# Jordan Nutrient Rules: Agriculture TAG#1

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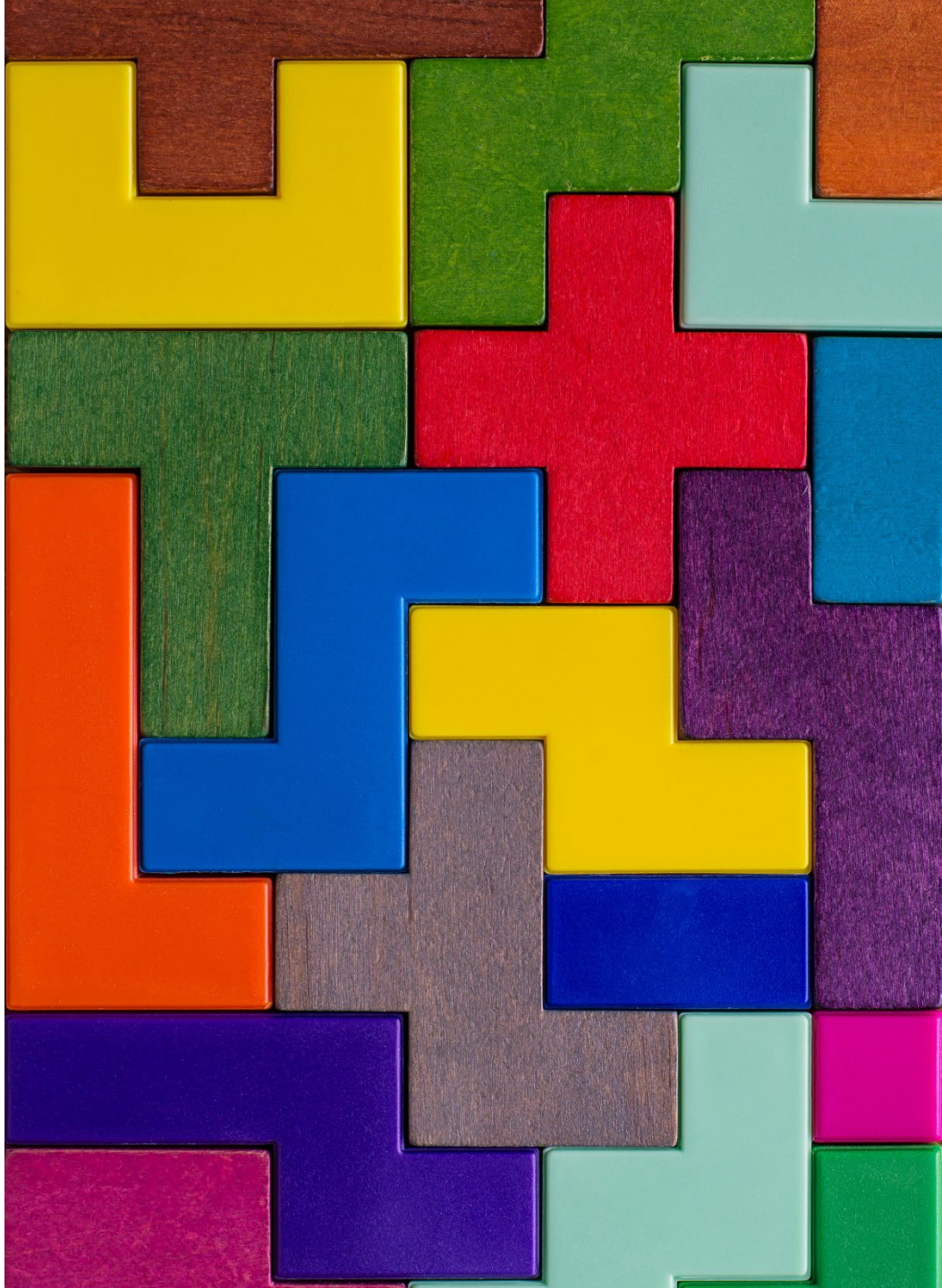
June 2024

**Welcome to the first Technical Advisory Group (TAG)** for Agriculture Jordan Rule Readoption.

**Introductions:** please state name, affiliation, relation to Jordan agriculture rule



# TAG Purpose & Process

- Purpose of TAGs: to get feedback from stakeholders on current implementation and rule revision concepts.

- TAG Process
  - June 25th – review current rule and implementation progress, get feedback agricultural activities and initial rule concepts.
  - 2nd TAG (August) – aim to send **draft rule concept prior to meeting**, review in the meeting and discuss implementation questions.
  - 3rd TAG (Nov) – aim to send **draft rule language prior to meeting**, review in meeting and discuss implementation questions.

  - Intent: Complete stakeholder engagement, comments on all rules by November 2024. Draft rules and approved fiscal analysis to WQC ~mid-June for July 2025 WQC approval.

**‘Informal’ Stakeholder Engagement**

**WQC Approval to Proceed (expected multiple reviews)**

**“Formal” Rulemaking (steps can require > 1 pass)**

## 2024

- DWR stakeholder engagement.
- DWR rule drafts and internal review.
- Stakeholder groups review rule language.

## 2025

- Jan - Begin fiscal analysis.
- May-Jun – OSBM fiscal approval
- **July or Sept WQC**: Action item
  - Provide approved fiscal analysis
  - Request to proceed w/rules
- **Sept or Nov WQC**: 2nd attempt if needed

(filing dates = 1 mo prior to meetings)

## 2026-2027

- EMC approval to proceed
- 60-day public comment period
- Hearing Officers deliberate
- Develop Hearing Officers report
- EMC adopts rules
- Rules Review Commission approves

# Modeled Reductions to Meet Chl-a Standard

- Overall, new model is calling for significant additional nutrient loading reductions to meet chl-a standard.

| Current Rule – Lake Reduction Goals* | | |
|---|---|---|
| | N | P |
| Upper NH | 35% | 5% |
| Lower NH | 0% | 0% |
| Haw | 8% | 5% |

* relative to 1997-2001 baseline period

| New Lake Model – Further Lake Reduction Needs* | | |
|---|---|---|
| | N | P |
| Upper NH | **60-70%** | 0-50% |
| Middle NH | **30-60%** | **0-70%** |
| Haw | **0-70%** | **0-40%** |

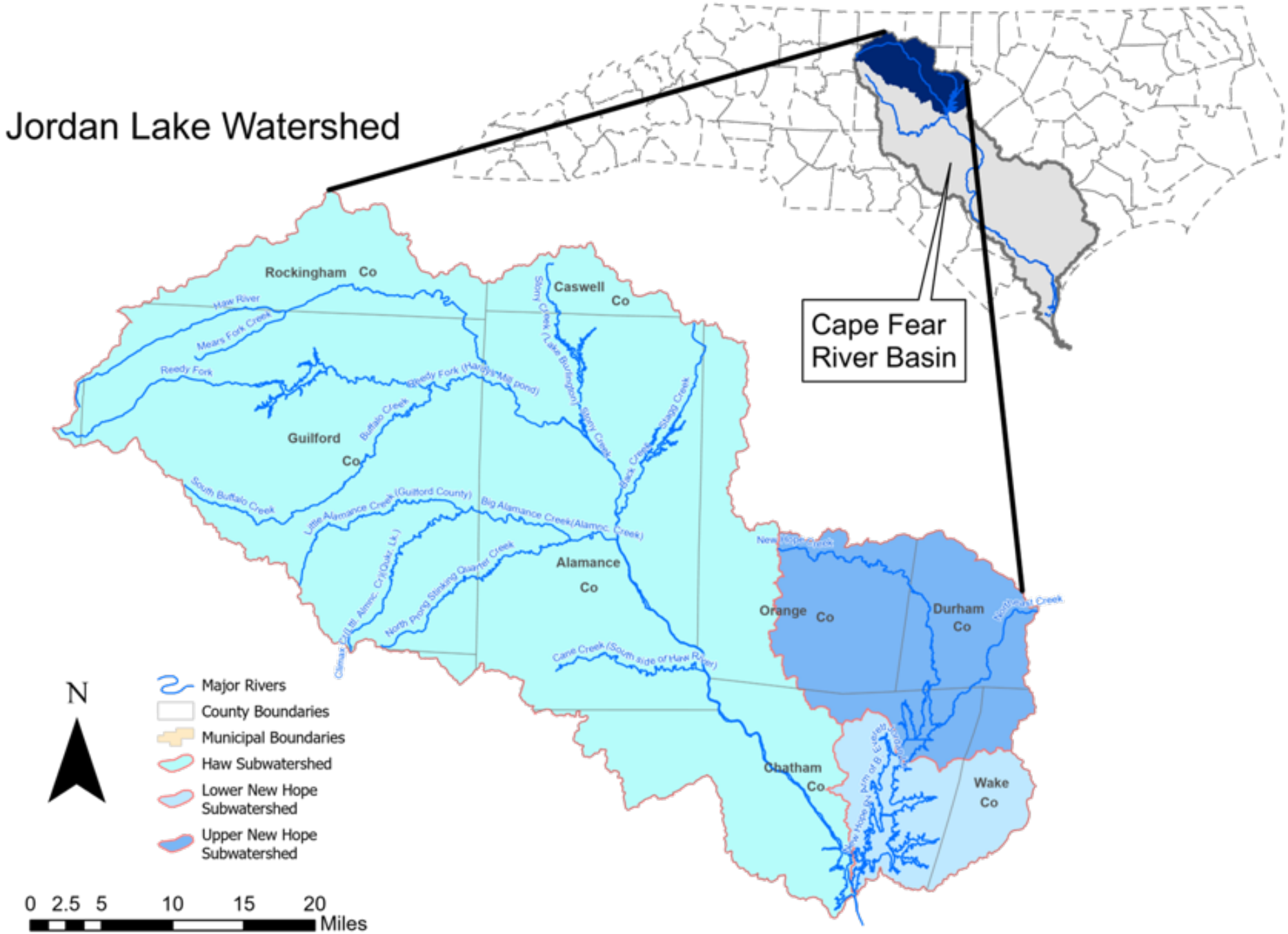
* relative to 2014-2016 model period

- Model is available for external review.

