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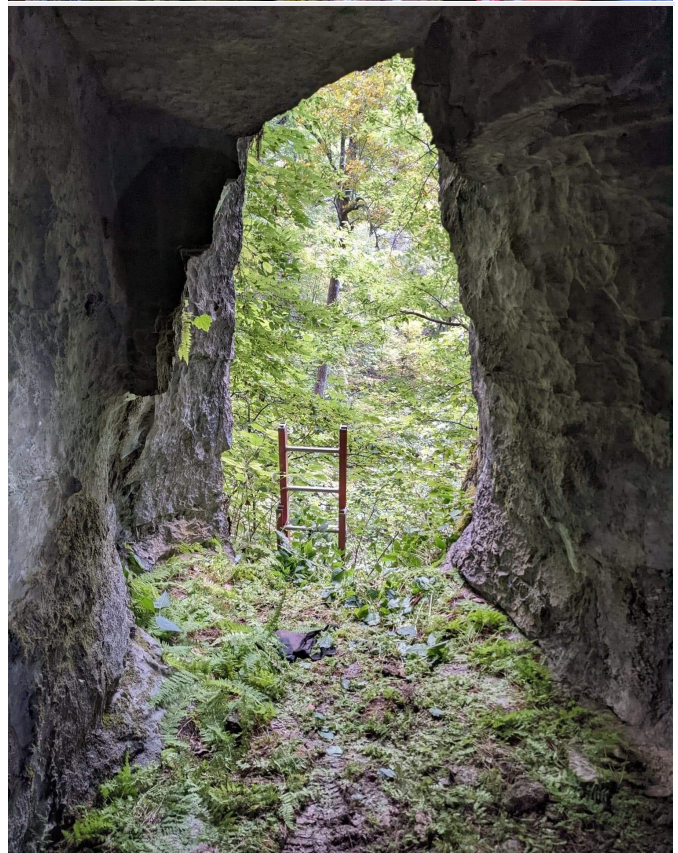
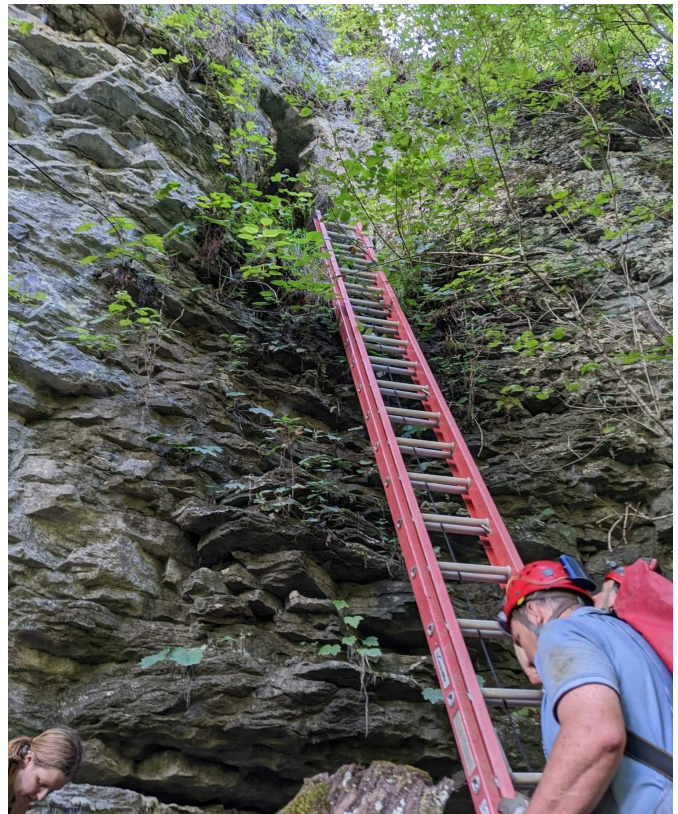
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Ozarks, top: Marty Brown & Kayla Sapkota look up the ladder toward the Bill Villines Ladder Cave entrance. **Bottom:** Entrance of Bill Villines Ladder Cave looking out. Photos by Claty Barnett.

65 Years of CRF-NPS Closeness “Keep your friends close, your enemies closer”

By: Roger Brucker, CRF - September 5, 2022

The famous quotation “Keep your friends close, your enemies closer,” is by Sun Tzu, from *The Art of War*. The meaning is be alert to favorable and unfavorable opportunities and threats. This expression accurately describes the history of the relationship between the Cave Research Foundation and the National Park Service over the past 65 years. National Park Service’s Mammoth Cave National Park grew out of a Commonwealth of Kentucky initiative in 1926 to make Mammoth Cave a National Park. It became an official National Park in 1941, but the “park story” begins earlier. The Cave Research Foundation, Inc., became a Kentucky nonprofit in 1957, but it, too, had a previous history spanning several years.

It is a story of suspicion, intrigue, animosity, whistle-blowing, negotiating, discovering, conserving, cooperating, wary accommodation, strong friendships, and immense ongoing value. The story is complex, too convoluted to tell in a few pages, and probably worthy of a future Ph.D. history thesis project. But the outline can perhaps be described with the acknowledgement that the author is responsible for errors of fact and conclusions.

An arbitrary start date of the story is January 31, 1925, when Floyd Collins became trapped in Sand Cave. A sensational rescue effort unfolded over the next 17 days. At the end of that time Floyd Collins was the best-known man in the United States, thanks to STOP-PRESS newspaper and radio reporting, but also dead. To many, this was the ideal time to push for Mammoth Cave to be designated an official National Park.

Mammoth Cave, only five miles from the Sand Cave death trap, was the second most famous tourist attraction, second only to Niagara Falls. However, the south central region of Kentucky centered on Mammoth Cave was a warring land of small cave owners, roadside souvenir stands, shabby hotels, and bad roads. Prominent Louisville executives founded the Mammoth Cave Association to raise money to buy 50,000 acres of the cave itself and surrounding farms. From 1886 until 1929, The Mammoth Cave Railroad brought scores of visitors. Traffic jumped in the 20s with prosperity and the affordable automobile that boosted visitor traffic, giving

impetus to the fledgling Mammoth Cave Association’s fundraising effort to buy historic Mammoth Cave and later the New Entrance of Mammoth Cave.

The stock market crash of 1929, plus the slow Mammoth Cave land acquisition progress, convinced the Association board to lobby the Kentucky legislature to become a commonwealth official body. That way, lands could be accumulated cheaply and rapidly using the power of eminent domain. “We will pay you \$30 per acre. Accept it or we take you to court and you get \$10 per acre.” Some 150 families were bought out and moved out, engendering bitterness for generations.

When about 30,000 acres had been gathered, Kentucky petitioned the U.S. Congress to make an exception to the 50,000 acre minimum requirement for national park status, and accept the new Mammoth Cave National Park. In the meantime, out of the depths of the depression, President Franklin Roosevelt set up the CCC (Civilian Conservation Corps) as a part of a whirlwind of welfare projects to employ millions of desperate men.

The federal budget money river now flowed. A clever manager of the “park-in-waiting” could squeeze the maximum of infrastructure out of every government nickel. Three CCC camps were constructed to build roads, buildings, picnic grounds, utilities, and cave trails.

A participant in the 1925 Collins rescue effort, civil engineer Roy B. Anderson, was hired by Louisville Gas & Electric Co. to investigate potential dam sites near Mammoth Cave. He placed dye in Three Springs on Flint Ridge that emerged in Echo River in Mammoth Cave, proving that a dam would not hold water and that the two ridges were hydrologically connected. This result gave proof to the cave discovery recipe: **Follow the Water**. Fresh water springs surrounded Flint Ridge next door to Mammoth Cave so the springs were tapped and pumped to two round tanks that acted as pressure standpipes for potable water for the hotel. A sewage treatment plant was built and sewage lines were then constructed by CCC labor.

Why not buy the last two big inholdings of private land -- Great Onyx Cave and Crystal Cave -- while making a national park? Oh, they won’t accept \$30 per acre? We’ll show them! We will neglect their roads, ban their advertising signs, and squeeze them out financially.

Owners of Crystal Cave and Great Onyx became sworn enemies of the National Park Service, seeing themselves as victims of the economic squeeze. William T. Austin, son, grandson, and heir-apparent of the owners of Crystal

On the Cover

Chad McCain, Mark Brooks and Gretchen Asselmeier in Pot Of Gold at the last survey station set from the Berome Moore Entrance. Photo by Mark Brooks.

Cave, studied Civil Engineering at U.K. He became manager of Crystal Cave. His idea: Stage a large expedition to explore and discover that Crystal Cave was bigger and more valuable than the government thought.

Bill Austin and the owners of Crystal Cave invited the National Speleological Society to stage a large expedition to explore and discover the extent of the cave. In February 1954 the NSS brought dozens of cave explorers and media reporters for a week-long, highly publicized expedition. Skeets Miller, hero of Floyd Collins' rescue efforts and Pulitzer Prize winner, reported by field telephone from the Lost Passage. (Joe Lawrence, Jr. and I wrote the book about the C-3 expedition, *The Caves Beyond*, Cave Books).

Several of us explorers (Phil Smith, Roger McClure, Roger Brucker, and Jim Dyer) were dissatisfied with the leadership and exploration techniques. We wanted better mapping, cave food, communications, and organization. Our proposal: A new set of principles and technical approaches to bring cave exploration to a higher, more productive level. Our mapping competence had earned Bill Austin's permission to put the new techniques of project caving to work in Crystal Cave.

We NSS members formally applied to the Superintendent of Mammoth Cave National Park for permission to survey and map an adjacent cave in the park. We received a curt refusal. Phil Smith did some quiet investigation and contacted a Ranger, Joe Kulesza, who said we were turned down because the NPS thought we were in cahoots with Crystal Cave's owners who desired to increase the perceived value of their property. And weren't we part of the NSS? At the time cavers from Louisville were sneaking into the caves and giving the rangers fits.

Ranger Joe said we should form an independent scientific organization, and Smith agreed. Phil Smith was at the time deeply involved in "big science" logistics support with the U.S. Army arctic programs.

In 1957 we formed the CRF, Cave Research Foundation, Inc., a Kentucky nonprofit, dedicated to explore caves of the world, support cave science, interpretation, education, and conservation. Joe Kulesza told us the NPS was concerned about liability for volunteer cavers becoming lost, injured, or killed. A lawyer friend introduced us to the Joint Venture, an English Common Law business arrangement by which companies could isolate each company from others in a risky undertaking, and not get into legal imbroglios in case of accidents. CRF was advised by Charles Marshall and other Washington park experts. We applied for and the NPS approved our request to survey and explore Colossal Cave.

By the end of 1962 we had connected several Flint Ridge caves together. Unknown Cave and Crystal Cave were joined, Colossal Cave and

Salts Cave were connected. Then in 1962 all four of those caves were connected into the Flint Ridge Cave System. CRF prematurely announced it had discovered the longest cave in the world, and suffered embarrassment because Hölloch Hölle in Switzerland was longer. It also marked the last traditional claim that Mammoth Cave was 150 miles long: The Nelson map showed about 40 miles.

Two years later in 1964 CRF produced a folio of cave maps and invited NPS officials to an impressive unveiling. CRF was on the move! This full story is told in the book *The Longest Cave*, Roger W. Brucker and Richard A. Watson, (SIU Press). Seemingly overnight, two original adversaries -- NPS and CRF -- were becoming friends and building trust.

