

Trophy Club Water Fest 2015

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Where water came from

The water cycle

Water reservoirs (where H₂O is stored)

Water uses (weather, etc.)

Control of water (H₂O seeks its own level)

How do and can I use water

Grapevine Lake Watershed

The 17 subwatersheds (defined by the green polygons) that make up the Grapevine Lake watershed. Stream segments are only mapped for those areas within the 16-county North Central Texas region.

Size: 695 square miles

Subwatersheds: Black Creek-Denton Creek, Braden Branch-Denton Creek, Catlett Creek-Sweetwater Creek, [Denton Creek-Grapevine Lake](#), Dove Creek-Grapevine Lake, Dry Valley Creek, Elizabeth Creek-Denton Creek, Harts Creek-Denton Creek, Headwaters Elizabeth Creek, Henrietta Creek, Hog Branch-Denton Creek,

Grapevine Lake Watershed

[Marshall Branch-Grapevine Lake](#), Morris Branch-Denton Creek, North Pecan Creek-Denton Creek, Oliver Creek, Panther Creek-Denton Creek, and Wells Branch-Denton Creek

Communities: Argyle, Bartonville, Corral City, Decatur, Denton, DISH, Double Oak, Flower Mound, Fort Worth, Grapevine, Haslet, Justin, Keller, New Fairview, Northlake, Ponder, Rhome, Roanoke, Southlake, Trophy Club, Westlake, Cooke County, Denton County, Montague County, Tarrant County, and Wise County

Downstream Watershed: Elm Fork Trinity River



Understanding Water in the Urban Environment

Water is not only one of the most common substances on the surface of the Earth, but it's also one of the most unique chemical compounds known. It's exceptionally stable. Each symmetrical water molecule consists of a single oxygen atom bound to 2 hydrogen atoms lying 105 degrees from each other. In liquid water, every molecule establishes hydrogen bonds with 4 of its neighbors, eventually forming long, branching chains.

Water is sometimes referred to as a “universal solvent”.

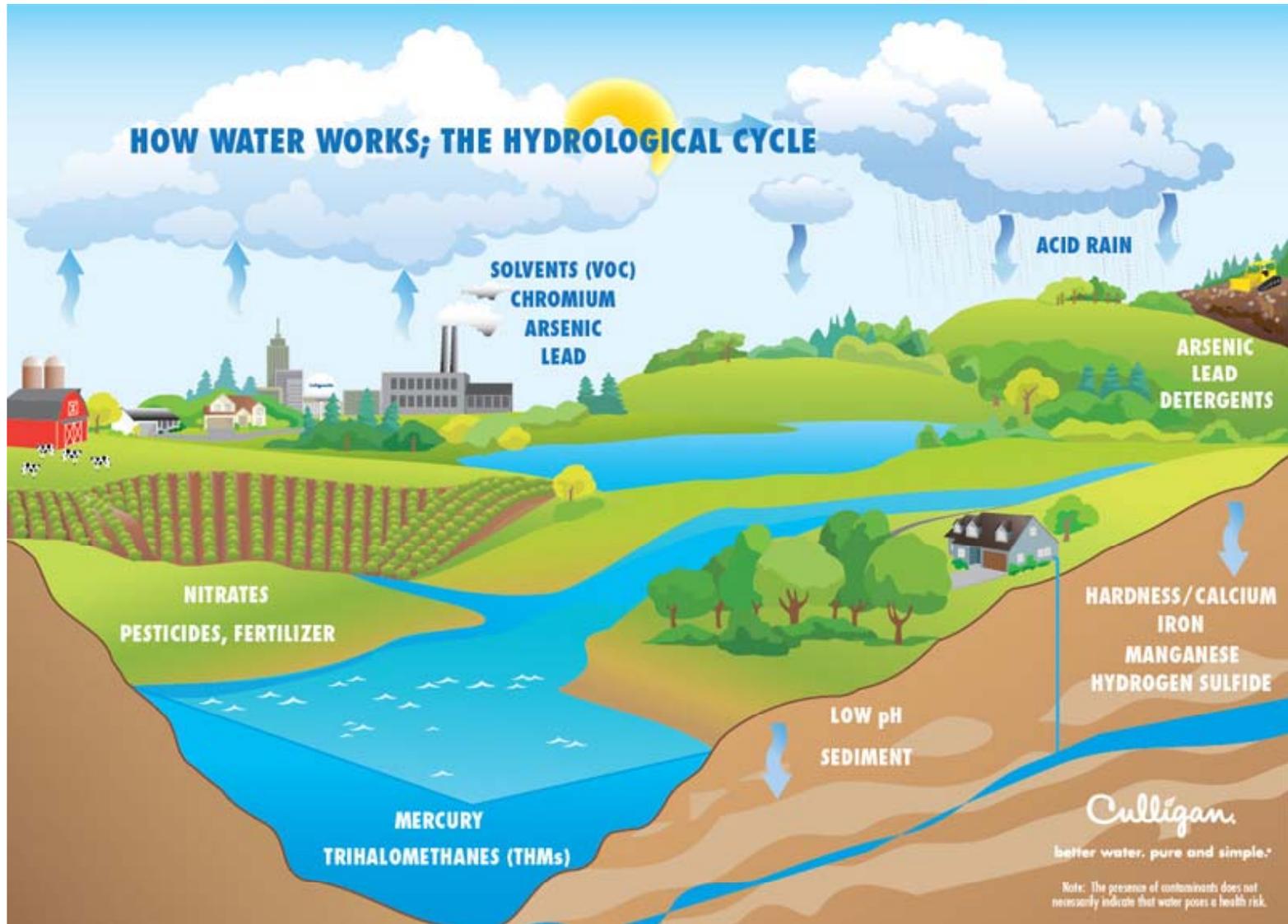
While this is far from true, water will dissolve more substances, and in greater amounts than any other naturally occurring liquid. Over 50 % of the known chemical elements have been found in natural waters.

