



Water Conservation & Rainwater Harvesting

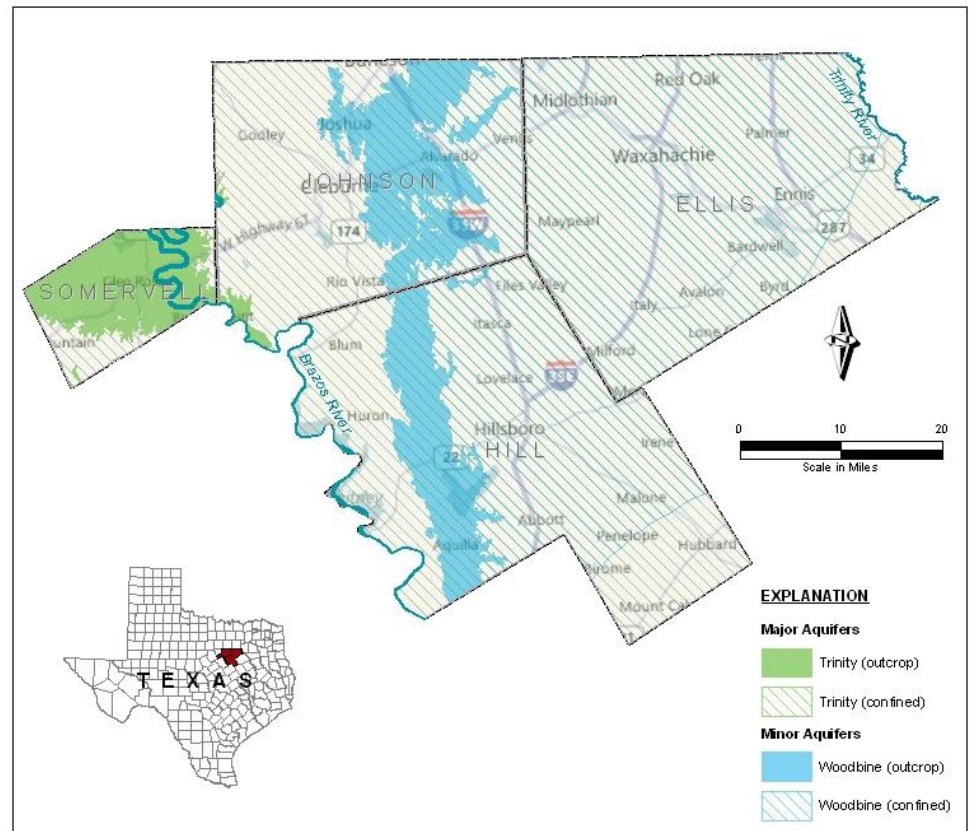


Kathy Turner Jones
General Manager

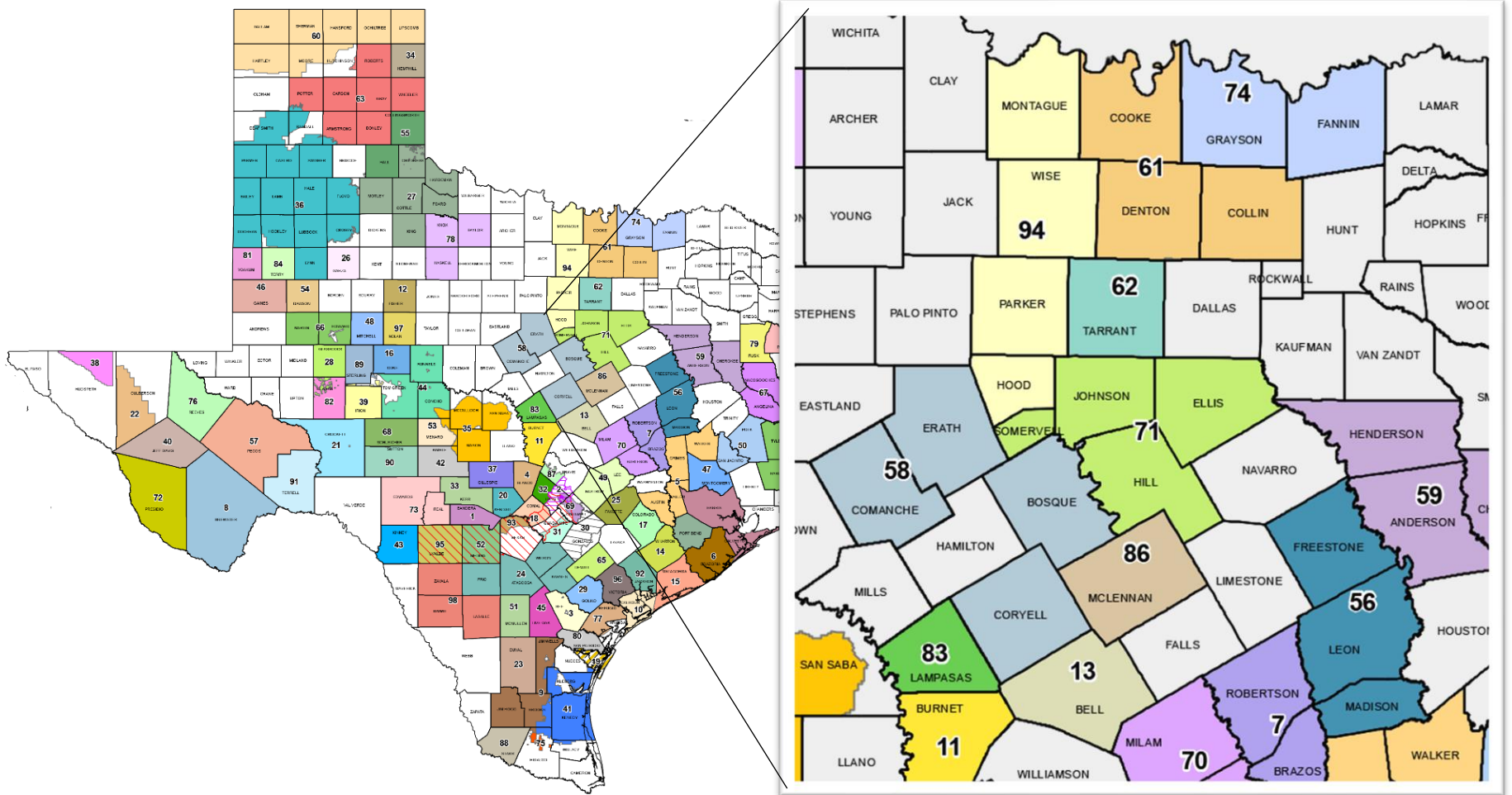
Whitney Curry
Public Relations and Education Director

OVERVIEW OF THE DISTRICT

- Covers Ellis, Hill, Johnson, and Somervell counties
- Headquartered in Cleburne
- Enabling legislation was prompted by a TCEQ finding of expected groundwater shortages over the next 25 years.



