Mar 17th, 1:45 PM

Session 2B: Variety

Kentucky Water Resources Research Institute, University of Kentucky

MUD, HORSES AND CLEAN WATER- A BMP DEMONSTRATION PROJECT FOR SUBURBAN HORSE OWNERS

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The Mud-Horse BMP demonstration project is related to environmental and water quality protection targeted to suburban and pleasure horse owners in Kentucky. Existing educational programs for horse owners are usually on a county level basis only. This project aims at reaching larger audiences. With nearly 200,000 horses in Kentucky, an interdisciplinary team has been assembled to provide the horse owner with the training and information needed to implement sound management decisions that enhance horse well-being and protect the environment. Little information is available to the horse owner demonstrating the proper use of, or more importantly, the effectiveness of BMP's in suburban horse farms.

The goal of the BMP demonstration project was to transfer and promote the knowledge that will be essential to realistically protect water quality in suburban horse farms while enhancing horse well-being. We have tried to accomplish this by (i) accurately identifying baseline water quality and other environmental issues in suburban horse farms, (ii) implementing BMPs that have been proven to reduce water pollution elsewhere, and (iii) facilitating the transfer of this knowledge to horse farmers.

The project developed and distributed a survey to 4000 horse owners in the state of Kentucky. At present, we have received over 700 responses. The data are being analyzed for inclusion in a fact sheet about critical issues faced by the suburban horse owner. A project website has been created with information for the horse owner. Heavy use pads have been constructed at farm sites in Anderson, Fayette, Jessamine, Scott, and Woodford Counties. Fact sheets have been developed related to the heavy use pads, composting, and pasture management. A distribution strategy for the fact sheets is under development.

NOTES

A TOPOLOGICAL MODEL OF OPEN CHANNEL FLOWS

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Experimental results of flow visualizations in turbulent open channel flows over smooth and rough beds reveal a universal pattern of coherent vortex formation that influences the spatial and time-average velocity distributions. These interactions are responsible for the generation of large eddies in rivers. The geometrical properties of the coherent vortices are shown to be related to the size of the roughness elements in gravel-beds. These structures are responsible for three-dimensional control of the turbulent core region and the location of the maximum velocity filament in the instantaneous and time-average velocity fields. The topological properties of the linked and knotted vortex interactions are used to constrain the derivation of the velocity distribution in straight, gravel-bed reaches and a simple model for velocity distribution based on the topological properties of the coherent vortex structure is presented and compared to measured velocity data in new experimental channels and to data from previous field studies.

NOTES

RAIN GARDENS: RESTORING A WASTE WATER TO A PRICELESS RESOURCE

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Impervious surfaces such as roofs and pavement prevent stormwater from soaking into the ground. In developed areas, small tributaries and larger streams often experience eroded banks, incised channels, loss of habitat, increased flooding, and cause property damage because they are unable to handle the increased water volume and flow. Temporarily retaining as much stormwater as possible and letting it soak into the ground rather than letting it run off quickly can help manage harmful flows. Rain gardens are one way to reduce stormwater runoff.

A rain garden is a shallow depression that captures runoff before it enters the stormwater system. It filters pollutants and reduces the amount of runoff by encouraging infiltration of water into the soil where it can recharge groundwater. The increased soil moisture and added vegetation can help reduce the Urban Heat Island Effect that can cause temperatures to be up to 5 ^{o}F warmer in urban settings; attract birds, bees, and butterflies; and decrease drainage problems and localized flooding. Rain gardens are typically sized to capture water from a 1 inch rainfall event and allow it to soak into the ground within 1-2 days.

Deep roots of native plants typically help to enhance this process. Native plant species are recommended for rain gardens because of their extensive root systems and tolerance to local weather conditions. Their deep root structures break up the soil and help water infiltrate into the ground. Use of plants that bloom at different times can help create a long flowering season. A mix of heights, shapes, and textures also gives the gardens depth and dimension. Shredded hardwood mulch can help prevent weeds and adds nutrients to the rain garden.

NOTES

KENTUCKY EROSION PREVENTION AND SEDIMENT CONTROL (KEPSC) – AN ANSWER TO THE QUESTION "WHAT IS A QUALIFIED INSPECTOR?"

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A permit is required for projects that disturb one or more acres or is less than one acre but is part of a common plan of sale or development that disturbs one or more acres. Many projects are able to be covered under the Kentucky Storm Water General KPDES Permit (KYR10) when a properly executed application, or Notice of Intent (NOI), is submitted. KYR10 requires that Best Management Practices Plans (BMP Plans) be prepared and implemented for each project, and that inspections for proper implementation of the BMP Plans be conducted by qualified personnel. But KYR10 does not define what qualified personnel are.

Thus began the challenge for each community, agency, developer and contractor. What is a qualified inspector? The Municipal Separate Storm Sewer System (MS4) Workgroup, consisting of storm water professionals from across the Commonwealth, decided to develop a consistent approach across the Commonwealth instead of each community trying to define a qualified inspector (QI) on their own. The MS4 Workgroup established a Subcommittee to help develop the approach to define a QI.

The Qualified Inspector (QI) Subcommittee started working the first part of 2007 to develop a training course and exam to determine who is a QI. The Subcommittee titled

the training Kentucky Erosion Prevention and Sediment Control (KEPSC) – Qualified Inspector. The training course and exam rolled out in June 2007 and continues to be offered throughout the Commonwealth. The training course uses the information contained in KYR10 to address what a QI needs to know and what they need to do.

The main guidance for determining what constitutes a QI is KYR10; therefore, the QI needs to be knowledgeable of the KYR10 contents. KYR10 states what should be contained in a BMP Plan, what a QI should inspect and document, how often a QI should conduct an inspection, and who are the responsible parties of the permit.

Though the QI is not required to have the skill set to develop a BMP Plan, they need to be knowledgeable about BMP Plans to know what seems reasonable and to know when a modification is needed. The BMP Plan typically consists of a map and a written portion. KYR10 contains requirements for the contents of the written portion, including:

- Site description
- Sediment and erosion control measures
- Other control measures, such as good housekeeping
- Other state or local requirements
- Maintenance requirements for the BMPs
- Inspections: frequency, documentation
- Management of non-storm water discharges
- Names of Contractors and Subcontractors

The QI needs to be able to read the BMP Plan map to know what BMPs need to be installed and where they need to be installed. The QI should use the *Kentucky Erosion Prevention and Sediment Control Field Guide* and *Kentucky Planning and Technical Specifications BMP Manual* as references. To be able to determine the proper functioning of the BMPs, the QI needs to know the applicability, proper installation, and proper maintenance of each of the BMPs on the Plan.

As the name signifies, the QI conducts an inspection. The inspection is to assess the proper implementation of the BMP Plan. The training guides the QI in how to conduct an inspection and provides checklists for what to inspect.

The inspection does not serve much use unless it is documented and communicated with the appropriate personnel. The QI will be guided on how to document the inspection by completing a recommended inspection form. The inspection form is necessary to validate compliance with KYR10 and is an excellent tool for communicating BMP Plan deficiencies to appropriate personnel.