

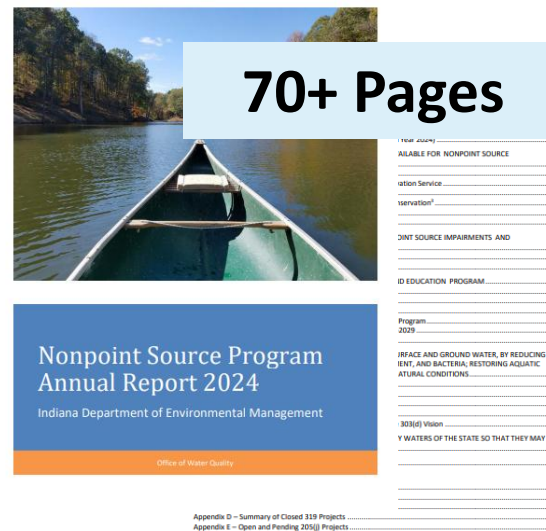
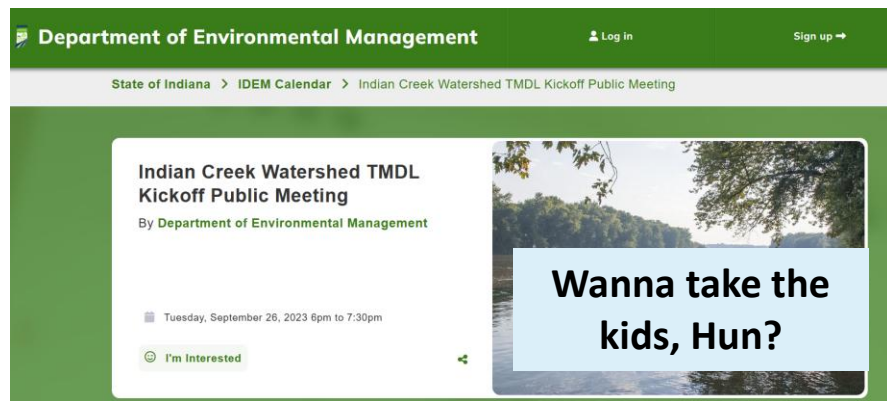
# **Making Water Talk**

Creative, Technical, and Interactive Tools for Public Engagement

ACWA Annual Meeting  
August 13, 2025

Caleb Rennaker  
Indiana Department of Environmental Management

# Communication Challenges



## IDEM's 2024 Integrated Water Monitoring and Assessment Report Submittal, Including the 2024 303(d) List of Impaired Waters

- [Indiana's 2024 Integrated Water Monitoring and Assessment Report to the U.S. EPA \[PDF\]](#)
  - [Appendix A: Integrated Report Tables \[PDF\]](#)
  - [Appendix B: Integrated Report Figures \[PDF\]](#)
  - [Appendix C: Metadata and Definitions \[PDF\]](#)
  - [Appendix D: Status of Category 4 Waters \[PDF\]](#)
  - [Appendix E: IDEM's Priority Ranking and 2024-2026 Schedule for Total M](#)
  - [Appendix F: IDEM's 305\(b\)/303\(d\) Monitoring, Assessment, Reporting, ar](#)
  - [Appendix G: IDEM's 2024 Consolidated Assessment and Listing Methodology \[PDF\]](#)
  - [Appendix H: Comprehensive Aquatic Life Use and Recreational Use Assessments \[PDF\]](#)
  - [Appendix I: Trend and Trophic Status of Indiana's Lakes](#)
  - [Appendix J: IDEM's Notice of Comment Period for the 2024 Draft 303\(d\) List \[PDF\]](#)
  - [Appendix K: IDEM's Responses to Comments on the Indiana Draft 2024 303\(d\) List of Impaired Waterbodies and Consolidated Assessment and Listing Methodology \(CALM\) \[PDF\]](#)
    - [U.S. EPA Comment File \[XLS\]](#)
  - [Appendix L: Listing Tables Including Indiana's Finalized 303\(d\) List of Impaired Waters \(Category 5\) for 2024 \[XLS\]](#)
  - [Appendix M: Indiana's 2024 Consolidated List \(Categories 1-5\) \[XLS\]](#)

400+ Pages

Big Raccoon-Wabash River Watershed TMDL Report

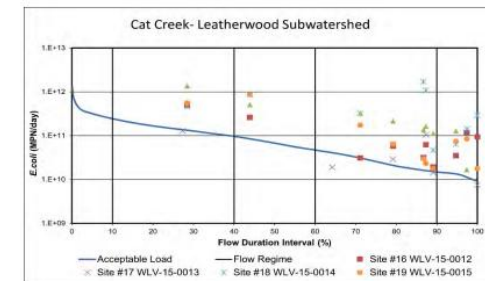
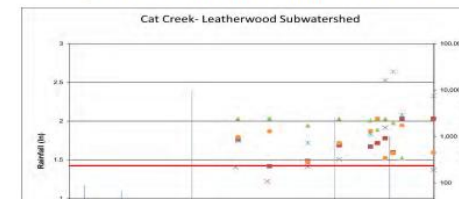


Figure 41: E. coli Load Duration Curve for Cat Creek Subwatershed



TMDL E. coli Allocations (MPN/day)					
Allocation Category Duration Interval (%)	High Flows 5%	Moist Conditions 25%	Mid-Range Flows 50%	Dry Conditions 75%	Low Flows 95%
LA	3.10E+11	1.44E+11	7.00E+10	2.72E+10	1.30E+10
WLA (Total)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MOS (10%)	3.64E+10	1.70E+10	8.24E+09	3.20E+09	1.53E+09
Future Growth (5%)	1.82E+10	8.49E+09	4.12E+09	1.60E+09	7.64E+08
Upstream Drainage Input	8.94E+12				3.75E+11
TMDL = LA+WLA+MOS	9.30E+12				3.90E+11
Allocation Category Duration Interval (%)	High Flows 5%	25%	50%		Low Flows 95%
LA	87.11	40.60	19.71	7.65	3.66
WLA (Total)	0.00	0.00	0.00	0.00	0.00
MOS (10%)	10.25	4.78	2.32	0.90	0.43
Future Growth (5%)	5.12	2.39	1.16	0.45	0.22
Upstream Drainage Input	2,515.09	1,172.10	569.12	220.88	105.54
TMDL = LA+WLA+MOS	2,617.58	1,219.86	592.31	229.88	109.84

