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CLIMATIC PERSPECTIVES

Climatic Perspectives

A WEEKLY REVIEW OF CANADIAN CLIMATE

MONTHLY SUPPLEMENT INCLUDED

APRIL 13,1984 (Aussi disponible en français) VOL.6 NO. 14

FOR THE PERIOD APRIL 3 -9 ,1984

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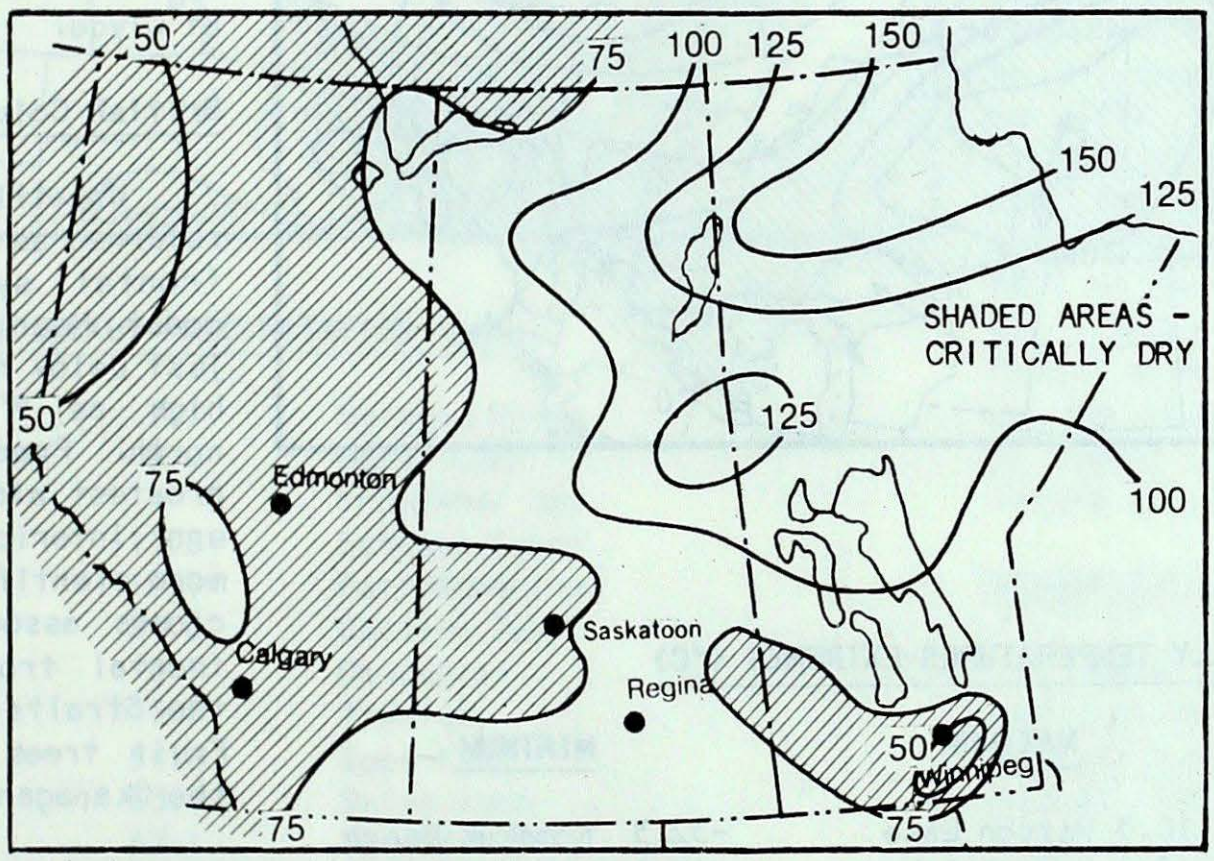
A DEARTH OF WINTER SNOWFALL ON THE PRAIRIES

...A CONCERN FOR THE '84 GROWING SEASON



PER CENT OF NORMAL PRECIPITATION
FOR THE PERIOD NOVEMBER 1983 TO MARCH 1984

The much below normal precipitation across the Prairies this past winter season has raised concerns both about inadequate soil moisture reserves for the upcoming growing season and water shortages in ponds, watering holes and wells. Total precipitation values are close to normal, only in east central Alberta, mainly due to heavier snowfalls. The two driest areas continue to be the Peace River District, where total winter snowfall from September to the end of March is only half the normal, and southwestern Manitoba. ...continued on page 5A

INSIDE THE MARCH MONTHLY SUPPLEMENT...

- **Toxic Chemicals in the Environment**
- **Weather and the Retail business**
- **Treasures in the Arctic**

