FORESTRY BMP IMPLEMENTATION SURVEY

NORTH CAROLINA FOREST SERVICE

WATER QUALITY & FORESTRY

- Unlike some other industries, silvicultural operations do not require erosion control plans or NPDES inspections.
- But there are still rules!
  - Forest Practice Guidelines (FPG) related to Water Quality (under SPCA)
  - NC GS 77-13 & 14: Restricts stream and drainage ditch obstructions
  - Riparian Buffer Rules
  - Federally required BMPs for working in wetlands
- The NCFS produces the BMP manual for forestry operations and conducts compliance inspections for FPGs.
- Loggers and/or landowners chose which BMPs to use on their site based on conditions.

SURVEY PURPOSE & GOALS

NCFS's Water Resources Branch assesses BMP implementation on forestry tracts across the state.

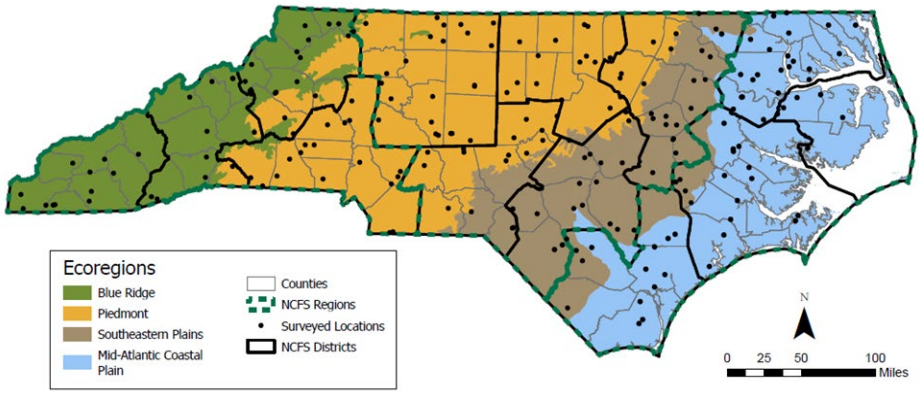
The goal was to identify the rate of BMP implementation and potential risks to water quality.

Survey questions were based on BMP recommendations found in the North Carolina Forestry BMP Manual (2006 version).

TRACT SELECTION METHODS

TRACT ELIGIBILITY

- 5+ acre tract size
- Waterbody within or adjacent to the tract
- Operationally active or active within 6 months
- No evidence of land use conversion



- 216 tracts were surveyed from 2018-2020.
- ≥1 surveys collected in 98 out of 100 counties.
- An iterative tract selection method was used to prevent bias.
  - Randomly selected from a list of sites identified using SouthFACT.
  - Randomly selected from list of NCFS inspected sites.
  - Discovered opportunistically while traveling.

SAMPLE SIZE & DISTRIBUTION

DATA COLLECTION

- Survey123 and ArcCollector were used to collect data on 12 BMP categories.
  - Capturing Sediment & Runoff
  - Skid Trails
  - Decks
  - Logging Systems
  - Wetlands
  - Rehabilitation of the Project Site
  - Chemicals, Fluids, and Solid Waste
  - Firelines
  - Roads and Access
  - Site Prep & Reforestation
  - Stream Crossings
  - Streamside Management Zones (SMZs)
- Background information was also collected (tract size, location, harvest type, etc.)
- Location/length of streams and SMZ width.

