Creek E209072 u/s Bell Pole	Jun 27 - Jul 25	5	all < 0.1 ug/L	Objective met
	E210219 at Bell Pole	Jun 27 - Jul 25	5	all < 0.1 ug/L	Objective met

TABLE 13

TRIBUTARIES TO OKANAGAN LAKE NEAR VERNON WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms <100/100 mL 90th percentile (np)	Lower Vernon Creek: 0500089 Kalamalka Lake outlet	Jul 6 - Aug 3	5	14 - 130 /100 mL np = 90/100 mL	Objective met
	0500091 Okanagan Lake inlet	Jul 5 - Aug 3	5	450 - 3700/100 mL np = 2100/100 mL	Objective not met
	Deep Creek: 0500258 u/s Armstrong	Jul 5 - Aug 3	4	100 - 160000/100 mL np > 100/100 mL	Objective not met
	E220165 d/s Armstrong STP	Jul 5 - Aug 3	5	400 - 2300/100 mL np = 2000/100 mL	Objective not met
	0500020 Okanagan Lake inlet	Jul 6 - Aug 3	5	290 - 780/100 mL np = 650/100 mL	Objective not met
E. coli <100/100 mL 90th percentile (np)	Lower Vernon Creek: 0500089 Kalamalka Lake outlet	Jul 6 - Aug 3	5	< 1 - 74/100 mL np = 44/100 mL	Objective met
	0500091 Okanagan Lake inlet	Jul 6 - Aug 3	5	< 1 - 160/100 mL np = 85/100 mL	Objective met
	Deep Creek: 0500258 u/s Armstrong	Jul 6 - Aug 3	4	< 1 - 7500/100 mL np > 100/100 mL	Objective not met
	E220165 d/s Armstrong STP	Jul 6 - Aug 3	5	< 1 - 100/100 mL np = 60/100 mL	Objective met
	0500020 Okanagan Lake inlet	Jul 2 - Aug 3	5	< 1 - 200/100 mL np = 110/100 mL	Objective not met
Enterococci <.25/100 mL 90th perc. (np)	Lower Vernon Creek Deep Creek	1995	0	no data collected	Omitted 1995
Suspended Solids 10 mg/L or 10% maximum increase	Lower Vernon Creek: 0500089 Kalamalka Lake outlet	Jul 6 - Aug 3	5	< 4 - 9 mg/L	Control site
	0500091 Okanagan Lake inlet	Jul 6 - Aug 2	4	11 - 13 mg/L max. inc = 9 mg/L	Objective met
		Jul. 20	1	15 mg/L increase = 11 mg/L	Objective not met
	Deep Creek: 0500258 u/s Armstrong	Jul 6 - Aug 3	5	< 4 - 129 mg/L	Control site
	E220165 d/s Armstrong STP	Jul 6 - Aug 3	4	6 - 11 mg/L max. inc. = 7 mg/L	Objective met
		Jul. 27	1	15 mg/L increase = 11 mg/L	Objective not met

TABLE 13 continued

TRIBUTARIES TO OKANAGAN LAKE NEAR VERNON WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Suspended Solids 10 mg/L or 10%	Deep Creek: 0500020 Okanagan Lake inlet	Jul 6 - Aug 3	5	5 - 6 mg/L	Objective met
Turbidity 5 NTU or 10% maximum increase	Lower Vernon Creek: 0500089 Kalamalka Lake outlet	Jul 6 - Aug 3	5	0.2 - 1.2 NTU	Control site
	0500091 Okanagan Lake inlet	Jul 6 - Aug 3	5	1.5 - 4.5 NTU	Objective met
	Deep Creek: 0500258 u/s Armstrong	Jul 6 - Aug 3	5	2.0 - 5.3 NTU	Control site
	E220165 d/s Armstrong STP	Jul 6 - Aug 3	5	1.2 - 6.0 NTU max. inc. = 3.6 NTU	Objective met
	0500020 Okanagan Lake inlet	Jul 6 - Aug 3	5	0.4 - 3.1 NTU	Objective met
Ammonia-N < 0.762 mg/L av 5.60 mg/L max at pH = 8 temp = 20 °C	Lower Vernon Creek: 0500089 Kalamalka Lake outlet	Jul 6 - Aug 3	5	< 0.005 - 0.007 mg/L av = 0.006 mg/L	Objectives met
	0500091 Okanagan Lake inlet	Jul 6 - Aug 3	5	< 0.005 - 0.011 mg/L av = 0.006 mg/L	Objectives met
	Deep Creek: 0500258 u/s Armstrong	Jul 6 - Aug 8	5	< 0.005 - 0.101 mg/L av = 0.025 mg/L	Objectives met
	E220165 d/s Armstrong STP	Jul 6 - Aug 3	5	< 0.005 - 0.041 mg/L av = 0.016 mg/L	Objectives met
	0500020 Okanagan Lake inlet	Jul 6 - Aug 3	5	< 0.005 - 0.016 mg/L av = 0.007 mg/L	Objectives met
Nitrite-N < 0.06 mg/L av 0.18 mg/L max at av Cl = 4 - 6 mg/L	Lower Vernon Creek: 0500089 Kalamalka Lake outlet	Jul 6 - Aug 8	5	< 0.005 - 0.007 mg/L av = 0.005 mg/L	Objectives met
	Deep Creek: 0500020 Okanagan Lake inlet	Jul 6 - Aug 3	5	< 0.005 - 0.006 mg/L av = 0.005 mg/L	Objectives met
Nitrite-N < 0.20 mg/L av 0.60 mg/L max at av Cl > 10 mg/L	Lower Vernon Creek: 0500091 Okanagan Lake inlet	Jul 6 - Aug 3	5	0.011 - 0.015 mg/L av = 0.012 mg/L	Objectives met
	Deep Creek: 0500258 u/s Armstrong	Jul 6 - Aug 3	5	< 0.005 - 0.018 mg/L av = 0.008 mg/L	Objectives met
	E220165 d/s Armstrong STP	Jul 6 - Aug 3	5	< 0.005 - 0.011 mg/L av = 0.006 mg/L	Objectives met

TABLE 13 continued

TRIBUTARIES TO OKANAGAN LAKE NEAR VERNON WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Nitrate + Nitrite-N 10 mg/L max	Lower Vernon Creek: 0500089 Kalamalka Lake outlet	Jul 6 - Aug 3	5	< 0.02 - 0.12 mg/L	Objective met
	0500091 Okanagan Lake inlet	Jul 6 - Aug 3	5	0.43 - 0.50 mg/L	Objective met
	Deep Creek: 0500258 u/s Armstrong	Jul 6 - Aug 3	5	0.23 - 0.78 mg/L	Objective met
	E220165 d/s Armstrong STP	Jul 6 - Aug 3	5	< 0.02 - 0.25 mg/L	Objective met
	0500020 Okanagan Lake inlet	Jul 6 - Aug 3	5	< 0.02 - 0.14 mg/L	Objective met
Chlorophyll-a < 100 mg/m2 av (average based on six reps)	Lower Vernon Creek: 0500089 Kalamalka Lake outlet	Jul. 27	1	7.1 - 122 mg/m2 av = 32.1 mg/m2 (avg. of 6 reps)	Objective met
	Deep Creek: 0500020 Okanagan Lake inlet	Jul. 27	1	112 - 233 mg/m2 av = 173 mg/m2 (avg. of 6 reps)	Objective met
pH 6.5 - 9.0	Deep Creek: 0500258 u/s Armstrong	Jul 6 - Aug 8	5	7.2 - 7.7	Objective met
	E220165 d/s Armstrong STP	Jul 6 - Aug 3	5	7.6 - 7.8	Objective met
	0500020 Okanagan Lake inlet	Jul 6 - Aug 3	5	7.8 - 8.0	Objective met
Dissolved Oxygen 8.0 mg/L min. May - Oct 11.0 mg/L min. Nov. - Apr.	Lower Vernon Creek: 0500089 Kalamalka Lake outlet	Jul 6 - Aug 8	5	8.4 - 10.4 mg/L	Objective met
	0500091 Okanagan Lake inlet	Jul 6 - Aug 3	5	9.2 0 10.6 mg/L	Objective met
	Deep Creek: 0500258 u/s Armstrong	Jul 6 - Aug 8	5	6.0 - 7.8 mg/L	Objective not met
	E220165 d/s Armstrong STP	Jul 6 - Aug 3 Jul. 27	4 1	8.8 - 12.2 mg/L 6.6 mg/L	Objective met Obj. not met
	0500020 Okanagan Lake inlet	Jul 6 - Aug 3 Jul 13 - Jul 20	3 2	8.2 - 8.6 mg/L 6.4 - 6.7 mg/L	Objective met Obj. not met

TABLE 14

THOMPSON RIVER WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 10/100 mL 90th perc. (np)	South Thompson: 0600135 Kamloops d/s Peterson C.	Jan 24 - Nov 7	12	0 - 150/100 mL	Indefinite result
	North Thompson: 0600164 Kamloops u/s Paul Creek	Jan 24 - Dec 13	4	0 - 1/100 mL	Indefinite result
	Kamloops Lake E218768 near outlet	Dec. 13	1	< 1/100 mL	Indefinite result
	Lower Thompson: 0600004 at Savona	Apr 25 - Dec 13	2	all < 1/100 mL	Indefinite result
	0600163 d/s Walhachin	Apr 25 - Dec 13	2	all < 1/100 mL	Indefinite result
	E206586 Spences Br. d/s Nicola R.	Apr 25 - Dec 13	2	1 - 11/100 mL	Indefinite result
E. coli < 200/100 mL geometric mean (gm)	South Thompson: 0600135 Kamloops d/s Peterson C.	Jan 24 - Nov 7	12	0 - 12/100 mL	Indefinite result
	North Thompson: 0600164 Kamloops u/s Paul Creek	Jan 24 - Dec 13	4	0 - 1/100 mL	Indefinite result
	Kamloops Lake E218768 near outlet	Dec. 13	1	< 1/100 mL	Indefinite result
	Lower Thompson: 0600004 at Savona	Apr 25 - Dec 13	2	all < 1/100 mL	Indefinite result
	0600163 d/s Walhachin	Apr 25 - Dec 13	2	all < 1/100 mL	Indefinite result
	E206586 Spences Br. d/s Nicola R.	Apr 25 - Dec 13	2	all = 1/100 mL	Indefinite result

TABLE 14 continued

THOMPSON RIVER WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Colour 15 TCU max or 5 TCU increase over average of N + S Thompson rivers	Kamloops Lake: E218768 near outlet	Dec. 13	1	5 TCU	Objective met
	Lower Thompson: 0600004 at Savona	Mar 1 - Dec 13	4	< 5 - 10 TCU	Objective met
	0600163 d/s Walhachin	Jan 24 - Dec 13	4	< 5 - 5 TCU	Objective met
	E206586 Spences Br. d/s Nicola R.	Apr 25 - Dec 13	2	< 5 - 5 TCU	Objective met
Chlorophyll-a < 50 mg/m2	Lower Thompson: 0600004 at Savona	Jan. 19	5	218 - 332 mg/m2 av = 268 mg/m2	Objective not met
		Feb. 14	5	239 - 324 mg/m2 av = 280 mg/m2	Objective not met
		Mar. 13	5	80.4 - 314 mg/m2 av = 226 mg/m2	Objective not met
		Apr. 11	5	44.8 - 225 mg/m2 av = 126 mg/m2	Objective not met
		Oct. 31	5	17.9 - 77.8 mg/m2 av = 39.8 mg/m2	Objective met
		Nov. 23	5	33.6 - 289 mg/m2 av = 128 mg/m2	Objective not met
		Dec. 19	5	84.0 - 486 mg/m2 av = 280 mg/m2	Objective not met
	0600163 d/s Walhachin	Jan. 19	5	108 - 337 mg/m2 av = 204 mg/m2	Objective not met
		Feb. 14	5	61.6 - 108 mg/m2 av = 87.2 mg/m2	Objective not met
		Mar. 13	5	47.6 - 100 mg/m2 av = 76.4 mg/m2	Objective not met
		Apr. 11	5	70.8 - 195 mg/m2 av = 141 mg/m2	Objective not met
		Oct. 31	5	63.2 - 130 mg/m2 av = 91.0 mg/m2	Objective not met
		Nov. 23	5	68.0 - 124 mg/m2 av = 101 mg/m2	Objective not met
		Dec. 19	5	79.4 - 370 mg/m2 av = 210 mg/m2	Objective not met

TABLE 14 continued

THOMPSON RIVER WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dioxins and Furans in water 0.2 pg/L max TEQ-TCDD	Lower Thompson d/s Weyerhaeuser mill	Jan. 18	1	effluent level = 2.872 pg/L TEQ-TCDD dilution = 95:1 calculated river level: 0.030 pg/L TEQ-TCDD	Objective met
		Apr. 19	1	effluent level = 1.351 pg/L TEQ-TCDD dilution = 238:1 calculated river level: 0.006 pg/L TEQ-TCDD	Objective met
		Jul. 9	1	effluent level = 2.670 pg/L TEQ-TCDD dilution = 954:1 calculated river level: 0.003 pg/L TEQ-TCDD	Objective met
		Oct. 9	1	effluent level = 2.976 pg/L TEQ-TCDD dilution = 225:1 calculated river level: 0.013 pg/L TEQ-TCDD	Objective met
Dioxins and Furans in fish muscle 1.0 pg/g max TEQ-TCDD wet weight	Lower Thompson: R14 above Walhachin (Hatfield Consultants site)	Sep.19	5	0.10 - 0.62 pg/g TCDD-TEQ in muscle of mountain whitefish	Objective met
			3	1.7 - 4.1 pg/g TCDD-TEQ in muscle of mountain whitefish	Objective not met
Dioxins and Furans in sediments 0.7 pg/g max TEQ-TCDD dry weight	Lower Thompson Kamloops Lake	1995	0	no data collected	Objective not checked

TABLE 14 continued

THOMPSON RIVER WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Resin Acids 12 ug/L DHA max 45 ug/L total max at pH = 7.5	Kamloops Lake: E218768 near outlet	Dec. 13	1	< 1 ug/L DHA < 7 ug/L total	Objectives met
	Lower Thompson: 0600004 at Savona	Jan 24 - Dec 13	5	all < 1 ug/L DHA all < 7 ug/L total	Objectives met
	0600163 d/s Walhachin	Jan 24 - Dec 13	5	all < 1 ug/L DHA all < 7 ug/L total	Objectives met
	E206586 Spences Br. d/s Nicola R.	Apr. 25	1	< 1 ug/L DHA < 7 ug/L total	Objectives met

