

# Nutrient Trading in Ohio's Great Miami River Watershed

*Rappahannock River  
Basin Commission*

*April 27, 2011*

*Douglas "Dusty" Hall  
The Miami Conservancy District  
Dayton, Ohio*



# Presentation overview

- **The Miami Conservancy District**
- **Great Miami River Watershed**
- **Great Miami River Watershed  
Water Quality Credit Trading Program**
  - **Drivers**
  - **Program description**
  - **Program status**
    - **Projects**
    - **Funding**



# The Miami Conservancy District

- Great flood of 1913
- Ohio Conservancy Act
  - Signed into law in 1914
  - *Watershed-based political subdivision*
  - Broad authority primarily for water-related purposes
- MCD established 1915

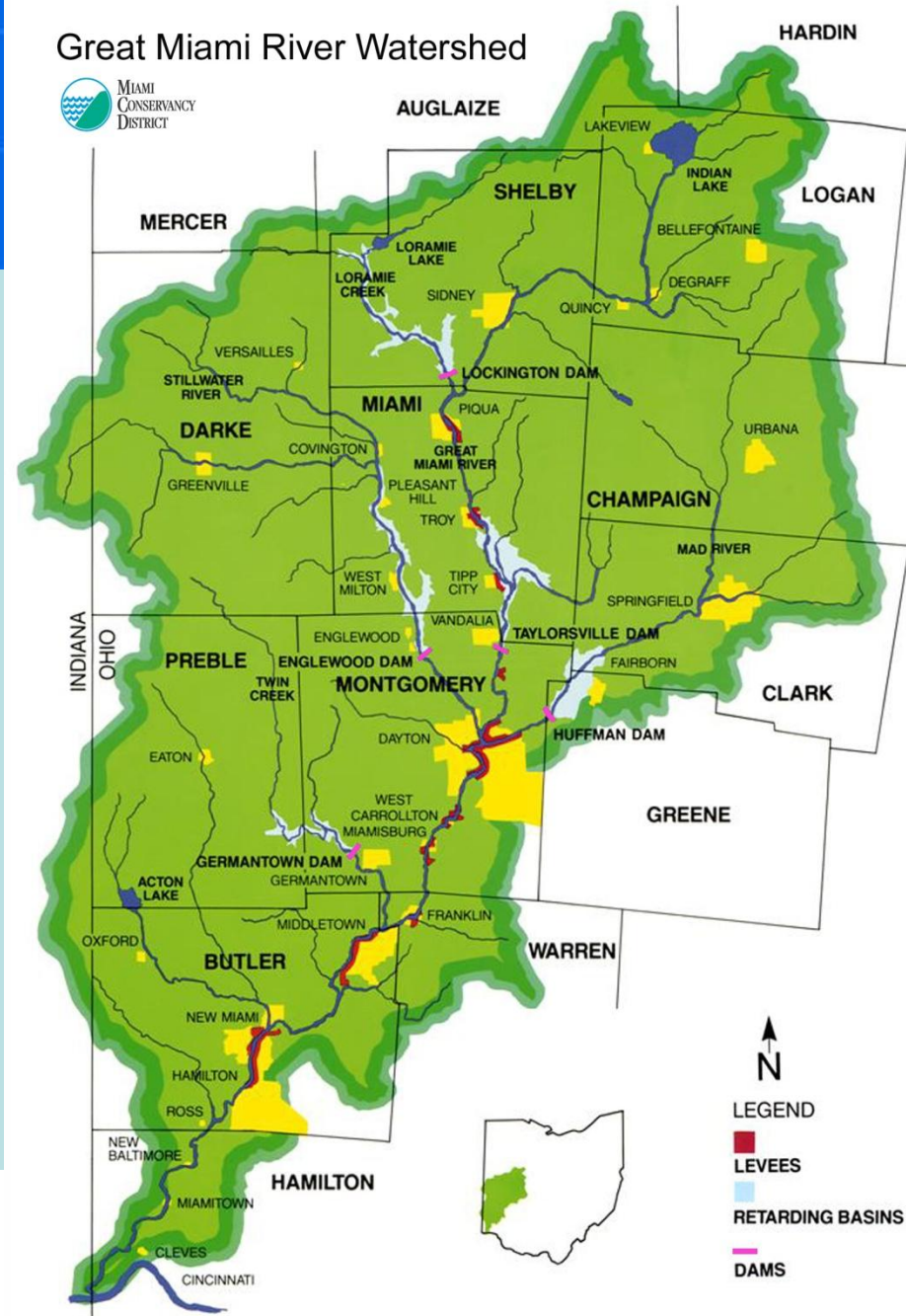


# The Miami Conservancy District

- ***Protecting*** people and property from flooding
  - √ Five dry dams and levees
  - √ Floodplain preservation
- ***Preserving*** the quantity and quality of water
  - √ Aquifer protection
  - √ Stormwater collaboration
  - √ Water quality credit trading
- ***Promoting*** the enjoyment of waterways
  - √ Land and water trails
  - √ Parks and preserves