Groundwater Conservation Districts in Texas



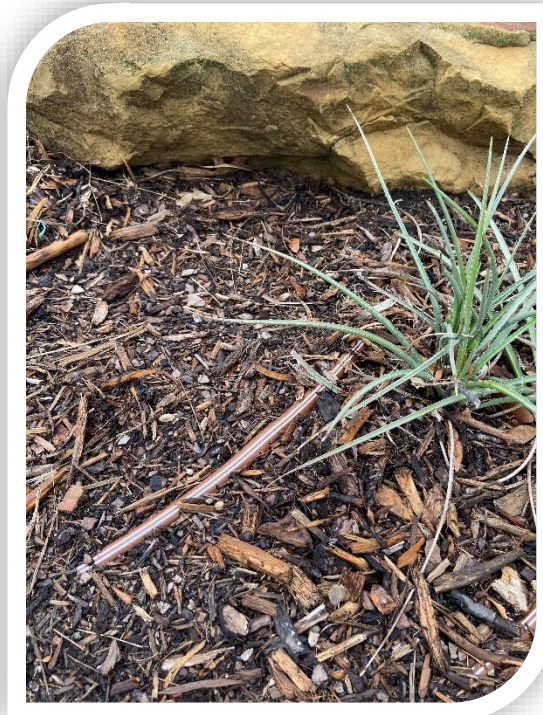
WHAT WE DO

- Develop and implement comprehensive management plan and rules
- Well Registration and Permitting
- Conduct scientific and technical research on groundwater resources
- Respond to concerns and questions from the public, local and state officials
- Groundwater monitoring
- Educate public about groundwater resources and conservation



