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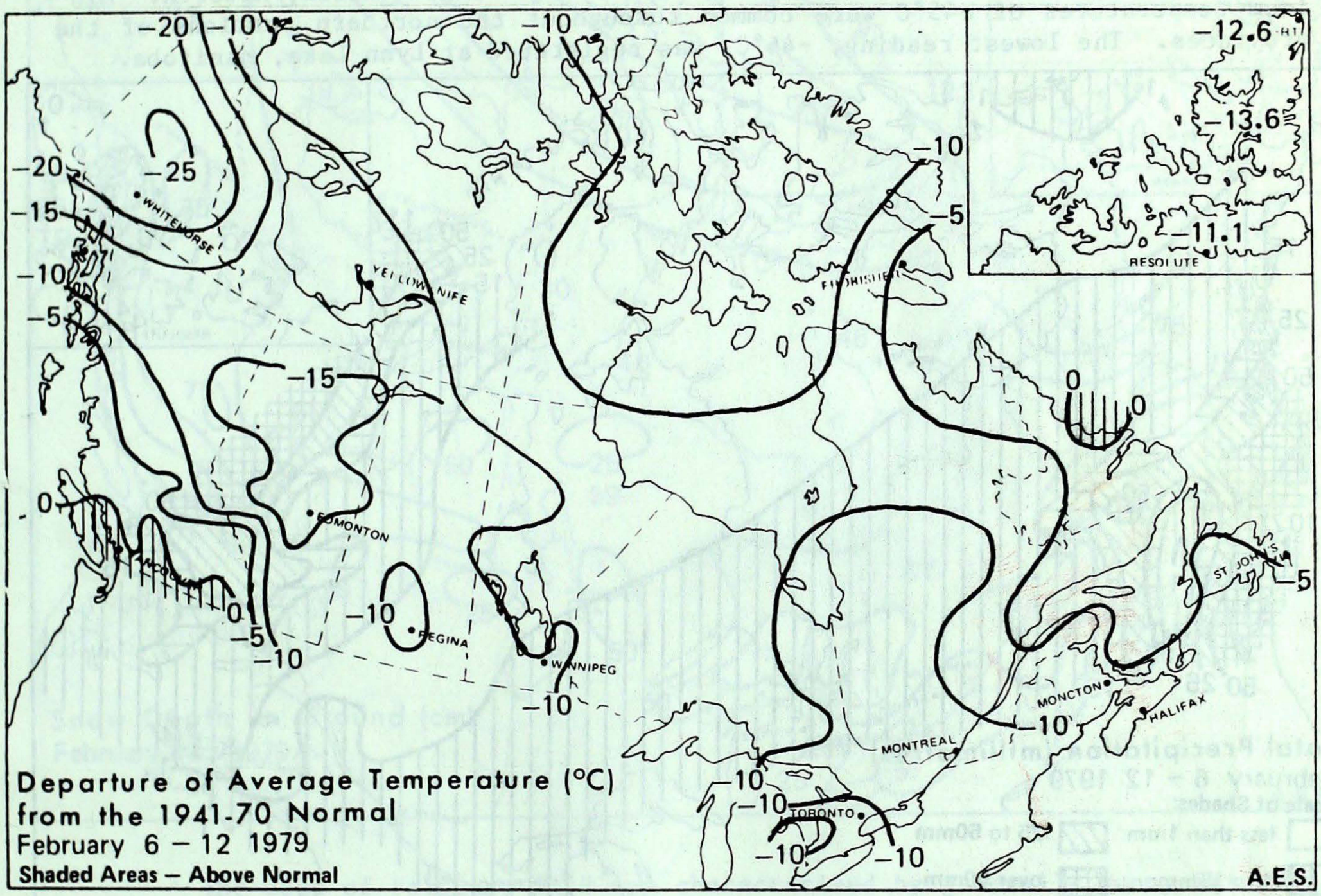
A WEEKLY REVIEW OF CANADIAN CLIMATE

CLIMATIC PERSPECTIVES

THE CANADIAN CLIMATE CENTRE,
ATMOSPHERIC ENVIRONMENT SERVICE,
4905 DUFFERIN ST., DOWNSVIEW, ONTARIO M3H 5T4

16 FEBRUARY, 1979 VOL. 1 NO. 1



Departure of Average Temperature (°C)
from the 1941-70 Normal
February 6 – 12 1979
Shaded Areas – Above Normal

A.E.S.

