

SUSS BULL 52(3)

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2013



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Cover Photo: Megan Pryke in Horseshoe Aven, Mammoth Cave, Jenolan.
Photo by Alan Pryke

In this Bull

The long awaited second installment of the Mammoth maps are in this bull. In this installment is the Railway Tunnel area. Many thanks to Phil Maynard for his time and effort in leading this work.

In the News

Needles Dam

Historically this dam was proposed in the 1960s or 1970s and rejected after some battles which OSS played a part in. This dam will flood some of Cliefden Caves. The dam site is a few km downstream from Cliefden Caves. There are some technical issues with the engineering geology which helped stop the dam 40 years ago. The proposal is probably being pushed by Central Tablelands water.

<http://www.abc.net.au/news/2014-01-21/needle-dam-john-cobb/5211156>

<http://www.westernadvocate.com.au/story/2037385/dams-proof-will-be-in-the-digging/?cs=117>

<http://www.centralwesterndaily.com.au/story/2037355/job-losses-john-cobb-gives-a-dam/?cs=103>

Project Progress

Cooleman

Evs Cave now connected to Keiths Faint Hole.

Considerable advance has been made by Phil and Keir in both downstream River Cave and upstream Murray Cave. When survey data is calculated they will be close.

Jenolan

A diveable cave has been discovered 1km south of the end of Barralong. This cave has been named Enigma (J340). The entrance is 10m above the dry Camp Creek riverbed, with the start of the dive a couple of metres below the entrance and some metres above Camp Creek level. Explain that if you can? More details will be printed in the next Bull.

- tagging

As the surface surveying of the southern karst is progressing SUSS is providing names for some of the unnamed, but tagged caves.

To this end J150, a large overhang, is proposed to be called Sleet cave, as we sheltered under it when it sleeted in early December 2013.

J346 has been tagged and is called Spike cave after a large spike found nearby, which looks to be late 1890's vintage.

J271 has been notionally called "Crystal Skull" after a formation that looks remarkable like a human skull, which was found just near the cave entrance.

- dive survey

There are currently drought conditions across much of NSW. The water table is low, allowing divers to get into areas that until now had too much water pressure. Deborah has been documenting the details which can be found in this Bull.

Wombeyan

The Quarry mapping work that Mike Lake has been keen to progress took a major leap forward when the CSIRO "Zebedee" team, led by Robert Zlot, provided assistance. Their use of the 3D laser mapping equipment was gratefully appreciated and our thanks go to Robert and his team. An article on this will appear in the next Bull.

Helpful Hint number 86

When you go on a canyon trip or a bushwalk in the mountains it is a good idea to carry a Personal Locator Beacon (PLB) device in case you get into trouble and need to call assistance.

If you are a poor student there is a way to get hold of one for that trip to the blue mountains. The police or NPWS in the blue mountains make them available for a nominal fee (or maybe no charge if you ask nicely).

Try one of these contacts:

Katoomba Police Station. 217 Katoomba St, Katoomba

Springwood Police Station. 4 Jerseywold Ave, Springwood

Blackheath NPWS Govetts. Leap Road, Blackheath

<http://www.abc.net.au/news/2014-01-17/epirb-loans/5205212>

BY DEBORAH JOHNSTON

Participants: Rod Obrien, Deborah Johnston, Kelly Vaughan-Taylor, John Bowden, Phil Maynard, Anjali Sawh, Rowena Larkins

On Saturday, Rod and I had big plans of being out the door of the cavers hut and into our dive well before lunch; but with some new cavers to gear up, tanks to top up, and multiple cups of tea beckoning it just wasn't meant to be. We finally got ourselves more or less organized, then set about getting some people to help us with gear. . . but it was too late! While we puffed they had all gotten ready to head off on their own various adventures on the northern and southern limestone. It was going to be just the two of us.

We grabbed a tourist cave key, loaded ourselves up with three bags of gear each, and plodded down the stairs of the tourist cave, cursing the wicked 'just too low' hunched-over stoop sections on the way. We passed the gear from the tourist path down the ladder to the dry gravel bed between upstream and downstream Lethe, geared up, and took the plunge.

Rod got in the water first (at 11:40, not bad!) and went ahead to check multiple side leads he had marked on his survey but not yet fully explored. They were all fairly tight and horrible, with most of them petering out or looping back into one another.

I entered the water 25 minutes later which was just enough time to catch up to him as he sketched the last side passage on his map. We swam ahead to continue our survey of the main passage, first locating the broken end of the survey tape which had inexplicably snapped on the previous trip (bastard!). Over the next three long, cold hours we made great progress and completed this survey. Despite being in a 7mm wetsuit with hood and gloves, I was absolutely frozen solid and couldn't wait to get out. Rod was also freezing having been in the water an extra half-hour but luckily with a two piece wetsuit for extra protection. I zoomed ahead rushing to get out, but in my rush I launched up into the restriction without lining myself up properly, and wedged myself in the tightest part seemingly unable to move up, down, or sideways. I tried reaching around under the tanks to dislodge them from whatever little nodule of rock was holding me in place, but my arms weren't long enough. I tried a few other elegant movements with no success, then realized the best approach was the old SUSS 'thrash and dangle' technique (or as the poet Red-Foo would say, wiggle, wiggle, wiggle, wiggle, wiggle, wiggle). By then Rod had caught up and had to wait with equal parts frustration and amusement until I wiggled myself free and got out of the way.



Anjali in the mud tunnel area.

If we were sensible we would have left the gear there to sort out the next day with people to assist, but the cold had numbed the smart parts of our brain and with just macho-ness left we grabbed all the packs again and made our way back out huffing and puffing up the stairs feeling super tough, only stopping to have a tour group make fun of us for being out of breath.

Back at the hut I was so stuffed I went to bed at 4pm to nap for a couple of hours. When the other divers returned from their trip, we plugged the new survey data into Phil's computer to make a stick map of the dive, then overlaid that on the dry cave map showing the passage above. The purpose of this was to locate the top of the dry climb which has been verified to reach dry cave passage by Alex Boulton who we'd shoved up there on our previous trip. This location was still in mud tunnels and close to the tourist track, and the target of the next days exploration. Rod and I were both a lot more stuffed than normal and crashed out by around 7pm.

On Sunday; me, Rod, Phil, Rowena, Kelly, John and Anjali went back to the mud tunnels, where we climbed down the pit near the stairs to Orient, and explored the dry cave in this area looking for leads that went to water. We spread this search out over a wide area as dive surveys accumulate much more error than dry surveys due to the increased difficulty taking and recoding the measurements. In the very spot we had the aven marked, Rowena found a very tight side passage that I was only just able to wiggle up. This ended with a small dogleg passage and formation choke that matched the description given by Alex who had climbed up the other side. I threw a rock over the choke and verified the connection by hearing the rock fall down the aven then splash into the pool below. Ho ho! If you could strut while caving then that is what Rod and I did for the rest of the day, extremely pleased with closing this loop and how incredibly accurate Rod's mapping had been.

The group then spent several hours systematically exploring all other possibly side leads in the area looking for those which may possibly re-enter the dive passage. Three possible leads were identified, and one was determined to have water in the bottom. We also found a tight vertical hole leading to a promising looking tube that the new guys thought was impossible until we threw a tape down and deployed Phil. The way down was, as always, easier than the return back up through the vertical squeeze and after a couple of minutes watching him dangling, we deployed The Rod to pull him back out by the arms. We marked all the promising leads on the map to be revisited on future trips when we have the time to explore them properly, and after using our spare water to clean some formations, we headed back out via Orient cave which is always breathtaking.



Deb, after finding the tie-in to the river.

JENOLAN DEC WEEKLONG, 2013

BY DEBORAH JOHNSTON

(with non diving trips summarised by the editor)

Saturday November 30th

Diving Upstream and Downstream Lower River, Mammoth Cave

Participants: Rod Obrien (diving), Rick Grundy, Al Warild, Steven Kennedy, and Deborah Johnston

Rod, Rick and I head to Mammoth at 11am (spotting three feral pigs at Mammoth Flat on the way) and did a fast trip down to lower river to see if the water levels were low enough to attempt the dives Rod had planned for the weekend. We found the water levels to be very low, so exited the cave to get the dive gear and bring it back in, running into Steve and Al who had come to give us a much appreciated hand with the gear.



Rod Obrien starting dive, Upstream Lower River, Mammoth.

Photo by Deborah Johnston

With a group of five we got the gear from the entrance gate to the river in just half an hour without cracking a sweat, except for Rick who was wearing a new plastic cave suit that would have had him roasting in Antarctica.

Rod geared up and hit his first target for the day – downstream lower river. We knew that a few people had given this dive a cursory look over the years, but that no-one had made any real progress. With the regular heavy water flow in the river this would have been a one-way trip anyway as the passage is so small that it is most likely impossible to claw your way upstream against it. Luckily the water levels were only around a third. Rod came prepared with some extra thick heavy-duty dive-line on a large reel, and spent half an hour locating the very small hole at the bottom of a slope that appeared to be taking all the water and trying to make it large enough to fit in. After a bit of work he was able to get his legs through the hole up to his waist with both tanks detached and held ahead of him. He felt around with his feet and could tell that the rest of the tube was just as tight, for at least that metre. He

abandoned the trip for the day, planning to instead return with a thinner wetsuit and 3l cylinders.

During the dive he noticed several brown bugs that looked a bit like crickets living in the water at around 2m depth, crawling on the walls. I think this is the first sighting of bugs living underwater in the caves so could turn out to be a significant find. Rod came out of the downstream dive with plenty of air left so began to dive upstream.

There had been two floods since this was last dived, which sent the river through with enough force to slice off the 8mm climbing rope they had put through one squeeze to help the divers pull themselves upstream against the force of the flow. Luckily, with the flow so low, Rod was able to brace himself on the side walls to dig out the river gravel, then push himself through with his feet on the roof and pushing tanks ahead of him. Once through, he pulled out the broken diveline, relay line, and began surveying. He got six legs of survey done before reaching a section of passage with a vertical shaft. Looking down the shaft he noticed that the line looked a bit loose. He went down a short distance and gave the line a little tug which brought a spiderweb of line downstream to tangle all around him. He tidied up the mess and shoved the line in his pocket before checking his air to see that it was time to head back out for the day. We exited with enough time to get ready for ever rowdy SUSS XMAS BBQ party at the fireshed, with cavers and guides celebrating the 65th year of SUSS!

Summary of other trips - Ed

During the day, several people headed down south to do some surveying and assess the likelihood of the newly tagged caves doing something interesting. While surveying down Camp Creek a swallet was tagged, J347. Due to the pile of chicken wire sitting next to it the name "Chicken Wire cave" was bestowed.

A group went off to Hennings to progress the re-survey; and another group headed to Frenchmans for a tourist trip.

Sunday December 1st

Diving Upstream Lower River, Mammoth Cave

Participants: Rod Obrien (diving), and Deborah Johnston

Rod and I surprised everyone by rising at 8am without hangovers and keen for another day lugging tanks in and out of the caves. We went back down to lower river where Rod continued his survey of the cave, completing around another third of the map in a 90 minute dive. There was a group of dry cavers heading to Ice Pick Lake in Mammoth before Lower River, so we concocted an elegant plan where one or two of these cavers would assist us bringing the bags out at the end of the day. Unfortunately, by the time the group got to Ice Pick and back they were too tired to continue and went back to the hut! Rod and I reminded ourselves that people pay lots of money to attend boot-camps as we pulled all the gear out between the two of us, getting the bags out of the cave in a respectable but sweaty 75minutes. On the way out I photographed a mean looking spider that was later identified as a male funnelweb. The afternoon sun was shooting dramatic shafts of light down into the large entrance chamber which Rod posed in for me. At the gate we saw no sign that the other group had exited so we decided to err of the side of caution and leave the cave unlocked, which was lucky for the others who were about half an hour behind us straggling out of the caves.



***Funnelweb, Mammoth, Jenolan.
Photo by Deborah Johnston***

Diving Upstream Lethe, Southern Tourist Caves

Participants: Rick Grundy and Al Warild (diving), Ian Lewis and Stephen Kennedy

This morning we pointed out to Rick that he was on the 'living legends' trip with Al Warild diving with him, and Ian Lewis helping them to sherpa gear to the mud tunnels! Al, Rick, Steve and Ian went to the sump for Upstream Lethe via the Baal steps at around 11am. Rick and Al dived upstream with the purpose of looking for leads that Rod and I may have missed, and seeing if they could find an alternative way through the current end of the dive. No new leads presented themselves unfortunately but this was still an enjoyable dive for the guys as the water visibility was great after being cleared by the multiple recent survey dives. The group exited via Orient Cave at around 1pm and made their way back to the hut for a late lunch.

Diving Pool of Cerberus, Southern Tourist Caves

Participants: Keir Vaughan-Taylor and Phil Maynard (diving), William Slee, Isy Nguyen and Ian Cooper

The group entered the cave with the Upstream Lethe group (Rick, Al, Ian and Steve), then continued on to Pool of Cerberus. Keir and Phil dived in Pool of Cerberus and explored underwater sections through large but stable rockpile before surveyed some side legs. Phil Maynard and Ian Cooper also surveyed dry passage and rockpile in the area which they tied into the dive survey.



Black Snake, Jenolan.

Southern Jenolan Survey - Ed

This was the day that Split Rock was surveyed in the morning, and after lunch a crawl through the Doline above Bottomless, J295, was surveyed. Interestingly the crawl had a nice formation at the start with the eastern termination being a nice flowstone wall.

On the way back to the hut, down the north side of the hill, on the west side of the breach, a Red Belly was spied. A quick pause to grab the camera and a couple of decent photos of this snake was taken. Red Bellies are venomous, but prefer to flee rather than fight. No sooner had the photos been taken, than it fled!

Monday December 2nd

Diving Upstream Lower River, Mammoth Cave

Participants: Al Warild (diving), Tom Begic and Deborah Johnston

Rod Obrien had to remove his gear the day before and go down to Sydney for work. Al Warild volunteered to continue Rod's dive in upstream lower river and replace the broken line so that it was ready for Rod to continue surveying the next weekend when he got back to Jenolan. Tom and I helped Al with his gear and with the three of us we arrived at the river in around 30 minutes. Al geared up with minimal gear, forgoing a helmet and attaching a torch to his wrist instead. He struggled through the first restriction and realised that the wrist torch would make fixing the line a chore, but also that the little bumps on the roof were constantly pulling his hood off in the freezing cold water! He returned to borrow a helmet mounted scurion dive light instead and set back off into the dive. Al returned from his 35 minute dive shivering from the cold (14° water which cools the body even more rapidly by the constant flow past the body). He triumphantly presented the empty reel and I expressed surprise that he had to replace so much extra broken line. The news was even better as he had used about 10m to repair broken line, with the other 20-35m being laid into new passage! This was an amazing achievement as the total length of the previously laid line was only around 50m. Al described the passage as an initial squeeze which he was able to negotiate with effort by pushing one tank ahead of him and the other on his side (only just fitting his slender, streamlined frame through while wearing a thin wetsuit meaning most divers would need both tanks removed). The dive then becomes very, very small passage with walls covered in tiny little hooklike protrusions that grab onto everything you have as you pass, including hoses, wetsuits, mask straps, and lights.



Rod Obrien resting, while exiting Mammoth, Jenolan.

Photo by Deborah Johnston

He had sensibly chosen not to wear fins, which allowed him to more easily push his way up the passage against the current by moving his feet along the walls for purchase. The passage then turned into a very tall but narrow rift, with one larger (but still tight) section the diver is able to slowly wiggle along with effort. Al moved through this section by standing up horizontal, pressing a belly against one wall, and shuffling upstream along the rift with a tank by either side. There is then a couple of short vertical drops before a length of more passage. The new section he found has currently ended in a tight vertical shaft which descends at least 12m straight down. Al had noticed he was at around 30m and had planned to return given his air supply (which is consumed faster the deeper you are) and had spotted a good tie off at the bottom of the shaft only a couple of metres away. He was almost there when his arms was jerked upwards.

He had reached the end of the line on the reel so instead tied a small weight to the end. He contemplated leaving the line to drop the extra meter or so to the very bottom of the shaft to peek ahead into the unknown, but wisely stayed on the guideline and exited the cave. Exiting is made easier by the current moving in the same direction, but is still fairly slow and awkward as the diver needs to twist and contort through various tight and unusually shaped sections of passage. Probably a much newer direction of the river.

Al's dive computer read a maximum depth of 32.5m which raises many questions about where this passage is going, and adding to the logistics of future dives. We hope it starts to go back up again, preferably into dry cave, although it could be going far deeper down this series of vertical drops. We wonder what is happening in the rocks above and/or below to force the water down to these depths instead of continuing at a fairly straight gradient. The very small size of the passage relative to the high flow and mostly downstream passage, indicated that this is. We imagine that the water flowed through bigger passage in the past which was then blocked for whatever reason, forcing it to take this alternative current route. When Al finished his dive he was so cold that his numb fingers and toes, and violent shivering, made it hard for him to shed the dive gear and get back into his caving gear for the way out. With just the three of us he still had to do more than his fair share of gear lugging on the way back out which helped warm him a little, but nothing compared to Tom and I who were puffing and sweating our way through the various crawls, climbs and passes. We made good time and reached the entrance in around 45-50minutes (a guess as we didn't have a watch), where I detoured to try and relocate the funnelweb from yesterday to squash him. Lucky for him he was hidden elsewhere so did not meet the bottom of my shiny white gumboot. A large white worm had been spotted on the mud banks near the river on the way in, but no other cave life was seen during the trip.

Diving Pool of Cerberus, Southern Tourist Caves

Participants: Keir Vaughan-Taylor and Phil Maynard (diving)

Phil and Keir went back to the tourist caves to investigate some additional side sections and continue their survey. In one side passage they found piles of rubbish which had been left over from some path building in the past, with some that had worked its way down in the water upstream of Pool of Cerberus as well. After their dive they spoke to Dan Cove the cave manager and suggested some clean-up trips, an idea which was enthusiastically supported. That evening as it was starting to get dark; Phil and Keir went back to that polluted section with Tom Begic with empty packs lined with garbage bags to begin shovelling and hauling rubbish to bring out. Luckily there was a guided tour on at 8:30pm so they didn't have to do any special arrangements to delay the alarming of the caves, so long as they were out by 10pm.

Paradox survey - Ed

Today we started the Paradox survey. Rowena took a waterproof portable smart camera (Raspberry Pi) to sit outside the cave and monitor any wildlife passing in and out. An iPad was taken to setup the Raspberry Pi. Survey through the first few chambers encountered no flying wildlife. Bats were encountered in the large chamber about half way through the cave. Signatures of several early visitors, including J. Wilson, were noted before leaving.

Tuesday December 3rd

Diving Pool of Cerberus, Southern Tourist Caves

Participants: Keir Vaughan-Taylor and Phil Maynard (diving), Tom Begic and Thomas Wilson

Keir and Phil went to River Styx where Keir had intended to measure some depths with a plum line. In Keir's words; "I intended to put a sinker down a rift at what we thought was the 20m lowest point but I never found the rift. Instead I encountered a squeeze through into horizontal passage with alcoves, each alcove separated by sheet of limestone with holes. Each hole easily big enough to pass through to more passage. This descended mostly to



***Santa hat selfie.
Photo by Deborah Johnston***

passage 2-3m wide but with a silty floor, easily disturbed. The descending 20m passage was down at about 25m-30m depth. (I'm unsure because my depth gauge needs replacement.) The passage just ends as a snub wall. There is perhaps more there but after a few seconds all splendor is lost in silt out."

Thomas Wilson did a climb into a high lead near Pool of Cerberus to assist Phil with surveying these dry sections which had not been included in the main tourist cave survey due to the difficulty of access.

Surface Exploration above Mammoth Cave

Participants: Deborah Johnston and Al Warild

The night before, Al and I had planned a return trip to Lower River. On the Tuesday morning it was decided to wait a few days instead to nurse various niggling injuries and to sort out some more appropriate gear for the specific demands of the dive. Instead, we delayed Phil from his own trip and obtained details of various chambers within Mammoth relative to surface features above. We then located these surface features and began searching the hillside around each one for any possible alternative entrances to Mammoth cave, with the dream goal being a way to enter the dry chamber located above Gargle Chamber, off Slug Lake. Various remnant cave passages (both tagged and untagged) were located but no Mammoth entrance prospects were found. I don't know if it was the "super punchy" nettles, sunburn, aching muscles from the three previous days of tank hauling, blazing sun scorching us on the way back up the hill the hut, or the annoyance of me saying "it's hot!" over and over again; but we both agreed we were uninspired to return to that area anytime in the near future. This was a disappointing end to the trip so far as we had to drive back to Sydney for work.

Southern Jenolan Survey - Ed

The surface survey of Lucas Rock survey commenced today, starting from J273 (as yet unnamed), proceeding to J272, now named "Crystal Skull cave" after a ball shaped crystal with formation looking like eye sockets and nose, found near the entrance, and now located on the top of the entrance chamber. A micro-bod is needed to get through the small continuation of this cave sometime. The survey continued on up the hill to Winch cave (J290) and then terminated on a relocatable rock, soon to be tagged, in the saddle.

