

# North Carolina's Nutrient Management Strategies

March 4<sup>th</sup>, 2020



# *Why We Manage Nutrients*





# Why We Manage Nutrients

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 Mayhew | Sunday 3 August 2014 13:21 | 20 comments

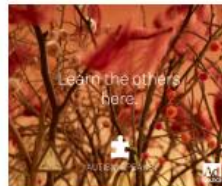


Residents in Toledo line up for water on Saturday, August 2, after a state of emergency was declared in northwest Ohio. (AP Photo/The Blade, Jetta Frase.)

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)

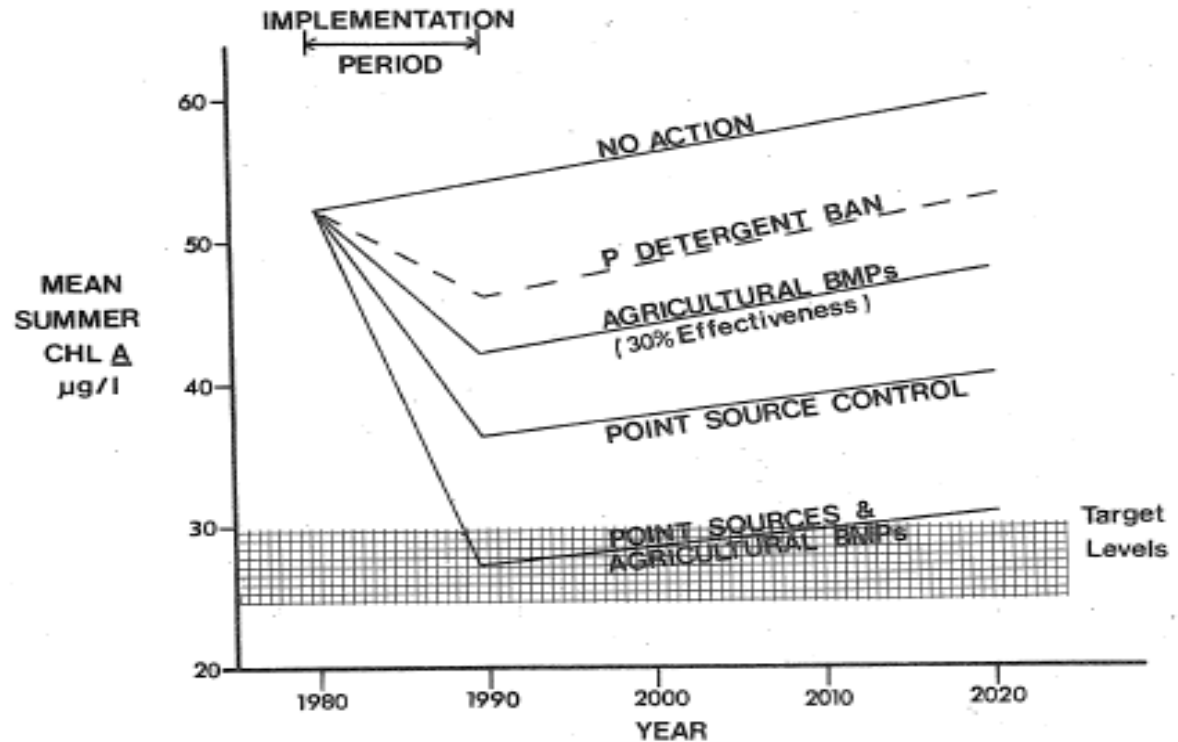
Recent tests results show that toxic amounts of blue-green algae have surfaced in Lake Okeechobee, according to [data released by the Florida Department of Environmental Protection](#).

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.



