
Carlsbad Cavern Expedition Report

New Mexico Room, Guadalupe Room, and Big Room Sections Expedition: July 3-6, 2019

submitted by: Derek Bristol - September 12, 2019

Summary

This report summarizes the results of a four-day expedition to the New Mexico Room, Guadalupe Room, and Big Room sections of Carlsbad Cavern. The expedition was planned and led by Derek Bristol. There were a variety of survey objectives split between the Guadalupe Room and New Mexico Room, as well as a significant technical climbing lead at the southern end of the Big Room. The results of the expedition included 1,743.7 feet of total survey; 1,386.3 feet of new survey and 357.4 feet of redundant survey. The expedition added 0.26 miles to the length of Carlsbad Cavern, which now stands at 38.26 miles, although this value is overstated and additional work is needed by all the cartographers to exclude duplicated surveys.

Expedition Goals and Accomplishments

The primary goals for this expedition started off being exploration of leads and fixing of bad loops in the Guadalupe Room and New Mexico Room. With the late approval of the aid climb of Liberty Dome in the Big Room, the limitation of only climbing when the tour trail had closed for the day, and with the difficulty and logistics of the climb, a total of three evenings were spent on this objective. The time was used to make the initial ascent, put in robust rigging, thoroughly check for leads, and conduct a detailed survey. Despite these late evening activities,



Surveying Gossamer Loft, above the Guadalupe Room . (photo by Sonia Meyer)



Pool formation in Gossamer Loft. (photo by Sonia Meyer)

one day was spent in the Guadalupe Room and another two days were spent surveying and fixing loops in the New Mexico Room. The major portion of the Liberty Dome climb was completed on the first night (July 4th). It was hoped that any new discovery could be named "Independence Hall", but alas, no going leads were discovered. A second night was spent removing anchors used in the ascent and rigging rebelays for safe access, and a third night was used to thoroughly explore and survey the top of the dome. A register from 1976 was found, but not the reported boneyard maze. The Gossamer Loft area in the ceiling of the Guadalupe Room was revisited with full clean gear and the exploration and survey continued, but this well decorated area was very quickly finished with no remaining leads after about 150 feet of survey. Teams visited lower level areas on the southern end of the Guadalupe Room and discovered well decorated rooms and passages with many leads remaining to be explored. Finally, time was spent in the New Mexico Room with the primary objective of fixing a series of six bad loops, but two of

these are no longer accessible because ropes were pulled, and three of them suffer from issues related to mistakes made in relabeling, which will be very difficult to fix, and will require additional trips to the area. Still, steady progress is being made on improving the data and moving the cartography ahead.

Team

Team members included Derek Bristol (CO, expedition leader, sketcher, climber), Steve Reames (CO), Marty Reames (CO), Aria Midice (NM, sketcher), Hunter Klein (CO), Sonia Meyer (CA), David Brumbaugh (NM), Leah van Vranken (TX), and Tiffany Nardico (CA). Most of these cavers have done volunteer work in Carlsbad Caverns NP in the past. This was the first expedition for Hunter and Tiffany. Everyone caved safely, with low impact, and remained focused on generating high quality survey data. All veteran and new team members should be welcomed back.

Detailed Daily Reports

Note: trip leaders for each team are underlined.

July 3, 2019 (Guadalupe Room)

Derek, Sonia, Marty and Tiffany entered the cave via the Natural Entrance along with Aria, Steve and Leah at 10:15. The two teams traveled together down the Main Corridor and followed the wild caving tour route past the Hall of the White Giant and beyond to the Guadalupe Room using the standard flagged trail. At the rope that leads to Gossamer Loft, near GC14, the teams split up. Derek went with Aria's team towards the Grand Ballroom and pointed out several leads that needed survey near station GRC16. He then returned to the Gossamer Loft rope where Tiffany, Marty and Sonia were completing their ascent. Once everyone was at the top of the fixed rope they took time to calibrate

both of their Disto-Xs and then changed into clean gear and shoes for the transition onto the clean flowstone above GC14D. A new designation, GL for Gossamer Loft, was begun and the team surveyed to the southwest across a very delicate area that has a flowstone floor and many stalactites, soda straws and helictites hanging from the ceiling. A number of dead bats were observed encased in flowstone. Following a low spot in the ceiling, a room was encountered that is about 25 feet wide and 60 feet long with a floor that transitions from flowstone to sediment. Marty crossed the sediment-floored area



