



SEDIMENTS

Newsletter of the North Carolina Sedimentation Control Commission

Sediment Control BMPs: Comparing Effectiveness of New and Old Technologies

By Richard A. McLaughlin, Ph.D., and Melanie McCaleb, MS, CPESC, Soil Science Department, NC State University, Raleigh, NC

Compost socks vs. silt fence - The use of silt fence has been a mainstay in the sediment and erosion control industry as an inexpensive material for controlling sediment on construction sites. New technologies have made their ways into the market with the goal of improving on the performance and reliability of silt fences. A study was conducted at the Ohio Agriculture Research and Development Center's (OARDC) Composting Research Center in Wooster, OH, to compare silt fence and compost socks for removing sediment and to pond water under controlled conditions (Keener et al, 2007). Also determined were the effects of sock diameter (8, 12, and 18") and coarseness (fine grade < 0.0661" and coarse grade > 0.5") of the material used to fill the socks. The test was conducted in a flume tilted to slopes of either 11 or 22 percent. Measurements of the discharged flow rates were calculated with clear water and with water containing almost 1 percent added soil. The testing done with clear water showed a relatively consistent flow-through rate for both silt fence and compost socks. The rate of flow-through was related to the depth of ponded water behind the socks. Clear water flow rates were increased nearly 4 times when coarse material was used in the sock compared to fine material, and was roughly the same compared to silt fence. When sediment-laden water was used, the amount of sediment accumulating on/in the devices increased, reducing flow and eventually leading to the overtopping of the devices. Tests with sediment-laden water showed the coarse compost socks of both 12" and 18" diameter took much longer to overtop than a 30" silt fence when flows were less than 5

gallons per minute per foot. At higher flow rates, all of the devices overtopped quickly. The 8" diameter coarse compost sock was equal in performance to a (shorter) 18" silt fence as measured by time to overtopping.

Total sediment removal efficiency percentage was 50.0, 34.7, and 29.3 at in-flow rates of 2, 4, and 5 gpm), respectively, averaged across three sediment control devices (8' and 12" compost sock and 24" silt fence). Total sediment removal rates were 30.7, 39.7, and 43.0 percent for the 8" diameter silt sock, 12" diameter silt sock, and 24" silt fence respectively when test results for each device were averaged for all flow rates. The 24" silt fence retained statistically significantly more sediment than the 8" coarse compost sock but not compared to the 12" coarse compost sock. (See Figure 1 on page 7).

Are rock filter dams effective components of SWPPP?

A Stormwater Pollution Prevention Plan (SWPPP) describes structural and non-structural controls that will be designed and implemented on a site to decrease negative impacts of offsite storm water discharges to the environment. The purpose of these installed features is to minimize erosion and to minimize pollutant loading into our waterways. One of the most common features of erosion and sediment control plans, considered part of the SWPPP, are rock dams which slow water flow and allow sediment to drop out of runoff.

A study was conducted around the Houston Texas area on a dry drainage ditch that

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State of North Carolina,
Department of Environment & Natural Resources
Dee Freeman, Secretary

Land Quality Section, Division of Land Resources
James D. Simons, Director and State Geologist

NC Sedimentation Control Commission: May Actions

At its meeting on May 20, 2010 the NC Sedimentation Control Commission (SCC) took the following actions:

Delegated Local Programs

- Town of Kitty Hawk: Approved the continuation of Local Delegation of erosion and sediment control (ES&C) programs.
- Town of Kill Devil Hills: Approved the continuation of Local Delegation.
- Town of Nags Head: Approved the continuation of Local Delegation.
- City of Jacksonville: Approved the continuation of Local Delegation.
- City of Raleigh: Approved the continuation of Local Delegation.
- City of Newton: Approved the continuation of Local Delegation.
- Catawba County: Approved the continuation of Local Delegation.
- Iredell County: Approved the continuation of Local Delegation.
- Cabarrus County: The County surrendered their Local Program. The Mooresville Regional Office has resumed responsibility for the county's ES&C program.

Adoption of Draft Rules for Design Standards in the Falls Lake Watershed and Permanent Ground Cover.

- Four draft standards for erosion control for the Upper Neuse River Basin/ Falls Lake Watershed were approved to proceed to the public comment process based upon recommendations by the Technical Advisory Committee (TAC). These draft standards are similar to those already developed for water supply watersheds throughout the State, except the fourth standard has a 10-day limit for establishing ground cover. The SCC is required to develop and adopt rules for the Falls Lake watershed by December 1, 2011. The four draft standards include (standards 1-3 are paraphrased):

1. Erosion and sedimentation control measures shall be planned, designed, and constructed to provide protection from the 25-year storm event (paraphrased);

2. Sediment basins shall be constructed so that an estimated 70% of larger soil particles (40-micron or greater) will be captured for a 2-year storm (paraphrased);
3. Newly constructed open channels shall have no steeper side slopes than 2:1 slopes if vegetative cover is used for stabilization; steeper side slopes are permitted if soil or geologic conditions ensure stabilized side slopes by using mechanical devices, structural devices, or acceptable ditch liners. In any event, the angle for side slopes shall be sufficient to restrain accelerated erosion (paraphrased).
4. Stabilization of disturbed areas shall be provided within 10 calendar days wherever land-disturbing activities have ceased, or have temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. Extensions may be approved by the Sedimentation Control Commission or a local government that administers an erosion and sedimentation control program approved under G.S. 113A-60 (actual proposed standard)

Adoption of Draft Rules for Temporary and Permanent Ground Cover.

