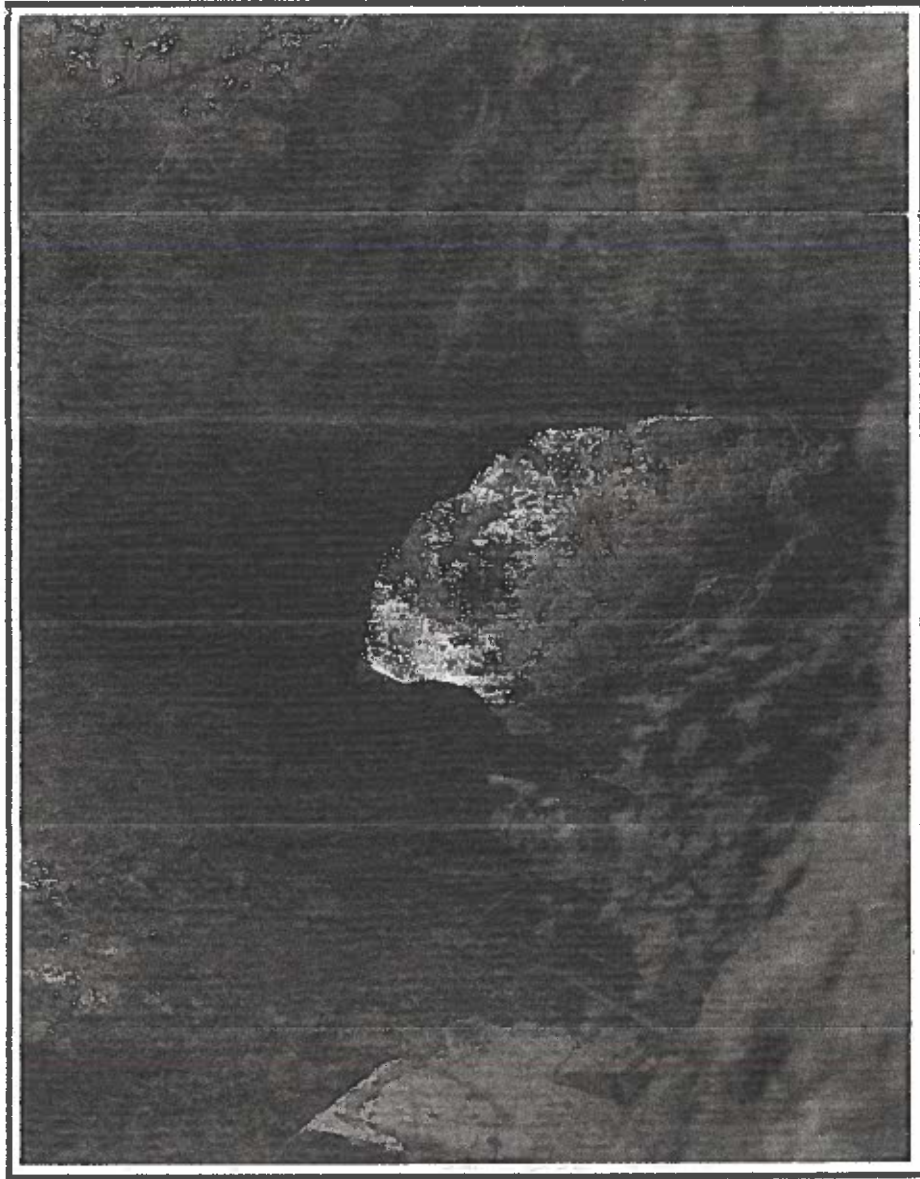


Caves in Kansas



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caves are wet and must be entered through sinkholes either by rope or by cable ladder. Entering these caves requires special training and equipment, and, as is necessary with all privately owned caves, the caver must have the owner's permission.

