

# Climatic Perspectives

Monthly Supplement

Vol.8 September, 1986

## CLIMATIC HIGHLIGHTS

### Wet Weather Plagues Most Agricultural Regions P. Scholefield

Abnormally high amounts of rain were recorded during the month over the agricultural districts in Nova Scotia and the southern portions of Québec, Ontario, Saskatchewan, Alberta and the interior of B.C. (see map on page 3B showing the percent of normal precipitation). Medicine Hat, in the heart of Canada's drybelt, received an incredible 198 mm of rain which is more than six times the normal amount for September and exceeds the previous record for any month of 147 mm set in August 1927. This unusual period of wet weather across the country can be related to the anomalous upper level flow pattern over the country. Eastern Canada was affected by a strong

southwesterly flow of warm humid air while southern B.C. and Alberta were under the influence of troughs and abnormally low 50 kPa heights (see page 7B).

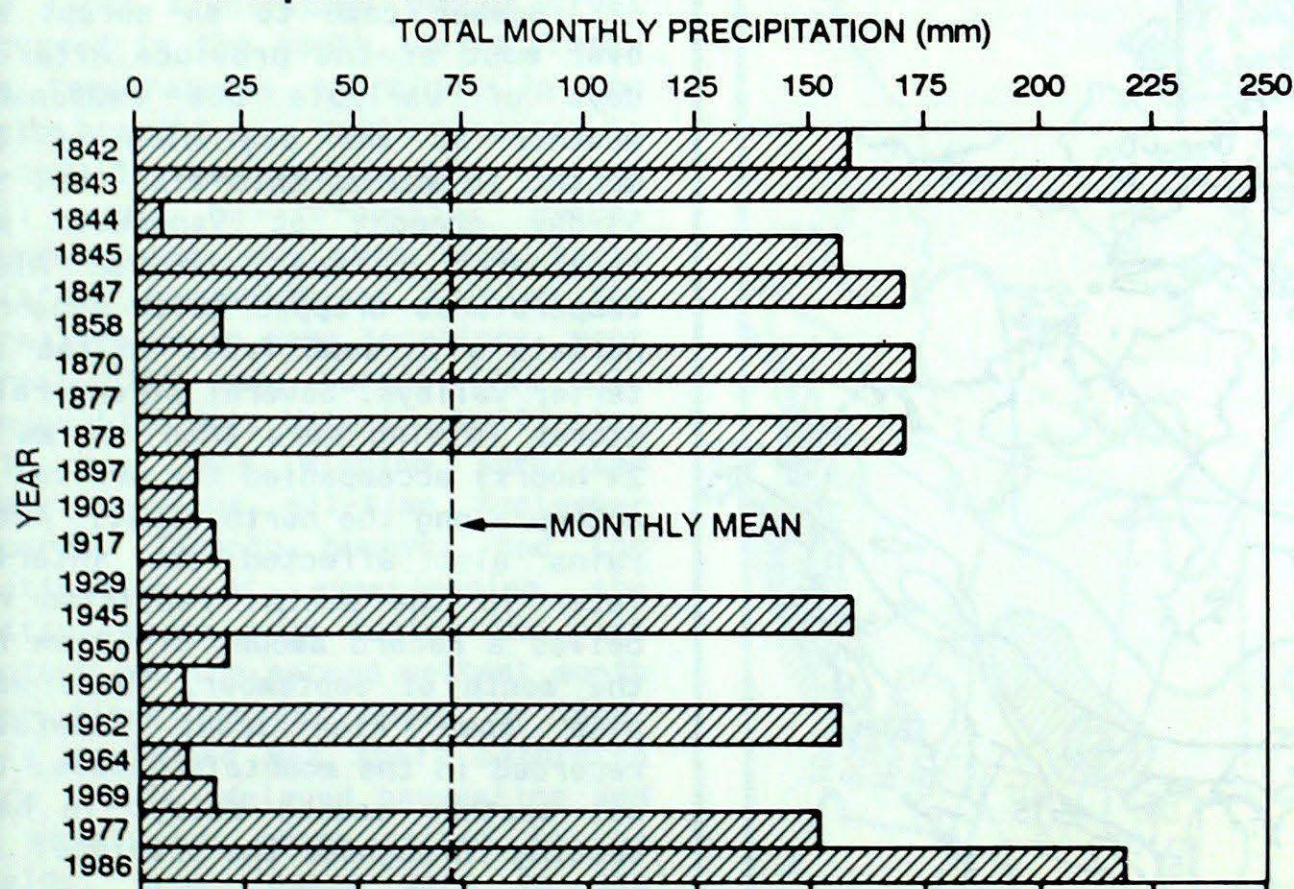
### Southern Ontario Wet Spell Continues

The enhancement and continuation of the wet spell in southern Ontario during September was the most significant climatic event across the country. Rainfall amounts during July and August were nearly twice the usual values prior the deluges in September which dumped from 2 to

... continued on page 10B



This photo shows a typically saturated cornfield north of Toronto on September 30th



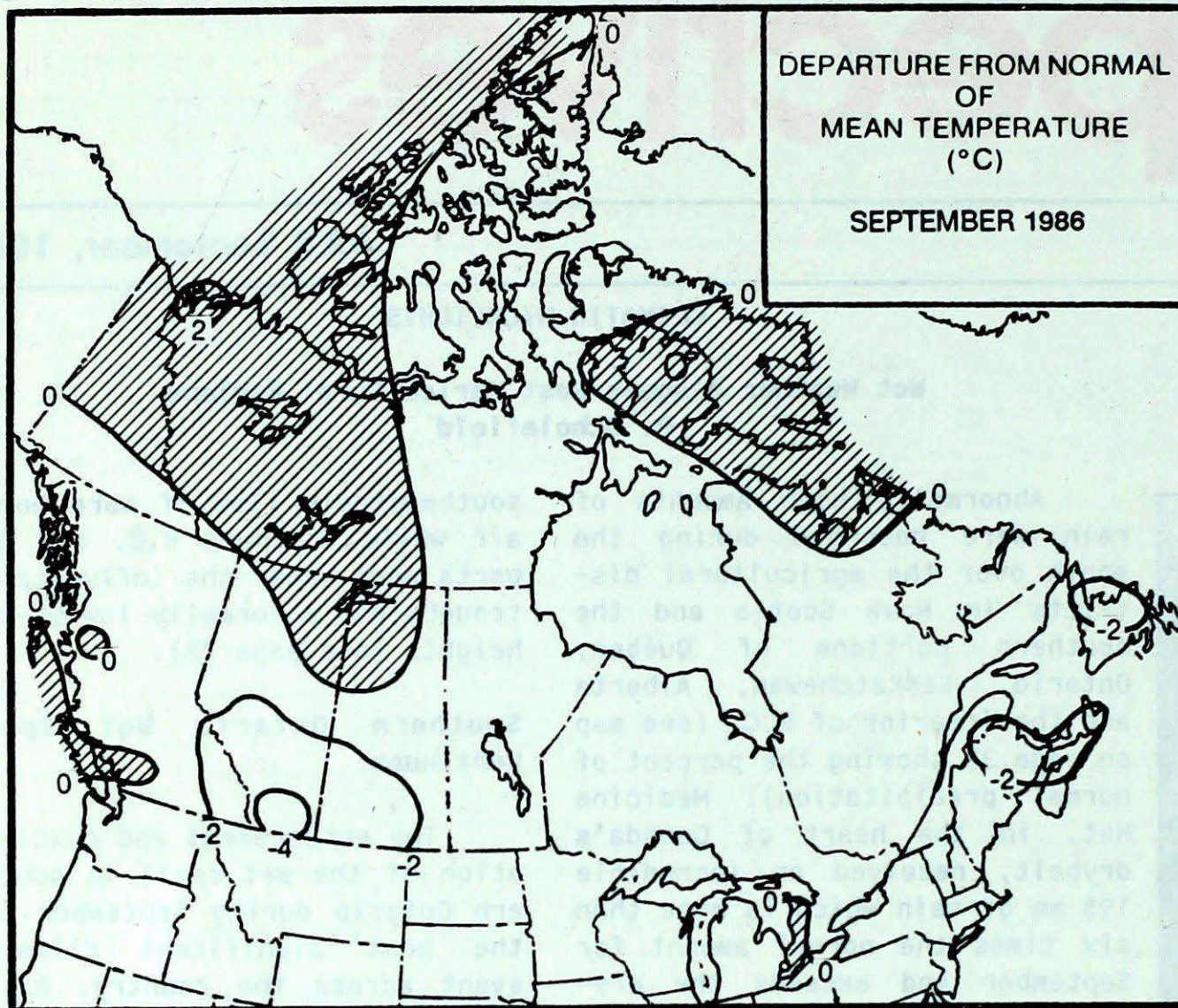
THE TEN WETTEST AND DRIEST SEPTEMBERS  
AT TORONTO (1840-1986)



Harvesting in the lush Holland Marsh just north of Toronto was paralysed by the heavy rains as shown in this photo taken on September 30



