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CLIMATIC PERSPECTIVES

Climatic Perspectives

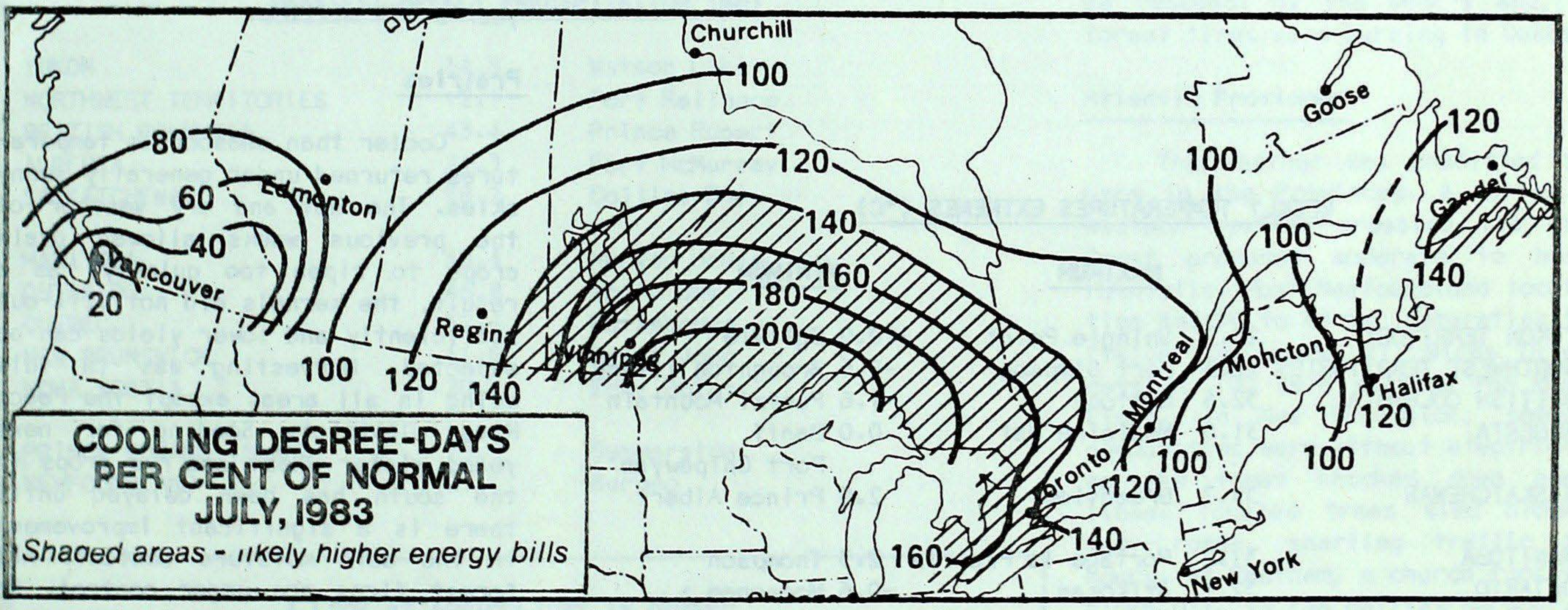
A WEEKLY REVIEW OF CANADIAN CLIMATE

AUGUST 26, 1983 (Aussi disponible en français) VOL. 5 NO. 34

FOR THE PERIOD AUGUST 16-22, 1983

- ***Cost of fighting forest fires in Alberta about 50 million dollars lower than last year's***

- ***Storms on the East Coast***



COOLING DEGREE-DAYS PER CENT OF NORMAL JULY, 1983

Shaded areas - likely higher energy bills

- ***Millions of dollars spent to keep cool this summer***

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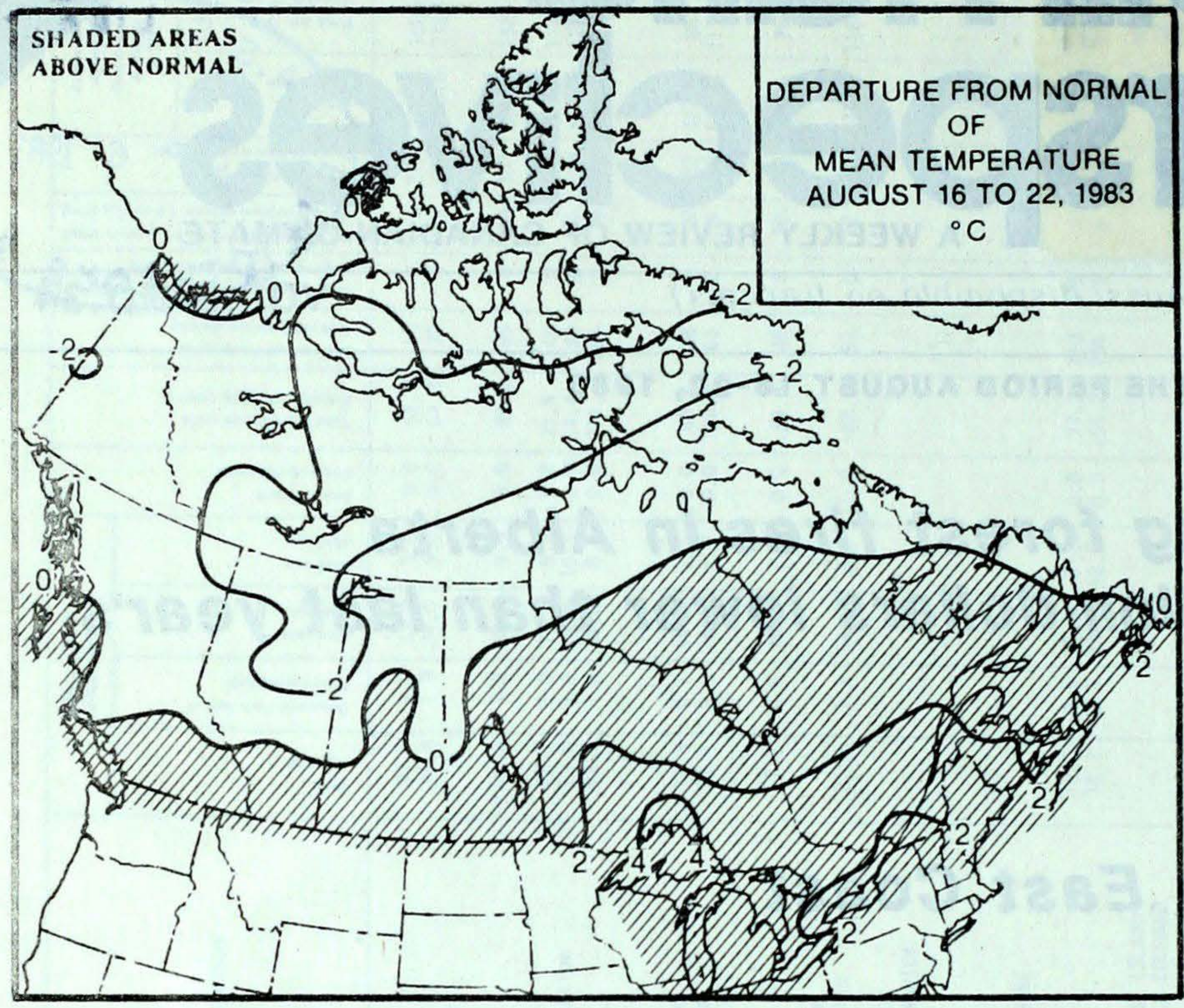
NOTE: The data shown in this publication are based on unverified reports from approximately 225 Canadian synoptic stations.

