

North Carolina's Nutrient Trading Options

October 25th, 2019



Why We Manage Nutrients



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News > World > Americas

Toledo water crisis: Half a million people without safe drinking water as toxins contaminate Ohio city supply

National guard called in to help after state of emergency declared

Freddy Maynew | Sunday 3 August 2014 13:21 | 20 comments

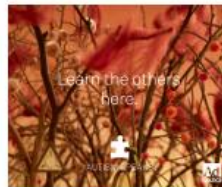


Residents in Toledo line up for water on Saturday, August 2, after a state of emergency was declared in northwest Ohio. (AP Photo/The Blade, Jetta Fraze.)

Up to half a million residents of one of the largest cities in Ohio are without safe drinking water after a dangerous toxin was discovered in the supply.

A state of emergency has been declared in Toledo, Ohio's fourth largest city, and its surrounding suburbs after the contamination was discovered late on Friday.

Restaurants and even the local zoo have been forced to close as a result of the crisis, thought to be caused by a "harmful algal bloom" at the water's source in Lake Erie, according to city officials.



Toxic algae increases in Lake Okeechobee

By JOE MARIO PEDERSEN
ORLANDO SENTINEL | JUL 02, 2019 | 1:00 PM



Water full of algae laps along the Sewell's Point shore on the St. Lucie River under an Ocean Boulevard bridge, Monday, June 27, 2016. The Martin County Commission decided at an emergency meeting Tuesday to ask state and federal authorities to declare a disaster where blue-green algae has closed beaches. County officials on Florida's Atlantic coast want the U.S. Army Corps of Engineers to close the locks between Lake Okeechobee and the St. Lucie River. (Richard Graulich/The Palm Beach Post via AP) (Richard Graulich / AP / Orlando)

Recent tests results show that toxic amounts of blue-green algae have surfaced in Lake Okeechobee, according to [data released by the Florida Department of Environmental Protection](#).

The liquid heart of Florida is showing more signs of cyanobacteria algae blooms contaminating its arteries in Martin and Palm Beach counties new data shows.



North Carolina's Approach to Nutrient Pollution

- Federal + state authorities
- Controlling state legislation requires “fair, reasonable and proportionate” nutrient reductions from point and nonpoint sources.
- NSW water quality classification
- Chlorophyll a criteria: 40 $\mu\text{g/L}$ (10/90)
- No numeric N or P criteria
- Modeling establishes TMDL/WLA for N and/or P
- Few nutrient TMDLs, strategically-selected watersheds

