
Appendix I: Briefing Provided to Congressional Requesters



Implementation of EPA's Storm Water Program

**Further Implementation and Better Cost Data Needed to
Determine Burden on Communities**

**Briefing for Staff for the Senate Committee on
Environment and Public Works
December 18, 2006**



“Keep it clean, cause we’re all downstream!”

Source: City of Boulder, Colorado, and the Watershed Approach to Stream Health (WASH) Project.



- Storm water runoff is a leading cause of water quality problems in the U.S.
- In the 1987 amendments to the Clean Water Act (CWA), Congress required the Environmental Protection Agency (EPA) to address storm water runoff
- EPA established the National Pollutant Discharge Elimination System (NPDES) storm water program
- Some are concerned that EPA's storm water program imposes a burden on communities



- Objectives of GAO study
- Background on storm water program
- Status of current program implementation
- Extent of program burden on communities
- Review of EPA's cost estimates
- Challenges to EPA in assessing future program implementation
- Conclusions
- Next steps



Objectives of GAO Study

- Objectives of GAO study:
 - Identify progress made in implementing the program
 - Determine the extent to which the program has burdened* communities
 - Determine the accuracy of EPA's cost estimates
 - Assess future program issues
- GAO:
 - Collected program data for all 50 states
 - Reviewed program documents from a sample of municipal separate storm sewer systems (MS4s)
 - Conducted about 90 interviews with EPA, state, and local officials; academic and industry experts; and others

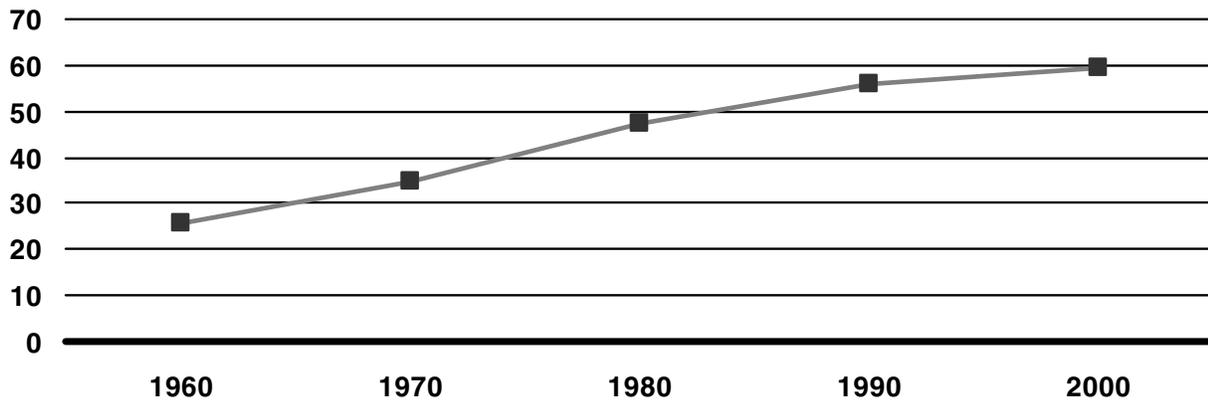
*We define burden to be the difficulty associated with program implementation including additional costs incurred by MS4s, increased administrative activities, reduced budget flexibility, actions related to litigation, and the influences of other environmental programs.



- Storm water runoff generally results from rain or snowmelt running off paved areas into water bodies
- The U.S. urban land area has greatly increased over time

Change in U.S. Urban Land Area Over Time

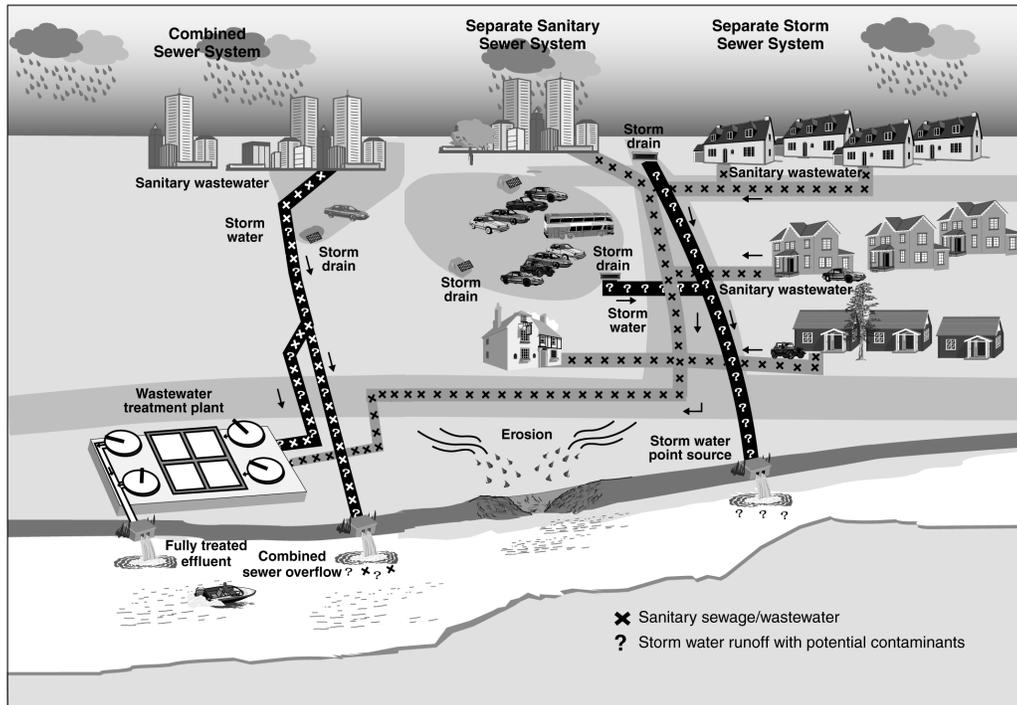
Urban area (million of acres)



