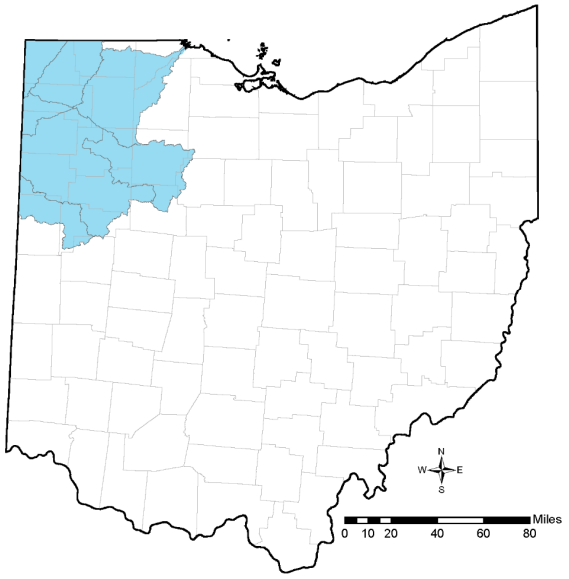


Maumee Watershed Nutrient TMDL Project: Addressing Lake Erie Impairments

Module 3 of 3
Ongoing Implementation and Future Opportunities

September 2021

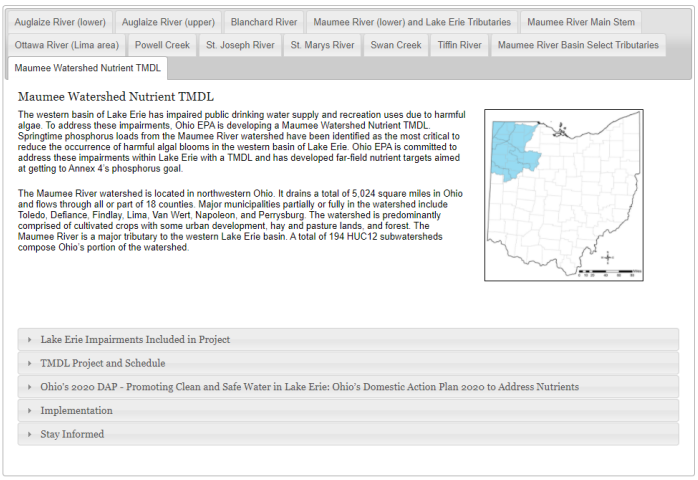
Ohio Environmental Protection Agency

1

Hello, this is the third module of Ohio EPA's public outreach for the Maumee Watershed Nutrient Total Maximum Daily Load (or TMDL) Project. I'm Tiffani Kavalec, the Division of Surface Water Chief at Ohio EPA.

Today, Ohio EPA staff and sister agencies, along with environmental staff from Indiana and Michigan, and university spokesmen have come together to provide an overview of the plethora of work occurring in tandem with the TMDL document development. The state of Ohio continues to commit nutrient reduction efforts with investments and coordination throughout the basin and this overview will provide our stakeholders with the current status of these efforts.

Maumee Watershed Nutrient TMDL Website



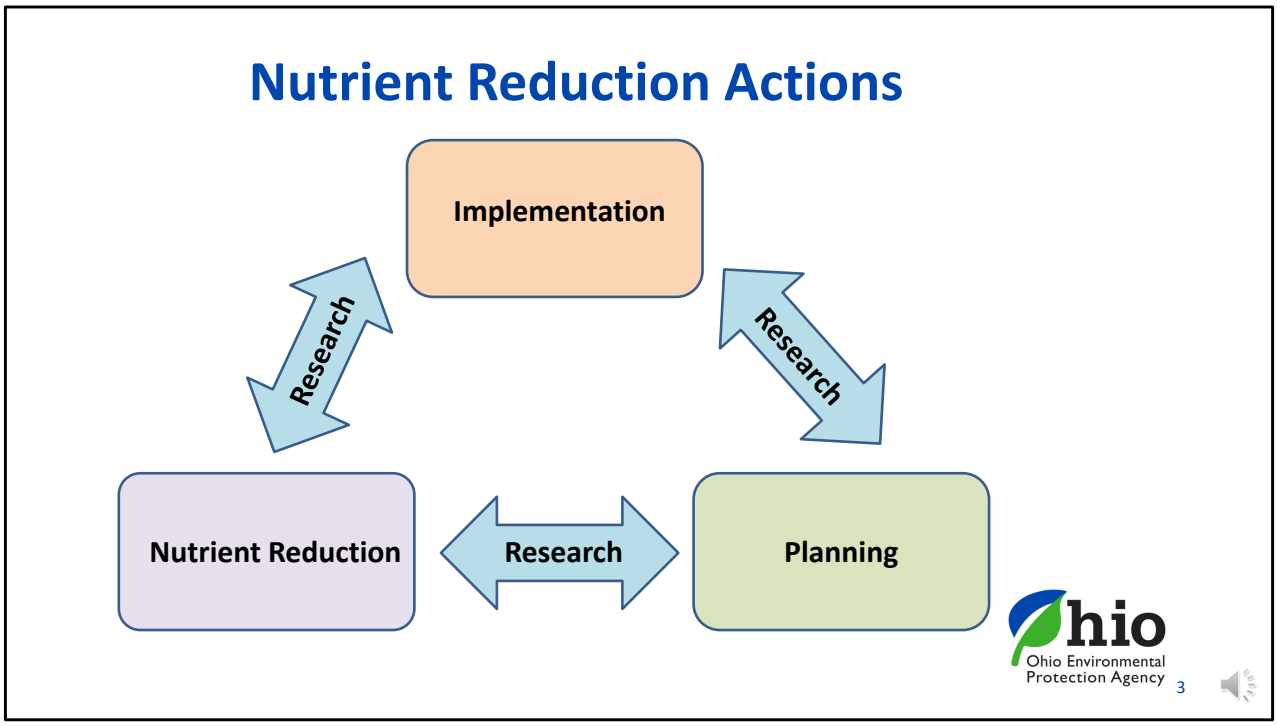
Ohio EPA project specific webpage:

https://epa.ohio.gov/dsw/tmdl/MaumeeRiver#119945358-maumee-watershed-nutrient-tmdl

Ohio Environmental Protection Agency

2

And as a reminder, all of the information Ohio EPA is developing for this TMDL can be found on our Maumee Watershed Nutrient TMDL website. This website will continue to be updated regularly throughout the development and implementation of this project.



As presented in Module 2, the schedule for releasing the draft TMDL is planned for late 2022, however, a great deal of work is already underway addressing nutrient reduction.

There are several components to nutrient reduction. As mentioned in module 2, Ohio's Domestic Action Plan focuses on providing tools to local stakeholders to properly plan for nutrient reduction activities and we'll present more about that planning work in this module.

The term "implementation" is used for actions taken in the field to reduce nutrients. This module will also describe the numerous efforts underway to promote, support and fund implementation actions.

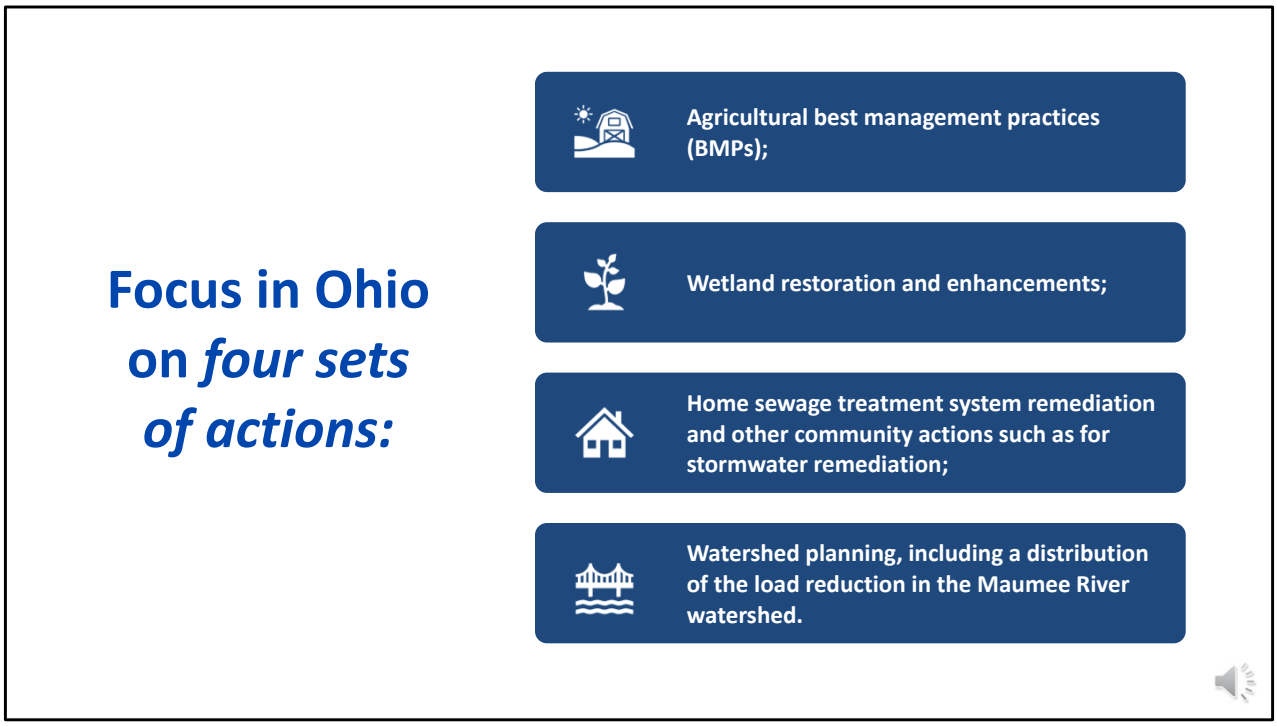
As the slide indicates, all aspects of these actions are actively being researched, and we will close this presentation with details about many of the ongoing research projects that will inform our future impact on nutrient reduction.

We'll start with a discussion of the Domestic Action Plan which is overseen by the Ohio Lake Erie Commission.

My name is Sandra Kosek-Sills of the Ohio Lake Erie Commission, and I am here today to set some overarching context about Ohio's nutrient reduction implementation actions. The Ohio Domestic Action Plan serves as Ohio's framework for adaptive management of this challenging issue. Governor DeWine's H2Ohio Initiative provides state funding to work toward achieving the goals of the Plan. Other sources of funding and programs, including the TMDL process, are part of this broad strategy to address Harmful Algal Blooms in Lake Erie.

The Ohio Lake Erie Commission is a state agency tasked to preserve Lake Erie's natural resources, to protect the quality of its waters and ecosystem, and to promote economic development of the region by ensuring the coordination of policies and programs of state government pertaining to water quality, toxic substances, and coastal resource management.

Under the Great Lakes Water Quality Agreement, Annex 4, goals have been set to protect Lake Erie. These are the Annex 4 goals as ecosystem objectives: reducing HABs and increasing oxygen. These objectives have been translated into pounds or metric tons of nutrient loads to be reduced. We are not going to cover the targets in detail here, but they are described in the Ohio Domestic Action Plan 2020 and the development of the targets is described in a report by the Annex 4 Subcommittee which is referenced in the Plan document.



In Ohio's Domestic Action Plan 2020, we are building on existing actions as well as adding new components that are part of the H2Ohio Initiative. There are 4 key action areas to highlight.

1. Establish science-based priorities for agricultural best management practices (BMPs) and state programs to support H2Ohio efforts, led by ODA;
2. Enhance the ability of wetland restoration to remove nutrients and focus by ODNR to restore and enhance wetlands for nutrient reduction as part of H2Ohio;
3. Work with communities to offer H2Ohio support for home sewage treatment system remediation led by Ohio EPA with partners;
4. Integrate the role of watershed planning at the local level for siting projects to reduce nutrients efficiently, including a distribution of the load reduction throughout the Maumee River watershed based on the Ohio EPA Nutrient Mass Balance method.

The new resources and focus provided by H2Ohio should accelerate the progress being made toward achieving the Annex 4 and Ohio Domestic Action Plan goals for nutrient reduction, support achievement of the TMDL, and ultimately, result in a healthier Lake Erie.

Next, each of our agency partners will describe in more detail their implementation actions under the Ohio Domestic Action Plan that are also actions that will implement the reductions needed for the TMDL

New implementation actions developed under the TMDL will be added to a future iteration of the Ohio DAP.

Ohio Department of Agriculture

Conservation Activities in the Maumee Watershed

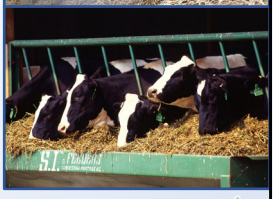
Peter McDonough
Division of Soil & Water Conservation
Peter.McDonough@agri.ohio.gov

Ohio | Department of Agriculture

Conservation & Regulatory Activities

Overview

- **H2Ohio Program**
- **Soil & Water Phosphorus Program**
- **Agricultural Pollution Abatement Program (APAP)**
  - Manure/Fertilizer Application in Western Lake Erie Basin (WLEB)
- **Concentrated Animal Feeding Facility (CAFF) Permitting**
  - Certified Livestock Manager (CLM)
- **Fertilizer Certification & Licensing**



Ohio | Department of Agriculture

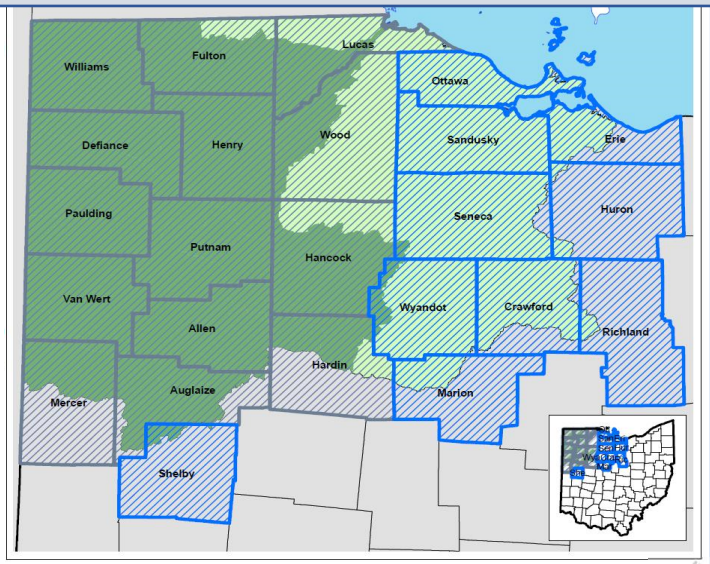
H2Ohio

Expansion to 10 additional counties

The new biennium budget has secured funding to expand H2Ohio to the remainder of the Western Lake Erie Basin.

