WATER QUALITY SECTION
WATER MANAGEMENT BRANCH
MINISTRY OF ENVIRONMENT, LANDS AND PARKS

Water Quality in British Columbia

Objectives Attainment in 1998 and 1999

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SUMMARY

The setting of water quality objectives in priority basins in British Columbia began in 1982. By the end of 1999, the Ministry of Environment, Lands and Parks had set water quality objectives in 48 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 1998 and 1999 to check the attainment of objectives in 12 basins (1998) and 13 basins (1999). Due to budgetary restraints, the program has been considerably reduced as compared to previous years.

The results are summarized in a series of tables. For all Ministry Regions the objectives were met 95 percent of the time in 1998 and 91 percent of the time in 1999. The findings in 1998 and 1999 are significantly higher than the 1996 and 1997 figures (81% and 77%, respectively), and similar to previous years when attainment ranged from 94 percent in 1987 to 83 percent in 1995.

There was not 100 percent attainment 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 each of the 1998 and 1999 sampling programs 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.

ACKNOWLEDGEMENTS

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

Additional data found in this report were also obtained from regional offices of B.C Environment, from the federal Department of Fisheries and Oceans (DFO), RL & L Environmental Services on behalf of B.C. Hydro, Celgar Pulp Company, the Greater Vancouver Regional District and from the Cariboo Health Unit.

An additional acknowledgment goes to R.J. Rocchini, who wrote the past *Objectives Attainment Reports*, forming the basis to this document.

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 the setting of water quality objectives for fresh and marine surface waters of British Columbia.

Water quality objectives are safe conditions or threshold levels of a substance that 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. Water quality objectives 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 46 areas or basins and updated them in two. 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 1998 and 1999 is the eleventh in a series of reports that began in 1986 (the report for 1996 and 1997 was also combined into one document). 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. In order to reduce publication costs and increase convenience of data management, the 1998 and 1999 attainment reports are included in one document. 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 developed a water quality index in 1995. 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 that 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.

In 1995 the index was applied in 33 water basins plus five groundwater aquifers in the Province to produce a *B.C. Water Quality Status Report*. This report, the first of its kind, is intended to show the public in non-technical terms 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 April 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 48 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	7
Skeena	5
Omineca-Peace	9
Cariboo	2
Southern Interior	12
Kootenay	5
Lower Mainland	8
Total	48

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 1998 in Tables 1 to 15, and for 1999 in Tables 16 to 30, with a separate table for each of the 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 guidelines 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 400/100 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 guidelines to allow for the fact that threats to water quality have changed or are better understood since publication of the objectives reports.

Four different concluding statements are used: objective met, objective not met, indefinite result, and omitted 1998 or 1999. We consider the objective to have been met if the monitoring result equaled 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 omitted if, for some reason, planned data collection did not take place or was excluded 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 or exceeded in 1998 and 1999.

Text

In the next section, the text briefly explains the quality assurance program and its status in the 1998 and 1999 monitoring years. 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, 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 1998 and 1999 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 1998 and 1999 helps highlight those variables that had a detrimental effect on water quality in a particular water body.

The 1998 and 1999 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 48 basins where objectives have been set. Separate maps, Figures 2 to 16, illustrate the 13 water basins monitored in 1998/1999 and show the sampling sites referred to in the tables.

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 trans-boundary 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

Due to fiscal restraints, the Quality Assurance Program was suspended in 1996. Prior to this, the Quality Assurance Program ran over a five-year period from 1991 to 1995. This program described the accuracy and precision of the test results to assess the reliability of the results, and was specific to the variable and levels measured for objectives attainment. In its place the Ministry conducts a more general quality assurance program to ensure that contract laboratories are producing results that meet Ministry data quality standards.

PROVINCIAL OVERVIEW OF RESULTS

Presentation of Results

In the tables summarizing the monitoring data, there are four kinds of concluding statement. These are: objective met, objective not met, omitted 1998 or 1999, and indefinite result.

To get an overview of performance for the Province, we totaled 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 in 1998, and Table 15 presents its 1999 equivalent. 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.

- 1998 -

Table 1 shows that the objectives were met 85% of the time in the Province as a whole in 1998. This result varied according to Region from 18% to 92%. Objectives were not met from between 0% to 28% of the time, with an overall average of 5%.

The occurrence of objectives omitted and indefinite results in 1998 averaged 5% for both parameters. If we subtract these instances from the total, the objectives were met 95% of the time and objectives not met 5% of the time. By subtracting the instances of no

results, we speculate that if all objectives had yielded results, then the above trend would continue.

We can therefore generalize that, in the Province as a whole, the objectives were met about 95% of the time in 1998.

- 1999 -

Table 16 indicates that the objectives were met 80% of the time in the Province as a whole in 1999. This result varied according to Region from 25% to 84%. The objectives were not met from between 2% to 25% of the time, with an overall average of 8%.

The occurrence of objectives omitted and indefinite results in 1999 averaged 6% for both parameters. If we subtract these instances from the total, the objectives were met 91% of the time and objectives not met 9% of the time.

We can again generalize that, in the Province as a whole, the objectives were met about 91% of the time in 1999.

This is an approximate general statement at the best of times, but is especially so for 1998 and 1999 because of the reduced monitoring in those years. 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.

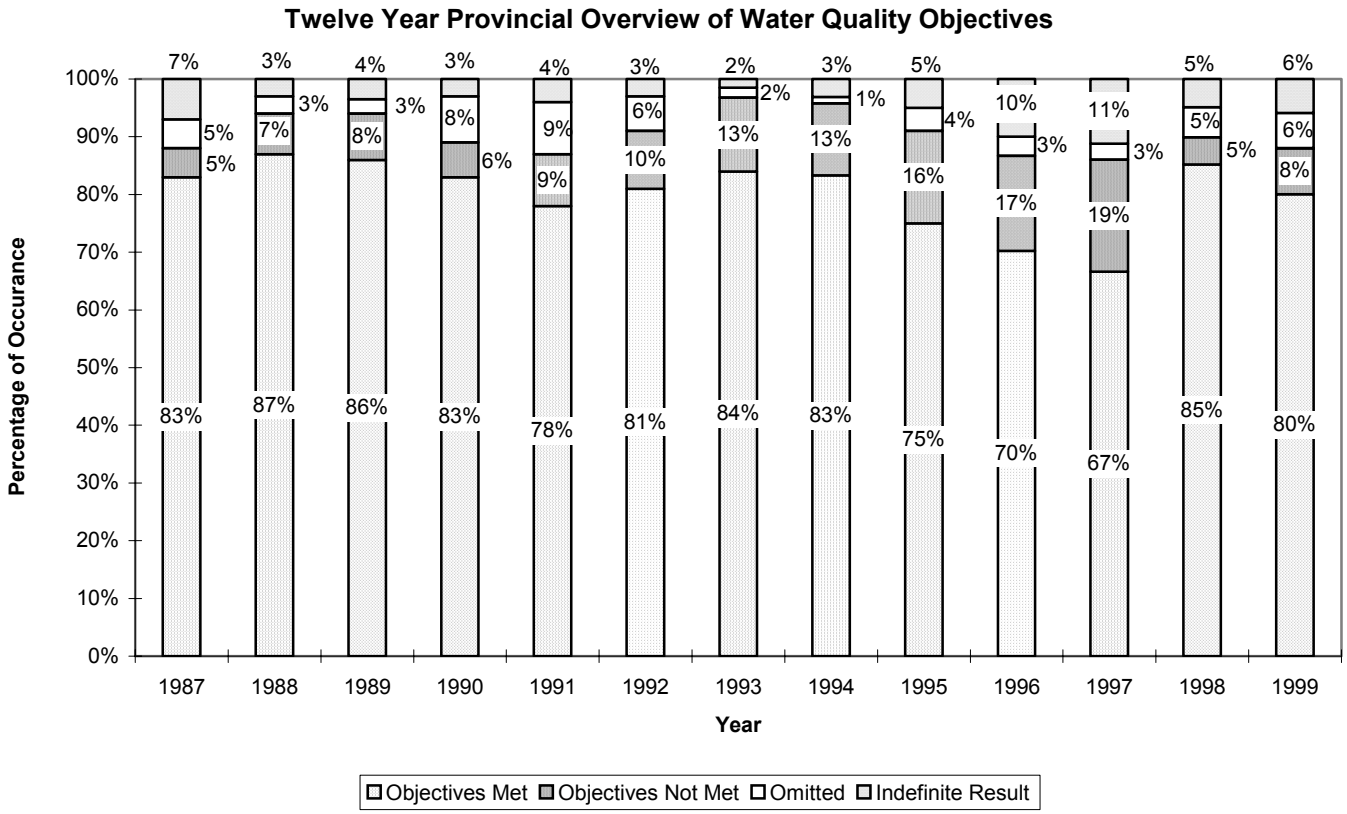
When comparing the data from past years, a reversal in the downward trend in percent of objectives met is evident in 1998 and 1999 (as seen in the table below). However, as the monitoring program is repeated in future years, it is speculated that a downward trend could continue. This is because new basins 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 to free-up funding for areas that have persistent water quality concerns.

	Year of Objective Monitoring												
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Percent of the Time Objectives Were Met	94%	93%	92%	93%	90%	89%	87%	87%	83%	81%	77%	95%	91%
Number of Basins Sampled	20	22	24	30	34	33	32	21	16	15	14	12	13

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 an increasingly 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.

Twelve Year Water Quality Attainment Overview

This report marks the twelfth year of the *Water Quality Objectives Attainment Report* series. Included below is a graph representing the findings from the past twelve years of attainment reporting: this graph shows trends in each of the four concluding statements (objectives met, objectives not met, omitted, and indefinite results).


Twelve Year Provincial Overview of Water Quality Objectives
Percentage of Occurance
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
Year
7% 3% 4% 3% 4% 3% 2% 3% 5% 10% 11% 5% 6%
5% 3% 3% 8% 9% 6% 2% 1% 4% 3% 3% 5% 6%
5% 7% 8% 6% 9% 10% 13% 13% 16% 17% 19% 85% 8%
83% 87% 86% 83% 78% 81% 84% 83% 75% 70% 67% 80%
Objectives Met
Objectives Not Met
Omitted
Indefinite Result

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 from 1994 to 1997. Monitoring carried out from 1988 to 1993 gave fairly consistent results, with water quality ratings of fair for both rivers (Cowichan River index = 30; Koksilah River index = 36). 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.

Table 2 lists results for 1998 and Table 16 presents results in 1999.

- 1998 -

Monitoring to check objectives attainment resumed in 1998. In 1998, objectives were met 84% of the time when sufficient data was collected to evaluate compliance. Objectives that were exceeded occasionally included fecal coliforms and *E. coli*, suspended solids, and dissolved copper.

- 1999 -

In 1999, objectives were met in all instances when there was sufficient data to evaluate compliance.

Middle Quinsam Lake, and Quinsam River Basin

Middle Quinsam Lake drains via the Quinsam River into the Campbell River just upstream from the Campbell River estuary (Figure 2[A,B]). 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. It was noted as having excellent water quality (index = 3) based on measurements between 1989 and 1993 while the Quinsam River had good water quality (index = 8).

A few samples were collected for objectives monitoring in 1998 (Table 3), and monitoring was suspended in 1999. Figure 2[A,B] shows site locations.

- 1998 -

Objectives were met in all samples collected in 1998.

Oyster River

The Oyster River flows from the Forbidden Plateau area into the Strait of Georgia, south from 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, with a water quality rating of good (index = 16). Since the situation is stable, we did not monitor from 1994 to 1997. One sample was collected in 1998, and two were collected in 1999.

Table 4 lists results in 1998 and Table 17 presents results in 1999.

- 1998 -

Monitoring to check objectives attainment resumed in 1998. In 1998, none of the objectives that were measured were exceeded.

- 1999 -

In 1999, objectives were met in all instances when there was sufficient data to evaluate compliance.

Elk and Beaver Lakes

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.

Prior to this report, Elk and Beaver Lakes where monitored from 1993 to 1995. During the 1993 to 1995 study period, objectives for dissolved oxygen, chlorophyll-*a*, and the phytoplankton community were consistently not met, reflecting the eutrophic nature of the lakes. The water quality ratings were borderline, (index =54), for Elk Lake and poor, (index =72), for Beaver Lake.

Monitoring in the future will be a lower priority until action is taken to improve water quality conditions.

Tsolum River

The Tsolum River flows from Mount Washington to the Puntledge River at Comox on Georgia Strait (Figure 3). 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.

Table 5 lists results in 1998, Table 18 presents results in 1999, and Figure 3 shows site locations.

Objectives for the Tsolum River were checked for the first time in 1994 in the river just downstream from the mine site. Since then, the objectives for dissolved copper were often not met.

- 1998 -

Dissolved copper concentrations continued to exceed objectives in 1998, indicating a continued potential threat to fish. The objective for percent steelhead survival will not be checked until water quality conditions improve substantially.

- 1999 -

The objective for dissolved copper was not met again in 1999, although the maximum concentration of dissolved copper decreased from 1998. The percent steelhead survival objective will not be checked until there are further water quality improvements.

We recommend continued objectives monitoring to track the progress of reclamation work at the mine.

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 road building are the main influences on water quality.

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

Quatse Lake

Quatse Lake is located on the north-eastern end of Vancouver Island, approximately three kilometres north from Coal Harbour. In addition to a source of drinking water for Coal Harbour, Quatse Lake is also an important aquatic habitat for both fish and wildlife. A substantial portion of the watershed has been logged, which in turn has raised concerns that water quality may be affected.

Monitoring to check the attainment of water quality objectives has not yet been carried out, and is not planned in the immediate future.

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 from 1988 to 1992 and obtained consistent data, with a water quality rating of good, (index = 15). Given these results, we consider objectives checking to be a relatively low priority at this time and have not monitored the Bulkley River since 1992.

Kathlyn, Seymour, Round, and Tyhee Lakes

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. Once corrective action starts, more complete monitoring for objectives attainment should resume to document progress. Water quality was reported as fair for Kathlyn, (index = 34), and Tyhee, (index = 21), lakes.

Lower Kitimat River and Arm

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 methanol plant discharge at the head of the arm. The existing water quality objectives are being updated.

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, with a water quality rating of good (index = 9). 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, with a water quality rating of borderline (index = 46). 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, with a water quality ratings of fair for both Bullmoose Creek (index = 22), and West Bullmoose Creek (index = 23), and good for South Bullmoose Creek (index = 10). Further monitoring is a low priority at this time.

Nechako River

The Nechako River, a major tributary to the Fraser River at Prince George, has its flow controlled by dams for power generation (Figure 4). 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 past years, the fecal coliform objectives were met in the Nechako River except immediately downstream from Vanderhoof. The temperature objectives immediately downstream from Cheslatta Falls were often not met in the summer. We have obtained

similar results since 1987. For the period, 1987 to 1993, water quality was considered as fair (index = 22). Temperature objectives might be met if a cold-water release structure, proposed for the Kenney Dam upstream from Cheslatta Falls, is installed. The attainment of the temperature objectives further downstream on the Nechako at Vanderhoof and upstream from the Stuart River has improved due to water temperature management by the Nechako Fisheries Conservation Program.

Table 6 lists results in 1998, Table 19 presents results in 1999, and Figure 4 shows site locations.

- 1998 -

Objectives not met in the Nechako River in 1998 include temperature and pH. Temperature objectives were frequently exceeded at all three of the sites measured on the Nechako (immediately downstream from Cheslatta Falls, 10 km downstream from Cheslatta Falls, and at Vanderhoof).

- 1999 -

As in previous years, the temperature objective downstream from Cheslatta Falls was not met in the summer months of 1999. The temperature objectives further downstream at Vanderhoof were met. pH objectives were also met in 1999.

Given the importance of the river for fisheries populations, we recommend continued monitoring to check objectives; especially water temperature.

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, with a water quality rating of good (index = 5).

Pouce Coupe River and Dawson Creek

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

The exact causes for objectives not being met need to be found. Water quality ratings were fair for the Pouce Coupe River (index = 33; period of record: 1987 to 1990), and borderline for Dawson Creek (index = 56; period of record: 1987 to 1989). 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.

However, considering Alberta's increasing interest in the quality of the water crossing the provincial border, we recommend that objectives monitoring of the Pouce Coupe River and Dawson Creek be resumed.

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. Water quality for the Peace River was judged as fair (index = 22), for the period of record from 1988 to 1993.

Objectives not met at times in 1994 included those for turbidity, suspended solids, temperature, and chromium. No monitoring was conducted in 1995, through 1999 to check objectives.

Considering Alberta's interest in the quality of the water crossing the provincial border, we recommend that objectives monitoring of the Peace River be resumed.

Upper Finlay River Sub-Basin

The Finlay River, located in the north east part of the Province, drains into the north end of Williston Lake. This river is broken into two sub-basins, the upper and the lower Finlay.

The drainage area of the upper Finlay sub-basin includes portions of the Skeena Mountains, Spatsizi Plateau, Omineca Mountains, and the Rocky Mountains. The upper Finlay was the site of a gold and silver mine and mill, now closed. The upper Finlay system is an important aquatic habitat for sports fishery species such as Dolly Varden (*Salvelinus malma*), and Rainbow Trout (*Oncorhynchus mykiss*). In addition, other water uses include recreational uses and as a source of drinking water for the community of Ware. 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.

Lower Finlay River Sub-Basin

The lower Finlay sub-basin drains a portion of the Rocky Mountains, and the Finlay Range about 8000 km^2 in size. Even though the lower Finlay is an important fish habitat, other water use is minimal due to low development and population in the area. Water quality concerns stem from logging and potential mineral extraction in the region.

No water quality monitoring is recommended at this time, but as development increases an assessments may show that monitoring is needed in the future.

Fraser River from the Source to Hope

This is the most important river in the Province in terms of fisheries values. 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.

Table 7 lists results in 1998, Table 20 presents results in 1999, and Figure 5 shows site locations.

- 1998 -

Insufficient data were collected from the Fraser River in 1998 to determine a 90^{th} percentile value for fecal coliforms or *E. coli*, so these objectives could not be evaluated. The only objectives not met were a single colour value of 20 TCU measured at Hope that exceeded the objective of 15 TCU, as well as a single pH value measured at Stoner of 8.52 that exceeded the objective of 8.5 pH units.

- 1999 -

Once again, insufficient data were collected from the Fraser River in 1999 to determine a 90^{th} percentile value for fecal coliforms or *E. coli*. The only objective not met in the Fraser River in 1999 was that for colour, at both the Marguerite and Hope sites.

We recommend continued monitoring to check objectives in this section of the Fraser River, as well as increasing sampling frequency for fecal coliforms and *E. coli* sufficiently to be able to evaluate objective compliance.

CARIBOO REGION

Williams Lake

Williams Lake drains to the Fraser River and is important for drinking water, recreation, and aquatic life (Figure 6). The water quality is affected by phosphorus that 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. For the period from 1987 to 1993, the water quality was rated as borderline (index = 55). However, cores of the lake bottom have recently been sampled, and preliminary findings indicate that Williams Lake has historically been more eutrophic (productive) than originally thought. Therefore, the algal blooms and other indicators of high phosphorus concentrations may be endemic rather than linked to anthropogenic activities. Pending the final results of this investigation, the water quality objectives for Williams Lake may be changed to reflect this new information.

Table 8 lists results in 1998, Table 21 presents results in 1999, and Figure 6 shows site locations.

- 1998 -

The only objectives measured frequently enough to determine compliance in 1998 were turbidity and total phosphorus concentrations. Both of these parameters frequently exceeded objectives in 1998.

-1999 -

The number of parameters measured in 1999 increased over 1998, with chlorophyll *a*, dissolved oxygen and water clarity also being monitored. Fecal coliforms concentrations were not measured frequently enough to determine 90^{th} percentiles, resulting in indefinite results for this parameter. Turbidity was the only objective measured that was consistently met. The other parameters (total phosphorus, chlorophyll *a*, dissolved oxygen and water clarity) all exceeded objectives on occasion.

We recommend continued monitoring of objectives to track the progress of corrective measures being undertaken in the watershed, and for the water quality objectives for Williams Lake to be updated to reflect new knowledge.

San Jose River

The San Jose River originates at Lac La Hache and is the main inlet to Williams Lake (Figure 7). 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 1970's.

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. Sampling was suspended in 1997, and is not expected to continue until the objectives for Williams Lake have been revisited.

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. The water quality rating for the time period 1987 to 1993 was fair.

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

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 (Figure 8). 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.

Table 9 lists results in 1998, Table 22 presents results in 1999, and Figure 8 shows site locations. The number of sampling locations represented for all of the Okanagan Valley Lakes has been increased for 1998 and 1999, to give a better picture of water quality in the overall lake.

- 1998 -

Average spring-turnover phosphorus concentrations in Wood, Kalamalka, Skaha and Osoyoos lakes were met for all samples collected in 1998. Objectives were occasionally not met in Okanagan Lake at all of the sites monitored except the south basin and upstream from the Kelowna Sewage Treatment Plant.

- 1999 -

Objectives for phosphorus were once again met consistently in Wood and Skaha lakes. However, concentrations in Kalamalka Lake and Osoyoos Lake showed an increase over 1998 and exceeded objectives. Objectives were also occasionally exceeded in Okanagan Lake, although they were met consistently at a number of sites (Vernon Arm, the central basin, the south basin and upstream from the Kelowna Sewage Treatment Plant) compared to only one site in 1998.

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 established and monitored.

Given the environmental and recreational importance of these lakes, we recommend continued monitoring of phosphorus at spring overturn, and the preparation of a more complete set of water quality guidelines.

Similkameen River

The Similkameen River flows from Manning Park, east through the south Okanagan, then south across the U.S. border (Figure 9). It is important for fisheries, drinking water, and irrigation. Water quality could potentially 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 with water quality ranked as good (index = 14), and was suspended in 1994 as low priority. The main

problem has been with fecal coliforms, possibly from agricultural operations, which did not always meet the drinking water objective required for water that is treated by disinfection only. Limited data was collected in 1996 and 1997. All objectives were met in 1996, and all objectives except for total lead in Hedley Creek were met in 1997.

Table 10 lists results in 1998, Table 23 presents results in 1999, and Figure 9 shows the various site locations.

- 1998 -

Samples were collected on 31 occasions at various locations in the Similkameen River and Hedley Creek in 1998. Exceedences occurred occasionally for weak-acid dissociable cyanide, total copper, and total iron. However, fecal coliforms and *E. coli* (which have been a problem in the past) were not measured, and therefore may be a problem as well.

- 1999 -

In 1999, a total of 27 samples were collected for the Similkameen River and Hedley Creek. Objectives that were exceeded on occasion include total chromium, total copper, total iron, and total zinc. Once again, fecal coliforms and *E. coli* were not measured.

Cahill Creek

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 (Figure 10). 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 that began operating in 1987. Monitoring to check objectives began the same year, with water quality for 1987 to 1993 being rated as good (index =13). Objectives not met in 1996 and 1997 included turbidity, dissolved sulphate, weak-acid dissociable cyanide, and nitrate. Cahill Creek was not monitored in 1998, and only a single sample was collected in 1999.

Table 24 presents results in 1999 and Figure 10 shows site locations.

- 1999 -

Objectives not met in 1999 included sulphate and nitrate. The majority of other parameters for which objectives have been set (including turbidity and dissolved solids, which have been a problem in the past) were omitted. Objectives that met water quality objectives included maximum weak-acid dissociable cyanide and maximum nitrite.

We recommend continuing routine monitoring to check objectives while work proceeds to improve the mine operation.

Bessette Creek

Bessette Creek, which flows into the Shuswap River, is formed by the confluence of Harris and Duteau creeks near the town of Lumby (Figure 11). 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 wood-waste landfill along Duteau Creek, and agricultural operations in the area generally. Based on data from1990 to 1993, water quality was rated as fair for Bessette Creek (index = 33), Lawson Creek (index = 40), and Spider Creek (index = 40), but good in Harris Creek (index = 17).

Monitoring was suspended for 1998 and 1999.

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 in the early 1990's. 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, with water quality rating of fair to good. Further monitoring was considered a low priority and was discontinued in 1994.

Since that time, concerns have been raised about possible discharges from the closed Brenda Mines Operations. Hearings of the Environmental Appeal Board have resulted in the region re-assessing current objectives for Trepanier Creek.

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 irrigation. The creeks can be affected by urban storm-water 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 storm-water and other diffuse sources of contamination.

Tributaries to Okanagan Lake near Vernon

Lower Vernon Creek and Deep Creek are tributaries to Okanagan Lake at its north end (Figure 12). 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.

Objectives were last checked in 1996, when objectives for suspended solids were not met in both creeks, and those for fecal coliforms and *E. coli* were not met on the Lower Vernon Creek.

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 a recreational fishery 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, with at water quality rating of fair (index =35). Monitoring was discontinued in 1994, as results were fairly predictable.

Thompson River

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 (Figure 13). 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 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.

Of the objectives checked in 1996, only the dioxin and furan objectives for sediments were not met. Dioxin and furan levels in sediments were not monitored in 1997.

Table 11 lists results in 1998, Table 25 presents results in 1999, and Figure 13 shows site locations.

- 1998 -

All of the objectives checked in 1998 met the applicable objectives, including those for colour and resin acids. However, dioxin and furan concentrations in both fish and sediments were not measured.

- 1999 -

Results for the 1999 monitoring program were identical to those of previous years, with objectives for colour and resin acids being met and those for dioxins and furans not measured.

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 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 database.

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, with a water quality rating of good (index = 5 for Columbia Lake and 4 for Windermere Lake), monitoring was discontinued 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

The Columbia River is one of the major rivers in British Columbia and in Washington State further downstream (Figure 14). 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 that recently expanded production and upgraded its effluent treatment to secondary. There are also small discharges of secondary-treated municipal effluent

and urban runoff. Water quality was rated as fair (index = 35), but appears to be improving based on data review from 1991 to 1993.

Objectives for dissolved gasses were not met in both 1996 and 1997, and those for dioxin/furan levels in fish were not met in 1996. The monitoring program in 1997 was significantly reduced over previous years.

Table 12 lists results for 1998, Table 26 presents results in 1999, and Figure 14 shows site locations.

- 1998 -

Objectives for pH and dissolved gas were occasionally not met in 1998. A number of parameters, including dioxins and furans, were not measured. Objectives for dissolved oxygen, colour, suspended solids, fecal coliforms and *E. coli* were met in 1998.

- 1999 -

Objectives for dissolved gas were once again not met in 1999, and one dissolved oxygen value was slightly below the minimum threshold (9.9 mg/L, versus the objective of 10 mg/L). Objectives that were met include pH, colour, suspended solids, sediment total organic carbon, fecal coliforms and *E. coli*.

Considering the international significance of the river and its importance to aquatic life, continued monitoring to check the attainment of objectives is recommended.

Columbia River from Birchbank to the International Border

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 Birchbank and the international border, the main influence is a metal smelter

and refinery at Trail. There are also small discharges of secondary-treated municipal effluent and urban runoff.

The objectives report for this section of the Columbia River was completed in 1997, and therefore no data collected prior to 1998 has been analyzed to determine objectives compliance.

Table 13 lists results for 1998, and Table 27 presents results in 1999.

- 1998 -

Objectives for pH and dissolved gas were occasionally not met in 1998. A number of parameters, including dioxins and furans, were not measured. Objectives for dissolved oxygen, colour, suspended solids, fecal coliforms and *E. coli* were met in 1998.

- 1999 -

Objectives for dissolved gas were once again not met in 1999, and one dissolved oxygen value was slightly below the minimum threshold (9.9 mg/L, versus the objective of 10 mg/L). Objectives that were met include pH, colour, suspended solids, sediment total organic carbon, fecal coliforms and *E. coli*.

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 were updated in 1998 and we recommend checking the revised objectives when they are finalized. Overall water quality was rated as good (index = 7).

Fraser River from Kanaka Creek to the Mouth

The river downstream from Kanaka Creek and the outer estuary are very important for salmon migration and rearing (Figure 15). 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.

Water quality was rated as good (index = 4), in the Main Stem, fair (index = 28), in the Main Arm, and fair (index = 18), in the North Arm.

