

Local Wetland Protection in a Changing Climate

**Michigan Wetlands Association Conference
August 28, 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*



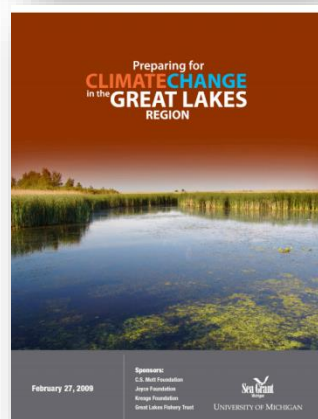
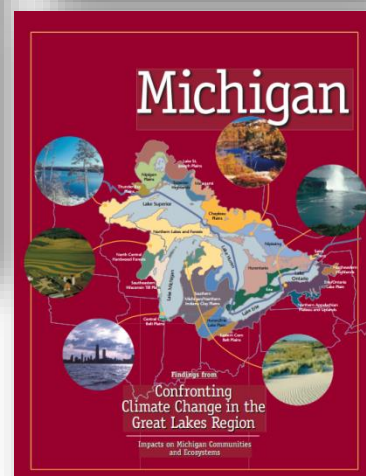
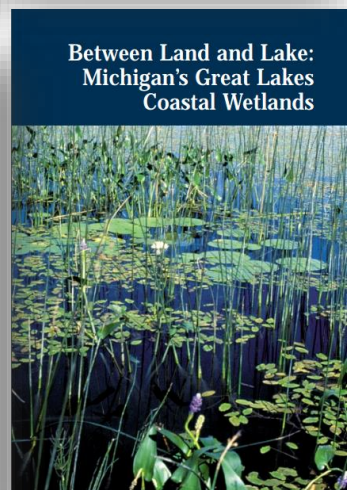
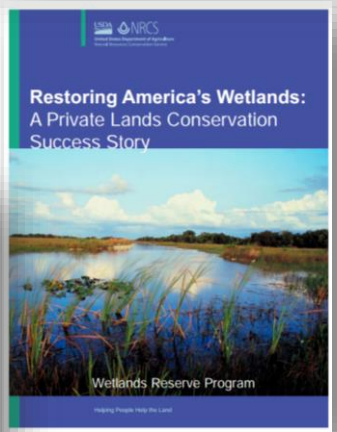
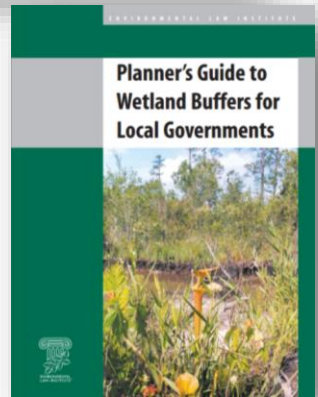
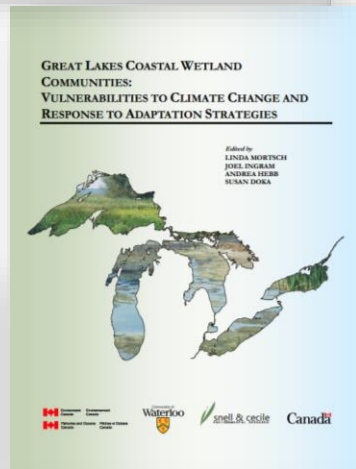
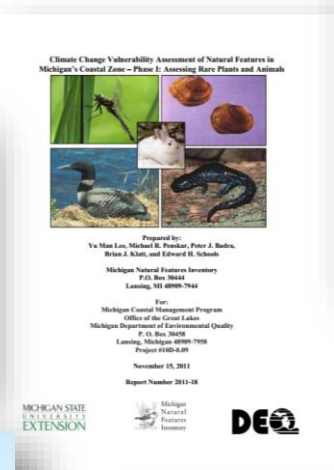
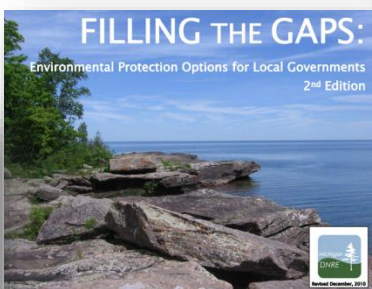
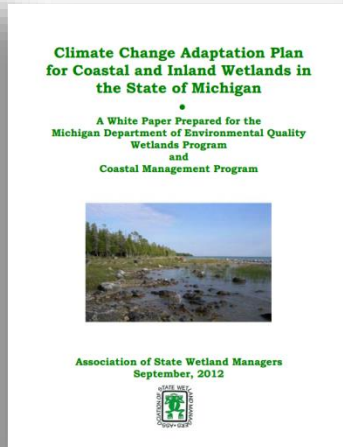
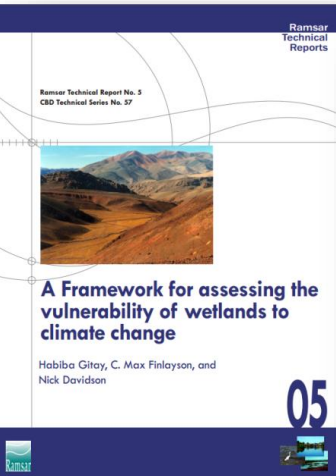
Overview: Coastal Wetland Research Project

CZM Wetland Adaptation Strategy

*"Work with ... and other agencies and organizations that provide land use planning assistance to local governments to **develop technical assistance** on incorporating climate change adaptation measures for coastal wetlands"*

*"There are **no known efforts at the local level** to identify climate change adaptation measures for coastal wetlands, and incorporate these measures into local plans and ordinances. ... The current **regulatory processes do not** incorporate a review that could **integrate climate change** into the permitting, enforcement and mitigation decision making processes. ... This strategy represents the first major step... to identify climate change impacts on coastal wetlands and appropriate adaptation measures."*

