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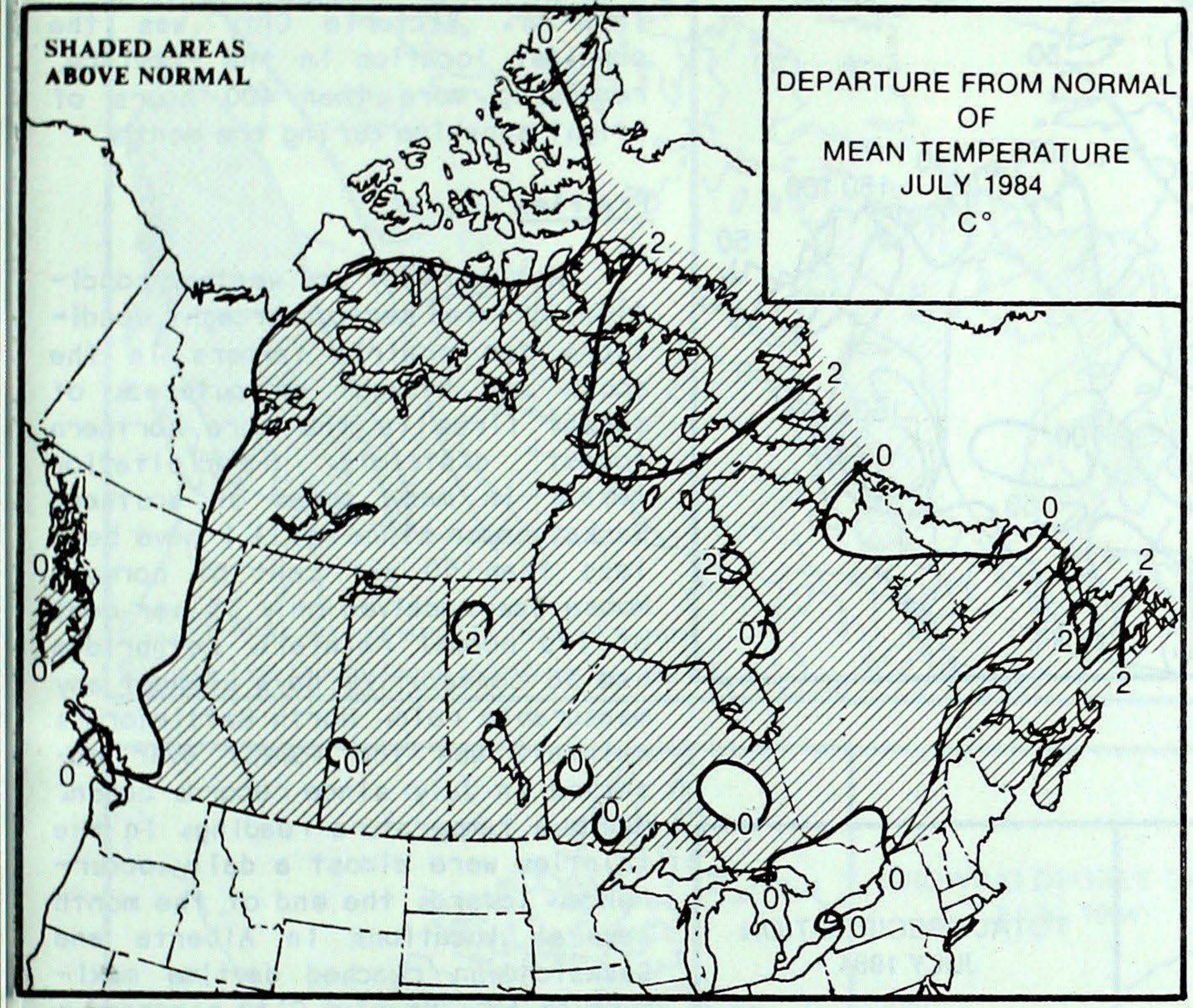
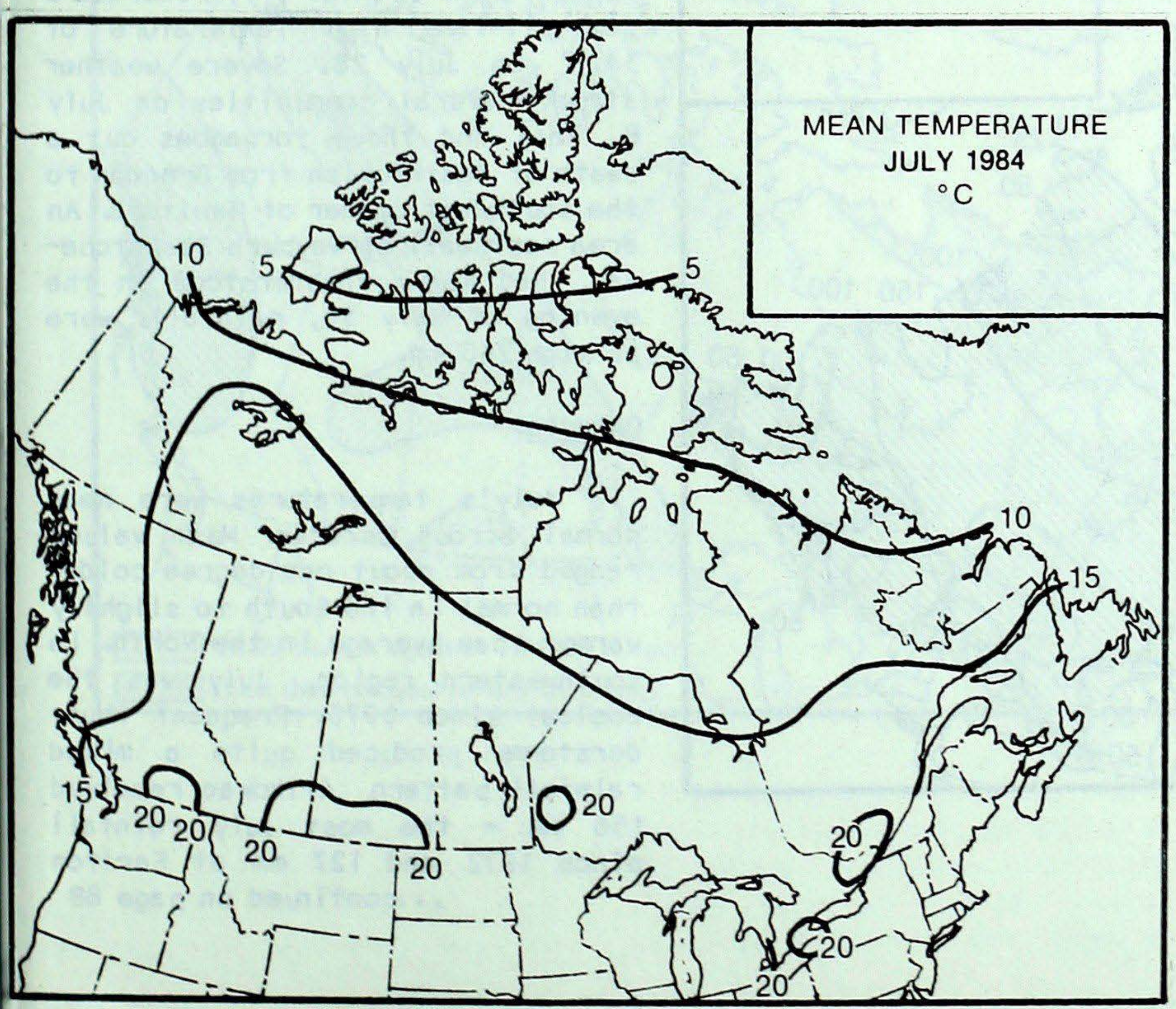




ACROSS THE COUNTRY...