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. Updated objectives were released in 1998.

Table 14 lists results in 1998, Table 28 presents results in 1999, and Figure 15 shows site locations.

- 1998 -

The only objectives monitored in the lower Fraser River in 1998 were those for fecal coliforms. All fecal coliform objectives were met for this section of the Fraser River.

- 1999 -

As in 1998, the only objectives measured in this section of the Fraser River were those for fecal coliforms. One objective was exceeded on one occasion, at the Greater Vancouver Regional Districts site on Locarno Beach.

While these results indicate an improvement in water quality compared to previous years, we cannot be certain they are truly representative because of the very limited monitoring.

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, storm-water, and septic tanks in Boundary Bay and from agriculture in the tributaries.

Objectives were checked from 1988 to 1993 giving consistent results, with a water quality rating of fair (index = 40). 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. Sampling resumed in 1999, when four samples were collected at various sites and analyzed for a number of parameters.

Table 29 presents results for Boundary Bay in 1999, and Figure 15 shows site locations.

- 1999 -

Objectives not met for the Boundary Bay sites included maximum fecal coliforms values and increases in suspended solids. Insufficient samples were collected to determine compliance for objectives based on averages, geometric means or 90th percentiles.

Burrard Inlet

Burrard Inlet includes Port Moody Arm, Indian Arm, Vancouver Harbour, False Creek, and English Bay (Figure 16). 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 that can affect water quality. These include primary-treated sewage, combined sewer overflows, storm-water, bulk-loading terminals, a sugar refinery, a sodium chlorate plant, a chlor-alkali plant, and oil depots. Water quality was ranked as fair in Port Moody Arm (index = 40), Indian Arm (index = 18), Second Narrows to Roche Point (index = 31), First to Second Narrows (index = 42), and outer Burrard Inlet (index = 20), but borderline in False Creek (index = 44). Samples were last collected in 1996 and 1997, but analyzed only for fecal coliforms. Objectives for fecal coliforms were occasionally not met at Deep Cover, Cates Park and Brockton Point.

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 last checked in 1994. At that time, objectives were not met at times for phenols, water temperature, chromium, iron, zinc, and chlorophenols in water. Water quality was ranked as fair in School House Brook (index = 38), good in Lynn Creek (index = 12), and good in the Capilano River (index = 16).

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 that can affect water quality include storm-water, agricultural runoff, treated sewage, landfill leachates, wastewaters from gravel operations, and a wood preservation plant.

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. Water quality was ranked as fair in Kanaka Creek (index = 41), good in the Pitt River (index = 16), and Pitt Lake (index = 4), fair in the Alouette (index = 24) and North Alouette (index = 22) rivers, and excellent (index = 3) in Alouette Lake. Coquitlam River water quality was ranked as fair (index = 34), while the Brunette River was good (index = 14).

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.

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 tri-butyl 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.

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 database.

Table 1. Provincial overview of water quality objectives - 1998

Region	Number of Occurrences				
	Objectives Met	Objectives Not Met	Indefinite Results	Omitted 1998	**Totals**
Vancouver Island	151 60.4%	27 10.8%	42 16.8%	30 12.0%	**250** **100.0%**
Omineca - Peace	552 88.9%	34 5.5%	16 2.6%	19 3.1%	**621** **100.0%**
Cariboo	2 18.2%	3 27.3%	1 9.1%	5 45.5%	**11** **100.0%**
Southern Interior	751 91.8%	28 3.4%	15 1.8%	24 2.9%	**818** **100.0%**
Kootenays	572 85.1%	23 3.4%	52 7.7%	25 3.7%	**672** **100.0%**
Lower Mainland	42 73.7%	0 0.0%	0 0.0%	15 26.3%	**57** **100.0%**
All Regions	**2070** **85.2%**	**115** **4.7%**	**126** **5.2%**	**118** **4.9%**	**2429** **100.0%**
All Regions less occurrences with no result	**2070** **94.7%**	**115** **5.3%**			**2185** **100.0%**

Table 2. Cowichan - Koksilah Rivers Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms	Cowichan River: E206108 d/s Cowichan Lake	Jul.6 - Dec.1	13	<1 - 62 CFU/100 mL	
< 10 /100 mL 90th percentile		Jul.6 – Aug.5, Nov.4 - Dec.1	2	np = 37.8 - 39.2 CFU/100 mL	Objective not met
(np)	0120808 300m u/s L. Cowichan STP	Jan.27 - Dec.1	28	<1 - 360 CFU/100 mL	
		Jul.6 – Aug.4, Nov.4 - Dec.1	4	np = 68.6 - 253.2 CFU/100 mL	Objective not met
	E206107 400m d/s L. Cowichan STP	Jan.27 - Dec.1	29	<1 - 240 CFU/100 mL	
		Jul.6 – Aug.4, Aug.5 – Sep.1, Oct.13 – Nov.4, Nov.9 – Dec.1	4	np = 29.6 - 216 CFU/100 mL	Objective not met
	0120802 u/s Highway 1	Jul.6 - Dec.1	12	10 - 93 CFU/100 mL	
			1	np = 62.1 CFU/100 mL	Indefinite result
	Koksilah River: E207425 Pt. Renfrew Rd.	Sep.3 - Nov.17	5	10 - 170 CFU/100 mL	
					Indefinite result
	E206976 Koksilah Rd.	Jan.14 - Nov.17	17	<1 - 570 CFU/100 mL	
					Indefinite result
	0123981 at Highway 1	Jul.30 - Nov.17	7	12 - 210 CFU/100 mL	
					Indefinite result
E. Coli	0120808 300m u/s L. Cowichan STP	Jan.27 - Nov.17	9	<3 - 33 CFU/100 mL	
< 10 /100 mL 90th percentile		Aug.4 - Sep.1	1	np = 39.2 CFU/100 mL	Objective not met
	E206107 400m d/s L. Cowichan STP	Jan.27 - Nov.17	9	<3 - 60 CFU/100 mL	
		Aug.4 - Sep.1	1	np = 50 CFU/100 mL	Objective not met
Enterococci	Cowichan River: 0120808 300m u/s L. Cowichan STP	Jun.2 - Aug.4	2	<3 - 33 CFU/100 mL	
90th percentile (np)					Indefinite result
	E206107 400m d/s L. Cowichan STP	Jun.2 - Aug.4	2	<3 - 41 CFU/100 mL	
					Indefinite result
Turbidity max increase: 5 NTU or 10%	E206107 400m d/s L. Cowichan STP	Jul.30	1	0.53 NTU	Indefinite result no control
	0120802 u/s Highway 1	Jul.30	1	0.44 NTU	Indefinite result no control

Table 2 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Suspended Solids max. increase 10 mg/L or 10%	Koksilah River: E207425 Pt. Renfrew Rd.	Oct.13, Dec.1	2	all <5 mg/L	Control Site
	E206976 Koksilah Rd.	Jan.14 - Dec.1	5	<5 - 34 mg/L	
			2	increase = 0 mg/L	Objective met
	0123981 at Highway 1	Oct.13, Dec.1	2	all <5 mg/L	
			2	increase = 0 mg/L	Objective met
Suspended Solids max. increase 10 mg/L or 10%	Koksilah River: E207425 Pt. Renfrew Rd.	Oct.13, Dec.1	2	all <5 mg/L	Control Site
	E206976 Koksilah Rd.	Jan.14 - Dec.1	5	<5 - 34 mg/L	
			2	increase = 0 mg/L	Objective met
	0123981 at Highway 1	Oct.13, Dec.1	2	all <5 mg/L	
			2	increase = 0 mg/L	Objective met
Ammonia-N < 1.30 mg/L av 6.75 mg/L max at pH = 7.9 temp = 15 C	Cowichan River: E206108 d/s Cowichan Lake	Jul.6 - Sep.1	8	<0.005 - 0.016 mg/L	Max obj. met
		Jul.16 - Aug.13	1	av. = 0.006 mg/L	Av. obj. met
	0120808 300m u/s L. Cowichan STP	Jan.27 - Nov.17	19	<0.003 - 0.015 mg/L	Max obj. met
		Jul.6 - Aug.4	1	av. = 0.006 mg/L	Av. obj. met
		Aug.6 - Aug.25	1	av. = 0.007 mg/L	Av. obj. met
	E206107 400m d/s L. Cowichan STP	Jan.27 - Nov.17	19	<0.003 - 0.028 mg/L	Max obj. met
		Jul.6 - Aug.4	1	av. = 0.006 mg/L	Av. obj. met
		Aug.5 - Aug.25	1	av. = 0.007 mg/L	Av. obj. met
	0120802 u/s Highway 1	Jul.6 - Dec.1	9	<0.005 - 0.018 mg/L	Max obj. met
		Jul.6 - Aug.5	1	av. = <0.005 mg/L	Av. obj. met
	E206106 1 km d/s Duncan STP	Jul.6 - Dec.1	9	<0.005 - 0.262 mg/L	Max obj. met
		Jul.6 - Aug.5	1	av. = 0.098 mg/L	Av. obj. met
Chlorophyll-a 50 mg/m^2 max	Cowichan River	1998	0	no data collected	Omitted 1998
Total Cl_2 Res. 0.002 mg/L max	Cowichan River	1998	0	no data collected	Omitted 1998

Table 2 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Oxygen 8.0 mg/L min Jun - Sep 11.2 mg/L min Oct - May	Cowichan River Koksilah River	1998	0	no data collected	Omitted 1998
Dissolved Cu <0.002 mg/L av 0.004 mg/L max or 20% increase	Cowichan River: E206108 d/s Cowichan Lake	Nov.24 - Dec.1	2	0.0007 - 0.0008 mg/L	Max obj. met
					Av. not checked
	0120802 u/s Highway 1	Nov.24 - Dec.1	2	0.0007 - 0.0028 mg/L	Max obj. met
					Av. not checked
	E206106 1 km d/s Duncan STP	Nov.24 - Dec.1	2	0.0006 - 0.0007 mg/L	Max obj. met
					Av. not checked
Dissolved Cu <0.002 mg/L av 0.004 mg/L max or 20% increase	Koksilah River: E207425 Pt. Renfrew Rd.	Nov.24 - Dec.1	2	0.0008 - 0.0010 mg/L	Max obj. met
					Av. not checked
	E206976 Koksilah Rd.	Nov.24 - Dec.1	2	0.0043 - 0.005 mg/L	Objective not met
					Av. not checked
	0123981 at Highway 1	Nov.24 - Dec.1	2	0.001 - 0.0017 mg/L	Max obj. met
					Av. not checked
Dissolved Pb <0.003 mg/L av 0.008 mg/L max or 20% increase	Cowichan River: E206108 d/s Cowichan Lake	Nov.24 - Dec.1	2	<0.00005 - 0.00011 mg/L	Max obj. met
					Av. not checked
	0120802 u/s Highway 1	Nov.24 - Dec.1	2	<0.00005 - 0.00018 mg/L	Max obj. met
					Av. not checked
	E206106 1 km d/s Duncan STP	Nov.24 - Dec.1	2	both < 0.00005	Max obj. met
					Av. not checked
	Koksilah River: E207425 Pt. Renfrew Rd.	Nov.24 - Dec.1	2	0.00009 - 0.00015 mg/L	Max obj. met
					Av. not checked
	E206976 Koksilah Rd.	Nov.24 - Dec.1	2	0.00009 - 0.00028 mg/L	Max obj. met
					Av. not checked
	0123981 at Highway 1	Nov.24 - Dec.1	2	0.00027 - 0.00045 mg/L	Max obj. met
					Av. not checked

Table 2 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Zn <0.030 mg/L av 0.180 mg/L max or 20% increase	Cowichan River: E206108 d/s Cowichan Lake	Nov.24 - Dec.1	2	0.002 - 0.006 mg/L	Max obj. met
					Av. not checked
	0120802 u/s Highway 1	Nov.24 - Dec.1	2	<0.001 - 0.003 mg/L	Max obj. met
					Av. not checked
	E206106 1 km d/s Duncan STP	Nov.24 - Dec.1	2	both < 0.001	Max obj. met
					Av. not checked
	Koksilah River: E207425 Pt. Renfrew Rd.	Nov.24 - Dec.1	2	< 0.001 - 0.002 mg/L	Max obj. met
					Av. not checked
	E206976 Koksilah Rd.	Nov.24 - Dec.1	2	0.001 - 0.002 mg/L	Max obj. met
					Av. not checked
	0123981 at Highway 1	Nov.24 - Dec.1	2	0.002 - 0.003 mg/L	Max obj. met
					Av. not checked
Cu-8 Quinolinolate 0.0005 mg/L max	Cowichan River	1998	0	no data collected	Omitted 1998

Table 3. Middle Quinsam Lake Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total-P < 0.007 mg/L av. (May - Sept.)	0126400 Quinsam River at highway	May - Sept.	14	0.014 - 0.042 mg/L	
					Av. not checked
Chlorophyll-a < 50 mg/m^2	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Turbidity < 1.0 NTU av. 5.0 NTU max.	0126400 Quinsam River at highway	Jan.5 - Dec.22	31	0.69 - 23.7 NTU	
					Av. not checked
Suspended Solids < 5 mg/L av. 25 mg/L max. or 10 mg/L max. inc.	0126400 Quinsam River at highway	Jan.5 - Feb.9	4	< 5 - 18 mg/L	Objective met
					Av. not checked
Ammonia-N < 1.82 mg/L av. 12.5 mg/L max. at pH = 7.5 temp. = 12 ºC	0126402 Quinsam River u/s Middle Quinsam Lake	Apr.15	1	< 0.005 mg/L	Objective met
					Av. not checked
	0900504 Quinsam River d/s Middle Quinsam Lake	Apr.15	1	< 0.005 mg/L	Objective met
					Av. not checked
	E219412 Long Lake at outlet	Apr.15	1	0.007 mg/L	Objective met
					Av. not checked
	E217017 No Name Lake outlet	Apr.15	1	< 0.005 mg/L	Objective met
					Av. not checked
Nitrate-N < 40 mg/L av. 200 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Dissolved Oxygen 3 mg/L min. 1m above seds. (May - Sept.)	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
pH > 6.5 90th percentile (np) > 6.9 median (med.)	0126400 Quinsam River at highway	Jan.5 - Dec.22	31	7.17 - 8.30	
			1	np = 7.71	np not checked
			1	med. = 7.37	med. not checked
	0126402 Quinsam River u/s Middle Quinsam Lake	Apr.15	1	7.44	np not checked med. not checked
	0900504 Quinsam River d/s Middle Quinsam Lake	Apr.15	1	7.52	np not checked med. not checked
	E219412 Long Lake at outlet	Apr.15	1	7.48	np not checked med. not checked

Table 3 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
pH > 6.5 90th percentile (np) > 6.9 median (med.)	E217017 No Name Lake outlet	Apr.15	1	7.29	np not checked med. not checked
Dissolved Aluminum < 0.05 mg/L av 0.1 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Arsenic < 0.05 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Cadmium < 0.0002 mg/L av. 0.0003 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Cobalt 0.05 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Copper < 0.002 mg/L av.	Quinsam River Quinsam Lake No Name Lake	1998	0	no data collected	Omitted 1998
Total Iron < 0.3 mg/L av.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Lead <0.003 mg/L av. 0.005 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Lead <0.003 mg/L av. 0.005 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Manganese 0.05 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Manganese 0.05 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Mercury 0.1 µg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998

Table 3 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Nickel 0.025 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Silver 0.0001 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998
Total Zinc 0.03 mg/L max.	Quinsam River Quinsam Lake No Name Lake Long Lake	1998	0	no data collected	Omitted 1998

Table 4. Oyster River Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 100 /100 mL 90th percentile (np)	Oyster River	1998	0	no data collected	Omitted 1998
Turbidity max increase: 5 NTU or 10%	Oyster River	1998	0	no data collected	Omitted 1998
Suspended Solids 12 mg/L max	Oyster River: 0125580 at Highway	May.12	1	<5 mg/L	Objective met
Ammonia-N < 1.85 mg/L av. 12.7 mg/L max at pH = 7.5 temp = 10 C	Oyster River	1998	0	no data collected	Omitted 1998
Nitrite - N <0.02 mg/L av. 0.06 mg/L max	Oyster River: 0125580 at Highway	May.12	1	<0.005 mg/L	Max objective met
			1	av. = < 0.005 mg/L	Av. not checked
Nitrate - N 10 mg/L max	Oyster River: 0125580 at Highway	May.12	1	0.014 mg/L	Objective met
pH >6.5 90th perc (np) 8.5 max	Oyster River: 0125580 at Highway	May.12	1	7.26	Max objective met
			1	np = 7.26	np not checked
Dissolved Al <0.05 mg/L av. 0.1 mg/L max	Oyster River	1998	0	no data collected	Omitted 1998
Total As 0.05 mg/L max	Oyster River: 0125580 at Highway	May.12	1	0.0002 mg/L	Objective met
Total Cd 0.2 µg/L max	Oyster River: 0125580 at Highway	May.12	1	< 0.05 µg/L	Objective met
Total Cr 2 µg/L max	Oyster River: 0125580 at Highway	May.12	1	0.3 µg/L	Objective met
Total Co 50 µg/L max	Oyster River: 0125580 at Highway	May.12	1	< 0.1 µg/L	Objective met
Total Cu <3 µg/L av. 5 µg/L 90th perc. (np)	Oyster River: 0125580 at Highway	May.12	1	1.6 µg/L	Objective met
					np not checked

Table 4 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Fe <0.3 mg/L 90th perc. (np)	Oyster River	1998	0	no data collected	Omitted 1998
Total Pb < 3.5 µg/L av. 5.4 µg/L max at hardness 11.8 mg/L	Oyster River: 0125580 at Highway	May.12	1	< 0.05 µg/L	Objective met
					np not checked
Total Pb 0.8 µg/g max in fish muscle	Oyster River Woodhus Creek Little Oyster River	1998	0	no data collected	Omitted 1998
Total Mn 0.05 mg/L max	Oyster River: 0125580 at Highway	May.12	1	0.00179 mg/L	Objective met
Total Hg <0.02 µg/L av. 0.1 µg/L max	Oyster River: 0125580 at Highway	May.12	1	<0.01 µg/L	Objective met
					np not checked
Total Hg 0.5 µg/g max in fish muscle	Oyster River Woodhus Creek Little Oyster River	1998	0	no data collected	Omitted 1998
Total Ni 0.025 mg/L max	Oyster River: 0125580 at Highway	May.12	1	<0.0001 mg/L	Objective met
Total Zn <0.01 mg/L av. 0.03 mg/L max	Oyster River	1998	0	no data collected	Omitted 1998

Table 5. Tsolum River Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Copper < 0.007 mg/L av. 0.011 mg/L max.	E207826 Tsolum River 500m d/s Murex Creek	Feb.2 - Nov.21 Apr.16 - Jul.13	19 7	0.0042 - 0.011 mg/L 0.0122 - 0.034 mg/L	Objective met Objective not met
		Oct.22 - Nov.18	1	av. = 0.00618 mg/L	Objective met
% steelhead egg survival no difference between test & control (at 95% confidence)	Tsolum River	1998	0	no in situ bioassay data collected	Omitted 1998

Table 6. Nechako River Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT SITE	DATE	n	VALUE	CONCLUSION
Fecal Coliform <100/100ml 90th perc. (np)	Nechako River 0400629 200m u/s Fort Fraser	Feb.24 - Aug.25	2	0 - 2 /100 mL	np not checked
	0400631 200 m d/s Fort Fraser	Feb.24 - Aug.25	2	0 - 10 /100mL	np not checked
	E206583 at Prince George	Jan.13 - Dec.22	26	< 1 - 38 /100 mL	np not checked
	Chilako River	1998	0	no data collected	Omitted 1998
Fecal Coliforms <10/100ml 90th perc (np)	Stuart River:	1998	0	no data collected	Omitted 1998
Fecal Coliforms <200/100ml geometric mean (gm) <400/100ml 90 perc. (np)	Necoslie River:	1998	0	no data collected	Omitted 1998
Total Cl_2 Res. 0.002 mg/L max	Nechako & Stuart Rivers	1998	0	no data collected	Omitted 1998
Ammonia-N <2.05 mg/L av 14.1 mg/L max at pH = 7.5 temp = 1 °C	Nechako River	1998	0		Omitted 1998
Ammonia-N <1.24 mg/L av 6.46 mg/L max at pH = 8.0 temp = 1 °C	Stuart River	1998	0	no data collected	Omitted 1998
Nitrite-N < 0.02 mg/L av	Nechako River E206583	Jan.13 - Dec.8	29	all <0.005	Objective met
0.06 mg/l max	at Prince George				Av. not checked
Chlorophyll - a < 50 mg/L av	Nechako River Stuart River	1998	0	no data collected	Omitted 1998
Chlorophyll - a < 100 mg/L av	Chilako River	1998	0	no data collected	Omitted 1998
Dissolved Oxygen 7.75 - 11.2 mg/L min depending on fish egg stage	Nechako River E206583 at Prince George	Nov.2 - Dec.22	5	12.8 - 14.6 mg/L	Objective met

Table 6 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
pH 6.5 - 8.5	Nechako River E206583 at Prince George	Feb.28, Jun.23 Jan.13 - Dec.22	2 28	4.74 - 6.16 7.72 - 8.15	Objective not met Objective met
Temperature < 15 °C av. ~ 100 m d/s Cheslatta Falls	Nechako River: immediately d/s Cheslatta Falls* (DFO's Cheslatta Falls site)	Oct.23 - Dec.4	43	2.87 - 9.86 °C	Objective met
	10 km d/s Cheslatta Falls* (DFO's B. Irvine site)	Jan.1 - Jun.6 Sep.26 - Dec.31	104	0.1 - 15.0 °C	Objective met
		Jun.6 - Sep.26	46	15.1 - 21.4 °C	Objective not 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)	Aug.18 - Aug.31	14	16.7 - 19.2 °C	Objective met
		Sep.1 - Sep.2	2	18.3 - 18.4 °C	Objective not met
		Sep.3 - Dec.31	120	0.0 - 16.4 °C	Objective met
Total Gas Pressure 109 % max	Nechako River	1998	0	no data collected	Omitted 1998

Table 7. Fraser River (From the Source to Hope) Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms	E206182 at Stoner	Nov.18 - Dec.15	4	82 - 130 /100 mL	
<100 /100 mL	(d/s Pr. Ge. mills)				np not checked
90th percentile	0600011	Feb.12 - Dec.15	18	< 1 - 82 /100 mL	
(np)	at Marguerite				
	(d/s Quesnel)				np not checked
	E206581	Jan.13 - Dec.22	28	<1 - 71 /100 mL	
	at Hope				
		May.5 - Jun.2	1	np = 22 CFU/100 mL	Objective met
E. coli	E206182	Nov.18 - Dec.15	4	64 - 120 /100 mL	
<100/100 mL	at Stoner				
90th percentile	(d/s Pr. Ge. mills)				
(np)					np not checked
Chlorine Residual	Fraser River	1998	0	no data collected	Omitted
< 2 µg/L av.					1998
Suspended Solids	Fraser River	1998	0	no data collected	Omitted
					1998
10 mg/L or 10%					
max increase					
Turbidity	0600011	Jan.30 - Dec.15	27	7.1 - 82.5 NTU	Indefinite result
1 - 5 NTU	at Marguerite				No control
max increase	(d/s Quesnel)				
(control: 5 - 50 NTU)					
	E206581	Jan.13 - Dec.22	28	3.18 - 79.9 NTU	Indefinite result
	at Hope				No control
Colour	0600011	Jan.30 - May 20	11	15 - 50 TCU	Objective
	at Marguerite	Jun.3 - Sept.21	10	5 - 15 TCU	met
15 TCU max	(d/s Quesnel)	Oct.5 - Dec.15	6	10 - 23 TCU	
Jun - Sep	E206581	Jan.13 - May 5	10	8 - 30 TCU	Objective met
	at Hope	Jun.16 - Sep.29	9	< 5 - 8 TCU	Objective met
75 TCU max		Jun.2	1	20 TCU	Objective not met
Oct - May		Oct.13 - Dec.22	7	13 - 30 TCU	Objective met
Temperature	E206182	Jan.15 - Dec.15	9	0.02 - 5.8 ºC	Indefinite
	at Stoner				result
1 °C	(d/s Pr. Ge. mills)				No control
max increase	0600011	Jan.30 - Dec.15	27	-1 - 20 ºC	Indefinite
	at Marguerite				result
	(d/s Quesnel)				No control
	E206581	Jan.13 - Dec.22	42	0.5 - 21.5 ºC	Indefinite
	at Hope				result
					No control

Table 7 (continued)

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	1998	0	no data collected	Omitted 1998
Nitrite - N < 0.04 mg/L av. 0.12 mg/L max. at chloride 2-4 mg/L	0600011 at Marguerite (d/s Quesnel)	Jan.30 - Dec.11	26	< 0.005 - 0.009 mg/L	Objective met
		Jan.30 - Feb.25	1	av. = < 0.005 mg/L	Objective met
	E206581 at Hope	Jan.13 - Dec.8	28	< 0.005 - 0.006 mg/L	Objective met
					Av. not checked
Nitrate+Nitrite-N 10 mg/L max	0600011 at Marguerite (d/s Quesnel)	Jan.30 - Dec.11	26	0.03 - < 0.259 mg/L	Objective met
	E206581 at Hope	Jan.13 - Dec.8	28	0.035 - < 0.171 mg/L	Objective met
Chlorophyll-a 50 mg/m2 max	Fraser River	1998	0	no data collected	Omitted 1998
pH 6.5 - 8.5	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.15 - Dec.15	8	7.10 - 8.36	Objective met
		Dec.2	1	8.52	Objective not met
	0600011 at Marguerite (d/s Quesnel)	Jan.30 - Dec.15	27	7.01 - 8.17	Objective met
Dissolved Oxygen 8.0 mg/L min May to Oct 11.0 mg/L min Nov to Apr	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.15 - Apr.8 Nov.18 - Dec.15	6 3	12.2 - 13.9 mg/L 12.5 - 13 mg/L	Objective met
	0600011 at Marguerite (d/s Quesnel)	Dec.11 - Dec.15	2	14.2 - 14.3 mg/L	Objective met
Total Lead 0.8 µg/g max in fish muscle	Fraser River	1998	0	no data collected	Omitted 1998
Total PCBs 2.0 µg/g max in fish muscle 0.1 µg/g max in whole fish	Fraser River	1998	0	no data checked	Omitted 1998

Table 7 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Chlorophenols max. TCP's pH 7.8 2,3,4-: 0.1 µg/L 2,3,5-: 0.08 µg/L 2,3,6-: 0.32 µg/L 2,4,5-: 0.08 µg/L 2,4,6-: 0.5 µg/L 3,4,5-: 0.06 µg/L tot: 1.14 µg/L	Fraser River	1998	0	no data checked	Omitted 1998
max TTCPs pH 7.8: 2,3,4,5-: 0.2 µg/L 2,3,4,6-: 0.3 µg/L tot: 0.6 µg/L	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.15 - Apr.8	7 7	all 0.002 µg/L 2,3,4,5- 0.002 - 0.066 µg/L 2,3,4,6-	Objective met
max PCP pH 7.8: 0.1 µg/L	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.15 - Apr.8	7	all 0.001 µg/L PCP	Objective met
AOX no increase over control at 95% confidence	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.11 - Dec.15	10	0.013 - 0.057 mg/L	Indefinite result No control
	0600011 at Marguerite (d/s Quesnel)	Jan.30 - Dec.15	22	< 0.01 - 0.063 mg/L	Indefinite result No control
	E206581 at Hope	Jan.13 - Dec.22	25	< 0.01 - 0.026 mg/L	Indefinite result No control
Resin Acids 12 µg/L max DHA 45 µg/L max total at pH 7.5	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.15 - Apr.8	7 7	< 1 - 2 µg/L DHA < 12 - < 14 µg/L total resin acids	Objective met Objective met
Dioxins and Furans in water 0.06 pg/L max TCDD-TEQ	Fraser River	1998	0	no data collected	Omitted 1998
Dioxins and Furans in sediments 0.25 pg/g max TCDD-TEQ	Fraser River	1998	0	no data collected	Omitted 1998
Dioxins and Furans in fish lipids 50 pg/g TCDD-TEQ	Fraser River	1998	0	no data collected	Omitted 1998

