

WHEN YOUR PET GOES ON THE LAWN,

REMEMBER IT DOESN'T JUST

GO ON THE LAWN.



When our pets leave those little surprises, rain washes all that pet waste and bacteria into our storm drains. And then pollutes our waterways. So what to do? Simple. Dispose of it properly (preferably in the toilet). Then that little surprise gets treated like it should.

If you have questions regarding storm water, please contact your municipality or Pennsylvania Department of Environmental Protection's Regional Office.
For general questions, you may also contact DEP's Bureau of Water Management at (717) 772-5661 or visit www.dep.state.pa.us.
Thanks to the Washington State Water Quality Consortium for permission to adapt and use this poster.

What the Construction Industry Should Know About Storm Water In Our Community

The construction industry plays an important role in improving our community's quality of life by not only providing new development, but also protecting our streams and rivers through smart business practices that prevent pollution from leaving construction sites.

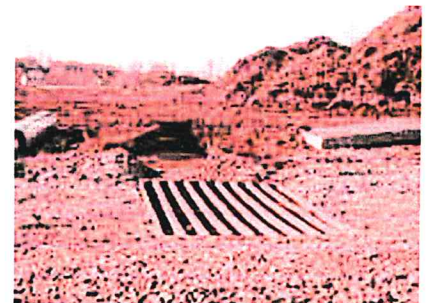
Storm water runoff leaving construction sites can carry pollutants such as dirt, construction debris, oil, and paint off-site and into storm drains. In our community, storm drains carry storm water runoff directly to local creeks, streams, and rivers with no treatment. Developers, contractors, and homebuilders can help to prevent storm water pollution by taking the following steps:

1. Comply with storm water permit requirements.
2. Practice erosion control and pollution prevention practices to keep construction sites "clean."
3. Conduct advanced planning and training to ensure proper implementation on-site.

The remainder of this fact sheet addresses these three steps.

Planning and permitting requirements exist for construction activities. These requirements are intended to minimize storm water pollutants leaving construction sites.

- Pennsylvania's Erosion and Sediment Pollution Control Program (25 Pa. Code, Chapter 102) requires Erosion and Sediment Control Plans for all earth disturbing activities.
- The National Pollutant Discharge Elimination System (NPDES) Permit Program (25 Pa. Code, Chapter 92) requires that construction activities disturbing greater than one acre submit a Notice of Intent for coverage under a general NPDES permit.



Knowing your requirements before starting a project and following them during construction can save you time and money, and demonstrate that you are a partner in improving our community's quality of life. For more information about these programs, contact your local county conservation district office or the Department of Environmental Protection.

Erosion Control Practices:

- Perimeter controls (e.g. silt fence)
- Sediment traps
- Immediate revegetation
- Phased, minimized grading
- Construction entrance
- Protection of streams and drainage ways
- Inlet protection



Rain that falls onto construction sites is likely to carry away soil particles and other toxic chemicals present on construction sites (oil, grease, hazardous wastes, fuel). Storm water, if not properly managed, carries these pollutants to streams, rivers, and lakes. Erosion and sediment control practices can serve as a first line of defense,

Pollution Prevention Practices:

- Designated fueling and vehicle maintenance area away from streams.
- Remove trash and litter.
- Clean up leaks immediately.
- Never wash down dirty pavement.
- Place dumpsters under cover.
- Dispose of all wastes properly.

minimizing clean up and maintenance costs, and the impacts to water resources caused by soil erosion during active construction. Erosion controls can reduce the volume of soil going into a sediment control device, such as a sediment trap, therefore, “clean out” frequencies are lower and maintenance costs are less. When possible, divert water around the construction site using berms or drainage ditches.

In addition, use pollution prevention and “good housekeeping measures” to reduce the pollution leaving construction sites as well. This can be as simple as minimizing the pollution source’s contact with rainwater by covering it, maintaining a “clean site” by reducing trash and waste, and keeping vehicles well maintained.

Plans such as erosion and sediment control plans and storm water pollution prevention plans are important tools for outlining the erosion control and pollution prevention practices that you will use to manage storm water runoff prior to breaking ground. Developing good plans allows for proper budgeting and planning for the life of the project. Proper installation and maintenance of erosion and storm water controls is essential to a plan that works. Training for on-site staff helps to ensure the proper installation and maintenance of erosion controls and pollution prevention practices. Inspect controls and management techniques regularly to ensure they are working, especially after storm events. If polluted storm water is leaving the site, you may need to repair or add additional storm water controls.



Your community is preventing storm water pollution through a comprehensive storm water management program. This program addresses storm water pollution from construction, but it also deals with new development, illegal dumping to the storm sewer system, and municipal operations. It will also continue to educate the community and get everyone involved in making sure the only thing that storm water contributes to our streams is . . . water! Contact your community or the Pennsylvania Department of Environmental Protection for more information about storm water management.

Pennsylvania Association of Conservation District's:
<http://www.pacd.org/default.html>

