



# Compensatory Mitigation in North Carolina & Challenges in Urban Settings

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Periann Russell  
Division of Mitigation Services





# *Compensatory Mitigation Defined*

## Section 404 of the Clean Water Act (CWA)

regulates the discharge of dredge and fill material in waters of the United States, including many wetlands and streams

## Compensatory Mitigation (permitting component of CWA)

defined as offsetting unavoidable impacts to wetlands, streams, and other aquatic resources via restoration, establishment, enhancement, and/or preservation

(National Wetlands Newsletter, Vol. 37, No. 6, Copyright © 2015 Environmental Law Institute ® Washington, DC, USA By Joseph A. Morgan and Palmer Hough)





## *NC Compensatory Mitigation*

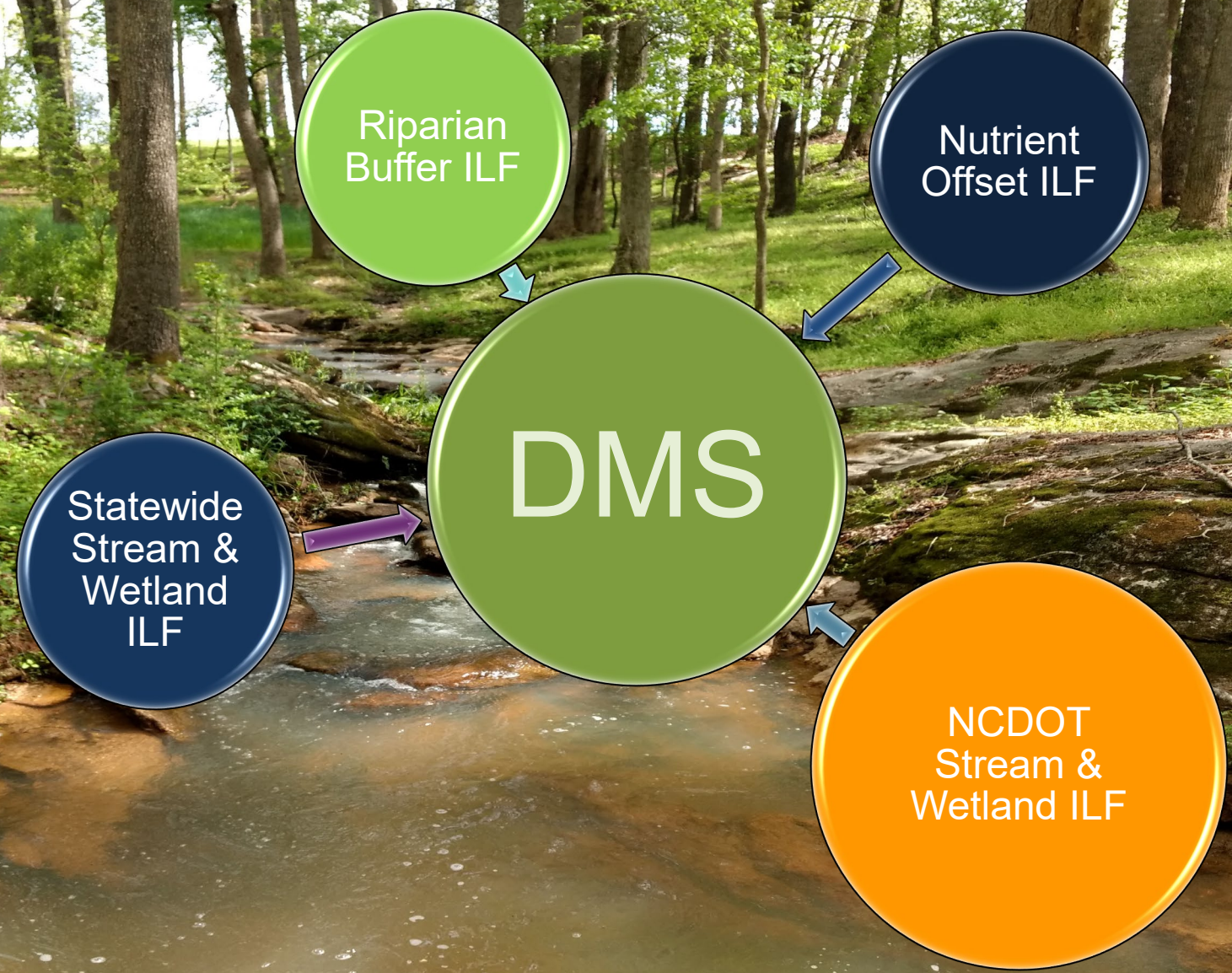
Part of the 404/401 permitting process

Subject to review and approval by Federal and State Agencies

Success/Credits of projects based on performance standards





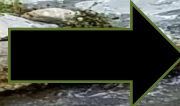


# *DMS Programs*



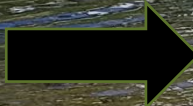


650 total projects



Over 200 active

2.7 million  
stream credits



Approx. 4 million  
linear feet

Over 12,000  
wetland credits



Approx. 29,000  
wetland acres

Average 20 projects contracted per year  
(44 projects contracted last year)





