Climatic Perspectives

Monthly Review

SEPTEMBER - 1989

Vol. 11

CLIMATIC

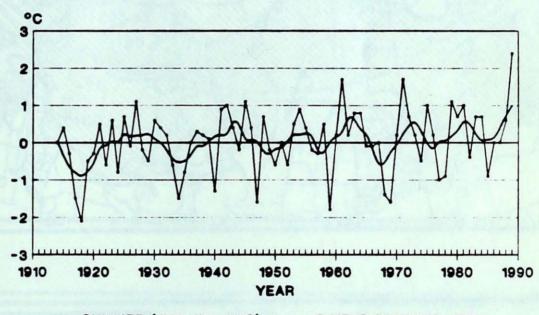
HIGHLIGHTS

he western portion of the Canadian Arctic experienced an unusually hot summer in 1989. As a result, a number of climate stations in the region recorded significantly higher temperatures throughout the June to August season than at any time during their recorded history. As illustrated in the figure for the trends of summer temperatures at Coppermine, this was the second consecutive record-warm summer for a number of stations.

Furthermore, most of these stations show mean values over the last five summers, 1°C and more warmer than any previous average of five consecutive summers. Other stations showing new records for both 1989 and the 5 consecutive year average include Inuvik, Hay River and Fort Simpson.

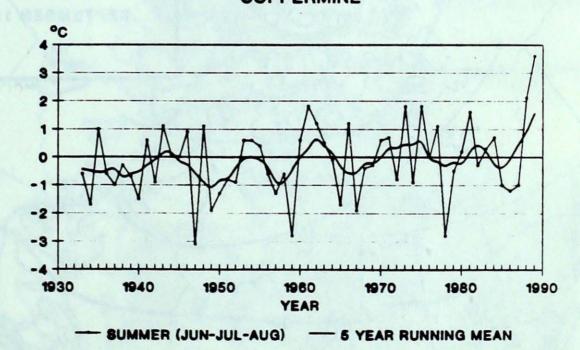
Other regions of Canada were less spectacular in terms of average summer temperatures. In fact, while southwestern Canada showed above normal but not record-setting temperatures, much of eastern Canada experienced normal to slightly below normal temperatures.

The pattern of departures from normal temperatures across Canada appears to be dominated by the effects of a ridge of high atmospheric pressure which moved into the Northwest Territories from the North Pacific in early June, bringing a warm southerly flow to the west and cooler flow from the north to the east. However, the unprecedented nature of the heat in the west Arctic supports evidence that the Northern Hemisphere has been slowly warming over the past two decades, and continues to do so. While it is premature to MEAN SUMMER TEMPERATURES FORT SIMPSON



SUMMER (JUN-JUL-AUG) -- 5 YEAR RUNNING MEAN

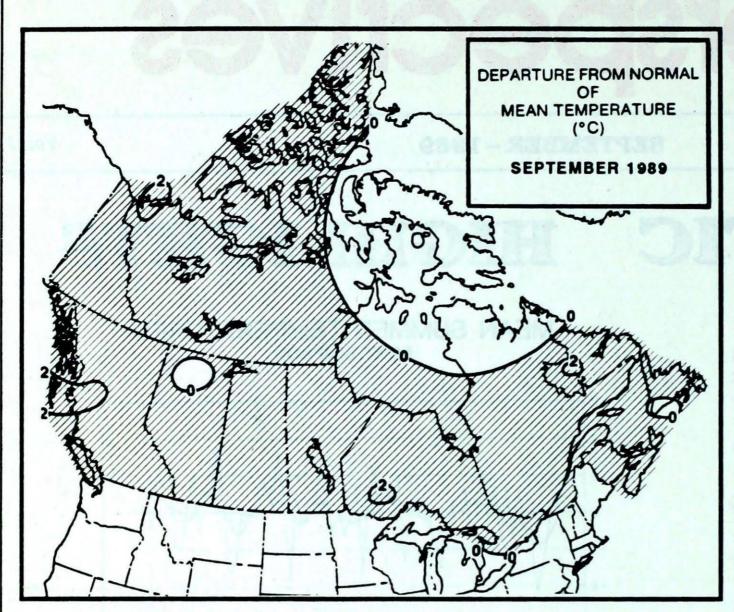
COPPERMINE

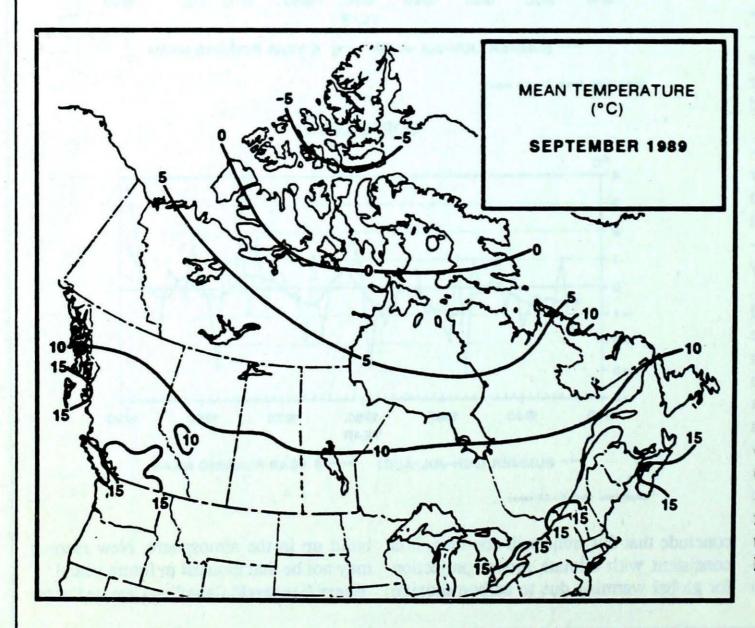


departure from 61-80 mean

conclude that this trend will continue, it is consistent with climate model projection for global warming due to carbon dioxide

build up in the atmosphere. New records may not be that unusual in future years! Henry Hengeveld, Canadian Climate Centre





Across the country

The Northwest Territories

Wintry weather conditions gradually encompassed all of the Arctic, and by the end of the month maximum readings failed to climb above freezing, with snow and blowing snow becoming more common. Weather and gale warnings were issued regularly for the Keewatin and northern Hudson Bay districts. By the end of the month there was a general coverage of snow over much of the Arctic. Baker Lake, near the western shoreline of Hudson Bay, received 13 cm of snow, which is more than twice the normal for the month.

The short shipping season came to a close in the eastern and western Arctic by the end of the month, with resupply operations successfully completed. Only the John A. MacDonald remains in Lancaster Sound to assist the ice-strengthened ore carrier M.V. Arctic on its final voyage to Nanisivic, located on northern Baffin Island, in early November.

In the Mackenzie Valley, warm temperatures were experienced at the beginning of the period, frost and the first flakes of snow were reported after the middle of the month. It was unusually wet in the Mackenzie Delta, where precipitation amounts were more than twice the normal.

Yukon

In the Yukon, mild summer weather conditions stretched into September. The first half of the month saw temperatures climb into the twenties, with daily temperature records broken on a number of consecutive days. At Whitehorse, this was the 5th month in a row with above normal mean temperatures. Frost was reported in most areas by mid-month. Below freezing overnight minimum temperatures were common by the latter half of the month. Sunshine, which was prevalent during the first part of the month, gave way to more typically cloudy autumn weather by the latter half of the month.

For the most part, precipitation was less

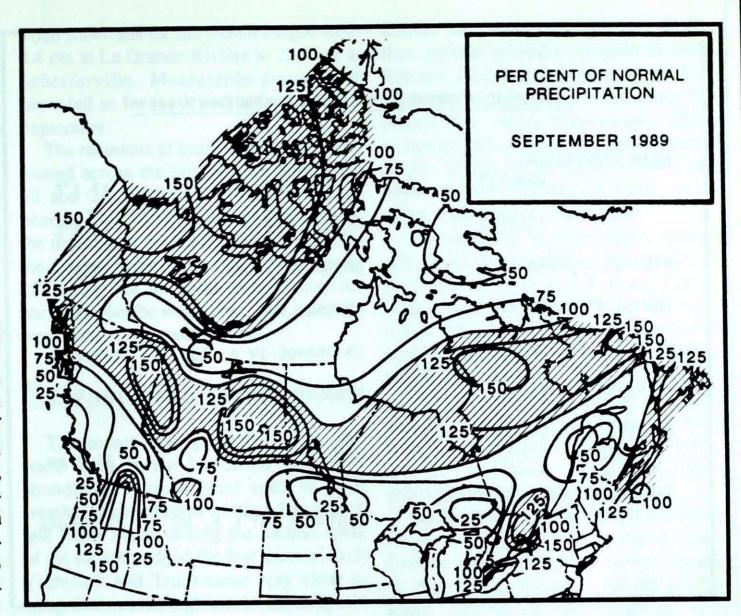
than would be expected at this time of the year. The wettest area was along the southwest side of the Pelly Mountain range, which includes Whitehorse. While in the northern and central Yukon precipitation fell as a mixture of rain and snow, snow was definitely lacking in the southern valleys, where it is not unusual to receive at least a few centimetres of snow in September. By month's end most mountain peaks in the Yukon were covered in snow.

