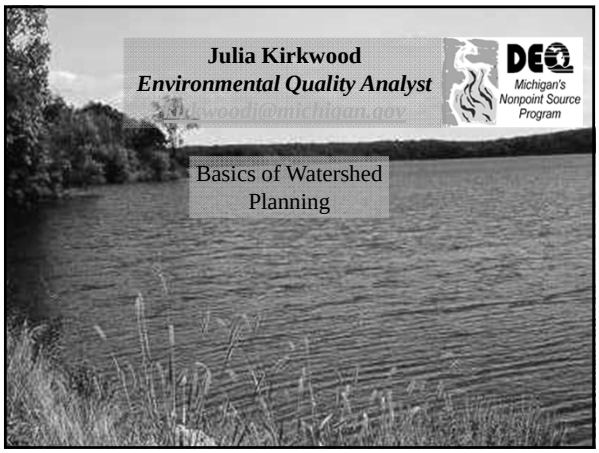


Nonpoint Source Pollution

The most significant source of WQ impairment

Addressing NPS:

Federal

- 1987 - Clean Water Act Section 319
  - Directed states to:
    1. *Assess extent of NPS*
    2. *Prepare management plan to correct it*
  - *Provides for funding*
- *Federal Register:*
  - *Guidelines to states*

Assessment of Water Quality

Clean Water Act requires:

- *Water Quality Assessment:305(b)*
- *List of waters not meeting designated uses/attaining standards: 303(d)*
- *Status and trends assessment of publicly owned lakes: 314*

Integrated Report

What are Water Quality Standards?

State's yardstick to measure health of waters

The goals are in three areas:

1) Designated Uses of the lake or stream
2) Safe levels to protect the uses
3) Protection of high quality waters.

Water Quality Standards

Part 31: Part 4 Rules PA 451, as amended:
sets the standards for chemical and physical components

Two types of criteria

1) Numeric –concentration-based (130 E coli/100 ml)

2) Narrative - aesthetic conditions - absence of odor, color, turbidity, oil films, floating solids, toxic substances

Designated Uses

All surface waters of the state are designated for and shall be protected for all the following uses:

1. Agriculture
2. Industrial water supply
3. Public water supply at the point of intake
4. Navigation
5. Warmwater fishery
6. Other indigenous aquatic life and wildlife
7. Partial body contact recreation
8. Total body contact recreation-May 1-Oct 31
9. Cold water fishery – where applicable

****Part 4 Rules, Part 31, PA 451, as amended****

Impaired Waterbody?

Doesn't meet criteria to support its designated use/s

What Is A TMDL?

Total Maximum Daily Load

WHAT

* Process to determine pollutant load a lake or stream can handle and still meet water quality standards

WHY

* Required by EPA when water body not attaining designated uses - 303 (d) list

Includes

* Available information to determine potential sources of pollutants
* Identifies location, use impairments, pollutant, length of impairment, possible sources and causes

Addressing NPS: *State*

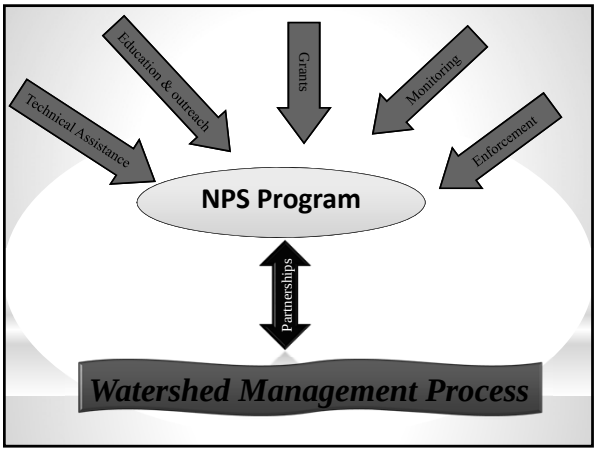
* 1988: Non-Point Source Program created pursuant to Federal Guidelines
* MI Natural Resources and Environmental Protection Act 451 (NREPA) Part 88: Clean Michigan Initiative (CMI) NPS Control Grants
  * Sets guidelines for watershed plans, best management practices and grant funding.