WEATHER HIGHLIGHTS FOR THE WEEK - FEBRUARY 6-12, 1979

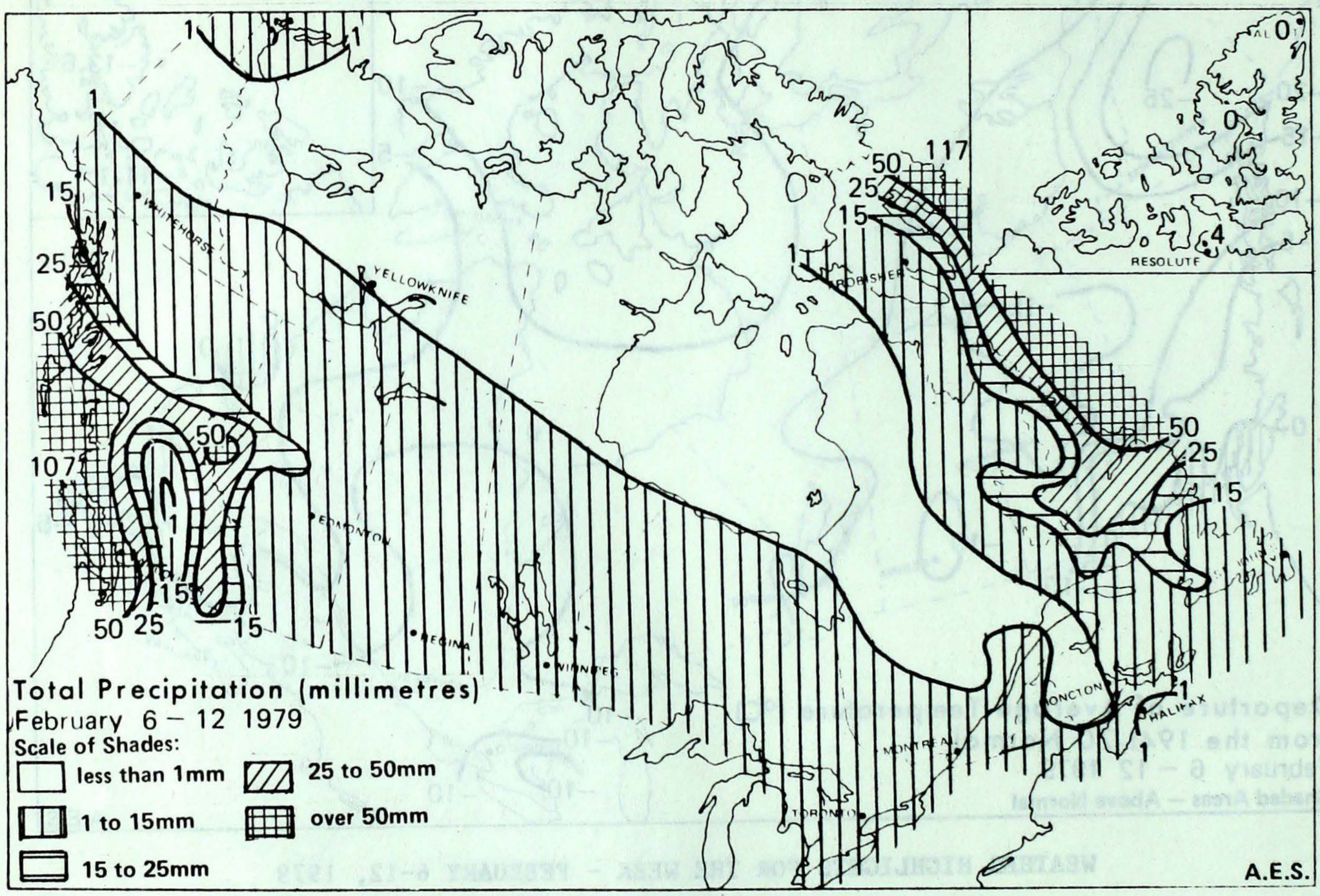
Bitterly cold aptly describes Canada's weather during the past week. With the exception of southern British Columbia and coastal portions of Labrador all of Canada recorded temperatures well below the 1941-70 average. The major control was a high pressure system, with a central pressure greater than 105 kPa, which stagnated in the Yukon for more than a week before moving southeastward across the Prairies, through Ontario and into Quebec. As a result, numerous daily low minimum and low maximum temperature records were set across the country.

In the far north, daily minimum temperature readings in the vicinity of -50°C were not infrequent; in fact, the thermometer dropped to -56°C at Resolute and Dawson on February 10 and 11 respectively, records for the month since measurements began at Resolute and since 1955 at Dawson. The weekly temperature departure from normal of -26.4°C which occurred at Mayo, Yukon Territory was the most extreme of this winter season.

NOTE: The data shown in this publication are based on unverified reports from approximately 170 Surface Synoptic reporting stations of the Atmospheric Environment Service.

The Western Cordillera provided an effective barrier between moist Pacific air in the southern B.C. interior, coastal regions and the very cold continental arctic air which surged into northern portions of the province. Temperatures of 11°C were recorded at Abbotsford on February 8 and 9 while, in contrast, temperatures dropped to -38°C at Fort Nelson on February 8, 10 and 11. Weekly temperature departures from the 1941-70 normal ranged from 3.3°C at Cranbrook to -17.6°C at Fort St. John. With the exception of the Okanagan Valley most of southern B.C. experienced well above normal precipitation.

Weekly temperature anomalies generally ranged from -10°C to -15°C across the Prairie Provinces with the largest, -19°C, occurring at Edson, Alberta. Minimum temperatures of -45°C were common throughout the northern portions of the provinces. The lowest reading, -46°C, was registered at Lynn Lake, Manitoba.