Arrival of the Job Corps

In 1961 the NPS and the two cave inholdings owners of Great Onyx Cave and Crystal Cave finally agreed on a price for their sale to the government. Later CRF moved from its camp into the old Floyd Collins house and Crystal Cave owners' buildings when the resident ranger moved out. It was a temporary move that would house CRF for about ten years.

President Lyndon Johnson's Great Society, a welfare program started in 1964-1965, needed an answer to a severe unemployment problem among underemployed youth. President John Kennedy's Peace Corps program had been a smashing success employing idealistic youth in far-flung projects. The answer was a counterpart of the CCC called the Job Corps. It would teach disadvantaged youth practical vocational skills, at the site of the old CCC Camp #1 on Flint Ridge.

An invitation to lunch in 1964 at the Engineer's Club in Dayton, Ohio, was my first introduction to this new chapter in NPS history. The geologist from the U.S. Geological Survey wanted to know if I knew of any large underground rivers under Flint Ridge. It was a query in response to the demand that the Department of Interior construct a new Job Corps camp on the site of the former CCC camp, and water would be in short supply. He asked, did the karst system hold another Echo River that could supply hundreds of corpsmen? I did not know of any such river. Why not tap Green River with a water purification plant if a reliable supply was needed?

No answer was forthcoming. Within a few months a massive Job Corps camp was under construction in the center of Flint Ridge in Mammoth Cave National Park. The old CCC site was being reactivated. Two massive new water storage tanks were being poured next to the older tanks on Flint Ridge. The answer to limited spring water was vast water storage. Also under construction was a large sewage lagoon on top of the same Flint Ridge caves we were discovering and surveying. A sewage lagoon is a rela-

tively low cost treatment scheme used in the arid U.S. southwest, where evaporation rates are high.

Hundreds of Job Corps recruits moved into the new camp and were soon learning earth moving. Bulldozer training was located on the small natural deposit of Pennsylvanian gravel beside the Flint Ridge Road in the park. The CRF President reported the bulldozer work to the Superintendent of MC National Park. The bulldozer mining of the gravel ceased abruptly. CRF was moving from enemy to neutral to friendly to back toward active nuisance.

Over the months that followed, bored Job Corpsmen plundered CRF's food supplies and broke into the Unknown Entrance several times. CRF reported the breaches, prompting the NPS to locate a resident ranger station in the Austin house. Then CRF mapping teams found green slime sewage in a main passage beneath the Job Corps camp. Our surface reconnaissance disclosed sewage lagoon seepage through the pond's gravel walls. Raw sewage falling into the cave! The Superintendent of the Park heard enough, when we presented him with a bottle of greenish-yellow chunky liquid. "How do I know you didn't just pee in the bottle?" asked the skeptical Superintendent.

We arranged to guide two rangers to sample the pee-pool a few weekends later. Joe Davidson, CRF President and a professor of engineering at the Ohio State University, took the rangers to the pool. At the exit to the cave the rangers stored their samples in an ice chest.

Weeks went by with no report from the NPS about the samples. Joe called the U.K. lab where KY water samples are tested. They told him the submission was most curious: The order was to test for natural coliforms, but to specifically NOT TEST for fecal coliforms. In answer to Joe's Davidson's subsequent telephone call, the NPS Superintendent reported that NO fecal coliforms showed up! We were lied to!

Unknown to the Superintendent Joe had taken samples, iced and submitted them for water testing at an Ohio State lab. They reported the fecal coliform count was in the millions! Here was a cover-up of a major pollution of the Park's cave system. We shared this knowledge with the Sierra Club and the National Parks Association in Washington, D.C. They called a joint press conference and the deception became national news.

CRF was suddenly the darling of the conservation organizations and pain-in-the-ass to the NPS! The Sierra Club, CRF, and Bill Bishop sued the NPS/Department of Interior to enjoin the NPS to close the Job Corps camp..

The judge accepted the NPS plea that they would move the Job Corps camp to a "safe location" within a year. The judge warned that they would be in contempt of court if it was not moved by the time they agreed. "And I remind you, contempt of court is a criminal offense," said the judge.

Later, CRF on a hunch sampled water from Crystal Spring on Flint Ridge, part of the perched aquifer. It showed high fecal coliform count, evidence that the thin karst layer atop the Big Clifty sandstone was showing drinking water pollution from the sewage lagoons. We reported this finding to the Superintendent. There was no skepticism this time.

A year came and went. The NPS was summoned into court and threatened by the tough, conservative judge. Within weeks we found a massive volume of raw sewage in the cave, and a swath of dead and dying bushes and trees down Three Sisters Valley. In the breakneck speed to close the camp the contractor had bulldozed the banks of the two sewage lagoons and spilled the contents into the valley sinkholes draining into the karst! The camp's buildings were demolished, paved roads plowed up, and grass seed sown.

In 1982 CRF was directed out of the old Crystal Cave site and relocated to Maple Spring. The Superintendent directed the Austin house removal and the Collins House and Ticket Office listed for stabilization if and when funds were available. The inconvenience of sharing quarters and meeting ferry schedules was a primary factor prompting CRF to purchase its own land outside the park to build a headquarters with a modern central building and two dormitories.

Professional engineering and environmentally sensitive staff now guided the park development. The Park was connected to a regional potable water source outside the park, and the spring water collection system subsequently abandoned. The region was guided by now-Superintendent Joe Kulesza and citizen Bill Austin to establish the Caveland Sanitation District encompassing the National Park, and towns of Park City, Cave City, and Horse Cave. A large sewage treatment plant was connected and built serving the area.

Wonderful era of friendship between NPS and CRF

From the 1980s onward, CRF and NPS remained close. For one thing, the NPS was increasingly staffed by environmentally-sensitive career officials. Secondly, CRF continually added to scientific cave knowledge and to the length of Mammoth Cave and ongoing scientific studies, and third, personnel crossover took place. In 1972 an NPS park ranger was part of the CRF survey party that found and surveyed the connection between the 100-mile Flint Ridge Cave System and the 44-mile Mammoth Cave. The old myth that Mammoth Cave was 150 miles long was now replaced with its surveyed length of 144.4 miles, the longest cave in the world.

Goodwill created by the connection quickly led to closer interaction between CRF and NPS. CRF initiated a multi-year series of science-oriented workshops to educate and orient sea-

sonal guides to the features of Mammoth Cave. These sessions helped to overcome the past suspicions old guides and rangers held toward CRF. CRF was asked for engineering-level consulting on several prospective large projects, relocation of the visitor center, and assessment of the New Entrance stability in a contract dispute. At one point a CRF president helped prevent the unjust removal of a park superintendent under political pressure.

Also CRF started expanding its programs to other NPS parks: Carlsbad Caverns, Sequoia-Kings Canyon, Buffalo National River, Cumberland Gap, and Lava Beds. Concern that the field of cave management was woefully neglected sparked CRF and other organizations to initiate a biennial Cave Management Symposium. Public and private cave managers all over the land benefited from scientific best practice knowledge.

The United Nations began a program to recognize outstanding world natural treasures. CRF officers nominated Mammoth Cave National Park to be an early UNESCO World Heritage Site and World Biosphere Reserve. The NPS proudly claims this honorific status and has adopted strong policies to protect the environment.

In 1983 Mammoth Cave, Proctor Cave, and Roppel Cave were connected into a 293-mile system, a story told in the book *Beyond Mammoth Cave*, James Borden and Roger Brucker, (SIU Press). Other caves have been connected to Mammoth over the succeeding years: Floyd's (Donkey) Cave, Hoover Cave, Stan's Well, as well as additional interconnecting passages.

Hundreds of CRF-supported scientists and researchers have worked and are working in Mammoth Cave National Park. The maps in 2022 show 426 miles of connected cave with 28 (three more closed) entrances. Nearly every month CRF conducts survey and exploration trips into the expanding cave from its headquarters on the edge of Hamilton Valley on Flint Ridge. The south central region of Kentucky -- the Mammoth Cave Region -- has become the epicenter of cave and karst education between Western Kentucky University and Mammoth Cave National Park. Every summer interns and students are studying many subjects.

As new entrances are discovered, CRF has designed and constructed secure entrance gates to Mammoth Cave beyond the National Park

boundary. CRF has also helped the NPS build cave gates inside the park.

September 9, 2022 is the 50th Anniversary of the connection of the Flint Ridge Cave System and Mammoth Cave, a time for celebration, but not a time to pause the work.

Do enemies remain? Yes, development brings air and ground water pollution. These threaten the natural diversity of Mammoth Cave. When diversity is lost, sewage-loving organisms overwhelm. Their control is a continuing challenge to those who want to protect and preserve Mammoth Cave in perpetuity. Nearby is the 130-mile long Fisher Ridge Cave System, the Whigpistle Cave System, and also the four-mile Great Onyx Cave -- all are possible next connection possibilities. Some hundreds of small caves in the park are being registered, cataloged, surveyed, inventoried. Hundreds of miles of Mammoth Cave and many other caves lie outside of the national park beyond federal environmental protection.

For many years prophets have said all these caves are connected: Édouard-Alfred (E.-A.) Martel, the Father of Speleology, said that, Stephen Bishop, a famous slave cave guide, predicted it; Horace Hovey and Floyd Collins voiced that expectation; and James Borden and Roger Brucker said, the cave will be 1,000 miles long by the end of the 21st Century.

The enduring legacy of the 65 years of closeness is PEOPLE. These are not ordinary people. Rather, they are people who value caves highly and are steeped in the conservation of cave and karst resources. Many are trained cave scientists and professional educators. They have written papers and books. They teach. They are people who continuously volunteer to assist the NPS and assist in other project cave activities worldwide. The closest evidence of this long-range benefit is the significant number of CRF cavers working for the NPS nationwide, and the significant number of NPS employees volunteering with CRF to discover, explore, survey, map, and study caves and their history. Cave science has grown from the "dustbin of science" (as Philip Smith used to say) to a significant set of widely studied, interrelated disciplines.

The founders of CRF set out to create a multi-generation volunteer organization to study and care for the great caves 65 years ago. They hope it will continue to inspire and produce such people to the end of time.

REGIONAL EXPEDITION REPORTS

Lava Beds, Siskiyou County, California, July 11-20, 2022

By: Mark Jones

July 11:

Larry Welch had arranged with Dave Hays, Natural Resource Program Manager at Lava Beds National Monument to return to continue his radon research begun in 2019. Chris Beck and Mark Jones rounded out the team. Four different sensors were set at Steamboat Frank Cave for a ten-day run.

July 12:

Larry, Chris, and Mark started the day surveying two small surface tubes in the Post Office Flow. Both features measured over 100 feet. The remainder of the day was spent setting sensors in Post Office Cave.

July 13:

The length of the radon study allowed the three to focus on surveying caves at Lava Beds National Monument as well as the Modoc National Forest. Using the Disto-X to record compass and inclinometer the team tallied over 700 feet of survey in a large tube separated by a trench collapse.

July 14:

Bill Broeckel recommended surveying the Tichnor Cave Complex, so Larry, Chris, and Mark spent the day in Tichnor Caves #1 & #2. Several interesting lava formations were noted in both. Tichnor #1 had 482.4 feet while Tichnor #2 clocked in at 220.5 feet.

July 15:

The team was joined by Drew Stasak along with Emma Sutphin, Lauren Anderson, and Anna Reachmack of the Lava Beds National Monument to continue surveying the Tichnor Caves within the Modoc National Forest. Tichnor #3 recorded 360.8 feet. Only a portion of Tichnor #4 was surveyed for a total of 184.6 feet.

