

### **What is the Great Lakes Water Quality Agreement?**

First signed in 1972, the Great Lakes Water Quality Agreement (GLWQA) reflects a shared commitment between Canada and the United States to resolve a wide range of water quality issues facing the Great Lakes. The purpose of the GLWQA is to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes basin ecosystem.

### **What is SOLEC?**

In 1992, Canada and the U.S., as the Parties of the GLWQA, established the State of the Lakes Ecosystem Conference (SOLEC) and corresponding *State of the Great Lakes* reports to provide coordinated, consistent and science-based reporting on the state of the Great Lakes ecosystem.

The objectives of SOLEC and the *State of the Great Lakes* reports are:

- To assess the state of the Great Lakes ecosystem based on accepted indicators
- To strengthen decision-making and environmental management concerning the Great Lakes
- To inform local decision-makers of Great Lakes environmental issues
- To provide a forum for communication and networking amongst all Great Lakes stakeholders.

### **What are Great Lakes indicators?**

An indicator is a piece of evidence that helps us to understand the condition of something. Great Lakes indicators can provide insight on how the lakes are doing right now and over time, and whether we are meeting our ecosystem goals. Great Lakes indicators serve the decision-makers working to restore and maintain the largest freshwater ecosystem on the planet. Over 70 complementary indicators have been identified and placed within an organizational framework that provides decision-makers with the maximum use of the information.

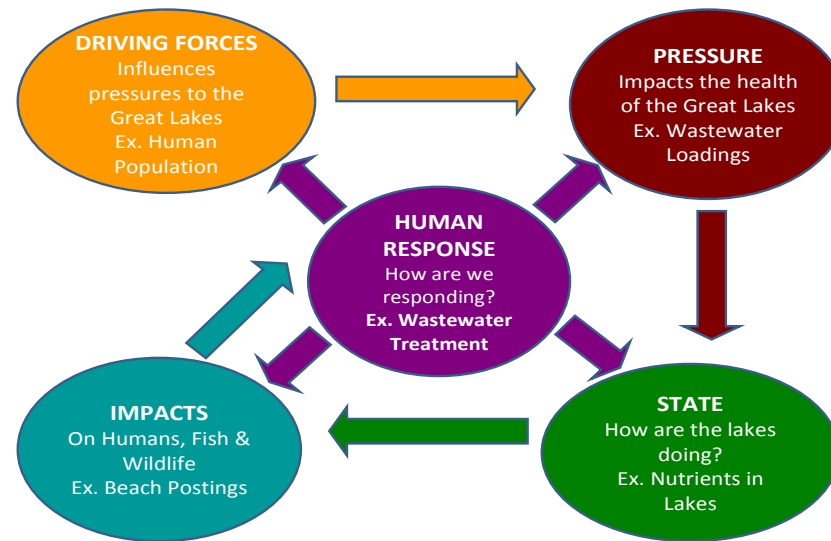
### **What is the geographic scope of the indicator reports?**

Indicator reports will provide the status and trend for the Great Lakes overall and, where possible, on an individual lake basin scale. Additionally, status and trends will be reported for certain indicators at the scale of each lake's open and nearshore waters.

### **How are the indicators organized?**

Indicators have been used to report on Great Lakes ecosystem components since the first SOLEC in 1994. In 2010, the Great Lakes indicator suite was reviewed by experts to deliver an improved, updated and representative indicator suite that reports out on the state of the Great Lakes in a comprehensive, understandable and science-based manner.

As a result of this review, the *Driving Force – Pressure – State – Impact – Response* (DPSIR) framework was adopted with ten top-level reporting categories (see reverse side for DPSIR framework, categories and indicators). The DPSIR framework is an underlying tool to help select, organize and report on indicators. The DPSIR framework allows decision-makers to understand the linkages between the condition of the ecosystem, pressures on the ecosystem, and how human activities are related.



Decision-makers are responsible for the STATE of chemical, physical and biological integrity of the Great Lakes because it IMPACTS the quality of life of humans, fish and wildlife. We are therefore working together on PRESSURES such as invasive species. Together we are asked to RESPOND to ecosystem conditions through restoration and protection efforts.

### **How are the indicators and the GLWQA connected?**

The GLWQA provides the context for selecting appropriate indicators and reporting categories. Ecosystem objectives identified by the GLWQA and supporting programs are the reference values for assessing status and trends within the Great Lakes indicators.

### **When will the indicator reports be available?**

The next round of reporting will be presented and discussed at the **State of the Lakes Ecosystem Conference** held in Erie, PA on **October 26 – 27, 2011**. It is not anticipated that the entire Great Lakes indicator suite will be reported on during SOLEC 2011. The final *State of the Great Lakes* indicator reports will be available by the Fall of 2012.