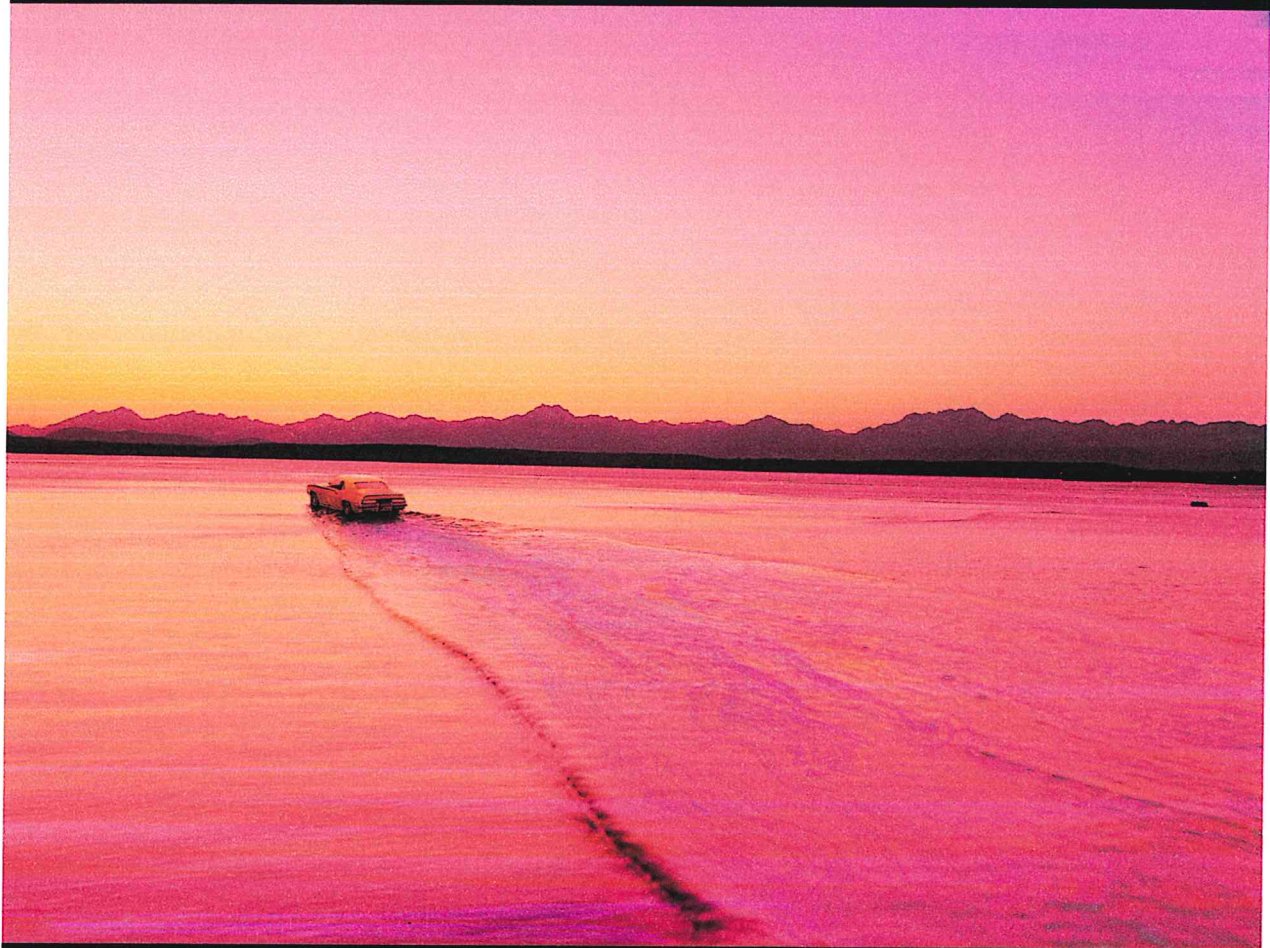
Pennsylvania Handbook of Best Management Practices for Developing Areas:
http://www.pacd.org/products/bmp/bmp_handbook.html

Storm Water Manager's Resource Center:
<http://www.stormwatercenter.net>

Pennsylvania Department of Environmental Protection:
<http://www.dep.state.pa.us>



**WHEN YOUR CAR'S LEAKING OIL ON
THE STREET, REMEMBER IT'S NOT JUST
LEAKING OIL ON THE STREET.**



Leaking oil goes from car to street. And is washed from the street into the storm drain and into our lakes, streams and into coastal waters including the Chesapeake Bay. Now imagine the number of cars in the area and you can imagine the amount of oil that finds its way from leaky gaskets into our water. So please, fix oil leaks.

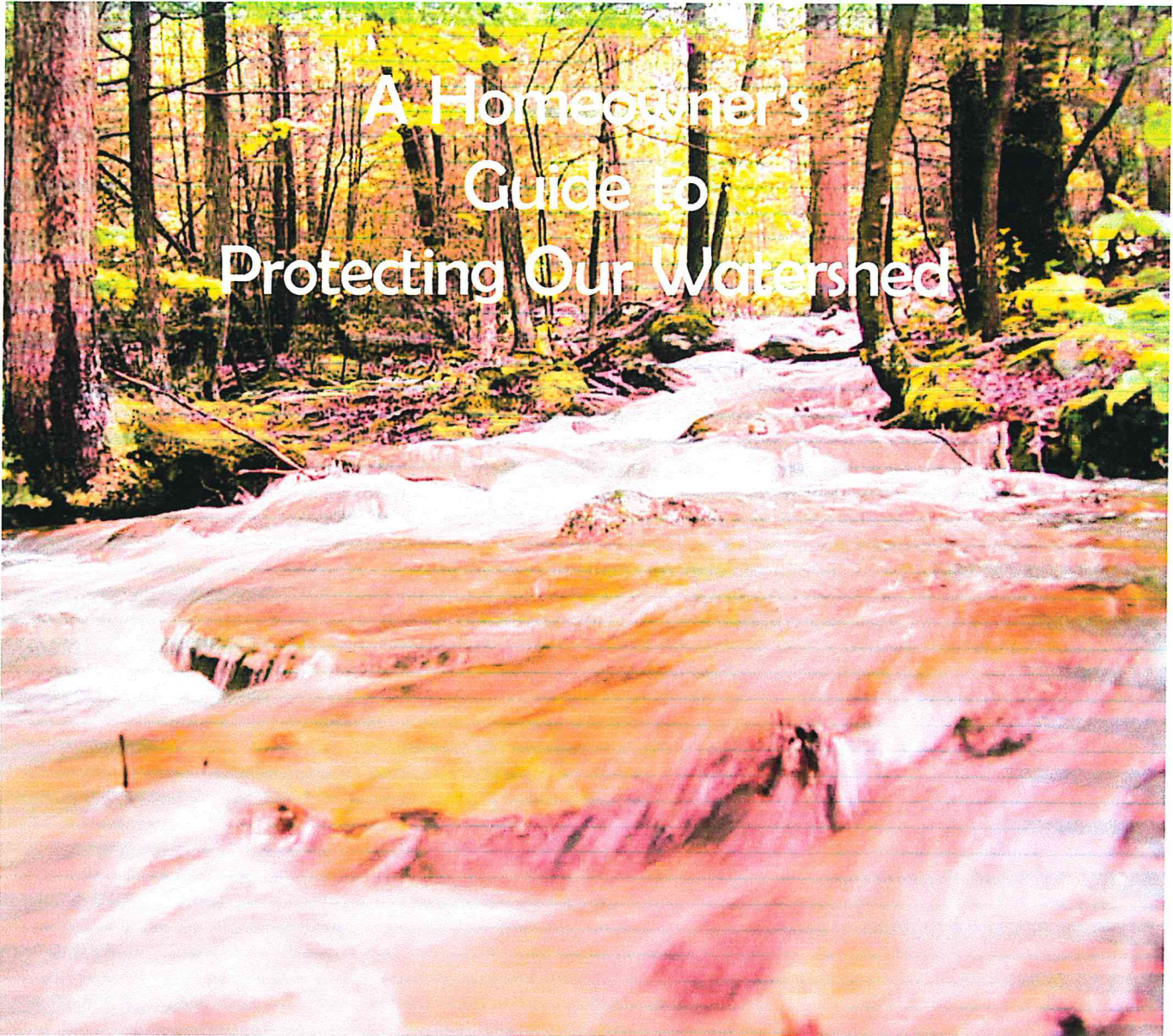
If you have questions regarding storm water, please contact your municipality or Pennsylvania Department of Environmental Protection's Regional Office. For general questions, you may also contact DEP's Bureau of Water Management at (717) 772-5661 or visit www.dep.state.pa.us. Thanks to the Washington State Water Quality Consortium for permission to adapt and use this poster.

