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# The 2020 Great Xpedition Report

*Great Expectations Cave, Wyoming: August 8-15, 2020*

*Derek Bristol - September 10, 2020*

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## Summary

This report summarizes the results of an eight-day expedition to Great Expectations Cave in the Bighorn Mountains of north-central Wyoming. The upper entrance to the cave system (The Great Entrance) is located on the National Speleological Society Great Expectations Cave Preserve, and the lower entrance (Great Exit) is located on the Bureau of Land Management Trapper Creek Wilderness Study Area. The expedition was planned and led by Derek Bristol. Most trips involved areas accessed through the upper entrance, including continuation of the survey through the Flowstone Gallery to Lost Worland River, a survey of the Cephalopod Malt Shop, survey of many side passages off of the Great Hall, and survey of the Shredder Maze area. A few trips were taken to the lower entrance where several days of work were contributed to improve the condition and marking of the route between the Great Exit and its parking area, and a resurvey of the Grim Crawl of Death was begun. The end of the week was marked by a recreational through-trip from the upper to lower entrances that was completed safely in 9 hours. A total of 697 work hours were volunteered during the week. This does not count recreational activities, camp time, or travel. The results of the expedition included 12,193.3 feet of total survey. When added to the three days of survey conducted in 2018-2019, the total surveyed length of Great-X Cave is now 15,846.4 feet (3.00 miles).



*Jake, Jen and Ben in the Great Entrance (photo by Hazel Barton)*

## Expedition Goals and Accomplishments

The primary goals for this expedition were to continue working on surveying the central route between the Great Entrance and Great Exit, survey the river between station B1 and the Cephalopod Malt Shop, and begin surveying side passages off of the Great Hall and Flowstone Gallery, including the

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Shredder Maze and Theta Room. More than 200 survey shots were taken to begin to chip away at the mammoth task of resurveying the central line that traverses the Lost Worland River. This leaves an additional 350 survey shots (approximately) to complete this objective. The route to Cephalopod Malt Shop, as well as a large infeasible were fully surveyed, but a few miserable looking leads remain in this area. Several days were spent in the Shredder Maze, which heads north, away from the Great Hall at its eastern end. Several leads remain, and a few major passages end in breakdown collapses with very strong airflow. These collapses may lead to an upstream continuation of the Great Hall and are worth a thorough investigation for digging opportunities. Over three days of work, 27 survey shots were put into the Great Exit and up the lower end of the Grim Crawl, but there are probably another 40 survey shots needed to complete the task, which requires laying in 38°F water for extended periods, but continuing to survey this from the bottom is the most practical option. Many of the larger side passages on the eastern end of the Great Hall were surveyed. These all end quickly or loop back to known passage. A few more side passages exist in the Great Hall that will be tackled on a future trip. Potential climbing leads in the Great Hall were scouted, and there are a couple that may be of interest, but it was decided not to climb them during this expedition. A couple of them don't appear to be leads at all, and the best lead looks as though it might be accessible from the west end of the Great Hall without technical climbing. Two other climbs that do look promising were identified including a dome in Shredder Maze that might be free-climbed with a belay, and a tall canyon heading away from the Lost Worland River opposite the 60-foot rope pitch, which will take an exposed bolt traverse to reach. There was not time to begin working on the survey of the Theta Room / Nervous Breakdown area or Soda Straw Hall. The cartography was fully updated prior to this expedition, and it will be updated again before returning.

## Team

Team members included Derek Bristol (CO, expedition leader, sketcher), Hazel Barton (OH, sketcher), Kevin Manley (CO, sketcher), Jennifer Foote (NM), Sonia Meyer (CA, sketcher), Joey Meyer (CA), Carl Bern (CO, sketcher), Amy Bern (CO), Aven Bern (CO), Carl Froslic (MT), Savannah Sawyer (MT), Ben Smith (CO), Jake McLeod (CO), Kelly Mathis (SD, sketcher), Shawn Thomas (OR, sketcher), Rene Ohms (SD, sketcher), Adam Weaver (SD, sketcher), Nick Anderson (SD), Kasey Cory (MT), Bob Montgomery (WY), George Breley (OH, sketcher) and Ellen Whittle (WY). Derek, Hazel, Kevin, Jen, Carl Bern, Amy, Carl Froslic, Savannah, Jake, Rene, Adam, Kasey, Bob and Ellen have all been to Great-X Cave in the past. For everyone else it was their first visit. Only Carl Bern, Bob and Kasey had been on a through-trip previously, though none of them came on this year's trip.



*Great Expedition 2020 partial team (photo by Hazel Barton)*

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## Detailed Daily Trip Reports

*Note: daily trip leaders for each team are underlined.*

**August 8, 2020 (Flowstone Gallery; Shredder Maze; Cephalopod Malt Shop)**

Derek, Ellen, Jake and Kelly left camp at 9:30 and hiked to the Great Entrance. There are four logs lying across the gap between the talus slope and large breakdown block just inside the entrance.