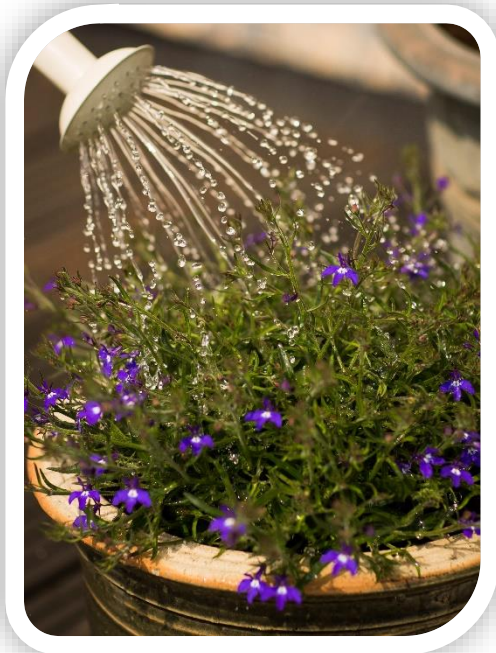
WAYS YOU CAN CONSERVE

Drip Irrigation: Drip irrigation systems are very efficient (use up to 60% less water) at supplying water to smaller areas of a landscape. The simplest and least expensive example of drip irrigation is the use of soaker hoses. These are especially useful in flower beds and around trees. They can also be placed next to the house to stabilize soil next to the foundation.



WAYS YOU CAN CONSERVE

Hand Watering: Hand watering means using yard sprinklers that must be moved and the use of a handheld hose, or even using a watering can. Hand watering plants allows you to precisely apply water where it is needed, and control how much is being applied. This is a good option for outdoor potted plants and hanging baskets.



WAYS YOU CAN CONSERVE

Mowing: Keeping the grass mowed a little taller than usual will help hold in moisture better, encourages deeper root growth and is less susceptible to browning. A good rule of thumb is approx. 3 inches tall during the summer, any taller will cause stress to the grass.



WAYS YOU CAN CONSERVE

Native and Adapted Plants

Native and adapted plants are the ideal choice for an aesthetically pleasing and water efficient landscapes in Texas.

There are several native and adapted plants with various structures, textures and colors to meet your needs and to help save time and money.

Native or adapted plants are tolerant of drought and heat, have low water demands, and low pesticide and fertilizer requirements.

A bonus is they can also attract bees and butterflies!





Rainwater Harvesting

Rainwater harvesting is the capture and storage of rainwater for landscape irrigation, potable and non-potable indoor use, and storm water abatement.



How do I collect rainwater?

A basic rainwater harvesting system is made of the following components:

- **Catchment surface**, such as a roof
- **Conveyance system**, gutters and downspouts to channel water from the roof to the tank
- **Leaf screens** to remove debris and dust from water before it goes into the tank
- **Storage tanks**, or cisterns.
- **Delivery system**, either gravity-fed or pumped to end use

