



# We All Live Downstream

## A Guide to Urban Stormwater Issues and Solutions

### Stormwater, Pollution and You

#### The Connection

In natural areas, stormwater is not a problem. Nature has managed stormwater through the Hydrologic Cycle. Stormwater has been recycled since the dawn of time.

In developed areas, both urbanization and agriculture have altered the Hydrologic Cycle and the natural management of stormwater. People have tried to control stormwater runoff, but in many cases have created greater problems, increasing flooding, erosion and pollution.

Recent legislation has been passed that will require municipalities and developers to install best management practices that will help manage stormwater following the principles of the Hydrologic Cycle. Practices will also be implemented that will decrease non-point source pollution.

Non-point source pollution is all the stuff stormwater picks up as it runs over land to the sewer and eventually the stream. Non-point source pollution includes oil, sediment, nutrients and bacteria from pet waste, chemicals and nutrients from gardens and lawn chemicals, litter, etc. You can help decrease stormwater runoff and prevent non-point source pollution by following these tips.

### Urban Stormwater Runoff Issues and Solutions

#### Use a Rain Barrel

Rain Barrels capture and store rain, making it available for watering gardens, washing cars, and other activities that you would use your hose for. The collected rainwater is used in place of your utility or well water, therefore reducing costs. The stored rainwater will not contribute to stormwater runoff, which causes flooding and carries pollutant to our streams.

#### Minimize Lawn Chemicals

Stormwater can carry pesticides and herbicides into the stream. Try natural lawn care methods instead of chemicals. If using chemicals, make sure to follow directions, and do not apply when the forecast is calling for rain.

#### Properly Dispose of Hazardous Waste

Do not dump anything down storm drains – they drain directly to the creek! Check with your township for the location of a hazardous waste pickup site or visit your township website for details.

#### Pick Up After Your Dog

Pet waste can contribute nutrients and bacteria to our streams. In drinking water areas bacteria can form algae, which is costly to treat. These costs can be passed on to you!

#### The Hydrologic Cycle



#### Only Rain in the Drain

Never put anything into storm sewers, including oil, paint, soap, debris, leaves, etc. Storm sewers do not go to the sewer plant but discharge directly into our streams. You might be pouring oil into your own drinking water!



#### Plant Native Trees and Shrubs

Riparian buffers are the vegetated areas alongside streams. They are an important part of the natural ecosystem and vital to the health of streams and their organisms including plants, fish and other aquatic organisms.

**Do your part for your neighborhood. Help prevent stormwater pollution and Keep Our Streams Clean!**

Additional Stormwater Runoff and Pollution Prevention Tips are available at:

[www.delcodd.org](http://www.delcodd.org)  
[www.dep.state.pa.us](http://www.dep.state.pa.us)  
[www.epa.gov/owow/nps/toolbox/beta/](http://www.epa.gov/owow/nps/toolbox/beta/)



Financial and other support for this project is provided by the Pennsylvania Association of Conservation Districts, Inc. through a grant with the U.S. Environmental Protection Agency's Section 319 Program.

Get involved – join a watershed group...

Darby Creek Valley Association  
[www.dcvva.org](http://www.dcvva.org)  
 Chester Ridley Crum Watersheds Association  
[www.crcwatersheds.org](http://www.crcwatersheds.org)  
 Green Valleys Association  
[www.greenvalleys.org](http://www.greenvalleys.org)

# How much rain can a tree retain?

*One mature tree reduces stormwater runoff by over 1,000 gallons per year.*

**Trees manage stormwater runoff. They help reduce pollution and make waterways healthy for people and fish.**

Trees are the “new” technology to retain water on site, to slow the flow to our waterways.

Trees in your yard and your community protect water and soil resources. Trees reduce the amount of runoff and pollutants in creeks, ponds and other receiving waters in three primary ways:

- surfaces of leaves, branches, and trunks intercept and store rainfall, thereby reducing the amount of runoff, soil erosion, and delaying the onset of peak flows;
- root growth and decomposition of organic matter increase the capacity and rate of infiltration of rainfall into the soil and reduce surface flow;
- the tree's system recycles rainfall back into the atmosphere as evaporation.

## Incorporate Trees into Stormwater Management on Your Property

- 1 Increase the tree canopy on your property by planting large trees with full crowns and broader leaves, such as maple, oak, and beech.
- 2 Plant needle-leaf and broad leaf evergreens on the north side for wind shields and for winter rainfall interception; avoid planting evergreens in front of south-facing windows to maximize winter solar heat gain.
- 3 Encourage your community to plant more trees in appropriate areas such as parkways, boulevards, parking lots, traffic islands, swales, median strips, and “rain gardens.” This will aid the retention/detention and infiltration/filtration processes.
- 4 With new tree plantings, extend a thin layer of organic mulch to the drip line to improve your tree's ability to absorb rainfall.



