

A photograph of a river with a rocky bar in the foreground and a dense forest in the background. The river is greenish-brown, and the rocks are light-colored. The forest is lush and green.

# Lower Grand River Watershed TMDL

Project Update Meeting  
January 20, 2011  
Jennifer Olson, Tetra Tech

## Background on TMDLs

- The federal Clean Water Act requires states to adopt water quality standards to protect waters from pollution.
- These standards define how much of a pollutant can be in the water and still allow it to meet designated uses, in this case aquatic recreation and aquatic life.
- Total maximum daily load (TMDL) studies address water bodies not meeting their designated uses.

# Background on TMDLs

**TMDL = maximum amount of a pollutant that a water body can receive and safely meet water quality standards**

**TMDL = Load Allocation + Wasteload Allocation +  
Margin of Safety + Reserve Capacity**

LA = nonpoint source loads

WLA = point source loads

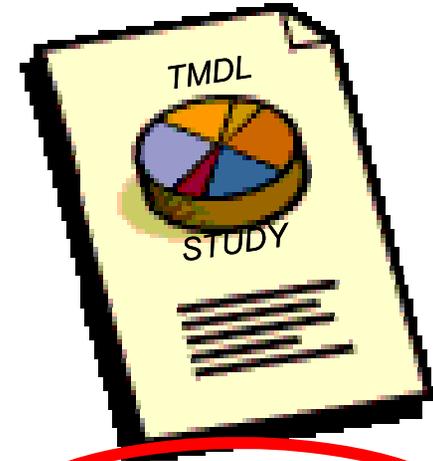
# The Impaired Waters Process



Test the water



Place on list



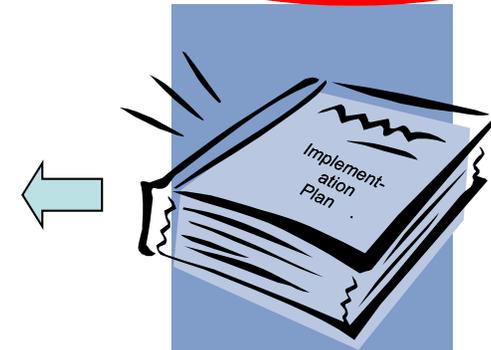
Do TMDL study



Evaluate results



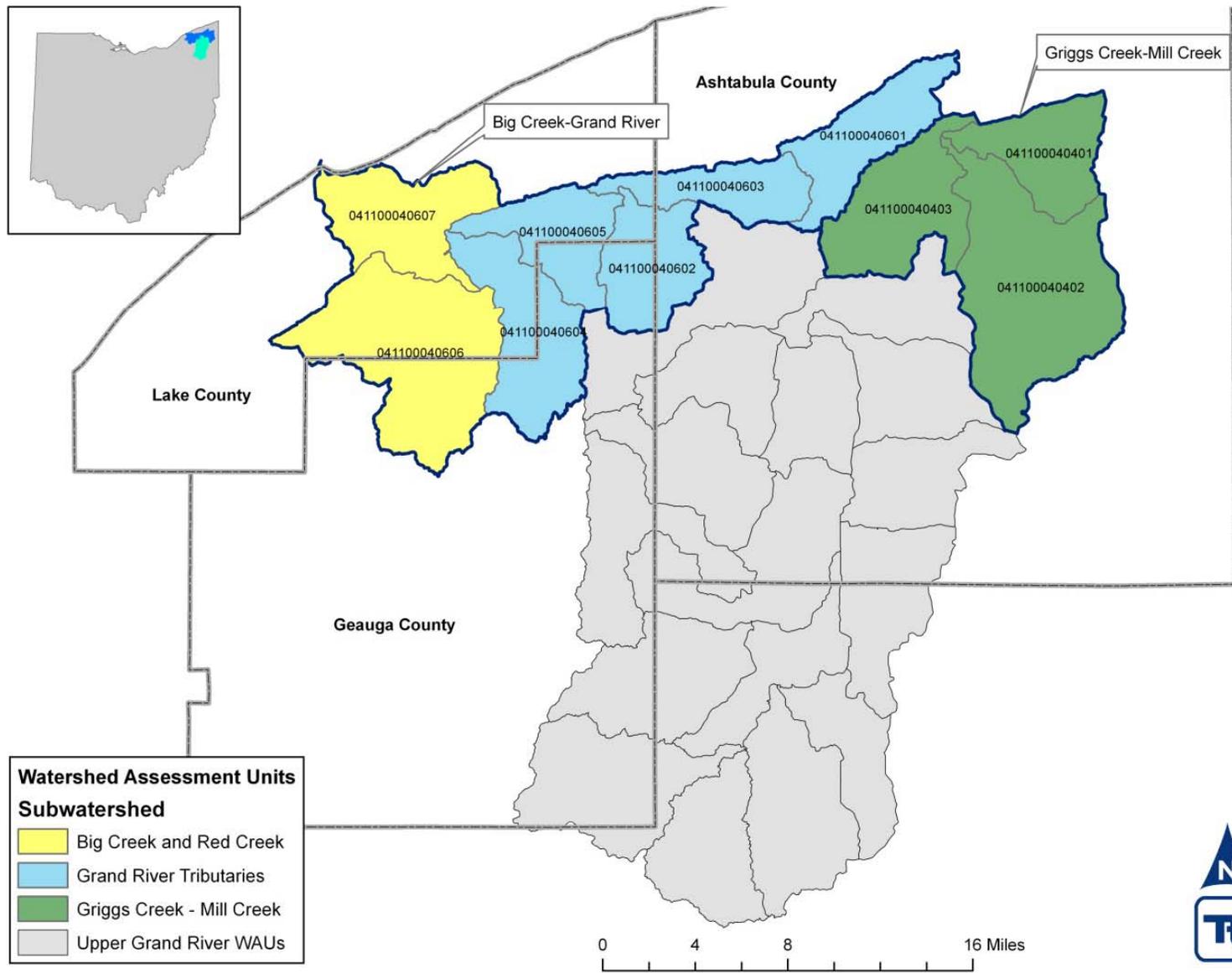
Implement actions



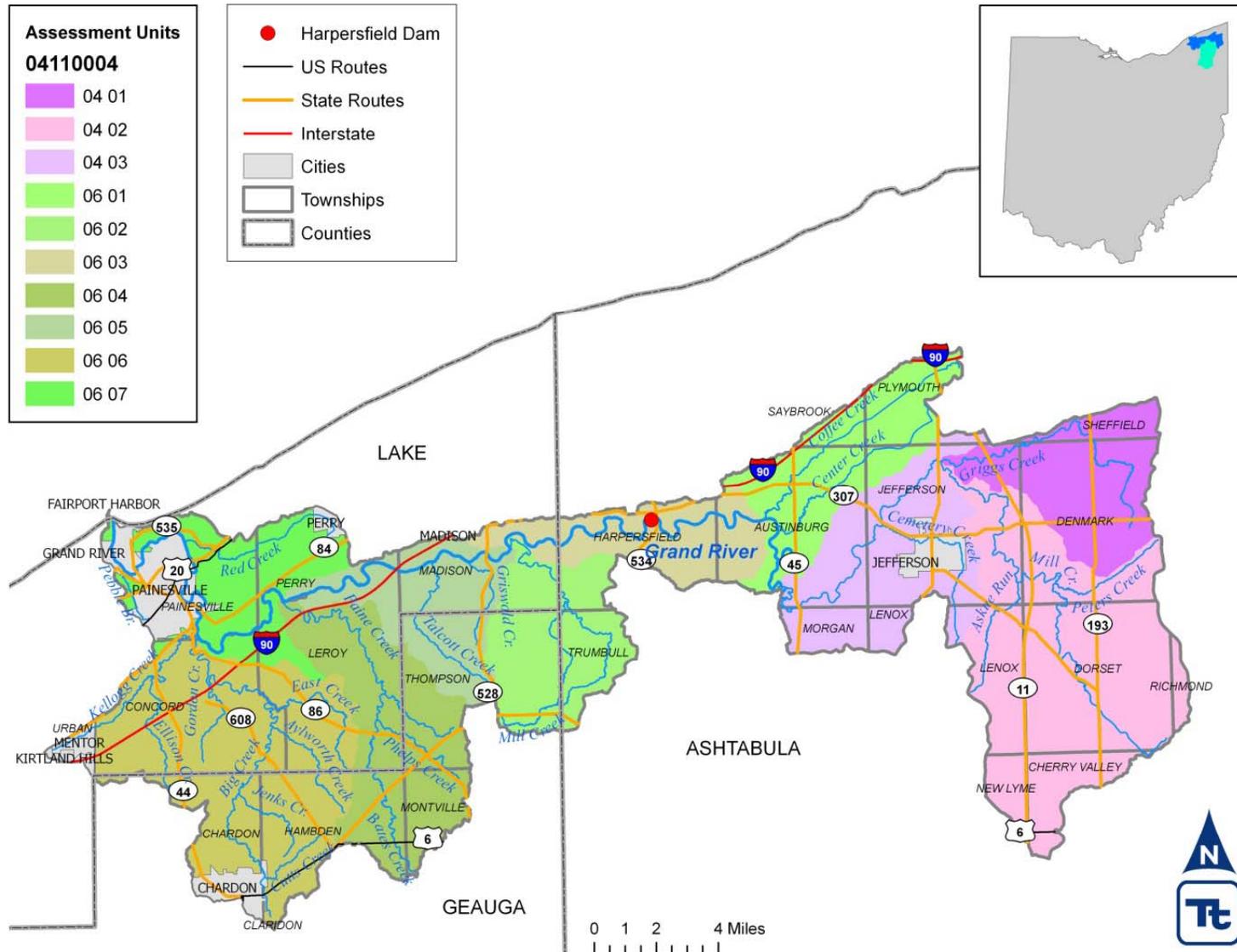
Do Implementation Plan



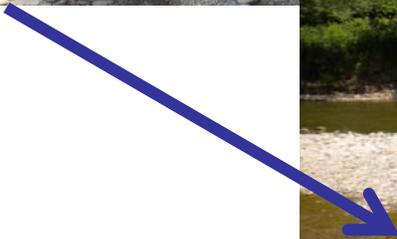
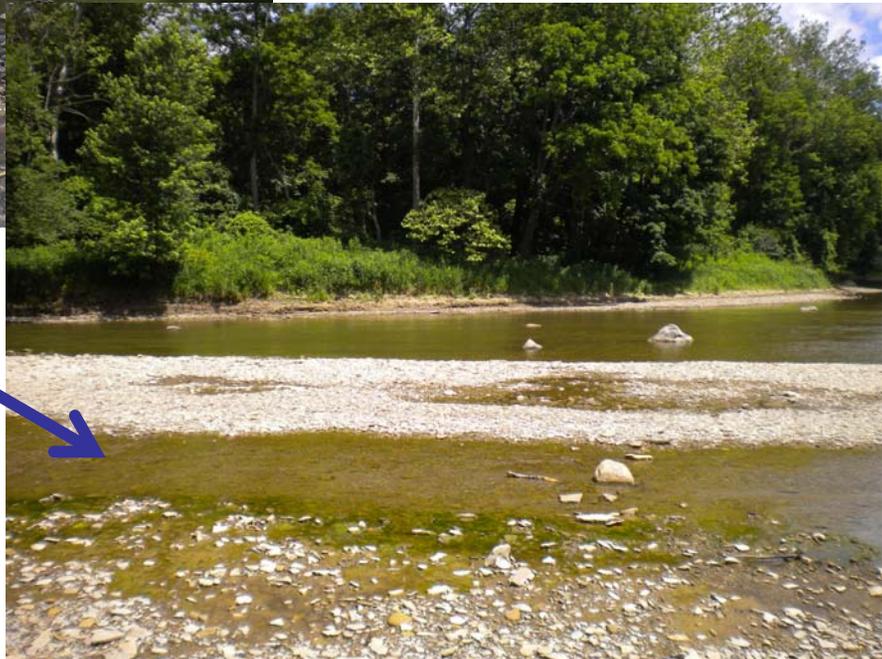
# Lower Grand River Watershed