**Station Set:** Haw Stations

| P loading reduction (%) | Nitrogen Loading Reduction (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% |
| 0% | 0.21 | 0.20 | 0.18 | 0.17 | 0.16 | 0.16 | 0.17 | 0.10 |
| 10% | 0.19 | 0.18 | 0.16 | 0.15 | 0.14 | 0.14 | 0.15 | 0.10 |
| 20% | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.12 | 0.09 |
| 30% | 0.13 | 0.12 | 0.11 | 0.09 | 0.08 | 0.09 | 0.09 | 0.07 |
| 40% | 0.10 | 0.10 | 0.08 | 0.07 | 0.06 | 0.05 | 0.05 | 0.05 |
| 50% | 0.09 | 0.08 | 0.07 | 0.06 | 0.05 | 0.03 | 0.03 | 0.03 |
| 60% | 0.08 | 0.08 | 0.06 | 0.05 | 0.04 | 0.03 | 0.02 | 0.02 |
| 70% | 0.07 | 0.07 | 0.05 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 |

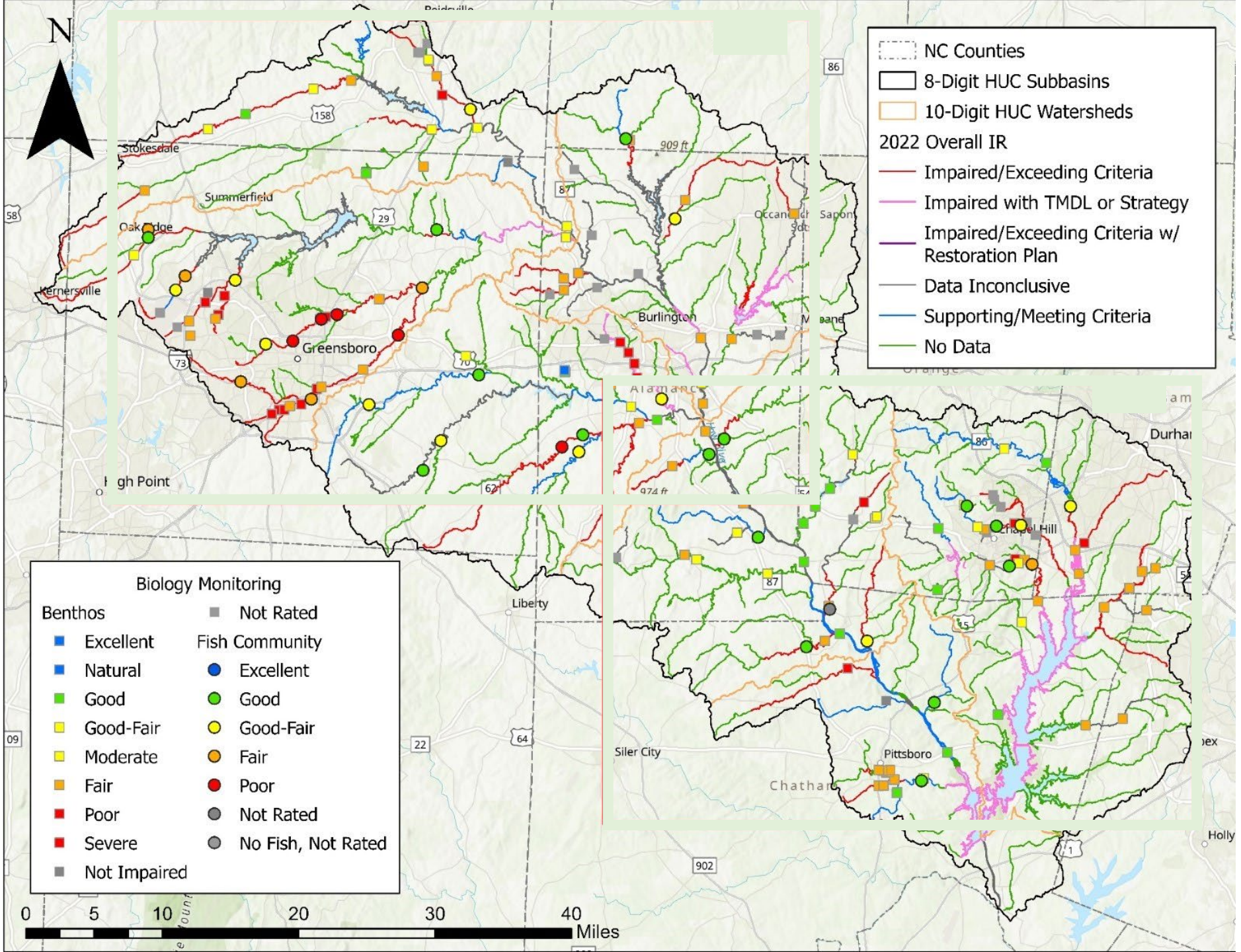
Any new reduction goal will have a new baseline of 2014-2016.


Jordan Lake Watershed
Cape Fear River Basin
Rockingham Co
Caswell Co
Guilford Co
Alamance Co
Orange Co
Durham Co
Chatham Co
Wake Co
Haw River
Mears Fork Creek
Reedy Fork
Buffalo Creek
South Buffalo Creek
Little Alamance Creek (Guilford County)
Big Alamance Creek(Alamance Creek)
North Prong Stinking Quarter Creek
Cane Creek (South Ridge of Haw River)
Slabtown Creek
N
Major Rivers
County Boundaries
Municipal Boundaries
Haw Subwatershed
Lower New Hope Subwatershed
Upper New Hope Subwatershed
0 2.5 5 10 15 20
Miles

## *Jordan Watershed (Haw River basin HUC10) Watershed Ambient Water Quality Means for 2016-2020.*

| Watershed HUC 10 | Watershed Name | Number of Stations | pH | DO (mg/L) | Conductivity (µS/cm) | NH3 (mg/L) | TKN (mg/L) | NOx (mg/L) | TN (mg/L) | TP (mg/L) | Turbidity (NTU) | TSS (mg/L) | Fecal Coliform (cfu/100 mL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Highest HUC 8 in Cape Fear River Basin** | | **x̄** | | | 711 | 0.09 | 0.92 | 1.34 | 2.10 | 0.21 | 20.19 | 22.90 | 1,093 |
| **Highest HUC 10 in Cape Fear River Basin** | | **x̄** | | | 1,413 | 0.27 | 1.44 | 2.62 | 3.48 | 0.38 | 26.63 | 26.64 | 2,478 |
| **03030002*** | **HUC8 Haw River Watershed** | 35 | 7.20 | 8.27 | 222 | 0.06 | 0.77 | 1.34 | 2.10 | 0.13 | 20.19 | 22.90 | 749 |
| 0303000201 | Reedy Fork (Urban) | 7 | 7.23 | 8.47 | 270 | 0.10 | 0.84 | 2.53 | 3.35 | 0.19 | 12.92 | | 947 |
| 0303000202 | Headwaters Haw (Ag) | 6 | 6.95 | 8.30 | 110 | 0.04 | 0.58 | 0.40 | 0.98 | 0.06 | 20.76 | | 429 |
| 0303000203 | Big Alamance Creek (Ag, Ur | 2 | 7.07 | 7.62 | 164 | 0.04 | 0.73 | 0.45 | 1.19 | 0.11 | 20.85 | | 1,056 |
| 0303000204 | Back Creek-Haw | 8 | 7.31 | 8.57 | 248 | 0.07 | 0.84 | 1.39 | 2.23 | 0.16 | 21.38 | | 983 |
| 0303000205 | Cane Creek-Haw | 2 | 7.38 | 9.01 | 217 | 0.04 | 0.89 | 1.23 | 2.12 | 0.11 | 23.61 | | 848 |
| 0303000206 | B Everett Jordan Lake-New Hope (Lake) | 6 | 7.11 | 7.52 | 275 | 0.05 | 0.75 | 1.45 | 2.19 | 0.14 | 26.63 | 26.64 | 732 |
| 0303000207 | Roberson Creek-Haw (Fores | 7 | 7.41 | 8.61 | 176 | 0.05 | 0.82 | 0.80 | 1.61 | 0.09 | 17.27 | 15.85 | 313 |
| | | | | | | | | | | | | | |
| Healthy Piedmont Stream[#] | | | | | 12-90 | 0.05 | | 0.30 | 0.80 | 0.05 | | | |
| EPA Nutrient Criteria - Piedmont[+] | | | | | | | | | 0.70 | 0.038 | | | |

Orange highlighted values represent the highest mean instream concentration or lowest DO concentration in comparison to the other HUC 10 watersheds.
Green highlighted row represents the overall HUC 8 watershed mean for each constituent for comparison purposes.



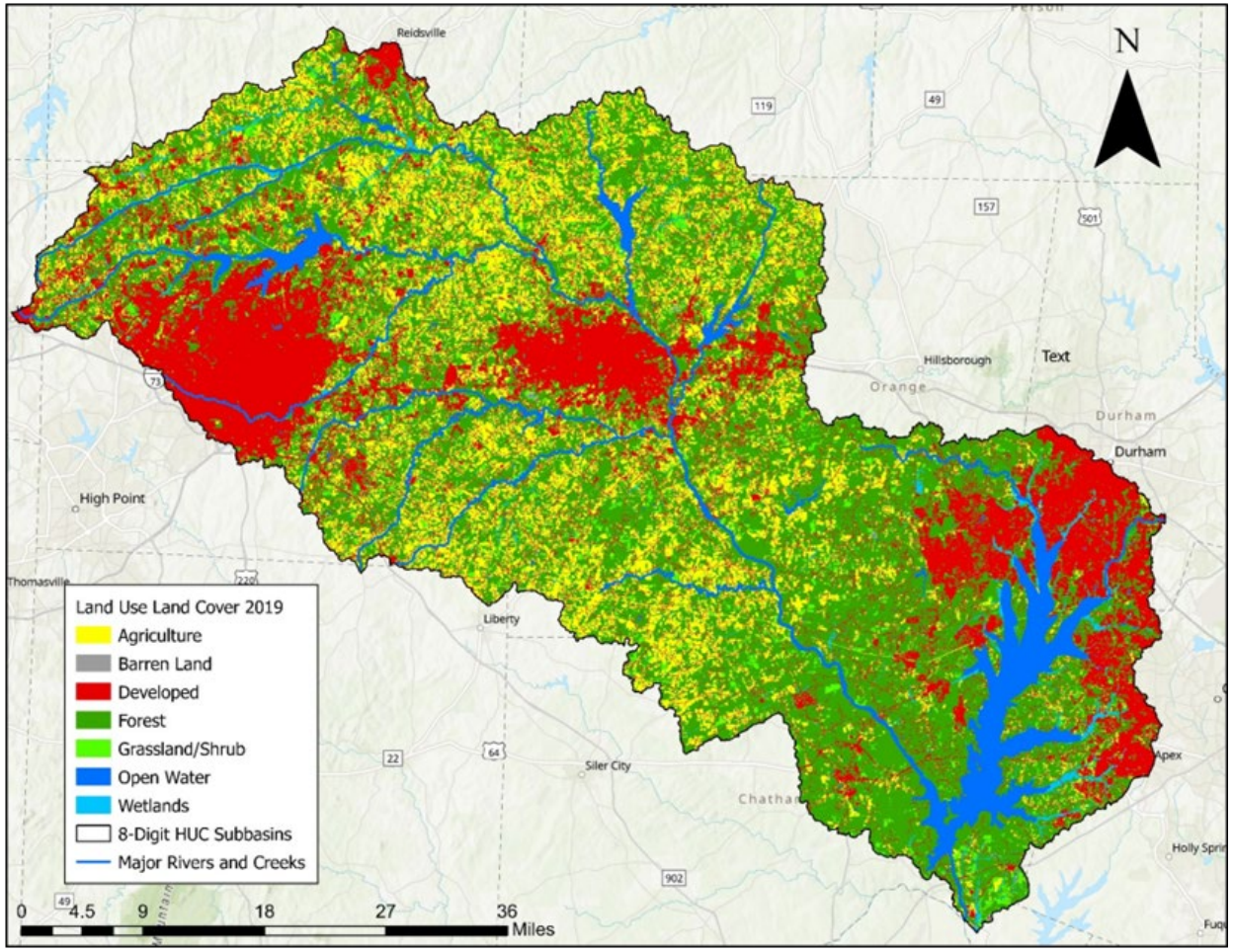

*Biological community monitoring stations for benthos and fish in the Jordan Watershed.*

DWR Biological Assessment Branch monitors each basin on a rotating cycles – this figure includes 2008, 2013 and 2018.

