Survey of Selected British Columbia and Yukon Salmon Streams for Sensitivity to Acidification from Precipitation

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Sullivan, M.A., S.C. Samis, J.A. Servizi and R.W. Gordon. 1985. Survey of selected British Columbia and Yukon salmon streams for sensitivity to acidification from precipitation. Can. Tech. Rep. Fish. Aquat. Sci. 1388:ix + 105p.

Surface water samples from 174 Pacific salmon streams on the British Columbia North Coast, Queen Charlotte Islands, Vancouver Island, Sunshine Coast and Lower Mainland of British Columbia and near Whitehorse in the Yukon were collected between 1982 and 1983 and analyzed for pH, alkalinity and metals. Snow samples were collected in 1983 from 26 of the watersheds drained by these streams and analyzed for pH, alkalinity and metals. Twenty-five streams on the North Coast and Queen Charlotte Islands, 43 streams on Vancouver Island and the Sunshine Coast and 22 streams on the Lower Mainland were found to have alkalinities below 200 $ueq \cdot L^{-1}$ for at least part of the year. Buffer capacities ($ueq \cdot L^{-1} \cdot pH^{-1}$) were calculated for 57 of these low alkalinity streams.

RÉSUMÉ

Sullivan, M.A., S.C. Samis, J.A. Servizi and R.W. Gordon. 1985. Survey of selected British Columbia and Yukon salmon streams for sensitivity to acidification from precipitation. Can. Tech. Rep. Fish. Aquat. Sci. 1388:ix + 105p.

Entre 1982 et 1983, on a recueilli des échantillons d'eau en surface dans 174 cours d'eau fréquentés par des saumons du Pacifique et situés sur la côte nord de la Colombie-Britannique, dans les îles Reine-Charlotte, dans l'île Vancouver, sur la côte Sunshine et dans les basses terres continentales de la Colombie-Britannique, ainsi que près de Whitehorse au Yukon, et l'on en a fait l'analyse pour déterminer le pH, l'alcalinité et la présence de métaux. En 1983, on a aussi recueilli des échantillons de neige dans 26 des bassins versants où s'écoulent ces cours d'eau et on les a analysés. On a trouvé que 25 cours d'eau de la côte nord de la Colombie-Britannique et des îles Rein-Charlotte, 43 de l'île Vancouver et de la côte Sunshine et 22 des basses terres continentales avaient une alcalinité inférieure à 200 µ eq/L pendant au moins une partie de l'année. On a calculé le pouvoir tampon (µ eq/L/pH) de 57 de ces cours d'eau qui présentaient une faible alcalinité.

INTRODUCTION

Joint surveys by the Department of Fisheries and Oceans (DFO) and the International Pacific Salmon Fisheries Commission (IPSFC) to document sensitivities of British Columbia salmon streams to acidic depositions began in April, 1981. The initial impetus for the surveys was the proposed construction of a coal-fired electric generating plant in the Hat Creek valley of south-central B.C., described elsewhere (Servizi et al. in press). Studies were expanded in June 1982 to include the coastal areas of the province, where bedrock geology and soil profiles indicate many watercourses likely to be sensitive to acidic depositions (B.C. Ministry of Environment 1978). A province-wide survey of surface water alkalinities also indicated a number of water-courses sensitive to acidic deposition occurred in coastal areas (Clark and Bonham 1982). Because some of these areas receive acidic precipitation of pH 5.0-5.5 or lower (Nikleva 1982), documentation of pH, alkalinity and other water chemistry variables in selected streams supporting Pacific salmon was initiated. The study areas in British Columbia reported on here encompass the Lower Mainland, Sunshine Coast, Vancouver Island, Rivers Inlet, North Coast, Queen Charlotte Islands (QCI) (Figure 1) and parts of the Yukon (Figure 2).

METHODS

SAMPLING LOCATIONS

Sixteen salmon streams between Prince Rupert and Terrace (Figure 3) and twelve salmon streams on Graham Island (QCI) (Figure 4) were sampled between June 1982 and October 1983. A survey of twelve salmon streams between Terrace and Houston (Figure 5) was conducted in October 1982. Four salmon streams were sampled near Rivers Inlet (Figure 6) during October 1983. Snowpack samples were collected from the Prince Rupert-Terrace area in February 1983.

Sampling in the Lower Mainland, Vancouver Island, Sunshine Coast and Yukon began in January 1983 and continued to October 1983. Thirty-five Lower Mainland streams and seven snowpack sites were sampled between Vancouver and Hope, and one in the Squamish area (Figure 7). Seventy-four streams and eight snow pack sites on Vancouver Island (Figures 8, 9, 10) and twelve streams and three snowpack sites in the Sunshine Coast area (Figure 11) were sampled. One survey of nine Yukon streams (Figure 12) was conducted in October 1983.

A brief outline of the methods used in this study are included here; details can be found in Servizi et al. (in press).

FIELD METHODS

Water samples for pH, alkalinity and conductivity analyses were collected by surface grab using new 1 L polyethylene bottles, triple-rinsed with sample water before filling. Samples were collected near the centre of the channel, just under the water surface. Filled sample bottles were stored on ice until completion of each field trip and refrigerated upon receipt at the IPSFC Sweltzer Creek laboratory until analyzed. Because a previous study (Servizi et al. in press) indicated no significant pH/alkalinity change with storage, samples were analyzed within 14 days of sample collection. Kluckner and Sandberg (1981) reported that pH and acidity of water samples were not altered by 15 days storage.

Samples for dissolved, extractable and total metals analyses were collected coincident with the pH/alkalinity/conductivity samples. Water for dissolved metals analyses was collected with a 60 cc disposable plastic syringe and filtered through a 0.45 um sterile membrane filter into a 100 mL acid washed polyethylene bottle containing 0.25 mL of concentrated nitric acid. The syringe and filtering unit were rinsed with stream water before the sample was collected. Samples for total and extractable metals were collected 15 to 30 cm below the water surface in 200

mL acid washed polyethylene bottles which contained 1 mL concentrated nitric acid preservative. The analyses for metals were performed by the EPS/DFO Chemistry Laboratory (West Vancouver, B.C.).

Snow samples were collected with a clear acrylic, hollow half-cylinder sampler, 20 L in volume, 1 m in height and 0.16 m in diameter (Servizi et al. in press). Samples were obtained by plunging the sampler into the snow just beyond the exposed face of a pit dug to ground level in the snow cover. An acrylic partition inserted into a track at the open side of the half-cylinder and an acrylic cap placed on the bottom of the sampler served to enclose the sample and allowed retrieval of the contents intact. The snowcore was stored in a polyethylene pail with an airtight lid and kept frozen until analyzed.

Where the snowpack was deeper than the height of the sampler (1 m), additional cores were taken to complete the vertical profile. Where snow depth was minimal (ie. less than 0.7 m), cores were combined to obtain an adequate sample volume.

All sites for snow sampling were chosen outside the drip line of the surrounding trees or bushes to eliminate "throughfall effects" (Johannes et al. 1980) and were removed from any obvious sources of other contamination.

ANALYTICAL METHODS

Conductivity was measured using an Industrial Instruments Conductivity Bridge (model R.C.-1) conductivity cell.

Alkalinity and pH were determined using a Radiometer pH meter (model 61) equipped with dual electrodes. Potentiometric titrations were conducted to pH 3.2 using 0.02 N hydrochloric acid and alkalinity was calculated first by the "low alkalinity" procedure (APHA 1980). Gran analysis (Kramer 1980) was used for those samples with a very low (or non-detectable) alkalinity using the APHA (1980) method. Most alkalinities reported are a result of the "low alkalinity" calculation.

Buffer capacities were calculated from minimum alkalinity values and the corresponding pH according to methods described by Faust and McIntosh (1983) and Faust and Aly (1981).

Buffer capacity is a calculation combining alkalinity (the capacity of a quantity of water to neutralize a quantity of acid) and corresponding pH values. Buffer capacity mathematically defines the resistance of a specific waterbody to pH change (Faust and Aly 1981; Faust and McIntosh 1983). The numerical value is negative when the pH is lowered (acid added) and

positive when the pH is raised (base added). Two waterbodies with the same alkalinity but different pH will have different buffer capacities. The waterbody with the lower pH will have the greater buffer capacity and be more resistant to pH change from acidification.

Metals levels were measured by inductively coupled argon plasma instrumentation. A list of detection limits is included as Appendix I.

The snow samples, in their lidded containers, were thawed at room temperature. The meltwater was treated in the same manner as the surface water samples.

RESULTS

NORTH COAST AND QUEEN CHARLOTTE ISLANDS (QCI)

There were four geographically distinct sampling areas in the North Coast-QCI area as follows: Prince Rupert-Terrace, Terrace-Houston, Rivers Inlet and Graham Island. Water samples were collected at three periods of the year: early summer, fall and mid-winter. The surface water pH in the Prince Rupert-Terrace area ranged from 4.55-7.45; the alkalinity ranged from below detection to 419 $ueq \cdot L^{-1}$ (Table 1). The minimum buffer capacity calculated for the Prince Rupert-Terrace area was -2.10 $ueq \cdot L^{-1} \cdot pH^{-1}$ (Table 2). The pH for the Terrace-Houston area ranged from 6.81-7.71 and the alkalinity ranged from 235-1,438 $ueq \cdot L^{-1}$; the buffer capacity of the stream with the lowest alkalinity was -124 $ueq \cdot L^{-1} \cdot pH^{-1}$ (Table 2). The streams sampled on Graham Island had a pH range of 4.31-7.39, and alkalinity ranged from below detection to 591 $ueq \cdot L^{-1}$; the lowest buffer capacity calculated was -38.70 $ueq \cdot L^{-1} \cdot pH^{-1}$ (Table 3). The pH of streams near Rivers Inlet ranged from 6.00-6.53 and the alkalinity ranged from 44.0-244.0 $ueq \cdot L^{-1}$; the minimum buffer capacity was -69.59 $ueq \cdot L^{-1} \cdot pH^{-1}$ (Table 4). Of the 44 North Coast and Queen Charlotte Islands streams sampled, 25 had alkalinities <200 $ueq \cdot L^{-1}$ for at least part of the year, 10 had alkalinities between 200-600 $ueq \cdot L^{-1}$ and 9 had alkalinities >600 $ueq \cdot L^{-1}$ (Table 5; Figures 13, 14, 15, 16,). All 9 streams in the latter category were in the Terrace-Houston area. The pH of the snow cores from the North Coast and Queen Charlotte Islands ranged from 5.21-5.49 (Table 12).

Some streams exhibited marked humic colouration. These streams were Kumdis Creek on Graham Island and the NcNeil River, Antigonish, Diana and Aberdeen creeks in the Prince Rupert-Terrace area. The humic acid content of these streams may be high enough to depress the pH.

The total and dissolved metals that were consistently above the detection limits were Al, B, Ba, Ca, Fe, Mg, Mn, Na, Si, Sr, Ti and Zn (Appendix II). The incidence of Cd, Co, Cr, Cu, Hg, Ni, P, Sn and V above the detection limit was rare (Appendix II). (Metal analyses were not conducted on samples from the Terrace-Houston area).

Snow samples collected from the Prince Rupert-Terrace area exhibited Ba, Fe, Na, Ti and Zn concentrations above the detection limits (Appendix III).

LOWER MAINLAND

The pH of the fall and winter water samples from Lower Mainland

streams ranged from 5.62-7.90 (Table 6). Alkalinities ranged from 3.0-1,782 $ueq \cdot L^{-1}$. There were 22 streams with alkalinities <200 $ueq \cdot L^{-1}$, 11 between 200-600 $ueq \cdot L^{-1}$ and 2 with alkalinities >600 $ueq \cdot L^{-1}$ (Table 5; Figure 17). The lowest buffer capacity calculated was -5.78 $ueq \cdot L^{-1} \cdot pH^{-1}$ (Table 6). The pH range of the snow samples was 4.38-5.80 (Table 13).

Total and dissolved Al, B, Ba, Ca, Fe, Mg, Mn, Na, Si and Sr were consistently above the detection limits in surface waters (Appendix II). Sn, Ti and Zn were less frequently found above the detection limit. Concentrations of Co, Cr, Cu, Mo and Ni were rarely above the detection limits. The metals consistently above the detection limits in the snow samples were B, Fe, Ti and Zn (Appendix III).

SUNSHINE COAST AND VANCOUVER ISLAND

Water samples were collected in the fall and winter. The pH of Vancouver Island streams ranged from 6.5-7.57 and the alkalinities ranged from 50-1,300 $ueq \cdot L^{-1}$; the minimum buffer capacity calculated was -38.84 $ueq \cdot L^{-1} \cdot pH^{-1}$ (Table 7). Streams in the Sunshine Coast area exhibited a pH range of 5.99-7.47 and alkalinities of 32-382 $ueq \cdot L^{-1}$ (Table 8). The minimum buffer capacity calculated for the Sunshine Coast was -38.59 $ueq \cdot L^{-1} \cdot pH^{-1}$.

A total of 86 streams were sampled on the Sunshine Coast and Vancouver Island; 43 had minimum alkalinities <200 $ueq \cdot L^{-1}$, 40 had alkalinities of 200-600 $ueq \cdot L^{-1}$ and 3 had alkalinities >600 $ueq \cdot L^{-1}$ (Table 5; Figures 18, 19, 20, 21,). The pH range of the snow samples was 4.95-5.96 (Tables 14, 15).

Metals analyses were conducted on surface water samples from 17 streams on Vancouver Island and 11 streams in the Sunshine Coast area (Appendix II). Total and dissolved metals occurring consistently above the detection limits were Al, B, Ba, Ca, Fe, Mg, Mn, Na, Si, Sr and Ti. Sn and Zn exceeded detection limits in a few cases. B, Fe, Na, Ti and Zn were above the detection limits in the 11 snowcores analyzed (Appendix III).

YUKON

The pH range of the fall water samples from the Whitehorse area was 7.10-8.01 (Table 9). The range of alkalinities was 378-3,135 $ueq \cdot L^{-1}$ (Table 9). There were 3 streams with alkalinities between 200-600 $ueq \cdot L^{-1}$ and 6 streams with alkalinities >600 $ueq \cdot L^{-1}$ (Table 5; Figure 22). No surface water collected had alkalinity <200 $ueq \cdot L^{-1}$. Because all alkalinities were >200 $ueq \cdot L^{-1}$, no buffer capacities were calculated. Snow was not sampled.

Total and dissolved Ba, Ca, Fe, Mg, Mn, Na, Si and Sr were consistently above the detection limit, whereas B, Ti and Zn only occasionally exceeded detection limits (Appendix II). Total Al was detected in 7 of the 9 samples; dissolved Al was below detection in all cases.

DISCUSSION

With the exception of the Terrace-Houston and Whitehorse sampling areas, streams sampled generally exhibited alkalinities <600 $ueq \cdot L^{-1}$. In some areas, the alkalinities of most streams sampled were <200 $ueq \cdot L^{-1}$ (Table 5). The distribution of the low alkalinity is not surprising when consideration is given to the mountainous nature of most of the drainage basins. Streams with alkalinities <200 $ueq \cdot L^{-1}$ are considered susceptible to acid deposition.

Some streams had a pH below that at which salmonids are usually negatively affected. For example, Kumdis Creek on Graham Island exhibited a minimum pH of 4.3; the McNeil River, and Antigonish and Diana creeks in the Prince Rupert-Terrace area had minimum pH levels of <5.0. Juvenile salmonids were present at the time of sampling.

Most impacts on fish in waterbodies with low pH are believed to be caused by chemical transformation of metal complexes (especially Al) to states which are available to aquatic life (Baker 1981). Aluminum, as the uncomplexed Al^{+3}, forms an hydroxy species which interferes with the normal function of fish gills (Hendershot et al. 1984). Organic ligands, such as humic acid, bind the reactive species of aluminum rendering them biologically unavailable (Driscoll et al. 1980). The four North Coast streams found to have pH levels <5.0 were also those streams which exhibited strong humic colouration. The presence of complexing ligands would bind Al or other toxic metals such as Cu, Cd, Pb and Zn, otherwise mobilized by low pH (Pagenkopf 1983; Saar and Weber 1982).

The buffer capacities calculated for this study indicate there are many streams with very little capacity to withstand acidification. A net acid input of 5 $ueq.L^{-1}$ from acidic deposition can result in a 0.1 drop in pH units in a stream with a buffer capacity of -50 $ueq \cdot L^{-1} \cdot pH^{-1}$.

$$\text{pH reduction} = \frac{5\ ueq \cdot L^{-1}}{-50\ ueq \cdot L^{-1} \cdot pH^{-1}} = -0.1$$

One North Coast stream, the McNeil River, had a buffer capacity of -2.10 $ueq \cdot L^{-1} \cdot pH^{-1}$ and one Lower Mainland stream, Widgeon Creek, had a buffer capacity of -5.78 $ueq \cdot L^{-1} \cdot pH^{-1}$. Many other streams have buffer capacities between 0 and -50 $ueq \cdot L^{-1} \cdot pH^{-1}$. It is apparent that potential acid depositions in such streams would be of concern.

The results of the snowmelt analyses indicate that pH conditions in most areas sampled were within "normal" limits (NRCC 1981). One notable exception was the Pitt Lake site, wherein the pH of the snow was 4.4, the lowest pH recorded in the survey.

Some streams east of Pitt Lake exhibited low alkalinities; Kanaka Creek and the Stave River had alkalinities <50 $ueq \cdot L^{-1}$; Whonock Creek, Widgeon Creek and the North Alouette River had minimum alkalinities <20 $ueq \cdot L^{-1}$. Another West Coast study (Nikleva 1983) investigated the pH of precipitation deposited from individual storm events, in conjunction with prevailing wind conditions. This work suggested that the low pH precipitation values reported for the Lower Mainland were associated with emissions advected northward from the Puget Sound area of Washington state, in additional to emissions from the B.C. Lower Mainland. Worsening, or even long term continuation of the present acidic deposition to this area clearly has the potential to impact Pacific salmon stocks.

FUTURE MONITORING

The baseline data obtained in this study indicate that there are a number of streams sensitive to acidification. However, widespread baseline data collection may be inadequate to plot longer-term trends of surface water acidification. Thus concentration of efforts in sensitive watersheds identified as receiving acidic depositions is warranted at this time.

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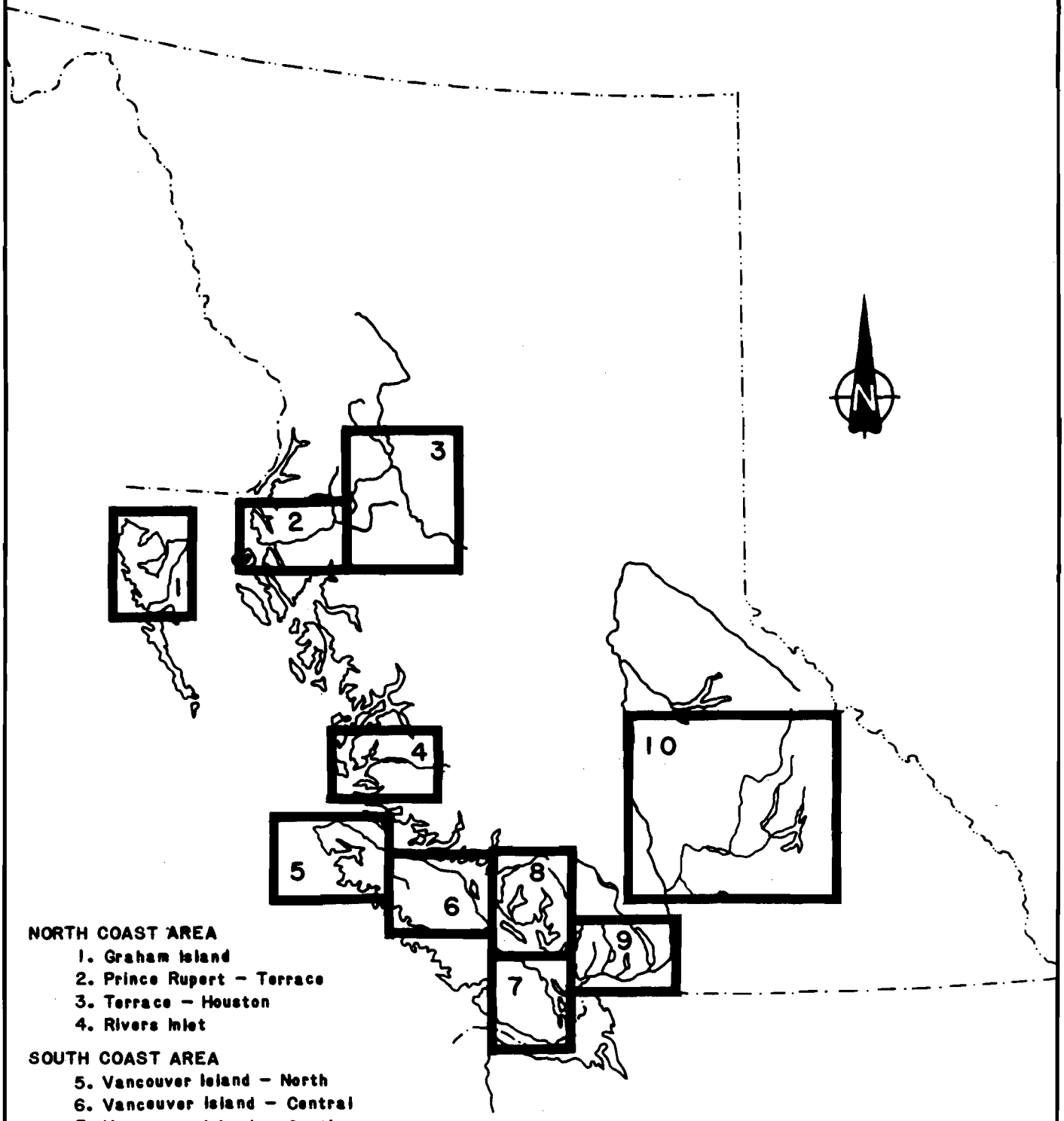
FIGURE 1

BRITISH COLUMBIA STUDY AREAS

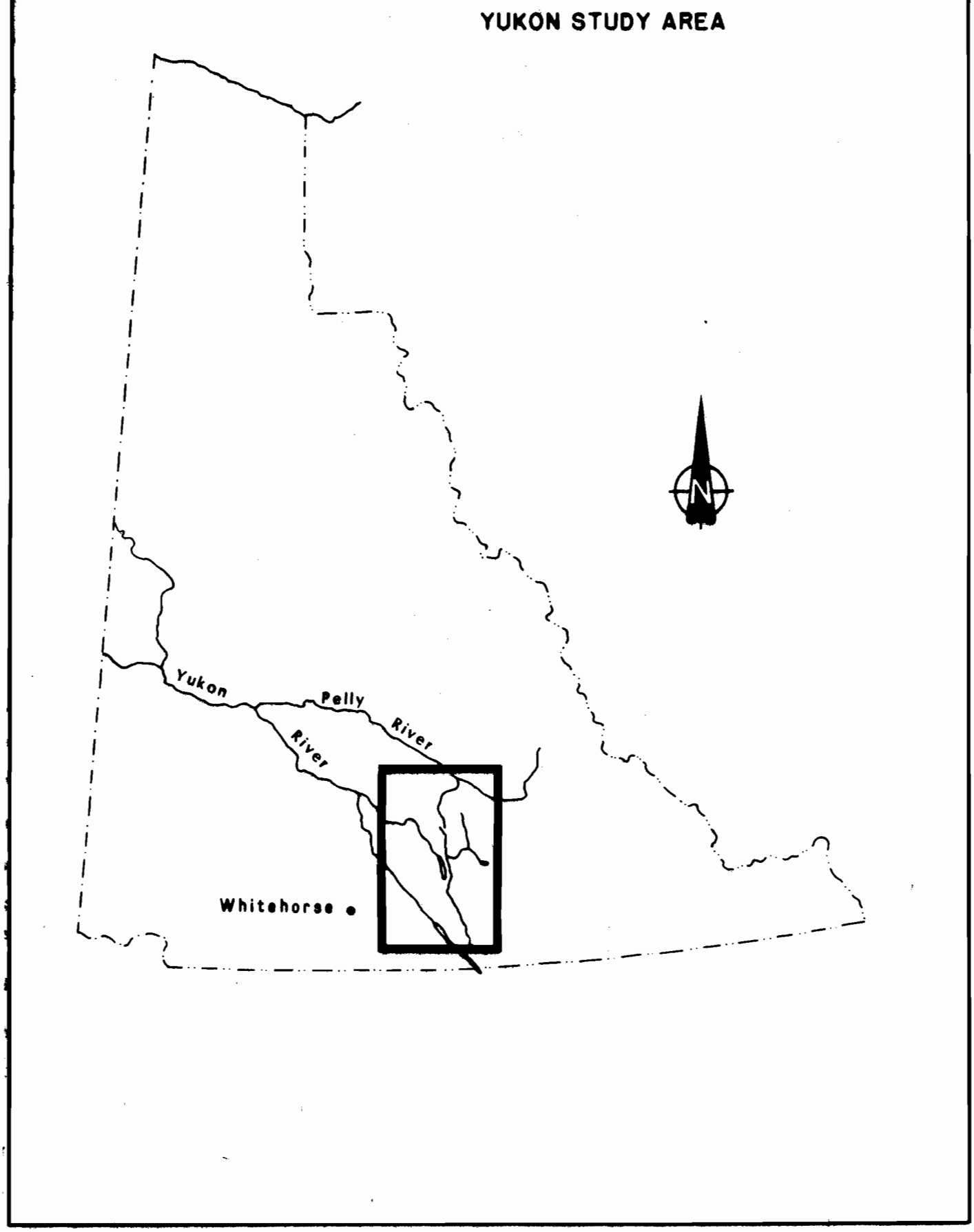


NORTH COAST AREA
1. Graham Island
2. Prince Rupert – Terrace
3. Terrace – Houston
4. Rivers Inlet

SOUTH COAST AREA
5. Vancouver Island – North
6. Vancouver Island – Central
7. Vancouver Island – South
8. Sunshine Coast