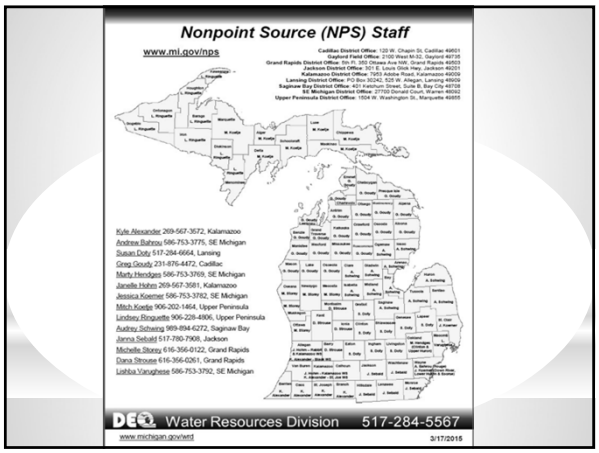
NPS Program

Two Goals

1) Restore impaired waterbodies - ***Priority***

2) Protect high quality waters





NPS Program Funding: ***Grants***

State: Clean Michigan Initiative

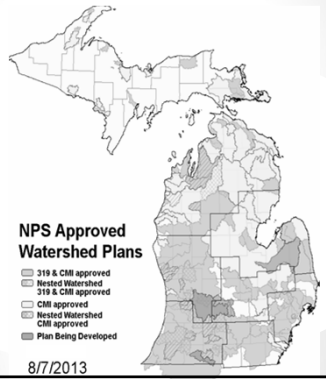
- No planning
- FY 2015 $500,000

Federal: Section 319(h) and 205(j)

- FY 2015 2.1 million
- Planning – very limited

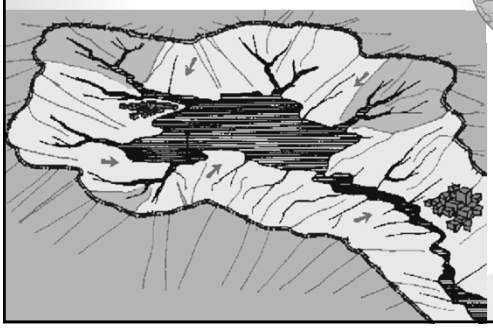
Watershed plans:

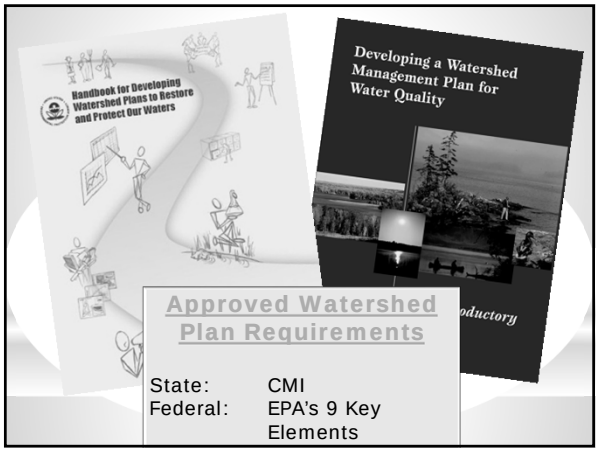
Needed to restore impaired waters & protect high quality waters

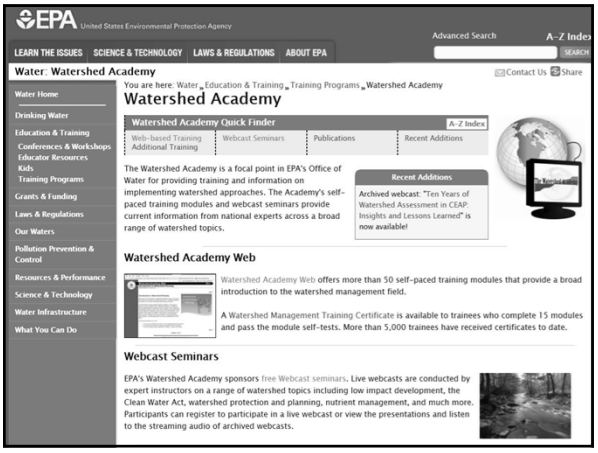


Watershed:

