CWMTF Innovative Stormwater Projects

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NC CWMTF
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NC DEPARTMENT OF NATURAL AND CULTURAL RESOURCES

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CWMTF Restoration Program

- Three Current Funding Areas:
  - Stream Restoration
  - Innovative Stormwater
  - Planning
- Legacy funding areas (pre-2013)
  - Wastewater Infrastructure (3 active projects)
  - Stormwater Infrastructure (no active projects)

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Stream Restoration Examples

- Streams provide many benefits, including:
  - Clean drinking water
  - Aquatic habitat
  - Recreational opportunities
- Many streams have been altered by changes in the surrounding landscape
- Changes to streams may compromise benefits
- Restoration can restore streams' abilities to provide community and environmental benefits.

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Stream Restoration Examples

- Streams benefits may be restored, enhanced and/or protected in many ways
  - Instream habitat enhancement
  - Wetland and/or floodplain restoration
  - Riparian planting, maintenance and protection
  - Dam removal
  - Stream restoration based on natural channel design

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Stream Restoration Examples

- The Issue: Stream degradation
  - Loss of riparian buffers
  - Impervious surface in the watershed
  - Instream and/or in-floodplain structures
- Result may be channel instability and increased erosion

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Channel Erosion on Limekiln Creek

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Eroding stream banks of the Fisher River

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Restored channel of the Fisher River

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Bank stabilizing structures along a meander of the Ararat River

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Limited riparian buffers on the New River

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Riparian plantings (willow livestakes) on the Ararat River

A permanent conservation easement employed to protect riparian areas from top of bank back 50’ feet

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Fish passage obstructions, Roanoke River

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Fish passage obstructions resolved, Roanoke River

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Planning Examples

- CWMTF may fund planning efforts that develop potential projects that:
  - Enhance or restore degraded waters
  - Protect unpolluted waters
  - Contribute toward a network of riparian buffers
  - Provide buffers around military bases to protect the military mission
  - Acquire land that represents the ecological diversity
  - Acquire land that contributes to the development of a balanced State program of historic properties
  - Facilitate innovative efforts to improve stormwater treatment

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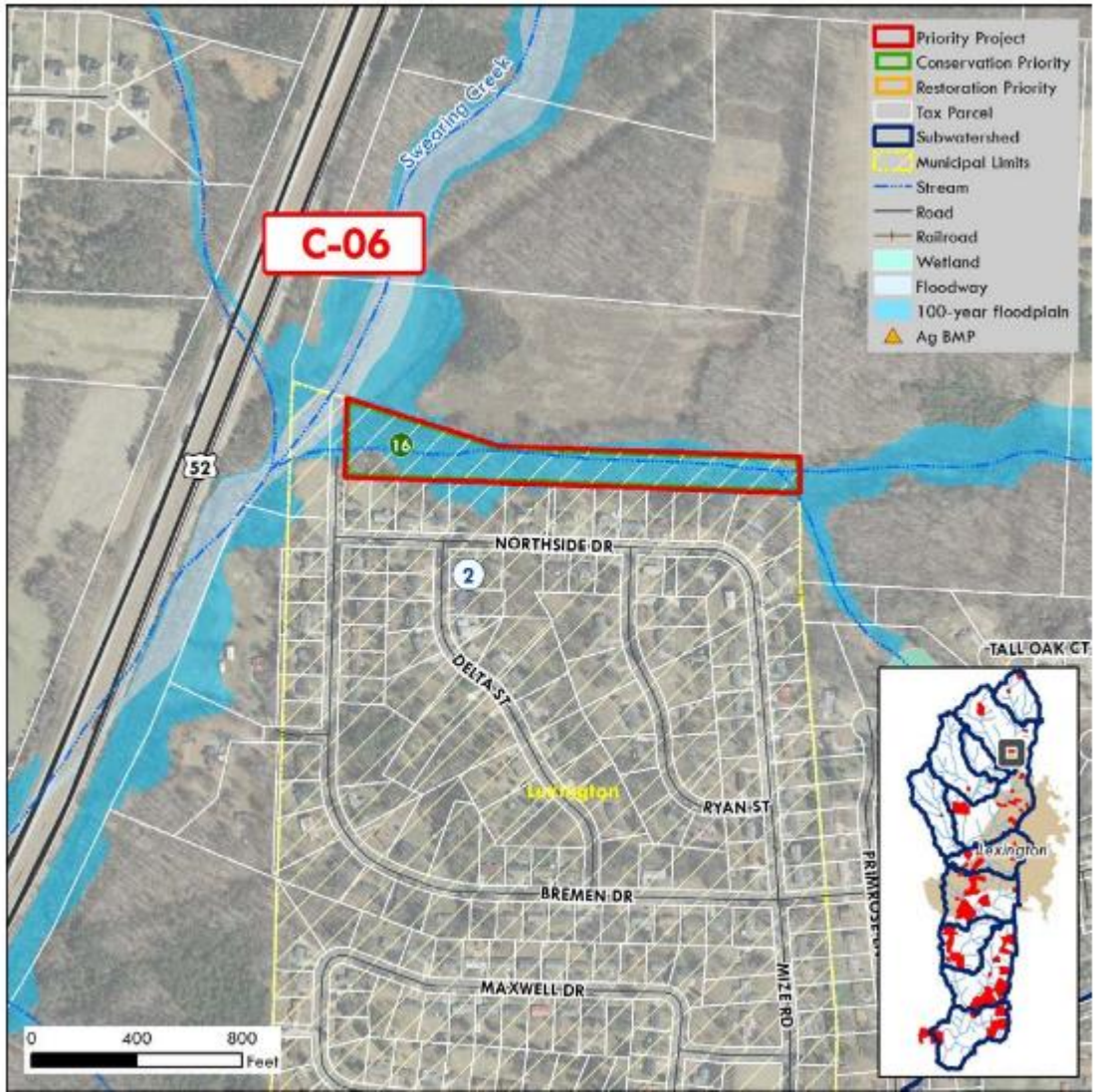
Planning Examples