Source: GAO presentation of USDA data.



Background—Types of Sewer Systems



Source: GAO illustration based on EPA data.



Background—Storm Water Program History

- 1987 CWA amendments address runoff from MS4s, and required permits in two phases
 - EPA's Phase I program requires permits for MS4s that pose the greatest threat, generally those serving populations of 100,000 or more
 - Applications required by Nov. 1992 (large) and May 1993 (medium)
 - EPA's Phase II program requires permits for other systems, generally smaller MS4s in urbanized areas
 - Applications required by Mar. 2003
- EPA has authorized the states to issue and enforce permits*

*In most cases.



Background—Federal Funding for Storm
Water Activities

Federal funding for storm water projects is limited

- Primary source is the Clean Water State Revolving Fund (CWSRF)
 - From July 1987 to June 2006, \$346 million, or less than 1% of all CWSRF funding for wastewater projects, was loaned for storm sewer projects
- Other assistance includes:
 - Grant programs for states and MS4s
 - Technical assistance programs
- Other federal agency programs may have a storm water component (e.g., community development block grants)

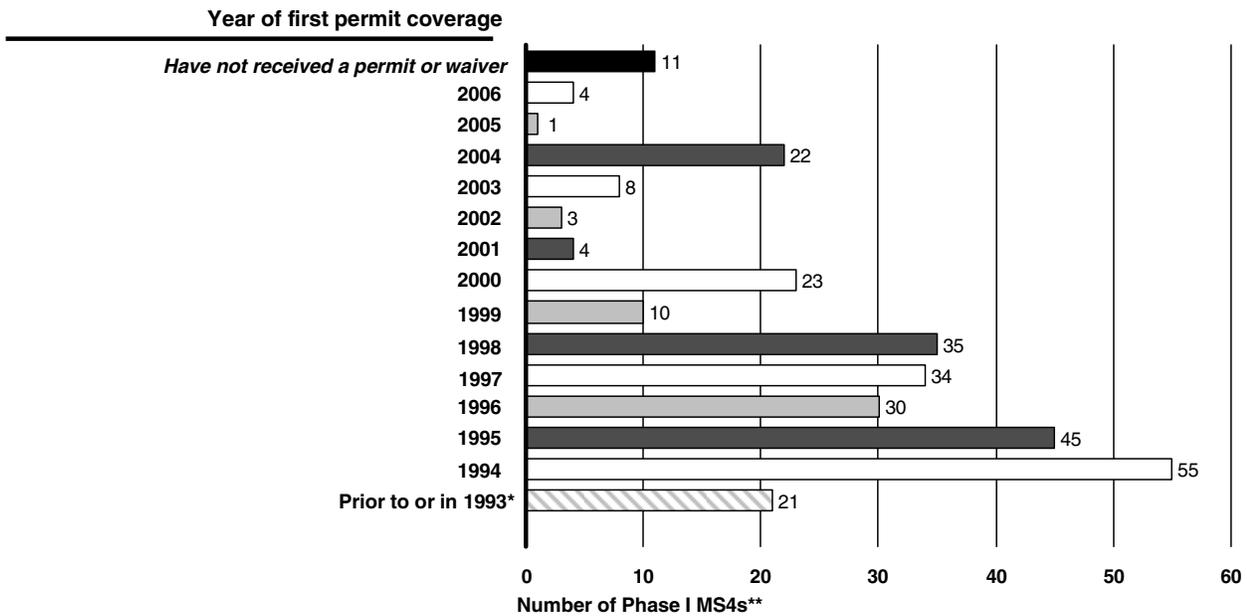


Status of Implementation—Permit Issuance
Slow for Many MS4s

- Nearly 11% of MS4s are not permitted yet, and therefore are not responsible for implementing program requirements
- For permitted MS4s, many permits were not issued for years after the program began
 - Nearly 60% of Phase I MS4s did not receive their initial permits until at least 2 years after the 1993 application deadline
 - Over 50% of Phase II MS4s did not receive permit coverage until 2004 or later



Status of Implementation—Majority of Phase I Permits
Delayed Until Well After Application Deadline