*Land Cover in Jordan Watershed, NLCD 2022 (table) and 2019 (map).*

| Land Cover[1] | 2001 | 2011 | 2019 | % Change 2001-2019 | mi² Change 2001-2019 | Total mi² 2019 |
|---|---|---|---|---|---|---|
| **Agriculture** | 21.78% | 20.28% | 19.85% | **-1.93%** | **-32.99** | **338.89** |
| **Barren Land[2]** | 0.08% | 0.09% | 0.10% | **0.02%** | **0.29** | **1.67** |
| **Developed** | 21.05% | 23.42% | 24.38% | **3.34%** | **56.95** | **416.33** |
| **Forest** | 50.39% | 47.53% | 47.46% | **-2.94%** | **-50.13** | **810.38** |
| **Grassland/Shrub** | 2.18% | 4.24% | 3.68% | **1.49%** | **25.48** | **62.79** |
| **Open Water** | 2.65% | 2.56% | 2.70% | **0.05%** | **0.89** | **46.06** |
| **Wetlands** | 1.87% | 1.88% | 1.84% | **-0.03%** | **-0.48** | **31.47** |
| **Total mi²** | | | | | | **1,707.59** |

[1]Data was downloaded from the Multi-Resolution Land Characteristics NLCD website and processed for each Cape Fear River Basin HUC8s in 2022.
[2]Barren Land is a catch-all category for tilled land, new development, cutover, bare rock areas.
Top 3 land cover




As of 2023, Greater than **60% of agricultural land** acreage in the watershed is estimated to be used for **pasture or hay production**. Followed by soybeans, wheat, corn, and tobacco (DSWC Jordan AR, 2023).

# Current Jordan Agriculture Rule

- **Collective N and P reduction goals** for cropland and grazed pastureland agriculture
- Annual cropland progress accounting and pastureland accounting every five years by DSWC via Nitrogen Loss Estimation Worksheet (NLEW)
- Tracks changes in N loss in comparison to baseline based on major crop acres, N rates, and implemented BMPs

- Watershed Oversight Committee (WOC) – oversees implementation and accounting process

- In effect in 2009, collective reduction deadlines delayed to 2018
- **Achieved reduction goals in 2014 and all years thereafter**

# Reporting & Rule Compliance Process

Local Data Review & Submission

Watershed Oversight Committee

Division of Water Resources Receives Progress Reports

- Local agriculture stakeholders (SWCD staff, NCDA&CS regional agronomists, and others) are consulted to **<u>provide county data</u>** to be incorporated into cropland and pastureland reporting.

Farm Service Agency annual crop report or USDA NASS annual crop survey data

Local knowledge and data on farmer-implemented N and P reducing BMPs not supported by cost share funding

Fertilization rate application data

Select BMPs implemented using state and federal cost share funding

USDA NASS annual livestock survey data and Agriculture Census data

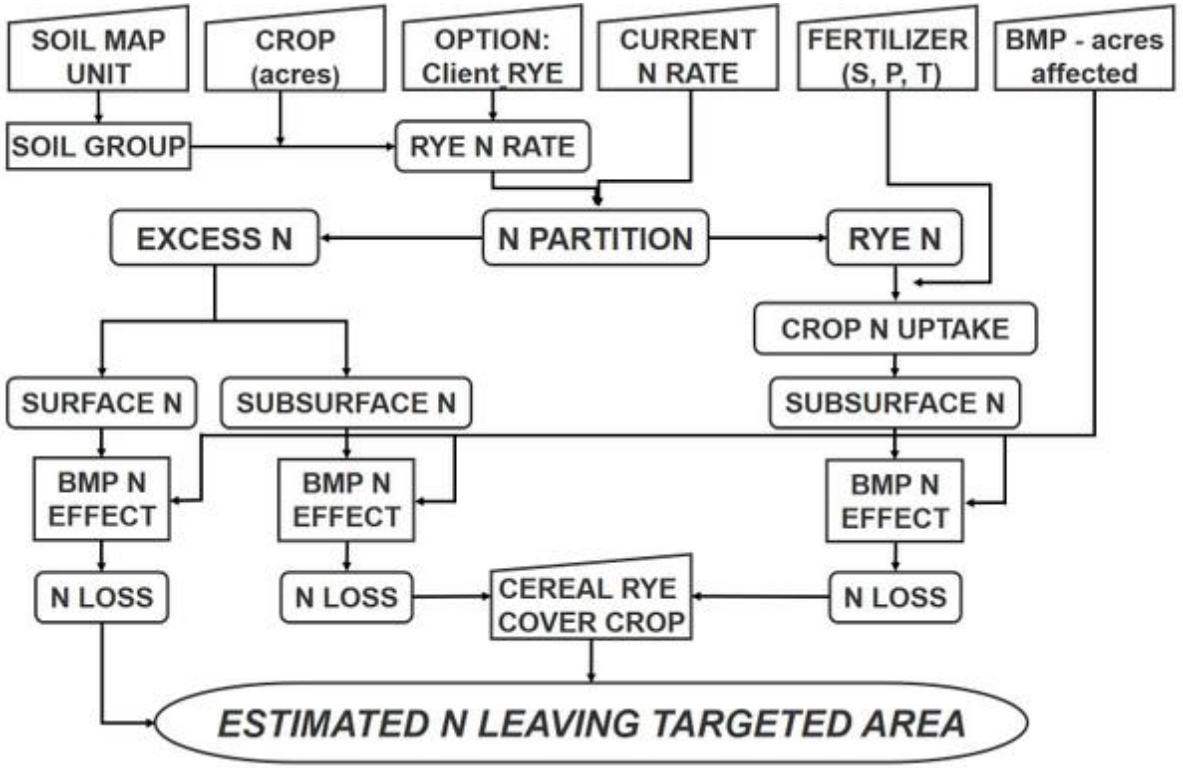
- Agriculture, environmental, agency, and academic stakeholders serve
- Committee is responsible for maintaining and updating as needed the **<u>accounting tools and methodologies</u>** for tracking agricultural N and P losses
  - NLEW
  - Qualitative P Changes
- **<u>Review and approve reports</u>** on Agriculture's collective reductions of N and P loss prepared by the DSWC NPS Planning Coordinator position

NORTH CAROLINA DEQ Department of Environmental Quality

# Agriculture Nutrient Loss Reduction Tracking

**Aggregate Nitrogen Loss Estimation Worksheet (NLEW)**

- Developed to meet Neuse Ag Rule and approved for use in Jordan Lake
- Assumes majority of N lost moves as soluble N through the soil system to shallow groundwater
- Estimates a baseline N loss
- Captures inorganic and animal waste fertilizer application
- Tracks N-reducing BMP implementation
- Tracks changes in N losses at whole-county scale adjusted for acreage in the watershed



# Report

2024

Jordan Lake - Haw Subwatershed

Alamance

Cropland

# Data

Save

## SMG Acres

| SMG | %Acres | #Acres | |
|---|---|---|---|
| TOTAL | 100.000 % | | |
| 4 | 0.109% | | |
| 101 | 2.301% | | |
| 102 | 0.076% | | |
| 103 | 8.795% | | |
| 105 | 2.313% | | |
| 106 | 0.251% | | |
| 107 | 1.945% | | |
| 109 | 9.409% | | |
| 110 | 13.019% | | |
| 111 | 29.652% | | |
| 113 | 25.424% | | |
| 115 | 0.758% | | |
| 116 | 3.860% | | |
| 117 | 2.085% | | |

## Crop Acres

| Type | Acres | N Rate |
|---|---|---|
| TOTAL | 0 | |
| Bahiagrass (Hay) | | |
| Barley (Grain) | | |
| Caucasion/Old World Bluestem (Hay) | | |
| Common Bermudagrass (Hay) | | |
| Corn (Grain - Coastal) | | |
| Corn (Grain - Conventional) | | |
| Corn (Grain - No Till) | | |
| Corn (Silage - Coastal) | | |
| Corn (Silage - Conventional) | | |
| Corn (Silage - No Till) | | |
| Cotton | | |
| Cucumber | | |
| Dallisgrass (Hay) | | |
| Fescue (Hay) | | |
| Hybrid Bermudagrass (Hay) | | |
| Hybrid Bermudagrass | | |

## Cover Crops

| Type | N Reduction | Acres |
|---|---|---|
| Barley (Grain) | 10.00% | |
| Oats (Grain) | 10.00% | |
| Rye (Grain) | 15.00% | |
| Triticale (Grain) | 15.00% | |
| Wheat (Grain) | 5.00% | |

## BMP Acres

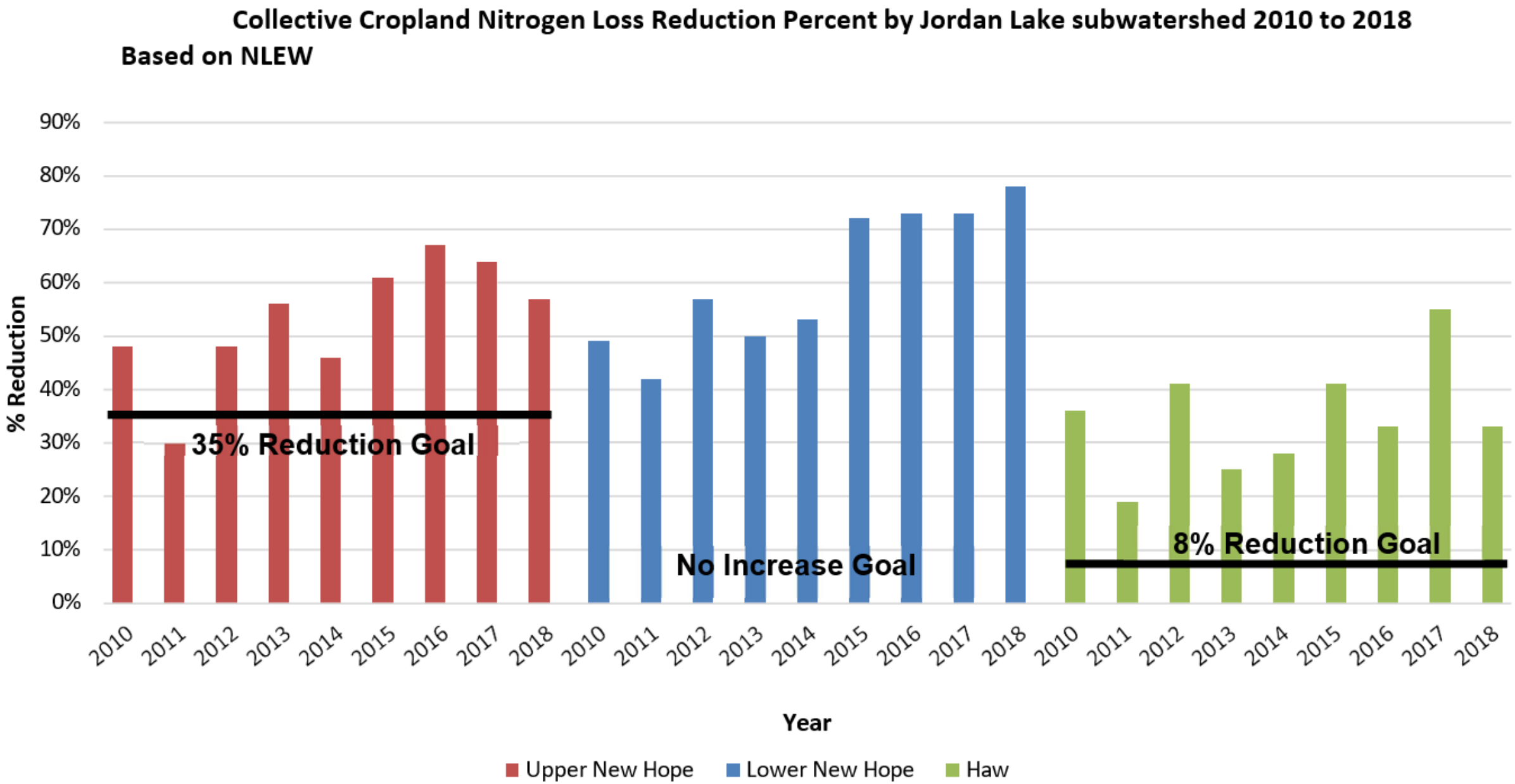
| BMP | N Reduction | Acres |
|---|---|---|
| Buffer: Minimum 20 ft | 20.00% | |
| Buffer: Minimum 30 ft | 25.00% | |
| Buffer: Minimum 50 ft | 30.00% | |
| Buffer: Minimum 100 ft | 35.00% | |
| Water Control Structure | 40.00% | |
| Water Control Structure and Buffer | 40.00% | |

