



Hypoxia Task Force

State Actions and Outcomes

2026 Report



Contents

Hypoxia Task Force State Actions and Outcomes.....	4
1. Arkansas	5
1.1 Nutrient Trends by Watershed	5
1.2 Arkansas’s Goals	10
2. Illinois	14
2.1 Water Quality Trends.....	14
2.2 Agricultural Sector	16
2.3 Point Source Sector.....	23
2.4 Urban Stormwater Sector.....	26
2.5 Gulf Hypoxia Program	27
2.6 Adaptive Management	29
2.7 Conclusion.....	29
3. Indiana.....	30
3.1 Indiana Science Assessment	30
3.2 Other Water Quality Monitoring Trends Efforts.....	32
3.3 Gulf Hypoxia Program Workplan Summary.....	32
3.4 Nonpoint Source Efforts and Program Updates	33
3.5 Point Source Efforts and Projects	35
4. Iowa.....	36
4.1 Historical Progress in Iowa Compared to the HTF Baseline.....	36
4.2 Recent Highlights	36
4.3 Recent Funding or Program Announcements.....	37
4.4 Iowa Point Source Updates.....	38
4.5 Iowa Nutrient Reduction Exchange	41
4.6 Iowa Nutrient Research Center	41
4.7 Addition of New Practices in the INRS.....	41
5. Kentucky.....	42
6. Louisiana	51
6.1 Nutrient Management Strategy Implementation.....	52
6.2 Funding in Support of HTF States	52
6.3 Nutrient Monitoring.....	52
6.4 Alternatives to TMDLs/New Vision for 303(d) Program	53
6.5 Water Quality Credit Trading.....	53
6.6 Nonpoint Source	53
6.7 Source Water Protection	54
6.8 Coastal Protection and Restoration.....	55

7. Minnesota	55
7.1 Nonpoint Source Programs.....	56
7.2 Point Source Programs.....	59
7.3 Watershed Approach	59
7.4 Total Maximum Daily Loads for Nutrient-Impaired Waters	60
7.5 River Nutrient Trends.....	60
7.6 Work plan for Gulf Hypoxia Program funds.....	60
7.7 Advancing climate-related goals.....	61
8. Mississippi	61
8.1 Overview of Mississippi’s Nutrient Reduction Strategies	61
8.2 Mississippi’s Approach for Using Gulf Hypoxia Program Grant Funds	62
9. Missouri.....	66
9.1 4R Nutrient Stewardship.....	66
9.2 TP Point Source Target Reduction Rule	67
9.3 Nutrient Trading.....	68
9.4 Grant Projects	68
9.5 Ongoing Nutrient Loss Reduction Efforts of the Missouri Soil and Water Conservation Program and Soil and Water Conservation Districts	69
9.6 Future of Missouri’s NLRs.....	69
10. Ohio	69
10.1 Monitoring and Research	69
10.2 NPS Efforts Including Watershed Planning and Implementation Projects.....	73
11. Tennessee	76
11.1 Overall Strategy in Action	76
11.2 Point Sources	78
11.3 Nonpoint Sources.....	79
12. Wisconsin	82
12.1 Coordination and Development	82
12.2 Implementation and Innovation	83
12.3 Tracking and Trends.....	87

Hypoxia Task Force State Actions and Outcomes

The Mississippi River/Gulf of America Watershed Nutrient Task Force (Hypoxia Task Force, or HTF) is a voluntary federal, state and Tribal member partnership that works collaboratively on reducing excess nitrogen and phosphorus loads delivered from the Mississippi and Atchafalaya River Basin (MARB) to reduce the size of the Gulf of America hypoxic zone. HTF members represent five federal agencies, 12 states bordering the Mississippi and Ohio rivers,¹ and the National Tribal Water Council represents interests of Tribes.

The HTF's [2008 Gulf Hypoxia Action Plan](#) describes the goals and presents a Framework for Action through six principles:

- Encourage actions that are voluntary, incentive-based, practical, and cost-effective;
- Utilize existing programs, including existing state and federal regulatory mechanisms;
- Follow adaptive management;
- Identify additional funding needs and sources during the annual agency budget processes;
- Identify opportunities for, and potential barriers to, innovative and market-based solutions; and
- Provide measurable outcomes.

The first action and the cornerstone of the Action Plan is for states to take the lead and implement comprehensive nitrogen and phosphorus reduction strategies (Nutrient Reduction Strategies, or NRS). These principles are reflected in each HTF state [NRS](#), and states report on measurable outcomes at regular intervals as described in their individual strategies. In addition to their direct reporting to the public, HTF states have described their recent work and outcomes through the Hypoxia Task Force Reports to Congress that EPA publishes biennially in accordance with the Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2014.

This summary presents HTF states' updates as a complement to their own public reporting since the publication of the Hypoxia Task Force's [2023 Report to Congress](#), including implementation of nutrient reduction strategies and progress towards nutrient reduction goals.

¹ [Federal and state members](#): U.S. Environmental Protection Agency; U.S. Department of Agriculture (Farm Production and Conservation, and Research, Education and Extension); U.S. Department of Interior; U.S. Department of Commerce National Oceanic and Atmospheric Administration; and the U.S. Army Corps of Engineers; and Arkansas, Illinois, Indiana, Iowa, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Ohio, Tennessee, and Wisconsin.

1. Arkansas

The Arkansas NRS (ANRS) uses two complementary methods to track progress: water quality monitoring and estimated load reduction from best management practice, or BMP, implementation. Water quality analysis alone does not always reflect conservation impacts or land use changes. By tracking BMP implementation through Arkansas's BMP tracker, Arkansas can estimate nutrient reduction with and without BMPs across watersheds. Arkansas aims to correlate BMP implementation with in-stream water quality monitoring. Other factors, such as land use change, are also accounted for in the BMP tracker.

1.1 Nutrient Trends by Watershed

The ANRS focuses on reducing TN and TP loading to the Gulf of America by targeting watersheds with the highest need for reduction. In 2021, a water quality analysis of HUC-8 watersheds was completed that prioritized watersheds based on 30 years of statewide monitoring data (Figure 1). Nutrient trends at water quality monitoring stations associated with stream gages are currently being evaluated using weighted regression on time, discharge and season. If no gaging data are available, monotonic changes over time are evaluated with linear regression, the Mann-Kendall test and the seasonal Kendall test. Arkansas's 58 watersheds were classified into four tiers based on nutrient concentrations and trends:

- Tier 1 – Maximum focus on nutrient reduction activities; sufficient data.
- Tier 2 – Focus on nutrient reduction activities; needs more monitoring.
- Tier 3 – Less focus on nutrient reduction activities; needs more monitoring.
- Tier 4 – Least focus on nutrient reduction activities; sufficient monitoring.

The goal of the analysis was to evaluate nutrient concentrations and trends relative to ecoregions, determining which watersheds should be prioritized for nutrient reduction. The analysis evaluated the magnitude and trend of nutrients in HUC-8s. The trend analysis showed that nutrient concentrations have mostly declined or remained stable across Arkansas watersheds in the last three decades. Previous efforts over the last 30 years to reduce nutrient concentrations seem to be successful. Only the Spring River Watershed (HUC 11010010) showed an increase in TN (Figure 2), while no HUC-8s showed increases in TP (Figure 3).

Many watersheds do not have enough data due mainly to a shortage of water quality monitoring sites. A major challenge to developing a statewide prioritization framework was uneven water quality monitoring coverage. About one-third of Arkansas's HUC-8s did not qualify for analysis due to insufficient data. Figure 4 demonstrates an individual HUC-8 that accounts for data availability and nutrient trends. Currently, Arkansas is investing in Gulf Hypoxia Program funding and Nonpoint Source Program funding to enhance monitoring as well as planning for the next full water quality analysis in 2029.

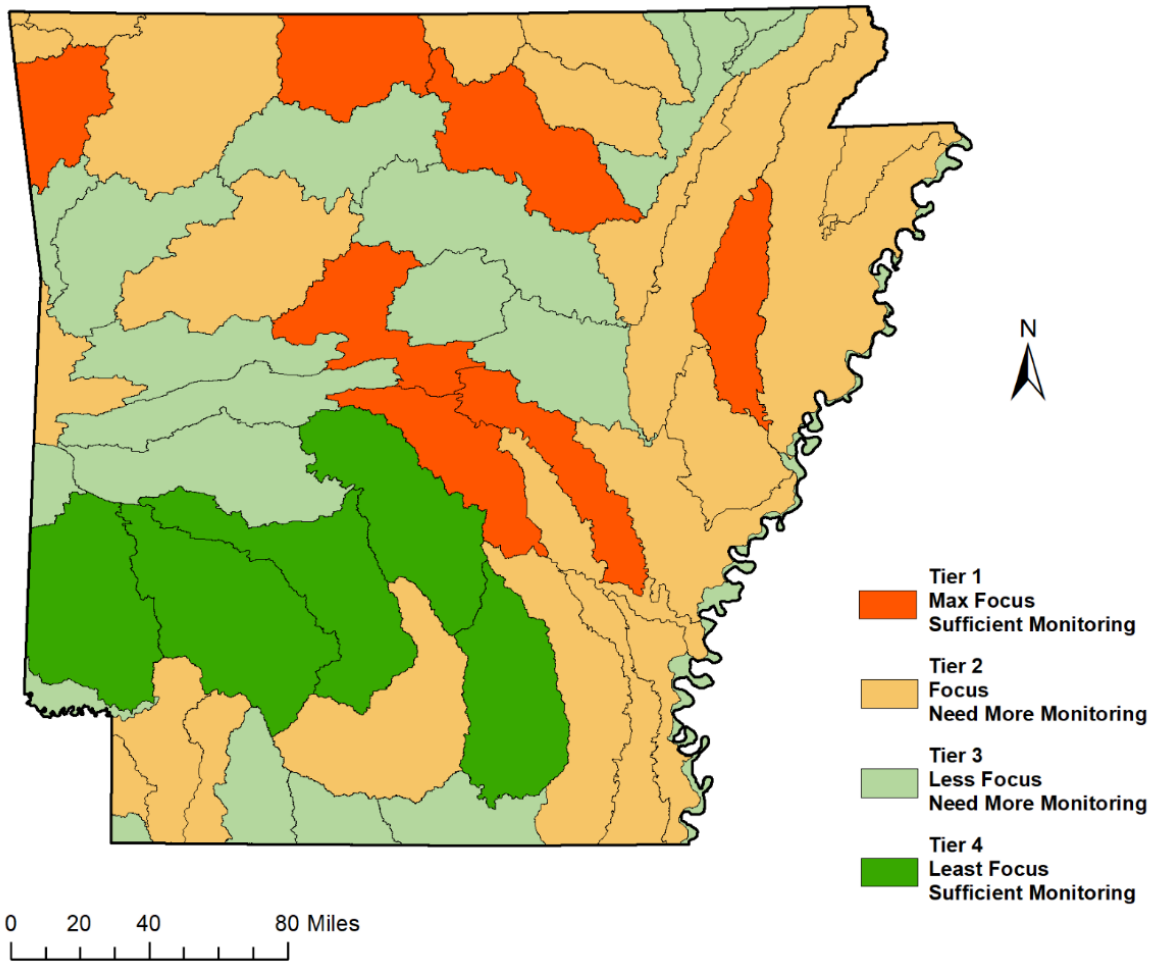


Figure 1. Four tiers of ANRS watersheds.

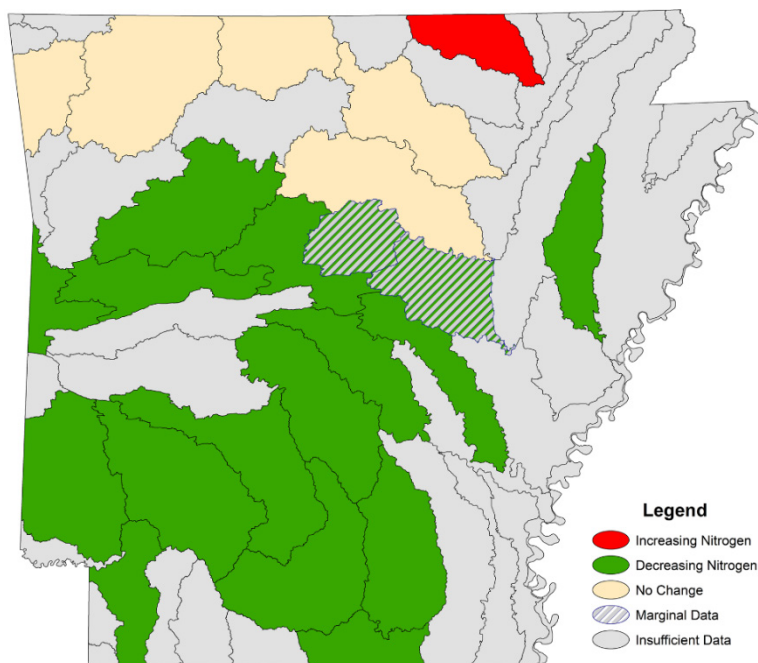


Figure 2. Trends in watershed TN concentrations, as the 75th percentile of annual station medians, 1990 – 2019.

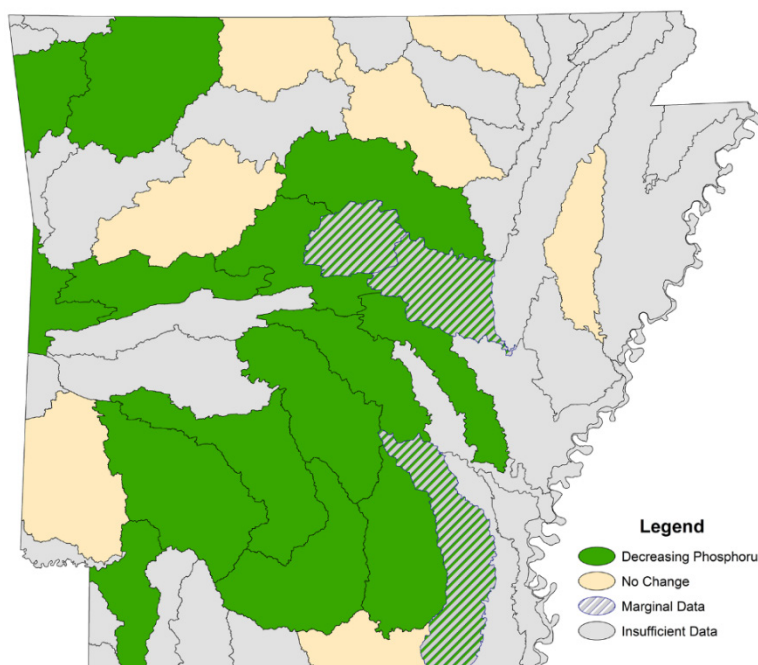


Figure 3. Trends in watershed TP concentrations, as the 75th percentile of annual station medians, 1990 – 2019.

Tier 1 Designation

The seven Tier 1 HUC-8 watersheds were prioritized for maximum focus due to sufficient data and high potential for TN and TP reduction. Watersheds designated as Tier 1 include:

- Lake Conway-Point Remove (11110203)
- Illinois (11110103)
- L'Anguille (08020205) (see Figure 4)
- Bayou Meto (08020402)
- Middle White (11010004)
- Lower Arkansas-Maumelle (1110207)
- Bull Shoals Lake (11010003)

Some of these watersheds also have other prioritizing factors, such as being a priority watershed for *Clean Water Act* (CWA) Section 319 funding, designation as a nutrient surplus area or participation in the NRCS Mississippi River Healthy Watersheds Initiative.

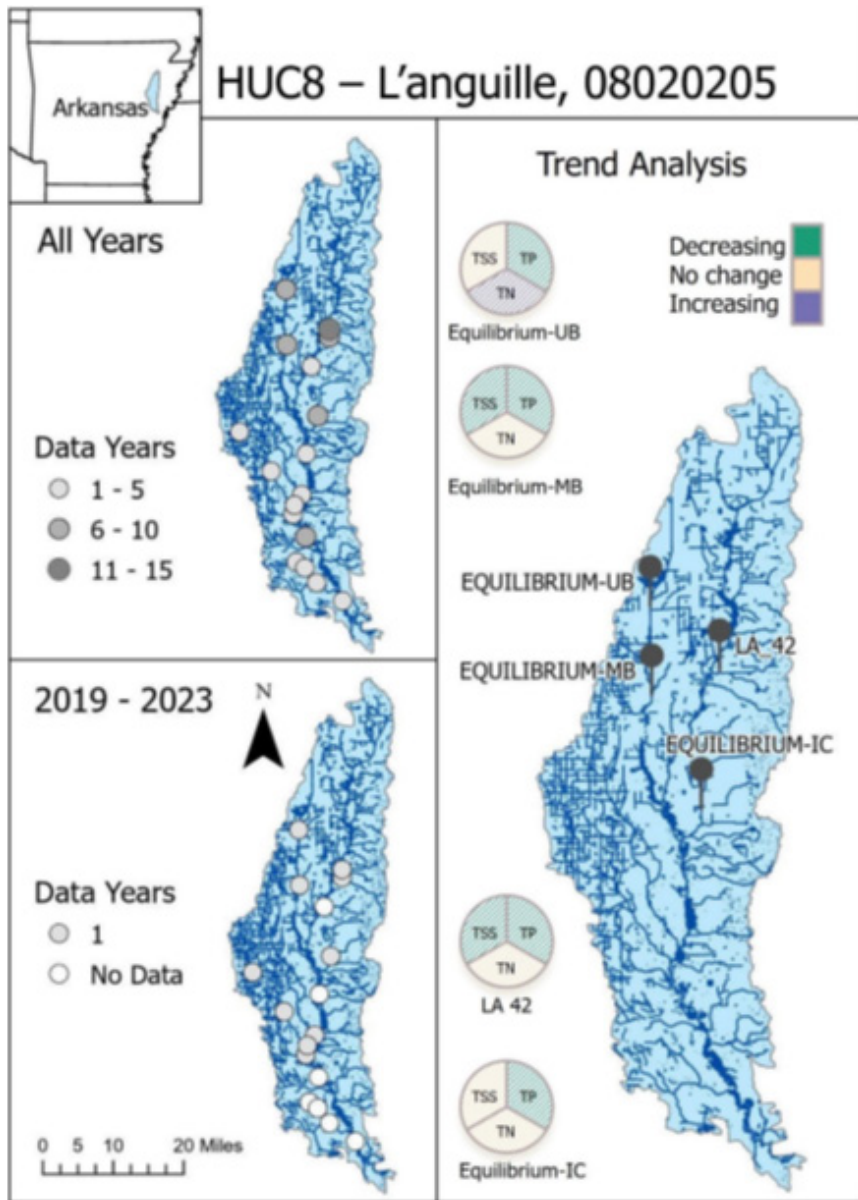


Figure 4. L'anguille data availability by number of years with data collection for the full period of record and last 5 years (2019 – 2023). Trend analysis results for sites meeting data requirements show sites with potential decreases in green, increases in purple and no changes in tan. Hashed colors indicate that trend analysis was conducted without flow adjustment.

Great Lakes to Gulf

In 2022, the Arkansas Department of Agriculture's Natural Resources Division worked with the Great Lakes to Gulf to display water quality data via the [Arkansas Data Portal](#). The Great Lakes to Gulf interactive website provides user-friendly access to water quality information about the Mississippi River and its tributaries, helping visualize nutrient pollution. The Arkansas Data Portal features:

- Site-level trends analysis
- Aggregated HUC-8 trend analysis
- Water quality stations and data availability

1.2 Arkansas's Goals

Arkansas has made progress on the three main goals of the ANRS (Figure 5):

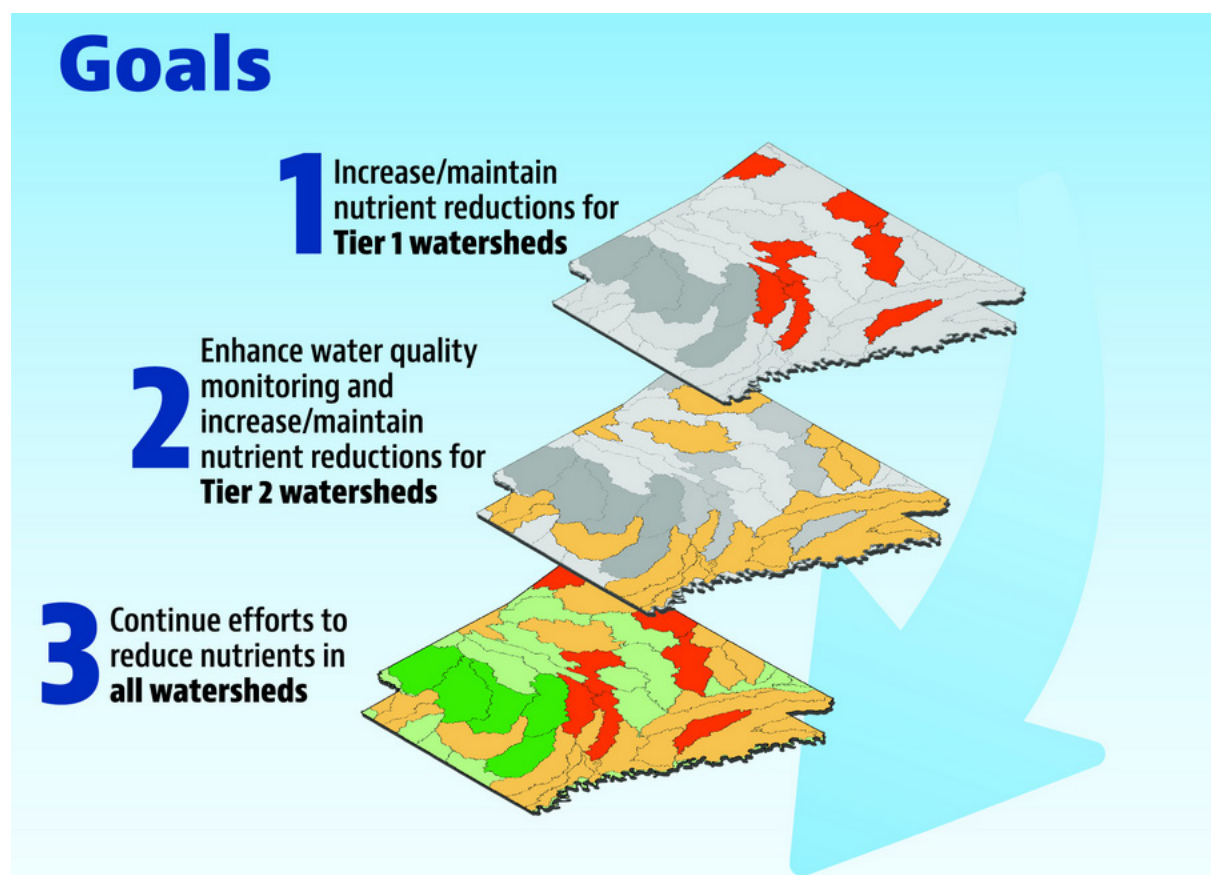


Figure 5. The three main goals of the ANRS.

Goal 1: Maintain and Increase Downward Nutrient Trends in Tier 1 Watersheds

Arkansas aims to continue nutrient reductions in Tier 1 watersheds through conservation efforts. These efforts, supported by local, state and federal programs, provide technical assistance and financial support to operators and landowners.

Tracking BMP Implementation

In addition to water quality monitoring, the ANRS tracks BMP implementation through the BMP tracker. The tracker has three key elements:

- Collecting implementation data for 10 commonly used agricultural BMPs that have assigned reduction efficiencies.
- Estimating nutrient loads in HUC-8 watersheds with the Spreadsheet Tool for Estimating Pollutant Loads (STEPL).
- Reporting BMP implementation and nutrient load changes.

The BMP tracker calculates nutrient load reductions from the 10 BMPs that have been assigned a nutrient reduction efficiency in Arkansas, using data from various sources like the National Land Cover Database, Cropland Data Layer and septic system data.

Updating the BMP Tracker

Arkansas's BMP tracker compares baseline data from the 1990s with the most recent data using a model last updated in 2019. The most current data on BMPs, land use, irrigation, animal numbers and septic systems will be entered if available for the next update. In 2023, the results of these modeled outputs were uploaded to the [ANRS webpage](#) as an interactive dashboard. Additional updates will be evaluated and modeled as newer land use data, BMP implementation or BMP efficiency data become available.

Nutrient Reductions in Tier 1 Watersheds

The N load analysis for Arkansas's Tier 1 watersheds compares the 1992 baseline N levels with 2019 levels both with and without BMPs. Figure 6 shows that the Illinois Watershed has the highest N amount across all categories, while the Lower Arkansas-Maumelle Watershed has the lowest. Implementing BMPs in 2019 reduced N amounts in most watersheds, indicating the effectiveness of these BMPs in reducing N pollution. Notably, the Bayou Meto and L'Anguille watersheds showed the most substantial reductions in N levels due to BMP implementation in 2019.

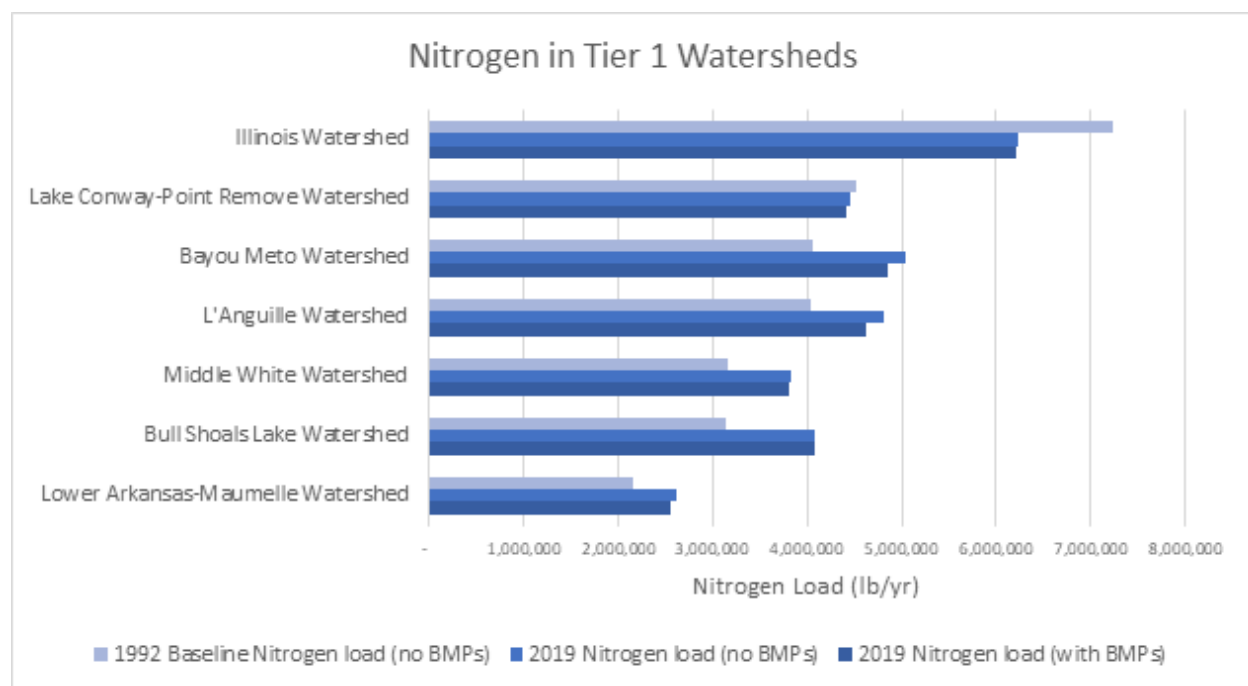


Figure 6. N loads in Tier 1 watersheds with and without BMPs.

Figure 7 shows P loads in Tier 1 watersheds in Arkansas, comparing the 1992 baseline P load to the 2019 P loads both with and without BMPs. In most watersheds, STEPL has modeled a difference in P loads from baseline to 2019, which is contributed to the model variables connected to land use changes and increased animal production. The Illinois Watershed shows the highest P load across all categories, while the Lower Arkansas-Maumelle Watershed has the lowest. In 2019, the highest reduction of P reduction due to BMP implementation was in the L'Anguille and Bayou Meto watersheds. All 58 HUC-8 watersheds

indicated a reduction of TP after BMP implementation, with 51% of HUC-8 watersheds showing a reduction from baseline.

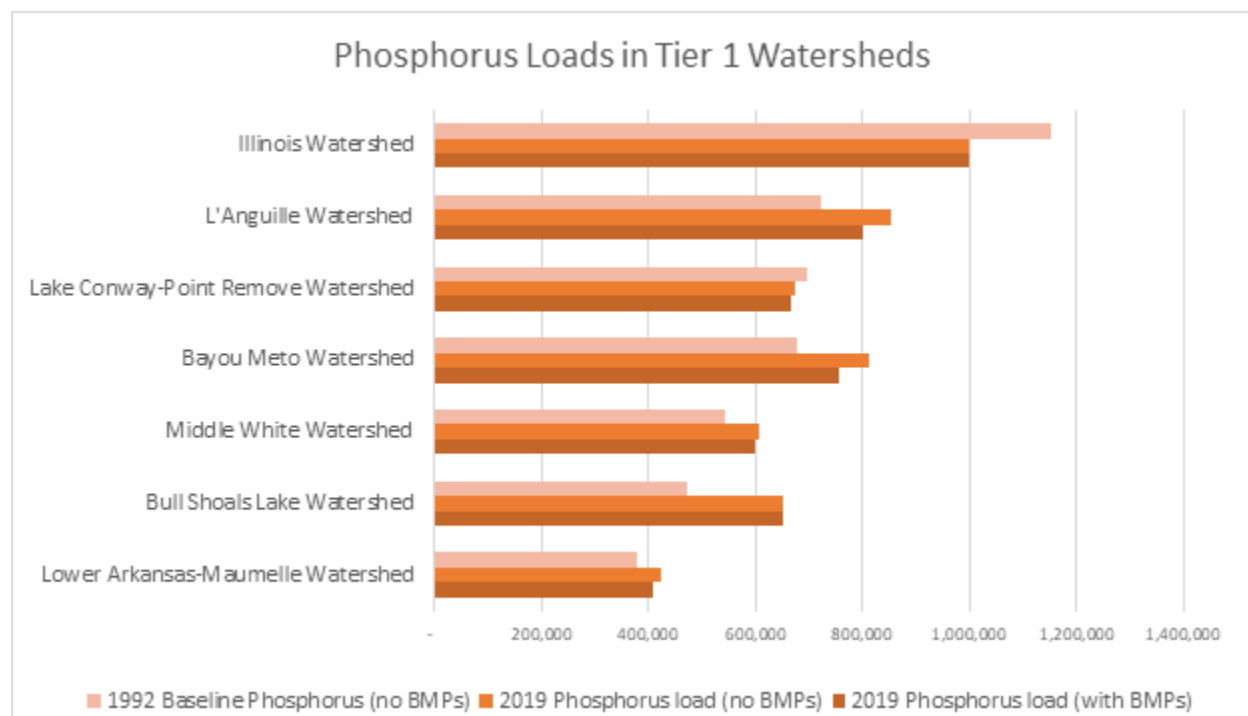


Figure 7. P loads in Tier 1 watersheds with and without BMPs.

Watershed Management Plans

A key ANRS objective is updating watershed management plans for all Tier 1 watersheds. Recent updates have been completed for the Bayou Meto, Middle White, Lake Conway-Point Remove and Illinois River watersheds, identifying water quality issues and recommending voluntary improvement measures. These watershed management plans are available on the [Natural Resource Division's Nonpoint Source Management website](#).

Goal 2: Enhance Water Quality Monitoring to Inform Nutrient Trends for Tier 2 Watersheds

Tier 2 Designation

Twenty-three HUC-8s were designated as Tier 2 due to nutrient reduction needs or data limitations. These watersheds were categorized into four subgroups based on data analysis and priority (Table 1).

A subcommittee of the Innovation (Science and Research) Workgroup was formed in 2023. The subcommittee was tasked with prioritizing watersheds for water quality monitoring with limited funding. The subcommittee identified Bayou Bartholomew (Tier 2a), Cache River (Tier 2c), Strawberry (Tier 2c) and Lower St. Francis (Tier 2a) as top priorities for water quality monitoring.

Table 1. Tier 2 subcategories and designated HUC-8s in each subcategory.

