

Abstracts

Wednesday, April 30

Session F5: Best Management Practices in Urban and Suburban Landscapes

8:00 – 9:30 am | Room 233

Digesting Multiple Lines of Evidence to Evaluate Possible Designated Use Impairments and Promising Restoration Options – Western Bays, Long Island, NY

Thomas Gulbransen

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Abstract

Nutrient over-enrichment in the Western Bays south of Long Island, NY causes periodic eutrophic conditions. Problematic blooms of phytoplankton and macroalgae dominate segments of the bays. Sea grasses, desirable fish/shellfish species, and intertidal wetlands have declined from historic levels. Parts of the waterbody were added to the NYSDEC 303(d) list of impaired waterbodies in 2006 based on nitrogen from municipal WWTP and urban/stormwater runoff. USEPA Region 2, New England Interstate Water Pollution Control Commission and NYSDEC supported an investigation of the complex relationships between nutrient loads, regional geomorphology, ambient nutrient concentrations, and environmental fate and effects in order to develop alternative nutrient criteria and nitrogen management options.

Multiple lines of evidence about existing conditions in the bays were advanced to inform four main questions: (1) Is waterbody impairment evidence consistent? (2) Which are best endpoints to document impairments? (3) Are impairments linked to excess nitrogen? (4) Which nitrogen management options are most promising?

Reviews of historical water quality data from the municipality and USGS yielded few trends. Hydrodynamic modeling simulations revealed significant surprises in water column transport. Watershed nitrogen loading models established an updated context to evaluate restoration targets. Seven field surveys and two lab experiments were performed. The nitrogen loading budget integrated past work from USGS, surface and groundwater monitoring, plus projections based on land use characteristics and literature coefficients for nitrogen application and uptake.

Nitrogen Management Plan (NMP) options were assembled into a simple, interactive, spreadsheet-based decision model to compare 19 basic approaches to managing nitrogen as it cascades through the ecosystem. NMP options aimed at source reduction/import into watershed, waste minimization/ release onto watershed, enhance processing in bays, or remediation/removal of nitrogen from bays. Relative ranking of net potential efficacy for each NMP reflected best professional judgment scoring against 11 criteria, such as magnitude addressed, cost estimates, likelihood of success, and timing.

WWTP effluent relocation ranked highest based on a preliminary scenario of criteria scores and weights constrained within the Western Bays study area. A campaign to improve watershed residents' nutrition and digestion via pre/ probiotic health emerged as second most promising means to reduce nitrogen loads.

Assessing Watershed Scale Responses to BMP Implementation in Urban Watersheds

John Jastram

US Geological Survey, Richmond, Va.

Abstract

The USGS Virginia Water Science Center, in cooperation with the Fairfax County Stormwater Planning Division, is conducting a study of urban/ suburban watersheds in Fairfax County, Virginia to assess watershed-scale water-quality responses to implementation of Best Management Practices (BMPs) and stream restoration activities. Specifically, the objectives of the study are to: 1.) Describe current conditions and trends in both water quality and water quantity, compute loads in water-quality constituents, and use these data to evaluate water-quality improvements that are associated with BMP implementation and stream restoration activities, and 2.) Evaluate the transferability of results from intensively monitored watersheds to other watersheds with less-intensive monitoring. This unique study is reliant upon a long-term (10+ year) data collection effort in 20 small (1-6 mi²) watersheds that represent the range of land-use conditions in suburban Fairfax County. The study was designed to include a mix of intensively monitored watersheds (n=5), for which continuous streamflow and water-quality parameters are measured and over 100 routine and storm event samples are collected, and less intensively monitored watersheds (n=15), for which periodic streamflow and water-quality measurements are made. This presentation will include critical elements of the study design, the novel monitoring methods employed, and a discussion of preliminary results.

Evaluation of Pollutants in Wastewater Generated by Mobile Commercial Car Washing Operations in Durham, NC

Maverick Raber, John Cox and Michelle Woolfolk
City of Durham, Durham, N.C.

Abstract

The City of Durham has a Stormwater Management and Pollution Control Ordinance that prohibits the discharge of non-stormwater to the drainage system, including commercial vehicle washing wastewater. In order to comply, mobile car washing companies are required to contain, collect, and properly dispose of their wastewater to the sanitary sewer. In 2011, thirty-seven businesses actively operating in the City had previously demonstrated compliance with the ordinance. The goal of this study was to quantify pollutant load reductions to the stormwater drainage system by mobile car washing companies operating in compliance with the ordinance. To quantify these load reductions, wastewater was collected and composited from two local mobile car washing companies that agreed to participate in the study. Each composite contained wastewater from 3-5 vehicles (25 vehicles total) and was sampled for total organic carbon (TOC), 5-day biochemical oxygen demand (BOD₅), metals, nutrients, and polycyclic aromatic hydrocarbons (PAHs). Analyses indicate hundreds of pounds of pollution are prevented from reaching the City's stormwater drainage system by implementation and enforcement of the ordinance on an annual basis.

Enumerating the Return on Investment for Restoration Projects in an Urban Watershed through Successful Partnerships and Volunteer Monitoring Efforts

Kara Scheerhorn
Mill Creek Watershed Council of Communities, Cincinnati, Oh.

Abstract

The Mill Creek Volunteer Water Quality Monitoring Program is an outlet for citizen scientists, residents, and volunteers to be the eyes and ears of the Mill Creek Watershed. It is the goal of the Mill Creek Watershed Council of Communities (Council) to advance research and knowledge in our urban watershed with volunteer participation through programs like the water quality monitoring program. When we can track how the stream system functions throughout the year and understand when and where water quality is of concern, we are able to implement successful restoration projects.

From stream restoration to wetland construction to innovative stormwater management, the Council puts projects in the ground that deliver environmental and economic benefits in the Mill Creek Watershed. With the implementation of past and present restoration projects, and plans for more improvements with direction from

State of Ohio-endorsed Watershed Action Plans, it is important for us to track the benefits our investments make. It is valuable to have publishable data that give us the confidence to articulate to communities, stakeholders, and grant funders the specific environmental and economic benefits achieved by implementation of proposed projects. We want to know what works, why it works, and be confident about enumerating return on investment not just in terms of water quality improvement, but also economic vitality and community development.

The first year of our program began in 2013, and we completed 8 months of successful sampling and lab analysis. In 2014, we anticipate gaining momentum and increasing our volunteer base. By reaching out to other watershed stakeholders in the community we have gained valuable partnerships that will allow our program to grow and continue. In our second year of the program, volunteers in the field and in the lab will collect and record data through our mobile water quality application using tablets and smart phones. It is our intent to make this program sustainable and to be able to tie it into other aspects of our work and mission.