

Total Maximum Daily Load Development for Ox Creek



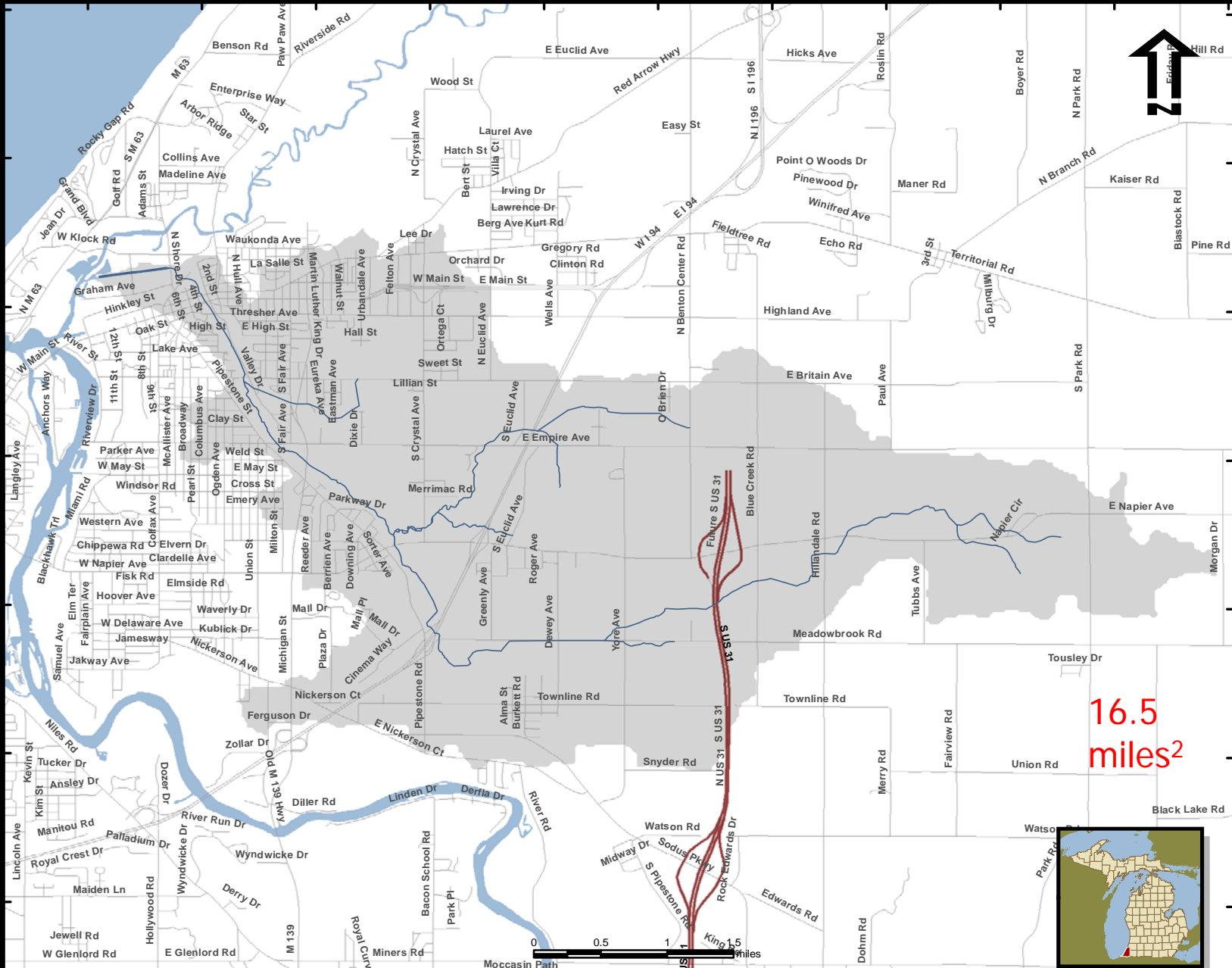
Public Meeting
November 4, 2009
Benton Charter Township Hall



Overview

- Ox Creek Sampling Background
- What is a Total Maximum Daily Load (TMDL)?
- Why is a TMDL needed for Ox Creek?
- What is next?
- Questions and Comments.