# Great Miami River Watershed

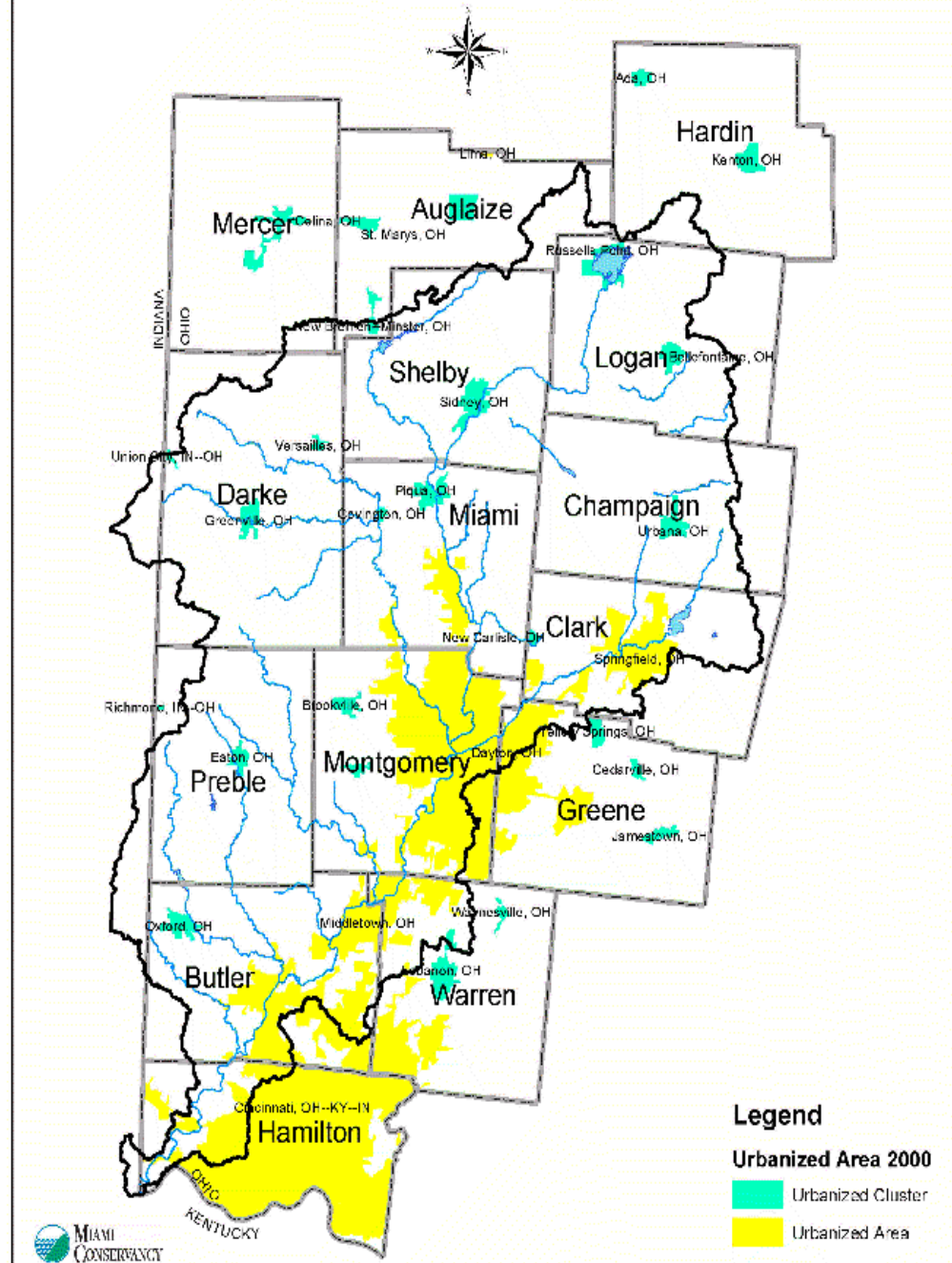
- 4,000 mi<sup>2</sup>
- Major tributaries:
  - Stillwater River
  - Mad River
- 1.5 million residents
- Dayton is largest city
- Agriculture is dominant land use



# Great Miami River Watershed

- Rural - upstream
- Urban – downstream
- More than 6,000 miles “blue line” streams
  - Nearly 19 miles tribs and headwaters per mainstem mile
- 70% agricultural land use

Urbanized Areas within the Great Miami River Watershed  
2000 Census



# Ohio's Great Corridor

- “Vibrant city waterfronts  
...land & water trails...  
picturesque farmland...  
exquisite natural areas.”
- Annual River Summit



## Ohio's GREAT CORRIDOR

### Discover Ohio's Great Miami River Corridor

You're out of college now or will be soon. You know what you want, and finding that perfect job is critical. But where that job is and what the region has to offer drives your decision. That's why Ohio's Great Corridor has to be on your list. It is the largest and most vibrant corridor of its kind, with more than 10 cities interconnected by land and water trails.