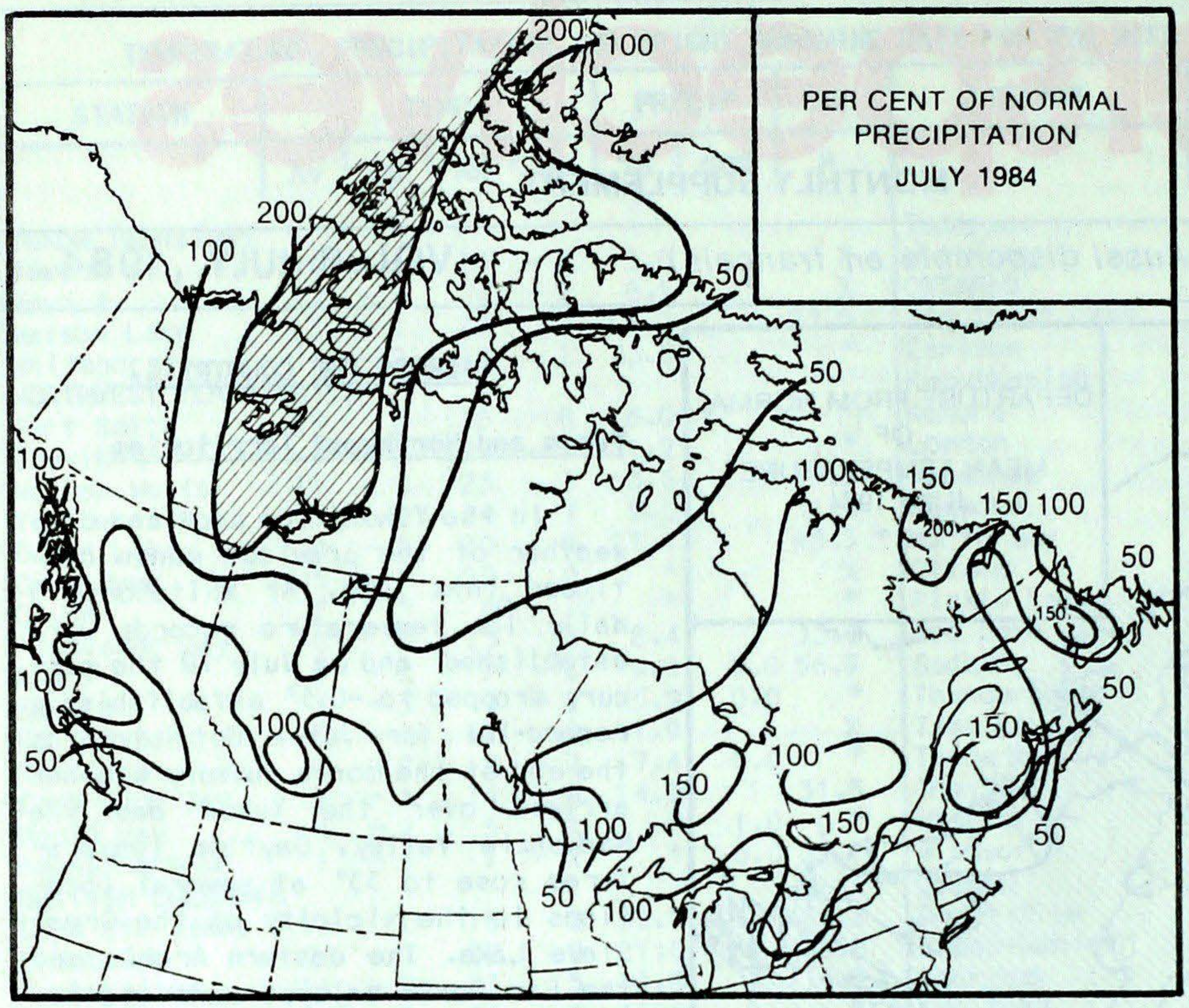
Yukon and Northwest Territories

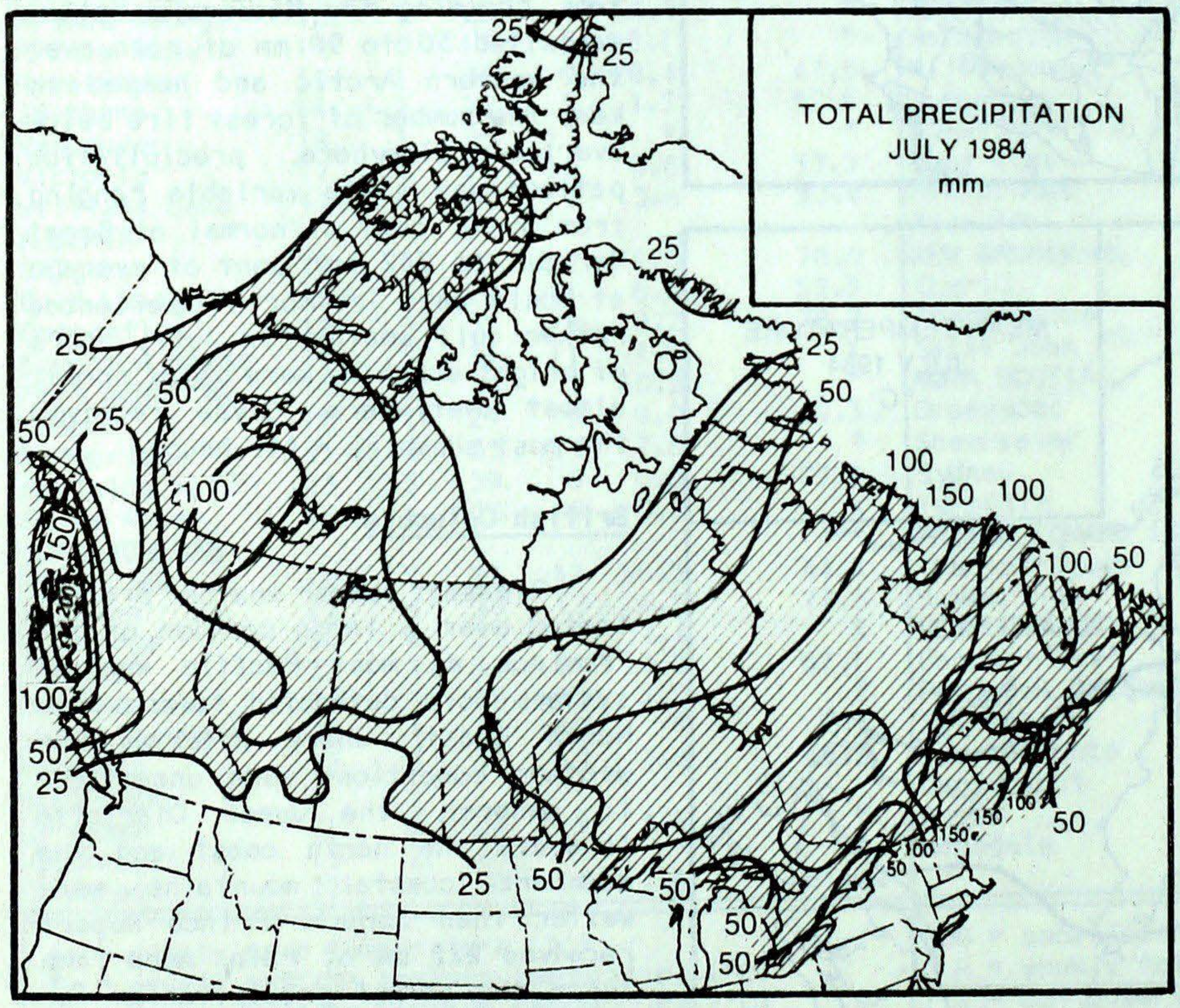
In the Yukon, the cool and damp weather of the previous month continued into July. At Whitehorse 6 daily low temperature records were established, and on July 19 the mercury dropped to -0.5° establishing a record-low for July. But, towards the end of the month summery weather arrived over the Yukon and the Mackenzie Valley. Daytime temperatures rose to 33° at several locations in the vicinity of the Great Slave Lake. The eastern Arctic and the Far North enjoyed warm weather for the first 3 weeks; however, cooler temperatures returned near the end of the month. Weather systems crossing the Mackenzie Valley deposited 30 to 90 mm of rain over the western Arctic and helped to keep the number of forest fire below average. Elsewhere, precipitation pattern was quite variable ranging from 5 per cent of normal at Coral Harbour to 242 per cent of average at Mould Bay. The North experienced rather dull weather in July, hours of bright sunshine were below normal almost everywhere. Clyde received the most sunshine - 441 hours.

British Columbia

Pleasant summer weather predominated over a large portion of the Province as most Pacific weather systems were deflected towards the North Coast, where unfortunately weather conditions were unsettled. In general, the Queen Charlotte Islands, the north coast and the adjacent coastal mountains were wetter than normal. Prince Rupert received 222 mm of rain, more than twice the normal precipitation for the month. In contrast, all other areas of the Province with the exeption of the east Kootenays were significantly below normal in rainfall. Most locations in the south

Canada





received only 25 to 50 per cent of their normal expected rainfall. Victoria City had no measurable precipitation during July. Sunshine was plentiful in all districts except the North Coast, Sandspit received only 148 hours. Record amounts of sunshine were enjoyed in many communities of the southern interior. Victoria City was the sunniest location in the Province, receiving more than 400 hours of bright sunshine during the month.

Prairies

Hot and very dry weather conditions created serious drought conditions for prairie farmers in the south and brought an outbreak of forest fires in the more northern forest districts. Precipitation totals in many areas of southern Saskatchewan since April 1 have been less than 50 per cent of normal; Moose Jaw received only 35 per cent of its normal rainfall. Lethbridge had 36 consecutive days without any measurable rain. North Battleford's rainfall was the lowest ever observed in July since records began. Maximum temperature readings in the thirties were almost a daily occurrence. Towards the end of the month several locations in Alberta and Saskatchewan reached daytime maximums of 38°. Uranium City recorded a new all-time high temperature of 34.7° on July 28. Severe weather struck several communities on July 8. Hail and three tornadoes cut a swath of destruction from Brandon to the southeast corner of Manitoba. An area northeast of Weyburn Saskatchewan, had heavy thunderstorm on the evening of July 30, rainfalls were as high 240 mm.

Ontario

July's temperatures were near normal across Ontario. Mean values ranged from about one degree colder than normal in the South to slightly warmer than average in the North. In southwestern region, July was the coolest since 1976. Frequent thunderstorms produced quite a mixed rainfall pattern, Atikokan received 156 mm - the most July rainfall since 1972 and 127 mm at Earlton

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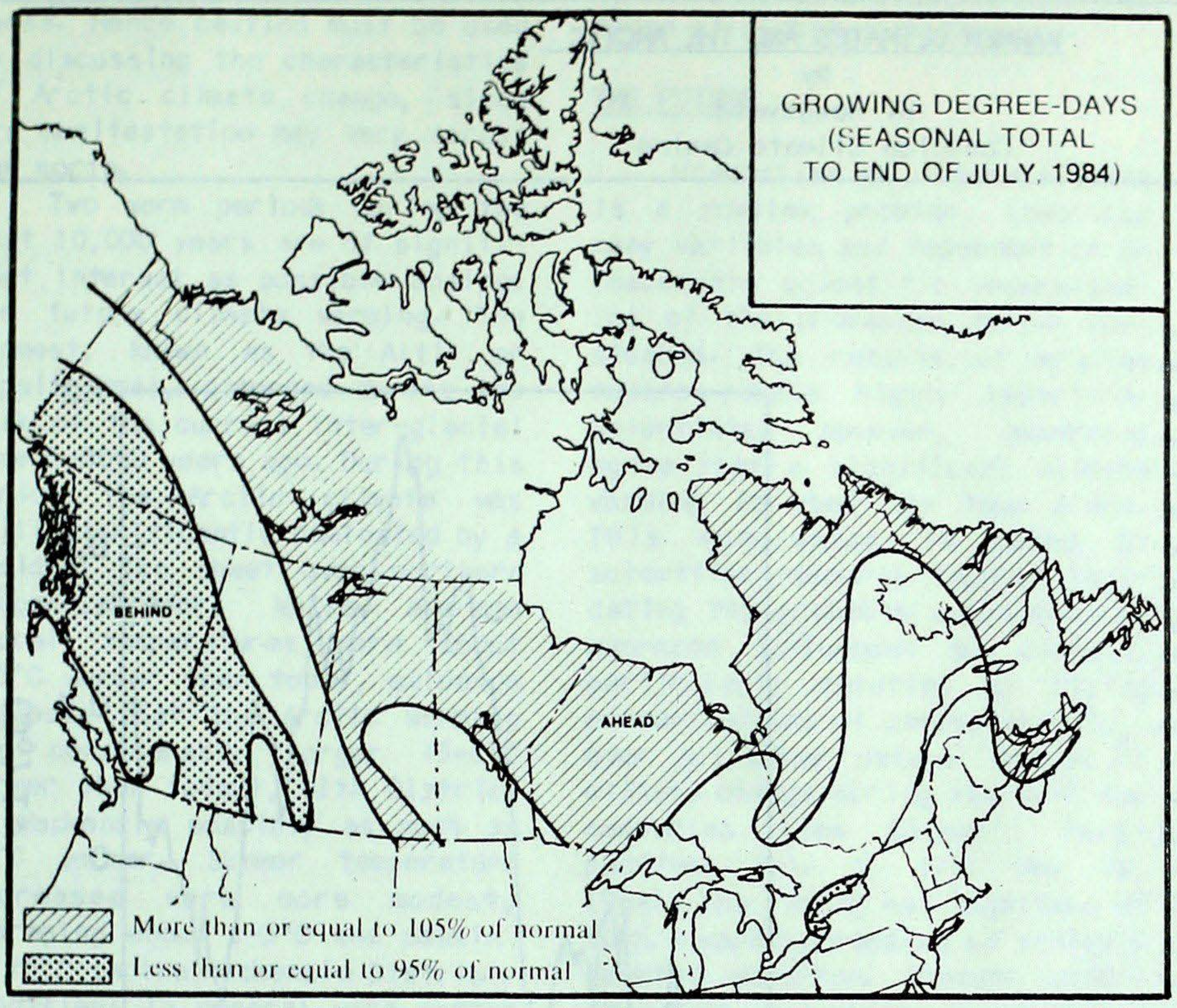
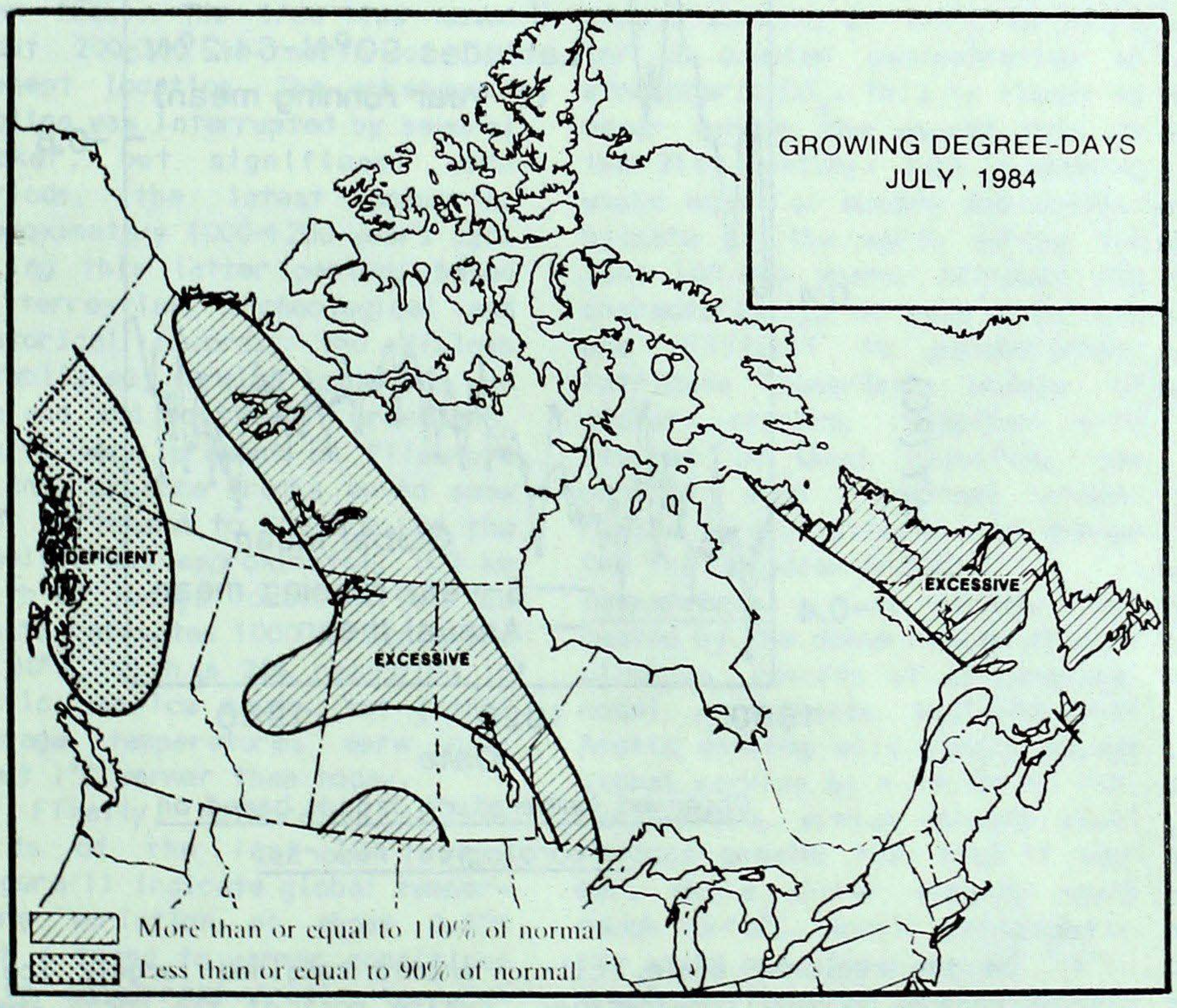
GROWING DEGREE-DAYS





