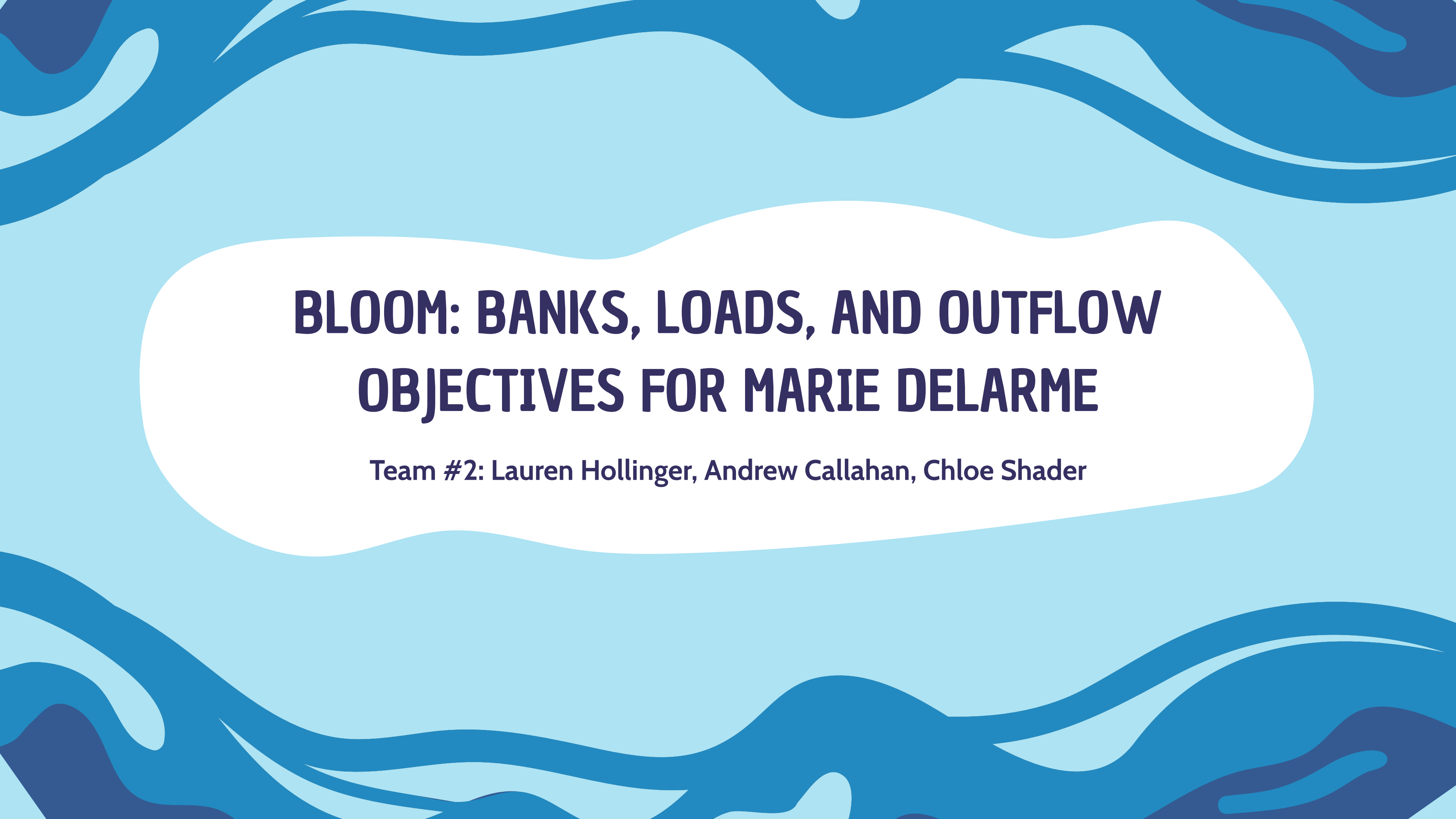




BLOOM: BANKS, LOADS, AND OUTFLOW OBJECTIVES FOR MARIE DELARME

Team #2: Lauren Hollinger, Andrew Callahan, Chloe Shader



OUTLINE

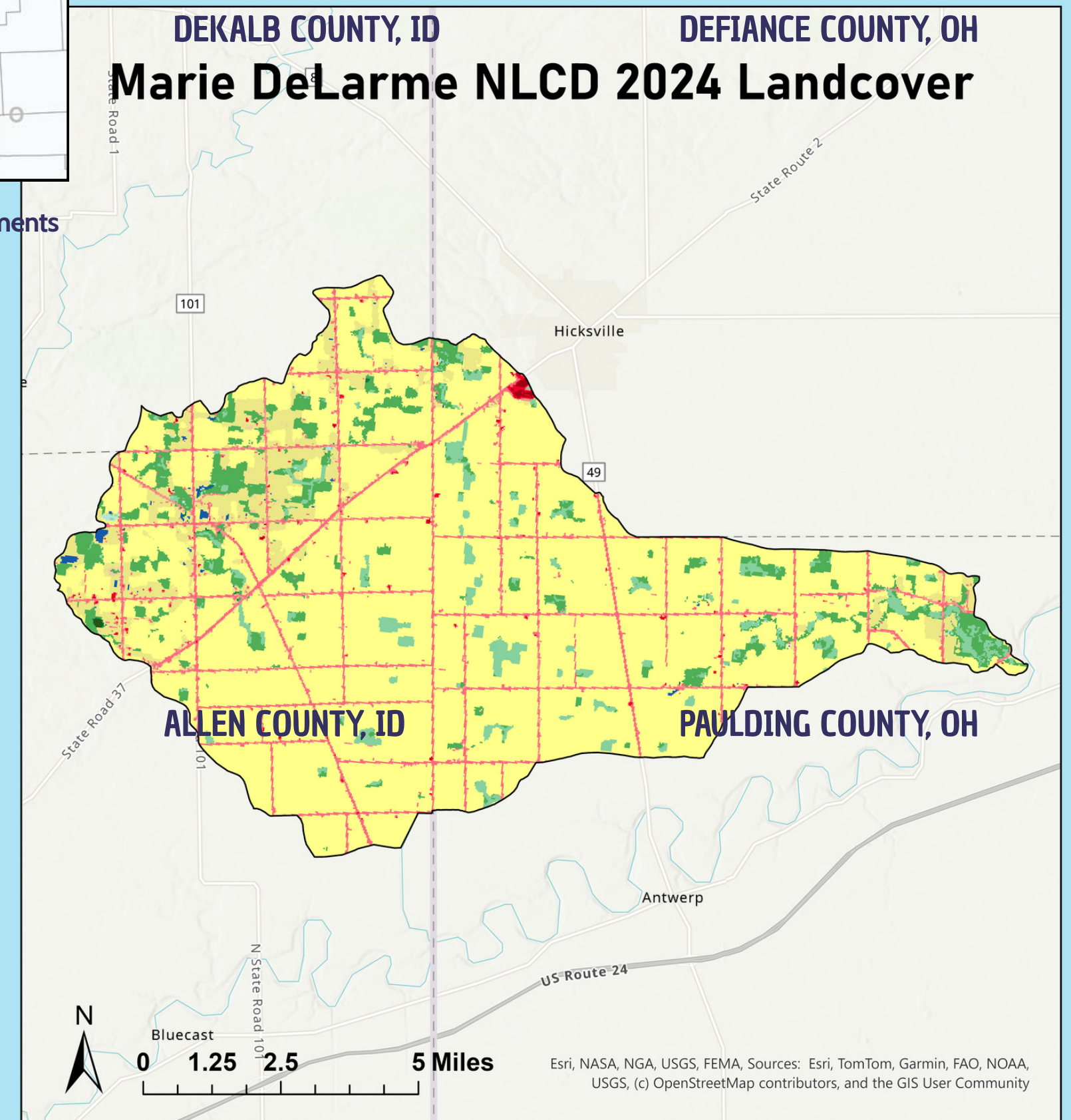
- Area of interest
- History
- Mission Statement
- Current Governance Structures
- Proposed Governance Structure
- Finance/Economics
- Problem #1: Banks (Sediment Deposition/Erosion)
 - Solution #1
- Problem #2: Loads (Nutrient Loading)
 - Solution #2
- Problem #3: Outflows (Septic/Wastewater)
- Conclusion