# Agriculture Nutrient Loss Reduction Tracking

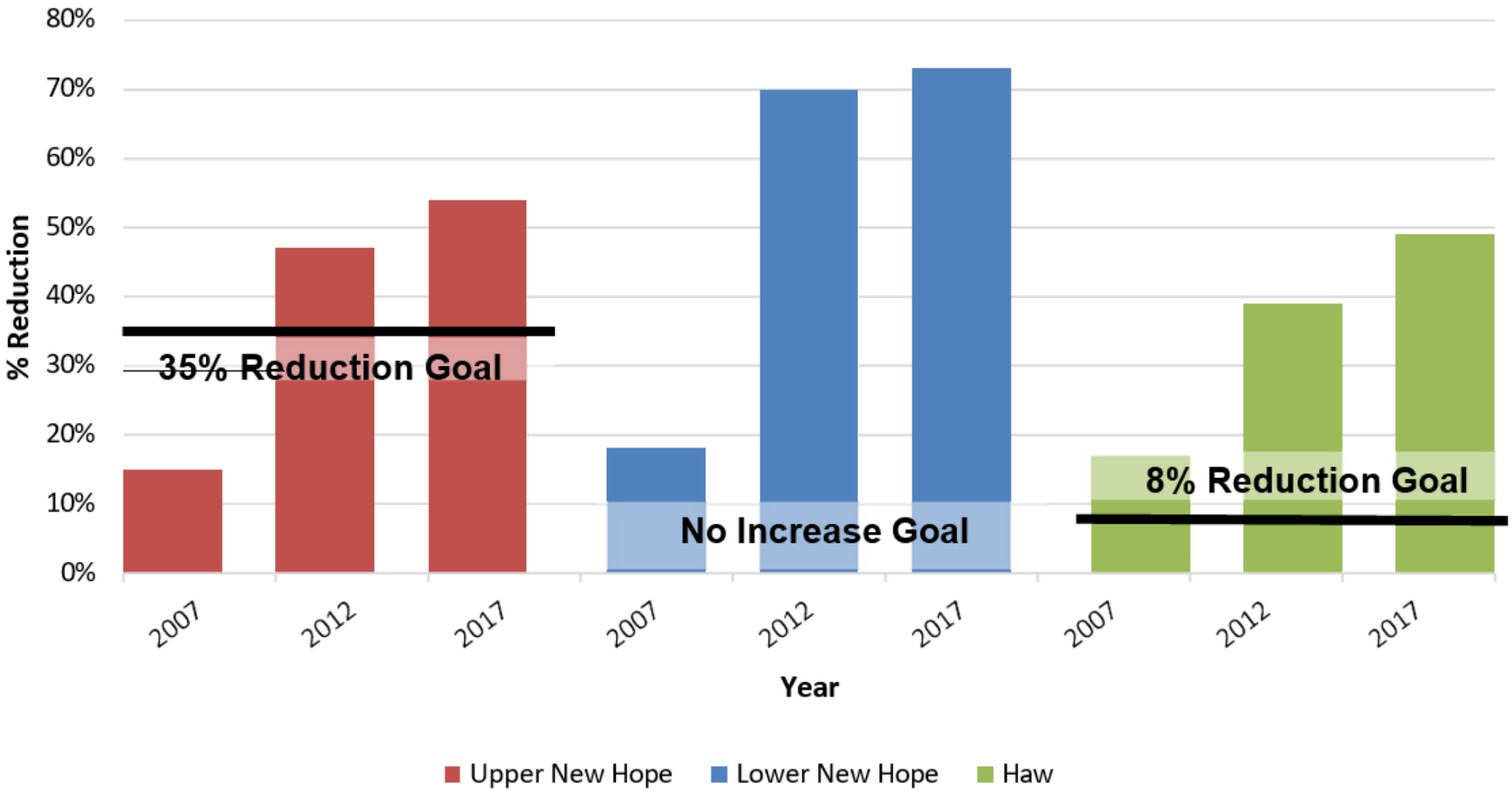
**Phosphorus Loss Risk Estimation**

- A defensible, aggregated, quantitative, county-scale accounting method for estimating phosphorus losses from agricultural lands was determined not feasible
- Relative changes that either increase or decrease the risk of phosphorus (P) loss from agricultural lands in basins/watersheds are qualitatively tracked annually
- Developed to meet Tar-Pamlico Ag Rule requirements, adopted for use in Jordan Lake

| Parameters Assessed for an Increased or Decreased Loss Risk for Qualitative P Tracking |
| --- |
| Total Reported Cropland in Production (annual) *excludes fallow and idle land* |
| Tobacco Acres (annual) |
| Cropland Conversion to Grass & Trees Acres (cumulative) |
| Wetlands Reserve Program and Conservation Reserve Program Acres (cumulative) |
| Conservation Tillage Acres (rolling 10yr window) *approximated active contracts* |
| Vegetated Buffers Acres (cumulative) |
| Unfertilized Cover Crop Acres (annual) |
| Animal Waste Phosphorus (annual) |
| Soil Test P Median (annual) |


Collective Cropland Nitrogen Loss Reduction Percent by Jordan Lake subwatershed 2010 to 2018
Based on NLEW
% Reduction
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
35% Reduction Goal
No Increase Goal
8% Reduction Goal
2010
2011
2012
2013
2014
2015
2016
2017
2018
Year
Upper New Hope
Lower New Hope
Haw

**Collective Pastureland Nitrogen Loss Reduction Percent by Jordan Lake subwatershed 2007 to 2017 Based on NLEW**



# BMP Implementation Not Tracked by NLEW

- Not all BMPs that reduce N are included in NLEW
- Implementation of these BMPs are included in an annual report table to demonstrate beneficial water quality actions that are not captured in NLEW outputs
- Top practices:
    - **Livestock fencing**
    - **Prescribed grazing**
    - **Sod based rotation**
    - **Streambank and shoreline protection**
    - **Cropland conversion**
    - **Pasture renovation**

**Best management practices installed from 2002 to 2022, Jordan Lake Watershed***

| Conservation Practice | Units | 2002-2022 (cumulative) | 2012-2022 (active contracts – 10-year rolling window) |
|---|---|---|---|
| Ag road repair-stabilization | feet | 3,207 | 327 |
| Agricultural pond restoration/repair | units | 26 | 9 |
| Closure-waste impoundments | units | 21 | 4 |
| Conservation cover | acres | 862 | 77 |
| Constructed wetland | acres | 2 | 0 |
| Critical area planting | acres | 88 | 22 |
| Cropland conversion - grass | acres | 1,322 | 314 |
| Cropland conversion - trees | acres | 1,092 | 230 |
| Diversion | feet | 5,412 | 340 |
| Fencing (USDA programs) | feet | 80,587 | 73,846 |
| Field border | acres | 166 | 25 |
| Filter strip | acres | 0.4 | 0 |
| Grassed waterway | acres | 319 | 29 |
| Habitat management | acres | 332 | 35 |
| Nutrient management | acres | 5,540 | 430 |
| Nutrient management plan | no. | 30 | 1 |
| Pasture renovation | acres | 3,325 | 503 |
| Pastureland conversion to trees | acres | 31 | 0 |
| Pond | no. | 2 | 1 |
| Prescribed grazing | acres | 7,167 | 3,445 |
| Sediment control basin | units | 2 | 0 |
| Sod-based rotation | acres | 11,307 | 1,609 |
| Streambank and shoreline protection | feet | 18,816 | 1,911 |
| Terrace | feet | 20,409 | 0 |

** Additional BMPs may exist in the watershed as producers may maintain practices after the life of a cost share contract, and other practices are installed by farmers without cost share assistance.*

# Questions on Current Implementation?

# Potential Options for Rule Readoption

- Consider alternative to reduction goal assignments for agriculture and NLEW N-loss accounting.

- Track a list of possibly improved agricultural nutrient indicators for both N and P to gauge effectiveness of practices, although no compliance targets.

- Focus any regulation on areas of identified nutrient concern, potentially including:
  - Livestock in streams
  - Waste application to high-P soils

# Pastureland in Jordan

According to NASS 2022, pastureland is one of the highest agricultural land uses in Jordan and is about 16% of the total land cover.

