BEST PRACTICES

Seasonal First Flush: A Story About Stormwater Contamination

Western Washington's climate is often compared to a Mediterranean climate. We usually have a wet winter and spring followed by a rainless summer season. During our summer drought pollutants build-up on impervious surfaces. When we get our first heavy rains in the fall it mobilizes built-up contaminants that end up in stormwater runoff. This phenomena is called seasonal first flush.

So what is the problem? Stormwater runoff is generated from rain and snowmelt that flow over land or impervious surfaces. The runoff picks up pollutants like trash, chemicals, oils, and sediment that can end up in our rivers, streams, lakes, and Puget Sound. In fact, 75% of the toxic chemicals reaching Puget Sound are carried by stormwater runoff! This is partly because many older stormwater system components were designed to reduce the flow of stormwater to prevent flooding, but not to remove pollutants.

Impervious: *not allowing fluids to pass through, impermeable, watertight*

How Seasonal First Flush Impacts Urban Stormwater Quality

The initial surface water runoff after the first major rainstorm of the season is generally referred to as the first flush. The amount of impervious surface in a watershed can have a significant impact on the seasonal first flush. When there is large percentage of impervious surface area and it rains hard, it can often result in faster moving stormwater runoff. This runoff can easily transport debris and scour (scrub) pollutants from surfaces. In developed urban landscapes, runoff occurs almost immediately at the onset of rainfall. The quickly occurring runoff and short time of travel produced in urban areas, provides greater potential for high concentrations of contaminates delivered by first flushes. During seasonal first flush the amount of pollutants carried into our local water bodies is significantly higher than other times of the year. A report done in 2005 by the California Department of Transportation (Caltrans) Division of Environmental Analysis notes that various ways have been proposed to define first flush. Most suggest the existence of a first flush if 80% of the pollutant mass is emitted in the first 30% of the runoff volume.

A study by Lee, Lau, Kayhanian and Stenstrom, (2004) found pollutant concentrations in the first part of the wet season ranged from 1.2 to 20 times higher than concentrations near the end of the season.

Another analysis performed by Caltrans in 2003 showed that several environmental and site-specific factors have a significant influence on runoff pollutant concentrations:

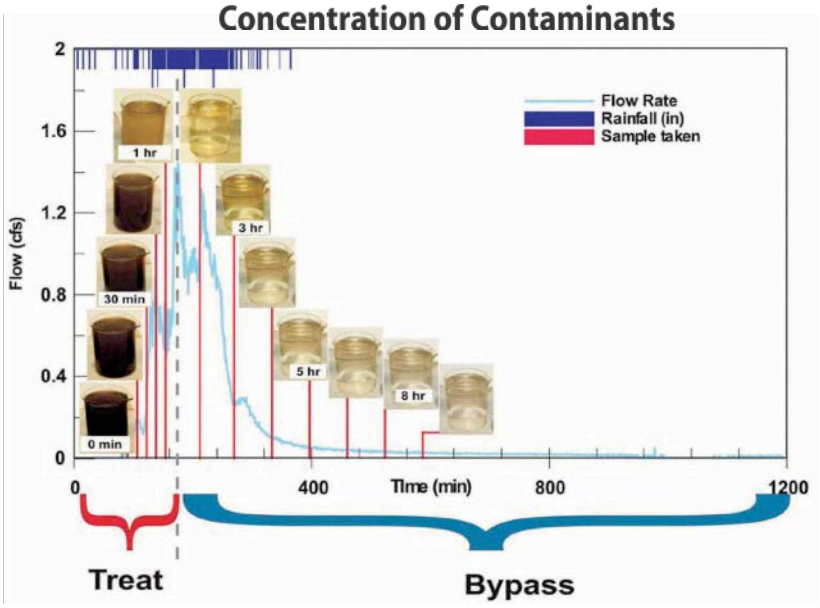
- Pollutant concentrations in stormwater runoff increase with higher traffic levels.
- Pollutant concentrations in runoff are highest early in the wet season.
- Longer dry periods prior to rain events result in higher pollutant concentrations in runoff.
- As total event rainfall increases, pollutant concentrations tend to decrease; i.e., runoff from larger storms tends to dilute pollutant concentrations.

How Can We Prevent Stormwater Pollution?

Before our first rain events begin this fall and throughout the year, there are practices we can all follow to help keep contaminants out of stormwater runoff. When it comes to stormwater pollution prevention small actions add up to make a big difference! Here are some ways to help reduce stormwater pollution:

- Clean-up litter, pet waste, leaves, and debris out of street gutters and storm drains.

- Avoid or apply lawn and garden chemicals sparingly and according to directions. Avoid weed-and-feed type lawn fertilizers; they contain pesticides.
- Sweep driveways and sidewalks.
- Use public transit, walk, or ride a bike.
- Properly store oil, antifreeze, paints, and other household chemicals.
- Clean up and properly dispose of spilled brake fluid, oil, grease, antifreeze and garden chemicals. Do not hose them into the street.
- Control soil erosion on your property by planting native or non-invasive ground cover and stabilizing erosion-prone areas.
- Encourage local government officials to enforce construction erosion and sediment control ordinances in your community.
- If you have an on-site septic system, have it inspected and pumped, at a minimum, every 3–5 years so that it operates properly.



The first flush image above shows how the concentration of contaminants decreases with the amount of rainfall over time.

Image provided by Caltrans (2005) "First flush Phenomenon Characterization", Stenstrom Michael K., Kayahnian M, Report No. CTSW-RT-05-73-02.6, California Department of Transportation, August 2005

Keep Storm Drains Clear

As we move into the rainy season storm drains can get clogged with leaves, sediment and debris. Help reduce the risk of local flooding by picking up leaves and other yard waste from your property. Never blow or sweep yard debris into the roadway. If you see a storm drain in your neighborhood that needs to be cleared, use a rake or shovel to remove the debris. Remember safety always comes first! To properly dispose of leaves, put them in your organics cart or compost pile. Alternatively, use leaves to mulch planting beds to provide winter protection for plants.

In addition to looking after your neighborhood storm drain, residents and businesses can take two other important steps to get ready for the storm season:

- Maintain gutters, downspouts, rain barrels, and private culverts by keeping them clean, flowing and directed away from properties and hillsides.
- If you see major flooding or you are unable to clear a drain contact your local jurisdictions: Olympia: 360-753-8333; Thurston County: 360-867-2300 Tumwater: 360-754-4150; and Lacey: 360-491-5644

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