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A Water Quality Atlas for Streams and Lakes of Labrador

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June 1979

Fisheries & Marine Service Data Report No. 148

Fisheries and Environment Canada
Fisheries and Marine Service

Pêches et Environnement Canada
Service des pêches et de la mer

Fisheries and Marine Service

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• Cover design by Christine Rusk

Fisheries and Marine Service

Data Report No. 148

June 1979

A WATER QUALITY ATLAS FOR STREAMS AND LAKES OF LABRADOR[1]

by

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This is the seventh Data Report from the
Research and Resource Services Directorate, St. John's.

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Cat. no. Fs 97-13/148 ISSN 0701-7634

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ABSTRACT

Jamieson, A. 1979. A water quality atlas for streams and lakes of Labrador. Fish. Mar. Serv. Data Rep. 148: iv + 53 p.

A first account of the quality of the surface fresh water of Labrador is presented. Data are presented on eight chemical and physical parameters; these include pH, total alkalinity, total hardness, specific conductance, chloride, calcium, turbidity and bicarbonate. A brief comparison is made with insular Newfoundland's freshwater quality.

Key words: water quality, fresh water, Labrador

RÉSUMÉ

Jamieson, A. 1979. A water quality atlas for streams and lakes of Labrador. Fish. Mar. Serv. Data Rep. 148: iv + 53 p.

On présente un premier compte rendu sur la qualité des eaux douces de surface du Labrador. Les données présentées selon huit paramètres chimiques et physiques, soit le pH, l'alcalinité totale, la dureté totale, la conductivité spécifique, le chlorure, le calcium, la turbidité et le bicarbonate. On fait également une brève comparaison avec la qualité des eaux douces de l'île de Terre-Neuve.

INTRODUCTION

This water quality atlas presents for the first time a preliminary, yet fairly concise, review of some water quality parameters for Labrador. A similar atlas of insular Newfoundland freshwater quality was compiled in 1974. The fact that the Labrador atlas is 5 years behind the Newfoundland effort is somewhat a reflection of the attention afforded Labrador vis à vis the island portion of the Province. However, readers should be aware that this Service has had a presence in freshwater research and management on the island for about 30 years yet our real presence in Labrador is limited to little more than 10 years. Obviously, the gap between the two areas in terms of our involvement with freshwater research and management is narrowing.

The need for a concise review of the water quality parameters of Labrador has existed for some time. Other than the fact the atlas presents water quality data for the first time for this geographic area, the requirements for, and the application of, this type of data are not unique to Labrador. There are a number of general uses or applications for water quality data; the principal ones are as follows:

1. Water quality parameters (especially specific conductance) can be used in conjunction with morphometric data from standing waters in simple mathematical models to determine "rule-of-thumb" maximum sustainable yields of resident fish species. The data from individual lakes or regions of lakes may be used to set lake-by-lake creel limits or set catch quotas over a geographic area.

2. An atlas of water quality provides baseline data on both specific location and geographic areas and as such may be used for future reference points in relation to pollution. Pollution from point-source and, perhaps even more important in the future, long-range atmospheric transport can be quantitatively determined using the background data provided in an atlas.

3. With respect to pollution, selected parameters (i.e. pH, alkalinity and hardness) can be used to determine the buffering capacity of receiving waters. On this basis "safe" or acceptable levels of acidic or alkaline pollutants in receiving waters can be established.

4. Data on conductivity can be used to assist in selecting appropriate sampling gear during the planning or electrofishing studies. The specific conductance of a given stream or region of streams will determine the effectiveness of the various gears available. Optimum choice of the most efficient gear will be possible if conductivity is known beforehand.

5. Water quality data may have some industrial application, particularly as it applies to corrosion of metals. Data on surface water pH could be useful in choosing between available metals or in determining the life expectancy of various structures.

6. Surface water quality anomalies are frequently used by geologists to assist in their mineral exploration planning. Variations in quality from the norm within a geographical area may indicate a unique geographical formation.

7. An atlas of water quality data permits comparison between or among areas.

In preparing this atlas, eight water quality parameters were chosen. They are as follows: pH, total alkalinity, total hardness, specific conductance, turbidity, chloride, calcium and bicarbonate. These parameters are the classical indicators of water quality and basic productivity and, as such, can be used to adequately assess the present situation and, perhaps even more important, to monitor future conditions. Also, they have the advantage of being both simple to determine and economical in terms of time and money.

MATERIALS AND METHODS

Data contributing to this atlas were collected, for the most part, in an opportunistic manner; little directed sampling was conducted because of the economics involved in doing this type of survey in a remote, inaccessible area like Labrador. Various research and management projects undertaken by the Freshwater and Anadromous Fisheries Management Program during the period 1967-78 contributed water samples as the opportunity arose. Principal contributors over the years were the Sandhill Salmon Project, the Fraser River Char Project, the Stream Survey Project, the Mercury Project, and the Labrador Lake and Reservoir Inventory Project. Nearly all data are derived from surface grab samples during the open-water season and were unfixed chemically. The shelf-life of these samples varied widely, however none exceeded 12 months. In some instances samples were collected at a site for more than one year or more than once within a year; all such data were averaged for that sampling site.

Table 1 presents the location of each sampling site with the latitude and longitude given in degrees and minutes.

The river systems from which the water samples were collected are also identified by a river code. This river coding system is described in Waldron (1974). The location map (Fig. 1) shows the Labrador coast represented as statistical area "0", which is divided into four statistical sections; these divisions were developed by the Economics and Intelligence Branch in 1968, and are listed below.

Statistical Section	Boundaries
50	Blanc Sablon to Cape St. Charles
51	Cape St. Charles to Indian Isle
52	Indian Isle to Cape Harrison
53	Cape Harrison to Cape Chidley

Under this system each river in Newfoundland and Labrador has an assigned seven digit code which commences at Cape Norman on the northern tip of the Great Northern Peninsula and proceeds consecutively and

clockwise around insular Newfoundland and into Labrador. The seven digit code, developed for quick identification and location of rivers as well as for computer coding, denotes not only the individual river number but also the statistical section in which the mouth of the river is located. For example, Naskaupi River, a tributary of Grand Lake, is coded 5211047. The number 52 indicates the statistical section, the number 1104 is the individual river number for Grand Lake and the number 7 represents the seventh tributary upstream from the mouth, i.e. Naskaupi River.

Due to the non-directed nature of the sampling program, 205 of the 309 sampling stations are located within the Churchill River drainage system. Gaps in sampling occur in the southeast coastal area and along the southern and northern "border" regions. Although the Churchill River system drains 31% of the land mass of Labrador there is still a bias in the data in favour of the Churchill system. The reader is therefore cautioned regarding the use of mean parameter values as presented insofar as they may be taken as representative of Labrador as a whole.

A definition of each parameter where required, and its analysis technique follows:

TOTAL HARDNESS

Total hardness is defined as the concentration of calcium and magnesium ions, expressed as calcium carbonate ($CaCO_3$).

The total hardness was determined using the Hach "Man Ver" hardness test, which is a complexometric titration method devised by Schwarzenbach in 1947.

SPECIFIC CONDUCTANCE

Specific conductance is a measure of a water's capacity to convey an electric current, and is related to the total concentration of ionized substances and to the temperature at which the measurement is made.

Two different conductivity meters were used in the determinations - a Y.S.I. conductivity bridge and the Radiometer Model COM2 conductivity meter.

TURBIDITY

Turbidity is an expression of an optical property of the fine suspended matter in a sample. Measurement is based on comparison of interference in the passage of light rays through a sample with that in standard samples.

All samples were tested for turbidity by using the Hach laboratory turbidity Model 2100.

pH

The pH determination is the measurement of acid or alkali strength of a solution, and is expressed in pH units from 0 (strongly acidic) to 14 (strongly alkaline) with a pH value of 7 expressing a neutral solution.

The pH value was electrometrically determined using a Corning "Model 10" meter, a Corning Digital 109 meter and an Orion Model 401 meter with the appropriate glass electrodes.

TOTAL ALKALINITY

The alkalinity of a water is the capacity of the water to accept protons, and is the result of the presence of bicarbonates, carbonates and hydroxides of calcium, magnesium, sodium and other metals. The value indicates the capacity of the water to neutralize acids.

Total alkalinity was determined by a potentiometric titration method similar to that of "Standard Methods for the Examination of Water and Waste Water", 13th Edition, 1971.

CALCIUM

Calcium was determined by direct aspitation of aqueous solutions, using a Jarrel-Ash Atomic Absorption Spectrophotometer (Model 82-270 Atomsorb) with a 10 cm standard air-acetylene flame.

CHLORIDE

Chloride was determined by the Mercuric Nitrate method.

BICARBONATE

Bicarbonate ion concentration is determined by a simple arithmetic approximation using the value of total alkalinity in the sample.

$$\text{i.e. } HCO_3 \simeq \text{total alkalinity} + 0.22\ (\text{total alkalinity})$$

The theory behind this simple transformation is provided in "Standard Methods for the Examination of Water and Waste Water", 13th Edition, A.P.H.A., A.W.W.A and W.P.C.F. Basically it assumed that in the case of soft waters (i.e. Labrador) HCO_3 alkalinity as $CaCO_3$ equals total alkalinity. In other words total alkalinity is not contributed to by carbonates or hydroxides.

Average values for each of the eight parameters were calculated for each of the sampling sites. Mean values were determined either from a number of values, (1) within any one year, (2) over a number of years, or (3) both.

Six of the parameters only were chosen for graphical representation; the remaining two (bicarbonate and turbidity) were considered to be of lesser significance in the atlas.

RESULTS

Data on each of the selected parameters at each sampling site are presented in Table 2. Data on pH, total alkalinity, total hardness, specific conductance, calcium and chloride are presented graphically in Fig. 2-7. Three ranges of each parameter are presented in each of the graphical displays.

Table 3 illustrates a comparison of Labrador water quality parameters with those of the island portion of the Province.

DISCUSSION

OVERVIEW

As previously stated, there is little published detail on the water quality of Labrador's surface fresh waters. The fact that they are generally considered to be soft (water with less than 60 ppm total hardness as $CaCO_3$ are considered soft) (Thomas 1960) is borne out from sketchy data provided in the recently published (1978) Hydrological Atlas of Canada. The atlas shows both Labrador and insular Newfoundland as having characteristically soft waters. It is suggested that for both total hardness is generally less than 60 ppm; total dissolved solids less than 50 ppm; and turbidity less than 5.0 JTU. More specifically it suggests an ionic order of dominance (of the analyzed) for Labrador and insular Newfoundland as follows:

Labrador	Insular Newfoundland
Bicarbonates, Calcium, Sulphate, Magnesium, Sodium and Chloride	Bicarbonates, Calcium, Chloride, Sulphate, Sodium and Magnesium

Only three of the six parameters described in the Hydrological Atlas were considered in this present Atlas. These are bicarbonates, calcium and chloride. For these particular parameters the Hydrological Atlas suggests mean values for Labrador as follows:

Bicarbonates	10.0 ppm
Calcium	1.1 ppm
Chloride	0.5 ppm

However, these data were generated from only three sampling stations.

Data generated in this present Atlas, however, represent over 300 stations. Generally speaking, the data bear out the suggestion that Labrador's surface fresh waters are indeed soft. The ionic order of dominance is suggested as being bicarbonates, chloride and calcium with the mean concentrations being 7.0 ppm, 1.5 ppm and 1.4 ppm, respectively. These numbers are not all that dissimilar from those suggested in the Hydrological Atlas with the exception of chloride. However, since chloride values are generally accepted as being a reflection of the proximity of the sampling station to marine coastal influence, the value suggested in the Hydrological Atlas may only reflect interior sampling stations as opposed to coastal stations.

