

Climatic Perspectives

A WEEKLY REVIEW OF CANADIAN CLIMATE

Canadian Climate Centre

JULY 27, 1984

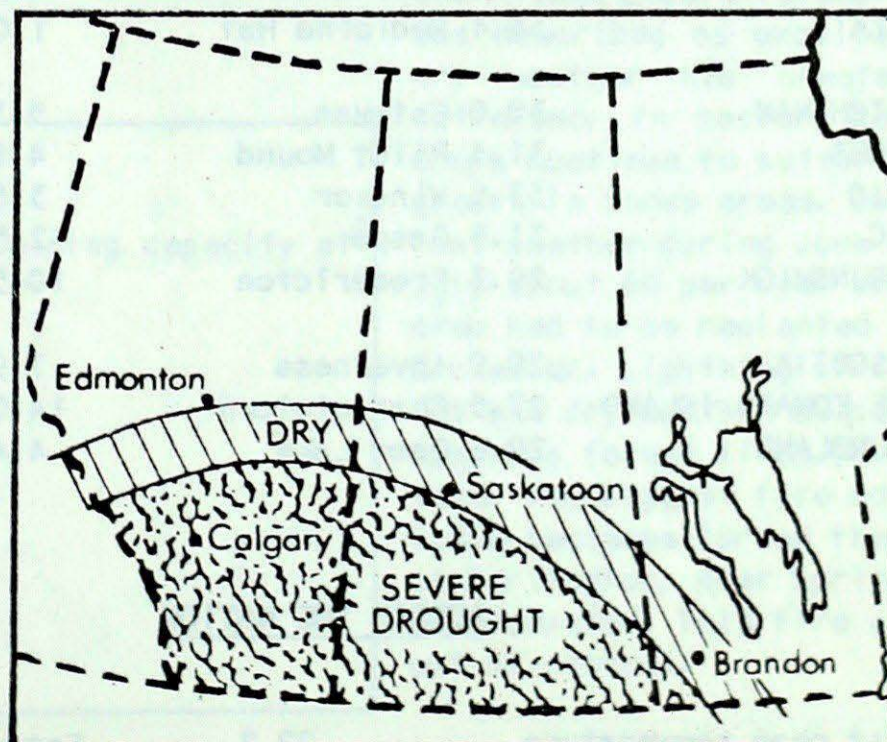
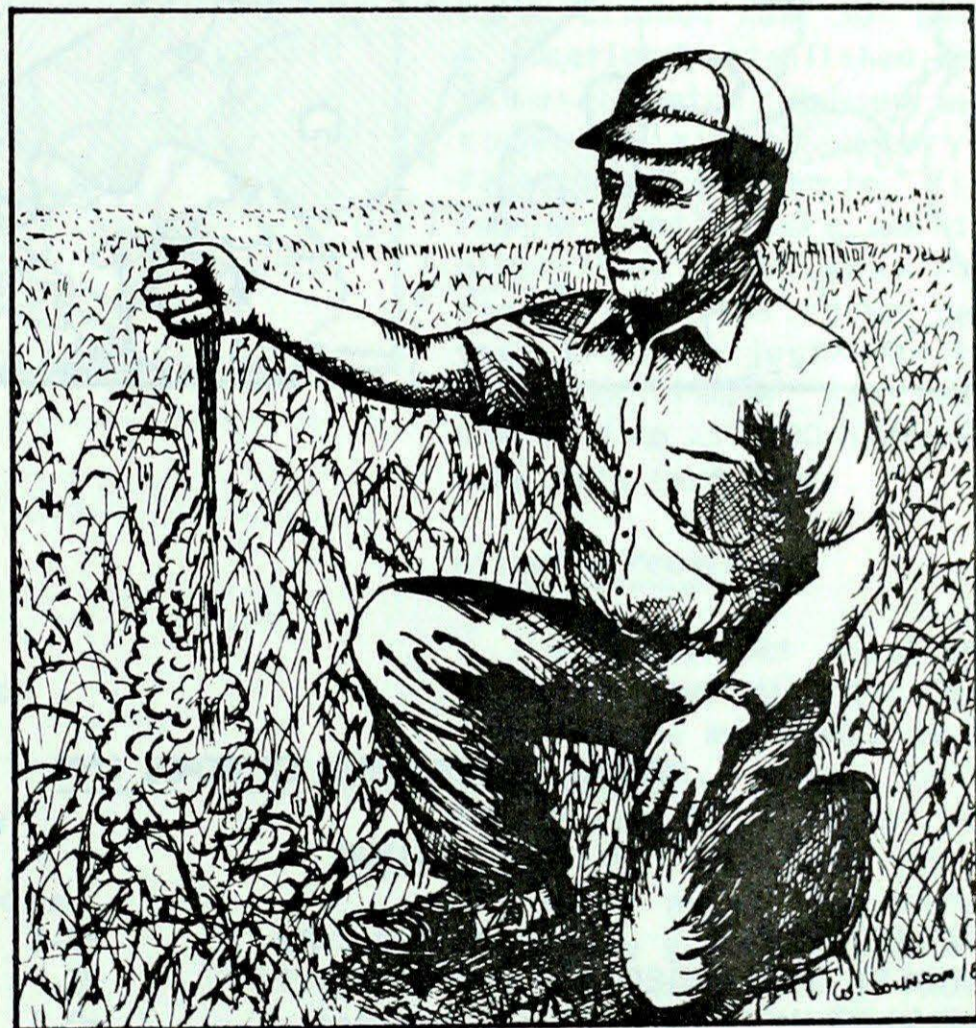
(Aussi disponible en français)