Resources Reviewed

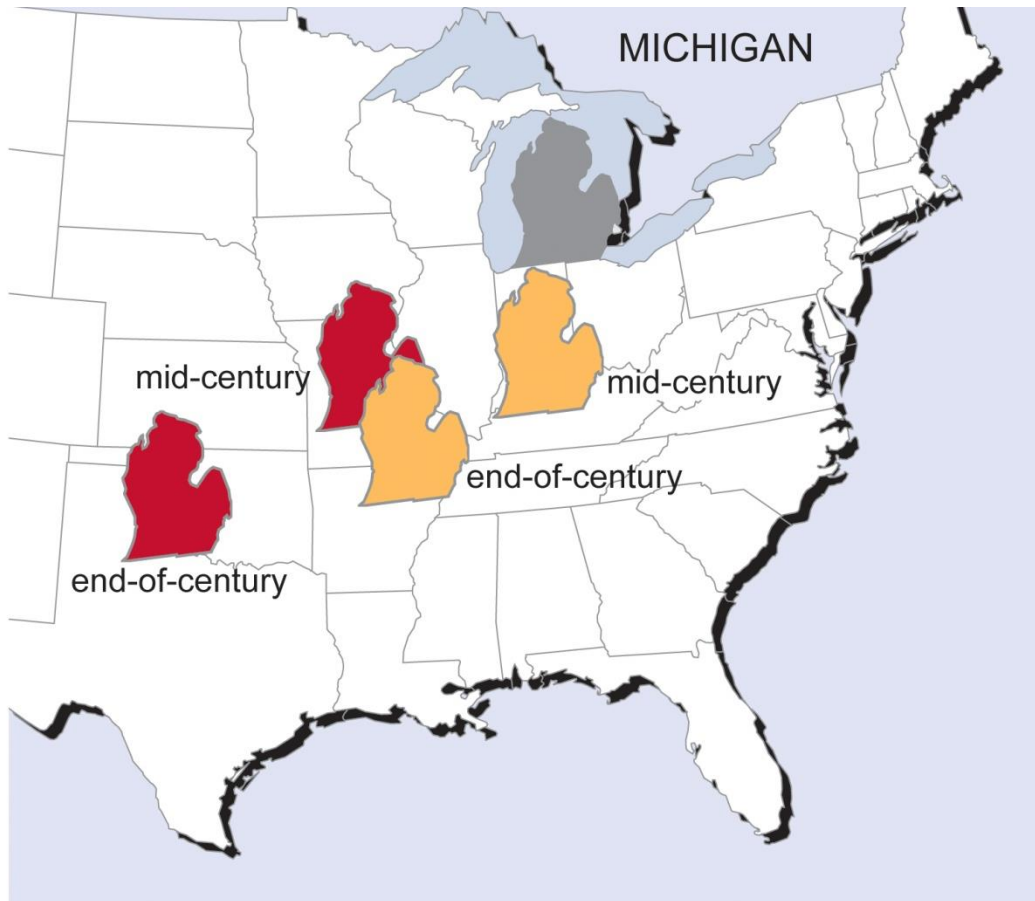


Coastal Wetland Research Project

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

Options for Action	Community Planning			Capital Improvements			Land Use Regulations			Local Stewardship Efforts	
	Inter-govt. Cooperation	Master Planning Efforts	Economic Development	Transportation Infrastructure	Parks & Recreation Areas	Landscaping and Site Design	Development Permits	Site Plan Review	Local Ordinances	Wetland Restoration Projects	Gather Baseline Data
Lower Commitment	Share wetland information across jurisdictional lines	Convene community discussion on vision and goals as they relate to wetland protection and quality.	Integrate wetland protection into regional economic development plans. Example goal is to leverage rare wetlands species for tourism.	Work with MDOT to protect high value wetlands by establishing wetland banks to mitigate transportation projects.	Restrict all new wetland disturbances in parks	Provide incentives for developments that treat stormwater on-site.	Require erosion controls during & after construction	Require setbacks from water & wetlands	Adopt an ordinance that requires a minimum vegetative buffer near wetlands & streams	Plant wind and drought-resistant plants	Use the MDEQ Wetlands Map Viewer to develop a baseline map - existing wetlands, potential areas for restoration.
Lower Commitment	Participate in Watershed Management Planning	Engage with Private Landowners regarding stewardship projects (i.e. corridor protection)	Work with MDEQ to set up a local Wetland Bank	Reduce impact of road crossings on streams and wetlands with construction and design techniques.	Control invasive species in wetlands & other park areas	Provide for sediment separation from runoff	Make lots along wetlands wider and deeper to reduce % of impervious surfaces and consider shared access.	Require vegetative buffer from water/wetlands with native plants	Adopt a local wetland ordinance (emphasis on groundwater recharge, regulate smaller wetlands, use OHWM and floodplain for setbacks)	Control invasive species (on-going)	Identification and Ranking Priority of Wetlands
Moderate Commitment	Work with the state to integrate wetland best practices into Regional Forest Management and Wildlife Plans	Engage Citizens in developing watershed management plan	Create a process for PDR and TDR to encourage wetland preservation and urban development.	Retrofit existing infrastructure to reduce the amount of excess sediments running off roads and parking lots.	Incorporate ponds/wetlands and wildlife viewing platforms in park design.	Integrate Low Impact Development into all new construction projects (e.g. bioswales, porous pavements, etc.)	Prioritize wetlands with significant carbon stores by adding additional permit requirements for these types of wetlands.	Encourage the use of green infrastructure design, including wetlands	Adopt a local Erosion and Sedimentation Control Ordinance - require a permit for any activity within 500 feet prior to administering a building permit.	Upland stormwater infiltration (e.g. basins, trenches, bio swales)	Develop a Water Quality & Wetlands Monitoring Program (biological and chemical conditions)
Moderate Commitment	Incorporate Wetlands in Natural-Areas Corridor Planning	Host a 'Summit' to educate the public on projected impacts and best practices for wetlands; bring in experts	Allow for property tax reductions and exemptions in sensitive environmental areas.	No dredging or filling for new infrastructure and no new parking lots or roads on Hydric Soils	Allow for temporary water storage capacity in park design	Incorporate vegetative buffers near wetlands & streams	Limit land splits outside of urban areas (e.g., parcel size)	Soil and Erosion control measures should be integrated into the site plan review process.	Other applicable local ordinances - Stormwater Control Ordinance, Critical Dune Ordinance	Re-establish natural hydrology with levees, bypass, or adding water when needed	Develop Regional Wetland Functions & Priorities Map
High Commitment	Identify migration routes for animals that cross jurisdictional boundaries and ownership boundaries	Clarify Conservation Goals (e.g., prevent extinctions, prevent flooding)	Work with local realtors to educate buyers on economic value of protected land and to identify properties with wetlands prior to sale.	Coordinate new transportation infrastructure projects with established migration routes and wetland areas to ensure wetland connectivity	Establish wetland/upland wildlife preserves (e.g. Meandering stream in Calgary)	Coordinate with communities upstream and mandate landscaping techniques that limit nutrient runoff.	Develop a general permit that streamlines the permitting process for wetland areas that have been damaged by storms.	Adopt a site plan review checklist to be used by developers and public officials that incorporates wetland best management techniques.	Adopt a County-wide ordinance that will fill the gaps of protection by local municipalities.	Installation of Wetland Maintenance Infrastructure (i.e. dikes, berms, etc.)	Regularly update local wetlands inventory based on changing conditions to support adaptive management.

