

Watersheds, Wells & Limestone in Loudoun County, Virginia

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WHEREVER YOU LIVE, YOU ARE IN A WATERSHED.

A watershed is all the land area that drains to a given body of water such as a stream, river, lake, or a bay – such as the Chesapeake Bay. Watersheds can be small or large depending on the size of the water body the land is draining to. After rain falls on the ground, it either evaporates, seeps into the ground to become groundwater, or flows across the ground to a lower area, eventually reaching a water body like a stream.

As water flows across a field, lawn, pavement, or other surface, it can pick up sediment, nutrients, pesticides, bacteria, oil, or other types of harmful contaminants which degrade the quality, safety, and usefulness

of the water. Protecting our water resources – both surface water and groundwater – is critical to our health, economy, and environment. To protect our water resources, we must be aware of our watersheds and what happens in them.

If everyone takes care of the watershed they live in, it will help take care of them by providing clean, abundant water and healthy ecosystems which are vital to our economy and quality of life.

What You Can Do To Protect Your Watershed

- Get to know your watershed and where you live in it.
- Limit or eliminate lawn fertilizers, chemicals, and irrigation.
- Dispose of animal waste properly; cover manure piles.
- Maintain vehicles & equipment to eliminate oil and fluid leaks.
- Keep livestock out of streams.
- Reduce lawn turf grass by using native landscape plants.
- Have your on-site sewage system inspected and maintained regularly.
- Dispose of hazardous materials and chemicals properly.



Groundwater flowing from a well in need of repair.

For many residents of Loudoun, the water they drink and use comes from a well. It may be a small well on their property or a large well in a community water

system. These people are dependent on a sustainable supply of clean groundwater which comes from an “aquifer” – an extensive underground body of sand, gravel, fractured bedrock, or other earth material that is saturated and provides useable amounts of water to wells or springs. This “groundwater” comes from water on the surface that seeps into the ground and slowly percolates through soil and other sediments which filter and clean the water.

Protecting our water resources is critical to our health, economy, and environment.

Where To Find Additional Information

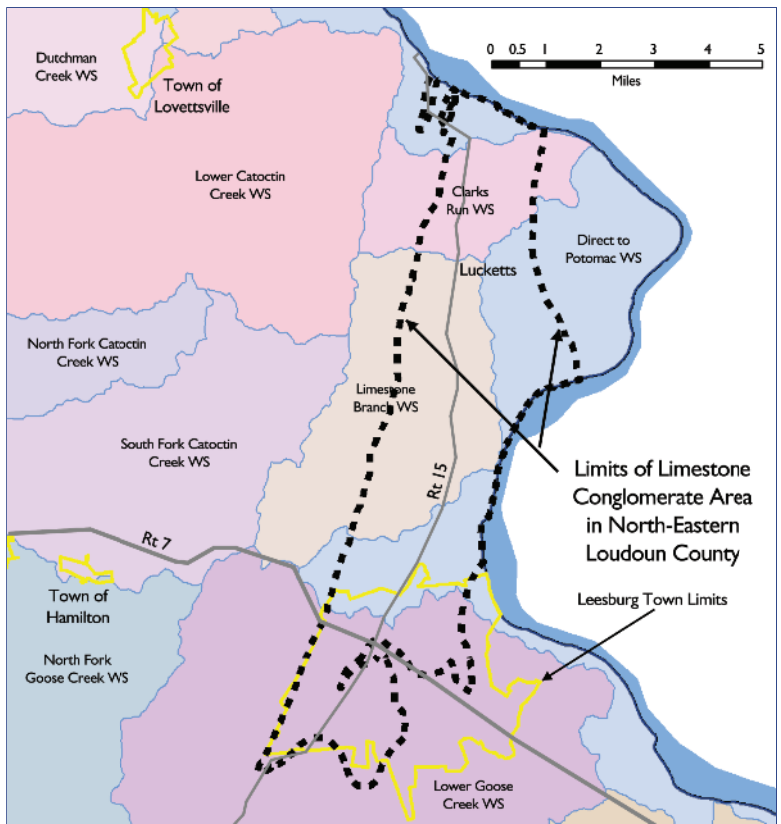
Loudoun County Government:

- Department of Building & Development, Engineering Division
703-777-0397 www.loudoun.gov/waterresources
- Department of Health, Environmental Division
703-777-0234 www.loudoun.gov/limestone-wells

Virginia Department of Conservation and Recreation:

“Tips for Living on Karst” at
www.dcr.virginia.gov/natural_heritage/livingonkarst.shtml

Limestone & Karst



Limestone is a common sedimentary rock composed primarily of calcium carbonate. Carbonate rocks dissolve when exposed to acid and because normal rainwater is slightly acidic, it dissolves limestone rock

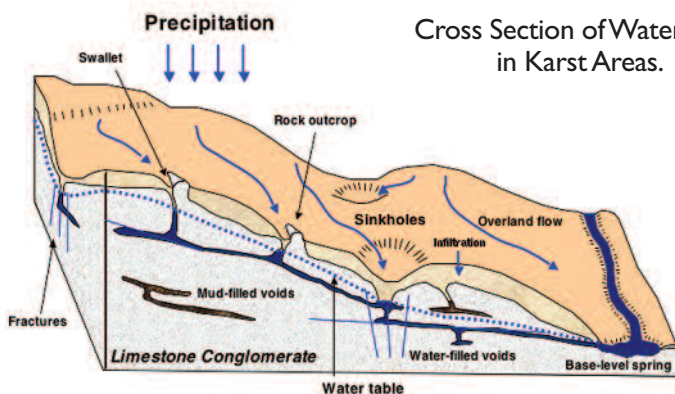
over time. This process continues below ground as groundwater flows through small cracks and fractures in the limestone rock and gradually enlarges them. Given the right conditions and enough time, channels and caverns form in the rock underground and create a type of landform called “karst”. Karst land areas have characteristics such as sinkholes, fluted and pitted rock outcrops, springs, and caves. The bedrock geology around Leesburg and northward includes carbonate rock material called limestone conglomerate and the area has many features of a karst terrain.

In the Limestone area of Loudoun County, the geology is quite different and has a significant affect on the groundwater resource.



Recently formed large sinkhole in the Limestone area of the County.

One of the most notable karst features are sinkholes. These form when the earth material overlying an underground cavity can no longer support its own weight and collapses into the cavity – often quite rapidly. Over time, sinkholes may fill up with sediment and create shallow, circular depressions. The precise location of underground solution channels and caverns (and potential sinkholes) is very difficult to predict without extensive testing. Predicting when a sinkhole may form is not possible although they tend to occur more frequently during sustained droughts and when heavy rains occur after a drought. Human activities such as changing surface water drainage patterns, well drilling, and heavy groundwater pumping may also initiate formation of a sinkhole in a location already prone to collapse.



Cross Section of Water Flow in Karst Areas.

What you Can do To Protect Your Well & Groundwater In Karst Areas

- Keep hazardous materials, fertilizers, animal waste, etc. away from your well and away from sinkholes and depressions.
- Do not fill sinkholes or depressions with trash as it may contaminate water pumped from your or your neighbor's well.
- Do not over-pump your well during extended droughts as this may increase the risk of developing a sinkhole nearby.
- The ground around your well casing should be graded to prevent standing water from accumulating around the well.
- Test your well water annually for coliform bacteria, nitrates, and any other suspected contaminants.
- Wells no longer in use should be properly abandoned in accordance with Loudoun County Health Department regulations.
- Alert the County at 703-777-0397, if you observe new sinkholes or depressions.

Groundwater flow and recharge in karst areas is significantly different from other areas. Water can flow down a sinkhole and into the groundwater system quite rapidly making groundwater in karst areas much more vulnerable to contamination from surface sources.

Surface water in a karst area can quickly enter the groundwater system through sinkholes or solution-riddled limestone rock outcrops with little or no filtering action through soils.

These contaminants may include bacteria from animal waste or failing drainfields, pesticides and fertilizers in runoff, and hazardous products that were not disposed of properly. Any of these could end up in well water. Contaminated wells and sinkholes are some of the problems that may occur in karst areas; however, as long as people are aware of the potential problems, take reasonable precautions, and take care of their watershed, wells can be safely used in the karst area of Loudoun County.