**WHEN YOU'RE WASHING YOUR CAR IN
THE DRIVEWAY, REMEMBER YOU'RE
NOT JUST WASHING YOUR CAR
IN THE DRIVEWAY.**



All the soap, scum, and oily grit runs along the curb. Then into the storm drain and directly into our lakes, streams and into coastal waters including the Chesapeake Bay. And that causes pollution which is unhealthy for fish. So how do you avoid this whole mess? Easy. Wash your car on grass or gravel instead of the street. Or better yet, take it to a car wash where the water gets treated and recycled.

If you have questions regarding storm water, please contact your municipality or Pennsylvania Department of Environmental Protection's Regional Office.
For general questions, you may also contact DEP's Bureau of Water Management at (717) 772-5661 or visit www.dep.state.pa.us.
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A Homeowner's Guide to Protecting Our Watershed

3 Rivers
Wet Weather
Demonstration Program



Improving our region's water quality

A Homeowner's Guide to Protecting Our Watershed

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Thank you for your interest in helping to protect our watershed. Nearly each time it rains in Southwestern Pennsylvania, our rivers and streams are overwhelmed with polluted stormwater and untreated sewage. This problem is widespread and complex—it crosses all geographic boundaries affecting city neighborhoods and suburban communities alike. But by working together and making positive



changes in our own backyards, we can help to safeguard our water resources and protect our watershed for generations to come.

Understanding the Problem

When it rains or snow melts, extra stormwater gets into our sewage collection system through direct connections or through leaky, cracked pipes. This extra volume of water overloads the sewage system pipes causing raw sewage to overflow at hundreds of locations before ever reaching the treatment plant. Untreated sewage streams into waterways, overflows from manholes and backs up into homeowners' basements.



Untreated sewage isn't the only problem.

Polluted stormwater runoff carries pollutants such as pet waste, oil, dirt and litter, chemicals and lawn fertilizers directly to the streams and rivers, where they can harm the water quality. Even if your home is not near a stream or river, the runoff flows down the street into a ditch or storm drain that eventually empties into a stream or lake, carrying pollutants with it.

And the effects of wet weather can last for days. During the recreational boating season, May 15-September 30, Allegheny County issues river advisories to warn individuals using the rivers to limit water contact when sewage overflows have likely contaminated the rivers with bacteria and viruses. Each time a river advisory is issued, it could last for several days after a rainfall. On average, river advisories are in effect at least half of the recreational season.



Pittsburgh's rivers serve as the main source of drinking water for 90% of Allegheny County residents.

Solving the Problem

The good news is municipal officials across Allegheny County have begun working cooperatively to solve the sewage and stormwater overflow problem. Communities in the ALCOSAN (Allegheny County Sanitary Authority) service area are working to comply with administrative consent orders signed in 2004 that require municipalities to map and assess the condition of 4,000 miles of sewer collection system, monitor the system's sewage (and stormwater) flow during dry and wet weather conditions and make critical repairs that will prevent raw sewage from overflowing into our waterways or backing up in homeowners' basements. These overflows violate the federal Clean Water Act.



By 2010, ALCOSAN communities will likely spend \$500 million collectively to comply with the current administrative consent orders. With the help of 3 Rivers Wet Weather, the region already has saved up to \$20 million dollars by tackling compliance activities cooperatively.

System-wide projects coordinated (and partially funded) by 3RWW, such as mapping the

collection system using global positioning satellite technology and developing a regional flow monitoring plan, have been more cost-effective when developed and implemented on a watershed basis. These projects also will give municipalities access to standardized, consistent data to develop an effective long-term plan for operating and maintaining the region's sewage collection system in the decades to come.

In addition to complying with municipal consent orders, communities must also follow stormwater regulations that require them to reduce and manage stormwater runoff in their communities.

It's critical that we all take an active role in protecting our watershed. This guide is meant to provide homeowners with simple, yet effective ways to help manage stormwater beginning in our own backyards.

For more information on the wet weather issue, updates on local progress, and educational materials, visit www.3riverswetweather.org.

Lawn and Garden Care

- Use herbicides, pesticides and fertilizers sparingly. Lawns and many plants often do not need much fertilizer, if any at all. Inexpensive soil testing (under \$10) can help determine whether fertilization is even needed. Visit the Penn State Cooperative Extension web site for information on their soil fertility testing program (www.aasl.psu.edu/SSFT.HTM)**



- Never fertilize before a rainstorm as the stormwater will carry pollutants down into the storm drains and into our waterways.
- Be sure fertilizer stays on the lawn. If it falls on paved surfaces (sidewalks, driveways, etc.), it will be picked up by stormwater during wet weather.
- Mix compost with your soil to reduce the amount of fertilizer necessary.
- Use environmentally friendly garden products. Organic fertilizers release nutrients more slowly.

Visit www.TheGreenGuide.com** for more information. (Issue #107 of the newsletter includes an article on non-toxic lawn care.)

