Rainscaping

BY KRIS WETHERBEE

By employing a variety of techniques to keep rainwater on their properties, gardeners can play an important role in protecting the health of local watersheds.

As a child, I looked forward to rain mainly because I enjoyed sloshing through the puddles. I still revel in the immediate aftermath of a downpour, breathing in the aroma of a freshly washed landscape and admiring the plants glistening with water droplets. And, like most gardeners, I view rain as a natural and welcome part of the process for keeping my plants happy. Until a few years ago, it never occurred to me to think of what effect the excess water that ran down my driveway and sloping lawn—and those of my neighbors—might have on our local waterways and watersheds.

When it rains, water runs off our roofs, sidewalks, lawns, driveways, roads, parking lots, and other impervious surfaces. The resulting runoff picks up and carries with it contaminants such as fertilizers, pesticides, de-icing salts, bacteria from animal waste, and petroleum products. Ultimately this cocktail of contaminants—environmental agencies refer to it as non-point source (NPS) pollution—ends up in local streams, rivers, lakes, and other water bodies.

NPS pollution is most pronounced in our cities and suburbs, where there is a greater percentage of impervious surfaces than there are in rural areas. Over the last couple of decades, urban planners and environmental groups throughout the United States have been recommending a variety of approaches to managing stormwater runoff and lightening the load on our watersheds. These approaches are often collectively called "rainscaping," a term that evolved in the Mid-Atlantic region in the late 1990s. Credit for coining the term is generally attributed to Joe Keyser, who was public education coordinator with the Montgomery County, Maryland, Department of Environmental Protection (DEP) until 2006. According to Keyser, the name was inspired by "the catchy Bayscapes program developed by the nonprofit Chesapeake Bay Foundation."

Rain barrels, attached to downspouts, can be used to collect water for patio plants.

AMANDA GRIESSER / AHS ARCHIVES

LANDSCAPING FOR RAIN

Rainscapes mimic natural processes by helping capture, divert, and store rainwater for later use. "In a typical housing development, about 70 percent of impervious surfaces are on roofs and driveways," explains Ann English, a RainScapes Planner who works in the same department Keyser did in Montgomery County, Maryland. "Capturing water close to the source using low-impact development techniques both reduces stormwater runoff and enhances one's property," says English.

The benefits of rainscaping are multifaceted. "More water infiltrates into the soil or is contained for future use rather than being lost as runoff," says John Church, an educator in the Natural Resources Management department of the University of Illinois Extension Center. "Reducing runoff can help decrease flooding, streambank erosion, and surface water contamination, as well as replenish groundwater."

Besides improving water quality and soil infiltration, employing various rainscaping techniques in a garden can also enhance wildlife habitat, increase property value, and reduce a community's carbon footprint.

WATER WORKS

Rainscaping techniques range from straightforward solutions that include redirecting downspouts to garden beds, setting up rain barrels and cisterns, installing a French drain, digging a dry well, and planting a canopy of trees and shrubs, to progressive approaches such as creating rain gardens and constructing rainwater-harvesting water features.

Church says that professional planning and construction are typically required for more complex projects such as installing green roofs, porous concrete and hardscapes, and permeable pavers and pavement. "Careful cost analysis, safety considerations, and runoff planning are essential," he says.

