

Harvesting

Central Texas Leads the Nation in Rainwater Collection

by Karen Branz Leach
Photography by Barton Wilder Custom Images

It's a Friday morning in August, and the butterflies are swarming, forming bright patterns of color in the summer sun. I'm standing in the front yard of the South Austin house owned by Robbin Trusty and Stan Ostrum, and the blooms of the native salvia and lantana are irresistible to the butterflies. It's a dazzling display, far more butterflies than I've ever encountered in a suburban yard.

Two years ago, this ground was covered in a carpet of St. Augustine grass. Trusty and Ostrum have spent many hours removing the grass and replanting with drought-hardy native plants to conserve a precious commodity—the rainwater that they harvest from their roof and store in two, two-thousand-gallon tanks.

Trusty and Ostrum are part of a growing population of Austin homeowners who are rejecting the suburban norm of water-hungry grass in favor of hardy native plants irrigated not with city water but with rain that they capture and store.

"We started with a couple of seventy-five gallon rain barrels that we got through the City of Austin program, but we knew we needed more," says Trusty. "They filled up and emptied pretty quick," says Ostrum.

The pair hired Chris Maxwell-Gaines, a civil engineer and partner in Innovative Water Solutions LLC, to design and build a rainwater collection and storage system. While the rain may be free, the infrastructure is

not; the system cost Ostrum and Trusty about sixty-five hundred dollars, minus a five hundred dollar rebate from the city.

"Collecting rainwater on this scale is not an economic advantage," Ostrum says.

"Nowhere in the US is it cheaper to use harvested rainwater than city-supplied water," says Dick Patterson, a City of Austin green building coordinator who once worked with the city's water conservation program and is still a rainwater harvesting cheerleader. He is also a former coworker of Trusty's and helped her and Ostrum with their early rainwater collection efforts. "You spend a thousand dollars to store a dollar's worth of water."

"We spent more than we had to, because we were concerned about the aesthetics," says Ostrum. Instead of one large plastic tank, which would have been considerably cheaper, he says, they opted for two, smaller metal tanks, which Ostrum and Trusty feel are more attractive and were easier to tuck away out of sight. They are located on either side of the house near the back yard, and are hard to see from the street.

If there is no economic advantage, why spend the money and time to build a rainwater catchment system? Ostrum and Trusty say they have two motivations, a lush yard and a need to live sustainably, to "tread lightly on the planet," as Trusty puts it.

Rainwater, they explain, is much healthier for plants because it

The Clouds

doesn't carry the heavy calcium load found in city water. It is slightly acidic, which plants like, and has just the right amount of nitrogen to produce lush growth.

"That's why grass looks so green after a good rain," says Patterson, who adds that you don't see that color of green when irrigating with the treated water supplied by the city.

Trusty and Ostrum believe that rainwater harvesting goes hand-in-hand with xeriscaping, because you can't have a water-hungry landscape if you use only rainwater for irrigation. The best way to achieve a drought-hardy, ecologically sensitive landscape is to plant native species that are adapted to Central Texas rain patterns and are not sensitive to disease and pests found here. The end result is lower use of treated water and no need for chemical fertilizers, pesticides or herbicides, thus reducing runoff of polluted water into local streams.

The Ostrum and Trusty landscape includes a wide variety of shrubs,



Robbin Trusty and Stan Ostrum

flowering perennials and cacti, including a bed of stunning blue agaves that were grown from cuttings of a neighbor's plant. And lots of salvia that attract hundreds of butterflies.

Patterson, who regularly speaks to groups on rainwater harvesting, agrees with Ostrum and Trusty that rainwater harvesting leads to more responsible use of water resources.

"The people who get the seventy-five gallon rainbarrels from the city become selective of what

plants get it (rainwater). That leads to conserving water and, I hope, of people being a little more judicious of city water use," says Patterson.