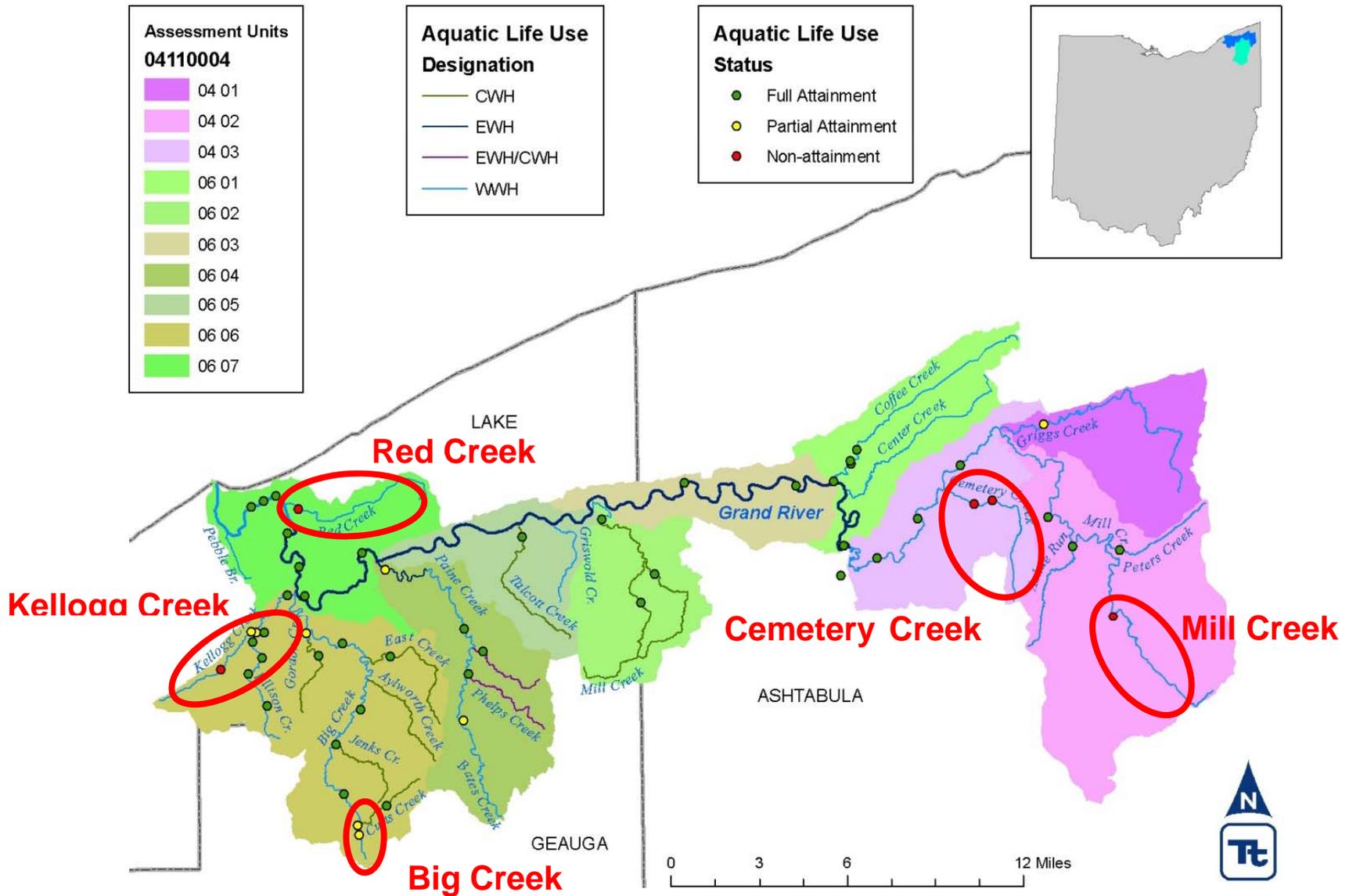
# Lower Grand River Watershed



# From Small Streams, Great Rivers Grow



# Aquatic Life Use Impairments



# Aquatic Life Use Impairments

- Red Creek, Kellogg Creek, Big Creek (headwaters), Mill Creek (headwaters) and Cemetery Creek
- Many smaller streams are threatened by current and future development (ex. Ellison Creek, Paine Creek, tribs to Big Creek)
- Grand River depends on ground water fed tributaries to maintain its high quality
- Watershed development and associated imperviousness is identified as a significant stressor (except for Mill Creek)
  - Watershed imperviousness is 9 – 15%
- Nutrients also identified as a stressor

