

The Journal of the Australian Speleological Federation Inc.

# CAVES

AUSTRALIA

NO. 228 MAY 2024

**DELTA VARIANT:  
AN END TO THE  
EXPLORATION**

**JENOLAN  
CAVE RESCUE**

**EXTRAORDINARY  
FOSSIL COMES  
TO LIGHT**

# CAVES

## AUSTRALIA

### CAVES AUSTRALIA

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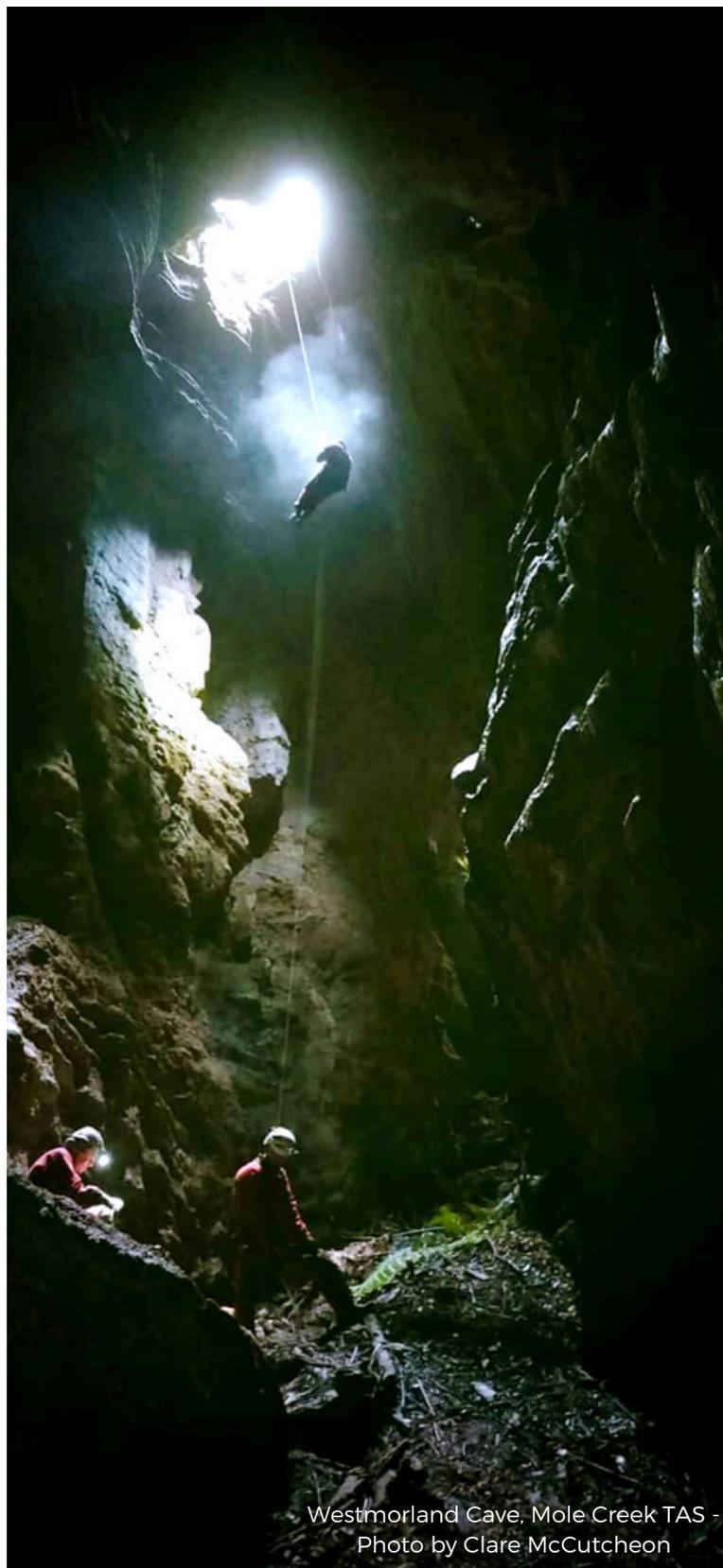
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Westmorland Cave, Mole Creek TAS -  
Photo by Clare McCutcheon

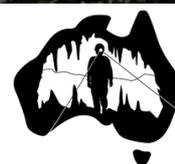
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3.5 m straw, spectacular shield, nobby stals and a Henry in Mersey Hill Cave, Mole Creek TAS - Photo by Alan Jackson

Remains in Shades of Death Cave, Murrindal VIC  
Photo by Nadine Muresan

# Editor's Note

Caving...the final frontier? Often as cavers we push ourselves above and beyond what most people consider sane. And yet it's the compelling thought of 'I swear I feel a breeze', that with just one more push and one more squeeze there will be something more beyond.

