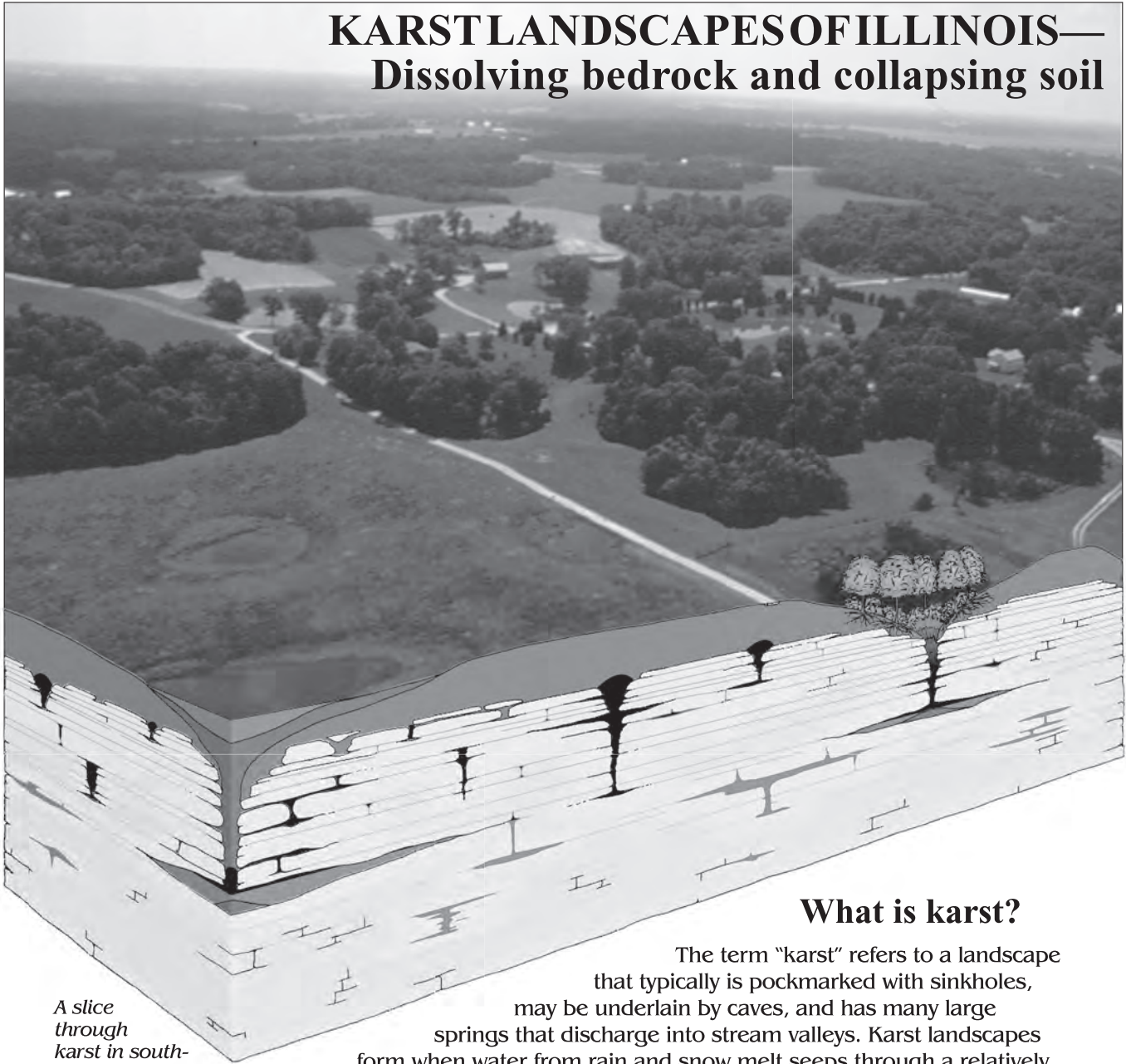


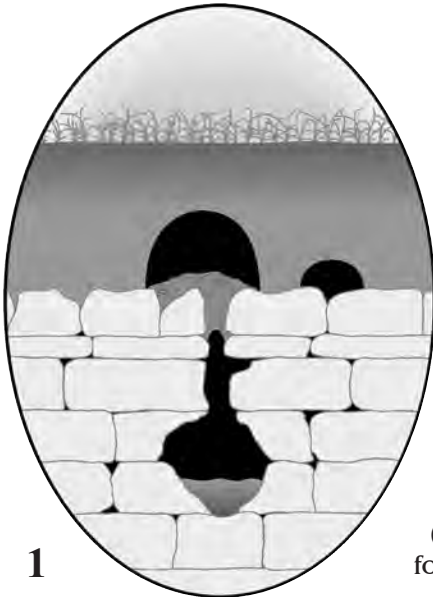
KARSTLANDSCAPES OF ILLINOIS— Dissolving bedrock and collapsing soil



A slice through karst in southwestern Illinois.

What is karst?

The term "karst" refers to a landscape that typically is pockmarked with sinkholes, may be underlain by caves, and has many large springs that discharge into stream valleys. Karst landscapes form when water from rain and snow melt seeps through a relatively thin soil cover and into a fractured and soluble bedrock (limestone or dolostone). As water moves through the fractured rock, it slowly (over thousands of years) dissolves and enlarges pathways along the fractures and bedding planes of the rock. Once these underground drainage pathways have been established in the bedrock, surface-water drainage is diverted underground. As a result, karst areas generally lack the network of surface streams seen in most other areas. In karst areas, surface runoff drains into sinkholes and flows through solution-enlarged conduits ("caves" if they are large enough for a human to crawl into) in the underlying rock until it is discharged through springs into surface streams at lower elevations.



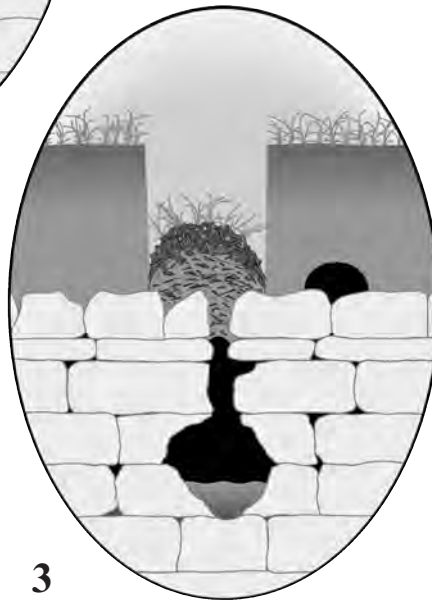
How do sinkholes form?

A sinkhole is a naturally occurring, usually cone- or bowl-shaped depression in the land surface formed as the result of the collapse of the soil cover into a crevice in the underlying bedrock, or the collapse of a cave roof and its overlying rock and soil cover into the cavity below.

Initially, a sinkhole forms as soil collapses into a crevice and is carried away through a conduit by water (1). Further collapse of the soil cover from below causes circular cracks to develop at the surface (2). Then the soil roof of the developing sinkhole falls into the hole to form a cylindrical cavity (3). Erosion by water flowing into this new drain hole smooths the hole's sharp edges to form the typical inverted cone- or bowl-shaped depression (4).



Simple cone- or bowl-shaped sinkholes can continue to enlarge and may coalesce with adjacent sinkholes to form a wider and irregularly shaped compound sinkhole. Some compound sinkholes in Illinois cover more than one-half square mile. If a build-up of soil and debris plugs the drain of the sinkhole's pathway to the underground, or if the conduit in the bedrock is blocked, the sinkhole may fill with water and form one of the round ponds typically seen in karst landscapes.