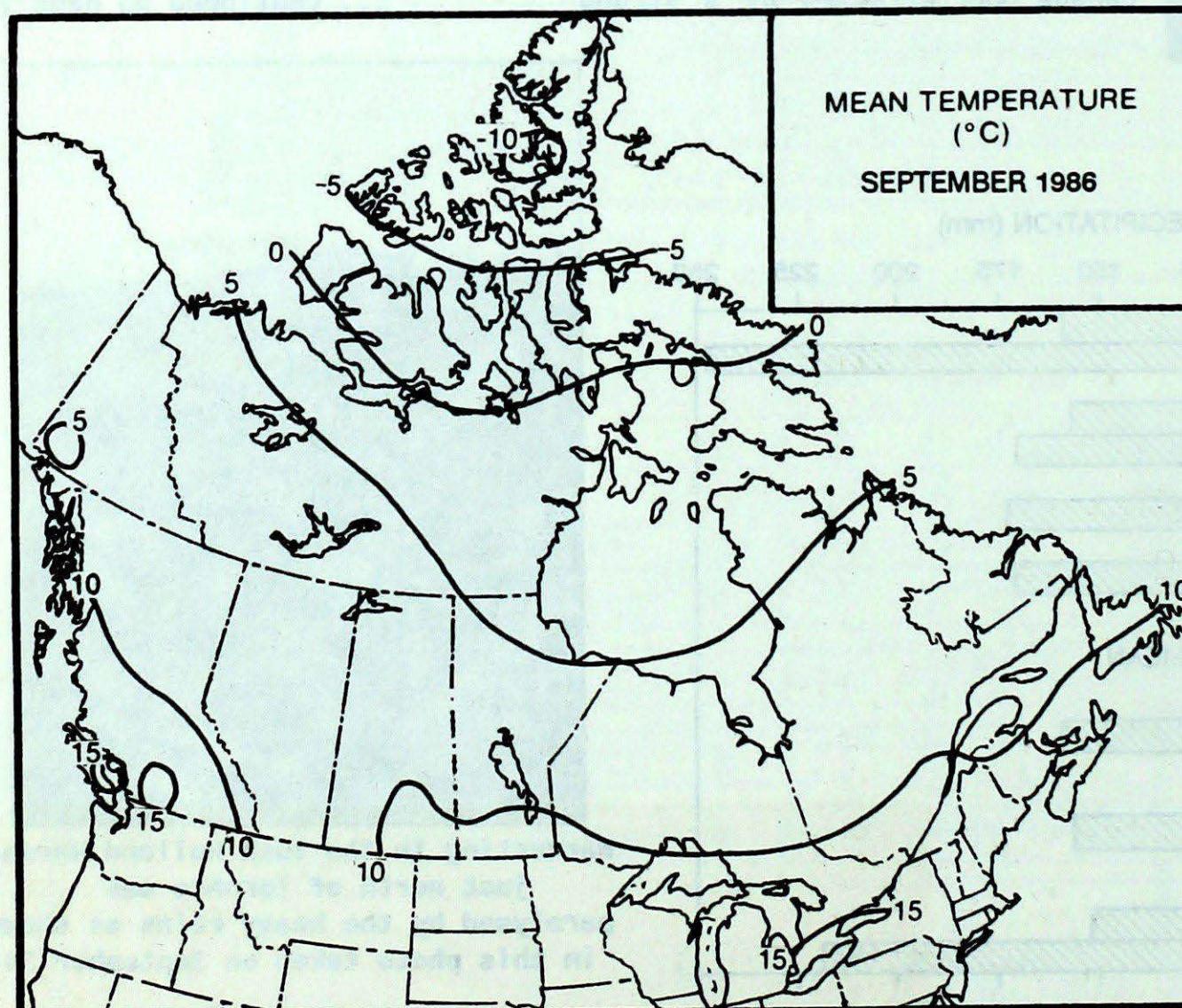
# TEMPERATURE



## ACROSS THE COUNTRY

### Yukon and Northwest Territories

Anticyclonic low level circulation and an associated upper-level ridge produced generally sunny weather over the Yukon and the District of Mackenzie particularly at the beginning of September. Daytime temperatures at times exceeded 20°C even though there was frost at night. Despite the fact that snow was reported throughout the north, precipitation amounts were below normal with the exception of some parts of the southern Yukon and Baffin Island. Frobisher received 52.6 mm of rain in the first week which already exceeded its monthly normal. A new monthly snowfall accumulation record of 30 cm was established at Whitehorse. Strong winds swept across the Arctic Islands. In the high Arctic, temperatures rarely exceeded 0°C. Heavy ice conditions forced the cruise ship "World Discoverer" (despite the assistance of an ice-breaker) to turn back after entering Peel Strait which separates the islands of Prince of Wales and Somerset.



### British Columbia

Summer came to an abrupt end over most of the province after 10 days of variable but reasonable weather at the beginning of the month. It was at this time that the 53-day drought at Vancouver was terminated by some showers. Also, temperatures dropped below seasonal normals with some frost in the interior valleys. Several strong rainstorms (giving more than 100 mm in 24 hours) accompanied the arrival of autumn along the north coast. Heavy rains also affected the interior later in the month. Penticton received a record amount of 62 mm for the month of September. There were also some significant snowfalls recorded in the mountain passes. The wet weather caused delays in harvesting throughout the province.



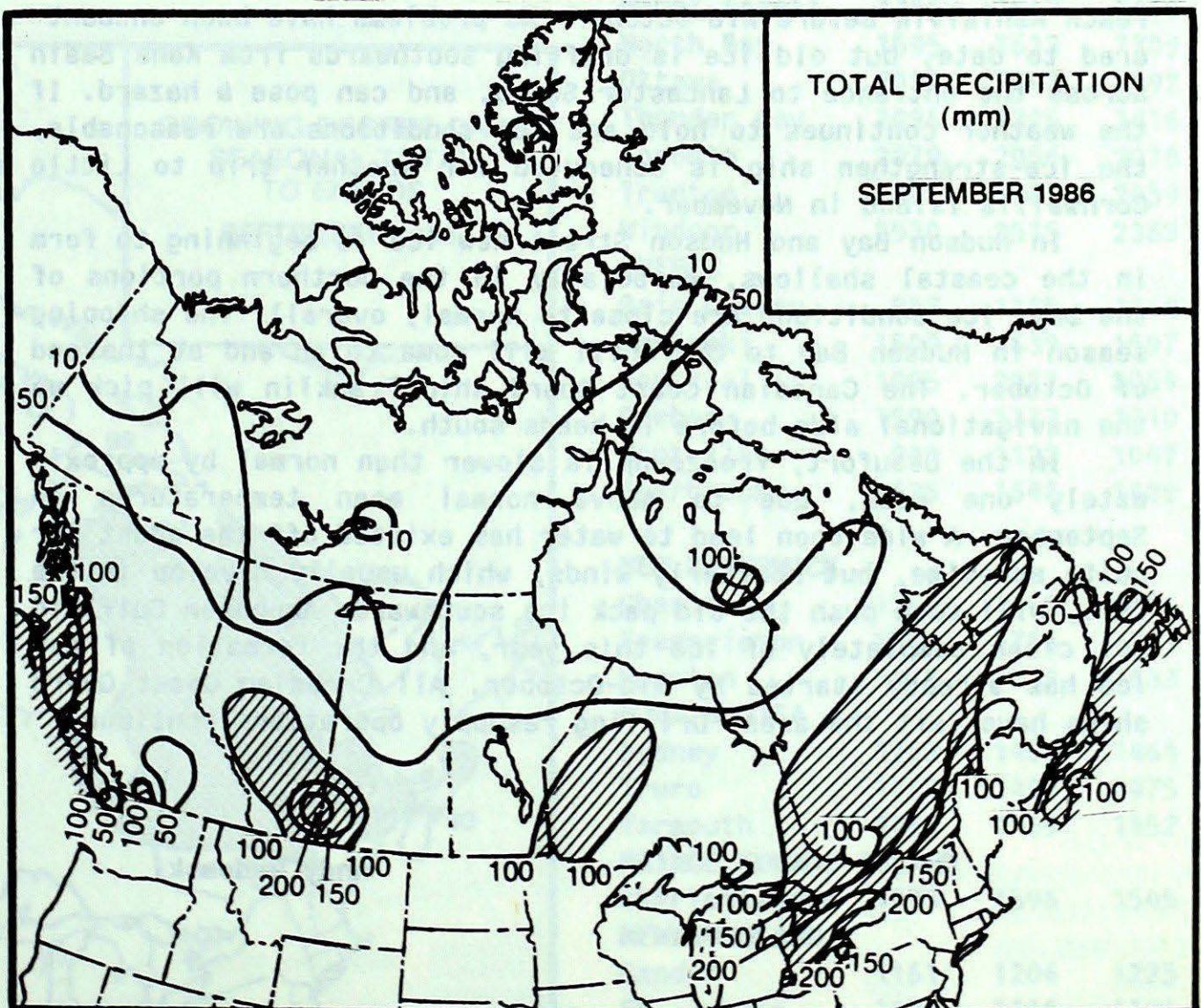
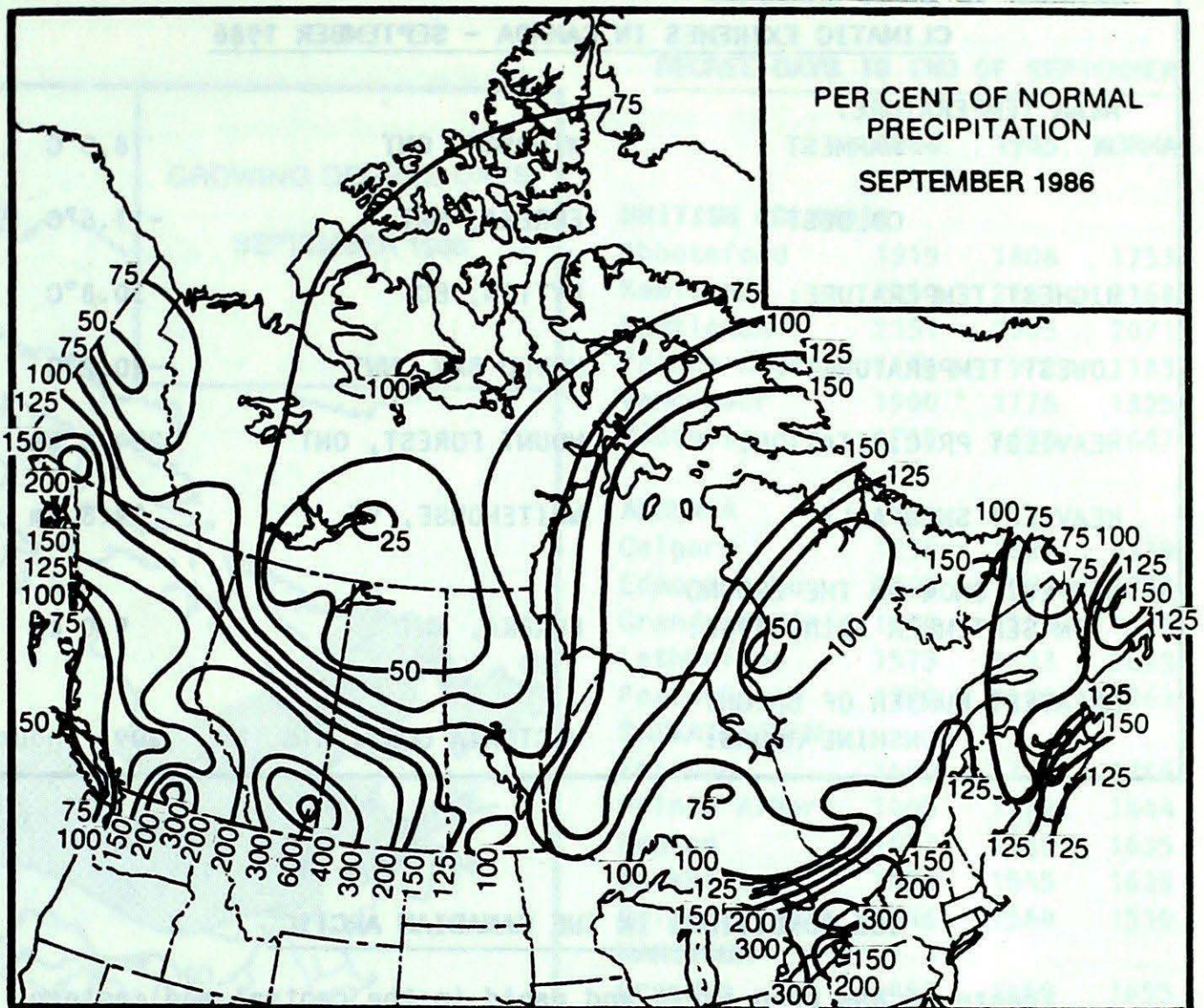
# PRECIPITATION

## Prairie Provinces

Except for the more northerly regions, September was cold, cloudy and wet. An extremely cold arctic airmass invaded the Prairies at the beginning of the month. Temperatures plunged well below freezing during the nights. Several absolute minimum temperature records were broken. Thompson dropped to  $-7.4^{\circ}\text{C}$  on the 9th which was lower and occurred earlier in the month than the previous record. Wet weather with showers showed the harvest at mid-month created a risk of the grain sprouting before being harvested. The heaviest precipitation began falling on the 24th. An intense storm from Colorado dropped 150 mm of water on Saskatchewan in 48 hours. This same storm helped Medicine Hat establish its all-time record precipitation for any month of 197.6 mm. The September normal for Medicine Hat of 32.4 mm was exceeded by 600%! Two weeks of good weather are needed to complete the Prairie harvest.