Derek placed a 3/8 x 3 inch Powers SS wedge bolt on each side of this traverse - both equipped with a stainless hanger and 8 mm maillon. 20 feet of 1" tubular webbing was rigged between the bolts and tensioned with a trucker's hitch to make a hand-line that is rigged at about chest height. This improves the convenience and safety of crossing this gap. A 10' aluminum ladder will be brought on a future expedition to create a more stable bridge for the crossing. Derek then opened the gate at Crisco Crack and installed a pair of 3/8 x 3.75 inch Fixe double-wedge bolts equipped with stainless hangers and 8 mm maillons on the wall above the first chimney climb. This was rigged with a 93-foot x 10 mm static rope, which was left in place during the week. The first two chimneys below Crisco Crack can be free-climbed, but the climb is not easy and the consequences of a fall are high. The team signed the register and headed into the cave at 10:30. Some orange flagging was added to the main travel route to help teams with navigation in the breakdown areas. No flagging was added to obvious areas such as the Great Hall. The team found the tie-in station at B44 (old SS40 station) in the Flowstone Gallery and began a digital survey and sketch. A large number of FS/BS measurements fell outside the tolerance range of 2 degrees and had to be

repeated. It took several hours of struggling with this before a single liner glove worn by the foresight person was determined to influence the azimuth readings. There was obviously something metallic in this glove despite appearing to be a simple knit construction. This is yet another example of why it's important to always take back-sights, preferably by an independent instrument reader with a different instrument. A total of 35 survey shots were taken through the Theta Room, Lunch



*Jen in the Velcro Chimney (photo by Hazel Barton)*

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Room, and down two rope drops to the edge of Lost Worland River for a total of 923.8 feet of resurvey using B45-79. The team exited the cave without incident, reaching the gate at 20:00 and the campsite at 20:30. A total of 44 work-hours were volunteered.

Hazel, Carl Froslic, Savannah and George left camp at 9:30 and spent about an hour in the Great Entrance calibrating Disto-Xs. They entered the Crisco Crack at 11:00 and traveled to station B12 in the Great Hall and began surveying the large side passage heading north into the Shredder Maze area. In



*Ben, Sonia and Jake in the Great Hall (photo by Hazel Barton)*

the first large room they found three leads and took the largest, which heads to the northeast in walking passage. A large dome that looks like an excellent easy climbing lead was passed and the passage eventually ended in a breakdown choke with good airflow passing through. A branch from this terminal passage area was surveyed and completed a loop back into an earlier part of the D survey. The loop closure was excellent with only 1.5 feet of error. A total of 922.2 feet of survey was completed using D1-28 in 28 shots. The team returned to camp without incident, exiting the gate at 20:00, just ahead of Derek's team, and returning to camp by 20:30. A total of 44 work-hours were volunteered.

Carl Bern, Jen, Kevin and Shawn left camp at 9:30 and spent some time in the Great Entrance calibrating Disto-Xs. They quickly realized they had only one instrument, and had issues with Disto settings and bluetooth communication once a second instrument was retrieved from camp. A total of 3 trips had to be made back to camp for various reasons, which delayed entering the cave until 12:30. The team quickly went to station B1 and began surveying down the chimney below to reach the stream and followed this out to Cephalopod Malt Shop. The survey went

smoothly and a few side leads were left for another day. The team exited the gate at 21:00 and returned to camp by 21:30. A total of 1,231.3 feet were surveyed in 45 shots using C1-39, C1A-B, C17A-B. A total of 48 work-hours were volunteered.

**August 9, 2020 (Lost Worland River; Cephalopod Malt Shop; Great Hall; Great Exit)**

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Derek, Ben, George and Jake left camp at 9:30 and entered the cave at 10:00. The team traveled to Basecamp and changed into wetsuits and vertical gear before heading down to the Lost Worland River. George took 150 feet of 8mm polyester rope, a rotary hammer, and a bolting kit to add-to or improve any rigging found in the first section of the river. He went as far as the Groucho-Walk Bypass and worked his way back to the survey team. A rope hanging from a side-passage below Gonzo Falls was ascended and the anchor consisted of a piton and nut. A single 3/8 x 3-inch bolt was placed to reinforce this anchor. A 2-bolt anchor consisting of stainless 3/8 x 3-inch bolts, hangers and maillons, and 20-feet of rope was installed at a 10-foot down-climb just past the river and Gonzo Falls bypass re-connection. The two bolt anchor on the upstream side of the rope traverse above Gonzo Falls was replaced with two new stainless steel 3/8 x 3-inch bolts, hangers and maillons. The two traverse ropes looked to be in reasonable condition and were left in place. The two old 1/4-inch button head bolts should be removed on a future trip. The survey team continued the previous day's survey at B79 and started a new "R" designation, which was used to survey all the way to the boulder on the far side of the traverse at Gonzo Falls. The team exited the gate at 21:15 and returned to camp by 22:00. A total of 1,786.8 feet was surveyed in 54 shots using R1-54. A total of 50 work-hours were volunteered.