The team heading to Liberty Dome via the elevator. (photo by Sonia Meyer)

in socks to verify that the far side of the room did not contain continuing passage. The survey and sketch of this room was completed and the team returned to GC14F and surveyed to the northeast through a very narrow opening between columns. Another small room was encountered, and Tiffany crossed the sediment-floored section to verify that this end of the passage also terminated. The survey was completed and no leads were left. The team retreated to the rope, changed back into dirty gear, and descended back into the Guadalupe Room. The team traveled down to the lower portion of the Guadalupe Room to a fixed rope that's rigged at GC2 and rappelled to a mid-level passage where they began a survey using GC40E as a tie-in. The rope continues down an additional pit, which is the direction the survey was taken. At the bottom of this pit is a room with breakdown leads going to the north and east that were left for another day. The team followed a southwest trending passage that also descends rapidly, following the downward-dipping south wall of the Guadalupe Room into a

series of boneyard passages. A crawl that doubles-back under the main passage and heads back northeast was surveyed to a termination. The team re-climbed the fixed rope and met back with Aria's team near the Gossamer Loft rope. A total of 308.6 total feet was surveyed in 20 shots using GL1-6 and GC40F-S. 303.8 feet was new survey, and 4.8 feet was redundant.

Aria, Leah and Steve surveyed into a lead heading northwest from GRC16 using the survey designation GRG. The passage is complex and mazy with a mix of solutional passage and breakdown. The survey eventually dropped into a large room at GRG19-23 that has gypsum chandeliers reminiscent of Lechuguilla Cave. The area was named Lil' Lechuguilla and 11 leads were left with much more work to be completed. The team returned to the top of the Guadalupe Room and met with the other team. The group of 7 all traveled back to the paved trail in the Main Corridor and exited together via the Natural Entrance at 21:30. A total of 321.9 total feet was surveyed in 23 shots using GRG1-23. 298.5 feet was new survey, and 23.4 feet was redundant.

July 4, 2019 (New Mexico Room, Big Room)

Derek, Marty and Hunter entered the cave along with Aria, Leah, Tiffany, Sonia and Steve at 9:15 via the elevator. The teams traveled together to the Green Lake Room, passing through the gate off of the main trail below Iceberg Rock.

They followed the normal route north using ladders and fixed ropes to reach the New Mexico Room. At the Chocolate Drop they changed to clean shoes and continued across the north end of the New Mexico Room and eventually reached the start of the Ranger Room near NMB5. Here the teams split up with Derek, Marty and Hunter checking the Ranger Room to discover that the ropes that previously accessed passage and leads above in the NY survey have been removed. There are two bad loops in the NY survey, and several leads, but reaching these will require re-climbing the domes above



Bat skeleton in flowstone in Gossamer Loft. (photo by Sonia Meyer)

the Ranger Room. The team then traveled down a flagged trail to reach the start of the Western Lower Maze and the CF survey. The objective was to locate survey blunders in 4 loops along the west side of the New Mexico Room in this lower maze. After some route-finding, they located CF64, which is part of one of the bad loops. The team began a resurvey by just re-shooting from station to station since the original stations were easily recovered. All of the shots matched the old data until the final 4 shots of the loop, which had a station sequence of CF75-80-81-82-60, rather than the CF75-82-83-84 shown in the Compass data file. Stations that are marked CF80-82 in the cave are apparently entered into the

data file as CF82-84. Correcting these names changes the loop sequences and fixes this one bad loop. They then traveled north in the Western Lower Maze and located CF150, which is part of a series of three interconnected bad loops that share some station sequences. Right away it was apparent that several shots included additional mis-labeled stations. It seems apparent that the CF stations in this area were relabeled after they were originally surveyed, and the data in the Compass file was changed to reflect these new station names, but either the stations were entered into Compass incorrectly, or the wrong labels were replaced in the cave. Subsequent surveys then tied into these newly labeled stations so fixing these problems is going to take much more time than originally thought. Time ran short to fix any more loops so the team traveled back to the New Mexico Room and met with the other team at the rope leading back to the Green Lake Room. A total of 197.9 total feet was surveyed in 10 shots using CF60-82. 49.1 feet was new survey, and 148.8 feet was redundant.



