

# **STORMWATER/MS4 REFERENCES AND RESOURCES**

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Note: Many of the sites listed in this document are not under the management or control of the Commonwealth of Pennsylvania and are not governed by the privacy or security policies of the Commonwealth. The following links and documents are being provided because they have information or features that may be of benefit to MS4 permittees or other interested entities. The Commonwealth of Pennsylvania does not necessarily endorse the views expressed or the facts presented on the sites. The Commonwealth does not endorse any commercial products that may be advertised or available on the sites.

## **PADEP MS4 & STORM WATER WEBSITES**

From the menu on the left hand side of the [DEP homepage](#), choose “Water” to view DEP’s water programs, including the [Bureau of Watershed Management](#), which provides information on various watershed management topics, including drinking source water protection, [stormwater management](#), water resources planning, watershed restoration protection, and waterways, floodways and wetlands.

Another route to DEP stormwater information is to begin at the DEP homepage, then select “DEP Programs A - Z” from the menu on the left hand side, then select “S”, then select either “Stormwater” or “Stormwater Management”. Both selections lead to the same [stormwater management program](#) site.

The [stormwater management program](#) has information and resources for numerous stormwater related topics, including the Pennsylvania [Comprehensive Stormwater Management Policy](#) and the [Pennsylvania Stormwater Best Management Practices \(BMP\) Manual and training resources](#).

For MS4 permit documents, start at the general DEP website, then select “Tools” from the menu on the left hand side, then select “eLibrary”, then select “Permit and Authorization Packages”, then select “Water Management”, then select “NPDES”, then select “MS4s” to view the [PAG-13 General Permit](#) (which expires on 3-9-11), the [MS4 annual report form](#), and the DEP [MS4 Protocol](#).

Visit the DEP [Water Quality Assessment and Standards homepage](#) for information on various water quality topics, including:

[Pennsylvania’s 2008 Integrated Water Quality Monitoring and Assessment Report](#) [includes Section 303(d) and 305(b) information] and the [2010 Report](#).

[Fish Consumption Advisories](#)

[Pennsylvania’s State-Wide Surface Waters Assessment Program](#)

[Pennsylvania Statewide Stream Existing Uses Classifications](#)

[PA Code Chapter 93: Water Quality Standards](#) (i.e., “designated uses”)

[PA Code Chapter 16: Water Quality Toxics Management Strategy - Statement of Policy](#)

[PA Code Chapter 96: Water Quality Standards Implementation](#)

[PADEP Water Quality Antidegradation Implementation Guidance](#)

Go [here](#) for DEP public participation information, including links to the [PA Bulletin](#) and [PA Codes](#).

DEP [TMDL information](#); [EPA's 2004 Section 303\(d\) Fact Sheet for Pennsylvania](#); the [PA DEP State Water Plan](#) (Act 220); PADEP’s web based mapping application [eMapPA](#), which can be used to locate impaired waters.

## US EPA MS4 & STORM WATER WEBSITES

The EPA MS4 regulations can be viewed at [40 CFR Part 122: EPA Administered Permit Programs: The National Pollutant Discharge Elimination System](#) (start at 122.26; small MS4 info at 122.34)

For an explanation of the Phase II Storm Water Regulations found at 40 CFR Part 122, including the history and rationale behind the MS4 regulations, go to the [December 8, 1999 Federal Register](#) and select vol. 64, then enter page number 68722 and hit “submit”.

For further EPA MS4/SW information and resources, begin at the [EPA homepage](#) or the EPA [Region 3 homepage](#). There is a great abundance of stormwater information and resources available from EPA. MS4 permittees are encouraged to explore their websites thoroughly.

From the EPA homepage, there are several paths that will lead to stormwater information. The [State and Local Governments](#), [A – Z index](#), and [Browse all topics](#) selections all offer stormwater information.

The “State and Local Governments” selection provides information on water quality, polluted runoff, water efficiency, and watersheds. Under the “A – Z index” selection, “stormwater” and “water” can be selected for further information and resources. Under the “Browse all topics” selection, “Water” can be selected to view EPA’s [Office of Water](#) and other water subtopics. Then under “Browse these EPA Water subtopics”, some useful sites include:

1. Select [Storm Water](#), then select
  - a. [NPDES: Storm Water Program](#) for useful stormwater information and links, including:
    - [Stormwater Basic Information](#)
    - [Municipal MS4 Information](#) (an excellent site that all MS4 permittees should review and post on the stormwater section of their municipal website)
  - b. [NPDES](#) for a helpful overview of the [NPDES Permit Program](#).
2. Select [Water Pollution](#), then [Non-point Sources](#), then [Polluted Runoff \(Non-point Source Pollution\)](#) for useful information, including:
  - [Education Resources](#)
  - [Outreach materials and toolbox](#)
  - [A kid’s page](#)
  - [Funding opportunities](#)
  - [Publications and information resources](#)

EPA’s [Watersheds](#) site offers numerous useful resources, including [Adopt Your Watershed](#), [Surf Your Watershed](#), and a [Handbook for Developing Watershed Plans to Restore and Protect Our Waters](#).

EPA's [Watershed Academy](#) provides training and information on implementing watershed approaches, including more than 50 free, self-paced training modules; webcast seminars; live watershed-related training courses; and educational resources such as [Reduce Runoff: Slow It Down, Spread it Out, Soak It In](#), a 9-minute on-line video discussing how rain gardens, green roofs and rain barrels can help manage stormwater runoff.

[EPA information](#) on "What is stormwater runoff?", "Why is stormwater runoff a problem?", "The effects of pollution", and "Stormwater Pollution Solutions".