Shawn, Kelly Mathis, Sonia and Joey left camp at 10:15 and entered the cave at 10:45. They traveled back to the Cephalopod Malt Shop and continued the survey from the previous day at C39. They surveyed west using C40-45 until the passage became too low and wet to continue. They then returned to the junction at C12 and surveyed east using C46-56 until the passage splits in breakdown with water coming in from two directions. The team exited the gate at 17:00 and returned to camp by 17:15. A total of 639.5 feet was surveyed in 21 shots using C40-56, C41A, C54A-C. A total of 28 work-hours were volunteered.

Kevin, Jen and Amy left camp at 10:00 and entered the cave at 10:45. They traveled to the top of the climb that leads up into the Great Hall and went to a large walking side passage at station B6. They discovered their Disto-X wasn't reading correctly and took time to recalibrate. An E survey was started and the passage was followed to E10



*Ben and Jen in the Great Entrance (photo by Hazel Barton)*

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where it ended in breakdown with no going leads. The team exited the gate at 18:20 and returned to camp by 19:00. A total of 226.6 feet was surveyed in 13 shots using E1-10, E5A, E6A, E10A. A total of 27 work-hours were volunteered.



*Sonia and Ben in the Cephalopod Malt Shop (photo by Hazel Barton)*

Hazel, Carl Bern, Aven, Savannah and Carl Froslic left camp at 11:00 and drove to the Great Exit trailhead. They hiked down the sandy 4WD road to a saddle and began route-finding down the hillside to the north towards the Great Exit. Several game trails were encountered, but these generally didn't provide the most efficient way down the canyon. The route was flagged with orange flagging and several areas with dense vegetation were cleared with machetes. The area close to the Great Exit was especially dense and required a good bit of clearing. A steep rock-band about half way down the canyon was descended, but one team member slipped here and took a fall. It was determined that this drop should be rigged with a webbing hand-line. The team hiked back up from the Great Exit and drove back to camp, arriving by 20:00. A total of 45 work-hours were volunteered.

**August 10, 2020 (Lost Worland River; Shredder Maze)**

Derek, Sonia and Carl Bern left camp at 9:45 and entered the cave at 10:30. They traveled to Basecamp where they changed into wetsuits and vertical gear and then proceeded to the Lost

Worland River and downstream to the end of the previous day's survey at R54. The survey was taken through the bypass around Gonzo Falls, back to the river beyond the bypass, and downstream past a few waterfalls. The team reached a round room with a chert or sandstone floor where a rope is hanging from a side passage at station R71. To warm up they suspended the survey and headed

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downstream, going all the way through Whirlpool Way, Groucho-Walk Bypass and to B-52 Falls. Derek removed several old abandoned ropes and maillons from the anchor at B-52 Falls, rigged the 8mm polyester rope that had been brought, descended the falls, and cut the rope to length. The rope was pulled up out of the waterfall, but left rigged for future survey work. The team returned to their last station at R71, but the diversion took so long, and one team member was feeling fatigued, so the team ate, drank, and then started exiting the cave. The trip out took a bit longer than usual due to fatigue. The team exited the gate at 22:45 and returned to camp by 23:15. The team arrived back in camp after their planned out-time, but before a response was triggered. A total of 506.8 feet was surveyed in 17 shots using R55-71. A total of 40.5 work-hours were volunteered.

George, Kevin and Ben left camp at 9:45 and entered the cave at 10:30. They traveled to the Shredder Maze near the east end of the Great Hall. A Disto-X was misbehaving again and they took the time to recalibrate it. They surveyed a lead going north out of the first large breakdown room using D3 as a tie-in. The joint controlled passage was surveyed for a couple of hours until a depleted phone battery used for the digital sketch died. Two of the team members hadn't been to the Cephalopod Malt Shop so they ended the survey and took a photo trip on their way back out of the cave. The team exited the gate at 18:00 and returned to camp by 18:30. A total of 376.0 feet was surveyed in 17 stations using D27-42, D29A-B. A total of 26.25 work-hours were volunteered.



*Jen in the Cephalopod Malt Shop (photo by Hazel Barton)*

Hazel, Amy, Aven and Jake left camp at 10:30 and drove to the Webber Canyon area south of Alkali Road. They used geologic maps to follow the drainage looking for potential cave entrances or other karst features. They did not find much of significance and presumed that they were too high. They drove back to camp arriving at 16:30. A total of 24 work-hours were volunteered.