Source: Maumee River Basin Partnership of Local Governments

AREA OF INTEREST

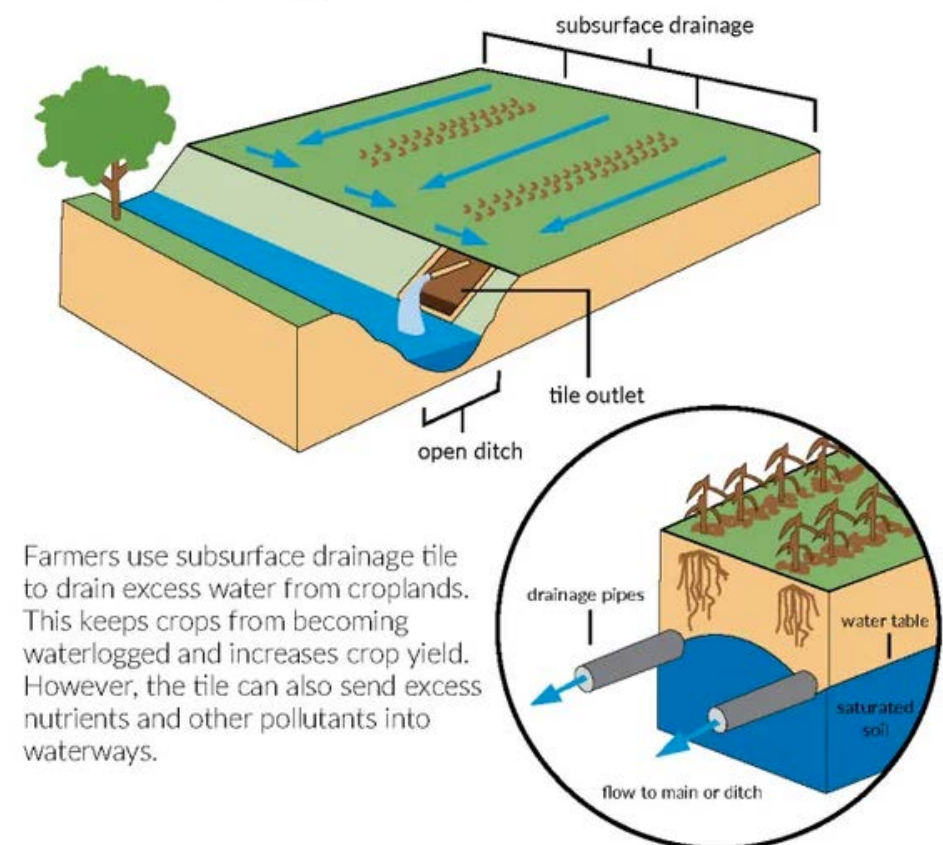
- ~50 square miles
- Sits on the border of Indiana and Ohio
- Part of the Maumee River Basin (the largest river basin in the Great Lakes region), which flows into Lake Erie.
- The land cover of the Marie Delarme watershed 77% cultivated crops.
- 2,444 residents based on 2020 census block data.



HISTORY

- Originally inhabited by Native American tribes. Some of the sites are listed as “outstanding” historic sites in Indiana
- The Great Black Swamp was largely drained and converted to agricultural lands for hay production
- Export of hay and cultivated crop products are the main agricultural export and have been so for a while

