



Homeowner Conservation Practices to Protect Water Quality

Introduction

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We all want clean water. But sometimes it is hard to know how one individual or family can make a difference. People who have a home with a yard have the opportunity to make decisions that can protect and improve water quality.

Rain that falls on your yard does not necessarily stay in your yard. Some water is infiltrated into the ground, some is drawn up through plants and into the air, and some can run off and flow into a roadside ditch or storm sewer, where it continues to flow to a lake or river (Figure 1). This runoff can pick up soil particles, motor oil, lawn chemicals, or other pollutants on your property and carry them downstream, where they can cause water quality problems.

The conservation practices described in this publication are ways you can manage your landscape to protect downstream water quality. Together they are sometimes referred to as "Rainscaping."

There are two main principles to keep in mind when planning and managing a home landscape to protect water quality:

Keep rainwater where it falls

Rain that falls on the ground either soaks into the soil or runs off over the surface. Water quality is protected when more of the rainfall is utilized where it falls, to nourish plants and other organisms. Some will eventually reach a water body, but it will

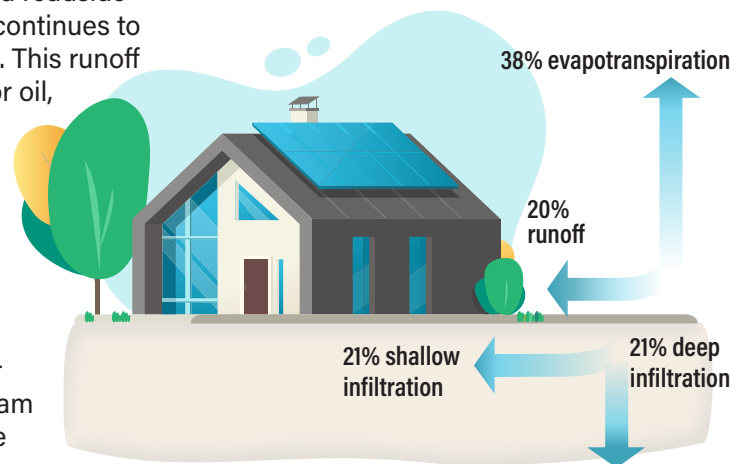


Figure 1: Homeowners can learn conservation practices that will protect downstream water quality.

be cleaner. Conservation practices that include healthy vegetation and soil will lead to more soaking in place, also known as infiltration.

Keep water that leaves your yard clean

In heavy rainfall, or if much of the yard is impervious (roofs, driveway, sidewalks), rain will run off your property. To keep the runoff as clean as possible, minimize impervious surfaces and bare soil, and keep the runoff away from chemicals. Therefore, it is important to make sure that any water that does leave your property stays as clean as possible. Minimizing impervious surfaces and bare soils as well as keeping this runoff away from chemicals will keep it cleaner.

This publication describes six practices that achieve these two goals. These practices are:

1. Reduce impervious surfaces
2. Select proper landscape plants for the location (right plant/right place)
3. Manage home lawns effectively
4. Install a rain barrel
5. Install a rain garden
6. Properly care for septic systems

1. Reduce impervious surfaces

The most basic way to reduce runoff is to minimize the area of hard surfaces that shed water — impervious surfaces — on your property. Reducing the size of your driveway, sidewalks, patio, or pool deck reduces rainwater runoff.

If that is not feasible, another option is to install **pervious pavement**. Options include pervious concrete, pervious asphalt, interlocking pavers, grid/grass pavers, and gravel (Figure 2). Pervious pavement allows rainwater to infiltrate, replenishing groundwater and reducing polluted runoff into waterways.

All pervious pavement requires maintenance, including visual inspection to remove sediment and debris. This will help prevent clogging that decreases permeability. If infiltration slows over time, a deeper cleaning, such as vacuuming and/or pressure-washing the surface, may be required. Construction of pervious pavement can be complex, so consult with an experienced contractor during the planning stage of your project. In some areas, contractor certification programs exist to ensure proper installation.

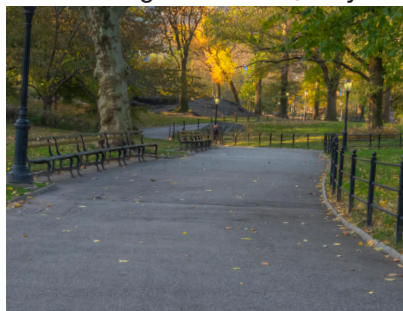


Figure 2: Rainwater can infiltrate pervious pavement, replenishing groundwater and reducing runoff that might be polluted. (Getty)

About sinkholes

A sinkhole can be a problem – or an opportunity – for property owners. A sinkhole is a gateway to an underground stream; the stream acts as a natural storm sewer. Do not treat a sinkhole as a dumping ground for trash or chemicals. Instead, treat it as a water body. Leave a buffer strip, and avoid mowing and spraying next to a sinkhole. By doing so, you prevent pollution from entering a sinkhole and being washed into a stream that you might not be able to see.