EPA's [Technical Tools for Watershed Management](#) addresses technical tools, data systems, databases, mapping, and water quality models.

EPA information on [Environmental Education](#)

EPA resources for: [Environmental Sites for Kids](#), [Water and Kids Health](#), [Water Education](#), [Water for Kids](#), [Water Games and Activities](#), [What You Can Do](#), [Water Science and Technology for Kids](#), [Water Science and Technology for Teachers](#)

For EPA MS4 Fact Sheets, click [here](#)

EPA Antidegradation Policy for Pennsylvania at [40 CFR Part 131.32](#)

[EPA Stormwater Publications](#)

EPA tools and resources for [septic systems](#)

EPA's [Used Oil Management Program](#)

EPA Publication 841-B-05-004, November 2005, [National Management Measures to Control Nonpoint Source Pollution from Urban Areas](#), offers guidance to help citizens and municipalities in urban areas protect bodies of water from polluted runoff that can result from everyday activities. The guidance will help municipalities implement their Phase II Storm Water Permit Programs.

EPA Publication 841-B-05-003, July 2005, [National Management Measures to Protect and Restore Wetlands and Riparian Areas for the Abatement of Nonpoint Source Pollution](#), offers guidance for wetlands and riparian areas.

EPA information on [River Corridor and Wetland Restoration](#)

EPA's [volunteer monitoring website](#) for information on monitoring and assessing water quality.

EPA's [TMDL website](#), [TMDL Program Results Analysis](#), and information on [Pennsylvania TMDLs](#)

EPA's [November 22, 2002 Memorandum](#): "Establishing Total Maximum Daily Loads (TMDLs) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs".

EPA Region 3 [summary](#) of 17 TMDLs with stormwater sources (including 2 from Southeast PA).

EPA Region 3 State 303(d) lists are available [here](#).

EPA's [GreenScapes website](#)

EPA's [Green Infrastructure](#) website discusses how to manage wet weather with green infrastructure, and includes a [Municipal Handbook](#).

EPA information on [Smart Growth](#), including [Protecting Water Resources with Higher-Density Development](#) and [Water Quality Scorecard: Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scale](#), which offers policy options for protecting and improving water quality through codes, ordinances, and incentives. The goals are to help identify ways to reduce stormwater flows and to educate stakeholders on policies and regulations. View the [Water Quality Scorecard](#) (PDF, 4.58 MB).

EPA information on [Healthy Watersheds](#)

Financing information and resources:

EPA's [Center for Environmental Finance](#)

The [Catalog of Federal Funding Sources for Watershed Protection](#) is a searchable database of financial assistance sources (grants, loans, cost sharing) available to fund a variety of watershed protection projects.

[Watershed Funding](#) resources, including [Resources for State and Local Governments](#).

EPA's Watershed Academy has added a new online training module on [Developing a Sustainable Finance Plan](#). The training module is designed to help watershed organizations develop and implement sustainable funding plans. Case studies are included throughout the module to provide real examples of finance strategies employed by nonprofit watershed organizations in the U.S.

EPA Region 3 Fact Sheet on [Funding Stormwater Programs](#)

EPA's [Guidebook of Financial Tools](#) is a reference document for officials with environmental responsibilities and includes over 300 financial tools that can be used to pay for environmental systems.

Examples of specific EPA storm water educational materials (all PDFs, some in Spanish also) available at [Storm Water Outreach Materials and Reference Documents](#):

[After the Storm](#) (425 KB)  
[Make Your Home the Solution to Storm Water Pollution](#) (698 KB)  
[Stormwater and the Construction Industry Poster](#) (743 KB) (refer to [Storm Water Outreach Materials and Reference Documents](#) for more options with this poster)  
[Clean Water is Everybody's Business](#) (238 KB)  
[Storm Water Pollution Found in Your Area!](#) (door hanger)(161 KB)  
[Kids Storm Water Stickers](#) (583 KB)  
[10 Things That You Can Do to Prevent Storm Water Runoff Pollution](#) (bookmark)(103 KB)  
[Take the Storm Water Runoff Challenge](#) (placemat)(960 KB)  
[Stormwater Management: An Overview for Auto Recyclers](#) (77 KB)  
[Stormwater Management: A Guide for Auto Recycler Owners and Operators](#) (301 KB)

Examples of specific EPA storm water information available at [National Menu of Storm Water Best Management Practices \(BMPs\)](#):

[Developing an Outreach Strategy](#)  
[Classroom Education on Stormwater](#)  
[Storm Water Outreach for Commercial Businesses](#)  
[Using the Media](#)  
[Educational Displays, Pamphlets, Booklets, and Bill Inserts](#)  
[Promotional Giveaways](#)  
[Stormwater Outreach Materials](#)  
[Landscaping and Lawn Care](#)  
[Pest Control, Pet Waste Management](#)  
[Residential Car Washing](#)  
[Water Conservation Practices for Homeowners](#)  
[Automobile Maintenance](#)  
[Pollution Prevention for Businesses](#)  
[Promoting Low Impact Development](#)  
[Adopt-A-Stream Programs](#)  
[Storm Drain Marking](#)  
[Stream Cleanup and Monitoring, Volunteer Monitoring](#)  
[Attitude Surveys](#)  
[Trash and Debris Management](#)  
[Preventing Septic System Failure](#)  
[Community Hotlines](#)  
[Municipal Construction Inspection Program](#)  
[Post-construction Plan Review](#)  
[BMP Inspection and Maintenance](#)  
[Low Impact Development and Other Green Design Strategies](#)  
[Municipal Employee Education and Training](#)  
[Spill Response and Prevention](#)  
[Municipal Facilities Management](#)  
[Storm Drain System Cleaning, Parking Lot and Street Cleaning, Municipal Vehicle Fueling](#)  
[Road Salt Application and Storage, Municipal Vehicle and Equipment Maintenance and Washing](#)

## **OTHER POTENTIALLY USEFUL MS4 & STORM WATER SITES**

The [Center for Watershed Protection](#) has an IDD&E Manual and many other educational resources and links, including [The Storm Water Manager's Resource Center](#).

