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Climatic Perspectives

Monthly review

SEPTEMBER

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CLIMATIC HIGHLIGHTS

by
P. Scholefield, CCRM

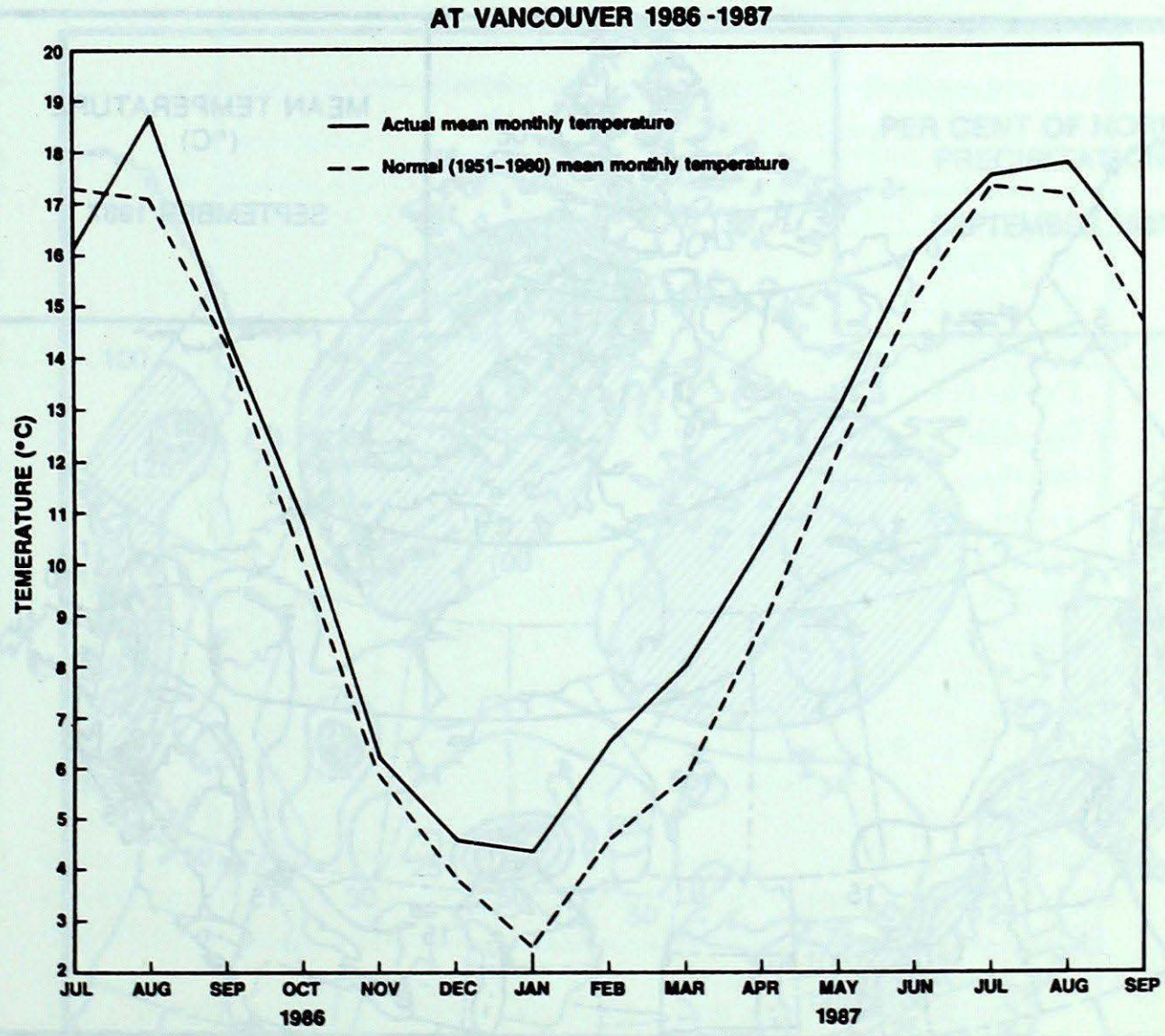
Warm Weather Returns

Except for residual pockets of persistent warm temperatures in southwestern B.C. and in the Great Lakes basin of Ontario, we last month pronounced the end of a prolonged period of above-normal temperatures across large parts of the country. The map on page 2B shows that unusually warm weather returned to most of the country in September as an upper level ridge persisted over the central and western parts. The result has been an extension of the residual warm spells in parts of Ontario and B.C. For a small region along and just north of the northern shores of Lakes Superior and Huron, mean monthly temperatures have been above normal now for 10 consecutive months. In scattered locations in B.C., the spell of consecutive months above normal temperatures has extended even longer (10 months at Abbotsford, Kelowna, and Smithers; 12 months at McInnes Island, Prince Rupert and Victoria/Gonzales; and 14 months at Cape St. James, Comox, Sandspit and Vancouver International Airport.

The accompanying graph shows the extent and magnitude of the warm spell at Vancouver which is the longest since records began in 1937. There were 12-month spells in 1939/40 and 1957/58. Note that the warm spell which began in November, 1939 would have extended 21 consecutive months to July, 1941 had it not been for below normal (-1.3°C) temperatures in November, 1940. The magnitude of the departures was the greatest during the 1957/58 spell where they exceeded 2.0°C during 5 of the months.

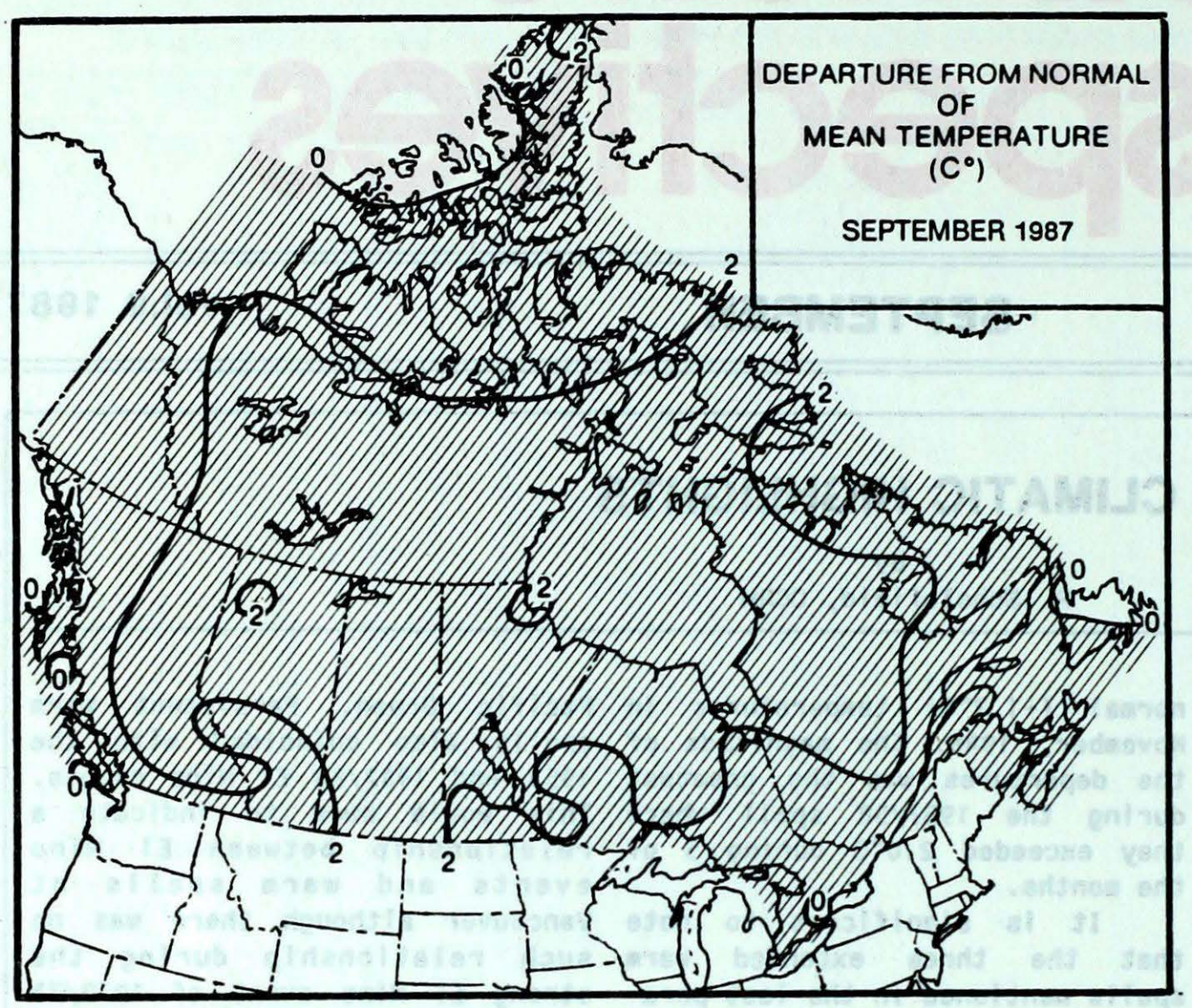
It is significant to note that the three extended warm spells mentioned in the last paragraph coincided with years when the was a moderate to strong El Nino event in the eastern tropical Pacific Ocean. Persistent warm spells also coincided with the 1953 and 1982/83 El Nino events. This would seem to indicate a relationship between El Nino events and warm spells at Vancouver although there was no such relationship during the strong El Nino event of 1972/73 and the moderate ones in 1965 and 1976.

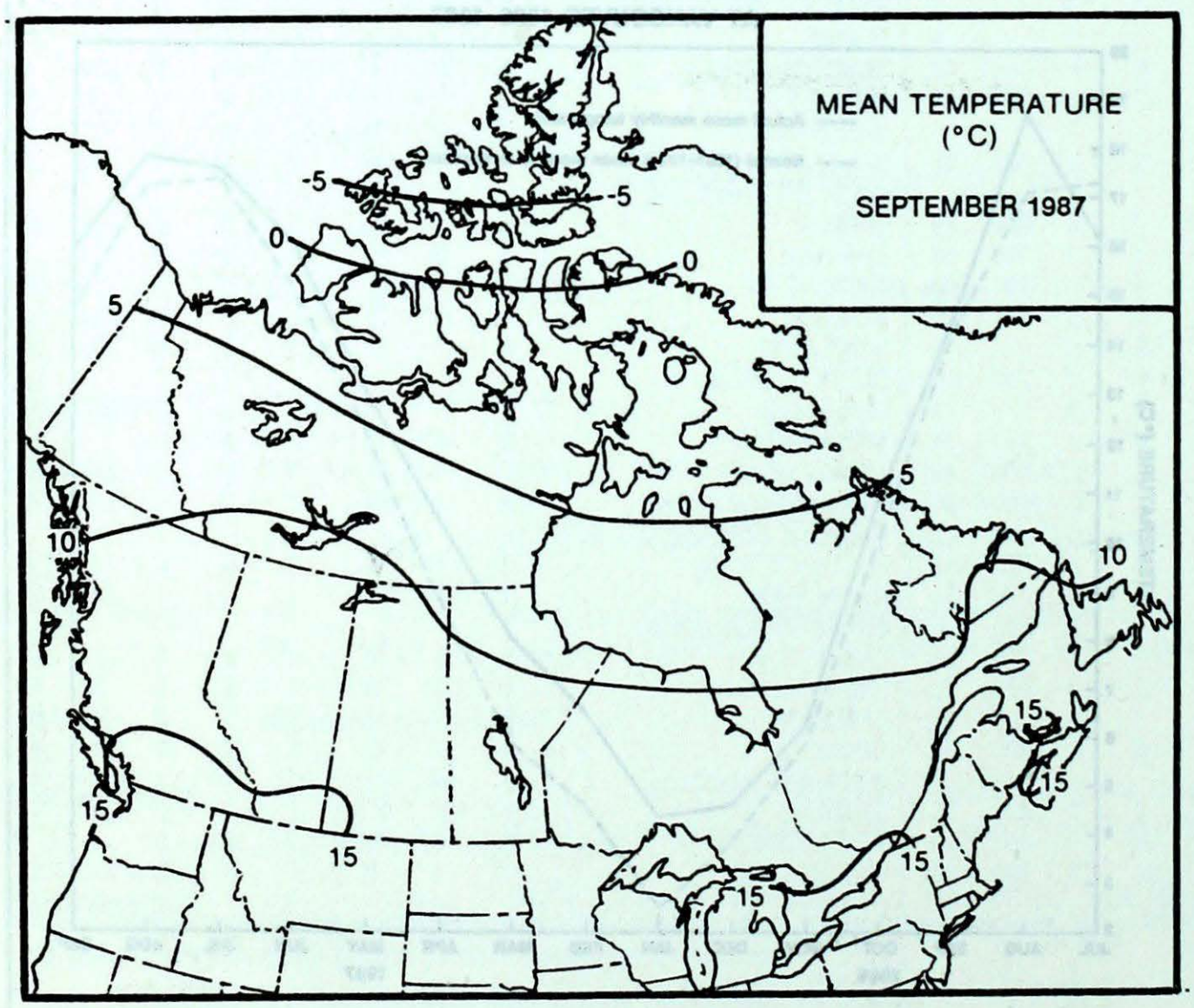
PROLONGED PERIOD OF ABOVE NORMAL TEMPERATURES
AT VANCOUVER 1986-1987



Canada

TEMPERATURE





ACROSS THE COUNTRY

Yukon and Northwest Territories

The weather was variable, but under the influence of air from the South Pacific, it was milder than normal. The monthly mean temperatures were above normal throughout the two territories. A number of storm systems passed, bringing rain and snow, mainly over the southern parts of the Arctic coast. These systems were accompanied by high winds as they crossed the Arctic.

