



**City of Hamilton
Monthly Climate Summary
November 2013**

Table of Contents

1. General Project Information	3
2. Site Information	4
2.1 Hamilton North	
2.2 Hamilton South	
2.3 Hamilton East	
3. Monthly Climate Data	5
3.1 Monthly Climate Data Hamilton North	5-6
3.2 Monthly Climate Data Hamilton South	7-8
3.3 Monthly Climate Data Hamilton East	9-10
4. Monthly Climate Summary	11-12
5. Sources	12

1. General Project Information

Project Identification:

Name: City of Hamilton
Project Code: C11-62-09
Description: Seasonal Weather Summary

Customer:

Organization: City of Hamilton
Name of Acceptor: Bob Paul

AMEC:

Account Executive: Shawn Allan
Project Manager: Ted Zarras

2. Site Information

2.1 Hamilton North

- 2.1.1 Latitude: 43° 33' 00.000" N
- 2.1.2 Longitude: 80° 13' 00.000" W
- 2.1.3 Climate ID: 6143039
- 2.1.4 WMO ID: 71833
- 2.1.5 TC ID: TGT
- 2.1.6 Elevation: 325.0 m

2.2 Hamilton South

- 2.2.1 Latitude: 43° 10' 25.000" N
- 2.2.2 Longitude: 79° 56' 06.000" W
- 2.2.3 Climate ID: 6153193
- 2.2.4 WMO ID: 71263
- 2.2.5 TC ID: YHM
- 2.2.6 Elevation: 237.70 m

2.3 Hamilton East

- 2.3.1 Latitude: 43° 17' 30.000" N
- 2.3.2 Longitude: 79° 54' 30.000" W
- 2.3.3 Climate ID: 6153301
- 2.3.4 WMO ID: 71297
- 2.3.5 TC ID: XHM
- 2.3.6 Elevation: 102.0 m

3. Monthly Climate Data

3.1 Hamilton North November 2013

<i>Day</i>	<i>Max Temp</i>	<i>Min Temp</i>	<i>Mean Temp</i>	<i>Heat Deg Days</i>	<i>Cool Deg Days</i>	<i>Total Rain mm</i>	<i>Total Snow cm</i>	<i>Total Precip mm</i>	<i>Snow on Ground</i>	<i>Dir of Max Gust</i>	<i>Spd of Max Gust</i>
01	14.8	7.0	10.9	7.1	0.0	M	M	M		24	63
02	7.0	-1.7	2.7	15.3	0.0	M	M	M			<31
03	2.8	-7.0	-2.1	20.1	0.0	M	M	M			<31
04	4.0	-7.4	-1.7	19.7	0.0	M	M	M		14	32
05	13.0	-2.4	5.3	12.7	0.0	M	M	M			<31
06	13.6	5.6	9.6	8.4	0.0	M	M	M			<31
07	5.6	0.6	3.1	14.9	0.0	M	M	M		32	52
08	3.1	-0.3	1.4	16.6	0.0	M	M	M		32	35
09	9.1	0.6	4.9	13.1	0.0	M	M	M		27	50
10	5.9	0.5	3.2	14.8	0.0	M	M	M		30	63
11	3.9	-4.0	-0.1	18.1	0.0	M	M	M		24	41
12	-0.7	-5.7	-3.2	21.2	0.0	M	M	M		33	50
13	1.8	-5.5	-1.9	19.9	0.0	M	M	M		25	50
14	8.8	-1.6	3.6	14.4	0.0	M	M	M		25	48
15	10.4	1.8	6.1	11.9	0.0	M	M	M		23	33
16	11.1	-2.4	4.4	13.6	0.0	M	M	M			<31
17	15.4	8.6	12.0	6.0	0.0	M	M	M		23	65
18	8.6	-0.4	4.1	13.9	0.0	M	M	M		26	67
19	1.5	-7.8	-3.2	21.2	0.0	M	M	M		30	52
20	2.4	-8.5	-3.1	21.1	0.0	M	M	M		11	32
21	5.6	-2.8	1.4	16.6	0.0	M	M	M			<31
22	7.0	-2.5	2.3	15.7	0.0	M	M	M		31	56
23	-1.4	-12.4	-6.9	24.9	0.0	M	M	M		32	61
24	-6.4	-13.2	-9.8	27.8	0.0	M	M	M			<31
25	0.1	-9.6	-4.8	22.8	0.0	M	M	M		23	52
26	-0.5	-2.7	-1.6	19.6	0.0	M	M	M			<31
27	-1.0	-8.3	-4.7	22.7	0.0	M	M	M		30	39
28	-4.6	-11.7	-8.2	26.2	0.0	M	M	M			<31
29	-1.3	-13.9	-7.6	25.6	0.0	M	M	M			<31
30	1.7	-7.5	-2.9	20.9	0.0	M	M	M			<31