July 16:

Chris, Drew, Larry, and Mark hiked back to the Tichnor Cave Complex where another 150 feet was garnered in #4. Tichnor #5 was a mere 35 feet and Tichnor #6 was 90 feet.

July 17:

Chris, Larry, and Mark documented two more small caves in the Valentine Flow in the morning before returning to swap out radon instruments at Post Office Cave. A futile attempt was made to drive out the backroads of Siskiyou County in hopes of getting some rocks to analyze for various elements. Unfortunately, we reached the limit of the vehicle when the trail denigrated into a cow path over four miles from our goal.

July 18:

Back in the Modoc National Forest the trio surveyed 956.8 feet in Upper Tichnor Cave. Numerous lava formations and features were found during this time.

July 19:

Downflow of Tichnor #6 the team began surveying Berthas Cave. This gem was full of amazing formations in a pair of parallel tubes. Over 1,000 feet of passage was sketched with plenty remaining.

July 20:

Larry, Chris, and Mark returned to Post Office Cave to retrieve the scientific instruments set down in Tangerine Dream. All the sensors were functioning properly.

Chris and Mark spent the afternoon finishing surveying Berthas Cave and began working on Berthas Cupboard. With the previous day's survey, the grand total for Berthas Cave was 1,387 feet. We only made a dent in Berthas Cupboard with 242.8 feet.

The expedition grand total of cave survey for the Tichnor Cave Complex was 4,408 feet!



Top: Lava curb in lava tube at Lava Beds. **Bottom:** Poison Rock (one drop will kill you), Modoc National Forest. Photos by Mark Jones.



Lava Beds, clockwise from upper left: *Larry Welch on rope in Modoc National Forest; Chris Beck records data in Post Office Cave; Larry Welch by hanging lava ball in Modoc National Forest; Emma Sutphin of NPS surveying a large lava tube in Modoc National Forest. Photos by Mark Jones.*

Craters of the Moon National Monument and Preserve, Butte County, Idaho September 2022 Cave Research Foundation Expedition

By: Mark Jones

Following the successful May CRF Expedition at Craters of the Moon National Monument and Preserve a crack team of cavers returned to continue surveying and inventorying lava tubes. Working off the master list from this past spring developed by Todd Stefanic, the wildlife biologist, we planned to continue surveying and inventorying lava caves throughout the monument using gear and equipment provided by the monument. Seven CRF cavers participated during the fifteen day event. Kailey Alessi, Andrew Erickson, Mark Jones, Paul McMullen, Rick Olson, Michael Raymond, and Fred Wilkinson were in the field fulfilling a variety of roles. Several National Park Service people also participated.

September 9:

To start the Cave Research Foundation (CRF) Fall Expedition Allen Palmer, the seasonal wildlife biologist and Mark, hiked out the

Tree Mold Trail to swap out an SD card for a bat monitor outside Surprise Bat Cave.

September 10:

Kailey, Andrew, Rick, Fred, and Mark plus Allen Palmer trekked out the Cave Wilderness Trail to survey some caves. We only surveyed 150 feet of the entrance area of the first cave due to bats being present. The second cave consisted of a room at the bottom of a lava slide. The last cave was reportedly less than 50 feet, but we recorded nearly 200 feet and still didn't finish.

September 11:

Kailey, Andrew, Paul, Rick, Fred, and Mark visited an important oasis cave located in the lava flow, again although 350 feet was surveyed, we didn't reach the end. Rick found a cave millipede expanding its range within the monument.

September 12:

Andrew, Paul, Rick, Fred, and Mark plus Makensie Stallings, the astro ranger at the monument, hiked out the Tree Mold Trail to start surveying lava tubes in the Blue Dragon Flow. While Andrew, Paul, Fred, and Mark surveyed, Rick and Makensie did surface reconnoitering. Three clustered lava features were put on a single map to get a better feel for their relationship. Next, two caves were also tied together on a single map. Finally, Fred discovered a backdoor to a known 50 foot cave that clocked in at over 300 feet.

September 13:

Under threatening skies Andrew, Paul, Rick, Fred, and Mark surveyed a popular woodrat haunt in the morning before documenting three more smaller caves. The last cave had several interesting lava features.

September 14:

Andrew, Paul, Fred, and Mark along with Kathryn McCabe, an interpretive ranger, and three ladies from the Natural History Association (Virginia Glasscock, Emilee Hansen, and Sarah Rogers) hiked out to Arco Tunnel to continue the survey begun in May. Our guests were instructed on surveying techniques during the trip. The survey followed the right wall 600 feet to the north wrapping around to the east before a tight pinch forced us to retire.

September 15:

Andrew, Paul, Rick, Fred, and Mark planned to finish the survey of Holiday Cave that ended in the spring of 2019 due to an ice constriction. After a hot summer we expected the passage to be open to us. Instead, we found that there was even more ice that nearly plugged the hole! A biological inventory revealed two dozen Idaho ice cave beetles or Blind Cave Leiodid Beetles feasting on the fungi growing on some scat. This discovery expanded the range of this species within the monument. A nearby 16 foot

surface tube was knocked off to finish the day. In the evening the CRF prepared a fish feast with loaded baked potatoes for a dozen monument staff.

September 16:

Andrew, Paul, Rick, Fred, and Mark hiked out the Blue Dragon Flow to survey more of the caves. Four small caves and two significant caves made for an interesting day.

September 17:

Michael Raymond joined the expedition as Andrew, Paul, Fred, and Mark hiked out the old Cave Wilderness Trail to mop up the unfinished sketch and begin work on other caves. Mark and Fred knocked off the unfinished cave and surveyed a second while Michael led Andrew and Paul surveying two other caves.

September 18:

Andrew, Paul, Rick, Michael, Fred, and Mark along with Allen returned to finish the oasis cave as well as surveying a nearby cave. Ice and water were found in both caves.

September 19:

Andrew, Paul, Rick, Michael, and Mark, along with Makensie, were back down the Tree Mold Trail to survey more of the known lava caves. Michael led Paul and Rick in surveying three caves while Mark, Andrew, and Makensie documented seven small caves and explored two significant caves that will be surveyed in 2023.

September 20:

Andrew, Paul, Rick, and Mark surveyed eight caves clustered in a lava depression. A variety of lava formations were found.

September 21:

With inclement weather approaching Andrew, Paul, Rick, and Mark surveyed three caves in the morning before calling it a day. The first cave had the most magnetic interference seen during the expedition in a lava tube –



Craters of the Moon, left: Water-covered ice pool. Photo by Mark Jones. **Right:** Blind Cave Leiodid Beetles. Photo by Paul McMullen.



Craters of the Moon, clockwise from upper left: Andrew Erickson, Mark Jones, Rick Olson, Paul McMullen and Fred Wilkenson in the field. Photo by Makensie Stallings; Rick Olson lead checking. Photo by Andrew Erickson; Semicircle Caves survey team. Photo by Rick Olson; Michael Raymond mapping in Worcestershire Cave. Photo by Rick Olson; Cave Bikers Mark Jones & Andrew Erickson. Photo by Rick Olson; Andrew Erickson on tape. Photo by Paul McMullen; Sarah Rogers in Arco Tunnel crawl. Photo by Paul McMullen; Needles survey team – organized chaos. Photo by Rick Olson.

bearing swings of over 200 degrees! The team beat the rain back to the apartment.

September 22:

Allen discovered bones in a pit while out in the lava fields and was interested in dropping down to investigate. Andrew, Paul, Rick, and Mark joined him to find a small blind pit with some gnawed cow bones.

September 23:

For the last day of surveying Andrew, Paul, Rick, and Mark returned to Arco Tunnel to continue the ongoing survey of this mile-long cave. A fascinating room, the Upper Chamber was surveyed before heading down to The Forum. Unfortunately, the magnetism in this large room was so strong that rather than continue, the line plot was drawn with plans to return in 2023 to resolve the sketch. Over 600 feet was added to the map. To end the day the crew headed over

to a nearby cave to swab the walls for an unidentified organism. A research permit to collect biological material was granted earlier this year, so a sample was taken from an ice alcove to be analyzed.

September 24:

To end the expedition Andrew, Rick, Mark, and Matt Piper, a seasonal ranger, trekked out to collect another biological sample for testing.

This concluded a most productive expedition thanks to the cooperation of everyone involved. The staff at Craters of the Moon National Monument and Preserve is to be commended for their assistance throughout our time at the monument. The CRF team worked diligently from start to finish to survey over 6,400 feet in nearly 50 caves! In addition to the surveying and faunal studies an archeological report was submitted. Plans are in the works to return in early May of 2023.

Moore Cave System, Perry County, Missouri

An Entrance Saved, a Major Expedition Held, and a Dog Gets All Our Press

Recently an old entrance to the Moore Cave System was acquired by the Missouri Caves and Karst Conservancy, funded by grants from a variety of sources, majorly from the Missouri Department of Conservation, but also with funds provided by L-A-D Foundation and Cave Research Foundation. This small sink entrance protects a headwater input to an endangered species (grotto sculpin) site. Hopefully this will demonstrate an ongoing commitment to protecting the headwaters of the sculpin sites, not just the human access to those environments.

CRF Fellows Mark Brooks and Chad McCain have been leading the charge on this work and have done an excellent job. In addition to reopening the lost entrance (The Pot of Gold) they also put together an effort to connect another nearby cave (like very nearby, as in 150 yards) to the Moore System. What follows are a couple of trip reports from them that are just too good not to share.

--Scott House

Reopening the Pot of Gold, July 1, 2022

By: Mark Brooks

Objectives for this trip were:

- 1- Identify 100% which sinkhole on the newly acquired MCKC property contains is the Pot of Gold entrance to the Moore system.
- 2- Determine what would be needed to open the entrance. No obvious hole is evident in either sink. Was large equipment necessary?
- 3- Talk to adjacent landowners just to be neighborly. One of them owns the entrance to Dorothy Taylor Cave.

I drove up to Perryville early on Friday morning not really expecting to accomplish much more than giving the two sinkholes a close look over. Stan Sides had given a good GPS location on the entrance back in 1991 which showed the entrance to be the southernmost sink. Previously Chad McCain and I looked the sink over but saw no evidence of it having any cave entrance to it, just some rocks and gravel level with the surface in an area no bigger than

five-by-five feet. The second sink was much bigger and full of concrete slabs and tree debris. Neither looked like it had much possibility. Chad and I both were plagued with the thought that we had pushed along the purchase of the property without being 100% sure that these were the actual sinks the cave entrance was in. There are other sinkholes close by.

I texted Chad on the drive up, got the neighbor's phone number and let him know I was going to be around. He told me to use his gate to access the field as he was going to be out of town for the weekend. Arriving at the property I didn't see anyone home at the neighbor's. I walked down to the sinks and gave them a good once over. The Mulberry tree sink offered nice shade so I decided to move some rocks and see if I could feel any cool cave air. NOTHING! No cold air at all - crap. I'm hard headed and found a short piece of bedrock, so I kept pulling out

lunch box sized rocks and pieces of old wire fence. Working my way down along that bed-rock was the trick. It started to undercut and soon I couldn't see the back of the undercut anymore. A few wheelbarrow sized stones slowed me up so I worked them down to a manageable size with a 2 lb sledge hammer. Underneath them was a large roll of web fencing.