The Center for Watershed Protection has prepared a new guidance manual titled [Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies Using Six Example Study Designs](#). The guidance is available as a free download and is designed to navigate the stormwater manager through the complexities of implementing a monitoring program so they can be confident in their results and get the most out of their limited stormwater dollars. Each study design covers essential elements such as scoping, budgeting, and staffing needs as well as equipment and sampling requirements.

The [Pennsylvania Organization for Watersheds and Rivers](#) has information on funding sources for watershed groups, finding a local watershed group, and other watershed information.

Access to online environmental resources is available at [Envirolink](#).

[The Environmental Directory](#) claims to be the largest exclusively environmental organization directory on the Web.

[OSUN.org](#) is a new document search engine that seeks out documents with extensions .pdf, .doc, and .ppt.

This [National Resources Defense Council site](#) documents some of the most effective strategies being employed by communities around the country to control urban runoff pollution.

The [Pennsylvania Environmental Council](#) has general information, resources, and links for storm water issues.

The [Pennsylvania Resources Council](#) is a citizen action environmental organization and has information on rain barrels.

The [Villanova Urban Stormwater Partnership](#) has information on Stormwater BMP research and previous Pennsylvania Storm Water Management Symposiums.

[Advanced Stormwater Information Systems](#) has storm water management software products and tools for MS4s.

The [Stroud Water Research Center](#) conducts freshwater research and provides watershed education, events and outreach efforts.

The Nature Conservancy offers an [interactive diagram](#) that explains the complexities of a river system.

Does your lawn need to be watered today? [Find out!](#)

A study of regionalization efforts for controlling stormwater pollution in Maine may be of benefit to MS4s:



ISWG PPM713 Final  
Report.doc

The [Local Government Environmental Assistance Network](#) provides environmental management, planning, funding, and regulatory information for local government elected and appointed officials, managers and staff. LGEAN is one of EPA's [Compliance Assistance Centers](#) that helps businesses, local governments, and federal facilities understand and comply with federal environmental requirements and save money through pollution prevention techniques.

[StormwaterPA](#) is a collaborative effort that highlights stormwater management innovations and provides developers, municipal officials, and engineers with the tools to transform local runoff problems from unwanted nuisance into beneficial resource.

The [Environmental Management Assistance Program](#) provides free and confidential environmental assistance to small businesses (500 employees or less) dealing with environmental compliance, pollution prevention, waste minimization, water conservation, and energy efficiency issues.

EPA's Office of Wetlands, Oceans, and Watersheds recently released a new version of its watershed handbook to help communities, watershed organizations, and local, state, tribal, and federal environmental agencies develop and implement watershed plans to meet water quality standards and protect water resources. The [Handbook for Developing Watershed Plans to Restore and Protect Our Waters](#) is designed to help anyone undertaking a watershed planning effort, but should be particularly useful to communities working with waters that are impaired or threatened.

Local grant opportunities and contacts to help property owners and municipalities develop a financing strategy for storm water management and infrastructure improvements, including retrofit and demonstration projects:

The [National Fish & Wildlife Foundation](#) was created by Congress in 1984 and directs public conservation dollars to the most pressing environmental needs and matches those investments with private funds.

US Dept. of Agriculture, [Natural Resource Conservation Service](#).

The [PA Infrastructure Investment Authority \(PennVest\)](#) provides low interest loans and supplemental grants for infrastructure projects (including stormwater).

The [PA Coastal Resources Management Program](#) provides federal funds for projects in PA's coastal areas.

The League of Woman Voters' [Water Resources Education Network \(WREN\)](#) provides information on resources and grants.

[TreeVitalize](#) (A partnership to restore tree cover in Southeast PA).



Planning Commissions can be viewed for Act 167 and other useful information:

[Bucks County Planning Commission](#)  
[Chester County Planning Commission](#)  
[Chester County Water Resources Authority](#)  
[Delaware County Planning Department](#)  
[Montgomery County Planning Commission](#)  
[Delaware Valley Regional Planning Commission](#)

Information on stormwater program funding:

The [National Association of Flood & Storm Water Management Agencies](#) has produced a guidance document (PDF, 1 MB) for municipal storm water funding.

The University of Maryland [Environmental Finance Center](#) and [Financing Stormwater Management in EPA Region 3](#).

The Boise State University Environmental Finance Center's [Plan2Fund Objective Prioritization Tool](#) has been designed to help your organization develop and implement a long term financial strategy to meet strategic goals.

A [stormwater financing presentation](#) from AMEC Earth & Environmental, Inc. is available through SmartWaterways.org. AMEC's [Financing a Municipal Stormwater Program](#) EPA webcast from 2006.

An [internet guide to financing stormwater management](#).

Natural Resources Defense Council: "[Funding and Gaining Support for Stormwater Programs](#)".

Florida Stormwater Association: "[Establishing a Stormwater Utility in Florida](#)".

"[The Stormwater Utility, Will it Work in Your Community?](#)" *Stormwater 1(1)*

"[Stormwater Utilities: Where do they Stand Now?](#)" *Stormwater 4(3)*

Here is information from Minnesota on the [Minneapolis Stormwater Utility Fee](#), including their stormwater credits program to encourage homeowners to make stormwater friendly changes.