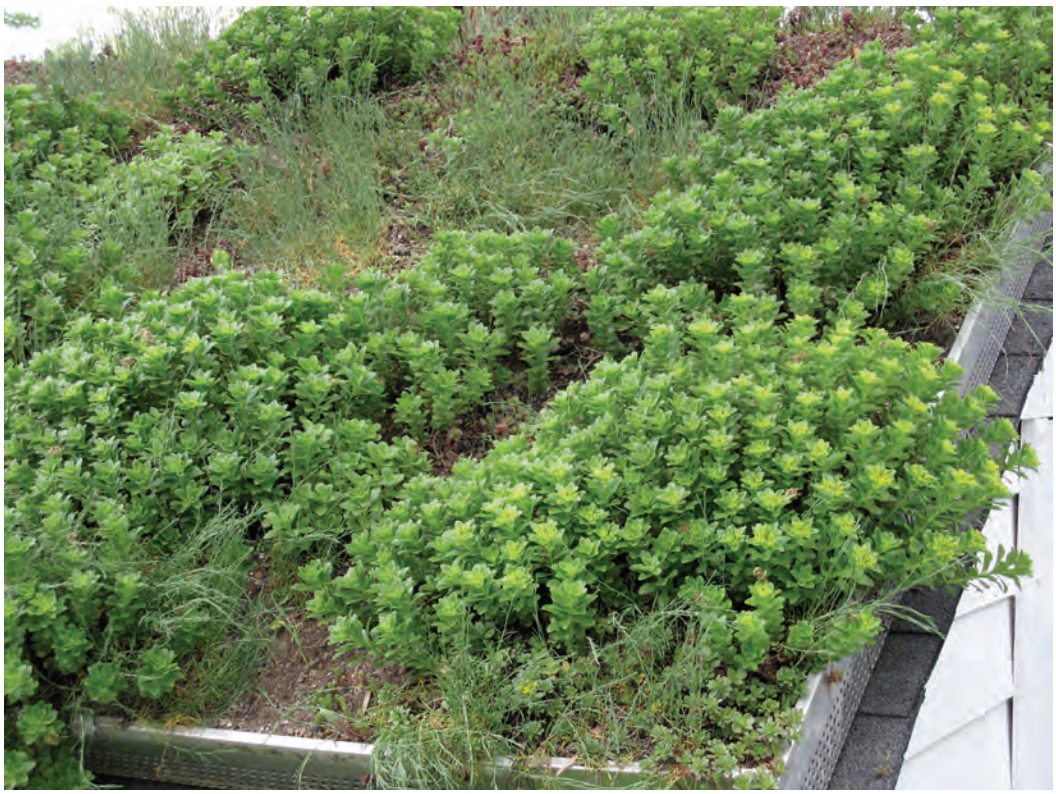
Besides your budget and the consequent do-it-yourself versus professional-for-hire debate, other factors to consider before deciding which rainscaping tech-

niques to implement include the volume and timing of rainfall, topography of your landscape, soil porosity, and the size of your lot and roof. Also identify any problem areas; for instance, underground utilities could interfere with digging (there's a toll-free number you can call to have your site checked before you dig, see "Resources," page 40). Finally, decide whether your goal is to divert or spread out runoff or, rather, to capture and reuse it to water your landscape.

Keep in mind that certain rainscaping practices that work well in one area may perform poorly in another. It all depends on your site, climate, and available conditions for installing each type of system.

English explains that while it may be critical to create a tree canopy in some areas, installing a rain garden may well be the method of choice in other areas. Likewise, water harvesting that implements a "catch and release" system of capturing the water and slowly releasing it might be the best approach for some. In other areas where land is scarce, replacing driveways with permeable interlocking concrete pavers is an excellent solution for reducing rainwater runoff.

Regardless of where you live, there are a wide variety of rainwater management options to consider. Let's look at some of the main ones to help you decide which ones—or which combinations—are right for you.



Green or living roofs, such as this one at the AHS's River Farm headquarters in Alexandria, Virginia, can help reduce runoff by absorbing some rainfall in the growing medium.

MARY YEE

RAIN BARRELS AND CISTERNS

A roof equipped with a gutter system can funnel rainwater to rain barrels or a cistern. How much water you collect depends on the size of your roof and the capacity of the cistern or rain barrels.

Consider that a one-inch rainfall over a 1,000-square-foot roof generates about 620 gallons of water. If your average annual rainfall is 40 inches, your yearly water yield rises to nearly 25,000 gallons. That amounts to an ample supply of "on the house" rainwater to fill the birdbath, replenish water features, and irrigate plants in containers and beds. That is, assuming you have enough containers to accommodate the runoff.

Commercial rain barrels typically hold between 55 and 100 gallons and come in a variety of styles and shapes. It's also fairly easy to make your own; many jurisdictions sponsor rain-barrel workshops. While rain barrels are relatively inexpensive and easy to install, they are, almost literally, a drop in the bucket when it comes to reducing runoff. A roof generating 300 gallons in a typical rainfall would require six 55-gallon rain barrels to house that amount of water.

The next step up is to install a cistern, which is a super-sized water tank that can hold anywhere from 1,000 to 10,000 gallons. "To really make a difference in utilizing runoff, one would need to install a very sizeable cistern, or direct the excess water from your rain barrel or cistern to another containment feature, such as a rain garden," note Mark Sindell and Zack Thomas, landscape architects with GGLO, an architectural firm in Seattle, Washington.