- Mow your lawn at the proper height. Grass thrives at three inches—it slows runoff, resists drought and needs less fertilizer. Mowing too close creates favorable conditions for weeds.
- Don't bag grass clippings. Leave them on the lawn as a natural fertilizer.
- Clean your lawn mower and/or spreader equipment on the lawn or other vegetated area, so chemicals and excess fertilizer can be absorbed into the ground. Never wash your equipment over a storm drain.

**70 million pounds of
active pesticide ingredients
are applied to lawns in
our country each year.***



**Over 50% of lawn owners
fertilize their lawns, yet only
10-20% perform soil tests to
determine the necessity.***

Landscaping

- Plant trees and other vegetation on your property. Depending on the species, a single tree can absorb hundreds of gallons of rainfall during a single storm. As a bonus, well-placed trees around your home can reduce air conditioning and winter heating bills. For guidelines on planting trees, visit

www.arborday.org or www.americanforests.org.**



- Use contained planters for flowers, shrubs, and ground cover. They can be used to absorb stormwater on sidewalks, parking areas, backyards and other impenetrable surfaces. Choose native drought and saturation-tolerant plants for containers. For more information on container gardening or creating your own planters, visit www.taunton.com, www.hgtv.com or www.diynetwork.com.**

Did you know...

- Planting a tree within 50 feet of a house can increase its sale price by 10-15%. (University of PA)

- Just three well-placed trees around a home can lower air conditioning bills by up to 50 percent, and windbreak trees can reduce winter heating bills by up to 30 percent.

- Trees absorb stormwater. A city's urban forest can reduce peak storm runoff by 10 to 20 percent. (USDA Forest Service)

- One inch of rain on a 1,000 square foot roof results in 625 gallons of stormwater.

- 27,200 gallons of water fall on a one-acre yard during a one-inch rainfall.*

- 16 times more stormwater runoff is produced by a one-acre parking lot compared to a one-acre meadow.*

Rainspouts

- Check with your municipality to see if you need to disconnect your rainspouts from the sewer system. You may live in a community with a separate sanitary sewer system designed

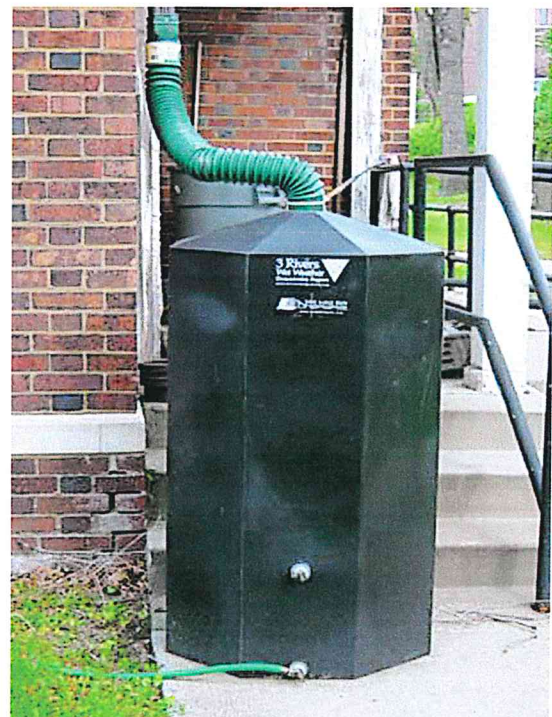


to carry sewage in a separate set of pipes from stormwater. It is illegal for rainspouts (or any stormwater drain) to be connected to a separate

sanitary sewer system. Some communities have a combined system, which transports sewage and stormwater in the same set of pipes.

- Install a rain barrel. Whether you live in a community with a combined sewer system or a separate sanitary sewer system, rain barrels can help to reduce sewage overflows by capturing stormwater runoff from your roof. (You are collecting water that might normally get into and overwhelm the sewer system.) As an added bonus, you save money on your water bills and you have ready access to the perfect water source for your

garden during dry weather. You may be able to purchase a rain barrel at your local nursery, home improvement store or online. (While there are many online rain barrel distributors, here are a few we found: www.cleanairgardening.com, www.composters.com and www.riversides.com.**



Vehicle Maintenance and Washing

- Keep your vehicle tuned to reduce oil use.

Check it regularly for drips or oil leaks and fix them promptly.

- When changing oil or performing engine work, use a drip pan or drop cloth to capture solvents or oil.

- Use as little water as possible to clean spills, leaks and drips. Use rags and dry absorbent materials such as kitty litter.

- Recycle used motor oil. Many auto supply stores, car care centers and gas stations will accept used oil. Motor oil can also be taken to one of Southwestern Pennsylvania's household hazardous waste collection sites. Visit

www.prc.org for dates and locations.

- Never dump motor oil, antifreeze, transmission fluid or any other chemical on the ground, down a storm drain, catch basin or road ditch. It can be carried by stormwater runoff directly into our waterways.



- Take your vehicle to a commercial car wash to be cleaned, especially if you plan to clean the bottom of the car. Most car washes reuse water several times before sending it for treatment to the sewage treatment plant. Since the water is

treated, it prevents harmful phosphates (from the soap) and other pollutants (grease, oil) from getting into our waterways.

- If you wash your car at home, do it on gravel, grass or another penetrable surface, so the ground can filter the dirty wash water naturally.

- Use a hose that turns off when unattended to save water.

- Use soap sparingly and try to use non-phosphate detergents. When you're done, empty the bucket of soapy water down the sink, not on the pavement.



Recycling one gallon of used oil can generate enough electricity to run the average household for almost 24 hours.

*180 million gallons of used oil is disposed of improperly each year. **



*One quart of oil can pollute 250,000 gallons of a drinking water source.**

Pet Waste and Trash

- Scoop the poop. When taking your dog for a walk, carry a small bag and scoop for collecting pet waste to prevent it from being washed into our waterways during a rainstorm.

- When possible, flush the pet waste down the toilet, so it will be treated at a sewage treatment plant.

- Dig a small trench in your yard, toss the waste in the trench, and cover it with a layer of leaves, grass clippings and dirt.

- Don't litter. Everything thrown on the ground—gum and gum wrappers, cups, cigarette butts, etc.—can be carried by stormwater runoff directly into our streams and rivers. This type of pollution is one of the most easily prevented.



- Carry a small bag for trash in your vehicle to eliminate the temptation to throw litter out the window.

