

The Parish of St. Mary York

Faith in Action

Building hope for tomorrow in the face of climate change

Climate Change Parish Primer: What is Climate Change?

Guest Author: Mike Howe

The extreme weather events of this past summer, such as the western wildfires and the British Columbia heat event, have both magnified the impact of climate change, and increased the interest in the subject for many Canadians, including members in our parish. This has brought forward many questions and concerns about the role of climate change and the impact on ourselves, our families, and the environment in which we live. Many folks are just asking, **what is going on?**

This five-part “parish primer” will provide a simple overview into the science behind, and the evidence for climate change. It will talk about some of the impacts that are happening now, and those that are most likely to occur over the coming years, both globally and here at home.

When trying to explain climate change, perhaps the best way to start is to clarify what it is not.

First, it's important to note that **climate change is not weather**. Weather refers to the short-term changes (such as rain, snow and sun) that “Mother Nature” delivers on an hourly, daily or weekly basis.

Climate Change is also not global warming. This was a term used many years ago to describe the impact of climate change. In fact, global warming is only one of several impacts of climate change.



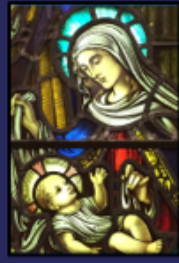
Climate Change actually refers to **any change in climate over time** – whether due to natural variability or as a result of human activity.

At this point, the evidence to support climate change is overwhelming. About 97% of the world's climate scientists have concluded that climate change is happening, and that it is caused by human activity.¹

So now we have defined what climate change is, next time we will discuss the basics of the science that explain climate change.

For further reading

¹ Global Climate Change: Vital Signs of the Planet – NASA <https://climate.nasa.gov/scientific-consensus/>



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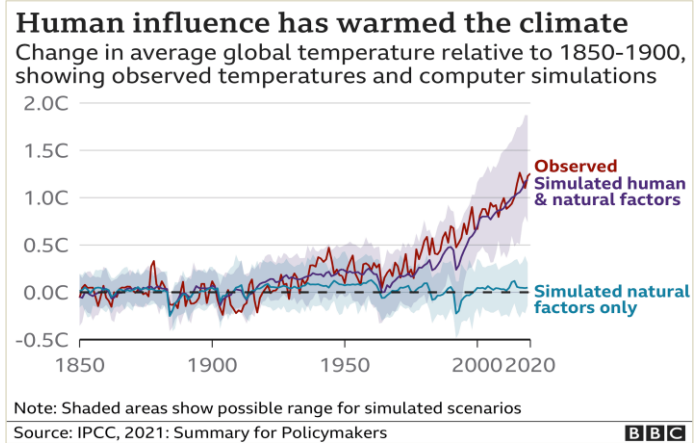
The Science of Climate Change

Guest author: Mike Howe

The earth has gone through alternating periods of accelerated warming and cooling over the past 4.6 billion years. Ice core samples, trees, coral, and rocks all provide us with forensic evidence that such changes have been occurring since earth's creation.

So why are we so concerned now when these changes have been occurring since the beginning of time? The fact is that the earth's "global temperature" has been rising at an accelerated rate since the advent of the use of fossil fuels (coal, oil and gas) to support the Industrial Revolution in the 1700s. This is caused by increased levels of pollutants, primarily carbon dioxide, introduced into the atmosphere from fossil fuel combustion.

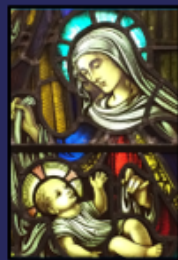
Carbon dioxide has the ability to absorb and re-emit infra-red radiation, which in turn warms the lower atmosphere (similar to a greenhouse). Carbon dioxide has resulted in a global temperature increase of approximately 1°C with over half occurring since the mid 1970's². This has been confirmed through observations such as ice core evaluations, surface observations and satellite measurements.



Temperature increases in the past were driven by naturally occurring volcanic activity, changes to the earth's orbit around the sun and other natural causes. But this is not currently the case.

Many countries, including Canada, have signed the Paris Agreement, an international agreement on climate change, whose objective is to cap global warming at 1.5°C³. This temperature is considered to be "the point of no return" or irreversible. Climate simulations, to-date, have been exceptionally accurate with the temperature forecast. If global action is not successful, earth's "thermometer" will cross the 1.5°C threshold in the 2040's if not sooner!

In my next article we will have a look at the global impact of climate change and what we can likely expect over the coming years.



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Climate Change: Impact on Creation

Guest author: Mike Howe

Mother Earth blessed us with a balance in temperature, allowing most of the world's population to live in the "Goldilocks zone" – not too hot, not too cold, but just right to sustain and nurture our existence.

