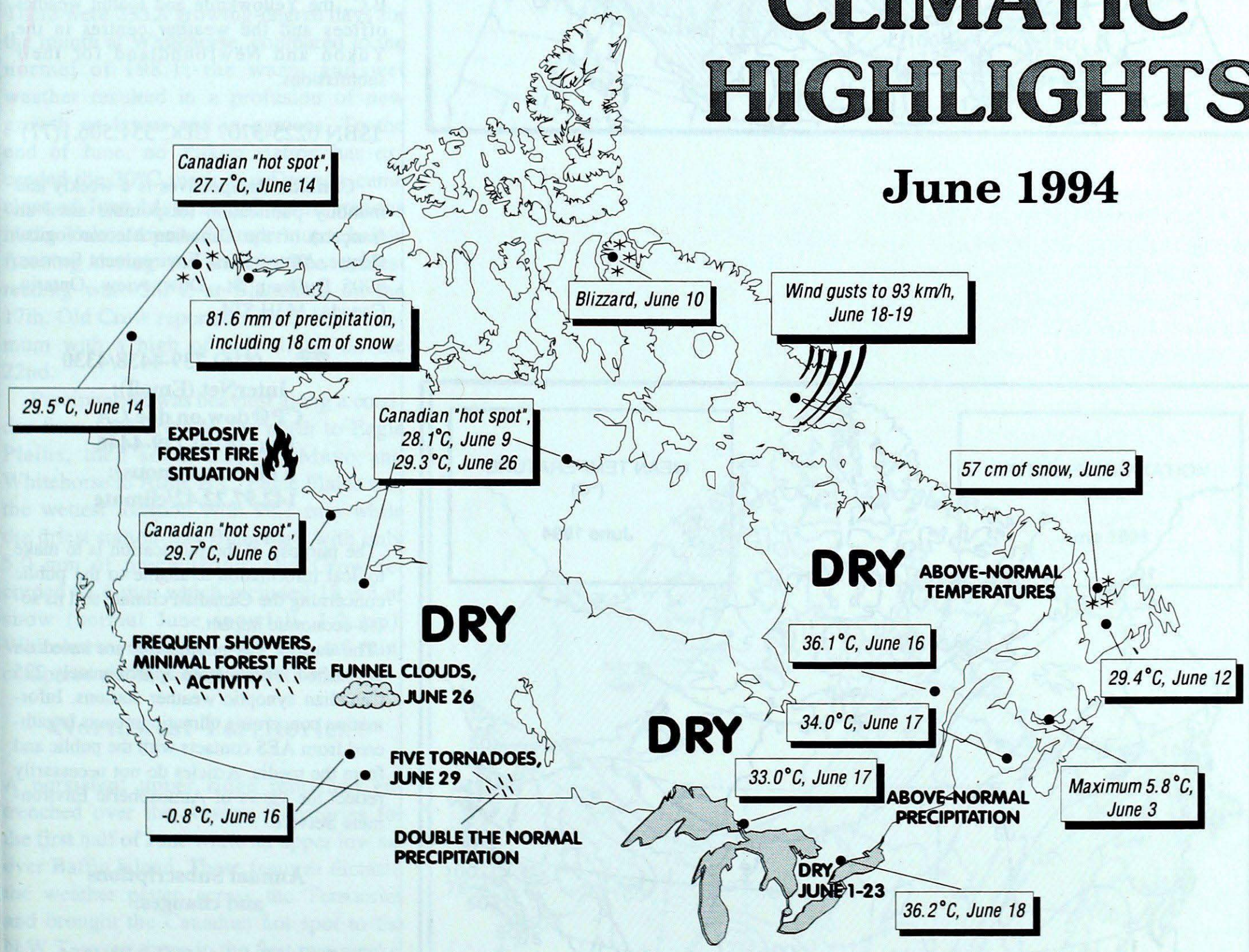
Climatic Perspectives

une 1994 — Monthly review of Canadian climate and water — vol. 16

CLIMATIC HIGHLIGHTS

June 1994



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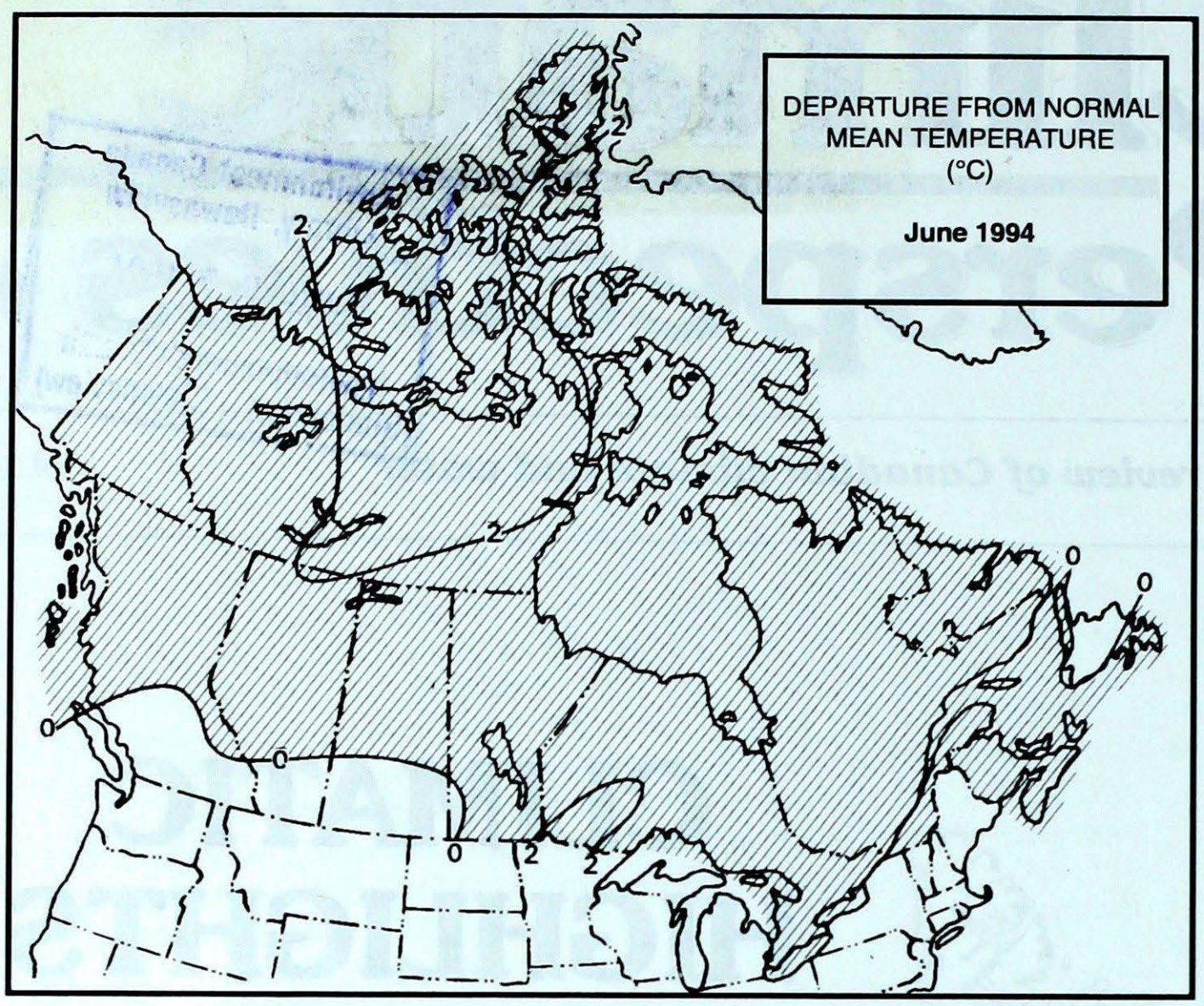

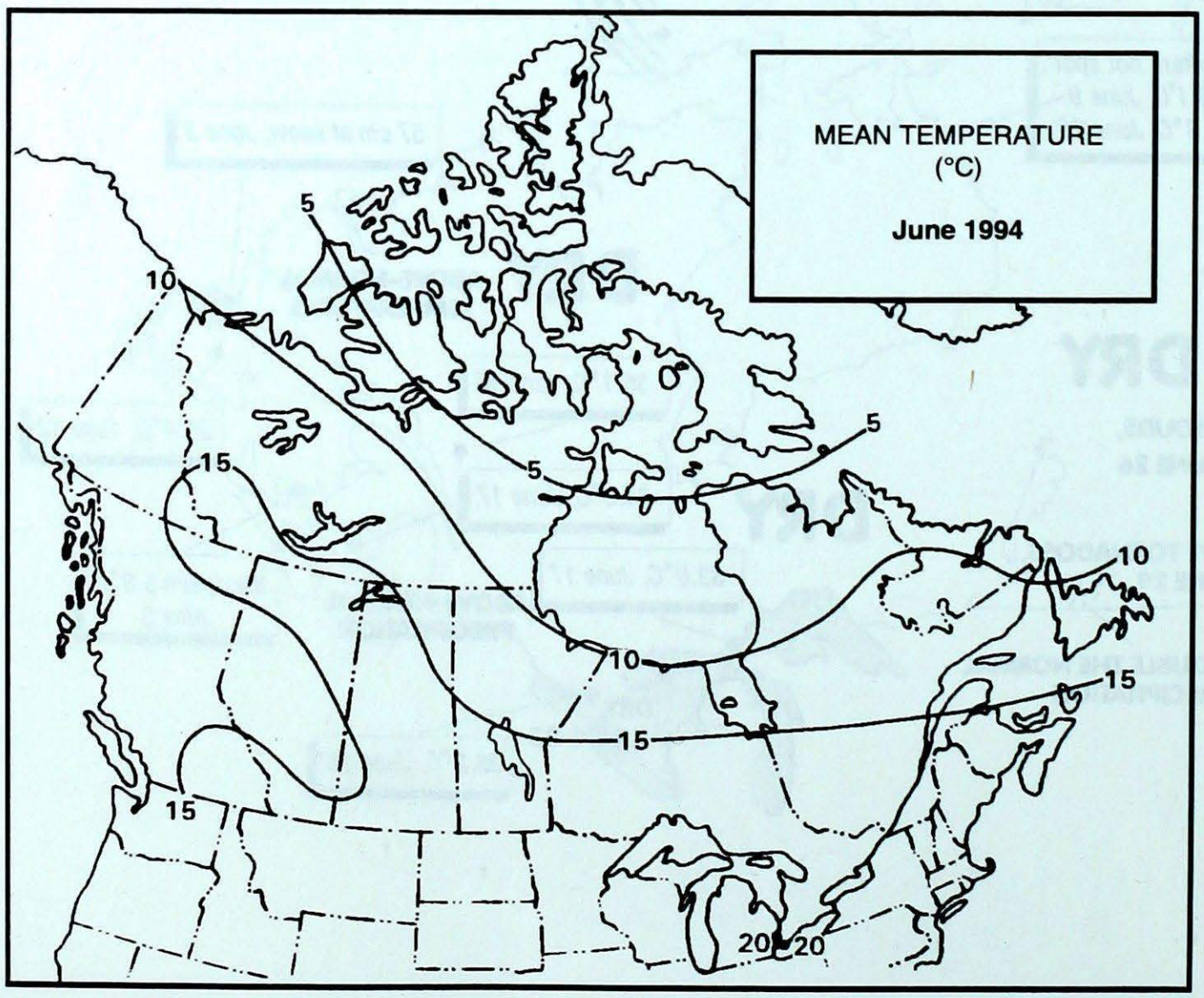

CLIMATIC PERSPECTIVES
VOLUME 16

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We would like to thank all AES Regional Climate Centres for their regular contributions to **Climatic Perspectives**. We would also like to thank the weather offices in B.C., the Yellowknife and Iqaluit weather offices and the weather centres in the Yukon and Newfoundland for their submissions.

ISBN 0225-5707 UDC 551.506.1(71)

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

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The purpose of the publication is to make topical information available to the public concerning the Canadian climate and its socio-economic impact.

The data in this publication are based on unverified reports from approximately 225 Canadian synoptic weather stations. Information concerning climatic impacts is gathered from AES contacts with the public and from the media. Articles do not necessarily reflect the views of Atmospheric Environment Service.

