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Climatic Perspectives

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CLIMATIC HIGHLIGHTS

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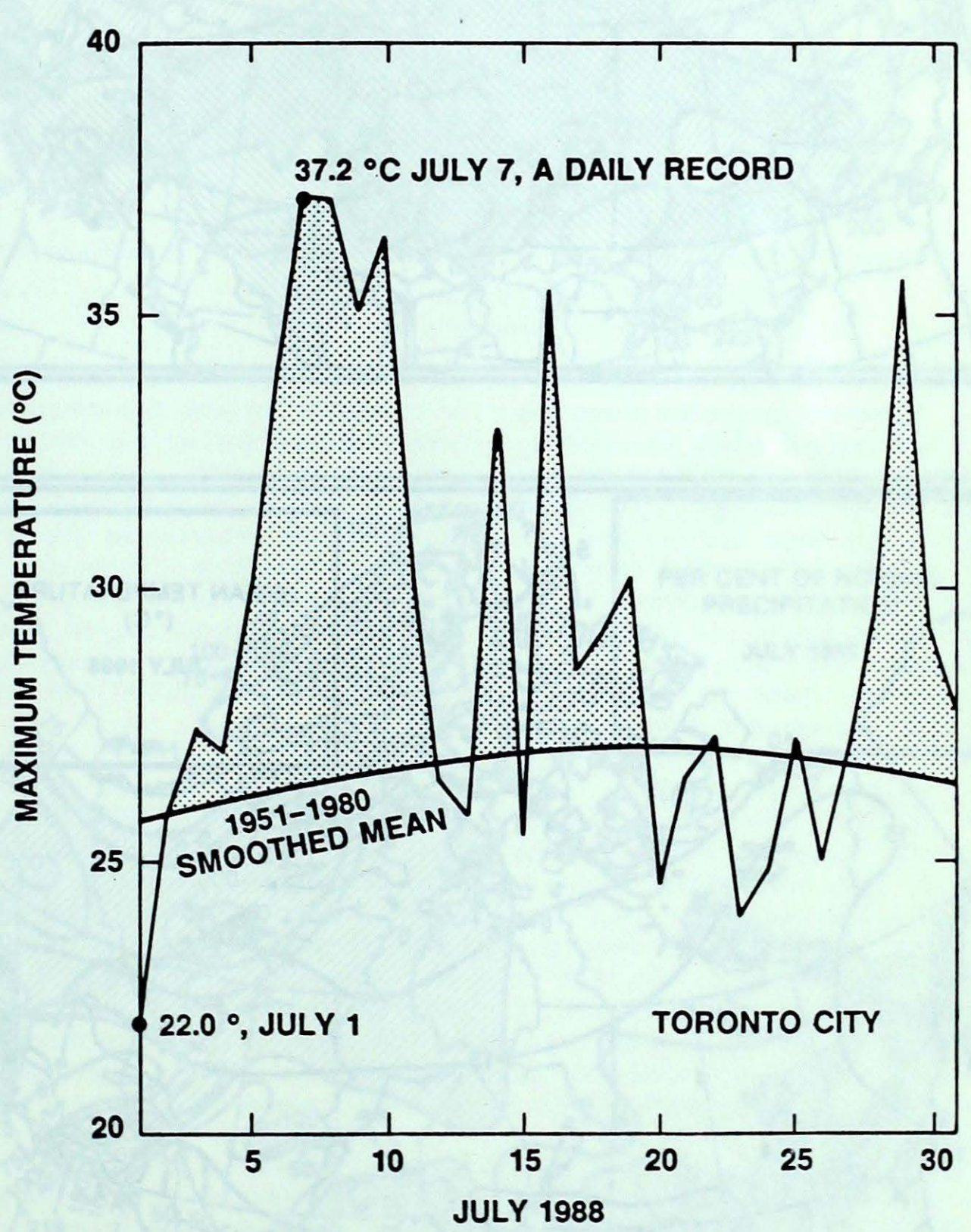
Hot July in Toronto

July 1988 was a hot shocker for Torontonians. After more than a decade with mostly below normal or near-normal summer temperatures, many residents were rudely reminded that the sweltering fifties and the dusty thirties were not just events in the past, and that Mother Nature has a habit of repeating herself.

This July was hot, the hottest since 1955 in Downtown Toronto. Fully two-thirds of the days were warmer than normal, and on the hottest afternoon, the mercury climbed to 37.2°C (99°F), the highest temperature since September 2, 1953, when the infamous 100°F (37.8°C) was reached.

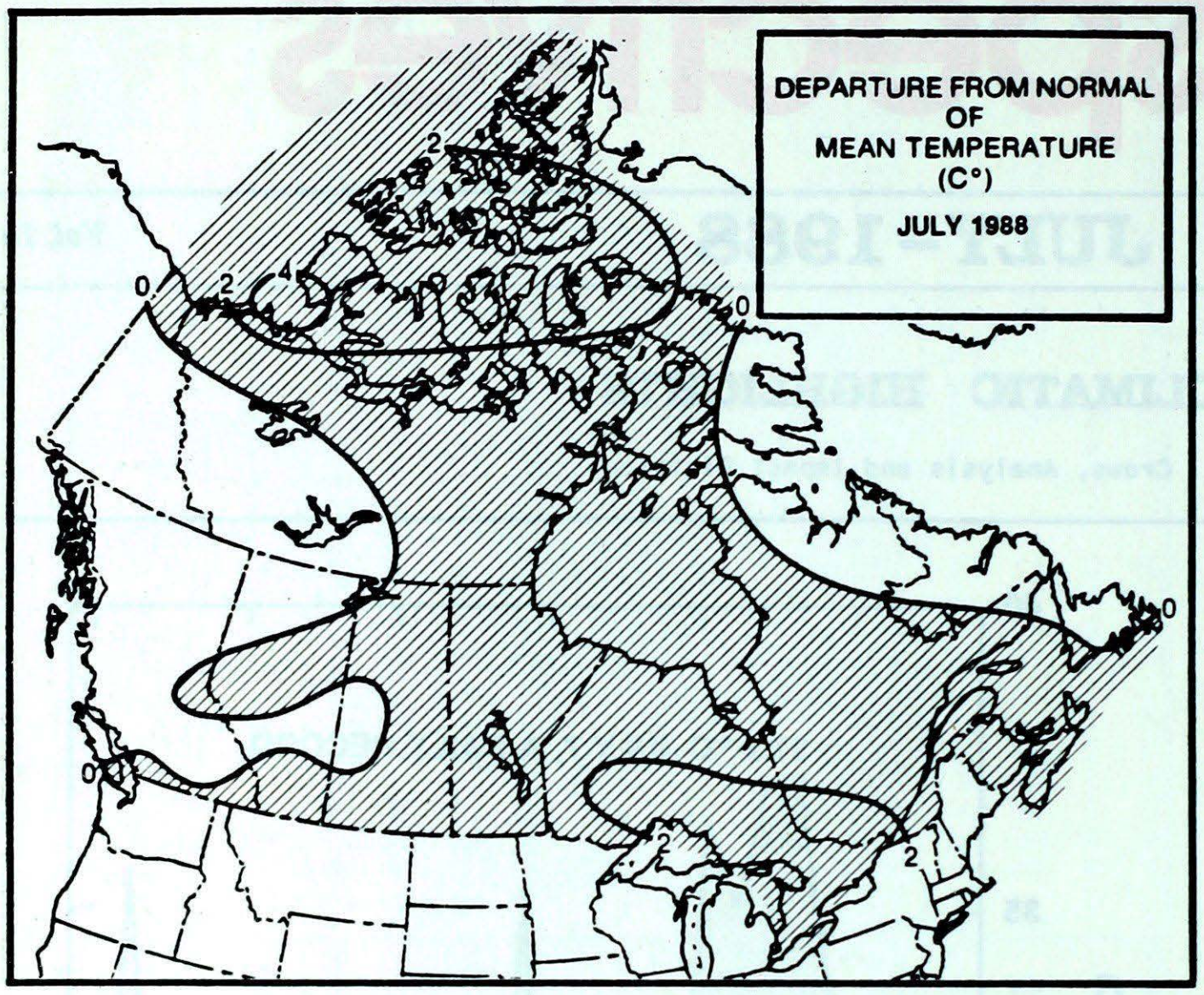
There have been other hotter Julys in the past. This year's mean temperature of 24.2°C ranks fifth since records began at Toronto in 1840. The mean of 25.5°C in July 1921 was not only the highest for July, but also the hottest month ever.

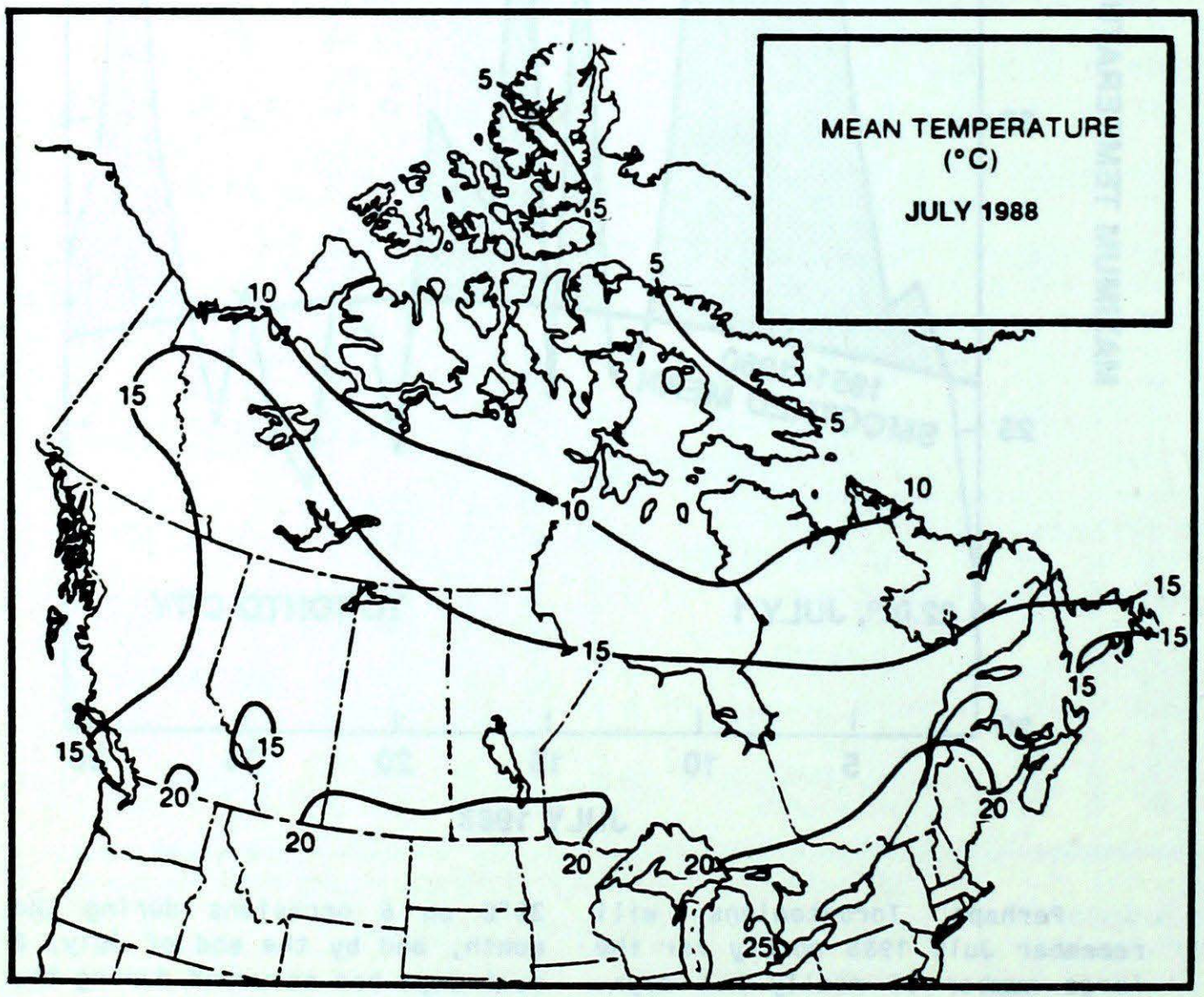
In terms of heat waves, the seven-day period from the fifth to the eleventh of July was noteworthy, but not as long as a ten-day stretch in late summer, 1973, nor nearly as intense as another ten-day stretch in July of 1936. That year's heat wave saw temperatures rise to 40.6°C (105°F) for three days consecutively, and this was in days when air-conditioning was a luxury.



