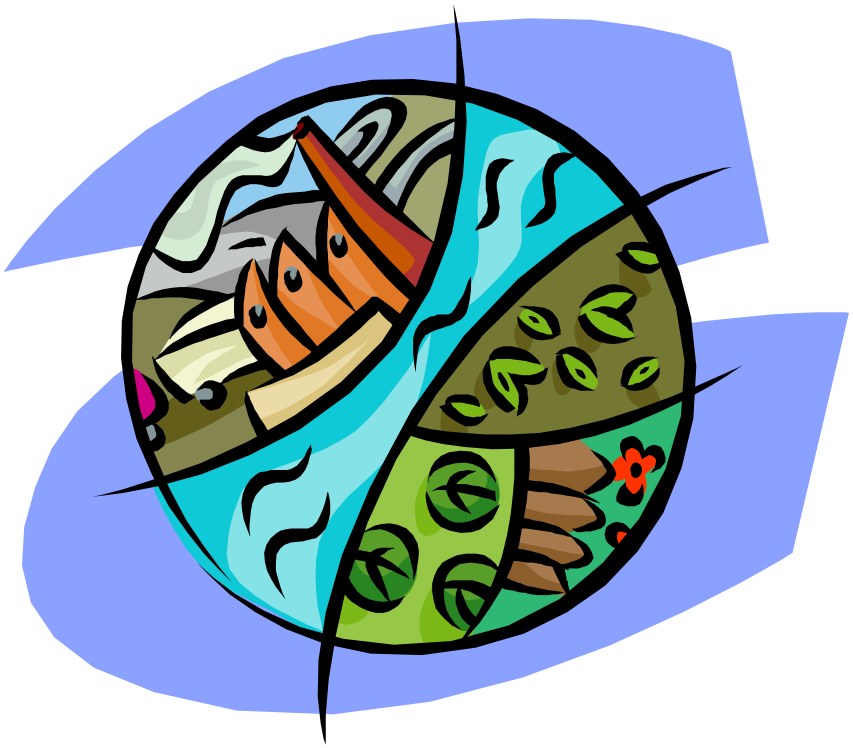
Stormwater Problems: Your Role



Stormwater Problems: Your Role

Stormwater Runnoff

In vegetated areas such as forests, fields, and wetlands, rainwater seeps slowly into the ground. However, when rain falls on paved and other hard surfaces it runs off quickly and is conveyed by pipes and ditches directly to King County lakes, wetlands, and streams. This water that flows across the land is called stormwater runoff. Stormwater runoff, although starting as rain, collects pollutants when it hits the ground and travels. For example, runoff from parking lots picks up oil and grease dripped from cars, asbestos from worn brake linings, and zinc from tires. Pesticides, herbicides, and fertilizers are washed off from landscaped areas, and soils are washed away from construction sites. Any substance found on the ground can contaminate stormwater runoff.

Storm Drains Lead to Lakes and Streams

Storm drainage systems are designed to decrease the chance of flooding in areas that have been developed with homes, businesses, and roads. The rainwater that used to seep into vegetated areas now must be collected and carried elsewhere. The storm drainage system collects this stormwater runoff and carries it to the nearest wetland, lake, stream, or to Puget Sound. In urban areas, the storm drainage system consists of drains and underground pipes. Storm drains are normally located in streets and parking lots. In rural areas, the storm drainage system may be in the form of ditches that carry the stormwater along a roadside or piece of property. These drainage systems are meant to carry only unpolluted stormwater to the nearest natural body of water. Putting oil, antifreeze, detergents, and other material into the storm drainage system is the same as dumping them directly into a lake or stream.

The sanitary sewer system is different. Sanitary sewer drains lead to the sanitary sewer system and end up at a wastewater treatment plant. This system carries household wastewater and some permitted industrial wastewater. The wastewater in this system is treated before being discharged into a natural water body.

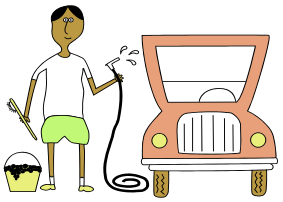
Polluting is Against the Law

Keeping pollutants out of the water isn't just a good idea - it's the law. The Washington State Water Pollution Control Law (RCW 90.48) and the King County Water Quality Code (KCC 9.12) prohibit the discharge of pollutants to the storm drainage system, surface water, and groundwater. Polluted stormwater runoff or the direct dumping of pollutants can negatively affect every water body it enters. Pollution can cause algal blooms causing taste and odor problems and impaired recreation and aesthetics; toxins can cause lesions and tumors in fish and other animals; turbidity can cause the destruction of fish spawning areas and other habitat for plants and animals; and all of this can result in a decrease in fishing, swimming, and boating opportunities.