- Approved draft amendments to proceed to the public hearing process. These amend the existing statutes and rules regarding ground cover to comply with the EPA's Effluent Limit Guidelines (ELG) that will require after August 3, 2011 all construction sites not being actively graded to be stabilized within 14 days or less. The current NC Rule 15A, NCAC 04B .0107 establishes a time period of 15 working days or 90 calendar days upon completion of construction, whichever period is shorter except as provided in 0401 24(e) which are the high quality water standards (shorter of 15 working days or 60 calendar days). The proposed draft rule is:

15 NCAC 04B .0107 (b) Pursuant to G.S. 113A-57(3), a temporary or permanent ground cover sufficient to restrain erosion shall be provided within 14 calendar days wherever land-disturbing activities have permanently ceased on any portion of the site. Permanent ground cover sufficient to

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SEDIMENTS is published by the NC Sedimentation Control Commission to provide information and assistance to the regulated community and to facilitate communication among personnel of state and local erosion and sedimentation control programs. Past issues are on the [Land Quality Section web site](#).

Send comments to Evangelyn Lowery-Jacobs, NCDENR-Land Quality, 1612 Mail Service Center, Raleigh, NC 27699-1612. Email: evangelyn.lowery-jacobs@ncdenr.gov.

To receive *Sediments* electronically, please see page 1 for list service instructions or contact bonnie_kurth@ncsu.edu or (919) 515-3723.

Personnel of the Land Quality Section of the NC Department of Environment and Natural Resources provide information and assistance for implementation of the NC Erosion and Sedimentation Control Program. For assistance, please contact the Regional Engineer or the Raleigh headquarters listed below:

- TBA
2090 US Hwy 70
Swannanoa, NC 28778
(828) 296-4500
- Steve Cook, CPESC
225 Green Street, Suite 714
Fayetteville, NC 28301
(910) 433-3300
- Zahid Khan
610 East Center Ave., Suite 301
Mooresville, NC 28115
(704) 663-1699
- John Holley, PE
3800 Barrett Drive, Suite 101
Raleigh, NC 27609
(919) 791-4200
- Pat McClain, PE
943 Washington Sq. Mall
Washington, NC 27889
(252) 946-6481
- Dan Sams, PE
127 Cardinal Dr. Ext.
Wilmington, NC 28405-3845
(910) 796-7215
- Matt Gantt, PE
585 Waughtown St.
Winston-Salem, NC 27107
(336) 771-5000
- Gray Hauser, PE
Raleigh Central Office
512 N. Salisbury St., 1612 MSC
Raleigh, NC 27699-1612
(919) 733-4574

The North Carolina Sedimentation Control Commission

The Sedimentation Control Commission (SCC) was created to administer the Sedimentation Control Program pursuant to the NC Sedimentation Pollution Control Act of 1973 (SPCA). It is charged with adopting rules, setting standards, and providing guidance for implementation of the Act. The composition of the Commission is set by statute to encompass a broad range of perspectives and expertise in areas related to construction, industry, government, and natural resource conservation and quality. All members are appointed by the Governor and serve three-year terms, except for the Director of the Water Resources Research Institute of the University of North Carolina, who serves as long as he remains Director. The chairman of the SCC is named by the Governor. The following is a list of current members with the organizations they represent:

Chair:

Robin Smith
Burnsville

Non-governmental Conservation

Commissioners:

Elaine C. Chiosso
Bynum

Non-governmental Conservation

Tommy Esqueda
Wake County

NC Association of County Commissioners

Joseph E. Glass
Fayetteville
Professional Engineers of NC

Kevin Martin
Franklinton
NC Environmental Management Commission

Rich McLaughlin
Raleigh
NC State University, Dept. of Soil Science

John William Miller, Jr.
Burnsville
NC Mining Commission

Randy Veltri
Charlotte
NC Public Utilities

Richard Vick
Wilson
Carolinas Associated General Contractors

Michael P. Voiland
Raleigh
Water Resources Research Institute of
The University of North Carolina

Rob Weintraub
Wake Forest
NC Home Builders Association

Manly West
Moyock
NC Soil and Water Conservation Commission

LQS Personnel Changes

Brad Cole transferred from the Raleigh Regional Office to the Raleigh Central Office on April 12, 2010 and is now an Assistant State Dam Safety Engineer

Deborah Williams started on April 19, 2010 as Program Assistant to the Sediment Program and Dam Safety Program in the Raleigh Central Office

Roger King started on May 3, 2010 as Program Assistant in the Dam Safety Program in the Raleigh Central Office

Evangelyn Lowery-Jacobs transferred from the Fayetteville Regional Office to the Raleigh Central Office on September 1, 2010 and is now the Sediment Education Specialist

Janet Boyer, Regional Engineer of the Asheville Regional Office, was promoted to State Mining Specialist in the Raleigh Central Office on December 9, 2010

The following nine (9) personnel left the Land Quality Section on September 30, 2010 because of a reduction in force (RIF):