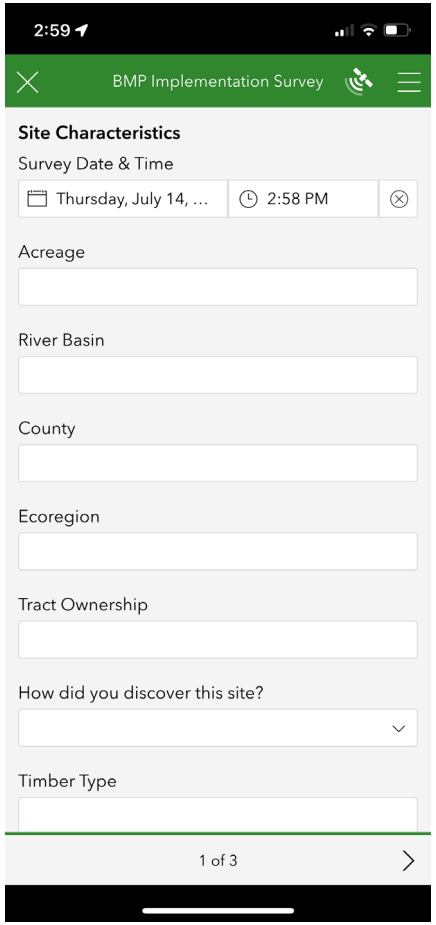
SURVEY RESPONSES WERE BINARY

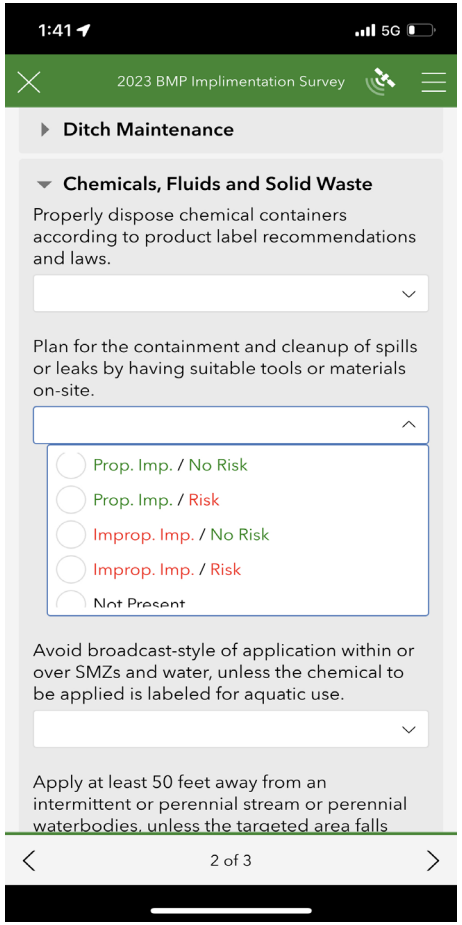
BMP IMPLEMENTATION

Yes, the BMP was properly implemented.

OR

No, the BMP was not properly implemented.