Total alkalinity

Total alkalinity values ranged from less than 1.0 to 42.0 ppm and averaged 7.0 ppm. Slightly over half the values determined were in the 5.0-10.0 ppm interval and just less than 50% were less than 5.0 ppm. Approximately 5% of the values were greater than 10.0 ppm. Fig. 2c illustrates that these values were distributed in the Wabush-Labrador City area, the Forteau area, and the Nain-Hopedale area of the coast. These elevated alkalinity values undoubtedly reflect local geological conditions and in fact the Wabush-Labrador City area lies within a large soft rock area where dolemite deposits are extensive.

Specific conductance

The average value for this parameter was 19.6 micro mhos/cm; this is very low by mainland Canadian standards. The range of values was from 5.0 to 123.0 micro mhos/cm. Approximately 97% of all values fell into the range of 10.0-50.0 micro mhos/cm. Fig. 3a illustrates that the extreme low values (<10.0) were encountered near Cape Harrison, near Saglek Fiord and in the interior. Most of the highest values were encountered in the Wabush-Labrador City area and the Goose Bay-Northwest River area. Contamination by brackish water at the latter site may be an explanation while high values at Wabush-Labrador City may once again reflect the soft rock nature of the surficial deposits.

Total hardness

Total hardness values ranged from 1.0 to 62.0 ppm and the average value was determined to be 8.8 ppm. Nearly 69% of the values were less than 10.0 ppm and approximately 30% were between 10.0 and 20.0 ppm. Fig. 4a illustrates the Churchill River drainage and southeastern Labrador. Only some 2% of the values exceeded 20.0 ppm and Fig. 4c shows that these were again primarily in the Wabush-Labrador City area and Goose Bay-Northwest River area. The previously-offered explanation for this distribution of values of specific conductance probably applies to total hardness.

Chloride

Chloride concentrations ranged from 0.3 to 33.0 ppm and averaged 1.5 ppm. Approximately 98% of the values were between <1.0 and 5.0 ppm. Lowest values (Fig. 5a) tended to be distributed in the Labrador West area, the Churchill River Valley, southeastern Labrador and the northern coast. Intermediate values were more randomly distributed (Fig. 5b) throughout the interior, coastal Labrador and the Goose Bay-Northwest River area. Less than 2% of the chloride values were greater than 5.0 ppm. Fig. 5c illustrates again that these were predominantly in the Goose Bay-Northwest River area. Contamination by brackish water is greatly suspected. Chloride values tend to reflect the distance a sampling site is removed from marine coastal influence and this is the normal situation respecting the distribution of the parameter in eastern Canada.

pH

Labrador surface fresh waters are slightly acidic with a mean pH of 6.4 units. The pH was found to range from a low of 4.80 to a high of 7.30. Obviously nearly all Labrador surface waters are on the acidic side; only 1.3% of the values were above 6.9 units. Approximately 94% of the values ranged from 6.0 to 6.9 pH units; only 4.2% of the values were less than 6.0 units. Fig. 6a illustrates that these values were encountered in central Labrador, the northern coast, the central coast and near Lake Melville. No general explanation is offered other than

localized conditions conducive to low pH (i.e. masking drainage, hard rock geology, humic acid, peat lands, etc.). Fig. 4c illustrates once again that one of the areas of pH values in excess of 6.9 is the Labrador City-Wabush area. Soft rock geology is undoubtedly responsible.

Calcium

The average value of calcium ion in Labrador surface fresh waters was 1.4 ppm. The values ranged from 0.3 to 10.2 ppm. Nearly 91% of the values were between <1.0 and 2.0 ppm. Fig. 7a suggests lowest values are encountered along the northern coast, the interior, southwestern and southeastern Labrador, and the Churchill River valley. Intermediate values are encountered in the Churchill River drainage, western Labrador and the central/southern coastal areas (Fig. 7b). Approximately 9% of the calcium values were above 2.0 ppm and Fig. 7c illustrates their distribution as Labrador City-Wabush area, western Labrador generally, the central coastal area, the Forteau area and the Lake Melville area.

Bicarbonates

Bicarbonate ion concentration ranged from 1.2 to 51.2 ppm with a mean of 7.0 ppm; 85% of the values were between <5.0 and 10.0 ppm with the remainder being higher than 10.0 ppm. Geographic distribution of bicarbonates was very similar to that of calcium so no attempt was made to display values graphically.

Turbidity

Labrador surface fresh waters ranged from 0.2 to 24.0 JTU turbidity. Approximately 94% of the waters ranged from <1.0 to 5.0 JTU. Labrador waters generally are characterized by low turbidity. No attempt was made to compare values geographically because of the inherent difficulties and limitations of comparing turbidity measurements.

Geographical comparisons

For the purposes of generalized comparisons of the water quality within various geographical areas of Labrador, the territory was arbitrarily broken down into a number of zones as follows:

1. Northern coast (Cape Chidley to Nain)
2. Central coast (Nain to Cape Harrison)
3. Southern coast (Cape Harrison to Forteau)
4. Southeastern Labrador
5. Southwestern Labrador
6. Central Labrador
7. Western Labrador

A ranking of these areas, in terms of the values of six of the more important water quality parameters, was undertaken. The value of parameters within an area was deemed high, low or average. Results are as follows:

	Water Quality Parameter					
Area	Total alkalinity	Specific conductance	Total hardness	Chloride	pH	Calcium
1	L	A	L	L	L	L
2	A	A	L	H	A	A
3	A	A	A	H	A	A
4	L	A	L	A	A	L
5	H	A	A	L	A	A
6	A	A	A	L	A	A
7	H	H	H	L	H	H

Generally speaking, the hardest water in Labrador would tend to occur in western, southwestern and central Labrador, while the softest water is encountered along the northern coast and southeastern Labrador. Overall aquatic productivity should parallel this situation with highest productivity in areas showing hardest waters.

With respect to chloride levels, as expected, highest levels are encountered in coastal areas and lowest levels towards the interior. Somewhat difficult to explain however are the relatively low levels of chloride encountered along the northern coast.

Comparison with insular Newfoundland

Table 3 provides summarized data for Labrador together with similar data from insular Newfoundland (Jamieson 1974). First of all, it would appear that Labrador freshwaters are slightly "softer" than those of insular Newfoundland. This is supported by higher means for total hardness and calcium in Newfoundland. However, the mean value for total alkalinity appears slightly higher for Labrador than for the island. Note, the range for the island values is much greater indicating that there are areas there that are considerably softer than the softest areas in Labrador.

With respect to conductivity, insular Newfoundland waters have almost twice the ionic concentration of Labrador waters even though they are only slightly softer. A comparison of chloride values provides part of the answer.

Labrador surface fresh waters are generally characterized by low chloride ion values in comparison to insular Newfoundland waters. The higher values for the island simply reflect the influence of the marine environment and climate. In Newfoundland chlorides contribute approximately 17% towards the total ionic concentration, whereas in Labrador the contribution is less than 8%.

Interestingly, the average pH for both Labrador and insular Newfoundland fresh waters is identical at 6.4 units. The recorded range for Newfoundland is however noticeably greater.

GENERAL IMPLICATIONS

1. Because Labrador surface fresh waters appear to be slightly softer than those of insular Newfoundland, a reduced buffering capacity is thereby implied. The reduced capacity to absorb acidic or alkaline pollutants is obvious.

2. Labrador surface water conductivities are approximately 1/2 those of Newfoundland. Potential problems in using certain models of electroshockers effectively in these waters is again obvious.

3. Baseline data for Labrador surface fresh waters now exist.

4. Data are now available (particularly specific conductance) that can be used in a simple mathematics model, together with lake morphometric and fish population data, to predict "rule-of-thumb" maximum sustainable yields from resident freshwater fish stocks.

ACKNOWLEDGMENTS

I thank all the people who, in the course of their own work in Labrador, took the time and made the effort to collect the water samples that made this report possible. I would also thank A. Kelly and J. Spurrell who helped in data compilation and first drafting of the report; S. Kearsey for typing and arranging the tables; M. Locke who typed the text and revisions of the tables. Also for much of the revisions on the tables I thank D. English. For the final drafting work on the maps and figures I thank H. Mullett and D. Stacey. The introduction and discussion were contributed by R. J. Wiseman, for which I express my thanks.

I express special thanks to the staff of the Conservation and Protection Branch in Labrador who, during their patrols, made an extra effort to collect water samples from some very remote areas.

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Table 1. Location of sampling sites.

Name	Latitude	Longitude	River code
Adlatok River	N55°09'	W60°38'	5317900
Adlavik Brook	N54°51'	W59°00'	5315080
Albert Lake	N52°58'	W66°45'	5210530
Anaktalik Brook	N56°29'	W62°05'	5320920
Anaktalik Lake	N56°30'	W62°50'	5320920
Anne Marie Lake	N52°26'	W60°51'	5210530
Ashuanipi Lake	N52°35'	W65°58'	5210530
Atikonak Lake	N52°43'	W64°31'	5210530
Beaver Brook	N52°54'	W61°51'	5210530
Beaver River	N53°42'	W60°57'	5211046
Big Bight Brook	N55°00'	W59°04'	5315300
Big River	N54°51'	W58°56'	5315040
Birch Lake	N54°06'	W65°34'	5210530
Blueberry Lake Stream	N53°23'	W63°53'	5210530
Cabot Lake	N56°09'	W62°38'	5320060
Cache River	N53°05'	W62°13'	5210530
Canairiktok River	N54°58'	W60°22'	5317330
Cape Chidley (unnamed lake)	N60°21'	W64°31'	
Caroline Brook	N53°16'	W60°32'	5210530
Churchill River System (Jacopie Structure)	N53°31'	W64°12'	5210530
Churchill River System (Lobstick Structure)	N53°44'	W64°44'	5210530
Churchill River System (Whitefish Structure)	N53°28'	W64°04'	5210530
Churchill River Tailrace	N53°21'	W63°50'	5210530
Churchill River (48 km SE of Winokapau)	N52°45'	W62°00'	5210530
Churchill River System			
WQ-1	N53°21'	W60°10'	5210530
WQ-2	N53°18'	W60°14'	5210530
WQ-3	N53°17'	W60°18'	5210530
WQ-4	N53°16'	W60°23'	5210530
WQ-5	N53°16'	W60°31'	5210530
WQ-6	N53°17'	W60°26'	5210530
WQ-7	N53°16'	W60°34'	5210530
WQ-8	N53°16'	W60°37'	5210530
WQ-9	N53°14'	W60°40'	5210530
WQ-10	N53°14'	W60°42'	5210530
WQ-11	N53°13'	W60°52'	5210530
WQ-12	N53°15'	W60°47'	5210530
WQ-13	N53°12'	W60°54'	5210530
WQ-14	N53°11'	W60°56'	5210530
WQ-15	N53°10'	W61°00'	5210530
WQ-16	N53°07'	W61°02'	5210530
WQ-17	N53°07'	W61°07'	5210530
WQ-18	N53°06'	W61°07'	5210530

Table 1. (Cont'd)

