

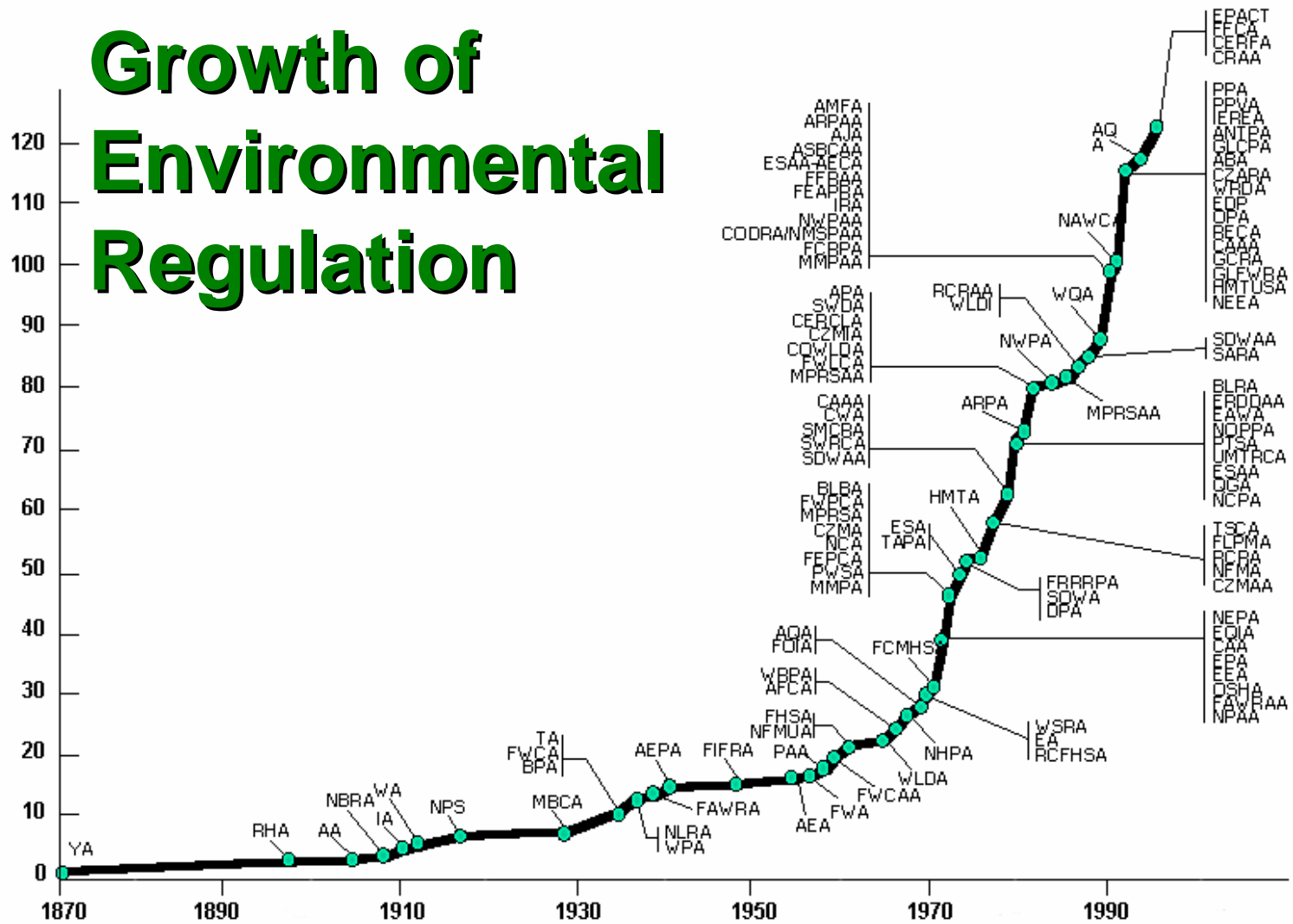


Evaluating the Implementation & Effectiveness of BMPs for Water Resource Protection

**NA Regional BMP
Monitoring Protocol**



Growth of Environmental Regulation



Legal Aspects of Water Resource Protection

- Clean Water Act (as amended 1987)
- Sec 319/404 Silvicultural exemption
- TMDLs (Total Maximum Daily Loads)
- State Forestry WQ Programs. BMPs as the principal means of NPS Control
- Burden of Proof: Monitoring remains the most important evidence of a State's compliance with and enforcement of the Clean Water Act.



Why does anyone care about forestry?



- Silviculture is identified as a minor source of NPS pollution
 - *But studies show that erosion and sedimentation do occur on a proportion of logging jobs*
- Impacts are limited in spatial and temporal effect
 - *But there can be serious localized impacts, impacts may occur at critical times of year or in critical areas – TMDLs/drinking water supplies*
- Simple cost-effective BMP's are shown to be effective
 - *But, States lack monitoring data to document the ongoing success of their efforts*



Burden of Proof: BMP Monitoring

Because the avoidance of pollution is not voluntary!



✓ Did you do it?

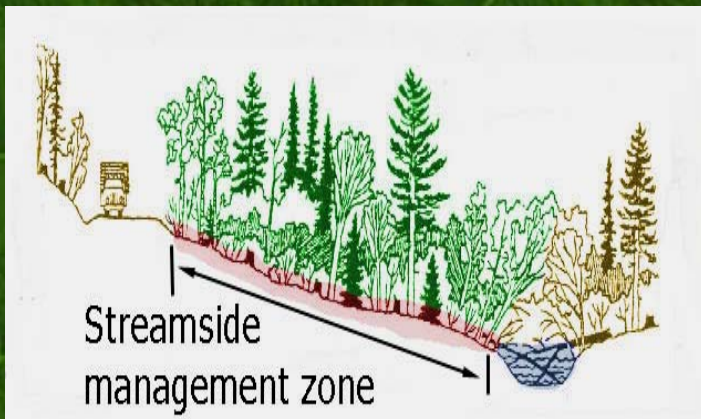


✓ Did it work?

Monitoring is a feedback mechanism to improve implementation



Implementation: Did you do it?



