

## **Summary Project A1189: Costing the Impacts of Climate Change in Atlantic Canada Using Recent Climate-Related Events as Benchmarks**

There is strong consensus that climate change is occurring and will cause significant environmental, economic, and social impacts across Canada. While significant research has been conducted to understand the impacts of climate change at the provincial and national levels, impacts at the community level are still relatively unstudied. As such, communities are struggling to understand the way in which climate change will impact them at the local level. This information is essential for helping community decision-makers develop appropriate adaptation policies to minimize the future impacts of climate change. Obtaining reliable environmental, economic and social impact estimates from climate change at the community level is difficult because: (i) there is generally much uncertainty about the environmental impacts of climate change in the future, especially at the local level; and (ii) every community has unique biophysical, social and economic characteristics that will be impacted in different ways. However, all communities have experienced extreme weather events in the past that can provide insight into measuring climate change impacts in the future. More specifically, under natural (or normal) climate conditions, many short term extreme weather events such as freshwater flooding, tornadoes, and blizzards impact Canadian communities in a periodic manner (e.g. a one in one hundred year flood). Under a changed climate, these periodic events are generally expected to increase in frequency and/or severity. Unfortunately, there has been little guidance provided to communities on how to go about estimating, in a systematic manner, the value of such climate change impacts. In August 2005, Riley Environment Limited in partnership with the University of New Brunswick and the City of Fredericton initiated a research project to carry out research into costing the impacts of climate change in Canadian communities. This toolkit has been produced as a result. The objective of this toolkit is to provide a framework for valuing the impacts of climate change on extreme, periodic weather events in communities across Canada. This toolkit can be extended in the future to value the impacts of climate change on non-periodic, extreme climate-related events such as sea level rise, avalanches, warmer average temperatures, etc., and to examine adaptation policies that can minimize the negative impacts of climate change. In Section 2 of this toolkit, a step-by-step method for valuing climate change impacts on extreme weather events in Canadian communities is provided. To begin, this section explains how to identify, measure, and value extreme weather event-types under a normal (or natural) climate. It then explains how to value the event-type under a changed climate, and compute the total impact of climate change on the value of that event-type. A set of worksheets have been developed in Section 3 that identifies the basic information needed to examine the impacts of extreme weather events in Canada. To value each event, the user will need to estimate indicator impacts and values at the stakeholder-level, and project the impacts of climate change on the frequency of an event-type. The manner in which the user derives the required estimates can range from extensive surveys to personal opinion. This flexibility allows every interested community to immediately begin using this toolkit. To illustrate the way in which the toolkit can be used, Appendix D provides a case-study analysis of flooding in the St. John River at Fredericton, NB.

<sup>6</sup> An Excel spreadsheet file is also available upon request from the primary investigator (contact Dr. V. Lantz, e-mail: vlantz@unb.ca). This file reproduces the worksheets, allows users to enter data and relevant information, and automatically makes the calculations explained in this toolkit.