TABLE 15

COLUMBIA RIVER (FROM KEENLEYSIDE TO BIRCHBANK) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Oxygen 10 mg/L min	Columbia River: 0200183 3 km u/s Celgar	Jul 5 - Jul 26	4	10.0 - 10.8 mg/L	Obj. met
		Jun. 29	1	7.3 mg/L	Obj. not met
	E213039 400 m d/s Celgar south bank	Jul 12 - Jul 19	2	10.1 - 10.6 mg/L	Obj. met
		Jun 29, Jul 5,26	3	7.3 - 9.2 mg/L	Obj. not met
	0200200 400 m u/s Kootenay	Jul. 12	1	11.2 mg/L	Obj. met
		Jun 29 - Jul 26	4	8.9 - 9.8 mg/L	Obj. not met
	0200003 at Birchbank	Jul. 5,26	2	10.2 - 10.6 mg/L	Obj. met
		Jun 29, Jul 12,19	3	8.2 - 9.6 mg/L	Obj. not met
pH 6.5 - 8.5	Columbia River: 0200183 3 km u/s Celgar	Jun 28 - Jul 26	4	7.6 - 7.7	Objective met
	E213039 400 m d/s Celgar south bank	Jun 28 - Jul 26	4	7.5 - 7.7	Objective met
	0200200 400 m u/s Kootenay	Jun 28 - Jul 26	4	7.5 - 7.7	Objective met
	0200003 at Birchbank	Apr. 26 - Jul 26	5	7.5 - 7.7	Objective met
Colour 15 TCU max	Columbia River: 0200183 3 km u/s Celgar	Jun 28 - Jul 26	5	<5 - 5 TCU	Objective met
	E213039 400 m d/s Celgar south bank	Jun 28 - Jul 26	5	<5 - 5 TCU	Objective met
	0200200 400 m u/s Kootenay	Jun 28 - Jul 26	5	<5 - 5 TCU	Objective met
	0200003 at Birchbank	Jun 28 - Jul 26	5	<5 - 5 TCU	Objective met
Suspended Solids 10 mg/L max increase	Columbia River: 0200183 3 km u/s Celgar	Jun 28 - Jul 26	5	all < 4 mg/L	Control site
	E213039 400 m d/s Celgar south bank	Jun 28 - Jul 26	5	all < 4 mg/L	Objective met
	0200200 400 m u/s Kootenay	Jun 28 - Jul 26	5	all < 4 mg/L	Objective met
	0200003 at Birchbank	Jan 3 - Dec 18	31	< 4 - 5 mg/L	Objective met

TABLE 15 continued

COLUMBIA RIVER (FROM KEENLEYSIDE TO BIRCHBANK) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Turbidity 5 NTU max increase	Columbia River: 0200183 3 km u/s Celgar	Jun 28 - Jul 26	5	0.2 - 0.7 NTU	Control site
	E213039 400 m d/s Celgar south bank	Jun 28 - Jul 26	5	0.2 - 0.8 NTU max increase = 0.2 NTU	Objective met
	0200200 400 m u/s Kootenay	Jun 28 - Jul 26	5	0.1 - 0.6 NTU max increase = 0.2 NTU	Objective met
	0200003 at Birchbank	Jun 28 - Jul 26	5	0.2 - 0.6 NTU max increase = 0.3 NTU	Objective met
Sediment TOC no increase u/s to d/s at 95% confidence	Columbia River: 0200183 3 km u/s Celgar	Aug. 29	1	6.1-0.8 = 5.3 mg/g TOC	Control site
	E213039 400 m d/s Celgar south bank	Aug. 29	1	8.5-0.7 = 7.8 mg/g TOC % increase = 47%	Objective not met
	0200200 400 m u/s Kootenay	Aug. 29	1	8.0-0.8 = 7.2 mg/g TOC % increase = 36%	Objective not met
	0200003 at Birchbank	Aug. 29	1	7.4-0.5 = 6.9 mg/g TOC % increase = 30%	Objective not met
Dissolved Gas 110% max	Columbia River: at Hugh Keeleyside u/s dam (B.C. Hydro site)	Jan 1 - Dec 31	343	95.5 - 109.9 % (% = daily av)	Objective met
	at Robson ~ 3.5 km d/s Celgar (B.C. Hydro site)	Jan 1 - May 14 May 15 - May 17 May 18 - Jun 24 Jun 25 - Sep 20 Sep. 21 Sep. 22 Sep 23 - Sep 26 Sep 27 - Sep 28 Sep 29 - Oct 16 Oct. 17 Oct 18 - Oct 24 Nov 5 - Dec 27 Dec 28 - Dec 31	123 3 48 88 1 1 3 2 18 1 7 50 4	97.7 - 108.3 % 110.3 - 113.9 % 105.3 109.9 % 110.5 - 141.1 % 109.6% 110.2% 109.3 - 109.7 % 110.5 - 111.2 % 106.0 - 110.0 % 111.4% 107.8 - 109.3 % 114.1 - 138.3 % 103.7 - 105.7 % (% = daily av)	Obj. met Obj. not met Obj. met Obj. not met Obj. met Obj. not met Obj. met Obj. not met Obj. met Obj. not met Obj. met Obj. not met Obj. met
	at Birchbank (B.C. Hydro site)	Jan 1 - May 9 May 10 - Sep 15 Sep. 16 Sep 17 - Sep 19 Sep 20 - Oct 25 Oct 26 - Dec 27 Dec 28 - Dec 29 Dec. 30 Dec. 31	129 119 1 3 36 63 2 1 1	98.5 - 109.6 % 110.6 - 126.6 % 108.6% 118.5 - 118.7 % 102.4 - 108.6 % 110.4 - 122.7 % 109.5 - 109.8 % 110.2% 109.4% (% = daily av)	Obj. met Obj. not met Obj. met Obj. not met Obj. met Obj. not met Obj. met Obj. not met Obj. met

TABLE 15 continued

COLUMBIA RIVER (FROM KEENLEYSIDE TO BIRCHBANK) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 100/100 mL 90th perc. (np)	Columbia River: 0200183 3 km u/s Celgar	Jun 28 - Jul 26	5	< 1 - 2/100 mL	Objective met
	E213039 400 m d/s Celgar south bank	Jun 28 - Jul 26	5	< 1 - 1/100 mL	Objective met
	0200200 400 m u/s Kootenay	Jun 28 - Jul 26	5	< 1 - 3/100 mL	Objective met
	0200003 at Birchbank	Jun 28 - Jul 26	7	< 1 - 2/100 mL	Objective met
E. Coli < 100/100 mL 90th perc. (np)	Columbia River: 0200183 3 km u/s Celgar	Jun 28 - Jul 26	5	< 1 - 1/100 mL	Objective met
	E213039 400 m d/s Celgar south bank	Jun 28 - Jul 26	5	< 1 - 1/100 mL	Objective met
	0200200 400 m u/s Kootenay	Jun 28 - Jul 26	5	< 1 - 1/100 mL	Objective met
	0200003 at Birchbank	Jul 5 - Jul 26	4	< 1 - 1/100 mL	Indefinite result
Toxicity % mill effluent in river: < 0.05 of the 96-h LC50	Columbia River at Celgar	monthly tests on rainbow trout	12	96-hLC50 = 100% (no fish mortalities)	Objective met
Chlorophenols < 0.05 ug/L tri < 0.10 ug/L tetra < 0.05 ug/L penta	Columbia River 0200183 3 km u/s Celgar	Jul. 5	1 1 1	tri: <0.05 ug/L any isomer tetra: <0.05 ug/g any isomer penta: <0.05 ug/L	Objective met Objective met Objective met
	E213039 400 m d/s Celgar south bank	Jul. 5	1 1 1	tri: <0.05 ug/L any isomer tetra: <0.05 ug/g any isomer penta: <0.05 ug/L	Objective met Objective met Objective met
	0200200 400 m u/s Kootenay	Jul. 5	1 1 1	tri: <0.05 ug/L any isomer tetra: <0.05 ug/g any isomer penta: <0.05 ug/L	Objective met Objective met Objective met
	0200003 at Birchbank	Jul. 5	1 1 1	tri: <0.05 ug/L any isomer tetra: <0.05 ug/g any isomer penta: <0.05 ug/L	Objective met Objective met Objective met

TABLE 15 continued

COLUMBIA RIVER (FROM KEENLEYSIDE TO BIRCHBANK) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dioxins & Furans 1pg/g TCDD TEQ max in fish (wet weight)	Columbia River: Between Keenleyside and Birchbank	Nov. 28	7	1.005 - 11.887 pg/g TCDD TEQ (mountain whitefish)	Objective not met
			3	0.020 - 0.870 pg/g TCDD TEQ (mountain whitefish)	Objective met
Dioxins & Furans 0.2 pg/L TCDD TEQ max in water	Columbia River	1995	0	no data collected	Objective not checked
Dioxins & Furans 0.7 pg/g TCDD TEQ max in seds	Columbia River: 0200183 3 km u/s Celgar	Aug. 29	1	0.038 pg/g TCDD TEQ	Objective met
	E213039 400 m d/s Celgar south bank	Aug. 29	1	2.130 pg/g TCDD TEQ	Objective not met
	0200200 400 m u/s Kootenay	Aug. 29	1	0.381 pg/g TCDD TEQ	Objective met
	0200003 at Birchbank	Aug. 29	1	0.020 pg/g TCDD TEQ	Objective met
Resin Acids 12 ug/L max DHA 45 ug/L max total at pH = 7.6	Columbia River: 0200183 3 km u/s Celgar	Jul. 19	1 1	DHA < 1 ug/L total < 7 ug/L	Objectives met
	E213039 400 m d/s Celgar south bank	Jul. 19	1 1	DHA < 1 ug/L total < 7 ug/L	Objectives met
	0200200 400 m u/s Kootenay	Jul. 19	1 1	DHA < 1 ug/L total < 7 ug/L	Objectives met
	0200003 at Birchbank	Jul. 19	1 1	DHA < 1 ug/L total < 7 ug/L	Objectives met
Chlorinated Resin Acids 6 ug/L max of mono Cl-DHA & di CL-DHA	Columbia River	1995	0	no data collected	Objectives not checked
Chlorophyll-a < 50 mg/m2 av	Columbia River: 0200183 3 km u/s Celgar	Aug. 15	6	0.5 - 1.3 mg/m2 av = 1.0 mg/m2	Objective met
	0200200 400 m u/s Kootenay	Aug. 15	6	< 0.3 - 0.5 mg/m2 av = 0.4 mg/m2	Objective met
	0200003 at Birchbank	Aug. 15	6	< 0.3 - 2.5 mg/m2 av = 1.2 mg/m2	Objective met

TABLE 16

FRASER RIVER (KANAKA CREEK TO THE MOUTH) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 1000/100 mL geometric mean (gm) 4000/100 mL max April - October	Main Stem	1995	0	no data collected	Objectives not checked
	Main Arm: GVRD 1 u/s Annacis	Apr 20 - Oct 17	4	20 - 1100/100 mL	Max. obj. met gm not checked
	GVRD 2 d/s Annacis	Jun 8 - Oct 17 Apr. 20	3 1	20 - 2300/100 mL 8000/100 mL	Max obj. met Max not met
	GVRD 3 12 km d/s Annacis	June 8 - Oct 17 Apr. 20	3 1	80 - 3000/100 mL 30000/100 mL	Max obj. met Max not met
	GVRD 4 d/s Lulu	Jun 8 - Aug 22 Apr 20 - Oct 17	2 2	80 - 2300/100 mL 11000 - 17000/100 mL	Max. obj. met Max. not met
	GVRD 5 d/s Steveston	Jun 8 - Aug 22 Apr 20 - Oct 17	2 2	40 - 140/100 mL 5000 - 11000/100 mL	Max. obj. met Max. not met
	North Arm Middle Arm	1995	0	no data collected	Objectives not checked
Fecal Coliforms < 200/100 mL geometric mean (gm) June - August at beaches	Iona Beach every 1.5 km along jetty east to west GVRD 4	Jun 5 - Jul 5 Jul 13 - Aug 16	6 6	gm < 22/100 mL gm < 22/100 mL	Objective met Objective met
	GVRD 6	Jun 5 - Jul 5 Jul 13 - Aug 16	6 6	gm < 25/100 mL gm < 20/100 mL	Objective met Objective met
	GVRD 8	Jun 5 - Jul 5 Jul 13 - Aug 16	6 6	gm < 31/100 mL gm < 22/100 mL	Objective met Objective met
	GVRD 10	Jun 5 - Jul 5 Jul 13 - Aug 16	6 6	gm < 27/100 mL gm < 22/100 mL	Objective met Objective met
	GVRD 12	Jun 5 - Jul 5 Jul 13 - Aug 16	6 6	gm < 25/100 mL gm < 20/100 mL	Objective met Objective met
	GVRD 14	Jun 5 - Jul 5 Jul 13 - Aug 16	6 6	gm < 32/100 mL gm < 30/100 mL	Objective met Objective met
	Tsawwassen Beach: GVRD 1 Causeway-north, 0 km	Jun 30 - Aug 18	5	gm < 49/100 mL	Objective met
	GVRD 2 Causeway-north, 2 km	Jun 30 - Aug 18	5	gm < 35/100 mL	Objective met
	GVRD 3 Causeway-north, 3 km	Jun 30 - Aug 18	5	gm < 20/100 mL	Objective met
	Sturgeon Bank Roberts Bank	1995	0	no data collected	Objective not checked

TABLE 16 continued

FRASER RIVER (KANAKA CREEK TO THE MOUTH) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Suspended Solids max increase: 10 mg/L or 10 %	North Arm E207398 u/s Scott Paper	Mar 2 - Mar 30	5	< 4 - 18 mg/L	Control site
	0300002 Oak Street Bridge	Mar 2 Mar 30	5	7 - 24 mg/L max. inc. = 7 mg/L	Objective met
	Middle Arm E207601 100 m d/s North Arm	Mar 2 - Mar 23	4	13 - 68 mg/L	Control site
	E207600 at Dinsmore Bridge	Mar 2 - Mar 23	4	11 - 21 mg/L max increase = 0	Objective met
Total Cl2 Res. 0.002 mg/L max.	Main Arm: GVRD 1,2,3,4,& 5	Feb 21 - Dec 5	6	all < 0.05 mg/L	Indefinite result
Ammonia-N 1.83 mg/L av 9.5 mg/L max at pH = 7.7 temp = 12°C	Main Arm: GVRD 1 u/s Annacis	Feb 21 - Dec 5	6	<0.01 - 0.05 mg/L	Max. obj. met
	0301308 u/s Annacis	Mar 2 - Mar 30	5	<0.005 - 0.538 mg/L av = 0.144 mg/L	Objectives met
	0301311 d/s Annacis	Mar 2 - Mar 30	5	< 0.005 - 0.027 mg/L av = 0.013 mg/L	Objectives met
	GVRD 2 d/s Annacis	Feb 21 - Dec 5	6	0.01 - 0.06 mg/L	Max obj. met
	GVRD 3 12 km d/s Annacis	Feb 21 - Dec 5	6	0.04 - 0.12 mg/L	Max obj. met
	E105892 u/s Lulu STP	Mar 2 - Mar 30	5	0.033 - 0.059 mg/L av = 0.043 mg/L	Objectives met
	E207407 d/s Lulu STP	Mar 2 - Mar 30	5	0.022 - 0.047 mg/L av = 0.038 mg/L	Objectives met
	GVRD 4 d/s Lulu	Feb 21 - Dec 5	6	0.04 - 0.14 mg/L	Max obj. met
	GVRD 5 d/s Steveston	Feb 21 - Dec 5	6	0.06 - 0.10 mg/L	Max obj. met
	North Arm	1995	0	no data collected	Objectives not checked
	Middle Arm: E207601 100m d/s North Arm	Mar 2 - Mar 30	5	0.05 - 0.014 mg/L av = 0.011 mg/L	Objectives met