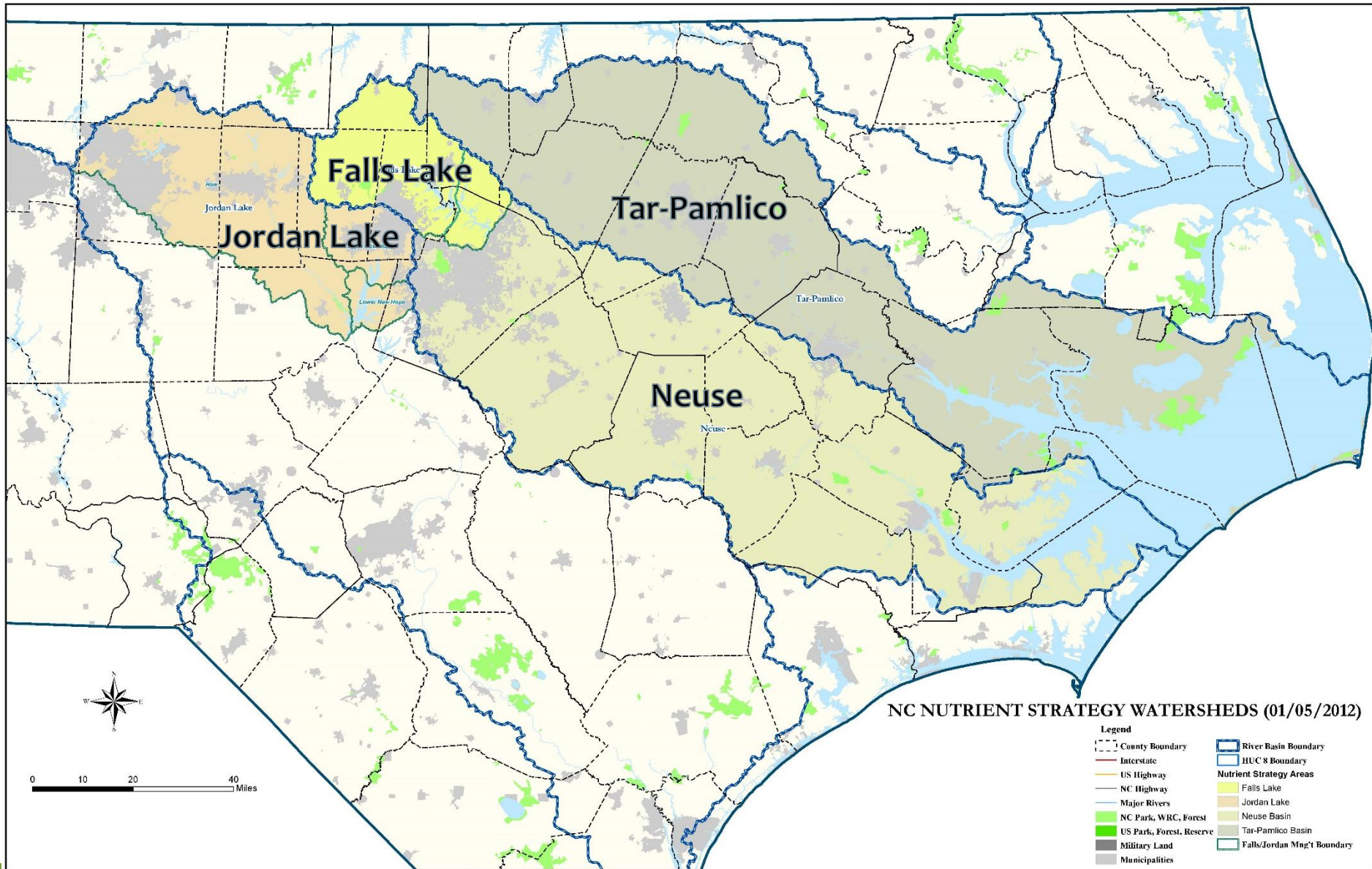


What is a Nutrient Management Strategy?

