

***Advancing Nature-based Stormwater Strategies to  
Reduce Flooding and Improve Water Quality in North Carolina***

***Welcome***  
**Bill Cary, Brooks Pierce**

March 25, 2020

# ***Advancing Nature-based Stormwater Strategies to Reduce Flooding and Improve Water Quality in North Carolina***

## **Zoom Information and Reminders:**

- Mute when not speaking (bottom left screen).
- Chat “tech Support” participant if having difficulties.
- Can’t see video? Follow along with agenda and slides.
- Dial-in from Zoom #s if you get disconnected.

***This meeting is being audio recorded for note taking purposes only and to share with any work group members unable to participate today. The recordings will not be shared with the public.***

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***Statement by:***

**Michael S. Regan, Secretary  
N.C. Department of Environmental Quality**

# *Advancing Nature-based Stormwater Strategies to Reduce Flooding and Improve Water Quality in North Carolina*

## **Meeting Overview:**

- Four Work Groups Meeting Today and Concurrently
  - a.m. - New Development and Roadways
  - p.m. - Stormwater Retrofit and Working Lands

## **Agenda Overview:**

- Project Overview and Defining “Nature-based Stormwater Strategies”
- Remarks from The Pew Charitable Trusts
- Facilitated Group Session
  - Nature-based Stormwater Strategies and Future Opportunities
  - Existing and Perceived Impediments to Implementation
  - Identify Research Needs
  - Next Steps

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***Project Overview and Defining  
“Nature-based Stormwater Strategies”  
New Development Work Group***

**Lauren Kolodij, North Carolina Coastal Federation**

# ***Advancing Nature-based Stormwater Strategies to Reduce Flooding and Improve Water Quality in North Carolina***

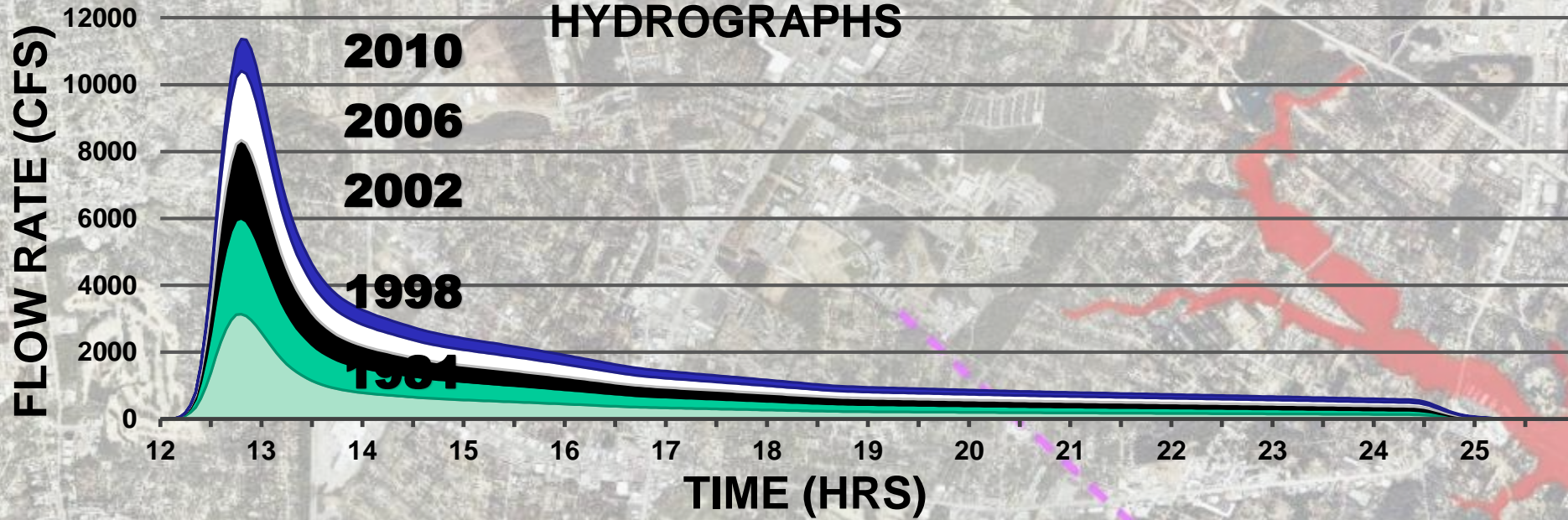
## **Increased Volumes of Stormwater Runoff and Flooding**

- Both urban and rural land uses alter natural hydrology.
- Alterations effect the land's capacity to collect and absorb rain and storms.
- Stormwater runoff causes flooding.
- Stormwater runoff carries pollutants to surface waters.
- Intensity and frequency of storms are magnifying problems.
- Statewide Issue.