Jason Fulton, Environmental Specialist, Asheville Regional Office

Andrew Schneider, Assistant Regional Engineer, Mooresville Regional Office

Michael Hedrick, Environmental Specialist, Mooresville Regional Office

Chad Broadway, Environmental Specialist, Mooresville Regional Office

Jennifer Fickler, Environmental Specialist, Mooresville Regional Office

Clif Whitfield, Assistant Regional Engineer, Winston-Salem Regional Office

Neil Uldrick, Environmental Specialist, Winston-Salem Regional Office

Ryan Locklear, Environmental Specialist, Fayetteville Regional Office

Paul Worthington, Environmental Specialist, Wilmington Regional Office

New SCC Members

Randy Veltri

Randy Veltri is a Manager for Siting and Site Development at Duke Energy, Charlotte, NC. Mr. Veltri's graduated from West Virginia University and is a registered

Landscape Architect responsible for siting and permitting Power Delivery Electrical Facilities. Mr. Veltri has 29 years of experience in siting and permitting.

Manly West

Manly West is the Chairman for the N.C. Soil and Water Conservation Commissioners, representing the Coastal Region. Mr. West is an elected soil and water supervisor for Currituck County, one of five counties that make up the Albemarle Soil & Water Conservation District, for which he has served as supervisor since 1987. A Currituck native, Mr. West is employed in information systems management for the federal government and also operates his own farm, which has been worked continuously by his family since the American Revolution. He has served in the U.S. Coast Guard, currently sits on the Currituck Co. Planning Board, and is active in his local church. Mr. West is married, with one son.

Kevin Martin

Kevin Martin is a member of the Environmental Management Commission (EMC). Mr. Martin is a N.C. Licensed Soil Scientist; Professional Wetland Scientist; Registered Professional Soil Scientist, N.C. Certified Waste Water Treatment Plant Operator, and N.C. Certified Sub-Surface System Operator. Since 1989, he has been the Co-founder and Principal of Soil & Environmental Consultants, PA, specializing in soil/site evaluation for on-site waste disposal, flood hazard soils and wetland consulting, well sampling and analysis, physical and chemical soils analysis, computer modeling, environmental assessments and other environmental analysis. Mr. Martin received his BS in 1980 in Conservation, Soil Science Concentration, NCSU and his MS in 1987 in Soil Science, Civil Engineering Minor, NCSU.

Rich McLaughlin

Rich McLaughlin is a Professor and Extension Specialist in the Dept. of Soil Science at NC State University. Dr. McLaughlin focuses on erosion, sediment, and turbidity control from construction sites. Simple, inexpensive turbidity reduction systems developed by McLaughlin and colleagues were recently cited by USEPA as methods to achieve the Effluent Limit Guideline rule regulating turbidity in construction site runoff.



SCC May Actions continued from page 2

restrain erosion must be established within 60 calendar days following completion of construction or development, other than small disturbances (less than one-half acre), except that permanent ground cover sufficient to restrain erosion must be established within 90 calendar days following completion of construction or development, other than small disturbances (less than one-half acre), in the following counties: Alexander, Alleghany, Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Polk, Rutherford, Surry, Swain, Transylvania, Watauga, Wilkes and Yancey; and except as provided in 15A NCAC 4B .0124(e). Extensions may be approved by the Sedimentation Control Commission or a local government that administers an erosion and sedimentation control program approved under G.S. 113A-60. Such extensions may be due to natural factors that impede the seeding process.

Education Projects:

- Funded North Carolina State University to continue electronic production (web-posting and listserv) of the Sediments newsletter (\$17,020). The Sediments newsletter will be produced semi-annually (reduced from quarterly), with summaries of the SCC meeting actions disseminated via the Sediments listserv in between these issues.
- Funded WRI to continue support for the Annual Workshop and Awards banquet for the Local Erosion and Control Programs, including meeting facility and attendee travel (\$65,918).
- Funded WRI to support the NC Sedimentation Control Commission (SCC) and NC Department of Environment and Natural Resources –Division of Land Resources, Land Quality Section (DENR-LQS) staff by providing assistance in the continuation of workshops for Design Professionals Training. Four workshops were funded, two in Raleigh and two at the Mountain Horticultural Crops Research and Extension Center in Mills River, near Asheville) (\$28,472). This year's funding includes a partnership with Dr. McLaughlin to provide classroom and field demonstration instruction on turbidity control for one day of the two-day workshops.
- Funded North Carolina State University

to establish the Western North Carolina Erosion, Sediment and Turbidity Control Training and Demonstration Site (\$19,550; up to \$27,550 if funds are available) at the Mountain Horticultural Crops Research and Extension Center. This would provide a site in the western part of the state similar to the Sediment and Erosion Control Research and Demonstration Facility at the Lake Wheeler Road Field Laboratory. This site would be utilized in the upcoming E&SC Design Professionals Workshops.

- Reallocate unspent education funds in the current year that ended June 2010 (\$47,212) to assist with Land Quality Section operations such as regional office rent, travel and supplies.