Tier 2a: Max Focus, Enhance Monitoring	Tier 2b: Focus, Continue Monitoring	Tier 2c: Focus, Enhance Monitoring	Tier 2d: Likely Focus, Design Monitoring
Lower St. Francis	Lower Ouachita-Smackover	Dardanelle Reservoir	Lake O' The Cherokees
Lower Sulphur	Beaver Reservoir	Little River Ditches	Lower Neosho
Mckinney-Posten Bayous	Spring	North Fork White	Upper White-Village
Bodcau Bayou	Poteau	Cache	Big
Bayou Bartholomew		Strawberry	Lower White
Elk			Lower Arkansas
			Boeuf
			Bayou Macon

The Upper Cache River, a Tier 2c watershed and a priority for water quality monitoring, faces significant nutrient runoff challenges. Gulf Hypoxia Program funds have been allocated to water quality monitoring and the implementation of two-stage ditches in this watershed. Two-stage ditches help reduce nutrient runoff and sedimentation by mimicking natural floodplains. This design allows sediment and nutrients to settle out, reducing pollution by up to 50% and improving downstream water quality. Monitoring efforts have begun in the Cache and implementation of two-stage ditches is anticipated to start in 2025.

Goal 3: Continue Efforts in all Watersheds

Implementation of documented BMPs in 2019, achieved a 2.22% reduction in N and a 3.85% reduction in P statewide. All 58 HUC-8 watersheds indicated a reduction of TP after BMP implementation, with 51% of HUC-8 watersheds showing a reduction from baseline. Arkansas removed 3.89 million pounds of N and 1.13 million pounds of P from waterways. The state also saw an increase in the number of overall conservation practices installed from approximately 15,000 in 2019 to 16,000 in 2023. From 2005 to 2023, Arkansas saw significant increases in conservation practices, particularly cover crops and conservation tillage, with a corresponding rise in enrolled acreage.

Education and Outreach

Education and outreach programs play a key role in raising awareness and promoting sustainable practices to reduce nutrient pollution, empowering communities and farmers to take proactive steps in improving water quality. The Arkansas Discovery Farms Program focuses on practical farm conservation, allowing farmers to choose conservation practices they want to implement while the state collects edge-of-field water quality samples. Data shows that nutrient losses from runoff are minimal, with practices like irrigation management and cover crops improving efficiency and reducing runoff. The program currently includes 13 active farms across the state. A key finding is that nutrient losses (both N and P) in runoff average less than 5% of the fertilizer applied, which is significantly lower than modeled results used in water quality-nutrient trading studies.

In 2022, two workgroups — Communication (Education and Outreach) and Innovation (Science and Research) — were established to support ANRS efforts. They concluded their recommendations in late 2023, focusing on communication and nutrient reduction strategies. Programs such as the Arkansas Watershed Stewardship and Tap Your Potential empower citizens to become watershed leaders. In 2024, the Arkansas Watershed Stewardship program engaged over 800 participants across 30 events, promoting ANRS goals and nutrient reduction. Moving forward, the Arkansas Watershed Stewardship program, along with other outreach efforts like the septic tank replacement program, will continue to expand outreach and education to enhance nutrient reduction efforts in Arkansas.

2. Illinois

The Illinois Nutrient Loss Reduction Strategy, or NLRS, is a statewide, collaborative effort working to reduce the amount of nutrients, particularly N and P, entering Illinois waterways. The following details the efforts and investments made by NLRS partners and stakeholders across the state to reduce nutrient loss from the agricultural, point source and urban stormwater sectors.

Partner organizations from across the state and across sectors remain devoted to reducing nutrient loss and advancing strategy implementation. The NLRS partnership continues to engage with its partners and stakeholders in overcoming practice implementation barriers, exploring innovative nutrient loss reduction practices, supporting research endeavors and raising awareness about the importance of water quality in Illinois and beyond.

The long-term objective of the strategy is a 45% reduction in TN and TP loads originating in Illinois, with interim targets of a 15% decrease in nitrate-N and a 25% decrease in TP by 2025. Nutrient levels in Illinois waterways continued to increase in 2021 and 2022 compared to baseline measurements. This is despite multi-sector investments in resources and practices that support nutrient loss reduction across the state.

Nutrient load increases are driven by a variety of factors, such as increased streamflow, legacy nutrients, nutrient management and other unknown sources. The effects of heavy precipitation and/or drought are also contributing factors. Despite the continued implementation of nutrient loss reduction practices across sectors, barriers remain. Particularly, the agriculture sector requires a swifter and more extensive adoption of conservation practices to meet the established goals.

The Illinois NLRS fosters a partnership to improve water quality within and downstream of Illinois to reduce the hypoxic zone in the Gulf of America. Illinois' strategy emphasizes the need for additional investments in human and capital resources to facilitate outreach, education and implementation of BMPs on land and in wastewater treatment facilities. The strategy continues to be guided by the NLRS Steering Committee, comprised of the Illinois Environmental Protection Agency (Illinois EPA), Illinois Department of Agriculture (IDOA) and University of Illinois Extension, with input and feedback from the Policy Working Group and several other stakeholder groups and councils.

2.1 Water Quality Trends

The Illinois NLRS's development and implementation is guided by research and the best available science. The original science assessment was established in the 2015 NLRS. It identified water quality conditions, determined critical watersheds, recommended reduction practices for each sector, and

proposed scenarios to reach the reduction targets. The assessment is updated in each Task Force Report to Congress report with the latest metrics and research to track progress toward the established reduction goals and to identify gaps in the understanding of nutrient dynamics that warrant further research.

Statewide nutrient levels are still higher than interim targets, with P being a significant concern. The 2017 – 2021 5-year average nitrate-N loads increased by 4.8%, and TP loads increased by 35% compared to the 1980 – 1996 baseline (Figure 8). River flow, or water yield, was 23% higher than the baseline. The 5-year averages for nitrate-N loads, TP loads and streamflow all decreased in 2017 – 2021 compared to the previous 2016 – 2020 averages of 16.2%, 42% and 30% above baseline.



Figure 8. Quantities and percent increases of recent five-year averages (2017 – 2021) of nitrate-N, TP and water yield relative to baseline and to interim and long-term NLRS goals in Illinois.

Statewide nitrate-N and TP loads have been highly correlated with water yield, which itself is highly correlated with precipitation. The most recent 5-year nutrient load averages, 2017 – 2021, were influenced by unusually high precipitation and river flows during this period. See Figure 9 and Figure 10 for nitrate-N loads and TP loads, respectively. Since 2008, the 5-year average water yields have been higher than the baseline water yield. Greater runoff and drainage associated with shifting weather patterns tend to increase river loads; therefore, more implementation will be needed to achieve the strategy’s water quality goals.

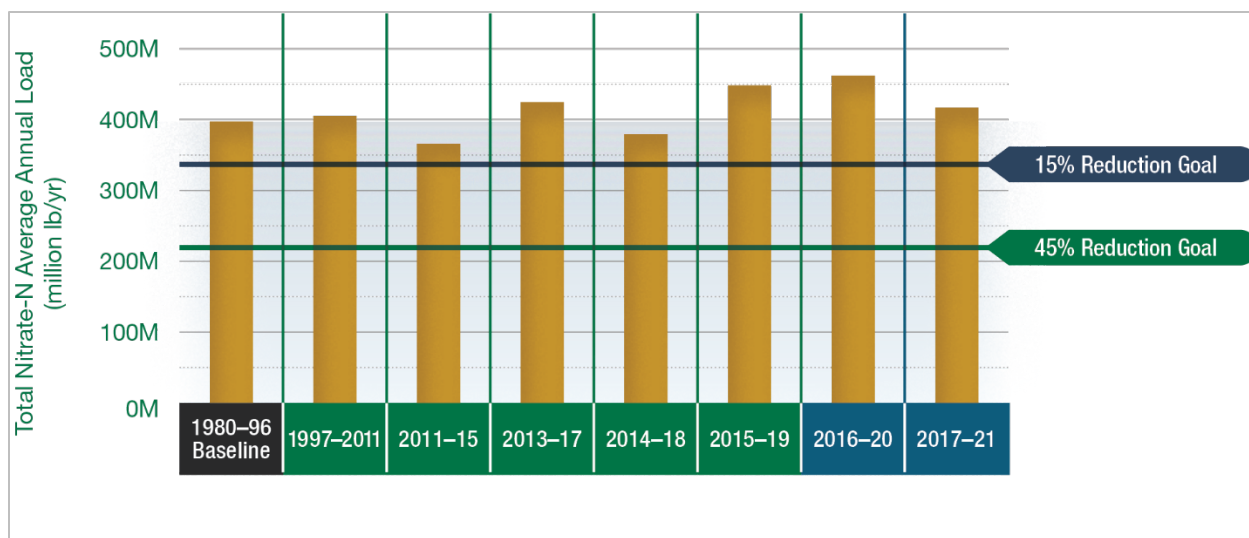


Figure 9. Illinois nitrate-N loads relative to the 2025 interim and long-term reduction goals.

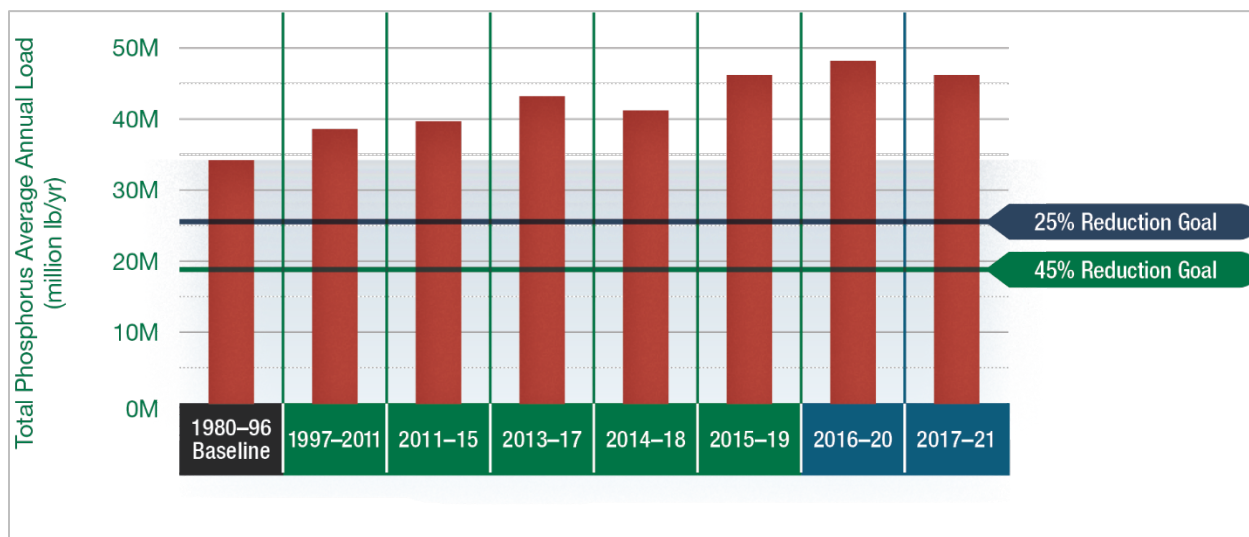


Figure 10. Illinois TP loads relative to the 2025 interim and long-term reduction goals.

2.2 Agricultural Sector

Resource Measures

For 2021 – 2022, 60 identified agriculture-related programs were administered by both government agencies and non-governmental organizations. These programs aim to guide producers in establishing practices and methods to reduce nutrient losses. In 2022, agriculture partner organizations reported more than 186 full-time staff members engaged in activities related to implementing the strategy, with a collective expenditure of nearly \$51 million.

Outreach Measures

The agricultural community is a firm believer in education and outreach to foster voluntary implementation of conservation practices that not only reduce nutrient loss from crop fields but also

align with farmer production goals. Between 2021 – 2022, the agriculture sector organized more than 940 outreach events related to nutrient loss, attracting more than 110,000 participants. This is the highest participation reported since the strategy’s inception in 2015. Information on nutrient management, cover crops and other practices that reduce nutrient loss was shared at a variety of outreach activities, including field days and online media and meetings. The Nutrient Loss Reduction Podcast, produced by Illinois Extension since 2019, has been a notable initiative, featuring 48 episodes and more than 10,000 downloads by the end of 2022.



Land and Facility Measures

National Agricultural Statistics Service Survey

A 2024 Survey by the National Agricultural Statistics Service provided insights into farmer awareness and strategy implementation levels for the 2023 crop year. Of the Surveyed farmers, 78% reported being slightly to very knowledgeable about the strategy. The Survey also highlighted adoption rates of fertilization practices for the 11.2 million acres of corn planted in 2023. A summary of the Survey results was reported by the farmers include:

- 79% of acres managed using the Maximum Return to N rate.
- 31% of acres applied fall only N, 26% spring only and 43% applied in the fall and spring.
- 87% of acres used a N inhibitor with fall/winter-applied anhydrous ammonia.
- 1.4 million acres of cover crops were planted after corn and soybeans.
- 8.5 million acres reduced P application rates since 2011.

Data from the Conservation Technology Information Center’s Operational Tillage Information System, OpTIS 3.0, indicated that 71% of cropland acres in Illinois are managed using conservation tillage which leaves 15% or more residue.

Agriculture Implementation

The Illinois NLRS identified 60 agriculture-related programs, initiatives and projects developed by agencies and non-governmental partner organizations to help producers establish practices and strategies to reduce nutrient losses. Farmers and landowners have implemented numerous

conservation projects through a variety of financial assistance programs, including IDOA's Partners for Conservation and Fall Covers for Spring Savings programs, Illinois EPA's Section 319 Nonpoint Source Pollution Control Program and multiple United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) programs.

Conservation Reserve Program

The USDA Farm Services Agency's (FSA) Conservation Reserve Program (CRP) partners with U.S. landowners and operators to conserve and enhance the nation's natural resources. Voluntary participants receive federally funded cost-share assistance, annual rental payments and incentives in exchange for establishing and maintaining grass-, wetland- and tree-based practices over contracts spanning 10 to 15 years (Figure 11 and Figure 12). The USDA FSA funds the program and administers CRP enrollment in Illinois. The USDA NRCS provides technical services with assistance from county SWCDs.

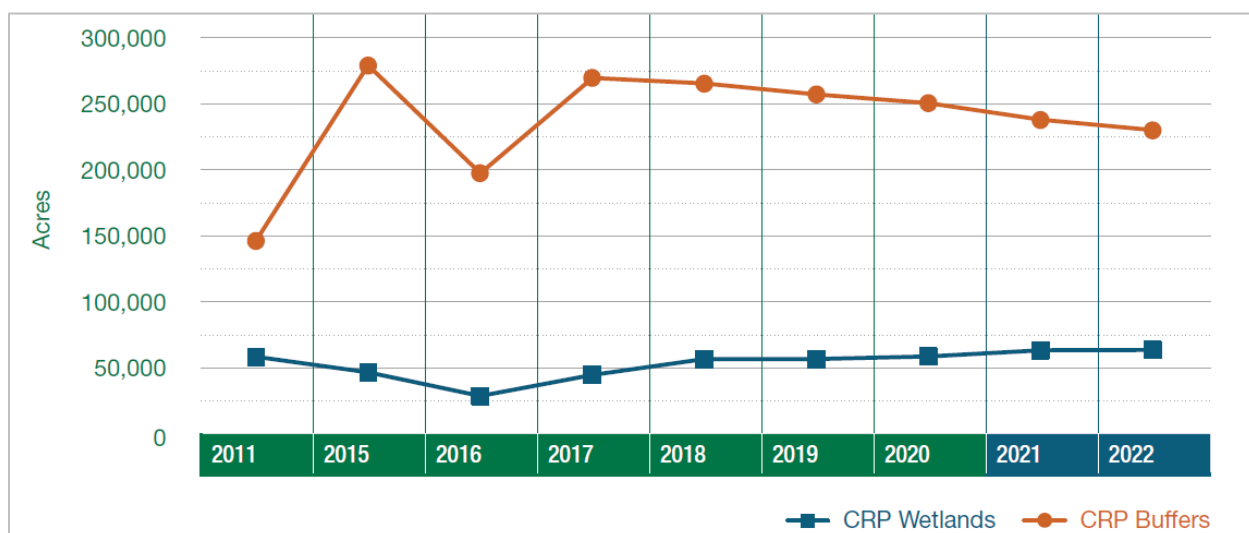


Figure 11. Acres enrolled in CRP wetlands and buffers from the 2011 baseline year and 2015 – 2022.

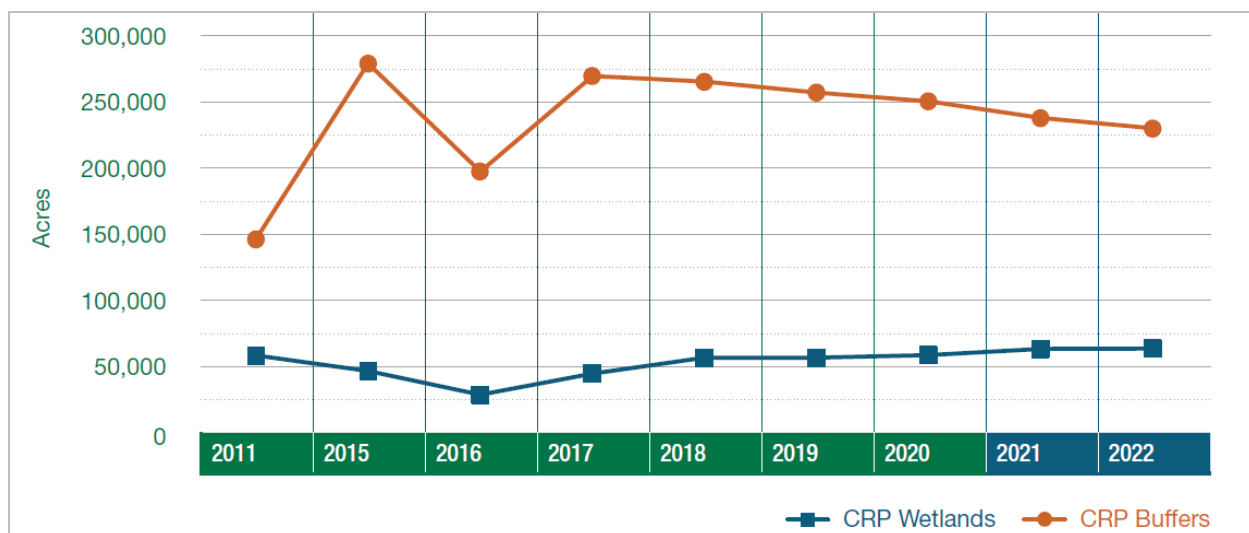


Figure 12. Illinois acres enrolled in CRP wetlands and buffers.

Producer acreage reports are combined with CRP-enrolled acres to result in a total acreage of perennials, energy or pasture across Illinois. The statewide total acreage remained close to 1.5 million through 2022 (Figure 13). The portion enrolled in CRP perennial vegetation practices was more than half a million acres.

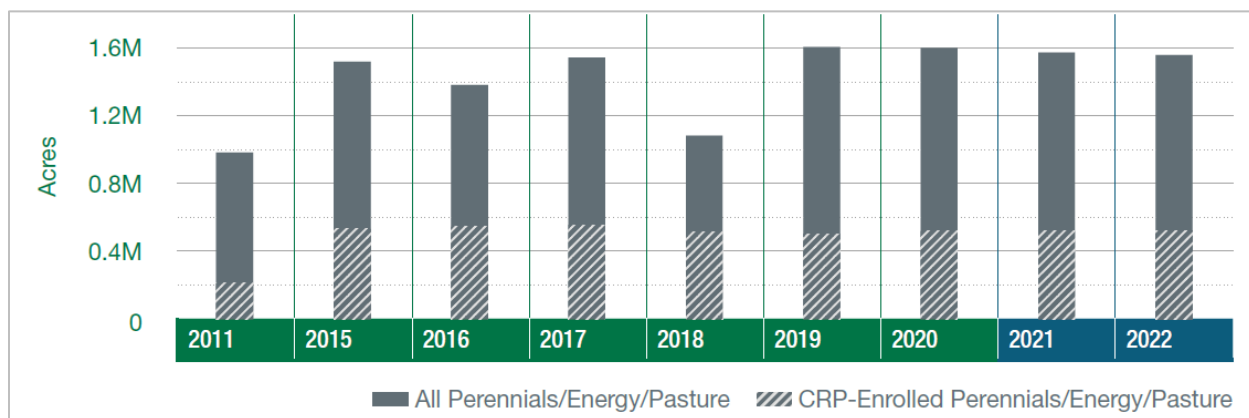


Figure 13. Illinois acres enrolled in perennials/energy/pasture.

Environmental Quality Incentives Program

The USDA NRCS's EQIP offers financial assistance to agricultural producers who co-invest in conservation practices that address natural resource concerns and deliver environmental benefits, such as improved air and water quality, ground and surface water conservation, increased soil health and reduced soil erosion and sedimentation, new or enhanced wildlife habitat, and mitigation against drought and increasing weather volatility.

In federal FY 2021 and FY 2022, NRCS obligated 869 new EQIP contracts to implement conservation practices on 68,899 acres. This represents a total financial investment of approximately \$33 million.

Figure 14 shows the acres implemented and funding spent through EQIP on nutrient conservation practices recommended by the NLRs for 2021 – 2022.

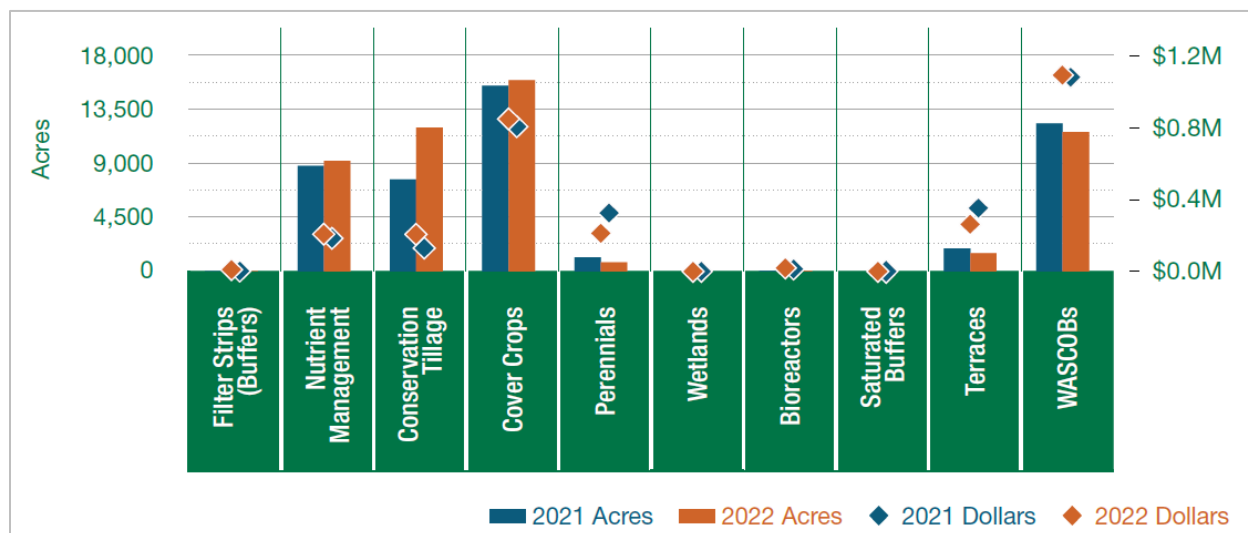


Figure 14. Illinois acres implemented and dollars spent on nutrient conservation practices through EQIP.

Conservation Stewardship Program

The USDA NRCS Conservation Stewardship Program (CSP) provides financial assistance to farmers who are maintaining and improving existing conservation systems, and adopting new, additional conservation activities. Participants earn CSP payments for conservation performance — the higher the performance, the higher the payment.

In FY 2021 and FY 2022, the NRCS obligated 357 new CSP contracts on 274,328 acres for a total financial investment of approximately \$29 million. NRCS renewed 211 CSP contracts on 149,827 acres, investing an additional \$16 million in 2021 – 2022. New nutrient conservation practices enrolled through CSP for 2021 – 2022 include:

- 62 acres of filter strips.
- 334,785 acres of nutrient management plans.
- 206,209 acres of conservation tillage.
- 185,497 of cover crops.
- 4,179 acres of perennial crops

Numerous nutrient conservation practices were also implemented through a number of special initiative programs administered by NRCS, including the Mississippi River Basin Initiative, the NWQI and the RCPP.

State Programs

From 2021 – 2022, the Partners for Conservation Program administered by the Illinois Department of Agriculture and the Section 319 NPS grant program administered by the Illinois Environmental Protection Agency tracked nutrient reductions associated with nutrient conservation practices implemented. Combined, those programs kept nearly 73,000 pounds of N and more than 30,000 pounds

of P from the agricultural sector out of waterways. Given the combined efforts of all the agriculture conservation programs, it is likely the nutrient reductions are higher than the reported figures.

A mapping project found that grass buffers of at least 30 feet on both banks were present next to half of the waterways, rivers and tributaries adjacent to cropland in Illinois, covering an area of 62,200 acres. Another 2.7%, 3,300 acres, were grass buffered on one bank. A fifth, 21.4%, were entirely unbuffered, indicating an opportunity to expand stream buffers by 26,700 acres in Illinois.

[NLRs Science Team](#)

The University of Illinois NLRs science team employs a process to determine which agricultural conservation practices should be recommended by the strategy. Practice proposals are submitted to the team for review, and the team determines whether the practice should be included as an NLRs recommendation. In 2022, water and sediment control basins were added as a recommended practice. This practice involves constructing an earthen embankment across a minor drainageway to capture sediment. It is estimated that implementing this practice can lead to a 60% reduction in TP. There are now 15 agricultural conservation practices recommended by the Illinois NLRs.

[Nutrient Research](#)

Since 2012, the [Illinois Nutrient Research and Education Council](#) has been Illinois agriculture's primary investment in nutrient research, funding over \$38 million through 2023. The Council is created by state statute and works closely with a variety of stakeholders across Illinois. The program is supported through a \$0.75 assessment on every ton of fertilizer sold in the state. It supports the Illinois NLRs through targeted research requests for proposals and investments as well as education and outreach. Focus areas include applying and understanding the 4Rs, capturing excess nutrients in the field, mitigating loss of nutrients to water supplies, and studying other nutrient management issues.

[Illinois Sustainable Ag Partnership](#)

The [Illinois Sustainable Ag Partnership](#) is a non-profit member-based organization working collaboratively to encourage the adoption of sustainable and profitable production practices that improve soil health and restore local waters. By developing comprehensive programming, building a strong network of sustainable agriculture advocates, and sharing relevant research and resources, the partnership is committed to working together to support healthy soil, clean water and profitable farms in Illinois.

[Investing in the Agriculture Sector](#)

The Illinois Department of Agriculture has secured several federal grants to fund agriculture conservation practices recommended in the NLRs. These grants include:

Federal Funding Summary

[Illinois NLRs and Conservation Planning Assistance](#)

Objective: This project allows the addition of up to 40 conservation planners across the state of Illinois. The conservation planners are recruited and supervised by IDOA and hired by a subcontract hiring agent. The staff are located in NRCS or IDOA offices across the state. The conservation planners conduct CRP technical assistance for planning, implementation and maintenance, and increase capacity to

develop new conservation plans and conduct conservation implementation follow-up to improve conservation successes.

- Illinois portion \$3.5 million cash
- Federal match \$12,983,895.85 (\$9,483,895.85 of financial assistance, technical assistance for IDOA \$862,172.35)
- 3-year grant through 08/31/2025

NRCS RCPP “Infield Conservation for Operationalizing Vital Ecosystem Resilience” (I-COVER)

Objective: This multi-state initiative leverages the resources of state government, academic institutions and agricultural industry from across Illinois, Indiana and Iowa to forge a new custom cover crop service intended to advance infield conservation for operationalizing vital ecosystem resilience while expanding the overall acres of cover crops planted across the Midwest ‘I’ states. The primary goal of this multi-state initiative is to establish a custom application cover crop program to advance the use of soil health and water quality practices, meet sustainability and carbon sequestration goals and maximize farmer resources and profitability.

- Partner match \$6,250,000 (Illinois portion \$2 million cash, \$250,000 in-kind)
- Federal match \$19,573,171 (Illinois to receive a portion of \$15 million in program financial assistance, and technical assistance for USDA)
- 5-year grant through 2028

NRCS RCPP IL Climate-Smart Agricultural Partnership

Objective 1: Expand the use of conservation cropping systems in Illinois by leveraging “Climate-Smart Cropland Practices” across the state’s diverse watersheds. All partners, including SWCDs, promote farmers to apply for the Partners for Conservation Funds program for the following conservation measures: Cover Crops, No-till or Strip-till planting systems, Conservation Cover-Pollinators, Critical Area Planting, Saturated Buffers and Denitrifying Bioreactors. The Saving Tomorrow’s Agriculture Resources program is utilized on all the submitted applications.

Objective 2: Formalize the creation of the Illinois Climate-Smart Agricultural Partnership. This partnership establishes an advisory committee of industry partners to address the rapidly growing competition abroad and Illinois’s ability to sustain a high level of agricultural production. This is critical to determine the optimum methods for production agriculture which results in the best return for the farm and best preserves the environment and the farmland of Illinois.

- Partner Match \$1,250,000 (\$1 million cash; \$250 In-kind)
- Federal Match \$1,396,590 (\$977,613 of financial assistance; \$251,386 technical assistance for SWCD; \$97,761 for IDOA Bureau of Land and Water Resources)
- 3-year grant through 1/31/2025

State of Illinois Climate Pollution Reduction Grant

By leveraging successful programs and established networks, Illinois is taking decisive steps to implement practical solutions, demonstrating a commitment to sustainable practices, environmental stewardship and contributing to broader efforts to increase resiliency within the crucial agricultural industry. These funds will help to reduce agricultural process and land-use emissions by 2% by 2030 and

10% by 2050, using approaches such as no-till agriculture, cover crops, natural carbon sequestration and other measures.

- Federal financial assistance \$76,000,000
- 5-year grant through 2030

State Funding Summary

Fall Covers for Spring Savings

Objective: This program is applicable for acreage in Illinois seeded to cover crops in the fall that will be planted to an insurable crop in the following spring. Eligible applicants will receive a premium discount of up to \$5 per acre on the following year's crop insurance, depending on individual crop insurance policies, for every cover crop acre enrolled and verified in the program. The discount program is designed to promote additional acres of cover crops that are not covered by other state or federal incentives. IDOA will use a combination of tools to verify that acres applied for through this program are planted in cover crops. The program is only applicable to those with coverage through the USDA Risk Management Agency crop insurance program. This program has received additional funding to support an additional 50,000 acres for FY 2025.

- Annual funding from Illinois' general revenue fund of \$960,000
- Supports funding for up to 150,000 acres.

2.3 Point Source Sector

Resource Measures

In 2021 – 2022, the point source sector documented investments of over \$237.7 million to further reduce TP loads. This included \$191.8 million allocated to 13 projects funded by the Water Pollution Control Loan program. This low-interest loan program is offered by Illinois EPA through the State Revolving Fund and supports upgrades in wastewater treatment facilities, green infrastructure, urban stormwater treatment and the management of combined and sanitary sewer overflows.

Outreach Measures

The point source sector has been proactive in outreach and education. In 2021 – 2022, the sector organized 18 events, including field days, presentations, workshops and conferences, reaching 4,320 stakeholders and professionals in wastewater management, as reported by the Illinois Association of Wastewater Agencies.

The point source sector continued its collaborations with stakeholders in both the agricultural and stormwater sectors to promote the Illinois NLRs. Many of these outreach activities focused on the efforts by point sources to control nutrient loss, including nutrient removal at wastewater facilities and biological P removal technologies. Over 4,300 people attended field days, presentations, workshops and conferences centered on nutrient loss.

The Metropolitan Water Reclamation District of Greater Chicago, or MRWDGC, also continued its collaboration with six different watershed planning commissions promoting nutrient management in Chicagoland area watersheds. In addition to outreach about point source activities, MWRDGC joined with organizations in the agricultural sector to promote research on the adoption of BMPs, including the

use of cover crops, bioreactors and edge-of-field practices. The MWRDGC co-sponsored field days and workshops with the Illinois Farm Bureau, Nutrient Research and Education Council and researchers at the University of Illinois Urbana-Champaign to showcase the impact of these conservation practices. Working with the Cook County Farm Bureau, the MWRDGC also sponsored its Annual Sustainability Summit, which featured stormwater management best practices, including green infrastructure, landscaping and composting.