- Inspections of individual BMP use and/or installation technique
- Failure to install a BMP may or may not be considered noncompliance in these monitoring strategies.
- In most states, complaints are still the primary method for detecting BMP failure.

Effectiveness: Did it work?



- Problem identification (Yes/No) studies assess the relative magnitude of success or failure
- Scientific watershed studies of pre and post harvest
- Paired Watershed Studies
- Individual practice effectiveness design studies



In its 1994 National WQ Assessment, EPA noted that *“until some consistent, baseline monitoring exists over a wider area, the benefits of forestry protection programs will continue to be defined by anecdotes rather than data.”*

In 2001, NCASI reported, *“After two decades of effort, it would seem that the easiest problems have been solved...boosting and maintaining BMP compliance will be more difficult. This points to a critical need for regular periodic field surveys of compliance....”*

In 2005, NASF reported that *“only half of states perform regular monitoring of BMPs...and methods varied widely. Monitoring is crucial both to determining the level of BMP effectiveness and pinpointing the need for improvement*



What is needed?



- Reasonable Assurance (of compliance)
 - Regular assessment
 - A measure of effectiveness
 - Quantitative data
 - Comparability (ability to use in regional & national reporting)
 - Consistency/Reliability
 - Ability to utilize in TMDL
- Ease of Use



*A BMP Monitoring Protocol for Protection of Water Resources **



**Original Concept: Roger Ryder and Tim Post, Maine
Forest Service**

**Project Manager: Dave Welsch, NA Watershed Specialist
USFS Northeastern Area**

**Information System: Dr. Paul Barten & Kristine Ferarre
University of Massachusetts**

**a cooperative effort of the USDA Forest Service-NA and the NAASF
with funding from State and Private Forestry and the US EPA*



Goals & Benefits of the Protocol Project

- Document the use and effectiveness of BMPs in protecting water resources during forest harvesting operations.
- Document the degree of compliance with the Clean Water Act as well as the, the Coastal Zone Management Act and various state laws and regulations.
- Create consistency and comparability among individual state monitoring efforts in order to foster greater confidence in results and allow evaluation and reporting at a variety of geographic scales.
- Facilitate cost-effective self assessment of water resource protection efforts by States, industry and other forestry organizations and encourage wider use and greater frequency of monitoring.

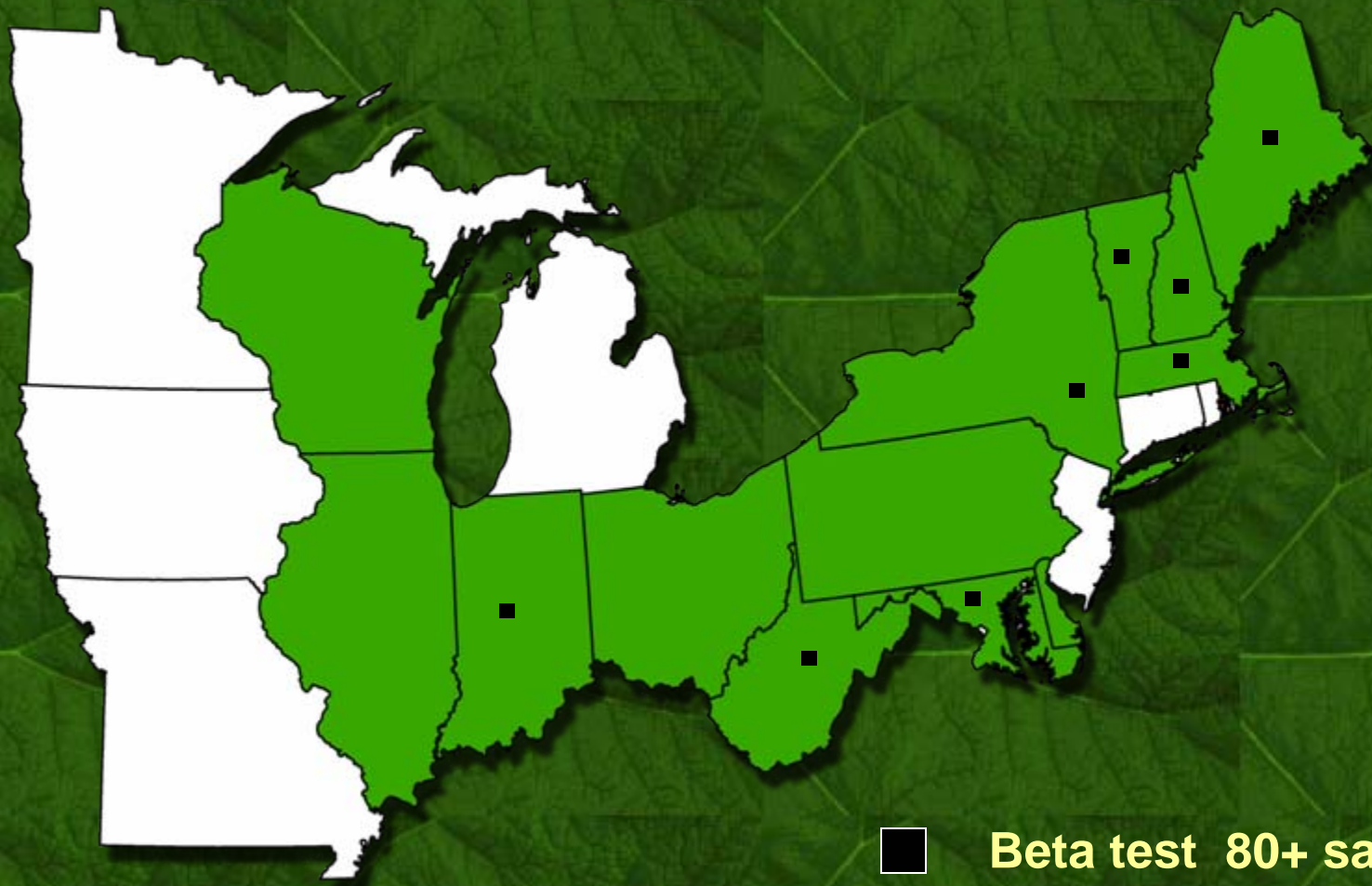


Additional benefits

- Respond to public concerns regarding the potential effects of timber harvesting based on measured evidence as opposed to observation and anecdotal assessments
- Assess water resource protection based on effectiveness of a suite/collection of BMPs as opposed to documenting the use of individual practices.
- Identify opportunities for improvement in water resource protection by identifying causes of BMP failure and reinforcing BMP training programs and improvement of BMP specifications
- Document water resource protection needed to facilitate Green certification.