Ox Creek Watershed



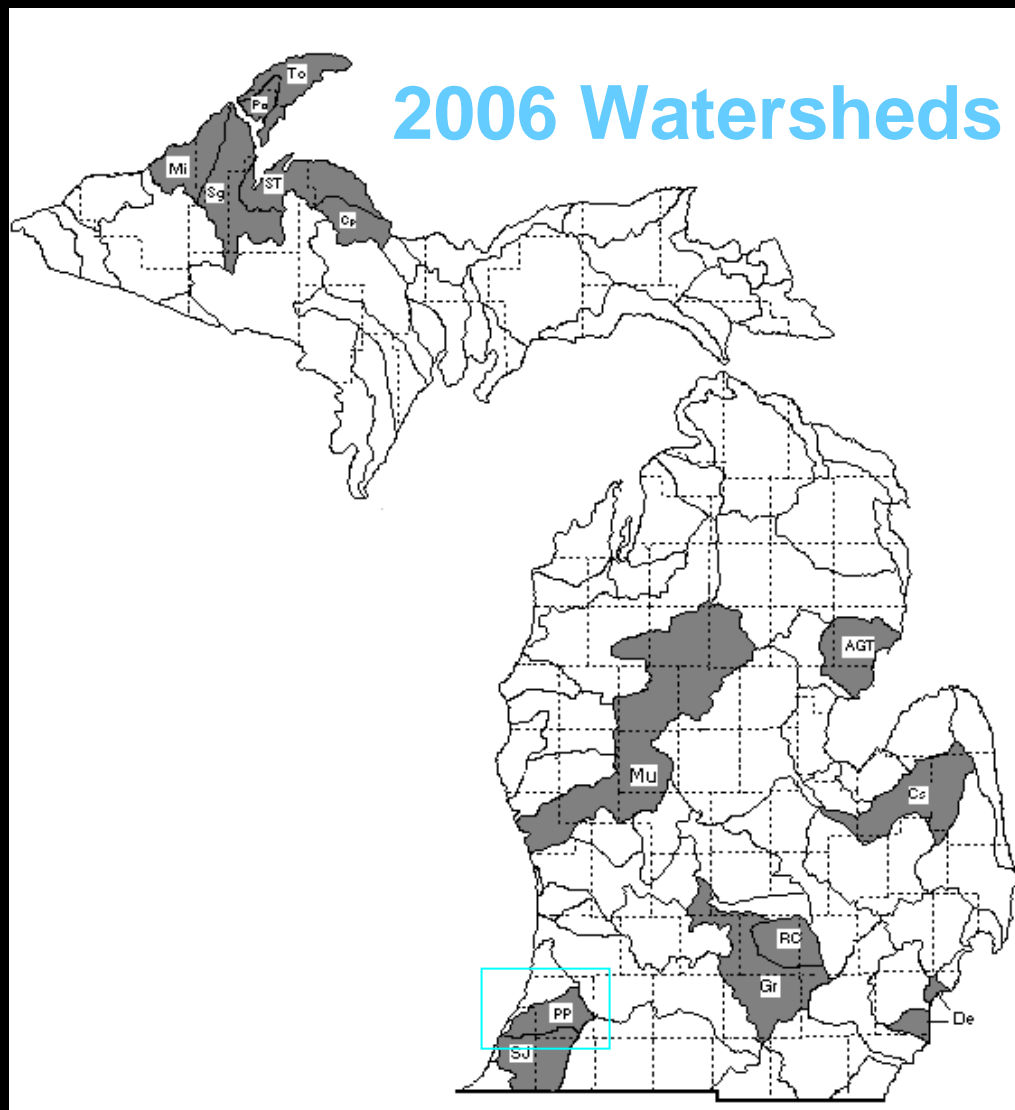
16.5
miles²



Ox Creek Watershed, Berrien County, MI.

