



## Polluted Runoff

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# Urban

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Urbanization increases the variety and amount of pollutants carried into our nation's waters. In urban and suburban areas, much of the land surface is covered by buildings, pavement and compacted landscapes with impaired drainage. These surfaces do not allow rain and snowmelt to soak into the ground which greatly increases the volume and velocity of stormwater runoff. In addition to these habitat-destroying impacts, pollutants from urban runoff include:

- Sediment
- Oil, grease and toxic chemicals from motor vehicles
- Pesticides and nutrients from lawns and gardens
- Viruses, bacteria and nutrients from pet waste and failing septic systems
- Road salts
- Heavy metals from roof shingles, motor vehicles and other sources
- Thermal pollution from dark impervious surfaces such as streets and rooftops

These pollutants can harm fish and wildlife populations, kill native vegetation, foul drinking water, and make recreational areas unsafe and unpleasant.

## Fact Sheets and Reports

- [Protecting Water Quality from Urban Runoff](#)

This is an EPA fact sheet about how urban runoff affects water quality (February 2003, EPA 841-F-03-003).

- [Nonpoint Pointer No. 7 - Managing Urban Runoff](#)

This is an EPA fact sheet from 1996 (EPA 841-F-96-004G).

## Guidance Documents and Manuals

- [National Management Measures to Control Nonpoint Source Pollution from Urban Areas](#)

This guidance helps citizens and municipalities in urban areas protect bodies of water from polluted runoff that can result from everyday activities. These scientifically sound techniques are the best practices known today. The guidance also helps states to

implement their nonpoint source control programs and helps municipalities implement their Phase II Storm Water Permit Programs (November 2005, EPA 841-B-05-0004).

- [Economic Benefits of Runoff Controls](#)

The purpose of this report is to show that certain urban runoff management controls can be incorporated into a development in a way that provides aesthetic and economic benefits (September 1995, EPA 841-S-95-002).

- [Management Measures for Urban Areas](#)

This is the urban management measures chapter in the official and operative guidance authorized by Congress under Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990.

- [Model Ordinances to Protect Local Resources](#)

These pages includes model ordinances to serve as a template for those charged with making decisions concerning growth and environmental protection.

- [Urban Runoff Management Documents](#)

This is a list of documents on managing urban runoff that the Nonpoint Source Control Branch at EPA headquarters has found to be especially well done.

- [Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures - Urban](#)

This guidance is intended to assist federal, state, regional and local environmental professionals in tracking the implementation of best management practices (BMPs) used to control urban nonpoint source pollution (January 2001, EPA 841-B-00-007).

- [Onsite Wastewater Treatment Systems Manual](#)

This manual provides current information on onsite wastewater treatment system (OWTS) siting, design, installation, maintenance and replacement. It reflects significant advances that the expert community has identified to help OWTSs become more cost-effective and environmentally protective, particularly in small suburban and rural areas (February 2002, EPA 625-R-00-008).

- [Financing Stormwater Management](#) EXIT Disclaimer

This site includes an annotated bibliography of existing stormwater finance materials; an archive that contains selected previously published materials concerning stormwater finance; a manual that discusses the financing options available to communities for stormwater management programs.

- [Guidance for Municipal Stormwater Funding \(PDF\)](#) (140 pp, 1MB, [About PDF](#)) EXIT Disclaimer

Developed in January 2006, this guidance examines a range of possible approaches to paying for stormwater management, with a focus on developing guidelines for service/user/utility fees to support these programs.

- [Watershed Based Wetlands and Water Resource Protection \(PDF\)](#) (30 pp, 5MB, [About PDF](#))

This presentation describes a modeling methodology used in New Castle County, DE to identify natural resource areas in need of

#### Quick Links

- [Learn about Low Impact Development \(LID\)](#)
- [Learn about Smart Growth](#)
- [Managing Urban Runoff for Homeowners](#)
- [Controlling Impacts from New Development](#)
- [Controlling Impacts from Existing Development](#)
- [National Management Measures for Urban Runoff \(Guidance\)](#)
- [EPA Research on Urban Watershed Management](#)

#### NPS Categories

- [Abandoned Mine Drainage](#)
- [Agriculture](#)
- [Forestry](#)
- [Hydromodification & Habitat Alteration](#)
- [Marinas & Boating](#)
- [Roads, Highways & Bridges](#)
- [Urban Areas](#)
  - [Low Impact Development](#)
- [Wetland & Riparian Management](#)



protection. This methodology and presentation were developed by the University of Delaware, Water Resources Agency, Institute for Public Administration with an EPA Wetland Program Grant.

