

Information is taken from The Center for Watershed Protection:

<https://www.cwp.org/reducing-stormwater-runoff/>

>Additional info can be found in the MN Stormwater manual<

https://stormwater.pca.state.mn.us/index.php/Available_stormwater_models_and_selecting_a_model

Saving trees and greenery

Trees and greenery are critical to help remove water. According to the University of Minnesota, just one large tree can lift up to 100 gallons of water out of the ground and discharge it into the air in a single day. By saving the removal of 100 trees, we keep over 10,000 gallons off our property per day (100 trees x 100 gallons). That equates to almost two million gallons in a 6 month time period (180 days x 10,000 gallons per day) that's 1 million 800 thousand gallons of water removed from the neighborhood!

Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick from eating diseased fish and shellfish or ingesting polluted water. Polluted storm water often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

#1: Reduce storm water runoff -- less hardscape = less storm-water runoff

The biggest reason and the number one concern every home owner shares is storm water runoff!

Wider streets equal more runoff, adding curbing equals more water being channeled at a faster velocity to settle off in place instead of being absorbed into the grass lawn edging control we currently have. The water has no place to go when the catch basins are full or not draining.

Storm water is water from rain or melting snow that does not soak into the ground. It flows from rooftops, over paved areas, bare soil and sloped lawns. As it flows, storm water runoff collects and transports animal waste, litter, salt, pesticides, fertilizers, oil and grease, soil and other potential pollutants. Polluted storm water runoff can have many adverse effects on plants, fish, animals and people. Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats. Polluted runoff is the number one cause of water pollution in the United States.

STORMWATER DOES NOT GET CLEANED

Because excess storm water can increase the potential for flooding and property damage, it is collected into a drainage system. The storm drain is intended to route rainwater quickly off the streets during a heavy storm. Unfortunately, it takes all the runoff along with it. Chemicals, trash, debris from lawns, parking lots and streets, either intentionally or accidentally spilled collects in the storm drains.

When it rains, the extra storm water causes the ditches and drains to fill to capacity. They do not connect to a sewer treatment system, so everything that flows down the drain flows directly to the nearest water body, ultimately flowing into the nearest lake, river or stream.

Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels. Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary. Debris, including plastic bags, six-pack rings, bottles and cigarette butts can wash into water bodies and choke, suffocate, or disable aquatic life like ducks, fish, turtles and birds.

Trees and forests improve stream quality and watershed health primarily by decreasing the amount of storm water runoff and pollutants that reaches our local waters. They capture and store rainfall in the tree canopy and release water into the atmosphere through evapotranspiration. In addition, tree roots and leaf litter create soil conditions that promote the infiltration of rainwater into the soil. This helps to replenish our groundwater supply and maintain stream flow during dry periods. The presence of trees also helps to slow down and temporarily store runoff, which further promotes infiltration, and decreases flooding and erosion downstream. Trees and forests reduce pollutants by taking up nutrients and other pollutants from soils and water through their roots, and by transforming pollutants into less harmful substances. In general, trees are most effective at reducing runoff from smaller, more frequent storms.

In addition to these storm water benefits, trees provide a host of other benefits such as improved air quality, reduced air temperatures in summer, reduced heating and cooling costs, increased property values, habitat for wildlife, and recreation and aesthetic value.

How Do Trees Reduce and Remove Pollutants from Storm water Runoff?

In most municipalities around the country with storm water management regulations, site designers are required to capture and remove pollutants from a specified runoff volume and control the maximum (or peak) rate of runoff from the site for certain size storm events. Under this scenario, water quality 'treatment' is defined solely by the pollutant removal functions of the storm water management practices used, and does not account for their ability to reduce the overall volume of runoff.

A number of states and communities are beginning to recognize that there are benefits of shifting from this peak-based storm water control to an approach that focuses on reducing the volume of runoff (through re-use, evapotranspiration, or infiltration) leaving a site. A volume reduction approach is most appropriate for the relatively small, frequent storms, which matches up well with the storm water benefits provided by trees.

Reducing runoff volume using green infrastructure has benefits beyond just removing pollutants. It also recharges groundwater, provides better protection of sensitive aquatic resources, and reduces the size and cost of hard infrastructure that would otherwise need to be constructed. One challenge with this approach has been how to account for the runoff reduction provided by green infrastructure in rainfall/runoff models commonly used by engineers.

What Are Some Specific Practices That Use Trees to Reduce Storm water Runoff?

The most effective way to minimize the impacts of storm water runoff described above is to limit the amount of paved surfaces that are created during development, and preserve as much as possible the natural topography and vegetation. Specifically, existing forests can be protected during construction and permanently managed as conservation lands. In cases where there are no existing forest stands (e.g., development of a former farmland), reforestation can help to offset these impacts.

The impacts of storm water runoff can also be minimized by increasing tree canopy over paved surfaces to increase interception of rainfall. Another way to minimize impacts is by "disconnecting" paved surfaces so that they no longer drain to the system of gutters, inlets and pipes that make up the storm drainage system and ultimately flow to our local streams and rivers. Disconnection can involve redirecting runoff from rooftops or individual parking lots to storm water management practices or vegetated areas and allowing the runoff to slowly soak into the ground.

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What is the city doing to reduce the storm water run-off?

The city needs to provide these answers to the residences beforehand in order to go forward with this project