

Carbon in the Boreal Forest

Our vast northern forests are always in a state of change. Two of the key contributors to this change are disturbance and succession. Disturbance from fire, insect infestation, logging and other natural and man-made activities create openings in the often closed forest. With the creation of openings and sunlight reaching the forest floor, plant succession begins. First the pioneer grasses and smaller shrubs invade the site but soon make it less suitable for their liking and more suited to a group of hardwood trees. In time, the hardwood trees will give way to conifer trees. This simplistic three step succession may take hundreds of years as it is often interrupted by on-going disturbances.

The Boreal forest stores a good portion of the world's carbon, in this land of long cold winter and short summers. This cold climate allows carbon from dead plant material to accumulate. The decomposing microorganisms are virtually inactive due to the cold climate and water-logged peatlands devoid of oxygen. In the northern boreal forest and Canada's tundra, carbon is stored as "soil organic carbon". The carbon as the term implies refers to carbon stored in the soil. This carbon would be from dead surface plant material and dead roots in the soil. It is suggested that during the maximum growing season during the northern spring and summer, the world level of carbon dioxide falls and subsequently the oxygen level rises.

Forests can be carbon sinks or carbon sources. A carbon sink is when it absorbs more carbon than it releases, which in case for the Boreal forest would be in its peak growing season. A carbon source is when it releases more carbon in the atmosphere than it absorbs. An example might be when a dead forest from fire or insect or a missing forest from logging or land clearing for oil and gas stops absorbing carbon and releases the stored carbon. As well as the climate warms, the carbon locked in cold wetlands will start to decompose and hence becomes a carbon source.

Global warming results from climate change, caused by an exaggerated greenhouse effect, due to high levels of greenhouse gases. Or is it climate change results from global warming caused by an exaggerated greenhouse effect due to high level of greenhouse gases. These extra gases in the atmosphere are typically carbon dioxide from the burning of fossil fuels, methane from decomposing peatlands and garbage dumps and nitrous oxide from chemical fertilizers in agriculture.

The scientific community is slowly developing an understanding of the boreal forest's significance in the carbon cycle and its role in control of greenhouse gases and the impact on global climate change. There is a long way to go to fully understand the complexities of the boreal forest and as the forest continues to change to adapt to changes within the environment, this will be an exciting but an endless journey.

Some activities are afoot to respond to the many uncertain circumstances around global warming, climate change, and the influences on the greenhouse gas accumulations. The Boreal Forest Conservation Framework calls for the protection of ecosystems and the carbon stored within. The Post 2012-Kyoto framework will hopefully promote management decisions supporting ecosystem conservation as a critical means to reducing emissions and helping ecosystems adapt to climate change.

Verbatim and summaries were gathered from the following websites:

http://www.borealforest.org/index.php?category=world_boreal_forest&page=overview

<http://www.interboreal.org/globalwarming/ibcc-borealandclimate.pdf>

<http://www.environmentalsociety.ca/issues/forests/climate-change-boreal.html>

<http://www.environmentalsociety.ca/issues/climate/index.html>