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Using BMP Field Evaluations to Aid Program Development in Charlotte, North Carolina

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Abstract Text:

The Southern United States continues to undergo tremendous population growth, resulting in an increased demand for housing, recreation, transportation, and commercial facilities. The impact of urbanization on watershed hydrology has led to degraded water quality in nearby surface waters.

In particular, the city of Charlotte, North Carolina, had the 25th highest percentage of population growth (19%) in the country between the years 2000 and 2006. In an effort to make informed decisions regarding the promotion of certain stormwater Best Management Practices (BMPs) to improve water quality, stream stability, and flood control, Charlotte-Mecklenburg County Stormwater Services (CMCSS) began a cooperative monitoring effort with the Cooperative Extension Service through the Biological and Agricultural Engineering Department at North Carolina State University (NCSU-BAE). The goal of this project was to monitor a variety of stormwater practices within the City of Charlotte to determine their pollutant removal and retention capabilities. BMPs were selected based on the likelihood that they will be installed in the City of Charlotte in various land uses. Monitoring was performed on 4 hydrodynamic (proprietary) devices, 2 dry detention basins, 1 bioretention area, 2 wet ponds, and 2 stormwater treatment wetlands. This information will be used to evaluate which BMP is most suitable for water quality, stream stability and/or flood control for a given watershed and site.

USEPA / ASCE International Stormwater BMP Performance Database monitoring and reporting guidelines were observed during this project (USEPA, 2002). Flow weighted composite samples were taken from the inlet and outlet of each monitoring site during the storms that were captured. Samples were measured for bacteria, nutrients, sediment, and metals. These samples were used to determine pollutant EMCs for the inlet and outlet of each SMP for each storm event that was captured at a given site. Average inflow and outflow event mean concentration (EMC) values for each pollutant were used to calculate a BMP efficiency ratio.

Impact Statement:

Stormwater runoff is a major non-point source pollutant in urbanized areas. By monitoring stormwater BMPs within the City of Charlotte, geographically specific stormwater pollutant removal data can be generated for the City. This data can be used in the decision making process regarding stormwater management. Essentially, pollutants of concern can be targeted by BMPs which have shown the ability to remove the pollutant of concern, thus resulting in more efficient water resource management.