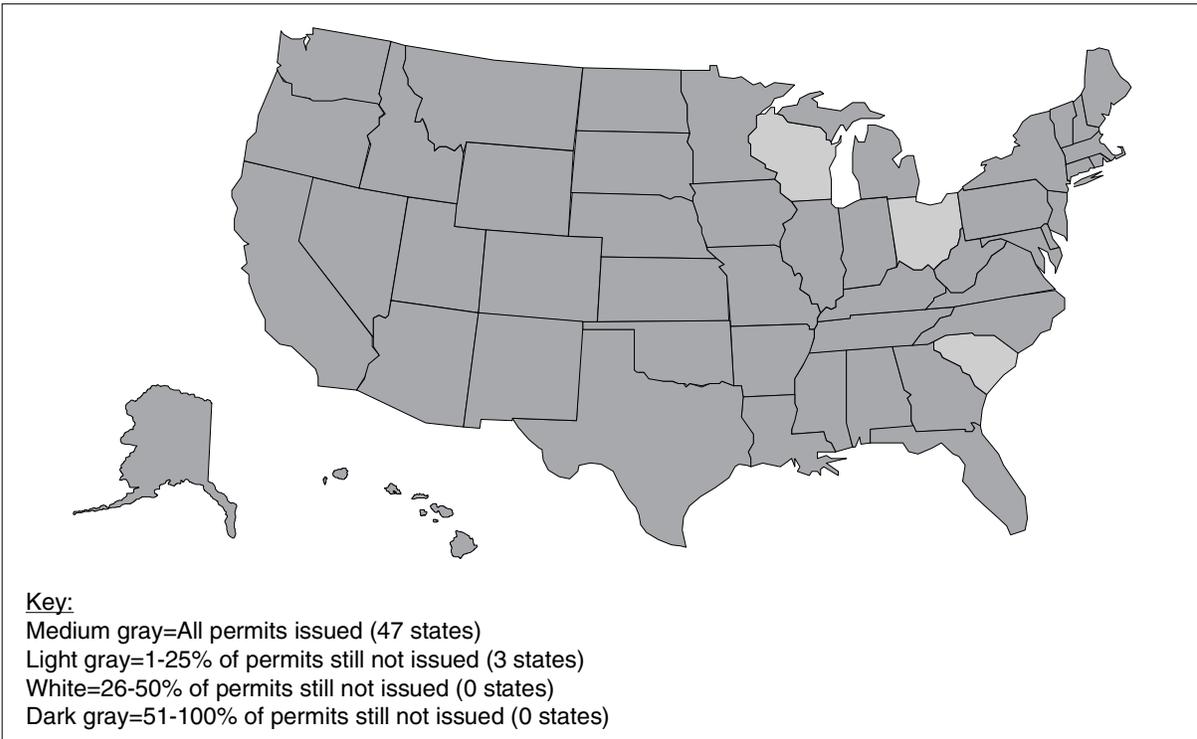
Source: GAO analysis of EPA and state data.

*Phase I permit applications were due by Nov. 1992 (large MS4s), and May 1993 (medium MS4s).

**These data represent lead Phase I MS4s, the total number of permitted Phase I MS4s is 939.



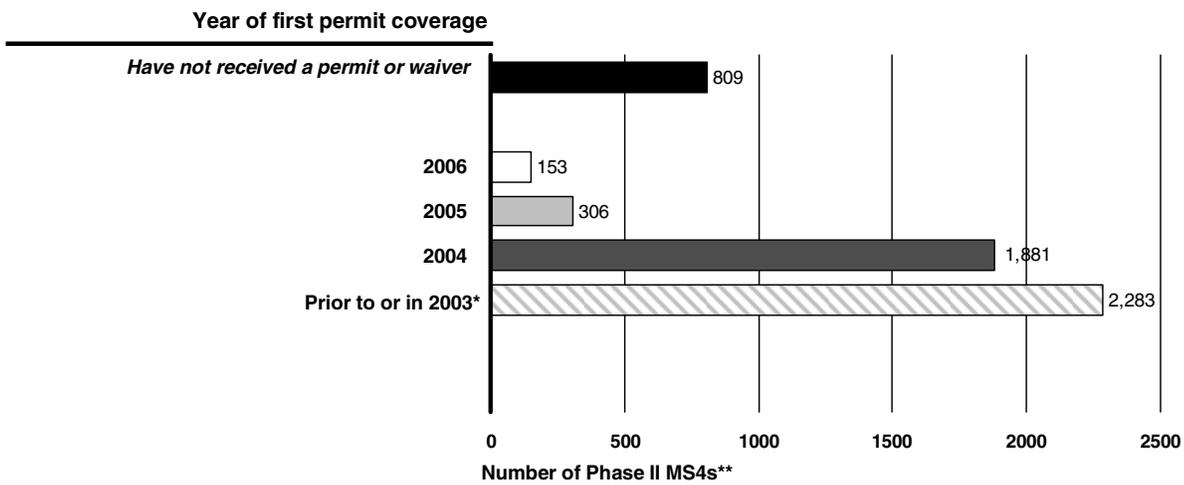
Status of Implementation—3 States Still Have Not
Issued All Phase I Permits



Source: GAO analysis of EPA and state data.