During the second week of the month, a number of daily maximum temperature records were set, from the Mackenzie Valley where the mercury climbed to nearly 25° right over the Baffin Island.

British Columbia

Most of the province enjoyed beautiful weather. Only western regions, along a line from Port Hardy to Watson Lake in the Yukon, suffered repeated assaults by storm systems coming from the Pacific.

The high temperatures set in at the very beginning of the month. On September 1, two monthly maximum records were set, at Penticton (37°C) and Kelowna (35°C). Numerous monthly mean temperature records were set as well. In the south, the unusually warm weather raised the forest weather index to extreme levels. There were great variations in precipitation. The northern coastal regions received the largest quantities. Terrace had a record high for September, with 265.00 mm (269% of normal). Moving east or south of this area, however, the recorded amounts drop off rapidly: Victoria airport 1.5 mm, and Quesnel 8.3 mm, record lows for the month.

The combined effect of warm temperatures and an absence of rain was particularly evident at Kamloops and Victoria, where the months from June to September were the driest on record. There are fears of possible shortfalls of water for livestock and human consumption.

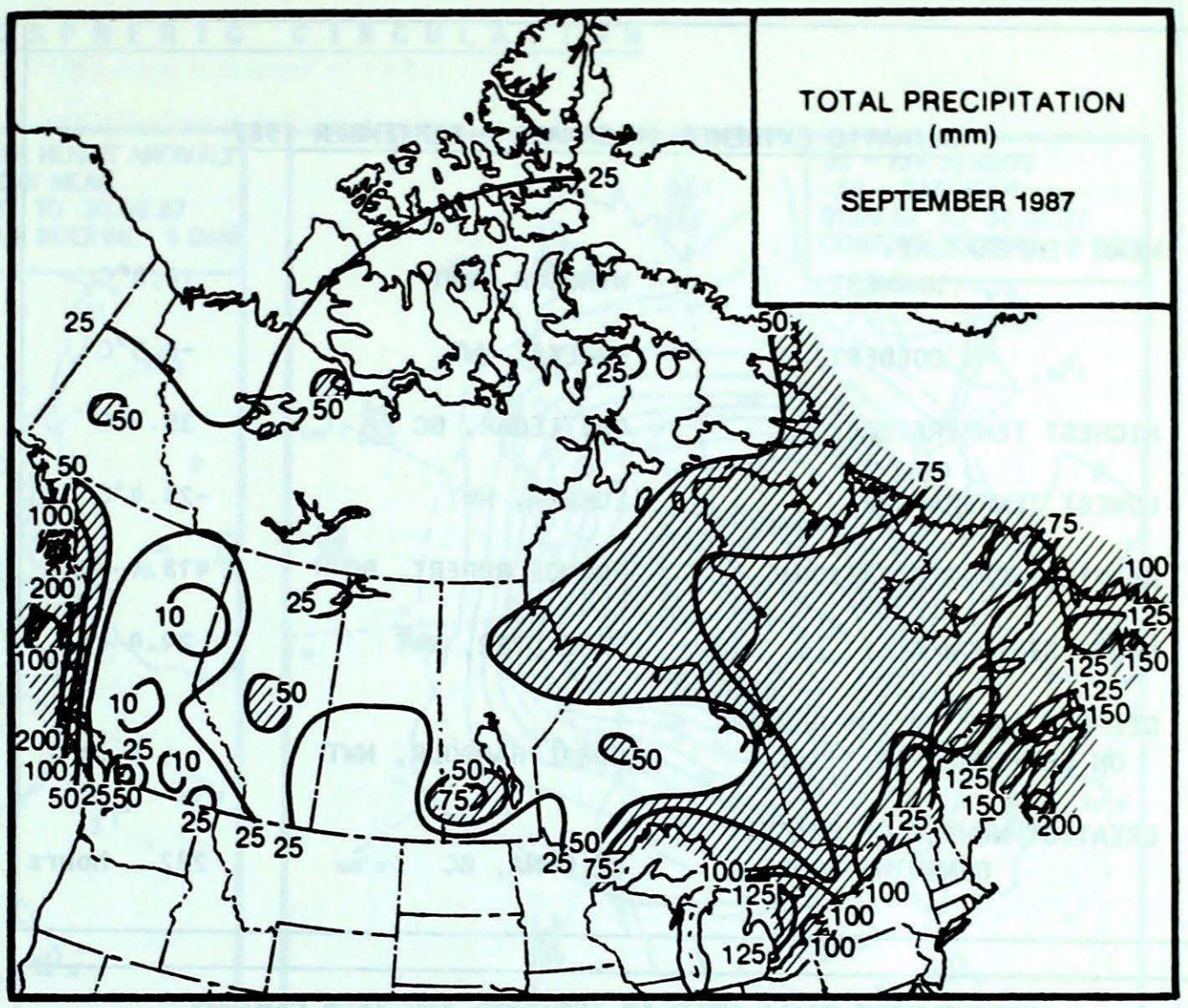
Prairies Provinces

September 1987 was very pleasant on the Prairies well above

normal, dry and sunny.

Daily maximum temperature records were set in many localities, especially in southern Alberta and Saskatchewan (above 30°C). But the clear, sunny skies also promoted night-time radiative cooling, and there were light frosts (seasonal at this time of year) in the northern Prairies and in the foothills of the Rockies. However at Thompson, Manitoba, this was the first frost-free September on record. Precipitation was light except for a storm early in the month which dumped 60 mm of rain on Edmonton in 12 hours, with hailstones the size of golf balls north of the city. Light snowfalls are normal on the Prairies in September, but this year only north-eastern Manitoba had snow.

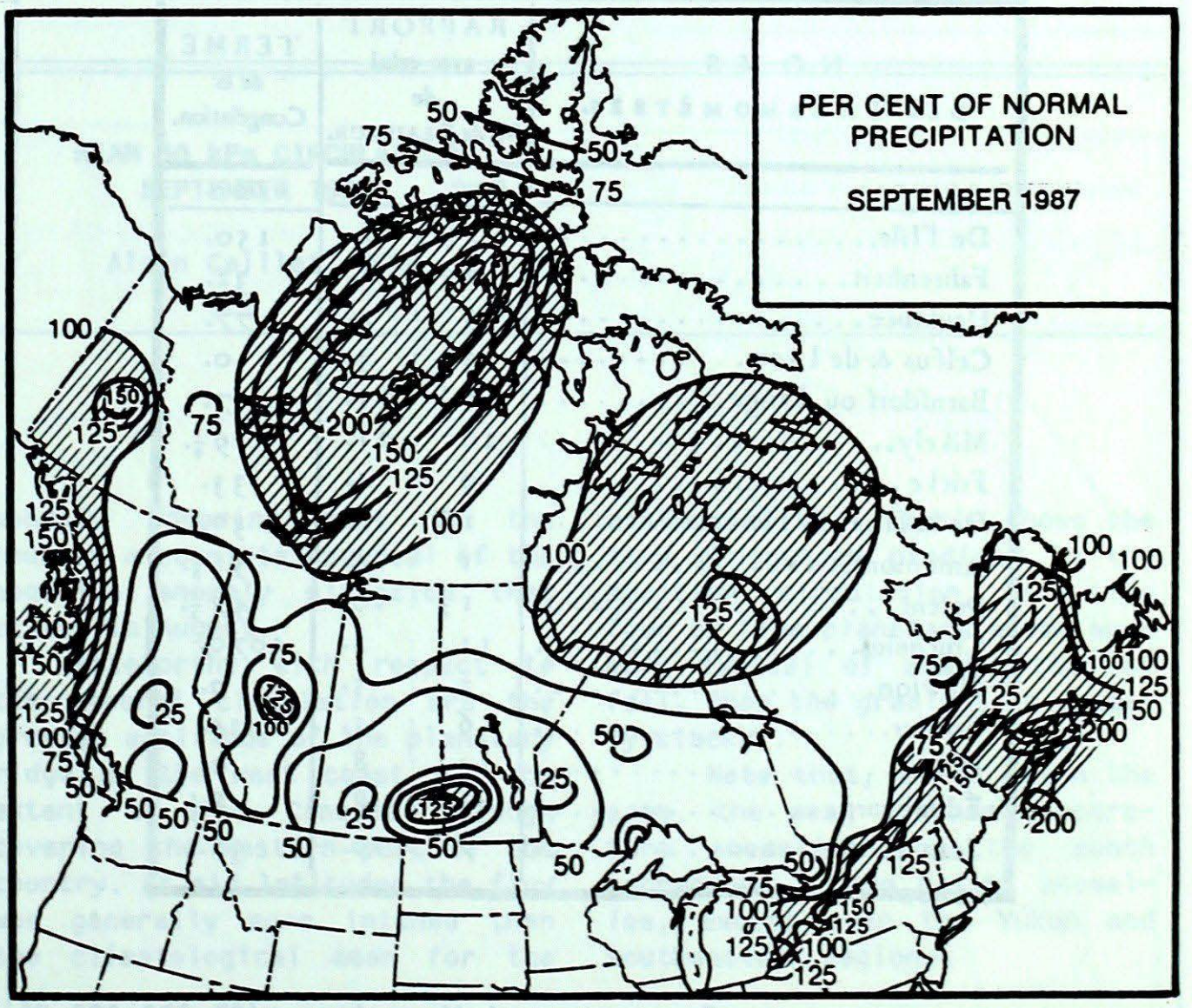
The fine weather allowed crops (behind schedule in late August) to mature in September. At month's end, harvesting was in full swing.



Ontario

September was generally cloudy and rainy in southern Ontario, while drier weather prevailed in the central and northern parts of the province.

Alongside mostly positive temperatures anomalies, there were some disagreeably cold days. Record daily minimums were set throughout the province on the morning of the 3rd, and on the 23rd the passage of a cold front brought frost to northern and eastern regions. In the south, the monthly means at several locations, including Toronto, did not even reach normal. Along with the smaller temperature anomalies, southern Ontario got the largest accumulations of rain, with above-normal amounts falling. Sarnia had 144 mm, which is 22% of the normal. There were two occurrences of severe weather. On the 12th, 100 mm fell in 24 hours near Windsor, causing fields, roads and basements to be flooded. On the 13th, one person was hit by lightning in Toronto and another in Orillia.



Québec

The weather was generally mild for most of the month. Precipitation was variable, but generally abundant, especially in southwestern

EXTRÊMES

CLIMATIC EXTREMES IN CANADA - SEPTEMBER 1987

MEAN TEMPERATURE:		
WARMEST	WINDSOR, ONT	18.0°C
COLDEST	EUREKA, NWT	-8.5°C
HIGHEST TEMPERATURE:	CASTLEGAR, BC	35.4°C
LOWEST TEMPERATURE:	EUREKA, NWT	-24.4°C
HEAVIEST PRECIPITATION:	PRINCE RUPERT, BC	418.1 mm
HEAVIEST SNOWFALL:	CAPE DYER, NWT	24.4 cm
DEEPEST SNOW ON THE GROUND ON SEPTEMBER 30, 1987:	CORAL HARBOUR, NWT	8 cm
GREATEST NUMBER OF BRIGHT SUNSHINE HOURS:	KELOWNA, BC	282 hours

THERMOMETRE SCALE USED IN THE 17th AND 18th CENTURY

Name	Ratio with de Reaumur		Freezing Point
NOMS DES THERMOMÈTRES.	RAPPORT avec celui de M. de REAUMUR.		TERME de la Congélation.
	Degrés.	R.	Degrés.
De l'Iſle	1 7/8 :	1.	150.
Fahrenheit	2 1/4 :	1.	32.
Haukſbée	5 :	2.	77.
Celſius & de Lyon	5 :	4.	0.
Barnſdorf ou Lange	0 1/2 :	1.	7.
Mikely	20 :	21.	9 1/4.
Fricke	9 :	4.	33.
De la Hire ou Florence	1 4/5 :	1.	30.
Amontons	1 :	4.	51 1/2.
Polcni	1 1/4 :	10.	47 1/2.
Crucquius	11 :	2.	1070.
Newton	2 :	5.	0.
Fowler	6 :	5.	34.
Hales	13 :	8.	0.
Édimbourg	35 :	8.	8 1/3.
Jean Patrice	7 :	10.	32.

