Adapting to Climate Change and Variability: For the Twin Cities Area Transportation Study
Agenda

• Acknowledgments
• GLISA’s role
• Relevance
• Purpose
• Process
• Climate Data
• Meeting 1
• Meeting 2
• Recommendations
• Interviews & Audit Summary
• Relationship to Existing Plans
• Implementation
Acknowledgments
Part of a National network of regional centers focused on climate change adaptation

Climatologists, social scientists, outreach specialists

GLISA funded MSU project team to work with two Michigan communities for one year
Relevance


Photo source: Don Campbell/ Herald Palladium Staff 2013
Relevance

Policy statement: DOT shall integrate consideration of climate impacts and adaptation into the planning, operations, policies, and programs of DOT in order to ensure that taxpayer resources are invested wisely and that transportation infrastructure, services and operations remain effective in current and future climate conditions.
Relevance

--- PRESIDENT OBAMA'S PLAN TO ADDRESS CLIMATE CHANGE ---

Reduce carbon pollution from power plants and build cars that burn less fuel.

Cut energy waste from our homes and businesses.

Help states and cities prepare for the impacts of climate change.

Lead global efforts to address climate change.

Wh.gov/Climate-Change  #ActOnClimate
Purpose

How Can we Adapt to Climate Change?

Government Action

Citizen Participation

Understand Relevant Data

source: http://eoimages.gsfc.nasa.gov/images/imagerecords/45000/45615/greatlakes_amo_2010240_lrg.png
Process

- Community Selection & Contact Meeting
- Community Conversations 1 & 2
- Stakeholder Interviews
- Audit Tool Completion
- Final Meeting

Timeline:
- Sept. '12
- Feb./May '13
- Jun. '13
- Aug. '13
Methodology

The Six Americas Audience Segments

- Alarmed: 16%
- Concerned: 29%
- Cautious: 25%
- Disengaged: 9%
- Doubtful: 13%
- Dismissive: 8%

Sept. 2012
n = 1,058

Highest Belief in Global Warming
Most Concerned
Most Motivated

Lowest Belief in Global Warming
Least Concerned
Least Motivated

Proportion represented by area
Source: Yale / George Mason University
Methodology

- Two-way communication
- Scientist involved in discussions
- Facilitated small group deliberations
- Climate science information made local and relevant
- Drew upon residents’ observations
CLIMATE DATA
Southwestern Michigan Temperature

Temperature Departure from the 1951-1980 Average

Change in Mean Temperature (°F) from 1951-1980 to 1981-2010

- Annual: 0.9
- Winter: 1.9
- Spring: 1.1
- Summer: 0.6
- Fall: 0.2
Southwestern Michigan Precipitation

Precipitation Departure from the 1951-1980 Average

<table>
<thead>
<tr>
<th>Season</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
<td>8.0</td>
</tr>
<tr>
<td>Winter</td>
<td>7.5</td>
</tr>
<tr>
<td>Spring</td>
<td>3.6</td>
</tr>
<tr>
<td>Summer</td>
<td>4.8</td>
</tr>
<tr>
<td>Fall</td>
<td>17.1</td>
</tr>
</tbody>
</table>

Change in Mean Total Precipitation (%) from 1951-1980 to 1981-2010
Snow Depth and Ice Coverage

- Average winter snow depths in SW Michigan have decreased since the 1980s but are near historic values.
- From 1973 to 2010, annual average ice coverage on the Great Lakes declined by 71%.

Meeting One
February 27, 2012

• Introduce purpose of the project
• Identify local climate impacts and concerns

How has the change in climate:
• affected the local economy?
• the area’s natural resources?
• affected you and your family?

What are some potential benefits of a changing climate?
What are some potential losses?
Areas of Concern

- Land Use (e.g. transportation)
- Water & Public Health (e.g. Lake MI levels)
- Food & Agriculture (e.g. drought)
- Tourism & Economy (e.g. marina access)
Meeting Two
May 8, 2013

Objective:
• Elicit feedback on proposed adaptation strategies identified at the first meeting.
• Prioritize strategies
Priority Categories

Category Evaluation

- Land Use & Development
- Tourism & Economy
- Public Health & Water
- Ag & Food

Votes

- Support
- Oppose
## Priority Best Practices

### Top 5 Best Practices

<table>
<thead>
<tr>
<th>#</th>
<th>Best Practice</th>
<th>Support</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintain diversity of native of crops/trees</td>
<td>15</td>
<td>Agriculture/Food</td>
</tr>
<tr>
<td>2</td>
<td>Enhance: pedestrian environment; non-motorized paths; access to marinas</td>
<td>10</td>
<td>Tourism/Economy</td>
</tr>
<tr>
<td>3</td>
<td>Critical habitat: identify, acquire, protect</td>
<td>10</td>
<td>Public Health/Water</td>
</tr>
<tr>
<td>4</td>
<td>Promote public transit</td>
<td>8</td>
<td>Tourism/Economy</td>
</tr>
<tr>
<td>5</td>
<td>Utilize water resources more efficiently</td>
<td>7</td>
<td>Public Health/Water</td>
</tr>
</tbody>
</table>
### Best Practices & Considerations

<table>
<thead>
<tr>
<th>Agriculture/Food Concerns</th>
<th>Best Practices: What Municipal Governments Can Do With Your Support</th>
<th>Transportation Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drought</strong></td>
<td>Tree species that require an abundance of moisture could be replaced in urban forests with species that are drought-resistant. Replace monocultures with polycultures (multiple species instead of one) along streets and arterial corridors to counteract tree deaths from drought.</td>
<td>Correct tree placement reduces street maintenance costs by reducing repair (surface destabilization from roots) and clean-up costs (leaves, fruits, and branches) associated with inappropriately-placed species.</td>
</tr>
<tr>
<td><strong>Availability/Access to Food</strong></td>
<td>Identify areas within the region that could be used for additional Farmers Markets and seek out additional community, municipal, and regional collaborators, as well as local markets and growers. This way, food supply is less likely to be interrupted during extreme events.</td>
<td>Temporary road closures, detours, and short-term conversion of parking areas to market areas; smaller local shipments to local markets rather than large semi-truck loads from major distribution centers.</td>
</tr>
<tr>
<td></td>
<td>Amend ordinances and plans, as well as economic development funding practices to allow food production within urban areas.</td>
<td>May lead municipalities to install porous pavement that captures run-off before sediment, fertilizer, and pesticides end up in storm and/or sanitary sewers.</td>
</tr>
</tbody>
</table>
Audit Summary

**Strengths**
- Capability of shoreline structures to handle extreme storm events/changes in lake levels
- Urban tree maintenance and replacement programs
- Addressing the aftermath of extreme lake effect (snow) events

**Vulnerabilities**
- Road infrastructure
- Water quality
- Erosion and land subsidence
- Tourism
Stakeholder Interviews

- Local experts contacted for 30-min interview
- Commented on priorities and actions
- Identified barriers to implementation
- Overall, experts impressed with recommendations

- Barriers:
  - Lack of resources, especially tax dollars, for some long-term improvements
  - Political will
Relationship to Existing Plans

- **TwinCATS Long-Range Transportation Plan**
  - Address the relationship between failing infrastructure and potential flood hazards.
Relationship to Existing Plans

- **Berrien County Hazard Mitigation Plan**
  - Address fire susceptibility impacts on roads and other related infrastructure
Implementation

• How can we take all of this information to prepare us for climate change and variability?

- Public Input
- Existing Plans
- Climate Data
- Update Community Policies, Ordinances, & Plans
- Funding & Partners
Thank You

Photo courtesy of Daniel Brown, GLISA