

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



GLISA

GREAT LAKES INTEGRATED SCIENCES + ASSESSMENTS



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

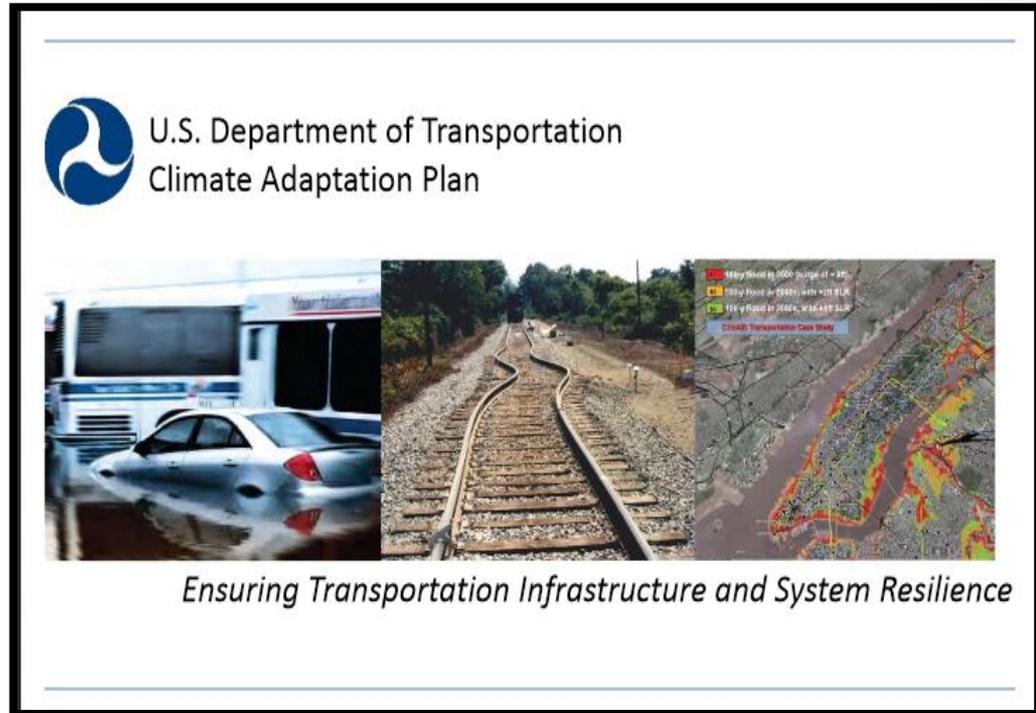


Geneva Township. Photo Source: FOX17 News.



