

Fact Sheet - Summer Severe Weather Warnings

Summer in Ontario. Time to pack the sunscreen, sunglasses, umbrella, sweater and rain jacket for a day's outing.



The province's climate in the summer features a steady progression of fair and unsettled weather. This is the result of the movement of two air masses - the dry air from

Canada's West and Northwest and the muggy air from the American South and Southwest. When the boundaries or fronts of these two air masses meet some spectacular thunderstorms may erupt.

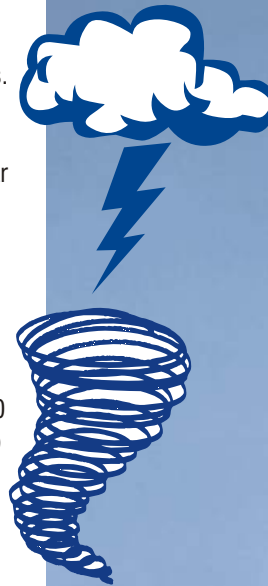
Thunderstorms develop in an unstable atmosphere. They form when warm, moist air near the ground rises and cools in the colder air above. The moisture in the air condenses to form rain droplets, ice crystals and hail in dark thunder clouds called cumulonimbus clouds.

Thunderstorms frequently occur on a warm, humid summer afternoon, but may develop at any time of the day or night. They usually form quickly and travel rapidly. The storm which struck Southwestern Ontario on July 14, 1997 is a classic example. In mid-afternoon, the weather radar screens at Environment Canada showed no rain at all. Twenty minutes later, a severe thunderstorm formed near Punkeydoodles Corners —

between Kitchener and Stratford. In a few hours the storm dropped more than 200 millimetres (mm) of rain. Winds of more than 115 kilometres an hour (km/h) uprooted trees and flipped over small aircraft as far east as Guelph.

Lakes and the local terrain may affect the intensity, duration and motion of thunderstorms. For example, when storms rise over a hill or ridge, they often become stronger, only to weaken again as they go down the other side of the slope. In mid-summer, storms may be triggered when the cool lake breezes blowing off the Great Lakes meet the hotter air farther inland. This is one of the reasons why the region from Windsor and Sarnia to Barrie is at a higher risk for tornado formation.

Occasionally, a large storm system consisting of a deep low pressure area and a strong cold front will focus all these factors into an organized line of severe thunderstorms. This is what happened on May 31, 1985 when 11 tornadoes crossed Southern Ontario, killing 12 people and causing more than \$150 million dollars in damage.



Summer Weather Ontario Region

Severe Thunderstorms - A breed apart: Only a small percentage of the thunderstorms which rumble through Ontario unleash enough energy to produce severe weather such as heavy rain, high winds, hail or tornadoes.

Tornadoes - Usually form in hot, humid weather and often, but not always, in the afternoon or early evening. Thunderstorms that produce tornadoes are called tornadic thunderstorms. They usually develop in the warm, humid air near the fronts or the boundaries between air masses. These thunderstorms may be extremely dark with the clouds taking on a pea green hue at the bottom. People who have had close calls with tornadoes have described their sound as similar to that of a freight train.

Tornadoes are wind funnels which stretch down from the bottom of a thunderstorm to touch the ground. The bottom end of a tornado may range in width from a few metres to two kilometres (km). Most tornadoes in Ontario have wind speeds of 100 to 180 km/h, although a few, such as the Barrie Tornado of May 31st, 1985, have wind speeds of 400 km/h. Tornadoes move at the speed of the parent thunderstorms, which may be from 20 km/h to 80 km/h, and usually from the southwest to the northeast. Tornadoes tend to be erratic and may bounce from spot to spot or change course suddenly.

Over the past 10 years, Ontario has had an average of 14 reported tornadoes a year. Most of these were in Southern Ontario. Many tornadoes in Northern Ontario are not reported because there are fewer people in the region. About 90 per cent of all tornadoes in Ontario register as F0 or F1 on the Fujita Scale. Only one to two per cent of the tornadoes are F3. The tornadoes which struck on April 20, 1996 in Grey, Dufferin and Wellington counties were F3 tornadoes. The Barrie Tornado of May 31st, 1985 and the Edmonton Tornado of July 31st, 1987 were both rated as F4 on the Fujita scale. In the United States some tornadoes are F5s with winds of more than 500 km/h.