How drainage tile works



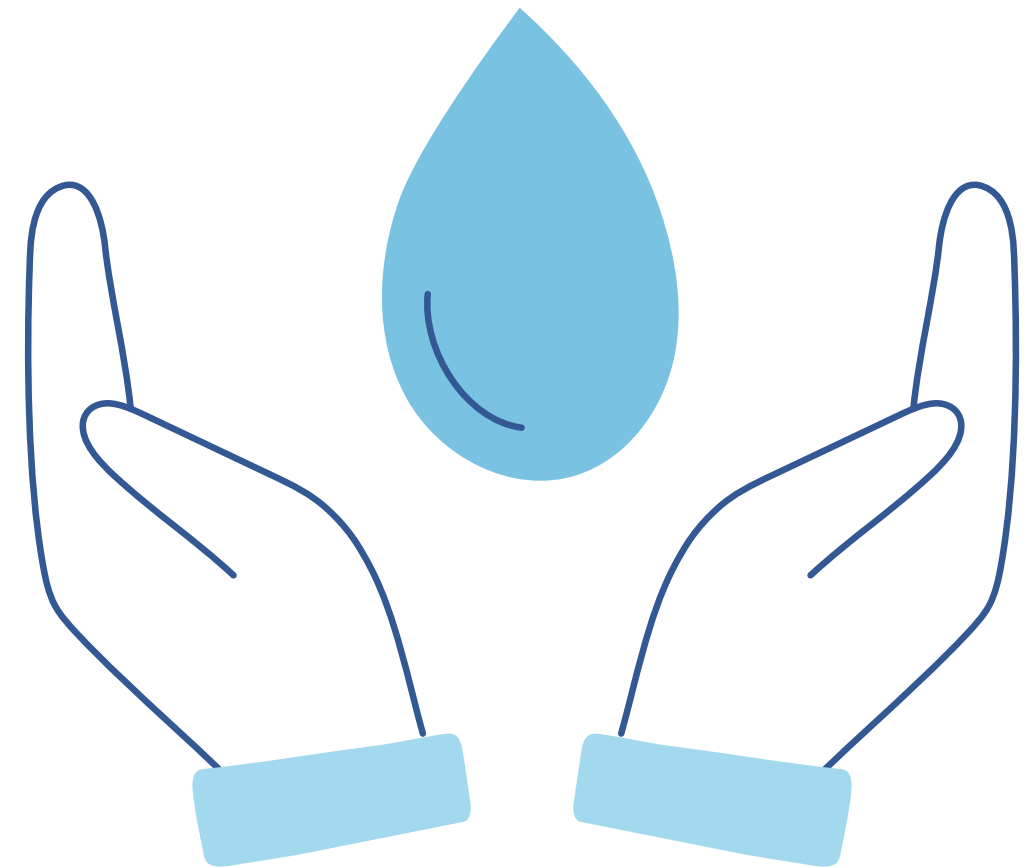
Farmers use subsurface drainage tile to drain excess water from croplands. This keeps crops from becoming waterlogged and increases crop yield. However, the tile can also send excess nutrients and other pollutants into waterways.

Source: Missourian reporting

JOY MAZUR/Missourian

MISSION STATEMENT

The mission of the BLOOM watershed management plan is to provide **critical analysis and actionable solutions** to the communities of Indiana and Ohio that encompass the Marie Delarme watershed. This plan addresses ongoing issues of nutrient loading, sedimentation, and failing sewage infrastructure that impact human and ecosystem livelihoods in the watershed and downstream. **By 2045**, we aim to secure a future where the watershed is fishable, swimmable, and provides a safe source of drinking water.



CURRENT GOVERNANCE STRUCTURES

• Federal - Examples

- Clean Water Act
- Great Lakes Commission and NOAA designated Maumee River as an Area of Concern → funding for habitat restoration via the EPA, but focus on urbanized areas

• States - Examples

- H2Ohio → BMPs for agriculture, education, \$ for projects
- Ohio EPA → TMDLs and monitoring. Last time Marie Delorme creek was measured was 2015. 2024 update includes restored wetlands along Marie DeLorme funded by the Ohio EPA.
- Indiana Department of Agriculture → Clean Water Indiana has competitive grants for conservation and water quality projects
- Indiana Department of Environmental Management → Watershed Planning section

CURRENT GOVERNANCE STRUCTURES

- Four Counties: Allen County IN, DeKalb County IN, Defiance County OH, Paulding County OH

→ Maumee River Basin Commission was established by Indiana State Law in 1986, 6 member counties, including Allen and DeKalb (IN). \$ from member counties.

→ 2014: Defiance County OH and Allen County IN collaborated to create the Upper Maumee River Watershed Management Plan with federal funding.

