Great Lakes Community Resilience Index:
A vulnerability self-assessment checklist

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New York Sea Grant
Presentation Outline

• What is New York Sea Grant
  • Resilience
• Project overview
  • Community Resilience Index (CRI)
• CRI - overview
• How you can get involved
What is New York Sea Grant (NYSG)?

- 33 Sea Grant programs in US
- NYSG founded in 1971
- State-wide network of integrated research, education, & extension services promoting:
  - Coastal economic vitality
  - Environmental sustainability
  - Citizen awareness & understanding about NY’s marine & Great Lakes resources
NYSG Extension Focus Areas

• Healthy Coastal Ecosystems
• Sustainable Fisheries & Safe and Sustainable Seafood Businesses
• Environmental Literacy & Workforce Development
• Resilient Communities & Economies

Photos: NYSG & NOAA
Resilience & NYSG’s Role

• Academic research
• Stakeholder-driven outreach
• Assistance in emerging issues
• Unique structure and positioning
• PARTNERSHIPS

• Coastal Community Development Program

➤ Climate Change Capacity Building Initiative

Photos: NYSG
Uncertainties of Climate Change

http://www.kleinisd.net/default.aspx?name=cimath.hs

\[
\frac{dx}{\left( \frac{3}{x^3} + 9 \right)} = \frac{dx}{6t^3 + 9t^2} = \left[ \begin{array}{l}
\frac{d}{dx} \left( \frac{9}{t^3} \right) = \frac{E}{x} \\
\frac{d}{dx} \left( \frac{6t^5}{x^2} \right) = \frac{Gt^5}{x^3 + 1}\end{array} \right] dt = 6 \left( t^2 - \frac{t}{x^2} - \frac{1}{t^2 + 1} \right) dt = 6 \left( t^2 - \frac{t}{x^2} - \frac{1}{t^2 + 1} \right) dt
\]

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6 \left[ \frac{2}{x^2} + 6t \ln |E + 1| \right] + C =
\]

\[
\left( \frac{1}{x} \right)^2 + \sqrt{\ln \left( \frac{6}{x^2} + 1 \right) + 1} \right] + C
\]
Potential Impacts of Climate Change: New York

- Rising temperatures
  - Heat waves/less freezing
- Changing precipitation patterns
  - Intense rains/flood
- Infrastructure
Potential Impacts of Climate Change: New York

- Ecosystems
- Agricultural
- Human health
Now What???

Photos: pintrest and 360factors
Available Tools: The Rabbit Hole...
Front-End Tools

1. Step 1: Identify the Problem
2. Step 2: Determine Vulnerabilities
3. Step 3: Investigate Options
4. Step 4: Evaluate Risks & Costs
5. Step 5: Take Action

Image: ustoolkit.gov
Climate Change Capacity Building Initiative

• Funding source
• 2/2015 – 1/2018
• Audience
• Process
• Current phase & timeline

• Great Lakes Community Resilience Index: a self-assessment checklist
Great Lakes Community Resilience Index (CRI)

• Advisory team

• Purpose
  • Audience

• Uses
  • What it will do
  • What it will NOT do

• Other initiatives

“I am a new local government planner, and I need baseline data to determine where current vulnerabilities are in my community.”

“I am a department of works manager and I need to be able to justify to my mayor/supervisor why I need funds for certain mitigation projects.”

“I work for the county and am interested in working with municipalities on a inter-municipal coastal recreation and tourism trail and need to know more about vulnerabilities prior to trial development.”
Gulf Region CRI: Model for the Great Lakes CRI

Gulf CRI:
CRI: Building Weather Scenarios

GULF REGION

<table>
<thead>
<tr>
<th>Variables</th>
<th>Bad Storm (benchmark) Scenario 1 Name</th>
<th>Future Storm (greater intensity) Scenario 2 Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind speed at landfall (mph)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rain (total 24-hours)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storm Surge (height in feet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed of Movement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tidal Influence (high or low)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landfall Location</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GREAT LAKES

- Blizzard
- Flash Flood (intense rain)
- Flash Flood (quick thaw)
- Ice Storm
- Wind Storm