*"I love the walkability of working and living in downtown Dayton. Plus, it's the epicenter of the region's system of bike paths. It lifts the spirit to see kayakers out on the river as I hike along one of the paths to my sand volleyball game. When it comes to nightlife, the arts scene in this town is amazing for its size. This is the perfect place for my husband and me to call home because we both love to get out and live!"* Shannon Peier

*"The Dayton region has wonderful opportunities for young professionals, including great restaurants, arts venues, civic and community organizations, leadership and career training, academic universities and colleges, and affordable housing options. Overall, Dayton is a great place to live, work, and play."* Andrew Reitz

*"Three things drove our decision to live here: the historic downtown, the bike trail, and the Great Miami River. My husband and I wanted to live in a community that had easy access to the outdoor activities that we love. Being able to run, walk, or ride on the bike trail or hop on the river were the key selling points for us to live in Miamisburg."* Elnie Frank

### In Ohio's Great Corridor, you'll experience:

- Great restaurants from outdoor cafes to formal dining, and wine galleries to microbreweries.
- A refreshingly original music scene.
- A vibrant arts community where one night you can experience local theater and the next take in a Broadway show.
- Stylish housing from lofts to affordable, eco-friendly, homes that tread lightly on the earth.
- Public markets with an eclectic choice of vendors featuring organic and locally grown foods.
- About 130 miles of hiking trails throughout numerous metropolises.
- Backpacking trails reminiscent of the backcountry wilderness with beautiful hills, creeks, abundant wildlife, and all within a short drive.
- A fully sustainable mountain biking trail system with beautiful hardwoods, a rock-bottom creek, great hills and rock-filled ridge that creates an extreme outdoor experience for all skill levels.
- Adrenaline pumping whitewater rapids to serene, calming pools of crystal clear water for kayaking and canoeing.
- An extensive system of more than 77 miles of riverbank trail for biking, rollerblading, and running, and more than 250 miles region-wide.
- Charming, historic communities with shopping, specialty restaurants, and festivals that draw as many as 250,000 people.
- Museums and National Parks showcasing everything from world-class art to Air Force One, the presidential jet of former US presidents.
- Division I college sports, minor league baseball and hockey.
- Downtown riverfront public spaces that offer everything from unique festivals to quiet spaces to relax and take a breath from life's full-on pace.

### Have an impact professionally now

In Ohio's Great Corridor, the business community is big enough to make a difference in the world and small enough to be accessible. You'll have a chance to meet key leaders and have a voice in the region from Day 1. Additionally, this region understands that the 21<sup>st</sup> century requires businesses to redefine and reinvent themselves. We're looking for young professionals to help make that happen.

Outstanding quality of life plus outstanding professional opportunities make Ohio's Great Corridor a world-class opportunity for you.