### **August 11, 2020 (Great Exit and Grim Crawl of Death; Shredder Maze)**

Derek, Hazel, Jake, Ben and Kelly left camp at 10:30 and drove to the Great Exit trailhead. They hiked down the previously flagged trail to the Great Exit and added a significant amount of orange flagging to improve the visibility of the route. A 40-foot 1-inch webbing hand-line was added to the short cliff

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band. Caution still needs to be used here due to loose rocks on the slope. Once reaching the Great Exit (Dumb Luck Entrance) Hazel, Derek and Jake put on wetsuits and began surveying from the entrance. The survey goes into a couple of small rooms and a short crawl before reaching the Grim Crawl of Death where the river diverts into a too-tight crack. The survey was taken another 7 shots upstream to a point where the passage gets quite low and it's nearly impossible to stay out of the stream. There were issues with communication and operation of the Disto-X due to the noise and splashing from the stream. A recoverable station was left at GC22 and the team returned to the surface. Kelly and Ben meanwhile worked on further improving trail flagging and clearing areas of the trail near the bottom of the canyon. The group changed back into dry clothes and hiked out of the canyon and drove back to camp, returning by 19:00. A total of 359.9 feet was surveyed in 21 shots using GC1-22. A total of 42.5 work-hours were volunteered.

Kevin, George and Amy left camp at 10:00 and entered the cave at 11:00. They traveled to the top of the climb-up near the start of the Great Hall and started surveying side leads between B4 and D1. All leads going both north and south off of the main travel route were surveyed and either ended or looped back into known passage. No new leads were generated. The team exited the gate at 18:40 and returned to camp by 19:30. A total of 845.0 feet was surveyed in 41 shots using B4A-B, B8A-O, B11A, D1A-X. A total of 28.5 work-hours were volunteered.

#### **August 12, 2020 (Lost Worland River; Cephalopod Malt Shop/Great Hall)**

Derek, Adam and Kevin left camp at 9:30 and entered the cave at 10:00. Along with Carl Bern's team they all traveled to Basecamp where everyone changed into wetsuits and vertical gear. Carl's team leapfrogged ahead to B-52 Falls where they started their survey. Derek's team proceeded to the previous final survey station at R71 and continued surveying downstream from there. The survey went through a few very short dry overflow or bypass routes, down Whirlpool Way, through Groucho-Walk Bypass and eventually they tied into the other team's station of S1 at the top of B-52 Falls. The survey took less time than expected despite the long distance, but without vertical gear they headed for the entrance. The team exited the gate at 19:30 and returned to camp by 20:00. A total of 2,091.5 feet was surveyed in 45 shots using R72-115. A total of 31.5 work-hours were volunteered.

Carl Bern, Nick and George left camp at 9:30 and entered the cave at 10:00. After reaching the river the team traveled downstream to B-52 Falls and set a new survey designation beginning with station S1 at the top of the falls. They descended the falls and continued surveying down-river past a few joint controlled turns, a few breakdown collapses, and down a few short cascades until reaching a steep 6-foot drop with poor climbing holds. They weren't confident about being able to climb back up this drop without rope so the survey was ended here and the team headed for the entrance. The team exited the gate at 21:00 and returned to camp by 21:30. A total of 913.6 feet was surveyed in 28 shots using S1-29. A total of 36 work-hours were volunteered.

Hazel, Sonia, Ben, Jake, Jen and Kelly left camp at 10:30, but due to a mix-up with keys getting locked inside the gate, it took them time to locate a spare key and they didn't enter the cave until 12:20. The team took some time while sorting out the key issue to take photographs in the entrance and the Crisco Crack. After getting inside the gate they traveled to the Great Hall and Cephalopod Malt Shop where several additional photographs were taken. The team exited the gate at 19:30 and returned to camp by 20:00. A total of 57 work-hours were volunteered.



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### August 13, 2020 (Great Exit and Grim Crawl of Death; Shredder Maze)

Derek, Hazel, Adam and Kasey left camp at 10:30 and drove to the Great Exit trailhead. They began hiking down the canyon, but when they reached the cliff-band that's rigged with a hand-line, a rock was accidentally knocked loose and struck Hazel in the leg. This resulted in a lot of pain and later bruising, and it was decided that it would be best if she returned to the truck parked at the top of the canyon. The rest of the team continued on to the Great Exit and decided to conduct the survey by



*Ben in the Cephalopod Malt Shop (photo by Hazel Barton)*

traveling all the way through the Grim Crawl and survey back out, with hopes of tying into the last station (GC21) within the 4 hours allocated. Kasey was the only one of the team who had been through the Grim Crawl previously, but that was 16 years earlier. The team entered the Dumb Luck Entrance, reached the river, and began following it upstream. Progress was very slow, though no significant wrong turns were taken. It took over two hours to reach the

upstream end of the crawl where the passage increases in height to 15 feet. Derek and Adam explored upstream for about 500 feet to a point where the passage lowers to hands-and-knees crawling again. The team decided that there wasn't enough time remaining to survey so they re-entered the crawl. The trip out was much faster with the current helping and took about 1.5 hours. The team changed back into dry clothes once out of the cave and hiked back up the hill and drove back to camp, arriving by 19:30. No survey was completed, but the team was able to preview the route through the Grim Crawl of Death, which would be extremely useful knowledge for a later planned through-trip. A total of 36 work-hours were volunteered.