Unlike most Flint Hills limestones, the Fort Riley contains no chert. It is divided into three layers. The upper layer is the thickest—up to 25 feet (8 meters). This layer is porous and forms sinkholes, which drain water from the relatively flat uplands. Boulders around these sinks are honeycombed and look like gray Swiss cheese (fig. 20). The middle layer—approximately 20 feet (6 meters) thick—is interbedded with shale and forms the roof of the horizontal cave passages. The passages themselves have developed in the third layer—a pure light-gray limestone in the lower 10 feet (3 meters) of the Fort Riley.

The Kansas Speleological Society knows of approximately 70 caves in the Fort Riley limestone, most of which are in Butler and Cowley counties. This rock layer is relatively thick in these counties [44–55 feet (13–17 meters)]. In places, karst topography extends over several square miles. The Fort Riley Limestone Member is even thicker in Morris County [averaging 67 feet (20 meters) thick], but any sinks and cave passages that may have existed here have been plugged by silt created by years of cultivation. The northernmost cave in the Fort Riley limestone is in Pottawatomie County, in the uplands near Tuttle Creek Lake.

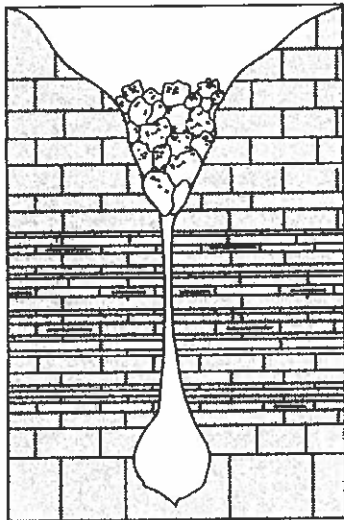


Figure 20. Cross section of a cave passage in the Fort Riley Limestone.

The longest mapped caves in Kansas are found in the Fort Riley limestone of Butler County. Spring Cave and Smith Cave have been mapped to lengths of 8,529 feet (2,512 meters) and 7,285 feet (2,185 meters), respectively (fig. 21). Spring Cave has the only large walk-in entrance left in the Flint Hills, although one once existed in a cave just west of the town of Towanda. The entrance to Smith Cave is typical for the area: a small body-size hole above a 42-foot-deep (13-meter-deep) vertical shaft. Legend has it that boards thrown in the entrance to Smith Cave floated out the Spring Cave entrance, but explorers have not yet made a physical connection between these caves. Unless explorers have a full wet suit to prevent hypothermia, proper caving equipment, and training, these caves are dangerous. Property owners do *not* allow entrance to Smith Cave, but Spring Cave can be entered with permission.

Because cattle ranching is the primary use of land in the southern Flint Hills, many of the sinkhole entrances have been filled to prevent cattle from falling into them. Fill material includes used barbed wire, concrete rubble, asphalt, cars, large appliances, tires, and household refuse. Ironically, ranching has also saved many of the entrances. Water for cattle is provided by windmills located directly above cave streams in natural sinkhole openings called karst windows. Because sinkholes on the surface are directly related to horizontally flowing water below, landowners should exercise care in disposing of wastes in their sinks. In one area a cave stream in a sinkhole was traced to a spring 5 miles (8 kilometers) away.

Hourglass Cave, located in the Fort Riley Limestone Member in Butler County, has been mapped by the Kansas Speleological Society to a length of 3,461 feet (1,055 meters) (fig. 22). It is typical of caves in the southern Flint Hills. The entrance is through a sinkhole 30 feet (9 meters) above the floor of the largest room of the cave. The room is approximately 8 × 12 feet (2.4 × 3.7 meters) with the ceiling nearly as high as the sink entrance. Cave explorers must use rappelling equipment to enter the cave (fig. 23) and, once in the cave, put on full wet suits and protective gear. To explore the cave, one must squeeze into a low-water crawlway over a bedrock floor, which continues for more than 100 feet (30 meters). This is followed by a passage of stooping—and occasionally standing and crawling—height. The standing areas are domes, often located under surface sinks.

These areas occasionally have stalactites, flowstone, and gours, tiny rimstone dams that form on sloping flowstone.