Canada



DEPARTURE FROM NORMAL
OF
MEAN TEMPERATURE
AUGUST 16 TO 22, 1983
°C

WEEKLY TEMPERATURES EXTREMES (°C)

	MAXIMUM		MINIMUM	
YUKON TERRITORY	20.2	Shingle Point	-10.0	Ogilvie
NORTHWEST TERRITORIES	22.3	Fort Simpson	-9.6	Broughton Island
BRITISH COLUMBIA	32.6	Lytton	-1.6	Puntzi Mountain
ALBERTA	31.6	Medicine Hat	0.0	Banff Fort Chipewyan
SASKATCHEWAN	35.7	Broadview	2.9	Prince Albert
MANITOBA	37.2	Portage la Prairie	2.3	Thompson
ONTARIO	32.1	Atikokan Kenora	-0.6	Moosonee
QUÉBEC	30.5	Bagotville	2.0	Kuujjuaq
NEW BRUNSWICK	30.5	Chatham Fredericton	7.7	Moncton
NOVA SCOTIA	30.0	Greenwood	9.1	Shelburne Western Head
PRINCE EDWARD ISLAND	28.4	Summerside	10.8	Summerside
NEWFOUNDLAND	29.4	Deer Lake	3.1	Wabush Lake

ACROSS THE NATION

Warmest mean temperature	21.4	Simcoe, ONT
Coolest mean temperature	-0.9	Broughton Island, NWT

ACROSS THE COUNTRY...

Yukon and Northwest Territories

The weather turned cold; mean temperatures averaged 2 to 5 degrees below normal across the Territories. Frost occurred in many communities, and on August 17, snow was observed on mountain tops at Whitehorse. Cassiar received 5 cm of snow on the same day. Leaves were changing their colours in the Yukon. Precipitation amounts ranged from 3 mm in the far North to 25 mm in the southern Yukon. In Baffin Bay, the ice cover was more extensive than normal, and ice breakers were assisting ships travelling farther north.