If you live in a region where mosquitoes are a problem, you will need a mosquito-proof screen on your rain barrel or cistern. Or you can add non-toxic products that kill mosquito larvae, such as Mosquito Dunks, to containers.

DRY WELLS AND FRENCH DRAINS

A dry well is a good option when rainfall is intermittent. Water enters the passive underground structure through one or more entry pipes or channels located at its top, and is then discharged through a number of small exit openings, where it gradually dissipates into the ground.

A French drain moves surface and groundwater from one area to the next. This type of system uses a perforated pipe placed in a gravel-lined trench. The pipe is topped with a grate or filter fabric and then covered with soil. Grass is often planted on top. Church suggests using a French drain to catch the runoff from a paved surface (such as a home foundation, patio, or retaining wall) so that it can slowly spread into the rest of the landscape. Water from a French drain can also be directed to a dry well or rain garden.

SWALES AND VEGETATIVE FILTER STRIPS

A grassy or planted swale is a good alternative for homes lacking a curb and gutter system. The system is similar to a French drain except the earthen channels are covered with a dense growth of hardy grasses or other low-growing vegetation. Swales provide runoff control but may not prove effective in regions with sandy soils. They also remove pollutants through the filtering action of the plants. Filtering potential and runoff control depend on the area, slope, height and density of the grass, and the quantity of flow.

Like swales, vegetative filter strips reduce stormwater runoff from rooftops, pavement, and lawns. Typically they are tightly planted with grass, but they can include shrubs or other plants. The strips run parallel to pavement, at least one foot from the edge, and are situated between the paved surface and a pond, wetland, or other surface water collection system. Vegetative strips help reduce the influx of pollutants and sediment, but are less effective at removing soluble pollutants.

Homeowners have diverse options for keeping rainfall in their gardens. Swales, top, can be attractively landscaped with moisture-loving plants. In more formal landscapes, permeable pavers are both functional and decorative.

TOP: DONNA KRISCHAN. BOTTOM: MARK TURNER

PERMEABLE PAVERS AND POROUS SURFACES

A great choice for patios, sidewalks, and driveways, permeable hardscaping provides the strength and stability of asphalt or concrete while allowing water to filter through the surface. The pavers are produced with holes or larger aggregates that create voids within the system. Water runoff and surface runoff of pollutants are reduced, snow melts faster, and summer heat levels are reduced. This system also makes for great curb appeal.

Examples of permeable paving systems include grass pavers, gravel pavers, interlocking concrete pavers created in grid-like fashion, and porous concrete. The type of paver determines how much water can soak through, though usually you can expect up to 80 percent water infiltration, sometimes more. Proper installation is essential, so you may want to enlist the help of a certified contractor.

A FUNCTIONAL WATER FEATURE

Having a water feature in the garden or landscape is on nearly everyone's wish

Decorative water features that recirculate rainwater stored in underground tanks, such as this one installed by Mark Harp in Washington, are sophisticated solutions for reducing runoff.

COURTESY OF MARK HARP

Sources

Aqua Barrel, Gaithersburg, MD. (301) 253-8855. *www.aquabarrel.com.*
Cascata Rain Barrel, Cambridge, Ontario. (866) 476-6311. *www.gardensupermart.com.*
Eagle Peak, Athold, ID. (877) 868-1195. *www.epcontainers.net.*
Green Culture, Lake Forest, CA. (877) 204-7336. *www.greenculture.com.*
Planet Natural, Bozeman, MT. (800) 289-6656. *www.planetnatural.com.*

Resources

811: Call Before You Dig hotline. *www.call811.com.*
Backyard Conservation Wetland by the National Resources Conservation Service, Washington, D.C. *www.nrcs.usda.gov/feature.backyard.*
Master Gardeners and County Cooperative Extensions—link to regional offices through the American Horticultural Society website *(www.ahs.org).*
Rain Gardening in the South by Helen Kraus and Anne Spafford. Eno Publishers, Hillsborough, North Carolina, 2009.
Rain Gardens: Managing Water Sustainably in the Garden and Designed Landscape by Nigel Dunnett and Andy Clayden. Timber Press, Portland, Oregon, 2007.

list. But a water feature on its own does little to reduce stormwater runoff. At least, that used to be the case.

