

CLIMATE CHANGE

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THE GLOBAL REALITY OF A CHANGING CLIMATE

Did you know that the ten warmest years since 1880 have all been in the 1980s or 1990s? The evidence proves that the global climate has warmed during the past 150 years. The increase in temperature has not been constant; rather it has occurred during warming and cooling cycles at intervals of several decades. Still, the long-term trend is one of net global warming.

Climate change scientists believe that these changes are caused, at least in part, by human activities. They note that by burning fossil fuels, humans are increasing atmospheric

concentrations of carbon dioxide, methane, nitrous oxide and other gases with the ability to insulate the earth. Scientists believe that we are changing the global climate at a greater rate than ever before. The impacts of climate change are expected to be most severe in the northern regions of the globe.

"It is getting warmer, and there are no 60 degrees below days anymore."

Source: Environment Canada Green Lane, *Understanding Climate Change*

THE THEORY OF CLIMATE CHANGE IN THE YUKON

Climate change predictions for the Yukon

All over the world, scientists are studying the potential impacts of climate change on the earth's systems. Yukon-specific predictions include the following changes in the Yukon climate:

- higher year-round temperatures;
 - winters warming more than summers, with the winter warming being greater farther north; and
 - summers warming more in the south and central Yukon than in the north, due to the moderating effect of the Beaufort Sea.
- more snow in the winter, with the change being greater farther north (there will be little change in average summer precipitation levels); and
- more and larger storms (both winter storms and heavy summer rainfall storms, with more thunder and lightning).

Some of these changes have already become evident, but scientists cannot predict exactly when, or if, we will see all of them.

The impacts of climate change on the Yukon

A changing climate will affect many components of the Yukon environment which, in turn, could affect the Yukon economy, traditional cultures and recreational activities.

"The blueberries were smaller, more bitter, burnt, and not ripe."

"The lakes are drying up along with creeks, with trees growing in some lakes."

Quotations from Old Crow residents as cited in the *Arctic Borderlands Ecological Knowledge Co-op Community-based Ecological Monitoring, 1997 Report*



IMPACTS OF CLIMATE CHANGE IN THE YUKON

Glaciers

In high snowfall areas, glaciers will continue to advance. The effect of the warmer summer temperatures will be balanced by the increase in snowfall. Glaciers at lower elevations may begin to retreat, or retreat at a greater rate.

Changes in Yukon glaciers affect land stability and the flow of water in streams. Changes in stream flow could impact aquatic habitats and hydroelectricity production.

Biodiversity

Habitat shifts are predicted to occur along lines of latitude and with altitude. For example, forested areas could increase and tundra areas decrease, with trees advancing up mountains and northward. This would mean a reduction of habitat for some plant and animal species and an increase in habitat for others.

A complicating factor is the rate of change. Human-induced climate change is predicted to occur at an unprecedented rate. Some species adapt much more rapidly to new conditions than others. This means that certain species favoured by a shift in climate might come to dominate ecosystems. For example, moose may become abundant at the expense of caribou.

Forests, alpine and tundra ecosystems

On an ecosystem level, the predicted changes include a decline in the size and number of wetlands, increased fire frequency and increased forest productivity. In alpine and tundra areas, shrubs may come to dominate at the expense of smaller, seasonal plants. In forests, white spruce and lodge pole pine are likely to dominate, whereas black spruce is expected to diminish. Southern plant species are predicted to move into the Yukon.

Agriculture

A longer growing season would allow the production of crops (especially grain) that cannot currently be produced in the Yukon. Projected increases in annual precipitation would not likely impact agriculture significantly.

Grazing animals

One of the chief climate change predictions for the Yukon is an increase in snow. Snow affects the movements, feeding and reproductive success of grazing animals, such as moose and caribou. Long-term changes in snow are predicted to alter the distribution and abundance of grazing animals.

Changes in the timing of spring are also important to these animals' survival, as this affects the availability of food during the calving season.

Fish

Although warmer temperatures could bring increased productivity to northern spawning areas, this may be offset by deteriorating conditions in the oceans. Some freshwater species (such as lake trout) may increase due to greater productivity in warmer waters. However, there could be a deterioration in stream habitats related to changes in water flows.

Sea level rise and coastal ecosystems

Along the Yukon's coast the sea is rising at an abnormally high rate. Depending on the effect of the warming climate on major ice sheets in Greenland and Antarctica, the Yukon's sea level could rise more.

The entire Yukon coast may be subject to increased erosion and coastal flooding from the predicted increased frequency and magnitude of summer storms, and from the rising Beaufort Sea interacting with melting ice-rich permafrost. These changes would have impacts on birds, fish and marine mammals.

Permafrost and land stability

In northern permafrost areas, the further decay of permafrost as a result of continued warming trends is likely to increase the occurrence of thaw-flow slides and other types of landslides. Locally, forest fires could amplify this effect.