Enrollment is already underway in this new 10-county project area.

Thanks to our local Soil & Water Conservation Districts for their excellent work implementing the H2Ohio program.



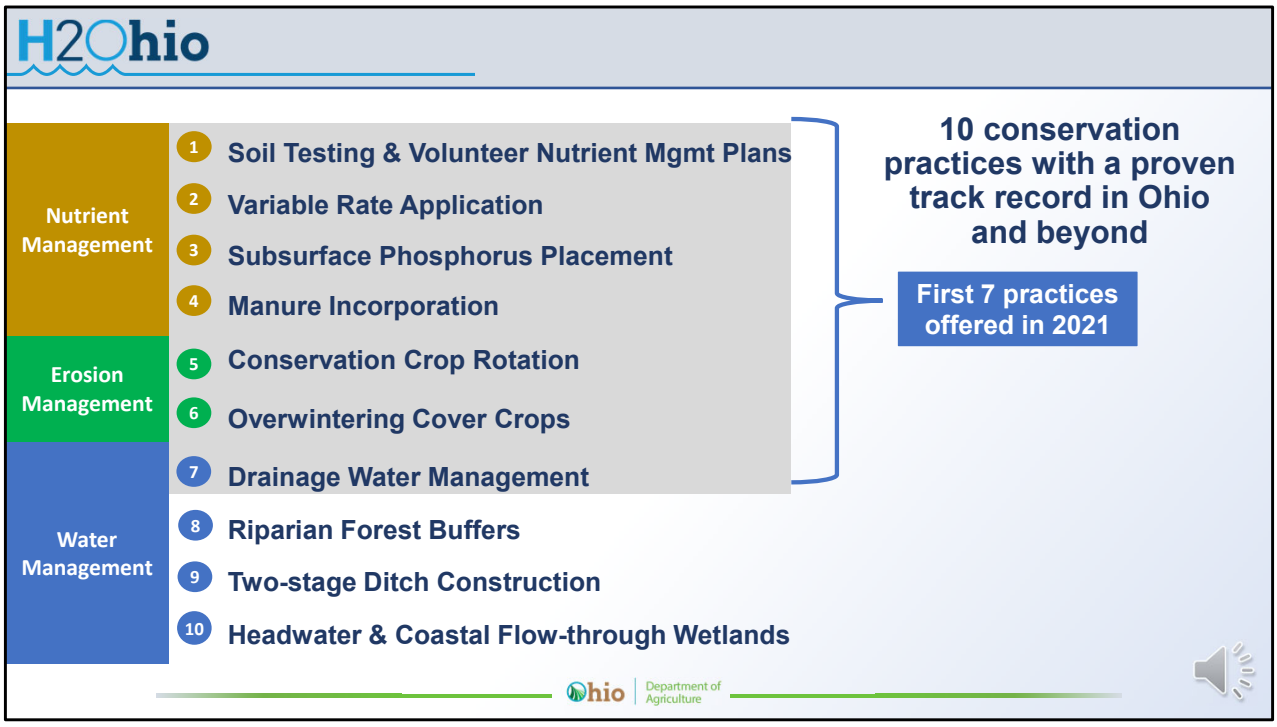
Ohio | Department of Agriculture

H2Ohio

Three areas of focus for Water Quality

Nutrient Management	▪ Match nutrient application to soil/crop needs ▪ Reduce nutrient losses though better application methods/timing
Erosion Management	▪ Encourage practices that reduce erosion on cropland ▪ Reduce loss of sediment and sediment-bound nutrients
Water Management	▪ Regulate timing and volume of water leaving fields ▪ Reduce nutrient loading to downstream waters

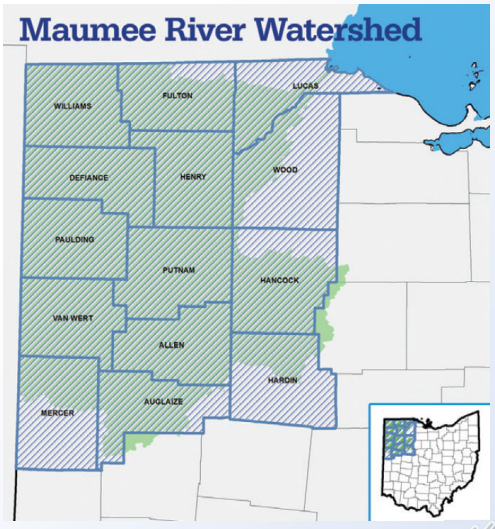
Ohio Department of Agriculture


H2Ohio
Nutrient Management
1 Soil Testing & Volunteer Nutrient Mgmt Plans
2 Variable Rate Application
3 Subsurface Phosphorus Placement
4 Manure Incorporation
Erosion Management
5 Conservation Crop Rotation
6 Overwintering Cover Crops
Water Management
7 Drainage Water Management
8 Riparian Forest Buffers
9 Two-stage Ditch Construction
10 Headwater & Coastal Flow-through Wetlands
10 conservation practices with a proven track record in Ohio and beyond
First 7 practices offered in 2021
Ohio Department of Agriculture

H2Ohio

Practice Signup - 2021 Crop Year

- Nearly 1.1 million acres in VNMP's
- 500,000+ acres in VRT
- 300,000+ acres in placement
- Nearly 170,000 acres in manure incorporation
- Nearly 155,000 acres in conservation crop rotation
- Over 450,000 acres in over-wintering cover crops
- 685 Drainage Water Management Structures



Ohio Department of Agriculture

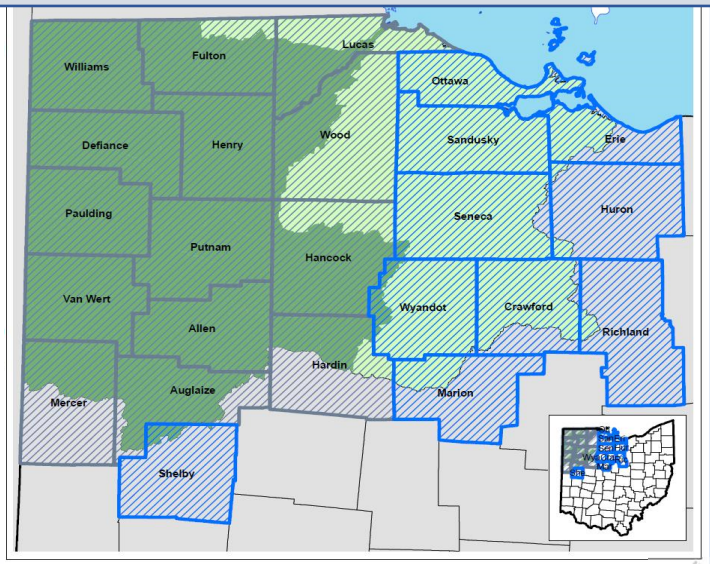
H2Ohio

Proposed expansion to 10 additional counties in FY 2022

This would engage the remainder of the Western Lake Erie Basin in conservation practices.

Significant steps forward – much more work to be done!

Thanks to our local Soil & Water Conservation Districts for their excellent work implementing the H2Ohio program.



Ohio | Department of Agriculture

H2Ohio

H2Ohio Accomplishments for Fiscal Year 2020

MIKE DEWINE
GOVERNOR OF OHIO

h2.ohio.gov

Soil & Water Phosphorus Program

Division of Soil & Water Conservation

Established in 2018 through Senate Bill 299 in the Maumee watershed
Precursor to H2Ohio Program

Purpose
- Encourage establishment of vegetative cover near environmentally sensitive areas
- Reduce suspended solids and dissolved contaminants in runoff

Offers two conservation practices to producers
- Working Lands Buffer (5,166 acres completed, 325 acres in progress)
- Working Lands Small Grain (39,231 acres completed, 21,700 acres in progress)

Buffer practices maintained on eligible cropland for 5 years

Ohio | Department of Agriculture

Agricultural Pollution Abatement Program (APAP)

Division of Soil & Water Conservation

Protecting water quality through investigation/resolution of agricultural pollution events into waters of the state.

ORC 939 & OAC 901:13-1 grant authority to establish state standards for a level of management and conservation practices in farming and animal feeding operations.

Standards apply to all facilities, permitted and non-permitted.

Common violations:

- Overflow and discharge from animal manure collection, storage or treatment facilities
- Manure contaminated runoff from feedlots and manure management facilities
- Pollution from other wastewaters (e.g., milk house wastewater or silage leachate)
- Excessive erosion
- Pollution occurring from the land application of manure
- Improper composting of animal mortality

Ohio | Department of Agriculture

Agricultural Pollution Abatement Program (APAP)

Ohio Senate Bill 150 (2014)

- Restrictions in the Western Lake Erie Basin

No special restrictions **IF** nutrients are injected, incorporated (within 24 hours), or applied to a growing crop.

Otherwise:

- No N, P, or manure applied to snow-covered, frozen, or saturated soil.
- No granular N or P applied when local weather forecast is >50% chance of precipitation exceeding one inch in a twelve-hour period.
- No manure applied when local weather forecast is >50% chance of precipitation exceeding one-half inch in a 24-hour period.

Does not affect restrictions currently in place for concentrated animal feeding facilities.

Ohio Department of Agriculture

Concentrated Animal Feeding Facilities (CAFF's)

Division of Livestock Environmental Permitting

Regulate the construction and operation of Ohio's largest livestock and poultry facilities.

Issues permits and certifications:

- **Permit to Install (PTI)** – Assures proposed building, facilities & location will adequately support the operation.
- **Permit to Operate (PTO)** – Assures the proposed facility has appropriate best management plans for manure management, insect and rodent control, animal mortality and emergency response.
- **Certified Livestock Manager (CLM)** – Required for a Major Concentrated Animal Feeding Facility (MCAFF), livestock brokers or applicators dealing with large amounts of manure.

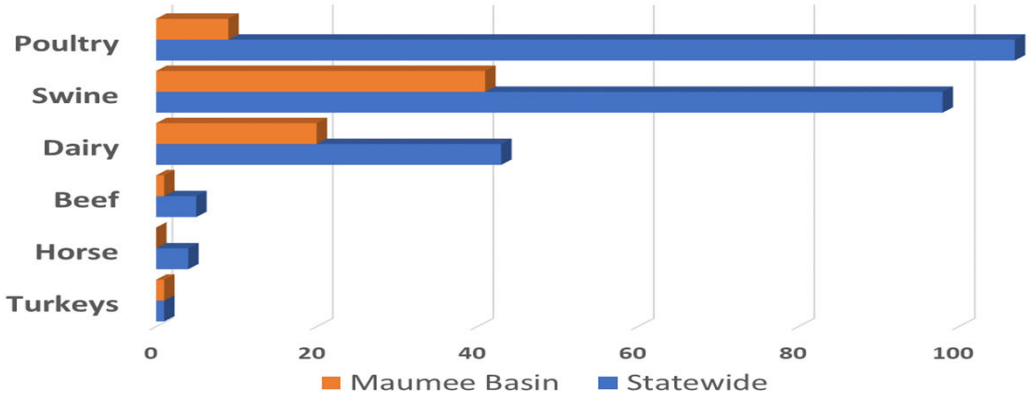
Work collaboratively with Division of Soil & Water Conservation APAP program.

Ohio Department of Agriculture

Concentrated Animal Feeding Facilities (CAFF's)

Total of 258 permitted facilities in Ohio

72 in the Maumee Basin



Ohio | Department of Agriculture

Fertilizer Certification & Licensing

Division of Plant Health

Ensure agricultural fertilizers are manufactured in accordance with the law and applied by certified persons.

Commercial Fertilizer Licensing

- Applies to manufacturing and distribution of agricultural fertilizers
- Annual renewal and tonnage
- ODA Inspectors verify compliance by collecting samples for testing

Product Registration

- Individual product registration required for specialty fertilizers & agricultural additives

Fertilizer Applicator Certification Program

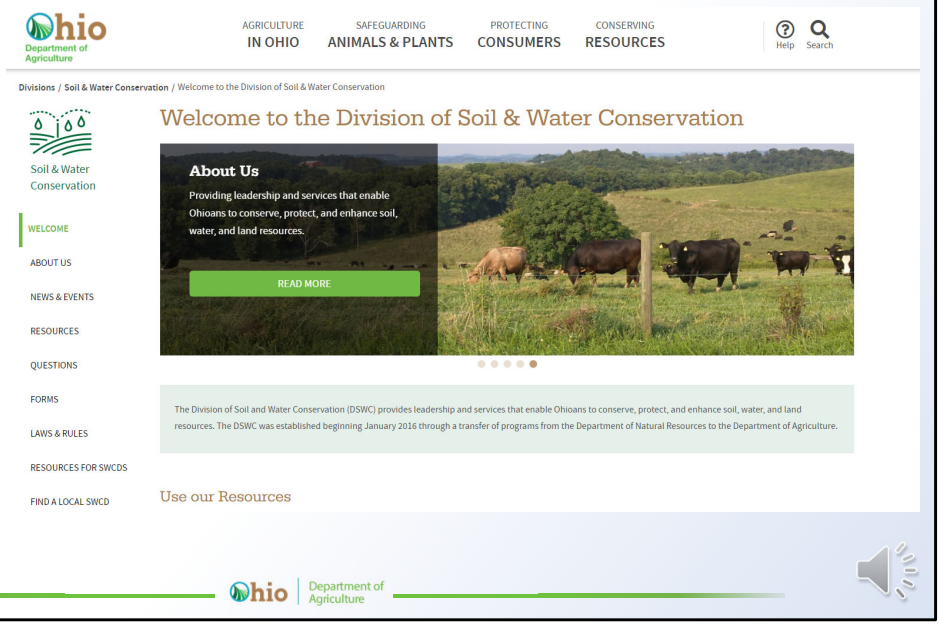
- Required when applying fertilizer (other than manure) to more than 50 acres for agricultural production
- Training provided by OSU extension
- Testing administered at ODA campus