### **What happens after SOLEC 2011?**

SOLEC organizers will continue to work to improve Great Lakes indicators. Activities will include:

- Reflecting the needs of any future changes to the GLWQA
- Working with programs to identify monitoring, data analysis and indicator sponsorship priorities
- Strengthening the relationships and linkages between indicators through a consistent conceptual model
- Evolving top level indicator categories into recognized indices
- Continuing to simplify metrics and remove redundancies as they become apparent
- Promoting and pursuing opportunities for a web-based reporting and mapping system, which is vital to the future relevancy and utility of State of the Great Lakes reporting.

For more information please contact the SOLEC organizers at [SOLEC@ec.gc.ca](mailto:SOLEC@ec.gc.ca) or visit [www.ec.gc.ca/greatlakes](http://www.ec.gc.ca/greatlakes) or <http://epa.gov/greatlakes/solec/index.html>.



# State of the Great Lakes Indicator Reporting Framework

DPSIR Framework Reporting Areas	Driving Forces	Pressures			State			Impacts		Responses
Top Level Categories	Economic/Social	Pollution & Nutrients	Invasive Species	Resource Use & Physical Stressors	Water Quality	Aquatic-Dependent Life	Landscape & Natural Processes	Human	Fish & Wildlife	Restoration & Protection
Reporting Indicators	<p><i>Human population</i></p> <p><b>Economic prosperity</b></p> <p><b>Energy consumption</b></p> <p><i>Value of Great Lakes</i></p> <p><i>Greenhouse gas emissions</i></p>	<p><b>Contamination in sediment</b></p> <p><b>Atmospheric deposition</b></p> <p><i>Inland water quality index</i></p> <p><i>Nutrients in tributaries</i></p> <p><i>Pesticides in tributaries</i></p> <p><i>Bacterial loadings from tributaries</i></p> <p><i>Municipal wastewater loadings</i></p> <p><i>Industrial loadings</i></p>	<p><b>Aquatic non-native species</b> <i>including a watch list of high risk species</i></p> <p><b>Terrestrial non-native species</b></p> <p><b>Sea lamprey</b></p> <p><i>Dreissenid mussels</i></p>	<p><i>Watershed stressor index</i></p> <p><b>Forest disturbance</b></p> <p><b>Artificial coastal structures</b></p> <p><b>Hardened shorelines</b></p> <p><i>Surface water temperature</i></p> <p><i>Air temperature</i></p> <p><i>Extreme precipitation events</i></p>	<p><b>Toxic chemicals in offshore waters</b></p> <p><b>Contaminants in whole fish</b></p> <p><b>Contaminants in waterbirds</b></p> <p><b>Groundwater quality</b></p> <p><b>Nutrients in lakes</b></p> <p><i>Major ions</i></p> <p><i>Water clarity</i></p> <p><i>Water chemistry</i></p>	<p><b>Wetland fish</b></p> <p><b>Wetland plants</b></p> <p><b>Wetland birds</b></p> <p><b>Wetland invertebrates</b></p> <p><b>Wetland amphibians</b></p> <p><b>Walleye</b></p> <p><b>Lake Trout</b></p> <p><b>Preyfish</b></p> <p><b>Benthos</b></p> <p><b>Diporeia</b></p> <p><i>Zooplankton Health</i></p> <p><b>Zooplankton Biomass</b></p> <p><b>Phytoplankton</b></p> <p><b>Threatened species</b></p> <p><b>Bald eagle</b></p> <p><b>Lake Sturgeon</b></p> <p><i>Piping Plover</i></p>	<p><b>Land cover</b></p> <p><i>Aquatic habitat connectivity</i></p> <p><b>Fish habitat</b></p> <p><b>Base flow due to groundwater</b></p> <p><b>Water levels</b></p> <p><b>Ice duration</b></p> <p><b>Forest cover</b></p> <p><b>Sediment coastal nourishment</b></p> <p><i>Tributary flashiness</i></p> <p><b>Wetland landscape extent and composition</b></p>	<p><b>Drinking water</b></p> <p><b>Beach advisories</b></p> <p><b>Fish consumption restrictions</b></p> <p><i>Harmful Algal Blooms</i></p> <p><i>Cladophora</i></p>	<p><i>Botulism outbreaks</i></p> <p><i>Fish disease occurrences</i></p> <p><i>Endocrine disruption</i></p>	<p><b>Withdrawing water sustainably</b></p> <p><b>Conserving and protecting forest land</b></p> <p><i>Managing contaminated sediment</i></p> <p><b>Treating wastewater</b></p> <p><i>Protecting and restoring of habitats and species</i></p> <p><i>Enhancing wildlife and conserving soil and water on agricultural lands</i></p> <p><i>Stocking native fish</i></p> <p><b>Protecting special lakeshore areas</b></p> <p><b>Implementing industrial efficiency measures</b></p> <p><i>Educating Great Lakes basin residents</i></p>

*Note: bold denotes an existing indicator*

*Note: indicator report names are subject to change*