Development & Testing: 2003-2006

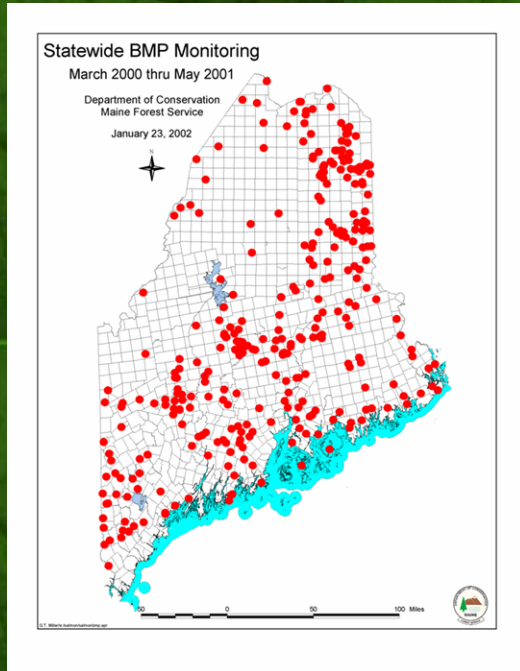


Field Protocol Components

- **Standardized Field Monitoring Procedure**
 - ✓ Branched Question set
 - ✓ Discrete Geo-referenced sample units
 - ✓ Automated data collection
 - ✓ Single assessor – single visit sampling procedure
 - ✓ Quality control re-sampling
 - ✓ Site and operator associated risk assessments
- **State maintains control of**
 - ✓ **BMP Specifications**
 - ✓ **Sample design and quality control**
 - ✓ **Monitoring Team**
- **Timber sale operators**
 - ✓ Select efficient, economical practices based on effectiveness and site conditions not rules



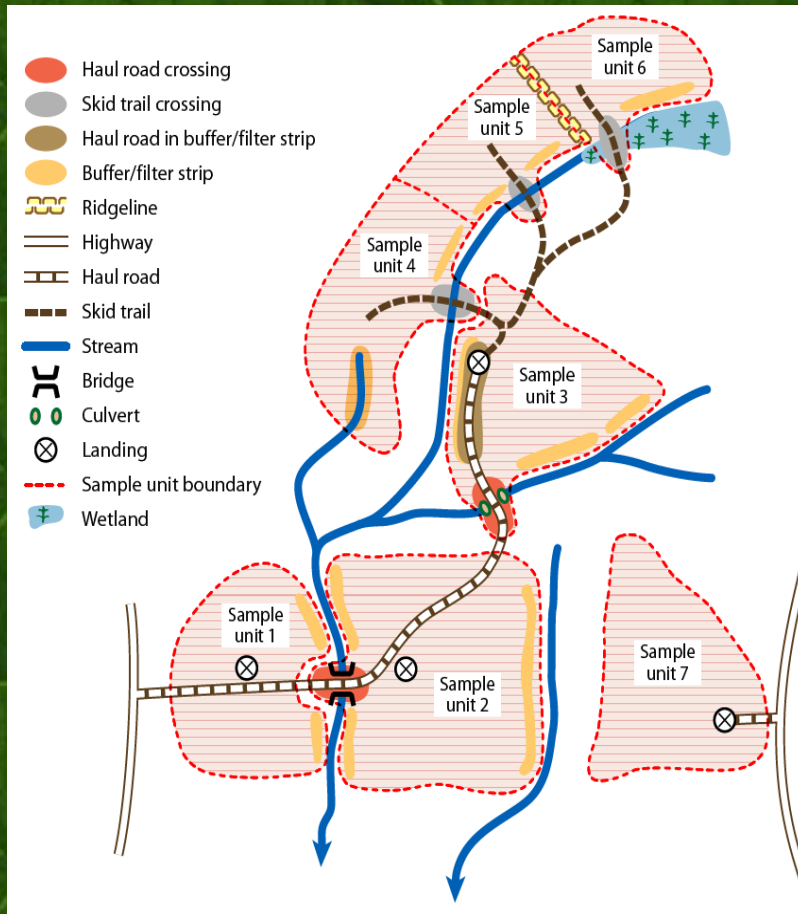
Geo-referenced Sample Locations



- Windows software for pocket PC's permits use of inexpensive portable data collection devices
- Geographical unit summaries