Project C-06 – Northside Drive Forested Buffer



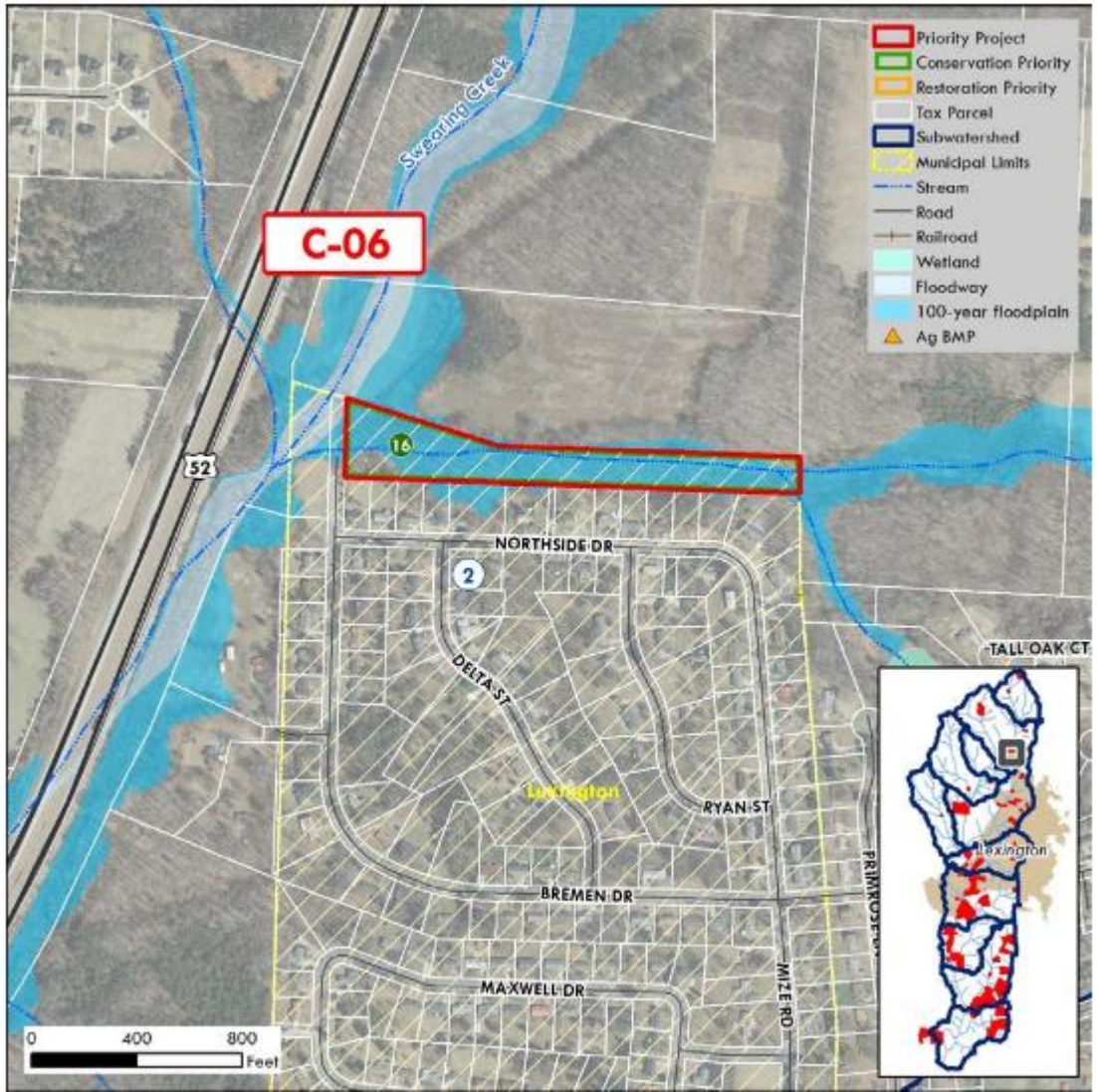
Swearing Creek Watershed Assessment

January 2018

Davidson County, NC

Planning Examples

Project C-06 – Northside Drive Forested Buffer



Attribute	C-06
Site Location	City
Subwatershed	2
Land Use	Forest
Linear Stream (Feet)	1,856
Area (Acres)	6.6
Floodplain Area (Acres)	5.9
Wetland Area (Acres)	n/a
Percent Impervious Surface Cover	1.83%
Percent Forest Cover	83.8%
Curve Number	73
Curve Number Scenario	81
Runoff Increase	21%

Recommended Actions:

1. Partner with conservation groups to contact property owner and gauge interest in donating land for conservation
   - Note: This parcel has also been identified in the Davidson County Greenway Plan. Critical buffer between residential development and tributary of Swearing Creek.
2. Explore opportunities to incorporate stormwater BMPs to reduce impacts from residential runoff
3. Restore stream buffers where appropriate

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Innovative Stormwater Funding

- Innovative stormwater projects may demonstrate untried methods to protect water quality
- Any proposed innovative stormwater project application should contain:
  - A clear description of the methods to be tested
  - A plan of how results from such a pilot test can be successfully transferred to other NC sites
  - NC DWR now provides to applicants area of need for development of the State's Stormwater design manual.

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Innovative Stormwater Funding

- **Unlike other funding areas, for ISW, CWMTF pays for discovery and new application rather than resource recovery.**

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Innovative Stormwater Funding

Rating Overview – The major components of the rating system are listed below:

Section I. Merit of the project's objectives (35%)

A. Proposal addresses aspect(s) of stormwater management that would be advanced by successful completion of the project
B. Proposal discusses how current practices are inadequate or need improvement
C. Proposal provides related experiences or research that indicates the proposed project type is a worthwhile undertaking.

Section II. Completeness and clarity of the project description and the project's outputs (15%)

A. Purpose and Goals
B. Approach (work tasks)
C. Output of the Project, measures of success, and the basis for evaluating success D. Long term care and operation

Section III. Potential for the project's results to be applied broadly (20%)

A. The project proposal indicates how the results and corresponding advanced or improved stormwater management practices could and should be applied broadly.
B. Activities that would be conducted, as a part of the project scope, to encourage broad application of the project results.

