

Rerouting the rain: Reap the rewards of passive rainwater harvest

The lowest area in this turf lawn has been modified into an artificial drain that removes rainwater from the site. Why not make use of the precious water resource that accumulates here by adding habitat and beauty with a native perennial garden, creating a sitting area under a couple of shade trees, or establishing a small vegetable garden or berry patch? The rocked area may appear to be low maintenance at first, but keeping debris and weeds cleared requires both time and money with very little human or ecosystem benefit. Photo by Micah Most.

In most parts of Wyoming, gardeners and homeowners spend a fair amount of time thinking about how to keep their spaces irrigated. Whether using large overhead sprinklers or meticulously arranged drip systems, the nuances of applying water to a landscape or garden bed with the right timing requires a lot of effort. Water is often a limiting nutrient in our state, and we all breathe a sigh of relief when it rains.

But where does that rainwater go once it hits your property? Perhaps it hits a roof, runs through a gutter system, and from there is piped into a storm drain or patch of turf. Perhaps it simply hits a concrete driveway and quickly exits into a street gutter.

Now consider this scenario: A raindrop hits your roof and runs through a gutter system with a downspout that directs the water into a shallow depression in the front yard. Native flowering perennials and grasses

Is this legal in Wyoming?

As of September 2025, the Wyoming State Engineer's Office does not have any permitting processes in place to manage rainwater harvest, insofar as it does not route live surface water from taking its normal course. Direct any questions about a specific situation to the Surface Water Division of the Wyoming State Engineer's Office at (307) 777-6475.



Passive rainwater harvest requires a shift in thinking about water management. Here, a set of empty stakes show where a young tree failed to establish and was removed—might drought have been a factor? How might these trees have been placed differently relative to the drain to maximize use of rainwater and reduce the need for expensive supplemental irrigation? Photo by Micah Most.

adapted to the boom/bust cycle of water availability fill the center of this rainwater “basin.” A shade tree is planted nearby, allowing its roots to seek out the collected moisture. A few hours after the storm ends, the water has receded into the soil and birds are singing from the top of the tree.

Passive rainwater harvest

Using this inexpensive and low-tech strategy to “capture” rainwater is referred to as passive rainwater harvest. It is distinct from active rainwater harvest, where water is stored in tanks and later applied to the landscape.

This passive approach is designed to be low maintenance (once installed), low cost, and low tech. “Bioswale” and “rain garden” are common synonyms.

The core concepts of passive rainwater harvest are to slow the runoff of rainwater, spread out the flow, and soak it into the soil. These concepts have been practiced by indigenous communities for centuries and can be adapted for rural and suburban settings alike.

Rainwater is a free resource. Slowing its movement across the landscape increases infiltration into the soil profile, boosts water availability to nearby plants, reduces soil erosion and nutrient migration, and helps supply groundwater resources in the long term.

Creating a rainwater harvest system

Establishing a rainwater harvest system should be a bit more thoughtful than simply digging a hole near a gutter downspout. Begin by observing the movement of water through the landscape during and after a

Looking for local data?

- For monthly averages, visit <https://bit.ly/WY-avg-precip>.
- For daily records, visit <https://bit.ly/WRCC-WY> and find the reporting station nearest to you.

rainstorm. Consider the slope and aspect (south-facing versus north-facing, etc.), as well as the soil texture. Leave a 10-foot buffer zone between any water-harvesting system and any foundation or basement to prevent water from infiltrating structures.

A common design is the basin and berm arrangement, in which a shallow depression is excavated and the soil that is removed is used to create a low berm downhill to the basin. After a rain event, water pools in the basin for a short period and then moves into the soil where it irrigates the surrounding plants and percolates down toward the water table.

When creating a new basin and berm system, one of the most important factors to consider is the quantity of water that might move through the system. To ensure the basin(s) can accommodate a big storm event, investigate the average annual precipitation and the historical maximum 24-hour precipitation amounts for your area.

Also consider that the goal is for rainwater to soak away in less than 72 hours. Standing water provides habitat for mosquitos and can be a safety risk. For this reason, soil texture and infiltration rate should be factored into the final design and basin proportions.

Some water math

Before getting started, consider the area from which water is being collected. If runoff is being funneled into the system from a roof and gutter or paved driveway system, it is relatively easy to determine the surface area by multiplying length by width. Note that the amount of water collected from this impermeable surface will vary by weather event.

For example, say a house has a gutter system that collects water from a roof that is 20 feet by 80 feet. The area is 1,600 square feet. If one inch of rain falls on the roof, how many gallons of water can be captured from its surface?

In other words, picture that 1,600-square-foot roof covered by one inch of standing water. To calculate the volume, first convert the one inch of rain to feet by dividing by 12. $1/12 = 0.08$ feet of water.

Next, multiply the roof area (1,600 square feet) by water depth (0.08 feet). In this case, 133.3 cubic feet of water could be collected. One cubic foot equals 7.48 gallons, so multiply 133.3 by 7.48 to get about 997 gallons of water—from a single rainfall event!

Now repeat the exercise using the maximum likely 24-hour rainfall total for a specific location. If it's 3 inches (exceptional for most of Wyoming), the total rainfall harvested would be nearly 3,000 gallons of rainwater.

Building a basin

When excavating a basin to harvest water, ensure that the capacity will hold the maximum estimated amount of rainwater. A similar process of calculations can be used to determine the length, width, and depth of a basin that will hold the max runoff amount.

A basin about 30 feet long, 15 feet wide, and 1 foot deep should be more than enough to hold 3,000 gallons of rainwater. ($30 \text{ ft} \times 15 \text{ ft} \times 1 \text{ ft} = 450 \text{ ft}^3 = 3,366$ gallons of capacity.)

In places where space or aesthetics are restrictive, play around with varying depths and proportions to find something that works. Several basins can be linked in series so that as the first fills, it begins to flow into a second, and a third, and so on.

Regardless of the final design, some type of outlet or overflow system should always be included in the final basin to prevent a heavy storm from washing out the berm.

Start small

If digging a basin in the front yard sounds too intimidating, start with a smaller-scale project. For example, rather than planting a new shade tree at a high point of the yard, consider planting it in a low spot where water briefly pools after a storm.

Simply by observing the landscape and how water moves through it at various times of the year, you will probably notice rainwater-harvesting principles already at work.

Fill it with life

Rainwater-harvesting basins should be filled with plants to slow the movement of water and filter out pollutants. Check out the garden resources at www.uwyo.edu/barnbackyard for inspiration or call the local extension office for ideas.

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