Area of land that catches all the flow of water

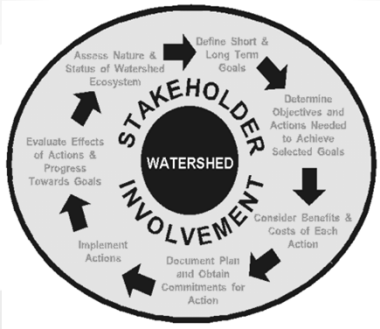




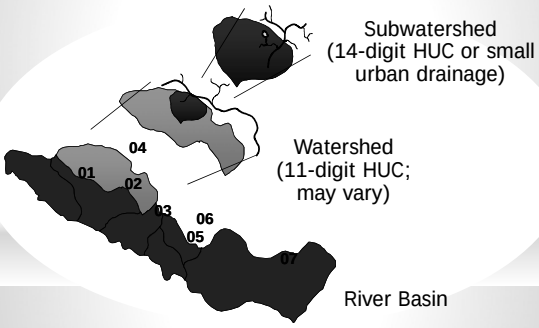


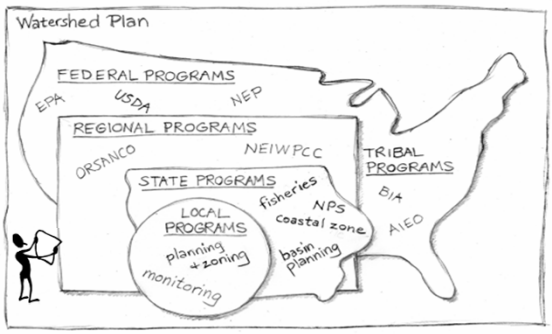
Watershed Approach:

A collaborative ongoing process



Define Area for Planning





BUILD PARTNERSHIPS

Coordinate watershed planning effort with other federal, state, and local activities

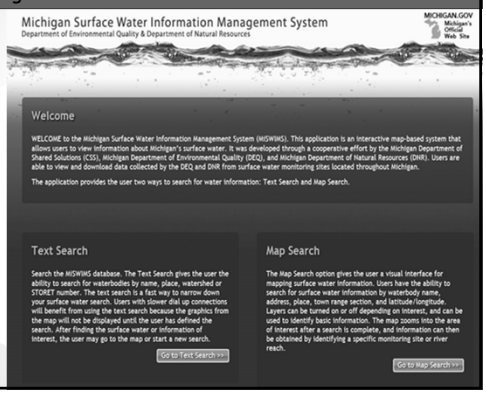
Characterize/Understand Your Watershed:

- Gathering data
- Inventory: *Identify sources and causes*

Characterize/Understand Your Watershed:

- Gathering data

MiSWIM



Characterize/Understand Your Watershed:

- Gathering data

NPS Awareness Survey

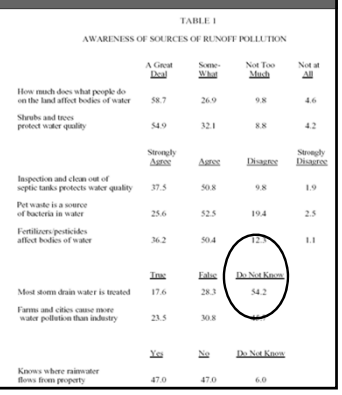


TABLE 1

AWARENESS OF SOURCES OF RUNOFF POLLUTION

	A Great Deal	Some-What	Not Too Much	Not at All
How much does what people do on the land affect bodies of water	58.7	26.9	9.8	4.6
Shrubs and trees protect water quality	54.9	32.1	8.8	4.2

