

STORMWATER BEST MANAGEMENT PRACTICES (BMPs)

The U.S. Environmental Protection Agency (EPA) defines a Stormwater Best Management Practice (BMP) as a technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of stormwater runoff in the most cost-effective manner.

Why use a Stormwater BMP?

Today, the United States' greatest source of water quality problems is nonpoint source pollution. This happens when rainfall, snowmelt or irrigation runs over the land and picks up potential pollutants and transports them into the nearest storm drain. From the stormwater drain, water is directly discharged into local water bodies. Imagine the path taken by a drop of rain from the time it touches the ground until it reaches bayous, rivers, lakes and eventually the Gulf of Mexico. Any pollutant that water picks up during the trip becomes part of the nonpoint source pollution problem. BMPs can reduce the amount of pollutants picked up by water during transport and slow down water leaving the site to better mimic the natural drainage. The *most effective* BMP is effective land-use planning that considers the proposed development and its effects on the entire watershed.

Generally, developed land is cleared of vegetation before construction begins. The resulting land dramatically changes the natural water recycling system. The preexisting watershed (the area that drains to a common waterway, such as a stream, lake, estuary, wetland, or even the ocean) functions of storage, filtration and infiltration are permanently altered. Undeveloped watersheds allow water to stay on site so that it filters into the ground or is absorbed by the existing vegetation. If it does leave the site it does so slowly compared to runoff from impervious materials such as a road or parking lot.

In urbanized areas, BMPs can be implemented to address a range of water quantity and water quality considerations. For new urban development, BMPs should be designed and implemented so that the post-development peak discharge rate, volume and pollutant loadings to receiving waters are the same as pre-development values. Generally speaking, limiting the amount of rainfall con-

verted into runoff is a primary goal to be considered during site design.

In order to meet these goals, BMPs can be implemented to address three elements: flow control, pollutant removal and pollutant source reductions.

- Flow control means managing the volume and intensity of water runoff to surrounding water bodies after significant storm events. Urbanization can severely affect hydrology in a watershed. Increased amounts of imperviousness create an environment that reacts very differently than natural areas.
- Properly designed BMPs can remove pollutants from runoff. For example, increased nutrient runoff can lead to algal blooms that deplete available oxygen causing fish kills in lakes or bayous.
- Pollutant source reductions can be used to minimize amount of potentially harmful substances that could be transported into our waters. These pollutants include nutrients, sediments, bacteria, oils, trace metals, thermal pollution, fertilizers and many others.

Major sources of stormwater pollution are residential, commercial, agriculture, construction, forestry and automotive facilities. Biological resources, public health, and the aesthetic appearance of waterways are negatively affected by stormwater pollution. How often have we seen waterbodies restricted from normal uses such as swimming or fishing? Or rapid growth of algae which can deplete the available oxygen? These are just a few examples of the result of polluted runoff draining into our surface waters. Better design techniques can be adopted to reduce these negative impacts on our environment. Events that are seemingly harmless or insignificant on a small scale can have an enormous cumulative impact.

Typical Sources of Stormwater Pollution

Residential

- Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute water bodies. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to



streams.

- Pool chemicals can pollute water bodies if they are washed away. Such products should be properly stored in waterproof containers.
- Leaking and poorly maintained septic systems release nutrients and pathogens that can cause health problems and environmental concerns.
- Washing your car and degreasing auto parts at home can send detergents and other contaminants through storm sewer systems. Automotive fluids dumped into drains will eventually reach water bodies.
- Pet waste can be a major source of bacteria and excess nutrients in local waters.
- Permeable pavement, rain barrels (in mosquito proof containers), grassy swales and vegetated filter strips are examples of home BMPs.

Commercial

Dirt, oil and debris that collect from impervious areas can be washed into local sewer drains.

Construction

Dirt, oil and debris that collect from impervious areas can be washed into local sewer drains.

Automotive Facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids.

Agriculture

Lack of vegetation on streambanks and overgrazed pastures can lead to erosion. Excessive use of fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms.

Forestry

Improperly managed logging operations can result in erosion and sedimentation.



Stormwater BMPs

There are two categories of stormwater BMPs

- *Structural*

BMPs are facilities that are engineered and constructed such as wet ponds, dry ponds, infiltration basins, porous paving, bioretention areas and constructed wetlands. Construction sites and new

land development utilize these facilities to address runoff prevention, reduce impervious surfaces, and maintain natural drainage systems.

For example, vegetative swales are a simple technique to filter sediment and pollutants. Also, native vegetation is easier to establish and is resistant to



naturally occurring pests. All design involving impervious surfaces should retain as much water on site as possible, using it to irrigate existing vegetation instead of channeling it off site.

- *Non-structural*

BMPs are institutional, education or pollution prevention practices that reduce the generation of stormwater runoff. These include preservation of open space, low impact development, lawn debris management and education and outreach which minimize the impact on collecting systems or receiving water bodies. For example, stenciling storm drains to educate the public can reduce harmful dumping.

Ten Simple Steps You Can Take to Prevent Nonpoint Source Pollution

- 1) Have your septic tank pumped and system inspected regularly.
- 2) Collect lawn clippings for composting.
- 3) Never dump anything down storm drains.
- 4) Revegetate or mulch disturbed soil as soon as possible.
- 5) Clean up spills of vehicle fluids or household chemicals and properly dispose of cleanup materials.
- 6) Minimize pesticide use and learn about Integrated Pest Management.
- 7) Direct roof drains away from paved surfaces and bare soil.
- 8) Keep lots of trees on your property.
- 9) Check your car for leaks and recycle motor oil.
- 10) Pick up after your pet.

*Adapted from list at EPA online
<http://water.epa.gov/polwaste/nps/whatudo.cfm>

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