Technical Advisory Committee

- Approved three additional members for the SCC Technical Advisory Committee: Fred Grogan, Craig Wyant, and Robert Hastings. The current committee members are: Greg Jennings (PE, PhD, NCSU, Biological and Ag Engineering), Kenny Waldroup (City of Raleigh Public Utilities), Curtis J. Richardson (PhD, Duke, Resource Ecology), Rich McLaughlin (PhD, NCSU, Soil Science), Kevin Martin (LSS, Soil Science consultant), Berry Jenkins (PE, Association of General Contractors), David Harris (PE, NC-DOT Roadside Erosion Control and Vegetation Management), Mark Senior (PE, City of Raleigh Stormwater), Mark A. Taylor (PE, Engineering consultant), Mack Little (RLA, Landscape Architecture consultant), Fred Grogan (Landscape Architect), Craig Wyant (Landscape Architect), Robert Hastings (Water Resources), Fred Roger Watson (PE, Metropolitan Sewerage District of Buncombe County), Chris Roberts (PE, Durham County, Division Manager Sedimentation & Erosion Control Division), Wyatt L. Brown (LSS, NC Ecosystem Enhancement Program, and Jimmy Kizer (PE, Engineering consultant). The Technical Advisory Committee's roles include being a technical advisory for the development of draft rules for the Falls Reservoir and Upper Neuse River water supply and evaluating potential revisions to the Sediment and Erosion Control Manual. ❖

NC Sedimentation Control Commission: August Actions

At its meeting on August 19, 2010 the NC Sedimentation Control Commission (SCC) took the following actions:

Delegated Local Programs:

- City of Monroe: Approved the continuation of Local Delegation of erosion and sediment control (ES&C) programs.
- Haywood County: Approved the expansion of the Local Delegation jurisdiction of Haywood County to include the Town of Clyde.

SCC Members (Informational Item)

- SCC members: Randy Veltri will represent local government utilities, Mr. West will represent the NC Soil and Water Conservation Commission, and Rich McLaughlin will represent NCSU Soil Science Department.
- Exiting members: Buzz Bryson, Grover McPherson, Joseph Kleiss, and Donnie Brewer.
- New Chair: Robin Smith ❖

NC Sedimentation Control Commission: November Actions

At its meeting on November 30, 2010 the NC Sedimentation Control Commission (SCC) took the following actions:

Delegated Local Programs:

- **NC Department of Transportation:** Approved the continuation of Local Delegation of erosion and sediment control (ES&C) programs. NCDOT was praised for their certification training for contractors and exceptional sediment and erosion control on the Western Wake Turnpike project. The following recommendations were noted in the Administrative review:
 - For sediment basins, DOT should update their skimmer details to show the PVC barrel pipe on floating skimmers should be at least 6 feet long. The orifice plate on the barrel

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of the skimmer should be checked as part of each self-inspection. Fabric linings of spillways should be carefully shingled (overlapped) and pinned. Interior slopes should be no steeper than 1.5:1 and the slopes should be stabilized with vegetation; matting is recommended. Drawings of the proposed contours are recommended in steep terrain to minimize the destabilization of adjacent steep slopes.

- For slope stabilization, graded slopes and fill need adequate seedbed preparation.
- For cutting and clearing within trout buffer areas, NCDOT shall consider tree clearing (even if stumps remain), as a disturbance requiring a trout buffer zone variance.
- Gaston County: Approved the change in Gaston County's ordinance to expand the Environmental Review Board to include 3 new members, one from the Gaston County Homebuilders Association and 2 developers nominated by the Gaston County Homebuilders Association. The current composition includes representatives from a participating municipality, Gaston County Soil and Water Conservation District, Gaston County Quality of Natural Resource Commission, Gaston County Chamber of Commerce, one Township representative appointed by the Gaston County Board of Commissioners, and a NC registered professional engineer.
- Jackson County: Approved a continuation of the review of Local Delegation until February 2011. The county is not taking effective enforcement action against sites with significant violations, notably for inadequate ground cover.
- Macon County: Approved the continuation of Local Delegation.
- Town of Highlands: Approved the continuation of Local Delegation.
- Town of Boone: Approved the continuation of Local Delegation.
- Watauga County: Approved a continuation of the review of the Local Delegation with an update from LQS in February 2011 and a follow-up review by May 2011. The Winston Salem Regional Office will assist the County to improve organization and structure, increase training of staff regarding erosion control reviews, and strengthen the ability to conduct formal inspections and documentations.

Plan Review Fees:

- Passed a resolution to recommend that the NC General Assembly amend the NC Sedimentation Pollution Control Act (SPCA) to increase Plan Review Fees to \$170 per disturbed acre or part thereof, as recommended in the report to the Environmental Review Commission (ERC); allowing inspection frequency to be increased to 1 inspection every 4 months. (Note: this fee increase would not be enough to provide the recommended monthly inspection frequency by the Regional Office staff.)

SCC 2011 Meeting Dates:

- Thursday, February 17
- Tuesday, May 17
- Thursday, August 18
- Tuesday, November 29

Support documents for SCC actions may be found online at <http://dlr.enr.state.nc.us/scc.html> ❖

To report possible violations of the NC SPCA call
1-866-STOPMUD 786-7683

News from Land Quality Section

Evangelynn Lowery-Jacobs - new Sedimentation Education Specialist

Ms. Evangelynn Lowery-Jacobs, formerly an Assistant Regional Engineer in the Fayetteville Regional Office, has transferred to Sedimentation Education Specialist in the Raleigh Central Office. This position is responsible for implementing the training and education programs of the Sedimentation Control Commission statewide.

