



# *Forestry Updates: USLE, BMPs, and FAP*

## **2021 North Carolina Erosion & Sedimentation Control Design Workshop**

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The N.C. Forest Service is a division of the N.C. Depart. of Agriculture & Consumer Services  
*Steve Troxler, Commissioner*





# Forestry Updates

**USLE:**        **Universal Soil Loss Equation** (Forest Version)

**BMPs:**        **Best Management Practices**

**FAP:**        **Forest Action Plan for North Carolina**

## How to Stay Updated:

“Water Quality” section of website, [www.ncforestservice.gov](http://www.ncforestservice.gov)

- Quarterly BMP Newsletter... FAQs about Logging... Laws & Rules Briefing Document... Statewide Contacts... BMP Manual... Training Videos... BMP Studies... etc.
- *Forestry Leaflets* on BMPs, Buffer Rules, forest management, bottomland swamps, longleaf pine, shortleaf pine, forest health.





# USLE: *Universal Soil Loss Equation (Forest Ver.)*

$$A = R (x) K (x) L (x) S (x) C (x) P$$

A: amount of soil loss/unit area

R: rainfall runoff factor

K: soil erodibility factor

L: slope length

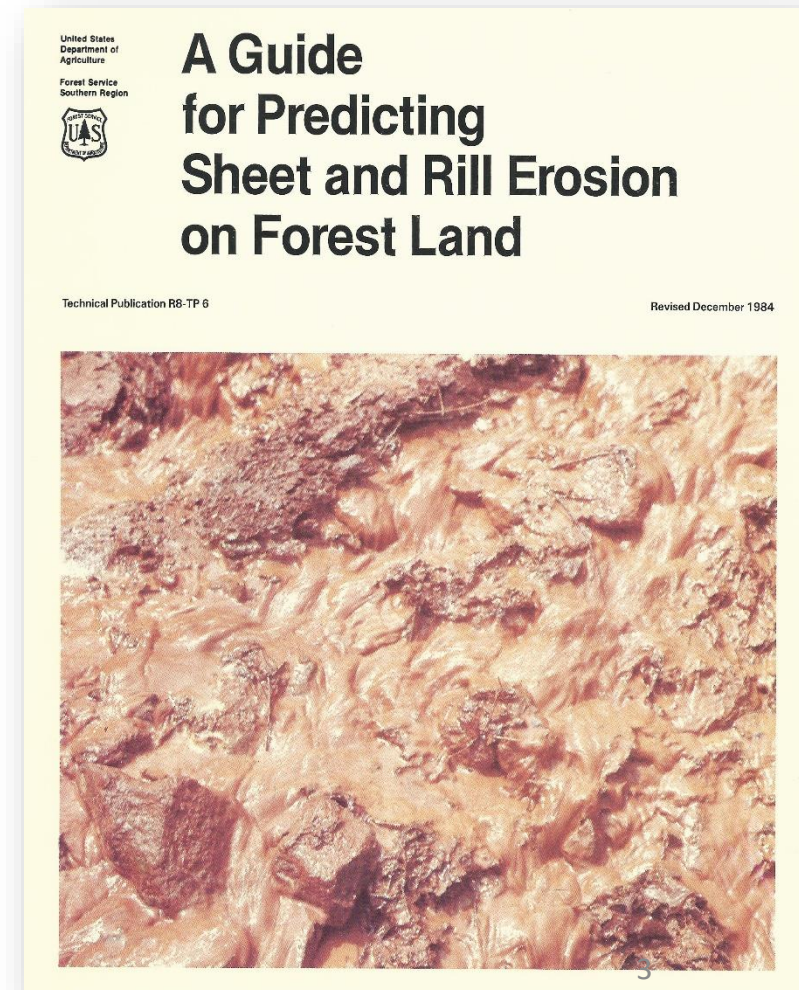
S: slope steepness

C: cover factor

P: practice factor

## Reference:

Dissmeyer & Foster  
(1984, USDA-Forest Service  
Tech. Pub. R8-TP-6)



# USLE-Forest, at Stream Crossings



- Assessed erosion potential on stream crossing approachways.
- Part of statewide site surveys of BMP monitoring, 2018-'20.
- Active or recently completed timber harvest sites.
- Estimated on-site....and Modeled a “No BMPs” scenario afterwards.