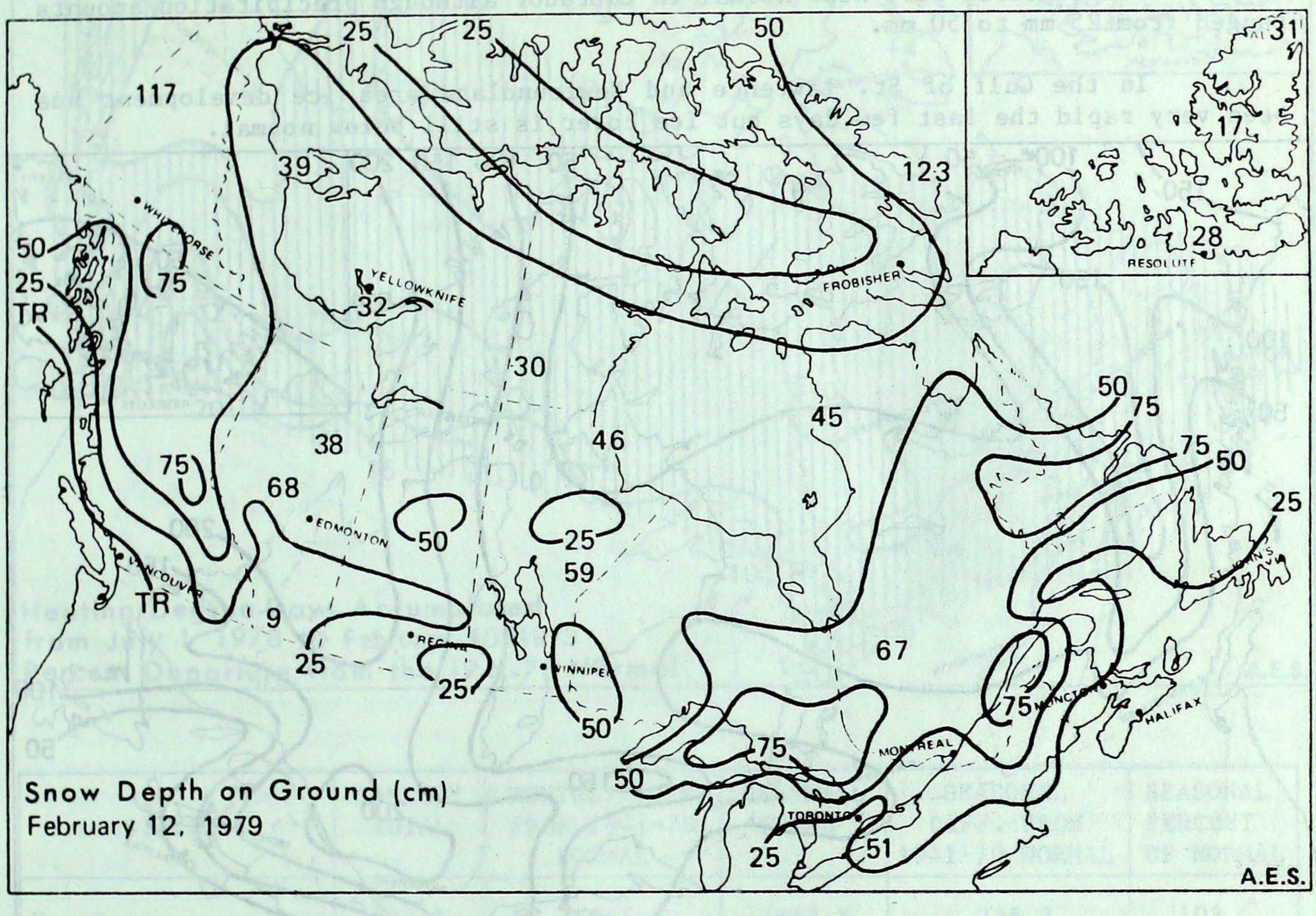


Significant amounts of precipitation fell in the foothills and southern portions of Alberta thus increasing the snowpack by a few centimetres. In a bulletin released February 7, Alberta Agriculture reported that "the survival of this year's winter wheat crop in parts of southern Alberta may be in serious doubt. Dangerously low temperatures with abnormally light snow cover left extensive areas exposed to potentially damaging conditions." The potentially severely affected area covered a region bounded by Calgary, Medicine Hat and Coronation.

With the exception of precipitation amounts of 10 mm to 15 mm in southwestern Saskatchewan, precipitation was seasonally light across Saskatchewan and Manitoba.

In Ontario weekly temperature anomalies ranged from -8°C to -12°C. At Muskoka Airport the weekly temperature departure from normal was -12.3°C. Trout

Lake recorded the lowest minimum -43°C on February 10. The minimum temperature reading of -42°C at Muskoka on February 11 broke the old record minimum for the day by 14°C! Some snow flurries occurred in the lee of the Great Lakes early in the period, but in general, precipitation was light; however, snow depths greater than 90 cm are prevalent in an area northeast and east of Georgian Bay. Except for Lakes Michigan and Ontario all the Great Lakes are predominantly ice covered, a little above normal for this time of year. Some shipping is taking place with the help of ice breakers.



The week of February 6-12 was characterized by generally sunny but cold weather for the whole of Quebec Province. At the beginning of the week temperatures ranged from 5°C to 10°C below normal in the western half of the province and 2°C to 3°C above normal in the east but by the weekend anomalously cold weather pervaded the entire province. The largest weekly temperature anomaly, -12.2°C, occurred at Maniwaki. At Quebec City, where the 25th Winter Carnival ended February 11, the mean temperature for the week was 8.5°C below the 1941-70 normal. Several low maximum and minimum daily temperature records were set from February 9th through to the 12th. On February 11 and 12 Sherbrooke set consecutive low minimum records for the date of -35°C and -40°C respectively.

