Study finds better way to protect streams from construction runoff

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Researchers at North Carolina State University have found an exponentially better way to protect streams and lakes from the muddy runoff associated with stormwater around road and other construction projects.

The alternative is lower or comparable in cost to commonly used best management practices (BMPs) around construction sites, yet much more effective at keeping streams and lakes free of runoff sediment that pollutes water and harms aquatic life.

In a study comparing BMPs against alternatives on road stormwater runoff in western North Carolina, the NC State researchers found the alternative method kept local streams that received the runoff cleaner, and helped reduce the amount of sediment loss inside ditches near roads. Sediment and muddy water are among the most common pollutants of streams and lakes.

Dr. Rich McLaughlin, associate professor of soil science at NC State and one of the researchers involved in the project, says that the current BMPs used in controlling erosion and sediment involve using so-called "sediment traps" along with rock check dams in ditches. Sediment traps collect water with the heavier sediment - like dirt and other larger, heavier particles - settling to the bottom and the "cleansed" water moving through rock check dams, or piles of rock that are intended to slow the flow of water through the ditch. Water then travels out of the ditch through a pipe to streams, rivers or lakes.

In the study, McLaughlin and NC State colleagues Scott King, extension associate in soil science, and Dr. Greg Jennings, professor and extension specialist in biological and agricultural engineering, found that the BMPs don't hold a candle to the alternative - natural fiber check dams (FCDs) enhanced with polyacrylamide (PAM), a chemical that causes sediment to clump together. FCDs use natural fibers instead of rocks as a type of dam to slow the flow of water in ditches.

The researchers found, in a measure of the "muddiness" of road runoff, that the BMPs yielded 3,813 nephelometric turbidity units (NTUs) in testing, equating to some rather muddy water, McLaughlin says. Fiber check dams with PAM yielded averages of 34 NTUs, a veritable drink of Perrier in comparison, McLaughlin adds.

Further, the study showed that after a storm, sites that used standard BMPs lost an average of 944 pounds of sediment compared with only 1.8 pounds of sediment lost at sites utilizing FCDs with PAM.

McLaughlin says that these results are so convincing that North Carolina's Department of Transportation is in the process of making FCDs with PAM the new best management practice around road and construction sites. McLaughlin's group is also training engineers and installers around the state and nationally in the use of this system.

A paper showing the study results appears in the March/April edition of the *Journal of Soil and Water Conservation*.

More information: "Improving construction site runoff quality with fiber check dams and polyacrylamide," Richard A. McLaughlin, Scott E. King and Greg D. Jennings, North Carolina State University, Published: March/April 2009 edition of the *Journal of Soil and* Water *Conservation*.

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