Checking a climbing lead in the Sand Room. (photo by Hunter Klein)

Aria, Leah, Tiffany, Sonia and Steve began to survey from the New Mexico Room into the Ranger Room. A webbing hand-line was fixed at the short climb-up required to get into the room. They surveyed only two long shots going south before reaching a drop that will require about 100 feet of rope. They met the other team and traveled back to the elevator together, exiting the cave at 16:00 and returning to the Quarters 56

apartment for an early dinner. A total of 105.3 total feet was surveyed in 2 shots using NMB7-8. 105.3 feet was new survey, and 0.0 feet was redundant.

After dinner Derek, Steve, Marty, Hunter, Sonia and Tiffany returned to the Visitor Center and took the elevator back to the Big Room and followed the tour route out to the southern end of the room above Bottomless Pit. Permission had been granted by the Cave Resource Office to re-climb Liberty Dome, which had originally been climbed by Tom Rohrer and Ron Kerbo in 1976. There were reports of possible leads that had been left at the top of the dome, and a new higher quality survey was needed. The railing was crossed near Mirror Lake and the team followed a wide, flat ledge that crosses the south side of Bottomless Pit. Eventually this ledge narrows and ends at the east side of a large overhang that guards the upper portion of the dome. A previously scouted line that follows the left side of this overhang was chosen to begin the climb. This line is approximately 40-50 feet left of

the original ascent, which takes a more direct but steeper route. The climbing gear was organized and a bottom anchor was established on a large gypsum block on the ledge. Sonia belayed as Derek led the first 40 feet using direct aid techniques up the slightly overhanging wall. A 10 mm x 60 m dynamic rope was used for the lead belay, and a 9 mm x 230 foot static rope was trailed and used to rappel and



Beginning the aid climb up Liberty Dome. (photo by Hunter Klein)

ascend for cleaning pitches. Most anchors were 1/4-inch diameter by 1.75-inch long Hilti Kwik-HUS screws with 8 mm aluminum hangers and a quickdraw. These require a very small hole that is nearly invisible, and the screws can be easily removed. They require a rotary hammer to make the hole, and an impact driver with 7/16-inch socket to place, but they are fast, low-impact, and capable of holding a lead fall.

On the first pitch every 3rd or 4th anchor was a 3/8-inch by 3-inch stainless sleeve bolt for an additional safety margin; however, placing these requires changing the SDS bit in the rotary hammer, and removing them is a fiddly process with a small pair of vice-grips. At the 40-foot level a small roof is crossed to a shallow sloping ledge. From this point the climbing route takes a sharp turn to the right and traverses this diagonally ascending ledge back towards the center of the dome. Due to the change in direction, and the availability of this sloping ledge, it was decided to set a belay anchor here to avoid rope drag later. A 2-bolt anchor was set using the 3/8-inch sleeve bolts, and Derek rappelled back to the start of the climb on the ledge above Bottomless Pit. Because the pitch was overhanging it could not be cleaned on rappel and required anchor removal while re-ascending the dynamic lead rope. All lead climbing anchors were removed except for one of the 3/8-inch stainless sleeve bolts that was about 25 feet off the ground. A significant amount of time was spend, but the bolt could not be removed, so the hanger and nut were removed and the stud hammered into the hole. Once the pitch was cleaned, the climbing gear was reorganized, and Sonia ascended the static rope to the 2-bolt belay anchor and put Derek back on belay. Derek continued the climb by following the sloping ledge heading up and to the right using direct aid. After about 6 screw placements a slightly lower-angled section of the wall allowed for about 50-feet of free-climbing to reach the middle of the dome. The final 40-50 feet of the pitch goes up a fairly vertical section of wall and the original climbing route was intersected. The old 1/4-inch corroded steel bolts are evident. Direct aid was used again to climb the final vertical section of the wall to reach a lips and a lower angled slope above. About 10-feet up this

slope, which was free-climbed, is a large breakdown block where a 2-bolt anchor was set and the two ropes were fixed. The slope continues above, and is easy free-climbing to reach the ceiling level, but rope drag from the long previous pitch prevented going any higher. Derek rappelled and clipped the static rope through the lead climbing anchors and was able to return to the belay anchor with Sonia and they both rappelled to the ground. It was getting close to midnight and the team was tired so they decided to come back the following day to clean the upper pitch and complete the rigging. While Derek and Sonia were climbing, Tiffany, Steve, Marty and Hunter worked on collecting photos and video of the climb. The team followed the trail back to the elevator and used the security code to exit the Visitor Center just after midnight.