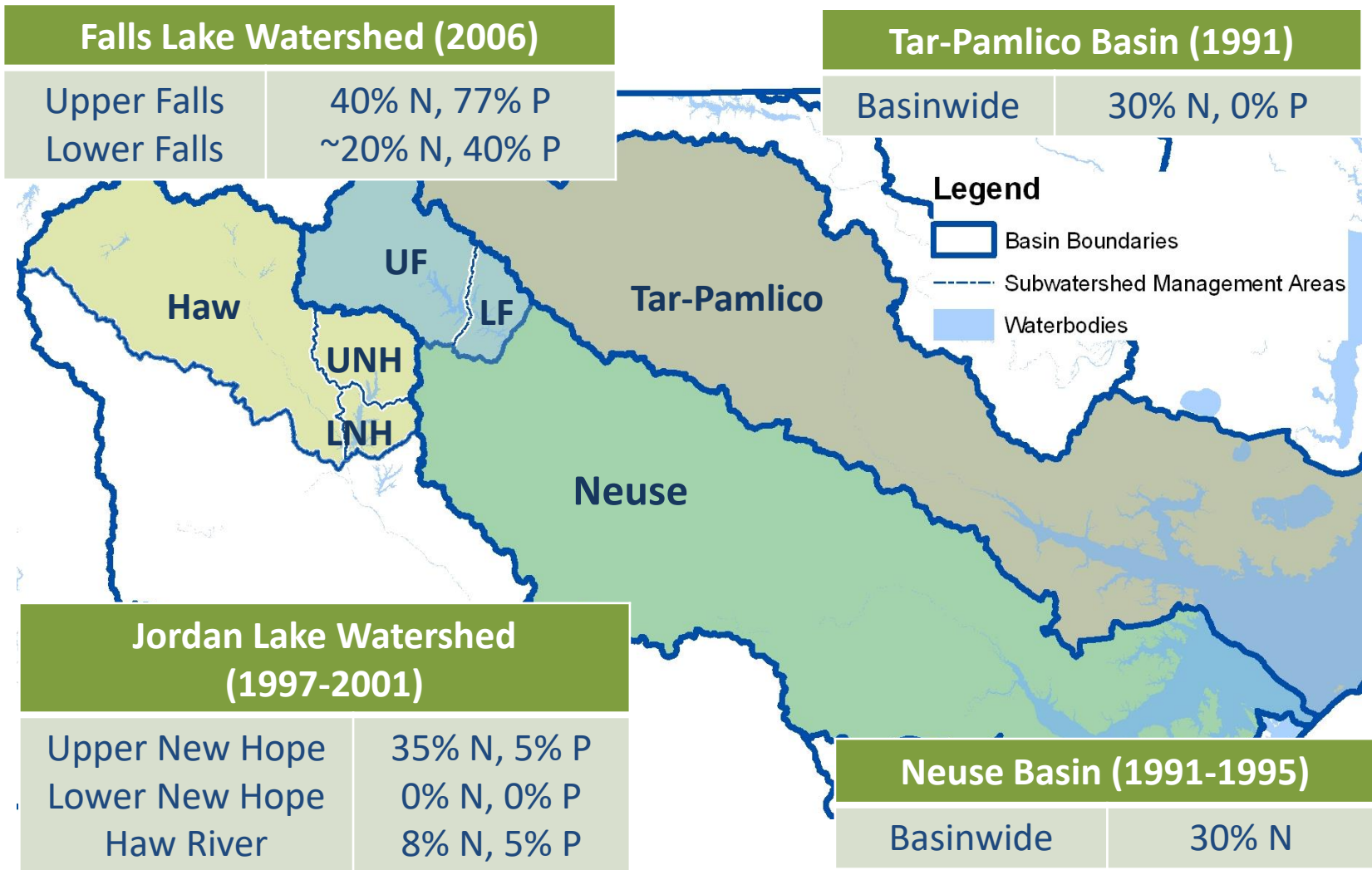
- Regulatory approach to reducing nutrients from multiple sectors and minimizing new sources of nutrient loading.
 - Wastewater
 - Agriculture
 - Riparian buffer protection
 - New development stormwater
 - Existing development stormwater
 - Nutrient trading



Nutrient Strategy Watersheds



Nutrient Strategy Goals



Wastewater Rules

- Individual nutrient mass limits (TN, TP)
- Watershed permitting
- Group permits, compliance associations
- Allocation/offset options for new/expanding facilities



Stormwater Rules

- New development
 - Implemented locally
 - Developers must hit nutrient rate targets
 - Stormwater nutrient calculator(s)
 - Can purchase offsite nutrient credits
- Existing development
 - Local governments as regulated community
 - Account for nutrient reductions on existing developed lands
 - State rule authorities and administration



Agriculture Rules

- Collective compliance throughout strategy area
 - Mirrors strategy goal reduction percentage
- Crop and sometimes pasture nutrient accounting
 - Not equivalent to nutrient reduction estimates from other sectors
 - Edge-of-field loss reduction estimates for nitrogen
 - Semi-quantitative risk evaluation for phosphorus



Riparian Buffer Rules

- Protect riparian buffers out to 50 feet
- Table of uses describes exempt, prohibited, or potentially allowable activities within a buffer zone
- Some uses are only allowable with buffer mitigation
- Driver for riparian buffer compensatory mitigation program



Nutrient Offset Rule

- Governs the generation and transaction of nutrient offset credits (= lbs. N or P)
- Usual practice: agricultural buffer restoration
- Actively used for compliance with new development rules
- Potential use for compliance with wastewater rules



Wastewater Trading Options

1. Joint Compliance
2. Allocation Trades
3. Nutrient Offset Credit Acquisition
4. In-Lieu Fee Payment
5. Nutrient Offset Credit Generation



Joint Compliance

- Watershed permitting approach means:
 - Regulated trading not necessary to meet individual facility limits
 - Compliance association bylaws govern contractual trading
 - Addresses economic free rider problem
 - Facilities over individual limits purchase “credit” from other facilities
 - Historical prices range from \$4-\$9 per lb. (Neuse basin)



