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Lumen in Tenebris

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Cover Photo: **Lower River, Mammoth Cave, Jenolan, Sept 2006.**
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NEWS AND GOSSIP

They said that?

"Are we heading to the cave now? Just wait, I had better charge my batteries."

"Pity I only brought two bottles of wine for the weekend. Next time I better bring more"

Which single SUSS female, on being introduced to a gentleman from Quebec, asked him if he would like to sleep with her that night?

Committee Relationships

It should be noted that after years of denying it, two committee members have become an item.

Movember is just around the corner

Celebrating Movember?

See if you can outdo Voss Wiburd!

In the News

Bat research
An Aussie Scientist counts bats at Wee Jasper
http://www.canberratimes.com.au/act-news/girls-night-out-as-bat-cave-empties-20120129-1t7sj.html
IR footage of bats leaving Drum Cave at Bungonia
http://www.flickr.com/photos/nswnationalparks/3550893704/

Heading up to the mountains? Want to know what the weather is like at Katoomba? Have a look using this webcam site!
http://www.scenicworld.com.au/explore-our-world/take-a-look/web-cam/

In this Bull

This Bull contains the first set of the maps of Mammoth; the Southern Section. Many thanks to Phil for his many hours of drafting the maps and leading survey teams to get a great survey.
(even more thanks to him for typesetting this for me, making my job a whole lot easier).

Project Progress

Jenolan

Suss has recently surveyed and mapped the previously unnamed cave J314. Given it is a nice big abseil cave we deemed it worthy of a name. We have called it Bifröst after the crystal bridge prominent in the cave.

New Zealand

Recently, mapping of new, and unmapped, caves in the Waitomo area of the North Island of NZ is progressing, with Moa Cave, Mahoenui expected to reach 2 kilometres of stream passage in 2014.

Helpful Hint number 145

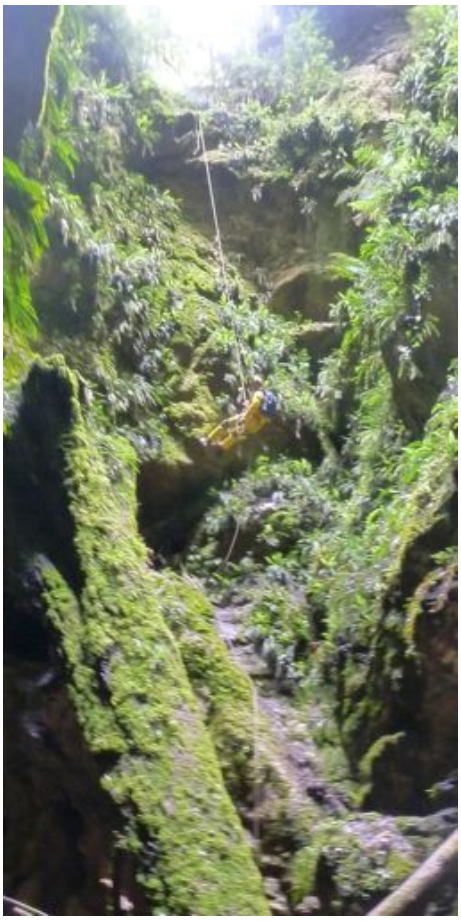
Often on a Sunday afternoon, when staying in a hut, there are people hunting everywhere to find lost sleeping bag covers (I have a spare in my car that was left behind some years ago – Ed). To make sure you can find your sleeping bag case when packing up from a stay at a hut why not attach the case to your sleeping bag using the draw string.

WHIRLWIND TOUR OF IDA BAY - CHRISTMAS DAY 2012 TO NYE 2013

BY DEBORAH JOHNSTON

Participants: Deborah Johnston, Phil Maynard, Mel Stamell, Seamus Breathnach. Special thanks to: Geoff Wise (guide), Alan Jackson and Tony Veness (STC oracles of information!)

Melanie Stamell, Phil Maynard and I all met up at Sydney airport on Christmas Day to escape down to Tasmania. We exchanged looks of mild alarm when picking up our spotless brand new hire car, but quickly filled it up with bags and began doing laps of Hobart for dinner before heading down south to Ida Bay. We reached the Ida Bay Railway by 9pm and checked into our cosy railway cabin for a good nights sleep.



Seamus abseiling Wolfhole. Photo by Deborah Johnston

We awoke the next day to very un-Tasmanian gorgeous weather. It didn't take much convincing from Phil to have us leave the helmets and trog suits packed and head down the road to hit the South Cape day-walk instead. We had realised in advance there would be no shops open these two days, so had a good brekkie at the Ida Bay Railway cafe, and snacked on bits and pieces we had packed in our luggage before leaving Sydney. We all packed our swimmers but only Phil was brave enough to venture past big-toe depth into the frigid ocean before we head back. Like with all good walks, you can have the track all to yourself. . . right up until answering natures call of course, which is just two long moments before a guy with a gopro camera rounds the corner.

The next day we drove into Huonville to get our groceries for the trip, and to pick up Seamus. We then made our way down to the Hastings Tourist caves (with some well decorated dolomite caves explored and mapped by SUSS in the past) to pick up the keys and permits. Unfortunately the slot containing the envelope of keys and permits is only big enough for a childs hand. Luckily a lady was nearby with two children, so I asked to borrow one for a minute, and she didn't seem too worried as I carried it off. Creepy little child hand did the trick, so we returned the kid, noted the thermal pools for later, and set off for Wolf Hole which I believe is not as popular as the other caves in the area, but has reports of a largish lake inside that I wanted to see. We were warned to allow extra time for getting lost despite the 15minute walk time, and were pleased to find the large entrance doline in about 20 minutes thanks to the STC directions and GPS. We rigged down the mossy walls of doom, and unfortunately missed the bolts that allowed a rebelay out of a particularly ordinary mud-slope abseil at the end. We had a map of the smallish cave, but instead we spent a few hours zooming around enjoying some random exploration, noting a few areas of nice formation, and a few large native cave spiders. We didn't stumble across the lake before retreating back in time to visit the thermal pools . . . or so we thought, as we found they closed a full hour before our arrival that time of year.

Friday we excitedly head off in the other direction and parked in the Mystery Creek carpark, setting off down the well maintained walking track with boot washing station, and antique bottles and leather shoes littering the bush, left over from mining camps in the past. We reached a small quarry, and were almost at the cave exit before heading straight up the hill, following the tape marked track to the Midnight Hole pitch entrance (with an extra half hour or so of geographical embarrassment thrown in for good measure). The cave did not disappoint with a series of great pitches (with nice new bolts by STC) ending in a short crawl then opening out into Mystery Creek Cave which was short but packed a punch, especially the final chamber before the large exit which is worth a trip just to see for the glow worm display.

Saturday we were all up early to meet Geoff Wise who had driven down from Hobart to be our guide for the day. We set off in the muggy weather for the longish walk up and over the mountain, down into the valley on the other side, heading to the valley entrance of Exit Cave which is where we started our through trip. Seamus suffered a slip near the start of the cave and sustained a hand injury, but soldiered on through the rest of the long day without one complaint. Geoff was a faultless guide, keeping us on time so we could explore a couple of side bits on the way, and updating us on the history of the caves exploration, including the Exitraveganza mapping trips that SUSS have assisted in the past. Before we knew it we reached the final chamber which has several side sections we had decided to save for the next day, so we crossed the knee high river (noting the safety traverse line much higher as an

indication of how high the water level gets) and made our way back to the railway cabin for the night where we cleaned and packed gear as best as possible.

The following day we head back to Exit Cave where we had exited the day before, and spent the day exploring the areas nearby including the Ballroom, before returning to camp to pack up for our disgustingly early start the next day. Oh so disgustingly early, we hit the road back to Hobart, and marvelled the irate cues of people who all seemed surprised that NYE was a busy airport day. Mel and I enjoyed the intermission of two seriously hunky AFP cops bringing an equally gorgeous sniffer dog through the cue, and how the only relaxed guy in the airport was taken aside after the sniffer dog practically did backflips over his luggage (in hindsight, that guy was TOO relaxed!). We made it back to Sydney in time to grab some kayaks and paddle out to the Sydney Harbour Bridge to enjoy the fireworks, a way I wouldn't mind ending every caving trip with!

Seamus in Mystery. Photo by Deborah Johnston

CAVE DIVING IN JENOLAN - JUNE 1-2 2013

Cave Diving in Downstream Imperial - Saturday and Sunday

BY DEBORAH JOHNSTON

Participants: Thomas Wilson, Al Warild, Ian Cooper, Deborah Johnston

The submerged sections of Imperial Cave between the tourist bridge and Blue Lake are known as Downstream Imperial. These passages were first mapped by Ron Allum and some other South Australian divers in 1979, and then remapped in stages from the mid 90s onwards. In the past 12-months, SUSS had resumed this mapping project and made great progress thanks to the efforts of many SUSS divers, especially Al Warild and Greg Ryan.

As Al and I drove through the rain to Jenolan on Friday night we hashed out our dive plan, and were surprised that the plan indicated finishing the main section of survey in just two more dives. Adding to our doubt, we both slumped up to the cavers cottage on Friday night full of snot and a solid dose of lurgy.

Throughout the evening the rain continued steadily and people were hesitant to commit to any one trip, instead choosing to wait and see what greeted them out the window the next morning. Unfortunately, the next morning brought the same drizzly view so we slowly pfaffed around with gear, topped up dive tanks with Keirs newly serviced compressor, downed multiple cups of tea, then trudged off for the day almost totally devoid of enthusiasm. Thomas Wilson generously offered to help for the day, and brought along his book of ancient Greek (or was it Latin?) to occupy his thoughts while waiting for the divers to return.

After checking in with the guides, we dropped our 7 heavy packs of gear in the Grand Arch then struggled into our thick wetsuits while answering questions for the large groups of interested tourists.

After letting the hordes enter the cave ahead of us , we made our way down to the river via the Woolshed, chaining packs and rigging a ladder down the short pitch. As the packs were lowered one-by-one to the river, there was a tense moment when a 12L dive cylinder (much heavier than the other 7l tanks) caused the handline to slip through the lowerers hands and came hurtling down the pitch much faster than anticipated by those above AND below!. Luckily the SUSSling below was already standing well back for safety and no cavers or tanks were harmed.

Al and Deborah geared up at the river, noting that the water flow was high but the clarity was clear. They began their dive and were at the back of the cave in just 5 minutes due to their familiarization with the passages from recent dives. They ran a dive line across to a side passage which has dive line that starts again out of view (to avoid divers wandering from the main passage accidentally). They noted that this side passage received virtually no water flow and is filled with mounds of very fine mud, and silt coating the scallops on the walls. They immediately realized this would be very difficult to survey as visibility could be reduced to zero with just one ill-placed hand, and no water flow to clear the silt. They proceeded very carefully and completed all of their desired survey legs down into the side passage. According to the dive plan, Deborah was to then proceed ahead and explore the passage ahead which goes into in a smaller phreatic loop which is chocked with the same fine, silty mud.

Eel, Imperial Cave, Jenolan. Photo by Deborah Johnston

Deborah took one look at the task ahead. . . and realized it was utterly horrible. Luckily she was close to her turnaround time having used almost 1/3 of the air in each tank, so did not have to search for additional excuses to get out of plunging into the dark, horribly, grovelly passage that day. A report from 1995 (SUSS Bull 38(3)) details SUSS first exploring this side passage and being held back by the silt and mud. On the way out, Deborah and Al looked for the resident eel which is often spotted in the short sump before the tourist bridge in Imperial so that it could be filmed for identification. As they exited, Deborah did not see the eel but did spot a neoprene dive hood up on the roof. As she reached up to grab the hood, her hand recoiled quickly when she realized it contained the tail end of the big, healthy freshwater eel. Al and Deborah watched the eel for a few minutes until it cruised away and they could retrieve the hood.

The next morning there was only one thing more horrible than how Al and Deborah were feeling with their colds, and that was the weather! At least thats what they thought at the time. Before unloading gear from the car, the group inspected the clarity of water in the river resurgence in Blue Lake. Al and Deborah were both secretly hoping this water would be muddied from the heavy rain, meaning they could join the other SUSSlings that were flaking out of caving in favour of “hut cave”. Unfortunately, the water was clear so they started getting ready for the day.

It was then they found the thing more horrible than the weather or their lurgy... the freezing cold, wet dive gear they had to put on! They groaned into their chilled gear and made their way back down to the river assisted by Ian Cooper and Thomas Wilson, and set off down the dive to complete some survey legs up a gravel slope which has become a squeeze due to recent floods moving massive amounts of gravel through the slope. Despite stirring up silt and they struggled through this restrictive section of passage, the high water flow meant that after just a few minutes the survey equipment could be read and the measurements were all recorded.

Diving, Imperial Cave, Jenolan. Photo by Deborah Johnston

Deborah exited the squeeze first and waited for Al in the large room beyond as he finished some data recording. While staring blankly at the wall dreaming of heat, Deborah was shocked to notice a very small bug crawling on the wall at about 11m depth. This creature is as yet unidentified, but hopefully a new troglobitic species so we call it the SUSSious Minimous! With plenty of air remaining but starting to shiver from the cold, Deborah made her way back to the side passage and this time noted a very old folding shovel sitting in the mud, presumably from the 1995 trips by Ron Allum, Keir Vaughan-Taylor and Kathy Savage. Before proceeding she needed to fix some dive line which had come untied from the wall, a simple task that took many long minutes due to shivering! She then went a little closer to the horrible silty passage before deciding it was just too gross to contemplate that day, and instead stirred things up as much as possible to dislodge the wall silt ensuring the visibility is better next time, then exiting.

On the way out, attempts were made to reroute the dive line in one section which follows a tight route, instead of a more spacious alternative off to the side, but a lack of suitable tie-offs were revealed as the reason for the routing. On the way out the divers noted a 2.5m long exposed crystal vug (paleokarst), an empty shell, an electricity cover box, a crushed VB can, and a curious infill of layered clays embedded in the limestone.

Realising that the main section of mapping was now complete, the divers enjoyed a very shakey handshake before chattering down the final section of passage and rushing to warmer places.

Cave Diving at BlueTongue - Saturday

BY KEIR VAUGHAN-TAYLOR

Participants: Roo O'Loughlin, Rita Mallison, Philip Maynard, Keir Vaughan-Taylor

We hoped to find a connection to the river section trending from the Lethe dive sections. This has been the forth dive in BlueTongue.

As usual we transported dive gear in containerised packs through the passages and rockpiles of the BlueTongue Pitch where we changed into wetsuits and assembled our dive kit. Roo and Rita are new to caving but did extremely well and Phil and I give special thanks for their efforts.

Previously a difficult squeeze was passed into a new section with smooth limestone wall rising through an aven surfacing in a small surface lake. The surface chamber looks onto a breakdown rock pile with a small inhospitable hole at the top of a slippery slope.

Any possible way on was lower in the aven. This trip we passed the squeeze with better visibility available. The cave structure beyond the squeeze is more like a cylindrical well but splaying out as you move upwards. A horizontal passage was apparent half way up the aven however attempting to navigate this passage proved impossible. A spare guide reel lost on a previous trip was recovered in this tunnel. We surfaced again in the airspace and made one last circuit looking for possible onward routes but none were found.

Returning to the BlueTongue Pitch we re-packed the dive gear. We then proceeded to inspect the Missing Link area again hoping to locate the missing section of river that cannot be far away. Some small avens were noted but nothing really found that might connect to the large water body somewhere not far away.

Cooks Cavern in the Missing Link area displays evidence of recent flooding to almost to the roof.

In this stage of the cave's geological development it is apparent that there is a restriction such as might be caused by rockfall perhaps downstream from BlueTongue Lake. The observed passage in BlueTongue Lake is insufficient for a person and may represent the restriction. We have experienced flooding at the BlueTongue Pitch. There may be a higher level not yet found where pooled water eventually escapes. Nevertheless the water reaches almost to the roof in Cooks.

We entered the cave about 10:45 and exited at 5:30.

UNRELIABLE MEMOIRS, WEE JASPER, 8-10 JUNE 2013

BY CHRIS NORTON

Participants: Thomas Cunningham, Rowena Larkins, Phil Maynard, Chris Norton, Will Slee

Note: Due to the difficulty of sourcing reliable historical documents for verification purposes, and the effects of the ageing process on mental faculties being as they are, the accuracy of information in this article cannot be completely guaranteed.

It was still Saturday morning – just. Rowena, Thomas and Phil were enjoying the sunshine on the lawn outside Cooradigbee Cottage, and communing with the goats, when Chris and Will arrived.

"Sorry we're late folks, but I left my wallet at home and had to drive back to get it," said Chris apologetically.

"Just in time, as these goats are really dull conversationalists," muttered Thomas. Rowena and Phil looked wounded. "No, no, I mean. . . anyway, what were you doing last night, Chris?"

"Well, you know. Something arty. Like all the cool young people like me do. Sitting in a dark room with loud banging and flashing lights."

"What, sort of like in Clockwork Orange, only voluntary?"

"Probably. Clockwork Orange is cool, right? It's a thing? I bet it's on YouTube."[1]

Of course the problem with getting to Wee Jasper late Saturday morning is that many of the caves were occupied. One of these days they will think to put in a convenient system with illuminated lights, like with aeroplane toilets, but for now the best way to work out which cave is full is to drive around and count 4WDs in carparks. The initial plan was to do Punchbowl but a high 4WD count meant the group moved to Dip – still plenty of cars but, with multiple entrances, easier to avoid bottlenecks of other people.

There was particular significance to this trip as it was the 30th anniversary of Chris' first caving trip, also at Wee Jasper. Those were the days – Australia won the America's Cup; a little tech startup called Microsoft released a program called Word; Michael Jackson told us to Beat It; Frankie said Relax! and we all passed it on via T-shirts; every girl had posters of that manly spunk George Michael on their wall; and the culinary word marvelled at the taste sensation that was the McNugget. A few hip cats with a taste for things retro had chosen to join in the celebration.

Chris Norton, Dip Series 5, Wee Jasper. Photo by Phil Maynard

Phil's love of the past did not, however, extend to embracing the rusty iron somethings at the top of the Series 4 entrance pitch as rigging points – although it did extend to rigging off an even older tree. Go figure. After the customary sighing at, and ridiculing of, people who bring single-rope descenders to double-rope pitches, everyone arrived at the bottom, along with some persistent flies.

The crew set off first to Series 5, through the constricted connection between the two. Chris informed everyone that on his first trip this was referred to in the argot of the times as a "Weathergirl Squeeze", after some amply proportioned ladies who were topping the charts at the time with a catchy ditty called "It's Raining Men"[2]. (Fun fact: this is also the only recording of this song that is not by a Spice Girl or drag queen.)

There was a pause in Series 5 near some of the pretty formations. Chris was anxious to point these out, saying "Look! Wee Jasper is not all *that* bad – see?" People couldn't believe it and took photos as proof.

They returned past the packs, and stopped for lunch in Series 3, and discussed movies. Rowena was proud to announce that she had been given free movie tickets to *The Internship*.

[1] http://www.youtube.com/movie?v=KSzjB3P-Ha8 $3.99 PPV.
[2] http://youtu.be/l5aZJBLAu1E

"Ah yes, that's the one where they get an internship at Google," said Chris.

"Gee, thanks for RUINING the movie for me," said Rowena.

"Um, that's not the ENTIRE plot[3] – and perhaps that part is given away a bit by the title?" said Chris, defensively. Talk then turned to *Star Trek* although Rowena put her fingers in her ears in case she found out there was trekking through the stars involved.

After lunch there was a brief tour of the rest of Series 3 and 4 before it was time to abseil through the Rathole. While clambering over some boulders Chris announced "I remember one trip where someone fell down here. Broke five arms and legs. Had to be helicoptered out I think."

"But how did they get a helicopter in past the squeezes?" asked Thomas.

"Er, the cave was different then. It didn't have as much of. . . that stuff." (He pointed to the roof.)

"But then it wouldn't have been a cave. Oh, and – how many arms and legs did you say?"

"Well, things evolve over time. Like the meaning of the word 'cave'. Or the finer points of human anatomy. Oh look, I really have to rig this pitch, or else it might evolve too", said Chris.

"I remember climbing up that pitch once," said Rowena. "I'm pretty sure there was a roof then. Mind you it was also a good 15 foot higher."

Series 1 and 2 were most noteworthy for having less nice formation, more cold air and more people, and Series 2 was leaking serious amounts of daylight at both ends. The crew eased their way past a group having a bit of difficulty on a nasty step-across thing in Series 1. "Ah yes," said Chris, "I remember on my first trip finding that a bit difficult."

"Well, I'm sure it would have been, for a three-year-old. Just how old are you again?" queried Thomas, his analytical physics mind kicking into high gear.

"Er, yes, sorry, maybe this is my twentieth anniversary trip. Subtraction is tricky sometimes," said Chris. Rowena and Phil shook their heads.