British Columbia

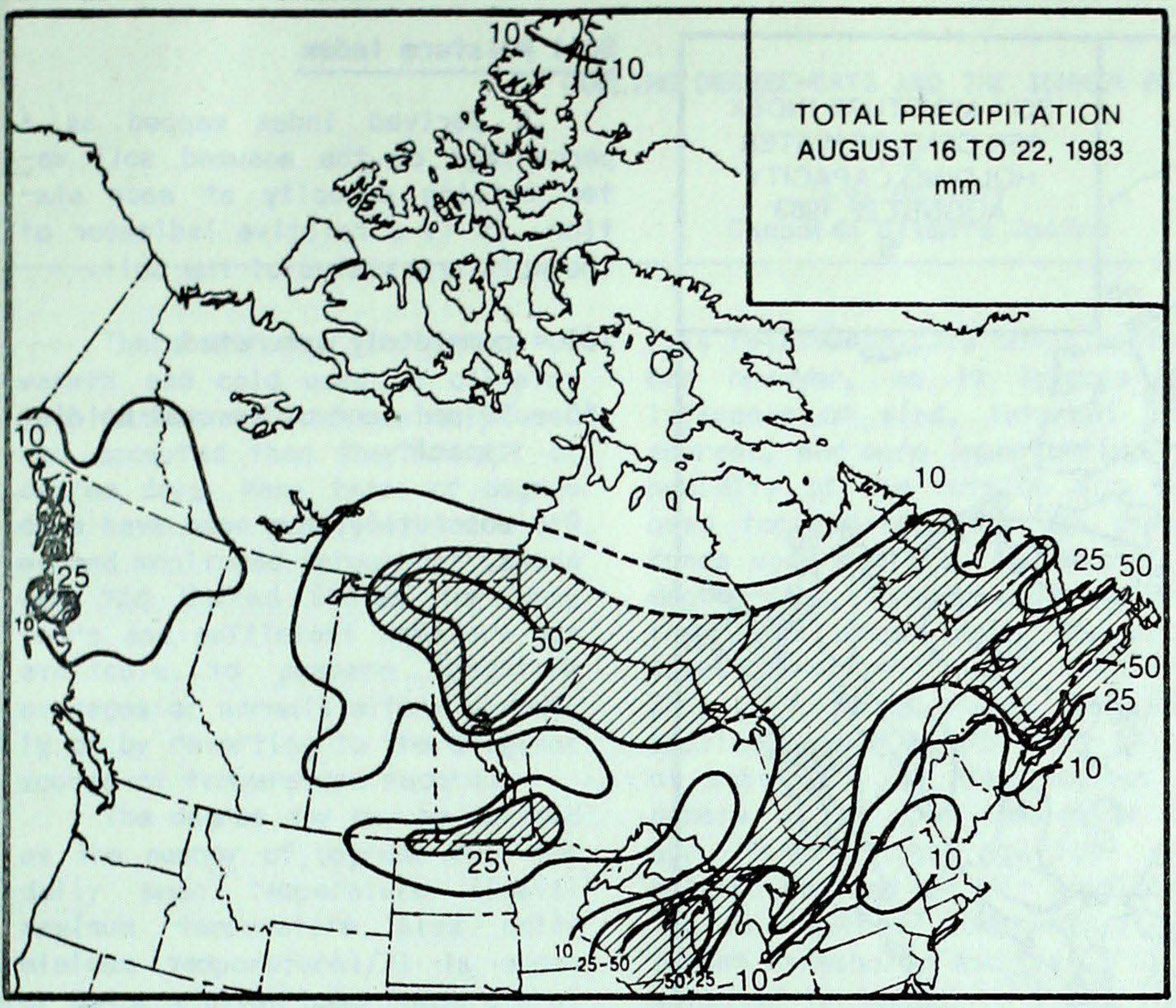
Abundant sunshine and near normal temperatures prevailed. The forest fire index is on the rise, but no major forest fires were reported. Due to this year's relatively wet and unsettled fire season, $16 million has been spent for fire controls compared to last year's $35 million.

Prairies

Cooler than seasonable temperatures returned under generally sunny skies. The hot and dry weather of the previous weeks allowed grain crops to ripen too quickly; as a result, the kernels did not fill-out sufficiently and lower yields can be expected. Harvesting was in full swing in all areas except the Peace River District. Seeding for next years winter wheat and rye crops in the south has been delayed until there is a significant improvement in the soil moisture content. All forest fires are under control. So far this year in Alberta less than $14 million has been spent on forest fire control, considerably less than last year's $63 million.

Ontario

Southern Ontario enjoyed dry and warm weather while the northern areas experienced dull and damp conditions. A province-wide rainfall on August 21 produced 10-40 mm in the South and 10-20 mm in the North. The recent rains have greatly benefitted apple orchards, although the



HEAVIEST WEEKLY PRECIPITATION (mm)

YUKON	14.8	Watson Lake
NORTHWEST TERRITORIES	12.1	Fort Reliance
BRITISH COLUMBIA	43.4	Prince Rupert
ALBERTA	21.3	Fort McMurray
SASKATCHEWAN	58.2	Collins Bay
MANITOBA	68.4	Norway House
ONTARIO	46.8	North Bay
QUEBEC	52.4	Natashquan
NEW BRUNSWICK	11.6	Saint John
NOVA SCOTIA	20.4	Eddy Point
PRINCE EDWARD ISLAND	23.8	Summerside
NEWFOUNDLAND	81.1	Burgeo

A LOOK AT AGRICULTURE IN QUÉBEC

According to The Federation of fruits and vegetables growers, consumers can expect to pay higher prices for vegetables and fruits this year. The Federation blames the small harvests for the inflated prices at the market place. Prices are expected to be 100 per cent more than last year's for lettuce and potatoes. Delayed planting because of the wet spring weather and slow crop growth due to the prolonged summer dry spell are responsible for the poor harvest. The yield of the corn crop could be 40 per cent below last year's and the radish harvest may well be only 70 per cent of last year's. Saguenay and Lac Saint-Jean agricultural areas are affected the most by the poor growing weather, and also suffer from insect infestations.

drought has significantly decreased the size of the fruit. The early potato harvest has also been helped by the August rains, however, the yields are still expected to be 30 per cent below normal. In addition, blue mold, the scourge of the 1981 tobacco crop, has reappeared in Norfolk County. But the disease is not expected to be a major problem this year because of the advanced stage of crop development.

If this warm weather continues, this summer should be the warmest in at least a decade.