Very  
Technical

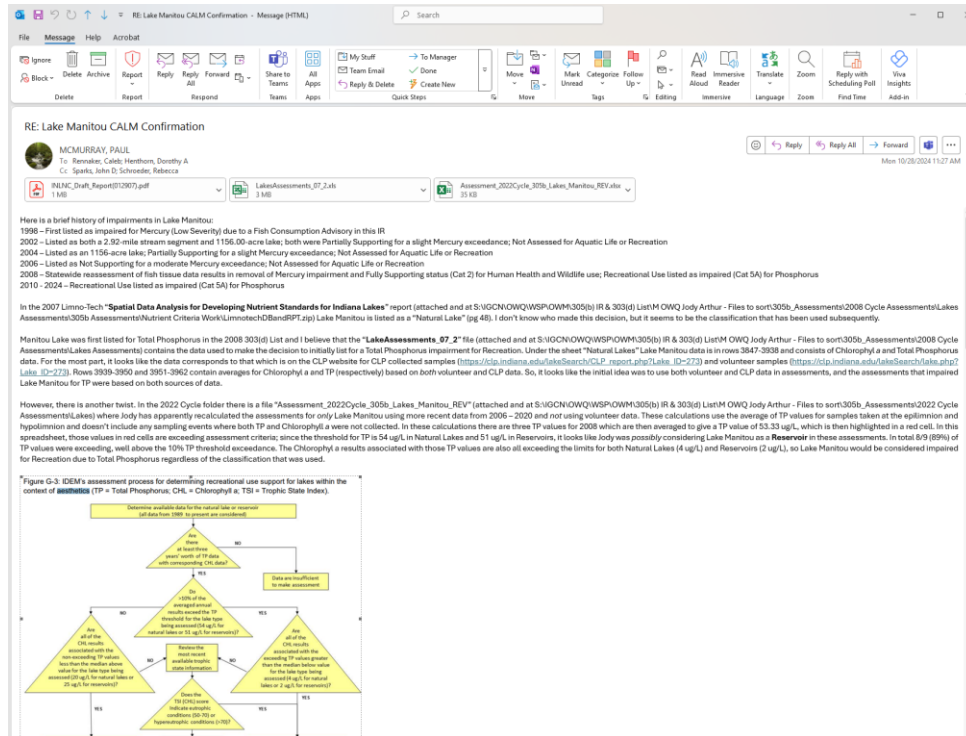
## Communication Challenges

# How Do We Communicate as Scientists/Regulators

*Question: For assessments, is this considered a natural lake or a reservoir?*

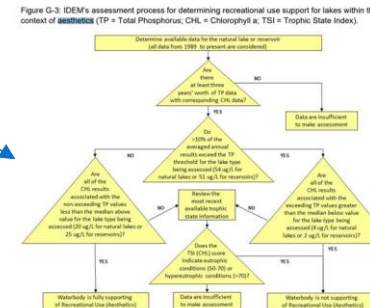
*Answer:*

## Reports/Spreadsheets



## Technical Jargon

However, there is another twist. In the 2022 Cycle folder there is a file "Assessment\_2022Cycle\_305b\_Lakes\_Mantou\_REV" (attached and at: S:\GNC\OWQ\WSP\OWN\305(b) IR & 303(d) ListM\OWQ Jody Arthur - Files to 305(b)\_Assessments\2022 Cycle Assessments\Lakes) where Jody has apparently recalculated the assessments for only Lake Mantou using more recent data from 2006 – 2020 and not using volunteer data. These calculations use the average of TP values for samples taken at the epilimnion and hypolimnion and doesn't include any sampling events where both TP and Chlorophyll *a* were not collected. In these calculations there are three TP values for 2008 which are then averaged to give a TP value of 53.33  $\mu\text{g/L}$ , which is then highlighted in a red cell. In this spreadsheet, those values in red cells are exceeding assessment criteria; since the threshold for TP is 40  $\mu\text{g/L}$ , the 2008 values are exceeding the assessment criteria. The 2008 values are also exceeding the assessment criteria for Chlorophyll *a* (8.9  $\mu\text{g/L}$ ) since the 2008 values are exceeding the assessment criteria. In total, 8 out of 9 (89%) of TP values were exceeding, well above the 10% TP threshold exceedance. The Chlorophyll *a* results associated with those TP values are also all exceeding the limits for both Natural Lakes (4  $\mu\text{g/L}$ ) and Reservoirs (2  $\mu\text{g/L}$ ), so Lake Mantou would be considered impaired for Recreation due to Total Phosphorus regardless of the classification that was used.



## Complex Charts/Tables

# How Can We Improve Our Communication Strategies

## Tools for Every Skill Level

We are constantly limited by staff resources and those staff are limited by their skills and abilities

We need to match skills with the right tools

Tool/Strategy	Technical Need	Creativity Need
Artificial Intelligence (AI)	Low	Medium
GIS Based Tools	Medium to High	Low
GIS Based Story Telling Tools	Medium	Medium

