



2021 – Tennessee Nutrient Strategy Taskforce Inaugural Report

Prepared by the Tennessee Department of Environment and Conservation and Taskforce Workgroups

For: Nutrient Strategy Taskforce | 2021



Introduction

Tennessee is one of 12 states with a nutrient contribution to the Mississippi River. The United States Geological Survey estimates that approximately 5% of the nitrogen and approximately 5% of phosphorous delivered to the Northern Gulf of Mexico is contributed by sources in Tennessee (Alexander et al., 2008). In Tennessee there are 3,971 river miles and 22,872 acres of lakes/reservoirs impaired by nutrients. Many stakeholders are actively working to manage nutrient inputs to our rivers, lakes, and streams.

Excessive nutrients can cause negative ecological impacts to waterbodies as well as pose public health risks.

In 2019, TDEC and TDA convened the Tennessee Nutrient Strategy Taskforce (the Taskforce), drawing representation from academia, state and local government, wastewater treatment plant operators, the private sector, and non-governmental organizations. The Taskforce was, in part, a response to the 2011 EPA “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 [Nutrient Reduction Framework](#) as part of comprehensive efforts to accomplish long-term nutrient reduction in Tennessee.

Together, the taskforce and its workgroups are working to:

- Prioritize watersheds for taking actions to address nutrients
- Set watershed nutrient load reduction goals
- Ensure effectiveness of point source permits
- Develop implementable watershed plans that maximize the effectiveness of BMPs
- Encourage nutrient reductions from urban runoff
- Establish watershed-based monitoring programs to evaluate effectiveness
- Document and report implementation activities

Following its formation, the Taskforce focused on developing a structure and strategy that would best support the taskforce’s effective functioning. The taskforce met a total of 3 times in its first year, created a SharePoint site for taskforce members to store resources and work product, developed work groups and refined their respective roles and responsibilities, and created a webpage. Up to 55 various stakeholders from all major sectors, private and public, state, federal and local are actively participating in the Task Force.

The leading sectors represented on the taskforce are agricultural technical assistance agencies, municipal wastewater, environmental regulatory agency, stormwater utilities, watershed management agency, transportation agency, environmental non-profits, chamber of commerce, academic research and others.



Organizations Represented in the Taskforce			
Clean Water Professionals of Kentucky and Tennessee	Tennessee Chamber of Commerce and Industry	Tennessee Municipal League	United States Department of Agriculture
Middle Tennessee State University	Tennessee Department of Agriculture	Tennessee Stormwater Association	United States Geological Survey
Municipal Technical Advisory Service	Tennessee Department of Environment and Conservation	Tennessee Technological University	University of Tennessee Knoxville
Natural Resource Conservation Service	Tennessee Department of Transportation	Tennessee Valley Authority	University of Tennessee Extension Services
Tennessee Association of Utility Districts	Tennessee Farm Bureau	The Nature Conservancy	Oak Ridge National Laboratory

The Tennessee General Assembly issued a joint House Resolution in 2021 recognizing the work of Tennessee representatives on the Hypoxia Taskforce:

"HOUSE JOINT RESOLUTION 751

By Halford HJR0751 012851 - 1

A RESOLUTION to honor and commend the Tennessee Department of Agriculture upon its exemplary work on the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force. WHEREAS, the Tennessee Department of Agriculture has ably represented the State of Tennessee on the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force since that group was founded in 1997; and WHEREAS, the task force is a cooperative effort that brings together the twelve states along the Mississippi and Ohio rivers, along with land grant universities and stakeholders in those twelve states and federal partner agencies; and WHEREAS, since its formation, the task force has worked with purpose and commitment to improve water quality in the Mississippi/Ohio river basins, as well as the quality of life for communities and residents of those watersheds, through voluntary, cost-effective, and innovative programs and projects; and WHEREAS, the Tennessee Department of Agriculture, working in collaboration with the Tennessee Department of Environment and Conservation and local partners, has utilized this opportunity to benefit agriculture, conservation, and water quality in this State's watersheds; now, therefore, BE IT RESOLVED BY THE HOUSE OF REPRESENTATIVES OF THE ONE HUNDRED TWELFTH GENERAL ASSEMBLY OF THE STATE OF TENNESSEE, THE SENATE CONCURRING, that we honor and commend the Tennessee Department of Agriculture upon its exemplary work representing this State on the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force and thank these dedicated professionals for their ongoing commitment to the health, safety, and welfare of their fellow Tennesseans."

Work Groups

The Tennessee taskforce has organized multidisciplinary work groups with specific goals to execute nutrient strategy as described below.