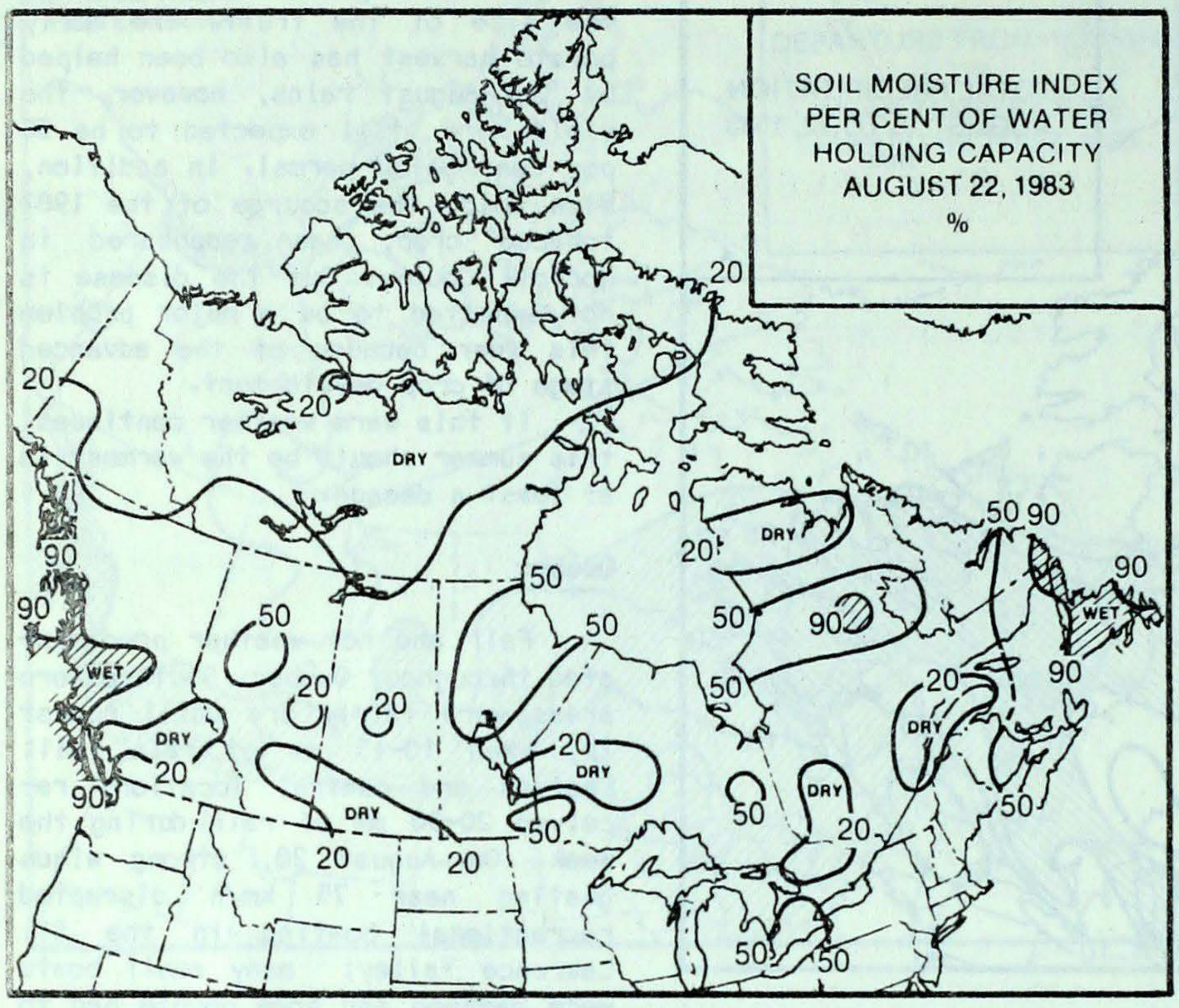
Québec

Fair and hot weather predominated throughout Québec. Southwestern areas were fairly dry until August 22, when 10-15 mm of rain fell. Eastern and central locations received 20-50 mm of rain during the week. On August 20, strong winds gusting near 75 km/h disrupted recreational boating in the St. Lawrence Valley; many small boats were damaged and some people had to be rescued. By the week's end, 22 forest fires were burning in Québec.

Atlantic Provinces

The weather was unsettled but warm in the Provinces. A series of weather systems crossing the East Coast produced moderate to heavy rainfalls. Most Newfoundland localities had 50 to 80 mm, saturating the fields. On August 21, winds in excess of 100 km/h whipped the Maritimes. In New Brunswick, several communities were without electricity as the trees knocked down power lines. Toppled trees also blocked many roads, snarling traffic for hours. At Chatham, a church roof was blown off. In the Halifax harbour, a boating regatta had to be cancelled; several small boats capsized and a few boaters had to be rescued.