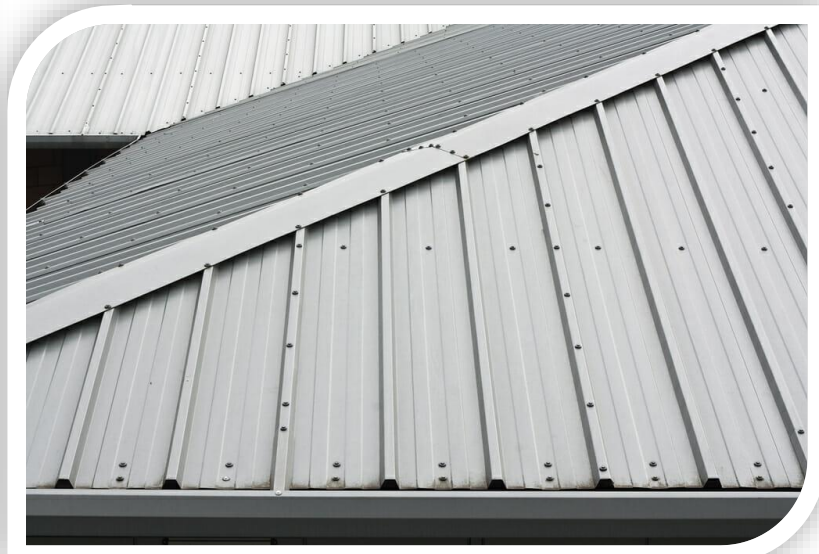


Catchment Surface

The best catchment areas have hard, smooth surfaces, such as concrete or roofing material.

Houses and barn roofs are common catchment areas.

The amount of water harvested from a catchment surface depends on size, texture, and slope.



Conveyance System

Gutters

Make sure gutters are sized and sloped appropriately. Large steep roofs will need larger diameter gutter to move water.

You don't have to gutter your entire roof. Consider catching rainfall from just a portion of your home.

Rain Chains

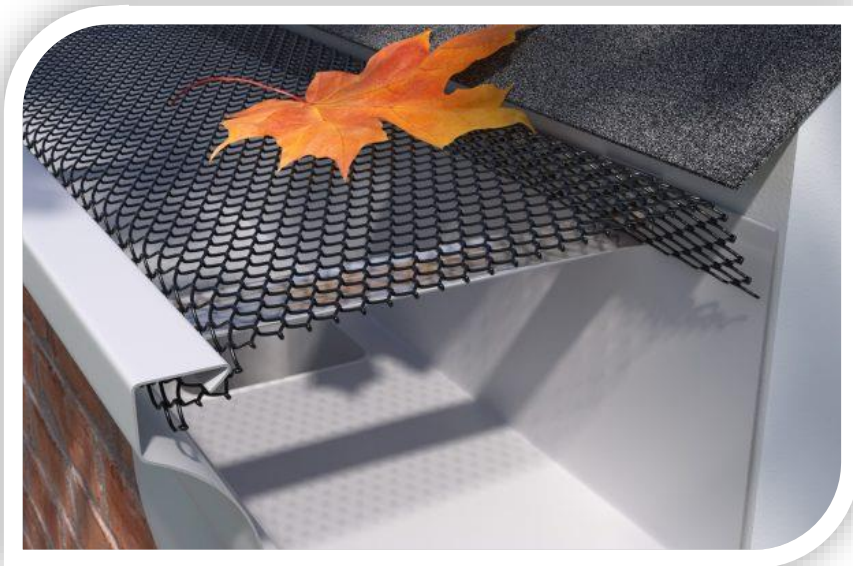
Rain chains are a beautiful way to guide water from the roof to a rain barrel.



First Flush Diverters and Leaf Screens

A first flush diverter is used to catch the accumulated debris and dirty water from the catchment area before rainwater is allowed to enter the storage tank.

Leaf screens on gutters and at the entrance of the rain barrel or cistern will help keep leaves and other debris from entering the tank.



Storage Tanks and Cisterns

Be creative and add your own unique touch!



Storage Tanks and Cisterns

Outflow

Space spigot several inches off the bottom of the tank to avoid disturbing any sediments that may have accumulated.

If desired, fit spigot with a hose, soaker hose or drip system.

If you need more water pressure or you will be moving water uphill or far from your tank, consider a pump.



Storage Tanks and Cisterns

Overflow

Allow excess rainwater to overflow into another barrel.

Aim for overflow to be 10 feet or more from the foundation of a building.

Consider installing a rain garden to catch overflowing water.



