NSS NEWS

March
2019

Five Years of Discovery in the Splinter Section, Jewel Cave National Monument

Dan Austin, Rene Ohms, Chris Pelczarski, and Adam Weaver

The Discovery of a Lifetime

(by Dan Austin)

It's almost surreal to think that we've been involved with surveying in the Splinter Section at Jewel Cave for the last five years. The time we've spent has gone by faster than we can keep up with. The new passages, camps, lakes and countless miles of discoveries have gone by in a frenzied blur. Looking back on the last five years, we've been incredibly fortunate to have been involved in such amazing discoveries. The friendships and stories we have created will last us the rest of our lives. Some of the times we had were hard: spending days underground, cut off from the rest of the world, away from family or loved ones, was difficult. It was even harder when the cave just wouldn't go where we wanted it to. But the rewards have been worth it. We've been successful in pushing a single lead to one of the biggest discoveries during the last few decades of exploration at the cave. We've found things that nobody ever expected to find. We've stood in places where no one has stood, or dreamed of standing, before. And of course, the cave keeps going. All the way out there on the edge, more than 12 hours from the entrance, there are hundreds of passages waiting to be explored, and the ever-tantalizing wind, which beckons us to go even further.

It was March 9th, 2014 when Rene Ohms, Chris Pelczarski and I set out on a day trip to the western branch of Jewel Cave. Our objective was to survey some not-so-promising leads and maybe try and track down the elusive airflow on the other side of Coyote Flats, where the wind howls. Little did we know that this fateful trip would be the beginning of some of the best times of our lives, and some of the biggest discoveries we would ever make. Out there on (what was then) the edge of the cave, four hours from the entrance, we wormed our way through a narrow fissure that we called the Southwest Splinter. It was tight, nasty business, and by the end of the trip, we had only progressed 300 feet to the southwest, but we were ecstatic. The Splinter poked out into blank space, away from the rest of the cave. Scooping ahead a short distance at the end of the day, Chris reported a junction of passages to return to—nothing huge, but it was promising—and a very slight breeze that gave me hope that this would be the way on. We have since only felt that breeze a handful of times in the Splinter—the air clearly takes another route into the new discoveries—and whether by fate or happenstance, it was blowing on the day we found it.

It was a few months before we returned to the area, to see where the passages on the other side of the Southwest Splinter led. Rene couldn't make the next trip, so Chris and I were joined by Larry Shaffer and Ian "Big Day" Chechet. It quickly became apparent that the passages on the other side of the Splinter were heading south—away from known cave—and it wasn't long before we were out of the narrow fissures near the Splinter and surveying in 30-foot-tall passages. I vividly remember establishing a new survey designation, calling it the !? survey with a "wahoo!" as we surveyed into virgin cave. At the end of the day, we had found over 1,700 feet of new passages and left over 20 leads to go back to.

Carl Bern at Piso Mojado Lake, near Deep Camp

That summer, the NSS convention was held at the NSS Headquarters in Huntsville, Alabama. I remember entering the Jewel Cave map in the cartography salon that year, with the newly discovered 2,000 feet of passage sticking out to the southwest. During the cartography critique, Paul Burger made a statement that turned out to be prophetic: "Anytime there's a breakthrough in Jewel Cave, it goes for at least 20 miles," he said flatly, examining the new passages on the map. I think there were more than a few of us that looked surprised—after all, we had only found less than half a mile of new stuff by that point.

This March is the five year anniversary of the Southwest Splinter discovery. During those short five years, we've managed to turn that one lead into 25 miles of surveyed passages, with hundreds of leads waiting to be explored. The discovery of the Splinter section has shifted the major focus for exploration at Jewel Cave, and it has fundamentally changed what we know (or

Katey Bender in an upper level passage near Deep Camp

All photos are NPS Photos by Dan Austin

Adam Weaver and Katey Bender working on collecting the microbial samples at Piso Mojado

thought we knew) about the cave in ways that we could never have imagined. It has led us swiftly to a major milestone in exploration that we thought was still years away, the 200th mile marker. And we continue to follow the air at the end, to push the cave to wherever it may lead us. We hope that this discovery keeps us busy for generations to come. The best part: there is still no end in sight!

What Lies Beneath

(by Chris Pelczarski)

Let's catch up where the tales of exploration left off in the March 2017 issue of the *NSS News*. Derek Bristol, Blase Lasala, Fr. Jonathan Venner and I headed in again for a four-day trip to Deep Camp, to continue pushing the end of the cave. Derek did some quick calculating just prior to the trip and noticed that if we surveyed over a mile on this trip, we'd hit the 300th kilometer. Even though no one cares about kilometers, it still sounded like an enticing goal. Derek and Blase, as a team of two, were the men for the job in this part of the cave: there were many, many leads, but not one that stood out more than another. They surveyed systematically, one by one, until something continued, eventually reaching a tight and grabby squeeze lined with rims, which, in good Jewel Cave tradition, was named the VAGG (Victory After Gettin' Grabbed.) This is where they stopped for the day, with more squirrelly passages heading southeast.

Unfortunately, the following day, Blase was sick and had to remain in camp. This only allowed us to have one survey team which we figured would destroy any hope of getting the 300th kilometer, as we needed to survey over 2500 feet that next day to get it. We also knew that somehow we'd have to convert those 2500 feet into meters, which was tricky. Luckily Derek was an expert at that, and he also knew how to use a calculator, so I was no longer worried. We began surveying and immediately got into a very interesting passage. It was a smallish tube passage, and as we surveyed, we noticed a too-tight hole down with huge open space below. Derek shot the Disto down it to see how much our imagination was running away with us and to our surprise, it read out at 80 feet! There was no way down this small hole, so we continued on at the upper level, hoping for another hole down. Soon, we had found it! There was most certainly large borehole 80 feet below us. Derek tried to climb down here but was met with a passage whose walls belled out to nearly 40 feet wide, well above the floor. This happened one hole after another, which inspired the name "What Lies Beneath." We surveyed like this for hundreds of feet, dreaming of the borehole we were trapped above as we peered into the black below through each window in the ceiling.