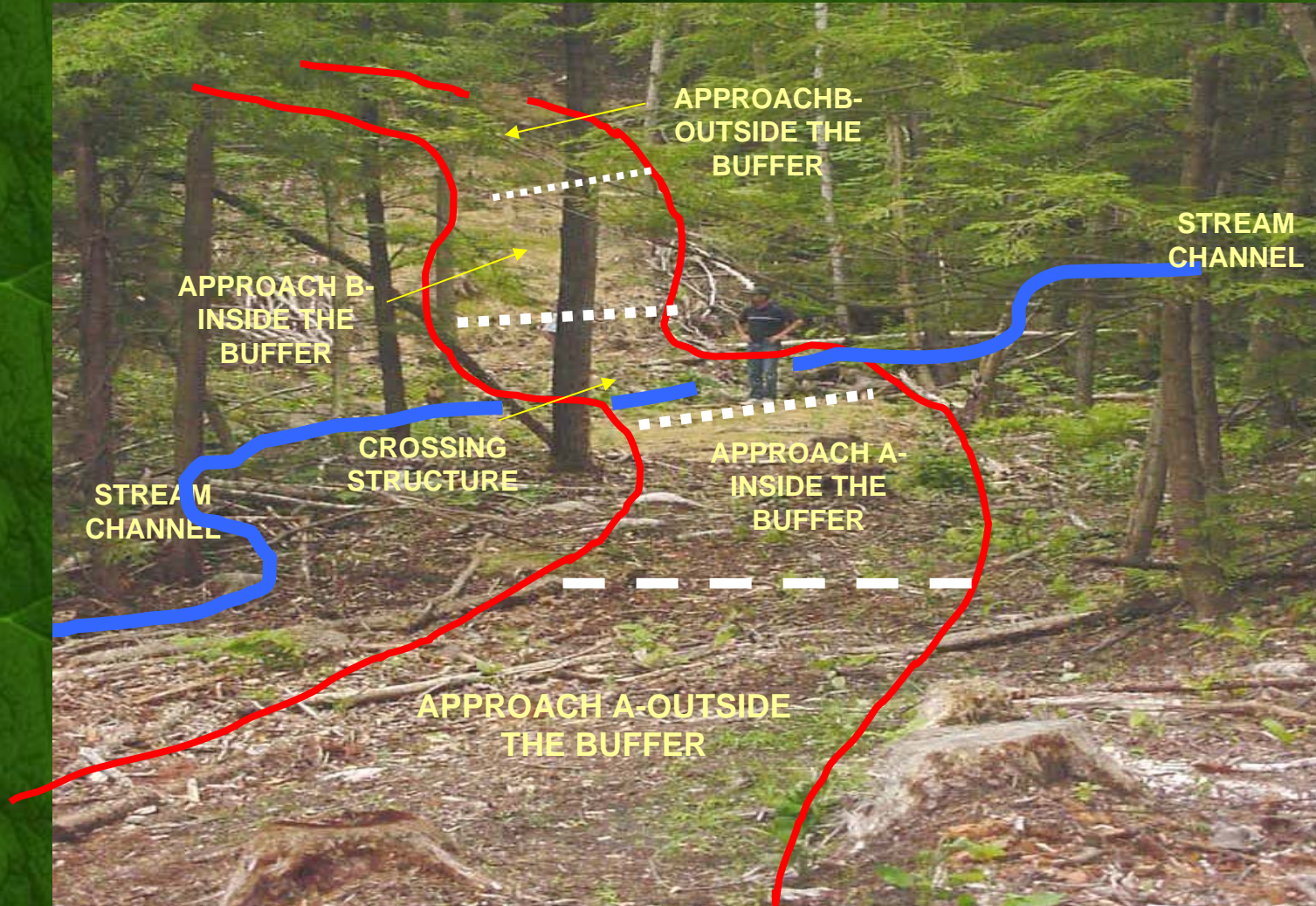


Discrete Sample Units



- Sample locations are randomly selected by States from tax or other records
- Measures evidence and eliminates averaging results
- Focus on areas having the greatest potential to impact water quality -crossings and riparian areas – increasing effectiveness

Crossing Sites Provide Five Opportunities to Observe and Record Soil Movement



Based on the Principles of Water Resource Protection

- Planning the operation
- Controlling water flow
- Stabilizing disturbed soils
- Managing chemical pollutants
- Minimizing biological impacts



Principles vs Practices

- Water flow control is a principle
- Practices used for water flow control
 - Water bars/Diversions
 - Cross drainage culverts
 - Broad base drainage ditches
- Evaluation of effectiveness is based on the principle not the individual practices.



Principles of Controlling Water Flow & Stabilizing Disturbed Soils

App A- Outside 12:58

Sample #: AL06N2000

X20 - Bearing capacity improvements
▼ 00. *** NOT ANSWERED ***

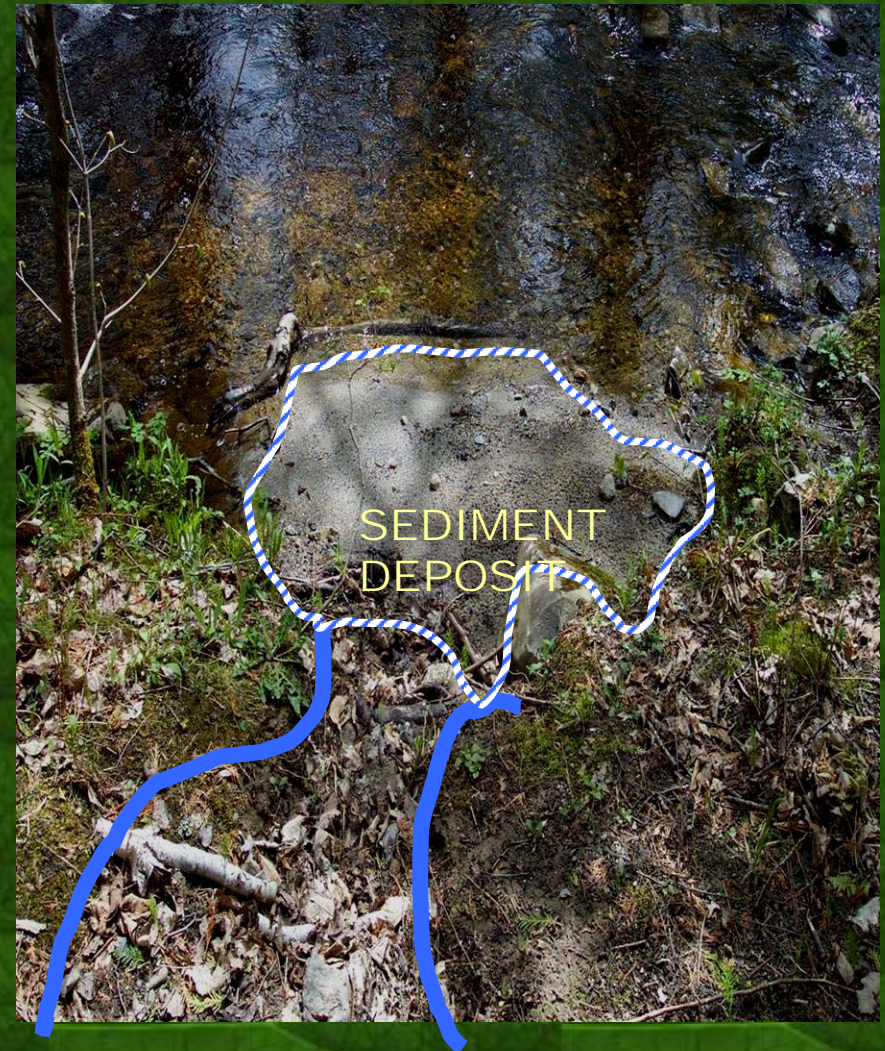
X21 - Primary adjacent land use
▼ 00. *** NOT ANSWERED ***