Section IV. Applicant's commitment to the project (10%)

A. Project timeline and readiness to begin work
B. Project budget/cost proposal and status of resources

Section V. Matching Resources (20%)

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Topics Needing More Research

Overall, in North Carolina, we need research on stormwater control measures that are cost-effective and can be replicated easily by a wide range of communities and developers. Some of the issues that the NC Stormwater Program has specifically identified as needing more research include the following:

1. ***Wetland Swales:*** DEQ receives numerous complaints about vegetated swales in our coastal areas that do not drain due to high water tables. Because this area of our state is flat, it is not possible to regrade these swales to promote drainage, so research is needed to turn these swales from nuisances to amenities by planting and maintaining them as "wetland swales." Some of the questions that need to be answered about wetland swales are:
    a. What are the most optimal planting plans for wetland swales?
    b. How can we increase public acceptance of wetland swales?
    c. What are the maintenance requirements for wetland swales?
    d. Are there opportunities to plant species in vegetated areas adjacent to swales that are not currently draining to intercept and evapo-transpire some of the drainage that is being stored in swales?

2. ***Floating Wetland Islands (FWIs):*** FWIs may be added as an optional enhancement to wet ponds to increase their effectiveness at removing nutrients. They have the potential to be cost-effective retrofits in nutrient sensitive waters throughout the state because they make use of existing wet ponds to provide a significantly higher level of nutrient reduction that wet ponds currently provide. Some of the questions that need to be answered about FWIs are:
    a. What is the most cost-effective design for FWIs?
    b. What are the maintenance requirements for FWIs?
    c. How should FWIs be credited in the SCM Credit Document?

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3. ***Stormwater Filtration Through Sand in SA Waters:*** The Coastal Stormwater Rule, 15A NCAC 02H .1019, requires that the effluent from a wet pond be filtered through a minimum of 18 inches of sand prior to discharge to surface waters. There are several technical questions regarding this requirement that could be addressed with further research, including:
    a. What the best designs to reduce the level of fecal coliform, TSS and other pollutants?
    b. How can this design standard be met when the SHWT is high?
    c. How can maintenance of the sand filtration system be optimized for cost and effectiveness?

4. ***Green Streets and Street Trees:*** Green spaces and street trees can cost-effectively manage stormwater runoff while also providing additional benefits including reducing the heat island effect and improving aesthetics and air quality. Integrated planning of green infrastructure and parks systems (or within public spaces) helps to cost-effectively provide multiple benefits and contributes to more livable communities.
    a. What are some options for designs that treat stormwater while also meeting additional community needs such as safety, tree preservation requirements, etc.?
    b. How should Green Streets and Street Trees be credited in the SCM Credit Document?

5. ***Sand Filters:*** Sand filters are a commonly-used SCM in North Carolina; however, their design and effectiveness have not been well studied in our state. Some of the questions that need to be answered about sand filters include:
    a. What is the most cost-effective design for sand filters?
    b. What are the maintenance requirements for sand filters?
    c. How should sand filters be credited in the SCM Credit Document?

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6. ***Flow-Through Stormwater Wetlands:*** The current MDC for stormwater wetlands call for drawing down the water quality volume over two to five days. However, research done by NSCU's Department of Biological and Agricultural Engineering suggests that the detention time needed for effective treatment in a stormwater wetland is likely to be much shorter than two days. If equivalent performance could be achieved with a shorter drawdown period, then the footprint of stormwater wetlands could be reduced, and likely make them more cost-effective than wet ponds.
    a. What is the most cost-effective hydrologic retention time for flow-through stormwater wetlands?
    b. How should flow-through stormwater wetlands be credited in the SCM Credit Document?
    c. Would a shorter/different retention time affect the mortality of the required wetland vegetation?

7. ***Pervious Surface Management:*** Research done by NCSU's Soil Science Department suggests that combining soil amendments with strategic native vegetation choices is likely to result in a landscape that reduces rather than contributes to TSS, nutrients and flooding.
    a. What are some options for pervious surface management that treat stormwater while also enhancing aesthetics?
    b. What is the water quality benefit associated with pervious surface management?
    c. How should Pervious Surface Management be credited in the SCM Credit Document?