## Findings to be Published:

“Estimates of Soil Erosion and Best Management Practice Effectiveness at Forestry Stream Crossings in North Carolina.” Lang, A.J., et.al.  
*Journal of Soil and Water Conservation*. In-press.





# USLE-Forest, at Stream Crossings



Assessed 434 approachways, on 117 tracts, in 73 counties.

## Type of Access

245 overland skid trail

127 bladed skid trail

62 haul road

## Type of Crossings

282 bridgemat

102 culvert


32 ford

16 pole/logs

2 other/unknown








**Estimated:**  
**(Gravel BMP)**  
 $A = 37.8 \text{ t/a/y}$





**Estimated:  
(Gravel BMP)**  
A = 37.8 t/a/y

**BMP Efficiency:**  
=  $[(86.8 - 37.8) / 86.8] * 100$   
= 56%

**Modeled "No BMP":  
(2x slope length factor)**  
A = 86.8 t/a/y



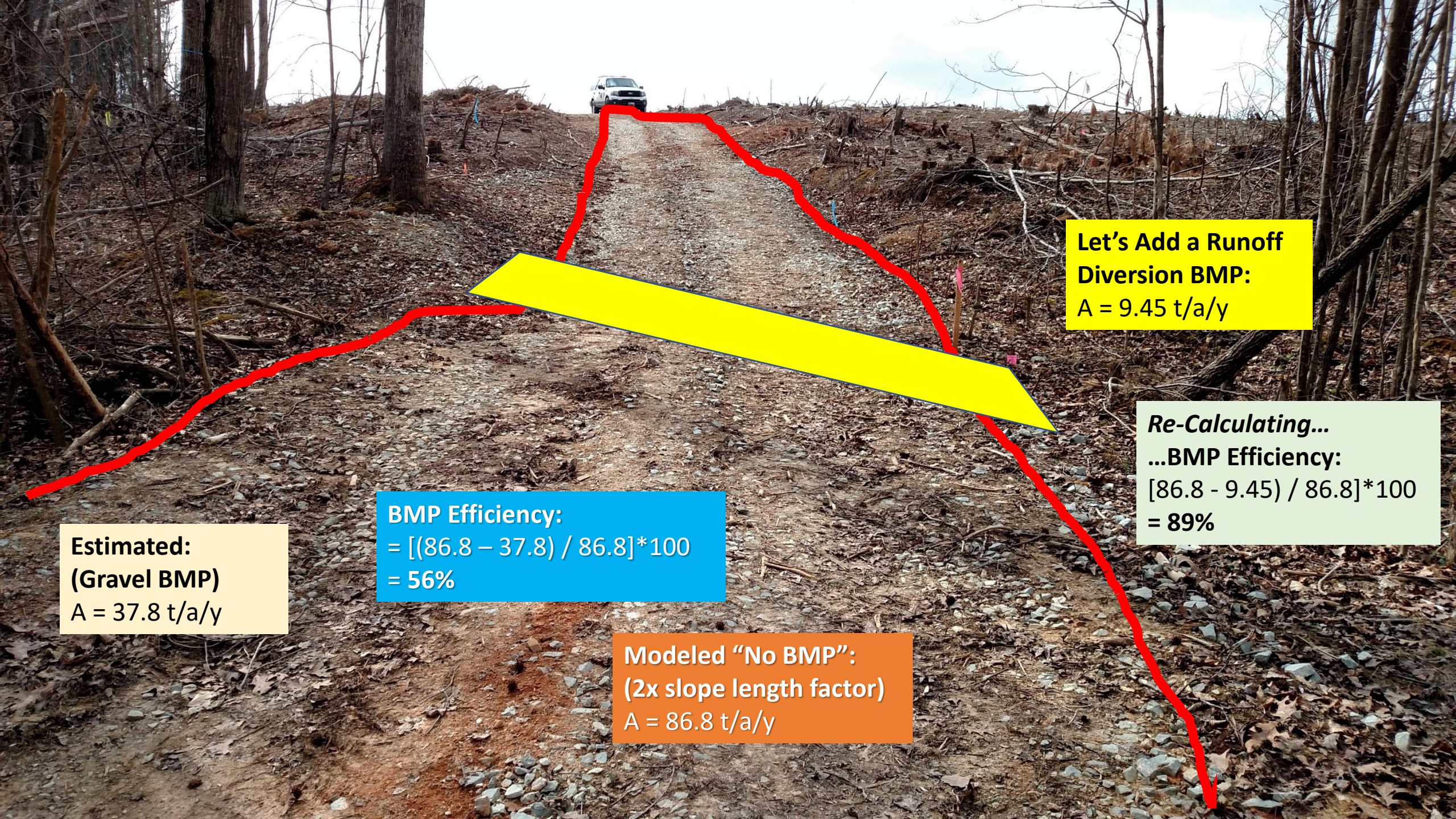
**Estimated:  
(Gravel BMP)**  
A = 37.8 t/a/y

