Coastal Climate Adaptation Planning:
Case studies and tools for Great Lakes communities

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The Nature Conservancy in the Great Lakes

- Aquatic Invasive Species
- Climate Change Adaptation
- Coastal Systems
- Native Fisheries
- Northern Forests
- Watersheds
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What Could Changing Great Lakes Water Levels Mean for our Coastal Communities?
* A case for climate-adapted planning approaches

Survey Says...
Great Lakes Coastal Communities Choose Climate Adaptation!
* Gaining knowledge, skills and new decision-making frameworks

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Sunset on Green Bay near Ephraim, Wisconsin. Photo by Claude Théron
Case Studies:  
www.nature.org/greatlakesclimate

- **Audience:** Great Lakes coastal community planners, elected officials, developers, conservation.

- **Goals:**
  Provide context and clarify: lake level change research, key resources for planning & decision-making

Provide examples:
- IJC, Lake Superior water regulation
- Northern Pike management using IJC decision-making framework

- **Approach should incorporate a range of best- and worse-case scenarios re. potential impacts on community/regional assets.**
Climate Change Adaptation = Preparedness

1. Identify Climate Change Impacts
   - Local climate projections report, review of scientific literature, communication with local scientists

2. Identify Local or Regional Vulnerabilities
   - Socioeconomic systems assessment report, natural systems and socioeconomic workshops

3. Identify Adaptation Strategies
   - Natural systems and socioeconomic workshops, advisory committee input, meetings with local leaders

4. Identify Opportunities for Cost-sharing and Collaboration across Sectors
   - Integration of recommendations, advisory committee input, meetings with local leaders

5. Build Partnerships and Prioritize Strategies
   - Research effective strategies, participate in outreach events, meetings with local leaders, experts, and stakeholders

6. Implement Adaptation Strategies
   - Support partners in planning efforts, grant-writing, and fundraising

7. Monitor and Re-evaluate Implemented Strategies
   - Support partners in incorporating sound monitoring approaches into adaptation plans
Great Lakes Water Level Changes: Addressing Risks and Impacts on Coastal Assets (4 minutes)

https://www.youtube.com/watch?v=lvqUzgWXCkY
Great Lakes Water Levels

Great Lakes water levels are continuously monitored by U.S. and Canadian federal agencies in a binational partnership. NOAA-GLERL relies on this water level data to conduct research on complex regional water budgets and to improve predictive models. Water level monitoring stations are operated by the Center for Operational Oceanographic Products and Services (CO-OPS) and the Department of Environment Canada. The U.S. Army Corps of Engineers Detroit District, Chicago District, and Environment Canada play crucial roles in research, coordination of data and operational seasonal forecasts for the basin.

For more information on particular aspects of Great Lakes Water Levels, use the tabs above:
- Monitoring Network: learn how Great Lakes water levels are measured
- Observations: examine current and historical water level conditions
- Forecasts: seasonal and multi-decadal projections of Great Lakes water levels

Great Lakes Dashboard Project (GLDP)
A multi-agency gateway to long-term, basin-scale hydrological and climatological data for the Laurentian Great Lakes

Please ensure you read the GLERL's Disclaimer and Intellectual Property Notice before viewing the dashboards. Thank you!

**Water Levels**
View current, historical, and projected water levels.

**Hydro-Climate**
View current, historical, projected water levels and data on drivers behind water level change.

**Great Lakes Dashboard**

**Great Lakes — St. Lawrence**
### Future Climate Model

**IPCC Fourth Assessment**

**Emission Scenario**
- High A2

**General Circulation Model**
- Ensemble Average

### Analysis Area
- United States
- Global

### Time Period
- Past 50 Years
- Mid Century (2050s)
- End Century (2080s)

### Map Options
- Map of Average
- Map of Change

### Measurement
- Average Temperature
- Precipitation

### Resources
- Case Studies
- Documentation
- Data
- Map Image
- Download
- ClimateWizard Custom Analysis
- Printer Friendly Version

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**Change in Annual Temperature by the 2080s**

Model: Ensemble Average, SRES emission scenario: A2

50%: This map shows the temperature change projected by the middle model. That is, half of the models project a greater amount of change, and half of the models project less change as compared to 1961-1990.
Welcome to the Adaptation Collaboratory!

