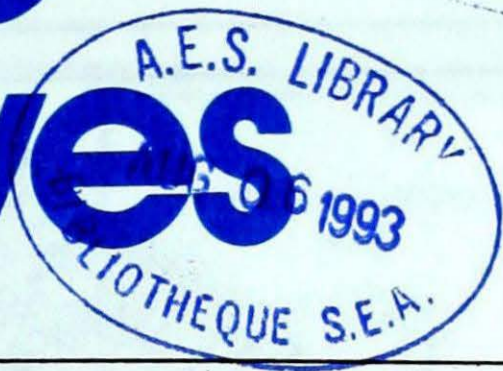




Climatic Perspectives



Severe summer weather

A cold front swept across southern Alberta on the 29th triggering severe thunderstorms in areas surrounding Edmonton. To the southwest, there were several reports of golf-ball sized hail and late that afternoon a small tornado was seen near Pigeon Lake.

The thunderstorms continued to redevelop and drift eastwards throughout the evening. Another tornado, near Holden, injured two people and a third, weaker tornado touched down near Smoky Lake after midnight.

In Manitoba, the Red River Valley was so saturated with water from last week's storms that rains from this week (July 26th, 27th) have flooded vegetable crops south of Winnipeg as well as portions of the city.

On July 26th, a line of severe thunderstorms struck southern and central Ontario. Near Orillia, winds that were estimated to be gusting to 120 km/h uprooted several large trees and downed power lines. In Burlington and Mississauga, structural damage to buildings resulted from another thunderstorm cell that moved along the Lake Ontario shoreline.

A record one day rainfall of 153.5 mm at Kenora on July 27th and 28th (140 mm falling in three hours), washed out several local roads. Severe erosion and flooding from the heavy rains, in this section of the province, caused the closure of the Canadian Pacific Rail main line and the Trans-Canada Highway, 150km east of Thunder Bay. On the 28th, southern Ontario experienced more severe thunderstorm ac-

tivity in an area around London, with reports of hail, downed trees and torn roofs.

Quebec was struck with severe thunderstorms on the 28th and 29th. Overnight on the 28th and into the 29th, Val-d'Or, Quebec received 66.8 mm of rain in less than six hours, causing 1,000 homes to suffer flooded basements. Southwestern Montreal received 53 mm of rain in one hour on the 29th, causing a flash flood that forced the closures of the Bonaventure highway downtown access and the exit to the Iles des Soeurs. Power outages in Montreal left close to 25,000 residents without electricity. Thunderstorms then rolled into Sherbrooke, flooding more basements and leaving an additional 30,000 residents without electricity.

Elsewhere...

In the Mackenzie region, a cold front pushed south of Great Bear on the 27th bringing with it clouds, showers and northerly winds. On the 28th, cloud and rain dominated the Great Slave area where Yellowknife recorded a 24-hour precipitation record of 17.6 mm. Iqaluit received heavy rains (41.2 mm) on the 31st.

The Yukon was mostly unsettled and cloudy, however, several stations set record high minimums this week.

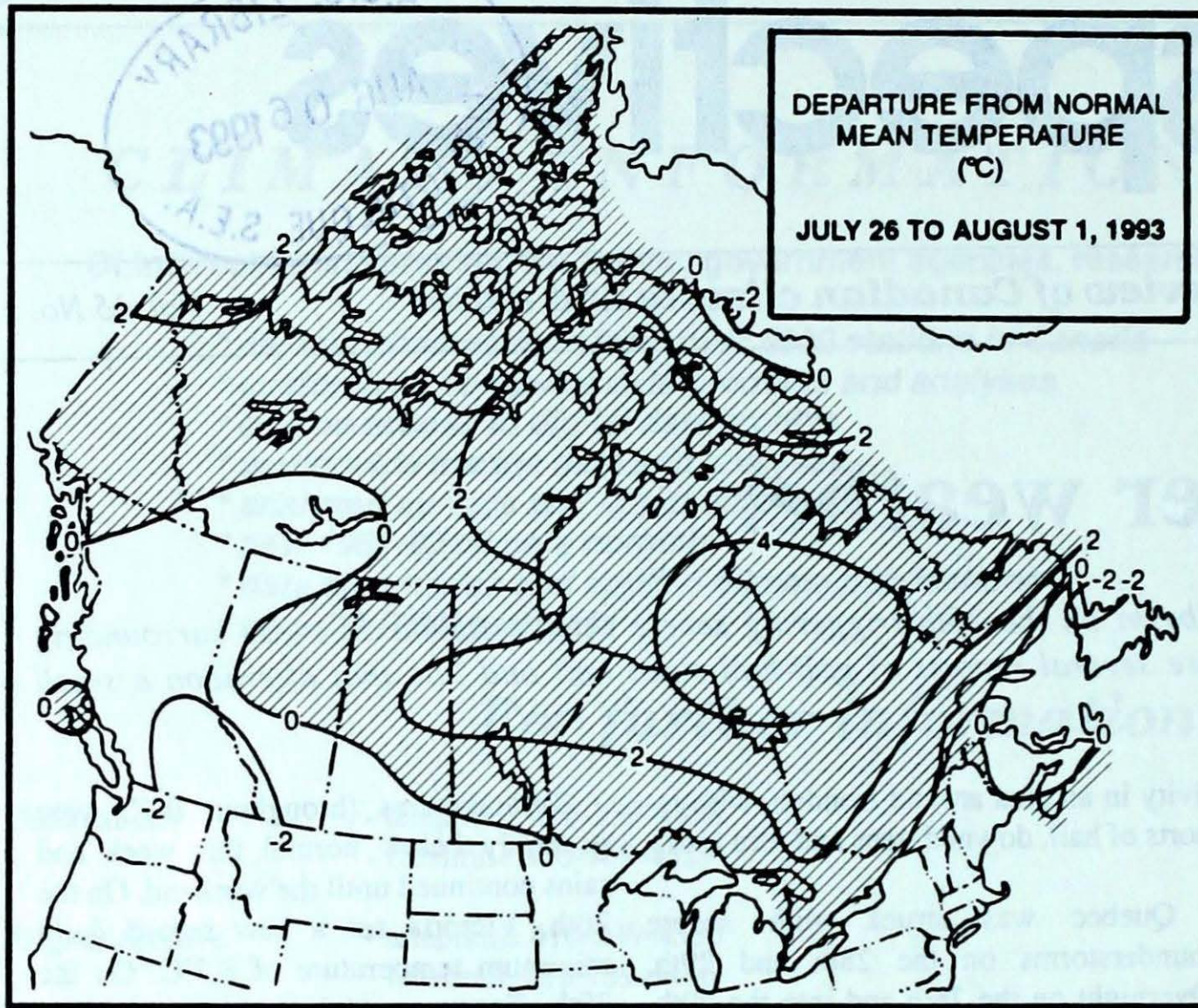
Temperatures throughout B.C. were generally below normal this week and rains continued until the weekend. On the 26th, Victoria set a new record daily minimum temperature of 8.7°C. On the 29th, Terrace experienced a record low daily maximum temperature of 13.1°C in addition to a daily record rainfall of 25.6 mm.

