Cuyahoga Soil and Water **Conservation** District

6100 West Canal Road
Valley View, Ohio 44125

216.524.6580
Fax/ 216.524.6584
www.cuyahogaswcd.org

Storm Water Program Technical Quarterly

excellence in conservation

Issue: TQ 9.4

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Web Links

- Improve BMP Performance with Research-based Construction Methods
- Construction Run-off: Low Cost Stream Protection
- Parking Lot Sealcoat: A Major Source of PAH (USGS)
- USDA/NRCS Soil Survey Manual
- USEPA Webcast
- OEPA-OCAPP
- Soil Sampling Field Book
- Aerials Now Online
- Urban Stream Pollution Feeds Mosquitoes
- If you have additional information, click here to let us know.

Construction Methods Critical For Infiltrative-Type BMPs

Post-construction water quality Best Management Practices (BMPs) work best when they substantially reduce runoff. In fact, "A BMP that substantially reduces (emphasis added) outflow water volume will almost always reduce pollutant loads" (Brown and Hunt, 2009). Notice that substantially reducing runoff volume is critical to reducing pollutant loading...and that is the goal. In order for infiltrative-type BMPs to reduce runoff, a detailed review of construction methods is necessary. Unlike porous pavements, bio-retention cells, enhanced dry swales, and infiltration basins are not load bearing structures, and as such, should not be compacted. Therefore, much like the construction of household sewage treatment (septic) systems, care must be taken to minimize the compaction of both the underlying soils, as well as, the materials used to construct the BMP. Studies indicate that construction methods which scarify or loosen underlying soils improve the potential for deep percolation which helps that BMP function as intended. Whereas, compaction of underlying soil and construction materials result in both poor infiltration and poor percolation. With the goal being reduced pollutant loading, care must be taken with the construction of infiltrative-type BMPs. Care, in this case, being consideration of both soil moisture condition at the time of construction (drier is better) and keeping soil materials loose by minimizing: exposure to raindrop impact (which causes crusting), scooping with a backhoe bucket (which increases smearing), and in general any practice that results in compaction.

Wet construction conditions contributes to increased compaction and decreased infiltration.

Soil Organic Matter: An Important Aspect of Urban Soils

Soil organic matter (SOM) is a complex mixture of living biomass (plant, animal and microorganisms), and plant and animal residues at various stages of decomposition. Soil organic matter is essential to sustaining desired soil functions related to construction site erosion control, gardening/landscaping, water quality treatment, and mined land reclamation, to name a few.

Soil organic matter influences soil physical, chemical and plant growth properties. Soil structural stability is especially influenced by SOM. In other words, sugar-like polysaccharides bind individual soil particles and small aggregates into larger aggregates. Based on *Stokes' law* (see page 4), larger particles settle faster; and therefore, SOM influences sediment control. Much of the chemical properties and water-holding capacities of surface soil horizons are provided by SOM. Mineralization of SOM also provides a natural slow-release fertilizer for plants and soil microbes. A series of soil quality improvement or degradation is the result of SOM addition or loss.

So, while management of soil organic matter requires advanced planning, the benefits of this portion of the soil and its management should not be overlooked, because of the long-term benefits.

Major Facelift For Ohio EPA Online

You may notice some changes when you visit Ohio EPA's Web site, you see it is redesigned.

The new Web site design was required of all Cabinet-level agencies so users could easily recognize when they are visiting a State of Ohio Web site. The site was not only redesigned, but reorganized and cleaned up. This should help users more quickly find the information they are looking for.

Although having a new look will take some getting used to, perhaps the biggest change associated with the new Web site design will be the Internet domain address, change from www.epa.state.oh.us to www.epa.ohio.gov. Additionally, the new Web design software creates pages with an extension of .aspx rather than the former .html format. As a result, users will experience broken links and have problems accessing pages that they have previously bookmarked. There is a custom 404 error page to help redirect users to the information they are looking for.

To help internal and external users find the information they are looking for, each division and office has created a Web site redesign page. These pages include information about their new design and note locations of commonly requested information.

3 Pillars of Quality BMP

1. Water Quality Services/Functions Provided
2. Accessibility/ Maintainability
3. Site and Soil Compatibility

Build Success into Your Next Post-Construction BMP Design

True or false?

Soils worldwide contain more carbon in soil organic matter than all of the plant biomass on every continent combined.

True: "Organic matter in the world's soils contains about 3 times as much carbon as is found in all the world's vegetation" (Brady and Weil, 2002).

Technical Contributors

Jim Storer—*District Conservationist, USDA-NRCS*
Todd Houser—*Storm Water Program Manager*
Lisa Vavro—*Storm Water Specialist II*
Patricia Hughes—*Urban Conservation Specialist*

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Take advantage of the Technical Quarterly hyperlinks, visit: http://www.cuyahogaswcd.org/services-stormwater-publications.html

Deicing Pollution Prevention

The effects of road salt on our infrastructure is well known by most roadway travelers, but the adverse effects of dissolved salts on our ground and surface water goes by a little less noticed. *(More on pollutant pathways and coarse soils in the next T.Q.)*

Salt dissolves in snow and ice to form brine, which lowers the freezing point of water, and thus breaks the bond between the pavement and snow or ice and makes the roads a little bit easier and safer to travel.

