



**National Association of Flood & Stormwater Management Agencies**

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Testimony of the National Association of Flood  
And Stormwater Management Agencies

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The Impact of Green Infrastructure and Low Impact Development  
on the Nation's Water Quality, Economy and Communities

U.S. House of Representatives  
Committee on Transportation and Infrastructure  
Subcommittee on Water Resources and Environment

Rep. Eddie Bernice Johnson, Chairwoman

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The National Association of Flood and Stormwater Management Agencies (NAFSMA) is very pleased to submit this testimony regarding “The Impact of Green Infrastructure and Low Impact Development on the Nation’s Water Quality, Economy and Communities” on behalf of its membership.

### **Background on NAFSMA**

NAFSMA is a 30-year old national organization based in the nation’s capital that represents close to 100 local and state flood and stormwater management agencies, most of which are in large urban areas. Its members serve a total of more than 76 million citizens by providing flood and or stormwater management and as a result, the association has a strong interest in the proposed discussion on Green Infrastructure and Low Impact Development in urban areas.

The mission of the Association is to advocate public policy and encourage technologies in watershed management that focus on issues relating to flood protection, stormwater and floodplain management in order to enhance the ability of its members to protect lives, property, the environment and economic activity from the adverse impacts of storm and flood waters.

It is important to note that many of NAFSMA’s member agencies are currently Phase I or II jurisdictions falling under the Clean Water Act’s Stormwater NPDES Permit Program.

Formed in 1978, NAFSMA works closely with the U.S. Environmental Protection Agency, the Corps and the Federal Emergency Management Agency to carry out its mission. NAFSMA members are on the front line protecting their communities from loss of life and property, while protecting and if possible, improving the quality of the nation’s surface and ground waters. Therefore, the organization is keenly aware that all options for mitigating damages that can be caused by urban stormwater runoff should be considered as tools to meet clean water goals.

NAFSMA is pleased to present these views and suggestions on the impact of Green Infrastructure and Low Impact Development on the nation’s water quality, economy and communities. Our testimony will initially and succinctly focus on those specific areas, but we would also like the subcommittee to rely on our previous testimony from March, 2009, where we addressed urban stormwater runoff, with a focus on green infrastructure. The text from the 2009 testimony is attached, so that we do not repeat thoughts and suggestions already expressed to the subcommittee. Also, while this testimony reflects updated

information obtained since Spring 2009, it clearly shows that our 2009 testimony was on point and is supported by the new data .

Because green infrastructure is an emerging technology, NAFSMA endorses the approach taken in H.R. 4202 to encourage further research on green infrastructure that is relevant to different geographic regions, and to provide federal funding and support for that research. We urge the committee to look at expanding this research effort to other best management practices for the management of stormwater runoff as well. NAFSMA is concerned, however, with the apparent direction of U.S. EPA's current rulemaking effort, which appears to be headed towards the creation of mandatory federal requirements for nationwide implementation of green infrastructure practices to the exclusion of other effective stormwater BMPs.

Addressing the issue of the use of green infrastructure on water quality, NAFSMA continues to believe that green infrastructure is an appropriate tool in the toolbox of best management practices (BMPs) for use throughout the country. However, it should never be considered as the only tool for improving the nation's water quality.

Our members continue to be concerned that there is currently no activity, practice or method, including green infrastructure that has proven to be effective in restoring an impaired watershed to an unimpaired state for all sources of pollutants. We agree that green infrastructure should be encouraged in those areas where you have the opportunity, hydrology, climate, soil conditions and funding to effectively construct and maintain the measures while recognizing that the decision as to what type of approach is suitable for an individual community is one that is best made at the local level.

We have information from reputable consultants and academic institutions that shows that green infrastructure, while effective at removing certain pollutants, is not the optimal solution for treating or serving each situation. For instance, Charlotte, NC worked with Tetra Tech, Inc., in September, 2005, as part of the process of developing a Post Construction Controls Ordinance and found green infrastructure to be no more effective at achieving certain in-stream goals than less expensive practices. As a result of this study and more than 36 meetings with stakeholders, Charlotte now has an ordinance that prefers green infrastructure, but does not mandate that it be the only choice or even the first choice for meeting water quality needs.

