



*Working Together:
Local Governments,
Businesses and Citizens*

**Patty O'Donnell
Northwest Michigan Council of Governments
2011**

Freshwater

Great Lakes	Inland Lakes
Rivers and Streams	Wetlands
Groundwater	

Water, Water Everywhere in Michigan



What is Groundwater?





Water Demands



Water Quantity/Quality

- Pollution
- Drought
- Algae
- Aquifer Depletion
- Recharge

Water Costs

- Municipal Water and Sewer Bills
- Well and Septic Systems
- Water Softening
- Water Heating



What Does Water Conservation Look Like in Michigan?



Water Solutions



- Repair Leaks
- Low-flow Faucets
- Dual Flush Toilets
- Insulate Hot Water Heater/Pipes
- Efficient Wash Machines and Dishwashers



Stormwater Management

-- Andy Reese, *Stormwater Paradigms*

HISTORIC PARADIGM SHIFT

- Run all of it in Ditches (1800s)
- Collect and discharge – any pipe will do (1900s to 1940s)
- Run Stormwater in Stormwater Pipes (1940s to 1970s)
- Keep the Stormwater from the Stormwater Pipes (1970s to mid-1980s)
- Just don't cause flooding – try to keep it on-site with best management practices
- And, don't Pollute either – better management practices
- Be accountable – NPDES compliance
- Green and Bear it – management with innovation and reuse

Effects of Stormwater Runoff



- Pollution
- Sedimentation
- Habitat degradation
- Spawning bed destruction
- Fish kills
- Loss of valuable topsoil
- Loss of valuable nutrients
- Increased costs of maintenance
- Increased erosion
- Decreased groundwater recharge
- Water quality degradation



Managing Stormwater - Drivers

- **Flooding**
- **Aging Infrastructure**
- **Erosion**
- **Regulatory mandates –**
- **Informed constituencies**
- **Tight or shrinking budgets**



Costs

- Operations and Maintenance
- System Rehabilitation
- Capital Investment
- Design review and oversight
- Regulatory compliance
- Public outreach and education
- Administration

Why Stormwater Management?

Stormwater runoff is precipitation

Widely dispersed locations:

Nonpoint source pollution



What to Do

Vegetation – buffers, strips

Wetlands

Prevent Erosion



What Else?

- Inventory Stormwater runoff source areas
- Promote onsite collection and treatment
- Improve road – stream crossings
- Promote agricultural best management practices
- Utilize land protection programs – conservation easements, nature preserves
- Land owner and business education
- Work with local governments
- Work with Road Commissions/landscape businesses
- Reduce the volumes and velocities



A Design Guide for Implementers and Reviewers



Low Impact Development Manual for Michigan

www.semcog.org

Rain Gardens and Green Roofs



Porous and Permeable Pavement



Water Harvesting and Reuse



Green Infrastructure

Adaptable term used to describe an array of products, technologies, and practices that use natural systems – or engineered systems that mimic natural processes – to enhance overall environmental quality and provide utility services.

Inventory and Mapping of Natural Assets

- Forested lands
- Federal, state, and local parks
- Non-motorized transportation facilities
- Wetlands and floodplains
- Rivers and lakes
- Land Trust/Conservancy public preserves/areas
- Source water protection areas/wellhead protection areas
- High risk landslide
- Agricultural land



Boyer City

Map Date: 20 October 2010
Map Produced By:

Let the Wisdom of People Be Free

















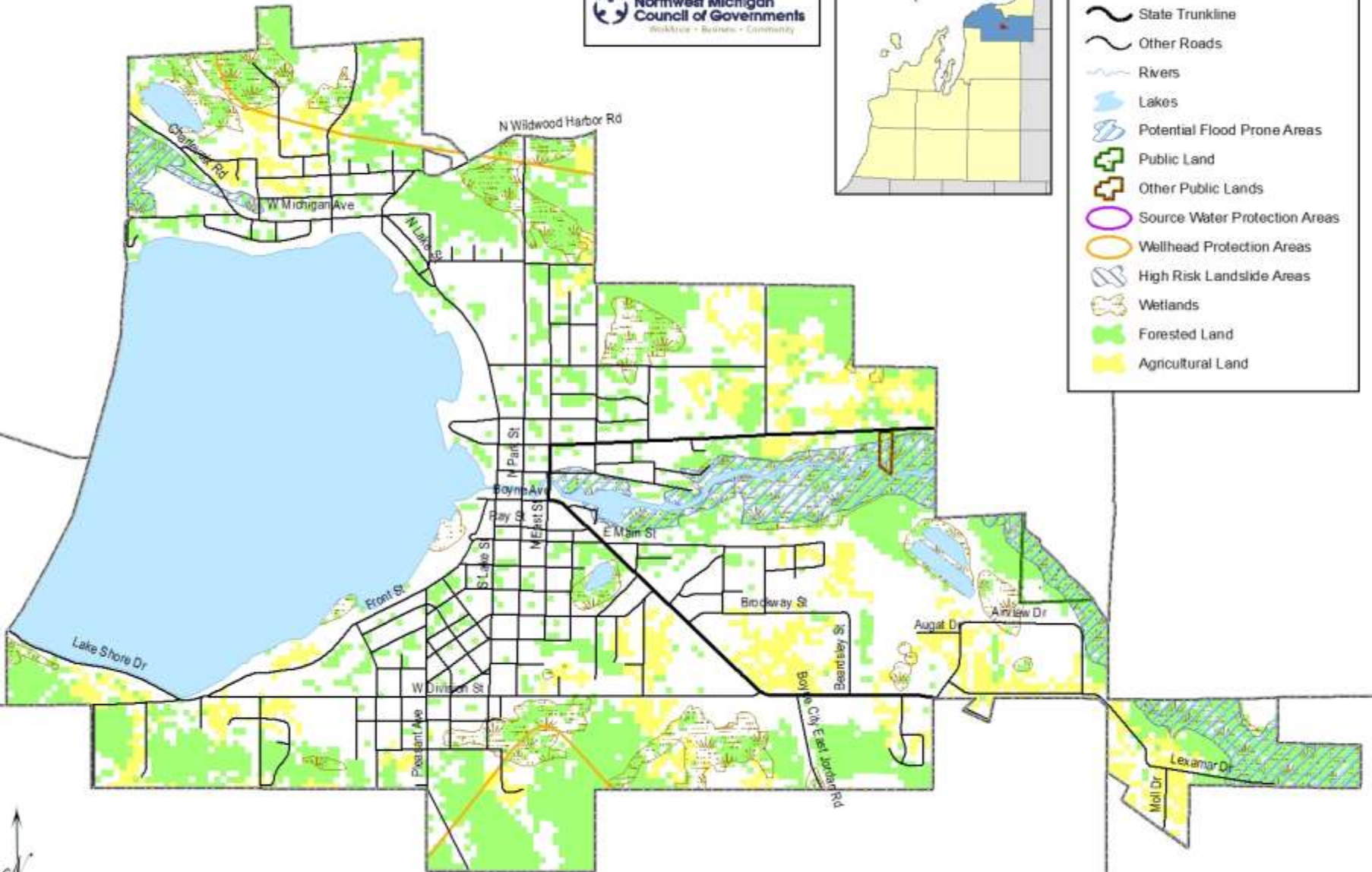
**Northwest Michigan
Council of Governments**