Far Chamber, Punchbowl
Photo by Thomas Cunningham

After an optional abseil, a second lap of Series 2 and a considered exposition of the subtle differences in detection techniques between Sherlock Holmes and Batman, it was time to leave through the rubbish dump entrance. [Insert frightfully witty pun about trashed cave here.] It was a blissfully serene country afternoon, with the gentle rustle of leaves, the twitter of birdsong and the repeated screech of Chris' car alarm which stubbornly refused to switch off. "Remember not to put the alarm on next time", said Rowena.

The sun was setting, and as Chris pointed out, old caving folklore has it that when humidity is rising, and the thermometer's getting low, according to all sources the hut's the place to go. So it was back to the cottage for an evening featuring a reasonable ration of wine, cheese and dubious conversation. . .

"This red is actually not too bad," said Phil.

"I couldn't believe they called it There Will be Blood. What a giveaway!" said Rowena.

"Back in the day we didn't have huts. We sat around the fire. Only there wasn't room for everyone so some of us had to sit around a pile of rocks, as they radiated the last heat of the day," said Chris.

"We were at this bar in Hanoi, and there was this other girl there staying at the same hostel. Phwoar, what a honey. . . " said Will.

"I've lobbied USyd admin to change the way they assign email addresses. Not so much on my own behalf, but more for my friends Frank Arthur and Charles Ockwell," said Thomas.

"It's actually taking on the character of a European red," said Phil.

"Which reminds me - did I tell you about the time I was in this little valley in the Dordogne?" said Chris. "They have this very unusual sanitary practice – well, they call it sanitary. . . "

[3]SPOILER ALERT: In fact, that pretty much IS the entire plot

"Which reminds me, if you're in a bar in Thailand, no matter how hot she is – CHECK. You don't want to learn the hard way, believe me!" said William.

"Which reminds me – if you're on Level 26 in the town, stand outside the armourer's, just to the left, equip your bastard sword, touch your left foot on the barrel and type in the Konami code. Then walk into the pub and – well, I won't spoil it for you, see for yourself, but you won't be disappointed," said Thomas.

"Which reminds me *Death of a Salesman* – why even bother?" said Rowena.

"More reason than with *Waiting for Godot*,"said Chris.

Nice formation, Wee Jasper. Photo by Eddy Torr

"STOP SPOILING THINGS!" said Rowena, exasperatedly.

"Yeah, I'll give you that one," said Chris.

Sunday morning saw the team rise bright and early, eager to begin coffee-drinking in earnest to delay caving as long as possible. Eventually they made it to the entrance to Punchbowl, which was teeming with a bunch of around ten eager cavers, who advised that they were getting out of the way to make room for the next ten who were on their way.

"Sorry about this folks, but I left my helmet in the car, have to go back and get it", said Chris. "Could you please start rigging the pitch?"

"Remember not to put the alarm on," said Rowena.

After retrieving the helmet and switching on the car alarm, Chris returned to find the gang setting up some rigging in a side chamber. Commendably, the rigging was well clear of the other party; not so commendably (except perhaps safetywise) the rigging was also nowhere near the pitch.

"No, no, no. Over there. But don't follow those other guys. Climb up high on the left side and hang the rope from the jug in the roof. Yes, it does make the pitch 50% longer. But it's what all the cool people do. It's a thing."

It took a while but eventually there was a sling round a stal, a rope on the sling, a traverse up the wall, a sling round a jug, a krab on the sling, a rope on the krab, a protector on the rope and a Thomas vanishing into the depths. Chris soon joined him. "Of course in 19-thingummy-3 we didn't use rope protection. Well, we did, but not that kind. When you rigged the pitch two big men came round and said Tony Fontaine would make sure nothing happened to the ropes if you paid them a hundred dollars. Can't do that any more – damn ICAC."

Before long the others had arrived and Chris explained the detailed folklore of the Pitch Chamber – the Wombat's Grave, the skeleton of Azaria, and the concreted tunnel to Signature Cave designed to reduce the chance of badly injured people escaping the cave alive. They continued through to the Fossil Wall and to Far Chamber, where there were extensive decorations well out of the reach of scouty fingers. Chris was anxious to point these out, saying "Honestly, Wee Jasper is sometimes quite nice, in bits, if you hold your nose." Thomas took photos as proof while Will tried to escape the stench of guano and stood to one side of the chamber gently retching.

Photography complete, it was time to venture off on the loop around through the Window, Slippery Dips and Loxin Chamber. One of the groups of ten people were inserting themselves into the Laundry Chute so the group passed on this, and waited for Chris to look carefully for the way on down the one navigable passage. "I don't specifically remember it being this way, but given that there is no other way, it's clear that the cave has evolved recently," declared Chris as the others struggled up the Slippery Dips.

"That's really very unlikely," frowned Thomas.

In the Loxin Chamber is the Loxin Wall, where you can climb up to a short section of passage leading back to the Pitch Chamber at a higher level.

"Those bolts look very dicey. I'm not going up there," said Phil.

"The climb isn't so bad, I've been up there before," said Chris. "I think it was with Matthew Hole."

"That figures," muttered Phil.

The group returned via the Strawberry Shortcut and looped back round to the Pitch Chamber. Time for a quick

climb out. Chris was up first, followed by Will on one of his first upward SRT adventures. As Will was taking a break partway up, Chris remarked "If you look over there, you can see that if we'd rigged on the other side, you'd be at the top of the pitch by now. But look, we now have all this extra pitch to do! Isn't that great?"

Will said "That does not reflect my sentiments at this juncture." (Or something like that.)

"But it's what all the cool kids do. Frankie say Relax! #YOLO" said Chris. (Or something like that.)

Will muttered something but the recording is a bit muffled at that point. However he was soon at the top, and he and Chris returned to the car to try to switch off the alarm.

"Remember to not put the alarm on properly next time", said Rowena.

There had been rumours that a group from NUCC were going to be at Wee Jasper for the weekend, so in the interests of promoting interclub relations and goodwill to all, some time was spent driving round the various campsites in ever-decreasing circles before the consensus position was reached that, if NUCC were here, then (strange as that may seem) they may in fact be down a cave. So it was back to the cottage for pretty much a repeat of the previous night except that someone possibly forgot to secure the goat-proof gate on the balcony.

The next day Phil had had quite enough and disappeared very early. The other four probably did a cave, the details of which are a bit hazy although Rowena did say she was impressed that in a cunning piece of misdirection worthy of M Night Shyamalan, the cave was in fact not on the south coast of France as its name implied. The hut was cleaned and emptied, bags were packed, and Chris' car failed to start.

"How can the battery be flat?" asked Rowena.

"It may have been drained by not not putting the alarm on so often," said Chris.

And the moral of the story? As Chris realised when he got home and found a large ragged hole in the bottom of his cave pack – don't forget to secure the goat-proof gate overnight. But let's face it – when you're getting on a bit, your memory isn't always what it should be.

Nice formation, Wee Jasper. Photo by Eddy Torr

Mammoth Survey – Part 1, Southern section

SOUTHERN SECTION OF MAMMOTH CAVE

This edition of the SUSS Bulletin kicks off a massive effort to publish the new maps of Mammoth cave at Jenolan, along with updated information about the cave and its context in the northern limestone of Jenolan. The cave is rather large, and the documentation large enough to cause postal indigestion, so the publication will be spread over several Bulls. This edition contains the maps and documentation for Southern Section of Mammoth cave, from the Entrance Chamber to Slug Lake and the dives beyond.

SUSS has a long history in Mammoth cave. From the first club trips to Jenolan, Mammoth was a destination, exploration target, and focus of survey and mapping [1]. The eventual publication of the Yellow Book in 1971 combined the mapping efforts of all clubs active at Jenolan, under the editorship of John Dunkley [2]. This book contained a comprehensive set of maps of the cave up to 1970, as well as descriptions, history and the geology of the northern limestone as it was understood at that time.

A re-survey effort in Mammoth cave was launched in 2000, for several reasons. Firstly, a large number of discoveries had been made since the 1970s, and there was a need to put these maps together to understand the cave overall. Secondly, a great deal of survey data from the 1960s was unavailable, and so the decision was taken to re-survey major passages for connections and accuracy. Thirdly, new digital mapping techniques were becoming affordable and sophisticated enough to replace pencil-and-ink drafting, which reduced the work required by an order of magnitude. Finally, in our experience the effort to re-survey a cave inevitably leads to a much closer look at the cave than ordinary trips, and new discoveries result!

Southern Section is the most-visited part of Mammoth cave, making it a logical place to commence this series. The main route is a mixture of rockpile, scalloped vadose passage, phreatic passages, large decorated chambers and a too-short stretch of rumbling river. It's also less of an epic than most of the trips to the northern end of the cave. When adventure guiding was introduced to Jenolan, Southern Section was one of the original tours allowed into a wild cave. It is also the first part of Mammoth visited by most new members of caving clubs. In contrast to the well-known route to Lower River, the areas south of the river crossing are much less-visited. The rift climb to Upper Oolite is rarely attempted, and the cave beyond this point is restricted by the authorities due to the quality and delicacy of the formations.

Despite representing less than 20% of the passage length in Mammoth cave, Southern Section is the heart of the cave's hydrology, showcasing the active river level, the intermittent flood drainages that lead down to it and the ancient fossil river passages in the upper levels of the cave. It also contains significant areas of ancient sediment, in

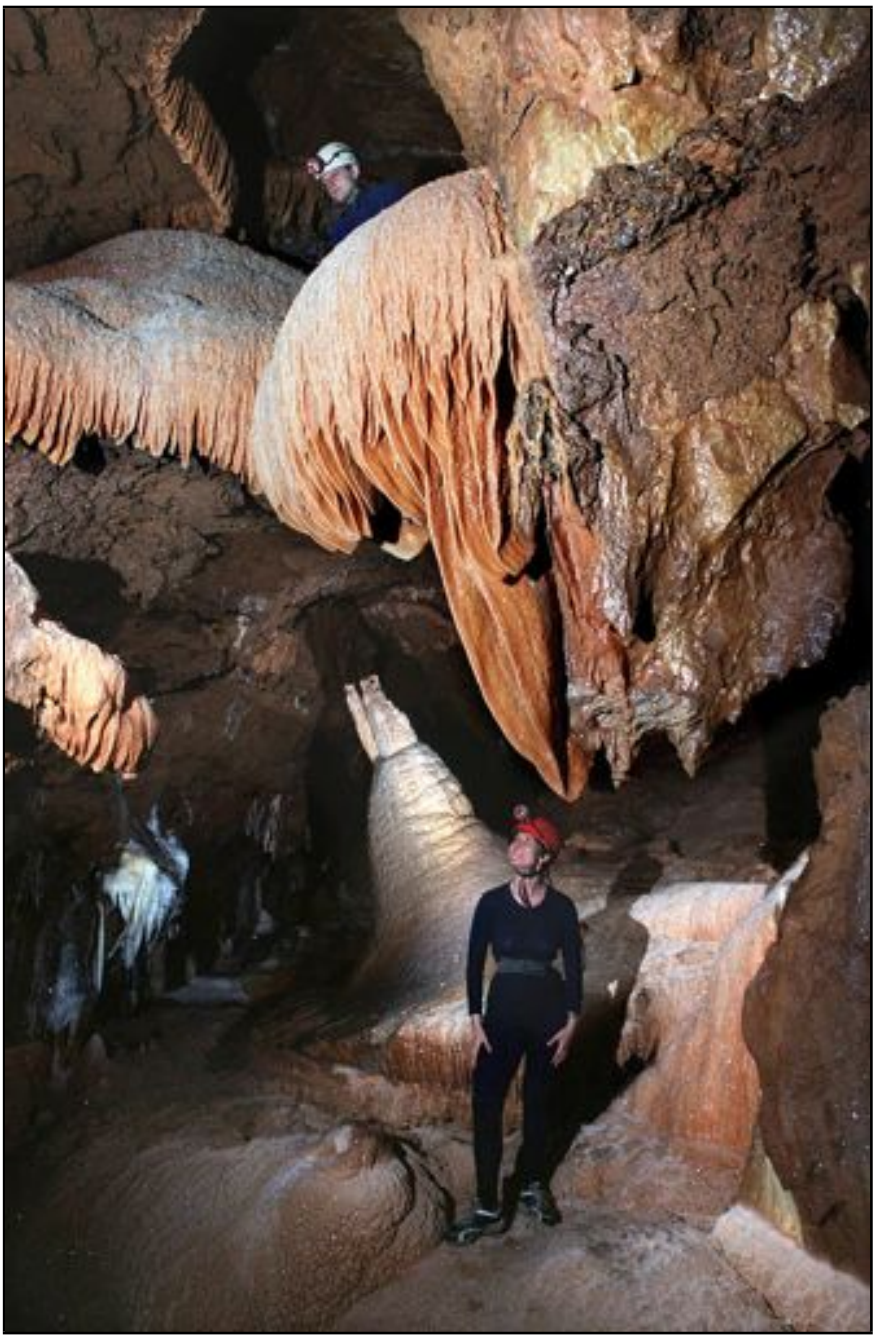
Mammoth cave – from Dunkley [2]

Conglomerate Cavern and in The Oval. For the more adventurous explorer, the dive from Slug Lake appears to be the most technically difficult penetration dive in eastern Australia, with multiple leads lower than -50 m depth and the main passage continuing at lower than -100 m depth.

The re-survey of Southern Section has changed our ideas about the cave. We have learnt a great deal about the fossil level including Pisa Chamber in particular. The Yellow Book map placed this chamber 30 m west of its true location and rotated more than 90° from its correct orientation. This appears to be an artefact of overlaying and combining multiple existing maps to trace the final product. Taking heed of this result, we are resolved to produce a single map of the whole of Mammoth Cave, to modern standards and using modern hardware and software. At the date of this Bull, we are nearly 80% of the way through the mapping of the middle and northern sections of Mammoth Cave and we will publish the completed areas regularly over the next few issues of the Bull.

This and subsequent articles on Mammoth are dedicated to Mark Staraj. His incredible drive and enthusiasm for project work at Jenolan was matched only by his cheerful optimism and ability to drag others into his projects. The reference list in this article is an introduction to the massive amount of written work he produced on Mammoth cave. We miss him!

Phil Maynard



Annalisa and Steve Contos in Pisa Chamber. Photo by Alan Pryke.

HISTORY OF SOUTHERN SECTION, MAMMOTH CAVE

Early European History and The Yellow Book

The early exploration of Mammoth cave was well described by John Dunkley in the Yellow Book [2] and updated in the second edition in 1978 [3]. The first known entrance by a European was Keeper Jeremiah Wilson in 1882. The cave was extensively explored by the Keepers and by Trickett, but after that era basically no documentation exists until the first trips by SUSS in 1949. Bushwalkers Noske and Welch succeeded in reaching Lower River in 1942 and they produced a map using prismatic compass and tape. The map clearly shows that they knew the main route to Lower River, but there is no sign of Oolite Cavern or of passage beyond Lower River.

SUSS rapidly became familiar with the route to Lower River and Oolite Cavern, to the point where Henry Fairley-Cunninghame describes Oolite Cavern as a beginners' trip along with photography in 1953 [4]. Henry continues the article with a description of exploration beyond Lower River:

> *"Denis Burke and myself swam about 25 feet down the river past the Oolite and Bruce Cobbin managed to climb along the wall. A steep mud and gravel slope was climbed, keeping to the left, to about 50 feet above the river. Moving to the right along the top of the slope, which is gravel at this height, a small gravel bank was crossed and a squeeze hole entered. This leads to a tunnel which gives way to talus and a descent of about 20 feet through a shaft in the talus leads to a tunnel in solid rock. There is some dry formation at this point and a further descent of about 12 feet over soft formation and requiring a ladder leads to a mud floored tunnel ranging in height from about four to fifteen feet and having a length of perhaps 100 feet. In places there are thin gours on the floor and formations on the roof and walls, but all are dry and have a rather good sparkle.*
>
> *"There are several side passages and there is also a crack in the wall about 18 inches wide leading down to apparently still water. The possibility of further exploration seem good (sic) but our lights were almost out and we could not continue further. The general direction of the cave is upstream (sic)."*

Kids, ask your parents about imperial measurements. Apart from the upstream error, this is an instantly recognisable description of the route beyond Lower River as far as the rockpile area.

By this time, divers were already attempting Lower River [5]. The first diving at Jenolan (6 – 7 December 1952) was conducted using home-built breathing apparatus (!) based on a gas mask, garden hose and bellows (!!!!!) and after deciding that Imperial Sump 1 would be too long for the hose, they changed plans:

> *"On the following morning we transferred all our gear to the Lower Level of the Mammoth; there were five members of the party, one of whom was very enthusiastic about the underwater work until he saw the water and felt how cold it was. As the other three were interested in keeping dry and warm, D.T.B. was again the victim.... we found that considerable improvements were necessary.*
>
> 1. *The Siphon proper is placed alongside the mudslide, and it would be quite practical to dig out a platform for the base within a few feet of the passage.*
> 2. *Without weights, one had to swim down the river bed (8–10 ft) and this required copious supplies of air which just weren't available.*
> 3. *As the mask was airtight, pumping had to be maintained all the time that the mask was on.*
> 4. *The lack of a signalling system added to our difficulties.*
> 5. *The water was very cold ($\frac{1}{2}$ hour immersion limit), and finally,*
> 6. *The lighting was inadequate. When one is submerged, the "crystal clear" water is found to be white, and , as the walls also appeared white, it was rather difficult to distinguish between them.*
>
> *"All these points were carefully noted and then we returned to the camp."*

Remember point number three. Always remember point number three. Remarkably, Denis Burke survived to explore another day.

Mapping of Southern Section by SUSS commenced with the publication of the route to Lower River by Brian O'Brien and Fred Stewart. This was followed with the first high-grade (CRG 5–6) map of Southern Section in 1962 – 1964 and an upsurge of interest in Southern Section, culminating in the discovery of Upper Oolite by Bill Crowle on 16th August 1964 [6]. Initially found using scaling poles up the west wall of Oolite Cavern, the explorers then dug out the tight rift climb that is used today. The report describes Pisa Chamber with surprisingly little exaggeration:

"The formation is the best in Mammoth and rivals that in the Chevalier. It consists of a very large expanse of flowstone, a number of shawls, numerous stalactites, straws up to six feet in length, some crystal pools and gours, and some magnificent aragonite crystals. Great care is needed to avoid damage – no boots and preferably no trog-suit."

In 1966 the J13 entrance of the cave was blocked by the Guides, to prevent vandalism. All trips to the cave needed to ladder down the 20 m pitch from J15. Exploration in all parts of the cave slowed down after this, because trips became epic in length and difficulty. There was one final attempt in Southern Section to push the high-level passage east out of Oolite Cavern, but Dick Heffernan's climb resulted only in reaching a formation choke [7].

"The first SUSS party to visit Mammoth since the recent events took some $2\frac{1}{2}$ hours to set up ladders and ropes and lower ten people and a load of ropes, ladders, scaling poles, cameras and so on to the bottom. Destination was Oolite Cavern where the east wall was scaled with considerable difficulty (another few hours to get three people to the top). The scaling pole was set up at the limit of exploration in 1964. Unfortunately a difficult climb above this point by Dick Heffernan led only to an impossibly small squeeze.....Exit was made at 1am."

Diving Slug Lake

Slug Lake was discovered soon after Henry Fairley-Cunninghame and Denis Burke's effort exploring across the river. By 1962 the cave was added to the maps of Southern Section created by SUSS, and it was immediately recognised as the take off point for discovering further sections of the Jenolan Underground River. At Slug Lake, there are no more phreatic passages above the waterline. The small passage at the lake is a water inlet from above (J29 doline, Adrians Folly). It was soon realised that there would need to be dive exploration to find any further cave.

Ron Allum first dived in Slug Lake in 1980. The outcome was an 'air pocket', and a vague impression of the cave continuing at depth. He returned several times, but the first dive which is documented in a trip report was on 31st of May 1997 [8]. This trip established the route to Gargle Chamber and then went the deep way into a chamber that got larger as it got deeper (ca. -50 m). On his next dive, 26th of June 1997, Ron was supported by Keir Vaughan-Taylor, who rigged a Tyrrolean traverse across Lower River for the dive gear and succeeded in preventing the silt-up of the dive downstream. Ron continued north east (deep branch) to a junction and tied off at -60 m. There was level passage ahead of him, but he turned south east and descended to -75 m before tying off and returning [9].

Eventually, it was realised that diving with air simply wasn't going to be good enough. At depths below -40 m, nitrogen narcosis is always lurking, even for experienced divers. At depths below -50 m, the partial pressure of oxygen is high enough to cause oxygen toxicity, which can lead to fitting and instant unconsciousness. With much preparation and a heroic effort to haul gear, a mixed-gas dive was carried out in Slug Lake on the 12th of December 1998. Ron Allum and Rod Obrien were the divers for this trip. Each diver needed seven (!) tanks. There were two helium/oxygen tanks per diver for deep diving, one air tank for shallow parts of the dive, three tanks for decompression and one air bottle to fill the dry suits [10].