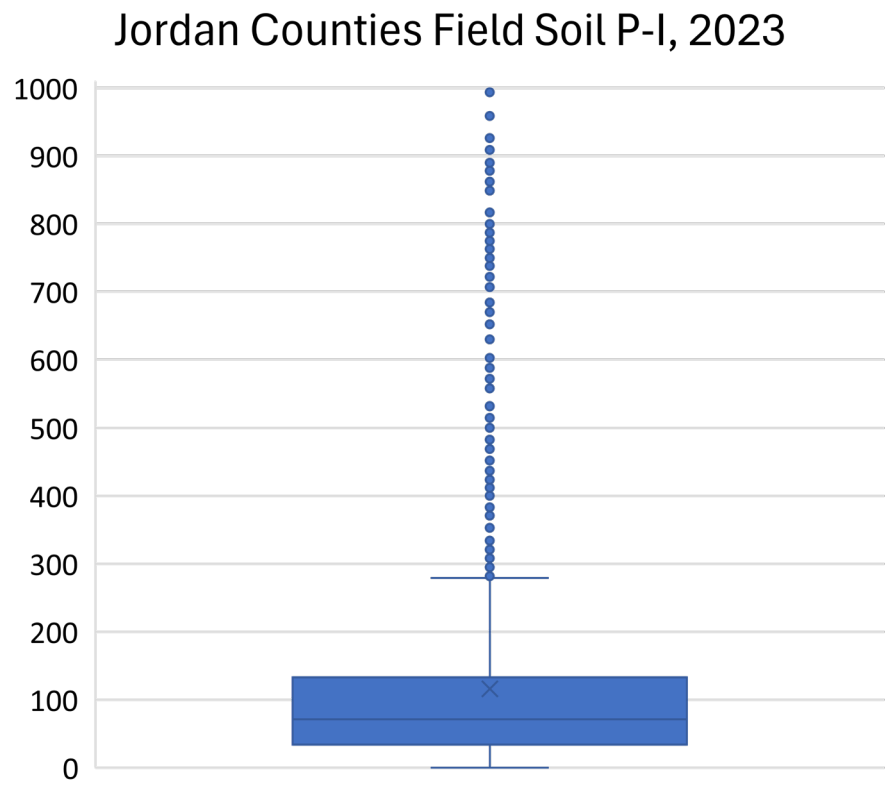
Line, D. E., & Doll, B. (2023). Effects of Livestock Exclusion on Pollutant Export From a North Carolina Beef Cow Pasture.
**Fences were installed to exclude cattle from two adjacent small streams on a beef and swine farm located in central North Carolina. The combined reductions for the two periods were 39%, 64%, and 74% for TN, TP, and TSS, respectively. These results indicated that exclusion fencing was effective at reducing pollutant exports during the first 1.8 years and that its effectiveness increased after about four years.**

Line, D. E., Osmond, D. L., & Childres, W. (2016). Effectiveness of livestock exclusion in a pasture of central North Carolina. *Journal of environmental quality*, *45*(6), 1926-1932.
**Data show that even a relatively narrow exclusion corridor implemented on only the main stream channel can significantly reduce the export of N, P, and sediment from a beef cattle pasture.**

- Do you want to require that cattle are fenced out of the stream?
- If so, what regulation would create the least burdens?
- What if any additional data would be helpful to inform understanding/decisions?

# High Phosphorus in Soil

- Soil P-I for Jordan Counties distribution below. Max 1005 P-I, Average 115 P-I.
- Soil P-I Optimum Range – 50-70 (NCDA&CS)



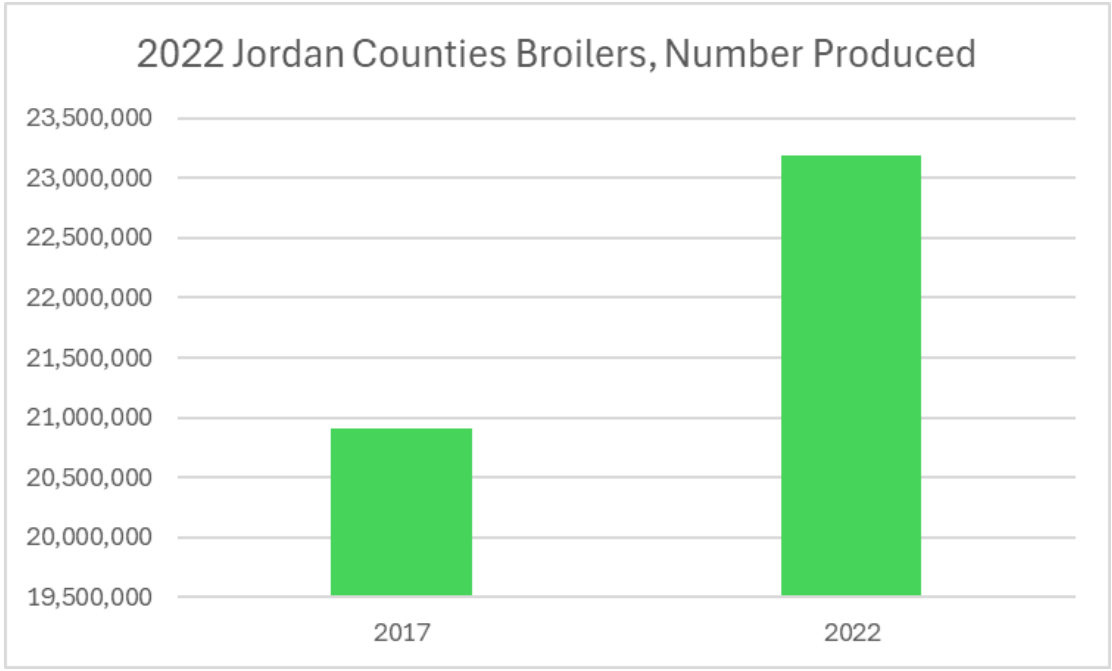

- Land application of organic wastes has been linked to higher STP. (i.e., Osmond, D. L. (2017). Agriculture in Jordan Lake Watershed)

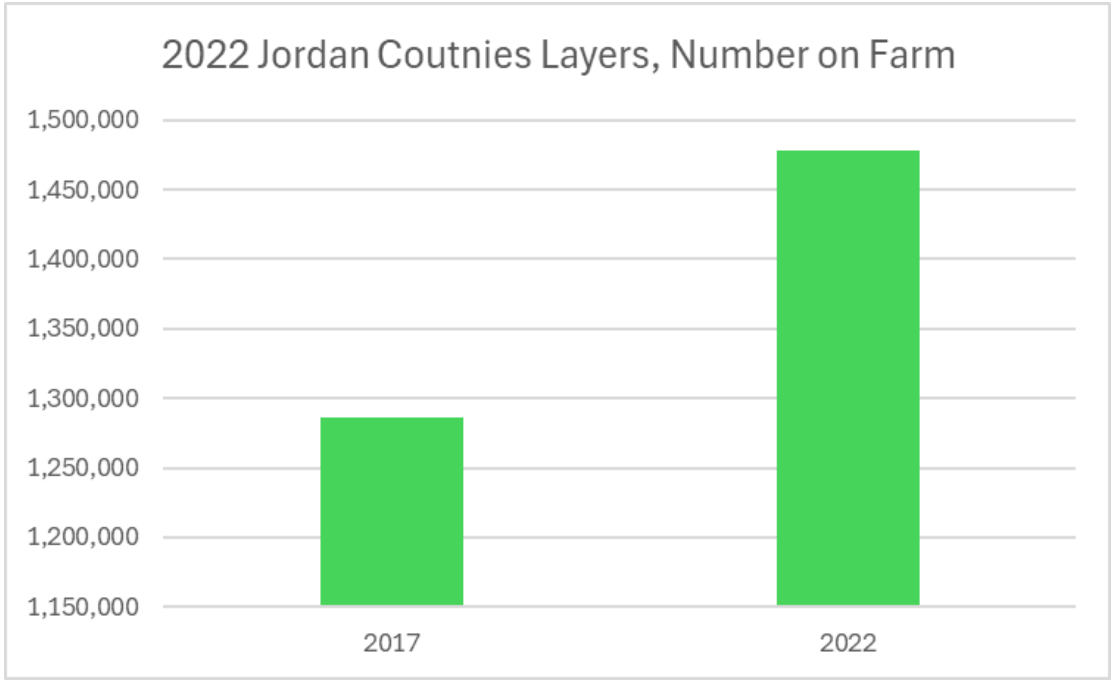
- According to State Statue, 15A NCAC 02T .0103 DEFINITIONS (1) "Agronomic rate" means the amount of waste and other materials applied to soil to meet the nitrogen needs of the crop, but does not overload the soil with nutrients or other constituents that cause or contribute to a contravention of surface water or groundwater standards, limit crop growth, or adversely impact soil quality. Nitrogen needs of the crop shall be based on realistic yield expectations (RYE) established for a soil series through published Cooperative Extension Service bulletins, Natural Resources Conservation Service publications, county soil surveys, or site specific agronomist reports.

# Poultry in Jordan

- Compared to the rest of the State, Jordan has lower broiler production and higher layer numbers.
- There have been some noncompliance issues documented with poultry litter management (piles and application rates) in the Winston Salem and Fayetteville regions.

- Based on what is known, is there concern about poultry wet and dry litter waste land application in Jordan?
- Can we anticipate more dry litter application driven by the processing plant in Siler City?
- Can dry litter be better managed in Jordan?




NASS, Agricultural Statistics Reports, 2017 and 2022

# Biosolids and Manure in Jordan

| Non-Discharge and Land Application | | | |
|---|---|---|---|
| **Major** | **Minor** | **Field Number** | **Field Acres** |
| 21 | 33 | 671 | 6,218.3 |
| Population in Jordan: **1,000,759 human** | | | |

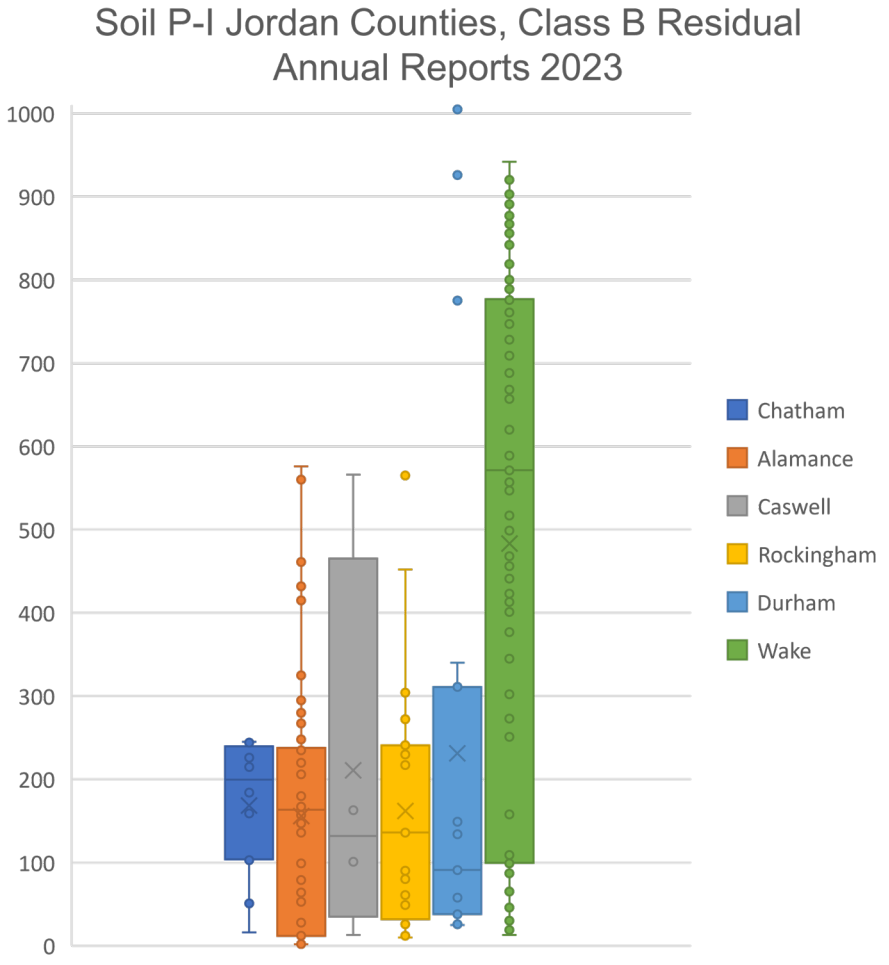
- Organic residuals/biosolids are products of wastewater treatment.
- The City of Burlington (WQ0000520) has the highest number of permitted field acres in the Haw River subbasin - 1,063 acres used for the land application of residual solids.

| Animal Feeding Operations | | |
|---|---|---|
| **Number of Permits** | **Allowable Headcount** | **Allowable Weight (lb)** |
| 23 | 10,057 | 6,004,810 |
| AFO totals: 12 state cattle, 4 swine, and 7 individual state permits. Dry litter poultry not included. | | |

- Dairy and Swine manures are held in lagoons and typically land applied on the operation's fields.
- Alamance Co highest cattle AFO animal numbers in Jordan (800 cattle in Liberty, NC). The number of AFOs in Jordan are much lower than the rest of Cape Fear Basin.