Workforce • Science • Community



Green Infrastructure

-  Non-Motorized Trails
-  State Trunkline
-  Other Roads
-  Rivers
-  Lakes
-  Potential Flood Prone Areas
-  Public Land
-  Other Public Lands
-  Source Water Protection Areas
-  Wellhead Protection Areas
-  High Risk Landslide Areas
-  Wetlands
-  Forested Land
-  Agricultural Land



Techniques

- Low Impact Development
- Smart Growth Practices
- Sustainable Infrastructure
- Protecting Your Green Infrastructure

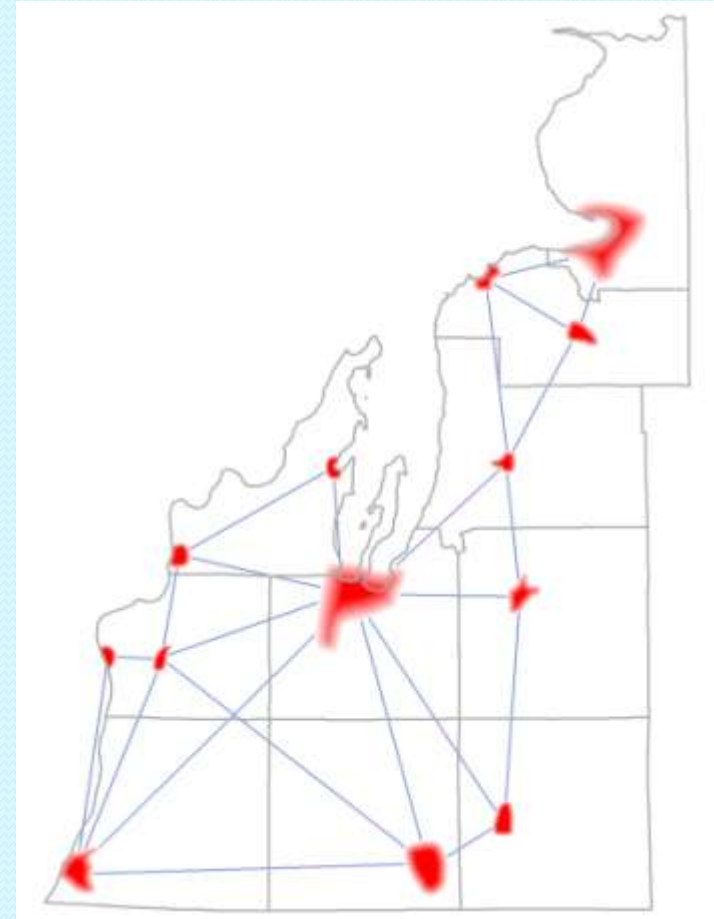
Green Infrastructure provides Ecological Support

- Enhances stormwater management and hazard mitigation (flooding, erosion)
- Creates source water protection
- Provides air purification and cooling
- Helps to prevent ecosystem fragmentation
- Prevents and controls increased costs of public services such as stormwater, drinking water, etc.
- Support agricultural lands

Governance

Each Community is distinct
and the same:

- Landscapes
- Natural Resources
- Demographics
- History
- Political Culture



*Cooperation Across Political
Boundary Lines
for Natural Resources Protection*



*THINK LIKE A
WATERSHED*

Community's Choice

- What do you want for your community?
- What do you want to do to restore or protect your watershed and quality of life?
- Have a strategy on how to get there.

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