Later that afternoon a brisk walk to Paradox to collect the Raspberry Pi was undertaken. Sadly, due to a programming oversight, the camera program stopped taking photos just after we had walked off.

Wednesday December 4th - Ed

The small mid week group split into two parties: the fit and the infirm.

The fit group progressed the cleanup of the rubble from Jubilee under the direction of Sasa Kennedy.

The others (those recovering from hospitalisation or injuries) took the opportunity to complete the survey of Midden cave, and take some photos of the bones it contains.



Alex Boulton diving, Bluetongue.

Photo by Felix Ossig-Bonanno

Thursday December 5th - Ed

Ian and Rowena headed up to Lucas Rocks to run the survey from the newly tagged saddle location, down the east side of the Lucas Rocks outcrop. In doing this we tagged the scrot hole J348 and surveyed this 2m residual cave, from the long gone upper level of the tourist caves. While doing this a 19th century spike was spied wedged into a boulder. This was retrieved and the cave appropriately named "Spike Cave". The survey continued on to Knitting Needle cave, named by Ron Neubold in the 1960's.

Back to the saddle we continued on the west side. Dark clouds gathered, the sky darkened and a cool change blew in. 'Cool', or should I say, 'Cold'. Icy Cold! On the 4th day of Summer we were being sleeted on. A quick dash was made to shelter under an overhang, tagged J150. This led to this hitherto unnamed cave remnant being named "Sleet Cave". After half an hour the weather moved on and we left the protection to continue the survey, only to be sleeted on again shortly after. It was back to the hut. Later we heard that snowfalls had occurred on the top of the range out towards Kangangra Walls.

Friday December 6th

Diving Upstream Lower River, Mammoth Cave

Participants: Rod Obrien (diving), Deborah Johnston, Felix Ossig-Bonanno, Thomas Wilson, Steve Kennedy

Rod and I managed to get Friday off work so drove up to Jenolan in the morning braving the school zones and road work. We ran into Rowena driving down the hill to continue her Southern Limestone documentation, but we had just missed the rest of the group so got Rod's gear ready in a leisurely manner and drove down to Mammoth Flat. We parked next to a ranger who was setting sand bars to look for fox prints and had a long chat about the pigs and snakes in the area (with him spotting a tigersnake only moments earlier)... at least until he mentioned hearing a group of SUSSLings at the Mammoth entrance about 10minutes earlier and we immediately grabbed the dive gear and rushed down to see if we could catch them to wrangle some assistance with the bags. The rushing wasn't required it turned out as the whole gang was pffaffing around the daylight hole taking photos of Tabitha Blair on the abseil. Luckily this was so boring three of them instantly volunteered to carry bags for us... far more than required but there were no complaints from us and we made it down to the water in around half an hour or less, the only interruption being a bat flying into Rod before making a u-turn then flying straight into him again!

Rod geared up at lower river while me and the boys lazed around talking shit. We passed the time by watching Felix bridge across lower river (not falling in to amuse us all as expected), then the guys did a quick detour to oolite chamber which Felix hadn't seen before, then returned just in time for Rod to return after around an hour of surveying. Rod had spent a fair bit of the dive at around 20m depth so had clocked up some deco. Rod had already had a big week of deco dives for work (as a commercial diver) and was feeling far colder and more tired than normal after exiting the water. Lucky the guys had hung around to help with bags like heroes and they disappeared out the cave ahead of us, reaching daylight at 3:30pm, 3 hours earlier than expected. On the drive back up the hill we passed a healthy looking echidna, which was nice, then filled 10 tanks, which was not so nice.

Southern Limestone - Ed

It was off to Cooke's cave to rig a 7m pitch and complete the survey of this cave. At the base of the pitch were a spider, an active leech, and two dormant leeches. The survey was completed, the solitary stalactite was photographed and then the prussic out was performed.

Saturday December 7th

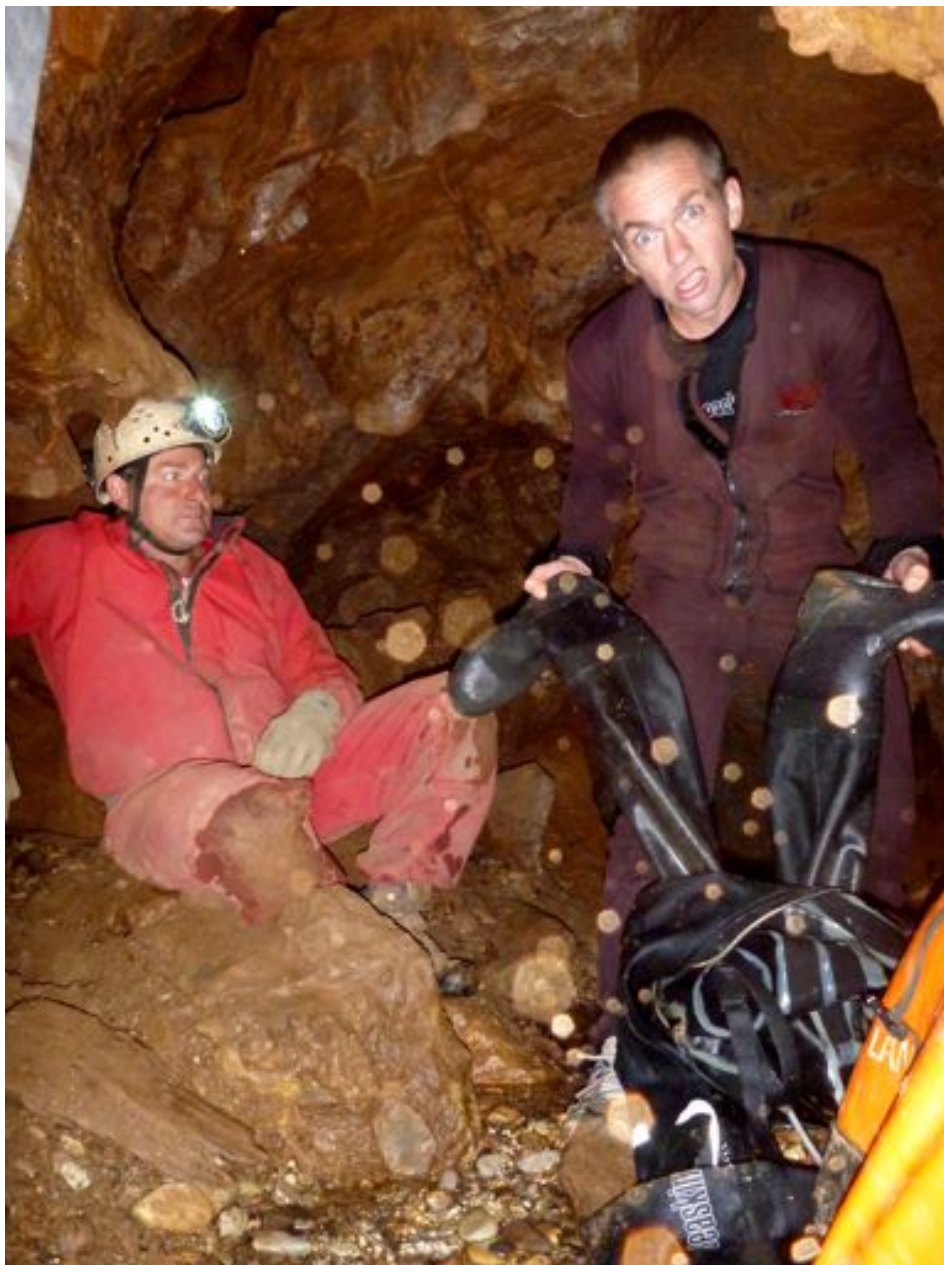
Diving Downstream Bluetongue, Southern Tourist Caves

Participants: Alex Boulton and Rick Grundy (diving), Deborah Johnston, Rod Obrien and Felix Ossig-Bonanno

We had initially planned to return to Mammoth today to continue the push and survey of upstream lower river. We had been told by one of the adventure tour guides that he had a trip the next day, but that it would be OK for us to go ahead with the trip anyway. In the past we have always been expressly forbidden from the wild caves when commercial tours are being run (to avoid spoiling the experience for the customers) so we decided to err on the side of caution and defer the trip to the following day.

Rick and Alex arrived around 10am, constituting 2/3rds of the expected group. We stalled with tea and gear packing for an hour then left a note for John Wooden explaining that we'd left without him! We went down to the guides office to arrange a time for entering the tourist caves and they explained that there had been a horrific head-on collision on the road down to Jenolan which had closed the road for most of the rest of the day. The five of us headed into the tourist caves via the Baal entrance and visited the abandoned tourist section before going off-track to the passage to blue tongue. We made it to the water in around half an hour by efficient chaining through the rock-pile and Alex geared up by the water. On the way in Alex snuck in a little trash-talking about a previous trip report I'd written which he though had implied he was too soft to push a dry lead in his drysuit... explaining to the group that he wore that drysuit in the caves because it was built for punishment... but more about that later! Alex crawled

down into the small entrance of the sump, and Felix and I went slightly back down the dry passage downstream of the dive where we showed Felix a very tight and awkward rift. We had found this rift on the previous month's trip and Phil I and had thrown some rocks around the corner and heard some enticing splashes.



***Alex Boulton with torn drysuit, Bluetongue.
Photo by Deborah Johnston***

that the regulator for the other tank was wedged on the side of the gap that his mouth wasn't on! He immediately decided that he needed his right hand on the other side of the rock to disconnect the inflator, and forced that hand along the sharp rock slicing a deep gash in the back of his hand. He disconnected the hose then instead of turning back, he kept going and managed to lay around 6m of new line before the silt caught up with him and he had to retreat. This was an exciting find as we hope to eventually connect this passage in with upstream lethe as a continuous dive. Alex's progress would not have been possible without the earlier work done by Keir Vaughan-Taylor and Phil Maynard who had spent hours digging out the gravel restriction and exploring the rockpile for leads and clearing the silt which gave Alex the visibility required to progress further.

Saturday December 7th

Diving Downstream Bluetongue, Southern Tourist Caves

Participants: Alex Boulton and Rick Grundy (diving), Deborah Johnston, Rod Obrien and Felix Ossig-Bonanno

With plenty of air left in the tanks, Alex then did a quick dive upstream where he made it a fair way up the dive reaching the first airchamber. He'd worn his fleece undersuit into the cave so unfortunately then had to wear it out, completely soaked! On the way out we stopped to clean the formation that is climbed over to access the off-track

Felix, the microbod, completely shredded what was left of his cotton overalls as he contorted past an awkward bend and then dropped into a chamber high enough to stand up in. The floor sloped away to a crystal clear sump around 2m by 3m and at least 2m deep with a small window heading off into the unknown. The dive looked enticing and promising, but getting dive gear to this pool of water would be an absolutely herculean effort! Felix named this section the worm hole, then contemplated how on earth to get back out! Whatever was left of Felix's suit was destroyed on the way out and we went back down the sump in time to see a sodden Alex pouring litres of water out of the legs of his drysuit which had filled up with the 15° water after an unfortunate series of events. Alex had made excellent progress in the dive, and reached the end of the previous line quickly then continued. He reached a small awkward section which required lying down on one side with one arm up ahead and one behind to make the smallest profile before wiggling through then popping up into an airchamber. Unfortunately, just as he wedged in the gap something pressed on the power inflator that sends air to bcd (air jacket) on his back. It immediately filled up completely and then continued dumping air out. His first through was "meh... I don't care" before he realised that there really wasn't a lot of air in the small 3l air cylinders we'd taken, and also

section, as we didn't have enough spare water to clean the damage we'd spotted on the previous trip. Alarmingly, it looked like some people had accessed this cave in the weeks between our trips, who had carelessly and unnecessarily placed stacks of muddy hand and footprints on the otherwise perfectly white flowstone wall. We just beat a tour group so exited the cave in around 45 minutes then ran into Rowena and Coops in the carpark. They were so impressed by Felix's efforts of the day that they stole him away from us to be deployed in another cave that they were on their way to check out. I saw Rowena holding up a string of black beads and thought she had found a bracelet, then was informed that it was actually quoll scat.

Alex, Rick, Rod and I returned to the hut to see if John had arrived (he hadn't!), then stuffed around with tea and bickies.

Southern Survey - Ed

There was a need to complete the Lucas Rocks Survey so Ian and Tony Le got together with Rowena to run the survey from Sleet Cave back to the fixed station in the saddle.

After the Lucas Rocks Survey was completed, and Tony had wandered off, we met up with the divers in Carpark three. Here we acquired the services of MicroBod Felix and it was off to survey J306. This cave filled the air with powdery dust as soon as the ground was disturbed, earning it the name "Dustbath". Felix was the only one able to pour himself past the squeeze, earning him the right to do the surveying of this terminal aven.

Diving Blue Lake to Mud Tunnels

Participants: Rick Grundy and Alex Boulton (diving), Deborah Johnston and Rod Obrien

Saturday December 7th

Diving Downstream Bluetongue, Southern Tourist Caves

Participants: Alex Boulton and Rick Grundy (diving), Deborah Johnston, Rod Obrien and Felix Ossig-Bonanno



Reflection in Stalactite.

Photo by Deborah Johnston

Alex was still keen to dive after bluetongue so we dug up the thin wetsuits Phil had been suffering in earlier in the week, and found that luckily (or unluckily?) they fitted him perfectly. We drove down to the grand arch where the guys geared up then strode impressively down to the resurgence of the southern river. We had run into Phil Maynard, Don Matthews, Don's son Finn and godson Sydney who watched the guys disappear in the cold dark water. Rod and I went for a stroll down to the dam wall to kill time where we saw the big platypus cruising around on the surface of the lake in the sun at around 4pm. The guys were back in just under an hour, completely frozen from the cold. They had moved some rocks out of a passage to make it easier to negotiate, checked some line that we had thought might need replacing, and experimented with a new configuration of dive lights. We went back up to the hut where we found John (who had been stuck behind the traffic accident) and harassed the others by running the compressor for an hour to refill the tanks.

That evening some SUSSlings went down to the fireshed to watch the Jenolan staff 'Donut Awards' ceremony which was entertaining. My particular favourite was Customer Comment No. 6, received after a guide had completed a long and serious explanation of the perils and achievements of SUSS cave diving over the years, to which a customer replied "do they use candles during the dives?". Steve Kennedy won the award for Culinary Excellence after leaving a box of eggs in the hot staff laundry for two months. He might have been able to deny ownership if it wasn't for the sign saying "Steve's, don't move!". Chatting with managers that evening we were told that we should have gone ahead with the Mammoth dive trip that day as they would have loved to tie in the exploration aspect with the tour. Oh well!



Rod Obrien wrestling gear out of Mammoth.

Photo by Deborah Johnston

Sunday December 8th

Diving Upstream Lower River, Mammoth Cave

Group One Trip Participants: Deborah Johnston and Rod Obrien (diving), John Wooden, Ian Cooper, Phil Maynard

Group Two Trip Participants: Maranie Ing, Felix Ossig-Bonanno, John Wooden, Susan Vu, Thomas Wilson, Alison Chau, Don Matthews, Finn Matthews, Sydney Foquet, Alan Pryke, Tony Le

Everyone was up early enough to stuff around with breakfasts and gear before leisurely heading down to the caves and reaching the entrance at 9:30am.

It took us around 40 minutes to chain five bags (including four 7l tanks) down to the river, and I geared up as Rod watched on cautiously. Coops calculated the water flow and pointed out that it is almost exactly 1/3rd of the normal flow. Don Matthews arrived with his 7yr old son Finn who was looking flash in gumboots and fitted red cave suit. I pointed at the hole for the start of the dive and asked Finn what he thought to which he said he thought we were a bit crazy. He then gave me a high-five for luck as I plunged into the cold water to tackle the first squeeze.

Coops and Phil continued on down the main passage, bridging over the river and continuing down the passage towards Slug Lake. The purpose of this side trip was for Coops to point out a pool of water he knew of that Phil hadn't included yet on his thorough map of the cave. The guys climbed 8m down a tight rift and inspected the pool at the bottom, determining that it was in a good spot to have potential for leads, and also possible to get dive gear to (with some difficulty).

I took Rod's advice and wore a harness instead of a bcd, no weights, and no fins. At his suggestion, I clipped both 7l tank together and pushed them ahead of me into the start of the dive which is also one of the tightest parts. The water here is trying its hardest to push you back out of the cave so you need to splay out like a cat and push your way forward by pressing your feet on ridges on the roof and forcing yourself forward. Luckily, the squeeze is short so once you're through there is a larger chamber where the water pressure eases off for the next few metres. The next obstacle is a tight rift which is best negotiated by standing up horizontally with a stomach against one wall and holding the tanks out to each side in your hands. A bit of side shuffling and wiggling gets you through this short rift which is when it's time to start travelling feet first down a series of tight vertical shafts intersected by horizontal bits around a body length or two. Most of these sections are best negotiated by finding your way with your feet and holding both tanks up above. Eventually I reached the end of the line at the bottom of one of the vertical shafts where Al had tied off to a weight at 32m just above what appeared to be another horizontal section. I plonked down on the bottom and twisted around to see where the passage was continuing.

The passage had followed a very straight line but at the bottom of this shaft it swung down at what seemed to be a 90° change, entering passage which was wide with large scalloping on the roof, and sloping gently down with around 10 or so metres visible. Unfortunately the passage was very chocked up with large cobblestones. No worries I thought as the passage would be wide enough to bulldoze the cobbles to the side as you wiggled down it feet first. Unfortunately though, a thick layer of black silt had covered all the cobblestones then hardened to cement them together. I tested this by trying to move just a couple of rocks and found that I had to pull fairly hard with both hands to make them budge. Persisting, I shoved my legs down the passage and started trying to force the top layer of rocks away by doing big long kicks down with the legs. This stirred up a lot of silt but not much else and I hit my turn-around point of air supply and decompression obligations and had to leave without finding out what was around that next corner. After my dive, Rod jumped in and made it down to his survey peg he'd left the weekend before and continued his survey. Rod is by far the fastest dive surveyer in the club (state, country, world?!) so he was able to reach the end of the line on this, his third survey dive in the passage. Rod inspected the same passage and saw how hard it was going to be to dig so instead he collected two samples of rock to show Coops, the club geology expert.

By then he had clocked up a fair bit of decompression so started making his way out doing decompression stops on the way to near the end of the dive where I had left one of my 7l tanks which was still over half full.

Luckily, during Rod's dive, a large group of dry cavers arrived who were willing to entertain themselves by bridging across lower river (with John falling in wearing just cotton overalls!), and then helping us take four heavy bags out (with Phil and Coops having generously taken two of my bags out with them earlier).

It was a quick exit with all the girls there to muscle out the bags upstaging the guys. On the way out I mentioned to Thomas that I thought I might be the first lady to dive in Mammoth (or any of the wild caves?), to which he joked "woman maybe, lady... I think not!".

Coops had left for home by the time we got back to the hut so the rock samples are still unknown, but the best guess was that they are dolomite.

Diving Downstream Bluetongue, Southern Tourist Caves

Participants: Rick Grundy (diving), Alex Boulton, Stephen Kennedy, Rowena Larkins

The group entered the southern tourist caves via the Baal steps at around 9:15am and made their way back to the Blue Tongue sumps. Alex and Rick were confident the night before that they could find their way back, but we convinced Steve (the all-knowing guide and hard-man SUSS member) to go along to make sure they didn't lose their way anyway (as we all know how caves grow extra loops and turns between trips!). Rowena took in a couple of litres of spare water to keep cleaning the muddied formation we had noticed the day before. They got to the water in under half an hour with all Ricks gear in just two medium sized bags. Rick geared up and dived to the end of the line where he laid an extra 6-8m before losing visibility, with a total dive time of just over 15minutes. Rick knew this would be a difficult dive after seeing that it had chewed up Alex's hand and drysuit the day before. Rick renamed the scariest muck passage 'soiled suit alley' in honour of Alex's ripped drysuit and an unnamed diver who had suffered a stomach upset earlier in the trip. Upon hearing Rick's description of the dive she suggested it could be renamed brown-tongue instead of blue-tongue because it's nasty enough to make divers shit themselves (metaphorically anyway). While Rick was in the water, Steve went to the incredibly horrible rift that Felix had somehow fitted through the day before to film the sump Phil and I had been tossing rocks into from around the corner. Steve, always up for a physical challenge, somehow defied the laws of nature and got through. On the other side he saw and heard bubbles coming up through the sump, verifying that it connects in with the main downstream passage. Entering via this sump would bypass the biggest restrictions in the dive, and allow the use of larger tanks, but accessing the sump with gear is not possible without seriously enlarging it. The group returned to the hut a few hours later where Rick made a grade 1 sketch on his iPad. The pair are keen to return next month to continue adding to this new passage bit by bit, clearing the silt as they go.

Other trips - Ed

Another trip was made to Sydney Smith cave to continue the survey.