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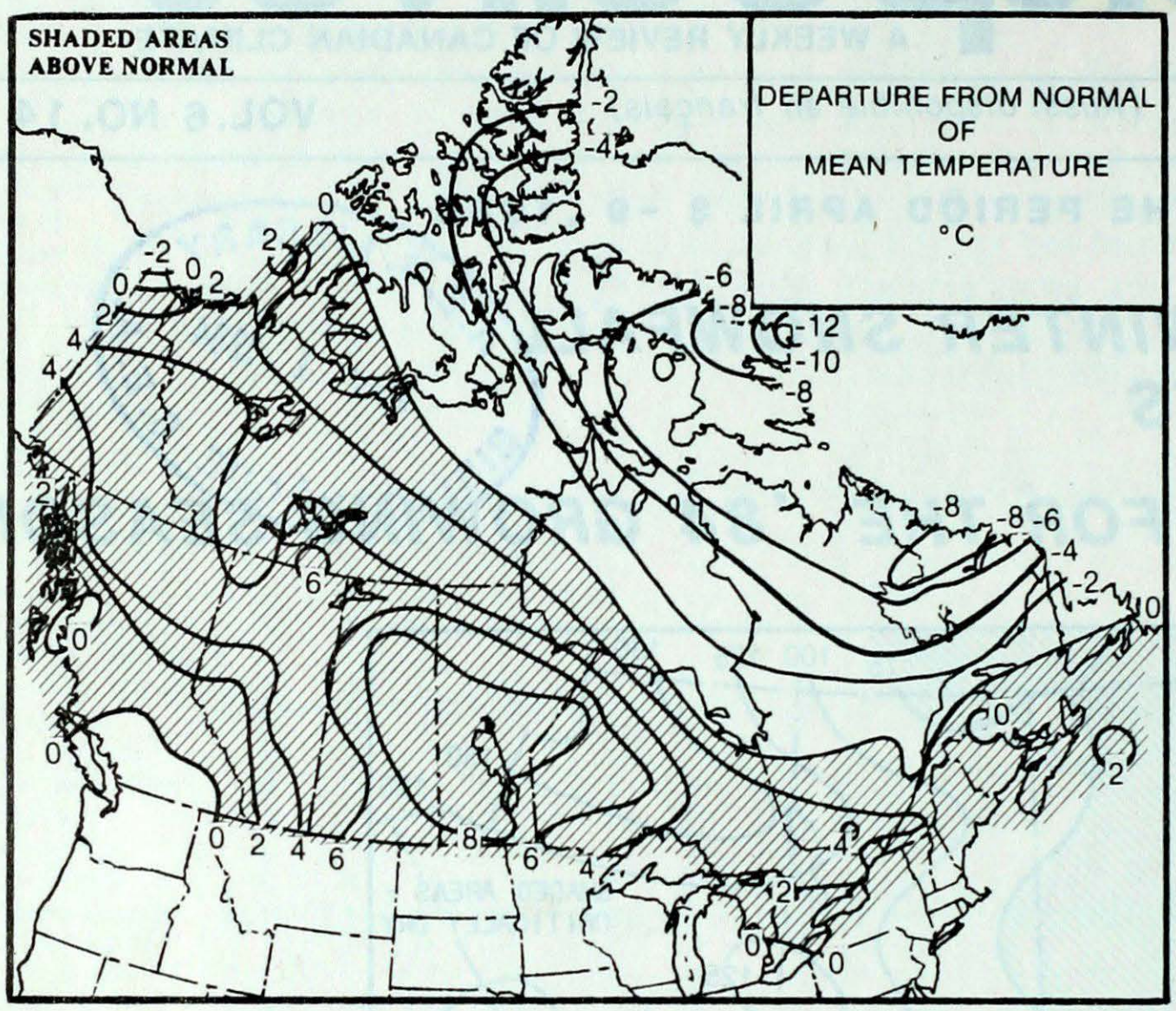
NOTE: The data shown in this publication are based on unverified reports from approximately 225 Canadian synoptic stations.

Canada



WEEKLY TEMPERATURES EXTREMES (°C)

	MAXIMUM		MINIMUM	
YUKON TERRITORY	10.3	Watson Lake	-32.3	Komakuk Beach
NORTHWEST TERRITORIES	13.2	Fort Smith	-43.6	Shepherd Bay
BRITISH COLUMBIA	16.3	Lytton	- 7.0	Mackenzie
ALBERTA	17.2	Peace River	-11.0	Fort Chipewyan
SASKATCHEWAN	19.6	Moose Jaw	-17.9	Collins Bay
MANITOBA	19.8	Dauphin	-23.3	Churchill
ONTARIO	14.8	Britt	-23.3	Moosonee
QUEBEC	16.1	Sherbrooke	-34.1	Kuujjuaq
NEW BRUNSWICK	13.3	Moncton	-12.1	Miscou Island
NOVA SCOTIA	18.8	Sydney	-11.4	Sydney
PRINCE EDWARD ISLAND	13.3	Summerside	- 6.6	Charlottetown
NEWFOUNDLAND	11.6	Deer Lake	-31.4	Wabush Lake

ACROSS THE NATION

Warmest mean temperature	9.2	Portage, MAN
Coolest mean temperature	-34.7	Eureka, NWT

ACROSS THE COUNTRY...

Yukon and Northwest Territories

Bitterly cold air returned to the eastern and the High Arctic, mean temperatures were 5 to 15 degrees below normal. At Eureka, the minimums remained near -40° all week. The Yukon and the Mackenzie District, however, enjoyed pleasantly mild weather. The readings were from 5 to 8 degrees warmer than the long term average, and typically daytime values were near 10° in the southern Yukon. Once again this week, precipitation was light. Baker Lake had the most, 9 mm. Depth of snow on the ground dropped several centimetres across the Arctic, but up to 85 cm remained on the ground at Clyde.