Ways You May Be Polluting

Many people know that it is illegal to dump toxic chemicals or other material down a storm drain. But you are also polluting if you allow pollutants to be washed into a storm drain with stormwater runoff or with wash water. For instance, you may be polluting if you:

- allow water from washing tools and equipment to enter a storm drain;
- spill antifreeze or other material on your site without cleaning it up;
- allow materials or wastes stored outside to leak on the ground; or
- clear land without taking steps to prevent erosion.



Virtually anything on the ground can become a water pollutant. Therefore, it is important to keep a clean site and ensure that polluting material is properly handled and stored.

Pollutants

Any substance that can render water harmful to people, fish, or wildlife or impair recreation or other beneficial uses of water is considered a pollutant. The broad categories of pollutants and their effects on fish and wildlife are described below.

Table 2.1 (located at the end of this chapter) presents a list of the activities addressed in this manual. This table indicates the types of pollutants that may be generated by those activities as well as the types of receiving water bodies that may be affected by stormwater runoff from the activity sites.

Oils, Greases, and Fuels

Oils and greases are a common component of stormwater runoff pollutants, primarily because there are so many common sources: driveways, streets and highways, parking lots, food waste storage areas, heavy equipment and machinery storage areas, and areas where pesticides have been applied. The familiar sight of a rainbow-colored puddle or trickling stream of water in parking lots, driveways, and street gutters is a reminder of the presence of oils and greases in stormwater runoff. Oils and greases can be petroleum-based or foodrelated (such as cooking oils). No type of oil or grease belongs in surface water. Oil and grease are known to be toxic to aquatic organisms at relatively low concentrations. They can coat fish gills, prevent oxygen from entering the water, and clog drainage facilities (leading to increased maintenance costs and potential flooding problems).

Metals

Many metals, including lead, copper, zinc and cadmium, are commonly found in urban runoff. Metals can contaminate surface and groundwater, and concentrate in bottom sediments, presenting health problems for fish and animals that eat from the bottom of lakes, streams, and Puget Sound. Reproductive cycles of bottom-dwelling species can be severely reduced, and fish inhabiting such metal-contaminated locations often exhibit lesions and tumors. Metals can also contaminate drinking water supplies. Industrial areas, scrap yards, paints, pesticides, and fallout from automobile emissions are typical sources of metals in runoff.

Sediments

Sediment, often originating as topsoil, sand, and clay, is the most common pollutant in stormwater runoff by volume and weight. Sediments readily wash off paved surfaces and exposed earth during storms. Sediment may seem harmless enough, but it poses serious problems in the water. Excess sediment concentrations turn stream and lake water cloudy, making them less suitable for recreation, fish life, and plant growth. Sediment is of particular concern in fish bearing streams where it can smother trout and salmon eggs, destroy habitat for insects (a food source for fish), and cover prime spawning areas. Uncontrolled sediment can also clog storm drains, leading to increased private and public maintenance costs and flooding problems.

Sediment is also of concern because many other pollutants including oils, metals, bacteria, and nutrients tend to attach to soil particles. Therefore, when sediments enter water, they usually carry other pollutants with them.
Cleared construction sites and exposed earth are generally the greatest contributors of soil particles in surface waters. Other sources include erosion from agricultural lands, application of sand and salts to icy roads, fallout from pressure washing and sandblasting operations, dirt from equipment and vehicles, and dirt and grit from parking lots, driveways, and sidewalks.

Oxygen-Demanding Substances

Plant debris, yard waste, food waste, and some chemical wastes fall into a category of water pollutants known as oxygen-demanding substances. Such substances use dissolved oxygen in water when they decay or chemically react. If dissolved oxygen levels in water become too low, aquatic animals become stressed or die. Salmon and trout are particularly at risk because they need high dissolved oxygen levels to live.

Animal wastes, food wastes, leaves and twigs, and other miscellaneous organic matter carried by stormwater runoff into surface water can lead to reduced oxygen levels. Slowmoving waters are particularly susceptible to oxygen depletion because aeration of the water by turbulence is lacking. Therefore, oxygen that is depleted in slow-moving waters due to the presence of excess organic matter or unnatural chemical compounds is not replaced. Reduced oxygen levels in these waters are often particularly severe after a storm.

Nutrients

Nutrients such as phosphorus and nitrogen are needed by plants to grow, but high levels can be harmful to water quality. Excess nutrient levels can over-stimulate the growth of algae and other aquatic plants, resulting in unpleasant odors, unsightly surface scum, and lowered dissolved oxygen levels from plant decay. Nutrients are most likely to pose a problem in slow moving water such as lakes or sluggish streams.