Benefits of Rainwater Harvesting

- Can reduce storm water runoff, reducing pollutants entering water bodies
- Helps prevent flooding and erosion around your home or building
- Reduces demand on groundwater and enhances shallow aquifer recharge
- Rainwater is of superior quality: zero hardness, sodium free, and nearly neutral pH (neither acidic nor basic)



Benefits of Rainwater Harvesting

- When properly managed, rainwater harvesting eliminates the need for costly treatment and distribution systems
- Apart from costs to collect, store, treat, and convey the water into the facility, rainwater harvesting is free
- Rainwater harvesting helps utilities reduce peak demands during summer months.
- **Creates a water-conserving behavior that carries over into other water-saving activities in your life, which will help reduce water usage.**



Where do I start?

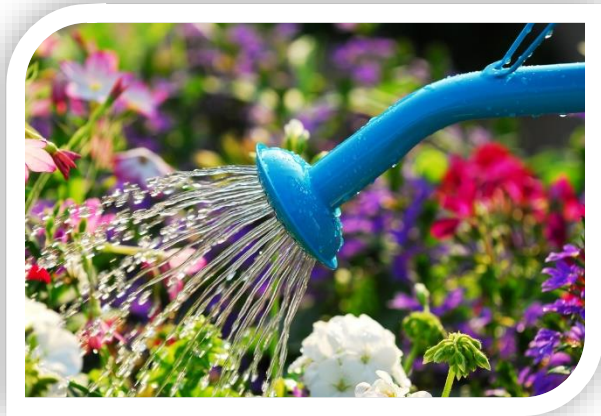
So, are you ready to implement a rainwater harvesting system?!

Here are some important considerations to help guide you:

- How do I want to use the water?
- How much water can I collect?
- What is my budget?
- Where do I want to place the system?
- Are there any ordinances or restrictions to be aware of?



Possible Uses for Rainwater



Rainwater is excellent for watering outdoor plants, flowerbeds, gardens and lawns. You can also use it to water indoor plants, too!



Rainwater can also be used to fill bird baths, provide water for livestock and wildlife, and fill decorative fountains.

Indoor use:

non-potable: flushing toilets and washing clothes.

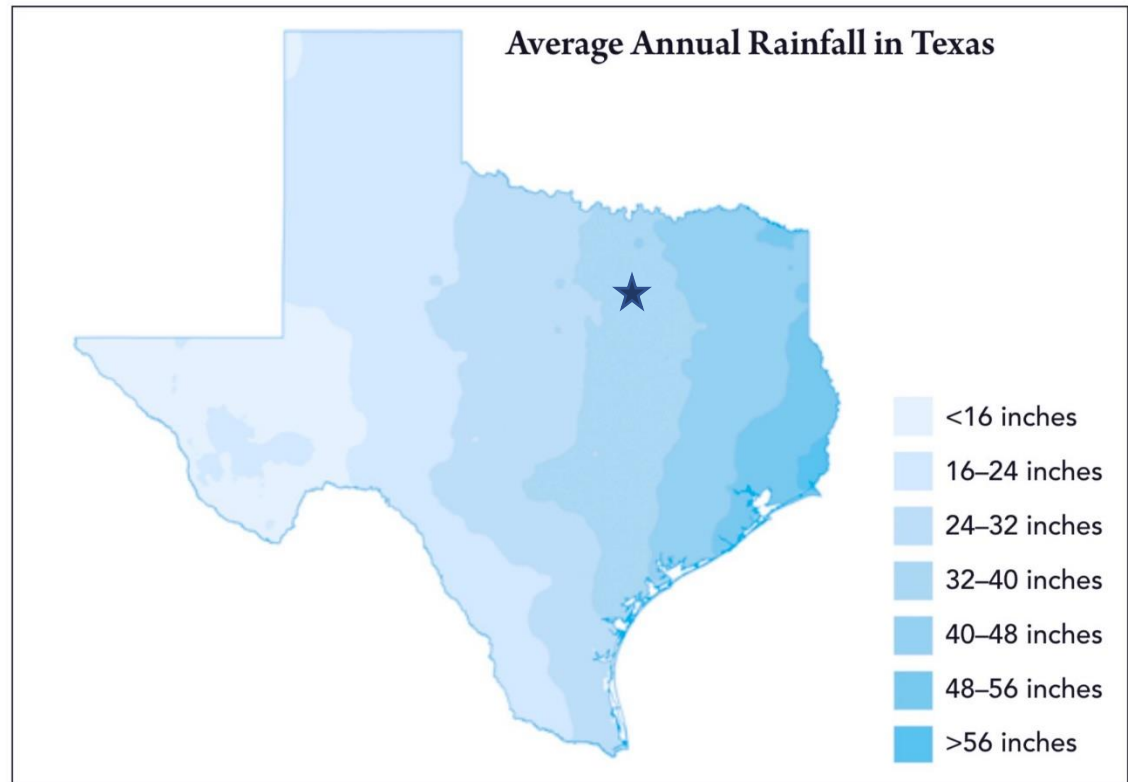
potable: Cooking, bathing, drinking (treatment needed)



