



Here's what you can do to protect your area waterways.

- Use the correct amount of fertilizer. More isn't better.
- Follow fertilizer package instructions or have your soil tested.
- Use lawn chemicals sparingly.
- Work with your lawn care service to make sure they "do the right thing."
- Bag your lawn waste and leave it on the curb for pickup.
- Mow the top 1/3 of your grass and leave the clippings on your lawn. Your lawn will require less water and fertilizer.

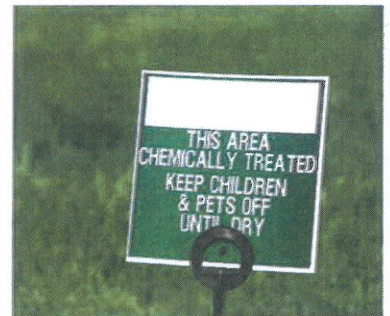
- Consider using organic fertilizers and pest control methods.
- Make your own compost using yard waste or use a commercially available variety. Mixing compost with your soil means you'll need less chemical fertilizer.
- Sweep up clippings and fertilizer from paved surfaces and dispose of them properly.



- Rake leaves and grass clippings out of the street and gutter.
- Keep soil covered with vegetation or mulch to control erosion.



- DON'T overwater after fertilizing.
- DON'T fertilize right before it rains.
- DON'T use fertilizer or mulch made with manure.





# Protecting Water Quality from **URBAN RUNOFF**

## Clean Water Is Everybody's Business

**I**n 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.

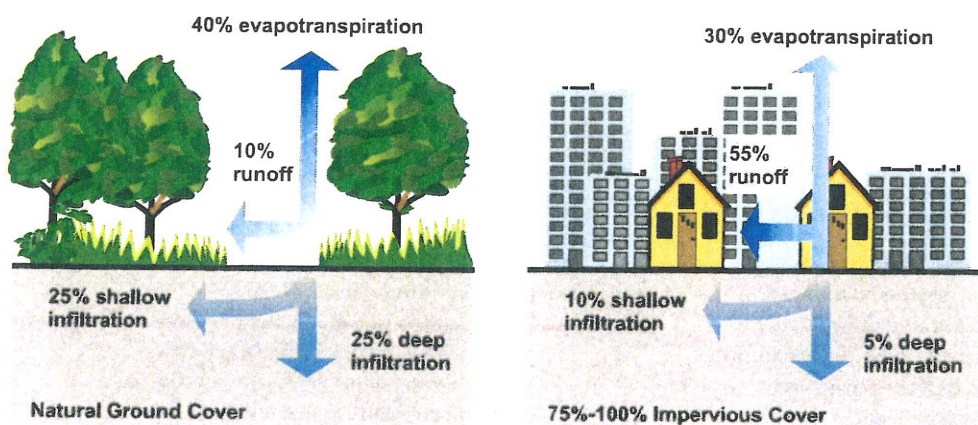
The loss of infiltration from urbanization may also cause profound groundwater changes. Although urbanization leads to great increases in flooding during and immediately after wet weather, in many instances it results in lower stream flows during dry weather. Many native fish and other aquatic life cannot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

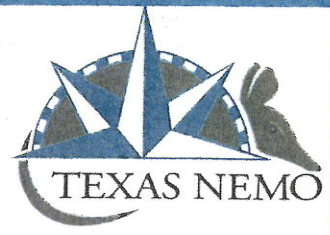
[www.nrdc.org/water/pollution/storm/stoinx.asp](http://www.nrdc.org/water/pollution/storm/stoinx.asp)

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

U.S. Environmental Protection Agency  
Nonpoint Source Control Branch (4503T)  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460  
[www.epa.gov/nps](http://www.epa.gov/nps)





# Stormwater Runoff Pollution

### What is stormwater runoff?

Stormwater runoff is rain fall that runs on the ground or impervious surfaces like building, roads, or parking lots and drains into our waterways. Water flowing over the land picks up an array of contaminants including oil from roadways and chemicals from lawns. This water finds its way into waterways either directly or through storm drain collection systems.

