

Sinkhole Management

The quality of the groundwater depends on how we use the land. There are positive actions that we can take to prevent sinkholes from becoming pathways to groundwater contamination:

- ✓ Don't use sinkholes as dump sites for trash, household or farm waste, hazardous chemicals including fertilizers and pesticides or natural debris such as grass clippings, tree limbs, dirt or dead animals. As a rule, don't put anything in a sinkhole that you wouldn't put in your drinking water.
- ✓ Reduce the entry of eroded soil and other pollutants by planting vegetation such as native trees, shrubs and grasses around sinkhole perimeters and fencing out livestock.
- ✓ Consider issues affecting karst topography when building structures and planning septic systems, lagoons and stormwater basins.



Source: Red River, Sumner County, Tenn.
Restoring sinkholes helps preserve the health and ecology of tributary streams and the Red River, the main drinking water source of many communities in the region.

Cleaning up groundwater in karst areas is slow, expensive and rarely successful. Prevention is the best measure!



All photographs were taken by RRWA staff and/or volunteers. For more information on sinkholes and protecting local waters, or to inquire about sinkhole restoration projects, contact
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Sinkholes and Water Quality in the Red River Watershed

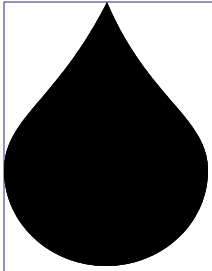


Source: Orlinda, Tenn., private property.

Restoring Water Quality One Sinkhole at a Time



Water Works



Clean, adequate water sources are the mainstay of life. In Middle Tennessee and South Central Kentucky, groundwater feeds our springs, creeks and waterways.

Groundwater is supplied largely by precipitation that infiltrates the soil and bedrock. Surface water, such as streams, lakes and oceans, feed into or draw on groundwater. Groundwater often re-emerges as surface water. Groundwater supports drinking water and habitats for diverse wildlife species and provides the water source for crop irrigation and industry.

Despite its tremendous value, the groundwater in the Red River Watershed is **threatened**. The unique karst topography (*a special type of landscape formed by the dissolution of soluble rocks, including limestone and dolomite*) and the groundwater recharge system make the water sources for this region vulnerable to pollution and contamination.

In both urban and rural areas, land or surface activities, such as industrial waste disposal, improper application of agricultural chemicals and fertilizers, inadequate stormwater management practices, malfunctioning septic tanks and accidental spills, can leak substances into groundwater.

Sinkholes and Water Quality

Sinkholes are natural drainage points for a groundwater system. The Pennyroyal karst that underlies the Red River Watershed is characterized by cones or bowl-shaped depressions that form in the land's surface as the result of a carbonate bedrock being dissolved by water. Rain and melting snow seep into the soil or through fractures and openings in the rock layers and contribute to the formation of sinkholes. Streams and surface runoff enter sinkholes, bypassing natural filtration.



Source: Hwy 79, North, Clarksville, Tenn.

A Montgomery County sinkhole historically used as a dump site.

Misuse of sinkholes through improper land use and surface activities, as well as unattended natural processes such as flooding, can spread contamination into our groundwater, streams and rivers. Impacted sinkholes mean loss of valuable land and structures and potential injury or loss of life to livestock and people.

The good news is there are positive, cost-effective measures that can be taken to restore sinkholes and minimize damages.

Partners In Protection

Since 2002, Austin Peay State University's Center of Excellence for Field Biology has pioneered the restoration of sinkholes in Montgomery and Robertson counties of Tennessee, and Todd County in Kentucky. Working in partnership with the Tennessee Department of Agriculture Nonpoint Source Program, the Tennessee Wildlife Resources Agency (TWRA), Natural Resources Conservation Service (NRCS) and the Red River Watershed Association (RRWA), the Center has procured funding to support sinkhole restoration projects on many private lands. The Center continues to successfully collaborate with local landowners and is making considerable strides to enhance and protect surface and groundwater supplies.

Best management practices used in the restoration process include excavating sinkholes by removing trash and debris from openings so that there is a clear pathway to bedrock or parent material allowing for adequate drainage and filtration and filling the sinkhole with a rock substrate. The final step, the addition of vegetation, including native trees, shrubs and warm season grasses, provides a buffer around the sinkhole through which pollutants are filtered.



Source: Todd County, Ky., private farm.

A restored sinkhole in Todd County, Kentucky with natural vegetation and livestock exclusion fencing.