# *We Suffer from Urban Stream Syndrome*

Describes the ecological degradation of streams draining urban land

(Walsh et.al 2022)

Flashy hydrograph

High nutrient concentrations

Altered channel morphology

Changes in groundwater discharge

Degraded (or absent) riparian vegetation



**Disruption of the hydrologic cycle**



# *NC Mitigation in Urban Areas - CHALLENGES*

- Credits
- Cost
- Goals
- Site Location
- Design
- Public Perception
- Maintenance





# *NC Regulatory Credit Structure*

## Credit Ratios

- Restoration 1:1 (1' of stream restoration = 1 credit)
- Enhancement I 1.5:1
- Enhancement II 2:1

Predictable ratios allow for economically feasible restoration



# *Urban Credit Structure*

Non-urban Credit Structure is not Applicable to Urban Stream Restoration

Additional Considerations for economical feasibility

- Stormwater Measures
- Non-traditional Buffer widths
- Educational Value (greenways, interpretative centers, signage)



Freedom Park Sugar Creek, Charlotte, NC



# Cost

Double/Triple  
Land  
Stormwater Control Measures  
Retrofit  
Constraints

# Measurable Goals

Nutrients  
Aquatic habitat  
Biology  
Vertical and Lateral Erosion  
Buffer Vegetation



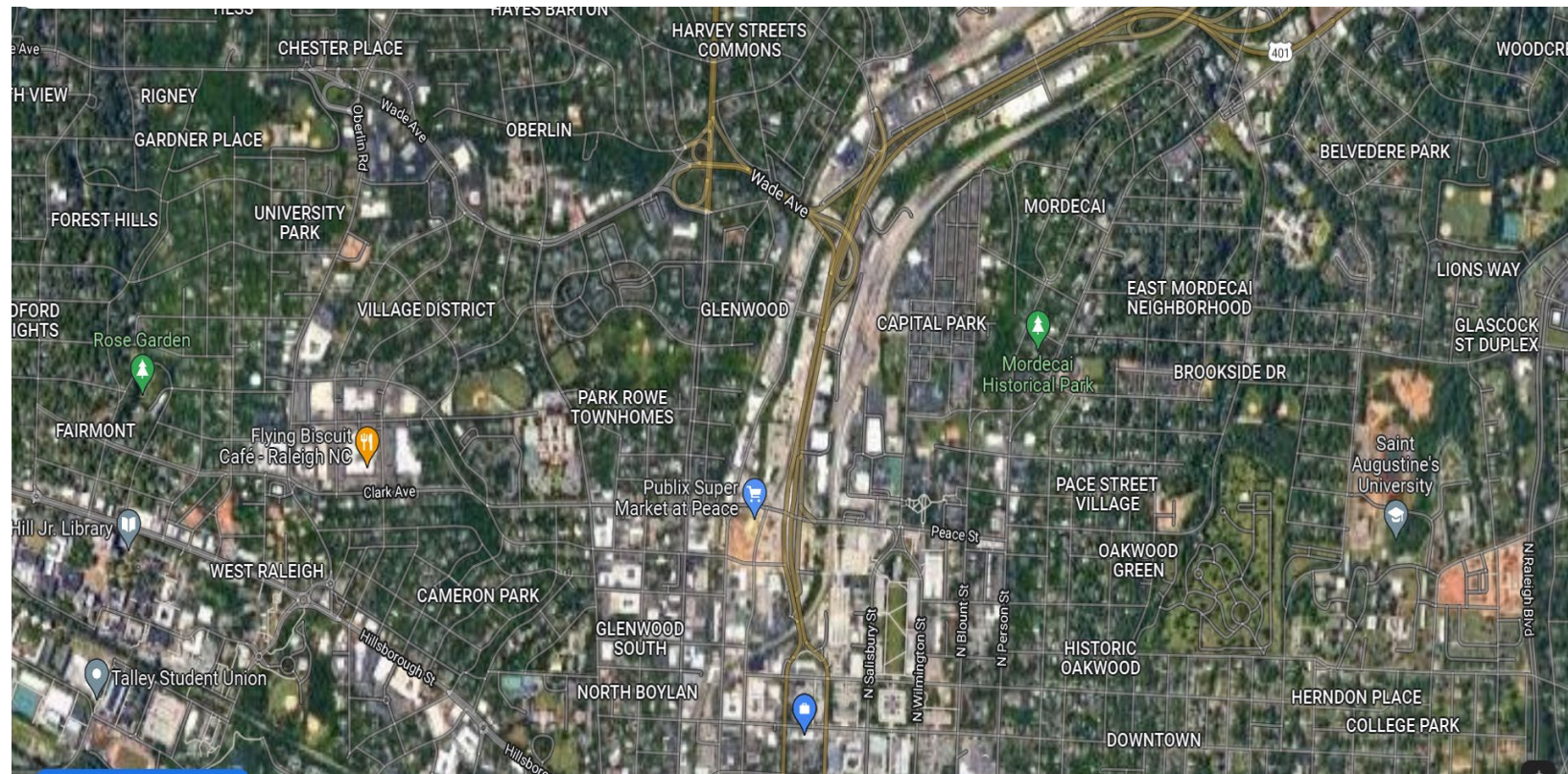
<https://chesapeakestormwater.net/the-bubbas/2014-bubbas/2014-urban-stream-restoration/>