TOTAL TO END OF JULY

	1984	1983	NORMAL
BRITISH COLUMBIA			
Kamloops	1362	1241	1396
Penticton	1237	1152	1319
Prince George	686	725	774
Vancouver	1177	1152	1152
Victoria	1069	1076	1054
ALBERTA			
Calgary	846	749	840
Edmonton Mun.	1049	877	884
Grande Prairie	768	748	848
Lethbridge	1028	858	1033
Peace River	795	713	838
SASKATCHEWAN			
Estevan	1217	951	1117
Prince Albert	975	755	930
Regina	1104	789	1035
Saskatoon	1081	880	1033
Swift Current	1016	758	1008
MANITOBA			
Brandon	1043	789	1047
Dauphin	1020	757	1003
Winnipeg	1092	875	1106
ONTARIO			
London	1246	1029	1283
Muskoka	1072	907	1056
North Bay	1014	827	1036
Ottawa	1298	1042	1262
Thunder Bay	931	723	858
Toronto	1199	1034	1281
Trenton	1199	1022	1272
Windsor	1461	1215	1500
QUÉBEC			
Baie Comeau	961	542	938
Montréal	1312	1040	1295
Québec	1107	876	1065
Sept-Iles	620	507	611
Sherbrooke	995	829	1138
NEW BRUNSWICK			
Charlo	905	715	897
Fredericton	1101	914	1057
Moncton	1004	857	957
NOVA SCOTIA			
Halifax	946	826	905
Sydney	910	714	797
Yarmouth	858	743	756
PRINCE EDWARD ISLAND			
Charlottetown	992	829	881
NEWFOUNDLAND			
Gander	799	669	684
St. John's	777	473	584
Stephenville	849	724	679

WARMER CLIMATES AND THE ARCTIC

by
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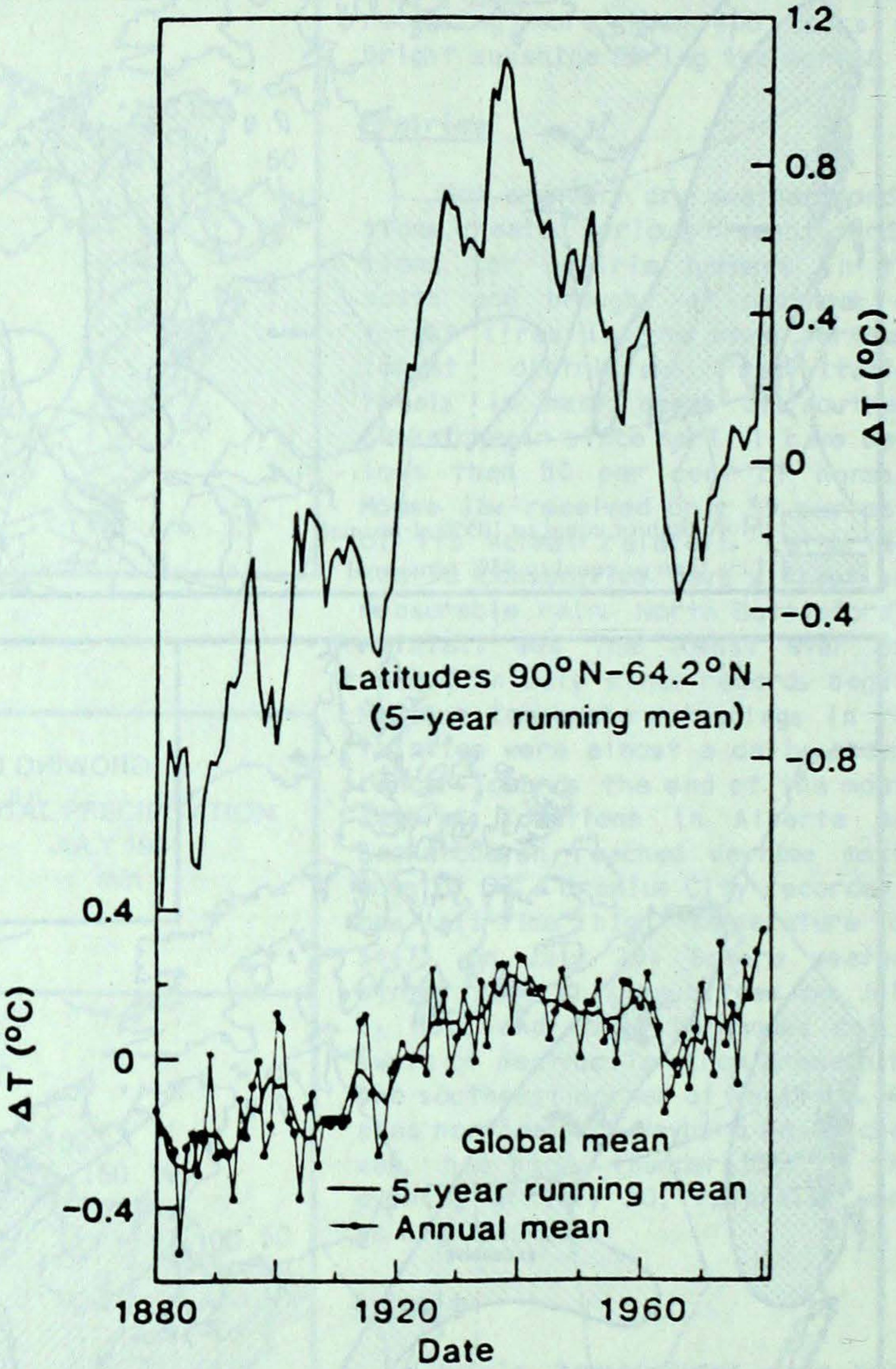
INTRODUCTION:

Recent articles in Climatic Perspectives have addressed the subjects of global climate change (Vol. 6 (19) May 18, 1984) and the threat of possible climatic warming due to rising concentrations of atmospheric CO_2 (Vol. 5, June 1983). The magnitude of climate change on a global scale, however, often appears to be of little concern to members of societies who already regularly experience much larger regional variations of their climates. Canadians in particular, living along the cold margins of habitable earth, must cope with large year-to-year climate fluctuations that bring with them increased risk to the socioeconomic activities of our country. Hence, the real threats and /or opportunities of a global climate change only become evident when translated into recognizable terms of regional climates. This article, dealing with climate change and the Arctic, is the first of several which will explore the possible implications of a global CO_2-induced warming on the environment of Canada and hence its citizens.

CLIMATE CHANGE IN THE ARCTIC: THE PAST

The Arctic terrestial surface is abundant with evidence that todays climate, on a time scale of millenia and longer, is not normal but only a momentary state of a constantly changing environment. Major ice ages have come and gone at regular 100,000 year intervals, while significant although smaller warm and cold periods have succeeded each other in between. In the Arctic these changes appear to have been significant amplifications of similar changes in the global climate. This magnification of global change is largely related to the role of snow and ice as reflectors of incoming sunlight and insulators of the ocean surfaces.



Observed temperature trends based on meteorological records.

On the regional scale, climate change becomes considerably more complex, within one area often displaying changes quite different in characteristics from those in an adjoining region. For example, during the most recent ice age, the northwest Canadian Arctic remained largely ice free while most of the North American continent was covered with a massive ice sheet. Similarly, during periods of glacial accretion of some Arctic ice caps (e.g. the Greenland ice cap), others appear to have decreased in size (e.g.

Ellesmere Ice caps), and vice versa. Hence caution must be used in discussing the characteristics of Arctic climate change, since its manifestation may vary across the north.

Two warm periods during the last 10,000 years are of significant interest as possible analogs for future climate warming. The warmest, known as the Alti- or Hypsithermal, occurred during the peak of the current inter-glacial some 5-8000 years ago. During this period the Arctic climate was still significantly dominated by a residual ice sheet over northern Québec-Labrador. While average global temperatures were about 1.5°C warmer than today, evidence suggests that the Arctic warming was considerably larger (3-4°C warmer than today), with District of Mackenzie possibly as much as 11°C warmer. Summer temperature increases were more modest, averaging about 1-3°C and peakin at ∿5°C in the Mackenzie District. Conditions in general were wetter than today. The tree-line moved about 200-300 km north of its present location. The subsequent cooling was interrupted by several weaker, but significant warm periods, the latest occurring approximately 1000-1200 years ago. During this latter period, based on terrestial, archeological and historical records, the Vikings established farming colonies on Iceland and south-west Greenland, Inuits were present on Ellesmere Island, cyclone tracks moved some 3-5° northward to 60-65°N and the treeline was approximately 100 km north of todays location. Sea ice limits retreated 1000 km northward to 80°N, with a 20% reduction in Arctic sea ice cover. Yet global average temperatures were only about 1°C warmer than today.

Finally, meteorological records of the last 100 years (Figure 1) indicate global temperature variation of about 0.6°C with a trend to warmer conditions while concurrent Arctic temperatures display a range in ariation of 2°C. Hence past climates consistently suggest that Arctic climate variations are amplified by a factor of 2-3 with respect to those of global climate.