3.1.1 Hamilton North Monthly Averages

<i>Month</i>	<i>Average High</i>	<i>Average Low</i>
November 2013	4.7	-3.8

3.1.2 Hamilton North Climate Normals, based on NCDIA

<i>Month</i>	<i>Normal High</i>	<i>Normal Low</i>
November	7.7	0.6

3.1.3 Hamilton North Seasonal Temperature Departures

<i>Month</i>	<i>High Temperature Departure</i>	<i>Low Temperature Departure</i>
November 2013	-3.0	-2.2

3.1.4 Hamilton North Observed Precipitation (mm)

<i>Month</i>	<i>Observed Precipitation (mm)</i>
November 2013	N/A

3.1.5 Hamilton North Normal Precipitation (mm), based on NCDIA

<i>Month</i>	<i>Precipitation (mm)</i>
November	81.5

3.1.6 Hamilton North Departure from Normal (mm), based on NCDIA

<i>Month</i>	<i>Precipitation (mm)</i>
November 2013	N/A

3.2 Hamilton South November 2013

<i>Day</i>	<i>Max Temp</i>	<i>Min Temp</i>	<i>Mean Temp</i>	<i>Heat Deg Days</i>	<i>Cool Deg Days</i>	<i>Total Rain mm</i>	<i>Total Snow cm</i>	<i>Total Precip mm</i>	<i>Snow on Ground</i>	<i>Dir of Max Gust</i>	<i>Spd of Max Gust</i>
01	15.7	7.5	11.6	6.4	0.0	0.6	0.0	0.6		M	98
02	7.7	-0.6	3.6	14.4	0.0	5.0	0.0	5.0		M	33
03	-2.8	-2.8	0.1	17.9	0.0	M	M	0.0		M	M
04	4.5	-4.8	-0.2	18.2	0.0	0.0	0.0	0.0		M	35
05	12.8	-0.6	6.1	11.9	0.0	0.0	0.0	0.0		M	41
06	14.8	7.5	11.2	6.8	0.0	10.2	0.0	10.2		M	63
07	7.5	1.0	4.3	13.7	0.0	1.0	0.0	1.0		M	50
08	4.6	0.1	2.4	15.6	0.0	0.0	T	T		M	52
09	10.7	-0.3	5.2	12.8	0.0	1.0		1.0		M	59
10	7.7	0.0	3.9	14.1	0.0	T	0.0	T		M	74
11	7.7	-2.9	2.4	15.6	0.0	2.4	T	2.4	0	M	56
12	1.1	-5.5	-2.2	20.2	0.0	0.0	0.0	0.0		M	50
13	3.5	-6.5	-1.5	19.5	0.0	0.0	T	T		M	72
14	8.6	0.5	4.6	13.4	0.0	0.0	0.0	0.0		M	70
15	11.6	3.2	7.4	10.6	0.0	0.0	0.0	0.0		M	52
16	12.7	2.6	7.7	10.3	0.0	0.0	0.0	0.0		M	33
17	16.3	10.3	13.3	4.7	0.0	11.2	0.0	11.2		M	85
18	10.3	0.8	5.6	12.4	0.0	0.4	T	0.4		M	82
19	4.1	-4.8	-0.4	18.4	0.0	T	0.0	T		M	46
20	3.1	-5.9	-1.4	19.4	0.0	0.0	0.0	0.0		M	39
21	6.3	-1.8	2.3	15.7	0.0	4.6	0.0	4.6		M	37
22	7.7	-1.7	3.0	15.0	0.0	4.6	0.0	4.6		M	52
23	-0.6	-9.9	-5.3	23.3	0.0	0.6	T	0.6	0	M	65
24	-3.7	-11.6	-7.7	25.7	0.0	0.0	T	T	0	M	44
25	1.0	-8.5	-3.8	21.8	0.0	0.0	T	T		M	59
26	0.1	-1.5	-0.7	18.7	0.0	0.0	2.0	1.6	0	M	37
27	-0.5	-9.1	-4.8	22.8	0.0	0.0	4.6	4.6	5	M	41
28	-3.0	-12.4	-7.7	25.7	0.0	0.0	1.0	1.0	5	M	<31
29	-3.1	-10.4	-6.8	24.8	0.0	0.0	0.0	0.0	6	M	<31
30	1.8	-8.9	-3.6	21.6	0.0	0.0	0.0	0.0	6	M	35

