What You Can Do to Minimize the Impact of Storm Events on Water Quality

What Kinds of Storm Events does New Hampshire Experience?

New Hampshire typically receives two types of storm events: rainfall and snowfall, simply known as wetfall. A single storm event encompasses a period of wetfall that intensifies, peaks and subsides. Separate storm events are characterized by a period of dry weather, typically six hours or more, between events.

Since 2005 New Hampshire has experienced an increased number of severe storm events that resulted in flooding, record snowfall and rainfall totals, and a tornado. In the wake of these natural disasters and tragic events, long term planning on safety, property management and water quality has become a necessary and crucial task.

When severe weather or a natural disaster occurs, the first course of action is to maintain personal safety, and then survey the damage. Extensive losses are often sustained, and recovery and damage assessment often consume the attention of those affected by this natural disaster. Our lakes and rivers, and the dependent aquatic biota, suffer extreme damage as a consequence of these events. Understanding the ramifications of these intense storms, including their negative impacts to water quality, helps us to know what steps to take to preserve our water resources.

What is Stormwater Runoff?

Stormwater runoff is precipitation that has not been absorbed or infiltrated through the ground. This occurs when rain events are long and highly intense or when melted snow/ice cannot penetrate frozen ground. Rather, the runoff washes over the land surface, concentrating pollutants as it travels. Impervious areas, such as paved roadways, parking lots, driveways, and rooftops further concentrate pollutants and intensify runoff amounts leading to the movement of larger particles. Stormwater runoff collects soil particles from eroding streambanks or other exposed/disturbed soils, fertilizer from lawns, petroleum products from roadway and driveway surfaces, residues from industrial activities, litter, and wildlife and pet wastes. The stormwater runoff transports these pollutants to surface waters, which adversely impacts water quality. Stormwater runoff, which is classified as non-point source pollution (pollution that is discharged over a wide land area and does not originate from one easily identifiable “point”), is the leading cause of water quality degradation in US rivers, lakes and ponds.

What are the Water Quality Impacts?

During severe storm events or snowmelt when high volumes of stormwater flow into water bodies, the runoff carries many undesirable substances, such as fertilizers, road salt, oil, metals and garbage. These pollutants enter the water body, degrade the water quality, and pose a health threat to those who come in contact with the water.

Runoff can have both short term and long term impacts on water quality and human health. A major storm in 2005 caused severe flooding of the Cold River in Alstead. Pieces of homes and vehicles had to be removed from the river, and the presence of oil, gasoline, and sewage in the water was evident from the odor in the air.

While the debris and odors were noticeable for a short time, other flooding impacts had a more prolonged effect. The expanded river width resulted in stream bank erosion or diversion. Sediments deposited into the water caused turbidity and a murky appearance. Increased turbidity, a measure of suspended solids, decreases sunlight penetration through the water, depriving plants from their source of energy, and clogs fish gills and interferes with feeding. Soil particles transport excess nutrients, such as phosphorus, causing excess plant and algal growth, decreased water clarity, and potential health issues. The sedimentation load to the stream smothers stream macroinvertebrates and leads to habitat loss.

Storm event erosion also damages the area along lake shorelines or river riparian zones causing vegetation to be uprooted or smothered by deposition. The loss of trees and shrubs is not only visually unpleasant; it also changes the surrounding ecosystem. Trees provide shade that cools the shoreland waters in rivers and lakes. When these trees are suddenly lost, the increased water temperatures dramatically change the biota to a less diverse inhabitance of aquatic species. Aquatic vegetation provides a habitat for insects, which are a food source for other aquatic creatures. Habitat loss threatens both the insects as well as the organisms that feed on them. The loss of trees and plants in lake or river shorelines create the loss of an important defense against non-point source pollutants. Vegetated root systems are important pollutant filters of runoff before pollutants enter the waterbody.

How to Manage Your Property to Reduce Stormwater Impacts

These are just a few impacts severe storm events have on our waterbodies. Lake residents and associations can help minimize stormwater runoff pollution. No effort is too big or too small in reducing stormwater impacts and making a positive difference! Here are some suggestions.

- **Plant native vegetation along the shoreline.** Erosion can be prevented by stabilizing stream banks and lake shorefronts. One low-cost and relatively simple way to do this is by planting native vegetation along the shoreline. The roots of the plants help to secure the soil and keep it in place. The Washtenaw County (Mich.) Conservation District suggests using cuttings from resilient plants with deep root systems, and planting in the early spring or fall. The cuttings should be planted with approximately two feet of space surrounding each one, and should cover the bank from the waters edge to the top. Or, refer to the UNH Cooperative Extension's publication *Landscaping at the Water's Edge: An Ecological Approach* a Manual for NH Landowners and Landscapers for additional information.

- **Use a rain-barrel to collect water from your roof.** Storing the rainwater prevents it from carving an erosive path and carrying pollutants from your roof to your waterbody. The stored water may be used to water your lawn or garden, allowing you to both use resources in a more sustainable manner

and save money and energy. For information on how to construct a rain barrel visit www.watershedactivities.com/projects/spring/rainbarl.htm

- **Construct a rain garden.** Rain gardens use native vegetation to soak up stormwater from roofs or other impervious surfaces around the yard such as driveways and walkways, allowing stormwater to infiltrate the soil. Thus reducing runoff from your property and helping to recharge groundwater. To learn how to construct a rain garden go to www.rainkc.com

- **Limit the amount of impervious surfaces on your property.** Re-vegetate bare slopes or pave your driveway with pervious pavement rather than traditional asphalt. Pervious pavement allows for water to soak through it and into the ground. Infiltration trenches and vegetated swales near your driveway are also useful for increased stormwater absorption. More information on pervious pavement can be found at www.stormwatercenter.net.

- **Keep culverts and ditches clear of debris**. Prevent stormwater from pooling at the end of your driveway or road by removing debris from ditches and culverts. You may have to consult your local road agent, but don't be afraid to ask for help!

- **Maintain your driveway and walkways to the lake.** Steep driveways and walkways to the lake also become paths for storm water that lead directly to either the lake or surrounding tributaries. Use water bars or turnouts to effectively redirect the water to a vegetated area where it can be absorbed. Additionally, dirt driveways that have been covered with gravel or bare patches of ground that are covered by grass clippings or mulch are less prone to erosion and thus are more desirable in the areas surrounding a water body. For more information on turnouts go to www.pwd.org/pdf/water_resources/conservation fact sheets/turnouts.pdf

Reducing stormwater impacts is something we can all take part in, whether on the state, local or private level. We cannot control severe weather, but we can alter stormwater impacts to our waterbodies. So please, pick a project and get started!