July 5, 2019 (Big Room)

Due to the long day and late night the previous day, and the need to return to Liberty Dome after the tour route closed for the evening, the team decided to sleep-in and forego a cave trip during the day. At 17:00 Derek, Hunter, Steve, Marty, Sonia and Tiffany went down the elevator in the Visitor Center and returned to the ledge above Bottomless Pit. Derek ascended to the 2-bolt belay anchor that was 40 feet up the left side of the dome and began de-rigging the long pitch climbed the previous night. Using a wrench and vice grips, the handful of 3/8-in sleeve bolts were removed, and using the



The traverse above the first belay anchor on Liberty Dome. (photo by Sonia Meyer)

impact driver, the many screw anchors were removed with no hardware left behind. At the 2-bolt anchor above the upper lip of the climb, Derek climbed another 20 feet up a low-angle slope to a ledge with a large breakdown block and an old rusted anchor from 1976. This short pitch was climbed with a self belay. From this stance a permanent 2-bolt anchor was installed using two 3/8 x 3.75-inch Fixe double-wedge bolts, hangers and maillon-rapides. The static rope was secured to this anchor, the lower 2-bolt anchor was removed, and a series of four rebelayes were installed while rappelling back to the ledge above Bottomless Pit. The rebelayes are all single bolt anchors that use the same Fixe double-wedge bolts and all are in good quality rock with at least 20 feet between anchors, which reduces the

fall-factor and impact forces in the unlikely event of an anchor failure. The four rebelay were necessary to avoid rub points from the many intermediate ledges. The upper three rebelay have shallow sloping ledges that help in crossing, but the lowest rebelay is at the lip of a sharply undercut roof and is hanging, so the loop in the rope or a footloop must be used to cross it on descent. Derek and Sonia reascended the newly secured fixed rope and returned to the ledge with the 2-bolt anchor. Sonia belayed as Derek free-climbed the next 30-40 feet of loose, but easy low-angle slope up to the wall, which is near

ceiling level. A large and robust natural thread around the junction between two breakdown blocks was used to rig the rope. Derek traversed to the right (North) to a flat alcove, which marks the high-point of the dome, and is right at the ceiling level of the dome. Some scouting of the area was made, but no obvious leads were seen. A small 35 mm film canister was found, which had



Sonia and Derek on the long second pitch of Liberty Dome. (photo by Hunter Klein)

the original ascent and survey team members names etched in the side. Inside was 8 cents (3 pennies and a nickel - all from 1976) and a bank deposit slip (an obvious inside joke. The small register was brought out and given to Rod Horrocks. The time required to clean the anchors from the climb and rig the multiple rebelay meant that it was getting late, and getting the entire team up and down the climb while surveying would have made for a very late night, so it was decided to leave the survey for the next and final night of the expedition. Derek and Sonia descended and the team left via the elevator at 23:00.

July 6, 2019 (New Mexico Room, Big Room)

Derek, Sonia, Tiffany, Marty and Hunter entered the cave via the elevator in the Visitor Center at 10:15. They traveled together to the first large room above the Green Lake Room on the standard route out to the New Mexico Room. Marty and Hunter continued on to the New Mexico Room using the ladders and ropes, and changing to clean shoes for the flowstone sections of the New Mexico Room. They returned to CF150 in the Western Lower Maze and spent several hours trying to locate and re-shoot survey legs that were part of the three bad loops in the NW corner of the Western Lower Maze. This proved to be difficult because it seems apparent that there are several stations in this area that have been mislabeled, and many portions of the bad loops are exposed and will require temporary rigging or hand-lines to visit safely. Several old survey shots were repeated but none of the bad loops

were fixed. Additional analysis and return visits will be required to sort out the mess that exists in this part of the cave. Unfortunately, fixing these data and labeling errors needs to be completed before cartography can begin. It is still hoped that the problems can be fixed without a full resurvey of the area. Marty and Hunter returned to NMD1 and met back up with the other team before leaving the cave. A total of 111.9 feet of resurvey was accomplished in 8 shots.