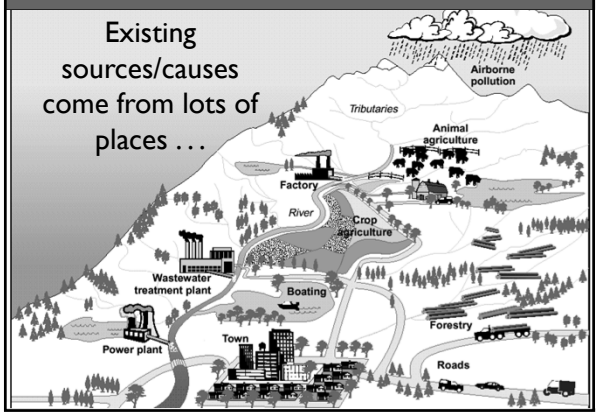
	Strongly Agree	Agree	Disagree	Strongly Disagree
Inspection and clean out of septic tanks protects water quality	37.5	50.8	9.8	1.9
Pet waste is a source of bacteria in water	25.6	52.5	19.4	2.5
Fertilizers/pesticides affect bodies of water	36.2	50.4	12.3	1.1

	True	False	Do Not Know
Most storm drain water is treated	17.6	28.3	54.2
Farms and cities cause more water pollution than industry	23.5	30.8	[illegible]

	Yes	No	Do Not Know
Knows where rainwater flows from property	47.0	47.0	6.0

Inventory: *Identify sources and causes*

Existing sources/causes come from lots of places . . .

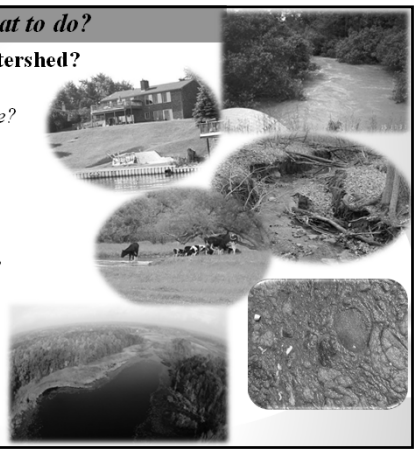


Inventory: *What to do?*

What is your watershed?
Urban/Rural?
River/Stream/Lake?

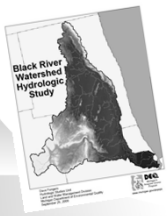
Problems?
Erosion
Sediment or nutrient
E. Coli
Lots of wetland loss?
Flashiness/flooding?

High quality areas?

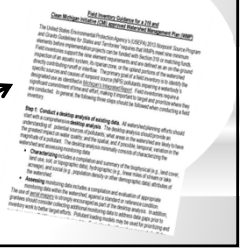


Inventory/Assessment Tools

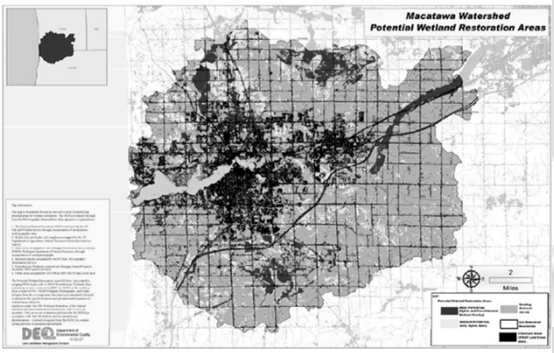
Aerial Photo review
Soil surveys
Land Use Analysis
Master Plan/Ordinance Reviews
Landscape Level Wetland Functional Analysis



Step 1: Conduct desktop analysis



MACATAWA RIVER WATERSHED

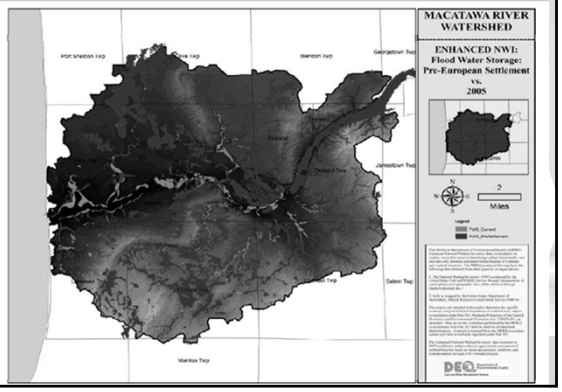


Macatawa River Watershed Wetland Resources Status and Trends

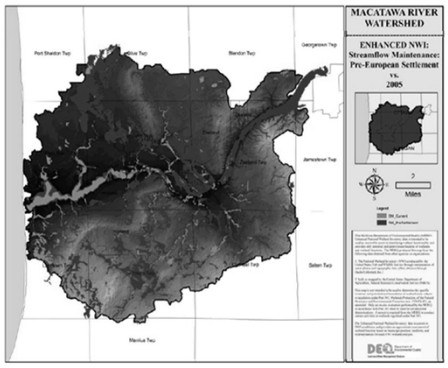
Pre-settlement Wetland conditions	2005 Wetland Condition
38,390 Acres of Wetlands	5,657 Acres of Wetlands
864 Polygons	1,264 Polygons
Average Size – 44 Acres	Average Size – 4.5 Acres