RISK TO WATER QUALITY

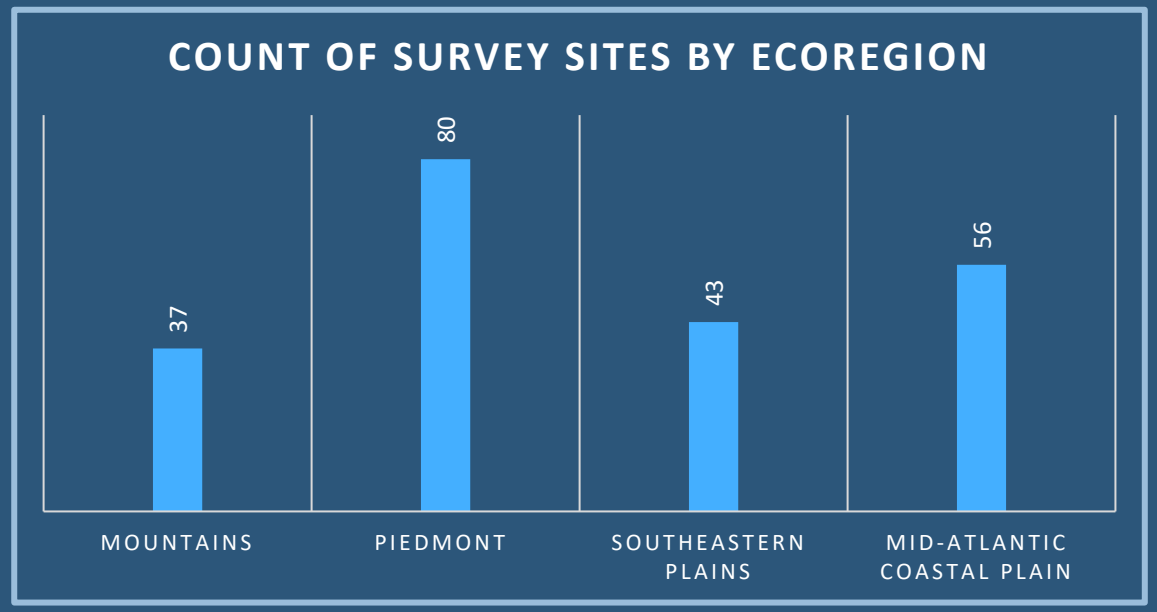
Yes, there is a risk to water quality

OR

No, there is not a risk to water quality.

RESULTS: STATEWIDE OVERVIEW

- A total of 31,472 BMPs were assessed statewide.
- The statewide implementation rate was 83%.
- Almost no recorded risks to water quality with proper BMP implementation.
- When BMPs were not implemented or implemented improperly there was risk to water quality in 13% of cases.



STATEWIDE OVERVIEW: HIGH PERFORMING CATEGORIES

HIGH BMP IMPLEMENTATION

- Categories with implementation rates above 90%:
  - Decks
  - Streamside Management Zones

- Categories with frequency of risk under 1%:
  - Decks
  - Logging Systems
  - Skid Trails
  - Controlling Erosion & Runoff
  - Site Preparation*
  - Wetlands*

LOW RISK TO WATER QUALITY

*Few observations in this category.

STATEWIDE OVERVIEW: LOW PERFORMING CATEGORIES

LOW BMP IMPLEMENTATION

- The categories with 30 or more observations and implementation rates below 80%:
  - Capturing sediment and runoff
  - Skid trails

- Categories associated with the highest frequency of risk:
  - Stream crossing
  - Rehabilitation
  - SMZs when BMPs improperly implemented.