The Maritimes were sunny and cool early in the week, but cloud, showers, drizzle and fog settled in by midweek. Temperatures managed to rise above seasonal values as sunny conditions returned for the weekend.

Newfoundland and Labrador had fair weather and warm southerly winds due to a ridge of high pressure lingering southeast of the Island. However, a few disturbances throughout the week triggered some shower and thundershower activity.

A Look Ahead ...

For the week of August 9, temperatures are expected to be above normal for Quebec and the Atlantic region. Below normal values are likely over the Arctic islands. Elsewhere, near normal temperatures will occur. Precipitation may brush southern British Columbia and the Alberta foothills. Precipitation is also likely over southern Quebec and the Atlantic region.



Weekly normal temperatures (°C)

| | max. | min. |
|---------------------------|------|------|
| Whitehorse A | 20.9 | 8.4 |
| Iqaluit A | 11.6 | 4.1 |
| Yellowknife A | 19.9 | 11.1 |
| Vancouver Int'l A | 22.9 | 13.0 |
| Victoria Int'l A | 22.7 | 10.9 |
| Calgary Int'l A | 23.7 | 9.4 |
| Edmonton Int'l A | 22.5 | 9.6 |
| Regina A | 26.4 | 11.4 |
| Saskatoon A | 25.5 | 11.2 |
| Winnipeg Int'l A | 25.7 | 12.7 |
| Ottawa Int'l A | 26.2 | 15.0 |
| Toronto (Pearson Int'l A) | 26.9 | 14.5 |
| Montréal Int'l A | 26.3 | 16.1 |
| Québec A | 25.1 | 13.7 |
| Fredericton A | 25.9 | 13.4 |
| Saint John A | 22.2 | 12.2 |
| Halifax (Shearwater) | 22.2 | 14.0 |
| Charlottetown A | 23.7 | 14.5 |
| Goose A | 22.0 | 11.5 |
| St John's A | 21.1 | 11.8 |

Weekly temperature and precipitation extremes

| | Maximum temperature (°C) | Minimum temperature (°C) | Heaviest precipitation (mm) |
|--|--------------------------|--------------------------|-----------------------------|
| British Columbia | Lytton 33 | Puntzi Mountain (aut) 1 | Smithers A 60 |
| Yukon Territory | Watson Lake A 26 | Watson Lake A 7 | Faro (aut) 12 |
| Northwest Territories | Inuvik A 28 | Cape Hooper -3 | Iqaluit A 48 |
| Alberta | Medicine Hat A 34 | Banff (aut) 3 | Slave Lake A 36 |
| Saskatchewan | Meadow Lake A 33 | Collins Bay 6 | Uranium City A 33 |
| Manitoba | Gillam A 31 | Churchill A 5 | Churchill A 45 |
| Ontario | Windsor A 34 | Armstrong 8 | Kenora A 161 |
| Quebec | Québec A 30 | Blanc Sablon A 2 | Val-d'Or 95 |
| New Brunswick | St-Léonard A 29 | St-Léonard A 5 | Saint John A 28 |
| Nova Scotia | Greenwood A 29 | Yarmouth A 8 | Shearwater A 55 |
| Prince Edward Island | Charlottetown A 26 | Charlottetown A 7 | East Point (aut) 35 |
| Newfoundland | Goose A 31 | Bonavista 2 | Burgeo 114 |

Across The Country...

| | |
|---|------------------------|
| Highest Mean Temperature | Windsor A (Ont.) 24 |
| Lowest Mean Temperature | Cape Hooper (N.W.T.) 1 |

CLIMATIC PERSPECTIVES
VOLUME 15

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ISBN 0225-5707 UDC 551.506.1(71)

Climatic Perspectives is a weekly publication (disponible aussi en français) of the Canadian Climate Centre, Atmospheric Environment Service, 4905 Dufferin St., Downsview, Ontario, Canada M3H 5T4