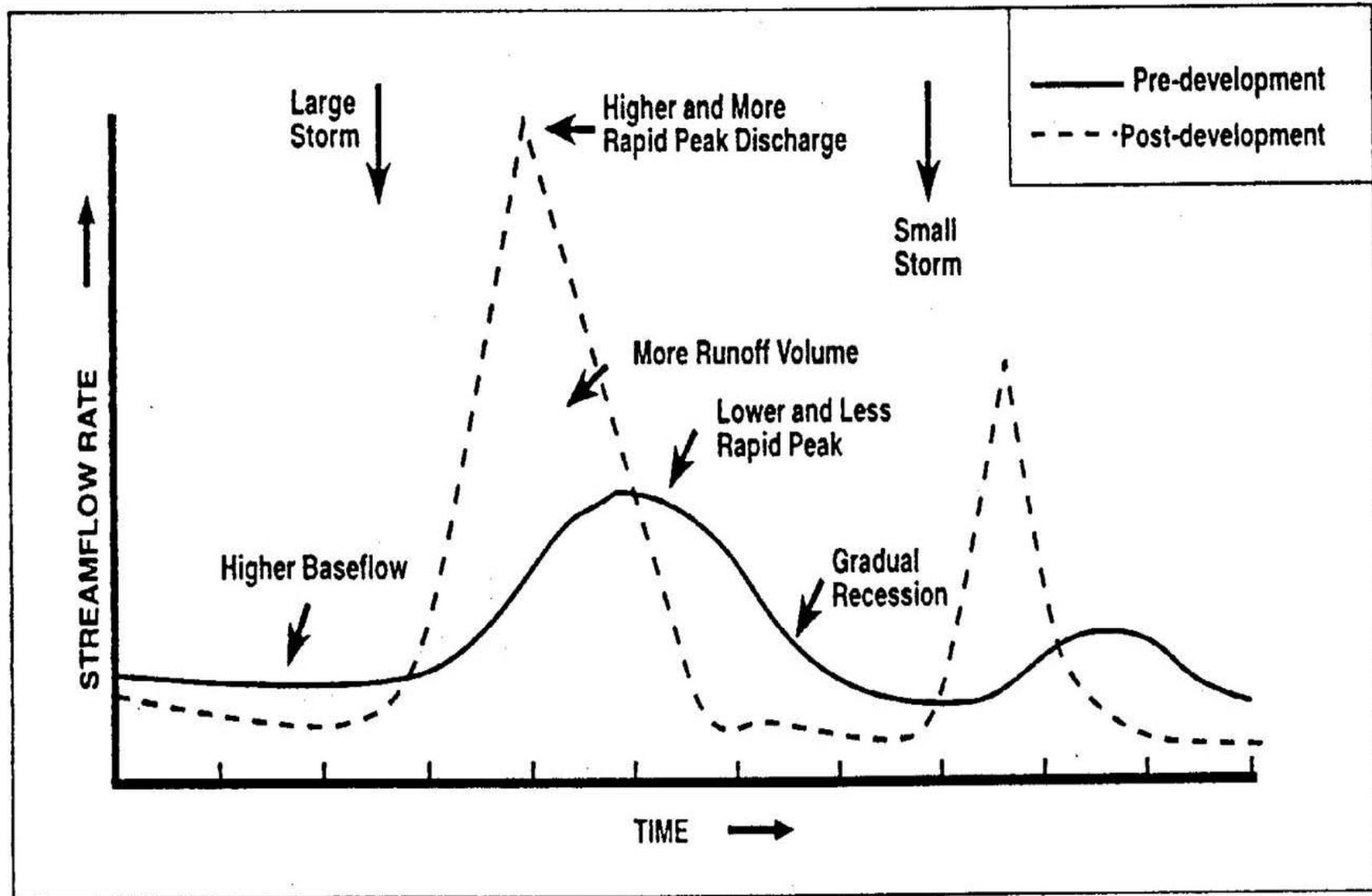
# Impairments Related to Imperviousness

- The impact of imperviousness on aquatic biota + water quality
  - Degraded habitat and siltation
  - High stream flow velocities, increase flow volumes
  - Erosion, channel scour, and bank failure
  - Poor stormwater quality
  - Increased temperature, reduction in base flow

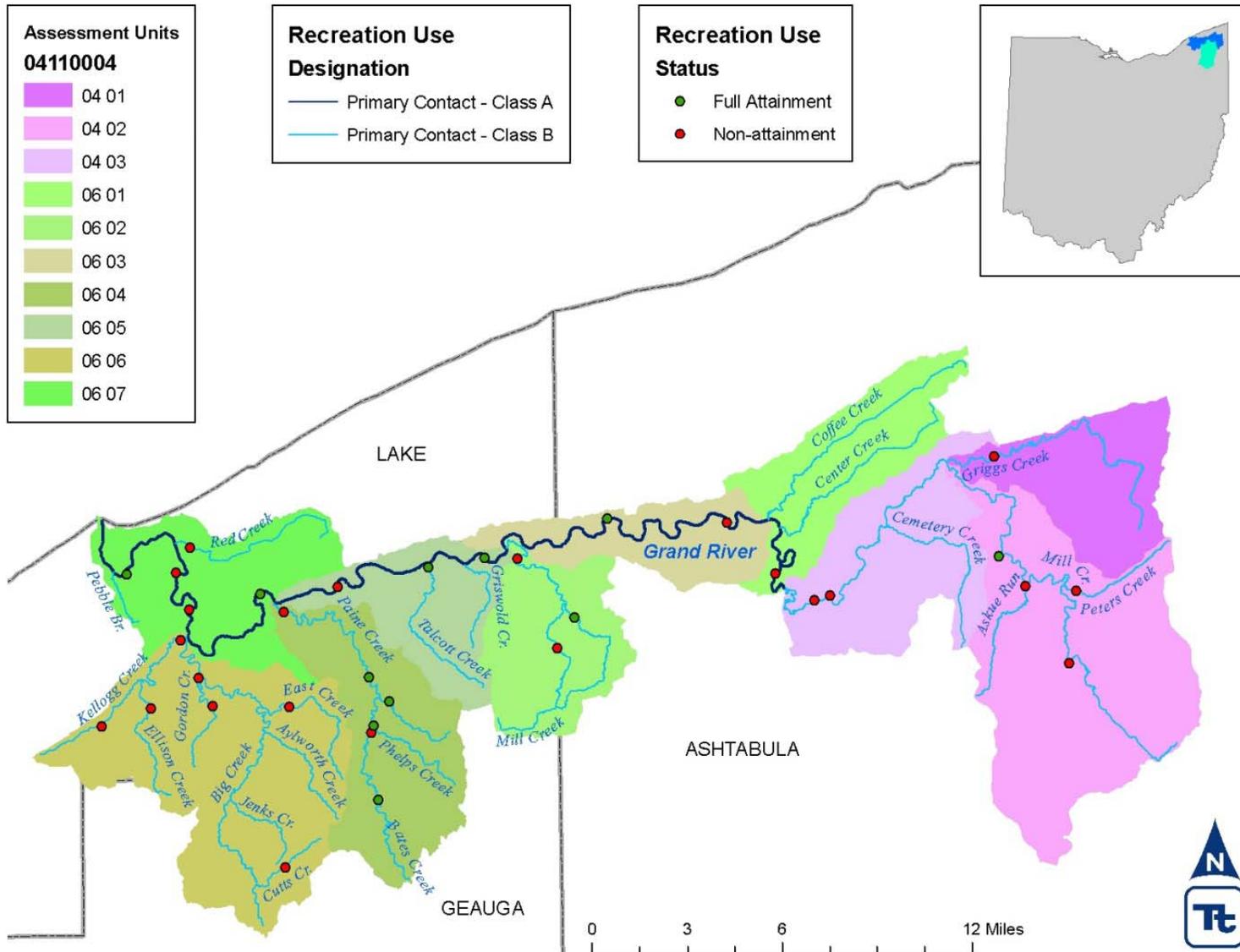
**Flow-based TMDLs and Protection Strategies will be developed**