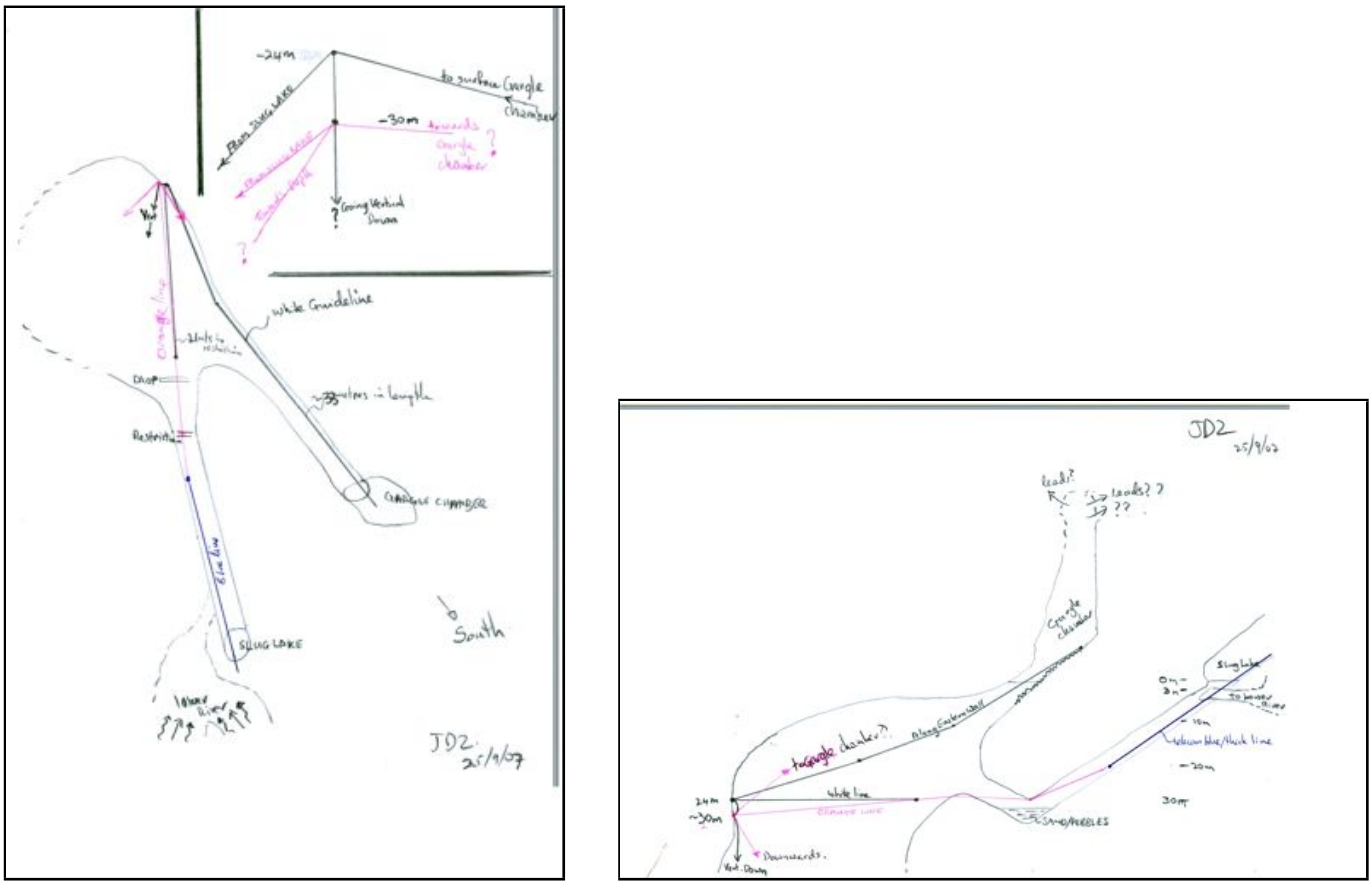
"Ron started the dive with Rod two minutes behind him. The squeeze at -30 metres had apparently silted up since the last dive. Ron, with the extra gear required on this dive, had difficulty negotiating the squeeze. Rod, similarly encumbered, found the squeeze even more difficult, since the visibility was worse for him, but nevertheless eventually got through.

"Ron pushed on with the dive while Rod worked his way through the squeeze, and soon found himself at the end of the dive line that he had laid on a previous trip terminating at -75 metres. He connected on and continued down the passage to -92 metres.

"The passage is in a 6 m wide slot in the roof of a huge underground lake. The wall splays outwards from the slot descending at about 70 degrees on each side and despite Ron's 100 watt light he could see no sign of the bottom. The roof slot continues steeply down but there was little point continuing and the clock was ticking on the runtime schedule they had planned for the dive.

"Ron tied off and started the return journey where he met Rod, who then also turned around. Ron had spent 5 minutes at -92 meters and inherited 2.5 hours of decompression."

In fact, Ron's depth gauge was calibrated for salt water. The different density of fresh water means the real depth of the dive was -96 metres. That, for the time being, is that. There have been plans to return with mixed-gas rebreathers or with robots to see where this extraordinary passage goes, but they have not come to fruition. It's all a long way from a gas mask and garden hose.



Plan and Elevation Sketches of the shallower parts of Slug Lake dive. Sketches John Dalla-Zuanna.

Ice Age

This was the first substantial new passage in Southern Section for air-breathing cavers since the 1960s. Mark Staraj and Ian Cooper had designs on pushing the rockpile south of Lower River for years, and there was a stream inlet underneath the *"further descent of about 12 feet over soft formation and requiring a ladder"* described by Henry Fairley-Cunninghame. This inlet was pushed upstream in May 1997 and was not able to be followed more than a few metres in the rockpile. In December 1997 Mark tried again, higher up in the rockpile above the 4m pitch [11].

Pushing past a dodgy rock in the roof above a squeeze ('Mass Extinction') he found a climb down, and at the base was a bedrock squeeze blocked with sediment but with a huge, wet, cold breeze. This is Primeval Fear, and it is a committing squeeze, requiring a head-first entry down a steep slope into a breathe-out tight spot, followed by an upslope to exit. Beyond this was a large phreatic passage! The dig and subsequent exploration were driven by Mark, Alan Pryke and David Jackson.

Ice Age was named for its constant dampness and breeze. At the north west end was a slope leading down to a damp, mud-filled phreatic tube which was the focus of a lot of trips at the time [12].

> *"After a couple of hours of scrambling, crawling, gut sliding and squeezing though (sic) places unnaturally small for the human body (including the aptly named 'Primeval Fear') we arrived at the end of 'Ice Age'. After a short break for lunch, which for me consisted of mud-flavoured LeSnacks, we were put to work. The buckets just kept on coming as Mark and Don frantically tried to reach that ellusive (sic) river."*

The dig is still worthwhile as a lead, but the constant sedimentation of Primeval Fear with each rain event discouraged the explorers in the long run.

PHYSICAL SETTING

Geology

The geology of the McKeowns Creek valley has been described by Ian Cooper [13][14], based on work by Tony Allen, Armstrong Osborne and Henry Shannon [15][16][17]. The Jenolan caves Limestone is highly pure (mineable, if you are into sacrilege), massively bedded for most of its depth, and Late Silurian in age. In the vicinity of Southern Section of Mammoth cave the limestone strike runs from 340° → 160°. The limestone overlies younger Devonian sediments to the east and is underneath older Ordovician sediments to the west. The dip is overturned at 80° in Southern Section of Mammoth cave. There is a major fault line on the western contact of the limestone, and a break in temporal continuity of the sediments.

The development of caves in the McKeowns valley is controlled by the near-vertical dip of the limestone. This has resulted in an extensive deposit of limestone being turned on its side, creating a long, narrow band of limestone running from north of Wiburds Lake cave down to the show caves of Jenolan and beyond into the southern limestone. In the vicinity of Southern Section of Mammoth cave, the limestone lies on the eastern edge of the valley and in the bluff behind. The contact between the limestone and the Ordovician sediments is across the valley floor at the entrance of Mammoth cave, but the contact crosses the surface creek to the eastern side of the valley near the junction with Dillons Creek. From here on south, the contact is at the base of the bluff (see Sheet 1 of the maps).

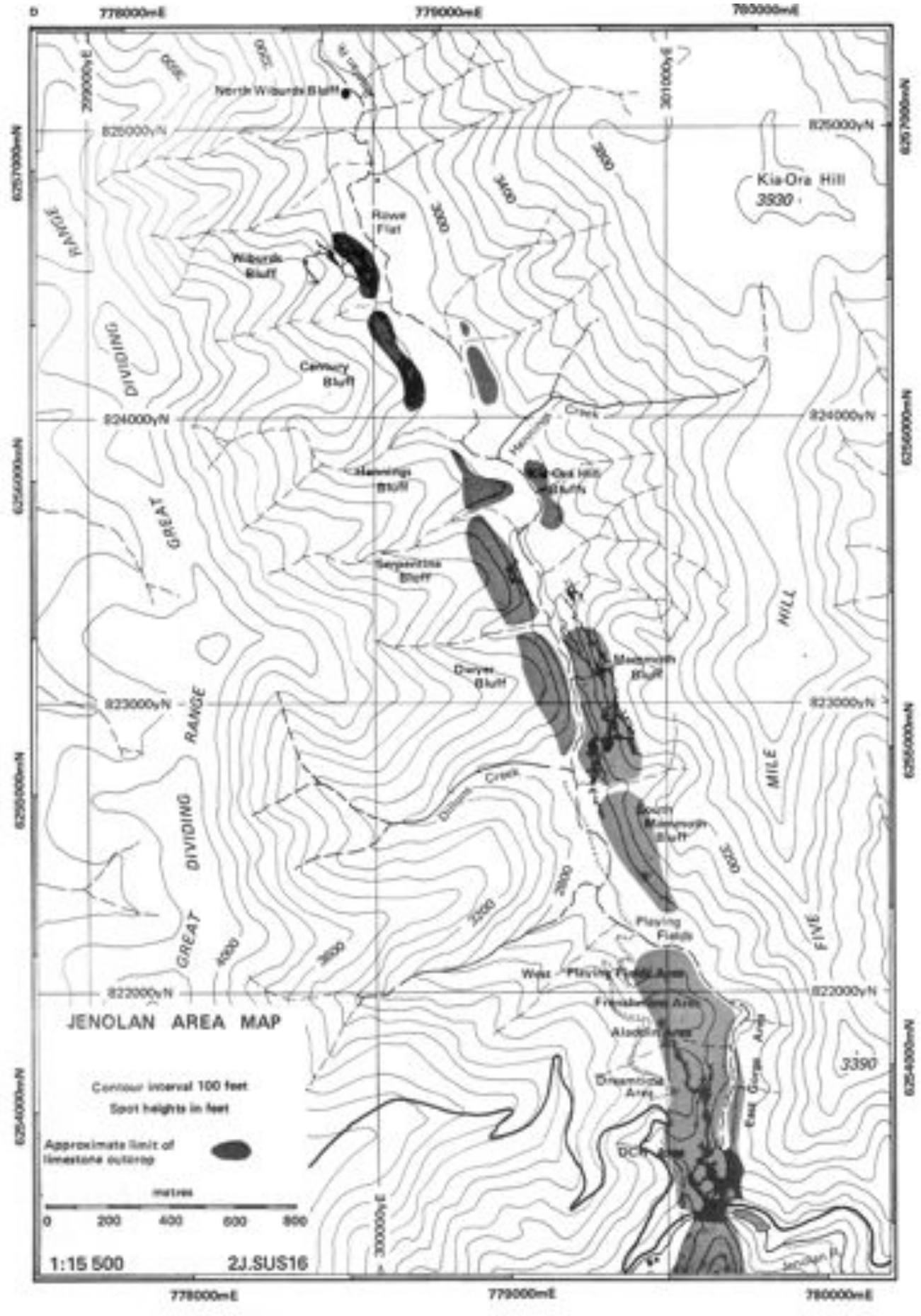
Within the cave, passage development has been affected by the closeness of the western contact – there are water inlets from the west, and passage development is constrained by the edge of the limestone. There is no sign of the eastern contact anywhere in Southern Section. Passage development is also driven by the dip, for example in the development of the exceptionally deep water-filled passages beyond Slug Lake. Unlike in the more northerly sections of Mammoth cave, there is no sign of volcanic intrusion in Southern Section. The dominant passage formation in Southern Section is along strike, easily seen in Sheet 1 of the maps. The other important control on passage development in Southern Section is a series of joints which are perpendicular to strike and produce passages on the 250° → 70° axis. These are most clearly seen in the Oolite Cavern area. In contrast to other caves in McKeowns valley, there is no evidence of mobile fault lines in Southern Section of Mammoth cave. The major exception to the 'strike, then joint' rule for passage development appears to be the underwater passages beyond Slug Lake. While full mapping of these dives has yet to be completed, the divers' compasses indicate the initial direction is roughly 120°.

Jenolan Underground River

The development of McKeowns valley is almost entirely fluvial, ie driven by water erosion on the surface. There is little or no karst development in the valley, until you travel all the way downstream to Devil's Coachhouse (and then the karst development is overwhelming). However, there is no surface flow downstream of Watersend cave except in flood conditions. The Jenolan Underground River follows a mostly-unknown course for 2.5 km south east from Watersend to Mammoth cave, with a few known constraints which suggest the river is underneath the western side of the valley for the entire distance until the vicinity of the Mammoth cave entrance.

The Jenolan Underground River appears in Mammoth cave as a flowing stream for 15 m, appearing from one sump and then disappearing into another sump. The river continues underneath the known passages south from here and flows into the large underwater passages beyond Slug Lake. The next known location of the river is the upstream end of Spider cave. The surveyed gap between Mammoth cave and Spider cave is 500 m, which includes a substantial portion of known but unsurveyed dive passage in both caves. However, the dive passage in Mammoth cave has headed south east, away from Spider cave, so a significant gap exists. From the upstream end of Spider cave, the course of the Jenolan Underground River is known through Spider and underneath Imperial cave to the resurgence at Blue Lake [18]. The average gradient of the river from Mammoth to the resurgence is 1% given the altitudes and distances involved. From the main sink in the valley downstream to Mammoth, the average gradient is steeper than 1%, which suggests that there may be more flowing passage and less sump passage in the upper part of the valley.

All of the major caves in McKeowns valley are related to the Jenolan Underground River (see the map overleaf, from "The Caves of Jenolan 2: The Northern Limestone"). Mammoth cave is developed as a series of fossil levels of the underground river, which generally lie further to the west as they become more recent (lower-level). In Southern Section, the ancient development of Pisa Chamber is an excellent example of this. The Entrance Chamber and Conglomerate Cavern are presumably phreatic river passage as well, but they are extensively modified by collapse and later sedimentation, so it is difficult to determine the exact sequence of development of river levels in Southern section. In the middle and northern sections of Mammoth cave, there are modern side creeks which have appropriated some of the fossil river passages, but that is generally not the case in Southern Section.



McKeowns Valley – From Welch [17]

DESCRIPTION

Entrance Chamber

The normal entrance to Mammoth cave (J13) is up from the bed of the dry surface creek on a track. Through the gate, there is a slope down to the Entrance Chamber. J14 is a tight entrance down near the creek. It passes through a squeeze and emerges in the wall of the Entrance Chamber above a 6 m pitch. The J15 entrance is a hole near the roof of the Entrance Chamber, with a 20 m pitch into the chamber. This is a good spot for SRT training, and gives good light shows in the chamber on sunny afternoons.

From the upper end of the Entrance Chamber, climbing routes down exist on either side to the south. The easier climbs are on the western side. This eventually descends to the small hole in rockpile that leads to the Jughandle. All routes to the northern end of the cave, and all routes to Southern Section other than Mammoth Squeeze, lead off from the base of the Jughandle climb. Continuing down the Entrance Chamber, the passage eventually narrows to about 3 m wide and then opens into Conglomerate Cavern.

A 3 m climb into Conglomerate Cavern gives access to two routes on – each involves a second climb down and then they meet. The left hand route is well decorated. Beyond the junction of the two routes, a major branch leaves the cavern on the right (west). There is a pitch above here into Fire Cavern. Following the western branch over a false floor leads to a meandering stream passage, which eventually opens into a chamber. Mammoth Squeeze starts at the eastern side of the chamber. Assuming you can penetrate Mammoth Squeeze, the climb down at the other end leads to the base of Forty Foot and the route to Lower River.

Megan Pryke climbs the scaling pole to Fire Cavern. Photo by Alan Pryke

Home Sweet Home area

At the base of the Jughandle, a steep slope leads down to a major junction. North from here, a hands-and-knees crawl leads to Cold Hole and Sand Passage. Cold Hole is the only way to the northern 80% of Mammoth cave. Sand Passage is the source of most of the water in Southern Section during flood. To the northwest of the Jughandle is an extensive rockpile, with multiple levels. To the west of the Jughandle, there are two routes down to Southern Section.

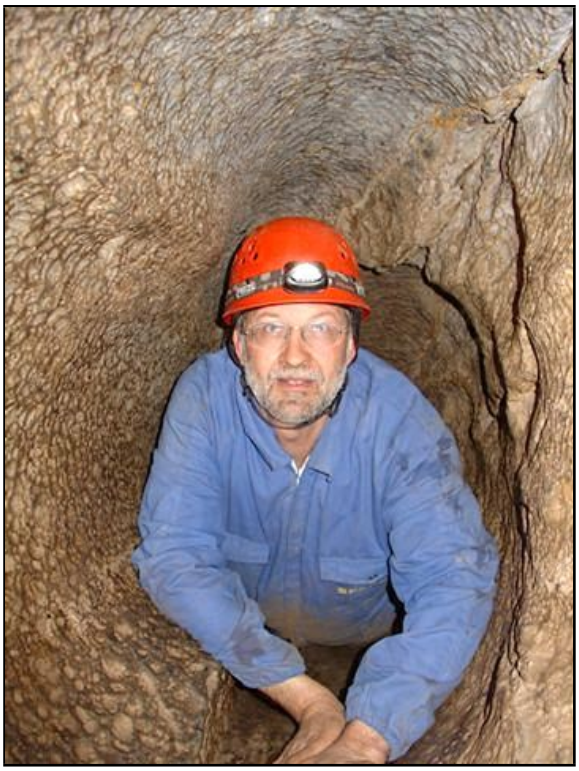
The climb down immediately west of the junction leads to a crawl about four metres long. At the far end of this is the Forty Foot, which is an eight metre pitch into a large rift. This pitch contains some permanent rigging nowadays as part of the Adventure tours run by the Guides.

Climbing around west of the route to Forty Foot, a junction is reached. To the left (south) is a climb up to the Entrance chamber, past a bone deposit. To the right (north) is a small passage that spirals to the east and down a couple of rockpile climbs. This is the Rockpile Route to Southern Section and leads to the base of Forty Foot, having completed a spiral underneath itself. Many people get lost here – keep the bedrock on your right hand as you descend through this route. Keep the bedrock on your left hand to reverse!

From the base of Forty Foot, the rift descends into a crawl passage underneath the exit from Mammoth Squeeze. Following this south, a junction is reached. Ahead is the sizeable chamber Home Sweet Home. To the left (east) is a tight passage which leads to the route to Lower River. From Home Sweet Home, a parallel route also leads to the route to Lower River.

Route to Lower River

A rifty, vadose passage leads south from Home Sweet Home. The entire outflow from Cold Hole flows through this passage, making further progress impossible during flood events [19]. This passage contains some beautiful scalloped walls as it turns to the east and out over a 3 m climb down. At the base of the climb is a junction. To the left (north) is the route to Grinning Monster Lake. This is a wide mud-floored passage that passes underneath the previous passage. After winding around for a bit, this passage reaches the top of a vertical squeeze. This opens into a 6 m climb down into the large chamber of Grinning Monster Lake. The sump is at the north west corner of the lake. To the north there is a passage that chokes in rockpile.



John Dalla-Zuanna in the Gunbarrel. Photo by Paul Boler

At the junction to Grinning Monster Lake, there is a climb on the opposite (east) wall. This leads up into the Duodenum, eventually crossing to the west side of the main passage and rejoining via climb down. The main passage heads right (south) from the junction, underneath the Duodenum, and then into a sandy squeeze. Beyond this a hand-and-knees passage heads past the entrance to Oolite Loop on the right (west) side and on to the Gunbarrel. This is a classic, circular phreatic passage that heads down, then up to a major junction.

To the left (east) at this junction, a crawl in stream gravel leads to Ooloop and, eventually, up 15 m of climbs to Pisa Chamber. Straight ahead (south) at the junction is Smirnoffs. This contains some tight passage and tall rifts that eventually leads to the sound of water down an impenetrable bedrock slot. To the right (west) at the junction is a walking passage that leads to a 2 m climb down. Just beyond this climb down is the passage to Oolite Cavern on the right (west side). Continuing ahead in the large passage soon leads to Lower River, encountered at the upstream sump.

Oolite Cavern

From the junction with the route to Lower River, a phreatic tube heads steeply up. A 3 m climb through flowstone leads to the bottom of Oolite Cavern. The bottom half of Oolite is track-marked, leading to the centre of the main chamber and avoiding active flowstone. Beyond the trackmarking, there is delicate floor formation on the right (east) of the chamber – do not traverse this side. On the left (west), flowstone on the floor can be avoided and the base of the climb to Upper Oolite is reached at the tight rift in the wall. Beyond the rift to Upper Oolite, the chamber continues around some boulders, past a side passage to the north west and around to a pitch down into Oolite Loop. There is some good formation in side chambers near here. The chamber circles back to the east side – do not traverse this side.

