



**When it Rains.
It Drains.**

Stormwater Runoff Goes Untreated

Stormwater can pick up debris, chemicals, dirt, and other pollutants left on the ground. When it rains, stormwater is carried off through a stormwater system and discharged into a lake, river, stream, wetland, or coastal waterway. Since stormwater systems don't treat the water they discharge, the pollutants picked up by stormwater are released directly into the environment.

Learn more at GatewayEngineers.com



Service information for this article provided with permission by the EPA.



Stormwater

When It Rains. It Drains.

Did you know?

Through the Municipal Separate Storm Sewer System (MS4) Program, your community is mandated by the Federal Government to manage stormwater runoff in order to reduce the potential for pollution to enter the streams and waterways in and around your community?

What is Stormwater?

Stormwater is the 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 stormwater runoff.

Stormwater Pollution – “Good Rain Gone Bad?”

Stormwater 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. Stormwater 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 stormwater does not get treated!

Contributors to Stormwater Pollution

Pet Wastes – When not properly disposed of or left on the ground, pet waste can get carried away by stormwater, contributing harmful bacteria, parasites, and viruses to our water.

Vehicle Fluids – During everyday use, toxic fluids from vehicles (oil, grease, gasoline, antifreeze, etc.) drip onto paved areas where stormwater runoff can then carry them through our storm drains and into our water.

Fertilizers/Pesticides – If not used properly, fertilizers and pesticides, for lawn and garden care, can wreak havoc on our watershed by introducing harmful chemicals into waterways.

Construction Waste – During construction, if proper precautions are not taken, the chemicals and materials used can wash into the storm sewer system when it rains causing erosion and the spread of toxic chemicals.

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 pet waste, vehicle fluids, fertilizers and pesticides, and construction waste, are left on the ground for rain to wash away. Here are some of the most important ways to prevent stormwater pollution:

1. Pick up after pets and dispose of their waste properly. No matter where pets make a mess – in a backyard or at the park – stormwater runoff can carry pet waste from the land, to the storm sewer system, and into a stream.
2. 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.
3. Use fertilizers and pesticides properly and efficiently to prevent excess runoff. Install rain barrels or rain gardens, that capture stormwater and keep it on site instead of letting it drain away into the storm sewer system.
4. Report poorly managed construction sites where stormwater carries soil and other pollutants away from the site. Construction vehicles tracking debris and chemicals into the street can also increase stormwater pollution and should be reported.



GREEN INFRASTRUCTURE:

A Sustainable Solution For Urban Stormwater Management.

Utilizing processes such as infiltration (water seeping into the ground), evaporation/transpiration (removing water from soil and vegetation), and rainwater capture and reuse, GI can reduce the ecological impact of an urban environment. Properly designed, GI can be an effective and economical tool to enhance community safety and quality of life. Managing stormwater runoff from a volume and water quality perspective is easily achieved through GI and provides a sustainable solution to a persistent problem - stormwater pollution.

Learn more at GatewayEngineers.com



Source information for this article provided
with permission by the EPA

GREEN INFRASTRUCTURE:

A Sustainable Solution For Urban Stormwater Management.



Stormwater In An Urban Environment

In urban areas, stormwater runoff is a major cause of water pollution. During rain events in undeveloped areas, stormwater is naturally absorbed and filtered by soil and plants. During rain events in urban areas, impervious surfaces such as roofs, streets, and parking lots prevent the absorption and filtration of stormwater. Since stormwater in urban areas can't be absorbed or filtered naturally, collection systems are engineered to remove stormwater to prevent flooding.

Traveling across impervious surfaces and into collection systems, stormwater in urban areas gathers trash, bacteria, heavy metals, and other pollutants. This stormwater does not get treated and is expelled into nearby waterbodies. The expulsion of this untreated stormwater is known as stormwater pollution which negatively affects the quality of receiving waterbodies, directly impacting the natural ecosystem. Furthermore, the expulsion of excess stormwater can overwhelm receiving waterbodies, causing flooding, property damage, and the deterioration of critical infrastructure.