### What is a storm drain and where does it go?

A storm drain is an opening in the curb or street that collects rain water and runoff and conveys it to the stormwater drainage system. The drainage system is a series of pipes and ditches designed to move water in a quick and efficient manor away from roadways and parking lots into local waterways, and ultimately Galveston Bay.



*A typical storm drain with organic debris*

The storm drain system is separate from the sanitary sewer system and does NOT lead to a wastewater treatment plant. It drains directly into our creeks, bayous and streams that lead to Galveston Bay. Any pollutants in stormwater flow directly into our waterways.

### What is stormwater runoff pollution?

Stormwater runoff pollution is often referred to as non-point source pollution, because it does not have a single point of origin. Runoff pollution is the cumulative result of our everyday personal actions and land use policies.



*Polluted bayou in Houston, TX  
Photo by Scott Barnes*

There are many kinds of stormwater runoff pollution. These include:

**Pathogens:** Pathogens are disease-causing microorganisms, such as bacteria and viruses, that come from the fecal waste of humans and animals. Exposure to pathogens, either from direct contact with water or through ingestion of contaminated shellfish can cause a number of health problems. Pathogens wash off the land from wild animals, pet waste, and farm animals, and can also enter our waterways from improperly functioning septic tanks, leaky sewer lines and boat sanitary disposal systems.





**Nutrients:** Nutrients are compounds that stimulate plant growth, like nitrogen and phosphorous. Under normal conditions, nutrients are beneficial and necessary, but in high concentrations, they can become an environmental threat. Over fertilization of ponds, bays and lakes by nutrients can lead to massive algal blooms, the decay of which can create odors and rob the waters of life-sustaining dissolved oxygen. Nutrients in polluted runoff can come from home lawn care products, agricultural fertilizers, septic systems, and yard and animal waste.

**Sediment:** Sand, dirt and gravel eroded by runoff usually ends up in stream beds, ponds or shallow coastal areas, where they can alter stream flow and decrease the healthiness of aquatic habitat. Poorly protected

construction sites, agricultural fields, roadways and suburban gardens can be major sources of sediment.

**Debris:** Trash is without a doubt the simplest type of pollution to understand. It interferes with enjoyment of our water resources and, in the case of plastic and Styrofoam, can be a health threat to fish, crabs and other aquatic organisms. Typically this debris starts as street litter that is carried by runoff into our waterways.

### Who causes stormwater runoff pollution?

You do, we all do. Polluted runoff is the cumulative result of our everyday personal actions and our local land use policies.

## 12 Things YOU Can Do To Combat Stormwater Runoff Pollution

There are many ways that you and your family can combat stormwater runoff pollution. Work to incorporate these simple changes into your life to make a difference in your watershed and help preserve Galveston Bay for future generations.

1. Pick up pet waste and deposit it in garbage cans or bury it in your yard instead of allowing it to wash into streams and bays
2. Take your car to a commercial car wash or wash it in the yard instead of the driveway
3. Divert down spouts to grassy areas instead of impervious surfaces such as driveways and sidewalks
4. Use organic lawn care options instead of chemical fertilizers and pesticides whenever possible
5. Don't pour anything down a storm drain – remember storm drains lead directly to our bays and bays
6. Use fertilizers on your lawn and garden only when necessary and always apply according to package instructions
7. Sweep sidewalks and driveways instead of hosing them down
8. Use native plants in your garden – they require less watering and maintenance
9. Participate in a storm drain labeling program in your town to let others know that storm drains "Drain to Galveston Bay"
10. Pick up trash and dispose of it properly
11. Harvest rain water for irrigation

**References:** Portions of this fact sheet are taken from National NEMO Program Fact Sheet #2

[http://nemo.uconn.edu/tools/publications/fact\\_sheets/nemo\\_fact\\_sheet\\_2\\_s.pdf](http://nemo.uconn.edu/tools/publications/fact_sheets/nemo_fact_sheet_2_s.pdf)



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