# Using Artificial Intelligence

Great for staff who are creative without needing to be highly technical

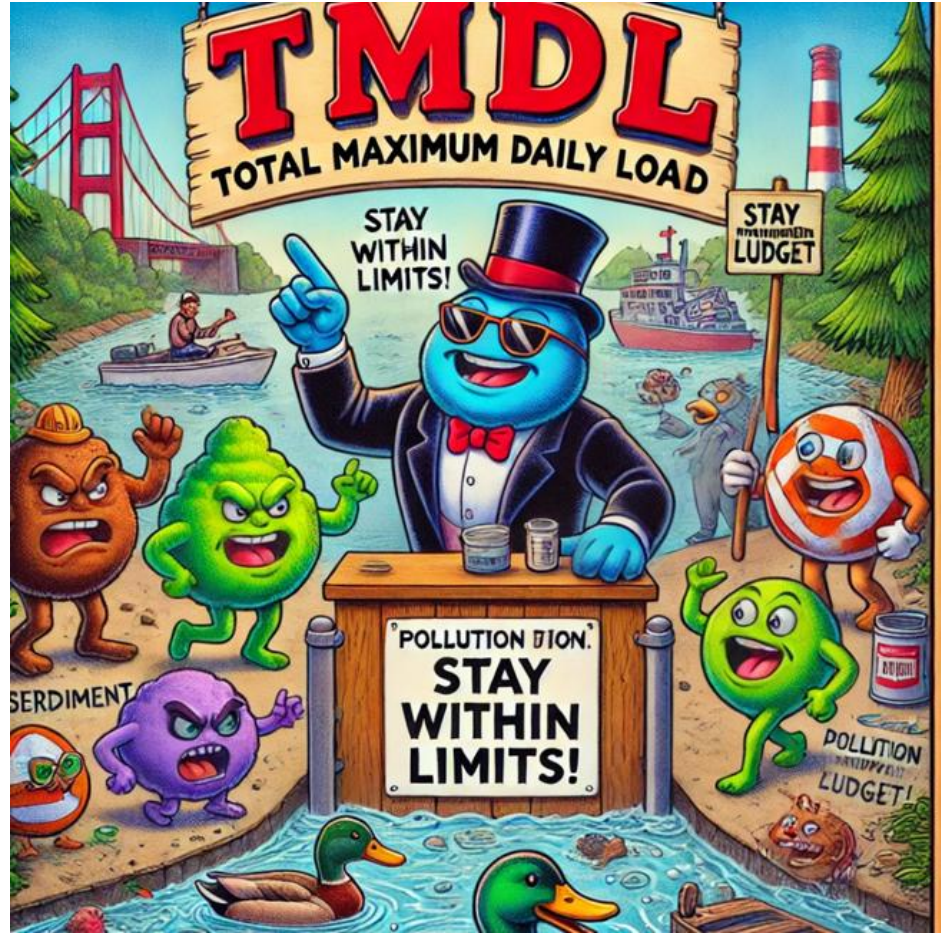
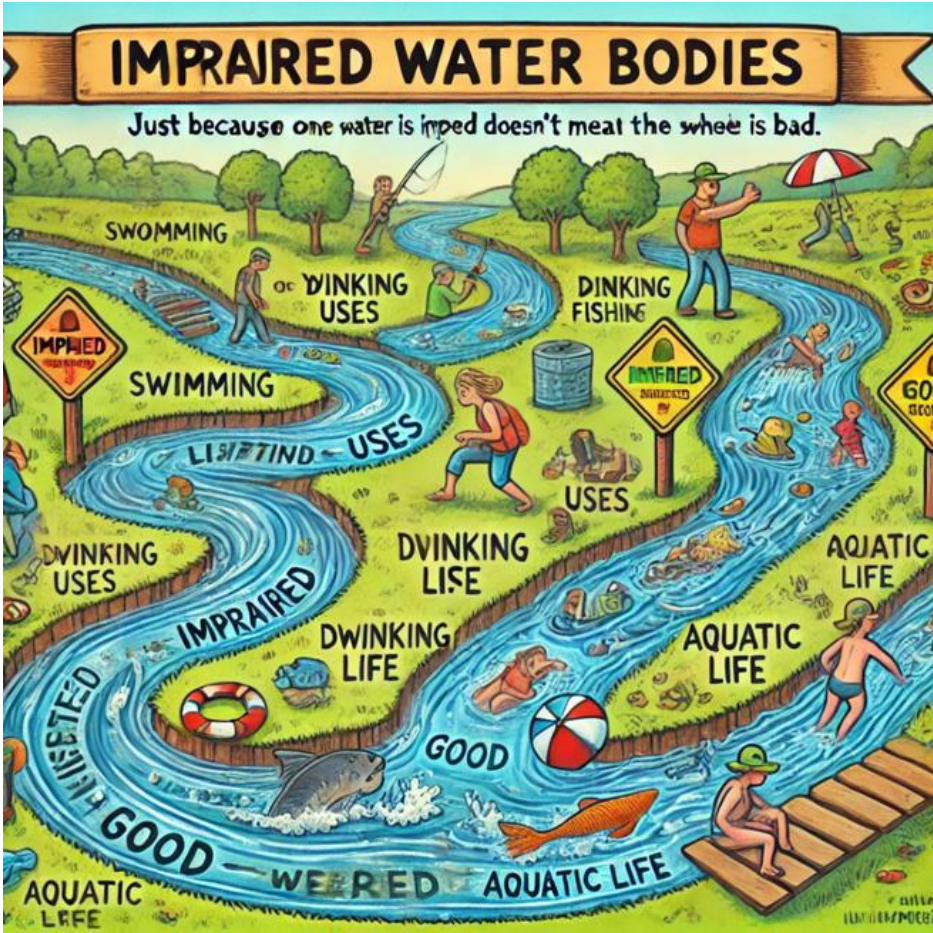
## Great for:

- Developing custom graphics
- Drafting narratives
- Creative feedback
- Readily available tools
  - *ChatGPT, MS Copilot, Claude, etc.*

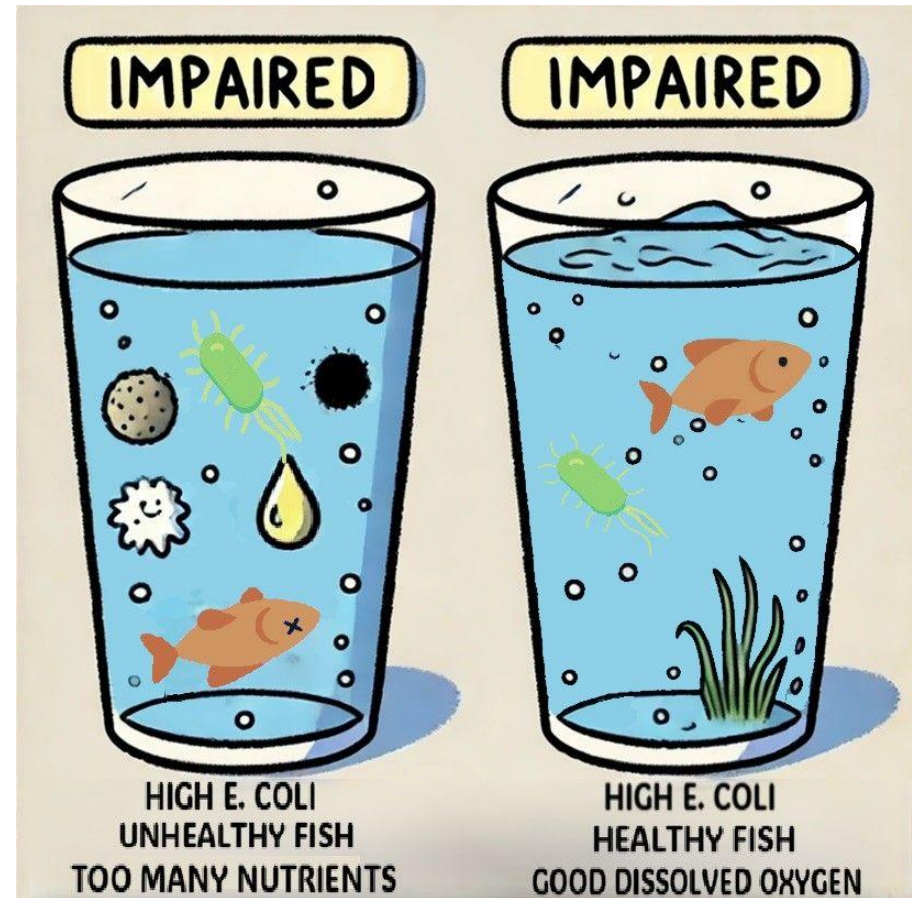
## Potential Shortfalls:

- Graphic Components
- Robotic Narratives
- Best With Clear Directives









# Only Limited By Your Own Creativity



Industrial  
Stormwater



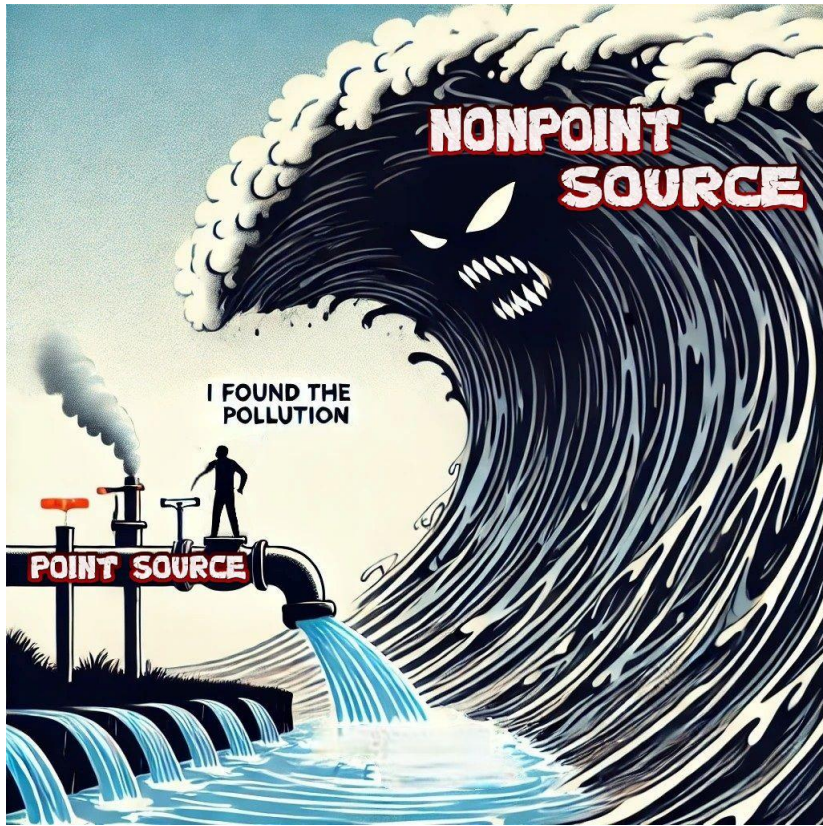
Construction Stormwater



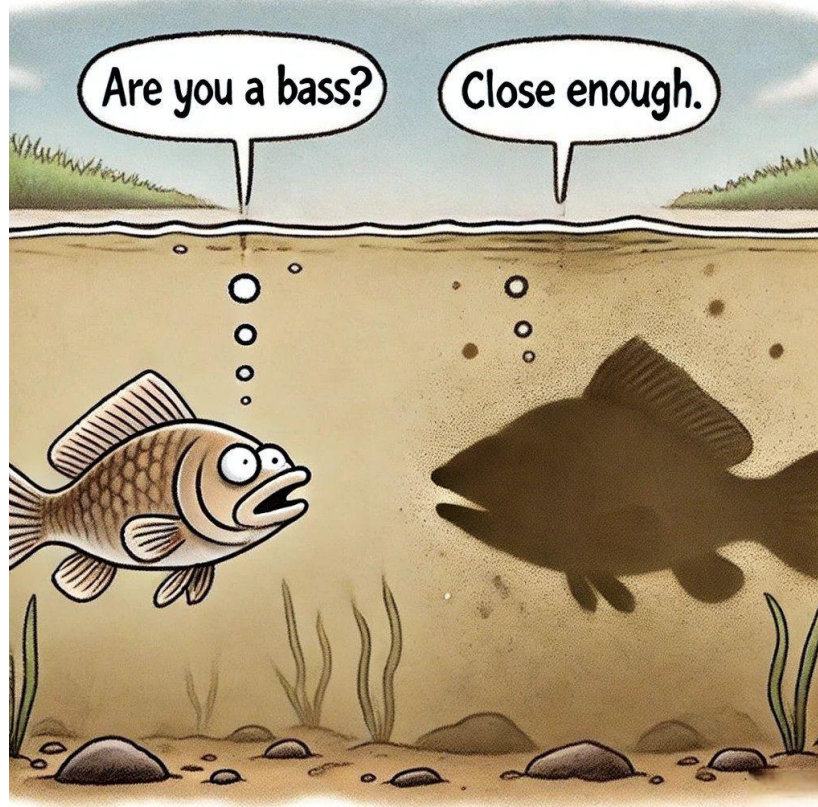
Total Maximum Daily  
Loads



# Only Limited By Your Own Creativity



NPS Pollution  
Magnitude



Fish Hybridization &  
Visibility



Context for Indiana  
Water

## Using GIS Based Tools

Better suited for med/high technical skills with lower creative needs

### Great for:

- Spatial communication
- Interactivity
- Communicating complex information

### Potential Shortfalls:

- Technical maintenance
- Ability to host, software
- Functionality for the public

## WATRS Tool

The screenshot displays the WATRS Tool interface. The top navigation bar includes the title "WMP and TMDL Reports Search (WATRS) Tool" and links for "Nonpoint Source Program Home Page" and "Contact Info". A search bar is located at the top left. The main map area shows a map of Indiana with various watersheds color-coded by region. A legend on the right side of the map identifies the regions: Northwest Region (1) in green, Northeast Region (2) in yellow, Southwest Region (3) in blue, and Southeast Region (4) in orange. A detailed pop-up window for the "Stony Creek-White River [0512020107]" is shown, providing information about the watershed specialist, TMDL, and WMP.

**Major Basin (HUC8)**

- Northwest Region (1)
- Northeast Region (2)
- Southwest Region (3)
- Southeast Region (4)

**Stony Creek-White River [0512020107]**

Subwatershed [HUC12]: William Lock Ditch-Stony Creek [051202010703]

Region: Northeast Region (2)

Watershed Specialist: Miranda Wentz  
Email: [mwentz@dem.in.gov](mailto:mwentz@dem.in.gov)  
Phone: 317-308-3265

Total Maximum Daily Load (TMDL): Duck, Pipe, Killbuck, Stony Creek E. coli TMDL  
Approval Date: April 22, 2008

Watershed Management Plan (WMP): Stony Creek WMP  
Approval Date: March 12, 2007  
Contract Number: 5-161

## Indiana e303(d) Tool

### Online e303d Tool

The screenshot displays the Indiana Impaired Waters e303d Tool interface. The top navigation bar includes the title "Indiana Impaired Waters e303d Tool" and a note "with ArcGIS Web AppBuilder". A search bar is located at the top left. The main map area shows a map of Indiana with various watersheds color-coded by region. A legend on the right side of the map identifies the regions: Northwest Region (1) in green, Northeast Region (2) in yellow, Southwest Region (3) in blue, and Southeast Region (4) in orange. A detailed pop-up window for a specific watershed is shown, providing information about the watershed, TMDL, and WMP.

**Indiana Impaired Waters e303d Tool**

Find address or place

Layers

- ☒ Sketch
- ☒ HUC 8 Sub-Basins
- ☒ HUC 10 Watersheds
- ☒ WMP and TMDL Reports Search Tool
- ☒ stateboundary\_mask
- ☒ ATTAINS\_Assessment
- ☒ ATTAINS Assessment Points
- ☒ ATTAINS Assessment Lines
- ☒ ATTAINS Assessment Areas
- ☐ ATTAINS Assessment Unit Catchment Associations