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

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



Lake Erie Algal Bloom



Kim Comerzan, MSN, RN, CNS *Health Officer/Director*
Carl J. Schmidt, MD, MPH *Chief Medical Examiner/Director*

FOR IMMEDIATE RELEASE
Date: August 3, 2014

Contact: Kim Comerzan 734-915-1297

South Monroe County Water remains undrinkable

Residents who live in South Monroe County and receive their water through the South County Water System remain under a water advisory and should not use their tap water for drinking, preparing food, brushing teeth or to bathe children or immune comprised adults. Healthy adults may shower with the water. Pets should NOT drink the water. Do not attempt to boil the water for use, as this increases the toxins.

The communities impacted include:

Bedford Township
Erie Township
Lasalle Township
City of Lima Pier



National Geographic



National Geographic

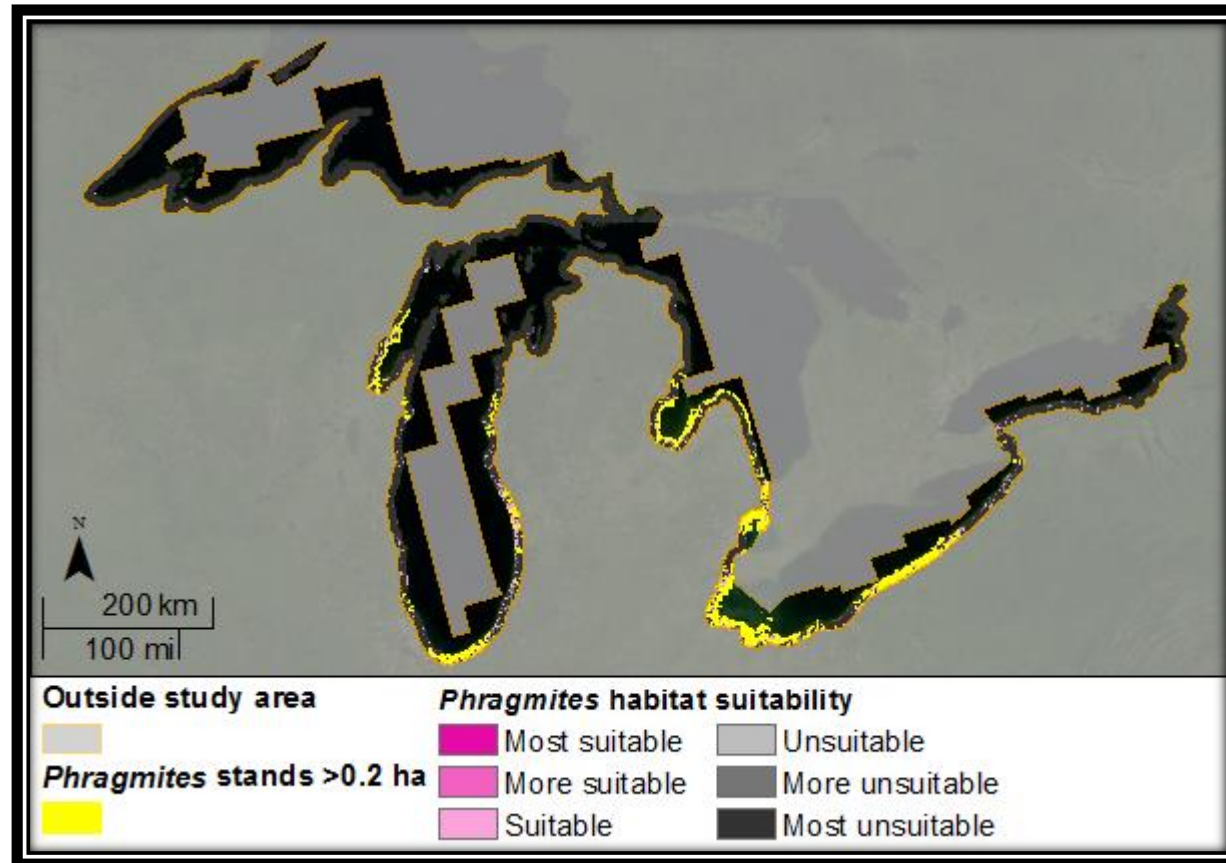
Phragmites



Photo Courtesy of Huron Pines



Photo Courtesy of GTRLC



Great Lakes Restoration Initiative

Changes in Great Lakes Water Levels



East Grand Traverse Bay in Traverse City, MI

Wetland Adaptation Goals