An October 2008 *Stormwater* editorial: "[MS4 NPDES Compliance: Where Will the Funds Come From?](#)"

EPA's fact sheet, [Green Infrastructure Approaches to Managing Wet Weather with Clean Water State Revolving Funds](#), identifies several ways in which communities and individuals can use the Clean Water State Revolving Fund to finance green infrastructure projects.

## **MCMs 1 & 2 – Public Education, Outreach, Involvement and Participation:**

### [The PADEP MS4 information resource CD](#)

EPA resources: Fact sheets for [MCMs #1](#) and [#2](#); a [Toolbox](#) with a variety of resources to help develop and implement an effective and targeted outreach campaign is available; an educational resource for kids, students, high school and teachers is available [here](#); overviews of [MCM #1](#) and [MCM #2](#); info on [attitude surveys](#); EPA [Public Outreach Resources](#) such as “Getting in Step”: [A Guide for Conducting Watershed Outreach Campaigns](#) (PDF, 3.3 MB) and [Engaging and Involving Stakeholders in Your Watershed](#) (PDF, 1.34 MB)

The Federal Communicators Network has developed a [guide](#) to help government officials communicate clearly to the public.

The [Delaware Riverkeeper Network](#)'s publication “[Protecting Streams in Pennsylvania: A Resource for Municipal Officials](#)” has been prepared for municipal officials, with their responsibility as stewards of Pennsylvania’s natural resources in mind, and for private citizens, to enhance their understanding of what to expect of those officials. This guide focuses on the municipal role in protecting water quality and quantity. "Protecting Streams in Pennsylvania" provides background information and useful tips for securing stronger local protections. This guide also includes action steps, a glossary, and links to important Internet sites that provide more information on water resource protection.

[The Center for Rural Pennsylvania](#) has developed a manual: “[Developing Effective Citizen Engagement: A How-To Guide for Community Leaders](#)”.

For effective stormwater outreach, use [Water Words That Work](#).

[Tools for Effective Outreach](#) provides guidance for conducting stormwater outreach to different target audience groups.

Learn about [NEMO](#) (Non-point Education for Municipal Officials), including educational information of [impervious surfaces](#)

### [Why Watersheds?](#)

[Water Environment Federation](#) educational materials for students, educators and the public.

[The Pennsylvania Center for Environmental Education](#) provides environmental education materials, resources and programs.

[The Pennsylvania Association of Environmental Educators](#) has information for environmental educators, including many links.

The [Pennsylvania Department of Education](#) has [State Academic Standards](#), including [Academic Standards for Environment and Ecology](#).

The [National Extension Water Quality Outreach Education website](#) offers educational and watershed management resources as well as featured resources addressing topics such as “Changing Public Behavior”, “Target Audience Research”, and “Defining Successful Water Programs”. [Stream Side Science](#) is a collection of 11 hands-on activities that teach middle and high school students about basic concepts of watershed and water quality science.

The [Pennsylvania Fish & Boat Commission](#) has a learning center and educational information.

[The Partnership for the Delaware Estuary](#) provides educational and outreach resources, including information for children, teachers, communities and volunteers.

The Philadelphia Water Department, [Office of Watersheds](#), has developed a useful “Homeowner’s Guide to Storm Water Management” which is available [here](#) (PDF, 1.74 MB).

[Pennsylvania Cleanways](#) provides information and education on stream/litter cleanup programs.

Pennsylvania is one of only three states that participate in [LitterButt.com](#). Cigarettes are the most littered item in America and the world.

Storm drain stenciling resources (in English and Spanish) are available from [C&R Stencils](#); storm drain markers are available from [das Manufacturing](#), [Clear Water Technology](#), [ACP International](#), [New Pig](#), the [Partnership for the Delaware Estuary](#), and [Almetek Industries](#). A [storm drain stenciling manual for communities](#) is available from the Texas Natural Resource Conservation Commission. The [Southeastern PA Resource Conservation & Development Council](#) also has resources available, including stream signage resources.

The [Water Drop Patch Project](#) inspires Girl Scouts to learn about water quality and to take action in their communities to protect and restore local water resources.

This [site](#) provides general information about storm drain stenciling and lists examples of service learning projects for students and children. Also available is [Welcome to Stormville](#).

[Give Water A Hand](#) is a national watershed education program designed to involve young people in local environmental service projects.

The [Air & Waste Management Association’s Environmental Education Council](#) has classroom lesson plans for non-point source pollution prevention for K-12.

[The GreenTreks Network](#) provides watershed and educational resources and Stormwater Best Management Practices [videos](#).

[The EAC Network](#) promotes the establishment and support of EAC’s across Pennsylvania.

The New Hampshire Department of Environmental Services has extensive guidance for creating a [Pet Waste Outreach Campaign](#).

The California Stormwater Quality Association has developed an [Industrial and Commercial Handbook](#) that provides general guidance for selecting and implementing BMPs to reduce the discharge of pollutants in runoff from industrial facilities and selected commercial businesses.

The [California State Water Resources Control Board](#) has developed an [Erase the Waste](#) stormwater educational toolbox, with a goal to encourage residents and stakeholders to take ownership of their communities, help reduce and prevent stormwater pollution, and become part of the pollution solution.

Stormwater educational information and resources are available from the [San Antonio Water System](#). While some of the information is specific to San Antonio, the site also provides other educational information and ideas that could be applied anywhere.

The University of Wisconsin's [Water Action Volunteers](#) provides general information on topics such as stream monitoring, storm drain stenciling, and river clean-ups. Some of this information could be utilized in other parts of the United States. Resources include a [free WAV packet](#) which includes eight action-oriented activities that promote good environmental stewardship through a solid educational framework. Volunteers learn about water quality issues, and then choose activities that promote a positive learning experience while benefiting a community's water resources.