Dissolved salts move through the environment in solution, and can rapidly percolate through coarse soils. As a result, almost all dissolved salts reach ground or surface waters and this can contaminate these resources. Dissolved salt in waterways damages wildlife food resources, habitat, plant communities, and exceeds many macroinvertebrates and aquatic species tolerance levels.

Madison, Wisconsin has been in the forefront of the deicing salt issue for nearly 40 years. The City of Madison adopted a deicing salt-use ordinance that includes the following:

- The use of Road Weather Information Systems (RWIS). Weather stations installed adjacent to highways and airport runways that work in conjunction with infrared pavement and air-temperature sensors installed on maintenance vehicles provide real-time weather conditions. This allows a more informed decision on how much road salt to apply
- Anti-icing (e.g. salt brine), or applying pre-wetted salt well in advance of a storm to prevent a bond between snow and ice and pavement. This will reduce the volume of salt required
- Limit the amount of salt in abrasives. Materials such as sand have been used to provide temporary traction. Road salt is typically mixed with sand to prevent the sand from freezing in stockpiles or spreader trucks. Working towards reducing the salt content of sand by volume from 10% to 5%
- Providing more training for public and private snowplow drivers
- Coordinating between municipalities and other agencies to systematically reduce the amount of salt used each year
- Considering on-board air and pavement temperature sensors installed in supervisors' vehicles
- Developing ordinances for regulating private commercial salt application, operating equipment, and annual compliance reporting requirements
- Considering development of an alert program for informing the public about expected driving conditions
- Annual updates regarding the implementation of salt-reduction recommendations and programs
- Strive for policies at all governmental agencies, municipalities, and private salt applicators


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Together, these measures could reduce the amount of salt applied by 20% to 30%. This reduction can make a profound difference to our surface waters during the cold and icy winter months. This and additional information can be found in the October 2009 edition of *Stormwater Magazine*.

(Excerpts from this article were taken from the referenced Stormwater Magazine.)

The "Law" Behind Sediment Control

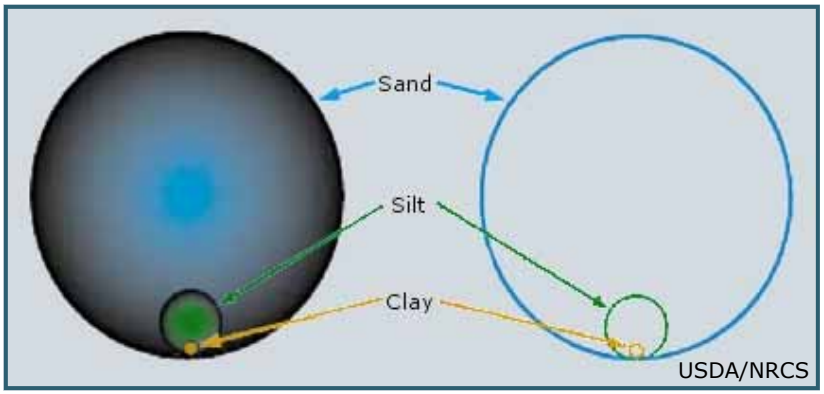
The "law" behind sediment settling was elucidated by Sir George Gabriel Stokes in 1851. Stokes' law describes the settling velocity of a particle in water to be proportional to the particle size. With knowledge of Stokes' law and soil particle size, one can determine how fast different soil particles will settle out.

The system used widely throughout the world to separate soil particle size is the U.S. Department of Agriculture classification system. This system separates soil particle sizes into clay (<0.002 mm), silt (0.002 – 0.05 mm), and sand (0.05 – 2 mm). These ranges are not purely arbitrary, but reflect changes in how soil particle sizes behave.

Stokes' law and soil particle size are of special interest to soil conservationists due to the fact that particle size influences settling velocity and sediment trapping efficiency. For example, larger particles, such as sand, settle out faster than fine particles (e.g. silt and clay). In fact, sand particles will settle out within a few seconds in most sediment settling ponds. Fine particles can take days to weeks to settle a few feet. Clay size particles, for instance, are so small that they behave as colloids; if suspended in water they do not readily settle out, and when you factor in flowing water and wind-caused turbulence, they may never settle out.

Soil conservation is an applied science, and understanding and applying professional judgment is necessary; particularly, in areas where soils are comprised mainly of silt and clay size particles. In other words, understanding of both Stokes' law and particle size distribution of soils at a construction site are essential to understanding the critical importance of sediment settling ponds for controlling sediment.

So, when it comes to sediment trapping efficiency, there are few better Best Management Practices (BMPs) for sediment control than a sediment settling pond. As the old rule of thumb goes...if it doesn't pond, it doesn't work, and the more water passes through sediment settling ponds on a construction site, the better.



2009 Schedule of Training Opportunities

Find details on our website's **Calendar of Events** for the most up-to-date information.

Date	Event
December 1, 2 & 3	2nd Ecological Landscaping Conference : Urban Landscape Ecology Program, The Ohio State University OARDC, Cleveland, OH
December 10	OEPA—OCAPP : CESSWI (Exam Only), Richfield, OH—Registration deadline December 4, 2009 4, 2009
December 10	OEPA—OCAPP : CPSWQ (Exam Only), Richfield, OH—Registration deadline December 4, 2009 4, 2009
December 10	OEPA—OCAPP : CPESC (Exam Only), Richfield, OH—Registration deadline December 4, 2009