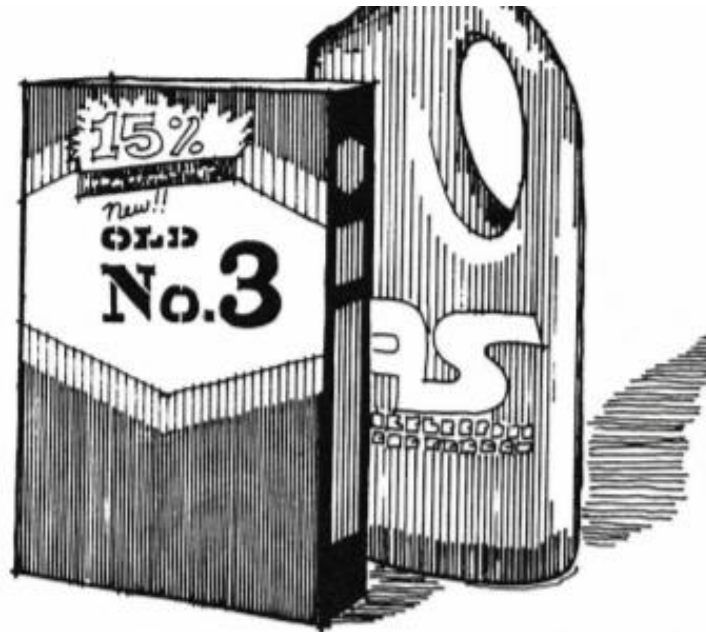
# Early Nutrient Reduction Efforts

- Chlorophyll a standard (1978)
- NSW classification (1979)
- Chowan nutrient strategy (1982)



# *Early Nutrient Reduction Efforts*

- Phosphorus detergent ban (effective 1988)
  - Contentious issue negotiated throughout the '80s
  - Result? Success....



A Phosphate Ban?

## *North Carolina's Current Approach*

- 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  $\mu\text{g}/\text{L}$  (10/90)
- No numeric N or P criteria (yet)
- Modeling establishes TMDL/WLA for N and/or P
- Few nutrient TMDLs, strategically-selected watersheds



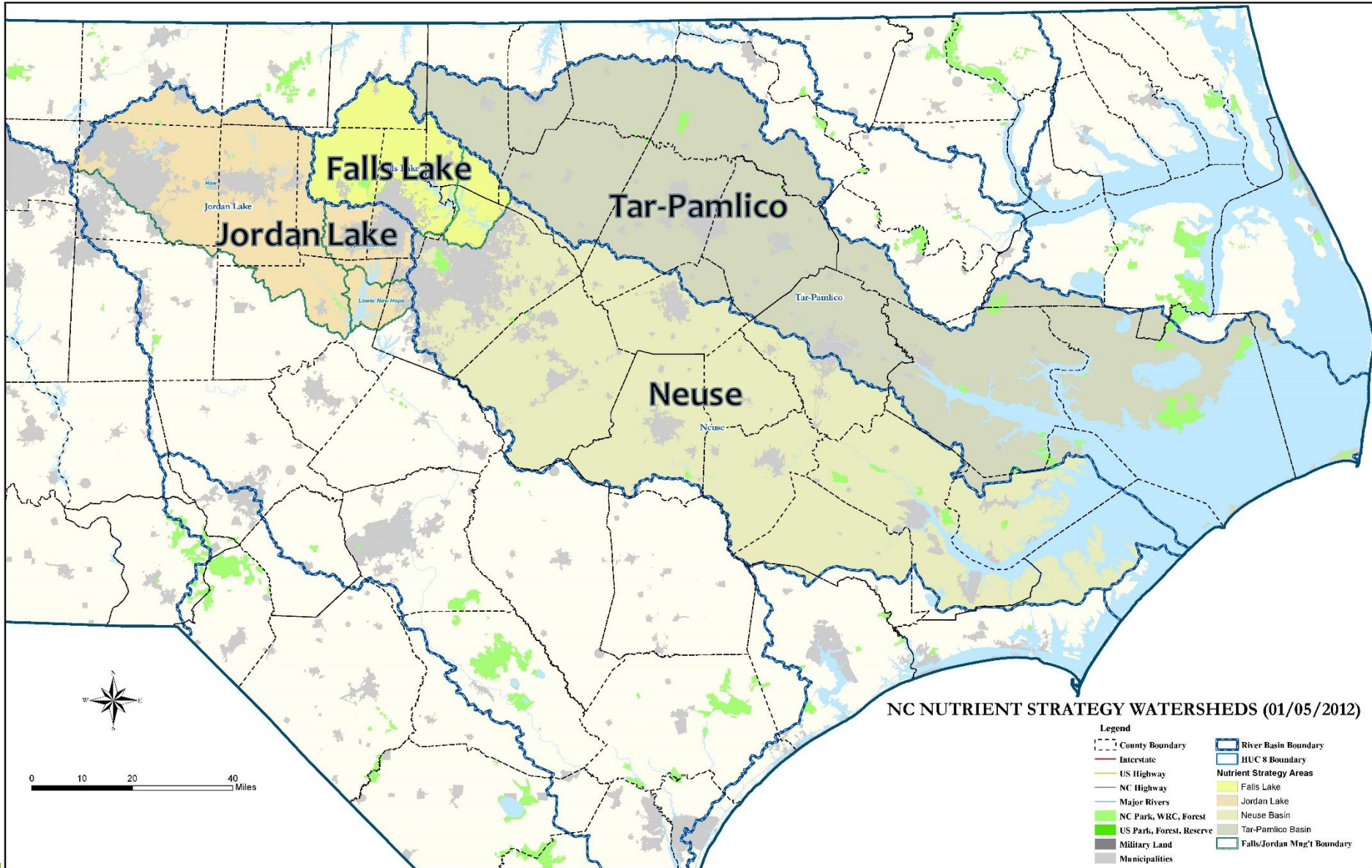
# *What is a Nutrient Management Strategy?*

