



ISSUE 64 • SEPTEMBER 2016

### **INSIDE THIS ISSUE:**

Erosion and Sedimentation Implications of Unconventional Shale Gas Development in the Marcellus Shale Region of Pennsylvania / Page 1

Tallying up the Results of Center Retrofits / Page 3

Center Welcomes Mike Hickman to Our Team / Page 4

CWPA Member Highlight: City of Omaha Stormwater Program / Page 4

Center Announcements / Page 4

## **Erosion and Sedimentation Implications of Unconventional Shale Gas Development in the Marcellus Shale Region of Pennsylvania**

The Center has been working on the Marcellus Shale Gas Sediment Control Project, an effort to research the erosion and sedimentation implications of unconventional shale gas development within the Marcellus Shale region of Pennsylvania, and to recommend methods to improve implementation of erosion and sediment control (E&SC) measures at these types of energy development sites. The project is funded by the National Fish & Wildlife Foundation, and led by the Susquehanna River Basin Commission (SRBC), with project partners including Pennsylvania State University's Center for Dirt & Gravel Road Studies, the Susquehanna River Heartland Coalition for Environmental Studies, and Downstream Strategies.



Pennsylvania and the Chesapeake Bay Watershed are at the epicenter of unconventional natural gas production. In 2012, the Marcellus Shale Formation became our Nation's largest producer of shale gas and Pennsylvania is currently ranked as the third largest gas-producing state in the country. It is estimated that the total number of potential wells located within the Chesapeake Bay Watershed is 50,000. In addition to the physical development of wells, each pad requires a network of mostly unpaved access roads needed to install and service wells as well as pipelines to distribute

gas to markets. Recent studies as well as water quality data collected by the SRBC indicates that inadequate stormwater management practice is potentially the most notable impact associated with natural gas industry activities, especially as it relates to pipeline construction and use of unpaved roads for activities occurring across or along stream corridors. Most of the unconventional gas production activity in the Bay Watershed occurs in higher-quality headwater regions where the aquatic ecosystem is highly sensitive to the effects of increasing turbidity and sedimentation.



While there are efforts underway to address the many water resources concerns associated with shale gas activity, there is no regional, comprehensive, and up-to-date identification of best practices emphasizing erosion control and stormwater management for the land disturbance aspects of shale gas development. In addition, exemptions associated with the Clean Water Act and Energy Policy Act exclude oil and gas development and construction activities, including stormwater discharges, from permits required for many other land disturbance activities. This means that effective identification of best practices must take place at the state level. This project will develop, package, and disseminate a comprehensive and practical approach for natural gas operators and related stakeholders to design and implement E&SC and stormwater management features in a manner that reduces sediment input to aquatic resources.

The Center worked with Downstream Strategies to conduct a Needs Assessment and Survey and literature review and to develop Best Management Practice (BMP) Fact Sheets. The Needs Assessment and Survey was sent via the Internet to a wide range of stakeholders involved with and interested in shale gas land development within the Marcellus region of Pennsylvania. The results indicate current trends and resources used to implement E&SC measures at shale gas sites, including dirt roads, well pads, pipelines, and related infrastructure. The literature review evaluated existing manuals, guides, and research that cover a range of practices used in the Marcellus region and other types of land disturbance sites. Resources from other parts of the country were also assessed in the review. A series of BMP Fact Sheets were developed as educational resources for those interested in E&SC practices that are currently implemented within the Marcellus region as well as those that may currently be underutilized, but represent some promise for improving overall protection of water resources. A technical memo summarizing the results of these tasks will be available soon and the project will move on to its next phase: a series of regional workshops and meetings to present the results. Project partners also envision scoping out a Phase 2 of this project that includes demonstrating implementation of best practices.

For more information about this project, contact Laura Gardner, [llg@cwp.org](mailto:llg@cwp.org) or 410-461-8323, ext. 3210.

## Tallying up the Results of Center Retrofits

Since our humble beginnings, the Center has gained national recognition for our stormwater research, national guidance manuals and training. But did you know the Center also works on design and construction of stormwater retrofit practices? Getting stormwater practices in the ground not only helps us to meet our mission of protecting and restoring watersheds, it also helps us to maintain practical knowledge that informs our guidance, and better tailor our training to meet the needs of designers and construction firms. These projects also give us a chance to show off good stormwater design and demonstrate their success.