A recent study jointly sponsored by the Urban Drainage and Flood Control District in Colorado and the Urban Watersheds Research Institute evaluated the relative effectiveness of both community-based and green infrastructure BMPs in terms of reduction in pollutant

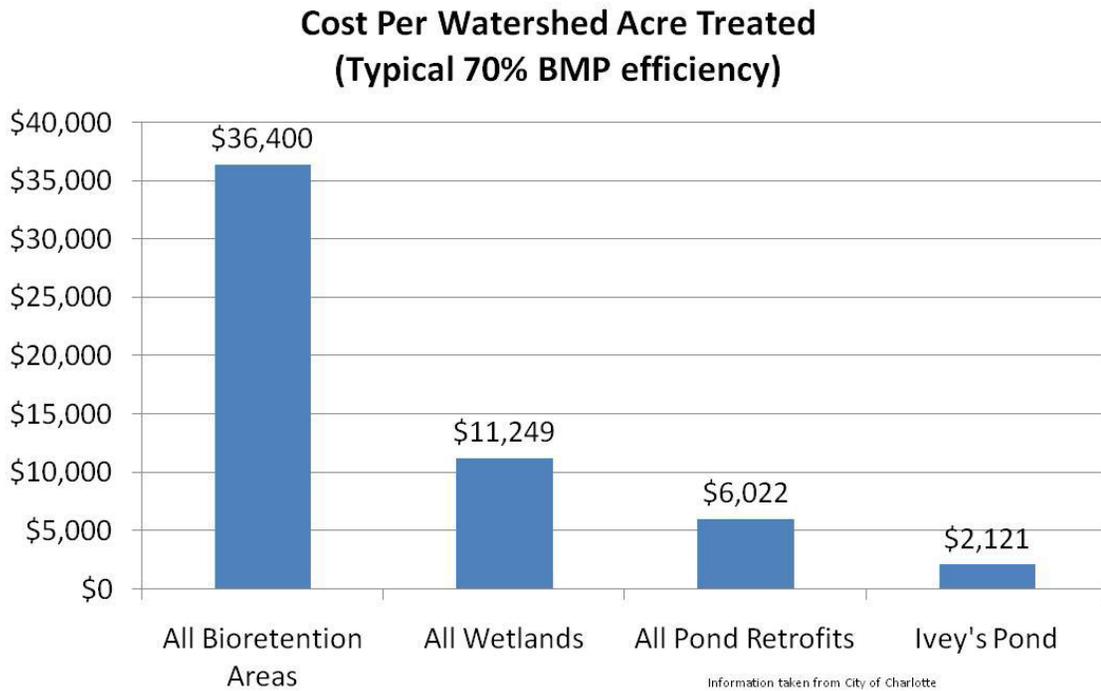
loads, surface runoff volumes and the long-term economics of keeping the BMPs in operation. The study compared the unit costs in dollars per pound of three pollutants removed by each of ten different BMPs – Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Copper (TCu). It found that flow-through types of BMPs, such as inlet inserts and hydrodynamic devices have no reduction in runoff volumes and show the lowest levels of pollutant removals. BMPs that infiltrate water into the ground (sand filter basins, porous landscape detention (rain gardens), and porous interlocking concrete pavers) were compared with similar BMPs with underdrains that discharge captured runoff volume back to the surface or underground conveyance system where site conditions do not permit infiltration. It was found that most of these BMPs exhibited reductions in annual pollutant loads that were not dramatically different whether the BMP infiltrates water into the ground or not. Another important finding of the study was that consolidated community-based BMPs such as extended detention basins, retention ponds and sand filter basins are capable of intercepting runoff from large areas very effectively and with little bypass, more so than inlet or lot-based BMPs.

The second significant concern of NAFSMA relative to the mandatory implementation of green infrastructure techniques is the inability of such infrastructure to address water quality compliance objectives established in the stormwater NPDES permits. While green infrastructure methodologies are intended to reduce stormwater borne pollutant loads to receiving waters, these methodologies do not produce, and in some cases increase, the pollutant concentrations being discharged. Stormwater performance is increasingly being measured in terms of pollutant concentrations and the large scale mandating of green infrastructure methodologies in stormwater management systems could cause otherwise compliant permitted stormwater programs to be determined to be in violation of their permits and the Clean Water Act.