I was three hours into this by now and it was HOT work. I took a break and sent Chad some photos and told him I thought I had found the entrance. He got excited and threw his gear in the vehicle, but he had some chores to get done first. He thought he could get down by 3:30. I went to Perryville and got some long straps to help out with the project. When I returned I hooked up my truck to that big roll of fencing and pulled it out. Now I could actually lie down and shine a light into the short crawlway. The "passage" was about a body length long and too tight to enter. Plate-sized rocks had sloughed off the ceiling and filled most of the space...but not all. I could see a small space above the rocks just big enough to see about ten feet further. Still no cool air. That worried me. Crawling in head first, I started pulling out slabs and roots until I could squeeze over and into actual cave passage. It was too tight to wear a helmet or turn my head so I couldn't see much. Jamming forward I scooped out the floor till I was about 20 feet in and to a place where I could turn around. When I did turn, my sweat-soaked face got a blast of hot outside air! The cave was sucking inward. No wonder I never felt any cool cave air. Moving rocks and dirt off to the sides, I worked my way back out and sat on a rock to cool off. Checking my phone showed I had

missed a call from Chad. He was on his way and had contacted Gretchen Asselmeier, a local SEMO Grotto caver.

My help finally arrived at 4:30. We suited up and crawled into the cave enlarging the passage until we could all get to the turnaround area. It was tight on Chad the first time, but we each worked at it as we entered. With nothing stopping us anymore we went deeper. I had a good mental image of Aaron Addison's sketch of the passage from 1993. We wanted to know how difficult this passage would be to use as an entrance to survey this far away section of the system.

Our pace was slow at first due to antique bottles, bones, teeth, and flowstone blockages to go around and under. Finally the passage started downcutting and getting larger. We kept an eye out for survey stations as this place had been surveyed twice before. After 500 feet we found a smoked dot in a circle on the left wall. I thought it might be from my survey back in 1987 (I still had carbide back then and that 14 hour trip was well beyond my wheat lamp's time). We finally found a flagged station from Aaron Addison's 1993 survey. We continued for another 500 feet and I spotted a second flagged station. When I got up to it I recognized we had arrived at Hammer Drop passage!! This had recently been discovered while looking for a Dorothy Taylor Cave connection. We all high-fived each other and took pictures! Not really a big deal or anything new, but still it felt great to be deep into the Berome system after only one and a half hours of caving. We were three and a half hours away from the Berome entrance and it was mostly dry. It was time to go back.



The trip out was fun, and I took pictures of the nice stuff to be seen. We noticed at one spot an unusually large number of amphipods and isopods in pools of cloudy water. I was immediately reminded of the pollution in Tom Moore in the 1980s when a raw sewage dump was entering the cave. The team arrived back on the surface at 9 pm. We took more photos and changed, said goodbyes and headed off to wherever it is we call home.

All of our objectives were met and exceeded. Chad can now start running survey crews

into this entrance knowing what they will be facing. Travel times to Paul Mills Lost Passage, Hammer Drop, and Upper Annex Passage are cut in half with no 1000 foot water-crawl to deal with. Travel is simple and non-technical. The area around the entrance will take a day of labor to clean up and made to look natural without too much effort. This passage is much safer to use due to water rise not being as much of an issue as it is with the Upper Annex water-crawl.



Pot of Gold Dig. Previous page, left: After the dig. **Right:** Chad McCain in Pot Of Gold Passage. **This page, left:** Mark Brooks at the entrance before the dig. **Right:** Cave team ready to enter POG Chad McCain, Mark Brooks, Gretchen Asselmeier. Photos by Mark Brooks.

Moore Cave Expedition, Saturday, August 6, 2022

By: Chad McCain

This expedition was planned entirely by Mark Brooks as he has made it a goal to try to connect the Moore system to Dorothy Taylor Cave. Mark and I began discussing the division of all teams and team leaders earlier in the week with the exception of the dive team, which was already set in stone.

On Friday afternoon Mark and I met up at the Berome entrance pavilion and went to the spring to check the water as it was very muddy from the heavy rains 36 hours prior, ending on Thursday morning. This was going to give us approximately 48-52 hours after the last rain fell for the water to clear. The overflow pool at the spring showed signs of rising five to six feet. We then headed to the Pot of Gold entrance to get an updated GPS coordinate and stop at Surprise Spring Cave, which showed signs of washing out and possibly opening up with a little digging. Lastly, we got a new coordinate on

the historic Tom Moore entrance. After the coordinates were plugged into the cave data set, an error correction for the Tom Moore entrance moved the survey line from 132 feet off to 7.2 feet off between the Tom Moore entrance and Berome Entrance. After we returned to Berome, the players for the weekend began trickling in, and we began packing and preparing for the morning.

As the morning started, everyone began arriving and began preparation, the teams started forming up. Isaac Smith, Michael Bradford, and Kyle Bourland were going to lead Mike Young to the dive site at the sump. Brian Biggs, Julie Springman, Aaron McClean, and Brent Wilkins were right behind them, carrying wetsuits and their job was to immediately head to the end of survey and start surveying toward the Pot of Gold entrance as they were going to do a door-to-door effort after the survey trip.

Mark Brooks led Marissa Schorr, Melissa Meyer, and Mollie and Alexis Ratliff, hauling some dive gear while I had Logan Dowd, Gretchen and Heidi Asslemeier, and Cathleen Yung hauling gear as well. We all met up at base camp, and after a safety briefing with the overall plan by Mark Brooks we took a group photo at 10:10 a.m. and immediately headed out. The trip to Camp 2 where the wetsuits would be put on was extremely fast for the large group as we all had arrived in 1.5 hours and I took a photo of Mike gearing up at 11:42 a.m. I am sure Michael Bradford and his crew got there in 1.25 hours total.

While this was going on, Krista Bartel led her team of surveyors including Jeff Fennel, Ben Geisert, and Cody Cox to Tom Moore to continue the survey of the paleo trunk line in Tom Moore. Joe Sikorski, Jessica Walden, and Shiloh Walden finished the survey in Tom Moore from the upstream main section to the field entrance (the entrance that was hit by the tornado a few years ago). Shawn Williams and Rita Worden went into historic Tom to do a bio survey for the USFWS. While this was going on, Rob "Bobcat" Kavaliauskas, Chris Gidley, Gerry Keene, and Christopher Ganey plus the kids of Bobcat and Chris went into the Berome connection to Tom. Rick Haley was on surface support.

After the divers took off, which was at 12:07 p.m., Brian's team and my team headed up to the end of the survey towards Pot of Gold. Brian and company began surveying while the rest of us either explored or cooked lunch. Logan and I climbed up to the original paleo trunk line out of the cave, which is now clay filled, and cooked in a strange position, sitting above everyone else. Gretchen and Melissa took off up Paul Mills Lost Passage to find the end, while Mark and others re-sketches some stuff between Camp 2 and the PM Lost Passage. After I ate and changed into dry clothes, I headed up POG to see if I could get to Hammer Drop passage in a reasonable amount of time. I traveled 20 minutes before turning around, retrieved an old whiskey bottle, then headed back. When I returned Aaron and Brent told me that Mark yelled that the dive team had returned 20 minutes ago.

I headed back to Camp 2 and sure enough everyone was gone but Isaac and Michael were waiting in the dark. After a discussion of what happened (an equipment malfunction, which resulted in the dive trip ending without a dive) Melissa and Gretchen returned. Since we were still missing Marissa and Mollie (Lost Passage), I asked Gretchen and Melissa go back and get them since Mollie's daughter was gone and we couldn't leave without them.

After they all returned, we headed back but split into two groups. Gretchen and Melissa took off followed by Isaac and Michael. I hung back with Mollie and Marissa, but eventually I caught up with Gretchen and Michael; Isaac and Melissa were long gone. We traveled in two groups of

two from here on out and joined back up where the Formation Passage water pours into Annex. We got topside around 5:00 p.m. and the stories began.

While we were gone, the education trip found a lost dog about 300 feet into Tom Moore between Berome and the pit entrance. Gerry Keene got Rick Haley and Rob Cahoon to assist with bringing the dog out of the cave and back to its owner. The dog, who had been missing since June 9, was skin and bone. The dog, her name is Abby, quickly became one of the more famous dogs in America as the plight was shared by most newspapers, national news media, NPR, and just about every television station that could get an interview with the rescuers, owners, and interested parties. The dog didn't have much to say about the experience.

It is probably faster at this time to get to the Paul Mills Lost Passage entrance from Berome with a small group traveling fast, than in from Pot of Gold.

Joe Sikorski, Jessica Walden, and Shiloh Walden knocked out 668.8 feet and ran the survey all the way to the field entrance, or the Tornado Entrance as I like to call it (The entrance took a direct hit from the tornado 4-5 years ago) finishing this section of the cave.

Krista Bartel, Jeff Fennell, Ben Geisert, and Cody Cox obtained 758.5 feet of survey in the paleo trunk out from the main Tom Moore junction.

Brian Biggs, Aaron McLean, Julie Stroud Springman, and Brent Wilkins continued chipping away at Pot of Gold Passage starting at the junction with Paul Mills Lost Passage and got 129.4 feet of survey.

The cave length grew by 127.7 feet and hit 129,731.5 feet of survey, in other words, 24.57 miles.

Teams:

Rick Haley: Safety and surface support

Derik Holtmann: Photo documentation

Isaac Smith: – Sump team

Mike Young

Michael Bradford

Kyle Bourland

Brian Biggs: Sump Support IN survey from Paul Mills to Hammer Drop

Julie Springman

Aaron McLean

Brent Wilkins

Chad McCain: Sump Support IN Survey from Paul Mills to Hammer Drop

Logan Dowd

Heidi Asselmeier

Gretchen Asselmeier

Cathleen Yung

Mark Brooks: Sump Support OUT and resurvey/resketch to Paul Mills

Mollie Ratliff

Alexa Ratliff

Marissa Schoor

Melissa Meyer

Joe Sikorski: Tom Moore Main to Tornado Entrance

Jessica Walden

Shiloh Walden

Krista Bartel: Tom Moore – Main Borehole Loop

Jeff Fennell

Cody Cox

Ben Geisert

Shawn Williams: Tom Moore biological monitoring

Rita Worden

Rob Kavaliauskas: Tom Moore education trip

Gerry Keene

Chris Gidley

Abby the Dog



Moore Cave Dog Rescue, clockwise from upper left: Abby with Kylie credited to Judy Kriete. Photo by Rick Haley; Gerry and Abby. Photo by Rick Haley; Gerry left, Rick right, Abby in the doggie bag. Photo by Rick Haley; Abby at discovery in Tom Moore. Photo by Gerry Keene.

Ozark Operations Activities, June-September 2022

By: Scott House, with reports by Kayla Sapkota

Work continues at a rapid pace in the Ozark Plateau and beyond, with CRF expertise being called forth for a variety of projects. Times were busy with numerous bat counts that had wisely been postponed due to the pandemic.

OZARK NATIONAL SCENIC RIVERWAYS

CRF Ozarks works with the Ozark National Scenic Riverways (NPS) under a cooperative cave management agreement. Trips usually originate from the NPS/USFS shared field office at Winona.

July 18, 2022:

Tony Schmitt and Korey Hart plus Dan, Henry, and Margaret Lamping monitored Branson Cave in Shannon County. They counted a number of salamanders and installed a new sign at the entrance.