- Dispose properly of household hazardous products, typically found in the kitchen, bathroom, garage, workshop and garden.

- Contact the Pennsylvania Resources Council (www.prc.com) for dates and locations of the



Southwestern Pennsylvania Household Hazardous Collection Days. The following materials are accepted: aerosol cans; automotive fluids (motor oil, transmission fluid, antifreeze, kerosene, brake fluid); batteries (household, automotive); chemistry sets; cleaners (ammonia, drain openers, acid cleaners, oven cleaners); mercury thermometers; paint products (latex, oil based, alkyd based, arts/crafts chemicals, rust preservatives, creosote, water sealers, paint thinners, furniture strippers); pesticides/garden (rodent killers, insecticides, weed killers, mothballs, fertilizer); photo chemicals; pool chemicals.



According to the U.S. Environmental Protection Agency, an average home can easily accumulate 100 pounds of household hazardous waste.

About 3 Rivers Wet Weather

3 Rivers Wet Weather (3RWW) was created in 1998 to support municipalities in Allegheny County in tackling the region's wet weather problem. Founded jointly by the Allegheny County Health Department (ACHD) and the Allegheny County Sanitary Authority (ALCOSAN), 3 Rivers Wet Weather is funded by federal, state and local resources.

The nonprofit organization is committed to improving the quality of Allegheny County's water resources by helping communities address untreated sewage and stormwater overflowing into the region's waterways. To promote the most cost-effective, long-term, sustainable solutions, 3RWW provides financial grants, advocates inter-municipal partnerships, coordinates regional, system-wide projects and educates the public.

In 2001, 3RWW organized municipal officials from each of the ALCOSAN communities into three basin groups east, north and south of Pittsburgh's three rivers. The Eastern, Northern and Southern Basin Groups has since met regularly to learn about new regulations, share resources and begin developing strategies for cost-effective basin-wide solutions to sewer system rehabilitation. The Basin Groups are also charged with exploring regionalization options for managing and operating the municipal collection system in the future.

In early 2004, communities signed an Administrative Consent Order from the Environmental Protection Agency identifying initial activities for correcting the sewage overflow problem. 3 Rivers Wet Weather helped facilitate the communication and process between these municipalities and the regulatory agencies, and will continue to help communities coordinate the assessment and evaluation activities outlined in the orders.

With the cooperation and involvement of communities throughout the ALCOSAN service area, 3 Rivers Wet Weather is committed to finding and implementing a regional solution to the wet weather overflow problem.

3 Rivers Wet Weather Demonstration Program



Improving our region's water quality

** Facts throughout this guide provided by the Center for Watershed Protection. www.cwp.org*

*** Web site references should not be considered a comprehensive list, nor are they an endorsement by 3RWW of the company/organization associated with the web site. These web sites are simply provided as reference for homeowners in their effort to help protect our watershed.*

What is Storm Water?

Storm water is water from precipitation that flows across the ground and pavement when it rains or when snow and ice melt. The water seeps into the ground or drains into what we call storm sewers. These are the drains you see at street corners or at low points on the sides of streets. Collectively, the draining water is called storm water runoff.

Why is Storm Water "Good Rain Gone Wrong?"

Storm water becomes a problem when it picks up debris, chemicals, dirt, and other pollutants as it flows or when it causes flooding and erosion of stream banks. Storm water travels through a system of pipes and roadside ditches that make up storm sewer systems. It eventually flows directly to a lake, river, stream, wetland, or coastal water. All of the pollutants storm water carries along the way empty into our waters, too, because storm water does not get treated!

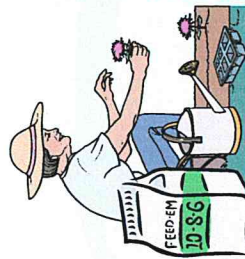
Pet wastes left on the ground get carried away by storm water, contributing harmful bacteria, parasites and viruses to our water.



Vehicles drip fluids (oil, grease, gasoline, antifreeze, brake fluids, etc.) onto paved areas where storm water runoff carries them through our storm drains and into our water.



Chemicals used to grow and maintain beautiful lawns and gardens, if not used properly, can run off into the storm drains when it rains or when we water our lawns and gardens.



Waste from chemicals and materials used in construction can wash into the storm sewer system when it rains. Soil that erodes from construction sites causes environmental degradation, including harming fish and shellfish populations that are important for recreation and our economy.



Where To Go To Continue the Information Flow

Your community is preventing storm water pollution through a storm water management program. This program addresses storm water pollution from construction, new development, illegal dumping to the storm sewer system, and pollution prevention and good housekeeping practices in municipal operations. It will also continue to educate the community and get everyone involved in making sure the only thing that storm water contributes to our water is ... water! Contact your community's storm water management program coordinator or the Pennsylvania Department of Environmental Protection for more information about storm water management.

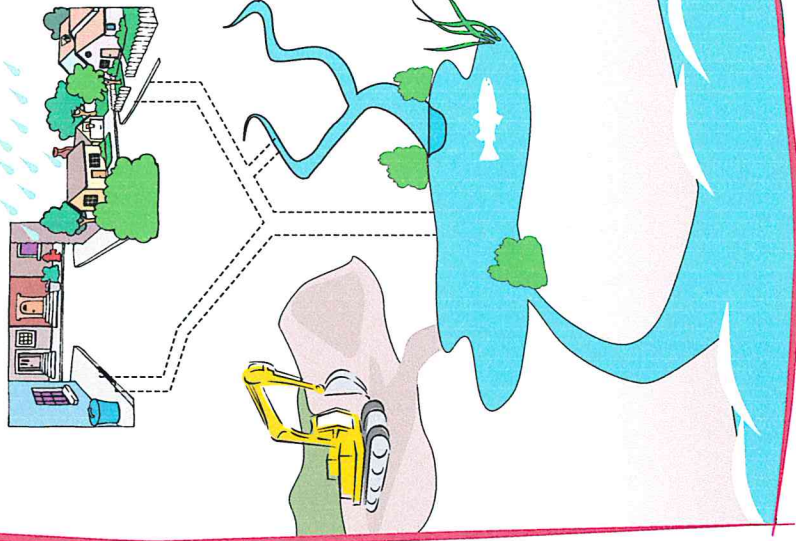


Pennsylvania Department of Environmental Protection

www.dep.state.pa.us

When It Rains, It Drains

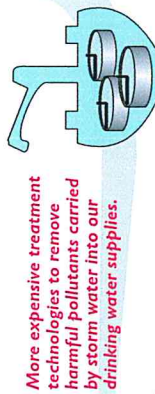
Understanding Storm Water and How It Can Affect Your Money, Safety, Health, and the Environment