Allocation Trades

- Bilateral allocation trades (7+ in Neuse)
- Enacted through mutual permit modifications
- Permanent sales historically, periodic leases possible
- Prices range from \$275-491 lbs. N/year
- Transport factors applied if required in strategy
- No uncertainty ratio applied
- Market liquidity concerns



Joint Compliance and Allocation Trade Examples: Neuse Basin

NRCA Nitrogen Transactions (Sales/Leases)					
Date: 2/14/18					
Year	Type of Nitrogen Transaction	Seller/Leasor	Buyer/Leasee	Estuary Lbs. of Nitrogen *	Cost per Pound
2017	Lease	Contentnea MSD	CWS, Inc.	7,000 \$	5.00
	Lease	NRCA	Craven County	50	9.00
	Lease	Dow-Dupont	Craven County	307	4.00
2016	Lease	Contentnea MSD	Town of LaGrange	1,000 \$	4.00
	Lease	NRCA	Craven County	50	9.00
2015	Lease	Contentnea MSD	Aqua, N.C., Inc.	750 \$	4.00
	Lease	Contentnea MSD	Town of LaGrange	1,300	4.00
	Lease	NRCA	Craven County	50	9.00
2014	Lease	Contentnea MSD	Aqua, N.C., Inc.	4,000 \$	4.00
	Lease	Contentnea MSD	Town of LaGrange	1,300	4.00
	Lease	NRCA	Craven County	50	9.00



Nutrient Offset Credit Acquisition

- Acquire credits from existing private nutrient offset banks
- Considerations
 - Price determined by private market
 - Location of credit-generating project
 - Consistent with trading zones identified in nutrient strategy
 - Within 8-digit HUC or downstream
 - Upstream of surface waters identified in strategy
 - Delivery factors if required in strategy
 - Uncertainty ratio applies



Example Ledger



Home Browse Search

Ivey Ferguson Ledgers - 4/4/2017

Metadata Thumbnails Annotations

Navigation icons: back, forward, search, zoom, refresh, etc.