It was at this point that Fr. Venner became nervous, since much of this time we had been crawling over breakdown that we knew had 80 feet of air below. It was impossible to tell if it would suddenly collapse beneath us. In one tight crawl, he began hooting incessantly. Derek and I looked at each other, stunned and in great confusion until we realized what he was doing—he was using a sort of human echolocation, checking to see if his hoots were met with any echo, indicating that he might be in danger of falling through into the borehole below. This peril was fortunately avoided.

Chris Pelczarski, Adam Weaver, and Katey Bender after completing the microbe sampling at Piso Mojado

Finally, the upper crawlway and lower borehole merged and we were standing on the actual floor of the passage. However, an interesting question arose. Should we continue to the southeast pushing off the map or double back under ourselves? Derek pointed out that even though we'd be surveying back underneath ourselves and towards known cave, it was cave that we knew was large and we knew was available to be surveyed. We were convinced, and headed northwest. Although it was going away from the frontier, it was amazing borehole where we took shot after shot, each over 100 feet. Soon, we realized that we

Katey Bender on the way to Better Lake (Than Never)

Rene Ohms admires Girth Brooks, the largest active stalagmite in the cave

were back in the realm of possibly surveying the 300th kilometer! The cave cooperated, even showing off a little, with another lake (Wellspring Lake) and an area with dripping wet formations, something rare for Jewel Cave. Having surveyed nearly 3000 feet for the day, we knew we had made the 300th kilometer and headed back to camp to break the news to Blase. The big lead to the Southeast remained.

It wasn't long before another trip was planned, and the large lead to the southeast was finally surveyed. A team led by Dan Austin, with Carl Bern and Steve Curtis, returned and surveyed nearly 1500 feet straight southeast with little to no side leads, which brought them to a beautiful canyon. One wall of the canyon was lined with golden yellow flowstone that vanished down a pit. This was the first evidence of dripping water in the entire Splinter section, and also told us that we were approaching the edge of Hell Canyon. The team stemmed straight across the flowstone passage, leaving the pit as a lead, and noted airflow in the area. This area was named Jewels of the Deep. They found plenty of cave continuing beyond.

The Train Wreck

(by Rene Ohms)

On the second day of the March 2017 camp, Dan Austin, Steve Curtis, and Carl Bern surveyed through a breakdown mess beyond Jewels of the Deep, and through a grabby tight spot that they named GGAGG (Gettin' Grabbed After Gettin' Grabbed). Dan climbed down a 20-foot-deep slot in the floor, then through a tight hole, and found himself in an awkward, wide stem. A thin crust on the walls threatened to break away as he did the splits across the void below. After transitioning into a body bridge, he brought his feet down and was soon standing on a real floor. The passage ahead looked pretty decent, but they were out of time and needed to turn around to meet up with me, Adam Weaver, and Chris Pelczarski for the long journey back to camp.

Meanwhile, we had had a frustrating day. It began with surveying Bum Town, a punishing series of belly crawls which led to a body-length squeeze that only I could fit through. We checked multiple leads, getting skunked at every turn, and eventually decided to backtrack to an area heading north near Sidewinder Lake. After surveying through some interesting fissures, we found ourselves in a large room with multiple leads. We could see some passage below us, and another intriguing lead sloped up to the north. Unfortunately, we were out of time and had to leave the leads as unknowns. We named the room "Sweet Memories of Cebu", which was a mysterious phrase printed on Chris's package of dried coconut. Cebu's sweet memories had brought us many hours (or at least minutes) of laughter, and it somehow seemed a fitting name for a passage deep in Jewel Cave.

When the two teams met up and exchanged tales, no one sounded thrilled to return to anything they'd found. Apparently we needed to sleep on it. We put off discussions about where to survey the next day, and decided to see how we felt in the morning. Hours later, when we got back to Deep Camp, our sleeping bags were a welcome sight, and it wasn't long before we were fast asleep and Dan was snoring loudly.

Day 3 began slowly. After such a tough day at the end of the cave, which was now a 3 hour journey from Deep Camp, we all woke up feeling like we'd been hit by a truck. The prospect of going back through the Pound and all the way out to Dan's lead was not sounding too appealing. The lure of virgin cave to the southeast was really enticing, though, and easily won out over my body's objections. After everyone had weighed their options and assessed their soreness, we decided that Adam would go back to Sweet Memories of Cebu and take Steve and Dan with him, and Carl would go back to Dan's climb beyond Jewels of the Deep with me and Chris.

We traveled as one team from Deep Camp to the Adoption Pit, then split up. Chris, Carl, and I headed toward Jewels of the Deep, feeling fairly energetic as we navigated the seemingly endless obstacle course of climbs and crawls. It took us a little while to find our way through the previous day's survey, but thankfully Carl remembered most of it. We picked up where they'd left off, and surveyed down the slot Dan had climbed. The acrobatic stem at the bottom turned out to be pretty fun, and doing a body bridge at the widest point was definitely the best way to go. At times like these, I'm glad I have long legs.

Chris Pelczarski in Where The Dangers Are Double

We got our bearings and surveyed ahead into a large passage that appeared to end to the northwest, but went big to the southeast. Yesss! The cave's southeastern trend was continuing, and it looked good. The ceiling ranged from 20 to 40 feet high. We took several shots, sloping downward at first, then ramping up and up. Since the cave's profile took a large dip here, we named the passage the Big Dipper. As we went up, we almost lost the way on, but found it again after a few minutes of searching. We left some side leads, including a couple of intriguing tube-shaped crawls heading southwest, and continued following the main passage. A few hundred feet later, we came to a large breakdown jumble, and zigzagged our survey through it, trying to stay on a southeastern trend. With only a few minutes remaining, we set a final survey station and scratched our heads at the mountain of large breakdown blocks before us. They resembled a pile of train cars after a massive derailment, so we named the impasse the Train Wreck. There was air here, but the way through the breakdown was unclear; it would take some serious pushing, and we were out of time.

