



Stormwater Management for Homeowners Fact Sheet 2: Rain Barrels

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This fact sheet is part of a series. Please refer to definitions in the glossary at the end of this fact sheet. Glossary terms are italicized on first mention in the text.

Introduction

When rain falls on *pervious surfaces*, like soil, mulch, and vegetative groundcovers, it soaks in through a process called *infiltration*. The water can be used by plants, or it can recharge underground water storage areas called *aquifers*.

When rain falls on *impervious surfaces*, like roads, driveways, and rooftops, it does not infiltrate. Instead, water quickly collects and flows off these surfaces to the nearest stream, river, pond, lake, reservoir, bay, sound, or ocean. Water that moves in this way is called *runoff* or *stormwater*. It carries *pollutants* with it, including fertilizer, pesticides, fluids from cars, *sediment* from bare soil areas, bacteria from animal waste, plant debris like leaves and grass clippings, and trash like plastic bottles and cigarette butts. The more area covered in impervious surfaces, the greater the amount of pollution and volume of runoff, which increases the likelihood of flooding, stream *erosion*, harm to wildlife and the environment, and degradation of water quality.

Stormwater best management practices, or *BMPs* for short, are tools for managing runoff. They reduce the speed and volume of runoff and clean up the pollutants in it. Homeowners can use different practices, like *rooftop redirection*, *rain barrels*, *permeable pavement*, *grass swales*, *rain gardens*, and *buffers*, in their landscapes to manage runoff at the source. This prevents large volumes of polluted runoff from going into storm drains that flow directly into nearby water bodies. Some additional benefits of BMPs include improved drainage, a healthier and more attractive landscape, increased property value, wildlife food and habitat, improved water quality, and a cleaner environment.

What Are Rain Barrels?

Rain barrels are small collection tanks (larger ones are called cisterns) that are installed at the ends of or near downspouts to collect rainwater runoff from a roof (see figure 1). The collected water is stored temporarily for later uses, including watering lawns and gardens; filling birdbaths and water gardens; and washing decks, patios, and cars. This water is nonpotable, meaning it has not been treated and is not safe to use for cooking, drinking, or bathing.



Figure 1. Left, rain barrel connected directly to a downspout; right: rain barrel connected to a downspout with a diverter hose. Photos by L. Fox and Nina Page, Virginia Beach Master Gardner Water Steward.

Why Have Rain Barrels?

Using rain barrels conserves fresh water supplies, which are limited. Money can be saved on the utility bill when rainwater is used instead of drinking (potable) water that is purchased from a municipal supply or pumped from a well. Water from rain barrels is easily accessible for garden chores or if the power goes out and the electric water supply pump won't work. Rainwater stored in rain barrels and used over time doesn't run off, which prevents erosion and pollution and improves water quality in nearby bodies of water.

How Do They Work?

A rain barrel has three main parts: the inflow, outflow, and overflow. The barrel can be placed under a downspout or within a few feet of one (see figure 2).



Figure 2. Left to right, rain barrel with a downspout and solid top, rain barrel with a spigot and clean out drain. Photos by N. Page.

Inflow

Rainwater flows into the top of the barrel directly from the downspout or through a downspout diverter hose (inflow). The advantages of a diverter hose are that the downspout does not have to be cut off, and the barrel can be moved slightly for easier access.

Be aware that some barrels have solid tops and some have screw-on tops. One type of top is not better than the other, but the type of top could affect the inflow and whether a screen is needed to keep out debris or for mosquito control.

Outflow

The spigot (outflow) is where water comes out of the barrel to fill a bucket or watering can or where a hose can be attached. The spigot is usually inserted 8 to 12 inches from the bottom of the barrel so a bucket or other container can fit under it. The spigot can be placed lower on the barrel if the barrel is placed up on blocks or on a platform to give it enough height for containers to fit underneath.

Overflow

The overflow is an opening near the top of the barrel that allows excess rainwater to exit the barrel when it is full. If a downspout diverter is used, an overflow hole may not be necessary. Most diverters close when the rain barrel is full, allowing runoff to bypass the barrel and continue to flow out the downspout. Overflow rainwater can go into another rain barrel, or it can be directed into another BMP, like a grass swale or rain garden, or into lawn or garden areas. An optional clean out drain can be installed near the bottom of the barrel.

Following are some things to consider:

- How the water will be used will determine how much runoff should be collected and how many rain barrels are needed. The barrels should be placed at the downspouts closest to where the water will be used. The average rain barrel holds 45 to 60 gallons of water. Larger barrels or cisterns are available.
- In a 1-inch rain event, a 1,000-square-foot area of roof will generate 600 gallons of water. That's about 12 barrels, so always plan for how to handle overflow runoff.
- Be safe. One gallon of water weighs 8.34 pounds, so a full rain barrel can weigh over 375 pounds. Make sure the barrels are installed on level ground or on sturdy and level blocks or platforms. In some cases the barrels may need to be secured to the building with a strap to prevent them from tipping over.
- Long-term storage of rainwater is not recommended. The water should be used so the barrel is empty for the next storm. Also, water that stands for more than seven days can be a source for breeding mosquitos if precautions aren't taken.
- Rain barrels can be painted or decorated to blend into the landscape or to become landscape art. Because the barrels are often plastic, special painting tips and instructions can be found online.

