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NORTH CAROLINA  
*Environmental Quality*

# **2021 Annual Report of the Nutrient Scientific Advisory Board to the Secretary of the NC Department of Environmental Quality as required by Session Law 2009-216**

**July 1, 2021**

## **Executive Summary**

During its eleventh year serving as a guide to the Division of Water Resources (DWR) Nonpoint Source Planning Program in implementing Existing Development stormwater nutrient rule requirements pursuant to Session Law 2009-216, the Nutrient Scientific Advisory Board (NSAB) continued to meet and assist DWR. This annual report recaps the year's activities and was assembled by DWR staff with guidance, review and approval by the NSAB.

The NSAB met four times over the past year in support of the following rule-related actions:

- Reviewed and provided input on the:
  - Draft Neuse and Tar-Pamlico New Development Model Program
  - Draft Falls Lake Existing Development Model Program
  - Draft Catalog of Nutrient Reduction Practices
- Provided members to the Workgroup on Stormwater Control Measures - Nutrient Data Standards
- Received informational presentations and provided feedback on the following:
  - NC Policy Collaboratory Falls Lake Nutrient Study Research
  - Streetsweeping Survey from the Charlotte-Mecklenburg Stormwater Services Dept
  - Latest NCSU stormwater control measures research

This report summarizes these activities.

More information on the NSAB's activities, charter, meeting summaries and previous annual reports can be found online at: <https://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/nutrient-scientific-advisory-board>.



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## Table of Contents

Executive Summary .....	1
Table of Contents.....	2
I. Introduction .....	3
II. Year in Review .....	3
III. NC Policy Collaboratory Nutrient Management Study.....	4
IV. Jordan Lake Watershed Nutrient Rules Readoption .....	4
V. Falls Lake and Neuse/Tar-Pamlico Nutrient Management Strategies....	5
VI. Overall Nutrient Strategy Advancement.....	6
VII. Nutrient Reduction Practices.....	7
VIII. Next Year.....	7
IX. Membership .....	8
X. Establishment, Duties, and Authority of the NSAB .....	9

## I. Introduction

The Nutrient Scientific Advisory Board (NSAB), serving as a guide for implementation of Existing Development Stormwater rules in Jordan and Falls watersheds by the Division of Water Resources (DWR), continued to meet and assist DWR during 2020-2021. This annual report to the Secretary of the Department of Environmental Quality was assembled by DWR Nonpoint Source Planning staff with guidance, review, and approval by the NSAB.

[Session Law 2009-216](#) established requirements for local governments and state/federal entities in the Jordan Lake watershed to reduce nutrient loading from existing developed lands. It also required the establishment of an advisory board to assist the state to identify, review, and refine strategies to reduce nutrient loading in the existing development community of Jordan Lake watershed and other watersheds that may face similar requirements in the future. Its full duties are listed in the Session Law and include advising the Secretary “on any other issue related to management and restoration of nutrient-impaired water bodies”.

In 2010, the Secretary established a 10-member Nutrient Scientific Advisory Board. As specified by legislation, up to six of the board’s members are representatives of local governments in the Jordan Lake watershed, while other members represent the conservation community, water quality science, stormwater engineering expertise and the N.C. Department of Transportation. In 2013, the NSAB added an advisor from the Falls Lake watershed to represent local governments subject to a similar set of rules in Falls Lake watershed.

Since its inception, the NSAB has actively assisted DWR to both better define nutrient reduction needs and improve the tools to reduce nutrient loading from existing developed lands. The remainder of this report provides updates on the NSAB’s activities over the last year.

## II. Year in Review

The NSAB received updates, and individual members reviewed the following:

- Neuse Tar-Pamlico New Development Model Program
- Falls Lake Existing Development Model Program
- Catalog of Nutrient Reduction Practices
- Stormwater Control measures data standards

The NSAB received presentations and provided feedback on the following:

- Streetsweeping Survey from the Charlotte-Mecklenburg Stormwater Services Dept
- NC Policy Collaboratory Falls Lake Nutrient Study Research
- NCSU stormwater management research

### III. NC Policy Collaboratory Nutrient Management Study

The NC Policy Collaboratory, created by the General Assembly in 2016, was charged under Session Law 2016-94 Section 14.13(a), with conducting two successive 3-year studies of nutrient dynamics for Jordan and Falls Lakes and their watersheds. These studies were to make recommendations to the NC Environmental Management Commission on potential revisions to its current regulatory nutrient strategies for these two watersheds. The Collaboratory completed its Jordan Lake nutrient study in December 2019 and is currently midway through its three year Falls Lake Study.