- DWR Non-Discharge Branch requires **Class B residual land application annual reports** with soil test data. Class A application is unknown. P-I was pulled per field for all Jordan counties in 2023 for **Class B. Wake County has highest P-I values and highest average although most of these fields are outside Jordan. Without Wake, Jordan counties has a mean P-I 167.**

- DWR **AFO program does not require annual reports** from the operations and the permit applications do not require soil test reporting. Soil testing must be completed and **records are held on-site**.




- Is there concern about biosolid and manure waste land application in Jordan?
- Do we have access to better data that can inform decisions?
- Do we want to reduce P application on Jordan soils?
- **Can a regulation support a nonregulatory program to reduce P land application?**

# Investments in Agriculture Sector?

There is interest from Jordan Lake One Water stakeholders to do more "one water watershed scale projects". This has led to some JLOW ideas for wastewater groups to invest in nonpoint source practices.

Is the Agricultural sector interested in investments from Urban areas for practices that would reduce nutrient loading and increase watershed resilience?

# Rule Component Considerations

**Waste Management**

- Pasture:
  - Explore possibility of potential collective livestock exclusion implementation targets
- Cropland:
  - Explore possibility of additional waste application management requirements for organic waste land application.

**Collaboration**

- Explore an adaptive program approach to focus on increasing collaboration, allowing joint projects and furthering whole watershed/community health and resilience

# Rule Component Considerations

**Reporting**

- Continue tracking collective agriculture activity on a regular schedule
- Explore the most useful and relevant metrics to document overtime and the reporting frequency

**What additionally should be explored or what other Rule components should be explored in lieu of the considerations listed here?**

# Current Accounting Paradigm - Benefits and Challenges

**Challenges:**

- All NLEW inputted county data - to some degree - is based on best estimates and assumptions from state or local staff as no comprehensive datasets exist (fertilizer amounts applied) or data access has historically been restricted (geospatial crop data)
- Little to no funding is available to further supporting research (updating crop RYEs, BMP effectiveness, etc.) or software improvements to upgrade NLEW or P-tracking tools

**Benefits:**

- NLEW is the easiest to use, scientifically based tool available in NC to capture farmer management activity (tillage, fertilizer management, etc.) to estimate N losses from ag land at an aggregated scale

# Current Accounting Paradigm - Benefits and Challenges

**Challenges:**

- Following the current annual reporting process and using existing tools requires significant resources from state and local entities
- Ongoing local engagement oscillates with staff transitions and shifting local priorities
- Gains have largely plateaued with available funding driving BMP implementation
- Not clear if progress reporting is being utilized annually or on a recurring basis to refine local or state strategies/actions

**Benefits:**

- Documents historical and ongoing collective activity for external stakeholders and the public which can inform potential Rule/Strategy revisions and shift preconceptions/perceptions
- Sets up a mechanism for continued local and state engagement in Rule implementation

# What Can Be Improved in Reporting?

- What outputs would be useful to local and state entities to document progress and inform local strategies/actions to further water quality goals?*

**There must be sufficient capacity available to implement the adjustment/suggestion!*

*Notes:*

# What Can Be Improved in Reporting?

- Should report content be adjusted?*
  - Progress metrics?
  - Watershed-wide strategic planning components?
- Should reporting frequency be adjusted?*

**There must be sufficient capacity available to implement the adjustment/suggestion!*

*Notes:*

# What Can Be Improved in Reporting?

- Should other organizations be responsible for generation of report sections or separate documentation?*

**There must be sufficient capacity available to implement the adjustment/suggestion!*

*Notes:*

# What Can Be Improved in Reporting?

- Should Oversight Committee roles and responsibilities be adjusted?*

**There must be sufficient capacity available to implement the adjustment/suggestion!*

*Notes:*

# What Can Be Improved in Reporting?

- Should the DSWC NPS Planning Coordinator position be utilized in a different way for Rule implementation?*

**There must be sufficient capacity available to implement the adjustment/suggestion!*

*Notes:*

# Data to Review for Tracking Effectiveness

- What are the most useful indicators for agricultural sector and for regulators?

## Agriculture Activities

- Nutrient application
- Crop Production
- Livestock Production
  - Pasture Cattle
  - AFOs
  - Poultry
- BMP practices
  - Riparian buffers
  - Conservation tillage
  - Cover crop
  - Livestock exclusion
  - Nutrient plan management
- Intervention programs
  - Conservation easement enrollment
  - Cost Share programs
  - Lagoon Closeout/buyout
- Timber harvest
- Land use changes (conversion of farmland to high and low-density residential uses)

## Environmental

- Soil health: P-I, BOD, SOC, indices
- SW health: TN and TP in stream
- GW health: Nitrates
- DWR aquatic habitat monitoring: Benthos, pH, Fecal, Nutrients, Impairment, TSS, Turbidity, Zn, Cu
- Other environmental health indicators:
  - NDVI - Normalized difference veg index
  - Forest and Wetland land area or percent tree cover
  - Evapotranspiration

## Social & Economic

- Producer Income
- Rural household income
- Sales
- Age, Gender Labor Force
- Education level
- Farmland preservation tools (ag district programs, land-use planning, farm link, state leasing programs, etc.)

Ellie Rauh

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**Thank you for your time and input.**

We appreciate your time sending us your comments and any data/reports that can support wastewater decisions.

**Table 1. Number of Acres and Percentage of this Area with no Buffers by County**

| County | Total Ag Acres | No Buffers – Acres Affected | % Ag Fields Not Buffered |
|---|---|---|---|
| Alamance | 1206.3 | 313.6 | 26 |
| Caswell | 165.6 | 99.2 | 60 |
| Chatham | 544.0 | 200.2 | 37 |
| Forsyth | 60.5 | 4.9 | 8 |
| Guilford | 1983.0 | 699.8 | 35 |
| Orange | 595.9 | 84.7 | 14 |
| Randolph | 93.0 | 41.7 | 45 |
| Rockingham | 524.4 | 184.4 | 35 |
| Wake | 45.5 | 3.5 | 8 |
| Total | 5218.2 | 1632.0 | 31 |

Osmond, D. L. (2017). Agriculture in Jordan Lake Watershed

Back up slides – not to send to the TAG.

**Station Set:** Haw Stations

| P loading reduction (%) | Nitrogen Loading Reduction (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% |
| 0% | 0.21 | 0.20 | 0.18 | 0.17 | 0.16 | 0.16 | 0.17 | 0.10 |
| 10% | 0.19 | 0.18 | 0.16 | 0.15 | 0.14 | 0.14 | 0.15 | 0.10 |
| 20% | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.12 | 0.09 |
| 30% | 0.13 | 0.12 | 0.11 | 0.09 | 0.08 | 0.09 | 0.09 | 0.07 |
| 40% | 0.10 | 0.10 | 0.08 | 0.07 | 0.06 | 0.05 | 0.05 | 0.05 |
| 50% | 0.09 | 0.08 | 0.07 | 0.06 | 0.05 | 0.03 | 0.03 | 0.03 |
| 60% | 0.08 | 0.08 | 0.06 | 0.05 | 0.04 | 0.03 | 0.02 | 0.02 |
| 70% | 0.07 | 0.07 | 0.05 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 |

**Station Set:** Morgan & Upper New Hope

**Nitrogen Loading Reduction (%)**

| P loading reduction (%) | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% |
|---|---|---|---|---|---|---|---|---|
| 0% | 0.29 | 0.28 | 0.26 | 0.25 | 0.22 | 0.17 | 0.11 | 0.05 |
| 10% | 0.29 | 0.27 | 0.26 | 0.24 | 0.22 | 0.16 | 0.11 | 0.05 |
| 20% | 0.28 | 0.26 | 0.25 | 0.24 | 0.21 | 0.16 | 0.11 | 0.05 |
| 30% | 0.27 | 0.25 | 0.24 | 0.23 | 0.21 | 0.16 | 0.11 | 0.05 |
| 40% | 0.26 | 0.24 | 0.24 | 0.22 | 0.20 | 0.16 | 0.11 | 0.05 |
| 50% | 0.24 | 0.23 | 0.23 | 0.21 | 0.19 | 0.15 | 0.10 | 0.05 |
| 60% | 0.23 | 0.22 | 0.21 | 0.20 | 0.18 | 0.14 | 0.10 | 0.05 |
| 70% | 0.22 | 0.21 | 0.20 | 0.19 | 0.17 | 0.13 | 0.09 | 0.05 |

**Color Scale**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **0.10** | 0.13 | 0.16 | 0.19 | 0.22 | 0.25 | 0.28 | 0.31 | 0.40 |

**Station Set:** Middle New Hope

**Nitrogen Loading Reduction (%)**

| P loading reduction (%) | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% |
|---|---|---|---|---|---|---|---|---|
| 0% | 0.25 | 0.23 | 0.21 | 0.18 | 0.13 | 0.11 | 0.09 | 0.06 |
| 10% | 0.24 | 0.22 | 0.20 | 0.17 | 0.13 | 0.10 | 0.08 | 0.06 |
| 20% | 0.23 | 0.21 | 0.19 | 0.17 | 0.12 | 0.10 | 0.08 | 0.05 |
| 30% | 0.22 | 0.20 | 0.19 | 0.16 | 0.12 | 0.09 | 0.07 | 0.05 |
| 40% | 0.21 | 0.19 | 0.18 | 0.15 | 0.11 | 0.09 | 0.07 | 0.04 |
| 50% | 0.19 | 0.18 | 0.16 | 0.14 | 0.10 | 0.08 | 0.06 | 0.04 |
| 60% | 0.17 | 0.16 | 0.14 | 0.12 | 0.08 | 0.06 | 0.05 | 0.03 |
| 70% | 0.15 | 0.14 | 0.12 | 0.10 | 0.07 | 0.05 | 0.03 | 0.02 |

**Color Scale**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **0.10** | 0.13 | 0.16 | 0.19 | 0.22 | 0.25 | 0.28 | 0.31 | 0.40 |