## Information Resources and Centers

- [Center for Watershed Protection](#) EXIT Disclaimer

The Center for Watershed Protection works with local, state and federal governmental agencies, environmental consulting firms, watershed organizations and the general public to provide objective and scientifically sound information on effective techniques to protect and restore urban watersheds.

- [Stormwater Manager's Resource Center](#) EXIT Disclaimer

The Stormwater Manager's Resource Center (SMRC) is designed specifically for stormwater practitioners, local government officials and others that need technical assistance on stormwater management issues.

- [EPA Smart Growth](#)

This site provides information to help create communities that promote the sustainability of America's environment, economy and quality of life.

- [Low-Impact Development \(LID\)](#)

Learn from reports, studies and documents about the effectiveness of LID practices, and access manuals and tools for implementing low-impact development.

- [National Conference on Urban Stormwater: Enhancing Programs at the Local Level](#)

A wide array of effective storm water management and resource protection tools have been developed for urban environments, but their implementation continues to be hampered by a lack of technology transfer opportunities. At the national conference *Urban Stormwater: Enhancing Programs at the Local Level* (February 17-20, 2003), attendees learned about state-of-the-art technologies and implementation programs that have proven success in local communities. This page provides papers from that conference.

- [American Society of Civil Engineers](#) EXIT Disclaimer

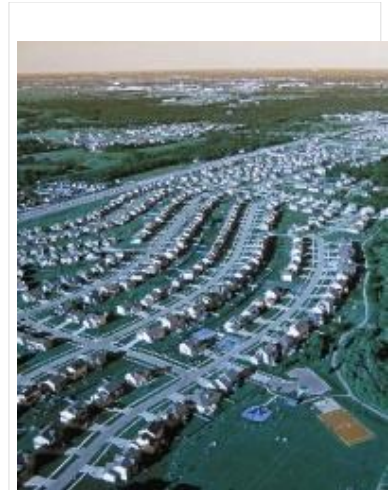
The ASCE provides a variety of resources to both members and non-members. Visit this site to learn more about upcoming events, current issues and membership opportunities.

- [American Water Resources Association](#) EXIT Disclaimer

The American Water Resources Association is a non-profit professional association dedicated to the advancement of men and women in water resources management, research and education.

- [Florida Stormwater Association](#) EXIT Disclaimer

The Florida Stormwater Association is composed of local governments, consulting firms, water management districts, water control



New homes replace farmland in Dallas County, Iowa, as suburbs of Clive and Waukee grow on the west side of Des Moines. (Photo courtesy of NRCS)



This vacant lot in Philadelphia was regraded to direct runoff into strategically placed swales and depressions. (Photo courtesy of Philadelphia Water Department)

districts and some non-profit organizations. These members have joined together to enhance the capacity of stormwater management through research, dissemination of information, active participation in the legislative decision process, and education.

- [International Stormwater Best Management Practices \(BMP\) Database](#) [EXIT Disclaimer](#)

This database provides access to stormwater BMP performance data in a standardized format for over 170 BMP studies conducted over the past fifteen years. The database was developed by the Urban Water Resources Research Council (UWRRC) of ASCE under a cooperative agreement with the US Environmental Protection Agency.

- [RiverSides Stewardship Alliance](#) [EXIT Disclaimer](#)

RiverSides is a non-profit organization dedicated to creating RiverSafe communities—communities that protect rivers by reducing runoff pollution from individual properties through education and providing the tools people need to make the connection between personal action and healthy rivers.

- [StormwaterAuthority.org](#) [EXIT Disclaimer](#)

This site provides information on stormwater pollution, treatment methodologies and related issues. The online library contains downloadable research papers, software and information regarding nonpoint source pollution, best management practices, upcoming conferences, total maximum daily loads and other stormwater topics.

- [Urban and Coastal Community Conservation Resources](#) [EXIT Disclaimer](#)

The National Association of Conservation Districts provide urban and community conservation resources and give conservation districts and their partners a place to gather information and exchange ideas about their urban and community conservation activities.

## Research Facilities

- [National Health and Environmental Effects Research Laboratory \(NHEERL\), Aquatic Stressors Research](#)

NHEERL is EPA's focal point for scientific research on the effects of contaminants and environmental stressors on human health and ecosystem integrity.