X22 - Soil movement outside buffer

00. *** NOT ANSWERED ***
01. Trace, films, cloudy in water
02. Measureable sediment in water
03. Sediment in buffer/not in water
04. Sediment moved, not in buffer
05. Soil is stabilized

Previous Next End

X12-15 X16-19 X20-22



Principles of Controlling Water Flow & Stabilizing Disturbed Soils

App A - Outside 1:00

Sample #: ALO6N2000

X23 - Evidence sdmnt reached water
▼ 02. Gully terminating in water

X24 - Length (ft) of rill/ditch/rut
999

X25 - Mid point x section (sq.in)
1728

X26 - Sediment in water (cu ft)
180

<<Previous

X23-26 X27-30 End



Managing Chemical Pollutants

Windows logo | Chemicals | [Icons] | 12:59 | [Close]

Sample #: HI05R2012

CP167- Logging spillage

- ▼ 02. Stains totaling <10 sq.ft

CP168 - Logging refuse

00. *** NOT ANSWERED ***

- 01. Discarded batteries present
- 02. Batteries/containers present
- 03. Containers only >5 gal.
- 04. Containers only <5 gal
- 05. No containers/batteries present
- 06. Non logging trash only
- 07. No evidence(CP167-168)Go B173

<<Previous Next>>

End

[Keyboard icon] [Arrow icon]



Minimizing Biological Impacts

Buffer ↔ ⏪ 1:01 ✕

Sample #: HI05R2012

B187-Avg % Shade

22	44	90	90	Avg->	62
----	----	----	----	-------	----

B188 -Avg. basal area

0	0	0	0	Avg->	0
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B189 - Avg diameter largest tree

0	0	0	0	Avg->	0
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B190 - Reduction in shade?


▼ 00. *** NOT ANSWERED ***

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Minimizing Biological Impacts

 Crossing 11:28

Sample #: AL06N0000

X72 - Crossing structure vintage
▼ 00. *** NOT ANSWERED ***

X73 - In place 3 mo. ? / Fishery?
▼ 00. *** NOT ANSWERED ***

X74 - Structure / bottom / substrate

00. *** NOT ANSWERED ***
01. Open bottom / natural substrate
02. Closed, cont natural substrate
03. Closed, substrate absent / patchy

<< Previous Next >> **End**

X68-71 **X72-75** X76-78



Monitoring Social Influences*

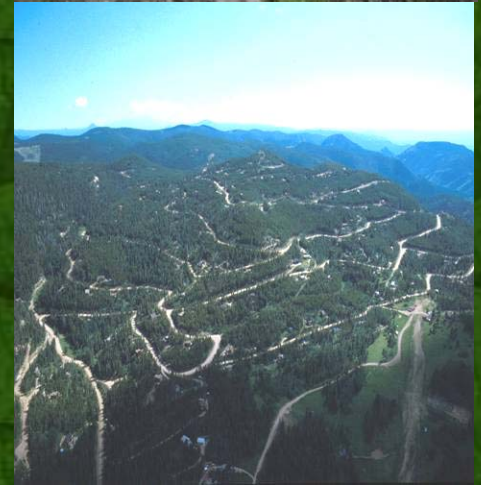
**allows results to be correlated with...*



- ✓ Landownership category
- ✓ Logger/landowner training
- ✓ Harvesting plan (y/n)
- ✓ Harvesting supervised by forester
- ✓ Voluntary or Mandatory programs

Risk Indexes and Models: Current and Future Potential

- Site Impact Potential
based on site sensitivity
- Operator Impact Potential
based on conduct of operation
- Composite Impact Potential
need for follow-up inspection
- Quantify impacts
models estimate volume of sediment, etc



BMP Management Protocol Information System*



- Data Storage and Retrieval
- Microsoft suite – Access-Excel-Word
- Computer generated Data Summary
- State/user report design and interpretation
- Potential for custom data queries

* *developed by Watershed Exchange and Technology Partnership*



Examples of Standard Data Summary

Soil Movement, Sedimentation and Stabilization

There are **five** opportunities in the protocol to observe the occurrence of soil movement, soil sedimentation, or stabilization for each sample unit. They are at Approach A outside the buffer, Approach A inside the buffer, the crossing structure, Approach B inside the buffer, and Approach B outside the buffer. **Proportions in this section are based on the total number of opportunities to make observations about soil conditions:**

For the **448** new sample units, there are **2240** opportunities to observe soil conditions.