George, Ben and Nick left camp at 10:15 and entered the cave at 10:40. They traveled out to the Shredder Maze and returned to the end of the previous survey at station D42. They surveyed a very mazy area with strong airflow that came from an impassible breakdown choke. A number of crawling leads were left and the main passage continued when the survey was ended. The team headed to the entrance and exited the gate at 19:10 and returned to camp by 19:30. A total of 1,322.8 feet was surveyed in 57 shots using D43-100. A total of 27.75 work-hours were volunteered.

### August 14, 2020 (Theta Room)

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Hazel, Amy, Jake and Kasey left camp at 12:30 and entered the cave at 12:50. The team had a number of issues at the entrance, the Velcro Chimney, and in the breakdown areas near the entrance. This resulted in a very slow pace. The late start and slow pace resulted in a decision to cancel survey plans at the Theta Room and the team headed for the entrance. The team exited the gate at 15:00 and returned to camp by 15:30. No survey was conducted. A total of 12 work-hours were volunteered.

**August 15, 2020 (Great Entrance to Great Exit Through-Trip; Great Exit and Grim Crawl of Death)**

Derek, Kevin, George, Adam and Nick left camp at 6:15 and entered the cave at 6:38. The team traveled fast through the entrance chimneys, breakdown areas, Great Hall, Flowstone Gallery, Theta Room, and arrived at Basecamp in only 1:05. They donned wetsuits and headed down the ropes to the river and quickly moved downstream. The team reached B-52 Falls after 3:00 where they took their first real break. They descended the fixed rope and continued downstream to the end of the survey at S29. They found the 6-foot down-climb to be reasonably easy and continued to the start of the Pterodactyl Tunnel bypass. The chimney climb was not immediately obvious and the team backtracked a little before deciding on the way on. The climb up just before the Chinese Wall was found easily and flagging was added to the spot. A wrong turn was taken in breakdown just before the Black Lagoon, but the team backtracked and found the correct route by climbing high. Another break was taken before climbing down to the Black Lagoon. A hand-line was rigged at the 15-foot falls in the Cascades at a drop likely called Lovers Leap, but it turned out to not be necessary. This was de-rigged and the rope taken ahead until reaching Connection Falls. The anchor at Connection Falls is in terrible condition and badly in need of replacement, but the team did not have a bolting kit, so a natural backup anchor was used. At the bottom of the falls the rope was cut to length, and about 60 feet was left in place. The team continued downstream and into Black Rock Corridor. At the next long dry bypass the team stopped for another break where there is a breakdown collapse. It took the team a little while to identify the tight squeeze through the breakdown, which is marked with orange flagging, which is the way on. After returning to the river there were a series of waterfalls and potholes before the passage levels out and faster progress was made. After a long non-technical section of river the passage changes character and becomes joint



*Camping under a dark Wyoming sky (photo by Hazel Barton)*

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controlled and mazy. A short section of lower passage with a bit of hands-and-knees crawling led to a waterfall that was the upstream end of the reconnaissance taken by Adam and Derek just two days prior. Another break was taken at the start of the Grim Crawl of Death. Derek led the way through the crawl and the team passed Hazel and Rene surveying just before exiting the river and reaching the Dumb Luck Entrance. The team exited the Great Exit at 15:38 after exactly 9 hours in the cave. After eating and changing into dry clothes everyone hiked back up the canyon to the vehicles and drove back to camp. No survey and no work was conducted by the through-trip team. This is believed to be the first through-trip since 2014 and only the second since 2009.

Hazel, Rene, Jen, Jake and Kasey left camp at 11:30 and drove to the Great Exit trailhead. They hiked to the bottom of the canyon where Hazel and Rene put on wetsuits and headed into the Dumb Luck Entrance. They entered the stream at the Grim Crawl and returned to the previous last station at GC22 and continued the survey upstream. Within a short time the team doing the through-trip came through so the survey was ended. A red-coated wire was wrapped around a chert pendant that is the tie-in station for a future survey at station GC27. The team exited the cave at 16:00, hiked back up the canyon, drove back to camp and arrived by 19:30. A total of 67.5 feet was surveyed in 5 shots using GC23-27. A total of 40 work-hours were volunteered.

## Management

- Orange flagging tape was added to key junction areas throughout the main travel route to improve navigation for those who are uninitiated. A few pieces of pink flagging existed along this same route, but these were removed to avoid confusion. Some orange flagging was also added along the Lost Worland River to more clearly identify tricky navigation areas such as the bypasses at Pterodactyl Tunnel and the Chinese Wall to Black Lagoon bypass.
- Some old rope and webbing was removed from anchors such as at B-52 Falls, but there is a need for more cleanup efforts on future trips. There is an old stove, pair of coveralls and plastic tarp at



*Nick surveying in Lost Worland River (photo by Carl Bern)*

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Basecamp, an inner tube and pump at the final rope down to Lost Worland River, and additional excess rope and webbing along the river. All of this should be removed from the cave.