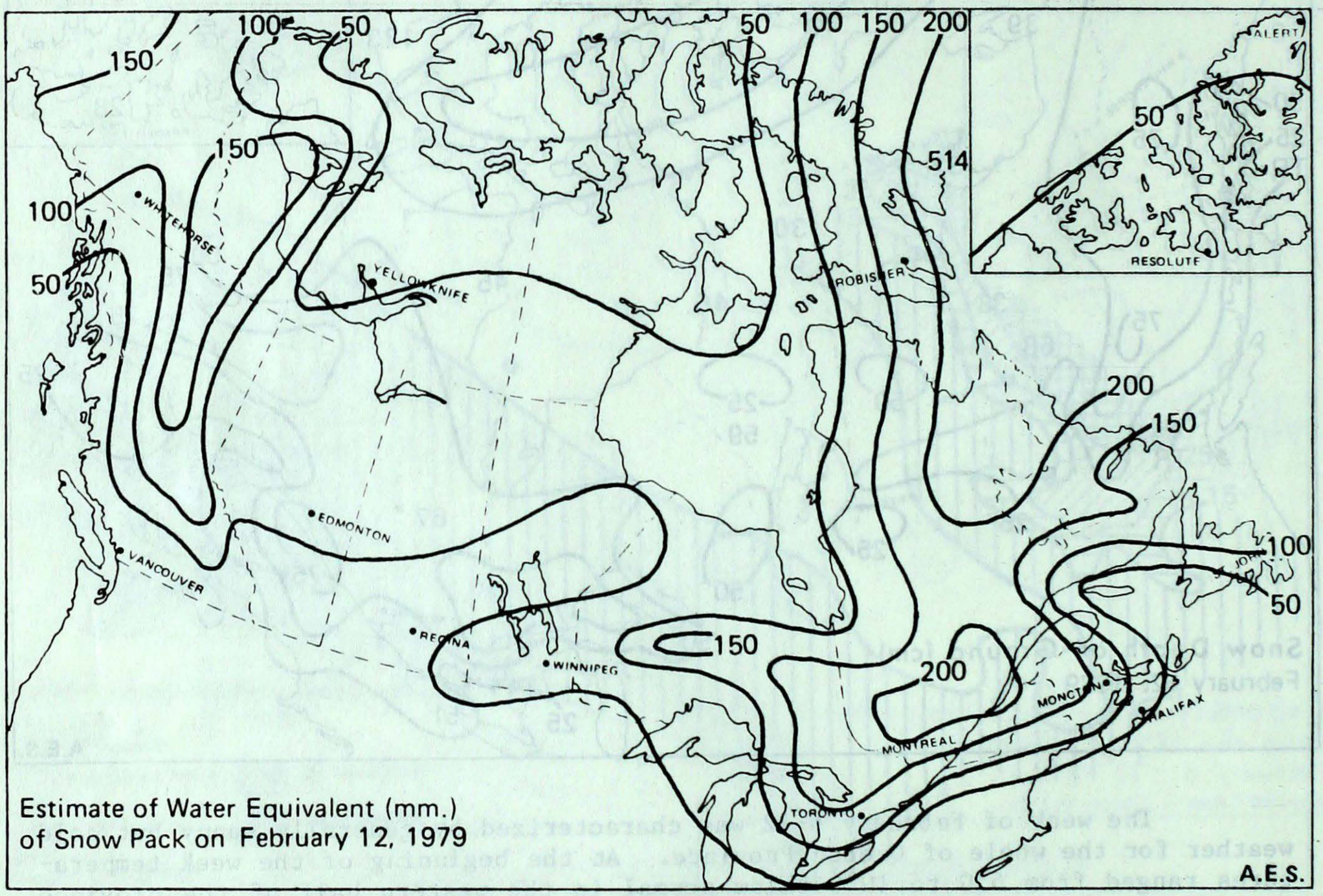
In the Maritimes weekly temperature anomalies ranged from -4°C to -7°C as cold dry air forced its way into the area by the middle part of the period. New daily record low maximums were set at a few localities in Nova Scotia on the 11th and 12th. Minimum temperatures were reported in the minus twenties at many stations early on the 12th, with -26°C at Charlo, N.B., making this the coldest day so far this winter at most locations. CFB Shearwater, N.S. reported a minimum

temperature of -20°C on the 12th, the first time the temperature had reached this level since February 4, 1975.

On February 6 strong northwest winds prevented the Princess of Acadia from making her daily crossing of the Bay of Fundy and also caused ice to pile up near the C.N. Marine terminal at Borden, P.E.I., thus delaying ferries on the run across Northumberland Strait.

Temperatures were near normal in Labrador although precipitation amounts ranged from 25 mm to 50 mm.

In the Gulf of St. Lawrence and Newfoundland area ice development has been very rapid the last few days but ice cover is still below normal.