Table 8. Williams Lake Water Quality Objectives - 1998

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	1998	0	no data collected	Omitted 1998
Fecal Coliform < 10/100 mL 90th percentile at water intakes	Williams Lake	1998	0	no data collected	Omitted 1998
Turbidity < 1 NTU av 5 NTU max.	0603019 Williams Lake: at lake centre	Apr.7	1 1 1 1	5 m : 2.4 NTU 10 m: 1.7 NTU 15 m: 1.4 NTU 19 m: 1.9 NTU	Max objective met
		Apr.7	1	av. = 1.85 NTU	Objective not met
	0603022 Williams Lake: at deepest point	Apr.7	1	0.5 m : 1.9 NTU	Max objective met
		Apr.7	1		Av. not checked
Total P < 0.020 mg/L av at spring overturn	0603019 Williams Lake: at lake centre	Apr.7	1 1 1 1	5 m : 0.046 mg/L 10 m: 0.042 mg/L 15 m: 0.043 mg/L 19 m: 0.044 mg/L	
			1	av. = 0.044 mg/L	Objective not met
	0603022 Williams Lake: at deepest point	Apr.7	1	0.5 m : 0.043 mg/L	
		Apr.7	1	av. = 0.043	Objective not met
Chlorophyll-a < 5 µg/L av (May to Aug)	Williams Lake	1998	0	no data collected	Omitted 1998
Dissolved Oxygen 4.0 mg/L min 5 m above sed.	Williams Lake	1998	0	no data collected	Omitted 1998
Water Clarity 1.2 m min Secchi reading (May to August)	Williams Lake	1998	0	no data collected	Omitted 1998

Table 9. Okanagan Valley Lakes Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total - P < 0.040 mg/L av. at spring overturn (short-term)	0500450 Wood Lake West of Vernon Creek	Mar.12	1 1 1	<10 m: 0.030 mg/L >20 m: 0.030 mg/L av. = 0.030 mg/L	Objective met
	0500848 Wood Lake Deep Basin	Mar.12	1 1 1	<10 m: 0.029 mg/L >20 m: 0.030 mg/L av. = 0.030 mg/L	Objective met
Total - P < 0.008 mg/L av. at spring overturn	0500246 Kalamalka Lake at south end	Feb.23	1 1 1	<10 m: 0.006 mg/L >20 m: 0.007 mg/L av. = 0.007 mg/L	Objective met
	0500461 Kalamalka Lake South of Coldstream Creek	Feb.23	1 1 1	<10 m: 0.006 mg/L >20 m: 0.007 mg/L av. = 0.007 mg/L	Objective met
	0500847 Kalamalka Lake Deep Site	Feb.23	1 1 1	<10 m: 0.005 mg/L >20 m: 0.004 mg/L av. = 0.005 mg/L	Objective met
Total - P < 0.010 mg/L av at spring overturn	0500239 Okanagan Lake at Armstrong Arm	Apr.2	2 3 2 1	1 m: 0.02 mg/L 20 m: 0.024 mg/L 45 m: 0.028 mg/L av. = 0.024 mg/L	Objective not met
		Apr.28	2 3 2 1	1 m: 0.009 mg/L 20 m: 0.008 mg/L 45 m: 0.012 mg/L av. = 0.010 mg/L	Objective met
	0500238 Okanagan Lake at Vernon Arm	Feb 3	1 1 1	1m: 0.012 mg/L 20m: 0.011 mg/L av. = 0.0115 mg/L	Objective not met
	0500730 Okanagan Lake at north basin	Feb.3	1 1 1 1	1 m: 0.011 mg/L 20 m: 0.013 mg/L 45 m: 0.012 mg/L av. = 0.012 mg/L	Objective not met
		Mar. 12	1 1 1 1	1 m: 0.004 mg/L 20 m: 0.007 mg/L 45 m: 0.005 mg/L av. = 0.0053 mg/L	Objective met
		Apr. 4	1 1 1 1	1 m: 0.008 mg/L 20 m: 0.007 mg/L 45 m: 0.007 mg/L av. = 0.0073 mg/L	Objective met
		Apr. 28	1 1 1 1	1 m: 0.006 mg/L 20 m: 0.004 mg/L 45 m: 0.004 mg/L av. = 0.0047 mg/L	Objective met

Table 9 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total - P < 0.010 mg/L av at spring overturn	0500236 Okanagan Lake at central basin	Feb.2	1 1 1 1	1 m: 0.009 mg/L 20 m: 0.012 mg/L 45 m: 0.012 mg/L av. = 0.011 mg/L	 Objective not met
		Mar.9	1 1 1 1	1 m: 0.005 mg/L 20 m: 0.006 mg/L 45 m: 0.005 mg/L av. = 0.0053 mg/L	 Objective met
Total - P < 0.010 mg/L av at spring overturn	0500236 Okanagan Lake at central basin	Mar.31	1 1 1 1	1 m: 0.003 mg/L 20 m: 0.01 mg/L 45 m: 0.004 mg/L av. = 0.0057 mg/L	 Objective met
	0500729 Okanagan Lake at south basin	Feb.9	1 1 1 1	1 m: 0.007 mg/L 20 m: 0.007 mg/L 45 m: 0.007 mg/L av. = 0.007 mg/L	 Objective met
		Mar.10	1 1 1	20 m: 0.006 mg/L 45 m.: 0.005 mg/L av. = 0.0055 mg/L	 Objective met
		Mar.31	1 1 1 1	1 m:<0.002 mg/L 20 m: 0.002 mg/L 45 m: 0.003 mg/L av. = 0.0023 mg/L	 Objective met
	0500454 Okanagan Lake U/S Kelowna STP	Mar.31	1 1 1	1 m: 0.003 mg/L 20 m: 0.002 mg/L av. = 0.0025 mg/L	 Objective met
	0500456 Okanagan Lake South Prairie C.	Feb.5	1 1 1	1 m: 0.010 mg/L 20 m: 0.012 mg/L av. = 0.011mg/L	 Objective not met
Total - P < 0.015 mg/L av at spring overturn	0500615 Skaha Lake at center	Feb 25	1 1 1 1	1 m: 0.006 mg/L 15 m: 0.006 mg/L 20 m: 0.006 mg/L av. = 0.006 mg/L	 Objective met
	0500453 Skaha Lake W.Okanagan L. river mouth	Feb 25	1 	1 m: 0.005 mg/L 	 Av. not checked
	0500846 Skaha Lake south basin	Feb 25	1 1 1	1 m: 0.011 mg/L 20 m: 0.009 mg/L av. = 0.010 mg/L	 Objective met

Table 9 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total - P	0500248	Feb 26	1	1 m: 0.012 mg/L	
	Osoyoos Lake		1	20 m: 0.013 mg/L	
< 0.015 mg/L av	south basin		1	av. = 0.0125 mg/L	Objective met
at spring	0500249	Feb 26	1	1 m: 0.013 mg/L	
overturn	Osoyoos Lake		1	20 m: 0.013 mg/L	
	at north basin		1	av. = 0.013 mg/L	Objective met
	0500728	Feb 26	1	1 m: 0.014 mg/L	
	Osoyoos Lake		1	20 m: 0.012 mg/L	
	opp. Monashee Co-op		1	av. = 0.013 mg/L	Objective met

Table 10. Similkameen River and hedley Creek Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 10 /100 mL 90th percentile (np)	Similkameen River	1998	0	no data collected	Omitted 1998
E. coli < 10 /100 mL 90th percentile (np)	Similkameen River	1998	0	no data collected	Omitted 1998
Enterococci < 3 /100 mL 90th percentile	Similkameen River	1998	0	no data collected	Omitted 1998
Suspended Solids max. increase: 10 mg/L or 10%	Similkameen River	1998	0	no data collected	Omitted 1998
Substrate Sedimentation: no increase in weight of particles < 3 mm dia.	Similkameen River	1998	0	no data collected	Omitted 1998
Turbidity max. increase: 1 - 5 NTU or 10%	Similkameen River	1998	0	no control site data collected	Omitted 1998
Total Cl_2 Residue 0.002 mg/L max.	Similkameen River	1998	0	no data collected	Omitted 1998
WAD-CN	0500073 Similkameen River	Jan.6 - Dec.22	31	< 0.0005 - 0.001 mg/L	Max objective met
< 0.005 mg/L av	@ Chopka Rd. Bridge	Mar.3 - Mar.31	1	av. = < 0.0005 mg/L	Objective met
0.010 mg/L max.	0500629 Similkameen River	Jan.13 - Dec.29	31	< 0.0005 - 0.0005 mg/L	Max objective met
	@ Princeton Hwy 3 Bridge	Feb.10 - Mar.10	1	av. = < 0.0005 mg/L	Objective met
WAD-CN	E223873 Hedley Creek	Sep.23 Jun.2	1 1	<0.0005 mg/L <0.03 mg/L	Objective met Indefinite result
< 0.005 mg/L av	u/s Nickel Plate Mine				Av. not checked
0.010 mg/L max.	E223874	Sep.23	1	0.0025 mg/L	Objective met
or	Hedley Creek	Jun.2	1	0.03 mg/L	Objective not met
20% increase	d/s Nickel Plate Mine				Av. not checked
SAD-CN + SCN	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Dec.22	31	< 0.0005 - 0.0037 mg/L	Objective met
0.20 mg/L	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29	31	< 0.0005 - 0.0012 mg/L	Objective met

Table 10 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
SAD-CN + SCN 0.20 mg/L	E223873 Hedley Creek u/s Nickel Plate Mine	Sep.23	1	< 0.0005 mg/L	Objective met
	E223874 Hedley Creek d/s Nickel Plate Mine	Sep.23	1	0.0484 mg/L	Objective met
Cyanate as CN 0.45 mg/L max.	Similkameen River	1998	0	no data collected	Omitted 1998
Total Arsenic 0.005 mg/L max. or 20% increase	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Dec.22	31	0.0007 - 0.0029 mg/L	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29	31	0.0001 - 0.0031 mg/L	Objective met
Ammonia - N < 1.09 mg/L av. 5.68 mg/L max. at pH = 8.0 temp. = 15 °C	Similkameen River	1998	0	no data collected	Omitted 1998
Total Phosphorus < 0.020 mg/L av. at spring overturn	Similkameen River	1998	0	no data collected	Omitted 1998
Chlorophyll-a < 50 mg/m^2 av.	Similkameen River	1998	0	no data collected	Omitted 1998
Dissolved Oxygen 8 mg/L min. (July - March) 11 mg/L min. (April - June)	Similkameen River	1998	0	no data collected	Omitted 1998
pH 6.5 - 8.5	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Dec.22	31	7.52 - 8.14	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29	31	7.49 - 8.24	Objective met
Dissolved Aluminum < 0.05 mg/L av. 0.10 mg/L max. or 20% increase	Similkameen River	1998	0	no data collected	Omitted 1998

Table 10 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Chromium < 0.002 mg/L av. 0.02 mg/L max. or 20% increase	0500073 Similkameen River @ Chopaka Rd. Bridge	Jan.6 - Dec.22 Mar.3 - Mar.31	31 1	< 0.0002 - 0.0029 mg/L av. = 0.00026 mg/L	Objective met Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29 Feb.10 - Mar.10	31 1	<0.0002 - 0.0057 mg/L av. = 0.0002 mg/L	Objective met Objective met
Total Copper < 0.002 mg/L av. 0.003 mg/L max. or 20% inc. at hardness = 14	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Dec.22 Mar.24 - Sep.1 Mar.3 - Mar.31	25 6 1	< 0.0002 - 0.0023 mg/L 0.0035 - 0.0065 mg/L av. = 0.00188 mg/L	Objective met Objective not met Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29 Mar.24 - Dec.14 Feb.10 - Mar.10	24 7 1	0.0004 - 0.0029 mg/L 0.0031 - 0.0066 mg/L av. = 0.00132 mg/L	Objective met Objective not met Objective met
Dissolved Copper < 0.002 mg/L av. 0.003 mg/L max. or 20% increase at hardness = 14	Similkameen River	1998	0	no data collected	Omitted 1998
Total Iron 0.3 mg/L max. or 20% increase	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Dec.22 Mar.24 - Jun.9	25 6	0.0176 - 0.202 mg/L 0.348 - 2.39 mg/L	Objective met Objective not met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29 May.5 - Dec.14	28 3	0.0193 - 1.67 mg/L 0.433 - 1.67 mg/L	Objective met Objective not met
Dissolved Iron 0.3 mg/L max. or 20% increase	Similkameen River	1998	0	no data collected	Omitted 1998
Total Lead 0.004 mg/L av. 0.030 mg/L max. or 20% inc. at hardness = 46	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Dec.22 Mar.3 - Mar.31	31 1	< 0.0002 - 0.0017 mg/L av. = 0.00026 mg/L	Objective met Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29 Feb.10 - Mar.10	31 1	< 0.0002 - 0.0009 mg/L av. = 0.00024 mg/L	Objective met Objective met
Total Magnesium 0.05 mg/L max. or 20% increase	Similkameen River	1998	0	no data collected	Omitted 1998
Dissolved Magnesium 0.2 mg/L max. or 20% increase	Similkameen River	1998	0	no data collected	Omitted 1998
Total Mercury < 0.02 µg/L av. 0.1 µg/L max.	Similkameen River	1998	0	no data collected	Omitted 1998

Table 10 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Molybdium < 0.01 mg/L av. 0.05 mg/L max. (May - Sept.)	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Dec.22	31	0.0005 - 0.0025 mg/L	Objective met
		Mar.3 - Mar.31	1	av. = 0.00172 mg/L	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29	31	0.0004 - 0.0017 mg/L	Objective met
		Feb.10 - Mar.10	1	av. = 0.00144 mg/L	Objective met
Total Nickel 0.025 mg/L max. or 20% increase at hardness < 65	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Dec.22	31	< 0.0002 - 0.0022 mg/L	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29	31	<0.0002 - 0.0034 mg/L	Objective met
Total Uranium < 0.01 mg/L av. 0.10 mg/L max. or 20% increase	Similkameen River	1998	0	no data collected	Omitted 1998
Total Zinc < 0.01 mg/L av. 0.03 mg/L max. or 20% increase	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Dec.22	31	< 0.0002 - 0.0056 mg/L	Objective met
		Mar.3 - Mar.31	1	av. = 0.00062 mg/L	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.13 - Dec.29	31	< 0.0002 - 0.0054 mg/L	Objective met
		Feb.10 - Mar.10	1	av. = 0.00094 mg/L	Objective met
Dissolved Zinc < 0.05 mg/L av. 0.08 mg/L max. or 20% increase at hardness = 46	Similkameen River	1998	0	no data collected	Omitted 1998

Table 11. Thompson River Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliform	0600135 South Thompson River Kamloops d/s Peterson Cr.	Jan.8 - Dec.9	21	< 1 - 64 /100mL	
					np not checked
< 10/100 mL 90th percentile. (np)	0600164 North Thompson River at Kamloops u/s Paul Cr.	Jan.21 - Dec.2	5	all < 1 /100mL	
					np not checked
	E218768 Kamloops Lake near outlet	Jan.21 - Oct.29	4	< 1 - 2 /100mL	
					np not checked
	0600004 Lower Thompson at Savona	Jan.21 - Sept.2	5	all < 1 /100mL	
					np not checked
	0600163 Lower Thompson d/s Walhachin	Jan.21 - Dec.2	5	< 1 - 10 /100mL	
					np not checked
	E206586 Lower Thompson at Spences Br. d/s Nicola R.	Dec.3 - Dec.16	2	11 - 52 /100mL	
					np not checked
E. coli < 200/100 mL geometric mean (gm)	0600135 South Thompson River Kamloops d/s Peterson Cr.	Jan.8 - Dec.9	21	< 1 - 78 /100mL	
					gm not checked
	0600164 North Thompson River at Kamloops u/s Paul Cr.	Jan.21 - Dec.2	5	< 1 - 1 /100mL	
					gm not checked
	E218768 Kamloops Lake near outlet	Jan.21 - Oct.29	4	< 1 - 1 /100mL	
					gm not checked
	0600004 Lower Thompson at Savona	Jan.21 - Sept.2	5	< 1 - 1/100mL	
					gm not checked
	0600163 Lower Thompson d/s Walhachin	Jan.21 - Dec.2	5	< 1 - 1 /100mL	
					gm not checked
Colour 15 TCU max. or 5 TCU increase over average of N + S Thompson Rivers	0600135 South Thompson River Kamloops d/s Peterson Cr.	Jan.21 - Dec.2	5	< 5 - 8 TCU	Objective met
	0600164 North Thompson River at Kamloops u/s Paul Cr.	Jan.21 - Dec.2	5	6 - 10 TCU	Objective met
				av. of N & S = 5.5 - 8 TCU	
	E218768 Kamloops Lake near outlet	Jan.21 - Oct.29	4	5 - 8 TCU	Objective met
			1	inc. over average: 0 - 1.5 TCU	

Table 11 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
	0600004 Lower Thompson at Savona	Jan.21 - Oct.29	4	5 - 7 TCU	Objective met
			1	inc. over average: 0 - 3.5 TCU	
Colour 15 TCU max. or 5 TCU increase over average of N + S Thompson Rivers	0600163 Lower Thompson d/s Walhachin	Jan.21 - Oct.29	4	< 5 - 8 TCU	Objective met
			1	inc. over average: 0 - 2.5 TCU	
	E206586 Lower Thompson at Spences Br. d/s Nicola R.	Jan.13 - Dec.30	32	< 5 - 10 TCU	Objective met
			1	no increase over average	
Chlorophyll - a < 50 mg/m^2	Thompson River Kamloops Lake	1996	0	no data collected	Omitted 1996
Dioxins & Furans 0.2 pg/L max. TEQ-TCDD	Thompson River Kamloops Lake	1996	0	no data collected	Omitted 1996
Dioxins & Furans 1.0 pg/g max. TEQ-TCDD wet weight in fish	Thompson River Kamloops Lake	1998	0	no data collected	Omitted 1998
Dioxins & Furans 0.7 pg/g max. TEQ-TCDD dry weight in seds.	Thompson River Kamloops Lake	1998	0	no data collected	Omitted 1998
Resin Acids 12 µg/L DHA max. 45 µg/L total max. at pH = 7.5	0600135 South Thompson River Kamloops d/s Peterson Cr.	January 21	1	DHA: 1 µg/L	Objective met
		January 21	1	total: < 11 µg/L	Objective met
	E218768 Kamloops Lake near outlet	January 21	1	DHA: 1 µg/L	Objective met
		January 21	1	total: < 12 µg/L	Objective met
	0600004 Lower Thompson at Savona	Jan.21- Mar.11	3	DHA: < 1 - 7 µg/L	Objective met
		Jan.21- Mar.11	3	total: < 13 µg/L	Objective met
	0600163 Lower Thompson d/s Walhachin	Jan.21- Mar.11	3	DHA: < 1 - 1 µg/L	Objective met
		Jan.21- Mar.11	3	total: < 12 µg/L	Objective met

Table 12. Columbia River (From Keenleyside to Birchbank) Water Quality Objectives – 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Oxygen 10 mg/L min.	0200003 at Birchbank	Jan.17 - May.11	13	11.3 - 12.8 mg/L	Objective met
	E223892 D/S Stoney Creek	Jan.17 - May.11	13	11.0 – 12.7 mg/L	Objective met
	E223893 100 m D/S RDCK STP outfall	Jan.17 - May.11	13	11.0 – 13.7 mg/L	Objective met
pH 6.5 - 8.5	0200003 at Birchbank	Jan.6 - Dec.30	61	7.07 - 8.48	Objective met
	E223892 D/S Stoney Creek	Jan.17 – May.20	21	7.08 – 8.47	Objective met
	E223893 100 m D/S RDCK STP outfall	Jan.17 - May.20	20	7.01 – 8.44	Objective met
Colour 15 TCU max	0200003 at Birchbank	Jan.6 - Dec.30	29	< 5 - 8 TCU	Objective met
Suspended Solids 10 mg/L max increase	0200003 at Birchbank	Jan.17 - May.20	10	all < 5 mg/L	Objective met
	E223893 100 m D/S RDCK STP outfall	Jan.17 - May.20	10	all < 5 mg/L	Objective met
Turbidity 5 NTU max increase	0200003 at Birchbank	Jan.6 - Dec.30	39	0.05 - 2.19 NTU	Indefinite result No control
Sediment TOC no increase u/s to d/s at 95% confidence	Columbia River:	1998	0	no data collected	Omitted 1998
Dissolved Gas 110% max.	0200003 Columbia River at Birchbank	Jan.17 Jan.23 Jan.29 - Feb.10 Apr.23 - Apr.29 May.7 - May.20	1 1 3 2 3	103.59% 111.03% 102.64 - 104.02 % 104.52 - 109.07 % 115.01 - 116.80 %	Objective met Objective not met Objective met Objective met Objective not met

Table 12 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliform < 100/100 mL 90th percentile (np)	0200003 at Birchbank	Jan.6 - Jan.29 Feb.3 - Mar.2 Mar.31 – Apr.29 May.7 – May.25	5 5 5 5	< 1 - 2 CFU/100 mL all < 1 CFU/100 mL < 1 - 3 CFU/100 mL < 1 - 9 CFU/100 mL	
			4	np = < 1 – 8.2 /100 mL	Objective met
	E223893 100 m D/S RDCK STP outfall	Jan.17 – Feb.10 Apr.20 – May.20	5 5	<1 – 16 CFU/100 mL 1 – 35 CFU/100 mL	
			2	np = 14.8 – 25.0 CFU/100 mL	Objective met
E. coli < 100 /100mL 90th percentile (np)	0200003 at Birchbank	Jan.17 - Feb.10 Apr.29 - May 20	5 5	< 1 - 1/100 mL < 1 - 7/100 mL	
			2	np = 1 - 6.2 /100 mL	Objective met
	E223893 100 m D/S RDCK STP outfall	Jan.17 – Feb.10 Apr.20 – May.20	5 5	<1 – 16 CFU/100 mL 1 – 35 CFU/100 mL	
			2	np = 9.4 – 15.8 CFU/100 mL	Objective met
Toxicity % mill effluent in river: < 0.05 of the 96 - h LC_{50}	Columbia River	1998	0	no data collected	Omitted 1998
Chlorophenols < 0.05 µg/L tri < 0.10 µg/L tetra < 0.05 µg/L penta	Columbia River	1998	0	no data collected	Omitted 1998
Dioxins & Furans 1pg/g TCDD TEQ max. in fish (wet weight)	Columbia River	1998	0	no data collected	Omitted 1998
Dioxins & Furans max. in water	Columbia River	1998	0	no data collected	Omitted
Dioxins & Furans 0.7 pg/L TCDD TEQ max. in seds.	Columbia River	1998	0	no data collected	Omitted 1998
Resin Acids 12 µg/L max DHA 45 µg/L max total pH = 7.6	Columbia River	1998	0	no data collected	Omitted 1998
Chlorinated Resin Acids 6 µg/L max. of mono Cl-DHA & di Cl-DHA	Columbia River	1998	0	no data collected	Omitted 1998
Chlorophyll - a < 50 mg/m^2 av.	Columbia River	1998	0	no data collected	Omitted 1998

Table 13 . Columbia River (From Birchbank to the International Border) Water Quality Objectives - 1998.

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
pH 6.5 - 8.5	0200559 at Waneta	Jan.6 - Dec.30	86	6.78 – 8.45	Objective met
	0200558 New Trail Bridge	Jan.17 – May.20 May.11	17 1	7.07 – 8.40 8.70	Objective met Objective not met
Ammonia 30-day average 1.13 mg/L at 10ºC and pH 8.0	0200558 New Trail Bridge	Jan.17 – Feb.10 Apr.23 – May.20	5 5	0.006 – 0.071 mg/L	
			2	av. = 0.031 – 0.036 mg/L	Objective met
	E216137 Old Trail Bridge	Jan.17 – Feb.10 Apr.23 – May.20	5 5	< 0.005 – 0.011 mg/L 0.007 – 0.036 mg/L	
			2	av. = 0.009 – 0.016 mg/L	Objective met
Dissolved Gas 110% max.	0200559 at Waneta	Jan.17 Jan.23 Jan.29 - Feb.10 Apr.23 - Apr.29 May.7 - May.20	1 1 3 2 3	102.90% 110.07% 102.51 - 103.67 % 106.71 - 107.14 % 112.19 - 114.05 %	Objective met Objective not met Objective met Objective met Objective not met
Fecal Coliform < 10 /100 mL 90th percentile (np)	0200559 at Waneta	Jan.6 – Dec.30 Feb.16 – Mar.16, May.11 – May.25 Jan.6 - Jan.23, Jan.26 – Feb.10, Mar.22 – Apr.20, Apr.23 – May.7, Jun.1 – Jun.29, Jul.6 – Aug.6, Oct.29 – Nov.25, Dec.2 – Dec.30	56 2 8	< 1 - 80 /100 mL np = 4.8 /100 mL np = 12.2 - 52 /100 mL	 Objective met Objective not met
E. coli < 10 /100mL 90th percentile (np)	0200559 at Waneta	Jan.17 – May.20 Jan.17 – Feb.10 Apr.23 – May.20	10 1 1	< 1 - 19 /100 mL np = 4.2 /100 mL np = 13.8 /100 mL	 Objective met Objective not met
Enterococcus sp. < 3 /100mL 90th percentile (np)	Columbia River	1998	0	no data collected	Omitted 1998
Total As 5 µg/L av.	0200559 at Waneta	Jan.6 – Dec.30 Jan.6-Jan.20, Jan.23-Feb.4, Feb.10-Mar.2, Mar.10-Mar.31, Apr.8-Apr.27, Apr.29-May.11, May.19-Jun.8, Jun.8-Jul.6, Jul.13-Aug.11, Sug.18-Sep.8, Sep.14-Oct.5, Oct.14-Nov.12, Nov.19-Dec.14	76 13	<0. 1 – 3 µg/L av. = 0.16 – 0.72 µg/L	 Objective met
	0200558 New Trail Bridge	Jan.17 – May.20 Jan.17 – Feb.10, Apr.23-May.20	10 2	0.4 – 0.6 µg/L av. = 0.44 – 0.5 µg/L	 Objective met
	E216137 Old Trail Bridge	Jan.17 – May.20 Jan.17 – Feb.10, Apr.23-May.20	10 2	0.4 – 0.6 µg/L av. = 0.2 – 0.22 µg/L	 Objective met

Table 13 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Cd 0.03 µg/L av.	0200559 at Waneta	Jan.6 – Dec.30	67	<0. 02 – 0.13 µg/L	
		Jan.6-Jan.20, Jan.29-Feb.16, Feb.25-Mar.22, Mar.24-Apr.20, Apr.23-May.11, May.19-Jun.8, Jun.15-Jul.6, Jul.13-Aug.6, Aug.11-Aug.31, Sep.8-Sep.29, Oct.5-Oct.20, Oct.28-Nov.19, Nov.25-Dec.14	13	av. = 0.084 – 0.12 µg/L	Indefinite result Detection limits exceed objective
Total Cr 1 µg/L av.	0200559 at Waneta	Jan.6 – Dec.30	55	<0. 2 – 0.4 µg/L	
		Jan.6-Jan.26, Feb.3-Mar.2, Mar.10-Apr.8, Apr.13-May.11, May.19-Jun.8, Jun.15-Jul.13, Jul.22-Aug.18, Aug.24-Sep.21, Sep.29-Oct.20, Oct.28-Nov.25, Dec.2-Dec.30	11	av. = <0.2 – 0.24 µg/L	Objective met
Total Cu 7.17 µg/L max	0200559 at Waneta	Jan.6 – Dec.30	67	0. 2 – 5.5 µg/L	Objective met
Total Cu 2 µg/L av.	0200559 at Waneta	Jan.6 – Dec.30	67	0. 2 – 5.5 µg/L	
		Jan.6-Jan.20, Jan.29-Feb.16, Feb.25-Mar.22, Mar.24-Apr.20, Apr.23-May.11, May.19-Jun.8, Jun.15-Jul.6, Jul.13-Aug.6, Aug.11-Aug.31, Sep.8-Sep.29, Oct.5-Oct.20, Oct.28-Nov.19, Nov.25-Dec.14	13	av. = 0.4 – 1.9 µg/L	Objective met
Total Pb 37.9 µg/L max	0200559 at Waneta	Jan.6 – Dec.30	67	< 0. 01 – 1.1 µg/L	Objective met
Total Pb 4.8 µg/L av.	0200559 at Waneta	Jan.6 – Dec.30	67	< 0. 01 – 1.1 µg/L	
		Jan.6-Jan.20, Jan.29-Feb.16, Feb.25-Mar.22, Mar.24-Apr.20, Apr.23-May.11, May.19-Jun.8, Jun.15-Jul.6, Jul.13-Aug.6, Aug.11-Aug.31, Sep.8-Sep.29, Oct.5-Oct.20, Oct.28-Nov.19, Nov.25-Dec.14	13	av. = 0.2 – 0.6 µg/L	Objective met
Total Tl 0.8 µg/L av.	0200559 at Waneta	Jan.29 – Dec.1	12	0. 02 – 0.85 µg/L	
					av. not checked
Total Zn 7 µg/L max	0200559 at Waneta	Jan.6 – Dec.30 Mar.24 – Aug.27	62 5	< 1 – 7 µg/L 8 – 11 µg/L	Objective met Objective not met

