Where does your well water come from?

Your **well** gets its water from an underground water source called **groundwater**. Water is found on the earth in three places—above the earth in clouds, stored on the surface in oceans, lakes and ponds, and stored beneath the surface as groundwater. **Groundwater** is water stored underground that originates from surface water and precipitation, including rain and melting snow, which has infiltrated the earth, filling the cracks and open spaces in the layers of soil, sand and rocks called **aquifers.** When rural residents have a **well** drilled for their **water supply**, the **well** taps into an aquifer. Aquifers typically consist of **permeable** materials that have large connected spaces allowing water to flow through. The speed at which groundwater flows depends on the size of the spaces in the soil or rock and how well the spaces are connected.

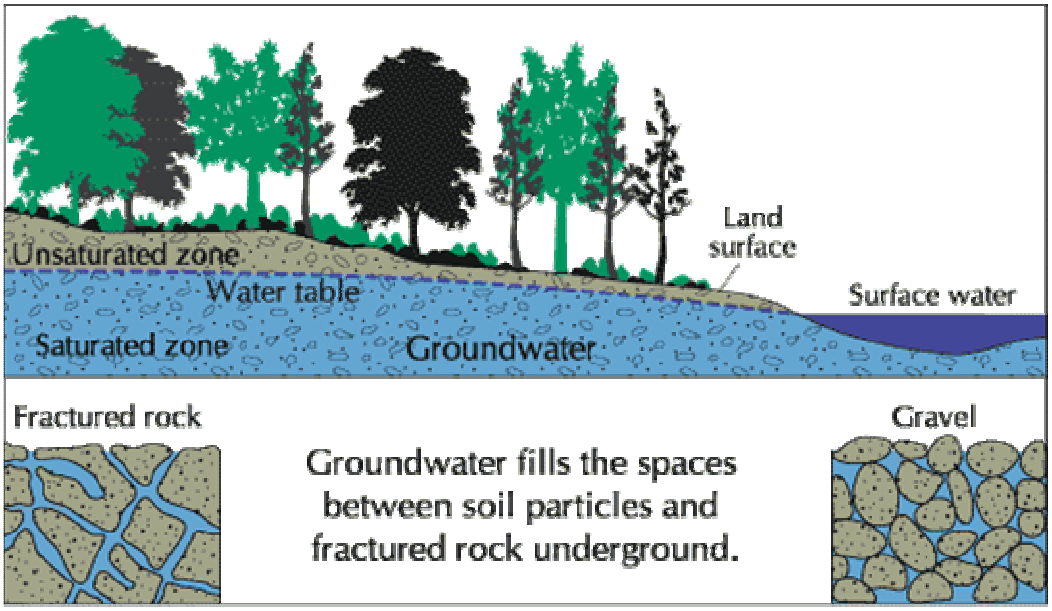

Image compliments of US Geological Survey, adapted by The Groundwater Foundation.

Groundwater can be found almost everywhere. The water table may be deep or shallow; and may rise or fall depending on many factors. Heavy rains or melting snow may cause the water table to rise, or excess use or heavy pumping of groundwater supplies may cause the water table to fall. Groundwater supplies are replenished, or **recharged,** by rain and snow melt. People face serious water shortages or **well** problems when groundwater is used faster than it is naturally replenished.

In areas where material above the aquifer is permeable, pollutants can readily sink into groundwater supplies. Groundwater can be polluted by landfills, septic tanks, leaky underground gas tanks, and from overuse of fertilizers and pesticides. If groundwater becomes **polluted**, it will no longer be safe to drink.

In rural areas drinking water is supplied by **wells** that have tapped into the groundwater. According to 2005 United States Geological Survey (USGS) figures, **groundwater provides an estimated 37%** of the public water supply withdrawals, **51%** of all drinking water for the total population, and **99%** of drinking water for the rural population

Influence of Impervious Cover on Groundwater and Runoff

Impervious cover (streets, houses, parking lots, tennis courts, etc.) is a useful tool to measure the impacts of land development on groundwater resources. As impervious cover increases, less water infiltrates into the ground, reducing groundwater recharge. As impervious cover increases:

- There will be more annual runoff volume as stormflow
- There will be less annual runoff volume as baseflow in streams (Baseflow is the portion of streamflow that comes from groundwater and not surface runoff.)
- There will be more rapid water velocities in streams
- Annual volume of runoff can increase by 2 to 16 times the pre-development rate, with proportional reductions in groundwater recharge.

