

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

***Welcome***

**Kristiane Huber, The Pew Charitable Trusts**

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”  
Roadways Work Group***

**Todd Miller, North Carolina Coastal Federation**

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

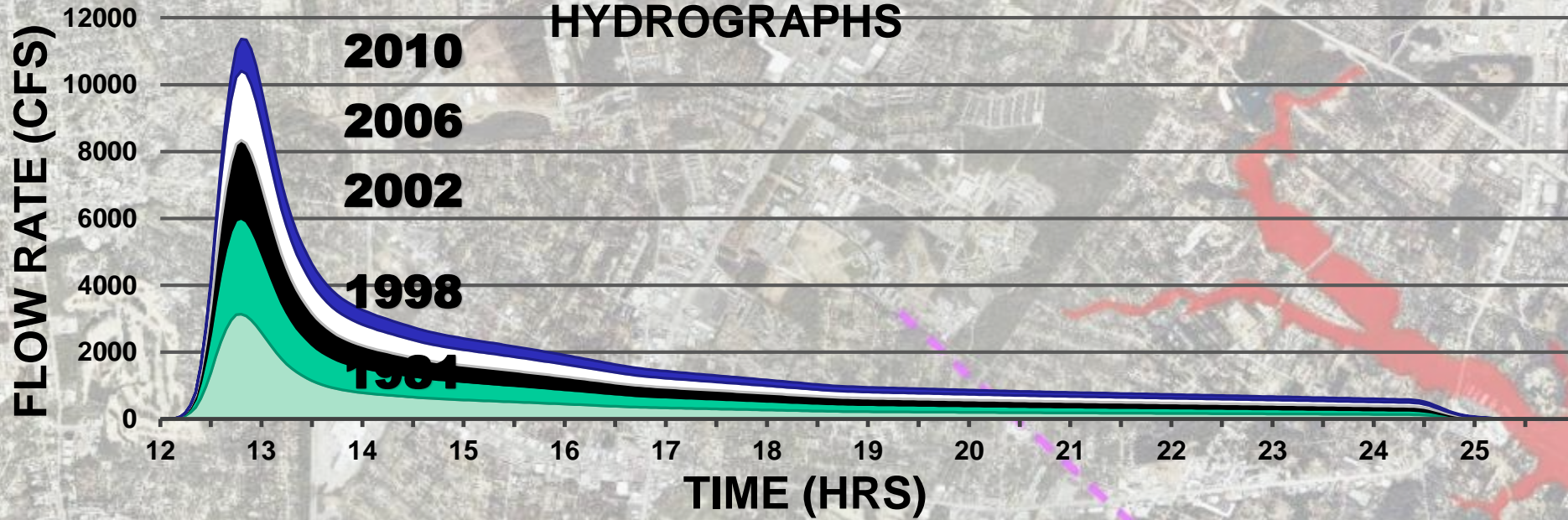
## **Increased Volumes of Stormwater Runoff and Flooding**

- 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.

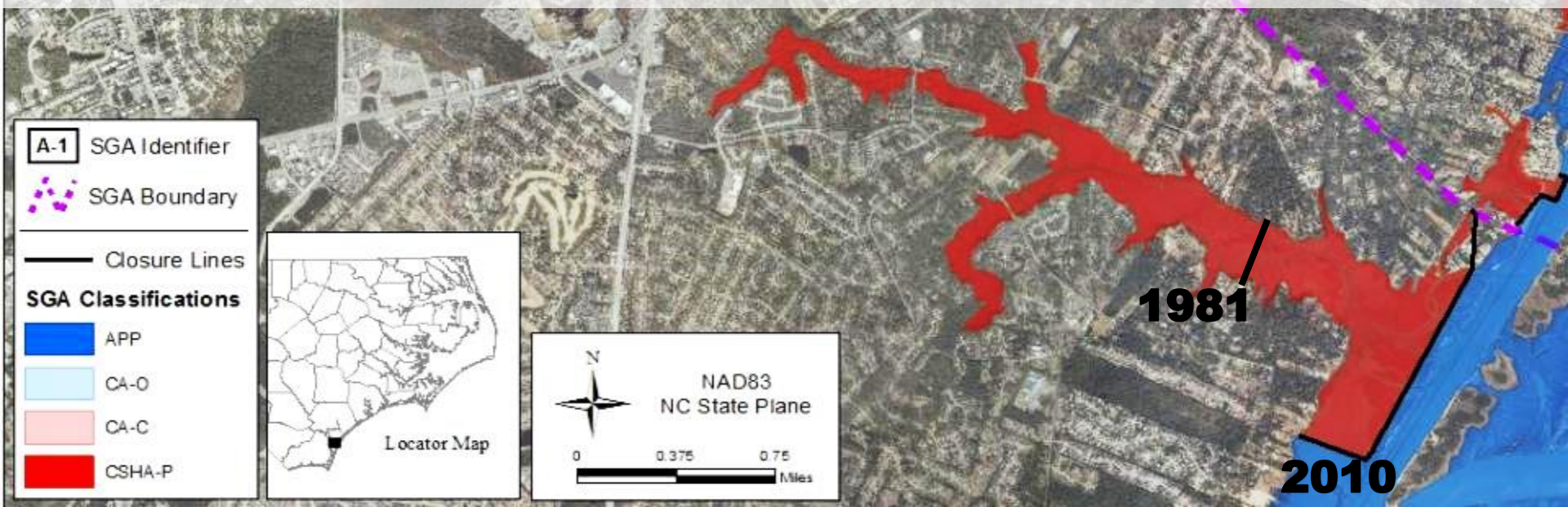
# ***Urban and Rural Land Uses Alter Natural Hydrology Result in Flooding and Surface Water Degradation***