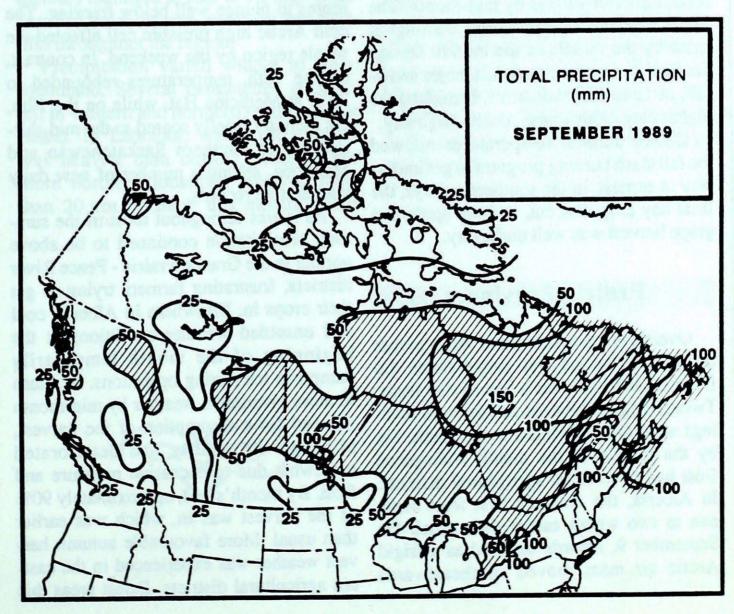
British Columbia

A persistent ridge of high pressure diverted Pacific weather systems northwards and allowed a large portion of the province to bask in sunny, warm, and for the most part, dry weather conditions, perfect autumn harvest weather. The communities along the north coast and in northern B.C. recorded their warmest September ever, with mean temperatures 2 to 3 degrees above normal. The warm temperatures were complimented by sunny skies.

Record amounts of bright sunshine were reported along the coast and across parts of the central interior. Both Abbotsford and Vancouver and some communities on Vancouver Island logged more than 250 hours of sunshine this month. A number of locations recorded half as much sunshine again in relation to their normal.

It was unusually dry throughout most of the province, with many locations receiving only a fraction of their normal monthly rainfall totals. Record low monthly precipitation values were established in several areas, particularly along the coast. Rainfalls during September from the Queen Charlottes, south to Vancouver Island, were less than 20 percent of normal. Precipitation was even more sparse on Vancouver Island, with actual amounts ranging as low as just a few millimetres. Victoria had just 2.2 mm of rain, only 6 percent of their September average. In contrast, well-above-normal amounts of precipitation fell in the northeastern portions of the province and a small pocket in the extreme southern interior, where amounts were as much as three times the





CLIMATIC EXTREMES IN CANADA - SEPTEMBER 1989 **MEAN TEMPERATURE:** 17.2°C LYTTON, BC WARMEST COLDEST ALERT, NWT -8.9°C 34.8°C HIGHEST TEMPERATURE: BRANDON A, MAN EUREKA, NWT -24.1°C LOWEST TEMPERATURE: **HEAVIEST PRECIPITATION:** LA GRANDE IV A, QUE 193.0 mm RESOLUTE A, NWT 54.4 cm **HEAVIEST SNOWFALL:** DEEPEST SNOW ON THE GROUND RESOLUTE A, NWT ON SEPTEMBER 30, 1989: 36.0 cm GREATEST NUMBER OF BRIGHT SUNSHINE HOURS: VICTORIA INT'L A, BC 277 hours

normal. Frost reached as far south as the central interior valleys by mid-month. The north saw the season's first dusting of snow by the middle of the month. During the final week of the month, a major snowfall, of 10 to 15 centimetres, blanketed the higher elevations of the Alaska Highway.

Cooler autumn temperatures allowed the fall slash burning program to get underway in earnest. In the southern valleys, the final hay crop was cut, and the apple and grape harvest was well underway.

Prairie Provinces

Overall it was a sunny and warm month across the Prairies, but temperatures did fluctuate markedly on a day-to-day basis. Twenty-degree daytime temperature readings were quite common in the south, but by the middle of the month widespread frost had covered all agricultural districts. In Alberta, the season's first frost came one to two weeks earlier than usual. On September 9, records tumbled as a frigid Arctic air mass moved southeastwards

over the region, causing overnight minimums to plunge well below freezing. The cold Arctic high pressure cell affected the whole region by the weekend. In contrast, on the 16th, temperatures rebounded to 29°C at Medicine Hat, while on the 17th, the mercury briefly soared to the mid-thirties across southern Saskatchewan and Manitoba, setting a number of new daily temperature records.

As it was throughout most of the summer, precipitation continued to be above normal in the Grande Prairie - Peace River districts, frustrating farmers trying to get their crops in. Elsewhere in Alberta, cool and unsettled weather conditions at the beginning of the month temporarily hampered harvesting operations. A return to more favourable weather by mid-month allowed for a resumption of the harvest, although the quality had deteriorated somewhat due to excessive moisture and frost. By month's end, approximately 90% of the harvest was in, which was earlier than usual. More favourable autumn harvest weather was experienced in the eastern agricultural districts. Driest areas this

month were southeastern Manitoba and northwestern Alberta. Light snowfalls are not unusual in the Prairies in September, but for the most part snowfalls this month were minimal - High Level, Alberta, received 11 cm.

The southern prairies were sunnier than usual this month, while sunshine was deficient in the more northern communities.

Ontario

After the third consecutive warmerthan-normal summer (June, July, August), the weather by the latter half of the month had definitely become more autumn-like. Temperatures across the northern twothirds of the province were, for the most part above normal, while colder than normal readings were experienced in the south.

The first snow of the season covered portions of northern Ontario on the 23rd. Timmins set a new September snowfall record of 13 cm, surpassing the previous monthly record of 11 cm, set in 1980. By month's end, a killing frost had hit many southern agricultural communities. September was a dry month, with many areas receiving half their normal precipitation. Sioux Lookout and Earlton received only 16 and 24 millimetres of precipitation, respectively. At Earlton, this was the driest month since 1939. The dry conditions would have been more apparent in southern Ontario if it were not for the oneday heavy rainfall on the 22nd, which was associated with the remnants of hurricane Hugo.

The former tropical storm, which ravaged the Carolinas earlier in the day, moved rapidly eastwards across the lower lakes. The first official day of autumn in southern Ontario was marked by heavy rain, which first moved across the Niagara Peninsula during the afternoon and then eastwards into Québec by evening. Heaviest 12-hour rainfall totals were between 50 and 75 millimetres. This was the seventh passage of a near-hurricane through Ontario since 1900, and the most severe since Hazel in 1954. Although rain-

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falls for the month in some locations of southern Ontario, as a result of this storm, exceeded 100 mm, for the most part September in Ontario could be considered a sunny month; most localities received more than their normal allotment of sunshine.

Québec

Except for the extreme north, temperatures for the month averaged above normal. In fact, new record high mean monthly temperatures were tied at Chibougamau and Blanc Sablon, and a new mean temperature record of 13°C was established at Gaspé.

While in northern Québec sunshine was deficient, it was unusually sunny across southern and central Québec. New monthly records for hours of bright sunshine were broken at Gaspé, Roberval, Chibougamau, Matagami and Val d'Or.

Precipitation was below normal over the southern half of the province, with the exception of those areas that were in the path of the remains of the former tropical storm Hugo. Rainfalls from this one storm alone ranged between 50 and 100 millimetres, all within a twelve hour period. A new low monthly rainfall record of 45.3 mm was established at Baie Comeau. Across northern Québec precipitation was heavier than usual, and eastward from the Hudson Bay shoreline precipitation amounts were almost double the normal.

Total snowfalls for the month ranged from 4.4 cm at La Grande Rivière to 22.4 cm at Schefferville. Measurable amounts of snow fell as far south as Maniwaki during September.

