Forestry BMP Use and Effectiveness in Maine

Clean Water Act

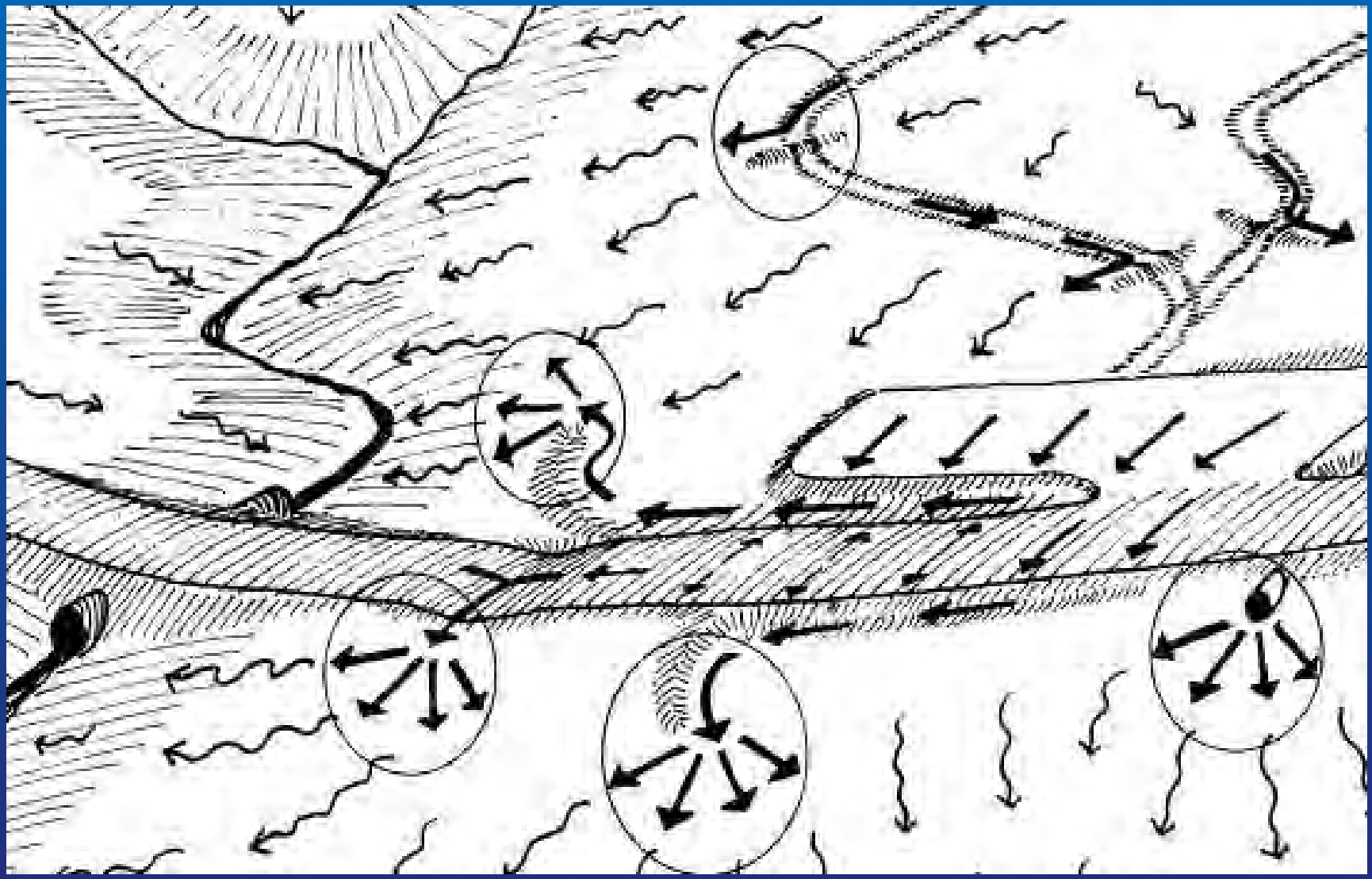
Provides a “Silvicultural Exemption” for construction of forest roads

Section 404

Requires a National Pollution Discharge Elimination System (NPDES) permit for discharge of pollutants through a "point source" into “waters of the United States."

Point Source Pollution

Nonpoint source



Clean Water Act Silvicultural exemption for forest roads

BMPs must be used to:

- Maintain flow and circulation patterns;
- Ensure chemical and biological characteristics of the navigable waters are not impaired; and
- Minimize any adverse effect on the aquatic environment.

Legal challenge to exemption in 2006

Failure to obtain a NPDES permit for logging roads constructed in a State Forest constituted a violation of the Clean Water Act

Timber Co. 1
Timber Co. 2
Timber Co. 3
Timber Co. 4

August, 2010

May, 2011

Jurisdiction of the Ninth Circuit Court of Appeals

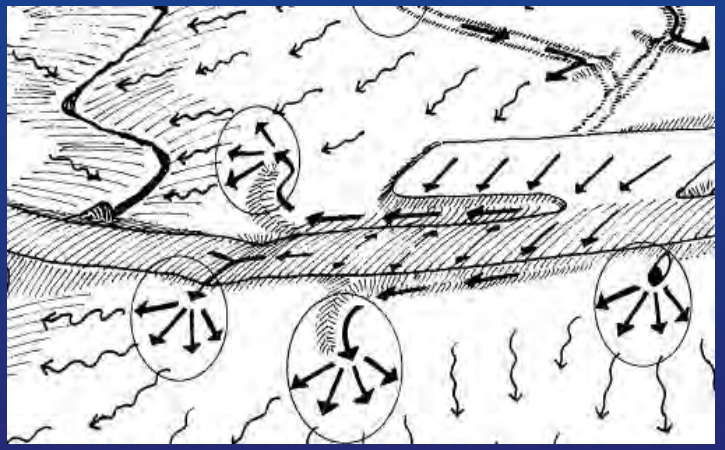
NPDES permitting requirements

Discharge limits

Record keeping, monitoring and reporting requirements.

Stormwater Management Plan

Prepared by a qualified professional, specifying site-by-site controls and a monitoring and inspection routine.