## Site Location

- Constraints
  - Sewer lines
  - Power lines
  - Buildings
  - Culverts
- Willing landowners



Capital Blvd adjacent to Pigeon House Branch

# *Design*

- Hydrology – Water, Water, Water
- Sediment Supply and Transport
- Existing Infrastructure
- Stormwater Control Measures
- Riparian Vegetation



Courtesy Capital Region Watershed District





Alluvial deposition on bench in Hillsdale Park Greensboro, NC





Confined stream and buffers on bench  
Chavis Park Raleigh, NC



Confined Stream  
Starmount park country club Greensboro, NC



# Public Perception

## ‘deficit model’

of public understanding and from a lack of fit between the expectations of restoration and policy workers and those of their local publics

*Environment and Planning C: Government and Policy*, [Volume: 24 issue: 5](#), page(s): 661-680  
Issue published: October 1, 2006

- Aesthetics
- Concerns e.g., crime, snakes
- Expectations

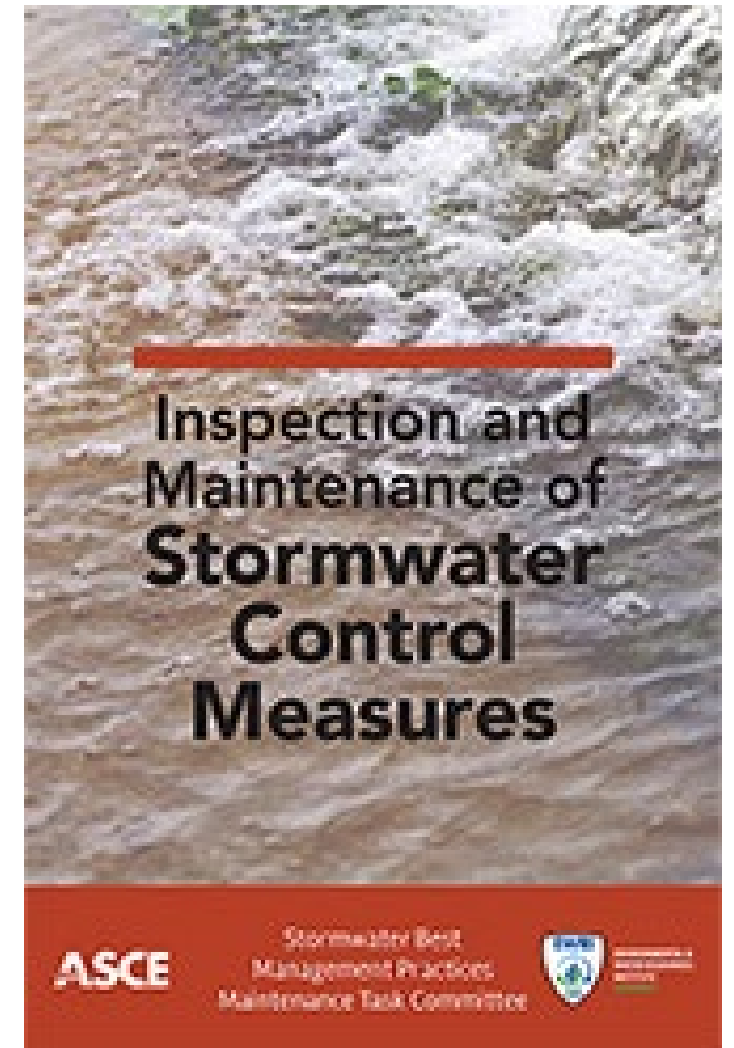


# Maintenance

- Stormwater Control Measures (SCM)
  - SCMs must be maintained properly
  - Maintenance needs depend on the type of SCM
  - SCMs inspected on a minimum quarterly basis
- Costs
- Vegetation Management



Stormwater Wetland







one cell of an experimental 3-tiered stormwater wetland in need of maintenance





Oak planting being overtaken by honeysuckle, Chavis Park, NC



# *Functional Uplift in Successful Urban Mitigation*



# *Hope for the Future?*

North Carolina Natural Infrastructure Program (NCNIP)