WORK GROUP	GOALS
<p>GOALS AND METRICS</p>	<ul style="list-style-type: none"> - Identify type and level of nutrient reductions necessary to achieve TN goals short, medium, and long-term goals and metrics by sector - Identify short, medium, and long-term goals and metrics for overall nutrient reduction in TN and translate Gulf Hypoxia Improvement goals to TN state level - Identify ways to track progress overall and in each sector - Look at other states and identify best practices (benchmarking)
<p>COMMUNICATION, EDUCATION, AND OUTREACH</p>	<ul style="list-style-type: none"> - Develop content, compile case studies and success stories to publish on the website - Draft implementation reports (annually) and content for Story Maps - Develop educational and engagement messaging for stakeholders - Conduct outreach to promote and assist in implementation of best practices, pilot projects, and innovative efforts
<p>MONITORING AND DATA ANALYSIS</p>	<ul style="list-style-type: none"> - Identify existing data and monitoring programs - Identify Quality Assurance Project Plans in use - Identify data and monitoring program gaps - Propose monitoring programs to fill the gaps - Develop Quality Assurance Project Plans for the collection of high-quality data
<p>BEST MANAGEMENT PRACTICES – MUNICIPAL, URBAN, AGRICULTURAL, AND INDUSTRIAL SECTORS</p>	<ul style="list-style-type: none"> - With the understanding of cost/benefit of applicable BMPs recommend most effective BMPs from each sector for implementation - With the understanding of cost/benefit identify workable implementation strategies for TN and consider impacts of strategies on various stakeholders/sector groups - Identify research needs and pilot opportunities for each source sector - Highlight successes and lessons learned - Plan for the challenges and develop strategies for overcoming the challenges.

2020 Activities

In 2020, TDEC convened the Nutrient Strategy Taskforce a total of four times. These meetings served as check-ins with stakeholders and provided opportunity to share tools and resources available to support nutrient-related strategies, engage in training opportunities, learn from peer environmental agencies and taskforces in other states, and exchange information related to nutrient activities supported by participating stakeholder agencies. A listing of meetings follows, with additional details covered in below subsections.

DATE	MEETING
1/31/2020	1 st NSTF Meeting (IN PERSON)
7/1/2020	2 nd NSTF - SPARROW Webex for NSTF members (VIRTUAL)
10/20/2020	3 rd NSTF - Illinois Nutrient Loss Strategy Presentation (VIRTUAL)
12/03/2020	4 th NSTF - Website demo and Great Lakes to Gulf Presentation (VIRTUAL)

Webpage Development

The partners created content for a series of webpages intended to house information about nutrient management in Tennessee. This includes historically important information, current efforts, and/or generally helpful resources that all pertain to nutrients or the state’s nutrient strategy. This webpage-development process created an online presence for the Taskforce and a clearinghouse for nutrient management activities in Tennessee. Webpage content is sourced by the Taskforce, with day-to-day webpage maintenance performed by TDEC. Webpages cover 4 sections:

- Background – why nutrient strategy is essential
- Partnerships –stakeholders in the state that work toward healthier waterways as it relates to nutrient reduction
- Resources – resources for anyone looking for helpful links related to nutrients and watershed management, models and tools, information on streambank erosion and restoration, and information on Riparian Buffers
- Success Stories – currently, case studies related to energy and nutrient optimization for wastewater treatment plants are listed under case studies.

TDEC and the Taskforce will update webpage content on an ongoing basis to reflect up-to-date information on partnerships, resources, and success stories.

USGS SPARROW Model Training



The regions delineated for use in Spatially Referenced Regressions on Watershed Attributes (SPARROW) models in the conterminous United States

The U.S. Geological Survey's SPARROW (SPAtially Referenced Regression On Watershed attributes) is one of the leading platforms available for measuring/estimating nutrients for a location based on human activities, watershed characteristics, and natural processes. The taskforce learned that SPARROW models estimate the amount of a contaminant transported from inland watersheds to larger water bodies by linking monitoring data with information on watershed characteristics and contaminant sources. They were also educated on the

interactive, online SPARROW mapping tools that allow for easy exploration of relations between human activities, natural processes, and contaminant transport. The presentation was an important step in helping the Nutrient Strategy Taskforce members to understand one way to identify potential contributions of nutrients to watersheds in Tennessee.

Peer Presentations

The Taskforce expressed interest in learning what other states are doing to manage nutrients, and how those practices/strategies could be incorporated into Tennessee's efforts. TDEC coordinated two presentations to help achieve this. In summary, the taskforce learned how the Illinois Nutrient Loss Reduction Strategy (NLRs) is working to reduce their nutrient load, and how the Great Lakes to Gulf (GLTG) Virtual Observatory facilitates access to water resource information for the Mississippi River and its tributaries, expediting data-to-knowledge-to-policy connections. It is a project of the National Great Rivers Research and Education Center, a partnership of Lewis and Clark Community College and the University of Illinois at Urbana-Champaign.