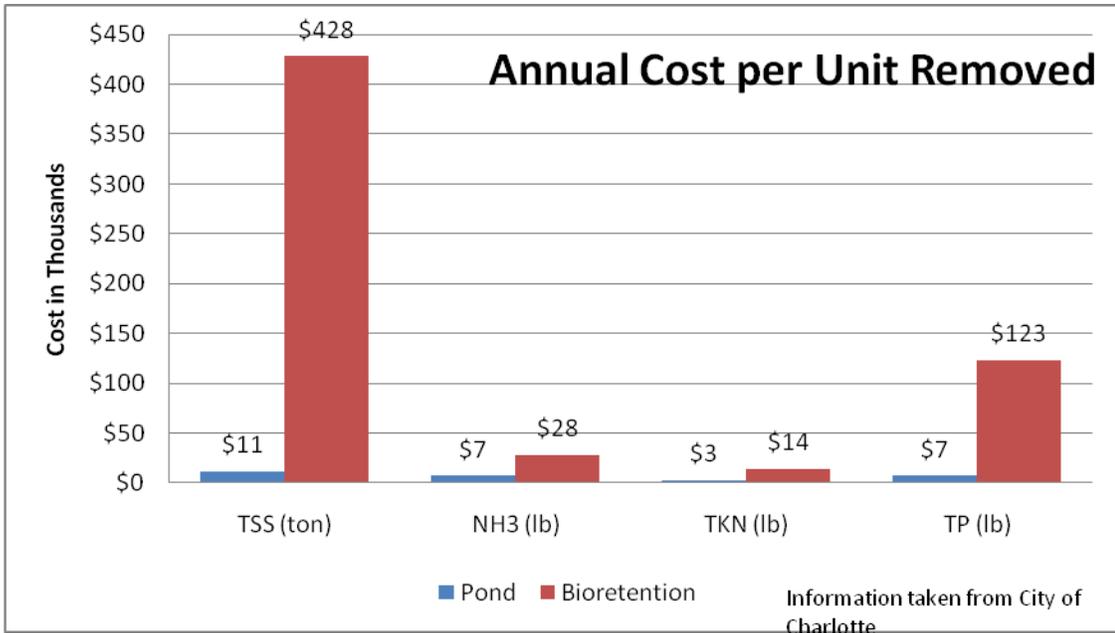
This brings us to the consideration of the impact of green infrastructure on the economy. Not only has green infrastructure not been proven to be the best solution for improving water quality of receiving waters in all cases, but it has been shown to be one of the most expensive options for trying to improve water quality. The Denver study mentioned above found that the unit cost per pound of pollutant removal was significantly higher for rain gardens and porous pavement than it was for sand filter basins and community-based BMPs such as retention ponds and extended detention basins. The study compared the unit costs in dollars per pound of three pollutants removed by each of ten different BMPs – Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Copper (TCu).

Charlotte has found that the average cost of pervious concrete is approximately \$490,000 per acre treated and bioretention (rain gardens) are over \$35,000 per acre treated. Increasing

the capability or improving wetlands and ponds, on the other hand, came in much lower with costs of approximately \$10,000 and \$5,000 per treated acre respectively (see Chart 1). This chart was developed to show the value of a increasing the capability or upgrading an existing community-based pond program, rather than a cost analysis for newly constructed projects. The impact of this information is to show that using regional solutions, often on existing sites, is effective at removing certain pollutants (See Chart 1 below – Cost Per Watershed Acre Treated).