Collaboratory researchers presented the following topics across two NSAB meetings:

- Estimating the Influence of Onsite Wastewater Treatment Systems on Nutrient Loading
- Cyanotoxin Presence and Year-Round Dynamics in Falls Lake
- Defining the Balance Between Cyanobacterial N<sub>2</sub> Fixation and Denitrification in Falls Lake
- Current Stormwater Control Measures research focusing on floating treatment wetlands, sand filters, bioretention, and stormwater treating tree planters.

### IV. Jordan Lake Watershed Nutrient Rules Readoption

The NC Policy Collaboratory finished its Jordan Lake watershed research and modeling work, and submitted its final report to the NC General Assembly, in December 2019. The three water quality models developed for that process were presented to the NSAB in February 2020. Stemming from those presentations, DWR contracted supplemental refinement of the lake modeling through August 2021 to provide the rigor, outputs and functional utility needed for regulatory policy development.

The Division of Water Resources is using the Jordan Lake One Water (JLOW) planning process as its first step in public involvement for rules readoption. One Water is an emerging alternative, popularized by the U.S. Water Alliance, that utilizes collaboration and integrated water management to meet water-related environmental, social, and economic needs. Using a One Water approach, stakeholders are better able to leverage knowledge and resources and more effectively communicate how water management decisions directly benefit citizens, businesses, and other community members. One Water has the potential to increase overall community resilience in the face of climate change.

JLOW is a grass roots collaborative planning process initiated by watershed local governments and including other interested parties from across the watershed, including DWR and other DEQ divisions. Participation in the process continues to grow.

Eight members of the NSAB serve on JLOW workgroups addressing the topics of: integrated watershed management; practices evaluation, monitoring, and financing; and watershed organizational governance. Division staff and participating NSAB members periodically update the NSAB on JLOW planning activities. The JLOW advisory committee released a draft set of recommendations in March 2021 and is currently facilitating outreach and seeking public comment. The organization plans to submit a final report to DWR in July 2021. The draft report contains two overarching recommendations:

1. Develop a watershed wide organization tasked with reviewing, compiling, and refining a list of encouraged JLOW water resource strategies, highlighting those that enhance community

resilience, and evaluating them based on the triple bottom line benefits of environmental, social, and economic factors.

2. Co-Develop a framework for collaboration between Jordan Lake One Water and the North Carolina Department of Environmental Quality to address regulatory concerns, including nutrient requirements.

Timeline for Jordan Lake Nutrient Rules Readoption:

- 2020 Evaluate NC Policy Collaboratory findings  
Engage stakeholders / Seek feedback / Fully participate in JLOW
- 2021 Receive JLOW recommendations  
Develop rule concepts  
Engage stakeholders / Seek feedback
- 2022 Develop draft rules  
Revise and finalize draft rules  
Engage stakeholders / Seek feedback  
Develop fiscal note
- 2023 EMC approves rules and fiscal note for public comment

## V. Falls Lake and Neuse/Tar-Pamlico Nutrient Management Strategies

While the NSAB was established primarily to assist the Jordan Lake nutrient strategy, it endeavors to learn about and transfer useful advances from nutrient strategies across NC including the adjacent Falls Lake watershed and the recently concluded rules readoption process for Neuse and Tar-Pamlico River Basins. The City of Durham and the NC Department of Transportation hold membership positions on the NSAB and advise on Jordan, Falls, and Lower Neuse Basin watershed strategies. The Executive Director of the Upper Neuse River Basin Association (UNRBA) serves as an advisor to the NSAB, helping to span the information overlaps and gaps between the Jordan and Falls nutrient strategies, as well as the larger Neuse and adjacent Tar-Pamlico Nutrient Strategies.

This past year the NSAB received DWR staff presentations, and provided comment, on the development of the:

- Falls Lake Existing Development Model Program, adopted by the EMC in January 2021.
- Neuse / Tar-Pamlico New Development Model Program, adopted by the EMC in March 2021.