Overview: Illinois

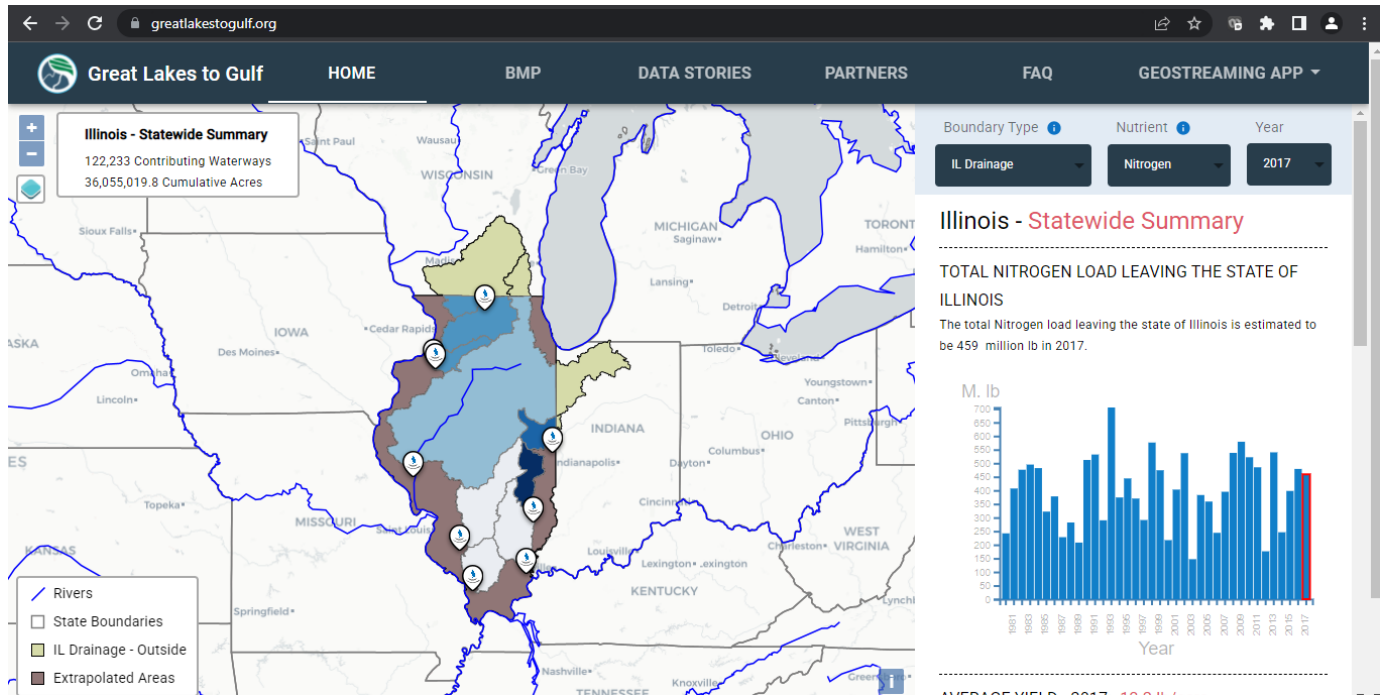
The Illinois NLRS was developed by a policy working group that includes representatives from local, state and federal agencies, the agricultural industry, and nonprofit organizations as well as scientists, academics, and wastewater treatment professionals. Like Tennessee, Illinois' strategy utilizes a combination of regulatory and voluntary efforts to influence nutrient management. The strategy describes a comprehensive suite of best management practices for reducing loads from wastewater treatment plants and urban and agriculture runoff. These practices are intended to help the state reduce its phosphorus load by 25 percent and its nitrate-nitrogen load by 15 percent by 2025. Illinois has an eventual target of a 45 percent reduction in the loss of these nutrients to the Mississippi River. They have identified several actions that have assisted or will assist with addressing water quality problems in Illinois rivers, lakes, and streams:

The Illinois strategy was developed by a policy working group led by the Illinois Water Resource Center-Illinois Indiana Sea Grant, the Illinois Environmental Protection Agency, and the Illinois Department of Agriculture.

- Identifying priority watersheds for nutrient loss reduction efforts. Recommended practices target the state's most critical watersheds and are based on the latest science and best-available technology.
- Establishing the Nutrient Monitoring Council to coordinate water quality monitoring efforts by government agencies, universities, non-profits, and industry.
- Creating the Nutrient Science Advisory Committee to develop numeric nutrient criteria for Illinois waters. This committee evaluates all available research, data, and methodologies and recommend a credible approach.
- Identifying strategies for improving collaboration among government, non-profits, and industry. This includes formation of an Agriculture Water Quality Partnership Forum to steer outreach and education efforts to help farmers address nutrient loss and an Urban Stormwater Working Group to coordinate and improve stormwater programs and education.
- Defining a process for regular review and revision by the policy working group, as well as for measuring progress and reporting to the public.

Overview: Great Lakes to Gulf

The GLTG Virtual Observatory is a web-based geospatial application that integrates water quality data and analytical tools from multiple sources allowing a user to visualize and understand nutrient pollution and water quality conditions in the Mississippi River watershed. The online interactive application provides users with tools to explore, analyze and compare water quality data from the Mississippi River and its tributaries.



<https://greatlakestogulf.org/>

Leveraging Partnerships

The Taskforce leveraged existing partnerships between current members and other stakeholders which document and/or further strategic progress as it relates to managing nutrient loss in the state. The Taskforce did not lead these arrangements but was (and remains) supportive of the work being done.