FRASER RIVER AREA
9. Lower Mainland
10. Hat Creek Study Area

FIGURE 2



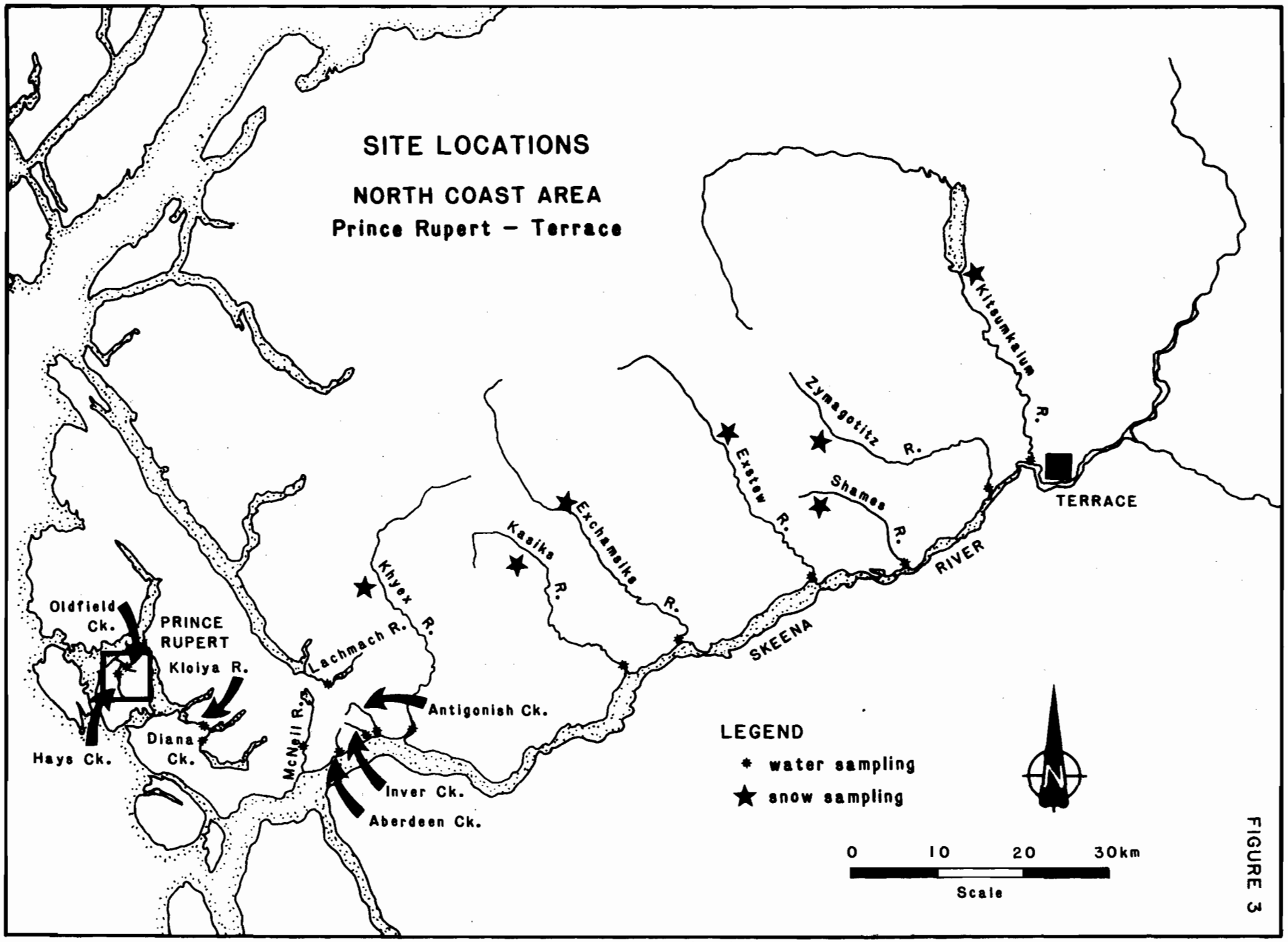

SITE LOCATIONS
NORTH COAST AREA
Prince Rupert – Terrace
Klitsumkalum R.
Zymagotitz R.
Exstew R.
Shames R.
TERRACE
Exchamsiks R.
Kasiks R.
Khyex R.
Lachmach R.
SKEENA RIVER
Oldfield Ck.
PRINCE RUPERT
Kloiya R.
Hays Ck.
Diana Ck.
McNeil R.
Antigonish Ck.
Inver Ck.
Aberdeen Ck.
LEGEND
water sampling
snow sampling
N
0 10 20 30km
Scale

FIGURE 3

FIGURE 4

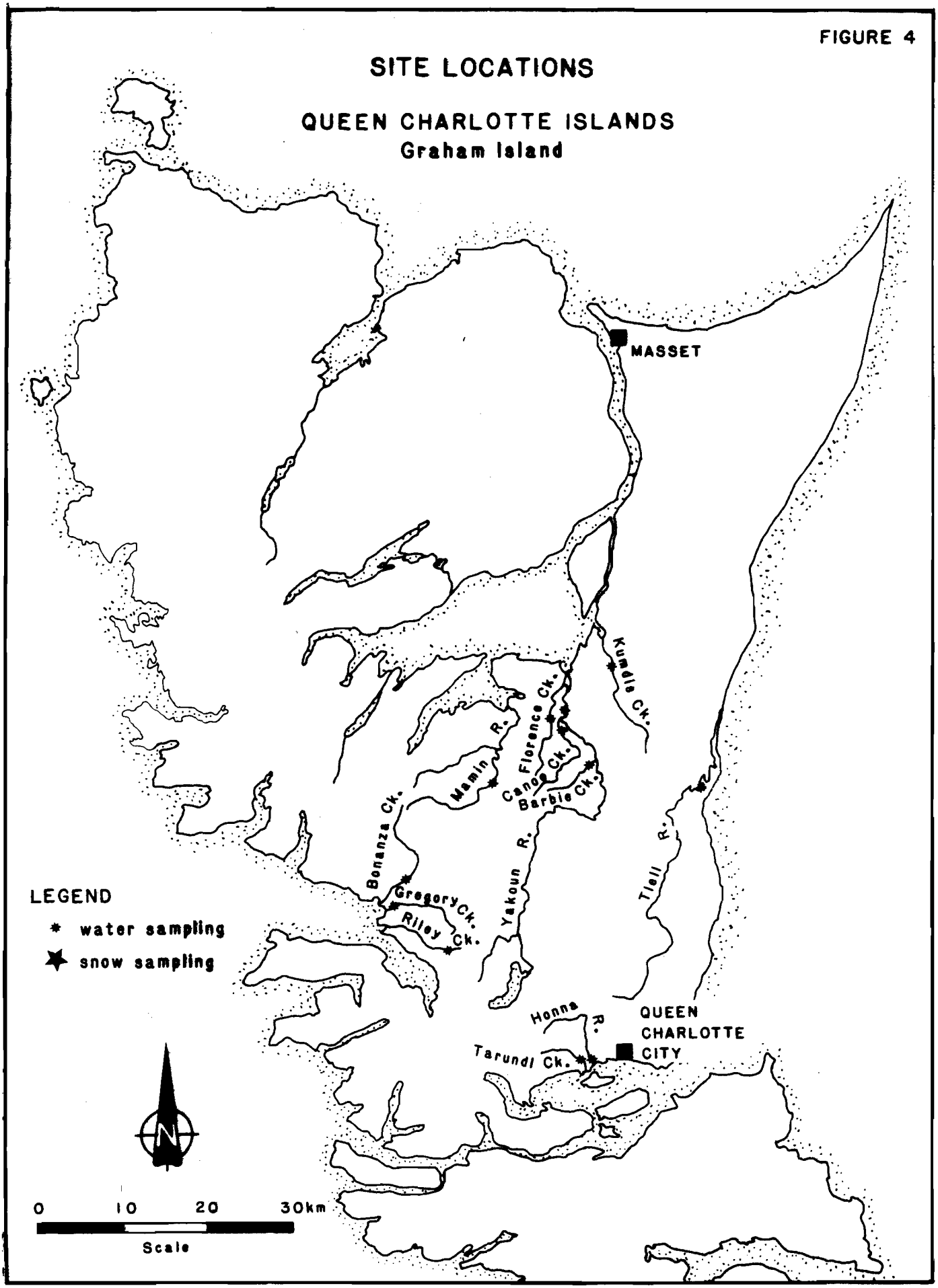
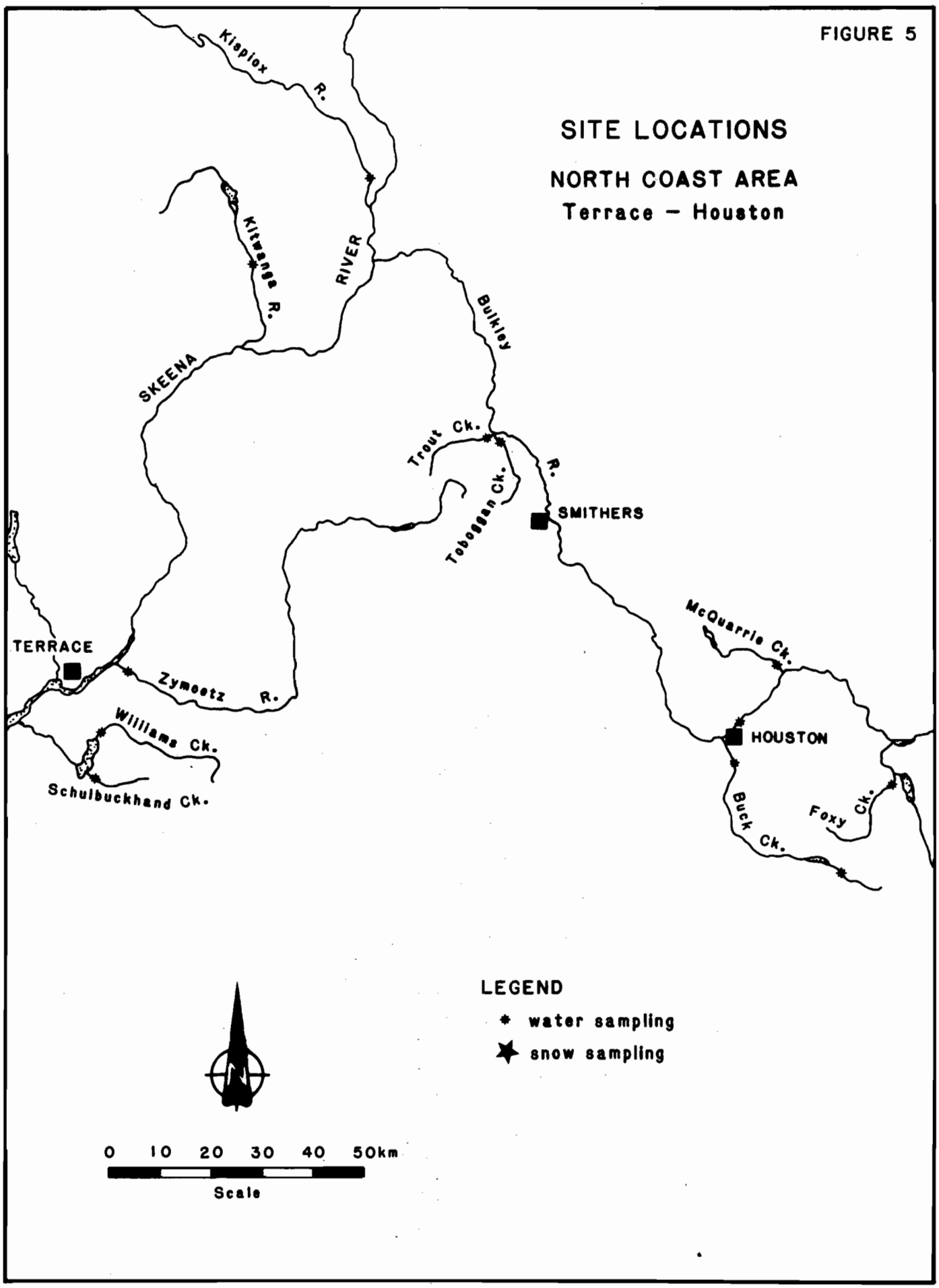

SITE LOCATIONS
QUEEN CHARLOTTE ISLANDS
Graham Island
MASSET
Kumdis Ck.
Florence Ck.
Canoe Ck.
Barbie Ck.
Mamin R.
Bonanza Ck.
Gregory Ck.
Riley Ck.
Yakoun R.
Tlell R.
Honna R.
Tarundl Ck.
QUEEN CHARLOTTE CITY
LEGEND
water sampling
snow sampling
N
0 10 20 30km
Scale

FIGURE 5


SITE LOCATIONS
NORTH COAST AREA
Terrace – Houston
Kispiox R.
Kitwanga R.
SKEENA RIVER
Bulkley R.
Trout Ck.
Toboggan Ck.
SMITHERS
TERRACE
Zymoetz R.
Williams Ck.
Schulbuckhand Ck.
McQuarrie Ck.
HOUSTON
Buck Ck.
Foxy Ck.
LEGEND
water sampling
snow sampling
0 10 20 30 40 50km
Scale

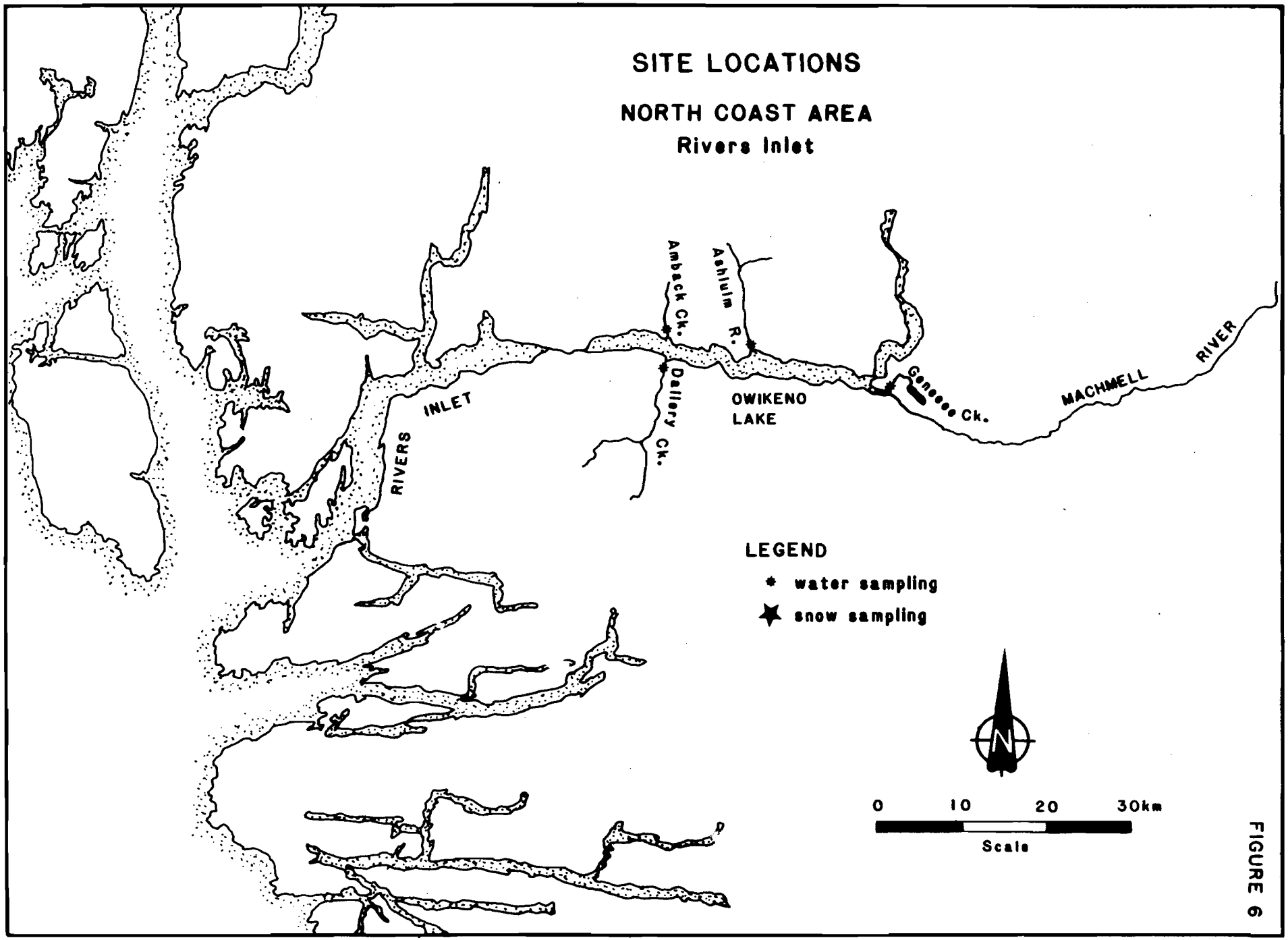

SITE LOCATIONS
NORTH COAST AREA
Rivers Inlet
Amback Ck.
Ashlulm R.
Dallery Ck.
OWIKENO LAKE
Geneese Ck.
MACHMELL RIVER
RIVERS INLET
LEGEND
water sampling
snow sampling
N
0 10 20 30km
Scale

FIGURE 6

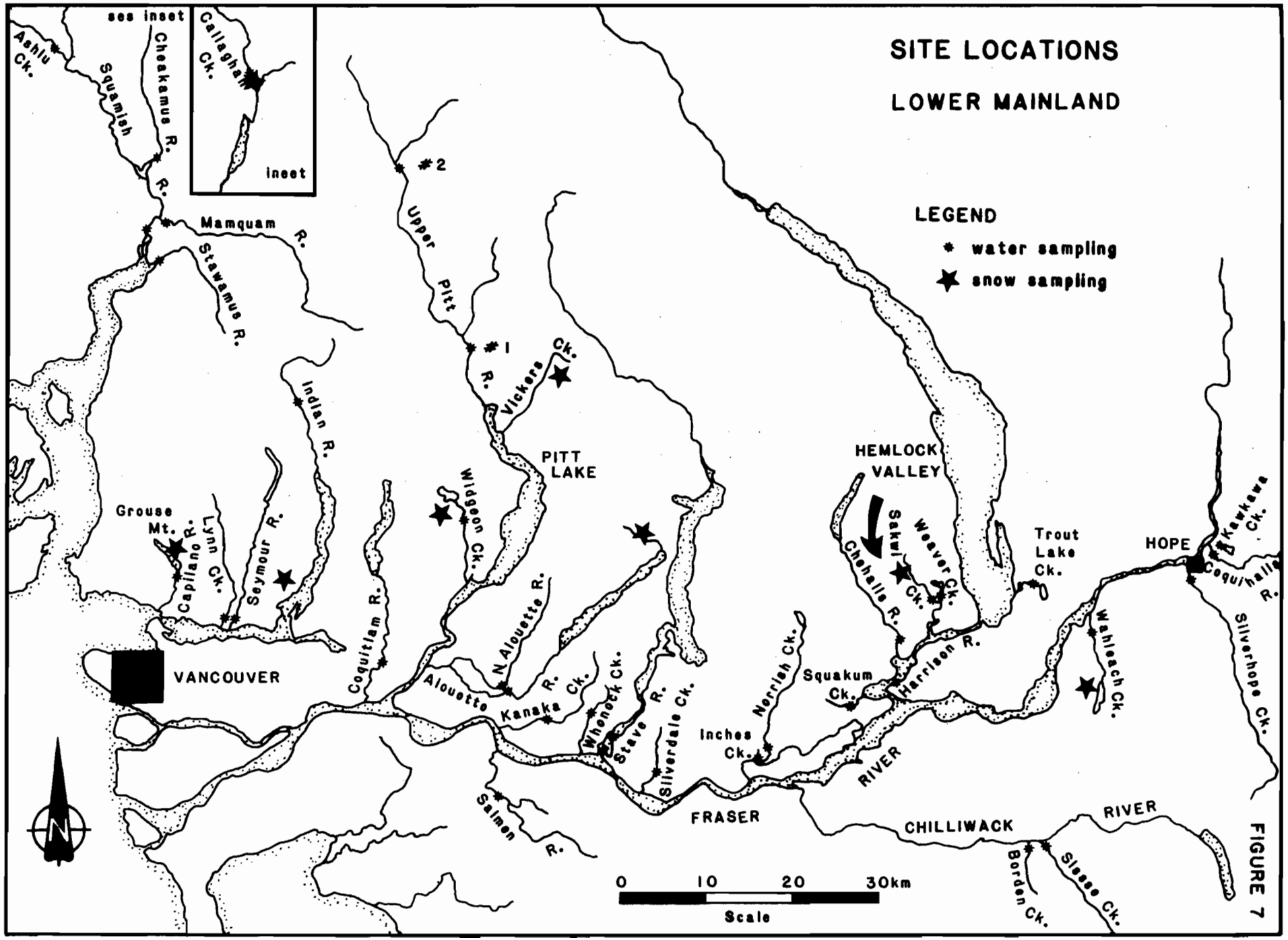
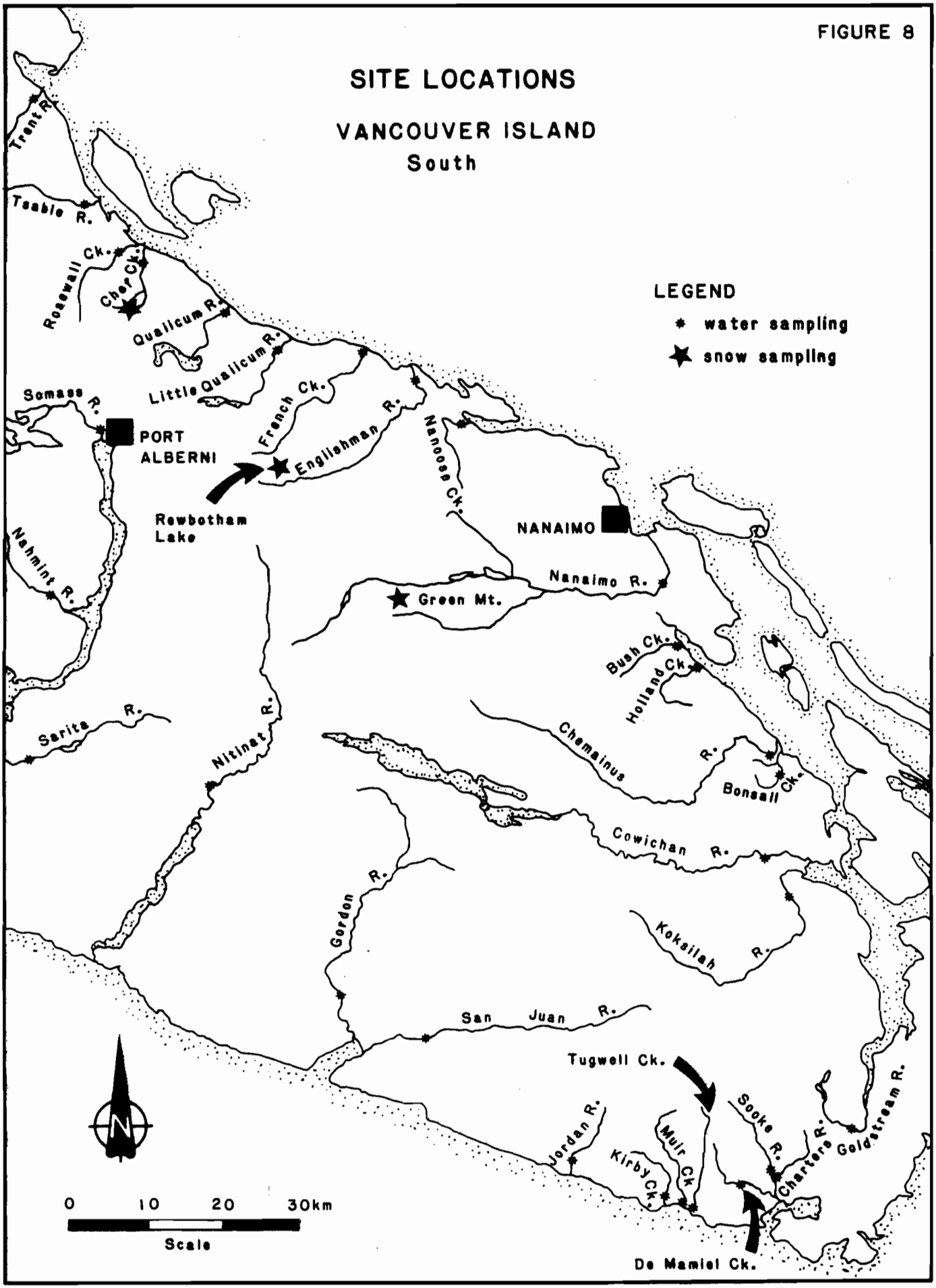

SITE LOCATIONS
LOWER MAINLAND
LEGEND
water sampling
snow sampling
see inset
Callaghan Ck.
ineet
Ashlu Ck.
Squamish R.
Cheakamus R.
Mamquam R.
Stawamus R.
Upper Pitt R.
#2
#1
Vickers Ck.
PITT LAKE
Indian R.
Widgeon Ck.
Grouse Mt.
Capilano R.
Lynn Ck.
Seymour R.
VANCOUVER
Coquitlam R.
Alouette R.
N. Alouette R.
Kanaka Ck.
Whonock Ck.
Stave R.
Silverdale Ck.
Salmon R.
FRASER RIVER
Norrish Ck.
Inches Ck.
Squakum Ck.
HEMLOCK VALLEY
Sakwi Ck.
Weaver Ck.
Chehalis R.
Harrison R.
Trout Lake Ck.
HOPE
Kawkawa Ck.
Coquihalla R.
Wahleach Ck.
Silverhope Ck.
CHILLIWACK RIVER
Borden Ck.
Sleese Ck.
0 10 20 30km
Scale
N

FIGURE 7

FIGURE 8

SITE LOCATIONS

VANCOUVER ISLAND
South



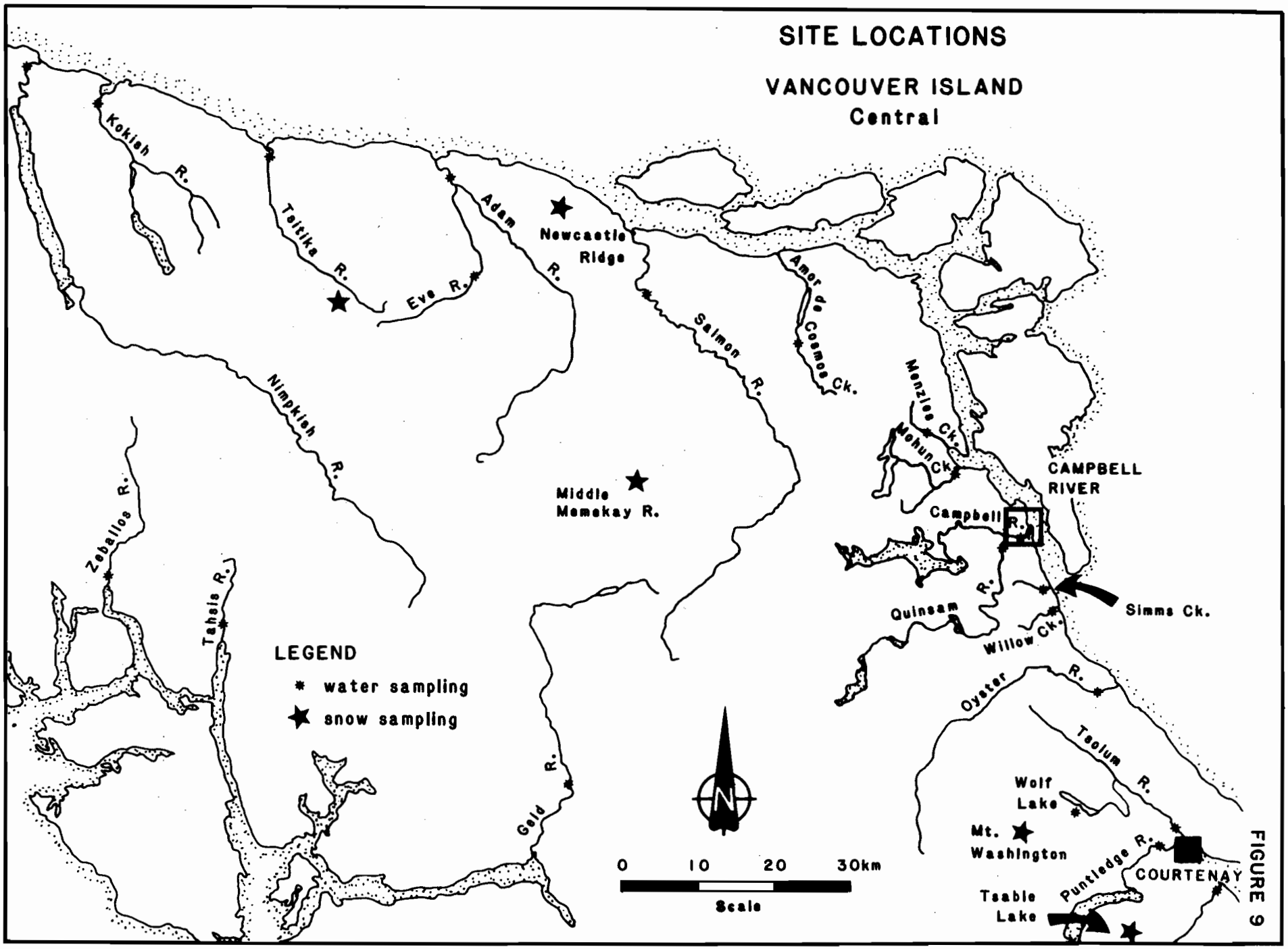

SITE LOCATIONS
VANCOUVER ISLAND
Central
Kokish R.
Tsitika R.
Eve R.
Adam R.
Newcastle Ridge
Salmon R.
Amor de Cosmos Ck.
Menzies Ck.
Mohun Ck.
CAMPBELL RIVER
Campbell R.
Simms Ck.
Quinsam R.
Willow Ck.
Oyster R.
Tsolum R.
Wolf Lake
Mt. Washington
Puntledge R.
COURTENAY
Tsable Lake
Nimpkish R.
Middle Memekay R.
Zeballos R.
Tahsis R.
Gold R.
LEGEND
water sampling
snow sampling
N
0 10 20 30km
Scale