**More trees**  
= equals =  
**lower costs**  
for stormwater control

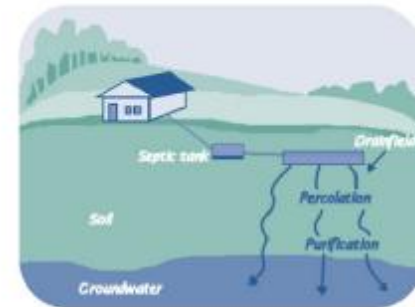


**Center for Urban Forest Research**  
Pacific Southwest Research Station,  
USDA Forest Service  
1 Shields Avenue, Suite 1103  
Davis, CA 95616-8587  
(530) 752-7636 • Fax (530) 752-6634  
<http://cufr.ucdavis.edu/>

# TIPS FOR SEPTIC SYSTEM OWNERS

One source of bacterial pollution to our local creeks appears to be pollutants leaking from septic fields. Here is an important checklist for septic system owners to review:

- Do not connect foundation sump pumps or other “clean water” discharges to your septic systems.
- Inspect your septic tanks and any distribution pumps every year. Measure the level of sludge build-up and inspect the baffles for scum. Pump your septic tank at least every 3 years (or sooner as indicated by your annual inspection of the tank).
- Avoid using a garbage disposal.
- Do not pour old medicines or strong cleaning agents down the drain. They will kill beneficial bacteria that break down the waste in your system.
- Keep trees and shrubs at least 35 feet away from your field to prevent roots from plugging or breaking pipes.
- Route surface water drainage and snowmelt away from your absorption field to avoid inundation of your field.
- Locate your absorption field as far away as possible from surface water to reduce its potential of becoming a source of contamination.



*Source:* Lake Notes, PA Association of Conservation Districts

## **Don't Top Off at the Pump!**

**Did you know that “topping off” gas tank after the nozzle clicks can cost money and cause pollution to our streams?**



- **Overfilling can cause fumes to escape and cause spills of gasoline onto the pavement which washes into storm drains and then streams.**
- **Forcing extra gasoline into the tank can lead to poor efficiency and affect the vehicle's emission system.**
- **Your car's vapor recovery system may actually feed this extra gas back into the pump.**



## Winter Deicing Tips for Residents

Excess salt and other deicing chemicals can harm aquatic life in our streams and impact drinking water supplies.

This winter, you can help by following these *environmentally-friendly* snow removal practices:

- Shovel snow before it turns to ice to limit the need for deicing chemicals like rock salt
- Shovel snow onto permeable surfaces including gently sloping and level landscape and grassy areas so as the snow melts it will soak into the ground rather than flow directly into a nearby storm drain or stream.

### If you must use deicing chemicals, follow these suggestions...

- Control application of chemical deicers and avoid over application.
- Limit chemical applications near environmentally-sensitive areas including springs, streams, ponds, wetlands, and water supply areas and sensitive landscape and vegetation.
- Sand and sawdust can be used as an environmentally-friendly alternative to commonly used salt products.
- Use salt substitutes that are less harmful including Calcium Chloride (CaCl<sub>2</sub>) and Calcium Magnesium Acetate (CMA).
- For larger areas, apply salt as a brine solution to prevent drift off of paved surfaces.
- After snowmelt, sweep up residues, including sand, to prevent it from washing into storm drains and streams.

### Why should I limit my use of salt and other chemical deicing products?

Deicing products contain chemical constituents that can be harmful to the environment including water resources and drinking water supplies. For example, sodium can break down soil structure and decrease soil permeability, which adversely impacts vegetation and soil microbes; chloride mobilizes heavy metals and impacts fresh water supplies including ground and surface waters; and heavy metal components can adversely impact water quality, plant and aquatic life.

# Clean Water Begins With You

## What is Stormwater Runoff?



Stormwater runoff is precipitation from rain or snowmelt that flows over the ground. Impervious surfaces such as streets, sidewalks, and driveways prevent stormwater from soaking into the ground. As stormwater flows over ground, it can pick up chemicals, debris, dirt, and other pollutants that enter the storm sewer system.

## Why is Stormwater Runoff a Concern?



Once pollutants from stormwater enter the storm sewer system, they are discharged **UNTREATED** into local streams and waterways. These are the same bodies of water that we use for drinking, fishing, and recreation.