Tennessee Plant Optimization Program

TDEC's Division of Water Resources continued promoting its voluntary Tennessee Plant Optimization Program (TNPOP), that provides resources to water and wastewater operators to achieve optimization in energy use and nutrient removal from their facilities through low-and-no-cost measures. This program is a critical part of the TDEC's integrated approach to nutrient management.

TN POP originated as two independent programs focused on optimizing the operations of water and wastewater treatment plants. One program, the Tennessee Water and Wastewater Energy Efficiency Partnership, operated from 2011-2018 and emphasized provision of no-cost technical assistance for facility energy efficiency improvements, which often resulted in on average 19 percent reductions in energy usage, and nutrient discharge co-benefits. The partnership was formed by TDEC's Division of Water Resources and Office of Sustainable Practices, the U.S. Environmental Protection Agency (EPA) Region 4, the University of Tennessee Municipal Technical Advisory Service, the TVA, and the University of Memphis. In 2016, TDEC's Office of Energy Programs received a U.S. Department of Energy grant to continue the efforts of the partnership. The work specifically focused on energy efficiency projects and technologies in the wastewater sector.

The second program, the Tennessee Wastewater Nutrient Optimization Program, began in 2014 and using State Revolving Fund support worked with two cohorts of wastewater treatment plants over a multi-year period to optimize water quality through low-cost, operational techniques to increase the efficiency and efficacy of wastewater treatment, particularly as it related to discharge of nutrients. With a nitrogen removal goal of 50 percent and a phosphorus reduction goal of 75 percent, the Tennessee Wastewater Nutrient Optimization Program often resulted in significant energy efficiency co-benefits.

When TDEC considered long-term financial sustainability of both programs, it recognized an opportunity to unify these historically separate programs under one program that facilitated both energy and nutrient optimization through technical assistance and low-to-no-cost measures. Since 2011, TN POP and its predecessor programs assessed several water and wastewater systems across Tennessee and conducted numerous workshops to train operators on how to run their facilities more efficiently. Additionally, top plant operators have been "optimizing" since around 2005 utilizing a variety of Off/On aeration strategies to save energy which results in significant reduction in total nitrogen discharges. Since 2019, TDEC has administered these programs collectively as the TN POP. During this reporting period, an additional six plants participated in plant optimization.

Middle Tennessee State University

Middle Tennessee State University (MTSU) has a long-standing history for developing and providing a wide variety of educational resources to diverse audiences. Two areas within the college are working together on the Taskforce to help achieve the nutrient outreach objectives.

The Environmental Health & Safety Department oversees the MTSU Stormwater Program which is currently in a co-permit partnership with the City of Murfreesboro Water Resources Department to provide public education under the National Pollutant Discharge Elimination System to address stormwater pollution. The co-permit built upon a long history of work throughout the state developing and distributing stormwater education materials to municipalities, educators, civic organizations and non-profits under the former MTSU Tennessee WaterWorks grant. The department continues to develop a variety of water quality materials for educational use and conduct outreach. A member of the MTSU Stormwater team (Cynthia Allen) is on the taskforce to represent water quality education and to help facilitate communications among the taskforce members, work groups and grant teams and other key community stakeholders.

The Center for Health and Human Services (CHHS) is partnering to help develop education materials and create a robust public education campaign addressing water quality and the impact of nutrient pollution. The public education campaign is funded through a grant from TDEC overseen by Director Cindy Chafin and Coordinator Christina Tayler Byrd to address water quality and ways to reduce excessive nutrient pollution to a wide range of TN audiences. A toolkit is also being developed to help tell the Tennessee nutrient story and share meaningful resources to a target audience of farmers, educators, homeowners, and the general public in a variety of media platforms (social, print, digital and video). Two MTSU faculty members are also included to help provide content regarding agriculture and farm practices (Dr. Samuel Haruna), and formal K-12 education (Dr. Kim Sadler) with integration of state curriculum standards. Topics for the awareness and education campaign will address what nutrient pollution is, where those pollutants come from, what Tennessee stakeholders are doing to prevent that type of pollution and what actions help reduce nitrogen and phosphorus pollution Tennessee waterways. The content created through this grant will be disseminated during the grant term as well as packaged in a digital format for distribution to municipal authorities and groups interested in addressing water pollution. CHHS will provide oversight and coordination of all grant activities as well as fiscal management of the grant. For sustainability beyond the grant term, the materials developed will be accessible on MTSU's website to increase usage.

Tennessee Tech University

Tennessee Tech University received \$2 million in grant funding from the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) that will allow researchers to assess nutrient removal abilities of restored wetlands within agricultural watersheds. The study involves the USDA buying land from farmers in Tennessee and Kentucky wetland areas and rehabilitating them back to their natural state.

Research will be focused on river floodplain wetlands located along the major rivers in Tennessee and Kentucky that flow directly into the Mississippi River.

Monitoring Data Compilation

Tennessee Tech University received \$40,000 from TDEC to engage in compilation and analysis of long-term nitrogen and phosphorous monitoring data in Tennessee. The data has been collected from the various partners, was reviewed, harmonized and compiled into a database.