The remnants of hurricane Hugo, which moved across the province on September 22 and 23, produced very strong winds near the Gulf of St. Lawrence shoreline on the morning of the 23rd. At Cape Chat, on the Gaspé, winds were clocked gusting to 129 km/h. For the most part, damage associated with the storm was light, but there were reports of power outages.

Atlantic Canada

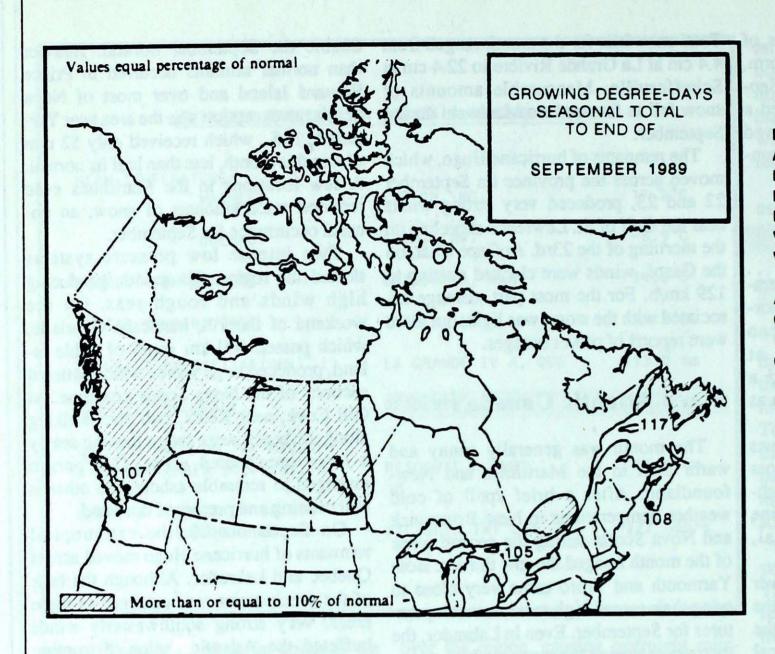
The month was generally sunny and warm both in the Maritimes and Newfoundland. After a brief spell of cold weather, temperatures in New Brunswick and Nova Scotia during the second week of the month nudged the low thirties. Both Yarmouth and Truro came very close to tying their record high maximum temperatures for September. Even in Labrador, the mercury managed to soar to the high twenties. For the most part, sunshine was plentiful throughout the region.

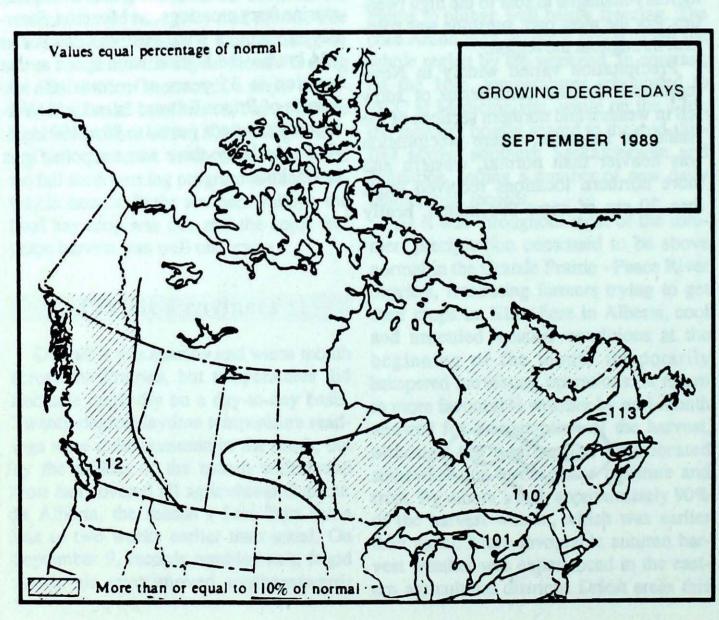
Precipitation varied widely in Newfoundland. Several centimetres of snow fell in western and northern sections of the Island. In Labrador, where precipitation was heavier than normal, western and more northern locations received more than 20 cm of snow this month, nearly double the September normal. Heavier than normal rainfalls occurred in Prince Edward Island and over most of Nova Scotia; an exception was the area near Yarmouth, N.S., which received only 52 mm of rain this month, less than half its normal. A few locations in the Maritimes even reported trace amounts of snow, an unusual occurrence for September.

Two intense low pressure systems skirted the region this month, producing high winds and rough seas. On the weekend of the 9th, hurricane Gabrielle, which passed 500 km south of Sable Island, produced huge waves which battered sections of the Nova Scotia coastline. At Gill Cove, near Ketch, two men walking along the beach were swept into the sea by a large unexpected wave. One person managed to scramble ashore; the other is still missing and presumed drowned.

On September 23, the extratropical remnants of hurricane Hugo moved across Québec and Labrador. Although the bulk of the precipitation was confined to these areas, very strong southwesterly winds buffeted the Atlantic region, disrupting marine ferry crossings. At Moncton, Saturday morning, a wind gust was clocked at 124 km/h - the highest wind speed at that location in 35 years of records. On the islands of Prince Edward Island and Newfoundland, winds gusted to 80 to 100 km/h. At St. Anthony, there was a reported gust to 120 km/h.





