

Local Wetland Protection in a Changing Climate

Michigan Inland Lakes Convention
May 1, 2014



LIAA is a Section 501(c)3 nonprofit corporation created in 1993 to stimulate & support greater civic engagement.

Our mission statement is:

*Helping people shape
better communities through:*

- *participation,*
- *education,*
- *information &*
- *the effective use of technology*



Planning for *Resilient Communities*

Learning, Adapting & Thriving

A new way of viewing the master plan process, focusing on **adaptation** in the face of changing conditions and circumstances.

A key focus of our effort is on protecting and enhancing **Ecosystem Services**.



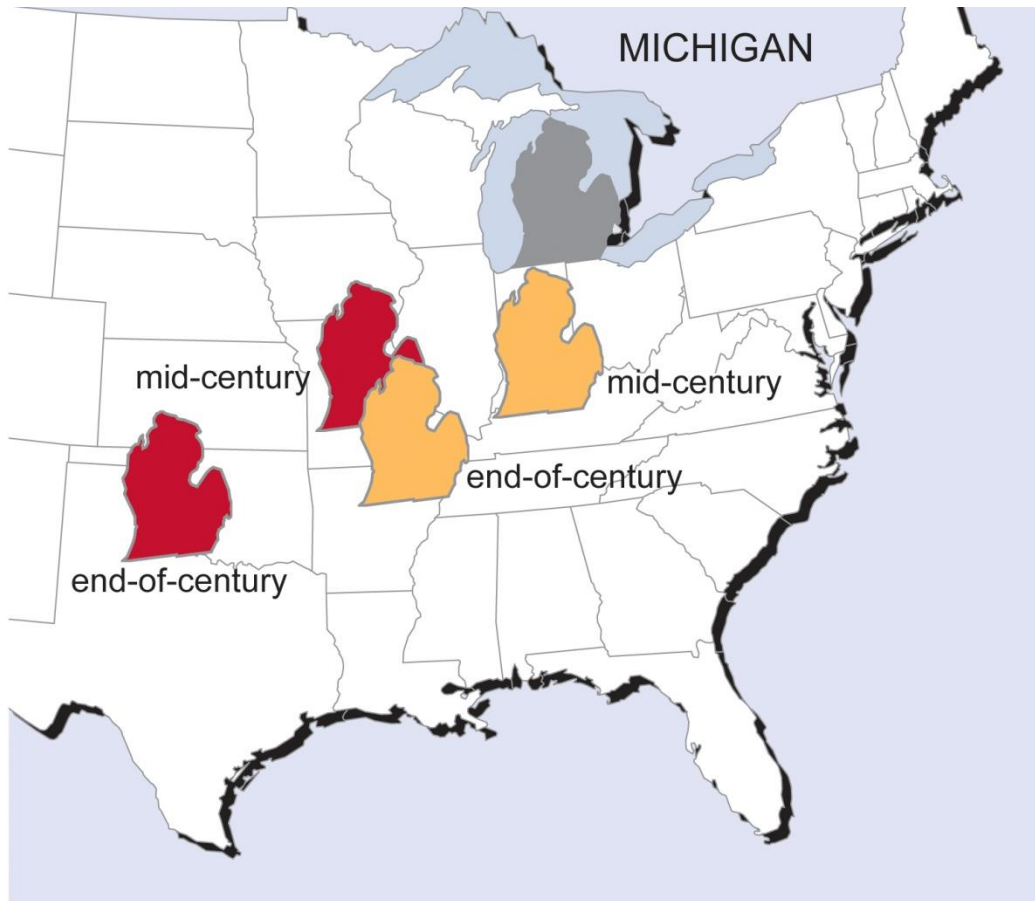
Overview

- **Coastal Wetlands Project**
- **Climate Change in the Great Lakes Region**
- **Local Wetland Protection in a Changing Climate**
 - *Local Wetland Inventory*
 - *Education and Citizen Engagement*
 - *High Priority Areas for Restoration*
 - *Integrate Protection into all levels of Municipal Management*
 - *Watershed-based Management*
 - *Local Ordinances*
- **Useful Resources**

Coastal Wetland Research Project

Interview	Name	Organization	Title
8-Jan	Grenetta Thomassey	Tip of the Mitt Watershed Council	Program Director
13-Jan	Anne Hokanson	MDEQ	Wetland Ecologist
30-Jan	Elizabeth Riggs	Huron River Watershed	Executive Director
30-Jan	Amy Beyer	Conservation Resource Alliance	Director
30-Jan	Anne Vaara	Clinton River Watershed	Executive Director
27-Nov	Don Uzarski	CMU Biological Station	Director
19-Mar	Erin McDonough	Michigan United Conservation Clubs	Executive Director
20-Mar	Brad Garmon	Michigan Environmental Council	Dir. of Conservation and Emerging Issues
21-Apr	Alan D. Steinman	Annis Water Resources Institute (GVSU)	Director
25-Apr	Carl R. Ruetz	Annis Water Resources Institute (GVSU)	Professor
18-Apr	John Roda	West Bloomfield Charter Township	Environmental Manager
18-Apr	John Hamlin	Ann Arbor Charter Township	Building Inspector and Zoning Official