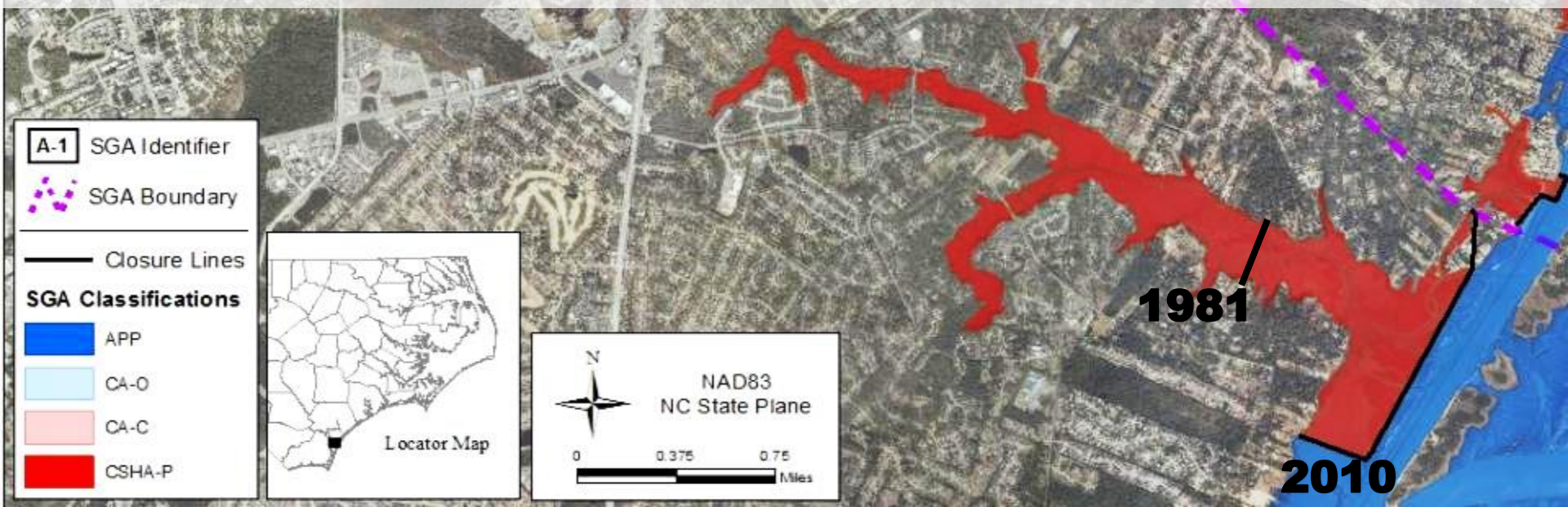
# ***Urban and Rural Land Uses Alter Natural Hydrology Result in Flooding and Surface Water Degradation***



# HEWLETTS CREEK WATERSHED 1-YR STORM HYDROGRAPHS



# CHANGES IN SHELLFISH CLOSURE BOUNDARIES





# ***Advancing Nature-based Stormwater Strategies to Reduce Flooding and Improve Water Quality in North Carolina***

## **Impact of Nature-based Stormwater Strategy Approach**

- Maintain natural hydrology and capacity of land to collect and infiltrate.
- Mimic natural hydrology (retrofits).
- Reduce flooding.
- Protect and restore water quality.
- Result in more resilient communities statewide.
- Multiple co-benefits – including economic and aesthetic.