Answers to Test Your Storm Sewer System Savvy:

- 1. Ditch** – Part of the storm sewer system. Most people think that the system is just a series of underground pipes. It can also include ditches used to convey storm water from the land to a receiving lake, river, or stream.
- 2. Fire Hydrant** – Not part of the storm sewer system. Water sprayed from fire hydrants is not storm water, but is allowed by law to enter the storm sewer system.
- 3. Curb with Storm Drain Inlet** – Part of the storm sewer system. Many people do not realize that this is an opening leading to the storm sewer system. Anything going into this inlet (e.g., trash, leaves, improperly discarded hazardous materials) travel directly to a receiving lake, river, or stream without being treated first. Many communities send storm drains with "Do Not Dump" messages to let people know.
- 4. Storm Sewer Outfall** – Part of the storm sewer system. An outfall is where storm water drains from the storm sewer system into a receiving lake, stream, or river. If there is a flow from an outfall when it isn't raining, there could be a problem with the system or someone has used a storm drain for illegally disposing of material.
- 5. Toilet** – Not part of the storm sewer system. Wastewater from sinks and toilets in houses and businesses travel through a sewer system constructed to carry sanitary wastes. In some instances, older communities may have a combined sewer system designed to carry both storm water and sanitary waste.
- 6. Septic System** – Not part of the storm sewer system. Homeowners use septic tanks to manage sanitary wastes on-site. Improperly maintained septic systems can leak and contribute pollutants to the storm sewer system, as well as directly to lakes, rivers, and streams.
- 7. Roads and Other Paved Areas** – Not part of the storm sewer system. Roads and other hardened surfaces such as parking lots and sidewalks can accumulate pollutants (e.g., oil, grease, dirt, leaves, trash, pet wastes) that storm water eventually washes into the storm sewer system.
- 8. Storm Drain Inlet** – Part of the storm sewer system. This is another example of what a storm drain may look like. Like the storm drain inlet shown in picture #3, anything that enters this drain will go directly to streams, rivers, and lakes without being treated first. It is important to recognize this as a storm drain to prevent it from being used as a trash can.

What Happens When It Rains?

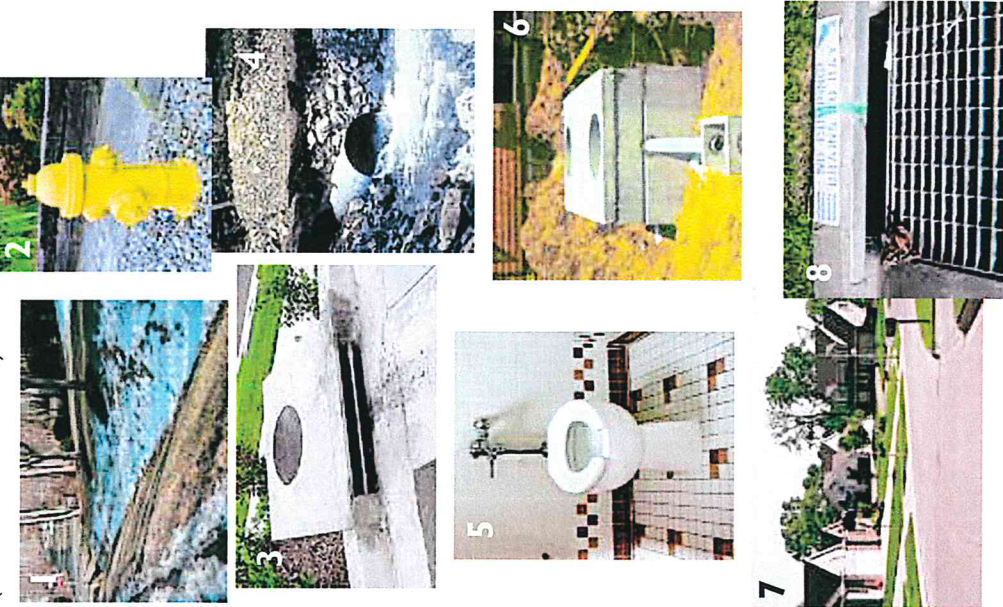


We can help rain restore its good reputation while protecting our health and environment while saving money for ourselves and our community. Keep reading to find out how...

Test Your Storm Sewer System Savvy!



What does the storm sewer system look like in your community? See if you can identify which pictures are part of the storm sewer system. (Answers are on the back.)