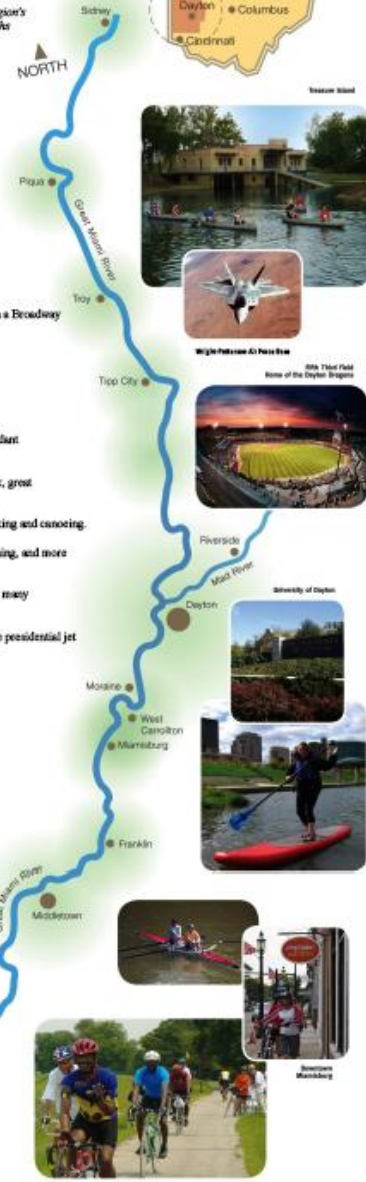


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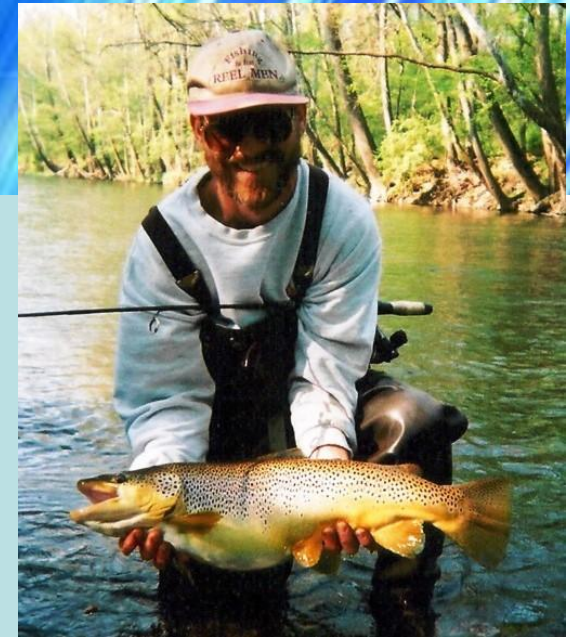
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Great Miami River Recreation Trail

# Near-field...Are we meeting water quality goals?

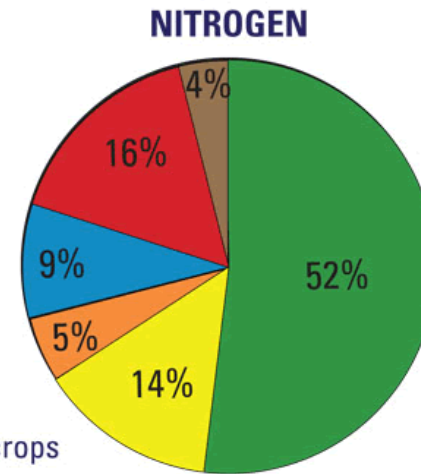
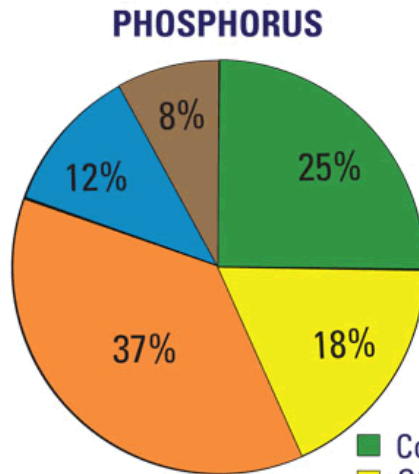
- Of our monitored streams:
  - ✓ Yes = 58.8%
  - ✓ Almost = 19.8%
  - ✓ No = 21.4%
- Excess nutrients contribute to impairment



# Far-field Ohio among “dirty” nine



## Sources of nutrients delivered to the Gulf of Mexico



**Sources**

- Corn and soybean crops
- Other crops
- Pasture and range
- Urban and population-related sources
- Atmospheric deposition
- Natural land

U.S. Department of the Interior  
U.S. Geological Survey

From: [http://water.usgs.gov/nawqa/sparrow/gulf\\_findings/primary\\_sources.html](http://water.usgs.gov/nawqa/sparrow/gulf_findings/primary_sources.html)

# Trading Program driver – regulations?

- Ohio – Spring 2011
- Florida
- Wisconsin - NOI
- Nancy Stoner memo – March 2011
- Clean Water Protection Guidance – Dec. 2010



## Federal Register

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Tuesday,  
January 26, 2010

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Part III

**Environmental  
Protection Agency**

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40 CFR Part 131  
Water Quality Standards for the State of  
Florida's Lakes and Flowing Waters;  
Proposed Rule

# Trading Program driver - economics

- Kieser and Associates analysis
- 20-year projection
- Customers save
- Better results

## Preliminary Economic Analysis of Water Quality Trading Opportunities in the Great Miami River Watershed, Ohio



*Prepared for:*

The Miami Conservancy District  
38 E. Monument Ave.  
Dayton, Ohio 45402-1265

*Prepared by:*

Kieser & Associates  
536 E. Michigan Ave., Suite 300  
Kalamazoo, Michigan 49007

July 23, 2004



# Trading Program driver – better results

	WWTP Upgrade	Ag. Practices
<b>Pollutant of concern</b>	<b>Yes</b>	<b>Yes</b>
<b>Other pollutants reduced</b>	<b>?</b>	<b>Yes</b>
<b>Habitat created</b>	<b>No</b>	<b>Yes</b>
<b>Canopy/shade/cooling provided</b>	<b>No</b>	<b>Yes</b>
<b>Stream bank stability enhanced</b>	<b>No</b>	<b>Yes</b>
<b>Flow velocity decreased</b>	<b>No</b>	<b>Yes</b>
<b>Wetlands created</b>	<b>No</b>	<b>Yes</b>
<b>Floodplains protected</b>	<b>No</b>	<b>Yes</b>
<b>Assimilative capacity increased</b>	<b>No</b>	<b>Yes</b>
<b>Energy/GHG benefited</b>	<b>No</b>	<b>Yes</b>