Entry Properties

Last modified
10/15/2019 6:24:55 AM
Creation date
4/11/2017 10:29:53 AM

Metadata

Fields

Template: Non-DOT Projects

Version

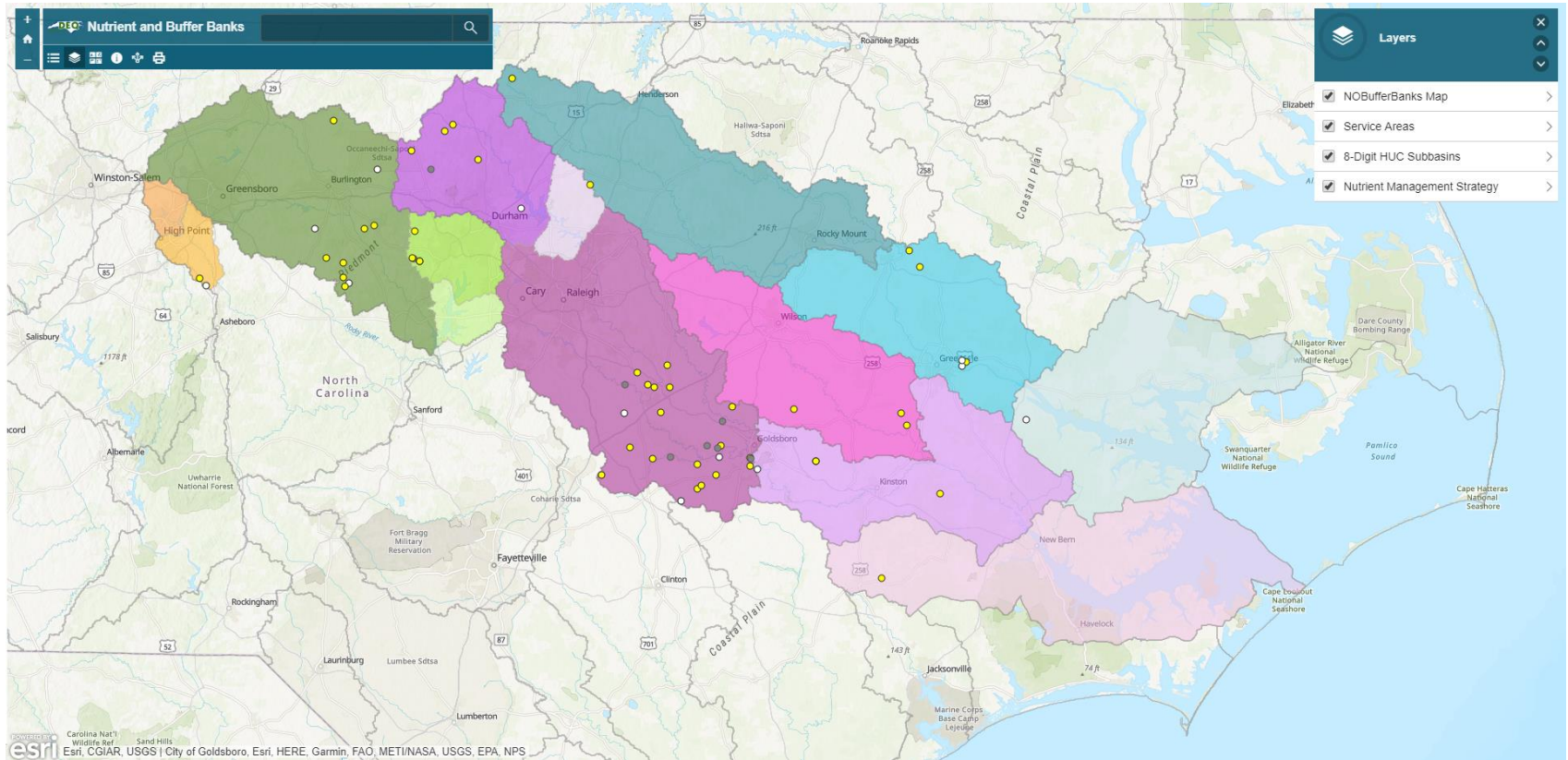
Document Date

Transaction Number	Sale/Release Date	Purchaser Name or % Credit Release	Project Name	N-digit HUC of project	Credits Released/Available to Bank		Credits Debited/Sold from Bank		Nutrient Credit Balance		Local Govt Requiring
					Generated N (lbs)	Delivered N (lbs)	Generated N (lbs)	Delivered N (lbs)	Generated N (lbs)	Delivered N (lbs)	
1	2/4/2013				9,251.69	3,700.68			9,251.69	3,700.68	
2	2/7/2013				4,625.85	1,850.34			13,877.54	5,551.02	
3	5/17/13	Wake County Public School System	Shrier Creek Modular	03030002060140			4,072.50	1,629.00	9,805.04	3,922.02	Cary
4	5/17/13	Casayok HVP, LLC	Hope Valley Farm BB Pod	03030002060120			7.25	2.90	9,797.79	3,919.12	Durham
5	5/17/13	Casayok HVP, LLC	Hope Valley Farm BB Pod (5% Durham)	03030002060120			0.36	0.14	9,797.43	3,918.97	Durham
6	7/8/2013	New Hope Church	New Hope Church	03030002060130			81.07	32.43	9,716.36	3,886.54	Durham
7	7/8/2013	New Hope Church	New Hope Church (5% Durham)	03030002060130			4.05	1.62	9,712.31	3,884.92	Durham
8	7/15/13	Kit Creek Energy Carolinas	Kit Creek Retail Substation	03030002060140			900.80	360.32	8,811.51	3,524.60	Wake County
9	7/15/13	B. Wallace Design & Construction	The Villas at Hope Valley	03030002060130			401.95	160.78	8,409.56	3,363.82	Durham
10	7/15/13	B. Wallace Design & Construction	The Villas at Hope Valley (5% Durham)	03030002060130			20.10	8.04	8,389.46	3,355.78	Durham
11	7/24/13	Trinity Development LLC	Bicycle Apartments at Central Park	03030002060100			861.75	344.70	7,527.71	3,011.08	Chapel Hill
12	8/2/13	KRG Parkside I, LLC	Parkside Town Commons Apartments	03030002060140			1,687.03	674.81	5,840.68	2,336.27	Cary
13	8/6/13	D.M. Williams Enterprises	Zaxby's at Hope Valley Farms	03030002060120			221.23	88.49	5,619.45	2,247.78	Durham
14	8/6/13	D.M. Williams Enterprises	Zaxby's at Hope Valley Farms (5% Durham)	03030002060120			11.05	4.42	5,608.40	2,243.36	Durham
15	8/13/13	Lennar Carolinas, LLC	Fryers Gate Subdivision - Phases 3 & 4	03030002060140			977.73	391.09	4,630.67	1,852.27	Cary
16	8/15/13	Chapel Hill Street Development, LLC	Kent Corner	03030002060120			652.44	260.98	3,978.23	1,591.29	Durham
17	8/15/13	Chapel Hill Street Development, LLC	Kent Corner	03030002060120			32.62	13.05	3,945.61	1,578.24	Durham
18	8/23/13	New Vista Development Inc.	MSRE Auto Body Repair Shop	03030002060140			161.70	64.68	3,783.91	1,513.56	Durham
19	8/23/13	New Vista Development Inc.	MSRE Auto Body Repair Shop (5% Durham)	03030002060140			8.08	3.23	3,775.83	1,510.33	Durham