A Changing Climate



Lower Emissions
Scenario⁹¹

Higher Emissions
Scenario⁹¹

Hayhoe *et al.*²⁸³

*Great Lakes Region Average
Temperature Increases*

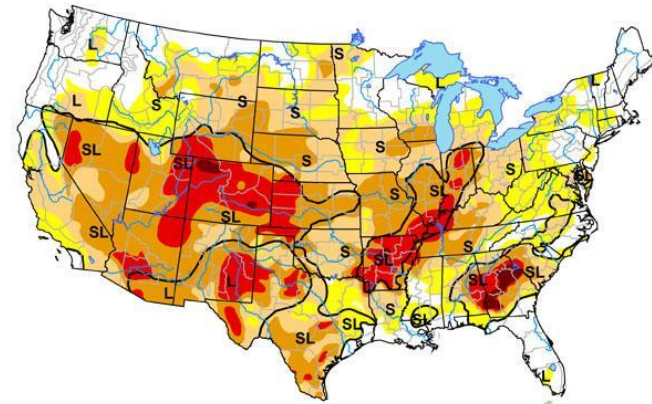
2.3° increase from 1968 – 2002

1.8° – 5.4° projected increase
by **2050**

A Changing Climate

Climate Models Indicate . . .

More summer drought and
more extreme heat events



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

Source: USDA

A Changing Climate

Climate Models Indicate . . .

More extreme storms &
more moisture in spring &
fall



Source: NASA



Source: NOAA



Source: NOAA

A Changing Climate

Climate Models Indicate . . .
Milder winter temperatures



Source: NOAA

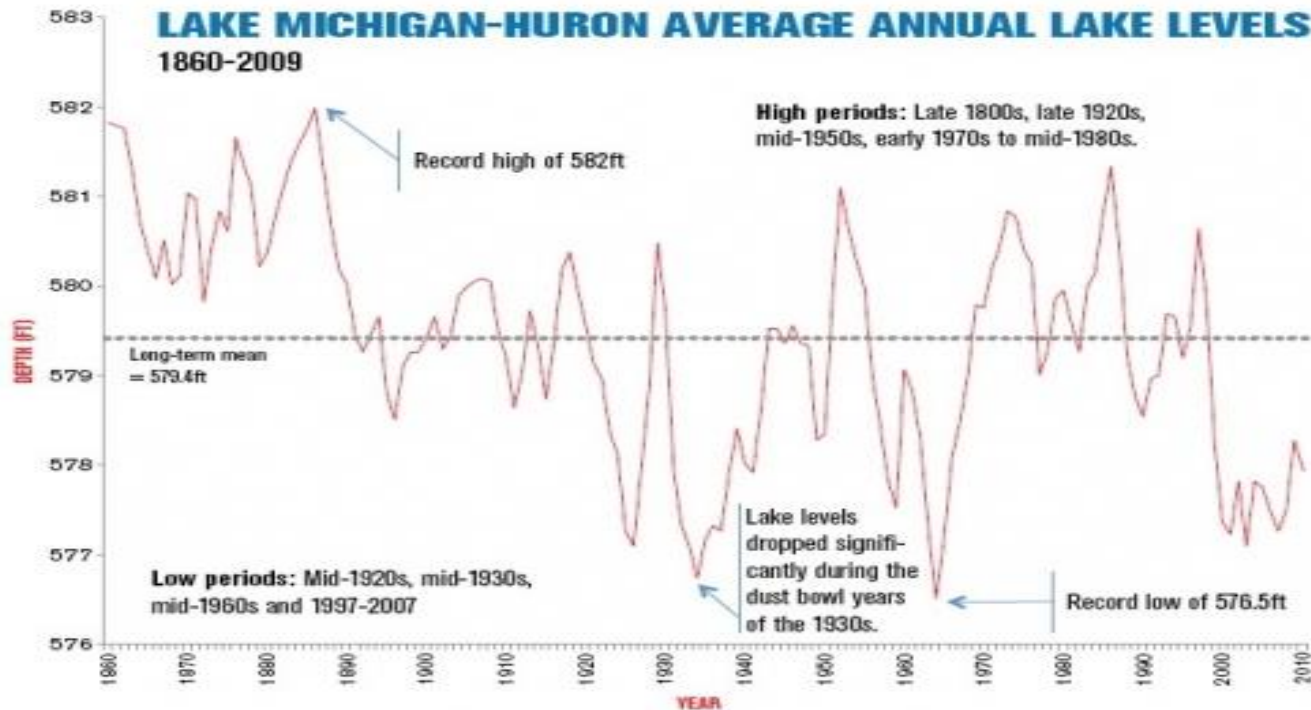


Source: USDA



Source: NOAA

A Changing Climate



Climate Models Indicate . . .

Uncertainty with respect to Great Lakes water levels, with potential for significant highs and lows.

A Changing Climate

So what does this mean for coastal wetlands?

- **Warmer temperatures and drought will:**
 - Increase organic matter decomposition and accelerate CO₂ release.
 - Reduce species diversity and biological integrity
 - Fragment habitat corridors
 - Stress wetlands and make them vulnerable to invasive species
- **Heavy Rain and Flooding will:**
 - Increase erosion
 - Reduce flood storage capacity
 - Reduce pollution filtration



A Changing Climate

So what does this mean for coastal wetlands?