***Rod Obrien, surveying Lower River, Mammoth.
Photo by Deborah Johnston***

Mammoth Survey Part 2 — Railway Tunnel

RAILWAY TUNNEL AREA, MAMMOTH CAVE

This article is the second in a series which are designed to document Mammoth Cave, Jenolan in detail as well as to publish the maps produced by SUSS over the past decade. The first article was published in SUSS Bull 52-1 [1] and covered the southern section of the cave. The third article will document Snakes Gut, Naked Lady Chamber, Ice Pick Lake and World of Mud.

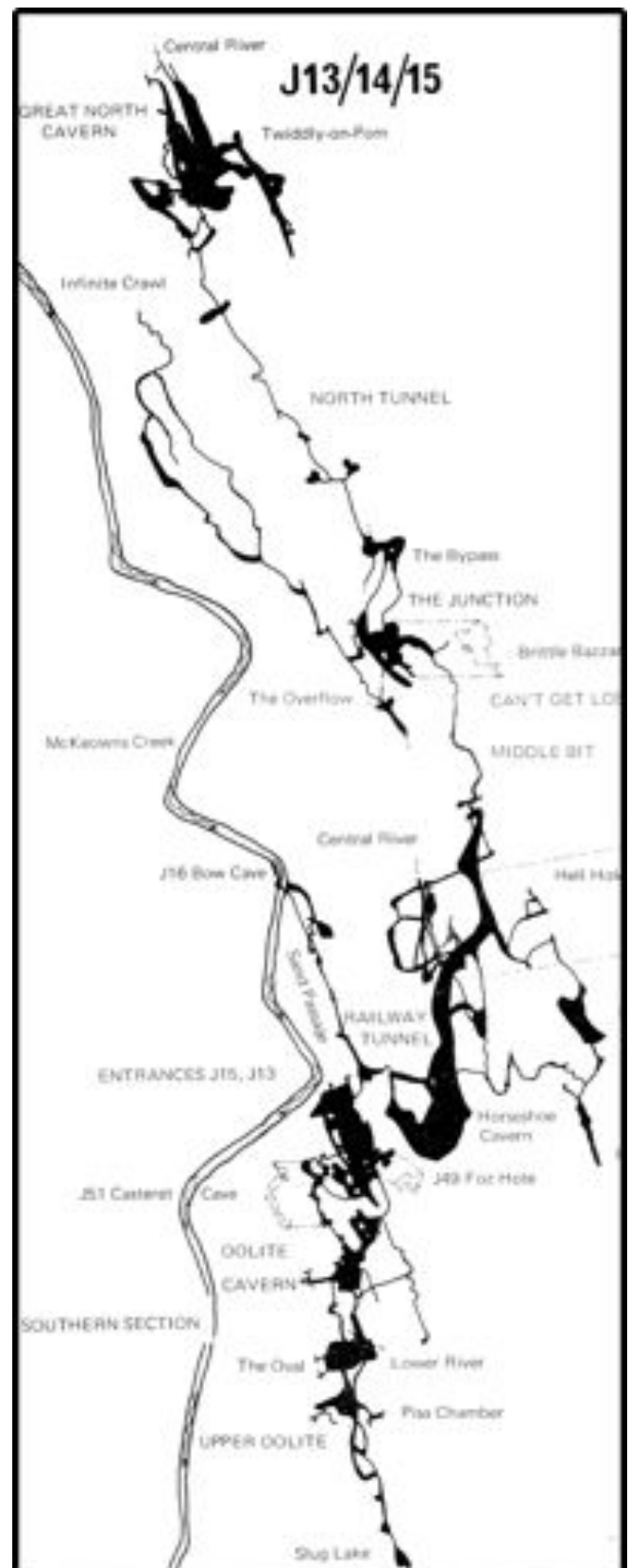
Mammoth Cave is the longest, largest, deepest wild cave at Jenolan. Railway Tunnel is the largest passage in the cave, extending more than 200 m and never less than railway tunnel-sized. The area around Railway Tunnel contains a mixture of high avens, excellent formation, mud, and complicated connections down to the northern stream levels below and to Ice Pick Lake.

Railway Tunnel is big, easy caving and close to the entrance. It's a popular and well known section of Mammoth, and it's been a destination for beginners over the years, as well as guided adventure tours. More serious trips traverse through Railway Tunnel on the way to the northern reaches of the cave or towards Ice Pick Lake.

Mapping a cave that's been mapped? Many maps of Mammoth cave were produced in the lead up to the publication of the Yellow Book in 1971 [2]. The cave was extensively documented with the publication of the Yellow Book. So why would we map the cave again? That's because the cave is still being explored, and significant new passages have been found since the Yellow Book [3]. It's also because the data for the Yellow Book was patchy (many passages were surveyed to ASF grade 2), and documentation of the survey was very patchy. As a result the new discoveries made in the 1980s and 1990s could not be tied back into the main passages of the cave. Instead of just adding to the patchwork by surveying the new passages the decision was taken to re-survey the entire cave.

The first of the current-project surveys in the Railway Tunnel area was Sand Passage, led by Mark Staraj in 1991 – 1992. The main passages were surveyed from 2001 – 2010 with the final survey trip in this part of the cave being the climb from Sugar Cubes down to Snakes Gut, surveyed by Rowena Larkins and Steve Kennedy. A number of areas surveyed in the current project were unknown to the co-ordinators of the Yellow Book project. Some of these passages were known to Wilson in 1890, while some were discovered after 1950 by the speleologists. In the Railway Tunnel area, the current survey has added the following locations to the maps published in the second edition of the Yellow Book:

- Helictite Hallway
- High Shawl Room
- Unsurveyed Connection/Davy Jones Locker



Mammoth cave – from Dunkley [2]

- Debouchment Detour
- Ninety Foot
- Railway Tunnel Extension

A major advantage of the current project over previous generations of survey is our access to computers. This enables us to provide digital data products which place the cave in context in the northern limestone of Jenolan, including the potential for graphical information system (GIS) formats. The surface survey through the valley connects to the cave survey and allows us to view Mammoth cave relative to the surface creek and to other caves in the valley. This is useful for our exploration efforts as well as for various fields of study such as hydrology, geomorphology, and biology. It's possible with the existing data set to create fly-throughs, animations of the cave passages rotateable in three dimensions. Does that mean that the traditional map is superannuated? No, the amount and kind of information provided in a map is not reproduced by the newer formats. In ten or twenty years' time, when three-dimensional models of the cave will be downloadable and 3-d printable at any scale and level of detail, the old-fashioned plan and elevation views we produce today will still have their uses!

Phil Maynard



Railway Tunnel north of Hell Hole route. Photo by Alan Pryke

HISTORY OF RAILWAY TUNNEL AREA, MAMMOTH CAVE

Early European History

The Railway Tunnel area of Mammoth Cave was entered early in the history of Jenolan Caves. The famous inscription at Skull and Cross Bones states “26/2/1884 *This Cave was discovered*”, along with the names of the party members led by Jeremiah and Fred Wilson. This area was explored intensively by the Keepers on multiple trips, but no map from the era survives. There are no trip reports directly attributable to Wilson which describe the discovery of the cave, or the later explorations of Railway Tunnel area. Our information about this period of exploration in Mammoth cave is based on second hand accounts published by the tourist promoters. The desire of the tourism promoters for Jenolan to have the biggest cave system and the grandest possible cave formations shows in the prose of the authors.



Rod Obrien at Skull and Crossbones. Photo by Alan Pryke

Cook wrote a guide book on Jenolan in 1889 [4]. In this, he describes Horseshoe Aven and Railway Tunnel, as well as exploration by Wilson down a shaft at the northern end of Railway Tunnel:

“Next is the Mammoth Cave, so called because of its vast chambers. One of these is estimated to be upwards of 300 feet high, 100 feet long and 100 feet wide. It contains a large amount of formations, the prettiest portions of which are about 200 feet from the floor.....

“The length of this chamber is about 10 chains – that is, one eighth of a mile. From this the curator was lowered into a chamber of vast proportions, and from 60 to 100 feet lower down, through solid limestone. At the end of its undulating floor he came to a river about 6 feet wide and 9 inches deep, the water of which was running in a strong stream.” [4]

This is an exaggerated set of measurements and not an especially accurate description of any of the shafts down from Railway Tunnel, but it is clear that exploration had extended down to Central River. Despite the original inscription by the Keepers at Skull and Crossbones, there are no accounts of the Keepers using Skull and Crossbones

to access Central River. Similarly, the obvious junction towards Hell Hole from Railway Tunnel would have been one of the first passages explored by the pioneers, but no trip reports or maps survive of the route to Ice Pick Lake. Almost certainly, trips to Railway Tunnel would have included exploration of these junctions off the main passage. Another guide book simply titled “The Jenolan Caves”, authored by Joshua Foster was released in 1890. It featured descriptions of many areas beyond the main showcaves, including Mammoth Cave. While most of Foster’s narrative focuses on the route to Southern Section, there are a number of paragraphs which describe Horseshoe Cavern and Railway Tunnel [5]:

“After a rough journey we arrive at a very large chamber, the dome of which is so lofty that even the magnesium light fails to disclose it. From the highest point visible, almost down to the floor, hang some lovely multi-coloured formations like drapery. Others are very grand indeed, of deep cream colour, and sparkling as if trimmed with spangles....

“The floor of this chamber is very muddy, being covered with thick chocolate coloured clay, scarcely hardened, and very slippery. It is full of holes some very deep and steep.... This chamber is entirely without rocks or boulders; but on leaving here we enter a long, wide and lofty passage, connected with this chamber, which is completely covered with colossal boulders, some over 100 tons weight, tumbled together, and piled chaotically, some of them being ornamented with fine deposits.” [5]

This is a description of Horseshoe Aven, the Cavern and Railway Tunnel that is recognisable and reasonably free from hyperbole. Once he moves to the northern end of Railway Tunnel, Foster gives a description that is tabloid style while not being as exaggerated as Cook:

“We are now at the beginning of a series of deep and extremely dangerous holes. No matter where we move a yawning abyss confronts us, and from the sound when a stone is thrown down, some appear to be almost bottomless.... At the bottom we find another series of chambers and passages, nearly all containing fine deposits. [5]

The ultimate limits of exploration in the cave by the Keepers are unknown, but there is no doubt that they knew the area around Railway Tunnel well. Wilsons Rift is one of the more difficult and obscure passages in this area; at the end of the well decorated section where a formation choke prevents further progress, Wilson’s signature is found along with Wiburd and several companions. The date beneath the signature is “20/1/91”.

Richard Welch

During the long hiatus between Oliver Trickett’s final report on Jenolan Caves in 1919 and the foundation of the speleologist movement (In NSW, SUSS started up in 1948), there is very little documentation of caves or cavers at Jenolan. There was definite interest in caves from the bushwalking clubs based in Sydney, and a lot of unpublished activity by sporting adventurers (Oliver Moriarty’s remarkable photo essay on Tuglow Caves is an example), but the limits of exploration are unknown and no deeper study of caves was undertaken.

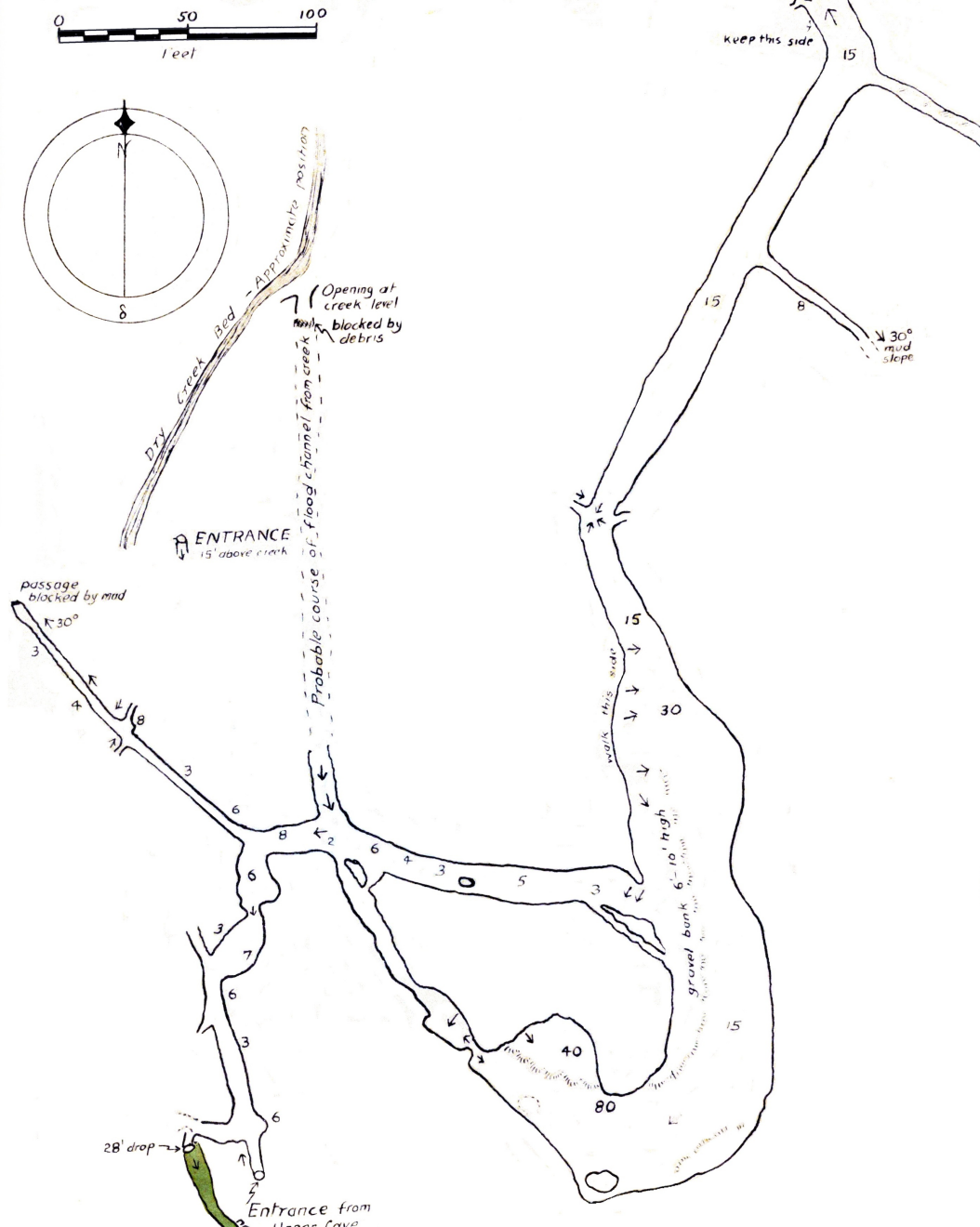
One exception to the poor documentation in this era was the Mammoth map produced by Richard Welch [6], [7]. Based on survey trips into the cave in 1943 and 1948, the map produced by Welch is immediately recognisable as Mammoth cave – it’s a remarkably good map given the instruments available. Welch has written of the project:

“We always had trouble raising enthusiasm for surveying in those days, but the first map, completed by I.Noske and R.Welch in 1943, extended from the holes below Entrance Cavern north and east to Railway Tunnel and the first 100’ or so of Sand Passage. Instruments used were a prismatic compass and a 66’ tape. We saw the Skull and Crossbones but did not attempt to descend the rockpile below.... In fact, we did not reach down to Central River below – we were on all our trips short of time, equipment and manpower” [7]

The only significant error in the plan view is the speculative course of the water from Bow Cave, which was at the time unknown. Other side passages in Railway Tunnel such as Wilsons Rift were either unknown, or not mapped.

Mammoth Cave

Central and Southern Levels



Railway Tunnel, 1948 map by Richard Welch.

Yellow Book

SUSS began systematically exploring Mammoth cave in the 1950s. Henry Fairley-Cunninghame describes a 1952 trip down through Skull and Crossbones, which also explored Sand Passage on the way back out [8]. In the following year, attempts to measure the Railway Tunnel area were underway:

"A hydrogen filled balloon was used to find the height of the high chamber in the Central Level of the Mammoth. The cotton was taken outside and measured and when the diameter of the ballown was added, the length came to 141 feet 6 inches to the nearest 6 inches. The total length of the Central Level was determined by laying a piece of string from one end to the other and then taking it outside and measuring

it. The length from the entrance to the high chamber mentioned above to the furthest point to which it is possible to walk without crawling or squeezing was found to be 688 feet.” [9]

The height of Horseshoe Aven recorded with laser distance measuring equipment is 53 m floor to ceiling (See below). From the entrance of Horseshoe Aven to the beginning of Railway Tunnel extension is surveyed as 228 m. Both of the measurements made with string seem to be somewhat short of the actual distances.

By 1960, Ian Williams was able to describe some of the complexity of the connections between Railway Tunnel and the river passages below [10]. He produced a schematic elevation which showed Debouchment Detour and Ninety Foot dropping from Railway Tunnel to Central River, as well as writing about the possible routes down from Skull and Crossbones.

The main work to collate, trace and re-draft existing maps for the Yellow Book was undertaken by Ted Anderson and John Dunkley from 1968 to 1970 [2]. The maps of Horseshoe Cavern and Railway Tunnel area produced for the first edition of the Yellow book are mostly redrafts of the map by Ian Williams and Jeff Hinwood in 1959 [2]. This map was based on high grade surveys with measured detail and cross-sections. On the other hand, the map of Sand Passage in the Yellow book was a redraft of a grade 2 sketch by Henry Shannon dating from 1960. The first edition maps were updated and more side passages added in the second edition, published in 1978 [6]. The map of Wilsons Rift area which was added to the second edition was credited to Macquarie University Speleological Investigation Group. The map shows Wilsons Rift and Trident passage, and notes the Wilson signature. This map is annotated “Climb to High Shawl Room above Railway Tunnel”, but no map of High Shawl Room was produced. This map also shows the first of (sadly) multiple surveys of the Unsurveyed Connection.

Horseshoe Aven

Horseshoe Aven is the highest chamber in Mammoth Cave, measured at 53 m from floor to ceiling. There was a major attempt to climb the aven in September 1997 [11]. The first, overhung section of the climb was led by Andrew Matthews using scaling poles and a lasso made of tape to snag a stalagmite beyond reach of the poles. From there, a lead climb up the gulley to the right of the major stalagmite brought him to a ledge, deep in guano. Matthew Hole and Phil Maynard then climbed another three scaling pole pitches, hauling the poles up each pitch and re-seating them on progressively-smaller ledges. Matthew’s description:

“Anchored at this point, and with assistance of the dichroic light source, shining up from 35 m below, the situation could now be re-evaluated. The Aven continues at least another 15 m up vertical walls, upon which can be found three rings of formation, each of which are overhung by a couple of metres. The walls themselves are in places covered with helictites, and the limestone is frequently calcited over. At the top of the Aven, a number of bats can be seen, flying across the chamber into a large opening in the wall, which again is overhung on a flowstone wall. Who knows what lies beyond?”

“As a final attempt to climb further up the Aven, Matthew decided to attempt bridging the 5 m wide shaft with 4 sections of scaling poles. Unfortunately, they weren’t long enough to safely span the rift.” [11]

Yes, Matthew attempted to make a horizontal bridge across the void with a scaling pole, 35 m above the floor. It was one of the more hair-raising things the author has seen, and a stop was soon put to the attempt (“What the ?!?!?!?!!? do you think you’re doing?”).

The final stretch of the Aven is indeed ringed by flowstone overhangs. Underhanging the overhangs is a superb display of shawls, and between the shawls are profuse helictites, ranging up to forearm size. It’s reminiscent of the Temple of Baal in the showcaves and it’s the best formation in Mammoth Cave, unfortunately out of reach and out of view for the casual caver. A climb over the formation rings to the top of the aven would be vandalistic, as well as suicidal. From the warmth, lack of air movement and the presence of bats, it may be guessed that the side passage at the top is a dead end.