- Despite descriptions to the contrary, there's really not a defined trail between the 4WD parking area and the Great Exit. Carl Froslic and Savannah Sawyer have done numerous work trips to help clear downed trees both from the 4WD access road and the path down the canyon. Several days of additional work was done with hand saws and machetes to clear brush and tree limbs from the path. The route down the canyon between the saddle below the parking area and Great Exit was marked with orange flagging tape. This is reasonably easy to follow in daylight, but will be a challenge if coming out of the cave at night. There are plans to add reflective markers on the downhill side of the path during a future trip.

## Rigging

- A 1-inch white tubular webbing hand-line was installed across the gap between large breakdown blocks just inside the entrance. A single 3/8 x 3 inch Powers SS wedge bolt, Fixe hanger and 8 mm SS maillon was installed on each side of the traverse. This improves the security and safety of crossing the 4 logs that are lying across this span. The span was measured at about 8 feet and a 10-foot aluminum ladder could be installed in the future to act as a bridge.
- A 2-bolt anchor was installed high on the wall just inside the Crisco Crack gate, above the register. These two 3/8 x 3.75 inch Fixe double-wedge bolts were equipped with Fixe hangers and provide a clean hang for a rope rigged down the first two chimneys below the Crisco Crack. A 90-foot rope is about right for rigging this 80-foot drop. The bolt anchor reduces rub spots and protects the rope from rodents while in the cave.
- The upstream side of the Gonzo Falls rope traverse was rigged with a pair of 1/4 inch steel button-head bolts, and two ropes were rigged across the span to a large breakdown block on the far side of the traverse. Two new 3/8 x 3 inch Powers SS bolts, Fixe hangers and 8 mm SS maillons were installed to replace the 1/4 inch bolts, though those bolts remain in place for now. Removing them will probably require a tuning fork tool. Both ropes looked like they were in decent condition so they were both left in place,



*George at B-52 Falls (photo by Carl Bern)*

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but the older white rope has some wear near the upstream anchor and will probably be removed on a future trip. Having a redundant traverse line isn't really necessary and makes it harder to clip and unclip.

- A steep 10 foot down climb next to a waterfall just below the place where the Gonzo Falls bypass reconnects with the stream was rigged with a 20-foot piece of 8 mm Imlay canyon polyester rope. A two-bolt anchor was installed here using 3/8 x 3 inch Powers SS bolts, Fixe hangers and 8 mm SS maillons. This anchor and rope is definitely not critical, but is helpful. It may be replaced with a chain anchor and rappel ring in the future so that it can be used for a pull-down so that rope is not left behind. Rope left rigged here is in the water and will get destroyed during a flood.
- There were at least 5 bolts, numerous plated steel maillons, and a nest of old rope rigged at the top of B-52 Falls. Four of these ropes had been used by previous parties and left behind in case retreat was necessary, and all had been cut by flood waters about 4 feet below the anchor. All of the old maillons and rope were removed and taken out of the cave. There are two bolts that appear to be stainless steel, but they are relatively close together and the surface rock where they are placed is flowstone. A 30-foot 8 mm Imlay Canyon polyester rope was rigged to these two SS bolts using 8 mm SS maillons. The rope was left in place during the through-trip on August 15. A return trip is planned and this anchor may be replaced with a chain and rappel ring to make it easier to rig and easier to do a pull-down if desired.
- There is a rope hanging from an upper level side passage above station R71. This was climbed and the anchor is a piton and nut. A single 3/8 x 3 inch Powers SS wedge bolt was added to improve the strength and redundancy of the anchor. A second bolt should be added and the piton and nut removed once this side passage is explored and surveyed.
- The 15-20 foot waterfall in the Cascade series of drops (likely called Lover's Leap) was temporarily rigged to a natural anchor, but the rope is not in a useful location to help with this



*George and Nick in Lost Worland River (photo by Carl Bern)*

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exposed down-climb. It is suggested that a 2-bolt anchor with chains and rappel ring be installed on the left wall above this waterfall so that it can be rigged for a safe rappel and pull-down.

- There is a single bolt that is 10-feet back from the edge of Connection Falls that is heavily corroded and pulling out of the rock. The main anchor is also corroded and fails to inspire confidence. This hardware was reused during this year's through-trip, but needs to be replaced on the next trip. The plan is to install a 2-bolt anchor 10 feet from the edge and a 2-bolt anchor with chains and rappel ring for the main anchor. A 60-foot Imlay Canyon polyester rope was rigged to this old anchor and left in place. It hangs directly in the waterfall and won't last long. There are several other old rope remnants here that should be cut free and carried out of the cave on a future trip.
- A steep and loose cliff-band on the exit trail was rigged with 40 feet of 1-inch white tubular webbing.