Land and Facility Measures

Nutrient Load Reductions

In Illinois, the point source sector, dominated by municipal wastewater reclamation facilities, continues to substantially reduce TP discharges. In 2023, the point source sector exceeded the strategy's 25% interim TP reduction goal for 2025 by reducing P discharges by 6.7 million pounds, a 37% decline since 2011 (Figure 15).

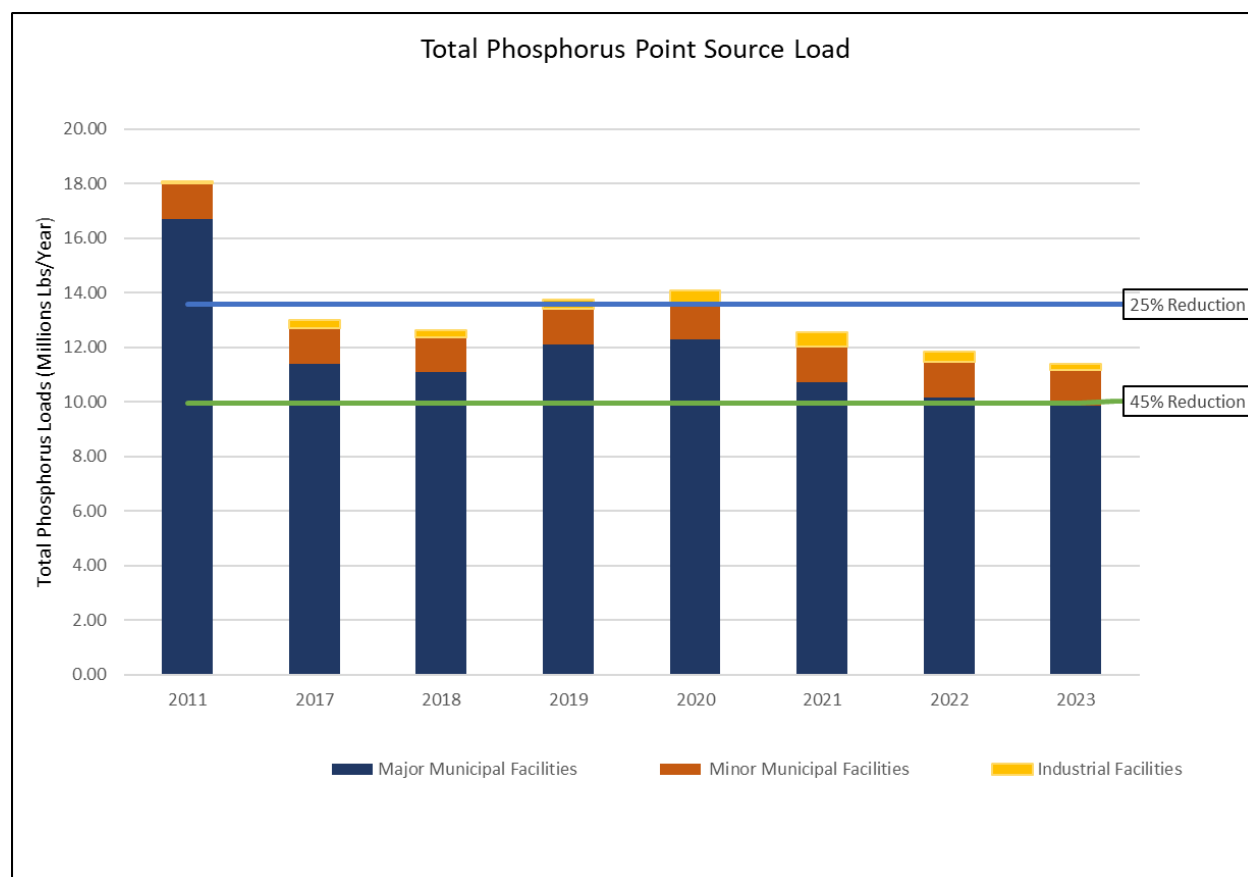
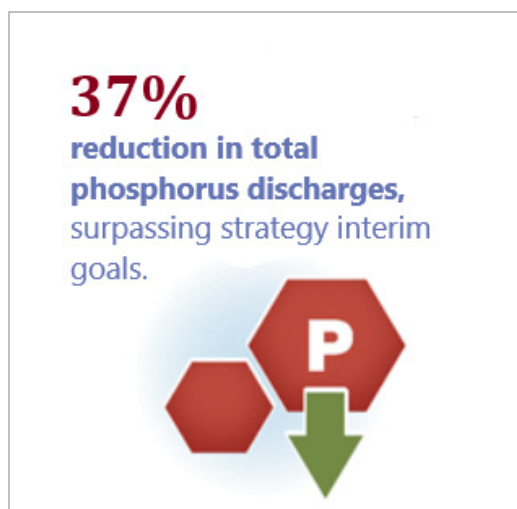


Figure 15. TP point source loads relative to the 2025 interim and long-term reduction goals.

This achievement is largely due to compliance with Illinois EPA's NPDES permit program, which mandates treatment facility improvements and optimizations. The initial 2015 NLRS science assessment identified P loss from the point source sector as a priority because, at that time, the sector contributed almost half of the statewide total for P loss.



The point source sector has also made progress in reducing TN loads. Point sources reduced statewide TN discharges by 9.3 million pounds since 2011, an 11% reduction (Figure 16).

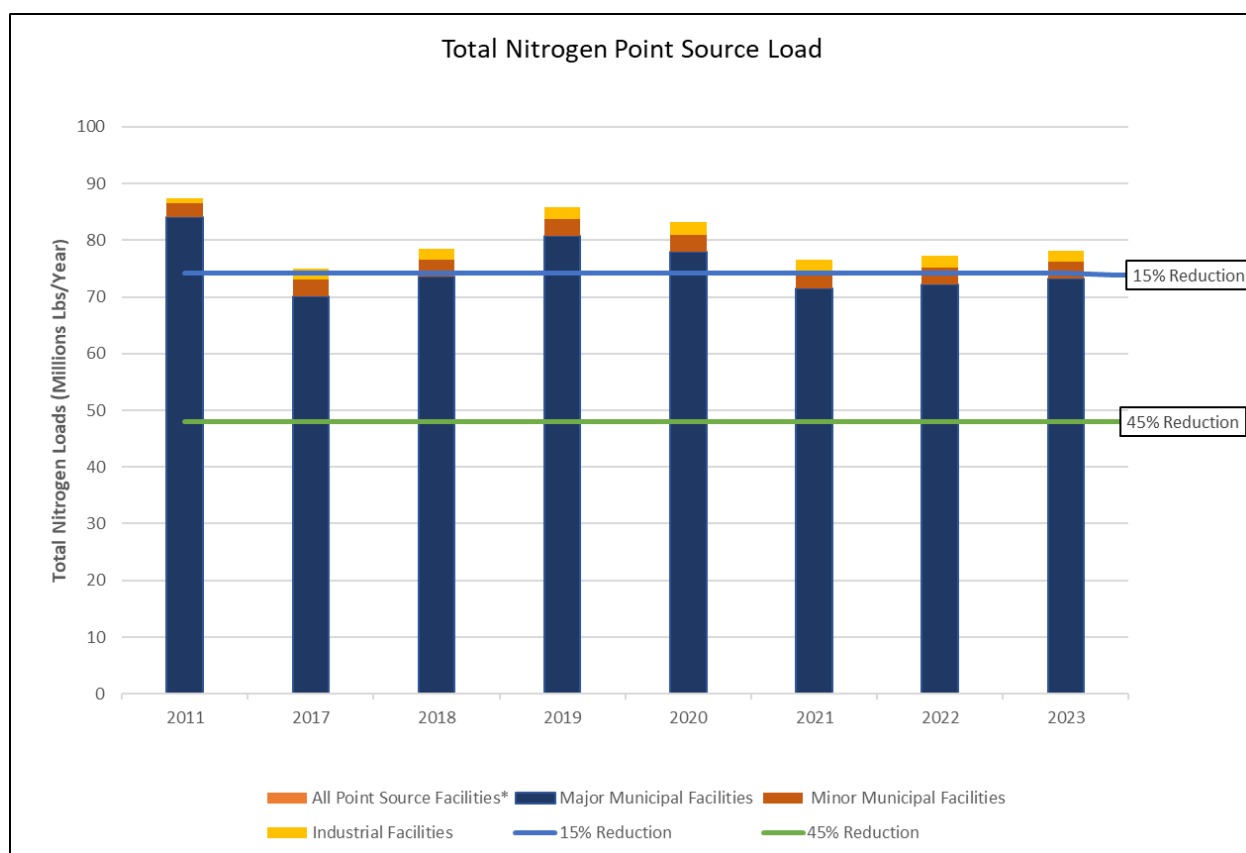


Figure 16. TN point source loads relative to the 2025 interim and long-term reduction goals.

By 2023, 38% of major municipal wastewater treatment facilities were meeting TP limits of 1 mg/L or lower. Facilities had also developed and submitted 210 nutrient reduction optimization studies and nutrient reduction feasibility studies since 2018.

More facilities have reduced their nutrient discharge in recent years. In 2023, 100 of the 211 major municipal facilities reported an average annual TP concentration of 1 mg/L or less, while 43 of these facilities averaged 0.5 mg/L or less. By comparison, in 2020, 90 facilities reported an average of 1 mg/L or less, with 31 averaging 0.5 mg/L or less.

Nutrient Assessment Reduction Plans are permit requirements for major facilities discharging into water bodies that are impaired or at risk of nutrient over-enrichment, known as eutrophication. Sixty-seven facilities are developing or have completed plans for P reduction measures. Another 89 facilities have developed Nutrient Assessment Reduction Plans as part of a watershed group.

With more facilities expected to comply with NPDES permit limits, further reductions in TP are expected in the coming years.

2.4 Urban Stormwater Sector

Stormwater runoff consists of rainfall and snowmelt flowing off impervious surfaces in developed areas, such as roads and sidewalks. This runoff carries pollutants, notably P and N, into waterways. Projects aimed at managing urban stormwater help improve water quality by reducing the volume of runoff entering waterways and by reducing the duration and intensity of floods.

Resource Measures

Reported stormwater-related funding totaled at least \$4 million in 2021 – 2022. These numbers underrepresent state implementation resources in part because they primarily reflect grants and loans given or received. For example, MWRDGC's stormwater report, which includes capital and personnel, notes that they committed \$44,743,377 to stormwater management implementation in 2021 alone. Capital and personnel information may be sought in the future to represent a more complete financial picture.

Outreach Measures

The stormwater sector reports on the activities of stormwater partners promoting best practices. These activities increasingly transitioned to an in-person format, offering professionals and members of the public hands-on instruction in managing nutrient loss. This sector also valued virtual communication. A host of new online resources have become available to support stormwater best practice implementation.

The stormwater sector also engaged with the public to raise the profile of stormwater conservation practices. They arranged tours of flood control facilities, rain gardens and other examples of green infrastructure and sponsored clean-up days for local waterways. They offered workshops on conservation practices at home, providing information about natural lawn care, native plants and installing rain gardens. Focusing on the next generation, they expanded their educational programming, sponsoring tours and presentations for schools and students in grades K-12.

Land and Facility Measures

Efforts to reduce nutrient loss from urban stormwater continue to grow. The Illinois EPA awarded 11 grants totaling \$5 million through the Green Infrastructure Grant Opportunities program in 2021. With an additional \$4 million from local matching funds, the total investments reached \$9 million. As of 2022,

five of these projects were either fully or partially completed. The projects retain an estimated 1.2 million gallons of stormwater, reducing annual pollutants by an estimated 1,005 pounds of N and 318 pounds of P. An additional 14 urban stormwater BMPs were installed in 2021 – 2022 through the Illinois EPA’s Section 319 grant program. These practices reduced TN by 4,192 pounds and TP by 1,033 pounds. Twelve projects totaling \$10 million will be administered for 2023 – 2024.

To enhance tracking efforts, a new publicly available Green Infrastructure Inventory tool has been introduced. This tool maps the location and type of almost 2,000 stormwater BMPs installed across Illinois.

Municipal Separate Storm Sewer System Report Analysis

University of Illinois Extension performed a comprehensive review of the Annual Facilities Inspection Reports from communities with Municipal Separate Storm Sewer System, or MS4, permits to better understand statewide NLRs-related practice implementation. For 2021 and 2022, 320 and 314 respective reports were analyzed.

Analysis of the MS4 annual inspection reports indicated that 70% of communities provide street sweeping and leaf collection at least annually, which helps to reduce P discharge via storm sewers. The analyses also sought information about green infrastructure. In 2022, 59% of communities reported local ordinance requirements for volume control and water quality improvements for new development and redevelopment. Some Illinois counties, such as DuPage, Cook and Lake, have ordinances that are followed by the MS4 communities within them. Of reporting MS4 communities, 17% have some form of inventory to monitor the location and efficacy of green infrastructure installations. The analysis reported a steady increase of 28% in MS4 communities with rain barrel incentive programs.

59%
of communities
reported local ordinance
requirements for volume
control and water quality
improvements for
new development
and redevelopment

2.5 Gulf Hypoxia Program

The U.S. Environmental Protection Agency’s Gulf Hypoxia Program provides HTF member states, tribes, subbasin committees and Land Grant Universities with funding to make significant progress toward reducing nutrient loads to the Gulf of America. Illinois is one of 12 HTF member states to receive funding. Illinois received \$1.7M in Gulf Hypoxia Program funds for FY 2022 – 2023.

The Illinois Environmental Protection Agency’s first workplan included seven projects that advance the implementation of the Illinois NLRs by creating new initiatives and scaling up existing programs. Projects include water quality monitoring in surface and groundwater, agriculture conservation practice implementation, watershed education and outreach, data metrics collection and nutrient strategy update and reporting.

Implementation of all projects will result in decreased nutrient loads to the Gulf of America as well as improvements to local water quality, including drinking water sources. Resiliency and mitigation will also be achieved by certain projects.

Projects funded in Illinois with Gulf Hypoxia Program funding included:

- **Priority Watershed Outreach and Planning**
 - Watershed outreach associates provide technical assistance and information regarding the implementation of both agriculture and urban stormwater BMPs to local organizations and stakeholders. This includes assisting local soil and water conservation districts, civic organizations, watershed groups and individual landowners. Educational programming includes presentations at field days, trainings, workshops and watershed meetings. Podcasts will also be developed, focusing on agriculture and urban stormwater conservation practices recommended in the NLRS.
- **Continuous Nutrient Monitoring Network**
 - In-stream nutrient monitoring is conducted at eight Department of Interior United States Geological Survey (USGS) continuous monitoring stations in Illinois. Water quality data will be logged approximately 15 minutes. The data is used to characterize nutrient concentrations and compute constituent loadings that are exported from the state. Discrete water-quality samples will be collected to verify continuous sensor data and describe how well the sensor locations represent the streams. Annual data summaries will be provided, and a formal, citable report will be written in the final year of the project.
- **Cover Crop Premium Discount Program**
 - IDOA “Fall Covers for Spring Savings” Cover Crop Premium Discount Program is offered for acres of cover crops installed outside of federal and state program incentives. Eligible applicants will receive a \$5/acre insurance premium discount on the following year’s USDA Risk Management Agency’s crop insurance invoice for every acre of cover crop enrolled and verified in the program. Gulf Hypoxia Funds will provide an additional 40,000 available acres in addition to 100,000 acres provided with state funding.
- **Groundwater Nitrate Monitoring Analysis**
 - IDOA administers the state’s Groundwater Monitoring Well Network to monitor the levels of pesticides in shallow groundwater. The monitoring network currently consists of 133 shallow groundwater monitoring wells located throughout the state. Each well in the network is sampled once during a 2-year period. Funding from the Gulf Hypoxia Program was used to purchase nitrate analysis equipment to analyze nitrate concentrations in groundwater samples.
- **NLRS 2023 Biennial Report**
 - Every 2 years, an NLRS Biennial Report is developed to inform the public on the progress Illinois has made in implementing the NLRS. The report serves a dual purpose: to detail implementation activities and as a mechanism to update the NLRS so it functions as a living document. Metrics such as resources, outreach, and land and facilities measures are included in sector chapters that include agriculture, point sources and urban stormwater. The water metric is included in the Science Assessment chapter, which also includes additional science assessment updates. A chapter discussing summaries of the NLRS Policy Working Group and subgroup meetings held during the reporting period is also included. The report ends with an adaptive management chapter that assesses implementation activity benchmarks and long-term water quality trends and recommends future action items and priorities.

- Illinois Ag Retail Survey
 - A Survey was conducted in 2024 at agricultural retail facilities to collect data on the implementation of nutrient management practices in Illinois, following the principles of 4R's of nutrient management. The Survey methodology was based on the Survey used by the Iowa Nutrient Research and Education Council. A final report detailing the Survey results was released in late 2024.
- NLRs Implementation in Priority Watersheds
 - Funding will implement NPS BMPs that address nutrient loss. Eligible practices will include those recommended in the NLRs, such as in-field and edge-of-field agriculture conservation practices. Funding will be focused in priority watersheds listed in the NLRs, with an emphasis on source water protection areas (public water supplies).

2.6 Adaptive Management

Nutrient pollution has neither a single source nor a single solution. This makes versatility, fluidity and collaboration crucial tenets of the Illinois NLRs. Adaptive management allows the strategy to be a living document focused on traditional and new technologies and practices. As weather patterns shifts and research and technological advancements emerge, the recommended approaches to achieving the strategy's goals will adapt accordingly.

Nutrient loads are still increasing, and there is an urgent need to continue supporting work in nutrient loss research, public education, outreach and technical support, especially within the agriculture sector. While the strategy addresses nutrient loss on a statewide level, there is a growing emphasis on localized, watershed-specific initiatives. These initiatives attract investments from federal, state and non-government partners. Locally led watershed-based planning remains a priority for meeting smaller-scale water quality goals. For example, the Illinois EPA has provided financial assistance for the development of 143 watershed-based plans since 2011. Moreover, numerous organizations are investing in research and incentive programs targeting specific watersheds.

Current research priorities, including studying P loss due to streambank erosion, analyzing nutrient loads at the watershed-level, and investigating 4R Strategy, cover crops and edge-of-field practices. A deeper understanding of the causes of rising P loads, particularly in the Illinois River, is needed.

This report underscores the ongoing efforts across the agricultural, point source and urban stormwater sectors. Yet, despite these efforts, nutrient levels remain higher than established goals. This is largely attributed to increased rainfall and storm events, among other factors, both controllable and uncontrollable.

2.7 Conclusion

The Illinois NLRs partnership is diligently working to implement nutrient loss reduction strategies for point and non-point sources. There is a pressing need to enhance the voluntary adoption of agricultural conservation practices and to garner more community support at the watershed level. The agriculture, point source and urban stormwater sectors all have crucial roles in reducing nutrient loss, each with its own set of unique challenges. Collaborative efforts and feedback from partner organizations remain pivotal to the success of the Illinois NLRs water quality and implementation goals.

3. Indiana

Indiana's [State NRS](#) (SNRS) is the product of an inclusive effort of the [Indiana Conservation Partnership](#) (ICP) under the leadership of the Indiana State Department of Agriculture (ISDA) and the Indiana Department of Environmental Management (IDEM). The SNRS aims to capture present and future endeavors in Indiana that positively impact the state's waters, as well as to gage the progress of conservation, water quality improvement and soil health practice adoption. It represents Indiana's commitment to reduce nutrient discharges and runoff into waters from nonpoint and point sources alike. The main objectives and importance of Indiana's strategy are included in the executive summary of the SNRS.

The last update to the Indiana SNRS was released in February 2021 and can be found on the ISDA [SNRS website](#). Since then, a lot of work has been done to carry out the efforts, initiatives and programs taking place under the SNRS and to achieve milestones under the SNRS. There are many conservation partners in the state that are involved in the implementation and efforts of the SNRS. The SNRS, which is now on a 5-year revision schedule, is due to be updated in late 2025, with a planned release date in early 2026.

3.1 Indiana Science Assessment

The [Indiana Science Assessment](#), started in 2019, is an effort under the SNRS and began out of the desire of the ICP to strengthen and improve the existing method of how sediment and nutrient load reductions from conservation practices are determined by the Region 5 Model, so that dissolved nutrients and other practices not tied to sediment can be captured. However, quantifying the nutrient load reductions and water quality improvement from individual practices is scientifically challenging, and the current Indiana method for determining nutrient load reductions will benefit from using the most recent research and including more parameters, such as dissolved nutrients. This will allow for more accurate reductions to be tracked and better assess the progress being made on improving water quality. In addition, knowing the historical and ongoing trends of nutrient loads in the watersheds of the state is important in order to know where more conservation work is needed. The Indiana Science Assessment addresses two components to move the SNRS forward.

Component 1 – Water Quality Monitoring and Trends

Component 1: Determine historic and ongoing nutrient loads leaving the state, and also by watershed basins used in the State Nutrient Reduction Strategy.

Component 1 of the Indiana Science Assessment determines water quality trends statewide at state borders and by major watershed basins by inputting water quality data from USGS and IDEM monitoring stations into the USGS Weighted Regressions on Time Discharge and Season, or WRTDS, model. The analysis includes determining trends of TN, TP and total suspended sediments. A trends report titled [Trends of Sediment and Nutrient Loads in Indiana Watersheds](#) was released in June of 2022 on the results of this analysis and can be viewed on the Science Assessment website. A web tool was also developed to display the results of the water quality trends report and to make the results more accessible to conservation partners and the public (Figure 17). This web tool visualizes water quality trends for N, P and sediment loads (also known as flux) for Indiana's major river basins. To see this tool, visit the ISDA Indiana Science Assessment [website](#). Analyzing water quality monitoring information to determine loads and concentrations within each of the basins in the state will further help in prioritizing watersheds for more targeted conservation efforts in the future. More work will be done within the next

year to determine a baseline of reductions needed and to draw comparisons of the basins in the state to determine the watersheds with the highest trends in nutrient loads and concentrations.

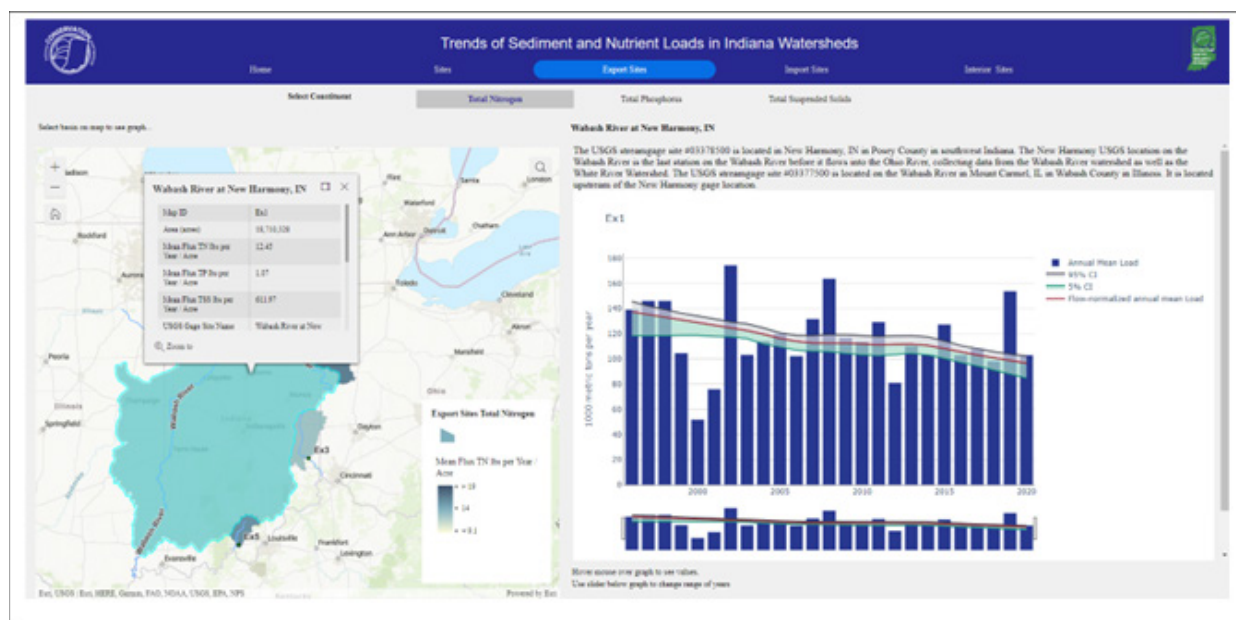


Figure 17. Screen shot of the web tool showing the TN trend at the New Harmony, IN, site on the Wabash River.

Component 2 – Tracking NLR’s from Conservation Practices and Conservation Practice Effectiveness

Component 2: Improve the method to quantify nutrient reductions from conservation practices, including dissolved nutrients, and determine efficiency of practices in reducing loads.

Component 2 of the Indiana Science Assessment focuses on strengthening and improving the method to calculate sediment and nutrient load reductions from implemented conservation practices as discussed above. Research conducted around the Midwest and in Indiana provides a new understanding of the effectiveness of in-field and edge-of-field practices in reducing N and P loads from agricultural fields. A research associate is working at Purdue University to compile, review and analyze research data to identify and develop a standardized tool and procedures for estimating nutrient load reductions from conservation practices and to be used in determining the percent efficiency of certain conservation practices in reducing nutrient loads. Component 2 is led by a core team from six conservation agencies and organizations, with scientific input from a Science Committee of 18 scientists at five academic institutions in Indiana and two federal research agencies (USDA Agricultural Research Service and USGS).

The project is currently analyzing 25 conservation practices selected by the Core Team and Science Committee to be researched and analyzed. Fact sheets sharing results for several of the practices will soon be available on the Science Assessment website (Figure 18). Progress reports for year 1 and year 2 are also available on the Indiana Science Assessment website, as well as a definitions document providing the definitions of the conservation practices assessed in the Science Assessment. An EPA Cooperative Agreement grant that was awarded in 2020 and used to carry out the work of Component 2 of the Indiana Science Assessment was completed, so to continue and expand upon the work of the

Science Assessment, ISDA and Purdue created the Indiana Nutrient Research and Education Program, or INREP, which is funded through the Gulf Hypoxia Program dollars, and is discussed further below.

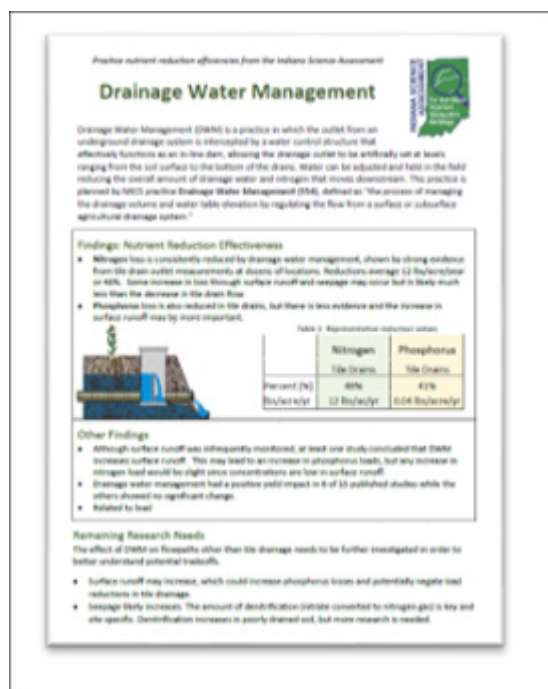


Figure 18. Fact sheet showing results of the data analysis done for Drainage Water Management.

3.2 Other Water Quality Monitoring Trends Efforts

ISDA worked with the National Great Rivers Research and Education Center to link the web tool from our trends analysis on the Great Lakes to Gulf [interactive website](#) which provides curated nutrient-focused water quality information and long-term trends for the Mississippi River and its tributaries.

The IDEM created a [GIS Story Map](#) showing a 10-year trend analysis of water quality monitoring data collected through the Fixed Station Monitoring Network of 168 current sites in Indiana from 2011 – 2020. This analysis was completed using the QWTREND model, and a total of 12 water quality constituents were analyzed, including nutrients, ions and metals.

3.3 Gulf Hypoxia Program Workplan Summary

In Indiana, current funding provided through the Gulf Hypoxia Program is focused on three areas: staff capacity, soil sampling and the Indiana Science Assessment. ISDA hired a staff person to help manage the Gulf Hypoxia Program dollars and provide support with the SNRS efforts. The staff person also manages and coordinates the statewide soil sampling program that was developed with Gulf Hypoxia Program funds to increase the frequency in which farmers/landowners sample soil and, therefore, improve nutrient use efficiency on agricultural land. Program funds were also used to support the INREP, which was created to continue and expand on the work of the Indiana Science Assessment.

ISDA will be developing a second workplan in the spring of 2025 to use the full congressionally appropriated Gulf Hypoxia Program funding. Plans for the funding include continuing the soil sampling

program for landowners, providing financial support for the continuation of the USGS supergage at New Harmony, IN, on the Wabash River and on three USGS supergage locations on the Kankakee River, and continuing support of the INREP.

Mississippi River Basin Soil Sampling Program

In September 2023, the ISDA-Division of Soil Conservation launched a new soil sampling program focused on increasing the knowledge and use of soil testing as a nutrient management practice to improve nutrient use efficiency while also reducing the risk of ecological impacts to local and downstream waterways. The program provides free or reduced cost of soil testing to farmers in Indiana watersheds that drain to the Mississippi River. Program applications were accepted during a fall 2023, a spring 2024 and a fall 2024 sign-up period, which resulted in very high interest among farmers and landowners. The program has enrolled approximately 458 landowners impacting 25,912 acres, and more than 3,800 soil samples have or will be collected and analyzed by the completion of our Fall 2024 soil sampling program. The program is planned to continue being offered in future spring and fall seasons.

Indiana Nutrient Research and Education Program

The INREP will develop and deliver knowledge that optimizes the management of conservation practices and nutrients across the Indiana landscape. Based at Purdue University, it will pursue science-based approaches by assessing the performance of current and emerging conservation and nutrient management practices, building consensus-based recommendations and analyses, and informing nutrient reduction strategies. Gulf Hypoxia Program funds will allow INREP to provide the scientific foundation for documenting nutrient reductions from conservation practice implementation, prioritizing those that are most effective, and which are critical components of the Indiana SNRS.

INREP will build on the Science Assessment process that has already made substantial progress, bringing together an active Science Committee that has achieved consensus on the basic process and practices to access. This funding will allow continued progress toward our goal of having widespread agreement on a tool and method for (1) tracking nutrient losses from decisions and practices that have already been implemented and (2) prioritizing practices that are most effective for future implementation.

The overall goal of the INREP will be to provide a scientific foundation to inform and improve nutrient stewardship in the State. Specific objectives are to:

1. Sustain and strengthen the network of scientists and agencies collaborating to provide the scientific foundation for the Indiana SNRS and related efforts.
2. Lead a continual process of refining and improving the Science Assessment.
3. Increase the availability of data from Indiana research on nutrient loss reduction.
4. Synthesize and deliver the knowledge to conservation partners and the agricultural community.

3.4 Nonpoint Source Efforts and Program Updates

Targeted Implementation Efforts

Indiana Conservation Reserve Enhancement Program (CREP)

One of the initiatives that is part of Indiana's SNRS is the [Indiana CREP](#). It is a component of the USDA CRP and is a voluntary conservation program involving an agreement between the federal government

and the ISDA that aims to improve water quality and address wildlife issues by reducing erosion, sedimentation and excess nutrients and enhancing wildlife habitats. It is specifically designed to install grass and tree buffers on water bodies, plant trees in the floodplain and restore wetlands to improve water quality.

The Indiana CREP, first announced in 2005, was originally slated to enroll 7,000 acres of eligible land within three watersheds touching 29 counties. In 2010, the program expanded into 11 watersheds, touching 65 counties with a total goal of 26,250 acres. In October 2024, the program was expanded further and is now available in every county and watershed in the state with a targeted enrollment of 100,000 acres.

As of September 30, 2024, 22,227 acres had been enrolled in the program and approximately 1,100 linear miles of waterways have been protected. The ISDA and its partners have invested over \$11.4 million to implement these conservation practices and, for every state dollar that is invested, \$4 – \$13 federal dollars are matched through payments made by the USDA FSA.

Clean Water Indiana Program

The [Clean Water Indiana Program](#), or CWI, supports the implementation of conservation practices that reduce NPS water pollution through education, technical assistance, training and cost sharing programs. The CWI fund is administered by the ISDA, Division of Soil Conservation under the direction of the State Soil Conservation Board.