Rotating Watersheds

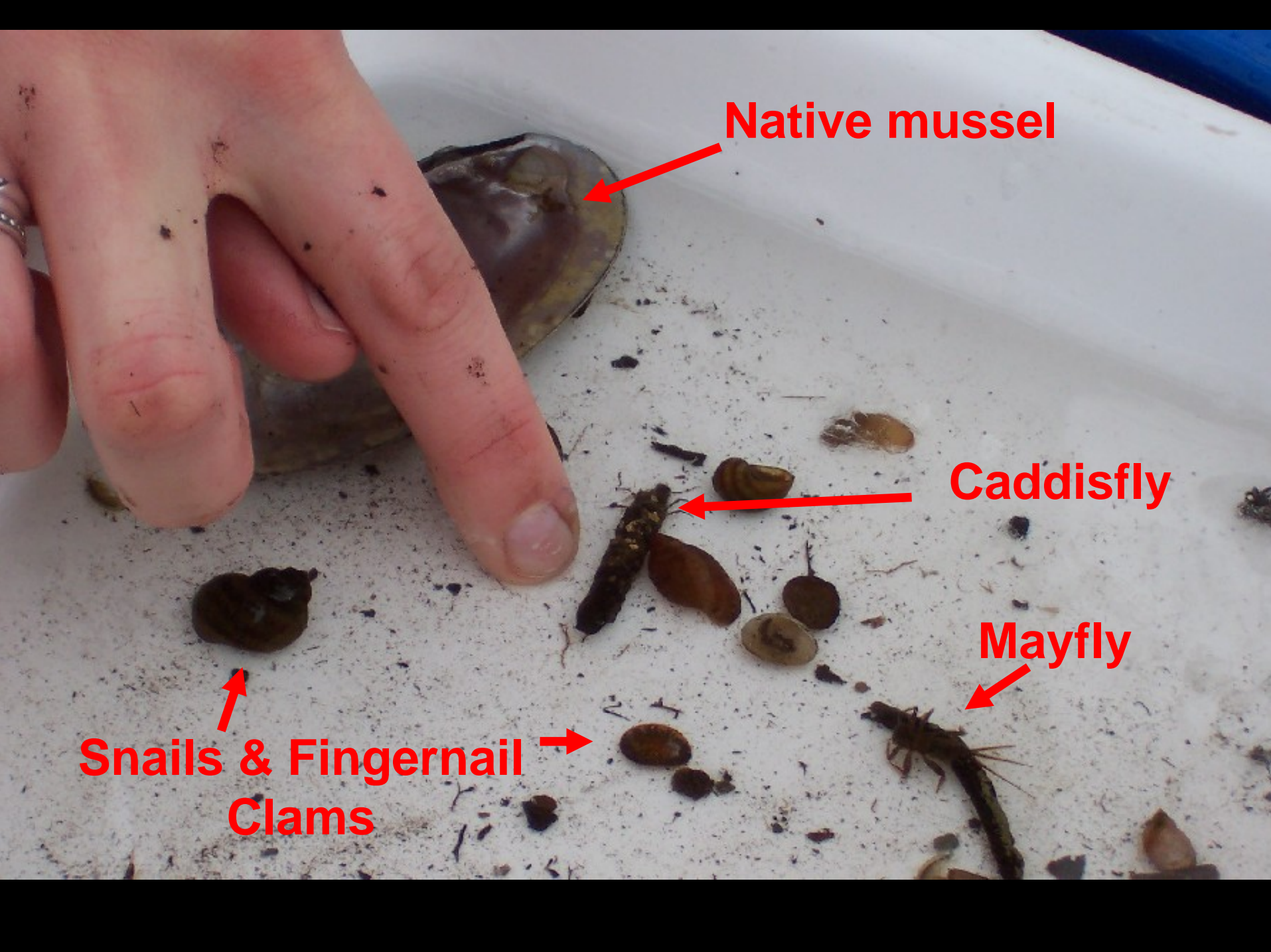
- **5-year** cycle
- **Linked to NPDES permitting cycle**
- **Sample June through Sept.**
- **Ox Creek sampled 2006, 2001, and 1991**



