The Cave Conservationist

The Newsletter of the NSS Conservation and Management Section

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National Cave and Karst Management Symposium

"Protecting the Aquifer in Karst Regions"

The Cave Diving Section of the National Speleological Society is pleased to host the National Cave and Karst Management Symposium to be held at the Gainesville Sheraton October 13-17, 2003. Located in the heart of cave diving country in north central Florida, Gainesville and the surrounding area has a high concentration of karst features containing many significant dry caves, but equally important are the springs and associated underwater caves that lie within the Floridian aquifer. Their importance in regards to water quantity and quality, as well as recreation, for one of the most rapidly growing population areas in this country is the subject of much debate and study.

The 2003 Cave and Karst Management Symposium will bring special focus on the problems and solutions of managing the aquifer within karst areas. Florida contains the largest concentration of springs in the world with 33 first magnitude springs and over 600 lesser magnitude springs throughout the state. The springs, and their cave systems, are home to over 40 species of cave-adapted life and are crucial wintering habitats for the endangered Florida Manatee. As windows into Florida's karst aquifer, the springs provide an important gauge of the health of our water supply. Only thinly protected by the overlying soils and sediments, Florida's aquifer is particularly susceptible to the effects of the exploding population of the State.

Florida faces many threats and challenges to its water supply: point and non-point pollution, increased nitrate levels from fertilizer, spreading of exotic plant species, and depletion of the aquifer due to increased usage by agriculture, industry, and an exploding population. Although this year has seen increased rainfall, the past few years have seen a drought unequaled in recent history. Wells and public water systems have run dry, water restrictions were everywhere. This has brought the issue of water resources to the forefront of public consciousness. Florida is growing at a rate of 2% each year that translates to roughly 1,000 people each day moving into Florida. It should come as no surprise that pressure is being placed on our water resources.

On the bright side the Florida Governor's office and the Legislature have taken steps towards a solution. In 1999, the Legislature passed the Watershed Protection Act that requires the State to identify its impaired waters, study why and how it's being polluted, and devise a plan to reverse the damage. The Governor's Office launched a "Springs Initiative" to study our springs and conceive ways to protect them and Governor Bush has called for a Water Conservation Initiative by state agencies to come up with ways to deal with the current problems as well as plan for the future.

We look forward to this opportunity to share information aimed not only at the management of karst aquifers, but many other areas of the world's cave and karst. The Symposium will be held at the Sheraton Hotel located in Gainesville, Florida at 2900 SW 13 Street. For more information and online registration, see the official NCKMS website at http://www.nckms.com or contact Steve Ormeroid at (937) 642-7775.

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About the Cave Conservationist…

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Membership in the Conservation and Management Section…

The NSS Conservation and Management Section is open to all members of the National Speleological Society as well as those interested in the conservation, management and protection of caves. Annual membership costs $5.00/ year and up to three years can be paid in advance.

The section gives an annual award to an Internal Organization or other NSS group (conservancy, conservation task force, project, etc.) that has made significant contributions to speleology in the field of conservation. Nominations may be made either by the group or others on their behalf.

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Send an e-mail to conservation@caves.org and type "subscribe" in subject field.

Robber's Cave Lincoln, Nebraska
Troy Taylor

When the settlers and the explorers first came to what is now Nebraska, it was the home of the Pawnee Indians. High on the summit of a place called Pahuk Bluff was where the nation met in high council. The bluff was considered to be a sacred place and it was here in 1854 that the Pawnee met in peace talks with General John M. Thayer, who later became governor of Nebraska. Despite an agreement that was met with the Indians, Pahuk Bluff was chosen by the settlers as the perfect place to build Neapolis, the planned state capital. The Pawnee were then moved to reservations in the south. The Indian villages were burned and they were driven out --- but some say that they left a little bit of their magic behind.

Beneath Pahuk Bluff was a place that the Pawnee held in awe, a cave system where young men were initiated into the spirit world and taught their animal powers and the healing virtues of plants and roots. Beneath this bluff is the underground Nebraska, caves of porous sandstone where for centuries, water has carved out an elaborate system that runs for miles. These caves were used for many years by the Pawnee and it was said that the sounds of drums and chanting could often be heard here. Stories told by the Indians spoke of tribe's ancestors, who lived here in spirit form, and whose voices and drums could still be experienced.

One of these portions of the spirit caves would later be dubbed "Robber's Cave" by later residents and for many years it was a popular site to visit in Lincoln, especially for teenagers and curiosity seekers. The cave was said to be haunted by sounds from the past. Visitors had long been reporting the sounds of unexplained voices, cries, screams, and unintelligible laughing and talking. Were these the spirits of the forgotten Pawnee or the ghosts of the cave's later inhabitants? In this cave, there were many former inhabitants to choose from.