- NGOs

1. Upper Maumee Watershed Partnership
→ education speaker series
2. Maumee River Basin Partnership of Local Governments → coalition meeting since 2001, not a lot of details
3. Black Swamp Conservancy → restoration projects including 8 acres of previous farmland in the Marie Delarme

PROPOSED GOVERNANCE STRUCTURE

- Patchwork of county and state governments lack coordination and collaboration within one small watershed
- There is no watershed plan or group specifically for the Marie Delarme
- Funding: no drinking water fee (wells), federal cooperative watershed management grant is paused currently
 - Nonprofits, like the National Sustainable Agriculture Coalition's Regional Conservation Partnership Program has funding for cross-state programs administered at local level

PROBLEM 1 - BANKS

SEDIMENT DEPOSITION AND EROSION

- Upper Maumee River Watershed Plan (2014): **sediment levels exceeded normal values** in half of the subwatersheds
 - Marie Delarme was marked as one of the priority areas for sedimentation concerns.
- Marie DeLarme is a **hotspot for intensive agriculture**
 - Draining wetlands **deprived the watershed of its natural buffer** for filtration.
- Dangers of sedimentation:
 - blocked sunlight
 - suffocate aquatic life
 - infrastructure damage
 - carry harmful toxins.

BANKS SOLUTION

- Conducting sediment sampling to improve data availability and set a baseline (ideally in the first year).
- Continue to support more wetland restoration projects.
- Help residents access and expand programs like the Ohio Working Buffer Program (\$200-\$250 per acre) and the Indiana Conservation Reserve Program (CRP).
- Use our watershed organization to conduct subsequent sediment monitoring.

Reduce sedimentation in the watershed by at least 25%



Source: Ohio EPA

PROBLEM 2 - LOADS

NUTRIENT LOADING

Windshield survey was conducted in 2010

- 26 locations identified as potential problems of improper management
- Marie DeLarme is primary agriculture lands

Old drainage pipes still leak fertilizer into water ways → leading to eutrophication

- Eutrophication: over-enrichment of water by nutrients leading to algal blooms (mostly from farms)
 - Creates dead zones in waters
 - Block sunlight for submerged plants

Source: 13ABC



LOADS SOLUTION

Wetland Restoration - progress has already been made on this. 8 acres of previously used hay production farm land is converted back to wetland.

Livestock monitoring and Phosphorus monitoring (P monthly to capture seasonal changes)

- 39 sites monitored in Marie DeLarme watershed

Precision fertilizer application - applies inputs as efficiently as possible but requires large upfront investments on technology (new hardware + software)