1 of 3

Not Assessed

Hydrologic Alteration

IR Category: 4A

Is Assessed: Y

Is Impaired: Y

Is Threatened: N

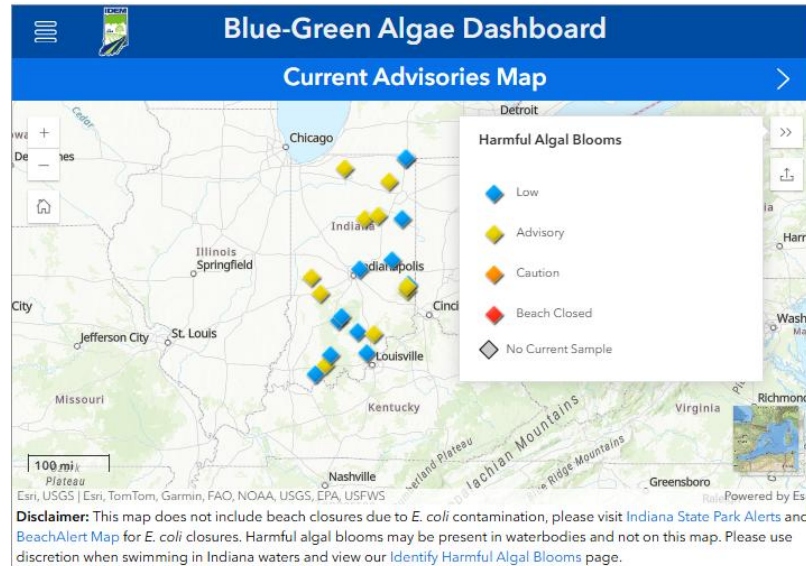
Mercury

Metals Other Than

Zoom to



# Cyanobacteria Dashboard for Indiana Lakes



## What do the Diamonds Mean:



- Blue: Low Risk** for blue-green algae
- Don't drink the water. Shower with soap after being in the lake.
  - Cell count and toxin concentrations are below thresholds.
  - The beach will be sampled monthly.



- Yellow: Advisory** for blue-green algae
- Swimming and boating permitted. In addition to cautions above, avoid contact with algae. Do not use lake water for cooking or bathing. Do not allow pets to swim in or drink water where algae are present.
  - Cell count is above 100,000 cells/ml and toxin concentrations are below thresholds.
  - The beach will be sampled biweekly.



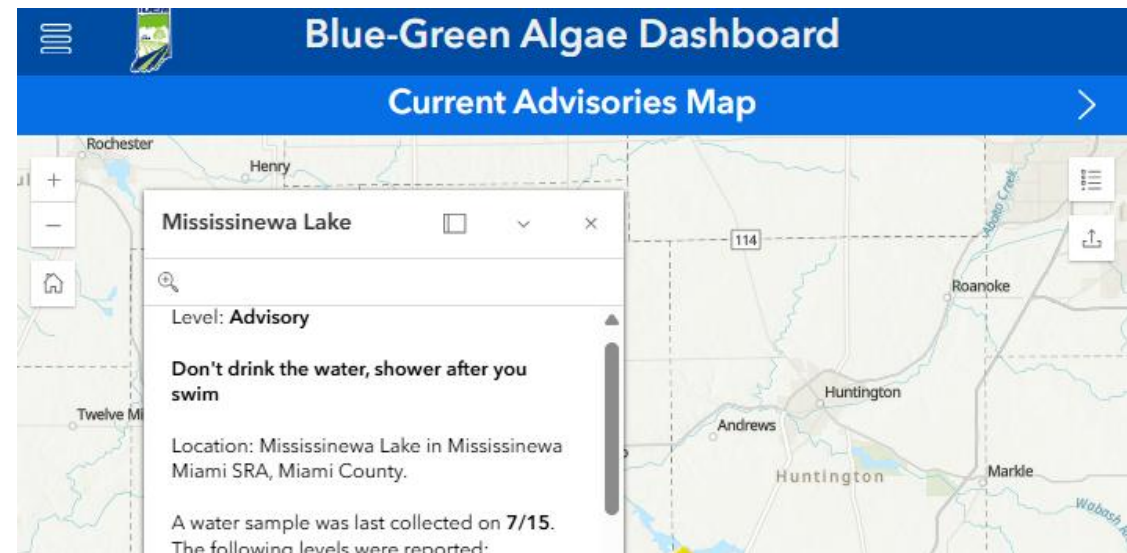
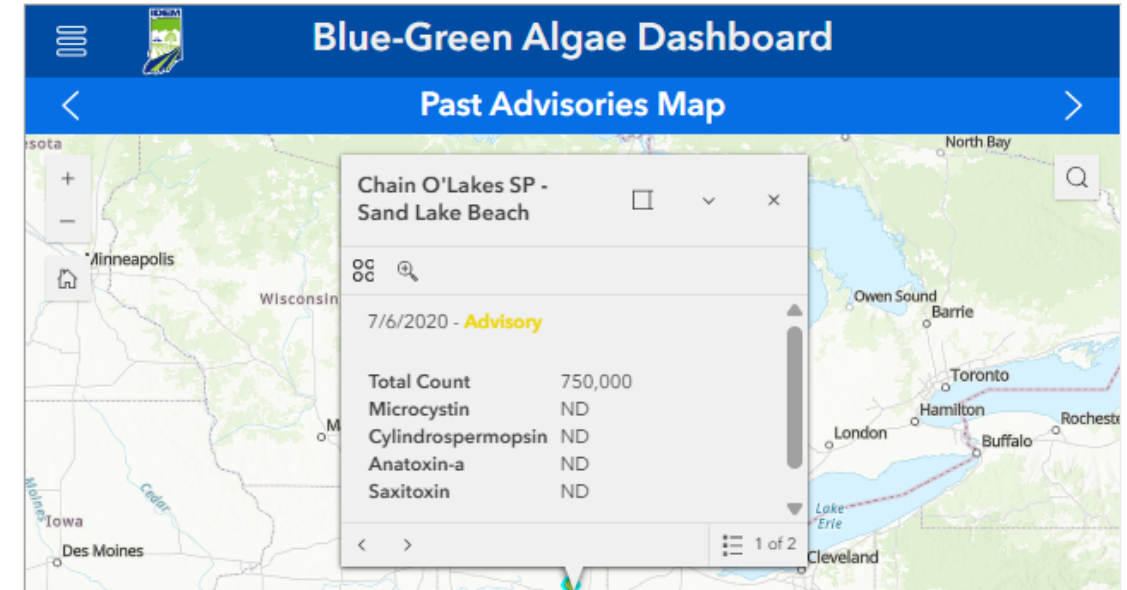
- Orange: Caution** for high levels of blue-green algal toxins
- Swimming and wading are not recommended.
  - Toxin concentrations are above thresholds.
  - The beach will be sampled weekly.



- Red: NO SWIMMING** due to high levels of blue-green algal toxins
- Toxin concentrations are elevated above thresholds.
  - The beach will be sampled weekly.

Toxin Exposure Thresholds				
Exposure Reference Values (µg/L)	Microcystin	Cylindrospermopsin	Anatoxin-a	Saxitoxin
Human Recreation Advisory	8	6	8	0.8
Dog Recreation Advisory	0.4	0.5	-	-
Dog Recreation Prohibited	0.8	1.0	0.4	0.05

Note: Dogs are not permitted to swim at Indiana State Park beaches except for the dog park lake at Fort Harrison State Park. The dog park lake is tested by IDEM, and the dog recreation thresholds will apply.



# Using GIS Story Based Tools

Good for those with medium levels of creativity and technical skills


## Great for:

- Communicating a more involved story or concept
- Interactivity
- Highlighting accomplishments and programs

## Potential Shortfalls:

- Technical maintenance
- Ability to host, Software
- Traditional methods for sharing/reporting

# GIS Story Based Tools



## Restoring Indiana's Waterways Through Local Partnerships



How the IDEM Watershed Planning and Restoration Section works with local watershed groups to improve water quality throughout Indiana.