## Ontario

After several fine days at the beginning of the month, heavy rainfalls arrived and continued for the rest of the month. Mean temperatures were generally less than normal. From the 6th to the 8th several daily minimum temperature records were set over northern Ontario and the first significant ground frost occurred in the south. Below freezing temperatures overnight in the north brought the growing season to an end. Southern and central regions fell prey to torrential rains, thunderstorms and even some hail. Rainfall accumulations tripled the normal value in some locations. Mont Forest (254 mm), Sarnia (246 mm), London (236 mm), Waterloo-Wellington (217 mm), and Wiarton surpassed their previous all-time September records. Toronto however had the distinction of experiencing the wettest month ever during the past century and the second wettest month ever since records began in 1840. This prolonged wet spell saturated farm fields, delayed harvesting and in some cases crops rotted in the fields. Crop losses were in the millions. There was also flood damage to parks, roadways and residential basements.





# EXTREMES

## CLIMATIC EXTREMES IN CANADA - SEPTEMBER 1986

MEAN TEMPERATURE:		
WARMEST	WINDSOR, ONT	18.5°C
COLDEST	EUREKA, NWT	-11.6°C
HIGHEST TEMPERATURE:	LYTTON, BC	30.8°C
LOWEST TEMPERATURE:	MOULD BAY, NWT	-20.2°C
HEAVIEST PRECIPITATION:	MOUNT FOREST, ONT	254.0 mm
HEAVIEST SNOWFALL:	WHITEHORSE, YT	29.8 cm
DEEPEST SNOW ON THE GROUND ON SEPTEMBER 30th, 1986:	EUREKA, NWT	9.0 cm
GREATEST NUMBER OF BRIGHT SUNSHINE HOURS:	VICTORIA GONZ. HTS, BC	209 hours

## ICE CONDITIONS IN THE CANADIAN ARCTIC

Freeze-up has been early and rapid in the central and eastern Arctic, approximately two weeks ahead of normal. Temperatures in the area have averaged at least 2°C below normal. New ice growth in early October extended from the west across Barrow Strait and into Lancaster Sound, with thicknesses ranging up to 30 cm. Two Canadian ice breakers are stationed in Lancaster Sound waiting for the arrival of the oil and ore carrier M.V. Arctic destined to reach Nanisivik before mid-October. No problems have been encountered to date, but old ice is drifting southwards from Kane Basin across the entrance to Lancaster Sound, and can pose a hazard. If the weather continues to hold and ice conditions are reasonable, the ice-strengthened ship is scheduled for another trip to Little Cornwallis Island in November.

In Hudson Bay and Hudson Strait new ice is beginning to form in the coastal shallows, especially in the northern portions of the bay. Ice conditions are close to normal, overall. The shipping season in Hudson Bay to Churchill will come to an end at the end of October. The Canadian Coast Guard ship Franklin will pick up the navigational aids before it heads south.

In the Beaufort, freeze-up is slower than normal by approximately one week, due to above normal mean temperatures in September. A wide open lead to water has existed off the coast for quite sometime, but northerly winds, which usually develop in the fall, will soon push the old pack ice southward. Amundsen Gulf did not clear completely of ice this year, and the formation of new ice has already started by mid-October. All Canadian Coast Guard ships have left the area. Drilling resupply operations continue.

Andy Radomski

## Québec

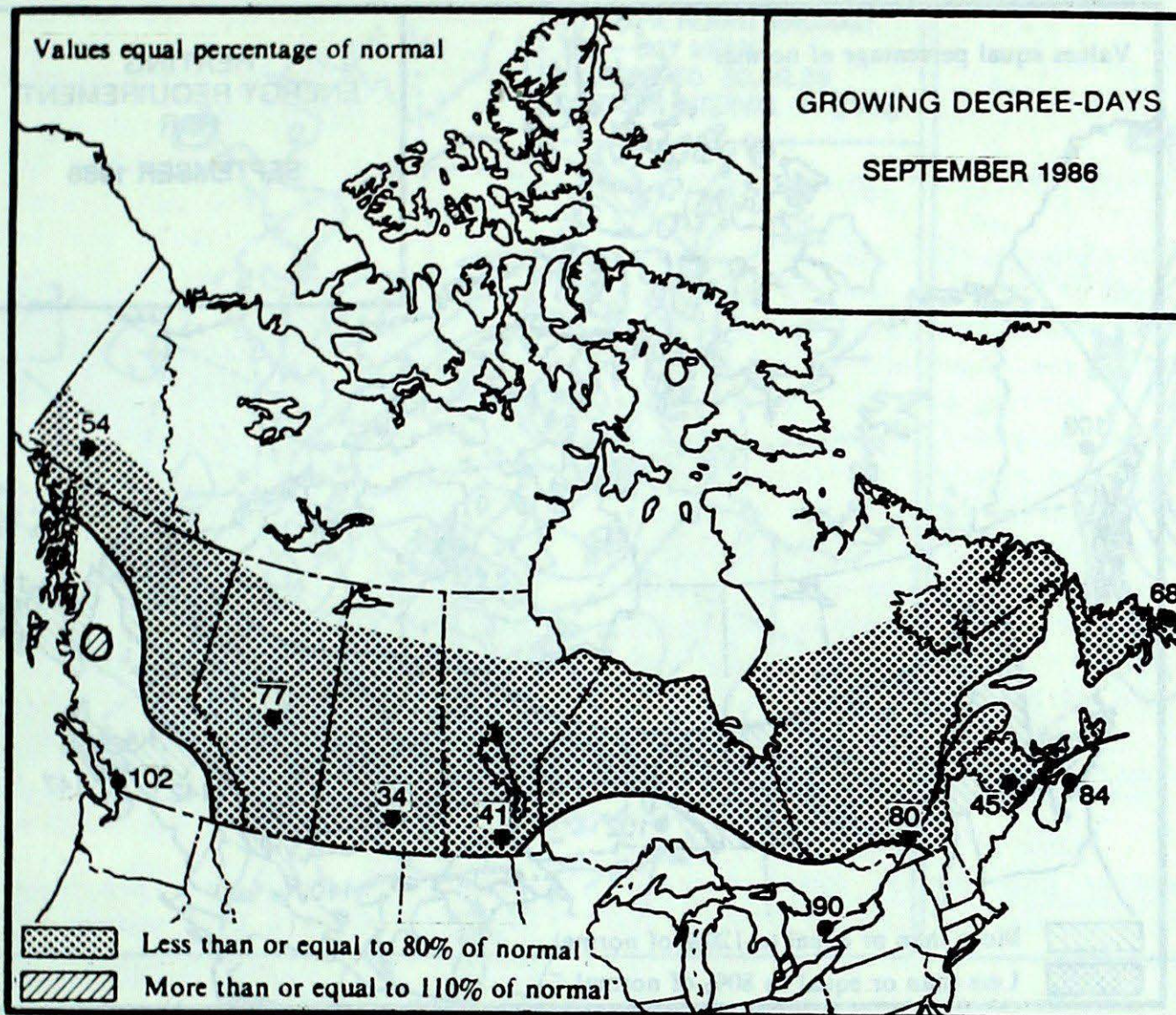
The weather was rather cool and variable all month. In the south, the mercury dropped below freezing at the beginning and mid-month, setting several daily minimum temperature records. At Gaspé, the monthly mean temperature dropped to 8.2°C, 0.6°C below the September 1978 record. Heavy rain was the most significant climatic feature of the month although some snow was recorded in the north. Although there were a few exceptions (over the north coast), the precipitation generally exceeded 100 mm. A large portion of the rain over the south was recorded between the 10th and 12th which occurred when an influx of humid tropical air from the south interacted with colder arctic air to the north. Deluges of rain at Saint-Agathe-des-Monts produced 96.7 mm in 24 hours which broke the previous record of 66 mm in 1985. Northwest of Montréal, at Lachute, a 10-metre high crack developed in a hydro-electric dam. There were also numerous flooding incidents and some road closures in rural areas. An all-time monthly record amount of 133.0 mm of precipitation was recorded at Inukjuak which exceeded the previous record of 107.2 mm in September 1970.

## Atlantic Provinces

September was cold. Mean monthly temperature differences of greater than 2°C below normal occurred throughout the region except over Prince Edward Island. Several mean monthly minimum temperature records were equalled or broken: 10.8°C at Moncton, 8.8°C at Charlo, a record for September; 9°C at Gander, the lowest in 45 years. A storm on the 16th with gusts of wind reaching 93 km/h caused electrical power failures in Nova Scotia. Newfoundland was also battered by this storm. At the end of the month strong winds gusting to 120 km/h at Port-aux-Basques (157 km/h at a drill rig on the Grand Banks). Most of the market garden harvests have been delayed or have a low yield (40-50% of normal) caused by the below normal temperatures which have persisted since the summer.