Perhaps Torontonians will remember July 1988 mostly for the large number of really hot days. The mercury touched or exceeded 35°C on 6 occasions during the month, and by the end of July, 8 such days had occurred during the summer, both new records.

Canada





Across the country

Yukon and Northwest Territories

In the Yukon, copious amounts of rainfall over the southern two-thirds spawned floods and mud slides near the middle of the month. Precipitation amounts of 200% or more were reported from Beaver Creek to Whitehorse then east to Watson Lake and Muncho Lake. The Carcross area registered 462% of the normal monthly precipitation. The northern areas were much drier than the south. Temperatures in the southern regions were below normal with the Whitehorse area 1.5°C on the cold side. Portions of the Yukon from the Carmacks to Ross River and north enjoyed above normal readings. Dawson recorded a monthly maximum of 32°C on the 13th while Klondike plunged to an overnight minimum of -2°C on the 26th.

The Northwest Territories experienced a generally wet and windy month as a series of cold lows ensconched themselves over the central portions. Early in the month, the Mackenzie and Great Slave Lakes region recorded more than 100 mm of rain. Several roads and highways were washed out as a result. By the end of the month, Cambridge Bay had received 373% of the precipitation normal.

Temperatures were generally above normal in the Arctic and most of the Northwest Territories.

British Columbia

July started off cool and damp but by mid-month, a ridge of high pressure brought sunshine to the southern half of the province. As a result, the second half of the month brought dry conditions to the south as the threat of forest fires mounted.

Rainfall was more abundant in the northern parts of the province as a series of low pressure systems moved over the ridge to the south. The northeast corner reached a high of 180% of normal. The north Coast, north of Vancouver Island, also received abundant rainfall with Langara establishing a record 220% above normal.

The central interior was dry with 75 to 85% of the monthly aver-

age and, by the end of the month, the forest fire hazard in the Victoria region had become once again high to extreme.

Prairie Provinces

In Alberta, temperatures were generally near normal with maximum temperatures during the latter half of the month peaking into the upper twenties over most regions and into the low and mid thirties over the south and southeast. Suffield recorded the highest temperature at 36°C on the 22nd.

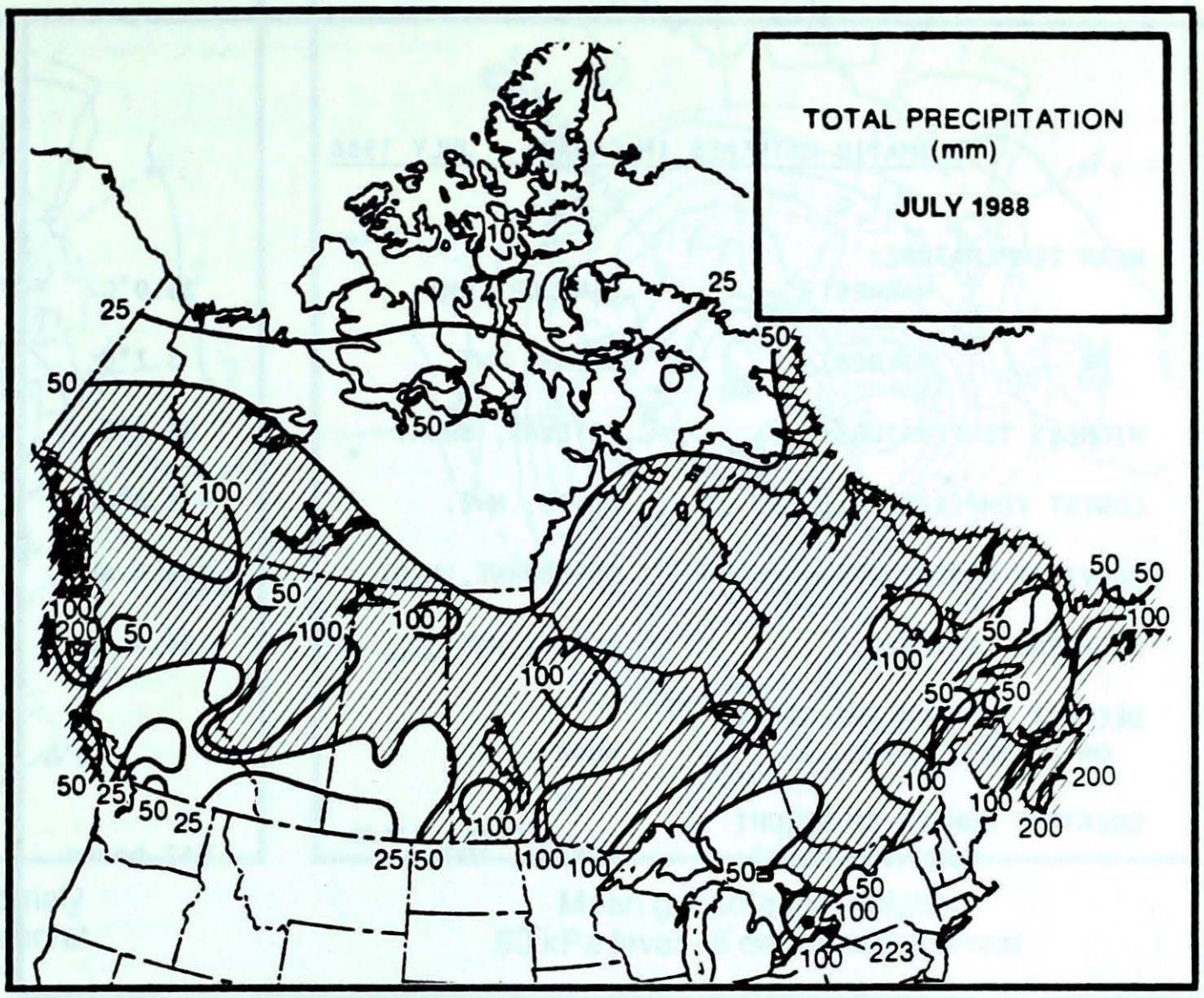
Southern Alberta continued to be dry with amounts of 13 and 14 mm at Lethbridge and Pincher Lake, while Medicine Hat recorded 24 mm. Much of central Alberta was wetter than normal with a number of localities recording well in excess of 100 mm associated with heavy thunderstorms. Flattop and Deer Mountain lookout towers in the Slave Lake district recorded 160 mm in less than 48 hours between the 6th and 7th resulting in extensive flooding. Basement flooding was reported in parts of Edmonton and St. Albert as this system moved northward on the 5th and 6th. Edmonton received 96 mm during the storm passage.

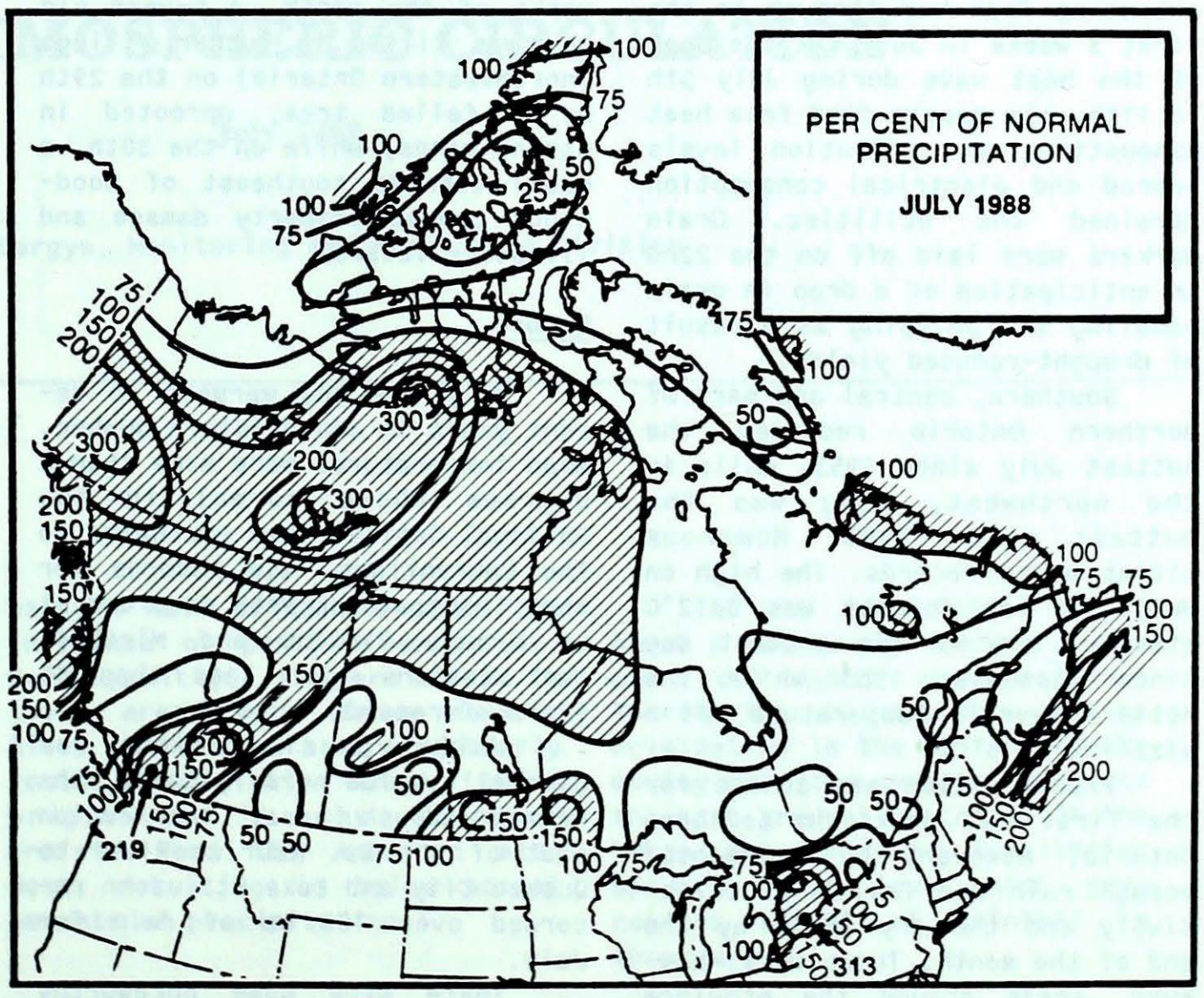
To the east, Saskatchewan and Manitoba experienced warm conditions although not as excessive as they were in June. The hottest temperature recorded was 38.6°C at Estevan on the 27th. Most of crop areas suffered from rainfall shortages. The northern regions were generally above normal in precipitation as were some pockets in the south. The Moose Jaw, Broadview, West Poplar triangle was the driest with only 50% of the monthly norm.