PHYSICAL SETTING

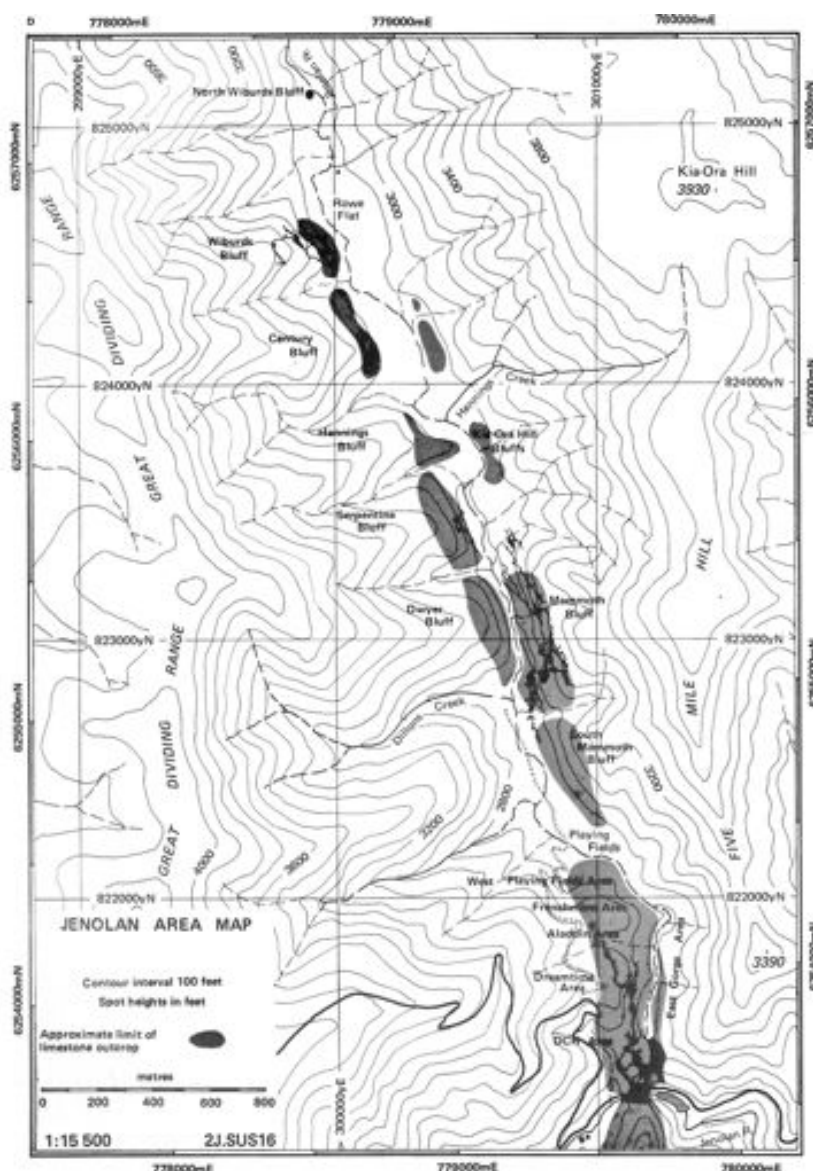
This section of Mammoth Cave lies generally to the east and north of the Entrance Chamber. Sand Passage is separated from the rest of this section, lying well to the west of any other cave passage. The remaining passages in this section of the cave are related in layout and development. The passages are generally horizontal in form, with multiple levels connected by climbs such as at Unsurveyed Connection, High Shawl Room, Debouchment Detour and Sugar Cubes. Railway Tunnel is a fossil level of the main river, and is at the same level as Can't Get Lost to the north and Pisa Chamber to the south. Sand Passage is an inlet for water from the surface creek. McKeowns Creek runs parallel to the full length of Sand Passage before swinging to the west at the Entrance Chamber. As well as the swallet entrance (J16 Bow Cave), there are sinks in the bed of the surface creek that correspond to major water inlets in Sand Passage.

Geology

The geology of the McKeowns Creek valley has been described by Ian Cooper [12],[13], based on work by Tony Allen, Armstrong Osborne and Henry Shannon [14][15][16]. In the Railway Tunnel area of Mammoth Cave, the limestone is highly pure, along a strike of $340^\circ \rightarrow 160^\circ$. This area of the cave is not close to either the eastern or western contact of the limestone. Due to the impounded nature of the Jenolan Caves Karst, the sediment from the inflow at Sand Passage is dominated by non-karst rocks; principally volcanics from the east and from the catchment divide to the north of McKeowns valley.

The bedding of the limestone in the Railway Tunnel area is close to vertical. There is no evidence of faulting or movement in this section of the cave. Most passages are developed along strike, with secondary development along joints (such as the section of Railway Tunnel between Skull & Crossbones and Hell Hole junction). Horseshoe Cavern is a notable exception to this 'primary along strike, secondary along joints' rule. The passage here smoothly turns through 180° to join two passages which are along strike (See the plan view sheets of this remarkable piece of passage).

There are two locations in this section of Mammoth Cave where igneous intrusions are found, originally described by Cooper [13]. In both locations the intrusion has been a sill (between bedding planes, oriented along strike). The intrusions are in Sand Passage, above the 5 m climb heading north, and at Abusive Intrusive (base of the climb down from Sugar Cubes, start of Snakes Gut):



McKeowns Valley – From Welch [16]

“Upon entering this chamber from Snakes Gut one observes the lower exposure of an intrusion with 0.3 m to 0.5 m wide zones of recrystallised limestone bounding a 0.1 m to 0.5 m thick intrusion..... The sill may be traced for at least 40 m along strike and vertically for 15 m.

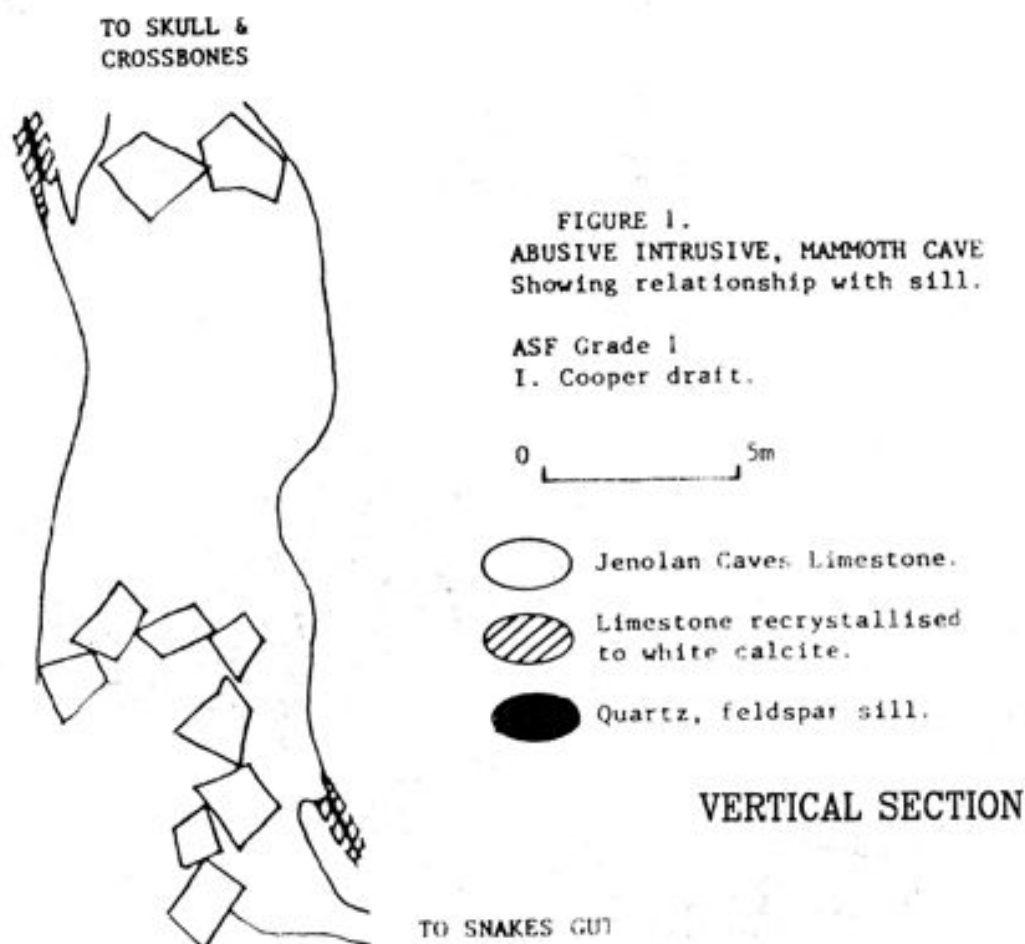
“The intrusive is generally a highly weathered light brown coloured rock containing quartz, plagioclase, and potassium feldspar.....The limestone margins have been altered to coarse grained, milky white calcite

crystals up to 80 mm across. The perfect cleavage of calcite is the only structure visible in the recrystallised areas, no sedimentary structures or metamorphic cleavage are preserved.....

“Large sections of Sand Passage are formed along a plane of weakness, generally parallel to bedding.... In this area the roof shows signs of intrusion with recrystallisation of limestone to coarse grained calcite crystals up to 60 mm across. This calcite is identical to that observed in Abusive Intrusive. This recrystallised limestone is visible for at least 40 m of Sand Passage.” [13]

Cooper suggests that the intrusions are Carboniferous and related to the granites that outcrop in the region (Oakey Camp, Morong Deep, Megalong Valley). The intrusions certainly post-date the uplift and near-ninety degree rotation of the Jenolan Caves Limestone (Devonian period) [12].

Dolomitic palaeokarst is a significant control of passage development in the Jenolan showcaves and in Spider cave [12]. Further north in McKeown's valley around Mammoth Cave there is no evidence of palaeokarst. The other feature of cave development in Jenolan caves is hydrothermal corrosion of limestone by hot fluids from below. This is seen as being responsible for many of the large domes in the showcaves [12]. In the Railway Tunnel area of Mammoth cave, there are a series of high avens (near Cold Hole, in High Shawl Room and of course Horseshoe Aven). It is likely that hydrothermal corrosion has driven the formation of these chambers, particularly Horseshoe Aven. The similarities in development between the top of Horseshoe Aven and Temple of Baal in the showcaves are striking (See the Elevation map in this article). Horseshoe Aven may be a fossil version of the exceptionally large chambers below the waterline at Slug Lake.



Abusive Intrusive – From Cooper [13]

DESCRIPTION

Cold Hole

From the base of the Jughandle climb, head North (right). After the low section, there is a passage to the right and a rockpile passage ahead. Go right (East) and climb up through Cold Hole. There is a major passage junction here. To the left (North) is Sand Passage. To continue to Horseshoe Aven, head East 10 m to a mud bank. There is a major passage junction here. To the left (North) is a significant climb up flowstone to a very high un-named passage. Ahead (East) is a low passage which bypasses Horseshoe Cavern and leads to Railway Tunnel. To the right (South) is the route to Horseshoe Cavern.



Iain McCulloch at Cold Hole. Photo by Alan Pryke.

Sand Passage

This passage is restricted due to the significant invertebrate fauna present in the mud banks. From Cold Hole, the passage runs for several hundred metres North with few side passages. Eventually the Gunbarrel (inlet aven and phreatic continuation) is reached. From here, tight passages head North, with exploration leads possible.

Horseshoe Cavern

Head South from the Cold Hole Junction through a couple of low points before standing up in Horseshoe Cavern. To the left (North) above the mudbanks is a lookout point to see up into Horseshoe Aven – at 55 m it's the highest aven in the cave. To the South East, across the mudbanks, the way on is trackmarked. Stick to the track marking; the mudbanks in this area have significant invertebrate fauna. In the right (South) wall at this point, there is a tight squeeze which leads to a pitch up. This is the route to Helictite Hallway and it requires a set of scaling poles, and gear for a 7 m down pitch at the top of the scaling pole. Helictite Hallway is a series of spacious, well-decorated chambers.



Megan Pryke in Horseshoe Cavern. Photo by Alan Pryke.

From the end of the track marking in Horseshoe Cavern, follow the passage on around to the North to enter Railway Tunnel. The short cut from Cold Hole re-appears at this point in the left (West) wall at the top of the mud banks.

Railway Tunnel

Railway Tunnel is in many ways the heart of Mammoth Cave. There are a very, very large number of side passages from Railway Tunnel and some of them wind up directly above or below the main passage. This area is complex to map or to traverse; knowledge of the route through this area of the cave is helpful!

Initially, the route is North over the stream gravels at the bottom of the passage. After 35 m, the Unsurveyed Connection is passed on the right (East) wall. This is low down, and the stream gravel leads into the entrance of this passage. The main route in Railway Tunnel continues up and over rockpile to the North. Scramble over the rockpile for 30 m to a major – complicated! – junction in the cave.

- Below the rockpile near the right (East) wall there is a 9 m pitch down to Davy Jones Locker (which is used by the Adventure Tours).
- Beyond the pitch on the right (East) wall is a major passage running North East. This is Skull and Crossbones.
- Under rocks on the left (West) side of the passage is a rockpile climb down to tight spiralling passage which leads down to Debouchment Detour.
- In the left (West) wall are two passages leaving from this point. A low crawl to the South from here leads to Trident Passage and High Shawl Room. A tall passage to the North from here leads up several climbs. This is Wilsons Rift.
- Ahead in the main passage, there is a pit which takes up most of the passage. Despite appearances, it is safe

to climb down from the South (closest) lip of the pit and then to climb down further on the right (East) wall. This is the start of Debouchment Detour.

Railway Tunnel continues beyond the pit. Climb up and around the pit to the left, up against the West wall. Immediately North of the pit, there is a sloping passage entering Railway Tunnel from the East – this leads up to an aven which is a permanent water inlet. Following the main passage down off a mud bank, a passage on the right (East) wall after 20 m connects to Skull and Crossbones, but is not traversable due to deep pits in the floor. Railway Tunnel continues North with a mud floor to a major passage junction on the right (East) wall after a further 25 m. This is the route to Hell Hole, Naked Lady Chamber, Ice Pick Lake and World of Mud.



Ian Cooper at the junction with Hell Hole route. Photo by Alan Pryke.

The main passage swings to the North West at the junction with the route to Hell Hole. Follow the passage 30 m down a mud bank, then climb up over rock pile and onto the mud bank on the right (East) side of the passage. Follow the right side of the passage North for another 20 m, avoiding the pits on the left. The last pit on the left is the Ninety Foot. This leads down a series of pitches and climbs to Central River and Middle Bit. Continuing along Railway Tunnel, climb up a mud bank to a level area. To the right (East) around rockpile is the entrance of Railway Tunnel Extension.

Unsurveyed Connection

From Railway Tunnel, crawl down the passage to a 3 m drop. Climb down this and then traverse the sloping slab to the left (North). At the end of the slab is a junction. Straight ahead (North) the passage leads to Davy Jones Locker. This is a sizeable chamber, with rift passages on the Eastern wall and at the Northern end of the chamber. The passage to the East leads to Skull and Crossbones, but is not traversable due to a deep pit at the Sugarcubes. The passage to the North leads past a tight passage down from Railway Tunnel and then into Debouchment Detour.

From the junction at the slab in Unsurveyed Connection, there is a climb down through a rockpile squeeze on the right (East) wall. At the base of the climb, head East over rockpile into a chamber. There is a hole in the rockpile on your right (South) after you enter the chamber. This leads down through several rockpile climbs to Snakes Gut. To the left (North), the chamber goes around to Sugar Cubes over the top of rockpile, or down to Snakes Gut low on the left (West) wall.

Skull & Crossbones

From Railway Tunnel, follow the passage up, then down to the right (South). The short climb down is easy but exposed. The way on is South over the Sugar Cubes – several rocks perched and bridging over a twelve metre drop. At the far end of the Sugar Cubes, the climb down connects with the Unsurveyed Connection. Below the climb on the right (West) wall is a small passage heading North which leads to a number of climb downs. There is some exposure on these climbs. At the bottom of the climbs, the route from Central Lake is encountered on the right (West) wall, while the way on is Snakes Gut.

Wilsons Rift and High Shawl Room

Heading North out of Railway Tunnel, there is a 5 m climb up into Wilsons Rift. The passage continues up several more climbs over the next 50 m. Eventually, there is a 3 m climb down into a sizeable, decorated chamber. A small passage running North out of the chamber chokes in formation. Wilson's signature is in this passage.

Heading South out of Railway Tunnel, a crawl leads into a high rift. To the right (North West) is Trident Passage. To the left (East) is a climb up flowstone. This leads up several more climbs, the last of which may need a tape for some party members. The climb opens into a large, decorated chamber, the High Shawl Room. To the right (South), the chamber passes the high shawls and then closes down to a decorated crawl which leads to a hole. This is a 14 m pitch down into Railway Tunnel.

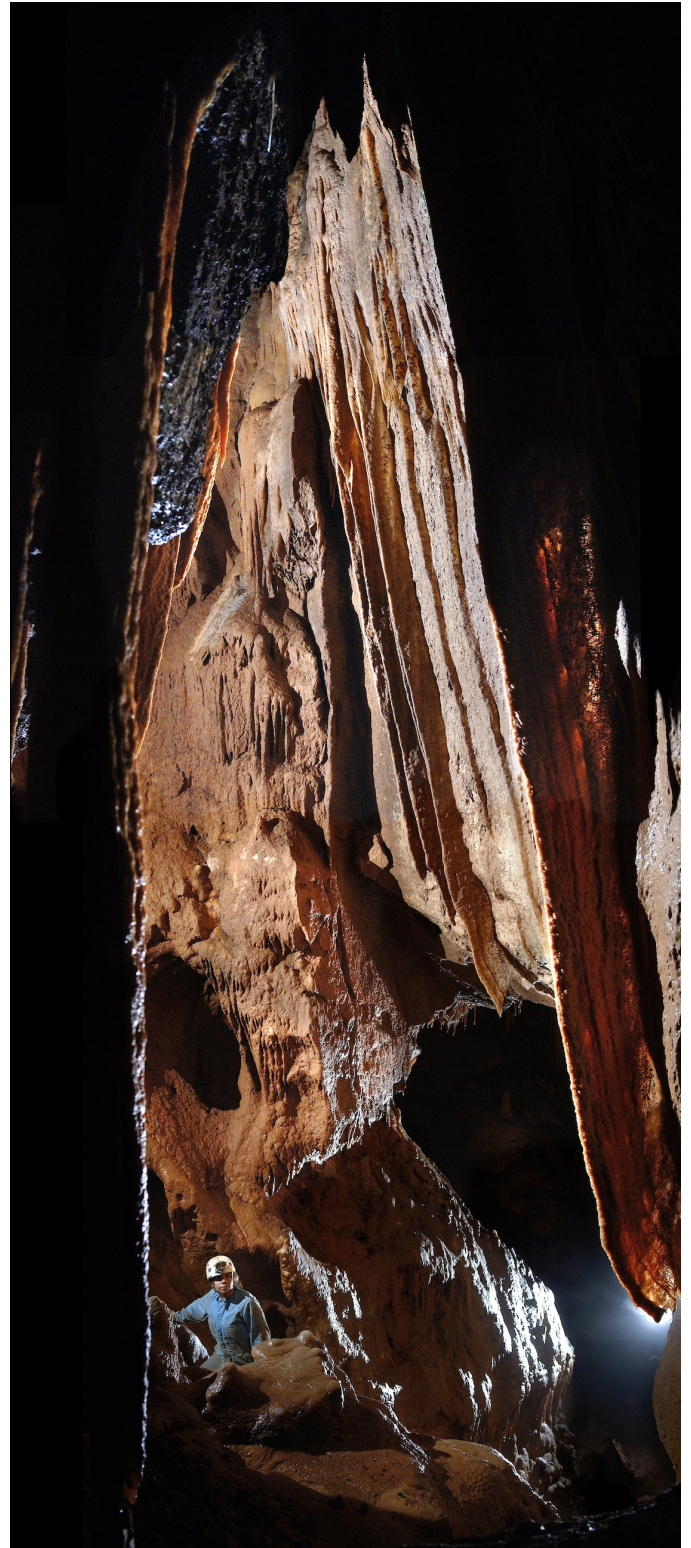
Debouchment Detour

The edge of the pit in Railway Tunnel is a 2 m climb down. Step across the gap and down to the right (East) wall. A chock stone here leads to a chimney down into the start of Debouchment Detour. Heading South, the passage goes down a tight, rifted climb, then down a slope in rift passage to a junction. To the left (South) is the passage from Davy Jones Locker, while Debouchment Detour continues ahead (West) down a rifted climb. Follow the passage to a wet squeeze in a tight corner to the right (North). The (permanently wet!) passage beyond the squeeze opens out above a 4 m climb down. Below this is another 2 m climb into a rockpile chamber. This is a junction point. To the right (East), the passage goes to the route above Central River, and splits to Central Lake (South) and First Crossing (North).

Ahead (North), Debouchment Detour continues up a mud slope, through a mud squeeze into a rockpile chamber. At the northern end of the chamber, squeeze through a couple of rocks into a crawl passage heading north. The passages on the right (East) head down to Central River. The passage ahead on the left (North West) leads to a large passage. This continues north to a balcony looking down on First Crossing. The way down is on the left hand wall, down a rock pile slope to the creek.

Ninety Foot

Ninety Foot is a deep pit near the Northern end of Railway Tunnel, which drops to the lower levels of the cave. Moving left from the track on the right (East) wall of



High Shawl Room. Photo by Alan Pryke

Railway Tunnel, close to the final flat-floored section of the Tunnel, drop down over boulders to a vertical 8 m pitch. At the base of the pitch, the passage slopes steeply down to the South East to a junction. To the left (North) at the junction, a 5 m pitch drops into Middle Bit. Straight ahead (South East), a passage leads to a 5 m pitch with water down to Middle Bit. To the right (South West), a tight passage drops steeply down to Central River, upstream of First Crossing.