TABLE 16 continued

FRASER RIVER (KANAKA CREEK TO THE MOUTH) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Ammonia-N 1.83 mg/L av 9.5 mg/L max at pH = 7.7 temp = 12°C	Middle Arm: E207600 at Dinsmore Bridge	Mar 2 - Mar 30	5	< 0.005 - 0.025 mg/L av = 0.017 mg/L	Objectives met
	Sturgeon Bank Roberts Bank	1995	0	no data colected	Objectives not checked
Dissolved Oxygen 7.75 mg/L min	Main Stem: E206965 Barnston Island	Mar 2 - Mar 30	5	11.0 - 12.6 mg/L	Objective met
	0300005 Pattullo Bridge	Mar 2 - Mar 30	5	10.9 - 12.6 mg/L	Objective met
	Main Arm: Gunderson Slough E216045	Feb. 10 Mar. 31	19 15	0-5.5 m: 8.0 - 11.6 mg/L 0-4.3 m: 8.5 - 10.0 mg/L	Objective met Objective met
	GVRD 1 u/s Annacis	Feb 21 - Dec 5	6	9.7 - 12.9 mg/L	Objective met
	0301308 u/s Annacis	Mar 2 - Mar 30	5	10.8 - 12.6 mg/L	Objective met
	0301311 d/s Annacis	Mar 2 - Mar 30	5	10.7 - 12.4 mg/L	Objective met
	GVRD 2 d/s Annacis	Feb 21 - Dec 5	6	9.7 - 12.6 mg/L	Objective met
	Deas Slough E216044	Feb. 11	16 1	0-4.6 m: 9.9 - 12.9 mg/L 4.9 m: 7.0 mg/L	Objective met Objective not met
		Mar. 31	18	0-5.2 m: 9.4 - 10.7 mg/L	Objective met
	GVRD 3 12 km d/s Annacis	Feb 21 - Dec 5	6	9.3 - 12.6 mg/L	Objective met
	Ladner Slough E216043	Feb. 11	16	0-4.6 m: 8.9 - 12.3 mg/L	Objective met
		Mar. 31	16 1	0-4.6 m: 7.8 - 10.9 mg/L 4.9 m: 5.0 mg/L	Objective met Objective not met
	E105892 100 m u/s Lulu	Mar 2 - Mar 30	5	10.8 - 12.5 mg/L	Objective met
	E207407 100 m d/s Lulu	Mar 2 - Mar 30	5	10.9 - 12.4 mg/L	Objective met
	GVRD 4 d/s Lulu	Feb 21 - Dec 5	6	9.2 - 12.5 mg/L	Objective met
	GVRD 5 d/s Steveston	Feb 21 - Dec 5	5	9.3 - 12.3 mg/L	Objective met

TABLE 16 continued

FRASER RIVER (KANAKA CREEK TO THE MOUTH) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Oxygen 7.75 mg/L min	North Arm: E207398 u/s Scott Paper	Mar 2 - Mar 30	5	10.8 - 12.6 mg/L	Objective met
	Tree Island Slough E216038	Feb. 10	15	0-4.3 m: 8.0 - 12.9 mg/L	Objective met
		Mar. 30	12 1	0-3.4 m: 8.4 - 10.5 mg/L 3.7 m: 7.6 mg/L	Objective met Objective not met
	E207397 *d/s Belkin*	Mar 2 - Mar 30	5	10.9 - 12.6 mg/L	Objective met
	E207401 d/s Mitchell Island	Mar 2 - Mar 30	5	10.9 - 12.0 mg/L	Objective met
	0300002 Oak Street Bridge	Mar 2 - Mar 30	5	10.9 - 12.0 mg/L	Objective met
	Eburne Slough E216039	Feb. 10	15	0-4.3 m: 8.1 - 11.8 mg/L	Objective met
		Mar. 30	10 1	0-2.7 m: 9.0 - 10.0 mg/L 3.0 m: 5.8 mg/L	Objective met Objective not met
	MacDonald Slough E216037	Feb. 10	19 1	0-5.5 m: 7.9 - 10.9 mg/L 5.8 m: 6.5 mg/L	Objective met Objective not met
		Mar. 30	15	0-4.3 m: 8.3 - 10.1 mg/L	Objective met
	Middle Arm: E207601 100 m d/s North Arm	Mar 2 - Mar 30	5	10.9 - 12.0 mg/L	Objective met
	E207600 at Dinsmore Bridge	Mar 2 - Mar 30	5	11.0 - 11.9 mg/L	Objective met
Dissolved Oxygen 9.0 mg/L min	Sturgeon Bank Roberts Bank	1995	0	*no data collected*	*Objective not checked*
pH 6.5 - 8.5	Main Stem: E206965 Barnston Island	Mar 2 - Mar 30	5	7.35 - 7.75	Objective met
	0300005 d/s Pattullo Bridge	Mar 2 - Mar 30	5	7.25 - 7.65	Objective met
	Main Arm: GVRD 1 u/s Annacis	Feb 21 - Dec 5	6	6.7 - 7.7	Objective met
	0301308 u/s Annacis	Mar 2 - Mar 30	5	7.3 - 8.0	Objective met
	0301311 d/s Annacis	Mar 2 - Mar 30	5	7.5 - 8.0	Objective met
	GVRD 2 d/s Annacis	Feb 21 - Dec 5	6	6.6 - 7.9	Objective met

TABLE 16 continued

FRASER RIVER (KANAKA CREEK TO THE MOUTH) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
pH 6.5 - 8.5	Main Arm: GVRD 3 12 km d/s Annacis	Feb 21 - Dec 5	6	6.6 - 7.8	Objective met
	E105892 100m u/s Lulu	Mar 2 - Mar 30	5	7.3 - 7.8	Objective met
	E207407 100m d/s Lulu	Mar 2 - Mar 30	5	6.9 - 7.8	Objective met
	GVRD 4 d/s Lulu	Feb 21 - Dec 5	6	6.8 - 7.8	Objective met
	GVRD 5 d/s Steveston	Feb 21 - Dec 5	6	6.9 - 7.8	Objective met
	North Arm: E207398 u/s Scott Paper	Mar 2 - Mar 30	5	7.25 - 7.65	Objective met
	E207397 d/s Belkin Paperboard	Mar 2 - Mar 30	5	7.35 - 7.65	Objective met
	0300002 Oak Street Bridge	Mar 2 - Mar 30	5	7.20 - 7.50	Objective met
	Middle Arm: E207601 100 m d/s North Arm	Mar 2 - Mar 30	5	7.3 - 7.8	Objective met
	E207600 at Dinsmore Bridge	Mar 2 - Mar 30	5	7.3 - 7.7	Objective met
Total Cu <0.004 mg/L av 0.006 mg/L max at hardness > 35 or 20% increase	Main Arm: GVRD 1 u/s Annacis	Feb 21 - Dec 5	6	all < 0.001 mg/L (Dissolved Cu)	Control Site
	0301308 u/s Annacis	Mar 2 - Mar 30	5	< 0.002 - 0.008 mg/L av < 0.004 mg/L (Total Cu)	Control Site
	0301311 d/s Annacis	Mar 2 - Mar 30	5	< 0.002 - 0.005 mg/L av < 0.003 mg/L (Total Cu)	Objectives met
	GVRD 2 d/s Annacis	Feb 21 - Dec 5	6	<0.001 - 0.001 mg/L (Dissolved Cu)	Indefinite result
	GVRD 3 12 km d/s Annacis	Feb 21 - Dec 5	6	<0.001 - 0.001 mg/L (Dissolved Cu)	Indefinite result

TABLE 16 continued

FRASER RIVER (KANAKA CREEK TO THE MOUTH) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Cu <0.004 mg/L av 0.006 mg/L max at hardness > 35 or 20% increase	Main Arm: E105892 100 m u/s Lulu	Mar 2 - Mar 30	5	< 0.002 - 0.002 mg/L av < 0.002 mg/L (Total Cu)	Objectives met
	E207407 100 m d/s Lulu	Mar 2 - Mar 30	5	<0.002 - 0.002 mg/L av < 0.002 mg/L (Total Cu)	Objectives met
	GVRD 4 d/s Lulu	Feb 21 - Dec 15	6	<0.001 - 0.001 mg/L (Dissolved Cu)	Indefinite result
	GVRD 5 d/s Steveston	Feb 21 - Dec 5	6	<0.001 - 0.001 mg/L (Dissolved Cu)	Indefinite result
	North Arm	1995	0	no data collected	Objectives not checked
	Middle Arm: E207601 100 m d/s North Arm	Mar 2 - Mar 30	5	< 0.002 - 0.005 mg/L av < 0.003 mg/L (Total Cu)	Objectives met
	E207600 at Dinsmore Bridge	Mar 2 - Mar 30	5	< 0.002 - 0.003 mg/L av < 0.002 mg/L (Total Cu)	Objectives met
Total Pb < 0.003 mg/L av 0.010 mg/L max	Main Arm: GVRD 1 u/s Annacis	Feb 21 - Dec 5	6	all < 0.001 mg/L (Dissolved Pb)	Indefinite result
	0301308 u/s Annacis	Mar 2 - Mar 30	5	all < 0.003 mg/L (Total Pb)	Objectives met
	0301311 d/s Annacis	Mar 2 - Mar 30	5	all < 0.003 mg/L (Total Pb)	Objectives met
	GVRD 2 d/s Annacis	Feb 21 - Dec 5	6	all < 0.001 mg/L (Dissolved Pb)	Indefinite result
	GVRD 3 12 km d/s Annacis	Feb 21 - Dec 5	6	all < 0.001 mg/L (Dissolved Pb)	Indefinite result
	E105892 100 m u/s Lulu	Mar 2 - Mar 30	5	all < 0.003 mg/L (Total Pb)	Objectives met
	E207407 100 m d/s Lulu	Mar 2 - Mar 30	5	all < 0.003 mg/L (Total Pb)	Objectives met
	GVRD 4 d/s Lulu	Feb 21 - Dec 5	6	all < 0.001 mg/L (Dissolved Pb)	Indefinite result

TABLE 16 continued

FRASER RIVER (KANAKA CREEK TO THE MOUTH) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Pb < 0.003 mg/L av 0.010 mg/L max	Main Arm: GVRD 5 d/s Steveston	Feb 21 - Dec 5	6	all < 0.001 mg/L (Dissolved Pb)	Indefinite result
	North Arm	1995	0	no data collected	Objectives not checked
	Middle Arm: E207601 100m d/s North Arm	Mar 2 - Mar 30	5	< 0.003 - 0.003 mg/L av < 0.003 mg/L (Total Pb)	Objectives met
	E207600 at Dinsmore Bridge	Mar 2 - Mar 30	5	all < 0.003 mg/L (Total Pb)	Objectives met
Total Zn < 0.050 mg/L av. 0.100 mg/L max.	Main Arm : GVRD 1 u/s Annacis	Feb 21 - Dec 5	6	< 0.001 - 0.001 mg/L (Dissolved Zn)	Indefinite result
	0301308 u/s Annacis	Mar 2 - Mar 30	5	< 0.01 - 0.05 mg/L av = 0.02 mg/L (Total Zn)	Objectives met
	0301311 d/s Annacis	Mar 2 - Mar30	5	< 0.01 - 0.04 mg/L av < 0.02 mg/L (Total Zn)	Objectives met
	GVRD 2 d/s Annacis	Feb 21 - Dec 5	6	all < 0.001 mg/L (Dissolved Zn)	Indefinite result
	GVRD 3 12 km d/s Annacis	Feb 21 - Dec 5	6	< 0.001 - 0.002 mg/L (Dissolved Zn)	Indefinite result
	E105892 100 m u/s Lulu	Mar 2 - Mar 30	5	< 0.01 - 0.07 mg/L av < 0.02 mg/L (Total Zn)	Objectives met
	E207407 100 m d/s Lulu	Mar 2 - Mar 30	5	<0.01 - 0.01 mg/L av < 0.01 mg/L (Total Zn)	Objectives met
	GVRD 4 d/s Lulu	Feb 21 - Dec 5	6	< 0.001 - 0.002 mg/L (Dissolved Zn)	Indefinite result
	GVRD 5 d/s Steveston	Feb 21 - Dec 5	5	< 0.001 - 0.001 mg/L (Dissolved Zn)	Indefinite result
	North Arm	1995	0	no data collected	Objectives not checked
	Middle Arm: E207601 100m d/s North Arm	Mar 2 - Mar 30	5	< 0.01 - 0.04 mg/L av < 0.02 mg/L (Total Zn)	Objectives met
	E207600 at Dinsmore Bridge	Mar 2 - Mar 30	5	<0.01 - 0.03 mg/L av < 0.02 mg/L (Total Zn)	Objectives met

TABLE 16 continued

FRASER RIVER (KANAKA CREEK TO THE MOUTH) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Chlorophenols (tri + tetra + penta -CP) in water 0.0002 mg/L max	Main Stem: E206965 Barnston Island	Mar. 30	1	all tri, tetra & penta - CP <0.0001 mg/L	Objective met
	Main Arm	1995	0	no data collected	Objective not checked
	North Arm: E207397 d/s Belkin	Mar 2 - Mar 30	5	all tri, tetra & penta - CP <0.0001 mg/L	Objective met
	E207401 d/s Mitchell Island	Mar 2 - Mar 30	5	all tri, tetra & penta - CP < 0.0001 mg/L	Objective met
	Middle Arm: E207600 at Dinsmore Bridge	Mar 2 - Mar 30	5	all tri, tera, & penta - CP <0.0001 mg/L	Objective met
Chlorophenols (tri + tetra + penta - CP) in sediments 0.01 ug/g max av of replicates (dry weight)	Main Stem: E206965 Barnston Island	Mar. 28	3	all < 0.005 ug/g for tri, tetra & penta - CP	Objective met
	Main Arm	1995	0	no data collected	Objective not checked
	North Arm: E207397 d/s Belkin Paperboard	Mar. 30	3	0.006 - 0.009 ug/g penta av = 0.007 ug/g penta - CP all < 0.005 ug/g for tri & tetra - CP	Objective met
	Middle Arm: E207600 at Dinsmore Bridge	Mar. 29	3	0.005 - 0.006 ug/g penta av = 0.005 ug/g penta - CP all < 0.005 ug/g for tri & tetra - CP	Objective met
	Sturgeon Bank: E216048 d/s MacDonald Slough	Mar. 30	3	all = 0.006 ug/g penta - CP all < 0.005 ug/g for tri & tetra - CP	Objective met
	Roberts Bank	1995	0	no data collected	Objective not checked
Chlorophenols (Tri + Tetra + Penta - CP) in fish 0.10 ug/g max. (wet weight)	Main Stem: E206965 Barnston Island	Mar. 28	3	(3 separate composites of 6,10,& 18 starry flounders) all < 0.005 ug/g for each homologue	Objective met

TABLE 16 continued

FRASER RIVER (KANAKA CREEK TO THE MOUTH) WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Chlorophenols (Tri + Tetra + Penta) in fish 0.10 ug/g max. (wet weight)	Main Arm E206970 Ewen Slough	Mar. 27	5	(5 samples from separate starry flounders) all < 0.005 ug/g for each homologue	Objective met
	North Arm E216037 in MacDonald Slough	Mar. 29	5	(4 samples from separate starry flounders + 1 composite of 2) all < 0.005 ug/g for each homologue	Objective met
	Middle Arm E207600 Dinsmore Bridge	Mar. 29	5	(5 samples from separate starry flounders) all < 0.005 ug/g for each homologue	Objective met
PCBs in sediments < 0.03 ug/g max av of replicates (dry weight)	Main Stem E206965 Barnston Island	Mar. 28	3	all < 0.02 ug/g	Objective met
	Main Arm	1995	0	no data collected	Objectives not checked
	North Arm: E207397	Mar. 30	3	all < 0.02 ug/g	Objective met
	Middle Arm: E207600 at Dinsmore Bridge	Mar. 29	3	all < 0.02 ug/g	Objective met
PCBs in fish 0.50 ug/g max (wet weight)	Main Stem: E206965 Barnston Island	Mar. 28	3	(3 separate composites of 6,10,& 18 starry flounders) all < 0.1 ug/g	Objective met
	Main Arm: E206970 Ewen Slough	Mar. 27	5	(5 samples from separate starry flounders) all < 0.1 ug/g	Objective met
	North Arm E216037 in MacDonald Slough	Mar. 29	5	(4 samples from separate starry flounders + 1 composite of 2) all < 0.1 ug/g	Objective met
	Middle Arm E207600 Dinsmore Bridge	Mar. 29	5	(5 samples from separate starry flounders) all < 0.1 ug/g	Objective met