- 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



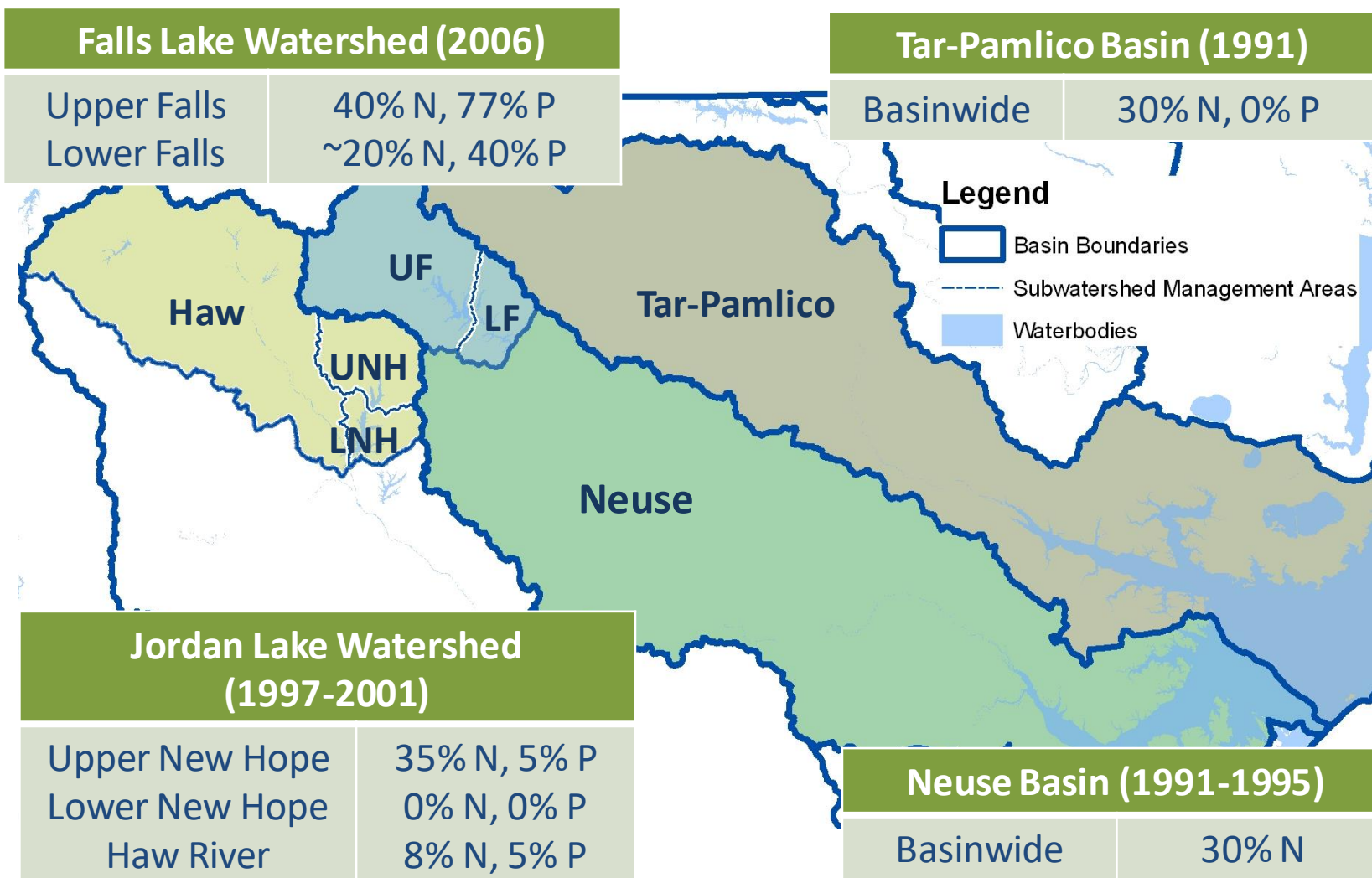


# Nutrient Strategy Watersheds





# 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



