PRIORITIZING CLIMATE SCIENCE KNOWLEDGE GAPS IN SUPPORT OF THE 2012 CANADA-U.S. GREAT LAKES WATER QUALITY AGREEMENT

In 2015, the *State of Climate Change Science in the Great Lakes basin: A Focus on Climatological, Hydrological and Ecological Effects* was released synthesizing the available science on observed and projected impacts of climate change and summarizing 43 **climate science knowledge gaps**. Using these identified knowledge gaps as a foundation, in 2017 and 2018, the Climate Change Impacts Annex Subcommittee, in collaboration with the Ontario Climate Consortium undertook several engagement sessions to prioritize the list of climate science gaps for potential attention by Canada, the U.S., as well as others engaged in Great Lakes climate change science. The result was the 2018 report, *Prioritizing Climate Science Knowledge Gaps in the Great Lakes Water Quality Agreement*.

Climate Science Knowledge Gap: A brief description of an identified deficiency in the scientific understanding of a particular theme as it pertains to climate change (e.g., water levels and surface hydrology). Deficiencies are identified as having low or limited agreement in scientific evidence as opposed to high agreement or robust evidence.

McDermid *et al*. (2015)

This 2018 report provides a prioritization of climate knowledge gaps in the Great Lakes basin to support the implementation of the Great Lakes Water Quality Agreement Annexes over the short-term and over a longer-term. The Climate Change Impacts Annex Subcommittee considers the report as a resource for policymakers and researchers. Addressing the following five high priority, short-term knowledge gaps in the next several years can enhance the collective understanding of climate change impacts on the Great Lakes and assist in delivering upon commitments in the GLWQA Annexes:

Five High Priority, Short-Term Great Lakes Climate Science Knowledge Gaps

- Modeled future projections of lake and river chemistry components (such as oxygen, carbon, nitrogen, and phosphorous levels) are limited;
- Lack of future projections of chemical uses, applications, and releases (i.e. socio-economic influences such as pesticides, phosphorous, or others used in agricultural applications);
- Lack of knowledge on the impacts climate change has on the Great Lakes basin's chemical exposure, fate, and transportation (i.e. ecosystem responses under future climate and chemical conditions are not well known);
- Lack of understanding of cumulative effects of environmental stressors into climate change impact projections in the Great Lakes (e.g., groundwater); and
- Lack of cumulative effects assessments that examine multiple environmental stressors (e.g., social, cultural, economic, health, built and political systems).

Addressing these five high-priority, short-term climate science knowledge may involve: improving clarity and understanding of data and climate science; integrating a climate science lens in research and policy; increasing availability of data and research; improving and/or building accessible modeling that encourages collaboration; and improving consideration of climate change science in policy and decision-making.