Since 2009, the Center has worked on design and construction oversight for more than 70 retrofit projects, including bioretention, bioswales, stormwater wetlands, wet swales, step pool storm conveyance systems, living shorelines, rain gardens, permeable pavement, dry pond conversions, soil restoration, and tree plantings. The projects are mostly located in Maryland and Virginia—with a handful in Pennsylvania, South Carolina and the Pacific Islands—and therefore cover a variety of landscape settings and conditions. In our home state of Maryland, we have worked on BMP installation in more than half of the counties in the State. Some of the retrofits were demonstration projects on public land implemented with volunteers while others are highly engineered and were done in partnership with local governments and other engineering firms. For some projects, we are also partnering with Universities to monitor these systems in order to better quantify their benefits.

We recently tallied up the results of all this effort and by our estimates, the completed projects collectively treat 117 impervious acres and reduce 736 lbs/year of nitrogen, 67 lbs/year of phosphorus and 62,332 lbs/year of sediment. We are working on compiling construction cost data for these same projects so that we have updated information from which to derive planning level costs for future projects. We leave you with some photos of our recently completed projects:



*Bioswale in Urbana, MD*



*Regenerative Stormwater Conveyance System in Wicomico County, MD*



*Sand Filter in Wicomico County, MD*

## Center Welcomes Mike Hickman to Our Team



The Center is happy to announce that Mike Hickman will be joining our team as a Water Resource Engineer starting October 1st. Mike most recently worked for the Pennsylvania Department of Environmental Protection, where he spent 3.5 years as a Water Program Specialist and worked on all things related to the State's MS4 permit. He also has 5 years of experience in design, construction and data management and is an Engineer-in-Training. Mike has a B.S. in Environmental Engineering from Penn State University- Capital College and an M.S. in Water Resources and Environmental Engineering from Villanova University. He will be working from our Philly-area office on our expanding work in the Delaware River Basin and also help Pennsylvania communities meet their Chesapeake Bay TMDL and MS4 permit requirements.

---

## CWPA Member Highlight: City of Omaha Stormwater Program

The City of Omaha Stormwater Program (OSP) is a proud member of the CWPA. Being a member provides access to learn about what is being done regarding stormwater across the country and connect with those doing the work. Earlier this year the OSP partnered with Douglas County Environmental Services and the CWP to be a host site for the 2016 National Watershed Stormwater Conference/Webinar. The event brought many people together, physically and virtually, to share information and have in-depth discussions on local issues.

The OSP has partnered with many organizations over the years to design, build, and share demonstration projects that showcase the use of green infrastructure in a variety of settings. One of the first projects was Orchard Park, a project that involved the Omaha Parks Department and local non-profits to restore a segment of Cole Creek and create bioretention gardens within the park. Local schools have been a great partner for OSP including a green roof and bioretention garden at Saddlebrook Elementary/Community Center, permeable pavement and bioretention garden at Creighton Prep, and outdoor classroom at the University of Nebraska at Omaha. A number of these projects have or will have monitoring efforts associated with them that seeks to gain insights into soil moisture movement in and around these systems, plant performance, water quantity, and more. To learn more about the Omaha Stormwater Program and what is going on, please visit [OmahaStormwater.org](http://OmahaStormwater.org).

---

## Center Announcements

### Next Webcast: Retrofitting Revisited: Forward Into the Past

*October 12, 2016, 1-2:30 PM EST*

This webcast will focus on the restoration of urban and suburban watersheds through stormwater retrofitting. In particular, we will revisit some past case studies highlighted in earlier webcasts and discuss the design and implementation of stormwater retrofit practices, how the retrofits have been performing, and what lessons were learned during the process. The webcast will also provide information about the cost and pollutant removal performance of stormwater retrofits.

[REGISTER NOW!](#)

### SAVE the DATE for the 2017 Watershed and Stormwater Conference!

On April 4, 2017, the Center will be hosting the 2017 Watershed and Stormwater Conference. Stay tuned for more information in the coming months.

---