The Fujita Scale rates the intensity of tornadoes.

Scale	Wind Speed	Damage
F0	up to 116 km/h	TV antennae bent, siding removed
F1	117-180 km/h	Barn roofs ripped off, summer cottages taken off their foundations
F2	181-252 km/h	Barns and silos demolished, farm wagons and other farm equipment picked up and moved Roofs removed from homes, house trailers demolished
F3	253-331 km/h	Upper storeys of brick houses destroyed, outer walls removed from most houses
F4	332-418 km/h	Two-storey brick houses almost destroyed, cars and vans carried long distances
F5	419-512 km/h	Little remains

Hail - Hail forms when updrafts carry raindrops upwards into the cold areas of the thunderstorm, which may reach heights of up to 20 km. Here the raindrops freeze. The powerful winds bounce the hail stones around while new layers of ice are added by raindrops which are moving upwards. When the updrafts are no longer able to support the hail stones, they fall to the ground. Some hail stones are so hard they can bounce off a sidewalk at 100 km/h without breaking.

Largest Canadian hail stone weighed 290 grams and measured 114 mm across. It fell in Cedoux, Saskatchewan on August 27, 1973.



Obtaining Summer Weather Information

Environment Canada provides summer weather information to the public through local radio and television stations, our Weatheradio network and our weather Web site. <http://www.weatheroffice.ec.gc.ca>

In addition, specific weather information may be obtained directly through an Environment Canada meteorologist via the 1-900 user-pay telephone service Weather-One-on-One 1-900-565-5555. For information on climate and past weather records, you can also refer to Environment Canada's climate Web site. <http://www.climate.weatheroffice.ec.gc.ca>

If you require an official past weather report or more information you can call the user-pay 1-900 climate number called ClimateSource at 1-900-565-1111 or send an e-mail to ontario.climate@ec.gc.ca and someone from the Ontario Climate Centre will respond to your request.

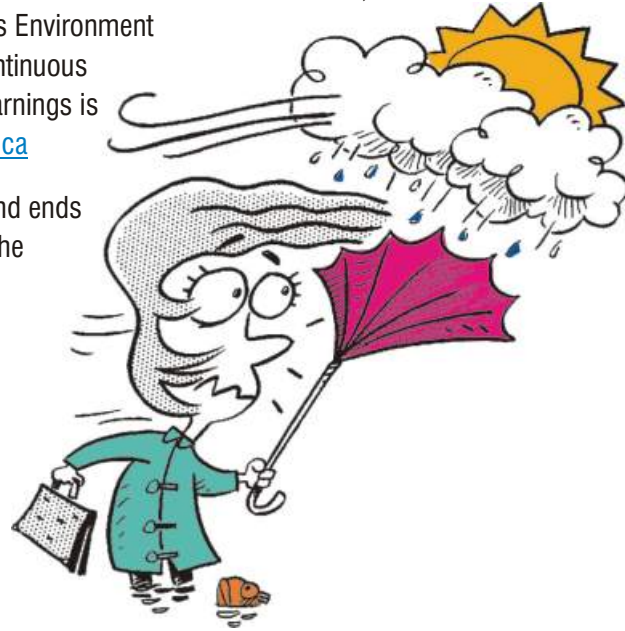
The Ontario Ministry of the Environment's Air Quality Index Program provides daily air quality bulletins for sites across Ontario. These bulletins are available through the media, recorded messages at 1-800-387-7768 and the Internet <http://www.airqualityontario.com>.



Summer Watches and Warnings

When severe weather approaches, Environment Canada warns you so that you have enough time to protect your family and to make weather wise decisions. The Ontario Storm Prediction Centre alerts you by issuing Special Weather Statements, Severe Weather Watches and Severe Weather Warnings on local and regional radio and television stations. In addition, Watches and Warnings are also broadcast in real time on Weatheradio. This is Environment Canada's network of low-powered VHF-FM radio stations which transmit a continuous stream of weather reports. Access to Environment Canada's Watches and Warnings is also available through our weather Web site. <http://www.weatheroffice.ec.gc.ca>

Environment Canada's Summer Severe Weather Program starts in mid-April and ends in mid to late October in Southern Ontario and starts in mid-May and ends at the beginning of October in Northern Ontario.