British Columbia

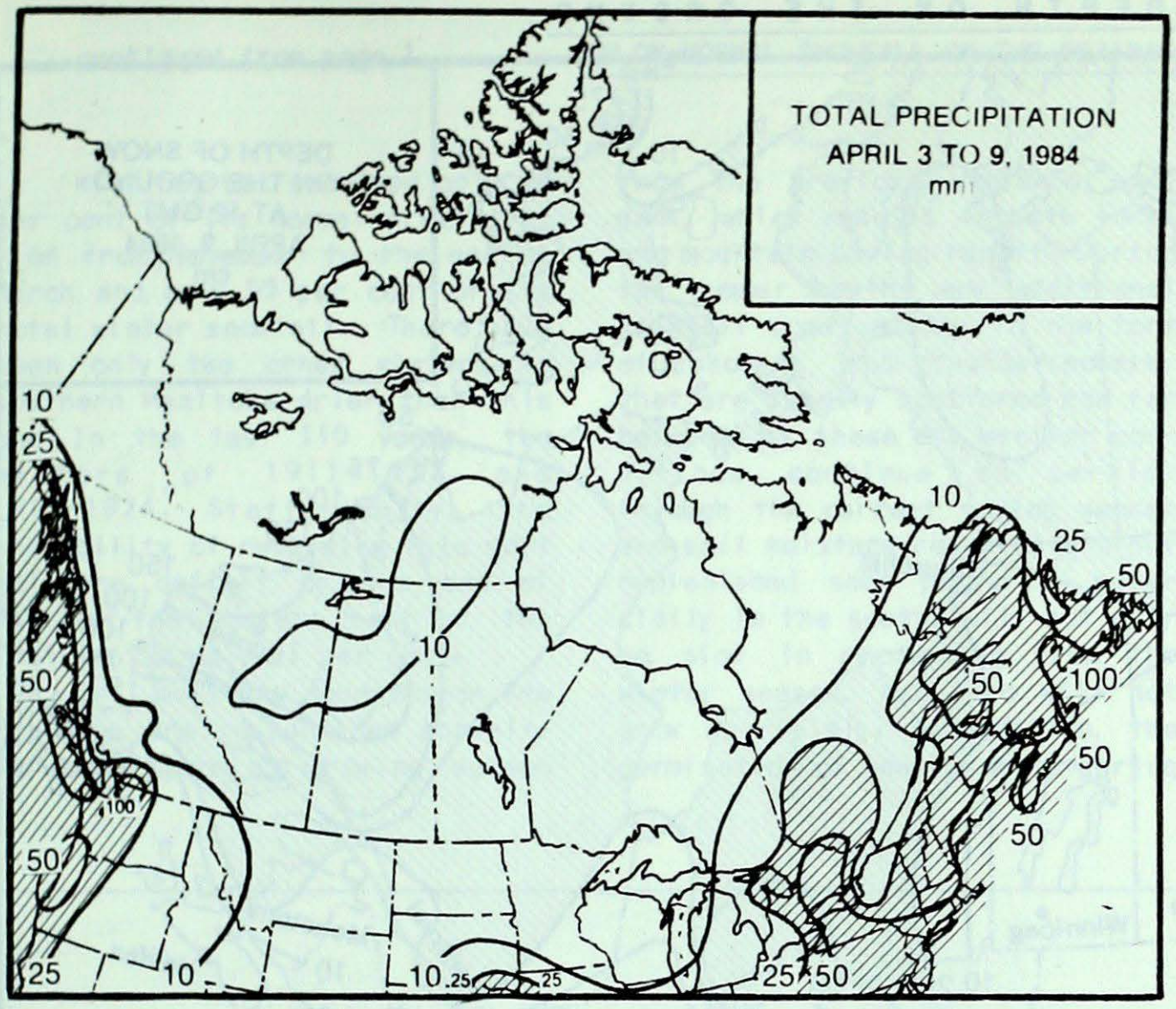
Unsettled and dull weather returned as several disturbances and frontal systems approached the coast. Mean temperatures ranged from just below normal in the south to as high as 5° above normal in the north. Precipitation amounts were greatest along the coast and southern interior, while sunshine was more plentiful in the north. Funnel clouds associated with an unstable frontal trough were observed over the Straits of Georgia on April 5. Fruit trees are in early bloom in the Okanagan.

Prairies

Sunny and mild spring weather continued with mean temperatures as high as 10° above normal in the east. Many new maximum temperature records were broken between April 4 and April 6. The mercury at Dauphin and Moose Jaw reached 20° on April 4. A weak disturbance crossing central Alberta and northern Saskatchewan on April 6 triggered thunderstorm activity in the Edmonton area during the late afternoon of the same day.

Ontario

Heavy rains and wet snow were widespread throughout most of the central and southern regions as a slow moving storm crossed the Pro-



HEAVIEST WEEKLY PRECIPITATION (mm)

YUKON	7.7	Shingle Point
NORTHWEST TERRITORIES	9.0	Baker Lake
		Frobisher Bay
BRITISH COLUMBIA	111.8	Estevan Point
ALBERTA	17.7	Fort McMurray
SASKATCHEWAN	24.0	Collins Bay
MANITOBA	8.1	Churchill
ONTARIO	75.5	Trenton
QUEBEC	54.8	Sept-Iles
NEW BRUNSWICK	63.6	Saint John
NOVA SCOTIA	67.1	Sydney
PRINCE EDWARD ISLAND	32.9	Summerside
NEWFOUNDLAND	116.2	Stephenville

Soil Moisture Index on the Prairies

Soil moisture index, expressed as percentage of the assumed soil water holding capacity, gives a relative indication of the moisture status of the soil. The values at the end of March at some of the Prairie stations follow:

Station	Per cent
Calgary	40
Lethbridge	38
Broadview	57
Regina	62
Yorkton	74
Brandon	66
Pilot Mound	64
Winnipeg	74

vince. Deluges of 40 to 75 mm of rain contributed to swollen rivers and creeks. Trenton received over 75 mm of rain, while farther north Timmins had 10 cm of wet snow from the same storm. Southern Ontario experienced slightly above normal temperatures. In contrast, Northwestern Ontario enjoyed very mild and sunny weather, the temperatures averaged nearly 8° above normal. The mild weather rapidly melted the snow cover across the North; however, Geraldton still had over 50 cm of snow on the ground.