Name	Latitude	Longitude	River code
WQ-19	N53°03'	W61°12'	5210530
WQ-20	N53°02'	W61°14'	5210530
WQ-21	N52°59'	W61°17'	5210530
WQ-22	N52°58'	W61°18'	5210530
WQ-23	N52°57'	W61°20'	5210530
WQ-24	N52°56'	W61°20'	5210530
WQ-25	N52°59'	W61°29'	5210530
WQ-26	N53°00'	W61°33'	5210530
WQ-27	N53°00'	W61°34'	5210530
WQ-28	N52°57'	W61°37'	5210530
WQ-29	N52°56'	W61°37'	5210530
WQ-30	N52°54'	W61°38'	5210530
WQ-31	N52°53'	W61°37'	5210530
WQ-32	N52°52'	W61°41'	5210530
WQ-33	N52°53'	W61°44'	5210530
WQ-34	N52°54'	W61°48'	5210530
WQ-35	N52°54'	W61°51'	5210530
WQ-36	N52°54'	W61°55'	5210530
WQ-37	N52°54'	W61°59'	5210530
WQ-38	N52°55'	W62°02'	5210530
WQ-39	N52°55'	W62°06'	5210530
WQ-40	N52°55'	W62°09'	5210530
WQ-41	N52°54'	W62°11'	5210530
WQ-42	N52°57'	W62°14'	5210530
WQ-43	N52°58'	W62°14'	5210530
WQ-44	N53°02'	W62°12'	5210530
WQ-45	N53°04'	W62°12'	5210530
WQ-46	N53°05'	W62°16'	5210530
WQ-47	N53°06'	W62°18'	5210530
WQ-48	N53°06'	W62°20'	5210530
WQ-49	N53°07'	W62°22'	5210530
WQ-50	N53°09'	W62°25'	5210530
WQ-51	N53°09'	W62°31'	5210530
WQ-52	N53°09'	W62°33'	5210530
WQ-53	N53°09'	W62°38'	5210530
WQ-54	N53°09'	W62°40'	5210530
WQ-55	N53°09'	W62°42'	5210530
WQ-56	N53°09'	W62°46'	5210530
WQ-57	N53°10'	W62°46'	5210530
WQ-58	N53°11'	W62°53'	5210530
WQ-59	N53°11'	W62°57'	5210530
WQ-60	N53°12'	W63°01'	5210530
WQ-61	N53°13'	W63°06'	5210530
WQ-62	N53°12'	W63°08'	5210530
WQ-63	N53°15'	W63°16'	5210530
WQ-64	N53°18'	W63°25'	5210530
WQ-65	N53°18'	W63°22'	5210530
WQ-66	N53°22'	W63°33'	5210530
WQ-67	N53°28'	W63°43'	5210530

Table 1. (Cont'd)

Name	Latitude	Longitude	River code
WQ-68	N53°29'	W63°49'	5210530
WQ-69	N53°29'	W63°51'	5210530
WQ-70	N53°30'	W63°57'	5210530
WQ-71	N53°31'	W63°59'	5210530
Crooks Lake	N52°40'	W59°25'	5206820
Demille Lake	N52°03'	W66°33'	5210530
Disappointment Lake	N53°39'	W62°30'	5210530
Dominion Lake	N52°28'	W61°39'	5210530
Double Mer River	N54°03'	W59°35'	5212880
Dumbell Lake	N52°30'	W65°40'	5210530
Eagle Lake	N53°25'	W57°15'	5206820
Eclipse River	N59°47'	W64°15'	5329240
Elizabeth River	N53°15'	W63°18'	5210530
Emerillon Lake	N53°05'	W66°20'	5201530
English River	N53°53'	W58°51'	5209000
Esker Lake	N57°09'	W62°55'	5321420
Fig River	N52°12'	W63°13'	5210530
First Lake (Forteau River)	N51°31'	N56°51'	5000120
Flour Lake	N53°35'	W64°37'	5210530
Flowers River	N55°43'	W60°56'	5319480
Forteau River	N51°30'	W56°58'	5000120
Fraser River	N56°37'	W62°15'	5321160
Gabbro Lake	N53°38'	W65°08'	5210530
Goose River	N53°23'	W60°23'	5210760
Gosling Lake	N53°36'	W60°20'	5210820
Grace Lake	N52°16'	W65°45'	5210530
Grande Hermine	N53°10'	W66°22'	5210530
Grand Lake	N53°32'	W60°06'	5211040
Green Pond, Mile 83 Esker Road	N52°31'	W64°30'	5210530
Gull Island	N52°58'	W61°22'	5210530
Gull Lake	N52°59'	W61°19'	5210530
Harp Lake	N55°05'	W61°49'	5317900
Herbron Lake	N58°08'	W63°38'	5324640
Hebron (unnamed)	N57°59'	W63°23'	5324760
Hebron Fiord River	N58°04'	W63°02'	5324640
Hebron (unnamed)	N58°03'	W63°14'	5324800
Hughette Lake	N52°54'	W67°05'	5210530
Hunt River	N55°33'	W60°38'	5319220
Ironstone River	N52°55'	W67°00'	5210530
Kaipokok River	N54°46'	W69°57'	5316080
Kamanatsuk Brook	N56°45'	W62°33'	5321400

Table 1. (Cont'd)

Name	Latitude	Longitude	River code
Kangalaksiorvik Lake (upper)	N59°24'	W64°11'	5328700
Kingurutik River	N56°45'	W62°30'	5321420
Kogaluk River	N56°13'	W61°43'	5320060
Kogluktokoluk Brook	N56°18'	W62°06'	5320260
Komaktorvik Lake	N59°09'	W64°14'	5328500
Konrad Brook	N56°13'	W61°55'	5320140
Lac à l'Eau Claire	N52°40'	W65°55'	5210530
Lac Fourmont	N52°04'	W60°24'	Quebec
Lac Gaffaret	N52°14'	W61°55'	Quebec
Lac Joseph	N52°44'	W65°26'	5210530
Lanse-au-Diable Brook	N51°34'	W56°45'	5000280
Lanse-au-Loup Brook	N51°32'	W56°50'	5000220
Leila Wynne	N53°04'	W66°45'	5210530
Little Minipi	N52°21'	W60°38'	5210530
Lobstick Boat Launch	N53°52'	W65°01'	5210530
Lobstick (16 km downriver)	N53°50'	W64°55'	5210530
Lower Brook	N53°15'	W60°52'	5210530
Makkovik Bay Brook	N55°04'	W59°10'	5315520
Makkovik River	N54°58'	W59°25'	5315640
McKenzie River	N53°14'	W60°44'	5210530
Menihek Lake	N54°21'	W66°16'	5210530
Metchin River	N53°19'	W63°22'	5210530
Michikamats Lake	N54°14'	W64°07'	5210530
Michikamau Lake	N53°52'	W63°37'	5210530
Michaels (St.) River	N54°41'	W57°47'	5214280
Mile 9 (Esker Road)	N53°49'	W66°21'	5210530
Mile 24 (Orma Road)	N53°44'	W63°31'	5210530
Mile 40 (Esker Road)	N53°47'	W65°46'	5210530
Mile 45 (Orma Road)	N53°48'	W63°22'	5210530
Mills Lake River	N52°51'	W66°55'	5210530
Minipi Lake	N52°18'	W60°51'	5210530
Minipi River	N52°52'	W61°37'	5210530
Minonipi Lake	N52°30'	W60°48'	5210530
Mistastin Lake	N55°54'	W63°16'	5320060
Mistinippi Lake	N54°47'	W61°19'	5317900
Mud Lake	N53°08'	W60°11'	5210530
Muskrat Lake	N53°04'	W60°46'	5210530
Nachvak Lake	N59°00'	W64°08'	5327800
Nachvak River	N50°01'	W64°03'	5327800
Nakvak Brook	N58°31'	W63°19'	5326260
Naskaupi River	N53°47'	W60°51'	5211047
Nipishish Lake	N54°05'	W60°45'	5211048
No Name Lake	N52°32'	N59°30'	
North Arm River, Saglek Fiord	N58°33'	N63°28'	5326200
North River	N58°29'	W62°32'	5322780
North West River	N53°22'	W60°13'	5211041

Table 1. (Cont'd)

Name	Latitude	Longitude	River code
Notakwanon River	N56°01'	W61°21'	5319740
Old Man's Lake	N53°30'	W63°50'	5210530
Orma Lake	N53°55'	W62°58'	5210530
Ossokmanuan Lake	N53°15'	W64°34'	5210530
Pamiulik River	N54°44'	W58°34'	5314880
Paradise River	N53°25'	W57°17'	5206600
Parke Lake	N52°55'	W59°03'	5206820
Pearl Lake	N53°54'	W66°00'	5210530
Peter's Brook (St.)	N52°06'	W55°48'	5001080
Pinus River	N53°01'	W61°16'	5210530
Pinware River (approx. 5 km from mouth)	N51°40'	W56°43'	5000360
Pottles Bay Brook	N54°30'	W57°35'	5213900
Richi Lake	N52°58'	W66°03'	5210530
River South of Big River	N54°41'	W59°06'	5315020
Rivière aux Poissons	N53°06'	W65°26'	5210530
Sail Lake	N54°12'	W63°06'	5210530
St. Paul's River	N52°10'	W58°26'	No code (Quebec)
Saglek (Nakvak Brook)	N58°38'	W63°46'	5326260
Saglek Lake	N58°49'	W63°21'	5326260
Sandhill River	N53°35'	W56°21'	5205820
Sango Brook	N55°53'	W61°11'	5319660
Seal Lake (Naskaupi River)	N54°19'	W61°46'	5211048
Shallow Lake	N57°39'	W63°16'	5322780
Shoal River	N53°07'	W62°23'	5210530
Sims River	N53°41'	W65°18'	5210530
Smallwood Reservoir	N53°47'	N65°00'	5210530
Snegamook Lake	N54°32'	W61°27'	5317330
South Ashuanipi Lake	N52°33'	W66°08'	5210530
Southern Back Water	N52°58'	W56°06'	5103000
Southwest Arm River, Saglek Fiord	N58°28'	W63°34'	5326140
Southwest Brook	N53°25'	W57°15'	5206860
Stag Bay Brook	N54°47'	W59°47'	5314940
Table Bay Brook	N53°41'	W56°44'	5206060
Tamarach River (Esker Road)	N53°48'	W66°18'	5210530
Tasialuk Lake (mouth of river)	N56°45'	W62°45'	5322280
Tasiuyak Lake	N57°05'	W62°03'	5322280
Ten Mile Lake	N53°35'	W64°52'	5210530
Tom Luscombe Brook	N54°21'	W58°12'	5213520
Trout River (a trib. of Pinware River)	N51°45'	W56°31'	5000360

Table 1. (Cont'd)

Name	Latitude	Longitude	River code
Ugjuktok River	N58°17'	W63°35'	5326040
Umiakovik Lake	N57°24'	W62°50'	5322780
Unnamed-S. side of Churchill River below Gull Lake	N52°59'	W61°17'	5210530
Unnamed-N. side of Churchill River at Horseshoe Rapids	N53°00'	W60°37'	5210530
Unnamed-N side of Churchill River above Metchin River	N53°20'	W63°25'	5210530
Upper Brook	N53°10'	W60°56'	5210530
Valley River	N53°26'	W64°22'	5210530
Waldorf River	N52°50'	W66°55'	5210530
Walsh River	N52°56'	W67°00'	5210530
Webb Bay (Tributary)	N56°49'	W61°56'	5321660
White Bear Lake	N54°32'	W59°31'	5206880
White Bear River	N53°35'	W57°31'	5206880
Wilson Lake	N53°09'	W62°45'	5210530
Winokapau Lake	N53°00'	W62°22'	5210530

Table 2. Values of selected water quality parameters of the fresh waters of Labrador (1972-78).

