MAKING A CASE FOR RESIDENTIAL GRASSROOTS GREEN INFRASTRUCTURE

The United States Environmental Protection Agency (EPA) has reported repeatedly for years that "… nonpoint source pollution is the leading cause of water quality problems" across the nation. As population continues to grow, so do the impervious surfaces associated with modern-day human habitation. These impervious surfaces like rooftops, roadways, and sidewalks (and many other examples) impede the natural infiltration of rainwater and snowmelt back into the ground and the water table. Sometimes even manicured grass lawns can be nearly impervious after years of abuse and mismanagement like in the bottom of stormwater detention basins that no longer drain for example. During the infiltration process into the ground, water is filtered not only by trees, plants, and sediments, but also by the trillions of microbes in the soil and their symbiotic mycological networks with fungi.

Because the problem has been improperly managed for decades, many professionals now believe that we must take drastic action to mitigate any further environmental disaster by more stringent regulations and monitoring protocols.

Here in the Garden State, the Integrated Water Quality Assessment Report of 2018 (303(d) list) reported a staggering 2,422 instances of surface water impairments caused by pollutants. Examples of such pollutants like arsenic (396), PCB's in fish tissue (245), E. coli (140), mercury (17), total phosphorus (171), dissolved oxygen levels too low (165), and many other impairments. Some impairments can be caused by natural deposits, seasonal conditions, and other factors like wildlife or wildfires. However, in most cases, impairments are proved to be caused anthropogenically (by humans). Common sources include agricultural lands, atmospheric deposition from air pollution, sediment contamination, urban runoff like from stormwater sewers and combined sewers where raw sewage during a storm event can overflow and discharge directly to local rivers (yes this still happens).

*** Example of an easy-to-use universal kit from RainBrothers.com with instructional video.***

The 2018 303(d) list however also showed 108 waterbody and pollutant combinations that have since been delisted. Reasons for this could be that the waterbody had been restored, a total mass daily load (TMDL) standard had been developed, active management measures were implemented that will restore water quality to acceptable standards, or human error. At least 80 delisted examples of these now meet surface water standards. Examples like dissolved oxygen (8), mercury in fish tissues (10), E. coli (3), total phosphorus being too high (2), and other examples. Other combinations were renamed (57 more) after further investigation and better data was available.

Despite some of the strictest environmental regulations in the nation, NJ still has a significant issue. A wise mentor once said, "rain barrels are the gateway drug to green infrastructure." and if everyone helped on their own property or helped friends and relatives with their properties, we could make a significant impact. I don't think we are going to see a significant change in the problem until people become ADDICTED to water conservation and protection like they are addicted to manicured lawns or the removal of leaves for example. Rain barrels are extremely cheap and easy to install and their impact if widely implemented can be massive!

Rain barrels can be decorative works of art that add to the curb appeal of your home or business. DIY videos online.

One example provided by the Rutgers University Water Resources Management Program shows that even a small house with 800 sq/ft of rooftop (40' by 20') will intercept about 500 gallons of water during a 1-inch rainfall event. Extrapolated out over a year, with an average rainfall of 42 inches annually, means that almost 21,000 gallons of water is running down the rooftop annually! With just 1 rain barrel at a 55-gallon capacity, it would be expected to catch about 10% of this or 2,100 gallons. For a quick guide PDF to rain barrel installation use this link from Rutgers RU Rain Barrel Brochure . This is a significant amount of water that could be reused for all manner of yard work, watering, washing etc.

Although highly taken for granted, has it ever made sense to use highly treated, tested, and expensive potable water (5th highest cost of water in the nation as of this writing) for outdoor use? High seasonal demands on the municipal water supply cause huge stressors on the environment, municipal employees, and utility distribution systems which have been increasingly problematic in more recent years. Between the Trump and Biden administrations, the largest investments in American history have been made to rebuild municipal distribution systems for water and wastewater. Although chlorinated water is one of the greatest technologies of the modern era, it is probably better for soil health, lawn, and garden to use non chlorinated water. We need all hands on deck to help our local watersheds, to alleviate the pressure on our local governments, our municipal employees, and the infrastructure that we all use every day!
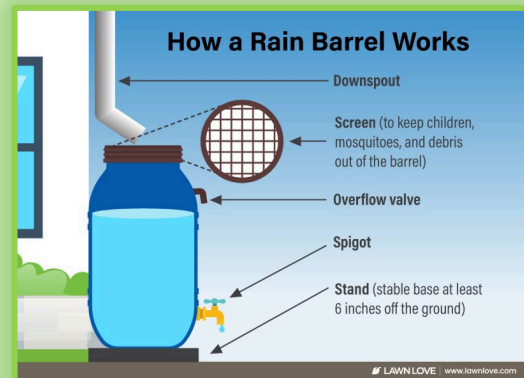
For the more advanced and ambitious among us, rain gardens are an even better option to protect the environment. Capturing even more water than a traditional 55- gallon rain barrel. A rain garden would decrease the flooding and erosion of your local waterways even better. With some planning, flowering native plants would create even more curb appeal throughout the seasons and would additionally create habitat for birds, native bees, and other insects for example. This is great because most species are in decline due to lack of contiguous wild habitat. Plants in your rain garden also capture water and snow on their leaves, further reducing flooding in addition to what is stored inside the plants. As much as 20-30% of a rain event can be captured in the tree canopy! Vegetation also shades the ground and drastically reduces the impacts of the urban heat island effect while simultaneously reducing the rate of evaporation.

*** Beautiful rain garden in East Greenwich, Gloucester County, NJ capturing, filtering, and infiltrating even more water than a rain barrel ***

Most of NJ has suitable drainage to accommodate rain gardens. Generally, if water can drain into your lawn at a minimum of a ½ inch per hour, you are golden! Anything less than that and you may need to amend the soil with sand or a bioretention mix, or it may just be an unsuitable geology like bedrock for example that doesn't drain. A simple percolation test can be conducted by digging a hole and filling it with water. Using a yard stick or other measuring device, you will need to measure just how fast the water drains over time. There are calculations available as well to estimate how much water your rooftop will capture during a typical storm event like was discussed previously above in the rain barrel example. It is recommended and better to design your rain garden to handle more than the average flow. Weather events are becoming increasingly more unpredictable and intense in nature. Installing an overflow trench lined with rocks that drains into the street or downgrade from your house or business is also highly recommended.

***Example at the thewatershed.org/ ***

In the year 2022, across the state of NJ we had a serious drought during the warmer months. Many areas reached the brink of mandatory water restrictions as reservoirs and rivers dropped

in level significantly. Many landscaped and wild plants died as well. As weather patterns continue to become more sporadic and intense, doing projects like these is a great way to ensure your personal safety and the wellbeing of your local environment. Additional installations like cisterns, raised planter boxes that capture downspout water, and even pervious pavements are also great ways to promote a healthier water cycle locally.

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