Québec

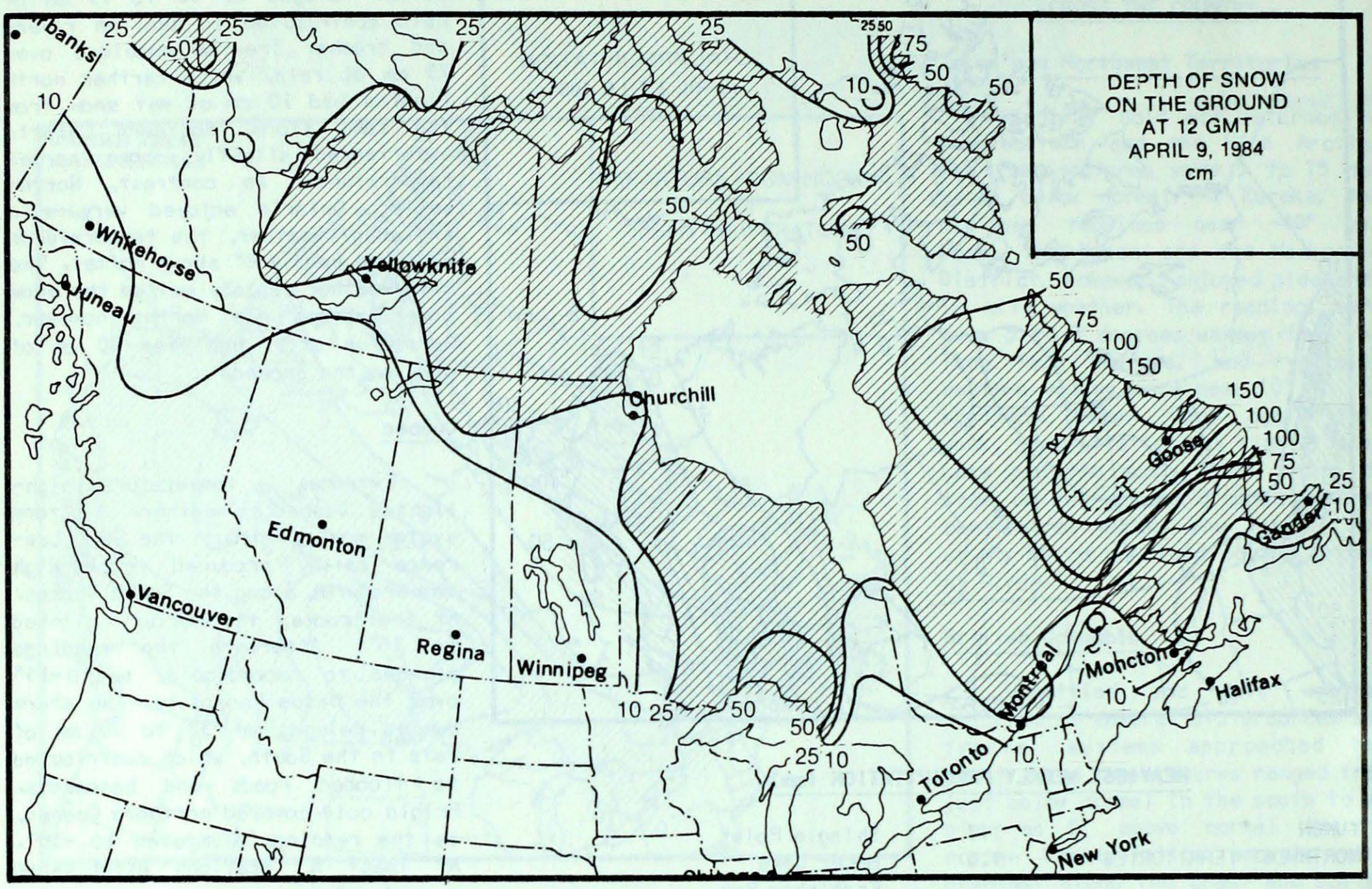
Extremes in temperatures highlighted Québec's weather. A storm system moving through the St. Lawrence Valley produced record-high temperatures along the South Shores. At Sherbrooke, the mercury climbed to 16°. Afterward the readings plunged to record-cold, near -15° over the Gaspé Peninsula. The storm dumped deluges of 30 to 50 mm of rain in the South, which contributed to flooded roads and basements. Frigid cold covered northern Québec, as the readings plummeted to -35°. At least 8 locations established record values.