VOL. 6 NO. 29

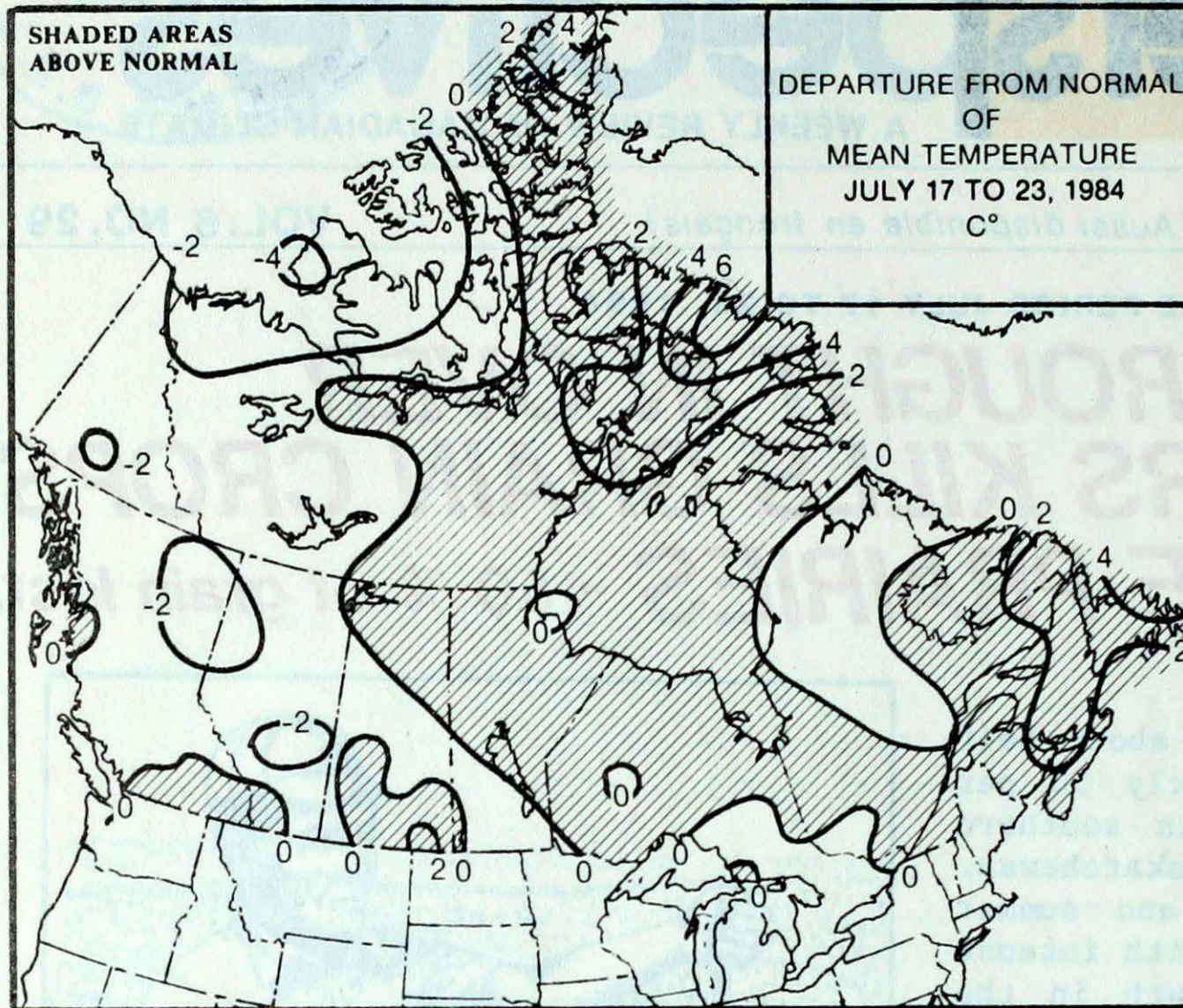
FOR THE PERIOD JULY 17 TO 23, 1984

● **WORST DROUGHT IN OVER 50 YEARS KILLS GRAIN CROPS ON THE PRAIRIES - 50 % of grain lost.**

The worst drought in about half a century has killed nearly 50 per cent of the grain crop in southern Alberta and southern Saskatchewan. Far below normal spring and summer rainfalls in combination with intense heat has halted crop growth in the Canadian Grainbelt. According to Walter Nemanishen, a hydrologist at the Prairie Farm Rehabilitation Administration: "Areas south of a line from Calgary through Saskatoon to Brandon are experiencing the poorest growing season since the drought of 1930s. Crops on nonirrigated lands are past the point of recovery, even if rain comes it will not revive drought-stricken crops". Even the irrigated lands are affected. Owing to the below-normal spring runoff from the mountains, the stream flow in the Oldman and the Bow Rivers, a moisture source for irrigation, has been far below normal. Farmers, insured against hail damage, are praying for hail. By collecting hail insurance payments, some farmers could save themselves from bankruptcy. Added to the drought problem, there is a severe grasshopper infestation. These insects have eaten crops covering more than 174,000 square kilometres already.



ACROSS THE COUNTRY...



Yukon and Northwest Territories

Since the beginning of July, the weather has been rather cool and damp over the western half of the Arctic. This week, there was no exception. The Yukon and the Mackenzie District experienced temperatures that were a few degrees below normal. In addition, weather systems crossing the Mackenzie Valley produced unsettled conditions over most of the Yukon. Dawson received 20 mm of rain, but up to 25 mm fell at Fort Simpson. Several low temperature records were established in the cool air mass covering the Yukon, including -0.5° at Whitehorse on July 19 that also broke the monthly low record at the same location. In contrast, eastern Arctic enjoyed unseasonable warmth. The temperatures were 4 to 7 degrees above normal over Baffin Island and precipitation was light.

British Columbia

Except for the Peace River District, near normal temperatures and dry weather covered British Columbia. Precipitation was light throughout the south but weak weather systems crossing the North deposited 10 to 25 mm of rain. Sunshine was abundant along the West Coast. Castalgar received 88 hours of bright sunshine - twice its weekly normal amount. The dry weather has raised the forest fire hazard in the moderate to high range in the interior.

Prairies

The lack of rain in the grain-belt added to the severity of drought in the South. Some of the agricultural land had less than 10 mm of rain, but once again this week most of the drought stricken areas received no rain. Although mean temperatures were near normal, over the weekend daytime readings soared into the record mid-thirties in southern Saskatchewan and southern Alberta. On July 30, the temperature rose to a record 38° at Estevan.