May 14, 2021


[Introduction](#) [Assessment](#) [Impaired Waters](#) [TMDL](#) [Section 319](#) [Success Stories](#) [How to Get Involved](#)

### Introduction

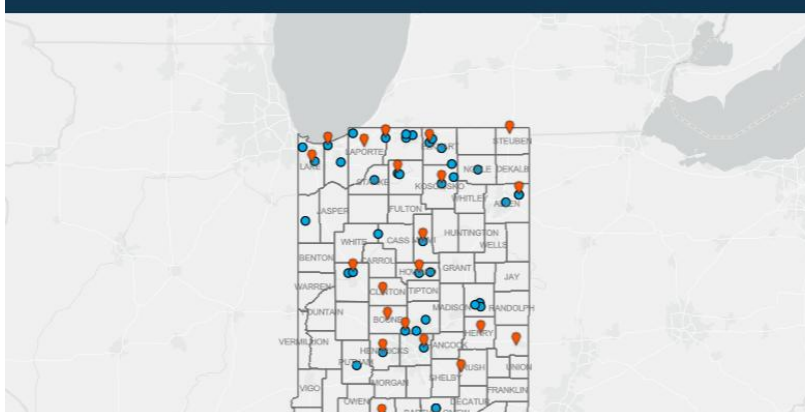
The mission of the Indiana Department of Environmental Management (IDEM), Office of Water Quality (OWQ) is to monitor, protect, and improve the quality of Indiana's water resources. The [IDEM Watershed Planning and Restoration Section](#) specifically works towards this mission by partnering with local watershed groups to reduce [nonpoint source pollution](#). This is accomplished through two different paths. In one option, IDEM works with local watershed groups directly to help them acquire funding through the Clean Water Act Section 319(h) and 205(j) Grants for baseline monitoring, planning, development of a Watershed Management Plan (WMP), and implementation. Alternatively, IDEM conducts monitoring and develops a Total Maximum Daily Load (TMDL) report for a [watershed](#) with an active local group who will use the TMDL analysis to further develop a WMP. This path also involves funding for local groups through federal grant programs. Both paths ultimately lead to implementation of best management practices to address nonpoint source pollution and improvements to water quality throughout Indiana.



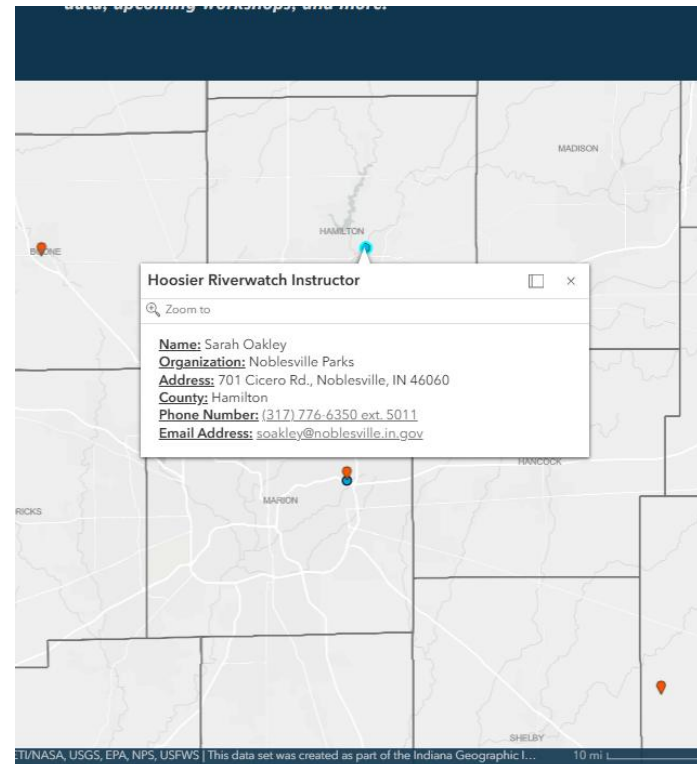
Hoosier Riverwatch at IDEM

Watch on 

Check out the [Hoosier Riverwatch website](#) for more information about volunteering, accessing data, upcoming workshops, and more.



## Water Quality Program Partnerships Story Map



Hoosier Riverwatch Instructor

Zoom to

**Name:** Sarah Oakley  
**Organization:** Noblesville Parks  
**Address:** 701 Cicero Rd., Noblesville, IN 46060  
**County:** Hamilton  
**Phone Number:** (317) 776-6350 ext. 5011  
**Email Address:** [soakley@noblesville.in.gov](mailto:soakley@noblesville.in.gov)

ETV/NASA, USGS, EPA, NPS, USFWS | This data set was created as part of the Indiana Geographic I... 10 mi L



# Replacing Traditional Reports as Interactive Tools

NPS Annual Report 2025

https://experience.arcgis.com/experience/c30a001eebc848f9a6cbbf79a230020/

Home Goal 1 Goal 2 Goal 3 Goal 4 Goal 5 Goal 6 Program Successes

## Indiana Nonpoint Source Annual Report

### FFY 2025

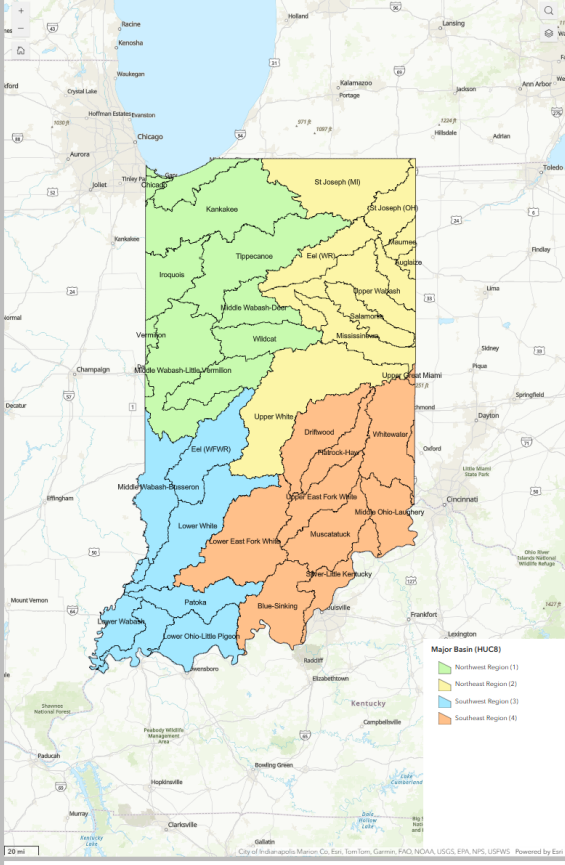
(Reporting period: October 1, 2024 - September 30, 2025)

Indiana Department of Environmental Management  
Office of Water Quality

**Introduction to the Nonpoint Source Pollution Management Program**

Untreated runoff is a significant source of water pollution in Indiana, and sediment, nutrients, and bacteria are the leading pollutants of concern in the state. Indiana's 2024 Integrated Water Monitoring and Assessment Report estimates that nonpoint sources impact 13,616 miles of streams and unknown sources impact 11,649 miles of streams. While some nonpoint source pollution is naturally occurring (e.g., atmospheric deposition), most is a result of human activities such as bacteria from pet waste and faulty septic systems, fertilizers and herbicides from residential lawns and agricultural lands, and oil and toxic chemicals from energy production.