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.**

Purpose



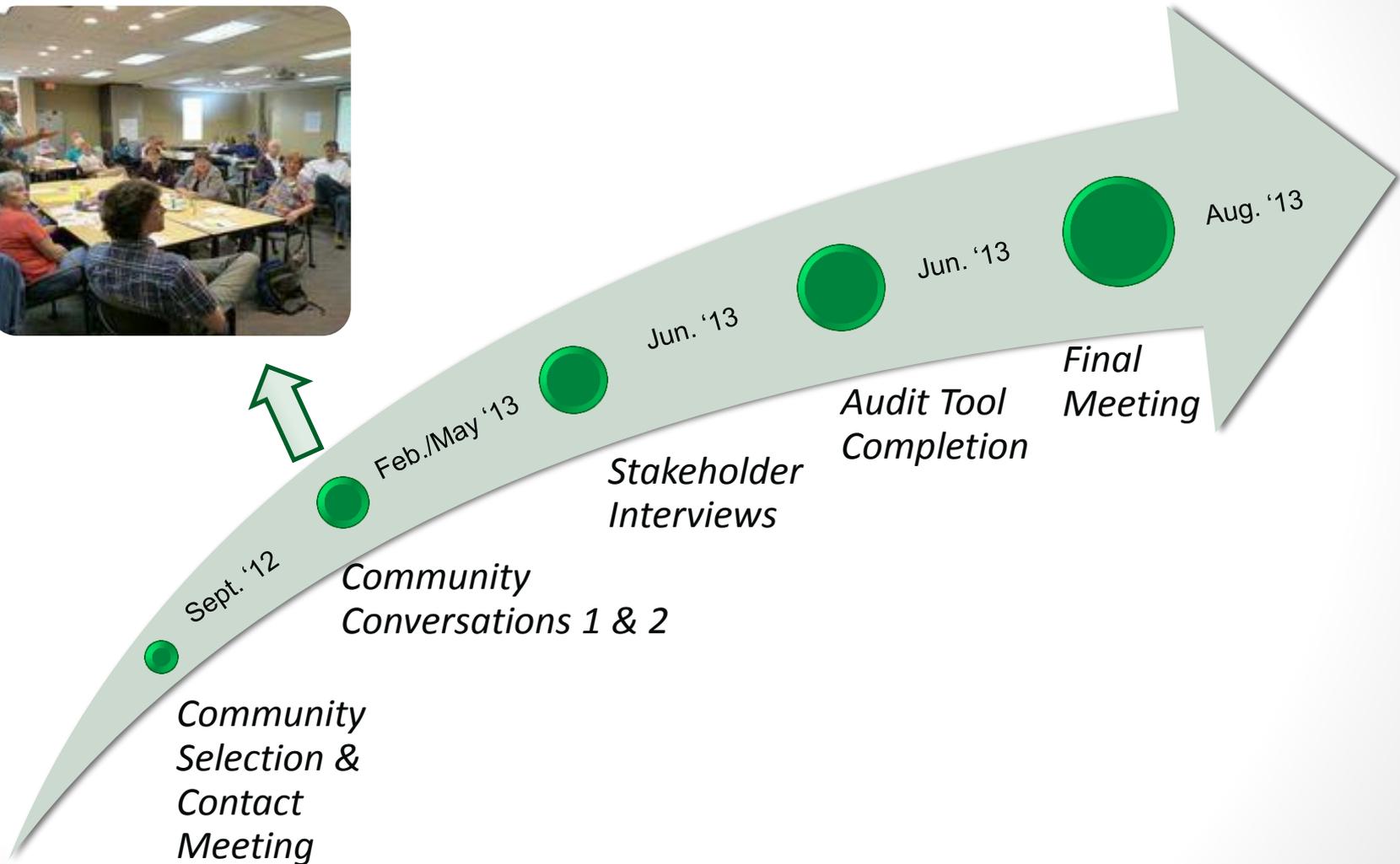
How Can we Adapt to Climate Change?