Ontario

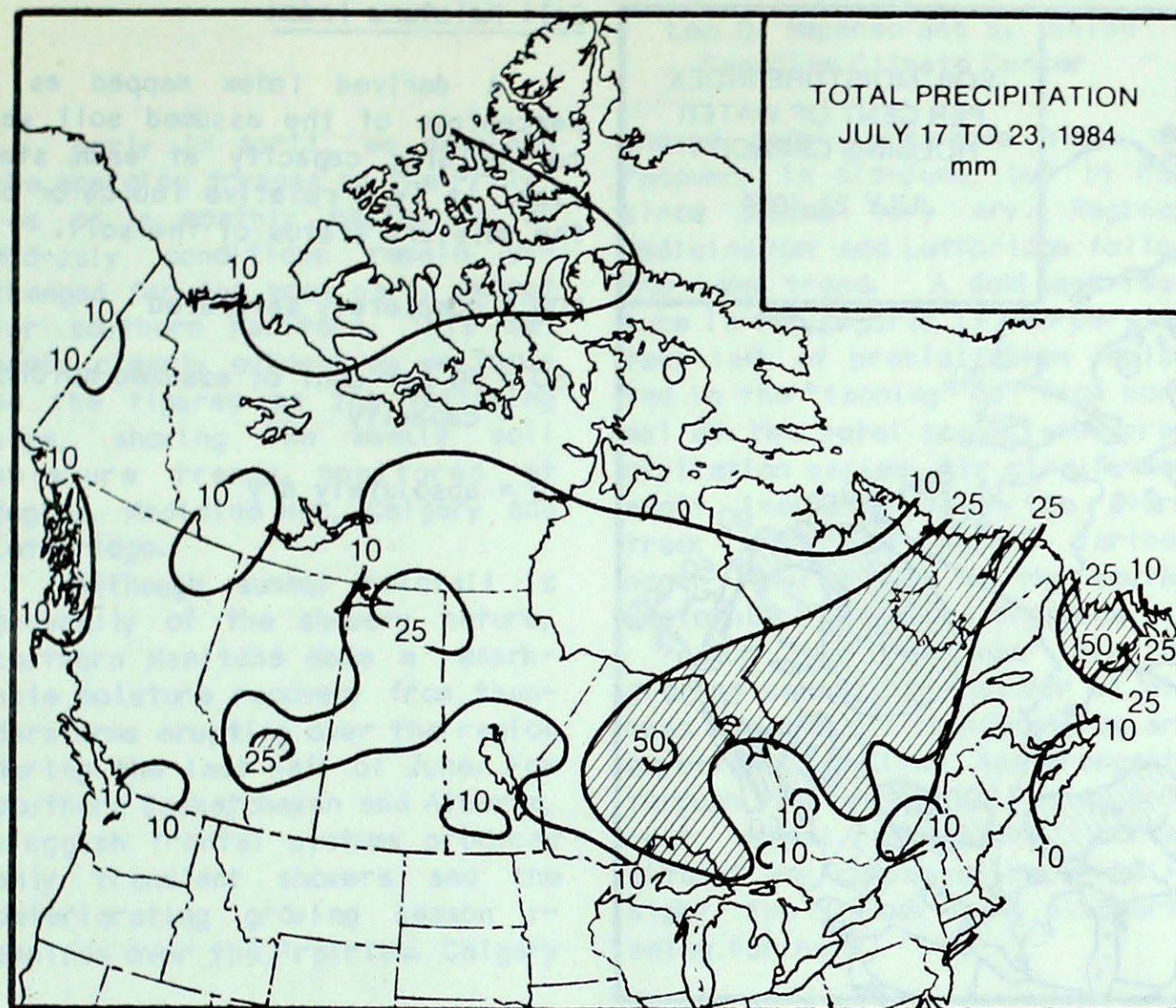
Cool weather returned to the

WEEKLY TEMPERATURES EXTREMES ($^{\circ}$ C)

	<u>MAXIMUM</u>	<u>MINIMUM</u>
YUKON TERRITORY	26.1 Watson Lake	-0.6 Komakuk Beach
NORTHWEST TERRITORIES	26.0 Norman Wells	-2.1 Sachs Harbour
BRITISH COLUMBIA	35.0 Penticton	-0.5 Dease Lake
ALBERTA	34.4 Medicine Hat	1.0 Slave Lake
SASKATCHEWAN	38.0 Estevan	5.3 Yorkton
MANITOBA	31.4 Pilot Mound	4.8 Churchill
ONTARIO	33.5 Windsor	3.8 Upsala
QUEBEC	31.5 Gaspé	2.5 Kuujuaq
NEW BRUNSWICK	29.3 Fredericton	10.5 St Stephen
NOVA SCOTIA	29.9 Inverness	7.9 Western Head
PRINCE EDWARD ISLAND	27.5 Charlottetown	14.0 Charlottetown
NEWFOUNDLAND	29.6 Deer Lake	4.4 Hopedale

ACROSS THE NATION

Warmest mean temperature	22.2	Estevan, SASK
Coollest mean temperature	0.4	Mould Bay, NWT



Province; however, the temperatures rose to above seasonable values over the weekend. July 18 was particularly cool, daytime readings below 20° proved to be of record-low proportions at many locations. Showers and thunderstorms were common throughout the South; but heavy rains in the 30 to 60 mm range fell in the far North. A line of severe thunderstorms crossed southern Ontario on July 18, large size hail was reported at some locations.

Quebec

Pleasant summery weather covered Québec. Near normal temperatures and light precipitation dominated the weather in the South. By the end of the week, the temperatures climbed near 30° and at least 4 locations established record-high values. Central Québec experienced showers almost everyday. At Val-d'Or, for example, fields were too wet and farmers could not complete their field work. Forest fire season has been rather quiet this year. To date just over 3,000 hectares of timber has been burned compared to 237,000 hectares for the same date last year.

HEAVIEST WEEKLY PRECIPITATION (mm)

YUKON	19.9	Dawson
NORTHWEST TERRITORIES	24.8	Fort Simpson
BRITISH COLUMBIA	17.7	Langara
ALBERTA	30.3	Red Deer
SASKATCHEWAN	35.0	Collins Bay
MANITOBA	24.8	Lynn Lake
ONTARIO	62.5	Lansdowne House
QUEBEC	52.2	Bagotville
NEW BRUNSWICK	36.0	Saint John
NOVA SCOTIA	8.2	Greenwood
PRINCE EDWARD ISLAND	16.2	Summerside
NEWFOUNDLAND	60.6	Burgeo

Soil Moisture on the Prairies

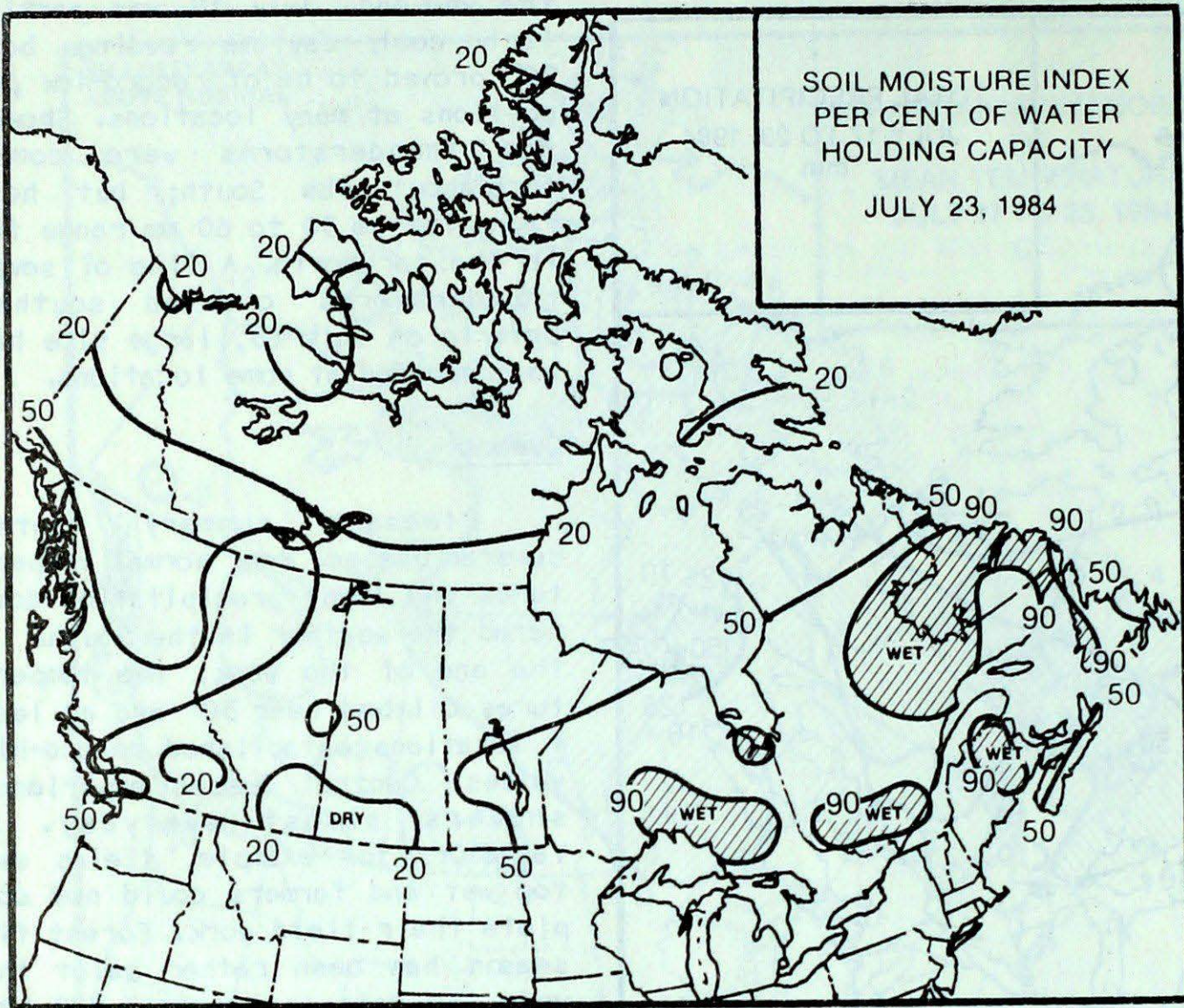
Soil moisture Index as a percentage of water holding capacity at selected stations as of mid-July.