2. Choose plants that promote infiltration

It is important to choose plants that are adapted to the soil conditions in your area. They are more likely to flourish and provide expected benefits. Soil conditions and sun exposure are especially important considerations when selecting plants. For the bottom of rain gardens and stream banks, it is likely that plants suited to medium-to-wet conditions will be useful; plants suitable for upland sites might be best for slopes.

Plant species and sources are abundant, but consider the use of plants native to your area. Species that are naturally found in your area likely will thrive — and also provide food and nectar for pollinators. Avoid invasive plants, which are species that have the potential to spread and multiply rapidly while displacing native species.

The following Purdue Extension documents provide additional information for plant selection:

- Rain Garden App (select Indiana for plant species compiled by Purdue Extension Rainscaping Education team) — <https://nemo.uconn.edu/tools/app/raingarden.htm>
- Alternatives to Invasive Species, ID-464 — <https://www.extension.purdue.edu/extmedia/ID/ID-464-W.pdf>
- Spreading Ornamental Plants: Virtues and Vices, HO-295 — <https://www.extension.purdue.edu/extmedia/HO/HO-295-W.pdf>
- Recommended Indiana Native Plants for Attracting Pollinators, POL-6 — <https://extension.entm.purdue.edu/publications/POL-6/POL-6.pdf>

3. Manage turfgrass effectively

A healthy lawn is a feature of the home landscape that provides many benefits. Areas with healthy turfgrass allow most of the rain to infiltrate and have minimal soil erosion. The following practices can help homeowners maintain a healthy lawn to maximize these benefits:

- Mow cool-season turfgrasses at a height of 3 - 4 inches. Mowing turf at higher heights encourages deep root growth, leading to a healthier lawn.
- Mow turf based on growth rate rather than on a schedule. Lawns mowed at the proper frequency tend to be thicker with fewer bare spots, providing greater water infiltration and better protection against soil erosion.
- Return clippings to the lawn to recycle nutrients, add organic matter to soil, save time, decrease costs, and reduce the amount of grass clippings transported off-site.
- When needed, irrigate lawns deeply and infrequently based on the response of turfgrass plants. Irrigating to reduce stress during dry periods will help the lawn remain dense and reduce pests as well as potential erosion. Early morning irrigation reduces water loss through evaporation, increases efficiency of water delivery to turf, and prevents prolonged leaf moisture leading to fungal disease.
- A healthy lawn requires nutrients in the soil, particularly nitrogen. Returning all clippings to the lawn provides some nutrients. However, nitrogen additions through applications of fertilizer help to yield a dense, well-nourished lawn that maximizes environmental benefits. Phosphorus fertilizer is seldom needed on established lawns, and most stores now carry phosphorus-free fertilizers. (For more information about phosphorus applied to lawns, see <https://www.extension.purdue.edu/extmedia/AY/AY-334-W.pdf>). Apply a minimum of 1 lb. of nitrogen per 1,000 square feet in early fall, using a lawn fertilizer that contains both slow-release and quick-release nitrogen. Calculate the correct amount of fertilizer for your size lawn, and apply only that. Prevent over-fertilization by reading and following instructions on the fertilizer label.

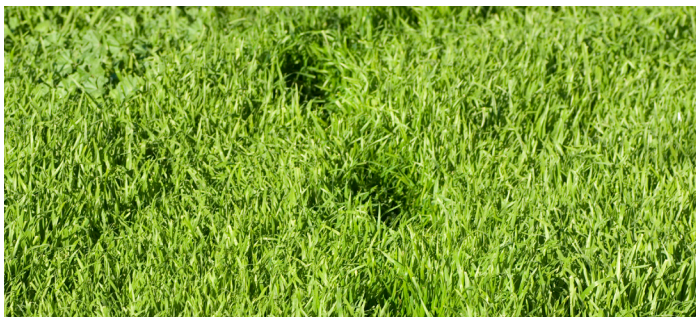


Figure 3: When you walk across a lawn and footprints remain, the condition is called foot-printing. It's a sign of water stress, a signal that the turfgrass plants could need more water. (Getty)

- As you apply it, if any fertilizer lands on impervious surfaces, such as sidewalks or driveway, be sure to sweep or blow it back into the lawn to prevent movement with the next rain. Coordinate fertilizer applications with the weather to move fertilizer into the soil without washing the fertilizer away. For more information about lawn fertilization, see <https://www.extension.purdue.edu/extmedia/AY/AY-22-W.pdf>.