Government Action

Citizen Participation

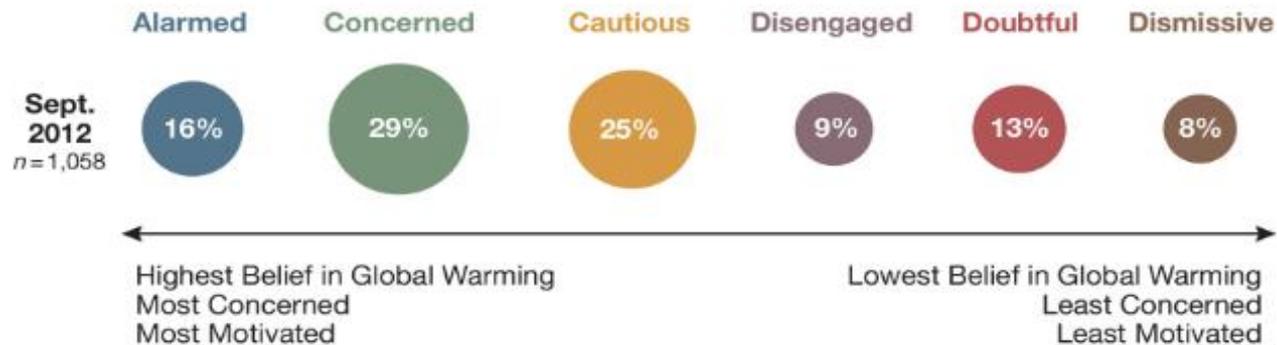
Understand Relevant Data

Process



Methodology

The Six Americas Audience Segments



Proportion represented by area

Source: Yale / George Mason University