Upper Oolite

This section requires special permission to enter. Climb the rift, up about 7 m. At the top of the climb, a horizontal squeeze heads left (south), then squeeze up into a rift. At the top of the rift, climb across the mud slope without falling into the holes. The large, well decorated passage here has a balcony to the left (east) looking down 15 m into Oolite Cavern. The passage heads west for 20 m before splitting into small, muddy tubes. The way on to the rest of the upper levels is back at the edge of Oolite Cavern. Head south into the passage between the flowstone slopes. This goes through some false floor and turns right (south west) through some flowstone shelves before opening out. The Oval is a large chamber containing a mix of flowstone floor and loose sediments, mostly on a steep slope. The area has been track-marked to stop the sediments being mobilised onto the flowstone; stick to the track marking.

At the base of the chamber the track-marking heads around a large crystal pool to a flat area. There is a visitors' book here. To the left (north east), the track heads around the pool and up a slope to the base of a flowstone rampart. This is the de-trog point. Do not try to enter Pisa Chamber with boots or overalls, and do not go barefoot. You should have rubber-soled shoes to walk across the extensive crystal and gours beyond this point.

The passage up into Pisa Chamber levels out at a large crystal pool and then passes underneath a flowstone balcony before emerging up into a large chamber with floor crystal. Back over the top of the previous section is an extensive field of gours and floor crystal. To the east, there is a side passage with extensive aragonite. To the left (north east) the large passage continues and the floor becomes mud and sand (boots required). This eventually reaches

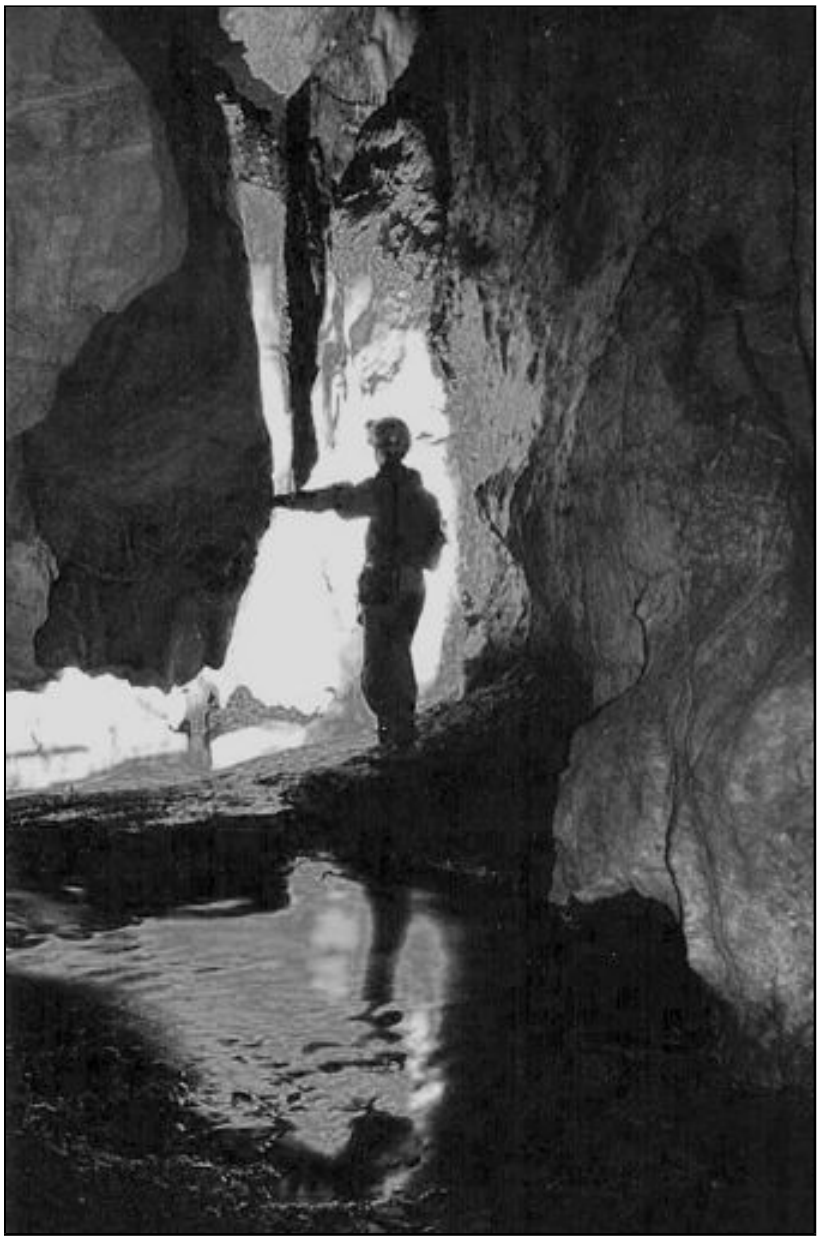
another section of floor crystal and gours (de-trog required), and then the flowstone begins to plunge down into Ooloop. This is a series of climbs in a rift, leading to a tight squeeze and then eventually back to the entrance of Smirnoffs. Parties should not use this route to reach Pisa Chamber because of the amount of mud involved.

From the top of the balcony section of Pisa Chamber, a large muddy passage heads south (boots required). There are aragonite clusters and oolites in this section. A large water-inlet aven is reached, with mud formations. Beside this aven is a muddy flat crawl passage, which is an exploration lead.

Lower River to Slug Lake

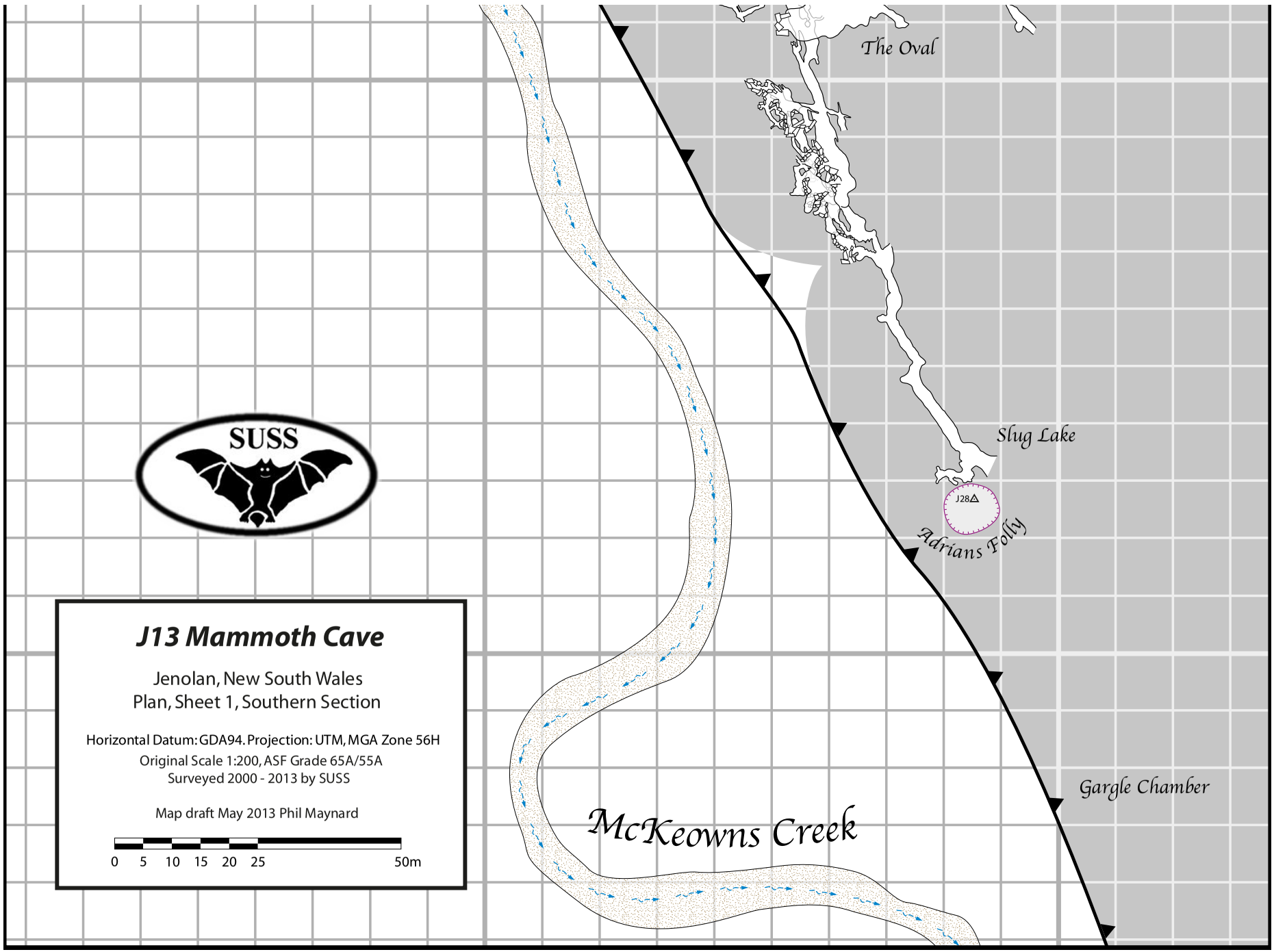
Cross Lower River. From the mud bank beside the downstream sump, climb up steeply on the left (east) side. At the top, traverse to the right (west) side of the passage above the drop, then into the rockpile passage heading south. At the end of this, squeeze out over a 4 m climb down. Below the climb, a flat area is reached. Behind on the right (north west) is a rockpile squeeze to the entrance of Primeval Fear and Ice Age. Ahead to the left (south east) is a difficult 4 m climb down to a stream passage. Ahead to the right (south) is a tight tube that leads to an easier climb down to the same place. At the base of the climb, follow the large passage up the slope to a well-decorated area. On the left (east) at the top of the slope there is a tight rift with an 8 m climb down to a small lake and sump. On the right (west), there is an extensive, multi-level rockpile. This climbs up more than 15 m above the main passage and descends 8 m below the main passage to a lake with a sump.

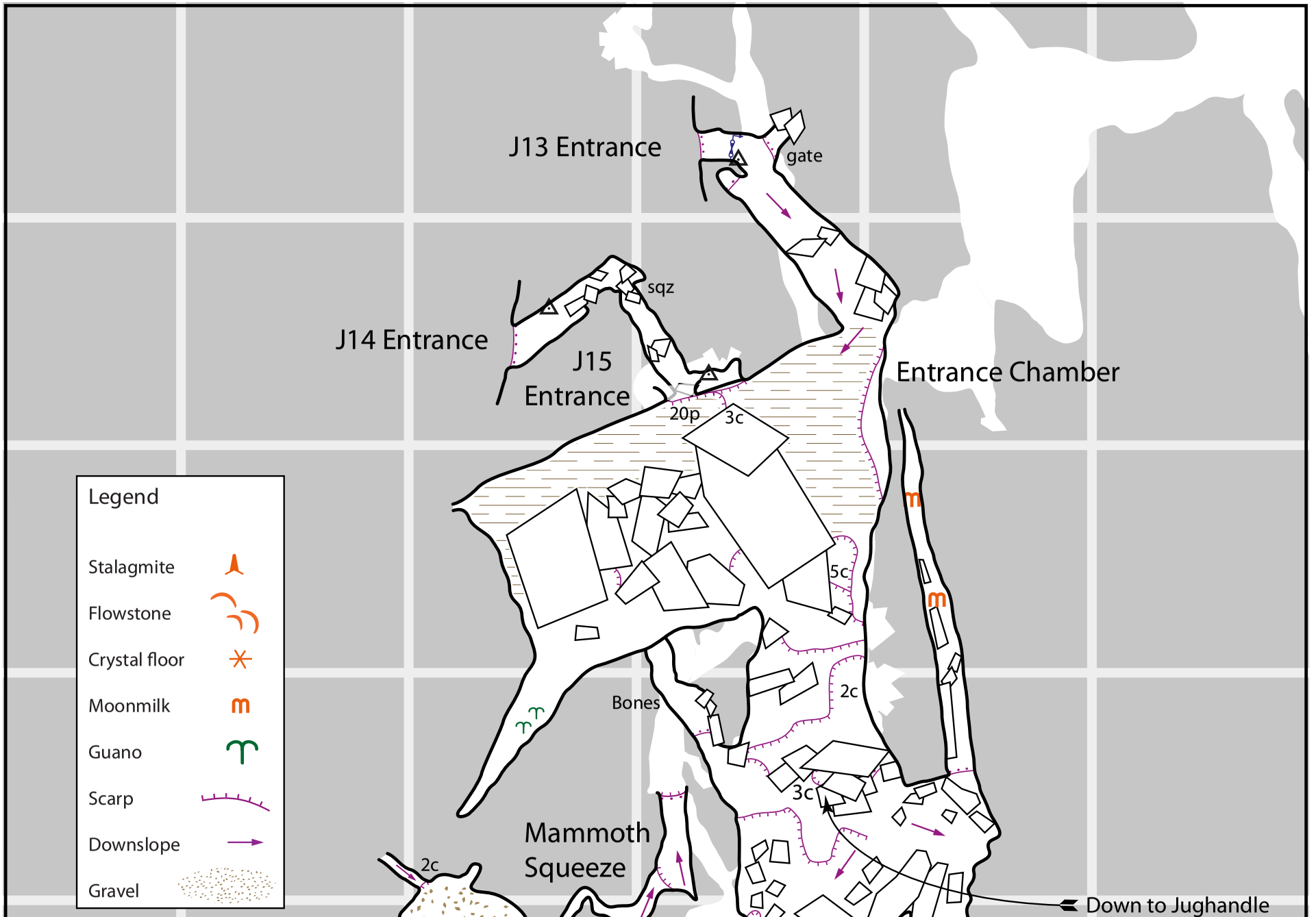
Passing a crystal pool and some good decoration, the end of the passage is reached. In the south wall, there is a slot which opens to a vertical climb down 3 m. At the base of the climb is a rockpile chamber with two exits to the left (east). Both lead to the same place; both involve squeezing. At the point where the two routes join, there is a large passage heading southeast. Follow this past a flowstone water inlet on the left (east) wall, across some very wet floor, and into a large muddy phreatic tube. This goes about 40 m to Slug Lake. The lake is worth the effort to get there – if you are a diver. For dry cavers, not so much. The next piece of known cave above the waterline is Gargle Chamber, accessible to divers only. The next piece of known cave accessible to dry cavers is Endzone in Spider cave.

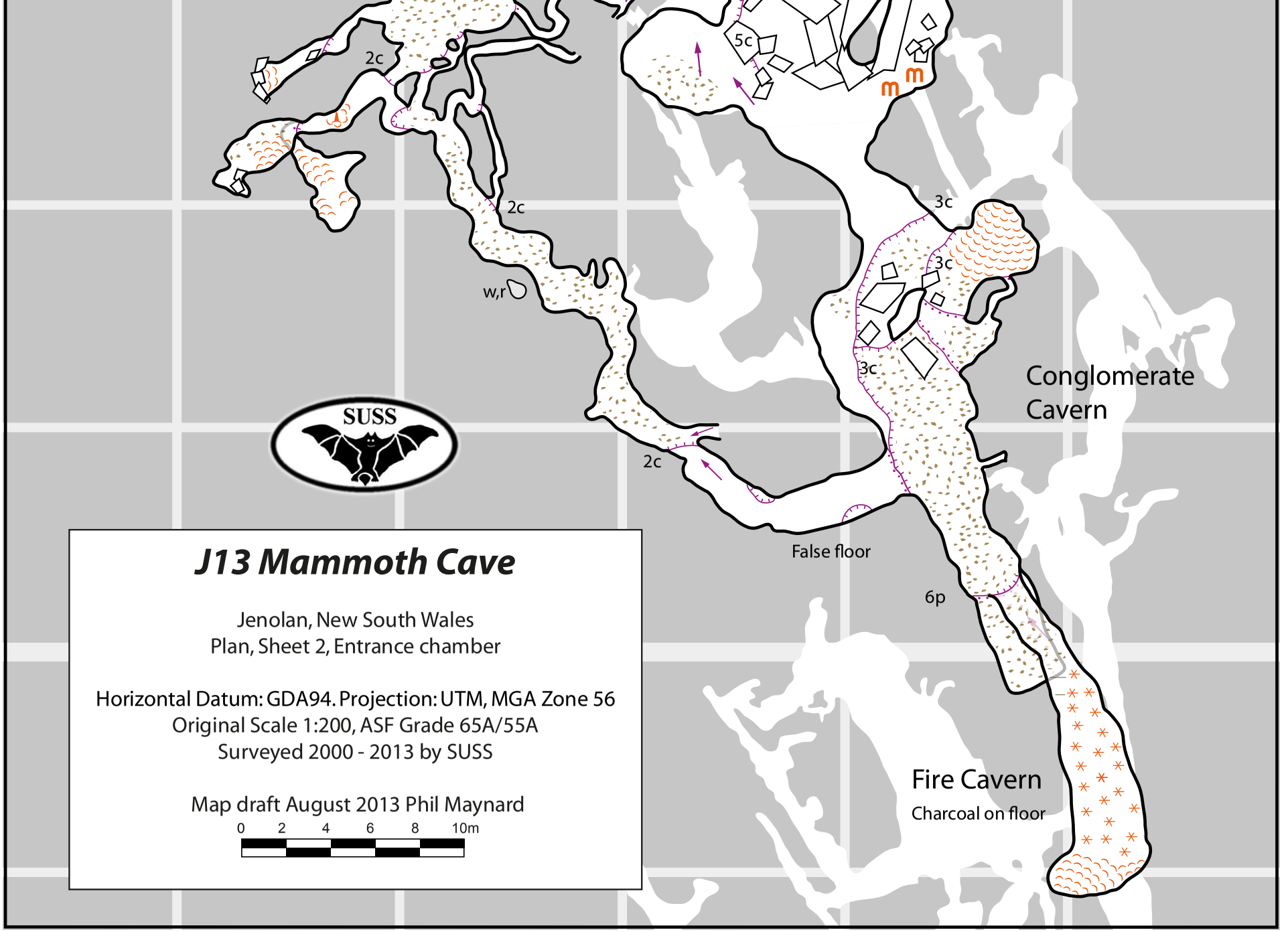


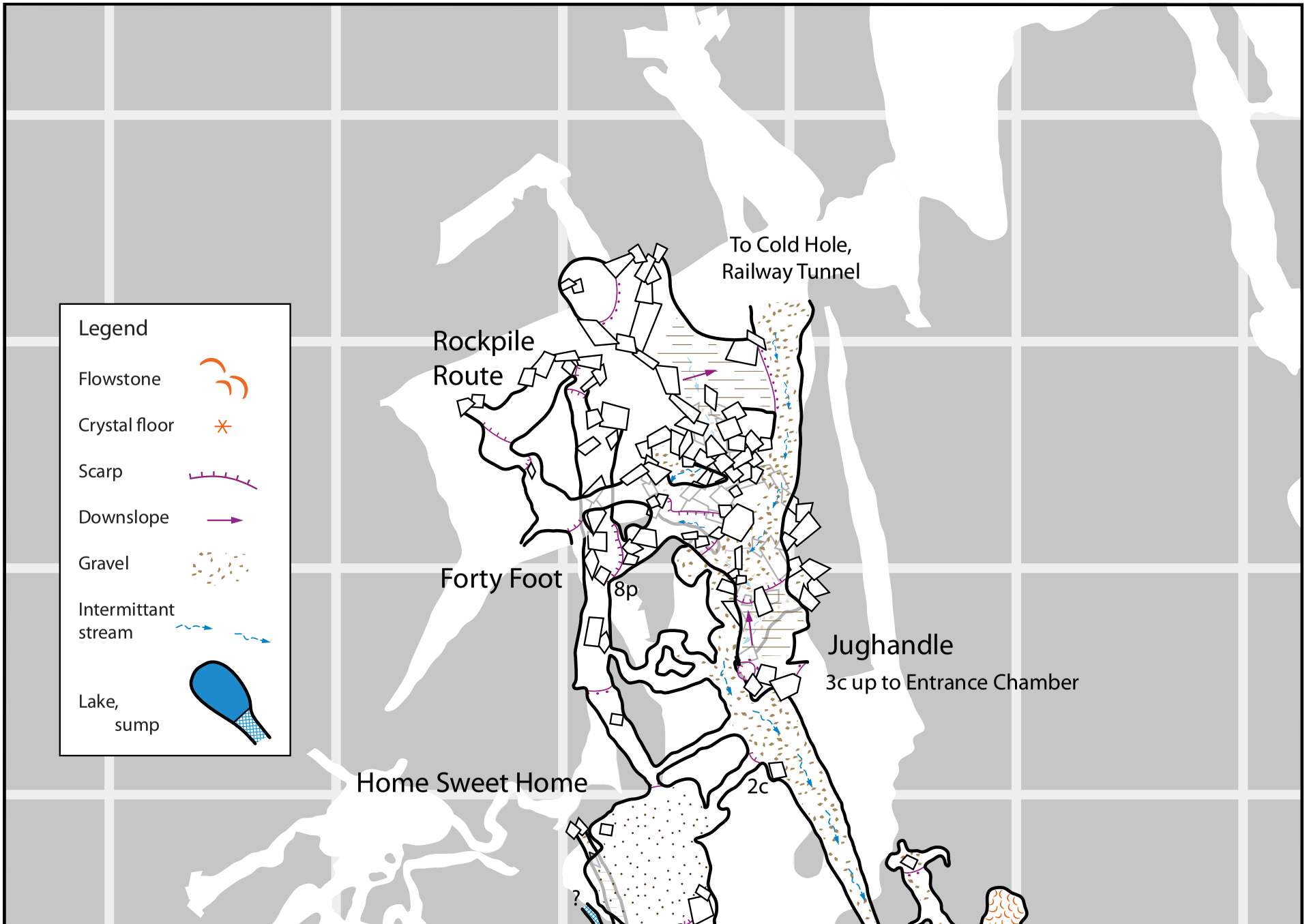
Annalisa Contos at Lower River. Photo by Andy Fulton