Some newer sustainable stormwater management solutions now combine a recirculating decorative water feature with a sub-surface rainwater harvesting collection system. The underground tank is connected to a high pressure pump, so you can have access to the stored water and use it to hand water or irrigate the landscape.

A water feature can also be installed on top of permeable pavers, allowing them to collect the water and direct it to the storage system; overflow can be directed to a rain garden or allowed to slowly infiltrate into the soil. Mark Harp, owner of the Pond Store in Sumner, Washington, says that combining the aesthetics of a water feature with the environmental benefits of rainwater harvesting also can give you an emotional lift every time you see it at work.

RAIN GARDENS

A rain garden is a natural or artificial saucer-shaped depression in the landscape. Its primary function is to slow down runoff, store it temporarily, and release it gradually so it has time to spread out and soak in, but rain gardens also filter sediment and pollutants while adding color and interest to the home landscape. The soil at the bottom of the depression is often amended with a mix of organic matter, sand, and gravel to facilitate drainage.

Rain gardens are typically planted with hardy, non-invasive plants adapted to the region and the light exposure in the garden. These should include drought- and flood-tolerant selections suited to the variable moisture conditions found in different sectors of the rain garden. Regional agencies often offer lists of plants for rain gardens (for links to regional plant recommendations, visit the web special linked to this article on the AHS website.) For tips on selecting an appropriate site for a rain garden, see the sidebar, opposite page.

PUTTING IT ALL TOGETHER

Once you know what works well in your area, you can combine several rainscaping methods to achieve your overall goal. English recalls one example where a rain garden overflowed into a conservation landscape swale equipped with three dry wells that doubled as stepping paths

Dry streambeds such as the one in Tucson, Arizona, top, provide a way to channel and slow down stormwater. Green bulrush *(Scirpus atrovirens)*, above, irises, and many other water-loving plants are good choices for rain gardens in temperate regions.

TOP LEFT: KAREN BUSSOLINI. BOTTOM LEFT AND RIGHT: COURTESY OF JIM NELSON

through the swale. She says that the combination of the techniques allowed the homeowner to reduce not only the runoff on his property, but that of two neighbors upstream.

Sindell and Thomas noted a recently designed rain garden that incorporated "waves" of rain garden plant masses in varying textures and colors. Several design elements were incorporated into the site, including an ethnobotanical urban agricultural garden and moss roof garden. "The planted 'waves' were an organizational tool used to simplify and weave together several design elements on a tight site," Thomas says.

We can all make a difference in reducing stormwater runoff, no matter what rainscaping techniques we implement in our landscapes. "Even a small residential rain garden helps to counter the threat to water quality created by the alarming pace of urbanization, suburban sprawl, and habitat loss," says Sindell. "Get inspired, get out there, and do your part."

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CHOOSING A SITE FOR A RAIN GARDEN

When planning a rain garden, three important factors to consider are size, location, and permeability of the soil. You'll need a sizeable space for the rain garden and overflow area. According to University of Illinois Extension educator John Church, homeowners often designate an insufficient area for the volume of water it will collect or for the porosity of the soil in the given space. The depth is determined by the soil porosity while the length and width depend on how much water you want to capture. Typically, rain gardens range from three to six inches deep, but heavy clay soil may require up to a 12-inch depth.

Rain gardens offer an aesthetically pleasing way to solve stormwater management issues.

Before deciding on a site, check the soil to be sure that it drains adequately. One way to do this is to dig a hole 12 to 18 inches deep and fill it with water. Allow the water to drain, fill it again, and then measure the depth of the water and how long it takes to drain. "This will give you an approximation of the infiltration rate in inches per hour," say landscape architects Mark Sindell and Zack Thomas. Soil that drains faster than one inch per hour is ideal; if it drains at a rate less than a quarter inch per hour, you may want to select a different location.

In *Rain Gardening in the South* (see "Resources," opposite page), authors Helen Kraus and Anne Spafford note that to be effective as a pollution filter, a rain garden's volume (depth × length × width) should be between five and 10 percent of the impervious area (rooftop and driveway, for instance) that drains into it. The garden also needs to be able to drain in two to three days.

Rain gardens should be located at least 10 feet from the house, away from septic systems, wells, and underground utilities. Be sure to site them downhill of your home or other structures. Avoid existing low, moist spots, which are probably better suited for consideration as a bog garden. If you have a steeply sloping property or get a high volume of stormwater, consult a licensed landscape architect for advice. —K.W.