The Nature Conservancy

One of The Nature Conservancy's priorities is protection of water. In Tennessee, TNC's agriculture program and TNC's floodplains program address nutrient reduction in pursuit of this priority.

One project that TNC's ag program is leading is made possible through a grant from TDEC. The goal of this grant is to advance nutrient reduction through soil health outreach. TNC's work under this award will involve engagement with agricultural industry partners and farmers, live presentations on the technical aspects and benefits of agricultural conservation practices, questionnaires to improve the understanding of barriers to adoption of agricultural conservation practices, and production of a publication that includes recent information about the tangible benefits of these best management practices.

TNC is also focusing on floodplain conservation priorities in Kentucky and Tennessee through development of a Floodplains Conservation Partnership with West Tennessee entities such as NRCS, the Tennessee Wildlife Resources Agency (TWRA), West Tennessee River Basin Authority (WTRBA), and U.S. Army Corps of Engineers (USACE). This work included development of a West Tennessee specific GIS Floodplain Prioritization Tool. While this tool aims to prioritize for multiple benefits, and nutrient reduction potential is a large part of this.

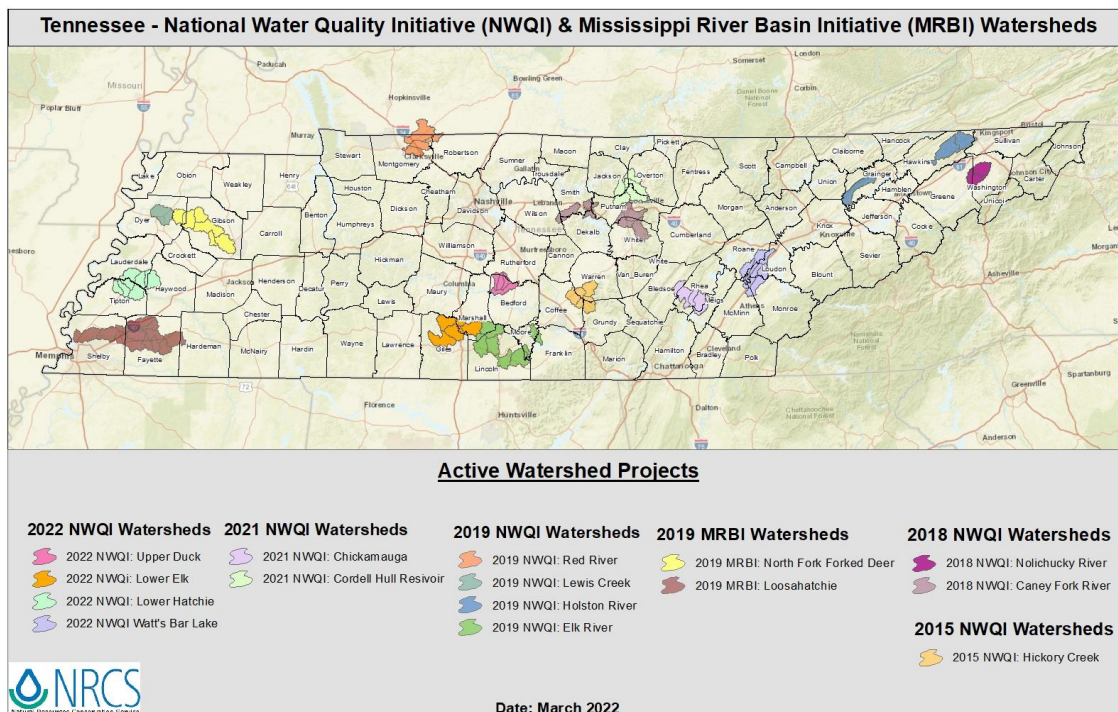
NRCS work

Through the National Water Quality Initiative (NWQI), NRCS and partners work with producers and landowners to implement voluntary conservation practices that improve water quality in high-priority watersheds while maintaining agricultural productivity. The NWQI watershed selection includes nutrient impacts as one of the prioritization considerations.

Loosahatchie Vulnerability Work

USDA NRCS provides financial assistance to landowners to implement agricultural conservation practices that improve and protect natural resources. The National Water Quality Initiative and Mississippi River Basin Initiative (MRBI) began with NRCS partnering with EPA at the national level. Funding is provided to the watersheds that are prioritized by partners and NRCS field. 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 four years. The development of the plan includes a map of areas that are most prone to impairing water quality and degrading soils and are considered “vulnerable”. A vulnerability index was formulated by Tennessee NRCS GIS specialists to identify areas that are most likely to contribute to water pollution.

The map below shows watersheds that are currently receiving NWQI and MRBI funding. Additional watersheds have been proposed in 2021.



2021 Meetings and Reports

At the first meeting of 2021, the working groups were energized and realigned. Their charge and focus were refreshed, and the year of hard collaborative work brought about a lot of progress as shown in the working groups reports below.



2021 Working Group Reports

Goals and Metrics

In 2021, the Goals and Metrics work group developed and proposed draft goals for reductions by sectors and recommended to select baseline by sector.