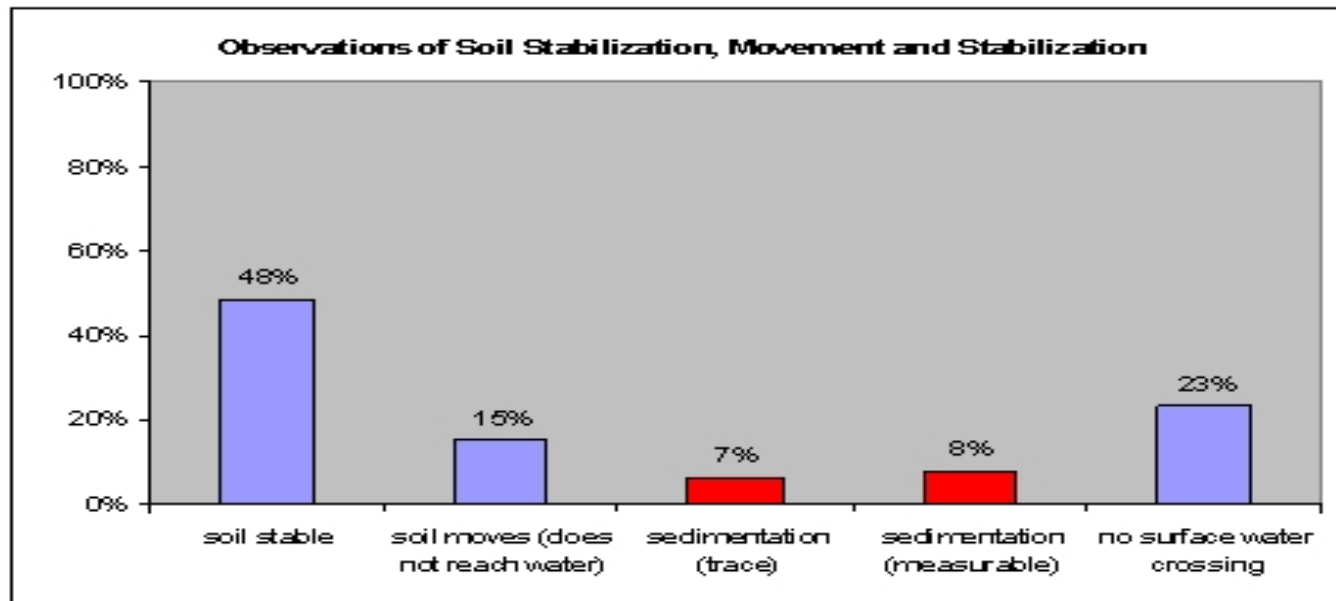


Figure xx Observations of soil movement, sedimentation and stabilization as a proportion of total opportunities to observe soil