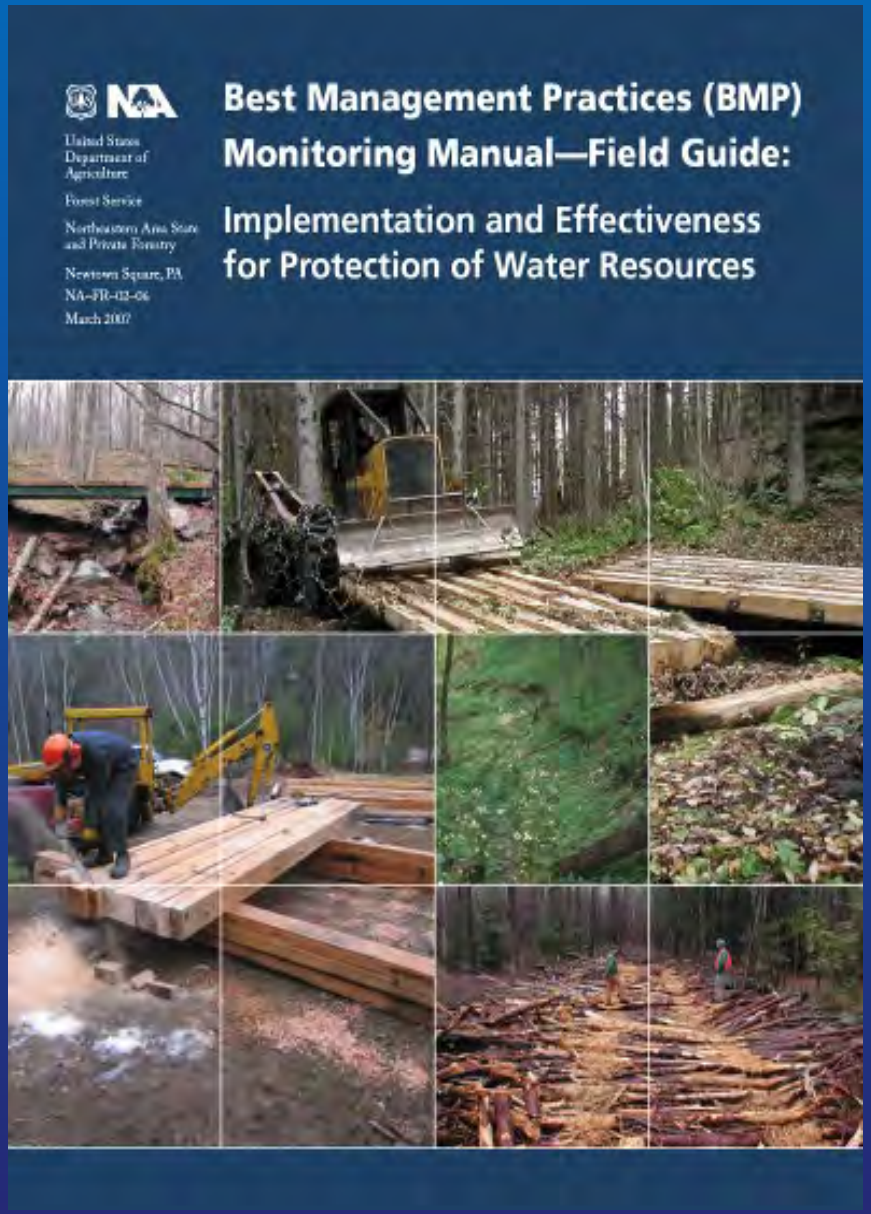
March, 2013 - The U.S. Supreme Court reversed the Ninth Circuit decision

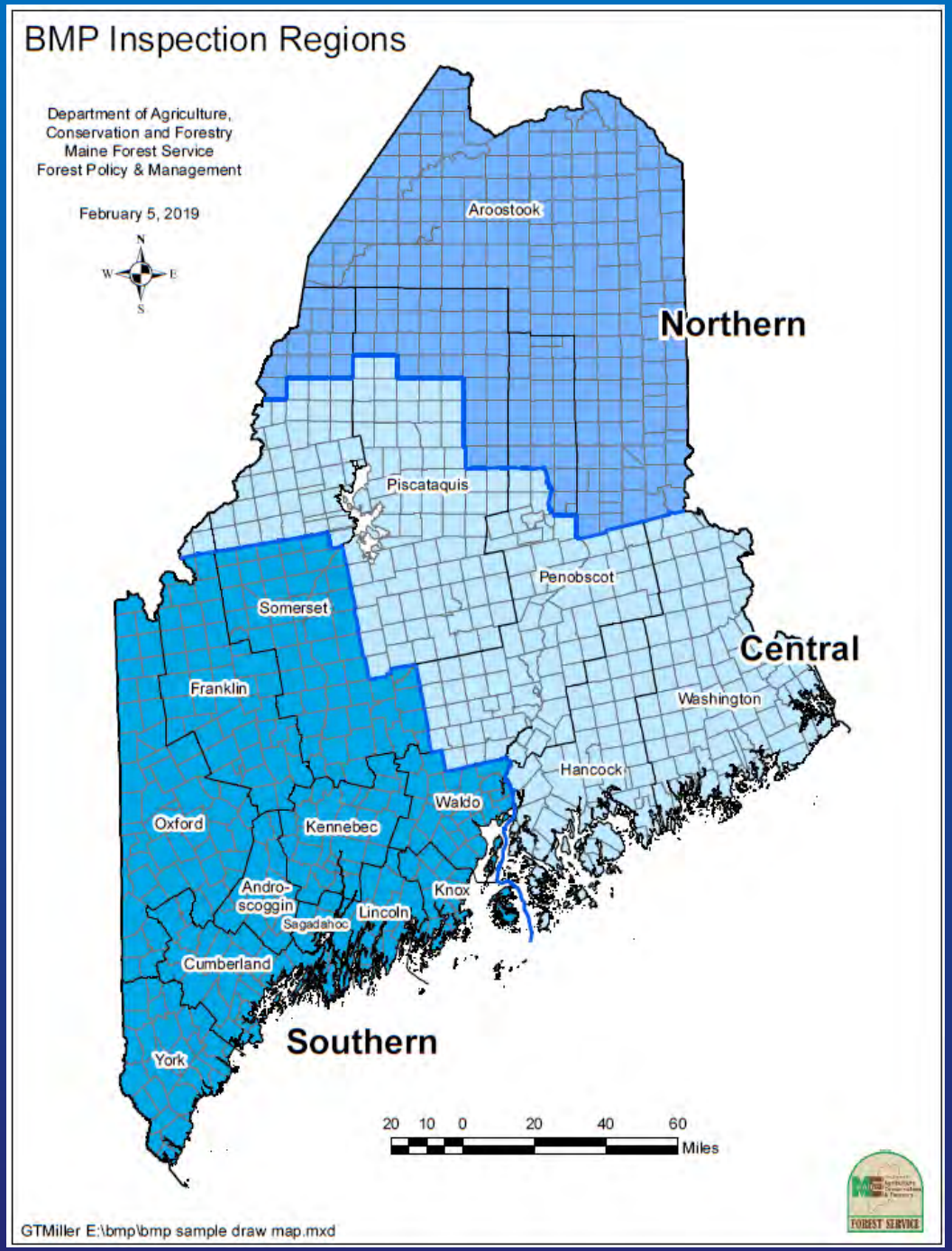
EPA cites the need for measurable evidence of BMP use and effectiveness.

- Measured evidence vs anecdotal reports
- Standardized monitoring
- Comparability among states

Northeast Regional Protocol

- Based on principles of water resource protection
- Standardizes monitoring method for comparability among states
- Relies on measurable evidence as opposed to anecdotal assessment
- Assess effectiveness, not the installation of individual practices