- Establishing 45% reduction of in stream nitrogen and phosphorus (same as Gulf Hypoxia and Illinois goals)
- Interim milestone 2027- 20% reduction of in stream nitrogen loads and 20% reduction of in stream phosphorus loads

Reduction Goals			
Nitrogen: Short Term		Phosphorus: Short Term	
Source	Percentage	Source	Percentage
Atmosphere	9.4	Parent Rock*	0
Agriculture	6.6	Agriculture	12
Wastewater	2.2	Wastewater	3
Stormwater	1.8	Stormwater	5
TOTAL	20	TOTAL	20
Nitrogen: Long Term		Phosphorus: Long Term	
Source	Percentage	Source	Percentage
Atmosphere	21.15	Parent Rock*	18.45
Agriculture	14.85	Agriculture	26
Wastewater	4.95	Wastewater	9
Stormwater	4.05	Stormwater	10
TOTAL	45	TOTAL	45

* No reduction from Parent Rock is assumed.

Metrics considered:

- Wastewater: number or wastewater treatment plants that have optimized for nutrient reduction
- Agriculture: acres converted to no-till, acres using cover crops, and miles of riparian buffers
- Atmosphere: reduction in atmospheric nitrogen emissions
- Urban runoff: number of MS4s added since the early 90s
- Ways to evaluate water quality:
 - o Identify HU10 watersheds that have higher inputs from various sectors
 - o Prioritize those watersheds while targeting the sectors that are the major contributors
 - o Recommendation to reach out to Division of Air to evaluate reduction of Nitrogen emissions

Monitoring and Data Analysis

There is a significant amount of nutrient data available for Tennessee streams. However, it is held by numerous agencies, some of which participate in this effort, and some do not. The data varies significantly in age, testing units, test parameters, test locations, and in the quality assurance which accompanied the sampling and testing. Tennessee Tech University is working to compile and homogenize this data.

TDEC has a stream sampling quality assurance document dated August 29, 2018 called Quality System Standard Operating Procedure for CHEMICAL AND BACTERIOLOGICAL SAMPLING OF SURFACE WATERS.

The scope and value of existing data is uncertain. When the TTU data compilation and homogenization is completed, there will be a better understanding of existing data and where the gaps in knowledge and insight exist.

It is recommended that an ongoing stream testing strategy utilize all the existing USGS gauge stations to quantify stream loading.

Best Management Practices

BMPs Working Group Goals:

1. With the understanding of cost/benefit of applicable BMPs, Recommend most effective BMPs for each sector for implementation
2. Identify workable implementation strategies for TN and consider impacts of strategies on various stakeholders/sector groups
3. Identify research needs and pilot opportunities for each sector
4. Highlight successes and lessons learned
5. Plan for challenges and develop strategies for overcoming the challenges

BMPs group split into 5 subgroups by sector:

Sector	Subgroup lead* and members
Municipal BMPs	Karina Bynum, Brett Ward, Dewayne Culpepper, Michelle Hatcher, Jessica Langstaff, Qiang He, Eddie O`Neill, Taylor Frye, Tania Datta*
Urban BMPs	Tom Lawrence*, Jacob Dorman, Mark Miller, Mary Bruce, David Mason, Mike Cramer, Josh Upham, Christian Saxe, Ethan Collier, Taylor Frye, Tania Datta
Industrial BMPs	Richard Holland, Neil Whitton, Taylor Frye, Crystal Warren*, Brent Fowler, Shannon O`Quinn, Michelle Cagley, Taylor Frye, Tania Datta
Agricultural BMPs	Forbes Walker, Lori Duncan, Jenny Adkins, Leslie Honicker, Zach Luttrell, John McClurkan*, Justin Murdock, Steve Batiste, Sally Palmer, Taylor Frye, Tania Datta

❖ **Municipal BMPs 2021 Activities**

Sector target questions:

- What existing BMPs are being implemented by municipal treatment plants for nutrient (TN and TP) removal?
- Are current BMPs different for small vs large treatment plants?
- Can we evaluate the current state of nutrient removal from Tennessee’s treatment plant discharges?
- Compile data to draw some idea on how many treatment plants are discharging nutrients lower than certain predetermined threshold (e.g. 10 mg/L TN, 5 or 3 mg/L TP)
- Distribution of treatment plants performing nutrient removal in TN

Data Gathering Phase:

- Generate a list of municipal wastewater treatment plants in Tennessee with permits for:
 - TN and/or TP limits
 - Report TN and/or TP
 - No reporting required
- Unit operations for each treatment plants
- Nutrient effluent data
- If possible, develop a consolidated spreadsheet with flow, loads and nutrient concentration data for treatment plants

❖ **URBAN BMPs/SCMs 2021 Activities**

- Sector team developed a list of SCMs that are known to reduce nutrient pollution or have historically been used to address nutrients:

Detention Basins	Retention Ponds	Wetlands	Grass/Vegetated Swales	Bioretention
Media Filters	High-Rate Filtrations	Hydrodynamic Separation	Oil & Grease Separators and Baffle Boxes	Permeable Friction Course and Permeable Pavements