# *Snapshot of Nature-based Stormwater Strategies*



# *Advancing Nature-based Stormwater Strategies to Reduce Flooding and Improve Water Quality in North Carolina*

## **Working Together Toward Solutions:**

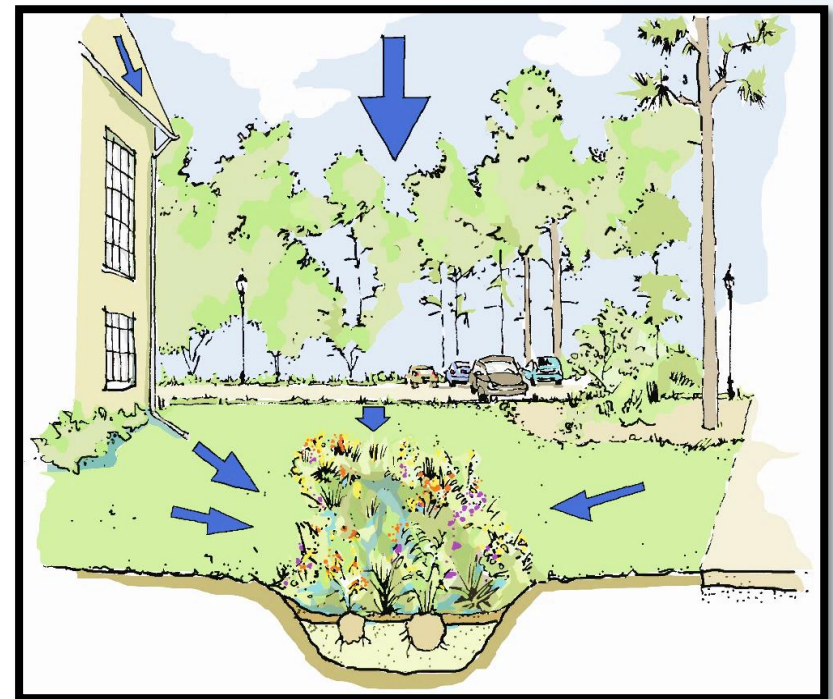
- Governor's Executive Order 80
- June 2019 Workshop
- Determined Need to Assemble Experts to Collaborate Toward Solutions
- Project Team Formed
- Work Groups Assembled



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## **Work Group Goals:**

- Develop and implement consensus-driven statewide Nature-based Stormwater Strategy Action Plan.
- Increase the use of nature-based stormwater strategies where practicable to reduce flooding and protect water quality.



# *Advancing Nature-based Stormwater Strategies to Reduce Flooding and Improve Water Quality in North Carolina*

## **Work Group Charge:**

- Evaluate current use of nature-based stormwater strategies, opportunities and need.
- Identify real and perceived impediments to its use.
- Formulate set of recommendations for advancing where feasible.

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## **Project Schedule:**

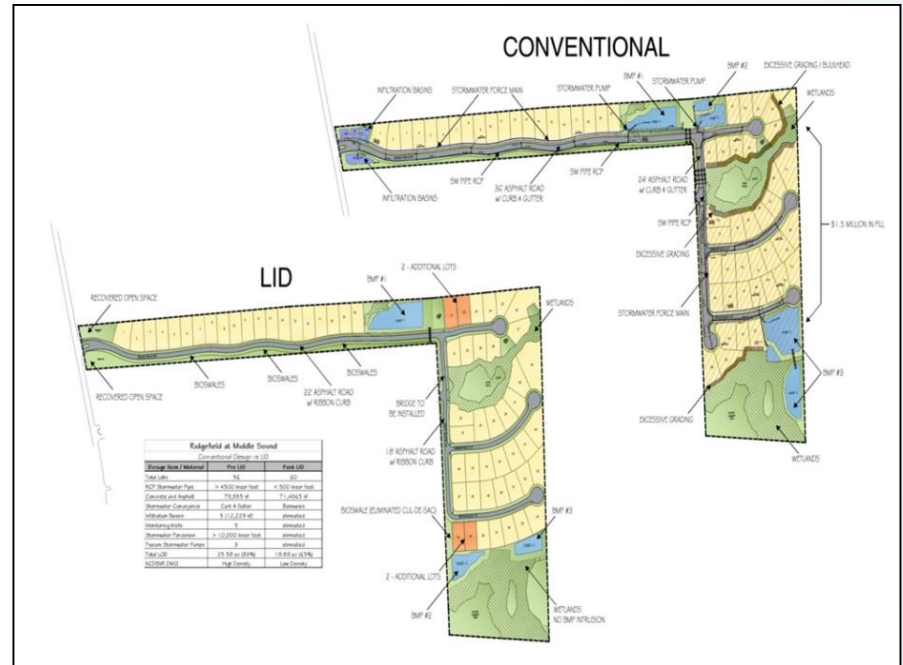
<b>March 2020</b>	Introductory meeting, identify impediments to implementation
<b>May 2020</b>	Compile policy, funding, and promotion needs for nature-based strategy implementation
<b>July 2020</b>	Develop draft Plan with tools to advance policies, funding, and promotion
<b>Nov. 2020</b>	Review and finalize Plan
<b>March 2021</b>	Host Nature-based Stormwater Strategy Summit