Ox Creek Sampling

- Macroinvertebrates
- Habitat
- Sediment
- Water
- Fish (limited)
- Caged Fish





Native mussel

Caddisfly

Mayfly

**Snails & Fingernail
Clams**

Macroinvertebrate Sampling



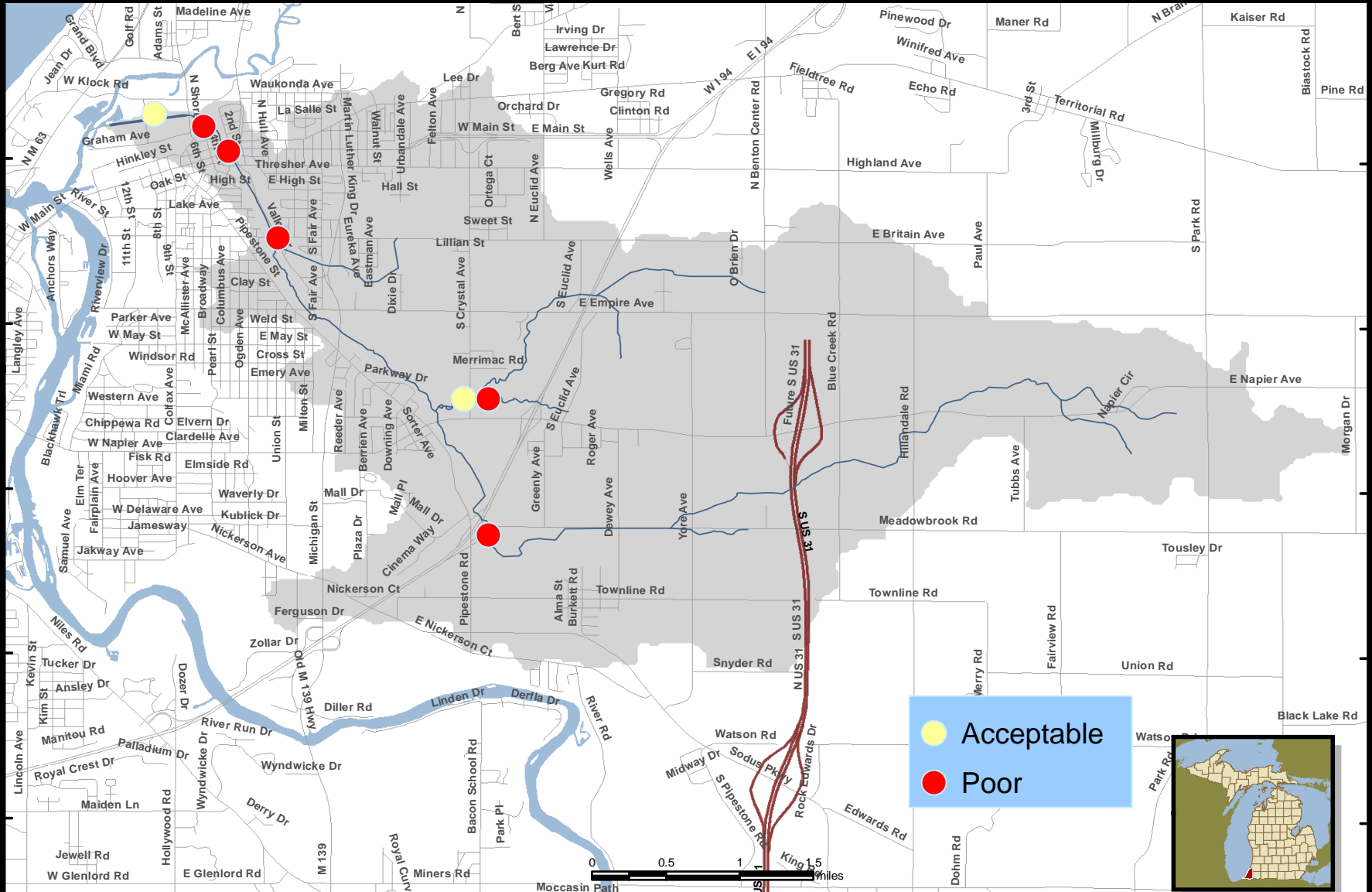
Why use macroinvertebrates?