- Discussed how to best evaluate urban SCMs to:
 - Understand which SCMs are preferable in different types of settings
 - Quantify nutrient reduction when using urban SCMs
- EPA provided Tennessee a comprehensive literature review of SCMs and their performance in the Southeast. Compilation is published on the Taskforce website at https://www.tn.gov/content/dam/tn/environment/water/nutrient-management/wr_ntf_region-4-urban-bmp-lit-review-dec2021-final.xlsx
- Developed a survey that has been sent out to Tennessee MS4s via TNSA to gather information on SCMs
- Collecting information from two international SCM databases that can be used to evaluate SCMs in Tennessee
Link to the published survey: https://tntech.co1.qualtrics.com/jfe/form/SV_9Ey8DpfGvVosHBA
- Conducted outreach at the TNSA conference (10/19-10/21)
 - Nutrient Session held on October 20 was very well attended and generated a lot of discussion. There is interest in the issue. Speakers were Cynthia Allen (Nutrient Education), Dave Mason (Urban Nutrient Reduction), and John McClurkan (Ag Nutrients).
 - Dave Mason’s presentation on Urban Nutrient Reduction discussed the need for better data from the operation of urban SCMs. Attendees seemed interested in the data being available.
 - Urban Sector Group has provided positive feedback to Cynthia Allen about the nutrient education materials that she is developing.



- In September 2021, Dave Mason and Tom Lawrence spoke to develop an Urban SCM needs list. On September 30, Tania Datta gave an update to the Nutrient Group about the Urban SCM Committee activities.
- Looking into ways to collect databases of nutrient SCMs from MS4s through the Annual Reporting under the new MS4 permit.

❖ **Agricultural BMPs**

Plan for documenting and assessing agricultural BMPs

- The team is in the process of generating a list of agricultural BMPs with *potential* for nutrient reduction
- NRCS and Tennessee Dept. of Agriculture will develop a data sharing agreement. Following that they will share data in some format that will allow the workgroup to either estimate or understand acres of agricultural land within a HUC-12 watershed with particular nutrient reduction BMPs.
- The workgroup will use the data to document acres of agricultural land implementing BMPs with *potential* for nutrient reduction in Tennessee.

Future Tasks:

- Develop a benchmark for nutrient reduction for each of the identified BMP practices either using RUSLE or some other method
- Document projects that will help in establishing nutrient reduction potential for some agricultural BMPs in Tennessee:
 - UTK's SWAT model for certain watersheds in West Tennessee
 - MTSU's AnnAGNPS model for certain watersheds in West Tennessee
 - TTU's wetland nutrient retention project for West Tennessee and Kentucky
- Collect and compile data on nutrient application rates; nutrient efficiency and other relevant precision agriculture that may indicate reduced fertilizer application in Tennessee.

❖ Industrial BMPs

Background of industrial Facilities in Tennessee:

- There are 427 regulated industrial facilities in Tennessee that have the potential to discharge TN and/or TP through their process wastewater and/or stormwater
 - 22 facilities have an Individual NPDES permit that requires monitoring for nitrogen and/or phosphorous.
 - 405 facilities have coverage under the TN Multi-Sector Stormwater Permit (TMSP) addressing stormwater discharges.
 - The TMSP covers 32 sectors of industrial activities. Of those 32 sectors, 7 sectors require facilities to monitor their stormwater discharges once/year for TN and/or TP
- A SurveyMonkey was sent to these facilities to survey BMPs utilized for nutrient reduction
 - 52 survey responses were received.
 - 18 of the 52 responses stated that BMPs/treatment technologies were utilized in some way to reduce the nutrients
 - 36 facilities stated that no BMPs/treatment technologies
 - The survey is available at <https://www.surveymonkey.com/r/25TV678>
- Also gathering information from the TMSP's Annual Monitoring Reports.

Industrial BMPs and Treatment Technologies for Nutrient Reduction

1. What city/region is your facility located?

2. Does your facility implement nutrient reduction Best Management Practices (BMPs) and/or treatment technologies? In this context, BMPs and treatment technologies can be structural or non-structural. Nutrients encompass nitrogen and/or phosphorous containing compounds.

Yes

No

3. Where on-site is the BMP and/or treatment technology being implemented?

4. List the nutrient reduction BMP(s) and/or treatment technologies being implemented at your facility. If your facility has more than one BMP, please list of all of them.

5. How long has each BMP and/or treatment technology been installed and implemented?

Communication, Education and Outreach

The Communication, Education and Outreach work group set up planning meetings to facilitate discussion among Task Force members, work groups, stakeholders and the MTSU CHHS grant team. The goal was to determine appropriate and accurate messaging, design a logo, and develop draft media content to help tell the Tennessee story, and develop and design campaign materials including videos, infographics, social media content and a toolkit for distribution.