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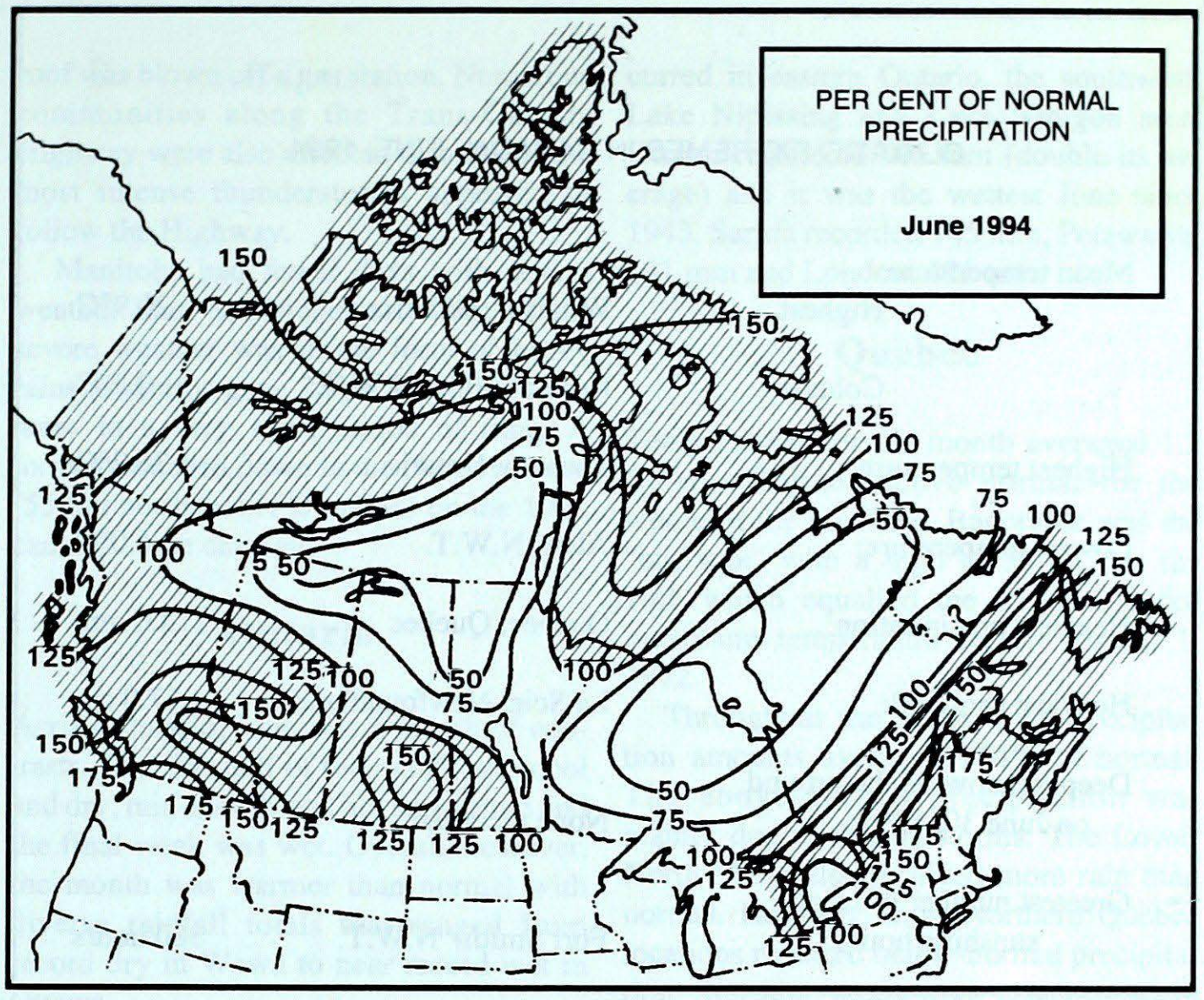
Across the country

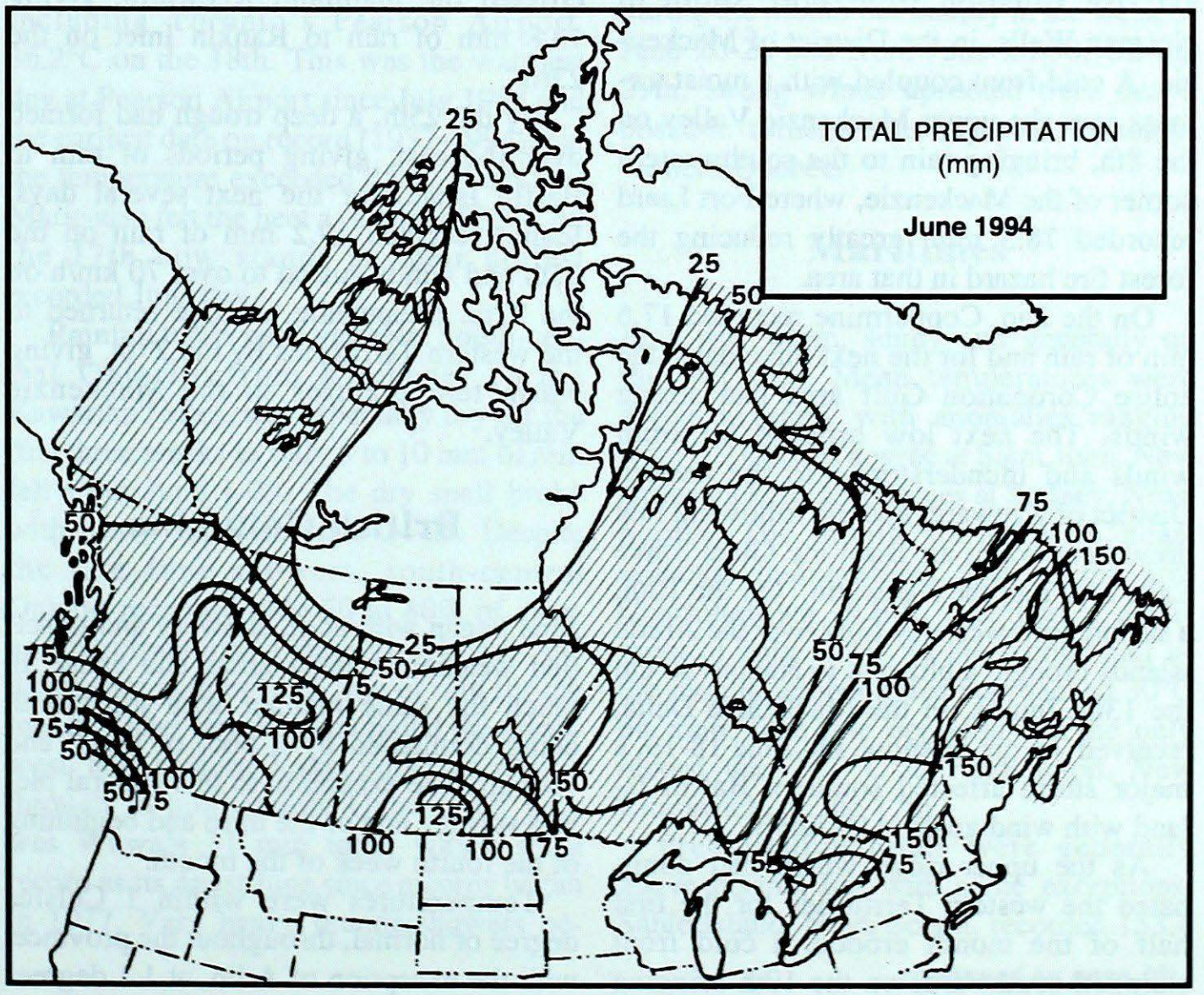
Yukon

June was an interesting month for weather in the Yukon. There was a good mix of sun, cloud and precipitation including some snow in northern areas. Temperatures were below normal in the north and except for Blanchard, above normal in the south. Below-normal precipitation was measured in the southeast, southwest and part of the Dempster Highway corridor. Elsewhere, above-normal precipitation was recorded.

Carmacks was the warmest spot in the territory with a monthly mean temperature of 14.6°C, 1.8 degrees above normal. There were 233.8 growing-degree days for the month at Whitehorse, compared to the normal of 198.1; the warm and wet weather resulted in a profusion of new growth on lawns and in gardens. To the end of June, no Yukon station has exceeded the 30°C mark, but Dawson came close on June 14, at 29.5°C. Most stations in the Yukon reported temperatures below freezing during the month. The coldest reading was -5.0°C at Blanchard on the 17th. Old Crow reported the coldest maximum with a high of only 4.4°C on the 22nd.

Precipitation was heaviest along a corridor from Old Crow in the north to Eagle Plains, then south through Mayo and Whitehorse to Atlin, B.C. Eagle Plains was the wettest location with 98.7 mm while the driest station was Blanchard with only 5.0 mm of precipitation. Old Crow recorded 81.6 mm which included 18 cm of snow (normal June snowfall, 1.2 cm). Whitehorse received 44.5 mm of rain, compared to the average of 30.3 mm.





Northwest Territories

A persistent upper ridge remained entrenched over the western Territories for the first half of June while an upper low sat over Baffin Island. These features dictated the weather patten across the Territories and brought the Canadian hot spot to the N.W.T. seven times in the first two weeks. Most of these occurred over the southern Great Slave region, where Hay River recorded 29.7°C on the 6th. Baker Lake at 28.1°C on the 9th and Inuvik at 27.7°C on

CLIMATIC EXTREMES IN CANADA -JUNE, 1994

Mean temperature:		
Highest	Windsor, Ontario	20.9°C
Coldest	Resolute Bay, N.W.T.	0.8°C
Highest temperature:	Toronto, Ontario	36.2°C
Lowest temperature:	Alert, N.W.T.	-6.0°C
Heaviest precipitation:	Québec, Quebec	213.0 mm
Heaviest snowfall:	La Scie, Newfoundland	57.0 cm
Deepest snow on the ground on June 30, 1994:	None recorded	
Greatest number of bright sunshine hours:	Fort Smith, N.W.T.	380 hours

the 14th were also Canadian hot spots for those days. Baker Lake broke nine record highs during the first twenty days of June. The warm, sunny conditions at the beginning of the month along with low humidity and dry lightning created an explosive forest fire situation from Fort Smith to Norman Wells, in the District of Mackenzie. A cold front coupled with a moist airmass over the upper Mackenzie Valley on the 8th, bringing rain to the southwestern corner of the Mackenzie, where Fort Liard recorded 78.3 mm, greatly reducing the forest fire hazard in that area.

On the 2nd, Coppermine recorded 17.6 mm of rain and for the next three days, the entire Coronation Gulf area had strong winds. The next low brought 60 km/h winds and thunderstorms to the eastern District of Keewatin and the following low drew very warm air from the Great Slave Lake area into the Keewatin. On the 10th, a strong northwesterly flow over the Arctic islands brought a blizzard to Nanisivik. On the 13th, Inuvik, in the Mackenzie Delta, received 7.6 cm of snow. On June 18-19, a major storm affected southern Baffin Island with wind gusts to 93 km/h.

As the upper ridge which had dominated the western Territories for the first half of the month eroded, a cold front slumped southwards on the 19th bringing strong winds and thundershowers to the Mackenzie Valley. Meanwhile, a low over the mainland coast turned northwards, generating strong southeasterly winds with 13.2 mm of mixed precipitation at Resolute on the 20th. A series of lows then crossed the mainland Keewatin, giving 13.8 mm of rain to Rankin Inlet on the 23rd.

By the 25th, a deep trough had formed over the east, giving periods of rain to Baffin Island for the next several days. Iqaluit received 19.2 mm of rain on the 25th and winds gusted to over 70 km/h on the 27th. Meanwhile, a ridge returned to the western Territories by the 27th, giving warm temperatures to the Mackenzie Valley.

British Columbia

June began with cool, showery and unsettled weather in most areas and ended in much the same manner with the month being dominated by a pool of moist and cool air. The exception to this general picture was the end of the third and beginning of the fourth week of the month.