# HEWLETTS CREEK WATERSHED 1-YR STORM HYDROGRAPHS



# CHANGES IN SHELLFISH CLOSURE BOUNDARIES

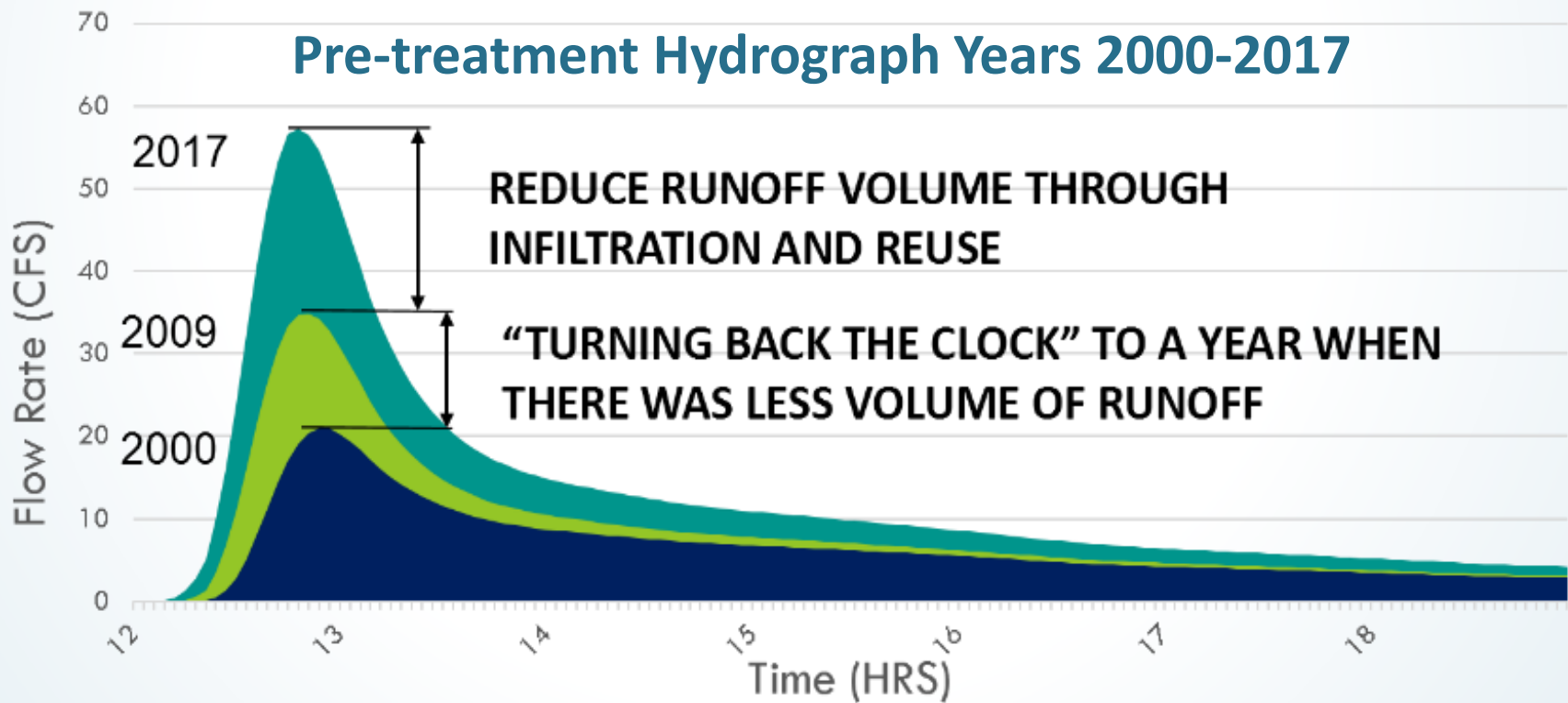




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## **Watershed Strategy**

Replicate natural hydrology by focusing on the watershed as a whole



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## **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:**

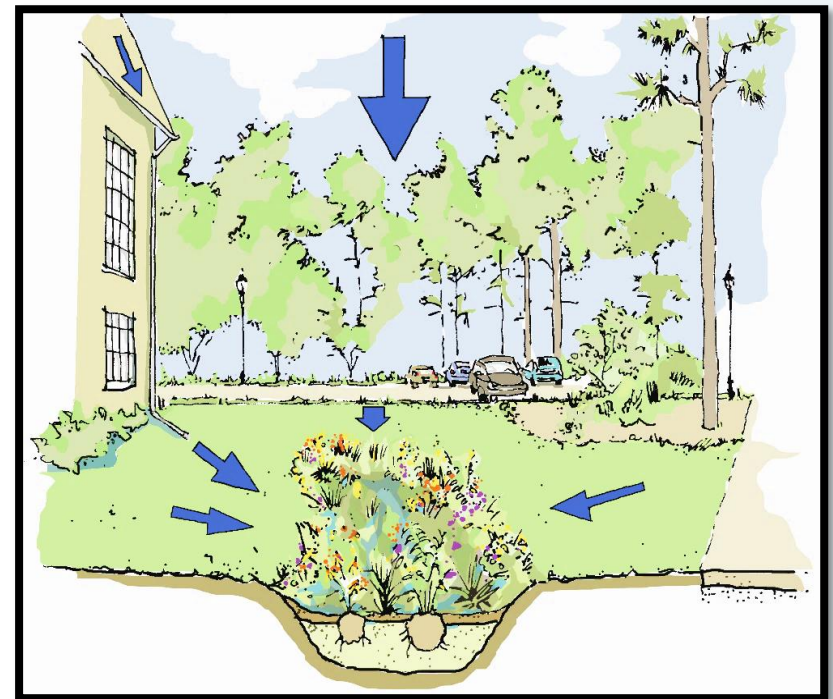
- Governor's Executive Order 80
- June 2019 Workshop
- Determined Need to Assemble Experts to Collaborate Toward Solutions
- Project Team Formed
- Work Groups Assembled



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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.



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## **Work Group Charge:**

- Evaluate current use of nature-based stormwater strategies, opportunities and need.
- Identify real and perceived impediments to using nature-based strategies.
- Formulate set of consensus recommendations for advancing nature-based strategies 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 Roadways***