Erosion and Sedimentation Control Planning and Design Workshop

By Nicole Saladin, Coordinator for Research & Outreach, Water Resources Research Institute, NC State University

In spite of a slow economy, urban and suburban developments are beginning to increase. Overall, development has occurred at unprecedented rates in recent decades. While development brings many opportunities, it also poses challenges to those who manage land and water resources, as well as to all the citizens who depend on those resources.

Urban landscapes contribute a variety of pollutants to local waterways, including heavy metals and oils from paved surfaces, nutrients from landscaping practices, and sediment from exposed and eroding soils. Sediment has been identified as the number one water pollutant in the country, and much of this comes from improper development practices that do not properly stabilize exposed soils during and after the construction process.

As regulations regarding land use practices and water quality are constantly updated and new technologies emerge, it is important for practitioners to understand the issues associated with sediment and erosion control, as well as the regulations that address those issues, and industry best practices for satisfying those regulations in the field. To help those practitioners – site designers, developers, contractors, surveyors, other engineers, and even regulators themselves stay up to date on this information, NC Department of Environment and Natural Resources (NCDENR) Division of Land

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Planning and Design Workshops continued from page 5

Resources partnered with the Water Resources Research Institute to host a series of two-day workshops aimed at erosion and sediment control, as part of the NC Sedimentation Control Program's educational efforts.

In October, 76 practitioners gathered at the Mountain Horticultural Crops Research Station in Mills River NC. In November, another 87 participants attended the workshop in Raleigh, where presentations were given at the Brownstone Hotel with a field trip on day two to NC State University's Lake Wheeler Research Station. In the classroom, participants learned from NC DENR staff and other experts about regulations, such as the Proposed Falls Lake Rules and trout buffer disturbances, stormwater best management practices, and land stabilization practices, such as the use of regionally appropriate vegetative cover and chemical applications such as polyacrylamides (PAM). On day two of each workshop, participants were guided in the field by Melanie McCaleb and Rich McLaughlin of NC State University's Department of Soil Science. They were given hands-on demonstrations on the use of PAM for sediment control using a variety of passive and active dosing treatments. Fiber check dams, a passive approach to dosing, were used along the newly constructed demonstration site at the Mountain Horticulture Site to show the effects of PAM on turbidity control (Figure 1). PAM was also used in conjunction with different types of ground cover applications to demonstrate the ability to reduce erosion and sediment loading rates (Figure 2).



Figure 1. Wattles installed with PAM.

Another series of workshops will be held in spring 2011, where participants will get another opportunity to tour the Fletcher and Raleigh research facilities, and prepare themselves and their colleagues for new regulations and learn new methods to help protect the state's land and water resources. More



Figure 2. Participants "raining" on different ground cover applications.

information on the workshops, such as agendas, presentations, and registration for the spring can be found at http://www.ncsu.edu/wrri/events/esc_workshops/pastescworkshops.html.

Photos are from the new training center at the Mountain Horticulture Crops Research and Extension Center. Workshop sponsors include: North Carolina Sedimentation Control Commission, North Carolina Department of Environment and Natural Resources - Division of Land Resources - Land Quality Section, and Water Resources Research Institute of The University of North Carolina. ❖

Another Home Builder Settles with USEPA for Clean Water Violations

Beazer Homes USA, Inc. has agreed to pay a \$925,000 civil penalty for erosion and sediment control violations in 21 states. The lawsuit covers 362 sites in twenty one states; 46 sites are located in North Carolina. As part of the settlement, Beazer will also implement a company-wide stormwater program to improve compliance with stormwater requirements at current and future construction sites around the country. Details on the Beazer Settlement are at: <http://www.epa.gov/compliance/resources/cases/civil/cwa/beazer.html>. For a summary of other settlements with other home builders, see the November 2009 Sediments Vol. 16(3) newsletter at: <http://www.dlr.enr.state.nc.us/pages/sedimentationnewsletters.html>. ❖

IECA's Environmental Connection - The World's Largest Soil & Water Event!

February 20-23, 2011

Disney's Coronado Springs Resort - Orlando, Florida USA

The premier educational event for the erosion and sediment control industry. Environmental Connection has more erosion, sediment control, and stormwater focused training, technology and networking events than any other event. Over 4 days, Environmental Connection provides peer-reviewed education, products and technology which address eight technology sections:

- Slope Stabilization
- Stream Restoration
- Vegetative Establishment
- Stormwater Management
- Wetlands Technology
- Erosion and Sediment Control
- Beach and Shoreline Stabilization
- Wind Erosion Technology