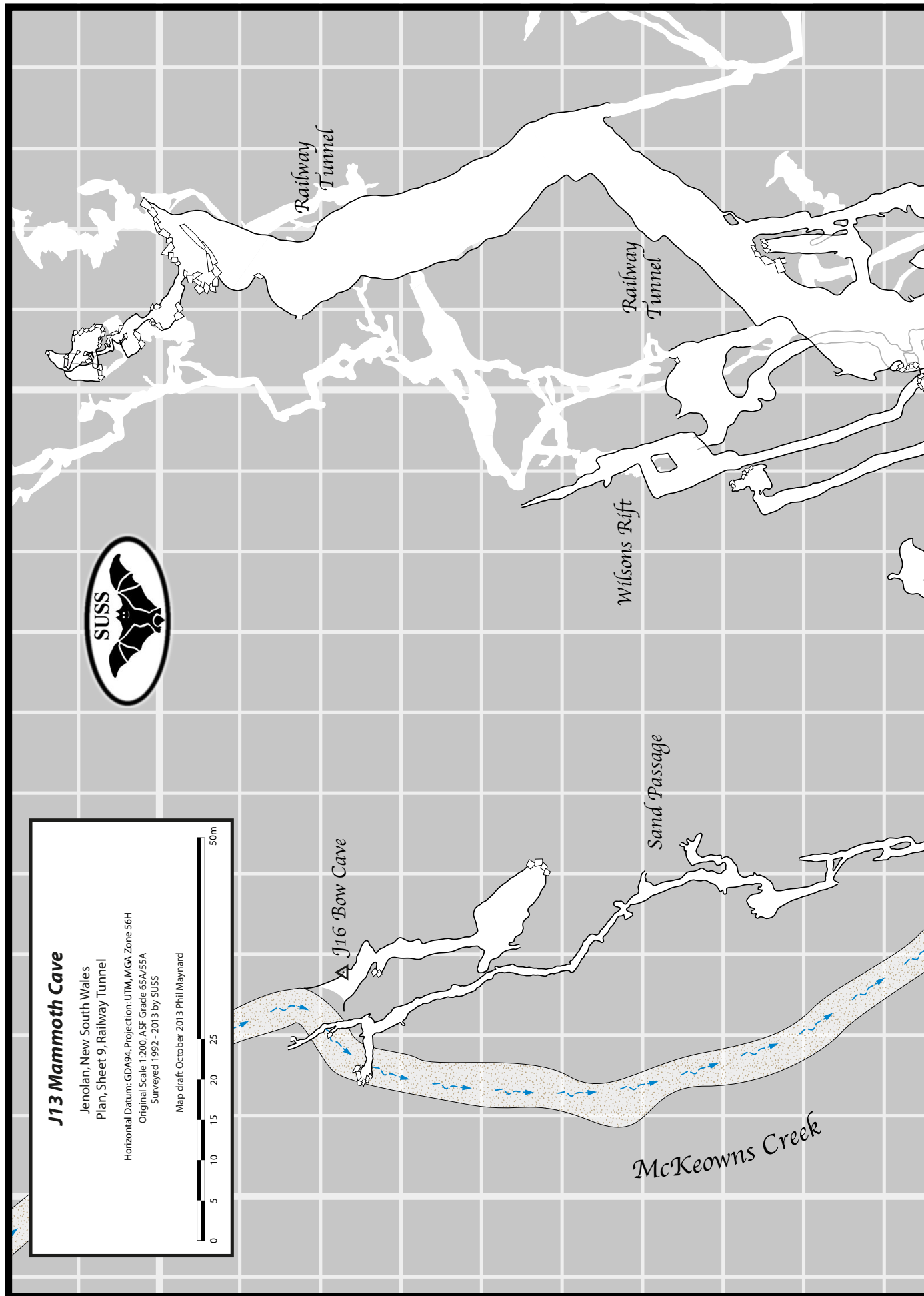
Railway Tunnel Extension

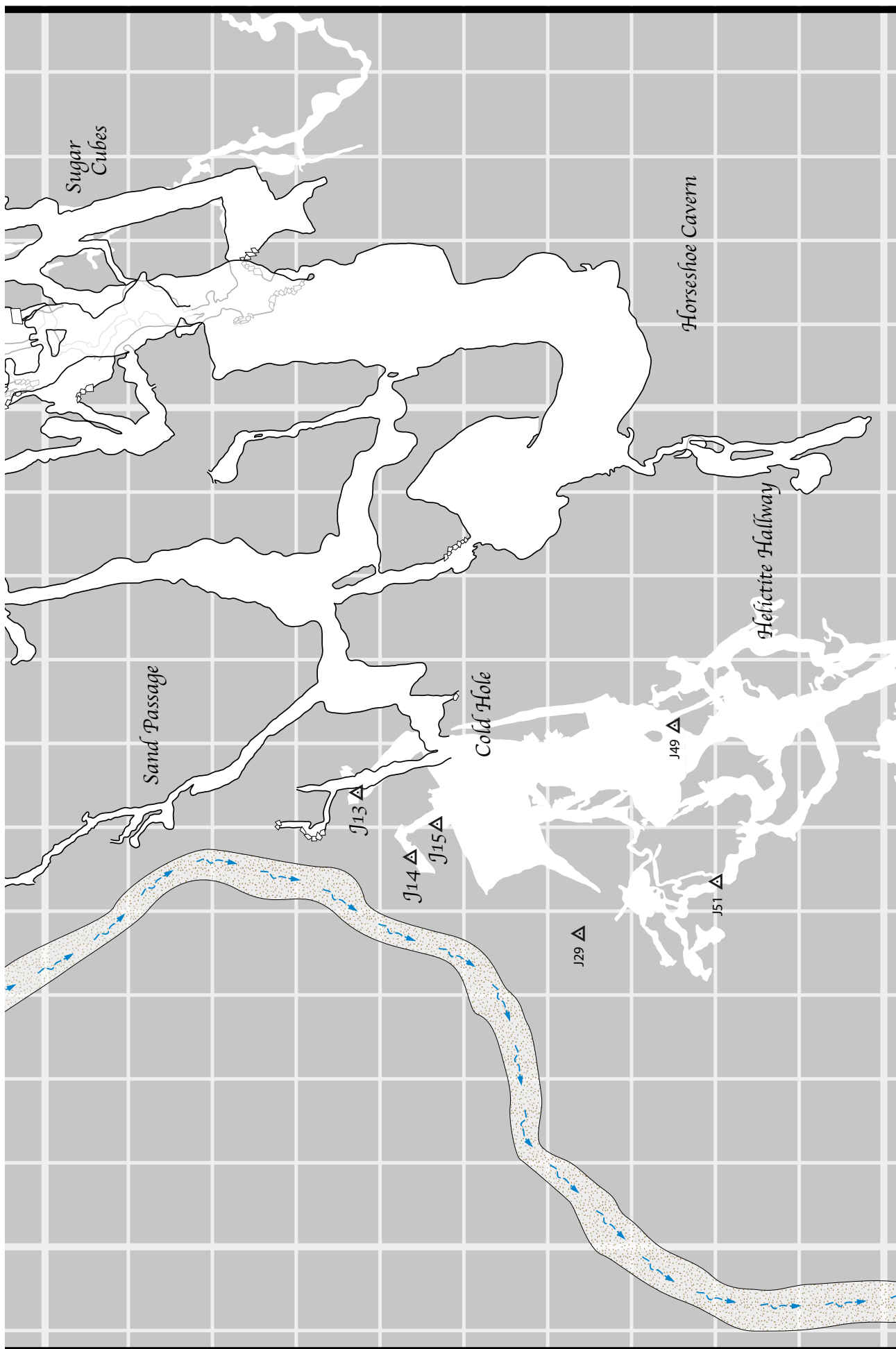
At the northern end of Railway Tunnel, the way on is on the right (East) wall. Follow this wall for ten metres, then climb up to the left (West) into the rockpile. The route climbs to the right (North), then drops steeply down through a rockpile chamber. At the bottom of the chamber, there is a junction. A small passage to the left leads to an 8 m pitch down into rockpile. At the base of this pitch, there is a route into the Middle Bit Rockpile to the East, while the route to the South leads down through a spiralling 15 m pitch to Central River.

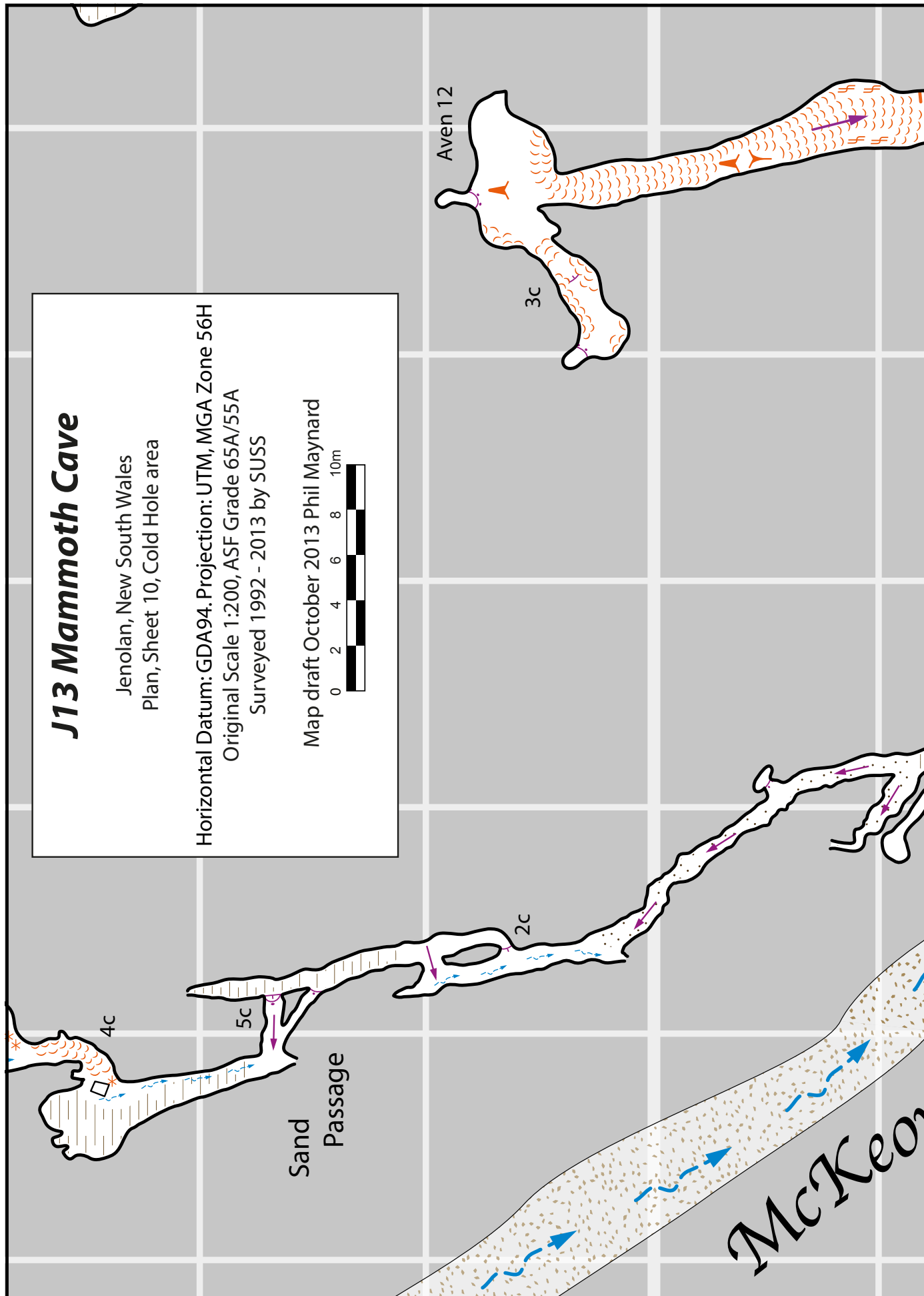
From the junction above the 8 m pitch, the route straight ahead (North) leads through two very tight squeezes to a rockpile chamber. Above this chamber is a scaling pole climb into further rockpile chambers and leads.



Damian Grindley in the unnamed passage above Cold Hole. Photo by Alan Pryke.



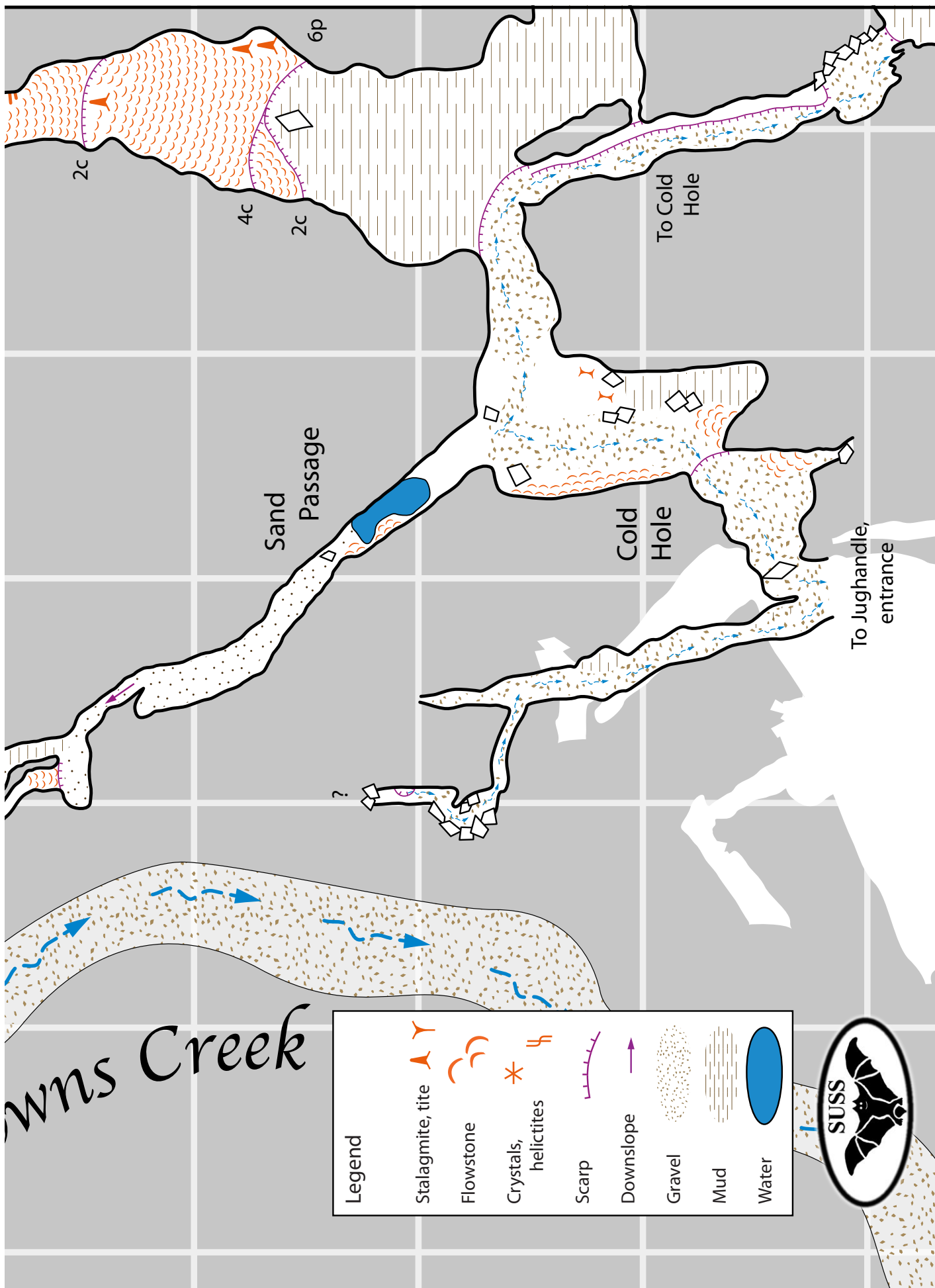


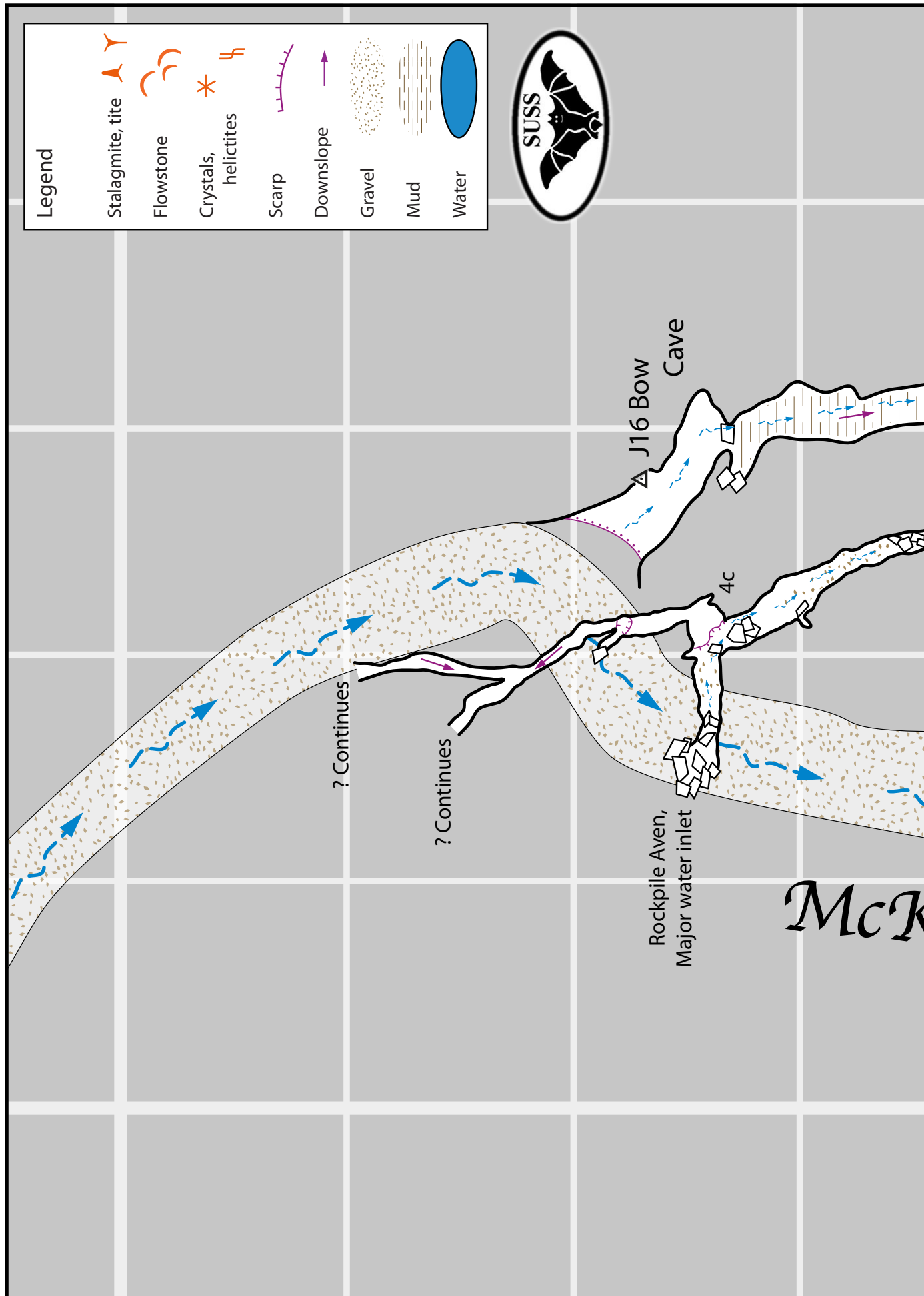


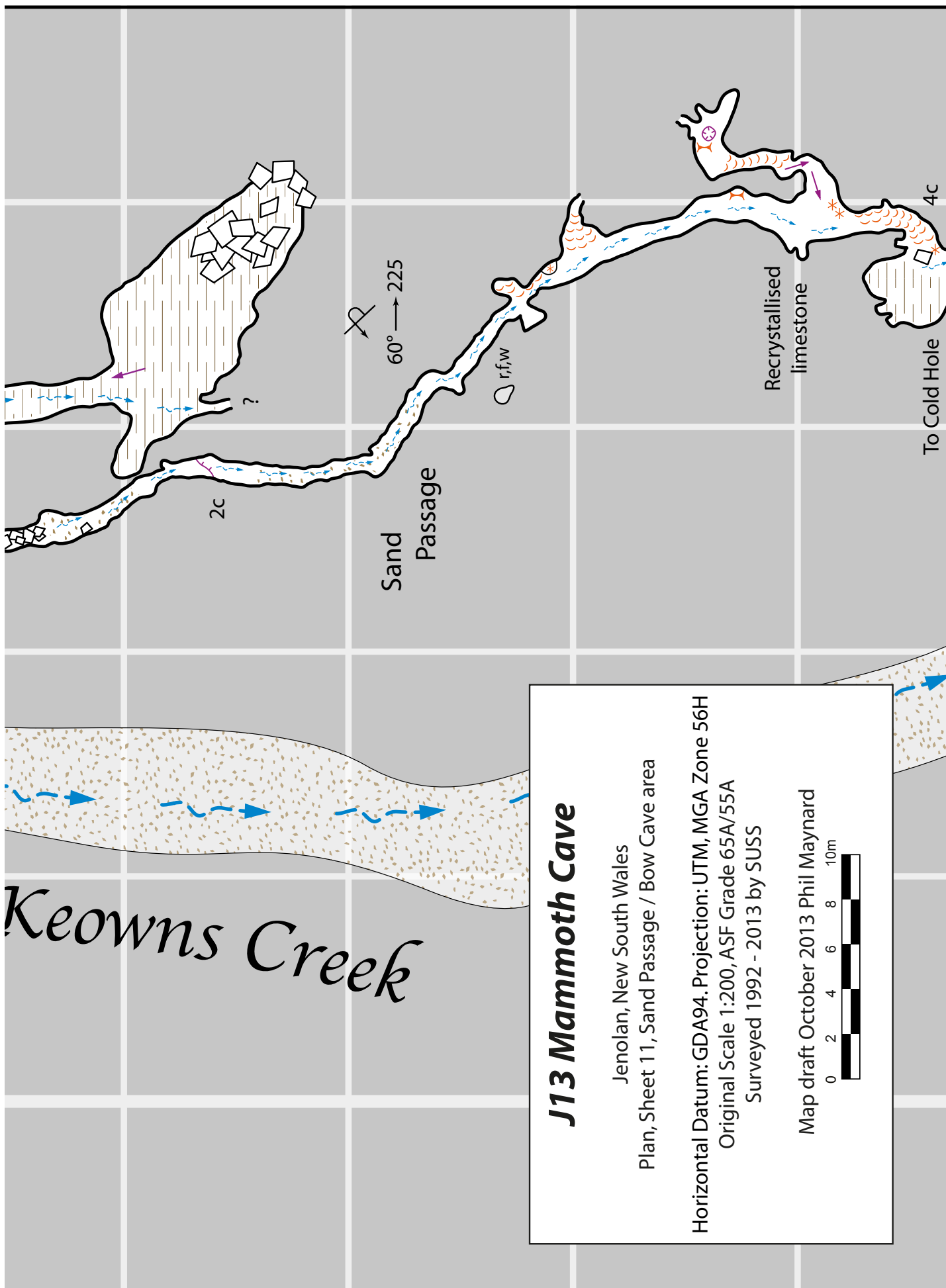
J13 Mammoth Cave
Jenolan, New South Wales
Plan, Sheet 10, Cold Hole area