Temperatures were within 1 Celsius degree of normal, throughout the province, with the exception of Atlin, at 1.1 degrees above normal. There were no new temperature records set during the month.

Frequent shower activity resulted in above-normal precipitation in most regions. Below-normal precipitation was reported in the Queen Charlotte Islands, a narrow strip along the Coast Mountains from Terrace southwards to Port Hardy and in the Revelstoke area. These areas reported values near 95%. There were no new records during the month.

Plentiful precipitation resulted in minimal forest fire activity in all areas. The Peace River area began the month with dry soil conditions but by the fourth week was looking for drier conditions. Frequent showers made it difficult for haying operations.

Sunshine was below average almost everywhere with most areas reporting 70 to 90% of average. Only in the far northwest corner of the province and in the Kamloops-Kelowna region were values above average, but only barely.

Alberta

June began with a splash as a disturbance moving northwards from the United States spread rain into much of the province. Rainfall amounts ranged from 53 mm in Vegreville (100 km east of Edmonton) to less than 20 mm across southern regions. Meanwhile, northern residents enjoyed sunshine and temperatures 5 to 10 Celsius degrees warmer than experienced across the south. By the 3rd, a ridge of high pressure dominated over Alberta providing mainly sunny skies and seasonal temperatures. Isolated showers and thundershowers developed through June 4-5, with some wind damage reported in the Edson and Grande Prairie regions. On the 6th, a low pressure system brought thundershowers to the southern foothills. As the low continued to move northwards, an area of rain developed over central regions. Rainfalls of 25 mm were common with up to 50 mm recorded in the Grande Prairie and Edson regions. Showers occurred over much of the province on the 9th. A series of upper disturbances moved eastwards on June 11-12 producing frequent showers. A low pressure system, moving southeastwards from the Peace River region, on the 13th, brought rain which dominated much of the province for the week. Rainfall amounts ranged from 40 to 80 mm. Edmonton set a new record low maximum of 8.7°C as tem-

peratures dipped well below normal on the 14th and High Level recorded a new record minimum of -0.6°C on the 15th. Frost was reported at numerous sites on the 16th and Calgary and Lethbridge recorded -0.8°C. On the 18th, thunderstorms and walnut-sized hail were reported in the south and Jasper received 25 mm of rain.

By the 20th a ridge of high pressure gave sunny conditions and temperatures in the mid-twenties to all locales. As of the 24th, a cold front moving southwards into central regions triggered thundershowers, gusty winds and small hail. Funnel clouds were reported near Drayton Valley, Westlock, Viking and Fort Saskatchewan on the 26th (all within a 125 km radius of Edmonton). Winds gusted to 100 km/h and combined with small hail and up to 20 mm of rain. Meanwhile, Fort McMurray was the nation's hot spot on the 26th, reaching 29.3°C. Showers occurred in northern and central regions from June 27-29. Sunshine and the resultant convective activity triggered thundershowers across the south with golf-ball-sized hail near Sundre and a tornado that briefly touched down near Taber. By the end of the month sunshine returned to all but western regions as a system approached from the west.

Saskatchewan and Manitoba

The month of June was, on average, normal in most areas. However, southeastern Saskatchewan received more than double the normal amount of precipitation as a result of several intense thunderstorm complexes that moved through the area. At the other extreme, northern Saskatchewan and northern Manitoba were dry with most areas receiving only half their normal monthly rainfall.

Precipitation is normally quite erratic across the region in the summer, due to convection. This was the case in June as approximately ten thunderstorm complexes developed and moved eastwards. Some areas were hit with very heavy rain while other areas only a few kilometres away received no rain. There were nine tornadoes in Saskatchewan in June, with five occurring on the 29th when a line of thunderstorms swept across the south. In Ernfold (70 km east of Swift Current) a church was pushed off its foundation and a roof was blown off a gas station. Numerous communities along the Trans-Canada Highway were also affected that day as the most intense thunderstorms appeared to follow the Highway.

Manitoba had fewer days with severe weather than Saskatchewan. Most of the severe weather was in the form of heavy rains as storms gave 25 to 50 mm to some areas in a very short period of time. A tornado touched down in the Neepawa area (55 km northeast of Brandon) on the 10th, causing some damage.

Ontario

Across Ontario, June was a month of contrasts. The first half of the month was cool and dry, mid-month was hot and humid and the final week was wet. Overall, however, the month was warmer than normal with diverse rainfall totals that ranged from record dry in Wawa to near record wet in Ottawa.

Mean temperatures were 2 Celsius degrees above normal in the northwest and 0.5 to 1.5 degrees above, elsewhere, despite cool temperatures during the first two weeks of the month. A late frost on June 3 dipped well into parts of southern Ontario. A heat wave June 16-18 sent the mercury soaring to 36°C at several locales including Toronto's Pearson Airport, 36.2°C on the 18th. This was the warmest day at Pearson Airport since July 1988 and the earliest date on record (1937-1994) that the temperature exceeded 35°C. Sault Ste. Marie also felt the heat as a high of 33°C on the 17th now stands as their hottest recorded June day.

Rainfall totals were variable. South-central Ontario, from Kitchener to the Kawartha Lakes, was especially dry for the first three weeks as only 5 to 10 mm of rain fell from June 1-23. The dry spell broke with heavy rains on June 24-25. Despite the late June showers, south-central Ontario recorded only 50 to 80% of average precipitation. Peterborough was the driest spot with only 28 mm of rain for the month. Other dry areas included the northwest and eastern Lake Superior region through to northeastern Ontario. Of note was Wawa's 31 mm total, which set a record as its driest June since records began in 1977. Very heavy thundershowers occurred in eastern Ontario, the southwest, Lake Nipissing and Lake Nipigon area. Ottawa registered 165 mm (double its average) and it was the wettest June since 1943. Sarnia recorded 145 mm, Petawawa, 141 mm and London, 121 mm.

Quebec

Temperatures for the month averaged 1.2 Celsius degrees above normal for the whole of the province. Bagotville was the "hot spot" with a high of 36.1°C on the 16th which equalled the all-time record maximum temperature set on August 1, 1972.

Throughout the south, total precipitation amounts averaged 164% of normal. The above-normal precipitation was mainly due to thunderstorms. The Lower North Shore also received more rain than normal. However, most Northern Quebec locations reported below-normal precipitation. Sunshine totals were near normal in the south, below normal along the Lower North Shore and above normal in the north.

A tornado occurred in St-Cuthbert (mid-way between Montreal and Trois-Rivières on the 12th, destroying a house and breaking trees. Many localities reported hail and heavy thunderstorms during the month but mainly in the week of June 20-26 and from June 28-30. On the 29th, strong winds uprooted trees and a possible tornado was reported in southwestern Quebec.

Maritimes

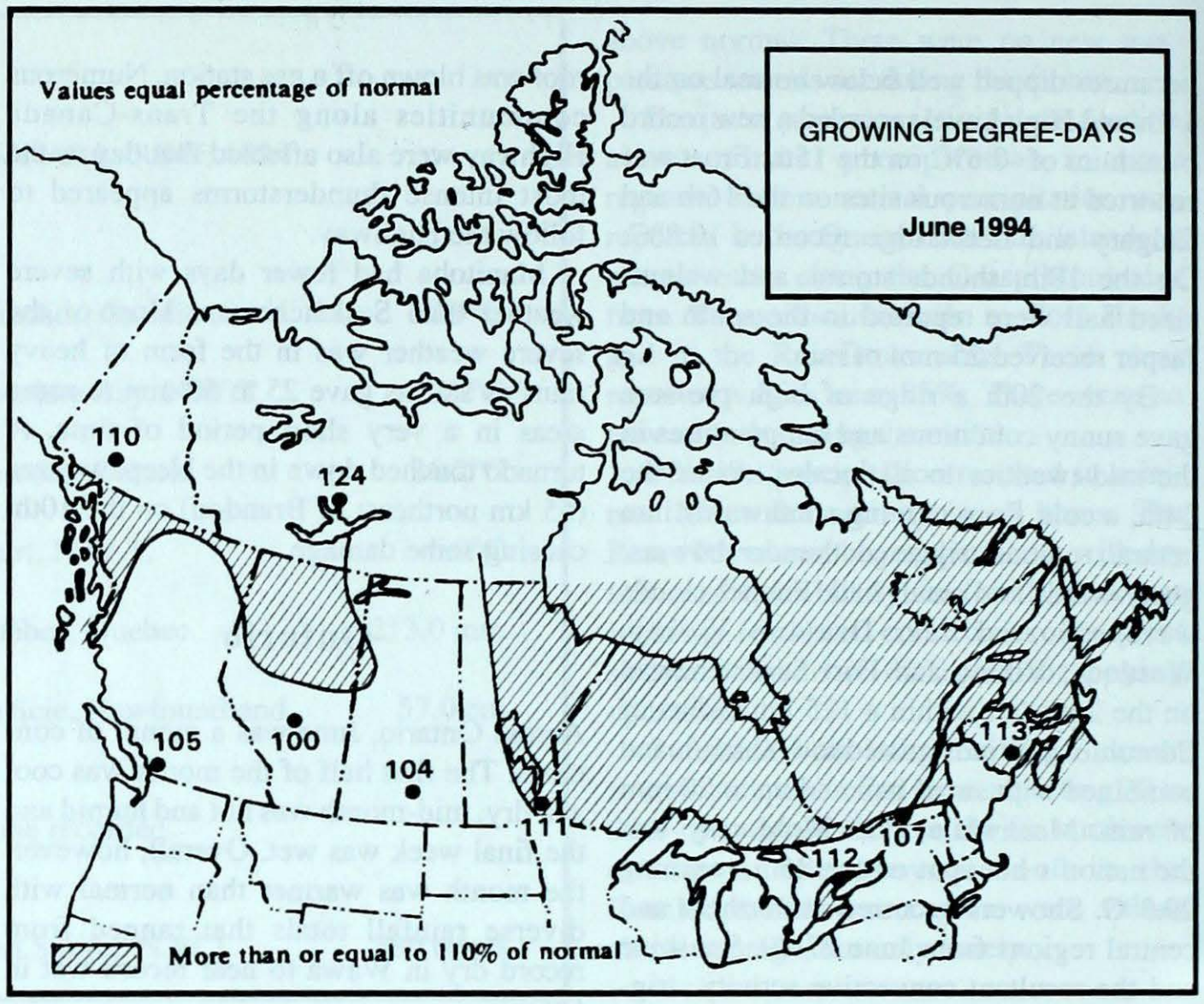
June was warm, sunny and generally on the wet side. Mean temperatures were above average, with anomalies ranging from 0.9 Celsius degree at Saint John, New Brunswick, to 2.5 degrees at Sydney, Nova Scotia. The month started with near-seasonal temperatures, but on the 3rd, Charlottetown, P.E.I., recorded a maximum of only 5.8°C. In the second half of the month, temperatures approached 30°C on more than one occasion but the only record was 34.0°C at Fredericton, New Brunswick, on the 17th.