There was a moderate amount of severe weather this month. On the 14th, there were numerous reports of funnel clouds near Saskatoon and on the 16th, several waterspouts were seen over Lake Winnipegosis. The last weekend of the month in southeastern Manitoba saw over 90 km/h winds, hail, and uprooted trees.

Ontario

Across southern Ontario, a record smashing six afternoon high temperatures topping the 35°C mark made this the hottest July since





CLIMATIC EXTREMES IN CANADA - JULY 1988

MEAN TEMPERATURE:		
WARMEST	WINDSOR, ONT.	25.0°C
COLDEST	ALERT, NWT.	3.7°C
HIGHEST TEMPERATURE:	ESTEVAN, SASK.	38.6°C
LOWEST TEMPERATURE:	CLYDE, NWT.	- 1.8°C
HEAVIEST PRECIPITATION:	SHELBURNE, N.S.	253.4 mm
HEAVIEST SNOWFALL:	ALERT, NWT.	26.4 cm
DEEPEST SNOW ON THE GROUND ON JULY 31, 1988:	None	
GREATEST NUMBER OF BRIGHT SUNSHINE HOURS:	EUREKA, NWT.	563 hours

1955. Compounding the heat was the severest drought since the 1930's, extending from May through to the first 3 weeks in July. At the peak of the heat wave during July 5th tc 11th, six people died from heat exhaustion, air pollution levels soared and electrical consumption strained the utilities. Grain workers were laid off on the 22nd in anticipation of a drop in grain handling and shipping as a result of drought-reduced yields.

Southern, central and part of northern Ontario recorded the hottest July since 1953, while in the northwest, July was the hottest since 1983. Numerous cities broke records. The high on July 7th for Toronto was 37.2°C standing out as the hottest day since September 1953 while the hottest overall temperature was a sizzling 38.8°C.

Precipitation was scarce for the first two weeks in southern Ontario. However, by mid-month, enough rain had fallen to effectively end the dry spell by the end of the month. There were, however, areas around the province which received only 40 to 85% of normal rainfall amounts.

Several severe thunderstorms were reported during the last two weeks of the month. A 5-year old boy was killed in Luther Village (northwestern Ontario) on the 29th by a felled tree, uprooted in strong winds, while on the 30th, a small tornado southeast of Woodstock caused property damage and livestock losses.

Quebec

July was the warmest in recent years in southwestern Quebec. Mean temperatures were more than 2 degrees above normal in the National Capital area northward to the Laurentians. New records for mean temperatures were recorded at La Grande Rivière and Mirabel, two stations with less than 15 years of records.

While precipitation was generally below normal, Gaspé, the Fermont-Wabush area, the region east of the St. Maurice River to Quebec City and Lake St. John recorded over 100 mm of rain for July.

There were some noteworthy severe weather events during the month. In the first week of the month, marble sized hail damaged automobiles in the Hull-Ottawa area. On the 8th, 18 mm of rain in a 30-minute period in Quebec City flooded basements while strong winds uprooted trees. On the 26th, a local thunderstorm east of Nicolet whipped up 80 to 100 km/h winds uprooting trees, while on the 30th, $20,000 worth of damage was caused in the Magog region, southwest of Sherbrooke.

Atlantic Provinces

July was mainly cloudy and humid with most areas above normal in temperature. Thunderstorms were the highlight of the month, particularly in Nova Scotia. On the 9th, unverified reports of hail and heavy rain were reported in the Nackawic, N.B. area and a severe thunderstorm in the area of Astle Crossing felled trees and dumped ice-cubed size hail. On the 12th, thunderstorms knocked out more than 20 transformers in and around Yarmouth, Nova Scotia. The last weekend of the month brought heavy showers and hail to most of Nova Scotia on the 29th, while on the 31st, the central region of the province experienced heavy showers, hail and strong winds causing flooding and uprooting trees.

The weather was variable in Newfoundland for the month. Unsettled conditions prevailed early in the month with precipitation recorded on most days. Later in the month, the weather pattern was more settled. The highest maximum temperature recorded was 30.6°C at Deer Lake on the 10th. Overnight minimums were especially low during the first half of the month. On the 17th, Badger reported a low of 0°C. The southern areas reported above normal rainfall amounts with St. Lawrence reporting 179.5 mm, about 80 mm above normal.

Labrador was generally near normal with regards to temperatures and precipitation. The first half of the month was showery and cool. The highest temperature recorded was 33.5°C at Goose Bay on the 13th while the minimum for the month was -1.3°C at Nain. The first part of July produced two forest fires 100

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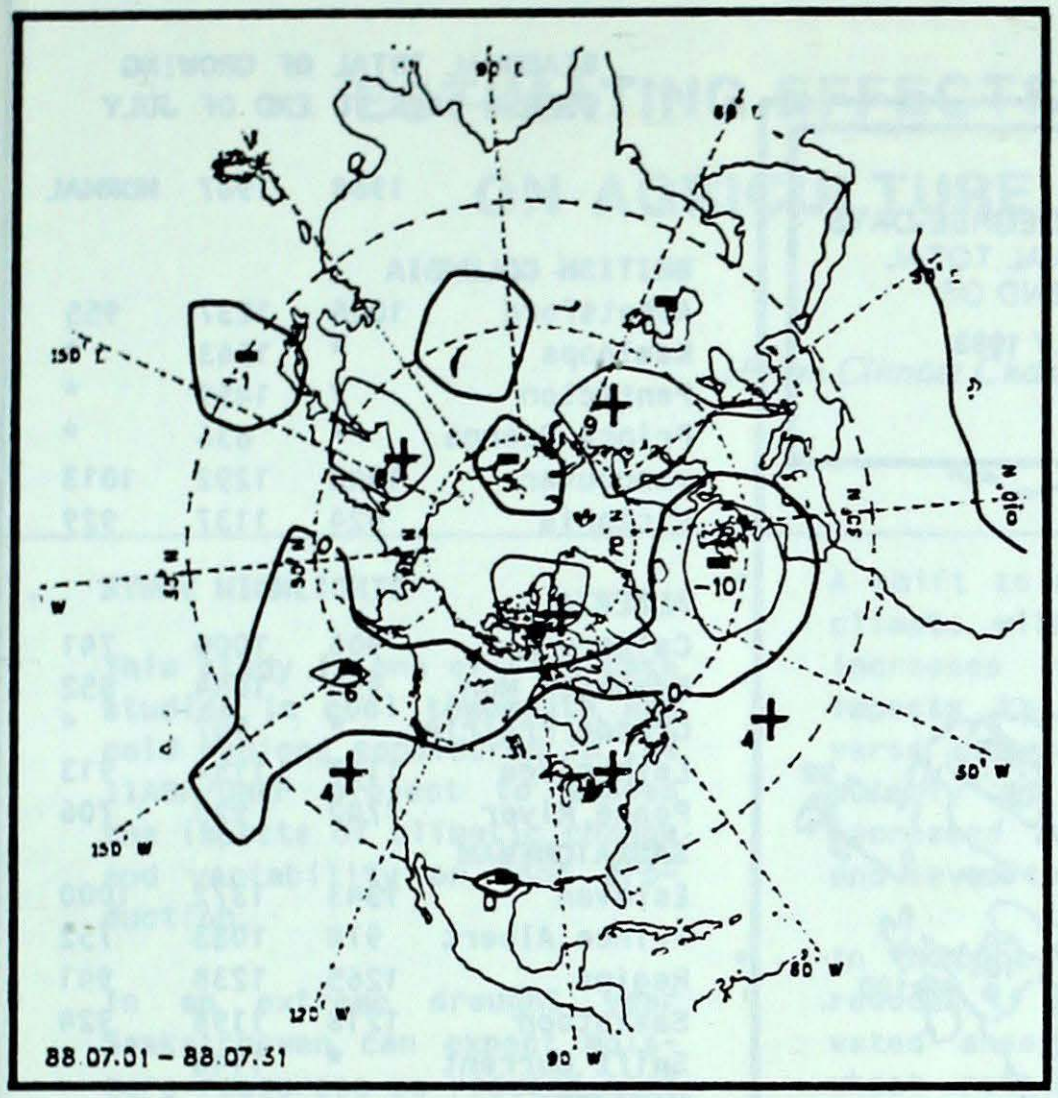
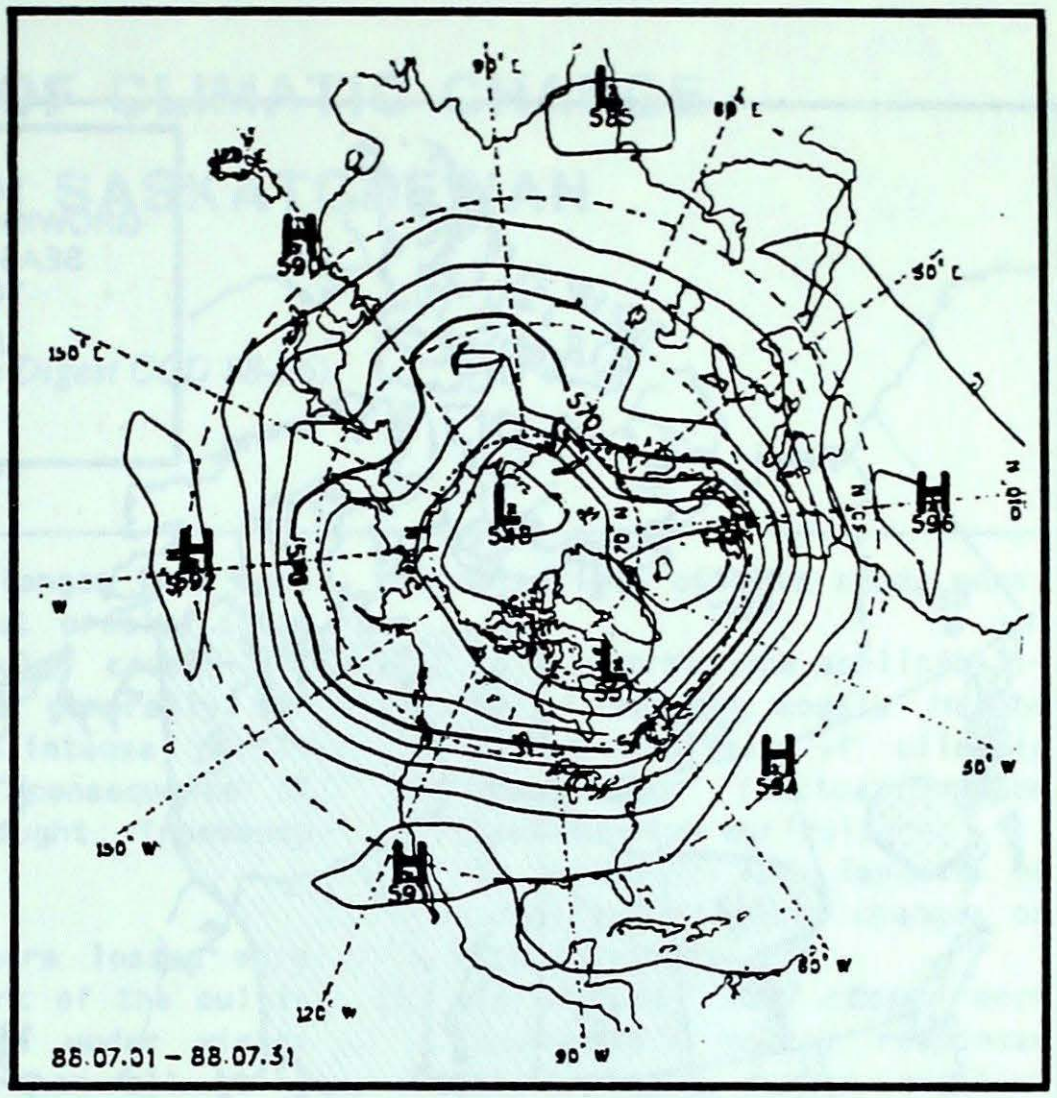


