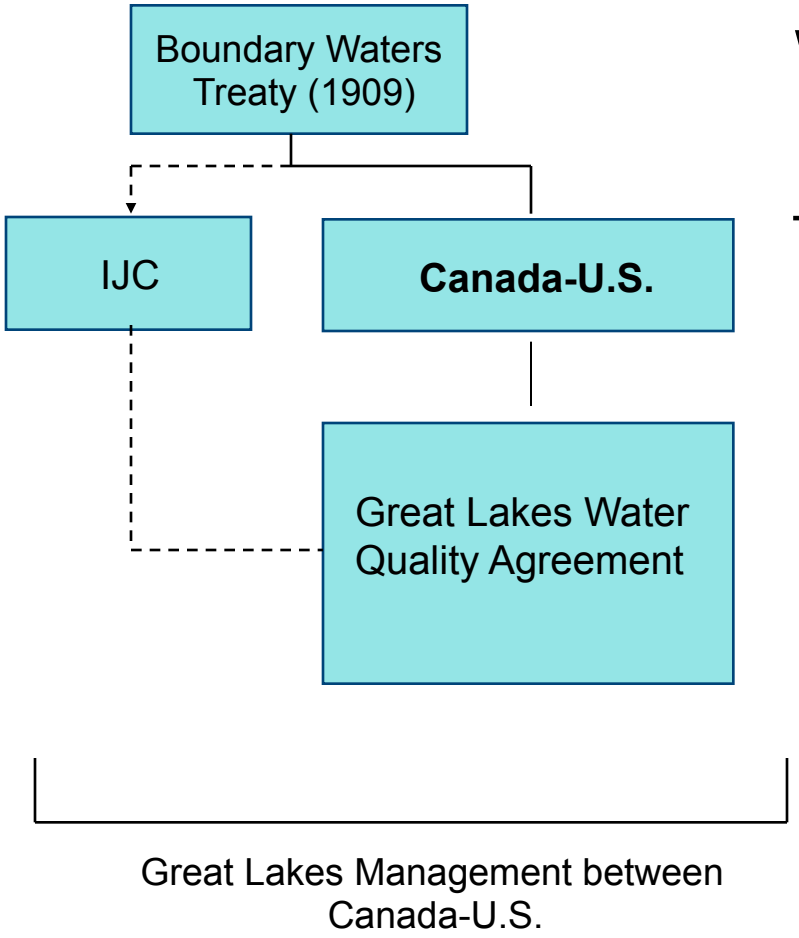
Lake Superior Ecosystem Climate Change Adaptation Plan

Lynelle Hanson
Lake Superior Binational Program Liaison
University of Wisconsin-Extension

LaMP
background



What is the Lakewide Management Plan (LaMP)?

The 1987 amendment to the GLWQA required the development of LaMPs to "restore and maintain the chemical, physical and biological integrity of the Great Lake Basin Ecosystem". The LS LaMP is an adaptive management plan for restoring and protecting the Lake Superior ecosystem.

Lake Superior Ecosystem Climate Change Adaptation Plan

- Chemical, physical, and biological aspects of Lake Superior are susceptible to changes in climate.
- Superior's fish, wildlife, and water quality are, to a great extent, temperature dependent.

Projected Changes to the Lake Superior Climate

- Air Temperature
- Precipitation
- Water Temperature
- Ice Cover
- Wind Speeds
- Lake Wind Levels
- Onset of Seasons

Expected Effects on Lake Superior Ecosystems

- Coastal Wetlands
- Forest Types
- Shoreline Effects
- Toxic Chemicals and Pollutants
- Lake Superior Water Quality

Expected Effects on Lake Superior Ecosystems (cont.)

- Phytoplankton/Zooplankton
- Fish
- Mammals
- Birds
- Trees and Plants
- Invasive Species

Ecosystem Adaptation Actions

- Actions should be tailored to specific ecosystems and regions
- Actions should fit into a larger plan of ecosystem management, since climate change is one of several stresses of concern
- Actions leading to maladaptation must be avoided.

Adaptation Actions for Vulnerable Ecosystems

- General Adaptation Actions
- Coastal Ecosystem Actions
- Forest Ecosystem Actions
- Aquatic Ecosystem Actions
- National Parks and Protected Areas
- Education and Outreach Actions
- Laws and Regulations Actions

Selected Examples of Adaptation Actions

- Aquatic Ecosystem Actions
  - Construct riparian buffer strips to manage heavy runoff of non-point source pollution and sediments associated with potentially more frequent and intense precipitation events (Baron et al., 2008)
  - Upgrade and replace existing infrastructure to handle the volume of runoff associated with potentially more frequent and intense precipitation events (Expert Panel on Climate Change Adaptation, 2009; Environment Canada, 2005)
  - Assess the health of riparian buffers along cold and cool water streams and restore riparian buffers where necessary to provide adequate shade (Tillison, 2012)

Selected Examples of Adaptation Actions

- Coastal Ecosystem Actions
  - Develop contingencies for Lake Superior water level extremes (high and low) and commit to ongoing drought and flood-preparedness (IUGLS, 2012; Mortsch et al., 2000)
  - Use wind-resistant vegetation to minimize blow-downs and erosion along coastal shorelines and adjacent areas (Environment Canada, 2005)

Selected Examples of Adaptation Actions

- Education and Outreach Actions
  - Continue to support and enhance the climate change education and outreach activities that are being conducted by the MI, MN, and WI Sea Grant programs
  - Develop a regional data management and access system for Lake Superior that facilitates the exchange of climate change data and information on expected impacts to ecosystems among researchers, stakeholder agencies, and the public (LimnoTech, 2011; U.S. National Park Service, 2010a).
  - Develop educational programs (e.g., courses, workshops, manuals) to teach the general public and key stakeholders about the principles of climate change science and the expected impacts of climate change on Lake Superior ecosystems (U.S. Fish and Wildlife Service, 2010; U.S. Forest Service, 2008)

Selected Examples of Adaptation Actions

- Forest Ecosystem Actions
  - Increase preparedness for insect and pest management (Parker et al., 1998), improve pest monitoring (IJC, 2003), and maintain or improve the ability of forests to resist pests and pathogens (Swanston and Janowiak, 2012)
  - Plant seeds or seedlings originating from seed zones that resemble the expected future conditions of the planting site (Minnesota Department of Natural Resources, 2011b
  - Plant tree species that are more tolerant to a changing climate, including drought and disease-resistant varieties (Colombo, 2008; IJC, 2003; Kling et al., 2003)

Contact information

Lynelle Hanson

Lake Superior Binational Program Liaison

Northern Center for Community and Economic Development

University of Wisconsin-Superior/Extension

Belknap & Catlin, PO Box 2000

Superior, Wisconsin 54880-4500

Phone: 715-394-8181

E-mail: lhanso14@uwsuper.edu