SOIL MOISTURE



Soil Moisture Index

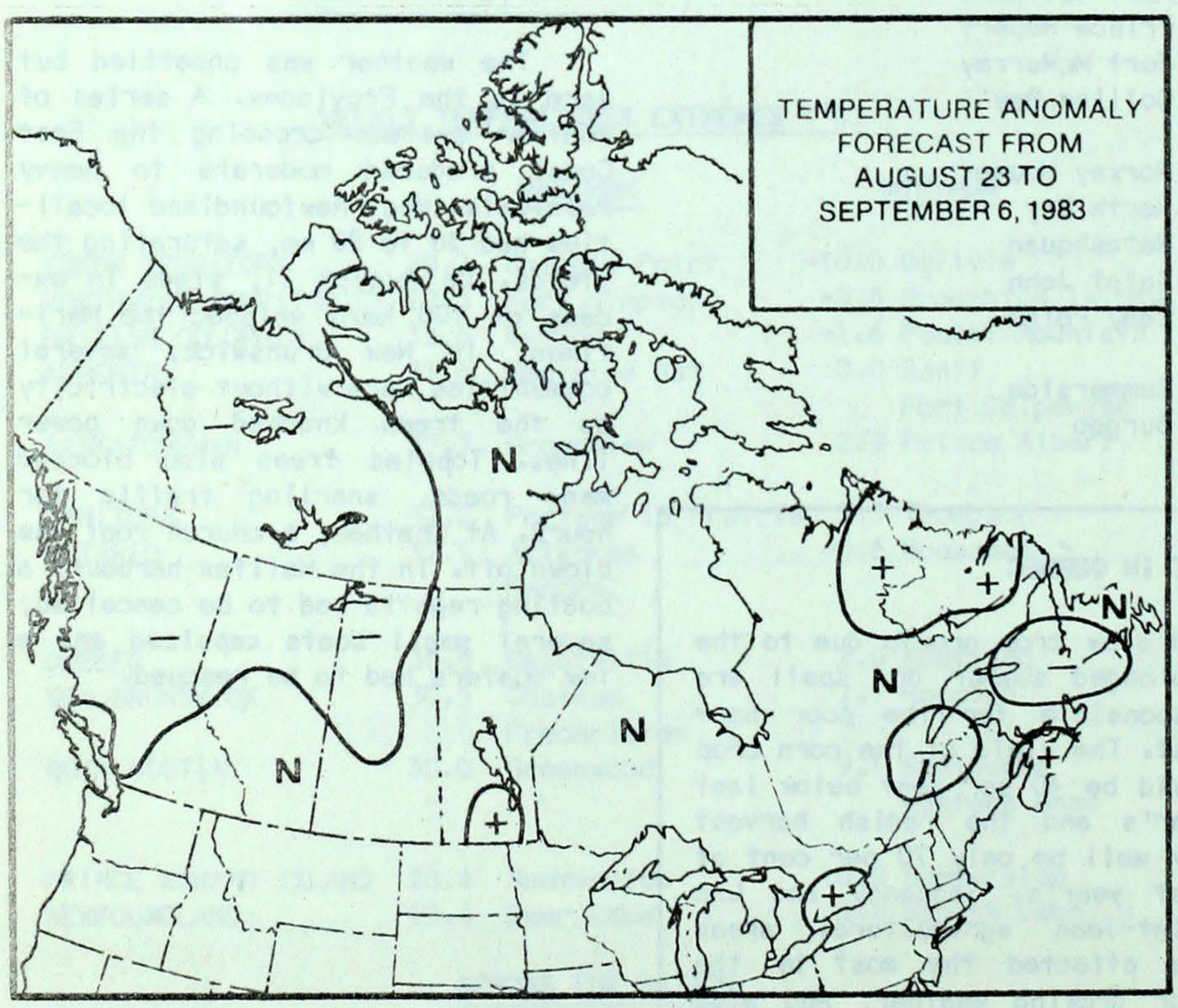
A derived index mapped as a percentage of the assumed soil water holding capacity at each station. It is a relative indicator of the moisture status of the soil.

100 = completely saturated

50 = 50 per cent of assumed holding capacity

0 = absolutely dry

TEMPERATURE ANOMALY FORECAST



Temperature Anomaly Forecast

The temperature anomaly forecast, for each of the 70 Canadian stations, is prepared by searching historical weather maps to find cases similar to the present one. The principle used is that a prediction for the next 15 days may be based on what is known to have actually happened during the 15-day anomaly periods. After the five best sets are selected, the surface temperature anomalies are calculated. This results in five separate forecasts, which are averaged to provide the consensus forecast depicted.

++ much above normal

+ above normal

N normal

- below normal

-- much below normal

COOLING DEGREE-DAYS AND THE SUMMER OF 1983

by
D.W. Gullett
Canadian Climate Centre

There are many indicators of warmth and cold used in climatology but none is more widely used and accepted than the concept of degree days. Many types of degree days have been routinely calculated and monitored throughout Canada and the United States for many years and sufficient data are now available to prepare long-term averages or normals either directly or by reverting to the original source of temperature records.

The degree day may be defined as the number of degrees that the daily mean temperature ((daily maximum temperature plus daily minimum temperature)/2) is above or below a given base temperature. The daily degree day values thus calculated are accumulated monthly and/or seasonally and are then used in many different climatic applications.

The heating degree-days, using a base temperature of 18.0°C, is the most familiar and is often informally referred to as the number of degrees of "cold". The larger the value, the colder the average temperature for the period in question. It is well established that heating degree-days are directly related to heating fuel consumption, however, discussion of this type of degree day will be left to a later occasion.

Of particular concern at this time of year is the reciprocal of heating degree days; the cooling degree-days. Cooling degree-days are simply the accumulation of the number of degrees that the daily mean temperature is <u>above</u> some base value, usually 18°C. Just as the energy required for heating is roughly proportional to the number of heating degree-days for a given period, so the energy required for cooling is roughly proportional to the number of cooling degree-days. This relationship is not a perfect one however, as it ignores any influence of wind, internal heat sources, and more importantly, the humidity of the outside air. The need for cooling, and its dependence upon humidity makes cooling degree-days somewhat less reliable than some other types of degree days, nevertheless the relationship is strong enough for many applications. The arbitrary choice of base 18°C is also subject to debate as it does not allow for any "energy-free" period when neither heating nor air conditioning is required. Sometimes a different threshold, such as 24°C, is selected to take this factor into consideration.

Cooling degree-days are not usually significant through most of Canada. Calculation of C.D.D. normals from climate records reveals a few comparatively small geographic areas where monitoring of cooling degree-days to assess summer energy requirements is practicable. These areas comprise a fairly narrow band through extreme southern Québec and Ontario, extreme southern Prairie provinces, and the central southern interior of British Columbia, including Kamloops and the Okanagan Valley. When one considers that nearly one-third of Canada's population lives there, the area's significance as a major energy consumer becomes readily apparent. Cooling degree-days are thus used by energy planners and engineers to estimate probable energy requirements for air conditioning much as heating degree-days are used to monitor energy requirements for heating purpose. The higher the number of cooling degree-days for a given period, the greater the requirement to artificially cool our industrial, commerical and residential buildings. Of course, as mentioned previously, the calculation of cooling degree-days ignores the important humidity factor. The combined effects of high temeprature and humidity are known to create very uncomfortable conditions for most human beings. This phenomenon is quantified into indices of relative human discomfort known as humidex values. Humidex calculation and uses were discussed at some length in a previous issue of Climatic Perspectives (see Humidex; CP, Vol. 5, No. 30).