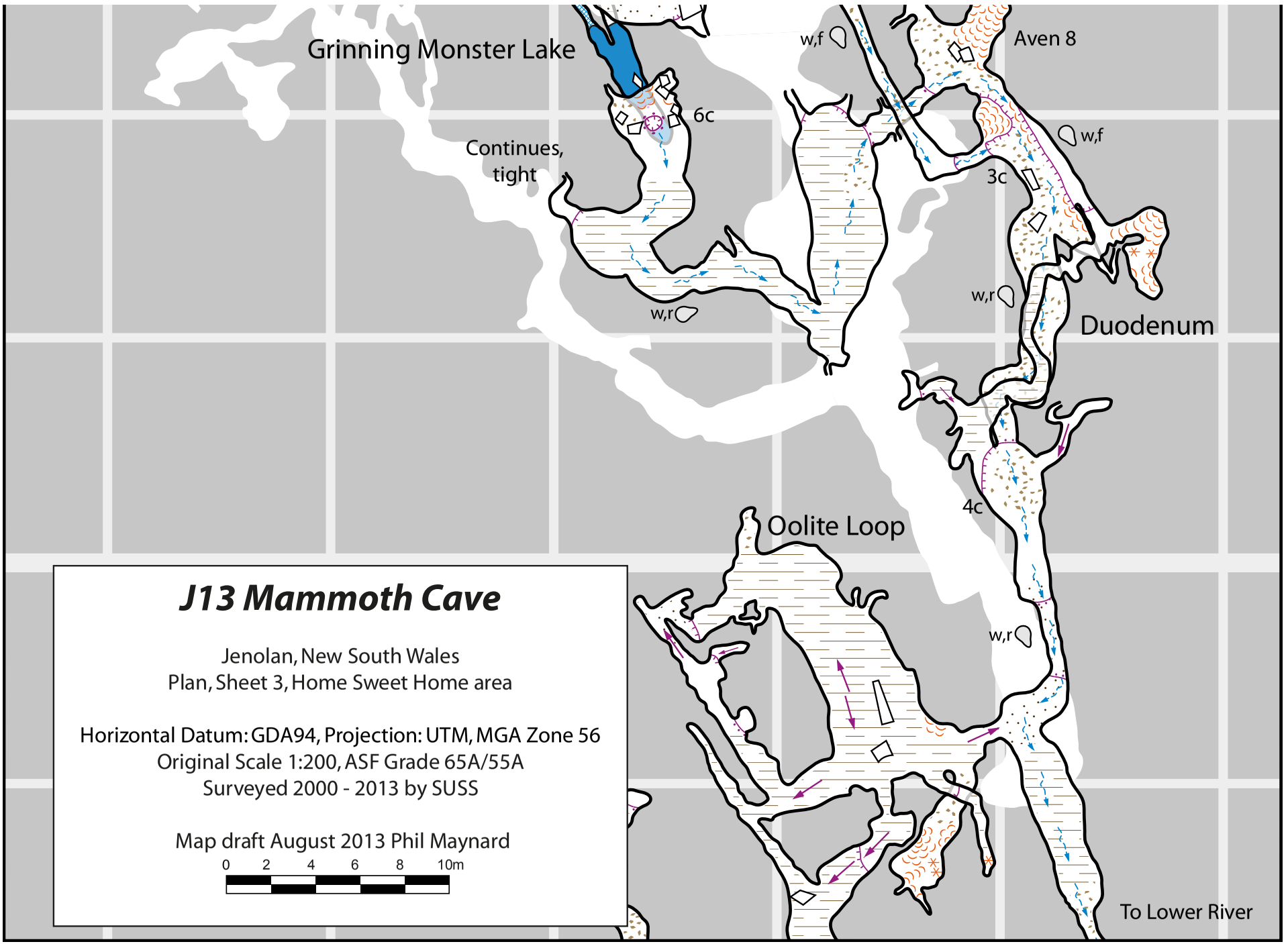

Entrance, gate
Entrance Chamber
Home Sweet Home
Foz Hole
Conglomerate Cavern
Ooloop
Pisa Chamber
Lower River
Oolite Chamber
Ice Age
Mammoth Squeeze
Casteret Cave
Grinning Monster
Lake
J13
J14
J15
J29
J49
J51
McKeowns Creek
Dillons Creek
Jenolan Caves Limestone
McKeowns Fault
Ordovician Sandstones and Siltstones and recent alluvials

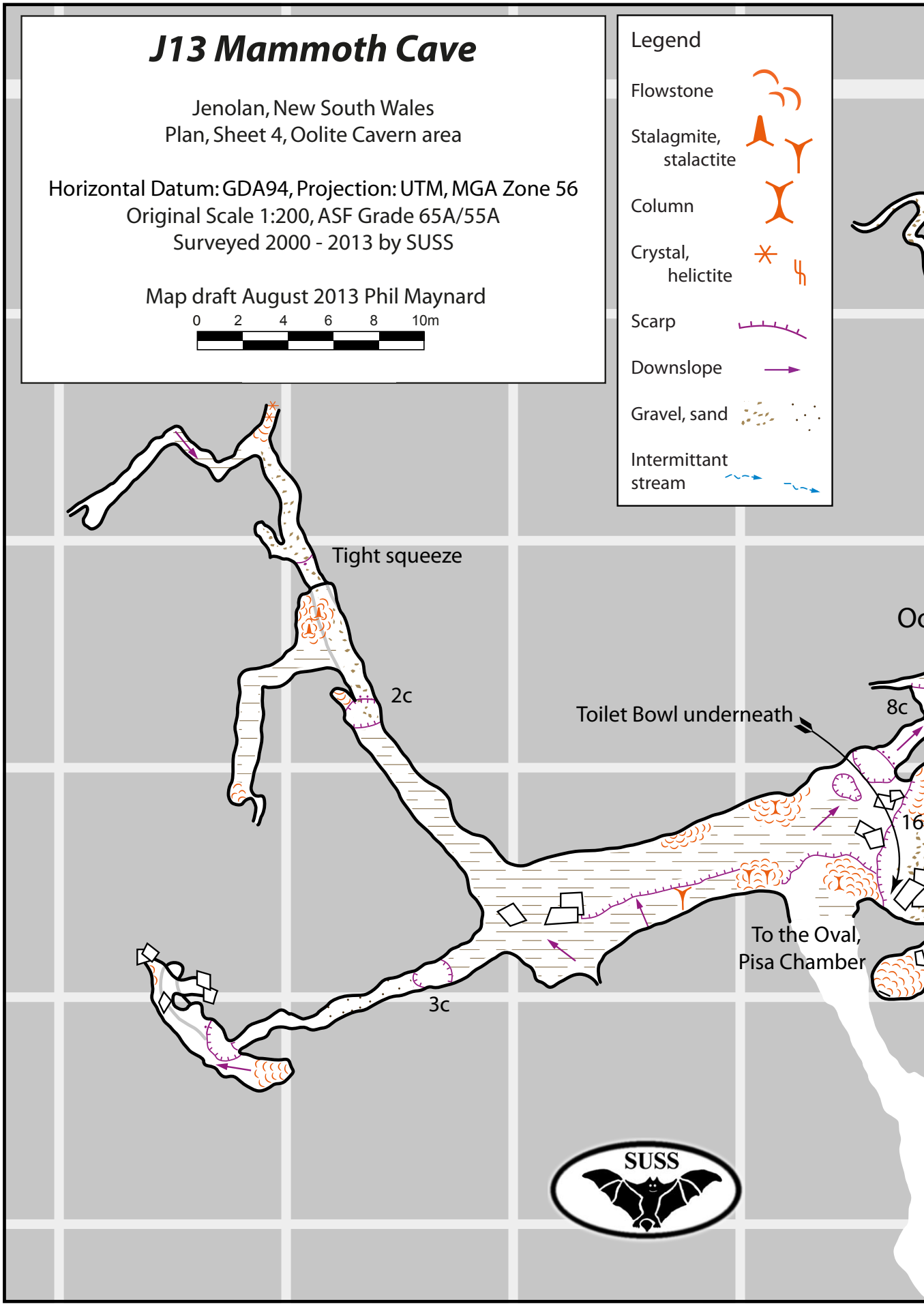

The Oval
Slug Lake
J28
Adrians Folly
Gargle Chamber
McKeowns Creek
SUSS
J13 Mammoth Cave
Jenolan, New South Wales
Plan, Sheet 1, Southern Section
Horizontal Datum: GDA94. Projection: UTM, MGA Zone 56H
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS
Map draft May 2013 Phil Maynard
0 5 10 15 20 25 50m

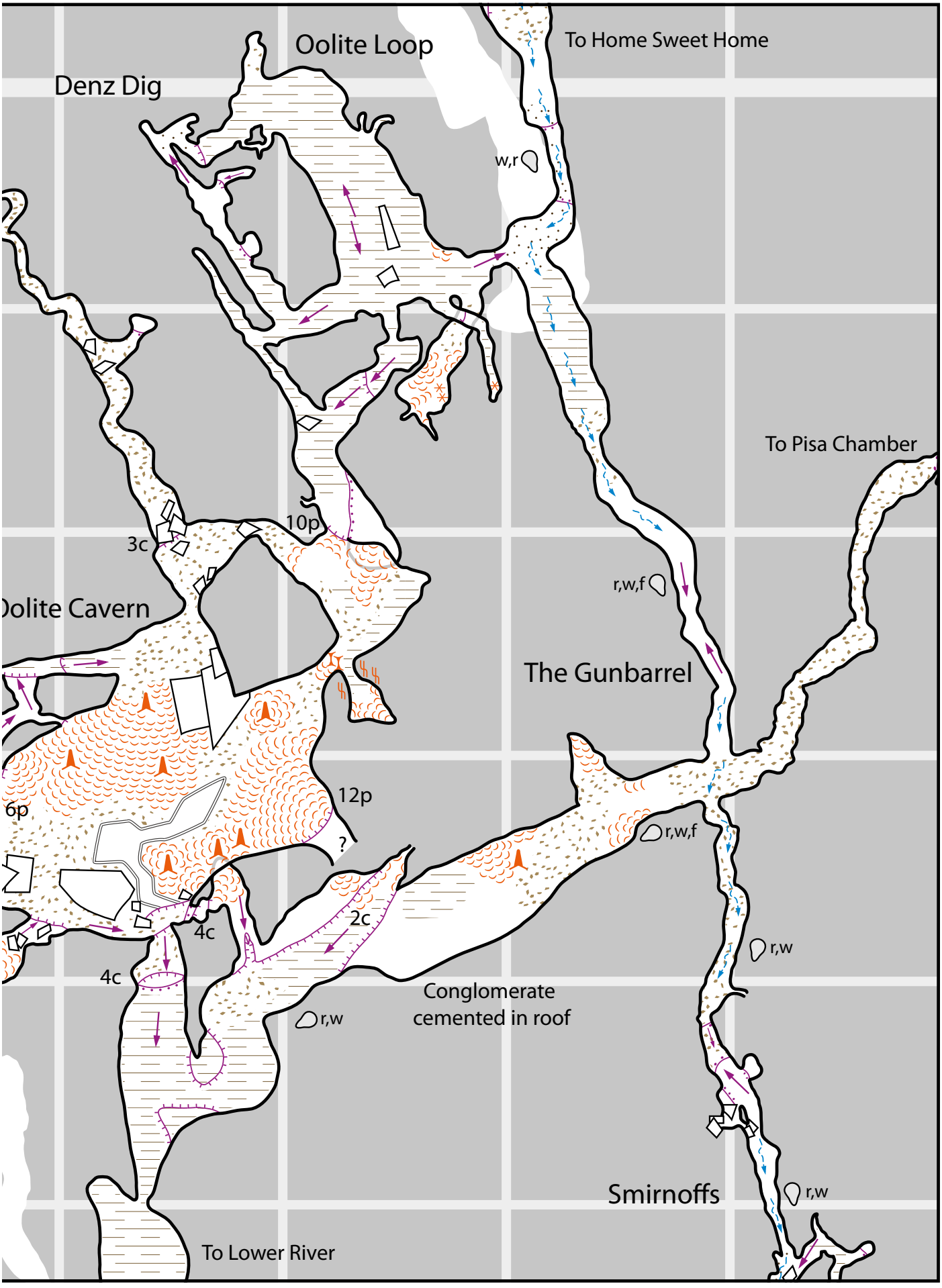

J13 Entrance
gate
J14 Entrance
sqz
J15
Entrance
Entrance Chamber
20p
3c
5c
2c
Bones
3c
Mammoth
Squeeze
2c
Down to Jughandle
Legend
Stalagmite
Flowstone
Crystal floor
Moonmilk
Guano
Scarp
Downslope
Gravel

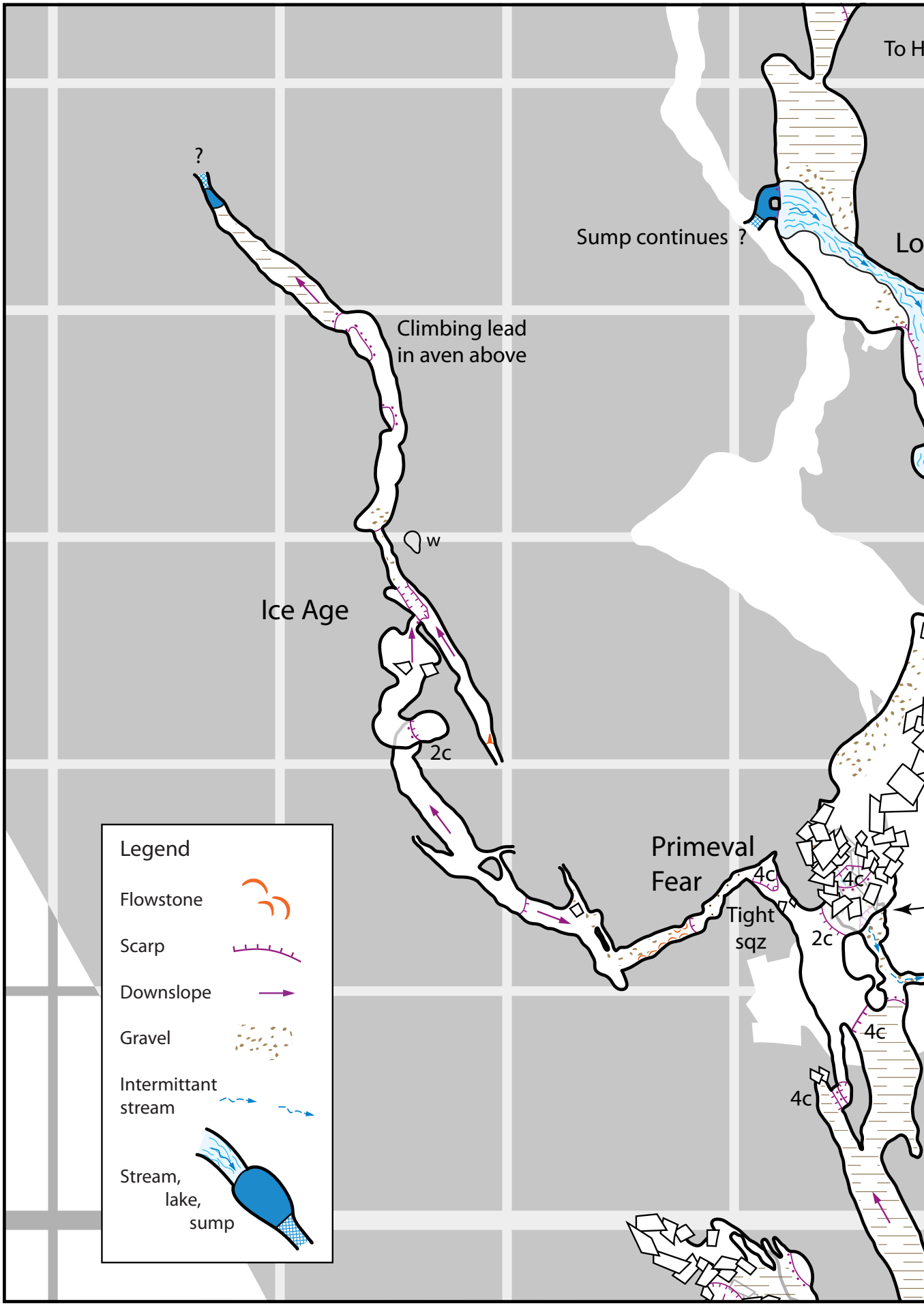

2c
5c
m
m
2c
3c
3c
w,r
3c
Conglomerate
Cavern
SUSS
2c
False floor
6p
Fire Cavern
Charcoal on floor
J13 Mammoth Cave
Jenolan, New South Wales
Plan, Sheet 2, Entrance chamber
Horizontal Datum: GDA94. Projection: UTM, MGA Zone 56
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS
Map draft August 2013 Phil Maynard
0 2 4 6 8 10m

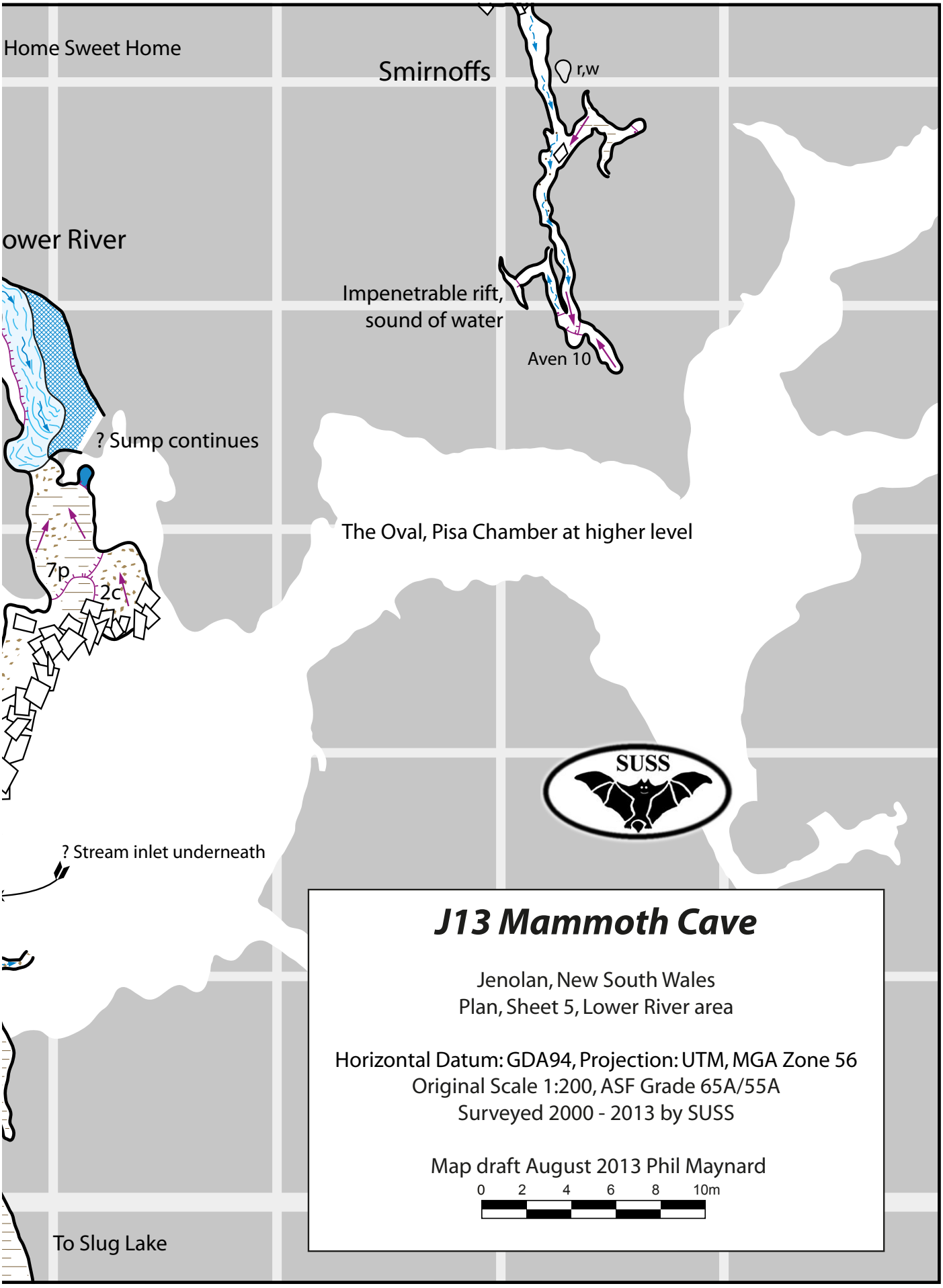

Legend
Flowstone
Crystal floor
Scarp
Downslope
Gravel
Intermittant stream
Lake, sump
To Cold Hole, Railway Tunnel
Rockpile Route
Forty Foot
8p
Jughandle
3c up to Entrance Chamber
Home Sweet Home
2c
?