FIGURE 9

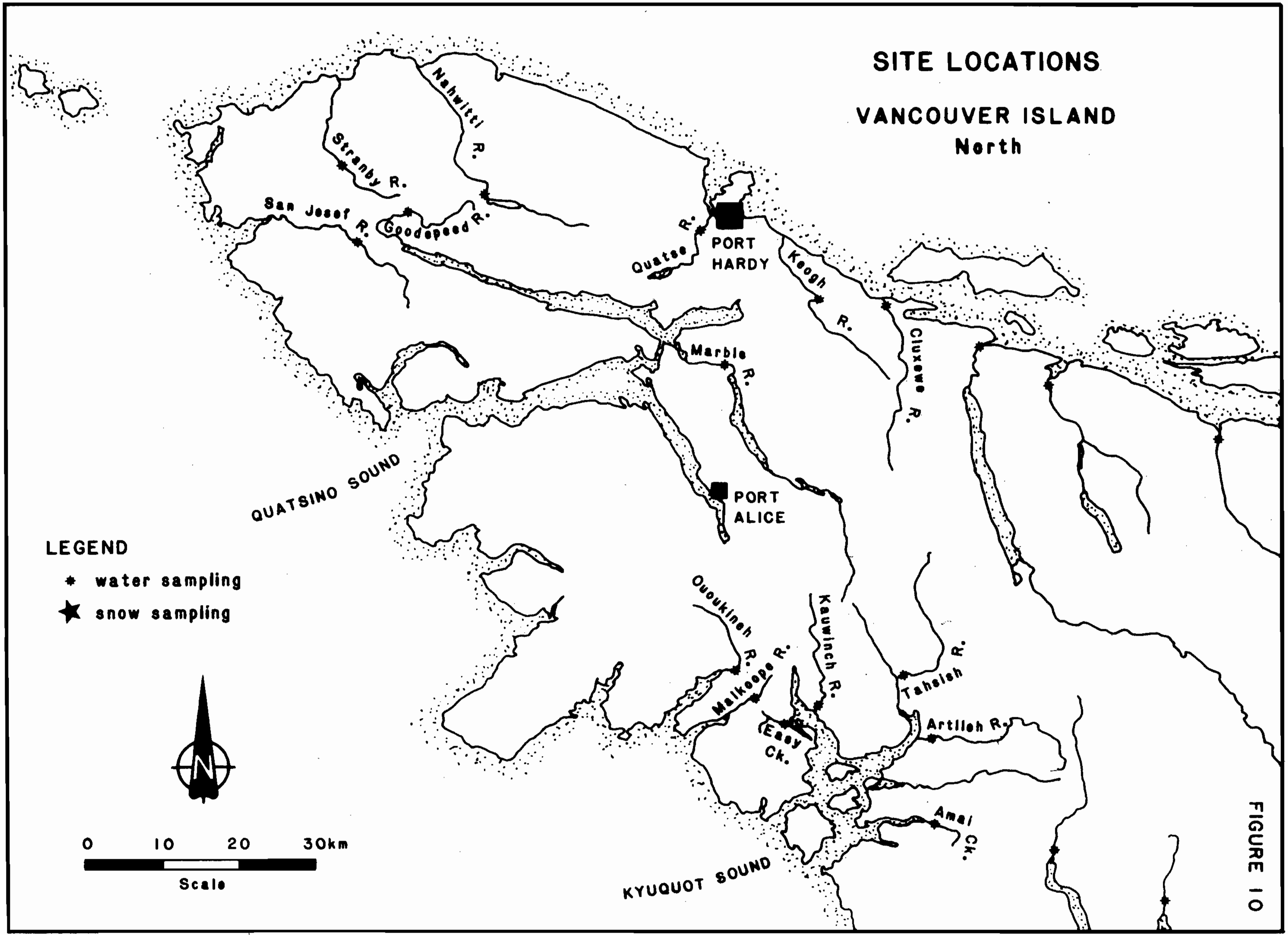
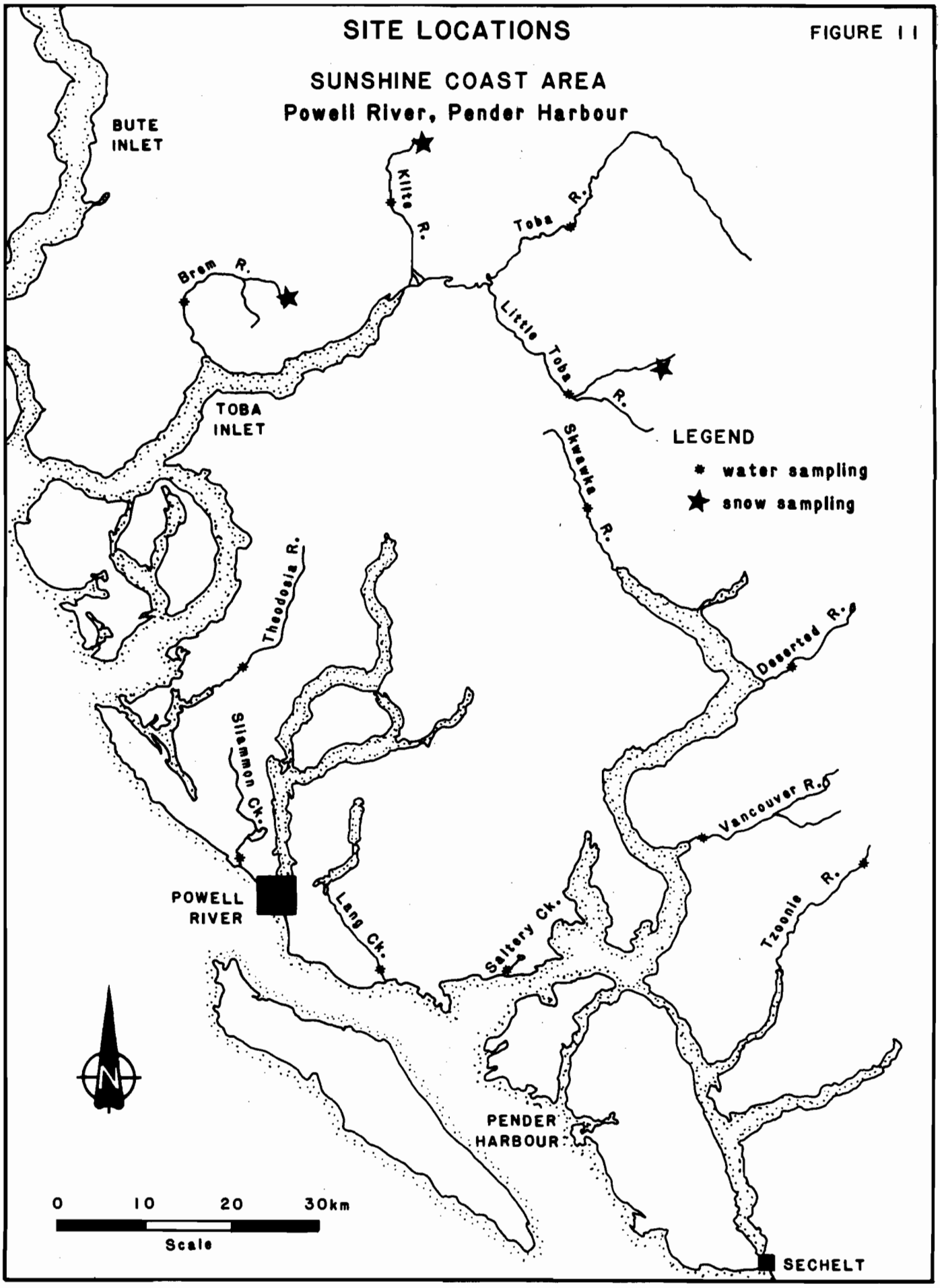

SITE LOCATIONS
VANCOUVER ISLAND
North
LEGEND
water sampling
snow sampling
0 10 20 30km
Scale
Nahwitti R.
Stranby R.
San Josef R.
Goodspeed R.
Quatse R.
PORT HARDY
Keogh R.
Cluxewe R.
Marble R.
PORT ALICE
QUATSINO SOUND
Ououkinsh R.
Kauwinch R.
Malksope R.
Easy Ck.
Tahsish R.
Artlish R.
Amai Ck.
KYUQUOT SOUND
N

FIGURE 10


SITE LOCATIONS
FIGURE 11
SUNSHINE COAST AREA
Powell River, Pender Harbour
BUTE INLET
Klite R.
Toba R.
Brem R.
Little Toba R.
TOBA INLET
LEGEND
water sampling
snow sampling
Skwawka R.
Theodosia R.
Deserted R.
Sliammon Ck.
Vancouver R.
POWELL RIVER
Lang Ck.
Saltery Ck.
Tzoonie R.
PENDER HARBOUR
SECHELT
N
0 10 20 30km
Scale

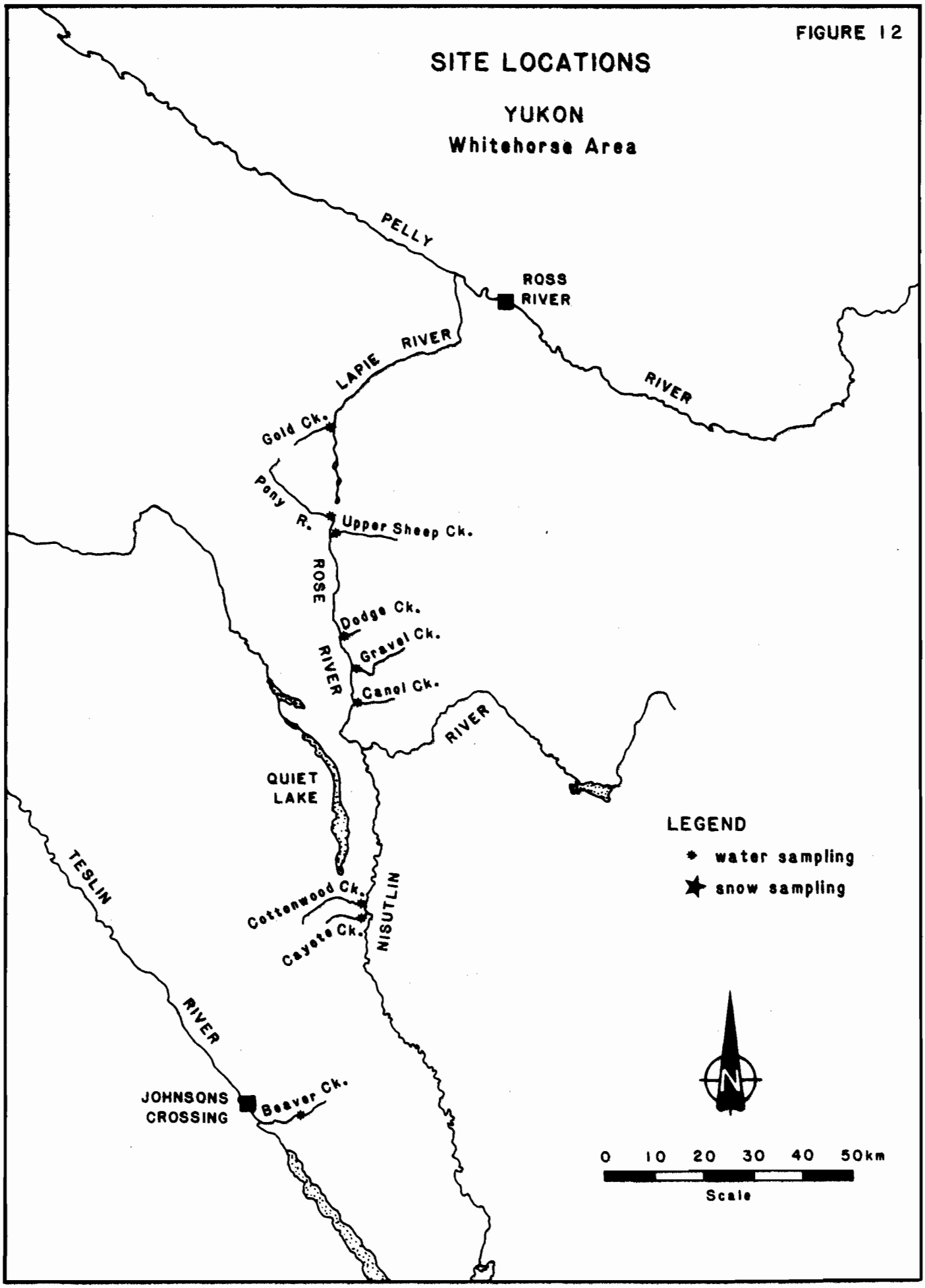


FIGURE 12
SITE LOCATIONS
YUKON
Whitehorse Area
PELLY
ROSS RIVER
RIVER
LAPIE RIVER
Gold Ck.
Pony R.
Upper Sheep Ck.
ROSE RIVER
Dodge Ck.
Gravel Ck.
Canol Ck.
RIVER
QUIET LAKE
TESLIN
Cottonwood Ck.
Coyote Ck.
NISUTLIN
RIVER
JOHNSONS CROSSING
Beaver Ck.
LEGEND
water sampling
snow sampling
N
0 10 20 30 40 50km
Scale

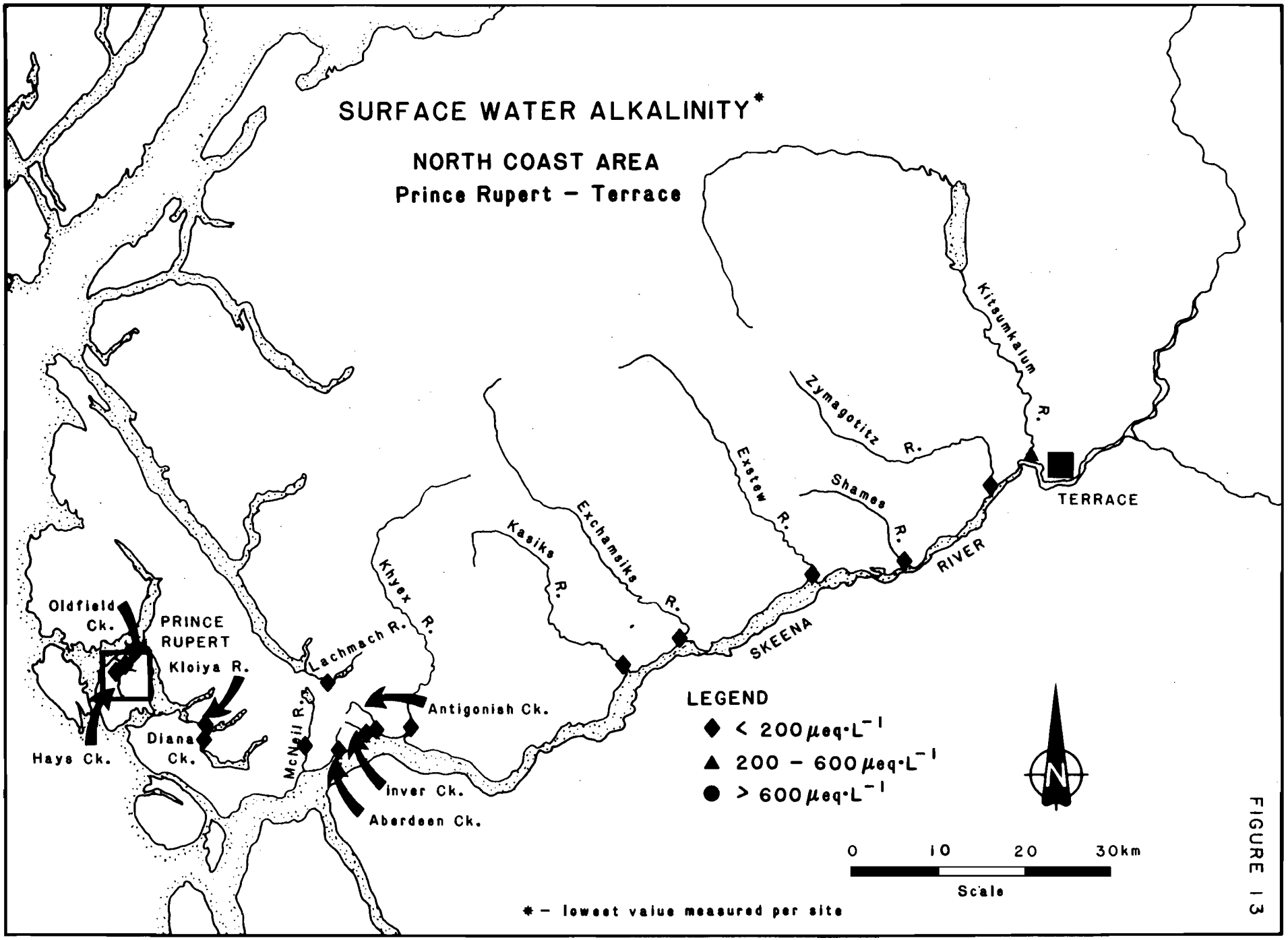

SURFACE WATER ALKALINITY*
NORTH COAST AREA
Prince Rupert – Terrace
Kitsumkalum R.
Zymagotitz R.
Exstew R.
Shames R.
TERRACE
SKEENA RIVER
Exchamsiks R.
Kasiks R.
Khyex R.
Lachmach R.
McNeill R.
Oldfield Ck.
PRINCE RUPERT
Kloiya R.
Hays Ck.
Diana Ck.
Antigonish Ck.
Inver Ck.
Aberdeen Ck.
LEGEND
◆ < 200 μeq·L⁻¹
▲ 200 – 600 μeq·L⁻¹
● > 600 μeq·L⁻¹
N
0 10 20 30km
Scale
* – lowest value measured per site

FIGURE 13

FIGURE 14

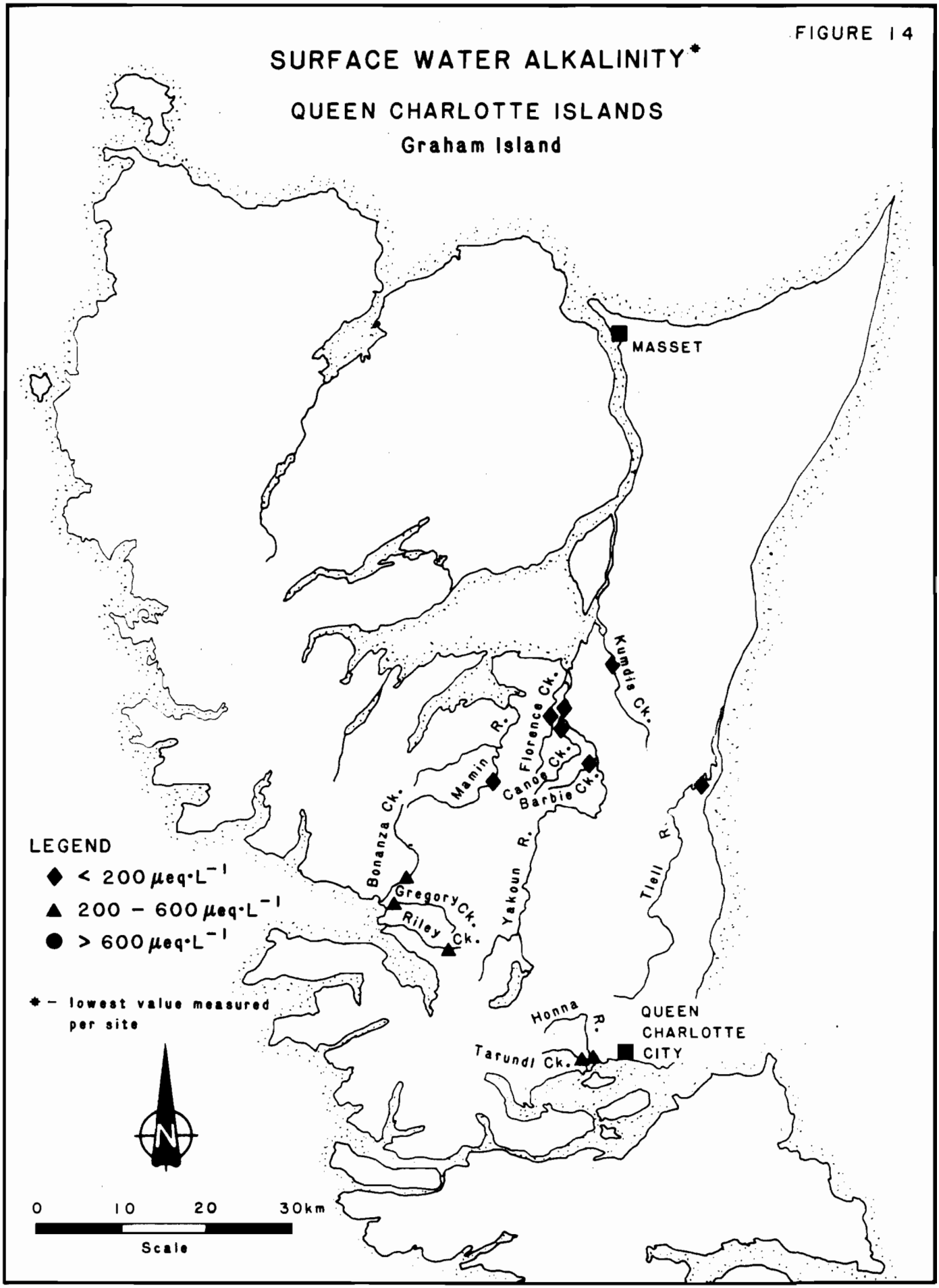
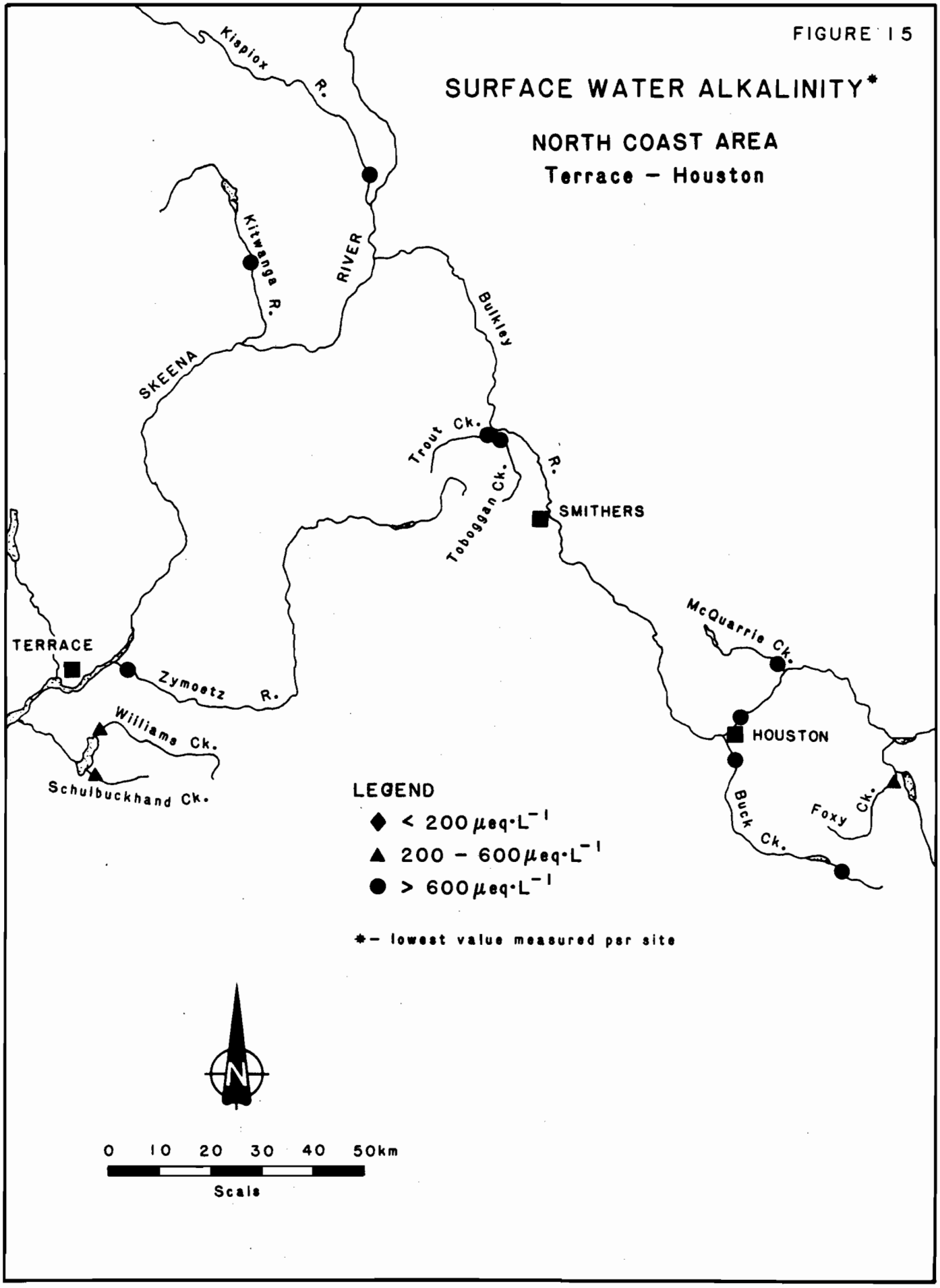

SURFACE WATER ALKALINITY*
QUEEN CHARLOTTE ISLANDS
Graham Island
MASSET
Kumdis Ck.
Florence Ck.
Canoe Ck.
Barbie Ck.
Mamin R.
Bonanza Ck.
Gregory Ck.
Riley Ck.
Yakoun R.
Tlell R.
Honna R.
Tarundl Ck.
QUEEN CHARLOTTE CITY
LEGEND
◆ < 200 µeq·L⁻¹
▲ 200 – 600 µeq·L⁻¹
● > 600 µeq·L⁻¹
* – lowest value measured per site
N
0 10 20 30km
Scale