Ohio Department of Agriculture

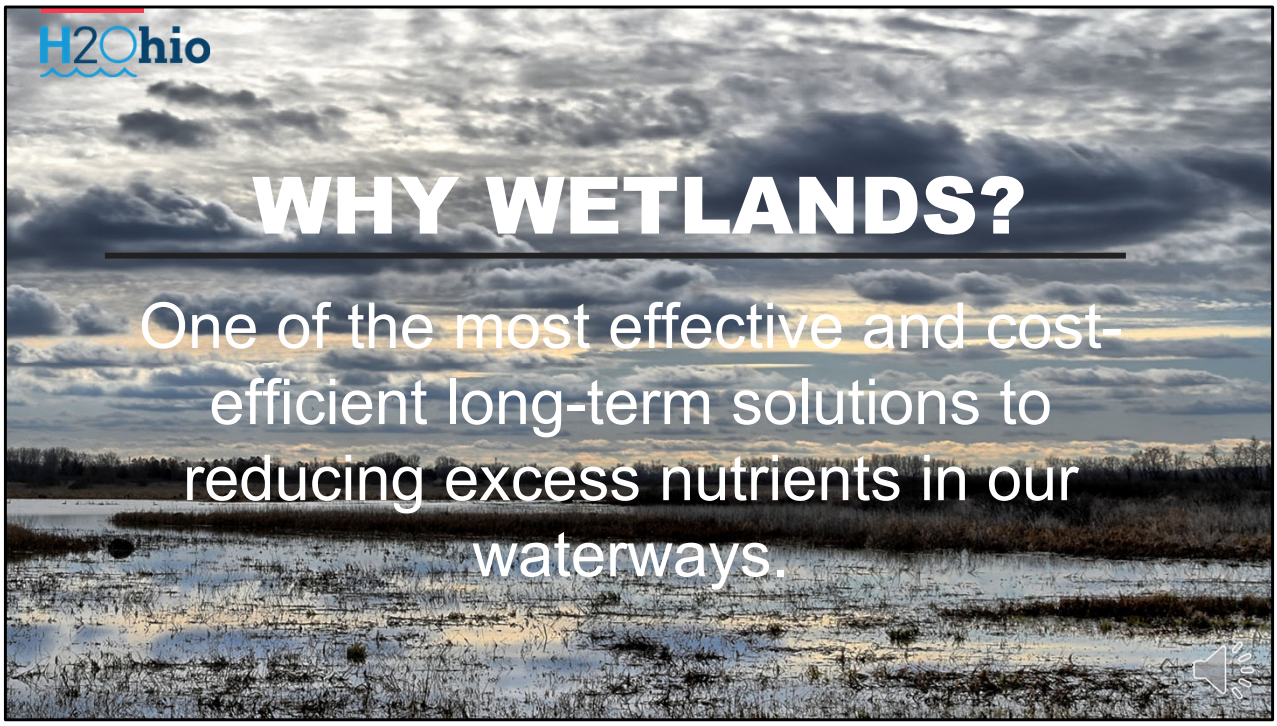
H2Ohio

For more information visit

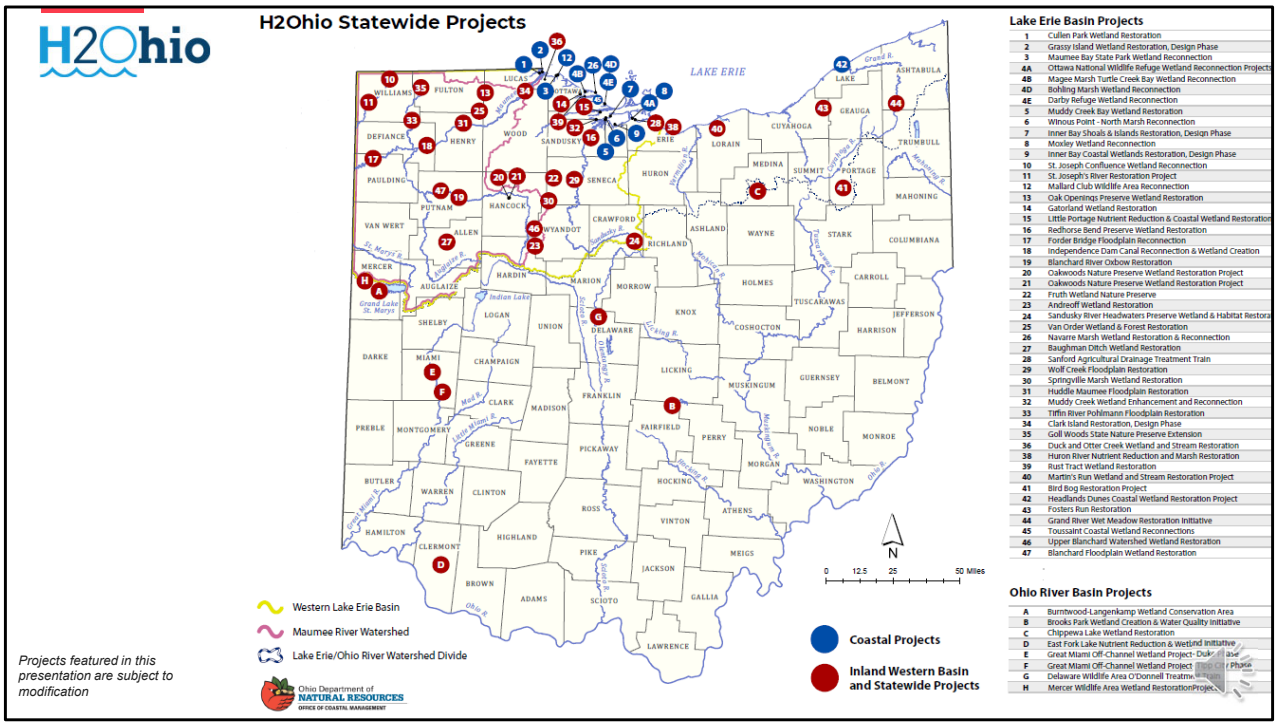
agri.ohio.gov



Hello, I'm Eric Saas from the Ohio Department of Natural Resources. Today I'd like to share with you the work that the department is doing to address nutrient reduction with the development of wetlands through the H2Ohio program.

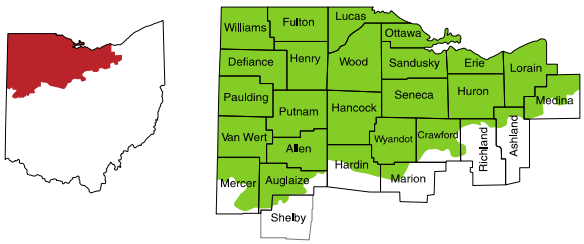


ODNR is implementing a natural-infrastructure based approach to improve water quality in Ohio's streams, rivers and lakes. For us, that means the creation, restoration and enhancement of wetlands– from the coast of Lake Erie to the headwaters. Restoring wetlands in the right places brings back a functional piece of the landscape to restore water quality. And there are of course the co-benefits that come along with this work:, in addition to nutrient reduction: expanded recreational opportunity, habitat for rare or endangered species, groundwater recharge and so on.



This map shows the locations of wetlands projects that have been funded by ODNR's H2Ohio Program since late 2019. Several projects are completed at this point in mid-2021 and many are in the design & engineering or construction phases. Our H2Ohio Program addresses water-quality issues statewide, but we lean most heavily into the nutrient loading and harmful algae bloom issues in the Maumee River Watershed, the other Western Lake Erie Basin Tributaries and our inland lakes. Ohio lost nearly 90% of its original wetland acreage through drainage and development, and much of that was concentrated in the footprint of the former Great Black Swamp overlapping the Maumee Watershed.

LAKE ERIE CREP
H2OHIO WATER QUALITY INCENTIVE PROGRAM



- One-time payment of $2,000 per acre in combination with Lake Erie CREP to restore wetlands and forested buffers.
- $5 million allocated to 150 landowners.
- Wetlands and riparian buffers reduce nutrient loading into waterways and help reduce flooding.
- Riparian buffers also stabilize streambanks to reduce soil erosion.

In addition to the projects shown on the previous map are 150 additional projects in planning on private lands, through an H2Ohio Initiative that provides additional incentive for landowners to enroll in select practices within the Lake Erie Conservation Reserve Enhancement Program. Projects have been accepted in 23 out of the 27 Lake Erie CREP counties. Out of the 150 approved projects, 133 projects will construct 2,423 acres of wetlands and 17 projects will create 114 acres of wooded riparian buffer

H2Ohio

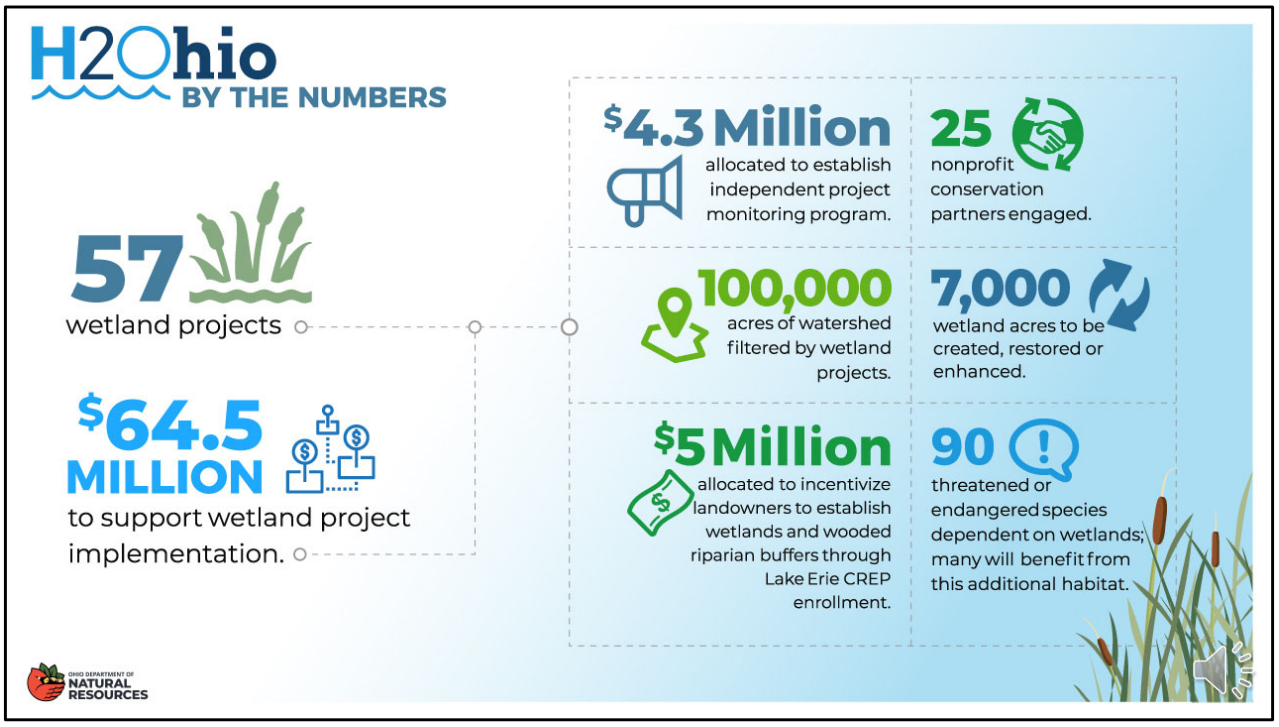
Ohio Water Development Authority Partnership

$5 Million to Fund Additional H2Ohio Wetlands Efforts

Advancing high-priority Maumee River and Western Lake Erie Basin projects including:	Expanding ODNR's statewide project focus through:
• Maumee River floodplain and wetland restoration • Wetland enhancements and reconnections on Muddy Creek, a tributary to Sandusky Bay • Marsh restoration in the Blanchard River watershed	• Wetland and stream restoration at Chippewa Lake • Floodplain wetland restoration along the Great Miami River • A wetland treatment train at Delaware Lake

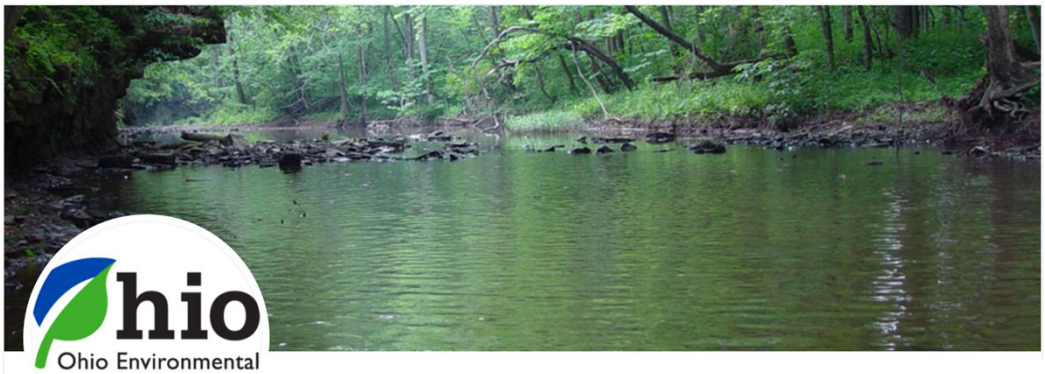
ODNR's H2Ohio Program can only accomplish all of this project implementation with the support of partners such as the Ohio Water Development Authority, who contributed a $5M boost to our project work in 2020– advancing our Maumee River project work as well as expanding our statewide focus.

ODNR's H2Ohio Program has also partnered with the Lake Erie and Aquatic Research Network's Wetland Monitoring Program, an academic consortium of water quality and wetland experts from universities across Ohio, to create a program to monitor the effectiveness of our wetland projects at reducing nutrient loading. Site characterizations are underway now at some of the first completed wetland projects. Information gained from this program will enable ODNR to fine tune our natural infrastructure approach and better understand which wetland designs or types maximize nutrient reduction.



To date, ODNR's H2Ohio Program has funded 57 wetland projects with $64.5M in investment. $5M of that funds our Water Quality Incentives Program for private lands projects, $4.3M funds the monitoring work being undertaken by the Wetland Monitoring Team at LEARN. Altogether, these projects consist of 7,000 wetland-pool acres that will filter over 100,000 acres of watershed and provide habitat to 90 of Ohio threatened or endangered species. We simply couldn't accomplish this without the expertise and hard work of over 25 nonprofit conservation partners who manage these wetland projects. In the coming years we will continue our urgent efforts to stem the nutrient loading in Ohio's rivers and lakes with ODNR's natural infrastructure approach. Thank you for your time today.

Ongoing Implementation
Ohio EPA



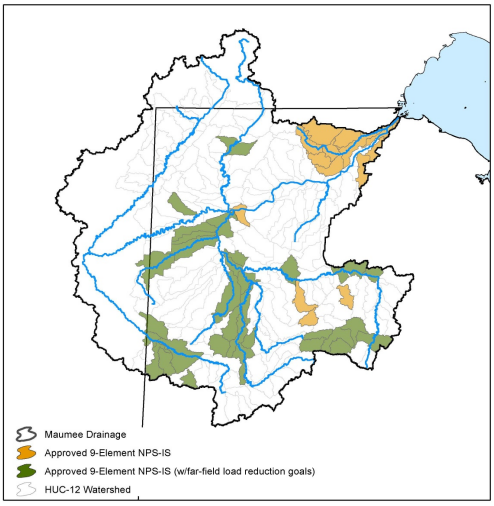
Ohio Environmental Protection Agency

29

TIFFANI - Next, we'll discuss the ongoing planning & implementation actions carried out by Ohio EPA.