Sampling station, number of samples and year			pH	Total Hardness (ppm)	Spec.* Cond.	Turb. (JTU**)	Total Alk. (ppm)	Calcium (ppm)	Chloride (ppm)	Bicarbonate (ppm)
Adlatok River	(1)	'73	6.7	12.0	25.0	3.6	12.0	0.5	2.2	14.6
Adlavik Brook	(2)	'72	6.5	5.0	13.0	0.7	2.0	2.5	0.8	2.4
Albert Lake	(1)	'76	6.8	30.0	57.0	2.2	24.0	6.9	0.6	29.3
Anaktalik Brook	(1)	'73	6.7	11.0	25.0	4.5	8.0	3.7	1.8	9.7
	(1)	'74								
Anaktalik Lake	(1)	'78	6.6	6.0	17.0	0.4	4.0	1.1	1.0	4.9
Anne Marie Lake	(1)	'77	6.5	7.0	13.0	1.3	4.0	0.7	0.9	4.9
	(1)	'75								
Ashuanipi Lake	(1)	'76	6.4	6.0	12.0	1.8	3.0	0.6	0.6	3.7
Atikonak Lake	(1)	'77	6.2	5.0	16.0	1.1	5.0	0.6	1.0	6.1
Beaver Brook	(1)	'76	6.2	7.0	13.0	1.0	2.0	1.0	1.0	2.4
Beaver River	(1)	'73	6.6	8.0	15.0	3.8	8.0	2.0	1.1	9.8
Big Bight Brook	(1)	'72	6.7	7.0	24.0	0.8	4.0	6.0	1.0	4.9
Big River	(1)	'76	5.5	4.0	16.0	2.5	1.0	0.7	1.7	1.2
Birch Lake	(1)	'77	5.9	8.0	17.0	0.4	3.0	0.6	1.0	3.7
Blueberry Lake Stream	(1)	'77	6.5	10.0	17.0	0.8	5.0	0.6	1.5	6.1
Cabot Lake	(1)	'78	6.7	6.0	18.0	0.9	6.0	0.8	1.0	7.3
Cache River	(1)	'76	6.0	6.0	12.0	1.3	1.0	0.9	1.0	1.2
Canairiktok River	(2)	'72	7.3	13.0	24.0	0.4	10.5	1.0	2.3	12.8
Cape Chidley (Unnamed lake)	(1)	'78	6.6	6.0	37.5	0.4	4.0	1.0	7.0	4.9
Caroline Brook	(1)	'76	6.1	10.0	18.0	6.5	4.0	1.3	1.5	4.9
Churchill River System (Jacopie Structure)	(6)	'73	6.8	11.0	25.0	1.3	10.0	1.4	2.6	12.5
	(1)	'77								
Churchill River System (Lobstick Structure)	(2)	'77	6.7	11.0	21.0	0.8	9.0	3.4	1.7	11.0
	(2)	'73								
Churchill River System (Whitefish Structure)	(2)	'73	6.7	12.0	22.0	1.6	9.0	1.7	1.9	11.4
	(1)	'77								
Churchill River Tailrace	(1)	'75	6.5	10.0	22.0	3.7	8.0	1.5	1.7	9.8
Churchill River (48 km SE of Winokapau)	(1)	'77	7.0	11.0	22.0	1.2	8.0	1.3	0.7	9.8
Churchill River System***										
WQ 1	(1)	'75	6.6	5.0	14.3	3.5	4.0	0.8	1.0	4.9
WQ 2	(1)	'75	6.8	5.0	15.4	4.0	5.0	0.9	1.0	6.1
WQ 3	(1)	'75	6.4	8.0	15.4	4.0	4.0	0.9	1.0	4.9
WQ 4	(1)	'75	6.3	6.0	16.5	5.0	5.0	1.0	1.0	6.1
WQ 5	(1)	'75	6.6	7.0	17.4	20.0	5.0	1.0	1.0	6.1
WQ 6	(1)	'75	6.6	7.0	17.4	14.0	5.0	1.0	1.0	6.1
WQ 7	(1)	'75	6.1	6.0	18.0	11.0	5.0	1.0	1.0	6.1

* Specific conductance: micro mhos @ 25°C.
** Turbidity: Jackson Turbidity Units.
*** Water quality stations (WQ) were established at approximately 4.0 km intervals along the river beginning at Happy Valley and proceeding to the Churchill Falls tailrace.

Table 2. (Cont'd)

Sampling station, number of samples and year	pH	Total Hard-ness (ppm)	Spec.* Cond.	Turb. (JTU**)	Total Alk. (ppm)	Calcium (ppm)	Chloride (ppm)	Bicar-bonate (ppm)
Churchill River System								
WQ 8 (1) '75	6.0	10.0	18.3	16.5	5.0	1.0	1.0	6.1
WQ 9 (1) '75	6.3	7.0	19.1	20.0	6.0	1.1	1.0	7.3
WQ 10 (1) '75	6.2	8.0	18.8	10.0	6.0	1.4	1.0	7.3
WQ 11 (1) '75	6.2	8.0	18.0	6.0	3.0	1.1	1.0	3.7
WQ 12 (1) '75	6.0	8.0	19.1	3.5	5.0	1.4	1.0	6.1
WQ 13 (1) '75	6.1	8.0	19.7	9.0	4.0	1.4	1.0	4.9
WQ 14 (1) '75	6.2	6.0	20.9	4.0	5.0	1.1	2.0	6.1
WQ 15 (1) '75	6.2	7.0	18.6	4.5	6.0	1.4	1.0	7.3
WQ 16 (1) '75	6.1	8.0	18.1	4.5	6.0	1.3	1.0	7.3
WQ 17 (1) '75	6.1	7.0	18.1	5.5	6.0	1.4	1.0	7.3
WQ 18 (1) '75	6.1	7.0	18.7	9.0	6.0	1.4	1.0	7.3
WQ 19 (1) '75	6.1	7.0	18.7	6.0	5.0	1.2	1.0	6.1
WQ 20 (1) '75	6.2	8.0	19.2	3.5	6.0	1.5	1.0	7.3
WQ 21 (1) '75	6.0	9.0	20.3	5.5	5.0	1.1	1.0	6.1
WQ 22 (1) '75	6.5	8.0	18.7	5.0	7.0	1.2	1.0	8.5
WQ 23 (1) '75	6.4	8.0	18.7	5.0	7.0	1.2	1.0	8.5
WQ 24 (1) '75	6.3	8.0	18.7	9.0	6.0	1.1	1.0	7.3
WQ 25 (1) '76	6.3	8.0	18.7	1.0	5.0	1.2	0.6	6.1
WQ 26 (1) '76	6.2	7.0	17.0	0.8	4.0	1.3	0.7	4.9
WQ 27 (1) '76	6.4	8.0	18.0	0.8	5.0	1.3	0.6	6.1
WQ 28 (1) '76	6.3	8.0	18.0	0.8	5.0	1.3	0.6	6.1
WQ 29 (1) '76	6.3	8.0	18.0	0.6	5.0	1.3	0.6	6.1
WQ 30 (1) '76	6.3	8.0	19.0	1.2	5.0	1.2	0.6	6.1
WQ 31 (1) '76	6.4	8.0	17.0	1.4	5.0	1.1	0.6	6.1
WQ 32 (1) '76	6.2	8.0	17.0	0.5	5.0	1.3	0.6	6.1
WQ 33 (1) '76	6.4	7.0	17.0	0.6	5.0	1.3	0.6	6.1
WQ 34 (1) '76	6.3	8.0	19.0	2.0	5.0	1.3	0.6	6.1
WQ 35 (1) '76	6.2	10.0	22.0	1.0	6.0	2.0	0.6	7.3
WQ 36 (1) '76	6.3	10.0	20.0	0.7	5.0	1.6	0.7	6.1
WQ 37 (1) '76	6.5	10.0	20.0	2.5	7.0	1.8	0.6	8.5
WQ 38 (1) '76	6.5	10.0	20.0	1.2	8.0	1.8	0.6	9.8
WQ 39 (1) '76	6.2	10.0	19.0	1.0	6.0	2.0	0.7	7.3
WQ 40 (1) '76	6.3	10.0	19.0	1.0	6.0	1.6	0.6	7.3
WQ 41 (1) '76	6.3	10.0	20.0	0.5	5.0	1.7	0.7	6.1
WQ 42 (1) '76	6.4	10.0	19.0	1.1	6.0	1.6	0.8	7.3
WQ 43 (1) '76	6.2	9.0	21.0	0.8	7.0	1.6	0.6	8.5
WQ 44 (1) '76	6.3	10.0	18.0	1.5	6.0	1.3	0.8	7.3
WQ 45 (1) '76	6.5	10.0	18.0	0.5	5.0	1.4	0.8	6.1
WQ 46 (1) '76	6.5	8.0	20.0	0.8	8.0	2.0	0.6	9.8
WQ 47 (1) '76	6.6	8.0	20.0	0.7	8.0	2.0	0.6	9.8
WQ 48 (1) '76	6.3	8.0	19.0	1.5	7.0	2.0	0.6	8.5
WQ 49 (1) '76	6.4	10.0	18.0	4.0	5.0	1.7	0.8	6.1
WQ 50 (1) '76	6.3	10.0	19.0	0.5	6.0	1.7	0.7	7.3
WQ 51 (1) '76	6.4	9.0	21.0	2.2	7.0	1.8	0.6	8.5
WQ 52 (1) '76	6.4	9.0	20.0	1.5	7.0	1.5	0.6	8.5
WQ 53 (1) '76	6.3	8.0	18.0	1.2	5.0	1.4	0.6	6.1
WQ 54 (1) '76	6.4	9.0	21.0	0.7	6.0	1.7	0.6	7.3
WQ 55 (1) '76	6.5	9.0	22.0	1.5	6.0	1.6	0.7	7.3
WQ 56 (1) '76	6.2	10.0	21.0	0.9	6.0	1.6	0.6	7.3
WQ 57 (1) '76	6.3	9.0	19.0	1.0	6.0	1.3	0.6	7.3
WQ 58 (1) '76	6.3	10.0	19.0	1.2	7.0	1.4	0.6	8.5
WQ 59 (1) '76	6.3	7.0	18.0	0.6	6.0	1.3	0.6	7.3
WQ 60 (1) '76	6.3	8.0	18.0	1.4	5.0	1.3	0.6	6.1
WQ 61 (1) '76	6.4	8.0	19.0	1.0	6.0	1.5	0.6	7.3
WQ 62 (1) '76	6.3	8.0	18.0	0.8	6.0	1.6	0.7	7.3
WQ 63 (1) '75	6.4	10.0	20.9	1.5	6.0	1.1	0.5	7.3
WQ 64 (1) '75	6.4	8.0	17.4	0.7	6.0	1.1	0.5	7.3
WQ 65 (1) '75	6.1	6.0	13.3	0.5	4.0	0.6	0.5	4.9
WQ 66 (1) '75	6.4	10.0	20.9	0.9	8.0	1.1	0.5	9.8
WQ 67 (1) '75	6.5	12.0	26.4	1.5	8.0	2.3	0.5	9.8
WQ 68 (1) '75	6.4	10.0	20.4	1.6	8.0	1.7	1.0	9.8
WQ 69 (1) '75	6.5	10.0	20.4	1.7	8.0	1.3	1.0	9.8
WQ 70 (1) '75	6.5	10.0	22.0	3.7	8.0	1.7	1.5	9.8
WQ 71 (1) '75	6.4	8.0	22.0	1.5	6.0	1.3	0.5	7.3

* Specific conductance: micro mhos @ 25°C
** Turbidity: Jackson Turbidity Units.