Credits Released/Available to Bank		Credits Debited/Sold from Bank		Nutrient Credit Balance		Local Govt Requiring
Generated N (lbs)	Delivered N (lbs)	Generated N (lbs)	Delivered N (lbs)	Generated N (lbs)	Delivered N (lbs)	
9,251.69	3,700.68			9,251.69	3,700.68	
4,625.85	1,850.34			13,877.54	5,551.02	
		4,072.50	1,629.00	9,805.04	3,922.02	Cary
		7.25	2.90	9,797.79	3,919.12	Durham
		0.36	0.14	9,797.43	3,918.97	Durham
		81.07	32.43	9,716.36	3,886.54	Durham
		4.05	1.62	9,712.31	3,884.92	Durham
		900.80	360.32	8,811.51	3,524.60	Wake County
		401.95	160.78	8,409.56	3,363.82	Durham
		20.10	8.04	8,389.46	3,355.78	Durham
		861.75	344.70	7,527.71	3,011.08	Chapel Hill
		1,687.03	674.81	5,840.68	2,336.27	Cary
		221.23	88.49	5,619.45	2,247.78	Durham
		11.05	4.42	5,608.40	2,243.36	Durham
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		652.44	260.98	3,978.23	1,591.29	Durham
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		161.70	64.68	3,783.91	1,513.56	Durham
		8.08	3.23	3,775.83	1,510.33	Durham



Nutrient and Buffer Banks App



See 401/Buffer Permitting Branch [webpage](#)



In-Lieu Fee Payment

- Make payment to N.C. Division of Mitigation Services
- Considerations
 - Price determined by actual cost method
 - DMS willingness and ability to satisfy credit requirements
 - Underlying price determined by trading zones, delivery factors, and uncertainty ratios
 - Option allowed if private banks have no available credits
 - Credits must be released before use by wastewater facilities



Nutrient Offset Credit Generation

- NPDES permittees generate credits through NPS projects
- Vertically-integrated
- Consistent with national trading approaches
- Potential to collaborate



Status of Nutrient Rules and Legislation

“Old” rules presently in effect, but:

- Jordan Lake Rules
 - S.L. 2016-94, 2018-5: rule readoption begins in 2020
- Falls Lake Rules
 - S.L. 2016-94, 2018-5: rule readoption begins in 2024
- Nutrient Offset Rule, Neuse and Tar-Pamlico Rules
 - Adopted by the Environmental Management Commission (Sept. 2019)
 - Presently before the Rules Review Commission (Nov. 2019 target)
- S.L. 2019-86, G.S. 143-214.26
 - Revised nutrient offset statute (currently in effect)