# Trading Program driver – GHG reductions

- 72 mgd WWTP
- Trading
  - CO<sub>2</sub> reductions from diesel saved 2,424 tons
  - CO<sub>2</sub> equivalent of C sequestered 92,130 tons
  - Subtotal 94,554 tons
  - BNR (power only) CO<sub>2</sub> emissions 11,240 tons
- Net *annual* CO<sub>2</sub> benefit **105,794 tons**

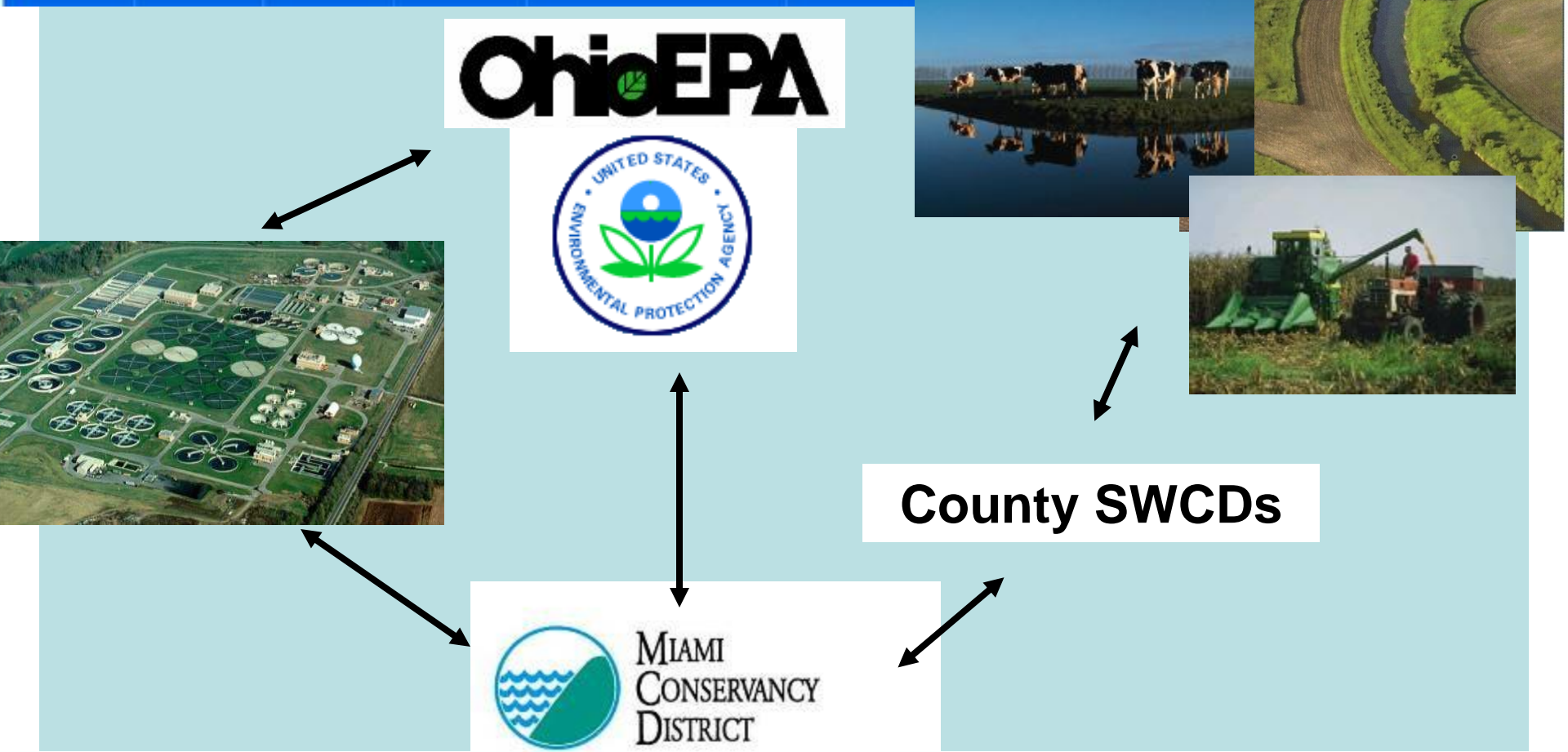
# What is “water quality credit trading?”

...A process by which a wastewater treatment plant substitutes “credits” from agricultural practices for pollutant reductions the plant would otherwise be required to achieve through a plant upgrade.