Robber's Cave is only about 500 feet long, although later passages that were sealed off may have gone much further. It plunges down to a depth of about 60 feet, not including the old well that was created by a seepage of ground water. This massive hole disappeared down into total darkness and while I have corresponded with a number of different people about this cave over the years, no one seemed to know just where this well ended up.

The various people that I have talked to have also offered much in the way of conflicting stories and information too. According to legend, the cave saw many uses over the years, including as a way station for slaves who escaped from the south via the Underground Railroad. In 1863, the original entrance was destroyed in a quarrying operation, only to be purchased a few years later in 1869 by brewers from Wisconsin. They hired local laborers to dig out the tunnels and renovate them for use in storing beer. At that time, before the widespread use of electric refrigeration, breweries would often lager German-style beer in underground caverns so that it would age in a cool location.

The brewery failed in 1873 and from that time, the cave became a meeting place for gamblers, outlaws and horse thieves. The most famous outlaw alleged to have visited Robber's Cave was Jesse James, who supposedly hid out here after a robbery in 1876. This has confused the cave with another Robber's Cave, which is also located in Nebraska, which Jesse James was also alleged to use as a hideout. This is an entirely different cave though and has nothing to do with the legends associated with the cave in Lincoln. Of course, growing up in the Midwest, and having an interest in the violent careers of the western outlaws, I often heard of locations connected to Jesse James. He turns up quiet a bit in our regional lore and even in my own family history. According to my father' great aunt, she was Jesse's second cousin -- which makes my connections to the outlaw about as tenuous as those of the Robber's Cave in Lincoln. But whether Jesse James ever used the cave as a hideout of not, it has been documented that the cave was used as a layover for outlaws and gamblers.

One room in the cave was most closely associated with the outlaws and a visitor could find it by climbing up about five feet along the cave wall. A narrow passage here then led into a vast hidden

chamber. On one side was a fire pit with a natural stone chimney above it and beyond that was a stone wall that had been filled in with bricks and sealed off. It was said that if you listened carefully, you could hear the sounds of the ghosts of Robber's Cave behind this wall. Visitors who came here in years past said that the voices of men talking and laughing could be heard, muffled as though coming from a distance. What many of the visitors did not realize is that the cave originally continued on for quite some distance beyond this brick and stonewalls. According to the stories (and again, I have received many conflicting reports about this location) the passageway met up with tunnels that once connected the state penitentiary and the State Hospital for the Insane. One story claims that this tunnel was used as an escape route for some prisoners and this is why it was finally sealed off.

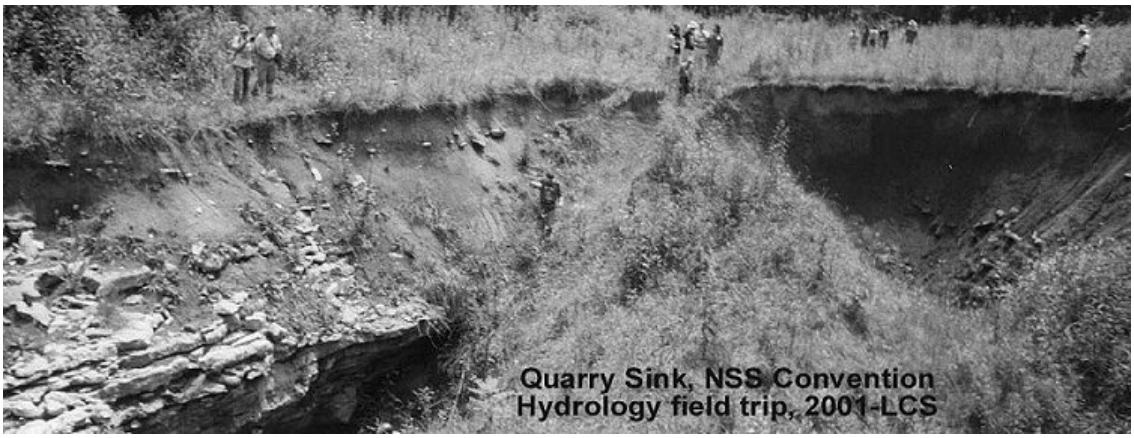
In 1906, a story spread about a treasure box that was found in the cave. This tale brought so many visitors that its more recent life as a tourist attraction was born. Brave tourists and sightseers visited the cave for years, braving slick pathways, ghost stories and scores of bats -- so many bats that reports sometimes claimed the ceiling looked like a "seething mass of fur and fluttering wings".