As the Jordan watershed enters its rules readoption process, these model programs for neighboring strategies will provide valuable examples and policy references to consider during the design of the Jordan strategy.

## VI. Overall Nutrient Strategy Advancement

The NSAB membership includes local and state government stormwater practitioners, stormwater engineers, and university researchers, all of whom provide valuable insight for all nutrient management in NC. As subject matter experts and practitioners, they are uniquely qualified to help researchers and division staff identify questions of science and practical implementation policy. Their inclusion in review and discussion provides DWR with a better understanding of stakeholder concerns as well as additional science and policy ideas for advancing watershed nutrient management.

This past year the NSAB continued working with staff in a review and advisory capacity on the following two projects.

### Catalog of Nutrient Reduction Practices

Approved by the DWR Director in April 2021. To support implementation of North Carolina's nutrient management strategy rules, the Division of Water Resources, with significant support from other agencies and organizations, has developed a Catalog of Nutrient Reduction Practices. The purpose of this catalog is to provide a single, comprehensive listing of all currently approved nutrient practices, along with referencing to the applicable information sources for design standards and nutrient reduction credit accounting. For each practice, the Catalog identifies applicable rules, suitability for trading, and use in permanent or term applications. It provides basic guidance and references to resources that can be used to assist with selecting the most suitable practice as well as a template and instructions for the approval of new practice types.

### Stormwater Control Measures - Nutrient Data Standards Workgroup.

Growing interest in finding the most cost-effective nutrient practices has included reevaluation of nutrient values previously established for urban stormwater control measures. This has led to a desire to standardize technical data requirements to support SCM nutrient credit revisions as well as new SCM approvals. The Stormwater Program of the Division of Energy, Mineral and Land Resources (DEMLR) has authority for establishing and revising the set of acceptable SCMs for post-construction stormwater control. The Stormwater Program works with stormwater researchers and the DWR Nonpoint Source Planning Branch to set and revise nutrient credit assignments for these practices. NCSU researchers conducted analysis of SCM studies and are developing a screening tool for identifying suitable SCM treatment performance data. The workgroup continues to review the research results and collaborating with the researchers on incorporating suitable data standards into the tool.

This workgroup goal is to develop data standards to support revisions to current SCM flow and nutrient values and to serve as planning guidance for future SCM studies. The nutrient data standards will be developed from the work of staff, subject matter experts, and stormwater researchers.

### Updates to SNAP tool and SCM workgroup

The Stormwater Nitrogen and Phosphorus (SNAP) tool v4.1 is a project-scale tool for modeling nitrogen and phosphorus in stormwater runoff from development sites and nutrient reductions provided by stormwater treatment. As of October 2018, it is the approved tool for regulatory compliance with stormwater requirements of the Falls and Jordan nutrient strategies, and for alternative riparian buffer mitigation compliance in all watersheds with buffer regulations. It is

currently being updated to reflect the latest stormwater research (see above) and to provide customization for use by Neuse and Tar-Pamlico local stormwater programs.

## VII. Nutrient Reduction Practices

As they are approved by DWR, nutrient reduction practices of all kinds are added to the set of options local, state and federal parties may use to achieve nutrient load reductions from existing developed lands, and in some cases for use by parties subject to other nutrient rules.

For most Existing Development rule practices, staff develops new practice documents using DWR's credit development process; additions to research data; assistance from subject matter experts; discussion, review and advisement by the NSAB; and public comment. Vetted practices are approved by the DWR Director and added to the initial set approved by the EMC in 2013.

No new practices were approved this past year. The NSAB was presented with the results of a Streetsweeping Survey from the Charlotte-Mecklenburg Stormwater Services Department. Streetsweeping was one of the practices approved the prior year.

In the 2020 Annual report, the NSAB planned to review for potential endorsement the following nutrient reduction practices, for which updates are provided here:

1. Malfunctioning Septic Systems - moved to 2021, given staff workload.
2. Riparian Buffer Improvements and Stream Restoration in Developed Areas (renamed: Riparian Revegetation and Stream Bank Stabilization) – partially completed; remains a priority; moved to 2021-22, given complexity and staff workload
3. Urban Reforestation – moved to 2021-22, given staff workload
4. Wastewater Regionalization and Overtreatment 2021 – work is resuming on this practice in the second half of 2021.