The CWI Program is responsible for providing local matching funds as well as grants for sediment and nutrient reduction projects for Indiana's SWCDs. The CWI competitive grant program is an annual award process for SWCDs and other conservation organizations. In 2023, the CWI Program received an historic \$5 million increase in funding by the state legislature for state FY 2024 and FY 2025. This increase allowed for more CWI grant applications to be approved and funded, as well as provided a significant increase to the Indiana CREP. For the state FY 2024, 26 applications were approved, totaling \$2,313,287 and impacting 48 SWCDs and organizations, creating a significant increase in support for the SWCDs around the state. For the state FY 2025, 17 applications were approved, totaling \$1,382,571 and impacting 26 SWCDs and organizations. Information on all the approved grants is available on the [CWI Program website](#). CWI also contributes critical state matching funds for Indiana's CREP and supports other statewide initiatives such as the Indiana [Conservation Cropping Systems Initiative](#).

Cover Crop Premium Discount Program

The [Cover Crop Premium Discount Program](#) is a partnership between ISDA, The Nature Conservancy and the USDA Risk Management Agency. The goal of the program is to expand cover crop use among farmers in several counties in the state to expand awareness and the adoption of cover crops as a tool to improve farm resiliency. The focus is to target first-time cover crop users, but others are eligible as well. Eligible growers can receive a \$5.00/acre premium discount on the following year's crop insurance invoice for verified acres. The program is available in the following counties: Bartholomew, Brown, Clark, Crawford, Daviess, Dearborn, Decatur, Floyd, Greene, Harrison, Jackson, Jefferson, Jennings, Johnson, Lawrence, Martin, Monroe, Ohio, Orange, Ripley, Scott, Shelby, Switzerland and Washington. The program achieved an enrollment of over 7,000 acres, with that number doubling to 15,000 acres the second year. In 2024, the goal was to enroll 30,000 acres which was reached in 36 days. Each year the program continues to experience high interest.

Regional Conservation Partnership Program

ISDA is the lead partner on a large RCPP project focused on water quality and water quantity in the Kankakee River. This project brings together 43 partners, including the Kankakee River Basin and Yellow River Basin Development Commission. The primary objective of this multi-state initiative is to accomplish nutrient reduction goals to address excess water by implementing agricultural and forest land conservation practices and voluntarily establishing wetland easements. The project aims to work with a multitude of landowners, including forestland, urban, specialty crop and traditional farmers to install conservation practices that facilitate water storage, build community involvement and improve water quality within the initiative's focal region.

- Goals: 3,000 acres of conservation cover, 400 acres of wetlands developed, and 2 miles of two-stage ditch developed
- Total request from USDA's Natural Resource Conservation Service: \$7,954,545
- Total partner support: \$7,954,777.64
- Total project cost: \$15,909,322.65

3.5 Point Source Efforts and Projects

NPDES Measures Update

To significantly reduce the discharge of nutrients to surface waters of the state and to protect downstream water uses, IDEM set a practical state treatment standard of 1.0 mg/L TP for municipal wastewater dischargers with design flows of 1 MGD or greater. This policy became effective January 1, 2015. Applying the 1 mg/L TP limit will amount to a nearly 45% – 50% reduction of TP loads from major wastewater dischargers over the next few permit cycles.

Additionally, IDEM will implement TMDL load reductions approved for TP upon the renewal of any affected permit and will continue to implement P removal as required by Title 327 Indiana Administrative Code Article 5-Rule 10-Section 2 and Title 327 Indiana Administrative Code Article 5-Rule 10-Section 4.

For N, effective January 1, 2019, IDEM requires all major municipal wastewater permits with an average design flow rating of 1.0 MGD or greater to monitor for TN. It requires TN be reported and sampled at a minimum of one time monthly for both effluent mass (loading) and concentration via 24-hour composite sampling.

For all major dischargers, TN must be determined by testing total Kjeldahl N and nitrate + nitrite and reporting the sum of the total Kjeldahl N and nitrate + nitrite results (reported as N). Nitrate + nitrite can be analyzed together or separately. Monitoring for TN is required in the effluent only. In addition to TN, major facilities that discharge into the Ohio River are required to monitor for and report both total Kjeldahl N and nitrate + nitrate separately.

The data collected will be used to garner a better understanding of N loadings in Indiana waters and aid the state with future updates of its nutrient reduction efforts.

4. Iowa

The Iowa NRS, INRS or strategy, is a research and technology-based approach to assess and reduce excess nutrients delivered to Iowa waterways and the Gulf. The strategy outlines opportunities for efforts to reduce excess nutrients in surface water from both point sources, such as municipal wastewater treatment plants and industrial facilities and nonpoint sources, including agricultural operations and urban areas, in a scientific, reasonable and cost-effective manner. The most recent version of the INRS (in 2025) and INRS-related documents can be accessed on [the INRS webpage](#).

The INRS, including the reporting of progress, is a collaborative effort supported by representatives of the Iowa State University College of Agriculture and Life Sciences, Iowa Department of Natural Resources (DNR) and Iowa Department of Agriculture and Land Stewardship. Data to support INRS reporting is collected annually from a variety of sources and entities. This process was established through the Water Resources Coordinating Council, a group of state and federal government agencies that coordinate around water-related issues in Iowa.

In recent years, the INRS reporting structure has evolved from an extensive written report to an interactive dashboard format. The current dashboard website can be found [here](#).

4.1 Historical Progress in Iowa Compared to the HTF Baseline

The combined statewide annual nutrient loads for both point and nonpoint sources during the baseline (1980 – 1996) and benchmark (2006 – 2010) time periods are shown in Table 2. The differences in the NPS estimates are mostly a result of changes in land use for N and reduced tillage and decreases in soil test P for P. Differences in point source estimates were mostly a result of increased estimates in flow and better estimates of effluent concentrations. The average annual N load increased by 5.3% from the baseline to the benchmark period, while the average annual P load decreased by 18.5%.

Table 2. Baseline (1980 – 1996) and benchmark (2006 – 2010) average annual loads from nonpoint sources and point sources.

		1980–1996 baseline ^a load (tons)	2006–2010 benchmark load (tons)	Change, 1980–1996 to 2006–2010		Major cause of change
Nitrogen	NPS	278,852 ^b	293,395	5.2%	Increase	Land use change
	PS	13,170	14,054	6.7%	Increase	Flow increase
	Total	292,022	307,449	5.3%	Increase	
Phosphorus	NPS	21,436	16,800	21.6%	Decrease	Reduced tillage and soil test P
	PS	2,386	2,623	9.9%	Increase	Flow increase
	Total	23,822	19,423	18.5%	Decrease	

Notes:

^a The baseline contribution is calculated as the percent of N and P loads that each source contributes to the total loads. The revised estimates represent the percent reductions contributed by each source, based on each source's baseline contribution.

^b The method used to derived the TN estimate of 292,022 tons indirectly reflected the point source contributions.

4.2 Recent Highlights

Recent INRS highlights can be accessed on the [Strategy Documents web page](#).

4.3 Recent Funding or Program Announcements

New Efforts to Scale-Up Edge-of-Field Practices

Since 2021, the Iowa Department of Agriculture and Land Stewardship has expanded partnerships with counties, SWCDs, USDA and municipalities to advance the “batch and build” model of conservation delivery with farmers and landowners. Over 290 tile outlets are being addressed through these projects in key watersheds in the state with many more underdevelopment.

Challenges in Scaling up Water Quality Wetlands

The process to identify, develop, permit and ultimately install water quality wetlands has changed dramatically since Iowa began prioritizing this practice. Though, not the only challenge, one of the most impactful changes is optimizing water quality wetland effectiveness while navigating the shifts in federal permitting requirements. Iowa’s landscape has been severely altered to address human health concerns and for the expansion of farmland that resulted in the conversion of prairies and wetlands. Many areas that were historically wetlands were converted to streams/ditches/erosional features to lower the water table to improve crop production. While these changes were often incentivized/encouraged by federal and state policies at the time, current policies are leading to their preservation of these historical conversions. Vast networks of wetlands and swales pre-settlement are now a series of drainage ditches and erosional features that function as streams due to increased surface runoff. Because these areas are under federal jurisdiction, permitting is required for activity that impacts these areas.

The INRS relies heavily on water quality wetlands to accomplish the 45% reduction (41% for NPS). All the scenarios, even with maximizing other available practices, would still require ~50% of the total load reductions to come from water quality wetlands. Based on the previous permitting structure of early water quality wetland development, this represented an estimated need of 4,000 to 7,000 wetlands, to reduce nitrogen loading from about 4 to 7 million acres of cropland. Shifts in federal permitting processes have forced WQ wetlands to smaller drainage areas to avoid mitigation requirements, which increases the overall number of wetlands needed to reach the reductions goals due to the reduced level of efficiency these individual, smaller sites have on nitrogen reduction. Since the early 2000s, all sites were able to be permitted without off-site mitigation. Changes to the permitting process and extended the definition of streams and reduced the areas within which water quality wetlands can be sited without requiring mitigation to offset impacts. The other alternative is to pay for mitigation, which is estimated to double the costs of restoring water quality wetlands. The first water quality wetland requiring mitigation was permitted in 2018 (example in Figure 19). Since that time permitting has become increasingly more difficult due to requirements that are limiting locations where wetlands can be restored without stream mitigation and the federal permitting process. This increases the costs to state programs and further limits the number of sites that can be restored with existing public resources. Iowa continues to work with the U.S. Army Corps of Engineers, the EPA and partners to assist in navigating these and other barriers to implementing this priority practice in the INRS (Figure 19).

Mitigation was required for this project. Historic wetland basin that was converted to a drainage ditch around 1917 and operated that way for 100 years.



Figure 19. Example project that required mitigation to restore targeted water quality wetland.

Partnership to Advance Measurement of Farmer Practice Adoption

Since 2020, the Iowa Nutrient Research and Education Council has conducted an annual Survey to track and report farmer in-field conservation practice adoption. This effort is conducted in consultation with the Iowa Department of Agriculture and Land Stewardship, Iowa State University and Iowa DNR and supports the overall tracking and reporting dashboards to track progress of the INRS. The Iowa Nutrient Research and Education Council Survey tracks primarily in-field nutrient and tillage management systems of Iowa farmers annually. The data had been challenging to quantify and has historically depended on response Surveys to estimate statewide usage. The Iowa Nutrient Research and Education Council Survey leverages partnerships with the Iowa agricultural retailer network to Survey “as applied” data for randomly selected fields and aggregated via statistically valid methods in partnership with the Iowa State University Statistical Laboratory. For more information on the project, follow this [link](#). Including the initial pilot phase, the Survey covers crop years 2017 to 2023, with data updated annually.

4.4 Iowa Point Source Updates

The INRS currently identifies 158 industrial and municipal wastewater treatment point source facilities that need to evaluate the amounts of nutrients in their discharges to meet the goals of the strategy. Upon receiving an NPDES permit under the INRS, each facility works to develop a feasibility study, which outlines the resources required to achieve nutrient reduction goals.

The permits also incorporate requirements for measuring nutrient concentrations and loads in influent and effluent to determine current nutrient removals and provide an empirical basis for feasibility studies. The data has enabled the facilities and the Iowa DNR to determine current TN and TP loads associated with these point sources, even before additional nutrient reduction technologies are installed.

A facility uses the data collected during the 2-year period after permit issuance to evaluate the feasibility and reasonableness of reducing the amounts of nutrients discharged into surface water. The INRS establishes a target of reducing TN and TP from point sources by 66% and 75%, respectively. A facility's feasibility study must include an evaluation of operational changes that could be implemented to reduce the amounts of TN and TP discharged. If the implementation of operational changes alone cannot achieve the targets, the facility must evaluate new or additional treatment technologies that could achieve reductions in the nutrient amounts discharged. (See Figure 20, Figure 21 and Figure 22, which summarize the progress over recent years.)

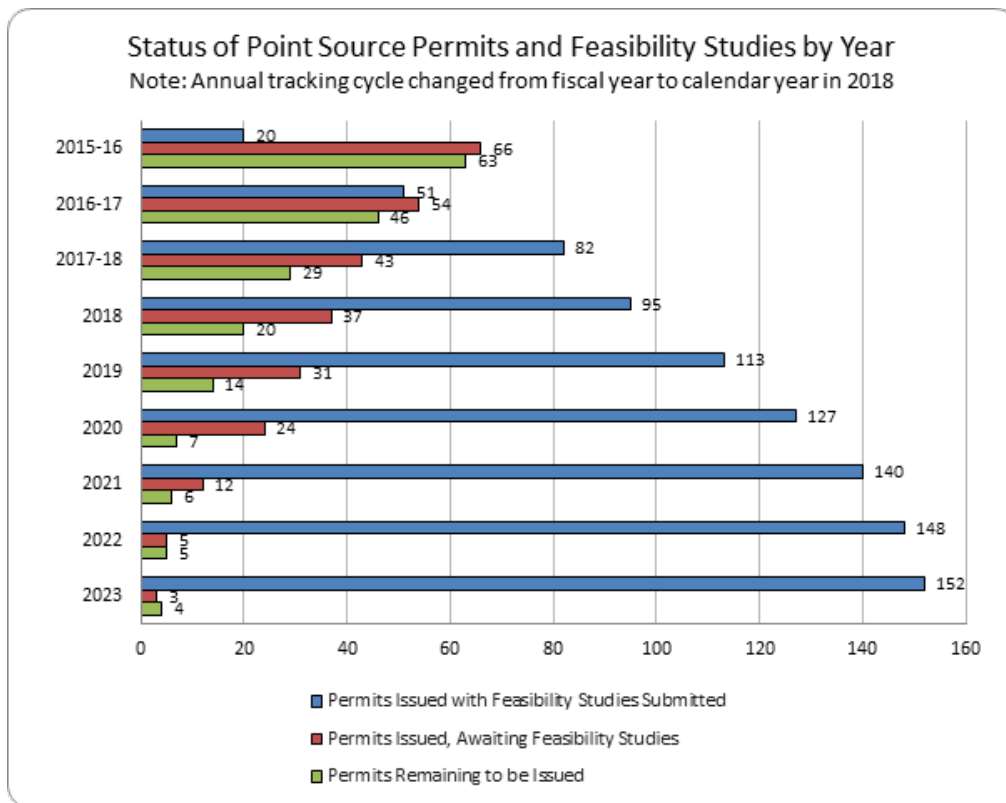


Figure 20. Status of point source permits and feasibility studies by year.

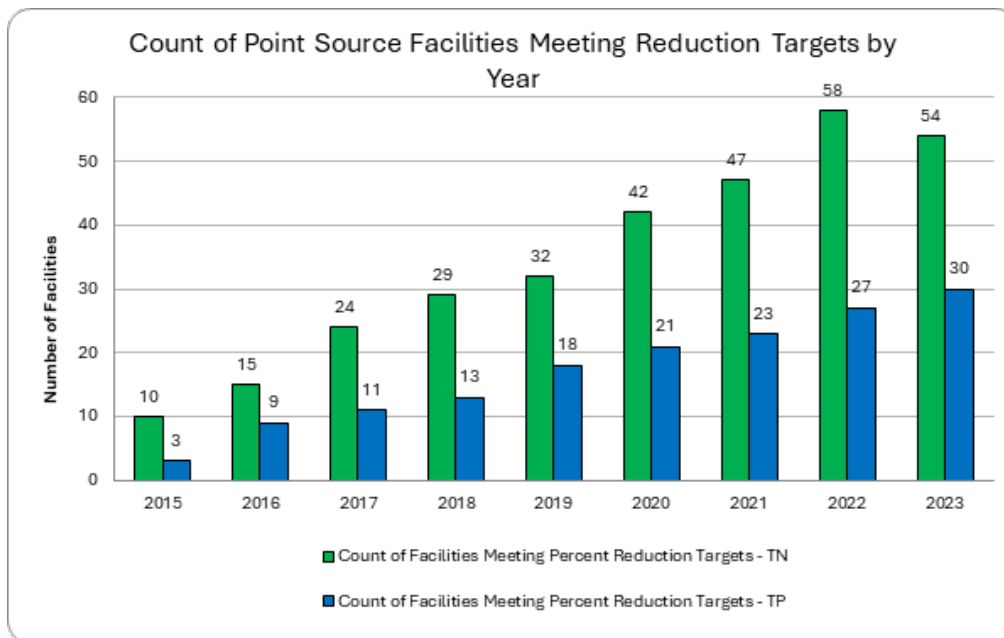


Figure 21. Point source facilities meeting reduction targets by year.

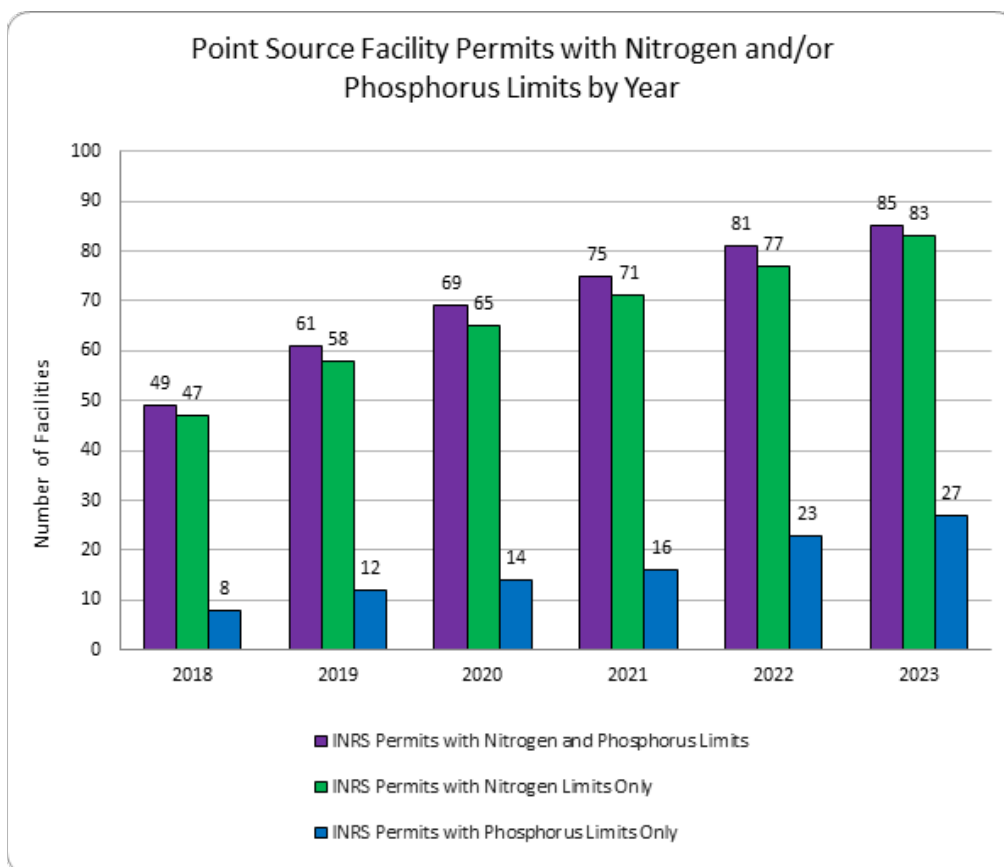


Figure 22. Point source facilities with N and/or P limits by year.

As these feasibility studies are reviewed and approved by the Iowa DNR, the schedules contained in the studies for installing nutrient reduction technologies or optimizing existing treatment are added to the facilities' NPDES permits by amendment. Once the construction or optimization outlined by the schedules is complete and treatment processes are optimized, facilities will submit 12 months of effluent TN and TP sampling results. Effluent limits based on those sampling results will then be added to facilities' permits and become enforceable.

4.5 Iowa Nutrient Reduction Exchange

Agricultural and urban partnerships are a critical component to meet the goals of the INRS. The Nutrient Reduction Exchange was developed to help establish these partnerships. The Nutrient Reduction Exchange incentivizes regulated municipalities and industries across the state to partner with farmers to implement nutrient-reducing BMPs. Participation in this tracking system is voluntary and non-regulatory. Iowa DNR may recognize those entities generating and registering nutrient reductions for: (1) meeting INRS goals, (2) offsetting new loads associated with growth and (3) future regulatory compliance relief through water quality trading.

Several cities have signed memorandums of understanding with Iowa DNR that provide the regulatory certainty needed by the cities to demonstrate that their efforts will be recognized and lay out the process for doing so. The cities of Cedar Rapids, Ames, Dubuque, Muscatine, Storm Lake, Mason City, Burlington, Forest City and Osage all have signed memorandums of understanding. Several communities in Iowa, especially Cedar Rapids and Ames, have made significant investments in their respective watersheds that are recognized in the [Nutrient Reduction Exchange](#).

4.6 Iowa Nutrient Research Center

The [Iowa Nutrient Research Center](#), or INRC, was established in 2013 to advance research-based understanding of current and emerging nutrient management practices and foster the development of new nutrient reduction practices. The INRC was established by the Iowa Board of Regents in response to legislation passed by the Iowa Legislature.

Since 2013, the INRC has awarded more than 145 grants among Iowa's three Regent Schools (University of Iowa, University of Northern Iowa and Iowa State University). The awards total slightly over \$17.6 million and leveraged funds from these projects of nearly \$70 million. Research funded by INRC has led to an improved understanding of cover crop use and performance, aided in the development of new conservation practices (e.g., saturated buffers and multi-purpose oxbows), aided in new technology development (e.g., drainage water recycling, the use of corn cobs in denitrification bioreactors) and advanced our understanding of conservation practice implementation.

4.7 Addition of New Practices in the INRS

As research on NPS conservation practices is conducted, new insights are developed regarding the effectiveness of practices in reducing N and P loss. These data can be submitted to the INRS Science Team to review the effectiveness of conservation practices in the same way the original INRS Science Assessment was conducted.

In 2024, a science team completed an updated review of N BMPs which are now included in the INRS. The [report](#) details the results of practice research since the original Science Assessment and updates their relative efficiencies, and corresponding corn yield impacts utilizing the same methodology developed for the INRS Nonpoint Science Assessment and BMP efficacy. This update reflects ongoing work to address the Research and Technology action item of the INRS. The updated assessment for P-based practices is underway.

Practices added as a result of ongoing research related to the INRC have been:

- [Saturated Buffers](#) (2016)
- [Blind Inlets](#) (2017)
- [Multi-purpose Oxbows](#) (2019)
- [Extended Rotation – 3 year](#) (2024)

5. Kentucky

After [updating Kentucky's NRS](#) (KNRS) in 2022, the Kentucky Division of Water (KDOW) held a kick-off meeting and established four nutrient workgroups to enhance engagement with utilities, public agencies, agriculture interests and non-governmental organizations (Figure 23). These workgroups facilitate feedback on Gulf Hypoxia Program projects, address stakeholder needs and provide forums for sharing emerging nutrient research. KDOW held workgroup meetings virtually and across the state in Murray, Versailles, Louisville and Frankfort in 2023 and 2024. Additionally, KDOW began distributing a quarterly [Nutrient Newsletter](#) in [2023](#) to an email list of over 140 members to reach a broad stakeholder group.

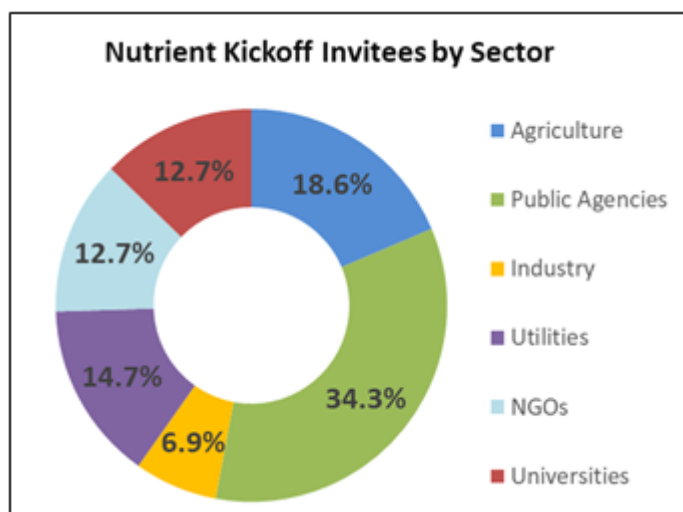


Figure 23. Kentucky NRS kick-off.

KDOW invested Gulf Hypoxia Program funds in MS4 training and outreach with the University of Kentucky to reduce nutrient loss from urban stormwater. One result of this project is an [MS4 Training Program Website](#) with interactive best practice guides and peer-to-peer training resources to help operators minimize erosion and nutrient loss.

The KDOW also built other tools to connect partners and stakeholders with resources. KDOW modernized the state's [Erosion Prevention and Sediment Control Guide](#) into an online resource, including Spanish translation, and developed an [Agriculture Success Stories](#) webpage to highlight innovative agriculture with nutrient reduction benefits. Lawncare outreach material (Figure 24) was also compiled on KDOW's Nutrient Reduction website Nutrient Reduction webpage, including a customizable doorhanger template DOW developed for MS4 community use.



Figure 24. Residential lawncare outreach media.

Kentucky is also expanding access to nutrient and energy optimization tools to municipal wastewater facilities and tracking improvement in wastewater quality. In 2023, KDOW developed an [optimization resources webpage](#) and used Gulf Hypoxia Program funds for staff training on the Bio-Tiger Model with Dr. Larry Moore. The Gulf Hypoxia Program will make nutrient optimization training available to wastewater operators through collaboration with the [Kentucky Operator Certification Program](#). KDOW also analyzed water quality benefits from regionalization efforts by wastewater utilities. A retroactive look at [Package Plant Success in Kentucky](#) indicates that over 25,700 pounds of ammonia have been kept out of local waterways as a result of package plant decommissions since 2017 (Figure 25).

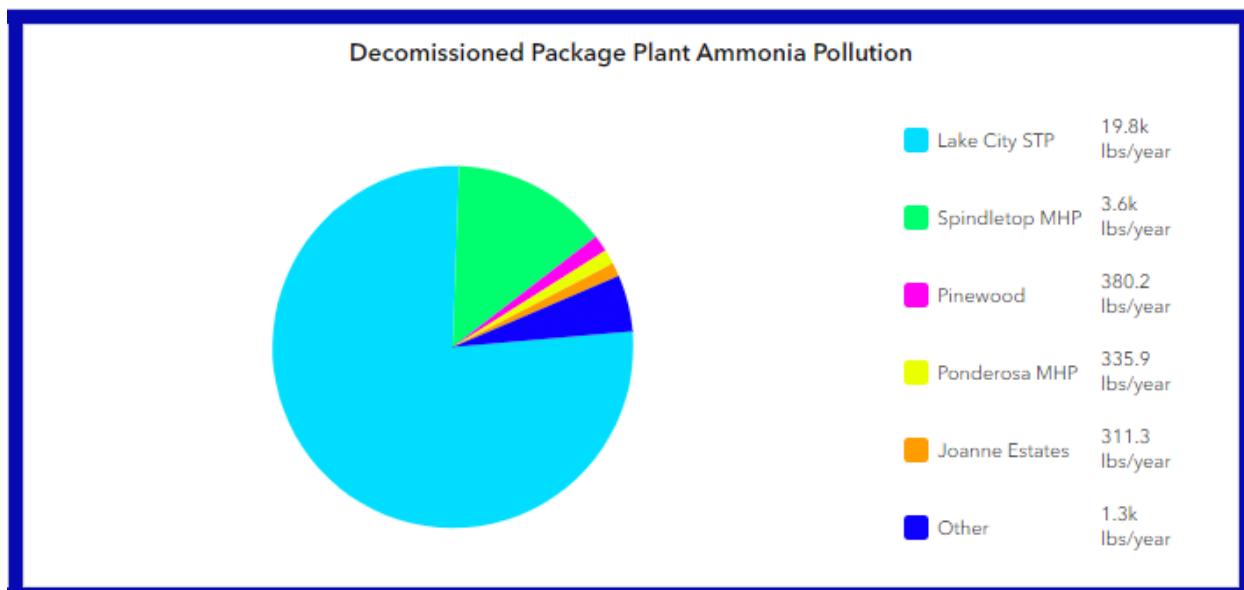


Figure 25. Ammonia reduction through package plant decommissioning.

The KDOW utilizes internal and partner monitoring networks to track nutrient progress. One recommendation of the KDOW [2022 KNRS Update](#) is to expand monitoring in Western Kentucky, where spatial gaps exist. Using Gulf Hypoxia Program funding, KDOW partnered with USGS to install flow gages on Mayfield Creek and Obion Creek (Figure 26), which complement KDOW's bi-monthly nutrient monitoring data collection. These gages are slated for long-term funding to support future nutrient studies.



Figure 26. New USGS flow gages on Obion Creek (left) and Mayfield Creek (right).

Lake Herrington is in a Nutrient Priority Area due to historic harmful algal blooms and the presence of drinking water intakes. KDOW placed advertisements in local newspapers to promote Agriculture Water Quality Plans near Lake Herrington (Figure 27) and partnered with the Boyle County Conservation District on a cover crop program. Two existing Watershed Plans in major tributaries to Lake Herrington ([Hanging Fork](#) and [Clarks Run](#)) continue to facilitate CWA Section 319 funded programs, while \$1.5 million from the [Sewer Overflow and Stormwater Reuse Municipal Grant Program](#) will connect 117 failing septic systems and six holding tanks on the lake to nearby wastewater treatment facilities. KDOW also developed a [Houseboat Pumpout](#) webpage to connect boat renters and owners with pump-out locations that reduce bacteria and nutrient pollution.

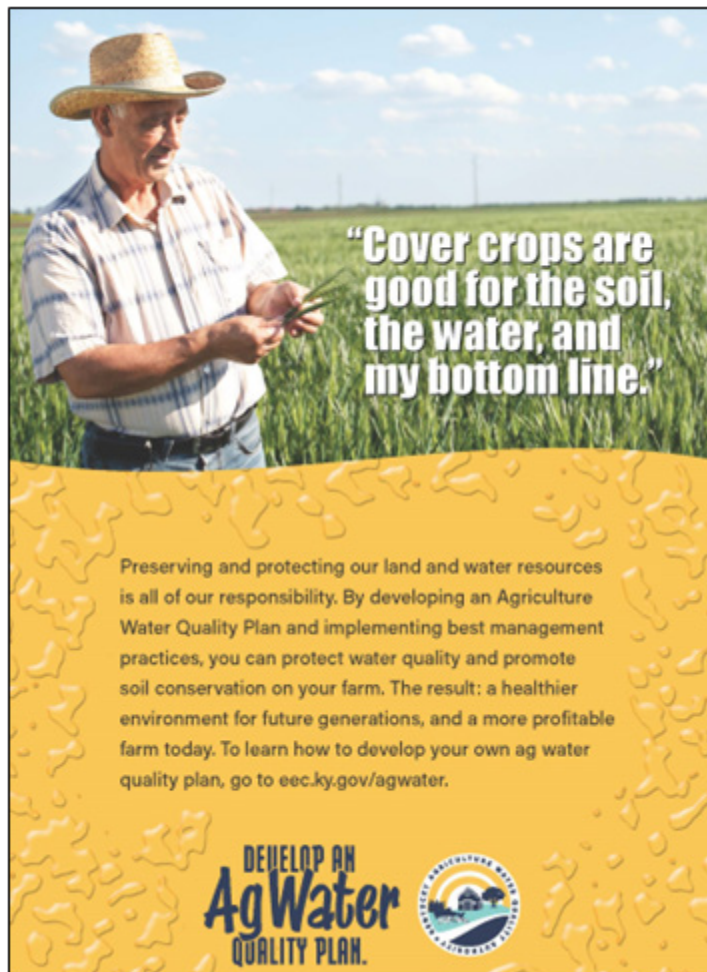


Figure 27. Cover crop outreach media.

Kentucky's alliances across state lines are particularly impactful, with collaboration and data sharing ongoing with Tennessee. In the fall of 2023, KDOW and partners including the Tennessee Department of Environment and Conservation, Tennessee Department of Agriculture, Kentucky and Tennessee NRCS offices, University of Kentucky, University of Tennessee, Kentucky Division of Conservation, The Nature Conservancy and the Cumberland River Compact met to coordinate on nutrient projects in shared watersheds (Figure 28). KDOW presented nutrient trend analyses of the Tennessee and Cumberland

Rivers to the Tennessee Nutrient Task Force in October 2024. KDOW is working with Tennessee to identify shared watersheds that can leverage Gulf Hypoxia Program funding to improve outcomes.