Current Implementation: Nonpoint Sources

- Recent 9 Element – Nonpoint Source Implementation Strategies (NPS-IS) address far-field load reduction goals with proposed implementation projects for HUC-12 watersheds
- 12-14 new plans are being developed in 2021 through Great Lakes Restoration Initiative funding (GLRI)
- These position implementation projects for both federal (e.g., Section 319 and GLRI programs) and state funding opportunities
- For instance, six watersheds have projects proposed for 2021-2022 that include grassed waterways, 2-stage ditch restoration, drainage water management and wetland development (GLRI)



Ohio Environmental Protection Agency

30

Hi I'm Paul Gledhill, one of the technical staff at Ohio EPA's Div. of Surface Water dealing with nutrient runoff.

The map that you see on this slide is of the Maumee River watershed divided into HUC12 management unit watersheds, the light-colored lines. The HUC12s that you see colored in are where local stakeholders have developed non-point source implementation strategies, also called 9-element plans. The BEST THINGS about these plans are they end up with action projects...projects that take a bite out of the nut reduction goal for that particular watershed. Ohio's DAP set far-field TP reduction goals for *all* of the HUC12s in Maumee River watershed. These goals are based on the hydrology and landuse specific to each HUC12 watershed. This year we are developing 12-14 new plans in the headwater areas of the Maumee using Great Lakes Restoration Initiative funding. These plans are critical as they not only list action-oriented projects, but they are also a prerequisite for local stakeholders to receive US EPA Section 319 and Great Lakes Restoration Initiative funding. They will be useful for future state funding opportunities as well. These plans have been used to find particular projects that can be implemented to reduce nutrients running off to the Maumee River.

Grassed waterways, 2-stage ditch restorations, drainage water management and wetland development are all examples of projects that are often included in these 9-element plans.

Current Implementation: Nonpoint Sources

- Example projects within 9 Element Plans
  - Grassed waterway, Black Creek watershed Mercer Co.

BEFORE

AFTER

Ohio Environmental Protection Agency

31

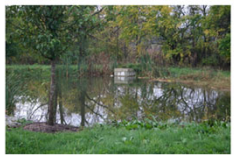
This slide shows one particular watesrhed, on the Black Creek in Mercer County. This area was a source of sediment and nutrients and has now becoming stable thanks to a waterway project. This work was part of a $556,000 grant awarded by the Great Lakes Restoration Initiative. The grant also funded four other projects that included a two-stage ditch and wetland restoration, drainage water management, additional grassed waterways, riparian buffer restoration and an urban stormwater project.

Ohio continues to use these newly developed 9-Element plans to garner funding for this type of implementation.

Current Implementation:

Municipal Separate Storm Sewer Systems (MS4)

- Requires six minimum control measures
  - Public Information & Education
  - Public Participation
  - Illicit Discharge Detection & Elimination
  - Construction Site Runoff Control
  - Post-Construction SW Management
  - Public Facilities Pollution Prevention



Ohio Environmental Protection Agency

32

Intro

Nutrients

Stormwater runoff is often worsened by human activities, and can contain various pollutants, including nutrients from fertilizers, pet and yard waste and failing HSTSs. In developed areas rain and snowmelt flow over streets, parking lots, and roofs collecting excess nutrients and pollutants before entering into a storm drain or water body. Because stormwater flows over hard surfaces directly into storm drains, there is no opportunity for soil and plants to filter out pollutants.

MS4 Program

Ohio EPA's MS4 Program is applicable to public entities, including city, village, county, township, ODOT, public university, that own/operate a stormwater systems located within urbanized areas

To address urban runoff, the permit requires the development/implementation of a local stormwater program. This stormwater program focuses on the following 6 minimum control measures.

1. Public Education and Outreach. A program to inform individuals, businesses and organizations within the MS4 as to the impact on surface water quality of contaminated storm water discharges and how they can help reduce storm water contamination.

2. Public Participation and Involvement. A program to create opportunities for individuals and organizations to participate in the development and implementation of activities to reduce the contamination of storm water.

3. Illicit Discharge Detection and Elimination. A program to detect and eliminate illicit sanitary crossconnections, dumping of wastes or other non-storm water discharges not authorized by a separate NPDES permit.

4. Construction Site Runoff Control. A program to require erosion and sediment controls for sites disturbing one or more acres of total land.

5. Post-Construction Runoff Control. A program to require the development, implementation and maintenance of controls on sites after development and redevelopment to minimize stormwater pollution after development.

6. Pollution Prevention/Good Housekeeping for Municipal Operations. A program, including an employee training component, to minimize pollutants from municipal operations such as garages, salt piles, pesticides/fertilizers used for green spaces.

The MS4 permit includes TMDL performance standards which incorporate additional implementation requirements for MS4s located within approved TMDLs. For example, MS4s located within TMDL areas with nutrients would be required to target education/involvement activities to nutrient issues.

Once the Maumee Watershed Nutrient TMDL is finalized, MS4 communities within the watershed may have an additional nutrient **MONITORING AND/OR** reduction responsibilities.

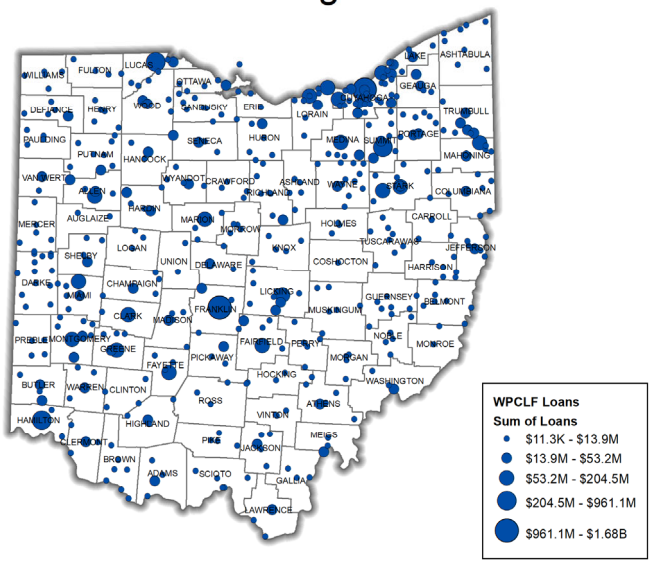
Ohio EPA Funding Programs

Jon Bernstein, Assistant Chief
Ohio EPA
Division of Environmental and Financial Assistance

Ohio Environmental Protection Agency

33

WPCLF Funding in Ohio



- Water Pollution Control Loan Fund
- Ohio's wastewater State Revolving Fund
- Low-interest and grant-like funds offered since 1989
- Over $10 billion in funds provided to communities
- Principal forgiveness offered since 2009
  - Unsewered areas
  - Regionalization
  - HSTS

Ohio Environmental Protection Agency

34

H2Ohio

$3,500,000
For Six Critical Water and Sewer Projects

Three wastewater projects in Miami, Meigs, and Williams counties serving 600 people and 250 homes.

Three drinking water projects in Pike, Coshocton, and Columbiana counties serving 4,000 people in rural Ohio.

$1,250,00

Lead service line and fixture replacement for safer water at Ohio daycare facilities.

$1,750,00

To seven local health districts for replacement of household sewage treatment systems.

Increased Monitoring and Data Collection

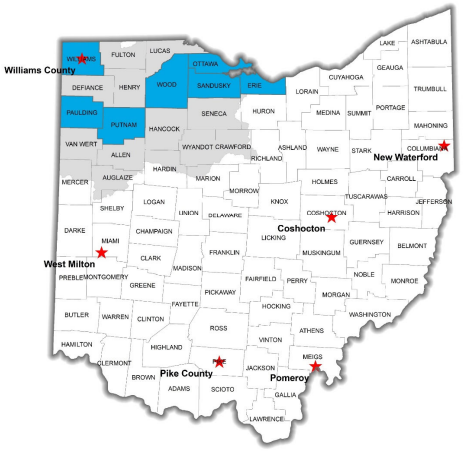
Installing an additional 20 rain gages to improve weather forecasting and rainfall estimates in northwest Ohio.

Mike DeWine Governor of Ohio

Ohio Environmental Protection Agency

H2Ohio

Wastewater and Water Infrastructure Funding



- Six communities
- $3,500,000 total
- Drinking water projects addressing contaminated wells and inadequate water supply
- Wastewater projects serving disadvantaged communities with failing HSTS
- Seven local health districts (LHDs) $250,000 each

Ohio Environmental Protection Agency

36

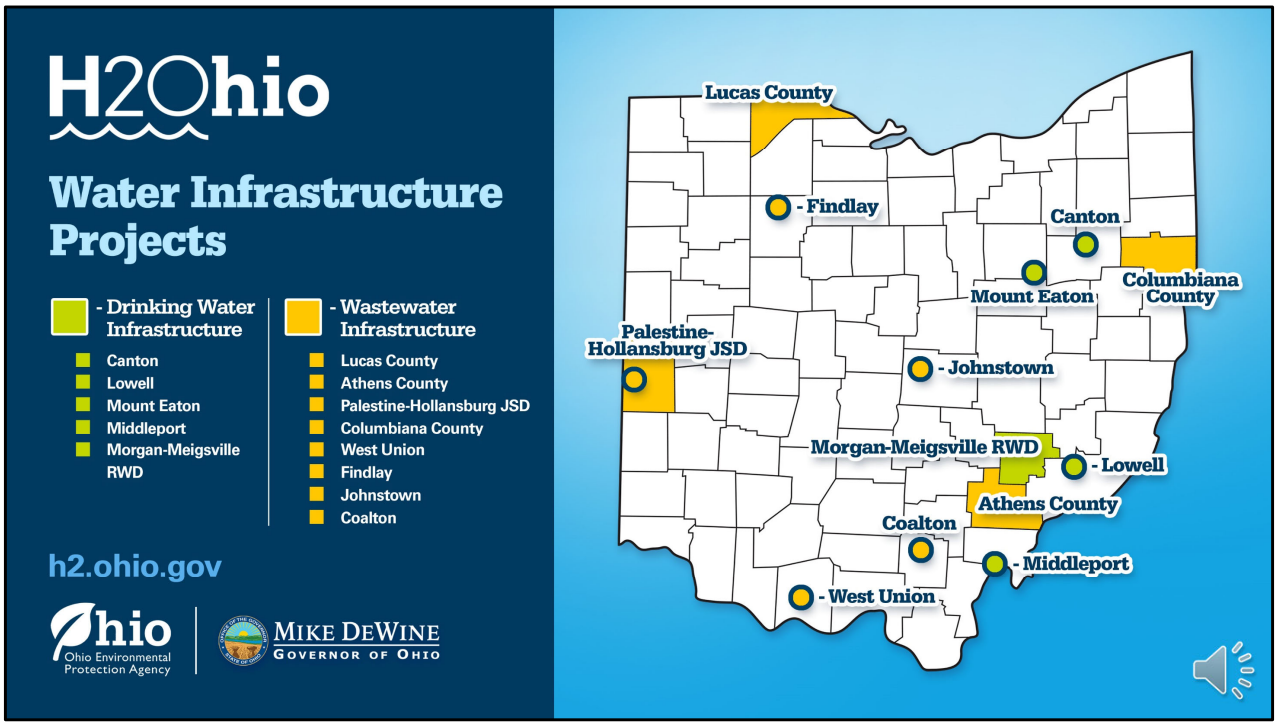
H2Ohio

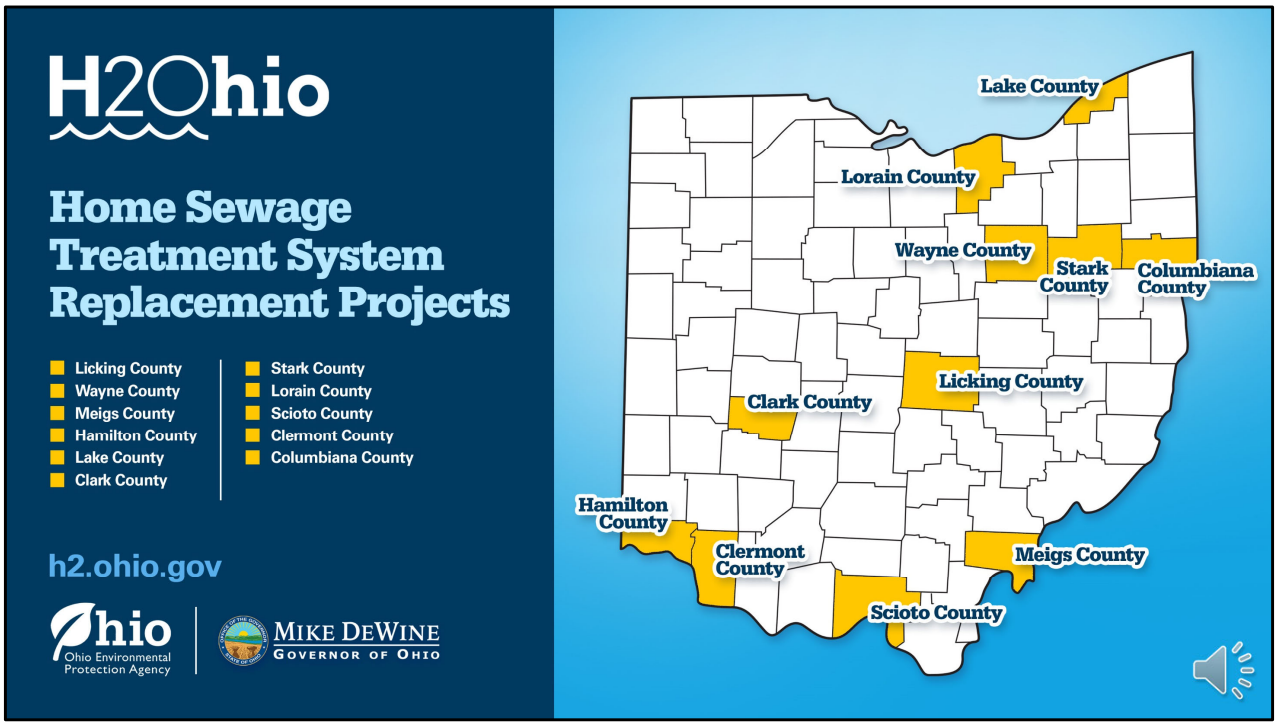
Childcare Lead Service Line (LSL) Replacement

- $1.25 million in targeted funding to address LSL and lead fixtures replacements in Cincinnati childcare centers.
- $500,000 grant to Cleveland to remove and replace city-owned lead service lines that supply water to approximately 440 childcare centers.