**Nutrient TMDLs will also be developed**

# Approach to Flow Based TMDLs

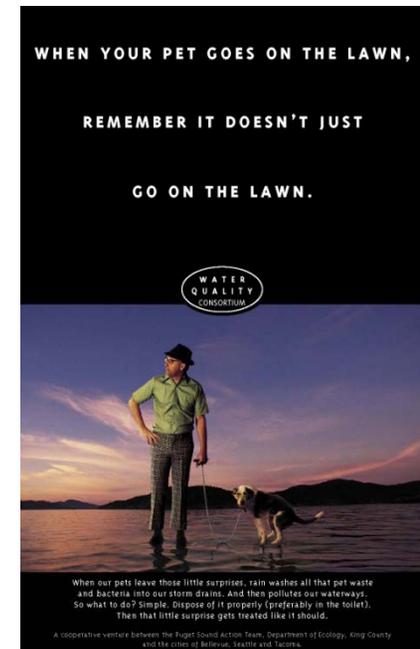
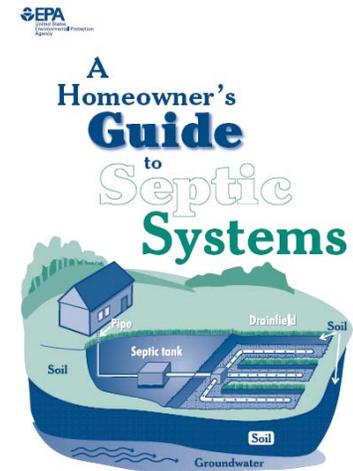


# Recreation Impairments



# Recreation Impairments

- Ohio EPA has criteria for E. coli bacteria
- Sources of bacteria include:
  - Wastewater
  - Agricultural activities
  - Urban runoff
- **E. coli TMDLs will be developed**



# Current Status of Project

- Watershed characterization and source assessment sections drafted
- Rainfall-runoff estimates under development
  - Develop reference stream approach for flow based TMDLs
  - Determine allowable loads
- Draft TMDL document – spring 2011
- Develop implementation strategy – summer 2011
  - SUSTAIN project → inform implementation
- Public review process
- EPA approval

A photograph of a lush green landscape. In the foreground, there are various green plants and flowers, including some with red and purple blossoms. A small pond or stream flows through the middle ground, surrounded by dense green vegetation. In the background, there is a line of tall trees under a blue sky with scattered white clouds. The overall scene is vibrant and natural.

# **SUSTAIN Application in the Lower Grand Watershed**

**Project Update Meeting**

**January 20, 2011**

**Jennifer Olson, Tetra Tech**

# Pilot Area Selection

- Potential project objectives
  - Retrofit opportunities
  - Land use planning and ordinance development
- Need to determine optimization strategy
  - Flow and volume **OR**
  - Pollutant loads