TABLE 17

BURRARD INLET WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 200/100 mL geometric mean (gm) May - Oct	Port Moody Arm: GVRD 1 Barnett Pk. E of pier	May 19 - Jun 23	5	< 20 - 230/100 mL gm < 33/100 mL	Objective met
		Jul 14 - Aug 25	5	< 20 - 40/100 mL gm < 26/100 mL	Objective met
	GVRD 2 Barnett Pk. Sandy Beach	May 5 - Jun 9	5	< 20 - 130/100 mL gm < 42/100 mL	Objective met
		Jul 14 - Aug 25	5	< 20 - 210/100 mL gm = 53/100 mL	Objective met
	Indian Arm: GVRD 35 Deep Cove Beach N	May 2 - May 31	11	< 20 - 1300/100 mL gm = 173/100 mL	Objective met
		Aug 15 - Sep 15	10	20 - 1100/100 mL gm = 169/100 mL	Objective met
	GVRD 39 Deep Cove Beach S	May 2 - May 30	10	< 20 - 2400/100 mL gm = 212/100 mL	Objective not met
		Jun 12 - Jul 12	10	< 20 - 500/100 mL gm = 95/100 mL	Objective met
	2nd Narrows-Roche Pt.: GVRD 36 Cates Park Beach	May 11 - Jun 12	6	< 20 - 130/100 mL gm < 34/100 mL	Objective met
		Aug 15 - Sep 15	5	< 20 - 170/100 mL gm = 59/100 mL	Objective met
	GVRD 29 Cates Park boat ramp	Jul 12 - Aug 11	5	20 - 3000/100 mL gm = 173/100 mL	Objective met
		Sep 18 - Oct 19	5	40 - 1700/100 mL gm = 328/100 mL	Objective not met
	1st-2nd Narrows: GVRD 5 1 km W Brockton Pt.	Jun 13 - Jul 17	5	40 - 9000/100 mL gm = 950/100 mL	Objective not met
		Sep 25 Oct 24	5	20 - 1700/100 mL gm = 150/100 mL	Objective met
	GVRD 1 1.5 km W Brockton Pt.	Jun 5 - Jul 10	5	140 - 3000/100 mL gm = 511/100 mL	Objective not met
		Aug 3 - Sep 5	6	70 - 3000/100 mL gm = 404/100 mL	Objective not met
	Outer Burrard: GVRD 14 Ambleside Beach	May 29 - Jun 26	6	< 20 - 2400/100 mL gm = 120/100 mL	Objective met
		Sep 27 - Oct 27	9	130 - 3000/100 mL gm = 367/100 mL	Objective not met
	GVRD 304 3rd Beach	May 2 - Jun 1	10	< 20 - 1300/100 mL gm < 45/100 mL	Objective met
		Jun 29 - Aug 1	11	< 20 - 300/100 mL gm < 40/100 mL	Objective met

TABLE 17 continued

BURRARD INLET WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 200/100 mL geometric mean (gm) May - Oct	Outer Burrard: GVRD 200 2nd Beach	May 2 - Jun 10	10	< 20 - 300/100 mL gm < 37/100 mL	Objective met
		Aug 14 - Sep 14	10	< 20 - 300/100 mL gm < 32/100 mL	Objective met
	GVRD 101 English Bay Beach	May 9 - Jun 8	10	< 20 - 300/100 mL gm < 28/100 mL	Objective met
		Aug 14 - Sep 14	10	< 20 - 110/100 mL gm < 35/100 mL	Objective met
	GVRD 703 Locarno Beach	Jun 26 - Jul 26	9	< 20 - 500/100 mL gm < 63/100 mL	Objective met
		Oct 3 - Oct 30	6	20 - 300/100 mL gm = 132/100 mL	Objective met
	False Creek: GVRD 16 at the mouth	Jun 12 - Jul 10	5	40 - 800/100 mL gm = 148/100 mL	Objective met
		Aug 8 - Sep 8	5	< 20 - 170/100 mL gm = 35/100 mL	Objective met
Enterococci <200/100 mL geometric mean (gm) May - Oct	Burrard Inlet	1995	0	no data collected	Omitted 1995
Suspended Solids 10 mg/L max. increase	Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Turbidity 5 NTU max. increase	Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Cl2-Produced Oxidants 3 ug/L av	Port Moody Arm 2nd Narrows-Roche Pt.	1995	0	no data collected	Objective not checked
Ammonia-N <1.0 mg/L av 2.5 mg/L max.	Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows False Creek	1995	0	no data collected	Objective not checked

TABLE 17 continued

BURRARD INLET WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Oxygen 6.5 mg/L min.	Indian Arm Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
WAD - CN 0.001 mg/L max	Port Moody Arm	1995	0	no data collected	Objective not checked
H2S 0.002 mg/L max	Port Moody Arm 1st-2nd Narrows	1995	0	no data collected	Objective not checked
pH 6.5 - 8.5	2nd Narrows-Roche Pt.	1995	0	no data collected	Objective not checked
Total As 0.010 mg/L max	2nd Narrows-Roche Pt. 1st-2nd Narrows	1995	0	no data collected	Objective not checked
Total As <20 ug/g av in sediment (long term)	Port Moody Arm 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Ba 0.5 mg/L max.	2nd Narrows-Roche Pt.	1995	0	no data collected	Objective not checked
Total Cd <0.009 mg/L av 0.043 mg/L max.	Indian Arm Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows False Creek	1995	0	no data collected	Objective not checked
Total Cd <1.0 ug/g av. in sediment (long term)	Port Moody Arm 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Cr 0.050 mg/L max	Port Moody Arm 2nd Narrows-Roche Pt. False Creek	1995	0	no data collected	Objective not checked

TABLE 17 continued

BURRARD INLET WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Cr <60 ug/g av in sediment (long term)	Port Moody Arm 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Cu <2 ug/L av. 3 ug/L max. (long term)	Indian Arm Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Cu <100 ug/g av in sediment	Port Moody Arm	1995	0	no data collected	Objective not checked
Total Cu <100 ug/g av in sediment (long term)	1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Fe 0.3 mg/L max (long term)	Port Moody Arm False Creek	1995	0	no data collected	Objective not checked
Total Fe 0.3 mg/L max	Indian Arm 1st-2nd Narrows Outer Burrard	1995	0	no data collected	Objective not checked
Total Pb < 2 ug/L av (long term) 140 ug/L max	Indian Arm Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Pb <30 ug/g av in sediment (long term)	Port Moody Arm 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Pb 0.8 ug/g max wet weight in fish tissue	Indian Arm Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked

TABLE 17 continued

BURRARD INLET WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Hg <0.02 ug/L av 2.0 ug/L max	2nd Narrows-Roche Pt 1st-2nd Narrows False Creek	1995	0	no data collected	Objective not checked
Total Hg <0.15 ug/g av Sediment	Port Moody Arm 2nd Narrows-Roche Pt	1995	0	no data collected	Objective not checked
Total Hg <0.15 ug/g av Sed. (long-term)	1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Hg 0.5 ug/g max wet weight in fish tissue	2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Ni < 8 ug/L av. 75 ug/L max.	2nd Narrows-Roche Pt. 1st-2nd Narrows False Creek	1995	0	no data collected	Objective not checked
Total Ni < 45 ug/g av in sediment	Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Zn < 86 ug/L av 95 ug/L max	Indian Arm Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Total Zn < 150 ug/g av in sediment (long term)	Port Moody Arm 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
Chlorophenols (tri + tetra + penta) <0.2 ug/L max	1st-2nd Narrows	1995	0	no data collected	Objective not checked
Chlorophenols (tri + tetra + penta) <0.1 ug/g max in sediment	1st-2nd Narrows	1995	0	no data collected	Objective not checked

TABLE 17 continued

BURRARD INLET WATER QUALITY OBJECTIVES - 1995

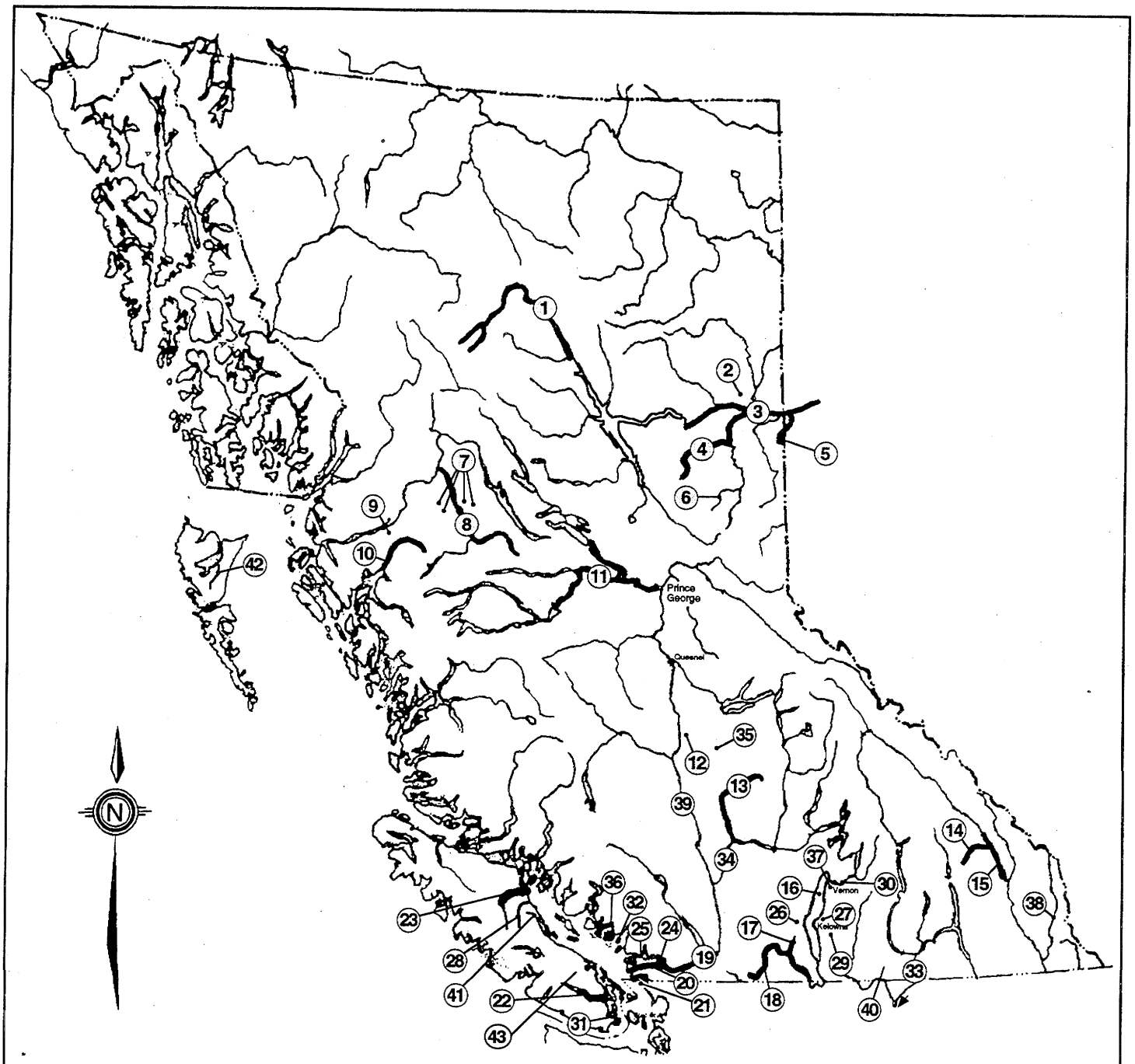
VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Chlorophenols (tri + tetra + penta) 0.1 ug/g max wet weight in fish	1st-2nd Narrows	1995	0	no data collected	Objective not checked
PCBs <0.03 ug/g av in sediment	Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
PCBs 0.5 ug/g max wet weight in fish tissue	Port Moody Arm 2nd Narrows-Roche Pt. 1st-2nd Narrows Outer Burrard False Creek	1995	0	no data collected	Objective not checked
TBT 10 ng/L	1st-2nd Narrows False Creek:	1995	0	no data collected	Objective not checked
Ethylene Dichloride < 0.2 mg/L av 2.0 mg/L max	1st-2nd Narrows	1995	0	no data collected	Objective not checked
Phenols 1 ug/L max	Port Moody Arm 2nd Narrows-Roche Pt.	1995	0	no data collected	Objective not checked
Styrene 50 ug/L max	Port Moody Arm: E207698	1995	0	no data collected	Objective not checked
L-PAH in sediment (max) naphthy 0.20 ug/g acenphyl 0.06 ug/g acenaphe 0.05 ug/g fluor 0.05 ug/g phenant 0.15 ug/g anthrac 0.10 ug/g total 0.5 ug/g	Port Moody Arm 2nd Narrows-Roche Pt. Outer Burrard False Creek:	1995	0	no data collected	Objective not checked

TABLE 17 continued

BURRARD INLET WATER QUALITY OBJECTIVES - 1995

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
H-PAH in sediment (max) fluorant 0.17 ug/g pyrene 0.26 ug/g bz-a-an 0.13 ug/g chrysene 0.14 ug/g bz-a-fl 0.32 ug/g bz-a-py 0.16 ug/g ind-pyr 0.06 ug/g dibz-an 0.06 ug/g bz-pery 0.07 ug/g total 1.2 ug/g	Port Moody Arm 2nd Narrows-Roche Pt. Outer Burrard False Creek:	1995	0	no data collected	Objective not checked

FIGURE 1: WATER BASINS WHERE WATER QUALITY OBJECTIVES HAVE BEEN SET



1. Upper Finlay River
2. Charlie Lake
3. Peace River
4. Pine River
5. Pouce Coupe River
6. Bullmoose Creek
7. Kathlyn, Seymour, Round, and Tyhee Lakes
8. Bulkley River
9. Lakelse Lake
10. Lower Kitimat River and Arm
11. Nechako River
12. Williams Lake
13. Bonaparte River
14. Toby Creek
15. Columbia and Windermere Lakes
16. Okanagan Valley Lakes
17. Cahill Creek
18. Similkameen River
19. Lower Fraser River
20. Lower Fraser River
21. Boundary Bay
22. Cowichan-Koksilah Rivers
23. Quinsam River
24. Lower Fraser River Tributaries
25. Burrard Inlet
26. Okanagan Tribs., Westbank
27. Okanagan Tribs., Kelowna
28. Oyster River
29. Hydraulic Creek
30. Bessette Creek
31. Elk Lake
32. Pender Harbour
33. Columbia River (to Birchbank)
34. Thompson River
35. San José River
36. Sechelt Inlet
37. Vernon Tributaries
38. Elk River
39. Fraser River (Prince George to Hope)
40. Christina Lake
41. Tsolum River
42. Yakoun River
43. Holland Cr & Stocking Lk