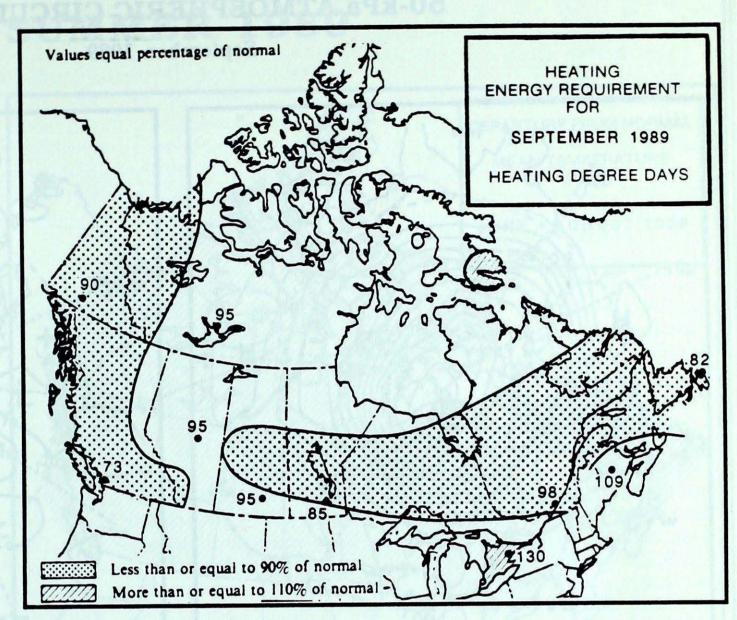


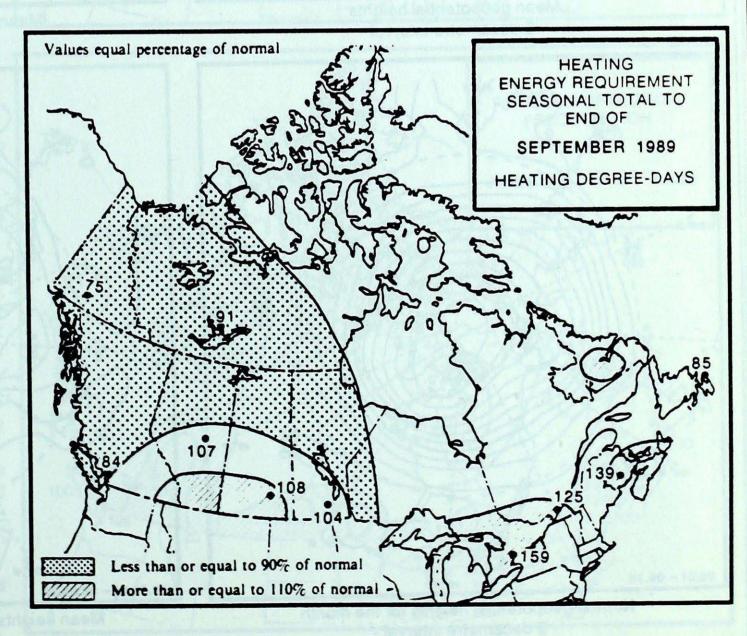
SEASONAL TOTAL OF GROWING DEGREE-DAYS TO END OF SEPTEMBER

	1989	1988	NORMAL
BRITISH COLUMBI	A		
Abbotsford	1766	1703	1592
Kamloops	2092	*	1990
Penticton	2021	*	1907
Prince George	1167	*	1012
Vancouver	1736	1717	1623
Victoria	1562	1502	1502
ALBERTA			
Calgary	*	*	*
Edmonton Mun.		*	*
Grande Prairie	*	*	*
Lethbridge	*	*	*
Peace River			
SASKATCHEWAN		2005	
Estevan	*	2005	*
Prince Albert		*	*
Regina	*	*	*
Saskatoon Swift Current	grund	*	*
MANITOBA	Quelle		
Brandon	*	*	*
Churchill	*	*	*
Dauphin	*	*	*
Winnipeg	*	1796	*
ONTARIO			
London	1850	2034	1784
Mount Forest	*	*	*
North Bay	*	*	*
Ottawa	*	1979	*
Thunder Bay	*	*	*
Toronto	1888	2009	1795
Trenton	*	2947	*
Windsor	2152	2399	2148
QUEBEC			
Baie Comeau	*	*	
Maniwaki	1650	1602	1493
Montréal	2003	1963	1890
Quebec	*	*	
Sept-Iles	*	*	*
Sherbrooke			ne boxed
NEW BRUNSWICK	total d	- ora	
Charlo	****	1343	
Fredericton		1607	1481
Moncton	1558	1471	1401
NOVA SCOTIA		1352	*
Sydney	mary!	1332	*
Truro Yarmouth	1448	1343	1341
	ISLAND	1343	THE VALUE
Charlottetown	1572	1433	1455
NEWFOUNDLAND			
Gander	*	*	*
St. John's	*	*	*
Stephenville	1350	1166	1156

SEASONAL TOTAL OF HEATING DEGREE-DAYS TO END OF SEPTEMBER

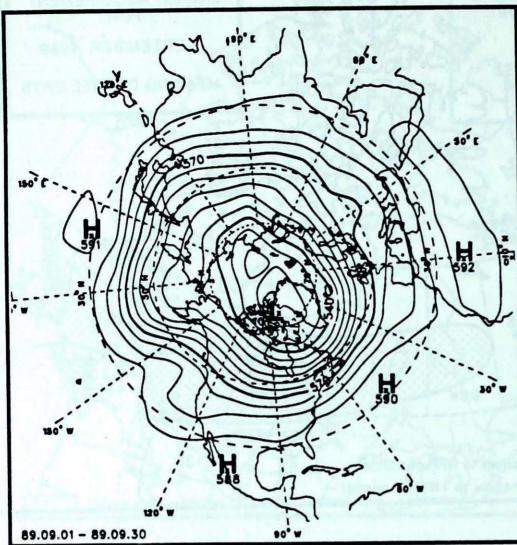
	1989	1988	NORHAL
BRITISH COLUMBI		1700	HUIVAL
Kamloops	96	129	96
Penticton	103	141	104
Prince George	368	495	463
Vancouver	141	182 283	167 238
Victoria	243	263	236
YUKON TERRITORY			
Whitehorse	460	711	610
NORTHWEST TERRI			
Iqaluit	1156	979	1138
Inuvik	618	766	813 514
Yellowknife	470	504	314
ALBERTA			
Calgary	327	397	361
Edmonton Mun	307	341	287
Grande Prairie	364	420	413
SASKATCHEWAN			
Estevan	191	210	175
Regina	227	263 306	210
Saskatoon MANITOBA	252	306	236
Brandon	227	252	221
Churchill	657	690	781
The Pas	337	309	322
Winnipeg	184	185	177
ONTARIO	35.5	206	364
Kapuskasing London	355 133	346 110	80
Ottawa	132	160	113
Sudbury	228	204	203
Thunder Bay	289	252	276
Toronto	127	109	80
Windsor	83	43	35
QUEBEC Baie Comeau	420	453	424
Montréal	125	155	100
Quebec	184	245	188
Sept-Iles	436	464	471
Sherbrooke	251	271	253
Val-d'Or	336	337	335
The second			
NEW BRUNSWICK Charlo	253	307	274
Fredericton	218	234	157
Moncton	229	230	177
NOVA SCOTIA			
Halifax		*	*
Sydney	237	259	
Yarmouth	245	237	237
PRINCE EDWARD Charlottetown	ISLAND 208	220	161
NEWFOUNDLAND	208	220	1.01
Gander	294	364	321
St. John's	302	362	
The Manual Control			



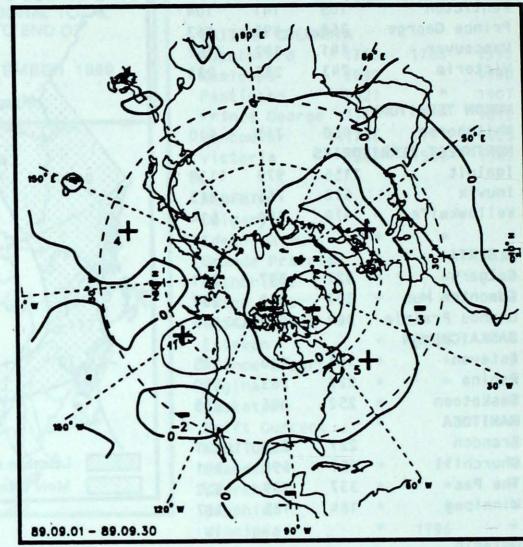


50-kPa ATMOSPHERIC CIRCULATION

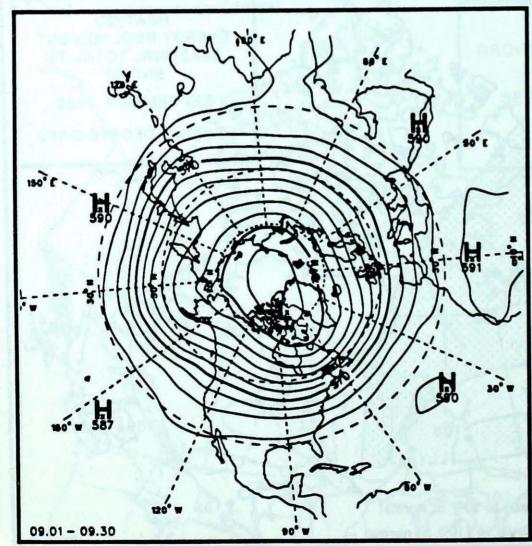
September 1989



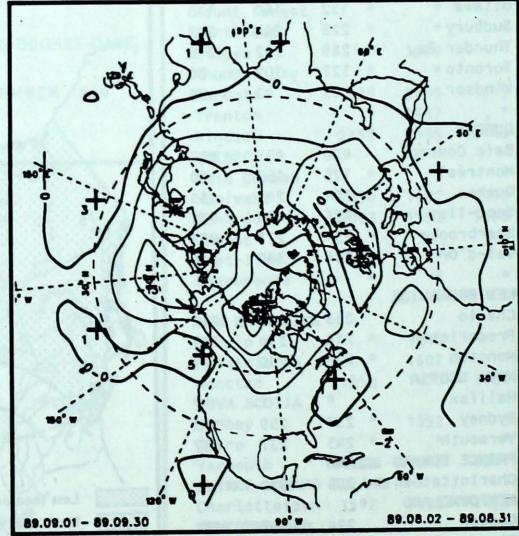
Mean geopotential heights - 5 decametre interval -