14% OF ORIGINAL WETLAND ACREAGE REMAINS
86% LOSS OF TOTAL WETLAND RESOURCE

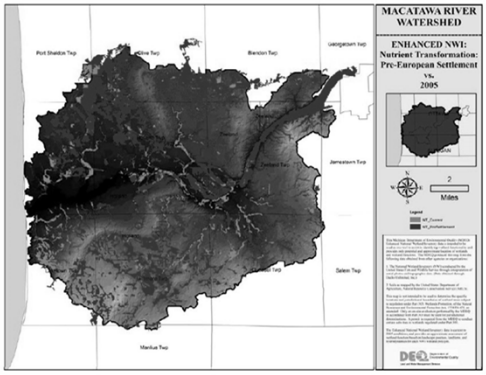
FLOOD WATER STORAGE



STREAMFLOW MAINTENANCE



NUTRIENT TRANSFORMATION

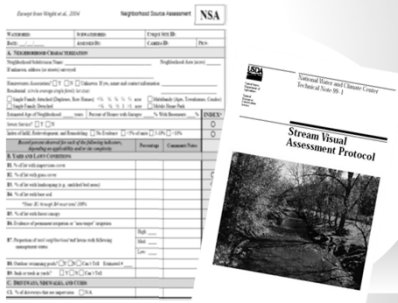


Inventory/Assessment Tools

Field Inventory: Stream walks, monitoring

Center for Watershed Protection

* Unified Subwatershed and Site Reconnaissance Survey



An example of a rill (a) compared to the size of a gully (b).

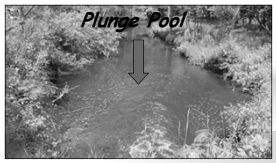
* *Road Crossing Information*

(Culvert Problems)

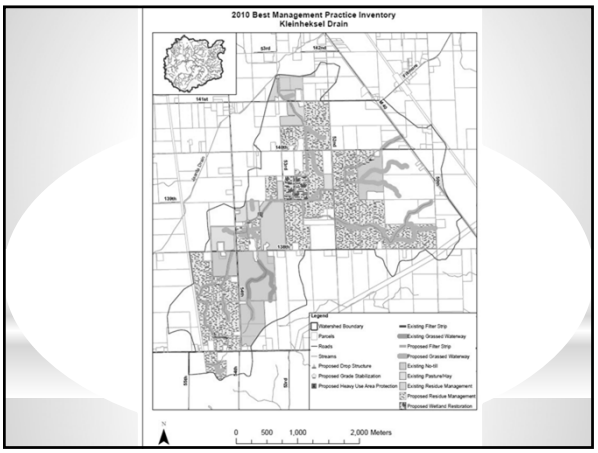
- **Poor Alignment-** Is the culvert aligned properly with the stream channel.
- **Inadequate Armoring-** Rip-Rap not installed or installed improperly.
- **Impounding Water-** Is the culvert ponding water upstream.
- **Obstructed-** Is the flow of water blocked from passing through the culvert.
- **Structural Integrity-** Is the culvert falling apart and need repair.

