Better Roads, Cleaner Streams

Western Region Staff Meeting

"Rainmaker" update

September 29, 2011

MARYLAND DEPARTMENT OF NATURAL RESOURCES

The Nature Conservancy
Protecting nature. Preserving life.™

Background

- Contribution unpaved roads make to water quality issues has largely been ignored
- MD's Better Roads, Cleaner Streams initiative developed from the PA Center for Dirt & Gravel Roads
- The "rainmaker" data collection device was assembled by The Nature Conservancy and calibrated by TNC and MD DNR following the PA Center's specifications and guidance

Partners and Support Staff

- MD DNR – Forest Service, Watershed Forestry
- Green Ridge State Forest Staff
- PA Center for Dirt & Gravel Roads
- The Nature Conservancy
- Appalachian Environmental Lab

What is the "rainmaker"?

- Developed following the PA Center for Dirt & Gravel Roads model
- PVC pipe and sprinkler system that simulates rain events
- The rainmaker enables us to quantify the amount of water and sediment leaving the roadway during a typical rain event

What is involved in a test run?

- Sites selected based on road assessment completed by PA Center for Dirt & Gravel Roads
- Rainmaker is set up on 100' section of road
- Water is pumped through the device and diverted from wheel tracks to collection point(s)

Test Day Protocol

- 2 rain-free days prior to test day
- Rain-free test day
- Winds <10 mph on test day
- Lots of folks to help with set-up and logistics!

Test Day Protocol

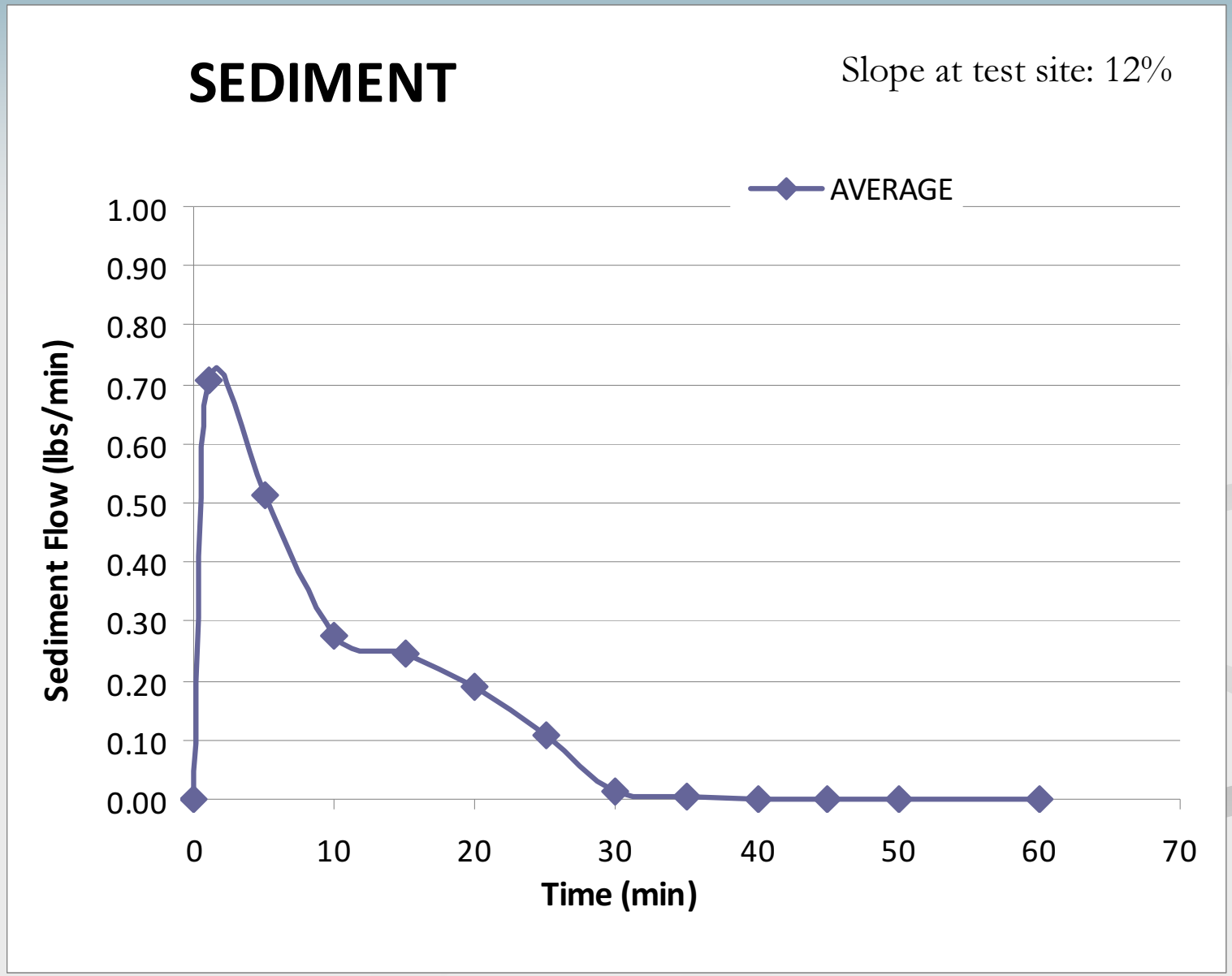
- 3 runs are completed at each test site
- For each run
  - Pump runs for 30 minutes at 30 PSI reading on gauge on far end of rainmaker (uses ~900 gal/run)
  - Sample times begin at T=0 when wetting front reaches sample/catch point
  - Flow sample taken at T=1 minute, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50
  - Sediment sample taken at T=1 minute, 5, 10, 15, 20, 30
  - Wait a total of 60 minutes from pump off to pump on for next run
  - During 60 minute drying period, drive a vehicle 20 overlapping passes through test site