FIGURE 2: ELK AND BEAVER LAKES

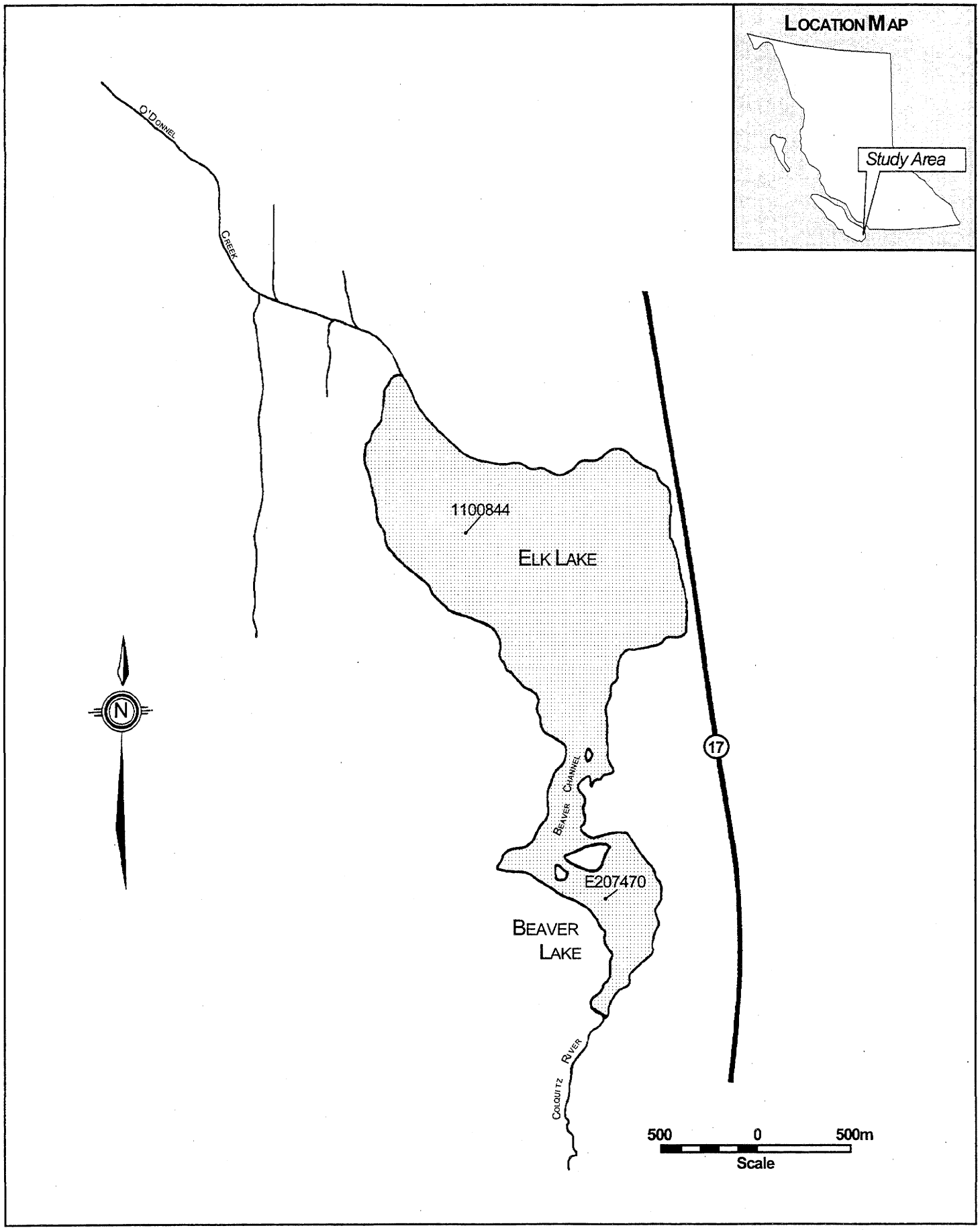


FIGURE 3: TSOLUM RIVER

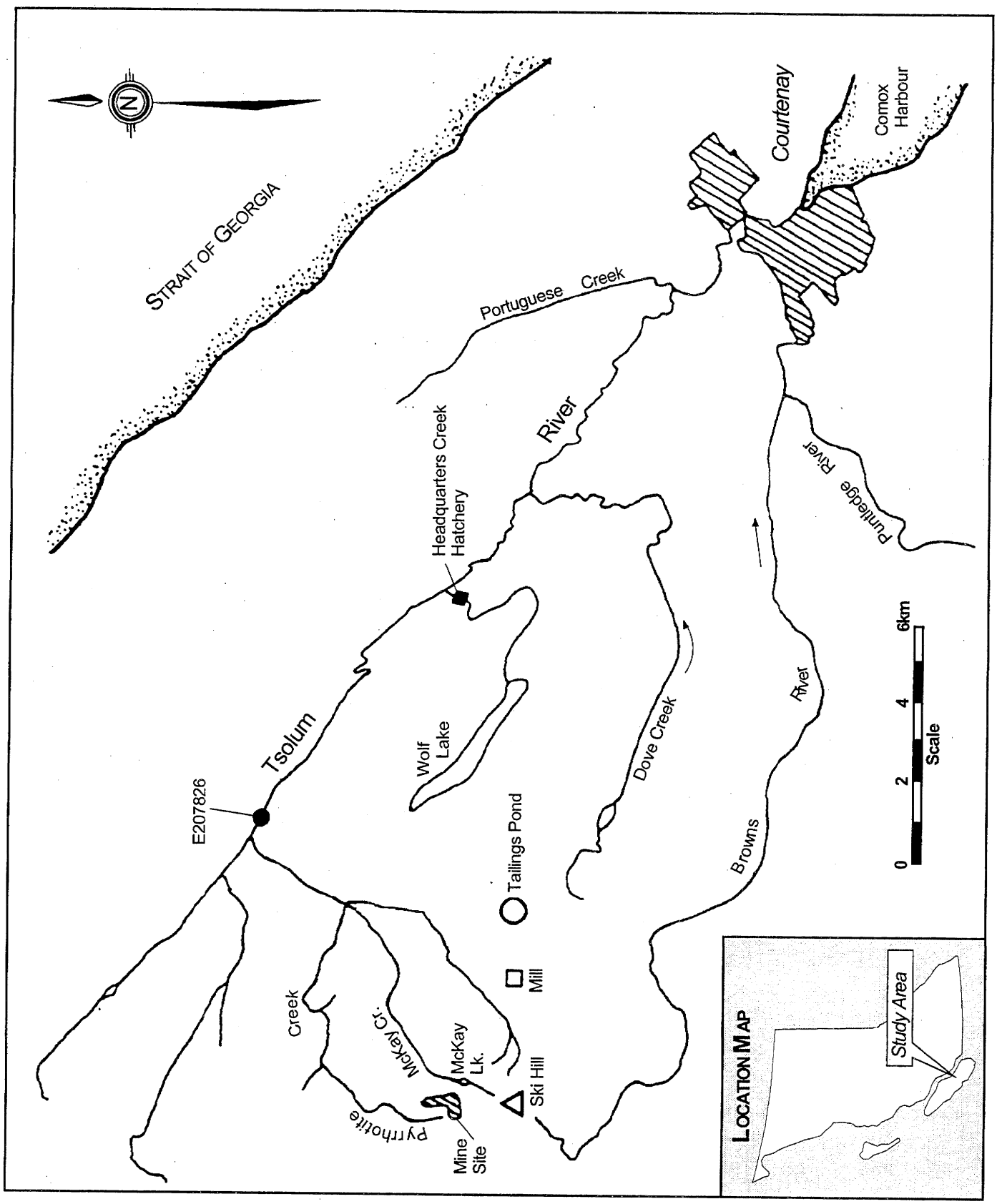


FIGURE 4: KATHLYN, SEYMOUR, ROUND AND TYHEE LAKES

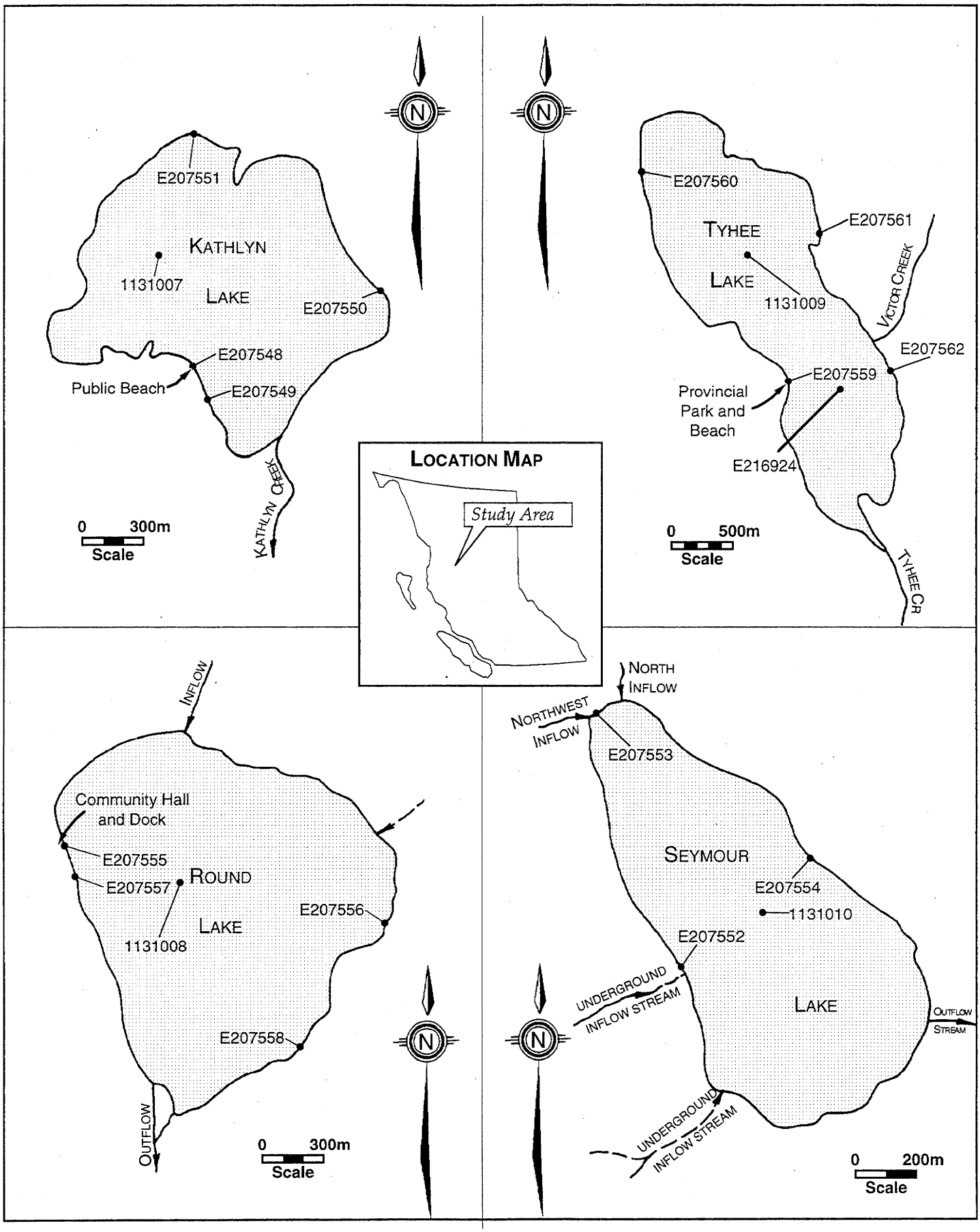


FIGURE 5: LOWER KITIMAT RIVER AND KITIMAT ARM

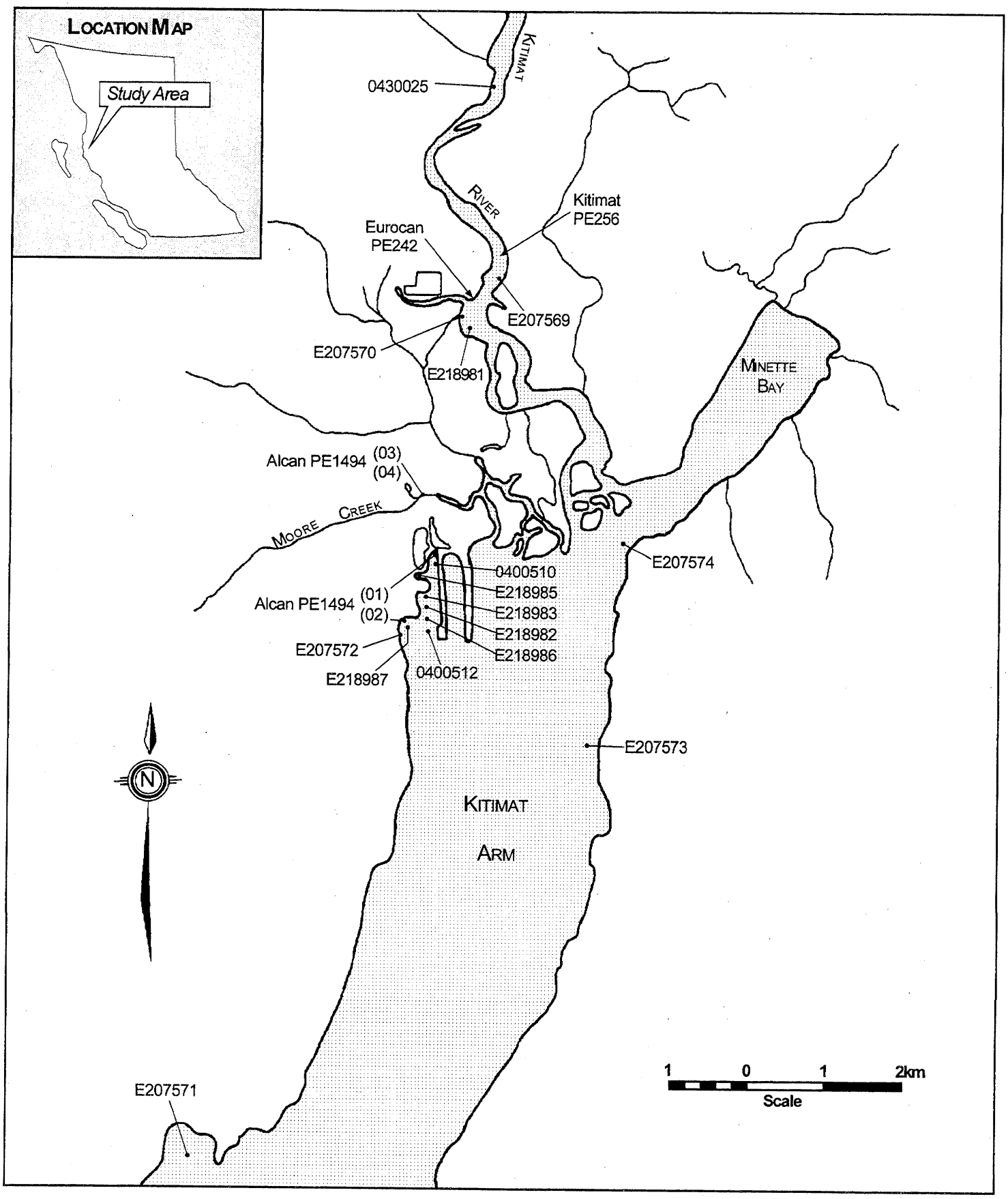