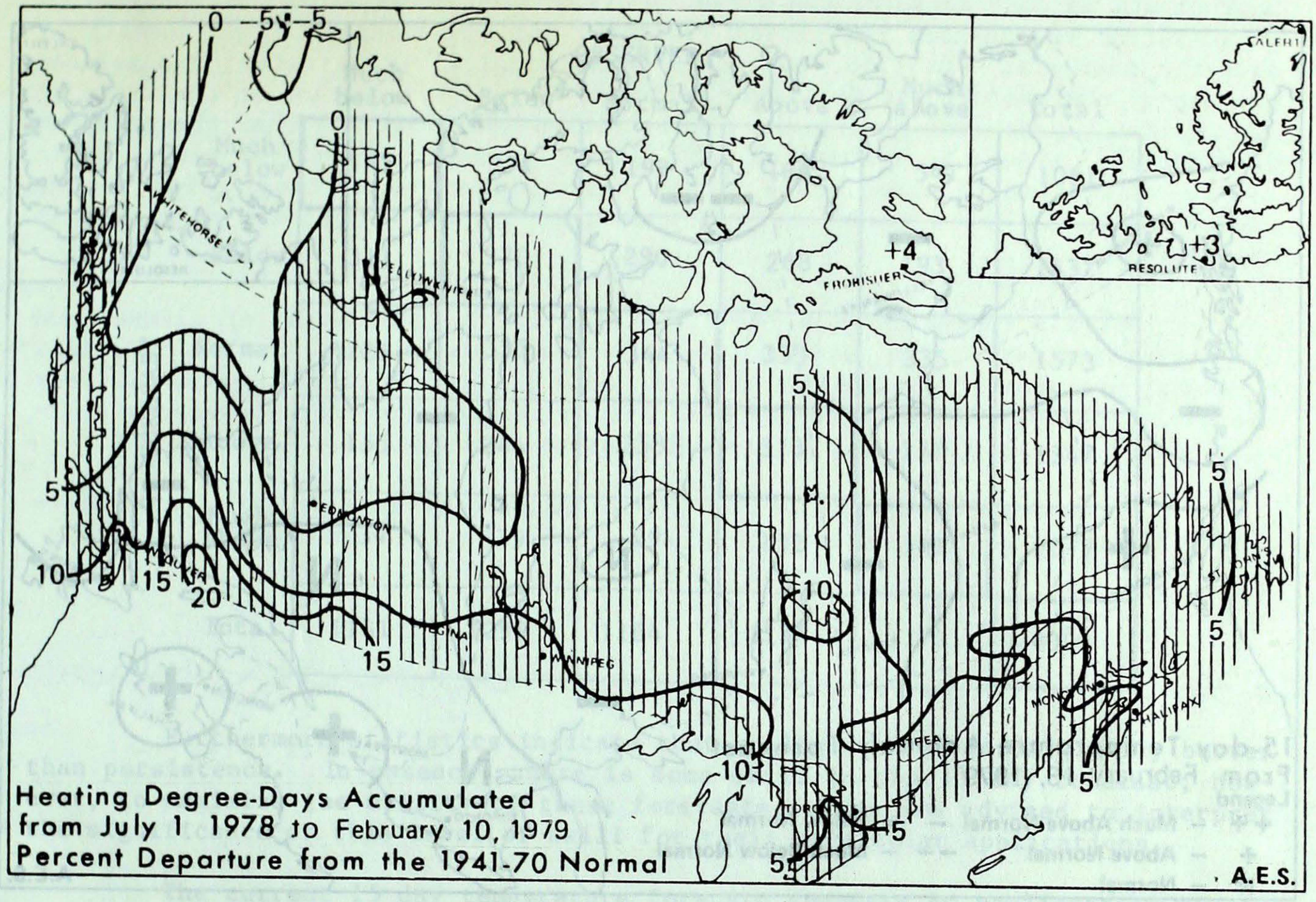


Estimated Water Equivalent of the Snowpack

The Hydrometeorology Division of the Canadian Climate Centre is currently processing near real-time water budgets for approximately 160 synoptic stations across Canada on a weekly basis. This effort is part of the monitoring role of the Canadian Climate Centre to quickly assess variations of climatic parameters in time and space with respect to hydrologic activities.

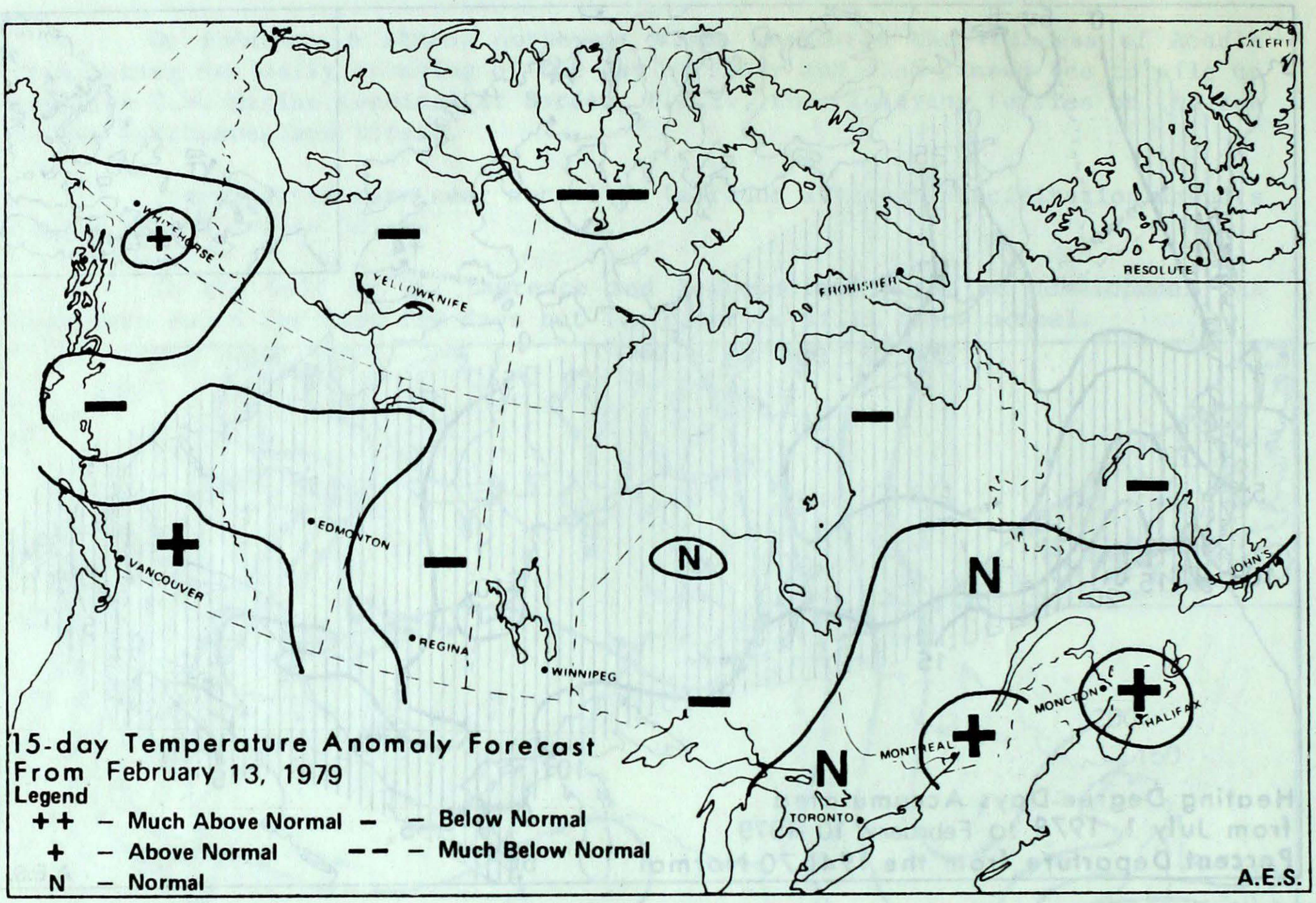
In the winter season, one component of the water budget of particular interest is the accumulated snow water equivalent. These values have been accumulated at each station since the beginnning of the winter season and are based on the assumption that precipitation falls as snow whenever the daily mean temperature is below freezing. On days with the mean temperature above freezing, a standard snowmelt equation is applied and the calculated snowmelt is subtracted from the accumulated total. These totals are in effect estimates of the net snow storage in water equivalent at each station.

