Stormwater Action Plan

Top ten tips for maximizing effectiveness.

By Zachary Henderson and Bob Rafferty

Stormwater is one of the nation's primary sources of water pollution and the focus of a key initiative of the EPA in Region 1 that will eventually impact enforcement actions across the country.

EPA has established this focus on stormwater because, left unregulated and uncontrolled, it pollutes drinking water sources, impairs navigable waterways with contaminated sediment, and can result in closures or reductions in commercial shell-fishing areas. Contaminated stormwater causes closures of beaches and other recreational waters, ruins fish and amphibian habitats, and can damage homes and businesses during periods of peak runoff.

With consequences too dire to be left unaddressed, state regulatory agencies have joined the EPA in focusing on the problem by increasing municipal stormwater permit requirements. Facing these increased permit requirements, communities across the country are spending millions, but often achieving little in the way of solutions—because they are focusing on the symptoms rather than the root problems. The symptoms usually point to end-of-pipe treatment, but comprehensive consideration of upstream conditions and non-structural alternatives can solve the root problems.

The key to effective stormwater management planning is gathering the information needed to develop a realistic and efficient action plan for a holistic approach that includes upstream and non-structural solutions, as well as the typical end-of-pipe treatment techniques. The following ten tips will help you develop a planning strategy that focuses on root causes and gathers the information needed to then implement a successful stormwater action plan tailored to your community. These tips address infrastructure, land cover, drainage areas, land ownership, code, stakeholders, staff, operations, equipment, and finances.

GPS and mobile data collection applications provide the efficiency and precision necessary for effective stormwater planning.

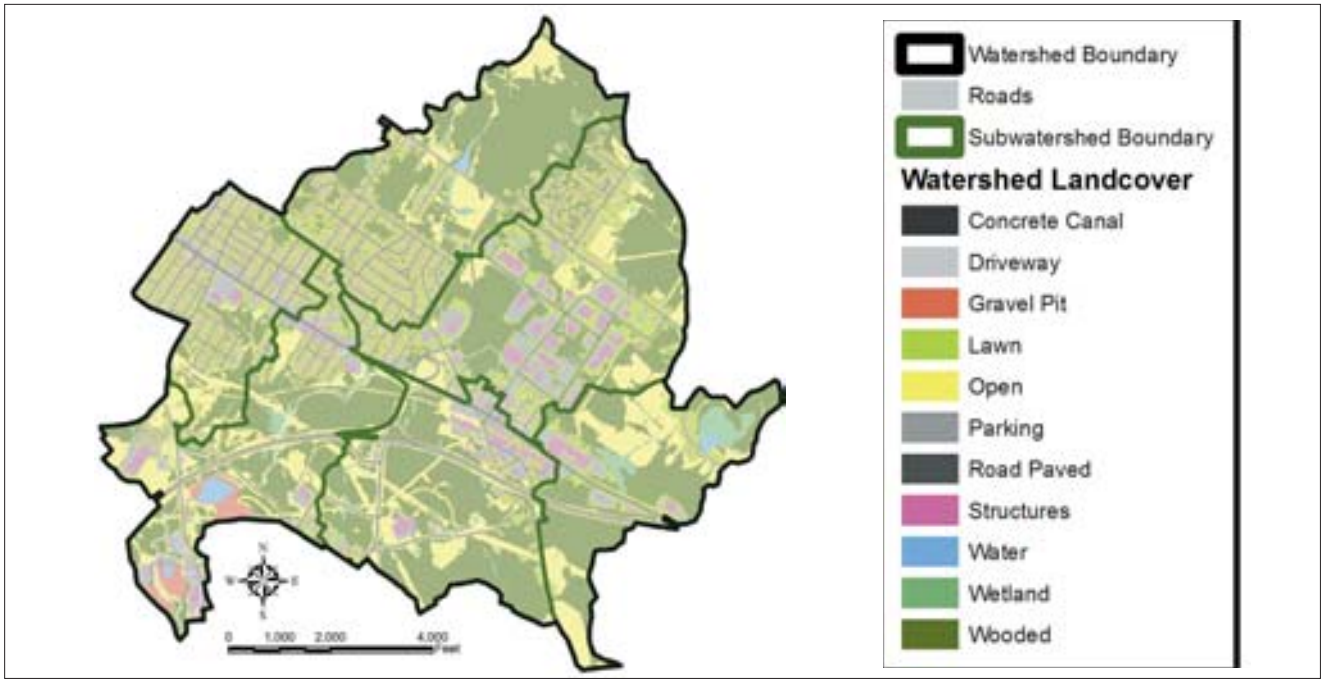
1. Know Your Infrastructure. The foundation of effective stormwater management is developing detailed knowledge of your community's hydrography, and your first step will be to identify and map stormwater conveyance infrastructure and flow paths. Surface flow paths, subsurface flow paths, and drainage nodes are critical components of a stormwater conveyance network. Additionally, creating linkages among these features allows for network analysis during future planning efforts. Network analysis tools can greatly reduce planning, design time, and costs for a variety of engineering applications.