FIGURE 6: NECHAKO RIVER

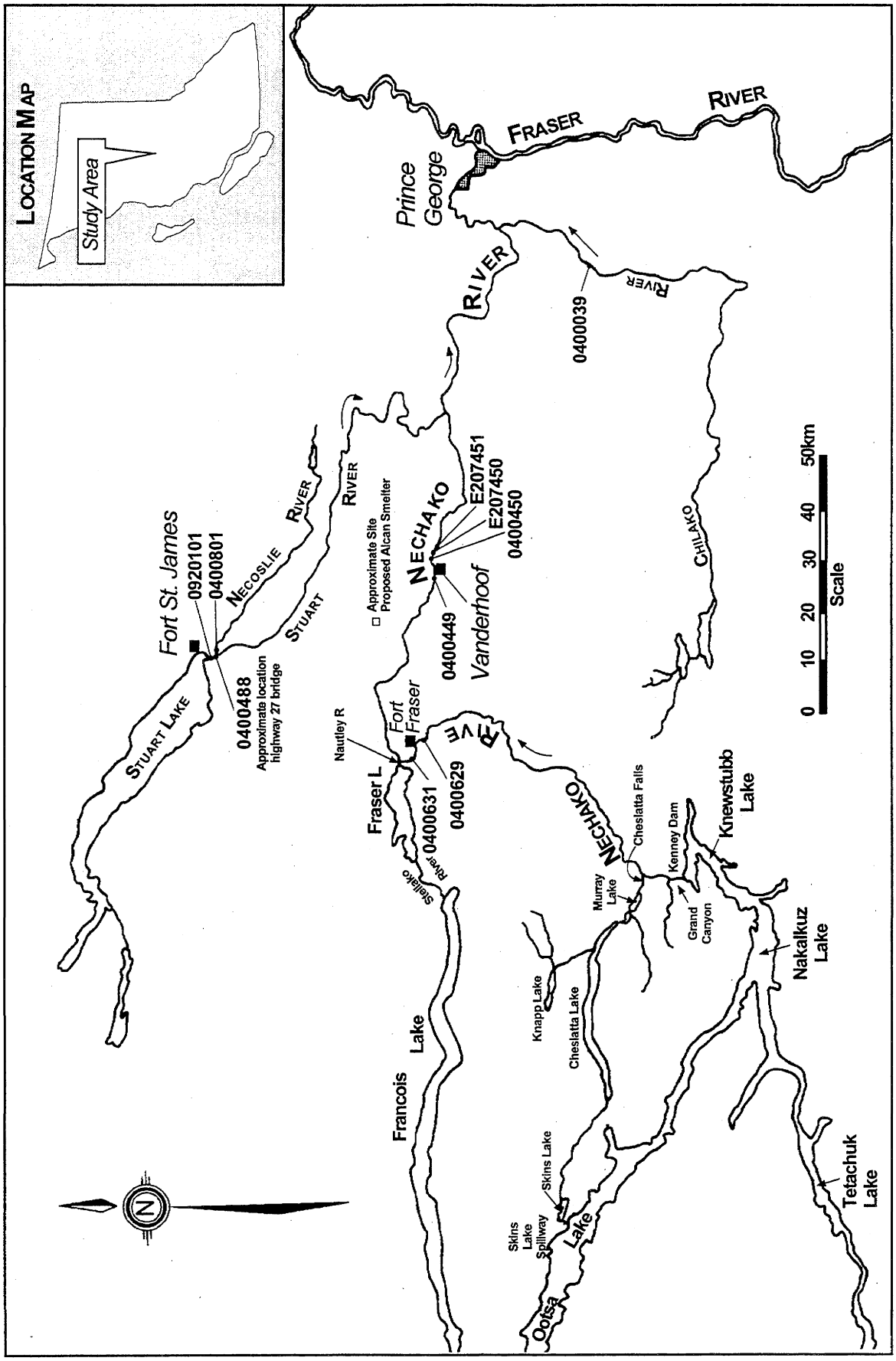


FIGURE 7: FRASER RIVER FROM SOURCE TO HOPE

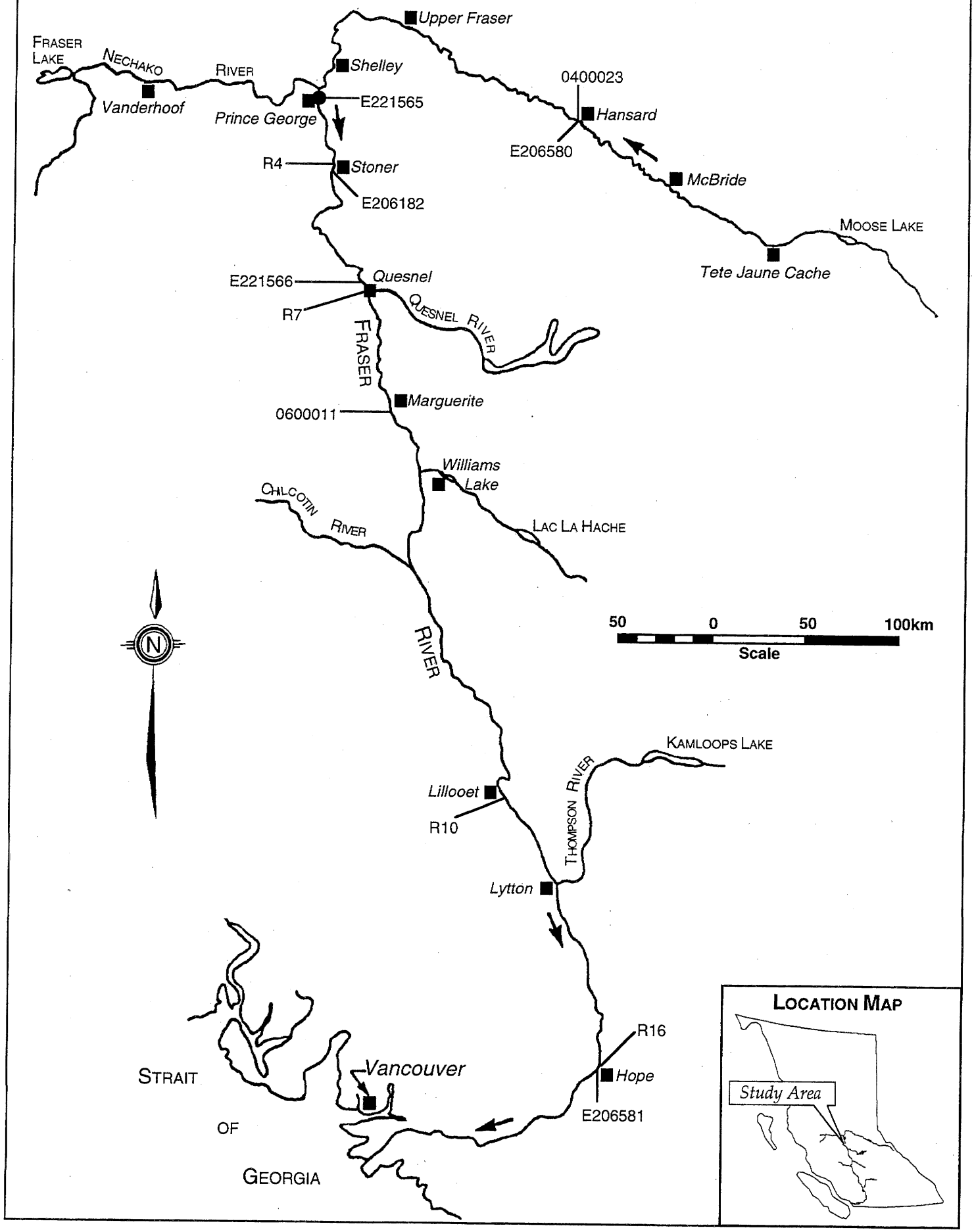


FIGURE 8: WILLIAMS LAKE

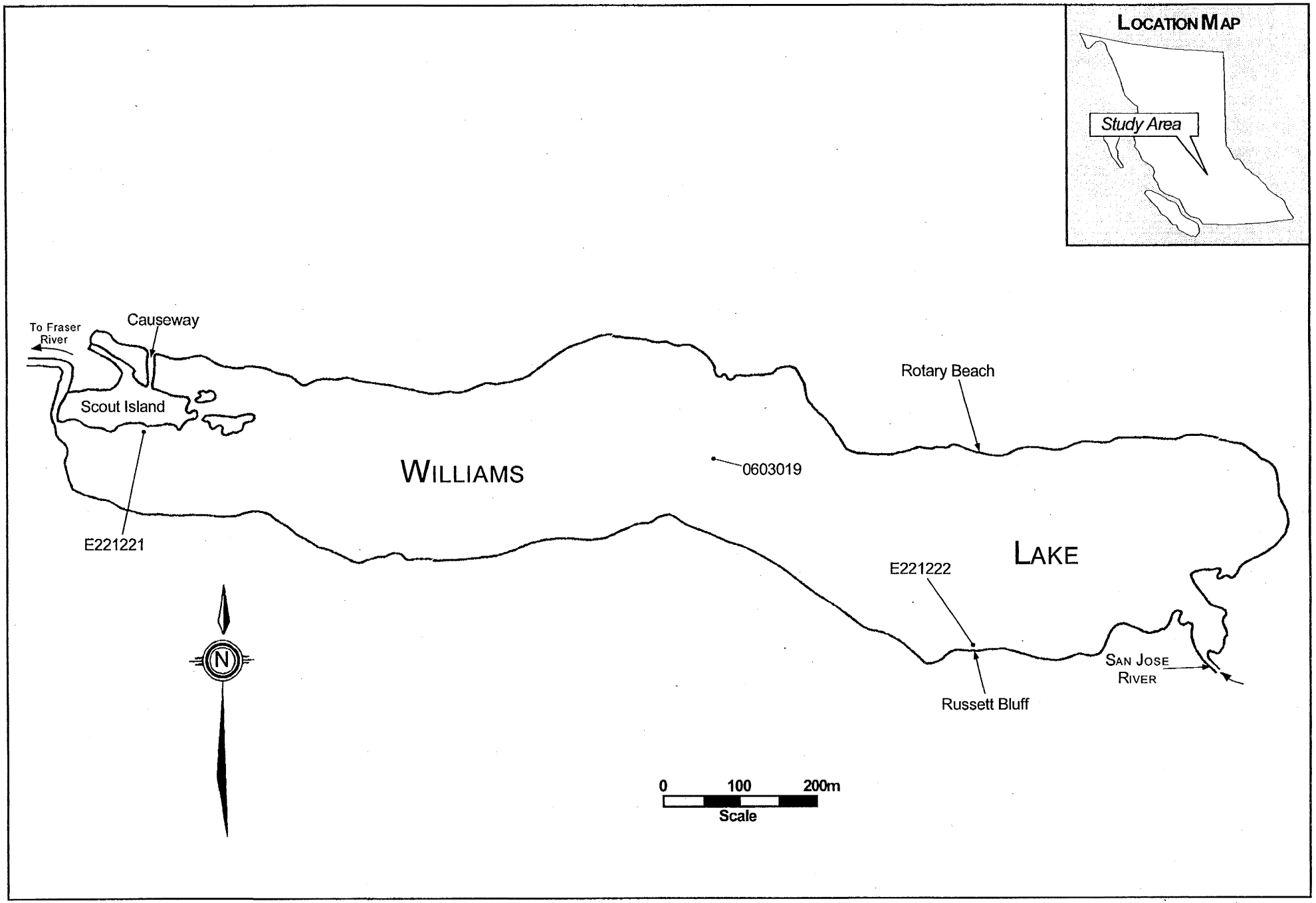


FIGURE 9: SAN JOSE RIVER

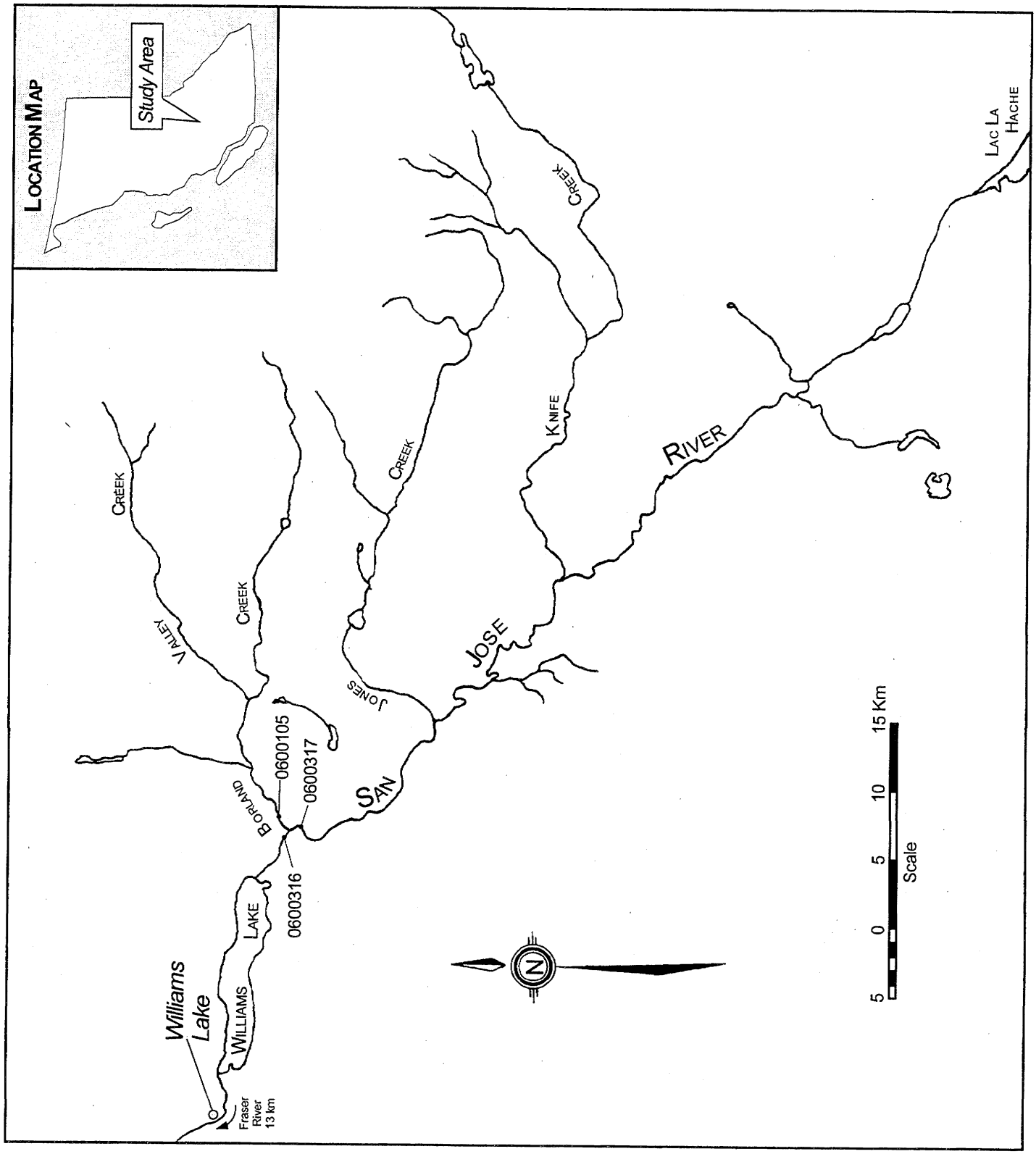