Status of Implementation—Many Phase II Permits Delayed or Not Yet Issued



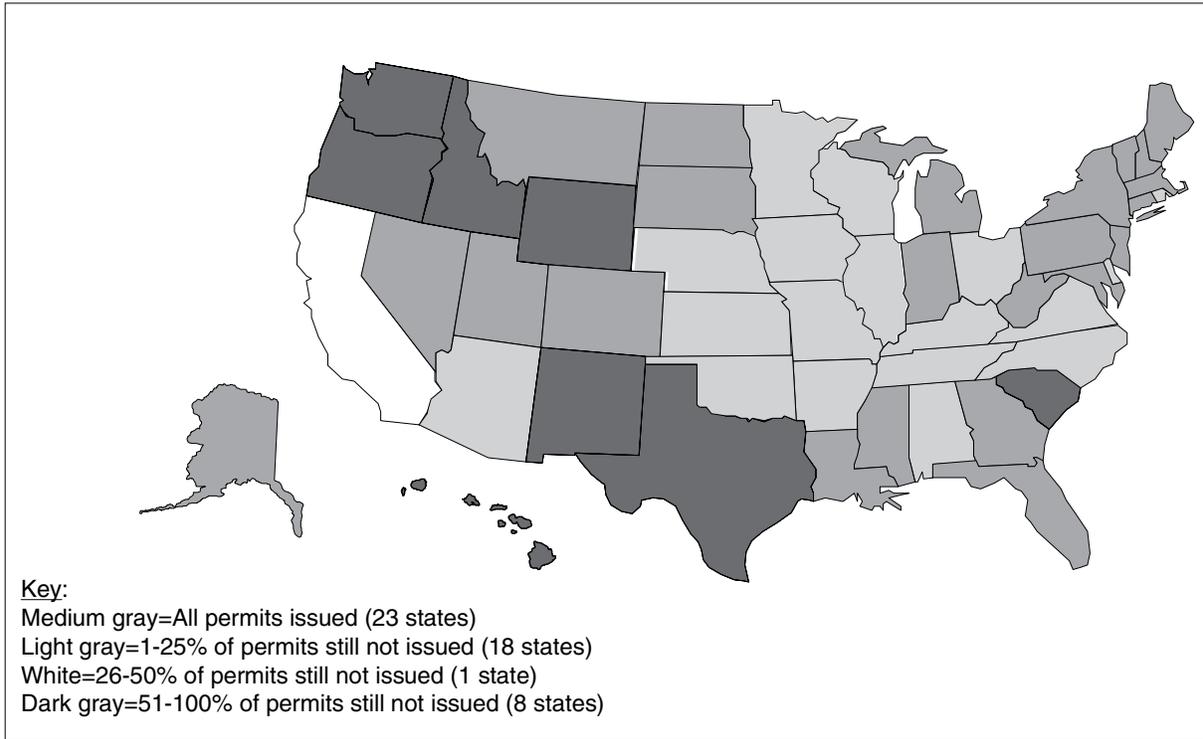
Source: GAO analysis of EPA and state data.

*Phase II permit applications were due by Mar. 2003.

**These data represent lead Phase II MS4s, the total number of permitted Phase II MS4s is 5,060.



Status of Implementation—25 States and 2 EPA Regions
Still Have Not Issued All Phase II Permits



Source: GAO analysis of EPA and state data.



Status of Implementation—MS4s Have Not
Fully Implemented Activities

- Almost all Phase II and some Phase I MS4s are still in their first 5-year permit terms
 - MS4s are phasing-in their storm water activities, as EPA guidance indicates that MS4s are typically not responsible for full program implementation until the end of their first 5-year permit term
- Some MS4s may not be complying with their permit conditions
 - During audits of MS4s in California, auditors found that many MS4s failed to control storm water runoff at municipally owned and operated facilities



Status of Implementation—Types of Best
Management Practices

- MS4s must reduce pollution to the maximum extent practicable (MEP) and may implement best management practices (BMPs) in the following categories
 - Public education
 - Public involvement
 - Illicit discharge detection and elimination (IDDE)
 - Construction site runoff controls
 - Post-construction runoff controls
 - Pollution (1) reduction from industrial, commercial, and residential areas (Phase I); and (2) prevention for municipal operations (Phase II)



**Pick Up After
Your Pooch to
Curb Pollution.**

Maybe you weren't aware, but dog waste left on the ground gets into storm drains, polluting rivers, lakes and beaches. The bacteria and risk of disease threatens the health of our kids and communities. Wherever you live in San Bernardino County, this pollution is a problem. The answer? Pick up after your dog, to help prevent pollution and protect our health. It's in your hands.