Sample Stratification

3 Regions

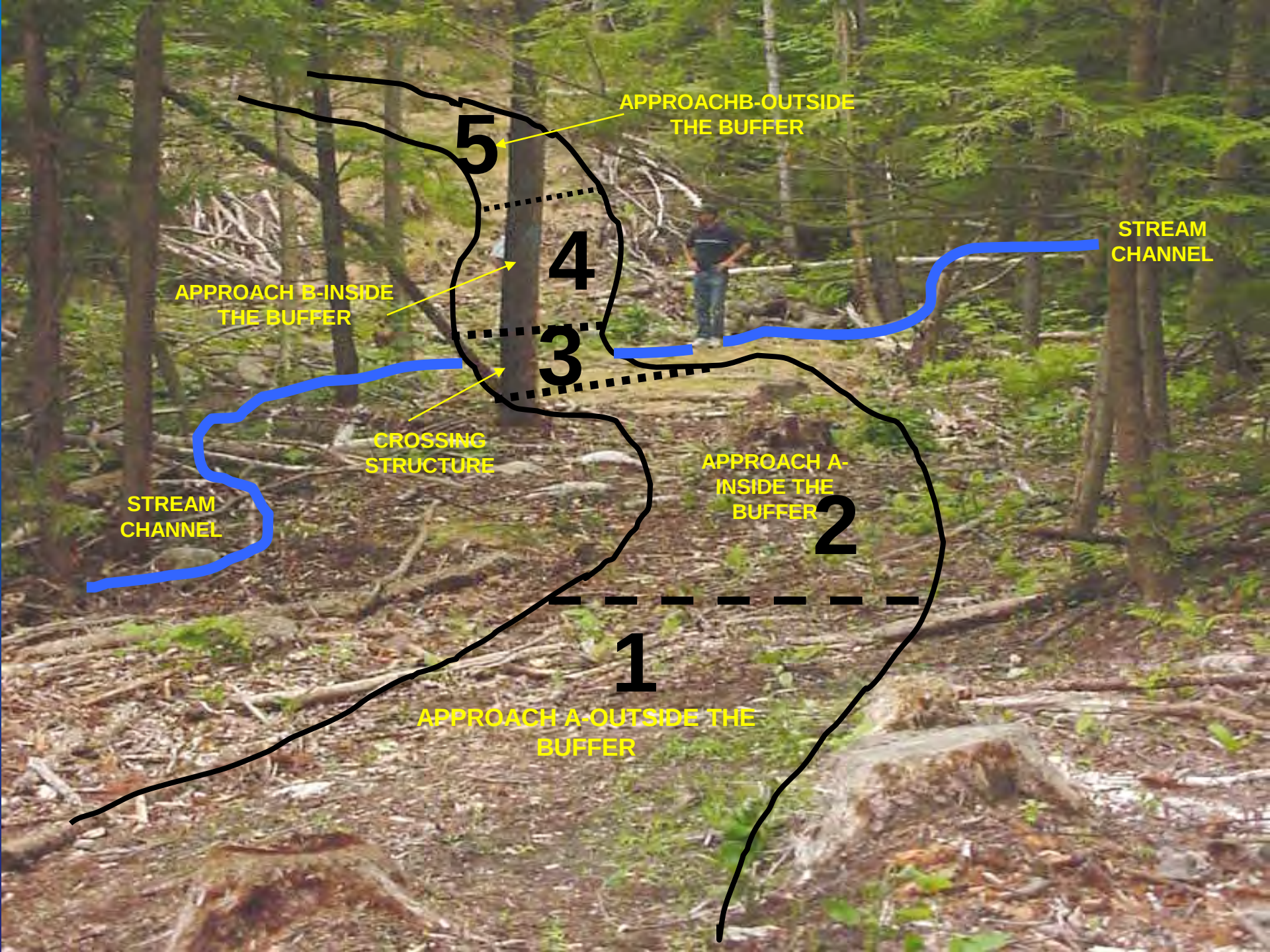
3 Land owner groups / region:

Group I: Harvests with < 200 acres.

Group II: Harvests with > 200 acres and <100,000 acres land ownership.

Group III: Harvests > 200 acres and > 100,000 acres land ownership.

10 Notifications are drawn for each landowner group per region.


5
APPROACHB-OUTSIDE THE BUFFER
4
APPROACH B-INSIDE THE BUFFER
STREAM CHANNEL
3
CROSSING STRUCTURE
STREAM CHANNEL
APPROACH A-INSIDE THE BUFFER
2
1
APPROACH A-OUTSIDE THE BUFFER

Biennial Reporting

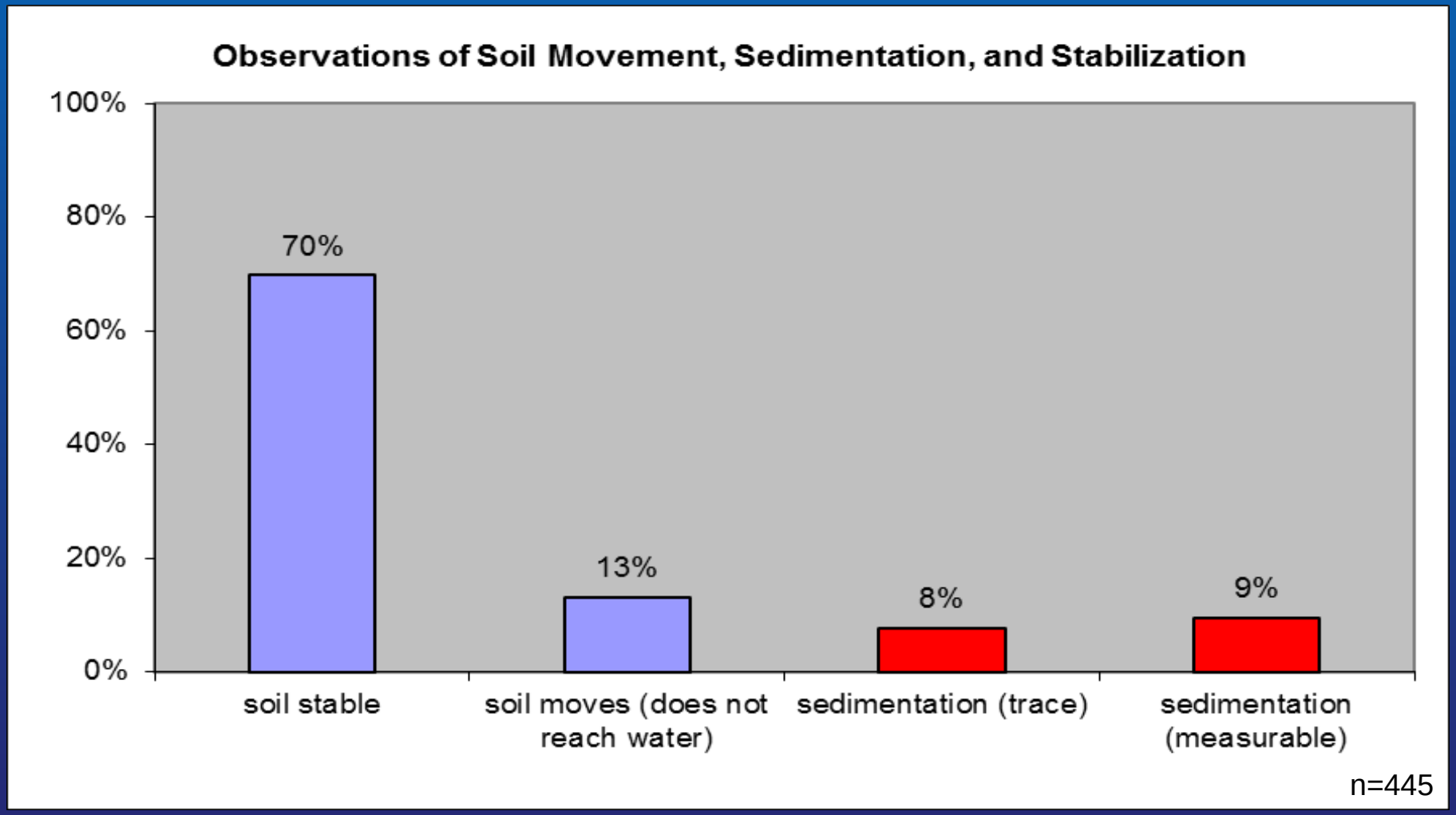
- Used to assess the use and effectiveness of BMPs in Maine
- Provides measurable evidence to respond to scrutiny
- Guides MFS educational efforts