The above table from **Cotte** ".. most used thermoters with the one of M. de Reaumur", give the relative characteristics of the thermometers used in the 18th century. Note: **The Celcius scale in 4th position**

Quebec and on the western shore of Hudson Bay.

The greatest temperature anomalies were in New Quebec (between 1.6 and 2.7°C). New mean temperature records were set at La Grande Rivière (9.5°/8.7° in 1985) and at Matagami (10.8°C/10.7°C in 1983). South of the Laurentians, and in eastern regions extending all the way to the Lower North Shore and the Gaspé Peninsula, the temperature anomalies were smaller. Eastern Quebec also saw the greatest contrasts in precipitation. Gaspé had only 34 mm (10 mm over the 1978 record minimum), but the Magdalen Islands received 156 mm, the most since September 1956. Measurable snowfall temporarily whitened mountainous regions in southern Quebec, enough to set records at Sainte-Agathe-des-Monts and at Sherbrooke airport.

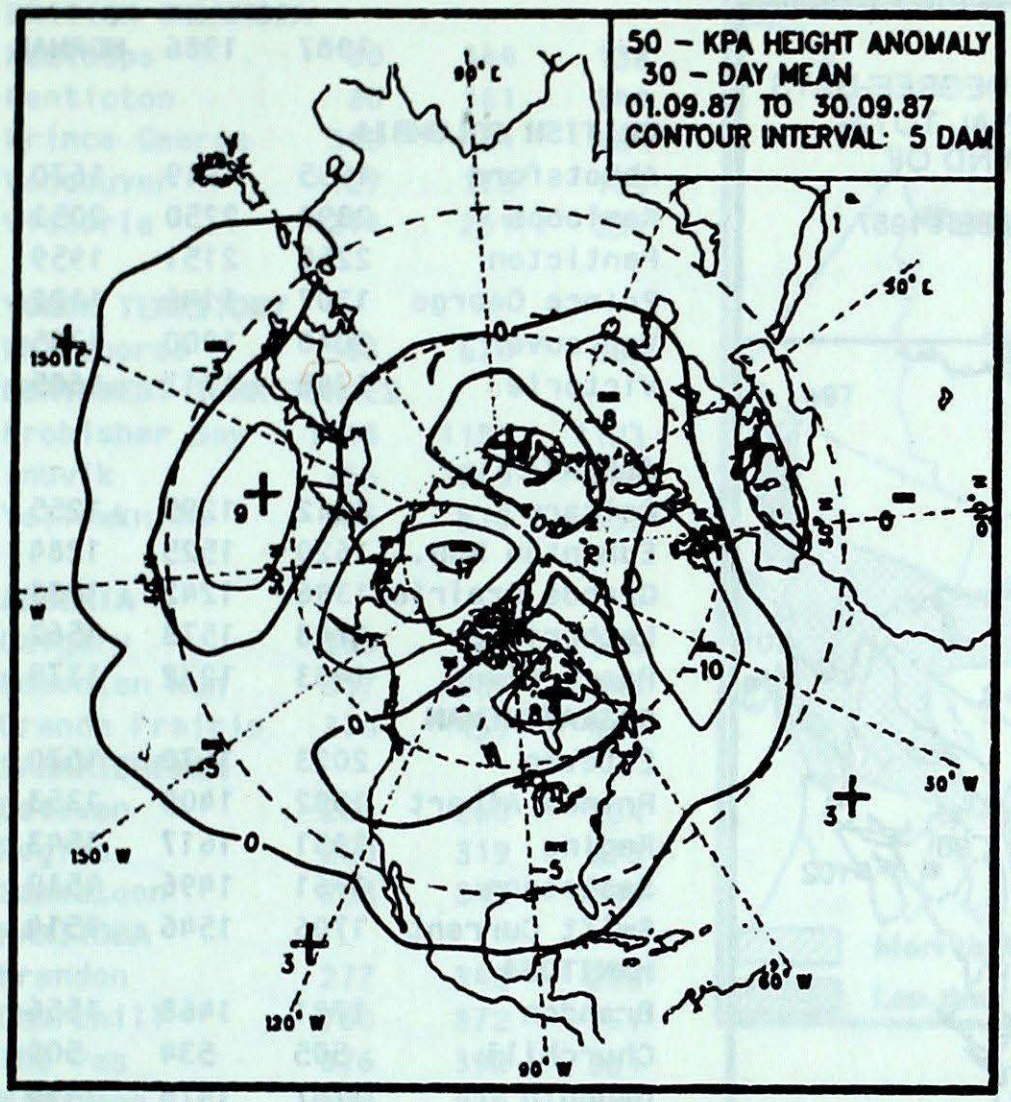
Along with the mild temperatures came sunny weather, especially in New Quebec, where Kuujjuaq recorded 132% of normal bright sunshine.

Atlantic Provinces

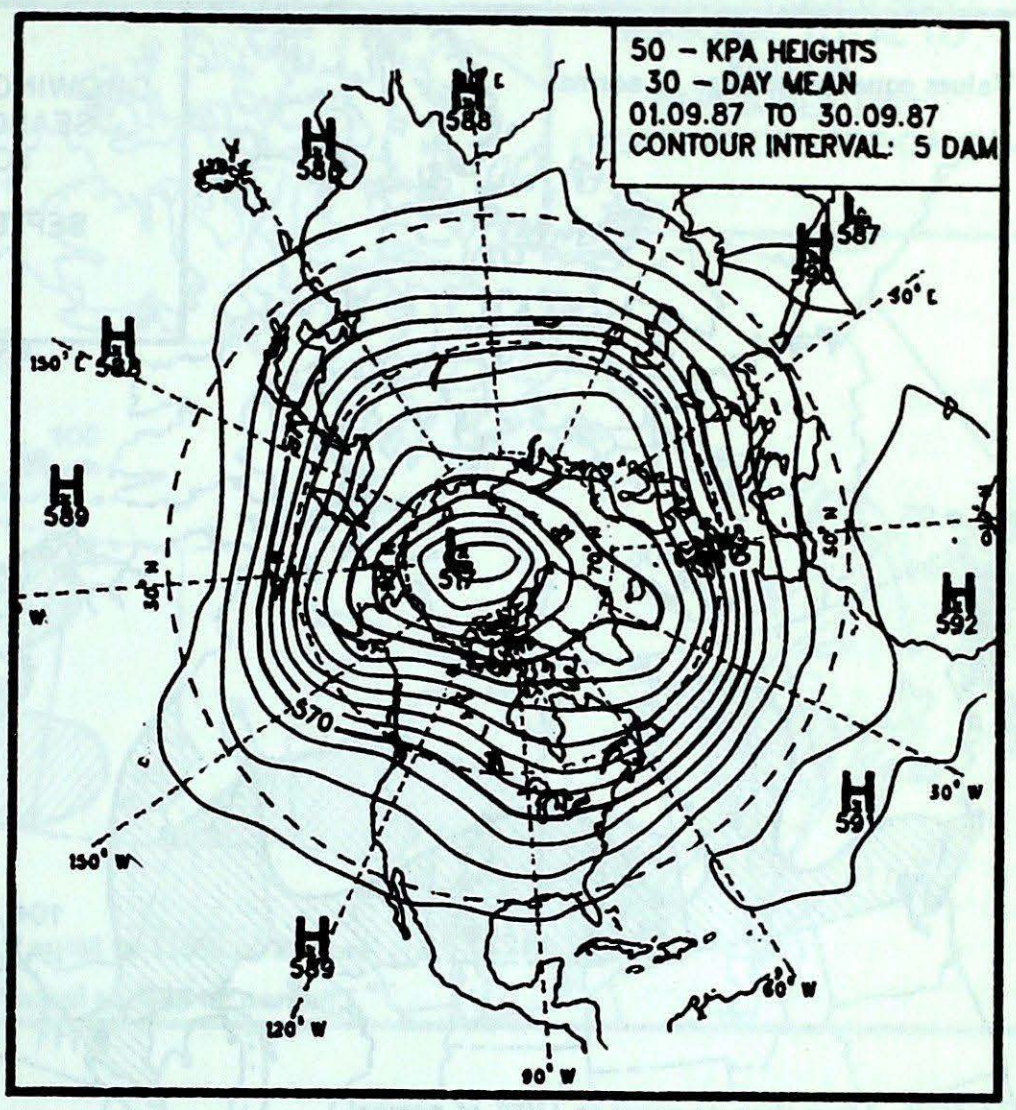
September was generally cloudy and very rainy. Mean monthly temperatures were variable: in general slightly above normal, excepted below normal in eastern Newfoundland.

There were some sharp contrasts in temperature. A cold snap from the 25th to the 28th brought the thermometer down well below seasonal values (several report of frost in N.B. and N.S.). But on the 29th the mercury climbed rapidly and daily maximum records were set in several localities. The rains quickly made up for the shortfalls of June and August in most regions. Almost all stations reported above-normal quantities. At Yarmouth N.S., it was the second rainiest month since the station opened in 1789. In 24 hours, 102 mm fell 12.6 mm more than the normal amount for the entire month! Charlottetown P.E.I. got 174.3 mm, the greatest September accumulation in 45 years. The rainfall not only helped crops, but also brought an end to a series of forest fires in New Brunswick and Newfoundland.

ATMOSPHERIC CIRCULATION



Mean 50 kPa height anomaly (dam)



Mean 50 kPa heights (dam)

MEAN 50 kPa CIRCULATION
SEPTEMBER 1987

Alain Caillet, CCRM

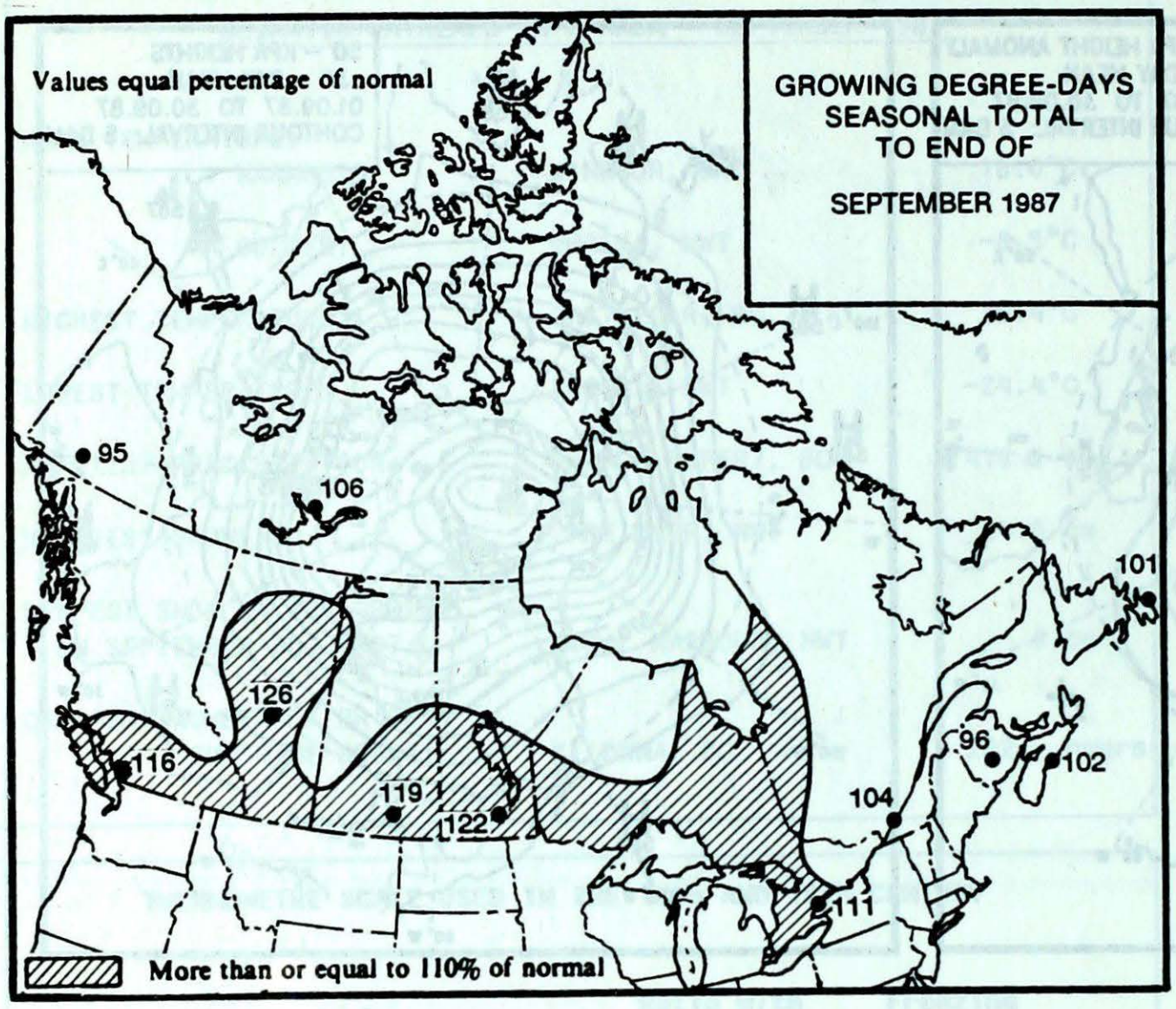
Changes in the 50 kPa circulation in September strongly reflect changes in radiation following the summer solstice. The onset of cooling, which is always more marked and more rapid at Arctic latitudes, was reflected in sharp drops in recorded heights over Alaska and Greenland. In Canada, however, there was an increase in heights centred over New Quebec, which shows up (see anomaly map above) as a positive anomaly covering most of the country a complete reversal of the negative anomaly situation that exists in August.