- **Messaging:** initial feedback was requested and gathered from an online survey ([Qualtrics Survey | Qualtrics Experience Management](#)) conducted in June 2021 to determine needs, goals and existing resources from leaders in the various sectors and determine the best education strategies, available resources and images, and success stories. Sectors included agriculture, education, wastewater, stormwater and 'other' category for more diverse participation. Seven (7) participants responded. Additional information was included at later meetings too as shared by stakeholders. The survey questions included:
 - What are three significant problems in the sectors that need to be addressed
 - *Significant problems:*
 - Need for updated stream data, concern with SPARROW model and lack of updated background data or data for large bodies of water.
 - Need for awareness of connectivity / watershed- scale issues and cohesive working among sectors instead of blaming.
 - Need for proper riparian zones in agriculture, development, and homeowners. Promote the benefits of wetlands. Address mowing and planting next to streams and loss of stream buffers from development.
 - Need to incorporate lawn options and solutions into the message.
 - What are three significant solutions in the sectors that prevent nutrient issues
 - *Possible Solutions:*
 - New funding for expanding stream data and appropriate sampling methods.
 - Outreach and possible incentives to farmers and public for riparian buffer zones and tree retention for runoff management.
 - Replacing aging infrastructure and green infrastructure to reduce runoff volume and treat pollutants.
 - Homeowner/ Property management outreach to reduce excessive fertilization.
 - More communication between groups with overarching planning groups that span sectors.
 - More funding- tap into various sources, private foundation, public taxes, grants, enforcement etc.
 - More effective targeted education that overlap into existing opportunities.

- What concise messaging and/or tagline helps explain the problem to priority populations?
 - *Possible Messaging:*
 - Use of riparian buffers helps water quality, prevents erosion and land loss.
 - Alternative plant choices that reduce fertilizer use and runoff.
 - Natural water systems such as wetlands and riparian areas reduce nutrients in nearby streams.
 - Managing nutrients right, for clear and abundant Tennessee waters.
 - 'Tennessee manages nutrients right. It's in our Nature'
 - Managing Nutrients for Tennessee's Waterways.
 - Watershed focus: we're all in this together.
 - Clean water starts with me. What are you willing to do for clean water?
 - Right choices- Healthy land- Clean water
- Please share for each sector: success stories, statistics, facts, case studies and resources to use in the messaging.
 - *Success Story/ Plant Optimization:* TDEC has an official plant optimization project, TNPOP, but others MTAS, TAUD, and FTC have assisted in similar projects. There are several successfully documented stories found at <https://www.tn.gov/environment/program-areas/wr-water-resources/tn-plant-optimizationprograms/tnpop/case-studies.html>
 - *Success Story/ Tennessee Smart Yards program:* Now a fully online, flexible format, certified 70 yards since Oct 2020 and spreading the message about the new modality. <https://tnyards.utk.edu> ; <https://tiny.utk.edu/tnsymap>
 - *Success Story/ Clean Water Nashville:* <https://www.cleanwaternashville.org/green-infrastructure>
 - *Success Story/ City of Murfreesboro Water Resources Plant:* Murfreesboro won the Utility of the Future Award
 - *Success Story/ Agriculture:* TN leads in cover crops for the nation
 - *Success Story/ Rutherford Co Extension Farmer of Year Award* for Conservation and cover crops
 - *Success Story/ Cumberland River Compact – River Friendly Farms Certification*
 - *Case Study/ Natural Solutions to Stormwater:* <https://www.nature.org/en-us/about-us/where-we-work/united-states/pennsylvania/stories-in-pennsylvania/natural-solutions-to-stormwater/>
 - *Case Study/ UTIA -Management Practices to Optimize Nitrogen Fertilizer Use with High Fertilizer Prices - UT Crops News*
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- **Logo:** several draft logos were developed with the below image chosen as the final logo.



- **Campaign Materials:** We're currently in the draft stages of the toolkit, infographics, and are continuing to research availability of existing stock footage for Tennessee specific images. We will continue to coordinate message content to complete the infographics. A script template has been developed and several videos near completion for education, homeowner lawn care, and educational video content that integrates into k-12 standards.
 - *Challenges-* high quality, Tennessee specific stock footage is limited. There have been nuances in getting the appropriate messaging for each of the various stakeholder groups but good progress is being made and continues towards final content to share.
 - *Initial Drafts:* the campaign materials will continue to be edited. The infographics are not the final images or messaging that will be used. They are only the starting point and first drafts of the Infographics to determine the direction and final messaging and images the group decides to convey.

Infographic Drafts: Batch 1



- **Outreach:** Targeted outreach was conducted during the timeframe including:

- *News Article:* Regarding the Education Grant <https://www.wgnsradio.com/article/67962/mtsucenter-receives-56000-state-grant-for-water-pollution-education>
- *Radio broadcast:* WGNS "Action Line" radio program on Monday, June 21, 2021 regarding the education grant (Cynthia Allen and Christina Tayler Bird)
- *Conference Presentation:* 3 session program to Tennessee Stormwater Association (TNSA) conference October 2021. Previously mentioned above.
- *Lawn & Landscape Service Operator Training Presentation:* Cynthia Allen presented to 52 registered operators for chemical applicators on the Task Force nutrient reduction efforts in Tennessee on Nov 16, 2021 at Rutherford County Extension.

