TREES AND STORMWATER

Stormwater Runoff – A Primary Concern

Stormwater runoff is a primary concern and number one cause of stream impairment in urban areas. In Vermont, seventeen waters are listed as "impaired" primarily due to urban stormwater runoff. Whenever development occurs, the hydrology and natural drainage patterns of the land are altered. Impervious surfaces created by development such as roads, driveways, parking lots, sidewalks and rooftops create runoff and reduce the land's capacity to allow stormwater to naturally infiltrate into the ground. The infrastructure required to handle stormwater can be costly to communities and developers. Retaining forest cover and strategically integrating trees into stormwater design can provide a more affordable alternative to traditional systems and reduce water treatment costs.

How Trees Protect Water Quality

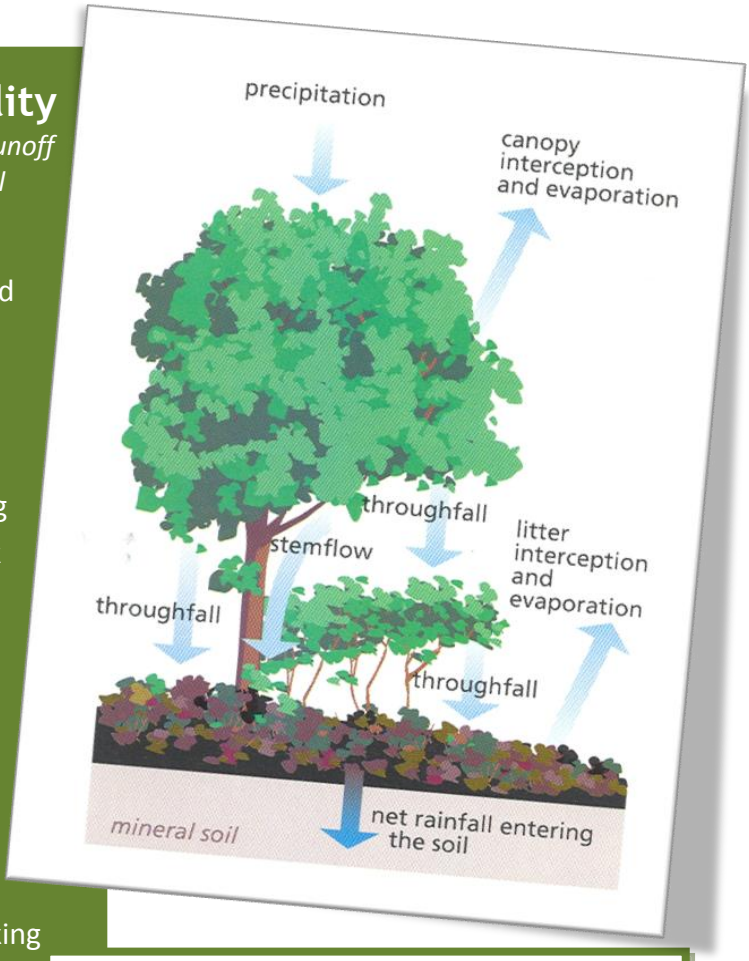
A healthy urban forest can reduce the amount of runoff and pollutant loading to receiving waters in several ways:

Capturing and storing rainfall in the canopy and releasing water into the atmosphere through **EVAPORATION.**

Leaves, branch surfaces and trunk bark **INTERCEPT** and store rainfall, thereby reducing runoff volumes and delaying the onset of peak flows.

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 streamflow during dry periods.

Trees and forests also reduce pollutants by taking up nutrients and other pollutants from soils and water through their roots, and by transforming pollutants into less harmful substances.



Studies have found that an average-sized tree can intercept up to 2,380 gallons of rainfall a year.

Community Stories: Trees and Stormwater

PLANT LIVE GROW

St Albans, VT: Main Street to Green Street

Home to two watersheds on the 'impaired' waters list due to stormwater runoff, the City of St. Albans is ready to break ground on a project to convert 1,120 linear-feet of their Main Street into a green street. The goal is to use trees and their associated tree pits, to capture, store and cleanse stormwater runoff from roads, sidewalks and rooftops. Techniques being investigated include those that will allow for increased soil volume under the pavement to increase tree canopy while providing a medium to manage stormwater. A downtown win-win: large healthy trees for economic development, community pride and character, and environmental mitigation.

Winooski, VT: Winooski Rain Garden Project

Winooski, a historic city that is heavily developed, has little area to build traditional engineered stormwater facilities. In order to reduce stormwater impact to Morehouse Brook, the city installed rain gardens. The goal was to demonstrate to residents and business owners a low cost and low maintenance practice to manage their stormwater runoff. Rain gardens utilize landscaping and soils to treat stormwater. This project highlights the versatility of rain gardens from a small residential garden treating roof runoff to a large public garden treating road runoff. Many of these gardens incorporated trees.

Rutland, VT: Strategic Watershed Tree Planting

Results are in for the City of Rutland from a recent Urban Tree Canopy assessment that estimates down to the parcel level, the amount of tree canopy currently present, along with the amount of tree canopy that could theoretically be established (Possible UTC). Armed with this data, the City is looking to increase canopy cover through strategically planting trees in the Moon Brook watershed. Priority parcels will include those along the Moon Brook which lack riparian canopy, and those with high impervious cover.

Pervious, Permeable and Porous Surfaces

Installing pervious (porous, permeable) concrete and asphalt parking lots, sidewalks and pavers is an effective strategy for reducing stormwater runoff given the proper conditions. Routine maintenance to prevent clogging and erosion control is essential, and the cost of pervious asphalt is approximately 20-25% more than traditional asphalt. Concrete costs are comparable. For northern climates, the benefits include reduced black ice, groundwater recharge continues in freezing temperatures, and surface traction is maintained when wet.

Permeable sidewalk demonstration.
Taylor Park - St. Albans, VT.

References

Watershed Forestry Resource Guide, Center for Watershed Protection and US Forest Service, Northeastern Area State & Private Forestry
Control Stormwater Runoff with Trees Fact Sheet, Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service.
Virginia Tech, Departments of Forestry & Horticulture. www.cnr.vt.edu/urbanforestry/stormwater/

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