Sweet Memories of Cebu didn't pan out for the other team. They left some leads, but none that Dan was excited about. The Train Wreck, in its confusing jumble, was looking like our best bet for some going cave.

Four months later, we were back to see what it did. On the second day of the July 2017 camp, Dan, Derek Wolfe, and I went to the Train Wreck, while Derek Bristol and Chris climbed down through the flowstone

Adam Weaver ascends Call of the Void, with Stan Allison looking on from below

pit at Jewels of the Deep. We followed our survey stations from March, and yet still somehow entered the Train Wreck in a different spot than we had on the previous trip. The cave here was confusing, and it was about to get worse.

We surveyed around a couple of giant breakdown blocks and turned southeast. The passage looked like it might end right there, but we surveyed along the left wall and found ourselves on a high shelf, looking down 15 feet into the continuation of the large passage. There was no way down from here, so we backed up and scoured the floor. Finally, we found a magic hole in the breakdown that brought us into the going cave below. We continued surveying, and after only 5 more stations, our good fortune ended. Before us was a terrible maze of massive breakdown. We surveyed through it, stopping often to climb up or squeeze between boulders, trying to figure out what the heck was going on and where we should go. It was maddening.

We did finally find some real passage at one point, where Dan worked his way down a spicy climb to a mud-coated fissure below. We had been trending downward, and were surprised that we were still going down, and down. The moist mud made our "lake radar" buzz, and we mused that we might find standing water around the next bend. Then, as we surveyed down a low, wide crawl that looked like it was going end in an alcove, Dan looked to his left and found exactly that. This lake was not as magnificent or aesthetically pleasing as Hourglass Lake or New Year's Lake. It was in an awkward location in a low passage, and had a scum of calcite rafts floating on its surface that dulled its blueish color. On a previous trip, we had talked about the origin of the cave's lakes, and Adam had suggested that perhaps the lakes were actually accumulations of bat sweat. We had decided then that the next lake found in the cave would be called Bat Sweat Lake, and now, here it was. As it turns out, Bat Sweat Lake is the cave's new deepest point, at -832 feet.

The Bat Sweat Lake area ended, so we backed up to the breakdown maze and eventually found another way into some real passage. At the far southeastern end of this, the cave ended in multiple too-tight cracks. With time running short, we left a few unpromising leads on the way out, and

Rene Ohms ascends Call of the Void

The 200th Mile crew at Deep Camp following a long day of survey at the end of the cave

stopped to survey the two intriguing crawls northwest of the Train Wreck that we'd left on the March trip. One of these ended in a large 15-foot-high breakdown room with possible leads in the breakdown but no obvious way on. No one has yet been back to this room, and it remains a lead. There are also multiple potential leads in the breakdown maze beyond the Train Wreck, for those with the mental fortitude.

Call of the Void

(by Chris Pelczarski)

While Rene, Dan and Derek were trying to find their way through the breakdown of the Train Wreck, Derek Bristol and I (as a team of two) decided that the flowstone pit down at Jewels of the Deep needed to be checked. When we climbed down, we were stunned—the passage we had considered incredibly decorated above paled in comparison to the lower portion of Jewels of the Deep. We climbed down the pit to a flowstone doorway with rushing air. I could see the cave continuing in the darkness beyond. As I went through the doorway, I was met with an unexpected obstacle: the 30 foot wide passage was laden from wall to wall with white flowstone, giant popcorn, and flowstone-coated frostwork bushes. We tiptoed through, finding a complex path on stepping stones of breakdown. I tend to wear my excitement on my sleeve about these kinds of things—I was going nuts! Derek, on the other hand, indicated his excitement in typical Derek fashion: he looked at me with a little smirk and said in a quiet voice, "I think we should survey this."

Carl Bern in Where The Grass Never Grows, on the edge of Jewel Cave

Derek and I began to survey the beautiful passage below, finding that it ended at the lowest level after a few hundred feet. However, after two climbs up involving wild stems, we arrived in some very large and complex cave passage. There were leads everywhere! The great complexity of the cave, combined with only having a survey team of two, contributed to a slow survey day. By the time our day had ended, I was in doubt about whether any really great leads had been left, but there were so many leads and so much breakdown, we just had to return.

In November of 2017, Adam Weaver, Kelly Mathis, Carl Bern and I made the return trek and began pushing leads in this new breakdown area. The first lead I wanted to check was a narrow fissure which Derek and I had abandoned near the end of our survey. The clue that piqued my interest in this narrow passage was a protruding knob with frostwork where the passage joined the larger room. I figured that since I had just been there only a few months prior that I would have no problem finding my way through the enormous breakdown area to that lead again. How hard could it possibly be to follow a single survey line? It is unsettling to the core to be on the remote frontier, placing trust that you'll ever see the sun again to another man's memory, and as we entered the complex area, I realized I was the beholder of those memories. I could tell as we traveled, certain that the *left* fork was the right way, then remembering it was the *next* left fork that we took, that this pattern, combined with the wild stem climbs, was bothering Adam and the others. I turned to ask Adam if he was okay. "Honestly, I just hope we don't die out here." Adam said. We simply lived with this weird reality, because what else could we do? Eventually my memory prevailed and we found the lead. We began the survey and the passage—which appeared almost too narrow to fit through—quickly got nicer. As Adam and I split up to check two different leads out of a room, Adam yelled to me, "turn your GoPro on!" I turned it on just in time to emerge from a wide belly crawl to a massive black hole—a dramatic 40-foot-deep pit which appeared unclimbable. I dove back through the belly crawl to find Adam. Adrenaline pumped as I yelled Adam's name. Suddenly, the passage I was in didn't look familiar. Nothing did. The passage was much too large to be what I had come through. There was certainly an exponential increase in worry with each second that went by, realizing I was lost. Luckily, I didn't make it very far into that worry equation. I backtracked to the main pit, discovering that there were actually two belly crawls heading out of the giant pit. This alternate belly crawl would at least give the team something to do on this trip since the pit was unclimbable.