July 19, 2022:

In sweltering heat, Tony, Korey, the Lampings, and new recruit Andrew Erickson floated a section of the Jacks Fork. Part of their mission was to look up a side hollow for a potential cave, which they located. They also monitored several known caves and searched another hollow for potential caves.

July 20, 2022:

Once again in severe heat, Tony Schmitt and Andrew Erickson relocated Edgars Well on the upper Jacks Fork River. The pit cave had not been entered in more than thirty years, and the location was off quite a bit but the team managed to find it, rig it, and monitor it. Back across the river they also monitored Meeting House Cave and nearby smaller caves.

July 21, 2022:

Tony and Andrew plus Derik Holtmann and NPS interpreter Kevin Tarbet monitored three caves along the upper Jacks Fork. Whiskey Spring Cave was as lively as always, while Flat Hole Cave had seen no visitation - which is a good thing. Bay Creek Camp Cave was more adventurous and vertical gear was used to effect a safe climb back down.

July 22, 2022:

Dan Lamping, Joe Sikorski, Derik Holtmann, and Andrew Erickson gave it their all in Alphen Hollow Spring Cave. The cave features a number of low water crawls punctuated by ear dips. The last previous trip was way back in 2014 because, basically, if a raindrop hits the ground the cave might flood. All the remaining leads and map inconsistencies were worked out to satisfaction and the cave survey is now complete.

August 15, 2022:

Scott House, Mark Jones, and Kevin Tarbet (NPS interpreter) went into Round Spring Cavern to finish the geologic profile of the left hand fork. The profile sketching here is fairly daunting but with effort the job was pretty well finished. Bio counts were done, with a vast number of salamanders noted. This is likely due to the fact that the cave has not had any tours during the years of covid and the salamanders are being more visible and/or numerous.

BUFFALO NATIONAL RIVER

Provided by Kayla Sapkota.

CRF work at Buffalo National River (NPS) is facilitated through a cooperative cave management, survey, and bat monitoring agreement.

July 9, 2022:

Kayla Sapkota, Nathan Windel, and Jake Sawyer mapped 288.2 feet of small side-leads on the north side of the Altar Rock Room in Fitton Cave. Laura Baumann, Paige Preston, and Chris Enders mapped 248.9 feet of side leads on the south side of the Altar Rock Room. Ben Damgaard and Tyler Rider mapped 92.8 feet of small side-leads on the north side of the Altar Rock Room. Matt Beeson, Courtney Werner, and Collin Henley mapped 845 feet in the Grand Central area of Fitton Cave.

July 14, 2022:

Matt Beeson and Courtney Werner returned to In-D-Pendants Cave and mapped another 471 feet there.

July 27, 2022:

Matt Beeson, Ben Miller, and Courtney Werner begin the survey of Devil's Den Cave, mapping 557 feet in this relatively deep pit.

August 13, 2022:

Kayla Sapkota, Maya Robles, Adrian James, Jessie Bridges, Ben Damgaard, and Paige Preston traveled to the Helictite Passage in Fitton Cave to continue the survey there. Kayla, Maya, and Adrian mapped a lead on the south side of the passage that continued further than expected, along with a crawl lead opposite Jessie's team. Jessie, Ben, and Paige mapped a low, crawl area on the north side of the passage. Combined, the crews mapped 1,030.2 feet.

Matt Beeson, Treavor Bussard, and Nathan Windel made an important tie on the east end of the Tennifer Room to a previously surveyed passage from many years ago, tying it into the new line. They also mapped a lead below the Altar Rock in the Corkscrew area. The crew

netted 189.9 feet of survey plus the very important tie-in.

Emily Roberts, John Davis, Skyler Vaughn, and James Price, with the Park's blessing, changed the locks on both entrances of the Fitton Cave system, as well as monitored each entrance a few hundred feet in. The crew also monitored Willis Cave, Ice Box Cave, and Mud Cave, as each are close to popular trails.

September 10, 2022:

Marty Brown, Adrian James, Kayla Sapkota, Treavor Bussard, Jessica Sheu, Claty Barnett, and Nathan Windel carried a ladder from the Kyle's Landing parking lot to a hollow about 2 miles up Indian Creek, where half a mile further laid a high lead in a bluff, reachable by ladder. The crew successfully set up the ladder on the steep slope of the hollow and mapped the cave to a length of 308.1 feet.

Laura Baumann, Maya Robles, Jasmine Summers-Evans, and Brian Gould mapped two caves in the Camp Orr area, mapping Rainey Cove Cave to 39.84 feet, and Tall Bluff Hollow Cave to 41.92 feet.

ARKANSAS NATURAL HERITAGE COMM.

Provided by Kayla Sapkota.

Arkansas State Parks

July 10, 2022:

Matt Beeson and Kayla Sapkota mapped 350.1 ft in War Eagle Spring Cave, completing one lead and shooting several stations into another before time ran out.

August 15, 2022:

Kayla Sapkota joined a LiDAR scanning team at War Eagle Spring Cave to scan a few rooms of concern related to a construction project. The handheld scanner was effective in capturing the data needed, which can be tied to the map's survey line.

September 11, 2022:

Claty Barnett, Meghan Gallo, Kayla Sapkota, and Aaron Thompson mapped 267.8 ft in War Eagle Spring Cave, completing one lead and leaving a good tie in for the remaining few leads before time ran out. The water was lower than usual, but the mud was still formidable.

Private

September 3, 2022:

Meghan Gallo, Derek Thompson, and Shawn Williams continued the survey in Onyx Cave (Carroll County, AR, show cave), mapping a hundred or so feet.

MARK TWAIN NATIONAL FOREST

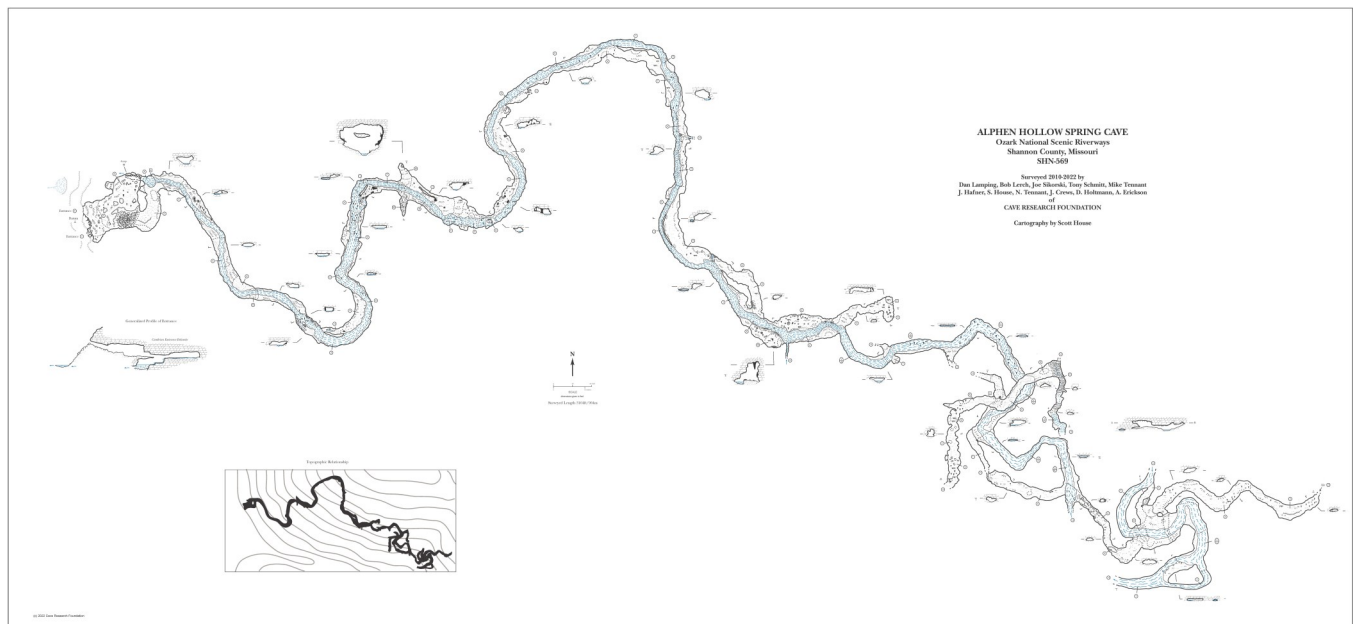
CRF work on Mark Twain National Forest (U.S. Forest Service) is performed through a cooperative agreement covering inventory, survey, monitoring, and gating. The Mark Twain covers 1.5 million acres, and the bulk of it contains caves. Much recent work has been focused on three forest districts: Ava, Cassville, and Eleven Point. The extreme heat of June and July kept a number of trips from happening.

June 26, 2022:

Bob Lerch, Ben Miller, and Aaron Soles checked out a sinkhole lead on (they thought) FS land on the Cassville District. The sink turned out to be not quite enterable and not quite on FS land. They then went and began a survey of a nearby privately-owned cave and got 110 feet before needing to quit for the day.

June 27, 2022:

Bob, Ben, and Aaron continued working on the Roaring River dye tracing project, gaining access to private land of interest. Heeding warnings not to unduly disturb the cattle of Dry Hollow, they managed to get a number of injections done without a bovine incident.



Dennis Novicky and Brenda Goodnight did a hike into the Irish Wilderness (Eleven Point District, Oregon County) and mapped ZigZag Cave.

CRF facilitates survey work in several areas of the county, including the City of Perryville, Crevice Cave, and the Moore Cave System.