**BMP Efficiency:**  
=  $[(86.8 - 37.8) / 86.8] * 100$   
= 56%

**Modeled "No BMP":  
(2x slope length factor)**  
A = 86.8 t/a/y

**Let's Add a Runoff  
Diversion BMP:**  
A = 9.45 t/a/y

**Re-Calculating...**  
**...BMP Efficiency:**  
=  $[86.8 - 9.45] / 86.8 * 100$   
= 89%







High Amount of Cover,...  
Very Short Slope Length,...  
Low Slope Angle.  
= High BMP Effectiveness.

Forestry BMPs may often look 'messy' and are not intensively engineered structures... but are still effective.

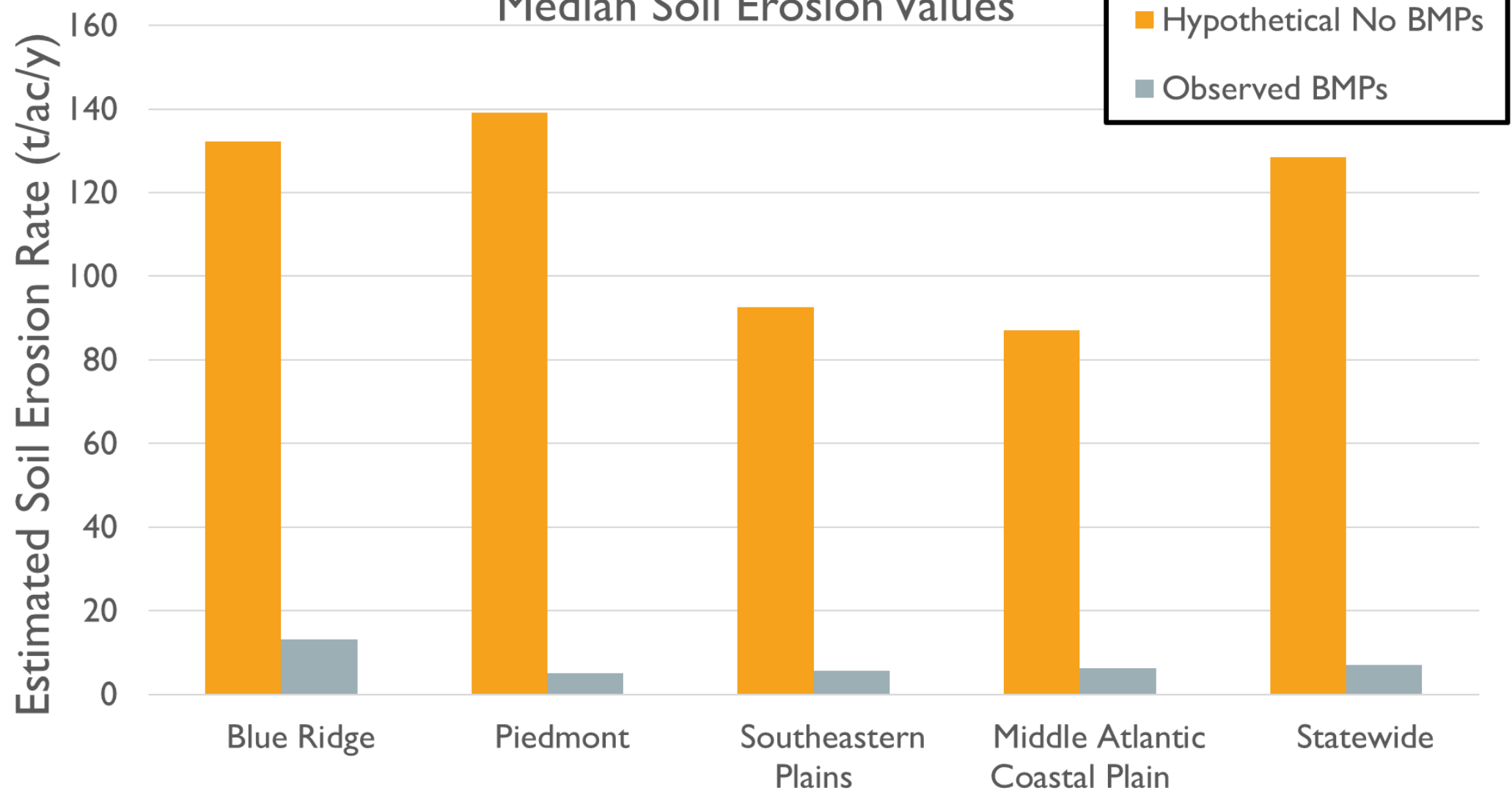
Even with 100's of crossings that "look like this"...there is very low erosion rates.