We surveyed up to the pit, then the side belly crawl I was lost in, finding an enormous multi-level room with an impressive collapse of mud at the uppermost level. This room we called "The Big Bad Buddha Room." A few leads were left out of this room, all with elusive air. We returned to the pit to meet Kelly and Carl, who had surveyed some side leads.

Sticking out into the center of the pit was a large horn. One can sit on this horn for the ultimate feeling of exposure which we call "Riding the Bronco." I began to demonstrate this for the others, and while riding the bronco, I found my imagination taking over: what would it feel like to jump off that horn into the black abyss, the cool cave air rushing past my face? I imagined landing on the floor feet first, free to roam the borehole below. Of course, I knew that wasn't how it would actually play out. I'd be dead. There is a phrase in French called "the call of the void" which describes these kinds of thoughts. It is the thoughts of curiosity of how a scenario would play out if you were to do something catastrophic. It's not a desire to take that action—it's a mental exploration of what would happen if you did. As I sat on the giant horn contemplating my exposure and wondering where the borehole below might go when we could come back with a rope, it was clear that the pit had found its name: The Call of the Void. We would have to wait for 3 months to discover what was at the bottom.

The Boat Ride

(by Dan Austin)

The discovery of lakes in the Splinter section was icing on the cake. Bat Sweat Lake marked the 8th significant water body discovered in the Splinter Section. Our elation at finding water slowly turned to dismay, though, when we realized that the lakes were filling up valuable virgin cave.

While most of the lakes were relatively small and deep, there was one lake that was an anomaly. Measuring 100 feet long and 15 feet wide, New Year's Lake was huge. When Chris and I found the lake on January 1st, 2017, we had followed a distinct breeze that was blowing from the 20-foot tall passage on the far side of the water. The only way to access this passage would be to float across—or to swim.

The return trip to Call of the Void would involve hauling some equipment—rope, webbing and SRT gear—the 8+ hours to deep camp. I figured: why not add a raft to our packing list?

In March 2018, we set out to access both the pit at the end of the cave, and the lead on the far side of the lake. Relative newcomer Daniel Heins joined Adam Weaver and I for the historic lake crossing, which, as it happened, was also my 100th exploration trip into Jewel Cave.

We took special care planning for the lake crossing; we didn't want to contaminate the pristine waters of the Madison aquifer with unnatural human debris. To that end, we needed a raft that could be sterilized. Luckily, Dr. Hazel Barton had just such a raft that she was willing to lend us: an inflatable kayak. Upon arriving at the lake, we set up a "clean area" with tarps, where we could change clothes and inflate the kayak. We would need to strip off our muddy clothes, and float across in our underwear. In the event the kayak were to capsize, we wouldn't be

Daniel Heins in a sterile, inflatable kayak on New Year's Lake

getting our primary gear wet, which would be a disaster that far into the cave. For a paddle, we placed a sketchbook in a Ziploc bag, and donned rubber gloves to keep our hands from touching the water. We also attached a line to the back of the raft, which would allow us to pull it back and forth across the lake once the first person had crossed.

Somehow, I got elected to be the first one to cross the lake and see what was on the other side. Entering the raft without capsizing was tricky, but once I was out on the water, it was a surreal experience. I was on a boat! In Jewel Cave! I almost couldn't believe it. About halfway across the lake, I was able to look down into the crystal clear, blue water. I could see at least 40 feet to the floor below—deeper than I had thought! It was incredible.

Seventy feet from the shore, two ledges protruded from the passage walls, forcing the lake through a narrow, 6-inch-wide slot. I could see the lake continued on the other side, but couldn't tell how big or how far. In order to see, I would need to climb out of the boat onto the ledges, and peer over the obstacle into the passage on the other side. Unfortunately, it was easier said than done, and it took several tries to get the right angle to pull myself out of the boat without getting wet or touching any of the water. I climbed up the slippery mud ledge in just my underwear, and looked over the top into the passage beyond. It continued for another 30 feet, with a high, dry lead, and another crawl lead on the far side of the lake. I turned to let the others know what it did, and it was then that I noticed the boat had floated away…

A rescue mission was quickly launched. Luckily we had the line attached to the boat from the far side, and Adam and Daniel were able to pull it back to them. Adam hopped in the boat, floated out to me, where I sat, stranded on a ledge in my underwear, and handed me a line I could pull it back with. Then he floated back to the shore. I pulled the empty boat back to me, and was able to re-enter the boat and make it back safely without lake contamination or, more importantly, hypothermia.

The entire process took a few hours, and when we were done, we were ready to go somewhere else for the rest of the day. The only way across the lake, we decided, would be if the water rose by 6 feet, or lowered by 4 feet – enough for us to float over or under the ledge obstacle that blocked our path. We decided to leave the raft, for future use, well above (what we thought was) the high-water line, 10 feet above the lake on a large boulder. We wondered how much the water fluctuated here—the lake was so new, we really didn't know—but we would soon find out.