# Partners in Trading Program development

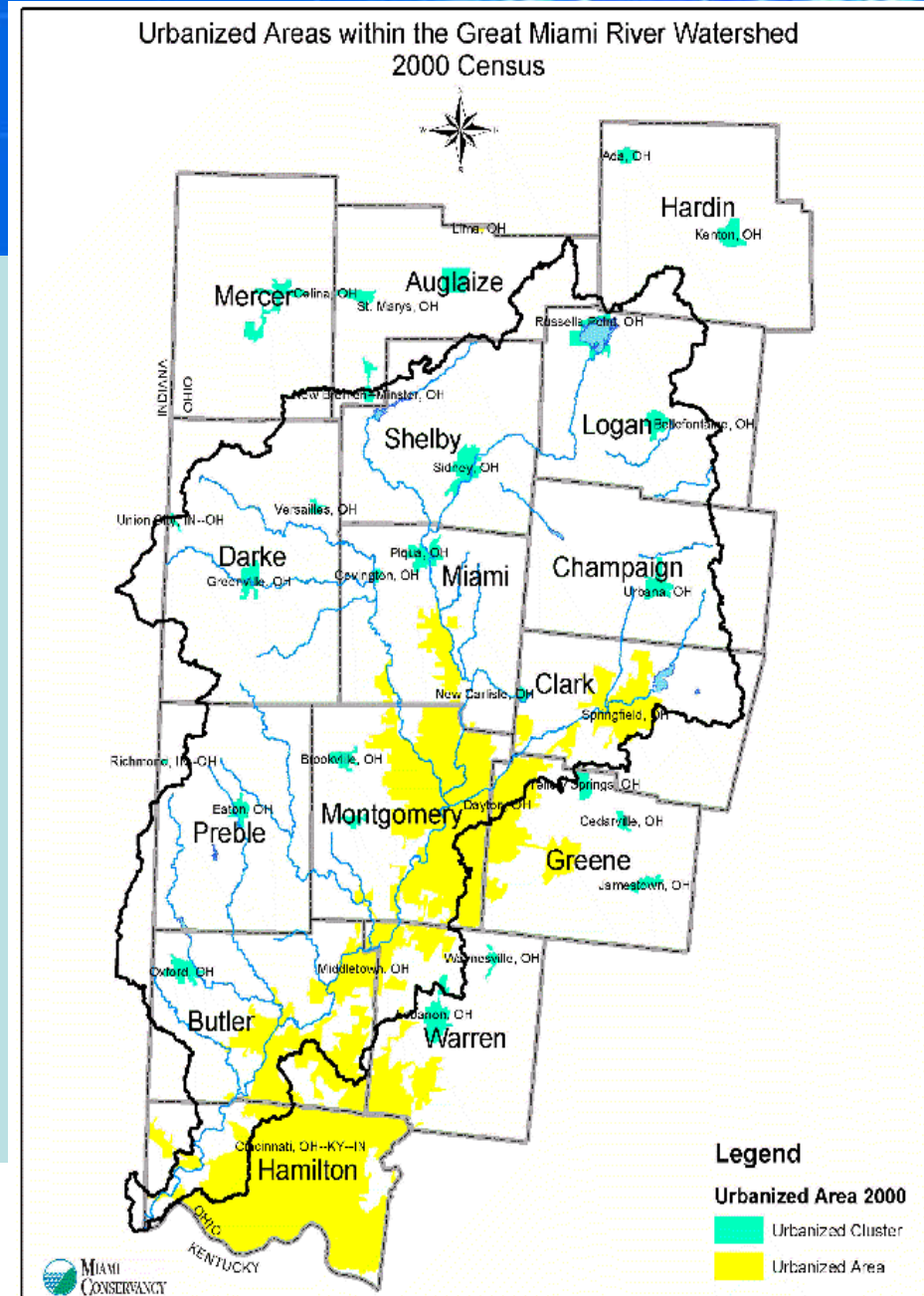
- More than 100 meetings – 2003/2005
  - Cities/counties with WWTPs
  - County soil and water conservation districts (SWCDs)
  - Agricultural producers
  - Ohio EPA and USEPA
  - Ohio Department of Natural Resources
  - Ohio Farm Bureau Federation
  - Chambers of commerce
  - USDA's Natural Resource Conservation Service
  - Ohio Environmental Council

# Trading Program overview



# Avoids “hot spots”

- Credits must be generated upstream from the WWTP that is using the credits for compliance



# Building on strengths

- Minimum new bureaucracy
- SWCD/NRCS staff
  - Identify and submit projects through SWCD
  - Quantify nutrient reductions
  - Annually inspect project
  - Identify “failed” practices



## Credit generation “baseline”

- *New* agricultural practices funded by the Trading Program - **YES**
- Agricultural practices under contract with state & federal conservation incentive programs - **NO**
- Any other required agricultural practice - **NO**