HEATING DEGREE-DAY SUMMARY TO FEBRUARY 10, 1979



STATION	MONTHLY TOTAL	MONTHLY DIFF. FROM 1941-70 NORMAL	SEASONAL TOTAL	SEASONAL DIFF. FROM 1941-70 NORMAL	SEASONAL PERCENT OF NORMAL
Resolute	579.5	59.5	7642.5	226.5	103
Inuvik	538.5	48.5	5834.0	-379.0	94
Whitehorse	447.5	110.5	4561.0	76.0	102
Vancouver Int'l A	149.5	6.5	2044.0	185.0	110
Edmonton Mun A	403.0	107.0	3646.0	46.0	101
Calgary Int'l A	347.0	74.0	3603.5	253.5	108
Regina	417.5	76.5	4138.0	390.0	110
Winnipeg Int'l A	446.5	89.5	4196.5	466.5	113
Thunder Bay	390.0	64.0	3928.5	383.5	111
Windsor	285.5	58.5	2342.5	116.5	105
Toronto Int'l A	305.0	56.0	2636.0	146.0	106
Ottawa Int'l A	349.5	62.5	3066.5	134.5	105
Montreal Int'l A	342.5	58.5	3040.0	253.0	109
Quebec	331.5	28.5	3383.0	251.5	108
Saint John, N.B.	265.5	-4.5	2916.5	104.5	104
Halifax	232.0	2.0	2489.0	176.0	108
Charlottetown	251.5	-13.5	2776.0	147.0	106
St. John's, Nfld.	213.0	-23.0	2825.5	171.5	106

15 DAY TEMPERATURE ANOMALY FORECAST



The 15 day forecast produced by the Extended Range Forecast Division of the Canadian Meteorological Centre, AES will be disseminated on a regular basis in Climatic Perspectives.

The forecast chart is based on analogue prediction techniques applied to 70 Canadian stations. The hypothesis is that historical weather patterns similar to the present, through reference to their known outcomes, can provide useful indications of what is likely to happen in the near future. The five most similar periods in the past are extracted and the surface temperature anomaly is obtained for the 15 days immediately following the current period by averaging the five forecasts. As a result of this method, large temperature anomalies tend to occur only when the five individual forecasts have at least the same sign; forecasts of normal temperatures are less likely to be a confident prediction of small anomalies than they are admissions of uncertainty, in other words an "indeterminate" forecast.

Each of the five temperature classes indicated on the forecast map have been designed to contain 20% of the climatologically observed 15 day means pertinent to the specific location and time of year.

Of 6090 forecasts made from November 1976 to July 1978, 1775 forecasts verified in the correct class as opposed to 1218 which would have been expected by chance.

Verification of 15-Day Temperature Forecasts

FORECAST \ OBSERVED	Much below	Below	Normal	Above	Much above	Total
Much below	435	271	193	108	54	1061
Below	311	370	290	268	193	1432
Normal	226	335	344	333	335	1573
Above	155	244	258	313	377	1347
Much Above	34	79	99	152	313	677
Total	1161	1299	1184	1174	1272	6090

Furthermore statistics indicate that analogue skill is marginally better than persistence. In essence, there is some skill to the 15 day forecast; however, to maximize the utility of these forecasts, users are advised to interpret the significance of this level of skill for their particular applications.

The current 15 day temperature forecast suggests an amelioration of the highly anomalous temperature patterns that have occurred across Canada during the past several weeks. With the exception of a much below normal temperature forecast in the central Arctic no extreme temperature classes are predicted for the 15 day period. For example, temperature anomalies ranging from +0.4°C to +1.2°C at Vancouver, -1.4°C to -4.5°C at Dawson, -1.4°C to -4.8°C at Frobisher, and -0.7°C to +0.7°C at Trenton are forecast.

CLIMATIC NORMALS

Part I - Definition

One of the most popular methods of presentation of any climatic element is the "normal". Standardization of climatic statistics is necessary in order to compare any two geographical locations; a standard evaluation of the climate is required in the planning of cities and industries, engineering, agriculture and many other aspects of human activity. The normal was therefore established to evaluate climate, ignoring yearly random fluctuations.

The definition of a normal has changed since the beginning of contemporary meteorology. According to the Glossary of Meteorology, a climatic normal is the average value of a meteorological element over any fixed period of years that is recognized as standard for the country and element concerned. Originally, more than a century ago, climatic normals were averages over the entire period of record and were considered to approximate the "true" climate, which was assumed

invariant. With additional data available and longer periods of record, it has become obvious that climate fluctuates and the concept of a stable climate is not appropriate in most parts of the world. In 1935, the International Meteorological Organization recommended the period 1901-1930 for standardization of normals of climatic elements. In 1956, the World Meteorological Organization recommended the use of the most recent available period of 30 years, starting on the first of January for a year ending with the digit 1 (then 1921-1950) and that these "standard normals" should be recomputed each decade (present: 1941-1970, next: 1951-1980). The standard normals are now interpreted as the representation of the present state of the climate and most countries in the world have adopted this definition.

Normals represent only the first step in the evaluation of climate and many other statistics are necessary in order to fully characterize it. Besides averages, measures of variability over the same period (30 years), extremes (over the entire period), probability ranges, return periods and other frequency characteristics are also included in the publication of normals.

Subsequent issues will cover the adjustment of normals, standard reference periods and representativeness of the climate by the normals.