Table 2. (Cont'd)

Sampling station, number of samples and year			pH	Total Hardness (ppm)	Spec.* Cond.	Turb. (JTU**)	Total Alk. (ppm)	Calcium (ppm)	Chloride (ppm)	Bicarbonate (ppm)
Crooks Lake	(3)	'75	6.7	5.0	11.0	1.1	4.0	0.5	0.5	5.3
Demille Lake	(1)	'76	6.7	23.0	46.0	1.3	18.0	4.8	0.6	22.0
Disappointment Lake	(1)	'74	5.9	5.0	12.0	1.3	2.0	1.0	0.8	2.4
Dominion Lake	(1)	'77	6.3	6.0	42.0	0.6	3.5	0.6	1.5	4.3
Double Mer River	(1)	'76	5.8	6.0	15.0	0.8	2.0	0.8	1.0	2.4
Dumbell Lake	(1)	'76	6.0	5.0	12.0	1.2	2.0	0.9	0.7	2.4
Eagle Lake	(1)	'77	6.7	6.0	17.0	3.1	4.0	1.6	1.0	4.9
Eclipse River	(1) (1)	'73 '78	6.4	4.0	15.8	0.7	3.0	1.0	1.7	3.7
Elizabeth River	(1)	'76	6.4	7.0	15.0	1.5	4.0	0.7	1.2	4.9
Emerillon Lake	(1)	'76	6.5	11.0	25.0	0.7	7.0	1.7	0.5	8.5
English River	(1)	'73	6.5	6.0	14.0	5.7	4.0	2.0	0.8	4.9
Esker Lake	(1)	'78	6.8	8.0	13.0	0.5	6.0	0.4	2.0	7.3
Fig River	(1)	'76	6.1	6.0	11.0	1.2	3.0	0.7	0.7	3.7
First Lake (Forteau River)	(1)	'78	6.5	16.0	33.0	0.4	14.0	1.7	4.0	17.1
Flour Lake	(1)	'74	6.6	10.0	22.0	1.0	7.0	1.0	2.0	8.5
Flowers Lake	(1)	'73	6.7	8.0	16.0	2.9	8.0	1.0	1.0	9.8
Forteau River	(1)	'78	6.6	20.0	39.0	0.4	16.0	2.5	4.5	18.5
Fraser River	(1) (1) (1)	'73 '75 '78	6.5	6.7	16.5	0.9	4.3	1.3	1.1	4.9
Gabbro Lake	(2) (6)	'77 '76	6.3	8.0	21.0	0.9	5.0	1.2	1.7	5.9
Grace Lake	(1)	'76	6.3	6.0	12.0	0.9	2.0	0.6	0.6	2.4
Grande Hermine	(1)	'76	6.6	11.0	24.0	0.5	9.0	1.7	0.5	11.0
Grand Lake	(1) (1)	'77 '74	6.4	12.0	55.0	2.1	4.0	1.7	12.5	4.3
Green Pond, Mile 83 Esker Road	(1)	'75	6.1	6.0	13.0	0.3	4.0	0.5	0.8	4.9
Gull Island	(1)	'74	6.6	10.0	25.0	2.7	8.0	1.0	2.0	9.8
Gull Lake	(1)	'78	6.7	10.0	21.0	5.0	6.0	1.0	1.0	7.3
Harp Lake	(1)	'78	6.6	10.0	16.0	0.2	6.0	0.7	1.0	7.3
Hebron Lake	(1) (1)	'77 '78	6.6	10.0	22.0	1.0	4.5	0.9	2.0	5.5
Hebron (unnamed)	(1)	'76	6.2	8.0	17.0	0.7	3.0	1.1	0.7	3.7
Hebron Fiord River	(1)	'73	6.0	6.0	19.0	0.9	3.0	2.5	0.9	3.7
Hebron (unnamed)	(1)	'73	6.4	8.0	20.0	0.4	4.0	1.5	1.0	4.9
Hughette Lake	(1)	'76	6.6	10.0	18.0	1.1	7.0	1.3	0.7	8.5

* Specific conductance: micro mhos @ 25°C.
** Turbidity: Jackson Turbidity Units

Table 2.(Cont'd)

Sampling station, number of samples and year			pH	Total Hard-ness (ppm)	Spec.* Cond.	Turb. (JTU**)	Total Alk. (ppm)	Calcium (ppm)	Chloride (ppm)	Bicar-bonate (ppm)
Hunt River	(1)	'73	6.9	12.0	31.0	3.6	12.0	3.0	2.0	14.6
Ironstone River	(1)	'76	6.7	16.0	29.0	1.0	10.0	3.5	0.7	12.2
Kaipokok River	(1)	'72	6.7	10.0	19.0	24.0	6.0	2.5	1.8	7.3
Kangalaksiorvik Lake (upper)	(1)	'78	6.6	6.0	19.0	0.3	4.0	1.0	2.0	4.9
Kamanatsuk Brook	(1)	'73	6.3	8.0	14.0	4.5	2.0	1.5	0.8	2.4
Kingurutik River	(1)	'73	6.3	6.0	11.0	0.8	4.0	1.0	0.8	4.9
Kogluktokoluk Brook	(1)	'73	6.9	16.0	34.0	8.4	16.0	1.0	3.4	19.5
Komaktorvik Lake	(1)	'78	6.6	8.0	15.0	0.4	3.0	0.5	1.0	3.7
Konrad River	(2)	'73	6.5	12.0	24.0	0.5	5.0	1.0	2.0	6.1
Kogaluk River	(1)	'73	6.6	6.0	16.0	0.7	4.0	1.0	1.4	4.9
Lac à l'Eau Claire	(1)	'76	6.2	5.0	12.0	0.8	4.0	0.6	0.6	4.9
Lac Fourmont	(1)	'78	6.5	6.0	17.0	1.5	4.0	0.5	1.0	4.9
Lac Gaffaret	(1)	'78	6.6	8.0	11.5	1.5	3.0	0.5	1.5	3.7
Lac Joseph	(1)	'76	6.5	6.0	16.0	0.8	5.0	1.0	0.8	6.1
Lanse-au-Diable Brook (near bridge)	(1)	'78	6.6	12.0	22.0	0.6	7.0	2.3	1.8	8.5
Lanse-au-Loup Brook (near bridge)	(1)	'78	6.7	26.0	49.0	0.6	20.0	3.0	6.0	24.4
Leila Wynne	(1)	'76	7.0	23.0	43.0	0.7	20.0	4.6	0.8	24.4
Little Minipi L.	(1)	'75	6.5	8.0	16.0	1.6	4.0	0.7	0.8	4.9
Lobstick Boat Launch	(1)	'78	6.7	14.0	21.0	1.5	7.0	0.9	<1.0	8.5
Lobstick (16 km downriver)	(1)	'78	6.6	14.0	22.0	2.5	9.0	0.8	1.0	11.0
Lower Brook	(1)	'76	6.5	7.0	15.0	4.0	3.0	1.1	1.5	3.7
Makkovik Bay Bk.	(1)	'72	6.3	5.0	15.0	0.8	3.0	2.5	0.6	3.7
Makkovik River	(1)	'76	5.9	6.0	21.0	1.0	2.0	0.6	4.0	2.4
McKenzie River	(1) (1)	'74 '76	6.4	9.0	17.0	1.4	5.0	1.1	1.7	6.1
Menihek Lake	(3)	'77	6.4	13.0	23.0	1.2	8.0	1.5	1.1	9.7
Metchin River	(2) (1)	'75 '76	6.0	7.0	14.0	1.3	4.0	0.7	0.7	4.5
Michikamats Lake	(1)	'77	6.1	12.0	21.0	0.7	8.0	1.3	1.0	9.8
Michikamau Lake	(3)	'77	6.0	6.0	15.0	0.9	3.5	0.9	1.7	4.3
Michaels River(St)	(1)	'76	5.9	6.0	21.0	1.0	2.0	0.6	4.0	2.4
Mile 9 (Esker Rd)	(1)	'78	6.8	10.0	24.0	0.6	10.0	2.2	1.0	12.2
Mile 24 (Orma Rd)	(1)	'78	6.7	10.0	10.0	0.9	2.0	0.3	1.0	2.4

* Specific conductance: micro mhos @ 25°C.
** Turbidity: Jackson Turbidity Units.

Table 2. (Cont'd)

Sampling station, number of samples and year			pH	Total Hardness (ppm)	Spec.* Cond.	Turb. (JTU**)	Total Alk. (ppm)	Calcium (ppm)	Chloride (ppm)	Bicarbonate (ppm)
Mile 40 (Esker Rd)	(1)	'78	6.7	12.0	16.0	0.8	8.0	1.2	4.0	9.8
Mile 45 (Orma Rd)	(1)	'78	6.7	6.0	9.5	0.3	4.0	0.5	1.0	4.9
Mills Lake River	(1)	'76	6.7	30.0	56.0	2.0	24.0	5.0	0.7	29.3
Minipi Lake	(1)	'77	6.6	6.0	16.0	1.2	3.5	1.3	1.3	4.3
Minipi River	(1)	'76	6.3	7.0	14.0	0.8	2.0	0.7	1.0	2.4
Minonipi Lake	(2)	'75	6.6	7.0	13.0	1.8	3.0	0.7	0.6	3.7
Mistastin Lake	(1)	'78	6.6	10.0	14.0	0.3	5.0	0.5	4.0	6.1
Mistinippi Lake	(1)	'78	6.5	4.0	17.0	0.7	4.0	0.5	1.5	4.9
Mud Lake	(1)	'77	6.5	14.0	37.0	1.3	6.0	0.6	7.5	7.3
Muskrat Falls	(1)	'77	6.6	10.0	16.0	1.7	6.0	0.9	1.3	7.3
Nachvak Lake	(1)	'78	6.8	8.0	20.0	0.4	6.0	0.5	1.5	7.3
Nachvak River	(1)	'73	4.8	1.0	16.0	1.4	<1.0	1.0	0.6	-
Nakvak River	(1)	'73	6.1	6.0	16.0	0.2	2.0	1.0	0.9	2.4
Naskaupi River	(1)	'74	6.7	12.0	30.0	2.1	10.0	2.0	3.5	12.2
Nipishish Lake	(1)	'77	6.5	20.0	123.0	0.8	8.0	0.9	33.0	9.8
No Name Lake	(2)	'75	6.6	7.0	16.0	3.0	3.0	1.0	1.7	3.7
North Arm River, Saglek Fiord	(1)	'73	4.8	6.0	16.0	0.3	<1.0	0.5	0.7	-
North River	(1)	'74	5.8	6.0	16.0	2.0	4.0	1.0	0.4	4.9
Notakwanon River	(2)	'73	6.6	7.0	15.0	5.4	5.0	1.3	1.2	6.1
Old Man's Lake	(2)	'75	6.5	10.0	20.0	1.7	8.0	1.0	1.5	9.8
Orma Lake	(2)	'77	6.2	7.0	15 0	0.5	4.0	0.9	1.0	4.3
Ossokmanuan Lake	(9)	'76	6.1	6.0	15.0	1.2	4.0	1.0	0.6	4.4
Pamiulik River	(1)	'76	6.3	4.0	8.0	1.2	2.0	1.8	0.7	2.4
Paradise River	(1)	'76	6.3	9.0	22.0	3.0	5.0	1.3	1.5	6.1
Parke Lake	(1)	'75	6.3	5.0	11.0	1.5	3.0	0.7	0.8	3.7
Pearl Lake	(1)	'76	6.3	10.0	21.0	2.0	4.0	1.0	1.5	4.9
Peter's Bk (St.)	(1)	'76	6.3	6.0	22.0	0.7	4.0	1.1	2.0	4.9
Pinus River	(1)	'76	6.2	8.0	17.0	1.2	4.0	1.3	2.0	4.9
Pinware River (5 km from mouth-approx.)	(1)	'78	6.8	6.0	16.0	0.6	2.0	2.0	0.7	2.4
Pottles Bay Bk.	(1)	'76	5.7	6.0	24.0	7.0	1.0	0.6	5.0	1.2
Richi Lake	(1)	'76	6.3	6.0	12.0	1.5	4.0	0.6	0.5	4.9
River South of Big River	(1)	'72	6.2	4.0	8.0	0.8	2.0	1.8	0.5	2.4
Rivière aux Poissons	(1)	'76	6.3	8.0	16.0	2.0	4.0	1.0	0.4	4.9

* Specific conductance: micro mhos @ 25°C.
** Turbidity: Jackson Turbidity Units.