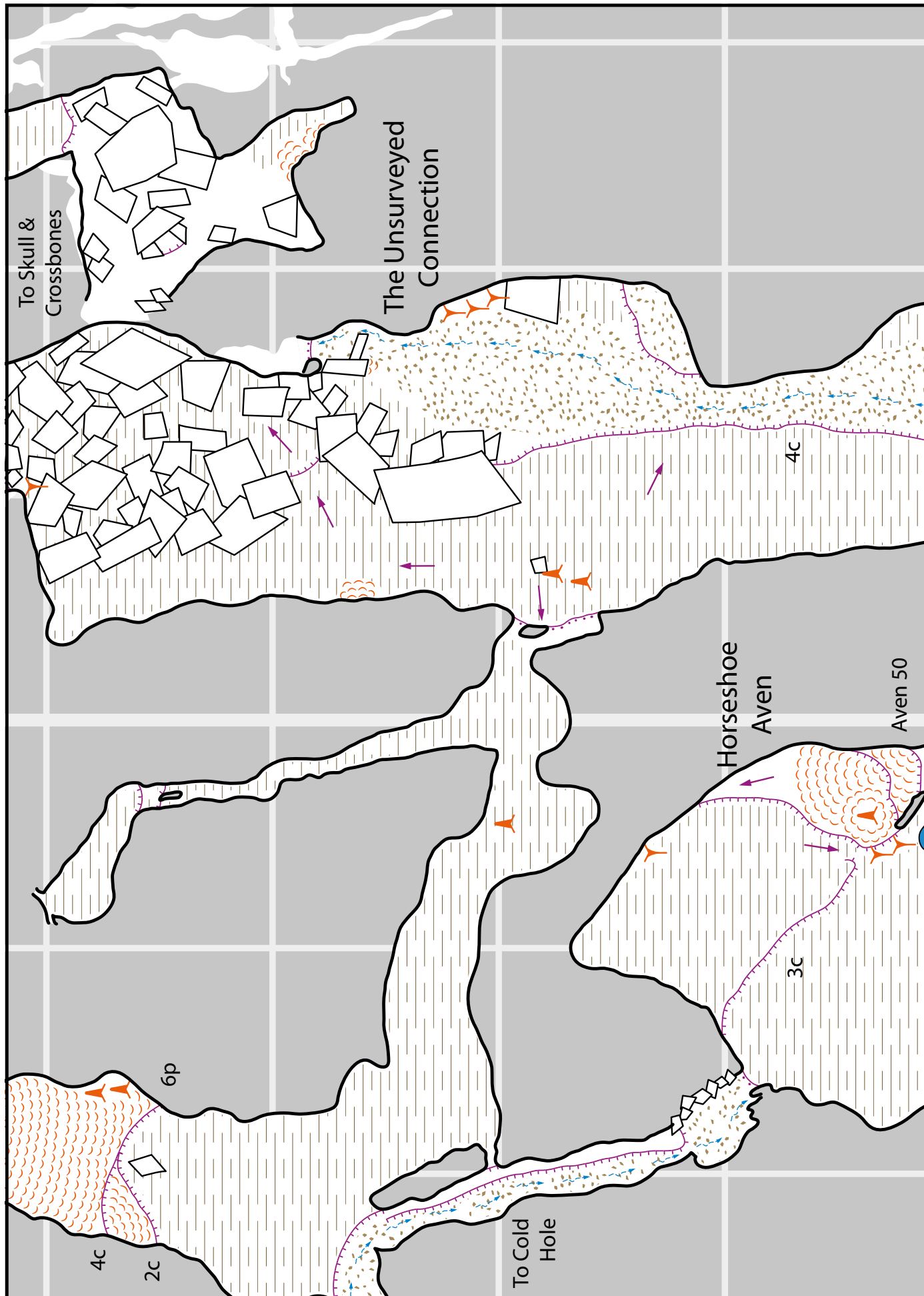
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Surveyed 1992 - 2013 by SUSS