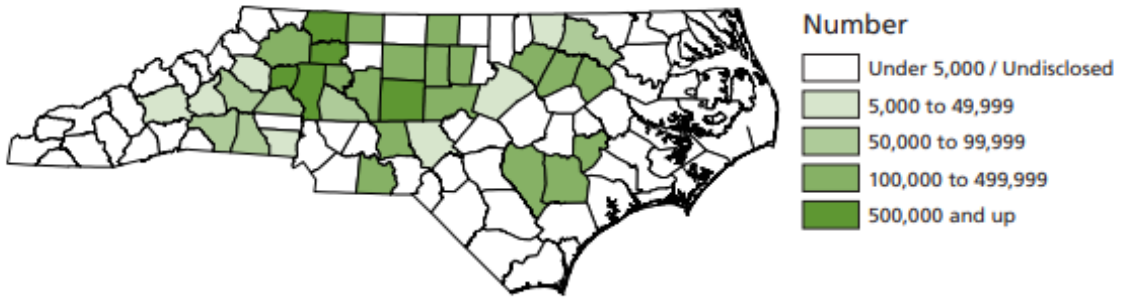
| NMS Watershed | Total Land Area (sq mi) | Cultivated Cropland % of Total | Pastureland % of Total[1] |
|---|---|---|---|
| **Neuse** | 6,062 | 21.76 | 3.78 |
| **Tar-Pamlico** | 6,147 | 18.97 | 2.79 |
| **Jordan Lake** | 1,708 | 3.29 | 16.58 |
| **Falls Lake** | 772 | 12.31 | 2.83 |
| **High Rock Lake** | 3,854 | 5.6 | 19.57 |

# Poultry in State

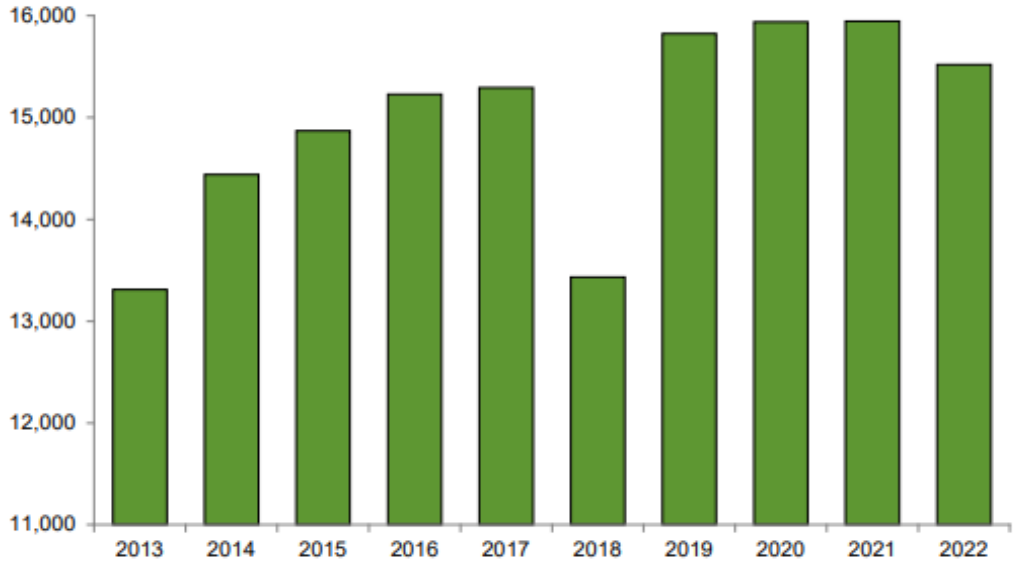
## LAYERS
Number on Farms, December 1, 2022

| Leading Counties [1] | Number |
|---|---|
| Yadkin | 1,850,000 |
| Alexander | 830,000 |
| Randolph | 685,000 |
| Surry | 670,000 |
| Iredell | 575,000 |
| Duplin | 470,000 |
| Wilkes | 460,000 |
| Alamance | 410,000 |
| Sampson | 345,000 |
| Anson [2] | 335,000 |
| Guilford [2] | 335,000 |

[1] *Ranking of published counties only.*
[1] *Ranked 10th*




## LAYERS
Number on Farms, December 1 *(Thousand Head)*



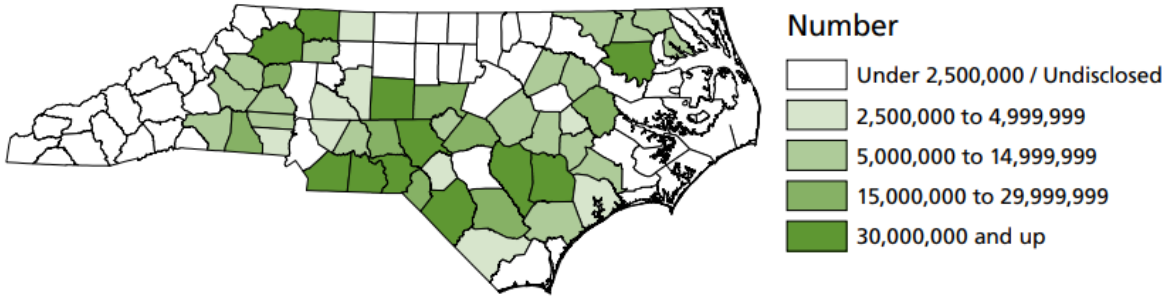

- In 2022, **Alamance and Guilford were in top 11** leading counties of Layers, Number on Farm. Although, far lower numbers than Yadkin and Randolph.

# Poultry in State

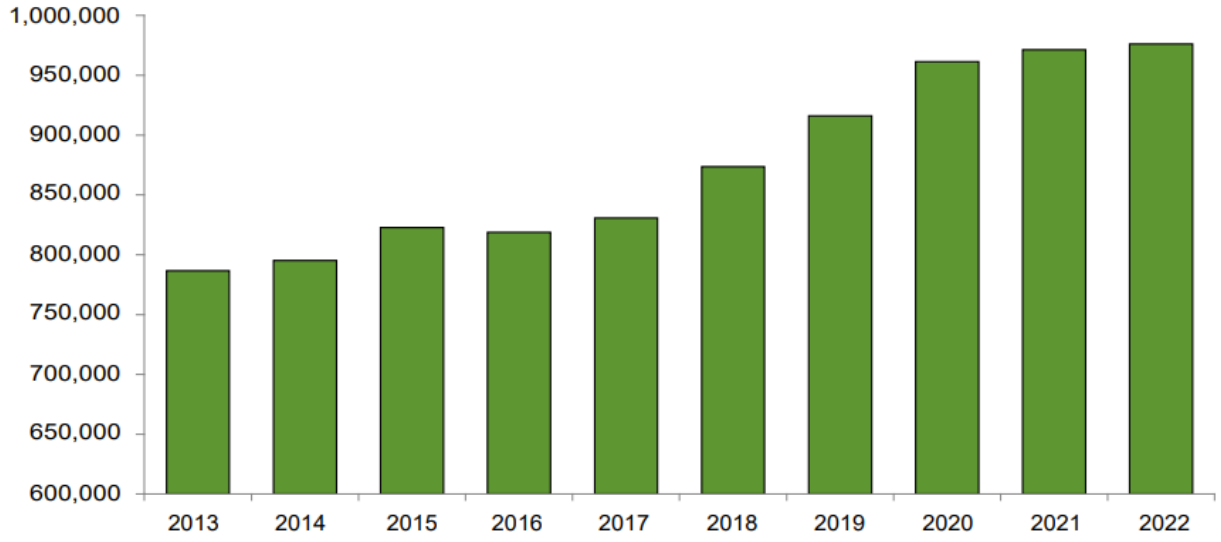
## BROILERS
Number Produced, 2022

| *Leading Counties* [1] | *Number* |
|---|---|
| Duplin | 92,500,000 |
| Wilkes | 68,100,000 |
| Anson | 58,200,000 |
| Union | 53,300,000 |
| Bertie | 44,700,000 |
| Robeson | 44,600,000 |
| Randolph | 41,100,000 |
| Sampson | 40,600,000 |
| Richmond | 37,300,000 |
| Surry | 35,200,000 |

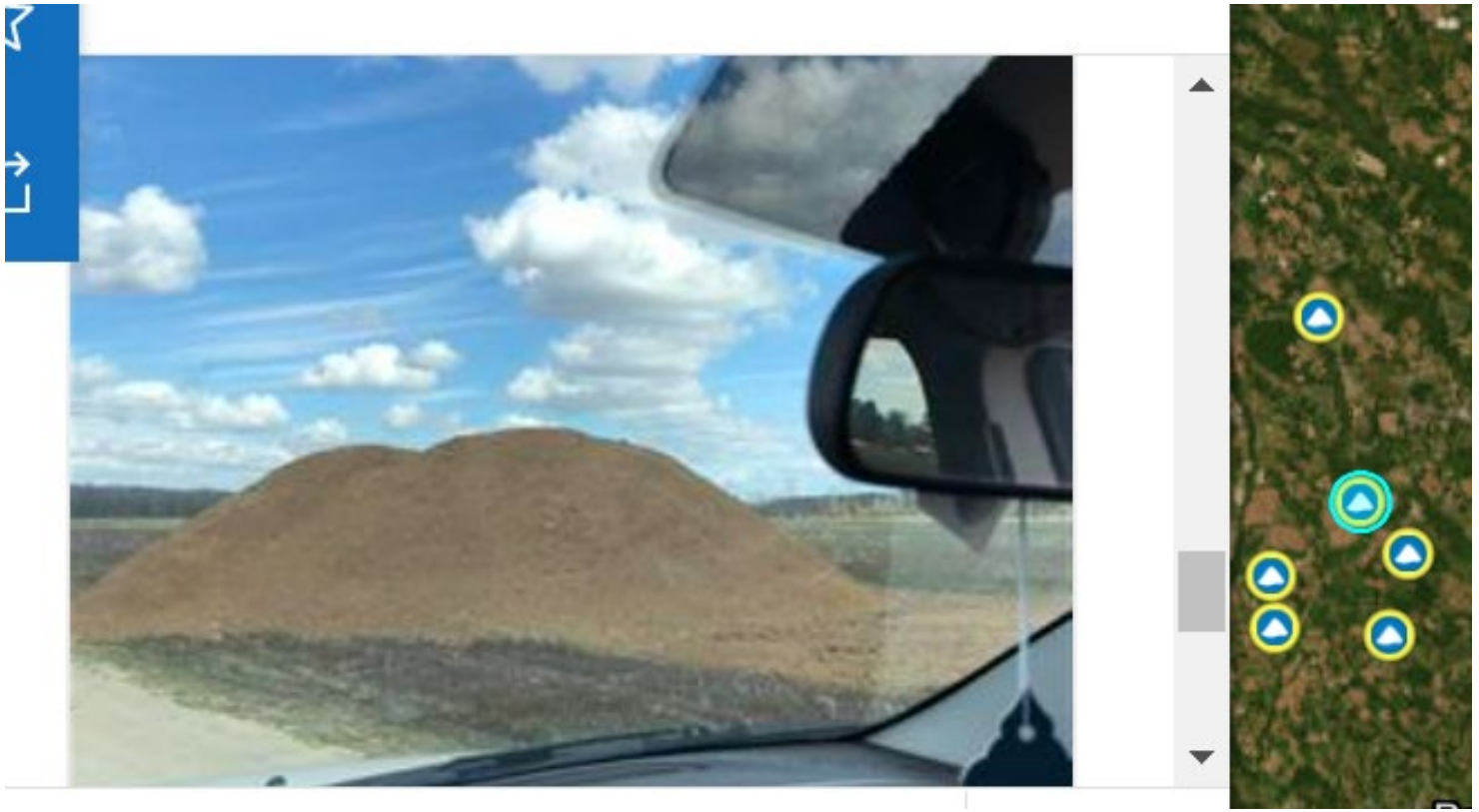
[1] *Ranking of published counties only.*
[2] *Ranked 5th.*