Municipal infrastructure mapping typically is focused on asset management needs. But thoughtful development of asset database inputs and data collection processes that incorporate stormwater planning needs before data collection will greatly enhance the cost-effectiveness of field efforts.

Stormwater management and planning is predicated on surface and pipe hydraulics, and drainage area land use. Surface flow path input locations, pipe invert depths from rims, and adjacent land use types are relatively low-cost types of information to collect during asset inventories. Capturing this data up front in Westbrook, ME, has saved the city and private developers time and effort on infrastructure upgrades and development projects. Eric Dudley, city engineer, indicates that the comprehensive mapping effort has greatly enhanced the quality of private stormwater plans and is helping the city identify realistic strategies for compliance with municipal stormwater permits. (To see Westbrook's stormwater conveyance network visit http://eisweb.woodardcurran.com/westbrook.)

Further, mapping of flow paths and infrastructure outside the municipal right-of-way is essential. Often municipal managers overlook the linkage between public and private infrastructure despite the fact that this linkage is critical to successful stormwater management.

2. Know Your Land Cover. Impervious surfaces such as parking lots, rooftops, roadways, and managed landscapes contribute pollutants to stormwater runoff. Detailed mapping



Detailed land cover mapping aides in establishing the proper focus and priorities for a stormwater action plan.

and descriptions of land cover types provide the basis for stormwater modeling efforts. Further, taking a detailed look at your community's land cover allows for quantitative analysis of areas that are likely to contribute specific pollutants. It also allows you to develop appropriate, targeted, stormwater management action items to manage those pollutants.

Different land cover will dictate different approaches. For example, drainage areas with high percentages of lawn cover will require management strategies and partners that focus on fertilizer application and turf management rather than the pollution prevention strategy focus that would apply to paved surfaces. This was the case in Lewiston, ME, where land cover data indicated that "stormwater-friendly" lawn care strategies would likely be a necessary action to meet state water quality classification.

3. Know Your Drainage Areas. While the need for this is obvious, identifying drainage area boundaries within urban areas is not necessarily easy. Subsurface stormwater conveyance infrastructure often does not follow surface topography. Developing accurate drainage divides requires careful consideration of both surface topography and subsurface storm drain infrastructure. The drainage area contributing to a discrete stormwater outfall is generally an appropriate focus for targeted structural and non-structural stormwater management solutions. Effective management system design and implementation are contingent on accurate drainage area boundaries.

In a stormwater planning effort in South Portland, ME, after drainage areas were delineated, ten areas ranging in size from four to 60 acres were selected for development of comprehensive structural retrofit solutions. The drainage area specific actions will make it possible to measure and quantify water quality improvements.

4. Know Your Land Ownership. Most municipalities make land ownership information available for public use. Using that information to analyze public open spaces, private easements, setbacks, and public rights-of-way is often the first step in identifying potential specific opportunity areas for stormwater quality mitigation and flood control projects.

5. Know Your Code. Municipal zoning, ordinance, and design standards are inextricably linked to the development of impervious surfaces and stormwater management system design. For example, many municipalities have requirements for the minimum number of off-street parking spaces tied to non-residential land uses; this number can direct designers to create expansive and often underutilized parking areas. Additionally, many municipal parking and roadway design standards can unwittingly restrict the implementation of Low Impact Development (LID) approaches, including pervious pavements and open drainage. A comprehensive review of—and willingness to modify—local municipal code is a critical component of long-term and sustainable stormwater management.