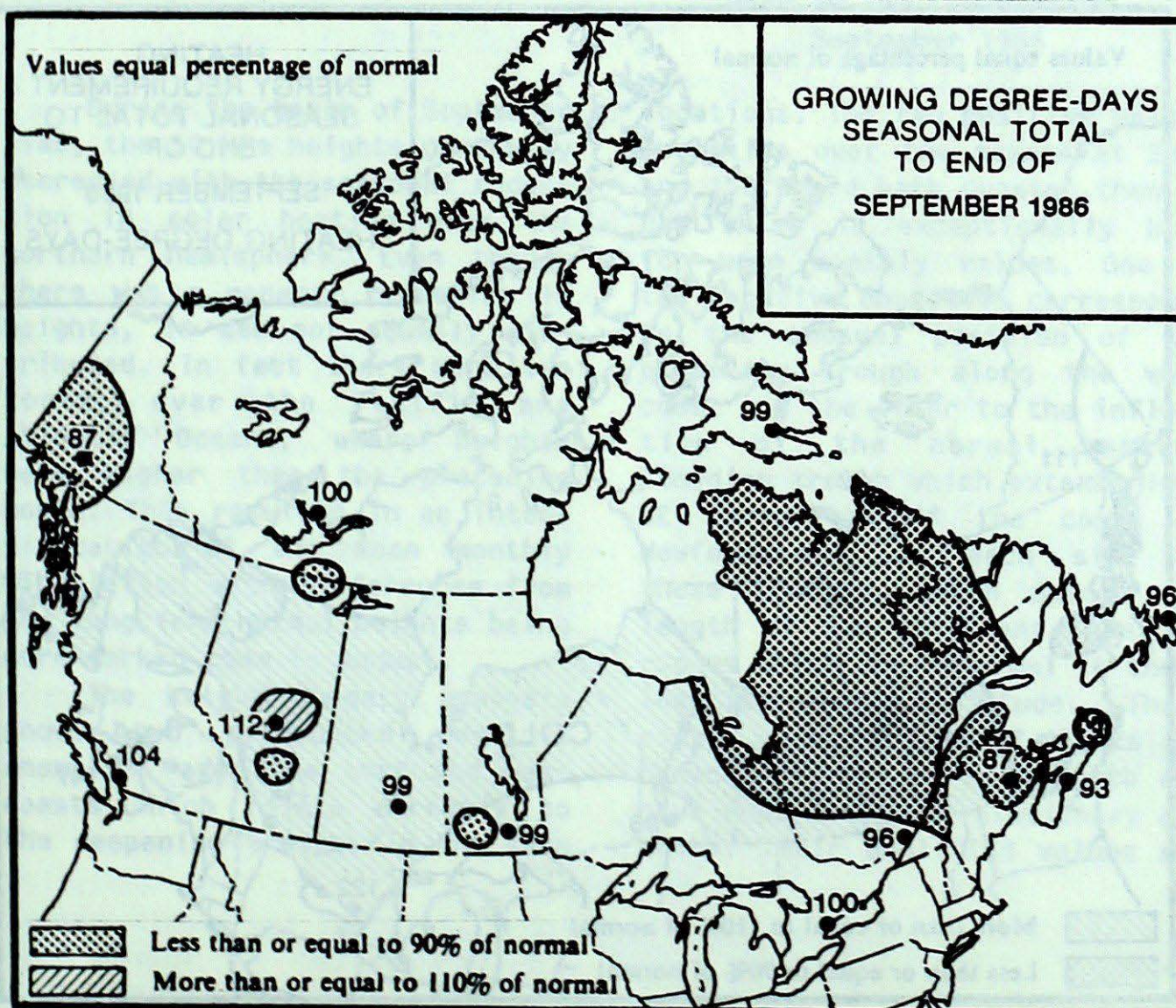
## GROWING DEGREE DAYS



## SEASONAL TOTAL OF GROWING

## DEGREE-DAYS TO END OF SEPTEMBER

	1986	1985	NORMAL
<b>BRITISH COLUMBIA</b>			
Abbotsford	1919	1808	1753
Kamloops	2250	2163	2168
Penticton	2151	2085	2071
Prince George	1146	972	1183
Vancouver	1900	1778	1825
Victoria	1717	1638	1687
<b>ALBERTA</b>			
Calgary	1295	1327	1339
Edmonton Mun.	1525	1464	1358
Grande Prairie	1242	1226	1324
Lethbridge	1573	1633	1669
Peace River	1272	1190	1263
<b>SASKATCHEWAN</b>			
Estevan	1670	1735	1786
Prince Albert	1405	1337	1444
Regina	1617	1569	1635
Saskatoon	1496	1545	1623
Swift Current	1546	1564	1510
<b>MANITOBA</b>			
Brandon	1468	1459	1655
Churchill	534	615	569
Dauphin	1478	1418	1593
Winnipeg	1752	1663	1564
<b>ONTARIO</b>			
London	2078	2127	2063
Mount Forest	1786	1667	1660
North Bay	1595	1612	1709
Ottawa	2032	2043	1992
Thunder Bay	1496	1396	1416
Toronto	2079	2056	2078
Trenton	2027	1987	2059
Windsor	2530	2515	2383
<b>QUEBEC</b>			
Baie Comeau	987	1125	1164
Maniwaki	1509	1639	1597
Montréal	1995	2031	2069
Quebec	1590	1737	1710
Sept-Îles	949	1122	1047
Sherbrooke	1625	1648	1829
<b>NEW BRUNSWICK</b>			
Charlo	1253	1468	1486
Fredericton	1500	1736	1721
Moncton	1478	1618	1633
<b>NOVA SCOTIA</b>			
Sydney	1283	1463	1464
Truro	1403	1494	1475
Yarmouth	1460	1469	1452
<b>PRINCE EDWARD ISLAND</b>			
Charlottetown	1473	1596	1545
<b>NEWFOUNDLAND</b>			
Gander	1161	1206	1225
St. John's	1059	1108	1105
Stephenville	1244	1293	1254





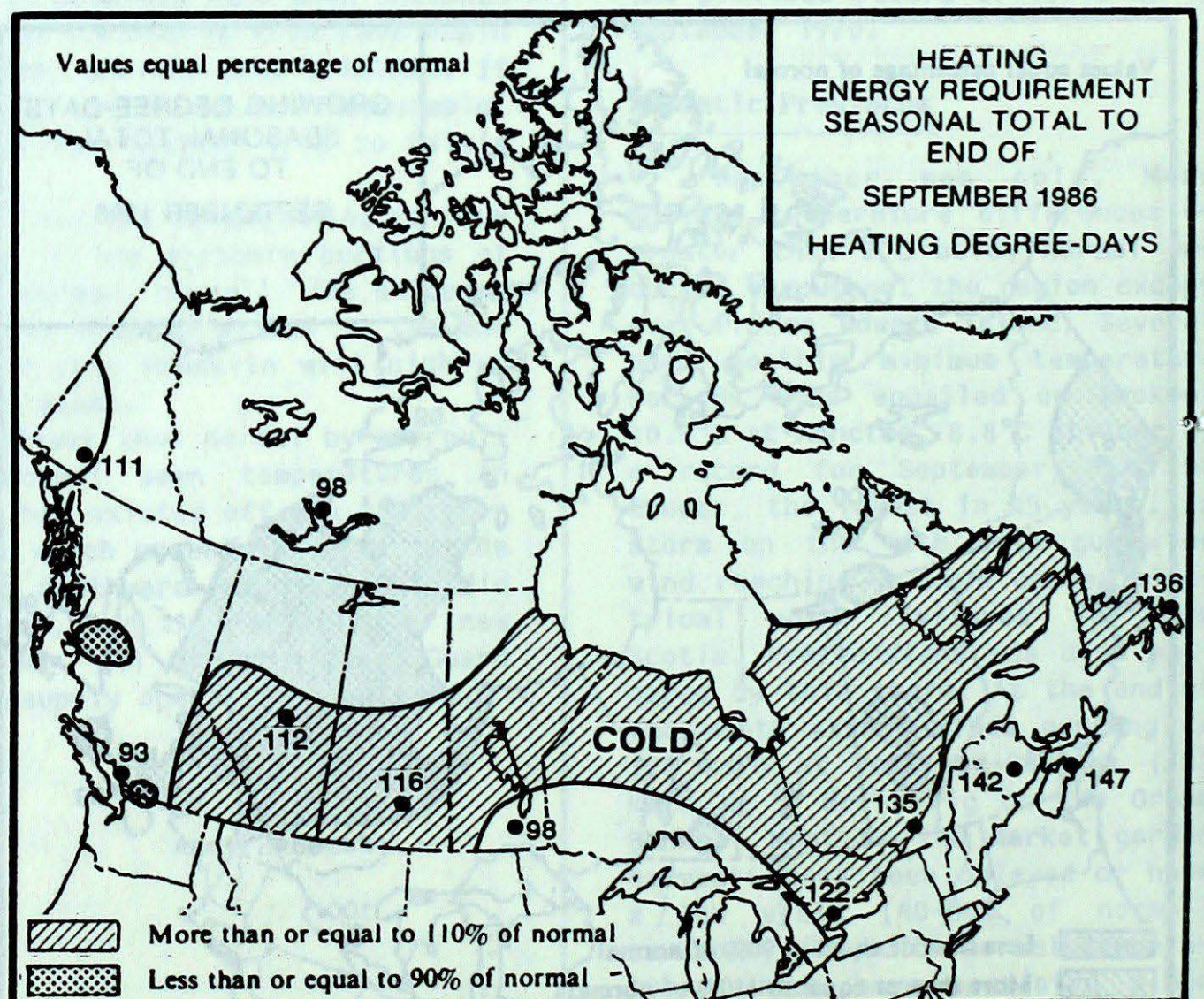
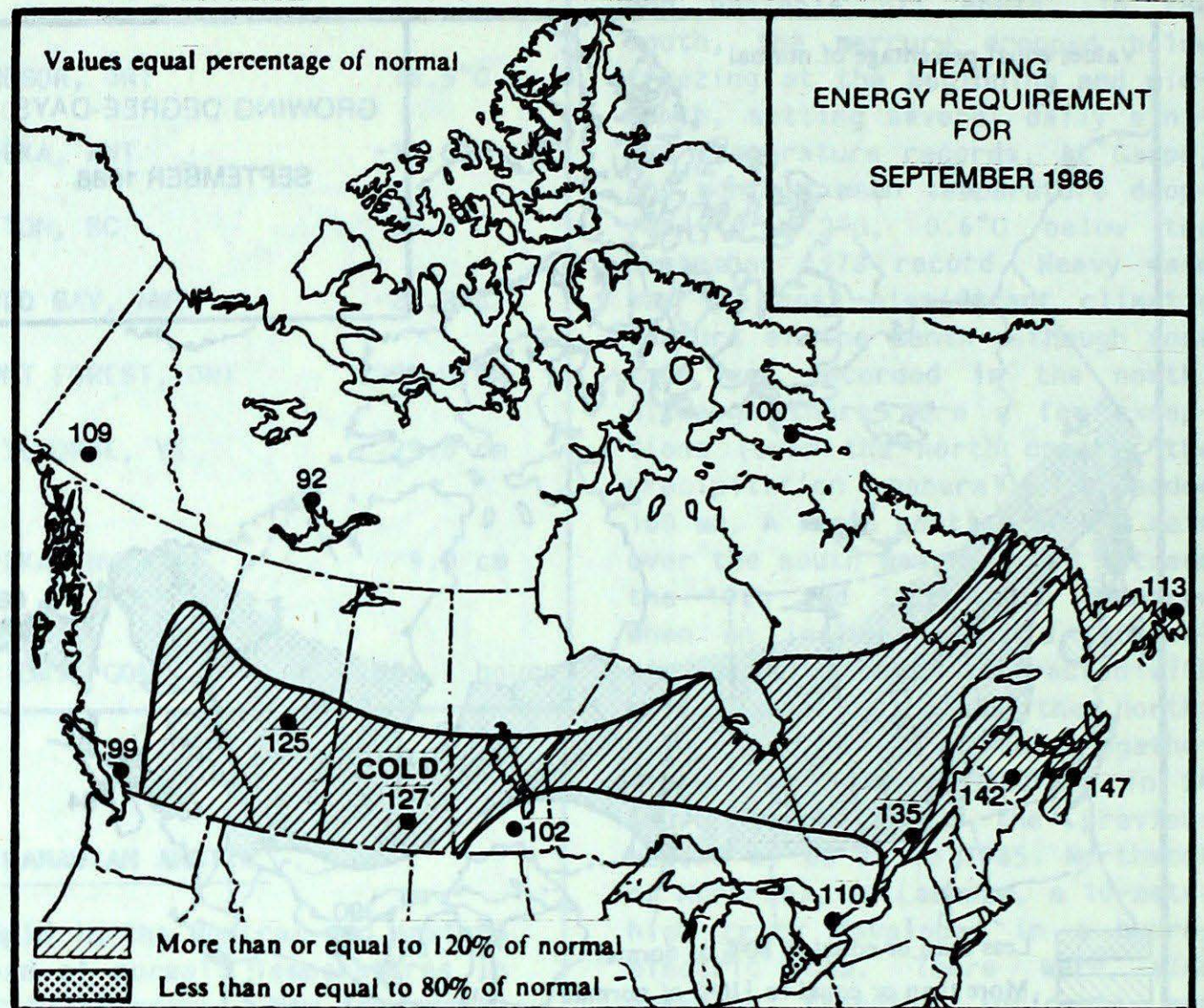
# ENERGY