## BROILERS
Number Produced *(Thousand Head)*



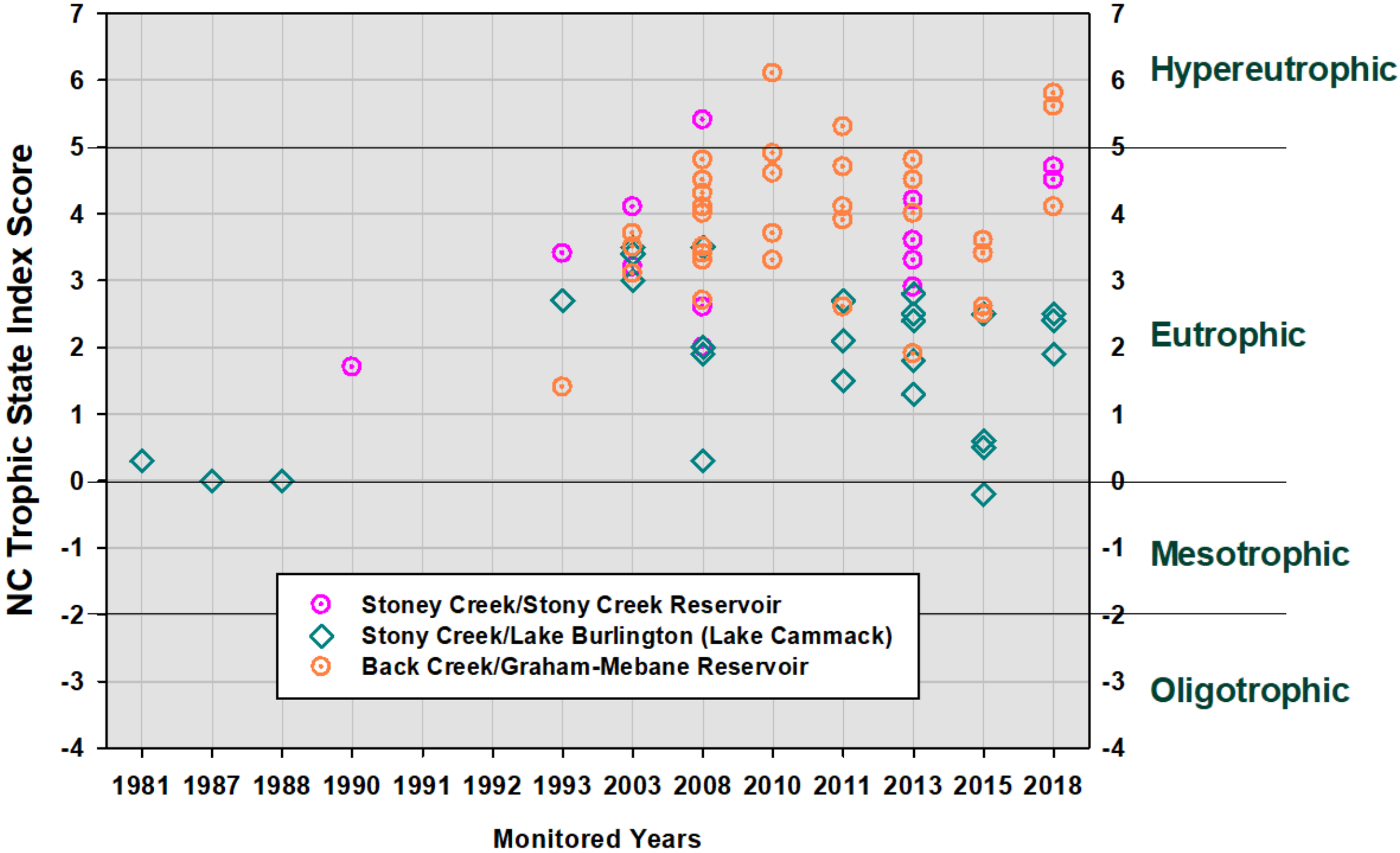

- **Most broiler numbers are in counties outside Jordan**, although dry litter generated in Randolph may be applied in Jordan watershed.

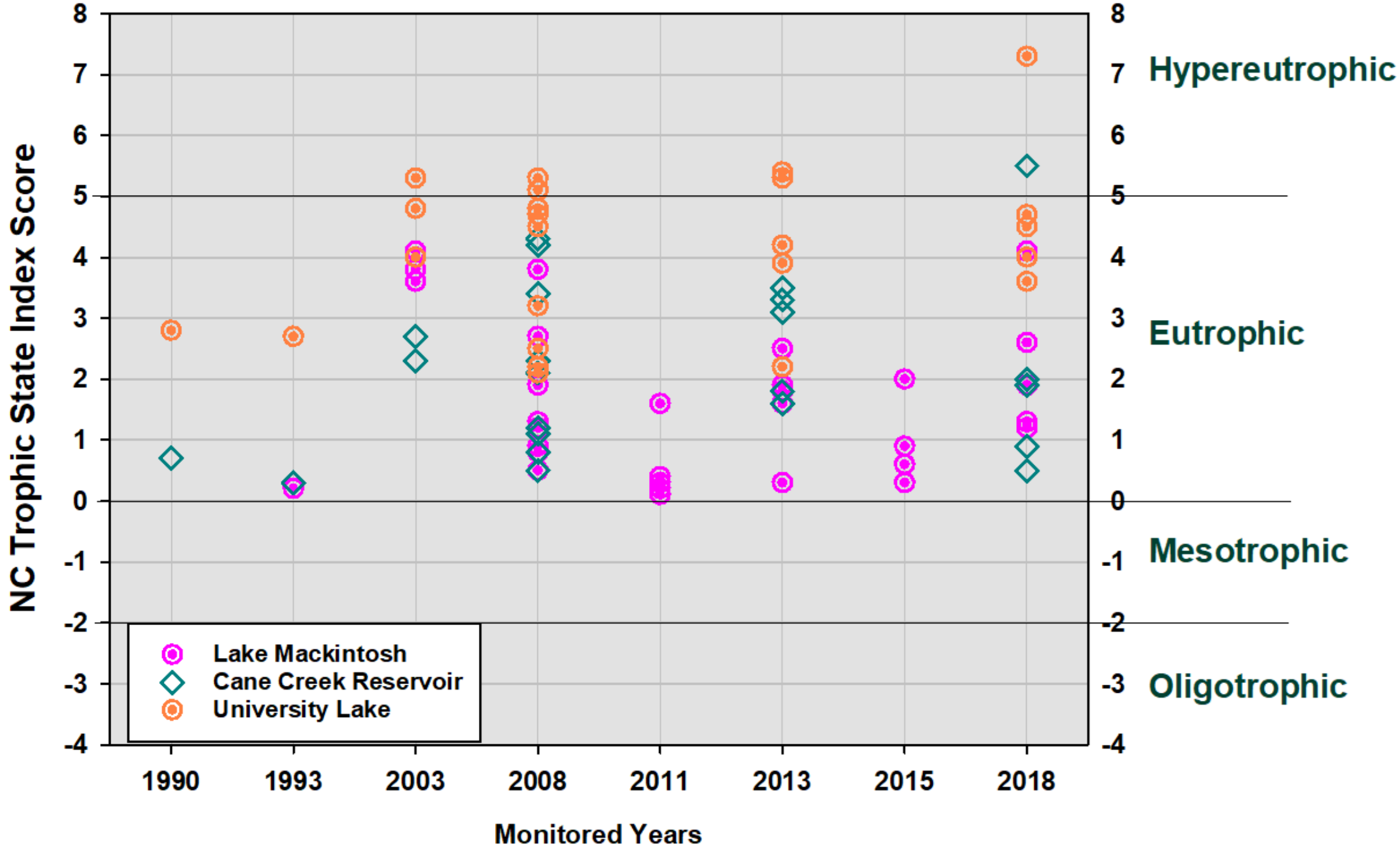


NOVs in Winston Salem for piles being within the 25ft setback limit, piles being uncovered for over 15 days, others. There has been inspector concerns about application over N-based agronomic rate.

| Data to Review | Source | Report Frequency |
|---|---|---|
| Riparian Buffers | DSWC, NRCS | 2 years |
| Cover Crops | DSWC, NRCS | 3 years |
| Tillage Management | DSWC, NRCS | 4 years |
| Precision Nutrient Management | DSWC, NRCS | 5 years |
| Livestock Exclusion | DSWC, NRCS | 6 years |
| Number of Waste Management Plans Written | | |
| Easement program enrollment | DSWC, ADFP, NRCS | 5 years |
| USDA Census of Agriculture Animal Numbers | DSWC | 5 years |
| Conservation Plan Implementation | | |
| Nutrient Management Plan Implementation | | |
| USDA National Agricultural Statistics Survey Animal Numbers | | |
| USDA Census of Agriculture Pasture Acres | DSWC | 5 years |
| Soil Test Phosphorus | DSWC | 2 years |
| Manure Hauler Records | DEQ-AFO | |
| Residuals Application | DEQ | |
| FSA Crop Acres | | |
| USDA Census of Agriculture Crop Acres | DSWC | 5 years |
| USDA National Agricultural Statistics Survey Crop Acres | | |
| Cost Share Expenditures | DSWC | 2 years |
| Closures/Buyouts | | |
| Outside Funding Resources | | |
| Timber Harvest Acres | | |
| Forest Management Plans | NCFS | |
| Fertilizer Application Rates | | |
| Voluntary Agricultural District (VAD) enrollment | | |

| PARAMETER (Category 4 and 5 Combined)[1,2] | FW Miles[3] | FW Acres[3] |
|---|---|---|
| Aquatic Passage | 8.6 | 0.0 |
| Benthos (Nar, AL, FW) | 222.6 | 0.0 |
| Chlorophyll a (40 µg/l, AL, NC) | 11.3 | 11,460.5 |
| Copper (7 µg/l, AL, FW) | 25.7 | 0.0 |
| Copper Dissolved Chronic (Calculated, AL, FW) | 5.6 | 0.0 |
| Dissolved Oxygen (4 mg/l, AL, FW) | 7.0 | 0.0 |
| Fecal Coliform (GM 200/400 5 in 30, REC, FW) | 21.5 | 0.0 |
| Fecal Coliform (GM 200/400, REC, FW) | 34.6 | 0.0 |
| Fish Community (Nar, AL, FW) | 70.8 | 0.0 |
| Hydraulics | 8.6 | 0.0 |
| pH (9.0, AL, FW) | 0.0 | 2,761.9 |
| Total Nitrogen | 0.0 | 11,375.9 |
| Total Phosphorus | 0.0 | 11,375.9 |


NC Trophic State Index Score
7
6
5
4
3
2
1
0
-1
-2
-3
-4
Hypereutrophic
Eutrophic
Mesotrophic
Oligotrophic
Stoney Creek/Stony Creek Reservoir
Stony Creek/Lake Burlington (Lake Cammack)
Back Creek/Graham-Mebane Reservoir
1981
1987
1988
1990
1991
1992
1993
2003
2008
2010
2011
2013
2015
2018
Monitored Years


NC Trophic State Index Score
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
Hypereutrophic
Eutrophic
Mesotrophic
Oligotrophic
Lake Mackintosh
Cane Creek Reservoir
University Lake
1990
1993
2003
2008
2011
2013
2015
2018
Monitored Years