Mean geopotential height anomaly
50 kPa level - 5 decametre interval



Mean geopotential heights
50 kPa level - 5 decametre interval

50 kPa ATMOSPHERIC CIRCULATION

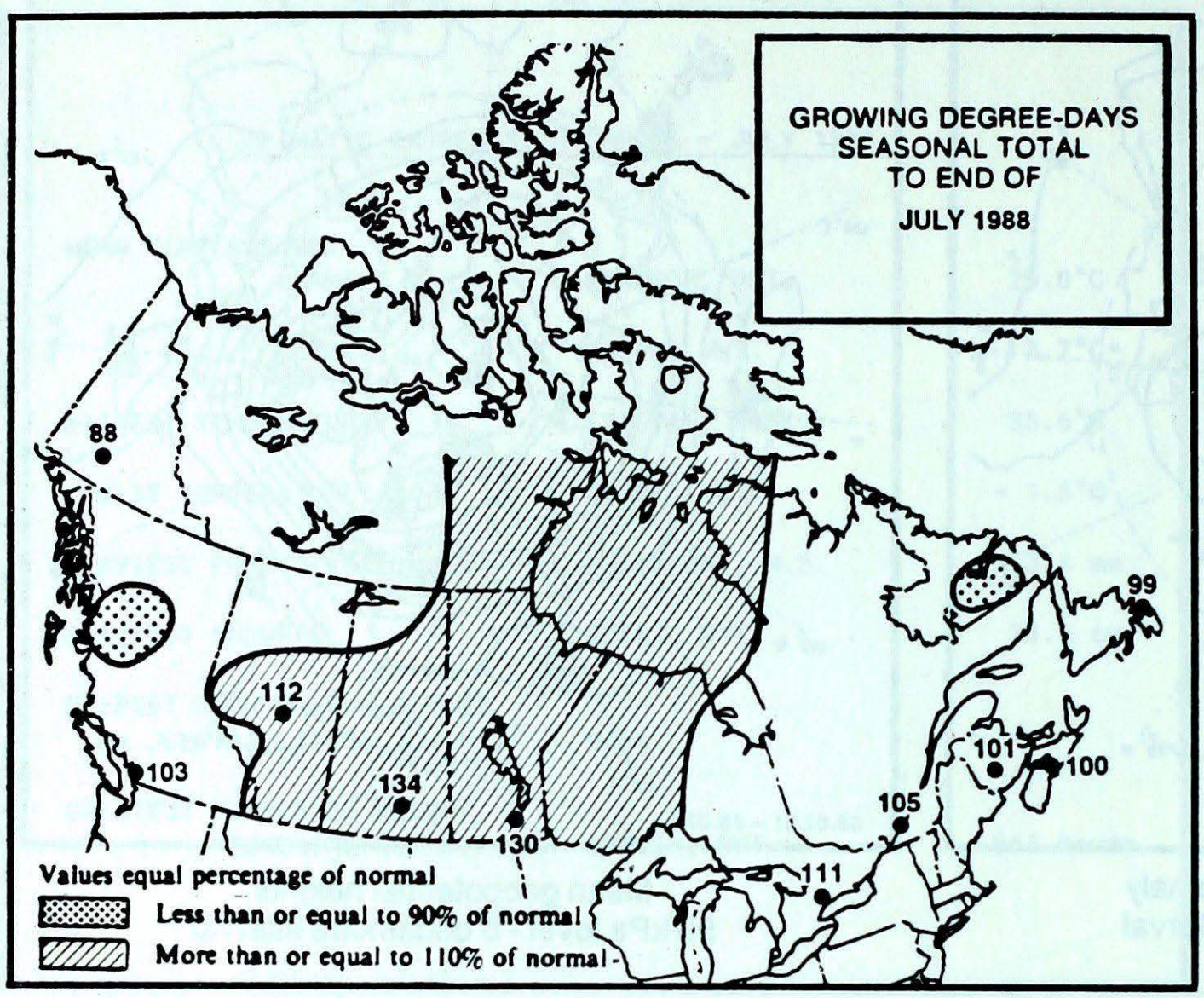
July 1988

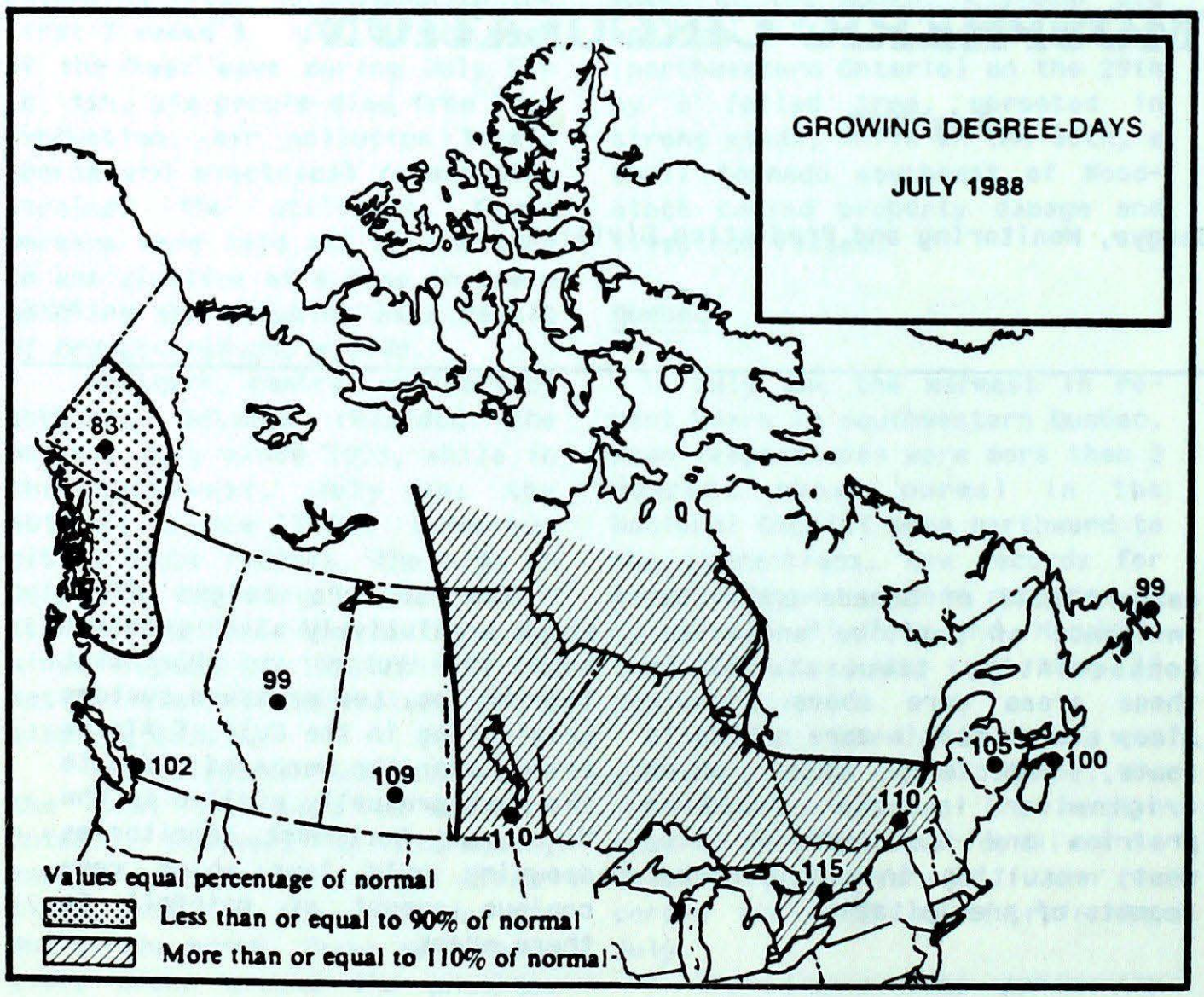
Aaron Gergye, Monitoring and Prediction Division

July's 50 kPa height field was characterized by a generally westerly flow across most of North America with weak troughing on the east coast, a weak ridge over British Columbia and the Prairies, an amplified trough in the Gulf of Alaska and a weak Arctic vortex over Baffin Island.