Lethbridge	15
Medicine Hat	6
Kindersley	21
Moose Jaw	13
Regina	16
Saskatoon	22
Estevan	24
Brandon	35

Atlantic Provinces

Near perfect vacation weather prevailed over Atlantic Canada, the temperatures averaged 3 to 6 degrees above normal. Except for parts of New Brunswick, the East Coast continued to experience dry weather. The above normal temperatures promoted crop growth throughout most of the Maritimes, and in Nova Scotia and Prince Edward Island crop growth was described as excellent. But the dry weather has created moisture deficiency in eastern Newfoundland. Crops continue to suffer from slow growth in those areas. Owing to the wet weather during June and early July about 60 per cent of the potato crop had to be replanted in New Brunswick. Lightning strikes in the hot and dry weather helped ignite numerous forest fires in Newfoundland. The biggest fire covering over 5,000 hectares forced the residents of Burlington, near Springdale, to be evacuated. This fire was raging out of control.

SOIL MOISTURE



Soil Moisture Index

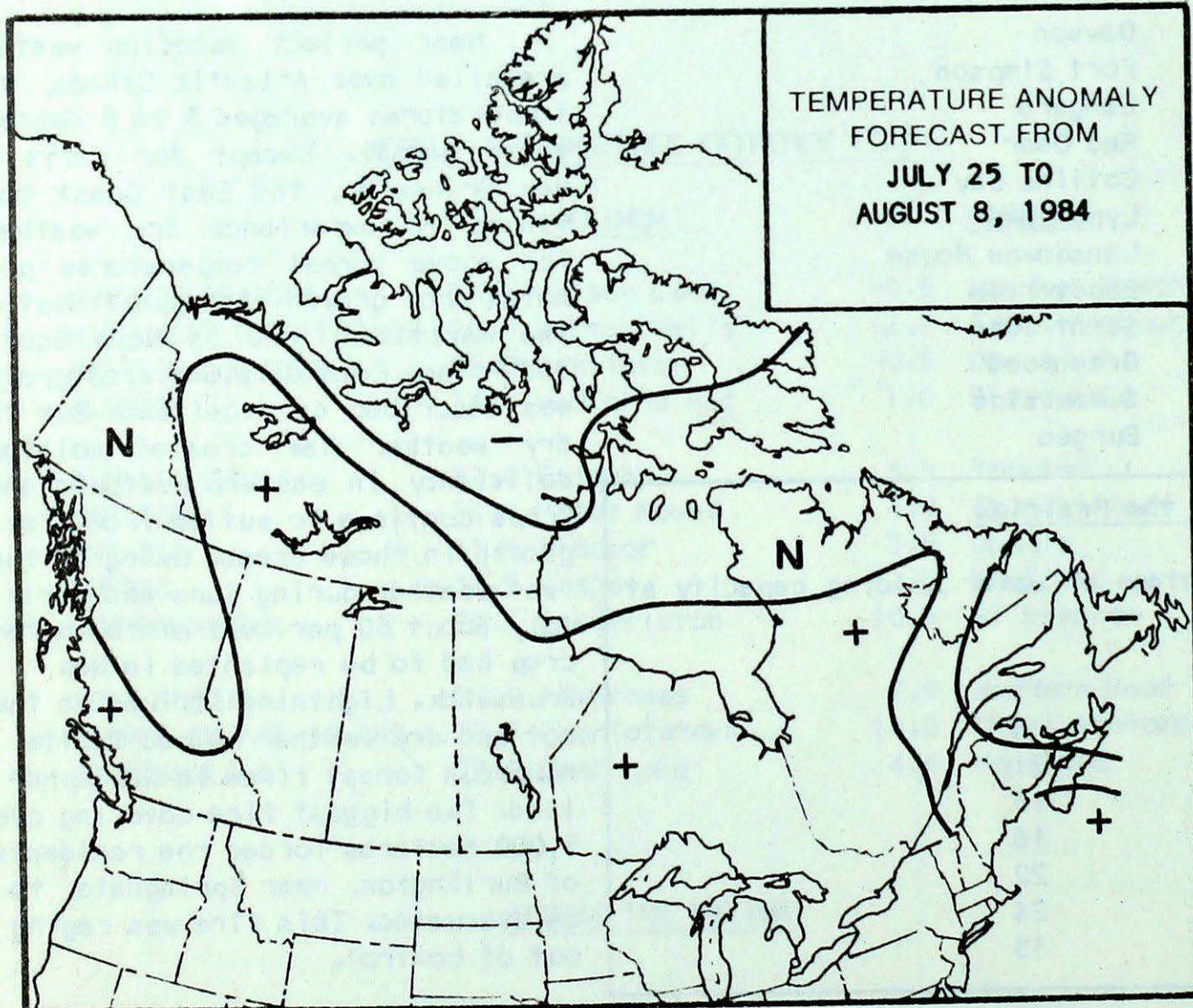
A derived index mapped as a percentage of the assumed soil water holding capacity at each station. It is a relative indicator of the moisture status of the soil.

100 = completely saturated

50 = 50 per cent of assumed holding capacity

0 = absolutely dry

TEMPERATURE ANOMALY FORECAST



Temperature Anomaly Forecast

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

++ much above normal

+ above normal

N normal

- below normal

-- much below normal

Soil Moisture Update in the Canadian Grainbelt

by

Leo O. Mapanao and S. Ishida
Canadian Climate Center

Early in April, we examined the emerging dryness on the Prairies on a monthly basis. As of mid-July conditions remain unchanged for the most part, except for southern Manitoba. This becomes clearly evident as we focus on the figures on the following page, showing the weekly soil moisture trends monitored at Regina, Medicine Hat, Calgary and Lethbridge.