Groundwater Conservation

Water conservation is increasingly important in the world as the population grows and more of our land becomes urbanized and more impervious. Since groundwater is available in limited quantities and an important resource for so many people, it is essential to protect it. Conserving the quantity of groundwater is easy. By simply reducing the amount of water that we use, our water supply will last longer. Using too much groundwater is not apparent, since one cannot see the water table going down like the water level in a reservoir. The general public is unaware of the amount of water stored beneath the land surface. In Guilford County, 40-60% of the yearly flow in our streams comes as base flow which comes from the groundwater aquifer *(US Geological Survey Report 97-4140)*. When groundwater becomes depleted base flow ceases as is the case in a drought. If groundwater is extracted by a **well** for whatever use, this reduces the amount of base flow now and in the future until this underground aquifer is replenished. The more the groundwater aquifer is depleted by pumping, the longer it will take for the aquifer to be replenished and for base flow to resume.

Do one thing each day that will save water.
Even if savings are small, each drop counts.

There are three ways to address water shortages now and in the future. These can be called the "Three R's".

Reduce the use of water
Reuse the water (recycle it)
Recharge the groundwater aquifer.

Any time water is applied to crops, lawns, and golf courses, it is a **consumptive use**, as evaporation and transpiration return the water as vapor to the atmosphere. However, water used inside the home for bathing and sanitation is a **non-consumptive use.** It is returned to the streams after treatment if you are a city resident, or to the groundwater aquifer for those living in rural areas on wells and septic systems.

Since almost half of the annual flow in streams comes from the groundwater aquifer, there are a number of steps which can be taken to increase the amount of water stored in this source. Natural and mulched areas do not require irrigation, seldom produce surface runoff, and are unequalled in recharging groundwater.

The best thing to do is adopt pollution prevention and conservation practices in order to protect important groundwater supplies from being contaminated or depleted in the first place.

Saving Water Outdoors

1. Don't overwater your lawn - no more than once a week in the winter or twice a week in the summer. A good rain eliminates the need for watering for up to two weeks. Buy a rain gauge. Most of the year, lawns only need one inch of water per week.
2. Plant it smart. Xeriscape landscaping is a great way to design, install and maintain both your plants and irrigation system. It will save time, money and water.

3. Water lawns during the early morning hours when temperatures and wind speed are the lowest. This reduces evaporation and waste.
4. Position sprinklers so water lands on the lawn and shrubs and not on paved areas.
5. Install irrigation devices that are the most water efficient for each use. Micro and drip irrigation and soaker hoses are examples of efficient devices.
6. Raise the lawn mower blade to at least three inches, or to its highest level. A higher cut encourages grass roots to grow deeper, shades the root system and holds soil moisture.
7. Avoid over fertilizing your lawn. Applying fertilizer increases the need for water. Apply fertilizers which contain slow-release, water-insoluble forms of nitrogen.
8. Use mulch to retain moisture in the soil. (Help preserve native cypress forests by selecting other types of mulch such as treated melaleuca.) Mulch also helps control weeds that compete with landscape plants for water.
9. Plant native and/or drought-tolerant grasses, ground covers, shrubs and trees. Once established, they do not need water as frequently and usually will survive a dry period without watering. They also require less fertilizer or herbicides. Group plants together based on similar water needs.
10. Use a broom or blower instead of a hose to clean leaves and other debris from your driveway or sidewalk and save 80 gallons of water every time.
11. Use a shut-off nozzle on your hose which can be adjusted down to a fine spray, so that water flows only as needed. When finished, turn it off at the faucet instead of at the nozzle, to avoid leaks. Check hose connectors to make sure plastic or rubber washers are in place. Washers prevent leaks.
12. Do not leave sprinklers or hoses unattended. A garden hose can pour out 600 gallons or more in only a few hours. Use a bell timer to remind yourself to turn sprinklers off.
13. Avoid purchasing recreational water toys which require a constant stream of water or installing ornamental water features (such as fountains) unless they use recycled water.
14. If you have a swimming pool, consider a new water-saving pool filter. A single backflushing with a traditional filter uses 180 to 250 gallons of water.
15. Use porous materials for walkways and patios to keep water in your yard and prevent wasteful runoff.
16. Remember to weed your lawn and garden regularly. Weeds compete with other plants for nutrients, light, and water.
17. While fertilizers promote plant growth, they also increase water consumption. Apply the minimum amount of fertilizer needed.
18. Aerate your lawn. Punch holes in your lawn about six inches apart so water will reach the roots rather than run off the surface.