Ohio Environmental Protection Agency

37

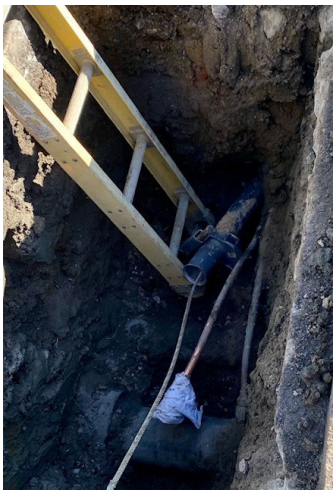

H2Ohio
Water Infrastructure Projects
- Drinking Water Infrastructure
Canton
Lowell
Mount Eaton
Middleport
Morgan-Meigsville RWD
- Wastewater Infrastructure
Lucas County
Athens County
Palestine-Hollansburg JSD
Columbiana County
West Union
Findlay
Johnstown
Coalton
h2.ohio.gov
Ohio Environmental Protection Agency
Mike DeWine
Governor of Ohio
Lucas County
- Findlay
Canton
Mount Eaton
Columbiana County
Palestine-Hollansburg JSD
- Johnstown
Morgan-Meigsville RWD
- Lowell
Athens County
Coalton
- Middleport
- West Union


H2Ohio
Home Sewage Treatment System Replacement Projects
Licking County
Wayne County
Meigs County
Hamilton County
Lake County
Clark County
Stark County
Lorain County
Scioto County
Clermont County
Columbiana County
h2.ohio.gov
Ohio Environmental Protection Agency
Mike DeWine
Governor of Ohio
Lake County
Lorain County
Wayne County
Stark County
Columbiana County
Licking County
Clark County
Hamilton County
Clermont County
Meigs County
Scioto County

H2Ohio

Future Funding

For ears Three and Four, Ohio EPA has **$10 million** per year to continue protecting public health by improving water and wastewater infrastructure, replacing failed home sewage treatment systems, and reducing lead exposure by replacing lead service lines.



Ohio Environmental Protection Agency

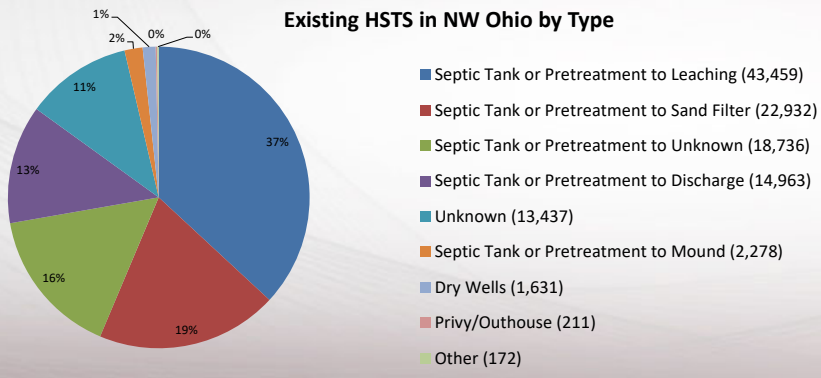
40

PART II

TIFFANI:
Next, we'll review implementation being carried out by the Ohio Department of Health. Rachel Townsend the Residential Water and Sewage Program Manager will now explain their efforts.

NW Ohio HSTS overview

2012 Clean Watersheds Survey Findings for NW Ohio



Ohio Department of Health

The Clean watersheds survey asked all of the local health districts to report on the existing household sewage treatment systems in their jurisdictions. Here are the results for northwest Ohio from the 2012 survey.

2012 Clean Watersheds Survey Findings for NW Ohio (continued)

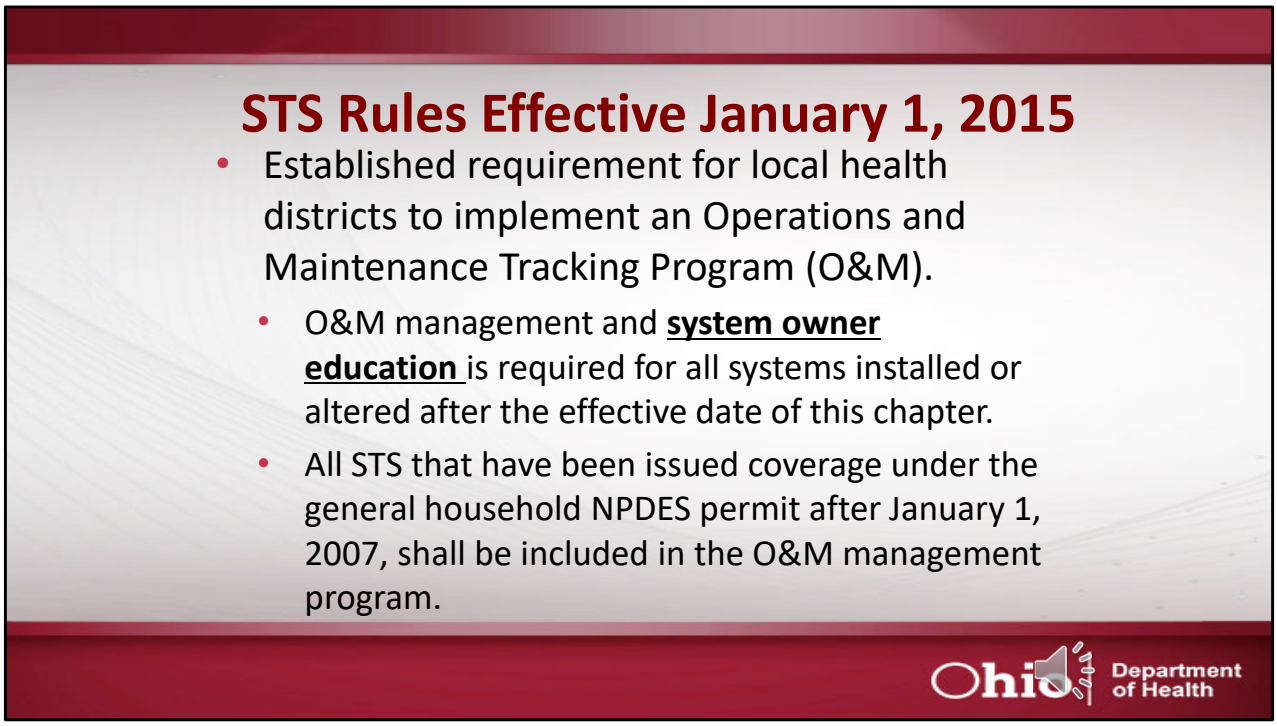
	Northwest	Statewide Total
Total Existing Systems Reported	117,819	628,493
Total Failing Systems Reported	45,560	193,988
Discharging* Systems Reported	37,895	178,505
Failing Discharging* Systems Reported	15,617	69,321
% of All Existing Systems that are Discharging*	32%	28%
Discharge* System Failure Rate	41%	**39%**
% of Overall Existing Failures	34%	36%

*Discharging Systems Reported also includes septic tank or pretreatment to discharge point or pretreatment to sand filter to discharge point.

In 2012, there were approximately 900 discharging HSTS in NW Ohio that have been issued coverage by Ohio EPA under the General NPDES Permit for HSTS. These are discharging HSTS installed since January 1, 2007.

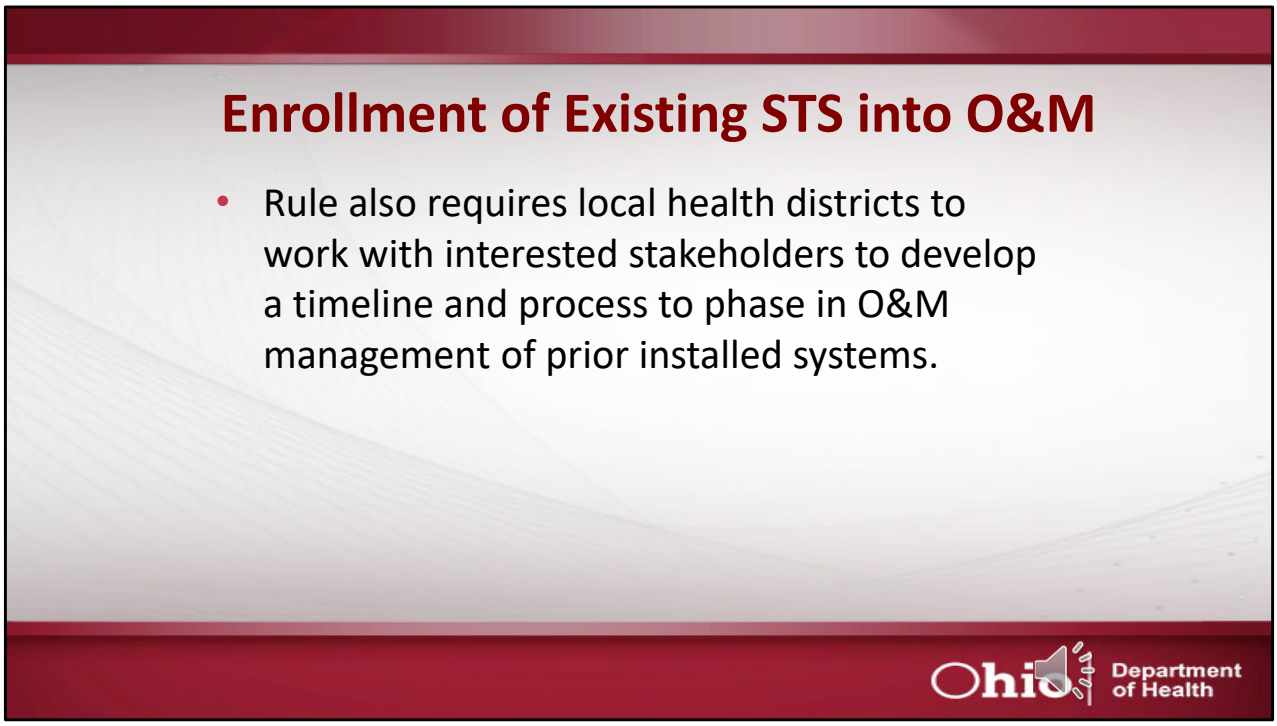
Ohio Department of Health

In 2012 41% of the discharging systems in northwest ohio were reported to be failing by their local health departments. With a failing discharging system, the impact to the environment – and possibly public health - is immediate because there is not a buffer like we might have with a soil based system.



January 1st, 2015 the sewage treatment systems rules became effective. These rules established the requirement that all local health districts have to implement an operation and maintenance tracking program. Every system put under permit from January 1, 2015 has to be enrolled. Additionally every discharging system installed after January 1, 2007 has to be enrolled.

The operation and maintenance tracking program requires the local health district to ensure that systems are being maintained in good working order and educating the system owner about what those requirements are for their system.



What about all the soil based systems in the ground before January 1, 2015? What about all the discharging systems that were installed before January 1, 2007? The rules also require that local health districts work with interested stakeholders to develop a timeline and plan to enroll those existing systems into their local O & M tracking program. Often the first step a local health district must perform is an inventory of existing systems to determine what type of system is installed at a location in order to provide the owner with the required maintenance activities specific to their system.

The system specific operation permit should identify the maintenance activities that the owner will need to demonstrate have been performed. If the system includes a pretreatment component or discharges the product manufacturer has product specific service checklists that the registered service provider will fill out when service is performed. The status of other components like pumps, tanks, soil absorption areas, etc. will be visually inspected and written documentation of their status provided. If the system type is required to be sampled, those results must be provided. When the tank or tanks are pumped, the registered septage hauler provides the system owner a copy of the pumping report which documents the status of the tank and the volume removed.

Ohio Department of Health
Sewage Treatment Systems
Program 614-644-7551
BEH@odh.ohio.gov

Ohio Department of Health

Watershed Restoration through Ohio's Areas of Concern

- Ohio's **Area of Concern** program addresses the four AOCs that were identified in Ohio under the **Great Lakes Water Quality Agreement** as degraded for biological and ecological conditions caused by human activities.

Lynn – introduction and discussion….. **Also part of the Great Lakes Water Quality Agreement, but under ANNEX 1 is the AOC program….**

Watershed Restoration through Ohio's Areas of Concern

- The **program** administered by **Ohio Lake Erie Commission in partnership with Ohio EPA** to **identify projects and actions** to remove the impairments that exist within the Areas of Concern boundaries and its specific program criteria.

- It is **partnership** program with local advisory committees, federal and state agencies, and other regional and community organizations and individuals.

Lynn – introduction and discussion…..

About the Maumee Area of Concern

- Lower 23 miles of the mainstem of the Maumee River.
- Includes 11 tributary watersheds of which all except one directly flow to Lake Erie.

About the Maumee Area of Concern

- The AOC is 787 sq miles of the total Maumee River watershed of 8,316 sq miles.
- Identified 10 of 14 beneficial uses as impaired but with targets, a plan, and projects identified to address them.

Maumee Area of Concern Projects that Contribute to Nutrient Reduction

- Sampling and data collection to identify conditions specific to AOC Beneficial Use Impairments.
- NPS-IS plans include projects within the AOC that will complement AOC efforts with nutrient reduction and improved ecological conditions.