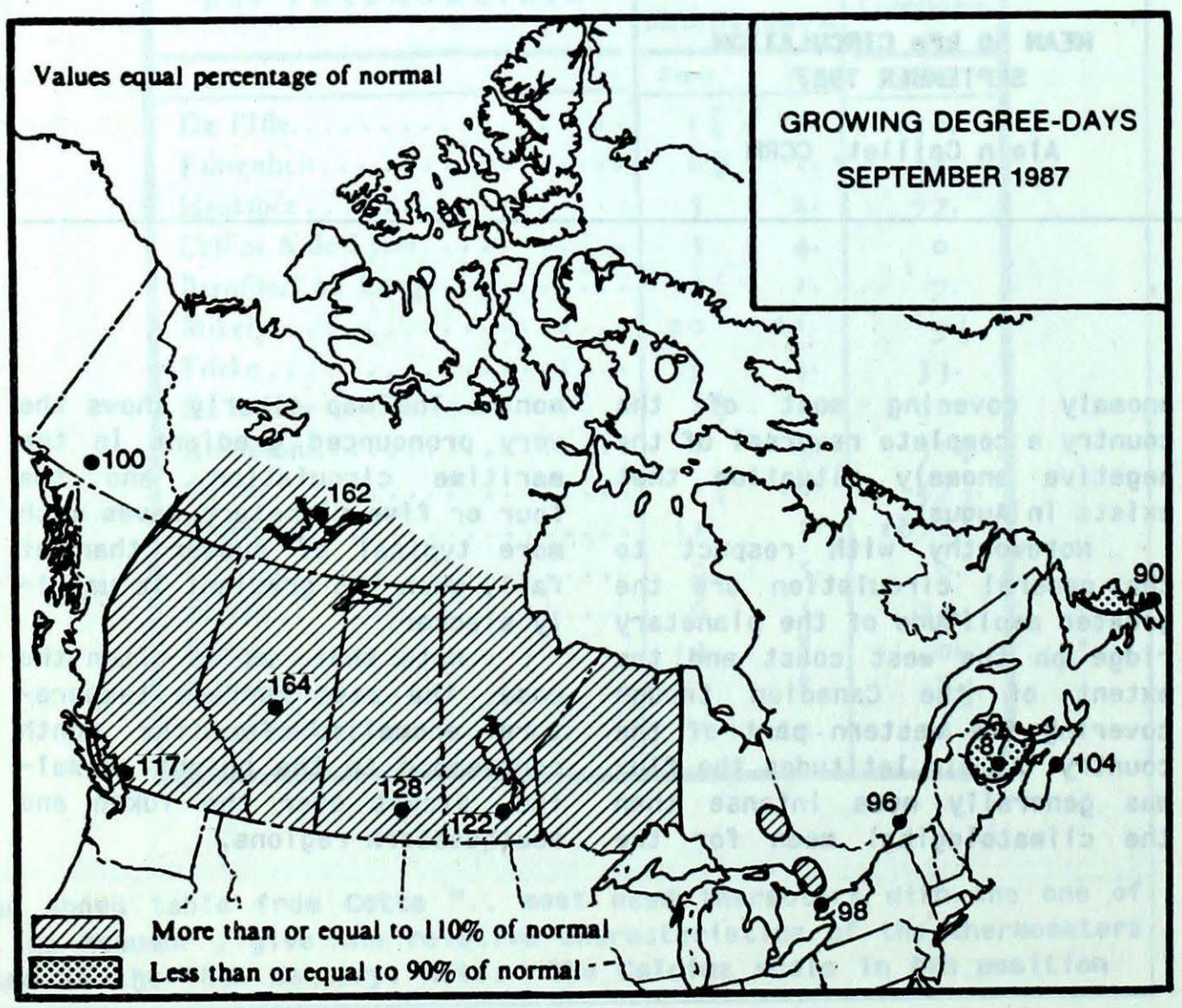
Noteworthy with respect to the general circulation are the greater amplitude of the planetary ridge on the west coast and the extent of the Canadian trough covering the western part of the country. At mid latitudes the flux was generally more intense than the climatological mean for the month. The map clearly shows the very pronounced gradient in the maritime circulation, and the four or five planetary waves much more typical of summer than of fall, when the gradient is usually slacker.

Note that, as is often the case, the mean surface temperature anomalies for the month correspond to the height anomalies, except over the Yukon and southeastern regions.

GROWING DEGREES

GROWING DEGREE DAYS



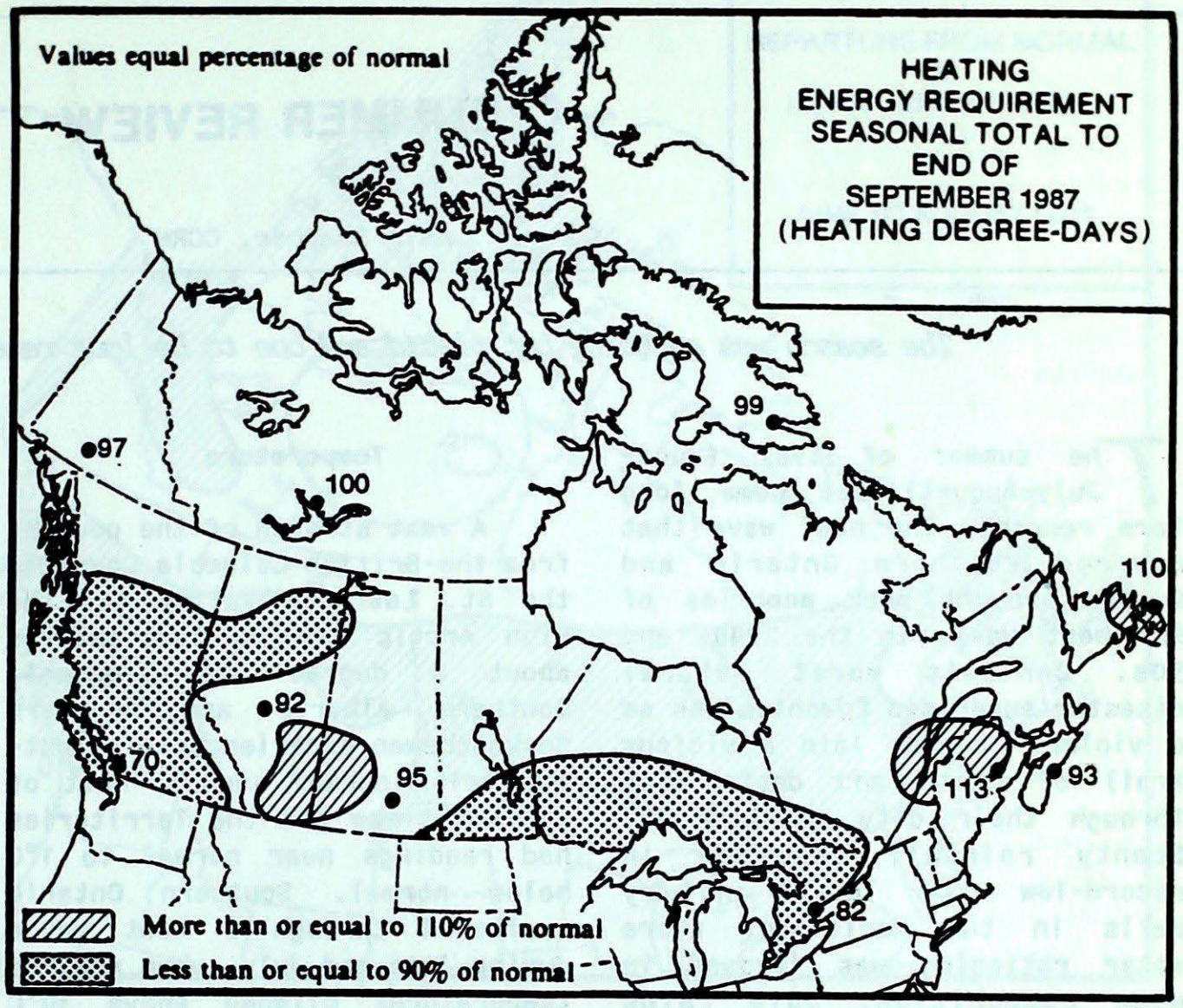


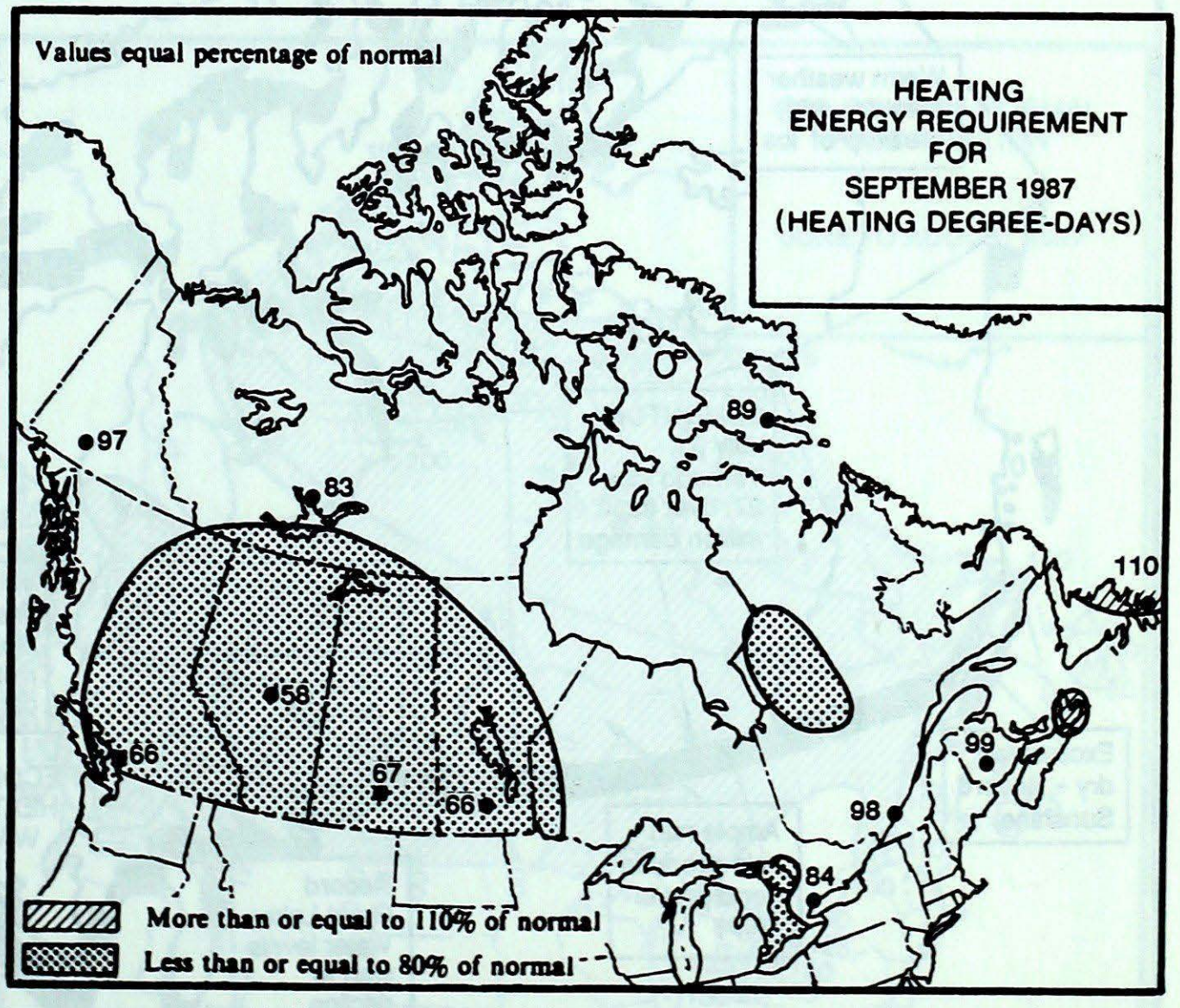
SEASONAL TOTAL OF GROWING DEGREE-DAYS TO END OF SEPTEMBER

	1987	1986	NORMAL
BRITISH COLUMBIA			
Abbotsford	1955	1919	1670
Kamloops	2390	2250	2051
Penticton	2250	2151	1959
Prince George	1207	1146	1122
Vancouver	2010	1900	1735
Victoria	1788	1717	1605
ALBERTA			
Calgary	1512	1295	1255
Edmonton Mun.	1620	1525	1284
Grande Prairie	1396	1242	1239
Lethbridge	1743	1573	1562
Peace River	1403	1272	1179
SASKATCHEWAN			
Estevan	2023	1670	1670
Prince Albert	1582	1405	1353
Regina	1831	1617	1543
Saskatoon	1761	1496	1519
Swift Current	1706	1546	1514
MANITOBA			
Brandon	1741	1468	1556
Churchill	505	534	509
Dauphin	1747	1478	1493
Winnipeg	2010	1752	1654
ONTARIO			
London	2225	2078	1952
Mount Forest	1762	1786	1575
North Bay	1623	1595	1603
Ottawa	2040	2032	1886
Thunder Bay	1552	1496	1323
Toronto	2174	2079	1963
Trenton	2117	2027	1947
Windsor	2512	2530	2262
QUEBEC			
Baie Comeau	1037	987	1096
Maniwaki	1545	1509	1507
Montréal	2042	1995	1954
Quebec	1594	1590	1606
Sept-Iles	975	949	970
Sherbrooke	*	1625	1720
NEW BRUNSWICK			
Charlo	1401	1253	1393
Fredericton	1544	1500	1617
Moncton	1506	1478	1536
NOVA SCOTIA			
Sydney	1334	1283	1374
Truro	1387	1403	1386
Yarmouth	1436	1460	1334
PRINCE EDWARD ISLAND			
Charlottetown	1480	1473	1455
NEWFOUNDLAND			
Gander	1160	1161	1144
St. John's	1054	1059	1044
Stephenville	1236	1244	1174