In the early 1970's, the cave was closed to the public because of the dangerous conditions. It was re-opened for a time in 1985 and but then closed down again a few years later. Today, the cave is no longer in existence in any form. The site has been filled and a business was constructed on top of what was the cave entrance. According to sources, the location is only known to those who once visited the cave because of a familiar landmark (a grain elevator co-op) that is located nearby.

And while the cave is now gone and only exists as a memory, one has to wonder if perhaps those lost passages -- located far beyond that brick wall -- still exist. If they are still down there, forgotten by the passage of years, do the sounds from the past still echo in the corridors and tunnels? Does the laughter and groans of the gamblers or the eerie chants of the Indians still drift down the through the cavern? It's likely that we will never know....

Sources & Bibliography:
Excerpt from the book "*Down In the Darkness*": "*The Shadowy History of America's Haunted Tunnels, Mines & Caverns*" by Troy Taylor -- Whitechapel Productions Press- 2003
Bingham, Joan & Dolores Riccio – "*More Haunted Houses*" (1991)
Personal Interviews & Correspondence

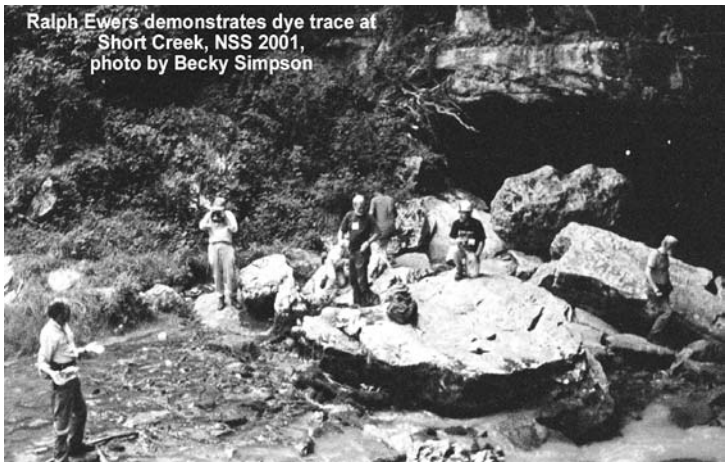
Note: *The entrance to Robber's Cave has been reported as bulldozed but that entry may still be possible and also a colony of bats were at one time known to use the cave. If anyone knows the status of the cave please let us know.*



Quarry Sink NSS Convention Hydrology Field Trip 2001 LCS, photo courtesy of Larry Simpson

Short Creek, Boiling Pots and the Caves of Sinking Valley

Larry C. Simpson



Short Creek emerges from a cliff face for a quick sunbath before cascading into echoing darkness. Ledges above the stream provide pathways through the karst window to a third cave entrance. A hemlock tree and tulip poplars grace the banks of its green waters. Redbud and dogwood blossoms decorate the cliffs in spring, and the wooded floor is dappled with trilliums. Jack-in-the pulpit, columbine and several species of fern also grow along the ledges.

Located about 10 miles east of Somerset, Kentucky, Short Creek is owned by Elwood and Norma Taylor. Its dependable stream and sheltering overhangs were a likely incentive for pre-historic habitation, and its wonder and mystery may have beckoned visitors as a sacred site. Since the nineteenth century, the stream has turned a succession of gristmills, but only the mossy ruins of a dam remain. The wooded amphitheater provides a setting for baptisms, picnics, and weddings. In summer, children splash in the cool stream.

Buck Creek, at 99 miles (159 km), has been championed as the longest creek in Kentucky. Short Creek has been called the shortest. The waters of Short Creek travel about 300 feet (100 meters) before returning underground to eventually meet Buck Creek. But upstream from the karst window, dye traces have shown subsurface streams to flow more than eight linear miles (Romanik 1986). Short Creek is the lowest segment of the Sinking Valley Aquifer. Covering nearly half of the Shopville Quadrangle and parts of Maretberg and Billows Quadrangles, Sinking Valley has more than 33 square miles (85 square km) of drainage. At least 20 sinking streams contribute to this aquifer.

