February 4, 2022 / 9:30 Am – 12:00 Pm

Remote WEB Meeting

# ATTENDEES

**Members / Advisors**

Drew Blake – Chatham County

Charles Brown – Cary

Mike Burchell - NCSU

Alisha Goldstein – Chapel Hill

Sally Hoyt – Raleigh

Bill Hunt - NCSU

Brian Jacobson - AECOM

Eric Julz - Cary

J.V. Loperfido – Durham

Grady McCallie – NC Conservation Network

David Phlegar – Greensboro

Haywood Phthisic – LNBA

Peter Raabe – American Rivers

Allison Schwarz Weakley – Chapel Hill

Forrest Westall – UNRBA

Sandra Wilbur – Durham

**DEQ Staff**

Patrick Beggs - DWR

Trish D’Arconte – DWR

Nora Deamer - DWR

Jim Farkas - DEMLR

Rich Gannon – DWR

Joey Hester - DWR

John Huisman – DWR

Jim Stanfill - DMS

**Guests**

Teresa Andrews – Guilford County

Alexandra Dinwiddie – NC DSWC

Jacob Dorman - Stormwater Solutions

Sean Eggleston

Stan Fortier

Jim Hawhee – Wake County

Michael Irwin

Keith Larick - NC Farm Bureau Federation

Annette Lucas – McAdams Co

Alix Matos - Brown and Caldwell

Don O’Toole – Durham

Ian Peterson

Sushama Pradham – NC DHHS

Ashley Rodgers – Wake County

Lauren Roper

Rick Savage - Carolina Wetlands Association

Steve Wall – NC Policy Collaboratory

Megan Walsh - Durham

Daniel Wiebke – McAdams Co

**TJCOG Staff**

Shantel Haskins

# AGENDA TOPICS

1. Introductions
2. Approve December 3, 2021 Meeting Summary
3. Constructed wastewater wetlands – Mike Burchell, NCSU
4. Sand filters & Floating treatment wetlands – Bill Hunt, NCSU
5. JLOW Update
6. Jordan Rules update
7. NSAB Updates/Round robin

**Meeting Materials and the NSAB Charter are available online:** [www.deq.nc.gov/nps](https://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/nutrient-scientific-advisory-board" \l "nsab-meeting-documents)

# MEETING SUMMARY

Patrick Beggs (DWR) opened the meeting with introductions and a review of the agenda.

The December 3, 2021 meeting summary was approved.

**The meeting was designed to allow the NSAB to learn of recent nutrient management work by Drs. Burchell and Hunt, both of NCSU Biological & Agricultural Engineering. The presentations are not available, and questions can be directed to Dr. Burchell or Dr. Hunt or brought up at the next NSAB meeting.**

## Constructed wastewater wetlands

Presenter: Dr. Mike Burchell NCSU

Surface flow constructed wetlands are a great example of ecological engineering offering minimal maintenance.

Wetlands operate best as a secondary treatment to reduce the amount of nitrogen accumulation or to convert the amount of ammonium to nitrate.

Despite documented success constructed wetlands are underutilized in the United States.

A comparison of two equally sized wetlands: One wetland (A) received a minimal amount of nitrogen added in treatment. Another wetland (B) naturally transformed with surface flow from stormwater. Wetland A that was manual treated was able to remove 30 times the amount of nitrogen per year when compared to the same size wetland B naturally affected by stormwater.

This comparison also highlighted constructed wetlands being relatively cheaper to produce in rural areas and a great way to polish wastewater to improve pollution issues.

North Carolina is home to four operational wetlands. There are challenges to more widespread constructive wetland adoption, including:

* lack of operational maintenance and guidance
* not receiving the proper levels to remove nitrogen,
* unaware of treatment trends,
* lack of resources for problem solving methods for wetlands,
* lack of incentives for proactive initial treatment,
* lack of clear economic incentives.

Research and water quality monitoring in Walnut Cove, NC from 2018-2020 challenged the negative perception of wastewater wetlands.

In conclusion provided strategic plan for wetlands in North Carolina, including:

* education of stakeholders on history of treatment,
* potential economics,
* maintenance,
* informing of potential lifespan of constructed wetlands,
* finding active audience,
* funding to study existing wetland system for improvement of performance,
* encourage operators to document performance,
* state regulations, and,
* grants for community participation.

Discussion / Q&A

* David Phlegar: Northern Middle and High School in Guilford County has a constructed wetland for wastewater treatment, as well as a Guilford County Food Lion Grocery.
* Applying wetlands to North Carolina, would there be a difference between building a wetland on the coast versus in the mountains as it relates to performance or maintenance?
  + Dr. Mike Burchell: There is a longer growing season and thus an active plant and microbial metabolism season near the coast of NC. Microbial activity can continue in the water below 5 degrees C. Probably be exceeding expectations in warmer weather that will offset winter slow down. Don't think winter in NC negates its usefulness. We would need geographically strict guidance.
* In natural wetlands do you see the same kind of continuation in nitrogen removal and is there a natural process like fire that is periodically restoring it?
  + Dr. Mike Burchell: By studying wetlands they naturally go through a nitrogen cycle. Wetlands naturally accumulate organic matter it has to be wet for a certain amount of time for a denitrification to occur.
* Very interesting!!! I went to several presentations back in the 90s about using wetlands to "polish" wastewater effluent. Seems like they were doing these in FL and WI.
* Forrest Westall: Great presentation Mike. Thanks for continuing to put this technology forward as a consideration, for the great information and guidance on what I still believe is another good option for nutrient reduction.

## Sandfilters and Floating Treatment wetlands

Presenter: Dr. Bill Hunt, NCSU

**Floating treatment wetlands**

Floating treatment wetlands which interrupt the flow path of the water use less area of floating treatment wetlands and result in positive nitrogen removal.

**Sand Filters**

Preliminary data has been collected for sand filters. Sand filters release low concentrations of nutrients but not always lower than what is in the flow.

The IWS retrofit does not appear to notably improve performance.

Some hydrologic mitigation is occurring.

Sand filter studies will be completed in December 2022.

**Discussion / Q&A**

* Most NC proposed sand filters have been underground how would that differ from above?
  + Dr. Bill Hunt: Would perform about the same if maintained properly.
* With internal water storage, would the lack of carbon source be a limitation?
  + Dr. Bill Hunt: No not incompatible.
* Can we develop an underground filter system that works well for our nutrients?
  + Dr. Bill Hunt: That is a great outlook and we hope the state decides it needs that information and calls upon us.
* Given the limited ultra-urban options, dwelling on the internal waters storage (IWS) component, any further thoughts on the infiltration potential for overall nutrient load reduction? Can you have your denitrification and infiltration too, like in a D soil?
  + Dr. Bill Hunt: Based on infiltration and soils.

## JLOW Update

Peter Raabe, American Rivers – JLOW Advisory Committee

* JLOW is transitioning to a nonprofit organization.

## Jordan rules timeline

2021-2022 Model Revision and Review

2022 Rule Concepts Development and Review

2022-2023 Draft Rule Development and Review

2023 Rules Impact Analysis Development

2024 Hearings/ Approval / Adoption

All Jordan rules will begin readoption at the same time, but the buffer rule will go on its own timeline and the 401 buffer permitting branch will help lead that. (Paul Wojoski and Sue Homewood)

**The NSAB plans to meet June 3, 2022.**