Data collection 2016-2017

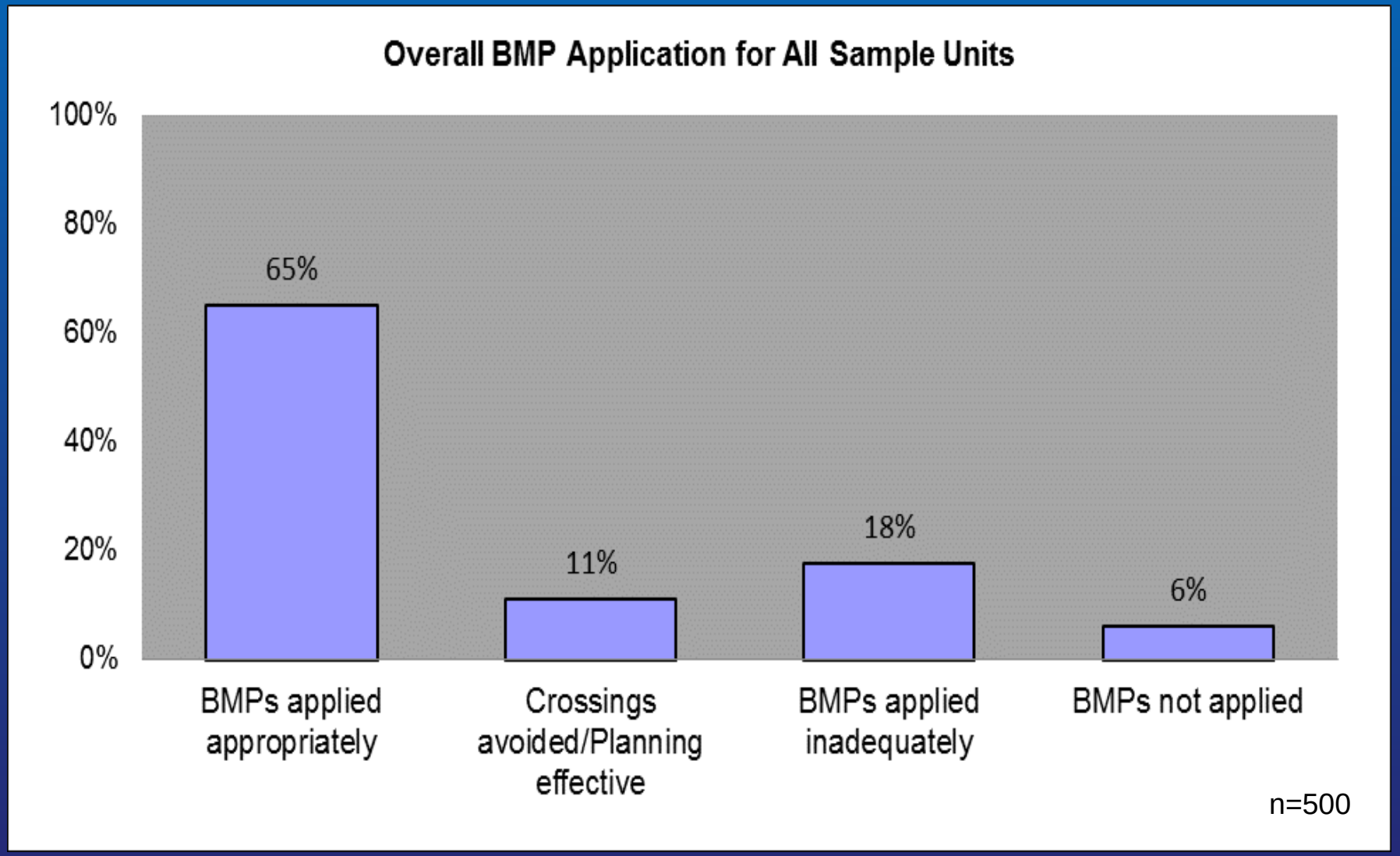
- **134 sites evaluated**
- **89 had water crossings**
  - **445 observations of BMP use and effectivness**
  - **Each observation included for analysis in 2016-17 BMP report**