Figure 28. October 2023 Tennessee-Kentucky collaboration meeting.

KDOW is also enhancing cooperation with other Kentucky state agencies, such as the Kentucky Division of Conservation, through funding and data sharing. The Gulf Hypoxia Program supports nutrient management plans produced by the Kentucky Division of Conservation, which build on efforts to improve conservation through the [Agriculture Water Quality Act](#). KDOW also provides an analysis of conservation practices funded by the Kentucky Division of Conservation's State Cost Share Program on nutrient outcomes with tools used by the CWA Section 319 Nonpoint Source Program. Cumulative nutrient load reductions between 2020 and 2023 from the CWA Section 319 Nonpoint Source Program and State Cost Share Program total over 426 tons/year of N, 108 tons/year of P (Figure 29 and Figure 30).

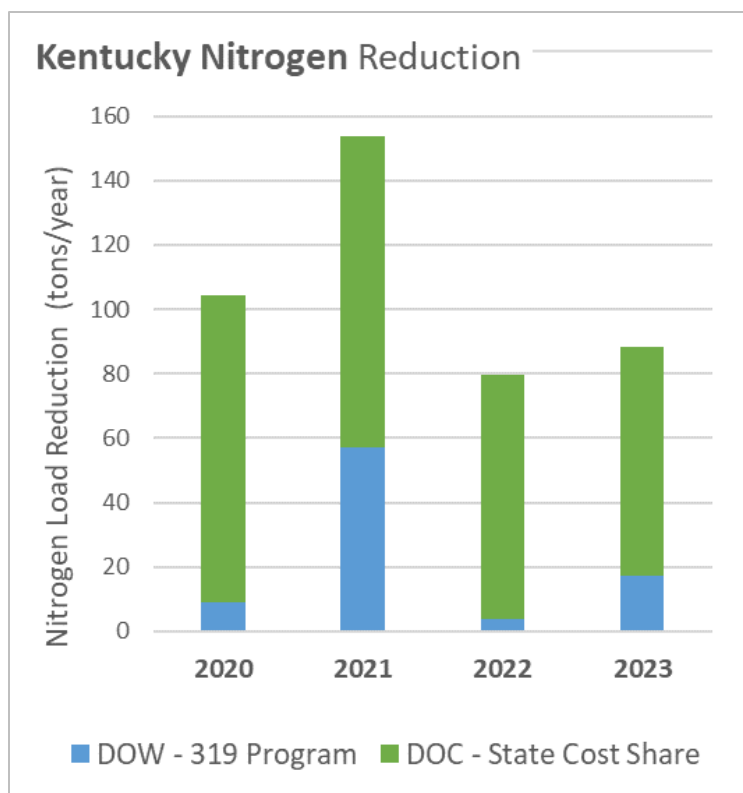


Figure 29. Kentucky N load reductions by program.

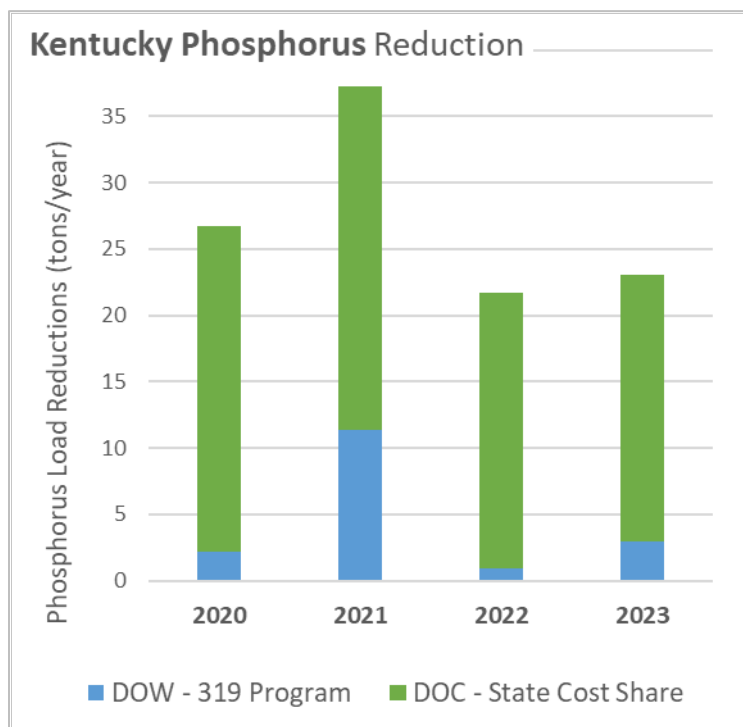


Figure 30. Kentucky P load reductions by program.

While it works to improve future nutrient outcomes, Kentucky recognizes the need to characterize existing progress using the same models applied to Hypoxia Task Force progress metrics. In 2024, KDOW produced a [Flow-Normalized Nutrient Loads](#) study that mirrors USGS’s WRTDS methodology. This method uniquely accounts for annual flow variability to quantify the influence of landscape management decisions on long-term nutrient load trends. KDOW analysis suggests that Kentucky’s monitored drainage basins, which include those predominantly fed by surrounding states (i.e., the Tennessee and Cumberland rivers), show a declining TN loading trend and a slightly declining TP trend between 2006 and 2023 (Figure 31 and Figure 32). Similar trends were found at the Ohio River and Mississippi and Atchafalaya River basins, where Kentucky’s N loading decreased at a greater magnitude and over a longer time period than P.

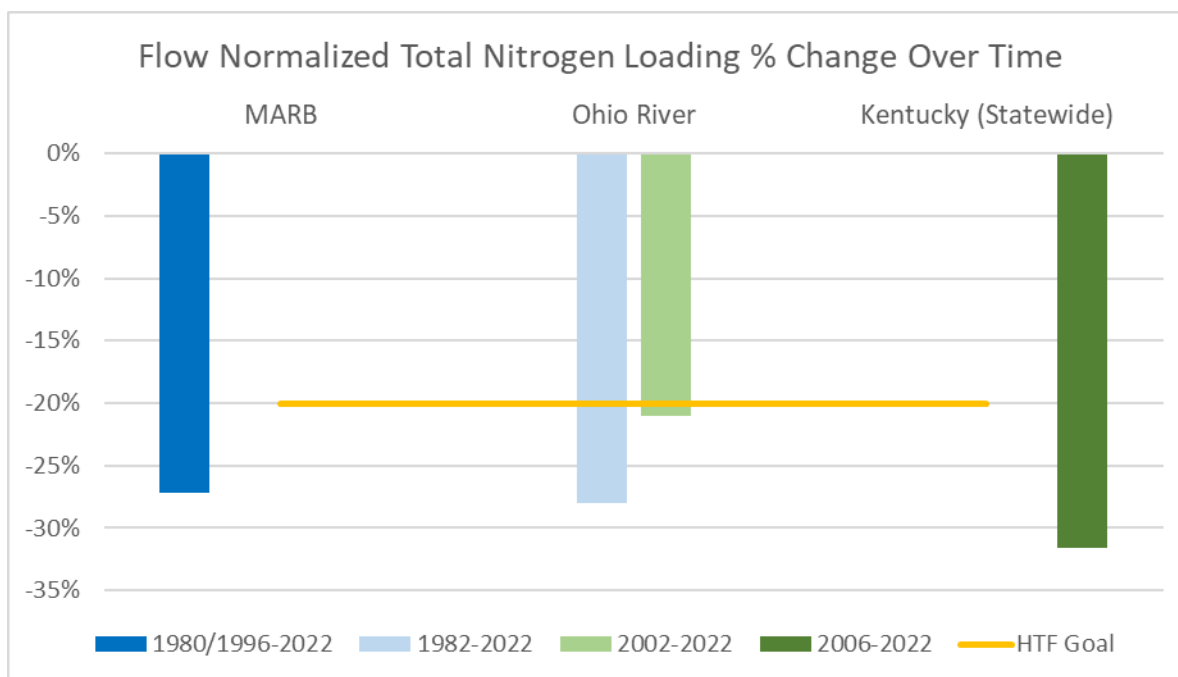


Figure 31. Flow-normalized N loading change over time.

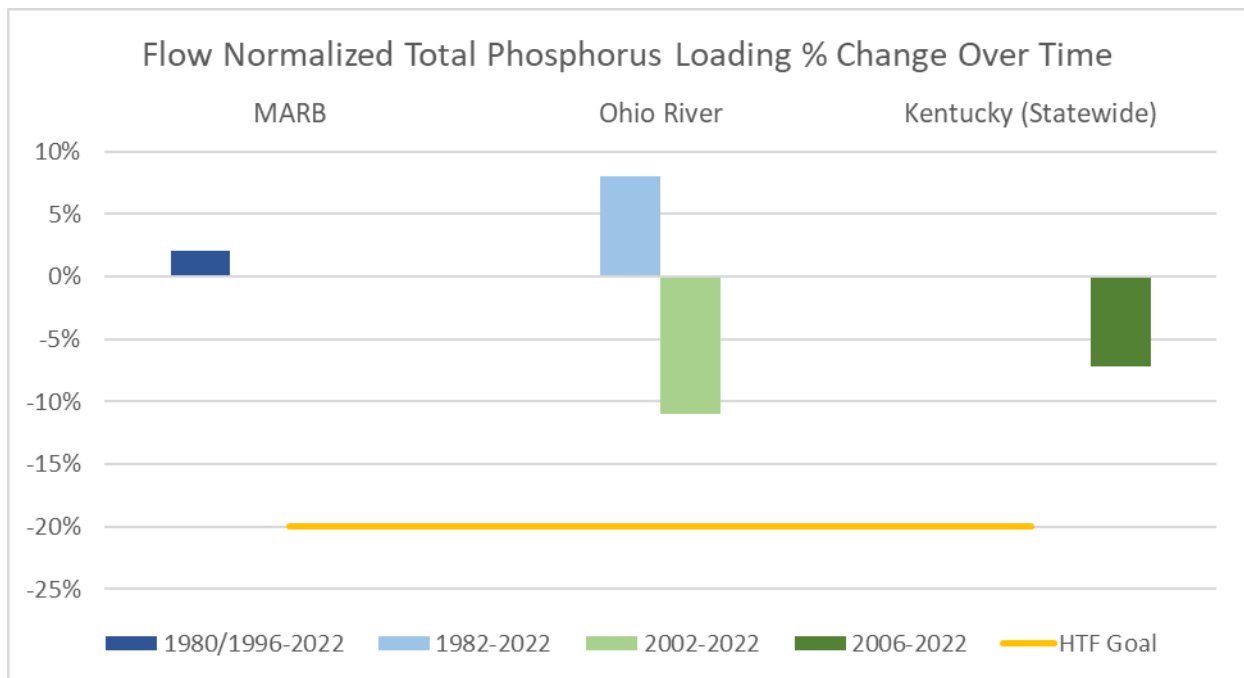


Figure 32. Flow-normalized P loading change over time.

While TN and TP loading declined overall at Kentucky nutrient-monitored sites, individual sites fared differently (Figure 33 and Figure 34). Basins larger than 1,400 square miles showed either no discernable or declining trends in flow normalized N and P loads. N trends across all sites reveal nine stations with a downward trend, four stations with no trend and three with an upward trend. P trends show nine sites with no trend, four with a downward trend and three with an upward trend.

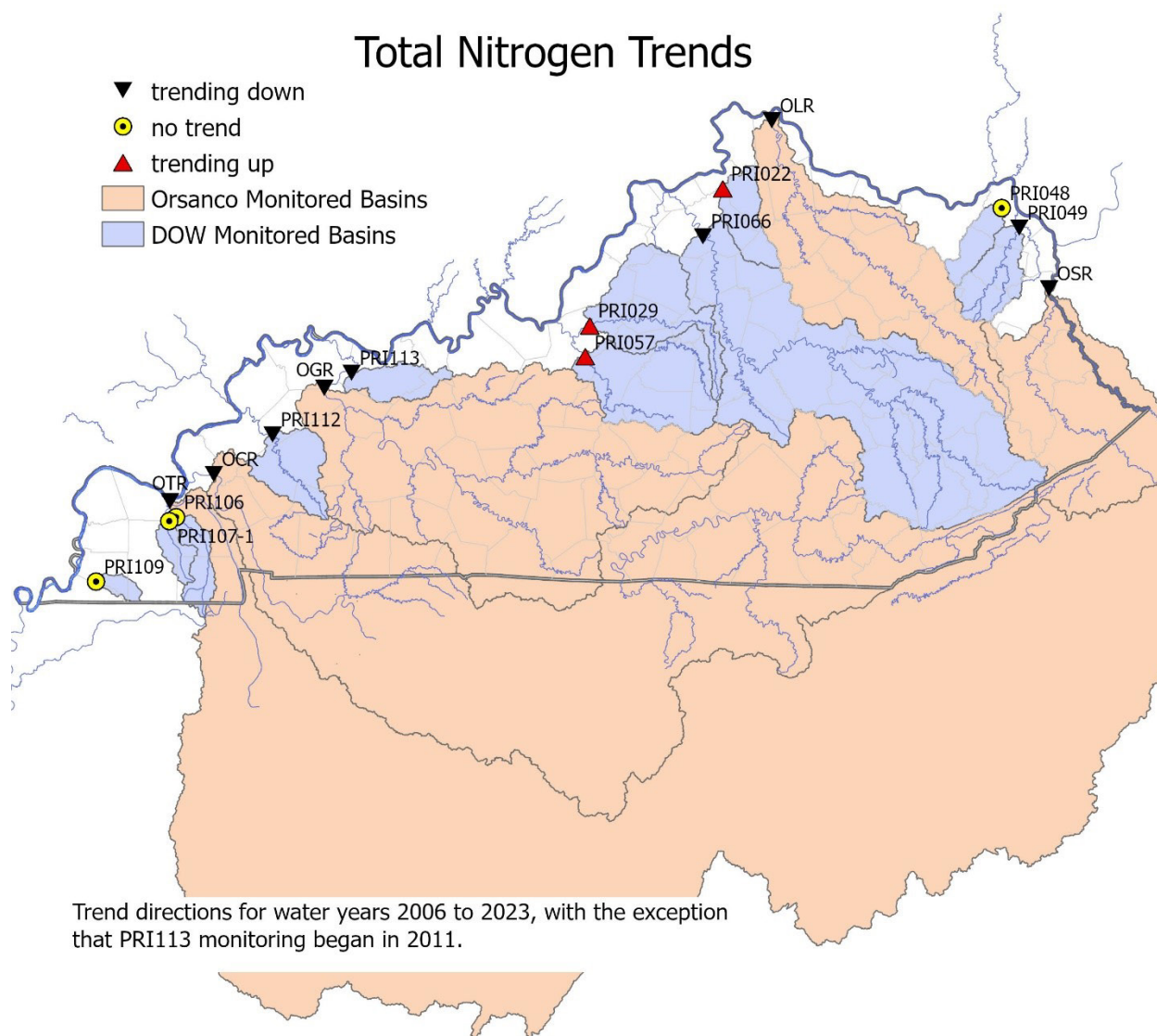


Figure 33. Flow-normalized N trends at Kentucky stations.

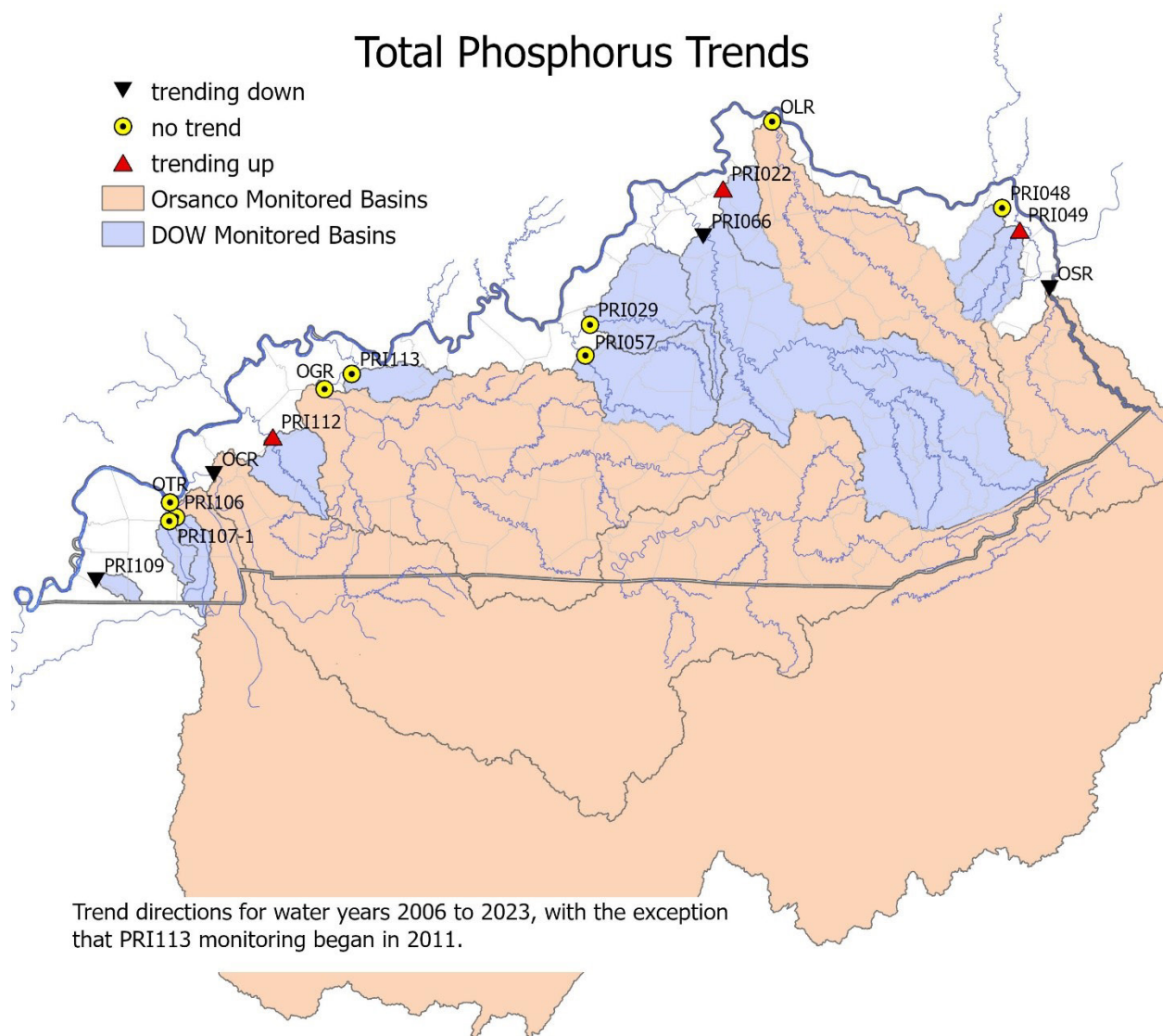


Figure 34. Flow-normalized P trends at Kentucky stations

6. Louisiana

The collaborative of Louisiana’s Coastal Protection and Restoration Authority, Department of Agriculture and Forestry (LDAF), Department of Environmental Quality (Louisiana DEQ), and the Department of Conservation and Energy (C&E) released an updated Louisiana Nutrient Reduction and Management Strategy in 2024. The strategy provides a framework of strategic components with underlying actions that guide implementation of nutrient reduction and management across the state to protect, improve and restore water quality in Louisiana’s inland and coastal waters. Implementation of the strategy has focused on six key areas: (1) NPS management, (2) point source management, (3) incentives, (4) leveraging opportunities, (5) new science-based technologies/applications and (6) river reconnections/diversions. The Strategy team is considering new core members moving forward.

6.1 Nutrient Management Strategy Implementation

The interagency collaborative that developed the Louisiana Nutrient Reduction and Management Strategy team continues to jointly implement and monitor the progress of the strategy in Louisiana. In addition to the EPA, other collaborative partners include the LDAH Soil and Water Conservation districts, Louisiana Master Farmer Partners, Louisiana State University Agricultural Center (AgCenter), USDA Louisiana, Barataria-Terrebonne National Estuary Program, Pontchartrain Conservancy and the Gulf of America Alliance (among others). The Louisiana Nutrient Reduction and Management Strategy Interagency Team compiles annual reports that document the nutrient reduction and management implementation activities in the state. The strategy, annual reports and pertinent nutrient management information can be accessed on [Louisiana's Nutrient Reduction and Management Strategy web page](#).

Every 5 years, the Louisiana Department of Environmental Quality analyzes trends from long-term monitoring sites that are a part of its Ambient Water Quality Monitoring Network. The document is available on the State's [Nutrient Reduction and Management Strategy website](#) under 'Reports and Tools' and provides localized trend results. The next report is anticipated in 2026.

6.2 Funding in Support of HTF States

The EPA's Funds to States in 2019 and 2020 (\$200,000 Total). Two projects were supported through this effort and were completed on September 30, 2022: (1) *Nutrient Reduction Strategies Supporting CWA Section 319: Louisiana NPS Water Quality Analysis*. Monthly monitoring in four priority watersheds provided critical data that established current water quality conditions, identified the highest concentrations of nutrients, determined geographical or temporal components to impairments and quantified water quality improvements. (2) *Pilot Expansion of Water Quality Monitoring from Inshore to Offshore*. Seasonal monitoring over a 2-year period filled a critical monitoring gap in the nearshore to offshore environment, providing baseline status data and supporting efforts on the improvement of nutrient uptake modeling to evaluate nutrient dynamics in response to a planned river diversion. Data are currently in use.

IIJA Funds in 2021 to the Gulf Hypoxia Program (~\$4.1 million Over 5 Years). Louisiana's *Lake St. Joseph, Louisiana, Nutrient Loading Reduction* project aims to reduce the concentrations of N and P in the Lake St. Joseph and Cypress Bayou watersheds within the Tensas River Basin. Agriculture is the major suspected source for nutrients, and off-site impacts of nutrient loading into Lake St. Joseph resulting from agricultural processes look to be significantly reduced or eliminated through BMPs and conservation efforts. Additional funds were provided to boost this project in 2025; work is anticipated to continue through the funding cycle and all data are uploaded to the federal water quality data portal when available.

6.3 Nutrient Monitoring

Louisiana DEQ routinely monitors surface waters for N and P in their Ambient Water Quality Monitoring Program. Regarding water permitting, Louisiana DEQ's goals are to incorporate nutrient monitoring into all individual sanitary permits and landfills, industrial permits that are a source of excess nutrients and general permits for which nutrient monitoring is required by a TMDL. Nutrient monitoring has been included in over 1,800 facility permits to date (2024). This information is based on permits that are coded into the EPA's ICIS.

6.4 Alternatives to TMDLs/New Vision for 303(d) Program

Under the EPA's [Vision for the CWA Section 303\(d\) Program](#), Louisiana DEQ began implementation of alternative restoration strategies for monitoring and reduction of nutrient loads in Yellow Water River (subsegment 040504), Natalbany River (subsegment 040503), New River (subsegment 040404) and Blind River (subsegments 040401 and 040403). Louisiana DEQ also began partnering with local citizen-based groups to aid in support for these restoration strategies.

6.5 Water Quality Credit Trading

Louisiana has developed a [Water Quality Trading](#) program, supported by state legislation and consistent with the CWA, to address excess nutrients and other appropriate parameters. Program objectives include providing a cost-effective method for achieving compliance with water quality standards that achieves an equal or greater reduction of pollution, reducing cumulative pollutant loading, improving water quality, preventing future environmental degradation and providing ancillary environmental benefits such as carbon sinks, flood retention, riparian improvement and habitat. Louisiana DEQ received and approved the first pollutant reduction credits in 2024; information is available on the website.

6.6 Nonpoint Source

NPS pollution management activities are conducted in accordance with the EPA's *Nonpoint Source Program and Grants Guidelines for States and Territories* issued May 4, 2024. The CWA Section 319 funds allocated to the State of Louisiana are divided equally between Louisiana DEQ and LDAF's Office of Soil and Water Conservation. Louisiana DEQ administers the program and collaborates with LDAF and other agencies and organizations to implement the statewide program to improve water quality across the state and support watershed-specific activities. Projects align with goals and objectives set in the EPA-approved Louisiana NPS Pollution Program Management Plan to partially or fully restore impaired waters identified in the Louisiana Water Quality Integrated Report (CWA Sections 305(b)/303(d)). Louisiana DEQ is working in collaboration with the state's agricultural partners at LDAF to refine techniques for calculating load reduction in implementation project areas. The goal of this collaborative effort is to compare estimated load reductions from implementation with loads calculated at sampling sites in priority watersheds through monitoring during the duration of implementation and one year following completion of implementation projects. A key goal in the Louisiana NPS Management Plan is to reduce concentration of nutrients, among other pollutants, to improve water quality in impaired water bodies. Louisiana DEQ works with federal, state and local partners to implement statewide educational programs and watershed-specific protection and restoration projects.

In addition to LDAF, Louisiana DEQ and USDA have coordinated their watershed programs and used water quality data to identify water bodies that are eligible for implementation of federal cost-share programs, as well as to help target BMP implementation geographically. EQIP, the Wetlands Reserve Program, CREP and CRP have been implemented in watersheds identified as impaired by agricultural nonpoint sources in the state's integrated report. The USDA and Louisiana DEQ continue to partner on USDA's Mississippi River Basin Healthy Watersheds Initiative to target practices that reduce excess nutrients such as N and P entering the Gulf. The Mississippi River Basin Healthy Watersheds Initiative

allowed states that border the Mississippi River to implement these types of NPS controls that could be expanded to adjacent watersheds to reduce the size of hypoxia in the Gulf.

Federal agencies participate in the Nonpoint Source Interagency Committee to coordinate their programs to meet CWA water quality goals. Two examples of this federal/state partnership are NRCS and U.S. Forest Service. Both agencies have partnered with Louisiana DEQ on coordination of projects to reduce the concentration and/or loading of sediment, excess nutrients and other pollutants associated with agricultural and forestry activities, respectively.

Federal and state agricultural agencies in Louisiana have taken leadership roles in addressing agricultural NPS pollution. Through Farm Bill programs that the USDA administers each year, thousands of acres of BMPs are implemented across the state to reduce the amount of sediment and excess nutrients entering the state's water bodies. Louisiana DEQ participates in the USDA State Technical Advisory Committee to ensure water quality improvements continue to be a top priority for USDA's Farm Bill Conservation Programs. Through USDA's ranking criteria, which are provided to local stakeholders and field offices, water quality and habitat protection remain key factors in selecting which lands are included in Farm Bill programs. Members of the State Technical Advisory Committee are provided an opportunity to vote on the list of resource concerns addressed by Farm Bill Conservation Programs in the same manner as members of local stakeholder groups. This process helps keep water quality priorities at the top of the list of issues that need to be addressed through Farm Bill programs. Each of the following statewide programs has a nutrient management component: Agricultural Statewide Program, Forestry Statewide Program, Urban Runoff Statewide Program, Hydromodification Statewide Education Program and Coastal Nonpoint Pollution Control Program.

Other state and local partners active in watershed activities that reduce nutrient runoff include Bayou Vermilion District, Barataria-Terrebonne National Estuary Program, Soil and Water Conservation Districts, Louisiana C&E - Office of Coastal Management and Louisiana State University AgCenter.

6.7 Source Water Protection

Louisiana DEQ's Source Water Protection Program staff assist Louisiana's communities in protecting aquifers and surface waters (e.g., rivers, lakes) that are sources of drinking water. The staff also works on environmental water quality issues that might arise related to drinking water sources. In addition, Louisiana Source Water Protection Program staff assist Louisiana NPS staff in watershed areas where watershed implementation plans are completed as part of the watershed coordination team effort.

Numerous areas of Louisiana have experienced rapid growth and development; therefore, emphasis has been placed on working with parishes to establish a drinking water protection ordinance that protects their source water from NPS pollutants. The Source Water Protection Program has collaborated with the NPS Management Program to educate the public on the importance of preventing NPS pollution and maintaining onsite sewage disposal systems.

6.8 Coastal Protection and Restoration

The Coastal Protection and Restoration Authority continues to work with universities, federal agencies (U.S. Army Corps of Engineers, USGS and Department of Commerce National Oceanic and Atmospheric Administration), nongovernmental organizations and private industry to improve the science surrounding nutrient assimilation. To improve understanding of water quality dynamics, an [automated tool for water quality assessment in Louisiana's watersheds and basins](#), and a [project projecting future estuarine hypoxia and habitat in Louisiana under increasing temperatures](#), were funded through Louisiana's RESTORE Center of Excellence Research Grants Program.

[Louisiana's Comprehensive Master Plan for a Sustainable Coast](#) (Coastal Master Plan) advances a comprehensive and integrated approach to restoration and protection. The Coastal Protection and Restoration Authority uses numerical models to predict potential N and P uptake by wetlands receiving river water input. Louisiana's coastal wetlands have the value-added benefit of assimilating and removing nutrients from the Mississippi River. Intercepting excess nutrients via river diversions by filtering them through coastal basins before they exit the mouth of the Mississippi River might ultimately reduce the concentrations of nutrients that reach the Gulf.

The contract for construction of the River Reintroduction into Maurepas Swamp project was awarded in July 2024. The project will reconnect the Mississippi River to the Maurepas Swamp and revitalize over 45,000 acres with freshwater, sediment and nutrients to nourish the area, one of the largest and last remaining coastal freshwater swamps in Louisiana. During early project design, hydrodynamic modeling was used to ensure that these objectives could be met.

The Coastal Protection and Restoration Authority has developed a System-Wide Assessment and Monitoring Program, also known as SWAMP, to monitor and assess both natural and human systems in coastal Louisiana. The development and implementation of SWAMP provides the framework to evaluate and manage the overall protection and restoration program and also serves as the backbone of project-related monitoring needs. Through SWAMP, a regional discrete water quality monitoring was implemented coastwide. The regional SWAMP water quality network leverages existing long-term water quality programs (Louisiana DEQ, Louisiana Department of Wildlife and Fisheries and the USGS), combined with the implementation of new water quality stations for a total of 120 discrete and three continuous water quality stations. Water quality parameters measured include N (total Kjeldahl N, nitrate + nitrite N and ammonia), P (TP, orthophosphate), silica, chlorophyll *a*, total suspended solids, turbidity, dissolved oxygen, dissolved oxygen percent saturation, temperature, salinity and pH. Water quality data coastwide can be accessed at: <https://cims.coastal.la.gov/monitoring-data/>.

7. Minnesota

From 2022 to 2024, Minnesota advanced its NRS (Minnesota NRS) implementation in multiple ways. Following a comprehensive 5-year Minnesota NRS progress report released in 2020, Minnesota began a planned revision of the MNRS, which is scheduled to be completed in 2025. Highlighted below are select progress updates and descriptions of new endeavors and products from the past 2 years. The 2014 Minnesota NRS and the 5-year progress report can be found on [Minnesota's NRS](#) webpage, as well as other updated materials, progress tracking displays and webinar recordings from the current Minnesota NRS revision process.

7.1 Nonpoint Source Programs

CWA Section 319 Nonpoint Source Pollution Program – The CWA Section 319 NPS pollution program was restructured in Minnesota to provide 16 years of stable local funding for small watersheds. The program focuses on relatively small watersheds to make it more manageable to get the detailed assessment needed for goal setting, source identification, critical area identification, implementation targeting and performance evaluation monitoring. Thirty-five watersheds have been selected to receive this funding, all with either a direct or indirect focus on nutrients. More information is available on the CWA Section 319 Small Watershed program [here](#).

State Funding Assistance for BMP Implementation – Over the State FY 2024 – 2025 biennium, Minnesota’s 25-year Clean Water, Land and Legacy funding provided approximately \$200 million for protection and restoration implementation activities, while in FY 2022 – 2023, a combination of Clean Water funds and local and federal dollars resulted in \$198 million for nonpoint pollution reduction actions. Figure 35 outlines the distribution of BMPs that have been implemented to address NPS watershed pollution in Minnesota since the inception of the Legacy Amendment. More information about these funds can be found in the [2024 Clean Water Fund Performance Report](#). More information on practices implemented to address water quality can be found at Minnesota’s [Healthier Watersheds Tracking System](#).

