



Austin's Underground Frontier

by Nico Hauwert, Senior Environmental Scientist, City of Austin

Caves naturally and commonly occur across the roughly five-mile wide exposure of the Edwards Aquifer along the west side of the City of Austin. If they are not plugged, these caves and sinks can be major sources of recharge for the Edwards Aquifer. When European pioneers first settled in Central Texas, sediment erosion resulted from new practices such as livestock ranching, vegetation removal, and urban disturbance. This erosion led to the filling of many low-lying caves and sinkholes. Ranchers also filled caves in order to eliminate livestock hazards, to dispose of trash, and to create water-holding stock ponds for livestock. In the 1800s, a large sinkhole near the mouth of Halifax Creek on the Blanco River was intentionally plugged because it absorbed (recharged) river flow desired for a downstream mill near Kyle.

The widespread practice of filling caves with trash and debris continues to degrade the water quality of the Edwards

Aquifer, which discharges within days to months at Barton Springs. This recharge can come from as far south as the Blanco River. Typical cave debris includes fencing, appliances, ranch equipment and household trash, as well as pesticides, solvents, gasoline, and batteries.

Maintaining cave recharge and reversing intentional cave plugging is important on a large scale to reduce downstream flooding and erosion.

For many years, caves have been covered or hidden from the public's view. When unprotected, caves often become targets of speleothem mining, graffiti, and other vandalism. Caves can also represent a public safety threat when entered without experienced cave guides and proper equipment.

Although caves were filled, trashed, or ignored for many years, cave biologists discovered rare cave species and petitioned for their federal listing in 1982. In 1988, a month after Austin's Earth First activists received nation-wide attention for a nine-day protest in favor of protection of caves, USFW listed five cave species as endangered, some of which had only been found in a few caves.

In 1996, the City of Austin and Travis County created the Balcones Canyonland Conservation Plan (BCCP), which intended for the continued preservation of both listed and rare cave species not yet listed ("species of concern"). The Plan includes preservation of 62 caves and also protects habitat for listed endangered birds - the Black-Capped Vireo and Golden Cheeked Warbler.

During the 1990s and 2000s, the City of Austin and partners took steps to excavate filled caves and restore corresponding recharge. This process included cave cleanups, led by City of Austin Parks and Recreation biologist Mark Sanders (who now works for the City of Austin Water Utility Balcones Canyonland Preserve) and others, including William Russell, Justin Shaw, Peter Sprouse, Bowie High School Science teacher Jill Harding, and myself. *[continued on next page]*



Nico Hauwert teaches TCEQ members about Maple Run Cave this July



Volunteers from UT Grotto, Texas Cave Management Association, Texas Cave Conservancy, Bowie High School students, Wildflower Center staff, and other organizations participated in the restoration effort.

Wildflower Cave, located at the Lady Bird Johnson Wildflower Center, was originally filled to the ceiling with trash and is now used by more than one thousand students per year in the Watershed Protection Department (WPD) Earth Camp Program. Cleanup of trash from Midnight Cave was the most extensive volunteer cleanup, led by Mark Sanders from 1993 to 1999. After restoration, the film *The Unforeseen* featured the pristine beauty of Midnight Cave.

In 2012, five large sinkholes, Sinky Dinky, Winter Woods, Brownlee, Williams Well, and Wyoka, on the sensitive Blowing Sink Research Management Area began collapsing large loads of sediment. While Brownlee Cave became plugged, others were left with gaping, up to 80 feet deep shafts, creating a public safety issue. Beginning that same year, the City of Austin initiated several projects to excavate ranch fill and trash to enhance the caves as preserves for rare species. Some of these caves are also intended for public access on guided tours to facilitate aquifer education. The WPD temporarily hired a team of professional cave specialists associated with UT Grotto to restore caves for specific projects.

While Zara Environmental excavated four of the sinkholes and constructed concrete support shafts beginning in November 2013, the Watershed Protection Department (WPD) cave team manually excavated sediment fill from the caves.

WPD Field Operations conducted landscape restoration of Sinky Dinky while Austin Water Utility Balcones Canyonland staff assisted in the restoration of Brownlee Sink. From 2012 to 2015, the WPD also removed ranch and construction fill and debris from LaCrosse Cave at the University of Texas Lady Bird Johnson Wildflower Center, Bowie High School Cave under Bowie High School, Hideout and Wade Caves at the Goat Cave Preserve, and Grassy Cove Cave in the Slaughter Creek Greenbelt for the purposes of utilizing the caves for education.