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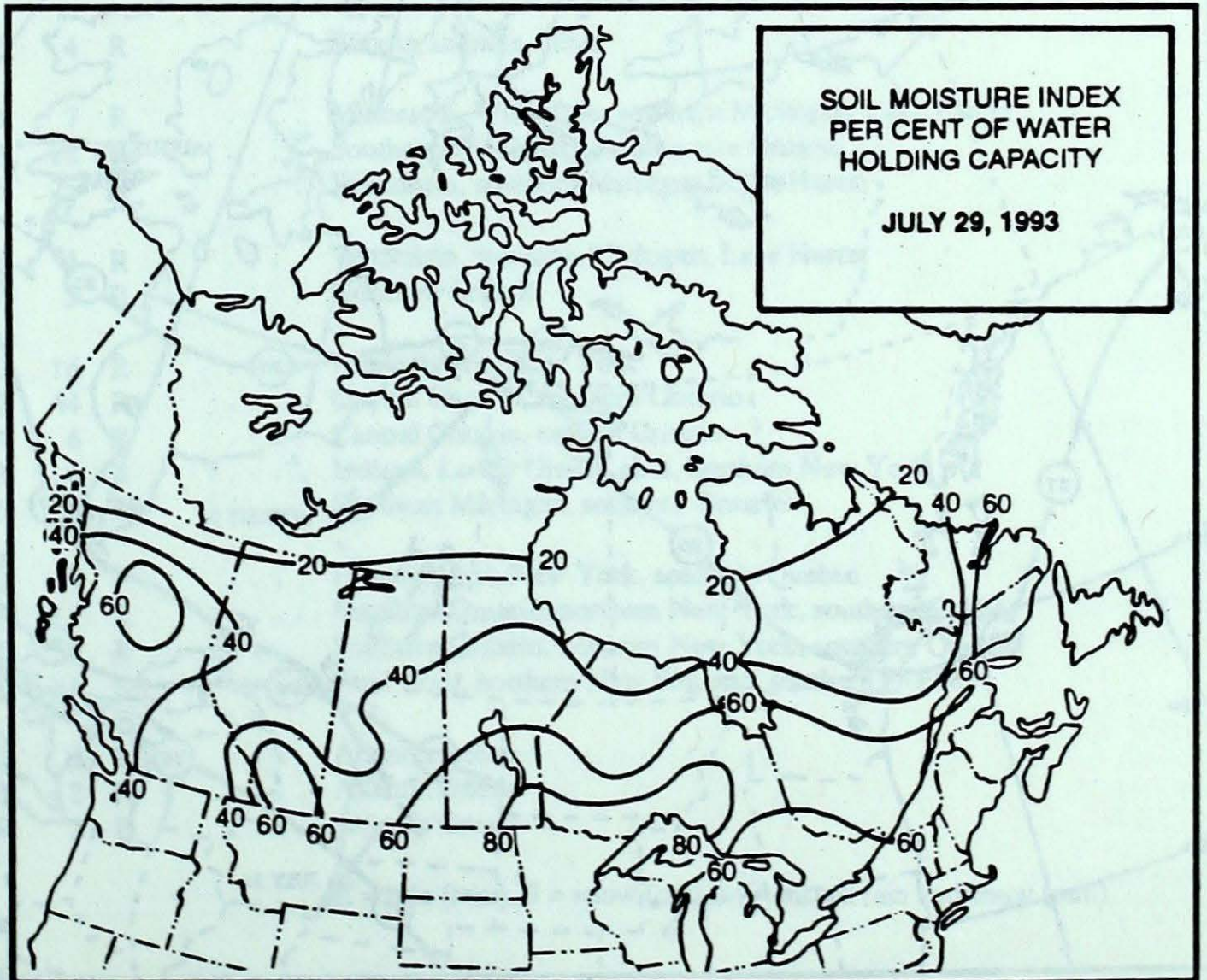
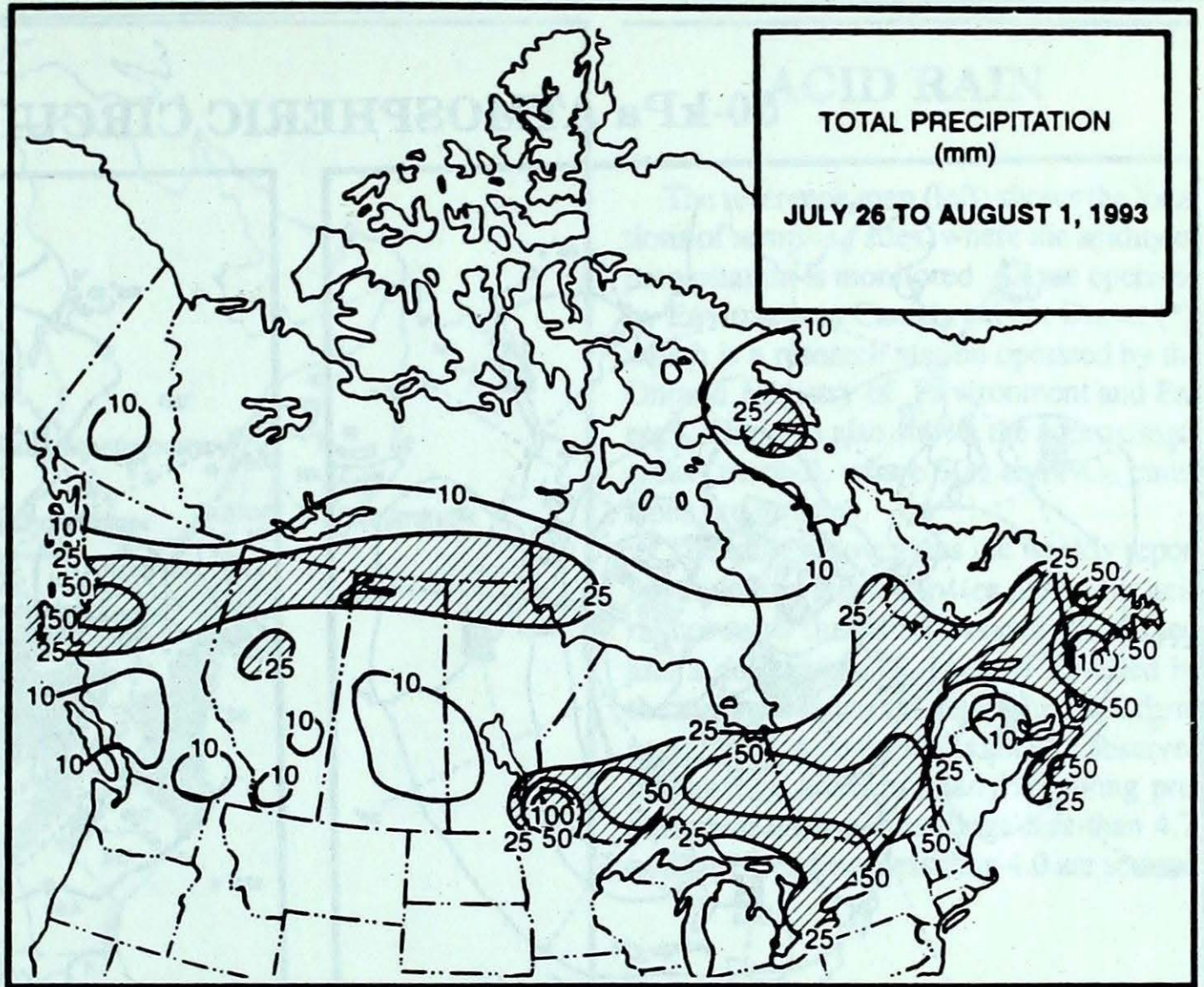
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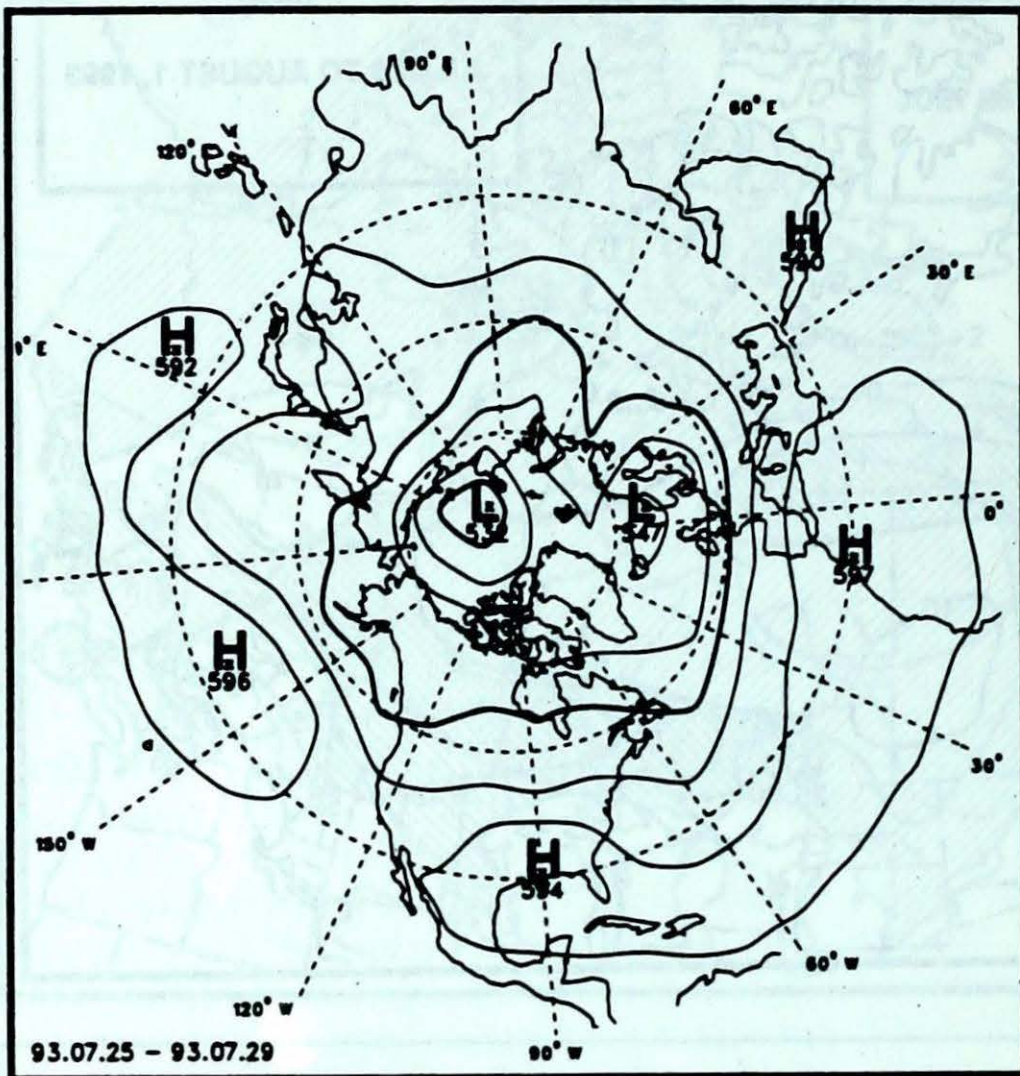