CLIMATIC PERSPECTIVES

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TEMPERATURE AND PRECIPITATION DATA FOR THE WEEK ENDING 0600 G.M.T. FEBRUARY 13, 1979

Station	Temperature (°C) Average	Departure from Norm	Extreme Maximum	Extreme Minimum	Precip. (mm) Total	Departure from Normal
BRITISH COLUMBIA						
Abbotsford	5	0	11	- 3	92.1	51.6
Blue River	- 4	M	5	-11	49.0	M
Bull Harbour	3	- 2	6	- 1	106.7	62.5
Castlegar A	- 1	0	6	-12	44.3	31.9
Cranbrook A	- 1	3	6	-14	6.6	0.2
Comox A	5	1	10	- 3	69.8	31.9
Estevan Point	M	M	M	0	M	M
Fort Nelson A	-32	-14	-26	-38	6.4	0.8
Fort St. John A	-30	-18	-25	-34	16.4	11.1
Kamloops A	- 2	- 1	8	-15	0.8	- 4.9
Lytton	2	2	9	- 6	13.5	- 3.6
Penticton A	1	1	8	- 7	6.4	0.4
Port Hardy A	3	- 1	7	- 1	81.5	39.9
Prince George A	-14	- 7	3	-22	41.0	31.0
Prince Rupert A	1	- 3	5	- 7	45.8	-24.7
Quesnel A	-11	- 5	5	-20	15.8	8.0
Revelstoke A	- 2	0	4	-13	48.8	23.1
Smithers A	-10	- 4	1	-20	12.2	6.3
Terrace A	- 5	- 5	2	-13	36.1	12.0
Vancouver Int'l A	5	1	9	- 1	66.7	37.5
Victoria Int'l A	6	1	10	- 1	M	M
Williams Lake A	- 8	- 5	5	-21	6.1	2.2
YUKON TERRITORY						
Dawson A	-48	-24	-39	-56	0.0	- 4.8
Mayo A	-47	-26	-37	-55	0.0	- 5.6
Watson Lake A	-34	-15	-26	-48	6.4	- 1.7
Whitehorse A	-35	-21	-26	-45	M	M
NORTHWEST TERRITORIES						
Alert	-45	-13	-39	-50	0.0	- 1.0
Baker Lake	-45	-12	-42	-49	0.0	- 1.7
Cambridge Bay A	-43	- 9	-35	-50	0.0	- 1.3
Cape Dyer	-24	M	-18	-30	116.8	M
Chesterfield Inlet	M	M	-42	M	M	M
Clyde	-38	-12	-35	-43	M	M
Coppermine	-38	- 7	-26	-43	0.0	- 1.1
Coral Harbour	-41	-11	-34	-48	0.0	- 2.5
Donnadai	-37	- 9	-28	-47	0.3	- 1.4
Eureka	-51	-14	-47	-53	0.0	- 0.7
Fort Simpson	-36	-13	-27	-43	2.0	- 2.4
Fort Smith A	-35	-13	-26	-43	5.4	0.9
Frobisher Bay A	-31	- 5	-23	-38	5.5	- 0.7
Fay River A	-36	-13	-25	-43	4.6	- 1.3
Inuvik A	-36	- 6	-22	-47	2.1	- 0.7
Mould Bay	-43	- 8	-33	-51	M	M
Norman Wells A	-39	-12	-26	-48	0.0	- 4.0
Resolute A	-45	-11	-41	-56	0.4	- 0.6
Sachs Harbour	-40	- 9	-34	-45	M	M
Yellowknife A	-39	-13	-31	-45	0.8	- 2.3
ALBERTA						
Banff	-11	- 4	1	-22	11.2	4.0
Calgary Int'l A	-20	-13	0	-26	3.4	- 1.4
Cold Lake A	-28	-16	-22	-38	7.8	4.4
Coronation A	-24	-13	-19	-30	7.4	4.4
Edmonton Mun. A	-24	-14	-18	-31	M	M
Edmonton Namao A	-26	-17	-19	-33	15.0	11.6
Edson A	-24	-19	-17	-31	4.7	2.2
Fort Chipewyan	-35	-17	-24	-45	6.8	2.9
Fort McMurray A	-29	-13	-21	-38	4.9	0.5
Grande Prairie A	-27	-15	-22	-32	16.8	11.5
Jasper	-19	-12	2	-27	24.7	21.4
Lethbridge A	-16	-11	2	-25	3.6	- 1.5
Medicine Hat A	-20	-13	-11	-29	10.4	5.3
Peace River A	-30	-17	-25	-41	12.6	9.3
Red Deer A	-23	-12	-16	-29	2.7	- 1.6
Rocky Mountain House	-23	-16	-17	-33	3.6	0.1
Vermilion A	-26	-12	-21	-33	5.1	2.3
Whitecourt	-25	-14	-20	-32	21.0	16.4
SASKATCHEWAN						
Broadview	-26	-11	-20	-35	5.5	2.4
Buffalo Narrows	M	M	M	-37	M	M
Cree Lake	-33	M	-22	-45	5.0	M
Estevan A	-23	-10	-17	-29	7.7	4.2
Hudson Bay	M	M	-19	M	M	M
Kindersley	-23	-13	-18	-29	M	M
La Ronge A	-30	-13	-22	-39	5.4	- 2.1
North Battleford A	-26	-11	-22	-33	3.4	- 1.2
Prince Albert A	-28	-11	-21	-34	7.1	2.7
Regina A	-23	- 9	-19	-32	5.2	1.3
Saskatoon A	-25	- 9	-19	-33	3.2	- 1.2
Swift Current A	-21	-11	-13	-30	13.9	10.4
Uranium City	-34	M	-24	-45	5.5	M
Wynyard	-26	-12	-21	-34	4.7	1.7
Yorkton A	-28	-12	-21	-39	4.5	- 1.3
MANITOBA						