Derek, Sonia and Tiffany brought a 100-foot rope that was rigged to a natural anchor above one of the pits in the floor just below NMD1. They surveyed down into this lower level, which is about even with the elevation of the Green Lake Room, using NMD24-45. There are several mazy passages in breakdown and boneyard that all lead to dead-ends or loop back up into the room above. After completing the area they de-rigged the rope and met back up with the other team and traveled out of the cave using the elevator. A total of 325.9 feet of new survey in 23 shots was completed using NMD24-45.

Derek, Sonia, Tiffany, Marty, Steve, Hunter and David returned to the cave at 18:30 via the elevator. Derek went up Liberty Dome first and rigged a traverse line at the top of the dome that can be clipped with a cowstail for safety (200 ft x 9 mm Cancord). This has a rebelay to a large breakdown block near the flat alcove area at the ceiling, another rebelay at a pair of small columns in the alcove, and the end is tied off to a breakdown block part way along a ledge that extends to the north side of the dome. This north trending ledge, and an area to the south were checked for leads, but none were found. The team found a tie-in station on the floor of the Big Room at Z267. The data at the time didn't have these Z stations included, so it was also tied into R36, just off the trail. The dome was surveyed with two very long shots using the BLD designation, but a large number of splays were shot and not recorded in order to improve the accuracy of the sketch. This is one of the big advantages of surveying with a Disto-X. Everyone on the team ascended to the high point of the dome where additional photos and video were captured and the survey completed. Others double-checked to ensure there were no missed leads. One by one the team members descended, pack up, and departed via the elevator at midnight. A total of 372.2 feet was surveyed in 4 shots using BLD1-2. 303.7 feet was new survey and 68.5 feet was redundant.