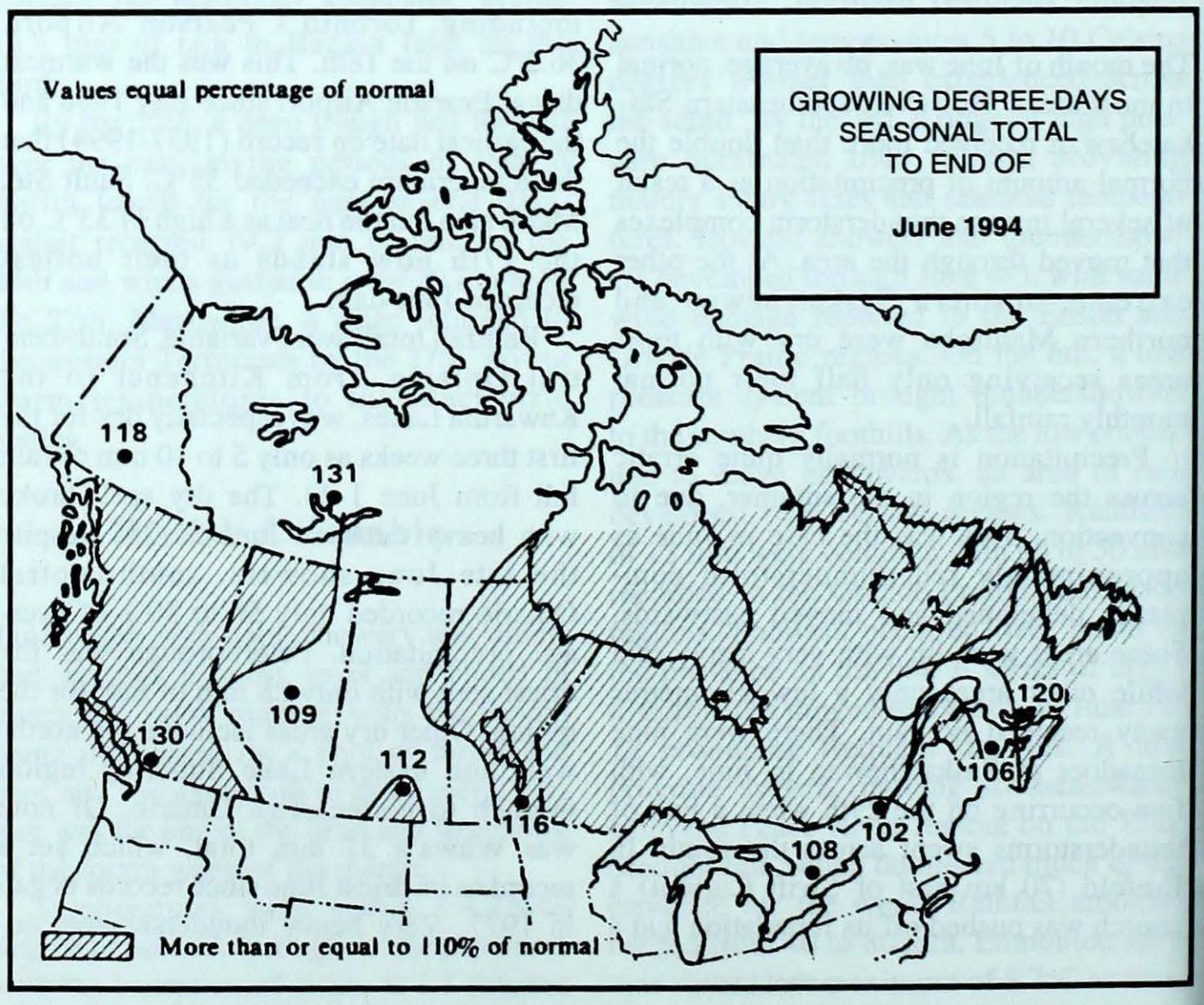
Precipitation totals were generally above normal but with some exceptions. Sable Island, Nova Scotia, recorded 153.4

continued on page 10...

SEASONAL TOTAL OF GROWING DEGREE-DAYS TO END OF JUNE

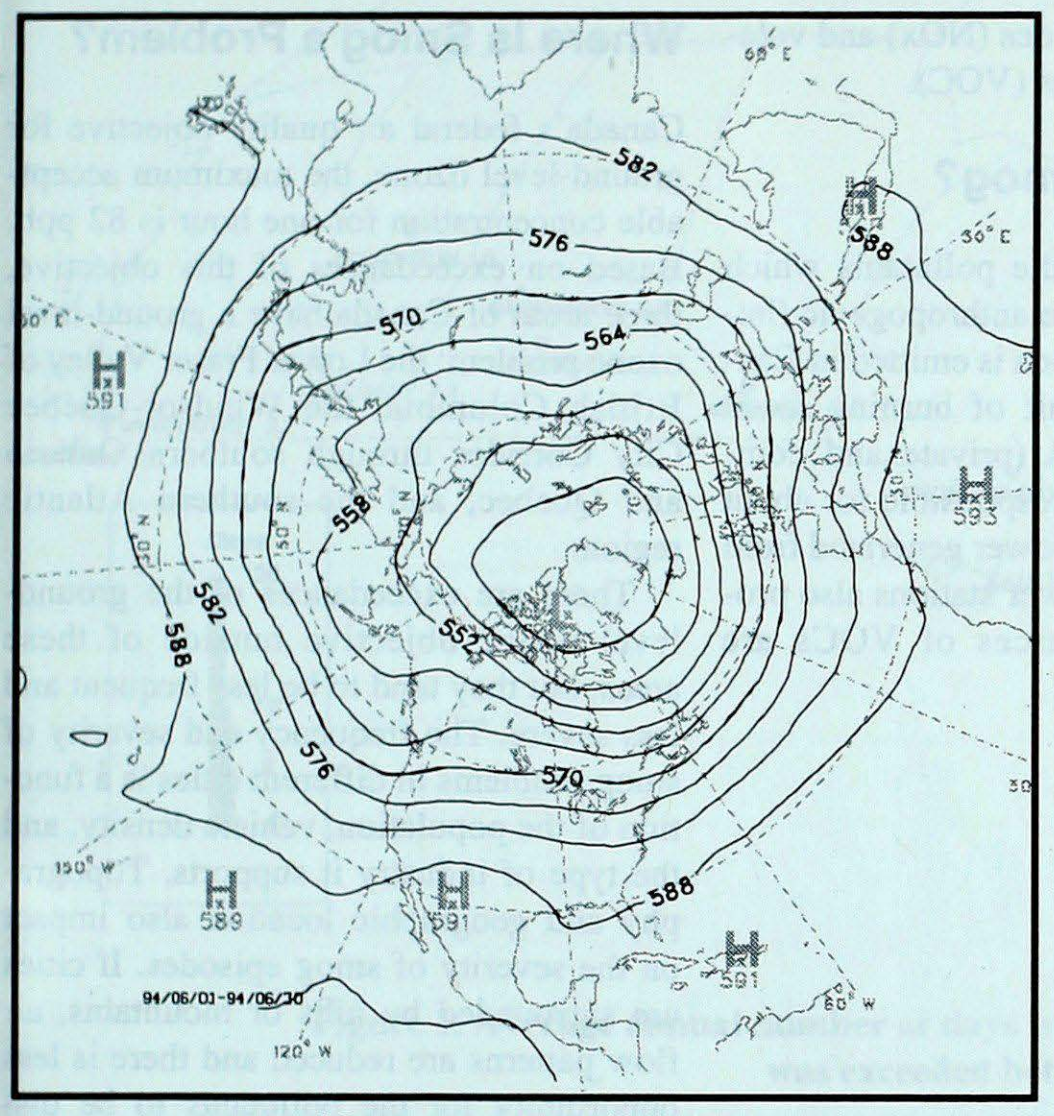
	1994	1993	NORMAL
BRITISH COLUMBIA			
Abbotsford	811	696	624
Kamloops	855	705	757
Penticton	857	758	732
Prince George	473	532	379
Vancouver	779	679	641
Victoria	729	634	592
ALBERTA			
Calgary	297	442	290
Edmonton Mun.	550	555	502
Grande Prairie	463	499	415
Lethbridge	492	555	373
Medicine Hat	390	596	563
Peace River	470	499	401
SASKATCHEWAN			
Estevan	535	452	505
Prince Albert	435	423	417
Regina	542	487	483
Saskatoon	477	451	476
MANITOBA			
Brandon	503	537	475
Churchill	95	*	37
Winnipeg	594	357	511
ONTARIO			
London	548	606	555
North Bay	434	483	391
Ottawa	629	624	601
Thunder Bay	412	271	374
Toronto	626	582	579
Trenton	603	576	599
Windsor	746	730	706
QUEBEC			
Baie Comeau	252	261	243
Montréal	645	622	631
Québec	488	545	441
Sept-Îles	218	166	184
Sherbrooke	470	492	412
NEW BRUNSWICK			
Fredericton	367	427	326
Moncton	376	348	346
NOVA SCOTIA			
Yarmouth	392	362	355
PRINCE EDWARD ISLAND			
Charlottetown	270	324	224
NEWFOUNDLAND			
Gander	145	8	135
St. John's	129	13	114
Stephenville	155	272	138