THE FUTURE

Prediction of future climate is a complex problem, involving many variables and dependent on an inadequate scientific understanding of the processes to be considered. The results of studies todate remain highly uncertain. Scientists, however, generally agree that a significant climate warming is about to take place. This conclusion is based on scientific research results indicating the probable domination of man-made influences on climate, particularly relating to rising concentrations of atmospheric CO_2, over all other natural causes of climate change during the next few centuries (see Climatic Perspectives Vol. 6, (19) May 18, 1984). The timing and magnitude of such a warming remains an actively debated question. Present understanding suggests a probable global warming of 1.5°C to 4.5°C for a doubled concentration of atmospheric CO_2. This is likely to occur during the second half of the 21st century. Such a warming would equal or exceed the warmest climate of the earth during the last 100,000 years. Although the characteristics of such a warming are difficult to parameterize, intricate numerical models of global climate, together with studies of past climates, can provide some important clues. Following are patterns that emerge for the Canadian Arctic.

Temperature. As already suggested by the above review of past climates, results of mathematical model experiments indicate that Arctic warming will likely exceed global warming by a factor of 2-3. Furthermore, winter warming would be much greater than that of summer. While winter warming could reach 10-15°C, Arctic summer warming would not likely exceed 3-4°C. Precipitation. A displacement of dominant storm tracks northward, together with increased moisture availability from expanded areas of ice free oceans, appear likely to result in a significant increase in precipitation, with some areas experiencing as much as 40-50% increase. Snow season will be shorter, but greater snow depths may actually accumulate due to precipitation increases. Hence river runoff would increase and peak earlier in the year. Increased summer evaporation will partially offset the effect of increased precipitation during the rainy season.

Permafrost. Increased winter temperatures and snow cover, together with warmer summers, will result in the slow decay of the thickness of the permafrost layer (∿30 metres/°C warming). The effect on continuous permafrost zone will be very slow, taking centuries and millenia to stabilize. Areas within the discontinuous zone, where the permafrost layer is relatively thin and interrupted, will however likely deteriorate more rapidly, since a shorter time is required for the frost to reach melting point. Land instability, development of thermokarst topography and lakes, and occurrence of mudslides would consequently increase.

Ice: Fresh Water. Ice seasons will become significantly shorter due to later freezup and earlier breakup of inland lakes and rivers. Preliminary studies suggest seasons could reduce duration by 4 to 11 days per °C of warming. Hence ice free seasons could lengthen by from one half to more than two months. Sea ice on the other hand, is influenced by not only temperature but also ocean currents, salinity and predominant winds. Studies of past climates as well as results of numerical model experiments suggest a major retreat of southern ice limits, possible complete disappearance of ice in the Arctic ocean durin mid summer, and a Hudson Bay free of ice year-round.

The prognosis for glacial ice is much more difficult. Increased melting of ice sheet margins during warmer and longer summers could very well be offset by net annual increase in snow depth accumulation at higher glacial elevations. This could result in increased glacial flow and, hence, iceberg production.

Sea Level. During the expected warming of the next 100 years, thermal expansion of the oceans together with melting of temperate glaciers are likely to raise sea levels by ½ to metre. A more remote possibility exists of a 5-6 metre rise due to the disintegration of the West Antarctic ice cap (see Climatic Perspectives Vol. 5 (44) Nov. 4, 1983). Such an event, if it does occur, would likely take 200 to 500 years to develop.

IMPLICATIONS OF A WARMER ARCTIC

The effects of a climate warming as described on socio-economic activities of our north would be profound. In general it would result in a significant improvement of conditions of northern living, reducing the hazards of human activities in a harsh environment and increasing the potential for economic development. It would also increase land instability, deteriorate winter road conditions and result in increased storminess. Much work remains to be done to assess northern sensitivity to such change. Some qualitative inferences however, can already be derived. Following are some of these:

Offshore Development /Transportation. Major constraints of offshore marine activities in the Arctic are harsh winter temperatures and less ice cover. Shipping is presently restricted to 4-6 months of the year, with some areas of the high Arctic totally inaccessible by marine route. Costs of building and operating powerful ice-strengthened vessels are high and risk of damage substantial. Offshore resource exploration is similarly limited, with costly drilling platforms remaining idle for much of the year. Ice free summer conditions, reduced thickness and extent of winter ice and more clement winter temperatures would dramatically reduce these restrictions. Costs of design and construction, operation and insuring offshore platforms and marine vessels, as well as risk to life and environement would be substantially reduced. Year round operation would become a reality. On the other hand, potential increase for storminess, increased wave activity in ice free waters, and possible increase in ice berg populations in eastern Arctic waters have negative, although less substantial, implications.

Fishing. Fish populations are known to be highly sensitive to ocean climate conditions. For example, cod populations off West Greenland were abundant during that warm period of 1000-1200 AD (historical reports), and more recently during the 1920-1950 warm period, only to disappear during subsequent cool periods. These changes are apparently related to climate related changes in ocean currents. How fish population will migrate in Arctic waters during a climate warming are as yet unknown, although major changes will undoubtedly take place. Accessibility to fishing grounds will improve as ice conditions become less restrictive.

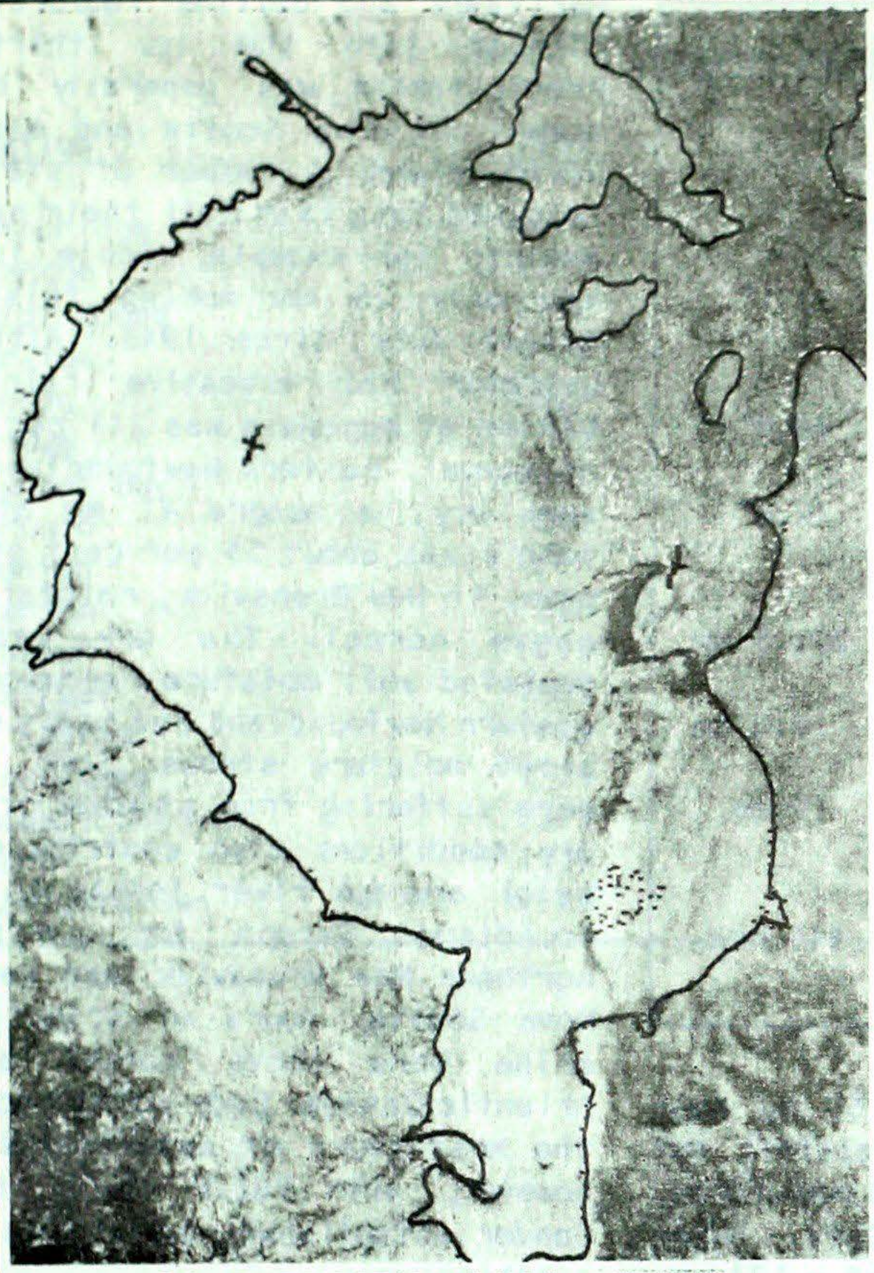
Agriculture and Forestry. Warmer summer temperatures, longer growing seasons and less severe Arctic winters, together with high photosynthesis potential of long summer days, bode well for a northern agricultural industry under a warmer climate. Soil limitations will however restrict this potential to the Mackenzie Valley and smaller valleys of the western Arctic. Whitehorse, for example, could experience a 40% increase in both growing degree days and frost free period (see Table 1.) while Yellowknife's improvements would be more modest at 34% and 18% respectively. Similarly forest productivity would increase substantially, with a gradual migration of the treeline northward by about 100 km/°C of global warming. Natural vegetation of the Arctic landscape would change substantially as certain species thrive and others disappear.

Other implications include reduced heating costs, increased damage to buildings and roads due to decaying permafrost, shorter seasons for using winter roads and effects on migration of wildlife. While the uncertainty surrounding the regional characteristics and magnitude of possible climate change, as well as the sensitivity of our northern society to such change remains high, scientists are quite certain that the projected general trends will materialize. A global warming, with an amplified Arctic change, now appears inevitable. Much more effort now needs to be devoted to reducing the uncertainties, quantifying the impacts and devising methods to mitigate or adapt to them. It calls for a coordinated effort between the various government, university and public interest groups, within Canada, and internationally too.

Location	1951-80		+2.3°C	
	GDD	FFD	GDD	FFD
Fort Simpson	1094	79	1525	99
Inuvik	654	51	826	72
Whitehorse	897	82	1269	115
Yellowknife	982	111	1312	131
Comparison:				
Edmonton	~1400	~120		

Table 1. Probable changes in growing-degree days (GDD) and frost free days (FFD) for various Arctic locations for a global 2.3°C warming.