Table 13 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total As 5.7 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Cd 0.6 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Cr 36.4 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Cu 35.1 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Pb 33.4 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Hg 0.16 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Zn 120 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total As 471 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998
Total Cd 900 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998
Total Cr 940 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998
Total Pb 160 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998
Total Hg 100 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998

Table 13 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dioxins & Furans 0.25 ng/kg PCDD and PCDF TEQ max. in sediments (dry weight)	Columbia River	1998	0	no data collected	Omitted 1998
Dioxins & Furans 1.1 ng/kg PCDD and PCDF TEQ max. in fish (wet weight)	Columbia River	1998	0	no data collected	Omitted 1998

Table 14. Fraser River (Kanaka Creek to the Mouth) Water Quality Objectives - 1998

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 1000 CFU / 100 mL geometric mean (gm) 4000 /100 mL max. April - October	Main Stem Main Arm North Arm Middle Arm	1998	0	no data collected	Omitted 1998
Fecal Coliforms < 200 CFU /100 mL geometric mean (gm) June - August at beaches	Iona Beach every 1.5 km along jetty east to west	Jun.3 - Aug.25	13	< 20 - 220 CFU/100 mL	
	GVRD 4	Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = 26 - 32 CFU/100 mL	Objective met
	GVRD 5	Jun.3 - Aug.25	13	< 20 - 80 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = 23 - 30 CFU/100 mL	Objective met
	GVRD 6	Jun.3 - Aug.25	13	< 20 - 170 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = 20 - 35 CFU/100 mL	Objective met
	GVRD 7	Jun.3 - Aug.25	13	< 20 - 80 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = <20 - 26 CFU/100 mL	Objective met
	GVRD 8	Jun.3 - Aug.25	13	< 20 - 170 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = 20 - 31 CFU/100 mL	Objective met
	GVRD 9	Jun.3 - Aug.25	13	< 20 - 220 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = 20 - 32 CFU/100 mL	Objective met
	GVRD 10	Jun.3 - Aug.25	13	< 20 - 170 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = 20 - 31 CFU/100 mL	Objective met
	GVRD 11	Jun.3 - Aug.25	13	< 20 - 40 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = 20 - 23 CFU/100 mL	Objective met
	GVRD 12	Jun.3 - Aug.25	13	< 20 - 130 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = 20 - 29 CFU/100 mL	Objective met
	GVRD 13	Jun.3 - Aug.25	13	< 20 - 300 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = 20 - 39 CFU/100 mL	Objective met
	GVRD 14	Jun.3 - Aug.25	13	< 20 - 20 CFU/100 mL	
		Jun.3 – Jul.9, Jul.16–Aug.11	2	gm = <20 - 20 CFU/100 mL	Objective met

Table 14 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 200 /100 mL geometric mean (gm) June - August at beaches	English Bay: GVRD 101 Third Beach below concession area	Jun.1 - Aug.31 Jun.1-15, Jun.17-Jul.3, Jul.6-20, Jul.21-Aug.7, Aug.10-24	27 5	< 20 - 110 CFU/100 mL gm = 20 - 32 CFU/100 mL	 Objective met
	GVRD 200 Second Beach at north end	Jun.1 - Aug.31 Jun.1-15, Jun.17-Jul.3, Jul.6-20, Jul.21-Aug.7, Aug.10-24	27 5	< 20 - 800 CFU/100 mL gm = 20 - 107 CFU/100 mL	 Objective met
	GVRD 304 English Bay Beach at north end of bath house	Jun.1 - Aug.31 Jun.1-15, Jun.17-Jul.3, Jul.6-20, Jul.21-Aug.7, Aug.10-24	27 5	< 20 - 500 CFU/100 mL gm = 20 - 66 CFU/100 mL	 Objective met
	GVRD 703 Locarno Beach at bath house	Jun.1 - Aug.31 Jun.2-16, Jun.18-Jul.2, Jul.7-20, Jul.22-Aug.6, Aug.11-25	26 5	< 20 - 800 CFU/100 mL gm = 40 - 83 CFU/100 mL	 Objective met
Suspended Solids max. increase: 10 mg/L or 10 %	North Arm Middle Arm Main Arm:	1998	0	no data collected	Omitted 1998
Total Cl_2 Res. 0.002 mg/L max.	Main Arm	1998	0	no data collected	Omitted 1998
Ammonia-N 1.85 mg/L av 17.6 mg/L max. at pH = 7.2 temp = 10°C	Main Arm North Arm Middle Arm Sturgeon Bank Roberts Bank	1998	0	no data collected	Omitted 1998
Dissolved Oxygen 7.75 mg/L min	Main Stem Main Arm North Arm Middle Arm	1998	0	no data collected	Omitted 1998
Dissolved Oxygen 9.0 mg/L min	Sturgeon Bank Roberts Bank	1998	0	no data collected	Omitted 1998
pH 6.5 - 8.5	Main Stem Main Arm North Arm Middle Arm	1998	0	no data collected	Omitted 1998
Total Cu <0.004 mg/L av 0.006 mg/L max. at hardness > 35 or 20% increase	Main Arm North Arm	1998	0	no data collected	Omitted 1998

Table 14 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Pb < 0.003 mg/L av 0.010 mg/L max.	Main Stem Main Arm North Arm Middle Arm	1998	0	no data collected	Omitted 1998
Total Zn < 0.050 mg/L av. 0.100 mg/L max.	Main Arm North Arm Middle Arm	1998	0	no data collected	Omitted 1998
Chlorophenols (tri+ tetra+ penta-CP) in water 0.0002 mg/L max.	Main Stem Main Arm North Arm Middle Arm	1998	0	no data collected	Omitted 1998
Chlorophenols (tri + tetra + penta - CP) in sediments 0.01 µg/g max. av of replicates (dry weight)	Main Stem Main Arm North Arm Middle Arm Sturgeon Bank Roberts Bank	1998	0	no data collected	Omitted 1998
Chlorophenols (tri+ tetra+ penta) in fish 0.10 µg/g max. (wet weight)	Main Stem Main Arm North Arm	1998	0	no data collected	Omitted 1998
PCBs in sediments < 0.03 µg/g max. av of replicates (dry weight)	Main Stem Main Arm North Arm Middle Arm	1998	0	no data collected	Omitted 1998
PCBs in fish 0.50 µg/g max. (wet weight)	Main Stem Main Arm North Arm Middle Arm	1998	0	no data collected	Omitted 1998

Table 15. Provincial overview of water quality objectives - 1999

Region	Number of Occurrences				
	Objectives Met	Objectives Not Met	Indefinite Results	Omitted 1998	**Totals**
Vancouver Island	109 64.5%	11 6.5%	36 21.3%	13 7.7%	**169** **100.0%**
Omineca - Peace	700 82.4%	83 9.8%	14 1.6%	52 6.1%	**849** **100.0%**
Cariboo	4 25.0%	4 25.0%	8 50.0%	0 0.0%	**16** **100.0%**
Southern Interior	634 81.2%	79 10.1%	21 2.7%	47 6.0%	**781** **100.0%**
Kootenays	452 83.7%	25 4.6%	40 7.4%	23 4.3%	540 100.0%
Lower Mainland	160 73.7%	4 1.8%	37 17.1%	16 7.4%	217 100.0%
All Regions	**2059** **80.1%**	**206** **8.0%**	**156** **6.1%**	**151** **5.9%**	**2572** **100.0%**
All Regions less occurrences with no result	**2059** **90.9%**	**206** **9.1%**			**2265** **100.0%**

Table 16. Cowichan -Koksilah Rivers Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 10 /100 mL 90th percentile (np)	Cowichan River: E206108 d/s Cowichan Lake	Jan.13 - Feb.9	2	2 - 3 CFU/100 mL	
					np not checked
	0120808 300m u/s L. Cowichan STP	Jan.13 - Sep.21	6	< 1 - 8 CFU/100 mL	
					np not checked
	E206107 400m d/s L. Cowichan STP	Jan.13 - Sep.21	6	< 1 - 32 CFU/100 mL	
					np not checked
	0120802 u/s Highway 1	Jan.13 - Feb.9	2	3 - 64 CFU/100 mL	
					np not checked
	Koksilah River: E207425 Pt. Renfrew Rd.	Jan.21 - Dec.15	19	< 1 - 12 CFU/100 mL	
					np not checked
E. Coli < 10 /100 mL 90th percentile (np)	0120808 300m u/s L. Cowichan STP	Mar.10 - Sep.21	3	<3 - 9 CFU/100 mL	
					np not checked
	E206107 400m d/s L. Cowichan STP	Mar.10 - Sep.21	3	all <3 CFU/100 mL	
					np not checked
	Koksilah River: E207425 Pt. Renfrew Rd.	Jan.21 - Dec.15	19	< 1 - 16 CFU/100 mL	
					np not checked
Enterococci < 3 /100 mL 90th percentile (np)	Cowichan River Koksilah River:	1999	0	no data collected	Omitted 1999
Turbidity max increase: 5 NTU or 10%	Cowichan River: E206108 d/s Cowichan Lake	Jul.29	1	0.4 NTU	Control Site
	E206107 400m d/s L. Cowichan STP	Jul.29	1	0.61 NTU	
			1	max inc. = 0.21 NTU	Objective met
	0120802 u/s Highway 1	Jul.29 - Aug.25	2	0.69 - 0.70 NTU	
			1	max inc. = 0.29 NTU	Objective met
	E206106 1 km d/s Duncan STP	Jul.29	1	0.98 NTU	
			1	max inc. = 0.58 NTU	Objective met

Table 16 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Turbidity max increase: 5 NTU or 10%	Koksilah River: E207425 Pt. Renfrew Rd.	Jan.21 - Mar.15	3	0.32 - 0.72 NTU	Control Site
Suspended Solids max. increase 10 mg/L or 10%	Cowichan River: E206108 d/s Cowichan Lake	Jan.13 - Mar.10	2	all <5 mg/L	Control Site
	E206107 400m d/s L. Cowichan STP	Jan.13	1	12 mg/L	
			1	max inc. = 7 mg/L	Objective met
	0120802 u/s Highway 1	Jan.13 - Mar.10	2	9 - 12 mg/L	
			2	max inc. = 7 mg/L	Objective met
	E206106 1 km d/s Duncan STP	Jan.13 - Mar.10	2	< 5 - 14 mg/L	
			2	max inc. = 9 mg/L	Objective met
	Koksilah River: E207425 Pt. Renfrew Rd.	Jan.13 - Mar.15	5	all <5 mg/L	Control Site
	E206976 Koksilah Rd.	Jan.13 - Mar.9	2	all <5 mg/L	
			2	max inc. = 0 mg/L	Objective met
Ammonia-N < 1.30 mg/L av 6.75 mg/L max at pH = 7.9 temp = 15 C	Cowichan River: E206108 d/s Cowichan Lake	Mar.10 - Jul.29	3	<0.005 - 0.025 mg/L	Max obj. met
					Av. not checked
	0120808 300m u/s L. Cowichan STP	Mar.10 - Sep.21	4	<0.003 - 0.005 mg/L	Max obj. met
					Av. not checked
	E206107 400m d/s L. Cowichan STP	Mar.10 - Sep.21	4	<0.003 - 0.018 mg/L	Max obj. met
					Av. not checked
	0120802 u/s Highway 1	Mar.10 - Aug.25	4	<0.005 - 0.098 mg/L	Max obj. met
					Av. not checked
	E206106 1 km d/s Duncan STP	Mar.10 - Aug.25	9	<0.005 - 0.149 mg/L	Max obj. met
					Av. not checked
Chlorophyll-a 50 mg/m^2 max	Cowichan River	1999	0	no data collected	Omitted 1999
Total Cl_2 Res. 0.002 mg/L max	Cowichan River	1999	0	no data collected	Omitted 1999

Table 16 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Oxygen 8.0 mg/L min Jun - Sep 11.2 mg/L min Oct - May	Cowichan River Koksilah River	1999	0	no data collected	Omitted 1999
Dissolved Cu <0.002 mg/L av 0.004 mg/L max or 20% increase	Cowichan River: E206108 d/s Cowichan Lake	Jun.8	1	0.00022 mg/L	Max obj. met
					Av. not checked
	0120802 u/s Highway 1	Jun.8	1	0.00022 mg/L	Max obj. met
					Av. not checked
	E206106 1 km d/s Duncan STP	Jun.8	1	0.00028 mg/L	Max obj. met
					Av. not checked
	Koksilah River: E207425 Pt. Renfrew Rd.	Jun.8	1	0.00041 mg/L	Max obj. met
					Av. not checked
	E206976 Koksilah Rd.	Jun.8	1	0.00062 mg/L	Max obj. met
					Av. not checked
Dissolved Pb <0.003 mg/L av 0.008 mg/L max or 20% increase	Cowichan River: E206108 d/s Cowichan Lake	Jun.8	1	< 0.00001 mg/L	Max obj. met
					Av. not checked
	0120802 u/s Highway 1	Jun.8	1	< 0.00001 mg/L	Max obj. met
					Av. not checked
	E206106 1 km d/s Duncan STP	Jun.8	1	< 0.00001 mg/L	Max obj. met
					Av. not checked
	Koksilah River: E207425 Pt. Renfrew Rd.	Jun.8	1	< 0.00001 mg/L	Max obj. met
					Av. not checked
	E206976 Koksilah Rd.	Jun.8	1	< 0.00001 mg/L	Max obj. met
					Av. not checked

Table 16 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Zn <0.030 mg/L av 0.180 mg/L max or 20% increase	Cowichan River: E206108 d/s Cowichan Lake	Jun.8	1	0.0004 mg/L	Max obj. met
					Av. not checked
	0120802 u/s Highway 1	Jun.8	1	0.00044 mg/L	Max obj. met
					Av. not checked
	E206106 1 km d/s Duncan STP	Jun.8	1	0.0002 mg/L	Max obj. met
					Av. not checked
	Koksilah River: E207425 Pt. Renfrew Rd.	Jun.8	1	0.00032 mg/L	Max obj. met
					Av. not checked
	E206976 Koksilah Rd.	Jun.8	1	0.00061 mg/L	Max obj. met
					Av. not checked
Cu-8 Quinolinolate 0.0005 mg/L max	Cowichan River	1999	0	no data collected	Omitted 1999

Table 17. Oyster River Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 100 /100 mL 90th percentile (np)	Oyster River	1998	0	no data collected	Omitted 1998
Turbidity max increase: 5 NTU or 10%	Oyster River	1998	0	no data collected	Omitted 1998
Suspended Solids 12 mg/L max	Oyster River	1998	0	no data collected	Omitted 1998
Ammonia-N < 1.85 mg/L av 12.7 mg/L max at pH = 7.5 temp = 10 C	Oyster River	1998	0	no data collected	Omitted 1998
Nitrite - N <0.02 mg/L av. 0.06 mg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	both <0.005 mg/L	Max objective met Av. not checked
Nitrate - N 10 mg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	0.009 - 0.094 mg/L	Objective met
pH >6.5 90th perc. (np) 8.5 max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	6.94 - 7.43	Max objective met np not checked
Dissolved Al <0.05 mg/L av 0.1 mg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	0.04- 0.047 mg/L	Max objective met Av. not checked
Total As 0.05 mg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	both 0.0002 mg/L	Objective met
Total Cd 0.2 µg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	< 0.01 - 0.01 µg/L	Objective met
Total Cr 2 µg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	< 0.2 - 0.2 µg/L	Objective met
Total Co 50 µg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	< 0.005 - 0.1 µg/L	Objective met
Total Cu <3 µg /L av. 5 µg/L 90th perc. (np)	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	both 1.3 µg/L	Objective met np not checked

Table 17 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Fe <0.3 mg/L 90th perc.	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	0.016 - 0.041 mg/L	
(np)					np not checked
Total Pb < 3.5 µg/L av 5.4 µg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	0.04 - 0.06 µg/L	Max objective met
at hardness 11.8 mg/L					Av. not checked
Total Pb 0.8 µg/g max in fish muscle	Oyster River Woodhus Creek Little Oyster River	1998	0	no data collected	Omitted 1998
Total Mn 0.05 mg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	0.0016 - 0.0039 mg/L	Objective met
Total Hg <0.02 µg/L av 0.1 µg/L max	Oyster River	1998	0	no data collected	Omitted 1998
Total Hg 0.5 µg/g max in fish muscle	Oyster River Woodhus Creek Little Oyster River	1998	0	no data collected	Omitted 1998
Total Ni 0.025 mg/L max	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	0.0002 - 0.0003 mg/L	Objective met
Total Zn <0.01 mg/L av	Oyster River: 0125580 at Highway	Jun.2 - Dec.14	2	0.0007 - 0.0008 mg/L	Max objective met
0.03 mg/L max					Av. not checked

Table 18. Tsolum River Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Copper < 0.007 mg/L av. 0.011 mg/L max.	E207826 Tsolum River 500m d/s Murex Creek	Feb.22 - Nov.24 Jun.9 - Jul.28	34 11	0.0018 - 0.0084 mg/L 0.012 - 0.028 mg/L	Objective met Objective not met Av. not checked
% steelhead egg survival no difference between test & control (at 95% confidence)	Tsolum River	1999	0	no in situ bioassay data collected	Omitted 1999

Table 19. Nechako River Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliform <100/100ml 90th perc. (np)	Nechako River 0400629 200m u/s Fort Fraser	August 30	1	0 /100 mL	np not checked
	0400631 200 m d/s Fort Fraser	August 30	1	0 /100mL	np not checked
	E206583 at Prince George	Jan.13 - Dec.20	22	< 1 - 190 /100 mL	np not checked
	Chilako River	1999	0	no data collected	Omitted 1999
Fecal Coliforms <10/100ml 90th perc (np)	Stuart River:	1999	0	no data collected	Omitted 1999
Fecal Coliforms <200/100ml geometric mean (gm) <400/100ml 90 perc. (np)	Necoslie River:	1999	0	no data collected	Omitted 1999
Total Cl_2 Res. 0.002 mg/L max	Nechako & Stuart Rivers	1999	0	no data collected	Omitted 1999
Ammonia-N <2.05 mg/L av 14.1 mg/L max at pH = 7.5 temp = 1 °C	Nechako River	1999	0		Omitted 1999
Ammonia-N <1.24 mg/L av 6.46 mg/L max at pH = 8.0 temp = 1 °C	Stuart River	1999	0	no data collected	Omitted 1999
Nitrite-N < 0.02 mg/L av 0.06 mg/l max	Nechako & Stuart Rivers	1999	0	no data collected	Omitted 1999
Chlorophyll - a < 50 mg/L av	Nechako River Stuart River	1999	0	no data collected	Omitted 1999
Chlorophyll - a < 100 mg/L av	Chilako River	1999	0	no data collected	Omitted 1999
Dissolved Oxygen 7.75 - 11.2 mg/L min depending on fish egg stage	Nechako River E206583 at Prince George	Jan.13 - Apr.27 May 12 - Oct.27	7 13	10.2 - 13.2 mg/L 8.1 - 12.8 mg/L	Objective met

Table 19 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
pH 6.5 - 8.5	Nechako River E206583 at Prince George	Jan.13 - Oct.27	20	7.39 - 8.41	Objective met
Temperature < 15 °C av ~ 100 m d/s Cheslatta Falls	Nechako River: immediately d/s Cheslatta Falls* (DFO's Cheslatta Falls site)	Feb.5 - Mar.20 Aug.25 - Sep.22 Sep.3 - Oct.7 Nov.17 - Dec.30	43 15 28 43	0.5 - 2.24 °C 15.01 - 16.66 °C 10.77 - 15.0 °C 1.48 - 5.52 °C	Objective met Objective not met Objective met Objective met
	10 km d/s Cheslatta Falls (DFO's B. Irvine site)	Jan.1 - Jul.6 Sep.6 - Dec.31	197	0.0 - 15.0 °C	Objective met
		Jul.9 - Sep.5	55	15.1 - 17.6 °C	Objective not 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)	Jan.1 - June 30 Sep.1 - Oct.14	226	0.0 - 17.2 °C	Objective met
		July 1 - Aug.31	62	14.1 - 20.0 °C	Objective met
Total Gas Pressure 109 % max	Nechako River	1999	0	no data collected	Omitted 1999

Table 20. Fraser River (From the Source to Hope) Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.11 - Dec.13	11	18 - 190 /100 mL	
<100 /100 mL					np not checked
90th percentile (np)	0600011 at Marguerite (d/s Quesnel)	Mar.22 - Dec.16	13	< 2 - 52 /100 mL	
					np not checked
	E206581 at Hope	Jan.5 - Dec.21	23	4 - 90 /100 mL	
					np not checked
E. coli <100/100 mL 90th percentile (np)	E206182 at Stoner (d/s Pr. Ge. mills)	Feb.19 - Mar.19	11	8 - 150 /100 mL	
					np not checked
Chlorine Residual < 2 µg/L av.	Fraser River	1999	0	no data collected	Omitted 1999
Suspended Solids 10 mg/L or 10% max increase	Fraser River	1999	0	no data collected	Omitted 1999
Turbidity 1 - 5 NTU max increase (control: 5 - 50 NTU)	0600011 at Marguerite (d/s Quesnel)	Apr.20 - Oct.20	11	13 - 390 NTU	Indefinite result No control
Colour	0600011 at Marguerite (d/s Quesnel)	Apr.20 - May.3	2	40 - 50 TCU	Objective met
		May.11 - May.19	2	80 - 100 TCU	Objective not met
		Jun.28 - Sep.19	5	17.5 - 22 TCU	Objective not met
15 TCU max Jun - Sep		Oct.7 - Oct.20	2	15 - 20 TCU	Objective met
	E206581 at Hope	Jan.5 - May 25	11	13 - 60 TCU	Objective met
		Jun.8 - Aug.31	6	17.5 - 25 TCU	Objective not met
75 TCU max Oct - May		Aug.17 - Sep.28	3	10 - 15 TCU	Objective met
		Oct.12 - Oct.26	2	15 - 17.5 TCU	Objective met
Temperature 1 °C max increase	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.11 - Dec.13	11	0.4 - 3.2 °C	Indefinite result No control
	0600011 at Marguerite (d/s Quesnel)	Apr.20 - Oct.20	11	5 - 13 °C	Indefinite result No control
	E206581 at Hope	Jan.5 - Oct.26	22	3.5 - 18.5 °C	Indefinite result No control
Ammonia-N < 1.78 mg/L av 9.26 mg/L max at pH = 7.8 temp = 0 °C	Fraser River	1999	0	no data collected	Omitted 1999

Table 20 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Nitrite - N < 0.04 mg/L av. 0.12 mg/L max. at chloride 2-4 mg/L	Fraser River	1999	0	no data collected	Omitted 1999
Nitrate + Nitrite-N 10 mg/L max	Fraser River	1999	0	no data collected	Omitted 1999
Chlorophyll-a 50 mg/m2 max	Fraser River	1999	0	no data collected	Omitted 1999
pH 6.5 - 8.5	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.11 - Nov.30	8	7.71 - 8.44	Objective met
	0600011 at Marguerite (d/s Quesnel)	Apr.20 - Oct.20	11	7.90 - 8.16	Objective met
Dissolved Oxygen 8.0 mg/L min May to Oct 11.0 mg/L min Nov to Apr	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.11 - Apr.14 Nov. 1 - Dec.13	7 4	11.3 - 11.9 mg/L 12.5 - 12.6 mg/L	Objective met
	0600011 at Marguerite (d/s Quesnel)	Apr.20 May 3 - Oct.20	1 10	11.2 mg/L 8.8 - 13.3 mg/L	Objective met
Total Lead 0.8 µg/g max in fish muscle	Fraser River	1999	0	no data collected	Omitted 1999
Total PCBs 2.0 µg/g max in fish muscle 0.1 µg/g max in whole fish	Fraser River	1999	0	no data checked	Omitted 1999
Chlorophenols max. TCP's pH 7.8 2,3,4-: 0.1 µg/L 2,3,5-: 0.08 µg/L 2,3,6-: 0.32 µg/L 2,4,5-: 0.08 µg/L 2,4,6-: 0.5 µg/L 3,4,5-: 0.06 µg/L tot: 1.14 µg/L max TTCPs pH 7.8: 2,3,4,5-: 0.2 µg/L 2,3,4,6-: 0.3 µg/L tot: 0.6 µg/L max PCP pH 7.8: 0.1 µg/L	Fraser River	1999	0	no data checked	Omitted 1999

Table 20 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
AOX no increase over control at 95% confidence	E206182 at Stoner (d/s Pr. Ge. mills)	Jan.11 - Dec.13	11	< 0.01 - 0.066 mg/L	Indefinite result No control
	0600011 at Marguerite (d/s Quesnel)	Mar.22 - Dec.16	15	< 0.01 - 0.051 mg/L	Indefinite result No control
	E206581 at Hope	Jan.5 - Dec.7	25	< 0.01 - 0.031 mg/L	Indefinite result No control
Resin Acids 12 µg/L max DHA 45 µg/L max total at pH 7.5	Fraser River	1999	0	no data checked	Omitted 1999
Dioxins and Furans in water 0.06 pg/L max TCDD-TEQ	Fraser River	1999	0	no data checked	Omitted 1999
Dioxins and Furans in sediments 0.25 pg/g max TCDD-TEQ	Fraser River	1999	0	no data collected	Omitted 1999
Dioxins and Furans in fish lipids 50 pg/g TCDD-TEQ	Fraser River	1999	0	no data collected	Omitted 1999