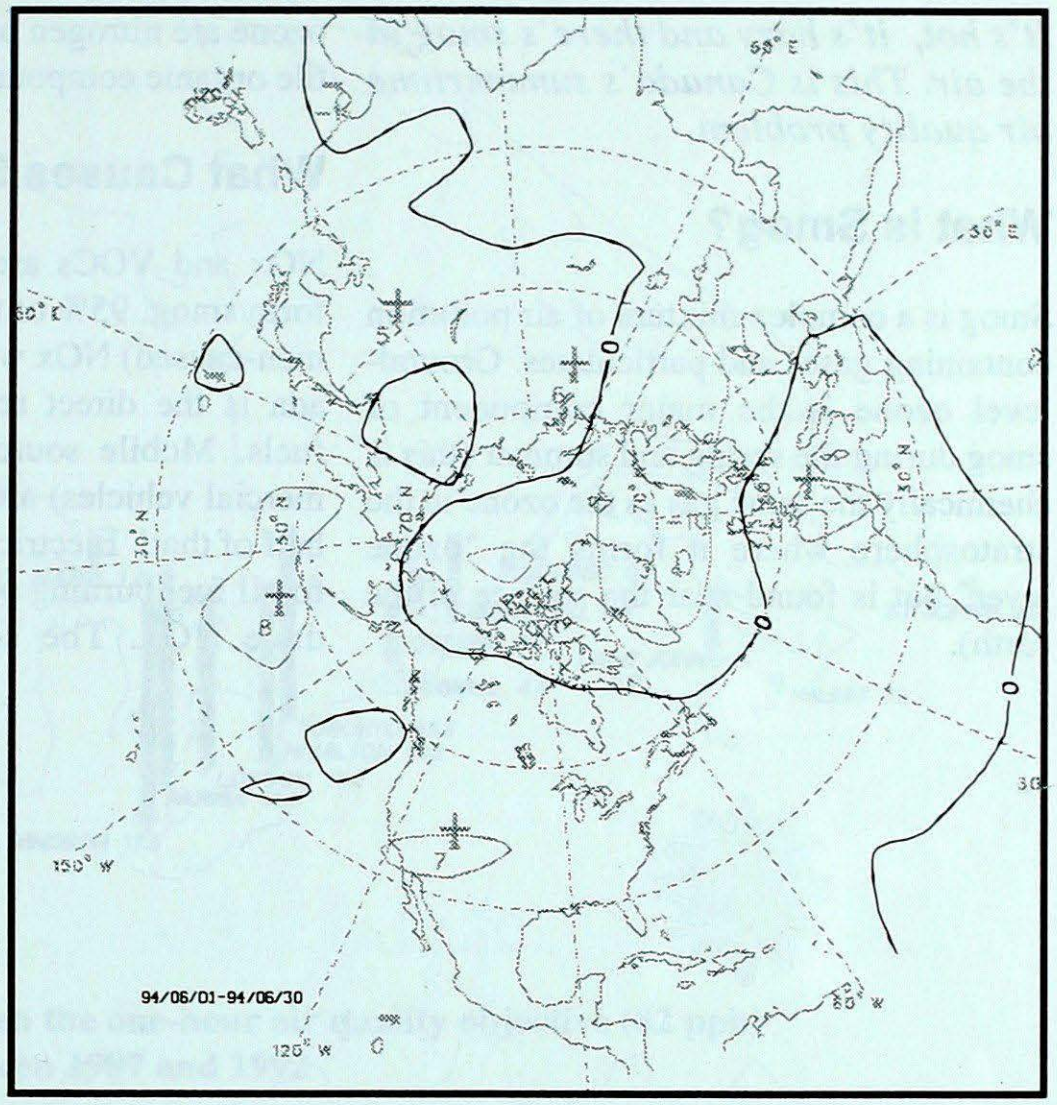


50-kPa ATMOSPHERIC CIRCULATION

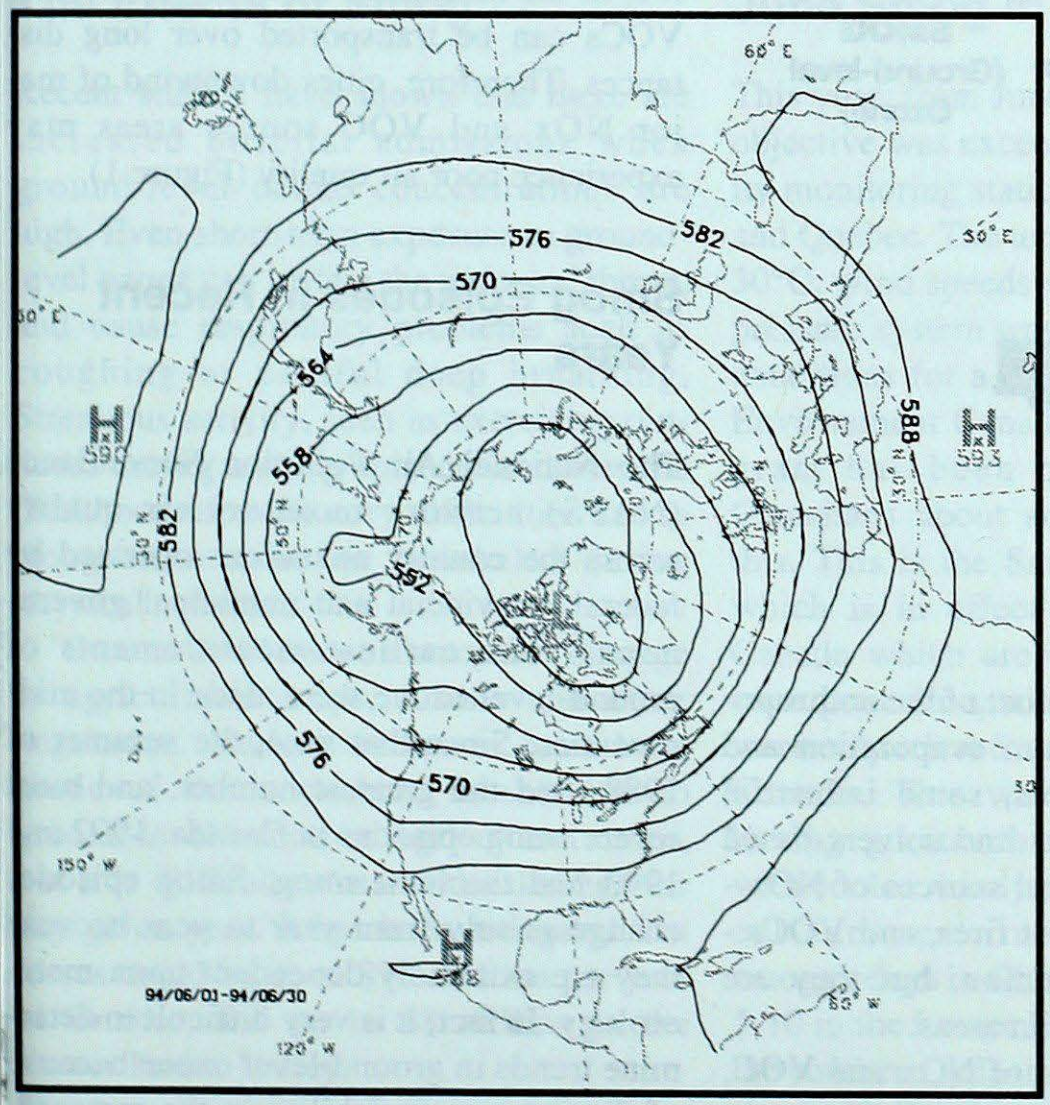
June 1994



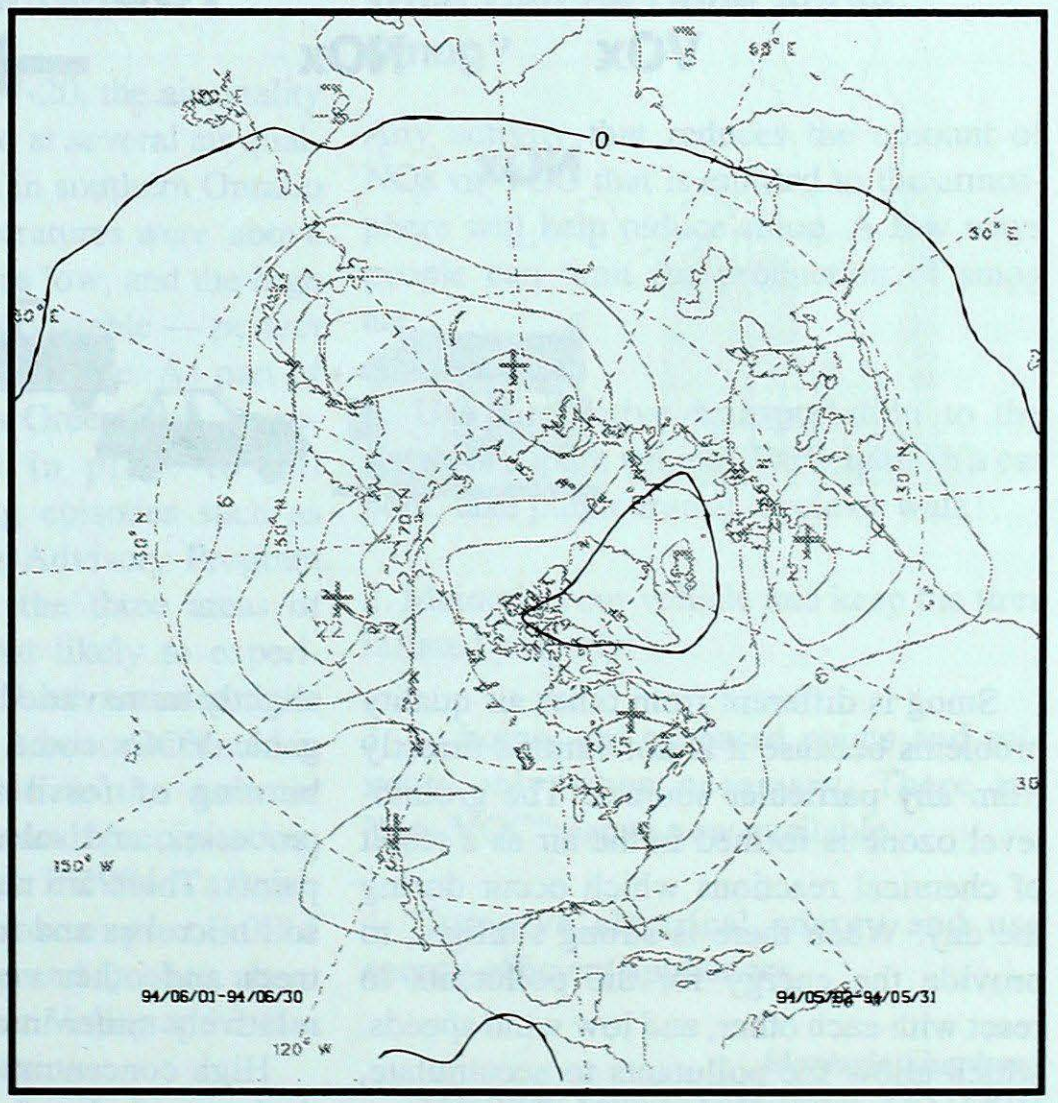
Mean geopotential heights
- 5 decametre interval -



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 -

Summertime Smog

It's hot, it's hazy and there's smog in the air. This is Canada's summertime air quality problem.

What is Smog?

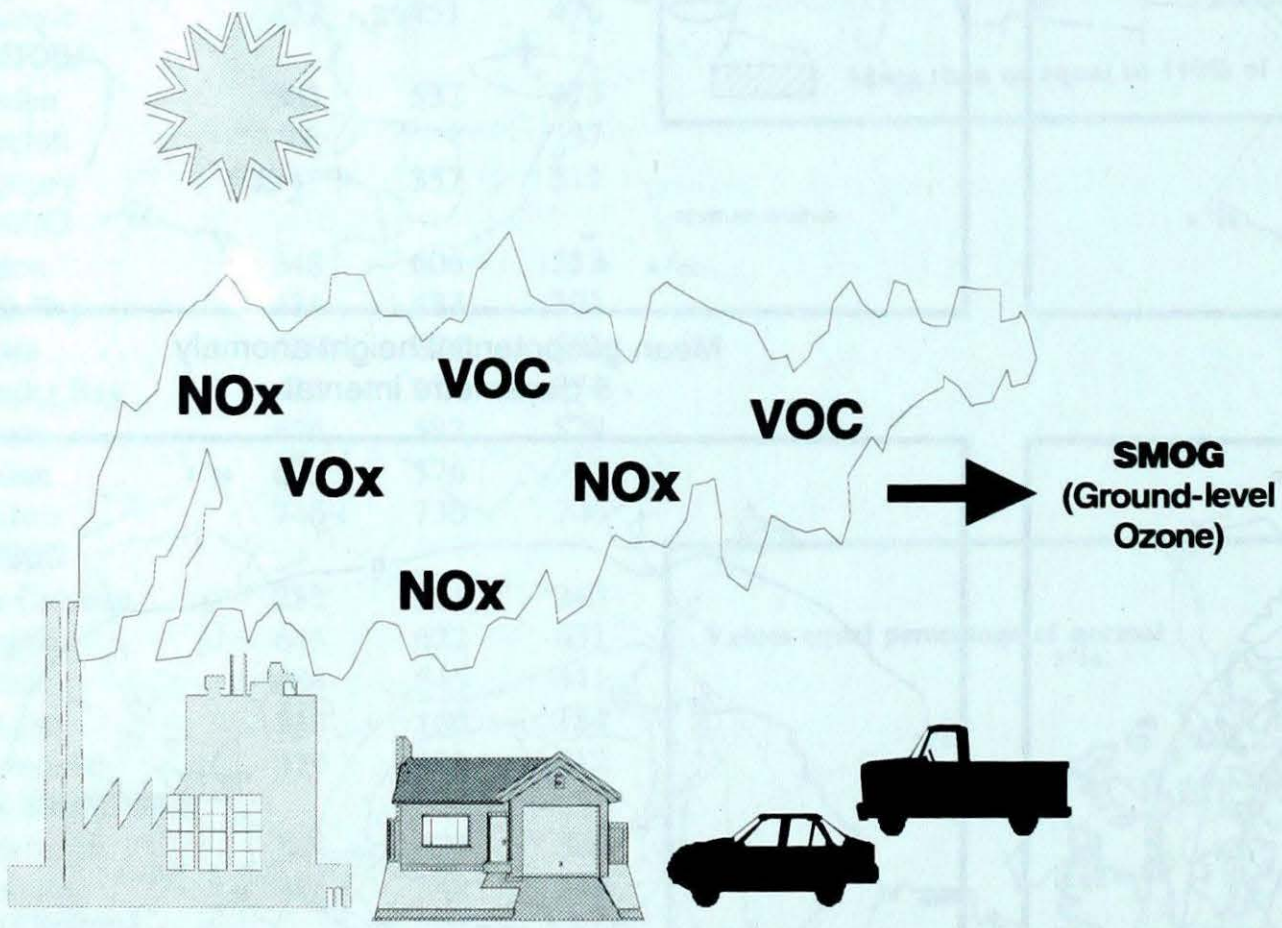
Smog is a complex mixture of air pollution containing gases and particulates. Ground-level ozone is the major component of smog during the spring and summer (this is chemically the same gas as the ozone in the stratosphere where it forms the "ozone layer" but is found near the surface of the earth).

Smog is different from other air quality problems because it is not emitted directly from any particular sources. The ground-level ozone is formed in the air as a result of chemical reactions which occur during the day. When there is strong sunlight, to provide the energy for the pollutants to react with each other, and low wind speeds, which allow the pollutants to accumulate, ground-level ozone is created. The primary pollutants which react to form ground-level ozone are nitrogen oxides (NOx) and volatile organic compounds (VOC).

What Causes Smog?

NOx and VOCs are the pollutants which form smog. 95% of the anthropogenic (human-caused) NOx which is emitted in Canada is the direct result of burning fossil fuels. Mobile sources (private and commercial vehicles) are responsible for about half of that! Electric power generated from fossil fuel burning power stations also produce NOx. The sources of VOCs are slightly more varied. Most of the anthropogenic VOCs come from evaporation and burning of fossil fuels, some industrial processes, and solvents and solvent-based paints. There are natural sources of NOx - soil microbes and forest fires, and VOCs - trees and other vegetation, but they are relatively minor in urban areas.