Information: <http://www.ieca.org/conference/annual/ec.asp>



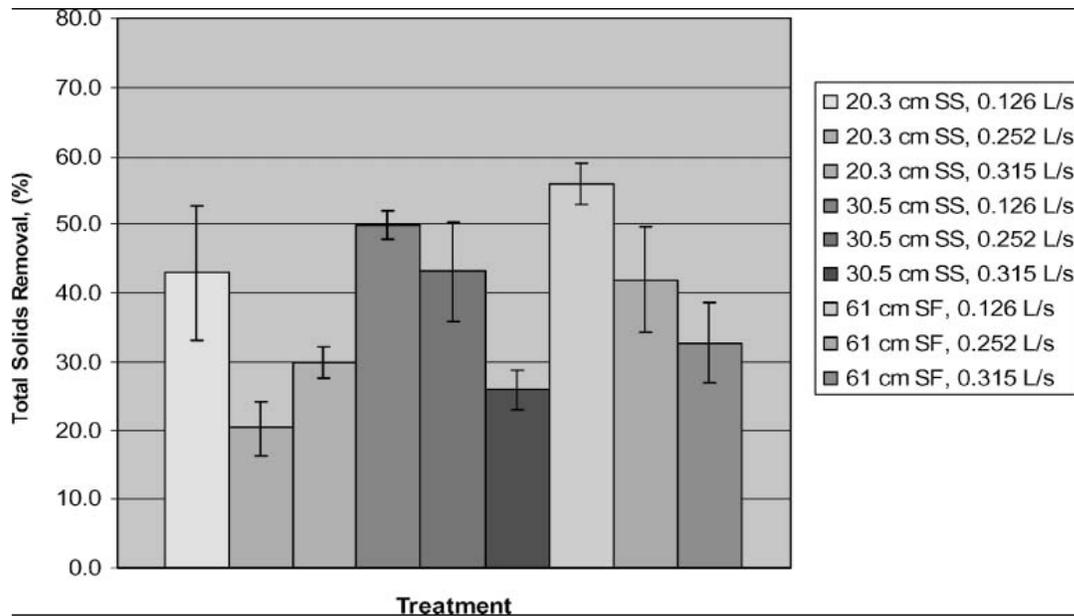


Figure 1. Total solids removal efficiency for diam 8 in (20.3cm) coarse SiltSoxx (SS), 12 in (30.5cm diam) coarse SiltSoxx, and 24 in (61cm) silt fence (SF) with a height of 18" (45.7 cm) above the flume, with corresponding flow rates. The standard error of the means for each treatment is shown. Flow rates tested were 2, 4, and 5 gpm (0.126, 0.252, and 0.315 L/s) (Keener et al, 2007).

Table 1. Materials added to BMPs for each test (Al-Hamdan et al. 2007).

Added material	Test designation					Total
	100%	80%	60%	40%	20%	
Sediment (dry weight, lb)	95	75	60	55	95	380
Organics*(1-gal container)	3	3	3	3	3	15
Metal (Soda Cans)	5	5	5	5	5	25
Plastic Bottles	3	3	3	3	3	15
Plastic Shopping Bag	1	1	1	1	1	5
Cigarettes Butts (Cup)	1	1	1	1	1	5
Cigarettes Box	1	1	1	1	1	5
Leaves and twigs.						

Table 2. Captured materials by BMPs at the end of testing (Al-Hamdan et al. 2007).

Material	Baysaver®		Total	CDS®			Stormceptor®				
	Primary Storage sump	sump		Inlet Pipe	Fiber glass/ inlet to screen Sump		After screen	Total	Fiber grass Sump Total		
Sediment (dry-wt., lb)	135.1	49.4	184.5	7.3	72.7	50.9	62.8	193.75	0.38	254.75	255.13
Organics (1-gal container)	3.8	6.7	10.5	1.5	7.4	3.9	0	12.8	0	11.8	11.8
Metal (Soda Cans)	7	15	22	0	12	13	0	25	0	24	24
Plastic Bottles	6	7	13	0	8	7	0	15	1	0	1
Plastic Shopping Bag	1	2	3	0	2	3	0	5	0	3	3
Cigarettes Butts, Cup	1.6	1.9	3.5	0.2	1.9	2.2	0	4.3	0.1	3.9	3.9
Cigarettes Box	1	3	4	0	2	3	0	5	0	5	5

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was adjacent to a two mile construction site (Cleveland and Fashokun, 2006). A rock filter dam was installed of unspecified materials, most likely rock of 3-5" diameter based on Texas DOT specifications and the picture provided. Water samples were obtained "upstream" and "downstream" of the dam over the course of two years and 142 sampling visits. Overall, total suspended solids were not reduced by the placement of this dam. The upstream TSS during storm conditions was actually less than that of the downstream samples. This could have been due to the ability of water flow to re-suspend already deposited sediment in the ditch line or within the dam. They also determined that the sediment load in the ditch was increased six fold once construction was initiated. Interestingly, the storm sediment concentrations were highest during the post-construction monitoring.

While there was no evidence of treatment in the water samples, the authors did note clear evidence of sediment being trapped upstream of the rock dam. This suggests that the sampling design did not fully capture the effects of the dam, and they indicated that sampling the solids above the dam should be included in future research projects.

Stormwater Pollution Control Show-down: Baysaver, CDS, and Stormceptor.

A study conducted in the central part of Florida investigated the effectiveness of three urban pollution control devices in removing sediment, nutrients, metals, and litter from entering storm drains (Al-Hamdan et al, 2007). The experiments were conducted at 100, 80, 60, 40 and 20 percent of the designed flow capacity for each device. The three devices were the Baysaver (max. 0.048 cubic meters per second (cms), or 1.7 cubic feet per second (cfs)), the CDS (max. 0.042 cms or 1.5 cfs), and the Stormceptor (max. 0.045 cms or 1.6 cfs). Stormwater from a retention pond was used with 172 kg (380 lbs) street sweepings from the city and fine sediments from a lake to add to the sediment concentrations (Table 1). For each device, paired influent and effluent samples were collected during the five tests and water quality samples were taken both before and after the devices.