The federal Clean Water Act (CWA) was amended in 1987 to establish the Section 319 (319) Nonpoint Source Pollution Management Programs to control nonpoint sources of water pollution. Section 319(h) provides the U.S. Environmental Protection Agency (U.S. EPA) with the authority to grant federal dollars to states to mitigate and prevent nonpoint source pollution in accordance with an approved state nonpoint source management program. The Indiana State Nonpoint Source Program management plan guides the usage of CWA 319 funds, which are administered by the Indiana Department of Environmental Management (IDEM), Office of Water Quality (OWQ), Watershed Assessment and Planning Branch (WAPB).



Above map: WMP and TMDL Reports Search (WATRS) Tool









Home Goal 1 Goal 2 Goal 3 Goal 4 Goal 5 Goal 6 Program Successes

## Goal 6: Provide networking, guidance, and support to the people doing the work

Progress in achieving the goals of Indiana's Nonpoint Source Program is deeply rooted in the dedication, collaboration, and hard work of stakeholders and watershed professionals across the state. To maximize the impact of each project, it is essential that our partners receive the appropriate tools, support, and networking opportunities.

IDEM will focus on identifying the strengths, weaknesses, and opportunities of those directly overseeing 319 program-funded projects. This information will guide the enhancement or development of critical resources, including guidance materials, networking opportunities, and tools designed to support these professionals in their roles. By improving these resources, IDEM aims to increase project success rates, reduce local turnover by fostering a supportive network, and decrease reliance on IDEM's technical staff, empowering local leaders to take on more responsibilities independently.

### Goal 6 Objectives:

 <p><b>Implement the updated 2024 WMP Checklist</b></p> <p>IDEM updated the Watershed Management Plan (WMP) Checklist that meets EPA's 9-key element WMP and IDEM's requirements.</p>	 <p><b>Farm equipment modification guidance</b></p> <p>IDEM is working towards developing program specific guidance on farm equipment modification.</p>	 <p><b>Grantee and program partner collaboration efforts</b></p> <p>IDEM is working with grantees and program partners to identify guidance support, needs, and/or shortfalls for developing and administering nonpoint source projects.</p>	 <p><b>Facilitating resource sharing between subgrantees</b></p> <p>IDEM is investigating and developing mechanisms for improved communication and sharing of information and materials for watershed planning and implementation projects (i.e., list serves, forums, etc.)</p>
 <p><b>Supporting Hoosier Riverwatch instructors and volunteers</b></p> <p>IDEM continues to support Hoosier Riverwatch instructors and volunteers by providing mechanisms in networking, producing guidance materials, and giving training support.</p>	 <p><b>Support tools or events for cross collaboration</b></p> <p>IDEM is continuing to investigate and develop mechanisms for improving communication and sharing of information and materials for watershed planning and implementation projects.</p>	 <p><b>Load calculation guidance for watershed planning</b></p> <p>IDEM worked to provide updated guidance on pollutant load calculations for use with watershed planning efforts.</p>	 <p><b>QAPP Tool progress</b></p> <p>IDEM is working with a contractor to test and implement the QAPP Tool to support nonpoint source monitoring projects.</p>

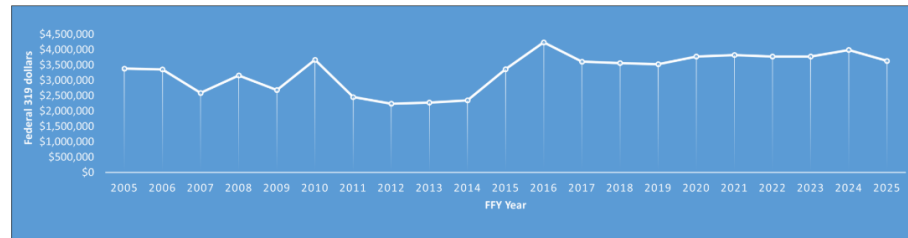
## Goal 4: Improve Indiana's water quality by reducing nonpoint source pollution and restoring aquatic habitats

The heart of Indiana's Nonpoint Source Program is its effort to restore waterbodies impaired by NPS pollution. A primary focus of the NPS program is to help improve conditions so that the state's water quality goals of "swimmable" and "fishable" are met. The Watershed Planning and Restoration Section (WPRS), which houses the Nonpoint Source Program, administers two federal pass-through grant programs aimed at improving water quality in the state: the CWA §319(h) and §205(j) programs. Section 319(h) funding is predominantly used for the development and implementation of comprehensive watershed management plans (WMPs) that guide efforts to restore water quality in impaired waterways. Section 205(j) funding is used for the development of comprehensive WMPs along with monitoring projects to better assess water quality in Indiana. This has resulted in measurable improvements, especially in terms of estimated pollutant load reductions. The WPRS also administers the TMDL program and the 303(d) Vision, and efforts are underway to revisit and integrate both the Nonpoint Source and TMDL program priorities. More information about the §319 and §205(j) grant programs and the TMDL program may be found on [IDEM's website](#).

### Section 319(h) Grant Program

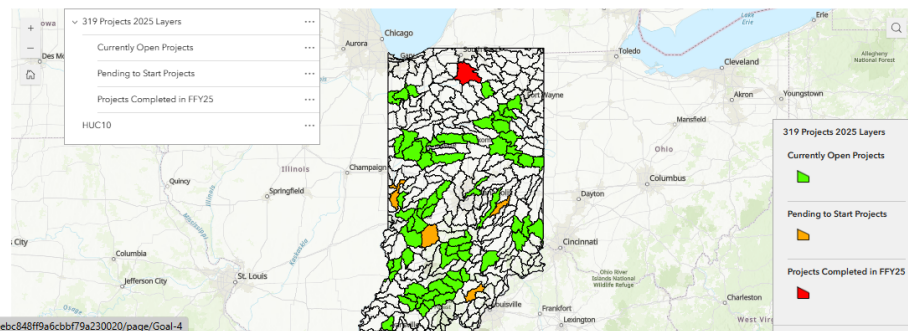
The §319 Grant Program is a major resource for reducing nonpoint source pollution in Indiana. In FY 2025 Indiana anticipates receiving \$3,632,445 in §319 funds that will be used for Nonpoint Source Program support (technical staff and administration) and nonpoint source pollution projects. Each year, IDEM solicits applications for projects that will reduce nonpoint source pollution in Indiana's surface waters. Projects are selected based on their ability to make measurable improvements in water quality and to protect water quality designated uses (i.e., recreation, aquatic life, and public water supply). The infographic below shows the total §319 funding received by Indiana from the past 20 years.