The New Jersey Department of Environmental Protection has a [Clean Water NJ](#) website that provides various stormwater educational resources.

[The ECAR Center](#) is a “one-stop shop” for all automotive dismantling and recycling operations and provides comprehensive and up-to-date environmental compliance assistance.

Local watershed organizations can be a valuable resource for public education and participation:

- The [Brandywine Valley Association](#)
- The [Red Clay Valley Association](#)
- The [Buck and Doe Run Watershed Partnership](#)
- The [White Clay Watershed Association](#)
- The [White Clay Creek Watershed Management Committee](#)
- The [Christina Basin Clean Water Partnership](#)
- The [Elk Creeks Watershed Association](#)
- The [Chester, Ridley, Crum Watersheds Association](#)
- The [Darby Creek Valley Association](#)
- The [Green Valleys Association](#)
- The [Perkiomen Watershed Conservancy](#)
- The [Wissahickon Valley Watershed Association](#)
- The [Lower Merion Conservancy](#)
- The [Park Creek Watershed Association](#)
- The [Pennypack Ecological Restoration Trust](#)
- The [Brandywine Conservancy](#)
- The [Heritage Conservancy](#)
- The [Cooks Creek Watershed Association](#)
- The [Natural Lands Trust](#)
- The [Nature Conservancy](#)
- The [Pennsylvania Land Trust Association](#)
- The [Gallows Run Watershed Association](#)
- The [Aquetong Watershed Association](#)
- The [Primrose Creek Watershed Association](#)

## **MCM 3 – Illicit Discharge Detection & Elimination:**

EPA's [fact sheet](#) and [overview](#) for MCM #3.

The Center for Watershed Protection [Illicit Discharge Detection and Elimination Guidance Manual](#), chapter by chapter, including the appendices.

For historical topographic maps, go to [MyTopo](#). Sources for current topo maps include [The USGS Store](#), [TopoZone](#), and [TerraFly](#).

The [Clean Water Network](#) has developed a [TMDL glossary](#) and a [Compilation of EPA's Regulations and Guidance on key TMDL Topics](#).

Virginia Tech's Center for Total Maximum Daily Load (TMDL) and Watershed Studies has developed an [online database](#) to house selected TMDL-related information and documents in one central location. The searchable clearinghouse contains three types of resources: TMDL guidance documents, reviews and summaries of TMDL-related technical and trade literature, and state-by-state summaries of TMDL programs across the nation. State summaries are updated regularly for all 50 states and include the approach and methodology used to develop TMDLs in that state. In total, about 500 documents are available within this database.

DEP guidelines on [swimming pool discharges](#)

DEP's [Mobile Washing Fact Sheet](#)

Pond management information is available from the [Chester County Water Resources Authority](#), including [Management Strategies for the Small Pond Owner](#) (PDF, 2.06 MB).

Information on water foam and oil like sheens:



What causes foam to appear on rivers.doc



Foam.doc



oil like sheen bacteria explan...



What's Floating on the water s...

Information on fish kills:



Fish Kill information.doc (100.



Fish Kill Information 2.doc



Fish Kill Information 3.doc (6...

Information on MBAS and parking lot cleaning:



MBAS\_000.pdf.pdf (145 KB)



PARKING LOT CLEANING BMPs.doc .

## **MCMs 4 & 5 - Erosion & Sediment Control and Post-Construction SW Management:**

EPA's fact sheets for [MCM #4](#) and [MCM #5](#); an [overview](#) of MCM #4 and an [overview](#) of MCM #5. [EPA Stormwater Management BMP Fact Sheets](#).

County Conservation Districts can be a source of valuable information:

The [Bucks County Conservation District](#) website provides environmental educational information, including a brochure on innovative stormwater BMPs; information on local watershed management programs; and useful links and resources.

The [Chester County Conservation District](#) website provides educational information and resources for erosion and sedimentation, stormwater management, and local watersheds.

The [Delaware County Conservation District](#) website provides information on stormwater, grants, and local watersheds.

The [Montgomery County Conservation District](#) website provides information on watersheds, rain barrels and rain gardens, Tree Vitalize, and a virtual tour of stormwater BMPs.

The [Pennsylvania Association of Conservation Districts](#) website provides E&S, BMP, and educational resources.

The [International Erosion Control Association](#) provides educational and resource information.

EPA has created a new [web-based Urban BMP Performance Tool](#) to provide stormwater professionals with easy access to approximately 220 studies assessing the performance of over 275 stormwater BMPs. The Tool provides access to studies covering a variety of traditional and low impact BMP types, including retention and detention ponds, biofilters, grassed filter strips, porous pavement, wetlands, and others. Users will also find a series of essays aimed at improving understanding of BMP performance and the importance of volume reduction/infiltration in these assessments.

EPA's [archived webcast](#) on BMP performance.

[The University of New Hampshire Stormwater Center 2007 Annual Report](#) is now available online. Produced in partnership with the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET), this publication contains performance data on the ability of stormwater treatment systems to treat water quality and manage water quantity. Recent presentations and posters from the Center are available [here](#).

The [Pennsylvania Stormwater Best Management Practices \(BMP\) Manual](#)

The Center for Watershed Protection's Stormwater Manager's Resource Center: [Environmental Indicator Profile Sheet: BMP Performance Monitoring](#) (PDF, 2.97 MB).