FIGURE 10: OKANAGAN VALLEY LAKES

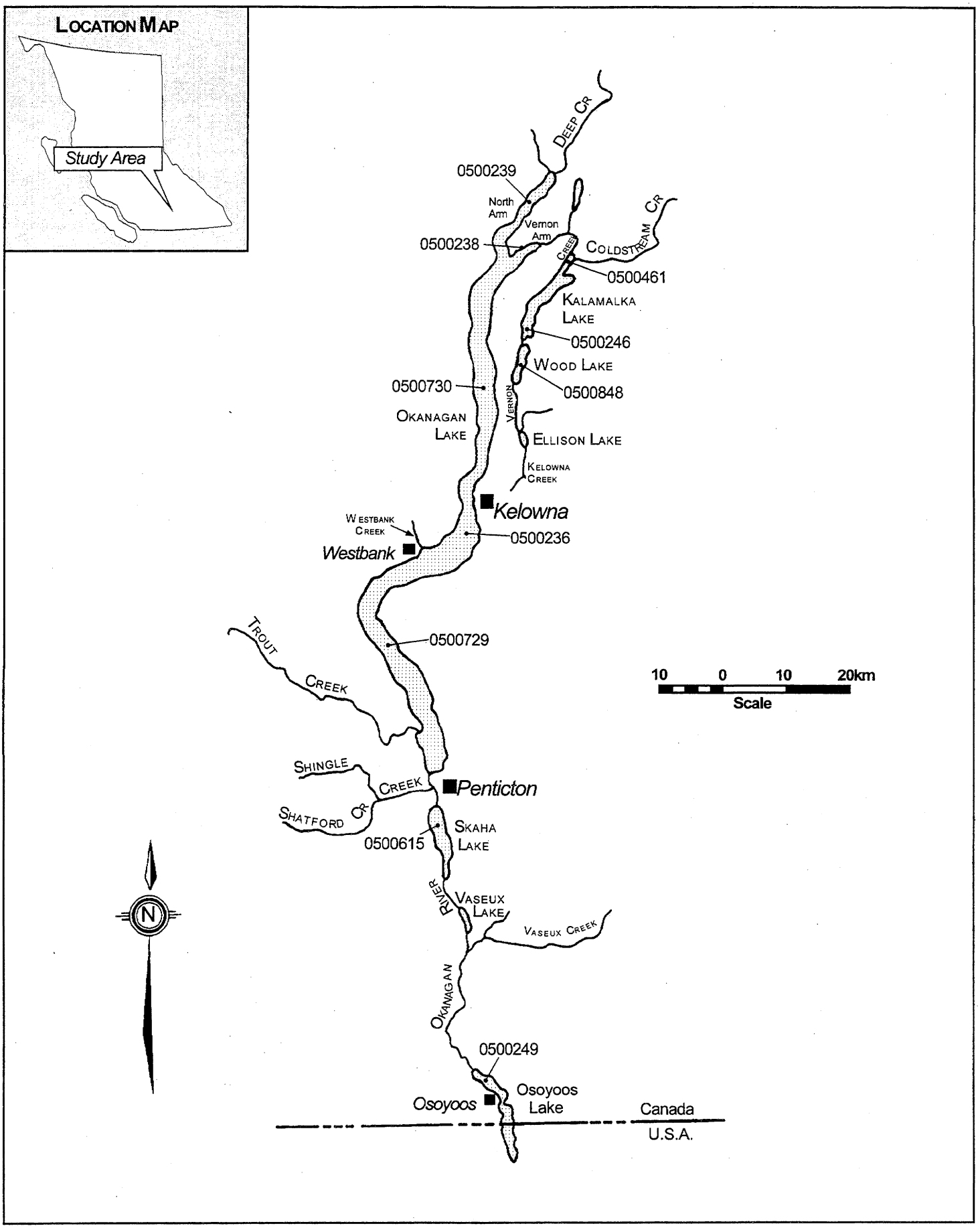


FIGURE 11: CAHILL CREEK

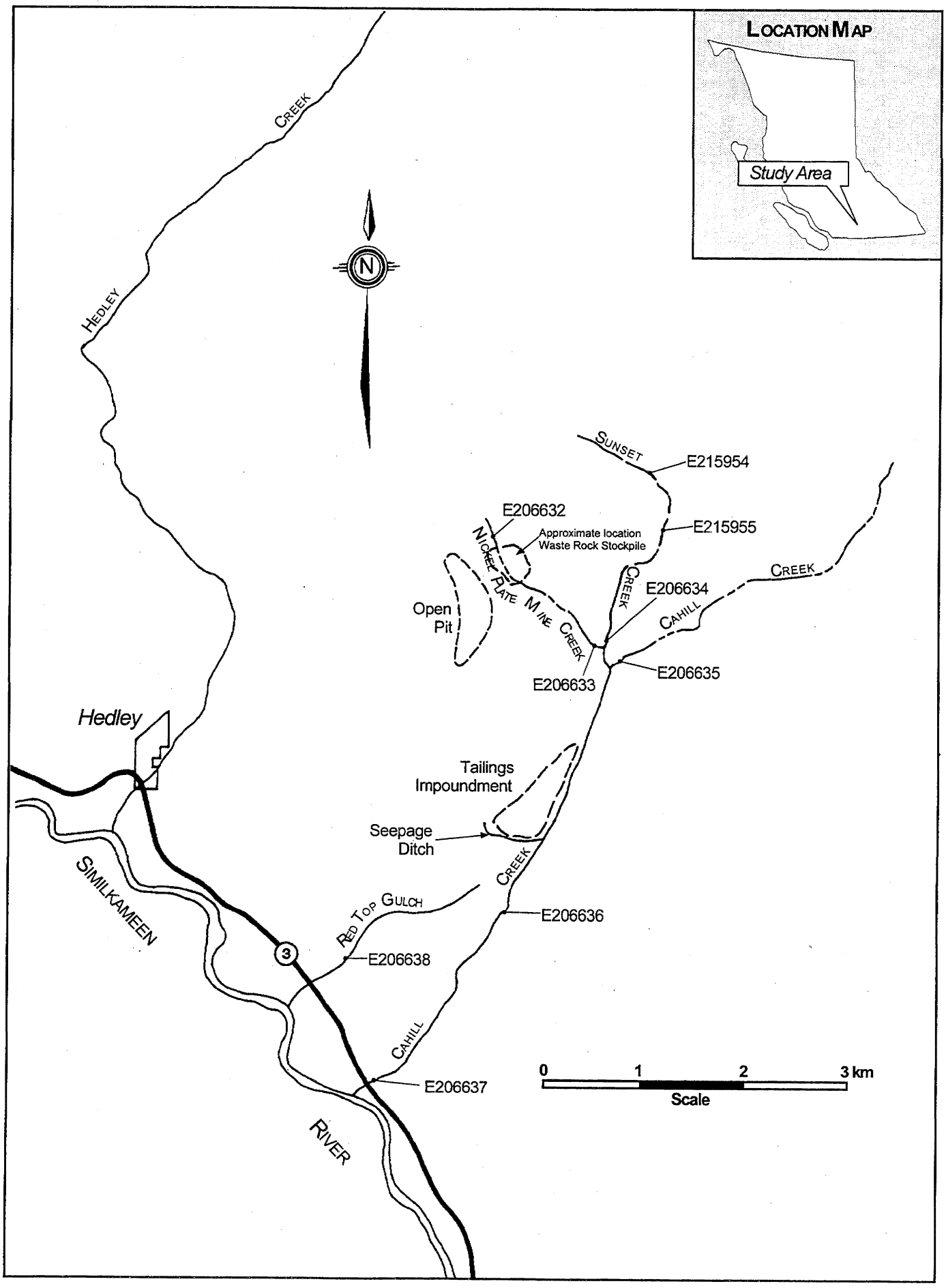


FIGURE 12: BESSETTE CREEK

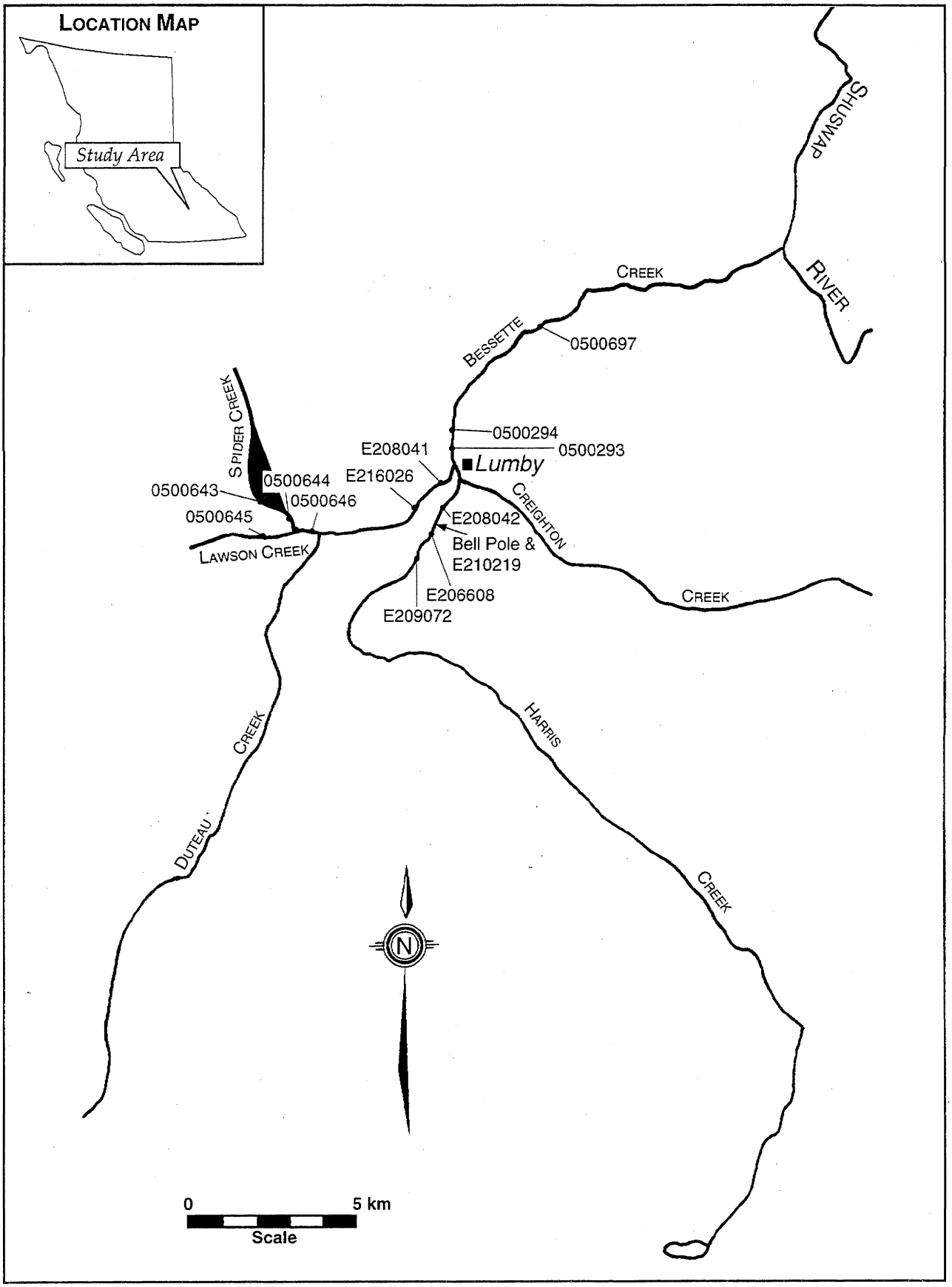


FIGURE 13: TRIBUTARIES TO OKANAGAN LAKE NEAR VERNON

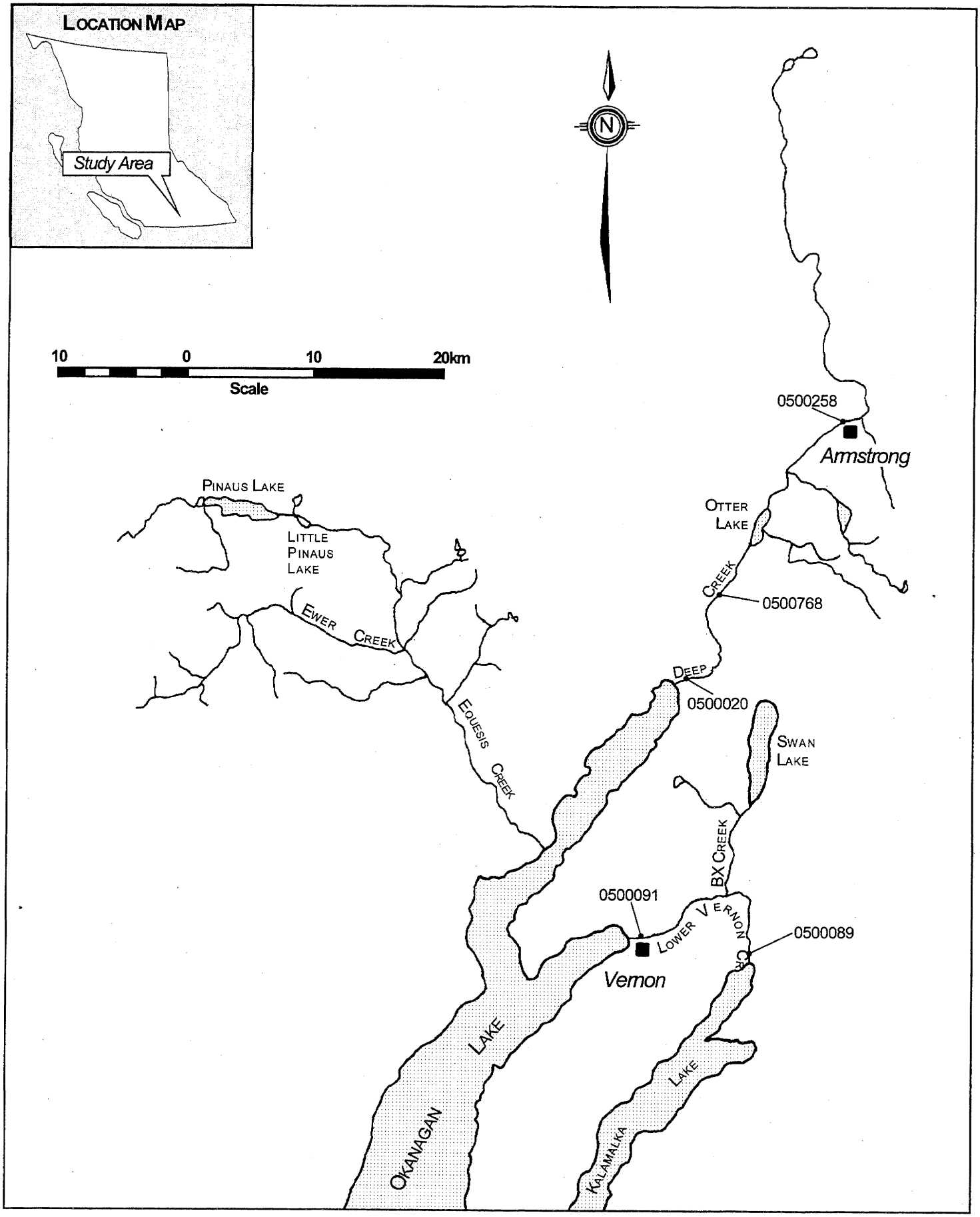


FIGURE 14: THOMPSON RIVER