Maumee Area of Concern Projects that Contribute to Nutrient Reduction

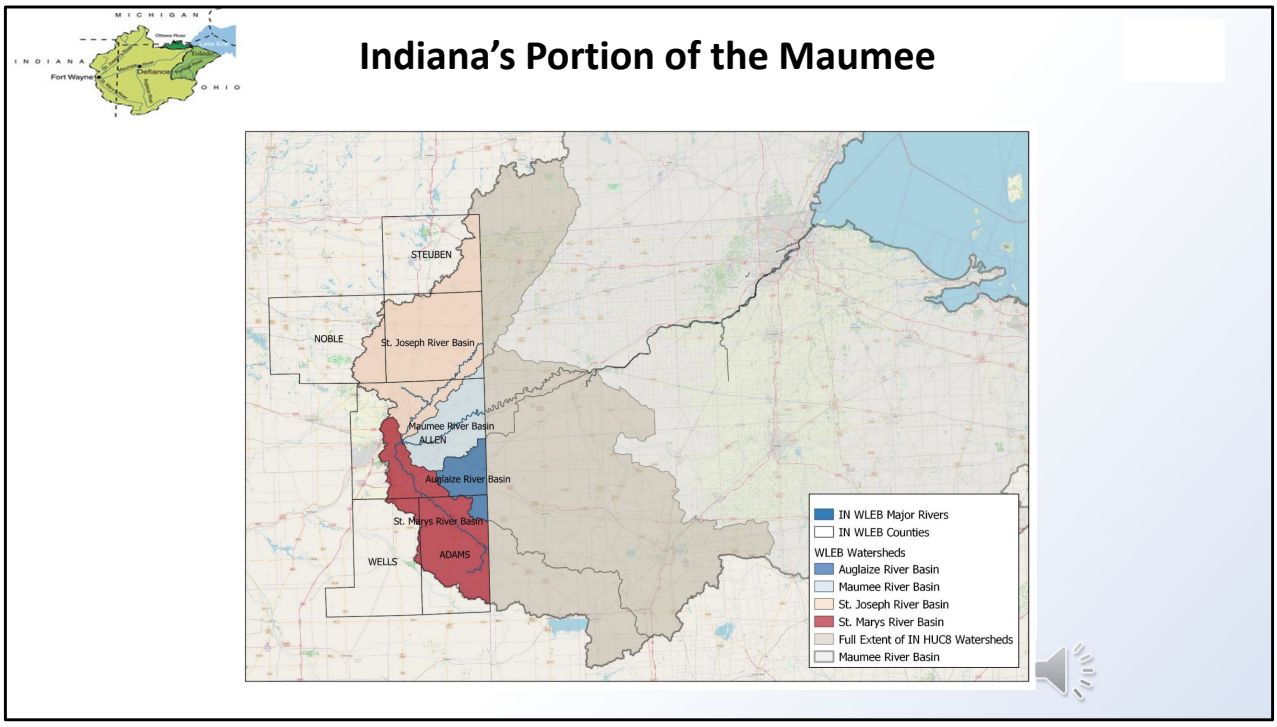
- Projects to improve the Lower Maumee River Watershed include:
  - Wildlife and Fish Habitat Restoration and Protection Projects – 17 projects identified for implementation.
  - Contaminated Sediment Remediation – in 3 areas.

Ohio Environmental Protection Agency

14

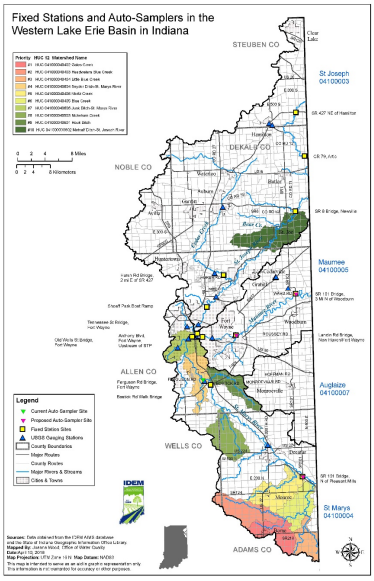
TIFFANI - The Maumee watershed extends to portions of Indiana and Michigan.

Samuel Ennett from the Indiana Department of Environmental Management will begin by explaining their efforts to address nutrients from their portion of the Maumee.



Indiana's portion of the Maumee River Basin hosts one of the major confluences of the Maumee River and the headwaters of the Maumee River. The confluence is formed by the St. Joseph River, which flows southwest from its headwaters in southern Michigan, and the St. Marys River which flows northwest from its headwaters in western Ohio. The two rivers meet in downtown Ft. Wayne to form the Maumee River that then flows northeast into Ohio. The Auglaize River basin forms the smallest part of the Maumee River Basin in Indiana. Each watershed in Indiana's portion of the Western Lake Erie Basin has active funding from state or federal sources for water quality improvements. The water quality improvement actions taken in the Maumee River Basin are coordinated by approved watershed management plans and other planning structures, and acted upon by municipal, county, and state governments, non-governmental organizations, and industry partners. The following slides describe the ongoing efforts in Indiana to reduce phosphorous loadings to Lake Erie.

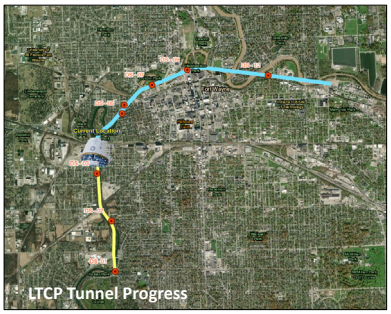
Monitoring



- Multi-scale monitoring effort
- USGS autosamplers and stream gages
- IDEM fixed station sampling and autosampler
- County sampling
- City sampling

Western Lake Erie Basin Domestic Action Plan Advisory Committee members and partners have created a multi-jurisdictional monitoring network across Indiana's portion of the Maumee watershed. The monitoring network is built with USGS stream gauges, state and federal autosamplers, as well as in-person sampling conducted by state and local groups. Advanced monitoring networks help target management practices to the watersheds that contribute the most to the water quality concerns in the Maumee basin. The current critical watersheds are shown on the map ranging from green to red. The majority of the critical areas are located in the St. Marys River watershed.

Urban Point Sources



- Municipal NPDES permits
- City of Ft. Wayne Long-Term Control Plan (LTCP)
- Municipal Separate Stormwater Sewer System Permits

The next focus area for the Advisory Committee are urban point sources. There are four major National Pollutant Discharge Elimination System or NPDES permitted facilities in Indiana's portion of the Maumee River basin. There are also 8 permitted municipal wastewater treatment plants (WWTPs), each with a total phosphorous effluent limit of 1 mg/L. These treatment plants are located in Fort Wayne, Decatur, Auburn, and Butler. These WWTPs average a discharge concentration below the 1mg/L TP limit. There are three minor municipal WWTPs and an additional seven industrial/other minor dischargers. Within the developed areas, there are seven combined sewer overflow (CSO) communities including Auburn, Berne, Butler, Decatur, Fort Wayne, New Haven, and Waterloo, each with an approved Long Term Control Plan (LTCP) or consent decree with compliance schedules. There are 13 designated municipal separate storm sewer systems (MS4s) and 10 have approved Storm Water Quality Management Plans (SWQMPs) including one in Adams County, 11 in Allen County, and one in DeKalb County. Municipal, county, and state regulatory personnel work to ensure point sources of pollution are in compliance with their permits.

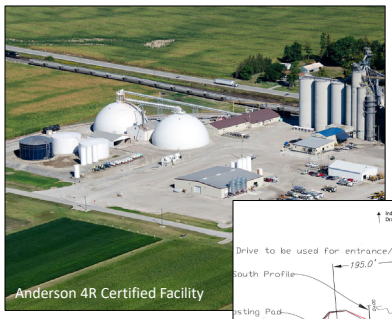
Urban Nonpoint Source

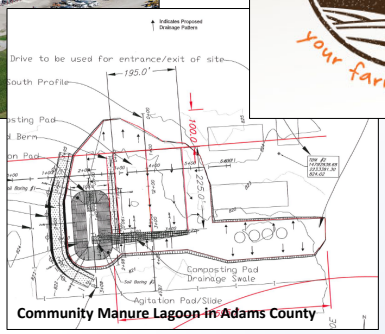

Tree Planting in 2019 organized by Save Maumee

- Revegetate urban stream banks with native plants (Save Maumee)
- Steuben County SWCD Urban Clean Water Indiana Grant for urban conservation practices located within ½ mile of a river, lake, or perennial stream

Ongoing urban nonpoint source pollution reduction projects conducted by Advisory Committee members include work being done by the community organization SaveMaumee, which organizes tree plantings in riparian areas, among other activities. Steuben County Soil and Water Conservation District also has a grant specifically targeted to urban practices located within ½ mile of a river, lake, or perennial stream.

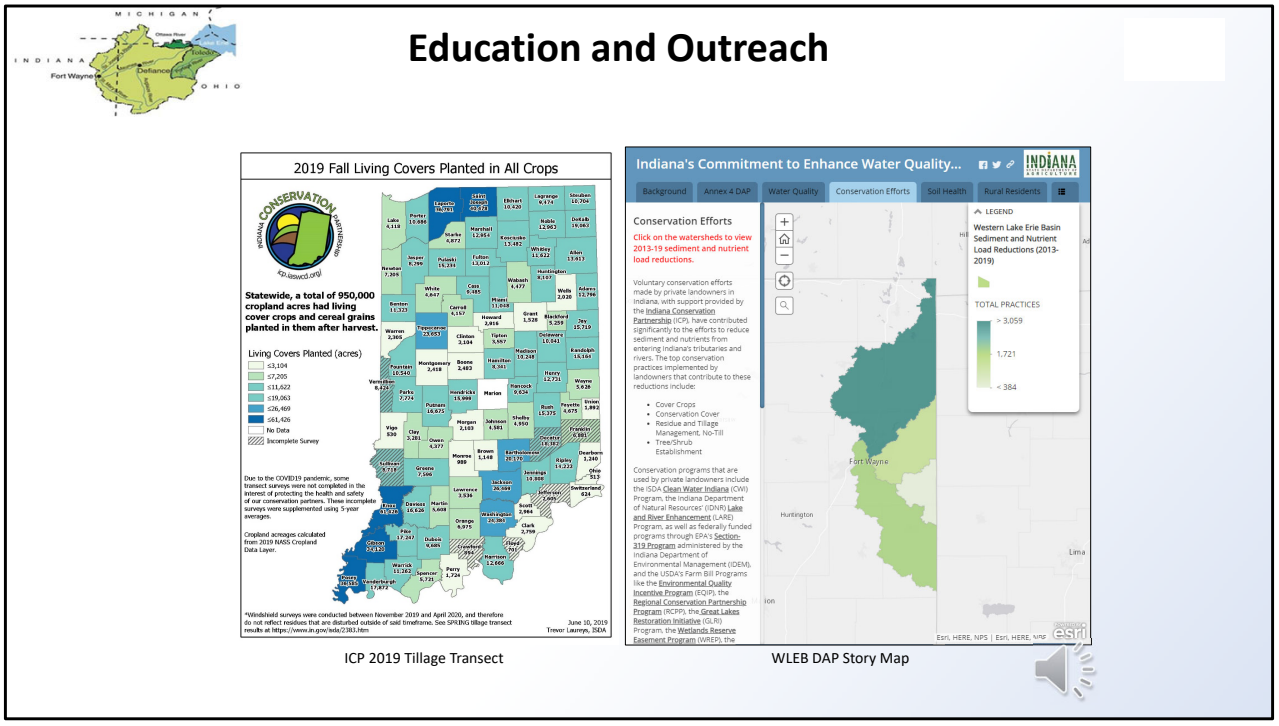
Rural Nonpoint Source


Anderson 4R Certified Facility



Community Manure Lagoon in Adams County

Multiple completed and ongoing projects across Indiana's portion of the Maumee watershed address rural nonpoint source pollution. Some examples of projects include 319 grant funded projects in the St. Joseph and St. Marys watersheds, a Great Lakes Restoration Initiative Grant in the Upper Maumee watershed, and a 205j planning grant in the Auglaize watershed. There are also several regional programs promoting responsible nutrient application, improving soil health, and conservation farming like the 4R nutrient stewardship program, the INField Advantage Program, and the Soil Health Partnership Program. One of the flagship accomplishments for the rural nonpoint source pollution reduction initiatives are the recently built emergency community manure storage lagoons in Adams county.



Indiana's domestic action plan supports multiple education and outreach efforts run by the partner organizations. The advisory committee maintains the Western Lake Erie Basin story map that contains information and resources for Maumee basin residents. County health departments conduct Education and outreach on septic system design and repair requirements. The Indiana Conservation Partnership, or ICP provides technical and education assistance to implement land and water stewardship decisions. The ICP also produces the Tillage Transect which is an annual state-wide survey of tillage practices and cover crop applications. Additionally, local municipalities conduct stormwater education and outreach, and each county soil and water conservation district supports education programs of their own. State run grant programs like 319/205j and Clean Water Indiana also support education and outreach within their project areas.

Promote Restoration of Natural Hydrology and Ecological Functions

- Maumee River Basin Commission
  - Reconnect natural floodplain lands to the floodplain.
  - Purchase homes with a history of flooding in the St. Marys watershed to lower flood crests in Ft. Wayne and provide area for sediment to deposit.

St. Marys River Stream Assessment Study

- Completed in 2019.
- Identified unique geomorphology, trends, and critical areas for the St. Marys River.

St. Joseph River Stream Assessment Study

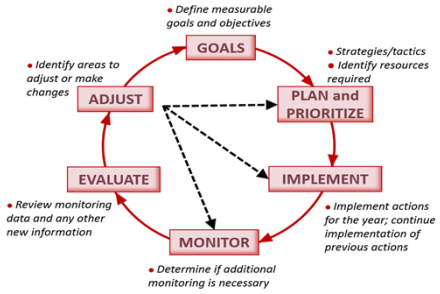
- Initiated in 2020.

The last goal of Indiana's domestic action plan is to enhance nutrient management, promote soil health practices, and restore more natural hydrology and ecological functions to the Maumee Basin watersheds by promoting drainage water management and emphasizing the importance of allowing water to infiltrate where it falls. The Maumee River Basin Commission is an advisory committee member that works to mitigate flood damage in the region. Current projects include purchasing property with a history of flooding in order to restore the flood plain and conducting planning efforts in the St. Marys and St. Joseph rivers to assess water quality impacts and flood risks associated with changing land use and urbanization. The St. Marys River Assessment was completed in 2019 and the St. Joseph Assessment is currently underway.

Hello. My name is Michelle Selzer and I am with the Michigan Dept of Environment, Great Lakes, and Energy. I will be presenting an update on the development of Michigan's Adaptive Management Plan that is currently being finalized. I am presenting on behalf of the state of Michigan's Domestic Action Team, which is a senior management working group from the Quality of Life Depts of EGLE, Agriculture and Rural Development, and Natural Resources. This presentation is a brief overview of the draft adaptive management plan currently in development to support Michigan's efforts to reduce nutrients in Michigan's portion of the Lake Erie Basin and cover some of the key elements of the of that process. Tackling a complex issue like nutrient management at a basin-scale is not a simple nor straight forward undertaking as this is as much of a human dimension challenge as it is an environment challenge, and we feel the better solutions will be found through active adaptive management moving forward.