Detailed information on the Section 319 policy, grant funding priority categories, and the application process, can be found on the IDEM NPS website at <https://www.in.gov/idem/nps/progress-evaluation/319205j-grant-application-instructions/>.



### 319(h) Open, Completed, and Pending projects during FFY 2025.

(Click on the map below for more information about these projects)



[gis.com/experience/c30a001eebc848f9a6cbbf79a230020/page/Goal-4](https://gis.com/experience/c30a001eebc848f9a6cbbf79a230020/page/Goal-4)

## Best Management Practices and Pollutant Load Reductions

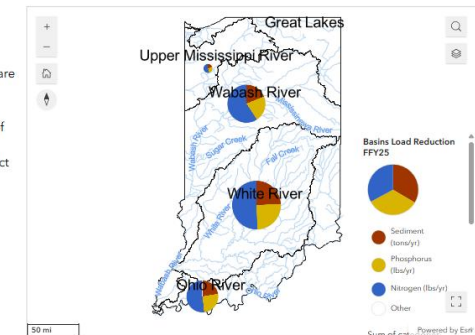
Best Management Practice	Approximate Number of BMPs installed in the calendar year					
	2020	2021	2022	2023	2024	2025
Cover Crops (Acres)	30,566	17,706	14,268	15,012	16,161	26
Fencing (Feet)	30,516	29,518	16,767	22,494	13,134	5,865
Grassed Waterways (Acres)	1,360	4,395	2	5,188	557	0
Heavy Use Area Protection (Sq Feet)	138,350	102,084	83,503	61,717	33,564	13,788
Native Planting (Acres)	0	38,450	0	0	0	0
Nutrient Management (Acres)	306	7,046	5,289	4,690	16,087	253
Pasture and Hay Planting (Acres)	730	299	166	505	213	33
Rain Barrels (Number)	7	3	0	2	0	0
Rain Gardens (Acres)	810	1,181	0	1,170	0	0
Residue Mgt, No-Till Strip Till (Acres)	4,438	557	291	2,105	23,775	1,176
Streambank Protection (Feet)	3,592	2,265	1,536	1,424	1,896	328
Tree/Shrub Establishment (Acres)	397	239	59	100	93	0
Watering Facilities (Number)	17	20	7	14	13	4

### 319(h) funded Best Management Practices in Indiana

In the Federal Fiscal Year 2025, watershed groups spent approximately \$1,200,000 in cost-share to install BMPs in critical areas of Indiana's watersheds. The table to the left lists some of the BMPs implemented in the last six calendar years based on data from IDEM's Project Tracking database. The 2025 data is currently in progress and will have finalized data by the next Annual Report.

### Load Reductions in FFY 2025 by Basin

The map to the right shows the achieved load reductions that occurred during Federal Fiscal Year 2025 from projects using 319(h) funding. These are summarized for the following five major basins: Great Lakes, Upper Mississippi River, Wabash River, White River, and Ohio River. Reported reductions include a total of 111,690 pounds of nitrogen, 51,000 pounds of phosphorus, and 45,900 tons of sediment load in Federal Fiscal Year 2025, contributing to healthier waterways across the state. These reductions reflect the cumulative impact of various conservation and water management practices aimed at reducing runoff and improving stream quality.

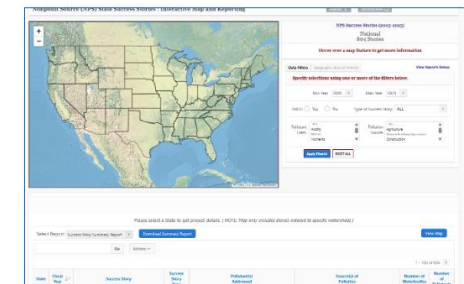


## Nonpoint Source Success Stories

IDEM reports success stories to EPA as a primary measure of success towards improving water quality in Indiana. This federal fiscal year, Indiana is excited to report that twelve (12) success stories were submitted to EPA.

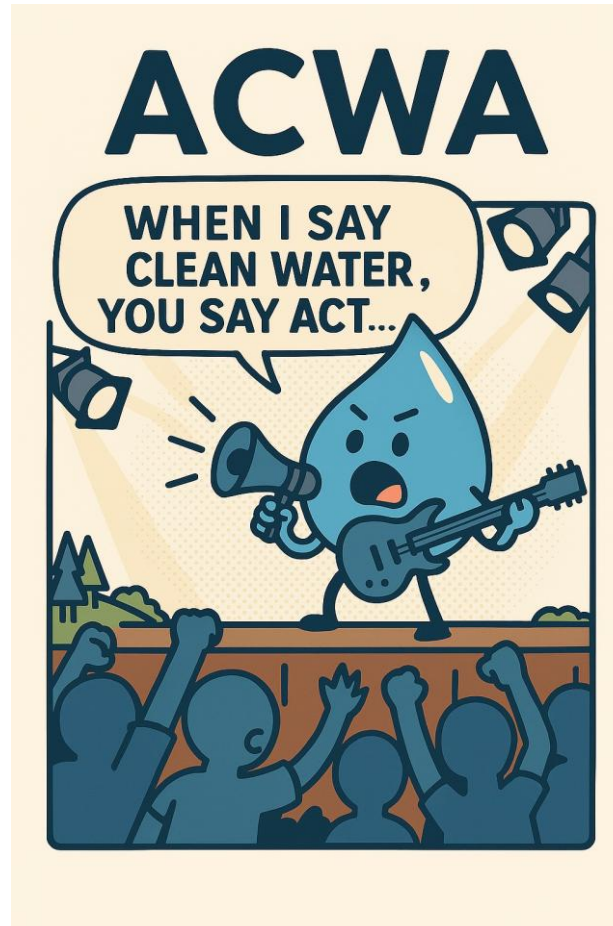
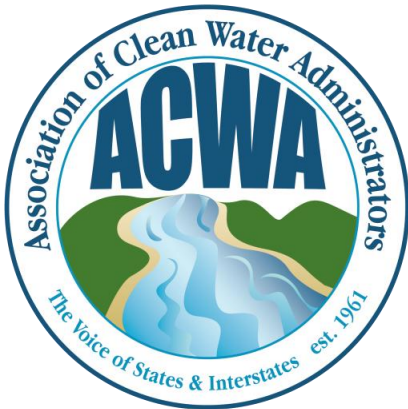
IDEM works side by side with numerous locally led watershed groups to help improve water quality. IDEM Clean Water Act grants and funds from a variety of innovative partnerships have helped clean up our rivers and streams by increasing education, developing effective water quality improvement plans, and helping individual landowners manage their land in ways that benefit our waterways. Over time, these projects have led to measurable improvements in water quality in our rivers, streams, and lakes.

[Open the Success Story Mapper and click on Indiana](#)



## Final Takeaway Question

*What's one tool you could try this year to make your water message clearer?*





# Contact Information



**Caleb Rennaker**  
Chief, Watershed Planning & Restoration Section

*Office of Water Quality*  
Indiana Department  
of Environmental Management

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[www.linkedin.com/in/caleb-rennaker-2a321191](http://www.linkedin.com/in/caleb-rennaker-2a321191)