The 50 kPa anomaly map shows all of the United States and the eastern half of Canada under the influence of positive anomalies. Consequently, temperatures in these areas were above normal. Also, storms took a more northerly route, especially those which originated in the Canadian prairies and the American mid-west, resulting in below normal amounts of precipitation.

The 50 kPa height field shows a relatively slack gradient over the Yukon and Northwest Territories. Low pressure systems originating in the Gulf of Alaska moving over the weakened ridge to the east gradually stalled in the Yukon and Northwest Territories spawning cold lows which gave copious amount of rainfall to these areas.





SEASONAL TOTAL OF GROWING DEGREE-DAYS TO END OF JULY

	1988	1987	NORMAL
BRITISH COLUMBIA			
Abbotsford	1026	1237	955
Kamloops	*	1563	*
Penticton	*	1459	*
Prince George	*	836	*
Vancouver	1048	1292	1013
Victoria	924	1137	929
ALBERTA			
Calgary	908	1000	741
Edmonton Mun.	954	1084	852
Grande Prairie	*	907	*
Lethbridge	1107	1154	913
Peace River	742	923	706
SASKATCHEWAN			
Estevan	1343	1372	1000
Prince Albert	974	1083	752
Regina	1265	1238	941
Saskatoon	1218	1198	924
Swift Current	*	1148	*
MANITOBA			
Brandon	1068	1181	845
Churchill	118	282	95
Dauphin	1046	1171	825
Winnipeg	1103	1336	848
ONTARIO			
London	1230	1448	1092
Mount Forest	*	1112	*
North Bay	*	1007	*
Ottawa	1231	1315	1128
Thunder Bay	818	949	690
Toronto	1195	1404	1078
Trenton	1157	1358	1081
Windsor	1439	1681	1291
QUEBEC			
Baie Comeau	*	638	*
Maniwaki	979	989	913
Montréal	1211	1319	1148
Quebec	*	991	*
Sept-Iles	542	579	550
Sherbrooke	928	962	870
NEW BRUNSWICK			
Charlo	571	836	555
Fredericton	948	947	938
Moncton	829	895	828
NOVA SCOTIA			
Sydney	719	715	703
Truro	*	820	*
Yarmouth	716	819	687
PRINCE EDWARD ISLAND			
Charlottetown	782	836	785
NEWFOUNDLAND			
Gander	502	669	523
St. John's	*	570	*
Stephenville	605	657	600

ESTIMATING EFFECTS OF CLIMATIC CHANGE ON AGRICULTURE IN SASKATCHEWAN

(From Climate Change Digest CCD 88-06)

1. STUDY HIGHLIGHTS

- This study is one of five case studies in cool temperate and cold regions considered in the IIASA/UNEP project to assess the impacts of climatic change and variability on food production.

- In an extreme drought year Saskatchewan can expect moisture resources so reduced that the wind erosion potential is doubled, spring wheat production is about 25% of normal and losses to the agricultural economy in 1980 dollars exceed $1.8 billion and 8000 jobs with a further reduction in other sectors of the economy of $1.6 billion and 17000 jobs.

- Occasional extreme 5 or 10 year periods in Saskatchewan can be expected over which biomass dry matter production is reduced by nearly half and spring wheat production by about one-fifth, average annual agricultural losses of about 2600 jobs and $0.6 billion, and a reduction in the provincial GDP of more than $0.5 billion and 5600 jobs.

- A shift to a longer term warm climate with precipitation increases, without major adaptive changes by agriculture, could reduce wheat yields by 16%, causing annual losses to agriculture of over $160 million and 700 person-years. Wind erosion potential could be reduced, potential biomass productivity increased, but, droughts becoming more frequent and severe.

- A shift to a longer term warm climate without precipitation increases would cause all impacts to be generally adverse and more intense, particularly as a consequence of increased drought frequency and severity.

- In drought years losses were reduced if part of the cultivated area was under winter wheat rather than all being under spring wheat, but the reverse was true for years approaching current normals.

- The impacts of long term warming would be more pronounced in the northern agricultural zone of Saskatchewan, with the result that the overall agroclimate and crop yields would become more homogeneous.

- Recommendations are made with respect to developing the analytical methods and tools and suggesting appropriate response policies.

2. INTRODUCTION

The International Institute of Applied Systems Analysis (IIASA) and United Nations Environment Programm (UNEP) climate impact project involved 76 authors in 17 countries. Canada was selected as a case study representing a cold-margin climate, given its northern location and the sensitivity of its agricultural industry to climatic fluctuations. The province of Saskatchewan in particular was selected because it is a major agricultural producer in Canada.

Within the context of the IIASA/UNEP climate impacts project, the objectives of this study were:

(1) To illustrate the applicability of several models in the impact analysis of climatic changes or fluctuations on Saskatchewan agriculture;
(2) To quantify the impacts of specified climatic changes or fluctuations; and
(3) To consider some of the more appropriate policy responses which would reduce negative impacts and maximize the positive ones.

The study does not attempt to assess the relative probabilities of different climatic scenarios, but instead concentrates on demonstrating techniques for translating climatic scenario information into assessments of the associated impacts on agriculture. A hierarchy of models is used to estimate impacts at various levels: 'first-order' impacts on the agroclimatic environment and crop yields, and 'downstream' or 'second-order' effects of these yield changes on farm production, employment and the provincial economy. Results are intended to inform planners and policy makers of the implications for agriculture of the latest climatological research. The study illustrates applications of historical and potential CO_2 warming scenarios and outlines some of the important climate-related problems affecting Saskatchewan agriculture.

3. METHODOLOGY

3.1 Scenario Selection

Climatic scenarios were selected to reflect issues of particular concern in the region and to enable comparisons to other case

studies in the IIASA/UNEP project to be made. These scenarios were constructed to represent future climates to test various methods of climatic impact assessment. Three broad types of scenarios were used: a single anomalous weather-year taken from the historical record, an extreme period of weather-years from historical records and a climate simulated using GISS (Goddard Institute for Space Studies) atmospheric general circulation model (GCM) results for 2 x CO_2. In order to provide a reference against which to compare results of analyses involving these scenarios, a standard climatic period based on the 30 year period, 1951 to 1980, was used and is referred to as HISTI (the use of the term HIST in the following refers to the use of actual historical weather records). From the historical records 1961 (HIST2) was selected as the extreme weather year, 1929 to 1938 the extreme weather decade (HIST3), and 1933 to 1937 an extreme weather pentad (HIST4). Each was selected on the basis of drought severity and the substantive impact on crop yields, land degradation and the economy in Saskatchewan. All historical climate cata were obtained from the Atmospheric Environment Service, Environment Canada.

Data generated by the GISS GCM model for the equilibrium 1 x CO_2 or 'control climate', (GISSE), and 2 x CO_2 (GISSC) climates were obtained from 9 grid points covering the agricultural area of Saskatchewan. Analysis of the GISSE data for Saskatchewan showed little resemblance to the present climate and as a result the actual GISS data could not be used in the study. To apply the GCM data it was assumed that the changes from GISSE to GISSC would correspond to the changes that could be expected for the climate of Saskatchewan with 2 x CO_2.

Subsequently, to derive a climatic scenario for 2 x CO_2, designated here as GISSI, temperature increments corresponding to a doubling of CO_2 obtained by subtracting GISSE from GISSC temperature data were applied to the 1951 to 80 historical HIST1 data. Precipitation data were generated by dividing GISSC by GISSE precipitation data and applying the derived ratios to the HIST1 data.

The GISS model results indicated general increases of precipitation in Saskatchewan accompanying the increases in temperature with CO_2 doubling. Historically, low precipitation and high temperatures have tended to occur in the same summers. Based on historical experience it was assumed that CO_2 warming might occur without being accompanied by increased precipitation. To facilitate analysis of this possibility GISS2, an alternative scenario, was used on which temperatures were increased (as with GISS1) but precipitation remained at the HIST1 level.

For both the historical and the GISS scenarios only temperature and precipitation were adjusted. All other climate data required by the impact models were held constant at the HIST1 normal level. Where maximum and minimum temperature data were required, it was assumed that both were affected equally. Potential benefits of direct effects of elevated CO_2 on plant photosynthetic capacity and moisture use efficiency were not considered in the biomass potential and the spring wheat model estimates since no consensus existed in the scientific community regarding the extent of the benefits. For the economic analysis, dollar values and technology were adjusted to represent conditions which existed in 1980.

3.2 Impact Models Used

Impact models were selected using the following criteria:

(1) relevance to analysis of the impacts on Saskatchewan's agricultural productivity, the stability of the agroclimatic resource, or the conservation of the soil;
(2) suitability of the model for the particular application. The model had to have demonstrated applicability to macroscale analysis, and sensitivity to changes in the variables being analysed; and
(3) the capacity to provide information cheaply from readily available data.

Broadly speaking the climate change would impact on the agroclimate, which would impact on crop yields and the mix of crops grown, which would impact on the economy. Various models were used to look at the potential changes in each of these areas. For example, heat and moisture models (degree day, precipitation effectiveness and Palmer Drought Index) were used to determine the impact on the provincial agroclimate. As well as changing the agroclimate, climate change could impact on the productivity of the land base by accelerating or decelerating soil degradation processes. Wind erosion is a major component of Saskatchewan's climate-related soil degradation. A model adapted for calculating soil wind erosion potential was used in this study to look at implications of climate change for the land resource base.

The climatic changes implied in the scenarios selected would undoubtedly be followed by changes in the mix of crops that would be grown in Saskatchewan. This could result in overall crop productivity being maintained or increased even though yields of present crops decreased.

To investigate the implications for specific crops growth model developed by Agriculture Canada was used to determine the impacts of climatic changes on spring wheat production. Economic implications of these changes on the provincial economy were then estimated using models developed by the Prairie Farm Rehabilitation Administration (PFRA). PFRA's models 'track' the impacts resulting from the changes in yields at the farm level through the entire agricultural sector at the regional and provincial levels. The subsequent effects on non agricultural sectors of the economy at the regional and provincial levels are also examined.

3.3 RESULTS

Generalized results of the climatic impacts related to the various scenarios are presented in Table 1. In some instances a range of values is given, whereas, in others only a single value is

given. Where a range is given the figures represent the maximum and minimum annual values computed over the period of record used. Where individual values are given the period of record was treated as an average or one year and represents a long term average (i.e. a 30 year average).