- **Change in water levels will**

 - Impact the type and quality of wetlands

 - Impact the hydrology of the watershed

- **Increased CO₂ emissions will**

 - Cause the pH of the Great Lakes to decrease



Climate is not the only Challenge

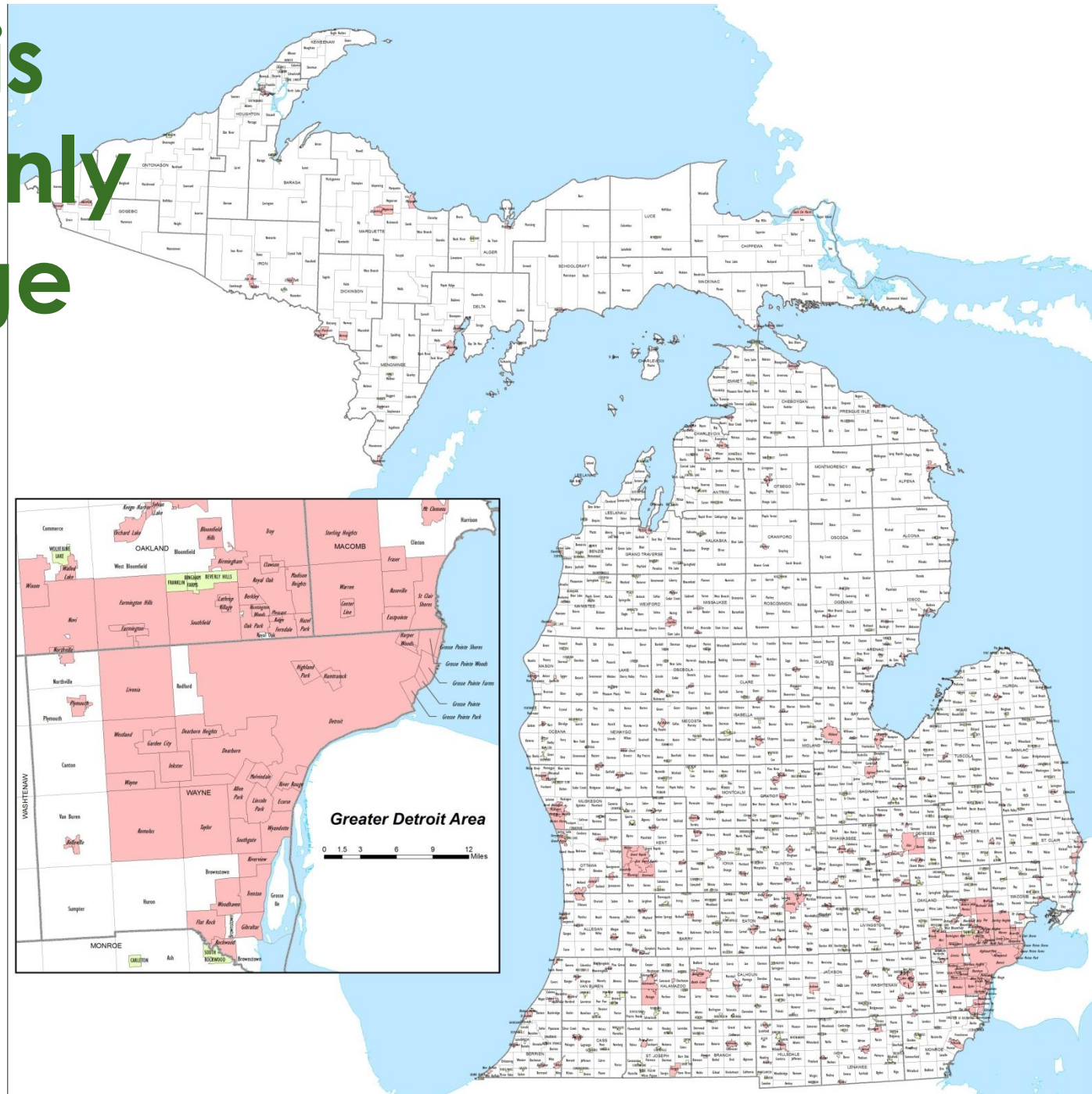
Watershed boundaries do not coincide with jurisdictional boundaries



Source: Michigan Sea Grant and USGS www.mseagrant.umich.edu/

Climate is not the only Challenge

In Michigan, there are over 530 cities and villages, 1,240 townships, and 83 counties



Wetland Adaptation Goals

- Protect Biodiversity
- Preserve the Hydrology
- Enhance Connectivity



Know what you have: *Wetland Inventory*

Adaptive Management requires continuous monitoring



Michigan Wetlands Map Viewer

Monitor:

1. Species type
2. Vegetation type
3. Vegetation coverage
4. Water temperature
5. Water level
6. Water quality

Education

Foster Public Stewardship Programs

- *Climate Adaptation* actions include:
 - Plant shady vegetation to reduce water temperatures
 - Temporarily adding water to extend species' natural adaptation time
 - Create berms or hills for organisms to take shelter during storms
 - Restore Riparian zones
 - Remove invasive species
 - Plant wind-resistant vegetation to minimize blow-downs and erosion along coastal shorelines.