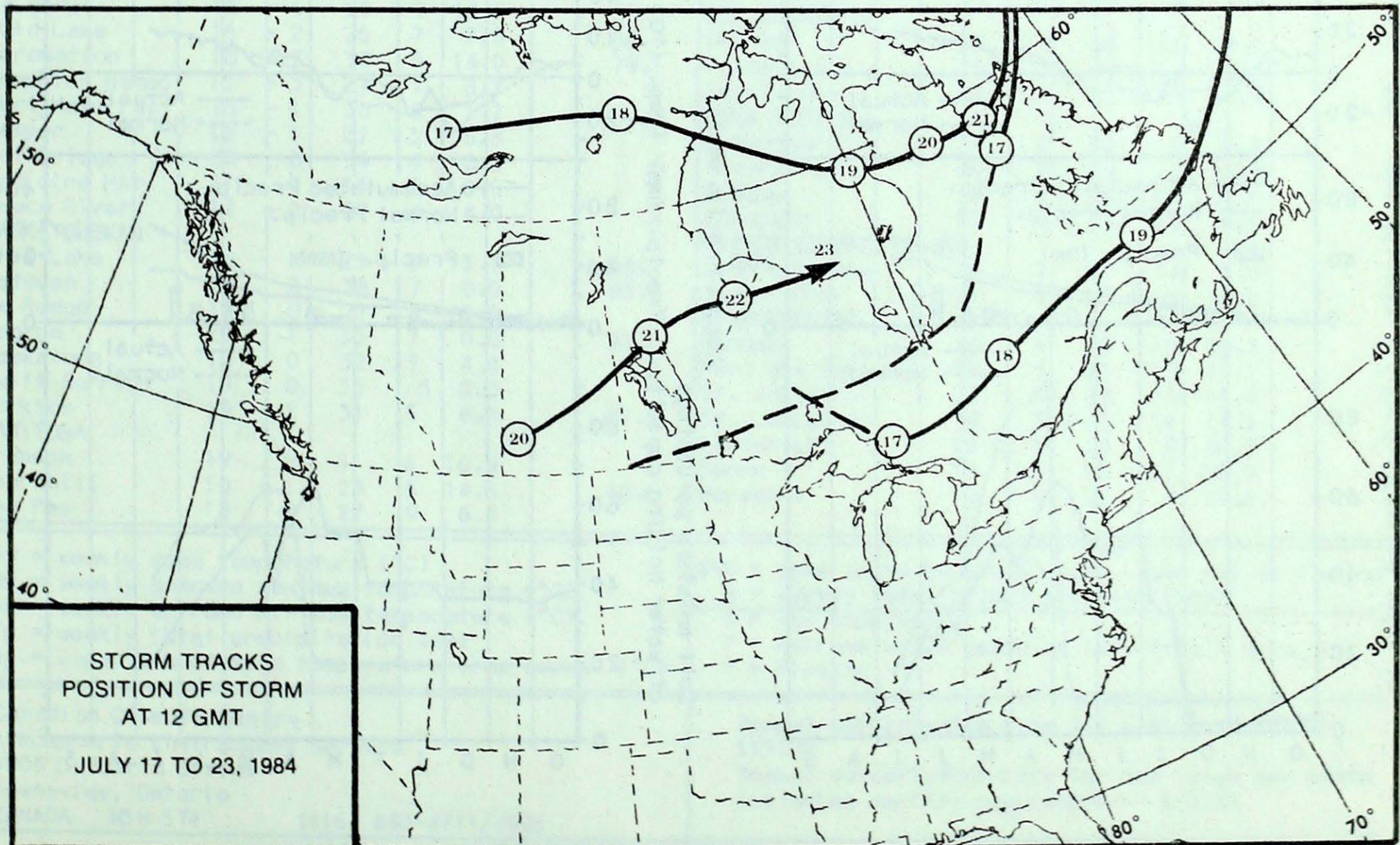
Although summer rainfall is generally of the showery nature, southern Manitoba made a remarkable moisture recovery from thunderstorms erupting over the region during the last half of June. For southern Saskatchewan and Alberta, sluggish frontal systems produced only transient showers and the deteriorating growing season remains over the Prairies. Calgary

showed some favourable signs of recovery in mid-June, but it has since become very dry. Regina, Medicine Hat and Lethbridge follow the same trend. A dominant feature in the figures is the persistent lack of precipitation depicted in the "fanning" out from normal of the total accumulated precipitation series. Air circulation aloft indicates that the storm track has been pushed farther north leaving much of the south-western Prairies in a dry zone.

For the remainder of the growing season, the number of air mass showers and thunderstorms are expected to decline. And prospects through September call for only near normal conditions, hence, without any compensating trend in sight, the outlook seems disheartening for now.