Water allows the dispersal of other molecules through its own substance, and in doing so, makes available vital nutrients and gases to the myriad lives existing in water.

Turbidity is the degree to which water is transparent.

Pure water is transparent, however natural waters contain suspended sediments and microorganisms.

HOW WATER WORKS; THE HYDROLOGICAL CYCLE



Where did water come from on Earth? There are two schools of thought: one, when the planet was molten, steam was created by the heat, and this was sufficient to start the water cycle. The second school of thought: there was an inundation of frozen water perhaps in the guise of comets that crashed into the Earth about 4.3 billion to 4.5 billion years ago. Personally, I do not know if either is correct. Regardless, we have the water cycle on our planet.

Flowing water transports nutrients to and carries waste products away from aquatic organisms and may even sweep them away. The pH of lotic (flowing) systems is related to underlying geology and the pH of surface runoff and other input. Generally alkaline waters (higher pH) have richer , more abundant fauna while acidic waters (lower pH) are generally low in nutrients and fauna.

The continuous process involving the circulation of water between the atmosphere, the ocean and the land is called the hydrologic cycle. Solar radiation and gravity are the driving forces that "run" the cycle. It's been calculated that there is a mass of about $13,967 \times 10^{20}$ grams of water on the accessible areas of the earth's surface. This water may be found on the surface as liquid or ice, and in the atmosphere as vapor.

Approximately 99% of the total is in the oceans and seas, and most of the remainder is locked in glaciers, ice, and snow. Water vapor in the atmosphere amounts to only a minor fraction of 1 % of the total. The remainder, the inland waters of the lakes, rivers, and wetlands, constitutes only about 0.25×10^{-20} grams, or 0.000018% of the total.

As water vapor cools, condensation occurs and clouds form. When rain or snow falls over land, a number of things can happen to the precipitation. Some precipitation runs off the land surface to collect in bodies of surface water where it can return to the atmosphere by evaporation and by transpiration in plants (evapotranspiration), and some percolates underground (infiltration) to become groundwater.

Underground formations that store water are called aquifers. The upper water level in an aquifer is known as the water table.