3.2.1 Hamilton South Monthly Averages

<i>Month</i>	<i>Average High</i>	<i>Average Low</i>
November 2013	5.8	-2.6

3.2.2 Hamilton South Climate Normals, based on NCDIA

<i>Month</i>	<i>Normal High</i>	<i>Normal Low</i>
November	7.0	-0.4

3.2.3 Hamilton South Temperature Departure from Normal

<i>Month</i>	<i>High Temperature Departure</i>	<i>Low Temperature Departure</i>
November 2013	-1.2	-2.2

3.2.4 Hamilton South Observed Precipitation (mm)

<i>Month</i>	<i>Observed Precipitation (mm)</i>
November 2013	48.8

3.2.5 Hamilton South Normal Precipitation (mm), based on NCDIA

<i>Month</i>	<i>Precipitation (mm)</i>
November	78.6

3.2.6 Hamilton South Precipitation Departure from Normal (mm), based on NCDIA

<i>Month</i>	<i>Precipitation (mm)</i>
November 2013	-29.8

3.3 Hamilton East November 2013

<i>Day</i>	<i>Max Temp</i>	<i>Min Temp</i>	<i>Mean Temp</i>	<i>Heat Deg Days</i>	<i>Cool Deg Days</i>	<i>Total Rain mm</i>	<i>Total Snow cm</i>	<i>Total Precip mm</i>	<i>Snow on Ground</i>	<i>Dir of Max Gust</i>	<i>Spd of Max Gust</i>
01	16.7	8.8	12.8	5.2	0.0	M	M	1.7		26	63
02	8.9	1.0	5.0	13.0	0.0	M	M	3.3			<31
03	3.5	-5.1	-0.8	18.8	0.0	M	M	0.0			<31
04	5.7	-5.9	-0.1	18.1	0.0	M	M	0.0			<31
05	14.8	-2.0	6.4	11.6	0.0	M	M	0.0			<31
06	16.3	8.2	12.3	5.7	0.0	M	M	10.5		33	43
07	8.3	2.8	5.6	12.4	0.0	M	M	0.0			<31
08	6.2	1.2	3.7	14.3	0.0	M	M	0.0		28	35
09	11.6	0.6	6.1	11.9	0.0	M	M	0.0		26	46
10	9.1	1.5	5.3	12.7	0.0	M	M	0.0		29	54
11	7.5	-1.6	3.0	15.0	0.0	M	M	0.3		26	44
12	2.8	-4.2	-0.7	18.7	0.0	M	M	0.0		32	37
13	4.2	-4.1	0.1	17.9	0.0	M	M	0.0		25	44
14	10.2	1.1	5.7	12.3	0.0	M	M	0.0		27	50
15	12.8	4.9	8.9	9.1	0.0	M	M	0.0		24	35
16	13.9	1.1	7.5	10.5	0.0	M	M	0.0			<31
17	18.0	7.7	12.9	5.1	0.0	M	M	11.3		26	56
18	11.8	2.0	6.9	11.1	0.0	M	M	0.0		26	63
19	4.9	-5.0	-0.1	18.1	0.0	M	M	0.0		30	37
20	3.7	-5.6	-1.0	19.0	0.0	M	M	0.3		6	33
21	7.5	-3.2	2.2	15.8	0.0	M	M	1.8			<31
22	8.4	-0.2	4.1	13.9	0.0	M	M	2.6		30	41
23	1.0	-9.6	-4.3	22.3	0.0	M	M	1.0		33	52
24	-3.4	-10.9	-7.2	25.2	0.0	M	M	0.0		28	32
25	2.1	-8.3	-3.1	21.1	0.0	M	M	0.0		23	43
26	0.9	-0.4	0.3	17.7	0.0	M	M	2.9			<31
27	1.0	-6.3	-2.7	20.7	0.0	M	M	0.3		31	32
28	M	M	M	M	M	M	M	M		M	M
29	-1.2	-9.7	-5.5	23.5	0.0	M	M	0.0			<31
30	3.0	-7.6	-2.3	20.3	0.0	M	M	0.0			<31