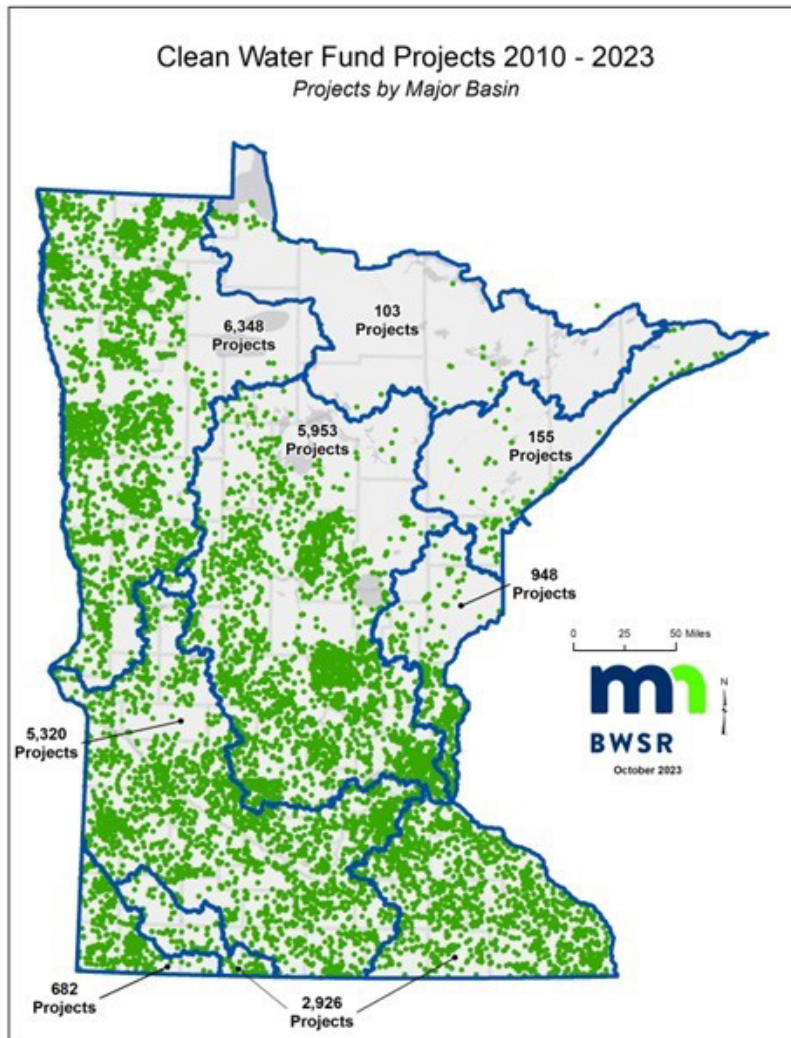
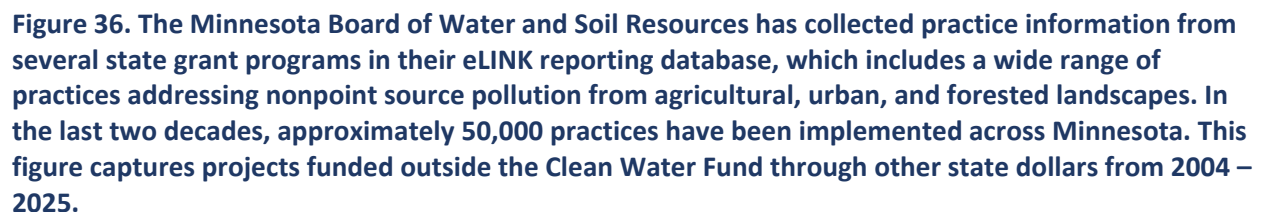


Figure 35. This map depicts the distribution of locations of project and BMPs that have been implemented since Minnesota State’s FY 2010 to present by major watershed basin. All locations represent projects implemented through local governments with local landowners from Clean Water fund grants from the Minnesota Board and Water and Soil Resources.

Minnesota Agricultural Water Quality Certification – The Minnesota Department of Agriculture has continued its [certification program](#) that provides regulatory certainty, technical assistance and cost-share for certified farms to meet BMP standards for water quality protection. Private industry has partnered with agencies to promote and use this program. Recent progress (September 2024) shows more than 1,500 producers that are certified, representing over 1,100,000 acres. Certified farmers have added 3,000 new practices.

Soil Health Financial Assistance Program Grant – The Minnesota Department of Agriculture [Soil Health Financial Assistance Program](#) grant is a first-of-its-kind program that provides cost-share for the purchase and retrofit of agricultural equipment needed to implement soil health practices. Individual producers, producer groups and local government units are eligible to apply. The Soil Health Financial Assistance Program was initially established as a \$500,000 pilot appropriation in Minnesota’s 2022

Soil Health Grant Program – The Minnesota Board of Water and Soil Resources received \$21 million from the state’s general fund and \$12 million from the Clean Water Fund during the 2023 legislative session to support soil health programming across the state. The Board of Water and Soil Resources was also selected last year to receive \$25 million in RCPP funds from the USDA NRCS for soil health initiatives. Soil health is a priority identified in the Minnesota Climate Action Framework. These grants are part of a large-scale effort to work with landowners to improve soil health. Some of these practices are reflected in Figure 36.



New Nitrate Sensor Network – The Minnesota Pollution Control Agency received \$2,000,000 from the state legislature to build a continuous nitrate monitoring sensor network in parts of southern Minnesota where nitrates are a pressing concern. These sensors will record nitrate level changes in real-time, such as after a precipitation event, and provide a more efficient way to gather nitrate data to inform restoration actions and protect drinking water supplies.

7.2 Point Source Programs

Wastewater Nutrient Discharge Reduction – Between 2000 and 2023, wastewater point source P discharges were reduced by 76% in Minnesota. More information is available on [Minnesota's wastewater P loads interactive map](#). During this time, wastewater N has risen slightly (approximately 1%), and N series monitoring was added to permits. In 2023, permits included nearly 3,000 N series monitoring requirements to provide better insight into how permitted sources impact statewide nutrient levels.

Wastewater N Reduction Strategy – Minnesota released a detailed [Wastewater N Reduction Strategy](#) in spring 2024. This strategy is multi-phased and focuses on making N reduction progress by first using non-regulatory methods like source reduction and wastewater treatment facility optimization. The second phase of the strategy includes the development of N water quality-based effluent limits and other TN effluent limits in permits upon adoption of nitrate water quality standards and state discharge restriction regulations. The state is working toward expanding water quality trading to support cost-effective solutions, along with permit controls and/or state discharge restrictions to ensure that local aquatic life is protected and commitments to downstream waters are met.

Proposed Changes to Feedlot Permits – The Minnesota Pollution Control Agency has proposed changes to the two permits that regulate the state's largest animal feedlots. With the proposed permits, farmers would have the option to apply manure in the spring or plant living cover on the landscape for manure applied in the fall. Other manure management regulations would apply, and the permits only apply to those facilities with over 1,000 animal units. Of the 17,000 livestock facilities in Minnesota, about 1,000 meet these size requirements. More information about these proposed changes can be found on Minnesota's [feedlot permits page](#).

7.3 Watershed Approach

Watershed Strategies and Planning – Minnesota uses watershed monitoring, modeling and other assessments to develop problem-solving strategies for local and downstream waters. Water quality conditions have been intensively monitored in all 80 watersheds, and in summer of 2023, all restoration/protection strategies were completed for the 80 watersheds in Minnesota. Updates to the oldest reports have now begun, incorporating new information about nutrient management and monitoring in the state. More information can be found on results of watershed monitoring and strategies at [Minnesota Watersheds](#).

The technical reports and strategies are used by partnerships of local governments to develop prioritized, targeted and measurable local implementation plans within the watershed planning areas. All planning areas have now begun or completed comprehensive watershed management plans through the [One Watershed One Plan program](#).

Watershed outlet load reductions to meet state line nutrient goals – Interim [guidance](#) was developed in 2022 to show nutrient load reductions from anthropogenic sources needed from each watershed to collectively achieve Minnesota’s part of the Gulf of America nutrient reduction goals. These watershed planning goals were updated to incorporate more recent modeling results and will be included as part of the 2025 Minnesota NRS revisions. The guidance includes information on how to estimate BMP combinations and levels of adoption that will achieve specific watershed nutrient load reductions. A user-friendly watershed nutrient reduction planning tool called [Watershed Pollutant Load Reduction Calculator](#) was recently developed to provide a quick and simple way for watersheds to estimate the effects of BMPs on nutrient reduction.

Watershed-Based Implementation Funding Program – As part of the Clean Water Legacy funding previously noted, the Minnesota Board of Water and Soil Resources has fully implemented the [Watershed-Based Implementation Funding Program](#) (\$75 million in State FY 2024 – 2025). Watershed-based funding is an alternative to the traditional project-by-project competitive grant processes used to fund water quality improvement projects and allows collaborating local governments to pursue timely solutions based on a watershed’s highest priority needs. The approach requires a comprehensive watershed management plan developed by local partnerships through the One Watershed One Plan program to provide assurance that actions are prioritized, targeted and measurable.

7.4 Total Maximum Daily Loads for Nutrient-Impaired Waters

TMDLs have been approved for 676 of the nutrient-impaired waters in the state, while during 2024 nutrient improvements led to the removal of 15 lakes from Minnesota’s impaired waters list. More TMDL progress info can be found [here](#).

7.5 River Nutrient Trends

P concentration trends continue to show mostly decreases in the Mississippi River Basin, whereas generally, N trends do not show as much progress as P. Updated River nutrient load trend results near Minnesota’s state lines have been assessed and will be included in Minnesota NRS revision. For more information, see page 35 of the [2024 Clean Water Fund Performance Report](#). Precipitation increases in the Mississippi River Basin within Minnesota between 2010 and 2020 caused additional challenges for reducing nutrient loads. Flow-normalized load trends show decreases in both N and P; however, for N, the loads are increasing when not normalized for weather and flow variability.

7.6 Work plan for Gulf Hypoxia Program funds

Minnesota’s work plan for Gulf Hypoxia Program allocations focuses on multiple areas important for Minnesota’s nutrient reduction work into the next decade and beyond, as follows:

1. **BMP needs, effects and priorities** – From existing research, identify the most promising agricultural BMPs and associated nutrient reduction efficiencies and new adoption acreage needs to reach our nutrient strategy goals.
2. **Scaling up BMP adoption** – Develop specific options and recommendations for how Minnesota can best scale-up and accelerate programs supporting the adoption of the most promising agricultural practices.

3. **Remaining loads and geographic priorities** – Update Minnesota’s river nutrient load estimates for each source sector and identify remaining river nutrient load reduction needs at the state line and watershed outlets. Priority watersheds for nutrient reduction efforts will also be re-evaluated.
4. **Tools for watershed planning** – Support and increase the use of watershed decision-support tools for local nutrient reduction planning and strategic implementation of effective practices at the local watershed scale.
5. **Point source wastewater N reduction** – Identify facilities with high nitrate loads and those potentially harming local river aquatic life, and work with those facilities to provide assistance for planning and piloting N reduction.
6. **Tracking system** – Design a progress-tracking system for displaying ongoing and cumulative nutrient reduction efforts and results.
7. **Strategy revision** – Update and revise Minnesota NRS to achieve point and NPS nutrient load reductions more effectively to waters through 2035.
8. **Manage and coordinate the above** – Manage and coordinate subcontracting, reporting, financial, multi-state collaboration and other project management work to accomplish parts 1 to 7 and continue to implement and facilitate the Minnesota NRS for years to come.

7.7 Advancing climate-related goals

Minnesota developed a comprehensive [Minnesota Climate Action Framework](#) in 2022, which emphasizes the importance of managing working lands. The agricultural practices needed for reducing greenhouse gasses, storing carbon and adapting to climate change are largely the same practices that are needed for nutrient reduction to waters. Minnesota aims to prioritize nutrient reduction practices that accomplish multiple benefits, including addressing climate change.

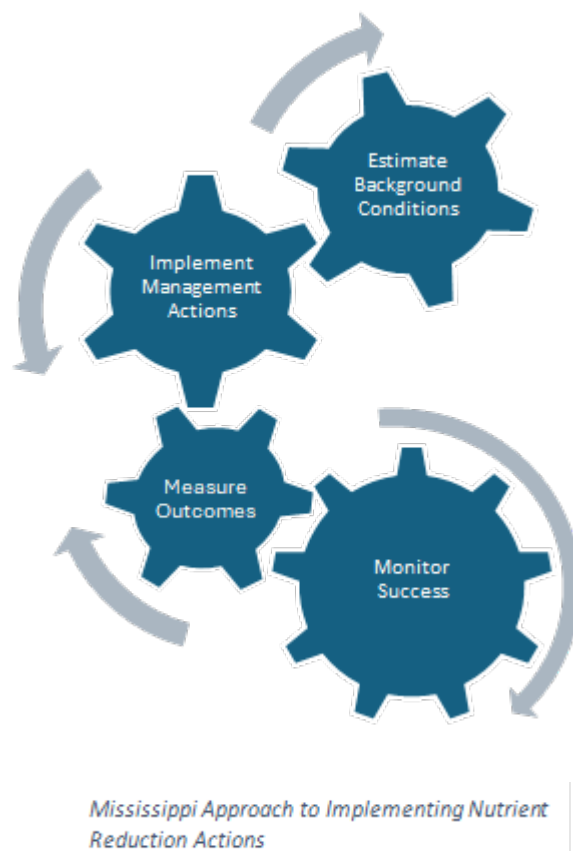
8. Mississippi

8.1 Overview of Mississippi’s Nutrient Reduction Strategies

In 2008, Mississippi started developing the state’s NRS (Mississippi NRS) specific to regional nutrient inputs and concerns. These strategies focus on land use practices and characteristics unique to each region: the [Mississippi Delta](#) (alluvial plain), [upland areas](#) and [coastal areas](#) of the state. As individual watershed projects have been developed, Mississippi’s NRS was used to guide the development and implementation of watershed restoration and protection plans to ensure actions included in these plans address nutrient contributions to state waters and the Gulf of America. In 2012, Mississippi developed a [statewide strategy](#) to provide a comprehensive approach to addressing nutrient concerns on state lands and waters.

8.2 Mississippi's Approach for Using Gulf Hypoxia Program Grant Funds

Mississippi received 2 years of funding (FY 2022 and FY 2023) from the Gulf Hypoxia Program, which made resources available to states and tribes within the HTF. Working with partners to identify the highest priorities, the first set of projects focused on filling data gaps and building tools to help Mississippi establish a strong foundation for making management decisions. Specifically, the funding targeted actions to better characterize delivered N loads to the Mississippi River (estimating background nutrient contribution), assess load reductions achieved through BMPs (load reductions achieved from implemented actions/plans), build a new biological response metric to measure water quality impacts from nutrient reduction activities (measuring outcomes) and communicate lessons learned and findings related to the Mississippi NRS (stakeholder engagement). Mississippi's approach to addressing nutrient reduction is centered around the concept of estimating background conditions, implementing actions, measuring outcomes and monitoring success. Activities completed in each of these steps are critical to incorporating adaptive management into Mississippi's process and ensuring the success of the overall program.

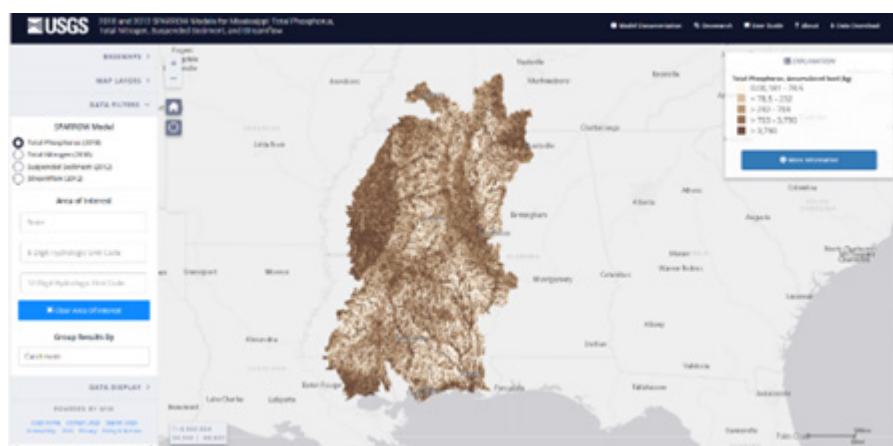


Estimate Background Conditions

Understanding existing nutrient conditions is critical to the long-term goal of measuring the success of nutrient reduction efforts. To do this, Mississippi is incorporating trend analysis using data from long-term monitoring stations as well as modeling approaches to estimate background loading. The SPARROW model developed by USGS provides estimates of background loading for N, P and sediment. These outputs are available for watersheds at a national scale. Recognizing the need to have similar information, Mississippi partnered with the USGS to develop a state-scale SPARROW model to provide these background loading estimates for Mississippi watersheds.

USGS Partnerships: Mississippi SPARROW Model and Nutrient Trends Report

Mississippi is working to better evaluate nutrient conditions at a statewide scale through a continued partnership with the USGS. Two recent outcomes from this partnership are a nutrient trends analysis at long-term monitoring stations and a state scale calibrated SPARROW model to provide nutrient loadings using data

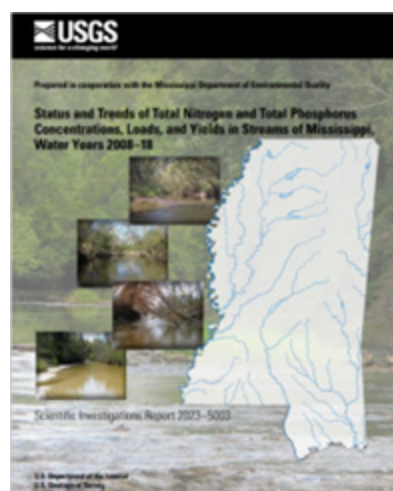


collected in Mississippi waters. The [Mississippi SPARROW](#) model estimates Mississippi's nutrient and sediment loading into the state's surface waters and serves as a key mechanism for determining background nutrient loads. Outputs from this model can also be used to help target areas in the state where implementation activities can have the most impact on water quality.

Additionally, the USGS partnership also produced a [nutrient trends analysis](#) encompassing more than 20 locations across the state using a 10-year dataset. As a result, flow-weighted concentrations and loads were calculated at each site and then evaluated by region and major land use type. This analysis provides foundational information to measure change in conditions from nutrient reduction actions through time. Another key outcome of this analysis shows how adjacent land use can impact nutrient conditions, leading to a better understanding of the relationship between rainfall and streamflow and nutrient conditions.

Implement Management Actions

Management and abatement of nutrient pollution rely on statewide and targeted watershed approaches implemented through regulatory and non-regulatory federal-, state- and local-level programs. Implementation of Mississippi's NRS is done in cooperation with numerous agencies, organizations and groups at all levels of government and in the private sector. A key component of Mississippi's NRS is to leverage work through partnerships and within existing programs to address nutrients. Mississippi has been working to build awareness of nutrient impacts and integrate nutrient reduction efforts into existing CWA programs.



Permitting and TMDL Modeling

Working within the NPDES permitting process, Mississippi has implemented nutrient requirements into 100% of permits for major municipal facilities and 82% of permits for minor municipal facilities. Major facilities have a discharge, or outflow, of more than 1 MGD and facilities with less than 1 MGD discharge are classified as minor. Monitoring of waters coming into facilities, or influent monitoring, is included in all NPDES permits for municipal facilities with a discharge greater than 1.0 MGD. Mississippi is also

working to incorporate nutrient requirements into industrial permits. Currently, Mississippi has incorporated nutrient requirements into 86% of the permits for major industrial facilities and 29% of the permits for minor industrial facilities.

Based on TMDL loadings calculated for the watershed and the current nutrient loadings from the facility, the nutrient requirements in permits may include permit limits or reporting of the amount of nutrients in the discharge. Currently, Mississippi has developed TMDLs for TN and/or TP for over 170 water bodies statewide. These TMDLs cover over 3,000 miles of rivers and streams and more than 12,000 acres of lakes and reservoirs. As part of the TMDL process, the nutrient impacts from over 20 million acres of watersheds have been evaluated. As a result, 65% of all watersheds in Mississippi have been included in nutrient TMDLs. This coverage will increase as the state continues developing water quality models that support permitting and TMDL efforts.



[Stormwater Guide for Coastal Decision Makers and Engineers](#)

As part of the MS4 permitting process, Mississippi requires entities to incorporate nutrient reduction actions in their stormwater management plans. To support these efforts, Mississippi developed and published updated guidance materials targeted to help communities better understand the impacts of development and how to minimize and/or mitigate those impacts. [Managing Stormwater for Healthy Watersheds in Coastal Mississippi: Best Practices](#)² was developed to help communities address stormwater impacts, highlighting the need for green infrastructure and low impact development. Although the focus is on stormwater, many of the practices included in the guidance also help address impacts from nutrient runoff.

[Nonpoint Source Management](#)

The Nonpoint Source and Basin Management Program implements strategies that target priority watersheds throughout the state. Prioritization of these watersheds is an evolving process addressed in coordination with resource agency partners and local stakeholders. Mississippi's collaborative approach to reducing excessive nutrients and their impacts focuses on the development and implementation of watershed projects using Mississippi's NRS to guide those efforts. The target audience for strategic planning and implementation includes local agencies and organizations with a mission for environmental and water quality restoration and protection, as well as local, state and federal agencies with the authority to develop and implement nutrient reduction plans and practices. CWA Section 319 NPS funding is used to support nutrient reductions at the watershed scale. The strategy behind this approach is to use the committed CWA Section 319 resources to attract additional leveraging opportunities that, together, create a greater potential to achieve quantifiable reductions in nutrient concentrations and loadings. During FY 2024, Mississippi's Nonpoint Source Program implemented over \$2.4 million in projects in support of nutrient reduction efforts.

² Mississippi Department of Environmental Quality. 2023. Managing Stormwater for Healthy Watersheds in Coastal Mississippi: Best Practices. Mississippi Department of Environmental Quality, Office of Pollution Control, Water Quality Management Branch, Jackson, MS.

Nutrient Reduction Strategies

Using Gulf Hypoxia Program Funds, Mississippi is working with stakeholders across the state to re-evaluate the existing Mississippi NRS and identify needed updates. This collaborative process allows Mississippi, along with our partners, to review the applicability of these strategies over time and, where necessary, apply adaptive management approaches to inform changes. This effort will highlight updates from lessons learned over the last 15 years and communicate nutrient reduction outcomes to partners and the public.

Water Quality Criteria

Mississippi Department of Environmental Quality's (Mississippi DEQ's) goal is to develop scientifically defensible water quality criteria that are appropriate and protective of Mississippi's surface waters. Mississippi DEQ continues working towards the development of numeric nutrient criteria for each of Mississippi's various water body types: lakes/reservoirs, rivers/streams, coastal waters and waters of the Mississippi Alluvial Plain. The criteria developed for each water body type will be coordinated with the water quality criteria for other water body types to build consistency across the state and ensure protection from negative impacts to downstream waters.

Measure Outcomes

Mississippi is working to develop new tools, models and metrics to measure the success of nutrient reduction. The output from these efforts not only can help quantify nutrient load reductions achieved from implementation actions but also help to inform management decisions in support of future efforts. A key component to measuring outcomes is understanding how nutrient contributions to waters is reduced from actions implemented on the landscape.

Nutrient Reduction Estimation Tool

Mississippi has been diligently implementing nutrient reduction activities across the state since the development of the first Mississippi NRS in 2008. However, until recently, these conservation efforts had not been aggregated into a consolidated data set that can be used to determine progress over time. Mississippi worked with partners to gather implementation data from 2008 to the present and has allocated Gulf Hypoxia Program funds to build a tool that uses these data to estimate the load reductions achieved through implementing conservation practices. This tool, Mississippi's Nonpoint Source Reduction Estimation Tool (NRET), will provide outputs that can be aggregated at different spatial scales as well as by practice. The NRET will advance Mississippi's efforts to estimate P, N and sediment load reductions achieved from the implementation of BMPs both as annual reductions and aggregated over time to measure the success of program implementation and communicate these results to stakeholders and partners.

Monitor Success

Although water quality models provide valuable estimates of reductions achieved and background conditions, Mississippi is also focusing efforts on collecting water quality data that can be used to refine those models and measure actual conditions in state waters. Nutrient monitoring is incorporated into all routine monitoring programs supported by Mississippi DEQ, but Mississippi is also using Gulf Hypoxia Program funds to augment those programs and fill data gaps.

Continuous Nitrate Monitoring

The HTF has prioritized the expansion of in-flow monitoring networks in the MARB to better estimate and track nutrient and sediment loads from states into the river. In support of this priority recommendation, Mississippi used Gulf Hypoxia Program funds to install real-time nitrate sensors in six major tributaries to the Mississippi River: Steele Bayou, Yazoo River, Big Black River, Bayou Pierre, Homochitto River and Buffalo River. This work is being done in partnership with the USGS. Data collected on these water bodies will be used to develop more accurate, scientifically defensible estimates of Mississippi's nutrient contributions to the river and the hypoxic zone.

Diatoms as a Biological Response Success Measure

As more efforts are focused on reducing nutrient loading in the MARB, it is important to advance the process by which these changes can be monitored and measured in the environment. Biological organisms that live in water, such as plants and fish, can be used to document and assess the health of streams. Non-vascular plants, such as algae and diatoms, are commonly used as indicators of water quality because they respond to nutrient pollution. Diatom communities respond as nutrients are added or reduced in water. Although Mississippi has a vast network of monitoring capabilities, including biological metrics, a portion of the Gulf Hypoxia Program funds is being used to collect diatom data and develop a stressor response relationship for nutrient loading. Data collected during this effort will be used to monitor and track changes in nutrient loading as well as target areas that need focused nutrient reduction efforts.

Routine Nutrient Monitoring Efforts

The Mississippi DEQ collects water samples at 37 bridge sites under the Fixed Station Monitoring Program each year within the state as part of a long-term status and trends monitoring program. These stations are placed on larger streams and rivers and are sampled monthly for routine water chemistry, including nutrient parameters. Mississippi also collects biological data to assess the health of benthic macroinvertebrate communities in wadeable streams. As part of this monitoring program, Mississippi DEQ collects biological community data along with habitat and water quality data on approximately 100 streams annually. Routine data collection is also performed on lakes and reservoirs across the state where nutrient data along with chlorophyll *a* is collected and assessed. Finally, as part of the Mississippi Coastal Assessment program, Mississippi DEQ collects samples at 25 randomly selected sites annually, along with 12 static sites in Mississippi's estuaries and near coastal waters. Data from these programs are used to assess the status of Mississippi's water resources.

9. Missouri

Missouri is continuing to make progress in efforts to reduce nutrient loss and implement the actions identified in the Missouri NLRS. Several of these recent Missouri DNR efforts are highlighted below.

Missouri continues to implement Numeric Nutrient Criteria for Lakes. As listed on Missouri's 2022 CWA Section 303(d) list, 119 lakes are listed as impaired due to nutrients or chlorophyll *a*.

9.1 4R Nutrient Stewardship

To date, Missouri DNR's Soil and Water Conservation Program has entered nutrient management contracts with cooperators in Randolph, Chariton, and Andrew Counties with *the potential* to reduce

nutrients from agricultural fields with additional contracts to be added in 2025 in Buchanan, Nodaway, and Pike Counties. A partnership between the Missouri Fertilizer Control Board and the University of Missouri through the Climate Resilient Crops and Livestock (CRCL) program has provided cost-share opportunities for Missouri Farmers to implement 4R nutrient management practices. There were 48 applications received for the 2024 cropping season with 36 being completed and 99 contracts received for the 2025 cropping season that are currently underway. Cost-share through the CRCL grant will be available for Missouri producers again in the 2026 cropping season.

The Missouri 4R Certification has grown from 6 retailers representing 450 4R acres in 2022 to 36 retailers/advisors representing 415,000 4R acres in 2023. Most recently, Missouri had 127 4R certified retailers/advisors representing 1.8 million 4R acres in 2024, all with the potential of reducing nutrient losses from agricultural fields.

Educational efforts have been underway through partnership with the Missouri Fertilizer Control Board (MoFCB). Videos, digital, and print materials have been developed by MoFCB to encourage producers to follow the 4Rs of nutrient management.

9.2 TP Point Source Target Reduction Rule

On October 30, 2023, the Missouri DNR finalized a rulemaking aimed at reducing Missouri's statewide load of TP. This rulemaking impacts domestic point sources with a design flow of greater than or equal to one million gallons per day and industrial facilities categorized as major that typically discharge P in their industrial wastewater. In total, this rule impacts 141 facilities, accounting for approximately 92% of all point source wastewater flows in Missouri. In the formation of this rule, the Missouri DNR emphasized flexibility to ensure that compliance would not create an undue burden for stakeholders impacted by the rule. This flexibility established four options for compliance. These flexible target reduction level options are:

1. Concentration-based value: 1.0 mg/L as an annual average TP concentration discharged.
2. Mass-based value: TP annual mass load equal to 1.0 mg/L at a facility's design flow.
3. An overall reduction of TP of 75% from a facility's 2-year average influent load.
4. An overall reduction of TP of a facility's effluent load by 75% using adequately representative effluent data.

These TP Target Reduction Levels will be established in Missouri State Operating Permits between 2029 and 2034, allowing facilities to plan, optimize and upgrade wastewater treatment facilities ahead of implementation. When fully implemented, the rule is estimated to reduce Missouri's point source TP load by over 60%.

While the goal of this rulemaking was to reduce the nutrient impacts from Missouri to the Gulf of America hypoxic zone, local impacts within Missouri are expected as a result of these nutrient reductions. The impacts include a decline in eutrophication and algal growth and an increase in the dissolved oxygen content of the waters receiving discharges from facilities impacted by the Total Phosphorus Rule. The Missouri DNR expects to see improvements in aquatic life, fish and macroinvertebrate communities due to these reductions. Waters impacted directly by these reductions are expected to be clearer and cleaner, with enhanced recreational and wildlife usage when compared to before the implementation of phosphorus reductions established in the rule.

This rule was subject to 3 years of public engagement and is considered by the Missouri DNR as a cornerstone example for nutrient work moving forward in the state.

9.3 Nutrient Trading

In April 2022, the Missouri DNR Water Protection Program presented a draft Missouri Nutrient Trading Program. This trading program delivers upon one of the strategic goals outlined in Missouri's NLRs. On October 30, 2023, Missouri established language in the Missouri Code of State Regulations 10 CSR 207.015 to allow for the use of nutrient trading. Missouri's Nutrient Trading Program is still in draft form and is expected to be finalized in 2025. This program will provide wastewater treatment facilities with a tool for compliance and may spur early adoption of wastewater treatment plant nutrient optimizations.

9.4 Grant Projects

Currently, the Missouri DNR Water Protection Program and Soil and Water Conservation Program have multiple grant projects made possible with funding via the Gulf Hypoxia Program. These projects include the development of a Progress Tracking Dashboard to track nutrient reduction trends in Missouri, an Education and Outreach project that aims to aid in informing Missourians of nutrient-related issues while also providing resources for continued stewardship and education, a project to evaluate soil and water conservation BMPs regarding subsurface nutrient transport with Lincoln University and a Wastewater Treatment Facility Pilot Project to optimize treatment facilities for N and P removal. Together, these projects account for \$666,916.00 of awarded grant projects.

Missouri has expanded its USGS Ambient Water Quality Monitoring Network, adding continuous nitrate monitors to four USGS water quality monitoring stations; the network now has a total of eight continuous nitrate monitors. The four additional stations were selected to better capture and characterize the water quality conditions of key sub-sections of the Missouri, Mississippi and Grand Rivers. Data will be used to better quantify the state's total nutrient loads. Continuous nitrate data is now available through USGS' website, Water Data for the Nation. The following locations have continuous nitrate sensors installed: Missouri River near St. Joseph, Missouri River near Napoleon, Missouri River near Hermann, Mississippi River near Keokuk, Mississippi River near Alton, Mississippi River near Cape Girardeau, Grand River near Sumner and the James River near Galena. USGS is also developing a TP and turbidity regression to estimate real-time P concentrations on the Missouri River near St. Joseph and Hermann, Missouri; USGS anticipates completion in 2025.

The Subsurface Nutrient Transport study at Lincoln University Busby Farm aims to quantify the relative amounts of nutrient pollution entering the Moreau River from surface water vs. subsurface (shallow groundwater) using isotope analysis and to use field study and modeling to determine what specific conservation practices would be the most effective at reducing nutrient transport from those two sources. The project installed shallow groundwater monitoring wells as well as a weather monitoring station and has been gathering baseline data since January 2024.

Missouri submitted a second Gulf Hypoxia Program workplan in November 2024 aimed at continuing funding for the expanded ambient water quality monitoring network and piloting new nutrient loss reduction BMPs. Practices in this proposal included two-stage ditches, blind inlets for terrace systems and a new incentive structure for edge-of-field buffers to increase participation. The results of the pilot

will be presented to the state's Soil and Water Districts Commission for consideration for future funding under the state's Soil and Water Conservation Program.