- Types of macroinvertebrates and how many different kinds reflects water and habitat quality.
- Some types of macroinvertebrates are more sensitive to pollution than others.



- Good indicators for the long term vs a one time water sample.

Macroinvertebrate Results



Habitat

- 10 Metrics used to rate habitat
 - Includes in-stream and riparian measurements
 - Poor, Marginal, Good, Excellent
- Habitat rated Marginal to Good in Ox Creek
 - Siltation evident
 - Some sedimentation
 - Banks fairly stable
 - Channel altered
 - Riparian area narrow



Water and Sediment Sampling

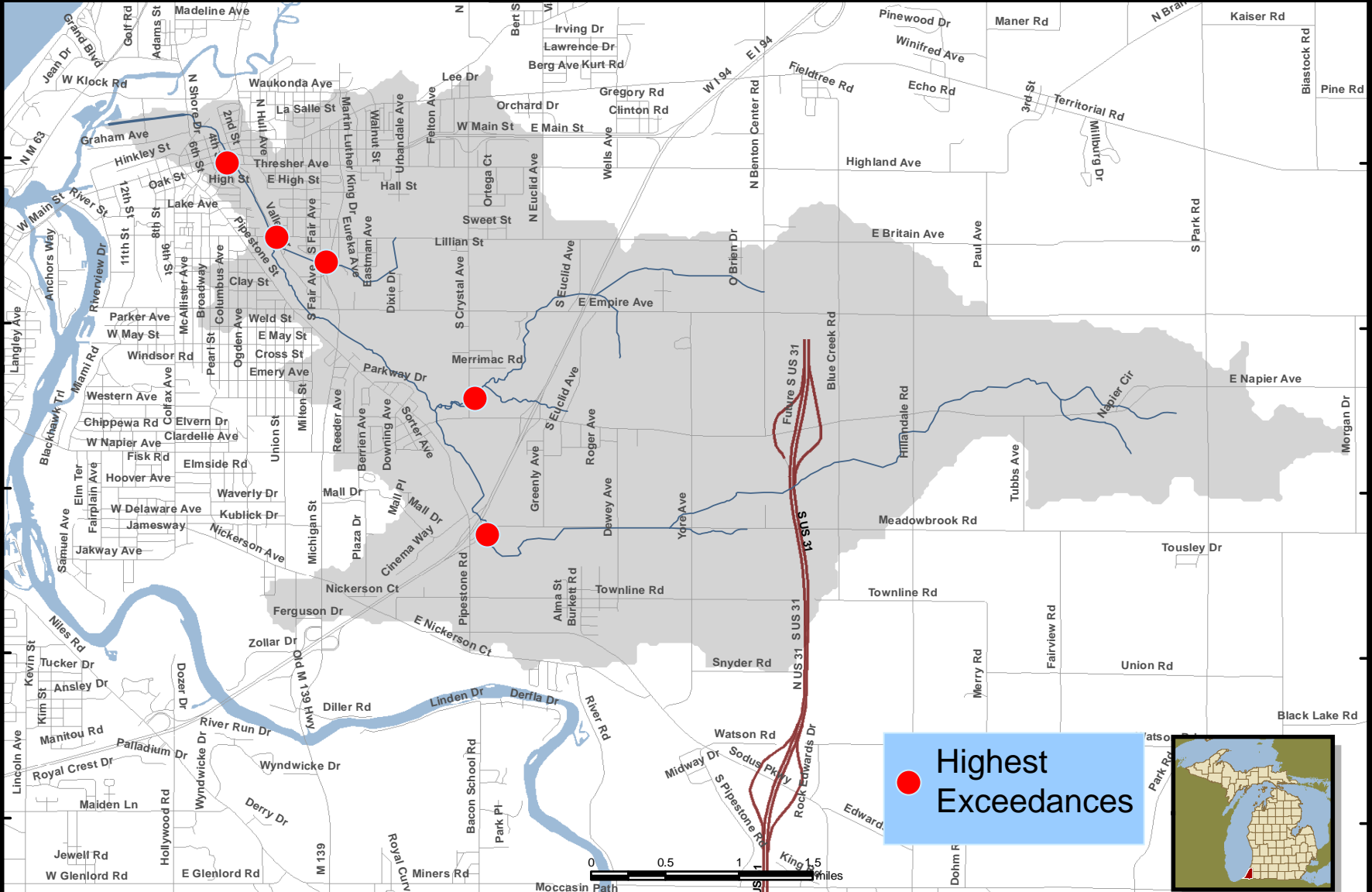


1991, 2001, & 2006 sediment data

- Arsenic
- Cadmium
- Chromium
- Copper
- Lead
- Zinc
- Anthracene
- Bis (2-ethylhexyl) phthalate
- Carbazole
- Dibenz [a,h]anthracene
- PCBs
- Phenanthrene
- Benz [a] anthracene
- Benzo [a] pyrene
- Chrysene
- Fluoranthene
- Pyrene



Sediment Sample Results



Total Suspended Solids Sampling



Total Suspended Solids Data

Rain Event	Low (mg/L)	High (mg/L)
1.5 inches 08/18/07	140	700
0.69 inches 04/09/08	110	3200
0.74 inches 08/05/08	< 4	110
Dry Weather	< 4	12

Yore Ave.



2007 & 2008 Water Sample Summary

Parameter	Meadowbrook	Empire
Benzo(a)anthracene	✓	
Chrysene	✓	✓
Fluoranthene	✓	✓
Phenanthrene	✓	✓
Pyrene	✓	✓

✓ Exceed Michigan Water Quality Standards

What are Water Quality Standards?

- Set of rules that establish minimum water quality requirements
- They protect the designated uses:

- ✓ Agriculture
- ✓ Navigation
- ✓ Industrial Water Supply
- ✓ Partial/Total body contact recreation
- ✓ Fish consumption
- ✓ Warmwater/Coldwater Fishery
- ✓ Other Indigenous Aquatic Life and Wildlife



Section 303d Listing

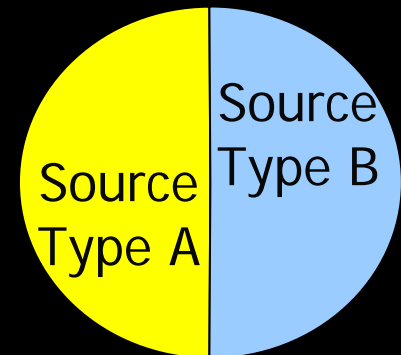