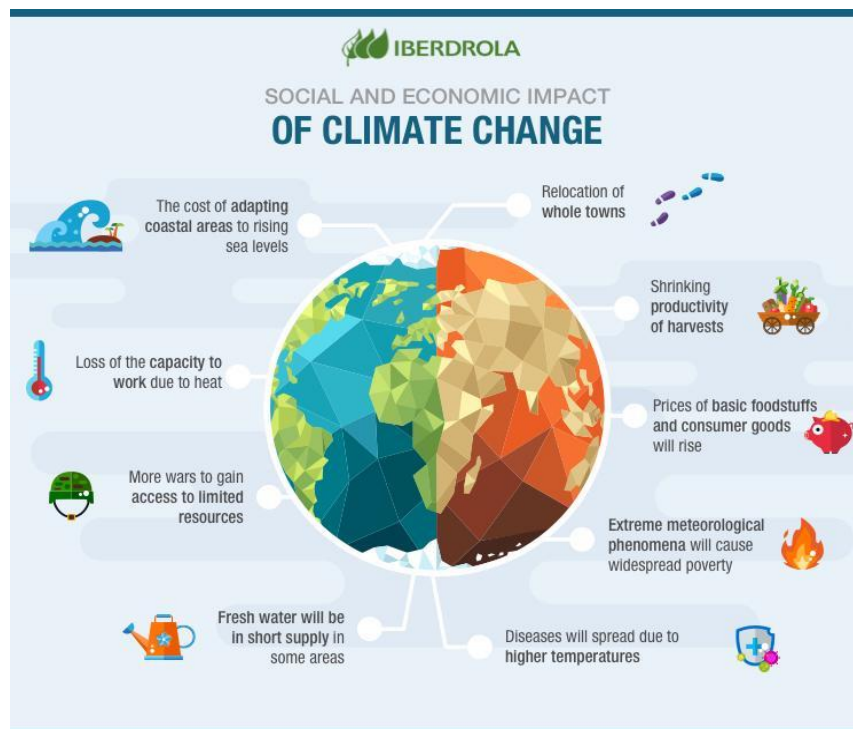
Climate change means that the earth / ocean / atmosphere system is continually trying to adapt to maintain that balance. Some of the large-scale changes that are occurring as a result include:

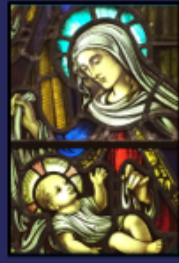
- **Melting permafrost in the Arctic.** Permafrost binds soil, rock and sand in the ground with ice. As it thaws, previously frozen organic matter in the ice decomposes, releasing gases such as methane and carbon dioxide.
- **Amazon deforestation.** This is concerning as trees absorb carbon dioxide which help the earth to maintain itself in equilibrium.
- **Warming oceans.** This results in reduced levels of oxygen dissolved in the water, and increasing levels of acidity, and has negative impacts on marine life and the ocean ecosystem.
- **Melting glacier ice.** Glaciers are disappearing at an alarming rate. This leads to sea-level rise, a major issue for coastal areas.

The earth has proven to be rather resilient and continually attempts to adapt to these changes, both natural and man-made, but we are rapidly approaching the breaking point.

In the next articles, I'll explain some of the changes we are seeing closer to home: in Canada and in NB.

We have been truly blessed with the creation God has provided. As caretakers of the Lord's creation, it is up to each and every one of us to do our share to manage "this home" that he has provided.





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Climate Change: Oh Canada!

Guest author: Mike Howe

So far, we've looked at the global effects of climate change. What changes are we seeing in Canada, and what can we expect in the future?

- Longer and hotter summers bringing more heat waves and wildfires
- Higher temperatures cause increased evaporation and more droughts
- Increase in severity of weather events such as hurricanes, heavy rainfall, and snowfall
- Increased coastal and inland flooding due to sea-level rise and heavy precipitation events
- Changing vegetation as our traditional coniferous (evergreen) forest continues to move northward and is replaced by deciduous tree canopy.

Changing vegetation is not only about the trees. This will impact those creatures that are dependent on this type of vegetation for food and shelter. The ultimate impact of these changes will depend on how successfully species can adapt to the "new normal."

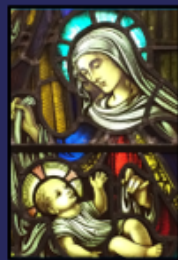
Climate change places increasing pressure on all living creatures to be able to adapt. Certain species, such as human beings, are more readily able to adapt than others. Those who are unable will be challenged to survive.

The great Canadian icon, the polar bear, for example, is facing an uncertain future due to dwindling sea ice in its Arctic habitat. Longer, warmer summers are causing much of the Arctic Ocean to be ice-free for extended periods of time, decreasing the bears' access to their primary food source – seals. Consequently, the bears are forced to spend more time foraging on land, where they are at risk of coming into conflict with humans.

Not only will the animals have to adapt, but it is also likely that Canada will experience an increase in human refugees, as climate change causes their countries to become increasingly inhospitable.

In my final article of this series, I will be discussing some of the likely impacts, specifically for New Brunswick and in particular Fredericton.





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Climate Change: Up Close and Personal

Guest author: Mike Howe

Our local climate is not immune from the pressures of a changing climate. It already has made changes in our Fredericton climate, and these changes will continue:

- Wetter springs and winters¹¹ – we can expect an average 12% increase in precipitation
- Warmer summers (a lot warmer!):
 - The number of days with the temperature 30°C or higher is expected increase from approximately 8 per year to as many as 63 per year!
 - The number of nights with the temperature 20°C or higher is expected to increase from an average of 1 per year to as high as 30 per year!
- Extended growing season:
 - We can expect an increase from 141 days up to 213 days
- Increase in the frequency of severe weather events such as heavy rainfall, snowfall, freezing rain, and wind
- Increased pressure on urban infrastructure to mitigate urban flooding due to heavy rainfall
- Even with an increase in average temperature and longer summers, we will still require our reliable snow blowers, as snowstorms are likely to be more severe.

Canada and Fredericton have both been truly blessed with what God has provided us. As caretakers of the Lord's creation, it is up to each and every one of us to do our share to manage "this home" that he has provided.



¹ Climate Atlas of Canada <https://climateatlas.ca/>