Atlantic Provinces

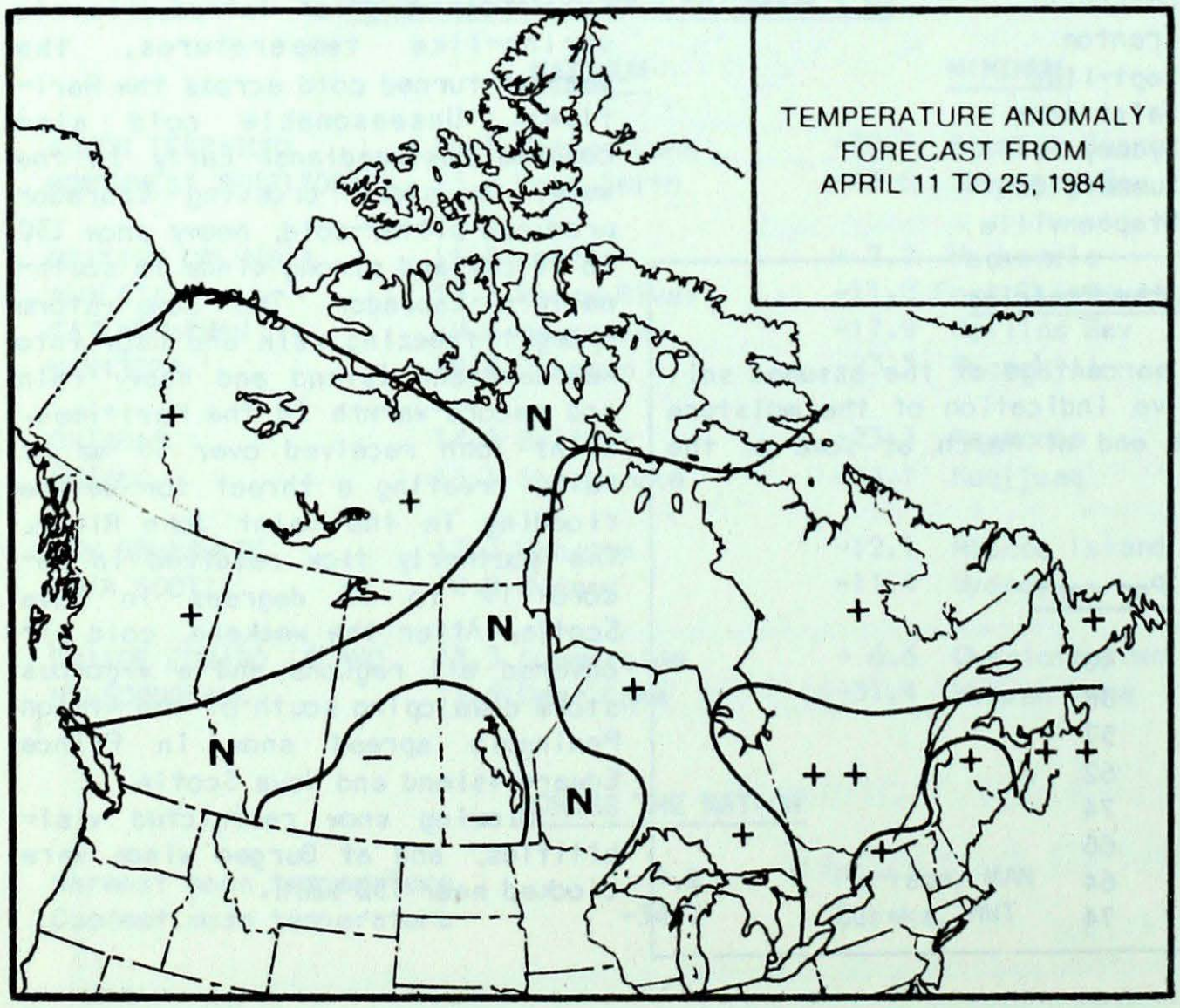
After a brief introduction to spring-like temperatures, the weather turned cold across the Maritimes. Unseasonable cold also covered Newfoundland. Early in the week, a storm crossing Labrador produced bitter-cold, heavy snow (30 to 50 cm) and strong winds in southeastern Labrador. The same storm brought freezing rain and snow into Newfoundland Island and heavy rain and record-warmth in the Maritimes. Saint John received over 55 mm of rain, creating a threat for severe flooding in the Saint John River. The southerly flow resulted in record 15 to 18 degrees in Nova Scotia. After the weekend, cold air covered all regions and a vigorous storm developing south of the Avalon Peninsula spread snow in Prince Edward Island and Nova Scotia.

Blowing snow restricted visibilities, and at Burgeo winds were clocked near 150 km/h.

SNOW DEPTH ON THE GROUND



TEMPERATURE ANOMALY FORECAST



Temperature Anomaly Forecast

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

++ much above normal

+ above normal

N normal

- below normal

-- much below normal

...continued from page 1

BELOW-NORMAL SNOWFALL ON THE PRAIRIES

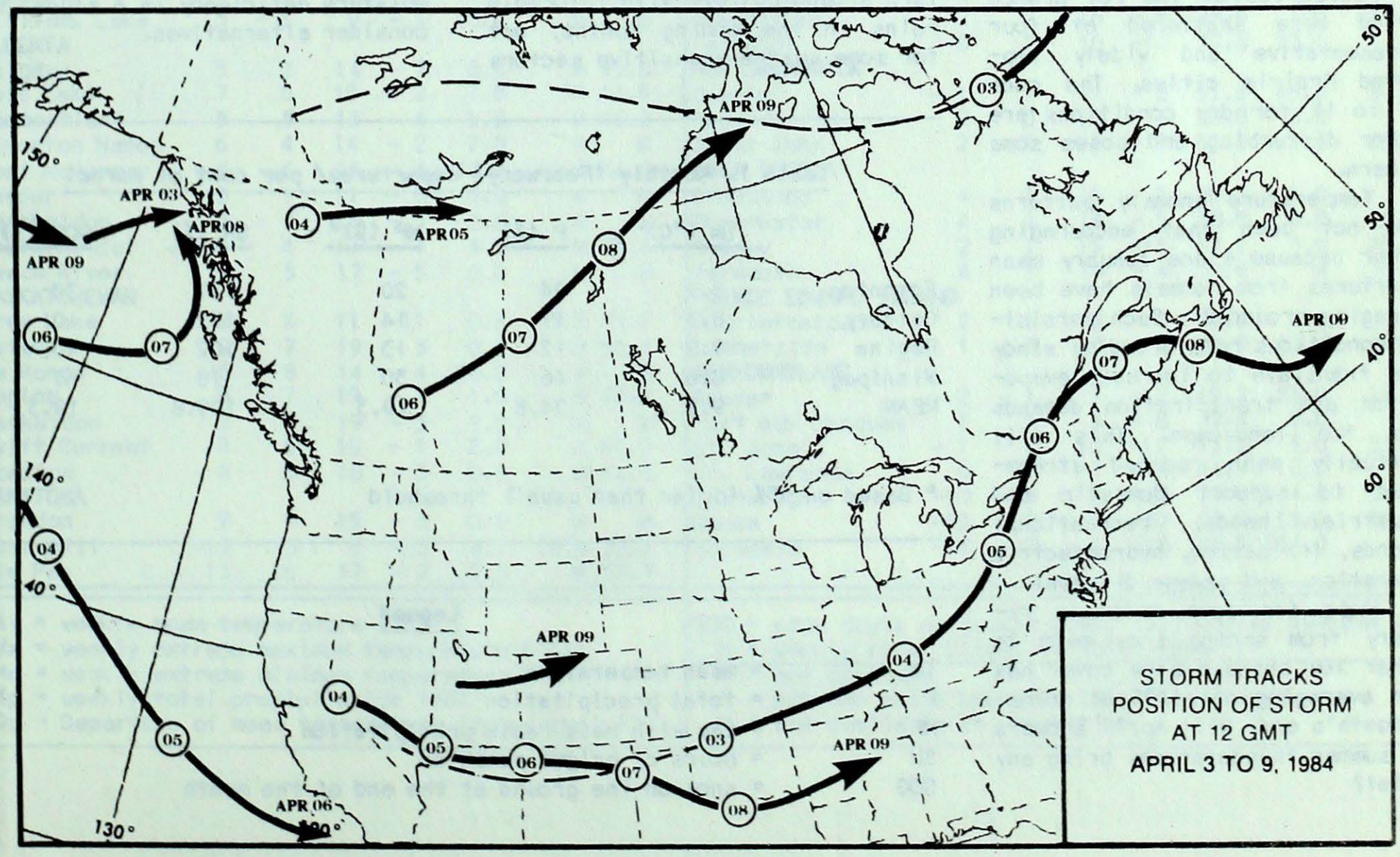
Winnipeg has received only 46 per cent of its normal precipitation from November to the end of March and only 55 per cent of its total winter snowfall. There have been only two other winters in southern Manitoba drier than this one in the last 110 years, the winters of 1911-1912 and 1923-1924. Statistically, the probability of reversing this soil moisture deficit by the end of May in the eastern half of the Prairies is only 11 per cent.

