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LIVING

Warming up to climate change

Early signs of a shift in temperature are creeping into the Kawarthas

As I sit down to write this column, the temperature outside is 14C. The normal for this time of year is 0C. Our outdoor Christmas planter is looking pretty out of place, to say the least. No longer is the weather or the dates of events in nature as predictable as they used to be. Climate change is changing everything.



DREW MONKMAN

OUR CHANGING SEASONS

Yes, it's true that the weather in central Ontario has always surprised us. Changeability is probably the most important characteristic of our region's climate. However, the erratic nature of the weather that is now the norm - warmer than usual temperatures almost every month, severe wind storms, and either extreme precipitation or near-drought - can no longer be explained by normal variability. According to a new study led by prominent climate scientist, James Hansen of NASA, extreme weather phenomena such as extremely hot summers have become far more common than would ever have happened without the build-up in heat-trapping greenhouse gases from human activities. In other words, the chances these extreme weather events would have happened naturally - without climate change - is negligible.

This week, I'd like to look at how climate change is already affecting the Kawarthas and what is likely in store for us in the future. However, before doing so, let's take a quick look at the bigger picture. We are now getting a clear sense of what climate change looks like.

- 2000 - 2009 was the warmest decade on record.
- Earth recorded its warmest September on record this year, tying with 2005 for the title. It was the 36th straight September with a global temperature above the 20th-century average.
- The 12-month period from October 2011 through September 2012 was the warmest on record in the U.S. During this time, the U.S. experienced its worst drought in half a century.
- The loss of Arctic sea ice in the area around the North Pole reached a new record low this year. It covered an area larger than the entire United States.
- Carbon dioxide emissions in 2012 are projected to be the highest on record.
- Some scientists believe that the horrific damage caused by Hurricane Sandy was made worse by the rise of sea level, itself a result of melting ice sheets in Greenland and Antarctica. The unprecedented melting of Arctic ice, too, may also have lead to a kind of "atmospheric traffic jam" that drove Sandy inland.

Despite all of the above, climate change remained a taboo topic in the U.S. election. For our own federal government, it could not be less of a priority, either. In fact, the right wing agenda is openly hostile to the subject. And, even though the annual UN climate talks are taking place in Doha, Qatar this week, most media seem to be ignoring the event.

How is a changing climate affecting the Kawarthas? What is in store in the longer term? First of all, it's important to note that most of the impacts are only beginning to be felt. We are seeing them mostly in the shoulder seasons of late fall and early spring - the starkest example being last March when summer-like conditions prevailed. However, there are other trends right before our eyes. One has to look no further than the mean monthly temperatures recorded in Peterborough over the past two years. During this period, 21 of the 24 months have been milder than the 1971 to 2000 average. The monthly means last winter were a full 4C to 7C above the long-term average. This is an astounding difference.

There are also a number of changes that local naturalists have been noticing in recent years. Frogs are calling earlier, some of our trees and wildflowers are blooming well ahead of normal dates and species that used to be restricted to extreme southern Ontario such as opossums and giant swallowtail butterflies are turning up in the Kawarthas with increased frequency.

Some of these changes are now being confirmed by science. Researchers from the Ontario Ministry of Natural Resources and Bird Studies Canada have found that warming spring temperatures are indeed advancing the peak calling of frog species that breed early in the year but not the later breed-

ers. The authors found that peak calling of leopard frog, spring peeper, and wood frog became earlier by roughly 10-20 days between 1995 and 2008.

So, what can we expect in the future? According to research that the Union of Concerned Scientists has published on climate change in the Great Lakes region, southern Ontario's climate will grow considerably warmer and probably drier during this century, especially in the summer. Average temperatures are expected to rise this century from 4C to 8C in summer and 3C to 7C in winter. Extreme summer heat, too, will be more common, as will the frequency of major storms. Although little change in annual average precipitation is expected, seasonal shifts are likely to occur. The overall increase in temperature may mean that Ontario will see drier soils and more droughts. Seasonally, winter precipitation is expected to increase by 10 to 30% while summer precipitation is expected to remain the same. The growing season in southern Ontario could be four to seven weeks longer, as well. The on-going decline in ice cover on the Great Lakes and inland lakes is also expected to continue.

Forests, in particular, will be impacted as the climate warms. There will probably be a reduction in the overall health of the forests because of more frequent droughts and forest fires. Insect damage is projected to get worse, too, as a result of the hotter and drier summer conditions and the milder winters. The northern limit of some devastating forest pests, such as the gypsy moth, is currently determined by cold winter temperatures. These insects will almost certainly become more widely established throughout the region in a warmer climate. We may have had an example of this phenomenon this past summer. There was speculation that the high number of West Nile virus cases in the U.S. and Canada was linked to the mild winter we had and the possibility that *Culex pipiens* mosquitoes - the species that carries the virus - survived the winter in greater than usual numbers.

Diversity in bird species is likely to be affected by a warming climate. Resident birds like black-capped chickadees will be able to breed earlier and raise more young. However, increased resident bird populations could reduce the food and other resources available to migratory species. Another fear is that the spring population boom of insects - the most critical source of food for nestlings - may occur before tropical migrants return in the spring. This could lead to a serious reduction in the number of young raised.

As for mammals, nuisance species such as raccoons and skunks will probably benefit from milder winters. The already prolific white-tailed deer may also fare well, since this species is not really adapted to traditional Canadian winters to begin with. Moose, on the other hand, could be negatively affected, not only by the warmth but also by increased levels of deer-carried parasites such as brainworm, which kill moose.

As lake and stream habitats warm up, native fish communities could change fundamentally, too. Cold-water species such as lake trout and brook trout will have a much harder time surviving. In the case of lake trout, one concern is that climate change will lead to an increase in water temperature that may cause the eggs to hatch earlier than usual. The fry may then become active in mid-winter when there is no food available and consequently starve to death. The outlook is not good for wall-eye, either.

A changing climate is likely to favour non-native invasive animals and plants with generalized requirements over native species with more specialized needs. This will likely compound the impacts of climate change in aquatic ecosystems. Zebra mussels and common carp, for example, may expand their range northward and, along with the introduction and spread of other invasive species, fundamentally change native fish communities. Invasive plants such as dog-strangling vine and Phragmites grass are expected to flourish, too. Both are increasingly common in the Kawarthas.

All of these changes will have an important impact on how it "feels" to live in the Kawarthas. One can't help but wonder for how much longer we'll be able to depend on the seasonal rituals we've kept for so long. Although the hour is late, we can't give up the fight to convince politicians - and our families, friends, and neighbours who elect them - to take aggressive action on cutting greenhouse gas emissions. Climate change is real and it's happening now. We can disagree about how to handle it,



Wickimedia photo

The Virginia opossum is among several species that have begun to appear in the Kawarthas as temperatures get warmer.

and how much those policies might cost, but we are far past the point of arguing about the science.

For more information, I would recommend visiting the Center for Climate and Energy Solutions (C2ES) website at

www.pewclimate.org This site covers all aspects of the global debate on climate change, including the basic science involved, a Kids Corner, and realities versus misconceptions about the cause of climate change.

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