July 1983 with its "Heat Wave in Ontario" (CP, Vol. 5, No. 29) has contributed to a long hot summer in Ontario. Cooling degree-days tabulations have been prepared for major centres across Canada for the months of June and July and are shown in the accompanying table along with normal values and per cent departures from these normals. The densely populated and industrial areas have experienced significant positive cooling degree-days anomalies this summer resulting in higher than usual summer energy consumption. Toronto Hydro has observed a significant increase in the energy requirement this summer, primarily due to the hot weather. A new all-time record peak load for the Toronto area was set in June and was subsequently broken in mid-July. The Utility Company expects this "summer peak", aided by the mild winter earlier this year, to be the high for 1983. They also point out that although summer peak loads are not rare they are much less common than the "traditional" winter occurrences when heating demands are heavy. Of course, many additional factors such as demographic changes and other non-climatic factors must be considered when examining energy consumption statistics. Ontario Hydro spokesmen believe that a 'less energy conscious' public, this year as opposed to recent past years, have also contributed to an increased province-wide load. June figures show a 10 per cent increase over the same month last year while the July results have not yet been released. Manitoba Hydro, in a recent press release, indicated similar findings with electrical energy consumption for July up about 13 per cent over the same month last year. They also estimated that additional air conditioning requirements accounted for about 48 per cent of their total increase this summer.

During the month of June, cooling degree-days were significantly above normal across the southern portions of the country from the Maritimes to Winnipeg. From southern Saskatchewan westward through the Okanagan Valley, rather cool conditions prevailed with below normal cooling degree-days accumulations. These ranged from near normal at Regina to only 40 per cent of normal in the Kelowna-Penticton area.

The warm weather of June in eastern Canada continued into July. In the Maritimes cooling degree-days accumulations ranged from near normal to 36 per cent above normal at St. John's. Southern Québec experienced only slightly above normal values while in southern Ontario (from the Ottawa Valley to Windsor) accumulations ranged from 35 to 55 per cent above the norm. Thunder Bay had a whopping 138 per cent above normal, while on the southern Prairies, the cooling degree-days ranged from 97 per cent above normal at Winnipeg to 30 per cent above at Regina. The Okanagan Valley, however, continued to be on the cool side with only 25 to 50 per cent of the July normals.

It appears that the trend, has for the most part, continued through to the middle of August. At any rate, the summer of 1983 will be remembered not only for its superb vacation weather but also for its increased demands on Canada's energy resources.

COOLING DEGREE DAYS
(18°C)

Station	June 1983 Actual	June 1983 Normal	June 1983 % of Normal	July 1983 Actual	July 1983 Normal	July 1983 % of Normal
St. John's A	2.4	1.8	133	19.9	14.6	136
Shearwater A	20.3	4.4	461	26.4	19.8	133
Fredericton A	28.5	24.2	118	54.1	61.9	87
Sherbrooke A	35.5	18.9	188	35.6	37.8	94
St. Hubert A	67.9	47.2	144	105.9	92.1	114
Montréal Int A	70.2	49.8	141	111.1	98.7	113
Ottawa Int A	86.5	45.2	191	122.0	90.6	135
Toronto (City)	94.7	62.1	152	169.2	126.5	134
Toronto Int A	59.5	43.7	136	142.4	91.5	156
Hamilton A	71.7	46.1	156	135.8	89.3	152
St. Catherine A	85.1	61.7	138	167.6	121.0	139
Simcoe	67.5	50.6	133	127.6	92.5	138
London A	64.7	46.9	138	131.6	85.0	155
Windsor A	102.9	79.4	130	185.3	133.2	139
Sudbury A	55.2	23.7	232	87.9	51.9	169
Thunder Bay A	13.5	6.8	199	77.5	32.5	238
Winnipeg Int A	38.1	34.2	111	141.9	71.9	197
Regina A	20.5	20.5	100	75.0	57.6	130
Calgary Int A	1.2	5.1	24	7.7	18.2	42
Edmonton Mun A	12.5	12.2	102	28.0	31.5	89
Kamloops A	24.3	39.9	61	57.2	98.5	58
Kelowna A	6.2	14.8	42	M	50.0	M
Penticton A	14.8	29.3	51	24.4	84.6	29
Vancouver Int A	0.6	3.8	16	3.6	17.9	20
Victoria Int A	0.0	2.5	0	3.3	10.5	31

HISTORICALLY, THIS WEEK ...

August 15-16, 1971

Extensive property damage resulted from Hurricane Beth which had lost punishing winds but retained exceptional moisture content as it moved over Nova Scotia. Flooding from rainfall, which reached 291.7 mm at the Halifax International Airport, washed out highways and bridges, temporarily isolating communities in eastern mainland Nova Scotia, wrought havoc with buildings of all kinds in the Halifax/Dartmouth twin city complex and caused considerable farm crop destruction.

August 16, 1956

A severe hailstorm, associated with tornado moved over a 192 km path from Elkhorn to Crystal City, Man. causing $15,000,000 damage.

August 19, 1968

A severe hailstorm was reported in the Lambeth, Ont. area causing extensive damage to crops and property. Four hours after the storm, ice was still piled 100 to 175 millimetres deep on the streets.