The Big Picture

83% of observations showed no sediment reached a waterbody

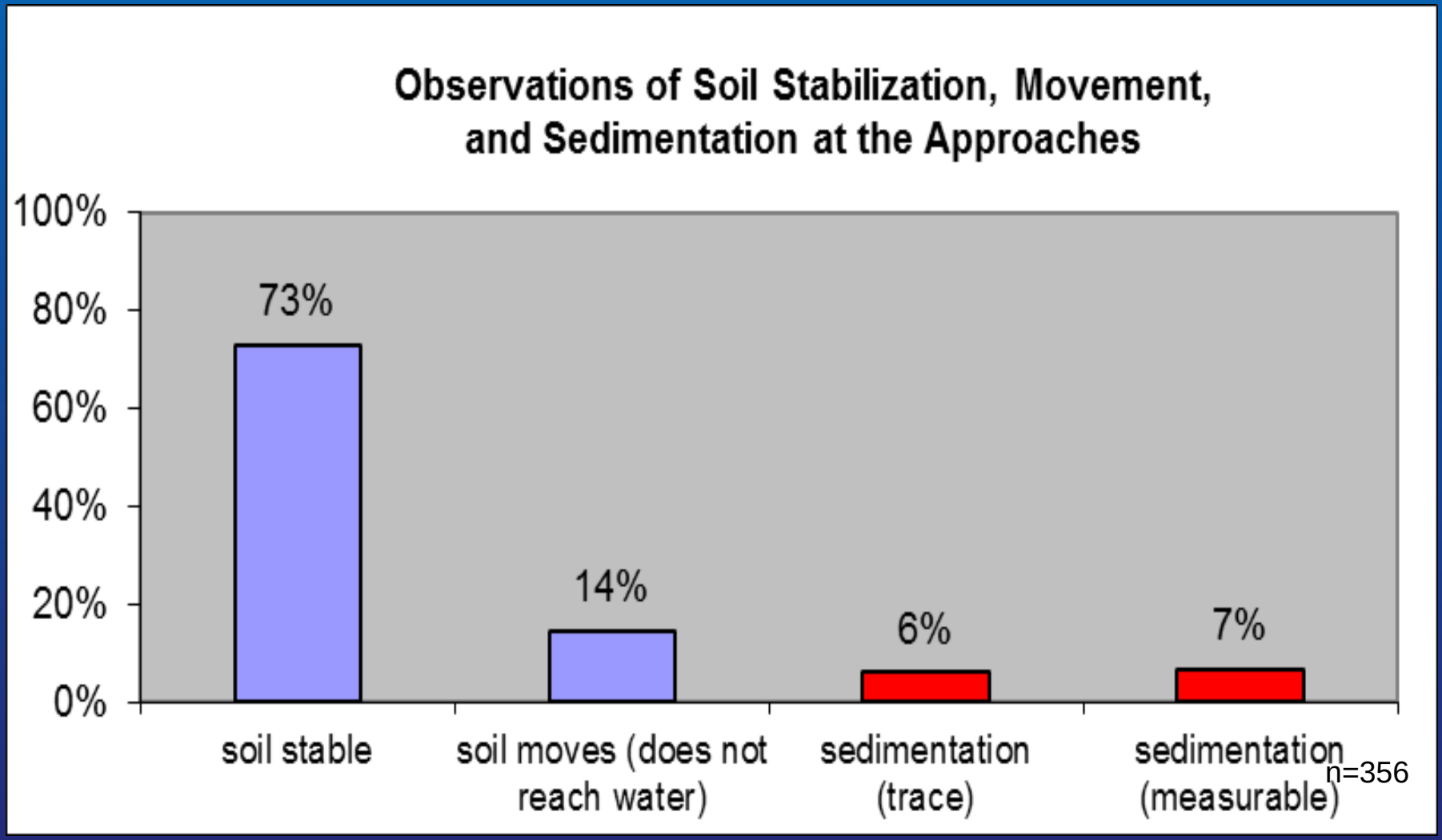


76% of observations had appropriate BMPs

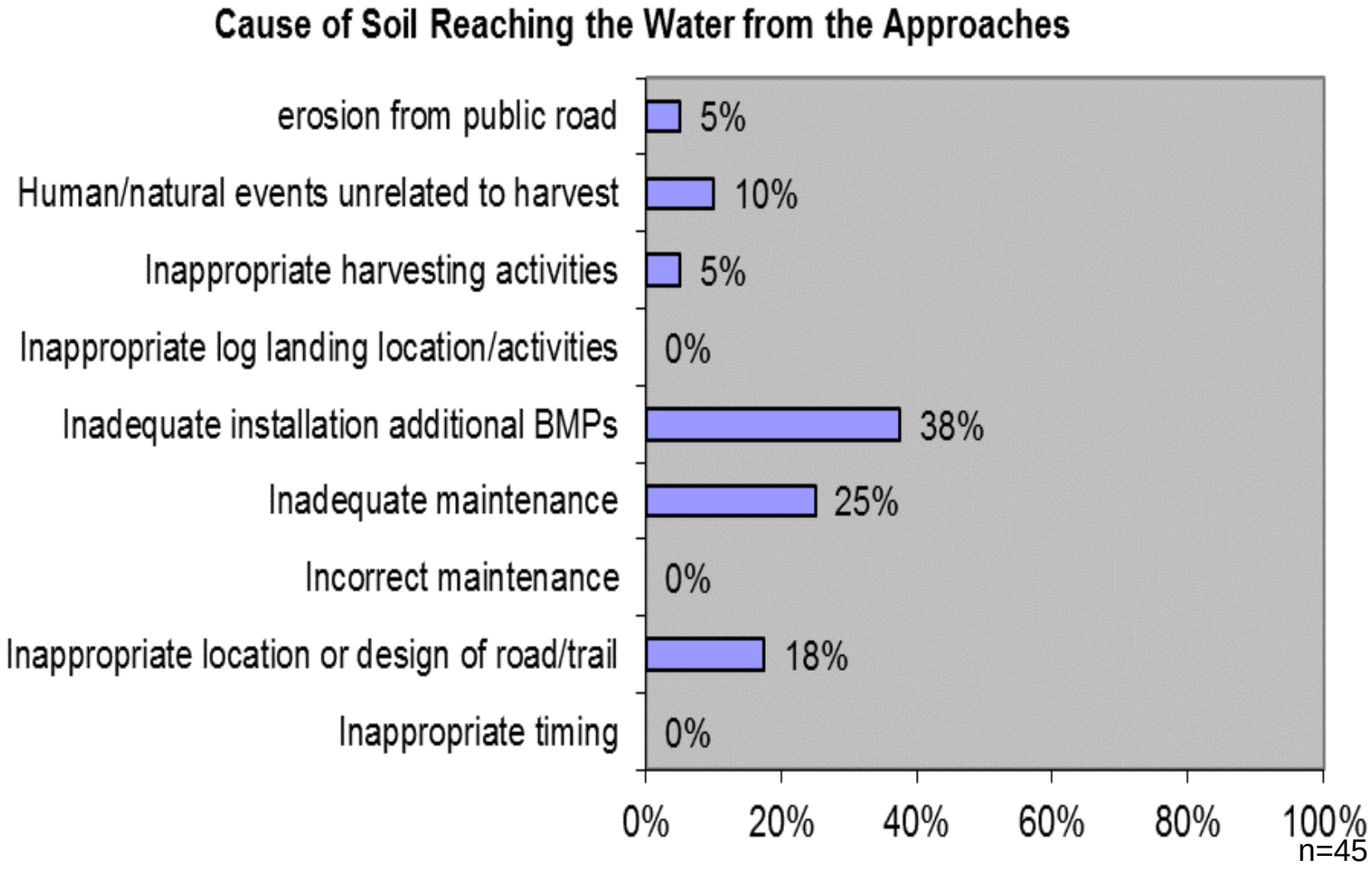


Soil movement at approaches

87% of observations showed no sediment entered a waterbody