# Credit assurance

- Insurance pool
  - Provides “back-up” credits for WWTPs if an agricultural project fails

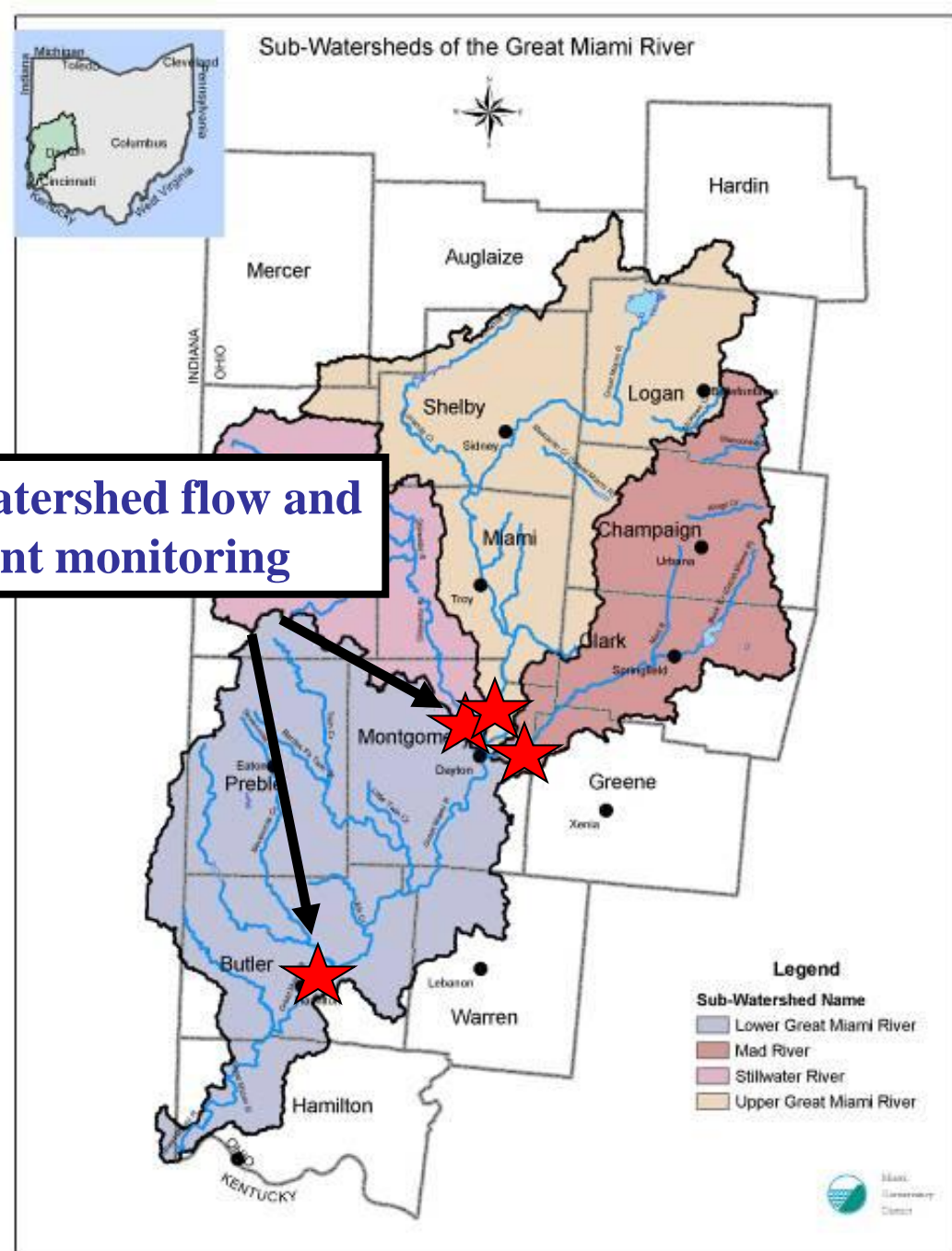


# Water quality monitoring

Field-scale monitoring



Subwatershed flow and nutrient monitoring



- Legend**
- Sub-Watershed Name**
- Lower Great Miami River
  - Mad River
  - Stillwater River
  - Upper Great Miami River



# Water quality monitoring

- “Rich” data sets
  - Flow
  - Concentration
  - Load
- Regulatory “agreement” essential - program performance



# Early buyer incentives

- Incentive for pre-compliance participation
- Earn perpetual “discount” of 33-50%
- Grant funds

