

# Rain, Rain, Stay Awhile

Cisterns and tanks give  
seasonal water a shelf life.

By Cheryl Weber, LEED AP

The Pacific Northwest might be the last place in the United States one thinks of as water-challenged. But on San Juan Island, which lies in the “rain shadow” of the Olympic Mountains, heavy winter rains are followed by summers so dry that desalination plants are needed to supplement well water in some communities. So when a conservation-minded couple decided to build a home on a rocky bluff there, a rainwater catchment system was high on their list. The 19,500-gallon cistern, dug from bedrock under the multi-level house, will supply their water needs.

Rob Stevens, senior project engineer at Core Design in Bellevue, Wash., calculated the tank size for the house based on how much water is available from the roof, how much will be needed daily, and seasonal supply and demand. The owners will use 62.5 gallons of water per person per day, he estimates, plus more to irrigate a 200-square-foot garden. The home’s 4,000-square-foot roof, 80 percent of it vegetated, is expected to collect 47,000 gallons of water per year.

“Stormwater is one of the biggest issues we have to deal with in the Pacific Northwest,” Stevens says, “and its treatment is costly. Rainwater harvesting saves developers from having to build a detention system downstream, and homeowners get free water for the rest of their lives.”

Rainwater is becoming a more precious commodity. Intermittent droughts plague even water-rich regions of the country, and many municipalities restrict nonessential watering during the dry season, putting landscape investments at risk. Conversely, too much water can cause soil erosion and polluted runoff. But homeowners who capture and use it are less tethered to the grid. “Soft” rainwater can help lower bills, is ideal for washing clothes and filling fish ponds, and it does away with mineral buildup on plumbing fixtures.

## Holding Patterns

Clients intent on harvesting their own water can choose solutions ranging from 1,000-gallon rain barrels that supplement landscape irrigation to 20,000-gallon potable water systems costing upward of \$15,000. In a basic assembly intended for household use, water from a roof’s downspouts is gravity-fed to a central filter that separates any debris. The filtered water is stored in an

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underground or surface tank, where it's pumped through a series of disinfectant chambers and to the point of use.

What size tank is needed to collect all the water from a roof? For every inch of

But even an irrigation-only supply requires more storage than most people realize, says Lee Jaslow, president of Baltimore-based Conservation Technology. On the East Coast, normal monthly

An assembly that size costs \$5,000 to \$10,000 for underground storage, and half that much for surface storage, Jaslow says. The investment amounts to enough water to fill a pond, water the peonies, and wash the cars, but it's almost never enough to irrigate a lawn. "You can use an entire year's worth of water in a week to irrigate a lawn," Jaslow says. He estimates, for example, that a quarter-acre lawn in a temperate climate will use 6,000 gallons of water a week, which is beyond the capacity of most tanks.

For every inch of rainfall, one square foot of roof surface yields about one-half gallon of collectable rainwater.

rainfall, one square foot of roof surface yields about one-half gallon of collectable rainwater. To estimate how many gallons of water can be caught from a roof in a year, divide the roof area in half and multiply by the region's average annual rainfall. According to government estimates, each person in a household uses 25 to 65 gallons a day, depending on the water-efficiency of the appliances and fixtures.

rainfall adds up to several thousand gallons of capacity, which is enough to water the average landscape during the growing season. "A 2,000-square-foot roof will shed about 3,000 gallons of water a month in the Eastern U.S., so if you have that much storage, you're able to use most of it," Jaslow says. An overflow mechanism would channel excess water away during the off-season.

When water is collected for interior use, it's best to avoid roofs with composite shingles, bituminous membranes, and asphalt coatings, but "the real hazard from roofs isn't the material, it's from viruses and parasites from bird droppings," Jaslow explains. "All those things are easily treatable with a purification system." And when it comes to tanks, vary-

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ing climatic conditions call for different materials, configurations, and technologies. In the rain-scarce Texas hill country, for example, large metal surface tanks are common because soils are hard and expensive to excavate.

"We have five to six distinct regional markets, and they're not at all similar," Jaslow says. Demand for rain catchment systems has been consistently strong in the Southwest, California, and the Pacific Northwest, he adds, and there is lower but steady demand in the Northeast, where water is collected mostly for irrigation.

## Informed Decisions

Architect Peter Pfeiffer, who has an above-ground rain barrel that supplies household water on his own Austin, Texas, property, cautions clients that reusing rainwater isn't as easy as turning on a tap. "I inform clients that it isn't some-

thing you can put in and forget about," says Pfeiffer, principal at Barley & Pfeiffer Architects. "Even if there is a gutter helmet, stuff gets clogged in the suction pump now and then, and filters must be periodically cleaned." Pfeiffer also suggests that the first priority is to use less water by choosing drought-tolerant plants and investing in dual-flush toilets, a front-loading washer, and low-flow bath faucets and showerheads. "Make sure a rainwater catchment system isn't just the cool eco-strategy of the day," he says.

Make sure, too, that draining rain from the gutters isn't at odds with the law. While some state and local governments encourage it, it's illegal in some places because of downstream water rights, some assigned centuries ago, says attorney Jesse Richardson, associate professor of urban affairs and planning at Virginia Tech in Blacksburg, Va. "In the East,

water rights are attached to land ownership," he says. "But some Western states, like Utah, prohibit it, and others require a permit." Santa Fe, N.M., requires rain-catching in some circumstances, and San Antonio is one of a handful of cities that offers tax rebates for the equipment.

The house on San Juan Island, now under construction, is about to get its green roof. The roofing membrane will turn up at the edge all the way around and funnel the water down in several places through hidden PVC pipes. Collecting drinkable water from a vegetated roof is a natural process because the water is partially filtered even before it drops into the cistern, says Michael McNamara, co-owner of Blue Sky Design, Hornby Island, British Columbia, who designed the house. "On an island water is always an issue," he says, "and we're trying to go as green as we can." ■

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