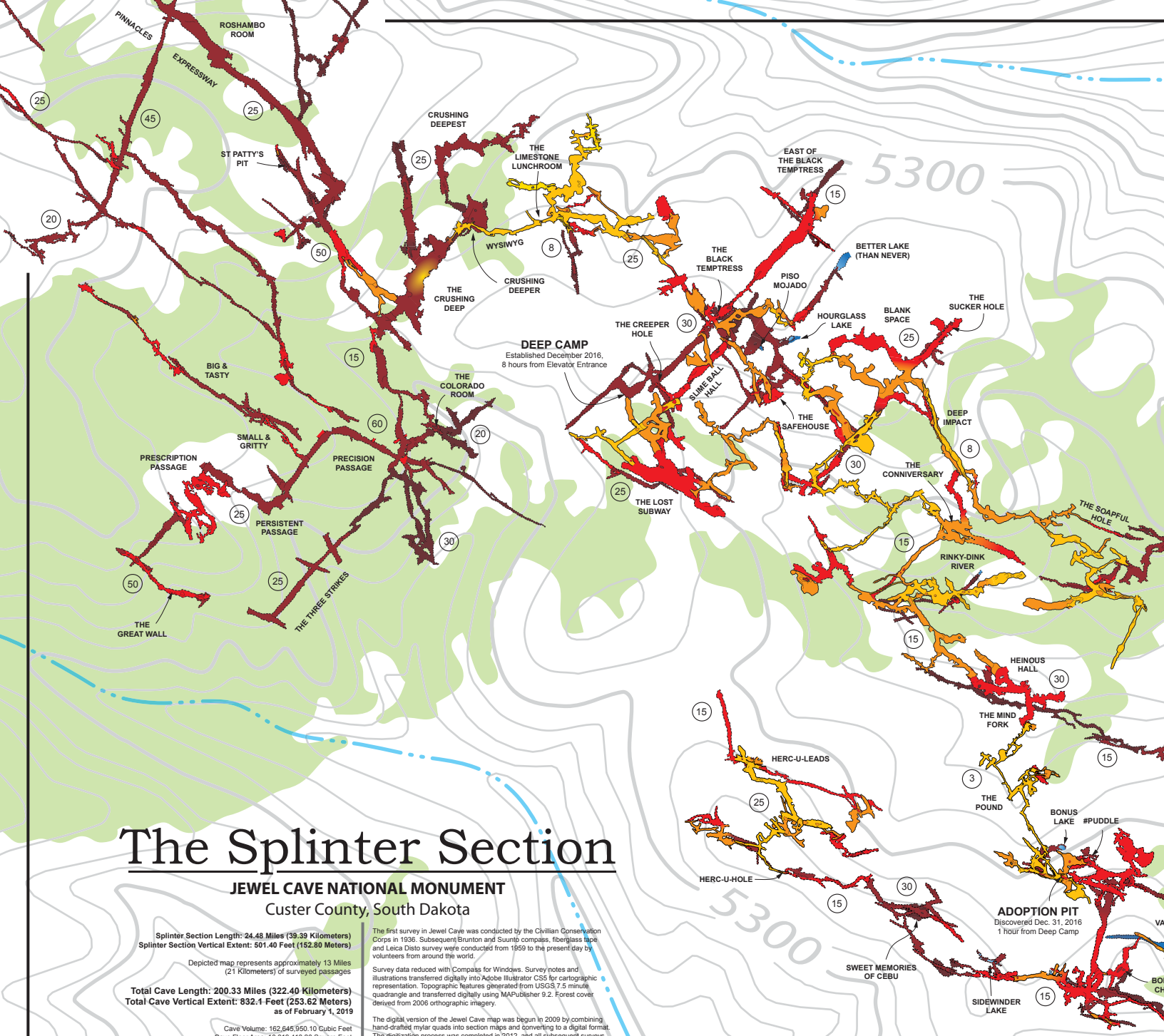
Side story: In November , following an unusually wet summer and fall, we returned to New Year's Lake to collect data from a transducer I had placed there in March, to see how the water in the aquifer fluctuated. We were stunned to find the lake had doubled in size—it was now over 200 feet long, 30 feet wide and nearly 70 feet deep! We couldn't even get close to where we had left the raft and other supplies—they had been completely submerged by nearly 30 feet of water.

Where the Dangers Are Double

(by Chris Pelczarski)

While Dan, Adam, and Daniel were busy screwing around down at New Year's Lake, we had finally found a team willing to haul all the vertical gear in to heed The Call of the Void. Rene, myself, and first time Jewel camper Katey Bender rappelled down to find an immediate choice to go North or South, both in big cave. We chose the South, which went a quite long way. We were able to spend the whole day surveying there and left a few interesting leads but nothing that struck me as *the* way on.

Adam, Rene, and I were able to return to the lead heading North from the bottom of the pit in October of 2018. As we began to survey, it appeared the passage was going to come to a definite end after just a couple hundred feet. As I sketched up the last shot I heard some chatter about being able to see through some breakdown into empty spaceiAdam and Rene had found a good dig in the breakdown at the end of the passage. One hard hit detached quite a large rock from the ceiling which Adam was not expecting to break off. As it rolled into the passage which was now passable, Adam exclaimed in surprise, "Oh…well, thank you, rock!" We didn't realize the magnitude of the 'Thank Yous' we would owe to Thank You Rock because immediately on the other side, things were going but it was fairly jumbled and small. After mapping a short bit, we



The Splinter Section

JEWEL CAVE NATIONAL MONUMENT

Custer County, South Dakota

Splinter Section Length: 24.48 Miles (39.39 Kilometers)
Splinter Section Vertical Extent: 501.40 Feet (152.80 Meters)

Depicted map represents approximately 13 Miles (21 Kilometers) of surveyed passages

Total Cave Length: 200.33 Miles (322.40 Kilometers)
Total Cave Vertical Extent: 832.1 Feet (253.62 Meters)
as of February 1, 2019

Cave Volume: 162,645,950.10 Cubic Feet
Cave Floor Area: 10,319,413.20 Square Feet

Average Passage Diameter: 13.00 Feet

Original hand-drafted map created by Herb Conn from 1959 to 1982 and updated by Mike Wiles from 1983 to 1992, and Dan Austin in 2002.

The first survey in Jewel Cave was conducted by the Civilian Conservation Corps in 1936. Subsequent Brunton and Suunto compass, fiberglass tape and Leica Disto survey were conducted from 1959 to the present day by volunteers from around the world.