Numerous communities and regional planning entities are now looking outside the "stormwater code" for requirements that directly contribute to the stormwater problem by requiring unnecessary impervious surfaces. By editing or crafting new codes and standards, municipalities are beneficially influencing final stormwater management system design.

6. Know Your Stakeholders. The nature of stormwater runoff dictates that private landowners engage in the implementation actions of a stormwater master plan. Identifying and engaging stakeholders early in the process of stormwater planning can greatly enhance the plan's effectiveness. This

task is often the most difficult aspect of developing a stormwater action plan, plus it can be costly. But it is crucial for municipal managers to understand the value and need for professional outreach and facilitation as a part of a stormwater planning project.

Chambers of Commerce and other pertinent local civic organizations can be invaluable allies in stakeholder identification and the development of planning strategies that have the best potential for stakeholder buy-in. A brief analysis of the socio-economic demographics within a planning area will also allow for the development of strategies that have the potential to succeed.

7. Know Your Staff. Identifying municipal staff and staffing resources that can contribute to successful implementation of a stormwater management plan can greatly improve action strategy development. Often stormwater management is left to public works and engineering departments based on infrastructure ownership. But stormwater action plans require guidance and implementation from a broad array of municipal staff who are also stakeholders. City arborists, recreation, planners, code enforcement, information technology, education, and public safety staff are often the most appropriate managers of individual stormwater plan action items.

Informal information-sharing sessions held during stormwater plan development can provide insights on the likelihood of implementation success and greatly enhance results. But the right people need to be at the table—so make sure that the full spectrum of water services, public works, parks and recreation, etc. staff are included in your planning effort.

8. Know Your Operations. Municipal operations can contribute to stormwater pollution; however, when managed properly these operations can also prevent pollution. A thorough review and listing of both municipal and contracted operations and maintenance services will improve the appropriate identification of good housekeeping and training actions.

For example, in many communities, state transportation agencies provide winter roadway maintenance while local communities provide summer maintenance. The identification of operations managers and "ownership" is an important prerequisite to effective stormwater master planning.

9. Know Your Equipment. Establishing realistic expectations for stormwater plan actions requires both knowledge of municipal and contracted equipment in use around the community and the skills of the staff operating them. Equipment used in stormwater infrastructure maintenance and pollution prevention operations is constantly improving, and it is important to identify likely limitations in municipal or contracted equipment before the development of plan actions. For example, street sweeping is considered a cost-effective approach to stormwater pollution prevention, but street sweepers vary greatly in their ability to reduce pollutant loads. Developing a list of equipment and skill level of operators before planning will provide the foundation for realistic stormwater actions.

10. Know Your Finances. A successful stormwater management plan requires local financing. Federal and state funding programs certainly may, under certain specific circumstances, provide funding to support stormwater management planning and/or implementation. However, usually these programs must be funded at the local level. So to develop a realistic plan, the stormwater management team needs to conduct an internal review of existing and future municipal budgets and the impact that the projected stormwater program costs will have on those budgets and the community's capital improvements plan. The team will also need to review the municipality's appropriation and bonding capacities and understand the legalities of implementing stormwater fees, system development charges, user charges, and/or levying special assessments.

Often, stormwater management actions can be integrated into existing programs, projects, and funding structures with minimal legal or fiscal impact and with some cost savings. So a thorough understanding of the municipal budgeting/capital expenditure process is essential to advance stormwater financing proposals. This understanding will help you to engage and win consensus from all of the stakeholders in the development of specific stormwater planning action items.

Putting these tips to work will arm you to isolate the root causes behind your community's stormwater issues and thereby allow you to develop your plan, putting you well on the way of a path toward:

- Mitigating existing stormwater discharges and minimizing the new.
- Institutionalizing appropriate Best Management Practices within your operations.
- Enhancing your community's livability and its natural areas.
- Eliminating institutional impediments for better site design and LID approaches. GE

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