An active cave stream covers the entire floor of the cave. In the entrance it runs under a pile of rubble, and in places large rimstone dams are found in the cave stream. The water depth ranges from a few inches to 3 feet (0.9 meter). Explorers

must occasionally totally submerge to negotiate the passage. With a cave temperature of 54°, explorers will chill rapidly without a wet suit for protection.

Several forms of life have been found in Hourglass Cave, including tiger salamanders, leopard frogs, cave crickets, crayfish, isopods (fig. 24), snails, and amphipods. Bats are occasionally found

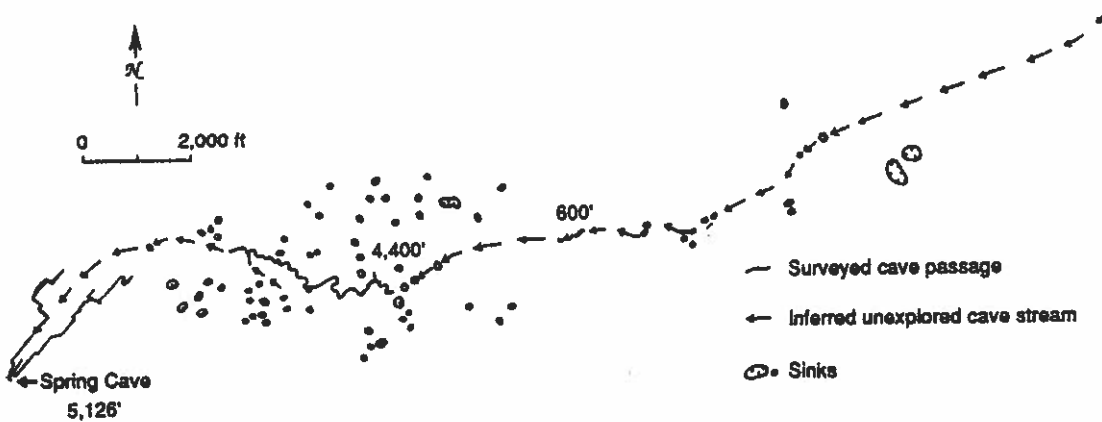


Figure 21. Spring Cave System. Map by Jonathan Beard and Charles Van Arsdale.