Water provides an array of socioeconomic values as well. These values, because they can be described in dollars, are often the easiest for people to understand and appreciate. Socioeconomic values fall into a number of categories :

- Flood control: Aquatic systems play an invaluable role in offsetting flood damage by maintaining the hydrology in rivers and streams during flood events.
- Erosion control: Soil erosion increases water turbidity and costs millions of dollars to maintain stream and channel navigability.
- Groundwater recharge: Standing water percolating through the soil in some aquatic systems may recharge groundwater supplies. Recharge volume varies depending on the permeability of the underlying soil strata.

- Harvestable natural products: Aquatic systems provide a variety of natural products including game and fur-bearing animals, fish and shellfish, timber, wild fruits and grains, peat and grazing areas.
- Recreation and aesthetics: Aquatic systems provide a natural environment that is often used for recreation and nature appreciation. Nineteen of the 25 most visited U.S. National Wildlife Refuges have significant wetland components. Aquatic systems are used for wildlife observation, hunting, fishing, hiking and boating.

Reservoirs (man made)

They are large bodies of water created by damming a river or stream. Many of them are created for flood control and to supply drinking water to neighboring cities. Because reservoirs encompass a river, they present a combination of characteristics of lotic (flowing) and lentic (still) environments. At the inlet and outlet points, they may behave like a lotic system, while behaving like a lentic system in the middle. Though they may share characteristics of natural systems, due to their young age, reservoirs are much more susceptible to rapid changes.

Groundwater

Water that is located beneath the soil surface is yet another special type of aquatic system. Precipitation that is not lost as runoff is absorbed into the soil becoming groundwater. It has been estimated that 22% of the Earth's total supply of fresh water lies underground. This water may be found in underground rivers, lakes, or aquifers. Aquifers are saturated zones of porous materials (such as rock, sand, gravel, etc.) within which water can move freely. In some cases, groundwater may flow (lotic) while in other cases it may not (lentic).

Though our local water issues in North Central Texas do not directly revolve around groundwater supplies as much as other cities' do, groundwater is still a critical component in the overall health of our local aquatic systems.

Where is water stored?

It's stored in the atmosphere, in the ground, and on the surface. So we do not have any ability to create more water. But we have to develop better uses of the water that is available to all of us. To control the water that we have access to we can capture falling water, preserve water that is brought to us through our municipal systems or go in our backyard and drill a well for underground water.

So now challenge yourself to conserve water. One of the options (if your community allows it), is to capture rainwater off of large surfaces like roofs. Another option inside your house is to find ways to save water. Fix all leaks and drips. Run only full loads in the dishwasher. Turn off water in between rinsing dishes. Turn off water while brushing teeth. Shorten showers by 2 minutes. Fill the bathtub half full while bathing. Don't use the toilet as a wastebasket. Wash only full laundry loads and cut back by one load per week. Install faucet aerators with flow restrictors on kitchen and bathroom faucets. Purchase new more efficient clothes washer, showerheads, and toilets.

In the lawn and garden begin by adding native plants to your yard. Go to www.npsot.org/trinityforks to find a list of Drought tolerant plants under their link to plant lists. These are native to this area or to drier and hotter climates in Texas. You can go to the link to NICE! for local nurseries carrying native plants. Start a compost pile rather than using the garbage disposal. Install rain barrels 55 gallons or larger for watering your yard. Use a broom rather than a hose to clean driveways and sidewalk. Water lawns after midnight and before 10 a.m. Reduce irrigation station run times by 2 minutes. Eliminate one irrigation cycle per week.

Adjust sprinklers to reduce overspray onto sidewalks, and other hard surfaces. Repair pipe leaks and broken sprinkler heads. Add mulch (2"-3") around trees and plants. Install water-efficient drip irrigation system. Install a "smart irrigation controller" that adjusts for temperature and precipitation. Use automatic car wash that recycles water instead of hand washing cars. Replace 1000 s. ft. of high water use landscape with a low water-use landscape. Repair leaks around pool or spa pump. Repair any leaking hose bibs. Install a pool cover to reduce evaporation.

And in conclusion, water seeks its own level. Pollution doesn't bother water. But it does complicate everything in the environment. The dinosaurs used the same water that we use today. In the universe water is eternal. It doesn't change. It is the effects that water has on everything that it comes in contact with that can change the environment. And that is what makes water precious water.