In the mid-nineteen sixties members of the Blue Grass Grotto (BGG) began a survey of Baker Cave. In the seventies the Dayton Area Speleological Society (DASS) completed the Baker survey and mapped some ten other caves in Sinking Valley, spurred by Ralph Ewers who conducted research for a doctoral thesis (Ewers 1979). Ewers installed monitoring devices in Stab Cave, and a stage recorder at Short Creek, recorded rainfall and made initial dye traces. Mike Johnson confirmed dye traces with total hardness variations identifying connected streams (Johnson 1980). Subsequently, students of Dr. Percy Daugherty from the University of Cincinnati and members of the Miami Valley Grotto (MVG), Greater Cincinnati Grotto, and BGG surveyed in Big Sink Cave, and others in the eighties.

Grad students of Dr. Ralph Ewers from Eastern Kentucky University have continued groundwater studies and dye traces of Sinking Valley since the mid-eighties (Romanik, 1986), (Ewers, Idstien & DeFosset, 2001), and Craig Brown showed patterns of nitrate pollution (Brown & Ewers 1991). Ewers has recently placed a device at Big Sink that allows the sampling of water in the master conduit, monitoring of temperature, conductivity, stage, surface temperature and rainfall (Ewers, personal communication).

As a result of construction plans threatening caves in Pulaski County (Florea et. al, 1999), the National Speleological Society and the Environmental Systems Research Institute allocated a grant to Lee Florea and others, a portion of which has supported a study of the Sinking Valley Karst Aquifer and possible impacts from the proposed I-66 roadway (Florea et al. 2002). Jason Gulley and other sump divers presently probe submerged portions of the master conduit.

The Sinking Valley Karst Aquifer is located along the Cumberland Plateau in Southern Kentucky. The Cumberland Plateau has receded with the erosion of the east flank of the Cincinnati Arch extending from Ohio near Columbus to Tennessee near Nashville. At the edge of the plateau, the retreat of the Cumberland Escarpment has exposed the limestone of each successive drainage basin from northwest to southeast. (An almost mirror image of this process exists on the western side of the Cincinnati Arch

in Kentucky). The Cumberland Escarpment is composed of Pennsylvanian sandstones, conglomerates and shales creating a caprock above Mississippian limestones. This karst forms a ribbon extending along the length of the escarpment.

The Lee Formation of sandstone and conglomerate is impermeable to water except where networks of joints allow water to seep forming springs along a cliff face. (Kipp & Dinger, 1987) The Pennington shale varies greatly in thickness because of an unconformity between it and the Lee Formation, which is the Mississippian, Pennsylvanian boundary. The extent to which this shale inhibits the flow of water into the limestone is evident from an observation that to the south of Short Creek where no long caves are known, the shale exceeds 180 feet (60 meters) in thickness, while just north of Short Creek, the shale is only half that, and in the northernmost part of the quadrangle, it disappears entirely. Localized thinning of shale beds may channel the water down gradient to concentrate where the beds are shallow enough for seepage into the limestone to initiate cavern development. Two beds of coal also exist within the Lee formation, each less than a meter in thickness. The natural acid runoff from their sulfur compounds, may aid development of caves.

As Buck Creek flows from the northwest corner of the Shopville Quadrangle, it passes through mature and eroded karst characterized by alluviated sinkholes, isolated knobs and short remnant caves. While this karst is active, through seeps, springs and sediment filled caves, the plumbing is often broken and clogged. Just east of this sinkhole plain, is Sinking Valley, possibly the most mature yet intact karst aquifer along a creek that has given birth to a number of significant caves. The caves inhabit two hundred feet of limestone, including the Newman (Kidder), Saint Genevieve and Saint Louis limestones, (Smith, 1974). The Saint Louis is underlain by the Borden* Formation, composed of limestone and siltstone, thought to be less conducive to caves. The Borden is exposed along Buck Creek in the northern part of the quadrangle and in one sink at Sinking Valley near Plato.

The Shopville Geologic Quadrangle (Hagen, 1964) shows structural contours, marked at twenty-foot intervals projected along the contact at the top of the Newman* limestone. These lines approximate the slope of cave bearing bedding planes dipping gently to the southeast at 20 to 100 feet per mile (6m/km). The majority of hollows on the east bank of Buck Creek generally follow the strike, while most on the west side trend along the dip.

Buck Creek meanders along the strike and down dip while flowing south, rarely climbing up dip, a pattern reflected by many caves in the area. While the limestone dips slightly toward Buck Creek on the west side of the stream, it usually dips away on the east side of the creek where Sinking Valley is located. Phreatic passages of caves in the area trend along the strike, but vadose entrenched passages (especially west of Buck Creek) often flow down dip. (Note that the Hartselle Shale, due to the unconformity sometimes slopes away from the dip of the limestone.)