3.3.1 Hamilton East Monthly Averages

<i>Month</i>	<i>Average High</i>	<i>Average Low</i>
November 2013	7.3	-1.7

3.3.2 Hamilton East Climate Normals, based on NCDIA

<i>Month</i>	<i>Normal High</i>	<i>Normal Low</i>
November	7.7	0.6

3.3.3 Hamilton East Seasonal Temperature Departures

<i>Month</i>	<i>High Temperature Departure</i>	<i>Low Temperature Departure</i>
November 2013	-0.4	-1.1

3.3.4 Hamilton East Observed Precipitation (mm)

<i>Month</i>	<i>Observed Precipitation (mm)</i>
November 2013	N/A

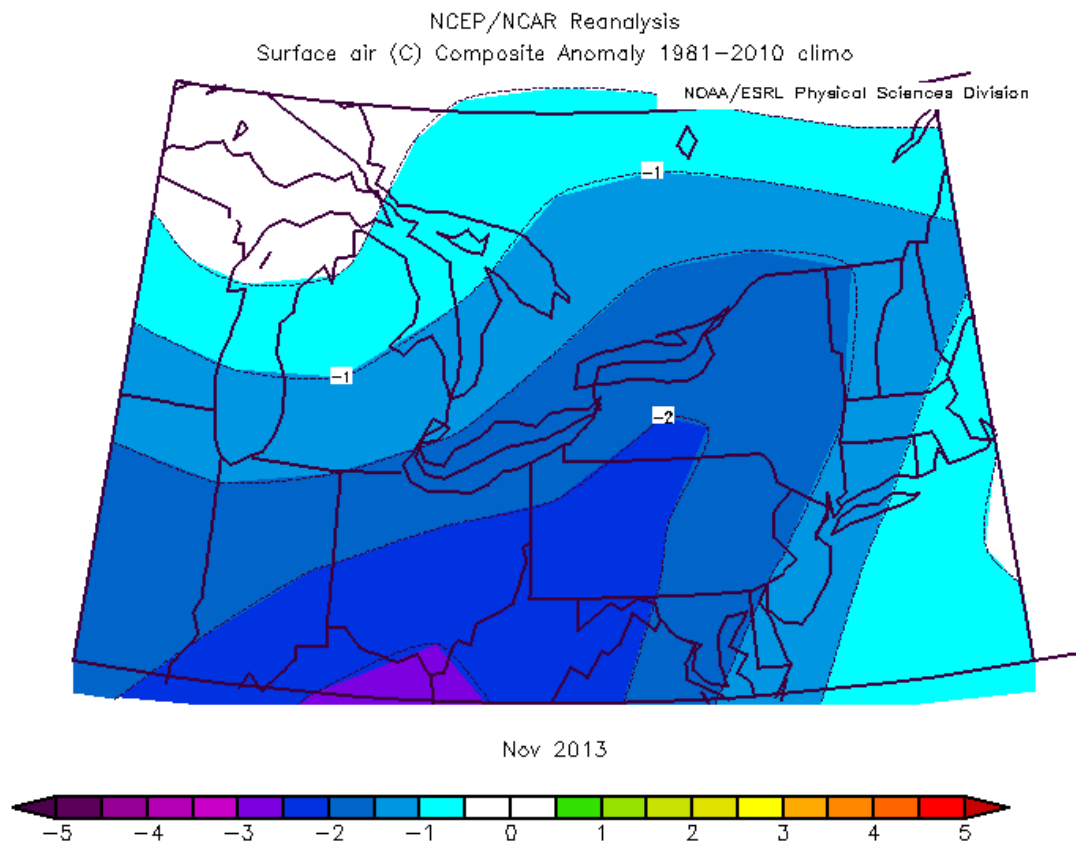
3.3.5 Hamilton East Normal Precipitation (mm), based on NCDIA