## SEASONAL TOTAL OF HEATING

### DEGREE-DAYS TO END OF SEPTEMBER

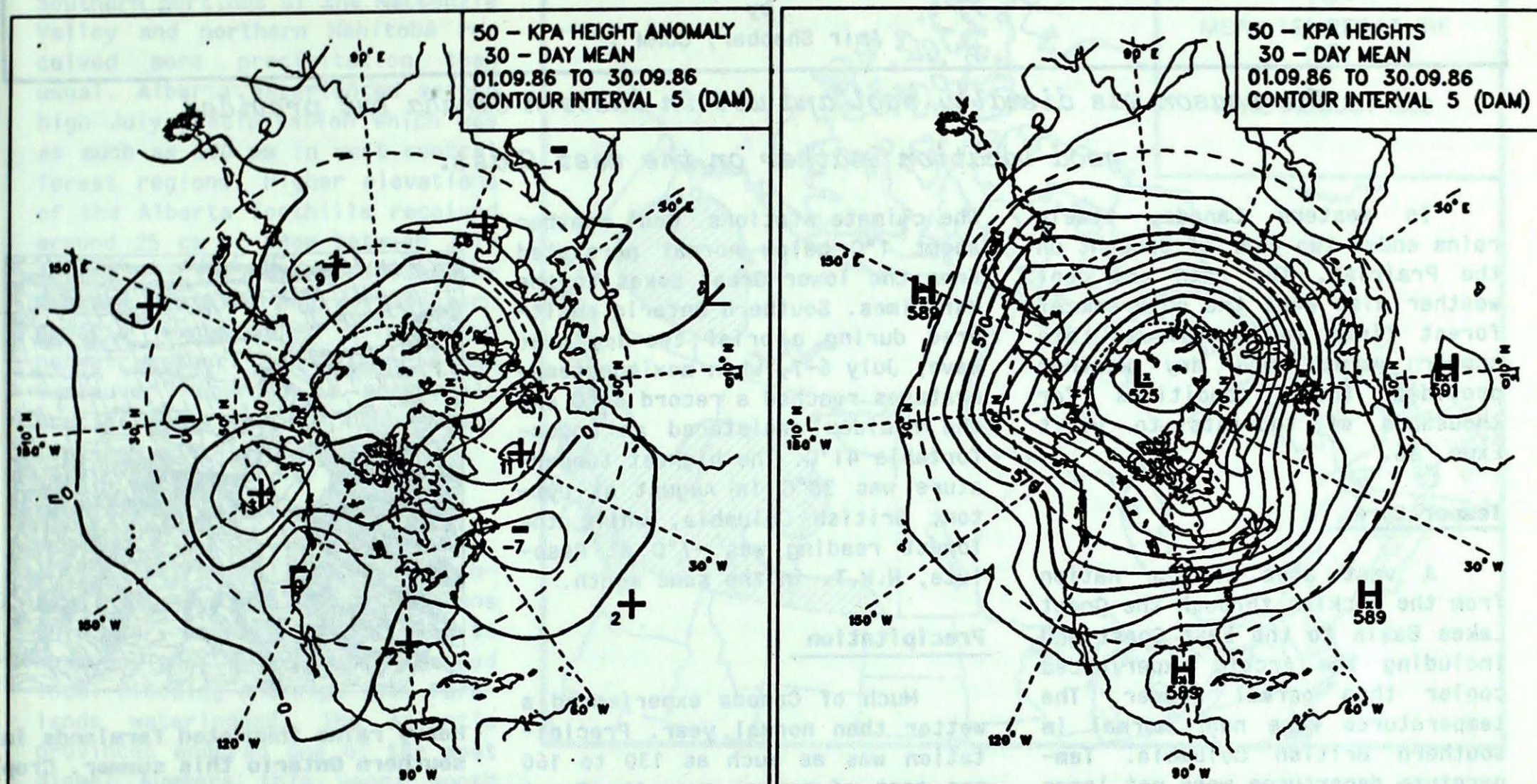
	1986	1985	NORMAL
<b>BRITISH COLUMBIA</b>			
Kamloops	144	175	138
Penticton	161	184	140
Prince George	481	516	484
Vancouver	178	185	201
Victoria	251	237	251
<b>YUKON TERRITORY</b>			
Whitehorse	670	691	605
<b>NORTHWEST TERRITORIES</b>			
Frobisher Bay	1130	1083	1121
Inuvik	769	981	835
Yellowknife	518	724	528
<b>ALBERTA</b>			
Calgary	476	515	386
Edmonton Mun	387	454	343
Grande Prairie	459	521	412
<b>SASKATCHEWAN</b>			
Estevan	268	329	223
Regina	319	394	265
Saskatoon	345	396	289
<b>MANITOBA</b>			
Brandon	342	414	268
Churchill	872	796	761
The Pas	392	464	351
Winnipeg	230	315	234
<b>ONTARIO</b>			
Kapuskasing	493	357	420
London	137	105	132
Ottawa	200	110	180
Sudbury	298	223	266
Thunder Bay	345	333	329
Toronto	155	100	129
Windsor	58	62	79
<b>QUÉBEC</b>			
Baie Comeau	552	386	462
Montréal	200	102	132
Quebec	305	164	212
Sept-Îles	552	398	490
Sherbrooke	325	224	327
Val-d'Or	485	334	396
<b>NEW BRUNSWICK</b>			
Charlo	424	241	264
Fredericton	309	183	209
Moncton	325	178	227
<b>NOVA SCOTIA</b>			
Halifax	243	147	180
Sydney	356	181	219
Yarmouth	301	240	253
<b>PRINCE EDWARD ISLAND</b>			
Charlottetown	304	153	205
<b>NEWFOUNDLAND</b>			
Gander	461	363	366
St. John's	501	376	394

## ENERGY REQUIREMENTS





## ATMOSPHERIC CIRCULATION



Mean 50 kPa height anomaly (dam)  
September 1986

Mean 50 kPa heights (dam)  
September 1986

### MEAN 50 kPa CIRCULATION September 1986

During the month of September 1986, the 50 kPa heights generally decreased with the seasonal reduction in solar heating over the northern hemisphere. Even though there was a general reduction in heights, it was not equally distributed. In fact there were two zones, over the Pacific and Atlantic Oceans, where heights were higher than the preceding month. This resulted in an intensification of the mean monthly circulation with differences from the long term normal heights being more marked than in August.

The height anomaly analysis shows two pronounced negative anomalies over the east and west coasts which relate directly to the deepening troughs in the same

locations. The two positive height anomalies over the oceans at 30°W and 150°W are both greater than 10 dam which is exceptionally high for mean monthly values. One of the negative anomalies corresponds to the unusual position of the planetary trough along the west coast and the other to the inflection of the normal eastern Canadian trough which extends in a SE direction off the coast of Newfoundland. On each side of these troughs, which extend the length of the continent, are two ridges which are abnormal in their location and amplitude. These ridges over the Gulf of Alaska and Greenland appeared last month and have remained quasi-stationary all month. Their amplified values are

characteristic of a blocking circulation. This persistent circulation pattern led to the enhancement of five well-marked hemispheric waves in the maritime flow stream.

At the surface, the effect of these anomalies was noticeable across the country. In the west the flow stream was split into a polar and a maritime component with the northern component bringing below normal temperatures to British Columbia and southern Alberta. Further eastward, these two streams converged over southern Ontario producing favourable conditions for heavy precipitation and the resulting problems for farmers.

A. Caillet, CCRM



## ARTICLE

## SUMMER OF '86 IN REVIEW

by  
Amir Shabbar, CCRM

*The season was dimally cool and wet in eastern Canada but provided good vacation weather on the west Coast.*

In western Canada, timely rains ended two year of drought on the Prairies. The rain and cool weather also kept the outbreak of forest fires to a minimum. Late summer warmth and dry weather provided ideal conditions for thousands of tourists to visit Expo '86.

#### Temperature

A vast area of the nation from the Rockies through the Great Lakes Basin to the East Coast and including the Arctic experienced cooler than normal summer. The temperatures were near normal in southern British Columbia. Temperature departures were not large - less than 2°C at the majority of

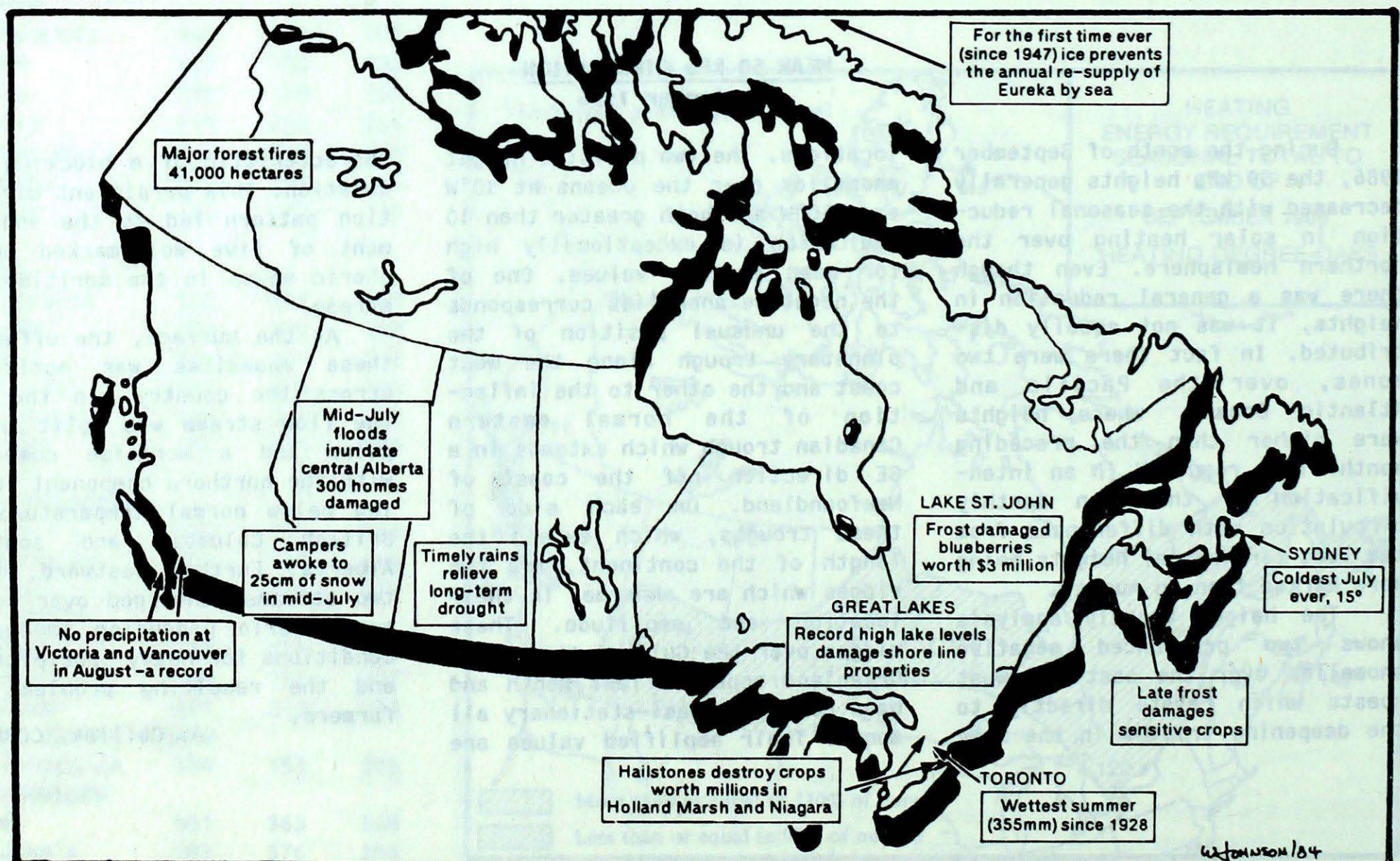
the climate stations. Cool weather about 1°C below normal persisted from the lower Great Lakes to the Maritimes. Southern Ontario sweltered during a brief two-day heat wave, July 6-7, when maximum temperatures reached a record 34°C and the humidex registered an uncomfortable 41°C. The highest temperature was 38°C in August at Lytton, British Columbia, while the lowest reading was -7°C at Resolute, N.W.T. in the same month.