## Safety

- A chert ledge collapsed on one caver during the through-trip resulting in bruising of his hip. This was not serious, but could have been worse. It's a good reminder to be cautious of the brittle chert ledges and nodules that are often used for hand and foot holds throughout the cave.
- A team member slipped and slid a little ways down a slope with a short cliff on the trail down to the Great Exit. They were able to grab a tree and arrest their fall, though this resulted in a number of scratches. On the next visit a hand-line was installed at this spot, but it remains loose and slippery.
- At the same spot on another day a rock was dislodged by the hand-line and this struck a caver in the calf, causing a fairly serious bruise. It's good to allow spacing on the steeper parts of the exit trail, and worth considering wearing helmets. There are many loose rocks and the slope is steep enough that they only accelerate once kicked free.



*Aven in the entrance chimney (photo by Carl Bern)*

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- There is a significant amount of loose rock on the climb-up to the Great Hall near station B4. Teams have always climbed this one at a time, which is a good practice to continue. During the week several very large rocks were knocked free here. It is now slightly more stable as a result, but caution is still advised.
  - Several team members suffered exhaustion following survey trips to Lost Worland River. The trip out there and back is long and physically taxing. It's also common, given the cold of the river and the difficulties of dealing with the noise and current, to neglect drinking or eating. This contributes to exhaustion and dehydration, and can exacerbate hypothermia. Eating and drinking on a regular basis needs to be encouraged and reminded more often in the future.

## Maps

The cartography was updated with all of the 2018-2019 survey (about 3,600 feet). At 1:600 scale (1" = 50') the map layout was 60 inches wide by 24 inches high. Following the August expedition at the same scale the map is now 170 inches wide by 36 inches high. It's apparent that the scale will need to be reduced to 1:1200 or smaller in the future to allow the cave to fit on a printable page.

## Conclusion

The expedition was very successful in making progress on resurveying the main route between the two entrances. It is estimated that this is now about 50% complete. It also appears that with the survey of the Cephalopod Malt Shop and Shredder Maze areas, more of these areas have been surveyed than was done by the original effort. A resurvey of the Nervous Breakdown and Soda Straw Hall areas and completion of the rest of the Lost Worland River should complete the resurvey and create a foundation for expanding the exploration and survey beyond what was done in the 1970s and 80s. Another 4-day expedition is planned for late September and it is hoped that another 200 survey shots can be completed in the river (out of roughly 350 that remains to be done).

Thanks to all the team members who traveled by car from as far away as California and New Jersey during a pandemic to participate in the expedition. The survey total of more than 12,000 feet and nearly 700 volunteer hours is astounding. The additional work on rigging, flagging, trail clearing, ridge-walking and photography just adds to the incredible productivity for the week. Everyone left relatively uninjured, and it appears (now that we are three weeks past the expedition) that the Covid mitigation strategy developed by Hazel was also successful in keeping everyone healthy. Special thanks to Bob and Savannah for managing the cave and helping make sure we had keys and completed all the necessary paperwork.

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Figure 1. Map of Great-X (July, 2020)