High concentrations of NOx and VOC, during periods of strong sunlight, warm temperatures and low wind speeds are the perfect conditions to cause a smog episode.



Where Is Smog a Problem?

Canada's federal air quality objective for ground-level ozone, the maximum acceptable concentration for one hour is 82 ppb. Based on exceedances of this objective, three areas of Canada have a ground-level ozone problem: the Lower Fraser Valley of British Columbia, the Windsor-Québec City Corridor through southern Ontario and Quebec, and the southern Atlantic region.

There are exceedances of the ground-level ozone objective outside of these areas, but they tend to be less frequent and less severe. The frequency and severity of smog problems in different cities is a function of the population, vehicle density, and the type of industry it supports. Topography and geographic location also impact on the severity of smog episodes. If cities are surrounded by hills or mountains, air flow patterns are reduced and there is less opportunity for the pollutants to be dispersed. Geographic location is important too, as the air masses containing NOx and VOCs can be transported over long distances. Therefore, cities downwind of major NOx and VOC source areas may experience poor air quality (Figure 1).

Smog Episodes in Recent Years

The National Air Pollution Surveillance (NAPS) network monitors air quality across the country at stations operated by federal, provincial and municipal governments. The earliest measurements of ground-level ozone were made in the mid-seventies. Since that time, the summer of 1988 had the greatest number, and most severe smog episodes in Canada. 1992 and 1993 had the least smog. Smog episodes change greatly from year to year because they are extremely dependent upon meteorology. In fact, it is very difficult to determine trends in ground-level ozone because of the extreme variability in the meteorological conditions from one summer to the next (Figure 2).

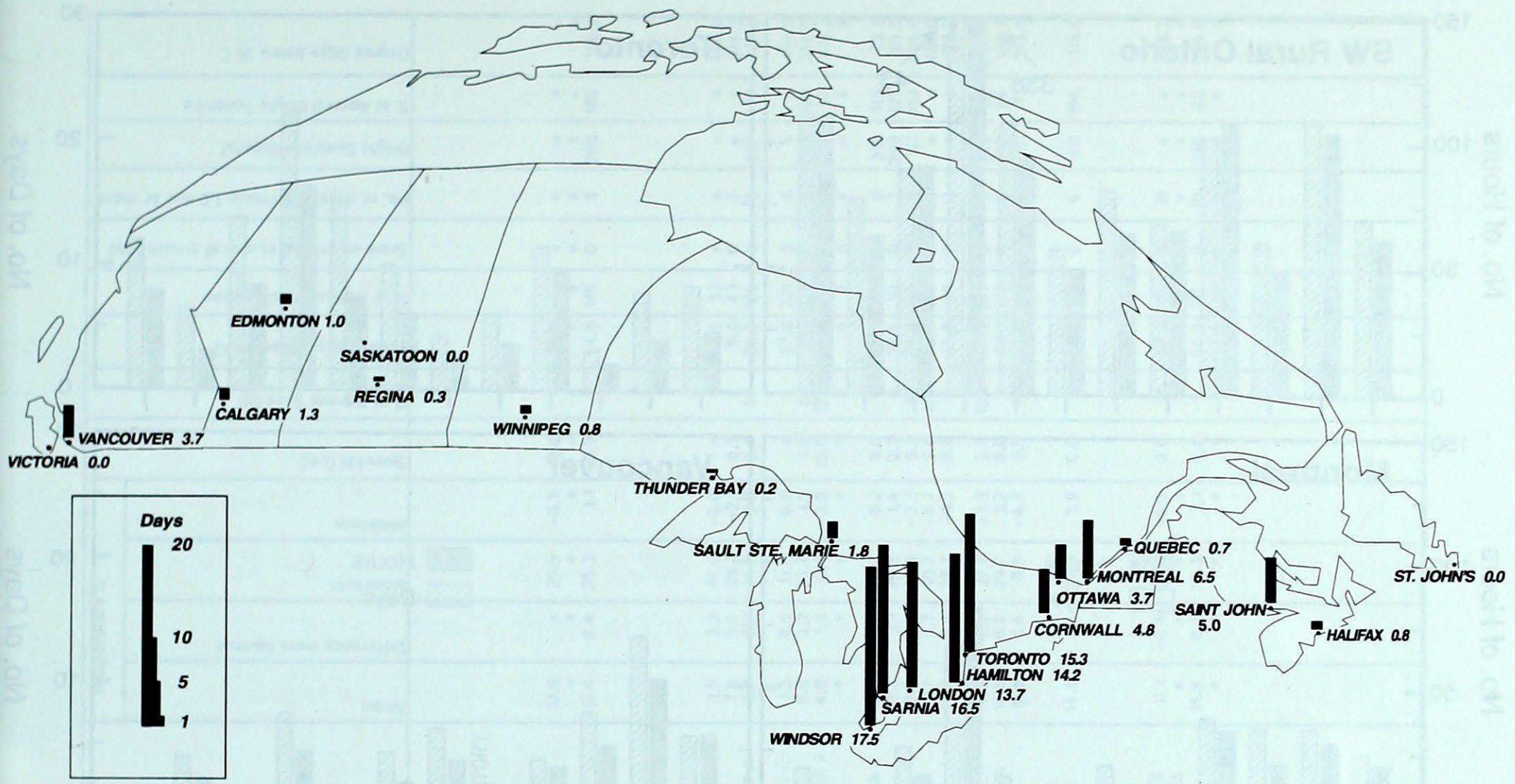


Figure 1. Average annual number of days when the one-hour air quality objective (82 ppb) was exceeded between 1987 and 1992

The Effects of Smog

Recent studies have shown that there are increased hospital admissions when ground-level ozone concentrations are high. Even short-term exposure to ground-level ozone can irritate the nose and throat, and cause respiratory problems such as coughing or painful deep breathing. Strenuous activity, such as exercising outdoors during a smog episode increases the likelihood of respiratory difficulties due to smog since more air is inhaled during physical activities.

Ground-level ozone also causes damage to agricultural crops, forests and other vegetation. Various estimates have been made of the economic losses due to ground-level ozone on agricultural crops, but it is difficult to assess the damage for any given year. It has been estimated that losses could be up to $70 million per year in Ontario, and up to $8 million in the Lower Fraser Valley.

June Smog in Ontario

This year, from June 17-20, the air quality objective was exceeded at several air quality monitoring stations in southern Ontario and Quebec. The temperatures were above 30°C, wind speeds were low, and the high pressure system was very stable — perfect conditions for a smog episode. As part of Environment Canada's Green Plan, a program has been put in place to tell Canadians about smog episodes such as this. This is the Smog Advisory Program which is in effect in the three areas of Canada which are most likely to experience poor air quality. Last summer there were only a few Smog Advisories issued in Canada. This was due to the summer having greater-than-usual precipitation, with cooler, windy days. If 1994 is a "typical summer", one can expect 10-15 smoggy days in Ontario and Quebec, about 5-10 in the Lower Fraser Valley and 3-5 in the southern Atlantic region.

What Can Be Done About Smog?

Any activity that reduces the amount of NOx or VOC that is emitted to the atmosphere will help reduce smog. A few ways people can limit the production of smog are:

1. Use alternative transportation to the single occupant vehicle. Participate in a car pool, take public transit, cycle or walk!

2. Maintain your vehicle and keep the tires inflated properly.

3. At home, use oil-based paints and solvents only when necessary. There are "low-VOC" paints now available.

4. Conserve electrical energy and use energy-efficient appliances.

Marjorie Shepherd
NOx/VOC Science Secretariat, AES/ARID

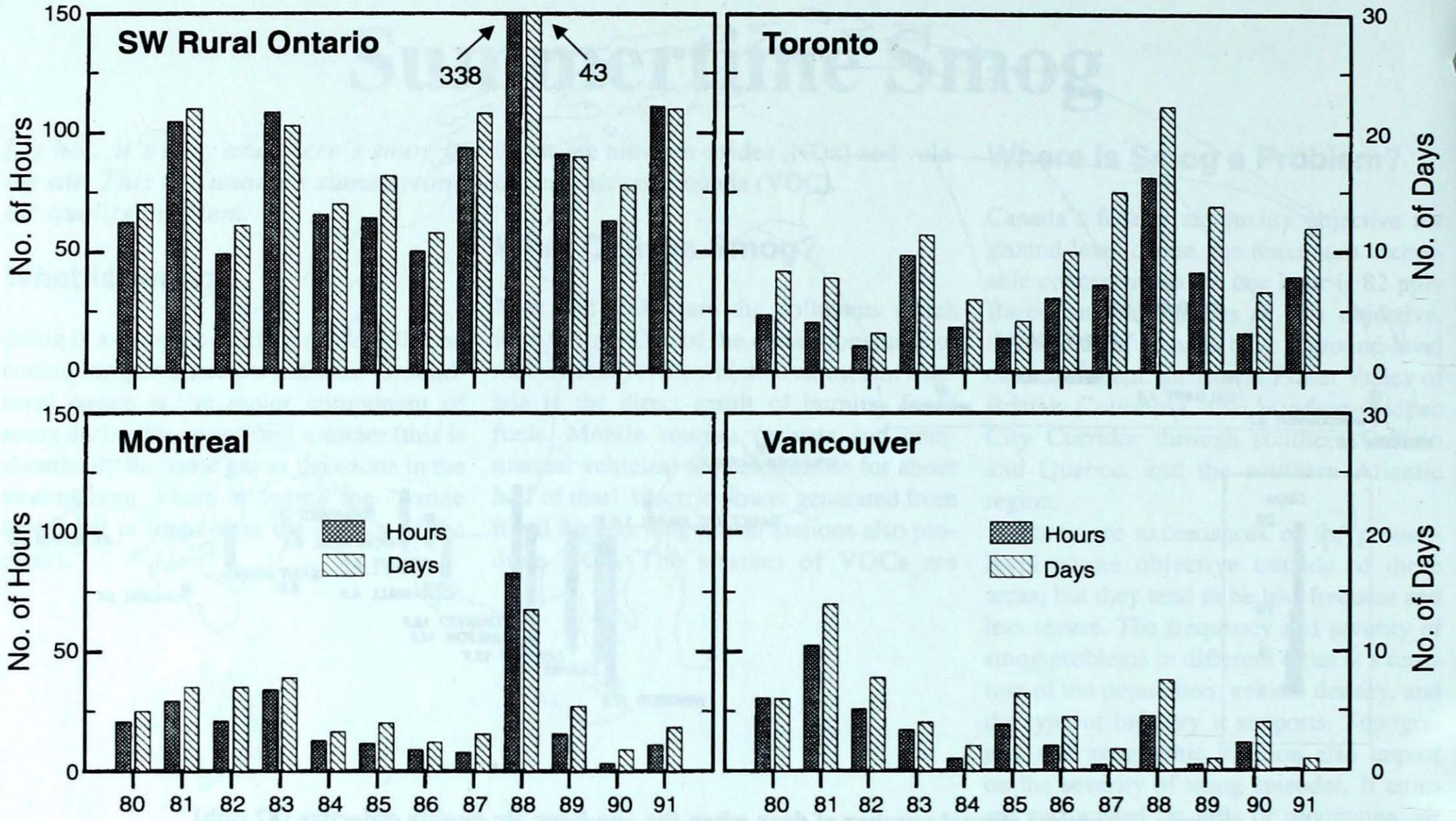


Figure 2. Average number of hours and days per year when ozone concentrations exceeded 82ppb

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mm or 45.7 mm greater than normal. The driest location was Greenwood, Nova Scotia, with 53.8 mm or 27.4 mm less than normal. Much of the precipitation fell in thunderstorm activity. On the 18th, severe downdraughts caused structural damage to barns and uprooted trees near Fredericton.

Sunshine was above normal, ranging from 6.2 hours above at both Charlo and Saint John, New Brunswick, to 52.4 hours above normal at Sable Island.