Table 2. (Cont'd)

Sampling station, number of samples and year			pH	Total Hardness (ppm)	Spec.* Cond.	Turb. (JTU**)	Total Alk. (ppm)	Calcium (ppm)	Chloride (ppm)	Bicarbonate (ppm)
Saglek (Nakvak Bk)	(1)	'77	6.6	8.0	26.0	3.0	7.0	0.8	1.5	8.5
Saglek Lake	(1)	'78	6.6	6.0	18.0	0.3	3.0	0.5	1.0	3.7
Sail Lake	(1)	'77	6.2	7.0	18.0	0.6	4.0	0.9	1.1	4.9
St. Paul's River	(1)	'77	6.0	6.0	20.0	0.5	4.0	0.6	3.2	4.9
Sandhill River	(1) (2)	'77 '72	6.2	7.0	22.0	2.7	4.0	1.7	3.6	4.9
Sango Brook	(1)	'73	6.7	12.0	27.0	2.6	12.0	3.5	2.0	14.6
Seal Lake	(1)	'78	6.7	12.0	26.0	0.3	9.0	1.5	1.0	11.0
Shallow Lake	(1)	'78	6.6	4.0	10.0	0.9	3.0	0.4	1.0	3.7
Shoal River	(1)	'76	6.1	6.0	10.0	1.2	3.0	1.0	1.0	3.7
Sims River	(1)	'77	6.8	12.0	23.0	0.5	12.0	2.3	1.0	14.6
Smallwood Reservoir	(10)	'74	6.5	11.0	23.0	1.2	8.0	0.8	2.1	10.2
Snegamook Lake	(1)	'78	6.7	14.0	32.0	0.6	9.0	3.8	2.0	11.0
South Ashuanipi Lake	(1)	'76	6.4	6.0	12.0	1.0	4.0	0.6	0.6	4.9
Southern Back Water	(1)	'76	6.3	7.0	22.0	0.7	2.0	0.7	4.0	2.4
Southwest Arm River, Saglek Fiord	(1)	'73	5.6	2.0	5.0	0.4	<1.0	0.5	0.3	-
Southwest Brook	(1)	'76	6.2	8.0	23.0	0.7	3.0	1.0	3.0	3.7
Stag Bay Brook	(1)	'72	6.2	4.0	8.0	0.6	2.0	1.5	0.6	2.4
Tamarach River (Esker Road)	(1)	'78	6.7	12.0	23.5	0.3	8.0	2.0	4.0	9.8
Tasialuk River (mouth of river)	(1)	'78	6.4	8.0	17.0	0.3	3.0	0.9	1.0	3.7
Tasiuyak Lake	(1)	'74	6.8	8.0	21.0	2.3	6.0	2.0	1.3	7.3
Ten Mile Lake	(3) (9)	'77 '74	6.3	7.0	15.0	1.4	5.0	0.7	1.2	5.8
Tom Luscombe Bk.	(1)	'76	6.1	6.0	20.0	1.0	2.0	1.0	3.0	2.4
Trout River (a tributary of Pinware)	(10)	'78	6.7	5.0	14.0	0.6	1.0	2.0	0.5	1.2
Ugjuktok River	(2)	'73	6.4	9.0	20.0	0.9	4.0	6.3	1.1	4.3
Umiakovik Lake	(1)	'77	6.6	6.0	20.0	0.8	3.0	0.6	1.5	3.7
Unnamed-S. side of Churchill R. below Gull Lake	(1)	'76	6.3	7.0	11.0	1.0	2.0	1.2	1.0	2.4
Unnamed-N. side of Churchill R. at Horseshoe Rapids	(1)	'76	5.9	5.0	12.0	1.2	1.0	0.7	1.5	1.2
Unnamed-N. side of Churchill R. above Metchin River	(1)	'76	5.8	7.0	12.0	1.4	1.0	0.8	1.0	1.2

* Specific conductance: micro mhos @ 25°C
** Turbidity: Jackson Turbidity Units.

Table 2. (Cont'd)

Sampling station, number of samples and year			pH	Total Hardness (ppm)	Spec.* Cond.	Turb. (JTU**)	Total Alk. (ppm)	Calcium (ppm)	Chloride (ppm)	Bicarbonate (ppm)
Upper Brook	(1)	'76	6.0	7.0	15.0	5.0	3.0	1.3	1.5	3.7
Valley River	(4)	'75	6.1	6.0	14.0	1.5	4.4	0.7	0.8	5.4
	(1)	'74								
Waldorf River	(1)	'76	7.1	62.0	93.0	1.5	42.0	10.2	0.6	51.2
Walsh River	(1)	'76	6.5	8.0	16.0	1.7	4.0	1.1	0.7	4.9
Webb Bay (Tributary)	(1)	'76	6.4	8.0	23.0	0.8	8.0	1.6	2.0	9.8
White Bear Lake	(1)	'78	6.6	6.0	13.0	0.8	1.0	0.4	1.5	1.2
White Bear River	(1)	'76	6.2	8.0	15.0	3.2	4.5	1.1	1.0	5.5
	(1)	'73								
Wilson Lake	(1)	'77	6.3	7.0	15.0	2.0	3.5	0.7	1.2	4.3
	(1)	'74								
Winokapau Lake	(2)	'77	6.4	10.0	22.0	1.9	6.0	1.4	1.2	7.7
	(2)	'74								
Mean			6.4	8.8	19.8	2.0	7.0	1.4	1.5	7.0

* Specific conductance: micro mhos @ 25°C.
** Turbidity: Jackson Turbidity Units.

Table 3. Comparison of summarized values for Labrador and insular Newfoundland.

Test	Labrador		Insular Newfoundland	
	Average	Range	Average	Range
Total alkalinity	7.0 ppm	<1.0 to 42.0 ppm	6.7 ppm	<1.0 to 95.0 ppm
Specific conductance	19.6 micro mhos/cm	5.0 to 123 micro mhos/cm	38.0 micro mhos/cm	11.0 to 275.0 micro mhos/cm
Total hardness	8.8 ppm	1.0 to 62.0 ppm	11.0 ppm	3.0 to 150.0 ppm
Chlorides	1.5 ppm	0.3 to 33.0 ppm	7.7 ppm	1.5 to 25.0 ppm
pH	6.4	4.8 to 7.3	6.4	4.7 to 8.0
Calcium	1.4 ppm	0.3 to 10.2 ppm	1.9 ppm	0.5 to 17.5 ppm

Labrador Average based on 309 values.
Insular Newfoundland Average based on 353 values.

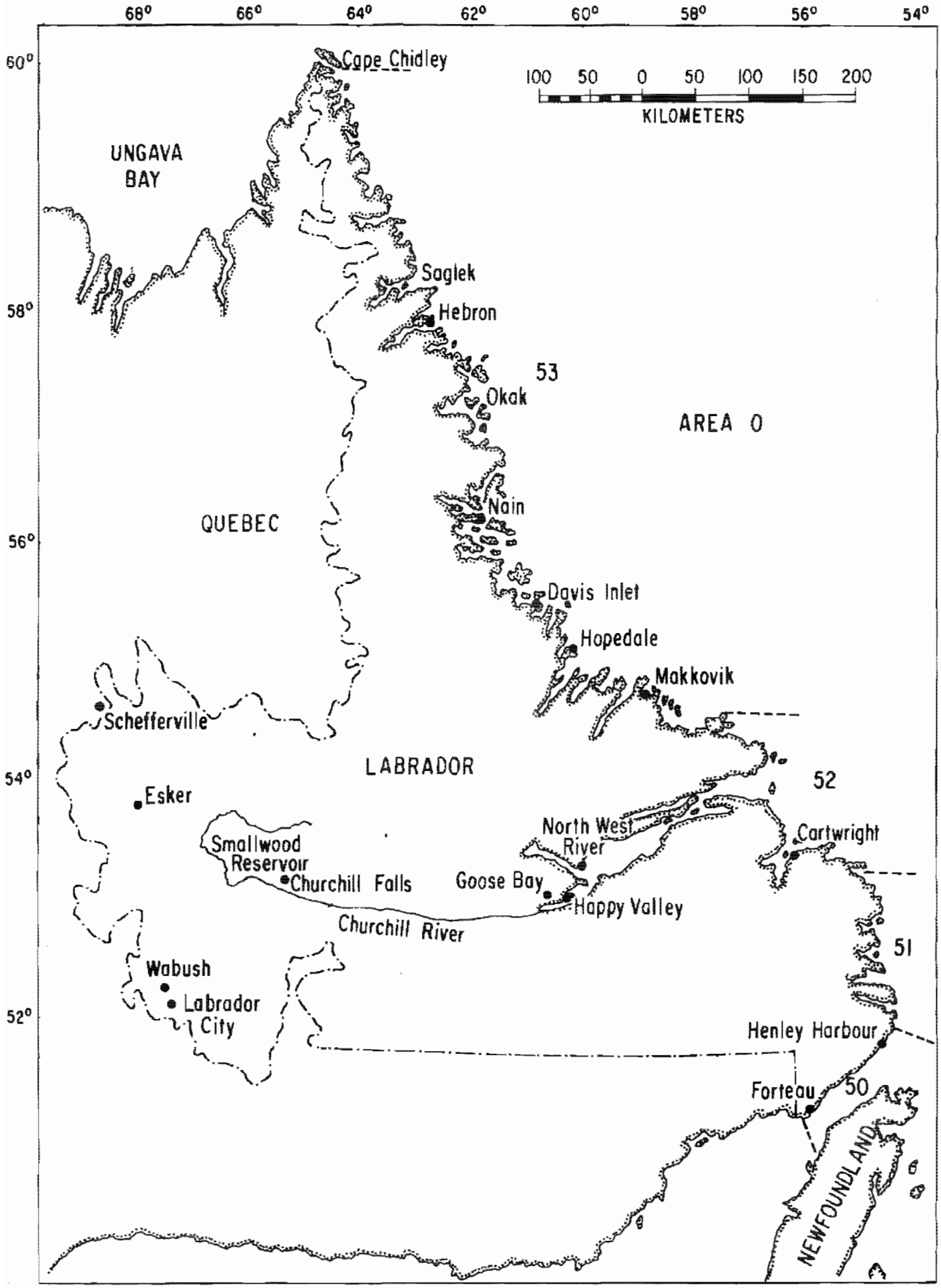

Figure 1. Location Map.