Michigan's Role in Addressing HABs Through An Adaptive Management Framework

- **2018 Michigan Lake Erie Domestic Action Plan released, setting goals to meet the 20% by 2020 & 40% by 2025 reduction goals**
- **The state is preparing to release the Michigan Adaptive Management Plan**
  - Transition from "passive" to "active" adaptive management
  - Capture agency & partner commitments in 2-yr workplans
  - Align resources & research needs with agency management priorities



Source: National Academies Press; original figure adapted from a Department of Interior source (see Williams et al., 2009)

24

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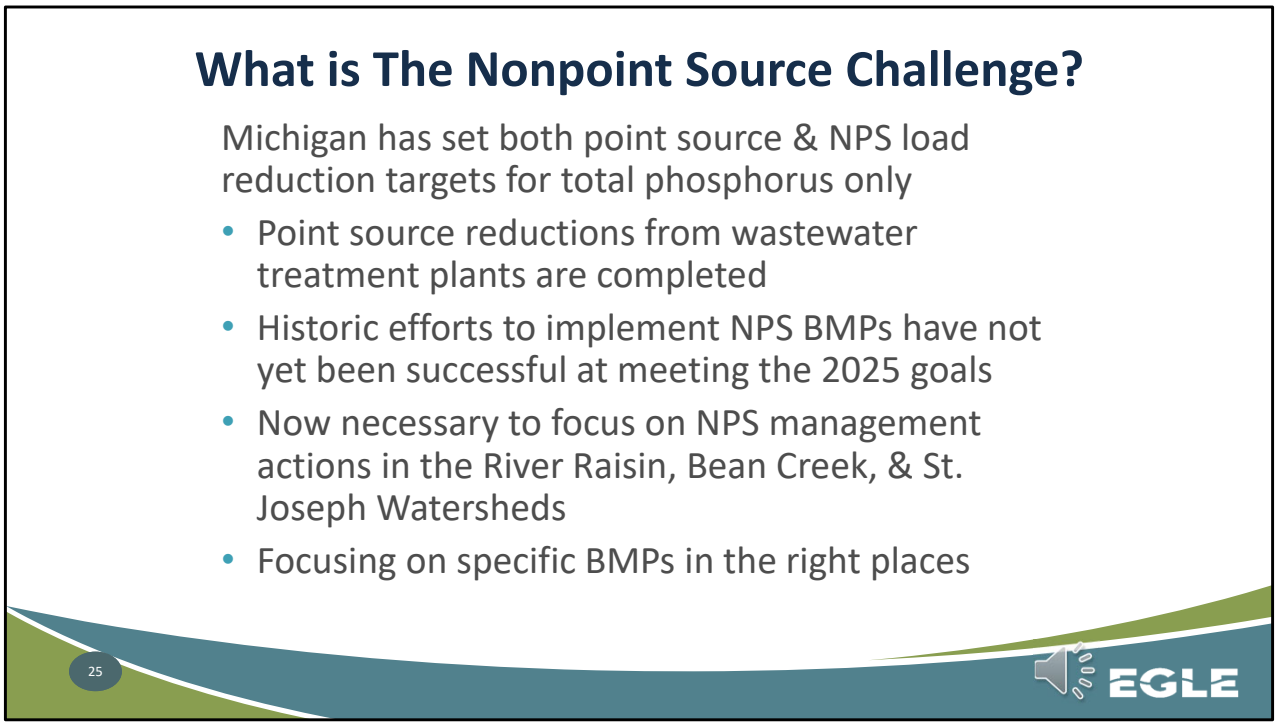
In 2018, MI released our DAP, which outlined nutrient reduction management actions that would be taken to achieve an aspiration goal of 20% reduction by 2020 and 40% by 2025. The GLWQA called for using an Adaptive Management approach to address the Lake Erie nutrient challenge. MI is using the six-step adaptive management process developed by USFWS as a starting point and outlined here. The DAP Team is just beginning to explore using this more formal approach. It has been an opportunity for the DAP Team to learn about adaptive management process itself and transition our collective work from a passive to a more active management effort. This more formal process will help capture agency & partner commitments through a 2-yr work planning process and help the agencies establish a more strategic method to better guide management decisions, on-the-ground actions, and policy development opportunities. Specifically, Michigan's adaptive management framework will align resources and research needs and will work in two ways: First, to evaluate the outcomes of deliberate,

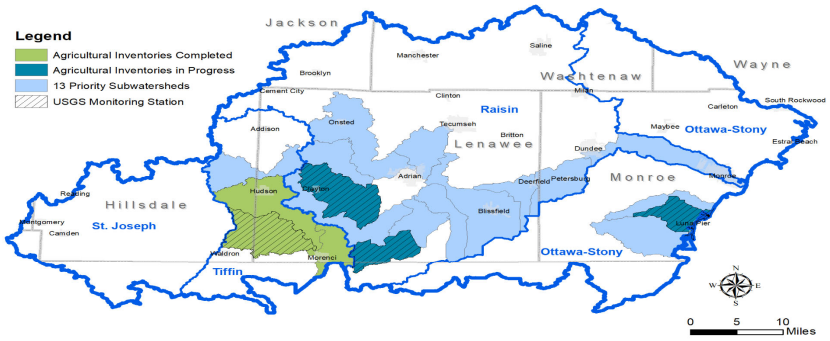
measured actions taken to reduce phosphorous and second implement projects to address knowledge gaps and uncertainties in our current approaches to reducing phosphorous delivery to Lake Erie.



As agreed to under Annex 4, Michigan has set both point source & NPS load reduction targets for total phosphorus only
The MI DAP called for point source reductions from four key wwtps. Those reduced permit limits are in place, and work at the Great Lakes Water Authority plant in Detroit helped MI meet our 20% by 2020 aspirational goal. Monitoring in the River Raisin has not shown improved water quality and to date, historic efforts to implement NPS BMP have not yet been successful at meeting the 40% phosphorus reduction goals by 2025. Therefore, the state is looking to focus on HUC-12 and field-scale NPS management actions in the River Raisin, Bean Creek, and St. Joseph River watersheds, specifically focusing on implementing specific BMPs in the right places on the landscape. Next, I will give a quick overview of one of the key management tactics that is currently being implemented and that shows great potential to help focus our work and to meet the NPS challenge.

To meet the NPS challenge, the DAP Team recognized that we needed a more focused and accelerated approach to increase impact at the HUC-12 subwatershed scale down to the field-scale. So since early last year, the state has been working the Environmental Working Group organization with funding from the Erb Family Foundation to plan and implement agriculture inventories in 13 priority subwatersheds in the Bean Creek and the River Raisin Watersheds. The Agriculture Inventory process is a field-scale approach to conservation that has three components. The first component is a modeling effort that looks at water flowpaths, slopes, and potential location where BMPs can be placed to address known resource concerns. The GIS-based desktop analysis component determines field boundaries, identifies fields within 50' and 300' of waterbodies, identifies fields with and without filter strips, fields with potential CAFO manure application, and other livestock operations that are not regulated. The field-by-field component inventories the current cropping systems on the ag fields and identifies fields where BMPs are already being implemented. When taken together, this information is being used to prioritize sites that have the potential to address water quality impacts and will be used by Conservation District staff and MAEAP technicians to help engage landowners on opportunities to implement specific BMPs.

Where & How to Meet the Challenge?
Focusing Conservation in the Right Places



Michigan's Western Lake Erie Basin 13 priority agricultural inventory subwatersheds (light blue), including completed (green) and in progress projects (dark blue). Hatched subwatersheds are where USGS monitoring gage stations have been installed.

27

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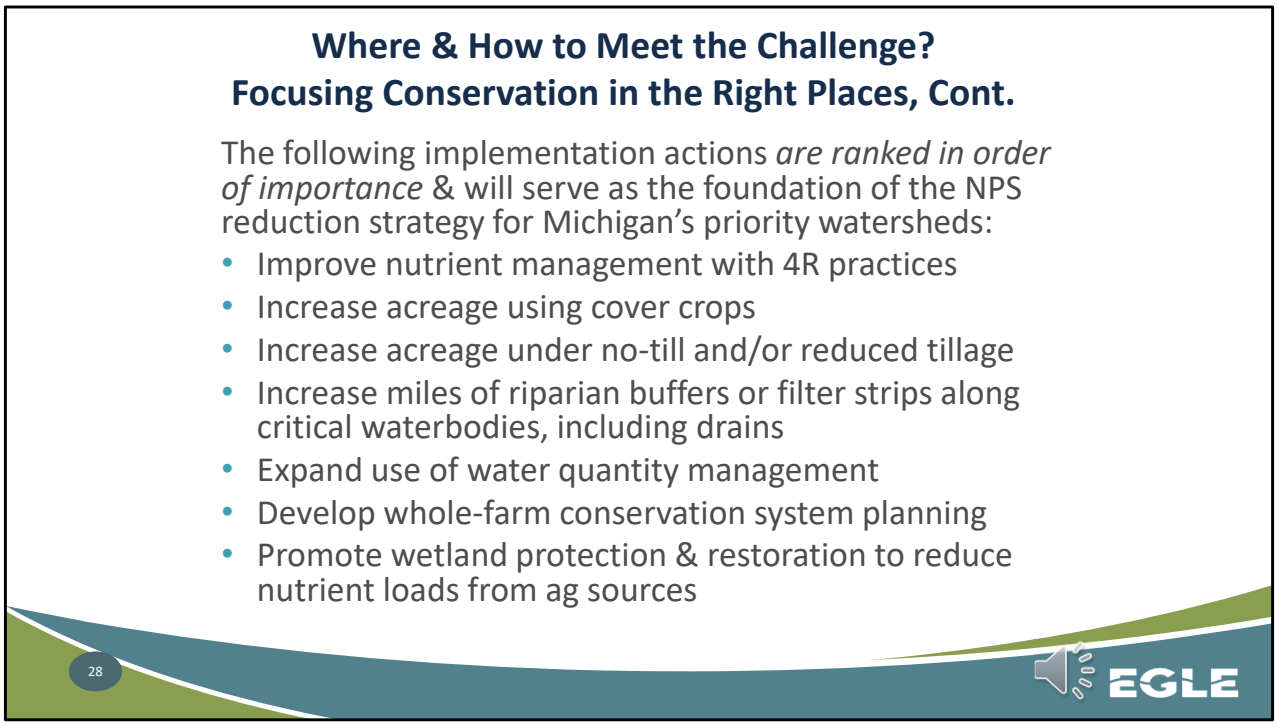
This graphic shows the Michigan's Western Lake Erie Basin 13 priority Ag Inventory subwatersheds highlighted in light blue, including those subwatersheds that have been completed shown in the green highlighted area & the subwatersheds where the ag inventory effort is in progress highlighted in dark blue. The hatched subwatersheds are where newer USGS monitoring gage stations have been installed. Our goal is to use this ag inventory process throughout the entire WLEB to further focus conservation in the right places.



Specifically, the following BMPs are ranked in order of importance & will serve as the foundation of the NPS reduction implementation strategy for Michigan's priority watersheds:

Improve nutrient management with 4R practices

Increase acreage using cover crops

Increase acreage under no-till and/or reduced tillage

Increase miles of riparian buffers or filter strips along critical waterbodies, including drains

Expand use of water quantity management

Develop whole-farm conservation system planning

And, where possible, promote wetland protection & restoration to reduce nutrient loads from ag sources

Expert & Stakeholder Engagement

- Strengthen relationships & collaborations across departments & stakeholder groups working in the WLEB
- Give thought to new supporting cross-sector network structures, including establishing a *diverse, science-based WLEB advisory group*
- Develop social indicators to track producer & public perception & understanding of the nutrient issue

(Illustration by Luke Best, from Stanford University)