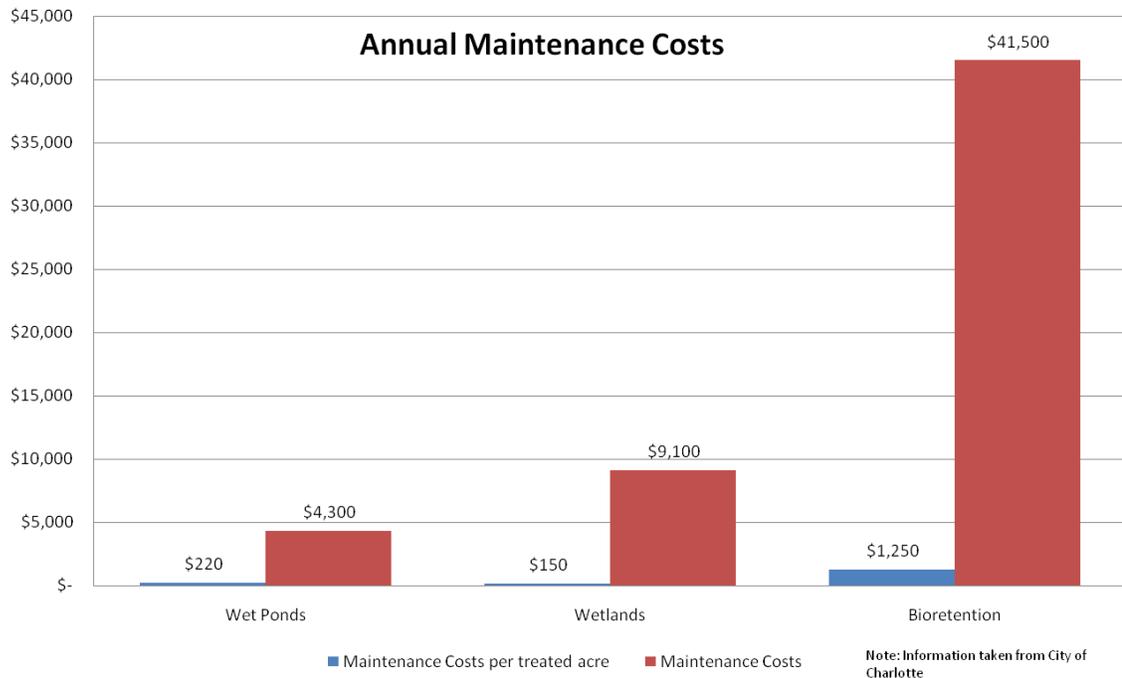
The cost per pound removed for TSS/TN/TP show similar relationships, as shown in Chart 2 below – Annual Cost per Unit Removed.



Based on information provided by MS4s like Denver and Charlotte, NAFSMA believes options involving new ponds and pond upgrades should be considered when developing stormwater rules.

In addition, Denver has shown that that total costs for construction, administration, maintenance and rehabilitation of rain gardens to be over four times the costs for conventional stormwater management techniques in a 50-year life cycle analysis for one-square mile of new development. The 50-year analysis showed the total net present costs for one square mile of mixed-use development to be approximately \$26 million (green infrastructure or lot-by-lot design) compared to approximately \$6 million (community-based measures).

Charlotte has a limited number of installations; however, our preliminary data shows the following for annual maintenance costs for various BMPs (See Chart 3 Below – Annual Maintenance Costs).



This brings us to the effect of green infrastructure on the community. NAFSMA continues to say that MS4s must compete with many other local service demands, not the least of which are public safety, transportation and solid waste services to fund and manage water quality programs. It is clear that the demands of aging infrastructure continue to be a drain on local communities as the roads, bridges and transit systems need continual maintenance and improvement. Local government is especially able to make the best decisions for their community given all competing interests.

Our communities are struggling with high unemployment and flat revenue sources, with project schedules continuing to creep further out as we try to find funding for infrastructure improvements and basic health and safety needs. We continue to hear from our development community and those particularly interested in affordable housing that increasing costs for development, including permitting and construction are hurting their ability to provide low cost housing. Given the experiences we have shown with effectiveness and costs of green infrastructure, it is clear that allowing local jurisdictions the opportunity to determine for their community which type of measure they use is vitally important. We can often get more pounds of pollutant removed and more acres treated through near-site or off-site regional BMPs (dry detention, wet detention, wetlands and ponds) for far less money spent.

In summary, green infrastructure can be effective in removing certain pollutants (though not proven to be effective in restoring watersheds) and in many circumstances, it is a good choice for addressing pollutant removal for new and to some extent redevelopment.

However, there are other choices, that for certain locations, are a better financial and water quality solution. NAFSMA hopes that Congress realizes the need for using these options and doesn't support mandating green infrastructure as a one size fits all approach.