Results suggest that without any fundamental change in climate Saskatchewan agriculture can expect an occasional year (HIST2) with moisture resources so reduced that crop production is only about 25% of normal, the potential for wind erosion is doubled, and losses to the agricultural economy exceed $1.8 billion and 8000 jobs. Ripple effects in sectors other than agriculture translate into an additional provincial economic loss of $1.6 billion and 17000 jobs. They also imply that in an extreme period of 5-10 consecutive years with warmer than normal growing seasons, moisture resources could be so subnormal that biomass dry matter production could be reduced by nearly half and spring wheat production by about one-fifth. The impact of these climate changes on the economy would be a direct loss to the agriculture sector of about 2600 jobs annually and an economic loss to nearly $600 million. This loss, resulting from effects on cereal crops alone, would have a further indirect effect on other sectors of the provincial economy causing an additional provincial GDP reduction of $500 million and 5600 jobs.

With respect to the climate inferred for a 2 x CO_2 atmosphere, the results suggest that on a long-term basis there would be a substantial increase in thermal resources, modest increases in moisture resources (according to the precipitation effectiveness index results) and potential biomass productivity, modest decreases in the wind erosion potential and in spring wheat productivity, and losses to the agricultural industry of about 700 jobs and $160 million annually. A further reduction in other sectors of the economy of about $150 million in provincial GDP and 1500 jobs annually could also be expected.

The results of the drought analysis (in contrast to the precipitation effectiveness results) indicate that the increase in precipitation projected by the GISS model would not be enough to offset the increase in evapotranspiration caused by higher temperatures. The climate would apparently shift to a more drought prone regime, with an

TABLE 1: Climatic impacts summarized for southern Saskatchewan in relation to normal (HIST1 or HIST5)

	Scenario			
Model	HIST2	HIST3	GISS1	GISS2
Degree Day	+10 to +18%	+3 to +16%	+48 to +53%	+48 to +53%
Precipitation Effectiveness	-18 to -53%	-21 to -26%	+1 to +13%	-10 to -12%
Biomass Potential	-53 to -100%	-26 to -60%	+1 to +30%	-19 to 43%
Wind Erosion Potential	+123%	-	-14%	+26%

	HIST2	HIST4	GISS1	GISS2
Spring Wheat Production	-76%	-20%	-18%	-28%
Expenditures by Agric. (million $)	-$1,810	-$599	-$163	-$277
Employment in Agriculture	-8,000	-2,647	-722	-1,224

PALMER DROUGH INDEX (PDI)

				RETURN PERIOD (YEARS)	
	HIST5	GISS3	GISS4	HIST5	GISS3
Severe Drought	0.1%	0.9%	10.8%	15 to 35	8.5 to 17.5
Drought	3.0%	9.1%	39.6%	6.5 to 10	4 to 6

increase in length and frequency of droughts. Findings suggest the return period for what we would presently call a 'severe drought' would be only about half as long as it is now.

The drought and spring wheat analyses both suggested that the greatest impacts of CO_2 related warming would be in the northern agricultural areas. Overall, the agroclimate and crop yields in Saskatchewan would become more homogeneous under a doubled CO_2 atmosphere than they are now. The spring wheat analysis further emphasized the need to distinguish between individual and consecutive drought years. In the economic analysis it was found that losses were considerably lower in drought years if the wheat crop mix was 10% winter wheat - 90% spring wheat compared to 100% spring wheat. In normal years however, it was found that producers would be better off economically if the entire crop was sown to spring wheat.

For a climate changed by the warming inferred for 2 x CO_2 but not the precipitation increase (GISS2), result on a long-term average basis imply: modest reductions in moisture resources and biomass productivity, a moderate increase in wind erosion potential; a moderate reduction in spring wheat productivity; losses for the agricultural economy of about 1200 jobs and $275 million annually; and an additional decrease to the provincial GDP in sectors other than agriculture of approximately $250 million and 2600 jobs. A several-fold increase in drought frequency could be expected if the projected precipitation increase is not received (GISS4).

The results for GISS1 indicate that the biomass potential would increase while wheat production would be reduced. This is not unreasonable because the long term climate would have changed to the point where spring wheat would no longer be a well-adapted crop. A shift to a climatic regime with more frequent and severe droughts, as indicated by the results of the drought analysis, could accentuate problems with spring wheat production further with the variability in yields increasing from year-to-year. The results for GISS1 indicate that the more humid climate, as reflected in the higher precipitation effectiveness levels, would generally reduce the wind erosion potential. However, the accompanying increase in expected drought frequent and severity could increase the risk of serious wind erosion events. A shift to winter wheat, which leaves the ground covered during the erosion-prone spring period, could help to reduce wind erosion potential. For a change to a warmer climate without increased precipitation (GISS2), results suggest that wind erosion potential would increase significantly. The likely reduction in biomass productivity and increase in drought frequency would accentuate this, although the probable shift from spring wheat to winter wheat could help to limit wind erosion in spring.

Continued from page 4

km north of Goose Bay during a warm spell. Meanwhile, pack ice lingered along the coast. News reports indicated that fishermen north of Groswater Bay suffered considerable damage to fishing gear.

JULY 1988

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	17.5	0.5	34.0	5.5	0.0		66.9	162	0	6	332	114	46.9
ALERT BAY	13.4	-0.6	26.4	5.5	0.0		18.5	35	0	4	X		141.8
AMPHITRITE POINT	14.5	0.6	24.5	7.6	0.0		58.8	80	0	8	X		146.4
BLUE RIVER	15.9	-0.5	32.8	2.2	0.0		77.3	102	0	11	205	83	*
BULL HARBOUR	12.5	-0.6	20.7	12.8	0.0		51.6	84	0	10	X		170.6
CAPE SCOTT	12.5	-0.7	17.2	8.5	0.0		66.9	80	0	12	X		165.6
CAPE ST.JAMES	12.8	0.1	18.6	7.6	0.0		89.8	153	0	9	183	*	161.3
CASTLEGAR	19.6	-0.7	35.6	6.4	0.0		23.0	64	0	4	305	96	21.8
COMOX	17.5	0.1	29.6	8.8	0.0		16.5	59	0	3	X		36.8
CRANBROOK	18.8	0.4	35.1	4.5	0.0		15.6	71	0	4	309	*	39.0
DEASE LAKE	11.1	-1.4	25.7	0.3	0.0		72.2	130	0	14	107	53	214.5
ETHELDA BAY											X		
FORT NELSON	15.7	-0.9	30.2	6.0	0.0		152.8	181	0	14	216	*	81.1
FORT ST.JOHN	15.2	-0.4	29.4	6.6	0.0		78.6	101	0	9	X		93.4
HOPE	18.1	-0.4	35.0	6.6	0.0		81.0	218	0	7	295	114	38.7
KAMLOOPS	20.8	0.0	36.9	9.3	0.0		24.5	109	0	4	310		13.7
KELOWNA	19.1	0.4	37.3	4.4	0.0		43.8	181	0	6	323	103	26.0
LANGARA	12.0	-0.2	16.5	7.1	0.0		175.3	218	0	20	X		196.5
LYTTON	21.6	0.0	37.2	9.0	0.0		15.6	141	0	4	285	96	12.7
MACKENZIE	13.6	-1.3	30.5	-0.1	0.0		55.0	106	0	11	244	90	137.0
MCINNES ISLAND	13.3	-0.4	19.0	8.6	0.0		205.9	207	0	13	X		145.4
PENTICTON	20.5	0.2	36.0	6.6	0.0		28.2	133	0	6	309	99	8.5
PORT ALBERNI	16.7	*	33.7	5.1	0.0	*	31.8	*	0	6	286	*	56.1
PORT HARDY	13.7	0.1	24.7	4.7	0.0		43.7	84	0	6	187	94	134.4
PRINCE GEORGE	14.1	-1.0	29.4	2.6	0.0		51.2	85	0	9	267	91	122.8
PRINCE RUPERT	12.5	-0.3	21.0	5.6	0.0		208.4	202	0	17	128	89	208.4
PRINCETON	16.9	-0.9	35.2	2.5	0.0		23.3	103	0	6	330	*	*
QUESNEL	16.1	-0.3	32.6	4.5	0.0		36.1	68	0	6	X		76.0
REVELSTOKE	18.0	-0.4	36.1	7.5	0.0		123.9	218	0	11	244	91	39.6
SANDSPIT	13.5	-0.5	21.5	6.4	0.0		73.6	170	0	14	121	64	137.9
SMITHERS	13.4	-1.3	31.0	2.5	0.0		37.3	81	0	6	212	87	144.1
TERRACE	14.4	-1.7	31.0	6.8	0.0		45.9	80	0	10	176	100	116.5
VANCOUVER HARBOUR											X		
VANCOUVER INT'L	17.6	0.3	31.5	8.7	0.0		22.0	68	0	5	331	107	36.3
VICTORIA GONZ. HTS	15.7	0.3	31.5	8.6	0.0		10.1	75	0	2	357	104	81.1
VICTORIA INT'L	16.3	0.0	32.0	6.5	0.0		7.0	38	0	2	352	106	64.0
VICTORIA MARINE	13.9	-0.1	27.0	6.0	0.0		9.3	40	0	3	X		128.3
WILLIAMS LAKE	16.0	0.6	33.6	3.5	0.0		35.2	72	0	6	260	83	85.1