9.5 Ongoing Nutrient Loss Reduction Efforts of the Missouri Soil and Water Conservation Program and Soil and Water Conservation Districts

Missouri had a record year in state FY 2024, spending \$49.5 million on soil and water conservation and nutrient loss reduction practices. This is an increase of 9.5 million from FY 2023. Of that \$49.5 M in conservation practice funding, \$6.7 million was spent implementing cover crops on 208,000 acres. Since 2018, Missouri has funded 1.2 million acres of the cover crop practice across the state.

9.6 Future of Missouri's NLRs

Missouri's NLRs was created in 2014. This document, developed by the Missouri DNR in cooperation with partners and stakeholders throughout the state, has served as a roadmap for Missouri's nutrient-related work. This strategy aims to improve water quality in Missouri while contributing to reducing nutrients moving downstream to the Gulf of America. As the strategy enters its 10-year anniversary, the Missouri DNR has begun a review to reassess the strategy's goals and action items. This review will update the strategy with information learned and accomplishments achieved since 2014 to ensure the next 10 years result in meaningful nutrient reduction progress.

10. Ohio

Ohio continues to make significant investments in research, monitoring and nutrient reduction efforts to reduce the severe nutrient issues that drive both far-field hypoxia and local harmful algal blooms through the H2Ohio Program, the Harmful Algal Bloom Research Initiative and investment in watershed-based planning. The provision of additional federal resources to support Gulf Hypoxia Program work by states in FY 2020 and FY 2022 – 2027 has been welcomed and has expanded strategic efforts to increase the implementation of nutrient-reducing practices in Ohio. Concern for Ohio River, Mississippi River and Gulf water quality directly corresponds with Ohio's regional and local concerns as impacts on drinking water sources and recreational contact remain a continuing problem in Ohio.

10.1 Monitoring and Research

Ohio Department of Higher Education - Harmful Algal Bloom Research Initiative

The Harmful Algal Bloom Research Initiative program has provided \$24.5 million since 2015. Matching funding from participating Ohio universities increases the total investment to more than \$37 million, demonstrating the state's overall commitment to addressing the harmful algal bloom issue. While much of this research has focused on the Lake Erie watershed, it is a statewide program that is benefiting Ohio and elsewhere. See the [2024 Summary of Harmful Algal Bloom Research Initiative Research](#) for more information.

Monitoring of Public Drinking Water Systems

Ohio requires that public drinking water systems monitor for toxins related to harmful algal blooms. Ohio's [Public Water System Harmful Algal Bloom Response Strategy](#) was updated in 2022, and a separate [Harmful Algal Bloom Response Strategy for Recreational Waters](#) was created in 2020. Harmful

algal bloom sampling results are considered when determining whether a surface water source is impaired for the drinking water beneficial use.

Ohio's Nutrient Mass Balance Report

In 2024, Ohio published its fifth biennial report on the mass loading of nutrients delivered to Lake Erie and the Ohio River from Ohio's nonpoint and point sources. The 2024 Nutrient Mass Balance Study for Ohio's Major Rivers provides estimated nutrient loading (TN and TP) based on regular sampling of pour points at gages in 11 watersheds in Ohio. Loadings are calculated by the National Center for Water Quality Research and USGS. Ohio's Mass Balance Study recognizes several factors that influence watershed loading, such as watershed size, annual water yield, NPS yield, land use, per capita yield and population density.

Ohio's Mass Balance Study covers 72% of the area of the state. Five Ohio River watersheds are included in the 2024 study (Great Miami, Little Miami, Scioto, Hocking and Muskingum rivers). Nonpoint sources contribute the highest loads of N and P to all five of these watersheds. The NPS loads increase relative to permitted sources (e.g., wastewater treatment plants) and Home Septic Treatment System as annual rainfalls increase. The following shows the relative amounts of N and P from different sources for each watershed.

The Great Miami River Watershed

Agricultural land use dominates 66% of this watershed. NPS is the largest proportion of the TP and TN load, as reflected in the relative proportions shown below (Figure 37). Ohio's analysis of the Great Miami River watershed does not include the Whitewater River tributary. This tributary is downstream of the monitoring point on the Great Miami River used by this study and mostly drains lands in the state of Indiana.

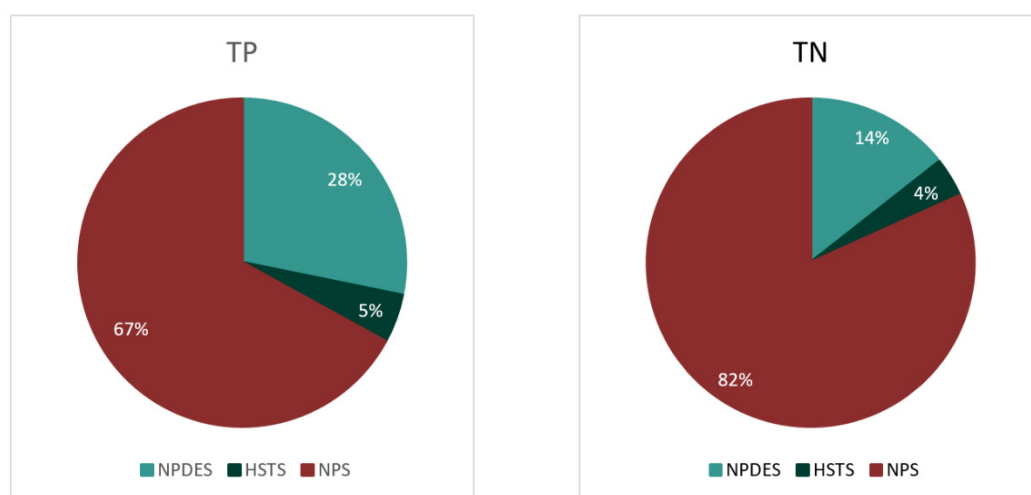


Figure 37. Proportion of TP and TN load from different sources for the Great Miami watershed, average of 5 years (water years 2019 – 2023). (Source: State of Ohio's 2024 Nutrient Mass Balance Report)

The Little Miami River Watershed

The Little Miami River watershed was added to Ohio's nutrient mass balance study due to monitoring that began at two points in 2020. The total watershed drains 54% agricultural land use. The relative proportion of TP and TN are shown below in Figure 38.

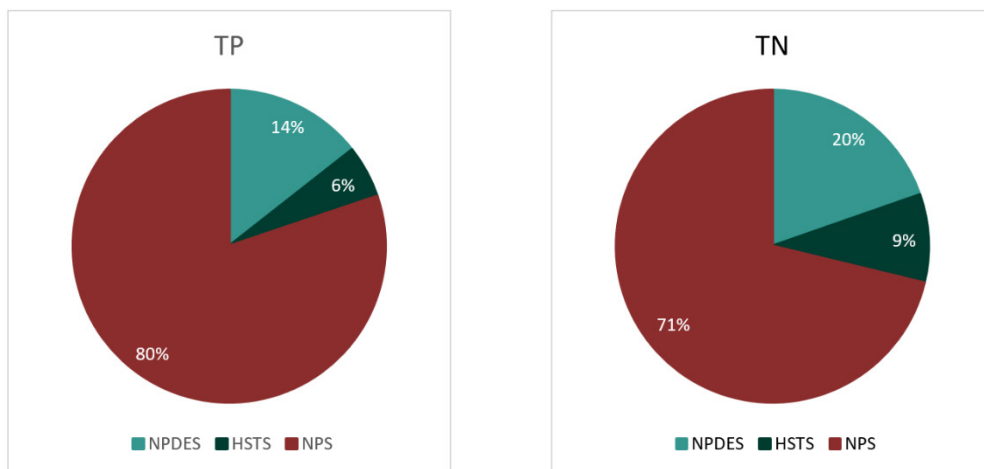


Figure 38. Proportion of TP and TN load from different sources for the Little Miami watershed, average of 3 years (water years 2021 – 2023). (Source: State of Ohio's 2024 Nutrient Mass Balance Report)

The Scioto River Watershed

The Scioto River is the second largest watershed in Ohio that drains to the Ohio River. Agricultural land use drains 57% of the Scioto watershed. The relative proportion of TP and TN are shown below (Figure 39).

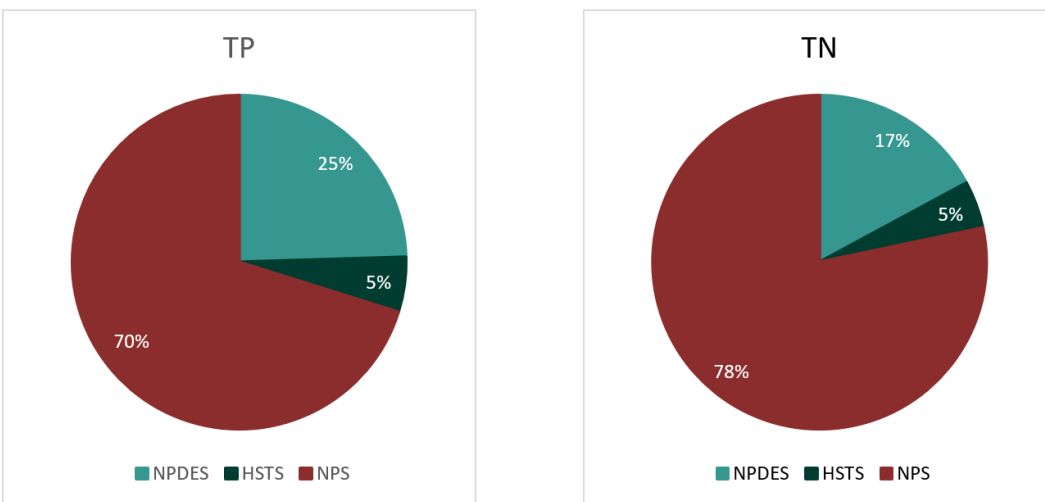


Figure 39. Proportion of TP and TN load from different sources for the Scioto watershed, average of 5 years (water years 2019 – 2023). (Source: State of Ohio's 2024 Nutrient Mass Balance Report)

The Hocking River Watershed

The Hocking River watershed was added to Ohio's nutrient mass balance study due to monitoring that began in 2020. Land uses from areas considered natural make up the majority in this watershed, at 66%. Agricultural lands represent 25% of this watershed's drainage area. The relative proportions of TP and TN are shown below (Figure 40).

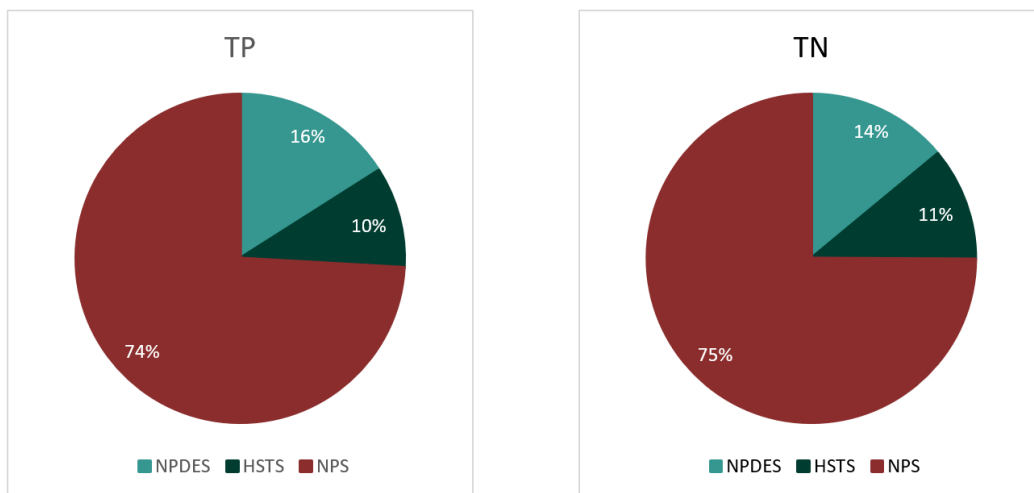


Figure 40. Proportion of TP and TN load from different sources for the Hocking River watershed, average of 3 years (water years 2021 – 2023). (Source: State of Ohio's 2024 Nutrient Mass Balance Report)

Muskingum River Watershed

Natural and agricultural land use contribute to the Muskingum River watershed at 48% and 39%, respectively. The relative proportion of TP and TN are shown below (Figure 41).

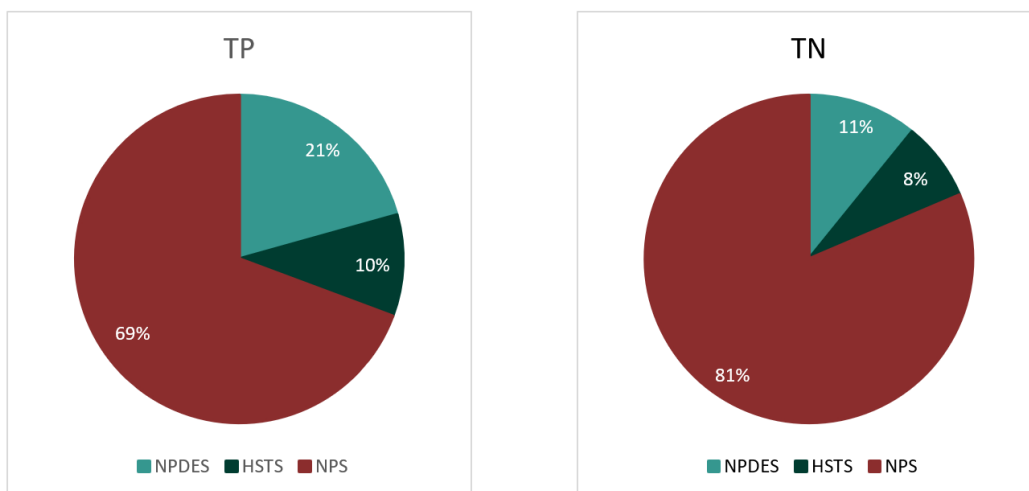


Figure 41. Proportion of TP and TN load from different sources for the Muskingum watershed, average of 5 years (water years 2019 – 2023). (Source: State of Ohio's 2024 Nutrient Mass Balance Report)

10.2 NPS Efforts Including Watershed Planning and Implementation Projects

H2Ohio

Ohio agencies have continued to develop and implement the H2Ohio program, which was first launched by Governor DeWine and Lieutenant Governor Husted in 2019. The program is administered by three Ohio agencies, each with state-funded resources with slightly differing water quality applications. The program is intended to develop long-term, sustainable, science-based and cost-effective strategies to address Ohio water quality problems. Accomplishments of the program through June 2024 are shared in the program's [annual report](#). For the latest information on the H2Ohio program, see the initiatives [webpage](#).

Ohio EPA's Nonpoint Source Program

Ohio utilizes the development of approved Nonpoint Source Implementation Strategic Plans, or NPS-IS, to engage stakeholders in a locally led process of tying water resource impairments to ready-to-apply actions and projects that will assist in reducing nutrients and other sources of impairment. Ohio EPA's Division of Surface Water and the Ohio Department of Agriculture's Division of Soil and Water Conservation provide financial and technical assistance for the development of NPS-IS. Approved strategies are data-driven characterization of causes and sources of issues within the watershed, development of measurable goals, and objectives that conclude with attainable projects. Since 2020, Ohio NPS-IS have also contained far-field pollution reduction goals. Additionally, the project summaries that NPS-IS contain are typically eligible for CWA Section 319 funding, should a public entity or nonprofit apply. An online [GIS application](#) provides an interactive tool to view where plans have been developed and projects implemented. Where applicable, a factsheet is linked to the map describing the project goals and outcomes.

In addition to the base NPS program, Ohio EPA has been implementing a 2-year workplan to increase Gulf hypoxia support activities using funding provided by the Gulf Hypoxia Program. An additional workplan will be submitted for the balance of the 5 years. Under this workplan, Ohio has been increasing support for nutrient reduction in Ohio's contributing area to the Mississippi River and Gulf through the following objectives:

Update Ohio's Nutrient Reduction Strategy

A 2024 update to Ohio's NRS (ONRS) is currently in development through the collaborative efforts of Ohio EPA, Ohio DNR, Ohio Department of Agriculture (ODA) and Ohio University's Voinovich School of Leadership and Public Service. Monthly virtual meetings with the Core stakeholder group (including representatives from Ohio EPA, DNR and ODA) were conducted to help identify data sources, define priority watersheds, analyze nutrient loads and evaluate strategies for nutrient reduction. Furthermore, four workgroup roundtables were conducted in early 2024, which included input from the core stakeholder group as well as state, local and federal agencies. These workgroup roundtables functioned to help gather regional input across the state from a variety of entities regarding modeling, monitoring, planning and implementation efforts to reduce nutrient loadings as well as advance topical aspects of the ONRS updates.

Increase Nutrient Management Technical Assistance

ODA has hired a Nutrient Management Specialist to help provide training and support to county SWCD personnel, farm and crop advisors and farm producers. The position's focus area is on the development of Voluntary Nutrient Management Plans that have been a required prerequisite to ODA's H2Ohio programs. Since hiring, 14 training sessions/workshops on Nutrient Management have been held, with direct technical assistance provided to over 20 SWCD on nutrient management.

Increase Conservation Practice Design Technical Assistance

The Department of Agriculture posted and hired a full-time Conservation Engineer to provide Professional Engineering Assistance to support approval and design of structural nutrient reduction practices such as two-stage ditches, wetlands, drainage water management and saturated buffers. This initiative has and will continue to increase access to plan approval and design services and preceded the expansion of Ohio's H2Ohio program to fund practices in areas beyond the Western Lake Erie Basin. The position especially focuses on priority agricultural areas that contribute higher amounts of nutrients.

Increase Ohio EPA Staff Support for Nutrient Reduction Activities and Evaluation to Support HTF Goals

Ohio EPA posted and hired a full-time Environmental Specialist to support nutrient reduction activities in the Ohio River basin that advance the goals of the HTF. This position assists in updating the ONRS and helps develop evaluation measures. This staff also evaluate potential nonpoint and point source measures for addition to the ONRS and evaluate ONRS progress, as well as evaluate the need for extra outreach, information or accommodation to ensure equitable access to the agency's programs and support the development of NPS-IS that include Gulf Hypoxia far-field targets.

Support Development of Additional HUC-12 NPS-IS

This subgrant funded the development of small watershed plans using the tools that conceptualize potential nutrient-reducing practices and/or reduce peak nutrients in spring flows through drainage water management, sediment reduction, water retention or reuse. Eleven new small watershed plans eligible for NPS program funding were supported by the Gulf Hypoxia Program.

Develop a Program That Reduces Nutrients from Home Septic Treatment Systems or Septage from Communities in Southeast or Southern Ohio

Discharges from failing septic systems are a source of nutrients, especially where poor installation, undersized leach fields, limited soil areas, poor maintenance and limited income to perform maintenance reduce treatment capability. With the help of Athens and Meigs County Health Departments, areas with high Home Septic Treatment System failure rates and areas lacking centralized systems were identified in the Southeastern Ohio Region. A total of four "Septic Socials" were hosted by Rural Action in partnership with Ohio University, where topics such as how septage impacts water quality, basic septic system operation and maintenance and enrolling in the Ohio Water Pollution Control Loan Fund were discussed. Rural Action also evaluated wastewater treatment plants in Athens and Meigs counties as potential sites for a pilot program that further expands opportunities for managing Home Septic Treatment System sludge in the region.

Measure the Effectiveness of New Innovative Practices

The Wright State Innovative Practice Monitoring Project aims to monitor changes in water quality following the installation of a new cascading grassed waterway. The objectives of this project were to provide concentration estimates for nutrients and total suspended solids concentrations, flow value estimates for water passing through the cascading grassed waterway, establish soil test P levels on an annual basis and calculate changes over time, calculating seasonal and annual changes in load and comparing documented loads/concentrations reductions to existing pre-data. To date, sites have been selected, monitoring equipment has been installed and a study plan to complete monitoring has been developed. Data collection is ongoing.

Support the Continued Maintenance of USGS Gage Water Quality Monitoring at Three Monitoring Points in the Ohio River Basin

Ohio has established water quality monitoring at three USGS gages on the Hocking River, the East Fork of the Little Miami and the Little Miami at Milford. This objective supported maintenance of these gages to continue to collect water quality data (specifically nutrient load, concentrations and flow) indefinitely, with the results being used in Ohio's Mass Balance Report.

Conservation Reserve Enhancement Program

Scioto River

The Scioto CREP began in 2005 as a partnership between USDA and the State of Ohio to provide increased incentives for restoring vegetative cover within 100-year floodplain areas of the Scioto Watershed. The maximum number of acres that can be enrolled in Scioto CREP is 70,000. Current enrollment is 58,297 acres, including native warm-season grass establishment, riparian trees, wetland restoration and filter strips. The Scioto CREP contract between USDA and the State of Ohio was renewed on October 1, 2022. The renewal of this agreement increased state incentive payments to landowners willing to enroll their properties. Incentives for wetland restoration have increased from \$500 per acre with a \$5,000 cap per project to \$1,500 per acre, thanks to Governor Mike DeWine's H2Ohio water quality improvement program.

Miami Rivers

The State of Ohio is currently working with USDA to establish the Miami Rivers CREP in the State. This new CREP would encompass both the Great Miami and Little Miami Watersheds. Over the course of this 15-year agreement, Ohio proposes to enroll 60,000 acres of eligible cropland. These lands would be restored to wetlands, riparian forest, grass buffers and saturated buffers. The State of Ohio is currently working to complete a Programmatic Environmental Assessment to get this CREP authorized. Ohio's goal is to have the CREP authorized in 2025 to accept sign-up, pending the renewal of the Federal Farm Bill.

Muskingum Watershed Program

Since 2012, the Muskingum Watershed Conservancy District and ODA-Division of Soil and Water Conservation have administered \$4,900,000 in project dollars to private landowners and local SWCDs within the watershed boundary. The program provides cost-share dollars to agricultural producers in the watershed to reduce runoff, sedimentation and loss of nutrients from crop and pasture fields. BMPs supported under this program include cover crops, livestock exclusion fencing, education and outreach opportunities, critical area seedings, field buffers and nutrient management planning. \$4,100,000 of those dollars have been used to cost-share on over 290,000 acres of cover crops.

Targeted Pasture Management Efforts

ODA partners with USDA-NRCS to deliver technical assistance to grazing and hayland producers. Under a FY 2024 – 2026 grant agreement with NRCS, ODA staff have worked on seven grazing management plans for 1,065 acres. ODA also partners with the Ohio DNR and wrote management plans on 2,000+ acres to help guide better pasture management for grassland bird habitat. Technical assistance also includes whole farm planning and consultations on pasture management and intensive grazing.

USDA-NRCS announced a \$9.3 million RCPP award to ODA in October 2024 to focus implementation of Climate-Smart practices on pasture and hayland throughout a 44-county project area in Southern and Eastern Ohio. Practices such as prescribed grazing, watering systems, pasture and hayland plantings, nutrient management and other associating practices will be available for cost-share through NRCS with dedicated RCPP funding. The goal of the program will be to improve water quality and increase resiliency through implementation of grazing and hayland conservation as a companion to statewide H2Ohio implementation on row crops.

11. Tennessee

11.1 Overall Strategy in Action

Multidisciplinary Tennessee Nutrient Stakeholder Task Force

In 2019, the Tennessee Department of Environment and Conservation (TDEC) and the Tennessee Department of Agriculture (TDA) initiated the engagement of stakeholders to improve on the framework by convening the [Tennessee Nutrient Stakeholder Task Force](#), which draws representation from academia, state and local government, wastewater treatment plant operators, the private sector and nongovernmental organizations. The Tennessee Nutrient Stakeholder Task Force was, in part, a response to the EPA’s 2011 “Stoner Memo,” which emphasizes collaboration between state agencies, conservation districts, industry, private landowners, agriculture, utility districts and other stakeholders for developing a comprehensive state framework for nutrient reductions and builds upon TDEC’s and TDA’s updated [Nutrient Reduction Framework](#) as part of comprehensive efforts to accomplish long-term nutrient reduction in Tennessee.

Currently, up to 75 stakeholders from all major sectors, private and public, state, federal and local, are actively participating in the Tennessee Nutrient Stakeholder Task Force. Together, they have contributed towards:

- Prioritizing watersheds for nutrient reduction.
- Compiling historical and current in-stream nutrient concentration and flow data to evaluate water quality data gaps in determining nutrient trends.
- Compiling nutrient data from mechanical wastewater treatment plants to evaluate trends and cost-effective nutrient reduction strategies.
- Assisting wastewater treatment plants with optimizing operations for nutrient reductions.
- Mapping agricultural conservation practices that enable nutrient reduction.
- Surveying producers in Tennessee to better understand their nutrient management practices.
- Participating in the public comment phase of the Tennessee NPDES Small Municipal Separate Storm Sewer Systems.
- Creating a communication and outreach toolkit.

- The formation of a Nature-Based Solutions Workgroup was formed to represent and advocate for the use of nature-based solutions for nutrient reduction in TN. Nature-based solutions are defined as using streams, riparian buffers, wetlands and floodplain dynamics to reduce the impact of excess nutrients.

Significant strides have been made since the formation of this Tennessee Nutrient Stakeholder Task Force. It is well understood by the Tennessee Nutrient Stakeholder Task Force stakeholders that more data is needed to better understand nutrient sources and applications so that meaningful programs can be implemented to eventually produce measurable reductions in nutrients contributions to the Mississippi River watershed.

Compilation and Analysis of Long-term N and P Monitoring Data in Tennessee

A study was conducted by Tennessee Technological University (TTU) and funded by TDEC to compile and analyze long-term N and P monitoring data in Tennessee, specifically in surface waters. To meet this goal, four main objectives were established: (1) identify potential N and P data sources across the state of Tennessee; (2) compile and standardize the acquired nutrient data; develop a central database to house the re-formatted data; (3) identify the data gaps; and (4) analyze the data for possible nutrient trends present in the watersheds of Tennessee. Water quality data acquired from multiple organizations across the state were wrangled and harmonized for storage in the Tennessee Nutrient Database. This database was developed as a part of this study. Analyzing the data compiled in the database revealed that many watersheds lacked sufficient monitoring sites and sample collection frequency for a thorough statistical understanding of how nutrients have changed over time. The types of nutrients monitored by different organizations across sites and watersheds were also not consistent. Nevertheless, the Regional Seasonal Mann Kendall statistical test was utilized for trend analysis and detected significant increases and decreases in nutrient concentrations in some watersheds. However, gaps in the data may have impacted these results, making the results useful as a starting point but not for drawing conclusions regarding nutrient trends. Through the aforementioned data processing and statistical analysis, this study revealed the need for a standardized reporting format and sampling methodology for the collection of water quality data. Improving the quantity and quality of nutrient data in the database will allow for more robust statistical analyses, resulting in a better understanding of how nutrients are changing in the surface waters of Tennessee. See the [complete study](#).

Nutrient Data Visualization

The Tennessee Nutrient Stakeholder Task Force partnered early on with Great Lakes to Gulf to help visualize water quality monitoring data in the state. The Great Lakes to Gulf is an interactive website that provides user-friendly access to water quality information about the Mississippi River and its tributaries. Interested parties can compare current and historic water quality conditions in rivers and streams and Download data for further exploration. See the [Tennessee portal](#).

The Tennessee Nutrient Stakeholder Task Force expanded this work by contracting with TTU. TTU used the compiled and harmonized nutrient data in the state in a database and created an interactive user interface to access the data. [The Tennessee Nutrient Database](#), or TnNDb, is now updated periodically with data submissions from partner agencies, municipalities and other stakeholders. The TnNDb serves all the partners of the Tennessee Nutrient Reduction Task Force as well as the interested public.

Nature-Based Solutions

After meeting for several years, Tennessee Nutrient Stakeholder Task Force members noticed that a crucial sector was missing from the BMPs workgroups. In 2023, the Nature-Based Solutions Workgroup was formed to address this gap and to represent and advocate for the use of nature-based solutions for nutrient reduction in TN. We define nature-based solutions as using streams, riparian buffers, wetlands and floodplain dynamics to reduce the impact of excess nutrients. The major goals for the group are to (1) advocate, report and summarize the use of nature-based solutions and (2) provide opportunities for interagency collaborations in improving and implementing nature-based solutions to reduce nutrient impacts. This year, the focus is on sharing the nature-based solutions potential with the Tennessee Nutrient Stakeholder Task Force, tracking the potential impacts to nature-based solutions due to Waters of the United States changes and tracking progress on the TN Floodplain Task Force Memorandum of Understanding partnership.

This approach was recently utilized when TDEC's West Tennessee River Basin Authority, along with TN Wildlife Resources Agency and The Nature Conservancy, partnered to convert 1,200 acres of farmland into a new state park with restored flood management areas. The newly formed Middle Fork Bottoms State Park (see page 10 in TDEC's [2023 Annual Report](#)) includes 250,000 recently planted hardwood trees, 20 acres of warm-season prairie, over 200 acres of restored shallow-water wetlands, two miles of restored stream and restored habitat for wildlife viewing.

11.2 Point Sources

Point Sources Permitting and Wastewater Treatment Optimization

Tennessee continues to address the discharge of nutrients from municipal and domestic sources through upholding of the antidegradation provision in Tennessee's state water quality standards and through education. The antidegradation activity presents differently for new, expanding and existing sources. For proposed new sources and expanding discharges, Tennessee requires applicants to evaluate treatment technologies with biological nutrient removal capability. For existing discharges, Tennessee is imposing "hold the line" limits on discharges into water bodies which Tennessee assesses as having "unavailable conditions" for nutrients. Also, in support of antidegradation, Tennessee applies these nutrient limits as annual rolling loads to encourage biological removal versus chemical addition and to encourage reuse alternatives. Tennessee imposes monitoring and reporting of effluent TN and TP at a quarterly frequency minimum in NPDES permits for POTWs, regardless of size. This provides Tennessee with data for watershed modeling, elevates the visibility of nutrients to the dischargers and provides the basis for capped limits when a facility needs to expand or when Tennessee assesses an impairment. For all POTWs and the small domestic dischargers, such as schools and businesses, Tennessee is including a narrative in the permit fact sheets on Tennessee's state-wide nutrient reduction program and encouraging voluntary participation in an optimization program for biological nutrient removal.

TDEC – Division of Water Resources has been championing plant optimization as an effective approach with environmental and economic benefits since 2011. Case studies from Tennessee cities and utilities are posted on the [Tennessee Plan Optimization Program website](#). The Tennessee Plan Optimization Program partners include the Tennessee Association of Utility Districts, Municipal Technical Advisory Services and Tennessee Industrial Assessment Center. The Tennessee Plan Optimization Program,

facilitated by the TDEC - Division of Water Resources, is a free initiative designed to assist wastewater operators in optimizing nutrient removal and energy efficiency in their facilities. With approximately 20 participating plants to date, the Tennessee Plan Optimization Program offers resources and support for achieving these goals through cost-effective measures. Within the next 5 years, the plan is to reach the remaining 160 municipal mechanical wastewater plants with this program.

11.3 Nonpoint Sources

Grant Programs Provide Source of Funds for Conservation Practices

319 Grant Program

TDA continues to partner with qualifying entities to fund projects under the CWA Section 319 program to lessen impacts on Tennessee waters from nonpoint sources, including excess nutrients. Tennessee normally receives around \$2.6 million each year through this program. With this money, TDA funds primarily watershed restoration projects that aim to install BMPs, as well as education/outreach projects that aim to educate and inform various audiences about NPS pollution. As required by the EPA, staff are modeling load reductions on CWA Section 319 funded watershed restoration projects and have chosen to use the EPA's STEPL model.

Success stories are documented on the EPA's [Tennessee Nonpoint Source Success Stories](#) web page. Tennessee ranks second in the nation in the number of *Success Stories* as defined by the EPA, with **45** total *Success Stories* (reflecting a total of 62 total water quality improvements). The most recent *Success Story* was written for Lytle Creek and just received approval from the EPA in September 2024. Plans are set to submit at least two new *Success Stories* each year.