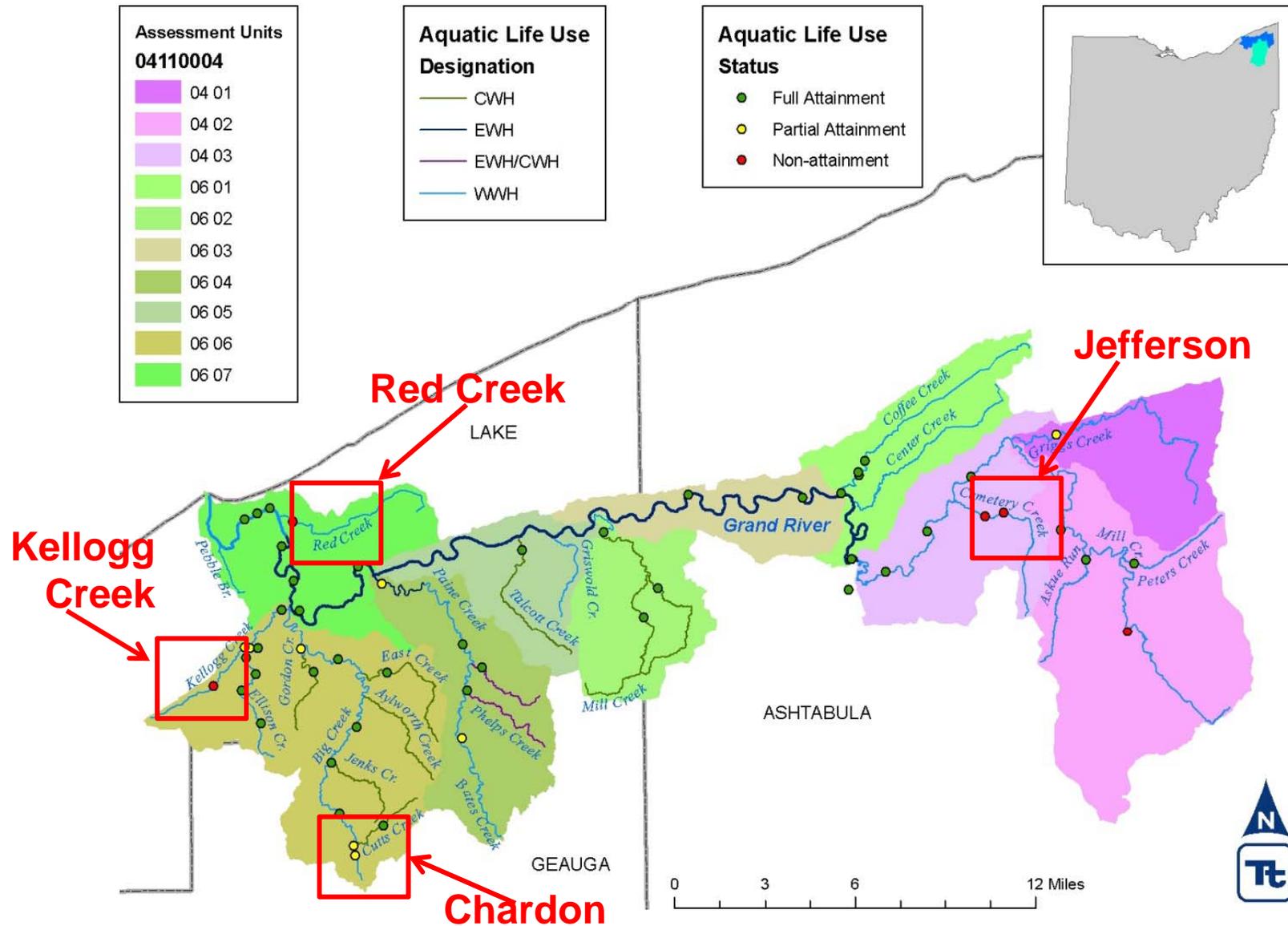


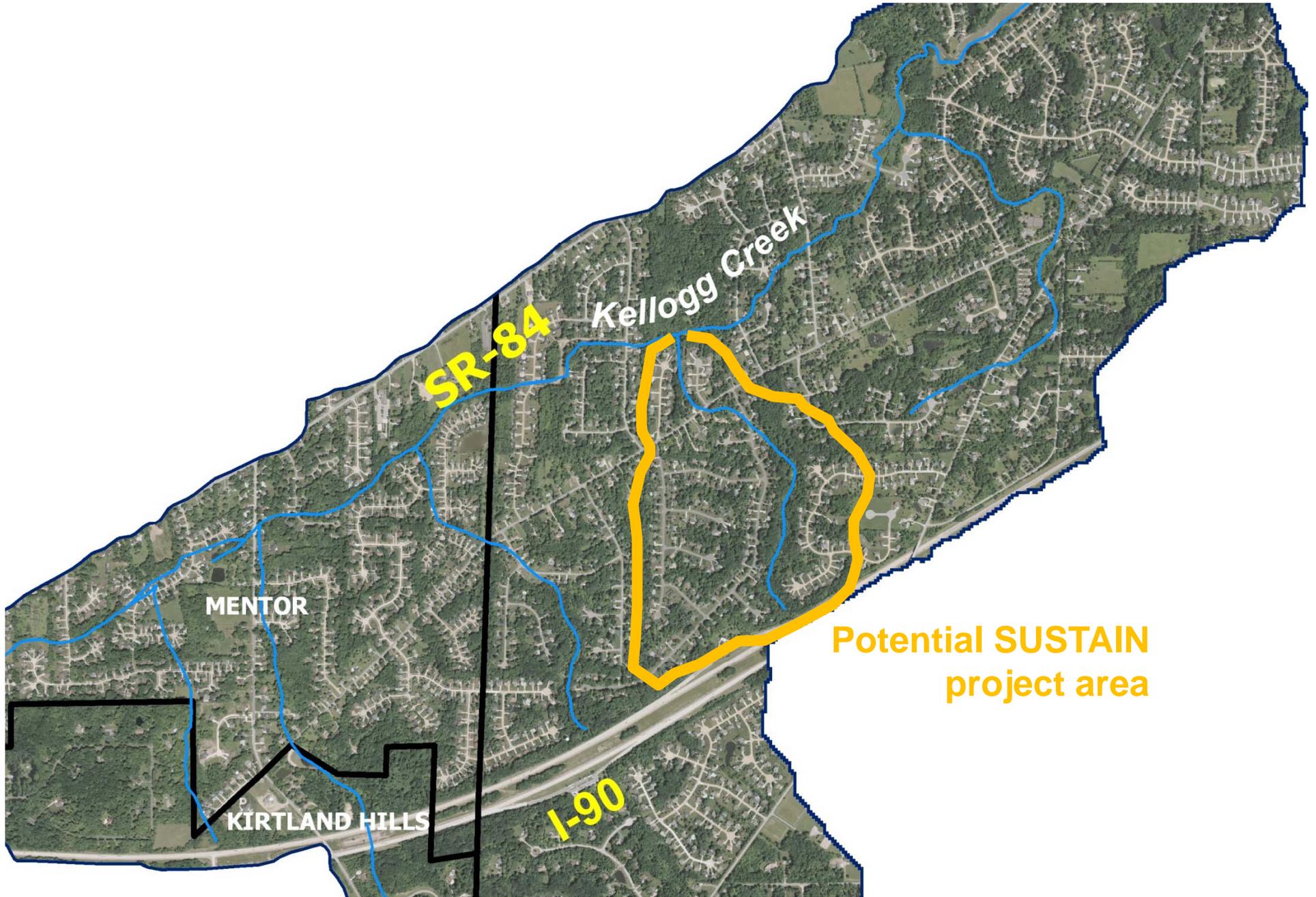
Kellogg Creek watershed,  
potential retrofit opportunity