# USLE-Forest, at Stream Crossings



### Median Soil Erosion Values



North Carolina Ecoregions





# Forestry BMPs:

# Best Management Practices

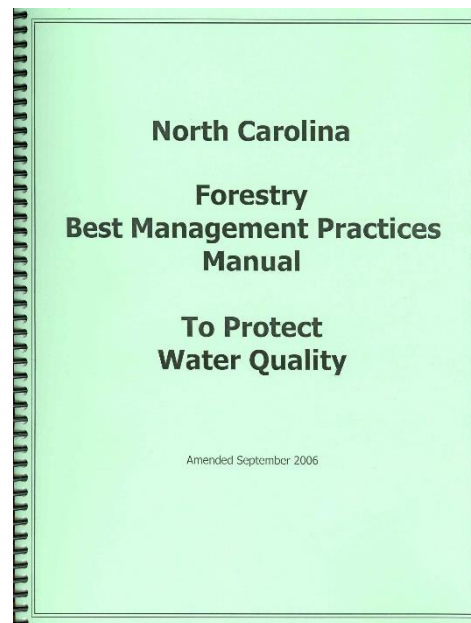
**N.C. SPCA:** Sedimentation Pollution Control Act

**FPGs:** Forest Practices Guidelines Related to Water Quality, 02 NCAC 60C

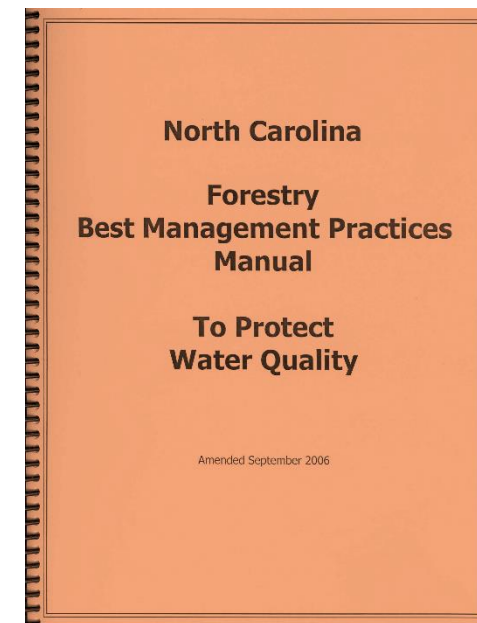
*(required statewide, narrative performance standards)*

**BMPs:** Best Management Practices

*(recommended measures to help comply with FPGs, etc.)*



2006



2021



# Forestry BMPs



- First update since 2006
- Modest revision: ~25% changed
- 2+ year review & revision process
- Engaged w/stakeholders and Forestry TAC
- Driven by findings from studies and monitoring
  
- Make connections with emerging issues:
  - *Climate-related resiliency*
  - *Aquatic T&E species habitat*
  - *Heightened awareness of wetlands*





**New**

## Notable Revisions Related to E&SC

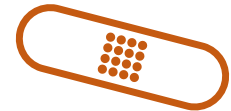


- Standardize recommended SMZ (stream buffer) = 50 ft. [each side].
- Minimum acceptable SMZ width = 20 feet.



- Encourage using the stream as a natural fire-break when doing prescribed fire; minimize soil disturbance along stream.

- Rolled erosion control products: wattles and matting.



- 'Rolling Dip' as a runoff diversion.

- BMPs for logging in bottomland swamp forests.



