

## Applying the Beavers' Blueprints

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Do you like giving away your land? Without erosion countermeasures, your land washes away with every storm. Bare soil is the most vulnerable to erosion. Grassy lawns offer some protection but shed much rain from the landscape; we can see this water flowing across sidewalks during moderate rains. Hard, impermeable surfaces, such as roads and roofs, funnel water into storm drains, thereby compounding the runoff's force and increasing its velocity. This water empties into woodlands. The energy from this fast, excessive water overwhelms and erodes the natural stream banks. [For flooding and sewer FAQ's, visit <https://www.fairfaxcounty.gov/publicworks/stormwater/flood-information> and <https://www.fairfaxcounty.gov/publicworks/stormwater>.]

Sediments from weathering topsoil and eroding stream banks build up in the neighboring Royal Lake. Many KPW residents complain about the rapid rate in which Royal Lake forms deltas, shoals, and displays other signs of "filling up." Although KPW residents blame the recent housing development off of Zion Drive, construction at GMU, or other factors outside of KPW, we also need to look at our own yards as possible contributing sources. Our neighborhood has plenty of eroding yards and impermeable surfaces, and the heavy erosion seen in Figure 1 is from storm drain discharge entirely gathered from a few acres within KPW. In contrast, spongy native forests slow down this water by allowing water to filter through the soil. Figure 2 shows a stream, also photographed near its source, supported by a completely natural watershed in Ellanor C. Lawrence Park. Both photographs were taken under similar conditions and heights above the stream bed.

In [A Tribute to Beavers](#), we learned about benevolent beavers and dam construction. The dams capture and slow down water. The resulting ponds help purify creeks by permitting sediments to settle. We can apply this key concept and the principles to reduce erosion on our property. Just as the beaver has an easier time building dams upstream instead of blocking a raging river, we are wise to capture water close to the source rather than after it rages out of a storm pipe.



**Figure 1. Erosion caused by a storm drain, Royal Lake Park, Fairfax, VA.**



**Figure 2. Naturally fed riparian streamside area near its origin, Ellanor C. Lawrence Park (Walney), Centerville, VA.**

A simple method to control runoff is by installing rain barrels. Connected to the downspout, rain barrels collect precipitation directly from the roof. A screen top lets water in and keeps mosquitoes and leaves out. When plants need water, either open the barrel's spigot into a watering can or connect it to a gravity-fed hose and water the ornamental gardens. Since most shingles have asphalt which leaches contaminants into water, do not use rain barrel water on food gardens. To learn more about rain barrels or attending a workshop to make your own, go to <https://www.fairfaxcounty.gov/soil-water-conservation/rain-barrel>.

To more significantly reduce erosion and apply the beavers' blueprints, install [rain gardens](#): specialized gardens with soil and plants selected to maximize water absorption from a small watershed. The water absorbed in the rain garden "recharges" the ground thereby reducing erosion and water bills. These beds also trap fertilizers, petroleum products, pet waste, and other impurities before entering the waterways.

Rain gardens come in all shapes and sizes and may provide landscape focal points. They can line drainage ditches, tier down slopes, or be located at any other point where rain water collects. Since water retention is a key factor, build rain gardens at least several yards away from the house to prevent basement flooding. Rain garden soil must be highly permeable, enabling the water to quickly migrate beneath the surface. This fast absorption means the soil consists of at least 50% sand, mixed with topsoil and organic material. A rain garden used in a home landscape usually requires the soil to be approximately two feet deep. Since much of KPW has clay, the existing soil may need to be excavated and replaced with the porous blend. This clay, together with rocks, is used to build the berm along the lower slope of the garden. Like a beaver dam, this berm causes ponding during heavy rains; all water is absorbed by a proper rain garden within a day, so breeding mosquitoes are not a problem.

Rain gardens resemble every other garden at the surface, and they work best with native species. Plant the top of the berm with grass, preferably switchgrass (*Panicum virgatum*) having deep, filamentous roots since heavy roots may cause berm failure. The garden will be an ephemeral wetland, so stock it with native species that thrive in or at least tolerate wet roots, such as rose mallow (*Hybiscus moscheutos*), cardinal flower (*Lobelia cardinalis*), marsh marigolds (*Caltha palustris*), blue flag iris (*Iris versicolor*), or marsh milkweed (*Asclepias incarnata*). Have fun stocking rarities, like Chadd's Ford orchids (*Speiranthus odorata*), or creating specialty gardens, such as carnivorous bogs with pitcher plants, butterworts, and sundews! Larger gardens can support woody plants, e.g. winterberry holly (*Ilex verticillata*), inkberry holly (*Ilex glabra*), and buttonbush (*Cephalanthus occidentalis*). If possible, anchor the garden with a sweetbay magnolia (*Magnolia virginiana*), river birch (*Betula nigra*), or ironwood (*Carpinus caroliniana*). To add a refined appearance, border the rain garden with native ferns. Only the area, amount of sun, and affinity to water restrict the native species options!

Rain gardens, like all gardens, need a little routine maintenance such as weeding. Fertilize them with compost. Carnivorous plants should never be fertilized since their nourishment comes from the bugs they catch.

Many plans and theories about rain garden exist, some of which conflict. Remember that some sort of a rain garden—even a berm with a few plants in front of it—is better than nothing. Most organizations encourage populating these gardens with native plants, though some designs include well-behaved non-natives (avoid *Liriope* because of this exotic plant's uncontrollable spread throughout the garden). An all-inclusive rain garden website directly applicable to Northern Virginia is at [http://www.dnr.state.md.us/forests/pdfs/VA\\_RainGardens.pdf](http://www.dnr.state.md.us/forests/pdfs/VA_RainGardens.pdf). For ready-to-go rain garden blueprints, visit [http://www.lowimpactdevelopment.org/raingarden\\_design/templates.htm](http://www.lowimpactdevelopment.org/raingarden_design/templates.htm). More ideas are at <http://www.raingardens.org/Index.php> and <http://www.appliedeco.com/RainGarden.cfm>. To see rain gardens in action, visit Hidden Oaks Nature Center (the center of the parking lot is a rain garden), Cub Run REC Center, Audrey Moore REC Center or Marie Butler Leven Preserve (near the parking lot, too).

A final step to retaining your land is to keep it covered, either with natural woodlands, gardens, grass or even 2-3 inches of leaf mulch. Some KPW yards have forested tree growth where lawns deteriorate, so mulch some leaves, cover the soil, and encourage the woodlands with complimentary native plantings. All of us can shore up our yards while working with nature and helping the environment.

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