Mean geopotential height anomaly - 5 decametre interval-



Normal geopotential heights for the month - 5 decametre interval -



Mean heights difference w/r to previous month - 5 decametre interval -

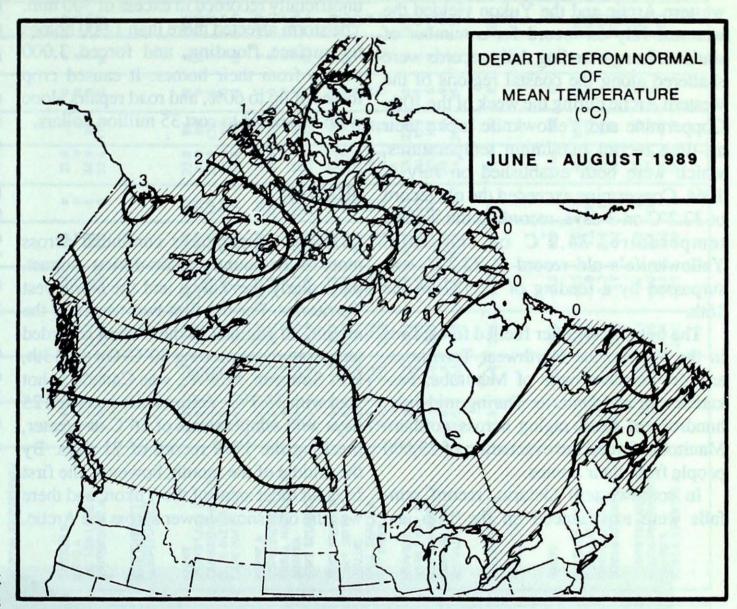
SUMMER 1989

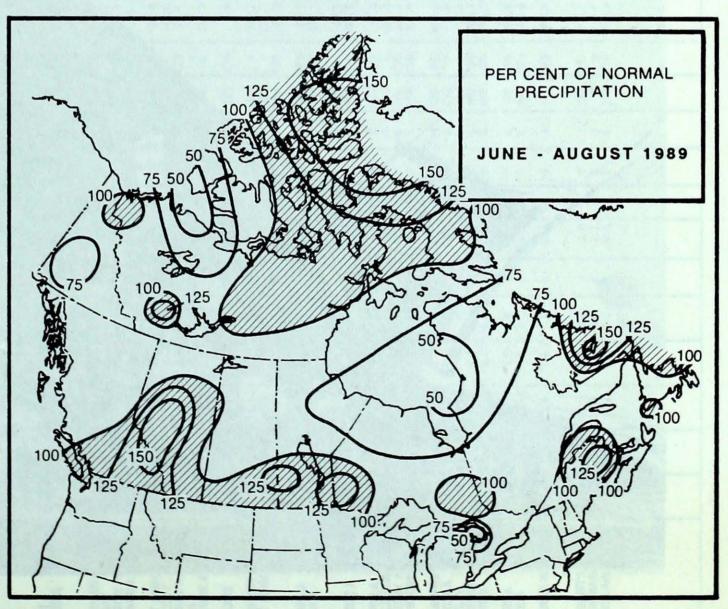
Record-warm temperatures across the Northwest Territories, the Yukon and the northern parts of the Prairies made the news this summer. The hot, dry weather put 1989 in the record books as the worst forest-fire year since records began in 1918. Up to the end of August, over 6 million hectares of forest had been destroyed in Canada, as compared to the ten-year average of 2 million hectares per year. In contrast, heavy rains during June and July inundated southwestern Ontario, and there was flooding and major crop losses.

June

The month of June was generally wet across the country. Although heavy rains were most welcomed by farmers across the Prairies, soggy fields in many areas of southern Ontario disrupted planting and caused considerable crop loss, particularly to potatoes and tomatoes.

Severe summer weather took its toll in the Okanagan region of British Columbia. On June 19, a severe hail storm caused a lot of damage to the apple orchards. Several outbreaks of severe weather occurred across the Prairies. The same day, eight tornadoes were reported across central Saskatchewan, with the worst damage occurring near Blaine Lake, although there were no personal injuries. On the 24th, 3 funnel clouds were reported near Winnipeg, and on the 25th, a tornado destroyed some property in Kendall, Saskatchewan. On June 30, a tornado damaged seventy of the one hundred homes on the Poundmaker Indian Reserve near Cutknife, Saskatchewan; fifteen people were taken to hospital. Near Paynton, on the same day, a tornado blew cars off the roads and damaged buildings.





continued ...

July

Torrid weather across the Praires, the western Arctic and the Yukon yielded the warmest July on record for a number of stations. Long-standing daily records were shattered along the coastal regions of the western Arctic during the week of the 10th. Coppermine and Yellowknife broke their all-time record maximum temperatures, which were both established on July 9, 1964. Coppermine exceeded the old record of 32.2°C on 3 days, recording the highest temperature, 34.9°C on the 15th. Yellowknife's old record of 32.2°C, was surpassed by a reading of 32.5°C on the 16th.

The hot, dry weather fuelled forest fires in the Yukon, the Northwest Territories, and the northern parts of Manitoba, Saskatchewan and Ontario. During mid-July, hundreds of fires, raging across northern Manitoba, forced the evacuation of 23,000 people from their homes.

In southwestern Ontario, record rainfalls were experienced on the 19th and 20th. Harrow received 264.2 mm in a 17-hour period, which was the highest 2-day total ever recorded in Ontario. Colchester unofficially recorded in excess of 300 mm. The storm affected more than 1,000 homes by surface flooding, and forced 3,000 people from their homes. It caused crop losses of up to 60%, and road repairs alone were estimated to cost 35 million dollars.

August

Warm temperatures continued across most of the country again during August, particularly the Yukon and the Northwest Territories. For the first two weeks of the month, all stations in the Yukon recorded temperatures exceeding 30°C. On the 13th, Fort Simpson, N.W.T., was Canada's hot spot with 33.7°C. Yellowknife recorded 25 days with temperatures of 25°C or greater, breaking the 1948 record of 21 days. By the middle of the month, however, the first frost hit most areas of the Yukon, and there was the odd snowshower across the Arctic.

There were some unusual reports of severe weather from the Prairies. On the 23rd, there was a report from Hyas, Saskatchewan, that hail was "bumper deep" on the highway, and that hail was still on the ground 19 hours after the event.

On August 8, in the Atlantic Provinces, the remnants of hurricane Dean passed south of Nova Scotia and across the southeastern part of Newfoundland. Winds were in excess of 100 km/h, with only minor damage reported in Newfoundland. On the morning of August 15, a tornado damaged a few properties in Carlisle, N.B. Tornadoes are rare in the Maritimes, and are reported on average only once every 2 years.

During the week of the 21st, a series of disturbances crossing Alberta dumped copious amounts of rain on the Grande Prairie district. Harvesting came to a standstill, as hay bales and peas rotted in standing water.

A. Gergye, Canadian Climate Centre



A tornado damaged this machine shed near Regina during a severe thunderstorm on June 19,1989. Canapress Photo Service.

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STATION	Mean	Difference from Normal	Madmum	Minimum	Snowfall (cm)	R of Normal Snowfall	Total Precipitation (mm)	X of Normal Precipitation	Snow on ground at end of month (am)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	X of Normal Bright Sunshine	Degree Days below 18 C
BB[USHbia													
ABBOTSFORD A ALERT BAY AMPHITRITE POINT BLUE RIVER A	16.1 12.9 14.6 11.5	1.6 0.3 1.2 0.8	29.6 27.9 24.4 26.2	3.2 5.7 6.2 -1.4	0.0 0.0 0.0 0.0	* * 0	11.4 17.1 6.5 33.3	13 14 4 40	0 0 0	2 5 3 9	254 # 164	146	65.0 151.7 103.6
CAPE ST JAMES CAPE SCOTT CASTLEGAR A COMOX A CRANBROOK A	15.2 12.6 14.7 15.2 12.5	2.3 0.1 0.1 1.5 0.5	23.2 23.5 28.7 28.6 26.1	9.8 6.1 2.9 7.0 -0.6	0.0 0.0 0.0 0.0 0.0	*	20.8 31.8 22.6 25.4 26.8	17 15 57 49 88	0 0 0 0	6 5 4 4	208 234 263 242	123 112	87.6 162.0 98.4 85.7 165.9
DEASE LAKE	8.5	1.4	23.7	-7.7	2.6	186	49.8	108	0	9	131	104	
FORT NELSON A FORT ST JOHN A HOPE A	9.9 10.4 17.5	1.2 0.9 2.0	24.4 23.3 30.0	-2.8 -1.6 6.5	0.7 8.2 0.0	11 158 *	66.2 71.2 36.5	159 182 35	0 0	10 10 8	184 153 230	133	241.7 227.8 41.3
KAMLOOPS A KELOWNA A	15.6 14.4	0.7	27.8 28.3	3.0 0.8	0.0	:	13.6 25.6	64 80	0	5	241 241	123 118	73.0 107.5
LYTTON MACKENZIE A	17.2 10.5	1.1	30.8 24.6	5.0 -6.0	0.0		27.4 39.2	116 74	0	3 6	196	106 143	37.2 225.8
PENTICTON A PORT ALBERNI A PORT HARDY A PRINCE GEORGE A	15.5 16.0 12.3 11.4	0.8 1.7 0.5 1.7	29.2 31.2 25.2 24.6	3.9 1.3 5.2 -1.4	0.0 0.0 0.0 0.0			290 16 16 28	0 0 0	2 3 4 5	246 258 190 208	117 138 130	77.5 60.8 169.7 197.9
PRINCE RUPERT A PRINCETON A QUESNEL A REVELSTOKE A	12.3 13.3	1.0 0.4 0.8	27.0 29.1 25.5	2.5 -1.7 2 3.0	0.0		192.6 29.2 29.4	79 160 *	0 0 0	11 4 * 4	139 232 182	118	168.6
SANDSPIT A SMITHERS A	15.4	2.5	23.0	1.5	0.0	0	33.6	19	0	6	166	120	178.8
VANCOUVER INT'L A	14.5	2.6	27.4	7.4	0.0	:	11.2	95	0	6	192	151	109.0
VICTORIA INT'L A VICTORIA MARINE WILLIAMS LAKE A	14.7 14.2 11.5	0.8 1.2 1.2	28.9 26.8 25.2	4.5 4.7 -2.0	0.0 0.0 0.0	. 0	2.2 2.3 16.1	6 9 53	0 0 0	1	277 229	142	101.6 116.6 194.9