Table 21. Williams Lake Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliform < 200 /100 mL geometric mean (gm) < 400 /100 mL 90th percentile (np) at beaches	E221222 Williams Lake at Scout Island Beach	Aug.6 – Aug.26	4	5 - 35 CFU/100 mL	gm not checked np not checked
	E221221 Williams Lake at Russet Bluff Beach	Aug.6 – Aug.26	2	35 – 50 CFU/100 mL	gm not checked np not checked
	Williams Lake at Rotary Beach	Aug.6 – Aug.26	2	15 – 45 CFU/100 mL	gm not checked np not checked
Fecal Coliform < 10/100 mL 90th percentile at water intakes	Williams Lake: south shore at centre	Aug.19	1	< 1 /100 mL	np not checked
	lake near Lexington	Aug.19	1	< 1 /100 mL	np not checked
	north shore at centre	Aug.19	2	both < 1 /100 mL	np not checked
	Russet Bluff	Aug.19	1	< 1 /100 mL	np not checked
	west end on north shore	Aug.19	1	< 1 /100 mL	np not checked
Turbidity < 1 NTU av 5 NTU max.	0603019 Williams Lake: at lake centre	May 17 - Aug.12 Aug.19 Aug.21 - Oct.7	3 1 1 1 1 1 4	0.5 m : 0.98 - 2.0 NTU 0.5 m: 0.28 NTU 5 m: 0.028 NTU 10 m: 0.023 NTU 15 m: 0.029 NTU 19 m: 0.17 NTU 0.5 m: 0.56 - 1.0 NTU	Max objective met
		July 30 - Aug.26	1	av. = 0.75 NTU	Objective met
Total P < 0.020 mg/L av at spring overturn	0603019 Williams Lake: at lake centre	Apr.17	1 1 1 1 1	0.5 m : 0.084 mg/L 5 m : 0.088 mg/L 10 m : 0.087 mg/L 15 m : 0.088 mg/L 19 m: 0.084 mg/L	
			1	av. = 0.086 mg/L	Objective not met
Chlorophyll-a < 5 µg/L av (May to Aug)	0603019 Williams Lake: at lake centre	May 21 & June 17	5	5.0 - 16.8 µg/L	
			1	av = 9.96 µg/L	Objective not met
Dissolved Oxygen 4.0 mg/L min 5 m above sed.	0603019 Williams Lake: at lake centre	May 17 & June 17	2	9.1 & 4.7 mg/L at 14.5 m depth	Objective met
		Jul. 15 & Aug 12	2	1.55 & 0.38 mg/L at 14.5 m depth	Objective not met
Water Clarity 1.2 m min Secchi reading (May to August)	0603019 Williams Lake: at lake centre	May 17 - Aug 12	11	1.3 - 2.9 m	Objective met
		June 8	1	1.0 m	Objective not met

Table 22. Okanagan Valley Lakes Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total - P < 0.040 mg/L av. at spring overturn (short-term)	0500450 Wood Lake West of Vernon Creek	Mar.10	1	<10 m: 0.038 mg/L	
			1	>20 m: 0.038 mg/L	
			1	av. = 0.038 mg/L	Objective met
	0500848 Wood Lake Deep Basin	Mar.10	1	<10 m: 0.034 mg/L	
			1	>20 m: 0.035 mg/L	
			1	av. = 0.035 mg/L	Objective met
Total - P < 0.008 mg/L av. at spring overturn	0500246 Kalamalka Lake at south end	Feb.23	1	<10 m: 0.008 mg/L	
			1	>20 m: 0.007 mg/L	
			1	av. = 0.008 mg/L	Objective met
	0500461 Kalamalka Lake South of Coldstream Creek	Feb.23	1	<10 m: 0.008 mg/L	
			1	>20 m: 0.007 mg/L	
			1	av. = 0.008 mg/L	Objective met
	0500847 Kalamalka Lake Deep Site	Feb.23	1	<10 m: 0.008 mg/L	
			1	>20 m: 0.010 mg/L	
			1	av. = 0.009 mg/L	Objective not met
Total - P < 0.010 mg/L av at spring overturn	0500239 Okanagan Lake at Armstrong Arm	Feb.26	1	1 m: 0.027 mg/L	
			1	20 m: 0.030 mg/L	
			1	av. = 0.0285 mg/L	Objective not met
		May 18	1	1 m: 0.017 mg/L	
			1	20 m: 0.013 mg/L	
			1	45 m: 0.022	
			1	av. = 0.017 mg/L	Objective not met
		June 9	1	1 m: 0.006 mg/L	
			1	20 m: 0.008 mg/L	
			1	45 m: 0.011 mg/L	
			1	av. = 0.008 mg/L	Objective met
	0500238 Okanagan Lake at Vernon Arm	Mar.2	1	1 m: 0.009 mg/L	
			1	20 m: 0.008 mg/L	
			1	av. = 0.0085 mg/L	Objective met
	0500730 Okanagan Lake at north basin	Feb.26	1	1 m: 0.012 mg/L	
			1	20 m: 0.011 mg/L	
			1	av. = 0.0115 mg/L	Objective not met
		May 18	1	1 m: 0.009 mg/L	
			1	20 m: 0.012 mg/L	
			1	45 m: 0.007	
			1	av. = 0.009 mg/L	Objective met
		June 9	1	0 m: 0.004 mg/L	
			1	20 m: 0.002 mg/L	
			1	45 m: <0.002 mg/L	
			1	av. = 0.003 mg/L	Objective met

Table 22 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total - P	0500236	Feb.23	1	1 m: 0.007 mg/L	
	Okanagan Lake		1	20 m: 0.005 mg/L	
< 0.010 mg/L av	at central basin		1	av. = 0.006 mg/L	Objective met
at spring		May 8	1	1 m: 0.008 mg/L	
overturn			1	20 m: 0.009 mg/L	
			1	45 m: 0.008 mg/L	
			1	av. = 0.008 mg/L	Objective met
	0500729	Feb.18	1	1 m: 0.008 mg/L	
	Okanagan Lake		1	20 m: 0.007 mg/L	
	at south basin		1	av. = 0.0075 mg/L	Objective met
Total - P	0500454	Feb.18	1	1 m: 0.007 mg/L	
	Okanagan Lake		1	20 m: 0.007 mg/L	
< 0.010 mg/L av	U/S Kelowna STP		1	av. = 0.007 mg/L	Objective met
at spring		Mar.31	1	1 m: 0.003 mg/L	
overturn			1	20 m: 0.002 mg/L	
			1	av. = 0.0025 mg/L	Objective met
	0500456	Feb.5	1	1 m: 0.010 mg/L	
	Okanagan Lake		1	20 m: 0.012 mg/L	
	South Prairie C.		1	av. = 0.011mg/L	Objective not met
		Feb.23	1	1 m: 0.007 mg/L	
			1	20 m: 0.007 mg/L	
			1	av. = 0.007 mg/L	Objective not met
Total - P	0500615	Feb.10	1	1 m: 0.010 mg/L	
	Skaha Lake		1	15 m: 0.010 mg/L	
< 0.015 mg/L av	at center		1	av. = 0.010 mg/L	Objective met
at spring	0500453	Feb.10	1	1 m: 0.005 mg/L	
overturn	Skaha Lake			20 m: 0.011 mg/L	
	W.Okanagan L. river mouth			av. = 0.008 mg/L	Objective met
	0500846	Feb.25	1	1 m: 0.011 mg/L	
	Skaha Lake		1	20 m: 0.011 mg/L	
	south basin		1	av. = 0.011 mg/L	Objective met
	0500248	Feb.17	1	1 m: 0.020 mg/L	
	Osoyoos Lake		1	20 m: 0.035 mg/L	
	south basin		1	av. = 0.0275 mg/L	Objective not met
	0500249	Feb.17	1	1 m: 0.018 mg/L	
	Osoyoos Lake		1	20 m: 0.017 mg/L	
	at north basin		1	av. = 0.0175 mg/L	Objective not met
	0500728	Feb.26	1	1 m: 0.017 mg/L	
	Osoyoos Lake		1	20 m: 0.017 mg/L	
	opp. Monashee Co-op		1	av. = 0.017 mg/L	Objective not met

Table 23. Similkameen River and Hedley Creek Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 10 /100 mL 90th percentile (np)	Similkameen River	1999	0	no data collected	Omitted 1999
E. coli < 10 /100 mL 90th percentile (np)	Similkameen River	1999	0	no data collected	Omitted 1999
Enterococci < 3 /100 mL 90th percentile	Similkameen River	1999	0	no data collected	Omitted 1999
Suspended Solids max. increase: 10 mg/L or 10%	Similkameen River	1999	0	no data collected	Omitted 1999
Substrate Sedimentation: no increase in weight of particles < 3 mm dia.	Similkameen River	1999	0	no data collected	Omitted 1999
Turbidity max. increase: 1 - 5 NTU or 10%	Similkameen River	1999	0	no control site data collected	Omitted 1999
Total Cl_2 Residue 0.002 mg/L max.	Similkameen River	1999	0	no data collected	Omitted 1999
WAD-CN	0500073 Similkameen River	Jan 5 - Nov 30	27	0.0005 - 0.0009 mg/L	Max objective met
< 0.005 mg/L av	@ Chopka Rd. Bridge	Jan.19 - Feb.16	1	av. = 0.00054 mg/L	Objective met
0.010 mg/L max.	0500629 Similkameen River	Jan.12 - Nov.30	26	all < 0.0005 mg/L	Max objective met
	@ Princeton Hwy 3 Bridge	Mar.9 - Apr.6	1	av. = <0.0005 mg/L	Objective met
WAD-CN	E223873 Hedley Creek	Feb 26	1	< 0.0005 mg/L	Max objective met
< 0.005 mg/L av	u/s Nickel Plate Mine				Av. not checked
0.010 mg/L max. or	E223874 Hedley Creek	Feb 26	1	0.0027 mg/L	Max objective met
20% increase	d/s Nickel Plate Mine				Av. not checked
SAD-CN + SCN	0500073 Similkameen River @ Chopka Rd. Bridge	Jan 5 - Nov 30	27	< 0.0005 - 0.0019 mg/L	Objective met
0.20 mg/L	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.12 - Nov.30	26	< 0.0005 - 0.0006 mg/L	Objective met

Table 23 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
SAD-CN + SCN 0.20 mg/L	E223873 Hedley Creek u/s Nickel Plate Mine	Feb 26	1	< 0.0005 mg/L	Objective met
	E223874 Hedley Creek d/s Nickel Plate Mine	Feb 26	1	0.0996 mg/L	Objective met
Cyanate as CN 0.45 mg/L max.	Similkameen River	1999	0	no data collected	Omitted 1999
Total Arsenic 0.005 mg/L max. or 20% increase	0500073 Similkameen River @ Chopka Rd. Bridge	Jan 5 - Nov 30	27	0.0004 - 0.0028 mg/L	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.12 - Nov.30	26	0.0001 - 0.0007 mg/L	Objective met
Ammonia - N < 1.09 mg/L av. 5.68 mg/L max. at pH = 8.0 temp. = 15 ºC	Similkameen River	1999	0	no data collected	Omitted 1999
Total Phosphorus < 0.020 mg/L av. at spring overturn	Similkameen River	1999	0	no data collected	Omitted 1999
Chlorophyll-a < 50 mg/m^2 av.	Similkameen River	1999	0	no data collected	Omitted 1999
Dissolved Oxygen 8 mg/L min. (July - March) 11 mg/L min. (April - June)	Similkameen River	1999	0	no data collected	Omitted 1999
pH 6.5 - 8.5	0500073 Similkameen River @ Chopka Rd. Bridge	Jan 5 - Nov 30	27	7.37 - 8.18	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.12 - Nov.30	26	7.08 - 8.30	Objective met
Dissolved Aluminum < 0.05 mg/L av. 0.10 mg/L max. or 20% increase	Similkameen River	1999	0	no data collected	Omitted 1999

Table 23 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Chromium	0500073	Jan.6 - Nov.30	26	< 0.0002 - 0.0051 mg/L	Max objective met
< 0.002 mg/L av.	Similkameen River	May.25	1	0.0271 mg/L	Objective not met
0.02 mg/L max.	@ Chopaka Rd. Bridge	Jan.19 - Feb.16	1	av. = 0.00022 mg/L	Objective met
or 20% increase	0500629	Jan.12 - Nov.30	26	<0.0002 - 0.0057 mg/L	Max objective met
	Similkameen River				
	@ Princeton Hwy 3 Bridge	Mar.9 - Apr.6	1	av. = 0.0003 mg/L	Objective met
Total Copper	0500073	Jan 6 - Nov 30	20	0.0006 - 0.003 mg/L	Max objective met
	Similkameen River	Apr.26 - Nov.15	7	0.0031 - 0.0595 mg/L	Objective not met
< 0.002 mg/L av.	@ Chopka Rd. Bridge	Jan.19 - Feb.16	1	av. = 0.00104 mg/L	Objective met
0.003 mg/L max.	0500629	Jan.12 - Nov.30	20	0.0007 - 0.003 mg/L	Max objective met
or 20% inc.	Similkameen River	Jan.26 - Jul.13	6	0.0033 - 0.0193 mg/L	Objective not met
at hardness = 14	@ Princeton Hwy 3 Bridge	Mar.9 - Apr.6	1	av. = 0.0003 mg/L	Objective met
Dissolved Copper < 0.002 mg/L av. 0.003 mg/L max. or 20% increase at hardness = 14	Similkameen River	1999	0	no data collected	Omitted 1999
Total Iron 0.3 mg/L max. or 20% increase	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Nov.30	27	0.0233 - 23.2 mg/L	Objective not met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.12 - Nov.30	26	0.0129 - 5.72 mg/L	Objective not met
Dissolved Iron 0.3 mg/L max. or 20% increase	Similkameen River	1999	0	no data collected	Omitted 1999
Total Lead	0500073	Jan.6 - Nov.30	27	< 0.0002 - 0.0129 mg/L	Objective
	Similkameen River				met
0.004 mg/L av.	@ Chopka Rd. Bridge	Jan.19 - Feb.16	1	av. = 0.00022 mg/L	Objective met
0.030 mg/L max.	0500629	Jan.12 - Nov.30	26	< 0.0002 - 0.0037 mg/L	Objective
or 20% inc.	Similkameen River				met
at hardness = 46	@ Princeton Hwy 3 Bridge	Mar.9 - Apr.8	1	av. = 0.00034 mg/L	Objective met
Total Magnesium 0.05 mg/L max. or 20% increase	Similkameen River	1999	0	no data collected	Omitted 1999
Dissolved Magnesium 0.2 mg/L max. or 20% increase	Similkameen River	1999	0	no data collected	Omitted 1999
Total Mercury < 0.02 µg/L av. 0.1 µg/L max.	Similkameen River	1999	0	no data collected	Omitted 1999

Table 23 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Molybdium < 0.01 mg/L av. 0.05 mg/L max. (May - Sept.)	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Nov.30	27	0.0005 - 0.0019 mg/L	Objective met
		Jan.19 - Feb.16	1	av. = 0.00168 mg/L	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.12 - Nov.30	26	<0.0001 - 0.0015 mg/L	Objective met
		Mar.9 - Apr.8	1	av. = 0.00128 mg/L	Objective met
Total Nickel 0.025 mg/L max. or 20% increase at hardness < 65	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Nov.30	27	< 0.0002 - 0.0193 mg/L	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.12 - Nov.30	26	<0.0002 - 0.0043 mg/L	Objective met
Total Uranium < 0.01 mg/L av. 0.10 mg/L max. or 20% increase	Similkameen River	1999	0	no data collected	Omitted 1999
Total Zinc < 0.01 mg/L av. 0.03 mg/L max. or 20% increase	0500073 Similkameen River @ Chopka Rd. Bridge	Jan.6 - Nov.30	27	0.0003 - 0.0087 mg/L	Objective met
		May.25	1	0.0599 mg/L	Objective not met
		Jan.19 - Feb.16	1	av. = 0.00084 mg/L	Objective met
	0500629 Similkameen River @ Princeton Hwy 3 Bridge	Jan.12 - Nov.30	26	0.0002 - 0.0158 mg/L	Objective met
		Mar.9 - Apr.8	1	av. = 0.00112 mg/L	Objective met
Dissolved Zinc < 0.05 mg/L av. 0.08 mg/L max. or 20% increase at hardness = 46	Similkameen River	1999	0	no data collected	Omitted 1999

Table 24. Cahill Creek and Tributaries Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Suspended Solids 10 mg/L or 10% max. increase	Cahill Creek Red Top Gulch	1999	0	no data collected	Omitted 1999
Suspended Solids 20 mg/L or 10% max. increase	Cahill Creek Red Top Gulch	1999	0	no data collected	Omitted 1999
Turbidity 5 NTU or 10% max. increase	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Dissolved Solids 500 mg/L max.	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Sulphate < 50 mg/L av. 150 mg/L max.	E206637 Cahill Creek at highway	June 1	1	70 mg/L	Max objective met
					Av. not checked
	E206638 Red Top Gulch at highway	June 1	1	205 mg/L	Objective not met
					Av. not checked
	Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
WAD-CN < 0.005 mg/L av. 0.010 mg/L max.	E206637 Cahill Creek at highway	June 1	1	<0.03 mg/L	Objective met
					Av. not checked
	E206638 Red Top Gulch at highway	June 1	1	<0.03 mg/L	Objective met
					Av. not checked
	Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
SAD - CN + Thiocyanate as CN 0.20 mg/L max.	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Cyantes as CN 0.45 mg/L max.	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999

Table 24 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Arsenic 0.005 mg/L max.	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Ammonia-N < 1.11 mg/L av. 5.78 mg/L max. at pH = 8.0 temp. = 12 ºC	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Nitrite-N < 0.02 mg/L av. 0.06 mg/L max.	E206637 Cahill Creek at highway	June 1	1	<0.005	Objective met
					Av. not checked
	E206638 Red Top Gulch at highway	June 1	1	<0.005	Objective met
					Av. not checked
Nitrate-N 10 mg/L max.	E206637 Cahill Creek at highway	June 1	1	4.95	Objective met
	E206638 Red Top Gulch at highway	June 1	1	11.1	Objective not met
	Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
pH 6.5 - 8.5	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Total Aluminum 0.30 mg/L max. or 20% increase at pH > 7	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Total Cadmium 0.005 mg/L	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Total Copper < 0.005 mg/L av. 0.007 mg/L max. or 20% max. increase	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Dissolved Iron 0.3 mg/L max.	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999

Table 24 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Lead < 0.005 mg/L av. 0.015 mg/L max. at 20% increase	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Total Mercury 0.1 µg/L max.	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Total Molybdenum 0.01 mg/L av. 0.05 mg/L max. (May - Sept.)	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Total Selenium 1.0 µg/L max. or 20% max. increase	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Total Silver 0.0001 mg/L max. or 20% max. increase	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999
Total Zinc 0.05 mg/L max.	Cahill Creek Red Top Gulch Nickel Plate Mine Creek Sunset Creek	1999	0	no data collected	Omitted 1999

Table 25. Thompson River Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliform	0600135 South Thompson River Kamloops d/s Peterson Cr.	Jan. 6 - Dec. 21	14	< 1 - 57 /100mL	
					np not checked
< 10/100 mL 90th percentile. (np)	0600164 North Thompson River at Kamloops u/s Paul Cr.	Jan. 6 - Dec. 21	6	< 1 - 22 /100mL	
					np not checked
	E218768 Kamloops Lake near outlet	Jan. 6 - Dec. 21	6	< 1 - 4 /100mL	
					np not checked
	0600004 Lower Thompson at Savona	Jan. 6 - Dec. 21	6	< 1 - < 2 /100mL	
					np not checked
	0600163 Lower Thompson d/s Walhachin	Jan. 6 - Dec. 21	6	< 1 - 4 /100mL	
					np not checked
	E206586 Lower Thompson at Spences Br. d/s Nicola R.	Jun. 8 - Aug. 16	3	4 - 12 /100mL	
					np not checked
E. coli < 200/100 mL geometric mean (gm)	0600135 South Thompson River Kamloops d/s Peterson Cr.	Jan. 6 - Dec. 21	14	< 1 - 7 /100mL	
					gm not checked
	0600164 North Thompson River at Kamloops u/s Paul Cr.	Jan. 6 - Dec. 21	6	< 1 - 18 /100mL	
					gm not checked
	E218768 Kamloops Lake near outlet	Jan. 6 - Dec. 21	6	< 1 - 5 /100mL	
					gm not checked
	0600004 Lower Thompson at Savona	Jan. 6 - Dec. 21	6	< 1 - < 2/100mL	
					gm not checked
	0600163 Lower Thompson d/s Walhachin	Jan. 6 - Dec. 21	4	< 1 - < 2/100mL	
					gm not checked
	E206586 Lower Thompson at Spences Br. d/s Nicola R.	Jun. 8 - Aug. 16	2	all 4 /100mL	
					gm not checked

Table 25 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Colour 15 TCU max. or 5 TCU increase over average of N + S Thompson Rivers	0600135 South Thompson River Kamloops d/s Peterson Cr.	Jan. 6 - Dec. 21	7	< 5 - 10 TCU	Objective met
	0600164 North Thompson River at Kamloops u/s Paul Cr.	Jan. 6 - Dec. 21	6	< 5 - 12.5 TCU	Objective met
				av. of N & S = 5 - 10 TCU	
	E218768 Kamloops Lake near outlet	Jan. 6 - Dec. 21	6	< 5 - 13 TCU	Objective met
			1	inc. over average: 0 - 6.0 TCU	
	0600004 Lower Thompson at Savona	Jan. 6 - Dec. 21	6	< 5 - 12 TCU	Objective met
			1	inc. over average: 0 - 5.0 TCU	
Colour 15 TCU max. or 5 TCU increase over average of N + S Thompson Rivers	0600163 Lower Thompson d/s Walhachin	Jan. 6 - Dec. 21	6	5 - 12 TCU	Objective met
			1	inc. over average: 0 - 5.0 TCU	
	E206586 Lower Thompson at Spences Br. d/s Nicola R.	Jan. 13 - Oct. 26	16	5 - 15 TCU	Objective met
Chlorophyll - a < 50 mg/m^2	Thompson River Kamloops Lake	1999	0	no data collected	Omitted 1999
Dioxins & Furans 0.2 pg/L max. TEQ-TCDD	Thompson River Kamloops Lake	1999	0	no data collected	Omitted 1999
Dioxins & Furans 1.0 pg/g max. TEQ-TCDD wet weight in fish	Thompson River Kamloops Lake	1999	0	no data collected	Omitted 1999
Dioxins & Furans 0.7 pg/g max. TEQ-TCDD dry weight in seds.	Thompson River	1999	0	no data collected	Omitted 1999
Resin Acids 12 µg/L DHA max. 45 µg/L total max. at pH = 7.5	Thompson River Kamloops Lake	1999	0	no data collected	Omitted 1999

Table 26. Columbia River (From Keenleyside to Birchbank) Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dissolved Oxygen 10 mg/L min.	0200003 at Birchbank	Jan.7 - Jan.30 Jan.25	3 1	10 - 11.9 mg/L 9.9 mg/L	Objective met Objective not met
	E223892 D/S Stoney Creek	Jan.7 – Jan.30 Jan.24	3 1	10.0 – 11.9 mg/L 9.8 mg/L	Objective met Objective not met
	E223893 100 m D/S RDCK STP outfall	Jan.7 – Jan.30	4	10.0 – 12.2 mg/L	Objective met
pH 6.5 - 8.5	0200003 at Birchbank	Jan.6 - Dec.27	44	6.67 - 8.14	Objective met
	E223892 D/S Stoney Creek	Jan.7 – Jan.30	10	7.6 – 8.13	Objective met
	E223893 100 m D/S RDCK STP outfall	Jan.7 – Jan.30	9	7.92 – 8.18	Objective met
Colour 15 TCU max	0200003 at Birchbank	Jan.11 - Nov.30	24	2.5 - 10 TCU	Objective met
Suspended Solids 10 mg/L max increase	0200003 at Birchbank	Jan.7 - Jan.30	5	all < 5 mg/L	Objective met
	E223893 100 m D/S RDCK STP outfall	Jan.7 – Jan.30	5	all < 5 mg/L	Objective met
Turbidity 5 NTU max increase	0200003 at Birchbank	Jan.7 - Nov.30	29	0.28 - 1.6 NTU	Indefinite result No control
Sediment TOC no increase u/s to d/s at 95% confidence	Columbia River: Birchbank Indian Eddy Waneta	Apr.12 Apr.12 Apr.12	3 3 3 	av. = 0.12 av. = 0.11 av. = 0.06 F = 1.52 vs F_{crit} = 5.14	Objective met P = 0.29
Dissolved Gas 110% max.	0200003 Columbia River at Birchbank	Jan.12 - Apr.18 Oct.15 Oct.21 - Nov.2 Nov.8	8 1 3 1	103.13 - 108.64 % 110.22% 107.01 - 109.33 % 112.78%	Objective met Objective not met Objective met Objective not met
Fecal Coliform < 100/100 mL 90th percentile (np)	0200003 at Birchbank	Jan.7 - Jan.30 Mar.8 - Apr.6 Oct.4 - Oct. 27 Nov.2 - Nov.30	5 5 5 5	< 1 - 2 CFU/100 mL < 1 – 10 CFU/100 mL < 2 – 6 CFU/100 mL < 2 – 2 CFU/100 mL	
			4	np = 2 - 8.8 CFU/100 mL	Objective met
	E223893 100 m D/S RDCK STP outfall	Jan.7 – Nov.8	15	<2 – 32 /100 mL	
		Jan.7-Jan.30, Mar.25-Apr.18, Oct.18-Nov.8	3	np = 8.4 – 21.6/100 mL	Objective not met

Table 26 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
E. coli < 100 /100mL 90th percentile (np)	0200003 at Birchbank	Jan.7 - Jan.30	5	< 2 - 4 CFU/100 mL	
			1	np = 3.2 CFU/100 mL	Objective met
	E223893 100 m D/S RDCK STP outfall	Jan.7 - Jan.30	5		
			1	np = 6.4 CFU/100 mL	Objective met
Toxicity % mill effluent in river: < 0.05 of the 96 - h LC50	Columbia River	1999	0	no data collected	Omitted 1999
Chlorophenols < 0.05 µg/L tri < 0.10 µg/L tetra < 0.05 µg/L penta	Columbia River	1999	0	no data collected	Omitted 1999
Dioxins & Furans 1pg/g TCDD TEQ max. in fish (wet weight)	Columbia River	1999	0	no data collected	Omitted 1999
Dioxins & Furans 0.2 pg/L TCDD TEQ max. in water	Columbia River	1999	0	no data collected	Omitted 1999
Dioxins & Furans 0.7 pg/L TCDD TEQ max. in seds.	Columbia River	1999	0	no data collected	Omitted 1999
Resin Acids 12 µg/L max DHA 45 µg/L max total pH = 7.6	Columbia River	1999	0	no data collected	Omitted 1999
Chlorinated Resin Acids 6 µg/L max. of mono Cl-DHA & di Cl-DHA	Columbia River	1999	0	no data collected	Omitted 1999
Chlorophyll *a* < 50 mg/m^2 av.	Columbia River	1999	0	no data collected	Omitted 1999

Table 27. Columbia River (From Birchbank to the International Border) Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
pH 6.5 - 8.5	0200559 at Waneta	Jan.4 – Dec.8	71	6.76 – 8.2	Objective met
	0200558 New Trail Bridge	Jan.7 – Jan.30	10	7.5 – 8.02	Objective met
Ammonia 30-day average 1.13 mg/L at 10ºC and pH 8.0	0200558 New Trail Bridge	Jan.7 – Jan.30	5	< 0.005 – 0.024 mg/L	
			1	av. = 0.014 mg/L	Objective met
	E216137 Old Trail Bridge	Jan.7 – Jan.30	5	0.005 – 0.017 mg/L	
			1	av. = 0.008 mg/L	Objective met
Dissolved Gas 110% max.	0200559 Columbia River at Waneta	Jan.12 - Nov.2 Nov.8	12 1	102.6 - 108.72 % 111.66%	Objective met Objective not met
Fecal Coliform < 10 /100 mL 90th percentile (np)	0200559 at Waneta	Jan.6 – Dec.30	62	< 1 - 150 /100 mL	
		Jun.21-Jul.19, Oct.27-Nov.8	2	np = 5.2 – 7.8 /100 mL	Objective met
		Jan.4-Jan.18, Jan.24-Feb.9, Feb.15-Mar.15, Mar.22-Apr.6, Apr.12-Apr.19, Jul.26-Aug.16, Sep.8-Oct.26, Nov.16-Dec.13	9	np = 12.8 – 69.2 /100 mL	Objective not met
E. coli < 10 /100mL 90th percentile (np)	0200559 at Waneta	Jan.7 – Jan.30	5	< 1 - 19 /100 mL	
			1	np = 11.2 /100 mL	Objective not met
Enterococcus sp. < 3 /100mL 90th percentile (np)	Columbia River	1998	0	no data collected	Omitted 1998
Total As 5 µg/L av.	0200559 at Waneta	Jan.4 – Dec.8	66	<0. 1 – 2.8 µg/L	
		Jan.4-Jan.12, Jan.18-Jan.30, Feb.1-Feb.25, Mar.2-Mar.29, Apr.6-Apr.26, May.3-May.25, May.31-Jun.21, Jun.29-Jul.17, Jul.19-Aug.10, Aug.24-Sep.14, Sep.21-Oct.18, Oct.20-Nov.8, Nov.16-Dec.8	13	av. = 0.2 – 0.86 µg/L	Objective met
	0200558 New Trail Bridge	Jan.7 – Jan.30	5	0.2 – 0.5 µg/L	
			1	av. = 0.44 µg/L	Objective met
	E216137 Old Trail Bridge	Jan.7 – Jan.30	5	0.1 – 0.3 µg/L	
			1	av. = 0.22 µg/L	Objective met