The Agricultural Resources Conservation Fund

State funds are provided through the Agricultural Resources Conservation Fund Incentive Program to provide financial support for Tennessee farmers to install conservation practices that lessen soil erosion, reduce livestock impacts to state waters and improve land management on Tennessee farms. This fund is generated by a state real estate transfer tax. In recent years of a strong real estate market in Tennessee, the fund has grown from providing \$3,000,000 per year a few years ago to producing a high point of almost \$15,000,000 in 2021 and \$11,465,000 in 2024. There has been a significant increase in the requests for funding for the planting of cover crops due to the promotional work by USDA NRCS across Tennessee. The Land and Water Stewardship section is also estimating load reductions using the EPA's PLET model for all these practices.

Almost all of this money goes to on-the-ground practices on farmland through all 95 SWCDs across the state. A small portion of the money is provided to universities in the state to do applied research that aims to answer specific questions that would better inform our grant programs and other agencies interested in increasing the quantity and quality of conservation activities in Tennessee.

Partnerships with Federal Agencies, Non-Governmental Organizations and Land Grant Universities

Soil Health Partnership/TN On-Farm Demo Project – The Nature Conservancy

The primary goal of this project is establishing a network of farms in Tennessee with the purpose of developing a scalable data collection system related to the real world, real field economics of cover crops and other conservation practices in Tennessee. Another goal is to use the project as an

opportunity for outreach, hosting field days and generating materials to present on data generated from the project, lessons learned and other pertinent topics.

A summary of progress over the past 12 months is as follows:

- Ten farmers are contracted to collect management and yield data through the 2025 growing season.
- Six of these farmers produce management data on approximately 2,650 acres across 37 fields. Approximately 80% of these fields are continuously cover-cropped and with the remainder no-tilled without cover crops (to produce an economic comparison).
- Four of these farmers are managing N rate trials in corn. These N fields bring another eight fields into the project (45 total between cover crops and N trials).
- Counties represented are Madison, Crockett, Lauderdale, Gibson, Dyer, Carroll, Henderson, Obion and Robertson.
- Data is on crops of corn, cotton, full-season soybeans, double-crop soybeans and wheat.
- A subaward agreement with IL Corn Growers Association has been finalized/signed. Under the subaward, IL Corn Growers has expanded their conservation economics tool (Precision Conservation Management) to include Tennessee and will also add functionality for cotton and the ability to filter output by farmer cover crop experience and field productivity.
- Soil sampling for basic nutrients, soil available nitrate, nutrient stratification down to 12 inches (no-till vs. cover crop comparison), soil compaction (no-till vs cover crop comparison), organic matter (no-till vs cover crop comparison), tissue sampling (N rate trials) and satellite remote sensing data to monitor soil moisture/crop stress during the growing season were all performed during the 2023 and/or 2024 growing season.
- An outreach “field day” was held on December 14, 2023, and was attended by over 30 farmers and agency staff.
- Additional outreach “field days” were held on August 13 and 14, 2024, in Jackson and Orlinda, with over 65 farmers and agency staff in combined attendance.
- Partners who have continued supporting the project either financially, by providing technical support or assisting outreach efforts are the University of Tennessee, Illinois Corn Growers Association, Quail Forever, NRCS, West Tennessee River Basin Authority and the Tennessee Department of Agriculture.
- A 30+ page publication is under development that will provide a summary of the project and cover related topics, including cover crop trends, original graphs and charts, challenges/benefits to cover crops, lessons learned from Tennessee’s successful adoption of no-till and recommendations for increasing cover crop adoption.

[Tennessee Valley Authority](#)

The Tennessee Valley Authority (TVA) has partnered with TDA to establish the Tennessee Riparian Incentive Program in the state of Tennessee to improve water quality, protect aquatic biodiversity and sequester carbon. The program is now available in all parts of the Tennessee River watershed, which encompasses all or part of 66 of Tennessee’s 95 counties. Partners in addition to the Tennessee Valley Authority and TDA include the USDA Farm Service Agency and NRCS. The Tennessee Valley Authority provided \$500K for the 10-year project. Project participation will require landowners to enroll land in CRP and install riparian forest buffers. As an additional incentive for CRP participants, the Tennessee

Riparian Incentive Program will provide an additional bonus payment of \$3,000 per acre to landowners for completed CRP riparian forest buffer projects in the priority watersheds.

[USDA NRCS / The Nature Conservancy: Tennessee Technological University](#)

USDA NRCS and The Nature Conservancy have funded Tennessee Technological University to conduct a 5-year study (2019 – 2023) assessing nutrient retention dynamics in 35 NRCS Wetlands Reserve Program easements along major rivers in western Tennessee and Kentucky. The goals of this study are to assess the effectiveness of the Wetlands Reserve Program in enhancing wetland nutrient retention and identify wetland attributes that promote N and P removal, with a focus on vegetation and hydrology restoration practices. Data from this research will be used to prioritize land purchased for enrollment in the USDA Agricultural Conservation Easement Program and better design wetland restorations to maximize nutrient retention capacity. Additional information about this project can be found [here](#).

[USDA NRCS](#)

USDA NRCS provides financial assistance to landowners to implement agricultural conservation practices that improve and protect natural resources. Watershed plans are developed in the first year, and financial funding for the implementation of practices identified to improve water quality are funded for the next 4 years. A vulnerability index was formulated by Tennessee NRCS GIS specialists to identify areas that are most likely to contribute to water pollution. Specifically, the NWQI and Mississippi River Basin Healthy Watersheds Initiative watershed selections include coordination with multiple state agencies, and nutrient impacts are one of the prioritized considerations.

[University of Tennessee Extension – 2024 Tennessee Nutrient Management Report](#)

The objective of this report is to examine and quantify the adoption of conservation practices focused on nutrient management in Tennessee. These practices include no-tillage, soil testing, cover crops, grazing, and poultry litter or manure applications for Tennessee row crop producers. The purpose is to establish a baseline number of acres in Tennessee that are using various conservation practices in concert with a nutrient management plan. Nutrient management plans for crop production match nutrient applications to crop needs, reducing commercial fertilizer use while maintaining and, in some cases, enhancing soil productivity and crop yields. The baseline numbers contained in this report demonstrate the progress Tennessee farmers are making towards environmental stewardship while also identifying potential areas for improvement.

For the second year in row an online Survey of producers in Tennessee was conducted in February and March 2024 to better understand their use of, and objectives with, nutrient management practices such as nutrient management planning, soil testing, cover crops, no-till and variable rate application, among other practices. This was a follow-up to the Survey conducted in 2023. Key findings of this report are:

- 86% of all Surveyed crop producers use no-till.
- 53% of all Surveyed crop producers use cover crops.
- 76% of all Surveyed crop producers soil test.
- 77% of all pasture/hay producer respondents soil test.
- 76% of all respondents said they determine how much fertilizer to apply based on soil tests.

We also utilized data from the USDA 2022 Census of Agriculture to validate some of our data and compare Tennessee to other states. This data indicated:

- Tennessee was the state with the highest percentage of adoption of no-tillage and conservation/reduced tillage practices compared to all tillage practices in 2022.
- Tennessee experienced a 4% increase in total acres of no-till or reduced tillage between 2017 and 2022.

Tennessee has made substantial progress in the public and private investment of nutrient management practices. The results are similar to the statistics reported last year. There was a slight decrease in the number of reported who planted cover crops, but more producers stated they determined how much fertilizer to apply based on soil tests. These differences could be due to changes in Survey respondents between the two years.

Gulf Hypoxia Program

Tennessee's workplan for the Gulf Hypoxia Program allocations focuses on a variety of activities that support and advance Tennessee's nutrient reduction strategy. Major components of the workplan include:

- Nutrient load monitoring, flow gaging and sampling.
- Nutrient optimization of municipal wastewater facilities.
- Nutrient loss reduction with cover crops in priority watersheds.
- Research staff support.

12. Wisconsin

12.1 Coordination and Development

Interagency partners in Wisconsin are collaborating on Wisconsin's NRS. Utilizing Gulf Hypoxia Program funding, the Wisconsin DNR Office of Agriculture and Water Quality is leading a collaborative process to rethink and redesign the Wisconsin NRS (WNRS). This process relies on input and contributions from the Interagency Water Quality Workgroup. The Interagency Water Quality Workgroup is comprised of Wisconsin DNR; Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP); University of Wisconsin-Madison Division of Extension; USDA NRCS; and Wisconsin Land and Water Conservation Association. The USGS also participates and contributes to the Interagency Water Quality Workgroup.

The primary objectives of the Interagency Water Quality Workgroup are to develop a new WNRS (the [current WNRS](#) was published in 2013) that serves as a shared vision for the State of Wisconsin to reduce nutrient loss from the landscape while building a multi-institutional and multi-stakeholder coalition to support implementation and evaluation of the strategies identified through a variety of collaborative and consensus-building processes. The new NRS will also incorporate an assessment of agricultural BMPs and a social science assessment to identify institutional, cultural and individual barriers and incentives to adopt agricultural BMPs.

12.2 Implementation and Innovation

State Watershed Initiatives

Various statewide and watershed-based programs and projects are implemented across Wisconsin in support of the NRS. Among other local, state and federal conservation programs, active watershed initiatives include producer-led groups, nine key element plans, adaptive management, and TMDLs (Figure 42).

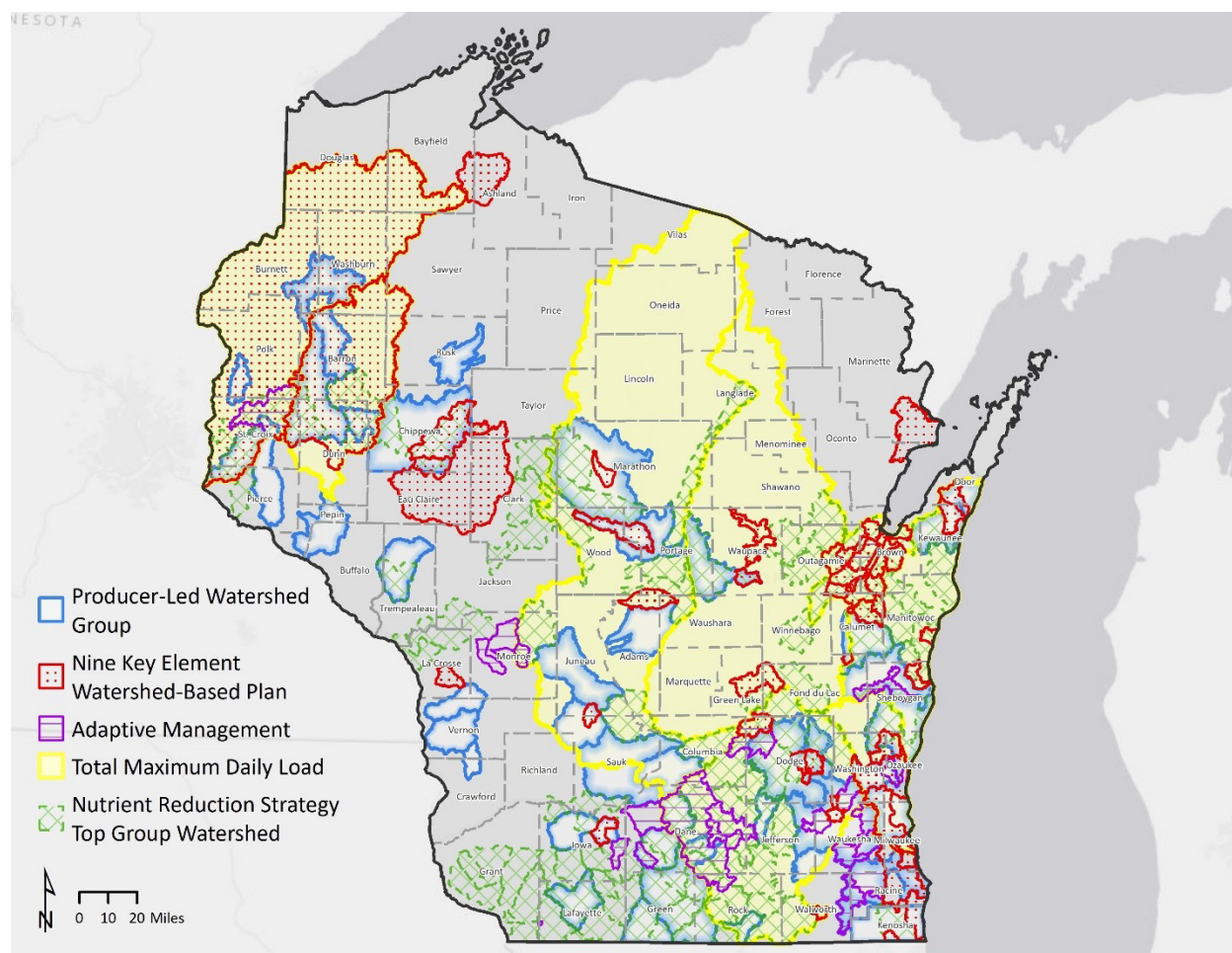


Figure 42. Wisconsin watershed initiatives.

Point Source–Nonpoint Source Collaboration

Since December 2010, the Wisconsin DNR has been including water quality-based effluent limits in Wisconsin Pollutant Discharge Elimination System permits to achieve Wisconsin’s numeric water quality standards for TP. Wisconsin’s [P Implementation Guidance](#) provides a detailed discussion of the P standards and implementation procedures in Wisconsin Pollutant Discharge Elimination System permits. P water quality-based effluent limits issued to point source dischargers typically fall below the limits of traditional biological or chemical treatment (Figure 43).

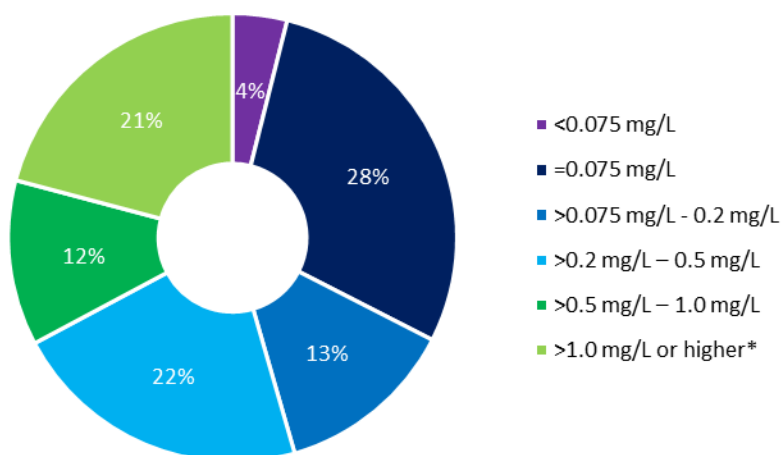


Figure 43. Ranges of calculated water quality-based effluent limits and the corresponding number of wastewater dischargers with limits in a given range. The >1.0 mg/L or higher* category includes facilities with no reasonable potential to contribute to water quality standard exceedances and are not issued a WQBEL for P.

Treating wastewater to achieve P levels below 0.2 mg/L often requires tertiary filtration, which is not affordable for many municipalities and industries (2015 [Phosphorus Economic Impact Analysis](#)). To help address this issue, Wisconsin has developed several permitting flexibilities for point source dischargers. These include extended compliance schedules, variances, and water quality trading. Many of these permitting options capitalize on opportunities presented for economical P reductions from nonpoint sources, allowing dischargers to achieve environmentally equivalent (or superior) water quality outcomes while minimizing costs.

Water Quality Trading

Wisconsin's water quality trading program was developed from various pilot programs and committees involving Wisconsin DNR and stakeholders from 2008 to 2013, which ultimately resulted in a formal water quality trading guidance document being released in 2013. In 2015, Wisconsin DNR approved the first water quality trade for compliance with P limits at a cheese processing facility. Water quality trading has since grown to be utilized by 65 Wisconsin Pollutant Discharge Elimination System dischargers for P WQBEL compliance as of 2024. A wide array of credit-generating practices has offset NPS P loading by roughly 23,329 lbs/year, as calculated by field-scale modeling protocols.

State legislation in 2020 created an additional approach for buying and selling water quality pollution credits through a central clearinghouse. The selected clearinghouse entity, Wisconsin Clearinghouse LLC, has been operational since early 2023. An [online portal](#) offers an interface for nonpoint sources to register potential credit-generating projects, while point sources can log in to review available projects and negotiate credit prices. As of 2024, the clearinghouse has registered 18 potential credit-generating nonpoint sources and 31 registered potential credit users on the portal. The clearinghouse, as well as more traditional partners such as county land conservation departments and private consultants, continue to promote partnerships between point sources and nonpoint sources.

Multi-discharger P Variance

In 2017, the EPA approved Wisconsin's Multi-discharger Phosphorus Variance, or MDV, for a 10-year period. The MDV can be applied to municipal and industrial Wisconsin Pollutant Discharge Elimination System permits when compliance with low-level P limits would cause economic hardship for the community. The MDV allows a discharger 5 to 20 years to comply with restrictive P limits while making meaningful contributions to local nutrient reduction efforts. During the variance term, point sources are required to optimize their P treatment processes and implement a watershed P offset.

Point sources can select one of three types of watershed projects eligible for the MDV: payments to county land and water conservation departments, an implementation agreement with Wisconsin DNR for P reduction projects or implementation with a third party for P-reduction projects. As of 2024, over 150 point sources have been approved for coverage under the MDV. The vast majority of dischargers utilize the county payment option. Because of this, funding levels continue to exceed \$1,000,000 for county land and water conservation departments statewide (Figure 44).

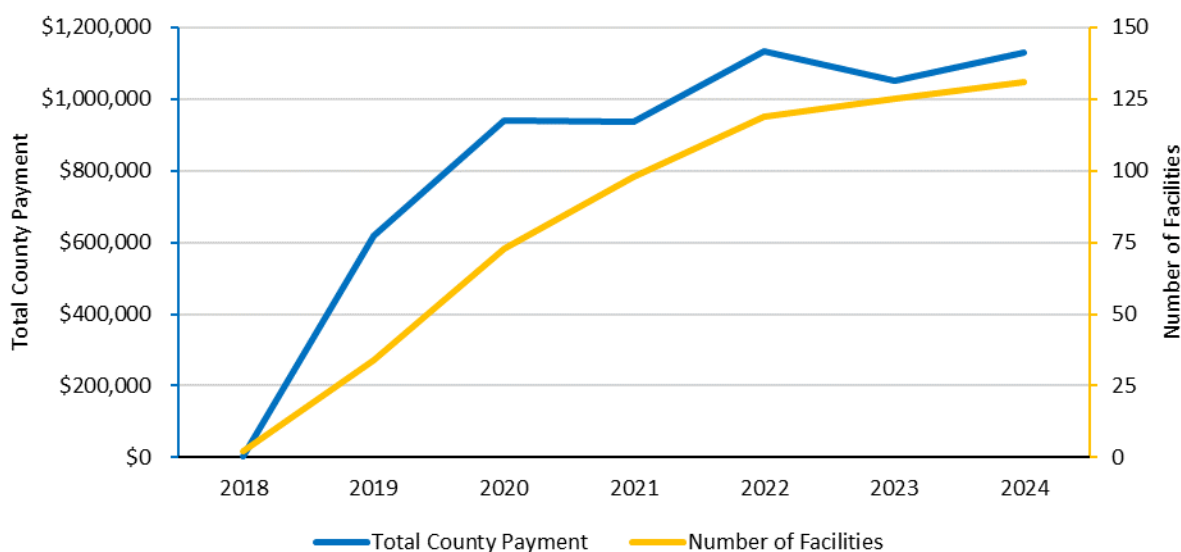


Figure 44. Number of facilities making payments and total annual payments to counties under Wisconsin's MDV for 2018 – 2024.

As part of the approaching federal 10-year MDV reevaluation, Wisconsin DNR has compiled implementation metrics from all NPS practices installed by counties for agricultural P reduction. To date, counties have used MDV funding to provide cost-share and establish 811 unique BMPs. Based on site-specific NPS modeling results, these practices kept roughly 58,128 pounds of P pollution out of waterways (Figure 45). Wisconsin DNR and stakeholders view the MDV as an important funding source specifically targeting nutrient reductions.

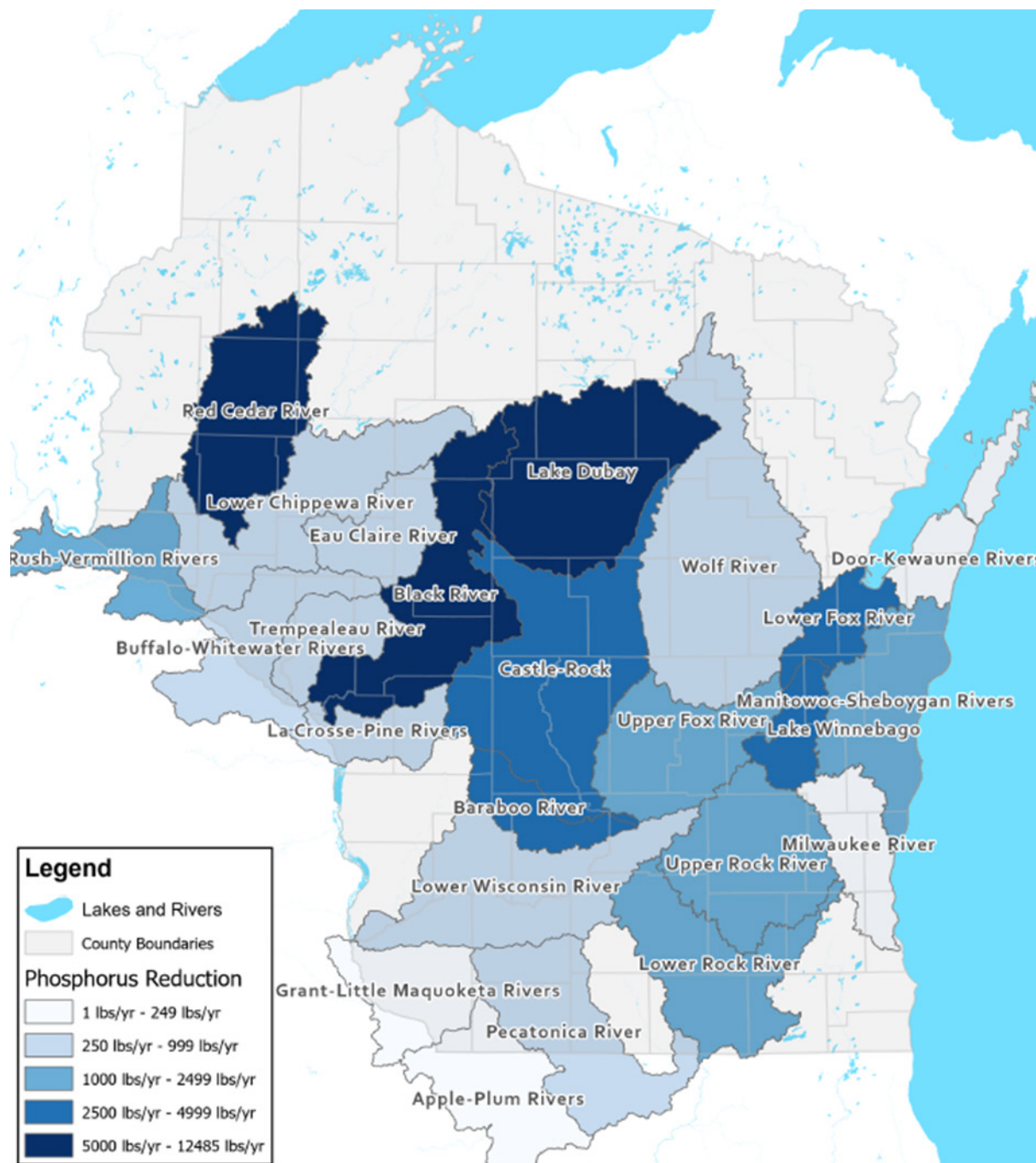


Figure 45. Modeled MDV P reduction in pounds per year, with totals by HUC-8 watershed for 2018 – 2024.

Peer-Based Outreach

The Producer-Led Watershed Protection Grant program continues to be a highly innovative and effective tool for promoting the adoption of sustainable farming systems and agricultural NPS pollution abatement. In 2024, 47 groups, including four brand-new groups, were awarded a total of \$1,000,000 to conduct outreach, promote and cost-share conservation practices and conduct research within their local watersheds. This novel farmer-to-farmer model has been key to successful practice adoption, as

research has shown farmers look to other farmers as their primary and most trusted source of information. For additional details on the program, please visit the DATCP Producer-Led Watershed Protection Grant [homepage](#).

Innovative Agricultural Practices

The competitive DATCP Innovation Grant program grew out of the desire to allow counties more freedom to address nutrient management and nutrient management plan implementation. Started in 2021, the Innovation Grant program has funded 42 projects across the state, totaling \$1,016,939. One barrier that counties found with the Innovation Grants is while they had the need and the program ideas, they lacked the personnel to take on additional projects. In 2024, funds from the Gulf Hypoxia Program enabled counties in the Mississippi River Basin to apply for staffing funds to supplement an Innovation Grant Award. In 2024 – 2025, five staffing support awards have been granted, totaling \$111,313.

Examples of awarded grants include incentivizing eligible landowners to sign up for Farmland Preservation agreements, which require a current nutrient management plan as a condition of the agreement. Another project that has been repeated across counties is well testing tied with education and the mitigation of identified groundwater contamination with cover crops. These projects have not only added to the state's groundwater database but have also provided a method for county conservationists to provide landowners with assistance in the testing and the interpretation of information found.

The Nitrogen Optimization Pilot Program was signed into law in March 2022 based on a recommendation by the Water Quality and Climate Change Task Forces. The program provides up to \$50,000 to farmers to conduct a 2-year minimum on-farm research study looking at how to optimize commercial N use. Each awarded farmer is required to collaborate with the University of Wisconsin on the research and data management, with up to 20% of their award going to the University of Wisconsin. To date, 38 grants have been awarded, totaling \$2,383,713. The [annual report](#) for the first year is available on the [Nitrogen Optimization Pilot Program project webpage](#).

12.3 Tracking and Trends

Point Source Loading

Annual nutrient loads from 57 point source facilities in the Mississippi River Basin portion of Wisconsin in 2023 included 9,518,435 pounds of N and 163,049 pounds of P.

Nonpoint Source Tracking

Agricultural nonpoint sources of N and P in Wisconsin are tracked primarily through conservation program data. Wisconsin currently is using Gulf Hypoxia Program funds to expand the BMP Implementation Tracking System and to pilot remote sensing-derived information on practice adoption in the Mississippi River Basin.

The BMP Implementation Tracking System includes a web application and database for submitting and tracking BMP implementation data. BMP Implementation Tracking System project goals include web-based access, spatial data collection, funding transparency and efficient tracking and reporting toward programmatic, geographic and statewide nutrient reduction goals. Recent developments include the

addition of urban NPS grants and associated pollutant reductions to the tracking system; server, web mapping and notification modernizations to streamline the user experience; and improved reporting functionality.

A pilot project is currently being conducted with Regrow and The Nature Conservancy to consider the utility of remote sensing-derived information on adoption levels of cropland BMPs. Agricultural acres in the Mississippi River Basin are evaluated by satellite imagery to estimate the extent of practices, including no-till and cover crops, and data are aggregated to the HUC-12 watershed scale. Results currently are being evaluated for one million cropland acres in Wisconsin, including verification and feedback from counties and local partners.

In 2022, 36 producer-led watershed groups influenced an estimated 1.1 million acres in the state, and the practices implemented by the groups reduced P runoff by 154,367 pounds, soil erosion by 218,480 tons and greenhouse gas emissions by 61,214 tons of carbon dioxide equivalents. In 2023, these groups influenced an estimated 1.58 million acres in the state and reduced P runoff by 143,068 pounds, soil erosion by 213,516 tons and greenhouse gas emissions by 70,000 tons of carbon dioxide equivalents (estimates derived using [SnapPlus](#) and [COMET](#) software). For additional details, please visit the DATCP Producer-Led Conservation Progress [page](#).

Long-Term Water Quality Trends

Water quality monitoring is a key indicator of Wisconsin's progress in reducing P and N loads. The [Long-Term River Water Quality Trends in Wisconsin](#) web application summarizes water quality data for major rivers. Many Long-Term Trends sites have been monitored since the 1970s, with the current network of 43 monitoring sites in place since 2001. Water quality trends are flow-normalized using the WRTDS model. Between 2001 and 2020, TP concentrations and loads to the Mississippi River have generally decreased over time and across Wisconsin, whereas nitrate concentrations and delivery within the Mississippi River Basin have increased over time (Figure 46).

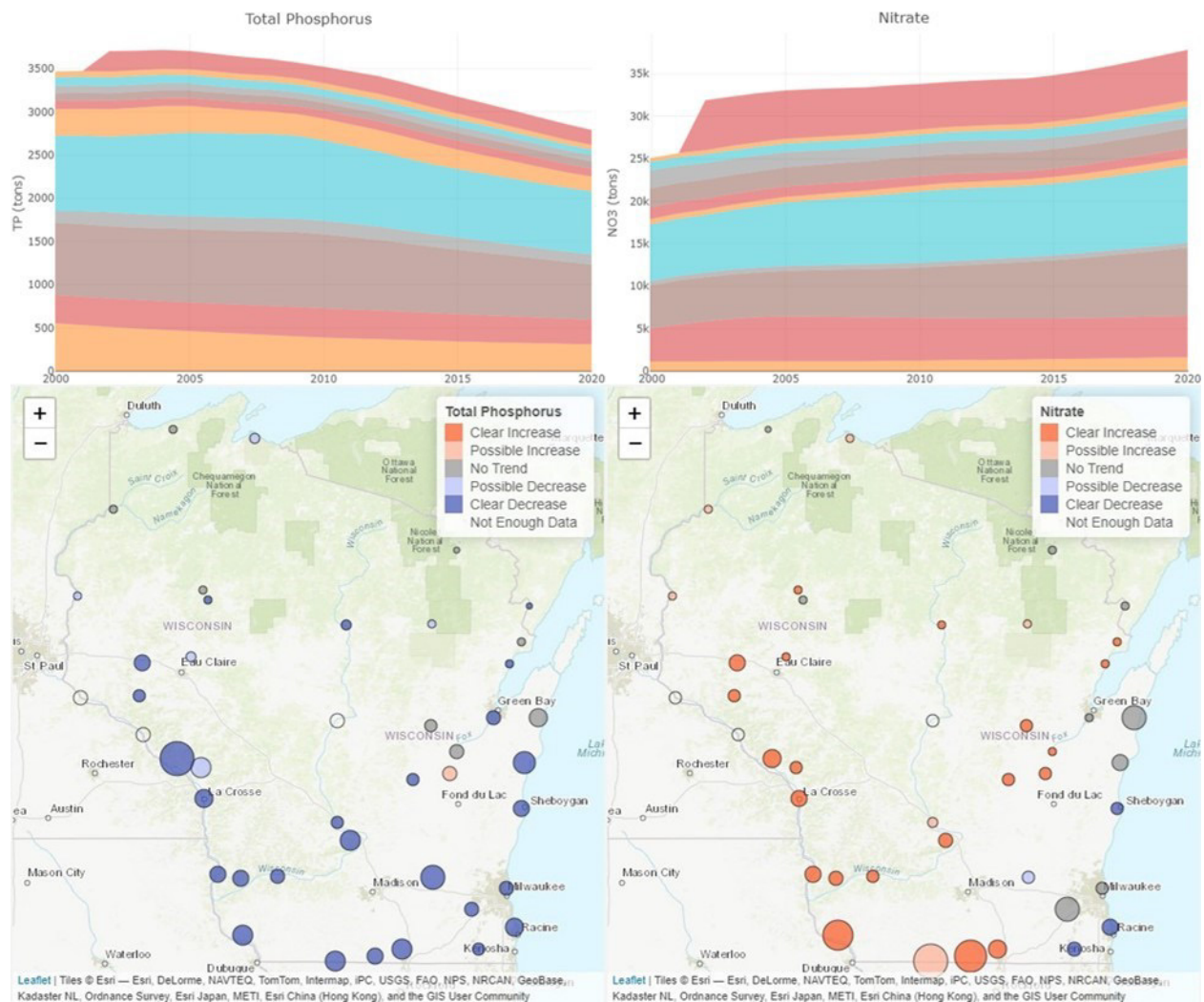


Figure 46. Between 2001 and 2020, TP loads (top left) and concentrations (bottom left) generally have decreased in the Mississippi River Basin portion of Wisconsin, and nitrate loads (top right) and concentrations (bottom right) generally have increased over the same time period. For the load plots, the width of each colored band in a particular year is the flow-weighted load at one site, and the total height of all bands is the sum of flow-weighted load estimates at all sites in the Mississippi River Basin portion of Wisconsin for that year.