

***Impacts of Climate Change and Variation  
on the Natural Areas of Newfoundland and Labrador***

Norm Catto,  
Department of Geography, Memorial University, St. John's, NL, A1B 3X9  
*ncatto@mun.ca*

***Executive Summary***

Newfoundland and Labrador's Provincial Parks, Ecological Reserves, Wilderness Reserves, and Scenic Attractions represent a wide variety of landscapes. This report summarizes the impacts of climate change and variation on the Newfoundland and Labrador landscape as a whole, focusing on the Natural Areas administered by the Department of the Environment and Conservation.

The report focuses primarily on the physical environment, including climate, terrain, weathering and erosion, and sedimentary processes. It also includes some discussion of potential impacts on terrestrial forest assemblages and fauna. Detailed discussion of the biological impacts of climate change on marine and avian species is not included within the scope of this report.

Climate is defined as the statistical average of meteorological (weather) conditions over a substantial period of time. Climate Change is considered as a recognizable change in climate as determined from two or more periods with minimum durations of 30 years each. Climate variation is considered as a recognizable shift or variation in meteorological conditions which occurs over time periods of one to several years, but which does not necessarily involve a change in climate over 30-year or longer periods. Climate variation does not include individual weather events (such as storms) or seasonal variations.

Climate change and variation since ad 1800 has resulted from a combination of natural and human-induced causes. Regardless of the exact proportions of natural and human factors in their initiation, climate changes and variations result in impacts in the Natural Areas of Newfoundland and Labrador.

The capacity of humans to influence climate, primarily by increasing temperature and/or precipitation, has been abundantly demonstrated on a local scale in urban centres. The existence of variations over small areas suggests that variations are to be expected over wider regions.

An overall warming of 0.3°C occurred in Atlantic Canada from 1948-2005. Summers show the greatest increase in temperature, and warming characterizes springs and autumns. Winters have become colder. Daily minimum temperatures show a slight increase, but daily maximums have decreased more. Precipitation has increased in Atlantic Canada since 1948. These overall values, however, include much variation locally, requiring assessment of individual sites. Coastal areas subject to North Atlantic Oscillation (NAO) influences differ substantially from interior areas, both in terms of their current response and the responses predicted for the future.

The strength of the North Atlantic Oscillation in recent years, resulting from the enhanced pressure differential between the Icelandic Low and the Azores High, is also related to colder temperatures in coastal areas of Newfoundland and Labrador. Strong NAO conditions result in severe northerly winds, low sea surface temperatures

(especially in winter), and extended areas and durations of pack ice and brash ice. These effects would be most pronounced in the winter months, when the majority of the temperature change has been recorded.

Newfoundland and Labrador currently are subject to a wide range of seasonal and interannual climatic events including mid-latitude storms, hurricanes and tropical storms, summer drought, snowfall, and frost action. Recent trends suggest that severe events will occur more frequently and be more intense.

The northern Atlantic Ocean has been undergoing an increase in hurricane frequency and magnitude since 1995. However, the relationship between changes in hurricane frequency and magnitude, and increases in air temperature or sea surface temperature (SST), is not clear at present. The distance between the Caribbean Main Development Region, and the southernmost coast of Newfoundland, results in numerous hurricanes making landfall before reaching latitude 45°N. Consequently, years with numerous hurricanes in the Caribbean (e.g. 2005) are not necessarily marked by notable effects in coastal Newfoundland. Regardless of the uncertainty of future changes in hurricane frequency and magnitude in response to climate change, it is apparent that the North Atlantic is currently undergoing a period of increased hurricane activity.

The impacts of climate change and variation on the natural areas of Newfoundland and Labrador include enhanced coastal erosion; rising sea level in all areas except Lake Melville; enhanced frost wedging in coastal locations; decreases in summer precipitation in most interior areas; increased precipitation in westernmost Newfoundland; changes in forest fire frequency; and changed in severe weather events. These changes are compounded by increased human usage of landscapes, both by tourists and citizens of Newfoundland and Labrador. The impacts of climate change and variation will occur, regardless of the causes involved. Successful adaptive measures to ensure that the natural areas will continue to contribute to tourism, recreation, and heritage in Newfoundland and Labrador will require recognition of ongoing impacts.

Individual Provincial Parks, day-use areas, Provincial Park Reserves, Wilderness Reserves, and Ecological Reserves are discussed sequentially. Emphasis is placed on impacts of climate change and variation and extreme weather events which have been recorded in the past twenty years, and impacts that are likely to occur in the near future. The discussion is intended to summarize the available information for each natural area, to provide a basis for further consideration of the most appropriate adaptive measures in subsequent analyses.