Table 27 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total Cd 0.03 µg/L av.	0200559 at Waneta	Jan.4 – Dec.8	61	<0. 02 – 0.13 µg/L	
		Jan.4-Jan.25, Feb.1-Feb.25, Mar.8-Apr.6, Apr.13-May.6, May.17-Jun.15, Jun.17-Jul.5, Jul.7-Aug.3, Aug.9-Aug.31, Sep.8-Sep.27, Oct.4-Oct.26, Nov.1-Nov.22	11	av. = 0.072 – 0.1 µg/L	Indefinite result Detection limits exceed objective
Total Cr 1 µg/L av.	0200559 at Waneta	Jan.4 – Dec.8	55	<0. 2 – 0.4 µg/L	
		Jan.4-Feb.1, Feb.9-Mar.8, Mar.29-Apr.26, May.3-May.31, Jun.7-Jul.5, Jul.12-Aug.9, Aug.16-Sep.13, Sep.21-Oct.18, Oct.26-Nov.22	9	av. = <0.2 – 0.24 µg/L	Objective met
Total Cu 7.17 µg/L max	0200559 at Waneta	Jan.4 – Dec.8	61	0. 3 – 2.53 µg/L	Objective met
Total Cu 2 µg/L av.	0200559 at Waneta	Jan.4 – Dec.8	61	0. 2 – 5.5 µg/L	
		Jan.4-Jan.25, Feb.1-Feb.25, Mar.8-Apr.6, Apr.13-May.6, May.17-Jun.15, Jun.17-Jul.5, Jul.7-Aug.3, Aug.9-Aug.31, Sep.8-Sep.27, Oct.4-Oct.26, Nov.1-Nov.22	11	av. = 0.5 – 1.2 µg/L	Objective met
Total Pb 37.9 µg/L max	0200559 at Waneta	Jan.4 – Dec.8	61	0. 06 – 1.1 µg/L	Objective met
Total Pb 4.8 µg/L av.	0200559 at Waneta	Jan.4 – Dec.8	67	< 0. 01 – 1.1 µg/L	
		Jan.4-Jan.25, Feb.1-Feb.25, Mar.8-Apr.6, Apr.13-May.6, May.17-Jun.15, Jun.17-Jul.5, Jul.7-Aug.3, Aug.9-Aug.31, Sep.8-Sep.27, Oct.4-Oct.26, Nov.1-Nov.22	11	av. = 0.24 – 0.46 µg/L	Objective met
Total Tl 0.8 µg/L av.	0200559 at Waneta	Jan.6 – Dec.8	13	0. 01 – 0.37 µg/L	
					av. not checked
Total Zn 7 µg/L max	0200559 at Waneta	Jan.4 – Dec.4 Mar.25 – Dec.8	54 7	1.4 – 6.1 µg/L 7.3 – 17.0 µg/L	Objective met Objective not met

Table 27 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Total As 5.7 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Cd 0.6 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Cr 36.4 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Cu 35.1 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Pb 33.4 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Hg 0.16 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total Zn 120 mg/kg dry weight max in sediments	Columbia River	1998	0	no data collected	Omitted 1998
Total As 471 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998
Total Cd 900 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998
Total Cr 940 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998
Total Pb 160 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998
Total Hg 100 µg/kg wet weight max in fish	Columbia River	1998	0	no data collected	Omitted 1998

Table 27 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Dioxins & Furans 0.25 ng/kg PCDD and PCDF TEQ max. in sediments (dry weight)	Columbia River	1998	0	no data collected	Omitted 1998
Dioxins & Furans 1.1 ng/kg PCDD and PCDF TEQ max. in fish (wet weight)	Columbia River	1998	0	no data collected	Omitted 1998

Table 28. Fraser River (Kanaka Creek to the Mouth) Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 1000 CFU /100 mL geometric mean (gm) 4000 /100 mL max April - October	Main Arm: 0300005 Fraser River near Patullo Bridge	Oct.25	1	70 CFU/100 mL	Max objective met
					gm not checked
	GVRD 1 u/s Annacis	Apr.14 - Oct.20	4	20 - 230 CFU /100 mL	Max objective met
					gm not checked
	GVRD 2 d/s Annacis	Apr.14 - Oct.20	4	20 - 130 CFU /100 mL	Max objective met
					gm not checked
	GVRD 3 12 km d/s Annacis	Apr.14 - Oct.20	4	<20 - 80 CFU /100 mL	Max objective met
					gm not checked
	GVRD 4 d/s Lulu	Apr.14 - Oct.20	4	40 - 230 CFU /100 mL	Max objective met
					gm not checked
	GVRD 5 d/s Steveston	Apr.14 - Oct.20	4	40 - 500 CFU /100 mL	Max objective met
					gm not checked
Fecal Coliforms < 200 CFU /100 mL geometric mean (gm) June - August at beaches	Iona Beach every 1.5 km along jetty east to west	Jun.1 - Aug.31	14	< 20 - 800 CFU/100 mL	
	GVRD 4	Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 51 - 73 CFU/100 mL	Objective met
	GVRD 5	Jun.1 - Aug.31	14	< 20 - 3000 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 79 - 178 CFU/100 mL	Objective met
	GVRD 6	Jun.1 - Aug.31	14	< 20 - 1700 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 31 - 110 CFU/100 mL	Objective met
	GVRD 7	Jun.1 - Aug.31	14	< 20 - 230 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 31 - 66 CFU/100 mL	Objective met
	GVRD 8	Jun.1 - Aug.31	14	< 20 - 300 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 59 - 67 CFU/100 mL	Objective met
	GVRD 9	Jun.1 - Aug.31	14	< 20 - 500 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 44 - 109 CFU/100 mL	Objective met
	GVRD 10	Jun.1 - Aug.31	14	< 20 - 800 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 50 - 134 CFU/100 mL	Objective met
	GVRD 11	Jun.1 - Aug.31	14	< 20 - 1300 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 54 - 75 CFU/100 mL	Objective met
	GVRD 12	Jun.1 - Aug.31	14	< 20 - 500 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 27 - 68 CFU/100 mL	Objective met

Table 28 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliforms < 200 CFU /100 mL geometric mean (gm) June - August at beaches	GVRD 13	Jun.1 - Aug.31	14	< 20 - 1300 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 38 - 79 CFU/100 mL	Objective met
	GVRD 14	Jun.1 - Aug.31	14	< 20 - 500 CFU/100 mL	
		Jun.1-Jun.30, Jul.7-Aug.4	2	gm = 39 - 65 CFU/100 mL	Objective met
Fecal Coliforms < 200 /100 mL geometric mean (gm) June - August at beaches	English Bay: GVRD 101 Third Beach below	Jun.4 - Aug.30 Jun.4-17, Jun.21-Jul.5, Jul.9-22	27	< 20 - 700 CFU/100 mL	
	concession area	Jul.26-Aug.9, Aug.12-23	5	gm = 23 - 47 CFU/100 mL	Objective met
	GVRD 200 Second Beach at	Jun.4 - Aug.30 Jun.4-17, Jun.21-Jul.5, Jul.9-22	26	< 20 - 700 CFU/100 mL	
	north end	Jul.26-Aug.9, Aug.12-23	5	gm = 30 - 127 CFU/100 mL	Objective met
	GVRD 304 English Bay Beach	Jun.4 - Aug.30 Jun.4-17, Jun.21-Jul.5, Jul.9-22	26	< 20 - 300 CFU/100 mL	
	at north end of bath house	Jul.26-Aug.9, Aug.12-23	5	gm = 26 - 179 CFU/100 mL	Objective met
	GVRD 703	Jun.1 - Aug.31	27	< 20 - 2200 CFU/100 mL	
	Locarno Beach	Jul.6 - Jul.20	1	gm = 443 CFU/100 mL	Objective not met
	at bath house	Jun.1-15, Jun.16-20, Jul.21-Aug.6, Aug.10 - 24	4	gm = 38 - 115 CFU/100 mL	Objective met
Suspended Solids max. increase: 10 mg/L or 10 %	North Arm Middle Arm Main Arm:	1999	0	no data collected	Omitted 1999
Total Cl_2 Res. 0.002 mg/L max.	Main Arm	1999	0	no data collected	Omitted 1999
Ammonia-N 1.85 mg/L av 17.6 mg/L max. at pH = 7.2 temp = 10°C	Main Arm North Arm Middle Arm Sturgeon Bank Roberts Bank	1999	0	no data collected	Omitted 1999
Dissolved Oxygen 7.75 mg/L min	Main Stem Main Arm North Arm Middle Arm	1999	0	no data collected	Omitted 1999
Dissolved Oxygen 9.0 mg/L min	Sturgeon Bank Roberts Bank	1999	0	no data collected	Omitted 1999
pH 6.5 - 8.5	Main Stem Main Arm North Arm Middle Arm	1999	0	no data collected	Omitted 1999

Table 28 (continued)

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 North Arm	1999	0	no data collected	Omitted 1999
Total Pb < 0.003 mg/L av 0.010 mg/L max.	Main Stem Main Arm North Arm Middle Arm	1999	0	no data collected	Omitted 1999
Total Zn < 0.050 mg/L av. 0.100 mg/L max.	Main Arm North Arm Middle Arm	1999	0	no data collected	Omitted 1999
Chlorophenols (tri+ tetra+ penta-CP) in water 0.0002 mg/L max.	Main Stem Main Arm North Arm Middle Arm	1999	0	no data collected	Omitted 1999
Chlorophenols (tri + tetra + penta - CP) in sediments 0.01 µg/g max. av of replicates (dry weight)	Main Stem Main Arm North Arm Middle Arm Sturgeon Bank Roberts Bank	1999	0	no data collected	Omitted 1999
Chlorophenols (tri+ tetra+ penta) in fish 0.10 µg/g max. (wet weight)	Main Stem Main Arm North Arm	1999	0	no data collected	Omitted 1999
PCBs in sediments < 0.03 µg/g max. av of replicates (dry weight)	Main Stem Main Arm North Arm Middle Arm	1999	0	no data collected	Omitted 1999
PCBs in fish 0.50 µg/g max. (wet weight)	Main Stem Main Arm North Arm Middle Arm	1999	0	no data collected	Omitted 1999

Table 29. Boundary Bay Water Quality Objectives - 1999

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Fecal Coliform	0300056	Jul.6 - Oct.25	4	88 - 570 CFU / 100 mL	Max objective met
<1000 / 100 mL	Mahood Creek	Jul.7	1	26000 CFU / 100 mL	Max objective not met
geometric mean	at 52nd St.				gm not checked
(gm)	0300057	Jul.7 - Oct.15	2	120 - 4200 CFU / 100 mL	Max objective met
<4000 / 100 mL	Serpentine River	Aug.23	1	4200 CFU / 100 mL	Max objective not met
max	at Hwy. 99A				gm not checked
April - October	0300059	Jul.6 - Oct.25	4	180 - 3200 CFU / 100 mL	Max objective met
	Serpentine River				
	at 80th Avenue				gm not checked
	0300060	Jul.6 - Oct.25	4	6 - 120 CFU / 100 mL	Max objective met
	Nicomekl River				
	at Hwy. 99A				gm not checked
	0300061	Jul.6 - Oct.25	4	93 - 540 CFU / 100 mL	Max objective met
	Nicomekl River				
	at 192nd Street				gm not checked
	0300062	Jul.6 - Oct.25	4	140 - 3400 CFU / 100 mL	Max objective met
	Nicomekl River				
	at 64th Ave				gm not checked
	0300063	Jul.6 - Oct.25	5	24 - 160 CFU / 100 mL	Max objective met
	Anderson Creek				
	at Colebrook Road				gm not checked
	0300064	Jul.6 - Oct.25	4	40 - 120 CFU / 100 mL	Max objective met
	Murray Creek				
	at 48th Avenue				gm not checked
	E207716	Jul.6 - Oct.25	4	86 - 610 CFU / 100 mL	Max objective met
	Latimer Creek				
	100 m U/S mouth				gm not checked
	E207719	Jul.6 - Oct.25	4	130 - 950 CFU / 100 mL	Max objective met
	Hyland Creek				
	at Hwy. 99A				gm not checked
Fecal Coliform	0300065	Jul.7 - Oct.25	4	54 - 1000 CFU / 100 mL	
<200 / 100 mL	Little Campbell River				np not checked
geometric mean (gm)	at 176th Street				gm not checked
<400 / 100 mL	0300066	Jul.7 - Oct.25	4	<1 - 44 CFU / 100 mL	
90th perc. (np)	Little Campbell River				np not checked
April - October	at 216th Street				gm not checked
Suspended	0300056	Jul.6 - Oct.25	4	all <5 mg/L	Indefinite result
Solids	Mahood Creek				No control
	at 52nd St.				
max increase:	0300059	Jul.6 - Oct.25	4	<5 - 31 mg/L	Control site
10 mg/L	Serpentine River				
or 10%	at 80th Avenue				

Table 29 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Suspended Solids max increase: 10 mg/L or 10%	0300057 Serpentine River at Hwy. 99A	Jul.6 - Oct.25	4 4	7 - 15 mg/L inc. = 0 - 5 mg/L	 Objective met
	0300062 Nicomekl River at 64th Ave	Jul.6 - Oct.25	4	<5 - 5 mg/L	Control site
	0300060 Nicomekl River at Hwy. 99A	Jul.6 - Oct.25	4 3 1	7 - 28 mg/L inc. = 2 - 7 mg/L inc. = 23 mg/L	 Objective met Objective not met
	0300061 Nicomekl River at 192nd Street	Jul.6 - Oct.25	4 4	<5 - 5 mg/L inc. = 0 mg/L	 Objective met
	0300063 Anderson Creek at Colebrook Road	Jul.6 - Oct.25	4	all <5 mg/L	Indefinite result No control
	0300064 Murray Creek at 48th Avenue	Jul.6 - Oct.25	4	<5 - 13 mg/L	Indefinite result No control
	E207716 Latimer Creek 100 m U/S mouth	Jul.6 - Oct.25	4	<5 - 5 mg/L	Indefinite result No control
	E207719 Hyland Creek at Hwy. 99A	Jul.6 - Oct.25	4	<5 - 6 mg/L	Indefinite result No control
	0300066 Little Campbell River at 216th Street	Jul.7 - Oct.25	3	<5 - 7 mg/L	Control site
	0300065 Little Campbell River at 176th Street	Jul.7 - Oct.25	3 3	<5 - 10 mg/L inc. = 0 - 3 mg/L	 Objective met
Substrate Sedimentation no increase in weight of particles <3 mm dia	Mahood Creek Serpentine River Nicomekl River Anderson Creek Murray Creek Latimer Creek Hyland Creek Little Campbell River	1999	0	no data collected	Omitted 1999
Turbidity max increase: 5 NTU or 10%	Mahood Creek Serpentine River Nicomekl River Anderson Creek Murray Creek Latimer Creek Hyland Creek Little Campbell River	1999	0	no data collected	Omitted 1999

Table 29 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Ammonia-N	0300056 Mahood Creek	Jul.6 - Oct.25	4	0.009 - 0.036 mg/L	Max objective met
<0.76 mg/L av	at 52nd St.				Av. not checked
5.6 mg/L max at	0300057 Serpentine River	Jul.6 - Oct.25	4	0.054 - 0.128 mg/L	Max objective met
pH = 8.0	at Hwy. 99A				Av. not checked
temp = 20 C	0300059 Serpentine River	Jul.6 - Oct.25	4	0.129 - 0.17 mg/L	Max objective met
	at 80th Avenue				Av. not checked
	0300060 Nicomekl River	Jul.6 - Oct.25	4	0.012 - 0.069 mg/L	Max objective met
	at Hwy. 99A				Av. not checked
Ammonia-N	0300061 Nicomekl River	Jul.6 - Oct.25	4	0.022 - 0.04 mg/L	Max objective met
<0.76 mg/L av	at 192nd Street				Av. not checked
5.6 mg/L max at	0300062 Nicomekl River	Jul.6 - Oct.25	4	0.012 - 0.03 mg/L	Max objective met
pH = 8.0	at 64th Ave				Av. not checked
temp = 20 C	0300063 Anderson Creek	Jul.6 - Oct.25	4	0.005 - 0.008 mg/L	Max objective met
	at Colebrook Road				Av. not checked
	0300064 Murray Creek	Jul.6 - Oct.25	4	0.007 - 0.02mg/L	Max objective met
	at 48th Avenue				Av. not checked
	E207716 Latimer Creek	Jul.6 - Oct.25	4	0.018 - 0.033 mg/L	Max objective met
	100 m U/S mouth				Av. not checked
	E207719 Hyland Creek	Jul.6 - Oct.25	4	0.027 - 0.045 mg/L	Max objective met
	at Hwy. 99A				Av. not checked
	0300065 Little Campbell River	Jul.7 - Oct.25	3	0.014 - 0.019 mg/L	Max objective met
	at 176th Street				Av. not checked
	0300066 Little Campbell River	Jul.7 - Oct.25	3	<0.005 - 0.022 mg/L	Max objective met
	at 216th Street				Av. not checked
Nitrite - N	0300056 Mahood Creek	Jul.6 - Oct.25	4	0.005 - 0.011 mg/L	Max objective met
<0.02 mg/L av	at 52nd St.				Av. not checked
0.06 mg/L max	0300057 Serpentine River	Jul.6 - Oct.25	4	0.012 - 0.014 mg/L	Max objective met
	at Hwy. 99A				Av. not checked
	0300059 Serpentine River	Jul.6 - Oct.25	4	0.014 - 0.02 mg/L	Max objective met

	at 80th Avenue				Av. not checked

Table 29 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
Nitrite - N <0.02 mg/L av 0.06 mg/L max	0300060 Nicomekl River at Hwy. 99A	Jul.6 - Oct.25	4	0.013 - 0.018 mg/L	Max objective met
					Av. not checked
	0300061 Nicomekl River at 192nd Street	Jul.6 - Oct.25	4	0.009 - 0.013 mg/L	Max objective met
					Av. not checked
	0300062 Nicomekl River at 64th Ave	Jul.6 - Oct.25	4	0.008 - 0.017 mg/L	Max objective met
					Av. not checked
	0300063 Anderson Creek at Colebrook Road	Jul.6 - Oct.25	4	0.008 - 0.01 mg/L	Max objective met
					Av. not checked
	0300064 Murray Creek at 48th Avenue	Jul.6 - Oct.25	4	0.005 - 0.019mg/L	Max objective met
					Av. not checked
	E207716 Latimer Creek 100 m U/S mouth	Jul.6 - Oct.25	4	0.009 - 0.012 mg/L	Max objective met
					Av. not checked
	E207719 Hyland Creek at Hwy. 99A	Jul.6 - Oct.25	4	0.006 - 0.015 mg/L	Max objective met
					Av. not checked
	0300065 Little Campbell River at 176th Street	Jul.7 - Oct.25	3	0.01 - 0.026 mg/L	Max objective met
					Av. not checked
	0300066 Little Campbell River at 216th Street	Jul.7 - Oct.25	3	0.003 - 0.006 mg/L	Max objective met
					Av. not checked
Chlorophyll-a 50 mg/m^2 av	Little Campbell River	1999	0	no data collected	Omitted 1999
Chlorophyll-a 50 mg/m^2 av	Mahood Creek Serpentine River Nicomekl River Anderson Creek Murray Creek Latimer Creek Hyland Creek	1999	0	no data collected	Omitted 1999
Dissolved Oxygen 6 mg/L min Jun - Oct	Little Campbell River Serpentine River Nicomekl River	1999	0	no data collected	Omitted 1999
Dissolved Oxygen 6 mg/L min Jun - Oct	Mahood Creek Anderson Creek Murray Creek Latimer Creek	1999	0	no data collected	Omitted 1999

	Hyland Creek				

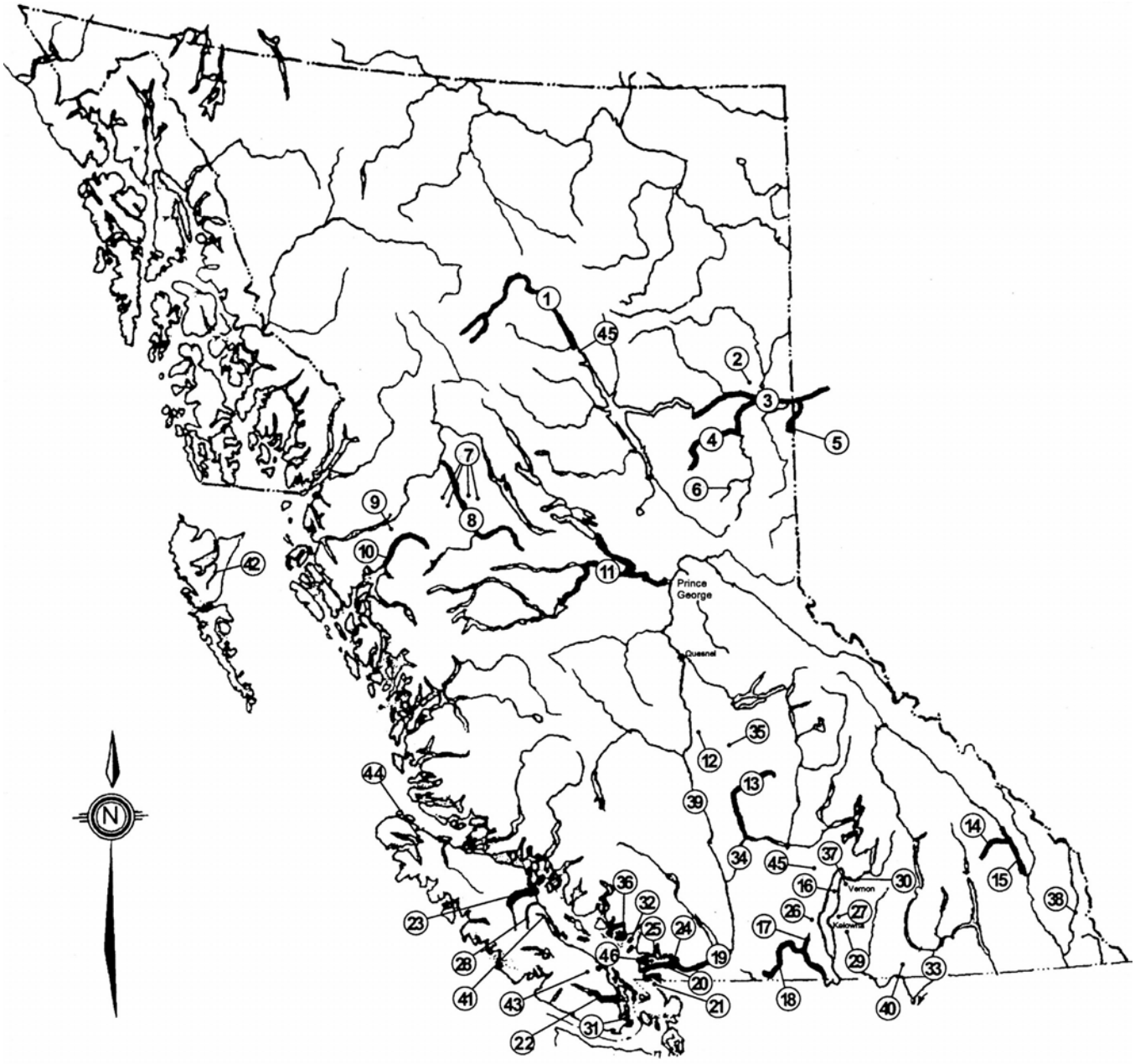
Table 29 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
pH 6.5 - 8.5	0300065 Little Campbell River at 176th Street	Jul.7 - Oct.25	3	7.7 - 7.79	Objective met
	0300066 Little Campbell River at 216th Street	Jul.7 - Oct.25	3	6.84 - 7.18	Objective met
pH 6.6 - 8.5 or 0.2 max increase	0300056 Mahood Creek at 52nd St.	Jul.6 - Oct.25	4	7.25 - 7.8	Objective met
	0300057 Serpentine River at Hwy. 99A	Jul.6 - Oct.25	4	7.0 - 7.5	Objective met
	0300059 Serpentine River at 80th Avenue	Jul.6 - Oct.25	4	7.05 - 7.28	Objective met
	0300060 Nicomekl River at Hwy. 99A	Jul.6 - Oct.25	4	7.24 - 7.74	Objective met
	0300061 Nicomekl River at 192nd Street	Jul.6 - Oct.25	4	7.39 - 7.73	Objective met
	0300062 Nicomekl River at 64th Ave	Jul.6 - Oct.25	4	7.36 - 7.57	Objective met
	0300063 Anderson Creek at Colebrook Road	Jul.6 - Oct.25	4	7.53 - 7.77	Objective met
	0300064 Murray Creek at 48th Avenue	Jul.6 - Oct.25	4	7.4 - 7.72	Objective met
	E207716 Latimer Creek 100 m U/S mouth	Jul.6 - Oct.25	4	7.19 - 7.36	Objective met
	E207719 Hyland Creek at Hwy. 99A	Jul.6 - Oct.25	4	7.02 - 7.45	Objective met
Total Lead <0.005 mg/L av 0.010 mg/L max	Nicomekl River	1999	0	no data collected	Omitted 1999
PCBs 0.001 µg/L max in water	Serpentine River Mahood Creek Latimer Creek Hyland Creek	1999	0	no data collected	Omitted 1999

Table 29 (continued)

VARIABLE & OBJECTIVE	MEASUREMENT				CONCLUSION
	SITE	DATE	n	VALUE	
PCBs <0.1-0.5 µg/g wet weight in fish	Serpentine River Mahood Creek Latimer Creek Hyland Creek	1999	0	no data collected	Omitted 1999
PCBs <0.03 µg/g dry weight in sediments	Serpentine River Mahood Creek Latimer Creek Hyland Creek	1999	0	no data collected	Omitted 1999

Figure 1. Map of British Columbia showing locations of watersheds with water quality objectives.



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. Fraser River (Hope to Kanaka)
20. Fraser River (Kanaka to Mouth)
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 and Beaver Lakes
32. Pender Harbour
33. Columbia River (to Birchbank)
34. Thompson River
35. San José River
36. Sechelt Inlet
37. Okanagan Tribs. Vernon
38. Elk River
39. Fraser River (Prince George to Hope)
40. Christina Lake
41. Tsolum River
42. Yakoun River
43. Holland Cr & Stocking Lk
44. Quatse Lake
45. Lower Finlay River
46. Burrard Inlet Trib.