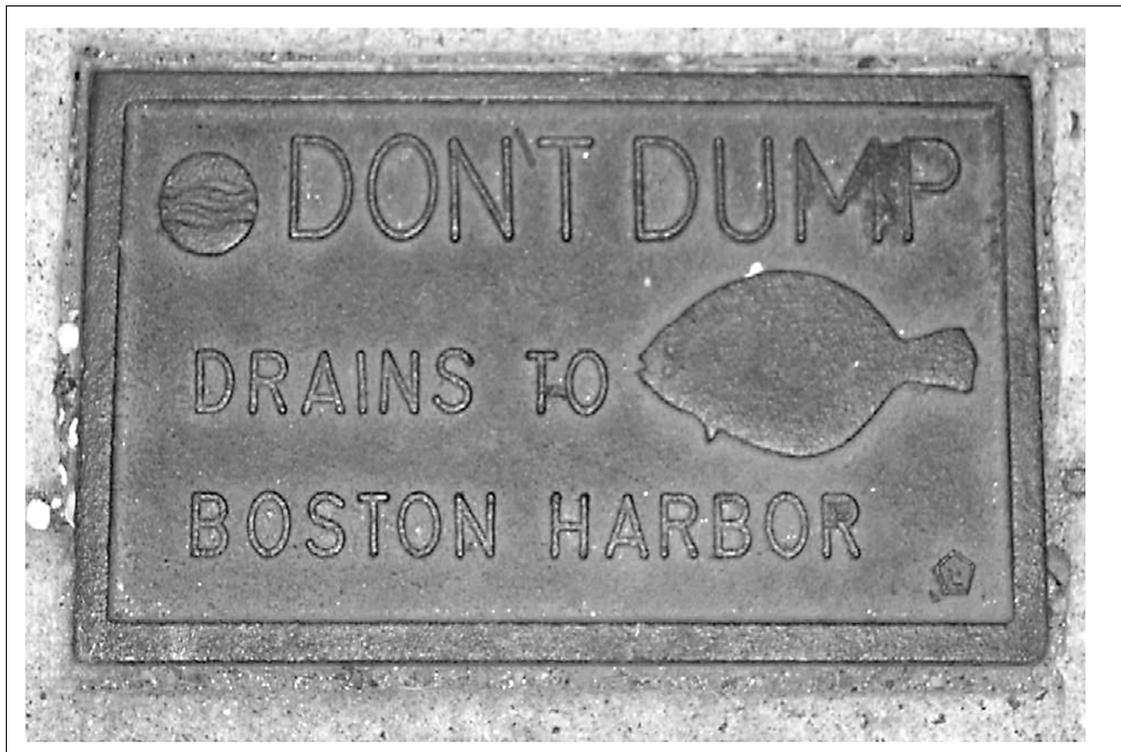
A black and white photograph of a dog's head, looking down and eating a piece of trash from the ground. The dog has a collar with a tag.The official seal of San Bernardino County, California, featuring a landscape with a mountain, a river, and a sun.

To report illegal dumping or for more information on Stormwater pollution prevention, call:
1 (800) CLEANUP
www.1800cleanup.org

Source: San Bernardino County Stormwater Program.



BMP Public Education (2)—Storm Drain Stencil



Source: GAO.



BMP Public Education (3)—Outfall Signage



Source: GAO.



BMP Public Involvement (1)—Volunteer Cleanup



Source: GAO.



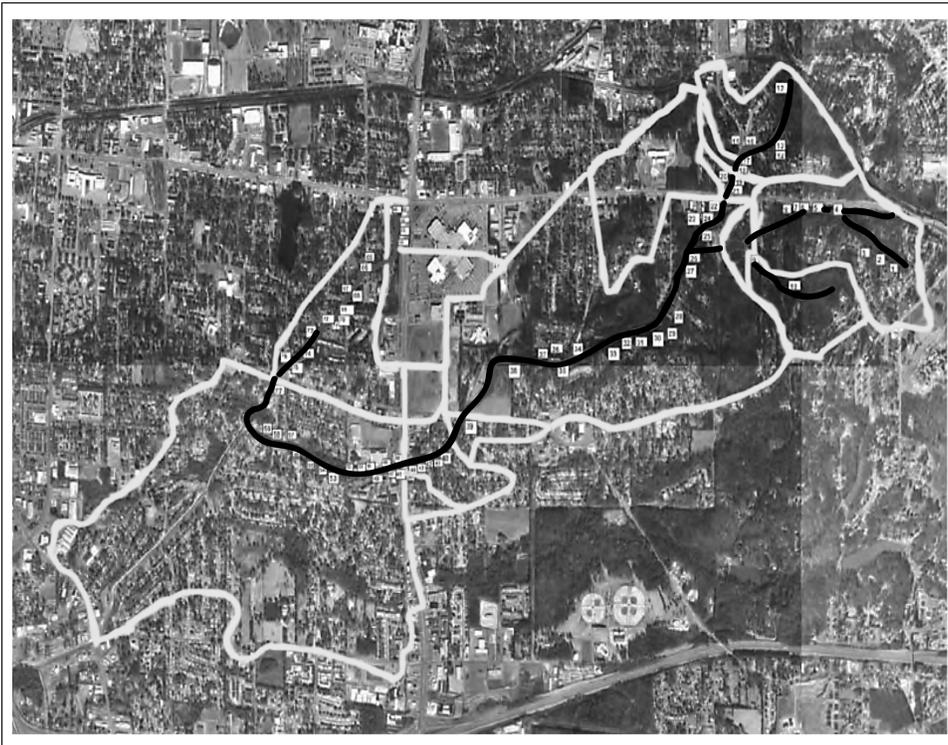
BMP Public Involvement (2)—Volunteer Storm Drain Stenciling



Source: City of Boulder, Colorado, and the Watershed Approach to Stream Health (WASH) Project.