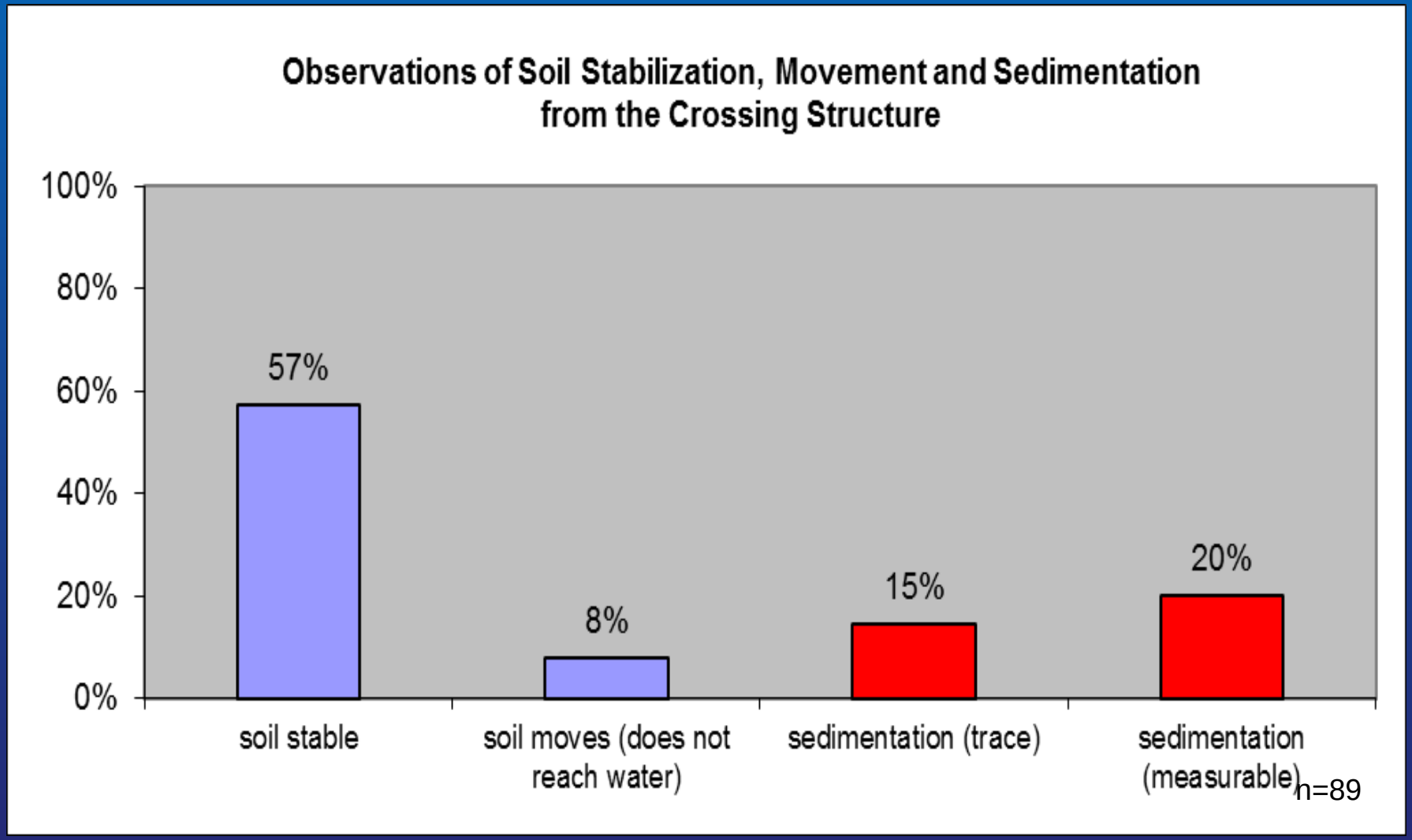


Cause of sedimentation from approaches

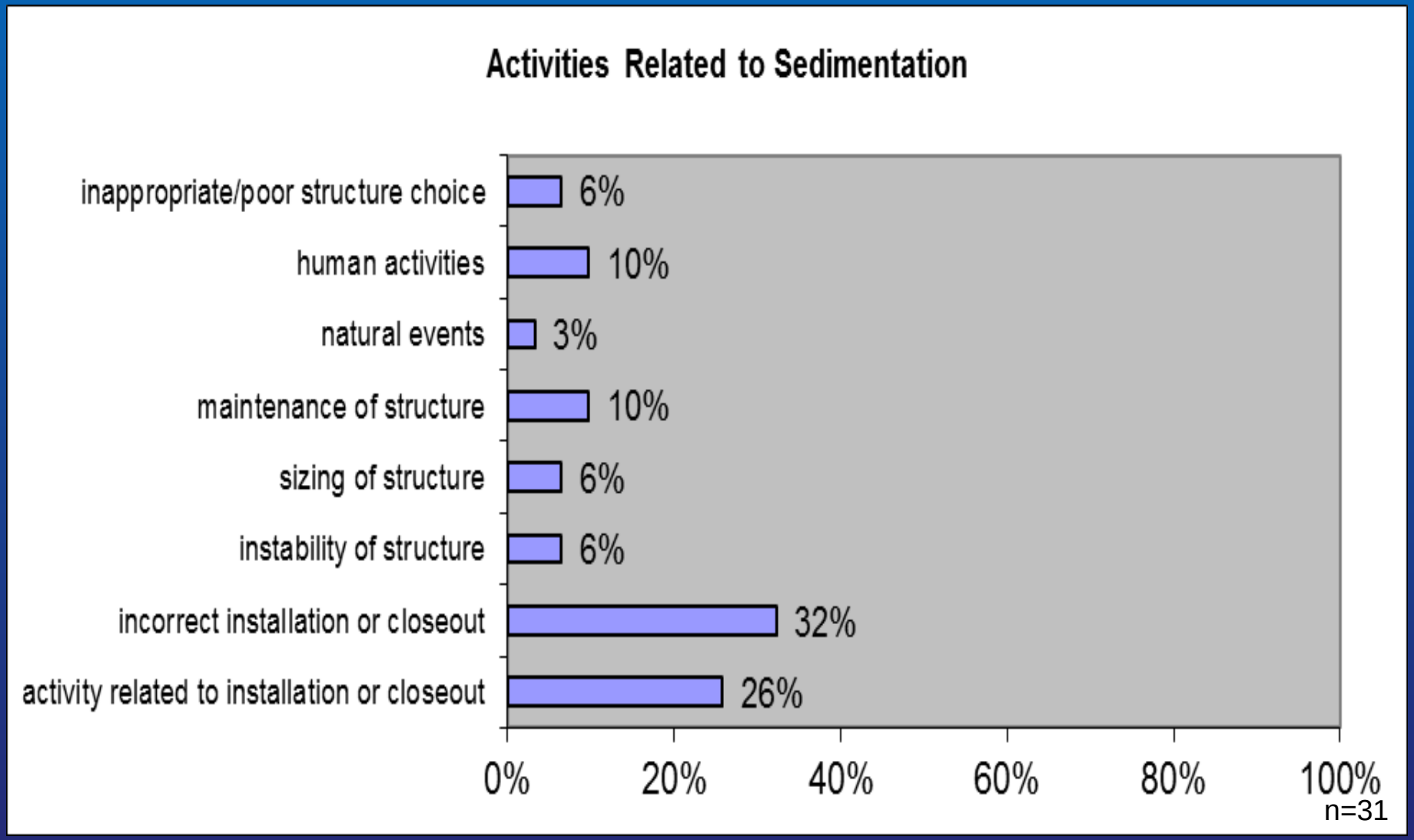


Soil movement at crossings

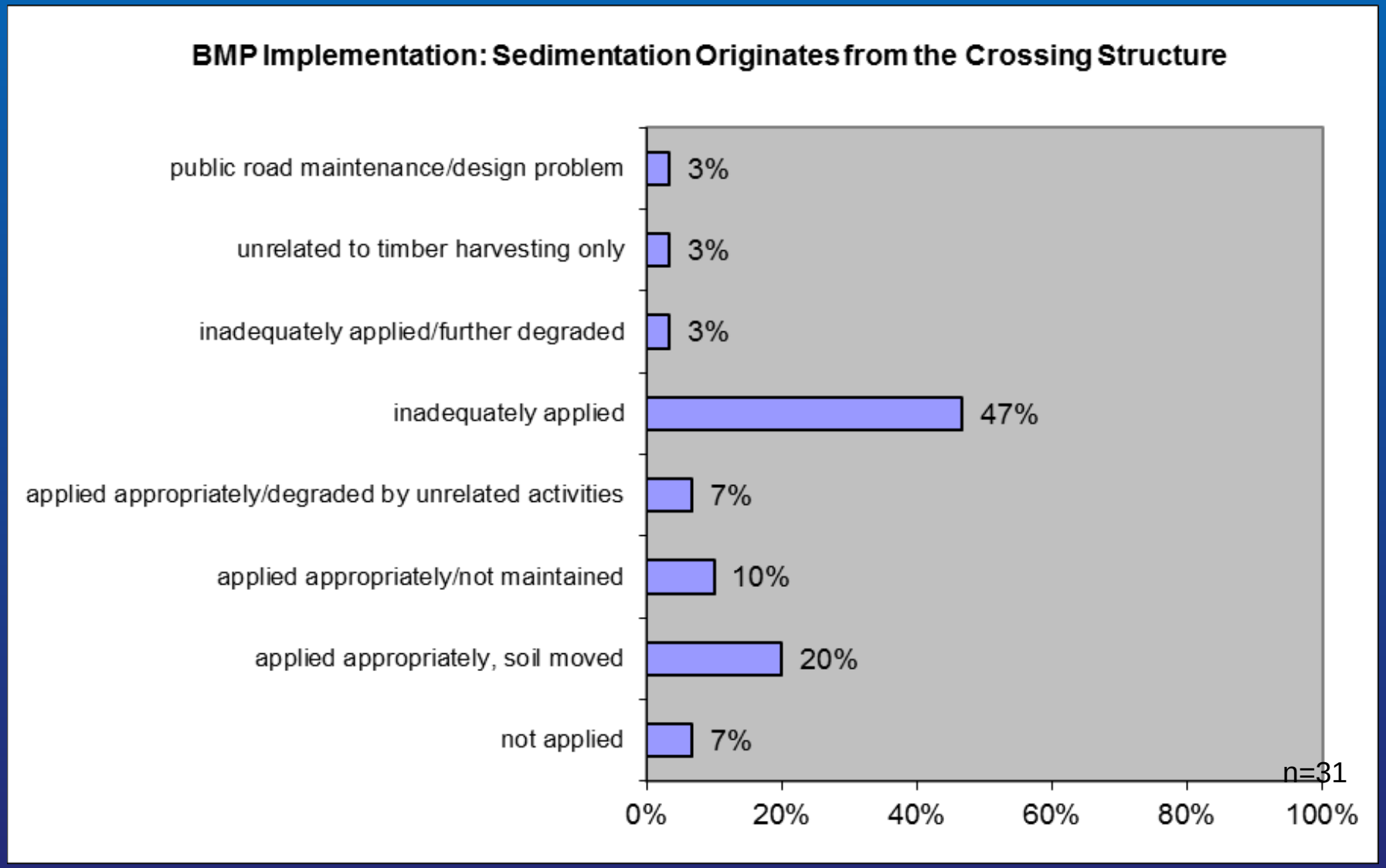
65% of observations show sedimentation was avoided at the crossing structure