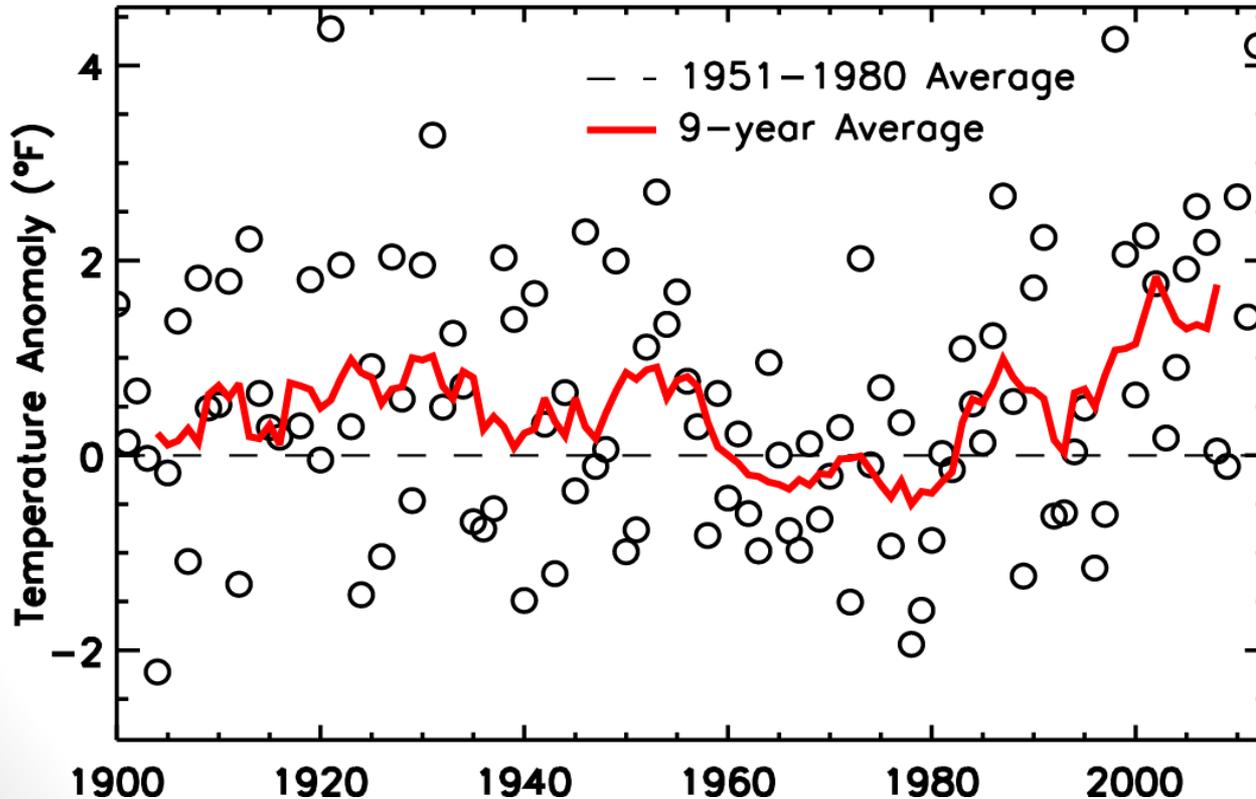
Methodology

- 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

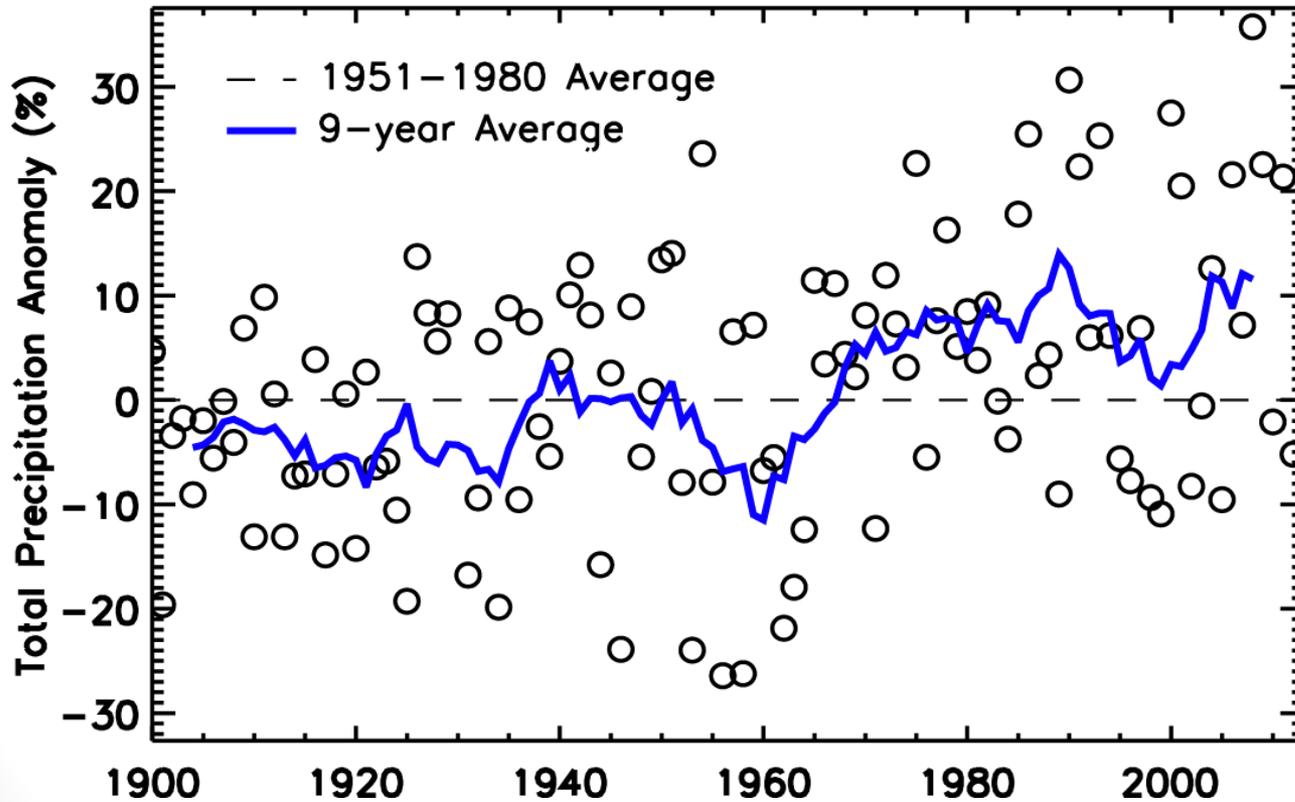
Temperature Departure from the 1951-1980 Average