Green Infrastructure

To combat the impact of stormwater pollution, architects, engineers, and city planners have been integrating Green Infrastructure (GI) as an alternative approach to urban stormwater management. GI protects, restores, or mimics the natural water cycle found in undeveloped areas and allows for stormwater to be absorbed and filtered on site. Using GI instead of traditional methods, significantly reduces stormwater pollution by limiting the volume of water that is expelled into nearby waterbodies.

Green Infrastructure Practices

Utilizing processes such as infiltration (*water seeping into the ground*), evaporation/transpiration (*removing water from soil and vegetation*), and rainwater capture and reuse, GI can reduce the ecological impact of an urban environment.

Properly designed, GI can be an effective and economical tool to enhance community safety and quality of life. Managing stormwater runoff from a volume and water quality perspective is easily achieved through GI and provides a sustainable solution to a persistent problem - stormwater pollution.

Green Infrastructure Practices

Permeable Pavement – A range of sustainable materials and techniques for permeable paving that allows stormwater to move through the surface of the pavement. This practice reduces runoff by allowing stormwater to be absorbed into the ground while filtering out pollutants.

Green Roofs – A roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane. The vegetation on the roof absorbs rain water and expels it naturally from their leaves as vapor instead of displacing it through a gutter system.

Rain Barrels – A barrel that connects to a gutter system to collect and store rainwater from a roof that would otherwise be lost to runoff and diverted to storm drains and streams. The captured water is filtered and can be reused during times when ground water is not as plentiful.



Learn more at GatewayEngineers.com

Source information for this article provided with permission by the EPA



MS4 Permit:

Municipal Separate Storm Sewer System

Did you know that your municipality has an MS4 permit? The Municipal Separate Storm Sewer System (MS4) Program was administrated through the Federal Clean Water Act (CWA) in 1999. Pennsylvania implemented state regulation of the MS4 permit in 2003. The underlying goal of the MS4 program is to prevent stormwater pollution from entering streams, lakes, ponds, rivers, etc. Municipalities are required through the EPA and PA DEP to implement a stormwater management program comprising of 6 minimum control measures (MCMs). These 6 MCMs not only rely on the Municipality for compliance, but cooperation and participation with its citizens to further advance the stormwater pollution prevention efforts.

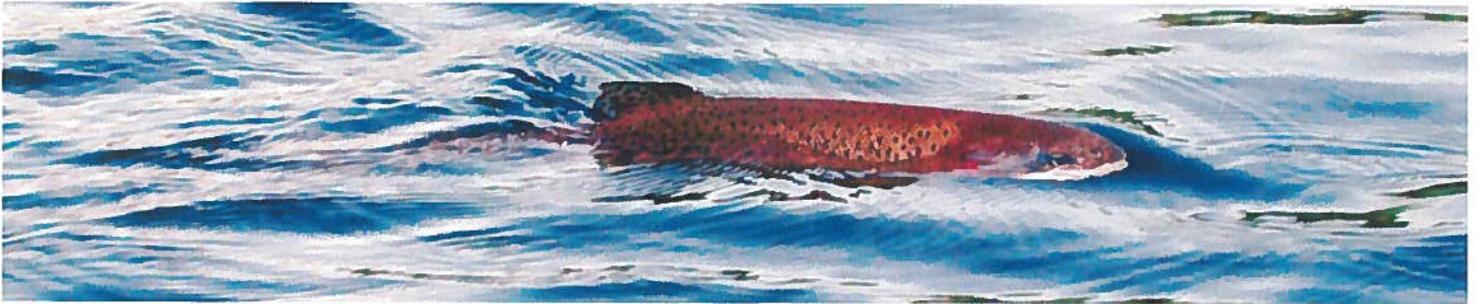
Learn more at GatewayEngineers.com



Source information for this article provided with permission by the EPA

MS4 Permit:

Municipal Separate Storm Sewer System



Did you know that your municipality has an MS4 permit? The Municipal Separate Storm Sewer System (MS4) Program was administrated through the Federal Clean Water Act (CWA) in 1999. Pennsylvania implemented state regulation of the MS4 permit in 2003. The underlying goal of the MS4 program is to prevent stormwater pollution from entering streams, lakes, ponds, rivers, etc. Municipalities are required through the EPA and PA DEP to implement a stormwater management program comprising of 6 minimum control measures (MCMs).