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Innovative Stormwater Examples

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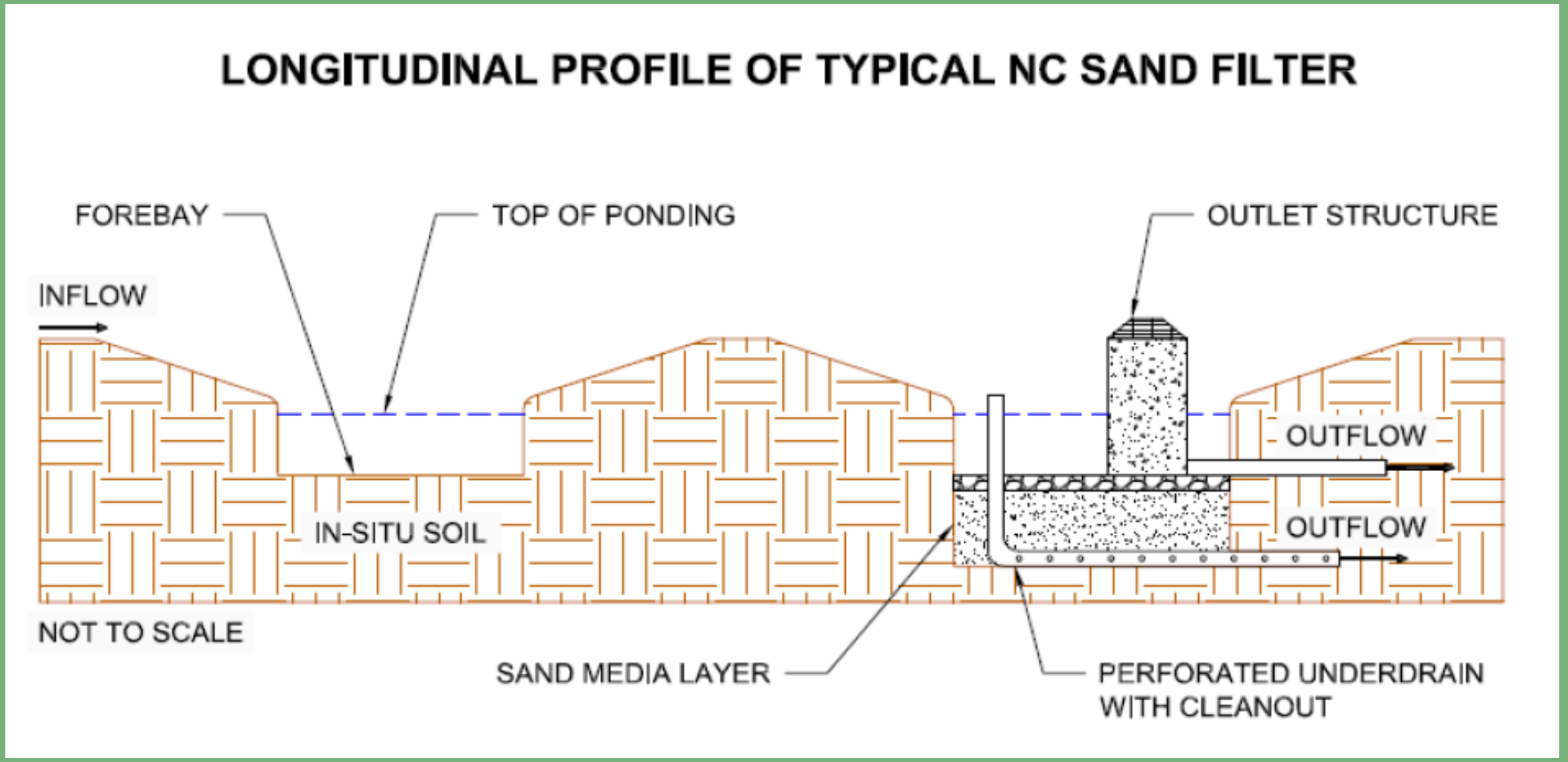