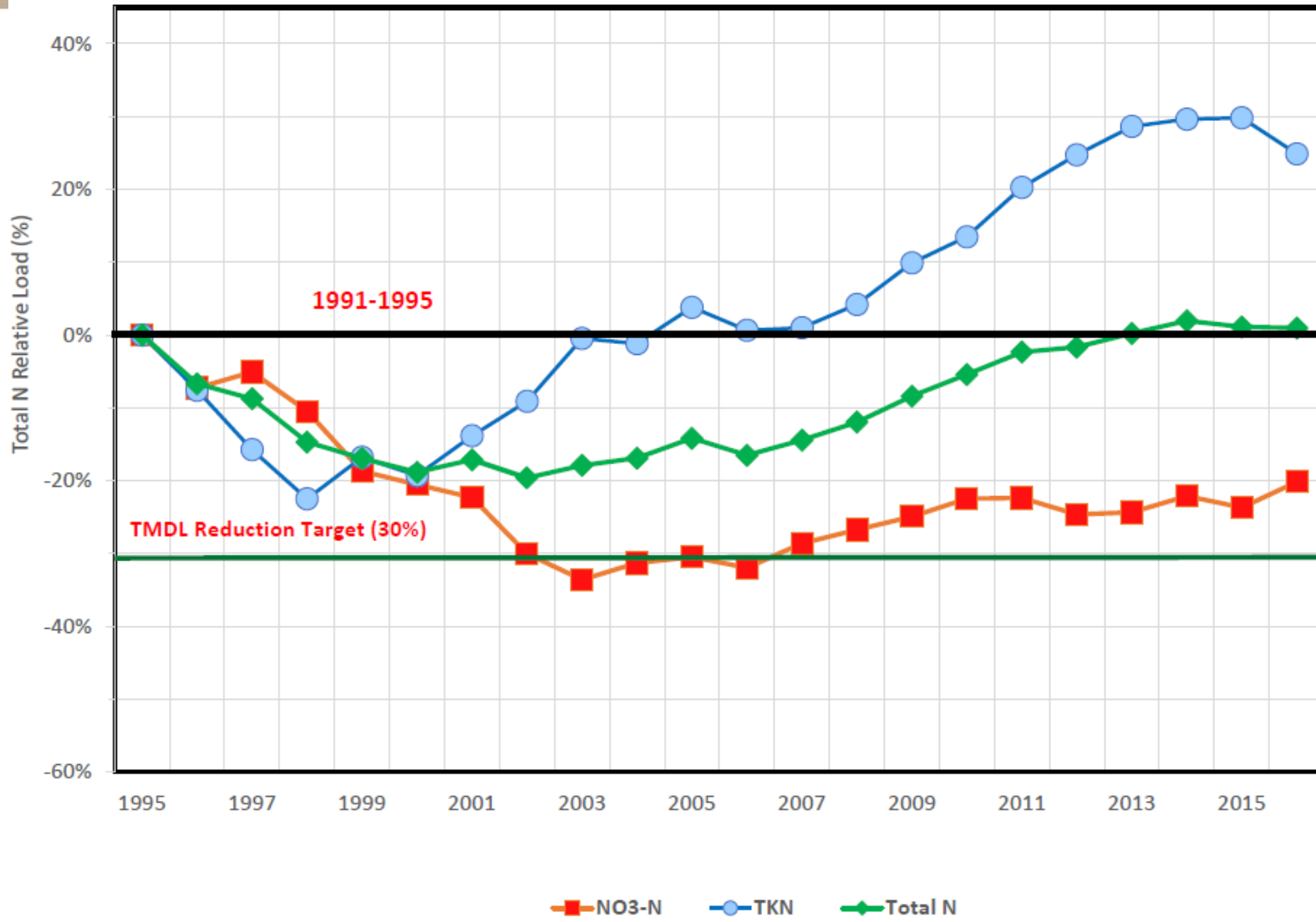
# *Riparian Buffer Rules*

- Protects 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.