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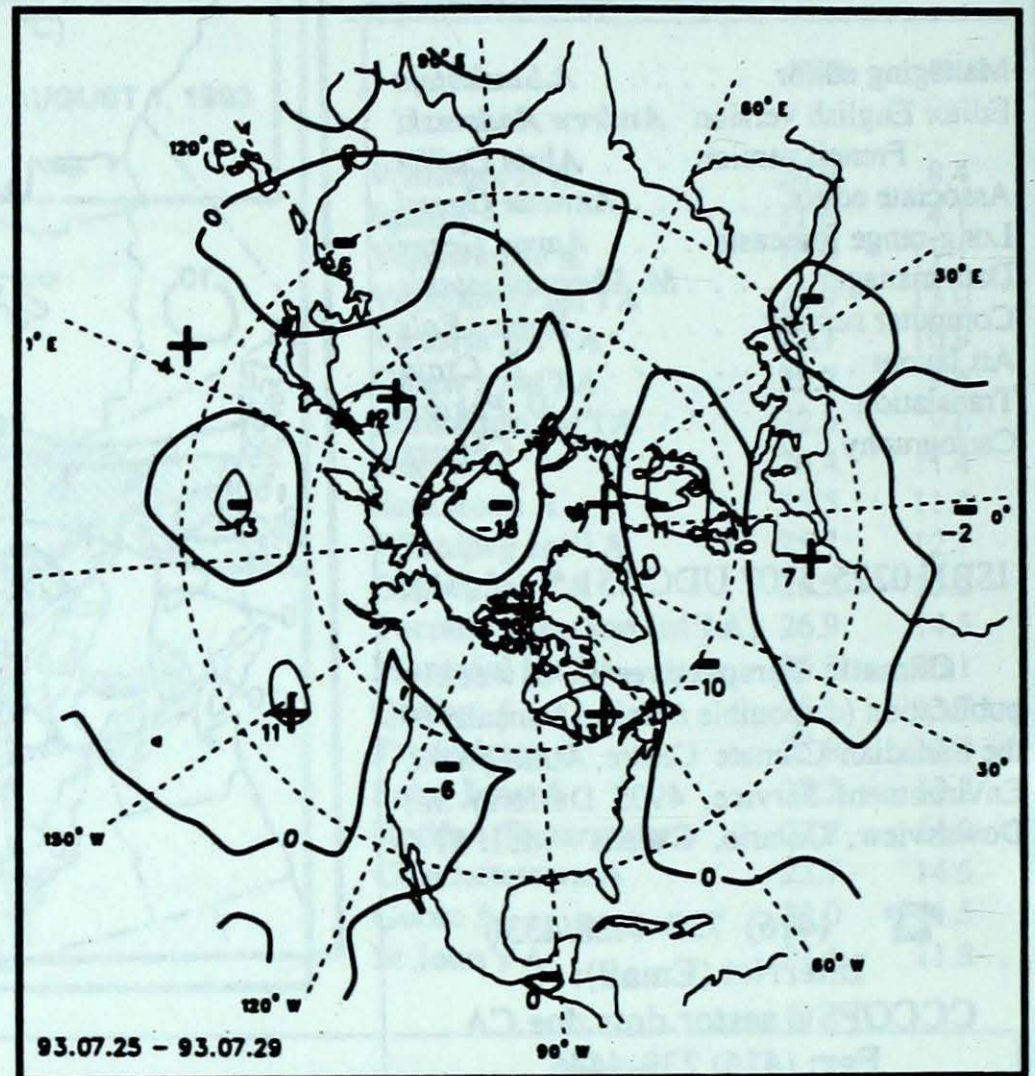
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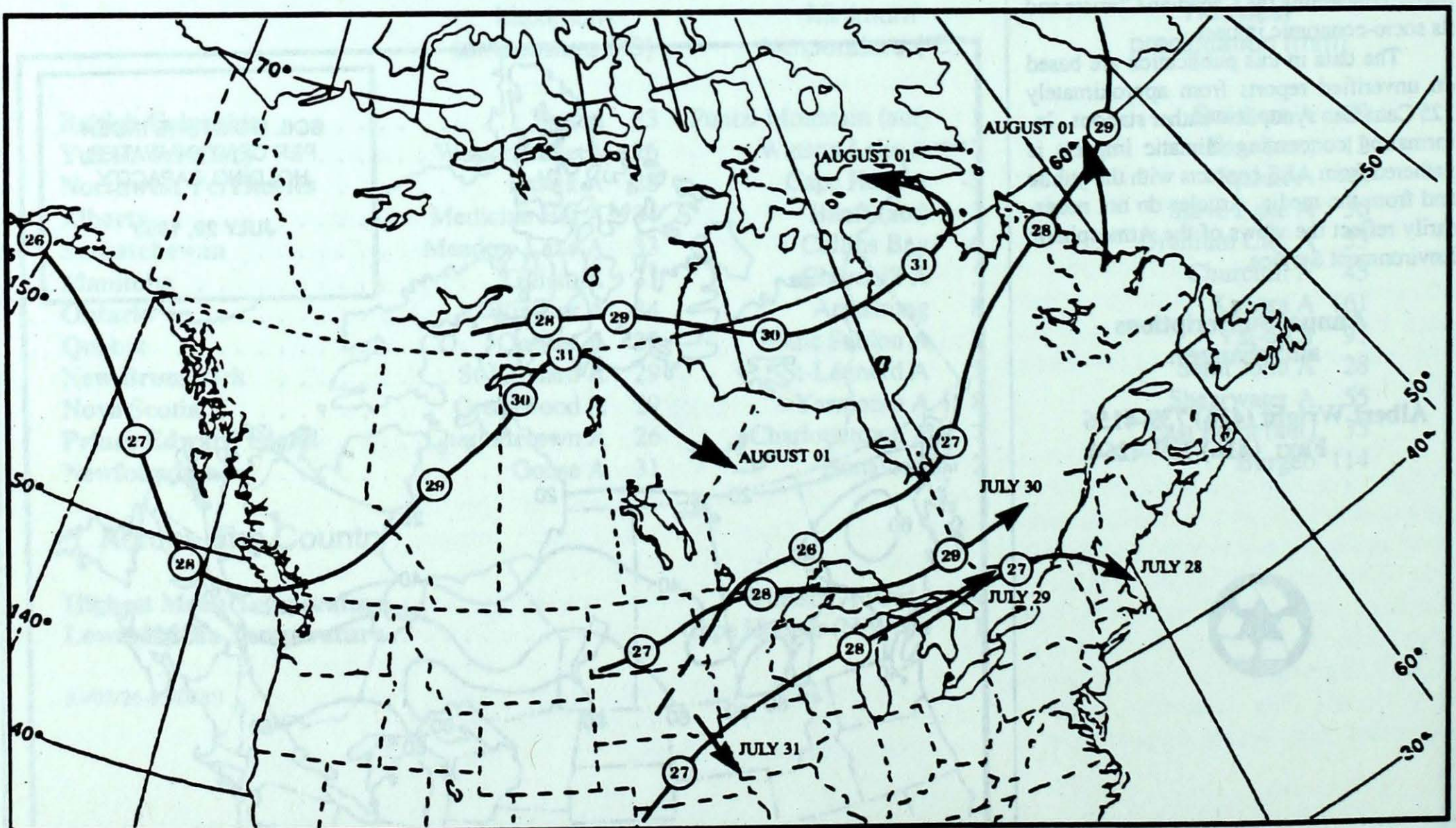
50-kPa ATMOSPHERIC CIRCULATION