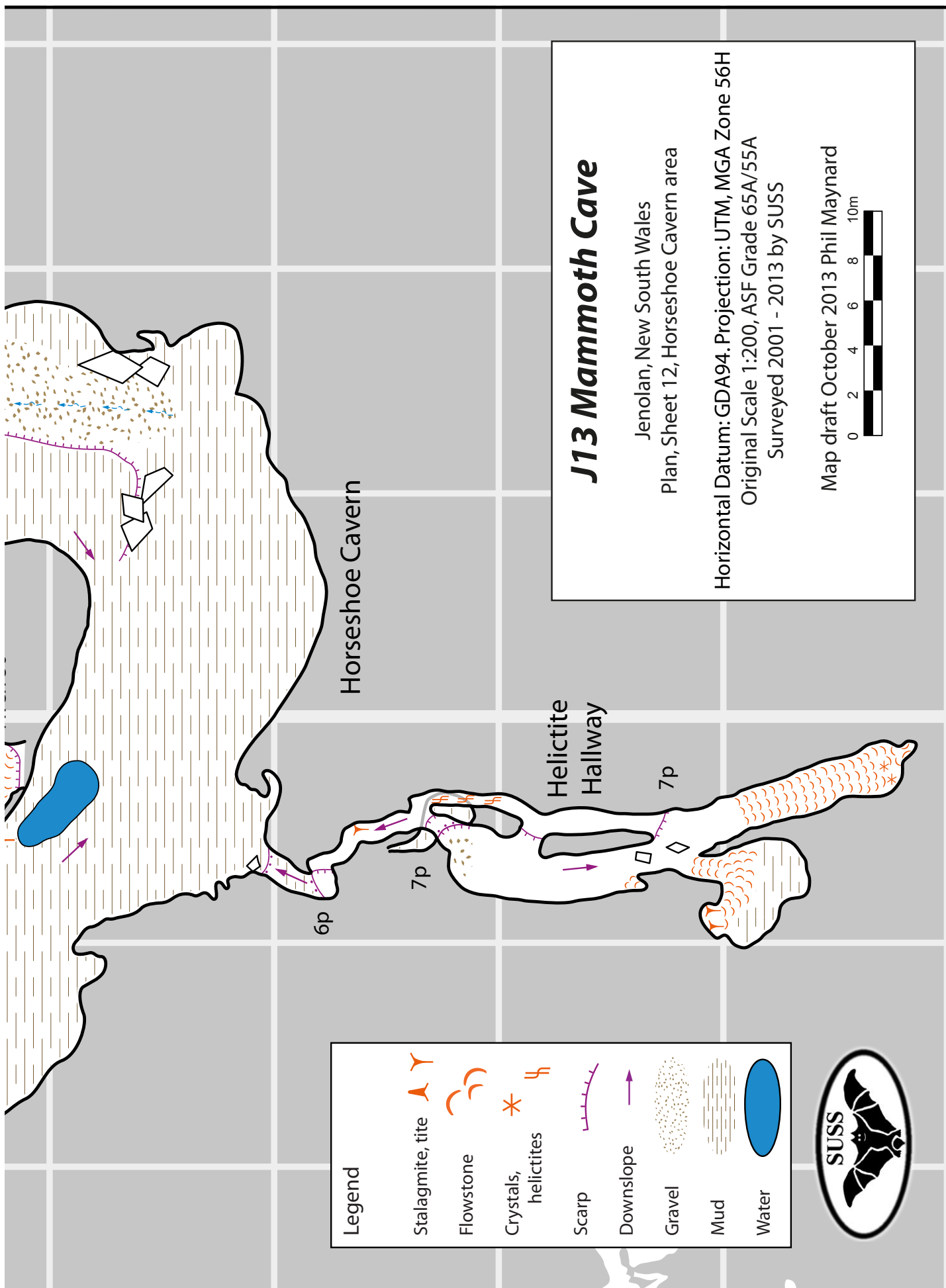
Map draft October 2013 Phil Maynard

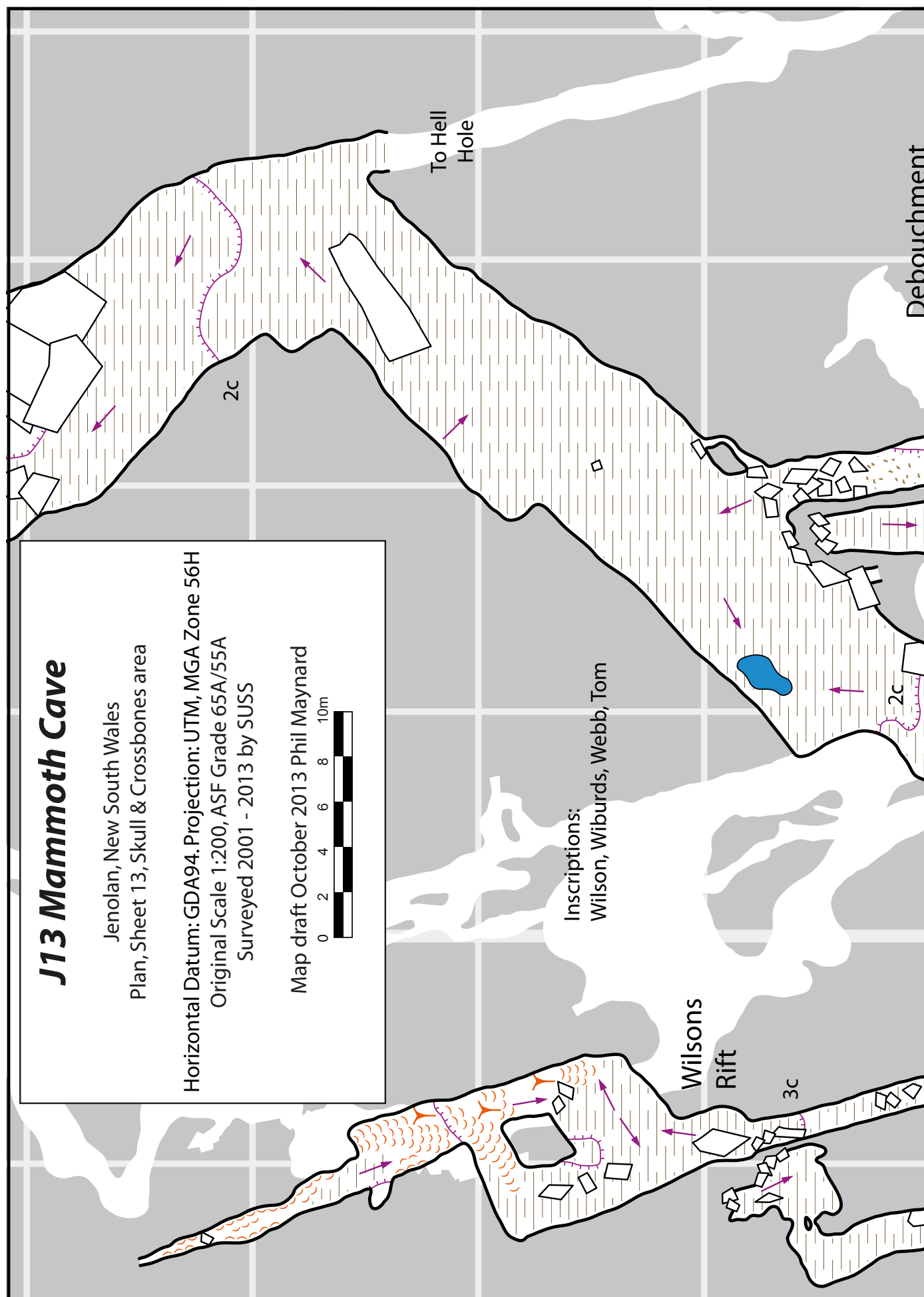


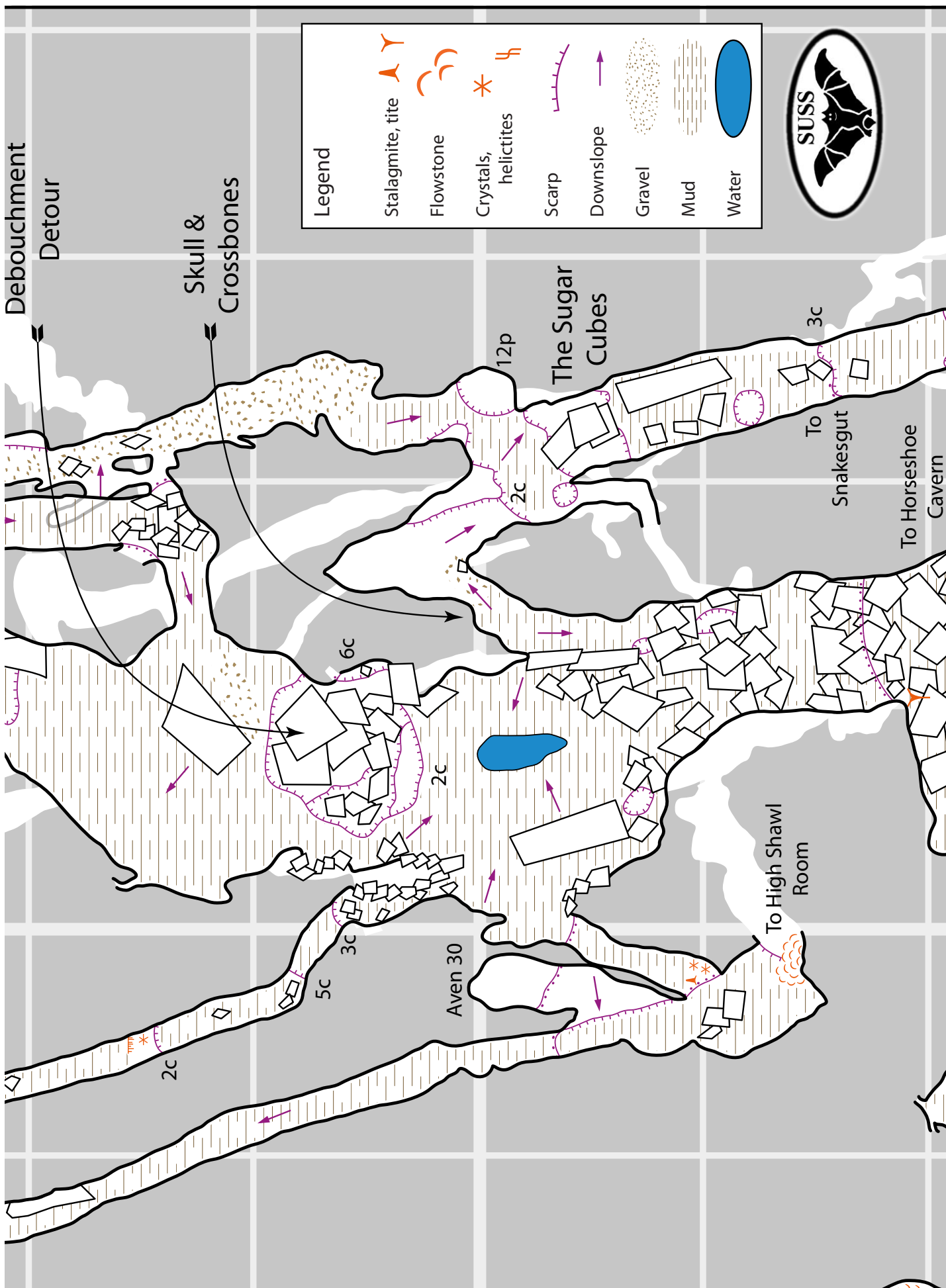










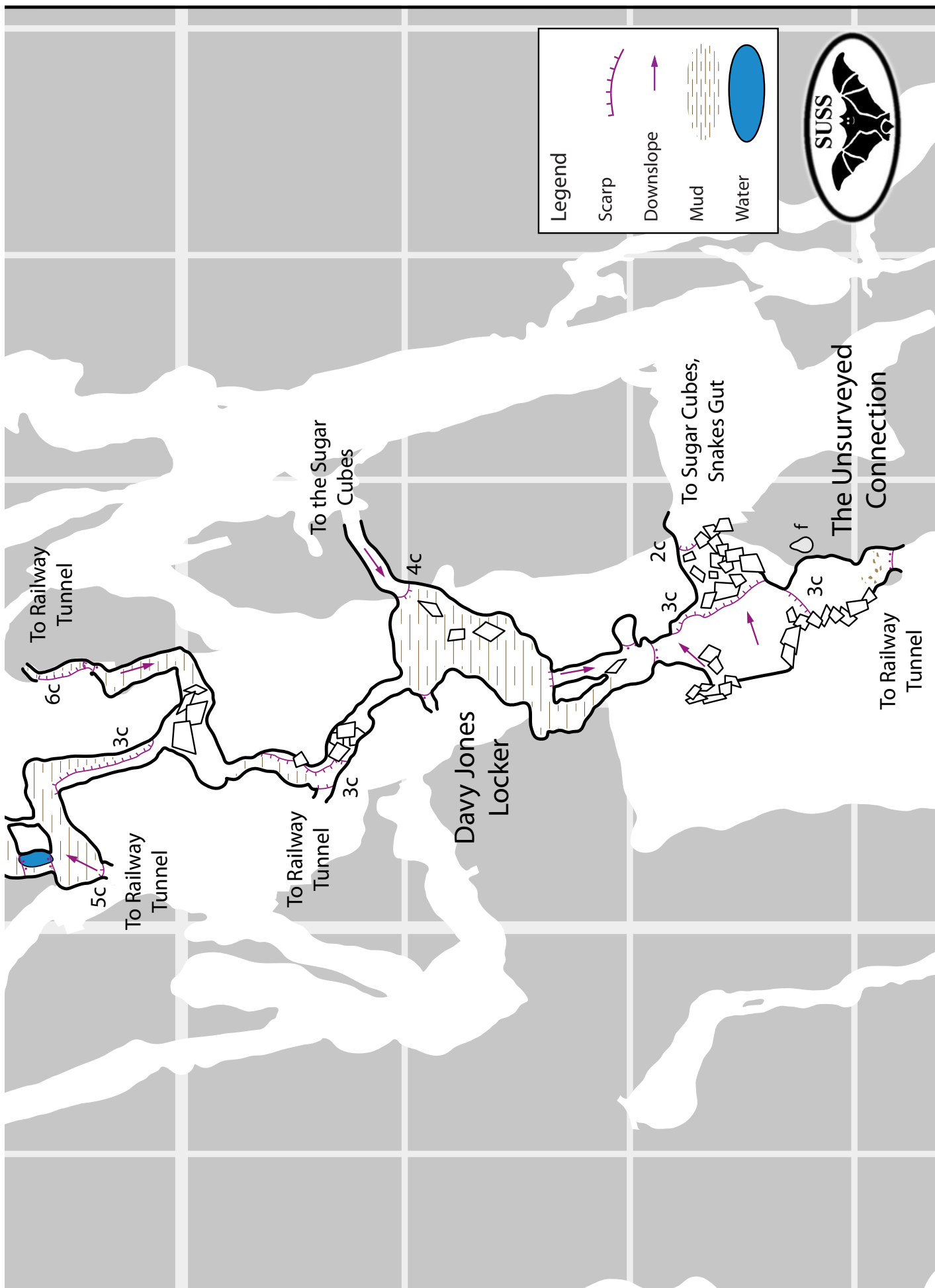


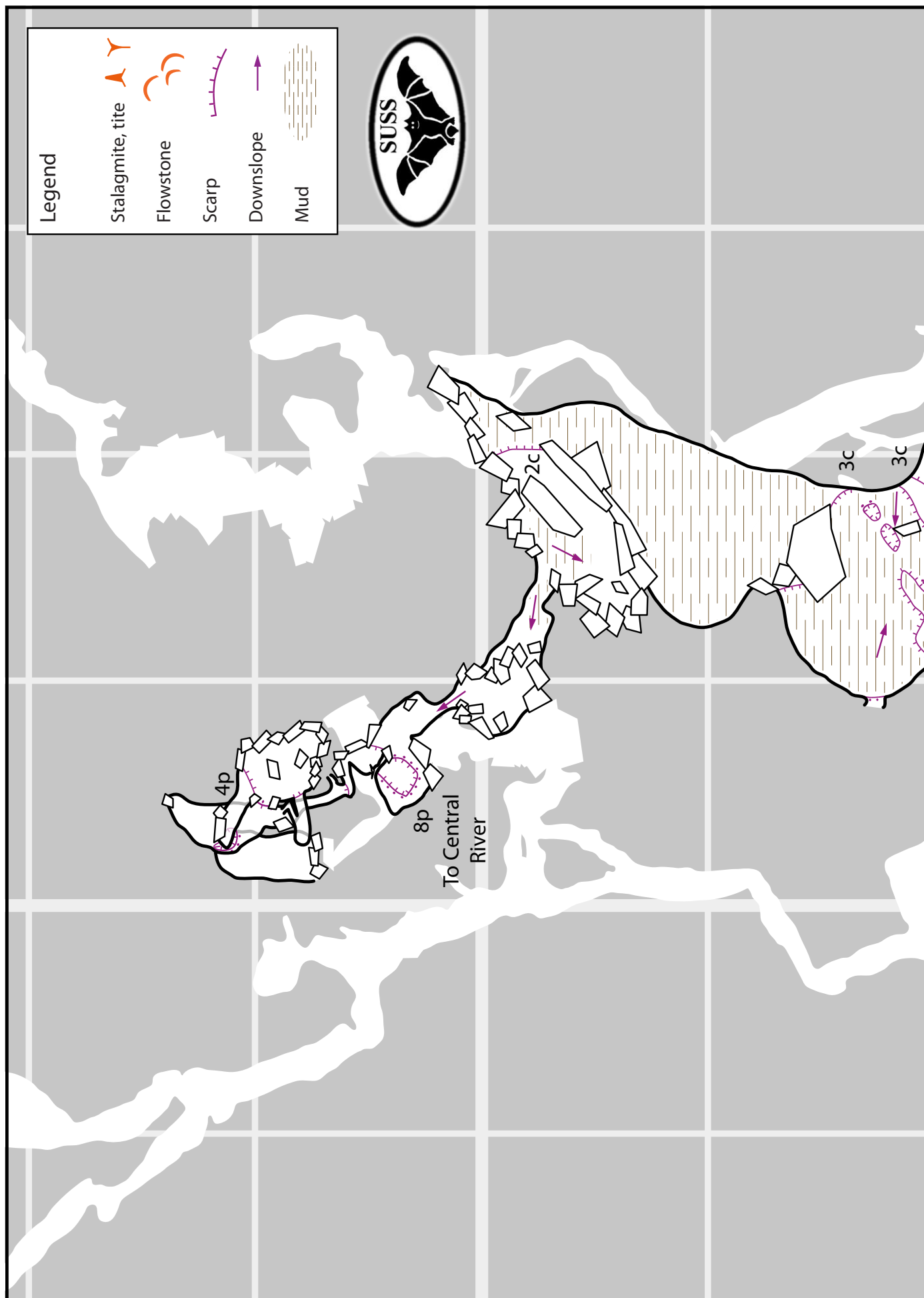
Jenolan, New South Wales
Plan, Sheet 14, Debouchment Detour area

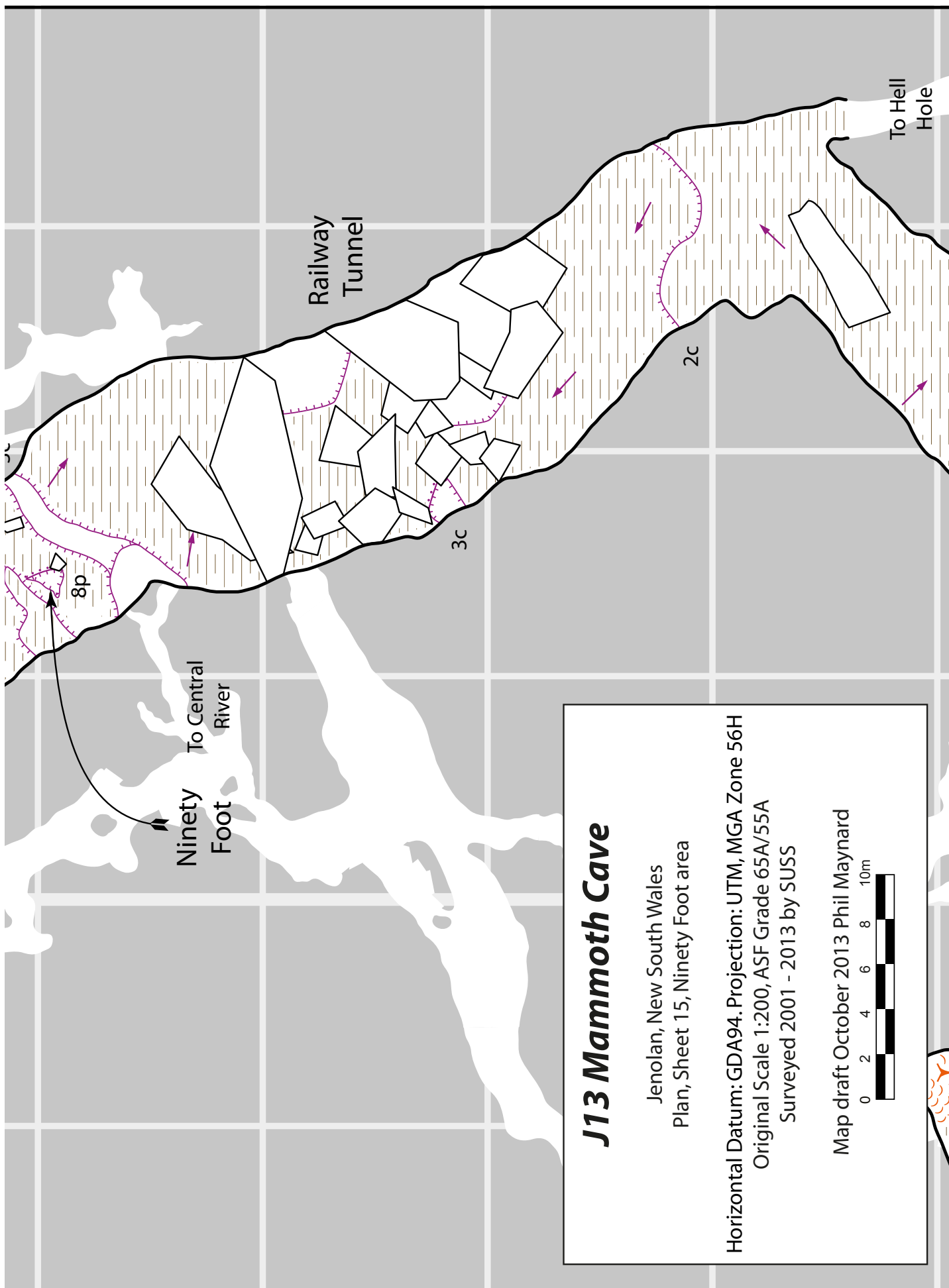
Horizontal Datum: GDA94. Projection: UTM, MGA Zone 56H
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2001 - 2013 by SUSS

Map draft October 2013 Phil Maynard









J13 Mammoth Cave

Jenolan, New South Wales
Plan, Sheet 16, High Shawl Room

Horizontal Datum: GDA94. Projection: MGA Zone 56H
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2005 by SUSS


Map draft October 2013 Phil Maynard



Legend

Stalagmite, tite 

Flowstone 

Column,
helictites 

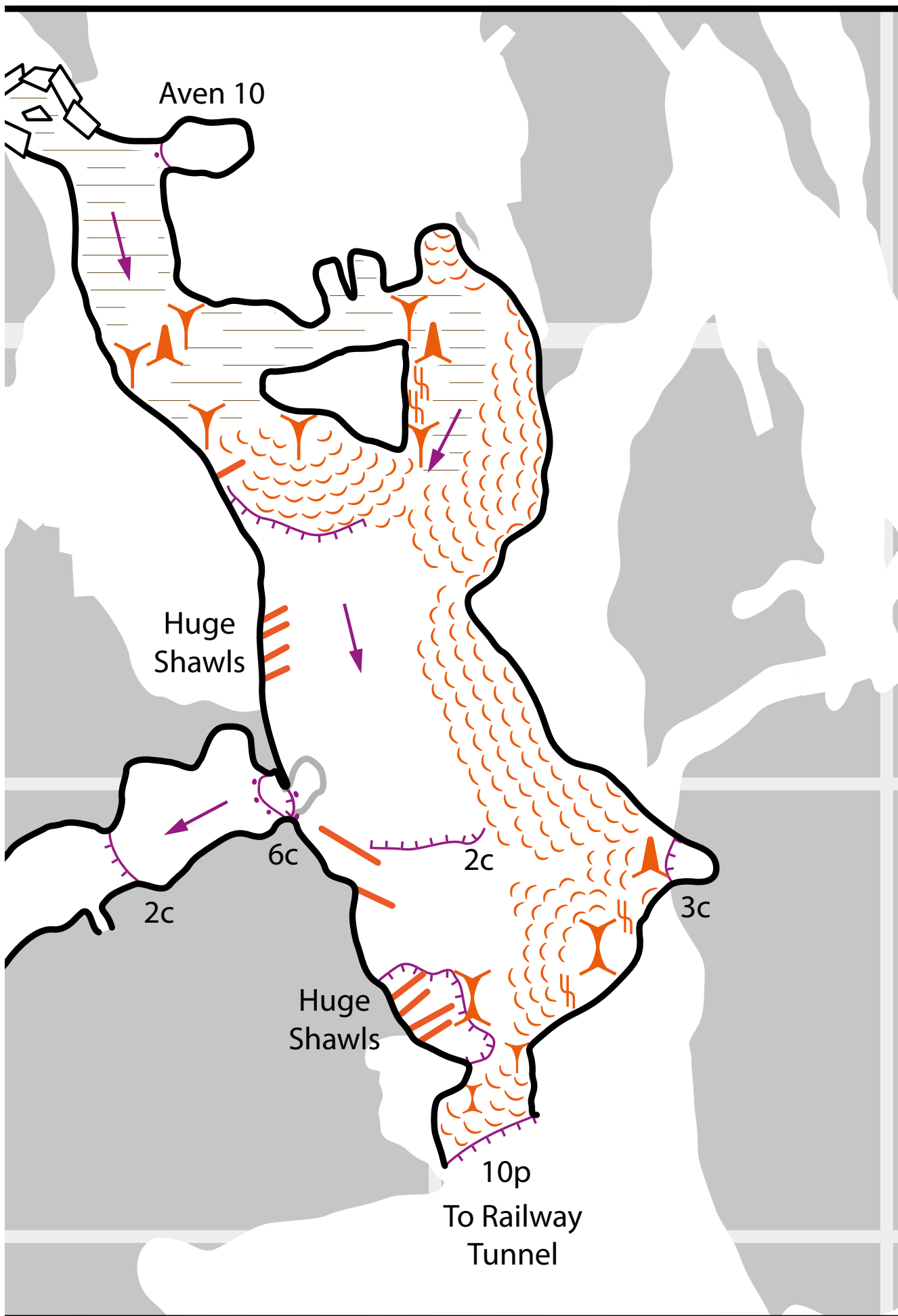
Scarp 

Downslope 

Mud 

To Railway
Tunnel

2c

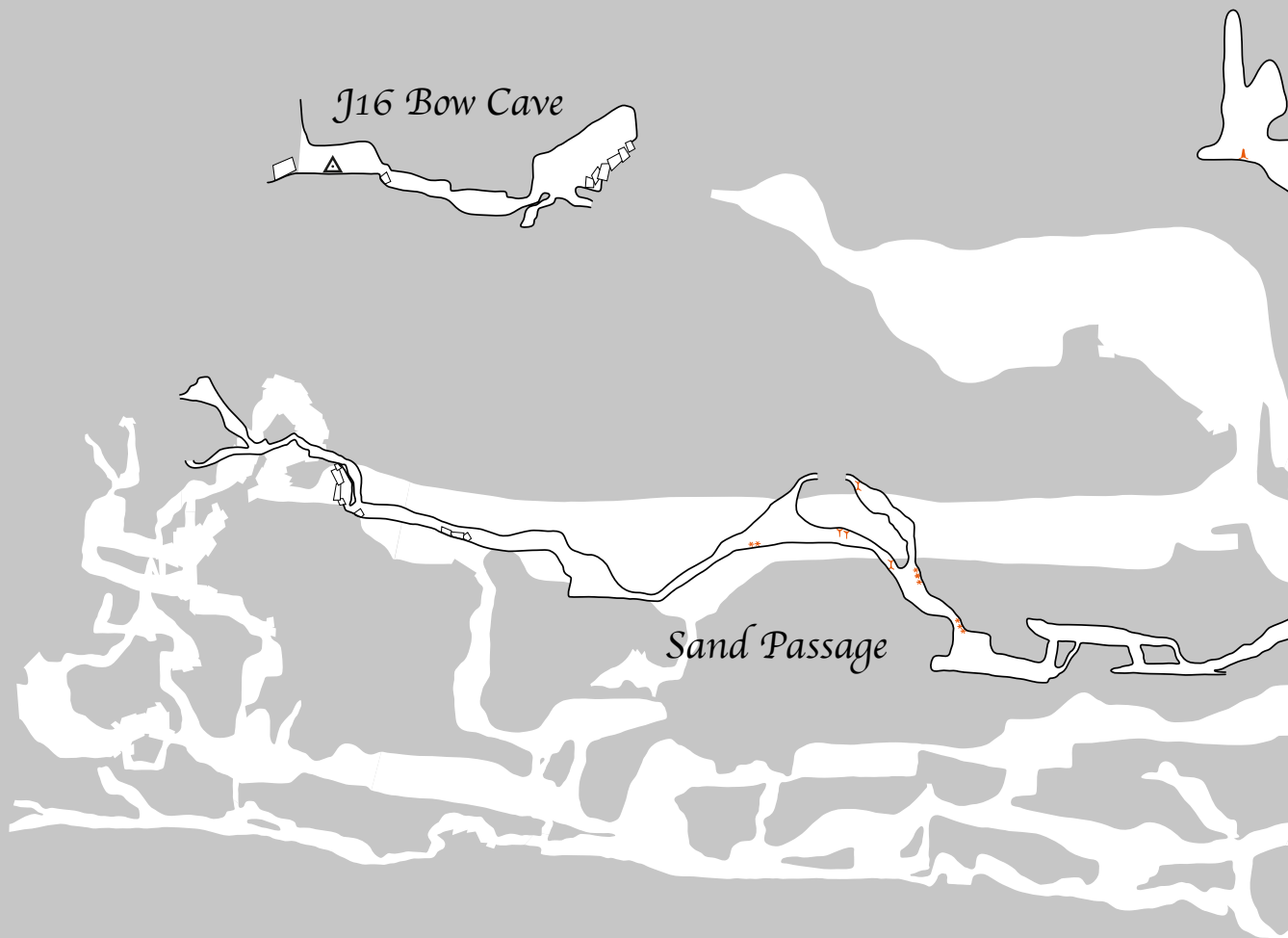


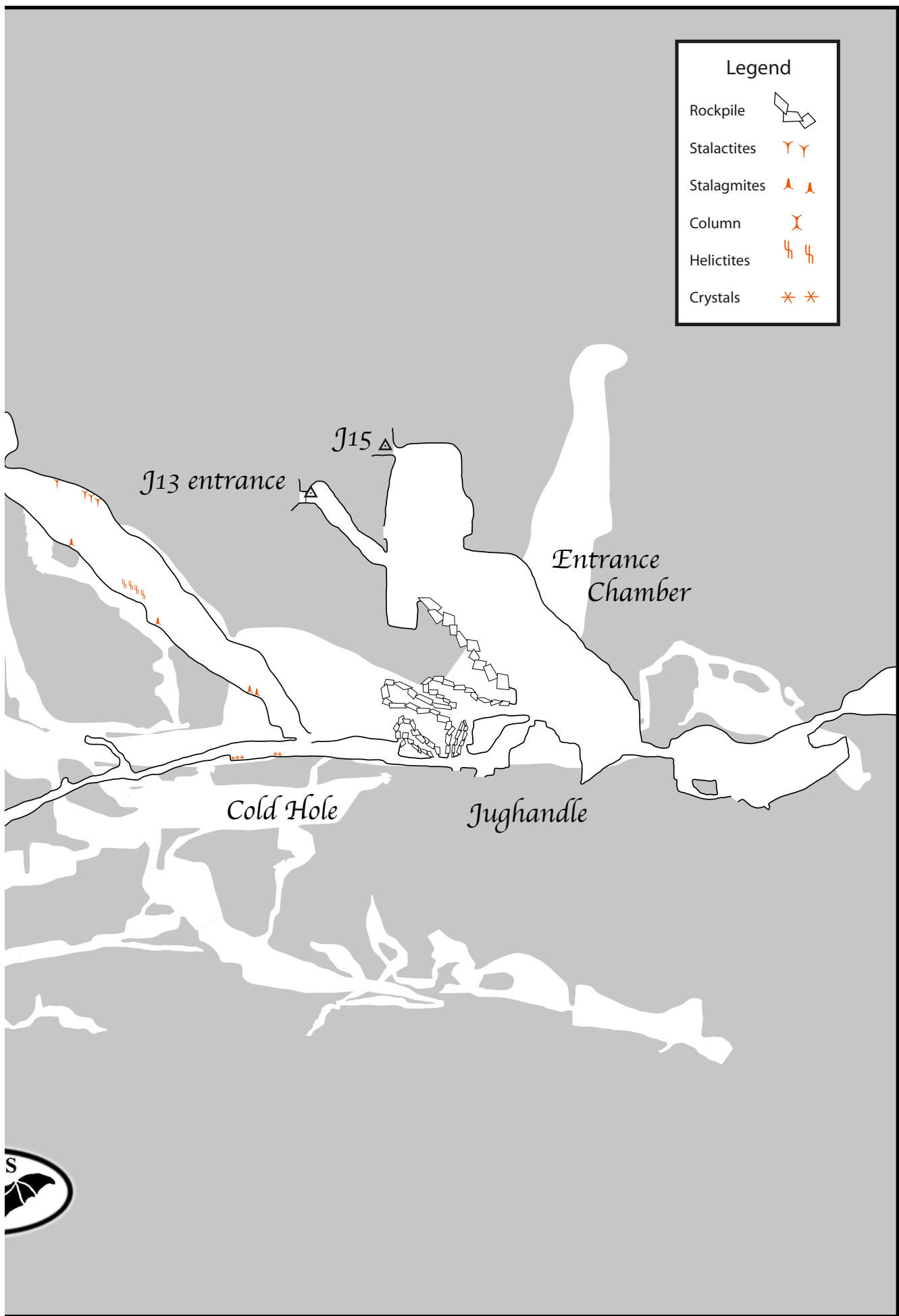
J13 Mammoth Cave

Jenolan, New South Wales
Elevation, Sheet 3, Sand Passage

View towards 080 grid MGA, No Vertical Exaggeration
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 1992 - 2013 by SUSS