DISCLAIMER



Relevant State Authorities for Wastewater Trading

- All Permittees
 - Nutrient offset rule, 15A NCAC 02B .0240/.0703
 - Permits (individual, group)
- Neuse Permittees
 - Neuse wastewater rule, 02B .0234/.0713
- Tar-Pamlico Permittees
 - Tar-Pamlico wastewater rule, 02B .0229/.0733
 - BMP payment rate, 02B .0237 (proposed for repeal)
 - Tar-Pamlico Phase IV agreement



Trading Authorities Wastewater Facilities

- Jordan Lake Permittees
 - Wastewater Rule, 02B .0270
 - Trading Rule, 02B .0273
- Falls Lake Permittees
 - Wastewater Rule, 02B .0279
 - Neuse Wastewater Rule, 02B .0234/.0713
 - Trading Rule, 02B .0282



Nutrient Offset Rule Amendments

Guiding principles

1. Ensure nutrient offset trading results in neutral or reduced nutrient loading to the estuary.
 - Reduce risk for wastewater permittees utilizing trading options
 - Comply with Clean Water Act and EPA guidance
2. Reduce offset costs by eliminating unnecessary barriers to trading.
3. Promote regulatory certainty by codifying existing practices.



Cost-Saving Changes for Nutrient Offset Credits

1. Permitting “cushion” reduced
 - Offsets needed for 10 years (down from 30)
2. Permanent class of nutrient offset credits introduced
 - No need to re-buy credits after 30 years
 - Temporary credits remain
3. Point-to-nonpoint uncertainty ratio (“trading ratio”) reduced
 - Consistency across all strategies
 - Reduction from 2:1 or greater in Neuse, Falls, and Tar-Pamlico



Cost-Increasing Changes for Nutrient Offset Credits



Cost Savings Example: 1MGD, Neuse 01, 50 years

Input Parameters	
Plant size (flow) increase at capacity (MGD)	1
Plant efficiency (mg/L TN)	3.0
Annual nutrient offset cost (lbs. N)**	\$21.34
PS: NPS trading ratio (x:1)	1.50
Years until initial operation (year 0)	0

Scenario Comparison	
Existing Rule	\$13,229,072
Adopted Rule	\$5,615,855

Cost Savings: 58%



S.L. 2019-86

- Expands the trading area for wastewater dischargers
- Immediately applicable in Neuse and Tar-Pamlico Basins
- Immediate cost savings for Neuse 01 basin



Cost Savings Example: 1MGD, Neuse 01, 50 years

Input Parameters	
Plant size (flow) increase at capacity (MGD)	1
Plant efficiency (mg/L TN)	3.0
Annual nutrient offset cost (lbs. N)**	-\$21.98 \$13.71
PS: NPS trading ratio (x:1)	1.50
Years until initial operation (year 0)	0

Scenario Comparison	
Existing Rule	\$13,625,820
Adopted Rule	\$5,784,278
Existing Rule & S.L. 2019-86	\$8,499,090
Adopted Rule & S.L. 2019-86	\$3,607,937

Cost Savings: ~~58%~~ 74%



Potential Trading Risks

- Regulatory climate
- Project failure
- Local government nutrient offset banks
- Point-to-nonpoint source uncertainty ratio
- Value of nonpoint source credits
- Transport and delivery factors
- Local impairments (not just nutrients)



Next Steps

- Completion of rulemaking process
- Trading Framework Guidance
 - Provide plain-language explanations of trading options
 - Build upon current draft guidance document
 - Update based on current rules



How a Wastewater Trade (Probably) Works

- Nutrient offset provider generates credit
 - Project selection, instrument, project plan, land acquisition, project construction, monitoring
- DWR releases credit (401/Buffer Permitting Branch)
- Wastewater facility acquires credit from provider
 - Price and terms negotiable
 - Maintain facility-specific credit ledger if necessary
- Wastewater facility applies for permit modification
 - New permit application, routine permit renewal, modification request, expansion request



How a Wastewater Trade (Probably) Works

- DWR approves individual wastewater permit (NPDES Permitting)
- Offset credit used to justify increased nutrient limits in a nutrient-impaired watershed
- DWR approves ledger transaction to use or retire credit (401/Buffer Permitting)
- Group permit modification



Questions and Follow-Up

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