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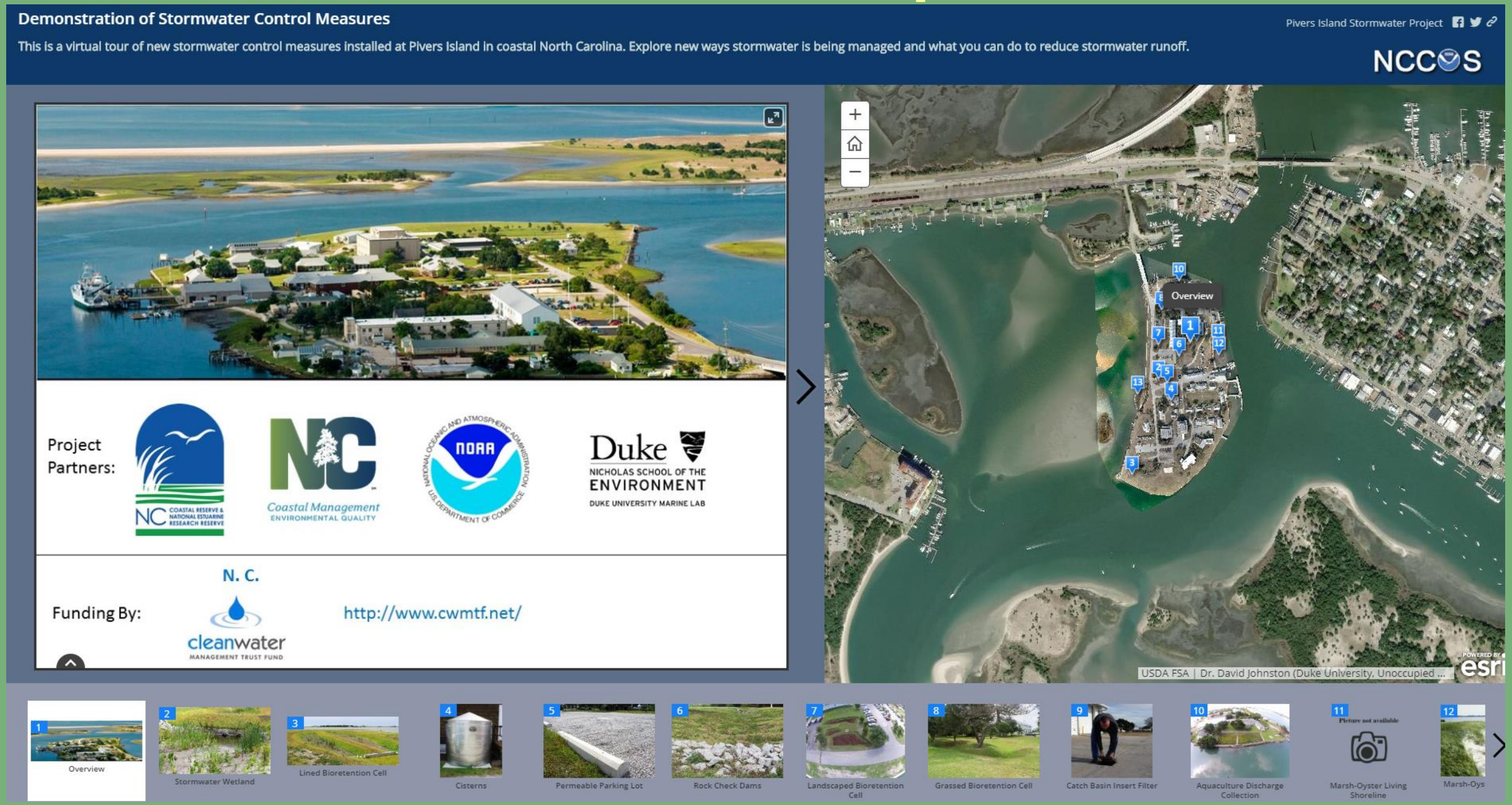