Source: CRA website

Citizen Engagement

Who should be at the table:

- Private Property Owners
- Drain Commissioner
- Entity responsible for Michigan Natural Features Inventory
- Local Conservation Partners (Land Conservancy, Land Trust, etc.)
- Realtors, Homebuilders Association
- Local Fisherman
- Outdoor Recreation Enthusiasts

The Master Plan

Goal Statements

Objectives and Actions

Asset Mapping

- Identify the most valuable natural resources and wetlands
- What ecosystem services do they provide for your community?

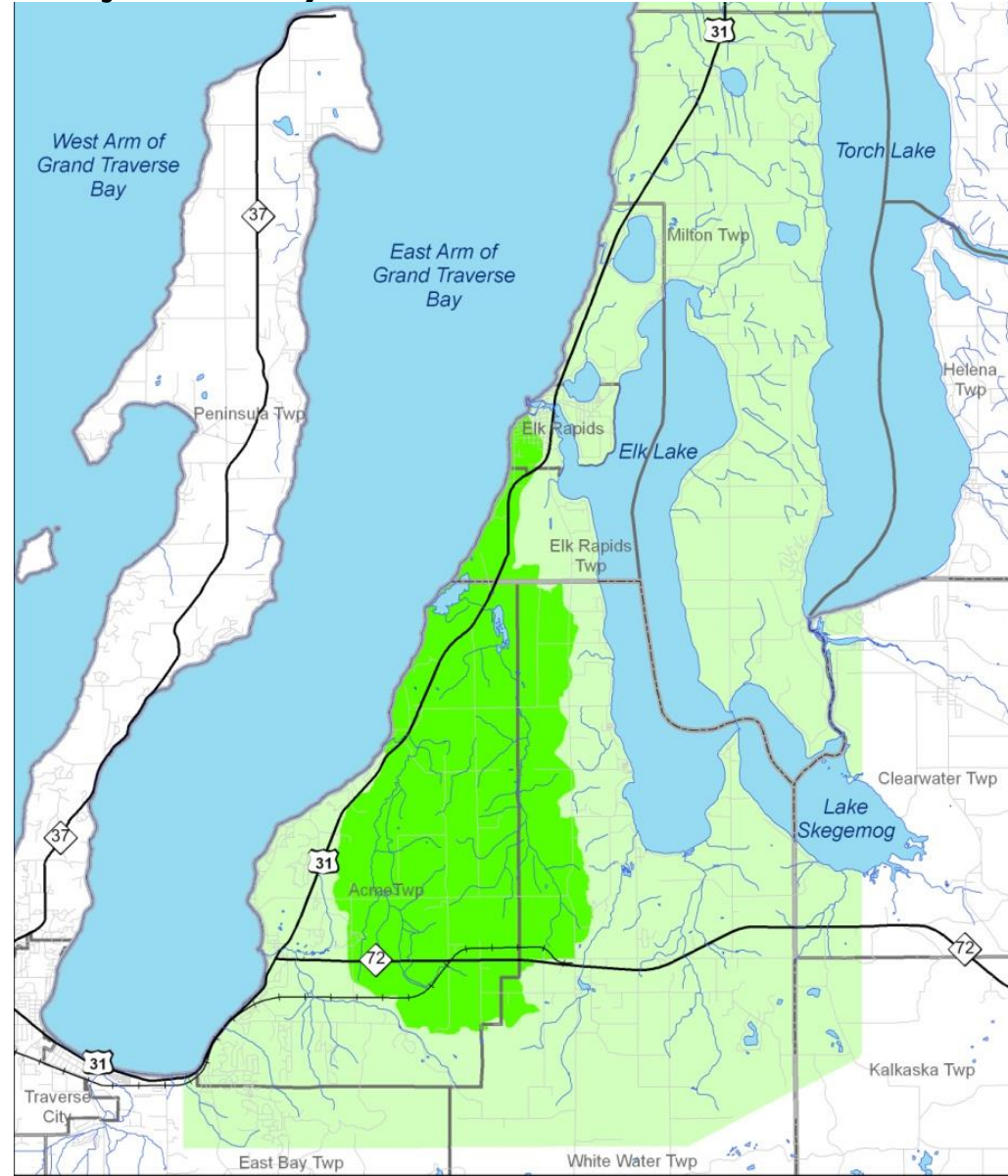


Identify High-Priority Wetlands to Conserve

Potential Conservation Areas

- Framework to identify areas for conservation
- Use **GIS** mapping tools and **Public Engagement**