ICE BREAK UP - HUDSON BAY 1984



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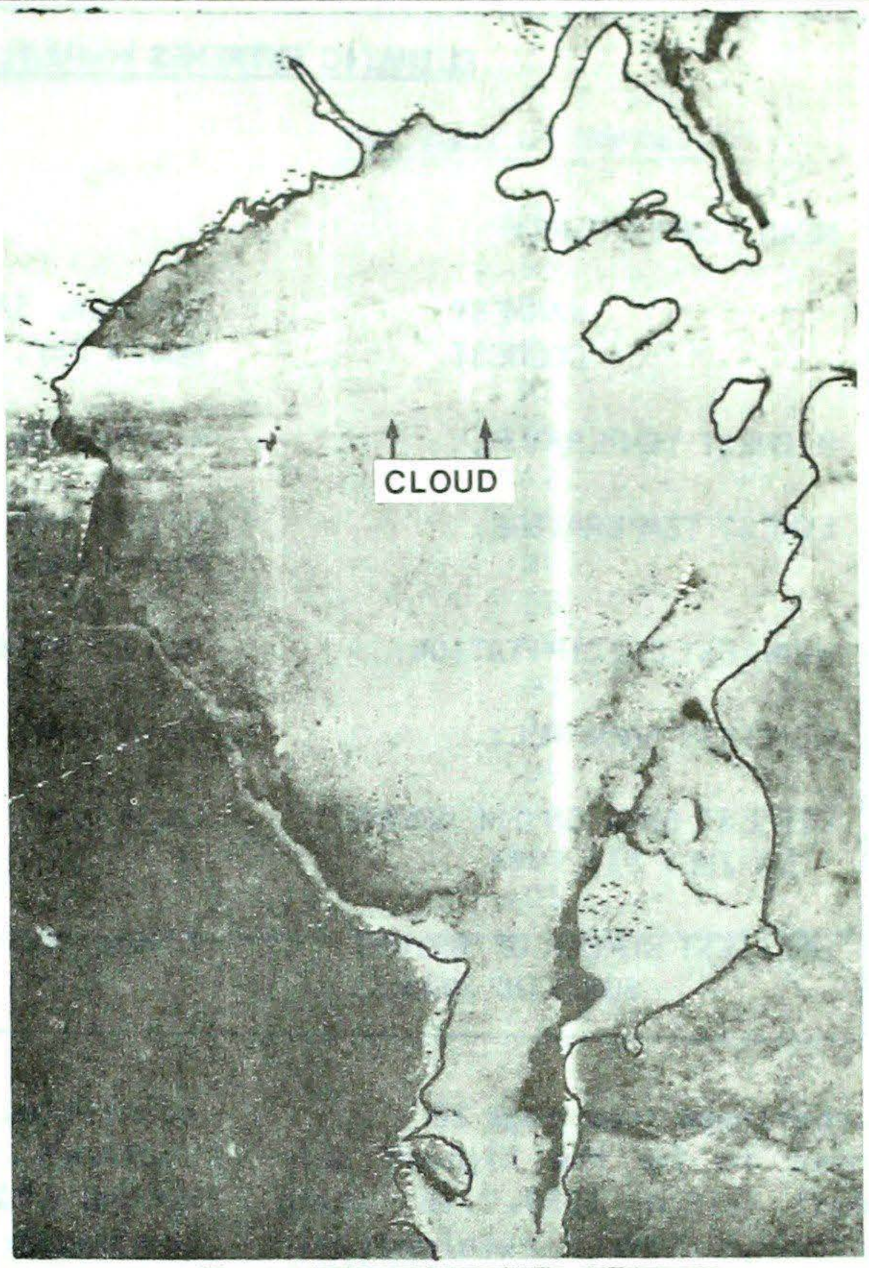

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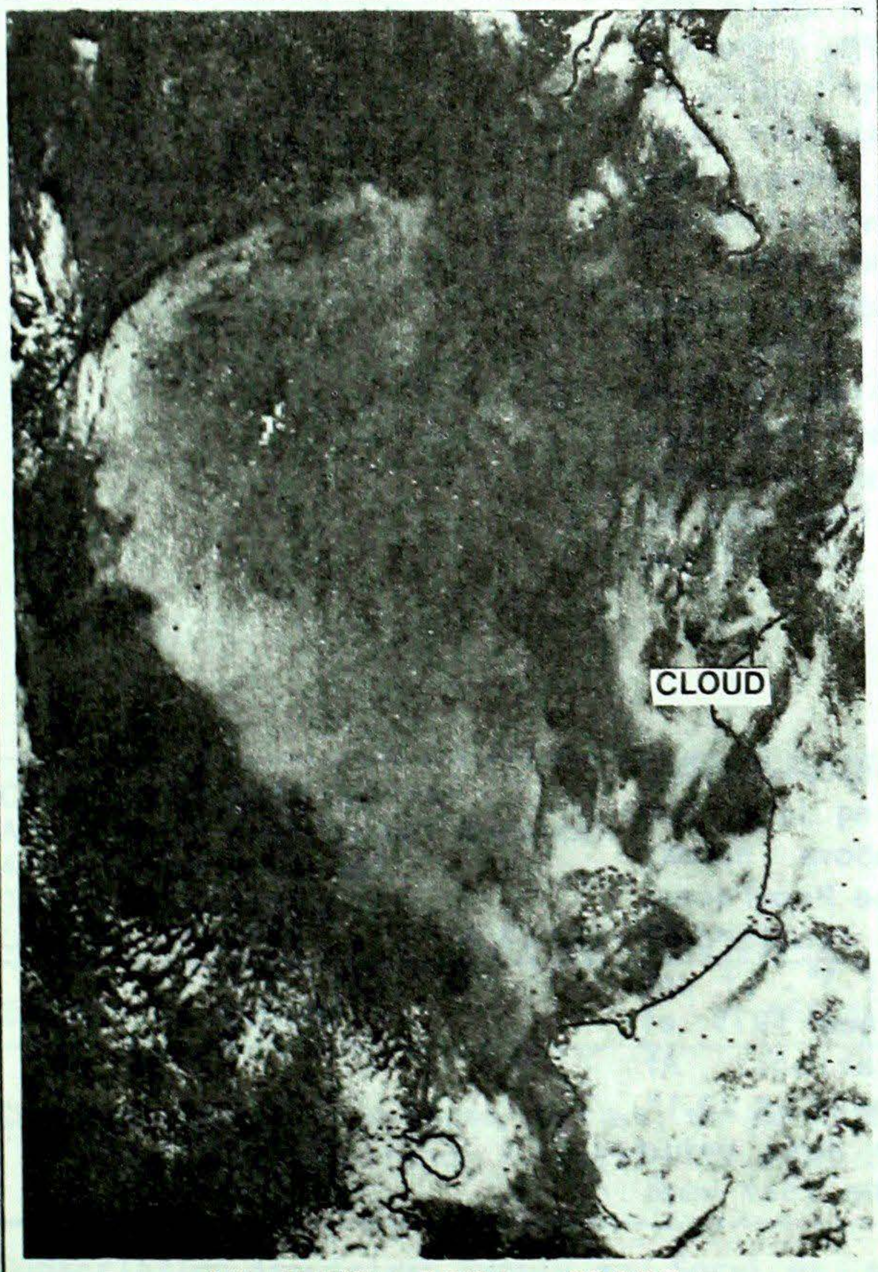

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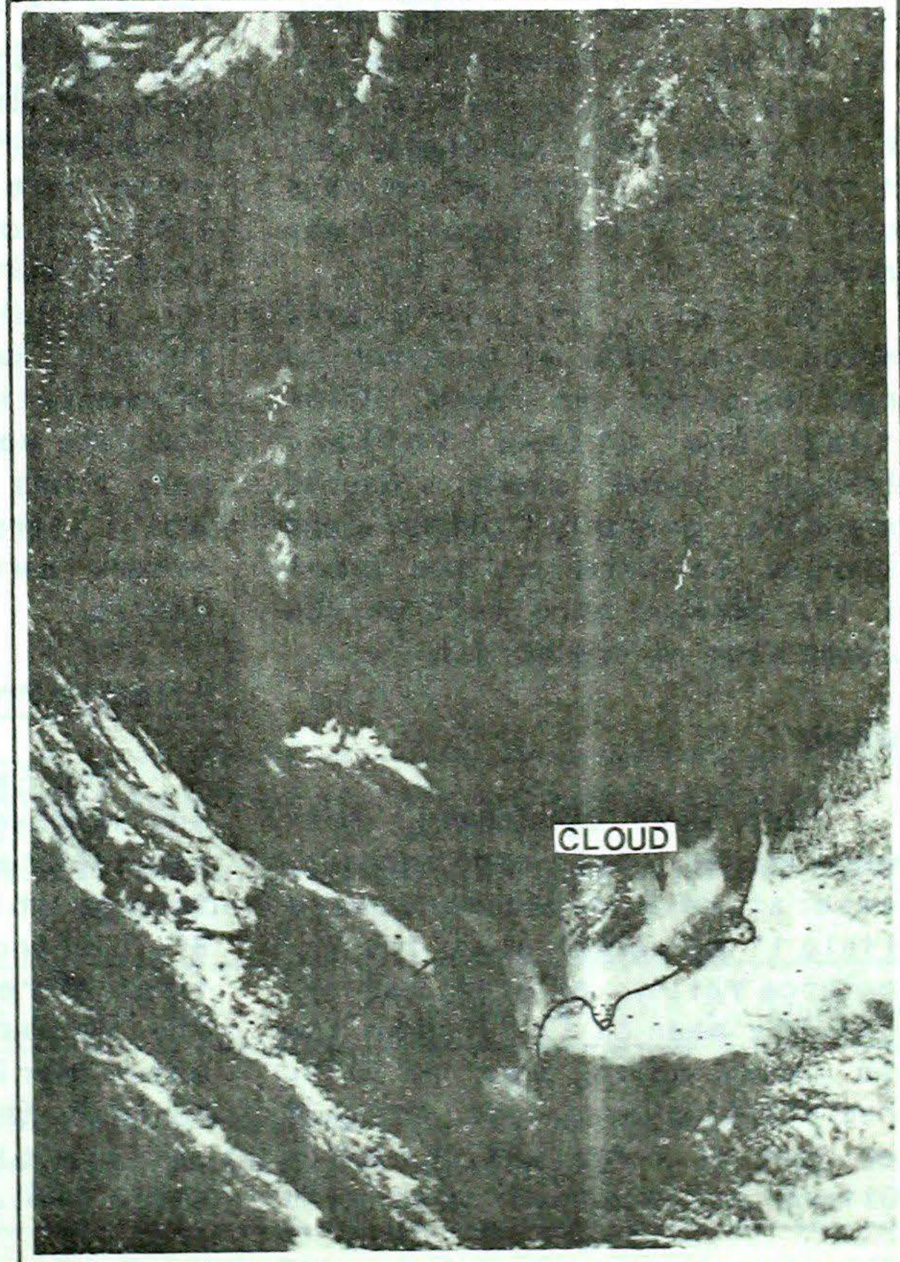

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CLIMATIC EXTREMES - JULY, 1984

MEAN TEMPERATURE:		
WARMEST	Estevan, SASK	22.1°
COLDEST	Mould Bay, NWT	3.1°
HIGHEST TEMPERATURE:	Lytton, BC	40.5°
LOWEST TEMPERATURE:	Clyde, NWT Mould Bay, NWT	-2.6°
HEAVIEST PRECIPITATION:	Prince Rupert, BC	222.3 mm
HEAVIEST SNOWFALL:	Cape Dyer, NWT	16.0 cm
DEEPEST SNOW ON THE GROUND ON JULY 31, 1984	Cape Dyer, NWT	12 cm
GREATEST NUMBER OF BRIGHT SUNSHINE HOURS:	Clyde, NWT	441 hrs

...continued from page 2B
proved to be the highest July amount since 1969. In sharp contrast, Windsor received only 38 mm and a sparse 29 mm provided the driest July since 1971 at St. Catharines. Hamilton and Mount Forest were dry with only 40 mm and Toronto received a meagre 44 mm. The last 10 days of the month were especially dry in the South, little or no rain fell across the lower Great Lakes.

On July 15, tornadoes carved wide paths of destruction from Ralphton to Deep River along the Ottawa Valley. Although these storms caused extensive property damage and injuries in Ontario, the brunt of the damages were felt on the Québec side of the border.

Québec

Over most of Québec, mean temperatures were near normal. Temperature departures were within 1° of normal along the St. Lawrence Valley; at Blanc Sablon, a monthly mean of 12.7 broke the old record dating back to 1975. Precipitation was less than 75 per cent of normal in the Hull--Ottawa and Montréal area with quantities 53 mm and 60 mm respectively. However, rainfall exceeded 150 mm at Trois-Rivières, Sherbrooke and Québec City. Sherbrooke received the most - 174 mm. Over eastern Québec, precipitation ranged from 68 mm at Gaspé to 137 mm at Blanc Sablon while the northern portion of the Province received amounts up to 141 mm at Nitchequon. Hours of bright sunshine were close to normal, but 275 hours of sunshine were 109 per cent of normal at Chibougamau.