- BMPs for maintaining drainage ditches.







# **FAP: Forest Action Plan**

## **for North Carolina**

- Every 10 years, each state produces its Action Plan
- Similar to state's Wildlife Action Plan
- Approval by USDA-Forest Service
- Intended as all-inclusive of the forest resources, issues, & needs... Not just the state forestry agency's
- First FAP: 2010-2020
- Second FAP: 2021-2030



# Forest Action Plan



Within 3 national themes, NC has 5 Goal Statements:

## *Goal #4: Manage and Conserve Forests for Clean Water.*

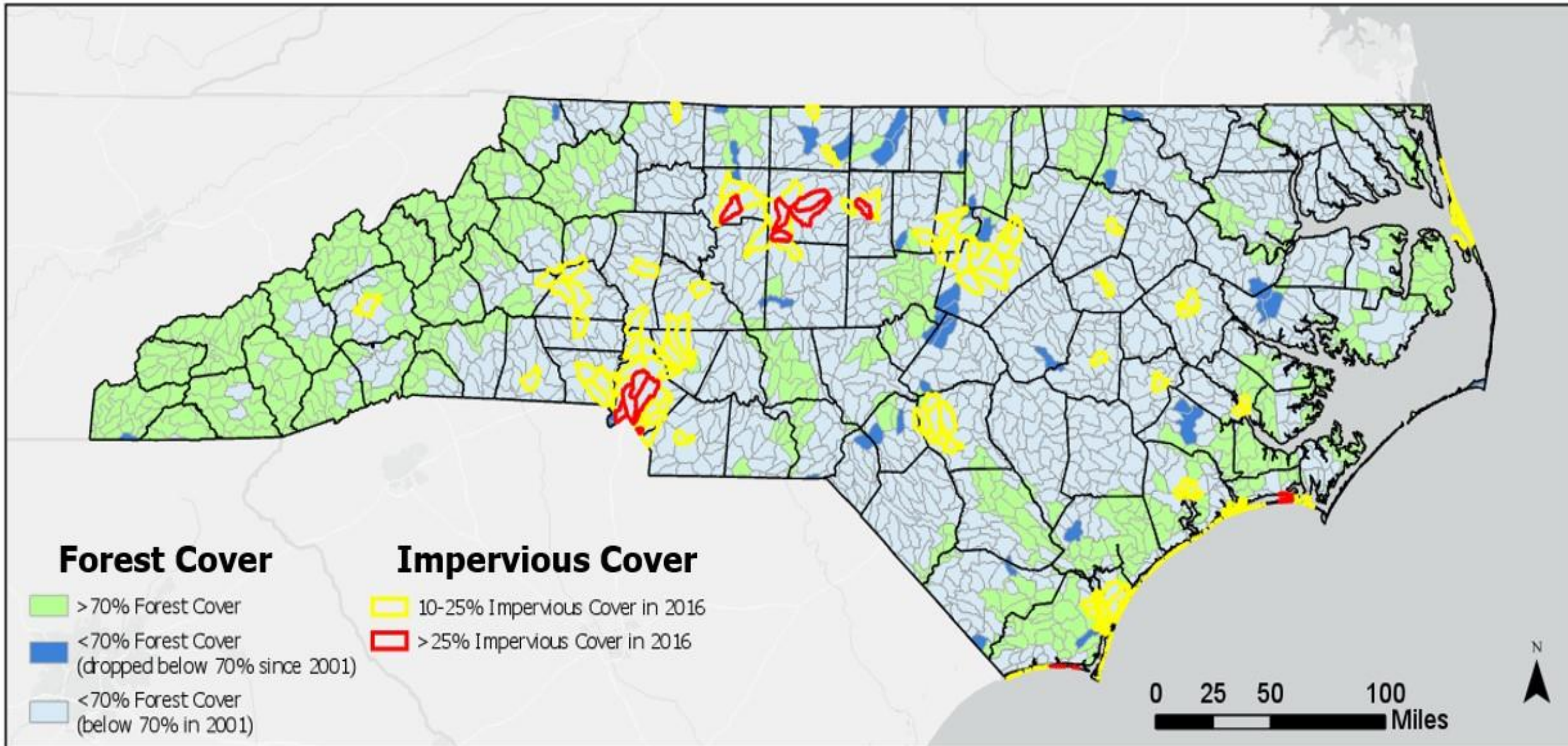
- Objective 4.1: Continue to identify and advance the drinking water, stormwater management, and related ecosystem services benefits that are derived from forests.
- Objective 4.2: Strive for continuous improvement in the implementation of BMPs.