SEASONAL TOTAL OF HEATING DEGREE-DAYS TO END OF SEPTEMBER

	1987	1986	NORMAL
BRITISH COLUMBIA			
Kamloops	60	144	138
Penticton	80	161	140
Prince George	363	481	484
Vancouver	129	178	189
Victoria	214	251	251
YUKON TERRITORY			
Whitehorse	588	670	605
NORTHWEST TERRITORIES			
Frobisher Bay	1108	1130	1121
Inuvik	755	769	835
Yellowknife	536	518	535
ALBERTA			
Calgary	380	476	386
Edmonton Mun	317	387	343
Grande Prairie	374	459	417
SASKATCHEWAN			
Estevan	206	268	234
Regina	260	319	273
Saskatoon	288	345	289
MANITOBA			
Brandon	277	342	268
Churchill	760	872	761
The Pas	376	392	351
Winnipeg	174	230	234
ONTARIO			
Kapuskasing	350	493	407
London	104	137	132
Ottawa	144	200	161
Sudbury	210	298	266
Thunder Bay	253	345	321
Toronto	104	155	127
Windsor	64	58	75
QUÉBEC			
Baie Comeau	485	552	437
Montréal	143	200	132
Quebec	245	305	222
Sept-Iles	481	552	469
Sherbrooke	300	325	313
Val-d'Or	382	485	382
NEW BRUNSWICK			
Charlo	297	424	257
Fredericton	234	309	207
Moncton	212	325	215
NOVA SCOTIA			
Halifax	160	243	172
Sydney	240	356	212
Yarmouth	238	301	236
PRINCE EDWARD ISLAND			
Charlottetown	194	304	194
NEWFOUNDLAND			
Gander	364	461	346
St. John's	409	501	373





FEATURE

SUMMER REVIEW

by
Amir Shabbar, CCRM

The season was anything but placid and one to be long remembered across Canada.

The summer of 1987 (June-July-August) set some long term records. The heat wave that covered southern Ontario and Quebec brought back memories of the heat waves in the 1940s and 50s. Canada's worst natural disaster surprised Edmontonians as a violent tornado laid a vicious trail of death and destruction through their city on July 31. Scanty rainfall resulted in record-low river levels and dry wells in the Maritimes, where water rationing was imposed in some communities. July rains averted an onset of drought on the Prairies. However, it was excessively dry on the West Coast.

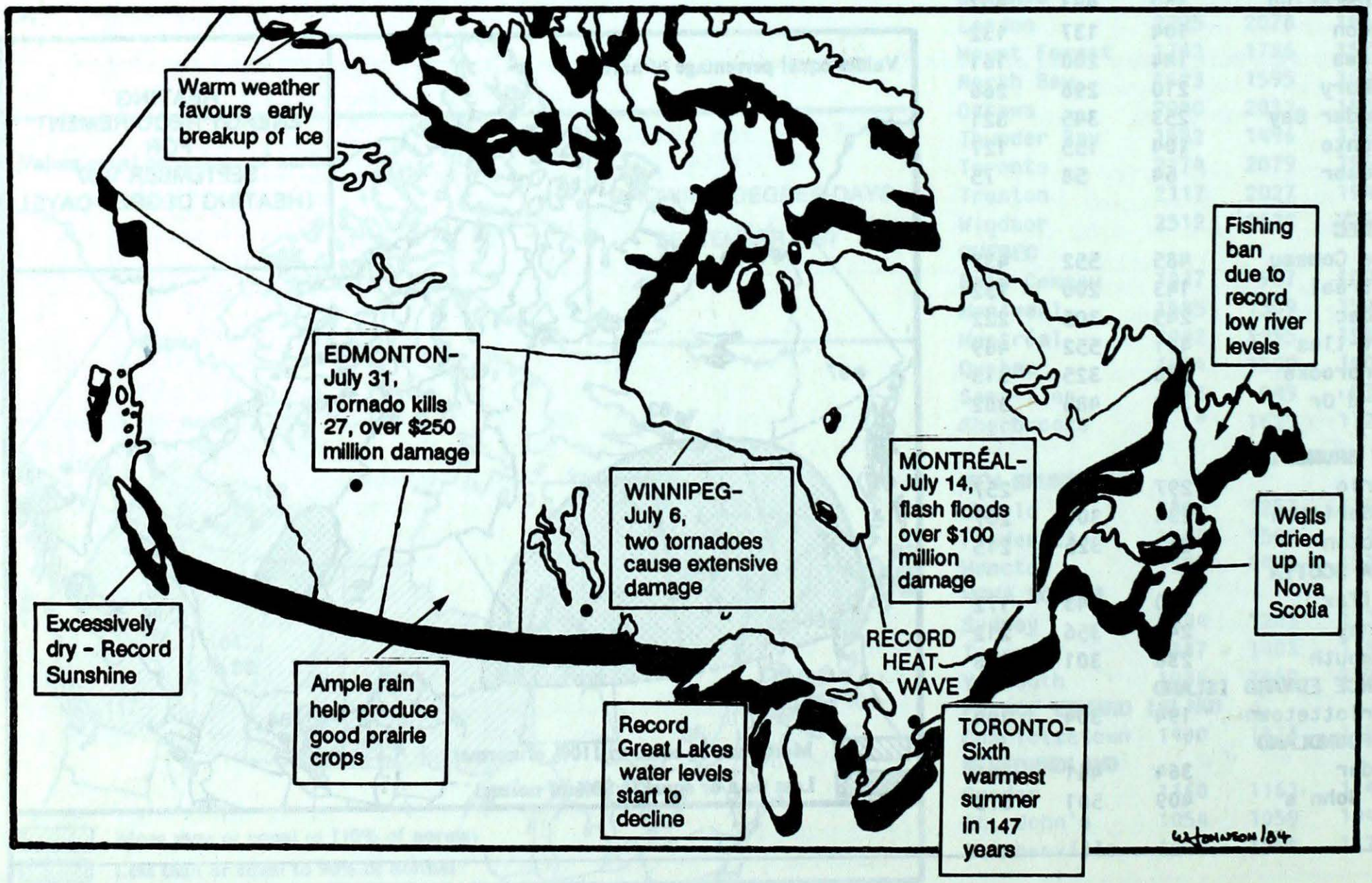
Temperature

A vast stretch of the country from the British Columbia Coast to the St. Lawrence Valley and the High Arctic enjoyed temperatures about a degree above normal. Southern Alberta and southern Saskatchewan experienced a slightly, below normal summer. Most of the Maritimes and the Territories had readings near normal to 1°C below normal. Southern Ontario sweltered through 2 heat waves during June and July, when maximum temperatures climbed above 30°C and the humidex registered an uncomfortable 40°C on 14 days.

The highest and lowest temperatures were 39.1°C at Lytton, B.C., -14.2°C at Cambridge Bay, N.W.T.

Precipitation

Areas from eastern Ontario to the East Coast experienced a drier than normal summer. Summer precipitation was less than 75% of normal in the Atlantic Provinces, in some southern Newfoundland communities amounting to less than half of normal. Charlo, Moncton and Fredericton received record-low July precipitation, from 20 to 40 mm. At Sydney, it was the driest July since 1937. The West Coast, the



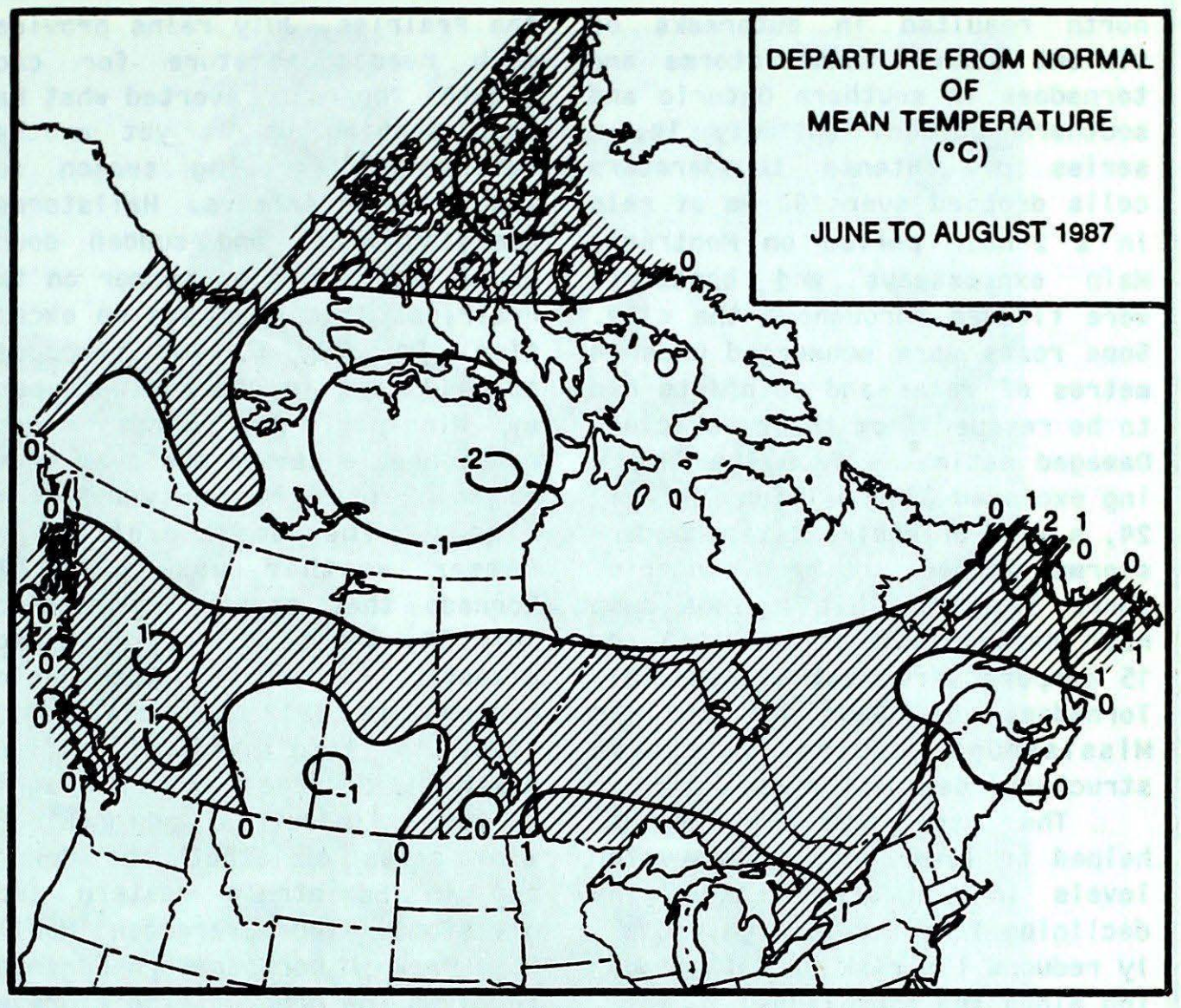
northern interior valleys of British Columbia and the Mackenzie Valley were also dry. Communities in these areas had from one half to two thirds of their normal summer rainfalls.