- Protect Biodiversity
- Preserve the Hydrology
- Enhance Connectivity



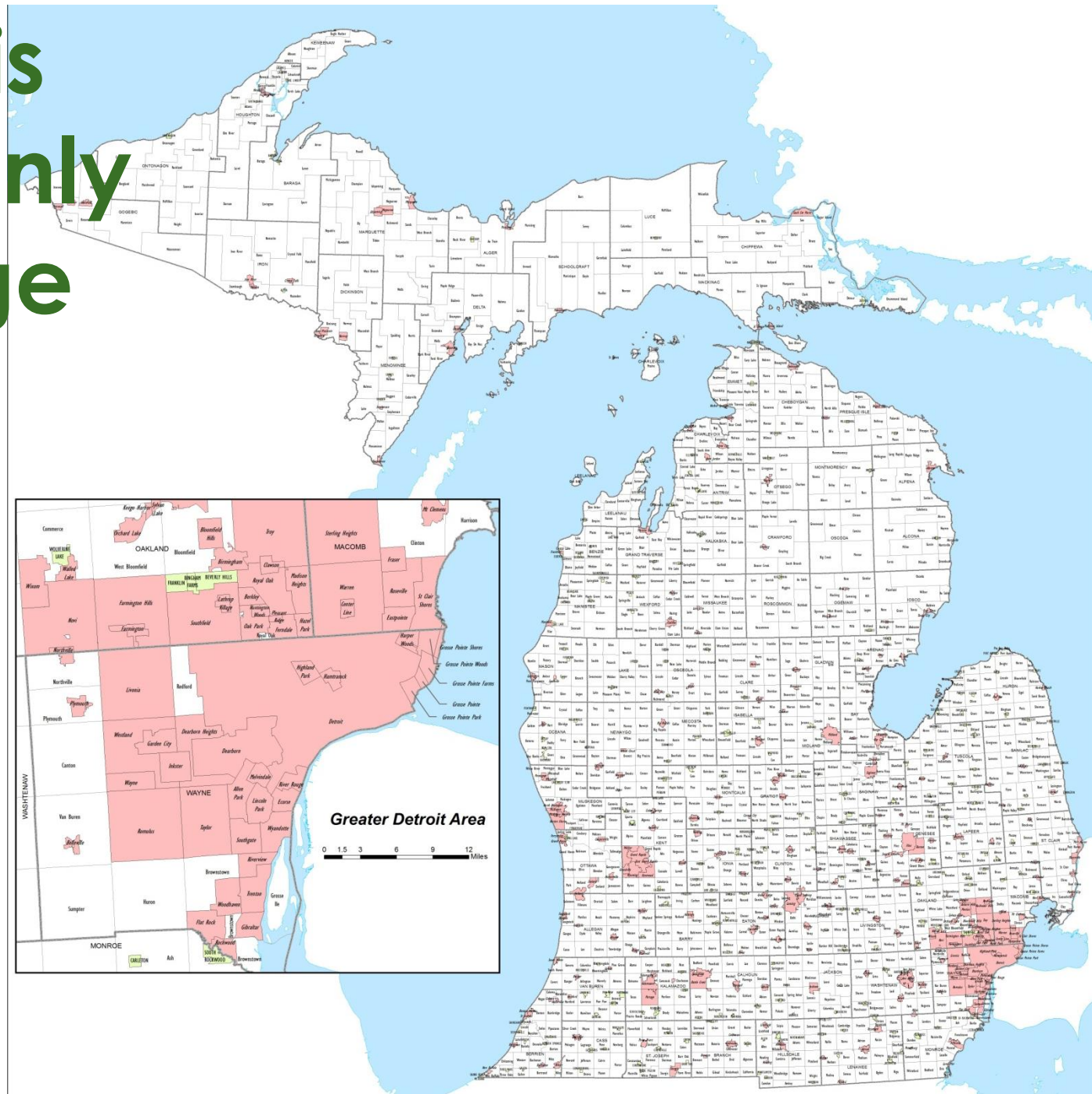
Climate is not the only Challenge

Watershed boundaries do not coincide with jurisdictional boundaries



Climate is not the only Challenge

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



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**.



Education

Two important things we learned:

1. Public does not always realize how unprotected wetlands are.
2. Wetlands are difficult to get out in and enjoy, which makes it difficult to foster appreciation



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

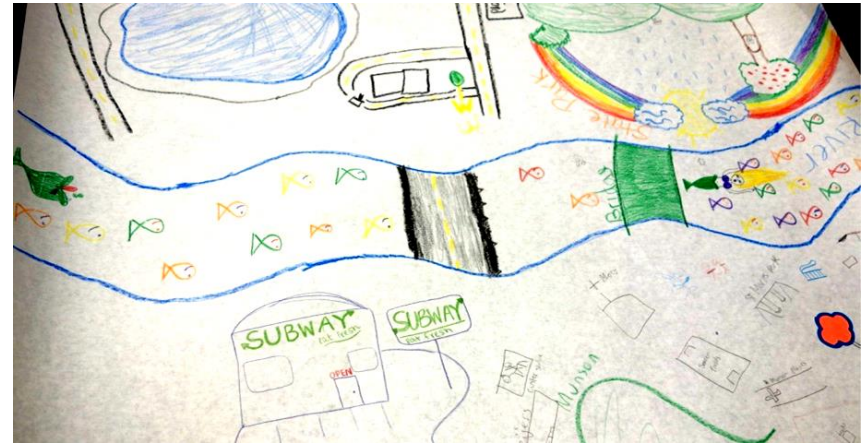
The Master Plan

Goal Statements

Objectives and Actions

Asset Mapping

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



Other Plans

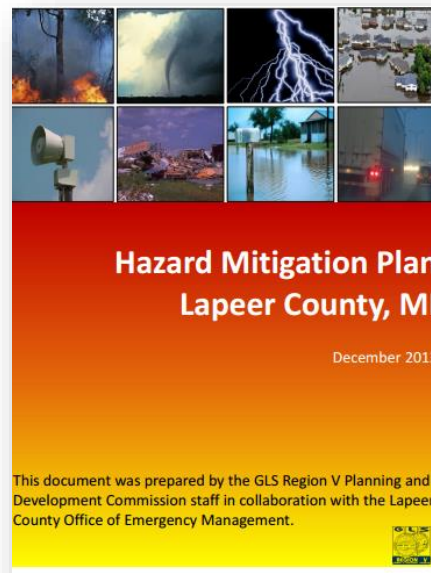
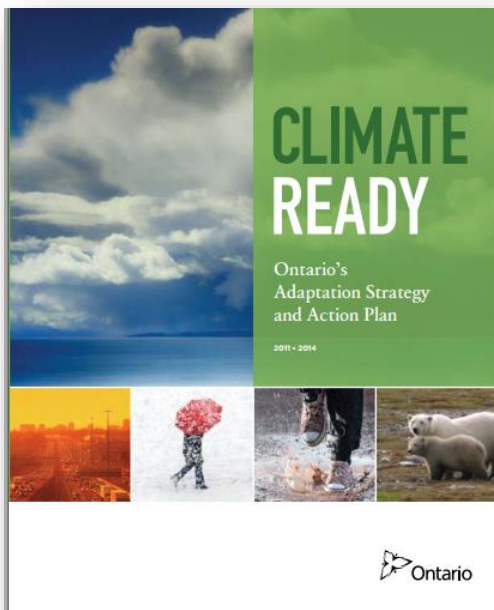
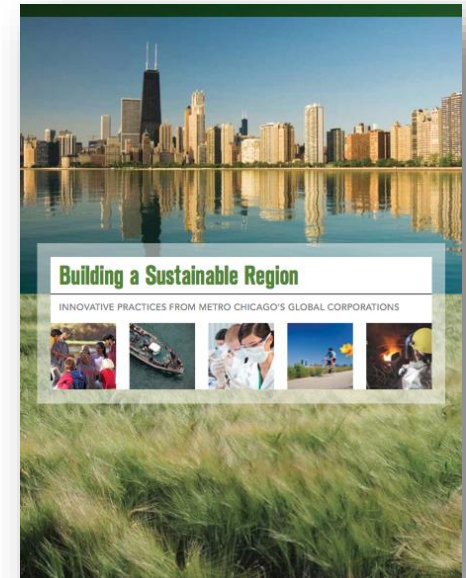
*Climate Action Plans

Hazard Mitigation Plans

Park Plans

Watershed Management Plans

Other Resource Management Plans



Know what you have: *Wetland Inventory*

Adaptive Management requires continuous monitoring



Michigan Wetlands Map Viewer

Monitor:

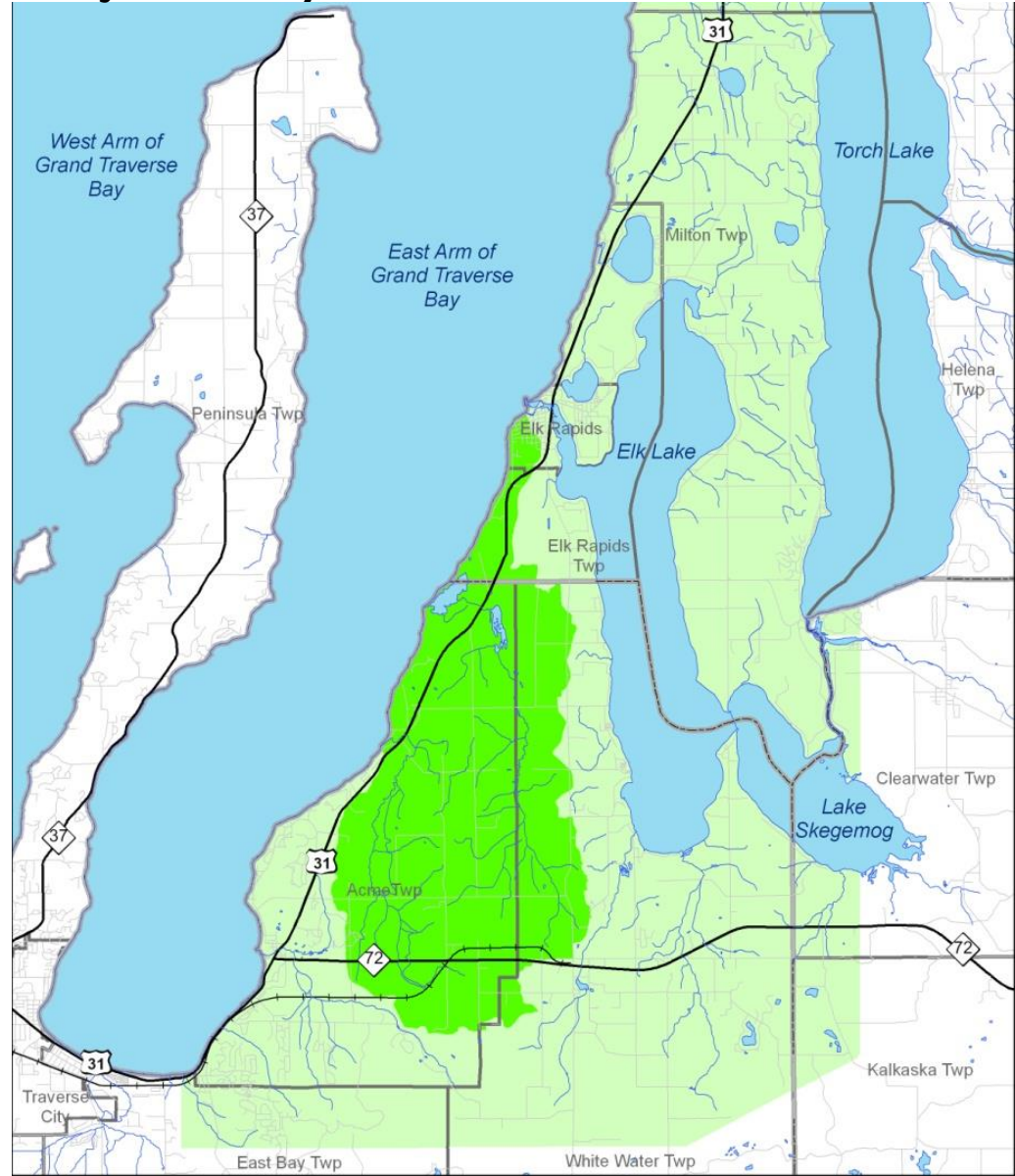
1. Species type
2. Vegetation type
3. Vegetation coverage
4. Water temperature
5. Water level
6. Water quality

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



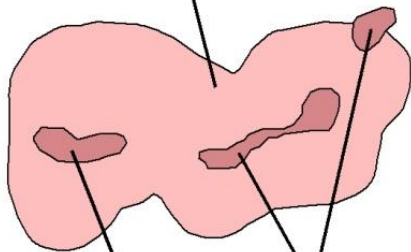
Potential Conservation Areas



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



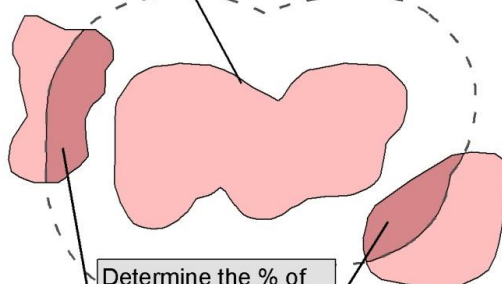
Natural Land



Calculate the total wetland area that intersects each natural land area.

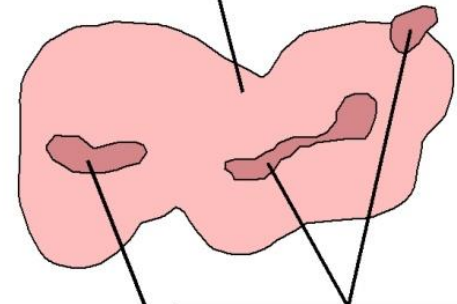
Natural Land

1/4 mile buffer



Determine the % of the total area of a natural area that falls within 1/4 mile of a natural area.