[www.ncforestactionplan.com](http://www.ncforestactionplan.com)



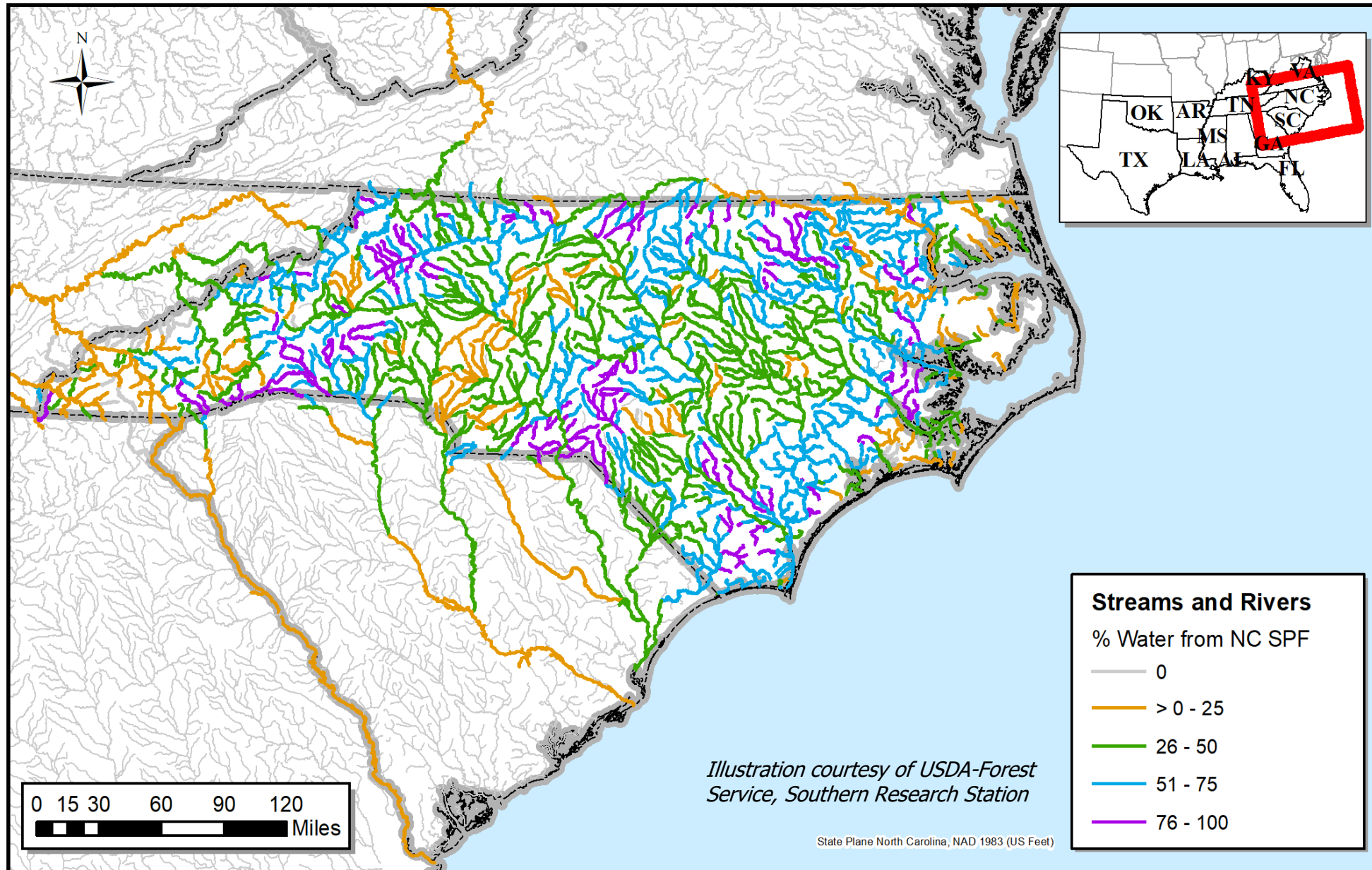


# Forest Action Plan





# Forest Action Plan



Analysis by the U.S. Forest Service indicates that 45% of NC's surface drinking water gets its source from state- or private-owned forestland.