Survey data reduced with Compass for Windows. Survey notes and illustrations transferred digitally into Adobe Illustrator CS5 for cartographic representation. Topographic features generated from USGS 7.5 minute quadrangle and transferred digitally using MAPublisher 9.2. Forest cover derived from 2006 orthographic imagery.

The digital version of the Jewel Cave map was begun in 2009 by combining hand-drafted mylar quads into section maps and converting to a digital format. The digitization process was completed in 2012, and all subsequent surveys are kept up-to-date, as they occur, in a digital format.

Most passage floor detail was omitted from this representation due to complexity and scale.

Digital cartography by D. Austin
Updated on February 1, 2019

PLAN VIEW

LEGEND

Surface Features

- Contour line (20 foot interval)
- Contour line (100 foot interval)
- Elevation (feet above mean sea level) 5603
- Forest canopy (Derived from 2006 orthoimagery)
- Identified surface elevation (feet above mean sea level) 5304
- Intermittent stream course
- Intermittent spring

Cave Passage Appearance

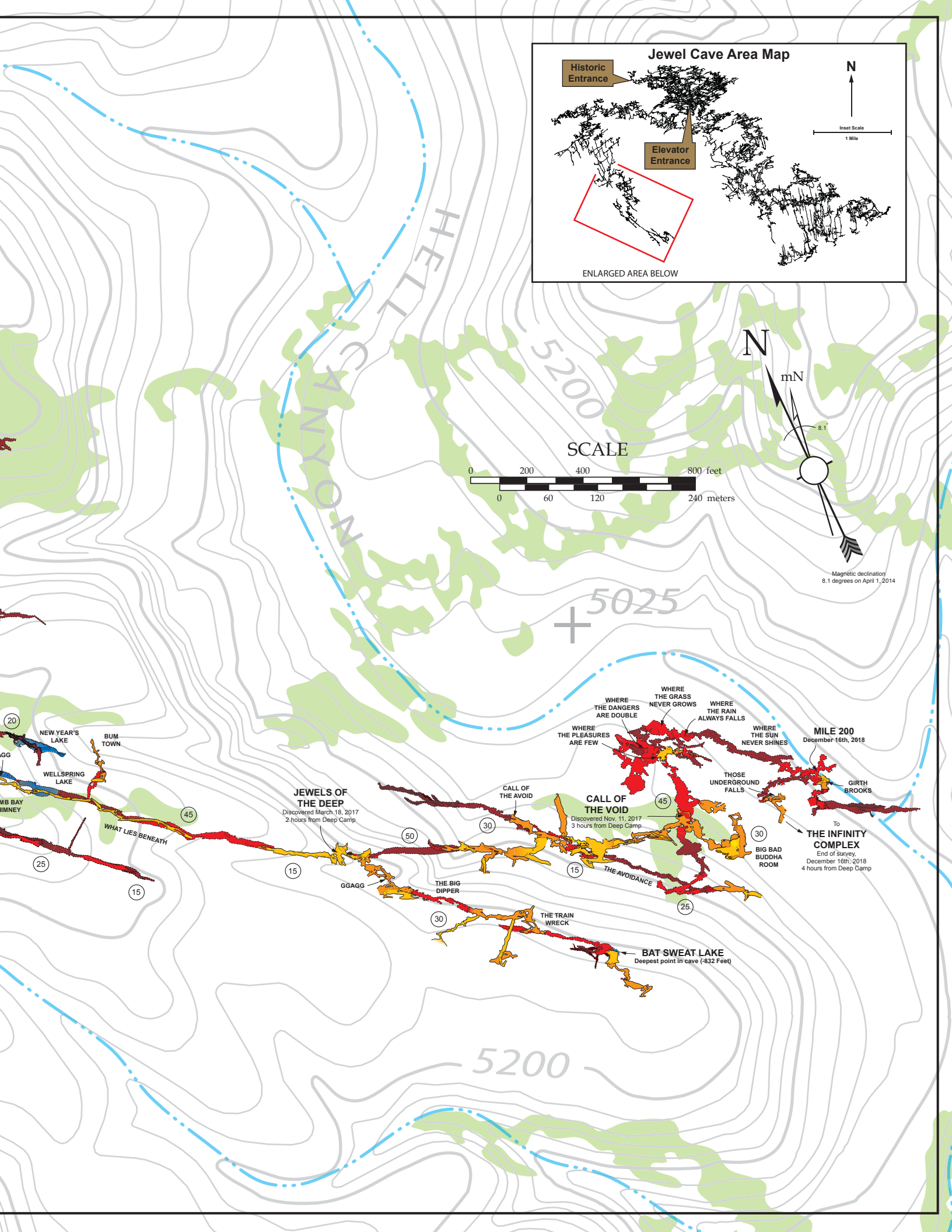
PASSAGES COLORED BY STRATIGRAPHIC LEVELS (not absolute elevation)

Passage walls

- Highest level (loft)
- Chert level
- Sub-chert level
- Main level
- Lower level
- Lowest level (basement)

Cave Passage Features

- Floor ledge (passage floor drops to the right)
- Pit or hole down
- Lake or pool
- Ceiling height (feet) 20