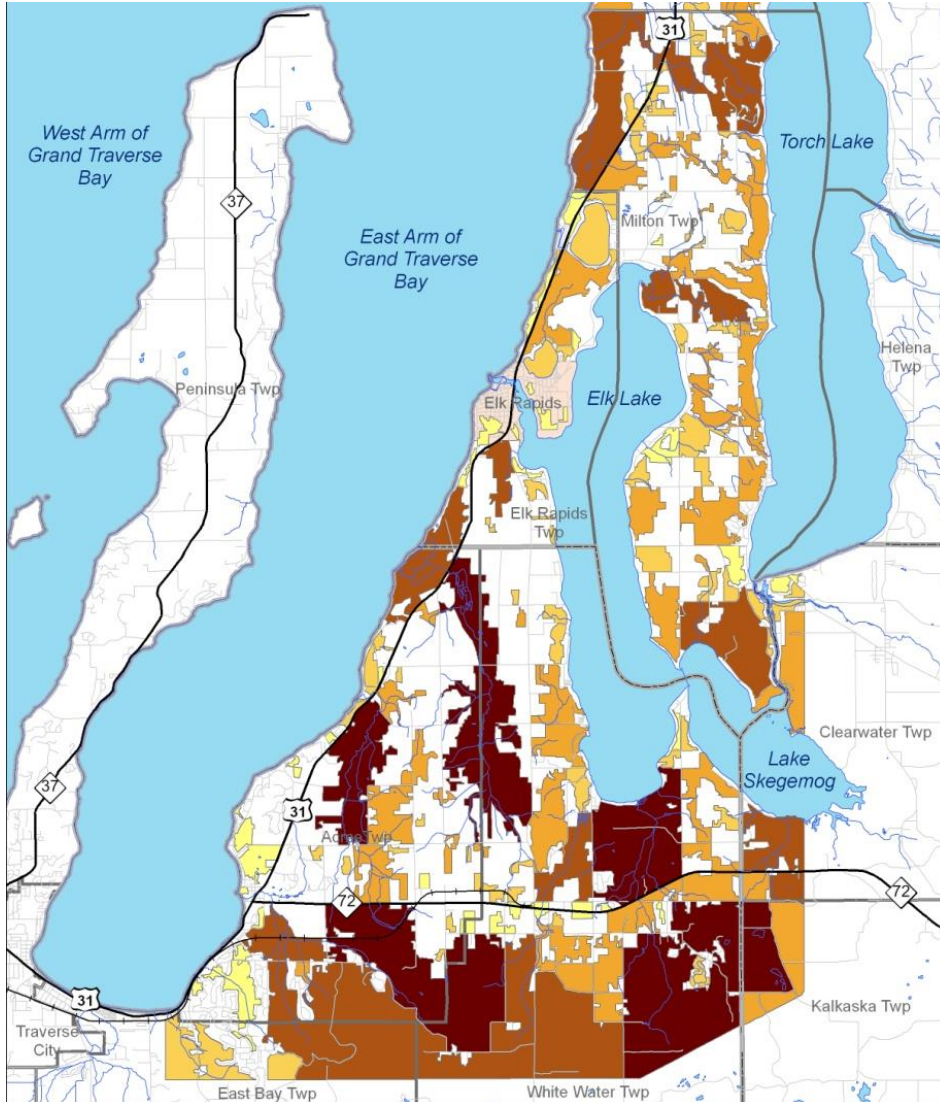
Natural Land



Calculate the percentage of total wetland area of each natural land area.

Potential Conservation Areas

Priority Areas to Conserve



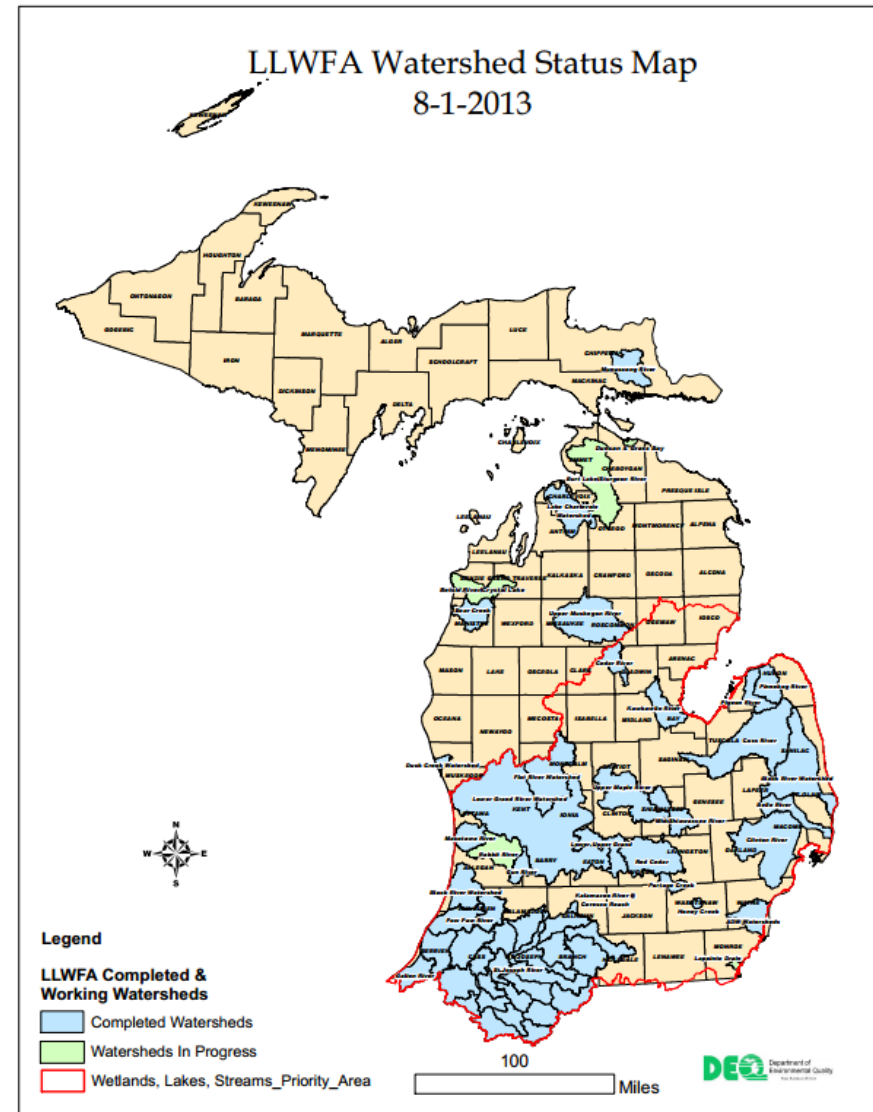
Local stakeholders can further refine analysis

High Priority Wetlands

Landscape Level Wetland Functional Assessment

A process using **spatial data** to prioritize wetland protection and restoration based on **functions** the wetland provides.

Functions could include **floodwater storage, stream flow maintenance, sediment retention, nutrient transformation, and shoreline stabilization.**