The Geologic Quad also shows a narrow strand of exposed Saint Genevieve limestone from Plato to Short Creek that defines the bottom of the valley and may have been the path of earlier master conduits. Sinking Valley trends nearly north south, diagonally down dip, then follows the strike for about ten thousand feet near its southern end. The drainage basin is an amalgam of several valleys and hollows. The upstream portion of Sinking Valley could be considered an enclosed sinkhole basin, in transition from a dry valley to a sinkhole plain. Karst valleys have coalesced near the headwaters to form a super-uvula 12,000 feet (4,000 meters) wide near the community of Plato. However, the topography narrows to a steep-sided valley less than 1,000 feet wide (300m) before joining Price Valley and Burdine Valley and bending westward to Short Creek.

Near the northern part of the Sinking Valley the St. Genevieve / St. Louis contact can be found inside Baker Cave, and the master stream passage appears to continue near this same contact all the way to Short Creek, a drop in elevation of approximately 50 feet (15 meters). The cave appears to trend slightly up-dip as it passes through Burdine Valley, which may contribute to sump formation in that area.

In the 1970's Ralph Ewers was the first geologist to do a concentrated study of karst in Pulaski County. He demonstrated that speleogenesis in this area begins when water seeps down through joints

reaching the partings between limestone layers and moves by capillary action and hydrostatic pressure towards a point of less pressure (Ewers 1972). Bedding planes have a wide lateral extent allowing water to move in any direction toward an area of lower hydrostatic head, such as a stream, spring, or conduit. As dissolution occurs along this path of least resistance, a conduit forms, enlarging from the input forward into a tube. Lowering frictional forces in the enlarging conduit, allow reduced pressure causing it to become a target for nearby developing conduits. Thus, caves can grow from a single tube, branching as more tributary conduits are attracted to the lower pressure field. (Ewers, 1982)

When the topography erodes, base level streams downcut below the conduit outlets, and the caves become air filled (vadose) rather than water filled (phreatic). Although streams may still flow inside the cave, they are no longer under pressurized flow. Instead of dissolving rock equally on all sides to form tubular conduits, the stream incises, creating keyhole cross-sections or sinuous canyon morphologies. Meanwhile, new phreatic tubes may form along lower bedding planes. Over hundreds of millennia, surface streams downcut, and water abandons older passages, sometimes creating several levels.

When a vadose stream encounters a fracture, it may drop in elevation rapidly forming a waterfall, domepit or a linear fissure canyon. These secondary streams may reuse and connect previously abandoned passages through piracy. Logan Cave is a fissure canyon that connects to the lower Greensnake Cave.

The size of the granular sediment is proportional to the velocity of the water, so as a conduit reaches base level, the flow decreases leaving deposits of sand and silt. The introduction of clastics eroded from insoluble caprock often shields the floor of a cave from dissolution, causing water to dissolve wide undercuts in the walls, sometimes creating collapse-enlarged rooms. Many of these collapses reach the surface, becoming sinkholes or karst windows.

Sediment loads may be deposited at the confluence of a swifter, high gradient canyons and deeper, low gradient passages, anywhere the water is no longer swift enough to carry its load. This process is evident in the lower section of Logan Greensnake Cave. Sedimentation can cause cave streams to form loops and maze areas where the water laterally dissolves new routes bypassing insoluble sediments, (Palmer, 1991). A remnant maze-like cave found in the valley floor is Hog Cave Annex, possibly formed when sediments forced the water to dissolve new routes through joints. Sediment blockage may even force water to seek an upward route through a joint, creating a lift tube to a new bedding plane or older vacant conduit. In Baker Cave, water sometimes rises into a higher, older conduit, transporting sediments toward the entrance.

Sometimes passages become nearly filled with sediment while the water carves an undercut to a new bedding plane below the old passage. The lower passage may cross under the old. It may enlarge until it cuts into the old passage from below allowing sediments to enter. Such underdrains often flush enough sediment out of the old passages to open rooms or truncated segments of passage. Baker Cave, Hog Cave and Stab Cave all have underdrain excavated passages.

Flooding may cause excessive deposition, but some sedimentation is a result of the natural development of a karst aquifer. Increased sedimentation often progresses with the enlargement of a karst valley. Erosion expands the drainage area and thus, increases run-off and sediment load. The Sinking Valley Cave System can be considered a conveyor belt for sediment. Sandstone remnants in the Sinking Valley drainage are 100 to 150 feet thick (30 to 45m). If half the amount that once covered the 33 square mile (85 km square) drainage passed through the cave, it would approach 9,000,000,000 cubic feet (255,000,000 cubic meters) of sediment.