"You're kind of your own water purveyor. You understand the hydrological cycle. If you have rainwater in a tank, you are participating in (the cycle) rather than just observing it." For Patterson, that's one of the big advantages of rainwater harvesting for the city water system: it makes people aware of water, which is the first step in getting them to conserve it.

South of the Trusty and Ostrum house, in Oak Hill, Barrett and Shawna



Shawna and Barrett Donop

Donop have a more immediate and practical reason for harvesting rainwater. The lot where they built their thirty-five-hundred-square-foot house isn't on the water system run by the Lower Colorado River Authority (LCRA), because tapping into the system that's one-thousand feet from their property was cost-prohibitive. Plus, the water carries so much calcium that it destroys appliances, says Barrett Donop, DVM, an Oak Hill veterinarian.

"Our neighbor is on LCRA water, and his appliances freeze up from the calcium. He replaces them every couple of years."

With LCRA water an unattractive option, they had two choices left: drill a well or harvest rainwater.

"We chose rainwater, because it was cheaper than a well and the water quality is much better. Well water out here is just terrible. It's incredibly hard, and wells are unpredictable," says Donop. The needs of their household are met solely with the rainwater that they harvest from their roof and store in two tanks that each hold ten thousand gallons. Like Trusty and Ostrum's, their system was designed and built by Maxwell-Gaines of Innovative Water Solutions.

The system is less than a year old, so it hasn't been tested in a drought year, but Donop says they collect and store more than enough water to meet

their needs. They even have a ten-thousand-gallon, in-ground pool that is rainwater-fed.

"When we were planning the house, I met with Chris and he cringed when I talked about a pool," says Donop. "But he went and crunched some numbers and found that it would use about seven thousand gallons a year due to evaporation. He said that was doable."

"It works because it's a small, deep pool, which limits the evaporation," says Maxwell-Gaines. Adding a cover would reduce evaporation, something Donop says he is considering. Even with the pool, Donop estimates that he and his wife use only about three thousand gallons a month.

"It's made me very water conscious," he says. "If a friend is over and is running the water in the sink, I notice." He says he no longer minds rainy days, because he knows it means more water in his tanks.

Subdivision depends on rainwater

In Dripping Springs just a little south of Donop's house, Robert Kathman, president of Kendree Custom Homes, is building a gated development of ten high-end homes, with prices starting at eight-hundred thousand dollars each. The houses will be solely supplied by rainwater.

"The last five or six houses we've

built in this area, the owners have chosen a rainwater system over a well," says Kathman. "Wells are just as expensive as rainwater systems, and you have to do a lot of stuff to the water to be able to drink it. And people are becoming educated on rainwater systems. They know that if they have a big enough tank they are not likely to run out of water." Kathman adds that in drought years, wells can go dry. With a rainwater system, if there is a drought, you can always

have water delivered to your tank, not something you can do if you are dependent on a well.

"When we originally planned the development, we intended to offer either wells or rainwater," he says. When the neighbors protested the development over fears that new wells would endanger existing wells, Kathman decided to offer only rainwater systems in the development.

"We were approved to do either, but I didn't want to antagonize the neighbors. We figured half the homes would choose rainwater anyway." There will be only one well on the property, says Kathman, to provide water for landscaping at the front of the development, including a waterfall.

Kathman says that adding a rainwater system to a house costs about twenty thousand to twenty-five thousand dollars, including guttering, piping, tanks, filters, pumps and purification systems. No special roofing is required, as a variety of testing sources have shown that composition shingles work just as well as a metal roof for collecting clean water that can easily be made potable.

"Central Texas is considered to be the national leader in rainwater harvesting," says Hari Krishna, PhD, a staff member in the Innovative Water Technologies section of the Texas Water Development Board and founder of the American Rainwater Catchment Systems Association. Krishna says he started the organization as a small endeavor in Central Texas, and it expanded to the entire state and then

Rainwater Resources

The following web sites offer information on rainwater harvesting:

American Rainwater Catchment Systems Association—This organization was founded in Austin in 1994 to promote rainwater catchment in the United States. See www.arcsa-usa.org.