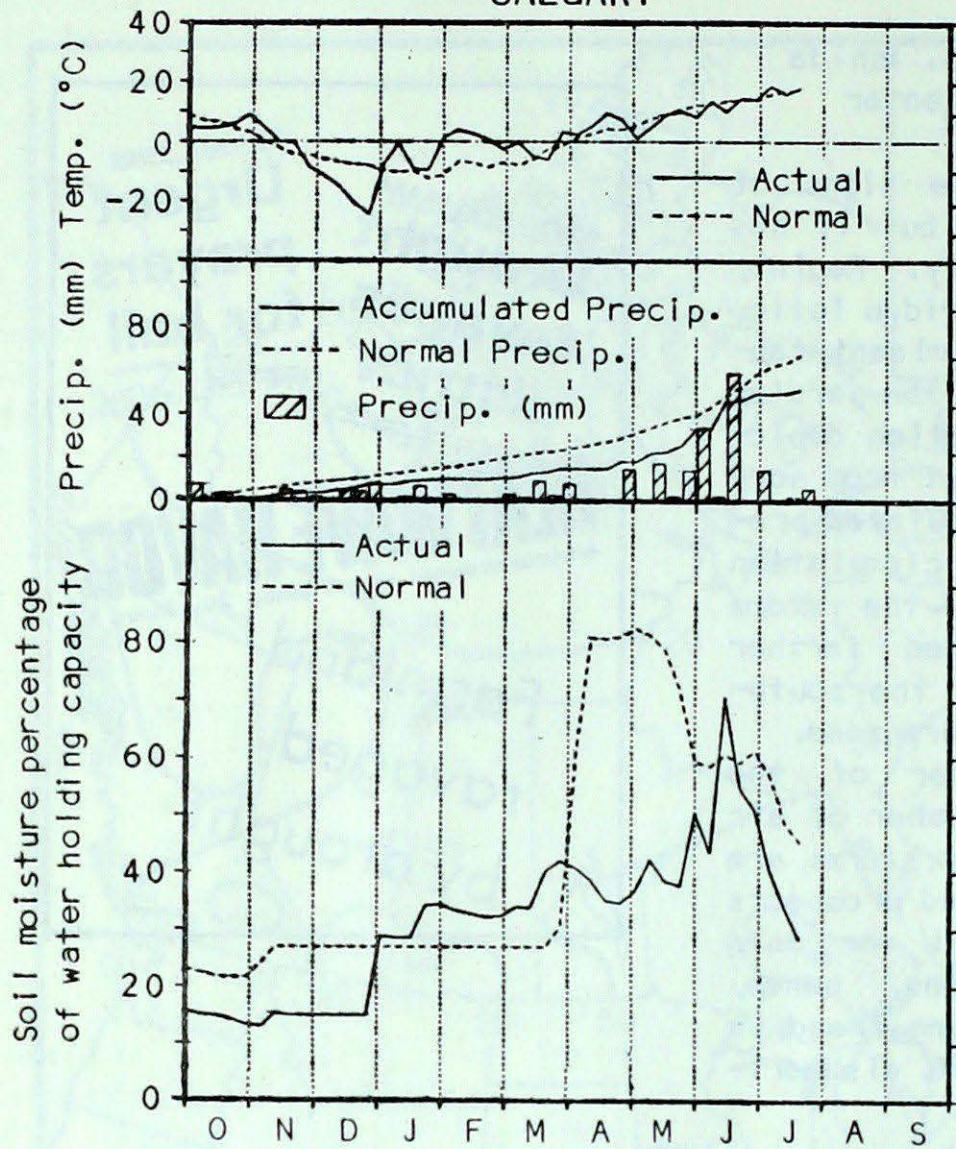


STORM TRACKS

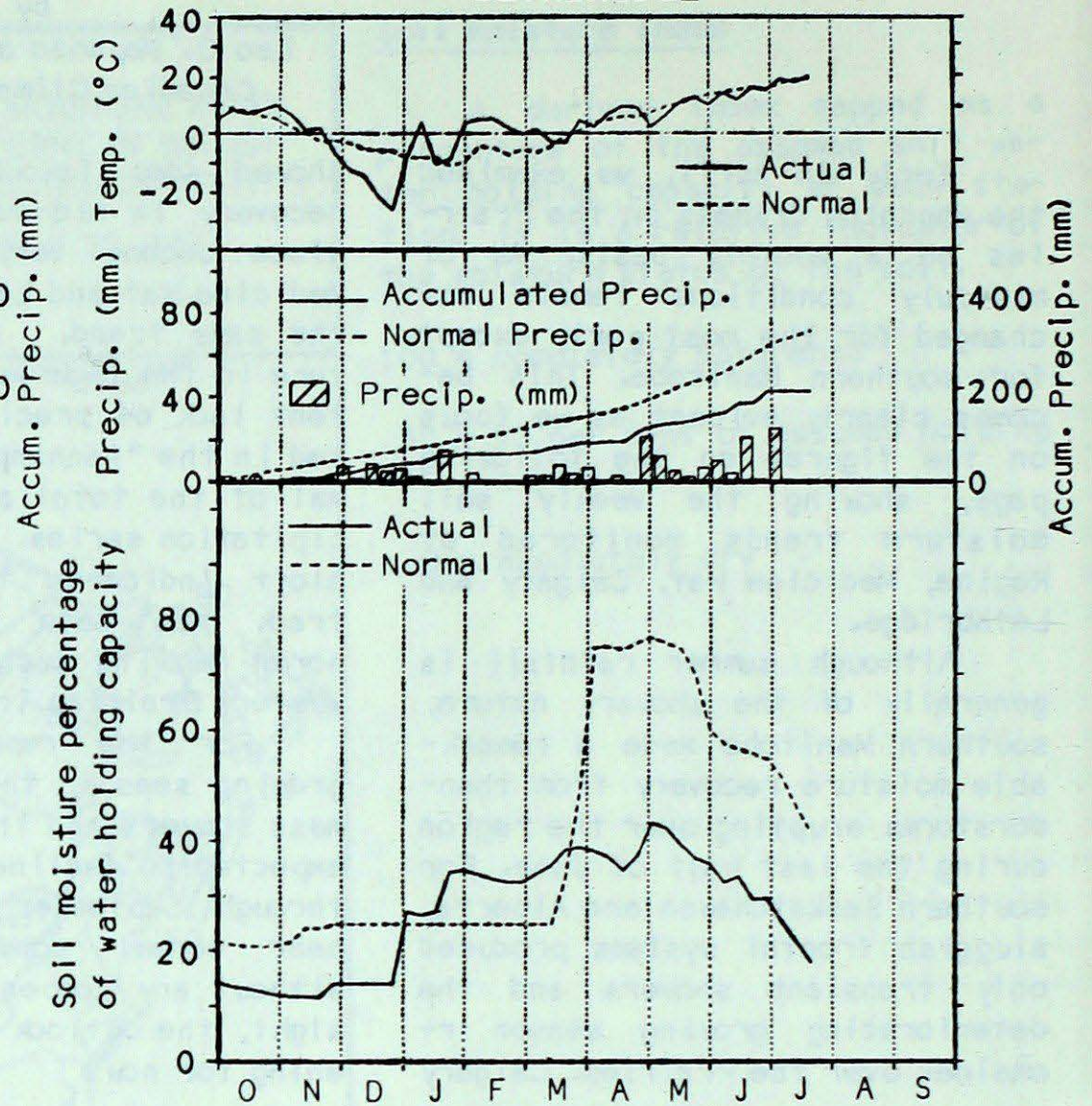


Temperature, precipitation and soil moisture profile
In the drought-stricken areas of the Prairies