The master conduit is subject to two kinds of flooding, and usually a combination of both. A flash flood happens when a downpour forces a pulse of water through the conduits, opening previously blocked pools, which increases the pulse even more, often flushing sediments farther into or out of the system. Backflooding occurs when runoff exceeds the capacity of the system, causing backup at constricted areas, depositing sediments where the water velocity becomes slow. A storm near the head of Sinking Valley, where the bedding plane gradient is more than 100 feet per mile (12m/km), can generate a

tremendous flood pulse. Residents report waterspouts from sinkholes during flash floods. Yet, erosion and sedimentation has not progressed enough to cause overland flow during normal conditions.

The Sinking Valley Cave System has potential for exceptional length, but collapse, sedimentation, and sumps have impeded exploration from within, and the vast drainage basin has yet to be fully canvassed above ground.

In northern Sinking Valley there are several remnants trunk passage, underlain by intermittently active conduit. The largest is Baker Cave with almost a mile surveyed. A connection has been established between Baker Cave and Short Creek Cave by dye tracing, a distance of more than six linear miles. While usually inactive, it both receives and emits floodwaters depending on the strength of the storm pulse. Other such abandoned trunk passages located in this super-uvula region include Gilmore, Hog Cave, Hog Annex, and Double Caves.

Near Baker Cave is Purcell Hole, a tributary segment that may connect to both Baker and the master conduit. Unfortunately, sedimentation, at the time of survey, made the passage too small to follow. Other sections of tributary passage have been surveyed, one of which, is Logan-Greensnake Cave, with 1.4 miles (2.2km). Logan Cave carries water eastward along a fracture or minor fault until it meets the low gradient Greensnake Cave, which has become a sediment trap.

Bullock Cave is an abandoned trunk, which becomes a tributary only during times of flood, when, water overflows from nearby sinkholes, blocks the road and cascades into a rock walled sink. The passage initially is about forty feet wide by twelve feet high (15m x 4m), with a 'v' shaped stream channel through fine-grained sediment. Within a few hundred feet of the entrance, a massive logjam blocks further egress. Daugherty, Turner and others once dug through the logjam to a water-filled canyon. All these tributary caves lie upstream from Big Sink, the northernmost direct entry to the master conduit.

Both Big Sink and Lela Price Cave feature stream conduit more than 40 feet wide and twelve feet high (12m x 4m) that regularly sumps during storm events. Big Sink approaches two and a half miles in surveyed length. Further south, Quarry Sink, about 100 feet (30 m) in diameter and 40 feet (12 m) deep, collapsed overnight during flood conditions in 1999 (Ewers, et. al, 2001). A recent sump dive by Jason Gulley pushed more than 2000 feet upstream from Quarry Sink, which has been visually connected to Lela Price Cave, still further downstream with 4000 feet (1220 m) surveyed. A forty-three-foot (14m) shaft was drilled into the main trunk passage of Lela Price cave to pump water for the quarry. During a 1981 flood pulse, the well was said to have spouted water twenty feet into the air. Since much of the Sinking Valley master conduit is flooded frequently, it can be considered in an epiphreatic stage, when solution enlargement occurs during pulses of inundation.

In the southernmost section of the karst aquifer, maximum water meets massive sedimentation to create spectacular karst features. Stab Cave is a large paleo-trunk overlooking Buck Creek. The cave consists of two sections of passage, forty feet wide by fifty feet high. Each is about 300 feet (100 meters) long and truncated by sedimentation. Fluted pendants on walls suggest that secondary water may have flowed down between the walls and sediment fill. Most of the floor in the first room is now covered in flowstone and a sloped pathway to the second room skirts a large stalagmite, at least six feet in diameter and eight feet tall. The walls of the second room are etched with extensive dendritic patterns where water seeped along the fill. Layers of gravel, sand and silt can be seen on either end of the room. A narrow underdrain passage has allowed release of sediments and now flows to Buck Creek independent of the main aquifer.

Stab may have been an early resurgence for Sinking Valley until collapse, sedimentation, and the downcutting of the creek forced other routes of exit such as Short Creek, a quarter-mile to the south. Evidence in Stab illustrates the process of sedimentation near the mouth of a conduit that may now be taking place near Short Creek.

The Boiling Pots are about 1,500 feet (500 meters) upstream from Short Creek and about a half mile downstream from Lela Price Cave. Boiling Pot Spring is a normally placid pool surrounded by mounds of sand and gravel that hint at violent flood surges known to expel stumps.