BMP IDDE (1)—GIS Map



Source: Center for Watershed Protection - Illicit Discharge Detection and Elimination Manual.



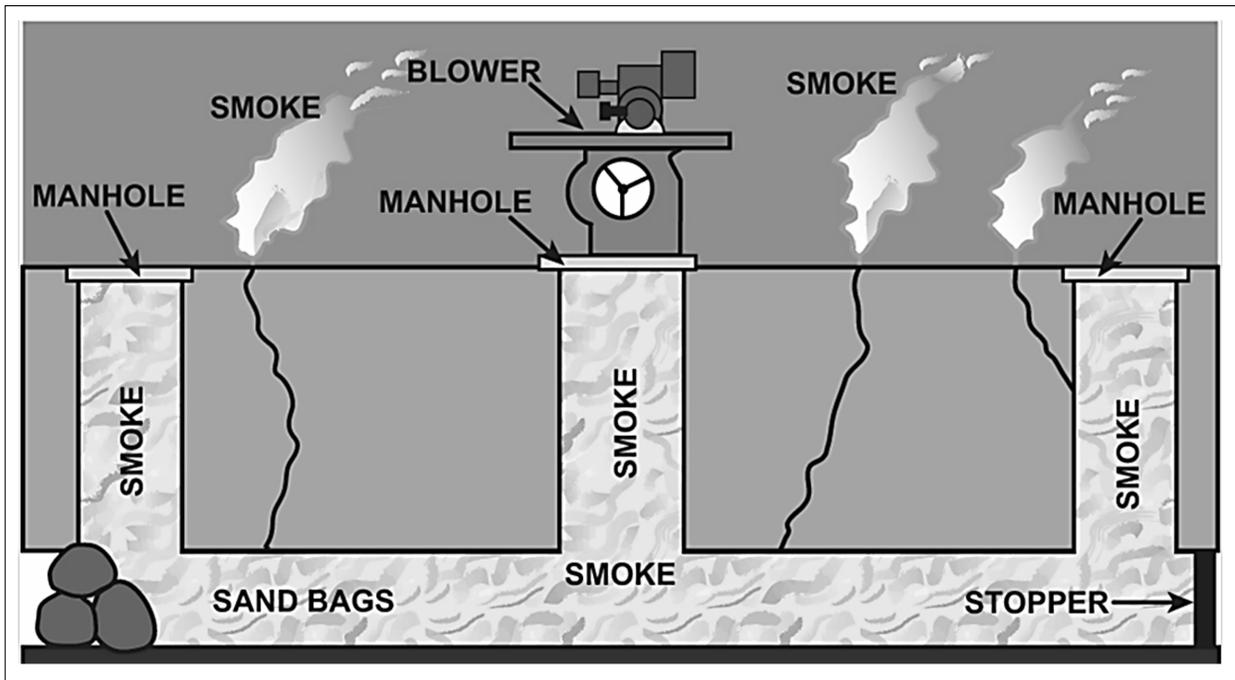
BMP IDDE (2)—Dye Testing



Source: IDDE Manual: A Handbook for Municipalities, NEIWPC, 2003.
Source: Center for Watershed Protection - Illicit Discharge Detection and Elimination Manual.



BMP IDDE (3)—Smoke Testing



Source: Center for Watershed Protection - Illicit Discharge Detection and Elimination Manual.



BMP Construction Site Controls (1)—Silt Fencing



Source: EPA.



Source: EPA.



BMP Construction Site Controls (2)—Site Stabilization



Source: EPA.