- Soil and Water Conservation District

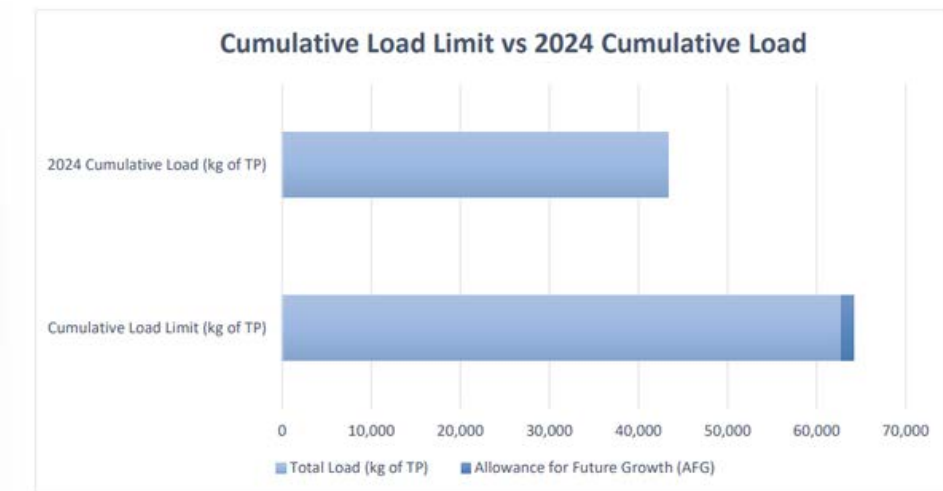


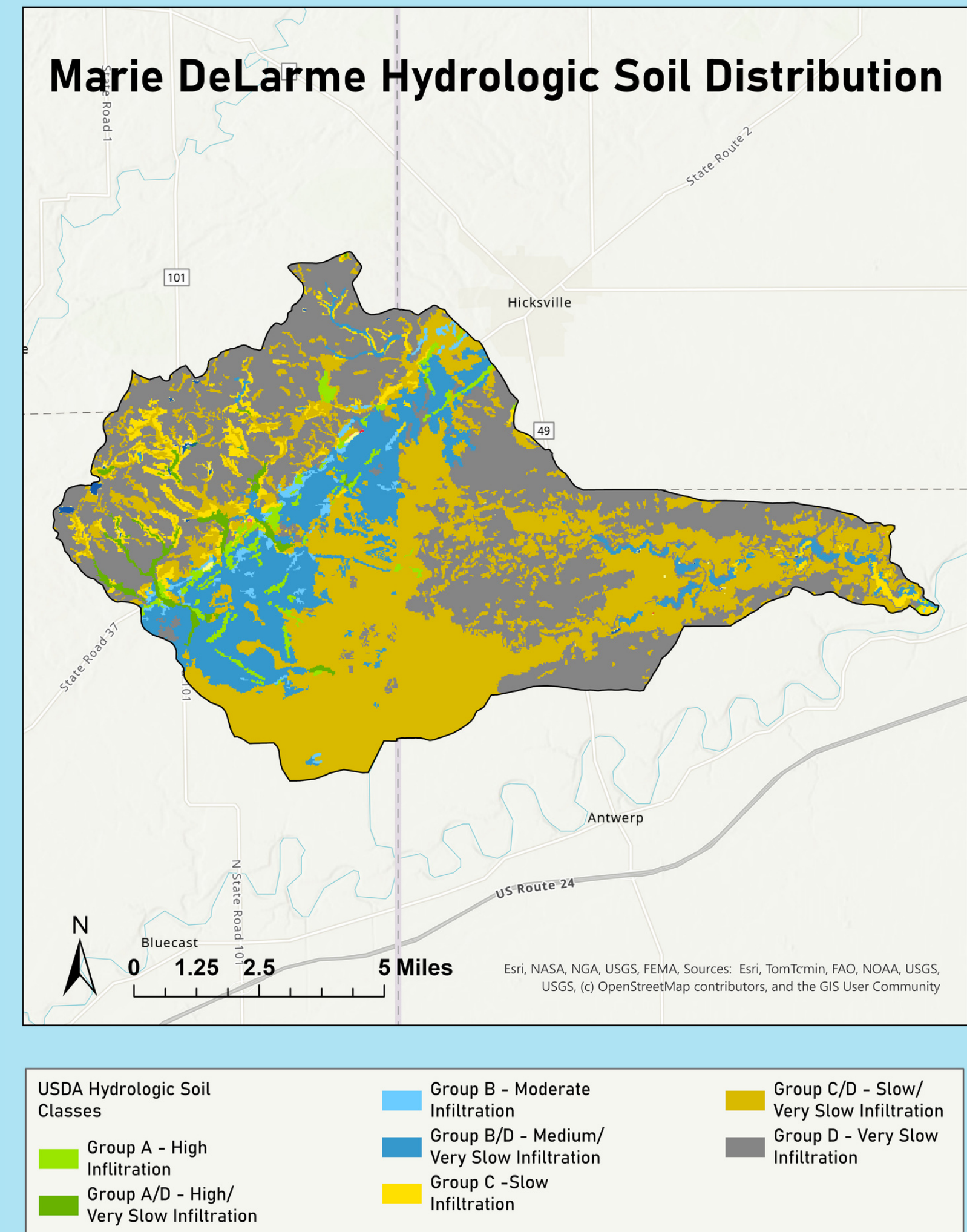
Figure 9. The Cumulative Load Limit for the Phosphorus General Permit, in kilograms (kg) of total phosphorus (TP), plotted alongside the 2024 Cumulative Load.