Harvest H₂O—This is an on-line forum for the rainwater harvesting community. www.harvesth2o.com.

City of Austin Water Conservation Department—The city offers voluminous guidance and some incentives for water conservation at www.ci.austin.tx.us/watercon.

City Of Austin Green Building Program—Austin Energy operates the nation's number-one program for green building. Find out more about the benefits of green building at www.austinenergy.com.

Green Builder—You will find a Sourcebook for Green and Sustainable Building at www.greenbuilder.com/sourcebook/Rainwater.html.

Texas Water Development Board—This state agency provides leadership, planning, financial assistance, information and education for conservation and responsible development of water for Texas. It publishes the *Texas Guide to Rainwater Harvesting*. See www.twdb.state.tx.us/iwt/rainwater.asp.

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the nation. "We have four hundred members around the US now." Members include professionals, academics, manufacturers, suppliers, consultants and interested individuals.

He says this area became a hotbed of rainwater harvesting for three reasons: a population that is environmentally conscious, a climate that makes harvesting feasible, and housing developments in an area where the quality of well water is not attractive. These factors, combined with the development of reliable technology, have driven the explosive growth in rainwater systems here.

In Austin proper, where cheap city water is readily supplied, most catchment systems are the seventy-five gallon rainbarrels that the city sells for sixty dollars apiece. More than nine thousand barrels have been sold since the program's inception in 1983, and most are used to water ornamental beds and vegetable gardens. The city also offers rebates of up to five hundred dollars on systems that store more than three hundred gallons. Systems the size of the one at the Trusty and Ostrum home are rare, because of the capital outlay required.

The potable water systems being installed are all in areas where there is no municipal water system. They are mostly based on either of two designs, one created in Germany, the other created in Australia.

The German model pre-filters the water before it goes into the tank, while the Australian system relies on first-flush, a system that diverts the first runoff (which carries most of the dirt and debris from a roof) from the tank and filters the water as it is used.

Joe Wheeler, who lives on Old Spicewood Springs Road west of Capital of Texas Highway, installed a system at his house based on the German model. He liked it so much that he became the sole US distributor for the company, WISY AG, under the name Rainfilters of Texas.

The German approach, he says, came out of extensive engineering research that occurred in response to poor sewer planning in Germany. When indoor plumbing first became common around the turn of the twentieth century, wastewater sewage was directed into the storm sewers and then to the treatment plants. When a heavy rain came along, the treatment plants were not only handling wastewater from homes, but also all of the storm water runoff. Unable to handle

Rainwater Harvesting Demonstration Sites

Want a look at a rainwater collection system? The following locations have been designated by the City of Austin as Rainwater Harvesting Demonstration Sites. All except Westwood High School are in Austin.

- American Botanical Council:** 6200 Manor Road.
- Feather and Fur Animal Hospital:** 9124 Manchaca Road.
- HEB Grocery:** 600 W. William Cannon Drive.
- Lady Bird Johnson Wildflower Center:** 4801 La Crosse Ave.
- Pickle Elementary School:** 1101 Wheatley Ave.
- Parque Zaragoza Recreation Center:** 2608 Gonzales St.
- Robert E. Lee Elementary School:** 3308 Hampton Road.
- Summit Elementary School:** 12207 Brigadoon Lane.
- The Natural Gardener:** 8648 Old Bee Caves Road.
- Westwood High School:** 12400 Mellow Meadow Drive, Round Rock
- Zilker Botanical Gardens:** 2220 Barton Springs Road.

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the load, wastewater overflows became common.

Rather than build larger treatment plants or separate sewer lines, Germans began capturing rainwater and storing it in cisterns, says Wheeler. This reduced the amount of storm runoff and therefore the number of sewage spills.