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

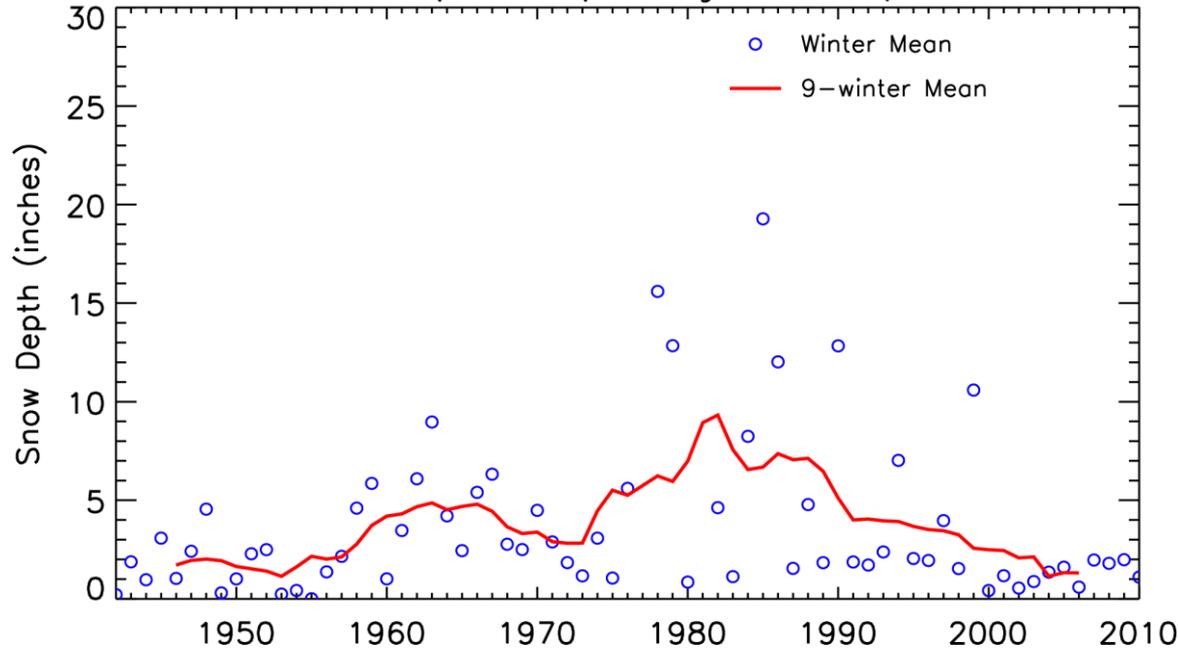


Change in Mean Total Precipitation (%) from 1951-1980 to 1981-2010

Annual	8.0
Winter	7.5
Spring	3.6
Summer	4.8
Fall	17.1

Snow Depth and Ice Coverage

Winter (Dec–Feb) Average Snow Depth



- 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%.