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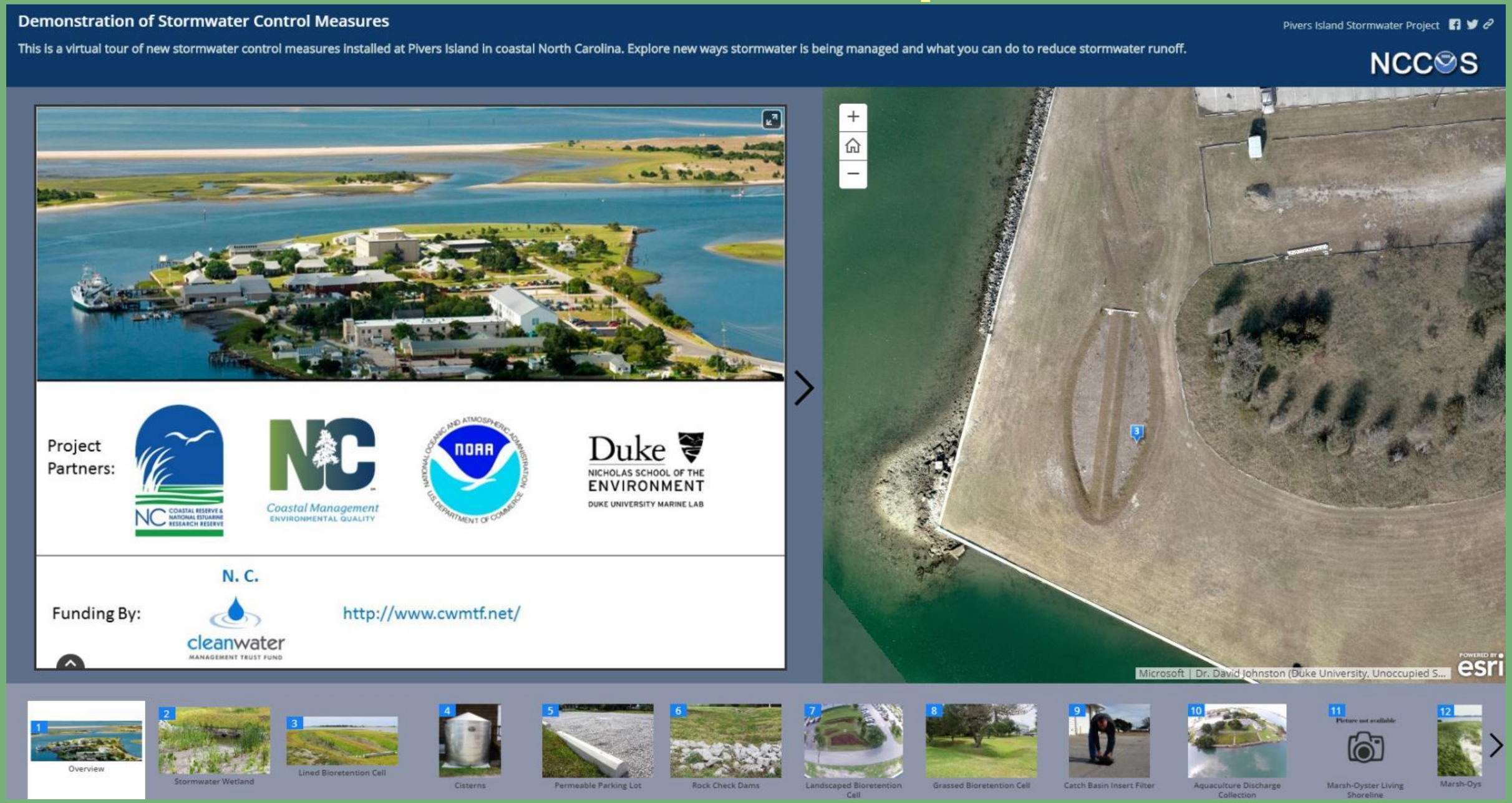