FIGURE 15


SURFACE WATER ALKALINITY*
NORTH COAST AREA
Terrace – Houston
Kispiox R.
Kitwanga R.
SKEENA RIVER
Bulkley R.
Trout Ck.
Toboggan Ck.
SMITHERS
McQuarrie Ck.
TERRACE
Zymoetz R.
Williams Ck.
Schulbuckhand Ck.
HOUSTON
Buck Ck.
Foxy Ck.
LEGEND
◆ < 200 µeq·L⁻¹
▲ 200 – 600 µeq·L⁻¹
● > 600 µeq·L⁻¹
*– lowest value measured per site
N
0 10 20 30 40 50km
Scale

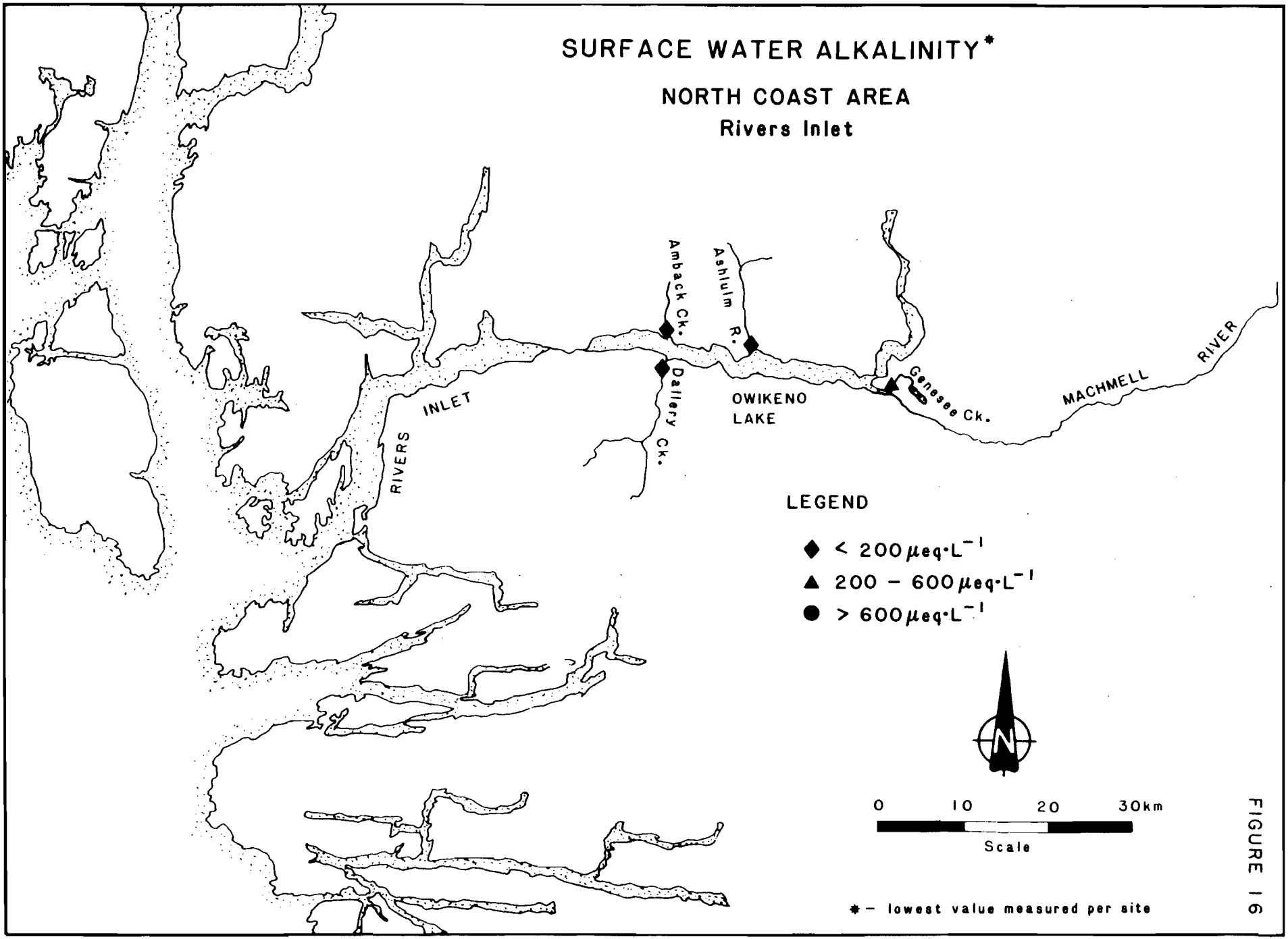

SURFACE WATER ALKALINITY*
NORTH COAST AREA
Rivers Inlet
Amback Ck.
Ashlulm R.
Dallery Ck.
OWIKENO LAKE
Genesee Ck.
MACHMELL RIVER
RIVERS INLET
LEGEND
◆ < 200 μeq·L⁻¹
▲ 200 – 600 μeq·L⁻¹
● > 600 μeq·L⁻¹
N
0 10 20 30km
Scale
* – lowest value measured per site

FIGURE 16

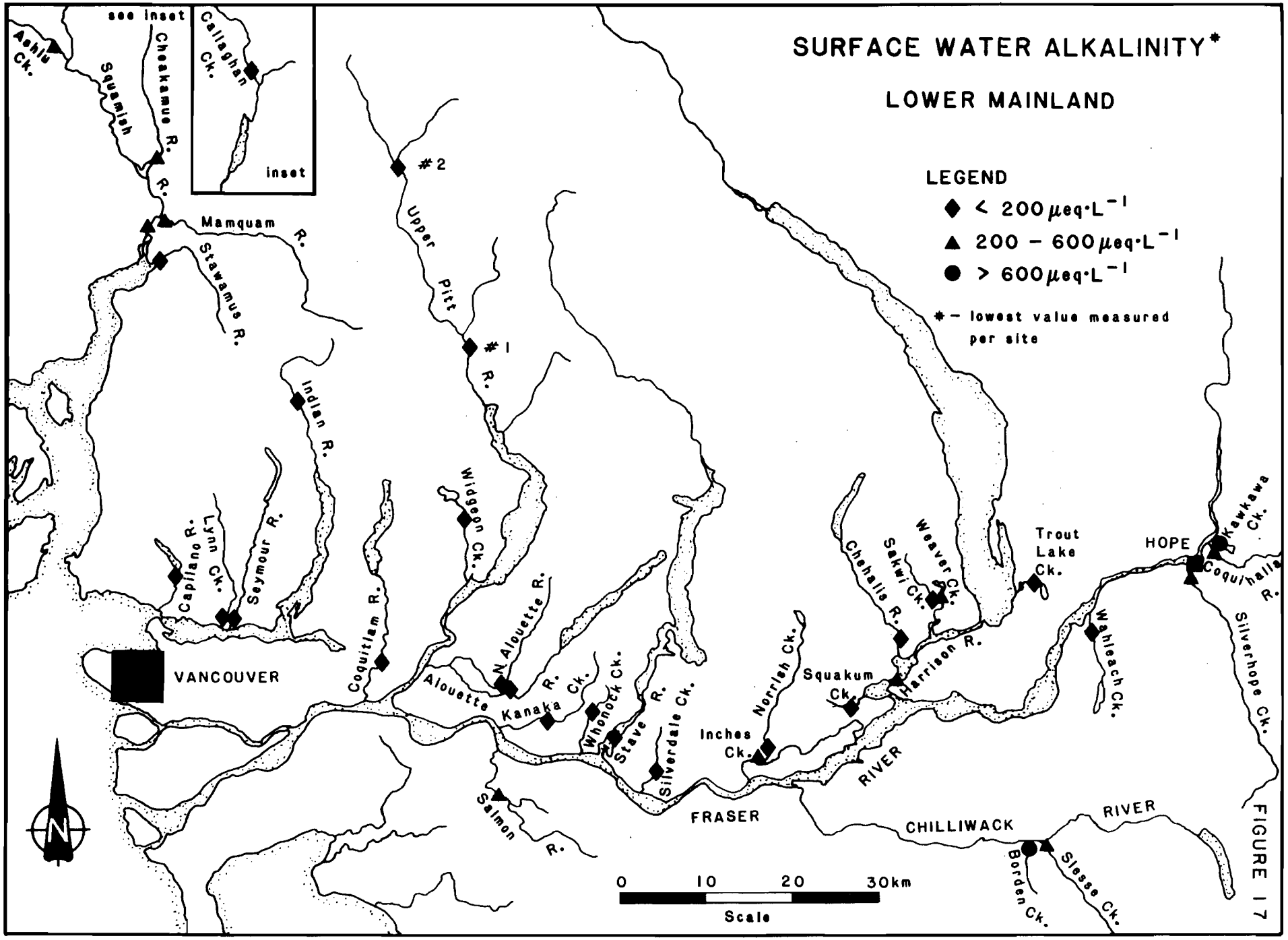
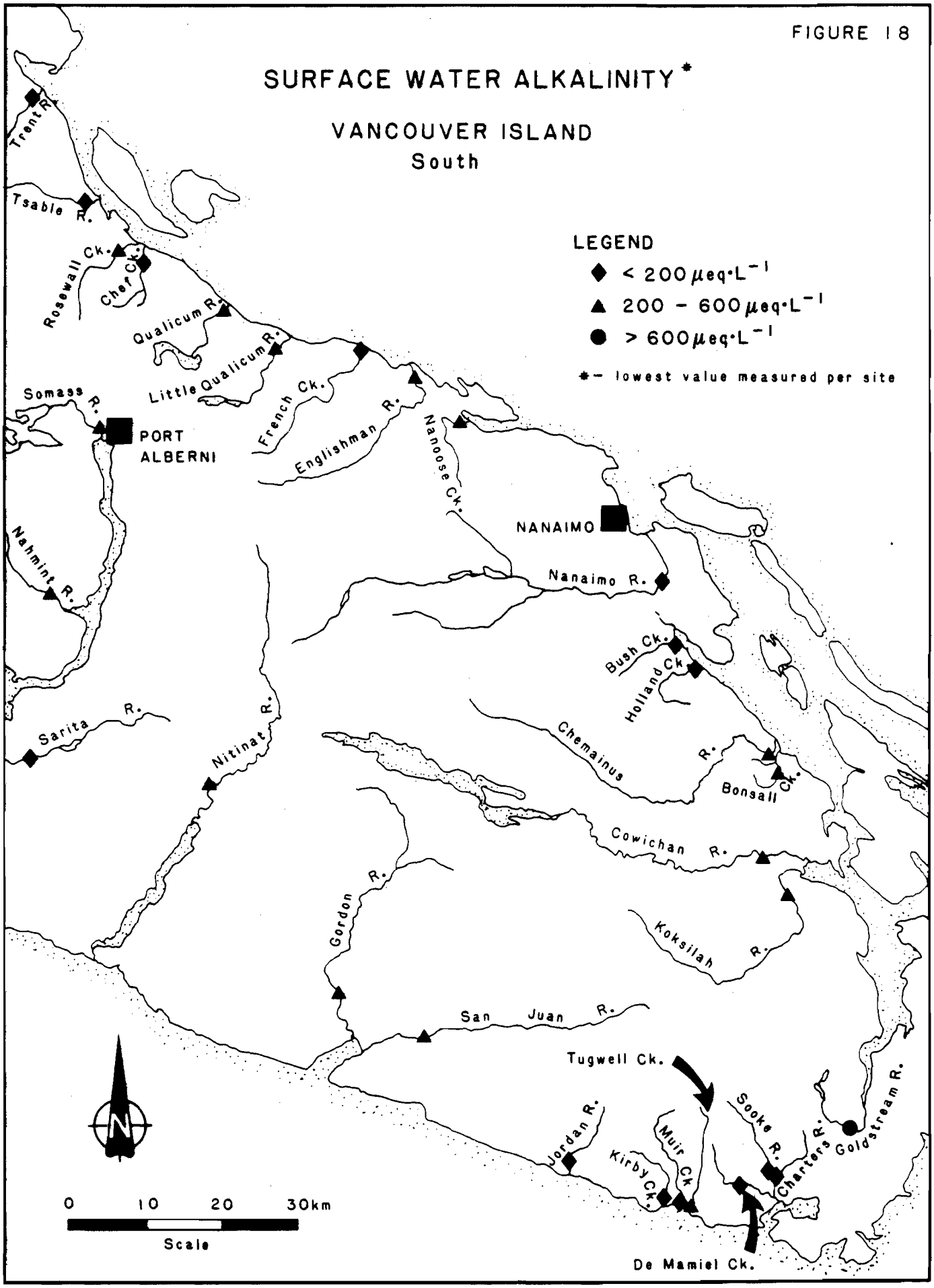

SURFACE WATER ALKALINITY*
LOWER MAINLAND
LEGEND
◆ < 200 μeq·L⁻¹
▲ 200 – 600 μeq·L⁻¹
● > 600 μeq·L⁻¹
* – lowest value measured per site
see inset
inset
Ashlu Ck.
Squamish R.
Cheakamus R.
Callaghan Ck.
Mamquam R.
Stawamus R.
#2
Upper Pitt R.
#1
Indian R.
Widgeon Ck.
Capilano R.
Lynn Ck.
Seymour R.
Coquitlam R.
N. Alouette R.
Alouette R.
Kanaka Ck.
Whonock Ck.
Stave R.
Silverdale Ck.
Norrish Ck.
Inches Ck.
Squakum Ck.
Chehalis R.
Sakwi Ck.
Weaver Ck.
Harrison R.
Trout Lake Ck.
HOPE
Kawkawa Ck.
Coquihalla R.
Wahleach Ck.
Silverhope Ck.
VANCOUVER
FRASER RIVER
Salmon R.
CHILLIWACK RIVER
Borden Ck.
Slesse Ck.
N
0 10 20 30km
Scale

FIGURE 17

FIGURE 18

SURFACE WATER ALKALINITY *

VANCOUVER ISLAND
South



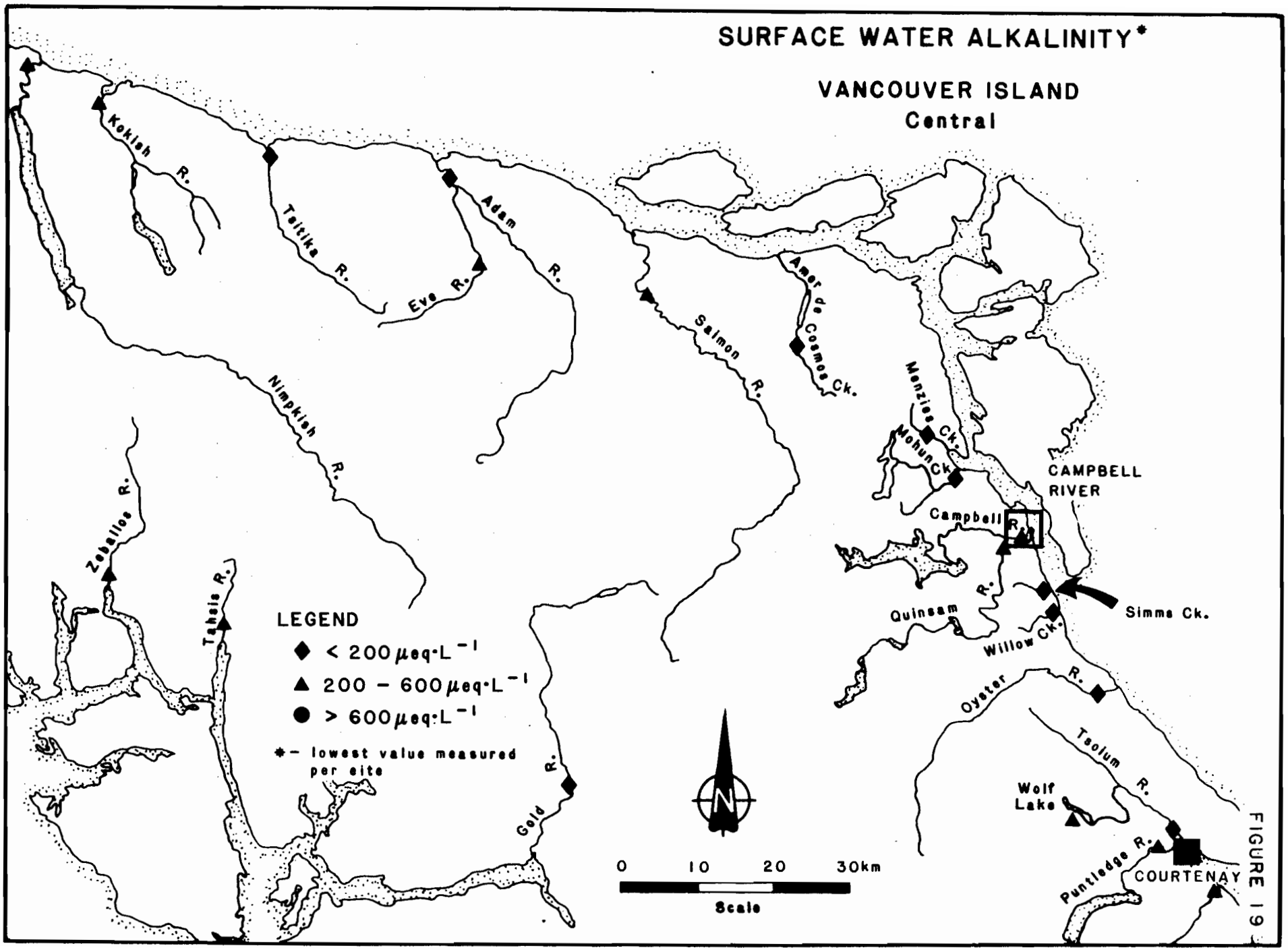

SURFACE WATER ALKALINITY*
VANCOUVER ISLAND
Central
Kokish R.
Teltzka R.
Eve R.
Adam R.
Salmon R.
Amor de Cosmos Ck.
Menzies Ck.
Mohun Ck.
CAMPBELL RIVER
Campbell R.
Simms Ck.
Quinsam R.
Willow Ck.
Oyster R.
Tsolum R.
Wolf Lake
Puntledge R.
COURTENAY
Nimpkish R.
Zeballos R.
Tahsis R.
Gold R.
LEGEND
◆ < 200 μeq·L⁻¹
▲ 200 – 600 μeq·L⁻¹
● > 600 μeq·L⁻¹
*– lowest value measured per site
N
0 10 20 30km
Scale

FIGURE 19

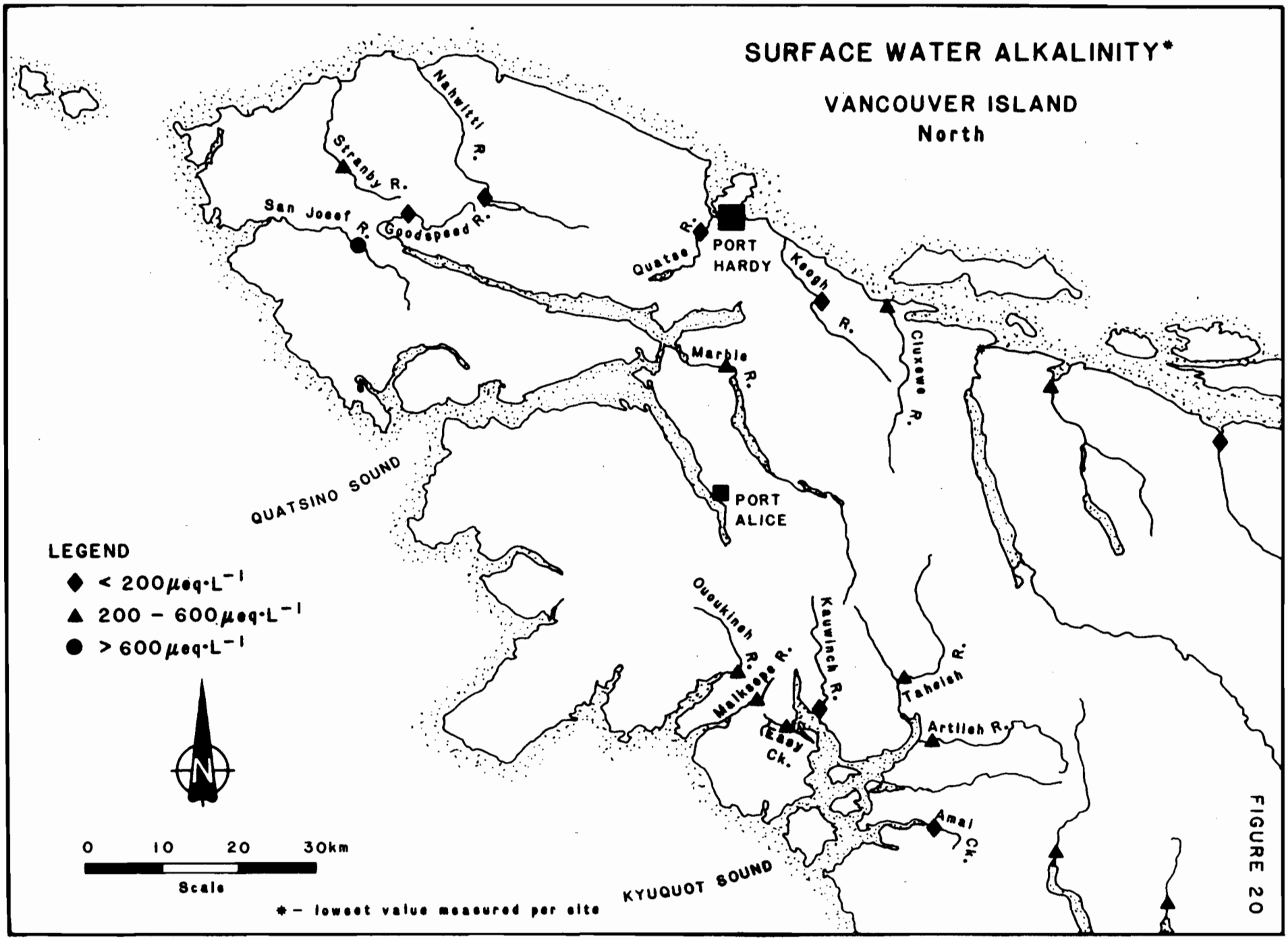

SURFACE WATER ALKALINITY*
VANCOUVER ISLAND
North
Nahwitti R.
Stranby R.
San Josef R.
Goodspeed R.
Quatse R.
PORT HARDY
Keogh R.
Cluxewe R.
Marble R.
QUATSINO SOUND
PORT ALICE
LEGEND
◆ < 200 µeq·L⁻¹
▲ 200 – 600 µeq·L⁻¹
● > 600 µeq·L⁻¹
N
0 10 20 30km
Scale
Ououkinch R.
Malksope R.
Kauwinch R.
Easy Ck.
Tahsish R.
Artlish R.
Amai Ck.
KYUQUOT SOUND
* – lowest value measured per site

FIGURE 20

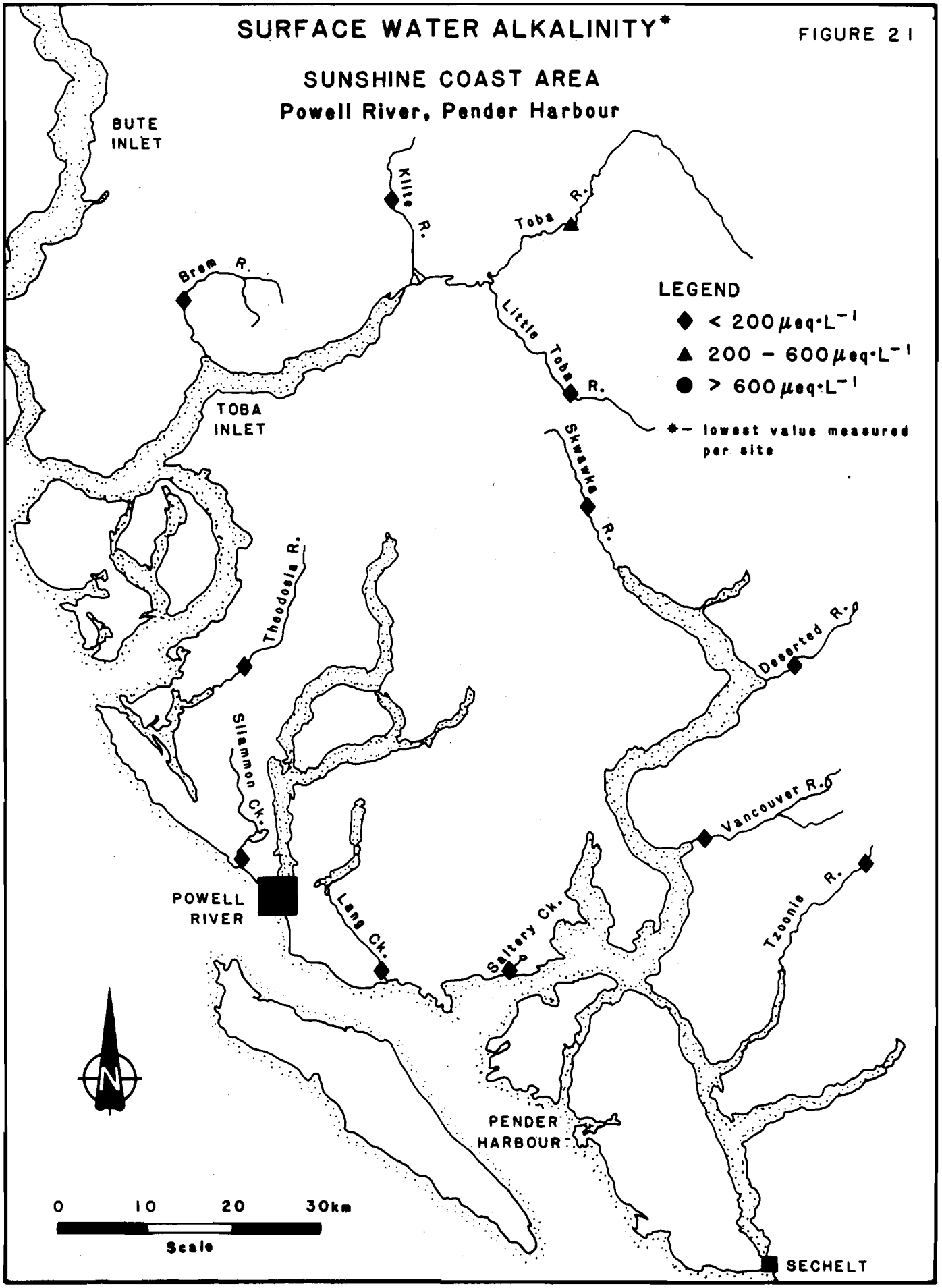

SURFACE WATER ALKALINITY*
FIGURE 21
SUNSHINE COAST AREA
Powell River, Pender Harbour
BUTE INLET
Klite R.
Toba R.
Brem R.
Little Toba R.
TOBA INLET
Skwawka R.
Theodosia R.
Deserted R.
Sliammon Ck.
Vancouver R.
POWELL RIVER
Lang Ck.
Saltery Ck.
Tzoonie R.
PENDER HARBOUR
SECHELT
LEGEND
◆ < 200 µeq·L⁻¹
▲ 200 – 600 µeq·L⁻¹
● > 600 µeq·L⁻¹
*– lowest value measured per site
N
0 10 20 30km
Scale

FIGURE 22.