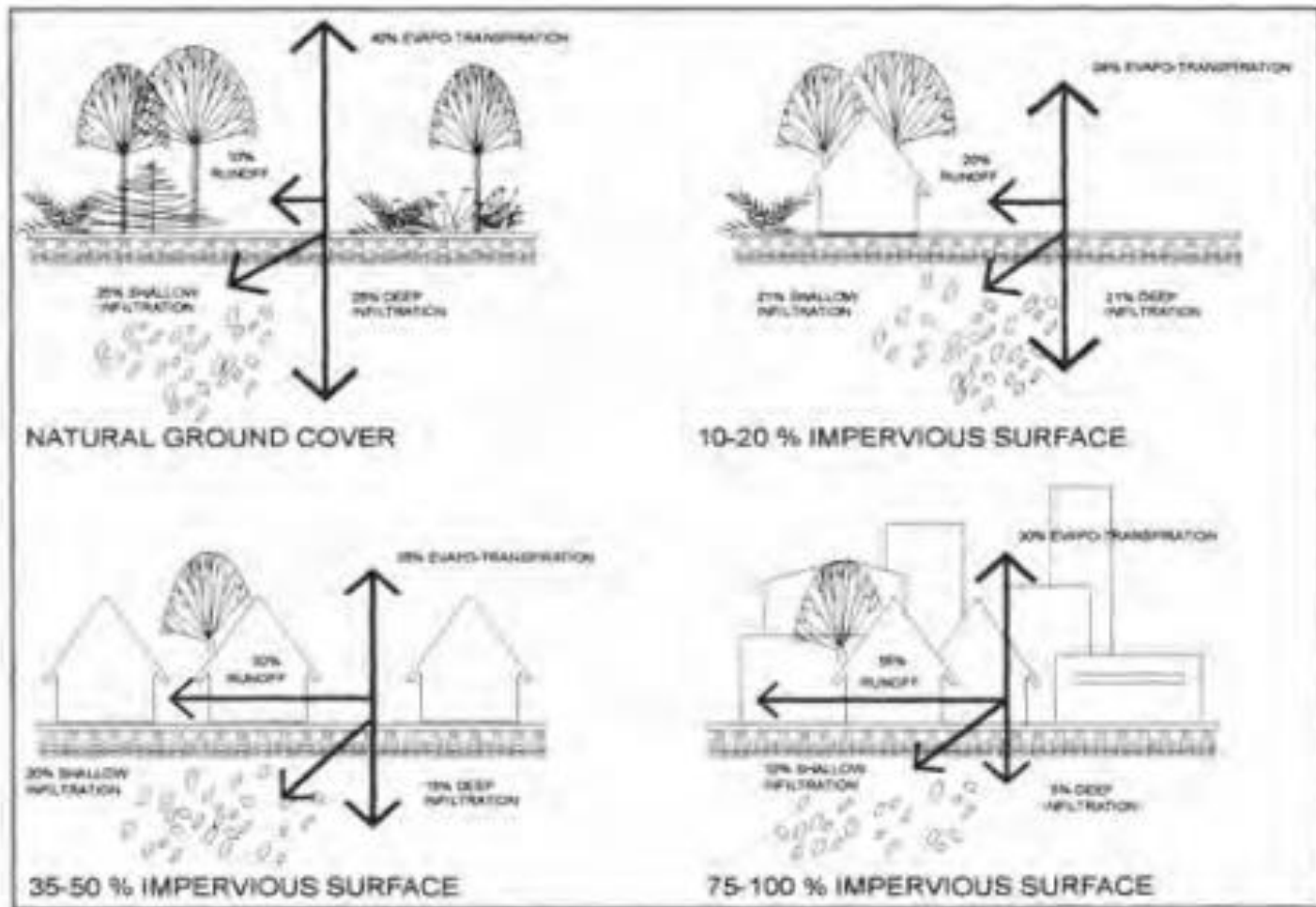
Nature-based stormwater strategies for highways, roads and streets utilize natural and built features to infiltrate and transport stormwater runoff, reducing its rate and volume.

Techniques like grassed roadside shoulders, sand filters, and others can reduce flooding and improve water quality by reducing the polluted stormwater runoff flowing into waterways.





# Nature-based Stormwater Strategies for Roadways



Goal is to maintain or replicate natural hydrology (rate and volume of runoff) to the extent practical.

## ***Nature-based Stormwater Strategies for Roadways***



The bioswale (*background*) infiltrates runoff from Hwy 211 and reduces pollutants entering the Lockwood Folly River while the bioswale outlet (*foreground*) structure captures overflow during heavy rain events.

## *Nature-based Stormwater Strategies for Roadways*



With a slight change to the landscaping and the addition of two curb cuts and a raised drain, runoff is directed into the grassy median where it soaks slowly into the ground reducing flooding and discharge to surface waters.

## *Nature-based Stormwater Strategies for Roadways*



Stormwater is directed into storm drains that flow into a grassed median where the rain soaks into the ground.

## ***Nature-based Stormwater Strategies for Roadways***



Stormwater is directed from the street to the grassed median. An overflow is raised to give the rain a chance to soak in.

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

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

## ***Opportunities***

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

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## ***Impediments***

- What are the impediments to implementing nature-based stormwater strategies on roadways?
  - Awareness?
  - Integrated Land Use Planning?
  - 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!