Innovative Stormwater Examples

Manual Valve Setpoint
2% Open
Change

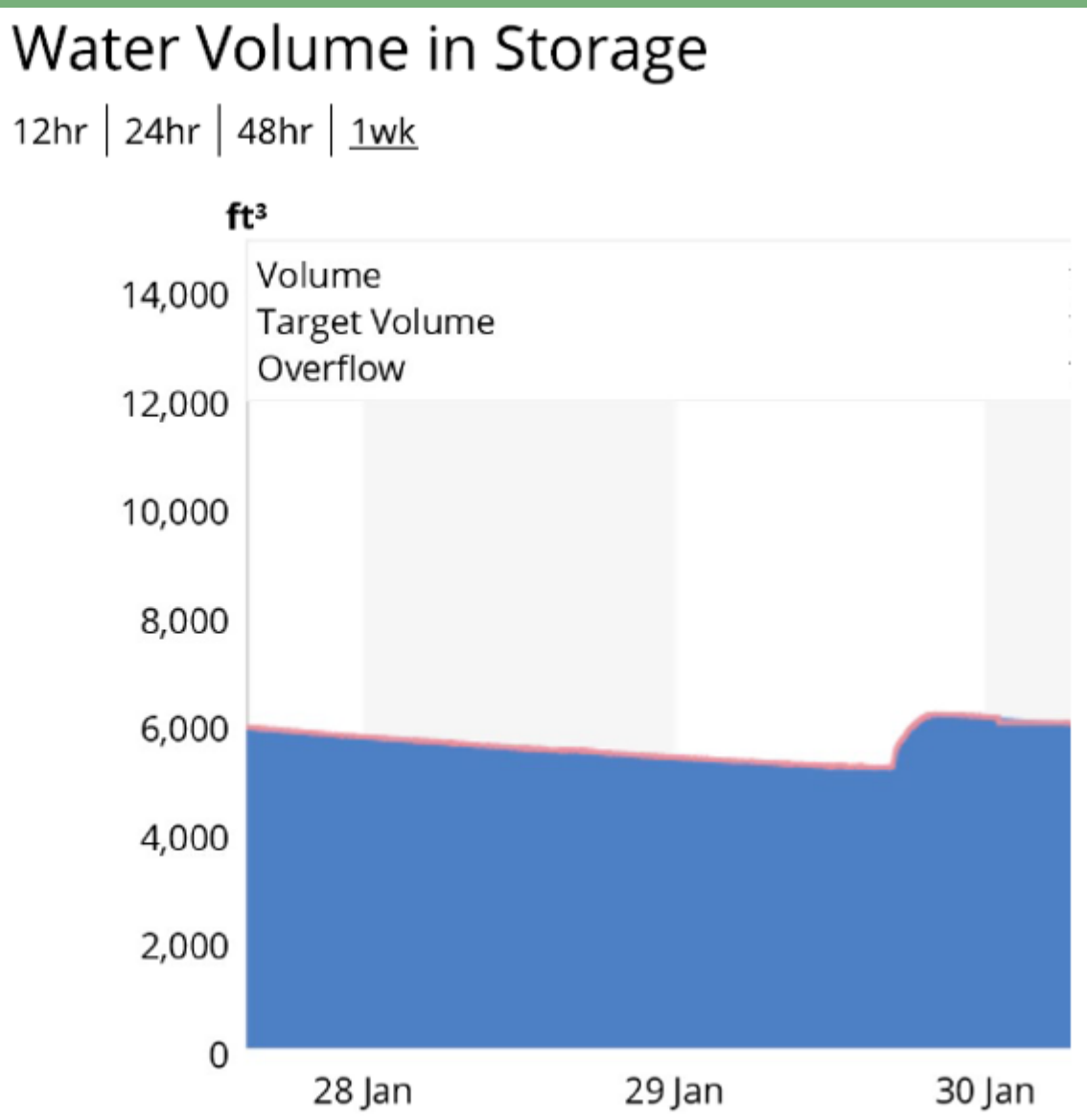
Currently in:
02/03/2019 14:57
Dry Weather

24-hr Forecast Precipitation (in)
02/03/2019 14:57
0.0

24-hr Forecast Runoff (ft^3)
02/03/2019 14:57
0.0

Storage Available (ft^3)
02/03/2019 14:57
9313.2

Target Discharge (cfs)
02/03/2019 14:57
0.0



Innovative Stormwater Examples

CWMTF Innovative Stormwater Program

Apply for an Innovative Stormwater Grant

Grant Application Process

Click here for a summary of changes and updates for the 2019 cycle

Project development

- Contact your CWMTF Field Representative to explore concept eligibility and potential grant opportunities.
- Develop your application narrative and budget in light of CWMTF Evaluation Criteria.

Online Grants Management System Access

- Applications are only submitted online through the Grants Management System (GMS).

Links

CWMTF Innovative Stormwater Application Guidelines & Questions, and Rating System

Access GMS

cwmtf.nc.gov