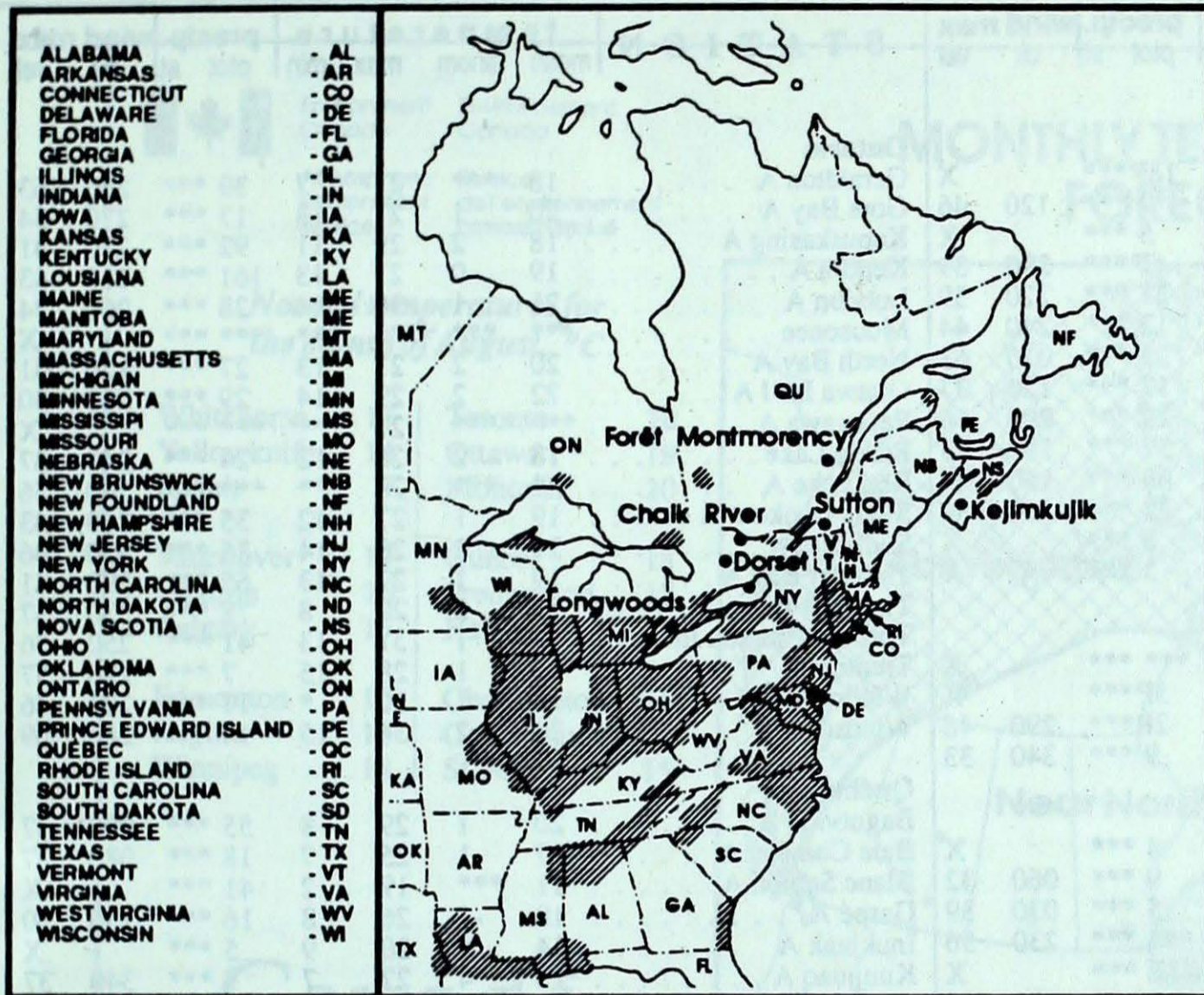
Mean geopotential height
50-kPa level (10 decametre intervals)