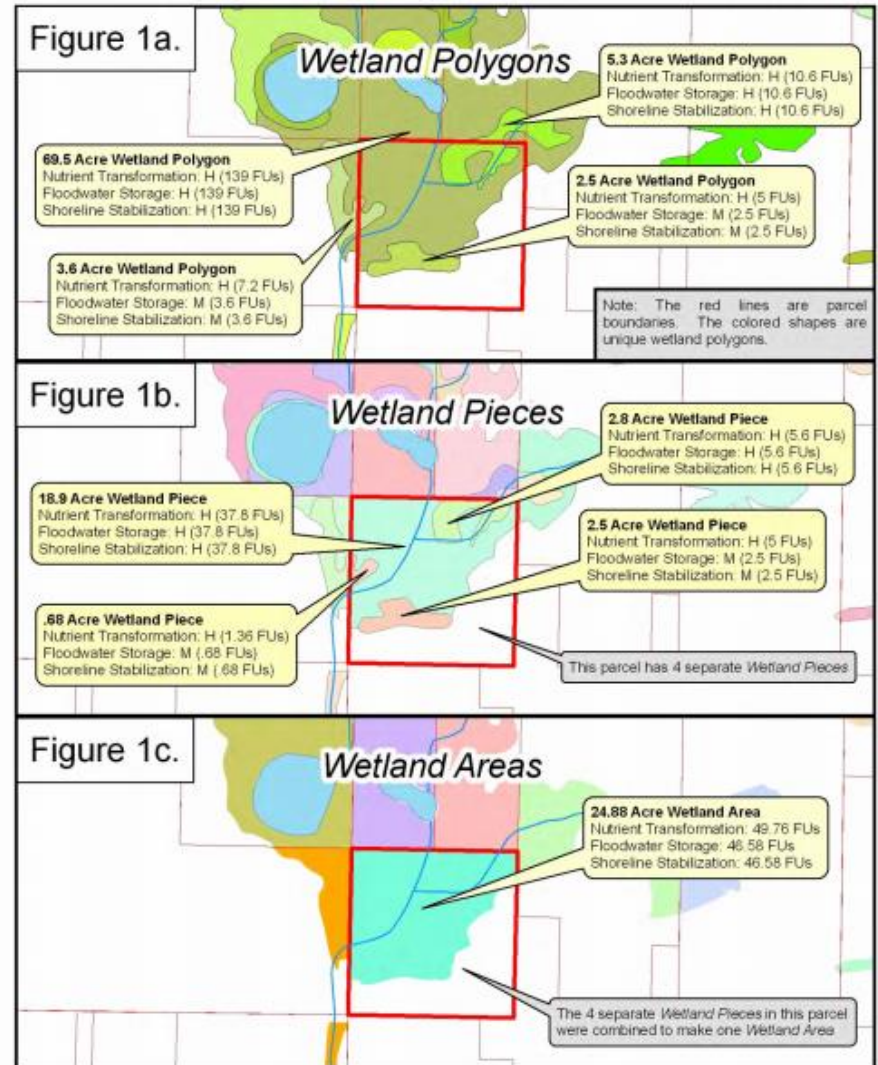
Wetland Mapping

Prioritization Methodology - Wetland Functional Assessment

Paw Paw and Black Rivers
Wetland Protection and
Restoration Project

Each wetland function is given a score of 1 or 2 FU (Functional Units) based on the quality of ecosystem service it provides.

Figure 1. Calculating Functional Units (FUs) - Parcel Example



High Priority Wetlands to Conserve

Migration Routes

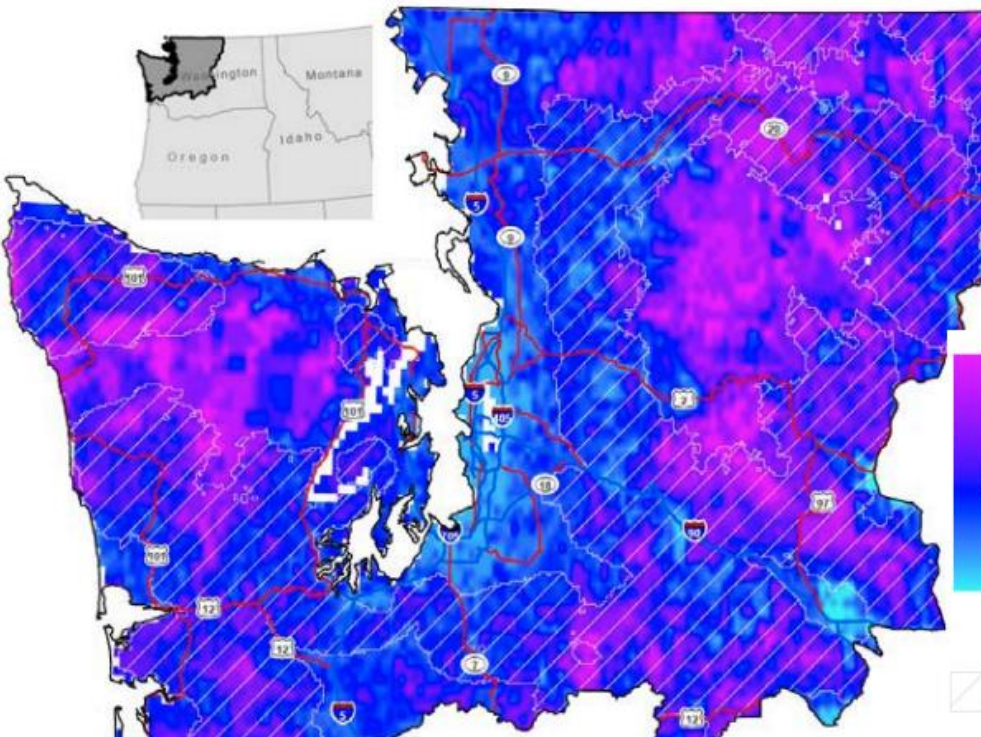
Conserve and restore ecological connections to facilitate migrations and other transitions caused by climate change