Caves and their ecosystems are part of the natural heritage of our area. The excitement of exploring wild caves should be available to all, without the risk of damaging the caves and their delicate ecosystems.

If you are interested in exploring local caves that are already open to the public visit <http://utgrotto.org/> and www.austintexas.gov/page/ansc-programs-exhibits.



Central Texas Educators learn about travertine at the SBCA-Sponsored Groundwater to the Gulf Program at Westcave Discovery Center.

Secrets of Goat Cave Karst Preserve

by Nico Hauwert, Senior Environmental Scientist, City of Austin

Goat Cave Karst Preserve is the only city-owned preserve designed for the public to see caves and sinkholes and learn about underground ecosystems. Its progression into a cave preserve is a fairly typical representation of how caves have been historically treated. The Preserve contains many karst features, including Goat Cave, Wade Cave, and Maple Run Cave. Today, City of Austin staff and nonprofit partners are working diligently to improve the site for educational and research purposes.

Cavers first mapped Goat Cave's extensive 20-foot-tall room first in 1961 and again in 1973. The cave was located on a goat ranch southeast of Austin, and cavers were once asked to rescue a live goat that had fallen down the 20 feet entrance drop, providing the cave its name. At the time, Goat Cave supported a large bat population. Wade Cave, also located on the Goat Cave Karst Preserve, was filled with ranch debris including dirt, glass, cans, and rolls of fencing, probably in part to keep livestock from falling in. The 1984 plans for the subdivision Street and Drainage Improvements show the placement of a proposed water quality detention pond directly over an unknown "sinkhole", and adjacent to another "sinkhole" that is Maple Run Cave. The pond as constructed actually overlies the majority of Maple Run Cave. Soon after the Maple Run neighborhood was constructed, a group of youths entered Maple Run Cave with a single flashlight that failed and necessitated a cave rescue. The incident received nationwide attention and Goat Cave was immediately gated, which eliminated the native bat population.



Goat Cave. Photo Credit :Jean Krejca

The undeveloped strip of land containing the caves was dedicated to the City of Austin Parks and Recreation Department and in the early 1990s became Goat Cave Karst Preserve. Just prior to the gating of Maple Run Cave in July 1996, two vandals mined formations from the cave. This vandalism required an 18-month restoration project, undertaken by Justin Shaw, Mark Sanders, and Jay Kane. Under the direction of speleothem restoration expert Jim Werker, 70% of the damaged formations were recovered and glued back into place. In partnership with Bat Conservation International, the cave gate was removed from Goat Cave in 2002 and has been replaced with a perimeter fence that is more "bat friendly," although unfortunately, as of 2015 the traditional bat roost has not returned.

The City of Austin Public Works planned and initiated a project to realign Davis Lane to facilitate traffic at the Brodie Lane intersection, and adjacent to Goat Cave and Blowing Sink preserves.

In 2012, Public Works contracted Zara Environmental and requested assistance from Watershed Protection Department to study potential impacts of roadway runoff to three federal permit preserve caves, Goat Cave, Maple Run, and Blowing Sink.

Tracers were poured during rain to several sites on either side of Davis Lane and it was discovered that Davis Lane runoff has been infiltrating a drainage channel and reaching drips in Goat Cave and Maple Run. Surprisingly tracers injected in Wade and Hideout caves traveled 3,000 feet south to drips in Blowing Sink Cave on the opposite side of Davis Lane. In fact tracers injected at the Wildflower center, one mile southwest of Blowing Sink Cave near Mopac South, also arrived in the cave stream. Based on the study results,

Public Works made modifications to the drainage of Davis Lane that are anticipated to improve water quality to the caves and aquifer by correcting poorly planned infrastructure from the 1980's. The Davis Lane realignment eliminated roadside parking that was historically used by the public to access Goat Cave Karst Preserve, but efforts are being made to seek new parking access.

Excavation and preparation of caves and sinks at Goat Cave Karst Preserve are still underway. These are major steps toward making the underground frontier more accessible to the public.

Save Barton Creek Association is currently trying to raise \$5000 toward an Austin Parks Foundation Grant to restore the kiosk and educational signage on the karst features at Goat Cave Preserve. To contribute to this effort, visit www.savebartoncreek.org and click "donate" or mail a check with "Goat Cave" in the memo line to P.O. Box 5923, Austin, TX 78763.

Goat Cave Karst Preserve is located at 3900 Deer Ln, Austin, TX 78749. The City's Parks and Recreation Department is offering underground photography classes at Goat Cave in Goat Cave Karst Preserve on August 25. Learn more and register at www.austintexas.gov/department/events/288.