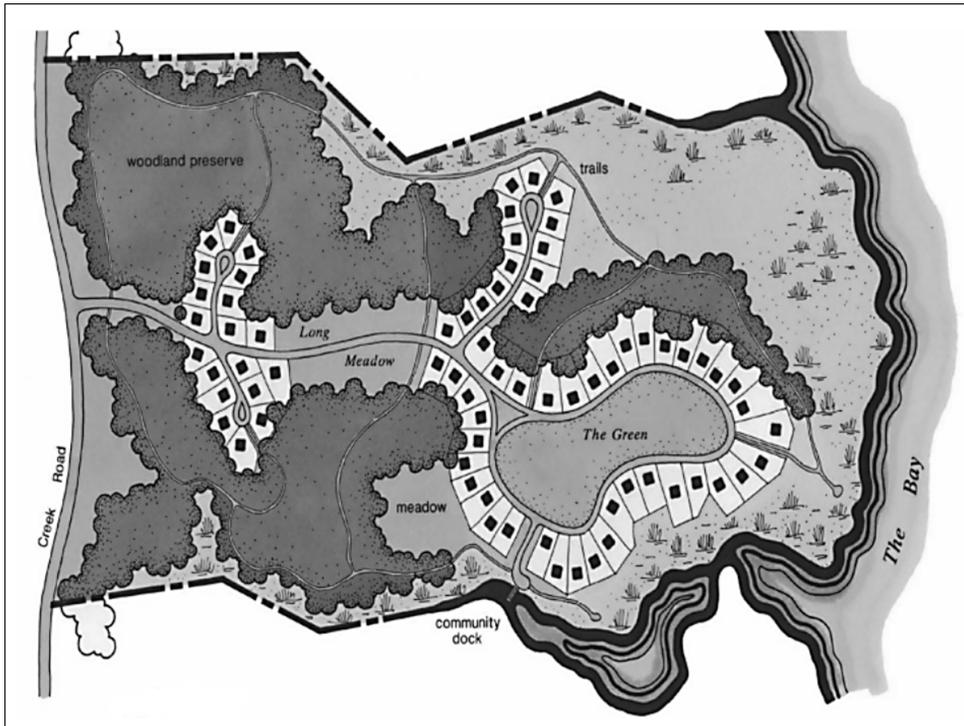
Source: EPA.



GAO

Accountability * Integrity * Reliability

BMP Post-Construction Runoff Controls (1)—Site Planning



Source: Conservation Design for Subdivisions by Randall G. Arendt, © 1996 Island Press.
Reproduced by permission of Island Press, Washington, D.C.



BMP Post-Construction Runoff Controls (2)—Structural BMPs

Stone Swale



Source: GAO.

Retention Pond



Source: GAO.



BMP Post-Construction Runoff Controls
(3)—Porous Pavement



Source: GAO.



BMP Post-Construction Runoff Controls
(4)—Green Roofs



Source: Green Roofs by Healthy Cities (www.greenroofs.org) and American Hydrotech, Inc.



BMP Post-Construction Runoff Controls
(5)—Gravel Wetland



Source: GAO.



BMP Pollution Reduction/Prevention
(1)—Catch Basin Cleaning



Source: Courtesy of Boston Water and Sewer Commission.



BMP Pollution Reduction/Prevention
(2)—Street Sweeping



Source: EPA.



BMP Pollution Reduction/Prevention
(3)—De-icing Material Storage



Source: EPA.



Program Burden—Flexibility in Federal Regulations
Reduces Burden

- The Maximum Extent Practicable standard allows MS4s to implement a variety of activities with varying levels of effort
- As a result, MS4s may:
 - Favor lower cost, nonstructural BMPs over higher cost structural activities
 - Rely on the private sector to bear the costs for installing structural controls in new development
 - Choose less costly routes to implement specific BMPs



Program Burden—Pre-Permit Activities Count
Towards Meeting Permit Requirements

- Some MS4s were implementing storm water management practices before the program
- Prior to the program:
 - Some states had regulations to control runoff
 - Some MS4s were already implementing comprehensive storm water management programs
 - Some MS4s conducted activities they can now count towards their permit requirements



Program Burden—MS4s Can Take Steps
to Reduce Burdens

- MS4s reduce the burden of implementing the storm water program by:
 - Obtaining state or federal program funds
 - Establishing dedicated funding sources
 - Sharing responsibilities with a state, co-permittees, or other MS4s
 - Planning capital and development projects to include storm water benefits and minimize additional expenditures



Program Burden—Additional State Permit
Requirements May Increase Costs

- In some instances, additional state permit requirements may lead to burden for MS4s, such as when they:
 - Widen the scope of the program
 - Establish additional environmental goals
 - Set timelines
 - Delineate measurable goals or minimum acceptable activity levels



Program Burden—Results of Litigation
Could Increase Burden

- Litigation has increased program burden because:
 - Permitting authorities have had to adjust their permit conditions or procedures in response to legal cases (particularly the 2003 decision by the U.S. Court of Appeals for the 9th Circuit)
 - MS4s have had to increase activity levels in response to court-mandated requirements



Program Burden—Other Regulatory Programs
Can Raise Storm Water Costs

- Other regulatory programs have increased burdens for some MS4s
 - Total Maximum Daily Load (TMDL) Program
 - TMDLs may add costs to storm water programs, particularly when implemented with numeric limitations
 - Combined Sewer Overflow Program
 - Endangered Species Act



Program Burden—Resource Limitations Can
Make Program Implementation More Burdensome

- Funding limitations
 - Limited federal funding
 - Barriers to establishing dedicated funding sources
 - Technical resource and staffing limitations
 - Lack of permit authority staff to provide assistance
 - Limited technical expertise and staff availability at the local level
-



Program Burden—MS4 Characteristics Could
Increase Costs

- MS4 characteristics may lead to additional cost
 - Environmental/geographic conditions, such as the quality of local receiving waters, soil characteristics, and topography
 - Community profile, including age of MS4, environmental activism, and the extent of new and redevelopment



EPA's Economic Analyses—Phase I and II
Cost Estimates

- Phase I per capita cost estimates for hypothetical cities (\$2006)

Scenario	Low		High		Weighted Average	
	Capital	O&M	Capital	O&M	Capital	O&M
1	\$18	\$25	\$318	\$263	\$73	\$61
2	\$29	\$30	\$378	\$372	\$91	\$76
3	\$54	\$32	\$61,279	\$13,456	\$7,924	\$1,762

- Phase II annual per capita cost estimate from National Association of Flood and Stormwater Management Agencies (NAFSMA) survey data, and EPA calculations of administrative costs (\$2006)

Low	High	Mean
\$0.20	\$25.75	\$4.30

Source: GAO analysis of EPA data.