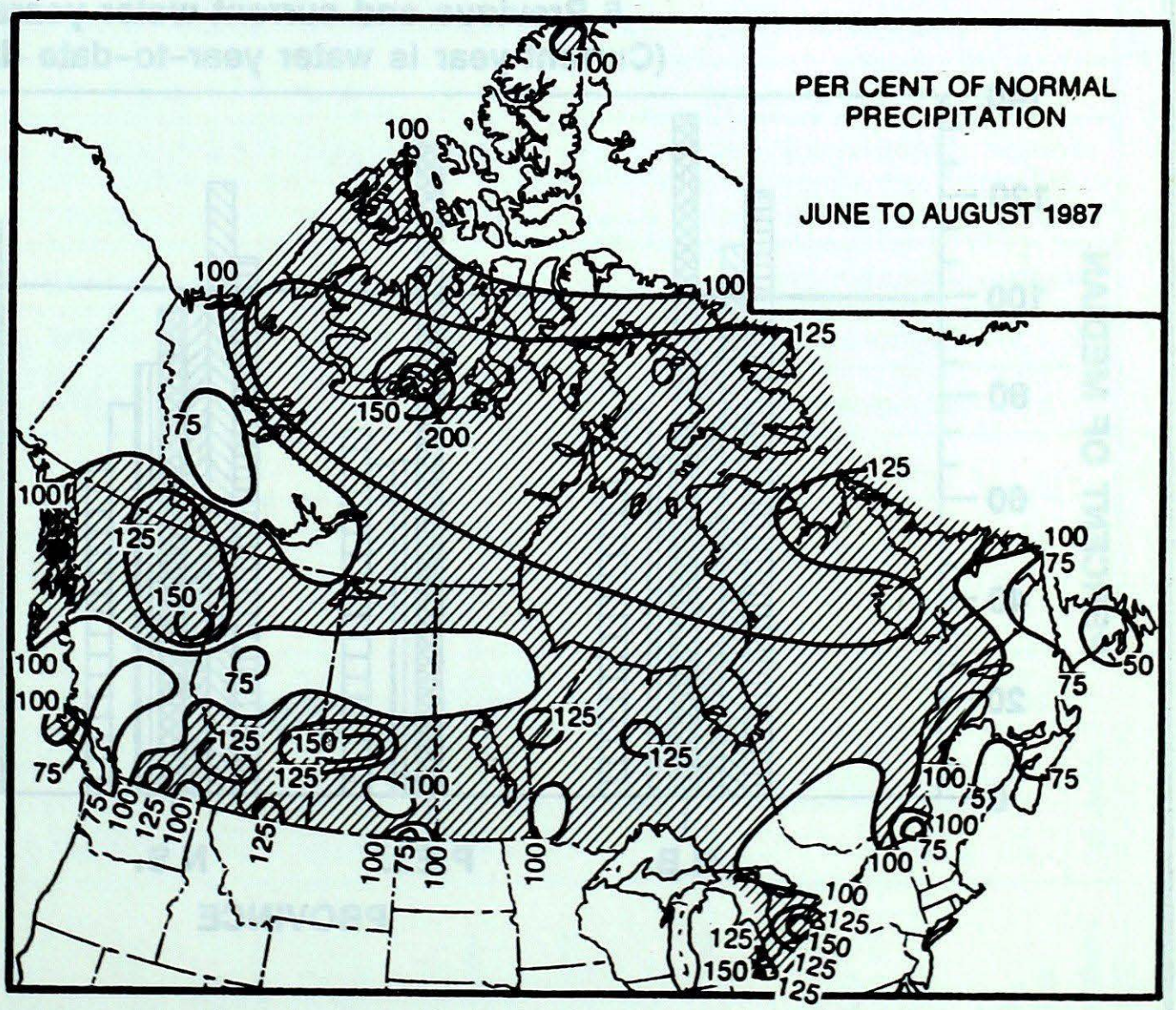
Most of the Prairies, Ontario and the Territories had ample rainfall. Precipitation was from 100 to 150% of normal. Deluges (200 to 300 mm) inundated the Grand Prairie and Edson Forest Districts during the last 2 days of July. Durign mid-August, south-western Manitoba received a "once-in-a-lifetime" rainfall when 120 to 140 mm fell in a 24-hour period.

Significant Climatic Impacts

The unusually dry summer created problems in the Atlantic Provinces as wells dried up and lake and river waters dropped to record, low levels. Travel in the woods was banned in western Nova Scotia, and owing to the heighten-ed fears of forest fires a permit was required to camp and picnic. Sheep farmers found their herds vulnerable to coyote attacks as sheep roamed further afield in search of watering holes and grass. In Newfoundland, 1,500 workers were laid off in the forestry industry as the forest fire hazard index rose to extreme levels.

Throughout most of July, central Canada baked during a record-breaking heat wave, when daytime temperatures soared above 30°C. Ontario had its hottest July in 33 years while a tropical brand of air mass covered the Province. Maximum temperatures exceeded 30°C on 14 occasions in Toronto - its greatest number of "hot days" in 67 years. Moreover, the extensive use of air conditioners set a record for daily electrical con-sumption in the city. Toronto experienced its sixth warmest summer since the start of records in 1840. The heat was beneficial for most Ontario crops, parti-cularly corn and soybeans. After a dismal summer in 1986, farmers were reaping in a bumper crop by the end of summer. On a number of occasions, a clash between the hot and humid air from the south and the cooler and drier air from the





FEATURE

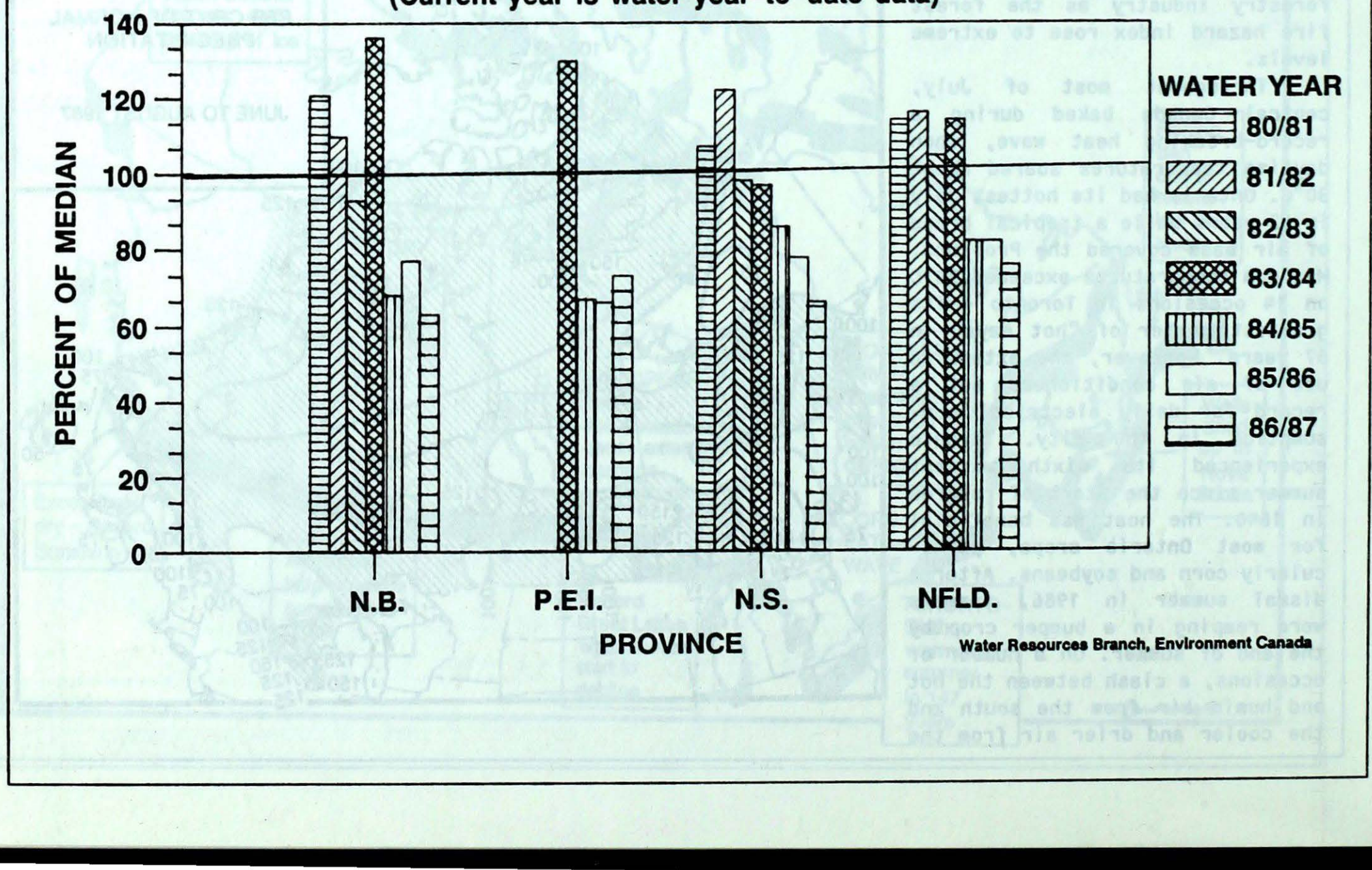
north resulted in outbreaks of violent summer thunderstorms and tornadoes in southern Ontario and southern Quebec. On July 14, a series of intense thunderstorm cells dropped over 100 mm of rain in a 2-hour period on Montréal. Main expressways and basements were flooded throughout the city. Some roads were submerged under 4 metres of water and motorists had to be rescued from their vehicles. Damaged estimates from the flooding exceeded $200 million. On July 24, a wave of destructive thunderstorms lashed southern Ontario, where lightning hit a YMCA camp near Bala (north of Orillia) and 15 campers were sent to hospital. Tornadoes at Sebright and in Mississauga caused extensive structural damage the same day.

The warm and dry weather helped to lower record-high water levels in the Great Lakes. The declining lake levels significantly reduced the risk of fall flooding along the shorelines.

After a very dry spring on the Prairies, July rains provided much needed moisture for crop growth. The rains averted what had been shaping up as yet another catastrophic growing season for the Prairie farmers. Hailstorms, damaging winds and sudden downpours are common in summer on the Prairies. This year was no exception. On July 6, two tornadoes touched down in the southern part of Winnipeg. The winds caused considerable damage and over 40 mm of rain in 2½ hours caused flash floods. The most destructive summer weather was a killer tornado that struck Edmonton on July 31, the second worst tornado disaster in Canada (The Region cyclone in 1912 had claimed 28 lives). It laid a vicious trail of death and destruction in the agricultural, industrial and residential areas of Strathcona County and in Edmonton's eastern subdivisions. The Evergreen Mobile Home Park in northeastern Edmonton received the brunt of the storm as the tornado ripped through the park turning it into a field of chipwood and mangled metal. In all, 27 people lost their lives, over 200 were injured and property damage exceeded $250 million. Heavy rains in the 200 to 300 mm range inundated the Grande Prairie and Edson Forest Districts during the last 2 days of July. Rain-swollen rivers washed out roads and bridges, and huge tracts of farmland were waterlogged.

Sunshine abounded on the West Coast, where Victoria received a record 348 hours of bright sunshine during August. Although many West Coast residents enjoyed the long stretches of sunny and dry weather, people on Galiano and Grabriola Islands, located between Vancouver Island and the mainland, saw their wells dry up and had to cope with rationed bath waters.

The warm weather and favourable winds sped up the ice breakup and helped crews drilling for oil in the Beaufort Sea.