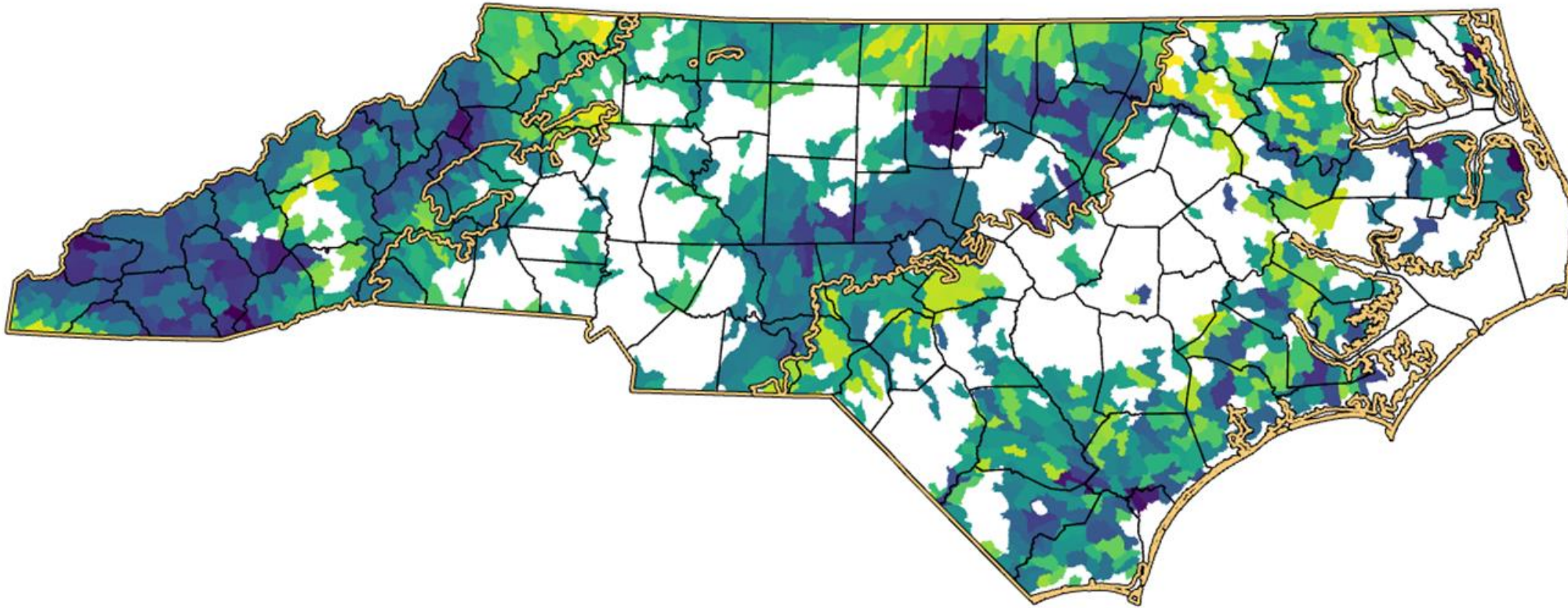
Reference Source:  
<https://www.fs.usda.gov/treearch/pubs/59645>



# Forest Action Plan



## Priority Forested Watersheds: Statewide Overview



 Ecoregions

Lower Priority  Higher Priority

Note: This map shows the 12-digit USGS hydrologic units with at least 50% forest cover. Watersheds with less than 50% forest cover were not classified.

The Forest Action Plan also has a zoomed-in priority map for each of the 3 major eco-regions.

This analysis also includes considerations of groundwater.



# Coming Soon...

[www.ncforestservice.gov](http://www.ncforestservice.gov)

*Programs & Services >>>  
Water Quality...*



- ✓ 2021 Year in Review
  - ✓ New Forest/Water Educational Workbook
  - ✓ Revised BMP Manual
  - ✓ USLE Study Journal Article
  - ✓ 2018-2020 Statewide BMP Monitoring Survey Report
  - ✓ Revised Forestry BMP Field Guide
- Look for quarterly BMP newsletter**



# On Behalf of the Conference Organizers...



Please Remember to Complete the End-of-Workshop Evaluation

<https://bit.ly/2021EscEval>



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