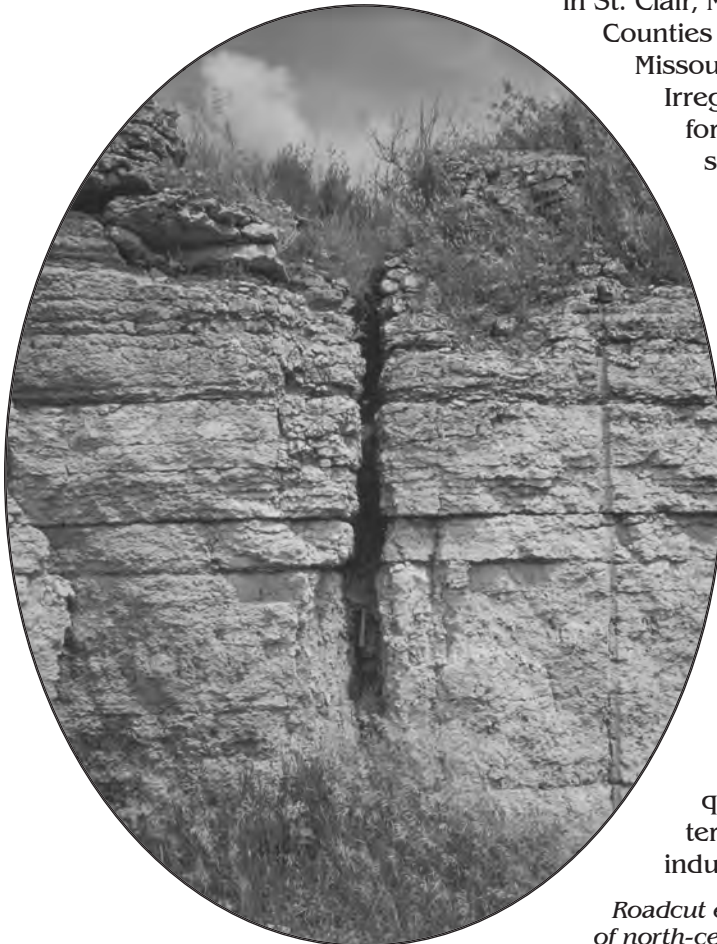
Karst regions of Illinois

Two conditions are necessary for karst landscapes (dark gray areas). (1) Soluble rocks, generally limestone and dolostone, must lie at or near the surface of the ground. (2) The loose soil covering the soluble bedrock must be thinner than about 50 feet.

In the northern one-third of Illinois, the soluble bedrock strata in which karst features form are mostly dolostone, made of the mineral dolomite (calcium-magnesium carbonate). In this area, the karst landforms tend to be comparatively small—sinkholes are generally round and measure a few tens of feet in diameter. Roadcuts along major highways expose solution-enlarged crevices in the rocks, many of which are completely or partially filled with soil.

In the southern two-thirds of Illinois, the soluble bedrock strata are mostly limestone, made of the mineral calcite (calcium carbonate). Because limestone is somewhat more soluble than dolostone, sinkholes and other karst landforms tend to be more numerous and larger here. Some sinkholes in St. Clair, Monroe, and Randolph Counties (southeast of St. Louis, Missouri) are more than half a mile in diameter.