* *Road Crossing Information*

(Perched Culverts)

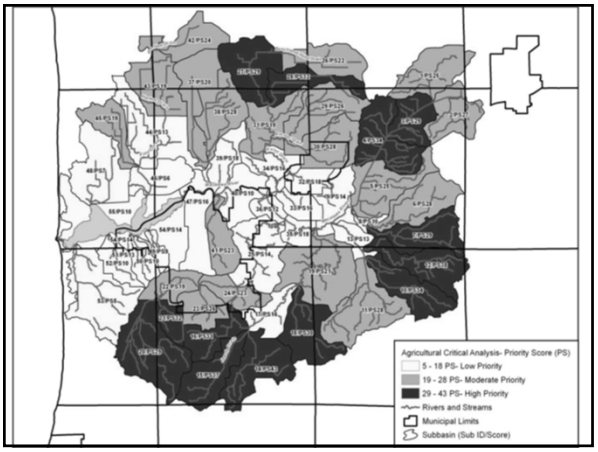


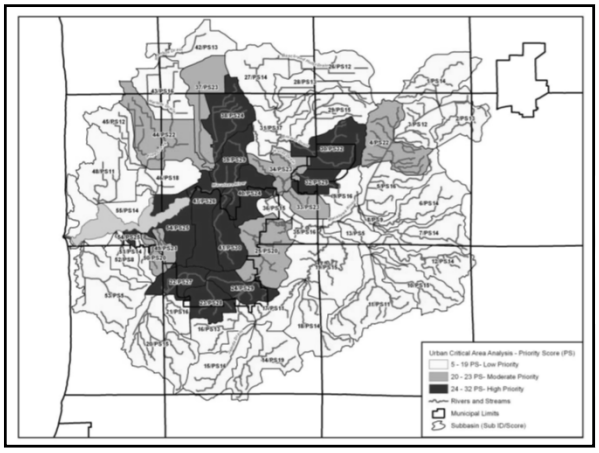
- ***Poor erosion control methods along roadways result in stream sedimentation.***

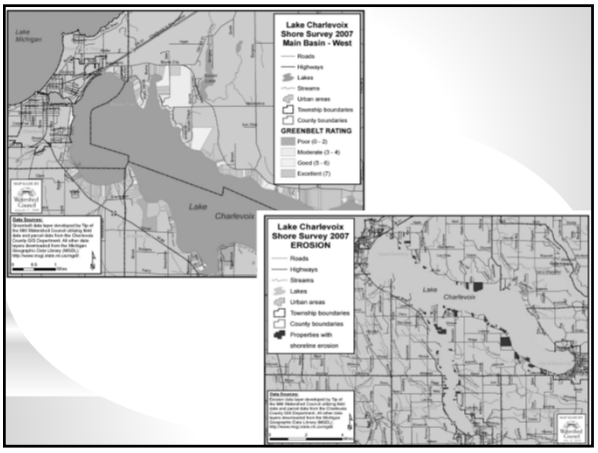


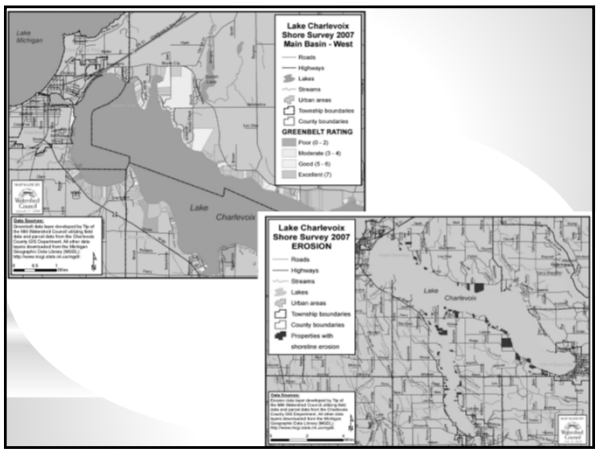
Next Steps for Putting a WMP Together

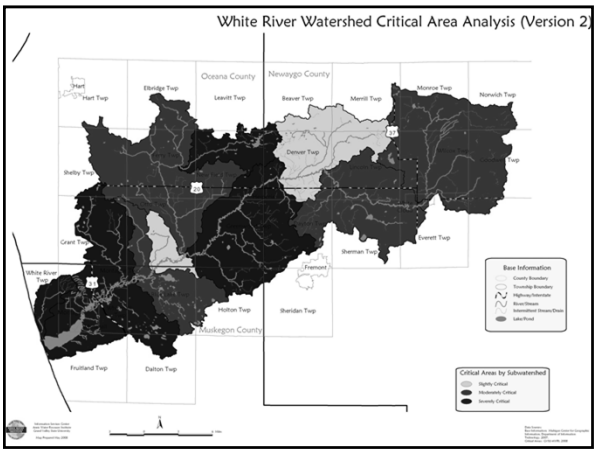
- Calculate pollutant loads
- Prioritize pollutants, sources, causes
- Determine objectives
- Define critical areas