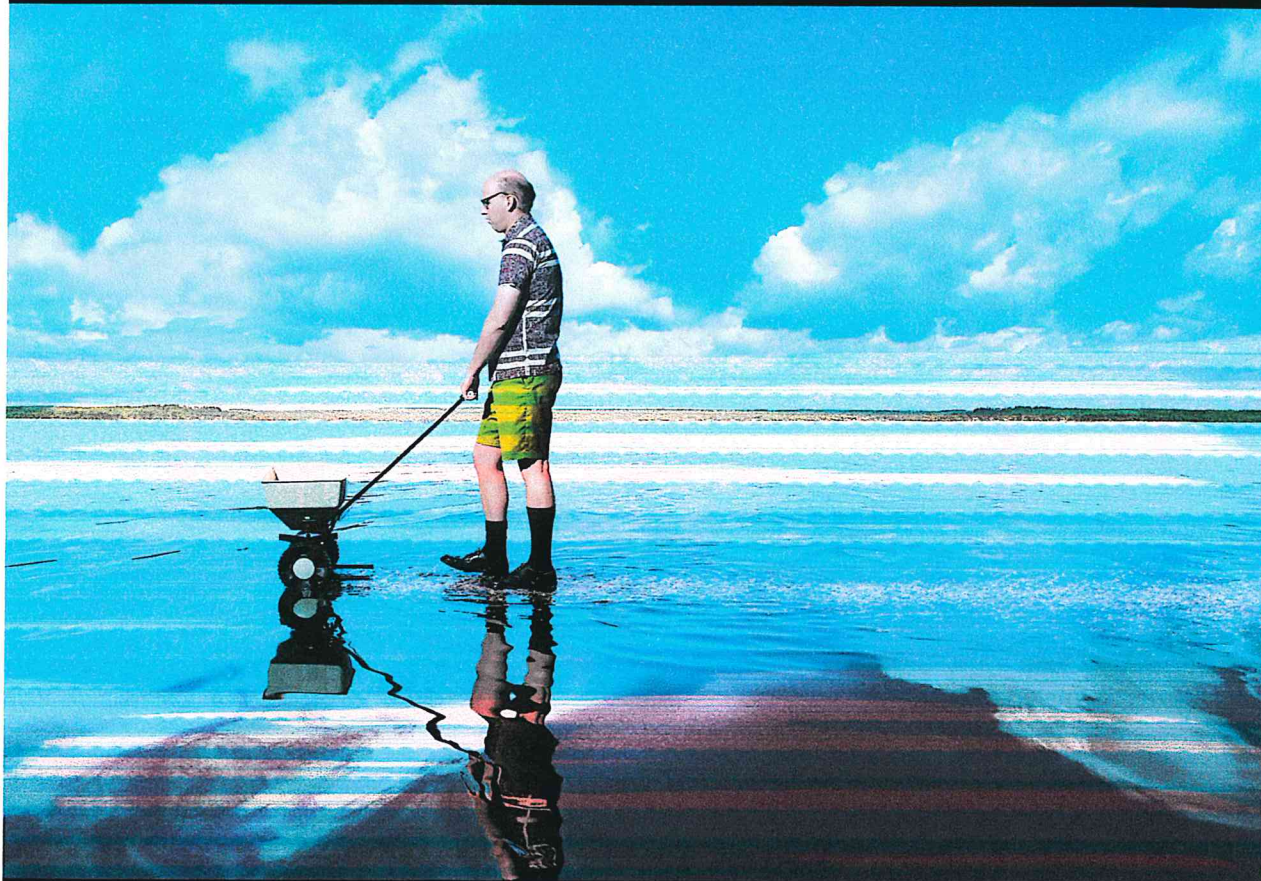


Restoring Rain's Reputation: What Everyone Can Do To Help

Rain by nature is important for replenishing drinking water supplies, recreation, and healthy wildlife habitats. It only becomes a problem when pollutants from our activities like car maintenance, lawn care, and dog walking are left on the ground for rain to wash away. Here are some of the most important ways to prevent storm water pollution:

- ◆ Properly dispose of hazardous substances such as used oil, cleaning supplies and paint—never pour them down any part of the storm sewer system and report anyone who does.
- ◆ Use pesticides, fertilizers, and herbicides properly and efficiently to prevent excess runoff.
- ◆ Look for signs of soil and other pollutants, such as debris and chemicals, leaving construction sites in storm water runoff or tracked into roads by construction vehicles. Report poorly managed construction sites that could impact storm water runoff to your community. (See the back of this brochure for contact information.)
- ◆ Install innovative storm water practices on residential property, such as rain barrels or rain gardens, that capture storm water and keep it on site instead of letting it drain away into the storm sewer system.
- ◆ Report any discharges from storm water outfalls during times of dry weather—a sign that there could be a problem with the storm sewer system.
- ◆ Pick up after pets and dispose of their waste properly. No matter where pets make a mess—in a backyard or at the park—storm water runoff can carry pet waste from the land to the storm sewer system to a stream.
- ◆ Store materials that could pollute storm water indoors and use containers for outdoor storage that do not rust or leak to eliminate exposure of materials to storm water.

**WHEN YOU'RE FERTILIZING THE LAWN,
REMEMBER, YOU'RE NOT JUST
FERTILIZING THE LAWN.**



You fertilize the lawn. Then it rains. The rain washes the fertilizer along the curb, into the storm drain, and directly into our lakes, streams and into coastal waters including the Chesapeake Bay.

This causes algae to grow, which uses up oxygen that fish need to survive.

So if you fertilize, please follow directions and use sparingly.

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Protecting Water Quality from **URBAN RUNOFF**

Clean Water Is Everybody's Business

In urban and suburban areas, much of the land surface is covered by buildings and pavement, which do not allow rain and snowmelt to soak into the ground. Instead, most developed areas rely on storm drains to carry large amounts of runoff from roofs and paved areas to nearby waterways. The stormwater runoff carries pollutants such as oil, dirt, chemicals, and lawn fertilizers directly to streams and rivers, where they seriously harm water quality. To protect surface water quality and groundwater resources, development should be designed and built to minimize increases in runoff.

How Urbanized Areas Affect Water Quality Increased Runoff

The porous and varied terrain of natural landscapes like forests, wetlands, and grasslands traps rainwater and snowmelt and allows them to filter slowly into the ground. In contrast, impervious (nonporous) surfaces like roads, parking lots, and rooftops prevent rain and snowmelt from infiltrating, or soaking, into the ground. Most of the rainfall

The most recent National Water Quality Inventory reports that runoff from urbanized areas is the leading source of water quality impairments to surveyed estuaries and the third-largest source of impairments to surveyed lakes.

Did you know that because of impervious surfaces like pavement and rooftops, a typical city block generates more than 5 times more runoff than a woodland area of the same size?

and snowmelt remains above the surface, where it runs off rapidly in unnaturally large amounts.

Storm sewer systems concentrate runoff into smooth, straight conduits. This runoff gathers speed and erosional power as it travels underground. When this runoff leaves the storm drains and empties into a stream, its excessive volume and power blast out streambanks, damaging streamside vegetation and wiping out aquatic habitat. These increased storm flows carry sediment loads from construction sites and other denuded surfaces and eroded streambanks. They often carry higher water temperatures from streets, roof tops, and parking lots, which are harmful to the health and reproduction of aquatic life.