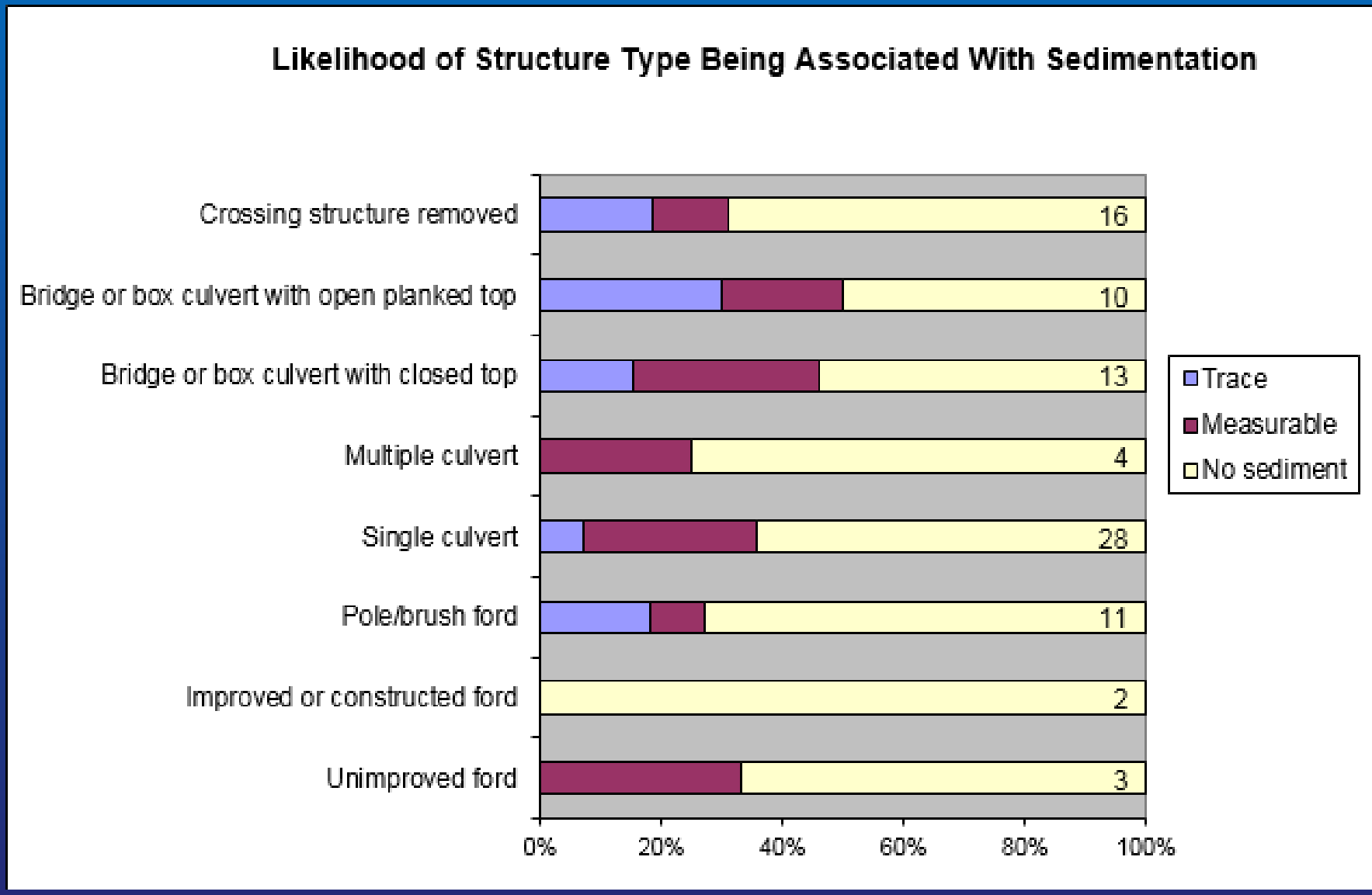
Sedimentation from Crossings



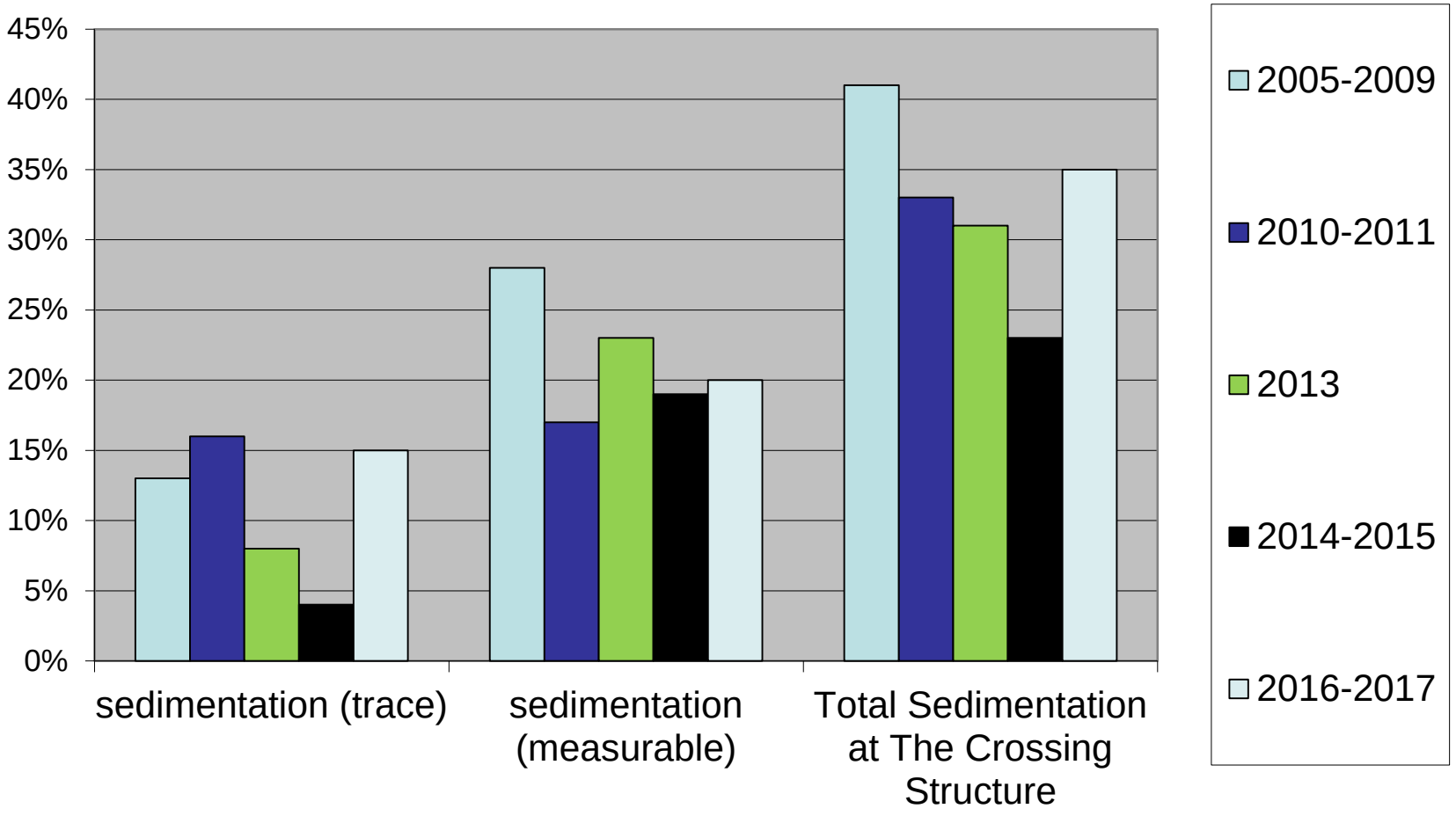
BMP Application
Sedimentation at the crossing