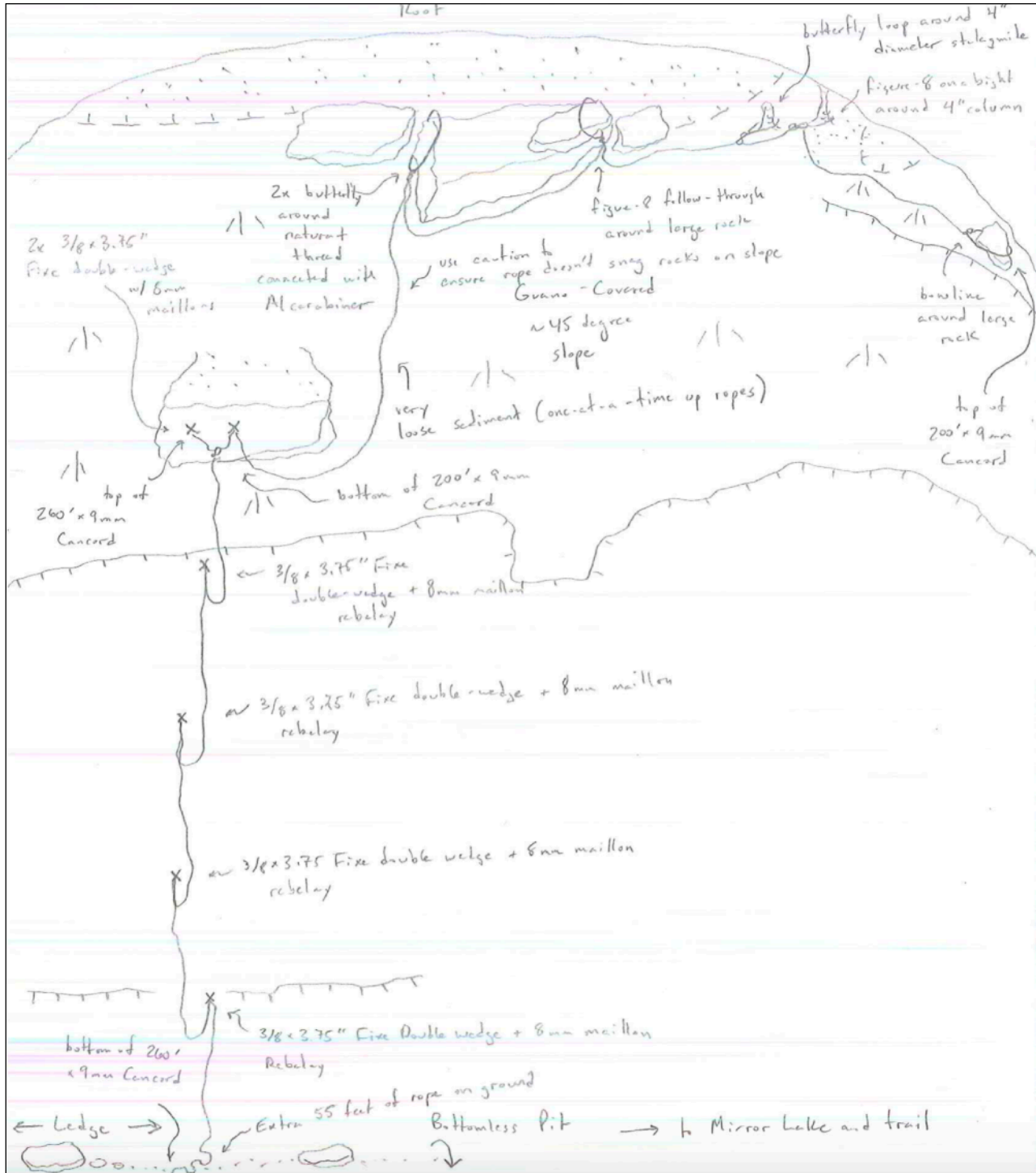
Conservation

- Nylon shoe covers or clean shoes (e.g. aqua-socks or 5-Fingers) were worn to reach some areas in and around the New Mexico Room.
- Full clean gear (shoes, packs, pads, clothes) was used to survey Gossamer Loft, which mostly has a floor of pure-white flowstone. The ends of the passage have a floor that transitions to sediment / CR, and these were crossed in socks so as not to dirty clean shoes. The Gossamer Loft area has been completed (i.e. no going leads), but because there was significant effort and danger in getting a rope up to this hole in the ceiling, and because it is higher than any other passage in the area, it was left rigged.
- Low impact aid climbing techniques were used successfully and will be used again in the future to maintain minimum safe standards for climbing while also minimizing impact to the cave. Screw anchors, designed for use in concrete, can be placed with a shallow, 1/4-in hole, and fully removed. The hole that remains is nearly invisible and there is no hardware left to corrode. Some testing shows that the shear strength on these screws is 20-25 kN, which is enough to catch even the worst lead fall.

Rigging

Two fixed ropes were installed in Liberty Dome (see Figure 1). The upper of the two ropes is a 200-foot x 9 mm Cancord static line that is mostly rigged as a traverse line across the top of the dome. One

Figure 1. Rigging schematic for Liberty Dome in the Big Room



of the natural anchors is rigged with a loop of rope and connected on both sides with a butterfly knots and a locking carabiner. This carabiner should be replaced with a stainless maillon, but it is rigged redundantly, so replacement isn't time critical. The lower rope in Liberty Dome is a 260-foot x 9 mm Cancord and includes 4 rebelay anchors below a 2-bolt top anchor. This rope is approximately 55-feet longer than needed.