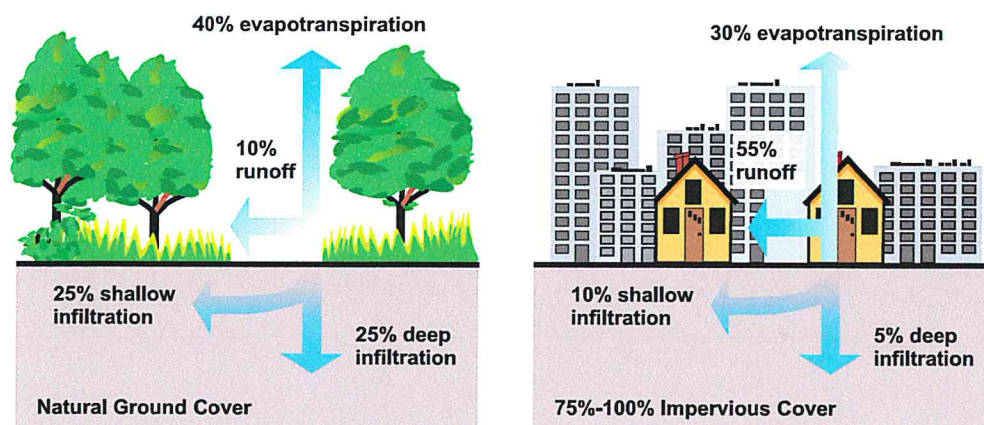
The loss of infiltration from urbanization may also cause profound groundwater changes. Although urbanization leads to great increases in flooding during and immediately after wet weather, in many instances it results in lower stream flows during dry weather. Many native fish and other aquatic life cannot survive when these conditions prevail.

Increased Pollutant Loads

Urbanization increases the variety and amount of pollutants carried into streams, rivers, and lakes. The pollutants 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 supplies, and make recreational areas unsafe and unpleasant.



Relationship between impervious cover and surface runoff. Impervious cover in a watershed results in increased surface runoff. As little as 10 percent impervious cover in a watershed can result in stream degradation.

Managing Urban Runoff

What Homeowners Can Do

To decrease polluted runoff from paved surfaces, households can develop alternatives to areas traditionally covered by impervious surfaces. Porous pavement materials are available for driveways and sidewalks, and native vegetation and mulch can replace high maintenance grass lawns. Homeowners can use fertilizers sparingly and sweep driveways, sidewalks, and roads instead of using a hose. Instead of disposing of yard waste, they can use the materials to start a compost pile. And homeowners can learn to use Integrated Pest Management (IPM) to reduce dependence on harmful pesticides.

In addition, households can prevent polluted runoff by picking up after pets and using, storing, and disposing of chemicals properly. Drivers should check their cars for leaks and recycle their motor oil and antifreeze when these fluids are changed. Drivers can also avoid impacts from car wash runoff (e.g., detergents, grime, etc.) by using car wash facilities that do not generate runoff. Households served by septic systems should have them professionally inspected

and pumped every 3 to 5 years. They should also practice water conservation measures to extend the life of their septic systems.

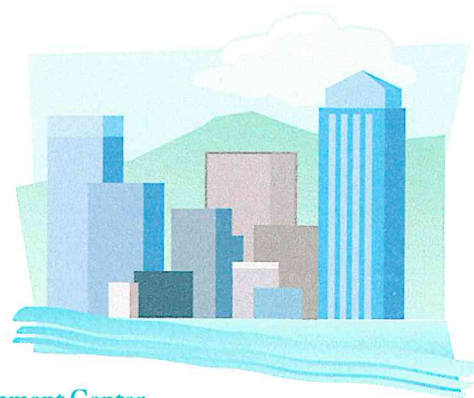
Controlling Impacts from New Development

Developers and city planners should attempt to control the volume of runoff from new development by using low impact development, structural controls, and pollution prevention strategies. Low impact development includes measures that conserve natural areas (particularly sensitive hydrologic areas like riparian buffers and infiltrable soils); reduce development impacts; and reduce site runoff rates by maximizing surface roughness, infiltration opportunities, and flow paths.

Controlling Impacts from Existing Development

Controlling runoff from existing urban areas is often more costly than controlling runoff from new developments. Economic efficiencies are often realized through approaches that target "hot spots" of runoff pollution or have multiple benefits, such as high-efficiency street sweeping (which addresses aesthetics, road safety,

and water quality). Urban planners and others responsible for managing urban and suburban areas can first identify and implement pollution prevention strategies and examine source control opportunities. They should seek out priority pollutant reduction opportunities, then protect natural areas that help control runoff, and finally begin ecological restoration and retrofit activities to clean up degraded water bodies. Local governments are encouraged to take lead roles in public education efforts through public signage, storm drain marking, pollution prevention outreach campaigns, and partnerships with citizen groups and businesses. Citizens can help prioritize the clean-up strategies, volunteer to become involved in restoration efforts, and mark storm drains with approved "don't dump" messages.



Related Publications

Turn Your Home into a Stormwater Pollution Solution!

www.epa.gov/nps

This web site links to an EPA homeowner's guide to healthy habits for clean water that provides tips for better vehicle and garage care, lawn and garden techniques, home improvement, pet care, and more.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas

www.epa.gov/owow/nps/urbanmm

This technical guidance and reference document is useful to local, state, and tribal managers in implementing management programs for polluted runoff. Contains information on the best available, economically achievable means of reducing pollution of surface waters and groundwater from urban areas.

Onsite Wastewater Treatment System Resources

www.epa.gov/owm/onsite

This web site contains the latest brochures and other resources from EPA for managing onsite wastewater treatment systems (OWTS) such as conventional septic systems and alternative decentralized systems. These resources provide basic information to help individual homeowners, as well as detailed, up-to-date technical guidance of interest to local and state health departments.

Low Impact Development Center

www.lowimpactdevelopment.org

This center provides information on protecting the environment and water resources through integrated site design techniques that are intended to replicate preexisting hydrologic site conditions.

Stormwater Manager's Resource Center (SMRC)

www.stormwatercenter.net

Created and maintained by the Center for Watershed Protection, this resource center is designed specifically for stormwater practitioners, local government officials, and others that need technical assistance on stormwater management issues.

Strategies: Community Responses to Runoff Pollution

www.nrdc.org/water/pollution/storm/stoinx.asp

The Natural Resources Defense Council developed this interactive web document to explore some of the most effective strategies that communities are using around the nation to control urban runoff pollution. The document is also available in print form and as an interactive CD-ROM.

For More Information

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