2020 NC General Assembly amended DMS enabling legislation

Blueprint

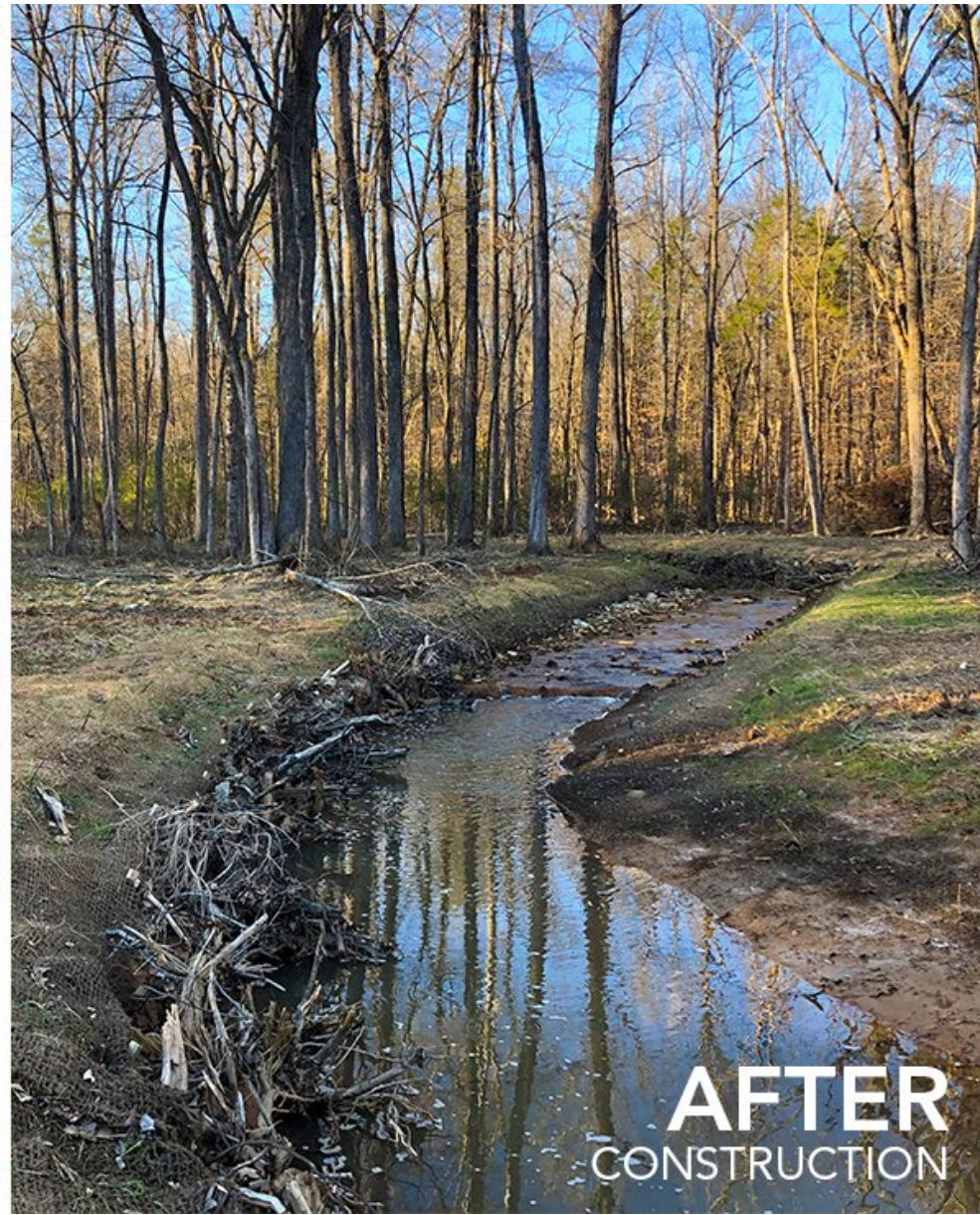
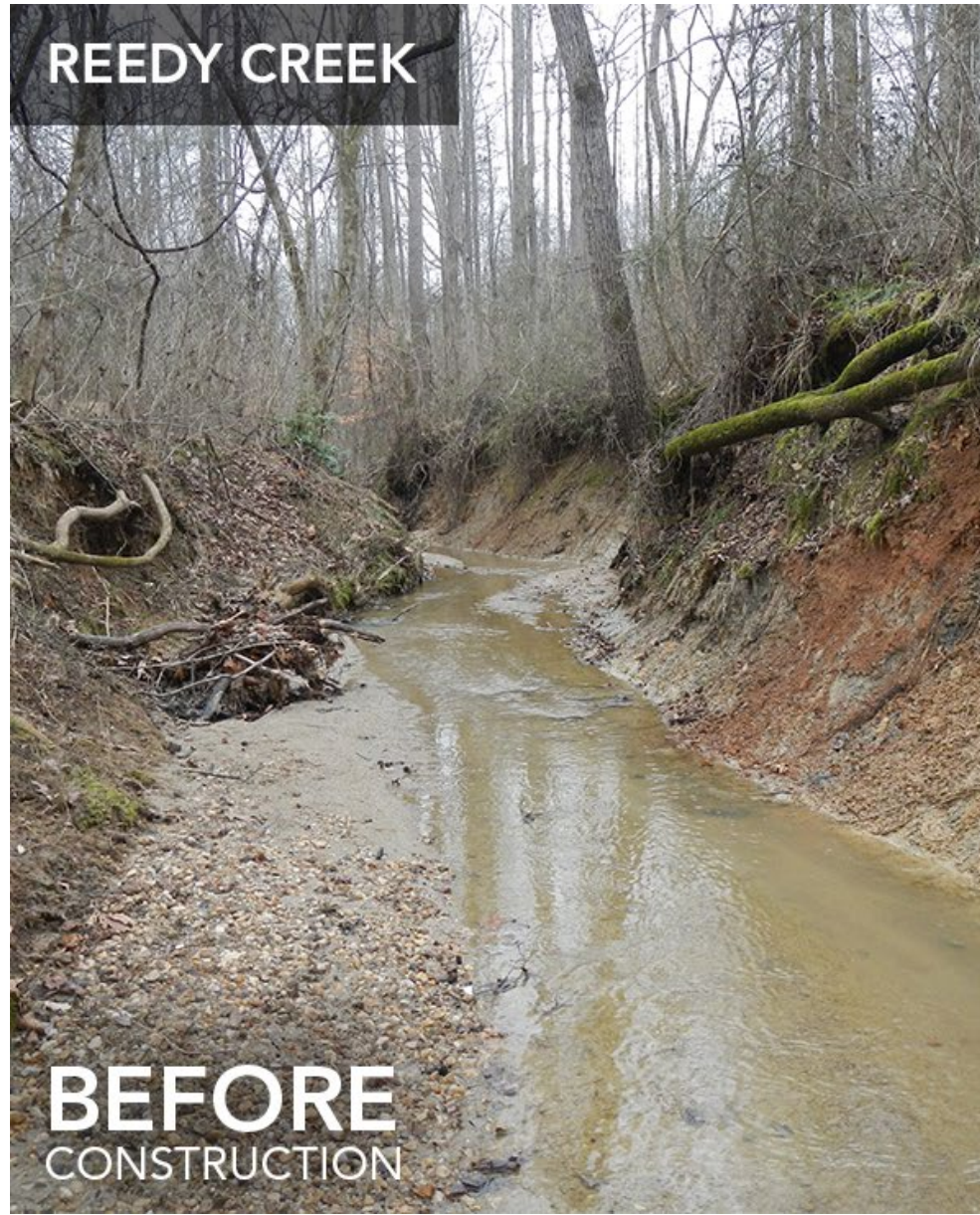
Stoney Creek Pilot

Flooding funds are targeted for Municipalities





REEDY CREEK



*Questions?*



# *NC In-Lieu Fee Program Basics*