## VIII. Next Year

The NSAB will continue work on several important tasks in the coming year:

- Gaining insights from researchers on the NC Policy Collaboratory Falls Lake Nutrient Strategy
- As part of Jordan Lake Nutrient Strategy Rule readoption, NSAB members will continue to contribute recommendations for rule concepts.
- As time permits, given the above priorities, the NSAB will review and potentially endorse additional nutrient credit practices that may include: Urban Reforestation; Bioswales; Wastewater Regionalization/Overtreatment; Malfunctioning Septic Systems, Livestock Exclusion update, Streambank Stabilization, Outlet Stabilization, Cropland Conversion, Rural Buffer Restoration, Urban Riparian Revegetation.
- Updates to the Stormwater Nitrogen and Phosphorous (SNAP) Tool
- Updates to the Nutrient Credit Catalog

## IX. Membership

### Nutrient Scientific Board Members

	NSAB Position	Member	Organization
1	Local Government Representative	Sandra Wilbur	City of Durham
2		Allison Weakley	Town of Chapel Hill
3		Morgan DeWit	Chatham County
4		David Phlegar	City of Greensboro
5		Josh Johnson	Cities of Mebane and Graham; Towns of Elon and Gibsonville
6		Eric Kulz	Town of Cary
7	Professional or Academic Representative	Michael Burchell	NCSU
8	Professional Engineer	Sally Hoyt	UNC- Chapel Hill
9	NC DOT Representative	Andy McDaniel	NC DOT
10	Conservation Organization Representative	Peter Raabe	American Rivers
11	Falls Lake Watershed Representative <sup>1</sup>	Forrest Westall	Upper Neuse River Basin Association

[Session Law 2009-216](#) (4)(a) calls for the establishment of the NSAB and stipulates five to 10 members with expertise or interests listed in the table above.

<sup>1</sup>In 2013 the NSAB chose to add an advisor to the board to represent the interests of Falls Lake Watershed local governments.

## X. Establishment, Duties, and Authority of the NSAB

SESSION LAW 2009-216

Section 4.(a) - (c)

AN ACT TO PROVIDE FOR IMPROVEMENTS IN THE MANAGEMENT OF THE JORDAN WATERSHED IN ORDER TO RESTORE WATER QUALITY IN THE JORDAN RESERVOIR.

The General Assembly of North Carolina enacts:

**SECTION 4.(a)** Scientific Advisory Board for Nutrient-Impaired Waters Established. – No later than July 1, 2010, the Secretary shall establish a Nutrient Sensitive Waters Scientific Advisory Board. The Scientific Advisory Board shall consist of no fewer than five and no more than 10 members with the following expertise or experience:

- 1) Representatives of one or more local governments in the Jordan Reservoir watershed. Local government representatives shall have experience in stormwater management, flood control, or management of a water or wastewater utility.
- 2) One member with at least 10 years of professional or academic experience relevant to the management of nutrients in impaired water bodies and possessing a graduate degree in a related scientific discipline, such as aquatic science, biology, chemistry, geology, hydrology, environmental science, engineering, economics, or limnology.
- 3) One professional engineer with expertise in stormwater management, hydrology, or flood control.
- 4) One representative of the Department of Transportation with expertise in stormwater management.
- 5) One representative of a conservation organization with expertise in stormwater management, urban landscape design, nutrient reduction, or water quality.

**SECTION 4.(b)** Duties. – No later than July 1, 2012, the Scientific Advisory Board shall do all of the following:

- 1) Identify management strategies that can be used by local governments to reduce nutrient loading from existing development.
- 2) Evaluate the feasibility, costs, and benefits of implementing the identified management strategies.
- 3) Develop an accounting system for assignment of nutrient reduction credits for the identified management strategies.
- 4) Identify the need for any improvements or refinements to modeling and other analytical tools used to evaluate water quality in nutrient-impaired waters and nutrient management strategies.

**SECTION 4.(c)** Report; Miscellaneous Provisions. – The Scientific Advisory Board shall also advise the Secretary on any other issue related to management and restoration of nutrient-impaired water bodies. The Scientific Advisory Board shall submit an annual report to the Secretary no later than July 1 of each year concerning its activities, findings, and recommendations. Members of the Scientific Advisory Board shall be reimbursed for reasonable travel expenses to attend meetings convened by the Department for the purposes set out in this section.