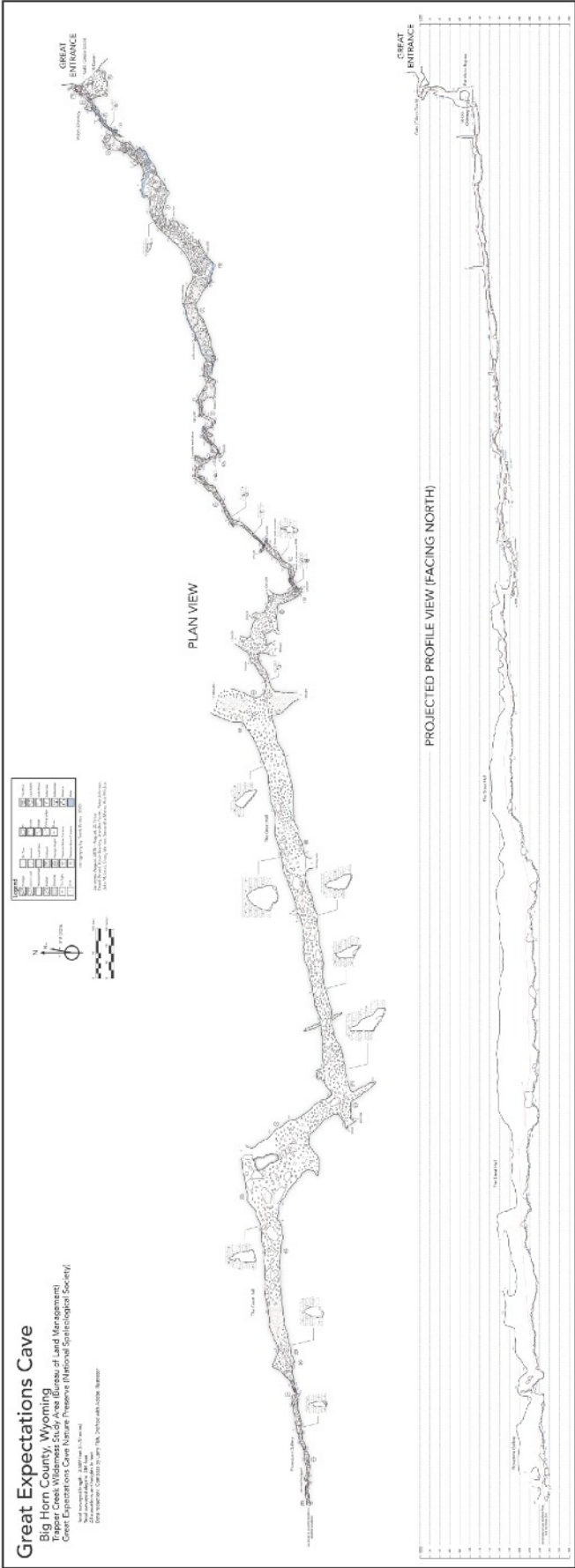




Figure 2. Chart of survey by team member (in feet)

	Aug 8 (Sat)	Aug 9 (Sun)	Aug 10 (Mon)	Aug 11 (Tues)	Aug 12 (Weds)	Aug 13 (Thurs)	Aug 14 (Fri)	Aug 15 (Sat)	TOTAL
<i>Derek Bristol</i>	923.8	1786.8	506.8	359.9	2091.5	0			5668.8
<i>Hazel Barton</i>	922.2	0	0	359.9	0	0	0	67.5	1349.6
<i>Nick Anderson</i>					913.6	1322.8			2236.4
<i>Adam Weaver</i>					2091.5	0			2091.5
<i>Kevin Manley</i>	1231.3	226.6	376	825	2091.5				4750.4
<i>Jen Foote</i>	1231.3	226.6			0			0	1457.9
<i>Jake McLeod</i>	923.8	1786.8	0	359.9	0		0	0	3070.5
<i>George Breley</i>	922.2	1786.8	376	825	913.6	1322.8			6146.4
<i>Ben Smith</i>		1786.8	376	0	0	1322.8			3485.6
<i>Kelly Mathis</i>	923.8	639.5		0	0				1563.3
<i>Rene Ohms</i>								67.5	67.5
<i>Shawn Thomas</i>	1231.3	639.5							1870.8
<i>Carl Bern</i>	1231.3	0	506.8		913.6				2651.7
<i>Amy Bern</i>		226.6	0	825			0		1051.6
<i>Aven Bern</i>		0	0						0
<i>Sonia Meyer</i>		639.5	506.8		0				1146.3
<i>Joey Meyer</i>		639.5							639.5
<i>Savannah Sawyer</i>	922.2	0							922.2
<i>Carl Froslic</i>	922.2	0							922.2
<i>Ellen Whittle</i>	923.8	0							923.8
<i>Kasey Cory</i>						0	0	0	0
<b>TOTAL</b>	<b>3077.3</b>	<b>2652.9</b>	<b>882.8</b>	<b>1184.9</b>	<b>3005.1</b>	<b>1322.8</b>	<b>0</b>	<b>67.5</b>	<b>12193.3</b>

Figure 3. Chart of volunteer time by team member (in hours)

	Aug 8 (Sat)	Aug 9 (Sun)	Aug 10 (Mon)	Aug 11 (Tues)	Aug 12 (Weds)	Aug 13 (Thurs)	Aug 14 (Fri)	Aug 15 (Sat)	TOTAL
<i>Derek Bristol</i>	11	12.5	13.5	8.5	10.5	9			65
<i>Hazel Barton</i>	11	9	6	8.5	9.5	9	3	8	64
<i>Nick Anderson</i>					12	9.25			21.25
<i>Adam Weaver</i>					10.5	9			19.5
<i>Kevin Manley</i>	12	9	8.75	9.5	10.5				49.75
<i>Jen Foote</i>	12	9			9.5			8	38.5
<i>Jake McLeod</i>	11	12.5	6	8.5	9.5		3	8	58.5
<i>George Breley</i>	11	12.5	8.75	9.5	12	9.25			63
<i>Ben Smith</i>		12.5	8.75	8.5	9.5	9.25			48.5
<i>Kelly Mathis</i>	11	7		8.5	9.5				36
<i>Rene Ohms</i>								8	8
<i>Shawn Thomas</i>	12	7							19
<i>Carl Bern</i>	12	9	13.5		12				46.5
<i>Amy Bern</i>		9	6	9.5			3		27.5
<i>Aven Bern</i>		9	6						15
<i>Sonia Meyer</i>		7	13.5		9.5				30
<i>Joey Meyer</i>		7							7
<i>Savannah Sawyer</i>	11	9							20
<i>Carl Froslic</i>	11	9							20
<i>Ellen Whittle</i>	11	9							20
<i>Kasey Cory</i>						9	3	8	20
<b>TOTAL</b>	<b>136</b>	<b>159</b>	<b>90.75</b>	<b>71</b>	<b>124.5</b>	<b>63.75</b>	<b>12</b>	<b>40</b>	<b>697</b>