Total suspended solid load reductions for Baysaver, CDS, and Stormceptor were 62, 71, and 83 percent respectively. This was based on an average of 100

Pollutant	Load Reduction (%)		
	Baysaver®	CDS®	Stormceptor®
Cadmium	N/A	N/A	N/A
Chromium	57.2	62.9	54.3
Copper	8.8	7.3	7.6
Iron	56.3	40.1	39.2
Lead	N/A	N/A	N/A
Nickel	N/A	N/A	N/A
Zinc	2.4	12.0	-1.8
Phosphorus, total	58.8	56.1	60.8
Phosphorus, Ortho	N/A	N/A	N/A
Total Nitrogen	5.0	28.4	-10.8
Nitrate/Nitrite as N	-15.7	-8.7	4.5
Residue, filterable (TDS)	6.9	2.3	31.2
Residue, Non-filterable (TSS)	62.2	71.2	83.0
*N/A= not available because of the undetected concentrations in the influent or/and effluent.			

and 200 mg/L of fine sediments having been added to the water. More fine sediments were captured by Stormceptor than the others and all the devices performed well in trapping the larger litter (Table 2).

Total nitrogen change in the Stormceptor was an increase of 27 percent, while Baysaver and CDS had increases in nitrate and nitrite. The increase in these concentrations in the effluent samples may have been due to aerobic degradation of organic materials by bacteria in the system. Nitrogen is usually more of a problem in coastal areas, where it can cause algal blooms in brackish or salt water systems. Phosphorous, which can cause algal blooms in fresh water systems, was reduced by the Stormceptor slightly more CDS device, likely due to the greater solids trapping of the former.

Phosphorous tends to bind to fine sediment and so more sediment trapping will usually result in more phosphorus trapping. On average all three devices performed similarly in reducing the three heavy metals studied: copper, chromium, and iron. For Baysaver, chromium, copper, and iron removal rates were 57, 9, and 56 percent respectively. CDS had removal rates of 63, 7, and 40 percent, and for Stormceptor removal rates were 54, 8, 40 percent (Table 3).

Noted in the conclusions of this study was the importance of maintenance of these types of devices. In addition, the ease of installation of such devices may be a factor. For instance, the riser of the Stormceptor needed a crane to install it, while a front end loader was used to install the remain-

ing devices. Both the ease and frequency of maintenance were also mentioned as factors in selecting storm water treatment devices. Much more detailed information such as particle size distribution and location of sediment in the devices, plus trapping of cans, bottles, cigarette butts, and other materials, is presented in this comprehensive paper.

The information on this article was also utilized in a recent IECA Environmental Connection article.

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New Self-Inspection Program for Erosion and Sedimentation Control

Effective October 1, 2010, persons conducting land-disturbing activities larger than one acre must inspect their project after each phase of the project, and document the inspection in writing. Land Quality Section has provided some FAQs to assist in this process.

Does this only apply to projects approved after October 1, 2010?

No, it applies to both old and new projects.

Who can conduct the inspection? The financially responsible party, landowner or their agent may conduct the inspection.

Is a special certification required to do the inspection? No

What is the goal of the self-inspection program? To make sure that the approved erosion and sedimentation control plan is being followed, including the installation and maintenance of measures, and the provision of ground cover in a timely manner.

What has to be inspected? All of the erosion and sedimentation control measures, including sedimentation control basins, sedimentation traps, sedimentation ponds, rock dams, temporary diversions, temporary slope drains, rock check dams, sediment fence or barriers, all forms of inlet protection, storm drainage facilities, energy dissipaters, and stabilization methods of open channels must be inspected.

What else has to be checked? The need for ground cover should be checked. Temporary or permanent ground cover must be provided on exposed graded slopes and fills within 21 calendar days of the completion of a phase of grading. Permanent ground cover must be provided within 15 working days or 90 calendar days (60 days in HQW zones), whichever term is shorter, upon the completion of construction or development.

Do newly installed sedimentation control basins have to be measured? Yes, the actual dimensions of the basins have to be checked, usually with a tape measure, and compared to the dimensions on the approved plan.

Do newly installed sedimentation control basins have to be measured by a Professional Land Surveyor? No. Generally the width and length of basins can be measured with a tape measure. A level and survey rod may be useful in checking the depth of a basin. Only relative elevations, comparing the bottom and top elevations are necessary.

What is a significant deviation from the approved plan? A significant deviation means an omission, alteration or relocation of an erosion or sedimentation control measure that prevents the measure from performing as intended. If the approved erosion and sedimentation control plan cannot be followed, a revised plan should be submitted for review.

Does it require a special form? A “Self-Inspection Report for Land Disturbing Activity as Required by NCGS 113A-54.1” is available for use. It can be completed by hand or completed as an Excel spreadsheet. An alternative is to make notations on the copy of the approved erosion and sedimentation control plan that is kept on the project site. Rule 15A NCAC 04B. 0131 states that “... documentation shall be accomplished by initialing and dating each measure or practice shown on a copy of the approved erosion and sedimentation control plan or by completing, dating and signing an inspection report that lists each measure, practice or device shown on the approved erosion and sedimentation control plan.”