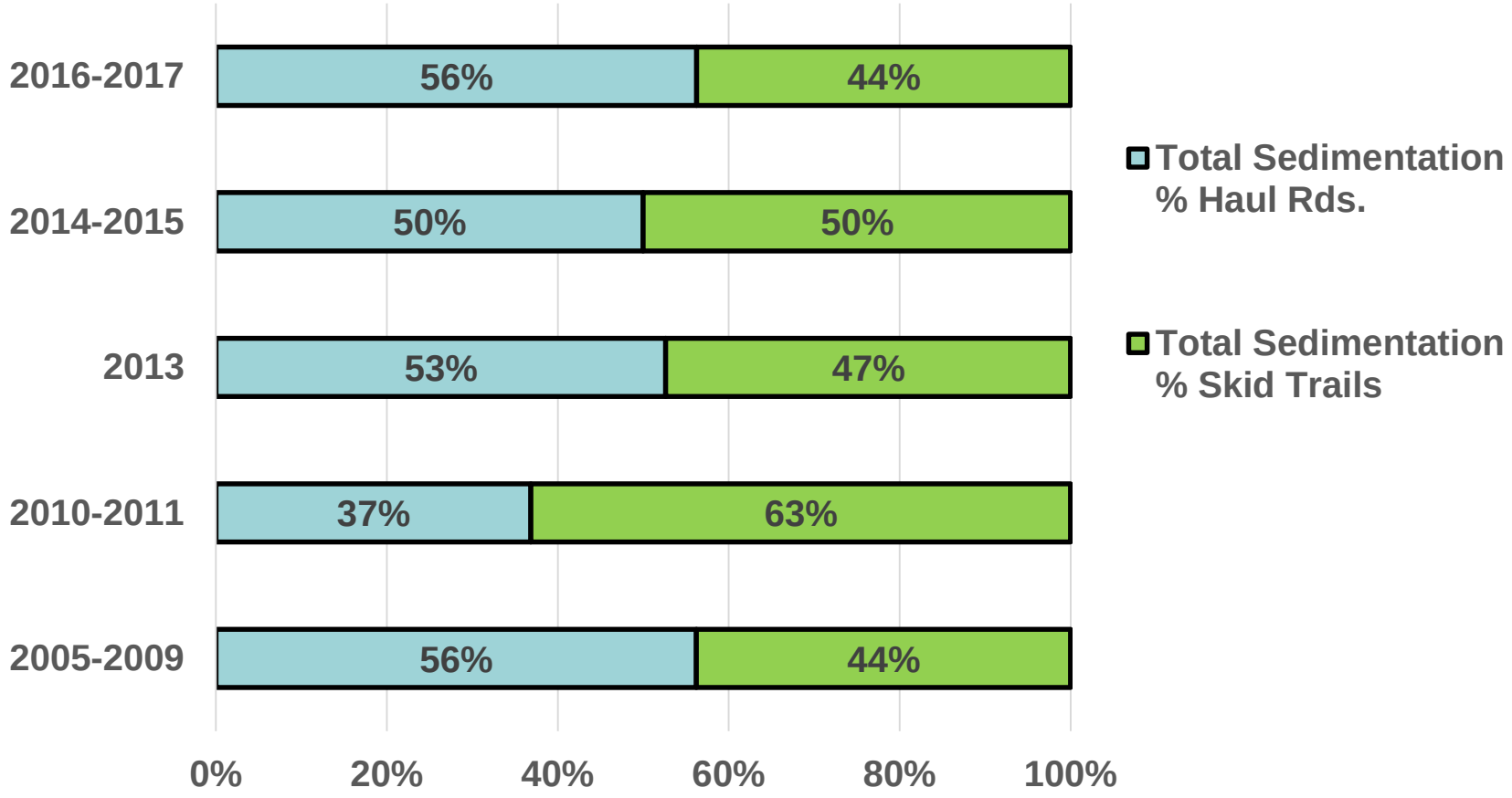
What structures led to sedimentation?



Sedimentation at The Crossing Structure 2005 - 2017



Sedimentation at Haul Rd. Crossings Vs. Skid Trail Crossings



Conclusions

- Most harvesting is not negatively affecting water quality
- Most loggers are properly using BMPs
- More focus on maintenance of BMPs is needed
- Sedimentation originating from the crossing structure is a particular concern

Training areas

- Stress proper application and maintenance of BMPs as site conditions change (approaches)
- Proper installation and closeout of crossings to minimize sediment input (crossings)

Stream Crossings

Wetland Crossings

Truck Roads

Log Landings

Trails and Harvesting

Hazardous Materials

Plan Ahead

Build it Right

Maintain It

Close it Out Correctly

BUILD IT RIGHT

Properly installed water crossings preserve water quality, protect your investment in the crossing, and reduce future maintenance costs.

ALL STREAM CROSSINGS

BMPs

1. **Minimize disturbance to the stream banks, channel, and streambed during installation, use, and removal.**
2. **Minimize and stabilize exposed soils on the approaches within the filter area.** During operations, you can stabilize the approaches with brush or other materials.
3. **Install diversions on the approaches to prevent channeled runoff from entering the stream from the trail or road, and to disperse it into adequate filter areas.**
4. **Build the narrowest roads and trails possible in the filter area and at the crossing.**
5. **Do not obstruct water flow or fish passage in the stream. See the guidelines for fish passage on page 41. Install culverts with the bottom resting on or below the stream bed at the inlet and outlet.**
6. **Minimize work during wet weather or when the soil is saturated.**

TEMPORARY CROSSINGS

BMPs

1. **Stabilize crossing approaches with brush or similar materials, before and during operations.**
2. **Protect the approaches by extending temporary bridges well beyond the stream bank.**
3. **Install any temporary, portable bridges so that all portions of the bridge are above the stream's normal high water mark. Keep abutments back from the banks, if possible.**

A pole ford.

A temporary bridge.

BUILD IT RIGHT

PERMANENT CROSSINGS

BMPs

1. **If possible, build crossings when streams are dry or at low water. If considerable excavation is necessary during periods of regular or high flow, temporarily divert the water while installing the crossings.**

STOP **Permanent crossings may require permits, especially if water must be diverted during installation.**

2. **Install crossings and approaches using a "no-grub zone" at least the width of the filter area, wherever possible.**
   - Minimize excavation on stream banks and approaches.
   - Construct road approaches using fill (instead of grubbing), leaving the forest floor undisturbed, especially outside the road profile. Consider surfacing with clean gravel or stone. This will stabilize the road surface, prevent it from eroding directly into the stream, and keep mud from being tracked onto the crossing structure.
   - Use geotextile and fill on unstable soils or during wet weather.
   - Set abutments back from the stream's edge.
3. **Design bridges using solid decking or other features to minimize the amount of material that falls through the deck and into the stream.**

Two types of permanent crossings.

KEY ISSUE

Fish Passage

Stream Smart Crossing

Designing and installing stream crossings that function effectively for road infrastructure while maintaining fish passage is becoming increasingly important. Crossings designed using the **4 "Stream Smart" principles** allow for adequate capacity for high flows, minimize sedimentation of the stream and provide passage for fish and other aquatic life.

STOP Crossings on streams with fish are required by law to allow fish passage. Call the Maine Dept. of Inland Fisheries and Wildlife for help identifying streams with fish habitat at (207) 287-8000.

Principle #1 – Span the Stream Channel

A crossing that is narrower than the natural stream channel can "pinch" the stream, causing water flow to accelerate through the crossing. This can create a barrier to fish movement, as water may move faster than a fish can swim. In addition, when accelerated water flow exits a culvert that is too narrow, it will create a scour hole. This will cause the culvert to become perched above the streambed, which also limits fish passage. Crossings that are at least as wide as the stream channel allow natural flows to be maintained through the crossing, minimizing velocity problems. In *most* cases a crossing sized to be as wide as the stream channel will also accommodate at least a 50 year flood.

A culvert that is spanning the stream channel.

Principle #2 – Set the Crossing at the Correct Elevation

Stream crossings, including closed bottom culverts and footers of open bottom structures, should be set <u>below</u> the elevation of the **ORIGINAL** stream channel. This is particularly important to be aware of when replacing a stream crossing, since old crossings are often set at too high an elevation. A stream crossing that has not been set at the correct elevation limits fish passage and may pond water on the upstream side, which in time may compromise the road.

Water ponded upstream of an old crossing is a good indication that the crossing is set too high.

Principle #3 – Slope Matches the Stream

Crossings should be set at the same gradient as the natural stream channel. This allows the stream to maintain its natural velocity and minimizes problems such as scour holes below the crossing.

Principle #4 – Substrate in the Crossing

Open bottom crossings such as bridges and arch culverts are open to the natural stream bottom. Properly sized and embedded closed bottom culverts can have a stream bottom redevelop in the crossing as stream bed material accumulates. Material may need to be added to culverts, particularly on steeper streams.

A culvert installed to stream smart principles that is accumulating substrate

Tip: The width of the opening for a bridge or culvert should be at least as wide as the stream channel at the normal high water mark. Sizing a crossing only based on the 10 or 25 year flood (see page 48-49) may not always accomplish this goal.

Maine Forestry Best Management Practices (BMP) Use and Effectiveness—Data Summary 2016-2017

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