Soil moisture reserves on the Prairies are replenished annually for the upcoming growing season from the previous winter's snow pack, which results in both local and mountain spring runoff. During the summer months any additional rainfall comes mostly in the form of showers and thundershowers, that are usually scattered and far between. If these dry weather conditions continue to persist through the current spring season and soil moisture reserves are not replenished soon pastures, especially in the south, will not only be slow in recovering from the winter season, but also will not grow as rapidly. In addition, the germination of newly seeded spring crops will be adversely affected. Due to the fact that local snow melt on the Prairies the last few weeks was below normal, a lot now depends on a significantly heavy spring runoff from the mountains, which usually occurs during the months of May and June, to raise water levels.

The spring mountain runoff will have an important bearing on just how critical the water shortages will be during the upcoming growing season and whether there will be need for urgent measures.

A. Radomski

STORM TRACKS



WHAT KEY MOISTURE INDICATORS ARE TELLING ON THE PRAIRIES

by
Leo O. Mapanao
Canadian Climate Centre

A dry spell lingers over the Prairies. Is it time to review options?

In whatever terms - precipitation, hours of bright sunshine, days with measurable precipitation, temperature anomalies or snow cover - one may assess the moisture situation, the spectre of drought seems looming. Here are the facts.

Widespread dryness and warmth have dominated the Prairies since January. In Winnipeg (Fig. 1) monthly precipitation totals were not only below median (dry class) since October but suddenly in December, exceeded the thres hold for the driest 75% in 45 years and stayed above this level through February. Now, Regina, Calgary, and Edmonton are showing similar signs (see Table 1). Even the hours of bright sunshine(109% of normal) confirm the emerging picture. In terms of days with measurable precipitation, again the threshold for the driest 95% in all Februaries of the ref erence period were shattered at four representative and widely separated Prairie cities. The odds (19 to 1) for dry conditions are rather disturbing and poses some concern.

Temperature anomaly patterns have not been that encouraging either because since January mean departures from normals have been averaging around 8°. Such persisting conditions reinforced by windy days translate to increase evaporation and transpiration demands from the landscape. This will eventually mean reduced streamflows to support domestic and industrial needs, recreational demands, irrigation, hydroelectric generation, and sewage disposal.

Hope for some moisture recovery from spring snow melt is rather low because snow cover has been averaging only 19% of normal at month's end. Will April showers and summer thunderstorms bring any relief?