The Center for Watershed Protection offers MS4 communities a lot of [storm water management resources and information](#), especially for MCM #5 issues. One free resource is their July 2008 manual *Managing Stormwater in Your Community: A Guide for Building an Effective Post-Construction Program*. Their 2007 *Urban Sub-watershed Restoration Manual No. 3: Urban Stormwater Retrofit Practices* is a free download and focuses on retrofit practices that capture and treat stormwater runoff before it is delivered to a water body. It describes both off-site and on-site retrofit techniques that can be used to remove pollutants, minimize channel erosion, and help restore stream hydrology.

The Center also has numerous resources available addressing [Better Site Design](#).

The [Chesapeake Stormwater Network](#) seeks to improve on-the-ground implementation of more sustainable stormwater management and environmental site design practices within the Chesapeake Bay Watershed. While their focus is on the Bay Watershed, much of their information and resources can also be applied outside of the Bay Watershed. The site includes information for MS4s under “Local Stormwater Managers”.

The Chesapeake Bay Program: [Stormwater BMP Categories and Pollutant Removal Efficiencies](#).

The [International Stormwater BMP Database](#) provides information on the design, selection and performance of SW BMPs, including a [project overview](#) and the Technical Memorandum: [Development of Performance Measures: Determining Urban Stormwater Best Management Practice Removal Efficiencies](#).

The Center for Neighborhood Technology (CNT) has developed a [Green Values stormwater calculator](#) that estimates savings from conventional versus green development for several scenarios.

The University of New Hampshire [Stormwater Center](#) provides useful stormwater information and has launched the [Innovative Stormwater Management Inventory](#) web site, in conjunction with NEMO (Nonpoint Education for Municipal Officials). This searchable and amendable inventory is designed to highlight innovative BMP strategies implemented throughout New England.

The California Stormwater Quality Association has developed a [New Development and Redevelopment](#) handbook that provides general guidance for selecting and implementing BMPs to reduce pollutants in stormwater runoff. The handbook contains general information on planning and design concepts, source control and treatment control BMPs, and information on long-term maintenance of BMPs.

The Capitol Region Watershed District (Twin Cities, MN) [Volume Reduction Worksheet](#) represents an example of a method to account for various volume reduction practices, as well as subsurface storage and infiltration volume. The spreadsheet provides storage volume credits for seven different types of practices.

The [National Resources Defense Council](#) provides information and case studies on green infrastructure alternatives to traditional hardscape solutions to wet weather discharge problems. Go [here](#) for a June 2008 report (PDF, 6.67 MB) assessing the benefits of naturalized basins.

Go [here](#) for a report on how to reduce the amount of impervious cover in an impaired stream flowing through a highly urbanized area. Approximately 50 stormwater retrofit opportunities were identified.



Rain garden information is available at the [Rain Garden Network](#), including webcast information on how to [fund green stormwater infrastructure projects](#).

The [New Jersey Water Resources Research Institute](#) provides useful general information on rain gardens and bioretention in their [Fall 2008 newsletter](#) (PDF, 1.61 MB).

The North Carolina State University Stormwater Engineering Group offers a wealth of information on various stormwater topics, including [research information](#) on stormwater BMPs and pathogens, rainwater harvesting, permeable pavement, green roofs, and bioretention areas; information on [backyard rain gardens](#); guidance information for local governments to implement their [Phase II MS4 programs](#); and numerous [fact sheets](#).

[The Alliance for the Chesapeake Bay](#) has many [stormwater related publications](#) available, including information on buffers, rain barrels and gardens, homeowner stormwater guidance, integrated pest management, and a *Citizen's Guide to the Control of Invasive Plants in Wetland and Riparian Areas*.

Rain garden information is available at [The Green InterNetwork](#), including a “How to Build a Rain Garden” video, a rain garden blog, and other related information.

Additional rain garden information and resources (e.g., articles, presentations, manuals, fact sheets, websites) are available at the Rutgers University [Rain Garden Information Center](#).

The [University of Wisconsin Cooperative Extension for Water Resources Education](#) provides stormwater educational information and publications, including resources on stormwater runoff, home and garden clean water practices (e.g., pet waste, rain gardens, yard care), and volunteer monitoring/water action volunteers.

How to make a rain garden from [raingardens.org](#).

[Rain garden information](#) is available from the [University of Connecticut Cooperative Extension System](#)

[Greenroofs.com](#): The resource portal for green roofs, including the [top 10 hot designs in greenroof design](#).

See how green roofs are changing the way architects design buildings at <http://www.inhabitat.com/2009/10/07/green-roofs-are-changing-the-way-architects-design-buildings>.

Here is a [Science Daily](#) article on Sedum, plants commonly used on green roofs.

Information about [Live Roof](#), a hybrid green roof system.

EPA [Vegetated Roof Cover](#) information.

How to [make your own rain barrel](#). Additional rain barrel information is available [here](#), [here](#), and [here](#).

Visit [rainwaterhog.com](#) for innovative rainwater collection systems that catch and store rainwater.



The [Northern Virginia Regional Commission](#) has developed several [BMP Handbooks](#), including a [guidebook](#) for private owners and operators of storm water BMPs. This publication is designed for individual property owners, homeowner's association representatives, and residential/commercial property managers. The guidebook outlines basic maintenance and planning tasks to keep Stormwater Best Management Practices (BMPs) functioning properly, including information on types of BMPs, general maintenance needs, who should carry out maintenance, inspections, and planning for BMP maintenance costs. The guide also contains a sample inspection checklist, a BMP maintenance costs planning sheet, and a local government resource guide.

The Pennsylvania Environmental Council has developed a useful guide (PDF, 2.54 MB) for homeowners, "[Maintaining Stormwater Basins on Your Property – Fall 2008](#)", that has been made available via StormwaterPA.