How Much Rainwater Can I Collect?

The average rainfall across Ellis and Dallas County is approximately 38 inches/year.

Remember, rainfall events are highly unpredictable, so rainwater harvesting may have fluctuations by season or year depending on weather patterns.



How Much Rainwater Can I Collect?

Calculating Demand vs. Supply

Go read your water meter and write down the number.

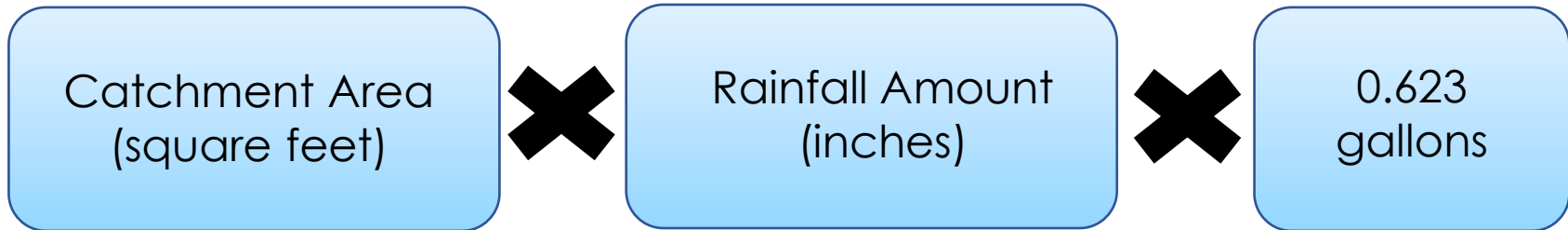
Water your plants, run your sprinkler, use water like you normally would outdoors.

After you are done, go read your water meter again.

How many gallons did you use? Could you have used that amount from harvested rainwater?



How Much Rainwater Can I Collect?



Example of Potential Rainfall Event Amounts:

1,500 sqft roof X 1.5 inches of rain X 0.623 gallons = ~ 1,401 gallons

400 sqft catchment area x 1 inch of rain x 0.623 gallons = ~ 249 gallons

Example of Potential Annual Amounts

1,500 sqft roof x 38 inches x 0.623 gallons = ~ 35,511 gallons/year

400 sqft catchment area x 38 inches x 0.623 gallons = ~ 9,470 gallons/year



System Pricing and Budget

- The primary cost for your system will be the cistern itself. Cost may increase as you increase sizing, tank material, treatment, and distribution methods.
- Consider cost of gutters if you need to install. Doesn't have to be entire house, maybe one area that may be more productive than another or easier to place a cistern nearby.
- A single 55-gallon rain barrel with a spigot ranges between \$120-\$150. Large metal, wooden, concrete or poly tanks can cost upwards of \$1,000



Where to Put Your System

Before installing a rainwater collection system, you'll need to consider what size storage tank you will need, and the amount of space required for it.

Your tank size needs will vary based on how much rainfall you have in your area and how much space you have around your home or building.

Place the rain barrel under a downspout on a stable, level pad.

Keep the barrel out of sunlight to reduce algae growth.

Also, consider how visible you want your system to be from the road, windows, patio, etc.



But I Heard Rainwater Harvesting is Illegal??

The State of Texas encourages rainwater harvesting!