#### Precipitation

Much of Canada experienced a wetter than normal year. Precipitation was as much as 130 to 160 per cent of normal over the Great Lakes Basin and the Maritimes and



Heavy rains inundated farmlands in southern Ontario this summer. Crop damage from rains was established at \$100 million.



Major climatic impacts during the summer of 1986



up to 150 per cent of normal in southeastern British Columbia. Southern portions of the Mackenzie Valley and northern Manitoba received more precipitation than usual. Alberta experienced record high July precipitation which was as much as 300 mm in west central forest regions. Higher elevations of the Alberta foothills received around 25 cm of snow between July 16 and 19. The west Coast, southwestern Prairies and northwestern Ontario experienced drier than normal weather. Both Victoria and Vancouver recorded no measurable precipitation during August setting new monthly records.

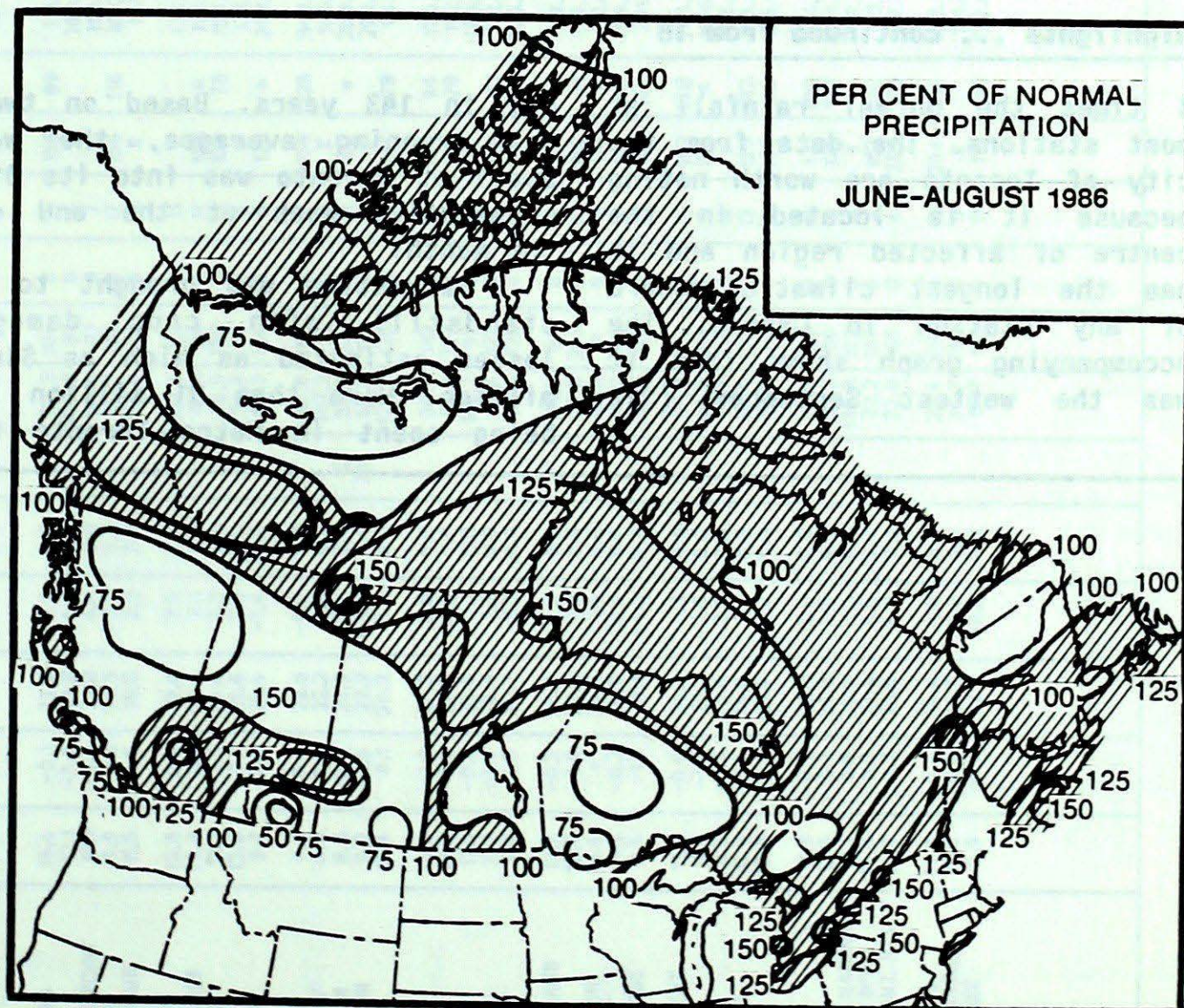
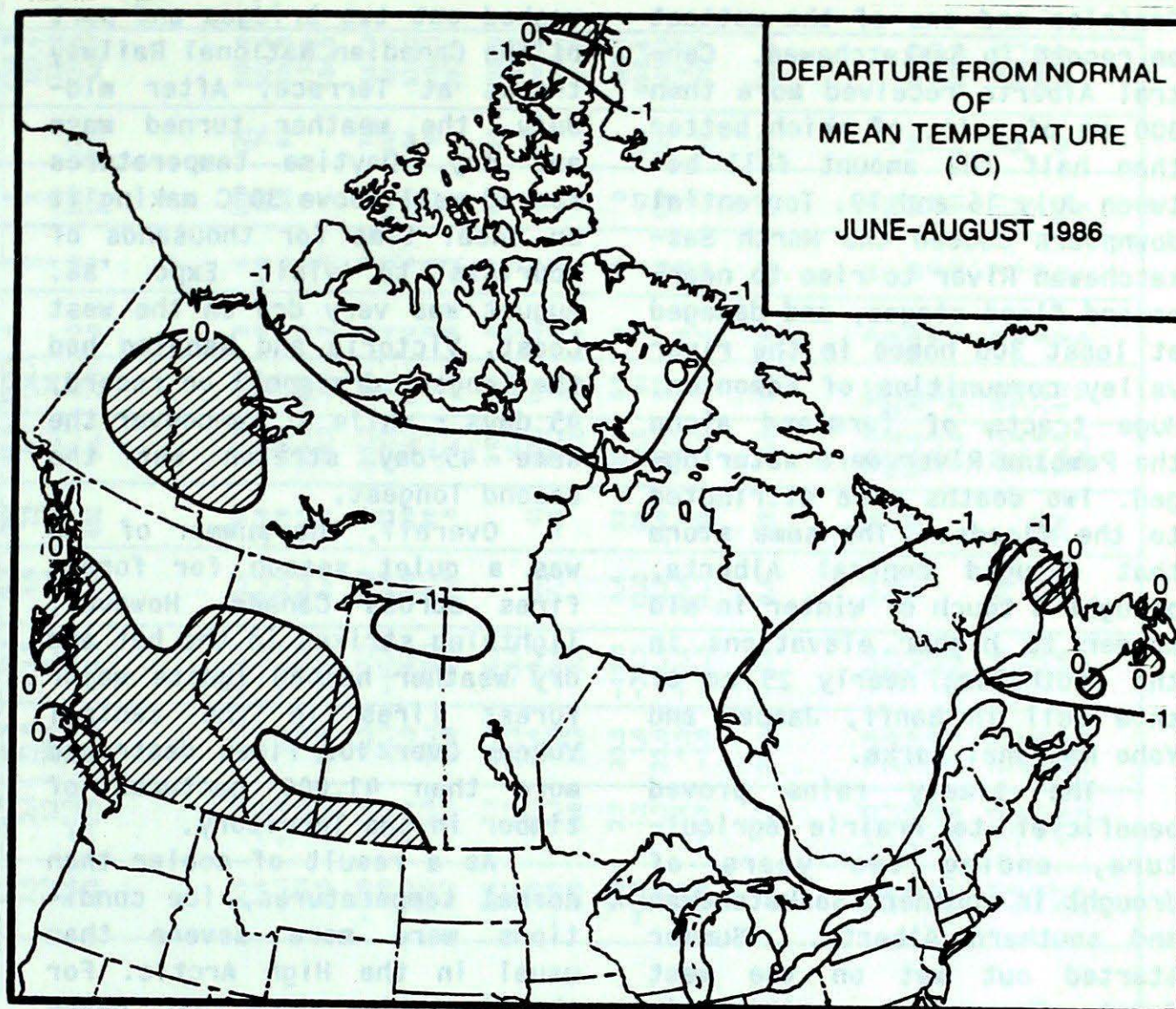
### Significant climatic impacts

Summer's cool and damp weather disappointed most Canadians this year. From the Great Lakes to Newfoundland, heavy rains caused local flooding and kept some farmlands waterlogged. The Atlantic provinces endured one of the most dismal summers this year; month after month record-low temperatures were set as the mercury fell several degrees below normal. Sydney, Nova Scotia recorded its coldest July ever ( $15^{\circ}\text{C}$ ). Late frost damaged some sensitive crops in New Brunswick and Prince Edward Island. In June, frost destroyed blueberry crop worth \$3 million at Lake St. John, Québec.

Heavy rains inundated southern Ontario during late summer, including major roadways in Toronto where it was the wettest summer since 1928 - 356 mm. Moosonee on Hudson Bay received a record 189 mm of rain in July.

Southern Ontario had numerous outbreaks of severe weather. On June 16, a violent tornado ripped through the two of Minden. Along the 80 km track, 50 to 100 cottages were damaged or destroyed. On August 1, golfball-size hailstones destroyed tender fruits and vegetables in the Holland Marsh and the Niagara Peninsula, crop damage was estimated at \$20 millions.