On July 15, tornadoes ripped through communities along the Ottawa Valley. The village of Blue Sea Lake was the hardest hit where many homes were reduced to rubble and 1 person was killed and 38 others were injured from flying debris.

Atlantic Provinces

The East Coast enjoyed sunny and warm weather during July. The temperatures were above normal throughout most of the Provinces. St. Lawrence recorded the largest temperature anomaly of 3°. It was the warmest July since 1975 at many Maritime locations; At Halifax, the monthly mean of 20.1° was the highest July mean value since 1961. During the last week of July, a heat wave covered the Maritimes and daytime temperatures climbed into the low thirties. Precipitation was generally below normal in Nova Scotia and eastern Newfoundland. A number of stations received less than half their normal amount; for example, Sable Island had only 26 mm making this the driest July since 1945. Although Labrador had excessive rainfall, 178 mm at Hopedale was 211 per cent of normal. Eastern Newfoundland was very dry, a meagre 41 mm at St. John's was about 55 per cent of the norm. In New Brunswick, rainfall was above normal. The dry weather depleted soil moisture resources in eastern Newfoundland and crops exhibited moisture stress. Some crops were suffering from stunted growth. Dry conditions also contributed to below average river levels in Newfoundland. Except for parts of northern New Brunswick and western Nova Scotia, hours of bright sunshine were above normal across Atlantic Canada. Eddy point received the most hours of sunshine, 285.6, however, with 268.5 hours of sun Gander established record amount of sunshine.

CORN HEAT UNITS

Seasonal Accumulation to the end of July

Station	1984	1983	Per cent of Normal
Lethbridge	1114	1058	112
Brandon	1304	1253	96
Pilot Mound	1336	1372	100
Earlton	1121	1124	108
London	1609	1548	97
Ottawa	1593	1559	95
Thunder Bay	1111	1102	117
Toronto	1557	1546	95
Trenton	1573	1544	92
Wiarton	908	1297	68
Windsor	1871	1845	98
Montréal	1693	1597	97
St Agathe	1185	1187	74
Sherbrooke	1324	1233	99
Fredericton	1322	1271	98
Truro	1119	993	111
Charlottetown	1173	1092	103

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JULY 1984

STATION	Temperature C Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
BRITISH COLUMBIA													
ABBOTSFORD	17.0	0.0	32.7	6.5	0.0	0	22.9	56	0	3	340	117	51.3
ALERT BAY	13.5	-0.5	22.7	7.5	0.0	0	58.5	112	0	8	X		134.3
BLUE RIVER	16.4	0.0	33.9	1.9	0.0	0	35.0	46	0	11	283	115	MSG
BULL HARBOUR	12.7	-0.4	19.0	7.4	0.0	0	79.9	130	0	15	X		164.5
CAPE ST. JAMES	12.7	0.0	18.4	8.6	0.0	0	53.0	91	0	13	168	*	163.6
CAPE SCOTT	13.0	-0.2	17.7	8.6	0.0	0	73.4	38	0	11	X		156.5
CASTLEGAR	20.1	-0.2	36.7	8.6	0.0	0	10.0	28	0	4	338	107	3.4
COMOX	17.2	-0.2	30.4	9.1	0.0	0	10.6	38	0	4	X		35.4
CRANBROOK	19.3	0.9	35.5	3.3	0.0	0	34.8	159	0	5	362	*	26.3
DEASE LAKE	11.5	-1.0	27.5	0.5	0.4	40	20.4	37	0	10	229	115	201.3
ETHELDA BAY	12.9	-0.3	21.2	4.4	0.0	0	102.4	31	0	15	X		157.9
FORT NELSON	16.6	0.0	33.0	4.9	0.0	0	108.0	128	0	13	MSG	*	66.9
FORT ST. JOHN	15.3	0.2	30.1	5.0	0.0	0	42.1	55	0	9	X		84.7
HOPE	18.4	-0.1	33.0	6.9	0.0	0	20.5	55	0	4	312	121	32.4
KAMLOOPS	21.5	0.7	38.3	7.5	0.0	0	15.5	69	0	4	364	115	11.6
KELOWNA	19.3	1.1	35.7	3.6	0.0	0	10.6	44	0	3	350	112	17.3
LANGARA	12.3	0.1	16.4	8.1	0.0	0	97.3	121	0	21	X		176.2
LYTTON	21.7	0.1	40.5	10.2	0.0	0	3.6	33	0	1	312	106	9.7
MACKENZIE	14.1	-0.3	32.2	0.9	0.0	0	30.0	58	0	6	280	104	128.7
MCINNES ISLAND	14.0	0.3	19.8	9.4	0.0	0	100.4	101	0	16	X		127.2
MERRY ISLAND	17.9	0.3	27.3	11.0	0.0	0	4.2	11	0	2	342	*	26.7
PENTICTON	20.3	0.5	35.0	5.6	0.0	0	12.0	57	0	2	349	112	11.5
PORT ALBERNI	17.0	-0.1	33.5	5.0	0.0	0	12.0	43	0	2	374	*	48.9
PORT HARDY	13.7	0.1	21.6	7.0	0.0	0	56.0	108	0	7	193	98	133.0
PRINCE GEORGE	14.9	-0.2	32.0	2.3	0.0	0	41.6	70	0	7	332	113	108.2
PRINCE RUPERT	12.7	-0.1	19.3	6.9	0.0	0	222.3	216	0	21	133	93	162.3
PRINCETON	17.9	0.0	37.7	2.0	0.0	0	4.4	20	0	2	368	*	MSG
QUESNEL	16.7	0.3	35.3	3.3	0.0	0	58.3	112	0	8	MSG	*	65.8
REVELSTOKE	19.2	0.3	34.4	6.4	0.0	0	25.2	44	0	6	279	104	26.6
SANDSPIT	13.4	-0.6	20.2	6.7	0.0	0	63.5	147	0	12	148	80	141.4
SMITHERS	13.9	-0.3	33.2	0.5	0.0	0	31.3	68	0	7	230	95	132.4
STEWART	MSG	MSG	MSG	MSG	MSG	MSG	MSG	MSG	MSG	MSG	MSG	*	MSG
TERRACE	14.3	-1.3	31.2	7.6	0.0	0	72.6	128	0	13	165	94	110.1
VANCOUVER HARBOUR	17.3	0.2	28.1	10.5	0.0	0	3.3	9	0	1	MSG	*	29.0
VANCOUVER INT'L	17.2	-0.1	26.9	10.1	0.0	0	3.9	12	0	1	347	113	39.3
VICTORIA GONZ. HTS	15.3	0.4	27.0	9.3	0.0	0	0.0	0	0	0	403	118	78.9
VICTORIA INT'L	16.6	0.3	30.3	7.7	0.0	0	1.2	7	0	0	390	119	56.1
VICTORIA MARINE	14.2	0.2	26.2	6.7	0.0	0	0.6	3	0	0	X		117.5
WILLIAMS LAKE	15.7	0.3	31.3	3.5	0.0	0	40.3	84	0	6	344	110	90.1

STATION	Temperature C Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
YUKON TERRITORY													
BURWASH	11.2	-1.1	22.4	0.4	0.0	0	43.0	70	0	10	X		214.7
DAWSON	14.0	-0.7	26.2	0.3	0.0	0	91.2	269	0	15	X		125.9
MAYO	14.5	-0.7	26.1	1.9	0.0	0	33.9	66	0	9	X		107.3
WATSON LAKE	14.2	-0.7	28.0	2.5	0.0	0	45.0	77	0	3	250	95	119.0
WHITEHORSE	12.5	-1.6	24.0	0.5	0.0	0	19.9	59	0	9	MSG	*	170.3
NORTHWEST TERRITORIES													
ALERT	4.4	0.3	14.6	-1.7	9.0	81	45.1	231	0	7	262	33	423.3
BAKER LAKE	12.2	0.7	25.3	2.1	0.0	0	38.9	102	0	7	333	110	183.0
CAMBRIDGE BAY	9.2	1.3	20.7	1.4	0.0	0	18.0	91	0	4	293	96	272.6
CAPE DYER	8.6	3.5	19.1	-1.7	16.0	235	19.0	44	12	3	X		291.6
CAPE PARRY	6.5	0.3	19.5	2.9	1.6	229	38.3	228	0	9	X		356.3
CLYDE	6.5	2.4	18.4	-2.6	13.6	181	29.5	129	TR	6	441	169	356.2
COPPERMINE	MSG	MSG	23.9	1.0	0.0	0	62.6	243	0	7	294	93	223.4
CORAL HARBOUR	11.5	2.8	23.2	2.9	0.0	0	1.9	5	0	1	394	138	200.3
EUREKA	4.9	-0.5	15.2	0.3	0.0	0	8.5	70	0	3	317	93	392.2
FORT RELIANCE	15.3	1.4	34.3	7.4	0.0	0	65.7	193	0	13	X		100.0
FORT SIMPSON	16.3	0.2	33.6	5.6	0.0	0	103.0	174	0	13	273	96	64.7
FORT SMITH	17.1	1.1	33.5	6.5	0.0	0	85.0	149	0	14	290	96	57.4
FROBISHER BAY	9.0	1.4	24.4	-0.2	0.2	67	46.8	74	0	3	296	147	277.6
HALL BEACH	7.3	2.4	20.9	0.3	TR	0	12.5	36	0	3	X		316.9
HAY RIVER	16.3	0.5	32.7	7.5	0.0	0	98.0	204	0	10	X		74.7
INUVIK	12.3	-1.3	28.3	0.9	TR	0	29.8	89	0	3	273	30	179.0
MOULD BAY	3.1	-0.3	15.3	-2.6	15.8	479	35.3	242	0	3	129	47	460.2
NORMAN WELLS	15.8	-0.5	30.2	6.1	0.0	0	65.0	116	0	13	233	31	77.3
POND INLET	MSG	MSG	MSG	MSG	MSG	MSG	MSG	MSG	MSG	MSG	MSG	*	MSG
RESOLUTE	3.7	-0.4	13.8	-2.0	5.9	179	31.4	140	0	9	207	76	443.0
SACHS HARBOUR	4.3	-1.1	16.7	-2.1	4.4	232	24.9	164	0	3	136	55	403.7
YELLOWKNIFE	17.1	0.3	31.0	9.0	0.0	0	61.6	182	0	13	305	30	49.1
ALBERTA													
BANFF	15.5	0.7	32.5	1.5	0.0	0	26.4	62	0	MSG	MSG	*	MSG
BROOKS	18.7	0.2	36.5	4.0	0.0	0	53.3	133	0	MSG	MSG	*	MSG
CALGARY INT'L	17.4	1.0	35.3	3.4	0.0	0	24.6	38	0	6	367	114	46.0
COLD LAKE	17.7	0.3	30.5	6.4	0.0	0	47.4	55	0	7	306	98	43.0
CORONATION	17.0	-0.3	35.0	3.1	TR	0	38.2	61	0	6	360	107	60.0
EDMONTON INT'L	16.3	1.0	34.3	3.7	0.0	0	48.2	53	0	6	326	104	62.0
EDMONTON MUN.	18.6	1.2	33.4	7.7	0.0	0	44.5	50	0	6	343	112	33.3
EDMONTON NAMAO	17.2	0.3	31.5	6.5	0.0	0	65.7	86	0	6	X		54.7
EDSON	15.2	0.3	30.4	2.5	0.0	0	66.3	75	0	3	324	115	96.7
FORT CHIPEWYAN	17.7	1.7	33.5	8.0	0.0	0	57.9	77	0	MSG	MSG	*	MSG