Some forms of algae are toxic to fish and other aquatic organisms and may even cause death in animals that drink affected water. Algae can also cause taste and odor problems in drinking water, foul-smelling odor in ponds and lakes, and problems with clogged water intakes, drains, and pipes. Heavy loading of nutrients into slow-moving waters can adversely affect many beneficial uses of the water. Forms of nitrogen (ammonium), in combination with pH and temperature variations, can cause water quality problems and be toxic to fish. This process consumes large amounts of oxygen in the water and subsequently stresses or kills fish and other aquatic organisms when oxygen levels are reduced.

Ammonia can harm fish and other aquatic organisms.

Fertilizers, animal wastes, failing septic systems, detergents, road deicing salts, automobile emissions, eroded soils, and organic matter such as lawn clippings and leaves are all contributors to excessive nutrient levels in urban/rural and agricultural stormwater runoff.

Toxic Organic Compounds

Toxic organic compounds such as pesticides are particularly dangerous in the aquatic environment. Excessive application of insecticides, herbicides, fungicides, and rodenticides, or application of any of these shortly before a storm, can result in toxic pesticide chemicals being carried from agricultural lands, construction sites, parks, golf courses, and residential lawns and gardens to receiving waters. Many pesticide compounds are extremely toxic to aquatic organisms and can cause fish kills.

Many other toxic organic compounds can also affect receiving waters. These toxic compounds include phenols, glycol ethers, esters, nitrosamines, and other nitrogen compounds. Common sources of these compounds include wood preservatives, antifreeze, dry cleaning chemicals, cleansers, and a variety of other chemical products. Like pesticides these other toxic organic compounds can be lethal to aquatic organisms.

Fecal Coliform Bacteria

Fecal coliform bacteria in water may indicate the presence of pathogenic (disease-causing) bacteria and viruses. Pet and other animal wastes, failing septic systems, livestock waste in agricultural areas and on hobby farms, and fertilizers can all contribute fecal coliform bacteria. This can limit the recreational use of a water body. Bacterial contamination has led to closures of numerous shellfish harvesting areas and swimming beaches in the Puget Sound region.

pH

The pH value of water is an indication of its relative acidity. The pH value can range from 0 to 14, with a range of 6 to 8 being desirable for most bodies of water. A pH level outside this range will adversely affect plant and animal life. Waters with very high (basic) or very low (acidic) pH are corrosive to metal surfaces. There are several sources that can contribute to change of pH in runoff, including industrial processes that discharge acidic wastewater, solutions used in metal plating operations, acidic chemicals used in printing and graphic art businesses, cement used in concrete products and concrete pavement, and chemical cleaners used in homes and businesses.

How can I help…around my Dog?

Scoop the poop, bag it and throw it in the trash (not in the yard waste bin). 87% of dog poop in Puget Sound lands in our own backyards. 48% of the people in King County say they don't always properly dispose of pet waste at home.

Backyard poop is a big problem. Keep your yard clean of pet waste by scooping at least weekly if possible. Always carry plastic bags when walking your pet. After you've picked it up and bagged it, throw the poop in the garbage and be sure to wash your hands. It's that simple and your garbage hauler won't mind (plus, not pickup up your dog's poop is illegal). Just remember to keep the poop out of the yard waste container.

The Issue

Pet waste is raw sewage. It contains hazardous organisms that cause bacterial contamination in local streams, rivers, and lakes. When it rains, bacteria in dog poop is carried by stormwater runoff to storm drains, ditches, and streams that feed our rivers, lakes, and Puget Sound. Dog waste contains fecal coliform bacteria and other disease-causing organisms such as salmonella, roundworms, and giardia. These bacteria can make water unsafe to drink or swim in. These bacteria also end up in shellfish, and can make the people who eat them very sick.

Facts: We have more than 125,000 dogs and 60,000 outdoor cats in Seattle! That amounts to about 50,000 pounds of bet waste every day. In one gram of dog poop, a piece about the size of a round green pea, there are 23 million fecal coliform bacteria.

Left on streets, curb strips, and in yards and parks, pet waste can be carried by rainwater to storm drains and into our creeks, lakes, and Puget Sound without treatment, it is one of the leading causes of bacterial contamination in our streams and causes other water quality problems just like livestock manure and fertilizer.

Get Involved

- Purchase a pet waste baggie dispense and bags for your street. Available online or in pet supply stores these are not supplied or maintained by the City).
- Spread the word about the importance of picking up pet waste. Print an *I Poop Poster* from the Puget Sound Starts Here website and ask a local business to post it.

What if pet waste isn't picked up?

It's bad for your health, our waterways, and potentially your pocketbook! There are laws in Seattle to protect our health and our environment which require pet waste to be picked up and disposed of properly.