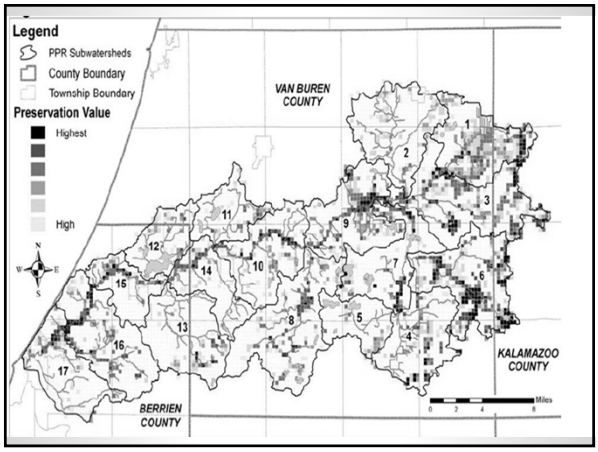






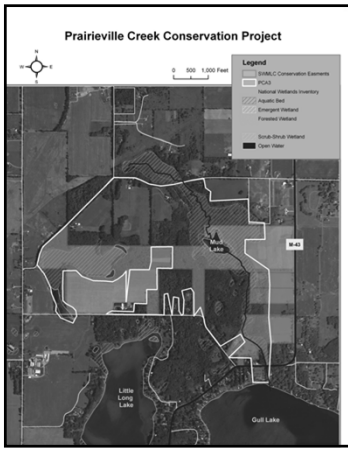






Next Steps for Putting a WMP Together:
BMPs, Costs, Resources, Timeline, Milestones, Evaluation

Urban Management Areas (See Figure 26)	High priority waterbodies –Sand Creek, Paw Paw Lake, Maple Lake, downstream portions of Paw Paw River mainstem, East Branch, Mill Creek, Ox Creek, West Branch Medium priority waterbodies –Eagle Lake, Three Mile Lake, Cora Lake, Reynolds Lake and Christie Lake, Mattawan Creek, Lawton Drain, downstream portion of Brush Creek							
Task	Pollutant	Source	Cause	Begin Implementation	Potential Lead (Partners)	Estimated Cost	Potential Funding or Partner Programs	Milestones (after implementation begins)	Proposed Evaluation Method
Utilize stormwater best management practices (road/parking lot sweeping, stormceptors, rain gardens, vegetated swales, constructed wetlands, wet/dry ponds, etc)	Sediment, nutrients, pesticides, oil, grease, metals, temperature	Stormwater runoff – impervious surfaces and storm drains	Lack of stormwater management	2009-2013	Municipalities, Drain Commissioner, Road Commission (SWMPC, MTA, MML)	Depends on practice Rain Garden – $5-40/ft2 Rain Barrel – $75 each Green Roof – $12-24/ft2 Bioswales – $0.05-2.50/ft2 Permeable paving- $1-5/ft2	Municipalities, MDEQ 319	By 2015: 2 municipalities By 2018: 4 municipalities By 2023: 8 municipalities	Number of municipalities sweeping streets/parking lots and using other practices; Estimate pollutant loading reduction
	Sediment	Streambanks	Increased flow fluctuations						
Enact stormwater and post construction control ordinances	Sediment, nutrients, pesticides, oil, grease, metals, temperature	Stormwater runoff – impervious surfaces and storm drains	Lack of stormwater management	2009-2013	Municipalities, Drain Commissioner, Road Commission (SWMPC, MTA, MML)	$5,000/municipality	Municipalities, MDEQ 319	By 2015 – 2 municipalities By 2018 – 4 municipalities By 2023 – 8 municipalities	Number of municipalities with ordinances enacted
Identify and correct illicit discharges or connections	Sediment, nutrients, pesticides, oil, grease, metals, temperature	Stormwater runoff – impervious surfaces and storm drains	Illicit connections or discharges	2009-2013	Drain Commissioner, Municipalities, Road Commission	$500 - $5,000/site	Drain Commissioner, Municipalities, Road Commission	By 2015: 3 sites By 2018: 5 sites By 2023: 8 sites	Number of connections or discharges identified and corrected
Utilize best management practices for road maintenance	Sediment, salt	Stormwater runoff – roads and parking lots	Improper road salt/sand application and snow disposal	2009-2013	Road Commission, Municipalities	$50-$1,000/practice	Road Commission, Municipalities	By 2015: 2 road agencies By 2018: 3 road agencies By 2023: 5 road agencies	Number of road agencies adopting improved practices; Estimate sediment loading reduction
Enact county –wide phosphorus fertilizer ban	Nutrients, pesticides	Stormwater runoff – lawns, parks, golf courses, agricultural lands	Improper application or overuse of fertilizers and pesticides	2009-2013	Counties (SWMPC, Conservation Districts, Health Department, Drain Commissioner, Two Rivers Coalition)	$2,000/county	Unknown	By 2015: 2 counties By 2018: 3 counties	Number of counties with bans