Benchmark vs. Credible Worst Case Scenario
CRI: Key Indicators of the Community

GULF REGION

GREAT LAKES

- Critical Infrastructure & Facilities
- Transportation Issues
- Plans & Community Agreements
- Current Mitigation Measures
- Business Plans (Large Businesses)
- Social Systems/Resilience
- Public Outreach & Education
- Disaster Preparedness & Recovery
- Hazard Mitigation
- Recreation & Tourism
- Natural Resources/Habitat/Ecosystems/Water Resources
- Agriculture
- Other (for community-specifics)
Gulf Region CRI: Example of Attributes for Key Indicators

2. Assuming Scenario 1, if any of the following affect your transportation evacuation route(s), will your community regain a pre-storm level of service within one week? Check Yes or No.

<table>
<thead>
<tr>
<th>Transportation issue*</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Will flood-prone areas (tunnels, roads in low-lying areas) be operational within one week?</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Will primary bridge(s) be out for less than one week?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will roads blocked by storm debris (trees, wrack) be cleared in less than one week?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will washouts (roads) be passable in less than one week?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will flood-prone areas (tunnels, roads in low-lying areas) be operational within one week?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is public transportation available to assist evacuation of residents unable to evacuate on their own?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there more than one evacuation route?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a plan for post-storm traffic management?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total number of Yes answers and No answers:

A Joint Program of • State University of New York • Cornell University • NOAA/US Department of Commerce
Gulf Region CRI: **Example for Determining Your Resilience Index**

- Users use scores they assigned in previous sections, to populate tables.
- Points are determined for each table

Use the box labeled “Total number of Yes answers” from Sections 2-6 to complete the following chart.

<table>
<thead>
<tr>
<th>Sections 2-6</th>
<th>Number of Yes answers</th>
<th>Translate number of Yes answers to Resilience Index</th>
<th>Resilience Index</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Example) Section 2: Transportation issues</td>
<td>1</td>
<td>2 or fewer (LOW)</td>
<td>LOW</td>
<td>A road construction project will create an additional evacuation route within a year. Also, we are in talks with the local public transportation provider about a program to assist evacuation.</td>
</tr>
<tr>
<td>Section 2: Transportation Issues</td>
<td></td>
<td>3 to 4 (MEDIUM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 or more (HIGH)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 3: Community Plans and Agreements</td>
<td>4</td>
<td>4 or fewer (LOW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 to 8 (MEDIUM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 or more (HIGH)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 4: Mitigation Measures</td>
<td></td>
<td>4 or fewer (LOW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 to 8 (MEDIUM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 or more</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Gulf Region CRI: Example for Interpreting Your Resilience Index Results

• Resilience Index: an indicator of community’s ability to reach acceptable level of function and structure post-weather event.

**LOW Resilience Index:**
- Needs attention
- Critical infrastructure: > 18 months

**MEDIUM Resilience Index:**
- Could improve
- Critical infrastructure: < 2 months

**HIGH Resilience Index:**
- Good to go
- Critical infrastructure: probably no to minimal impacts
Gulf Region CRI: Using Your Results

- Learn & investigate weaknesses identified
  - Planning and zoning considerations
  - Ecosystem services
  - Prioritization of vulnerabilities
  - Further analyses
  - Funding for improvement projects
GREAT LAKES CRI: How YOU Can Get Involved

- Timeline
- Reviewers
- Test communities
- Formatted
- Distributed
  - Hardcopy to attendees
  - URL: http://seagrant.sunysb.edu/articles/r/2149
WANTED: Reviewers & Test Communities

I am interested in more information about reviewing the Great Lakes CRI Content.
Name: ____________
Phone: ____________
Email: ____________
Comments:
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

I am interested in more information about being a Great Lakes CRI test community.
Name: ____________
Phone: ____________
Email: ____________
Comments:
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
Summary & Questions

• Tools for baseline analysis
• Great Lakes CRI will be an option
  • Reviewers & test communities
• Reach out to partners and experts as a first step
• Thank you!

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