Lake Michigan Ice Coverage, March 2013.
Photo: NASA

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

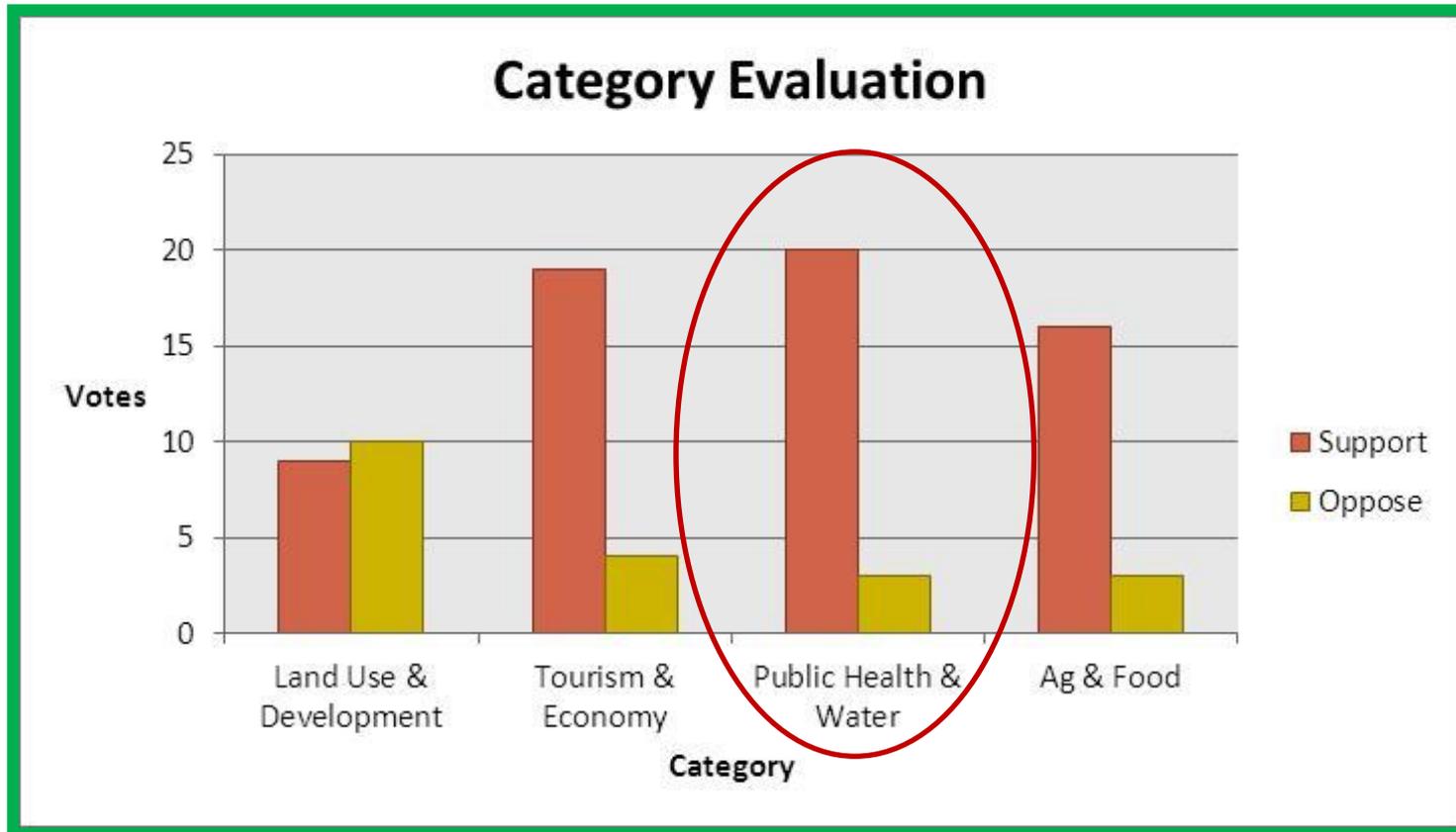
May 8, 2013

Objective:

- Elicit feedback on proposed adaptation strategies identified at the first meeting.
- Prioritize strategies



Priority Categories



Priority Best Practices

Top 5 Best Practices

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

Best Practices & Considerations

Agriculture/Food Concerns	Best Practices: What Municipal Governments Can Do With Your Support	Transportation Considerations
Drought	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	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
Availability/Access to Food	<p>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</p> <p>Amend ordinances and plans, as well as economic development funding practices to allow food production within urban areas</p>	<p>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</p> <p>May lead municipalities to install porous pavement that captures runoff before sediment, fertilizer, and pesticides end up in storm and/or sanitary sewers</p>

Audit Summary

SWMPC's Climate Change Readiness Audit	
Category	Relevance
Critical Infrastructure Flooding	High
Critical Facilities Flooding	N/A
Built Environment & Infrastructure	High
Operations & Maintenance	High
Water Resources	Medium
Ecosystems & Habitats	Medium
Tourism & Recreation	Medium
Business Plans & Equipment	N/A
Community Plans	High