X = Not observed   * = normal missing   MSG = data missing

JULY 1984

STATION	Temperature C				Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
	Mean	Difference from Normal	Maximum	Minimum									
FORT MCMURRAY	17.6	1.2	34.6	5.7	0.0	0	87.4	116	0	8	316	111	49.2
GRANDE PRAIRIE	16.0	0.1	31.4	3.0	0.0	0	27.4	42	0	6	344	*	81.1
HIGH LEVEL	16.3	0.6	33.6	4.3	0.0	0	61.3	90	0	12	300	102	77.9
JASPER	15.6	0.5	31.1	3.2	0.0	0	23.4	47	0	5	302	*	93.3
LETHBRIDGE	19.4	0.3	35.7	4.4	0.0	0	20.2	46	0	2	373	108	14.8
MEDICINE HAT	20.6	0.7	38.0	5.0	0.0	0	14.2	35	0	2	379	109	9.7
PEACE RIVER	16.1	0.4	30.6	4.3	0.0	0	43.3	72	0	6	X		76.7
RED DEER	15.9	-0.2	32.7	0.4	0.0	0	73.5	95	0	9	X		81.0
ROCKY MTN HOUSE	15.4	0.1	30.3	0.2	0.0	0	37.9	41	0	7	X		90.7
SLAVE LAKE	16.1	0.5	31.7	4.5	0.0	0	50.1	65	0	9	348	119	76.4
SUFFIELD	20.4	1.0	36.7	5.0	0.0	0	30.8	94	0	2	357	102	MSG
WHITECOURT	16.3	1.2	30.3	5.0	0.0	0	22.5	22	0	5	X		75.4
SASKATCHEWAN													
BROADVIEW	19.2	1.5	35.4	4.0	0.0	0	46.8	92	0	6	376	113	26.8
COLLINS BAY	16.1	2.0	31.6	5.3	0.0	0	88.0	102	0	14	257	*	75.1
CREE LAKE	16.7	1.1	31.9	6.7	0.0	0	51.1	65	0	12	269	96	67.8
ESTEVAN	22.1	2.2	38.0	7.3	0.0	0	24.7	46	0	3	363	102	1.2
HUDSON BAY	18.2	0.9	33.9	3.7	0.0	0	22.8	29	0	6	384	*	32.0
KINDERSLEY	18.2	-0.1	38.0	5.2	0.0	0	27.1	57	0	4	X		22.0
LA RONGE	18.3	1.6	32.1	8.0	0.0	0	53.1	59	0	8	X		26.0
MEADOW LAKE	17.0	-0.2	33.4	4.6	0.0	0	57.4	70	0	5	347		54.0
MOOSE JAW	20.6	0.9	36.0	5.6	0.0	0	19.5	37	0	3	374	109	5.4
NIPAWIN	18.2	*	33.3	4.7	0.0	0	47.3	*	0	8	391	118	30.3
NORTH BATTLEFORD	18.5	0.4	36.1	6.2	0.0	0	11.4	18	0	5	X		32.6
PRINCE ALBERT	18.7	1.3	35.0	6.4	0.0	0	38.7	59	0	7	366	124	23.7
REGINA	20.5	1.6	35.3	6.3	0.0	0	25.6	48	0	4	385	112	8.0
SASKATOON	19.8	1.3	38.1	6.5	0.0	0	13.4	25	0	3	X		21.0
SWIFT CURRENT	19.1	0.8	34.5	6.0	0.0	0	22.5	48	0	1	364	106	17.4
URANIUM CITY	17.4	1.2	34.7	8.7	0.0	0	100.3	212	0	12	X		50.8
WYNYARD	18.3	0.8	35.1	5.4	0.0	0	15.6	28	0	7	381	117	31.4
YORKTON	18.6	0.3	34.5	4.5	0.0	0	30.5	54	0	5	371	113	30.5
MANITOBA													
BISSETT	18.9	0.6	28.5	3.4	0.0	0	72.0	101	0	13	297	102	22.0
BRANDON	19.1	0.3	32.2	2.2	0.0	0	30.9	46	0	6	X		23.1
CHURCHILL	12.2	0.4	27.8	2.0	0.0	0	32.2	71	0	6	303	106	182.0
DAUPHIN	18.8	0.3	31.5	1.5	0.0	0	29.1	45	0	4	342	106	22.3
GILLAM	16.8	1.8	31.8	4.2	0.0	0	69.2	74	0	8	X		56.2
GIMLI	19.1	0.5	29.2	5.9	0.0	0	32.6	56	0	9	308	94	16.0
ISLAND LAKE	18.7	1.6	31.8	7.8	0.0	0	78.9	75	0	13	X		27.3
LYNN LAKE	17.6	1.8	33.0	5.1	0.0	0	48.2	59	0	8	281	101	40.7
NORWAY HOUSE	18.6	*	30.5	7.5	0.0	0	39.3	*	0	11	X		24.2
PILOT MOUND	19.4	0.3	33.0	3.9	0.0	0	33.6	47	0	4	X		21.4
PORTAGE LA PRAIRIE	19.9	0.2	33.7	4.2	0.0	0	36.9	48	0	7	X		14.3
THE PAS	18.8	1.1	34.6	4.4	0.0	0	47.2	67	0	15	357	118	24.3
THOMPSON	17.0	1.4	34.0	4.1	0.0	0	54.2	58	0	12	323	127	47.0
WINNIPEG INT'L	19.6	0.0	31.1	4.6	0.0	0	38.3	50	0	5	333	106	14.9
ONTARIO													
ATIKOKAN	17.3	0.1	31.1	2.9	0.0	0	155.6	148	0	13	279	98	48.3
EARLTON	18.2	0.5	30.1	8.3	0.0	0	127.3	158	0	14	X		33.4
GERALDTON	17.5	1.2	29.4	6.5	0.0	0	111.9	137	0	17	X		42.6
GORE BAY	18.4	-0.4	27.4	9.2	0.0	0	48.4	80	0	9	X		19.0
HAMILTON RBG	20.7	-1.0	32.2	9.1	0.0	0	70.3	105	0	5	X		MSG
HAMILTON	19.8	-0.7	30.5	8.5	0.0	0	39.8	56	0	5	X		12.3
KAPUSKASING	16.7	-0.1	30.5	3.7	0.0	0	156.6	163	0	16	X		62.5
KENORA	20.0	0.8	29.6	6.9	0.0	0	43.5	47	0	8	X		16.6
KINGSTON	20.0	-0.1	29.0	9.0	0.0	0	41.3	78	0	7	275	98	6.7
LANSDOWNE HOUSE	17.9	0.9	30.2	7.9	0.0	0	114.0	119	0	13	X		32.2
LONDON	19.6	-0.7	30.4	7.5	0.0	0	106.3	147	0	9	259	94	14.5
MOOSONEE	15.9	0.6	32.7	1.0	0.0	0	131.2	137	0	16	250	105	92.6
MOUNT FOREST	17.5	-0.7	28.3	5.2	0.0	0	71.0	94	0	9	X		42.2
MUSKOKA	17.9	-0.4	27.7	5.7	0.0	0	95.1	123	0	8	X		MSG
NORTH BAY	18.0	-0.3	26.2	8.2	0.0	0	137.2	134	0	12	244	89	29.5
OTTAWA INT'L	21.0	0.4	31.9	8.9	0.0	0	53.2	62	0	7	282	103	4.4
PETAWAWA	18.8	0.1	30.7	6.7	0.0	0	114.7	136	0	11	X		14.3
PETERBOROUGH	18.6	-0.6	31.3	4.0	0.0	0	88.8	114	0	8	X		25.5
PICKLE LAKE	17.9	0.8	29.5	5.9	0.0	0	109.6	99	0	13	X		40.1
RED LAKE	18.0	-0.2	29.9	4.3	0.0	0	107.1	123	0	10	287	*	35.4
ST. CATHARINES	21.0	-0.7	32.2	9.5	0.0	0	29.2	42	0	4	X		7.1
SARNIA	20.4	-0.5	33.3	8.7	0.0	0	99.7	165	0	9	MSG	*	7.4
SAULT STE. MARIE	MSG	MSG	MSG	MSG	MSG	0	MSG	MSG	MSG	MSG	MSG	*	MSG
SIMCOE	19.6	-1.0	30.0	8.0	0.0	0	66.4	97	0	7	X		15.4
SIOUX LOOKOUT	18.5	0.2	29.4	7.3	0.0	0	78.0	83	0	13	X		30.7
SUDBURY	18.8	0.1	31.7	7.9	0.0	0	61.1	74	0	10	271	94	21.7
THUNDER BAY	18.2	0.6	31.5	6.9	0.0	0	97.0	129	0	15	304	100	30.8
TIMMINS	16.5	-0.7	30.3	3.6	0.0	0	95.4	106	0	16	X		57.4
TORONTO	21.2	-0.8	31.8	10.2	0.0	0	44.0	59	0	5	X		5.3
TORONTO INT'L	19.8	-0.8	32.1	7.1	0.0	0	63.3	89	0	5	X		13.5
TORONTO ISLAND	19.1	-1.2	29.3	7.8	0.0	0	50.8	72	0	7	MSG	*	18.9
TRENTON	19.9	-0.7	30.4	7.3	0.0	0	44.0	72	0	5	X		11.0
TROUT LAKE	16.6	0.6	29.2	4.8	0.0	0	90.3	95	0	11	MSG	*	65.1
WATERLOO-WELL	18.8	-1.0	29.9	6.0	0.0	0	77.4	103	0	6	24	*	24.1
WAWA	13.6	*	25.5	4.7	0.0	0	104.8	*	0	10	X		135.2
WIARTON	18.0	-0.5	28.7	3.0	0.0	0	78.4	104	0	5	301	102	26.2
WINDSOR	21.8	-0.4	33.5	9.7	0.0	0	38.1	46	0	5	MSG	*	3.2

