

# Climate Change and Inland Lakes Workshop

assessing and adapting to climate change impacts

In January 2018, approximately 60 participants from 15 different organizations attended the Climate Change and Inland Lakes workshop, which was hosted by the WICCI Water Resources Working Group. The goal was to bring together scientists and stakeholder representatives to share recent research, discuss new research needs, and identify potential adaptation strategies for climate change impacts on Wisconsin's inland lakes.



The workshop focused on climate change impacts and adaptations for: 1) Lake Levels; 2) Water Quality; 3) Aquatic Invasive Species; and 4) Fisheries and Native Aquatic Species. Breakout sessions focused on the four themes, with plenary talks on wild rice, temperature modeling, genomics, community capacity, communicating adaptation, and examples of successful adaptation strategies.

### Workshop goals and products:

- strengthen the statewide lake research and management communities
- create partnerships and exchange lessons learned between researchers, managers, and stakeholder groups
- publish a workshop report on inland lakes and climate change
- publish an accessible pamphlet on the latest research in lakes and adaptation strategies

## Key Ideas

We need to work within the social framework of lake users. To produce the most effective resource management we need to understand how users interact with and value the lake. Outreach efforts have historically proven very useful in mitigating changes, for example, managing aquatic invasive species, and we need to continue to improve upon these methods. However, we also need to start managing lake user expectations so that the public understands that they cannot expect lakes to be the same in the future as they are today.

Developing a multi-faceted approach will be key to minimizing negative impacts of climate changes. The 3R's approach may be a useful framework for developing multi-faceted adaptation strategies:

1. Resistance – defend high value lakes against changes caused by climate
2. Resilience – improve the capacity of the lake to maintain prior conditions by reducing stress and minimizing vulnerabilities.
3. Response – intentionally accommodating some changes and minimizing undesired outcomes.

	Advances	Knowledge Gaps	Adaptation Strategies
<b>Lake Levels</b>	<ul style="list-style-type: none"> <li>• technologies and tools that increase data on lake levels and drivers of changes.</li> <li>• good citizen science data</li> <li>• greater understanding of importance of variability.</li> </ul>	<ul style="list-style-type: none"> <li>• understanding what part of water balance drives changes.</li> <li>• additional temporal and spatial data.</li> <li>• understanding lake-specific impacts.</li> </ul>	<ul style="list-style-type: none"> <li>• set public expectations about future lake levels</li> <li>• smart growth strategies</li> <li>• managing land use to reduce vulnerability</li> </ul>
<b>Water Quality</b>	<ul style="list-style-type: none"> <li>• advances in coupled models to understand scenarios and mechanisms</li> <li>• advances in data and monitoring</li> <li>• importance of non-P variables</li> </ul>	<ul style="list-style-type: none"> <li>• mechanisms and models of algal bloom development</li> <li>• understanding social incentives and economics of changes in water quality and adaptation scenarios</li> </ul>	<ul style="list-style-type: none"> <li>• 3Rs strategy of Resistance, Resilience, and Response</li> <li>• get public to prioritize water quality and enact change</li> <li>• improved communication and outreach</li> </ul>
<b>Aquatic Invasive Species</b>	<ul style="list-style-type: none"> <li>• new tools to help managers predict or reduce impacts.</li> <li>• outreach prevention programs are known to work</li> </ul>	<ul style="list-style-type: none"> <li>• understanding species' impacts</li> <li>• management outcomes</li> <li>• global to local scaling</li> </ul>	<ul style="list-style-type: none"> <li>• stop arrival of invasive species</li> <li>• outreach and prevention activities</li> <li>• promote lake resilience to impacts</li> </ul>
<b>Fisheries and Native Aquatic Species</b>	<ul style="list-style-type: none"> <li>• many new studies on fish and climate changes</li> <li>• importance of variability in response to climate change</li> </ul>	<ul style="list-style-type: none"> <li>• safe operating space for fish and resource management</li> <li>• meta-population dynamics and fish movements</li> <li>• impacts of multiple drivers</li> </ul>	<ul style="list-style-type: none"> <li>• changing angler values and managing expectations</li> <li>• alternative stocking strategies</li> <li>• triage system for lakes to focus on resilient systems</li> </ul>



## What is WICCI?

The Wisconsin Initiative on Climate Change Impacts (WICCI) is a collaboration between the University of Wisconsin - Madison and the Wisconsin DNR. WICCI's mission is to generate and share information that can limit vulnerability to climate change in Wisconsin and the Upper Midwest

WICCI engages citizens; private and public decision-makers; and scientists from Wisconsin and the region in a collaborative network to

- develop scientific understanding of climate impacts
- identify vulnerability to climate change and climate variability
- enable better planning, investment, and other adaptation activities

WICCI is a network of many groups and individuals who work together through communication and collaboration.



Workshop Co-Sponsors