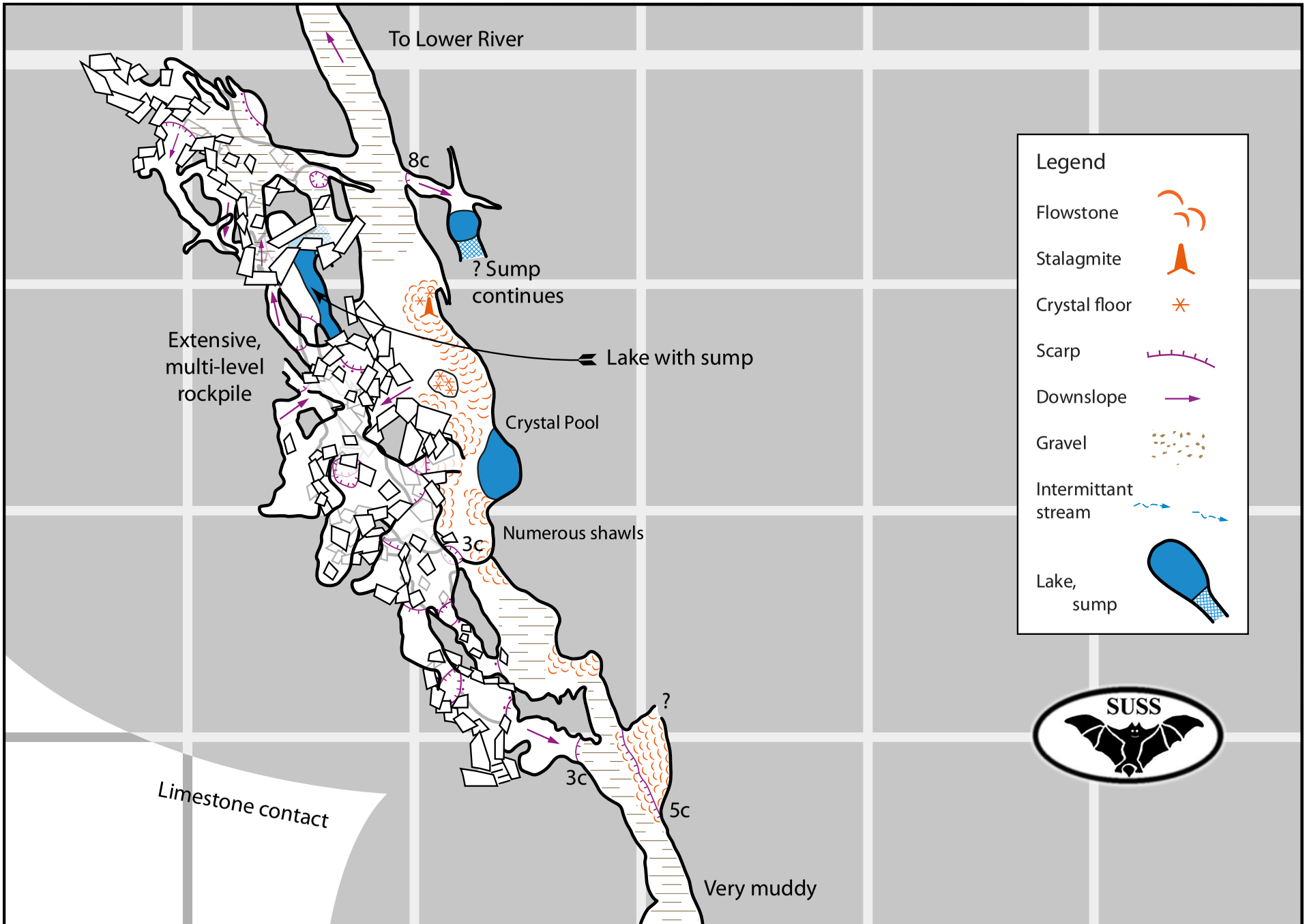

Grinning Monster Lake
w,f
Aven 8
6c
Continues,
tight
w,f
3c
w,r
w,r
Duodenum
4c
Oolite Loop
w,r
To Lower River
J13 Mammoth Cave
Jenolan, New South Wales
Plan, Sheet 3, Home Sweet Home area
Horizontal Datum: GDA94, Projection: UTM, MGA Zone 56
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS
Map draft August 2013 Phil Maynard
0 2 4 6 8 10m

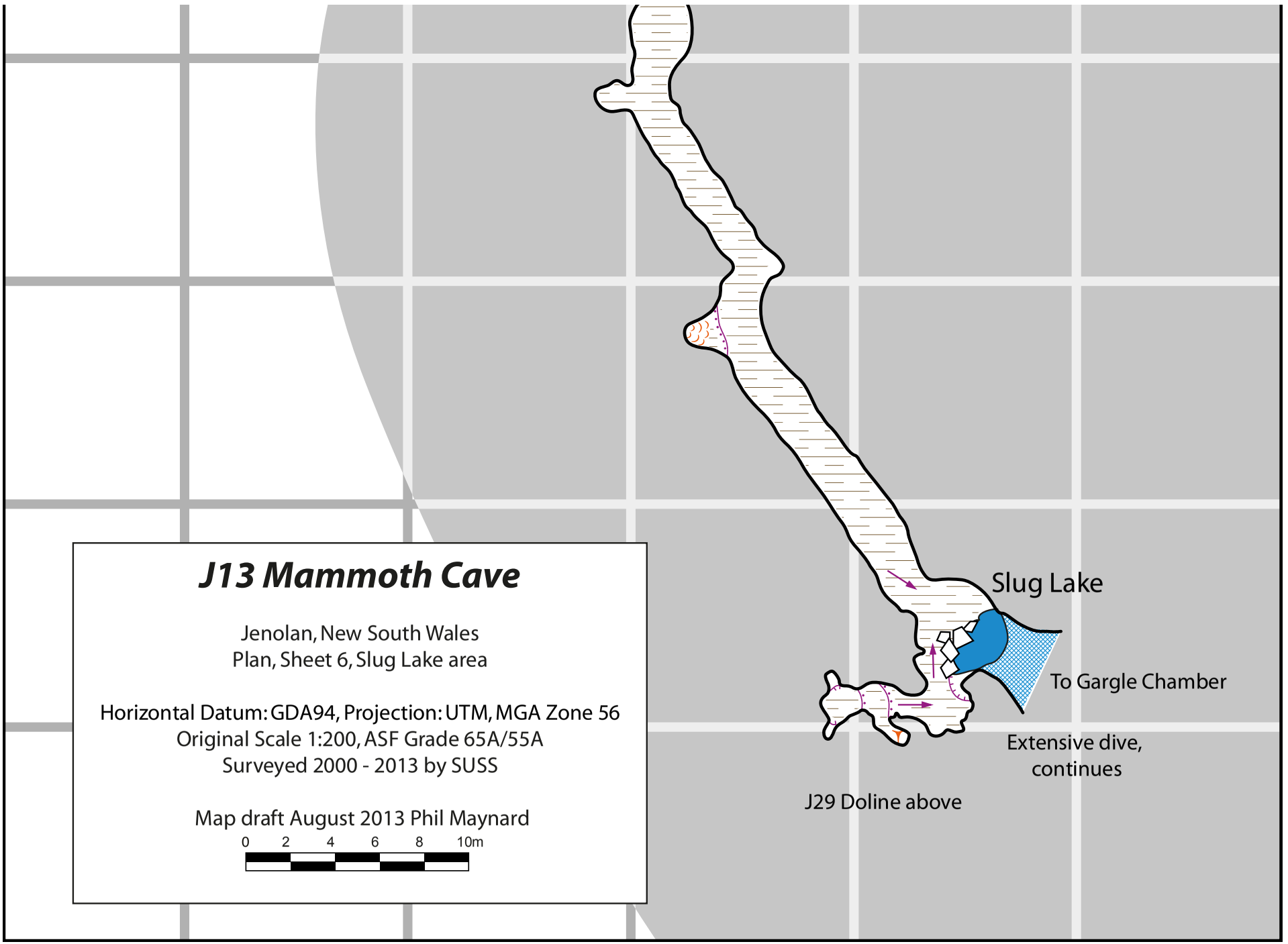

J13 Mammoth Cave
Jenolan, New South Wales
Plan, Sheet 4, Oolite Cavern area
Horizontal Datum: GDA94, Projection: UTM, MGA Zone 56
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS
Map draft August 2013 Phil Maynard
0 2 4 6 8 10m
Legend
Flowstone
Stalagmite, stalactite
Column
Crystal, helictite
Scarp
Downslope
Gravel, sand
Intermittant stream
Tight squeeze
2c
Toilet Bowl underneath
8c
16
To the Oval, Pisa Chamber
3c
SUSS

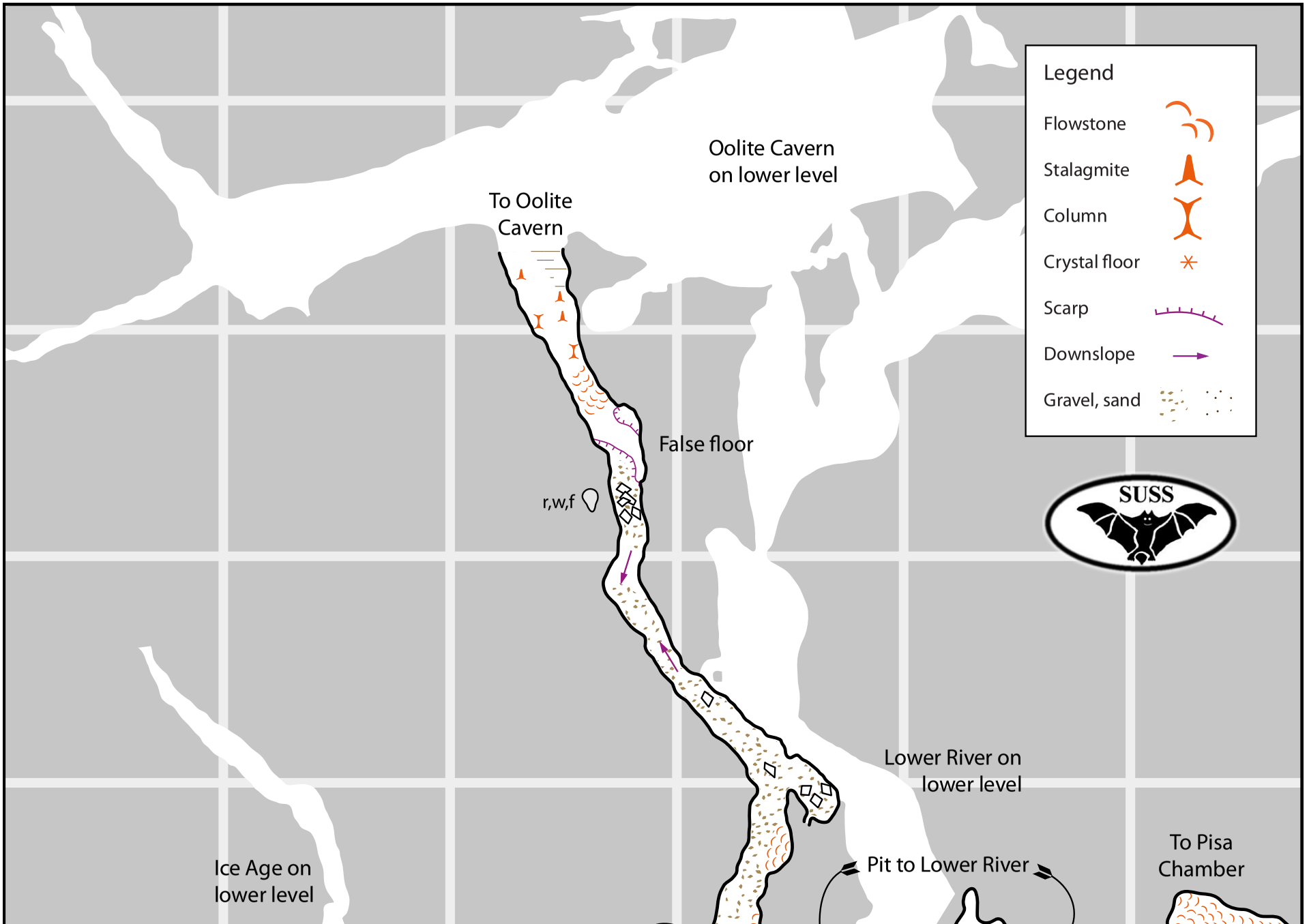

Oolite Loop
To Home Sweet Home
Denz Dig
w,r
To Pisa Chamber
10p
3c
r,w,f
Oolite Cavern
The Gunbarrel
12p
6p
?
r,w,f
2c
4c
r,w
4c
Conglomerate
cemented in roof
r,w
Smirnoffs
r,w
To Lower River

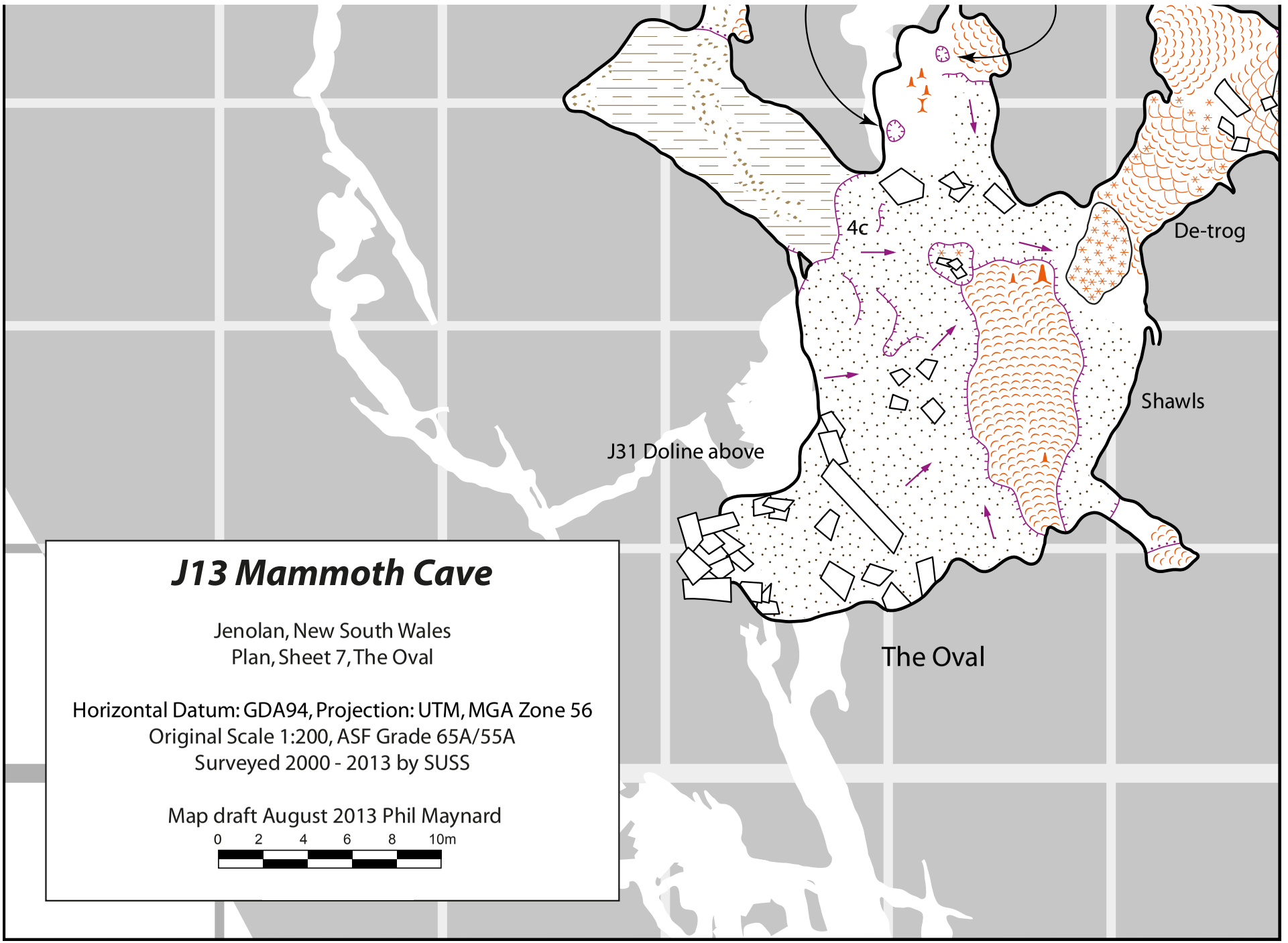

To H
?
Sump continues ?
Lo
Climbing lead
in aven above
w
Ice Age
2c
Legend
Flowstone
Scarp
Downslope
Gravel
Intermittant
stream
Stream,
lake,
sump
Primeval
Fear
4c
4c
Tight
sqz
2c
4c
4c

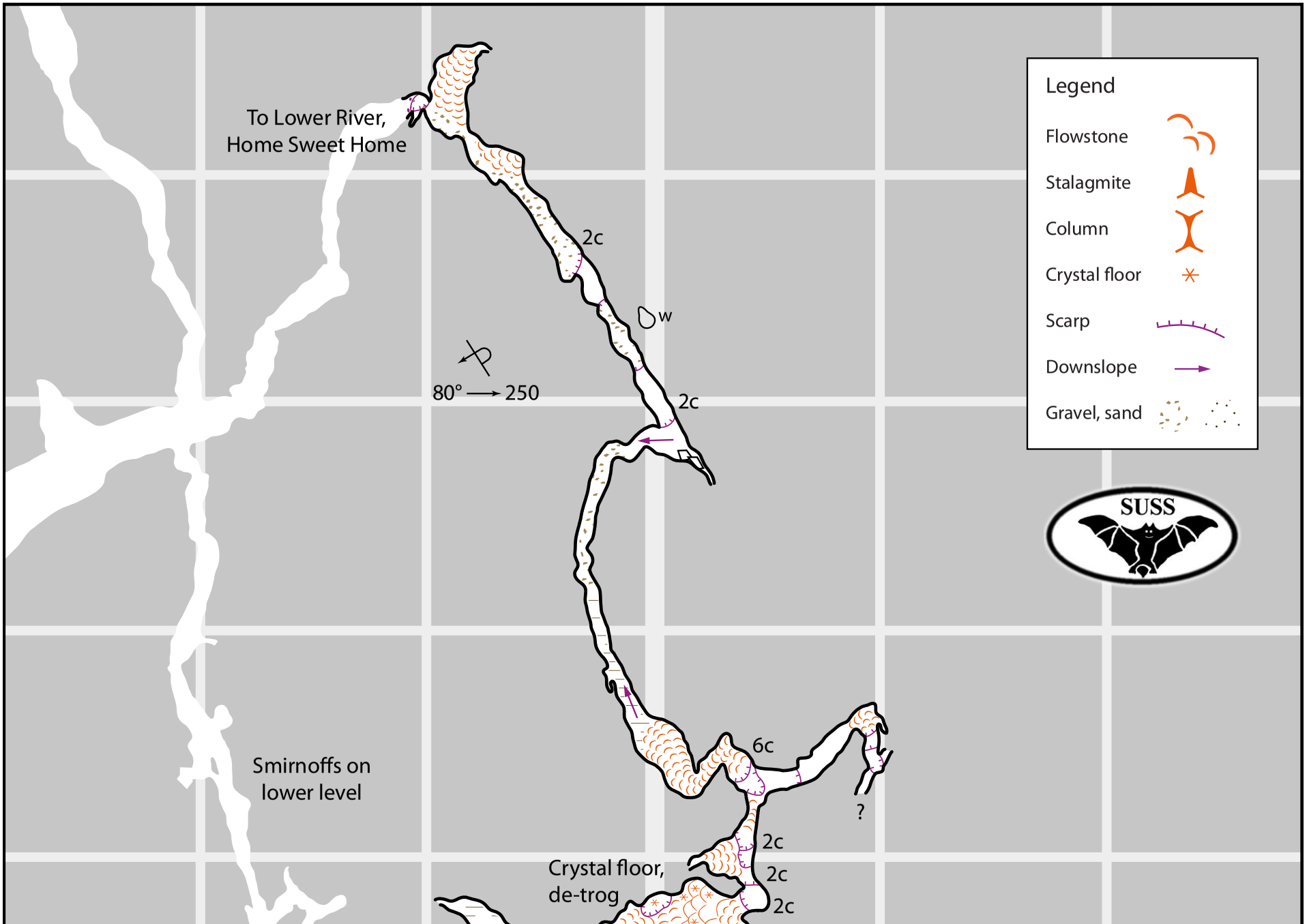

Home Sweet Home
Smirnoffs
r,w
ower River
Impenetrable rift,
sound of water
Aven 10
? Sump continues
The Oval, Pisa Chamber at higher level
7p
2c
SUSS
? Stream inlet underneath
To Slug Lake
J13 Mammoth Cave
Jenolan, New South Wales
Plan, Sheet 5, Lower River area
Horizontal Datum: GDA94, Projection: UTM, MGA Zone 56
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS
Map draft August 2013 Phil Maynard
0 2 4 6 8 10m