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YUKON TERRITORY													
DAWSON	14.8	0.1	31.8	0.3	0.0		33.2	97	0		×××		
MAYO	15.8	0.6	28.8	5.0	0.0		86.2	166	0	14			78.1
WATSON LAKE	13.5	-1.4	26.1	5.2	0.0		134.8	231	0	13	165	62	139.2
WHITEHORSE	12.6	-1.5	25.1	2.0	0.0		109.6	323	0	13	190	75	168.1
NORTHWEST TERRITORIES													
ALERT	3.7	0.1	16.3	-1.6	26.4	237	20.6	105	0	5	375	125	443.6
BAKER LAKE	11.6	0.6	23.5	2.6	0.0		38.4	101	0	5	371		198.9
CAMBRIDGE BAY	8.9	1.0	18.4	0.2	0.0		73.6	373	0	5	351	115	280.5
CAPE DYER	4.6	-0.5	15.9	-1.2	11.4	167	62.4	146	0	12	X		415.4
CAPE PARRY	9.9	4.2	20.0	3.5	0.0		10.9	64	0	1	X		251.6
CLYDE	4.6	0.5	16.5	-1.8	2.8	37	15.2	66	0	3	320	123	416.4
COPPERMINE	10.5	0.8	24.6	0.8	0.0		34.2	132	0	5	401	126	232.3
CORAL HARBOUR	9.4	0.7	18.6	1.8	0.0		51.6	126	0	13	272	95	267.7
EUREKA	7.2	1.8	17.5	1.1	0.0				0	0	563	165	333.1
FORT RELIANCE	13.3	-0.6	25.2	4.8	0.0		49.7	146	0	11	X		148.7
FORT SIMPSON	16.7	0.1	27.5	2.9	0.0		87.2	147	0	7	297	102	69.8
FORT SMITH	15.9	-0.1	27.2	3.9	0.0		91.9	161	0	14	281	93	72.3
IQALUIT	7.2	-0.4	19.6	-0.8			27.2	42	0	8	158	78	335.5
HALL BEACH	5.9	0.5	16.3	0.1	0.0		30.2	87	0	3	X		375.5
HAY RIVER	14.5	-1.3	26.0	5.9	0.0		92.8	192	0	10	X		112.4
INUVIK	14.8	1.2	29.1	1.4	0.0		24.1	71	0	7	378	111	95.7
MOULD BAY	5.9	2.0	15.6	-0.7	1.8	54	14.9	100	0	5	344	124	376.1
NORMAN WELLS	16.2	-0.1	28.5	3.4	0.0		54.2	96	0	11	283	98	78.0
POND INLET	7.4	3.0	18.0	0.7	0.0		15.2	28	0	4	X		328.4
RESOLUTE	6.2	2.1	16.6	0.2			4.0	17	0	2	492	179	365.3
YELLOWKNIFE	15.8	-0.5	27.0	7.3	0.0		107.4	317	0	8	342	89	76.5
ALBERTA													
BANFF	14.3	-0.5	29.5	3.0	0.0		105.0	247	0	8	X		
CALGARY INT'L	16.5	0.1	32.8	4.8	0.0		46.8	71	0	7	309	95	66.3
COLD LAKE	16.0	-0.9	30.7	6.0	0.0		51.7	60	0	6	275	87	72.3
CORONATION	16.7	-0.6	33.2	5.4	0.0		30.8	48	0	10	353	104	59.2
EDMONTON INT'L	15.8	0.0	31.0	4.6	0.0		132.9	146	0	9	316	100	79.5
EDMONTON MUNI.	17.2	-0.2	31.0	8.7	0.0		139.9	157	0	10	313	102	48.0
EDMONTON NAMAO	16.0	-0.9	30.3	7.2	0.0		137.7	180	0	8	X		76.4
EDSON	14.6	0.2	30.6	2.5	0.0		45.4	50	0	8	257	91	110.1
FORT CHIPEWYAN	16.0	0.0	32.0	5.0	0.0		87.6	115	0		X		

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FORT MCMURRAY	16.6	0.2	33.0	7.4	0.0		118.4	157	0	15	252	88	58.1
GRANDE PRAIRIE	15.4	-0.5	29.0	4.2	0.0		53.8	82	0	8	286	*	84.3
HIGH LEVEL	15.5	-0.2	26.8	4.2	0.0		35.8	51	0	10	248	84	82.8
JASPER	15.3	0.2	31.0	3.3	0.0		25.2	50	0	5	225	*	91.1
LETHBRIDGE	19.0	0.4	34.7	6.6	0.0		13.4	30	0	2	352	101	21.3
MEDICINE HAT	20.6	0.7	35.1	7.7	0.0		24.3	60	0	3	387	111	8.5
PEACE RIVER	15.3	-0.4	26.3	5.2	0.0		74.1	122	0	9	X		88.0
RED DEER	15.0	-1.1	32.0	1.3	0.0		98.0	126	0	9	X		98.6
ROCKY MTN HOUSE	14.1	-1.2	31.1	1.5	0.0		109.6	117	0	14	X		124.9
SLAVE LAKE	15.7	0.1	29.2	6.3	0.0		121.8	157	0	10	293	100	76.6
SUFFIELD													
WHITECOURT	15.5	0.4	32.3	4.9	0.0		104.0	102	0	9	X		89.6
SASKATCHEWAN													
BROADVIEW	18.9	1.2	37.2	3.4	0.0		31.8	62	0	6	369	110	24.7
COLLINS BAY	15.3	1.2	29.2	6.7	0.0		102.2	118	0	13	260	*	
CREE LAKE	15.9	0.3	29.5	4.6	0.0		85.5	108	0	14	238	85	78.6
ESTEVAN	21.2	1.3	38.6	8.0	0.0		57.6	106	0	8	370	103	6.2
HUDSON BAY													
KINDERSLEY	18.9	0.6	35.3	6.1	0.0		66.8	139	0	5	X		24.6
LA RONGE	17.8	1.1	30.7	4.9	0.0		82.8	91	0	11	X		48.5
MEADOW LAKE	16.2	-1.0	31.4	5.5	0.0		81.2	98	0	10	306	*	63.1
MOOSE JAW	20.7	1.0	38.4	7.7	0.0		23.8	44	0	5	387	112	7.3
NIPAWIN	20.2	*	34.0	6.1	0.0	*	45.4	*	0	10	295	*	20.5
NORTH BATTLEFORD	17.7	-0.4	34.2	5.8	0.0		46.4	69	0	7	X		33.7
PRINCE ALBERT	18.5	1.1	33.1	6.8	0.0		61.8	94	0	6	310	104	20.1
REGINA	20.1	1.2	38.3	6.9	0.0		44.8	84	0	5	363	106	10.0
SASKATOON	19.2	0.7	37.1	8.1	0.0		58.4	107	0	4	X		22.9
SWIFT CURRENT	19.1	0.8	35.8	6.3	0.0		34.7	73	0	6	381	111	23.1
WYNYARD	19.2	1.2	36.7	7.0	0.0		47.8	84	0	4	X 346	106	22.8
YORKTON	18.8	0.5	36.5	5.7	0.0		24.5	43	0	3	353	107	24.1
MANITOBA													
BRANDON	19.5	0.7	34.2	6.9	0.0		121.8	182	0	8	X		14.6
CHURCHILL	11.5	-0.3	26.9	0.5	0.0		48.4	106	0	7	231	81	202.9
DAUPHIN	19.5	1.0	33.2	6.4	0.0		54.6	85	0	6	312	96	17.1
GILLAM	15.9	1.0	31.0	3.8	0.0		103.6	114	0	10	X		*
GIMLI	19.9	1.3	33.5	8.8	0.0		86.2	148	0	10	324	99	9.9
ISLAND LAKE	19.0	1.8	32.0	6.2	0.0		30.8	30	0	7	X		29.9
LYNN LAKE	16.3	0.5	30.4	6.9	0.0		95.4	115	0	12	275	98	71.0
NORWAY HOUSE	18.1	*	31.4	5.5	0.0	*	68.0	*	0	8		*	33.4
PORTAGE LA PRAIRIE	21.1	1.4	35.4	9.1	0.0		97.7	128	0	6	X X		4.3

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THE PAS	18.6	0.9	33.3	7.7	0.0		54.5	77	0	9	298	98	27.4
THOMPSON	16.7	1.1	31.9	1.5	0.0		89.7	96	0	12	275	108	63.8
WINNIPEG INT'L	21.1	1.5	35.5	6.9	0.0		70.8	93	0	7	347	109	7.9
ONTARIO													
ATIKOKAN	19.3	2.1	3.6	5.1	0.0		106.0	100	0	12	315	110	25.4
BIG TROUT LAKE	17.6	1.6	30.2	3.8	0.0		115.2	121	0	13	243	*	52.8
EARLTON	19.8	2.1	37.1	6.5	0.0		34.6	42	0	8	X		23.4
GERALDTON	18.5	2.2	34.5	3.6	0.0		137.4	168	0	11	X		37.7
GORE BAY	21.6	2.8	36.2	11.1	0.0		32.4	53	0	6	X		*
HAMILTON RBG	24.2	2.5	38.8	12.4	0.0		118.8	177	0	7	287	*	
HAMILTON	23.0	2.5	37.4	8.9	0.0		111.3	157	0	8	X		2.8
KAPUSKASING	19.0	2.2	34.6	4.4	0.0		57.6	59	0	6	X		37.4
KENORA	21.1	1.9	32.5	10.3	0.0		159.1	173	0	12	X		8.3
KINGSTON	22.0	1.9	33.8	9.0	0.0		50.8	95	0	8	256	91	3.0
LANSDOWNE HOUSE	18.3	1.3	30.2	5.8	0.0		79.2	82	0	14	X		
LONDON	22.7	2.4	36.4	8.7	0.0		120.2	166	0	8	294	107	3.2
MOOSONEE	16.0	0.7	32.8	0.5	0.0		116.0	120	0	7	272	114	106.7
MUSKOKA	20.4	2.1	33.3	5.8	0.0		121.4	156	0	8	X		
NORTH BAY	20.8	2.5	35.4	9.5	0.0		70.0	68	0	11	299	109	9.5
OTTAWA INT'L	22.7	2.1	35.8	11.0	0.0		78.2	91	0	6	285	*	2.5
PETAWAWA	21.3	2.6	37.3	6.0	0.0		78.0	92	0	10	X		7.0
PETERBOROUGH	21.8	2.6	36.1	6.5	0.0		45.4	58	0	5	X		6.1
PICKLE LAKE	18.9	1.8	31.5	6.8	0.0		99.2	89	0	14	X		29.6
RED LAKE	19.5	1.3	31.2	5.3	0.0		96.8	111	0	10	285	*	16.8
ST. CATHARINES	23.7	2.0	37.4	11.2	0.0		105.6	153	0	6	X		1.8
SARNIA	22.9	2.0	37.3	6.8	0.0		105.7	174	0	6	307	104	5.4
SAULT STE. MARIE	19.5	2.2	36.8	5.1	0.0		66.4	119	0	10	318 X	110	21.3
SIOUX LOOKOUT	20.5	2.2	34.8	9.8	0.0		117.1	124	0	9	X		10.4
SUDBURY	21.9	3.2	36.6	9.4	0.0		29.8	35	0	4	301	104	3.3
THUNDER BAY	19.4	1.8	35.8	4.0	0.0		56.1	74	0	6	310	102	18.4
TIMMINS	19.5	2.3	36.6	5.0	0.0		44.0	48	0	9	X		29.8
TORONTO	24.2	2.2	37.2	12.8	0.0		81.2	109	0	10			0.3
TORONTO INT'L	22.9	2.3	37.6	7.6	0.0		109.7	153	0	11	X		2.8
TORONTO ISLAND	23.4	3.1	36.8	13.0	0.0		99.3	140	0	8			0.1
TRENTON	22.3	1.7	33.9	9.4	0.0		39.0	64	0	7	X		3.5
WATERLOO-WELL	21.7	1.9	36.0	7.6	0.0		223.2	295	0	8	X		4.9
WAWA	17.1	*	29.0	3.5	0.0	*	45.2	*	0	6		*	51.8
WIARTON	20.9	2.4	32.0	4.0	0.0		63.9	85	0	8	323	109	16.8
WINDSOR	25.0	2.8	37.8	11.0	0.0		51.8	62	0	8	X		0.0