## What are the effects of Stormwater?

Polluted stormwater can lead to an overall decline in stream health that results in a negative impact to fish, wildlife, and recreation.

- ◆ Increased volumes of stormwater entering streams due to impervious surfaces, preventing infiltration and increasing runoff, can lead to erosion of stream and lake banks. This in turn results in large amounts of sediments entering our waterways. Higher volumes of water entering our waterbodies also leads to flooding.
- ◆ Sediments cloud water, making it difficult for aquatic plants and animals to survive.
- ◆ Excess nutrients, often a result of fertilizer runoff from our lawns, causes algal blooms. When algae die and decompose, the process removes oxygen from the water. Fish and aquatic organisms cannot live in water with low oxygen levels.
- ◆ Bacteria, often from dog waste left on the ground, can wash into local streams and create a health hazard.
- ◆ Debris and trash that is left on streets, sidewalks and parking lots is washed into our waterbodies degrading them aesthetically and harming wildlife that use the water as a home.
- ◆ Pollution from stormwater degrades streams and waterways used for drinking water. This can affect public health and lead to increased costs to treat the water.



### Storm Drains

Never dump anything down a storm drain especially used motor oil or antifreeze. Dispose of these properly at a local service station or approved recycling center. Encourage your community to stencil storm drains with "No Dumping, Drains to Creek" so others will know that everything that enters the storm sewer system also enters their local creeks.



### Pet Waste

Pet waste can be a major source of excess nutrients and bacteria to local waterbodies. It is important to always pick up after your pet and dispose of the waste properly. When pet waste is left on the ground it increases public health risks.



## What you can do to be part of the solution

### Auto Care

Washing your car at home on the driveway or the street can send detergents and other contaminants through the storm sewer system. It is best to wash your car at a commercial car wash where they treat and recycle the wastewater. If you do wash your car at home, do so in your yard so the water infiltrates into the ground.



Repair all car leaks. Fluid leaking from a car onto a paved surface is washed into the storm sewer system when it rains.

### Streambank Landscaping

Erosion of streambanks can be prevented through the use of vegetated strips along the banks. Also known as riparian buffers, these strips of tall grasses, trees, and flowers act to stabilize banks, which prevents erosion and additional sediment load in the stream.

### Residential Landscaping

Downspouts – Direct all downspouts away from pervious surfaces and onto lawns. Rain barrels can be used to collect the rainwater from downspouts. This water can be used later on the lawn and garden.

Lawn Care – Fertilizers and Pesticides should be used sparingly. When applied in excess, these chemicals are washed off by rainwater and enter the local storm sewer system. Additionally, it is important not to sweep yard waste and leaves into the street. These add extra nutrients to streams.

Rain Gardens or Grassy Swales – These specially designed gardens can be planted with native vegetation to provide an area for rainwater to collect and soak into the ground. Stormwater from rooftop drains and pavement areas can be directed to these vegetated areas.



WHEN YOU'RE WASHING YOUR CAR IN

THE DRIVEWAY, REMEMBER YOU'RE

NOT JUST WASHING YOUR CAR

IN THE DRIVEWAY.

[www.DelawareEstuary.org](http://www.DelawareEstuary.org)



When you wash your car, all the soap, scum and oily grit runs along the curb and into storm drains and the Schuylkill and Delaware Rivers. This causes pollution which is unhealthy for people and fish. Please wash your car on grass or gravel instead of the street or your driveway. Or better yet, take it to a car wash where the water gets treated and recycled.

Thanks to the Washington State Department of Ecology, King County, and the cities of Bellevue, Seattle, and Tacoma.

WHAT CAN YOU DO?

- Wash your car on a grassy area if possible, so the ground can filter the water naturally. Use soap sparingly. Try to use non-phosphate detergents.
- Use a hose that is high pressure, low volume and has a pistol grip or trigger nozzle to save water. Wash one section of the car at a time and rinse it quickly.
- When you're done, empty your bucket of soapy water down the sink, not in the street.
- Best of all, take your car to a commercial car wash, especially if you plan to clean the engine or the bottom of the car. Most car washes reuse water several times before sending it for treatment at a sewage treatment plant.

FOR MORE INFORMATION  
VISIT THESE WEB SITES:

[www.delcocc.org](http://www.delcocc.org)  
[dsf.chesco.org/water/](http://dsf.chesco.org/water/)  
[www.dep.state.pa.us](http://www.dep.state.pa.us)  
[www.crcwatersheds.org](http://www.crcwatersheds.org)

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WHEN YOU'RE FERTILIZING THE LAWN,

REMEMBER YOU'RE NOT JUST  
FERTILIZING THE LAWN.