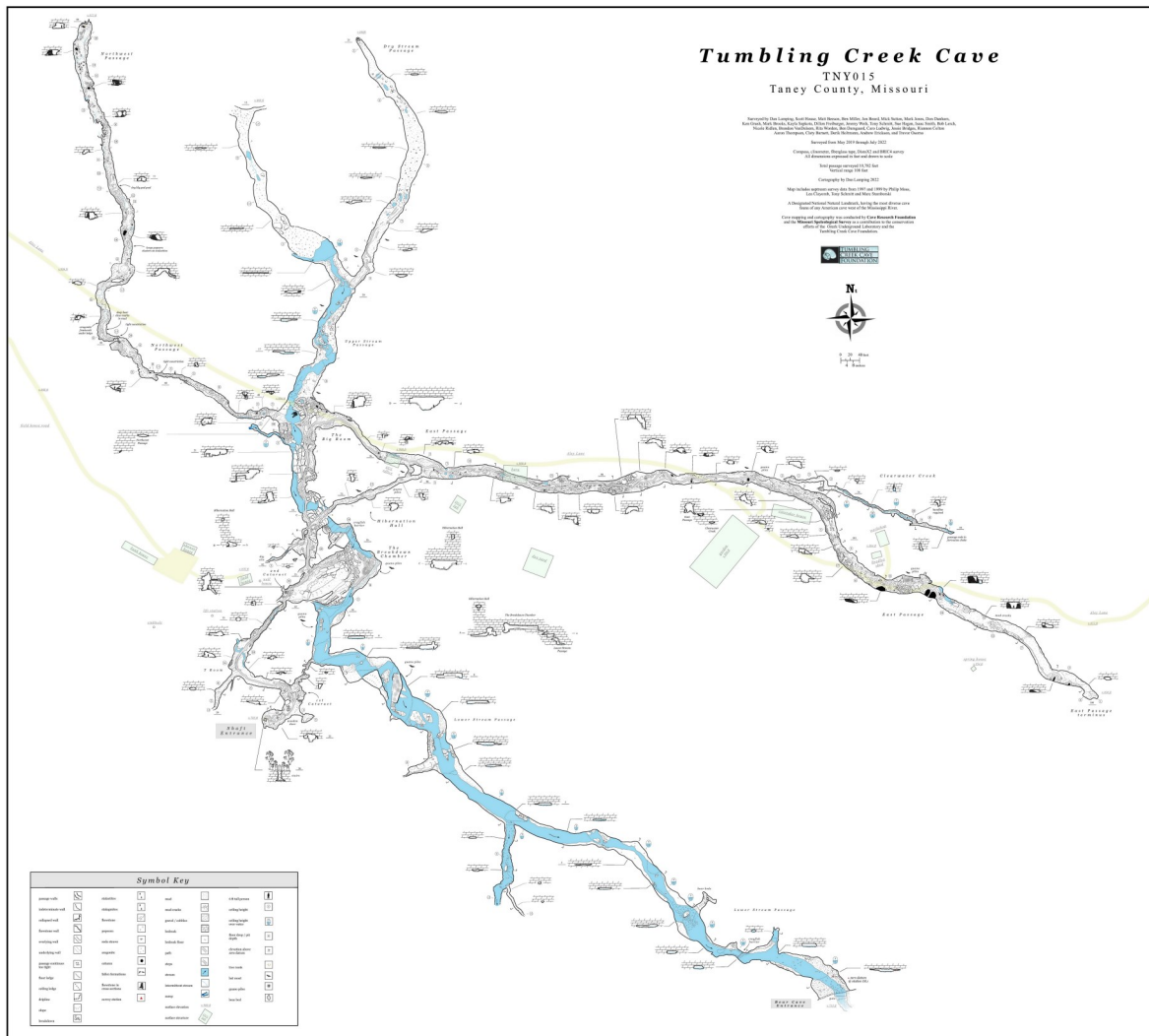
Mark Brooks, Gretchen Asselmeier, and Chad McCain investigated the newly acquired Pot of Gold entrance to the Moore Cave system. Mark arrived first, opened the cave after quite a bit of work (it had been filled some years previously); the others arrived shortly and the trio made their way into the cave. Eventually they found flagging from a 1993 survey and realized where they were. The Pot of Gold was open once again.

Scott House, Richard Young, Gerry Keene, Josh Cooper, Marissa Schorr and Bill Eddleman made a new map of Shrine Cave, southern Perry

A dive was planned (by expedition leader Mark Brooks) to attempt a connection between the Moore system and nearby Dorothy Taylor Cave. Thirty-plus people showed up for the expedition. See separate article on this event.

CRF and MSS work under unfunded permits to collect survey data on MDC lands. Ancillary support comes from CRF and cooperating federal agencies.

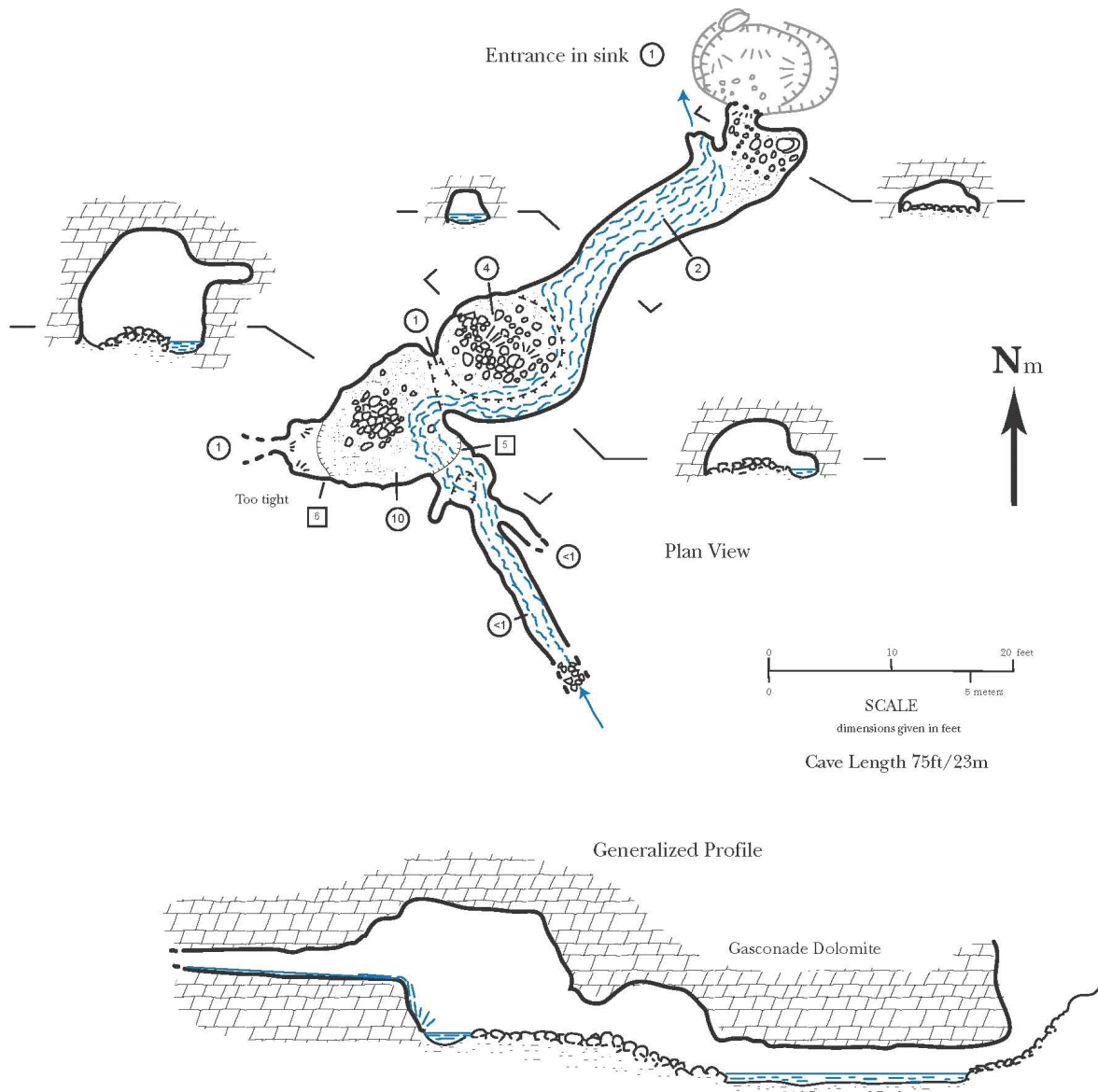
Ken Grush, Sam Grush, and Jim Cooley made a day of it, working on caves in the Truman Lake area, St. Clair County, accessed by boat. These areas are titled to the Corps of Engineers but are managed by the MDC. Difficulties included the constant access issue (deep mud and flood debris) plus the continuing presence of turkey vultures roosting in these rela-



PREDICTION CAVE

Shannon County, Missouri
SHN-698

Surveyed 16 July 2022 by
Dennis Novicky and Tyler Skaggs
of
CAVE RESEARCH FOUNDATION
in cooperation with
Missouri Department of Conservation
Cartography by Scott House



tively short caves. Nonetheless they persevered and surveyed/monitored a number of caves.

June 21, 2022:

The same trio continued working, but in a different area with more water. Here the difficulty was the climb up the bluffs to the caves. However, they went at it again with several known caves mapped and at least one new cave added to the list.

June 25, 2022:

Max White, Charley Young, Abby Young, and Jeff Young monitored Lowell Cave in Wright County. They cleaned trash from the cave and did a thorough bio count.

July 16, 2022:

Dennis Novicky and Tyler Skaggs surveyed Prediction Cave in Island Branch Natural Area. Too small for most humans, they got the thing off of the do list and now all known caves in the area are surveyed.

July 17, 2022:

A large crew of mostly Meramec Valley Grotto members monitored Lone Hill Onyx Cave in Franklin County. The trip was led by Joe Light, with Dan Lamping, Henry Lamping, Margaret Lamping, Justin Elden, Kayla Flamm, Georgia Thomas, Kyle Mann, and Steve Kaub rounding out the crew.

July 18, 2022:

Scott House accompanied Susan Harrington of MDC, plus a couple of loaner biologists from The Nature Conservancy and Missouri Department of Natural Resources (state parks) in an effort to document features on a large chunk of land in Shannon County. Four new caves were found in addition to a number of listed plants.

ELSEWHERE

This includes trips done on US Army Corps of Engineers lands and private lands. Some of this work is funded and some is not. Some of the protection efforts may be funded by CRF, MO Dept. of Transportation and other sources.

June 11, 2022:

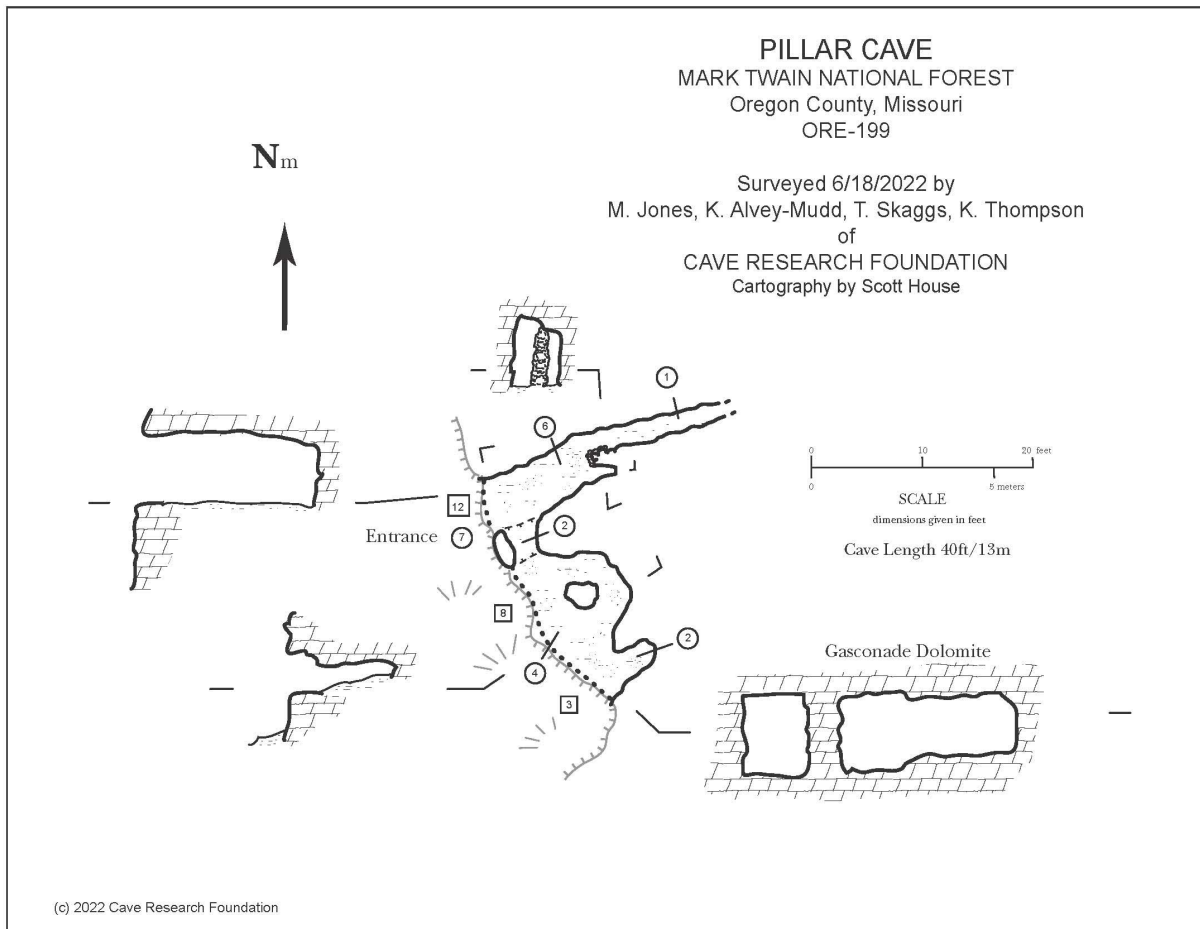
Dan Lamping presented a talk on the ongoing survey of Carroll Cave, Camden County, MO.