Map draft October 2013 Phil Maynard



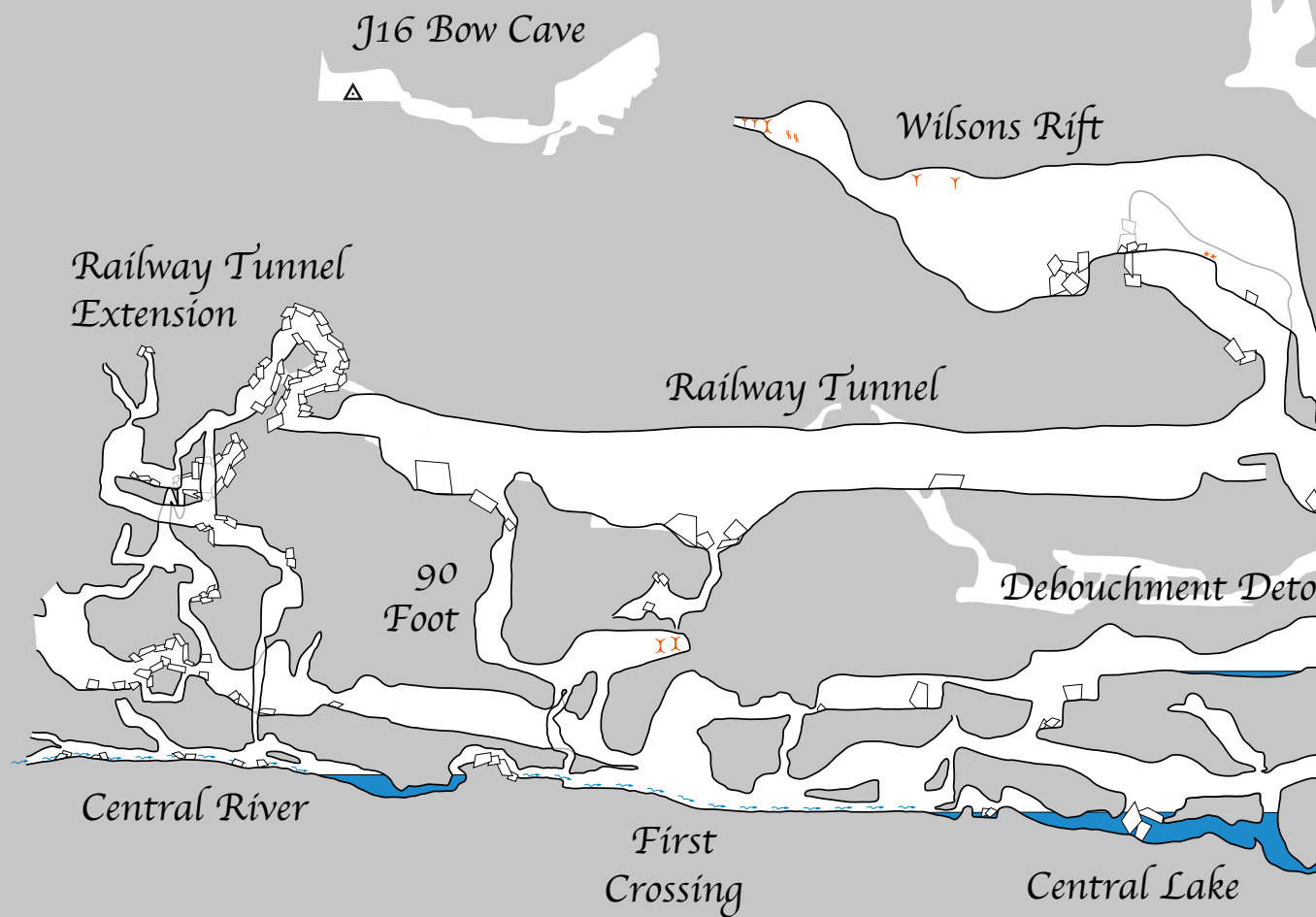


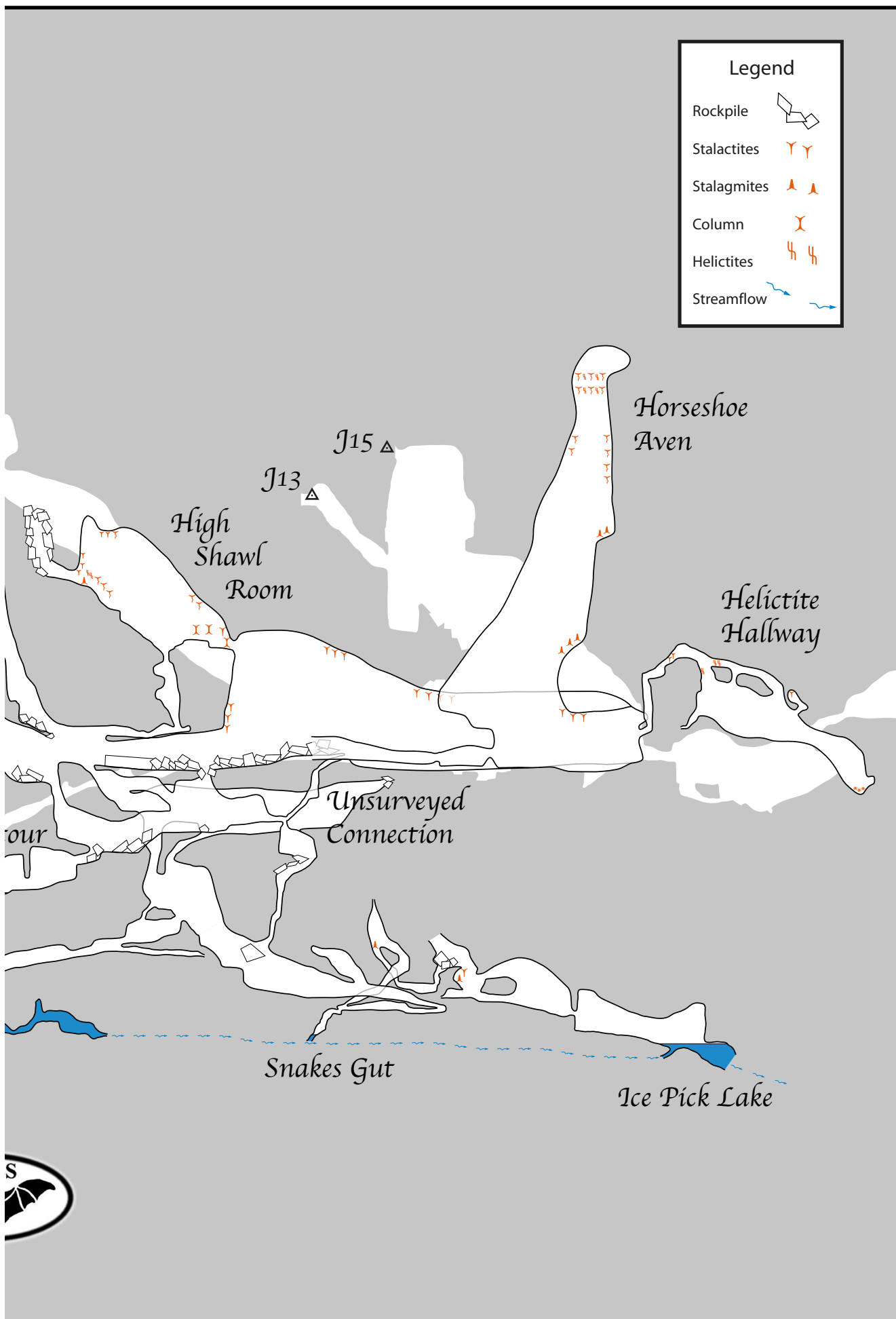
J13 Mammoth Cave

Jenolan, New South Wales
Elevation, Sheet 2, Railway Tunnel

View towards 080 grid MGA, No Vertical Exaggeration
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS

Map draft October 2013 Phil Maynard





Sand Passage

Sand Passage is the most significant inlet passage into Mammoth Cave. Water from the surface creek enters Sand Passage through several pathways, most obviously via Bow Cave, J16. Where most surface water at Jenolan enters the underground system through sinks in the gravel bed of the surface creeks, Bow Cave is a classic swallet. During high flood events, the cave can absorb in excess of one cumec [17], [18]. The cave is full (and on occasions overfull) of debris from past flood events. From Bow Cave, water flows through an impenetrable slot and down to Sand Passage below.

Water also enters Sand Passage through two routes out of the bed of McKeowns Creek [19]. The Gunbarrel is a rockpile aven near the northern end of Sand Passage which lies directly under the bed of the surface creek. During flood events it takes a significant, unknown volume of water flow. The other entry point for water into Sand Passage is the northern extremity of the passage. This is a tight bedrock squeeze which is notable as the only point in Mammoth Cave lying to the west of the bed of the surface creek. Water entering at this point is most likely from the bed of the surface creek, but could also flow from under Dwyers bluff to the west. This inflow is volume-constrained by the size of the squeeze.

Sand Passage is largely a bedding plane rift, and carries a high flow rate of water during flood events. There is evidence of flood debris on the roof at multiple points of the passage, as well as sediment banks on the floor. Before the southern end of the passage, water leaves via impenetrable slots and is presumed to re-appear at Forty Foot in southern section (See the article on Southern Section [1]). In high floods, water flows up to the entrance of Sand Passage. At the southern end of the passage, water flows out of Sand Passage at Cold Hole. In a flood event, the initial flow in Cold Hole is to the south, down to Forty Foot and into Southern Section and eventually to Lower River. Water also enters Cold Hole through a rockpile from the north [20]. This water is sourced from a sink in the bed of McKeowns Creek.

Horseshoe Cavern/Unsurveyed connection

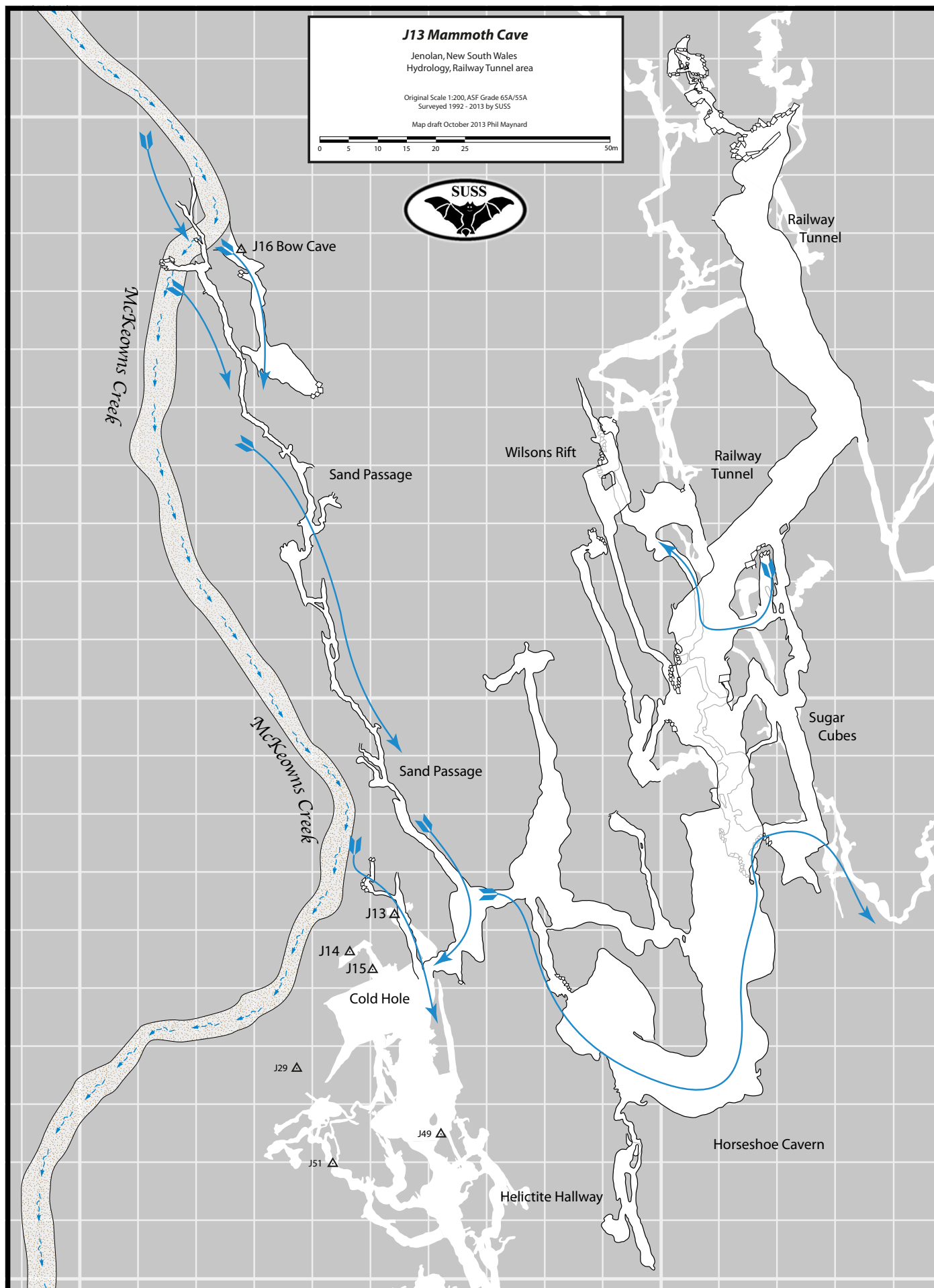
In a major flood, flow from Sand Passage overwhelms the capacity of the passage to Forty Foot. Excess water at Cold Hole flows to the east and enters Horseshoe Cavern. This water can fill Horseshoe Cavern waist deep in short order [18], [21], [22]. From Horseshoe Cavern, water flows north to Unsurveyed Connection. There is no water flow north of Unsurveyed Connection in Railway Tunnel. Water flows down through the tight and volume-constrained passage in Unsurveyed Connection to the rockpile south of the Sugar Cubes. This rockpile connects down to Snakes Gut and the water is then in the Central River catchment. The ultimate destination in the cave of all water in Central River is Ice Pick Lake.

Inlet at Railway Tunnel

A high aven in the central area of Railway Tunnel is an apparently permanent water inlet. Water from this aven enters Railway Tunnel as a constant trickle and then splits and flows down De-bouchment Detour as well as into Railway Tunnel itself.



Unsurveyed Connection. Photo by Paul Lewis



Surveyed length	1,825 m
East-West extent	118 m
North-South extent	210 m
Vertical extent	65 m
Dates of survey	15/12/1992 – 10/12/2010
Number of survey trips	22
Number of surveyors	29



***Megan Pryke and Ian Cooper surveying with the forestry compass in Horseshoe Cavern.
Photo by Alan Pryke.***

This highly-complex section of a highly-complex cave was as difficult to survey as it was to draft up. Sincere thanks to the 29 cavers who volunteered – it's all voluntary labour here, folks. The main traverse of the cave was conducted with a forestry compass: Cold Hole – Horseshoe Cavern – northern end of Railway Tunnel, and down Debouchment Detour to First Crossing. The side passages and loops were surveyed with Suunto compass and clinometer up until 2010, and with a Leica Disto X subsequently. The forestry compass and the Disto X are capable of ASF Grade 6 survey, while the Suuntos give ASF Grade 5 survey in easy terrain – and worse in rockpile squeezes!

Surveyed on more than five trips: Philip Maynard, Ian Cooper, Mark Staraj.

Surveyed on up to five trips: Annalisa Contos, Shannon Crack, Simon Goddard, Chris Norton, Gary Whitby, Steve Contos, Matt Fischer, Steven Kennedy, Rod Obrien, Jenny Whitby, Thomas Cunningham, Darren Dowler, Mark Euston, Alison Fenton, Michael Fraser, Damian Grindley, Sean Hill, Rowena Larkins, Aaron Lloyd, Max Midlen, Tim Moulds, Steven Peachey, Alan Pryke, Steven Tidman, Tina Willmore.

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- [21] Randall King, “A Wet Week Wading the Wintry Waters of Jenolan”, SUSS Bull 14(9), 106–111, 1974.
- [22] Rik Tunney, “More Water (Too Much?)”, SUSS Bull 13(10), 126–128, 1974.

PICTURE GALLERY



Thylacine Jaw bone, Midden Cave, Jenolan. Photo by Alan Pryke



Bones, Midden Cave, Jenolan. Photo by Alan Pryke



Felix Ossig-Bonanno, Sydney Smith Cave, Jenolan. Photo by Tina Willmore



Thylacine Jaw bone, Midden Cave, Jenolan. Photo by Tina Willmore



Phil Maynard, High Shawl Room, Mammoth Cave, Jenolan. Photo by Alan Pryke



Rod Obrien in Mammoth Cave light beam, Jenolan. Photo by Deborah Johnston

THINGS TO BUY

For postage and handling costs and the details of how to order go to the SUSS website <http://ee.usyd.edu.au/suss/> and click on "Publications". There you will also find a range of must-have maps and other publications.

Maps and Bulls on DVD

The entire SUSS cave map library of over 300 maps is on DVD and available for purchase. Our map library was scanned to provide wider access to the maps for SUSS and other ASF Caving Clubs and to ensure that many copies exist in the event of the loss or damage of the originals.

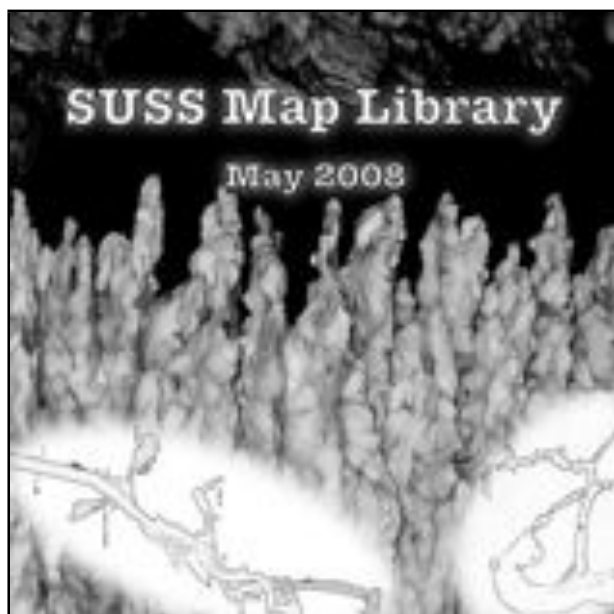
There are field sketches, ink maps produced on drafting film, ink maps produced on linen, as well as some of the latest digitally-produced cave projects. The DVD also contains all SUSS Bulls in HTML format from 35(1), July 1995 to 47(4), March 2008 and SUSS Bulls as PDF format from 42(1), April 2002 to 47(4).

Price is \$25.00 + PH. Pick one up at the next SUSS meeting or if you can't make that then contact the treasurer and they can supply you with the SUSS publications fund bank BSB and account number for a direct deposit.

Tuglow Caves

By Ian Cooper, Martin Scott and Keir Vaughan-Taylor. 1998, 70 pages.

Examines caving procedures, site descriptions, history, biology, surveying and maps, geology and hydrology of Tuglow Cave and others. Cost is \$13 for members and \$16 for non-members + PH.



A must-have reference DVD for all cavers



The Caves of Jenolan, 2: The Northern Limestone

Edited by Bruce R. Welch. 1976, 140 pages.

We still have some copies of these books left. Contains maps and descriptions of many caves in the Northern Limestone section of Jenolan plus notes on the history of Jenolan and its geology, geomorphology and hydrology. Cost is \$8 for members and \$10 for non-members + PH.

TRIP LIST: FEB 2014 TO MAY 2014

SUSS General Meetings are held on the first Thursday of the month at 7:00pm (for a 7.30pm start) in the Common Room in the Holme Building at the University of Sydney.

For updates to this list, check out the SUSS Website: <http://suss.caves.org.au>. Detailed information on each caving area (plus other useful information such as what you will need to bring) can be found in the *Beginner's Handbook* section of the Website.

Please Note: it is YOUR responsibility to inform the trip supervisor of any relevant medical conditions which may in any way affect your fitness, such as asthma, diabetes and the like.

Feb

1–2 Wombeyan. A beautiful camping ground in the Southern Highlands, with caves to match! Contact Tina: tinawillmore@gmail.com

6 General Meeting. Holme Building, 7.30pm.

8–9 Jenolan. Our constant lair. Reside within the lavishly appointed Speleologists' Residence. Contact Rowena: rowena1234@hotmail.com

15–16 Canyoning. Make the most of the still-warm summer weather. For a wet and wild time contact Denis: dstojanovic91@gmail.com

22–23 Bungonia. Sporty caves for the less experienced; lots of ropework for the more experienced. Contact Will: william_slee@hotmail.com

Mar

1–2 Wombeyan. Relax in the Southern Highlands after having great fun in the caves. Contact Phil : Philip.Maynard@uts.edu.au

6 General Meeting. Holme Building, 7.30pm.

8–9 Jenolan. Stay at the Luxurious Caver's Cottage, and enjoy our regular haunts. Contact Maddie: m.logan330@gmail.com

15–16 Canyoning. Don't miss out on doing some canyoning this Summer. Contact Denis: dstojanovic91@gmail.com

22–23 Training Day. Learn the ropes. Contact Thomas: taw.wilson@gmail.com

29–30 Wombeyan. A place of beautiful scenery, fun caving, and great camping. Contact Alison Chau: a.d.chau@gmail.com

Apr

3 General Meeting. Holme Building, 7.30pm.

5–6 Borenore. Coincidentally Orange Food Week is on the same weekend. Caving and gourmet food in one trip. Contact Will: william_slee@hotmail.com

12–13 Jenolan. Our constant lair. Reside within the lavishly appointed Speleologists' Residence. Contact Denis: dstojanovic91@gmail.com

18–21 Spend Easter with SUSS. Watch out for the newsletter or on the web site for more details.

25–27 Spend Anzac day long weekend with SUSS. Watch out on the web site, or newsletter for more details.

May

1 General Meeting. Holme Building, 7.30pm.

3–4 Wombeyan. For details see triplist closer to the date.

10–11 Jenolan. For details see triplist closer to the date.