HIGH RISK TO WATER QUALITY

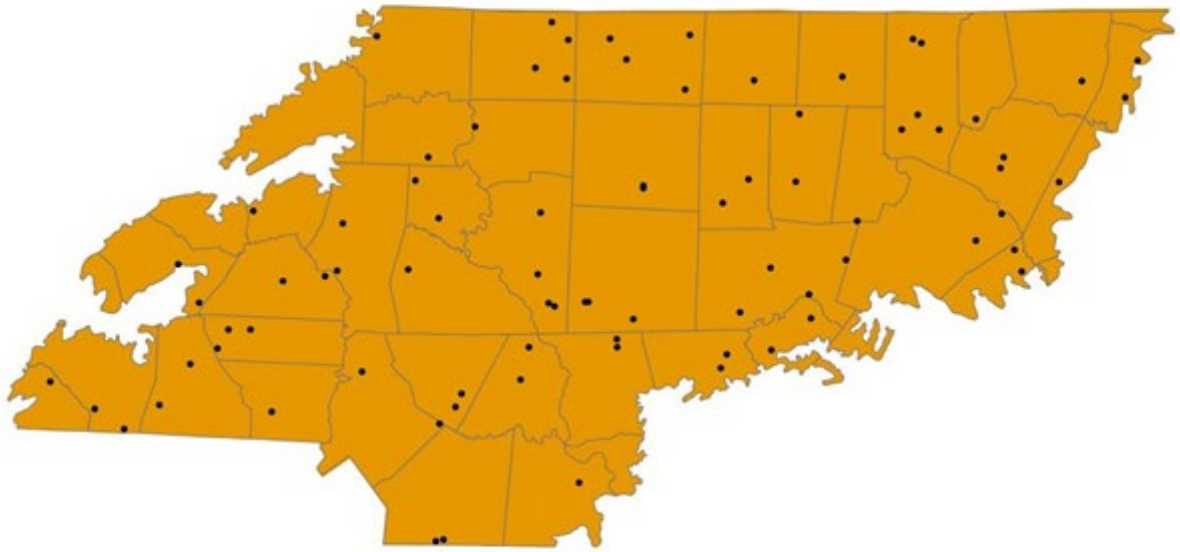
RESULTS: MOUNTAINS

- 76% implementation rate (lowest of all ecoregions).
- Lowest rate of risk both overall (1%) and from improperly implemented BMPs (4%).
- Skid trail category had lowest implementation rate (58%)*.
  - Steeper slopes
  - More bladed skid trails
  - Lack of cover
  - Excessive # of skid trails.

*Lowest of the categories with more than 30 observations.

RESULTS: PIEDMONT

- BMP implementation rate of 84%
- Highest rate of risk both overall (3%) and from improperly implemented BMPs (18%).
- Skid trails had the lowest implementation rate* at 74%. Road access was second lowest at 79%.
  - Lack of erosion control measures used
  - Poor or excessive skid trail locations
  - Lack of BMP maintenance/improvements for legacy roads and skid trails.
  - Place roads and skid trails away from gullies and ephemeral channels.



*Lowest of the categories with more than 30 observations.