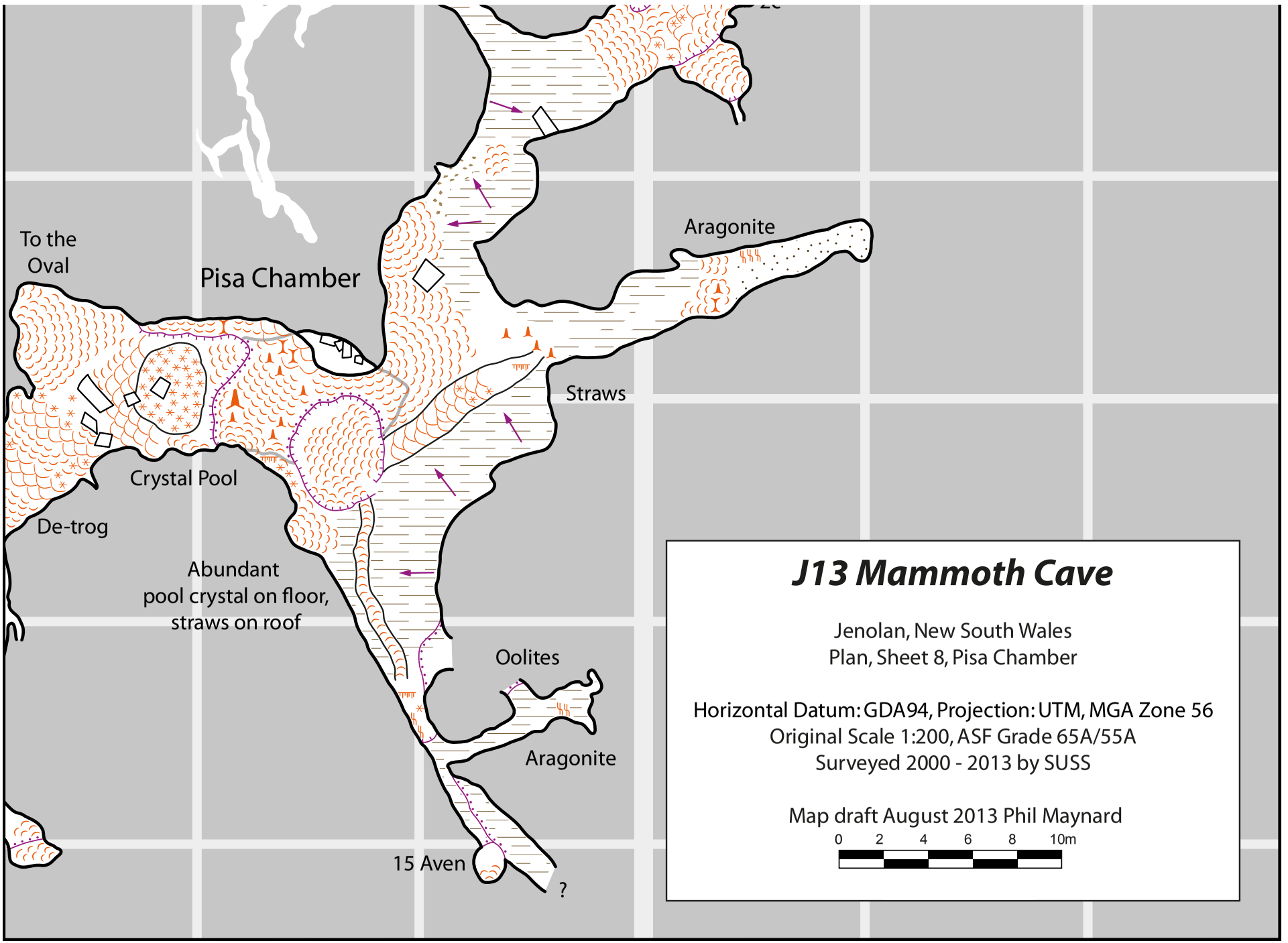

To Lower River
8c
? Sump
continues
Extensive,
multi-level
rockpile
Lake with sump
Crystal Pool
Numerous shawls
3c
?
3c
5c
Very muddy
Limestone contact
Legend
Flowstone
Stalagmite
Crystal floor
Scarp
Downslope
Gravel
Intermittant
stream
Lake,
sump
SUSS

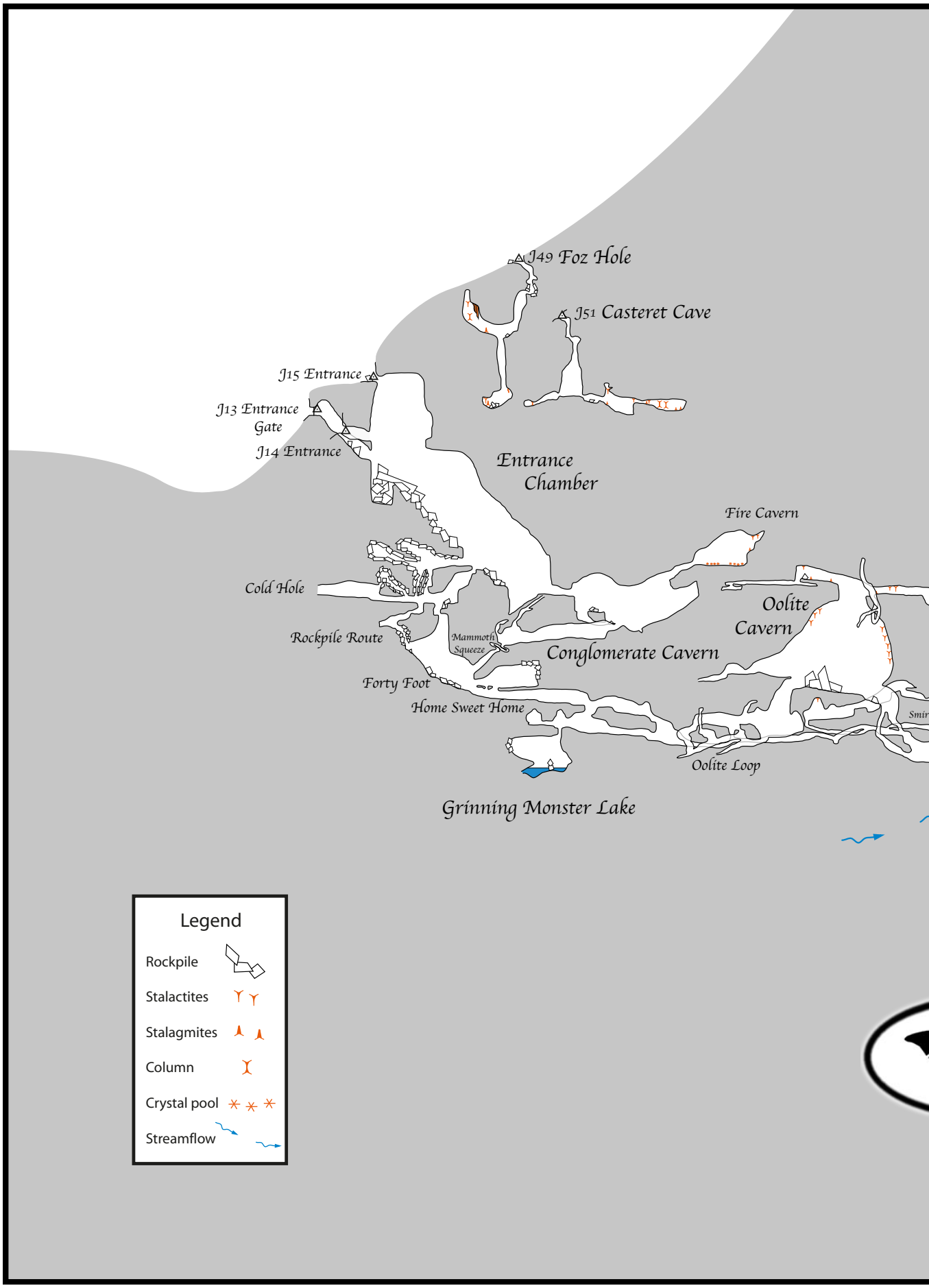

J13 Mammoth Cave
Jenolan, New South Wales
Plan, Sheet 6, Slug Lake area
Horizontal Datum: GDA94, Projection: UTM, MGA Zone 56
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS
Map draft August 2013 Phil Maynard
0 2 4 6 8 10m
Slug Lake
To Gargle Chamber
Extensive dive, continues
J29 Doline above

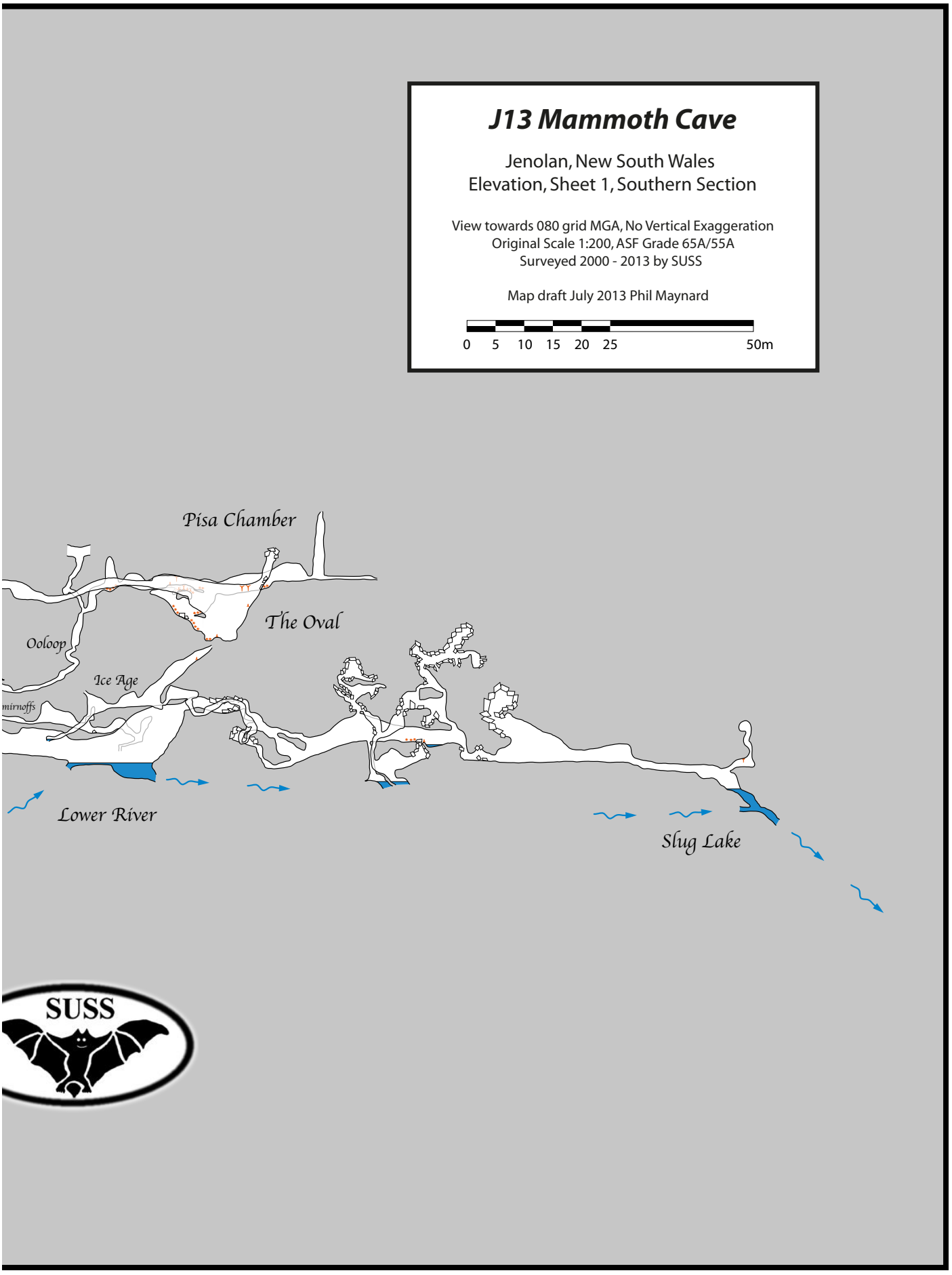

Legend
Flowstone
Stalagmite
Column
Crystal floor
Scarp
Downslope
Gravel, sand
SUSS
Oolite Cavern
on lower level
To Oolite
Cavern
False floor
r,w,f
Lower River on
lower level
Pit to Lower River
To Pisa
Chamber
Ice Age on
lower level


4c
De-trog
Shawls
J31 Doline above
The Oval
J13 Mammoth Cave
Jenolan, New South Wales
Plan, Sheet 7, The Oval
Horizontal Datum: GDA94, Projection: UTM, MGA Zone 56
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS
Map draft August 2013 Phil Maynard
0 2 4 6 8 10m


To Lower River,
Home Sweet Home
2c
w
80° → 250
2c
Smirnoffs on
lower level
6c
?
2c
Crystal floor,
de-trog
2c
2c
Legend
Flowstone
Stalagmite
Column
Crystal floor
Scarp
Downslope
Gravel, sand
SUSS


To the
Oval
Pisa Chamber
Aragonite
Straws
Crystal Pool
De-trog
Abundant
pool crystal on floor,
straws on roof
Oolites
Aragonite
15 Aven
?
J13 Mammoth Cave
Jenolan, New South Wales
Plan, Sheet 8, Pisa Chamber
Horizontal Datum: GDA94, Projection: UTM, MGA Zone 56
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS
Map draft August 2013 Phil Maynard
0 2 4 6 8 10m


J49 Foz Hole
J51 Casteret Cave
J15 Entrance
J13 Entrance
Gate
J14 Entrance
Entrance
Chamber
Fire Cavern
Cold Hole
Oolite
Cavern
Rockpile Route
Mammoth
Squeeze
Conglomerate Cavern
Forty Foot
Home Sweet Home
Oolite Loop
Grinning Monster Lake
Legend
Rockpile
Stalactites
Stalagmites
Column
Crystal pool
Streamflow

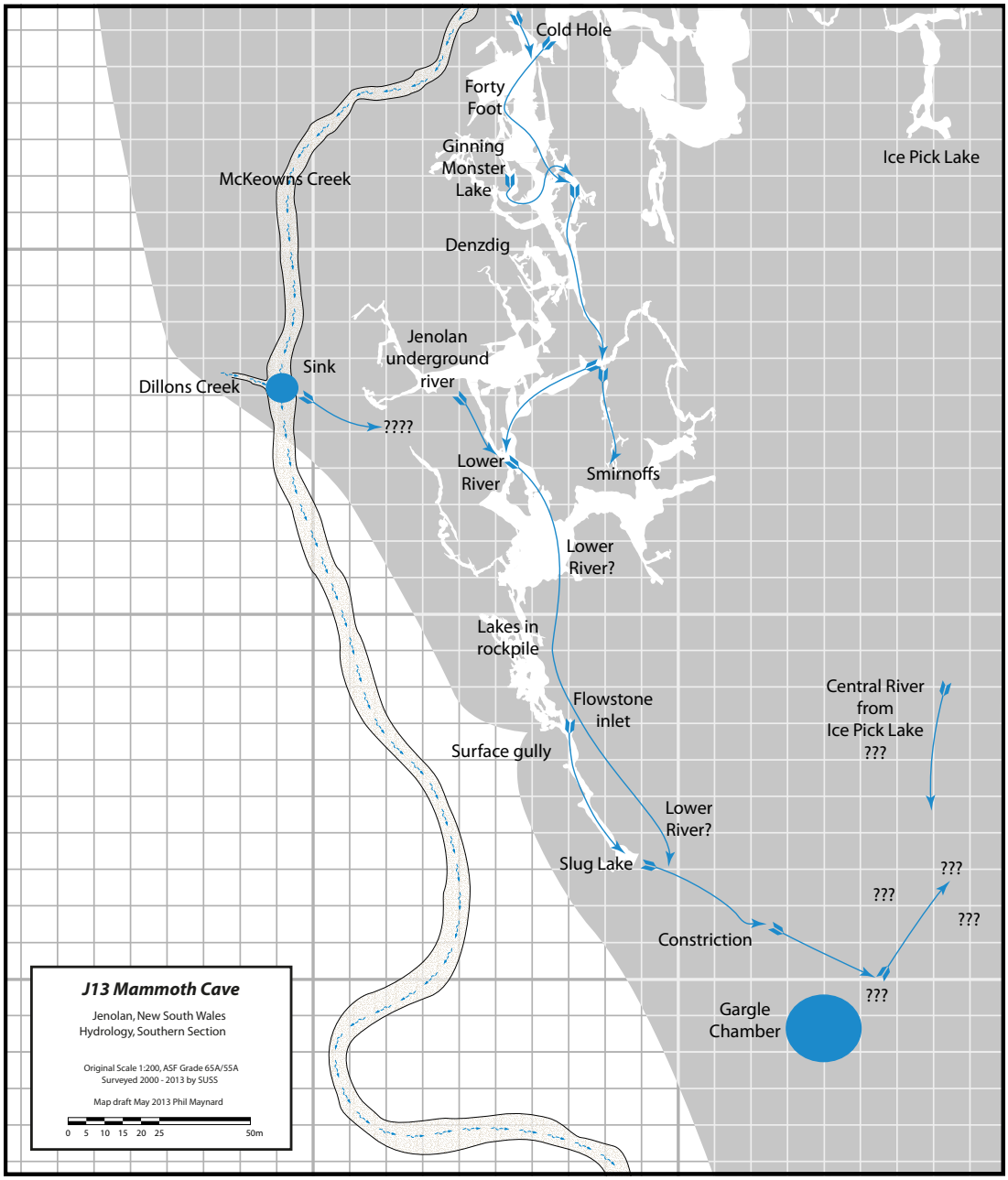

J13 Mammoth Cave
Jenolan, New South Wales
Elevation, Sheet 1, Southern Section
View towards 080 grid MGA, No Vertical Exaggeration
Original Scale 1:200, ASF Grade 65A/55A
Surveyed 2000 - 2013 by SUSS
Map draft July 2013 Phil Maynard
0 5 10 15 20 25 50m
Pisa Chamber
The Oval
Ooloop
Ice Age
mirnoffs
Lower River
Slug Lake
SUSS

Lower River

Lower River in Mammoth cave was the only section of the Jenolan Underground River known in a wild cave until the discovery of Spider cave. The water wells up from a sump under pressure; at times of high flow this has been observed as a dome of water 2 m in diameter. The water flows through a shallow race down to a deep section from which water disappears into a sump. The water is next seen at a couple of lakes near the rockpile south of Ice Age, and then in Slug Lake. Running water is not seen again downstream from Lower River.

The dive at Slug Lake commences in the main flow of the river, down to a constriction at -30 m. The constriction rises downstream to -27 m and then opens into a vast underwater area where the current is lost. Exploration of this area is required, not only to find the downstream continuation of the Jenolan Underground River, but also the entry point of Central River from Ice Pick Lake.

Upstream from Lower River, there is evidence of the river in the Toilet Bowl (impossible vertical squeeze in Oolite Cavern) [20]. The sound of running (dripping?) water is regularly heard down this hole. One person is reported to have succeeded in passing the squeeze in the Toilet Bowl and climbing down a vertical rift to water [21]. This probably does connect to the underground river, but is not a bypass to diving the river. It is also possible that the river rises into Oolite Loop in flood via Denzdig [22].



Surface Creek inlets

McKeowns Creek runs parallel to the southern section of Mammoth cave. This creek is normally dry for the full length of its valley once it contacts the Jenolan Limestone. A well documented set of stream sinks in the bed of the river fill progressively as a flood event unfolds [17][23][24]. As each sink is filled with a flow rate beyond its capacity, the creek overflows the sink and advances down the valley to the next sink. In the vicinity of Southern Section of Mammoth, the first key sink is outside Dwyers cave, with the water appearing in Sand Passage. Bow cave (J16) is a major swallet that also supplies water to Sand Passage in flood. The Sand Passage/Bow cave descriptions and hydrology will be detailed in the next installment of Mammoth cave. Water from Sand Passage flows to the top of Forty Foot and also inside the Rockpile Route to Southern Section [19].