Can I just use the NPDES Self-Monitoring Report? The NPDES Self-Monitoring Report may only be used to report that the maintenance and repair requirements for all temporary and permanent erosion and sedimentation control measures, practices and devices have been performed.

When do the inspections have to be done? Unlike the NPDES Self-Monitoring Report, the Self-Inspection Report for Land-Disturbing Activity does not have to be weekly. Rather, this report is completed after each phase of the approved erosion and sedimentation control plan is complete. Not every project will have all the possible phases, but the list of phases includes the following:

- Installation of perimeter erosion and sediment control measures
- Clearing and grubbing of existing ground cover
- Completion of any phase of grading of slopes or fills

- Installation of storm drainage facilities
- Completion of construction or development
- Establishment of permanent ground cover sufficient to restrain erosion.

Where do I mail the report? Do not mail the report. The records must be made available to the erosion control inspector at the site. Any documentation of inspections that occur on a copy of the approved erosion and sedimentation control plan shall occur on a single copy of the plan and that plan shall be made available on the site. Any inspection reports shall also be made available on the site.

Additional links, including the required Self-Inspection Report for Land Disturbing Activities and an Excel spreadsheet with the Self-Inspection Report Worksheet can be found at:

http://www.dlr.enr.state.nc.us/pages/sedimentation_new.html

The Self-Inspection Rules can be found at:

<http://reports.oah.state.nc.us/ncac.asp>

and entering: 15A NCAC 04B 0131

[or Click this link to view the updated rules for self inspection.](#) ❖

EPA Effluent Limitations Guideline (ELG)-Update

In August 2010 USEPA announced it is re-evaluating the 280 NTU Effluent Limitations Guideline (ELG) for construction sites disturbing 10 or more acres. This action was a result of a lawsuit filed by the National Association of Home Builders and petition filed by the Federal Small Business Administration. An updated numeric standard is expected to be released by the end of 2011. While the ruling delayed the issuance of a numeric limit, the other requirements of the ELG remain in place. EPA is expected to issue interim stormwater management guidance for construction site operators as the agency works to refine the rule. Additional information: <http://water.epa.gov/scitech/wastetech/guide/construction/>.

The other requirements are summarized in Sediments Vol 16(4) and includes stabilization within 14 days on all construction sites and sampling of discharges for all sites 10 acres or more.



Newsletter of the North Carolina
Sedimentation Control Commission
c/o NCSU Water Quality Group
Campus Box 7637
Raleigh, NC 27695-7619

Calendar of Events

1/18/2011	Level I & II Recertification: Erosion & Sediment Control/Stormwater Recertification, Raleigh, NC http://www.bae.ncsu.edu/workshops/dot/	3/22-23/2011	2011 Water Resources Research Institute's Annual Conference, Raleigh, NC Abstracts Due Feb. 4. http://www.ncsu.edu/wrri/conference/
1/19/2011	Level II: Erosion & Sediment Control / Stormwater Site Management, Raleigh, NC http://www.bae.ncsu.edu/workshops/dot/	4/5-6/2011	Erosion and Sediment Control Planning and Design Workshop, Mills River, NC http://www.ncsu.edu/wrri/
1/20/2011	Level I: Erosion & Sediment Control / Stormwater Site Management, Raleigh, NC http://www.bae.ncsu.edu/workshops/dot/	5/10/2011	Level I & II Recertification: Erosion & Sediment Control/Stormwater Recertification, Mills River, NC http://www.bae.ncsu.edu/workshops/dot/
1/26-27/, 2011	Local Programs Workshop, Raleigh, NC. (Limited to Local Program staff)	5/11/2011	Level II: Erosion & Sediment Control/ Stormwater Site Management, Mills River, NC http://www.bae.ncsu.edu/workshops/dot/
1/31-2/1, 2011	2011 Land Grant & Sea Grant National Water Conference. Washington, DC. http://www.usawaterquality.org/conferences/2011/default.html	5/12/2011	Level I: Erosion & Sediment Control/ Stormwater Site Management, Mills River, NC http://www.bae.ncsu.edu/workshops/dot/
2/20-23, 2011	IECA Annual Environmental Connection. Orlando, FL. http://www.ieca.org/conference/annual/ec.asp	5/23-25, 2011	American Ecological Engineering Society Meeting, Asheville, NC http://www.bae.ncsu.edu/workshops/aees/
3/01/2011	Level III-A: Design of Erosion & Sediment Control Plans, Raleigh, NC http://www.bae.ncsu.edu/workshops/dot/	6/17-20/2011	2011 Soil and Water Conservation Society (SWCS) International Annual Conference, Washington, DC. Abstracts Due Dec. 17. http://www.swcs.org/en/conferences/2011_annual_conference/
3/02/2011	Level III-B: Design of Erosion & Sediment Control for Reclamation Plans, Raleigh, NC http://www.bae.ncsu.edu/workshops/dot/	9/25-28, 2011	Low Impact Development Symposium and National Nonpoint Source Monitoring Workshop, Philadelphia, PA http://www.bae.ncsu.edu/stormwater/2011lid/
3/8-9/2011	Erosion and Sediment Control Planning and Design Workshop, Raleigh, NC http://www.ncsu.edu/wrri/		