X = Not observed   * = normal missing   MSG = data missing

JULY 1984

STATION	Temperature C: Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
QUEBEC													
BAGOTVILLE	13.5	0.6	32.4	7.3	0.0	0	121.2	101	0	16	X		22.7
BAIE COMEAU	16.0	0.2	25.9	4.0	0.0	0	111.1	137	0	12	244	*	66.4
BLANC SABLON	12.7	1.6	20.2	5.2	X	0	136.6	141	0	16	126	*	164.1
CHIBOUGAMAU	16.4	0.6	32.2	5.3	0.0	0	118.4	103	0	13	202	81	63.5
KUUJJUAQ	10.9	-0.5	24.4	0.6	0.0	0	61.1	106	0		198	100	220.4
GASPE	17.7	0.5	31.5	6.1	0.0	0	63.3	82	0	15	232	*	32.1
INUKJUAK	11.4	2.1	23.3	2.1	0.0	0	46.6	86	0	13	214	104	203.3
LA GRANDE RIVIERE	12.3	*	30.0	1.5	0.0	0	63.0	*	0	12	199	*	184.1
MANIWAKI	18.1	-0.2	30.0	6.6	0.0	0	MSG		0	13	239	88	23.2
MATAGAMI	16.3	1.2	32.4	MSG	0.0	0	MSG		0	16	228	91	36.6
MONT JOLI	14.9	-2.4	27.2	3.9	0.0	0	89.4	119	0	10	275	109	19.9
MONTREAL INT'L	21.3	0.4	30.6	10.4	0.0	0	60.1	67	0	6	270	98	26.0
MONTREAL M INT'L	19.6	*	29.3	3.9	0.0	0	99.9		0	9	272	*	9.3
NATASHQUAN	14.9	0.7	24.3	4.3	0.0	0	73.6	77	0	14	208	85	100.0
NITCHEQUON	14.6	1.0	23.2	6.7	0.0	0	140.3	132	0	21	181	89	102.7
KUUJJUARAPIK	9.7	-0.3	25.3	2.5	0.0	0	82.3	100	0	14	144	169	256.9
QUEBEC	19.3	0.7	31.1	10.1	0.0	0	152.4	131	0	14	234	95	9.6
ROBERVAL	13.3	0.9	32.4	8.5	0.0	0	77.3	65	0	11	255	*	16.4
STE AGATHE DES MONTS	17.3	0.2	28.6	7.9	0.0	0	133.4	121	0	12	240	275	30.9
ST HUBERT	21.1	0.4	30.1	10.1	0.0	0	MSG		0	9	*		1.9
SCHEFFERVILLE	13.5	0.7	23.0	4.2	0.0	0	130.4	135	0	19	187	101	147.4
SEPT-ILES	15.7	-0.2	24.3	6.9	0.0	0	124.4	128	0	13	223	92	70.9
SHERBROOKE	13.0	0.2	29.4	5.2	0.0	0	173.6	148	0	10	236	*	32.1
VAL D'OR	17.2	0.1	29.7	6.2	0.0	0	97.3	96	0	16	237	91	43.4
NEW BRUNSWICK													
CHARLO	13.9	1.1	30.5	8.2	0.0	0	104.3	106	0	12	250	98	17.3
CHATHAM	20.1	0.9	32.0	8.6	0.0	0	81.0	89	0	12	252	100	11.0
FREDERICTON	20.0	0.7	32.7	8.3	0.0	0	141.0	159	0	13	243	*	8.1
MONCTON	19.6	1.1	31.0	9.1	0.0	0	103.3	109	0	12	259	106	8.3
SAINT JOHN	17.3	0.4	27.4	9.2	0.0	0	165.7	160	0	10	225	103	33.2
NOVA SCOTIA													
EDDY POINT	13.0	1.6	29.6	10.7	0.0	0	57.3	60	0	7	286	126	19.4
GREENWOOD	20.7	1.6	31.3	9.4	0.0	0	35.2	110	0	9	X		5.6
HALIFAX INT'L	20.1	1.9	31.6	11.2	0.0	0	50.5	54	0	12	X		6.4
SABLE ISLAND	17.3	1.3	23.0	11.3	0.0	0	26.5	29	0	6	198	121	25.5
SHEARWATER	18.7	1.3	30.6	10.9	0.0	0	48.2	50	0	9	260	119	17.9
SYDNEY	19.4	1.7	28.6	3.5	0.0	0	50.7	62	0	6	283	116	12.6
TRURO	19.5	1.7	30.7	8.0	0.0	0	42.6	47	0	6	272	121	42.6
YARMOUTH	16.6	0.3	25.6	9.6	0.0	0	77.2	99	0	6	194	94	45.5
PRINCE EDWARD ISLAND													
CHARLOTTETOWN	19.3	1.5	27.5	11.5	0.0	0	51.4	61	0	9	X		7.0
SUMMERSIDE	20.1	1.2	28.3	12.4	0.0	0	113.6	146	0	12	272	103	3.4
NEWFOUNDLAND													
ARGENTIA	14.2	0.2	25.1	5.3	0.0	0	41.2	57	0	8	X		120.1
BATTLE HARBOUR	15.6	5.4	28.2	5.0	0.0	0	66.5	98	0	16	X		75.7
BONAVISTA	17.2	2.5	27.0	5.9	0.0	0	31.2	51	0	6	X		51.1
BURGEO	14.1	0.6	23.0	9.1	0.0	0	145.2	107	0	17	113	72	121.5
CARTWRIGHT	12.5	-0.2	25.3	2.3	0.0	0	86.9	104	0	12	212	107	157.5
CHURCHILL FALLS	14.2	0.5	25.5	5.0	0.0	0	148.2	124	0	23	185	92	113.0
COMFORT COVE	18.2	1.6	29.8	5.2	0.0	0	63.1	80	0	10	X		44.2
DANIEL'S HARBOUR	15.0	1.2	23.6	8.3	0.0	0	100.0	112	0	12	93	95	30.4
DEER LAKE	18.4	2.5	31.2	5.0	0.0	0	85.3	110	0	12	X		30.2
GANDER INT'L	18.0	1.5	28.6	3.9	0.0	0	63.2	92	0	12	263	125	42.0
GOOSE	16.3	1.0	28.4	5.2	0.0	0	91.3	87	0	13	198	101	63.3
HOPEDALE	9.6	-0.9	24.1	1.1	0.0	0	173.3	211	0	17	X		260.1
PORT-AUX-BASQUES	15.2	2.0	22.5	9.1	0.0	0	36.2	80	0	13	168		94.0
ST ANTHONY	14.9	2.0	25.6	3.0	0.0	0	84.6	84	0	12	*		98.6
ST JOHN'S	17.9	2.4	28.7	5.4	0.0	0	41.4	55	0	7	286	130	34.7
ST LAWRENCE	15.1	3.0	24.3	5.0	0.0	0	67.3	67	0	9	X		MSG
STEPHENVILLE	17.7	1.7	25.6	9.5	0.0	0	110.0	194	0	12	137	90	32.5
WABUSH LAKE	14.0	0.5	22.6	4.4	0.0	0	191.1	131	0	19	131	92	124.5

X = Not observed * = normal missing MSG = data missing

JULY 1984 JUILLET

STATION	Temperature °C / Température °C: Mean / Moyenne	Difference from Normal / Écart à la normale	Maximum / Maximale	Minimum / Minimale	Snowfall (cm) / Chute de neige (cm)	Total Precipitation (mm) / Précipitation totale (mm)	% of Normal Precipitation / % de précipitation normale	Snow on ground at end of month (cm) / Neige au sol à la fin du mois (cm)	No. of days with Precip. 1.0 or more (mm) / Nombre de jours de préc. 1.0 ou plus (mm)	Bright sunshine (hours) / Durée de l'insolation (heures)	Degree Days above 5°C / Degrés-jours au-dessus de 5°C: This Month / Présent mois	Since Jan. 1st / Depuis le 1er janv.	Mean Dew Point °C / Point de rosée moyen °C
AGROCLIMATOLOGICAL STATIONS AGROCLIMATOLOGIQUES													
BRITISH COLUMBIA COLOMBIE-BRITANNIQUE													
Agassiz	18.2	0.3	33.0	8.0	0.0	24.2	52	0	5	315	409.0	1211.9	
Kamploops													
Sidney													
Summerland	21.1	0.2	35.0	6.5	0.0	9.8	44	0	3	378	500.5	1147.0	
ALBERTA													
Beaverlodge	16.0	0.8	31.0	3.0	0.0	18.0	28	0	5	344	327.5	694.2	
Ellerslie	16.3		32.5	3.0	0.0	35.6		0	5	338	357.1	800.4	
Fort Vermilion													
Lacombe	15.6	-0.5	33.0	1.5	0.0	49.2	68	0	7	307	330.5	756.2	
Lethbridge													
Vauxhall													
Vegreville	16.1	-0.2	32.0	1.5	0.0	79.1	106	0	8		345.5	822.2	
SASKATCHEWAN													
Indian Head	20.2	1.6	35.0	5.5	0.0	17.8	34	0	3		476.0	972.0	
Melfort	18.6	1.2	33.5	7.0	0.0	40.9	64	0	5	355	425.0	945.5	
Regina	19.5	0.9	35.5	1.5	0.0	53.1	82	0	2		500.6	986.0	
Saskatoon	21.7		38.5	5.5	0.0	13.0		0	4	380	459.5	1065.0	
Scott	17.7	0.5	37.5	3.0	0.0	8.8	15	0	3	357	395.8	884.2	
Swift Current South	18.1	-0.4	35.0	6.0	0.0	14.8	39	0	2	343	440.1	1014.9	
MANITOBA													
Brandon	20.0	0.8	33.5	2.0	0.0	27.7	40	0	4	347	445.1	1047.9	
Glenlea	19.0	-0.6	30.0	6.5	0.0	63.4	86	0	10	310	431.0	1040.8	
Morden	20.6	0.6	34.5	6.0	0.0	38.4	52	0	9	323	483.9	1153.7	
ONTARIO													
Delhi	19.9	-0.8	31.0	6.0	0.0	88.8	126	0	11	275	432.2	1160.2	
Elora	18.4		28.8	5.4	0.0	42.9		0	6		414.0	993.5	
Guelph	18.8	-0.9	30.0	4.7	0.0	70.8	86	0	5	237	428.5	1038.5	
Harrow	21.1	-0.9	32.0	9.5	0.0	27.7	35	0	6	279	495.0	1292.7	
Kapuskasing													
Merivale													
Ottawa	20.8	0.2	31.3	8.5	0.0	58.7	69	0	10	273	489.7	1184.1	
Smithfield	20.8	0.6	30.0	7.0	0.0	38,6	57	0	6		502.4	1135.8	
Vineland Station	20.8	-0.7	32.4	9.5	0.0	25.4	41	0	5	270	491.0	1163.9	
Woodslee													
QUEBEC													
La Pocatiere	19.6	0.9	32.0	8.5	0.0	99.4	105	0	9	271	451.1	886.6	
L'Assomption	20.3	0.1	31.5	8.0	0.0	67.6	73	0	9	259	469.9	1110.7	
Lavaltrie													
Lennoxville													
Normandin	17.5	0.6	32.0	5.5	0.0	136.0	119	0	13	226	383.9	807.0	
Ste. Clothilde	21.3	1.1	31.0	12.0	0.0	55.2	61	0	8	281	505.1	1217.5	
NEW BRUNSWICK NOUVEAU-BRUNSWICK													
Fredericton													
NOVA SCOTIA NOUVELLE-ECOSSE													
Kentville	21.1	1.9	31.0	9.0	0.0	43.2	62	0	8	285	499.4	1100.4	
Nappan	19.0	1.0	28.0	7.5	0.0	112.3	133	0	11	272	435.0	916.5	
PRINCE EDWARD ISLAND ILE-DU-PRINCE-EDOUARD													
Charlottetown													
NEWFOUNDLAND TERRE-NEUVE													
St. John's West													

ACID RAIN REPORT ISSUED BY ENVIRONMENT CANADA
FOR AUG. 5 - AUG. 11, 1984

SITE	DAY	pH	AIR PATH TO SITE
Longwoods, near London, Ont.	6	3.7	U.S. Midwest
	8	3.9	Illinois, Indiana, Ohio.
Dorset,* Muskoka, Ont.	7	4.3	Wisconsin, Michigan, across Lake Huron and Georgian Bay.
	11	4.1	Wisconsin, Michigan, central Ontario
Chalk River Ottawa Valley, Ont.	6	4.1	Illinois, Michigan, central Ontario.
	7	4.1	Northern Ontario, northern Quebec.
	8	3.7	Northern Ontario, northern Quebec.
	11	4.0	Wisconsin, Michigan, central Ontario.
Montmorency, Quebec City, Que.	6	4.9	Northern Ontario, northern Quebec.
	9	3.3	Maine, southern Quebec.
	10	4.3	New Brunswick, Maine, southern Quebec.
	11	4.1	From the northeast off of the Atlantic Ocean.
Kejimkujik, Southwestern N.S.	7	3.8	New York, New England states.
	8	3.8	New York, New England states.
	10	4.4	From the southeast off of the Atlantic Ocean.
	11	4.7	From the southeast off of the Atlantic Ocean.

* Data for Dorset supplied by the Ontario Ministry of Environment.

Environmental damage to lakes and streams is usually observed in sensitive areas regularly receiving precipitation with pH less than 4.7. pH readings less than 4.0 are serious.

This report was prepared by the Federal Long Range Transport of Air Pollutants (LRTAP) Liaison Office. For further information, please contact Dr. H.C. Martin at (416) 667-4803.