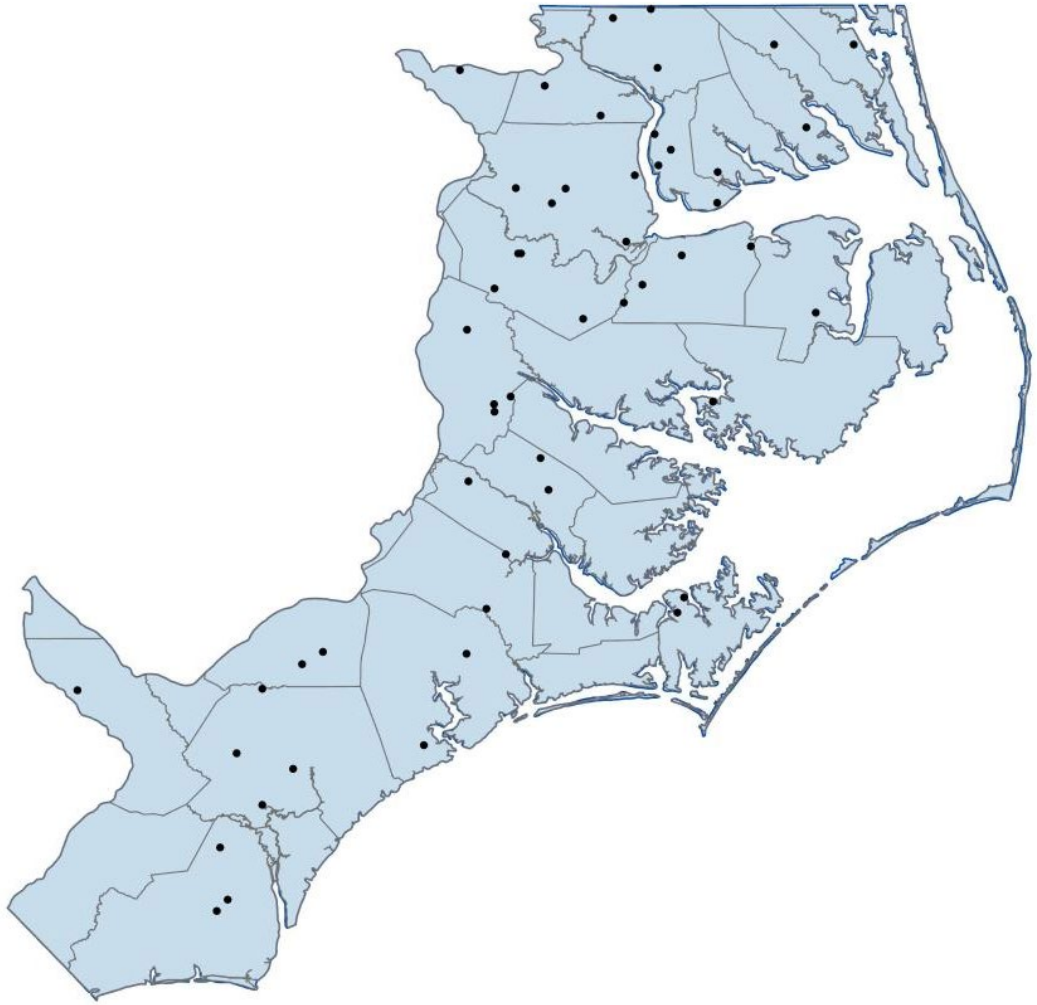
RESULTS: SOUTHEASTERN PLAINS

- Highest overall implementation of 89%.
- Second lowest rate of risk both overall (1%) and from improperly implemented BMPs (10.5%).
- Site rehabilitation scored lowest on implementation (81%)*.
  - Debris in channels at stream and ditch crossings.
  - Fine sand and silts common in this region can be problematic as a road base, especially when not properly compacted.

*Lowest of the categories with more than 30 observations.

RESULTS: MID-ATLANTIC COASTAL PLAIN (MACP)

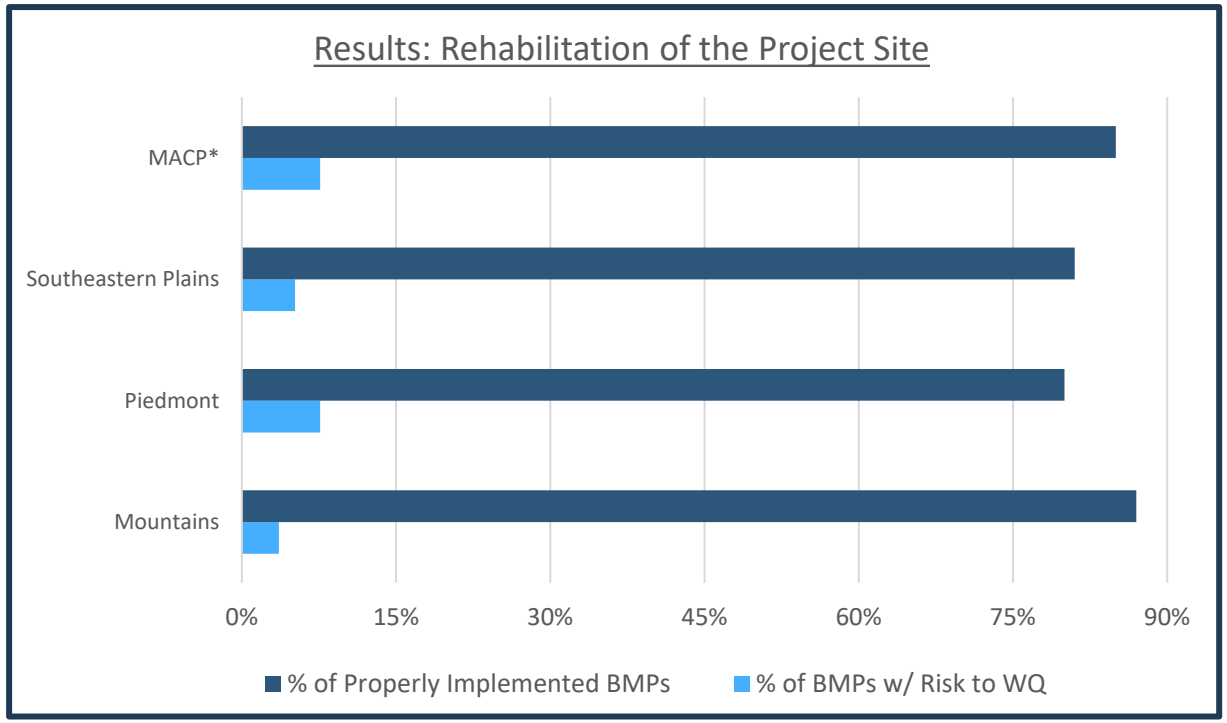
- BMP implementation rate was 87%.
- Risks observed 2% of the time, and 13% when BMPs were improperly implemented.
- Site preparation had the lowest implementation (69%)
  - Water ponding when no gaps present between beds.
  - Large contiguous areas of bare soil.
- Logging systems had 75% implementation.
  - Cease operations during wet weather to prevent rutting or use low ground pressure equipment.
  - Identify and plan for permanently wet areas