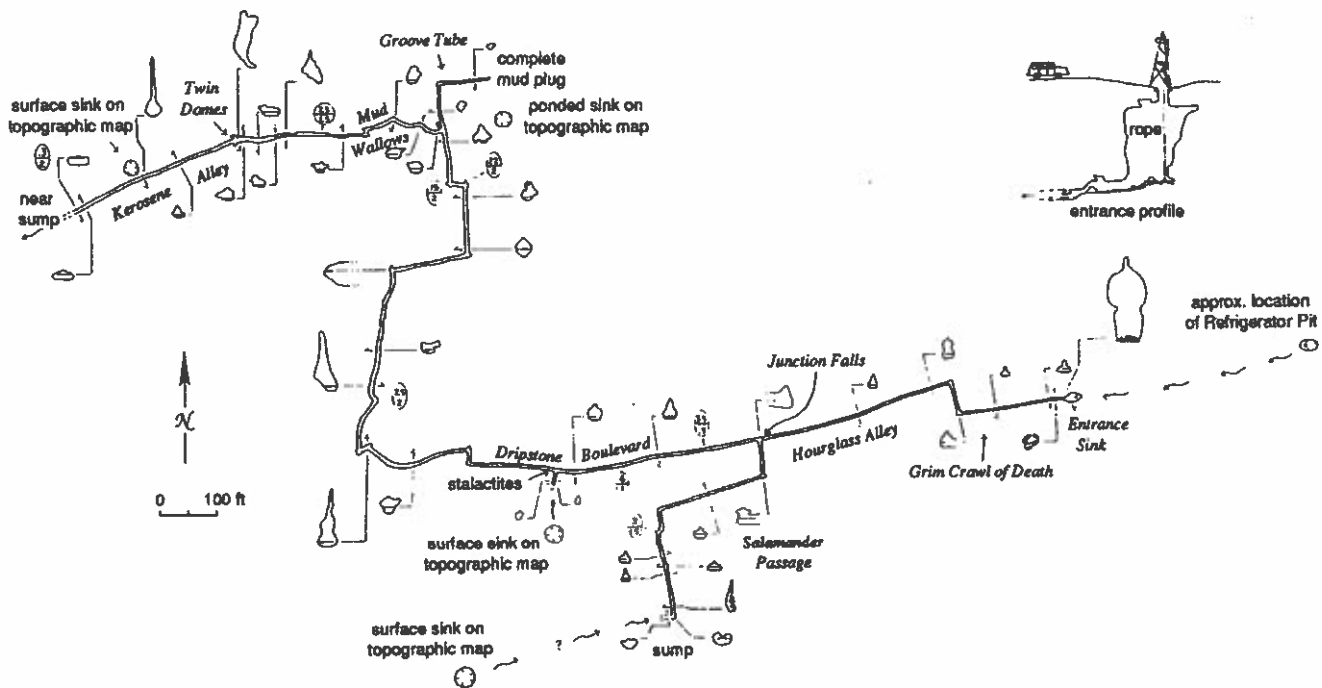


Figure 22. Hourglass Cave. Total surveyed length is 3,460.7 feet. Surveyed by Jonathan Beard, James Young, and Donald Koller.

in other caves in the Fort Riley Limestone Member, but not in large numbers. Members of the KSS have observed fish in Spring Cave, but they are probably from nearby ponds outside the caves and are not a special cave-adapted animal.

Caves in the Florence Limestone Member

A third cave-forming limestone in the Flint Hills is the Florence Limestone Member. It makes up the lower part of the Barneston Limestone and is located below the Fort Riley Limestone Member. The Fort Riley and the Florence Limestone Members are separated by the Oketo Shale Member (see fig. 4). Early geologists referred to the Florence limestone as the Florence flint. It forms a prominent steep hill because of the abundance of chert in it and is one of the limestones that gives



Figure 23. Looking up into the sinkhole entrance of Hourglass Cave, Butler County. Photo by Jim Young.

the Flint Hills its name. The chert found in the Florence limestone occurs in lenses (bands of side-by-side chert nodules). Chert makes the Florence limestone easily distinguishable from the chert-free rock of the Fort Riley Member.

Springs and seeps are common along the lower part of the Florence Limestone Member. These are easily recognized from a distance on the prairie by a line of shrubs and green vegetation. The upper layer of Florence limestone forms the gentle slopes of the Flint Hills, which are strewn with residual chert. The edge of the hill is formed by a sparsely cherty limestone that is cellular and porous in many places. Cave passages can form within this middle layer. The floor of the cave is formed by a third layer that has two or more thin fossiliferous shale breaks. The creeks near the springs are floored in shale of the Blue Springs Shale Member, which lies directly below the Florence Limestone Member.

Jack Spring, the largest spring in Chase County, is one such prairie oasis. During periods of low flow it discharges 95 gallons (360 liters) of water per minute, or about 50 million gallons (190 million liters) per year. During periods of increased precipitation, a much greater volume of water is discharged.

The entrance to Jack Spring Cave is picturesque (plate 8). Water flows from several small holes in the base of the limestone wall. The water then cascades over a "hill" of travertine covered with watercress into a small stream. To gain entrance, a caver has to crawl through the flowing water through a hole 18 inches (0.5 meter) in diameter. The hole is better suited for raccoons, which have left their footprints thousands of feet into the cave. After a 40-foot (12-meter) entrance crawl, a stooping passage leads to a small room with a mud bank (fig. 25). Two short, dead-end passages, which lead from this room, suggest previous entrances. The ceiling height in the main passage is approximately 3 feet (0.9 meter); the width of the main passage is 6 feet (2 meters), and there is 6 inches (0.2 meter) of water and mud on the floor. About 1,000 feet (300 meters) into the cave, the ceiling drops to an 18-inch (0.5-meter) maximum height and continues as such for 670 feet (204 meters). In this passage the explorer must slither like a salamander. The latter section of the passage is littered with broken