Saving Water Indoors

19. Never pour water down the drain when there may be another use for it. Use it to water your indoor plants or garden.
20. Retrofit all household faucets by installing aerators with flow restrictors.
21. Check for toilet leaks by adding food coloring to the tank. If you have a leak, the color will appear in the bowl within 30 minutes. (Flush immediately to avoid stains.)
22. If the toilet handle frequently sticks in the flush position or if the toilet flapper sticks open after flushing, letting water run constantly, replace or adjust it.
23. Install a toilet displacement device to cut down on the amount of water needed for each flush. (Don't use a brick! There are devices available at most hardware and home centers.) Be sure installation does not interfere with the operating parts. Consider low-volume toilets which use less than half the water of older models. NOTE: In many areas, low-volume units are required by law.
24. Take shorter showers. Replace your showerhead with an ultra-low-flow version. Time your shower to keep it under 5 minutes. You'll save up to 1000 gallons a month.
25. Place a bucket in the shower to catch excess water to water indoor plants.
26. Operate automatic dishwashers and clothes washers only when they are fully loaded or set the water level for the size of load you are using. You could save 1000 gallons a month.

27. When hand washing dishes, save water by filling two containers – one with soapy water, one with rinse water containing a small amount of chlorine bleach.
28. Store drinking water in the refrigerator. Don't let the tap run while you are waiting for water to cool.
29. Do not use running water to thaw meat or other frozen foods. Defrost food overnight in the refrigerator, or use the defrost setting on your microwave.
30. Kitchen sink disposals require lots of water to operate properly. Start a compost pile as an alternate method of disposing of food waste. Using compost when you plant adds water-holding organic matter to the soil.
31. Don't let water run while brushing your teeth, washing your face or shaving and save 4 gallons a minute. That's 200 gallons a week for a family of four. Consider washing your face or brushing your teeth while in the shower.
32. Avoid flushing the toilet unnecessarily. Dispose of tissues, insects and other similar waste in the trash rather than the toilet.
33. Collect the water you use for rinsing produce and reuse it to water houseplants
34. Install an instant water heater on your kitchen sink so you don't have to let the water run while it heats up. This will also reduce heating costs for your household.
35. Choose new water-saving appliances, like washing machines that save up to 20 gallons per load.

General Water Saving Tips

36. Make sure your home is leak-free. Repair dripping faucets by replacing washers. One drop per second wastes 2,700 gallons of water per year!
37. When you are washing your hands, don't let the water run while you lather.
38. Consider using a commercial car wash that recycles water. If you wash your own car, park on the grass and use a hose with an automatic shut-off nozzle.
39. Do not waste water waiting for it to get hot. Capture it for other uses such as plant watering or heat it on the stove or in a microwave.
40. Consider insulating your hot water pipes, so you don't have to run as much water to get hot water to the faucet.
41. Think twice about installing a water-to-air heat pump or air-conditioning system. Newer air-to-air models are just as efficient and do not waste water.
42. Install water softening systems only when necessary. Turn softeners off while on vacation.
43. If you have a well at home, check your pump periodically. If the pump kicks on and off while water is not being used, you have a leak.
44. Teach your children to turn the faucets off tightly after each use.
45. Make sure you know where your master water shut-off valve is located. This could save gallons of water and damage to your home if a pipe were to burst.
46. More plants die from over-watering than from under-watering. Be sure only to water plants when necessary.
47. When you clean your fish tank, use the water you've drained on your plants. The water is rich in nitrogen and phosphorus, providing you with a free and effective fertilizer.
48. Bathe your pets outdoors in an area in need of water.
49. When you give your pet fresh water, don't throw the old water down the drain. Use it to water your trees or shrubs.
50. If you accidentally drop ice cubes when filling your glass from the freezer or when you have ice left in your cup from a take-out restaurant, don't throw them in the sink. Drop them in a house plant instead.

For additional information visit Water, Use It Wisely, http://www.wateruseitwisely.com/.