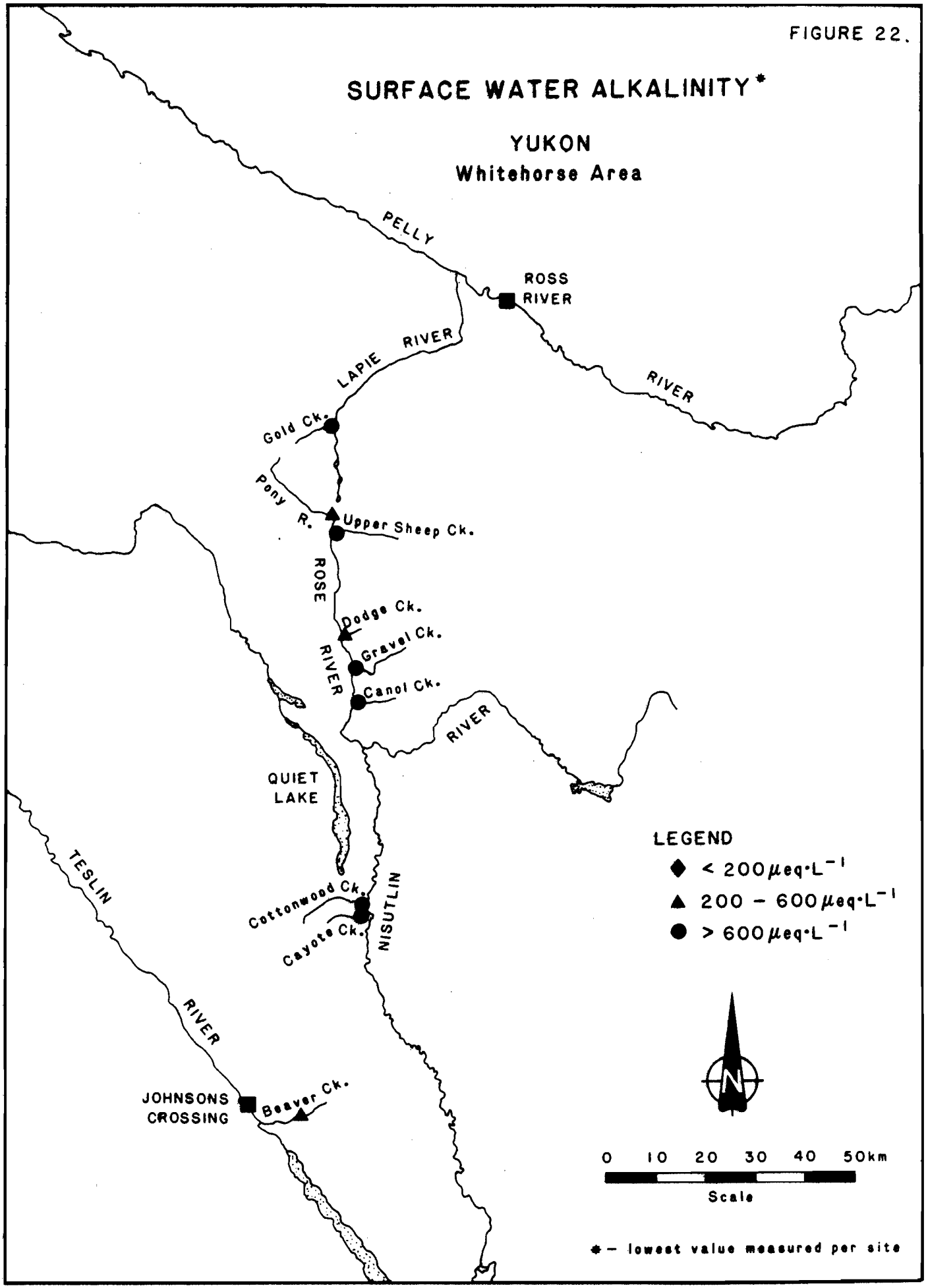

SURFACE WATER ALKALINITY*
YUKON
Whitehorse Area
PELLY
ROSS RIVER
LAPIE RIVER
RIVER
Gold Ck.
Pony R.
Upper Sheep Ck.
ROSE RIVER
Dodge Ck.
Gravel Ck.
Canol Ck.
RIVER
QUIET LAKE
TESLIN
Cottonwood Ck.
Coyote Ck.
NISUTLIN
RIVER
JOHNSONS CROSSING
Beaver Ck.
LEGEND
◆ < 200 μeq·L⁻¹
▲ 200 – 600 μeq·L⁻¹
● > 600 μeq·L⁻¹
N
0 10 20 30 40 50km
Scale
* – lowest value measured per site

Table 1
Surface Water Chemistry
NORTH COAST AREA (Prince Rupert - Terrace) - 1

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Aberdeen Creek	Jan 06/83	5.38	0.29	5.8	9.78	-12.06
	Jul 21/83	5.69	0.70	14.0	7.39	
	Oct 11/83	5.19	ND	-	8.92	
Antigonish Creek	Jun 24/82	5.30	ND	-	11.40	
	Oct 24/82	4.55	ND	-	11.55	
	Jan 06/83	5.38	0.78	15.6	12.01	
	Feb 01/83	5.41	0.30	6.0	10.99	-12.31
	Jul 21/83	6.00	1.50	30.0	14.85	
	Oct 11/83	5.15	ND	-	12.26	
Diana Creek	Jun 24/82	5.30	0.25	5.0	12.40	
	Oct 24/82	4.84	ND	-	12.40	
	Jan 06/83	5.39	0.20	4.0	11.50	- 8.30
	Feb 02/83	5.28	ND	-	11.55	
	Jul 22/83	5.52	0.30	6.0	11.55	
	Oct 11/83	5.08	ND	-	11.54	
Exchamsiks River	Jun 24/82	6.10	2.72	54.4	10.65	-80.26
	Oct 24/82	5.92	3.38	67.6	15.40	
	Feb 01/83	6.68	9.00	180.0	35.07	
Exstew River	Jun 14/82	6.17	2.43	48.6	11.55	-49.80
	Oct 24/82	6.13	3.97	79.4	15.37	
	Feb 01/83	6.55	17.10	342.0	69.34	
Hays Creek	Jun 24/82	6.71	20.97	419.4	89.15	
	Oct 24/82	6.49	14.11	282.2	71.37	
	Jan 07/83	6.39	7.84	156.8	39.87	-172.47
	Feb 01/83	6.75	14.90	298.0	68.34	
Inver Creek	Jan 06/83	5.65	0.78	15.6	12.43	-29.96
	Jul 21/83	6.07	2.10	42.0	21.01	
	Oct 11/83	5.50	0.75	15.0	12.35	
Kasiks River	Jun 24/82	5.81	2.85	57.0	14.30	
	Oct 24/82	5.79	2.61	52.2	15.89	-94.29
	Jan 07/83	6.30	5.83	116.6	33.01	
	Feb 01/83	6.41	6.45	129.0	33.74	
Khyex River	Oct 24/82	5.19	0.59	11.8	11.70	-15.10
	Jan 07/83	6.40	3.72	74.4	41.72	

Table 1 - Surface Water Chemistry
NORTH COAST AREA (Prince Rupert - Terrace) - Continued-2

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Kitsumkalum River (Lower)	Jun 24/82	6.84	13.03	260.6	32.77	
	Oct 24/82	6.62	11.86	237.2	32.50	
	Jan 07/83	7.35	19.26	385.2	50.94	
	Feb 01/83	7.45	19.60	392.0	50.68	
Kloiya River	Jun 24/82	6.06	2.73	54.6	13.65	
	Oct 24/82	5.32	0.52	10.4	12.19	-13.21
	Jan 06/83	5.75	0.83	16.6	12.89	
	Jan 31/83	5.78	0.90	18.0	12.69	
	Jul 22/83	6.11	1.80	36.0	13.25	
	Oct 11/83	5.49	0.60	12.0	13.23	
Lachmach River	Feb 01/83	5.78	0.90	18.0	10.02	-32.67
McNeil River	Jun 24/82	5.12	0.44	8.8	5.72	
	Oct 14/82	4.67	ND	-	13.20	
	Jan 06/83	5.29	0.10	2.0	10.29	
	Feb 01/83	5.33	0.05	1.0	9.10	- 2.10
	Oct 11/83	5.08	ND	-	9.78	
Oldfield Creek	Jan 07/83	6.51	3.14	62.8	20.85	-59.24
	Oct 11/83	6.71	7.85	157.0	33.63	
Shames River	Jun 24/82	6.07	2.17	43.4	9.10	-67.63
	Oct 24/82	6.07	3.53	70.4	14.40	
	Jan 07/83	6.75	6.57	131.4	23.34	
	Feb 01/83	6.93	7.45	149.0	23.41	
Zymagotitz River	Jun 24/82	6.22	4.05	81.0	14.40	-80.46
	Oct 24/82	6.21	5.64	112.8	21.30	
	Jan 07/83	6.79	10.29	205.8	32.41	
	Feb 01/83	7.01	10.90	218.0	31.84	

ND - Not detected

Table 2
Surface Water Chemistry
NORTH COAST AREA (Terrace - Houston)

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Buck Creek (above Goosly L.)	Oct 22/83	7.15	62.43	1248.6	138.10	
Buck Creek (below Goosly L.)	Oct 26/82	7.40	43.81	876.2	98.37	
Bulkley River	Oct 26/82	7.58	71.88	1437.6	147.27	
Foxy Creek	Oct 22/82	7.07	24.12	482.4	82.50	
Kispiox River	Oct 25/82	7.32	31.65	633.0	80.50	
Kitwanga River	Oct 25/82	7.59	57.18	1143.6	124.80	
McQuarrie Creek	Oct 26/82	7.71	66.30	1326.0	139.45	
Schulbuckhand Ck.	Oct 25/82	6.81	11.76	235.2	28.60	-124.18
Toboggan Creek	Oct 25/82	7.22	26.75	535.0	78.90	
Trout Creek	Oct 25/82	7.51	44.79	895.8	97.79	
Williams Ck.- A (upstream)	Oct 25/82	6.81	21.36	427.2	53.39	
Williams Ck.- B (bridge)	Oct 25/82	6.88	16.86	337.2	37.70	
Zymoetz River	Oct 25/82	7.21	26.95	539.0	65.69	

Table 3
Surface Water Chemistry
QUEEN CHARLOTTE ISLANDS (Graham Island)

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Barbie Creek	Jul 28/83	5.75	3.05	61.0	65.26	-112.33
Bonanza Creek	Jun 23/83	6.63	17.44	348.8	65.26	
	Feb 03/83	6.69	20.20	396.0	54.03	
Canoe Creek	Jul 28/83	5.79	2.80	56.0	40.96	-101.16
Florence Creek	Jun 23/82	6.22	8.82	176.4	44.39	
	Feb 03/83	5.63	1.00	19.6	36.78	- 38.70
	Jul 28/83	6.21	6.10	122.0	40.96	
Gregory Creek	Jun 23/82	6.91	22.54	450.8	121.76	
	Feb 03/83	7.11	14.70	288.2	64.29	
Honna River	Jun 23/82	7.13	18.03	360.6	59.60	
	Feb 04/83	7.13	11.20	218.0	52.55	
Kumdis Creek	Jun 23/82	5.09	3.23	64.6	62.40	-141.03
	Feb 03/83	4.31	ND	-	72.88	
	Jul 28/83	4.41	ND	-	76.87	
Mamin River	Jun 23/82	6.49	11.22	224.4	40.59	
	Feb 03/83	6.61	6.50	127.4	35.20	
Riley Creek	Jun 23/82	7.39	29.55	591.0	91.60	
	Feb 03/83	7.28	16.10	315.6	61.41	
Tarundl Creek	Jun 23/82	6.79	16.37	327.4	51.46	
	Feb 04/83	6.95	12.35	242.0	61.45	
Tlell River	Feb 03/83	6.30	4.10	80.4	61.25	- 43.41
Yakoun River	Jun 23/82	6.51	11.37	227.4	41.30	
	Feb 03/83	6.52	6.55	128.4	40.05	
	Jul 28/83	6.55	12.00	240.0	57.22	

ND - Not detected

Table 4
Surface Water Chemistry
NORTH COAST AREA (Rivers Inlet)

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Amback Creek	Oct 17/83	6.00	7.50	150.0	29.30	-238.96
Ashlulm River	Oct 16/83	6.01	2.20	44.0	10.00	- 69.59
Dallery Creek	Oct 16/83	6.53	5.80	116.0	16.60	
Genesee Creek	Oct 16/83	6.39	12.20	244.0	35.60	

Table 5
Summary of Surface Water Alkalinity by Area

Area	Alkalinity		
	No. of streams <200 ueq.L^{-1}	No. of streams 200–600 ueq.L^{-1}	No. of streams >600 ueq.L^{-1}
NORTH COAST AND QUEEN CHARLOTTE ISLANDS			
Prince Rupert–Terrace	15	1	0
Terrace–Houston	0	6	7
Graham Island	7	5	0
Rivers Inlet	3	1	0
	25	10	9
VANCOUVER ISLAND AND SUNSHINE COAST			
Vancouver Island	32	39	3
Powell River–Pender Harbour	11	1	0
	43	40	3
LOWER MAINLAND	22	11	2
YUKON (WHITEHORSE AREA)	0	3	6

Table 6
Surface Water Chemistry
LOWER MAINLAND - 1

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Alouette River	Jan 11/83	6.50	2.99	59.8	17.67	-57.17
	Feb 15/83	6.85	7.90	158.0	37.39	
	Sep 15/83	6.99	11.00	220.0	49.79	
Ashlu Creek	Feb 02/83	7.19	10.80	216.0	31.18	
Borden Creek	Jan 14/83	8.10	89.13	1782.6	183.21	
Callaghan Creek	Feb 24/83	7.09	8.85	177.0	28.07	
Capilano River	Jan 11/83	6.45	1.96	39.2	11.81	-40.02
	Sep 15/83	6.45	2.95	59.0	12.87	
Cheakamus River	Jan 13/83	7.28	15.78	315.6	84.69	
Chehalis River	Jan 12/83	6.85	4.51	90.2	17.26	
	Feb 15/83	6.82	4.40	88.0	17.40	-51.45
	Sep 16/83	6.63	5.90	118.0	23.72	
Coquihalla River	Jan 13/83	7.50	24.99	499.8	72.46	
Coquitlam River	Jan 11/83	6.22	3.14	62.8	17.29	-83.13
	Feb 15/83	6.43	3.80	76.0	18.28	
	Sep 15/83	6.80	12.20	244.0	37.71	
Harrison River	Jan 12/83	7.05	14.06	281.2	39.52	
Inches Creek	Jan 12/83	6.42	6.96	146.0	23.20	
	Sep 16/83	5.90	7.60	152.0	22.93	
Indian River	Feb 02/83	7.15	10.75	215.0	33.38	
Kanaka Creek	Jan 11/83	6.38	2.35	47.0	17.00	-52.32
	Sep 15/83	6.81	7.40	148.0	26.35	
Kawkawa Creek	Jan 13/83	7.90	35.87	717.4	91.60	
Lynn Creek	Jan 11/83	6.55	3.43	68.6	18.35	-61.22
	Feb 15/83	6.71	3.75	75.0	18.78	
	Sep 15/83	6.65	10.90	218.0	34.66	

Table 6 - Surface Water Chemistry
LOWER MAINLAND - Continued-2

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Mamquam River	Jan 13/83	7.02	10.68	213.6	32.07	
Norrish Creek	Jan 12/83	6.68	3.33	66.6	12.87	-48.99
	Feb 15/83	6.75	3.55	71.0	17.67	
	Sep 16/83	6.71	6.85	137.0	20.25	
N.Alouette River	Jan 11/83	6.00	0.69	13.8	10.18	-21.98
	Sep 15/83	6.45	3.80	76.0	17.00	
Sakwi Creek	Jan 12/83	7.09	9.90	198.0	27.47	
	Feb 24/83	7.01	7.05	141.0	21.46	
	Sep 16/83	6.82	15.60	312.0	52.09	
Salmon River	Jan 11/83	7.05	15.88	317.6	79.18	
Seymour River	Jan 11/83	6.50	2.70	54.0	15.43	-51.62
	Sep 15/83	6.68	5.35	107.0	32.89	
Silverdale Creek	Jan 11/83	6.70	4.80	96.0	26.12	-68.40
	Sep 15/83	7.25	20.25	405.0	50.92	
Silverhope Creek	Jan 13/83	7.30	13.18	263.6	33.37	
Slesse Creek	Jan 14/83	7.52	29.79	595.8	78.62	
Squakum Creek	Jan 12/83	6.08	8.13	162.6	29.64	
Squamish River	Jan 13/83	6.80	10.68	213.6	34.93	
	Feb 16/83	6.68	10.30	206.0	41.15	
Stave River	Jan 11/83	6.95	2.25	45.0	11.56	-20.87
	Sep 15/83	6.21	2.35	47.0	10.01	
Stawamus River	Jan 13/83	6.48	3.92	78.4	19.25	
	Feb 16/83	6.13	2.70	54.0	18.85	-77.66
Trout Lake Creek	Jan 12/83	6.92	7.64	152.8	21.71	
	Feb 18/83	7.00	7.60	152.0	21.87	
Upper Pitt R.#1	Feb 02/83	6.98	9.50	190.0	35.07	

Table 6 - Surface Water Chemistry
LOWER MAINLAND - Continued-3

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Upper Pitt R.#2	Feb 02/83	6.99	7.90	158.0	26.51	
Wahleach Creek	Jan 12/83	6.81	4.95	99.0	18.27	
Weaver Creek	Jan 12/83	6.99	8.87	177.4	33.01	
	Sep 16/83	6.55	13.30	266.0	43.54	
Whonock Creek	Jan 11/83	5.99	0.98	19.6	11.00	-31.44
	Sep 15/83	6.30	3.85	77.0	17.26	
Widgeon Creek	Feb 02/83	5.62	0.15	3.0	7.51	- 5.78

Table 7
Surface Water Chemistry
VANCOUVER ISLAND - 1

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Adam River	Jan 21/83	7.05	8.50	170.0	22.03	
	Mar 03/83	7.11	10.25	205.0	23.77	
Amai Creek	Jan 21/83	6.53	3.45	69.0	13.70	-63.33
	Mar 03/83	6.79	3.50	70.0	15.17	
Amor De Cosmos Ck.	Jan 20/83	6.88	7.00	140.0	24.82	
	Mar 02/83	6.90	6.80	136.0	29.26	
Artlish River	Jan 21/83	7.40	27.40	548.0	64.00	
Bonsall Creek	Jan 18/83	7.00	21.17	423.4	55.50	
Bush Creek	Jan 17/83	6.85	8.48	169.6	40.41	
Campbell River	Jan 20/83	7.32	16.85	337.0	40.05	
Charters River	Jan 18/83	6.88	6.96	139.2	28.25	
Chef Creek	Jan 19/83	7.00	8.13	162.6	19.59	
	Mar 02/83	7.18	12.70	254.0	28.07	
Chemainus River	Jan 17/83	7.15	11.17	223.4	32.41	
Cluxewe River	Jan 20/83	6.90	10.15	203.0	26.42	
Cowichan River	Jan 17/83	7.31	18.52	370.4	50.94	
De Mamiel Creek	Jan 18/83	6.52	6.42	128.4	27.90	
Easy Creek	Jan 21/83	7.57	11.00	220.0	30.04	
Englishman River	Jan 19/83	7.09	10.29	205.8	28.70	
Eve River	Nov 24/83[a]	6.7	11.0	220	-	
French Creek	Jan 19/83	7.05	9.41	188.2	26.50	
	Mar 02/83	7.07	12.70	254.0	32.07	
Gold River	Mar 03/83	7.06	9.40	188.0	20.10	
Goldstream River	Jan 18/83	7.39	30.97	619.4	99.85	
Goodspeed River	Jan 21/83	7.05	9.80	196.0	41.52	

a - analyzed by DFO/EPS Laboratory

Table 7 - Surface Water Chemistry
VANCOUVER ISLAND - Continued-2

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Gordon River	Jan 23/83	7.31	16.65	333.0	43.53	
Holland Creek	Jan 18/83	6.90	4.70	94.0	20.52	
	Mar 04/83	6.93	7.50	150.0	26.50	
Jordan River	Jan 23/83	6.68	4.20	84.0	32.53	-61.79
Kauwinch River	Jan 21/83	6.58	4.20	84.0	16.69	-71.83
	Mar 03/83	6.63	4.70	94.0	17.84	
Keogh River	Jan 21/83	6.59	4.30	86.0	17.00	-72.47
Kirby Creek	Jan 18/83	6.81	7.64	152.8	33.13	
Kokish River	Jan 21/83	7.45	18.05	361.0	39.35	
Koksilah River	Mar 04/83	7.22	15.80	316.0	56.99	
Little Qualicum R.	Jan 19/83	7.50	25.68	513.6	59.79	
Malksope River	Jan 21/83	7.43	19.95	399.0	54.00	
Marble River	Jan 21/83	7.39	22.90	458.0	57.05	
Menzies Creek	Jan 20/83	6.73	4.05	81.0	27.81	-55.03
	Mar 02/83	6.80	4.70	94.0	27.98	
Mohun Creek	Jan 20/83	6.68	5.40	108.0	28.88	
Muir Creek	Jan 18/83	6.89	6.13	122.6	25.31	
Nahmint River	Jan 23/83	7.29	18.35	367.0	40.77	
Nahwitti River	Jan 21/83	6.89	6.70	134.0	27.30	
Nanaimo River	Jan 18/83	7.12	8.82	176.4	25.82	
	Mar 04/83	7.20	10.60	212.0	28.97	
Nanoose Creek	Jan 19/83	7.31	22.93	458.6	68.39	
Nimpkish River	Jan 20/83	7.11	11.25	225.0	26.42	
Nimpkish River (headwaters)	Nov 24/83[a]	6.9	14.0	280	-	

[a] - analyzed by DFO/EPS Laboratory

Table 7 - Surface Water Chemistry
VANCOUVER ISLAND - Continued-3

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Nimpkish L. trib. (#1)	Nov 24/83[a]	7.1	25.0	500	-	
Nimpkish L. trib. (#2)	Nov 24/83[a]	7.5	65.0	1300	-	
Nitinat River	Jan 23/83	7.32	23.15	463.0	57.38	
Ououkinsh River	Jan 21/83	7.18	15.10	302.0	38.67	
Oyster River	Jan 19/83	7.13	9.41	188.2	23.04	
	Mar 02/83	7.31	13.60	272.0	29.64	
Puntledge River	Jan 19/83	7.29	14.30	286.0	31.62	
Qualicum River	Jan 19/83	7.57	28.71	574.2	66.56	
Quatse River	Jan 22/83	6.90	4.15	83.0	20.90	-42.15
Quinsam River	Jan 20/83	7.25	15.55	311.0	37.55	
Rosewall Creek	Jan 19/83	7.45	15.39	307.8	32.89	
Salmon River	Jan 20/83	6.97	10.05	201.0	24.96	
	Mar 02/83	7.00	13.50	270.0	30.04	
San Josef River	Jan 21/83	7.33	33.00	660.0	83.55	
San Juan River	Jan 23/83	7.11	18.10	362.0	49.94	
Sarita River	Jan 23/83	6.85	5.00	100.0	23.10	-55.47
Simms Creek	Jan 20/83	6.81	10.00	200.0	63.39	
Somass River	Jan 22/83	7.30	16.85	337.0	36.04	
Sooke River	Jan 18/83	7.17	6.37	127.4	29.64	-38.84
Stranby River	Jan 21/83	6.80	10.35	207.0	33.87	
Tahsis River	Jan 21/83	7.35	21.50	430.0	51.07	
Tahsish River	Jan 21/83	7.57	25.65	513.0	60.15	

a - analyzed by DFO/EPS Laboratory.