conditions in the protocol (n=2240).



Was sediment generation due to implementation issues?

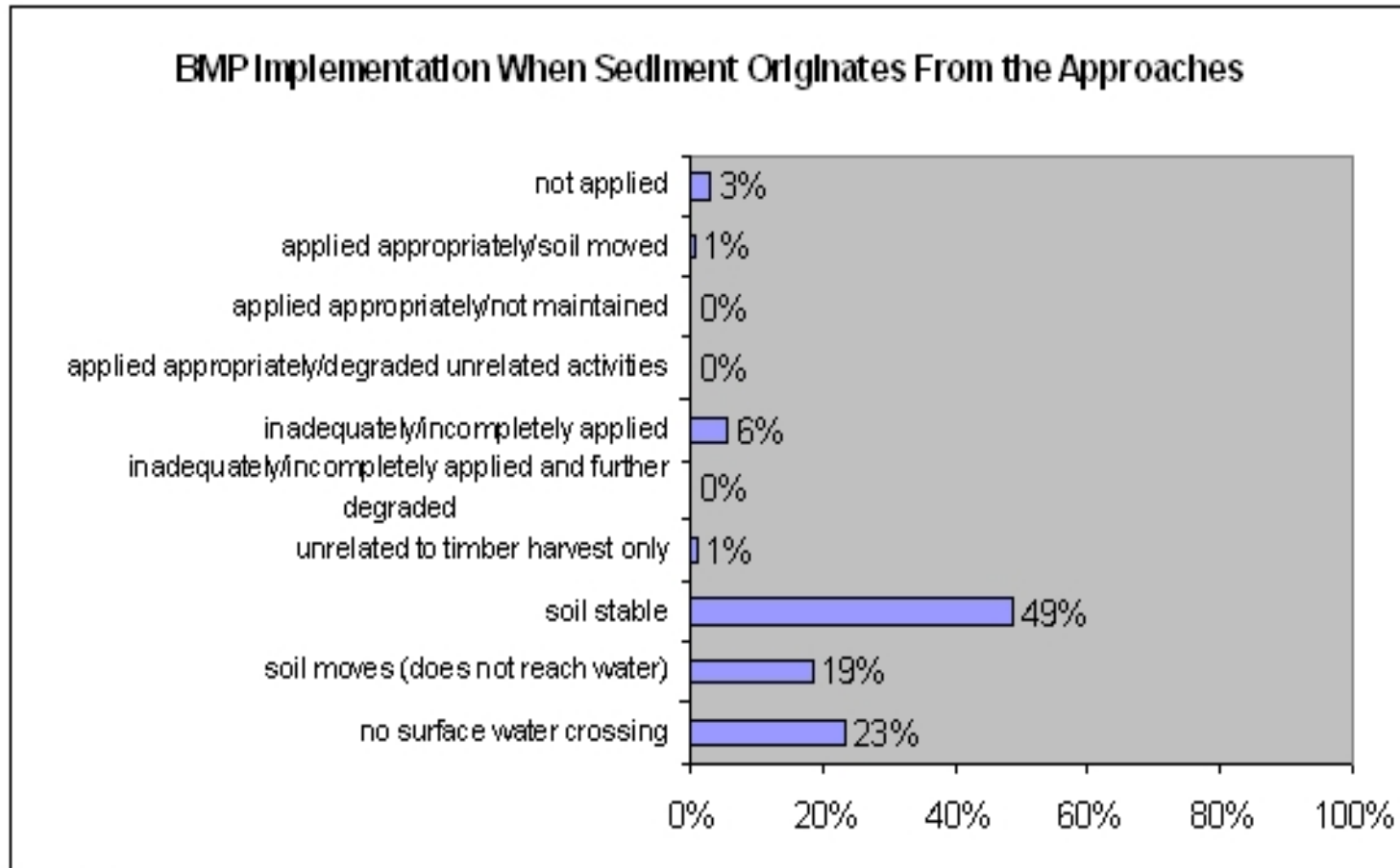
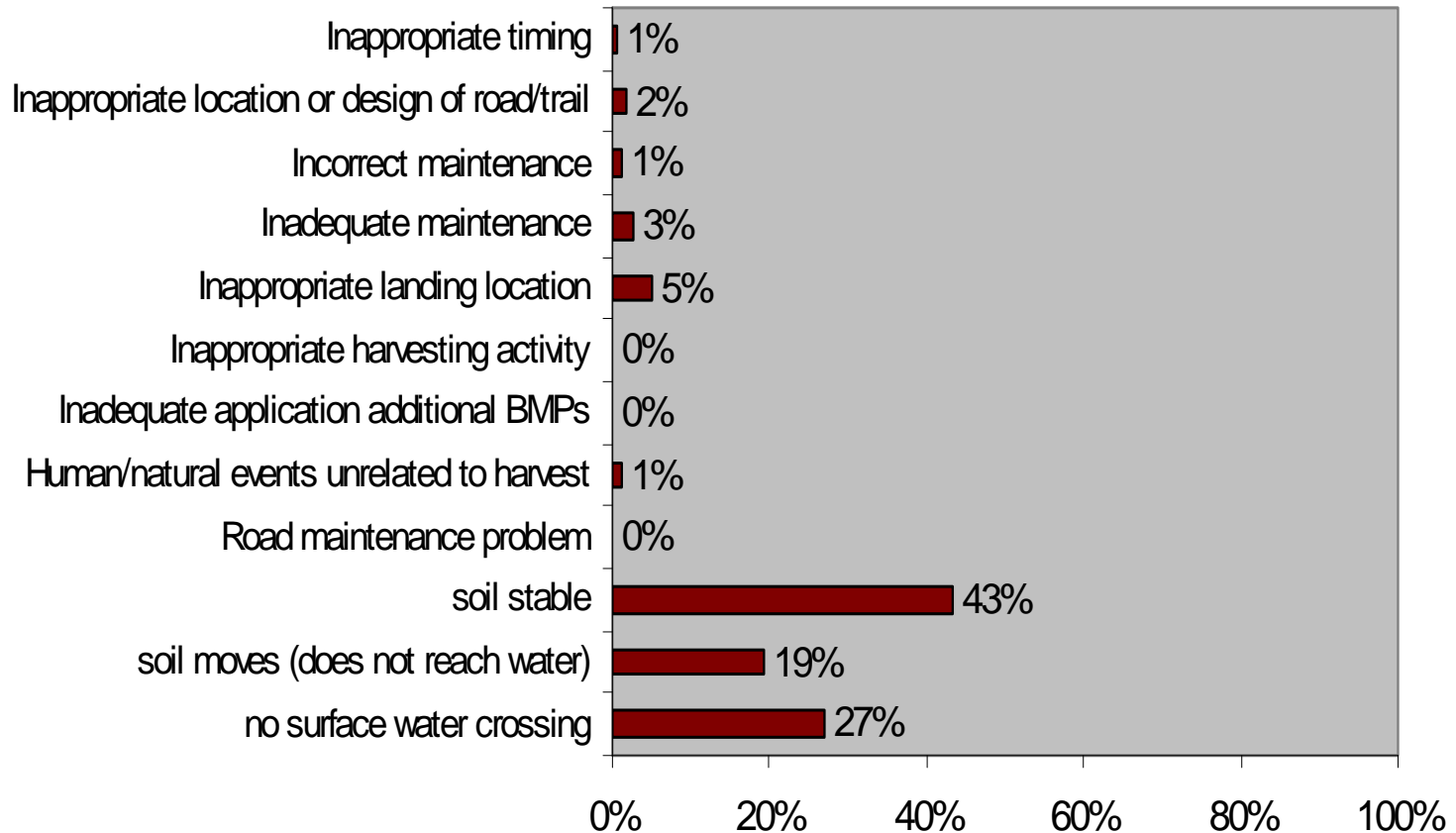