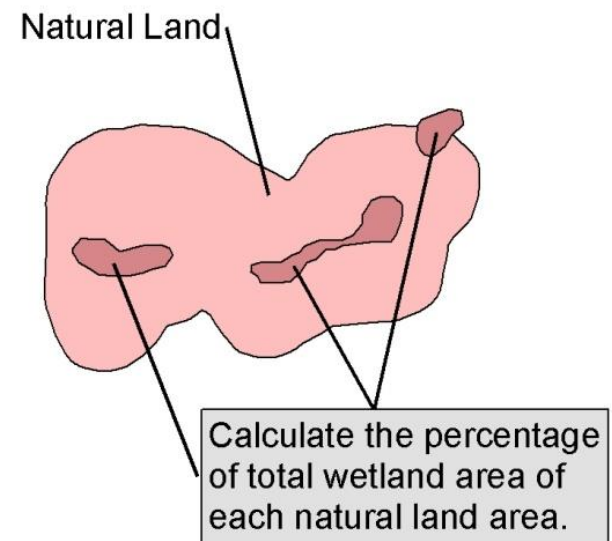
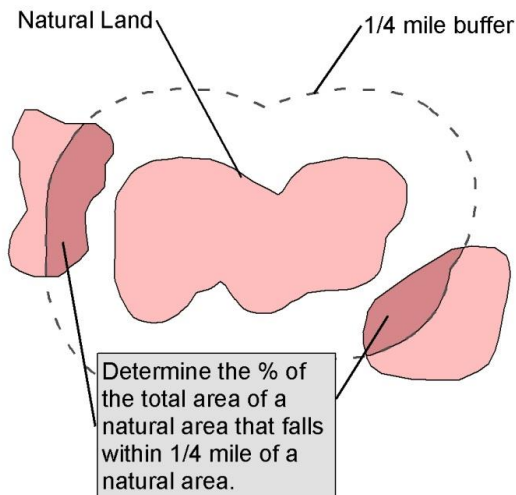
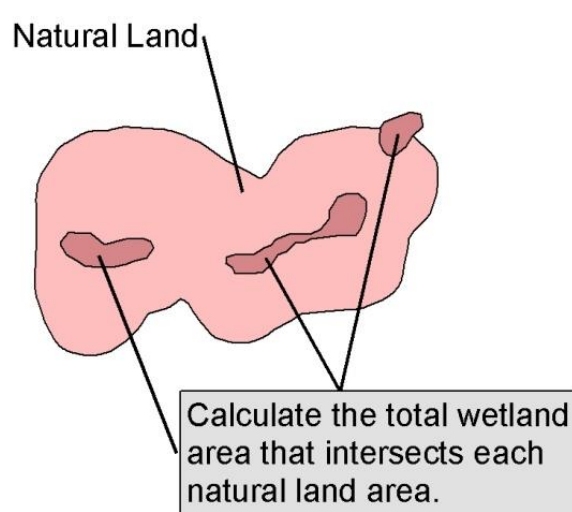
Project Study Area