Jewel Cave Area Map
Historic Entrance
Elevator Entrance
N
Inset Scale
1 Mile
ENLARGED AREA BELOW
HELL CANYON
5200
5025
5200
SCALE
0 200 400 800 feet
0 60 120 240 meters
N
mN
8.1°
Magnetic declination
8.1 degrees on April 1, 2014
NEW YEAR'S LAKE
BUM TOWN
WELLSPRING LAKE
WHAT LIES BENEATH
JEWELS OF THE DEEP
Discovered March 18, 2017
2 hours from Deep Camp
GGAGG
THE BIG DIPPER
THE TRAIN WRECK
BAT SWEAT LAKE
Deepest point in cave (-832 Feet)
CALL OF THE AVOID
CALL OF THE VOID
Discovered Nov. 11, 2017
3 hours from Deep Camp
THE AVOIDANCE
WHERE THE DANGERS ARE DOUBLE
WHERE THE GRASS NEVER GROWS
WHERE THE RAIN ALWAYS FALLS
WHERE THE PLEASURES ARE FEW
WHERE THE SUN NEVER SHINES
MILE 200
December 16th, 2018
THOSE UNDERGROUND FALLS
GIRTH BROOKS
BIG BAD BUDDHA ROOM
To
THE INFINITY COMPLEX
End of survey,
December 16th, 2018
4 hours from Deep Camp

decided to split up and see if there was a way through. I took a route that became more complicated than I really wanted it to be, since I was on my own, until emerging in a really nice large room. I jumped onto a large boulder and scanned the room as its contents sparked the music player in my mind to play my favorite caving song. It's an adaptation of an old mining song called "Dark as Dungeon" by Jan Conn. Why had this popped into my mind? The song echoed between my ears. "Well it's dark as a dungeon and damp as the dew, Where the dangers are double, and the pleasures are few…" Then, the realities of my mind and the physical cave merged—right in the center of this room was an enormous prow of rock, separated from the ceiling but somehow still attached in one tiny corner. It was sickening. Its defiance of natural law was so great that I was afraid to walk under it, for it might choose that moment to obey physics again and fall and squish me like a bug! Below the rock and offset just a little bit was a deep pit that was unclimbable. With these two features, this room became "Where the Dangers Are Double."

Where the Sun Never Shines

(by Dan Austin)

The following month, Adam, Chris, Katey Bender, Carl Bern and I returned to Where the Dangers Are Double to see where the big room under Hell Canyon would take us. Before descending Call of the Void, though, I wanted to look for a shortcut that would bypass the vertical pit. We began probing the breakdown that Chris and Derek had found the year before, in hopes of getting into the lower level bedding plane fault passage that ran 40 feet beneath.

It wasn't long before Chris found a narrow fissure heading down to a terrifying traverse out over a 40-foot pit. After some insanity, Chris made it to the floor of the pit, with me following a short distance behind. Adam, Katey, and Carl followed cautiously.

After some looking around, Chris found a survey station. We had made the connection, and bypassed the SRT at Call of the Void. Chris and I screamed and high-fived loudly, our enthusiasm bubbling over. We decided to call the bypass Call of the Avoid, since it avoided the SRT pit. However, the Avoid seemed to be much more exposed and scarier than the Void, and we waffled on whether to keep using the bypass in the future, or just suck it up and do the vertical.

After a long travel from the Call of the Avoid, we finally arrived at Where the Dangers Are Double. We split up near the last survey station: Carl and I would survey as a team of two down the pit in the floor under the large, hanging boulder, while Chris, Adam and Katey took the lead at the far end of the room.

Carl and I started surveying through the confusing breakdown below. It wasn't long before we were heading southeast once again, and after a quick climb up, we had popped out into a 30-foot-wide, 20-foot-tall passage heading both to the southeast and northwest. Continuing with the lyrics from Jan's song, Carl and I named this passage "Where the Grass Never Grows."

At the southeastern end of the borehole, we encountered a room with water continuously raining down all around us. This became "Where the Rain Always Falls," a slight deviation in the lyrics of the song, but aptly named. Unbeknownst to us, Chris, Adam and Katey had also found a room with a tremendous amount of dripping water, which they also named "Where the Rain Always Falls." As it turns out, the two rooms are only 20 feet apart from each other, a pretty amazing coincidence.

Carl and I continued the southeasterly trend, climbing down a pit to a lower-level, 20-foot diameter borehole. This became "Where the Sun Never Shines." Now we just needed to find "Those Underground Halls" to complete the lyrics. We climbed back up at the end of the borehole to discover a huge maze of interconnected passages, with dripping water, frostwork and formations everywhere! We were stumped as to which way to go; there was cave everywhere, and nothing deserving of the name we were ready to provide. This was clearly the way on, but it would have to wait until the next trip for us to see what it would do.

Part of the November Camp was set aside to complete some science work out at Deep Camp for Dr. Olivia Hershey at the University of Akron, Ohio, and Riley Drake at MIT. The objective for the science was to get enough lake water pumped through filters so that the microbes in the water could be studied. We had hauled out sampling equipment days before, and we spent the morning of day 3 of the November camp helping Katey (the designated field researcher from the university), collect the samples from Piso Mojado, a lake nearby Deep Camp. Results are still pending in this study.

Since we didn't want to go all the way to the end of the cave on day 3, we opted to survey close to Deep Camp. Carl and Chris surveyed south of camp, while Adam, Katey, and I went north. There are still many leads to be checked, even 5 minutes from camp, but most of them are small. I never expected to find anything horribly exciting that close to camp, so I was surprised when we did.

After a few hours of survey in gritty upper-level passage, Adam, Katey, and I began descending narrow fissures that became muddier the further we descended. At one point, the passage ahead dropped off into a slippery, muddy pit. Katey slid around one side of the pit, and was able to carefully work her way to the bottom without sliding. Adam and I waited at the top to see what was at the bottom before we committed. After calling down to see what she found, we heard her voice from the darkness below: "There's a lake down here!"

We quickly surveyed the remaining 100 feet to the shore of Jewel Cave's 9th lake, which became known as Better Lake (Than Never). Air blasted at us from across the surface of the water, and I recalled the New Year's Lake crossing. Maybe someday we would find a way across this one, to the Never-land on the far side.