<i>Month</i>	<i>Precipitation (mm)</i>
November	81.5

3.3.6 Hamilton East Departure from Normal (mm), based on NCDIA

<i>Month</i>	<i>Precipitation (mm)</i>
November 2013	N/A

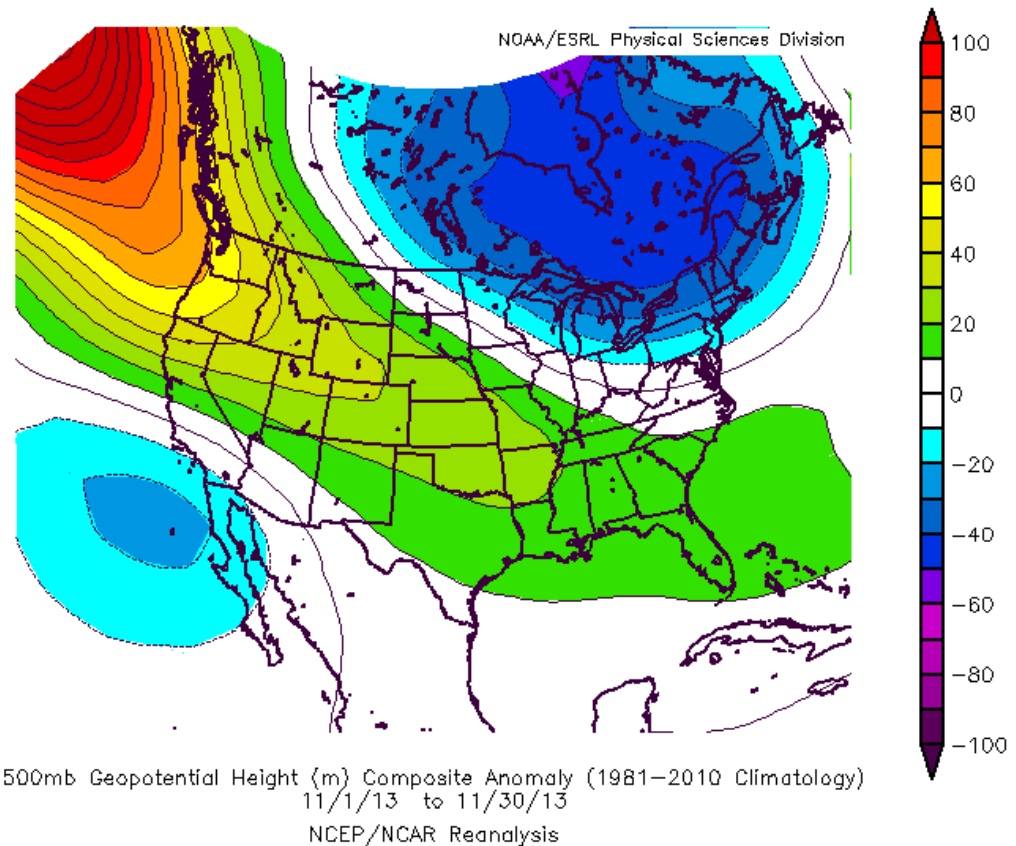
4. Monthly Climate Summary



Temperature Anomalies November 2013

Monthly temperatures over November 2013 across the Hamilton Region were below normal by as much as 3.0 degrees Celsius for Hamilton North. A core of minus 4.0 degree Celsius below average temperatures stretched from western Texas across the Gulf Coast States and into the Mid-Atlantic States. From Lake Superior eastward the nose of this cold anomaly core spread into New York State with coastal regions of Lake Erie and Ontario across southern Ontario seeing temperature departures of 1.0 to 2.0 degrees Celsius.

It should be noted that much of the northern hemisphere remained in what's known as a "blocking pattern" over the month. Anomalous high pressure remained in place over the Pacific (a "blocking ridge") and troughs of low pressure, one over Hudson Bay and another over southern Europe, flanked a region of high pressure south of Iceland creating an "Omega Block"; all features combined of the latter and the resultant air flow form the Greek letter Omega hence the name. A byproduct of atmospheric blocking is steady wind direction or "flow" into a particular region. This was the case for Hamilton as further described below.



500mb Geopotential Height Anomalies (approximately 5500 metres) November 2013

As discussed, an amplified ridge of high pressure across the northern Pacific centered over the Aleutian Islands remained in place for much of the month. Conversely a persistent trough of low pressure remained in place over Hudson Bay. The resultant pressure gradient and atmospheric flow produced northwesterly winds for much of the month, which transported successive shots of cold air from the northwest southeastward across the region. Due to the shallow nature of the cold air, much continued to flow well past Southern Ontario, producing the coldest anomalies across the Gulf Coast and Southeastern States. Precipitation values were near average to slightly below for the Hamilton region with a broad region of above average precipitation across the western nickel belt region due to several days of Lake Effect snow in cold westerly winds.

5. Sources

- 5.1 Climate Prediction Center
<http://www.cpc.ncep.noaa.gov/>
- 5.2 Earth System Research Laboratory
<http://www.esrl.noaa.gov/>
- 5.3 National Climate Data and Information Archive
http://climate.weatheroffice.gc.ca/Welcome_e.html