4. Install a rain barrel

Rain barrels are a way to collect water from a roof to store and use in lawn and flower garden areas. This is one way to reduce rainwater from downspouts to keep runoff, including pollutants, from getting into our local waterways while also reducing water costs. Rain barrels come in a variety of shapes and sizes and prices. Most models hold 40-80 gallons in a plastic barrel. They can be purchased as kits or as fully assembled through online suppliers or lawn and garden supply stores, through local conservation organizations or municipal stormwater departments.

When selecting a rain barrel, consider which type of downspout diverter to use as a connection between the downspout and barrel. Some barrels are designed for use with an interior diverter system where the downspout is clipped and fitted into a hose that screws directly into the rain barrel. Other systems simply lay a hose on top of the barrel or have a lever to turn water flow off or on during rain events. Follow the appropriate directions for your system to connect the downspout diverter to the unit.

Rainwater can be contaminated with pathogens, including *Salmonella*, and cause severe illness. Water collected in a rain barrel should be used only for lawns and flowers rather than for irrigating crops for human consumption.

All rain barrels should have covers to discourage mosquito breeding or access from other insects or animals. Empty your rain barrels at least once per week to eliminate stagnant water and reduce mosquito breeding. Even with an overflow spigot, some water is likely to collect in the bottom, so be sure to completely drain your rain barrel each month. Position the rain barrel on a level surface next to a downspout that is easily accessible. Most barrels need to be on a base of at least 12 inches in height to maximize pressure and water flow. All rain barrel systems should have an overflow hose that diverts excess water to a flower garden or lawn when the barrel fills during a storm.

To use a rain barrel for irrigation, attach a short hose to the spigot or fill a bucket or watering can directly under the spigot. Pumps can also be used to allow for better pressure farther from the barrel. At the end of each growing season, disconnect the rain barrel from the downspout, rinse and store it in a garage or outdoors in an upside-down position. Rain barrels will crack and be damaged if left filled through the winter months. Purdue Extension Rainscaping Education Program: Rain Barrel Installation Video https://www.youtube.com/watch?v=oaZLPx9F_5g

5. Install a rain garden

A rain garden (Figure 4) is a garden constructed with a shallow depression that holds water, allowing infiltration from lawns, parking lots, roofs, and other surfaces to reduce polluted rainwater runoff and increase groundwater recharge. In many rain garden installations, the underlying soils are replaced with amended soils to

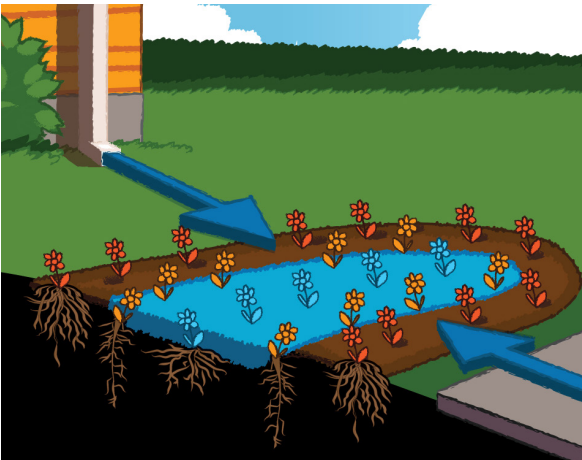


Figure 4: Rain gardens are intended to hold water for as long as 24 hours. (Joel Davenport, Purdue Rainscaping Education Program)

promote infiltration. The size and depth of a rain garden will vary based on site conditions and how much water you expect to capture. A typical residential rain garden is 100-300 square feet and 4 to 8 inches deep. Rain gardens should be sized no larger than 12 inches deep to prevent water from standing more than 24 hours. Rain gardens are planted with native or well-adapted plant species that can tolerate both wet and dry conditions, depending on their placement. Deep-rooting plants that promote infiltration are desirable. Rain gardens can be designed based on individual preferences. For example, plants can be selected based on seasonal interest or on what they offer specific wildlife.

Once established, rain gardens require minimal maintenance, but some maintenance can be expected each year. During the first two years, rain garden plants should be watered until well established. Garden maintenance includes weeding, mulching and removing debris from blocking water inflows and outflows.