MCM #1 Public Education and Outreach Program

Requirements are to educate the public on stormwater pollution and prevention. Distribution of stormwater educational materials can occur through bulletin boards, newsletters, magazines, public meetings, Township's webpage, and social media.

MCM #2 Environmental Activities and Events

Requirements are to promote environmentally related activities for public participation. Some examples are planting days, cleanup programs, storm drain stenciling, and collection events.

MCM #3 Illicit Discharge, Detection and Elimination

Requirements are to develop, implement and enforce a program to detect and eliminate illicit non-stormwater discharges. The program primarily consists of a storm sewer system map, an ordinance prohibiting illicit discharges, stormwater outfall screenings, and illicit discharge education.

MCM #4 Construction Site Stormwater Runoff Control

The goal of this MCM is to reduce stormwater pollution from construction sites disturbing one or more acres. In Pennsylvania, Townships typically rely on PA DEP's statewide program that requires the local county conservation district to undertake these tasks.

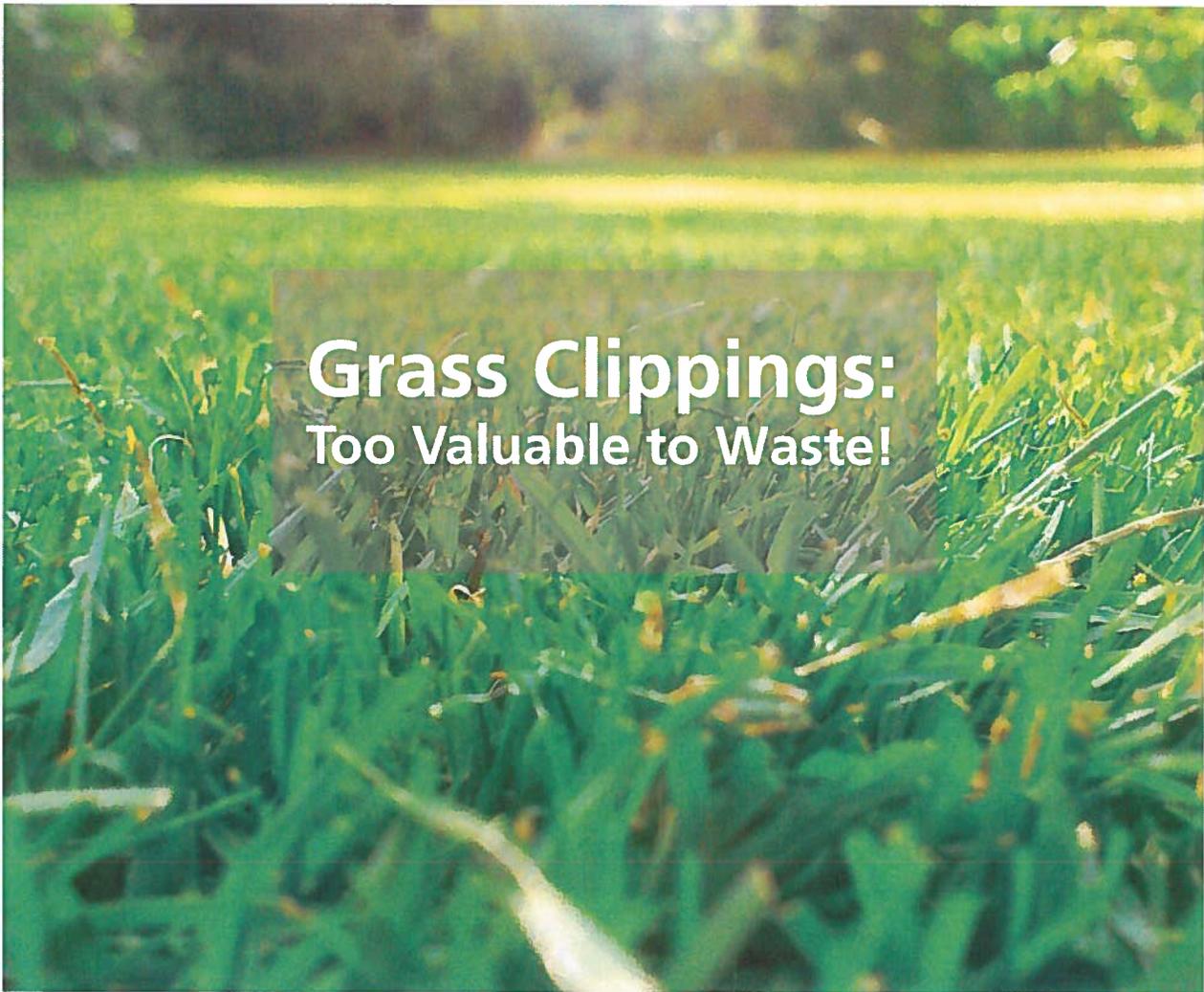
MCM #5 Post Construction Stormwater Management