TOTAL ALKALINITY

Range <1.0 to 42.0 ppm

41.7% less than 5.0 ppm
53.4% from 5.0 to 10.0 ppm
4.9% above 10.0 ppm

Average for Labrador based on
309 values - 7.0 ppm

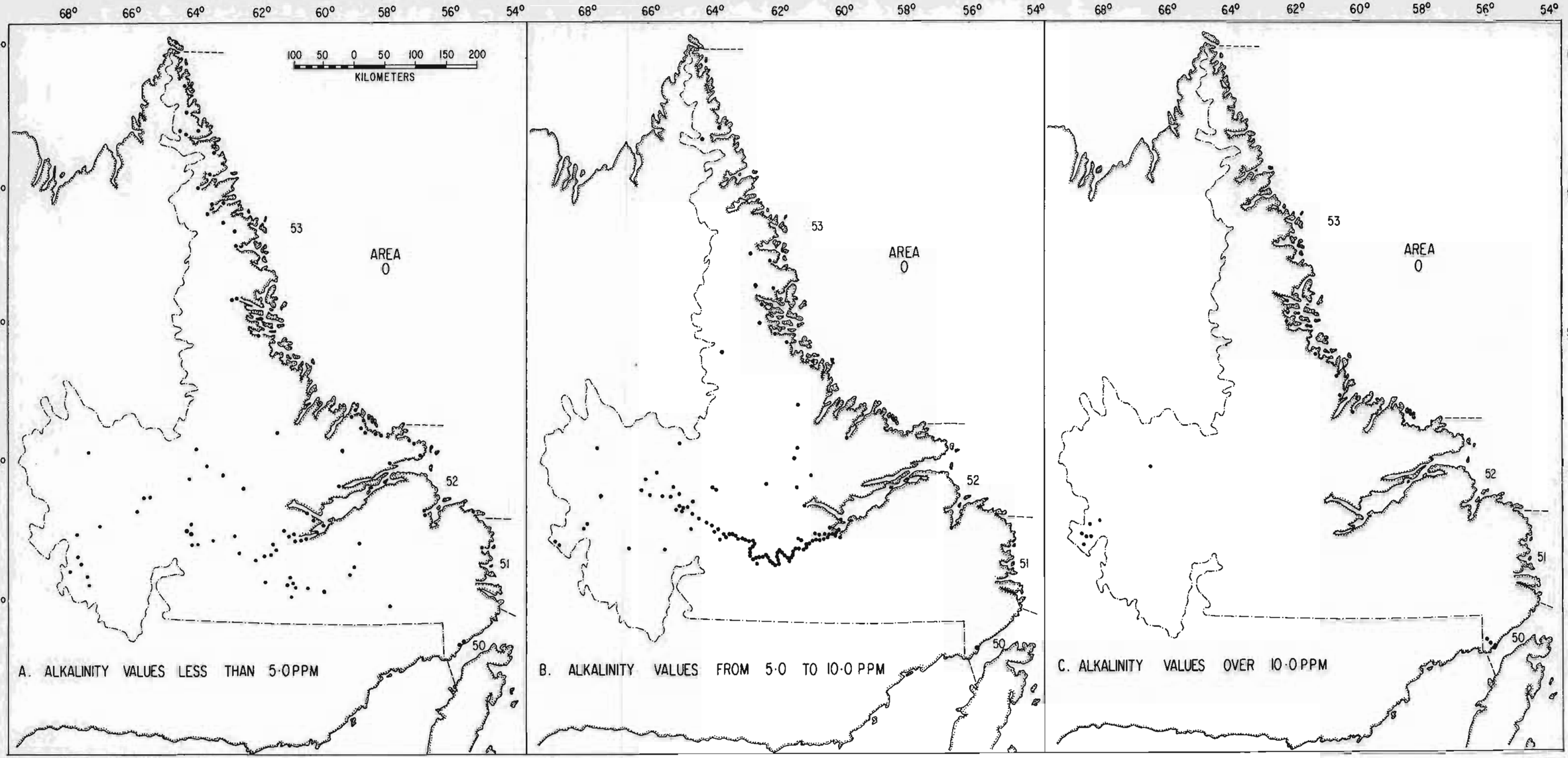

Figure 2. Total Alkalinity.

SPECIFIC CONDUCTANCE

Range 5.0 to 123 micro mhos/cm

1.6% less than 10.0 micro mhos/cm
96.8% from 10.0 to 50.0 micro mhos/cm
1.6% above 50.0 micro mhos/cm

Average for Labrador based on
309 values - 19.6 micro mhos/cm

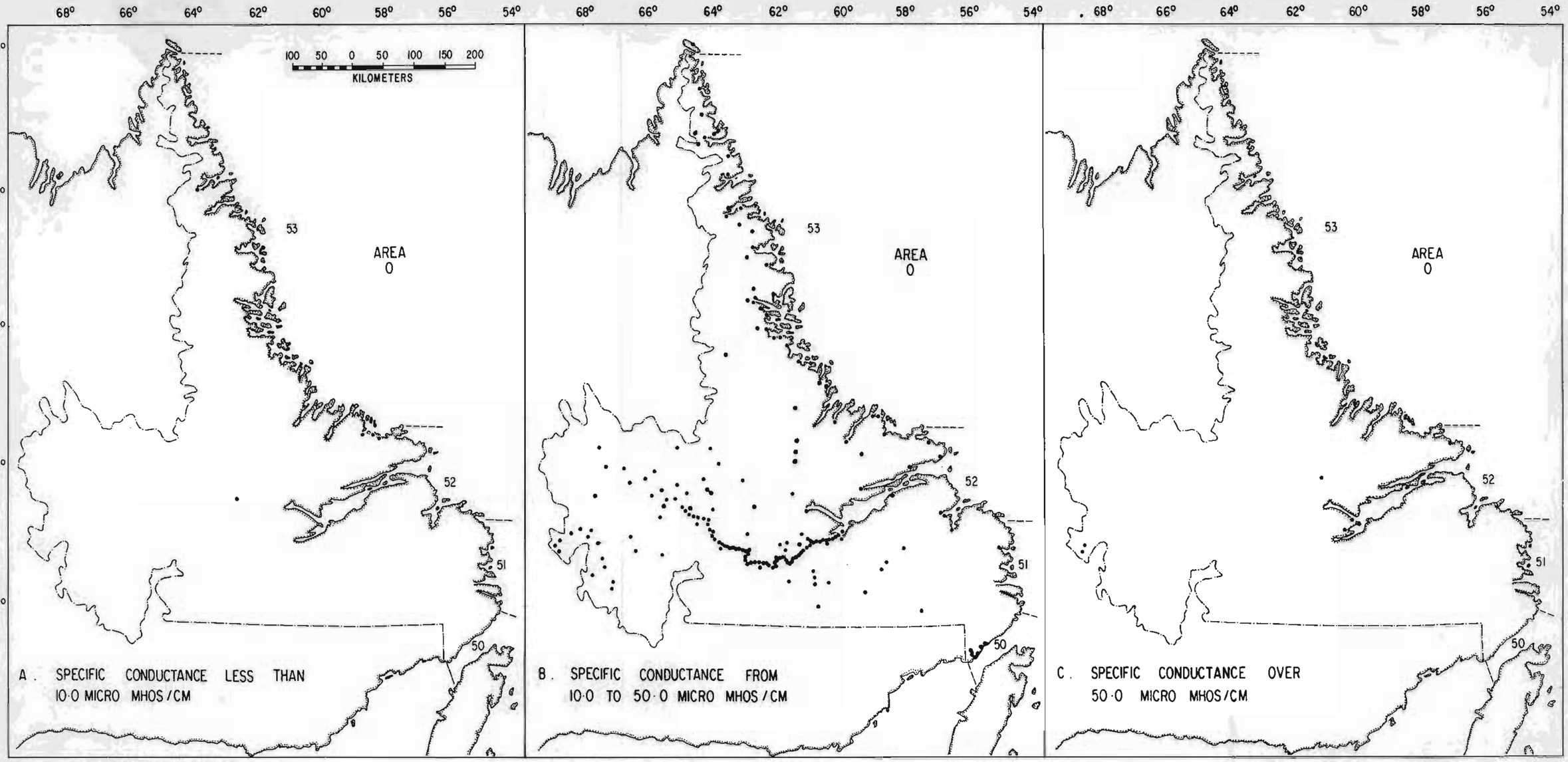

Figure 3. Specific Conductance.

TOTAL HARDNESS

Range 1.0 to 62.0 ppm

68.6% less than 10.0 ppm
29.5% from 10.0 to 20.0 ppm
1.9% above 20.0 ppm

Average for Labrador based on
309 values - 8.8 ppm

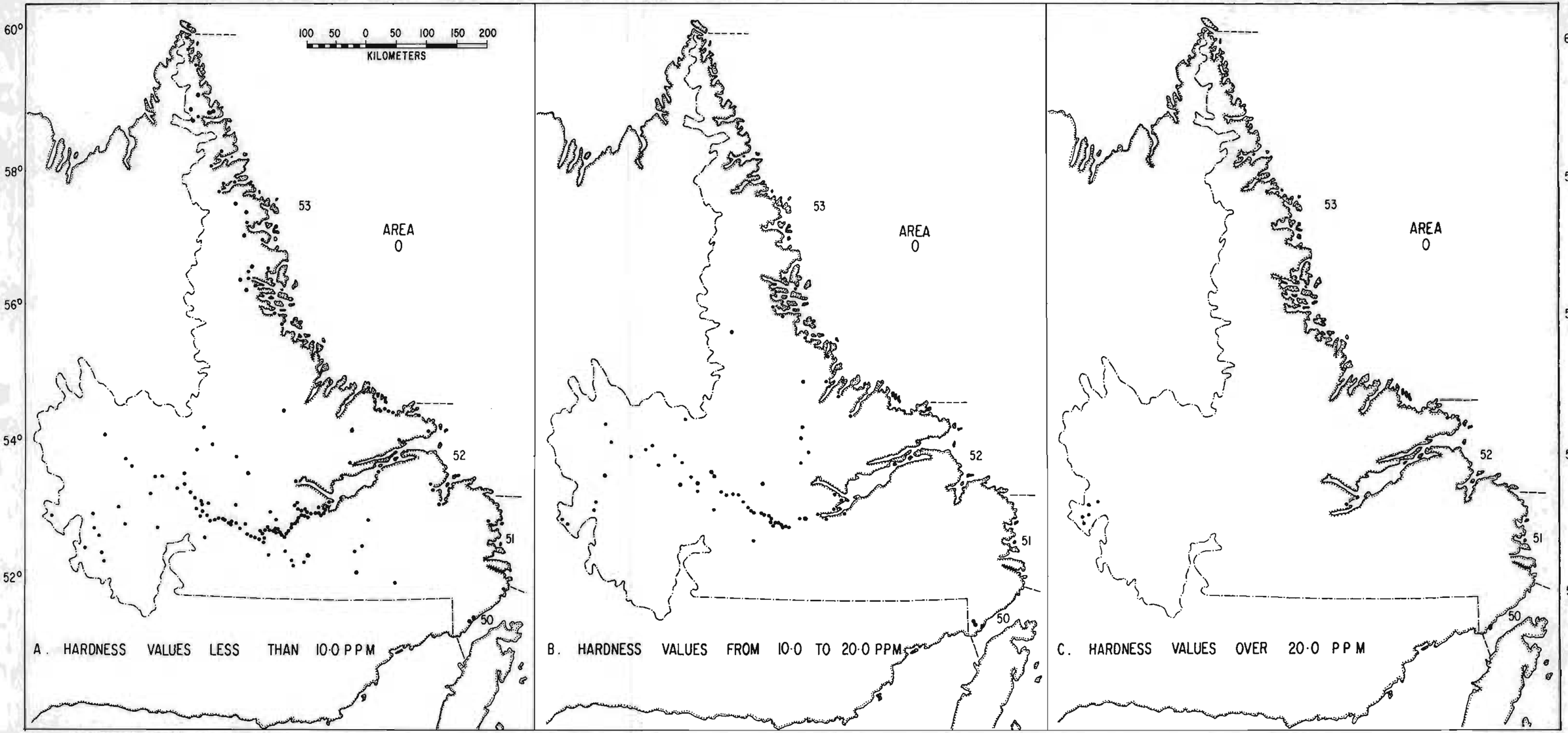

Figure 4. Total Hardness.