Special Weather Statements

In Ontario, Environment Canada issues Special Weather Statements for four reasons during the summer:

- To tell you in general terms what areas of the province may have thunderstorms during the day, especially those where the storms may become severe. These Weather Statements are issued every morning and afternoon during the peak thunderstorm season of May to September.

OR

- To tell you when a weather system that may cause you some inconvenience is approaching. Such a system may produce torrential rains or strong winds but the rainfall and wind gusts may not reach Environment Canada's criteria for a Severe Weather Warning. Such a system may also bring unusual weather like thick fog. This type of Weather Statement is issued 12 to 24 hours in advance.

OR

- To give you a summary of the day's weather, especially when severe thunderstorms have caused damage in several areas.

OR

- There are occasions when no Warnings or Watches are in effect or required in Ontario, but the United States Weather Service has issued Warnings for states directly bordering the province. In those instances, Environment Canada may issue a Special Weather Statement to keep Canadians along the border apprised of the situation.

Severe Weather Watches

Environment Canada issues Severe Weather Watches as a heads up. They tell you that severe weather is likely to develop. The lead time is normally two to six hours. Thunderstorms, however, often form quickly so the lead times may be less than two hours.

All Watches are either updated or ended. If you hear that a Storm Watch has been issued, please watch the skies and listen to your local Canadian radio or television station, Environment Canada's Weatheradio broadcasts or check out our weather Web site for more information.

There are two types of Watches:

- A Severe Thunderstorm Watch is issued when weather conditions indicate the likely development of thunderstorms, some of which may become severe.
- A Tornado Watch is issued when severe thunderstorms are expected to develop and there is a possibility that one or more may spawn tornadoes.



Severe Weather Warnings – Environment Canada issues Severe Weather Warnings only when severe weather is occurring or is about to occur. The weather service tries to provide lead times of 15 minutes to two hours. Environment Canada usually issues Watches first, then Warnings. In some situations, however, when severe thunderstorms develop quickly, the weather service skips the Watch stage and issues Warnings directly.

Severe Thunderstorm Warnings	When one or more of the following is expected to occur: - wind gusts of 90 km/h or more, - hail of two centimetres (cm) in diameter or larger, - rainfall of 50 mm or more within one hour or 75 mm or more within three hours.
Tornado Warning	When a tornado has been reported or when the weather service forecasts that a tornado is likely to form and touch down.
High Wind Warning	When winds are forecast to reach sustained speeds of 60 km/h or more for three hours or more and/or when wind gusts of 90 km/h or more are expected.
Rainfall Warning	When 50 mm or more of rain is expected to fall within 12 hours.

Weather Advisories – Finally, Environment Canada issues two types of Advisories to tell you that the air pollution or the combination of the heat and humidity may affect your well-being.

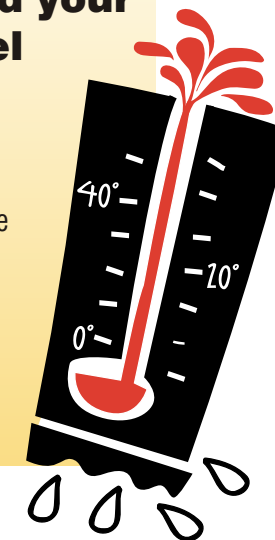
- Air Quality Advisory is issued when air quality is expected to be poor. An Advisory is issued when the Air Quality Index is expected to reach or exceed 50. These Advisories are issued in co-operation with the Ontario Ministry of Environment, the operator of the Air Quality Index Program.
- Humidex Advisory is issued when temperatures are expected to reach or exceed 30° C and the humidex values are expected to reach or exceed 40. Humidex values represent the effect which high humidity and high temperatures have on the human body. The higher the humidex, the harder it is for perspiration to evaporate and cool the body.



Humidex and your comfort level

- 20 - 29 Comfortable
- 30 - 39 Varying degrees of discomfort
- 40 - 45 Almost everyone is uncomfortable
- 45+ Many types of work and exercise should be restricted.

A heat wave is defined as three or more consecutive days of temperatures of 32°C or more.



Lightning hits the CN Tower in Toronto about 70 times a year.

did you know?

The worst heat wave in Ontario was in July 1936. Temperatures hit 42.2°C in Atikokan and Fort Frances.

In Canada, lightning kills, on average, six to 12 people each year.