These Purdue Extension resources provide additional information for rain gardens:

- Purdue Extension Rainscaping Education Program: Rain Garden Installation Part 1 Video <https://youtu.be/r7kyagywAS8>
- Purdue Extension Rainscaping Education Program: Rain Garden Installation Part 2 Video https://youtu.be/Z0ioq2_OViU
- Purdue Extension Rainscaping Education Program: Demonstration Gardens <https://extension.purdue.edu/rainscaping/demo-rain-gardens>

6. Proper care for septic systems

Most people do not like to think about it too much, but proper treatment of human waste is essential for protecting personal and environmental health. Most human waste will be treated through either a municipal system or a home septic system. It is important to know if you are on a septic system and if your system is compliant with current regulations. To find out if your home is on a septic system, contact your county health department. They can tell you if a septic permit is in effect for your residence. Even if you do not have a permit, you may still have and use a septic. However, if your septic system is outdated or noncompliant, consider whether you should have it upgraded or replaced. Though some expense is involved, an upgraded system will improve the environment and increase your home's property value.

A septic system (Figure 5) consists of two main sections. The septic tank functions as a place for solids to settle out from liquid and be stored. The absorption or leach field is where liquid is filtered of impurities before being released into the environment.

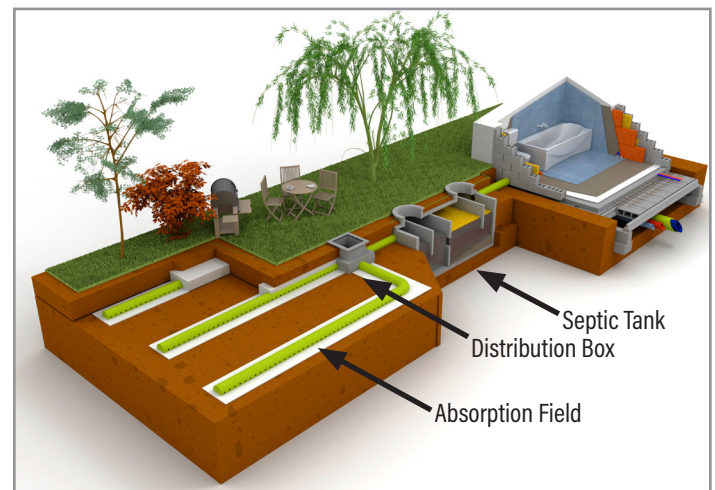


Figure 5: A septic system has two primary sections: A tank and an absorption field. Controlling what does and doesn't go into the system can be key to making sure it functions properly.

Proper maintenance is essential to ensure that a septic system continues to function properly. One way is by controlling what goes into the system. Animal fats, food waste, feminine hygiene products, paper towels, wet wipes and other “flushable” products do not break down in a septic tank and will fill it quickly. This may result in solids leaking into the leach field – or even a septic backup. If you have a garbage disposal, consider reducing or even avoiding its use. Reduce water use wherever possible. Do a single large load of laundry rather than multiple small loads. Repair any leaks in your plumbing. Avoid pouring chemicals, such as bleach and sanitizers, or pharmaceuticals down the drain or into the toilet. These products may kill the bacteria required for your system to function. A septic tank should be pumped out regularly, at least once every three years. However, if you have a garbage disposal or an unusually large number of people using the system, this may need to be done as often as yearly.

Leach fields also require proper care. Avoid driving heavy equipment over the field, as this may crush pipes. The roots of certain species of trees are prone to invading leach fields. Avoid planting these in or near your system. Do not use a leach field as a location to plant a garden. Avoid construction or other activities which may alter the drainage near your leach field. Observe your leach field for signs that your septic system may not be functioning properly. Signs of trouble may include a foul odor, surface water ponding, strips of greener grass, and slowly draining toilets. Many local health departments offer free septic system troubleshooting.

Septic system failure can be costly and harmful. Failure may result in a situation where sinks and toilets back up, and what is essentially raw sewage may enter your landscape, or even your basement. Contaminants reaching water sources can cause illness in people, wildlife exposed to the water, and aquatic life. For additional information on septic systems, contact your local health department’s environmental health division.

Conclusions

Homeowners can do numerous things to improve their impact on water quality.

Before installing rain gardens or rain barrels, contact local stormwater or utility departments for incentives or other regulatory considerations. In some communities, local government offices may provide rain garden plants or rain barrel kits for free or at a reduced cost, or may offer a stormwater credit for reducing runoff. Before starting any project, contact 811 to locate underground utilities.

How these practices protect water quality:



Keep rainwater on site



Keep water that leaves the site clean

There are numerous sources for information for the conservation practices mentioned in this publication. For example, the Purdue Rainscaping Education Program provides training and online resources for residential rain garden installation and rainscaping practices for the home: <https://extension.purdue.edu/rainscaping/>. Find additional information through Purdue Extension County offices, Soil and Water Conservation Districts, stormwater departments, and conservation organizations.

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