Potential Conservation Areas

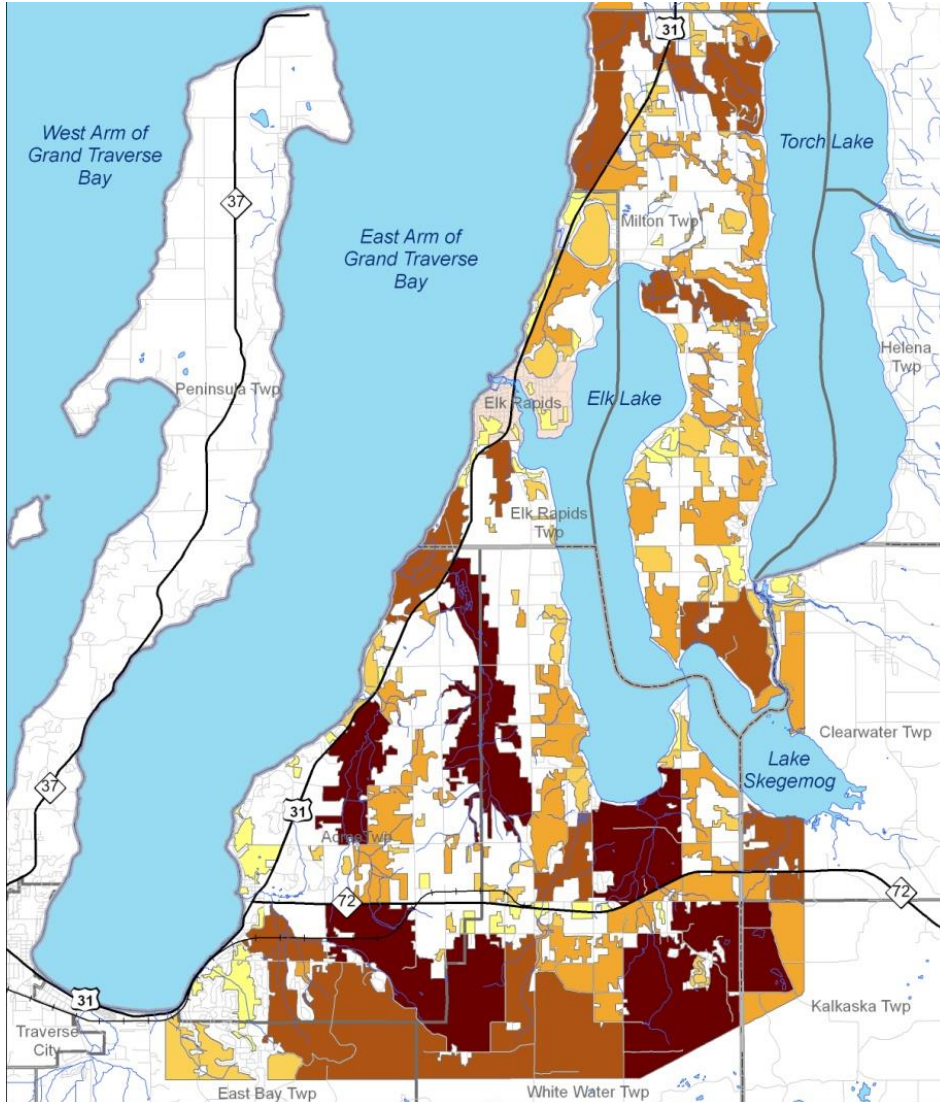


Prioritized based on **size**, presence of a **stream corridor** or **shoreline**, **wetland acres**, biological **diversity**, vegetation **quality**, landscape **connectivity**



Potential Conservation Areas

Priority Areas to Conserve



Local stakeholders can further refine analysis

Identify High Priority Wetlands to Conserve

Migration Routes

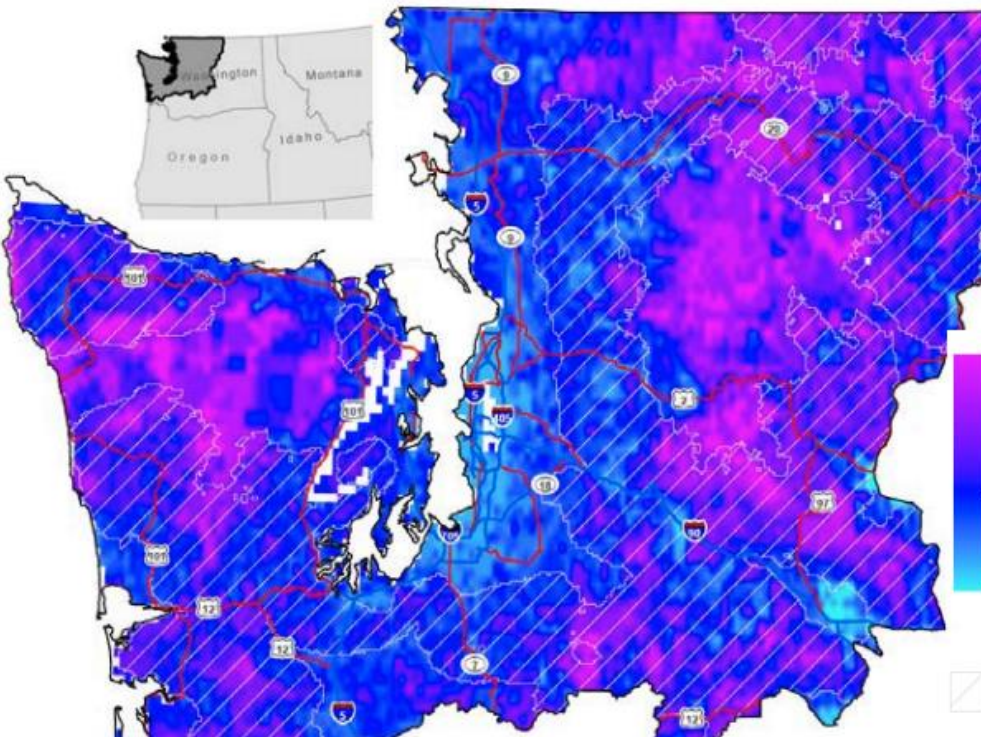
Conserve and restore ecological connections to facilitate migrations and other transitions caused by climate change

Conservation Resource Alliance's **Wild Link Program** works with private property owners to preserve connective corridors for wildlife.



Migration Routes

Corridor Connectivity modeling with **Climate Change**: Puget Sound Regional Planning Council



Model Integrates:

- Biodiversity
- Landscape Quality
- Development Risk
- Projected Future Vegetative changes