Widespread use of rainwater systems led to a massive investment in rainwater collection and storage technology, resulting in the model that is commonly used throughout Germany.

In this model, water from gutters is filtered to remove particles and the bacteria that cling to them. This excludes everything larger than one-ninetieth of an inch. The second component is a "calming inlet" for the tank, which allows entry of the water without stirring up sediment from the bottom of the tank. According to Wheeler, the German model relies on any particulate matter to either settle to the bottom or float to the top, leaving the cleanest water in the middle of the tank. The bottom sediment layer does not need to be removed as long as it is undisturbed.

The next component is the floating suction filter, which is positioned to remove water from the mid-tank layer. Finally, an overflow system periodically washes away the debris that accumulates on the top of the water.

In the Australian model, which both the Donop and Trusty-Ostrum systems use, the first hundred gallons of rainwater are diverted away from the tank. According to Maxwell-Gaines, this diverts the vast majority of debris from the tank. He says that

the Australian model takes the point of view that pre-filtering is expensive and requires too much maintenance in the form of filter cleaning. Also, the Australian systems periodically remove the bottom sediment layer, either with a suction device similar to a pool vacuum, or through a suction system that is part of the tank overflow system.

Filtering before use

Once the water leaves the tank, three systems can be used to disinfect the water: ultraviolet light (UV), ozone exposure or reverse osmosis (RO) filtering. Most systems use either UV or ozone, both of which are relatively environmentally neutral. RO filtering is also environmentally neutral and produces the best water, but it loses a lot of volume in the process.

Richard Heinichen, owner of Tank Town, a store located in Dripping Springs that specializes in water storage tanks, uses all three methods to sterilize the two-hundred-and-fifty-thousand gallons of rainwater that he collects from the twenty-thousand square feet of roof on his buildings. His system is the only certified public water system that uses no chemicals to clean its water.

Most public water systems use chlorine, a chemical known to be toxic to humans, says Heinichen. While adding ozone to the water can result in the production of bromates, which are also harmful, the residual ozone can be removed through the addition of nitrogen, which Heinichen does. "It's not really necessary," he says, "because bromates only occur if there is biological material in the water."

Heinichen's system filters everything larger than seven-thousandths of a micron, and contains too few organisms to allow bromates to form, he says.

Obtaining certification as a public water source took more than four years, he says, because the United States does not recognize rainwater as a viable water source. Also, the lack of chlorination was an issue, because most public water travels through pipes that expose it to a variety of pathogens, which the chlorine kills. Since his water is bottled and is not piped anywhere, the system was eventually certified without chlorine.

Heinichen now bottles his water and markets it as Richard's Rainfall, Fresh Squeezed Cloud Juice. It's available locally at the Austin Wine Merchant, Wheatsville Co-op, Jo's Coffee, The Natural Gardner, People's Pharmacy and several restaurants. You can also order it on-line for home delivery (see Tank Town in the accompanying article, "Local Rainwater Collection System Suppliers).

The largest rainwater catchment system in the world holds one million gallons and is here in Central Texas at the new Advanced Micro Devices (AMD) campus in southwest Austin, due to be completed in late December.

"We have eight hundred and seventy thousand square feet of office space spread over five buildings, and four parking garages, all with specially designed roofs, and a series of cisterns under the parking garages," says Travis Bullard, an AMD spokesperson. "It's the largest roof rainwater collection system in the world."

AMD is aiming to earn a gold rating from the US Green Building Council under the LEED rating system, which stands for Leadership in Energy and Environmental Design. The system awards up to fifty-four points for each building element that is energy saving or environmentally friendly. A gold rating requires thirty-nine points.

"For a building this size, a gold rating is almost unheard of," says Bullard. Contrary to what has been reported, he says, AMD did not design a green campus to get approval to build. "The land was previously zoned for commercial development, approved for more than a million square feet of office space." Building green, he says "goes back to AMD's desire to design the campus as a landmark and an example to others of an innovative system."