The [Perkiomen Watershed Conservancy](#) has developed a [booklet](#) that discusses simple methods to improve the function and appearance of stormwater detention basins. The booklet addresses naturalized stormwater management basins.

Additional guidance on detention basin maintenance for homeowner associations and businesses is available from the [Rouge River National Wet Weather Demonstration Project](#). Further [stormwater management](#) information is available, including [detention pond inventory](#) and [maintenance](#) (PDF, 1.32 MB) guidance.

The USDA NRCS Mid-Atlantic Interdisciplinary Resource Team has developed guidance for [maintenance of residential stormwater management areas](#) (PDF, 1.52MB).

[DNREC](#) provides some guidance and resources for stormwater pond/facility maintenance, roadside swale maintenance, native plants, and invasive species.

EPA's [Stormwater Wet Pond and Wetland Management Guidebook](#) (PDF, 4.11 MB).

[Stormwater Maintenance, LLC](#) provides inspection, maintenance, and repair services for stormwater and drainage systems and has a goal of helping owners stay within government regulations, meeting maintenance and repair commitments, and budgeting for and minimizing their overall infrastructure expenditures.

The [Stormwater Equipment Manufacturers Association](#) is seeking people to complete their [online questionnaire about BMP maintenance costs](#).

The [Construction Industry Compliance Assistance Center](#) has information on low impact development, a storm water construction industry poster, and SW BMP information and research.

The [Low Impact Development Center](#) provides information on low impact development, including [urban design tools](#) for retrofits and new/re-development, and [LID Strategies and Tools for NPDES Phase II Communities](#).

EPA's [Low Impact Development](#) website provides fact sheets and reports, design/guidance manuals, and information resources.

Storm water management information is available from [The Stormwater Authority](#).

[SUSTAIN](#) (System for Urban Stormwater Treatment and Analysis Integration Model) was developed by EPA and is a decision support system to facilitate selection and placement of BMPs and LID techniques at strategic locations in urban watersheds. It was designed for use by watershed and stormwater practitioners to develop, evaluate, and select optimal BMP combinations at various watershed scales on the basis of cost and effectiveness. Applications include developing TMDL implementation plans, identifying management practices to achieve pollutant reductions under a MS4 permit, and developing a phased BMP installation plan.

The [National Decentralized Water Resources Capacity Development Project](#), under “Publications & Presentations”, offers lessons learned from a 2009 Residential Low Impact Development Project in Western Washington (Project No. 04DEC11SG). This is a large (9.18 MB) pdf report that evaluates the performance of individual LID practices (in this case, bioretention swales, permeable concrete, compost amended soils, and surface flow dispersion) and evaluates the effectiveness of integrating these practices into a stormwater management system.

The U.S Department of the Interior and the U.S. Geological Survey, in cooperation with the Wisconsin Department of Natural Resources, has recently published a report titled “[A Comparison of Runoff Quantity and Quality from Two Small Basins Undergoing Implementation of Conventional and Low-Impact-Development \(LID\) Strategies.](#)” This report is available as a free download (5.86 MB).

Information on [permeable pavements](#), from the [Interlocking Concrete Pavement Institute](#).

Articles in *Stormwater* on [permeable pavers](#), [porous pavement](#), and [volume-based hydrology](#).

The [American Society of Landscape Architects](#) has released a resource to help create sustainable and resource-efficient homes. The site discusses integrated site design and provides links to organizations, publications, and resources, including information on permeable materials.

[Aquatic Plant Management: Best Management Practices in Support of Fish and Wildlife Habitat](#) provides nationally recognized BMPs for chemical, mechanical-physical, biological, and cultural procedures for controlling aquatic plants, using methods that protect or restore fish and wildlife habitat.

The [Water Environment Research Federation](#) recently unveiled a new [Web site](#) that gives landscape architects, designers, engineers, stormwater managers, elected officials and the public creative new ideas on sustainable stormwater practices. The site provides practical tools, frameworks for implementation, and planning aids that can be adapted to any community or project. While on the WERF homepage, to review stormwater related research and guidance, select “[Search Research Publications & Tools](#)” and then select relevant stormwater subject area topics such as Green Infrastructure, Low Impact Development, Stormwater BMPs, Stormwater Source Identification & Control, and TMDLs.

[The Planner's Guide to Wetland Buffers for Local Governments](#), from the [Environmental Law Institute](#) (ELI), identifies both the state-of-the-art and the range of current practice in protection of wetland buffers by local governments. The guide book presents ELI's detailed examination of more than 50 enacted wetland buffer ordinances around the nation and nine model ordinances, as well as several hundred scientific studies and analyses of buffer performance. The guide provides to local governments considering enacting or amending a wetland buffer ordinance what they need to know to manage land use and development in these important areas.

The University of South Australia Urban Water Resources Group has developed a [website](#) that specializes in quantity and quality issues associated with research into collection, treatment, storage, retrieval and use of urban water resources. They have developed a publication, *Water Sensitive Urban Design: basic procedures for source control of stormwater*, and a student edition of the handbook is available as a free download from the [Publications and Downloads](#) section of the website. Topics of note in the handbook include use of source control strategies to enable continued use of competently performing stormwater infrastructure without expensive upgrades, and to enable overburdened stormwater infrastructures to achieve progressive improvement in performance, without expensive upgrades.

From the Chagrin River Watershed Partners, Inc.: [Riparian Setbacks: Technical Information for Decision Makers](#).

From EPA: [Riparian Buffer Width, Vegetated Cover, and Nitrogen Removal Effectiveness: A Review of Current Science and Regulations](#) (PDF, 1.14 MB).