Mean geopotential height anomaly
50-kPa level (10 decametre intervals)



Tracks of low pressure centres at 12:00 U.T. each day during the period.



ACID RAIN

The reference map (left) shows the locations of sampling sites, where the acidity of precipitation is monitored. All are operated by Environment Canada except Dorset (*), which is a research station operated by the Ontario Ministry of Environment and Energy. The map also shows the approximate areas (shaded), where SO₂ and NO_x emissions are greatest.

The table below gives the weekly report summarizing the acidity (or pH) of the acid rain or snow that fell at the collection sites, and a description of the path travelled by the moisture laden air. Environmental damage to lakes and streams is usually observed in sensitive areas regularly receiving precipitation with pH readings less than 4.7, while pH readings less than 4.0 are serious.

| SITE | day | pH | amount | AIR PATH TO SITE |
|--|-----|-----|--------|--|
| July 25 to 31, 1993 | | | | |
| Longwoods | 25 | 3.7 | 4 R | Illinois, Indiana, Ohio |
| Dorset * | 26 | 4.0 | 7 R | Minnesota, Wisconsin, southern Michigan, Lake Huron |
| | 28 | 4.3 | 12 R | Southern Michigan, southwestern Ontario |
| | 29 | 4.5 | 25 R | Wisconsin, southern Michigan, Lake Huron |
| Chalk River | 30 | 5.1 | 1 R | Wisconsin, southern Michigan, Lake Huron |
| | 31 | 4.7 | 5 R | Northern Ontario |
| Sutton | 26 | 4.0 | 16 R | Pennsylvania, New York |
| | 27 | 4.9 | 44 R | Central Ontario, southern Ontario |
| | 28 | 4.4 | 6 R | Central Ontario, eastern Ontario |
| | 29 | 4.3 | 4 R | Indiana, Lower Great Lakes, northern New York |
| | 30 | 4.6 | 18 R | Southern Michigan, southern Ontario |
| Montmorency | 26 | 4.2 | 9 R | Pennsylvania, New York, southern Quebec |
| | 27 | 4.3 | 5 R | Southern Ontario, northern New York, southern Quebec |
| | 29 | 4.6 | 19 R | Southern Ontario, northern New York, southern Quebec |
| | 30 | 4.6 | 18 R | New York, northern New England, southern Quebec |
| Kejimikujik | 27 | 4.3 | 2 R | Atlantic Ocean |
| | 28 | 4.6 | 12 R | Atlantic Ocean |
| | 29 | 3.9 | 2 R | Atlantic Ocean |
| R = rain (mm), S = snow (cm), M = mixed rain and snow (mm) | | | | |