- Ox Creek watershed not meeting the Other Indigenous Aquatic Life and Wildlife designated use
- Determined by poor macroinvertebrate community
- Supported by exceedances of water quality standards and exceedances of sediment quality guidelines

Section 303d Listing Continued

- Also listed for not supporting the Fish Consumption designated use due to elevated PCBs in fish tissue and water column.
- Will be addressed with a statewide PCB TMDL in the future

Total Maximum Daily Load = TMDL

- Calculation of the **maximum amount of a pollutant** that a waterbody can receive and still meet water quality standards
- An **allocation** of that amount to the pollutant's sources.
- **Required** by Clean Water Act and U.S. EPA for waterbodies that are not meeting designated uses [Section 303(d)]
- Cover a wide variety of pollutants



Loading Capacity Development

- Maximum loading of a pollutant to meet WQS
- $LC = WLAs + LAs + MOS$
- WLA = Wasteload Allocation for point sources
- LA = Load Allocation for non-point sources
- MOS = Margin of Safety

TMDL Process



Designated Use
Not Being Met



Allowable Levels Calculated:
based on potential and known
sources and in-stream
conditions



Document Written:
Explains possible and known
sources and Restrictions or Actions
occurring or needed to restore
quality of the resources

What a TMDL Can and Can Not Do

- TMDL can
 - Exercise regulatory authority over point source discharges
 - Regulations require permit limits to be consistent with TMDL
 - Provide available information on potential sources of contaminants
- TMDL Can **NOT**
 - Exercise authority over non-point sources (LAs)

Cooperation is the goal!

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