June 18, 2022:

Jim and Julie Cooley checked out a mine on Truman Lake area for human use (high) and bat use (indeterminate). The probability is that the mine warrants some protection.

June 20, 2022:

Mark Jones and Dennis Novicky measured for gates at Devil's Den State Park in Arkansas. The purpose is to protect Ozark Big-eared bats.



July 3, 2022:

Tony Schmitt, Meagan Banta-Lewis, and Mary Sofia did a monitoring trip to Catacombs Cave, St. Louis County, MO. The cave is in a county park and had a healthy population of salamanders. They also checked and oiled the lock to a nearby pit cave in the park.

July 18, 2022:

Jim Cooley, Andrew Erickson, and a variety of other people (cavers, agency folks, etc.) made a trip to privately-owned Bat Cave in Franklin County in order to assess it for continued bat usage. New guano was noted, but no bats, which indicates at least transient use. Some years ago, this was to be the site of a restoration effort but the work was not completed. The cave is owned by nearby Meramec Caverns.

July 23, 2022:

Dan Lamping, Tony Schmitt, Joe Sikorski, Derik Holtmann, and Andrew Erickson made a night time survey trip (gray bat avoidance) into

Tom Aley's Tumbling Creek Cave, Taney County MO. Splitting into two teams, they managed to survey the remaining leads in the cave. Mark this survey as now finished.

August 18, 2022:

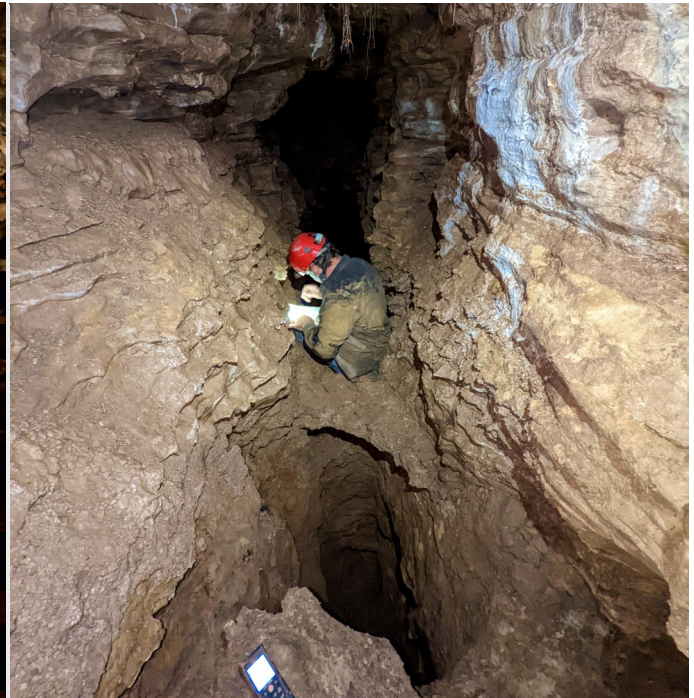
Scott House, Mark Jones, Dennis Novicky, Kirsten Alvey-Mudd, and Don Dunham surveyed in Lost Boys Cave on Missouri Department of Transportation property in Marion County, MO. Over 600 feet of muddy passage was added to the map. The cave survey is now about 2400 feet in length.

August 19-20, 2022:

Mark, Kirsten, and Dennis worked for two days on securing entrances to the Lime Kiln Mine (Sodalis Nature Preserve) in Hannibal, Marion County, MO. There are many gates, some of which have been violated and others were porous to smaller humans. They also installed new signs on many of the gates.



Hannibal area, upper left: Dennis Novicky puts the fix on a Lime Kiln Mine gate. Photo by Kirsten Alvey-Mudd. **Upper right:** Mark Jones sketches in Lost Boys Cave. Photo by Kirsten Alvey-Mudd. **Lower right:** Kirsten Alvey-Mudd emerges from the entrance of Lost Boys Cave, affectionately known as the Tardis. Photo by Mark Jones.





Mammoth Cave: Independence Day Expedition , July 1-10, 2022

By: Dave West and Karen Willmes, Expedition Leaders

We had 25 participants and fielded 26 parties in Mammoth and other local caves. Of the 23 teams caving inside the park, six trips supported the small cave inventory, two trips went to the New Discovery section, six parties entered Colossal Cave, five parties went in Historic, and one party apiece went to Long Cave, Doyle Valley, the Elevator, and Carmichael. This amounted to 670.89 volunteer hours or 56 people days.

We also spent one day on a training exercise. Michael Raymond is one of the instructors for the SPAR course (Small Party Assisted Rescue) offered by NCRC (National Cave Rescue Commission). We asked him to give a mini-course on some SPAR principles. It was very useful as a way to think about how to approach a cave rescue situation.

The weather preceding the expedition had been exceptionally dry, so one focus was on objectives that are usually too wet to pursue.

One of the small caves worked on was Sandhouse Spring, where a dive team made an attempt to dive the entrance pool. The dive went very well and they put in 194.5 feet of survey. Other small caves surveyed were Sheltered Cave (#373), Cut Log Cave (#280), and Katy Pace Talus Cavelet (#281) for a total of 166.47 feet. Logsdon Cave was reached by taking a raft down the river. The party surveyed 114.1 feet before they got too cold to continue. In Wilson Cave, a party surveyed 408.32 in the Piney Creek section, mostly crawls, but they closed an enormous and unexpected loop.

One New Discovery team put in 190.4 feet of new survey and 269.65 feet of resurvey in the western end of the cave. The first lead they pursued continued but required a very tight and tricky squeeze. Only one party member fit. They also started the resurvey of the F survey, a nice

and well decorated tube. Another team took a ladder in to resurvey passage near the China Wall, 18.1 feet of new survey and 243.5 feet of resurvey.

One focus of the expedition was to try to reconnect the Hazen entrance to Colossal Cave. Several parties tried various methods to open the lock at the Hazen entrance, without success until an angle grinder was brought to the cave. The team that was able to enter the cave found a route that may not have been used before. It led to a pit with leads at the bottom. They got 135.4 feet of new survey. The teams that weren't able to get into Hazen worked on objectives in Colossal instead. They also looked at the potential connection area from the Colossal side and observed shattered rock and pieces of lumber. One party added details and additional survey near Chalybeate Spring (116.4 feet of new survey). Two parties surveyed cutarounds along Grand Avenue (405.765 feet of new survey, 124.925 feet of resurvey). Another party surveying cutarounds near New Years Junction found an unexpected lead off of one of them (141.1 new survey, 194.7 resurvey).

A party continued the resurvey of Hanson's Lost River (97 feet of new survey, 853.6 feet of resurvey), a key part of the connection route between Flint Ridge and Mammoth Ridge. The party leader had been on earlier resurvey trips in the summer of 2007, when the weather had been dry. In 2007, the water was "earwash" level. This time it was an easy hands-and-knees crawl with over a foot of airspace. This may be one of the changes in the base level water level affected by the Green River dam breach.

One of the Historic teams carried in a ladder to check leads in the River Hall area (60.7 feet of new survey, 24.1 feet of resurvey).

Using the Carmichael entrance, a party investigated a passage off Pilgrims, but the ladder they had wasn't long enough.

A party entered the Doyle Valley entrance to map a network of crawls near the X Loop (480.2 feet of new survey).

Total survey footage inside the park was 4,238.73, of which 2,528.255 was new survey and 1,710.475 was resurvey. An additional 435.55 feet of new survey and 20 feet of resurvey was collected outside the park.

For park-requested support, one trip went to Long Cave to help set up a microbiology study. Two parties helped carry ladders to Colossal for the study. Four parties helped with the archaeology project at the Historic Entrance. Kailey Alessi, a graduate student from the University of Idaho who has participated in several CRF areas, is doing an archaeological dig at the Historic Entrance, right next to the tourist trail.

Ozarks, preceding page, clockwise from upper left: *Kayla Sapkota, Paige Preston, Maya Robles, Adrian James, and Ben Damgaard in Fitton Cave - selfie; Henry and Margaret Lamping looking for life in Branson Cave. Photo by Dan Lamping; Derick Holtmann enjoying the apparently endless mud in Alphen Hollow Spring Cave. Photo by Dan Lamping; Laura Baumann sketches at Tall Bluff Hollow Cave. Photo by Maya Robles; Kirsten Alvey-Mudd wades into a deep rise pool looking for blind fish in Merritt Rock Cave. Photo by Mark Jones. Courtney Werner in In-D-Pendants Cave. Photo by Matt Beeson; Moving the ladder up the trail. Photo by Claty Barnett; New recruit Andrew Erickson going through one of the low spots in Alphen Hollow Spring Cave. Photo by Dan Lamping.*

Volunteers helped with carrying tools, setting up the grid, taking photographs, excavating, screening the dirt, and identifying artifacts.

Outside the park, two teams went to Hidden River Cave and one to Stan's Well. In Hidden River, one party surveyed a side lead off Wheel River until it became too tight (150.7 feet of new survey, 20 feet of resurvey). Another party pushed leads up the West Branch (222.35 of new survey). The Stan's Well team added 62.5 feet of survey.

We had enough rain to wet the grass, so Dave West was able to put on his annual display of fireworks for the Fourth of July. Bill Koerschner and Pat Kambesis made chicken barbeque for the occasion. Pat Kambesis took care of the rest of the food for dinner as well as breakfast that day.

Special thanks to Spike Crews, who helped with breakfast every day; Elizabeth Winkler cooked dinner one night; Bill Copeland helped a lot with clean up. Spike, Rachel Saker, and Tom Brucker stuck around to clean the facility at the end of the expedition.