Figure 2A. Quinsam River

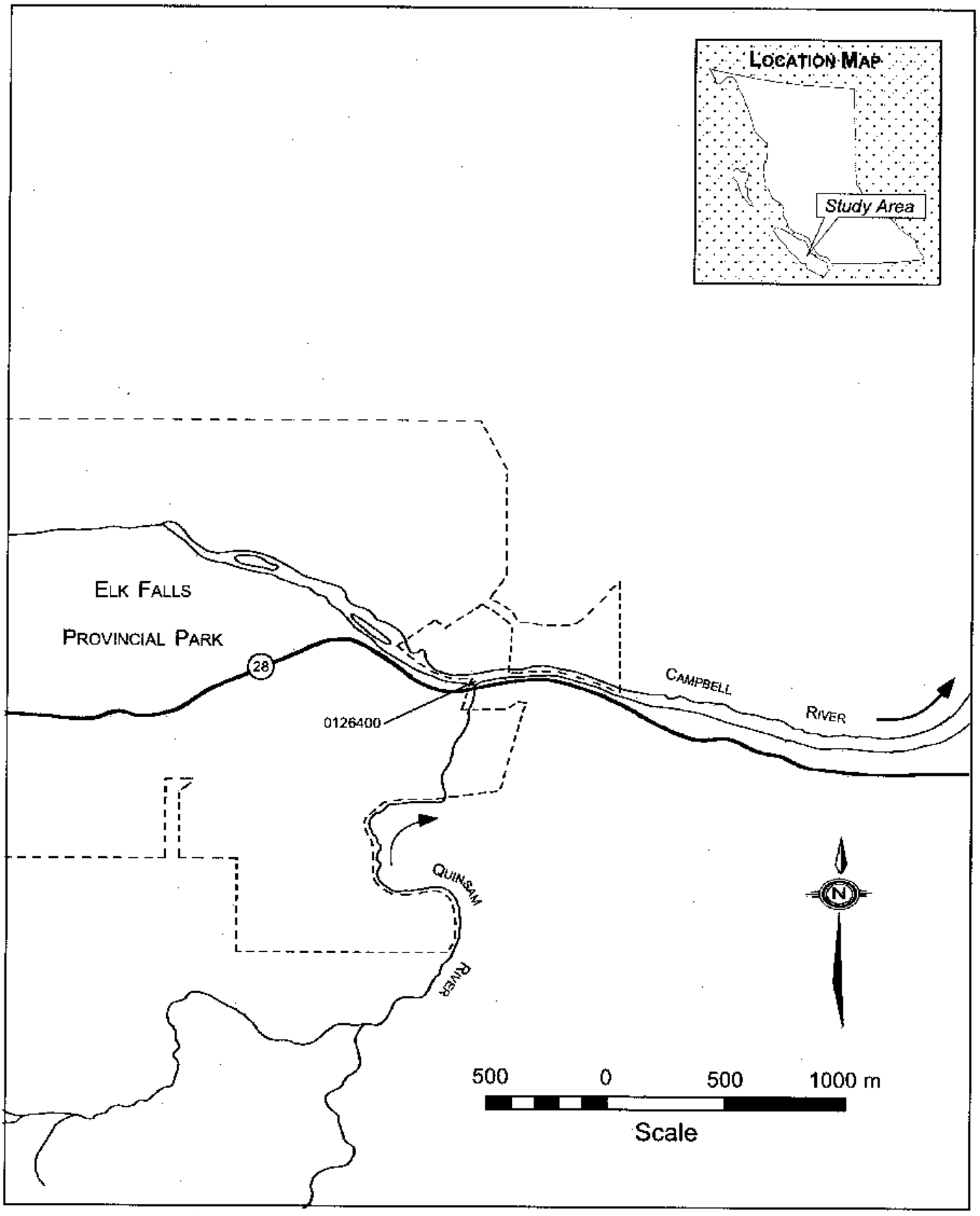


Figure 2B. Middle Quinsam Lake

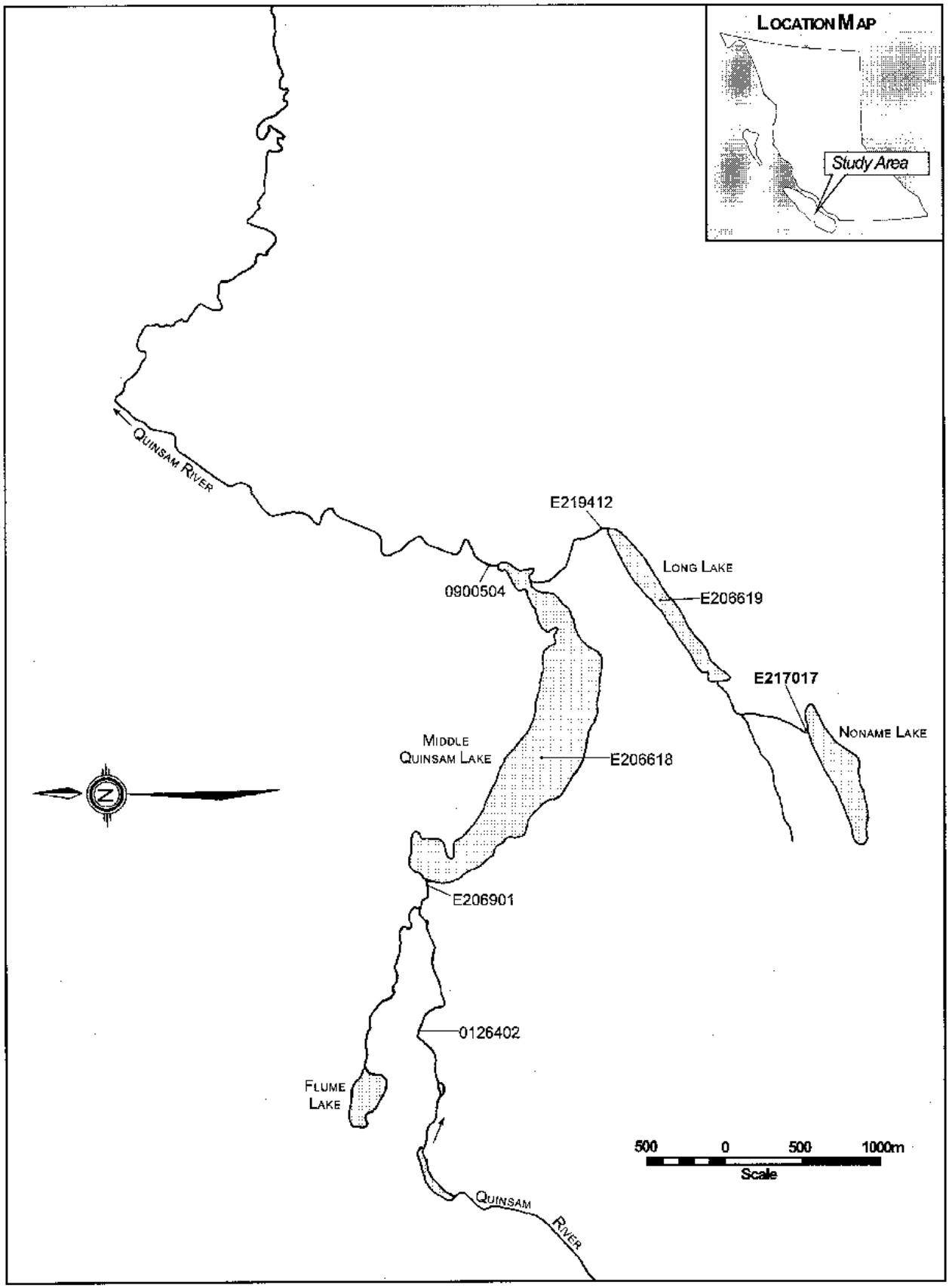


Figure 3. Tsolum River

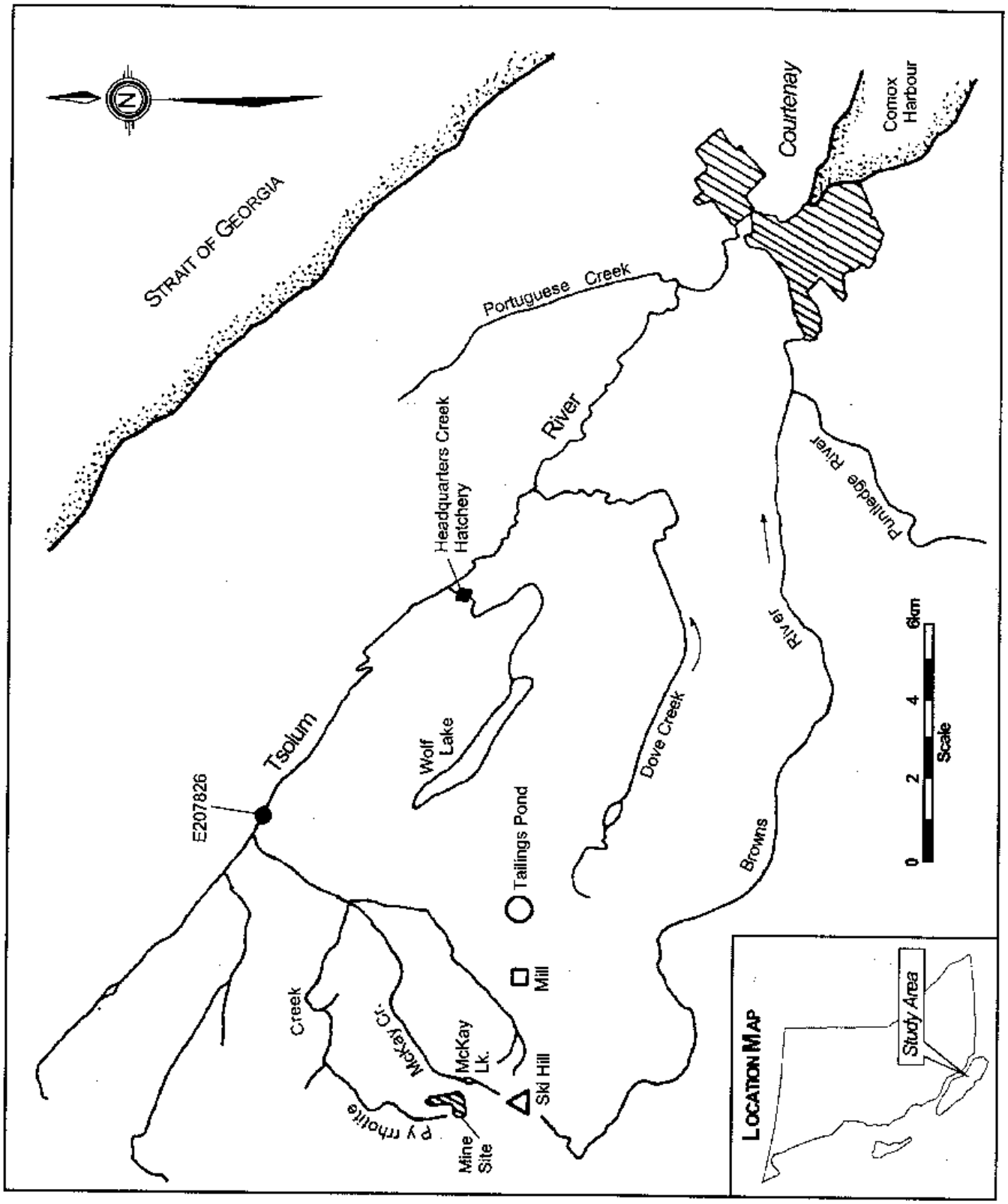


Figure 4. Nechako River

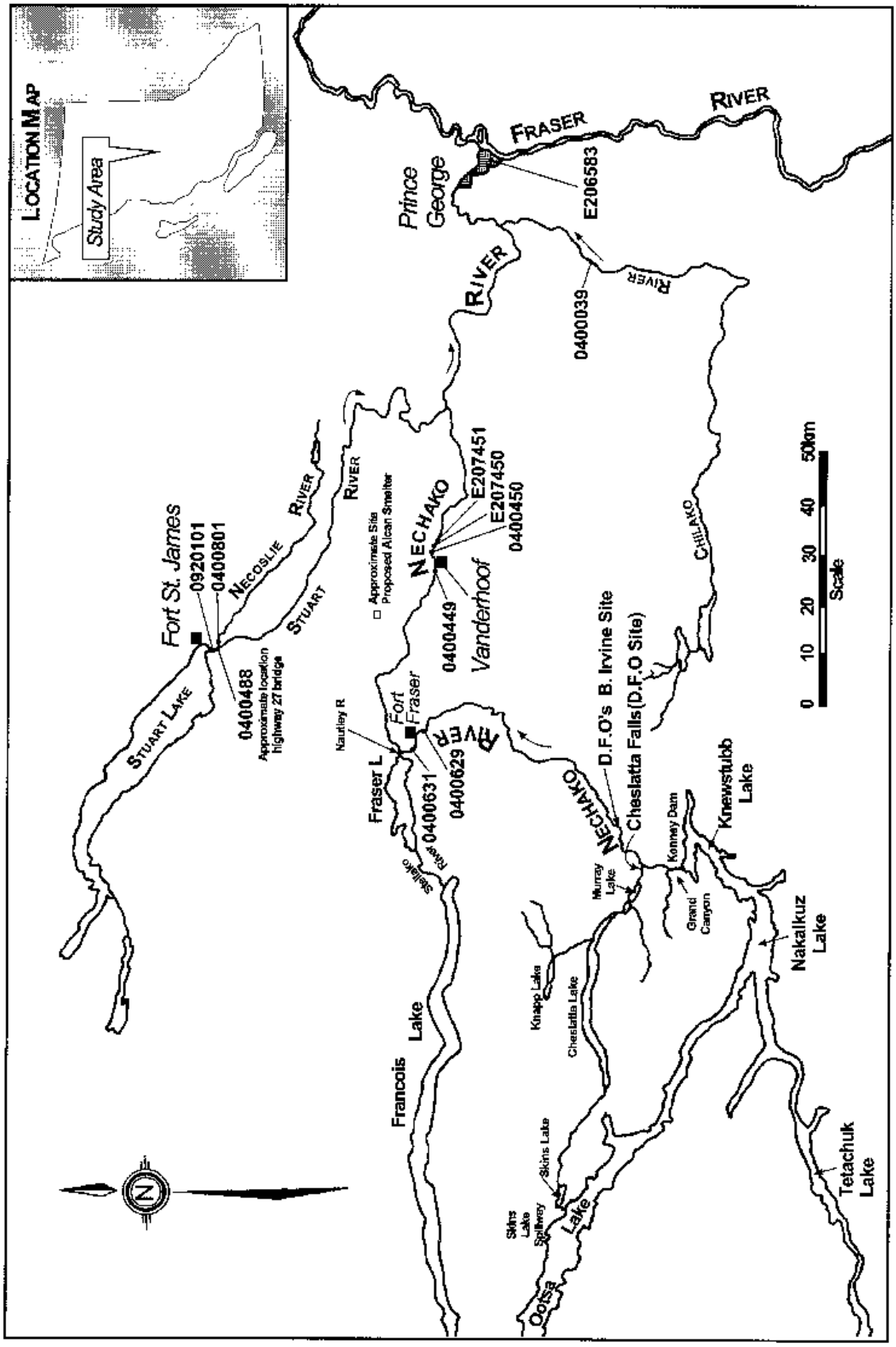


Figure 5. Upper Fraser River

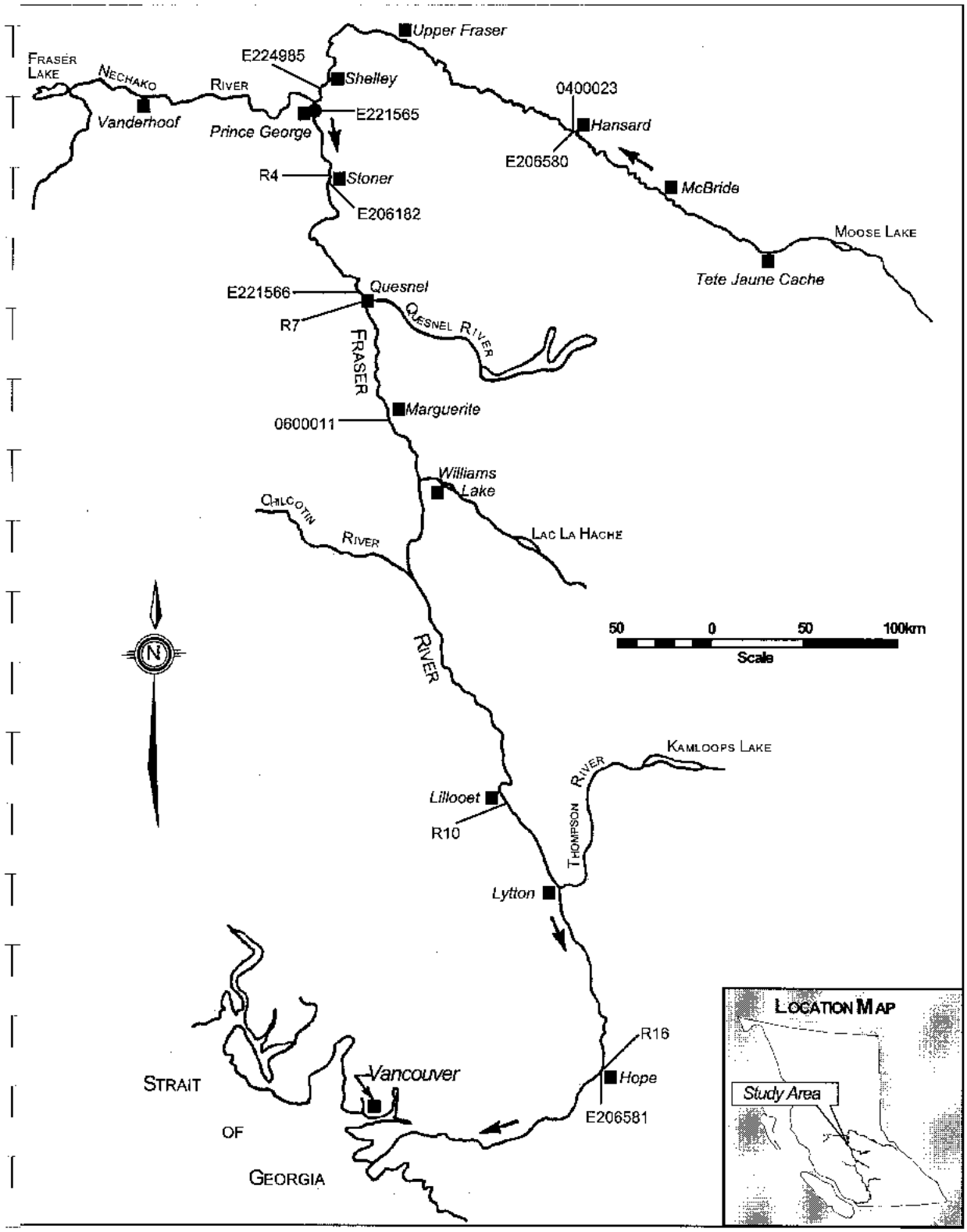


Figure 6. Williams Lake

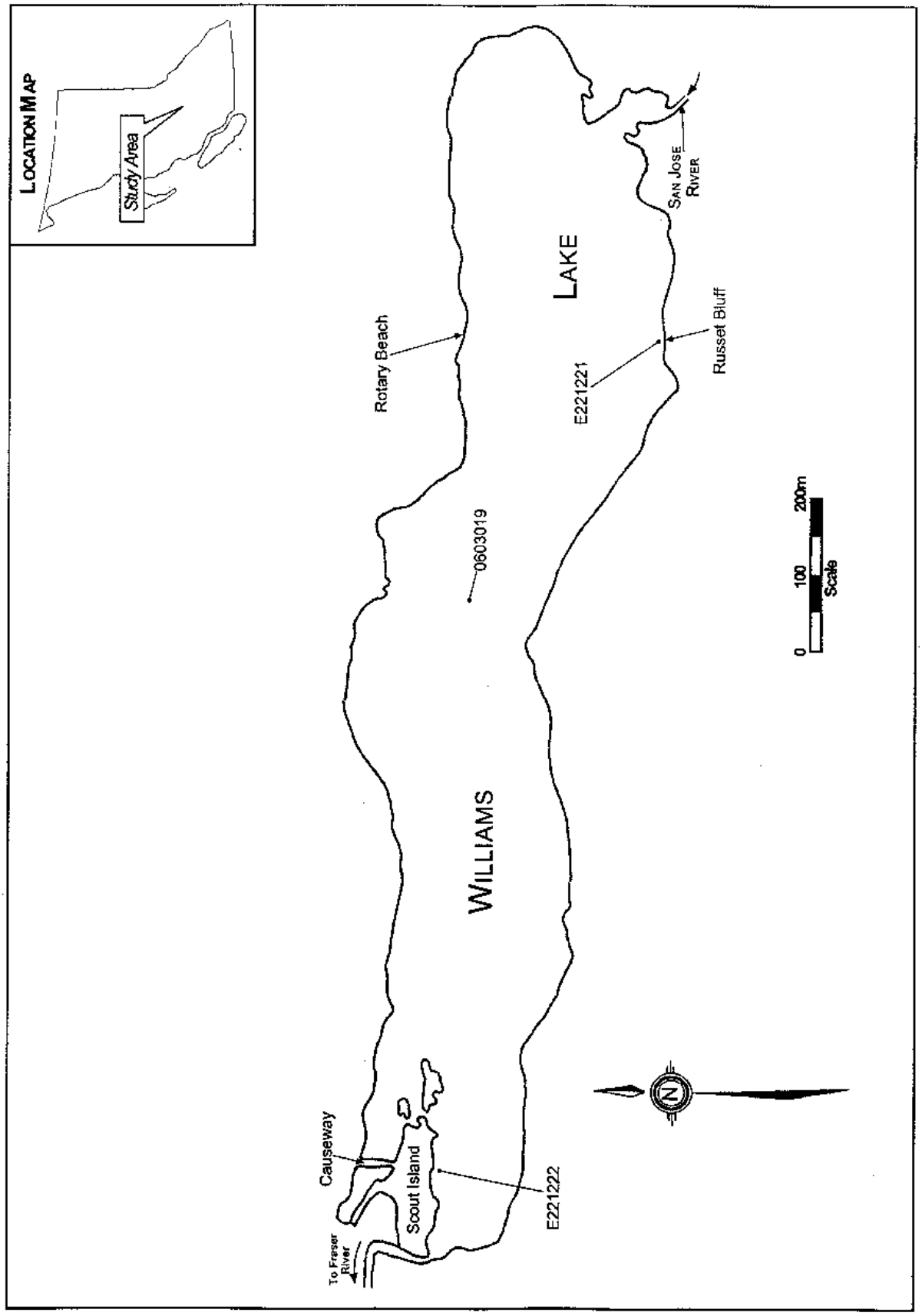


Figure 7. San Jose River.

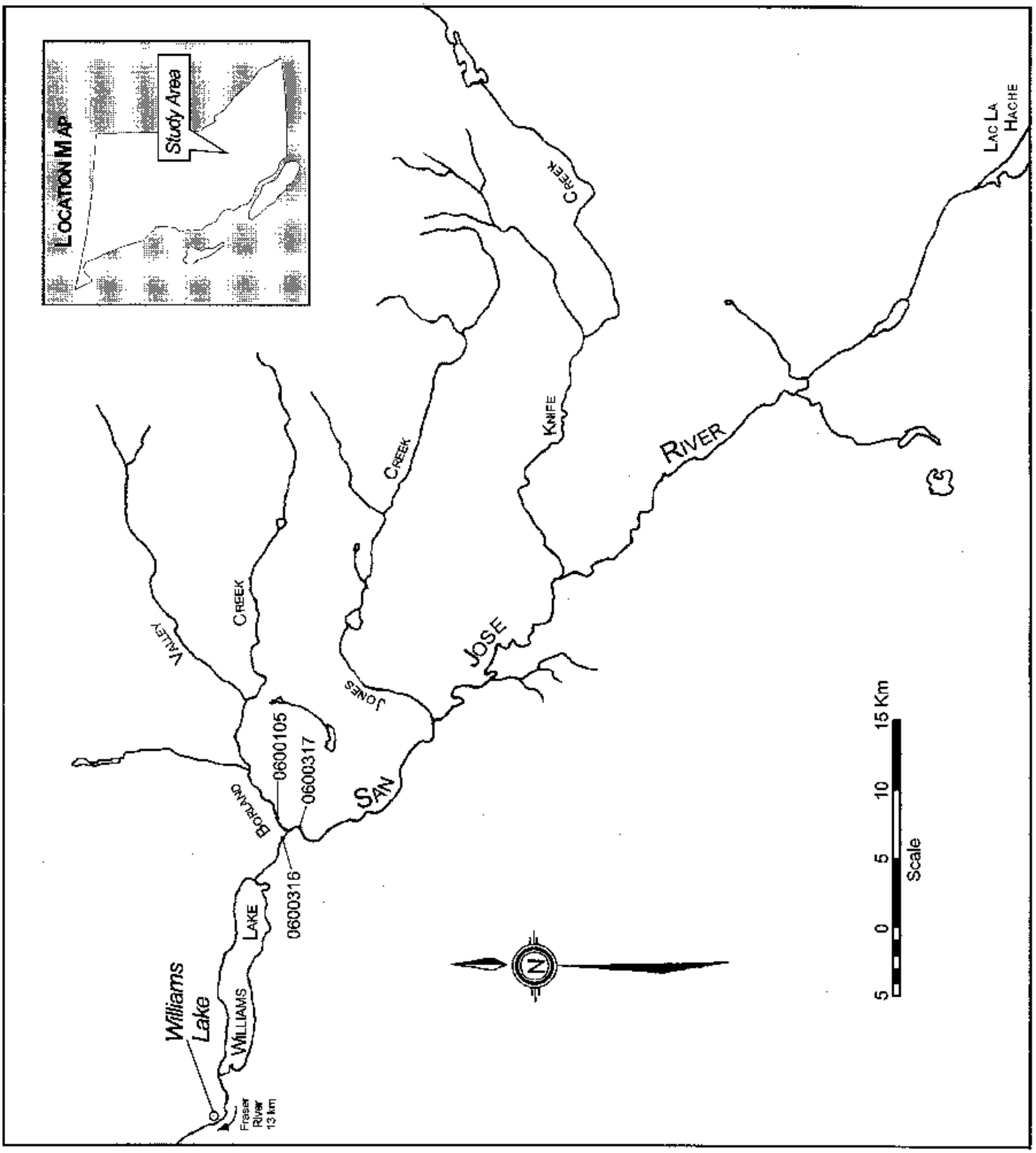


Figure 8. Okanagan Valley Lakes.

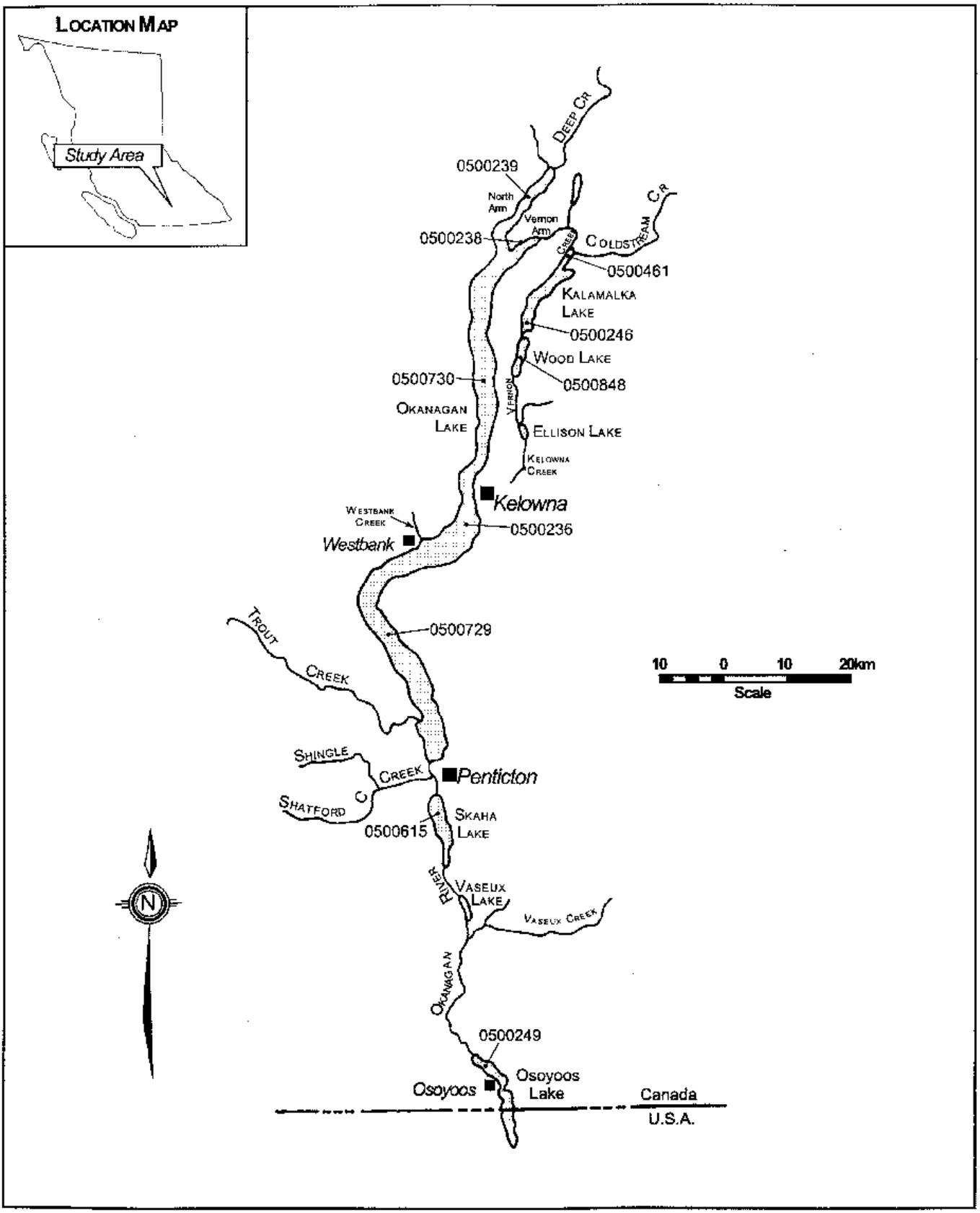


Figure 9. Similkameen River.