# Pilot Area Selection

- Selection considerations
  - Location – subwatershed within impaired watershed
  - Ability to extrapolate results
    - Land use (both retrofitting needs and future land use plans)
    - Watershed considerations
  - Availability of spatial data
    - Conveyance system, land use, existing BMPs
  - Size of pilot area
    - Should be at least 60 acres

# Potential Project Area Sites





**SR-84**

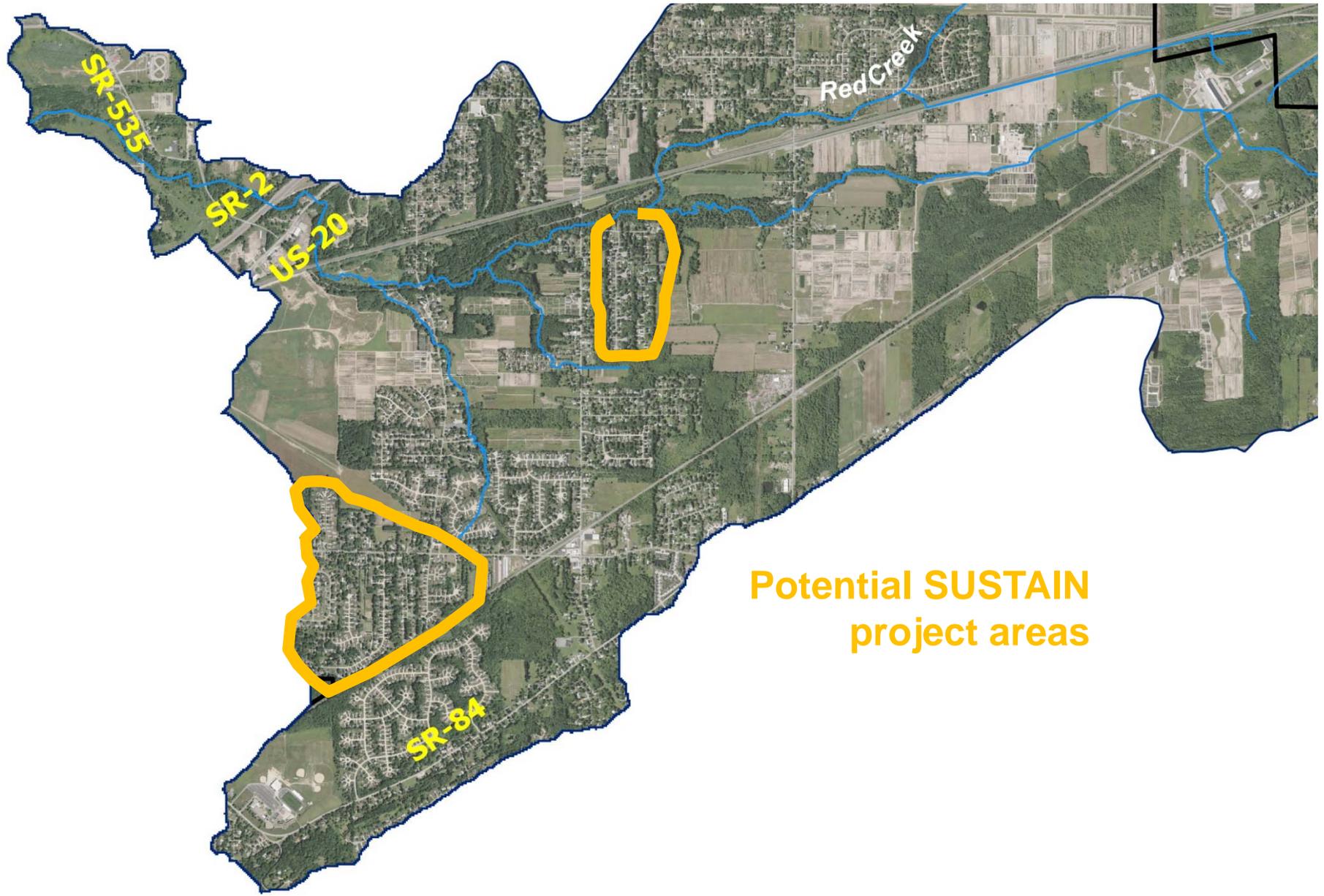
**Kellogg Creek**

**MENTOR**

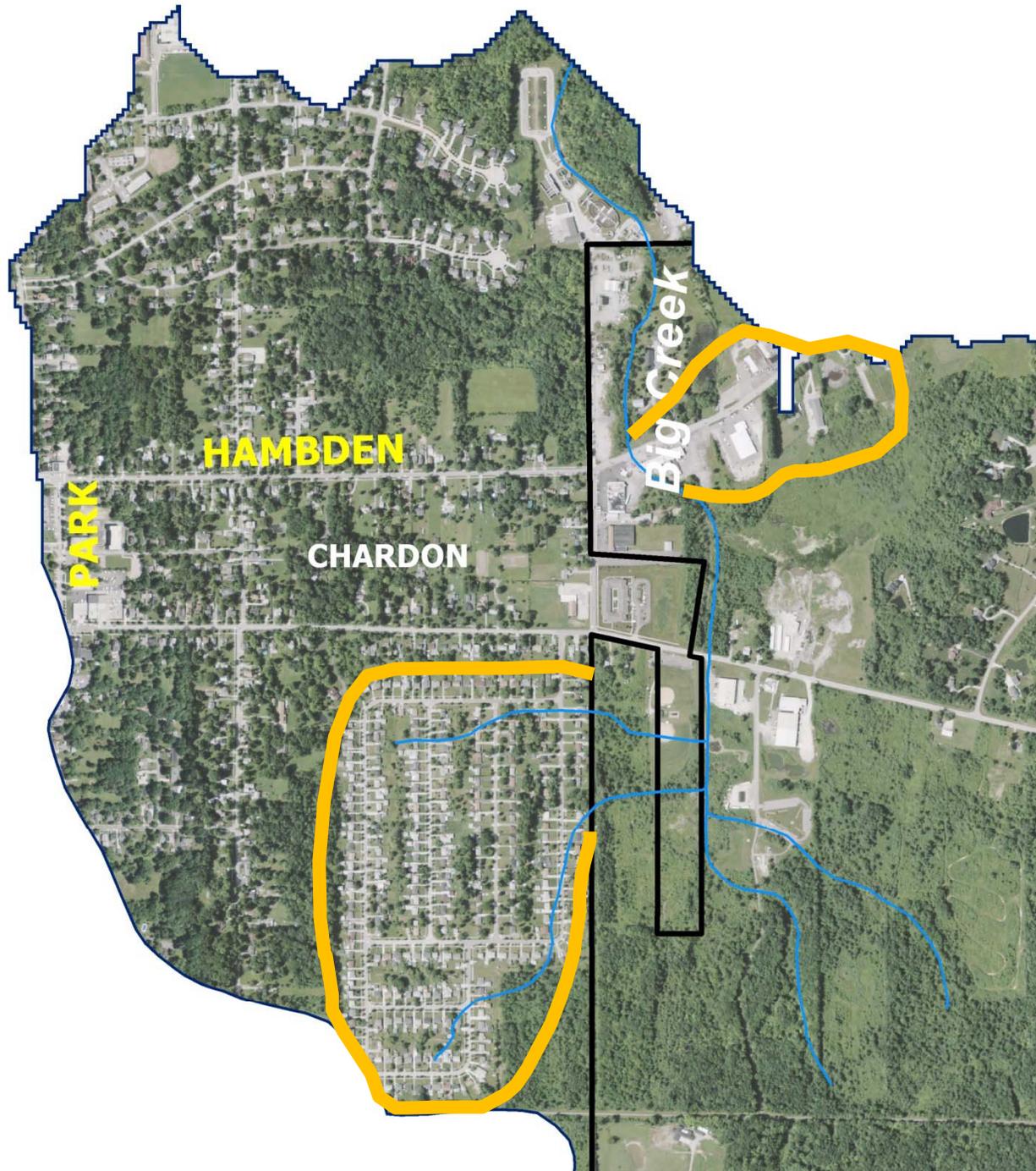
**KIRTLAND HILLS**

**I-90**

**Potential SUSTAIN  
project area**



**Potential SUSTAIN  
project areas**



Potential SUSTAIN  
project areas

# Best Management Practices Selection

- SUSTAIN BMPs
  - Bioretention/rain gardens
  - Porous pavement
  - Wet pond, dry pond
  - Infiltration trench
  - Green roofs
  - Grassed swale
  - Rain barrels/cisterns
  - Buffer strip