Dillons Creek is a major side creek that flows on to the limestone from the west just before it joins McKeowns Creek. Because its catchment area and valley flow is on a non-karst landscape, this creek often flows (it was described as a permanent creek in the 1970s issues of the Bull) and is a major source of surface flow during floods. There is a sink in McKeowns Creek at the junction with Dillons Creek, which absorbs all of the water from Dillons Creek until a flood occurs [24]. From the Mammoth map, the water from Dillons Creek is close to the muddy section of Upper Oolite and, at a lower level, to the end of Ice Age. Neither of these passages contains a permanent or semi-permanent stream, so the fate of the water from Dillons Creek is unknown. Cooper speculates that the water lies within the rockpile south of Ice Age, where there is a lake underlying the rockpile [25].

Just to the south of the rockpile area and about 40 m north of Slug Lake, a surface gully heads west, dividing Mammoth Bluff from South Mammoth Bluff and crossing above the cave before it opens out into an alluvial fan. Underneath the gully in the cave, there is a large, permanently wet flowstone wall and a section of muddy floor that can eat gumboots. The flowstone has been climbed for some distance and shows signs of coming from a passage higher up. This appears to be the point of entry into the cave of the water from the gully.

Forty Foot – Lower River

Observations and conclusions/speculations about flooding in the main route of Southern Section were published by Mark Staraj [20] [22] [26]. When a flood commences in Mammoth cave, water begins to flow into Southern Section through the Rockpile Route. A bedrock stream inlet, choked with rockpile, supplies a stream into the lowest levels of the Route. At higher flood levels, water flows into the stream passage just downstream from Cold Hole and then over the Forty Foot. This inlet is constrained in capacity and does not cause major flow in the rift below Forty Foot. At maximum flood levels, water flows out the entrance of Sand Passage, through Cold Hole and over Forty Foot. Staraj recounts this flow as being 400 ls^{-1}, enough to make Southern Section unenterable [19]. Mammoth Squeeze does not take major flow, but can be filled with water from roof flow in the chamber before the entrance of the squeeze.

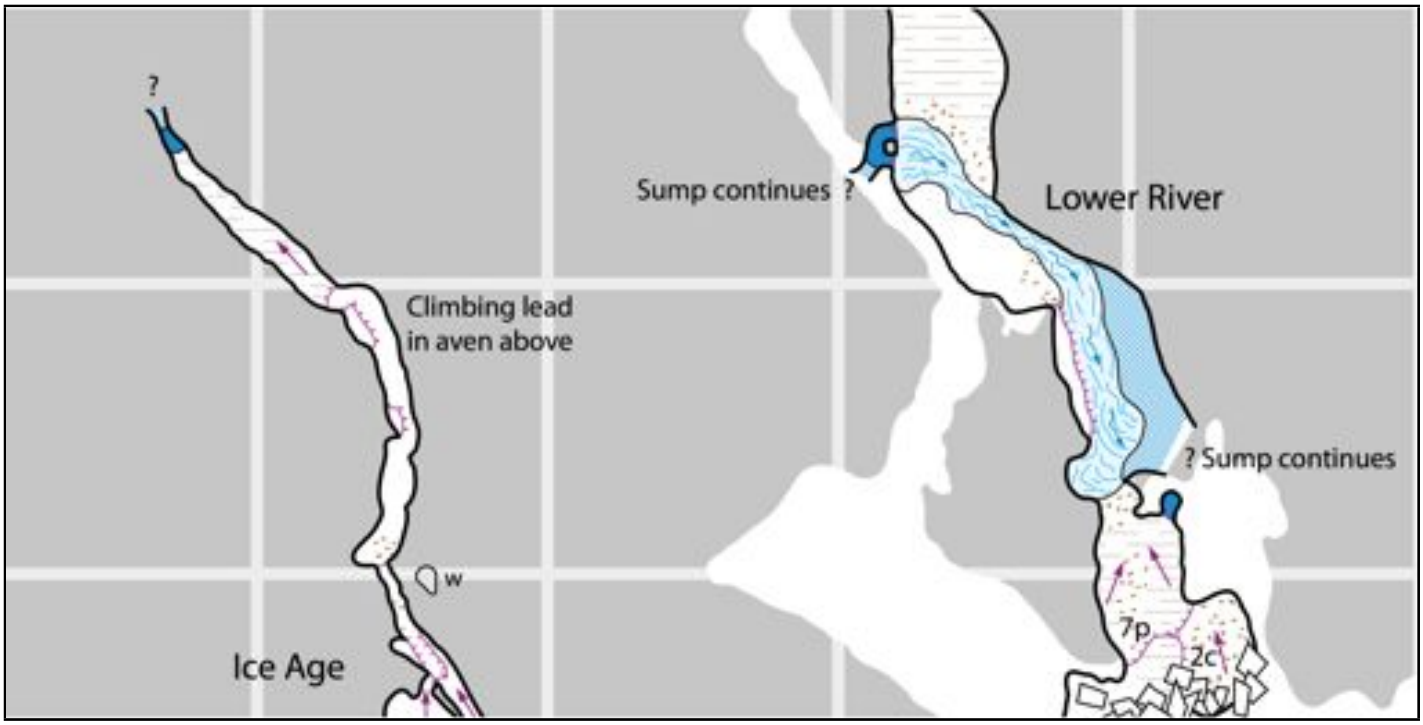
From the base of Forty Foot, vadose passages run down past Home Sweet Home to the junction with the route to Grinning Monster Lake. In dry conditions, GML is 6 m down a squeeze climb from the passage leading to it. The lake rises to overflow out of this squeeze during a flood and pours down the passage to the main route to Lower River. The combined flow from Home Sweet Home and Grinning Monster Lake flows down through a constricted piece of passage just before Oolite Loop – this shows high tide marks after a flood recedes and constricts the flow rate down to Lower River. Beyond this squeeze is the phreatic loop of the Gunbarrel, which sumps in flood, and then the water flow splits between Smirnoffs and the route to Lower River. Lower River backs up several (many?) metres into here during a flood, as evidenced by the high tide marks on the ceiling. Smirnoffs contains squeezes and can not take a large flood flow. The end of Smirnoffs is an impenetrable bedrock slot with the sound of running water.

McKeowns Creek in flood. Photo by Alan Pryke

Mark Staraj summarised the known exploration problems in Mammoth Cave in 2005 [27]. As the first and most popular area of Mammoth cave for explorers, the main areas of Southern Section have been known and looked at for a long time. Nevertheless, there are important leads remaining in this part of the cave, related – as always at Jenolan – to the course of the underground river.

Ice Age

Described by Mark Staraj [28]. This passage is one of the most important dry (by some definitions of dry) exploration leads at Jenolan, because it has the potential to lead to the underground river upstream of its furthest known point at Lower River. The exploration has been restricted by two factors; both related to Primeval Fear. Firstly, this squeeze is intimidating to most sane people. Secondly, every time it rains, sand washes into Primeval Fear and needs to be dug out. The northwest lead in Ice Age slopes down to a dig that was wet, and it was assumed at the time that this was at river level, so the dig would be unfeasible. Not so: the elevation map sheet shows that the end of Ice Age is about 4 m above the water at Lower River. It appears as though the water in the dig is coming from the top of the slope in Ice Age. This lead remains open and is the highest priority in Southern Section of Mammoth cave. Above the slope down to the dig, there is an aven that also needs to be explored. It may need bolting; no scaling pole will ever reach this point.

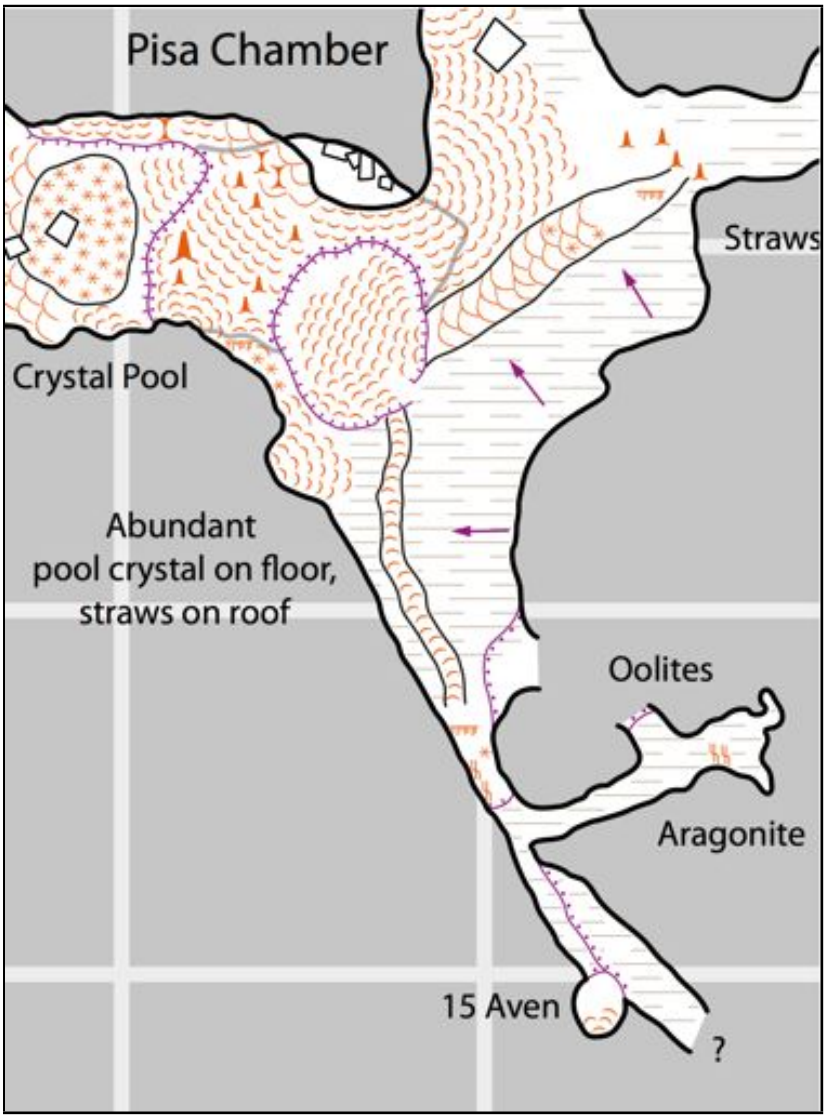


Lower River

Diving at Lower River has not been tried for many years. Downstream was seen as too risky because of the current, and pointless because the river goes to Slug Lake. In general, dives downstream in a strong current are very problematic, and need to be approached with great care. A dive upstream from Slug Lake to here may make a through trip feasible. Upstream from Lower River, the passage contains restrictions which are dangerous in the full current of the Jenolan underground river (Al Warild describes having his face mask removed by the current, and gravel being picked up in the restriction and peppering the diver).

Pisa Chamber

Let's face it – a muddy dig on the far side of a chamber that's famous for its floor decoration and which requires de-trog is never going to be popular with the powers that be. If it's a chamber that has tightly restricted access, and which has never even been seen by most of the cavers who visit Jenolan, there's even less likelihood of this lead being pursued. Nevertheless, the current survey has shown that the crawl beside the aven at the southern end of Pisa Chamber is a fossil level of the main stream. This passage is a flat out crawl in mud, leading south into an area that has no known cave at this level. We here document the fact that it's a major exploration lead, without recommending in any way that you should actually dig it.



Slug Lake

This dive has already seen a major extension in our knowledge of the Jenolan underground river. From the small entrance pool, the water-filled passage rapidly bells out as the descent progresses. At -6 m depth, a side passage enters from the north with a strong permanent current. This is Lower River. The passage descends to -30 m, then enters a rising restriction, which often needs to be cleared of gravel to permit a diver to pass. This opens out at -27 m into the largest underwater space known at Jenolan. The divers initially swam straight across the chamber and tied off at the other side (east), finding the chamber to be 30 m wide. As a result of the tie-off being placed on the far side of the chamber, most of the wall on the near side has never been seen or explored. The position of the tie-off was located from the surface using Ken Smith's magnetic direction finders ('Pingers') [29]. To the southwest from this tie-off, the divers ascended steeply to a lake in a large chamber, christened Gargle Chamber. This was the focus of a major aid climbing effort by Al Warild. To the northeast of the tie off, the divers descended steeply to -45 m and into a relatively small passage. This opened out into a massive set of chambers, with some leads in the wall seen at various levels down to -75 m. Ron Allum followed the passage to the east to -96 m in the roof, where he was unable to see a floor with his spot light. The roof at this point continued to descend steeply [10]. There remains a great deal to do here, including a dive survey through to Gargle Chamber, completing the aid climb in Gargle Chamber, thorough exploration of all levels in the water, and a look upstream in the river passage at -6 m.

John Dalla-Zuanna with the Pingers in Slug Lake. Photo by Paul Boler

Surveyed length	1920 m
East-West extent	100 m
North-South extent	240 m
Vertical extent	71 m
Dates of survey	2000 – 2013
Number of survey trips	31
Number of surveyors	31

This project kicked off in December 2000 with the survey of Conglomerate Cavern, and was completed in January 2013 when the Mammoth Squeeze survey was linked in to the Forty Foot traverse.

The main passages were surveyed with a Ushikata Forestry Compass and tape measure. The forestry compass produces survey to ASF grade 6, with survey loop closure errors on the order of 0.2% [30]. The Forestry compass survey extends from the J13 entrance tag down to the entrance of Mammoth Squeeze, beyond Conglomerate Cavern. The forestry compass was then taken down through the Jughandle and north to the entrance of Sand Passage. The forestry compass survey of southern section branched off this survey down Forty Foot, connecting to an old copper nail at the base of the rift. The forestry compass survey was progressively extended from there south to Lower River, up into Oolite Cavern, and from Lower River down to Slug Lake.

The side passages were surveyed with hand-held instruments. In the early years of the project, these were Suunto sighting compass and clinometer, together with a tape measure. These instruments produce survey to ASF grade 5 in easy terrain, with loop closure errors of about 2% [30]. In difficult terrain such as tight rockpiles, the Suuntos were unable to produce survey to this level of accuracy or precision. The use of tape measures for distance measurement is similarly problematic in difficult terrain, or for measurement beyond 10 m. Commencing in 2002, the Leica Disto was introduced for laser distance measurement in cave surveys at Jenolan [31]. This eliminated many of the sources of error inherent in the use of tape measures. The first survey in the project to use a Disto was the J15 entrance pitch, which would have been very difficult to survey without the laser. Subsequently, the development of the Disto X for digital measurement of distance, bearing and vertical angle revolutionised cave survey at Jenolan. By removing the need to sight through a compass, the Disto X eliminates parallax error – the single largest source of error in difficult terrain. In our experience, loop closure accuracies with the Disto X are comparable to the forestry compass. This is evidenced by the remarkable sub-metre loop closure achieved by Alison Chau and Rowena Larkins through Mammoth Squeeze.

Thanks to all of the surveyors who took part in the project to document southern section – it's been a mammoth effort.

Surveyed on more than five trips: Phil Maynard, Ian Cooper, Shannon Crack, Alan Pryke.

Surveyed on up to five trips: Simon Goddard, Annalisa Contos, Steve Contos, Glenn Smith, Matt Fischer, Mark Staraj, Ken Anderson, Greg Holmes, Tim Moulds, Megan Pryke, Eric Tse, Chris Norton, Paul Maynard, Simon Oliver, Mike Lake, Rod Obrien, Kevin Moore, Steve Roy, Paul Lewis, James Southwell, Alison Chau, Cam Quinn, Kat Martin, Thomas Wilson, Henry Shannon.

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[1] Henry Fairley-Cunninghame, "Jenolan Caves August 6 – 9, 1950", *SUSS Journal*, 1(2), 7–8, 1952.

[2] John Dunkley (ed), *The Exploration and Speleogeography of Mammoth Cave, Jenolan*, 1971.

[3] John Dunkley and Peter Winglee (eds), *The Exploration and Speleogeography of Mammoth Cave, Jenolan*, Second edition, 1978.

[4] Henry Fairley-Cunninghame, "Jenolan 24th – 26th April, 1953", *SUSS Journal*, 1(3), 6, 1953.

[5] Denis T. Burke, Fred Stewart, Ben Nurse, "Underwater Research at Jenolan", *SUSS Journal*, 1(3), 17–20, 1953.

[6] "Report on some new discoveries at Jenolan", *SUSS Newsletter*, 4(4), 8–9, 1964.

[7] John Dunkley "Jenolan, 5 – 6 March", *SUSS Newsletter*, 5(6), 7, 1966.

[8] Greg Ryan, “Jenolan Diving: February – May 1997”, *SUSS Bull*, 37(2), 68–82, 1997.

[9] Keir Vaughan-Taylor and Greg Ryan, “Cave Diving at Jenolan 1996 – 1998”, *SUSS Bull*, 40(1), 36–46, 2000.

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Exit Cave formation, Tas. Photo by Deborah Johnston

Exit Cave formation, Tas. 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

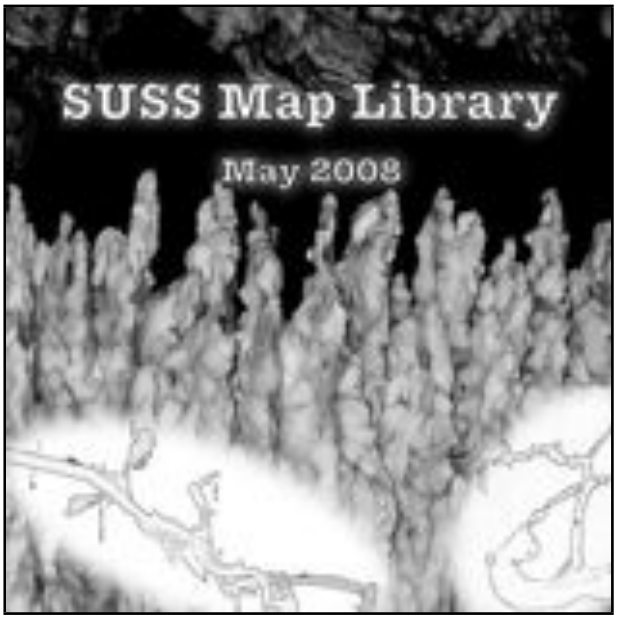
The entire SUSS cave map library of over 300 maps is on DVD and available for purchase. Out map library was scanned to provide wider access to the maps for SUSS and other ASF Caving Clubs and to ensure that many copies exist in the event of the loss or damage of the originals.

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: SEPT TO DEC 2013

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.

Sept

Aug 31 – Sep 1 Jenolan. Lots to do; stay at the luxurious cavers' cottage. Contact Alison: a.d.chau@gmail.com

5 General Meeting. Holme Building, 7.30pm. An evening of fine entertainment as we find out what the group up at Bullita discovered on their expedition this year.

14 – 15 Wombeyan. It will be a caving trip to remember. For marble caves and scenic views contact Will: william_slee@hotmail.com

21 – 22 Wyanbene. It's gonna be wet, and it's gonna be grand. Rumours abound that there'll be an abseil into the Big Hole as well. Contact Deb: birinxi@gmail.com

28 – 29 Bungonia. A return to this well-equipped camping area for caving and maybe even a canyon or two. Contact Tabitha: tabspeanut@gmail.com

Oct

5 – 7 Yarrangobilly. Join SUSS in the Snowy Mountains for some ruggedly beautiful terrain and some of Australia's finest caving. Accommodation is camping in the refurbished cottage. Possibilities for an extra day caving on the 4th, and some exploration trips over the weekend for those who are interested. Contact Will: william_slee@hotmail.com

5 – 7 Wellington. A very SUSS long weekend to Wellington where we will be running dry caving and diving trips each day! Options for camping or cabins in the campground. Contact Deborah: birinxi@gmail.com

12 – 13 Jenolan. SUSS's second home. Reside within the lavishly-appointed Speleologists' Residence. Contact Tabitha: tabspeanut@gmail.com

19 – 20 Wombeyan. Stay in the picturesque campground in the Southern Highlands, and visit the excellent marble caves. Contact Thomas C: tcun0287@uni.sydney.edu.au

19 – 20 Borenore. We hear that the Orange Wine Week will be coinciding with this trip. How fortuitous. Caution: there may be some caving. Contact Kevin: troglokev@gmail.com

Nov

2 – 3 Jenolan. Check out what all the fuss about the caves and the cottage is about! Contact Phil: Philip.Maynard@uts.edu.au

9 – 10 Bendethra. Get out your 4WD for SUSS's first excursion to this far-flung karst area in many a year! Contact Denis: dstojanovic91@gmail.com

16 – 17 Wombeyan. Beautiful caves in the southern highlands Contact Rob: rob@robjones.org

23 – 24 Canyoning. Join the extragavanza that will herald the start of the canyoning season. Contact Thomas W: taw.wilson@gmail.com

30 – Dec 8 Jenolan Weeklong. Come for a few days or a make an epic out of it to celebrate the end of exams! Jenolan has plenty to offer from grandma trips to full assault courses. Leave the protective equipment home at your peril. Contact Alison: a.d.chau@gmail.com

Dec

Watch the SUSS web site trip list for details of this months activity.