- Texas Property Code prevents a homeowner's association from prohibiting the use of rainwater harvesting systems. (Texas Property Code §202.007)
- The state also requires certain new state facilities to incorporate rainwater harvesting systems in their design (Texas Government Code §447.004(c)(8))
- Municipalities and counties are encouraged to promote rainwater harvesting at residential, commercial, industrial, and educational facilities through incentives such as discounts for rain barrels or rebates for water storage facilities (Texas Local Government Code §580.004)
- The Texas Legislature allows the exemption of part or all the assessed value of the property on which approved water conservation initiatives, such as rainwater harvesting, are made (Texas Tax Code §11.32).
- Texas Tax Code 151.355 exempts rainwater harvesting equipment from sales tax. You will need Texas form 01-339 to complete this process.



Rain Gardens

A rain garden is a garden of native shrubs, perennials, and flowers planted in a small depression, which is generally formed on a natural slope.

It is designed to temporarily hold and soak in rainwater runoff that flows from roofs, driveways, patios or lawns.

Rain gardens are effective in removing up to 90% of nutrients and chemicals and up to 80% of sediments from the rainwater runoff. Compared to a conventional lawn, rain gardens allow for 30% more water to soak into the ground.

A rain garden is not a pond or a wetland. It typically holds water only during and following a rainfall event. Because rain gardens will drain within 12-48 hours, they prevent the breeding of mosquitoes.

Rain gardens collect rainwater runoff, allowing the water to be filtered by vegetation and percolate into the soil recharging groundwater aquifers.



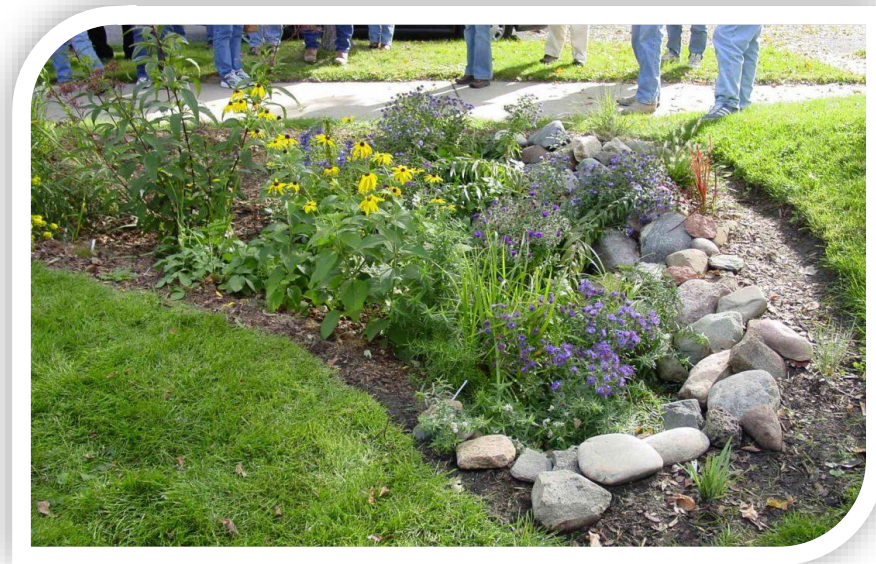
Rain Gardens

What Makes a Rain Garden Different From a Traditional Garden?

In the design of a rain garden, typically 6-12 inches of soil is removed and altered with tillage, compost and sand to increase water infiltration.

Rain gardens are generally constructed on the downside of a slope on your property and collect rainwater runoff from the lawn, roof and/or the driveway.

Also, rain gardens incorporate native vegetation; therefore, no fertilizer is needed and after the first year, maintenance is usually minimal.



Rain Gardens



System Maintenance

Rainwater Harvesting System Maintenance

- Clean gutters, screens, filters and first flush diverters regularly.
- Keep nearby trees trimmed.
- Flush out or insulate conveyance pipes during winter to avoid freeze damage.
- Don't store water for extended periods of time. Stagnate water can breed bacteria.
- Empty and clean out the cistern with a garden hose as needed.
- Install a backflow preventer if connecting a rain barrel into an irrigation system or municipal supply. Check local backflow prevention codes



System Maintenance

Mosquitos

Mosquitos can enter any opening in a barrel larger than a window screen, and can breed in standing water in a puddle the size of a bottle cap.