Water from the collection system will be used to irrigate native xeriscaping and in one cooling tower on the campus.

Hays County incentives favor rainwater, Travis County offers little

Hays County faces a difficult combination of growing population and limited groundwater supply. Water politics in the county have been known to be heated, especially during drought years when local residential wells run low or dry up. As Hari Krishna of the American Rainwater Catchment Systems Association notes, if a neighbor drills a well that is deeper than yours, it may lower the water table enough to cause your well to run dry. So any new development that relies on well water faces heavy opposition from those dependent on existing wells.

To relieve pressure on the water table, Hays County has instituted a series of rebates, loans and tax incentives that encourage use of rainwater harvesting and discourage well drilling. First, if you build a system, the cost of the system is not added to the value of your land. With systems costing twenty thousand dollars or more, that results in a significant annual tax savings that you (and any future owner of the property) will reap year after year. Second, low-interest loans are available from the county to build rainwater systems. Finally, state sales tax is waived on the purchase of equipment for rainwater catchment systems anywhere in Texas.

Travis County, however, does not offer similar incentives. Within the county, the City of Austin's residential rebate, which is targeted toward small urban systems, tops out at five hundred dollars. Nice if you are installing a three-hundred gallon system for your garden, but not much of an incentive for citizens that want to build homes solely dependent on rainwater. Commercial entities can receive up to forty thousand dollars in city rebates for projects that conserve water, including rainwater harvesting. The county itself does not offer any rebate or tax incentive. Travis County building codes do not recognize rainwater catchment as an approved water supply for housing developments, though the county readily approved Robert Kathman's plans for a small development using rainwater harvesting. The Travis County

Local Rainwater Collection System Suppliers

The following retailers are listed on the City of Austin web site as suppliers of equipment and consultation on rainwater catchment systems:

Austin Gutterman Inc., Benny Knight—Supplies gutters and complete systems. 12229 Roxie Drive in Austin. Phone 512-450-1821 or visit www.austingutterman.com.

Austin Pump & Supply—A wholesale supplier. 3803 Todd Lane in Austin. Phone 512-442-2348.

Barrel City USA, Phillip Orr—A supplier of recycled fifty-five gallon drums. 21681 S I-35 in Kyle. Phone 512-292-3269.

Barley & Pfeiffer Architects, Peter Pfeiffer—This company does system design, building, consulting. 1800 W. Sixth St. in Austin. Phone 512-476-8580 or visit www.barleypfeiffer.com.

Bowerbird Construction, Keith Miller—A supplier of Ferro cement tanks, systems. PO Box 1141, Dripping Springs, Texas 78620. Phone 512-858-5395 or e-mail BowerbirdConst@aol.com.

Captured Rainwater Company LC, Curtis Chubb—Provides construction supplies and installation. 830 County Road 330 in Milano. Phone 512-455-9180.

Farm & Ranch Service Supply Company—A supplier of concrete tanks, roof washers, floating filters. 12296 S. Highway 181 in San Antonio. Phone 800-292-0007.

Innovative Water Solutions LLC—Designs and installs systems. PO Box 9963, Austin, Texas 78766. Phone 512-490-0932 or visit www.watercache.com.

John Dorn Tank Building, Inc.—A supplier of bolted, galvanized coated tanks. 155 Lakeview Road in Vidor. Phone 409-769-5129

L & F Manufacturing—A supplier of fiberglass tanks. US Highway 290 East at CR 296 in Giddings. Phone 800-237-5791 or visit www.lfm-frp.com.

Lakota Water Company, Alan Rossing—Provides design, installation and maintenance. 10006 Longhorn Skyway in Dripping Springs. Phone 512-217-3051 or visit www.lakotawatercompany.com.

Preload Inc.—A supplier of concrete tanks. 800 E. Campbell, Suite 221 in Richardson. Phone 972-994-0550 or 800-645-3195.