Damaging winds, destructive hailstorm and violent tornadoes caused widespread crop and property damage in the southeastern Prairies in July and August. July was excessively wet on the





## ARTICLE

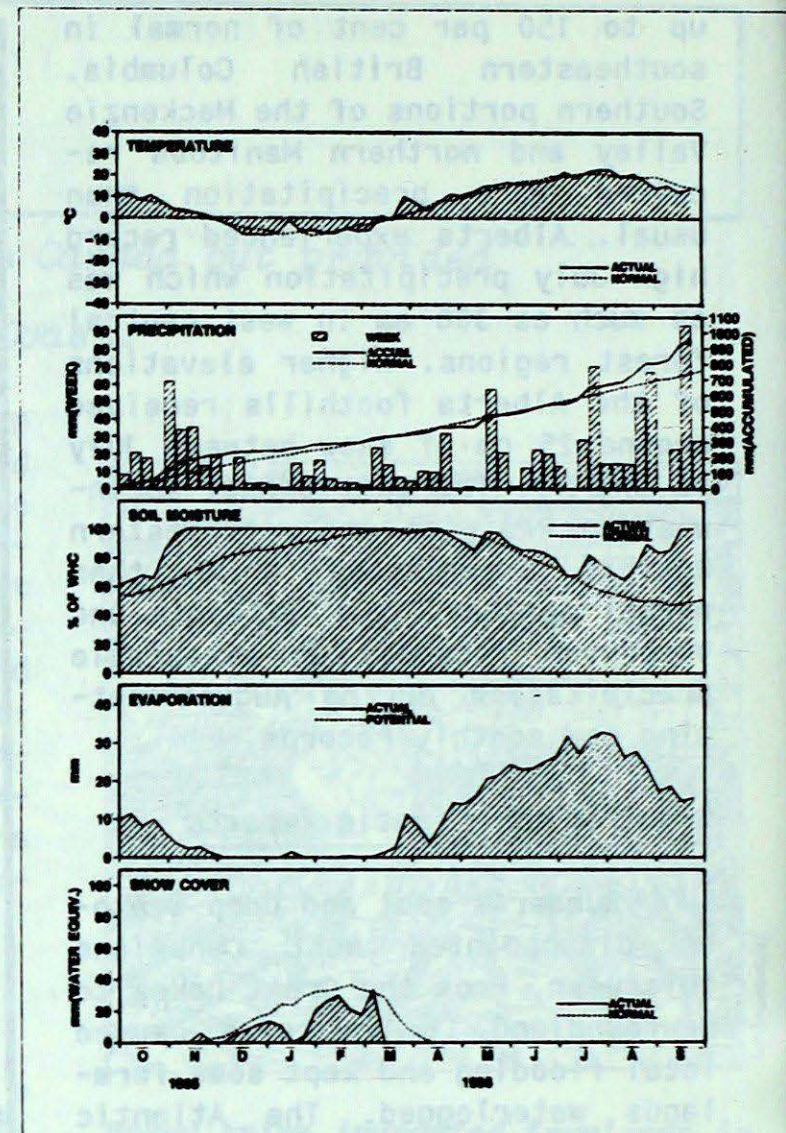
Prairies and one of the wettest on record in Saskatchewan. Central Alberta received more than 300 mm of rain, of which better than half the amount fell between July 16 and 19. Torrential downpours caused the North Saskatchewan River to rise to near-record flood stages, and damaged at least 300 homes in the river valley communities of Edmonton. Huge tracts of farmland along the Pembina River were waterlogged. Two deaths were attributed to the floods. The same storm that deluged central Alberta, brought a touch of winter in mid summer to higher elevations in the foothills; nearly 25 cm of snow fell in Banff, Jasper and Yoho National Parks.

The timely rains proved beneficial to Prairie agriculture, ending two years of drought in southern Saskatchewan and southern Alberta. Summer started out wet on the west Coast, several communities in the Interior valleys of British Columbia received twice the normal amount of rainfall in June. On June 15, heavy rains

washed out two bridges and part of the Canadian National Railway tracks at Terrace. After mid-July, the weather turned warm and dry. Daytime temperatures soared well above 30°C making it an ideal time for thousands of tourists to visit Expo '86. August was very dry on the west Coast, Victoria and Nanaimo had the longest dry spell on record, 45 days - while at Vancouver the same 45-day stretch was the second longest.

Overall, the summer of '86 was a quiet season for forest fires across Canada. However, lightning strikes in the hot and dry weather helped ignite major forest fires in the central Yukon. Over 100 fires destroyed more than 41,000 hectares of timber in the Territory.

As a result of cooler than normal temperatures, ice conditions were more severe than usual in the High Arctic. For the first time since 1947, heavy ice floes blocked shipping lanes in the Norwegian Bay and prevented annual resupply to Eureka by sea.



Time series of water budget components at Toronto from October 1985. Values are based on a 7-day mean. WHC is the water holding capacity of soil

### Highlights ... continued from 1B

3 times the normal rainfall at most stations. The data from the city of Toronto are worth noting because it is located in the centre of affected region and it has the longest climatic record of any station in Canada. The accompanying graph shows that it was the wettest September (218

mm) in 143 years. Based on two-week running averages, the wet spell at Toronto was into its 8th consecutive week at the end of the month!

Harvesting was brought to a standstill with crop damage losses estimated as high as \$100 million. More than \$1 million is being spent in Metro Toronto to

repair damages and strengthen waterways. Rain delays have been costly to Toronto's construction boom. Continued wet weather or strong wind storms could result in disastrous flooding along the shores of the Great Lakes which are at their highest levels in 110 years.



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									
BRITISH COLUMBIA													
ABBOTSFORD	14.4	-0.1	29.6	2.9	0.0		93.3	104	0	9	156	89	115.6
ALERT BAY	12.1	-0.5	21.8	4.4	0.0		103.8	87	0	14	X		180.8
AMPHITRITE POINT	12.1	-1.3	21.8	4.4	0.0		141.6	87	0	7	X		154.6
BLUE RIVER	9.9	-1.1	24.5	-3.2	0.0		90.7	106	0	17	154	116	MSG
BULL HARBOUR	11.5	-0.6	18.0	3.3	0.0		112.4	74	0	8	X		197.1
CAPE SCOTT	13.6	0.9	17.6	7.9	0.0		102.6	53	0	11	X		134.6
CAPE ST. JAMES	13.8	0.9	19.7	8.1	0.0		83.1	66	0	11	193	*	126.5
CASTLEGAR	13.1	-1.3	28.6	2.3	0.0		65.8	180	0	13	150	78	150.4
COMOX	13.8	0.1	25.4	3.3	0.0		34.6	66	0	7	X		131.0
CRANBROOK	9.7	-2.6	25.4	-1.4	0.0		54.7	184	0	8	129	*	248.4
DEASE LAKE	6.5	-0.6	22.5	-6.3	0.0		85.6	185	0	7	158	125	343.9
ETHELDA BAY	11.8	-0.3	22.2	3.0	0.0		187.2	72	0	13	X		185.9
FORT NELSON	8.3	-0.4	22.9	-2.8	0.4	6	53.0	127	0	8	172	*	289.6
FORT ST. JOHN	8.0	-1.5	22.2	-3.8	4.0	76	66.8	170	6	13	X		299.8
HOPE	15.6	0.1	30.3	3.8	0.0		129.3	125	0	11	135	78	96.5
KAMLOOPS	13.9	-1.0	27.3	2.8	0.0		30.5	142	0	10	184	94	130.9
KELOWNA	12.6	-0.5	26.8	-0.9	0.0		66.8	227	0	11	163	79	162.7
LANGARA	11.9	-0.2	18.8	7.1	0.0		155.2	92	0	15	X		183.6
LYTTON	15.1	-1.4	30.8	2.2	0.0		31.6	122	0	6	150	81	112.4
MACKENZIE	7.8	-1.3	20.7	-5.1	0.0		62.6	125	0	11	146	109	305.8
MCINNIS ISLAND	12.7	-0.2	20.0	7.8	0.0		191.5	93	0	14	X		157.9
PENTICTON	13.7	-1.0	29.5	2.5	0.0		62.6	353	0	10	150	71	139.3
PORT ALBERNI	14.6	*	30.3	1.5	0.0	*	35.0	*	0	8	176	*	112.4
PORT HARDY	11.6	-0.2	20.3	3.0	0.0		94.7	69	0	7	142	102	189.5
PRINCE GEORGE	8.6	-1.1	21.1	-4.2	0.0		72.2	122	0	11	165	102	291.1
PRINCE RUPERT	11.0	-0.4	24.2	2.3	0.0		171.2	73	0	9	162	138	205.5
PRINCETON	11.2	-1.7	27.2	-2.0	0.0		44.0	241	0	9	150	*	MSG
QUESNEL	9.7	-1.6	23.6	-2.9	0.0		95.7	210	0	12	X		248.5
REVELSTOKE	11.8	-1.0	24.6	2.1	0.0		81.4	139	0	12	125	82	185.0
SANDSPIT	13.8	0.9	21.4	7.7	0.0		81.0	90	0	10	166	119	126.3
SMITHERS	8.9	-0.9	22.1	-3.0	0.0		63.7	126	0	8	131	100	274.7
TERRACE	12.6	0.7	24.8	2.8	0.0		55.2	56	0	8	174	137	163.7
VANCOUVER HARBOUR	15.1	0.5	26.9	7.5	0.0		135.8	172	0	*	X		92.2
VANCOUVER INT'L	14.4	0.2	27.0	6.0	0.0		72.2	107	0	4	187	102	113.1
VICTORIA GONZ. HTS	14.0	-0.2	26.9	8.0	0.0		22.0	65	0	4	209	101	122.0
VICTORIA INT'L	13.5	-0.4	27.8	4.6	0.0		22.4	56	0	5	204	104	132.6
VICTORIA MARINE	12.6	-0.4	23.7	5.0	0.0		38.7	62	0	5	X		161.9
WILLIAMS LAKE	8.9	-1.4	22.3	-2.8	0.0		57.7	191	0	8	171	91	273.4

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	Mean	Difference from Normal	Maximum	Minimum									
YUKON TERRITORY													
BURWASH	4.4	-0.7	19.6	-13.1	15.1	251	32.0	133	4	6	X		408.3
DAWSON	7.5	2.1	22.8	-13.8	1.9	23	9.6	26		2	X		357.4
MAYO	7.7	1.2	23.5	-4.7	1.0	37	11.0	36		4	X		327.2
WATSON LAKE	7.4	-0.2	20.5	-3.5			39.0	89	0	8	152	120	320.5
WHITEHORSE	6.6	-0.9	21.4	-4.2	29.8	662	64.1	211	0	7	177	129	342.7
NORTHWEST TERRITORIES													
ALERT	-8.9	1.3	1.1	-20.0	15.6	47	21.0	75	8	4	107	129	807.9
BAKER LAKE	1.4	-0.9	12.8	-7.6	14.4	244	31.2	84	0	9	82	76	500.5
CAMBRIDGE BAY	-1.1	-0.4	5.0	-13.3	15.0	176	20.7	119	2	6	68	82	570.9
CAPE DYER	0.1	1.5	7.2	-6.0	25.0	44	90.5	122	3	10	X		537.4
CAPE PARRY	1.8	1.1	10.0	-8.5	8.4	57	19.3	82	2	7	X		486.9
CLYDE	-0.8	-0.6	6.5	-7.2	27.2	92	23.3	66	6	8	60	70	563.1
COPPERMINE	3.0	-0.5	16.1	-10.5	8.6	162	17.0	70	4	5	104	147	451.8
CORAL HARBOUR	0.5	-0.4	7.9	-4.7	8.9	89	61.2	180	0	9	102	94	526.2
EUREKA	-11.6	-3.3	-8.1	-15.1	10.2	99	7.8	79	9	3	93	91	488.1
FORT RELIANCE	6.2	0.1	16.8	-4.0	0.2	8	5.0	16	0	2	X		353.5
FORT SIMPSON	8.4	1.1	22.3	-6.7			31.0	99	0	7	174	130	288.8
FORT SMITH	8.2	0.7	21.3	-3.6			16.7	40	0	3			293.2
FROBISHER BAY	2.5	0.1	10.4	-6.7	5.7	41	77.1	167	0	10	87	105	465.6
HALL BEACH	-0.5	0.1	3.9	-5.0	17.7	146	21.7	79	2	7	X		556.1
HAY RIVER	8.9	0.8	21.3	-0.9			14.6	34	0	4	X		272.8
INUUVIK	5.8	2.7	23.5	-13.3	6.4	53	22.4	93	1	8	0		367.1
MOULD BAY	-5.3	1.2	1.0	-20.2	12.8	95	12.6	91	7	4	47	101	698.4
NORMAN WELLS	7.4	1.3	23.0	-8.0	13.8	260	27.4	93		6	152	127	315.1
POND INLET	-0.5	1.6	4.5	-10.0	19.4	*	16.2	*	5	6	X		832.2
RESOLUTE	-5.9	-0.8	-1.0	-17.3	14.3	93	12.6	70	6	4	71	120	717.7
YELLOWKNIFE	7.9	1.2	20.4	-4.8	0.8	22	10.6	34	0	3	191	125	305.0
ALBERTA													
BANFF	7.0	-2.3	19.5	-3.0	5.4	87	82.4	197	0	14	X		
BROOKS	8.8	-3.1	24.5	-2.0	0.0		140.9	338	0		106	*	
CALGARY INT'L	7.3	-3.3	22.0	-1.9	8.1	137	145.6	381	0	18	98	50	322.2
COLD LAKE	8.5	-1.3	22.0	-3.0			29.3	65	0	9	133	75	286.0
CORONATION	7.5	-3.0	24.8	-3.3			71.6	218	0	9	91	49	316.6
EDMONTON INT'L	8.1	-1.7	20.9	-4.6	0.0		84.7	185	0	8	131	71	297.3
EDMONTON MUNI.	9.0	-2.0	20.7	-0.5			94.6	241	0	9	136	74	269.1
EDMONTON NAMAO	8.3	-2.1	20.5	-1.5	0.2	10	96.6	232	0	8	X		291.2
EDSON	6.7	-1.8	20.8	-4.4	21.6	270	141.8	318	0	14	110	67	337.7
FORT CHIPEWYAN	8.7	0.9	20.0	-3.0			29.7	70	0		X		