Mile 200

(by Adam Weaver)

Following the many camps in recent years, there was always a subconscious understanding that we were getting very close to surveying the cave's 200th mile. With every trip, the mileage grew, and the cave never gave us any sign that it might ever end. At some point on the way out of the cave, from the November Deep Camp, it finally set in that the next camp would likely survey the 200th mile. This topic filled at least an hour of the conversation and it seemed that everyone had a different opinion about where we should survey it, when the trip should be, what the marker should look like, if anyone cared about the number, and every detail about the trip imaginable. These conversations spilled over into the surface world, and eventually led to some meetings with Jewel Cave National Monument park staff. After talking with the park and the key trip participants, some details were made pretty clear: Both park staff and cavers wanted the 200th mile to be surveyed on the frontier, near the end of the cave. The trip needed to be in December, prior to the holidays, or it wouldn't happen until late February; this had the potential to halt exploration temporarily. Due to some of the key trip participant's time constraints, the trip was going to have to be a 3-day camp. Finally, there was going to be a small celebration immediately following our exit from the cave.

This meant that we had to recruit a very strong team due to the distance we had to travel and the time in which we needed to accomplish this mission. It was going to essentially be a "smash and grab" of the mile marker. I started organizing the trip, and I was able to quickly fill 5 of the 6 available spots with some of the finest horizontal cave explorers in the U.S: Chris Pelczarski, Rene Ohms, Dan Austin, Garrett Jorgenson, and me. The last spot took some searching, and a bit of convincing, but we were finally lucky enough to get the legendary Stan Allison to

come back to the cave after a long hiatus. All told, this team had 5 of the top 10 surveyors in the cave's long history of exploration, with a combined total of 178 miles of surveyed passage between them.

Another part of this story is the return of Kelly Mathis to the Black Hills in November. As many reading this article know, Kelly is an experienced and excellent surveyor/trip leader. He's taken part in some of the cave's hardest trips, and surveyed over 30 miles in Jewel. In the period between the November Camp and the 200th mile expedition, Kelly and I led day trips to many parts of the cave closer to the entrance that resulted in over 3000 feet of surveyed passage. This allowed us to be sure we would be able to survey Mile 200 at the end of the cave on December 16th, the second day of the 3-day trip. In Jewel, it's never a question of "if" any mile marker can be surveyed; it's only a question of where and when. There are truly hundreds of leads, located in every section of the cave, on every edge. We just need the time and determination to map them.

On the day of the trip we met at the park Visitor Center, with Jan Conn there to see us off! She seemed just as excited about the milestone as we were. We headed into the cave and made some pretty good time to Crushing Deep, about 7 hours from the elevators. We then split into two teams and surveyed ~1600' of passage in about 4.5 hours of survey. Some quick math told us that we were only 70 feet from surveying the cave's 200th mile. On day two, we headed to the end of the cave with one survey team going through "Call of the Avoid," to attempt to locate a better way through this section, and the other traveling to "Call of the Void" to re-rig the vertical pit. The "Avoid" team was unable to find a better way around, but the pit at the "Void" was re-rigged for a safer, more efficient SRT experience. It was determined by timing the routes that the rope, with the right gear, is the easier and better choice for now.

When we got to the end of the cave, we took the Mile 200 survey shot as a single group. Some of us set the station, while others found the label rock. We used a carbide lamp to draw the label, as homage to the days of old. The milestone had finally been achieved. After taking photos and a small celebration, we split into two teams again and started surveying the complex cave where Carl and Dan had left off a month before. Initially, one team went southeast and one went west. This section of cave is very large, and filled with giant breakdown that creates such a high number of leads that it is difficult to pick a meaningful way through. The southeast team found a very large striped stalagmite which they named "Girth Brooks," the largest active stalagmite in the cave at 8 feet tall and 5 feet in diameter. It's really a sight to see! Their passage continued south and east in some nice cave, but at the end of the day they didn't have a clear path forward in this direction.

The west team surveyed down a 60-foot tall canyon. This eventually turned southeast, through a complicated mess of cave. The big find for this team was a passage called "Those Underground Falls" where water was coming into the cave in a huge area at the rate of a shower head! Upon entering this passage, it sounded like approaching a rushing stream. This team ended in a large room with some frostwork that appears to trend to the southeast in walking passage. We surveyed about 3300' over the 2-days, bringing the cave's length to 200.25 miles.

On day 3, we awoke early to exit the cave. We had told the folks on the surface that we would be out within 30 minutes of 8 pm on this day, to allow for the park to plan a pot-luck get together. Some folks on the team had suffered from some pretty serious gear malfunctions on the trip, so we wanted to be able to take a moderate pace on the exit, and have time to spare if we needed it. At 7:55 we arrived at the elevators. In the Visitor Center lobby, the elevators came to life in a room full of eager friends, who had been waiting for us to arrive. But no one came out of these elevators. Instead, our team stopped in the basement to unload some things. Jan Conn, knowing where we had gone, came down the stairs to meet us. We told her of our success, and I asked her if she wanted to ride up in the elevator with us. She said, "Well Sure! This appeals to my sense of the absurd!" When the doors opened in the lobby we were greeted by 50 friends of the local caving community, the media, and some applause. It was surreal. Many photos were taken; stories shared, and pulled pork sandwiches consumed. People kept congratulating us, which to me felt really weird: The 200th mile is just a number, just a single 25-foot survey shot in a small room in the cave, that isn't anything special.

What *is* special is the long-term success of the exploration program at Jewel Cave, and the strength of the current program. The exploration program at Jewel right now is arguably one of the most active in the world. Three of the most productive survey years in Jewel's history have happened within the last 5 years. Two new camps have been established. And the cave keeps going! It has happened because there are people who are dedicated to finding out what is around the next bend in the passage. All of the folks who have explored the cave in the past, as well as those who have worked from within the National Park Service to protect this resource, each share equally in this success.

In recognition of all of this work, and for the bright future ahead, Jewel Cave National Monument, the Paha Sapa Grotto, and the Black Hills Parks and Forests Association are hosting a Celebration this summer. The Jewel Cave 200th Mile Reunion and Celebration will be held June 28-30th in Custer, SD. With 3 days of speakers and activities it's sure to be an event worth attending.

For more information on the event, please visit www.blackhillsparks.org. It is open to anyone who is interested in attending!

Rene Ohms in a newly discovered passage beyond the 200th Mile

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