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QUEBEC													
BAGOTVILLE	19.4	1.5	34.4	6.9	0.0		67.4	56	0	14	X		20.7
BAIE COMEAU	16.1	0.3	30.3	4.9	0.0		35.2	43	0	8	267	*	70.2
BLANC SABLON	10.9	-0.2	20.2	3.7	0.0		95.0	98	0	15	118	*	
CHIBOUGAMAU	17.5	1.7	32.9	4.2	0.0		85.0	73	0	13	271	108	54.3
GASPE	17.7	0.5	31.2	5.2	0.0		114.0	137	0	11	284	*	43.9
INUKJUAK	9.5	0.2	20.5	1.1	0.0		48.6	89	0	7	241	116	262.6
KUUJJUAQ	11.1	-0.3	24.8	1.0	0.0		64.4	111	0	12	203	102	211.4
KUUJJUARAPIK	11.6	1.1	31.5	2.4	0.0		52.0	63	0	8	249	146	206.7
LA GRANDE RIVIERE	15.4	*	30.8	2.0	0.0	*	64.2	*	0	10	287	*	108.4
MANIWAKI	20.4	2.1	36.8	4.8	0.0		61.9	67	0	9	278	102	17.1
MATAGAMI	17.1	1.5	34.0	3.0	0.0		60.4	57	0	11	301	120	68.5
MONT JOLI	18.1	0.8	33.6	6.1	0.0		37.6	49	0	7	269	106	38.6
MONTREAL INT'L	22.5	1.6	33.8	9.5	0.0		31.2	34	0	6	237	86	6.4
MONTREAL M INT'L	20.7	*	33.0	8.5	0.0	*	73.6	*	0	9	243	*	9.3
NATASHQUAN	15.0	0.8	25.8	6.5	0.0		28.4	29	0	6	246	100	99.8
QUEBEC	20.5	1.4	33.0	9.1	0.0		104.8	89	0	11	233	94	16.4
ROBERVAL	19.7	1.8	31.5	7.4	0.0		111.9	93	0	11	274	*	28.5
SCHEFFERVILLE	12.3	-0.3	26.2	2.3	0.0		71.4	73	0	15	217	*	179.2
SEPT-ILES	15.6	-0.3	30.7	5.5	0.0		57.0	58	0	10	257	105	84.5
SHERBROOKE	19.5	1.7	32.7	8.0	0.0		85.2	72	0	11	223	*	19.9
STE AGATHE DES MONTS	19.5	2.3	33.6	6.5	0.0		66.2	62	0	9	242	88	22.6
ST-HUBERT	21.9	1.2	35.2	9.4	0.0		40.9	42	0	7	*		8.0
VAL D'OR	19.0	1.9	34.7	3.1	0.0		32.4	31	0	7	259	99	36.5
NEW BRUNSWICK													
CHARLO	18.5	1.1	32.9	8.1	0.0		53.2	61	0	8	249	98	30.2
CHATHAM	20.1	0.9	35.9	9.2	0.0		77.4	85	0	9	211	83	16.0
FREDERICTON	20.2	0.9	32.5	8.3	0.0		60.0	67	0	9	187	*	15.8
MONCTON	19.2	0.7	32.2	7.1	0.0		88.8	93	0	13	200	82	21.2
SAINT JOHN	17.3	0.4	29.1	8.1	0.0		107.8	104	0	12	165	75	34.5

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
NOVA SCOTIA													
GREENWOOD	19.9	0.8	33.4	7.0	0.0		178.9	230	0	13	X		14.7
HALIFAX INT'L	19.1	0.9	30.2	8.8	0.0		190.4	202	0	9	*		19.9
SABLE ISLAND	16.1	0.6	22.4	9.6	0.0		129.4	140	0	13	120	73	61.4
SHEARWATER	17.6	0.2	27.2	9.3	0.0		165.6	170	0	12	179	81	36.5
SYDNEY	17.6	0.2	30.9	8.2	0.0		143.4	176	0	14	147		47.1
TRURO													
YARMOUTH	17.0	0.7	26.2	8.6	0.0		178.6	229	0	14	170	82	37.9
PRINCE EDWARD ISLAND													
CHARLOTTETOWN	19.7	1.4	29.0	8.1	0.0		79.5	94	0	13	X		22.5
SUMMERSIDE	19.4	0.5	27.7	9.9	0.0		56.8	72	0	10	196	73	13.5
NEWFOUNDLAND													
BATTLE HARBOUR	*		29.6	2.8	0.0		63.5	90	0	16	X		*
BONAVISTA	14.9	0.2	26.3	6.2	0.0		26.8	44	0	8	X		100.1
BURGEO	13.0	-0.5	21.0	7.0	0.0		176.2	130	0	15	*		152.5
CARTWRIGHT	12.3	-0.4	29.2	2.7	0.0		95.2	114	0	17	223	112	181.4
CHURCHILL FALLS	13.5	-0.2	28.5	4.0	0.2		95.9	79	0	16	264	131	148.2
COMFORT COVE	15.5	-1.1	28.7	4.5	0.0		45.8	58	0	10	X		88.0
DANIEL'S HARBOUR	14.2	-0.2	18.5	5.6	0.0		32.1	35	0	1	129	63	179.0
DEER LAKE	16.1	0.2	30.6	1.5	0.0		85.6	110	0	8	X		76.2
GANDER INT'L	15.8	-0.7	29.0	4.4	0.0		48.8	70	0	10	224	104	80.8
GOOSE	15.6	-0.2	33.5	4.4	0.0		92.2	87	0	13	236	120	98.6
PORT-AUX-BASQUES	13.2	0.0	23.4	7.4	0.0		91.0	84	0	14	112	*	148.1
ST ANTHONY	12.5	*	25.1	1.5	0.0	*	120.5	*	0	13		*	172.1
ST JOHN'S	15.2	-0.3	25.6	6.4	0.0		80.4	106	0	17	156	70	95.8
ST LAWRENCE	14.3	*	22.7	8.5	0.0	*	179.5	*	0	19		*	116.5
STEPHENVILLE	16.3	*	25.7	7.7	0.0	*	151.0	*	0	14	174	*	64.0
WABUSH LAKE	13.7	*	29.1	4.5	0.0	*	114.4	*	0	15	270	*	134.5

AGROCLIMATOLOGICAL STATIONS — JULY 1988

STATION	Temperature C				Snowfall (cm)	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)	Degree days above 5 C	
	Mean	Difference from Normal	Maximum	Minimum							This month	Since jan. 1st
BRITISH COLUMBIA												
AGASSIZ	18.0	0.1	34.0	6.5	0.0	89.8	193	0	8	295	402.8	1239.2
SIDNEY SUMMERLAND	17.3	*	31.0	8.0	0.0	11.2	*	0	4	315	380.3	1054.2
ALBERTA												
BEAVERLODGE ELLERSLIE	15.0	−0.2	29.0	4.0	0.0	64.0	100	0	9	281	300.0	803.3
LACOMBE LETHBRIDGE	15.2	−0.9	31.5	2.0	0.0	103.5	143	0	11	307	316.7	902.5
VEGREVILLE	15.9	−0.4	32.0	4.0	0.0	42.2	57	0	7	N/A	343.8	1013.6
SASKATCHEWAN												
INDIAN HEAD	19.5	0.9	37.5	5.5	0.0	52.6	99	0	6		454.3	1297.3
MELFORT	19.0	1.6	35.5	7.0	0.0	34.2	53	0	6	272	430.5	1196.5
REGINA	19.4	0.8	38.0	5.0	0.0	38.6	73	0	5	N/A	448.0	1301.5
SASKATOON	19.2	0.8	37.0	6.0	0.0	42.7	76	0	6	337	445.5	1326.0
SCOTT	17.6	0.4	34.5	6.0	0.0	35.2	59	0	9	335	389.2	1141.3
SWIFT CURRENT SOUTH	19.5	1.0	36.0	6.5	0.0	34.9	91	0	6	357	449.8	1330.3
MANITOBA												
BRANDON	20.5	1.3	36.0	7.0	0.0	102.0	147	0	4	N/A	479.4	1373.8
GLENLEA	21.3	1.7	36.5	6.5	0.0	85.0	115	0	7	337	505.9	1325.5
MORDEN	22.1	1.9	37.0	9.0	0.0	42.8	58	0	6	337	535.5	1509.5
ONTARIO												
DELHI	22.8	2.1	36.5	7.0	0.0	184.6	261	0	10	300	545.0	1354.6
ELORA	21.1	2.0	35.1	6.1	0.0	101.3	139	0	11		500.5	1155.7
GUELPH	21.8	1.9	36.5	4.5	0.0	147.3	179	0	12	282	519.4	1207.9
HARROW	23.7	1.7	36.5	8.0	0.0	109.8	139	0	6	299	578.8	1520.3
KAPUSKASING	19.0	2.1	34.0	4.0	0.0	54.9	59	0	7	294	433.7	842.3
OTTAWA	22.7	2.1	34.7	10.9	0.0	50.9	60	0	8	285	548.4	1297.3
SMITHFIELD	23.8	2.6	37.8	8.8	0.0	64.1	96	0	7	N/A	583.7	1351.9
VINELAND STATION	23.3	1.8	36.7	10.2	0.0	134.0	217	0	8	282	566.0	1319.7
QUEBEC												
LA POCATIERE	19.3	0.6	33.0	6.0	0.0	43.2	46	0	9	248	446.0	963.8
L'ASSUMPTION	21.8	1.6	34.5	8.5	0.0	48.4	52	0	10	234	519.6	1221.0
LENNOXVILLE												
NORMANDIN	18.4	1.5	31.0	3.5	0.0	61.4	54	0			408.1	850.0
ST. AUGUSTIN												
STE CLOTHILDE	21.8	1.6	34.0	9.5	0.0	44.8	50	0	9	255	520.8	1236.2
NEW BRUNSWICK												
FREDERICTON	20.3	1.2	33.0	9.0	0.0	62.9	70	0	13	187	475.5	1046.2
NOVA SCOTIA												
KENTVILLE	19.8	0.6	32.0	6.0	0.0	154.1	220	0	10	179	*	1009.4
NAPPAN	19.1	1.1	31.0	6.0	0.0	102.7	122	0	11	180	514.5	978.8
PRINCE EDWARD ISLAND												
CHARLOTTETOWN	19.3	0.4	28.5	9.0	0.0	75.4	94	0	11	187	443.8	887.1
NEWFOUNDLAND												
ST. JOHN'S WEST	15.7	0.1	26.0	7.0	0.0	77.6	105	0	18	132	*	696.0