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

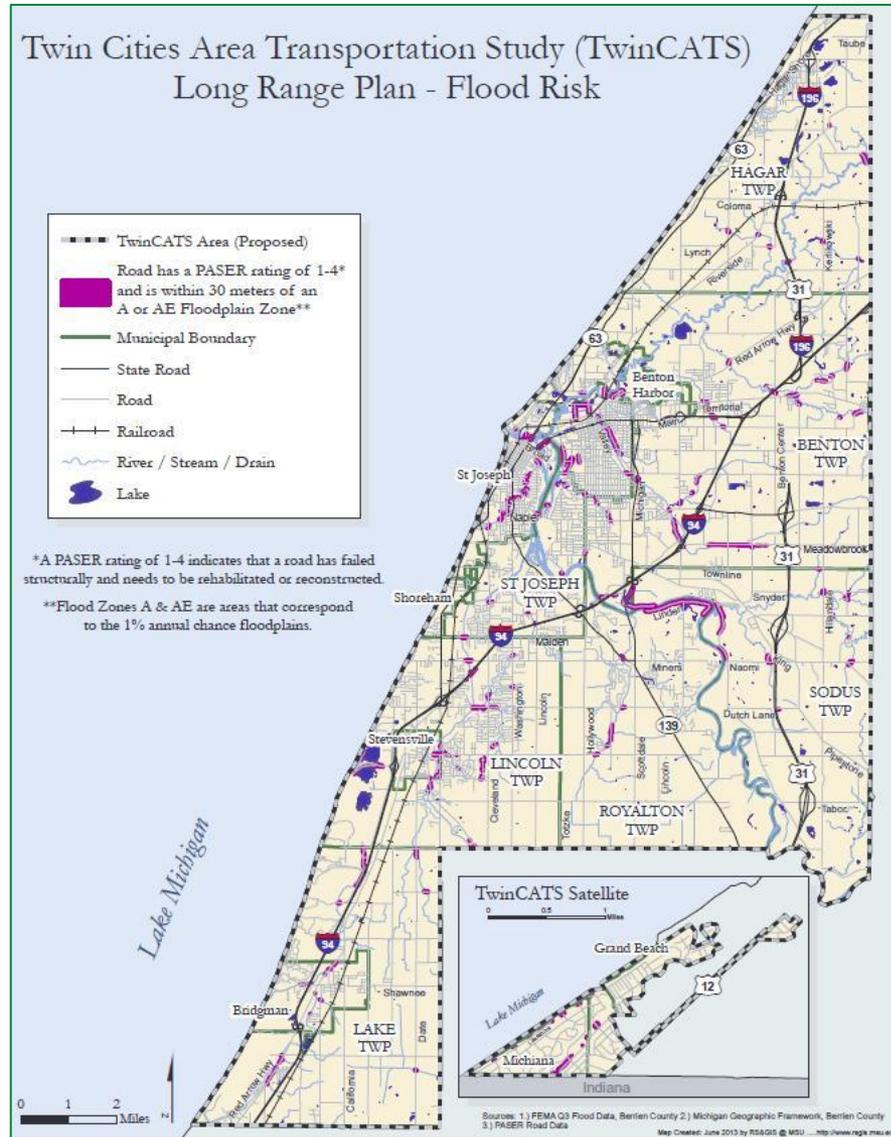
Stakeholder Interviews

- 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*

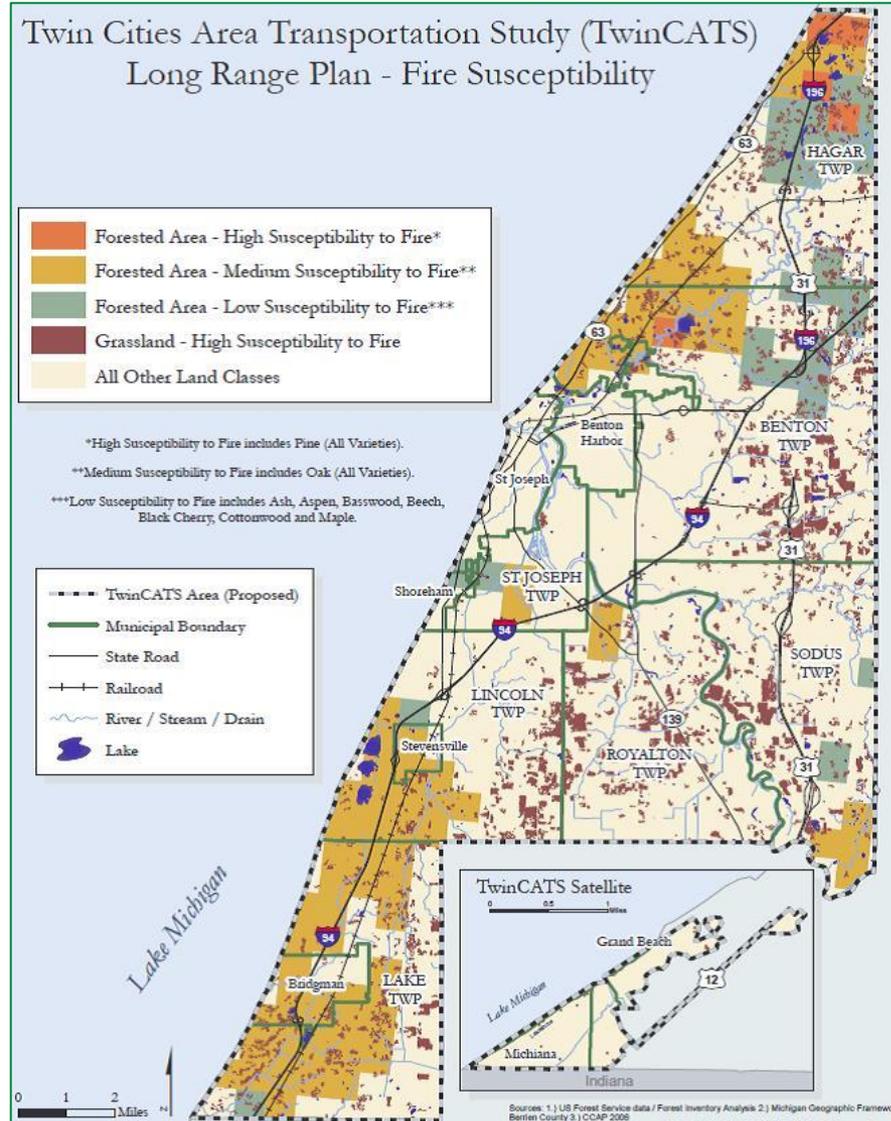
- Address the relationship between failing infrastructure and potential flood hazards.