III THE	Tem	peratur	e C		-				2	more			
STATION	Medn	Difference from Normal	Maximum	Minimum	Snowfall (cm)	X of Normal Snowfall	Total Precipitation (mm)	Z of Normal Precipitation	Snow on ground at end of month (am)	No. of days with Precip 1.0 mm or ma	Bright Sunshine (hours)	Z of Normal Bright Sunshine	Degree Days below 18 C
YUKON TERRITORY				31 70 70									
DAWSON A MAYO A WATSON LAKE A WHITEHORSE A	6.4 8.7 8.6	* * 11 11 11 11 11 11 11 11 11 11 11 11	24.2 25.3 24.5	-12.2 # -4.0 -5.6	1.4 8 0.2 0.0	6 0	27.8 # 40.9 39.4	94 130	0 * 0 0	# 9 10	181 137	# 143 100	279.7 283.3
NORTHWEST		art l		ere i									
ALERT BAKER LAKE A CAMBRIDGE BAY A CAPE DYER A CAPE PARRY A	-8.9 2.5 -0.2 -2.9 1.4	1.3 0.2 0.5 -1.5 0.7	2.6 21.6 11.8 6.9 14.5	-20.2 -7.7 -13.4 -14.1 -5.1	30.6 13.0 10.8 45.2 20.0	93 220 127 80 137	23.9 31.9 23.8 31.3 44.6	86 86 138 43 191	19 0 4 11 0	8 12 8 7	106 90 72 8	128 84 87	807.9 466.4 545.5 626.1 498.6
CLYDE A COPPERMINE A CORAL HARBOUR A EUREKA FORT RELIANCE	-1.5 2.7 2.7 -8.0 6.5	-1.3 0.2 0.3 0.4	8.9 16.8 3.3 22.8	-13.8 -8.8 2 -24.1 -4.4	15.9 13.8 # 14.2 3.2	54 260 # 138 128	22.1 31.6 10.6 43.4	63 132 110 144	60 . 60	9 8 3 10	130 71 # 90	153 102 8 88	583.9 461.9 780.7 341.2
FORT SIMPSON A FORT SMITH A IQALUIT HALL BEACH A HAY RIVER A	8.4 7.6 0.6 -1.0 8.6	1.1 0.1 -1.0 -0.4 0.5	25.7 23.9 10.1 7.2 24.8	-4.6 -8.3 -6.8 -8.3 -6.7	8.4 1.6 16.4 11.4 1.6	147 80 118 94 57	77.3 22.8 20.5 14.2 11.5	58 55 45 52 27	0 0 0 11 0	6 10 6 5	214 181 89	160	288.7 314.0 521.8 570.4 282.5
INUVIK A MOULD BAY A NORMAN WELLS A POND INLET A RESOLUTE A	5.3 -4.1 7.1 -3.0 -5.0	2.2 2.4 1.0 8 0.1	26.2 4.5 21.6 6.7 1.6	-6.8 -16.9 -4.3 -13.7 -18.8	30.4 15.1 3.4 21.4 54.4	253 111 64 * 356	53.9 20.7 35.7 20.8 54.6		0 6 0 9 36	11 4 9 7 15	109 46 116 97 53	100 98 90	382.7 663.6 326.7 629.1 690.2
YELLOWKNIFE A	7.5	0.8	21.9	-4.9	4.8	133	22.6	74	0	9	193	127	314.9
ALBERTA			17	1-4	187								
BANFF	10.4	1.1	25.0	-40	0.0	0	31.4	75	0	8			
CALGARY INT'L A COLD LAKE A CORONATION A EDMONTON INT'L A	11.6 10.6 10.9 10.9	1.0 0.8 0.4 1.1	26.6 23.5 25.4 25.2	-1.3 -2.9 -5.3 -3.9	0.0 1.2 0.4 0.2	0 48 14 7	44.4 50.1 20.8 26.0	108 112 64 57	0 0 0	7 9 6 7	240 174 193 220	123 99 93 120	193.5 220.6 213.7 213.5
EDMONTON MUNICIPAL EDMONTON NAMAO A EDSON A FORT CHIPEWYAN A	11.4 10.9 9.8 8.2	0.4 0.5 1.2 0.2	25.1 24.6 24.6 23.0	-3.7 -4.2 -3.7 -7.0	0.8 0.4 0.0 0.0	20 0 0	27.8 27.6 25.0 36.0	71 66 44 79	0 0 0	7 7 8 *	226	124 107	197.9 214.1 247.1

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	Tem	peratur	e C						5	моге				
STATION	Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	A of Normal Snowfall	Total Precipitation (mm)	X of Normal Precipitation	Snow on ground at end of month (am)	No. of days with Precip 1.0 mm or m	Bright Sunshine (hours)	X of Normal Bright Sunshine	Degree Days below 18 C	
FORT MCMURRAY A GRANDE PRAIRIE A HIGH LEVEL A JASPER LETHBRIDGE A	9.1 10.8 7.6 10.5 13.1	0.1 1.0 -0.9 0.7 0.4	23.2 24.7 25.1 25.0 28.2	-5.1 -0.4 -8.2 -3.7 -2.7	0.0 0.0 11.0 0.0 0.0	0 0 846 0	71.6 73.4 12.0 38.6 33.5	122 196 30 102 90	0 0 0 0	11 11 4 4 6	139 181 175 196 240	97 # 117 # #	258.6 215.6 312.9 225.7 146.9	01
MEDICINE HAT A PEACE RIVER A RED DEER A ROCKY MTN HOUSE A SLAVE LAKE A	13.3 9.2 10.3 9.5 10.0	0.1 0.1 0.2 -0.2 1.0	28.9 22.5 24.8 24.3 22.2	-3.1 -1.9 -4.8 -4.0 -4.6	0.0 4.7 0.0 1.0 0.0	0 181 0 16 0	27.8 46.8 33.2 40.6 23.8	86 119 76 82 44	0 0 0 0	5 7 6 8 6	233	117	144.7 254.3 231.6 255.1 239.4	H
SUFFIELD A WHITECOURT A SASKATCHEWAN	12.9 10.4	1.5	28.1 23.8	-2.6 -4.3	0.0	0	23.0 29.7	86	0	7	239	:	153.9 229.0	KK
BROADVIEU COLLINS BAY CREE LAKE ESTEVAN A	15.9 7.4 7.8 13.0	1.1 8 0.4 0.6	29.5 22.9 22.1 33.4	-3.9 -5.6 -5.6 -3.5	0.0 12.5 1.4 0.0	0 # 17 0	18.8 76.3 82.8 34.8	37 2 151 80	0000	4 12 15 4	250 148 111 241	134 8 83 114	184.7 320.7 303.8 149.5	M OT PE
KINDERSLEY LA RONGE A MEADOW LAKE A MOOSE JAW A NIPAWIN A	11.5 9.7 10.2 12.9 10.8	0.0 0.4 0.5	26.7 23.5 23.7 28.4 25.0	-2.6 -4.5 -1.8 -1.4 -2.9	0.8 6.0 0.6 0.4 0.0	80 194 2	29.4 89.7 64.6 51.4 35.2	111 141 2 143	0 0 10 0	7 12 8 9	196 158 236 189	****	194.4 252.6 233.4 153.6 217.0	PI PI RI SI
MORTH BATTLEFORD A PRINCE ALBERT A REGINA A SASKATOON A SWIFT CURRENT A YORKTON A	11.3 10.8 12.1 11.7 11.7 11.5	0.3 0.9 0.4 0.5 0.0	25.6 25.2 29.0 26.4 27.1 27.2	-2.1 -4.1 -1.4 -2.4 -2.4 -3.9	0.0 0.6 0.0 0.0 2.8 0.0	0 26 44 0 97 0	53.8 58.0 46.2 27.8 42.6 27.9	209 147 126 87 125 60	0 0 0 0 0	4 7 9 5 7 6	188 212 214 236	113 111 110 128	201.9 214.8 178.1 187.9 188.9 198.0	SIST
BRANDON A CHURCHILL A DAUPHIN A GILLAM A	12.5 6.2 12.4 7.3	1.1 0.8 1.1 1.3	34.8 25.9 32.0 25.3	-5.7 -3.3 -4.6 -6.0	0.0 1.2 0.0 2.2	0 19 0 39	24.8 35.8 32.5 50.2	56 70 55 91	0 0 0	5 9 7 12	239 108 221	97 123	169.7 354.6 173./ 321.4	10
ISLAND LAKE LYNN LAKE A NORWAY HOUSE A	12.2 10.3 7.6 9.7	ui.	29.9 23.2 25.2 23./	-4.1 -1.0 -5.0 -3.8	3.0 4.6 0.0	* 51	10.1 65.8 55.8 48.8		0 0 0	13 11 11	227	135	180.0 231.9 249.0	
PORTAGE LA PRAIRIE THE PAS A THOMPSON A WINNIPEG INT'L A	13.8 10.0 7.5 13.6	0.2 0.6 1.2	23.9 24.5 31.8	-3.7 -1.7 -4.9 -4.5	0.0 0.0 4.6 0.0	0 159 0	20.8 98.3 54.0 10.0	42 172 78 19	0 0 0 2	4 11 13 *	155 110 241	99 87 130	139.3 237.5 314.6 143.9	