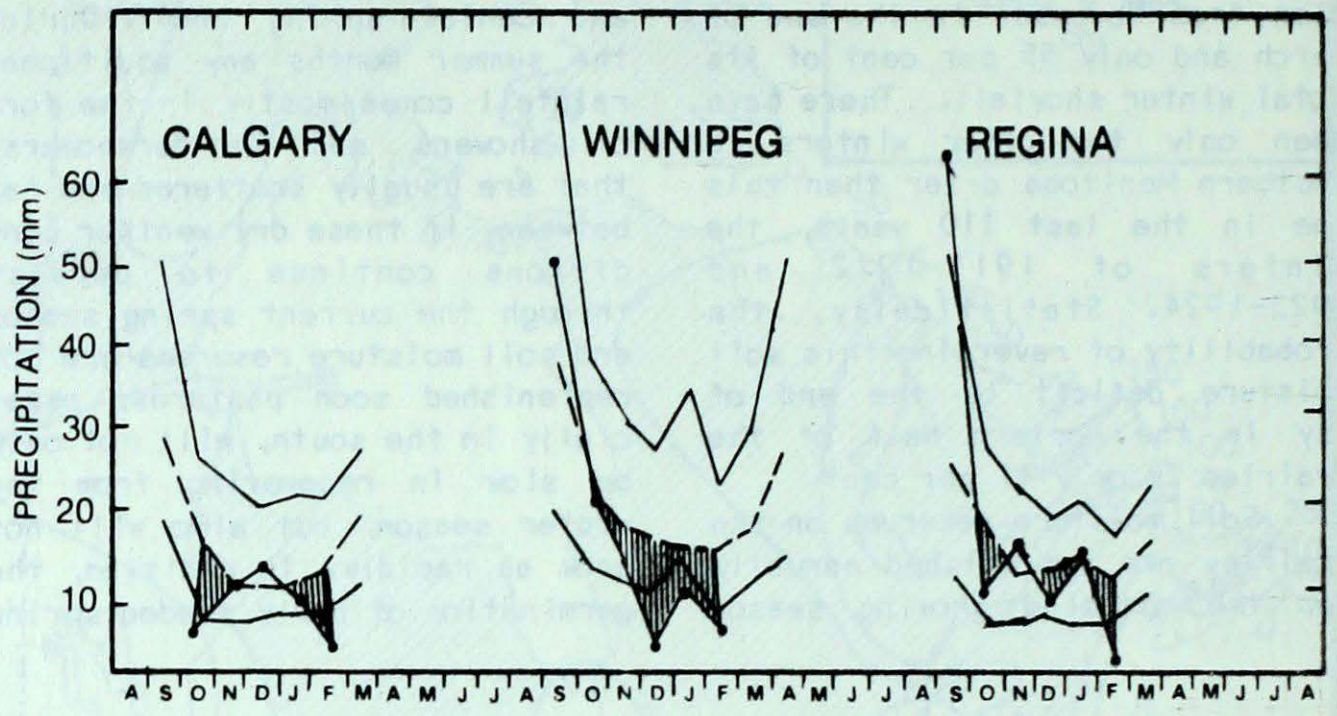


Fig 1. Monthly Moisture Trends. Solid lines are 75% thresholds for wet (upper) and dry (lower) classes. Dash line is median, circled line is observed.

Admittedly, these trends can turn around quickly with favorable rains in the coming months, but for some weather-sensitive sectors of the economy, two months of moisture deficiency is a signal to consider alternatives.

Table 1. Monthly (February) departures/ per cent of normal

	Tm (°C)	P (%)	MP (%)*	SH (%)	SOG (%)
Edmonton	8.7	24	20	127	30
Calgary	8.3	17	14	132	0
Regina	9.9	12	13	102	40
Winnipeg	8.8	46	30	78	7
MEAN	9.2	24.8	19.3	109.8	19.3

* Based on 95% (drier than usual) threshold

Legend

Tm	= mean temperature
P	= total precipitation
MP	= day with measurable precipitation
SH	= hours of bright sunshine
SOG	= snow on the ground at the end of the month

TEMPERATURE, PRECIPITATION AND BRIGHT SUNSHINE DATA FOR THE WEEK ENDING 0600 GMT APRIL 10, 1984

STATION	TEMP				PRECIP		SUN
	Av	Dp	Mx	Mn	Tp	SOG	H
YUKON TERRITORY							
Dawson	0	5	9	- 9	1.2	22.0	M
Mayo A	2	6	9	- 7	2.8	14.0	M
Watson Lake	2	5	10	- 8	2.0	16.0	M
Whitehorse	1	3	9	- 8	0.0	3.0	52.8
NORTHWEST TERRITORIES							
Fort Smith	- 1	6	13	-10	4.0	2.0	44.5
Inuvik	-17	1	- 5	-32	3.4	69.0	18.5
Norman Wells	- 7	5	2	-15	0.0	3.0	M
Yellowknife	- 7	5	4	-15	0.2	12.0	20.9
Baker Lake	-23	- 1	-11	-34	9.0	68.0	40.0
Cape Dyer	-28	-12	-15	-39	M	47.0	M
Clyde	-25	- 4	-15	-33	0.4	85.0	60.2
Frobisher Bay	-24	- 7	- 9	-33	9.0	25.0	46.5
Alert	-30	- 1	-24	-35	1.0	14.0	M
Eureka	-35	- 2	-28	-41	0.4	12.0	M
Hall Beach	-32	- 8	-17	-41	0.0	28.0	M
Resolute	-32	- 5	-23	-41	0.0	38.0	M
Cambridge Bay	-26	0	-17	-36	0.0	42.0	66.3
Mould Bay	-28	- 1	-19	-37	M	24.0	65.7
Sachs Harbour	-20	4	-14	-30	0.4	15.0	38.9
BRITISH COLUMBIA							
Cape St. James	6	0	10	3	33.5	M	27.8
Cranbrook	5	0	12	- 3	16.2	M	24.2
Fort Nelson	3	5	13	- 6	0.9	3.0	29.9
Fort St. John	4	4	13	- 3	0.0	M	M
Kamloops	7	- 1	15	- 1	2.2	M	31.0
Penticton	6	- 2	14	- 2	11.9	M	21.9
Port Hardy	6	0	11	1	45.4	M	30.8
Prince George	3	1	10	- 4	6.8	M	30.9
Prince Rupert	6	1	11	- 1	49.7	M	M
Revelstoke	6	1	13	0	10.0	M	14.9
Smithers	4	1	11	- 5	2.0	M	29.3
Vancouver	8	- 1	13	3	36.7	M	29.0
Victoria	7	- 1	13	0	10.5	M	39.5
Williams Lake	3	- 1	9	- 3	10.4	M	21.6
ALBERTA							
Calgary	5	3	14	- 7	0.2	M	45.0
Cold Lake	7	6	15	- 2	7.8	M	41.8
Coronation	5	5	13	- 4	5.8	M	46.2
Edmonton Namao	6	4	14	- 2	7.0	M	M
Fort McMurray	4	6	16	- 4	17.7	M	44.0
Jasper	3	1	11	- 6	0.0	M	M
Lethbridge	7	3	16	- 5	2.6	M	M
Medicine Hat	8	4	17	- 1	4.6	M	48.4
Peace River	5	5	17	- 5	0.0	M	M
SASKATCHEWAN							
Cree Lake	2	X	11	-11	8.8	3.0	41.7
Estevan	9	7	19	- 3	0.2	M	51.4
La Ronge	6	8	14	- 4	10.0	M	M
Regina	8	7	19	- 1	1.0	M	43.2
Saskatoon	7	7	19	- 3	9.0	M	M
Swift Current	8	6	18	- 1	2.0	M	44.7
Yorkton	8	9	18	- 3	0.8	M	54.0
MANITOBA							
Brandon	9	9	19	- 3	0.0	M	M
Churchill	-12	3	5	-23	8.1	18.0	27.7
The Pas	13	16	17	- 2	0.6	M	53.7
Thompson	0	8	13	-13	0.3	1.0	40.6
Winnipeg	9	9	17	- 1	0.4	M	46.7
ONTARIO							
Big Trout Lake	1	8	10	-11	0.0	29.0	M
Earlton	2	3	12	- 9	M	M	M
Kapuskasing	0	3	12	-13	0.0	3.0	M
Kenora	8	8	14	0	0.0	M	M
London	4	0	12	- 3	10.0	M	30.0
Moosonee	- 7	- 1	11	-23	0.0	20.0	58.4
Muskoka	4	2	13	- 6	M	M	M
North Bay	3	3	13	- 6	19.3	0.0	54.2
Ottawa	4	1	12	- 3	38.8	M	45.0
Pickle Lake	4	7	12	- 7	0.0	44.0	M
Red Lake	6	7	14	- 7	0.0	10.0	50.6
Sudbury	2	3	13	- 8	17.6	0.0	M
Thunder Bay	3	3	14	- 7	0.0	M	63.6
Timmins	0	3	11	-12	11.2	3.0	M
Toronto	4	1	11	- 3	31.2	M	M
Trenton	5	1	12	- 2	75.7	M	M
Wiarton	3	1	12	- 4	28.4	M	46.2
Windsor	5	0	12	- 1	13.0	M	M
QUEBEC							
Bagotville	0	1	10	-10	14.4	20.0	M
Blanc-Sablon	- 6	- 3	4	-17	18.6	M	31.7
Inukjuak	-19	- 4	0	-31	0.0	37.0	48.4
Kuujjuaq	-19	- 7	1	-34	1.6	65.0	54.9
Kuujjuarapik	-14	- 2	7	-28	0.0	35.0	62.9
Maniwaki	3	3	14	- 7	47.8	0.0	46.0
Mont-Joli	- 2	- 1	5	- 8	19.4	8.0	28.9
Montréal	4	2	14	- 4	17.6	M	44.8
Natashquan	- 6	- 3	4	-15	30.0	32.0	M
Nitchequon	-14	- 5	2	-31	11.0	28.0	53.0
Québec	0	- 1	7	- 6	24.0	36.0	39.7
Schefferville	-18	- 8	- 4	-32	0.8	81.0	54.8
Sept-Iles	- 4	- 2	4	-13	54.8	59.0	M
Sherbrooke	2	2	16	- 8	28.6	1.0	39.9
Val-d'Or	0	2	10	-10	37.6	23.0	M
NEW BRUNSWICK							
Charlo	- 1	1	8	- 8	51.8	45.0	31.1
Fredericton	2	0	12	- 6	36.8	3.0	M
Saint John	2	1	12	- 7	63.6	2.0	27.2
NOVA SCOTIA							
Greenwood	4	1	15	- 5	20.2	1.0	M
Shearwater	4	1	14	- 5	38.5	0.0	28.0
Sydney	2	1	19	-11	67.1	3.0	28.6
Yarmouth	4	1	14	- 4	32.6	M	34.7
PRINCE EDWARD ISLAND							
Charlottetown	2	1	13	- 7	29.8	5.0	M
Summerside	1	0	13	- 6	32.9	13.0	30.4
NEWFOUNDLAND							
Gander	- 2	- 1	7	-12	49.2	31.0	19.8
Port aux Basques	1	1	6	- 8	39.4	0.0	M
St. John's	- 1	- 1	10	-12	53.2	3.0	33.2
St. Lawrence	0	1	7	-11	44.7	0.0	M
Cartwright	-12	- 8	0	-23	70.8	154.0	34.2
Goose	-13	- 9	5	-30	43.0	115.0	40.5
Hopedale	-14	- 8	- 1	-28	22.5	184.0	M