2011 Test Sites
at Green Ridge State Forest

Gordon Road

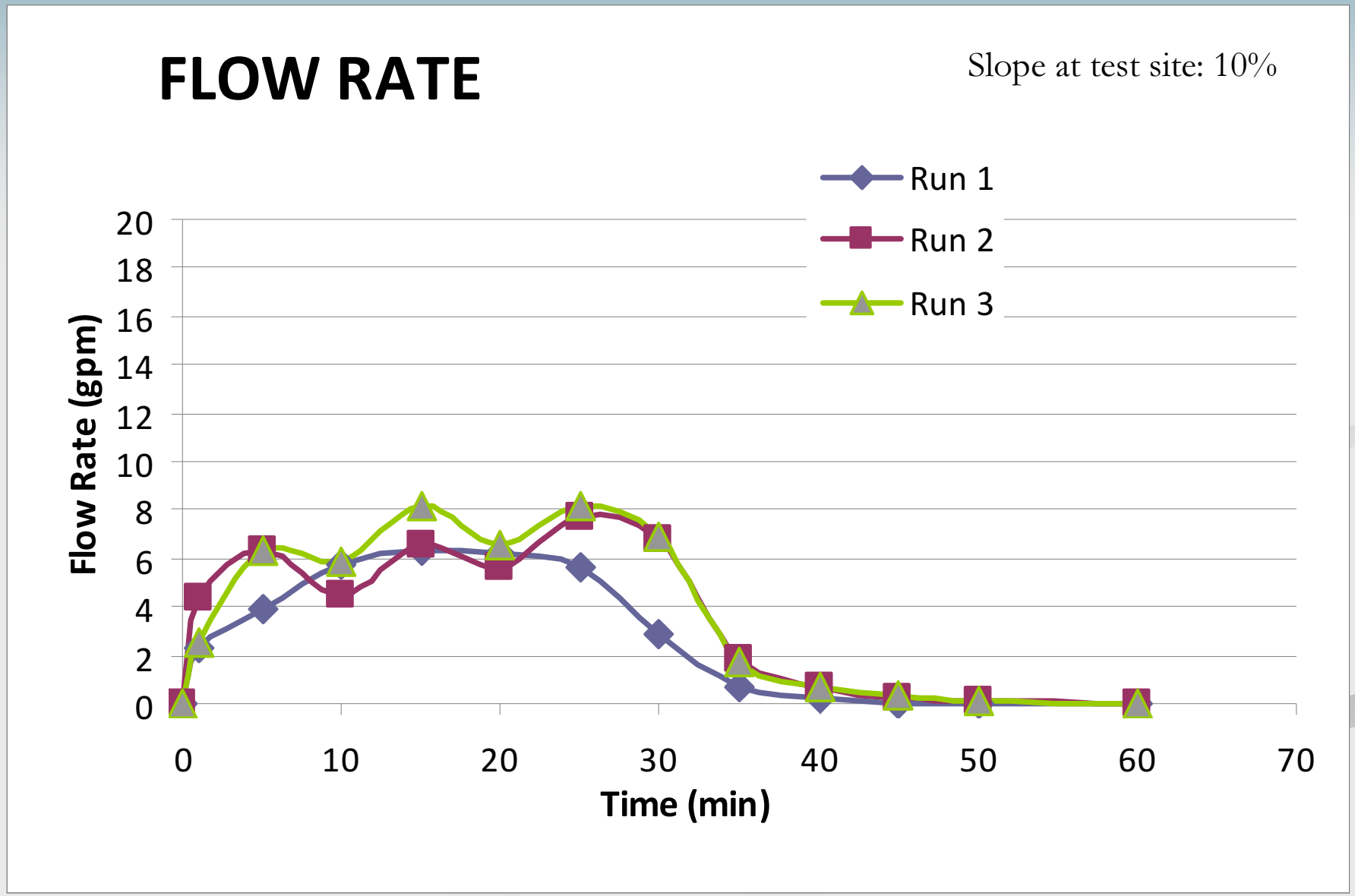
Gordon Road Results

Gordon Road Results

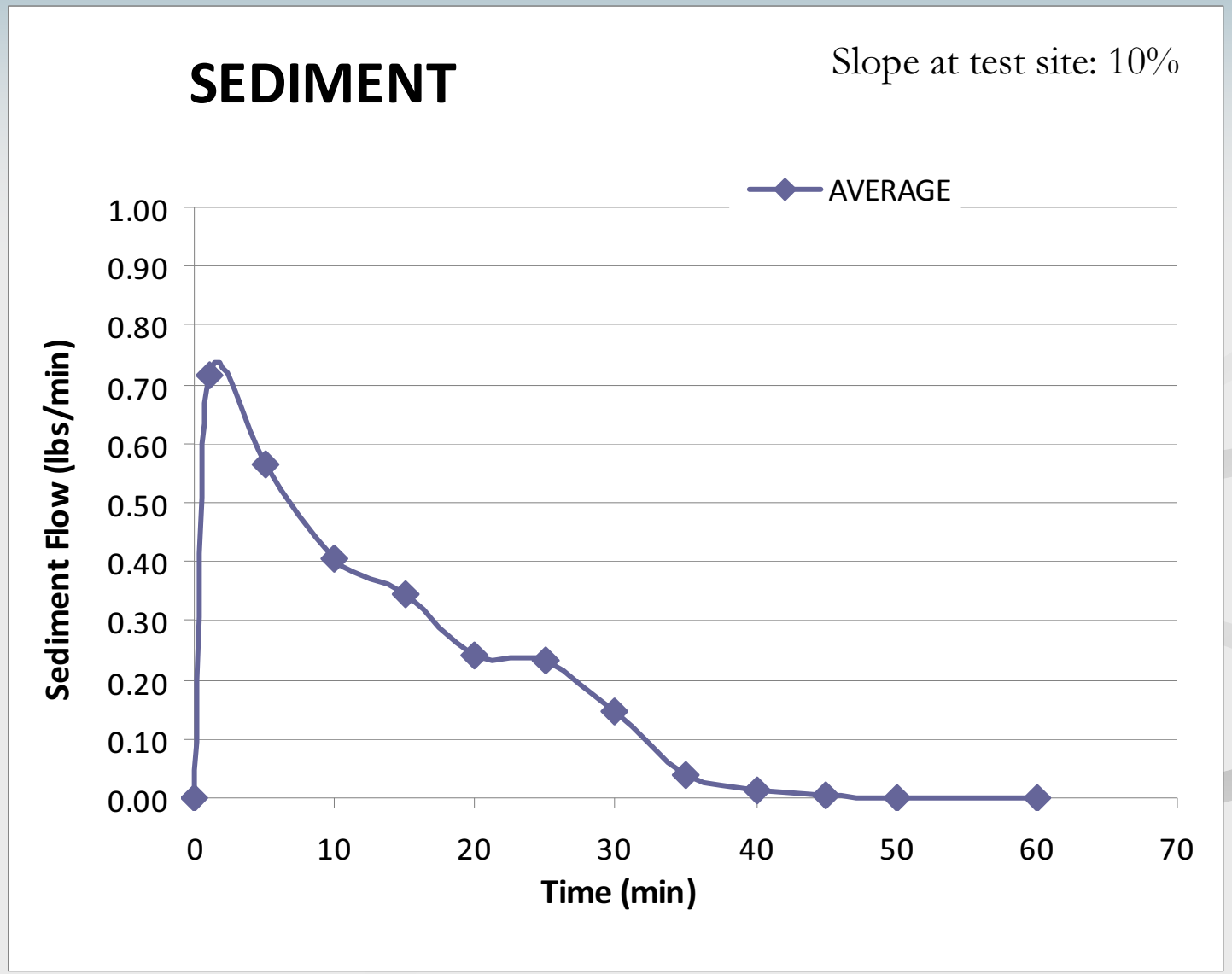


Carroll Road

Carroll Road Results



Carroll Road Results



Twigg Road

Twigg Road Results*

*Equipment failure (loss of pressure from pump) occurred in the 3rd run, preventing it from being completed. All data for Twigg Road site based only on runs 1 and 2.