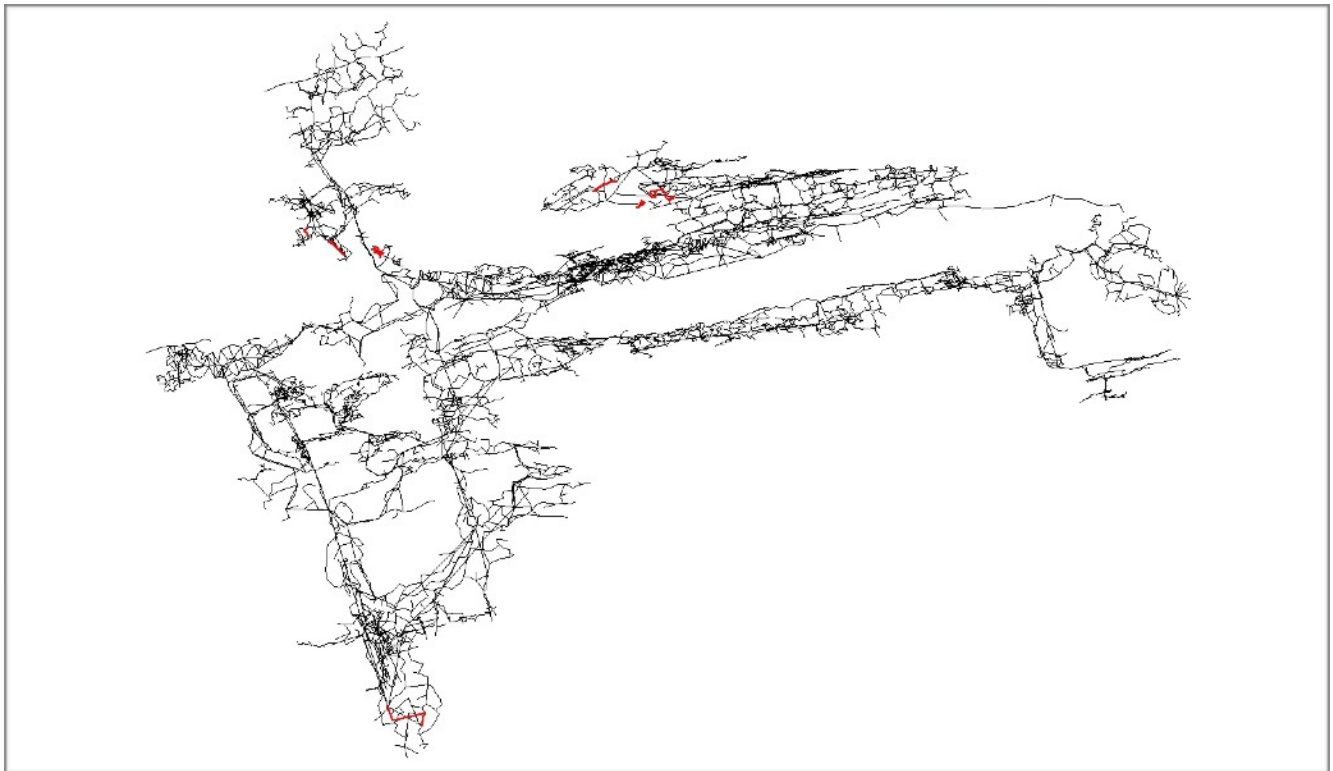
The high domes above the Ranger Room in the old NY survey that was reportedly climbed and explored by Don Doucette in the 1990's has been de-rigged. There are two bad loops, and several leads remaining in this high and vertically complex area. Fixing the problems and continuing the exploration will require the climbs be repeated. This may be added to a future proposal.

Safety

There were no significant safety incidents of note. Team members exited the cave in the same condition they entered. Even though the Liberty Dome climb is well away from the tour path, the climb and subsequent rigging and survey was done after-hours. Some loose rock was kicked loose from the slope above, and even though it landed well away from the path and any infrastructure, it's likely this would have startled some visitors, so it was probably a wise decision to limit climbing to these times.

Maps

Below is a plan view line plot showing the newly surveyed passages (new survey in red).



The cartography for Chocolate High and the New Mexico Room has been updated, but drafting of the Western Lower Maze has delayed until the loops can be fixed. Unfortunately this will need to be delayed a little further. Some updates to the Guadalupe Room map have been made, but more work is needed to get it current with the survey. These updates are planned to be completed prior to the next expedition, which is scheduled for November, 2019.

Lead Lists

A list of completed leads from the July, 2019 expedition, and notes on how the leads were surveyed, is shown in Table 1.