Table 7 - Surface Water Chemistry
VANCOUVER ISLAND - Continued-4

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Trent River	Jan 19/83	6.95	7.25	145.0	24.55	
	Mar 02/83	7.10	12.00	240.0	53.11	
Tsable River	Jan 20/83	6.92	6.05	121.0	16.38	
Tsitika River	Jan 21/83	6.72	4.55	91.0	13.67	
	Mar 03/83	6.55	4.90	98.0	13.15	
Tsitika River (headwaters)	Nov 24/83[a]	6.5	2.5	50	-	-47.80
Tsolum River	Jan 19/83	6.75	6.13	122.6	21.92	
	Mar 02/83	6.94	9.60	192.0	27.30	
Tugwell Creek	Jan 18/83	6.99	10.60	212.0	34.66	
Wolf L. trib. (upper)	Nov 24/83[a]	6.6	13.0	260	-	
Wolf L. trib (lower)	Nov 24/83[a]	7.0	20.5	410	-	
Willow Creek	Jan 21/83	6.97	8.75	175.0	36.19	
Zeballos River	Jan 21/83	7.31	17.00	340.0	38.02	
	Nov 24/83[a]	7.0	17.0	340	-	
Zeballos River (headwaters)	Nov 24/83[a]	6.8	11.0	220	-	
Zeballos R. trib. (#1)	Nov 24/83[a]	6.8	8.0	160	-	
Zeballos R. trib. (#2)	Nov 24/83[a]	7.0	16.0	320	-	
Zeballos R. trib. (#3)	Nov 24/83[a]	7.1	18.0	360	-	

a - analyzed by DFO/EPS Laboratory

Table 8
Surface Water Chemistry
SUNSHINE COAST (Powell River - Pender Harbour)

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Brem River	Jan 24/83	6.72	2.95	59.0	10.74	
	Feb 21/83	7.47	17.15	343.0	43.75	
	Oct 26/83	5.99	1.60	32.0	8.50	-51.33
Deserted River	Jan 25/83	6.91	6.00	120.0	21.71	
	Feb 21/83	6.91	5.50	110.0	19.51	
	Nov 21/83	6.53	4.65	93.0	16.84	-85.36
Klite River	Jan 24/83	6.65	2.60	52.0	13.09	
	Feb 21/83	6.31	1.60	32.0	16.66	-38.59
	Oct 06/83	6.35	2.55	51.0	18.69	
Lang Creek	Jan 25/83	6.82	4.75	95.0	19.01	-55.37
	Sep 26/83	6.49	5.75	115.0	20.07	
Little Toba River	Jan 24/83	6.81	3.85	77.0	20.34	
	Feb 21/83	6.91	5.45	109.0	23.84	
	Oct 06/83	6.49	3.50	70.0	21.46	-67.85
Saltery Creek	Jan 25/83	6.82	5.25	105.0	19.89	
	Feb 21/83	6.80	4.20	84.0	17.67	-50.78
	Sep 26/83	7.18	16.55	331.0	40.78	
Skwawka River	Jan 25/83	6.69	3.55	71.0	14.10	-51.41
	Feb 21/83	6.98	8.70	174.0	25.39	
	Nov 20/83	6.73	10.45	209.0	28.16	
Sliammon Creek	Jan 25/83	6.71	4.30	86.0	20.25	
	Oct 27/83	6.09	3.50	70.0	16.09	-104.11
Theodosia River	Jan 24/83	7.00	5.10	102.0	17.29	
	Feb 21/83	6.79	4.50	90.0	15.02	
	Oct 26/83	6.40	4.10	82.0	14.65	-89.11
Toba River	Jan 24/83	7.10	19.10	382.0	55.47	
Tzoonie River	Jan 25/83	6.82	4.05	81.0	12.69	
	Nov 09/83	6.53	3.40	68.0	10.61	-62.41
Vancouver River	Jan 25/83	6.53	2.55	51.0	10.65	
	Feb 21/83	6.50	2.30	46.0	9.49	-43.98
	Nov 29/83	6.42	2.60	52.0		

Table 9
Surface Water Chemistry
YUKON AREA (Whitehorse)

Watercourse	Date Collected	pH	Alkalinity ($mg \cdot L^{-1}$)	Alkalinity ($ueq \cdot L^{-1}$)	Conductivity ($umhos \cdot cm^{-1}$)	Buffer Capacity ($ueq \cdot L^{-1} \cdot pH^{-1}$)
Beaver Creek	Oct 12/83	7.10	20.90	418.0	55.5	
Canol Creek	Oct 12/83	7.49	34.30	686.0	87.7	
Cottonwood Creek	Oct 12/83	7.90	92.75	1855.0	192.8	
Cayote Creek	Oct 12/83	7.99	156.75	3135.0	313.0	
Dodge Creek	Oct 12/83	7.22	18.90	378.0	46.9	
Gold Creek	Oct 12/83	8.01	102.00	2040.0	232.8	
Gravel Creek	Oct 12/83	7.19	30.80	616.0	75.6	
Pony River	Oct 12/83	7.39	27.25	545.0	76.9	
Upper Sheep Creek	Oct 12/83	8.01	93.00	1860.0	232.2	

Table 10
Surface Water Chemistry
NORTH COAST (Prince Rupert-Terrace)

Water Source	Sampling Dates	Sulfate ($mg \cdot L^{-1}$)	Nitrate-N ($mg \cdot L^{-1}$)	Ammonia-N ($mg \cdot L^{-1}$)	Chloride ($mg \cdot L^{-1}$)
Antigonish Creek	June 24/82	4.8	ND	0.010	0.9
Diana Creek	June 24/82	3.4	ND	ND	1.6
Exchamsiks River	June 24/82	4.6	0.04	0.005	0.8
Exstew River	June 24/82	3.8	0.03	ND	0.7
Hays Creek	June 24/82	7.6	0.03	ND	8.5
Kasiks River	June 24/82	4.0	0.03	0.005	0.9
Kitsumkalum R., (Lower)	June 24/82	5.1	0.06	0.005	0.9
Kloiya River	June 24/82	3.6	ND	0.005	1.5
McNeil River	June 24/82	4.9	ND	0.006	0.9
Shames River	June 24/82	3.8	0.02	0.007	0.6
Zymagotitz River	June 24/82	3.7	0.03	0.011	0.8

Table 11
Surface Water Chemistry
QUEEN CHARLOTTE ISLANDS (Graham Island)

Water Source	Sampling Dates	Sulfate ($mg \cdot L^{-1}$)	Nitrate-N ($mg \cdot L^{-1}$)	Ammonia-N ($mg \cdot L^{-1}$)	Chloride ($mg \cdot L^{-1}$)
Bonanza Creek	June 23/82	5.8	0.12	ND	5.0
Florence Creek	June 23/82	4.7	ND	0.011	7.3
Gregory Creek	June 23/82	8.4	0.07	ND	7.5
Honna River	June 23/82	4.8	0.01	0.006	3.9
Kumdis Creek	June 23/82	15.7	ND	0.033	17.0
Mamin River	June 23/82	3.8	0.04	ND	4.0
Riley Creek	June 23/82	6.5	0.11	ND	5.2
Tarundl Creek	June 23/82	4.1	0.07	ND	2.7
Tlell River	June 23/82	1710	ND	0.026	*
Yakoun River	June 23/82	4.3	ND	ND	4.3

* $21^{\circ}/_{\circ\circ}$ salinity (saline water)
Cl > 2,500 ppm

Table 12
SNOWMELT CHEMISTRY
NORTH COAST AREA (Prince Rupert - Terrace)

Sampling Area	Date Sampled	pH	Conductivity ($\mu mhos \cdot cm^{-1}$)
Exchamsiks River	1.[a]Feb 01/83	5.39	<3.6
	2. Feb 01/83	5.40	<3.6
Exstew River	1. Feb 01/83	5.40	<3.6
	2. Feb 01/83	5.45	<3.6
Kasiks River	1. Feb 01/83	5.23	<3.6
	2. Feb 01/83	5.32	<3.6
Khyex River	1 Feb 01/83	5.45	<3.6
	2. Feb 01/83	5.49	<3.6
Kitsumkalum R. (Lower)	1. Feb.01/83	5.43	<3.6
	2. Feb.01/83	5.35	<3.6
Shames River	1. Feb 01/83	5.43	<3.6
	2. Feb 01/83	5.43	<3.6
Zymagotitz River	1. Feb 01/83	5.21	<3.6
	2. Feb 01/83	5.25	<3.6

a - Replicate samples

Table 13
SNOWMELT CHEMISTRY
LOWER MAINLAND

Sampling Area	Date Sampled	pH	Conductivity (umhos·cm^{-1})
Alouette Lake	1.[a]Mar 11/83	5.64	<3.6
	2. Mar 11/83	5.52	<3.6
Callaghan Creek	1 Feb 24/83	5.70	<3.6
	2. Feb 24/83	4.99	<3.6
Grouse Mountain	1. Feb 21/83	5.31	<3.6
	2. Feb 21/83	5.32	<3.6
Hemlock Valley	1. Feb 18/83	5.47	<3.6
	2. Feb 18/83	5.22	<3.6
Mount Seymour	1. Feb 18/83	5.62	4.74
	2. Feb 18/83	5.10	5.49
Pitt Lake	1. Mar 10/83	4.50	<3.6
	2. Mar 10/83	4.38	9.41
Wahleach Lake	1. Mar 11/83	5.19	4.50
	2. Mar 11/83	5.49	<3.6
Widgeon Lake	1. Mar 11/83	5.80	4.51
	2. Mar 11/83	5.40	<3.6

a - Replicate samples

Table 14
SNOWMELT CHEMISTRY
VANCOUVER ISLAND

Sampling Area	Date Sampled	pH	Conductivity (umhos·cm^{-1})
Chef Creek	1.[a]Mar 3/83	5.52	<3.6
	2. Mar 3/83	5.96	<3.6
Green Mountain	1. Mar 1/83	5.39	<3.6
	2. Mar 1/83	5.40	<3.6
Middle Memekay R.	1. Mar 3/83	5.90	<3.6
	2. Mar 3/83	5.29	<3.6
Mt. Washington	1. Mar 2/83	5.55	<3.6
	2. Mar 2/83	5.40	<3.6
Newcastle Ridge	1. Mar 3/83	4.95	<3.6
	2. Mar 3/83	5.31	<3.6
Rowbotham Lake	1. Mar 3/83	5.50	<3.6
	2. Mar 3/83	5.25	<3.6
Tsable Lake	1. Mar 3/83	5.59	<3.6
	2. Mar 3/83	5.49	<3.6
Tsitika River	1 Mar 3/83	5.60	<3.6
	2. Mar 3/83	5.58	<3.6

a - Replicate samples

Table 15
SNOWMELT CHEMISTRY
SUNSHINE COAST AREA (Powell River - Pender Harbour)

Sampling Area	Date Sampled	pH	Conductivity (umhos·cm^{-1})
Brem River	1[a] Feb 21/83	5.42	<3.6
	2. Feb 21/83	5.43	<3.6
Klite River	1. Feb 21/83	5.08	<3.6
	2. Feb 21/83	5.43	<3.6
Little Toba R.	1. Feb 21/83	5.60	<3.6
	2. Feb 21/83	5.47	<3.6

a - Replicate samples

Appendix I
Detection Limits of Surface Water and Snowmelt Metals Analyses

Metal	Detection Limit ($mg \cdot L^{-1}$)
Al	0.05
As	0.05
Ba	0.001
Be	0.001
Ca	0.1
Cd	0.002
Co	0.005
Cr	0.005
Cu	0.005
Fe	0.005
Hg	0.05
Mn	0.001
Mo	0.005
Na	0.2
Ni	0.02
Pb	0.02
Sb	0.05
Se	0.05
Si	0.1
Sn	0.01
Sr	0.001
Ti	0.02
V	0.01
Zn	0.002

Appendix II

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (1)

Metal	ABERDEEN CREEK					
	Jul 21/83			Oct 11/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.18	0.2	0.2	0.2	0.26	0.27
As	ND	ND	ND	ND	ND	ND
B	ND	0.009	ND	ND	0.006	ND
Ba	0.005	0.006	0.006	0.007	0.006	0.007
Be	ND	ND	ND	ND	ND	ND
Ca	0.2	0.3	0.3	0.3	0.3	0.3
Cd	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND
Fe	0.08	0.111	0.129	0.152	0.145	0.145
Hg	ND	ND	ND	ND	-	-
Mg	0.2	0.2	0.2	0.2	0.2	0.2
Mn	0.001	0.003	ND	0.003	0.004	0.004
Mo	ND	ND	ND	ND	ND	ND
Na	0.9	0.9	0.9	ND	0.9	0.8
Ni	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND
Si	1.8	1.8	1.7	1.5	1.5	1.4
Sn	ND	ND	ND	0.01	ND	ND
Sr	0.004	0.005	0.005	0.005	0.005	0.004
Ti	ND	0.002	ND	0.002	ND	0.002
V	ND	ND	ND	ND	ND	ND
Zn	ND	0.003	0.004	ND	ND	0.009
Hardness (Ca, Mg)	1.06	1.47	-	1.28	1.65	1.65

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (2)

Metal	ANTIGONISH CREEK											
	Jun 24/82		Feb 01/83			Jul 21/83			Oct 11/83		
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.16	0.19	0.26	0.27	0.3	0.3	0.32	0.34	0.32	0.35	0.39
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	ND	ND	ND	ND	0.009	ND	ND	ND	ND
Ba	0.003	0.003	0.004	0.005	0.004	0.006	0.005	0.006	0.005	0.005	0.006
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	0.5	0.5	0.8	0.8	0.7	1.2	1.4	1.4	0.8	0.9	0.9
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.007
Fe	0.11	0.119	0.228	0.234	0.244	0.26	0.347	0.361	0.274	0.284	0.292
Hg	ND	ND	ND	ND	ND	-	-	-	-	-	-
Mg	ND	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.3
Mn	0.002	0.002	0.006	0.006	0.005	0.001	0.003	ND	0.005	0.007	0.007
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005
Na	0.7	0.7	1.0	0.9	1.0	1.4	1.4	1.4	ND	1.0	1.0
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	0.006	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.4	0.4	1.1	1.2	1.1	1.3	1.4	1.3	1.3	1.3	1.3
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.005	0.004	0.007	0.007	0.007	0.012	0.012	0.011	0.008	0.008	0.007
Ti	0.002	0.003	0.00	0.004	0.009	0.005	0.005	0.003	0.003	0.002	0.004
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	0.003	0.004	0.003	ND	0.003	0.012
Hardness (Ca, Mg)	1.73	-	2.77	2.83	-	4.13	4.69	-	2.91	3.23	3.55

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (3)

Metal	DIANA CREEK										
	Jun 24/82		Feb 02/83			Jul 22/83			Oct 11/83		
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.14	0.13	0.16	0.17	0.2	0.17	0.19	0.19	0.17	0.2	0.25
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	-	-	ND	ND	ND	ND	0.02	0.007	ND	ND	ND
Ba	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	0.6	0.5	0.6	0.6	0.6	0.5	0.7	0.6	0.6	0.7	0.7
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.008
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.189	0.208	0.167	0.182	0.193	0.215	0.264	0.274	0.198	0.216	1.0
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Mg	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3
Mn	0.005	0.004	0.006	0.006	0.006	0.006	0.008	0.005	0.005	0.007	0.006
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	1.1	1.1	1.2	1.1	1.1	1.1	1.2	1.2	0.2	1.1	1.0
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.004	0.004	0.005	0.005	0.005	0.004	0.005	0.006	0.005	0.006	0.007
Ti	ND	ND	0.008	ND	0.007	ND	0.002	ND	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	0.004	0.005	0.004	ND	ND	ND
Hardness (Ca, Mg)	2.23	-	2.3	2.26	-	2.0	2.5	-	2.09	2.6	2.71

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (4)

Metal	EXCHAMSIKS RIVER					EXSTEW RIVER				
	Jun 24/82		Feb 01/83			Jun 24/82		Feb 01/83		
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot	Ext	Tot	Diss	Ext	Tot
Al	0.34	0.41	ND	ND	ND	0.42	0.61	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	-	-	0.05	0.031	0.035	-	-	0.061	0.031	0.026
Ba	0.019	0.019	0.028	0.029	0.029	0.018	0.02	0.04	0.035	0.036
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.2	1.2	3.6	3.5	3.7	1.5	1.4	6.9	5.5	5.6
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.491	0.573	0.326	0.436	0.445	0.563	0.691	0.703	0.909	0.929
Hg	ND	ND	ND	ND	ND	ND	ND	0.05	0.07	ND
Mg	0.4	0.3	0.6	0.6	0.6	0.4	0.4	1.2	0.9	1.0
Mn	0.012	0.012	0.028	0.029	0.03	0.013	0.015	0.289	0.174	0.177
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.4	0.4	2.2	2.1	2.1	0.4	0.5	5.3	3.8	3.8
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	1.1	1.3	2.1	2.1	2.1	1.2	1.7	3.3	2.9	2.8
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.008	0.009	0.024	0.024	0.025	0.011	0.012	0.053	0.044	0.044
Ti	0.051	0.059	0.005	0.005	0.005	0.052	0.067	0.005	ND	0.006
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (Ca, Mg)	4.81	-	11.2	11.1	-	5.38	-	22.2	17.5	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (5)

Metal	HAYS CREEK					INVER CREEK					
	Jun 24/82		Feb 01/83			Jul 21/83			Oct 11/83		
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.07	0.09	0.07	0.09	0.12	0.15	0.25	0.42	0.22	0.25	0.3
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	-	-	ND	ND	0.026	ND	0.009	ND	ND	ND	ND
Ba	0.033	0.032	0.024	0.024	0.026	0.005	0.006	0.007	0.005	0.005	0.005
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	9.5	9.3	6.8	7.0	7.3	0.5	0.7	0.7	0.5	0.5	0.6
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.46	1.5	0.574	0.733	0.823	0.128	0.301	0.448	0.141	0.135	0.145
Hg	0.9	0.9	ND	0.06	ND	-	-	-	-	-	-
Mg	ND	ND	0.7	0.7	0.8	0.3	0.4	0.4	0.2	0.2	0.3
Mn	0.15	0.149	0.064	0.066	0.07	0.005	0.009	0.008	0.002	0.004	0.003
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	6.2	6.4	4.3	4.3	4.5	3.0	3.2	3.1	0.6	1.4	1.4
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	1.7	1.7	1.6	1.6	1.6	1.6	1.8	2.0	1.5	1.5	1.5
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.039	0.04	0.027	0.028	0.029	0.008	0.008	0.008	0.006	0.006	.007
Ti	ND	0.003	0.006	ND	0.007	ND	0.007	0.012	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.003	0.009	0.002	ND	ND	0.003	0.003	0.003	ND	0.008	ND
Hardness (Ca, Mg)	27.5	-	19.9	20.4	-	2.62	3.28	-	2.1	2.3	2.6

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (6)

Metal	KASIKS RIVER					KHYEX RIVER			KITSUMKALUM RIVER, (LOWER)				
	Jun 24/82		Feb 01/83			Feb 01/83			Jun 24/82		Feb 01/83		
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Ext	Tot	Diss	Ext	Tot
Al	0.1	0.11	ND	0.07	0.12	0.07	3.2	10.8	0.91	2.07	0.06	0.22	0.26
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	-	-	ND	0.009	ND	ND	0.009	ND	-	-	0.059	0.036	0.055
Ba	0.014	0.014	0.029	0.031	0.031	0.003	0.045	0.09	0.019	0.032	0.011	0.014	0.015
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3	1.2	2.4	2.5	2.5	2.2	4.0	5.1	5.2	5.3	7.1	7.1	7.2
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	0.01	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	0.01	0.018	ND	ND	ND	ND	ND
Fe	0.179	0.19	0.294	0.533	0.573	0.126	5.93	14.3	1.14	1.77	0.152	0.396	0.422
Hg	ND	ND	ND	ND	ND	ND	0.45	ND	ND	ND	ND	ND	ND
Mg	0.2	0.2	0.5	0.6	0.6	2.2	3.8	6.1	1.0	1.1	0.8	0.9	0.9
Mn	0.015	0.014	0.045	0.048	0.049	0.008	0.248	0.35	0.032	0.04	0.011	0.015	0.016
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.5	0.5	3.0	3.0	3.1	16.3	17.8	18.7	0.9	1.1	1.4	1.4	1.3
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	0.45	0.56	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.8	0.8	2.2	2.2	2.2	1.8	5.3	17.3	2.7	5.6	2.2	2.4	2.4
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.009	0.009	0.02	0.02	0.02	0.022	0.04	0.058	0.04	0.045	0.052	0.053	0.056
Ti	0.006	0.009	0.006	0.007	0.013	0.007	0.119	0.537	0.048	0.116	0.007	0.017	0.025
V	ND	ND	ND	ND	ND	ND	0.01	0.03	ND	0.01	ND	ND	ND
Zn	ND	ND	ND	ND	0.003	ND	0.022	0.04	0.004	0.007	0.004	ND	ND
Hardness (Ca, Mg)	4.15	-	8.23	8.54	-	14.4	25.7	-	17.1	-	21.1	21.5	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (7)

Metal	KLOIYA RIVER												LACHMACH RIVER		
	Jun 24/82		Jan 31/83			Jul 22/83			Oct 11/83				Feb 01/83		
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot		Diss	Ext	Tot
Al	0.09	0.11	0.16	0.16	0.20	0.15	0.19	0.19	0.19	0.2	0.26		0.18	0.2	0.2
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
B	-	-	ND	ND	ND	ND	0.009	0.003	ND	ND	ND		ND	0.02	0.041
Ba	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005		0.005	0.005	0.005
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Ca	1.3	1.3	0.9	1.0	0.9	1.1	1.2	1.2	1.0	1.0	1.0		0.7	0.7	0.6
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.006		ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Fe	0.129	0.137	0.161	0.197	0.209	0.14	0.232	0.238	0.212	0.243	0.267		0.154	0.158	0.167
Hg	ND	ND	ND	ND	ND	-	-	-	-	-	-		ND	ND	ND
Mg	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3		0.2	0.2	0.2
Mn	0.004	0.004	0.007	0.007	0.007	0.004	0.006	0.005	0.007	0.009	0.008		0.005	0.005	0.005
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Na	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.2	0.3	1.1	1.1		0.9	0.9	0.9
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Si	0.5	0.6	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8		1.0	1.0	1.0
Sn	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Sr	0.007	0.008	0.006	0.006	0.006	0.007	0.009	0.008	0.007	0.007	0.006		0.006	0.006	0.006
Ti	ND	ND	0.007	ND	0.008	ND	ND	ND	ND	ND	0.003		0.009	ND	0.008
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND
Zn	ND	0.002	ND	ND	ND	0.004	ND	0.003	ND	ND	0.13		ND	ND	0.003
Hardness(Ca,Mg)	3.84	-	3.19	3.34	-	3.61	4.1	-	3.26	3.38	3.73		2.43	2.59	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (8)

Metal	McNEIL RIVER											
	Jun 24/82		Feb 01/83			Jul 21/83			Oct 11/83		
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.07	0.09	0.18	0.19	0.22	0.14	0.96	2.41	0.18	0.22	0.26
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	-	-	ND	ND	ND	0.012	0.043	0.01	ND	ND	ND
Ba	0.002	0.002	0.004	0.004	0.004	0.004	0.012	0.024	0.005	0.004	0.005
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	0.2	0.2	0.4	0.4	0.4	2.4	3.4	3.5	0.3	0.4	0.4
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	0.007	0.02	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.044	0.051	0.17	0.177	0.189	0.384	1.92	3.33	0.192	0.202	0.222
Hg	ND	ND	ND	ND	ND	-	-	-	-	-	-
Mg	ND	0.1	0.2	0.2	0.2	3.1	4.0	4.2	0.2	0.2	0.2
Mn	0.001	0.001	0.005	0.005	0.005	0.042	0.078	0.089	0.006	0.008	0.007
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.5	0.6	1.0	0.9	0.9	28.0	32.6	32.0	ND	1.4	0.8
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	0.07	0.12	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.3	0.3	0.9	0.9	0.8	1.3	2.7	5.0	0.9	1.5	0.9
Sn	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND
Sr	0.002	0.002	0.004	0.004	0.003	0.032	0.041	0.045	0.005	0.006	0.004
Ti	ND	ND	0.001	0.002	0.007	0.009	0.026	0.085	0.004	ND	0.003
V	ND	ND	ND	ND	ND	ND	ND	0.01	ND	ND	ND
Zn	ND	0.002	ND	ND	ND	0.005	0.008	0.012	ND	0.008	ND
Hardness (Ca, Mg)	0.659	-	1.58	1.68	-	18.6	24.8	-	1.49	2.3	1.81

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (9)

Metal	OLDFIELD CREEK						SHAMES RIVER				
	Jul 22/82			Oct 11/83			Jun 24/82		Feb 01/83		
(mg.L^{-1})	Diss	Ext	Tot	Diss	Ext	Tot	Ext	Tot	Diss	Ext	Tot
Al	0.13	0.16	0.19	0.09	0.12	0.14	0.1	0.11	0.06	0.08	0.09
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	0.043	0.01	ND	ND	ND	-	-	0.045	0.025	0.026
Ba	0.03	0.042	0.044	0.023	0.022	0.22	0.005	0.005	0.009	0.009	0.009
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	9.5	13.4	13.4	4.2	4.1	4.0	1.0	1.0	3.0	3.1	3.1
Cd	ND	ND	ND	ND	ND	0.007	ND	ND	ND	ND	ND
Co	ND	0.012	0.015	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.44	2.68	2.86	0.164	0.19	0.197	0.082	0.086	0.062	0.091	0.079
Hg	-	-	-	-	-	-	ND	ND	ND	ND	ND
Mg	0.8	1.3	1.3	0.6	0.6	0.6	0.1	ND	0.3	0.3	0.3
Mn	0.12	0.156	0.153	ND	0.004	0.004	0.002	0.002	0.002	0.002	0.002
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	4.2	5.6	5.7	1.3	2.1	2.0	0.3	0.4	1.3	1.2	1.2
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	1.4	2.3	2.2	1.8	1.7	1.6	0.9	0.9	2.5	2.6	2.5
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.044	0.063	0.065	0.016	0.015	0.014	0.01	0.009	0.025	0.026	0.027
Ti	0.004	0.01	0.01	ND	ND	ND	0.006	0.007	0.005	ND	0.006
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.063	0.005	0.005	ND	0.01	ND	ND	ND	ND	ND	ND
Hardness (Ca, Mg)	27.0	38.6	-	12.8	12.5	12.6	3.1	-	8.63	8.94	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Prince Rupert - Terrace (10)

Metal	ZYMAGOTITZ RIVER				
	Jun 24/82		Feb 01/83		
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot
Al	1.06	2.09	ND	0.14	0.46
As	ND	ND	ND	ND	ND
B	-	-	0.039	0.031	0.018
Ba	0.014	0.023	0.008	0.01	0.012
Be	ND	ND	ND	ND	ND
Ca	2.1	2.2	3.9	4.0	4.0
Cd	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND
Fe	1.18	1.87	0.22	0.515	0.76
Hg	ND	ND	ND	ND	ND
Mg	0.6	0.7	0.4	0.4	0.5
Mn	0.031	0.039	0.019	0.023	0.026
Mo	ND	ND	ND	ND	ND
Na	0.6	0.8	2.0	1.9	1.9
Ni	ND	ND	ND	ND	ND
P	0.09	0.1	ND	ND	ND
Pb	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND
Si	2.7	5.0	2.8	3.0	3.4
Sn	ND	ND	ND	ND	ND
Sr	0.016	0.019	0.027	0.027	0.028
Ti	0.059	0.118	0.0[illegible]	0.004	0.021
V	ND	ND	ND	ND	ND
Zn	0.003	0.004	ND	ND	ND
Hardness (Ca, Mg)	7.86	-	11.2	11.7	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Rivers Inlet

Metal	AMBACK CREEK Oct 16/83			ASHLULM CREEK Oct 16/83			DALLERY CREEK Oct 16/83			GENESEE CREEK Oct 17/83		
(mg.L-1)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.11	0.52	0.9	0.22	0.23	0.4	0.08	0.24	0.37	0.17	0.48	0.97
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.006	ND	ND	ND	ND	ND	0.006	ND	ND	ND	ND	ND
Ba	0.009	0.013	0.017	0.007	0.007	0.009	0.004	0.005	0.006	0.014	0.017	0.02
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	2.1	2.3	2.4	1.0	1.0	1.0	2.6	2.7	2.7	4.4	4.6	4.8
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.132	0.88	1.14	0.302	0.318	0.397	0.128	0.519	0.605	0.175	0.597	0.922
Hg	-	-	-	-	-	-	-	-	-	-	-	-
Mg	0.3	0.4	0.5	0.2	0.2	0.2	0.2	0.3	0.3	0.6	0.7	0.8
Mn	0.009	0.02	0.023	0.006	0.005	0.007	0.003	0.009	0.011	0.011	0.02	0.025
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	1.6	1.5	1.6	0.6	0.6	0.6	0.6	0.5	0.6	0.9	0.8	1.0
Ni	ND	ND	ND	0.03	ND	ND	ND	ND	ND	ND	ND	ND
P	0.15	0.29	0.31	ND	0.05	0.07	ND	ND	ND	0.17	0.21	0.25
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	2.6	3.0	3.9	1.6	1.6	1.9	1.2	1.4	1.6	2.2	2.5	3.5
Sn	ND	ND	ND	ND	ND	ND	ND	0.01	0.01	ND	ND	ND
Sr	0.015	0.016	0.019	0.006	0.006	0.007	0.008	0.008	0.009	0.017	0.017	0.021
Ti	0.003	0.03	0.057	0.014	0.015	0.024	0.002	0.013	0.021	0.003	0.023	0.062
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.007	0.003	0.003	0.003	ND	ND	ND	ND	ND	0.008	0.006	0.006
Hardness (Ca, Mg)	6.36	7.51	7.97	3.19	3.22	3.33	7.25	7.77	7.84	13.5	14.5	15.1

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Graham Island (1)