Bissett	-26	-11	-18	-37	M	M
Brandon A	-27	-12	-20	-36	8.0	4.2
Churchill A	-36	- 9	-29	-42	1.0	- 3.5
Dauphin A	-29	-13	-19	-41	2.2	- 3.3
Gillam A	-34	M	-24	-42	1.8	M
Gimli	-25	- 9	-19	-37	5.2	0.9
Lynn Lake	-33	-13	-24	-46	4.4	- 3.9
Norway House	-29	M	-20	-39	M	M
Pilot Mound	-26	-11	-19	-36	7.7	4.4
Portage la Prairie	-26	-12	-18	-35	M	M
The Pas A	-28	- 9	-21	-36	M	M
Thompson A	-33	-12	-22	-45	3.0	- 1.1
Winnipeg Int'l A	-26	-10	-18	-35	4.0	0.4
ONTARIO						
Armstrong A	M	M	-17	M	M	M
Atikokan	-24	- 5	-13	-38	8.6	3.4
Earlton A	-26	-11	-15	-37	6.6	- 4.3
Geraldton	-28	- 9	-15	-39	4.0	- 3.9
Gore Bay A	-20	-10	- 9	-34	17.8	5.9
Kapuskasing A	-28	-11	-17	-41	1.6	-12.6
Kenora A	-23	- 8	-18	-31	4.8	- 0.7
Kingston A	-19	-11	- 9	-30	M	M
Lansdowne House	-30	-10	-19	-40	1.4	- 5.4
London A	-16	-10	- 5	-26	1.3	-15.5
Moosonee	-31	-12	-20	-41	1.3	-10.1
Mount Forest	-19	-10	- 6	-32	3.4	- 9.4
Muskoka A	-22	-12	- 9	-42	3.6	-11.4
North Bay A	-23	-11	-13	-33	3.3	-13.7
Ottawa Int'l A	-21	-10	-10	-29	4.7	-12.2
Petawawa A	-22	M	-12	-37	3.6	M
Pickle Lake	-27	- 8	-19	-40	M	M
Red Lake A	-26	- 8	-19	-38	6.4	- 0.7
Simcoe	-15	- 9	- 4	-24	M	M
Sioux Lookout A	-25	- 9	-18	-37	4.6	- 3.0
Sudbury A	-23	-10	-13	-33	M	M
Thunder Bay A	-22	- 8	-10	-32	7.1	- 0.7
Timmins A	-27	-11	-18	-39	2.9	- 7.7
Toronto Int'l A	-16	-10	- 4	-27	2.8	- 8.2
Trenton A	-18	-11	- 7	-28	5.0	-10.6
Trout Lake	-32	-10	-21	-43	2.0	- 3.9
Wawa A	-23	M	-13	-35	3.6	M
Wiarton A	-17	-10	- 3	-34	11.3	- 2.5
Windsor A	-13	- 9	- 2	-19	3.0	- 9.3
QUEBEC						
Bagotville A	-24	- 9	-16	-31	2.4	-13.0
Baie Comeau	-18	- 3	- 8	-29	0.2	-15.0
Border	-24	- 5	- 7	-34	4.0	-15.4
Chibougamau	-28	M	-19	-38	0.0	M
Fort Chimo A	-26	- 2	-15	-34	11.6	2.1
Gaspé A	-14	- 7	- 4	-23	M	M
Grindstone Island	-11	- 4	- 3	-20	4.0	-12.9
Inoucdjouac	-32	- 7	-23	-38	M	M
Maniwaki	-24	-12	-12	-41	4.2	- 8.0
Matagami A	-31	M	-19	-43	0.0	M
Mont Joli A	-18	- 7	- 7	-27	3.1	-17.7
Montréal Int'l A	-20	-11	-11	-28	1.9	-16.3
Natashquan A	-15	- 4	2	-27	3.4	-17.1
Nitchequon	-32	-10	-21	-41	5.4	- 4.3
Port Menier	-16	- 5	- 3	-24	11.7	- 4.3
Poste de la Baleine	-32	-10	-24	-41	0.0	- 7.9
Québec A	-20	- 9	-10	-29	M	M
Riviere du Loup	-19	- 8	-13	-26	M	M
Roberval A	-24	- 9	-16	-32	0.0	-17.4
Schefferville A	-28	- 6	-18	-35	22.6	12.7
Sept-Iles A	-17	- 3	- 4	-27	2.0	-18.7
Sherbrooke A	-23	-12	-11	-40	1.8	-12.7
Val d'Or A	-27	-12	-16	-39	1.4	-10.2
NEW BRUNSWICK						
Charlo A	-16	- 5	- 7	-26	0.0	-12.8
Chatham A	-14	- 5	- 5	-25	M	M
Fredericton A	-15	- 7	- 6	-23	0.2	-23.2
Moncton A	-15	- 7	- 6	-25	1.3	-23.9
Saint John A	-14	- 7	- 6	-23	0.0	-31.1
NOVA SCOTIA						
Greenwood A	-12	- 7	- 5	-20	2.4	-21.8
Shearwater A	-11	- 7	- 4	-20	0.7	-31.0
Sydney A	-11	- 6	- 2	-20	4.3	-28.1
Truro	M	M	M	M	M	M
Yarmouth A	-10	- 7	- 4	-16	10.6	-19.6
PRINCE EDWARD ISLAND						
Charlottetown	-14	- 7	- 6	-24	M	M
Summerside	-14	- 7	- 5	-22	2.2	-21.4
NEWFOUNDLAND						
Battle Harbour	-12	- 4	0	-23	M	M
Cartwright	-14	- 1	1	-26	M	M
Deer Lake	-11	- 6	- 1	-21	3.6	-17.1
Gander Int'l A	-11	- 5	- 3	-23	0.8	-25.8
Goose A	-17	- 2	1	-29	34.0	15.8
Hopedale	-15	1	- 2	-27	41.0	27.6
St. Anthony	-12	M	0	-23	M	M
St. John's A	- 9	- 5	- 1	-18	4.2	-35.5
Stephenville A	-10	- 4	1	-19	15.3	- 7.3
Wabush Lake	-26	- 6	-11	-37	7.6	- 6.4

M-Denotes missing data