| STATION | temperature | | | | precip. ptot | st | wind max | | STATION | temperature | | | | precip. ptot | st | wind max | |
|------------------------------|-------------|------|-----|-----|--------------|-----|----------|--------------------------|-----------------------------|-------------|------|-----|-----|--------------|-----|----------|-----|
| | mean | anom | max | min | | | dir | vel | | mean | anom | max | min | | | dir | vel |
| British Columbia | | | | | | | | Ontario | | | | | | | | | |
| Blue River A | 15P | -3P | 25P | 8P | 18P*** | | | X | Geraldton A | 18 | *** | 27 | 7 | 39 | *** | 240 | 63 |
| Comox A | 17 | -1 | 28 | 10 | 2 | *** | 120 | 46 | Gore Bay A | 20 | 1 | 27 | 13 | 17 | *** | 270 | 54 |
| Cranbrook A | 17 | -3 | 29 | 8 | 5 | *** | | X | Kapuskasing A | 18 | 2 | 29 | 11 | 92 | *** | 220 | 41 |
| Fort Nelson A | 16P | -1P | 27P | 7P | 6P*** | | 270 | 39 | Kenora A | 19 | 0 | 27 | 13 | 161 | *** | 110 | 43 |
| Fort St John A | 15 | -1 | 24 | 7 | 31 | *** | 220 | 39 | London A | 21 | 1 | 30 | 14 | 28 | *** | 200 | 74 |
| Kamloops A | 20 | -2 | 30 | 9 | 12 | *** | 240 | 44 | Moosonee | *** | *** | *** | *** | *** | *** | | X |
| Penticton A | 20 | -1 | 31 | 11 | 23 | *** | 020 | 63 | North Bay A | 20 | 2 | 27 | 13 | 27 | *** | 120 | 41 |
| Port Hardy A | 15 | 1 | 23 | 9 | 17 | *** | 120 | 37 | Ottawa Int'l A | 22 | 2 | 29 | 14 | 29 | *** | 230 | 50 |
| Prince George A | 15 | 0 | 25 | 6 | 29 | *** | 200 | 56 | Petawawa A | *** | *** | 27 | *** | *** | *** | | X |
| Prince Rupert A | 14 | 1 | 20 | 9 | 37 | *** | 180 | 33 | Pickle Lake | 18 | 2 | 28 | 12 | 24 | *** | 240 | 37 |
| Smithers A | 15 | -1 | 24 | 7 | 60 | *** | 150 | 46 | Red Lake A | *** | *** | 28 | *** | *** | *** | 240 | 56 |
| Vancouver Int'l A | 18 | 0 | 23 | 12 | 22 | *** | 160 | 39 | Sioux Lookout A | 19 | 1 | 27 | 12 | 35 | *** | 260 | 43 |
| Victoria Int'l A | 16 | -1 | 26 | 9 | 8 | *** | | X | Sudbury A | 21 | 2 | 28 | 14 | 35 | *** | 330 | 46 |
| Williams Lake A | 14 | -2 | 24 | 5 | 3 | *** | | X | Thunder Bay A | 19 | 1 | 27 | 13 | 65 | *** | 290 | 41 |
| Yukon Territory | | | | | | | | Québec | | | | | | | | | |
| Komakuk Beach A | *** | *** | *** | *** | *** | *** | | X | Bagotville A | 20 | 1 | 29 | 8 | 55 | *** | 090 | 37 |
| Teslin (aut) | 15P | *** | 23P | 7P | 5P*** | | | X | Baie Comeau A | 17 | 1 | 25 | 7 | 18 | *** | 080 | 37 |
| Watson Lake A | 16P | 1P | 26P | 7P | 2P*** | | 290 | 46 | Blanc Sablon A | 11 | *** | 19 | 2 | 41 | *** | | X |
| Whitehorse A | 16 | 1 | 25 | 9 | 9 | *** | 340 | 33 | Gaspé A | 18 | -1 | 26 | 8 | 16 | *** | 130 | 30 |
| Northwest Territories | | | | | | | | New Brunswick | | | | | | | | | |
| Alert | 6 | 2 | 17 | 1 | 4 | *** | | X | Fredericton A | 18P | -2P | 29P | 7P | 14P*** | 200 | 37 | |
| Baker Lake A | 13 | 3 | 22 | 7 | 9 | *** | 060 | 32 | Miscou Island (aut) | 19P | 0P | 24P | 12P | 4P*** | | X | |
| Cambridge Bay A | 9 | 1 | 17 | 4 | 5 | *** | 030 | 39 | Moncton A | 19 | 0 | 26 | 7 | 5 | *** | 180 | 33 |
| Cape Dyer A | *** | *** | *** | *** | *** | *** | 230 | 56 | Saint John A | 17 | -1 | 24 | 8 | 28 | *** | | X |
| Clyde A | 4 | 0 | 9 | 0 | 8 | *** | | X | St Leonard A | 18 | *** | 29 | 5 | 17 | *** | 170 | 44 |
| Coppermine A | 10 | 1 | 19 | 3 | 5 | *** | 090 | 39 | Nova Scotia | | | | | | | | |
| Coral Harbour A | 11 | 2 | 19 | 3 | 2 | *** | 020 | 43 | Greenwood A | 20 | 1 | 29 | 10 | 8 | *** | 180 | 46 |
| Eureka | 7P | 2P | 12P | 3P | 1P*** | | | X | Shearwater A | 17 | -1 | 24 | 11 | 55 | *** | 150 | 52 |
| Fort Smith A | 15 | 0 | 25 | 8 | 44 | *** | 330 | 48 | Sydney A | *** | *** | 27 | *** | *** | *** | 180 | 41 |
| Hall Beach A | 8 | 3 | 16 | 3 | 1 | *** | | X | Yarmouth A | 17 | 0 | 24 | 8 | 14 | *** | 190 | 41 |
| Inuvik A | 16 | 2 | 28 | 5 | 8 | *** | 340 | 35 | Prince Edward Island | | | | | | | | |
| Iqaluit A | 9 | 1 | 20 | 2 | 48 | *** | 300 | 39 | Charlottetown A | 17 | -2 | 26 | 7 | 15 | *** | 160 | 33 |
| Mould Bay A | *** | *** | 8 | *** | *** | *** | | X | East Point (auto) | 16P | ***P | 18P | 15P | 35P*** | | X | |
| Norman Wells A | 17 | 1 | 26 | 10 | 8 | *** | 110 | 52 | Newfoundland | | | | | | | | |
| Resolute A | 5 | 1 | 10 | 1 | 2 | *** | 330 | 41 | Cartwright | 17 | 3 | 29 | 2 | 19 | *** | 210 | 56 |
| Yellowknife A | 15 | 0 | 26 | 8 | 19 | *** | 030 | 44 | Churchill Falls A | 16P | 2P | 28P | 7P | 22P*** | | * | |
| Alberta | | | | | | | | 93/07/26-93/08/01 | | | | | | | | | |
| Calgary Int'l A | 16 | -1 | 29 | 7 | 12 | *** | 180 | 63 | Gander Int'l A | 17 | -1 | 26 | 4 | 32 | *** | 170 | 52 |
| Cold Lake A | 19 | 2 | 31 | 11 | 8 | *** | 280 | 57 | Goose A | 20 | 3 | 31 | 6 | 24 | *** | 240 | 44 |
| Edmonton Namao A | 18 | 1 | 26 | 10 | 13 | *** | 270 | 70 | Stephenville A | 16 | -1 | 23 | 7 | 66 | *** | 260 | 37 |
| Fort McMurray A | 16 | 1 | 25 | 8 | 13 | *** | 280 | 56 | St John's A | 16 | -1 | 26 | 3 | 34 | *** | 200 | 46 |
| Grande Prairie A | 16 | 0 | 24 | 7 | 20 | *** | 240 | 63 | St Lawrence | 14 | 1 | 20 | 6 | 9 | *** | | X |
| High Level A | 16 | 0 | 26 | 6 | 36 | *** | 330 | 54 | Wabush Lake A | 17 | 4 | 28 | 8 | 33 | *** | 320 | 46 |
| Lethbridge A | 17 | -2 | 31 | 9 | 31 | *** | 270 | 87 | | | | | | | | | |
| Medicine Hat A | 19 | -1 | 34 | 7 | 16 | *** | 240 | 83 | | | | | | | | | |
| Peace River A | 16 | 0 | 24 | 9 | 14 | *** | 270 | 48 | | | | | | | | | |
| Saskatchewan | | | | | | | | | | | | | | | | | |
| Cree Lake | *** | *** | 26 | *** | *** | *** | 270 | 91 | | | | | | | | | |
| Estevan A | 18 | -2 | 28 | 8 | 23 | *** | 310 | 65 | | | | | | | | | |
| La Ronge A | 19 | 3 | 32 | 11 | 11 | *** | 240 | 78 | | | | | | | | | |
| Regina A | 19 | 0 | 29 | 9 | 3 | *** | 290 | 67 | | | | | | | | | |
| Saskatoon A | 18 | -1 | 32 | 7 | 6 | *** | 240 | 69 | | | | | | | | | |
| Swift Current A | 18 | 0 | 32 | 11 | 12 | *** | 270 | 80 | | | | | | | | | |
| Yorkton A | 19 | 1 | 29 | 10 | 2 | *** | 270 | 85 | | | | | | | | | |
| Manitoba | | | | | | | | | | | | | | | | | |
| Brandon A | 18 | 0 | 28 | 7 | 14 | *** | 300 | 65 | | | | | | | | | |
| Churchill A | 13 | 1 | 27 | 5 | 45 | *** | 120 | 80 | | | | | | | | | |
| Lynn Lake A | 17 | 2 | 30 | 8 | 22 | *** | 260 | 50 | | | | | | | | | |
| The Pas A | 19 | 1 | 30 | 12 | 6 | *** | 250 | 74 | | | | | | | | | |
| Thompson A | 17 | 3 | 29 | 8 | 16 | *** | 240 | 56 | | | | | | | | | |
| Winnipeg Int'l A | 20 | 0 | 28 | 13 | 22 | *** | 300 | 59 | | | | | | | | | |