Relationship to Existing Plans

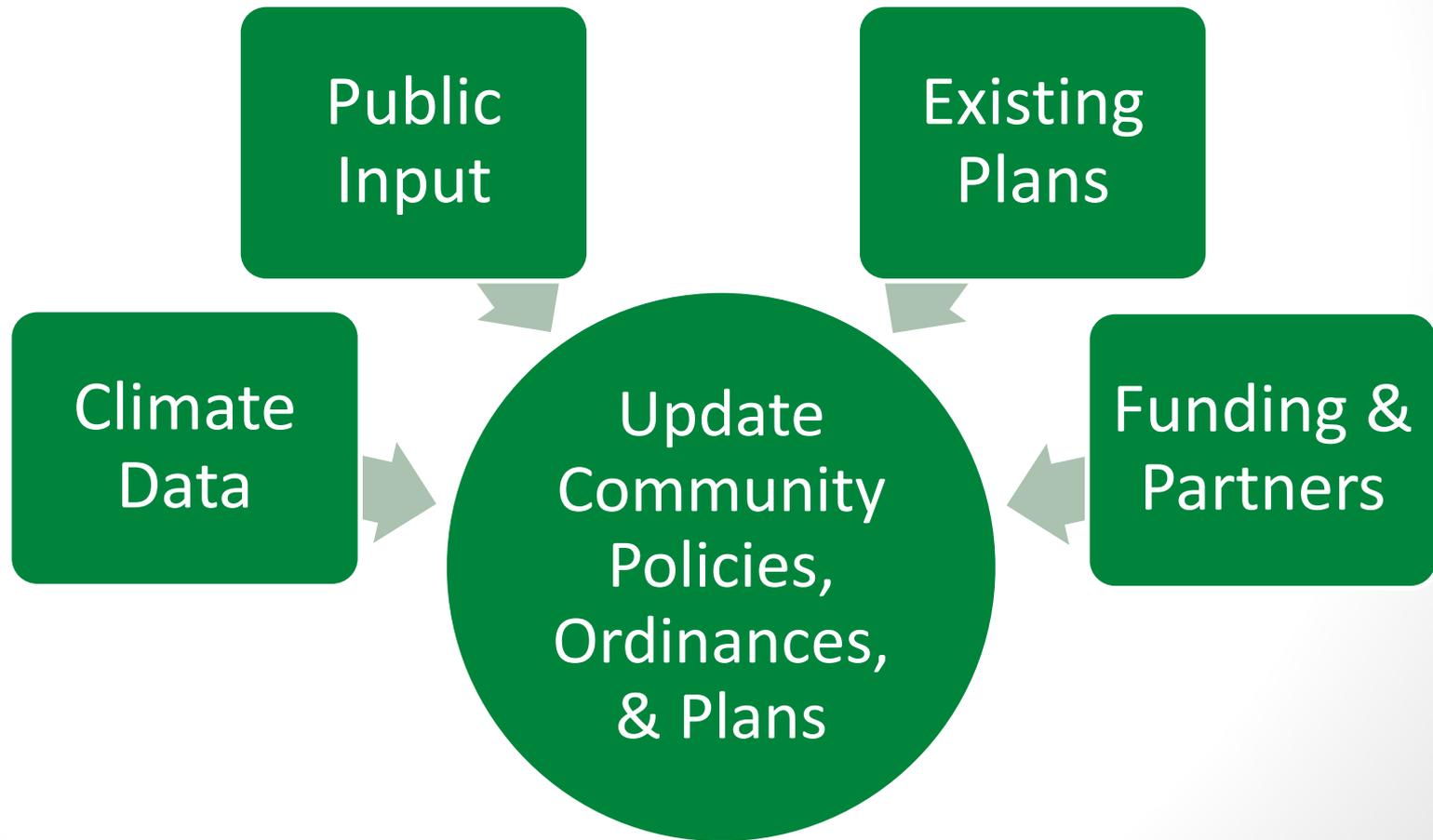
➤ Berrien County Hazard Mitigation Plan

- 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?



Thank You



Photo courtesy of Daniel Brown, GLISA