Colossal Cave—Hazen Entrance, Chalybeate Spring: Tom Brucker, Mandy Harris, Tim Green; **Hazen Loop, Grand Avenue:** Dave West, Elizabeth Winkler; **New Years Junction:** Tom Brucker, Mandy Harris, Tim Green; **Grand Avenue:** Michael Raymond, Spike Crews; **Hazen Entrance:** Tom Brucker, Rachel Saker, Karen Willmes; **Armstrong Pit area:** Rick Toomey; **Mammoth Cave—Hanson's Lost River:** Spike Crews, Michael Raymond, Rachel Saker; **River Hall:** Michael Raymond, Bill Koerschner, Spike Crews; **Pilgrims Avenue:** Spike Crews, Elizabeth Winkler, Rick Olson; **New Discovery—West:** Bill Koerschner, Kohl Mitchell, Laine Roberts, Greg Mosier; **China Wall Passage:** Bill Koerschner, Mandy Harris, Matteo Bucalossi; **Historic Entrance Archaeology:** 1) Spike Crews, Greg Mosier; 2) Rachel Saker, Corey Hackley, Keely Owens; 3) Karen Willmes; 4) Mandy Harris; **X Loop:** Corey Hackley, Keely Owens, Rachel Saker; **Small Caves—Sandhouse Cave:** Michael Raymond, Ian Flom, Rick Toomey; **Sheltered Cave:** Bill Copeland, Elizabeth Winkler; **Cut Log Cave, Katy Pace Talus Cave #2, Katy Pace Talus Cavelet:** Bill Copeland, Elizabeth Winkler; **Logsdon Cave:** Bill Copeland, Elizabeth Winkler; **Union City Cave:** Bill Copeland; **Wilson Cave:** Keely Owens, Hannah Lieffring, Matteo Bucalossi, Corey Hackley; **Long Cave:** Rick Toomey, Karen Willmes; **Hidden River Cave:** 1) Bill Koerschner, Kohl Mitchell, Roza Gawin; 2) Bill Koerschner, Spike Crews, Michael Raymond; **Stan's Well:** Ian Flom, Michael Raymond

Mammoth Cave: Kids' Caving Expedition, July 28-August 2, 2022

By: Aaron Bird and Rachel Bosch, Expedition Leaders

Camp Managers: Rachel Bosch and Aaron Bird

The 2022 Kids Expedition had 10 cavers participating, with 2 trips signing out. CRF volunteers contributed nearly 125 hours of work to Mammoth Cave and CRF projects.

On Saturday, Aaron Bird led 7 other team members on an 10-hour-long canoe-based trip on the Green River to visit known caves and springs and search for previously undocumented karst features. They put in at the Green River Ferry (river stage was at about 15 feet) and took out at Houchins Ferry. They located and investigated Sand Spring Cave, Sandhouse Cave, Whittle Spring, and Crump Island. Water temperature, pH, electrical conductivity, and total dissolved solids were measured at each feature and in the main flow of the Green River closest to each feature. It would be interesting to repeat this exercise during lower flow conditions.

On Sunday, a 4-hour-long trip was made by all 10 expedition attendees into Floyd Collins Crystal Cave. Aaron Bird led 5 kid-participants and 1 adult in a cave sketching activity. These new cave sketchers were provided with worksheets that had the survey line and passage walls already plotted for them. They were also given acrylic Cave Sketching Stencils that provided them the opportunity to trace a variety of cave map symbols. The sketchers-in-training applied these to make sketches at 1'=10' of the cave from the entrance to the junction in Grand Canyon. They then assembled their mini-map-

sheets to view a map of the extent of the cave they visited that day. Rachel Bosch led a side trip to the top of Collins Avenue to discuss the geology of Crystal Cave. The kids began the sketching exercise in teams near the entrance and "leap-frogged" their way down the passage. By the time they made it to the junction, several kids were feeling more confident in their skills and worked independently on the map sheets. Several parents said they felt like the Cave Sketching Stencils were a great tool to aid folks who are new to sketching.



Kids' Caving Expedition participants in Crystal Cave learning cave-map symbols with the Cave Sketching Stencil. Photo by Aaron Bird.

Mammoth Cave: August Expedition, August 4-6, 2022

By: Scott House

The purpose of the expedition was focused on fixing bad data and sketches in the Cathedral Domes area, adding details to Frozen Niagara and polishing off unfinished business in Colossal.

Thursday, August 4, 2022:

Matt Beeson, Bud Beeson, and Mike Beeson went out Genies Pass to Anna's Dome and continued the Cox Entrance route resurvey. They managed to tie in new surveys to other surveys that were put in during the time that the entrance was open. Now the resurvey to the entrance is complete. Armed with rope and etriers, they reported that the route required much more climbing than we thought. Further out, past the Cox Entrance, there are still leads to be done.

Dave West, Kirsten Alvey-Mudd, and Karen Willmes surveyed in Colossal Cave. They managed to get nearly 200 feet of new survey near Chalybeate Spring. A heavy shower inundated them on the way back to the car.



Kids' Caving Expedition participants in Sand Cave Lower, beside the spring pool. Photo by Rachel Bosch.

Friday, August 5, 2022:

Scott House and Kirsten Alvey-Mudd tied in a survey that closed a very long loop, about a mile or so, from Bransford Avenue to Becky's Alley. That closure may seem minor, but it was important to close it to determine the quality and adjust the overall loops. They also tried to verify a side survey off Robertson Avenue, but it was too old and too incomplete to salvage; resurvey will be necessary.

Two parties resketched a large chunk of historic Bransford Avenue, beginning at the Martel Junction. Matt Beeson and Jeffrey Crews were the sketchers aided by Mike Beeson, Bud Beeson, Karen Willmes, and Troy Wall. (Note that historic Bransford Avenue is a long way from East Bransford, although there is a genetic connection.)

Saturday, August 6, 2022:

The Beeson family (Matt, Mike, and Bud) surveyed near the Hippodrome (Kentucky Avenue) on the Frozen Niagara sheet. Old survey stations existed in the area but could not be found in the data.

Dave West, Karen Willmes, Troy Wall, and Tom Brucker went to Colossal and surveyed over 300 feet in a high lead there. Dave and Tom took turns sketching to prevent sketcher burnout.

Jeffrey Crews, Kirsten Alvey-Mudd, and new recruit A.B. Willford continued the resketch of Bransford Avenue, making good progress with difficult old sketches (as in the station clearly marked in the cave with carbide was 10 feet from the location shown on the sketch).

Thanks to:

Everyone who came worked hard and almost all helped. The place was kept clean as a whistle. On Sunday morning, the participants cleaned and disinfected the place. All tables, chairs, etc. were put away and the participants had mostly disappeared by 9:00 am. Folks really did well. This is verbatim from last year and it is always a joy to have the few, the brave, and the willing available to work.

Professional chef Kirsten Alvey-Mudd was the executive chef. She worked hard and we ate really, really well. We mostly used up leftovers and thus save a lot of money on food while also leaving behind a cleaner pantry.

Matt Beeson and Dave West took turns acted as the expedition cartographer, checking each book for completeness, scanning, and printing survey books; they uploaded same to the server and archives.



Mammoth Cave, left: *Becky's Relief*, the wide spot in *Becky's Alley*. Photo by Kirsten Alvey-Mudd. **Upper right:** Scott House looks at the \$100,000 Formation in Robertson Avenue, Mammoth Cave. Photo by Kirsten Alvey Mudd. **Lower right:** John Feil at the new entrance in Hamilton Valley. Photo by Aaron Bird.

2022-23 EXPEDITION CALENDAR

Before attending any expedition, you must contact the expedition leader as trip sizes may be limited. Failure to contact the leader may prevent you from attending the expedition as the trip may be full.

Eastern Operations - Mammoth Cave Schedule

Note: All participants must have signed the CRF Joint Venture Agreement prior to the expedition or sign a temporary JV agreement onsite. The JV agreement includes the requirement that the participant have hospitalization or accident and health insurance. Agreements signed in other operations areas transfer to Eastern Operations. At Mammoth Cave, although we are volunteers, we are not part of the official NPS Volunteers in the Parks program, which covers VIP accidents, rescues, and workers comp. Each CRF JV is responsible for their own health and/or accident insurance.

Thanksgiving, November 23-27, 2022. John DeLong, johnrdelong@yahoo.com, and Karen Willmes, kver@bellatlantic.net.

New Year's, December 30, 2022-January 2, 2023. Ed Klausner, klausnere@gmail.com, and Elizabeth Miller, elizabeth.batwoman@gmail.com.

President's Day, February 17-19, 2023. Spike Crews, cavespyque@gmail.com. (Note that there will be only one caving day this year, due to constraints imposed by rental of the facility.)

St. Patrick's Day, March 17-20, 2023. Dawn Ryan, dwn_ryan41@yahoo.com.

Earth Day, April 21-24, 2023. Bob Lodge, lodge54@gmail.com.

Memorial Day, May 26-29, 2023. Holly McClintock, hollymcclintock.caves@gmail.com, and Matt Mezydlo, mmezydlo@columbus.rr.com.

Independence Day, June 30-July 9, 2023. Dave West, dave.west@cave-research.org, and Karen Willmes, kver@bellatlantic.net.

Dog Days, August 1-6, 2023. Scott House, scott_house@hotmail.com, and Mark Brooks, primecj5@yahoo.com.

Labor Day, September 1-4, 2023. Bob Osburn, osburn@levee.wustl.edu.

Columbus Day, October 6-9, 2023. Mary Schubert, chockt3376@gmail.com.

Thanksgiving, November 22-26, 2023. John DeLong, johnrdelong@yahoo.com.

Note: Before attending any expedition, you must contact the expedition leader, preferably two weeks in advance. Participants of Mammoth Cave expeditions are required to attend one safety orientation before participating in expedition activities. Safety orientations will be conducted at the beginning of each expedition. New CRF members: please be sure to arrive at the expedition in time to attend the orientation.

ADDRESS CORRECTIONS

If you have changed phone number or e-mail, or have moved, please send your information to:

Phil DiBlasi
110 S. Campbell St., Unit 204
Louisville, KY 40206-1863
pjdiblasi@gmail.com

Ozarks

Ozarks Operations trips and expeditions take place on a variety of government and private lands; the trips are based in a variety of locales and may include staying in NPS buildings, campgrounds, or even motels. Ozarks trips are held year round, but are often scheduled (or cancelled) on short notice due to the vagaries of the weather. If interested in attending an Ozarks expedition your first stop is the operations manager. However, contact any of the following for information on upcoming trips or check CRF's website.

These individuals also lead expeditions, trips or projects:

Kayla Sapkota (Buffalo National River survey and bio-inventory), kayla.sapkota@gmail.com.

Dan Lamping (Pioneer Forest and Ozark Riverways surveys), daniellamping@att.net.

Tony Schmitt (Pioneer Forest and Ozark Riverways surveys), tonymary2601@yahoo.com.

Jon Beard (Mark Twain NF in SW MO), mokaanman@att.net.

Matt Bumgardner (Mark Twain NF in SW MO), shaw95@gmail.com.

Jim Cooley (Cave gating and Mark Twain NF Irish Wilderness), coolstoi@kc.rr.com.

Craig Williams (Mark Twain NF archaeology), cwilliams@caimstl.org.

Jeff Crews (Mark Twain NF Rolla/Houston area), cavespyque@gmail.com.

California - Lava Beds

Contact: John Tinsley, jmstinsl50@aol.com.

Before participating on any of these expeditions, please contact the Operations Area Manager, John Tinsley, at least two weeks before the expedition. Please do not just show up as there may be limits on the number of participants we can accommodate.

California - Lilburn and Sequoia/Kings Canyon

Some basic rules of engagement for California expeditions: Contact the expedition leader preferably two weeks ahead of time; please don't spontaneously show up. We have to deal with head count limits, particularly on our Lilburn trips, so we need to know who is planning to attend.

Contact: Jen Hopper, jennifer.hopper@ucr.edu, or Fofu Gonzalez, fofu@gzluna.com.

HSS/CRF Hawai'i Caving - Big Island

Contact: Pat Kambesis, pat.kambesis@wku.edu.

Carlsbad Caverns

Contact for all expeditions:

William and Tammy Tucker, william.tucker@att.net.

THE CRF WEBSITE

www.cave-research.org

Contact your operations manager for the user id and password for the members-only section