*Lowest categories with more than 30 observations.

RESULTS: SITE REHABILITATION

- 1,778 individual BMPs assessed for this category.
- When rehab BMPs were properly implemented there was no risk to water quality 99% of the time.
- When not implemented there was risk 36% of the time.



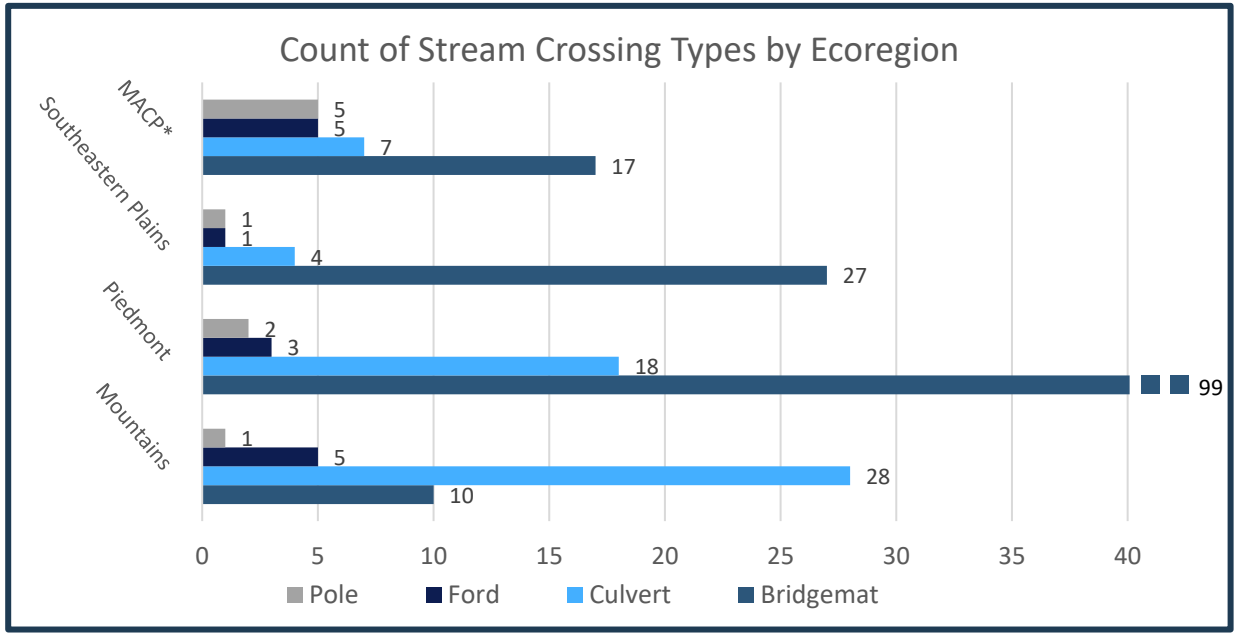
MACP: Mid-Atlantic Coastal Plain

Areas for Improvement:

- Removing debris from the channel at stream crossings.
- Stabilizing bare soil areas in order to prevent sedimentation at and around stream crossings.