29

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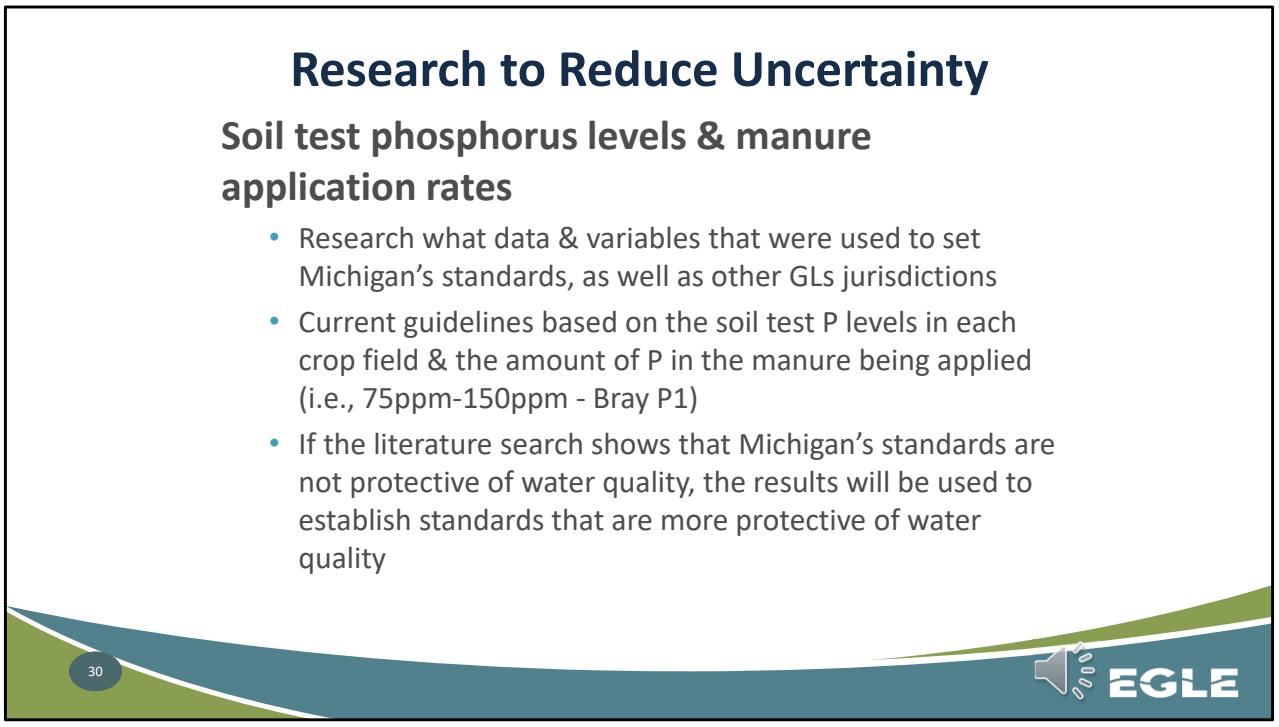
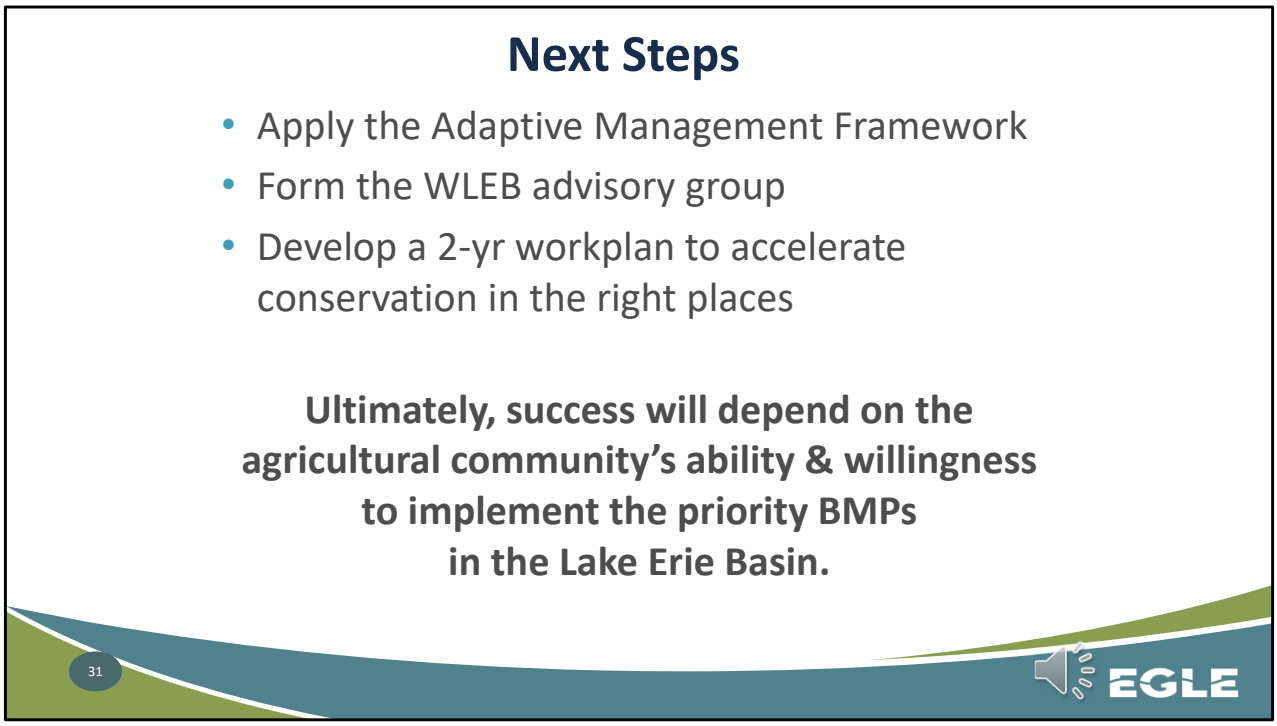
Another important effort was to conduct an expert and stakeholder engagement process. In addition to taking public comment, hosting webinar and one-on-one stakeholder engagement, Erika Washburn with Washburn Environmental Solutions served as neutral party and interviewed the DAP Team members, and over 20 outside experts engaged directly on the nutrient issue as well as human dimension experts and other researchers in the Great Lakes Region. The purpose of this component of the process was to assist the DAP Team with exploring concerns, ideas, challenges & opportunities for implementing an effective stakeholder advisory process. Here are some highlights of what we heard: In terms of overall coordination of efforts in region –we need to continue to strengthen our internal collaborations across the departments & with stakeholder groups working in the WLEB. When ask about what the existing engaged cross-sector network in the WLEB currently looks like, we heard that we need to give thought to a new, diverse, science-based WLEB advisory group. And, that we need to keep the engagement structures simple and a mix of both one-on-one consultations and group time to allow for social bonds and trust to form. When asked about what needs to

be considered when looking at incorporating social indicator research & development into the process, we heard that we need to develop social indicators that at minimum track producer and public perceptions and understanding of the nutrient issue.



An important part of the adaptive management process is to conduct research to address uncertainties or gaps in our knowledge. There are multiple sources of uncertainty that apply to an adaptive management process of this magnitude including: inadequate scientific understanding of phosphorus cycling, BMP effectiveness, and climate change impacts. One important research effort Michigan that will be undertaken by EGLE's NPS Program is looking at soil test P levels & manure application rates for the state. This was a common question we received during the public comment period on the draft Plan last spring. Current guidelines for determining manure application rates to fields, is based on the soil test phosphorus levels in the field and the amount of phosphorus in the manure. The current 75-150 ppm soil test phosphorus levels are applied to all soil types across the state. However, it is known that certain soils can bind up less phosphorus and therefore making phosphorus more susceptible to being lost and potentially impacting water quality. Also, it is not known if the current standard took into consideration soluble phosphorus and phosphorus discharges from tile lines. The state will be conducting a literature review to research what limits other states and Canada use for soil phosphorus limits. If the literature search shows that Michigan's standards are not protective of water quality, the results of this research will be used to establish standards that are more protective of water quality.



- For next steps, the DAP Team will Finalize Plan & is continuing to apply the Adaptive Management Framework to the work the agencies are planning and implementing.

- An important next step will be to form the WLEB science-based stakeholder advisory group that will provide key input and feedback into the adaptive management process.

- The DAP Team is just beginning to take next steps and develop a 2-yr workplan that will focus on efforts to accelerate conservation in the right places in the priority watersheds.

- We cannot do this work alone. Ultimately, success will depend on the agricultural community's ability and willingness to implement the priority BMPs in the Lake Erie Basin.

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32

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Thank you for your attention. Please feel free to reach out to me or any of the DAPT Team members listed here.

OHIO SEA GRANT AND STONE LABORATORY

Research Update: Lake Erie Algae and Nutrient Source Reduction Efforts

Dr. Chris Winslow, Director
Ohio Sea Grant and Ohio State University's Stone Lab
May 21st, 2021

Implementation: Research

Academic studies in the Maumee Watershed and throughout Ohio are focused on:

- BMP and nutrient removal treatment effectiveness
- Nutrient movement (fate/transport) through watersheds
- Nutrient monitoring throughout watersheds
- The nature of harmful algal blooms

Detailed research at the academic level is ongoing in the Maumee Watershed and throughout Ohio with focus areas applicable to this TMDL that include:

Implementation: Research

HARMFUL ALGAL BLOOM RESEARCH INITIATIVE

- HAB Research Initiative: Funding support via Ohio Department of Higher Education since 2015
- Co-administered by Ohio Sea Grant @ OSU and the University of Toledo
- $10M in funding, ~70 projects relevant to the causes and impacts of HABs (FY15-19').
- $4M currently being competed (FY20 & 21')

OhioHigherEd Department of Higher Education

UT

Sea Grant Ohio Sea Grant College Program

The Ohio State University

An overview of HABRI.

Research Continues To Be Truly Collaborative

2020 ODHE Projects (FY19')

- Temporal **trends of saxitoxin-producing cyanobacteria** in Ohio lakes (OSU/Chaffin)
- **Impact of rivers on phosphorus** delivery to western Lake Erie (OSU/Hood)
- Using remote sensing and water quality data to enhance **satellite-based monitoring of HABs in Ohio's inland lakes** and waters (OSU/Zhao)
- **Removing Cyanotoxins in Drinking Water Plants**: Strategy When Saxitoxin & Anatoxin Present with or without Microcystin (Akron/Cutwright)
- Fate and **movement of cyanotoxin** in porous and fractured media (BGSU/Liu)
- Assessing **microcystin inhalation risk** to shoreline populations (UT/Ames)

2020 ODHE Projects (FY19)

- Effect of soil properties on **leaching and crop uptake of microcystin** in land applied drinking **water treatment residuals** (OSU/Dayton)
- Assessing **cyanotoxin exposure in at-risk populations** (UT/Haller)
- Microcystin degrading bacteria as a novel **therapy for microcystin exposure and liver toxicity** (UT/Haller)
- Sensors for detection of **microcystins in fish tissue** (OSU/Lu)
- Role of **beach sands and human exposure to microcystin** (UT/Von Sigler)
- **Nutrient load reduction** achieved **via controlled drainage structures** (OSU/Lyon)

2019 Projects in Play (FY 17&18')

- Environmental drivers of **saxitoxin production in recreational and drinking waters (**BGSU/Davis)
- Model simulating how **conservation actions might impact tile-drained fields** (OSU/Kalcic)
- Design and launch of **HAB Satellite-1** (UC/McGhan)
- Expanding **Heidelberg tributary loading program** (Heidelberg/Johnson)

2019 Projects in Play (FY 17&18')

- Lake Erie open water **HAB impairment criteria** (UT/Bridgeman)
- Assessing **changes in on-farm manure management** on dissolved phosphorus runoff (OSU/Keener)
- **Mapping of agricultural BMPs and farmer perceptions** (UT/Rai)
- Spatial **distribution model for manure** from CAFOs (UT/Lawrence)

2019 Projects in Play (FY 17&18')

- **Reducing nutrient loads from manure** fertilization (BGSU/Midden)
- **Biosensors for detection of multiple cyanotoxins** in water (OSU/Lu)
- Environmental **fate and persistence of Microcystin** in land applied drinking water **treatment residuals** (OSU/Basta)
- Measuring **viral activity** associated with blooms to **inform water treatment** (BGSU/McKay)

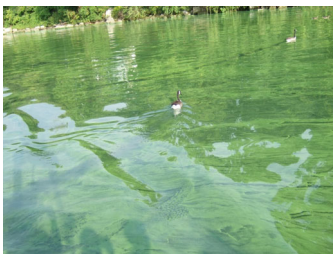
2019 Projects in Play (FY 17&18')

- Optimizing the use of **powdered activated carbon for Saxitoxin removal** (OSU/Lenhart)
- Microcystin **detoxifying water biofilters** (UT/Huntley)
- **Sensors to detection Microcystins in human biological samples** (e.g, blood and urine (OSU/Lu)
- HAB associated health effects and **airborne microcystin** levels in recreational lake users (UT/Ames)

2019 Projects in Play (FY 17&18')

- Identifying **liver cancer biomarkers** of acute and chronic cyanotoxin exposure (OSU/Knobloch)
- **Novel therapies** for microcystin induced totoxicity in individuals with pre-existing liver disease (UT/Kennedy)
- **Inflammatory bowel disease** and susceptibility to **microcystin toxicity** (UT/Haller)
- **behavior, growth and survival** of juvenile **yellow perch and walleye** exposed to toxic cyanobacteria (OSU/Ludsin)

Implementation: Other Relevant Research Efforts



- Ohio research consortium LEARN has partnered with ODNR for H2Ohio wetland monitoring
  - » **L**ake **E**rie and **A**quatic **R**esearch **N**etwork
  - » Research focus is on wetland nutrient removal
- NOAA sea grants administrated by Ohio Sea Grant
- Lake Erie Impairment Criteria:
  - » Multi university and agency collaboration led by Ohio Sea Grant
  - » Open Water HAB & Aquatic Life Use

Run through other research outlets.

Implementation: Other Relevant Research Efforts

- Ohio Water Resources Center
- ECOHAB: Forecasting algal bloom toxicity (Multi university collaboration led by OSU's Stone Lab)
- NIH/NSF Great Lakes Center for Fresh Waters and Human Health (Multi university and agency collaboration led by BGSU)
- Lake Erie Protection Fund administrated by Ohio Lake Erie Commission
- Ohio Water Development Authority's Research and Development Program

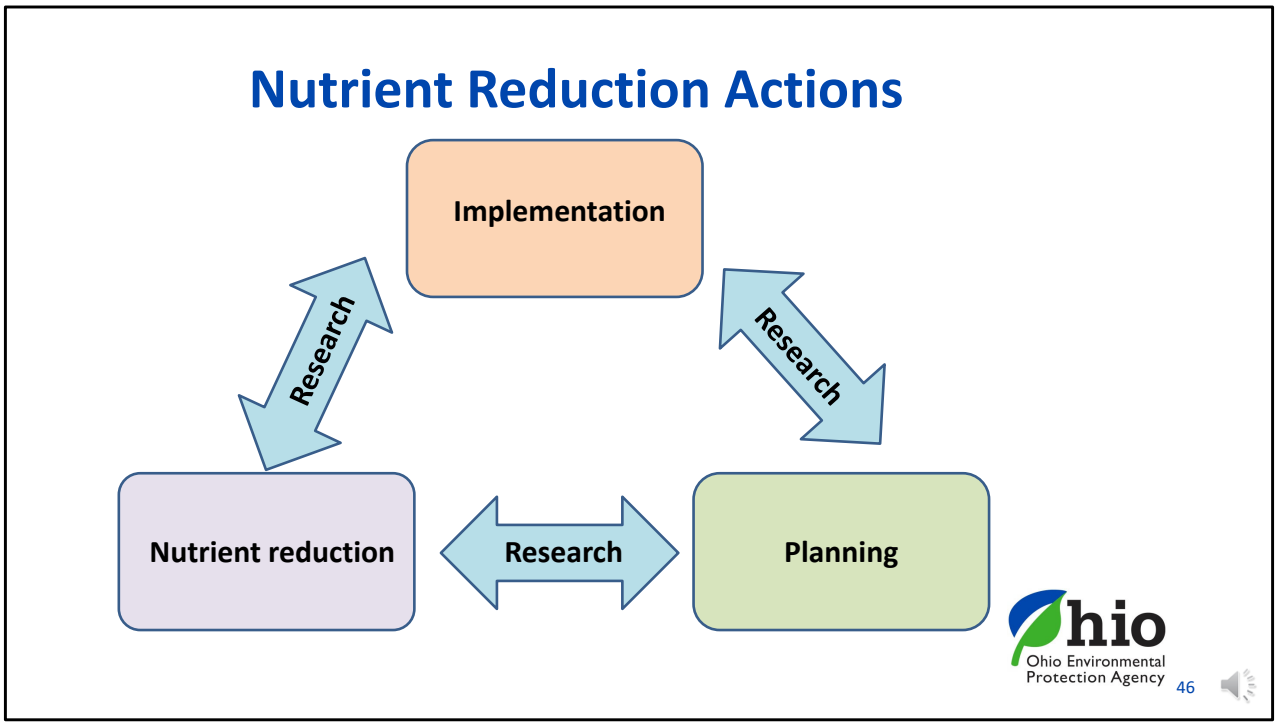
Ohio Water Development Authority

BGSU

The Ohio State University

Water Resources Center Ohio

Run through other research outlets.



TIFFANI - As you can see from today's presentations, planning for and implementing nutrient reduction efforts are comprehensive and ongoing. The research of these efforts is also extensive and will continually feed into informing what investments should occur and where they should take place.

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Ohio Environmental Protection Agency

47

This concludes the third module providing early outreach for Ohio's Maumee nutrient TMDL.
Thank you for your interest in this project and have a great day!