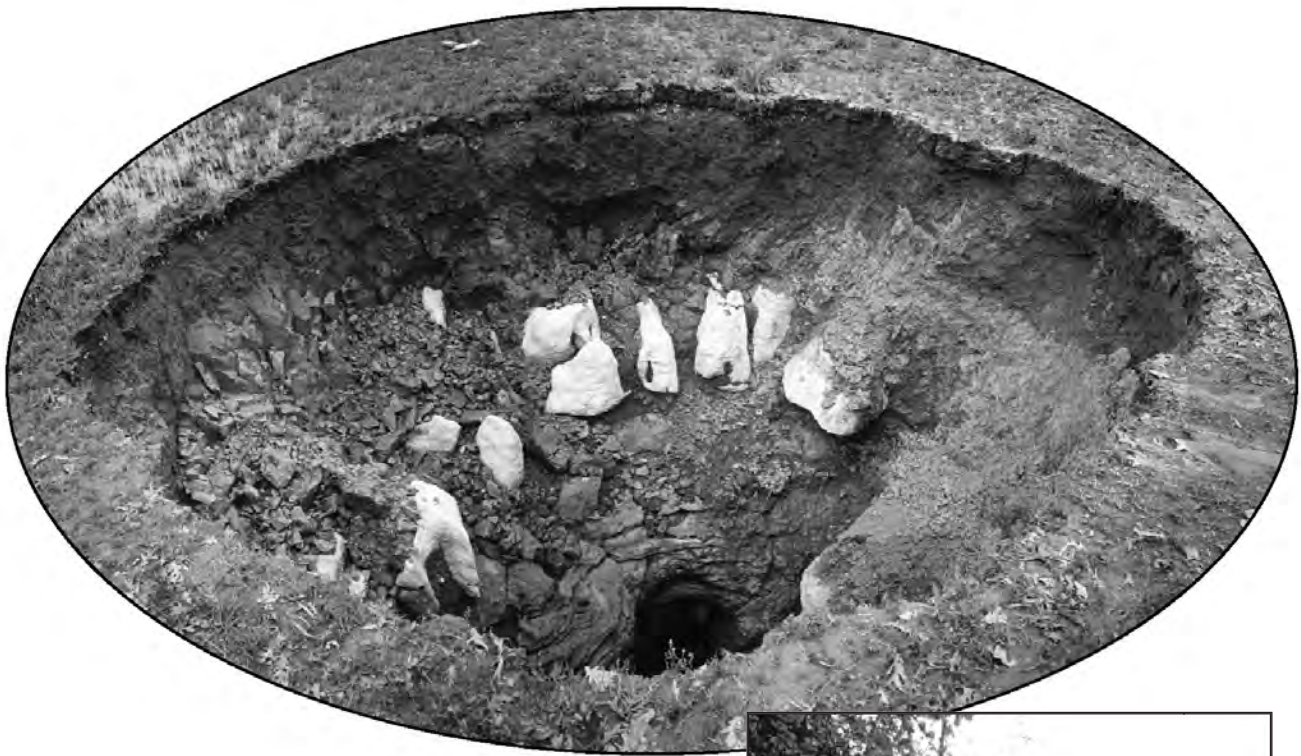
Irregularly shaped compound sinkholes, generally formed by the growth and merger of several round sinkholes, also are more common here than in northern Illinois.



Roadcut exposing creviced dolomite typical of north-central and northwestern Illinois.

Contamination susceptibility

Groundwater in karst landscapes is susceptible to contamination because of the fractured and honeycombed bedrock and the absence of a thick soil cover. Recharge to the groundwater does not benefit from the slow filtering that occurs when rain and snow melt seep through thick sequences of clay-rich glacial till or low-permeability bedrock. In karst areas, recharge to the water table is rapid (often occurring within minutes or a few hours of a rainfall) and can carry with it contaminants from the surface that may include effluent from private septic systems, agricultural chemicals, animal and live stock wastes, motor oil, industrial waste, and garbage. Consequently, in karst landscapes the risk of groundwater contamination from residential, agricultural, or industrial development is very high.



Sinkholes can be dangerous

The "throats" at the bottoms of some sink holes have sharp drop-offs that reach tens of feet deep into crevices or caves in the bedrock below. The funnel-like soil walls of a sinkhole may also be coated with slippery mud. Household pets, people, and even livestock can fall, get trapped, or drown in sinkholes. Trapped livestock have been reported in southwestern and southern Illinois. Young children and animals should be kept away from sinkholes. Newly formed sinkholes are particularly dangerous because they generally have steep vertical sides that may be tens of feet deep (one in Dongola, Illinois, was 60 feet deep) and overhangs of thin soil around the edge may collapse under the weight of a curious person.



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