- [Urban Watershed Research Facility](#)

The Urban Watershed Research Facility (UWRF), located in Edison, New Jersey, is a 20-acre, isolated, open space designed for the research of technology that may be used to control or mitigate stormwater runoff.

- [EPA's Urban Watershed Management Branch \(ORD NRMRL\)](#)

This EPA group researches, develops and demonstrates technologies, systems and methods to manage the risks to public health, property and the environment from wet-weather flow.

## Research Studies

- [National Epidemiological and Environmental Assessment of Recreational \(NEEAR\) Water Study](#)  
The main goal of the NEEAR study is to better understand how new ways of measuring water pollution can be effectively used to protect swimmers' health.
- [Urban Watershed Management Branch Study: Particle-Associated Microorganisms in Stormwater Runoff](#)  
This research investigated the effects of blending and chemical addition before analysis of the concentration of microorganisms in storm water runoff from a single summer storm to determine whether clumped or particle-associated organisms play a significant role.
- [Mid-Atlantic Integrated Assessment](#) [BROKEN]  
A research partnership between EPA Region 3 and the Office of Research and Development. Study topics include acid mine drainage, urban sprawl, animal wastes and transportation
- [Regional Environmental Monitoring and Assessment Program \(REMAP\)](#)  
Uses [Environmental Monitoring and Assessment Program \(EMAP\)](#) design principles to investigate ecological conditions and local and regional scales.
- [Urban Stormwater Best Management Practices Study](#)  
This EPA report from 1999 summarizes then-current information and data regarding the effectiveness of BMPs to control and reduce pollutants in urban stormwater, as well as their expected costs and environmental benefits (August 1999, EPA 821-R-99-012).
- [Urban Stormwater BMP Performance Monitoring](#)  
This EPA manual from 2002 provides targeted practical assistance in conducting water quality monitoring and reporting data that are useful for assessing the effectiveness of stormwater BMPs (April 2002, EPA 821-B-02-001).
- [Urban Stormwater BMP Performance Tool](#)  
This Web-based tool provides stormwater professionals with access to approximately 220 studies that assess the performance of over 275 stormwater Best Management Practices (BMPs).

## EPA Sites

- [National Management Measures to Control Nonpoint Source Pollution from Urban Areas](#)  
This guidance helps citizens and municipalities in urban areas protect bodies of water from polluted runoff that can result from everyday activities. These scientifically sound techniques are the best practices known today. The guidance will also help states to implement their nonpoint source control programs and municipalities to implement their Phase II Storm Water Permit Programs.
- [Protecting Water Quality from Urban Runoff \(PDF\)](#) (2 pp, 233K)  
This is a fact sheet about how urban runoff affects water quality (February 2003, EPA 841-F-03-003).

- [Low-Impact Development \(LID\) page](#)

- [EPA Smart Growth page](#)

This web site provides information to help create communities that promote the sustainability of America's environment, economy, and quality of life.

- [Watershed Based Wetlands and Water Resource Protection \(PDF\)](#) (30 pp, 5MB)

This powerpoint presentation contains a description of a modelling methodology which was used in New Castle County, DE to identify priority natural resource areas which need protection during the watershed build-out process. GIS tools and impervious surface cover overlays were used to identify wetlands, forested tracts, riparian buffers and open spaces areas that needed to be protected through zoning and plan review mechanisms in order to preserve or restore the subwatershed as the watershed. This methodology and presentation were developed by the University of Delaware, Water Resources Agency, Institute for Public Administration.

- [Economic Benefits of Runoff Controls](#)

- [EPA ORD NRMRL Urban Watershed Management Branch, Edison, NJ](#)

- [Management Measures for Urban Areas](#)

This is the urban management measures chapter in the official and operative guidance authorized by Congress under Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990.

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- [Nonpoint Pointer No. 7 - Managing Urban Runoff](#)

- [Onsite Wastewater Treatment Systems Manual](#) (February 2002)

This manual provides up-to-date information on onsite wastewater treatment system (OWTS) siting, design, installation, maintenance, and replacement. It reflects significant advances that the expert community has identified to help OWTSs become more cost-effective and environmentally protective, particularly in small suburban and rural areas.

- [Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures - Urban](#)

- [Urban Documents](#)

This is a list of urban documents that the Nonpoint Source Control Branch at EPA headquarters has found to be especially well done.