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	Mean	Difference from Normal	Maximum	Minimum									
FORT McMURRAY	9.1	0.1	22.0	-3.4	0.0		21.2	36	0	4	176	122	268.0
GRANDE PRAIRIE	8.3	-1.5	23.2	-3.5			77.5	207	0	11	120	*	280.3
HIGH LEVEL	7.8	-0.3	21.1	-6.1			17.4	51	0	5	187	125	305.1
JASPER	7.8	-2.0	21.5	-3.4			43.4	114	0	9	142	*	305.2
LETHBRIDGE	8.7	-4.0	25.7	-2.4	3.5	40	98.4	264	0	13	119	55	278.1
MEDICINE HAT	9.8	-3.4	27.0	0.4	0.0		197.6	609	0	13	124	62	250.2
PEACE RIVER	8.7	-0.4	21.5	-3.6	TR		22.3	57	0	6	X		281.9
RED DEER	7.3	-2.8	19.3	-2.5			119.1	271	0	12	X		330.1
ROCKY MTN HOUSE	6.5	-3.2	19.0	-3.8	9.0	142	136.8	275	0	15	X		343.0
SLAVE LAKE	8.1	-0.9	20.7	-3.3	0.0		56.2	112	0	9	151	93	295.3
SUFFIELD	9.4	-3.4	26.4	0.8			165.7	483	0	15	108	52	261.5
WHITECOURT	6.8	-2.1	20.6	-3.1	8.8	258	136.1	393	0	13	X		318.4
SASKATCHEWAN													
BROADVIEW	9.3	-1.3	23.2	-3.8	0.0		54.2	110	0	7	147	78	261.7
COLLINS BAY	5.9	-0.2	18.6	3.6	0.0		54.4	79	0	9	122	*	363.2
CREE LAKE	7.5	-0.4	19.5	-1.5	0.0		23.0	40	0	8	146	108	314.1
ESTEVAN	10.7	-1.7	24.7	-2.0	0.0		57.6	132	0	5	129	60	220.3
HUDSON BAY	8.6	-1.2	23.6	-3.9	0.0		50.8	96	0	8	136	*	281.2
KINDERSLEY	8.5	-3.0	23.4	-2.0	0.0		55.6	209	0	8	X		284.4
LA RONGE	8.3	-0.8	21.0	-2.5	0.0		38.3	65	0	7	X		248.9
MEADOW LAKE	7.8	-2.4	22.3	-5.0	0.0		28.6	67	0	7	130	*	303.3
MOOSE JAW	10.0	-2.5	25.9	-0.4	0.0		87.1	243	0	11	147	72	238.4
NIPAWIN	8.6	*	21.5	-4.2	0.0	*	38.3	*	0	9	141	*	282.8
NORTH BATTLEFORD	8.8	-2.2	21.2	-0.7	0.0		56.4	219	0	8	X		275.3
PRINCE ALBERT	8.5	-1.4	21.4	-3.3	0.0		35.3	89	0	9	121	72	286.5
REGINA	9.6	-2.1	25.0	-1.7	0.0		60.1	163	0	9	137	71	252.0
SASKATOON	9.4	-1.8	21.1	-1.7	0.0		58.8	184	0	8	X		258.7
SWIFT CURRENT	8.4	-3.3	25.5	-0.1	0.0		97.3	285	0	17	131	67	287.2
WYNYARD	9.1	-1.8	24.6	0.1	0.0		65.6	175	0	11	145	76	266.9
YORKTON	9.3	-1.6	23.5	-1.6	0.0		50.8	109	0	12	145	78	259.8
MANITOBA													
BRANDON	9.9	-1.5	22.1	-5.7	0.0		55.3	125	0	6	X		243.0
CHURCHILL	4.4	-1.0	17.5	-0.8	2.4	37	43.2	84	0	15	74	66	410.6
DAUPHIN	9.8	-1.5	22.7	-2.2	0.0		72.8	123	0	10	128	71	245.9
GILLAM	5.4	-1.2	17.2	-2.7	0.4	7	33.4	65	0	7	X		378.0
GIMLI	10.7	-1.0	20.8	-1.2	0.0		58.2	94	0	9	157	93	217.0
ISLAND LAKE	7.5	-1.7	17.1	-3.0	1.0	14	56.6	94	0	7	X		315.8
LYNN LAKE	5.8	-0.9	18.3	-2.8	0.0		27.0	37	0	6	107	91	363.0
NORWAY HOUSE	7.7	*	17.5	-3.4	0.0	*	62.6	*	0	14	0	*	309.9
PILOT MOUND	10.7	-1.2	22.9	-3.1	0.0		56.2	97	0	9	X		218.3
PORTAGE LA PRAIRIE	11.4	-1.0	23.3	-1.6	0.0		65.9	131	0	8	X		197.9

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	Mean	Difference from Normal	Maximum	Minimum									
THE PAS	8.5	-1.3	20.2	-2.1	0.0		58.8	102	0	11	125	79	282.8
THOMPSON	6.1	-0.8	18.6	-7.4	0.8	27	38.7	60	0	9	120	94	356.1
WINNIPEG INT'L	11.7	-0.7	24.0	-2.7	0.0		47.5	89	0	8	152	82	188.8
ONTARIO													
ATIKOKAN	9.6	-0.6	23.4	-4.3	0.0		93.2	115	0	10	148	88	254.2
BIG TROUT LAKE	6.3	-1.8	16.1	-1.6	36.8	*	142.3	193	0	12	101	*	349.8
EARLTON	10.0	-1.1	24.2	-2.9			106.2	107	0	14	X		240.4
GERALDTON	8.2	-1.1	10.6	-3.3			95.0	125	0	16	X		294.1
GORE BAY	13.1	-0.7	23.4	3.0	0.0		90.3	98	0	14	X		147.0
HAMILTON RBG	15.4	-1.4	25.9	3.3	0.0		140.9	193	0	10	146	*	97.7
HAMILTON	15.3	-0.4	25.5	2.9	0.0		126.4	169	0	11	X		285.6
KAPUSKASING	8.5	-1.5	25.8	-0.4	4.6	191	68.0	72	0	14	X		203.1
KENORA	11.2	-0.4	23.6	2.5	0.0		102.2	147	0	12	X		121.3
KINGSTON	14.1	-1.3	23.4	2.0	0.0		174.4	215	0	13	136	80	313.9
LANSDOWNE HOUSE	7.5	-1.5	19.8	-0.7	1.0	18	92.0	114	0	13	X		87.2
LONDON	15.3	-0.1	25.6	2.3	0.0		236.0	300	0	12	141	81	313.8
MOOSONEE	7.6	-1.9	25.2	-2.6	0.0		94.1	116	0	16	98	81	165.6
MOUNT FOREST	13.6	-0.2	24.5	0.8	0.0		254.0	317	0	14	X		200.5
MUSKOKA	12.2	-1.0	24.4	-2.1	0.0		174.7	170	0	14	X		145.1
NORTH BAY	11.3	-0.9	22.7	-1.0	0.0		103.4	89	0	11	114	73	197.2
OTTAWA INT'L	13.3	-1.0	25.4	2.0	0.0		167.6	211	0	11	146	*	149.0
PETAWAWA	11.4	-1.2	25.5	-2.7	0.0		87.6	105	0	12	X		291.9
PETERBOROUGH	13.3	-0.7	25.4	-1.3	0.0		178.4	244	0	12	X		269.6
PICKLE LAKE	8.3	-1.0	20.8	-1.4	7.0	162	106.4	122	0	12	X		78.4
RED LAKE	9.0	-1.8	20.1	-3.2			116.8	186	0	14	130	*	61.8
ST. CATHARINES	16.1	-0.9	26.0	3.5	0.0		100.6	123	0	11	X		170.9
SARNIA	16.8	0.3	27.7	3.9	0.0		245.7	391	0	13	163	83	92.0
SAULT STE. MARIE	12.3	-0.5	25.4	2.2	0.0		128.2	134	0	11	120	76	248.8
SIMCOE	15.5	-0.2	27.0	1.5	0.0		129.2	155	0	11	X		201.6
SIOUX LOOKOUT	9.7	-1.0	20.0	-1.0	0.0		149.2	182	0	12	X		221.3
SUDBURY	11.3	-0.9	24.9	-0.6			90.8	85	0	10	118	78	283.1
THUNDER BAY	10.6	-0.5	22.6	-1.4	0.0		83.1	93	0	11	135	80	75.7
TIMMINS	8.5	-1.8	24.3	-3.0	2.5	192	84.7	92	0	14	X		107.0
TORONTO	16.0	-1.1	24.3	4.9	0.0		217.8	329	0	11			90.8
TORONTO INT'L	14.7	-0.8	25.3	2.4	0.0		212.3	334	0	11	X		124.0
TORONTO ISLAND	15.2	-1.2	23.9	5.0	0.0		215.6	310	0	10			128.3
TRENTON	14.1	-1.1	24.7	1.0	0.0		206.4	282	0	13	X		257.2
WATERLOO-WELL	13.9	-0.9	24.5	0.2	0.0		216.6	313	0	10	X		116.4
WAWA	9.4	*	21.5	-2.5		*	111.8	*	0	13			39.3
WIARTON	14.4	0.2	25.9	1.0	0.0		195.7	206	0	14	127	74	
WINDSOR	18.5	1.1	30.3	4.4	0.0		208.0	310	0	9	X		