RESULTS: STREAM CROSSINGS

- 4,624 BMPs were assessed statewide.
- Soil erosion was estimated from stream crossing approach ways and published separately in a peer-reviewed journal article (Lang et al. 2022).
- Implementation for this category was 87%.
- Highest risk category when BMPs were improperly implemented. No risks when BMPs were properly implemented.



Areas for Improvement:

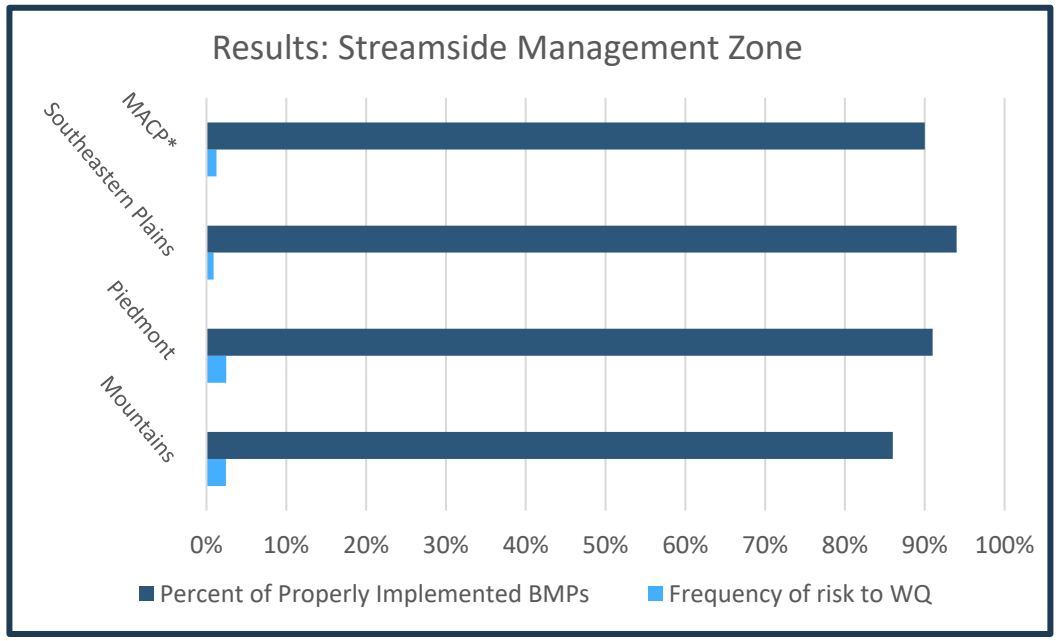
- Culverts had highest count of risk, but intermediate frequency of risk.
- Ford crossings had the highest frequency of risk.
- Allow floodwaters to flow around crossing structure.
- Stabilize approach ways

RESULTS: STREAMSIDE MANAGEMENT ZONES (SMZ)

- 8,086 BMPs assessed statewide.
- No risks when BMPs properly implemented. When not implemented, there was risk 21% of the time.
- Successful SMZs were wider on average than those where risks to water quality were observed.

Areas for Improvement:

- Minimize disturbance of soil / groundcover within ephemeral channels.
- Maintain half of pre-harvest canopy cover within SMZ.
- Avoid roads, skid trails, decks, and portable sawmills in the SMZ.



MACP: Mid-Atlantic Coastal Plain

CONCLUSIONS

BMPs are extremely effective at reducing water quality risks.

Observed risks to water quality were relatively infrequent (~2%).

Remember, clearcut acreage is not the same as bare soil area!

In many cases, even when BMPs were forgotten or incorrect, a risk to water quality was unlikely.

Please remember to complete the End of Workshop Evaluation.

https://bit.ly/2022EscEval

QUESTIONS?

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