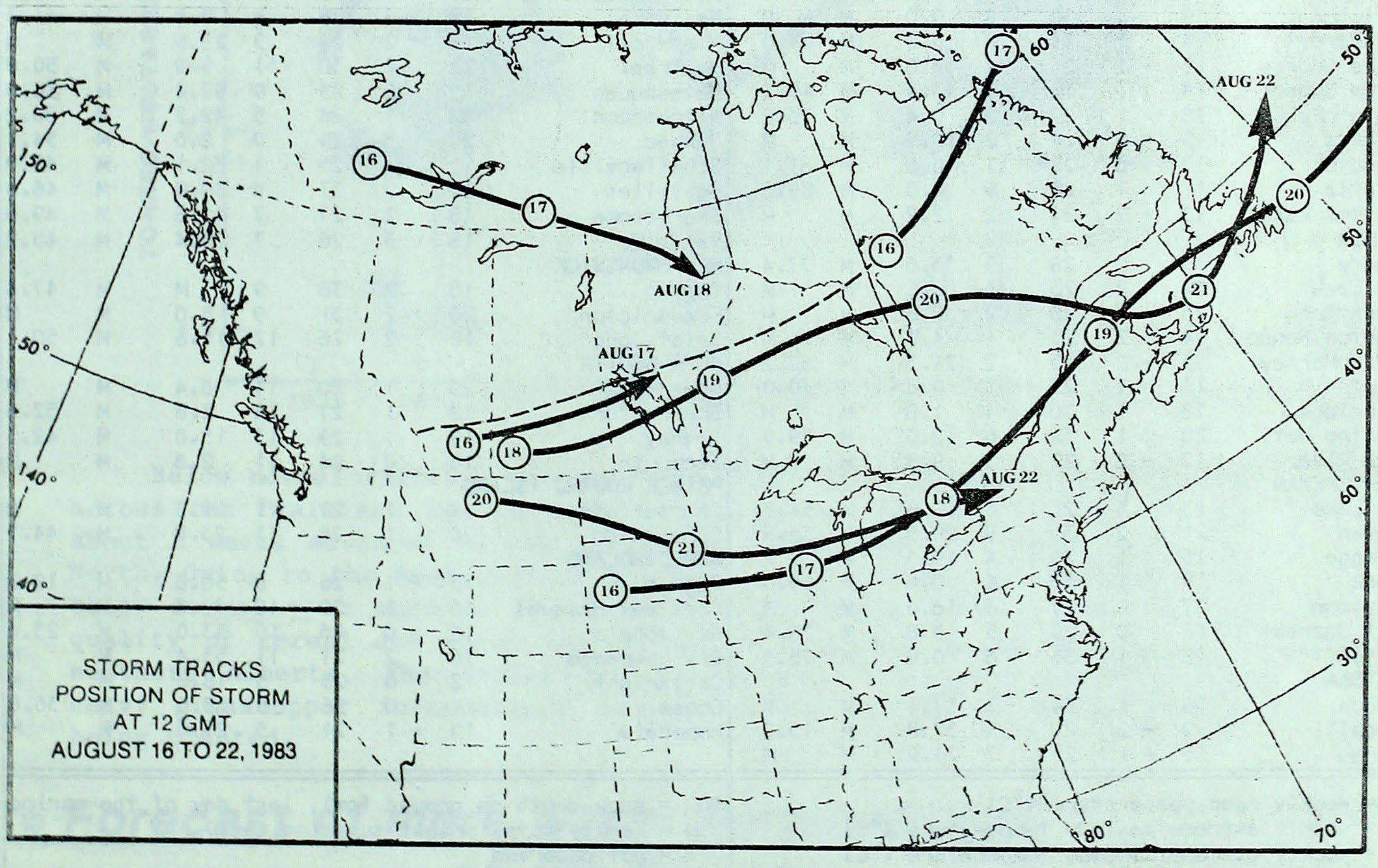
August 20, 1970

Winds of tornado-like intensity struck the Sudbury, Ont. area at about 8:30 a.m. A long path of destruction resulted, and in the immediate Sudbury area four persons were killed, 750 were left homeless and damages exceeded $6,000,000.

August 22, 1968

At St. Paul, Alta. a hailstorm caused extensive damage. The roads were piled 15 centimetres high with 12-millimetres pellets.