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

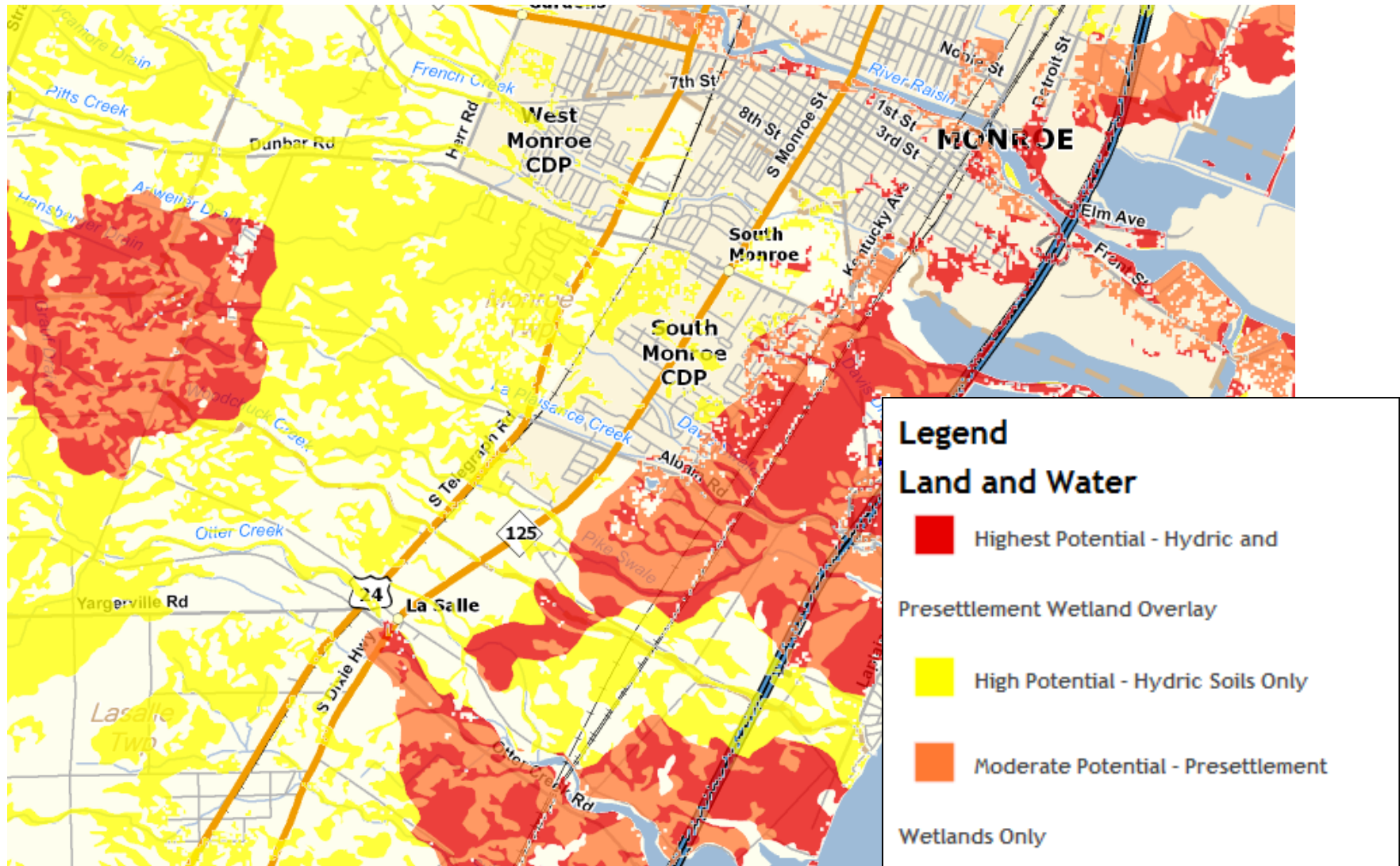


Model Integrates:

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

PINK = highest priority for conservation given climate projections

Wetland Banking



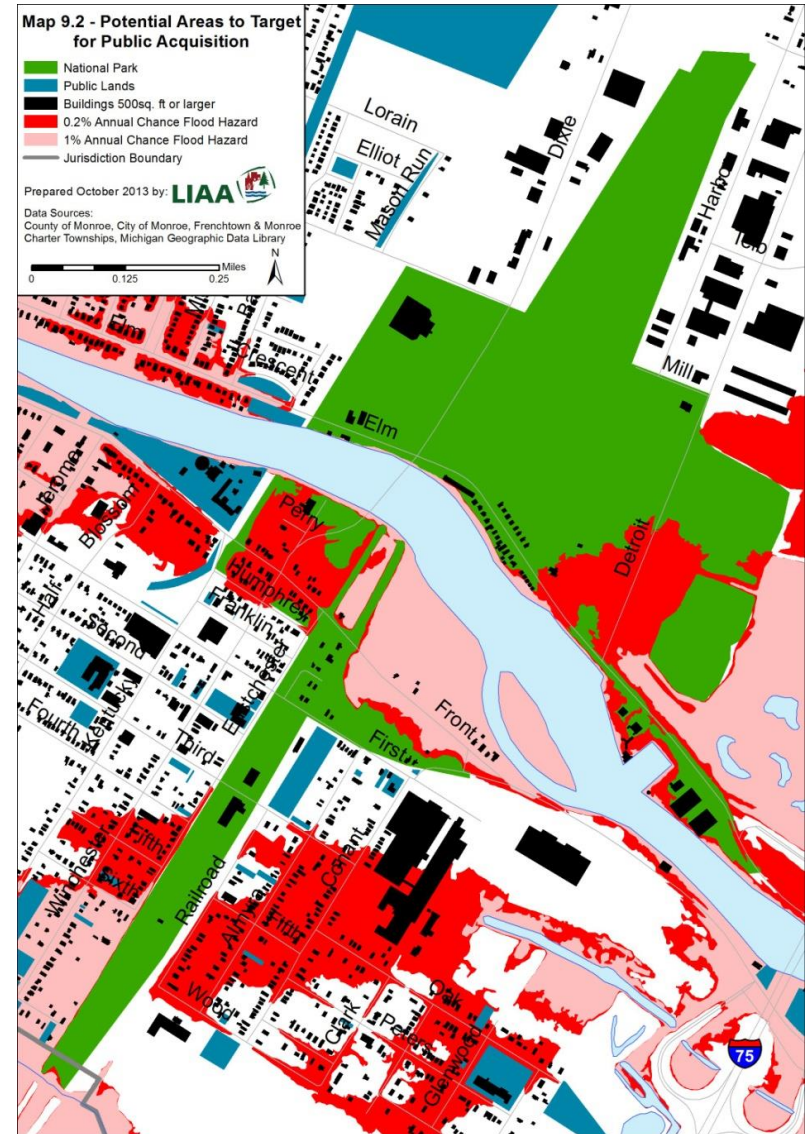
Source: <http://www.mcgi.state.mi.us/wetlands/mapBasic.aspx>

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.

A new approach to Drainage Districts?
A Water Resources Commissioner

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

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

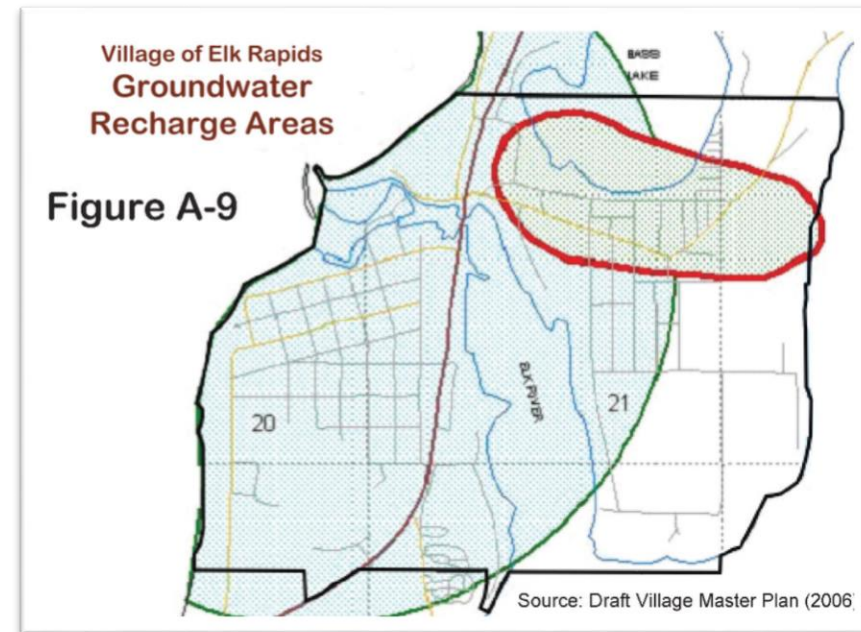
- **73%** regulate wetlands down to **2 acres**
- **19%** regulate wetlands down to **1 acre**
- Two communities have some type of **Wetlands Protection Committee**
- **27%** require **natural buffers**: most are **25 ft**

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.



Parting Questions

How can we make wetland info more relevant to local governments?

i.e. Link to economic development, quality of life, property values, etc.

Wetland Adaptation Best Practices v. Current Best Practices

How critical are the differences given known uncertainties?

Wetland Conservation Goals for Climate Change

Should we aim to Prevent Extinctions or Prevent Flooding?

What role do small, urban wetlands play in wetland adaptation planning?

Thank You



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