# Nature-based Stormwater Strategies for New Development

Nature-based stormwater strategies for new development utilize the landscape to infiltrate, filter, store and evaporate runoff throughout a development site.

Instead of directing stormwater to ditches, pipes and ponds, nature based strategies capture and absorb rain before it becomes polluted runoff. These strategies include bioretention, permeable paving and disconnecting impervious surfaces.

Nature-based strategies are most effective when incorporated early into the design phase of new projects.



## *Nature-based Stormwater Strategies for New Development*



Permeable pavement at the River Bluffs development in New Hanover County promotes infiltration on site.



# Nature-based Stormwater Strategies for New Development



RIVER BLUFFS.

“We saved about \$2 million in development cost on 100 lots by not installing curbing and by using natural areas as infiltration basins and not having to excavate for wet ponds. Other than that, all the other costs were about the same. I also think the trees we were able to save by not clearing for ponds and drainage was an added plus.” *Burrows Smith, developer*



# *Nature-based Stormwater Strategies for New Development*



The Sierra Nevada Brewery located in Mills River and has over 2.5 acres of permeable pavers which allows for guest parking and stormwater management.

## *Nature-based Stormwater Strategies for New Development*



This parking lot was designed to collect and infiltrate stormwater from the drive isles and parking stalls. The design is aesthetically pleasing in addition to being functional.

# *Nature-based Stormwater Strategies for New Development*

- North Carolina supports low-impact development and now formally defines LID as 'volume match'
- Storm-EZ Tool created to calculate volume matching
- Stormwater permitting credits for LID developed
- Door is open for implementation



The NC Stormwater Control Measure Document (2017) identifies credits for multiple LID practices.

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**Working Together:  
Remarks From The Pew Charitable Trusts**

**Yaron Miller, The Pew Charitable Trusts**



## **Flood-Prepared Communities The Pew Charitable Trusts**



**Reduce the impact of weather-related catastrophes, such as floods and hurricanes, on the U.S. taxpayer and environment by better preparing communities through federal and state policy reform in four areas: federal flood insurance, infrastructure, pre-disaster mitigation, and nature-based solutions to flood control.**

# North Carolina Climate Science Report



## Looking Back:

An upward trend in the number of heavy rainfall events (3 inches or more in a day), with 2015–2018 having the greatest number of events since 1900.

## Looking Forward:

It is *likely* that annual total precipitation in North Carolina will increase.

It is *very likely* that extreme precipitation frequency and intensity in North Carolina will increase.



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***New Development Work Group Facilitated Session***  
**Bill Cary, Brooks Pierce**

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## ***Opportunities***

- How are nature-based stormwater strategies being applied in North Carolina?
- With optimal, unimpeded application of nature-based stormwater strategies, what does North Carolina look like in 10 years?
- Can you share additional nature-based stormwater strategy successes? (in NC or other states)

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## *Impediments*

- What are the impediments to implementing nature-based stormwater strategies?

Awareness?

Regulatory Constraints (fed, state and local level)?

Costs?

Demand?

- How are nature-based stormwater strategies perceived in your field? By your colleagues?

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## ***Research Needs to Advance Our Work***

- Current policies and regulations?
- Current funding sources?
- Initiatives from other states?
- Other?

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## ***Next Steps***

- Follow Up Form to Solicit Additional Ideas.
- Send Meeting Notes.
- Project Team Complete Research.
- Work Group Meeting late May (begin recommendation development).
- Questions? Contact Lauren Kolodij, North Carolina Coastal Federation at [laurenk@nccoast.org](mailto:laurenk@nccoast.org)
- Thank You!