# Flow-Normalized Nitrogen Loads (% vs. 1991-1995)

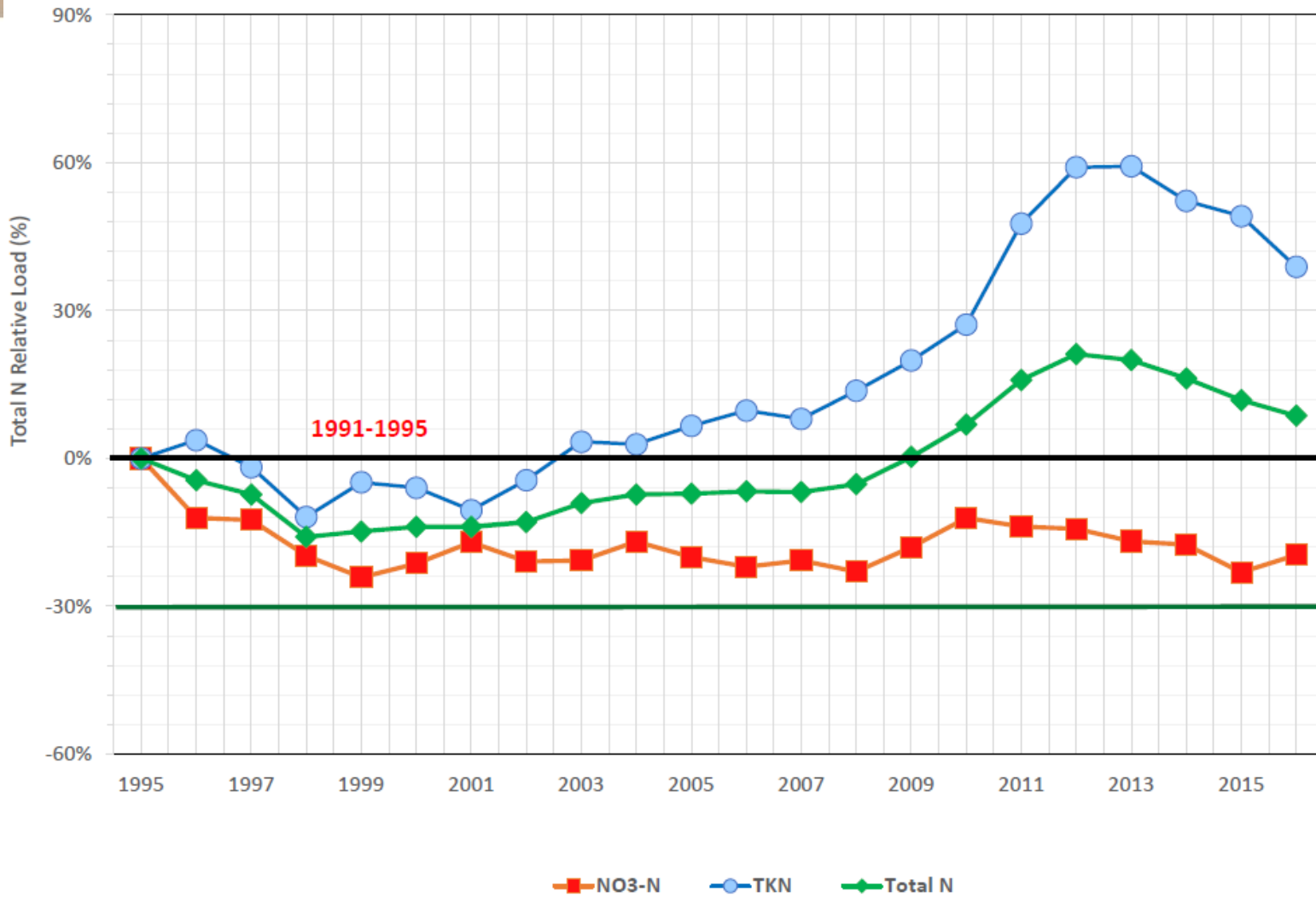
## Neuse River at Fort Barnwell





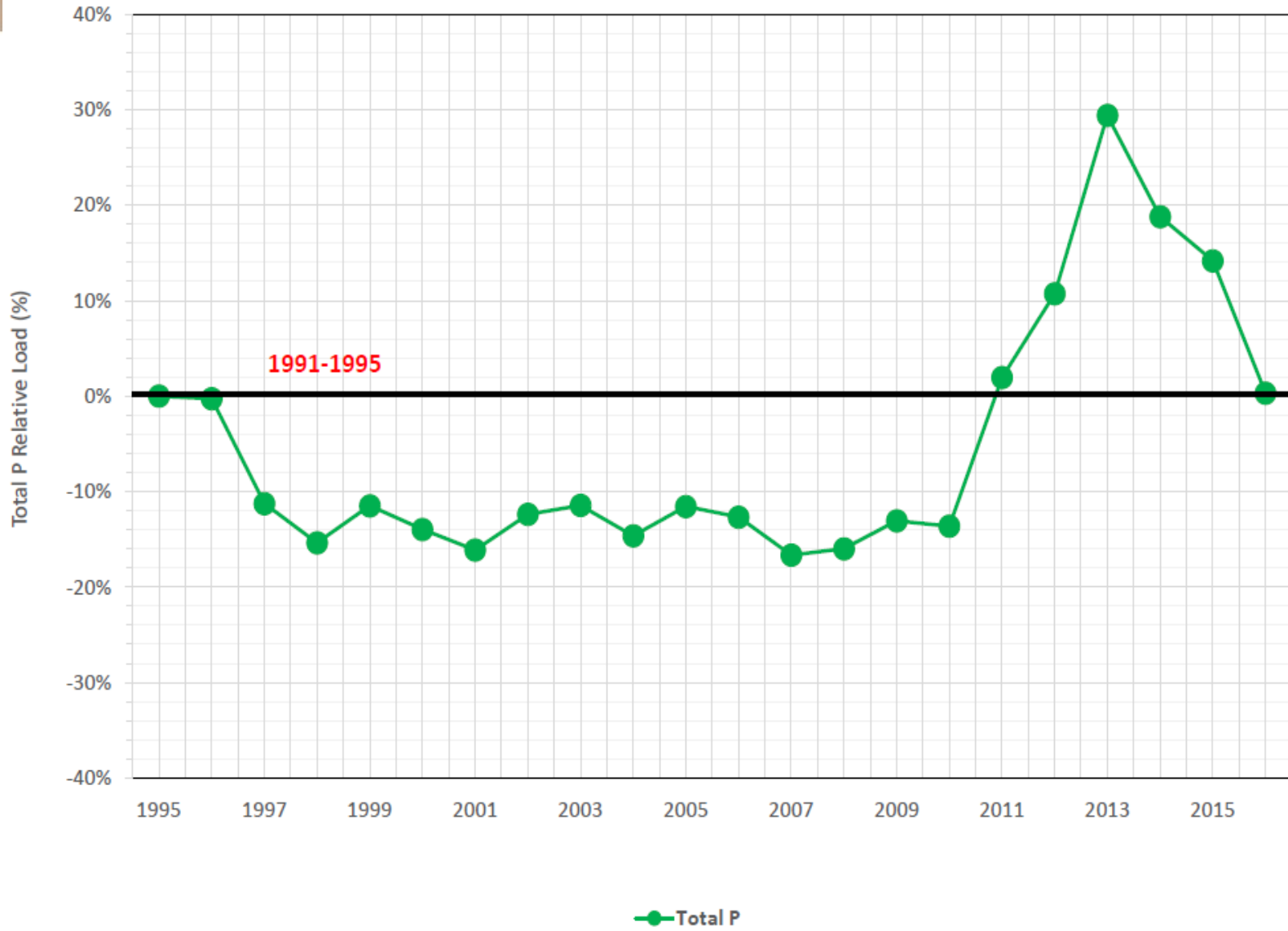
# Flow-Normalized Nitrogen Loads (% vs. 1991-1995)

## Tar River near Grimesland



# Flow-Normalized Total Phosphorus Load (% vs. 1991-95)

## Tar River near Grimesland



# *Nutrient Criteria Development*



- Criteria = regulatory goals for the water body
- Protect designated uses (sensitive endpoints)
- Albemarle Sound/Chowan River as pilot area
- Candidate for N/P criteria
- Reevaluation of response criteria