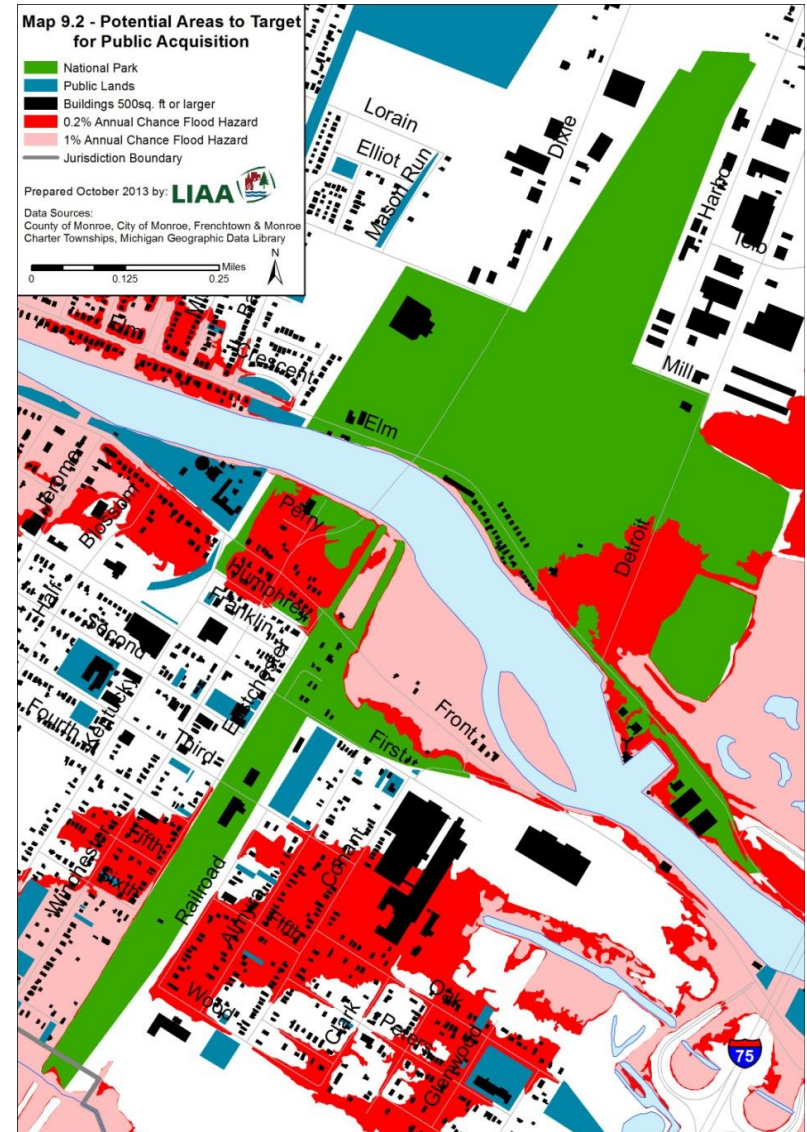
PINK = highest priority for conservation given climate projections

Parks Management and Wetlands

Wetlands and Flood Storage

Example: Monroe, MI

National Battlefield Park Concept Design



Wetland Restoration

Laycock City Park, Calgary, Canada



Green Infrastructure and Wetlands



Meridian Twp., MI

Low Impact Design strategies for urban wetland management cope with **flow alteration** and '**flashiness**' from **Climate Change**.



Towar Neighborhood in Meridian Township worked with the Ingham County **Drain Commissioner** to create **Rain Gardens** to address a continual flooding issues.

Wetland Restoration and Stormwater Management Menomonee Valley, WI

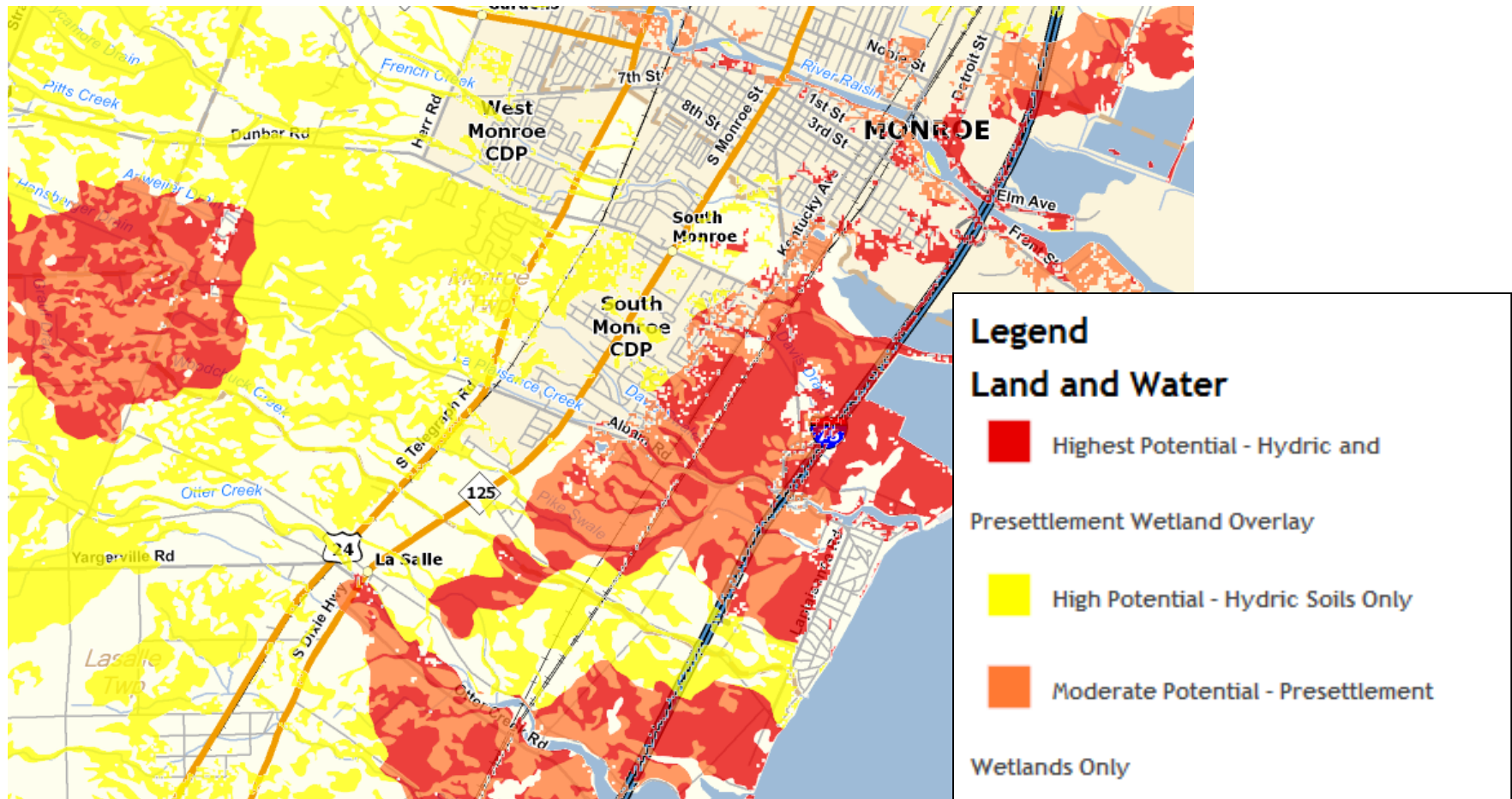
Experienced two 100-year flooding events in 10 years.
Restoration of wetlands and new stormwater management
features have improved water quality and addressed flooding.