Metal	BONANZA CREEK					FLORENCE CREEK					GREGORY CREEK				
	Jun 23/82		Feb 03/83			Jun 23/82		Feb 03/83			Jun 23/82		Feb 03/83		
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot	Ext	Tot	Diss	Ext	Tot	Ext	Tot	Diss	Ext	Tot
Al	0.5	ND	0.07	0.07	0.08	0.32	0.34	0.3	0.33	0.35	0.06	0.06	0.06	0.07	0.09
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	-	-	ND	0.035	ND	-	-	ND	0.013	0.029	-	-	ND	0.035	ND
Ba	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.002	0.003	0.003
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	6.0	6.1	4.1	4.2	4.3	2.2	2.2	1.3	1.2	1.3	9.0	9.3	6.4	6.5	6.7
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.078	0.085	0.071	0.079	0.084	1.12	1.21	0.511	0.536	0.541	0.039	0.048	0.055	0.067	0.063
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	1.3	1.3	0.9	0.9	1.0	1.3	1.3	0.8	0.8	0.8	1.6	1.6	1.0	1.0	1.1
Mn	0.015	0.015	0.006	0.007	0.007	0.029	0.031	0.027	0.028	0.029	0.012	0.012	0.002	0.003	0.003
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	5.1	5.2	4.5	4.5	4.5	6.0	6.2	4.7	4.6	4.6	6.2	6.5	4.2	4.2	4.2
Ni	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	3.3	3.3	2.5	2.6	2.5	5.6	5.6	3.0	3.1	2.9	2.3	2.3	2.0	2.1	2.0
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.025	0.025	0.019	0.019	0.019	0.016	0.017	0.011	0.011	0.01	0.033	0.033	0.024	0.024	0.024
Ti	ND	ND	0.005	ND	0.006	0.004	0.006	0.009	ND	0.005	ND	ND	0.008	ND	0.006
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	0.002	ND	ND	0.004	ND	ND	ND	ND	ND
Hardness (Ca,Mg)	20.3	-	14.1	14.4	-	10.7	-	6.55	6.34	-	29.0	-	20.1	20.5	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Graham Island (2)

Metal	HONNA RIVER		KUMDIS CREEK					MAMIN RIVER				
	Jun 23/83		Jun 23/83		Feb 02/83			Jun 23/82		Feb 03/83		
($mg.L^{-1}$)	Ext	Tot	Ext	Tot	Diss	Ext	Tot	Ext	Tot	Diss	Ext	Tot
Al	0.08	0.08	0.84	0.96	0.47	0.49	0.53	0.07	0.1	0.11	0.12	0.23
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	-	-	-	-	ND	0.024	ND	-	-	0.008	ND	0.041
Ba	0.007	0.007	0.004	0.005	0.005	0.005	0.005	0.003	0.007	0.003	0.003	0.006
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	6.3	6.5	2.1	1.9	0.9	0.9	1.0	3.1	3.2	2.4	2.4	3.2
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.109	0.116	1.49	1.68	0.544	0.551	0.567	0.191	0.206	0.119	0.134	0.334
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	1.2	1.2	2.2	1.6	1.1	1.1	1.2	0.9	1.0	0.7	0.8	1.1
Mn	0.005	0.005	0.048	0.048	0.029	0.03	0.031	0.016	0.017	0.008	0.009	0.034
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	3.8	4.0	13.9	9.1	8.4	8.4	8.5	4.0	4.1	3.7	3.6	6.6
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	1.5	1.5	4.2	4.1	1.4	1.5	1.4	2.7	2.7	2.5	2.5	1.5
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.031	0.031	0.017	0.012	0.011	0.011	0.01	0.018	0.018	0.015	0.015	0.019
Ti	ND	ND	0.006	0.013	0.012	0.007	0.012	ND	0.003	0.008	ND	0.004
V	ND	ND	ND	0.01	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	0.002	ND	0.002	ND	0.002	0.003	ND	ND
Hardness (Ca, Mg)	20.6	-	20.6	-	6.76	6.72	-	11.6	-	8.89	9.1	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Graham Island (3)

Metal	RILEY CREEK					TARUNDL CREEK	
	Jun 23/82		Feb 03/83			Jun 23/82	
($mg.L^{-1}$)	Ext	Tot	Diss	Ext	Tot	Ext	Tot
Al	ND	0.06	0.05	0.06	0.09	0.07	0.17
As	ND	ND	ND	ND	ND	ND	ND
B	-	-	ND	0.035	ND	-	-
Ba	0.01	0.01	0.006	0.006	0.006	0.012	0.013
Be	ND	ND	ND	ND	ND	ND	ND
Ca	10.7	10.9	6.2	6.3	6.5	5.5	5.7
Cd	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND
Fe	0.044	0.057	0.061	0.075	0.08	0.066	0.081
Hg	ND	ND	ND	ND	ND	ND	ND
Mg	1.9	1.9	1.1	1.1	1.2	1.0	1.0
Mn	0.001	0.001	0.002	0.003	0.004	0.005	0.005
Mo	ND	ND	ND	ND	ND	ND	ND
Na	4.9	5.1	3.9	3.9	4.0	2.9	3.1
Ni	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND
Si	2.0	2.0	1.7	1.7	1.7	1.6	1.7
Sn	ND	ND	ND	ND	ND	ND	ND
Sr	0.045	0.045	0.027	0.028	0.028	0.03	0.03
Ti	ND	ND	0.007	ND	0.005	ND	ND
V	ND	0.01	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND
Hardness (Ca,Mg)	34.4	-	19.9	20.1	-	17.9	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Graham Island (4)

Metal	TLELL RIVER			YAKOUN RIVER				
	03/02/83			June 23/82		Feb. 03/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Ext	Tot	Diss	Ext	Tot
Al	0.2	0.22	0.13	0.06	0.07	0.14	0.16	0.22
As	ND	ND	ND	ND	ND	ND	ND	ND
B	0.02	ND	0.024	-	-	0.003	0.001	0.041
Ba	0.005	0.006	0.003	0.005	0.005	0.005	0.005	0.006
Be	ND	ND	ND	ND	ND	ND	ND	ND
Ca	3.0	3.1	2.4	4.1	4.3	3.1	2.9	3.2
Cd	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.279	0.317	0.119	0.218	0.22	0.187	0.21	0.26
Hg	ND	ND	ND	ND	ND	ND	ND	ND
Mg	1.0	1.1	0.8	0.9	0.9	0.7	0.7	0.8
Mn	0.026	0.033	0.01	0.015	0.016	0.018	0.02	0.024
Mo	ND	ND	ND	ND	ND	ND	ND	ND
Na	6.5	6.4	3.6	3.9	3.8	4.0	3.8	3.9
Ni	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND
Si	1.5	1.6	2.5	2.0	2.1	1.9	2.0	1.9
Sn	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.019	0.019	0.014	0.022	0.022	0.018	0.017	0.018
Ti	ND	ND	0.005	ND	ND	0.007	ND	0.004
V	ND	ND	ND	ND	0.01	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (Ca,Mg)	11.9	12.1	-	14.0	-	10.7	10.3	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Lower Mainland (1)

Metal	ALOUETTE RIVER						CAPILANO RIVER		
	Feb 15/83			Sep 16/83			Sep 15/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	0.08	0.13	ND	0.08	0.13	ND	0.15	0.3
As	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.008	0.006	0.003	0.029	0.034	0.01	0.023	0.006	0.007
Ba	0.003	ND	0.004	0.003	0.003	0.003	0.003	0.004	0.005
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	3.8	ND	3.9	5.8	5.9	5.5	1.6	2.0	1.8
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	0.012	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.049	ND	0.133	0.131	0.136	0.162	0.07	0.216	0.287
Hg	ND	ND	ND	-	-	-	-	-	-
Mg	0.5	0.4	0.5	0.7	0.7	0.6	0.2	0.2	0.2
Mn	0.004	0.005	0.006	0.003	0.005	0.005	0.009	0.012	0.013
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	2.7	ND	2.8	4.2	4.1	3.9	0.7	0.7	0.7
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	3.1	3.0	3.2	3.5	3.6	3.2	1.6	1.7	1.8
Sn	ND	0.07	ND	ND	ND	ND	ND	0.02	ND
Sr	0.026	ND	0.027	0.036	0.036	0.035	0.007	0.008	0.008
Ti	ND	ND	0.007	ND	0.003	0.005	ND	0.007	0.012
V	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	0.007	0.026	0.026
Hardness (Ca,Mg)	11.6	-	-	17.3	17.5	16.4	4.64	5.72	5.54

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Lower Mainland (2)

Metal	CHEHALIS RIVER						COQUITLAM RIVER						INCHES CREEK		
	Feb 15/83			Sep 16/83			Feb 15/83			Sep 15/83			Sept 16/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	0.15	0.14	ND	ND	ND	0.11	0.37	1.15	ND	0.41	1.52	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	0.017	0.003	0.029	0.034	0.01	0.003	0.006	ND	0.006	0.028	0.007	0.029	0.028	0.007
Ba	0.004	ND	0.008	0.007	0.006	0.006	0.002	ND	0.013	0.003	0.012	0.017	0.006	0.006	0.006
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	2.3	ND	2.4	3.4	3.5	3.2	1.8	ND	2.1	4.3	4.5	4.3	3.1	3.1	2.9
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	0.006	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.015	ND	0.073	0.01	0.015	0.019	0.047	ND	0.755	0.059	0.479	1.11	0.006	0.008	0.014
Hg	ND	ND	ND	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	0.2	0.1	0.3	0.3	0.3	0.3	0.3	0.2	0.5	0.9	1.0	1.0	0.4	0.4	0.4
Mn	0.005	0.008	0.008	ND	0.001	0.001	0.008	0.014	0.021	0.007	0.016	0.023	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.006	ND	ND	ND
Na	0.7	ND	0.6	0.9	0.8	0.8	1.2	ND	1.2	2.6	2.5	2.5	1.2	1.2	1.1
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N
Si	1.7	1.7	1.8	2.0	2.1	1.8	1.8	1.9	3.4	3.9	4.3	5.9	3.0	3.0	2.6
Sn	ND	0.07	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	ND	ND
Sr	0.007	ND	0.007	0.01	0.01	0.01	0.012	ND	0.017	0.025	0.026	0.028	0.009	0.009	0.01
Ti	ND	ND	0.003	ND	ND	0.002	ND	0.005	0.041	ND	0.013	0.055	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	0.005	ND	ND	ND	ND	0.003	0.011	0.003	0.005	0.004	0.003	ND
Hardness (Ca, Mg)	6.7	-	-	9.93	10.2	9.47	5.79	-	-	14.7	18.5	15.0	9.26	9.31	8.73

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Lower Mainland (3)

Metal	KANAKA CREEK			LYNN CREEK						NORRISH CREEK					
	Sep 15/83			Feb 15/83			Sep 15/83			Feb 15/83			Sep 16/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.1	0.18	0.32	0.07	0.29	0.29	ND	ND	ND	0.08	0.13	0.17	0.05	0.08	0.08
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.017	0.017	ND	0.008	0.011	0.003	0.023	0.028	ND	0.003	0.011	ND	0.034	0.028	ND
Ba	0.004	0.005	0.006	0.003	ND	0.007	0.006	0.006	0.006	0.003	ND	0.005	0.005	0.005	0.005
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	2.9	2.9	2.7	2.1	ND	2.2	4.3	4.4	4.0	1.6	ND	1.6	2.8	2.8	2.6
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.103	0.196	0.269	0.046	ND	0.236	0.211	0.236	0.244	0.021	ND	0.07	0.04	0.024	0.034
Hg	-	-	-	ND	ND	ND	-	-	-	ND	ND	ND	ND	ND	ND
Mg	0.5	0.6	0.6	0.3	0.2	0.4	0.7	0.7	0.6	0.2	ND	0.3	0.3	0.4	0.4
Mn	0.002	0.004	0.005	0.007	0.013	0.013	0.023	0.024	0.023	ND	0.002	0.002	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	2.1	2.0	1.9	1.0	ND	0.8	1.8	1.8	1.7	0.8	ND	0.7	1.1	1.1	1.1
Ni	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND	ND	ND	0.03	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	3.7	3.8	3.5	1.4	1.5	1.6	2.7	2.8	2.4	1.7	1.6	1.8	2.7	2.8	2.4
Sn	ND	0.01	ND	ND	0.07	ND	ND	ND	ND	ND	0.06	ND	ND	0.01	ND
Sr	0.019	0.019	0.018	0.01	ND	0.011	0.019	0.02	0.02	0.005	ND	0.005	0.009	0.008	0.008
Ti	0.002	0.006	0.01	ND	0.0	0.011	ND	0.002	ND	ND	ND	0.005	0.003	0.002	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	ND	ND
Zn	ND	ND	ND	ND	0.004	0.004	0.003	ND	ND	ND	ND	0.003	0.003	ND	ND
Hardness (Ca, Mg)	9.36	9.54	9.03	6.36	-	-	13.5	13.7	12.7	4.82	-	-	8.41	8.6	8.01

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Lower Mainland (4)

Metal	NORTH ALOUETTE RIVER			SAKWI CREEK			SEYMOUR RIVER			SILVERDALE CREEK		
	Sep 15/83			Sep 16/83			Sep 15/83			Sep 15/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.06	0.07	0.09	ND	ND	0.06	ND	ND	0.09	ND	ND	0.07
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.006	ND	0.007	0.028	0.029	ND	0.023	0.006	0.007	0.028	0.034	0.003
Ba	0.004	0.004	0.004	0.013	0.013	0.012	0.005	0.005	0.005	0.007	0.007	0.007
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	2.1	2.1	2.0	8.1	8.1	7.6	2.6	2.7	2.4	6.6	6.8	6.3
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.012
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.044	0.046	0.048	0.012	0.017	0.032	0.208	0.258	0.273	0.189	0.261	0.271
Hg	-	-	-	-	-	-	-	-	-	ND	ND	ND
Mg	0.3	0.3	0.3	1.2	1.2	1.1	0.5	0.6	0.5	1.5	1.6	1.4
Mn	ND	ND	ND	0.004	0.005	0.004	0.004	0.005	0.005	0.005	0.008	0.008
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	1.0	1.0	1.0	1.5	1.5	1.4	3.3	3.6	3.4	2.9	2.9	2.9
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	2.3	2.3	2.0	3.2	3.2	2.8	2.0	2.0	1.8	5.3	5.4	4.7
Sn	ND	ND	ND	ND	0.01	ND	ND	ND	ND	ND	ND	ND
Sr	0.01	0.01	0.01	0.025	0.024	0.024	0.015	0.015	0.013	0.033	0.035	0.033
Ti	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.003	0.003	0.005
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	0.004	0.003	0.004	0.002	0.002	ND
Hardness (Ca, Mg)	6.41	6.45	6.21	25.2	25.3	23.7	8.71	8.94	8.16	22.6	23.3	21.5

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Lower Mainland (5)

Metal	SQUAMISH RIVER Feb 16/83			STAVE RIVER Sep 15/83			STAWAMUS RIVER Feb 16/83			TROUT LAKE CREEK Feb 18/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.05	0.17	0.28	ND	0.09	0.16	0.1	0.17	0.2	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.008	0.022	0.003	0.017	0.017	0.007	0.008	0.017	ND	0.008	0.011	0.003
Ba	0.007	0.003	0.012	0.003	0.003	0.003	0.004	ND	0.006	0.004	ND	0.006
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	4.9	ND	5.1	1.2	1.2	1.1	2.3	ND	2.3	2.7	ND	2.8
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	0.006	ND	ND	ND
Fe	0.14	ND	0.394	0.036	0.114	0.149	0.022	ND	0.12	0.015	ND	0.037
Hg	ND	ND	ND	-	-	-	ND	ND	ND	ND	ND	ND
Mg	0.6	0.5	0.7	0.1	0.1	0.2	0.2	0.1	0.3	0.3	0.2	0.4
Mn	0.014	0.017	0.019	0.005	0.008	0.008	0.004	0.005	0.007	0.005	0.009	0.009
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	2.6	ND	2.5	0.6	0.5	0.5	1.0	ND	0.8	1.0	ND	0,9
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	4.6	4.6	4.9	1.1	1.1	1.1	2.3	2,1	2.2	2.1	2,0	2,1
Sn	ND	0.07	ND	ND	ND	ND	ND	0.06	ND	ND	0.07	ND
Sr	0.036	ND	0.039	0.00[illegible]	0,005	0.004	0.011	ND	0.012	0.012	ND	0,012
Ti	ND	0.004	0.015	0.002	0.005	0.005	ND	ND	0.006	ND	ND	0,002
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	0.002	0.003	ND	ND	ND	ND	0.003	ND	ND	ND
Hardness (Ca, Mg)	14.4	-	-	3.46	3.6	3.44	6.64	-	-	8.25	-	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Lower Mainland (6)

Metal	WEAVER CREEK Sep 16/83			WHONOCK CREEK Sep 15/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	0.09	0.16	0.19
As	ND	ND	ND	ND	ND	ND
B	0.017	0.034	0.003	0.006	0.011	0.01
Ba	0.014	0.014	0.014	0.006	0.004	0.004
Be	ND	ND	ND	ND	ND	ND
Ca	7.0	7.1	7.1	2.0	2.0	1.8
Cd	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	0.007
Cu	ND	ND	ND	ND	ND	ND
Fe	0.058	0.076	0.077	0.202	0.537	0.566
Hg	-	-	-	-	-	-
Mg	0.8	0.8	0.8	0.3	0.3	0.3
Mn	0.015	0.017	0.017	0.011	0.014	0.014
Mo	ND	ND	ND	ND	ND	ND
Na	1.2	1.2	1.2	1.2	1.2	1.1
Ni	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND
Si	2.1	2.1	2.1	2.6	2.7	2.3
Sn	ND	ND	ND	ND	ND	ND
Sr	0.023	0.022	0.021	0.012	0.012	0.012
Ti	ND	ND	0.002	ND	0.002	0.005
V	ND	ND	ND	ND	ND	ND
Zn	0.005	0.005	0.005	0.021	ND	ND
Hardness (Ca, Mg)	20.9	21.1	20.9	6.13	6.31	5.73

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Vancouver Island (1)

Metal	ADAM RIVER			AMAI CREEK			AMOR DE COSMOS CREEK			CHEF CREEK		
	Mar. 03/83			Mar. 03/83			Mar. 02/83			Mar. 02/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.08	0.1	0.11	0.06	ND	0.08	ND	ND	0.05	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	0.003	0.006	ND	ND	0.003	ND	ND	0.006	0.005	ND	0.009
Ba	ND	ND	ND	ND	ND	ND	0.001	ND	ND	0.002	0.002	0.002
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	3.8	3.9	3.9	1.5	1.4	1.4	2.6	2.7	2.7	3.8	3.9	3.7
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.038	0.054	0.073	0.009	ND	0.009	0.024	0.04	0.049	0.012	0.015	0.02
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	0.7	0.7	0.7	0.3	0.2	0.3	0.6	0.6	0.6	1.0	1.0	1.0
Mn	ND	0.001	0.002	ND	ND	ND	0.002	0.004	0.004	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.8	0.8	0.8	1.3	1.2	1.2	1.7	1.7	1.7	1.2	1.0	1.0
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	2.4	2.5	2.4	1.1	1.1	1.0	1.6	1.7	1.6	3.2	3.3	3.0
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.006	0.006	0.006	0.003	0.003	0.003	0.007	0.007	0.006	0.008	0.008	0.008
Ti	0.002	ND	0.005	0.00.	ND	ND	0.003	ND	ND	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (Ca, Mg)	12.1	12.6	-	4.82	4.38	-	9.04	9.46	-	13.5	13.6	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Vancouver Island (2)

Metal	FRENCH CREEK Mar 02/83			GOLD RIVER Mar 03/83			HOLLAND CREEK Mar 04/83			KAUWINCH RIVER Mar 03/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.09	0.13	0.25	0.08	ND	0.09	0.06	ND	0.07	ND	ND	0.06
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	0.003	0.006	0.01	ND	0.003	ND	0.021	0.01	ND	ND	0.003
Ba	0.005	0.005	0.005	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.002
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	3.9	4.0	4.0	3.5	3.4	3.4	3.2	3.3	3.1	2.0	2.0	1.9
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.115	0.179	0.261	0.028	0.036	0.047	0.022	0.031	0.042	0.031	0.03	0.033
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	1.0	1.0	1.1	0.4	0.4	0.4	0.5	0.5	0.5	0.3	0.3	0.3
Mn	0.004	0.006	0.006	0.001	0.002	0.002	ND	0.001	ND	0.003	0.002	0.002
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	2.1	2.0	2.1	1.3	1.1	1.1	1.9	1.8	1.8	1.4	1.3	1.3
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	3.4	3.5	3.4	1.7	1.7	1.6	2.4	2.4	2.3	1.3	1.3	1.2
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.019	0.019	0.018	0.007	0.007	0.007	0.017	0.018	0.017	0.004	0.005	0.005
Ti	0.003	0.003	0.009	ND	ND	0.002	ND	ND	0.002	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (Ca, Mg)	13.9	14.2	-	10.4	10.0	-	9.99	10.4	-	6.36	6.18	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Vancouver Island (3)

Metal	KOKSILAH RIVER Mar 04/83			MENZIES CREEK Mar 02/83			NANAIMO RIVER Mar 04/83			OYSTER RIVER Mar 02/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	0.06	0.12	ND	ND	0.06	0.06	0.12	0.17	ND	0.06	0.13
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.005	0.008	0.006	ND	0.005	0.003	ND	ND	0.006	0.011	0.003	0.001
Ba	0.006	0.006	0.006	ND	ND	ND	0.004	0.004	0.005	ND	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	6.4	6.6	6.7	2.2	2.1	2.1	4.1	4.2	4.2	4.4	4.5	4.5
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.073	0.113	0.152	0.016	0.018	0.027	0.039	0.101	0.156	0.036	0.086	0.142
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	1.2	1.3	1.3	0.3	0.8	0.8	0.5	0.5	0.5	0.9	0.9	1.0
Mn	0.007	0.009	0.009	ND	0.001	ND	0.003	0.006	0.007	0.002	0.004	0.003
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	2.9	2.9	2.9	2.6	2.5	2.6	1.8	1.8	1.9	1.3	1.1	1.1
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	3.8	3.9	3.6	1.6	1.6	1.5	2.0	2.1	2.1	2.7	2.8	2.7
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.043	0.044	0.042	0.005	0.005	0.005	0.02	0.021	0.02	0.01	0.01	0.01
Ti	0.003	0.003	0.005	ND	ND	0.002	0.002	0.005	0.009	0.003	0.004	0.009
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (Ca, Mg)	21.0	21.7	-	8.68	8.47	-	12.1	12.5	-	14.8	15.1	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Vancouver Island (4)

Metal	SALMON RIVER Mar 02/83			TRENT RIVER Mar 02/83			TSABLE RIVER Mar 02/83			TSITIKA RIVER Mar 03/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.07	0.06	0.11	ND	0.06	0.13	ND	ND	0.09	0.15	0.17	0.16
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	ND	0.003	ND	0.006	0.027	0.027	0.031	0.005	0.003	0.006
Ba	0.002	0.002	0.002	0.01	0.011	0.011	0.004	0.003	0.003	0.003	0.003	0.002
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	5.1	5.1	5.0	5.8	5.9	5.9	7.9	7.8	7.5	1.7	1.8	1.7
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.042	0.065	0.105	0.057	0.123	0.166	0.022	0.05	0.07	0.085	0.094	0.098
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	0.7	0.6	0.7	1.0	1.1	1.1	12.0	11.2	11.1	0.3	0.3	0.3
Mn	0.004	0.005	0.005	0.005	0.009	0.009	0.003	0.003	0.036	0.002	0.002	0.002
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	1.1	1.0	1.0	3.4	3.2	3.3	103.0	95.9	97.3	1.0	0.9	0.9
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	2.6	2.6	2.5	2.7	2.8	2.6	2.0	2.1	1.9	2.2	2.3	2.1
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.01	0.01	0.011	0.03	0.031	0.03	0.08	0.076	0.072	0.006	0.006	0.006
Ti	ND	0.002	0.006	ND	0.004	0.006	0.002	0.003	0.005	0.002	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND	ND	0.003	0.002	ND	ND
Hardness (Ca, Mg)	15.5	15.4	-	18.8	19.1	-	69.2	65.6	-	5.37	5.64	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Vancouver Island (5)

Metal	TSOLUM RIVER Mar 02/83		
($mg.L^{-1}$)	Diss	Ext	Tot
Al	ND	0.08	0.19
As	ND	ND	ND
B	0.005	0.003	ND
Ba	0.002	0.001	0.002
Be	ND	ND	ND
Ca	3.3	3.3	3.3
Cd	ND	ND	ND
Co	ND	ND	ND
Cr	ND	ND	ND
Cu	ND	ND	ND
Fe	0.067	0.138	0.207
Hg	ND	ND	ND
Mg	0.8	0.8	0.9
Mn	0.006	0.008	0.008
Mo	ND	ND	ND
Na	1.6	1.5	1.6
Ni	ND	ND	ND
P	ND	ND	ND
Pb	ND	ND	ND
Sb	ND	ND	ND
Se	ND	ND	ND
Si	2.4	2.4	2.4
Sn	ND	ND	ND
Sr	0.01	0.01	0.011
Ti	0.004	0.005	0.011
V	ND	ND	ND
Zn	ND	ND	ND
Hardness (Ca, Mg)	11.6	11.7	-

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Powell River, Pender Harbour (1)

Metal	BREM RIVER						DESERTED RIVER					
	Feb 21/83			Oct 26/83			Feb 21/83			Nov 21/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	0.12	3.73	8.2	ND	0.08	ND	ND	0.06	0.09
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.011	0.005	0.009	ND	ND	ND	0.005	0.011	0.003	0.004	ND	0.008
Ba	0.02	0.003	0.026	0.005	0.047	0.081	0.006	ND	0.008	0.006	0.007	0.007
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	7.4	ND	7.5	0.9	2.2	3.9	2.7	ND	2.8	2.2	2.1	2.3
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	0.007	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	0.037	3.87	6.86	0.017	ND	0.03	0.02	0.057	0.065
Hg	ND	ND	ND	-	-	-	ND	ND	ND	-	-	-
Mg	0.2	ND	0.2	0.1	1.8	2.9	0.2	ND	0.2	0.2	0.1	0.1
Mn	ND	0.001	ND	0.003	0.127	0.185	ND	ND	0.001	0.001	0.003	0.003
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.6	ND	0.4	0.4	0.4	1.6	0.8	ND	0.7	0.7	0.5	0.6
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	0.47	0.53	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	1.1	1.0	1.1	0.9	4.5	14.4	1.9	1.8	1.8	1.7	1.5	1.7
Sn	ND	0.07	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND
Sr	0.016	ND	0.017	0.006	0.01	0.034	0.014	ND	0.014	0.011	0.012	0.012
Ti	ND	ND	ND	0.002	0.195	0.541	ND	ND	ND	ND	0.003	0.005
V	ND	ND	ND	ND	ND	0.02	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	0.013	0.019	ND	ND	ND	0.02	ND	ND
Hardness (Ca, Mg)	19.3	-	-	2.77	12.7	21.8	7.53	-	-	6.12	5.75	6.23

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Powell River, Pender Harbour (2)

Metal	KLITE RIVER						LANG CREEK		
	Feb 21/83			Oct 06/83			Sep 26/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	0.1	ND	ND	0.19	0.24	0.009	0.08	0.1
As	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	0.006	0.003	0.015	ND	ND	ND	ND	ND
Ba	0.009	ND	0.011	0.01	0.013	0.014	0.003	0.003	0.003
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	2.0	ND	2.0	2.6	2.6	2.8	2.3	2.2	2.2
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.007	ND	0.005	0.057	0.261	0.318	0.111	0.144	0.149
Hg	ND	ND	ND	-	-	-	-	-	-
Mg	ND	ND	ND	0.2	0.2	0.3	0.4	0.4	0.4
Mn	0.001	ND	0.001	0.002	0.005	0.007	0.015	0.008	0.008
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.7	ND	0.7	1.0	0.8	0.9	2.2	1.3	1.3
Ni	0.03	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	0.02	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	1.2	1.5	1.2	1.8	1.9	2.2	2.2	2.2	2.1
Sn	ND	0.07	ND	ND	ND	ND	ND	ND	ND
Sr	0.013	ND	0.012	0.014	0.015	0.016	0.012	0.012	0.011
Ti	ND	ND	ND	ND	0.017	0.023	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	0.002	0.002	0.003	0.023	0.006	ND
Hardness (Ca, Mg)	5.24	-	-	7.3	7.55	8.12	7.51	7.07	7.03