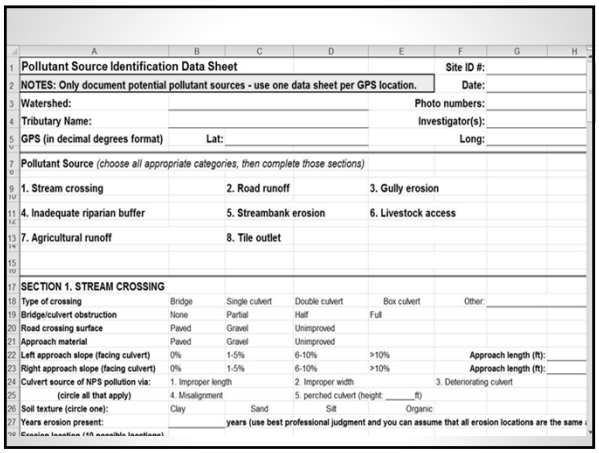


- Prairieville Creek = *60% total stream inflow into Gull Lake = about 21% of the lake's annual water.*
- Over 50% of the PCA now permanently protected

White outline the Priority Conservation Area

- Higgins Lake Boat Wash
- Lake Shoreline
- Road Stream Crossing
- Wetlands

***Field Sites Today**



	A	B	C	D	E	F	G	H
1	**Pollutant Source Identification Data Sheet**					**Site ID #:**		
2	**NOTES: Only document potential pollutant sources - use one data sheet per GPS location.**					**Date:**		
3	**Watershed:**					**Photo numbers:**		
4	**Tributary Name:**					**Investigator(s):**		
5	**GPS (in decimal degrees format)**	**Lat:**				**Long:**		
7	**Pollutant Source** *(choose all appropriate categories, then complete those sections)*							
9	**1. Stream crossing**		**2. Road runoff**		**3. Gully erosion**			
11	**4. Inadequate riparian buffer**		**5. Streambank erosion**		**6. Livestock access**			
13	**7. Agricultural runoff**		**8. Tile outlet**					
17	**SECTION 1. STREAM CROSSING**							
18	**Type of crossing**	Bridge	Single culvert	Double culvert	Box culvert	Other:		
19	**Bridge/culvert obstruction**	None	Partial	Half	Full			
20	**Road crossing surface**	Paved	Gravel	Unimproved				
21	**Approach material**	Paved	Gravel	Unimproved				
22	**Left approach slope (facing culvert)**	0%	1-5%	6-10%	>10%	**Approach length (ft):**		
23	**Right approach slope (facing culvert)**	0%	1-5%	6-10%	>10%	**Approach length (ft):**		
24	**Culvert source of NPS pollution via:**	1. Improper length		2. Improper width		3. Deteriorating culvert		
25	**(circle all that apply)**	4. Misalignment		5. perched culvert (height: _____ft)				
26	**Soil texture (circle one):**	Clay	Sand	Silt	Organic			
27	**Years erosion present:**	_____	**years (use best professional judgment and you can assume that all erosion locations are the same**