Source: menomoneevalley-fromthegroundup.org

Areas with High Potential for Wetland Restoration

Michigan Wetlands Map Viewer



Source: <http://www.mcgi.state.mi.us/wetlands/mapBasic.aspx>

Holistic Watershed Management and Wetlands

‘Stem to Tip’ Wetland Management

Reconnect channels and wetland areas to the Great Lakes or other larger water bodies.



Cooperative Weed Management

Huron Pines in Northeast Michigan



Source: huronpines.org

Climate Change will increase vulnerability of wetlands to invasive species

Huron Pines Resource Advisory Group

Cooperation across *jurisdictional* boundaries and *ownership* boundaries.

Regulation

State Wetland Regulations

Under Part 303, a permit is required if the wetland meets one of the following criteria:

1. Connected to a lake, pond, river or stream
2. Over 5 acres
3. Identified by the DEQ as 'Essential'

Regulation

Local Wetland Ordinances

44 communities in MI have a wetland ordinance

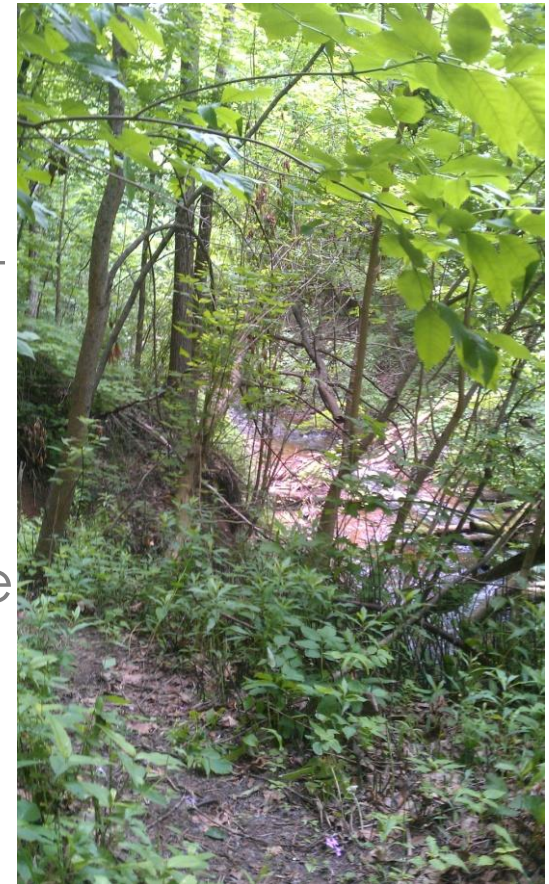
- **73%** regulate wetlands down to **2 acres**
- **19%** regulate wetlands down to **1 acre**
- Two communities have some type of **Wetlands Protection Committee**
- **27%** require **natural buffers**: most are **25 ft**

Regulation

Local Wetland Ordinances

Adaptation Strategies

- 2 Communities in Ingham County regulate all wetlands within **500ft of the Ordinary High Water Mark (OHWM)**, West Bloomfield regulates within **1000 ft**.
- Some communities apply ordinance to all lands within the **100-year floodplain**
- Some communities require proof that the activity will not impact the groundwater recharge rate.



Useful Resources

Planning for Resilient Communities in Michigan:

<http://www.resilientmichigan.org/>

International Panel on Climate Change: <http://www.ipcc.ch/>

Michigan Wetlands Map Viewer:

<http://www.mcgi.state.mi.us/wetlands/>

Wild Link Program: <http://www.rivercare.org/about-wild-link>

Huron Pines: <http://www.huronpines.org/>

Climate Wizard: <http://www.climatewizard.org/>

Climate Adaptation Knowledge Exchange (CAKE):

<http://www.cakex.org/>

Pacific Northwest Research Station: <http://www.fs.fed.us/pnw/>

NatureServe Climate Change Vulnerability Index:

<https://connect.natureserve.org/science/climate-change/ccvi>

Thank You



Claire Karner
Community Planner
ckarner@liaa.org
231-929-3696

Paul Riess
GIS Specialist
priess@liaa.org