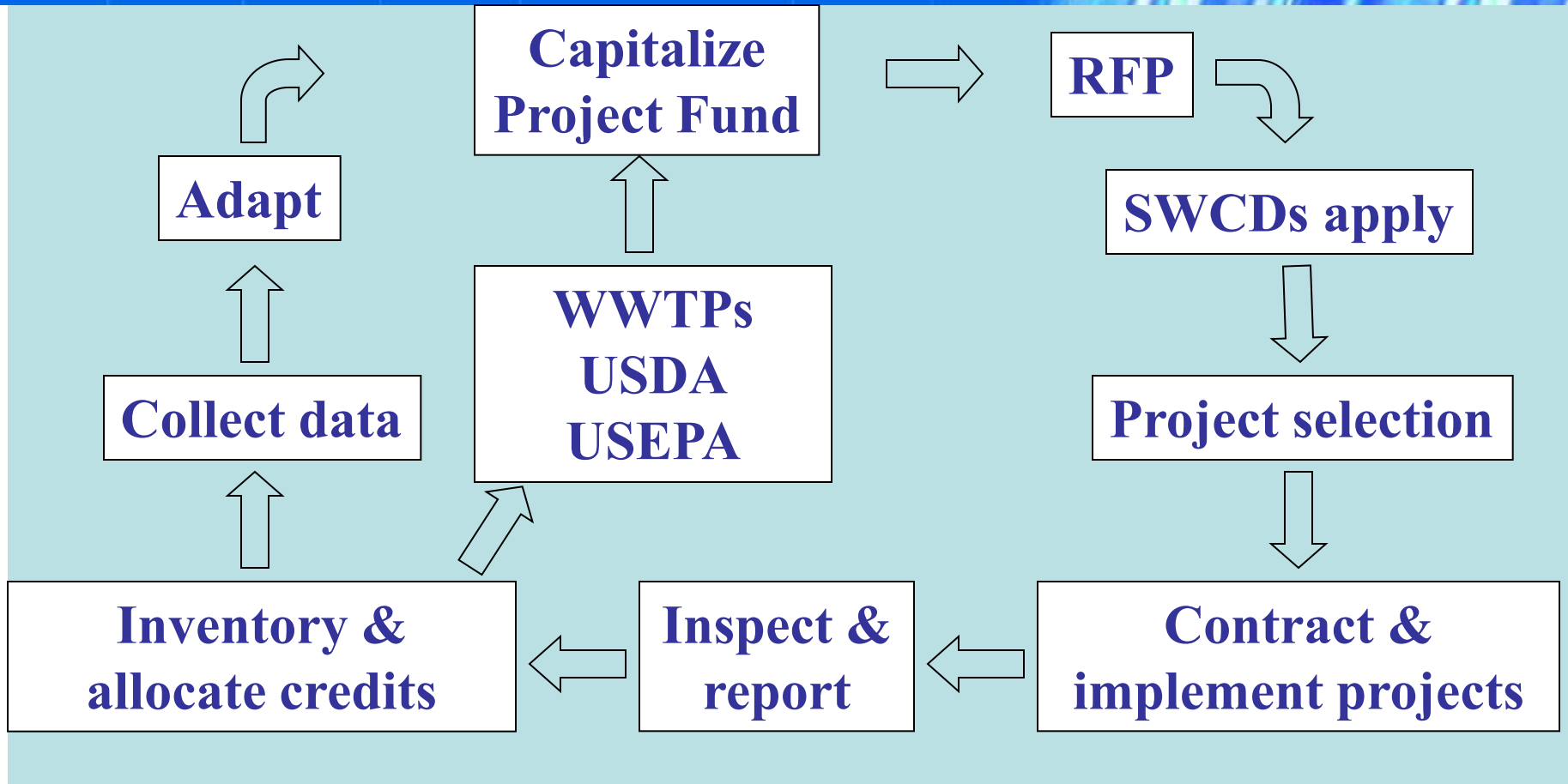


# Credit buyers

- City of Dayton
- Butler County
- Tri-Cities (Huber Heights, Vandalia, and Tipp City)
- Englewood
- Union



# Program process



# Project status

- Nine reverse auctions (“rounds”)
  - Projects = 345
  - Nutrient reductions > 500 tons
  - Payment total about \$1.5 million
- Cost about \$1.53 per lb. of nutrient reduction (credit)



# BMPs on-the-ground

- ✓ Cover crops
- ✓ Tillage
- ✓ Rotation
- ✓ Milk house/cow lot
- ✓ Pasture seeding/prescribed grazing
- ✓ Sod
- ✓ Hayland
- ✓ Manure storage
- ✓ Filter strips
- ✓ Grid sampling/VRT



# Funding status

- Years 1-3 initial pilot  
\$1,200,000 WWTPs  
\$ 937,000 USDA/NRCS  
\$2,137,000
- Years 4-6  
\$ 251,300 Non-Federal  
\$ 753,900 USEPA  
\$1,005,200



# MCD's vision

*Thriving communities, a healthy watershed, and a higher quality of life, sustained by well-managed water resources throughout the watershed.*



*Photo by Kendall Draeger*