Newfoundland and Labrador

Near-normal temperatures prevailed across much of the Island. Precipitation was below normal on the Avalon Peninsula, but well-above normal at some central and western locations. Sunshine varied from below normal in western regions to above normal in the east. After a cool, damp beginning, the latter three weeks of the month were generally fair with a mixture of sun, cloud and occasional rain. On June 3 a late spring storm dumped 20-55 cm of snow on central and northeastern regions with La Scie reporting 57 cm. Total monthly precipitation at western locations was near 150 mm, about 40 mm above normal. On the Avalon Peninsula, St. John's reported 74.8 mm, about 20 mm below normal. Total sunshine hours were near 200 hours in eastern locations, about 20 hours above normal. However, western locations reported about 150 hours, some 40 hours below normal.

Early in the month, cool conditions were common with a minimum of -3.0°C at St. Anthony on the 1st, and morning temperatures below freezing for the following three days. Temperatures rebounded quickly and Badger reported a maximum of 29.4°C on the 12th. With the frequent sunshine the latter half of the month, and a comparison to June 1993's dismal weather, June '94 will be remembered as a good weather month.

In Labrador, above-normal temperatures and sunshine and below-normal precipitation highlighted the month's weather. Except for a brief period early in the month, temperatures were generally above normal with Goose Bay reporting a maximum of 32:8°C on the 16th. Snowfall amounts were near 5 cm with total precipitation near 70 mm, 20-30 mm below normal. Sunshine was frequent, especially during mid-month with monthly totals near 225 hours, about 40 hours more than normal. Several forest fires were reported out of control during the warm, dry spell but were contained later in the period.

JUNE 1994

STATION	Temperature C Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
BRITISH COLUMBIA													
ABBOTSFORD A	15.0	0.3	25.9	5.8	0.0	*	102.4	159	0	10	212	98	90.0
AMPHITRITE POINT	12.7	0.3	17.4	6.3	0.0	*	182.8	198	0	9	*	*	158.2
BLUE RIVER A	13.9	0.1	30.7	-0.4	0.0	*	103.9	121	0	15	190	96	*
CAPE SCOTT	12.5	1.3	15.5	8.5	0.0	*	147.5	140	0	16	*	*	174.6
CASTLEGAR A	16.2	-0.7	32.9	4.1	0.0	*	100.8	175	0	15	228	94	70.7
COMOX A	14.9	-0.1	25.4	5.5	0.0	*	45.0	128	0	10	195	*	93.2
CRANBROOK A	14.6	-0.3	30.5	3.5	0.0	*	68.6	156	0	10	264	93	114.8
DEASE LAKE	*	*	*	*	*	*	*	*	*	*	*	*	*
FORT NELSON A	15.0	0.6	27.6	2.3	0.0	0	66.2	96	0	13	276	*	94.4
FORT ST JOHN A	14.1	0.6	26.8	3.3	0.0	0	116.3	171	0	8	256	*	123.3
HOPE A	15.1	-0.7	26.0	6.5	0.0	*	130.1	201	0	14	176	79	88.5
KAMLOOPS A	17.8	-0.2	33.5	5.4	0.0	*	30.8	103	0	9	269	105	37.3
KELOWNA A	16.2	0.1	33.4	1.8	0.0	*	49.9	196	0	10	263	97	68.6
PENTICTON A	16.9	-0.3	33.6	3.5	0.0	*	35.8	130	0	8	238	91	55.4
PORT ALBERNI A	14.2	-0.1	26.2	3.9	0.0	*	73.0	189	0	16	155	*	114.8
PORT HARDY A	12.6	0.8	17.5	5.5	0.0	*	56.2	79	0	11	124	72	163.6
PRINCE GEORGE A	13.9	1.0	29.1	0.0	0.0	*	75.4	113	0	12	233	90	128.1
PRINCE RUPERT A	11.7	1.0	16.5	4.8	0.0	*	134.3	108	0	17	111	73	187.1
PRINCETON A	14.4	-0.1	32.7	-0.2	0.0	*	48.8	184	0	7	250	*	*
REVELSTOKE A	16.3	0.5	33.4	5.3	0.0	*	68.6	103	0	13	200	92	66.7
SANDSPIT A	11.7	0.1	16.0	6.2	0.0	*	55.1	107	0	11	119	68	187.6
SMITHERS A	12.3	-0.2	26.8	0.1	0.0	*	58.2	145	0	13	171	69	168.3
TERRACE A	13.7	0.0	27.1	5.4	0.0	*	42.3	100	0	13	164	86	129.0
VANCOUVER INT'L A	15.0	-0.1	25.0	7.9	0.0	*	70.5	156	0	10	205	86	91.2
VICTORIA INT'L A	14.1	-0.2	23.5	5.0	0.0	*	29.8	103	0	9	243	94	118.1
WILLIAMS LAKE A	12.8	-0.2	28.1	0.1	0.0	0	84.9	188	0	14	235	83	156.3

STATION	Temperature C Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
YUKON TERRITORY													
DAWSON A	12.9	*	29.5	-0.5	0.0	*	55.9	*	*	*	*	*	*
MAYO A	*	*	*	*	*	*	*	*	*	*	*	*	*
WHITEHORSE A	12.4	0.4	26.3	1.1	0.0	0	44.5	145	0	9	288	105	166.2
NORTHWEST TERRITORIES													
ALERT	1.5	2.5	14.0	-6.0	*	*	4.0	33	*	*	*	*	495.0
BAKER LAKE A	7.5	3.4	28.1	-2.1	0.2	7	9.0	43	0	4	*	*	314.3
CAMBRIDGE BAY A	3.7	2.2	16.2	-2.2	2.4	60	25.0	189	0	6	207	77	427.9
CLYDE A	1.5	0.9	11.3	0.0	*	*	27.6	221	0	6	*	*	495.7
COPPERMINE A	6.0	2.2	23.7	1.5	1.6	62	38.1	224	0	8	309	100	359.0
CORAL HARBOUR A	4.0	1.9	17.7	-3.6	10.0	123	40.8	152	0	13	273	97	419.2
EUREKA	*	*	*	*	*	*	*	*	*	*	*	*	*
FORT SIMPSON A	16.2	1.6	29.3	0.2	0.0	*	46.0	116	0	9	318	113	73.5
FORT SMITH A	15.7	2.1	28.5	1.4	0.0	0	23.4	57	0	7	380	127	85.0
IQALUIT	3.6	0.2	16.6	-3.5	9.2	91	54.0	137	0	6	191	109	430.8
HALL BEACH A	1.7	1.7	10.7	-4.7	9.6	155	18.8	113	0	8	*	*	487.6
HAY RIVER A	14.3	2.4	29.7	-1.5	0.0	0	13.0	49	0	2	*	*	125.2
INUVIK A	10.3	0.2	27.7	-1.3	2.4	109	31.9	136	0	9	346	92	230.4
NORMAN WELLS A	14.6	0.6	29.7	3.2	0.0	0	43.1	116	0	9	292	94	108.7
RESOLUTE A	0.8	1.4	8.9	-4.8	5.5	79	19.6	162	0	3	181	71	515.4
YELLOWKNIFE A	14.4	1.5	27.0	3.9	0.0	0	20.5	122	0	4	411	104	115.6
ALBERTA													
BANFF	11.1	-0.5	27.0	-0.5	0.0	0	60.2	98	0	11	*	*	206.2
CALGARY INT'L A	*	*	*	*	*	*	*	*	*	*	*	*	*
COLD LAKE A	14.8	0.3	28.3	2.1	0.0	*	90.2	125	0	10	250	88	99.8
CORONATION A	*	*	*	*	*	*	*	*	*	*	*	*	*

JUNE 1994

STATION	Temperature C				Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
	Mean	Difference from Normal	Maximum	Minimum									
EDMONTON INT'L A	14.2	0.1	26.4	2.2	0.0	•	142.3	186	0	17	259	90	116.2
EDMONTON MUNICIPAL	•	•	•	•	•	•	•	•	•	•	•	•	•
EDSON A	•	•	•	•	•	•	•	•	•	•	•	•	•
FORT MCMURRAY A	15.2	1.2	29.7	1.1	0.0	•	61.0	95	0	5	252	92	96.0
GRANDE PRAIRIE A	14.6	0.9	26.8	4.7	0.0	•	101.1	144	0	10	281	•	105.9
HIGH LEVEL A	15.0	0.6	29.0	-0.6	0.0	•	26.2	37	0	6	349	115	97.0
JASPER	12.6	0.2	27.3	0.5	0.0	•	93.8	171	0	11	205	•	163.8
LETHBRIDGE A	14.5	-0.9	29.1	-0.8	0.0	0	74.4	95	0	8	304	107	108.1
MEDICINE HAT A	16.3	-0.3	31.2	3.3	0.0	•	66.6	105	0	9	308	110	69.7
PEACE RIVER A	14.6	0.9	27.8	2.8	0.0	•	67.7	114	0	0	•	•	107.8
RED DEER A	13.5	-0.1	26.9	-0.9	0.4	400	96.5	115	0	12	•	•	138.8
ROCKY MTN HOUSE A	•	•	•	•	•	•	•	•	•	•	•	•	•
SLAVE LAKE A	13.6	0.0	24.9	2.0	0.0	•	100.8	103	0	16	235	86	132.7
SUFFIELD A	16.1	•	30.3	4.2	0.0	•	84.8	•	0	12	283	•	74.6
WHITECOURT A	13.5	0.8	29.0	6.2	0.0	0	116.2	127	0	13	•	•	138.5
SASKATCHEWAN													
BROADVIEW	15.1	-0.1	28.3	2.2	0.0	•	150.6	255	0	16	234	79	89.4
ESTEVAN A	15.9	-0.6	29.3	6.4	0.0	•	104.2	134	0	13	237	78	72.7
KINDERSLEY	15.2	-0.5	29.7	3.7	0.0	•	48.4	85	0	7	296	•	90.4
LA RONGE A	15.2	1.2	29.3	0.5	0.0	0	89.7	100	0	8	•	•	91.6
MEADOW LAKE A	14.9	•	29.3	1.2	0.0	•	57.4	•	0	10	258	•	100.2
MOOSE JAW A	16.4	-0.2	30.7	6.1	0.0	•	73.1	110	0	10	240	84	65.6
NIPAWIN A	15.1	•	30.7	4.1	0.0	•	68.8	•	0	8	240	•	98.2
NORTH BATTLEFORD A	15.3	-0.1	30.1	2.7	0.0	•	29.6	49	0	7	•	•	85.6
PRINCE ALBERT A	15.0	0.4	30.0	0.7	0.0	•	88.0	127	0	11	237	90	98.4
REGINA A	16.1	0.2	29.3	4.7	0.0	•	123.0	155	0	13	228	81	66.7
SWIFT CURRENT A	14.8	-0.3	29.5	3.9	0.0	•	92.8	123	0	11	272	97	103.9
YORKTON A	15.5	0.0	29.1	6.2	0.0	•	142.2	201	0	12	241	83	83.3
MANITOBA													
BRANDON A	15.8	-0.3	28.8	2.9	0.0	•	75.7	98	0	15	258	•	70.4
DAUPHIN A	15.7	-0.1	30.1	1.1	0.0	•	131.6	152	0	16	243	89	78.4
GILLAM A	13.8	2.9	31.3	-1.4	3.8	97	65.8	117	0	6	•	•	133.8
ISLAND LAKE	15.1	1.1	30.0	2.5	0.0	0	61.6	96	•	10	•	•	100.2
LYNN LAKE A	14.7	2.2	28.3	0.5	0.0	0	26.0	38	0	6	345	131	106.1
NORWAY HOUSE A	14.9	•	28.9	2.6	0.0	•	66.6	•	0	10	•	•	102.1