SMC 9.25.082

(A) Allowing the accumulation of feces (civil infraction, $109.00 fine)
(B) Not removing feces from another's property (civil infraction, $54.00 fine)
(C) Not having equipment to remove feces (civil infraction, $54.00 fine)

How can I help…in my Yard?

Use fertilizers and pesticides sparingly, or just use compost.

Go Green with Less

It's okay to want green lawns and gorgeous flowers. But too much fertilizer or too many bug killers are not necessary. It doesn't take much of the right product to achieve the desired result. In fact, there are many non-chemical choices for preventing weeds and bugs. One choice is to try compost instead of a fertilizer or herbicide.

The Issue – 96% of the insects in a yard are good bugs

Scientists have found 23 pesticides in Puget Sound streams, many at levels that can harm salmon and other wildlife. When stormwater flows over our yards and gardens it picks up pesticides, herbicides, and fertilizers and carries them into streams, rivers, lakes, and Puget Sound. These chemicals poison wildlife and absorb oxygen in water, contributing to dead zones.

Yard Care Tips

If you already follow the directions on your fertilizer or pesticide, try something new and easy:

Go Natural: Use compost to augment your soil and fertilize your plants. There are many types of compost available and some cities or counties offer their own products. If you must, use slow release organic fertilizer in late September and/or early May.

Plant a Tree: Increase the number of trees to help intercept rainwater.

Let the Rain Soak In: Slow stormwater runoff by directing downspouts into lawns, beds, or rain gardens.

Build Healthy Soil: Supplement your soil with mulch, compost and other all-natural soil amendments. Healthy soils lead to robust plants that are more resistant to disease and insect problems, which means you'll reduce the need for herbicides and pesticides.

Clean Up Troublemakers: Remove diseased plants and compost the dead ones.

Minimize Spray: Try traps, barriers, fabric row covers and repellants before turning to pesticides.

Plant Right for Your Site: Select pest-resistant plants and put them in soil mixture and sun conditions they like. Consult a garden expert for advice on the right plant for your conditions.

Water Smart: Water deeply and infrequently. Most plants do best if the soil partially dries out between watering. One inch a week is the rule of thumb.

Test Automatics: Test, repair, and adjust your sprinklers annually, and install a rain shut-off device.

How can I help…in my House?

Use less hazardous cleaning solutions.

Household Cleaning

Even though most home cleaning products are processed through sewage treatment plants or septic systems, many of the harmful chemicals they contain still end up in our waterways. This also happens when some sewer systems overflow during big storms and heavy rains. Whenever possible, use natural cleaning products to tidy up your home. This includes detergents for dish and clothes washing that do not contain phosphorus. For other cleaning needs, avoid products that say “Poison” or “Danger.” And, create a low-cost household cleaning kit with white vinegar, baking soda, borax, castile soap, and a spray bottle. Recipes are available online: http://www.pugetsoundstartshere.org/at-home-andmore/household-cleaning/.

How can I help…in my Car?

Use a commercial car wash and have fluid leaks repaired.

Use a commercial car wash. Market research from the International Carwash Association shows that 38% of the public wash their cars at home.

Washing your car at home is a dirty business. Oil, brake pad and tire dust and other chemical residue build-up – along with soap – wash straight down the storm drain and flow, untreated, into nearby streams, rivers, and Puget Sound when you wash your car in the driveway or street. The water from commercial car washes flows into the sanitary sewer system and is treated by wastewater treatment plants before it enters local waterways.

The Issue

The water from car washing contains oil, zinc, lead, copper, solvents and antifreeze. All of these enter the Sound – or bodies of water that lead to the sound – when we wash our cars on the street, in our driveways or in a parking lot. Sops are a significant problem and are harmful to fish and the aquatic insects they eat. Soaps contain surfactants, which are chemicals designed to coat dirt and grime so they don't settle back onto your car. Surfactants also coat fish gills and prevent fish and aquatic insects from getting the oxygen they need.

Fix your car's oil drips
Motor oil is a pollution problem in our streams, rivers, and lakes. Oil doesn't dissolve in water, which means it sticks around for a long time. It's toxic to people, wildlife, and plants. Contain oil leaks that you know about until you can get your car fixed.

Car Care Tips

Dispose of Fluids Properly. Never pour anything but clean water down a storm drain, since most drains empty directly into streams or rivers. Recycle oil at registered collection centers throughout the region.

Use Cardboard. If you have an older car that leaks a little oil, put a piece of cardboard under the leak when the car is parked. Periodically dispose f the cardboard at registered collection centers, not in the trash.

Skip Driving Alone. Leave the car at home and take an alternative form of transportation, or carpool with other people in your neighborhood.