Cost

Rain barrels are inexpensive compared to some other stormwater management practices. Manufactured barrels range widely in price and style and can be purchased at local garden centers or ordered online. Do-it-yourself barrels can be made for less than \$100 (barrel and parts). If you want to make your own, there are often family-friendly rain barrel workshops that provide the barrels, the tools and parts, and instructors to help you make it for a reasonable fee. These workshops are offered by environmental groups and by Virginia Cooperative Extension offices. Videos and step-by-step instructions for making rain barrels are available online.

Clean, heavy-duty, commercial food-grade barrels are recommended because they hold up well to the pressure and weight of water, but suitable barrels can be hard to find. Places to check for barrels include local Extension or Soil and Water Conservation District offices, local environmental groups, restaurants and food distributors (for example, barrels used for coffee, pickles, or olive oil). The various parts can be purchased from local hardware or home and garden stores either individually or in kits. Kits can also be purchased online. Make sure there are adequate parts for the number of rain barrels and that the parts match the type of system you are installing.

Some cities and counties offer incentive programs that encourage residential stormwater management practices. The incentives could include rebates, utility bill credits, or cost sharing for installation. Homeowners should contact their local stormwater, public works, or soil and water conservation office to find out about these programs.

Maintenance

Maintenance of rain barrels is easy and is performed on an as-needed basis. Homemade barrels should be a dark color to block sunlight and prevent algae growth inside the barrel.

- Use screens to prevent gutters from clogging or clean out gutters regularly so leaves and other debris don't restrict water flow.
- Check the gutters, downspout, barrel spigot, and outflow to make sure they are not clogged, especially in the fall when leaves are falling and in spring when pollen is heavy.

- Make sure all fittings and connections are secure. Check for leaks in any pipes and around the spigot and overflow.
- Make sure the spigot is turned off tightly after each use.
- If you live where winter temperatures regularly drop below freezing, drain the barrels and leave the spigots open so water doesn't freeze inside the barrel and crack or damage it.
- Rain barrels are not meant to be long-term storage. If the collected rainwater is not used within seven days, use small mesh screens like window screens to cover any open holes in the barrel (especially the top if it is open), or use products to control mosquito larvae to prevent mosquito breeding. The most common mosquito control products contain the active ingredient *Bacillus thuringiensis* (Bt), which kills mosquito larvae for 30 days and is harmless to people, plants, and wildlife.

Resources

- Chesapeake Bay Program, "How-To's and Tips" – www.chesapeakebay.net/action/howtotips
- Chesapeake Conservation Landscaping Council, "The Eight Essential Elements of Conservation Landscaping" – www.ChesapeakeLandscape.org
- Chesapeake Stormwater Network, "Homeowner BMP Guide" – <https://chesapeakestormwater.net/homeowner-bmp-guide/>
- Clean Virginia Waterways, "Rain Barrels & Harvesting Rain Water" – www.longwood.edu/cleanva/RainBarrelDirections.html
- James River Association, "How to Build a Rain Barrel for Your Home" – <https://jrava.org/wp-content/uploads/2016/05/Rain-Barrels.pdf>
- North Carolina Cooperative Extension, "Rainwater Harvesting: Guidance for Homeowners" – <https://content.ces.ncsu.edu/rainwater-harvesting-guidance-for-homeowners>
- Virginia Cooperative Extension, "Best Management Practice" fact sheet series on urban stormwater management practices, 426-119 – 426-134, by D. Sample – <http://pubs.ext.vt.edu/>

Virginia Cooperative Extension, “Stormwater Management for Homeowners” fact sheet series, [HORT-293P-HORT-298P](http://pubs.ext.vt.edu/HORT-293P-HORT-298P), by L. Fox – <http://pubs.ext.vt.edu/>

Glossary

Aquifer – A natural underground storage area for water.

BMP (best management practice) – An action or device meant to manage runoff.

Buffer – An area of vegetation next to the water’s edge that protects water quality by slowing runoff, filtering pollutants and sediment, providing infiltration, and stabilizing shorelines. Buffers also add plant diversity to the landscape and provide wildlife with food, habitat, and movement corridors.

Erosion – The loss of soil on property, often due to water flow.

Grass swale – A graded, linear, shallow, open channel covered with plants, usually grass; used to slow down, spread out, and filter stormwater.

Impervious surface – A surface that does not allow water to flow through it.

Infiltration – The process by which water enters the soil or other materials.

Permeable pavement – Pavement with a top layer that allows water to infiltrate due to spaces in the paving material or spaces between the pavers.

Pervious surface – A surface that allows water to flow through it.

Pollutants – Materials that have a negative impact on human or environmental health.

Rain barrel – A small collection tank installed at the end of a downspout to collect and temporarily store rainwater runoff from a roof for later use.

Rain garden – A planted shallow depression that temporarily holds runoff from impervious areas until it evaporates, is absorbed by plants, or infiltrates into the ground.

Rooftop redirection (disconnection) – A stormwater management practice that moves the runoff collected from rooftops through gutters and downspouts into the landscape where it can spread out, slow down, and infiltrate instead of moving the runoff directly into a storm drain system.

Runoff – Water that runs off impervious surfaces during rain events, often associated with urban areas. Runoff can also occur from pervious surfaces if the precipitation rate is greater than the infiltration rate. Also called “stormwater.”

Sediment – Soil, rock, or biological material particles formed by weathering, decomposition, and erosion.

Stormwater – Water that runs off impervious surfaces during rain events, often associated with urban areas. Also called “runoff.”

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