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Many cars were stalled by floods, but this one was smacked by a tree on Décarie.
Montréal - Gazette - JAMES SEELEY

SEPTEMBER 1987

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	16.0	1.5	32.2	4.5	0.0		25.0	27	0	3	220	126	73.6
ALERT BAY	12.9	0.3	21.0	4.6	0.0		117.2	98	0	13	X		155.0
AMPHITRITE POINT	13.3	-0.1	21.0	7.6	0.0		62.6	38	0	9	X		139.9
BLUE RIVER	12.6	1.6	28.7	-0.8	0.0		33.4	39	0	6	191	144	MSG
BULL HARBOUR	12.5	0.4	21.4	3.8	0.0		154.8	102	0	12	X		165.0
CAPE SCOTT	12.8	0.1	18.7	8.4	0.0		201.0	104	0	17	X		156.0
CAPE ST.JAMES	13.2	0.3	19.1	8.9			149.5	119	0	14			144.9
CASTLEGAR	16.5	2.1	35.4	1.5	0.0		29.2	80	0	3	260	136	64.0
COMOX	15.2	1.5	28.7	5.4	0.0		13.0	25	0	4	X		87.0
CRANBROOK	14.9	2.6	32.6	0.2	0.0		14.5	48	0	2	266	*	93.2
DEASE LAKE	7.5	0.4	20.5	-2.3	0.0		55.8	120	0	12	79	62	315.7
ETHELDA BAY	11.8	-0.3	21.0	2.1	0.0		431.2	166	0	18	X		185.2
FORT NELSON	10.9	2.2	29.3	-1.0			13.0	31	0	5	191	*	213.7
FORT ST.JOHN	12.5	3.0	26.3	1.5	0.0		5.4	13	0	2	X		167.0
HOPE	17.0	1.5	32.2	5.8	0.0		52.1	50	0	5	215	124	56.6
KAMLOOPS	17.6	2.7	33.4	3.5	0.0		11.8	55	0	1	255	130	44.4
KELOWNA	15.9	2.8	34.8	-0.2	0.0		8.4	28	0	3	282	137	74.2
LANGARA	12.0	-0.1	16.5	7.1	0.0		306.7	182	0	21	X		200.8
LYTTON	18.4	1.9	34.4	5.8	0.0		19.2	74	0	3	213	115	37.4
MACKENZIE	11.1	2.0	25.0	-4.5	0.0		15.4	30	0	3	177	132	207.2
MCINNES ISLAND	13.2	0.3	18.5	8.2	0.0		318.5	156	0	17	X		143.8
PENTICTON	16.7	2.0	36.6	1.8	0.0		7.4	41	0	2	269	127	62.3
PORT ALBERNI	16.5	*	31.7	2.2	0.0	*	32.9	*	0	5	209	*	59.0
PORT HARDY	12.2	0.4	21.0	3.0	0.0		115.2	84	0	9	142	102	172.1
PRINCE GEORGE	12.4	2.7	27.3	-2.0	0.0		21.4	36	0	5	178	110	172.2
PRINCE RUPERT	11.9	0.5	17.8	3.2	0.0		418.1	179	0	21	91	78	181.2
PRINCETON	14.8	1.9	33.6	-2.5	0.0		13.4	73	0	2	263	*	MSG
QUESNEL	13.4	2.1	30.6	-0.7	0.0		8.3	18	0	3	X		141.2
REVELSTOKE	14.7	1.9	29.4	2.4	0.0		18.4	31	0	4	229	151	103.6
SANDSPIT	13.3	0.4	20.3	6.8	0.0		125.6	139	0	14	131	94	142.0
SMITHERS	10.4	0.6	25.9	-2.4	0.0		67.9	134	0	11	134	102	229.8
TERRACE	12.5	0.6	25.0	3.1	0.0		265.0	269	0	15	117	92	167.0
VANCOUVER HARBOUR	16.0	1.4	28.0	8.3	0.0		28.1	35	0	4	X		56.8
VANCOUVER INT'L	15.8	1.6	28.7	7.4	0.0		28.4	42	0	6	232	126	73.9
VICTORIA GONZ. HTS	15.2	1.0	29.1	7.9	0.0		4.2	12	0	1			87.6
VICTORIA INT'L	14.8	0.9	30.3	5.2	0.0		1.8	4	0	1	269	138	101.1
VICTORIA MARINE	13.3	0.3	25.3	4.9	0.0		17.6	28	0	3	X		140.9
WILLIAMS LAKE	13.5	3.2	29.2	-0.7	0.0		4.9	16	0	1	218	117	140.0

STATION	Temperature C Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
YUKON TERRITORY													
DAWSON	5.8	0.4	19.8	-9.9			29.0	80	0	8	X		365.8
MAYO	6.6	0.1	19.4	-5.3			52.0	171	0	13	X		342.6
WATSON LAKE	7.8	0.2	21.5	-2.4	2.2	64	35.0	80	0	9	104	82	279.9
WHITEHORSE	8.0	0.5	18.5	-3.9	6.9	153	30.2	99	0	6	145	106	300.3
NORTHWEST TERRITORIES													
ALERT	-6.9	3.3	6.5	-22.2	10.6	32	7.2	25	3	2	166	200	748.2
BAKER LAKE	4.8	2.5	15.3	-7.2	0.6	10	31.0	83	0	6	118	109	
CAMBRIDGE BAY	1.1	1.8	11.5	-12.3	6.6	77	35.0	202	2	10	70	84	507.0
CAPE DYER	2.0	3.4	16.6	-4.4	24.4	43	65.4	88	2	8	X		480.8
CAPE PARRY	3.0	2.3	13.2	-4.0	3.6	24	23.5	100	0	10	X		451.0
CLYDE	1.6	1.8	11.6	-6.9	20.4	69	29.4	83	6	9	72	84	493.7
COPPERMINE	4.7	2.2	17.5	-2.6	4.4	83	62.1	258	0	10	77	109	401.7
CORAL HARBOUR	3.0	2.1	15.4	-15.2	13.8	139	40.6	119	8	7	157	145	421.2
EUREKA	-8.5	-0.2	1.5	-24.4	6.4	62			4	2	137	134	793.4
FORT RELIANCE	9.2	3.1	22.7	0.6	2.4	96	32.7	108	0	8	X		264.9
FORT SIMPSON	10.2	2.9	26.0	-3.8	0.0		36.3	115	0	6	202	151	235.9
FORT SMITH	10.6	3.1	24.6	-4.0	0.0		48.8	118	0	9	157	126	221.2
IQALUIT	4.2	1.8	11.2	-4.0	0.0		46.8	101		8	160	194	415.5
HALL BEACH	1.3	1.9	11.0	-9.5	1.2	9	15.4	56	0	6	X		500.6
HAY RIVER	10.8	2.7	26.9	0.1	0.0		38.7	91	0	5	X		216.6
INUVIK	4.7	1.6	20.2	-6.6	2.8	23	21.7	90	0	5	66	60	399.8
MOULD BAY	-6.8	-0.3	2.4	-20.2	15.6	116	13.3	96	3	5	63	138	745.1
NORMAN WELLS	8.0	1.9	25.6	-3.2	2.0	37	20.6	70	0	4	159	142	299.4
POND INLET	0.3	2.4	9.9	-11.1	16.6	*	75.6	*	0	14	X		
RESOLUTE	-4.4	0.7	3.5	-16.7	22.0	143	38.4	213	1	10	67	113	672.9
YELLOWKNIFE	8.9	2.2	20.0	0.9			47.4	155	0	8	134	88	277.5
ALBERTA													
BANFF	12.3	3.0	28.0	-2.0	0.0		35.4	84	0	5	X		
BROOKS	13.5	1.6	32.5	-0.5	0.0		15.7	37	0		247	*	
CALGARY INT'L	13.6	3.0	29.8	0.8	0.0		29.2	76	0	4	256	131	134.8
COLD LAKE	12.8	3.0	27.6	0.0	0.0		23.6	52	0	2	209	119	156.7
CORONATION	12.3	1.8	29.0	0.1	0.0		17.2	52	0	2	255	122	170.9
EDMONTON INT'L	12.8	3.0	27.8	-1.3	0.0		48.4	105	0	3	259	141	155.4
EDMONTON MUNI.	13.9	2.9	27.8	2.9	0.0		66.8	170	0	2	249	136	124.0
EDMONTON NAMAO	13.3	2.9	27.4	1.8	0.0		56.8	136	0	3	X		141.2
EDSON	12.0	3.5	28.6	-1.6	0.0		25.6	57	0	4	240	147	179.3
FORT CHIPEWYAN	11.3	3.5	26.5	-2.0	0.0		19.8	47	0		X		

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	Mean	Difference from Normal	Maximum	Minimum									
FORT MCMURRAY	12.4	3.4	28.2	-1.3	0.0		31.3	53	0	4	190	132	169.3
GRANDE PRAIRIE	13.0	3.2	28.5	-0.7	0.0		3.8	10	0	1	214	*	150.9
HIGH LEVEL	10.0	1.9	26.5	-3.4	0.0		36.3	107	0	7	166	111	239.2
JASPER	12.7	2.9	28.1	-1.9	0.0		26.4	69	0	6	243	*	157.1
LETHBRIDGE	14.6	1.9	31.0	0.7	0.0		35.3	94	0	3	257	120	108.3
MEDICINE HAT	14.8	1.6	32.1	1.2	0.0		9.4	29	0	4	262	131	104.2
PEACE RIVER	12.5	3.4	26.5	-0.4	0.0		24.3	62	0	4	X		166.7
RED DEER	11.8	1.7	29.0	-3.2	0.0		33.8	76	0	4	X		184.6
ROCKY MTN HOUSE	11.2	1.5	27.0	-3.4	0.0		28.6	57	0	7	X		202.9
SLAVE LAKE	12.3	3.3	25.5	-0.2	0.0		43.0	86	0	5	231	142	170.7
SUFFIELD													
WHITECOURT	12.6	3.7	27.4	-0.6	0.0		53.6	154	0	5	X		161.2
SASKATCHEWAN													
BROADVIEW	12.9	2.3	31.9	0.0	0.0		66.2	134	0	7	257	137	160.2
COLLINS BAY	8.6	2.5	24.6	-4.2	0.0		57.7	84	0	7	152	*	253.1
CREE LAKE	11.0	3.1	26.1	-1.8	0.0		22.5	39	0	7	181	135	
ESTEVAN	14.5	2.1	33.3	1.0	0.0		20.4	46	0	4	237	111	118.4
HUDSON BAY	11.5	1.7	29.7	-1.1	0.0		22.8	43	0	6	178	*	196.5
KINDERSLEY	13.7	2.2	32.2	0.3	0.0		9.8	36	0	3	X		137.4
LA RONGE	11.4	2.3	27.1	-1.3	0.0		25.8	43	0	8	X		
MEADOW LAKE	12.3	2.1	28.6	-1.8	0.0		24.5	57	0	3	209	*	171.7
MOOSE JAW	14.4	1.9	34.7	0.0	0.0		11.8	32	0	3	*		122.2
NIPAWIN	12.3	*	29.9	-0.7	0.0	*	14.8	*	0	6	190	*	172.1
NORTH BATTLEFORD	13.6	2.6	30.0	0.6	0.0		9.0	35	0	2	X		137.5
PRINCE ALBERT	12.6	2.7	30.1	-1.2	0.0		13.2	33	0	6	178	107	162.5
REGINA	13.7	2.0	34.2	0.0	0.0		18.9	51	0	3	233	122	135.2
SASKATOON	13.9	2.7	34.5	0.5	0.0		13.0	40	0	2	X		130.4
SWIFT CURRENT	14.0	2.3	32.6	-0.2	0.0		6.3	18	0	2	257	132	133.5
URANIUM CITY											X		
WYNYARD	13.1	2.2	32.9	-0.4	0.0		13.0	34	0	2	211	111	
YORKTON	12.9	2.0	31.6	1.7	0.0		25.7	55	0	5	206	112	
MANITOBA													
BRANDON	13.0	1.6	27.9	-1.3	0.0		35.7	80	0	6	X		153.7
CHURCHILL	7.2	1.8	23.4	-3.6	0.2	3	42.2	82	0	8	76	68	322.1
DAUPHIN	13.2	1.9	29.1	0.8	0.0		84.8	143	0	8	173	96	145.5
GILLAM	9.2	2.6	21.5	-6.3	6.6	117	60.6	118	0	12	X		264.2
GIMLI	13.3	1.6	27.6	0.3	0.0		29.4	47	0	6	193	115	143.1
ISLAND LAKE	11.7	2.5	26.3	1.7			34.2	57	0	5	X		190.4
LYNN LAKE	9.0	2.3	25.0	-1.4	0.0		39.7	54	0	9	167	142	256.1
NORWAY HOUSE	11.3	*	28.4	-1.0	0.0	*	33.6	*	0	8	*		204.1
PORTAGE LA PRAIRIE	14.4	2.0	29.4	1.4	0.0		33.0	66	0	6	X		116.7