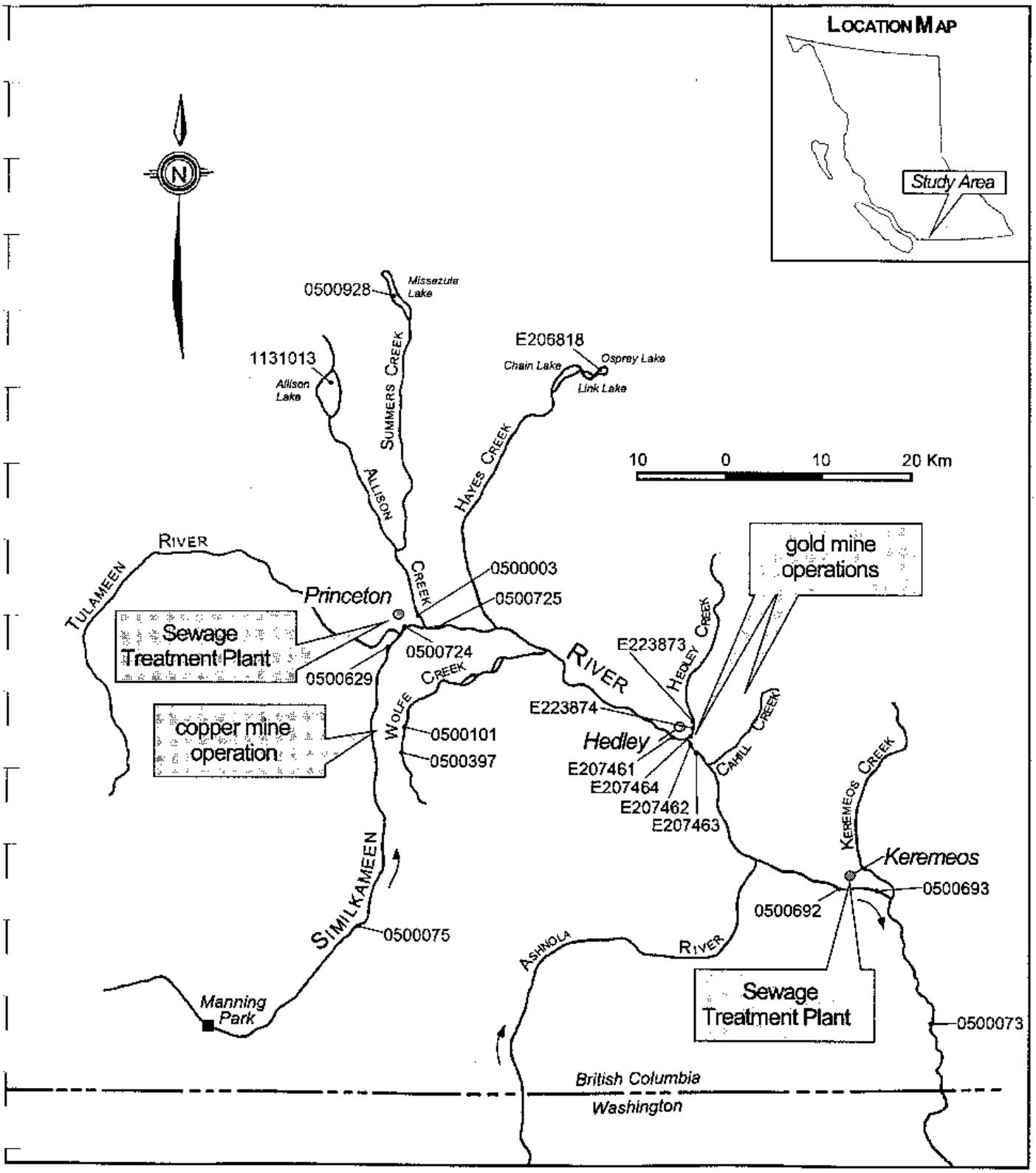


Figure 10. Cahill Creek.

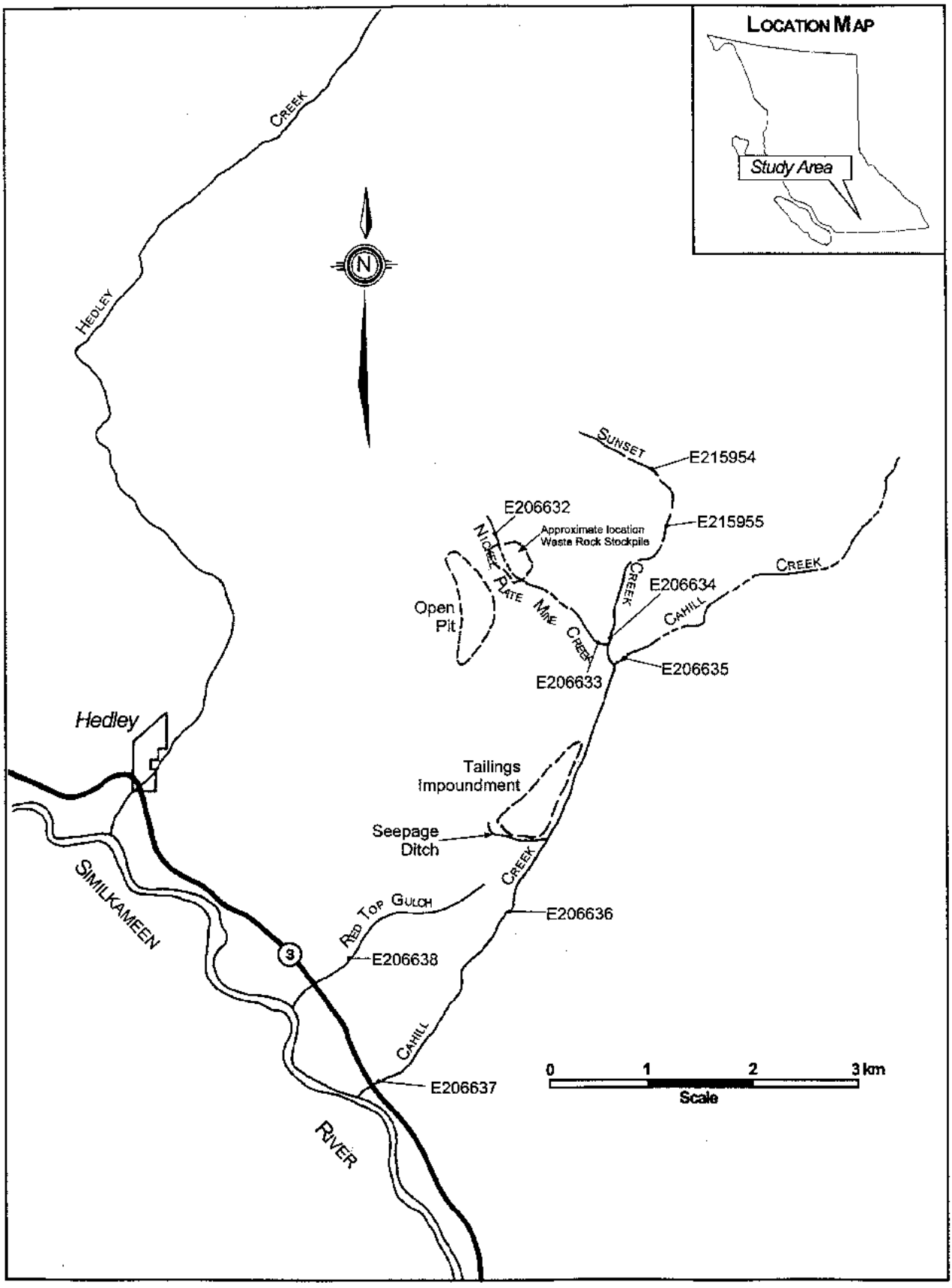


Figure 11. Bessette Creek.

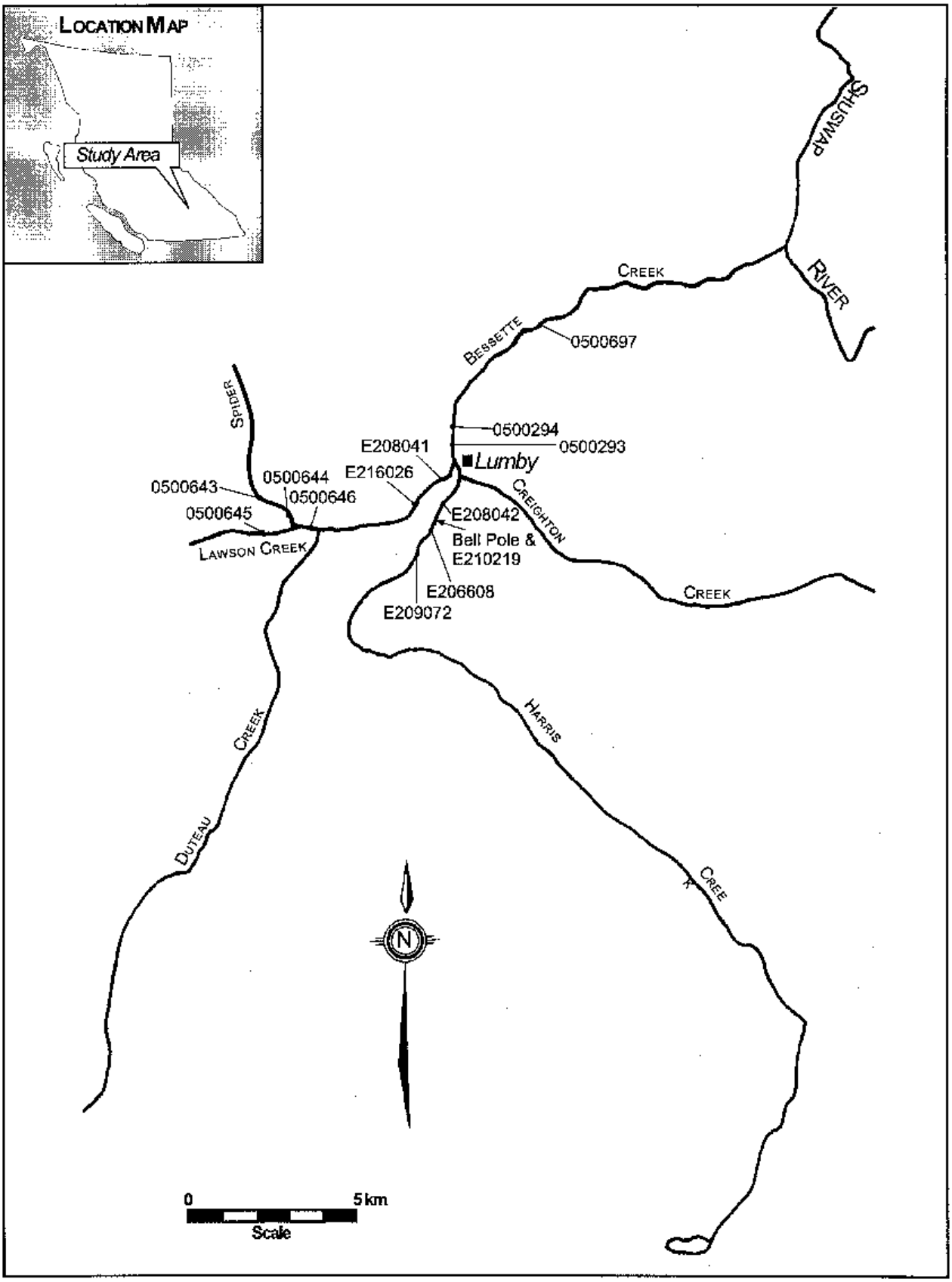


Figure 12. Tributaries to Okanagan Lake near Vernon.

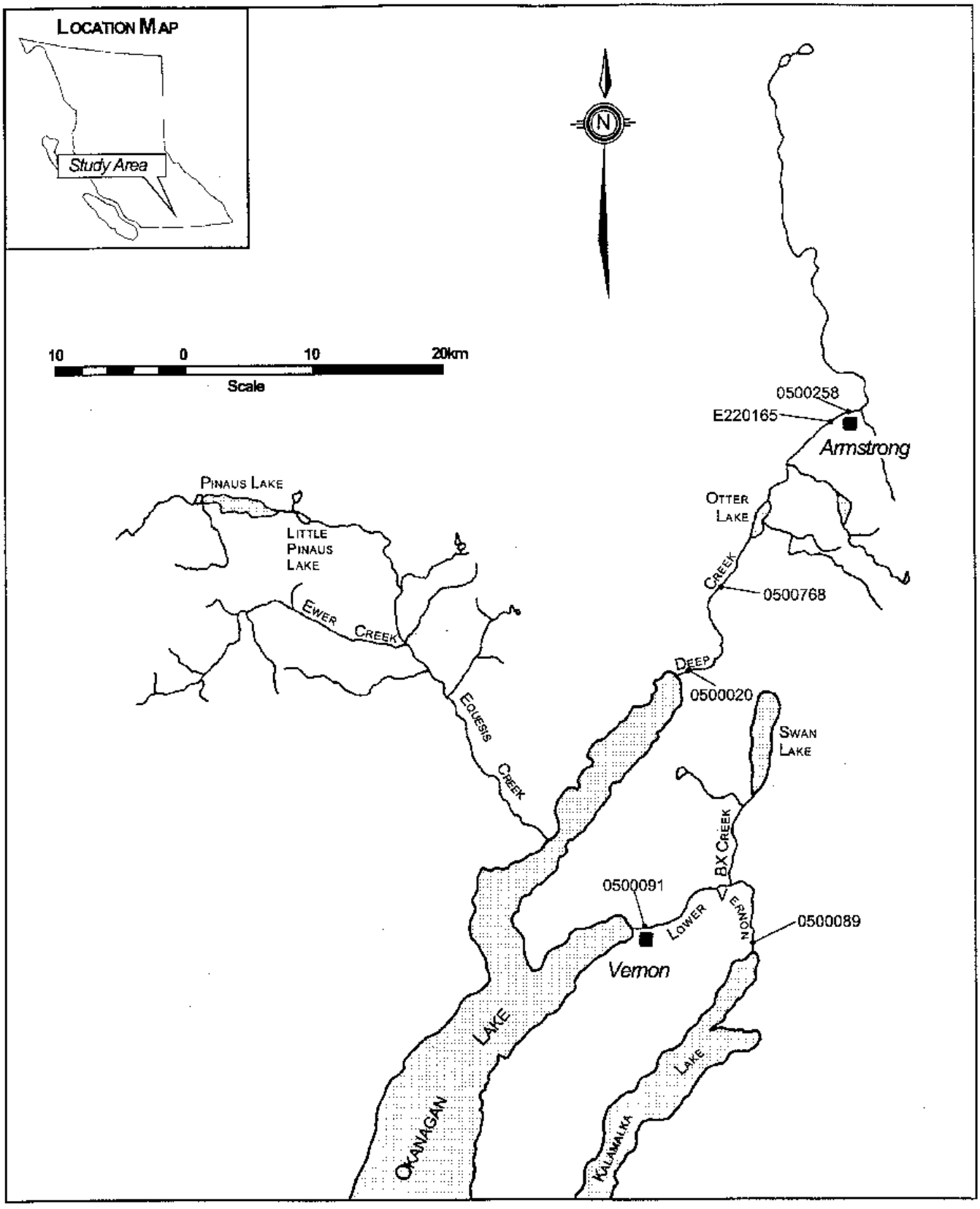


Figure 13. Thompson River.

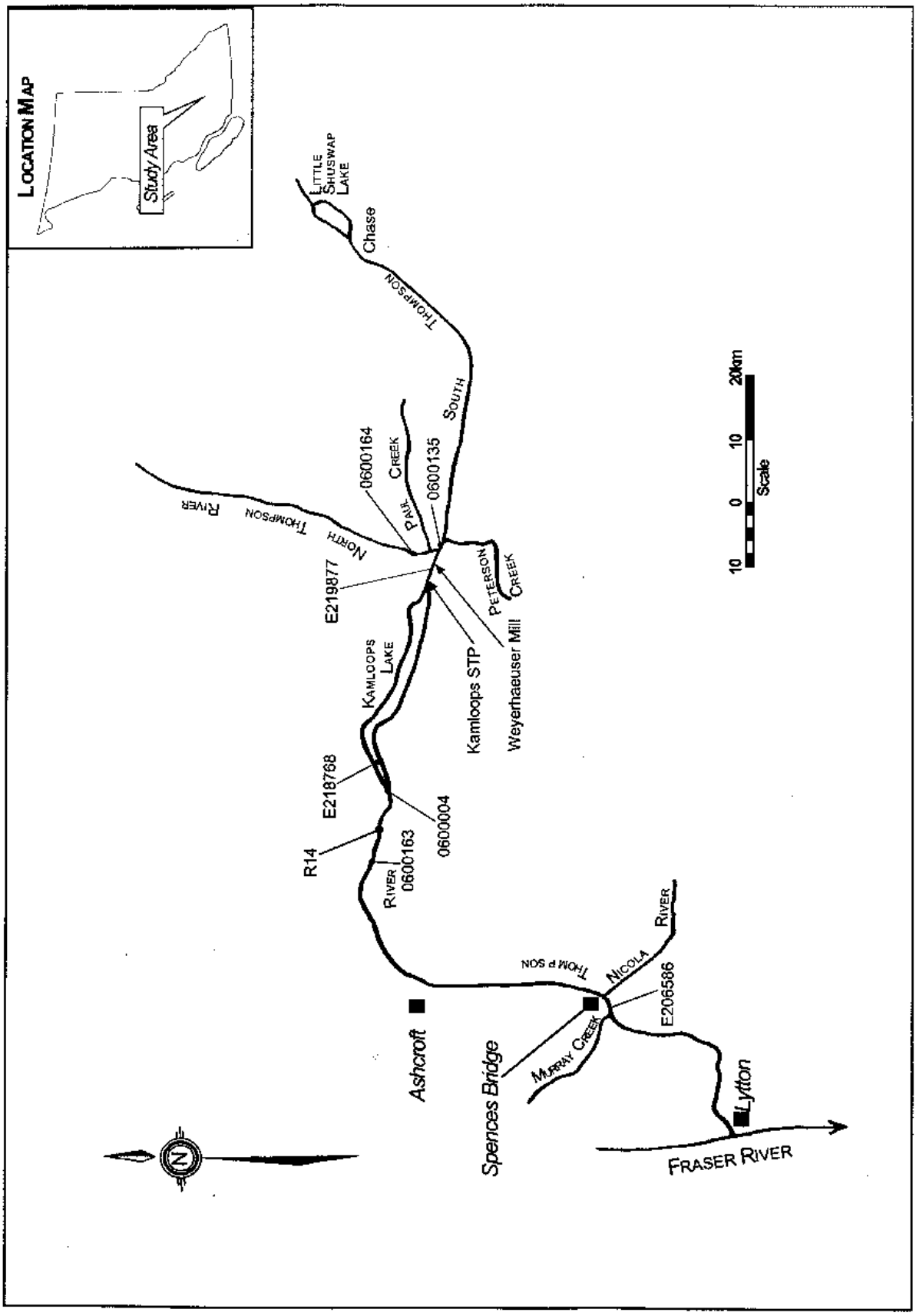


Figure 14. Columbia River from Keenlyside to Birchbank.

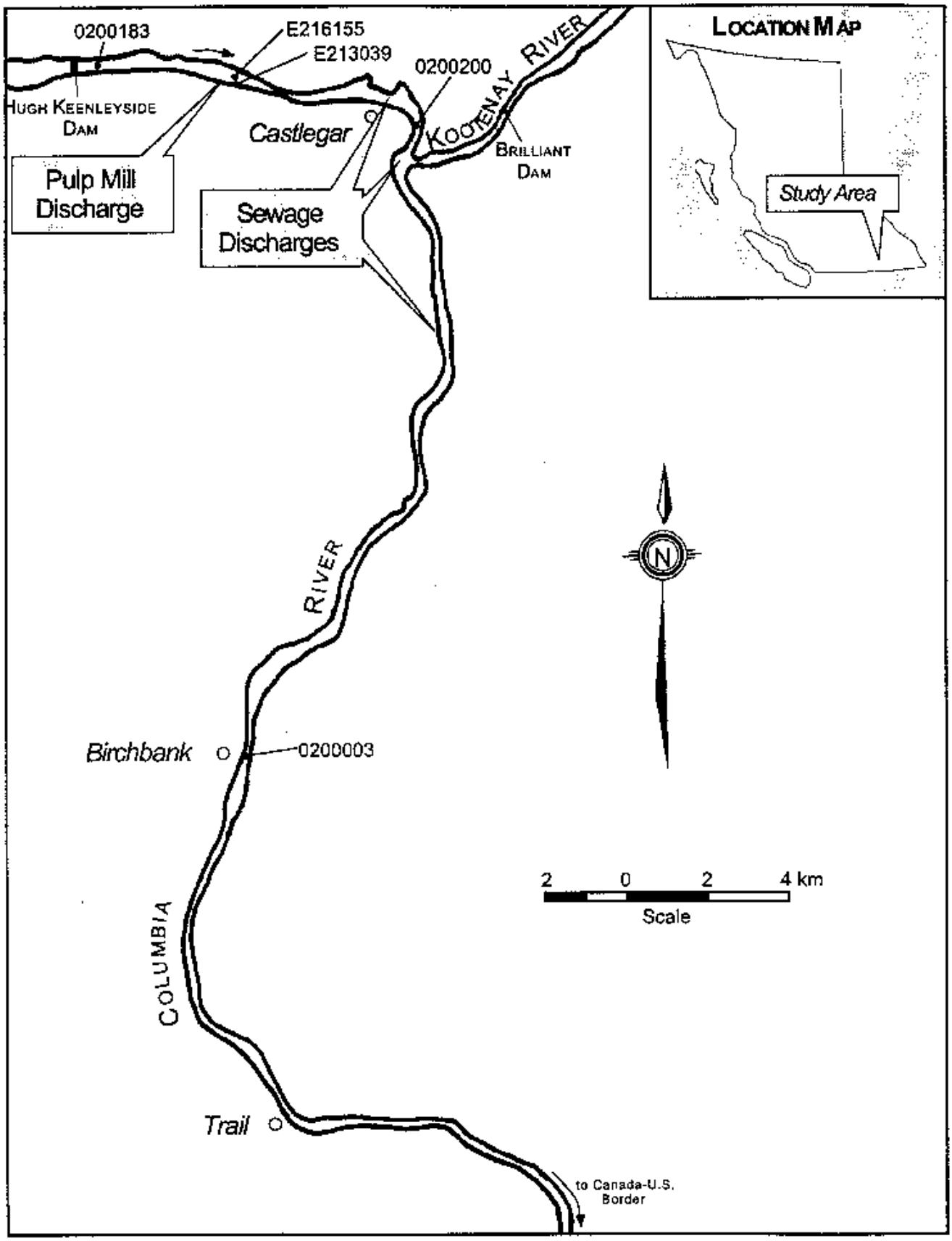


Figure 15. Fraser River from Kanaka Creek to the mouth.

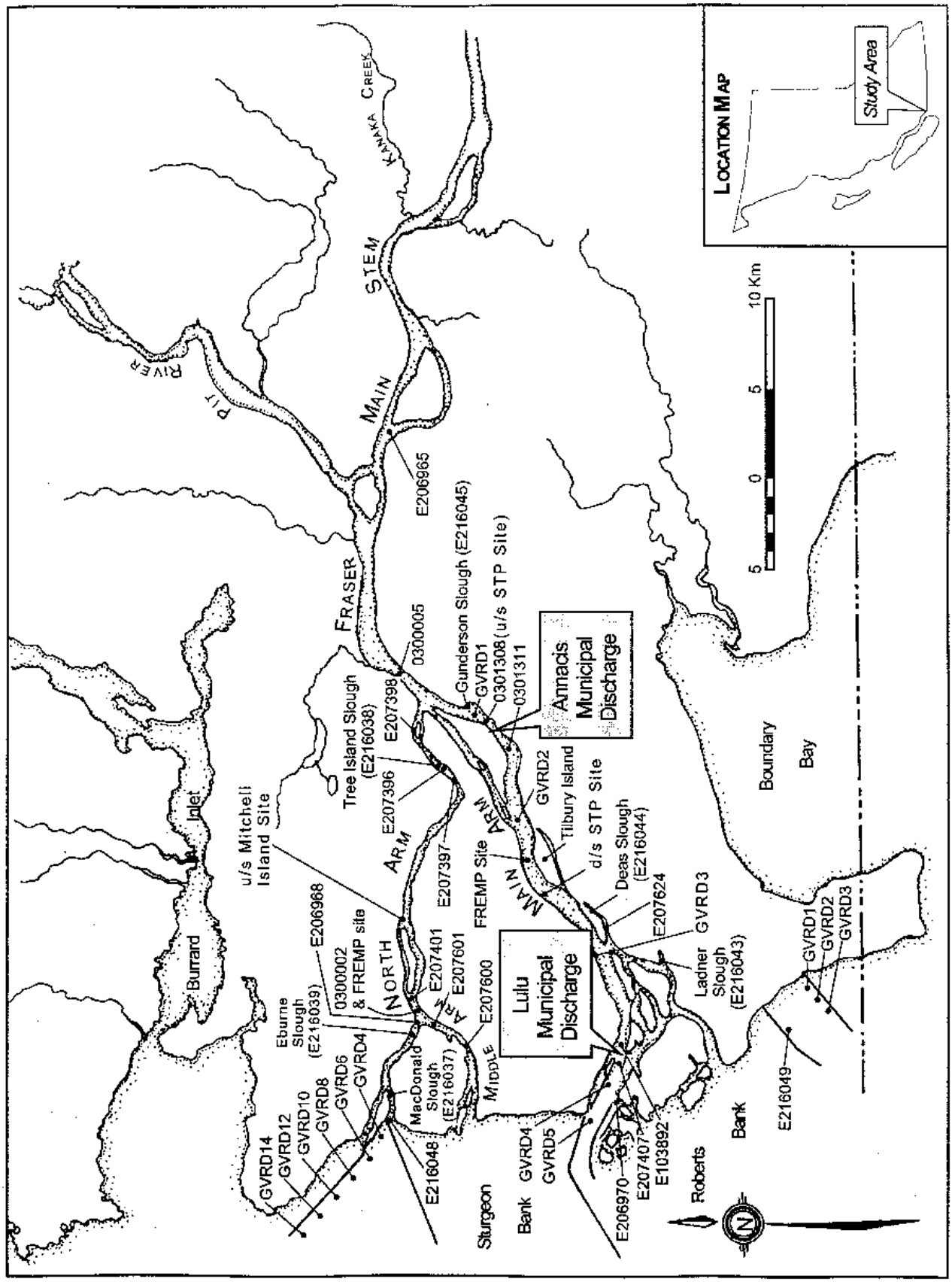


Figure 16. Burrard Inlet.