[www.DelawareEstuary.org](http://www.DelawareEstuary.org)



You fertilize the lawn. Then it rains. The rain washes the fertilizer along the curb, into the storm drain, and into the Schuylkill and Delaware Rivers. This causes algae to grow, which uses up oxygen that fish need to survive. So if you fertilize, please follow directions and use sparingly.

Thanks to the Washington State Department of Ecology, King County, and the cities of Bellevue, Seattle, and Tacoma.

WHAT CAN YOU DO?

- 💧 Use fertilizers sparingly. Lawns and many plants do not need as much fertilizer or need it as often as you might think. Test your soil to be sure. Consider using organic fertilizers because they release nutrients more slowly.
- 💧 Don't fertilize before a rain storm, and don't fertilize your sidewalks and driveways.
- 💧 Use commercially available compost, or make your own using your garden/yard waste. Mixing compost with your soil means your plants will need less chemical fertilizer and puts your waste to good use. Commercial compost and soil amendments may be available from your solid waste or wastewater utility, as well as your local garden store.
- 💧 Let your grass clippings lay! Don't bag the grass. Use a mulching lawn mower to cut one-third of the blade length each week and naturally fertilize your lawn in the process.
- 💧 Wash your spreader equipment on a pervious or penetrable vegetated area, like the lawn, to allow for the natural absorption of excess fertilizer.
- 💧 Maintain a buffer strip of unmowed natural vegetation bordering waterways and ponds to trap excess fertilizers and sediment from lawns/gardens.

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[www.crcwatersheds.org](http://www.crcwatersheds.org)

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## WHEN YOUR CAR'S LEAKING OIL ON

THE STREET, REMEMBER IT'S NOT  
JUST LEAKING OIL ON THE STREET.

[www.DelawareEstuary.org](http://www.DelawareEstuary.org)



Leaking oil goes from your car onto the street. Rain washes oil into storm drains and into the Schuylkill and Delaware Rivers. Now, imagine the number of cars in our region and you can imagine the amount of oil that finds its way into our local waterways. So please, maintain your car and always recycle used motor oil.

Thanks to the Washington State Department of Ecology, King County, and the cities of Bellevue, Seattle, and Tacoma.

## WHAT CAN YOU DO?

- Check your car or truck for drips and oil leaks regularly and fix them promptly. Keep your vehicle tuned to reduce oil use.
- Use ground cloths or drip pans under your vehicle if you have leaks or are doing engine work. Clean up spills immediately and properly dispose of clean up materials.
- Collect all used oil in containers with tight-fitting lids. Old plastic jugs are excellent for this purpose.
- Do not mix waste oil with gasoline, solvents, or other engine fluids. This contaminates the oil which may be reused, increases the volume of the waste, and may form a more hazardous chemical.
- Never dump motor oil, antifreeze, transmission fluid or other engine fluids into road gutters, down the storm drain or catch basin, onto the ground, or into a ditch.
- Recycle used motor oil. Many auto supply stores, car care centers, and gas stations will accept used oil. Many communities have hazardous waste collection days where used oil can be brought in for proper disposal. Recycling just one gallon of used oil can generate enough electricity to run the average household for almost 24 hours.

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[www.dep.state.pa.us](http://www.dep.state.pa.us)

[www.crcwatersheds.org](http://www.crcwatersheds.org)

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**WHEN YOUR PET GOES ON THE LAWN,**

**REMEMBER IT DOESN'T JUST**

**GO ON THE LAWN.**

*www.DelawareEstuary.org*



When your pets leave those little surprises, rain washes all that pet waste and bacteria into our storm drains.

This pollutes our waterways.

So, what can you do? Simple.

Dispose of it properly (preferably in the toilet). Then that little surprise gets treated like it should.

Thanks to the Washington State Department of Ecology, King County, and the cities of Bellevue, Seattle, and Tacoma.

**WHAT CAN YOU DO?**

- 💧 Scoop up pet waste. As long as the droppings are not mixed with litter or other materials, flush it down the toilet. This is best because then a sewage treatment plant or your septic system treats the pet waste.
- 💧 Bag your pet's waste and put it in the trashcan.
- 💧 Never put pet waste into the storm drain.
- 💧 If your community does not regulate pet waste (e.g. "scooper" law), try to make it a priority of your local governing body.
- 💧 Encourage your neighborhood to provide pet waste stations for collection and disposal of waste. Check to see if the parks in your neighborhood have them.

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