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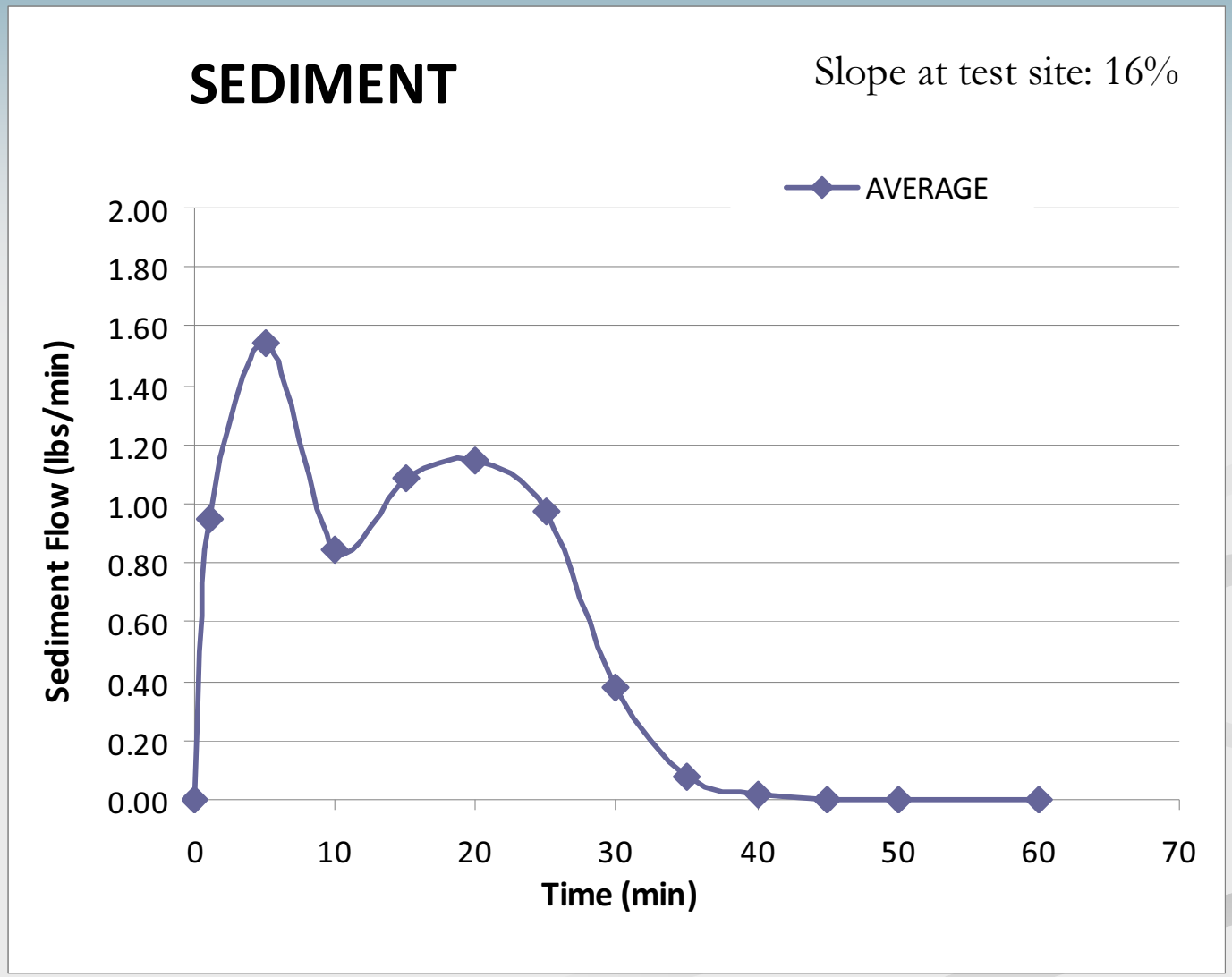

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Test Site Comparison

	Gordon Rd	Carroll Rd	Twigg Rd
Peak Average Flow Rate (gal/min)	12.6	7.2	15.8
Peak Average Sediment Flow (lbs/min)	0.709	0.717	2.193

Next Steps

- Fix the problem
  - Grant money has been applied for to conduct corrective maintenance projects on the Green Ridge State Forest test sites
  - Many environmentally sensitive maintenance practices (ESM's) developed & tested by the PA Center
    - 3 are currently credited under the TMDL Bay Model for sediment reduction
  - Following corrective maintenance, a second test can be conducted on the site to quantify the benefit: % reduction in flow and sediment

Current Credited Practices

Resource BMP	How Credited to Model	Sediment Reduction Efficiency
Dirt & Gravel Road Erosion & Sediment Control - Driving Surface Aggregate (DSA) + Raised Road Bed	Mass reduction/length	2.96 lb/ft
Dirt & Gravel Road Erosion & Sediment Control - With Outlets	Mass reduction/length	3.6 lb/ft
Dirt & Gravel Road Erosion & Sediment Control - Outlets Only	Mass reduction/length	1.76 lb/ft

Information obtained from Chesapeake Bay Program website:
http://archive.chesapeakebay.net/pubs/NPS_BMP_Table1.8.pdf

Education & Training

- Education
  - Rainmaker Field Day and Demonstration
    October 6th from 10:00-2:30 at Green Ridge State Forest
- Training proposed for 2012
  - Train county roads staff, state forest staff, and other managers of properties with unpaved roads in environmentally sensitive maintenance practices (ESM's)

Questions?