



# Storm Water Runoff

U.S. EPA - Mid-Atlantic Region III

In the mid-Atlantic area, most rain storms produce 2 inches or less of rain over a 24-hour period. However, even two inches of rain falling on the roof of a small house can send over 600 gallons of water down the drain spouts. Combine this with the runoff from other **impervious surfaces**, like sidewalks, driveways and streets, and you can see how quickly the volume of storm water can add up. Also, these impervious surfaces are often connected, so rain water is quickly moved from your down spouts, to your driveway, to the street, to the storm sewer, and finally to a nearby stream. While this is a very efficient way of removing storm water from your property, it quickly dumps the water on your neighbors downstream.

## The Storm Water Problem

When most of the mid-Atlantic area was covered by forests, the relatively rough surfaces of the trees, shrubs and leaves on the ground of the forest absorbed the impact of the rainfall, slowed it down, and allowed it to infiltrate the soil. When rain is not allowed to infiltrate due to impervious surfaces it causes two problems. The first is a high flow of storm water runoff into street storm sewers and ultimately nearby streams. This "flash" or **first flush** of water can wash and carry oil, fertilizer, animal waste, and other polluted runoff from the land as well as overwhelm the capacity of streams, which then back up and cause flooding. Similarly, the storm sewers can back up and flood streets and homes. Unfortunately, some storm sewers are also combined with sanitary sewers that carry kitchen and bathroom wastewater from your home to a treatment plant. If these combined storm water/sanitary sewers back up and overflow, they can send untreated waste into our streams.

While many people think that water going into storm sewers is treated at a municipal treatment plant, this isn't usually the case.

**Combined sanitary/storm water overflows** can kill the plants and fish in a stream or reduce their diversity by allowing only the hardiest species to survive in the polluted water. The stream bed or channel can also be damaged by the scouring effect of the flash of water running off of the land. The erosion of stream banks creates sediment that settles out of the stream and can clog the channel, bury fish habitat, and cause blockages and future back-ups.

*Written in 1753  
about  
Philadelphia:*

*"Our [stream] runs dry up ... The reason ... is this, when the country was covered with woods and the swamp with brush, the rain that fell was detained by these interruptions and so had time to insinuate into the earth and contribute to the springs and runs. But now the country is clear'd, the rain as fast as it falls is hurried into the rivers and washes away the earth and soil in our naked fields, fills and chokes the springs, and makes shoals and sandbanks in our creeks and rivers..."*

## Storm Water - A Lost Resource

The second problem with not allowing rainfall to infiltrate the soil is a lowering of the level of the water that exists in the soil and rock below the ground surface - also known as the **groundwater table**. Water below the ground, or **groundwater**, slowly seeps into our streams over a long period of time. This is why many streams continue to flow even when it has not rained for a while. This flow keeps fish and other wildlife alive. If the infiltration of rain water into the ground is cut off by more and more impervious surfaces, the groundwater table can drop and streams can dry up. If the water table drops below the depth of a water supply well, the well can dry up.

EPA has developed a strategy to promote the management of storm water as a valued water resource, to prevent pollution caused by storm water discharges, and to minimize the damaging effects to streams and public health. Included in the strategy is a new approach to storm water management known as **low impact development**. This approach has been used in urban and suburban areas for new development and to retrofit existing development. It is based on the concept of managing storm water on the site where it is generated, often by simple structures that allow the water to infiltrate the soil.

### What Can I Do?

- Instead of directing the water from your drain spouts to your driveway, direct it to a **rain barrel** for later use, or to a grassy area, a french drain, an **infiltration trench**, or a shallow depression where the water can soak in. Mulch and plant a shallow depression or **rain garden** with some of the many attractive trees, shrubs, and plants that like "wet feet". (Disconnecting downspouts connected to sewers in Philadelphia is not allowed. However, exceptions may be considered by calling the Philadelphia Water Dept. at 215-685-6300.)
- If you already have a wet area on your property, don't fill it in - consider it an asset!
- Instead of paths made of concrete, consider mulch, crushed stone, or other permeable paving materials.
- Reduce the amount of lawn area on your property by replacing it with trees and shrubs in a mulched bed.
- Add organic matter, like composted leaves and grass, to your soil. This will allow the soil to absorb and retain more rain and will benefit your plants also.
- Finally, consider the advantages of a **roof garden** or **green roof** - it absorbs and holds rain for use by plants growing on it and can cut down on your energy bills too!



### For Additional Information

Fred Suffian (suffian.fred@epa.gov)  
Non-Point Source Team Leader, US EPA Region 3,  
Water Protection Division, 215-814-5753

Storm water management:  
<http://www.epa.gov/reg3wapd/stormwater>

Polluted runoff:  
<http://www.epa.gov/reg3wapd/nps>

Low Impact Development Center:  
<http://www.lowimpactdevelopment.org>

Environmentally friendly landscaping:  
<http://www.epa.gov/reg3esd1/garden>

Stormwater Managers Resource Center:  
<http://www.stormwatercenter.net>