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Powell River, Pender Harbour (3)

Metal	LITTLE TOBA RIVER						SALTERY CREEK					
	Feb 21/83			Oct 06/83			Feb 21/83			Sep 26/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	0.06	0.08	ND	0.09	0.07	0.1	0.16
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.005	0.011	0.009	ND	ND	ND	0.006	ND	0.006	0.009	ND	ND
Ba	0.011	ND	0.014	0.01	0.011	0.011	0.002	ND	0.003	0.004	0.004	0.005
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	3.3	ND	3.4	2.1	2.1	2.2	2.2	ND	2.3	0.8	5.9	5.9
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.006	ND	ND
Fe	0.006	ND	ND	0.024	0.046	0.057	0.018	ND	0.026	0.057	0.062	0.252
Hg	ND	ND	ND	-	-	-	ND	ND	ND	-	-	-
Mg	0.2	ND	0.2	0.1	0.1	0.2	0.3	ND	0.3	0.8	0.8	0.8
Mn	ND	ND	ND	ND	0.001	0.001	ND	ND	0.001	0.026	0.004	0.004
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.7	ND	0.6	1.0	0.8	0.8	1.0	ND	0.8	4.2	1.9	1.8
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	1.8	1.6	1.7	1.5	1.5	1.5	2.0	ND	1.9	4.7	5.1	4.9
Sn	ND	0.07	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND
Sr	0.013	ND	0.012	0.014	0.014	0.014	0.008	ND	0.008	0.017	0.017	0.016
Ti	ND	ND	ND	ND	ND	ND	ND	ND	0.002	ND	ND	0.002
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	0.005	0.004	ND	ND	ND	0.07	0.006	ND
Hardness (Ca, Mg)	9.25	-	-	5.67	5.74	6.07	6.73	-	-	17.8	17.8	18.0

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Powell River, Pender Harbour (4)

Metal	SKWAWKA RIVER						SLIAMMON CREEK		
	Feb 21/83			Nov 20/83			Oct 27/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	0.12	ND	ND	ND	0.07	0.19	0.31	0.53
As	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.011	0.011	0.009	0.001	ND	ND	ND	ND	0.015
Ba	0.006	ND	0.009	0.007	0.007	0.008	0.003	0.004	0.005
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	4.0	ND	4.1	4.6	4.3	4.6	1.9	1.9	1.9
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.018	ND	0.02	0.028	0.037	0.17	0.039	0.097	0.235
Hg	ND	ND	ND	-	-	-	-	-	-
Mg	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4
Mn	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.004	0.005
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.6	ND	0.5	0.5	0.5	0.5	1.1	1.0	1.1
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	1.7	1.9	1.7	1.8	1.6	1.7	1.8	1.9	2.3
Sn	ND	0.07	ND	ND	ND	ND	ND	ND	0.01
Sr	0.013	ND	0.012	0.013	0.013	0.014	0.01	0.01	0.011
Ti	ND	ND	0.002	ND	ND	ND	ND	0.003	0.017
V	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	0.004	ND	ND	0.012	0.019	0.018
Hardness (Ca, Mg)	10.9	-	-	12.4	11.6	12.4	6.03	5.99	6.27

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Powell River, Pender Harbour (5)

Metal	THEODOSIA RIVER						TZOONIE RIVER		
	Feb 21/83			Oct 26/83			Nov 09/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.07	ND	0.07	0.17	0.19	0.29	ND	ND	0.06
As	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.016	0.022	ND	ND	ND	0.015	0.004	0.009	ND
Ba	0.002	0.005	0.002	0.003	0.003	0.003	0.002	0.003	0.003
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.9	ND	1.9	2.0	1.9	2.0	1.3	1.4	2.2
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.02	ND	0.032	0.074	0.1	0.144	0.013	0.025	0.036
Hg	ND	ND	ND	-	-	-	-	-	-
Mg	0.2	ND	0.2	0.2	0.2	0.2	ND	0.1	ND
Mn	ND	ND	ND	0.002	0.003	0.004	ND	ND	0.001
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.8	ND	0.8	0.8	0.7	0.8	0.5	0.5	0.7
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	2.0	1.6	1.9	1.9	1.9	2.0	1.5	1.6	1.5
Sn	ND	0.07	ND	ND	ND	ND	ND	ND	ND
Sr	0.008	ND	0.007	0.007	0.007	0.008	0.003	0.003	0.005
Ti	ND	ND	0.004	ND	0.003	0.007	ND	ND	0.003
V	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	0.02	0.003	ND	ND	ND	ND	ND
Hardness (Ca, Mg)	5.72	-	-	5.88	5.77	6.05	3.61	3.82	5.77

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Powell River, Pender Harbour (6)

Metal	VANCOUVER RIVER					
	Feb 21/83			Nov 26/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.09	0.06	0.1	0.8	0.08	0.1
As	ND	ND	ND	ND	ND	ND
B	0.011	0.006	ND	0.016	0.007	ND
Ba	0.003	ND	0.003	0.004	0.004	0.005
Be	ND	ND	ND	ND	ND	ND
Ca	1.0	ND	1.1	1.3	1.2	1.2
Cd	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND
Fe	0.022	ND	0.031	0.037	0.042	0.051
Hg	ND	ND	ND	-	-	-
Mg	0.1	ND	0.1	0.1	0.1	0.1
Mn	ND	0.001	0.001	ND	ND	0.001
Mo	ND	ND	ND	ND	ND	ND
Na	0.7	ND	0.6	0.8	0.7	0.7
Ni	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND
Si	1.7	1.7	1.7	2.0	1.8	1.8
Sn	ND	0.06	ND	ND	ND	ND
Sr	0.006	NL	0.006	0.007	0.006	0.006
Ti	ND	ND	ND	ND	ND	ND
V	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	0.003	ND	ND
Hardness (Ca, Mg)	3.04	-	-	3.83	3.49	3.65

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Whitehorse (1)

Metal	BEAVER CREEK Oct 12/83			CANOL CREEK Oct 12/83			CAYOTE CREEK Oct 12/83			COTTONWOOD CREEK Oct 12/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	-	ND	0.05	ND	ND	0.06	ND	0.27	0.72	ND	0.11	0.33
As	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	-	ND	ND	ND	ND	ND	ND	ND	0.009	ND	ND	ND
Ba	-	0.017	0.017	0.023	0.023	0.026	0.048	0.053	0.06	0.056	0.06	0.067
Be	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	-	7.3	7.5	9.6	9.7	11.4	41.4	41.6	42.5	25.3	25.4	27.5
Cd	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	-	ND	ND	ND	ND	ND	ND	ND	0.006	ND	ND	ND
Cr	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	-	0.037	0.038	ND	0.037	0.053	0.017	0.414	3.58	0.102	0.292	0.437
Hg	-	-	-	-	-	-	-	-	-	-	-	-
Mg	-	1.1	1.3	3.5	3.5	4.0	13.0	13.1	14.0	7.3	7.3	8.2
Mn	-	ND	ND	ND	0.001	0.002	0.007	0.034	0.036	0.006	0.014	0.017
Mo	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	-	1.1	1.1	1.2	1.1	1.2	3.7	3.6	3.7	2.5	2.2	2.4
Ni	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.03
P	-	ND	ND	ND	ND	ND	ND	ND	0.08	ND	ND	ND
Pb	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	-	4.5	4.3	5.1	5.2	5.5	5.3	5.8	6.8	4.7	4.8	5.5
Sn	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	-	0.029	0.029	0.031	0.031	0.033	0.179	0.18	0.18	0.096	0.096	0.103
Ti	-	ND	ND	ND	ND	ND	ND	0.008	0.048	ND	0.004	0.019
V	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	-	ND	ND	ND	ND	ND	ND	0.005	0.004	ND	ND	0.002
Hardness (Ca, Mg)	-	23.0	23.9	38.4	38.7	45.1	157	158	164	93.2	93.6	102

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Whitehorse (2)

Metal	DODGE CREEK Oct 12/83			GOLD CREEK Oct 12/83			GRAVEL CREEK Oct 12/83			PONY CREEK Oct 12/83		
($mg.L^{-1}$)	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	0.06	0.11	ND	0.06	0.13	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	ND	ND	ND	ND	0.004	ND	ND	ND	ND	ND
Ba	0.009	0.009	0.01	0.017	0.018	0.02	0.009	0.01	0.012	0.006	0.006	0.007
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	6.4	6.3	6.9	34.0	33.4	35.5	9.1	9.0	9.7	10.8	10.7	11.7
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	0.02	0.022	ND	0.089	0.133	0.034	0.078	0.112	0.032	0.09	0.1
Hg	-	-	-	-	-	-	-	-	-	-	-	-
Mg	0.8	0.7	0.8	7.5	7.4	8.2	2.4	2.3	2.6	1.2	1.2	1.3
Mn	ND	ND	ND	ND	0.003	0.003	0.001	0.003	0.004	0.004	0.006	0.006
Mo	ND	ND	ND	ND	ND	ND	ND	ND	0.006	0.005	ND	ND
Na	1.4	1.2	1.4	1.2	1.0	1.1	1.6	1.4	1.4	1.3	1.2	1.3
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	3.6	3.6	3.8	2.5	2.5	2.6	4.1	4.2	4.4	3.6	3.6	3.8
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.037	0.037	0.04	0.195	0.191	0.201	0.039	0.039	0.041	0.06	0.059	0.066
Ti	ND	ND	ND	ND	ND	ND	ND	ND	0.005	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (Ca, Mg)	19.0	18.6	20.5	116	114	122	32.5	32.2	34.9	31.8	31.5	35.1

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

SURFACE WATER CHEMISTRY - METALS

Whitehorse (3)

Metal	UPPER SHEEP CREEK Oct 12/83		
($mg.L^{-1}$)	Diss	Ext	Tot
Al	ND	0.08	0.26
As	ND	ND	ND
B	ND	ND	0.008
Ba	0.011	0.011	0.013
Be	ND	ND	ND
Ca	38.0	37.2	38.3
Cd	ND	ND	ND
Co	ND	ND	ND
Cr	ND	ND	ND
Cu	ND	ND	ND
Fe	ND	0.113	0.266
Hg	-	-	-
Mg	5.6	5.5	5.9
Mn	ND	0.004	0.005
Mo	ND	ND	ND
Na	1.2	1.1	1.1
Ni	ND	ND	ND
P	ND	ND	ND
Pb	ND	ND	ND
Sb	ND	ND	ND
Se	ND	ND	ND
Si	3.0	3.0	3.2
Sn	ND	ND	ND
Sr	0.131	0.126	0.128
Ti	ND	ND	0.005
V	ND	ND	ND
Zn	0.004	ND	ND
Hardness (Ca, Mg)	118	116	120

(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected

APPENDIX III

SNOWMELT CHEMISTRY - METALS

Prince Rupert - Terrace (1)

Metal ($mg.L^{-1}$)	EXCHAMSIKS RIVER AREA (February 1, 1983)						EXSTEW RIVER AREA (February 1, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	0.002	ND	ND	ND	0.005	ND	ND	ND	ND	ND
Ba	0.002	0.001	ND	0.001	ND	ND	0.001	0.001	ND	0.001	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	0.007	ND	ND	0.006	ND	ND	0.005	ND	ND	ND	ND
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	0.03	ND	ND	ND	0.002	ND	ND	ND	ND	ND
Mo	0.006	ND	ND	ND	ND	0.005	ND	ND	ND	ND	ND	ND
Na	ND	0.3	0.3	0.4	ND	0.3	ND	0.2	0.2	0.3	ND	ND
Ni	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	0.01	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.007	0.006	0.007	0.006	0.005	0.006	0.006	0.005	0.008	0.005	0.006	0.006
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.004	0.003	0.006	0.005	0.002	0.003	0.003	0.003	ND	0.002	ND	ND
Hardness (Ca, Mg)	-	0.237	-	0.219	-	-	-	0.111	-	0.127	-	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-11)

SNOWMELT CHEMISTRY - METALS

Prince Rupert - Terrace (2)

Metal ($mg.L^{-1}$)	KASIKS RIVER AREA (February 1, 1983)						KHYEX RIVER AREA (February 1, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	ND	ND	ND	ND	ND	0.008	0.005	ND	ND	ND
Ba	0.001	ND	ND	0.001	0.001	ND	0.001	ND	ND	0.001	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	0.008	ND	0.052	0.017	0.018	ND	0.006	ND	0.005	ND	ND
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	0.001	0.001	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	ND	0.3	0.3	0.6	ND	0.4	ND	0.5	0.4	0.6	ND	0.4
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.005	0.005	0.008	0.005	0.007	0.007	0.005	0.005	0.007	0.006	0.006	0.006
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.002	0.002	ND	0.005	0.005	0.004	0.005	0.004	0.003	0.005	ND	0.002
Hardness (Ca, Mg)	-	0.355	-	0.219	-	-	-	0.343	-	0.545	-	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-12)

SNOWMELT CHEMISTRY - METALS

Prince Rupert - Terrace (3)

Metal ($mg.L^{-1}$)	KITSUMKALUM RIVER, (LOWER) AREA (February 1, 1983)						SHAMES RIVER AREA (February 1, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	0.05	ND	ND	0.07	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	0.003	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ba	0.001	0.001	ND	0.001	ND	ND	0.001	ND	ND	0.001	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	0.037	0.051	ND	0.016	0.014	ND	0.009	ND	0.007	0.006	ND
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	0.001	0.004	ND	ND	ND	ND	ND	0.001	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	ND	ND	ND	0.3	ND	ND	ND	0.2	0.2	0.3	ND	ND
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	0.06	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	0.01	ND	ND	ND	ND	ND	0.02	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.005	0.009	0.012	0.004	0.007	0.007	0.006	0.006	0.008	0.007	0.006	0.006
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.002	0.002	ND	0.003	ND	ND	0.004	0.003	0.002	0.003	ND	ND
Hardness (Ca, Mg)	-	0.141	-	0.19	-	-	-	0.0855	-	0.229	-	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-13)

SNOWMELT CHEMISTRY - METALS

Prince Rupert - Terrace (4)

Metal ($mg.L^{-1}$)	ZYMAGOTITZ RIVER AREA (February 1, 1983) 1* Diss	1* Ext	1* Tot	2 Diss	2 Ext	2 Tot
Al	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND
B	ND	ND	0.002	ND	ND	ND
Ba	0.001	0.001	ND	0.001	ND	ND
Be	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	0.1	ND	ND
Cd	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND
Fe	ND	0.009	0.005	0.008	ND	ND
Hg	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND
Na	ND	ND	ND	0.3	ND	ND
Ni	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND
Pb	0.02	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND
Ti	0.007	0.006	0.007	0.007	0.006	0.005
V	ND	ND	ND	ND	ND	ND
Zn	0.002	0.003	ND	0.003	ND	ND
Hardness (Ca, Mg)	-	0.0363	-	0.47	-	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-14)

SNOWMELT CHEMISTRY - METALS

Lower Mainland (1)

Metal ($mg.L^{-1}$)	ALOUETTE LAKE AREA (March 11, 1983)						CALLAGHAN CREEK AREA (February 24, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.01	ND	0.003	ND	ND	0.003	0.004	0.011	0.016	ND	0.005	ND
Ba	0.002	ND	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	ND	ND	0.1	0.1	ND	0.1	0.1	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.019
Fe	ND	0.028	0.029	ND	ND	ND	0.005	0.01	0.008	0.01	0.006	ND
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	ND	ND	ND	ND	ND	0.2	0.2	ND	0.2	0.3	ND	ND
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	ND	ND	ND	0.004	ND	ND	0.006	0.006	0.005	0.005	0.006	0.004
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	0.002	ND	ND	0.003	ND	0.01
Hardness (Ca, Mg)	0.249	0.271	-	0.235	0.0807	-	0.516	0.258	-	0.523	0.251	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-7)

SNOWMELT CHEMISTRY - METALS

Lower Mainland (2)

Metal ($mg.L^{-1}$)	GROUSE MOUNTAIN AREA (February 21, 1983)						HEMLOCK VALLEY AREA (February 18, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.004	0.006	ND	ND	0.003	ND	ND	ND	ND	ND	ND	ND
Ba	ND	ND	ND	ND	ND	ND	0.001	ND	ND	0.001	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	0.1	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.008	0.005	ND	0.008	0.009	ND	ND	0.007	ND	ND	ND	ND
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.2	ND	0.2	0.2	ND	ND	ND	0.2	ND	0.4	ND	ND
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	0.01	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.005	0.005	0.005	0.007	0.005	0.005	0.006	0.005	0.008	0.006	0.006	0.006
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.004	ND	0.002	0.003	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (Ca, Mg)	0.57	0.254	-	0.524	0.335	-	-	0.103	-	0.106	-	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-8)

SNOWMELT CHEMISTRY - METALS

Lower Mainland (3)

Metal ($mg.L^{-1}$)	PITT LAKE AREA (March 10, 1983)						SEYMOUR RIVER AREA (February 18, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	0.35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.01	ND	ND	ND	ND	0.01	ND	ND	0.002	ND	ND	0.002
Ba	0.001	ND	ND	0.001	ND	ND	0.002	0.001	ND	0.002	0.001	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	0.1
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.007	0.01	0.017	ND	0.007	0.017	ND	0.005	ND	0.028	0.014	0.037
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.001	0.006
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.2	ND	ND	ND	ND	ND	ND	0.3	0.3	0.5	ND	0.4
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	0.05	ND	ND	ND	ND	ND	0.06
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	0.01	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	ND	ND	ND	0.004	ND	0.002	0.006	0.004	0.006	0.005	0.007	0.007
V	ND	ND	NL	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.003	ND	ND	0.007	ND	ND	0.002	0.002	ND	0.007	0.003	0.003
Hardness (Ca, Mg)	0.354	0.314	-	0.347	0.129	-	-	0.311	-	0.371	-	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-9)

SNOWMELT CHEMISTRY - METALS

Lower Mainland (4)

Metal ($mg.L^{-1}$)	WAHLEACH LAKE AREA (March 11, 1983) 1* Diss	1* Ext	1* Tot	2 Diss	2 Ext	2 Tot	WIDGEON LAKE AREA (March 11, 1983) 1 Diss	1 Ext	1 Tot	2 Diss	2 Ext	2 Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	0.05	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.012	ND	0.01	0.004	ND	ND	0.002	0.011	ND	ND	0.005	ND
Ba	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	0.1	ND	ND	ND	0.1	0.4	0.3	0.4	ND	0.1	0.1
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	0.006	ND	ND	ND	0.01	0.01	0.019	0.037	ND	0.009	0.01
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND
Mn	ND	ND	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.2	0.2	0.2	0.2	ND	ND	0.4	0.3	0.4	0.2	ND	ND
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	0.08	0.1	ND	ND	ND	ND	0.09	0.11	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	0.1	0.1	0.2	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND	0.004	0.003	0.004	ND	ND	ND
Ti	ND	ND	ND	0.004	ND	ND	0.003	0.002	0.003	0.003	0.002	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.003	ND	ND	0.002	ND	ND	0.003	0.003	0.003	0.005	0.004	0.003
Hardness (Ca, Mg)	0.471	0.532	-	0.382	0.381	-	1.41	1.18	-	0.203	0.325	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-10)

SNOWMELT CHEMISTRY - METALS

Vancouver Island (1)

Metal ($mg.L^{-1}$)	CHEF CREEK AREA (March 3, 1983)						GREEN MOUNTAIN AREA (March 1, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	0.05	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	0.009	0.004	0.011	0.022	0.004	ND	0.009	ND	ND	0.003
Ba	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	0.002
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	0.2	ND	0.2	ND	0.2	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.014	0.007	0.023	0.007	ND	0.017	0.012	0.017	0.072	ND	0.007	0.057
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND	0.001	0.001	0.002	0.003	0.003	0.004
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.3	0.3	0.3	0.4	ND	0.3	0.4	0.2	0.3	0.2	ND	0.2
Ni	ND	ND	ND	ND	ND	ND	ND	ND	0.03	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	0.09	0.08	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	0.002	ND	0.002	ND	0.002	ND	ND	ND	ND	ND	ND
Ti	0.004	0.005	0.005	0.007	ND	0.006	0.002	ND	0.005	ND	ND	0.003
V	ND	ND	ND	ND	0.005	ND	ND	ND	ND	ND	ND	ND
Zn	0.003	ND	ND	0.003	ND	ND	0.019	0.018	0.019	0.012	0.012	0.012
Hardness (Ca, Mg)	0.321	0.589	-	0.567	0.0438	-	0.3	0.272	-	0.303	0.0751	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-1)

SNOWMELT CHEMISTRY - METALS

Vancouver Island (2)

Metal ($mg.L^{-1}$)	MIDDLE MEMEKAY RIVER AREA (March 3, 1983)						MOUNT WASHINGTON AREA (March 2, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	0.09	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	0.003	ND	0.007	ND	0.003	ND	0.008	0.003	0.004	0.006	ND
Ba	ND	ND	0.001	ND	ND	0.001	ND	ND	0.001	ND	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	0.1	ND	0.2	ND	0.1	ND	0.2	0.1	0.2	0.1	0.1	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.006	ND	0.017	ND	0.006	0.008	0.006	0.009	0.137	ND	0.022	0.026
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	0.002	ND	0.002	ND	ND	ND	0.002	ND	0.001	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.3	ND	0.2	ND	0.2	ND	0.3	ND	0.2	0.4	ND	ND
Ni	ND	ND	ND	ND	ND	ND	ND	ND	0.03	ND	ND	0.02
P	ND	ND	ND	ND	ND	ND	ND	0.09	0.08	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.001	ND	0.001	ND	0.001	ND	ND	ND	0.001	ND	0.002	ND
Ti	ND	0.003	0.003	ND	ND	0.004	ND	ND	0.008	ND	0.004	0.004
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.005	ND	0.005	ND	0.005	0.002	0.005	0.002	0.003	0.004	0.004	0.003
Hardness (Ca, Mg)	0.411	0.29	-	0.176	0.433	-	0.743	0.306	-	0.41	0.453	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-2)

SNOWMELT CHEMISTRY - METALS

Vancouver Island (3)

Metal ($mg.L^{-1}$)	NEWCASTLE RIDGE AREA (March 3, 1983) 1* Diss	1* Ext	1* Tot	2 Diss	2 Ext	2 Tot	ROWBOTHAM LAKE AREA (March 3, 1983) 1 Diss	1 Ext	1 Tot	2 Diss	2 Ext	2 Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	0.05	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.001	0.004	ND	0.001	ND	0.003	ND	ND	0.009	0.001	0.002	0.015
Ba	ND	ND	ND	0.001	ND	0.001	ND	ND	ND	ND	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	ND	0.1	0.1	0.1	ND	ND	0.1	0.1	0.1
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	0.011	0.017	0.005	0.015	ND	0.01	0.044	0.005	0.008	0.027
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND	0.003	0.002	0.002	0.005	0.003	0.003
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.3	ND	0.2	0.2	ND	0.2	ND	ND	0.2	0.4	0.3	0.3
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	0.06	0.07	ND	ND	ND	ND	0.17	0.16
Pb	ND	ND	ND	ND	ND	ND	ND	0.04	0.04	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.004	0.005	0.006	0.005	0.004	0.006	ND	0.005	0.008	0.003	0.006	0.007
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	[illegible]	ND	ND	ND	ND	0.002	0.003	0.003	ND
Hardness (Ca, Mg)	0.342	0.0978	-	0.19	0.4	-	0.564	0.372	-	0.302	0.379	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-3)

SNOWMELT CHEMISTRY - METALS

Vancouver Island (4)

Metal ($mg.L^{-1}$)	TSABLE LAKE AREA (March 3, 1983)						TSITIKA RIVER AREA (March 3, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.018	0.008	0.003	ND	ND	ND	ND	ND	0.009	ND	ND	0.009
Ba	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	0.1	ND	0.2	0.1	ND	ND	0.1	ND	ND	ND	ND	0.1
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	0.005	0.006	0.03	ND	0.008	0.025	0.006	ND	0.006	ND	ND	0.028
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.4	0.2	0.3	0.4	0.2	0.3	0.3	ND	0.2	0.4	ND	0.3
Ni	ND	ND	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	0.03	ND	ND	0.02	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	ND	ND	0.005	0.007	ND	ND	ND	ND	ND	ND
Ti	0.005	0.006	0.007	ND	ND	ND	ND	0.005	0.007	0.004	0.006	0.008
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.012	0.009	0.01	0.007	0.006	0.006	0.003	ND	0.003	0.004	0.003	0.003
Hardness (Ca, Mg)	0.542	0.305	-	0.394	0.315	-	0.522	0.0679	-	0.176	0.0354	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-4)

SNOWMELT CHEMISTRY - METALS

Powell River - Pender Harbour (1)

Metal ($mg.L^{-1}$)	BREM RIVER AREA (February 21, 1983)						KLITE RIVER AREA (February 21, 1983)					
	1*			2			1			2		
	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.005	ND	0.006	ND	ND	0.003	ND	0.013	0.013	ND	0.005	0.003
Ba	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	ND	ND	0.011	ND	ND	ND	0.005	0.005	0.01
Hg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	ND	ND	ND	ND	ND	ND	0.2	ND	ND	0.2	ND	ND
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	0.01	ND	ND	0.01	ND	ND	0.02
Sr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.006	0.005	0.006	0.004	0.006	0.005	0.006	0.006	0.005	0.005	0.005	0.005
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.003	ND	ND	0.003	ND	ND	0.003	ND	ND	0.003	ND	ND
Hardness (Ca, Mg)	-	-	-	-	0.123	-	0.0369	0.0921	-	0.0973	0.0373	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-5)

SNOWMELT CHEMISTRY - METALS

Powell River - Pender Harbour (2)

LITTLE TOBA RIVER AREA (February 21, 1983)

Metal ($mg.L^{-1}$)	1*			2		
	Diss	Ext	Tot	Diss	Ext	Tot
Al	ND	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND
B	ND	ND	0.006	ND	ND	0.003
Ba	ND	ND	ND	ND	ND	ND
Be	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND
Fe	ND	0.006	0.007	0.006	ND	0.007
Hg	ND	ND	ND	ND	ND	ND
Mg	ND	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND
Na	ND	ND	ND	ND	ND	ND
Ni	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND
Sb	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND
Sn	ND	ND	0.02	ND	ND	ND
Sr	ND	ND	ND	ND	ND	ND
Ti	0.006	0.005	0.006	0.005	0.005	0.006
V	ND	ND	ND	ND	ND	ND
Zn	0.003	ND	0.009	0.002	ND	ND
Hardness (Ca, Mg)	0.135	0.258	-	-	0.195	-

* = Replicate Samples
(Diss) = Dissolved
(Ext) = Extractable
(Tot) = Total
(ND) = Not Detected
(wq9.1SNOW-6)