## Non-EPA Sites

*The inclusion of a link on this page does not constitute an endorsement by EPA of any organization's policies or activities, or of any item for sale. EPA makes no guarantees regarding information, data or links contained on non-EPA web sites. Please note that the following links will transport you off the EPA server.*

- [American Society of Civil Engineers](#)

Civil engineering involves the conception, planning, design, construction, and operation of technology and facilities essential to modern life -- including water pollution control systems. The American Society of Civil Engineers (ASCE) represents more than 137,500 members of the civil engineering profession worldwide, and is America's oldest national engineering society.

- [American Water Resources Association](#)

The American Water Resources Association is a non-profit professional association dedicated to the advancement of men and women in water resources management, research, and education. It is the professional home of a wide variety of water resources experts including engineers, educators, foresters, biologists, ecologists, geographers, managers, regulators, hydrologists and attorneys.

- [Center for Watershed Protection](#)

The Center for Watershed Protection works with local, state, and federal governmental agencies, environmental consulting firms, watershed organizations, and the general public to provide objective and scientifically sound information on effective techniques to protect and restore urban watersheds.

- [City of Fort Worth, Texas - Listing of Stormwater Programs in the United States](#)

- [Financing Stormwater Management](#)

This site was developed by the Center for Urban Policy and the Environment at Indiana University-Purdue University Indianapolis (IUPUI) in cooperation with the Watershed Management Institute, Inc. Funding was provided by the EPA. The site includes an annotated bibliography of existing stormwater finance materials; an archive that contains selected previously published materials concerning stormwater finance; a manual that discusses the financing options available to communities for stormwater management programs; a set of case studies that describe successful finance mechanisms that have been used in seven communities around the country; and a group of links to other useful web sites about stormwater management.

- [Florida Stormwater Association](#)

The Florida Stormwater Association is composed of local governments, consulting firms, water management districts, water control districts, and some non-profit organizations. These members have joined together to enhance the capacity of stormwater management through research, dissemination of information, active participation in the legislative decision process, and education.

- [How to Create a Stormwater Utility](#) (PDF, 3MB)

This is a set of documents placed into a single PDF file that describes the various steps necessary to create an effective stormwater utility. The document was created by the towns of Chicopee and South Hadley, Massachusetts using Section 319 grant funds.

- [National Stormwater Best Management Practices \(BMP\) Database](#)

This database provides access to stormwater BMP performance data in a standardized format for over 170 BMP studies conducted over the past fifteen years. The database was developed by the Urban Water Resources Research Council (UWRRC) of ASCE under a cooperative agreement with the US Environmental Protection Agency.

- [Puget Sound: Smart Growth and Low-Impact Development](#)

Although this website is about smart growth and low-impact development in the Puget Sound, much of the information is generally useful for those interested in smart growth and low-impact development issues.

- [RiverSides Stewardship Alliance](#)

- [Simple Things You Can Do to Clean Up Our Urban Streams and the Chesapeake Bay](#)

This brochure was created with EPA grant money (604-b).

- [Stormwater Manager's Resource Center](#)

The Stormwater Manager's Resource Center (SMRC) is designed specifically for stormwater practitioners, local government officials and others that need technical assistance on stormwater management issues.

- [Stormwater News](#)

This site provides information on stormwater pollution, treatment methodologies, and related issues. The site's on-line library contains downloadable research papers, software, and information regarding nonpoint source pollution, best management practices, upcoming conferences, total maximum daily loads, and other stormwater topics.

- [U.S. Department of Transportation](#)

- [Urban and Coastal Community Conservation Resources](#) [BROKEN]

Urban and community conservation resources are available online from the National Association of Conservation Districts to give conservation districts and their partners a place to gather information and exchange ideas about their urban and community conservation activities. It features information on the actions being taken by districts, their partners and NACD's Urban, Community and Coastal Resources Committee.

You will need Adobe Acrobat Reader to view the Adobe PDF files on this page. See [EPA's PDF page](#) for more information about getting and using the free Acrobat Reader.

- [Abandoned Mine Drainage](#)
- [Agriculture](#)
- [Forestry](#)
- [Hydromodification & Habitat Alteration](#)
- [Marinas & Boating](#)



- [Roads, Highways & Bridges](#)
  - [Urban Areas](#)
    - [Low Impact Development](#)
  - [Wetland & Riparian Management](#)
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