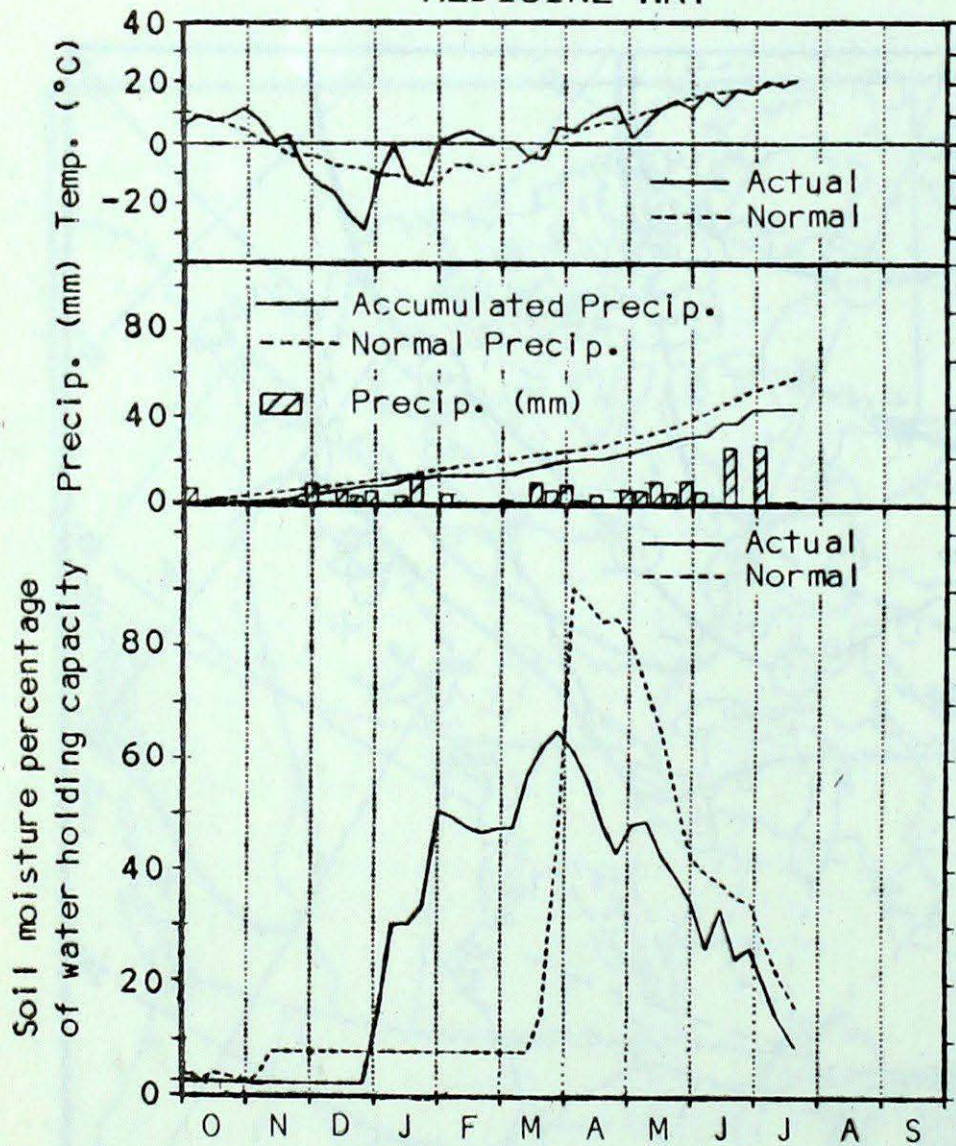
CALGARY



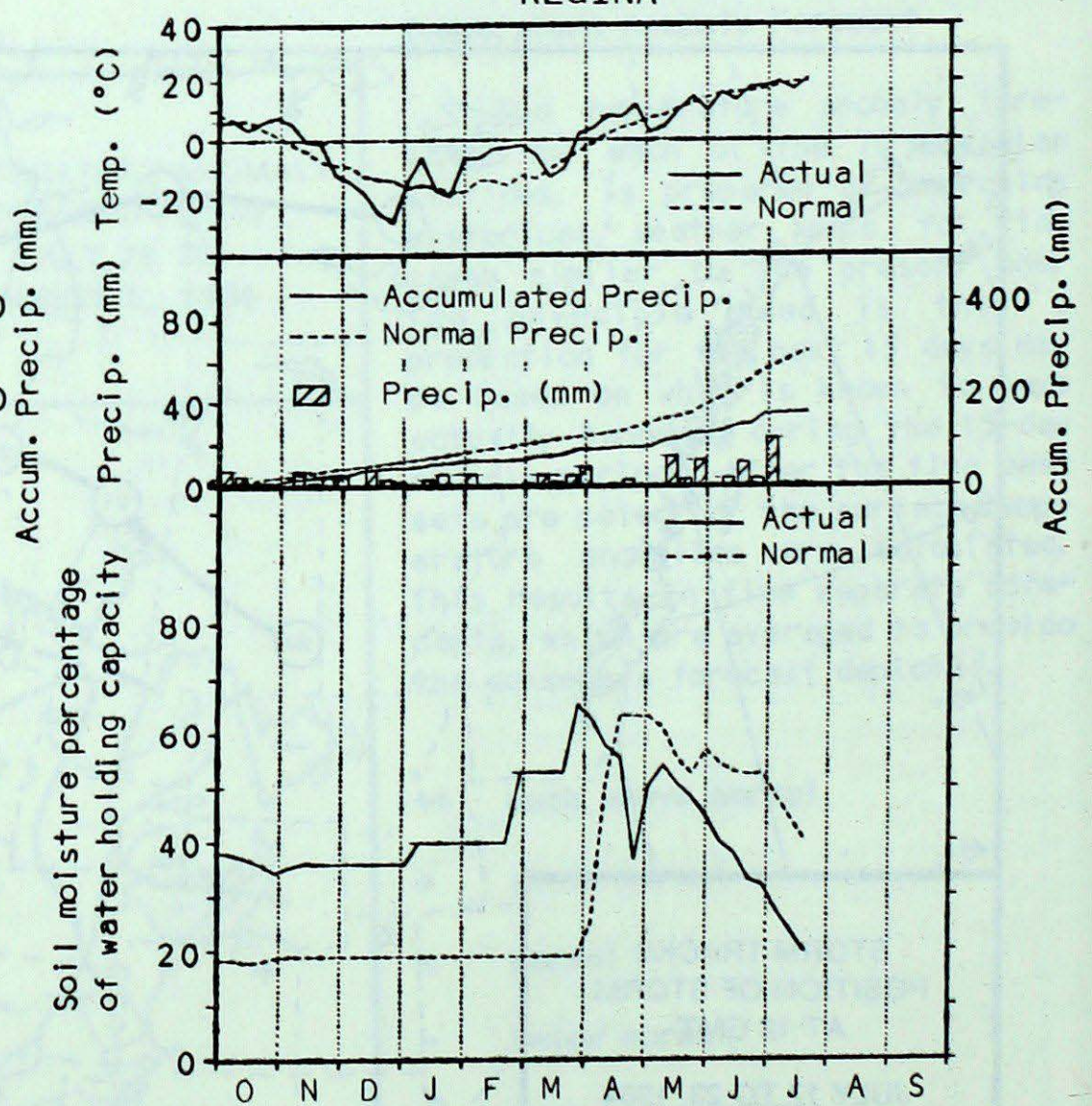
LETHBRIDGE



MEDICINE HAT



REGINA



TEMPERATURE, PRECIPITATION AND BRIGHT SUNSHINE DATA FOR THE WEEK ENDING 0600 GMT JULY 24, 1984

STATION	TEMP				PRECIP		SUN	STATION	TEMP				PRECIP		SUN
	Av	Dp	Mx	Mn	Tp	SOG	H		Av	Dp	Mx	Mn	Tp	SOG	H
YUKON TERRITORY								Thompson	17	1	27	6	8.1		*
Dawson	14	-2	23	6	19.9		X	Winnipeg	20	0	30	10	0.4		76.1
Mayo A	14	-1	23	5	8.0		X	ONTARIO							
Watson Lake	14	-1	26	3	0.3		70.5	Big Trout Lake	17	0	25	8	28.7		X
Whitehorse	11	-3	24	-1	0.0		*	Earlton	18	0	28	8	*		X
NORTHWEST TERRITORIES								Kapusksing	18	1	27	8	10.8		*
Fort Smith	16	-1	26	7	6.8		*	Kenora	20	1	28	13	4.0		X
Inuvik	10	-4	24	1	8.0		*	London	20	-1	30	11	13.7		*
Norman Wells	16	0	26	8	4.4		50.0	Moosonee	17	1	26	5	23.4		59.7
Yellowknife	16	-1	23	11	8.0		69.1	Muskoka	18	0	28	9	*		X
Baker Lake	12	0	22	2	14.9		66.3	North Bay	18	0	26	12	11.6		44.9
Cape Dyer	11	5	17	6	*		X	Ottawa	22	1	31	13	15.8		60.0
Clyde	9	4	18	1	0.0	0.0	111.5	Pickle Lake	18	0	29	9	25.4		X
Frobisher Bay	10	1	23	4	5.0		*	Red Lake	18	-1	28	10	22.6		70.8
Alert	8	4	15	-1	0.4		*	Sudbury	19	0	32	10	9.0		66.4
Eureka	6	1	10	3	0.3		*	Thunder Bay	19	1	31	10	43.1		74.7
Hall Beach	6	0	13	2	3.9		X	Timmins	16	-2	28	*	17.8		X
Resolute	3	-1	7	-1	12.6		*	Toronto	20	-1	32	12	16.0		X
Cambridge Bay	7	-2	13	-1	4.1		*	Trenton	21	-1	28	13	20.4		X
Mould Bay	0	-3	2	-2	10.8	0.0	*	Warton	19	-1	28	10	3.7		72.0
Sachs Harbour	0	-6	3	-2	12.3		14.6	Windsor	22	-1	33	13	4.1		X
BRITISH COLUMBIA								QUEBEC							
Cape St. James	13	0	17	10	2.8		67.7	Bagotville	18	0	26	9	52.2		X
Cranbrook	20	1	33	7	3.6		94.8	Blanc-Sablon	14	2	18	10	*		*
Fort Nelson	15	-2	29	5	16.4		*	Inukjuak	11	2	20	5	14.6		26.1
Fort St. John	14	-3	27	5	7.6		X	Kuujuuaq	12	0	21	3	4.0		48.7
Kamloops	21	0	33	10	2.9		*	Kuujuuarapik	10	-1	25	3	42.2		*
Penticton	21	0	35	9	*		*	Maniwaki	18	0	28	9	25.4		46.3
Port Hardy	14	0	22	8	9.0		*	Mont-Joli	19	2	26	13	23.8		63.5
Prince George	14	-1	28	2	*		*	Montréal	22	0	29	14	1.4		*
Prince Rupert	13	0	19	7	14.2		61.2	Natashquan	16	2	22	9	14.0		49.7
Revelstoke	19	0	33	8	3.0		66.8	Nitchequon	14	0	20	7	42.9		39.8
Smithers	14	-1	30	1	2.0		*	Québec	20	1	27	13	21.0		50.8
Vancouver	17	-1	27	11	0.0		82.1	Schefferville	14	1	21	7	48.7		44.6
Victoria	16	0	28	8	0.8		92.4	Sept-Îles	17	2	24	12	31.0		*
Williams Lake	14	0	27	6	0.0		76.6	Sherbrooke	18	0	27	11	3.8		51.1
ALBERTA								Val-d'Or	18	0	29	9	7.7		*
Calgary	16	-1	29	5	12.1		85.3	NEW BRUNSWICK							
Cold Lake	16	-2	26	7	7.8		66.4	Charlo	20	1	28	13	24.2		67.3
Coronation	16	-2	30	5	14.0		79.1	Fredericton	21	1	29	12	32.0		*
Edmonton Namao	15	-3	27	7	8.1		X	Saint John	18	0	25	11	36.0		52.8
Fort McMurray	16	-1	30	6	1.7		*	NOVA SCOTIA							
Jasper	15	-1	27	3	6.8		*	Greenwood	21	2	30	12	8.2		X
Lethbridge	20	0	34	4	0.0		*	Shearwater	20	2	27	12	2.8		64.5
Medicine Hat	21	0	34	6	0.0		*	Sydney	20	2	29	14	5.6		74.4
Peace River	14	-2	27	4	4.0		X	Yarmouth	17	0	22	12	2.9		44.0
SASKATCHEWAN								PRINCE EDWARD ISLAND							
Cree Lake	16	X	25	9	13.1		68.7	Charlottetown	21	2	28	14	5.0		*
Estevan	22	2	38	7	0.0		83.8	Summerside	21	2	27	16	16.2		73.6
La Ronge	17	0	27	8	21.8		X	NEWFOUNDLAND							