Figure X



What is the cause of sedimentation ?

Cause of Soil Reaching the Water from the Approaches

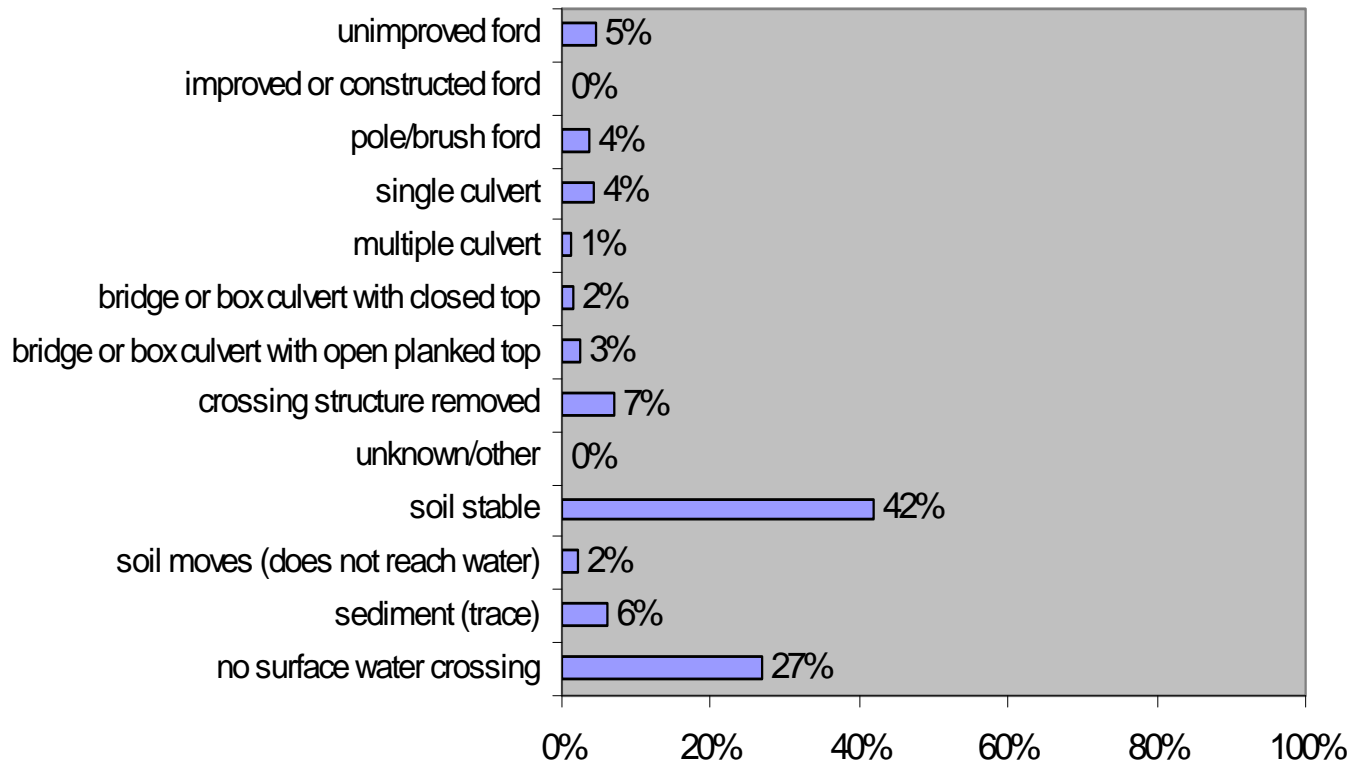


Standard Data Summary for the Northeast

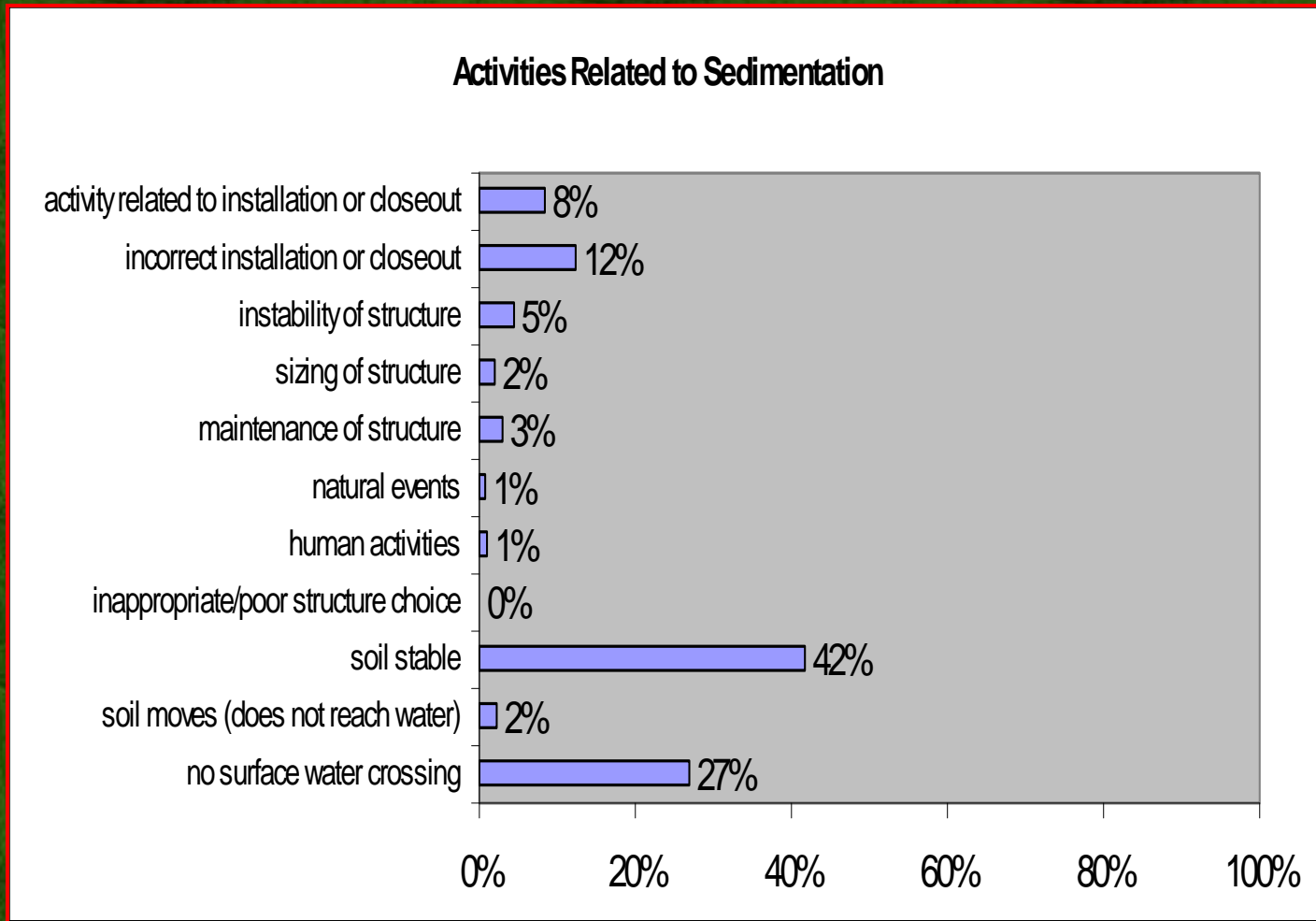


Was sedimentation the result of BMP choice?

Structure Type Associated with Observations of Measurable Sediment



What activity affected water crossing performance?



Standard Data Summary for the Northeast



Quantify/Evaluate BMP Design

Quantities of Sedimentation by Structure Type

	Average	Median	Maximum
unimproved ford	16	5	80
improved/constructed ford	--	--	0
Pole/brush ford	116	9	600
single culvert	27	4	123
multiple culvert	6	4	15
bridge/box culvert, closed top	59	12	200
bridge/box culvert, open top	16	6	54
structure removed	70	6	606
Unknown/other	76	76	150

Measured in Cubic feet



The NA BMP Protocol will help...

- Document effective use of BMPs and maintain the silvicultural exemption.
- Document compliance with the Clean Water Act and state laws and regulations.
- Create reliability, consistency, and repeatability in monitoring & foster greater confidence in forestry.
- Allow cost-effective self-assessment.
- Improve training and BMP specifications.
- Facilitate Green certification.





Endorsed by NA & the NAASF

- NAASF officially endorsed the Protocol and recommended it as a tool for use by States for monitoring BMPs in the Northeastern Area
- Individual States are using the Protocol as part of State Forestry BMP Programs
- States using the Protocol share sample data with NA for regional compilation

www.na.fs.fed.us/watershed/