Table 1. Completed Leads

Completed Leads (July, 2019 Carlsbad Cavern Expedition)						
Section	Area	Nearest Tie-In	Directions from Tie-In		Dimensions	Comments
			Distance (ft)	Bearing		
Guadalupe Room Complex	Lower Pit Series	GRC16	5	SW	4Wx4H	Surveyed with GRG1-23
Guadalupe Room Complex	Guadalupe Room	GC14F	10	SE	2Wx4H	Surveyed with GL1-4
Guadalupe Room Complex	Guadalupe Room	GC14G	5	SW	4Wx6H	Surveyed with GL5-6
Guadalupe Room Complex	Guadalupe Room	GC40E	10	S, down	6Wx6H	Surveyed with GC40F-S
Big Room	Bottomless Pit	Z267	230	up	60Wx230H	Surveyed with BLD1-2
New Mexico Room	New Mexico Room	NMB5	20	SE	40Wx40H	Surveyed with NMB7-8
New Mexico Room	Kings Palace	NMD1	12	N	6x6, down	Surveyed with NMD24-45

A list of new leads from the July, 2019 expedition, and notes on the size, nearest tie-in station, and general observations, is shown in Table 2.

Table 2. New Leads

New Leads (July, 2019 Carlsbad Cavern Expedition)						
Section	Area	Nearest Tie-In	Directions from Tie-In		Dimensions	Comments
			Distance (ft)	Bearing		
Guadalupe Room Complex	Lil' Lechuguilla	GRG9	20	NE, down	12Wx6H	Goes down a lot
Guadalupe Room Complex	Lil' Lechuguilla	GRG13	6	NE	5Wx1.5H	Complex breakdown
Guadalupe Room Complex	Lil' Lechuguilla	GRG15	5	N	10Wx4H	Goes 15 ft then left, small
Guadalupe Room Complex	Lil' Lechuguilla	GRG17	2	W	3Wx2H	Loose. Not good.
Guadalupe Room Complex	Lil' Lechuguilla	GRG16	15	NW	3Wx2H	Loose and dangerous. Not good.
Guadalupe Room Complex	Lil' Lechuguilla	GRG18	8	SE	4Wxlow, down	"To PX survey". Goes way down.
Guadalupe Room Complex	Lil' Lechuguilla	GRG20	6	S	2Wx2H	Lead on upper shelf. Looks bad.
Guadalupe Room Complex	Lil' Lechuguilla	GRG23	8	N	8Wx4H	?
Guadalupe Room Complex	Lil' Lechuguilla	GRG23	6	E	2Wx2H	?
Guadalupe Room Complex	Lil' Lechuguilla	GRG23	4	S	3Wx2H	Above ledge.
Guadalupe Room Complex	Lil' Lechuguilla	GRG23	0	down	4Wx2H	Pit down.
Guadalupe Room Complex	Guadalupe Room	GC40G	15	N	5Wx3H	Lead in breakdown, not checked.
Guadalupe Room Complex	Guadalupe Room	GC40G	25	NE	5Wx3H	Lead in breakdown, not checked.
Guadalupe Room Complex	Guadalupe Room	GC40G	30	E	8Wx2H	Lead in breakdown - route to near Grand Ballroom
Guadalupe Room Complex	Guadalupe Room	GC40G	10	SE	4Wx2H	Lead in breakdown, not checked.
Guadalupe Room Complex	Guadalupe Room	GC40J	15	W	4Wx4H	Lead up slope, not checked.
New Mexico Room	Ranger Room	NMB7	10	SW, down	50Wx10H	Large pit to lower level that parallels Ranger Room.
New Mexico Room	Ranger Room	NMB8	0	SE	50Wx100H	Continuation of Ranger Room - needs rope.
New Mexico Room	Green Lake Room	NMD26	10	SE	2Wx2H	Bad looking tight lead near bottom of center pit.

Conclusions

The expedition was very successful in working towards completion of high quality maps of both the New Mexico Room/Chocolate High and Guadalupe Room section maps. More than a quarter of a

mile was added to the length of the cave in four days of work while also completing a very significant technical climb in the Big Room. All of this was made possible through the efforts of highly skilled and experienced cavers/surveyors and careful pre-planning of survey objectives and logistics. These goals were accomplished while maintaining the priorities of safety and resource protection.

Thanks to all of the expedition team members for their drive, humor, flexibility and hard work.

Finally, thanks to Ellen Trautner, Aria Mildice, Erin Lynch and Rod Horrocks in the Cave Resources Office for providing information, training, housing arrangements, and gear preparation. Without their support none of this would be possible.

Sincerely,
Derek Bristol
7744 Gunsight Pass
Littleton, CO 80127
(303) 589-4469
derekbristol@gmail.com