	Tem	peratur	e C						5	Hore			
STATION	Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	2 of Normal Snowfall	Total Precipitation (mm)	X of Normal Precipitation	Snow on ground at end of month (am)	No. of days with Precip 1.0 mm or m	Bright Sunshine (hours)	X of Normal Bright Sunshine	Degree Days below 18 C
ONTARIO						21							
BIG TROUT LAKE EARLTON A GERALDTON A GORE BAY A	9.0 12.3 11.5 14.3	0.9 1.2 * 0.5	23.0 27.9 28.9 27.0	-2.3 -4.5 -4.0 -2.0	2.6 5.2 0.0 0.0	51 222 2	83.2 24.2 69.8 37.5	113 24 * 41	0000	13 5 8	122	:	270. 117.6 198.9 123.4
HAMILTON RBG HAMILTON A KAPUSKASING A KENORA A KINGSTON A	16.7 15.6 11.8 13.5 15.4	-0.1 1.8 1.9 0.2	29.8 28.1 27.7 28.9 25.5	-0.7 -0.1 -5.1 -1.0 -1.0	0.0 0.0 2.0 0.0 0.0	83	92.2 101.3 34.4 25.1 77.4	136 36 36 36	0 0 0 0	5 9 4 8	197	106	98.4 192.3 145.6 98.
LANSDOWNE HOUSE LONDON A MOOSONEE MUSKOKA A	15.0 11.0 12.6	-0.4 1.5 -0.4	28.8 28.2 26.3	-1.8 -3.6 -5.3	0.0 0.0 0.0	. 0	58.2 89.7 82.8	74 111 81	0 0	8 11 11	171 144 *	99 120	109.6 215.5 161.8
NORTH BAY A OTTAWA INT'L A PETAWAWA A PETERBOROUGH A PICKLE LAKE	12.6 15.2 12.9 13.9 11.2	0.4 0.9 0.6 0.1 1.8	26.4 28.0 27.2 28.0 27.8	-4.5 -1.5 -3.9 -2.0 -1.5	1.0 0.0 0.0 0.0 0.2	250	55.8 61.2 97.2 106.2 96.6	48 77 132 170 114	00000	4 7 7 6 9	193 191 2	125	166.4 107.8 157.5 137.8 208.7
RED LAKE A ST CATHARINES A SARNIA A SAULT STE MARIE A	11.7 16.8 15.1 13.0	1.2 0.3 -1.2 0.2	27.1 30.2 29.3 27.5	-4.2 2.9 1.8 -3.0	0.0 0.0 0.0 2.1	0	71.2 114.8 115.9 32.4	100 123 184 34	0 0 0	7 5 9 6	205 201 207	103 132	191.7 75.3 111.3 153.9
SIOUX LOOKOUT A SUDBURY A THUMDER BAY A TIMMINS A TORONTO	13.3 13.1 12.2 11.6 17.2	2.6 0.9 1.1 1.3	30.2 27.2 26.7 27.2 28.2	-3.2 -5.4 -3.8 -5.4 2.4	1.8 0.0 0.0 12.6 0.0	100 0 2 969	16.2 25.6 61.4 58.8 70.0	20 24 69 64	0 0 0 0	4 1 7 8 5	194 212 8	128 126 126	152.1 159.0 175.5 217.0 63.1
TORONTO INT'L A TORONTO ISLAND A TRENTON A WATERLOO WELLINGTON WAWA A	15.6 16.7 14.9 14.5 11.2	0.1 * -0.4 0.1	30.2 26.6 27.5 28.9 23.9	-1.9 2.8 -2.0 -3.7 -4.2	0.0 0.0 0.0 0.0 0.0	:	44.1 59.0 75.0 31.4 44.6	69 103 38	0 0 0 0	5 4 5 10	:	****	104.5 65.6 112. 123.6 205.6
WIARTON A WINDSOR A	14.3	0.1 -0.7	27.2 29.6	-3.4 2.3	0.0	:	63.6 79.4	67	0	5 10	191	112	130.5 78.4
					TATE OF THE PARTY.	F			The state of		Start tags		SOLD S
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AND BEEN	Tem	peratur	e C		- 5				5	a o e				BEK 1909	Tem	peratur	e C		1 200				5	more.	at v		
STATION	Mean	Difference from Normal	Madmum	Minimum	Snowfall (cm)	X of Normal Snowfall	Total Precipitation (mm)	X of Normal Precipitation	Snow on ground at end of month (am)	No. of days with Precip LO mm or m	Bright Sunshine (hours)	X of Normal Bright Sunshine	Degree Days below 18 C	STATION	Medn	Difference from Normal	Maximum	Minimum	Snowfail (cm)	Z o' Normal Snowfall	Total Precipitation (mm)	Z of Normal Precipitation	Snow on ground at end of month (am)	No. of days with Pracip 1.0 mm or m	Bright Sunshine (hours)	X of Normal Bright Sunshine	Degree Days below 18 C
QUEBEC BARE COMEAU A BLANC SABLON A	13.0 10.3 10.3	1.9 0.6 1.8	29.4 23.4 18.1	-0.5 -2.2 -1.0	0.0 0.2 0.0	0	74.4 46.5 140.8	74 44 156	0	8 6 13	195 105	124	164.3 232.3 271.1	NOVA SCOTIA GREENWOOD A HALIFAX INT'L A SABLE ISLAND	15.3 14.5 16.1	1.5 0.7 0.4	30.9 28.3 23.1	0.7 -0.8 4.6	0.0 0.0 0.0		119.9 113.4 110.1	143 121 120	000	7 5	224 224		121.3
CHIBOUGAMAU CHAPAIS GASPE A INUKJUAK A KUUJUAG A KUUJUARAPIK A	10.7 13.0 4.5 4.9 8.0	-0.5 -0.5 0.9	27.4 29.5 12.8 18.8 26.0	-2.6 -1.0 -2.4 -3.3 -0.6	5.6 0.0 14.6 8.0 5.4	298 94 318	110.4 48.2 116.1	186 84 133	0 0 0 0	15 12 17	161 203 89 65 66	132 * 101 66 62	219.3 163.1 404.2 394.0 302.1	SHEARWATER A SYDNEY A YARMOUTH A	15.2 13.8	0.7	26.4 25.7 28.0	1.6 -0.6 2.1	0.0		129.6 119.6 52.4	149	0	7 8	155 205 183 211	99 114 110 120	68.5 95.5 133.3
LA GRANDE IV A LA GRANDE RIVIERE A MANIWAKI MATAGAMI A MONT JOLI A MONTREAL INT'L A MONTREAL MIRABEL I/	7.6 7.9 13.1 10.8 13.8 15.6	1.0 2.6 0.8	25.0 23.9 27.2 26.9 27.4 29.1	-3.9 -2.8 -1.4 -5.2 1.2 0.3	8.6 4.4 1.0 10.4 0.0 0.0	250	193.0 112.8 139.5 62.6 33.0 57.4	148 39 65	0000	19 15 8 14 5 7	109 168 175 184 167	110 140 119 99	312.5 302.0 151.5 221.2 130.0 98.2	CHARLOTTETOWN A SUMMERSIDE A	14.2	0.7 0.2	26.0 25.7	1.8 1.7	0.4 0.0	:	94.2 98.8	109 125	0	8 10	199	118	125.0 122.9
NATASHQUAN A QUEBEC A ROBERVAL A SCHEFFERVILLE A SEPT-ILES A	14.2 10.3 14.1 13.2 6.1 10.2	1.5 2.0 0.9 0.9 1.6	28.0 22.3 28.9 27.1 22.3 21.0 30.1	-1.1 -0.7 -1.3 -1.2 -5.6 -0.4	0.0 0.0 0.0 0.0 22.4 0.4	0 114	101.6 85.4 110.2 76.9 121.0 100.6	90 92 85 146 90	00 00 100	10 11 7 18 7	161 160 85 195 171	120 105 86 124	131.4 231.6 131.8 15.7 358.3 234.8	BONAVISTA BURGEO CARTWRIGHT	13.4 10.8 9.1	1.7 -0.7 0.8	24.6 18.5 25.0	2.5 0.4 -1.0	1	200	65.2 175.1 117.8	151	000	10 13 17	0 111	* 0 *	137.2 215.9 265.2
SHERBROOKE A STE AGATHE DES MONT ST HUBERT A VAL D'OR A NEW BRUNSWICK	13.4 12.6 15.2 11.8	1.5 0.8 1.4	25.6 30.4 27.3	-2.4 -1.5 0.1 -4.0	0.0 0.0 0.0 8.0	667	82.7 102.9 72.2 74.9	79 99 80 70	0 0 0	10 9 9 12	171 184 165 189	114 2 134	153.0 168.6 109.6 192.7	CHURCHILL FALLS A COMFORT COVE DANIELS HARBOUR DEER LAKE A GANDER INT'L A GOOSE A	7.9 12.4 11.8 12.0 12.7	2.2 1.5 1.0 1.5 1.3	25.3 26.2 26.0 26.6 26.8	-44 -1.6 0.6 -2.8 -0.8	24.5 0.0 0.0 0.1 0.4 22.0	250 0 0 400 550	121.2 100.9 58.0 74.6 133.1	113 63 81 164	*000	14 11 8 10 10	112	125 88 130	302.6 169.1 185.9 186.2 163.0
CHARLO A CHATHAM A FREDERICTON A MONCTON A SAINT JOHN A	12.6 13.4 13.0 13.1 12.9	1.5 0.4 -0.2 0.1 0.2	28.8 30.9 30.0 30.3 27.0	-1.3 -1.7 -3.4 -3.2 -0.6	0.0 0.0 0.0 0.0	0	73.8 57.4 82.8 70.1 114.6	95 92	0 0 0 0	7 8 11 9	194 179 153 191 195	121 100 # 115 117	164.4 150.2 159.6 154.0 156.3	MARY'S HARBOUR PORT AUX BASQUES ST ANTHONY ST JOHN'S A ST LAWRENCE STEPHENVILLE A	9.2 11.1 9.4 13.1 12.2	0.9 -0.2 1.3 1.5 0.9	25.0 19.5 21.5 27.0 22.0	-1.0 0.4 -2.0 1.3 0.5	22.0 4.0 0.2 2.6 TR 0.0	236	117.8	172 133 102 82 136	00000	17 15 14 10 14	111 149 169	123	265.2 204.8 255.3 154.9 172.1
												I D NG		WABUSH LAKE A	7.3	i	23.4	-4.6	15.5	174	127.9	136	ŏ	ñ	164	115	320.9
WHO CHANGE THE														4 14 14 14 14 14 14 14 14 14 14 14 14 14													