24 to 48 hours after a rainfall event, check all areas of standing water for mosquito larvae. Mosquito larvae, typically c-shaped, can be seen wiggling or bouncing just beneath the surface of the water. Use a mosquito dunk in barrels or rain gardens that have larvae.



Making the Most of Your System

Water Efficiently

Healthy, properly irrigated lawns rarely need more than one inch of water per week during the summer months.

The best time to water all landscape plant material is early morning or late evening when winds are calmer and temperatures are lower, resulting in less water loss to evaporation.

A good rule is to wet the soil to a depth of 4 to 6 inches to reach the root system of the plants.

Each irrigation method has different benefits and downfalls.





Rainwater Harvesting

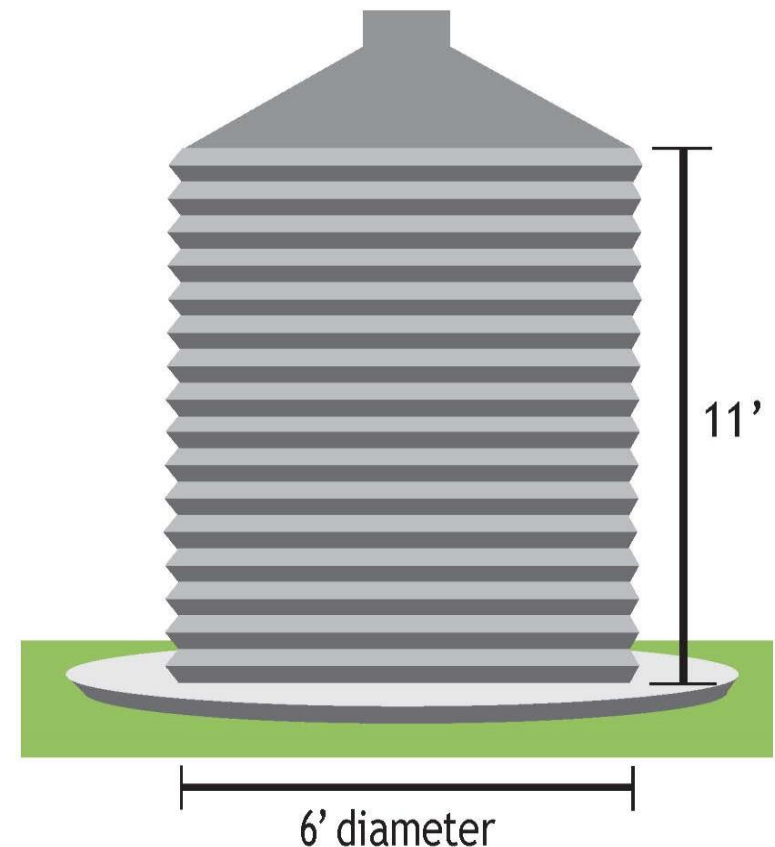
Prairielands GCD is proud to showcase this on-site rainwater harvesting system. Harvesting rainwater is a great resource for reducing erosion, preventing stormwater run-off, and alleviating demand on aquifers. The District utilizes this system to irrigate the both the front and back flowerbeds and landscaping.

Designed to store up to 2,300 gallons each.

Rainwater is collected off of the barn roof through the gutters and stored in the cistern. Then, rainwater is fed by a pump to water the landscape beds in the front and back of the District office.

The system only runs when needed to prevent overwatering and water waste. The irrigation schedule runs early in the morning and late in the evening to reduce loss of water from evaporation.

PGCD's system has potential to collect 80,000 gallons a year based on the 37" average annual rainfall amount for Cleburne at 80% of precipitation captured between the cisterns and rain garden.



PGCD RAINWATER HARVESTING SYSTEM



RWH System Examples with the District



Private Residence,
Johnson County



Private Residence, Johnson County



Guinn Justice Center, Cleburne



Wilemon STEAM
Academy, Waxahachie



Thank You!

Questions?



Prairielands Groundwater
Conservation District



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