STORM TRACKS



STORM TRACKS
POSITION OF STORM
AT 12 GMT
AUGUST 16 TO 22, 1983

TEMPERATURE, PRECIPITATION AND BRIGHT SUNSHINE DATA FOR THE WEEK ENDING 0600 GMT AUGUST 23, 1983

STATION	TEMP				PRECIP		SUN
	Av	Dp	Mx	Mn	Tp	SOG	H
YUKON TERRITORY							
Dawson	10	-3	17	-1	6.6	M	M
Mayo A	10	-1	17	-1	8.4	M	M
Watson Lake	11	-2	18	2	14.8	M	40.5
Whitehorse	11	-1	18	3	3.4	M	M
NORTHWEST TERRITORIES							
Fort Smith	12	-2	21	-1	14.7	M	M
Inuvik	10	-1	22	1	0.8	M	53.2
Norman Wells	12	-1	22	4	1.8	M	M
Yellowknife	12	-2	18	6	3.2	M	M
Baker Lake	7	-2	12	1	8.7	M	M
Cape Dyer	2	-2	6	-1	1.0	M	M
Clyde	2	-1	6	0	3.8	M	5.4
Frobisher Bay	5	-2	9	2	4.6	M	21.3
Alert	0	0	4	-4	M	7.0	7.5
Eureka	3	0	8	-1	6.2	M	37.9
Hall Beach	5	0	10	0	8.6	M	M
Resolute	2	-1	9	-3	0.0	M	M
Cambridge Bay	5	-2	9	0	2.8	M	27.2
Mould Bay	3	1	10	-2	0.0	M	M
Sachs Harbour	4	-1	12	-3	0.2	M	M
BRITISH COLUMBIA							
Cape St. James	15	2	21	12	4.8	M	M
Cranbrook	18	2	28	7	0.0	M	83.1
Fort Nelson	12	-2	24	2	10.3	M	33.5
Fort St. John	13	-1	23	4	3.6	M	M
Kamloops	20	0	30	8	1.4	M	M
Penticton	19	0	30	8	0.0	M	M
Port Hardy	14	1	21	8	8.0	M	59.6
Prince George	13	-1	24	2	13.0	M	M
Prince Rupert	14	1	18	9	43.4	M	40.7
Revelstoke	18	1	27	8	0.4	M	73.8
Smithers	13	-1	24	2	10.9	M	M
Vancouver	17	0	22	11	0.0	M	81.1
Victoria	17	1	25	9	0.0	M	89.6
Williams Lake	13	-2	24	2	2.2	M	M
ALBERTA							
Calgary	15	0	28	5	33.0	M	77.4
Cold Lake	14	-2	26	3	0.6	M	M
Coronation	15	-1	26	2	8.8	M	M
Edmonton Namao	14	-2	25	4	4.5	M	M
Fort McMurray	13	-2	25	2	21.3	M	62.2
Jasper	13	-1	25	1	0.8	M	70.0
Lethbridge	18	1	30	4	1.8	M	M
Medicine Hat	20	1	32	6	2.0	M	79.9
Peace River	12	-2	22	3	9.3	M	M
SASKATCHEWAN							
Cree Lake	13	X	21	6	19.8	M	54.7
Estevan	21	2	35	8	20.5	M	56.9
La Ronge	15	1	25	4	19.5	M	M
Regina	19	1	33	6	0.4	M	69.0
Saskatoon	17	0	27	6	16.6	M	M
Swift Current	18	0	29	5	3.8	M	76.4
Yorkton	18	1	33	6	0.0	M	75.5
MANITOBA							
Brandon	18	1	34	7	37.4	M	M
Churchill	9	-2	21	5	37.8	M	13.0
The Pas	15	-1	25	7	24.9	M	M

STATION	TEMP				PRECIP		SUN
	Av	Dp	Mx	Mn	Tp	SOG	H
Thompson	13	0	23	2	37.8	M	36.3
Winnipeg	19	2	36	9	M	M	58.4
ONTARIO							
Big Trout Lake	14	0	25	7	M	M	M
Earlton	19	4	29	9	M	M	M
Kapuskasing	17	3	30	5	11.8	M	M
Kenora	19	2	32	12	29.2	M	M
London	21	1	28	12	6.8	M	M
Moosonee	14	0	26	-1	17.7	M	45.2
Muskoka	20	3	29	6	M	M	M
North Bay	19	2	27	9	46.8	M	44.2
Ottawa	21	2	31	13	7.9	M	43.5
Pickle Lake	17	3	29	9	9.8	M	M
Red Lake	18	1	30	10	16.8	M	56.4
Sudbury	19	3	28	11	30.9	M	M
Thunder Bay	20	4	30	12	24.9	M	M
Timmins	17	2	30	6	40.6	M	M
Toronto	21	2	30	12	30.0	M	M
Trenton	21	1	30	10	0.0	M	M
Wiarton	21	3	31	11	8.9	M	43.2
Windsor	24	3	32	17	0.4	M	M
QUEBEC							
Bagotville	19	4	31	10	7.2	M	M
Blanc-Sablon	12	0	17	6	16.0	M	12.8
Inukjuak	9	1	16	4	4.2	M	49.2
Kuujjuaq	9	0	19	2	7.8	M	19.5
Kuujjuarapik	11	1	21	5	35.4	M	16.9
Maniwaki	18	2	28	8	8.8	M	44.3
Mont-Joli	18	2	29	9	23.6	M	M
Montréal	21	2	30	11	9.9	M	50.0
Natashquan	15	2	23	9	52.4	M	36.9
Nitchequon	12	1	24	5	42.2	M	36.2
Québec	20	3	29	9	2.0	M	54.1
Schefferville	11	1	25	4	32.1	M	41.9
Sept-Iles	15	2	27	9	30.8	M	46.8
Sherbrooke	18	2	27	7	11.6	M	49.0
Val-d'Or	18	3	28	7	25.4	M	45.2
NEW BRUNSWICK							
Charlo	18	2	30	9	M	M	47.4
Fredericton	20	2	31	9	5.0	M	M
Saint John	18	2	26	12	11.6	M	50.4
NOVA SCOTIA							
Greenwood	20	1	30	11	8.4	M	M
Shearwater	19	1	27	12	2.8	M	52.6
Sydney	19	1	29	13	15.0	M	42.3
Yarmouth	16	0	24	11	2.8	M	M
PRINCE EDWARD ISLAND							
Charlottetown	19	1	27	11	19.3	M	M
Summerside	20	1	28	11	23.8	M	44.1
NEWFOUNDLAND							
Gander	15	-1	26	8	50.8	M	19.2
Port aux Basques	16	1	20	10	42.8	M	M
St. John's	16	0	26	10	53.0	M	23.4
St. Lawrence	16	2	21	11	53.4	M	M
Cartwright	12	0	25	5	18.8	M	M
Goose	14	0	26	5	18.0	M	36.8
Hopedale	10	-1	21	5	27.0	M	M

Av = weekly mean temperature (°C)
Mx = weekly extreme maximum temperature (°C)
Mn = weekly extreme minimum temperature (°C)
Tp = weekly total precipitation (mm)
Dp = Departure of mean temperature from normal (°C)

SOG = snow depth on ground (cm), last day of the period
H = weekly total bright sunshine (hrs)
X = not observed
P = extreme value based on less than 7 days
M = not available at press time

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