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

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

ACID RAIN REPORT ISSUED BY ENVIRONMENT CANADA FOR APR. 1-7, 1984

LONGWOODS
NEAR LONDON
ONTARIO

Longwoods received strongly acidic rain April 3 and 4 with pH readings of 3.8 and 4.2 respectively. The air associated with the rain on April 3 came from the west through Wisconsin and Michigan and hovered over southern Ontario. The air which passed through Virginia, West Virginia, Pennsylvania and Southern Ontario produced the rain which fell on April 4.

DORSET*
MUSKOKA
ONTARIO

Air which passed through Virginia,Pennsylvania,New York and southern Ontario brought strongly acidic rain to Dorset on April 4 with a pH reading of 4.1. On April 5 and 6 Dorset received strongly acidic rain and snow with pH readings of 3.9 and 4.1 respectively. These events were associated with air which came up from the south along the east coast of North America through New Jersey, New York and southern Ontario.

CHALK RIVER
OTTAWA VALLEY
ONTARIO

Air which came from the west over northern Ontario brought moderately acidic rain with a pH reading of 4.6 to Chalk River on April 4. Air which came from the south along the east coast of North America and through New Jersey, New York and southern Ontario brought a small amount of slightly acidic rain to Chalk River on April 5 with a pH reading of 4.9 and moderately acidic snow on April 6 with a pH reading of 4.3.

MONTMORENCY
QUEBEC CITY
QUEBEC

Montmorency received a large amount of normal rain and snow with a pH reading of 5.1 on April 5. This event was associated with air from the south off of the Atlantic Ocean. Two days later on April 7 Montmorency received a small amount of strongly acidic rain and snow, pH of 4.0, which was associated with air which came from the Atlantic Ocean over Nova Scotia, New Brunswick and north-eastern Quebec.

KEJIMKUJIK
SOUTHWESTERN
NOVA SCOTIA

Air from the northwestern Quebec brought slightly acidic rain with a pH reading of 4.8 on April 4 and normal rain with a pH reading of 5.1 the next day April 5.

*Data supplied by the Ontario Ministry of the Environment.

Environmental damage to lakes and streams is usually observed in sensitive areas regularly receiving precipitation with pH less than 4.7.

This report was prepared by the Federal Long Range Transport of Air Pollutants (LRTAP) Liaison Office. For further information, please contact Dr. H.C. Martin at (416) 667-4803.