	Tem	peratur	e C					month (am)	E		Degree above	days 5 C		Tem	peratur	e C					month (cm)	E		Degree o	lays 5 C
STATION	Medin	Difference from Normal	Madmum	Misimum	Snowfall (cm)	Total Precipitation (mm)	Z of Normal Precipitation	Snow on ground at end of mo	No. of days with Pracip 1.0 mm or more	Bright Sunshine (hours)	This month	Since Jan. 1st	STATION	Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	Total Precipitation (mm)	2 of Normal Precipitation	Snow on ground at end of mo	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	This month	Since jan. 194
ANY BLOOK V THE MINISTER OF THE PARTY OF THE	1800,000		\$15 ASS	F975 4550	155.784			708 7380	0.00 0.00	A1044	SEC. 2.1		TO BOOK OLL V TO BOO	15. 23.838 L	FE (12022)	THE SEED OF	STATES	\$ 20205 gr	00	10 10 10 10 10 10 10 10 10 10 10 10 10 1	50 STATE	A W. OR SERVE A			THE BEST OF
BRITISHIA													QUEBEC												
AGASSIZ KAMPLOOPS SIDNEY SUMMERLAND	17.2 8.8 15.4 15.7	1.7 2.8 1.3 0.5	29.0 2.8 28.5 28.0	5.5 a.e 5.0 6.0	0.0 m.s 0.0 0.0	25.0 8.8 2.6 32.7	24 100 6 174	000	6 222	262 ## 251 259	366.5 8.8 312.0 323.0	2046.5 8.8 1753.3 2118.9	LA POCATIERE L'ASSOMPTION LENNOXVILLE NORMANDIN	14.9 15.9 2.2 11.8	2.3 1.3 a.s 1.4	30.0 29.3 26.5	-1.5 -1.5 a.e -3.0	0.0 0.0 e.e 0.0	44.4 75.2 8.8 107.0	47 85 88 112	0 0	6 8 223 8	188 175 88 195	295.9 a.e 206.0	1673.7 1962.1 8.8 1440.6
ALBERTA BEAVERLODGE ELLERSLIE	10.4	0.9	24.5 E.B	-0.5	0.0	62.0	148	0	10	170	165.5	1293.3	NEW BRUNSWICK	15.0	0.8	30.0	-0.5	0.0	75.0	87	0		178		1985.0
LACOMBE LETHBRIDGE	10.8	0.7	25.0	-6.0 R.B	0.0	23.3	57	0	6	219	176.7	1286.0	NOVA SCOTIA	13.9	0.5	30.0	-1.0	0.0	78.6	89	0	10	154	267.4	1736.9
VEGREVILLE SASKATCHWAN	2.0		2,0	8,8	2.8	8.0	**	222	222	22	8,8	2.8	RENTVILLE NAPPAN PRINCE EDWARD ISLAND	14.8 13.6	0.5	30.0 29.5	0.0	0.0	120.6 82.4	141	0	10	211 198	293.8 258.2	1853.8 1672.5
INDIAN HEAD MELFORT REGINA SASKATOON SCOTT	12.3 10.7 11.4 2.8 10.9	0.8 0.4 0.2 **	28.0 25.0 29.0 27.0 27.0	-3.0 -4.5 -4.5 *** -2.5 -2.0	0.0 0.4 0.0 *.* 1.5 0.0	27.5 48.3 37.1 8.8 34.2	65 118 105 88 120	0 0 0	10 6 9 888	1769 178 1720 ** 197 179	193.0 8.8 8.8 178.0 207.4	1524.5 8.8 8.8 1174.8	CHARLOTTETWN NEWFOUNDLAND	14.8	0.7	26.5	3.0	0.0	95.8	115	0	10	205	294.2	1718.4
MANITOBA	11.7	-0.1	27.0	-2.0	0.0	41.1	140	0	8	179	207.4	1607.6	ST.JOHN'S WEST	13.7	2.1	26.0	1.0	0.0	79.8	75	0	•	162	•	1373.0
BRANDON GLENLEA MORDEN	13.2 14.8 14.0	1.4 2.6 0.9	35.9 35.0 31.5	-6.4 -2.5 -7.0	0.0 0.0 0.0	21.0 52.6 8.6	105 17	0	5 5 3	1865 249 230	299.0 244.3	2057.0 1865.3	TERMON!								Sale Lagin				
ONTARIO DELHI ELORA GUELPH HARROW KAPUSKASING OTTAWA SMITHFIELD VINELAND WOODSLIE	15.7 14.0 14.6 16.5 11.9 15.4 15.7 16.8	-0.2 -0.2 -0.4 -1.0 1.6 0.8 0.7 -0.2	28.5 27.6 29.0 28.5 27.0 27.4 28.6 29.8	-2.0 -3.1 -5.0 1.0 -5.5 0.1 -0.5 1.2	0.0 0.0 0.0 0.0 3.0 0.0 0.0 0.0	95.9 29.0 26.5 59.2 34.9 93.3 73.6 103.0	120 41 42 90 39 116 94 138	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 6 6 6 4 4 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2012 1743 187 182 174 191 2037 182	287.9 345.4 215.3 310.3 2.2 354.6 2.8	2194.2 1836.8 2194.2 1323.7 2038.1 2048.0 2.8	-	glas	erotin	6	3	0			90	(me) fillioni to		4000	
MARCHAN A											100		100												

Climatic Perspectives

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