



Stormwater Part 1

Recently San Juan County formed a stormwater utility district and in December 2006 announced a fee structure to charge property owners for dealing with a wide range of stormwater problems.

I was a member of the advisory committee that determined the mission statement, goals and service rate. This month's article is a brief introduction to stormwater runoff and the problems it can cause. Next month we'll examine what steps you can take to mitigate these problems.

When rain falls in undeveloped areas of western Washington 40% to 50% of it is either absorbed by trees, and transpired back into the atmosphere, or quickly evaporates in the heat of the sun (hard to believe sometimes). Some 10% to 40% infiltrates into our groundwater and recharges our aquifers. This ultimately becomes the water that many of us will drink from our wells.

About 20% to 30% of it flows subsurface (known as interflow) and this is the source of our creeks, streams and lakes - in many cases this is another one of our sources of drinking water. Less than 1% runs uncontrolled over the surface.

In areas that have experienced excessive development, or in areas of unusual geology, these numbers are very different. When trees and native vegetation have been removed and replaced with impervious surfaces (such as roofs, roads and parking areas) only 20% to 30% evapo-transpires back into the atmosphere. Interflow reduces to between 0% and 30%, and groundwater recharge drops to only 10% to 20%. Surface runoff increases dramatically to between 20% and 30% (compared to 1%). This surface runoff can cause many problems.

Due to its geology and steep terrain, Orcas Island suffers from many of the problems that plague developed areas, especially low aquifer recharge.

Because we are a predominantly rural county we tend to think that we don't suffer from stormwater runoff problems, but in reality we do. In addition to our problematic geology we are suffering from poorly planned and managed development.

For example some people are building homes high on hilly slopes, removing trees and native vegetation to gain views. Some cut access roads into steep slopes that are then covered in asphalt or compacted gravel (which is effectively impervious). Homes are built that are overly large, with correspondingly large roof areas, in addition to studios, garages and other structures. Usually these roofs drain into a small number of downspouts that concentrate the rainfall into a small area. Then when it rains there is very little loose soil and vegetation left to absorb the rainfall.

Surprisingly lawns don't absorb as much rain as you might expect - lack of varied vegetation and compaction from mowing contribute to this problem. Once the thin layer of soil gets saturated, after the early fall rains, any fresh rain tends to flow over the surface as sheet flows. Where the water is concentrated - near downspouts for example - soil erosion often occurs. Many homeowners then have trenches dug to collect the runoff and divert it to the edge of their property. Here it either flows into their

neighbors property, or into county ditches. And now it becomes someone else's problem.

Water that flows over soil and lawn will collect soil and organic matter and wash it away. In some areas this can cause significant erosion, and lead to loss of valuable top soil that could be used for crops or plants. If excessive amounts of lawn fertilizers are used these can be dissolved into the water and washed into streams and waterways. Nitrates and phosphates are bad news since they cause the excessive growth of algae and many algae produce toxins that are poisonous.

Where runoff flows over surfaces used by vehicles it can collect a wide variety of petroleum-based chemicals and heavy metals such as Cadmium from brake dust and asbestos. If this was occurring on a single property it might not be a major problem but as water flows from one property to another it can collect an increasing amount of toxins until eventually they end up in our wetlands, creeks or ocean.

Sometimes the water is 'unpolluted', carrying perhaps only dissolved solids such as soil and organic matter. But the volume of water - increasing as it flows downhill - ends up flooding someone's property or covering a road. Standing water on a road can be just an inconvenience or it can cause accidents as traffic hydroplanes on the slick surface.

In urban areas such as Friday Harbor and Eastsound there is a higher concentration of impervious surfaces. There are more buildings, usually on smaller lots, more parking, more infrastructure such as roads and airports, and less native vegetation. Where there is greenery it is usually in the form of lawns (not as absorbent as meadow or pasture). Surface temperatures are usually higher too (asphalt gets a lot hotter than grass) which can heat stormwater to a higher temperature.

Due to their proximity to the ocean any water that flows down through Friday Harbor and Eastsound quickly ends up in the ocean, carrying much of the debris, dissolved solids, suspended solids, dog poop

and other pollutants with it. There are specially designed stormwater drains that can collect and remove some of these pollutants - but they typically remove only 80% of the debris and pollutants.

The good news is that there are simple cost-effective solutions to all these problems. Stay tuned!

This article was written by Steve Hussey, a Natural Resources Planner with the San Juan Islands Conservation District.