Rainfilters of Texas, LLC, Joe Wheeler—A supplier of prefilters, floating filters and consulting. PO Box 203113, Austin, Texas 78720-3113 Phone 512 257-7986, e-mail solutions@rainfilters.com or visit www.rainfilters.com.

Red Ewald Inc.—A supplier of fiberglass reinforced tanks. 2669 South Highway 181 in Karnes City. Phone 800-242-3524 or visit www.redewald.com.

Spec-All Products, Inc./ TimberTanks America—A supplier of plastic, corrugated galvanized metal and wood tanks. P.O. Box 91493, Austin, Texas 78709. Call 800-463-1898 or visit www.specallproducts.com.

Sustainable Homesteads—Design, installation and consultation services. Mark Licklider, 8607 Swanson Lane in Austin. Phone 512-282-6629.

Sweetwater Filtration—A supplier of treatment systems. 1321 Rutherford Lane, Suite 180 in Austin. Phone 512-837-2488 or 888-877-2488.

Tank Town, Richard Heinichen—A supplier of tanks and complete systems and author of *Rainwater Harvesting for the Mechanically Challenged*. 2770 US Highway 290 West in Dripping Springs. Phone 512-894-0861 or visit www.rainwatercollection.com

Texas Rain, Carlo Pannone and Darla Thompson—Suppliers of complete systems and installation. P.O. Box 1081, Wimberley, Texas 78676. Phone 512-439-9175 or visit www.texasrain.com.

Triple S Feed—A supplier of polyethylene tanks. 11407 FM 1625 in Creedmore and 2111 US Highway 290 West in Dripping Springs. Phone 512-243-0679 or 512-894-0344.

Two Ninety Fence & Ranch Supply, Jerry Yeaman—A supplier of tanks, PVC pipe and fittings. 2110 US Highway 290 West in Dripping Springs Phone 512-858-7876.

Waterspirit Inc., Stephen Bell—Design, installation of systems, consultation. 5504 Wagon Train Road in Austin. Phone 512-899-8888 or e-mail waterspirit2000@hotmail.com.

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building codes allow individual property owners to use whatever system they like when building a home for themselves, but they receive no incentives for rainwater systems.

Is rainwater good for your health?

If you are collecting rainwater, you are also collecting whatever pollutants the water collects on the way to your tank. So is harvested rainwater really safe to drink? What if you live near an agricultural area where growers regularly spray pesticides on the crops?

"If your rainwater is polluted, you have an even bigger problem," says rainwater harvester Barrett Donop, because that would mean your air is polluted. "Pollutants that are inhaled are much more dangerous than those that are ingested," because the inhaled pollutants can go straight from the lungs into your circulatory system, while ingested poisons are filtered through your gut.

"If you are worried about what falls through the air we breathe, you should be wearing a respirator," says Richard Heinichen, owner of Tank Town and the bottler of Richard's Rainwater, which uses rainwater as its source. Most pesticides, he says, are engineered to be heavy so that they fall immediately on the plants and less is wasted. Ground water is more likely to be polluted from agricultural runoff than rainwater is likely to be polluted from airborne particles, making well water (the only alternative for most people who capture rainwater for drinking) a bigger risk than rainwater.

"I suppose if you live in an area where crop dusting from a plane occurs, you might get a heavy concentration on your roof, but I'd be more worried about the air that you are breathing," Donop says. "Besides, one of the reasons you don't capture the first few gallons of rainwater is to wash away dirt and pollutants from the roof surface," he adds.

As to bacteria and viruses in the water, says Donop, UV and ozone exposure are both very effective at killing any critters that get through the filtering system. ☺

Karen Branz Leach has been writing for The Good Life for more than a decade. Though she doesn't collect rainwater, she does enjoy a good walk in the rain. You may e-mail Karen at kleach@goodlifemag.com.