This website is a resource for research, education, and collaboration in the area of adaptation and climate change. It is funded by the National Science Foundation and the University of Notre Dame. Our team at Notre Dame, and our outreach partners at The Nature Conservancy's Great Lakes Project, invite you to share your information needs, ideas, tools, and experiences in climate change adaptation. Click on a task in the slide show or choose an activity from the menus and start adapting!

If you are new to our site, you might start with our Collaboratory Tutorial.
Great Lakes & St. Lawrence Cities Initiative
Alliance des villes des Grands Lacs et du Saint-Laurent

Municipal Adaptation and Resiliency Service

Quick Hits
To register to the Community of Practice Portal, click here.
To download the Call to action form, click here.
To see other municipalities’ Call to Action, click here.
In This Guide...

Find hazards and climate change resources that Great Lakes counties and municipalities can use to communicate coastal issues and inform existing and future land use, infrastructure, and natural resource plans and policies to enhance community resiliency. Read more…

Hazard & Climate Case Studies

Read case studies to explore how local planners and practitioners are using data, tools, methods, and policies to help make their
More Than Just Data
Dive into the Digital Coast to Get the Data, Tools, and Training Communities Need to Address Coastal Issues.

What is the Digital Coast?
This NOAA-sponsored website is focused on helping communities address coastal issues and has become one of the most-used resources in the coastal management community. The dynamic Digital Coast Partnership, whose members represent the website’s primary user
http://coast.noaa.gov/digitalcoast/tools/snapshots

Local officials can use the snapshots as a planning tool to assess their county’s resilience to flooding and understand the benefits provided by natural resources. The handouts generated by the snapshots can be a helpful educational tool when working with governing bodies and citizen groups.

**Features**

- **Assesses** a county’s exposure and resilience to flooding
- **Analyzes** a county’s dependence on the ocean or Great Lakes for a healthy economy
- **Examines** the benefits a county receives from its wetlands
- **Compares** counties to each other or for regional analysis
- **Allows** users to download a PDF report for the snapshot of their choice

Current topics include:

- Flood exposure
- Wetland benefits
- Ocean and Great Lakes jobs

Tell us how your county uses the snapshots.

*View a recorded webinar* to learn more about the Coastal County Snapshots.
Case Studies:
www.nature.org/greatlakesclimate

**Audience:** coastal communities

**Goals:**
- Describe community needs-driven climate engagement process
- Relay survey data on adaptation challenges and motivations

**Take Home Messages:**
- Knowledge gain: workshops promoted awareness-building, started the learning process, created conditions for adaptation action
- Climate is one consideration, among many, that communities need to weigh as they plan for the future.
Measure Effectiveness to ensure that our efforts to reduce risk through restoration and adaptation are successful.
**GOAL:** demonstrate to the private sector, governments and the public that healthy habitats effectively reduce risk to people and property from storms and floods. Specifically, the Conservancy is working to:

- Create public acceptance and appetite for natural infrastructure by showing results in real places
- Protect communities by advancing policies that make disaster preparation and response programs more effective and affordable
- Support private sector innovation by partnering with the insurance and engineering industries
How can we apply this thinking in the Great Lakes?

By building 100 miles of oyster reefs, the 100-1000 coalition will create the conditions needed to plant, support and promote more than 1000 acres of coastal marsh and seagrass in Mobile Bay, AL to help restore the Gulf of Mexico:

- **Providing habitat** for oyster larvae to settle and colonize
- serving as nursery habitat for commercially and recreationally important finfish and shellfish (shrimp, blue crab, speckled trout, red drum, southern flounder, ladyfish and gray snapper)
- **Dampening of wave energy** and decreasing erosion
- **Stabilizing sediments** and decreasing turbidity
Science-based goal-setting framework benefitting people & nature

- Targeted Restoration and Protection
- Innovative Financing
- WLE Coastal Strategy
- Outcome-driven Cooperative Mgmt
- Science
Thank you!

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