CHLORIDE

Range 0.3 to 33.0 ppm

35.9% less than 1.0 ppm
62.5% from 1.0 to 5.0 ppm
1.6% above 5.0 ppm

Average for Labrador based on
309 values - 1.5 ppm

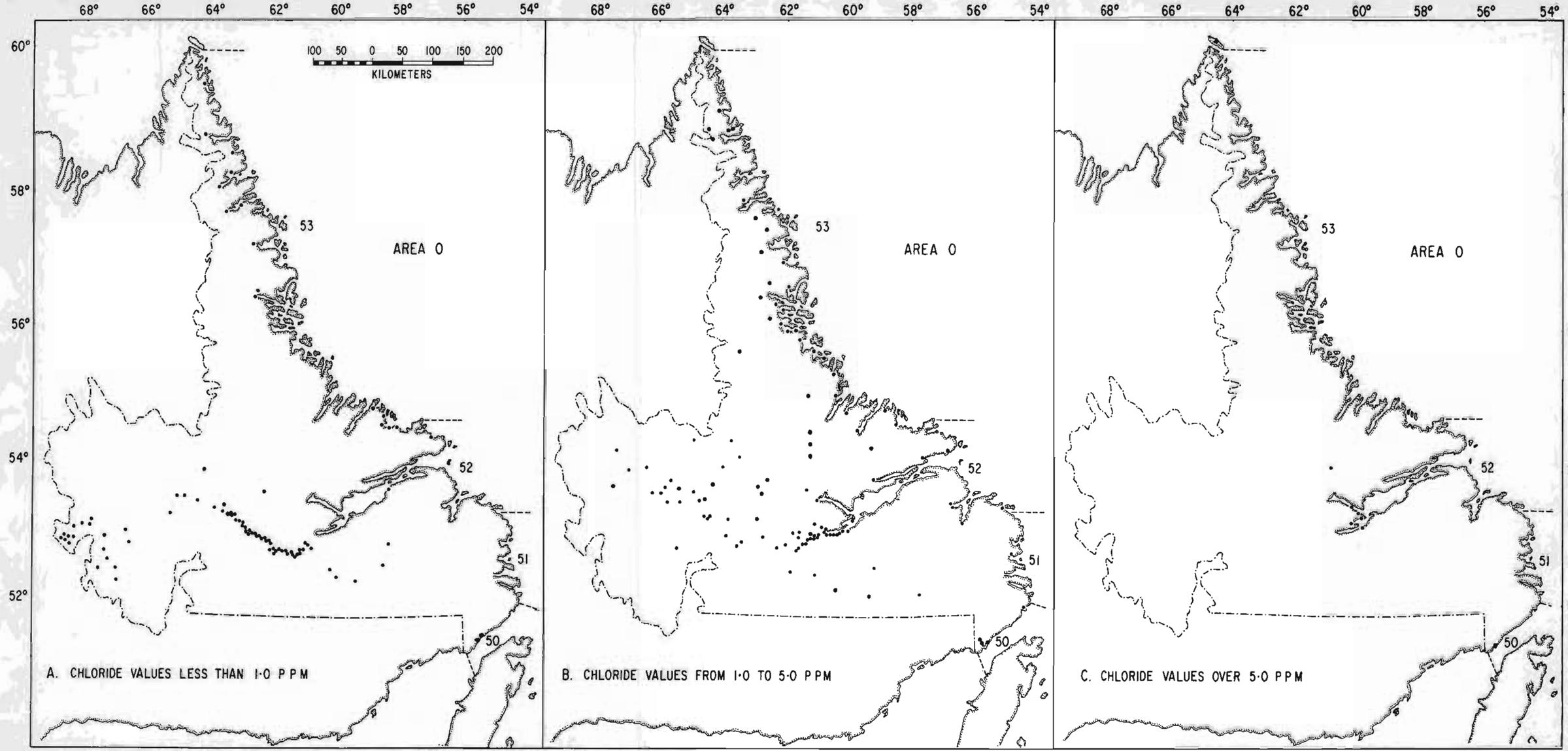

Figure 5. Chloride.

pH

Range 4.80 to 7.3 ppm

4.2 less than 6.0 ppm
94.5% from 6.0 to 6.9 ppm
1.3% above 6.9 ppm

Average for Labrador based on
309 values - 6.4 ppm

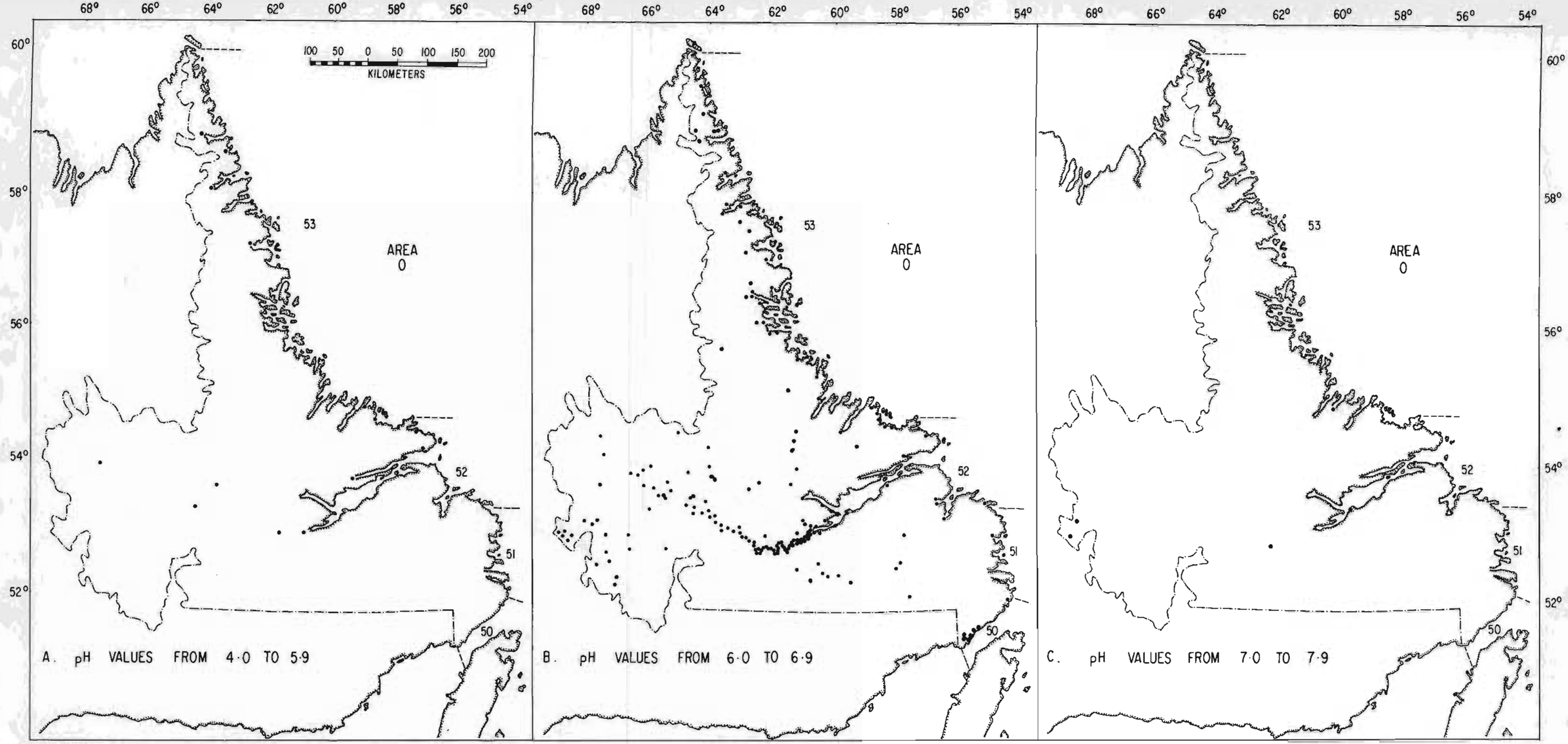
68° 66° 64° 62° 60° 58° 56° 54°
60°
58°
56°
54°
52°
100 50 0 50 100 150 200
KILOMETERS
AREA
0
53
52
51
50
A. pH VALUES FROM 4·0 TO 5·9
B. pH VALUES FROM 6·0 TO 6·9
C. pH VALUES FROM 7·0 TO 7·9

Figure 6. pH.

CALCIUM

Range 0.3 to 10.2 ppm

47.2% less than 1.0 ppm
43.4% from 1.0 to 2.0 ppm
9.4% above 2.0 ppm

Average for Labrador based on
309 values - 1.4 ppm

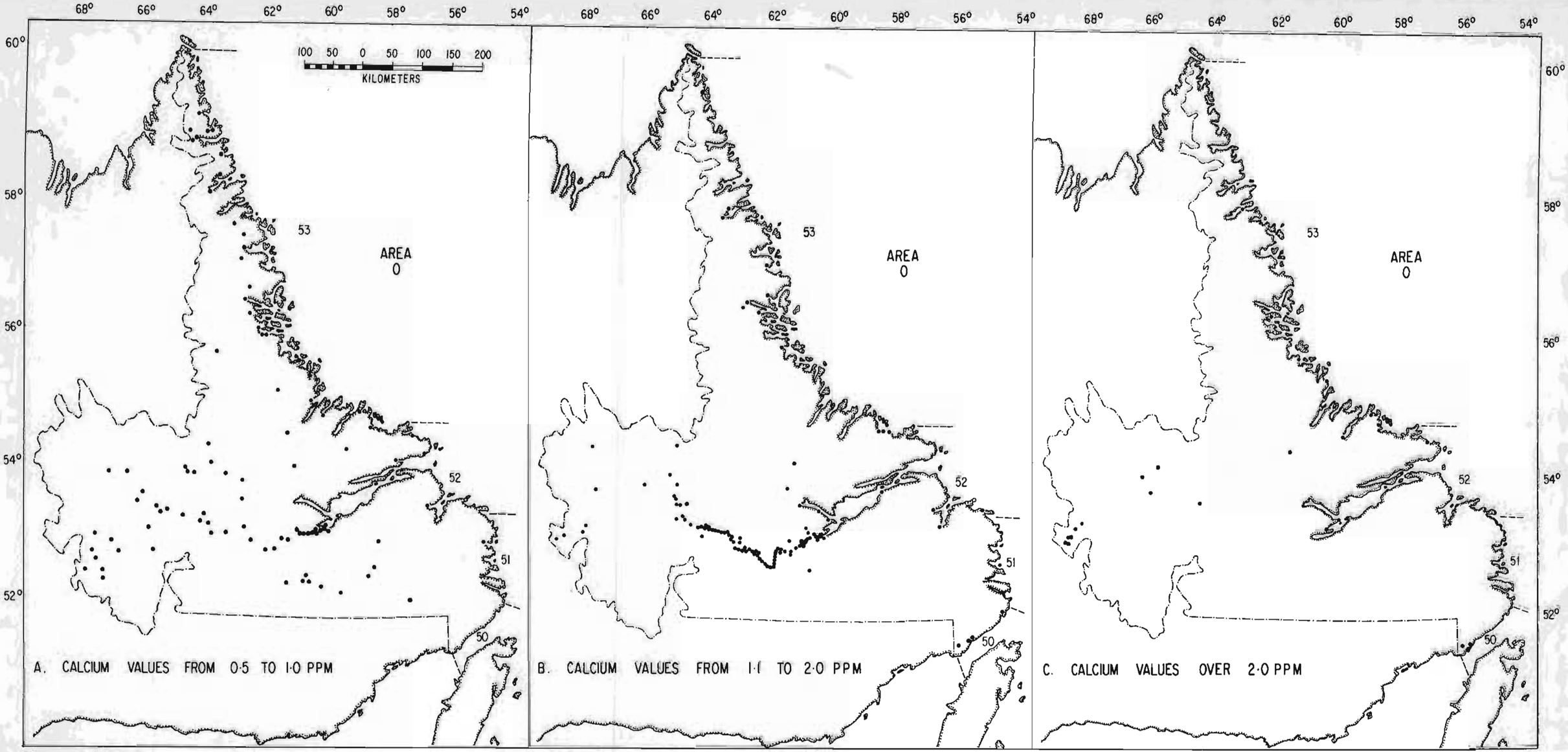

Figure 7. Calcium.

BICARBONATES

Range 1.2 to 51.2 ppm

37.3% less than 5.0 ppm
47.7% from 5.0 to 10.0 ppm
15.0% above 10.0 ppm

Average for Labrador based on
309 values - 7.0 ppm

TURBIDITY

Range 0.2 to 24.0 JTU

35.6% less than 1.0 JTU
58.3 from 1.1 to 5.0 JTU
6.1% above 5.0 JTU

Average for Labrador based on
309 values - 2.0 JTU