PROBLEM 3 - OUTFLOWS

SEPTIC AND WASTEWATER

- In the entire Upper Maumee River Watershed, only 3% of the land (lightest blue + lightest green) is suitable for septic systems because of the infiltration type.
- Most of the population is rural and depends on septic systems to process wastewater.
- In the 2014 report, more than 300 septic systems in the Marie Delarme watershed were estimated to be failing.
- Failing septic systems leach fecal coliform and lead to high e.Coli levels. This is important, especially for rural populations relying on well water.



OUTFLOWS SOLUTIONS

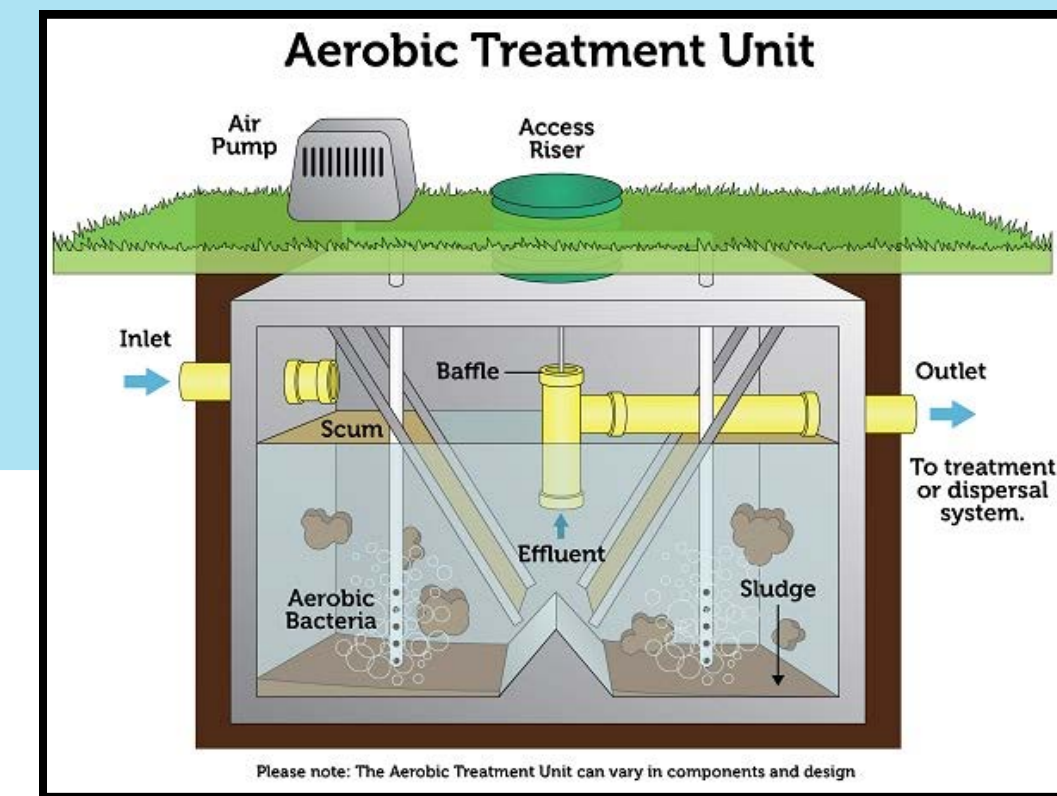


Image from US EPA

- Rural community → Alternate septic technologies:
 - Composting / incinerating toilets, Constructed Wetland systems, Aerobic Systems, Other above-ground alternatives
- Provide funding for septic system replacement, updates, and maintenance
- Require owners/operators of septic systems to have maintenance and inspection contracts
- Require new developments in hydric soil to use an appropriate wastewater management system through updates to zoning ordinances
- Require regular well water quality testing in each county



CONCLUSION

Solutions:

- Data collection and monitoring (sediment, nutrients, fecal coliform)
- Buffer creation
- Wetland restoration
- Livestock monitoring
- Precision fertilizer application
- Funding and support for septic system maintenance and alternative septic technologies
- Add septic system regulations

- **Recommendations: creation of a citizen-led watershed organization**
- **Collaboration across 4 county governments and 2 state governments needed**



Questions

SOURCES

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