EPA's Economic Analyses—Methodological
Concerns Affect Usefulness

- Analyses did not fully account for pre-existing activities
- NAFSMA survey data used in Phase II analysis flawed
 - Low response rate
 - Question design
- Extent to which Phase II analysis considered necessary capital investments is unclear
- Analyses did not estimate storm water costs driven by other environmental programs
- Phase I analysis does not provide a national program estimate, which limits its utility



Future Assessment—Developing More
Sophisticated Permits Could Increase Costs

- Permit requirements could become more complex and costly as permits are reissued
 - EPA guidance states that MS4s should refine their storm water programs over time
 - Pending and future lawsuits may prompt more stringent permit conditions
 - More TMDLs will be established and incorporated into permits (including TMDLs with numeric limits)



Future Assessment—More Aggressive Permit
Enforcement Could Increase Costs

- MS4s may have to increase activity levels as:
 - EPA’s Office of Enforcement and Compliance Assurance focuses more resources on MS4 permits
 - EPA regions implement the agency’s priority of increasing compliance monitoring of MS4s
 - Permitting authorities focus more resources on enforcement



Future Assessment—Increasing BMP Maintenance and
Replacement Needs Could Raise Costs

- Costs associated with maintaining and replacing BMPs could increase because:
 - Some BMPs with lower installation costs may have high maintenance costs
 - MS4s may not properly maintain BMPs, leading to higher repair and replacement costs
 - MS4s may need to replace some BMPs because they prove ineffective over time



Future Assessment—Program Review Is
Difficult without Good Data

- Limited and inconsistent reporting of data on MS4s' storm water activities hamper program evaluation
 - EPA will evaluate the MS4 program starting in or after Dec. 2012
 - Poor EPA guidance results in a wide variation in the scope and level of detail in MS4s' reports
 - MS4s do not report activities in sufficient detail to determine their costs or effectiveness
 - Inconsistencies in reporting make it difficult to analyze the information on a national basis



Future Assessment—Difficulties in
Estimating BMP Costs

- BMPs have very different types of costs, such as administrative, construction, labor, and land costs
- BMP costs depend on a variety of factors; for example, street-sweeping costs are influenced by:

Weather	Sweeping environment
Fuel costs	Dumping costs
Equipment types	Contracting/ownership options
Use of water	State and local regulations

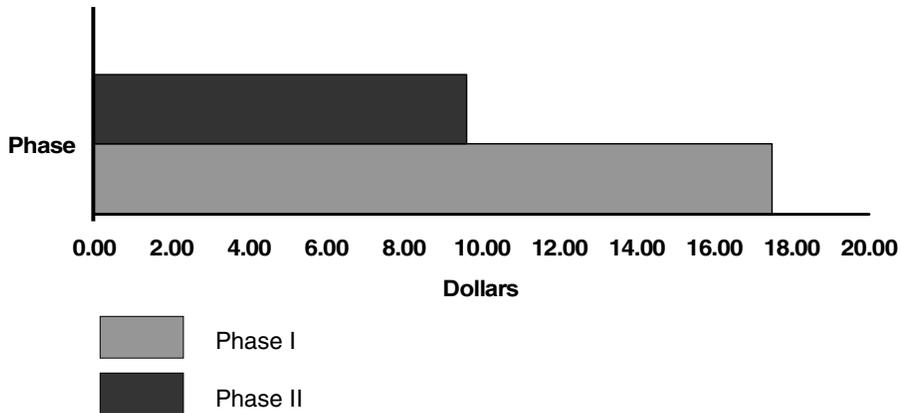
- Unless MS4s provide specific activity and cost data in their annual reports, it is hard to generate outside estimates



Future Assessment—BMP Costs Vary
Widely Between Different MS4s

- Per capita street-sweeping costs range from \$0-17.51 for Phase I and \$0-9.61 for Phase II MS4s

Phase I and II Street-Sweeping Costs



Source: GAO analysis.



Conclusions

- Implementation of the program has been slow, and many MS4s are not yet permitted or are still in their first cycle
- The extent of program burden on MS4s is difficult to ascertain because of delays and varying levels of implementation
- Methodological concerns with EPA's economic analyses raise questions about their usefulness
- The burden on MS4s could increase over time as the program is more fully implemented and enforcement increases
- EPA is unlikely to meet its 2012 goal to evaluate the program without more complete and consistent reporting on the scope, costs, and results of storm water activities