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	Mean	Difference from Normal	Maximum	Minimum									
THE PAS	12.0	2.2	29.0	2.0	0.0		24.6	42	0	5	176	111	182.2
THOMPSON	9.8	2.9	28.3	-2.7	0.0		51.0	79	0	7	128	100	246.0
WINNIPEG INT'L	14.1	1.7	29.3	1.4	0.0		20.0	37	0	4	193	104	123.6
ONTARIO													
ATIKOKAN	12.0	1.8	26.4	-2.6	0.0		64.2	79	0	12	167	99	178.6
BIG TROUT LAKE	10.8	2.7	24.4	-2.2	2.2	*	52.9	71	0	10	142	*	217.5
EARLTON	12.7	1.6	27.7	-4.3	0.0		67.2	67	0	10	X		161.4
GERALDTON	11.2	1.9	22.5	-1.5			68.8	91	0	14	X		209.2
GORE BAY	15.3	1.5	24.0	5.4	0.0		67.4	73	0	8	X		85.1
HAMILTON RBG	16.7	-0.1	28.5	6.3	0.0		54.8	75	0	13	155	*	
HAMILTON	15.7	0.0	26.1	3.6	0.0		51.7	69	0	10	X		76.1
KAPUSKASING	12.0	2.0	25.0	-2.0			59.3	62	0	10	X		182.2
KENORA	14.0	2.4	24.3	3.0	0.0		25.0	36	0	5	X		120.6
KINGSTON	15.3	-0.1	24.2	3.0	0.0		119.2	147	0	12	148	87	89.9
LANSDOWNE HOUSE	11.6	2.6	24.2	-9.2			37.9	46	0	9	X		189.2
LONDON	15.9	0.5	26.3	4.9	0.0		72.9	92	0	12	148	85	73.4
MOOSONEE	10.6	1.1	24.1	-3.2	0.0		36.4	45	0	10			182.2
MUSKOKA	13.8	0.6	26.7	-1.4	0.0		48.0	46	0	10	X		122.8
NORTH BAY	13.5	1.3	24.8	0.8	0.0		58.8	50	0	8	145	93	139.6
OTTAWA INT'L	14.8	0.5	26.7	1.0	0.0		121.6	153	0	11	166	*	108.1
PETAWAWA	13.9	1.3	29.0	-4.4			95.8	115	0	12	X		130.8
PETERBOROUGH	13.9	-0.1	26.3	-0.8	0.0		85.2	116	0	12	X		124.7
PICKLE LAKE	11.0	1.7	23.4	-1.1	1.4	32	62.6	72	0	9	X		209.2
RED LAKE	12.3	1.5	25.0	-2.0			11.8	18	0	3	195	*	170.0
ST. CATHARINES	16.8	-0.2	25.9	6.5	0.0		104.0	127	0	11	X		55.8
SARNIA	16.6	0.1	28.2	6.2	0.0		144.1	229	0	12	177	90	61.3
SAULT STE. MARIE	14.1	1.3	25.9	0.9	0.0		76.6	80	0	11	184	117	122.6
SIOUX LOOKOUT	12.6	1.9	22.9	-0.2	0.0		35.9	43	0	9	X		165.3
SUDBURY	13.8	1.6	26.1	-0.5	0.0		93.8	88	0	9	152	100	132.4
THUNDER BAY	13.1	2.0	24.5	-1.1	0.0		99.1	111	0	10	181	107	152.5
TIMMINS	11.8	1.5	26.6	-4.1	0.0		60.2	65	0	10	X		188.7
TORONTO	17.0	-0.1	25.1	6.4	0.0		96.4	145	0	13			50.2
TORONTO INT'L	15.5	0.0	27.0	3.6	0.0		108.0	170	0	12	X		82.2
TORONTO ISLAND	17.1	0.7	25.4	7.4	0.0		84.7	121	0	9			40.4
TRENTON	15.5	0.2	24.8	3.1	0.0		80.5	110	0	9	X		85.9
WATERLOO-WELL	14.9	0.1	26.3	3.0	0.0		68.0	98	0	11	X		98.8
WAWA	12.3	*	22.7	-1.7	0.0	*	75.0	*	0	10		*	174.1
WIARTON	15.4	1.2	26.8	2.7	0.0		150.0	158	0	11	186	109	91.9
WINDSOR	18.0	0.6	28.4	7.1	0.0		112.2	167	0	11	X		34.5

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QUEBEC													
BAGOTVILLE	11.6	0.5	26.9	-2.0	2.6	520	133.2	133	0	17	X		195.7
BAIE COMEAU	9.8	0.0	19.3	-1.2			98.3	95	0	13	112	*	245.8
BLANC SABLON	9.1	0.5	18.2	0.0	0.0		74.6	84	0	9	131	*	
CHIBOUGAMAU	10.4	1.6	26.7	-0.8	5.8	263	110.2	97	0	13	115	94	230.9
GASPE	11.3	0.0	24.8	-0.8	0.0		34.2	48	0	8	133	*	201.9
INUKJUAK	7.7	2.7	17.9	-3.0	4.8	97	83.6	141	0	14	105	119	308.4
KUUJJUAQ	7.0	1.6	22.9	-1.9	0.4	4	62.6	108	0	9	130	131	333.0
KUUJJUARAPIK	9.3	2.2	23.0		1.2	70	110.4	126	0	15	68	63	254.5
LA GRANDE RIVIERE	9.5	*	22.9	-1.7	4.0	*	128.4	*	0	12	86	*	225.1
MANIWAKI	13.1	1.0	26.0	-2.6	0.0		77.4	80	0	10	133	87	151.7
MATAGAMI	10.8	1.8	24.5	-5.0			118.4	123	0	15	136	108	218.8
MONT JOLI	11.5	0.3	25.6	2.0	0.0		86.6	103	0	10	123	80	197.8
MONTREAL INT'L	15.0	0.2	26.4	1.0			108.2	122	0	11	168	99	101.8
MONTREAL M INT'L	13.8	*	25.8	-1.3		*	164.0	*	0	9	181	*	129.9
NATASHQUAN	9.6	0.4	18.1	-2.1	0.0		111.2	117	0	10	162	103	250.1
QUEBEC	12.5	-0.1	24.9	0.4			125.6	105	0	14	131	85	161.7
ROBERVAL	13.5	2.3	28.7	0.4	0.0		93.5	102	0	15	131	*	154.3
SCHEFFERVILLE	7.8	2.6	18.4	-1.0	1.0	5	77.4	92	0	12	110	*	307.8
SEPT-ILES	9.5	0.2	20.6	-1.4	0.0		62.4	55	0	9	143	90	254.0
SHERBROOKE	12.5	0.4	25.8	-1.8	0.4		92.6	90	0	11	122	*	166.9
STE AGATHE DES MONTS	12.3	1.4	24.0	-1.9	2.4		141.8	138	0	12	140	88	175.5
ST-HUBERT	14.6	0.2	26.6	0.3	0.0		120.7	133	0	10	*		230.8
VAL D'OR	11.7	1.3	26.1	-4.8	0.2	16	74.8	69	0	14	149	105	189.6
NEW BRUNSWICK													
CHARLO	12.4	1.0	27.5	-0.4	0.0		53.3	70	0	9	132	82	171.1
CHATHAM	13.6	0.6	29.5	-1.5	0.0		124.0	145	0	8	140	78	140.9
FREDERICTON	13.4	0.2	29.0	-2.0	0.0		161.3	185	0	11	147	*	143.8
MONCTON	14.1	1.1	28.4	-0.2	0.0		154.9	203	0	11	160	96	127.1
SAINT JOHN	13.5	0.8	24.8	-1.4	0.0		178.3	159	0	10	162	97	137.9

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NOVA SCOTIA													
GREENWOOD	14.6	0.8	27.2	-0.5	0.0		151.2	180	0	12	X		108.2
HALIFAX INT'L	14.2	0.4	26.3	2.2	0.0		136.3	145	0	9	*		117.9
SABLE ISLAND	15.5	-0.2	21.1	6.6	0.0		135.9	147	0	9	159	101	76.8
SHEARWATER	14.7	0.2	23.2	3.6	0.0		144.8	167	0	10	169	93	101.3
SYDNEY	13.5	0.0	27.2	2.8			180.6	207		14	173	103	139.0
YARMOUTH	14.0	0.4	20.8	5.3	0.0		207.6	232	0	8	163	92	120.1
PRINCE EDWARD ISLAND													
CHARLOTTETOWN	14.0	0.5	25.7	2.1			174.3	201	0	14	X		123.9
SUMMERSIDE	14.5	0.4	26.4	2.2	0.0		143.6	182	0	10	163	96	110.2
NEWFOUNDLAND													
											X		
BATTLE HARBOUR	8.7	0.2	23.2	-0.6			59.4	78	0	7	X		279.4
BONAVISTA	11.2	-0.5	19.5	3.5	0.0		88.8	103	0	10	X		203.7
BURGEO	11.5	-0.1	19.8	3.1	0.0		122.6	102	0	12	*		190.1
CARTWRIGHT	8.8	0.5	22.2	0.6	0.0		78.3	86	0	12	150	139	274.9
CHURCHILL FALLS	8.4	1.7	21.6	-1.8	7.0	71	88.6	93	0	14	121	123	289.3
COMFORT COVE	9.8	-1.5	24.2	1.8	0.0		85.8	99	0	12	X		243.2
DANIEL'S HARBOUR	10.5	-0.3	22.0	2.0	0.0		139.1	151	0	13	162	124	224.2
DEER LAKE	11.2	0.7	24.4	-2.0	0.0		81.5	91	0	12	X		205.6
GANDER INT'L	10.4	-1.0	23.6	2.5	0.0		68.0	83	0	9	136	93	228.0
GOOSE	10.9	1.8	22.2	-0.8			92.3	104		13	147	121	239.2
PORT-AUX-BASQUES	11.9	0.6	20.2	3.1	0.0		108.8	94	0	15	147	*	182.2
ST ANTHONY	8.4	0.3	20.3	0.0	0.0		92.6	69	0	14		*	265.0
ST JOHN'S	11.2	-0.4	20.2	2.9	0.0		112.8	96	0	15	146	99	204.5
ST LAWRENCE	12.0	0.7	20.1	2.6	0.0		152.7	120	0	10		*	
STEPHENVILLE	12.7	0.8	22.2	3.9	0.0		143.9	138	0	15	114	*	160.7
WABUSH LAKE	8.1	1.9	18.8	-2.4	2.6	*	91.8	98	0	13	96	*	299.9

AGROCLIMATOLOGICAL STATIONS — SEPTEMBER 1987

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	16.8	1.3	31.0	4.0	0.0	44.4	42	0	4	224	354.0	2053.6
KAMLOOPS												
SIDNEY	15.6	*	30.5	6.5	0.0	10.8	*	0	2	249	318.5	1869.8
SUMMERLAND	17.5	2.3	36.0	4.5	0.0	6.8	36	0	2	277	376.3	2346.5
ALBERTA												
BEAVERLODGE	13.0	3.5	29.0	-2.0	0.0	3.0	7	0	1	208	233.5	1318.8
ELLERSLIE												
FORT VERMILLION												
LACOMBE	12.5	2.4	29.0	-3.5	0.0	28.6	70	0	4	262	225.0	1335.6
LETHBRIDGE												
VAUXHALL												
VEGREVILLE	12.7	3.0	28.0	-1.0	0.0	64.2	153	0	2		230.8	1457.9
SASKATCHEWAN												
INDIAN HEAD	13.7	2.2	33.0	0.5	0.0	23.6	56	0	4		264.0	1849.5
MELFORT	13.3	3.0	31.5	0.5	0.0	7.2	7	0	3	178	241.0	1630.0
REGINA	12.9	1.7	34.5	2.5	0.0	16.0	45	0	4		241.5	1721.0
SASKATOON												
SCOTT	12.8	2.4	32.0	1.0	0.0	21.5	76	0	3	247	233.7	1534.0
SWIFT CURRENT SOUTH	14.6	2.8	33.5	0.0	0.0	8.8	30	0	3	210	288.0	1809.9
MANITOBA												
BRANDON	13.8	2.0	28.8	-2.3	0.0	31.0	62	0	8		265.3	1914.2
GLENLEA	13.5	1.3	29.5	-3.0	0.0	20.8	42	0	5	188	262.5	1913.3
MORDEN	15.0	1.9	29.0	2.0	0.0	35.0	67	0	6	159	304.5	2141.0
ONTARIO												
DELHI	15.8	-0.1	26.0	3.5	0.0	58.4	73	0	11	148	322.3	2198.0
ELORA	14.3	0.1	26.1	2.8	0.0	69.2	97	0	11		231.2	1915.3
GUELPH	15.0	0.0	26.9	1.6	0.0	61.6	97	0	11	145	300.6	2024.4
HARROW	17.3	-0.2	26.5	6.0	0.0	78.8	119	0	82	187	380.6	2540.4
KAPUSKASING	11.9	1.6	24.5	-3.5	0.0	60.4	67	0	9	133	206.5	1446.0
MERIVALE												
OTTAWA	15.0	0.4	26.8	-0.3	0.0	132.2	164	0	11	166	298.7	2100.0
SMITHFIELD	15.7	0.7	24.5	3.0	0.0	118.9	151	0	10		321.3	2240.2
VINELAND STATION	16.7	-0.3	25.9	7.0	0.0	96.6	129	0	13	148	351.6	2266.8
WOODSLEE												
QUEBEC												
LA POCATIERE	12.1	-0.5	24.0	2.0	0.0	94.0	99	0	12	150	211.8	1555.0
L'ASSUMPTION	14.3	0.4	27.0	-2.0	0.0	125.4	142	0	12	150	279.1	1924.5
LENNOXVILLE												
NORMANDIN	11.3	0.9	27.5	-4.0	0.0	74.0	77	0	13	110	190.7	1376.1
ST. AUGUSTIN												
STE CLOTHILDE	14.4	0.2	27.5	-1.0	0.0	139.2	161	0	12	152	290.8	1981.3
NEW BRUNSWICK												
FREDERICTON	13.5	0.1	27.5	-3.0	0.0	160.8	182	0	11	147	255.9	1572.4
NOVA SCOTIA												
KENTVILLE	14.6	0.3	28.5	0.0	0.0	132.6	155	0	10	171	292.8	1740.5
NAPPAN	14.5	1.1	27.0	-1.0	0.0	166.2	205	0	14	153	281.0	1585.0
PRINCE EDWARD ISLAND												
CHARLOTTETOWN	14.5	0.4	26.0	3.0	0.0	169.6	203	0	12	169	284.3	1595.4
NEWFOUNDLAND												
ST. JOHN'S WEST	11.1	-0.5	19.5	1.5	0.0	101.6	95	0	14	129	183.8	1093.6