Half of these MCM requirements are fulfilled through the local county conservation district. Encouraging low impact development, implementing an ordinance for post construction runoff, and enacting a program for operation and maintenance of stormwater best management practices (BMPs) are the Township's responsibilities.

MCM #6 Pollution Prevention and Good Housekeeping

Educating and training Township staff to prevent and reduce stormwater pollution from municipal activities is the last MCM of the MS4 permit. These municipal activities consist of but are not limited to winter road maintenance, salt storage, street sweeping, and lawn mowing. The Township is required to develop written standard operating procedures (SOPs) for each activity that can generate stormwater pollution.

These 6 MCMs not only rely on the Municipality for compliance, but cooperation and participation with its citizens to further advance the stormwater pollution prevention efforts.



Grass Clippings: Too Valuable to Waste!

Grass Pollution Prevention

Leave it on the Lawn – A mulching lawnmower shreds the clippings and leaves them on the grass to decompose. Mulching not only prevents stormwater pollution, it also provides moisture and fertilizer for the lawn.

Backyard Composting – If grass clippings are typically bagged then backyard composting is another solution to pollution prevention. Home compost piles are becoming increasingly popular among residents. Adding grass to the compost pile provides both moisture and nitrogen allowing for more rapid decomposition. Composting yard waste is not necessarily restricted to a dedicated compost pile, mulching a garden is an additional option. Grass clippings provide natural fertilizer through nitrogen, potassium, and some phosphorus components. However, if weed killers were recently used on the lawn then it's inadvisable to mulch the garden.

Less Frequent Lawn Mowing – Mowing your grass less can actually be beneficial and prevent weeds from growing. Cutting only the top 1/3 of the grass blades will shade out some weeds and encourage deep root systems. Additionally, leaving 2 to 3 inches of grass keeps most of the nutrients in.

Learn more at GatewayEngineers.com



Source information for this article provided
with permission by the EPA

Grass Clippings:

Too Valuable to Waste!



The Ecologic and Economic Impact of Grass Clippings

The common practice of treating grass clippings as waste is resulting in overloaded landfills and stormwater pollution. Grass clippings left on the streets and sidewalks pollute waterbodies through nearby storm drains. Excessive algae growth is a major outcome of yard waste pollution in streams, lakes, and ponds throughout the country. At large amounts, algae can be detrimental to fish and humans by limiting the amount of oxygen in the water. In addition to algae growth, grass clippings can also clog storm drains resulting in potential flooding and expensive maintenance to correct the problem.

Grass Pollution Prevention

Leave it on the Lawn – A mulching lawnmower shreds the clippings and leaves them on the grass to decompose. Mulching not only prevents stormwater pollution, it also provides moisture and fertilizer for the lawn.

Backyard Composting – If grass clippings are typically bagged then backyard composting is another solution to pollution prevention. Home compost piles are becoming increasingly popular among residents. Adding grass to the compost pile provides both moisture and nitrogen allowing for more rapid decomposition. Composting yard waste is not necessarily restricted to a dedicated compost pile, mulching a garden is an additional option. Grass clippings provide natural fertilizer through nitrogen, potassium, and some phosphorus components. However, if weed killers were recently used on the lawn then it's unadvisable to mulch the garden.

Less Frequent Lawn Mowing – Mowing your grass less can actually be beneficial and prevent weeds from growing. Cutting only the top 1/3 of the grass blades will shade out some weeds and encourage deep root systems. Additionally, leaving 2 to 3 inches of grass keeps most of the nutrients in.



Learn more at GatewayEngineers.com

Source information for this article provided with permission by the EPA