A [recent article](#) in *Stormwater* offers a review of current literature of riparian and wetland buffers for water quality protection.

The Center for Watershed Protection and the US Forest Service has developed a [Watershed Forestry Resource Guide](#) website. This site addresses topics such as urban tree canopy, reducing stormwater runoff, forest-friendly development, and planting and maintaining trees.

The [Sustainable Sites Initiative](#) was created to promote sustainable land development and management practices that can apply to sites with and without buildings.

An [article](#) in *Water Online* describes research with several ornamental and wetland plants to remove nutrients from stormwater runoff.

The [Association of State Wetland Managers](#) provides links to many guides, articles, and websites related to wetlands.

The [Swamp School](#) offers wetland and environmental education, including a free wetland plant guide.

[The Center for Urban Forest Research](#) offers tree guides and fact sheets.

Go to [American Forests](#) for a review of case studies on how cities have improved their ordinances, obtained funding, and enhanced programs and staffing related to green infrastructure policy and practice within urban areas.

The Virginia Water Resources Research Center has developed a special report: [Virginia's Stormwater Impact Evaluation: Developing an Optimization Tool for Improved Site Development, Selection and Placement of Stormwater Runoff BMPs](#) (PDF, 3.42 MB).

## **MCM 6 – Pollution Prevention & Good Housekeeping for Municipal Operations:**

EPA's [fact sheet](#) and [overview](#) for MCM #6.

Training resources are available at [Excal Visual](#), including stormwater training resources.

The Center for Watershed Protection has developed a [Municipal Pollution Prevention/Good Housekeeping Practices Manual](#). The manual provides "how to" guidance, and outlines the Center's most recent ideas on how municipal pollution prevention/good housekeeping practices can be used to address local water quality issues and watershed restoration goals.

The Local Government Environmental Assistance Network provides a useful [storm water toolbox](#) describing operation and maintenance practices from Oregon that can be applied to MS4s in any location. The site contains guidelines and checklists.

A September 2009 article in *Stormwater*, "[Better Defined, More Strictly Enforced](#)", discusses stormwater system maintenance at the local level.

The California Stormwater Quality Association has developed a [Municipal Handbook](#) that provides general guidance for selecting and implementing BMPs to reduce pollutants in runoff from municipal operations.

The Center for Watershed Protection has information and resources for [Municipal Housekeeping](#), including street sweeping and storm drain cleanouts, and pollution source control practices.

For information about coal tar based pavement sealers, go to [The Truth About Coal Tar](#).

An [Environmental News Service article](#) discussing research by the [University of New Hampshire Stormwater Center](#) on pavement sealcoats and stormwater runoff.

The [Salt Institute's salt use handbook](#), and as a [printable version](#). Information on [salt storage](#), including highway salt and our environment.

For guidance on the environmental management of road salt used for control of snow and ice, go [here](#), [here](#), [here](#), or [here](#). For a literature review of deicers, go [here](#).

The [Center for Environmental Excellence](#) provides information on winter operations and salt, sand, and chemical management.

A study of [road salt use](#) in Minnesota is interesting, as is this chlorides article from [Science Daily](#).

DEP Fact Sheet on snow management and disposal:



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## **General items of Interest:**

In January 2009, the [Center for Rural Pennsylvania](#) published [Drinking Water Quality in Rural Pennsylvania and the Effect of Management Practices](#).

The PA Department of Conservation and Natural Resources, in conjunction with the U.S. Geological Service, has released a report, [Summary of Groundwater-Recharge Estimates for Pennsylvania](#), which provides a general overview of processes affecting groundwater recharge in Pennsylvania and discussion of estimates of recharge rates.

The [Penn State University College of Agricultural Sciences Master Well Owner Network](#) is a network of trained volunteers dedicated to the proper construction and maintenance of private water systems in Pennsylvania and throughout the Mid-Atlantic Region.

The [Source Water Collaborative](#) provides a tool to assist states, public water systems, and organizations reach out to local officials and decision-makers. The tool can be used to create a guide that highlights your community's source water protection needs.

For Chester County MS4s, [Landscapes2](#) is the county's comprehensive long range policy plan which was adopted on November 9, 2009. Chapter 6 discusses natural resources, including stormwater issues.

The [Trust for Public Land](#) offers a comprehensive database of land conservation in America. The site provides information about land conservation policy and offers parcel-level data and mapping features for exploring the results of land conservation. New data is added each month as information becomes available.

Recent articles published in [Stormwater](#) discuss the challenges of stream restoration as a stormwater management tool: [May 2009 article](#); [September 2009 article](#); [November/December 2009 article](#)

For an example of how a local community can restore a watershed, consider the James River Association and their [Extreme Stream Makeover](#) program, especially what was accomplished in their [Horsepen Branch 2008 ESM](#). Related to this is the Center for Watershed Protection's [Technical Report: Stormwater BMPs in Virginia's James River Basin: An Assessment of Field Conditions & Programs](#) (PDF, 1.97 MB).

For information on invasive species, visit the [National Invasive Species Information Center](#) or the [Bowman's Hill Wildflower Preserve](#), or the [Invasive Species Experts Database](#).

[Management of Canada Geese in Suburban Areas: A Guide to the Basics](#), from the NJDEP.

[Waterfowl Damage Management](#), from the [Internet Center for Wildlife Damage Management](#)

For information on pavement, go to [Pavement Interactive](#), a website with a purpose to provide an open, editable knowledge repository for all things pavement. You can search, view, add and edit articles on any pavement subject there is. It also provides an Internet location for the pavement community to collaborate (get together, share ideas, post information, etc.).