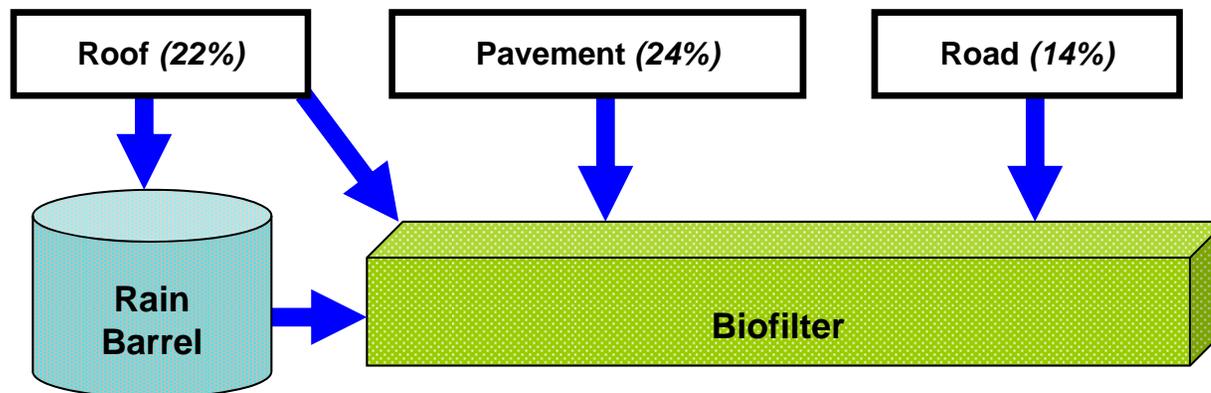
# BMP Selection – Considerations

- Physical
  - Soils and geology
  - Water table
  - Space constraints



# BMP Selection – Considerations

- Quality of source water
- BMP applicability, design
  - Water quality treatment needs
  - Flow/volume reduction
  - Land uses
  - Routing



# BMP Selection – Considerations

- Social acceptance
  - Are homeowners willing and interested?
  - Are the communities willing and interested?
  - Does the regulatory community allow the various BMPs?
    - Will local ordinances allow BMPs (e.g. pavement alternatives, front yard rain gardens)?

# BMP Selection – Design Considerations

- Soil amendment
- Size + location
- Underdrains
  - Include for larger bioretention areas with heavy soils
  - Do not include in small rain garden areas on residential property
- Operation and maintenance





**Questions/Comments?**

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