STATION	Temperature C				Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
	Mean	Difference from Normal	Maximum	Minimum									
THE PAS A	15.0	0.6	30.6	1.9	0.0	0	53.5	85	0	8	283	104	99.4
WINNIPEG INT'L A	17.9	1.1	29.3	5.1	0.0	•	80.0	100	0	9	264	96	27.4
ONTARIO													
EARLTON A	16.3	1.1	35.5	0.0	1.0	500	73.4	82	0	12	•	•	77.1
GERALDTON A	15.7	•	30.3	-1.4	0.0	•	107.0	•	0	11	•	•	81.7
HAMILTON RBG	19.2	•	34.5	6.0	0.0	•	61.2	•	0	8	281	•	•
HAMILTON A	18.7	0.8	34.6	4.0	0.0	•	67.8	98	0	9	•	•	42.7
KAPUSKASING A	15.6	1.5	34.1	-1.5	•	•	45.6	54	0	8	•	•	87.5
KENORA A	18.1	2.0	28.4	7.7	0.0	•	73.8	88	0	11	•	•	31.2
KINGSTON A	17.9	1.5	31.4	7.5	0.0	•	100.2	130	0	7	243	101	45.1
LONDON A	18.6	0.7	34.2	4.3	0.0	•	120.8	164	0	11	208	85	44.6
MUSKOKA A	16.5	0.6	32.3	1.6	0.0	•	79.9	98	0	8	•	•	77.4
NORTH BAY A	17.2	1.5	32.2	1.4	•	•	116.6	137	0	10	222	88	62.0
OTTAWA INT'L A	19.2	1.2	35.0	6.1	0.0	•	165.4	225	0	14	244	99	35.4
PETAWAWA A	16.7	0.3	35.5	0.7	0.0	•	140.7	149	0	11	•	•	73.3
PETERBOROUGH A	18.0	1.3	34.3	5.3	0.0	•	27.6	42	0	4	•	•	45.2
PICKLE LAKE	16.8	2.9	29.9	1.0	0.0	0	32.8	37	0	9	•	•	64.1
RED LAKE A	16.7	1.6	29.8	1.1	0.0	0	49.0	56	0	8	272	•	60.8
ST CATHARINES A	19.3	0.8	34.4	4.9	0.0	•	113.8	152	0	9	288	•	34.2
SARNIA A	18.1	0.3	34.5	3.3	0.0	•	145.0	176	0	10	271	100	69.0
SAULT STE MARIE A	15.2	0.8	33.0	0.3	0.0	•	62.0	74	0	8	286	112	105.4
SIOUX LOOKOUT A	17.3	2.1	29.0	1.9	0.0	0	66.3	72	0	10	•	•	57.7
SUDBURY A	17.2	1.2	33.2	2.1	0.0	•	111.0	134	0	8	224	91	61.1
THUNDER BAY A	15.4	1.4	29.8	-0.7	0.0	•	87.1	114	0	10	259	99	90.0
TIMMINS A	15.6	1.0	32.9	-0.5	2.6	•••	68.8	77	0	11	•	•	87.0
TORONTO	19.9	•	32.8	7.3	0.0	•	33.6	•	0	6	•	•	21.7
TORONTO INT'L A	19.1	1.4	36.2	4.9	0.0	•	54.4	81	0	6	•	•	35.6
TORONTO ISLAND A	17.4	•	31.5	7.1	0.0	•	31.8	•	0	5	•	•	52.7
TRENTON A	18.5	0.7	33.6	6.4	0.0	•	78.1	123	0	6	•	•	39.7
WATERLOO WELLINGTON	18.7	1.6	35.0	4.8	0.0	•	70.8	96	0	10	•	•	41.2
WAWA A	13.4	•	28.1	-2.3	0.0	•	31.0	•	0	7	•	•	148.4
WIARTON A	15.8	0.2	31.8	4.1	0.0	•	86.4	129	0	8	257	89	90.0
WINDSOR A	20.9	1.2	34.3	6.1	0.0	•	105.6	118	0	9	•	•	22.0

JUNE 1994

STATION	Temperature C				Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
	Mean	Difference from Normal	Maximum	Minimum									
QUEBEC													
BAGOTVILLE A	17.0	1.5	36.1	1.5	0.0	0	137.0	151	0	15	•	•	65.8
BAIE COMEAU A	13.2	0.4	25.1	0.9	•	•	111.2	157	0	12	202	87	146.9
BLANC SABLON A	7.0	-0.2	15.6	-2.3	1.6	•••	172.4	186	0	14	138	•	330.6
GASPE A	14.0	•	29.5	-1.5	0.0	•	77.4	•	0	9	212	•	127.1
KUUJJUAQ A	8.5	1.6	27.4	-3.3	1.2	33	27.2	54	0	6	218	121	286.1
KUUJJUARAPIK A	7.5	1.0	27.6	-3.3	1.2	25	13.6	24	0	3	269	144	315.9
LA GRANDE IV A	11.2	•	27.3	-4.4	0.0	•	67.6	•	0	8	250	•	205.9
LA GRANDE RIVIERE A	12.3	•	28.4	-2.1	0.4	•	46.8	•	0	6	317	•	194.0
MONT JOLI A	15.6	1.3	31.6	3.7	0.0	•	111.8	178	0	15	212	88	86.5
MONTREAL INT'L A	19.1	0.8	33.9	5.3	0.0	•	143.8	175	0	12	247	99	34.4
MONTREAL MIRABEL I/	17.8	•	33.5	3.3	•	•	146.8	•	0	13	243	•	51.2
NATASHQUAN A	11.1	0.6	24.5	0.8	0.0	•	145.4	162	0	13	18	8	207.9
QUEBEC A	17.9	1.5	31.4	4.0	0.0	•	213.0	194	0	14	232	104	42.2
ROBERVAL A	•	•	•	•	•	•	•	•	•	•	•	•	•
SEPT-ILES A	12.4	0.7	24.5	0.2	0.0	•	139.5	155	0	110	189	81	167.2
SHERBROOKE A	17.0	1.4	32.2	1.1	0.0	•	183.7	187	0	15	250	•	62.2
ST HUBERT A	19.1	0.9	34.4	4.4	0.0	•	161.1	188	0	13	258	•	35.5
VAL D'OR A	15.6	1.0	33.7	-0.8	0.2	100	168.4	179	0	16	229	94	93.3
NEW BRUNSWICK													
CHARLO A	15.5	0.8	29.6	2.2	0.0	•	120.4	142	0	13	240	102	90.2
FREDERICTON A	17.3	1.1	34.0	2.9	0.0	•	96.5	114	0	180	•	•	56.0
MONCTON A	16.0	1.0	30.1	2.5	0.0	•	91.3	102	0	12	239	106	83.2
SAINT JOHN A	14.7	0.9	26.3	2.8	0.0	•	136.8	145	0	14	214	106	99.5

STATION	Temperature C				Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
	Mean	Difference from Normal	Maximum	Minimum									
NOVA SCOTIA													
GREENWOOD A	17.6	1.7	31.1	3.0	0.0	•	53.8	75	0	12	•	•	51.5
HALIFAX INT'L A	16.5	1.7	28.9	4.0	0.0	•	105.7	118	0	13	•	•	69.5
SABLE ISLAND	12.6	1.6	19.5	2.8	0.0	•	153.4	164	0	9	214	131	163.8
SHEARWATER A	15.3	1.4	26.2	4.4	0.0	•	113.6	135	0	12	250	113	89.0
SYDNEY A	15.6	2.4	30.0	0.4	0.0	•	67.8	83	•••	11	•	•	112.3
YARMOUTH A	14.9	1.5	24.8	5.0	0.0	•	81.8	101	0	10	230	109	93.6
PRINCE EDWARD ISLAND													
CHARLOTTETOWN A	15.5	1.0	27.6	1.2	0.0	•	129.4	162	0	14	•	•	99.0
NEWFOUNDLAND													
BONAVISTA	10.6	1.0	23.0	0.2	1.0	83	82.8	130	0	12	•	•	223.4
BURGEO	11.3	1.8	26.6	-1.4	18.6	•	143.2	104	0	15	•	•	202.9
CARTWRIGHT	8.9	0.5	29.8	-2.0	7.6	304	74.6	96	0	11	227	126	272.0
DANIELS HARBOUR	10.5	0.7	21.7	-0.2	9.2	•••	163.6	190	0	15	141	74	225.6
DEER LAKE A	11.8	-0.4	27.4	-0.4	11.0	•••	115.6	163	0	12	•	•	181.2
GANDER INT'L A	11.5	-0.3	26.6	-0.7	24.4	871	123.8	154	0	12	187	101	197.7
GOOSE A	11.9	0.6	32.8	-2.3	0.0	0	69.3	74	0	11	226	121	188.4
MARY'S HARBOUR	8.4	2.2	28.6	-2.0	8.4	323	95.6	121	0	11	•	•	286.4
PORT AUX BASQUES	10.4	1.4	25.3	-0.5	0.0	•	147.6	143	0	16	172	•	221.5
ST ANTHONY	7.3	-0.8	20.5	-3.0	9.0	•••	152.0	152	0	14	•	•	316.3
ST JOHN'S A	11.4	0.5	24.7	-0.5	0.0	0	74.8	87	0	7	202	•	198.2
ST LAWRENCE	10.4	2.1	23.4	-0.7	0.0	0	127.8	116	0	9	•	•	229.4
STEPHENVILLE A	11.7	-0.2	22.4	2.1	0.0	•	148.9	173	0	16	154	•	189.0
WABUSH LAKE A	10.9	1.0	26.5	-2.5	6.4	•	76.2	85	0	13	236	•	213.5

AGROCLIMATOLOGICAL STATIONS

JUNE 1994

STATION	Temperature C				Snowfall (cm)	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	Degree days above 5 C	
	Mean	Difference from Normal	Maximum	Minimum							This month	Since jan. 1st
BRITISH COLUMBIA												
AGASSIZ	15.3	-0.3	26.5	6.5	0.0	112.4	140	0	12	172	308.3	988.7
SIDNEY	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
SUMMERLAND	17.0	-0.4	33.5	4.5	0.0	30.8	101	0	9	235	363.0	893.3
ALBERTA												
BEAVERLODGE	13.9	0.8	26.5	0.5	0.0	125.3	183	0	11	276	266.5	492.5
LACOMBE	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
SASKATCHWAN												
INDIAN HEAD	16.0	0.4	30.5	4.0	0.0	119.6	162	0	15	**	323.8	609.8
MELFORT	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
REGINA	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
SCOTT	15.0	0.5	29.0	0.5	0.0	55.1	83	0	12	244	299.9	539.1
SWIFT CURRENT	15.4	-0.1	30.5	4.5	0.0	81.9	111	0	12	240	309.7	611.4
MANITOBA												
BRANDON	16.3	0.0	30.5	3.5	0.0	74.0	91	0	18	**	338.6	615.1
MORDEN	18.0	1.1	29.0	6.0	0.0	71.6	81	0	11	279	395.0	723.5
GLENLEA	24.0	6.6	29.5	4.5	0.0	94.7	125	0	19	252	388.5	660.3
ONTARIO												
DELHI	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
ELORA	18.0	0.9	33.5	2.6	0.0	*.*	**	***	***	**	391.4	649.3
GUELPH	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
HARROW	20.0	0.3	33.0	4.0	0.0	83.6	111	0	7	278	451.5	842.3
KAPUSKASING	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
OTTAWA	19.2	1.1	33.9	6.2	0.0	133.8	167	0	11	244	425.1	736.0
SMITHFIELD	19.3	2.0	34.9	5.8	0.0	69.5	112	0	8	**	429.5	727.4

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STATION	Temperature C				Snowfall (cm)	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	Degree days above 5 C	
	Mean	Difference from Normal	Maximum	Minimum							This month	Since jan. 1st
QUEBEC												
LA POCATIERE	16.8	1.1	32.0	2.5	0.0	155.6	174	0	12	250	352.7	502.0
L'ASSOMPTION	19.0	1.4	34.9	3.1	0.0	199.2	227	0	16	232	*.*	419.8
NORMANDIN	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
NEW BRUNSWICK												
FREDERICTON	17.8	1.8	35.0	3.0	0.0	86.7	98	0	11	217	383.3	585.3
NOVA SCOTIA												
KENTVILLE	18.0	2.1	30.5	4.0	0.0	49.2	69	0	10	251	380.1	638.3
NAPPAN	16.4	1.7	28.5	1.0	0.0	100.4	128	0	15	212	337.7	538.5
PRINCE EDWARD ISLAND												
CHARLOTTETWN	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
NEWFOUNDLAND												
ST.JOHN'S WEST	12.2	1.1	25.5	0.0	0.0	57.5	72	0	8	206	217.9	305.2

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