Regina	20	1	35	7	0.0		92.0	Gander	19	3	28	12	29.2		68.3
Saskatoon	19	0	32	7	4.4		*	Port aux Basques	16	3	21	13	18.2		*
Swift Current	19	0	33	6	0.0		*	St. John's	20	4	27	13	11.8		74.6
Yorkton	18	-1	31	5	6.5		87.5	St. Lawrence	16	3	21	12	34.3		X
MANITOBA								Cartwright	15	3	25	8	26.9		X
Brandon	19	0	31	6	16.9		*	Goose	19	3	28	11	28.0		43.6
Churchill	10	-1	25	5	14.6		40.1	Hopedale	10	-1	20	4	28.6		X
The Pas	18	0	27	9	6.4		*								

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
* = missing

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Annual subscription rate for weekly issues---
\$35.00
Annual subscription rate for one issue per month
including monthly supplement--- \$10.00

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Subscription enquiries: Supply and Services Canada, Publishing Centre, Ottawa, Ontario, Canada, K1A 0S9

**LONGWOODS
NEAR LONDON
ONTARIO**

Air from the U.S. midwest brought a small amount of strongly acidic rain with a pH reading of 3.4 to Longwoods on July 15. On July 17 the region received strongly acidic rain with a pH of 4.1. The rain was associated with air that passed through Wisconsin, Illinois, Indiana and Michigan.

**DORSET*
MUSKOKA
ONTARIO**

Dorset received strongly acidic rain on July 15 and July 17 with pH values of 4.0 each day. On July 15 the air came from the U.S. Midwest while the rain on July 17 was produced in air that passed over Wisconsin, Michigan and central Ontario. Air from northern Ontario brought strongly acidic rain of pH 4.2 to Dorset on July 18. The rain was again strongly acidic on July 20 with a pH reading of 4.0. The air associated with this rain passed through Wisconsin, Michigan and across Lake Huron and Georgian Bay. Data provided by Ontario Ministry of the Environment.

**CHALK RIVER
OTTAWA
VALLEY-
ONTARIO**

Chalk River received a large amount of strongly acidic rain with a pH of 3.9 on July 15. This event was associated with air that came from the U.S. Midwest. Air that passed through northwestern Ontario brought slightly acidic rain of pH 4.9 to the region on July 16. On July 17 the rain was strongly acidic with a pH reading of 4.2. This air passed through northern Ontario. Chalk River received a large amount of moderately acidic rain with a pH value of 4.5 on July 20. The rain was produced in air that came from Wisconsin and across Lake Huron and Georgian Bay.

**MONTMORENCY
QUEBEC CITY
QUEBEC**

Montmorency received small amounts of strongly acidic rain on July 18 and July 20 with pH values of 3.7 and 4.2 respectively. These events were associated with air that passed over Michigan, central Ontario and northern Quebec.

**KEJIMKUJIK
SOUTHWESTERN
NOVA SCOTIA**

Air that came from the eastern seaboard brought strongly acidic rain with a pH of 4.2 on July 16 and moderately acidic rain of pH 4.4 to Kejimkujik on July 18.

*Dorset data supplied by the Ontario Ministry of Environment.

Environmental damage to lakes and streams is usually observed in sensitive areas regularly receiving precipitation with pH less than 4.7. pH readings less than 4.0 are serious.

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.