Upper Boiling Pot is as impressive as the lower one is modest. After a steep climb up the slope adjacent to Boiling Pot Spring, a semi-circular funnel shaped opening drops fifty feet down to an underground lake that is 90 feet (30m) by 45 feet (15 m) in diameter, reminiscent of a Mexican cenote. The headwall of a cliff rises above the lake for a total vertical distance of almost a hundred feet (30 meters). Beyond the lake is a voluminous section of active cave. With a normal depth in excess of twenty-five feet (eight meters) the underground lake is a retention pond that rises as much as thirty feet more (10 meters) during floods, storing water until it can seep through constricted passages. When water is low, a short stream can be seen flowing between two siphons in the cave. Sand filled passage, about fifty feet wide, at the upstream end of the cave, has been dug to about 600 (200m) feet distance. Boiling Pot Spring can be considered a pressure release valve for Upper Boiling Pot.

A portion of the dry streambed in Burdine Valley may have once been part of the master conduit, now collapsed. Less than 800 feet (270 meters) downstream from Boiling Pot, is Burdine Sink, a large entrance that takes overflow drainage from Boiling Pot Spring, Burdine Valley, and smaller side hollows. A massive logjam has blocked exploration from the outside, however, Jason Gulley has surveyed beyond this point using scuba gear from Short Creek Spring, which is located another 800 feet (270 meters) east-northeast and downstream of the sink. During heavy flooding, water from Burdine Valley overflows into a surface streambed to Short Creek where it rejoins that stream for a final dash underground to Buck Creek.

The waters of Short Creek inhabit a collapsed karst window about 200 feet (70 meters) in diameter. The normal discharge has been measured at 50 cubic feet per second (14.2 cubic meters per second) and flood discharge has been estimated at three times that, (Johnson, 1980). Within 300 feet (100 m), the water re-enters the ground but can be followed to the middle entrance. Although thirty feet wide by ten feet high, the passage between these two entrances appears to be an undercut along the wall of the collapsed karst window. Upon reaching the middle entrance, the passage doubles in size. The stream in this segment of cave can be followed for over a thousand feet to the other side of hill, but during normal flow, the stream disappears in a deep pool near the back entrance.

Buck Creek is found by following a dry streambed about 1,400 feet (427 m) to the east. This streambed appears to be a collapsed extension of Short Creek Cave. Two sections of cave, each about 500 feet long, parallel this streambed with siphons between. One transmits spring water to Buck Creek, as do several other smaller outlets along the banks of Buck Creek that have been dye traced from Short Creek.

It is evident that most of the visible cave is an overflow route, and that there are deeper or possibly laterally undercut complexes of sediment and water filled passages. The springs on Buck Creek suggest an underground delta where the spring water has become braided in its struggles to get through the mounting sediment deposits and low hydraulic gradients, similar to ones found along the Green River.

There are presently no active coalmines in Sinking Valley, the seams being less economical than larger ones of the Rockcastle River drainage. Two limestone quarries occupy the lower (western) area of Price Valley near the master Sinking Valley trunk passage The previously mentioned Quarry Sink collapse occurred between the two quarries. Rock flour can be seen entering the waters of Leila Price Cave, presumably from the quarry, (Florea, personal Communication) and a milky color in Short Creek and Boiling Pot was recently observed.

For the past 200 years, Sinking Valley has undergone systematic change at the hands of settlers who filled sinks to protect livestock or create ponds. Dougherty (1983) has written of the impact of deforestation on flooding in Sinking Valley. He concluded that while farming practices have not significantly changed the overall runoff per year; this land use causes more severe flooding and sedimentation in springtime when fields are plowed.

Land use of Sinking Valley is composed primarily of residential homes and family farms, with corn, tobacco and livestock being a major source of income. One family farm has experimented successfully in growing grapes and is starting a winery. Since there are virtually no surface streams, water for

livestock is dependent almost entirely on springs and wells. There are presently several small businesses including one gas station along highway 461 in the uppermost part of the drainage basin. Eventually leaking fuel tanks could pose a hazard for groundwater in the area.

Brown and Ewers (1991) monitored wells in Sinking Valley, showing that increased nitrates during wet weather pulses could be due to use of fertilizer, while decreased nitrates during high runoff in other wells was caused by dilution of barnyard seepage into the epikarst. This study adds to numerous others that show the insidious effects of leach lines, sewer lagoons, garbage dumps and toxic spills on karst basins. As development and population grows, well and spring water is more likely to become contaminated. The shallowness of the soil over bedrock makes construction of sewer and water lines difficult, so the use of more rudimentary sanitation and water facilities is widespread. Likewise the connectivity of the surface to conduits through the epikarst makes leach lines, aeration systems and sewer lagoons problematic, if not dangerous. Although, the small dairy farms that once dotted Sinking Valley have closed due to economic pressures, use of non-pasteurized milk on family farms could become a health problem.

