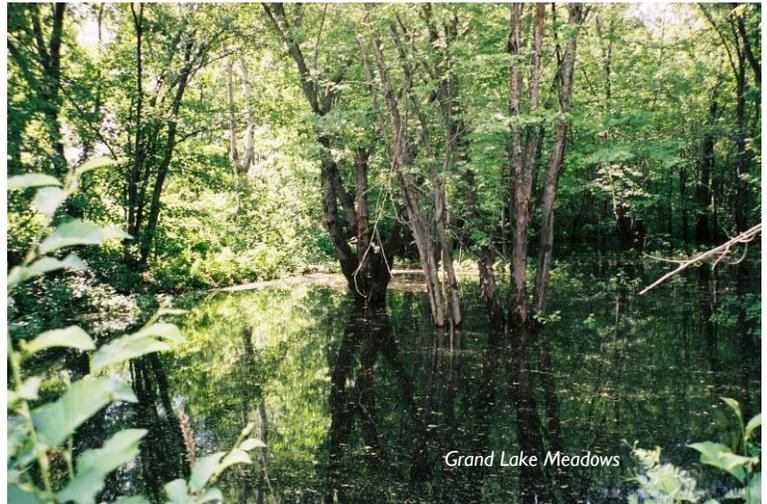


## **What is Predicted to Happen with Rivers and Wetlands in a Changing Climate?**

- Changes in precipitation patterns and temperature will result in significant extremes in groundwater levels. Spring floods will trend towards record high levels from the past, and more flooding in summer and autumn can be expected due to severe storms leading to greater runoff.
- Record low levels will result from increased evaporation from surface waters and less water being retained by the land following hard rains. Extended periods of drought will also lead to a decrease in water levels. The fluctuations in river conditions, and the accompanying increase in water temperatures, will endanger many of our aquatic species, like Atlantic salmon and brook trout, which rely on specific habitat conditions to thrive.
- The rapid rise and fall of river levels will contribute to erosion of river banks. Areas currently covered by water will be exposed to heat and air, drying them out, and making them more susceptible to erosion when high waters return.
- The threat to wetlands and lakes lies largely in evapotranspiration, loss of water to the air because of heat and dry conditions. Again, this will result in generally lower water levels. Some wetland areas may dry up altogether, resulting in loss of habitat to many species and possible extirpations. A side effect to drying out peat bogs is that it will increase the amount of carbon released into the atmosphere, thus adding to the problems of climate change.



*“Wetlands have been the forgotten ecosystems. They are very sensitive to climate change and can respond rapidly. Wetlands are estimated to contain about a third of the world’s carbon; if this were released, the atmospheric concentration of CO<sub>2</sub> would be at least 50% higher.”*  
Impacts of Climate Change on Agriculture, Forest, and Wetland Ecosystems: Synthesis and Summary, p.401



- Groundwater will face an increased risk of pollution in the future. Less predictable growing conditions may necessitate the use of more pesticides for farming and forestry, and these contaminants will be more likely to enter the water sources when strong storms cause runoff.

## **What are Possible Solutions for Rivers and Wetlands?**

The greatest natural protection for rivers and wetlands is the trees and other plant life that surround them. These natural buffers play many roles. The canopy cover of the trees over the water helps to regulate the water’s temperature by providing shade. Thick growth of understory plants lessens the impact of rain on the ground, slowing the water so that it has

*“Water, in its liquid and solid forms, and its multitude of uses and ecosystems values, is the component of the environment most vulnerable to climate change.”* from Water Sector: Vulnerability and Adaptation to Climate Change, 2000.

a greater chance of seeping into the ground instead of running off quickly into the rivers and streams. Forested areas help slow the rate of snowmelt, allowing much of the melted water to seep into the soil, gradually adding to groundwater, and preventing extreme floods. Plant root systems also strengthen river banks, providing some insurance against increased erosion.

Increasing riparian buffers will help conserve these protective functions for rivers and wetlands. We also may need to restore buffers in areas where development has eliminated them.

### To Implement the Climate Change Action Plan Related to Rivers and Wetlands:

- Buffer zones of trees, shrubs and plants conserved or restored along the entire length of streams, wetlands, coastal habitats and rivers will mitigate the impacts of built development, agriculture, logging or other development. To provide the best protective function, these buffer zones should not permit any development or removal of trees.
- Restoration of riparian or wetland buffers could include:
  - ▶ Heightened berms between wet areas and development, to slow the runoff from these areas.
  - ▶ Planting of trees along exposed areas, to strengthen river banks and provide shade
- Through forest management, special attention through policy or regulation to maintaining forest canopy cover over small headwater streams and seasonal pools will help regulate water flow into larger streams and rivers, and moderate water temperatures.
- Special conservation attention given to conserving intact peat bogs will allow them to continue to store high levels of carbon in their peat, since they will release that CO<sub>2</sub> into the atmosphere when they are drained or the peat harvested.



Restigouche River

### Useful Resources:

Lemmen, D.S., F.J. Warren, J. Lacroix and E. Bush Eds.2008. *From Impacts to Adaptation: Canada in a Changing Climate 2007*. Government of Canada (Natural Resources Canada), Ottawa, ON

Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007: Synthesis Report*. Contribution of Working Groups I, II and III to the Fourth Assessment. Report of the Intergovernmental Panel on Climate Change, Geneva, Switzerland, 104 pp.

Stone, JM.R., J.S. Bhatti, and R. Lal. 2006. "Impacts of Climate Change on Agriculture, Forest, and Wetland Ecosystems: Synthesis and Summary". In *Climate Change and Managed Ecosystems*, Eds Jagtar S. Bhatti, R Lal, M. J. Apps, M A Price, Taylor and Francis Group, LLC, Boca Raton.

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