mean = mean weekly temperature, °C
 max = maximum weekly temperature, °C
 min = minimum weekly temperature, °C
 anom = mean temperature anomaly, °C

ptot = weekly precipitation total in mm
 st = snow thickness on the ground in cm
 dir = direction of max wind, deg. from north.
 vel = wind speed in km/h

— Annotations —
 X = no observation
 P = less than 7 days of data
 * = missing data when going to printing.

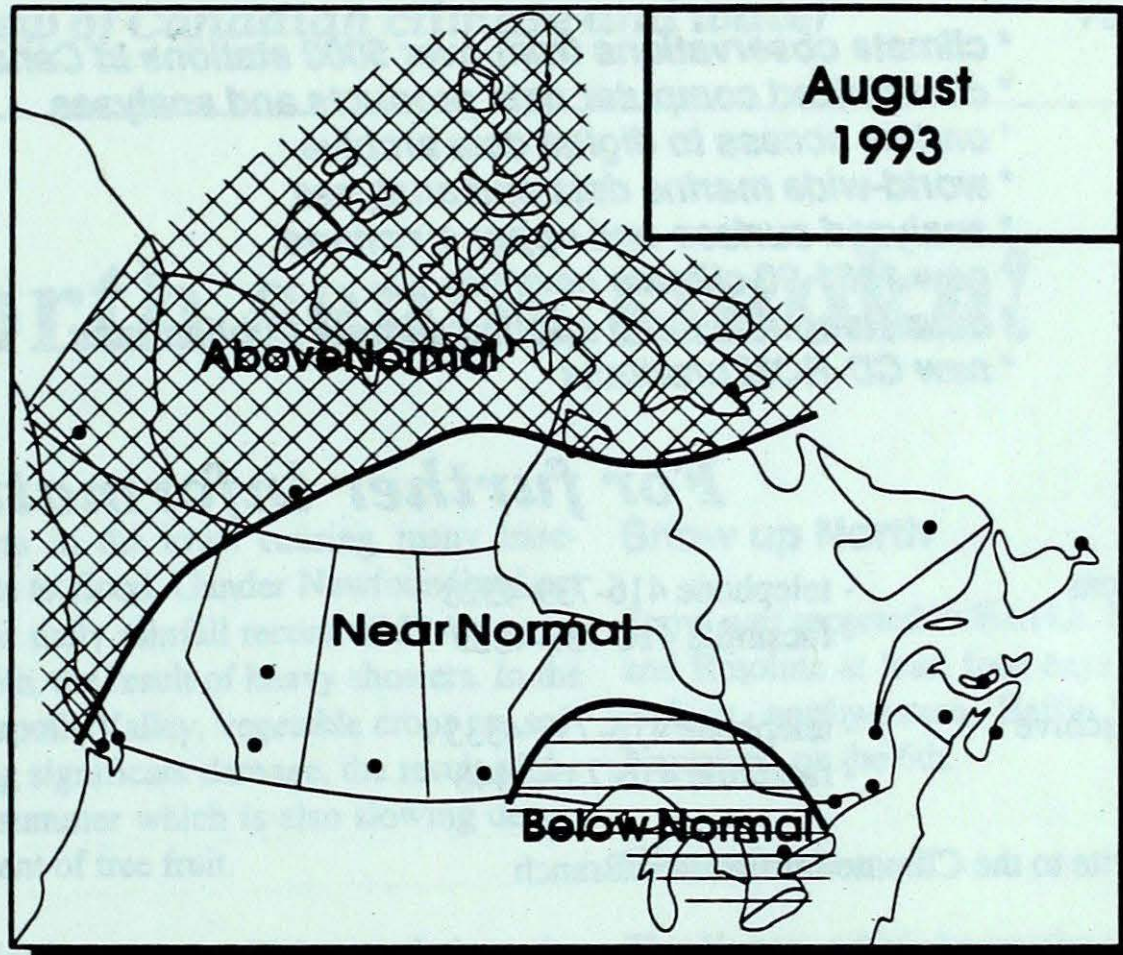


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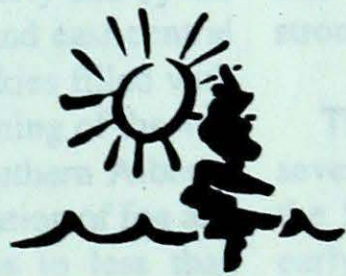
MONTHLY TEMPERATURE FORECAST

Normal temperatures for the month of August, °C

| | | | |
|-------------|----|---------------|----|
| Whitehorse | 13 | Toronto | 20 |
| Yellowknife | 14 | Ottawa | 19 |
| Iqaluit | 7 | Montréal | 20 |
| Vancouver | 17 | Québec | 18 |
| Victoria | 16 | Fredericton | 18 |
| Calgary | 15 | Halifax | 18 |
| Edmonton | 16 | Charlottetown | 18 |
| Regina | 18 | Goose Bay | 14 |
| Winnipeg | 18 | St. John's | 15 |



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