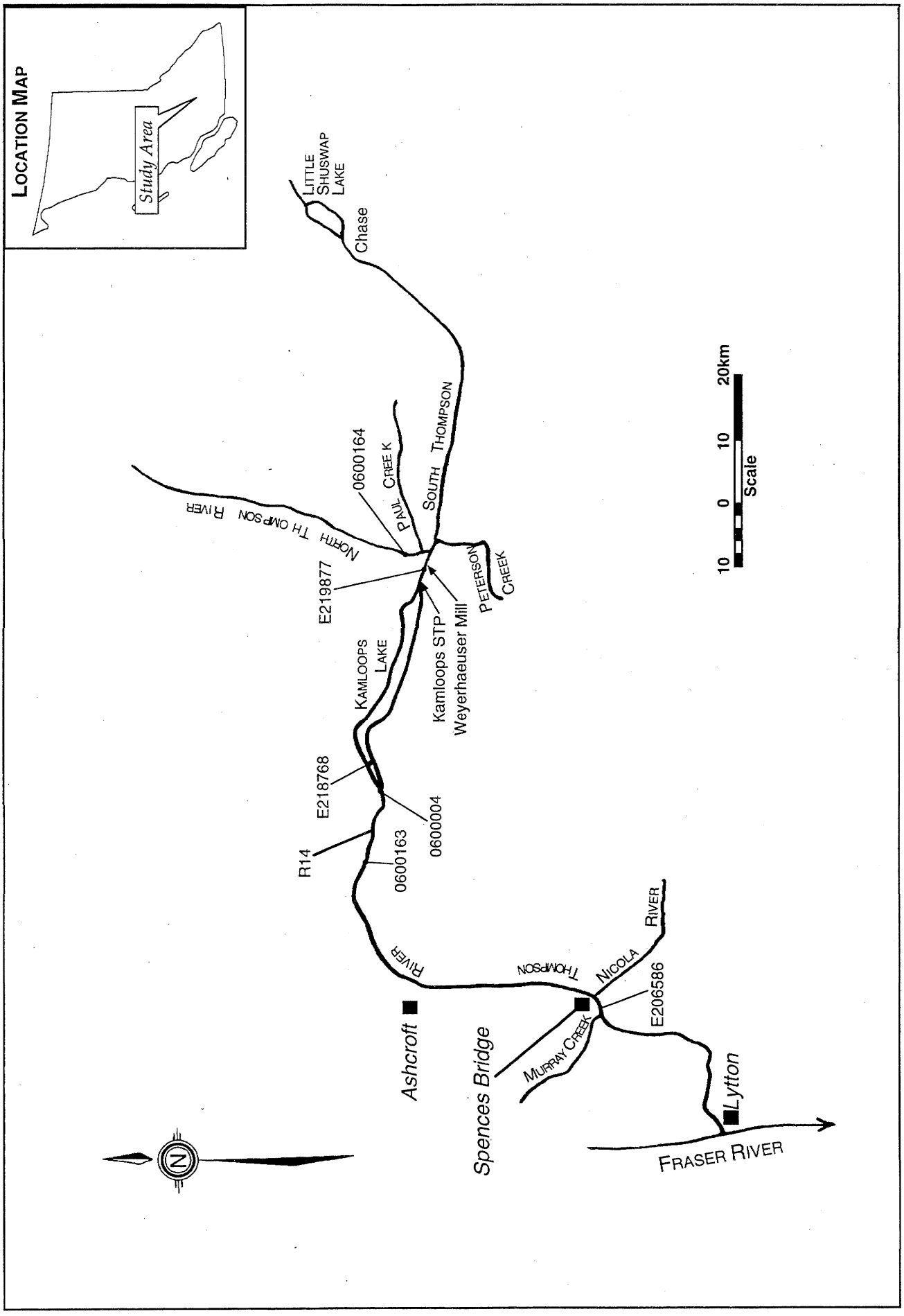


FIGURE 15: COLUMBIA RIVER FROM KEENLEYSIDE TO BIRCHBANK

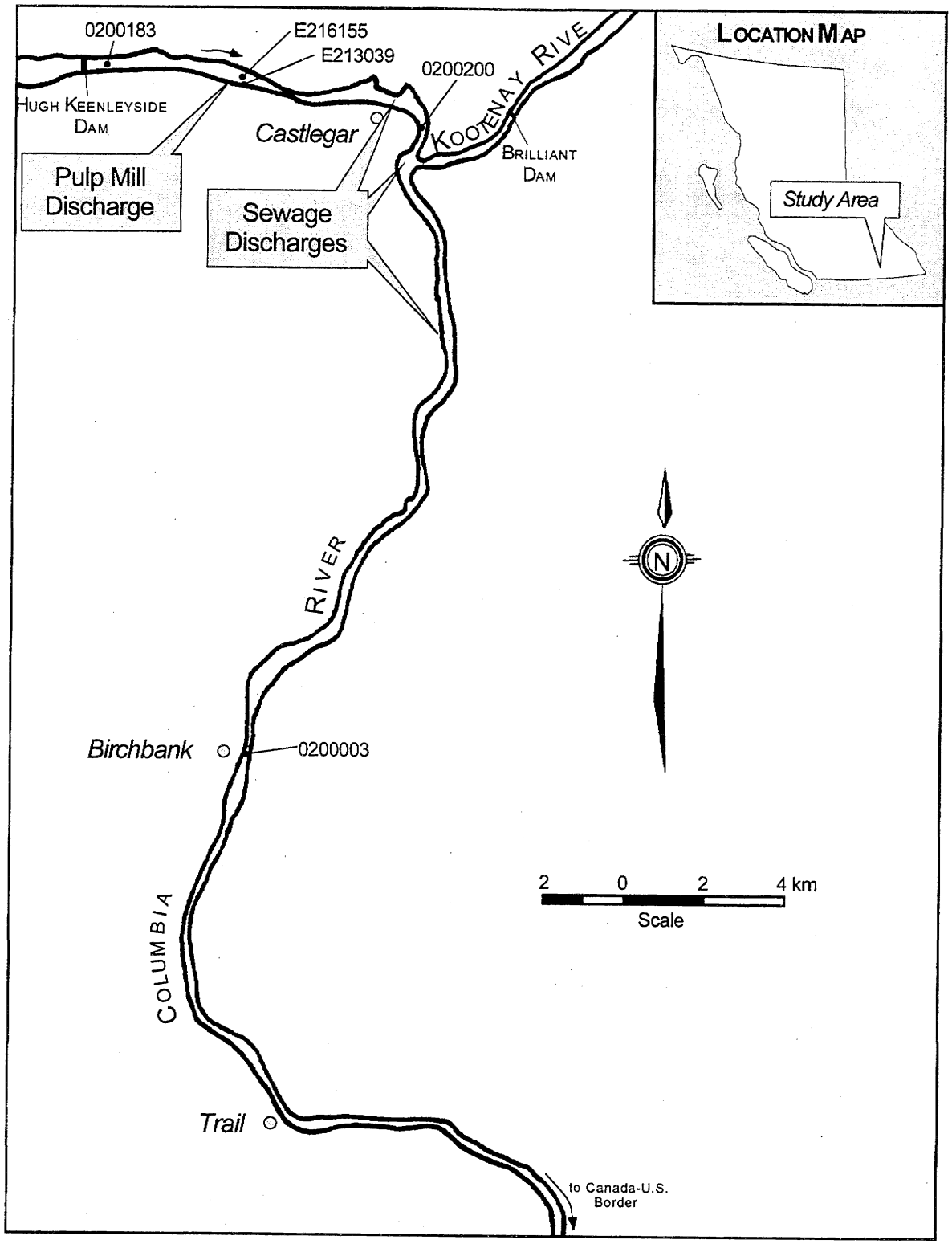


FIGURE 16: FRASER RIVER FROM KANAKA CREEK TO THE MOUTH

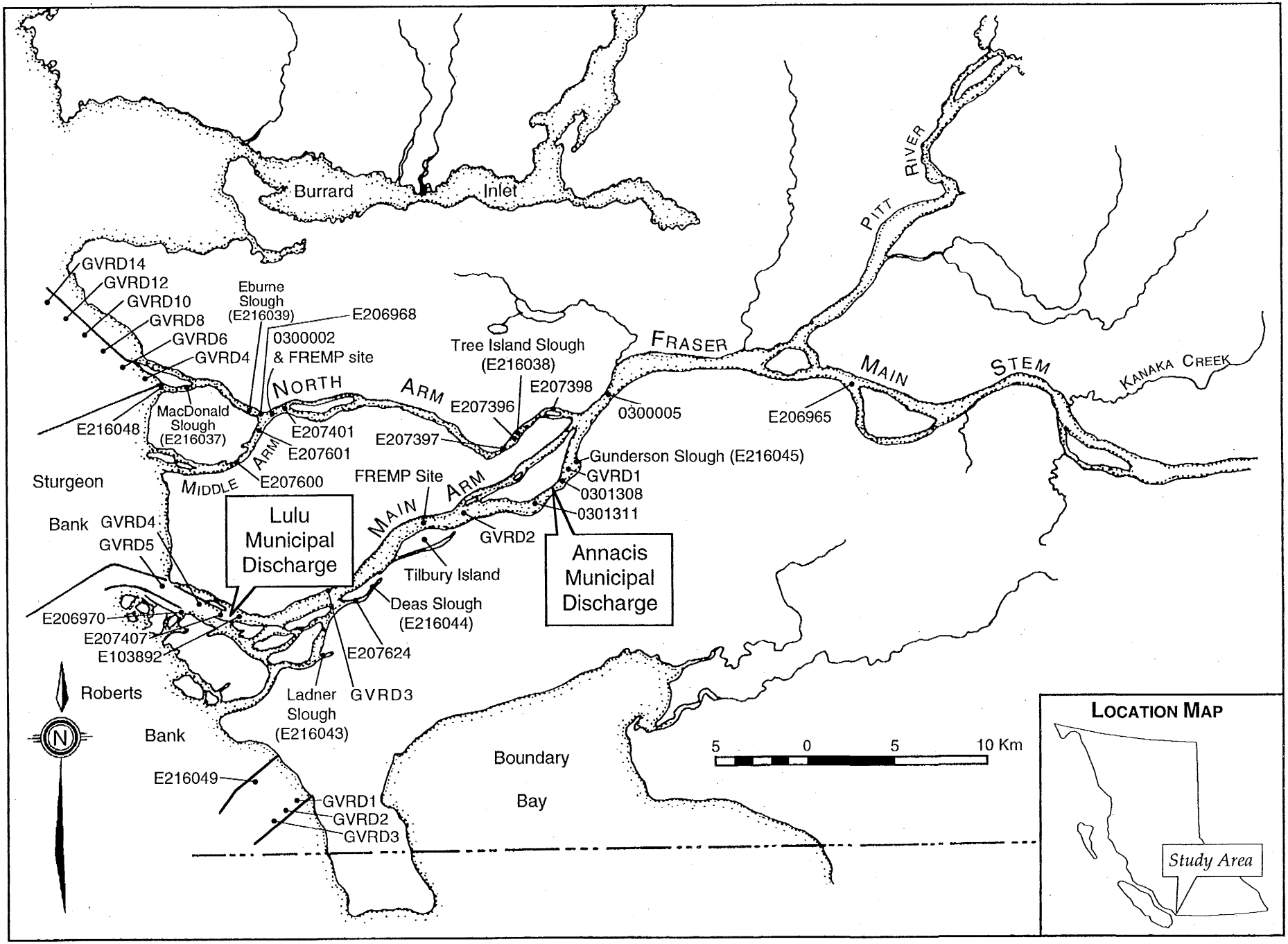
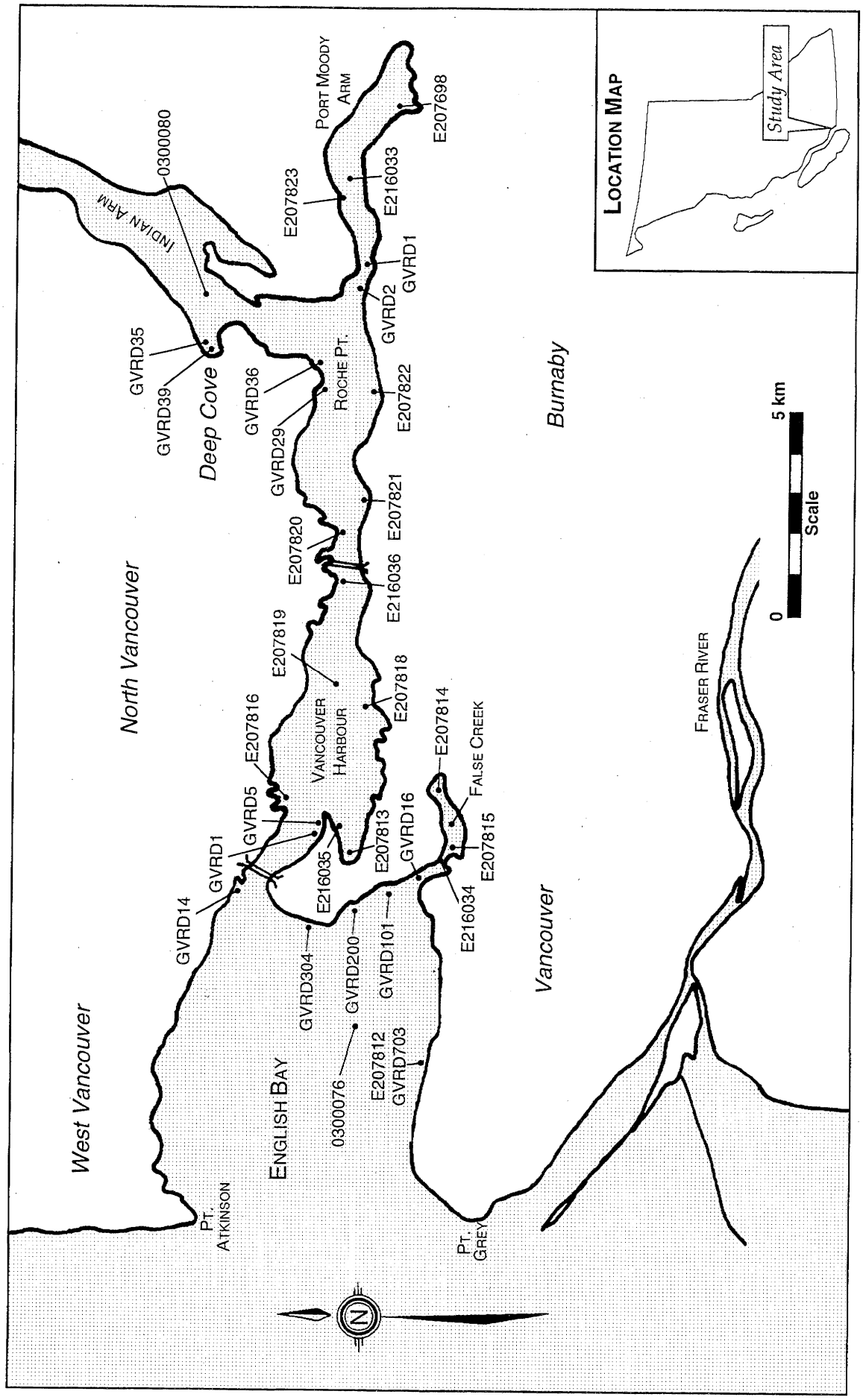



FIGURE 17: BURRARD INLET