While water from Short Creek is sometimes pumped into water trucks during droughts, one incident proves the susceptibility of its water to pollution. Cave diver, Jason Gully, describes a dive upstream in Short Creek where he surfaced in an air bell to find a "flotilla of animal corpses". He kept breathing from his regulator and escaped as quickly as possible.

No toxic spills have been documented recently, but years ago Ewers (personal communication) noted an odor in Stab Cave after a gasoline spill, which corresponded with a decrease in bats in that cave. Proposals to route Interstate 66 along the southern edge of Burdine Valley could alleviate truck use through Price Valley on Highway 80 but would increase traffic and the possibility of overturned trucks within its footprint. Hydraulic leakage and siltation during road construction could also contribute to degradation of the aquifer.

Toxic or flammable materials can travel miles underground. Crawford (1984) has documented such volatile and toxic seepages into basements, sewers and wells in Bowling Green, Kentucky. Environmental advantages exist for routing the I-66 corridor south of Sinking Valley with no interchanges in or near Sinking Valley. To protect ground water, independent drainage and retention systems need to be constructed for highways in karst.

Any highway corridor facilitates development, causing incremental but cumulative affects on fragile environments. As Somerset expands and outlying areas become more developed, it is possible that land use will overwhelm the underground system. The Nature Conservancy hopes to preserve as much of the Buck Creek drainage basin as possible through a joint bio-reserve project with the USDA by helping farmers practice better conservation, and by buying land to sell under ecological covenants. The same values of self reliance and love of the land that has held family farms together in the face of hardship these many years, often fosters mistrust by landowners for the ideas of strangers and the dealings of government. Conservationists have the task of educating residents one by one about the complicated and unseen world below their land.

Besides The Nature Conservancy, the Sierra Club, American Cave Conservation Association and the National Speleological Society are all active in education and advocacy for the karst environment. The Appalachia Science in the Public Interest and the Kentucky Waterways Alliance promote environmental awareness and action in Kentucky. The latter trains citizens to gather samples from polluted streams for water quality tests. In addition, the State of Kentucky also offers grants for upgrading home sewage disposals that would otherwise contaminate streams.

Short Creek is a site of natural beauty and wonder, revered since prehistoric times. The underground stream that feeds Short Creek is an extensive and mysterious wilderness. What biological and mineral rarities remain undiscovered cannot be guessed. But the Sinking Valley Karst Aquifer contains one resource in abundance that grows more rare each day, a mineral more valuable than gold because it sustains life. That resourse is water. With technological advances, environmental advocacy, and better education, it is hoped that we will make choices that will restore and preserve the purity of these

waters. Short Creek has washed away the stains of a multitude of mistakes. It is hoped it will never be permanently tainted.

Note: The geologic section was changed and renamed in 1973 (Smith et al.), updating Hagen's terminology, which had not recognized the Bangor limestone and Hartselle Shale sandwiched between the Pennington Shale and Monteagle (Newman) limestone. The upper Newman Limestone was also re-named the Kidder and the upper Borden was separated into Salem / Warsaw and Muldraugh Members in the Bobtown Quadrangle.

Related Web Sites:
Save the Short Creek/Sinking Valley Cave System http://www.tuningoracle.com/shortcreek/index.htm
KICK 66 http://www.geocities.com/kick66org/index.html
KEEP http://www.stoptranspark.org

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A Fond Farewell .....

Let me take the time to give a heartfelt Thanks to Julie Schenck for her years of service to the NSS as Editor of The Cave Conservationist. Julie we wish you well in all your future endeavors……

Membership in the NSS Conservation and Management Section

If you are not already a member of the Section, you are invited to join. Dues are $5.00 a year, payable to the NSS Conservation and Management Section. Members receive the newsletter regularly and are entitled to vote at the annual meeting.

Please send your name, address, phone number, e-mail and NSS number with a check or money order made out to the NSS Conservation/Mgmt Section to:

Evelyn Bradshaw, Secretary-Treasurer
5713 Castlebridge Road, Apt. #226
Fredericksburg, VA 22407

Articles Needed

The Cave Conservationist is in need of articles, stories, photos, poetry, etc. related to Cave Conservation and Management activities. The rest of the caving community is interested in the latest happenings, cave clean up's and conservation news so consider sending articles in to *The Cave Conservationist!* Items can be submitted to the Editor (see the submission guidelines on Page 2).

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Conservation and Management Section –Sept. 2003
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