This issue of *Caves Australia* has loads of amazing articles which highlight just how much we push ourselves to find that next section of a cave to be discovered, or simply just to find out if we can indeed fit into such a small hole. There are highlights on rescue, Michie phones, surveying and mapping. This *Caves Australia* is a testament to all those who are pushing their limits and are willing to share them...so if that doesn't inspire you I don't know what will. Until next time, let's go CAVING!

**Nadine Muresan**



Selfie outside of Wilsons Cave in Buchan Victoria at a Cave Rescue Event

# President's Report

Cave rescue has been in the news again with the recent rescue at Jenolan. Despite what must have been a very uncomfortable night, there were no serious injuries and thankfully everyone walked away from the cave in the end. Congratulations to everyone involved for the happy ending to a technically challenging rescue – fellow cavers, rescuers and support teams. Our thoughts were with everyone involved in what must have been a very difficult situation.

It's a reminder that accidents happen, and even experienced cavers can find themselves in a situation that requires outside assistance. I'm sure the incident has made many of us more aware of the risks involved in the activity we love. Being prepared is everything – assessing the cave and the team, having a plan in place to call for assistance when required, and skilling up through our clubs. The caving community, especially in NSW, is very fortunate to have a dedicated Cave Rescue Squad to get cavers out of situations we hope to never be in. In other parts of the country training and skills building happens on a semi-regular basis – either through local clubs or via the ASF's [Australian Cave Rescue Commission](#) (ACRC). The ACRC also has grants available for rescue training and equipment, and can arrange safety equipment hire for cave expeditions.

As the weather cools it marks the season for caving expeditions to remote areas such as to the Nullarbor and Judbarra-Gregory National Park. Make sure you all stay safe out there and look out for each other. We want to make sure everyone comes home safely to be able to write up their trip report for *Caves Australia*!

**Sarah Gilbert**



Photo by Dee Trewartha



## The 2025 Caving in the Moonlight 33rd ASF Conference is now OPEN for registration!

### **Accommodation updates:**

[Buchan Caves Camping is open!](#)

According to their policy, bookings can only be taken 6 months in advance. However, a special list has been started for the ASF Conference 2025! So in order to secure a place please contact Leanne on [leanne.hodge@parks.vic.gov.au](mailto:leanne.hodge@parks.vic.gov.au) Or 0447330397

This will reserve you a booking, and then in October payment will be requested and once paid it will turn into a booking.

[More Camping Options available at Grandview Sanctuary!](#)

Another option of camping has been promoted in Buchan Township at Grandview Sanctuary. There will be toilets and showers available for the event. Please contact Kirsty on 0418 400 511 for more details.

[The River Retreat](#) has opened its doors with some beautiful facilities right in the heart of Buchan Township. Please contact on 0493 812 918

### **Registration**

Please book your early bird registration online, remembering this pricing includes all the awesome presentations, delicious food, a T-Shirt and much much more!

<https://www.asfconference2025.com/booking>

Calling for ALL abstract submissions at <https://www.asfconference2025.com/contact-8>

Timetable below shows the caving that will be taking place both before and after the conference.

**Can't wait to see you all there!**  
**9th - 20th January 2025**

	THURSDAY 9th	FRIDAY 10th	SATURDAY 11th	SUNDAY 12th Day 1	MONDAY 13th Day 2	TUESDAY 14th Day 3	WEDNESDAY 15th Day 4	THURSDAY 16th Day 5	FRIDAY 17th DAY 6	SATURDAY 18th DAY 7	SUNDAY 19th	MONDAY 20th
Morning 1		PreConference CAVING	PreConference CAVING	PreConference CAVING	Welcome presentation Talks/Posters	Talks/Posters	Actives Day	Talks/Posters	Talks/Posters	SPELEO ACTIVITIES	Post Conference CAVING	Post Conference CAVING
Morning 2												
Afternoon 1				Registration open		CAVING		CAVING	SPELEO ACTIVITIES	CAVE RESCUE		
Afternoon 2				Welcome BBQ	Scientific posters				Cave diving demonstration			
Evening	Debrief for caving				Evening Activity	Evening Activity- Get to know your ASF Exec & Commissioners	Evening Activity	Evening Activity	Evening Activity	Cavers Dinner		

# Want to contribute to some upcoming research on Australian cave fungal diversity and bat conservation?

**Anna Langguth (University of Melbourne)**

An upcoming study run by the **University of Melbourne (UoM)** is exploring the types of fungi present in caves across south-eastern Australia. This research, conducted by PhD candidate Anna Langguth, aims to understand how a disease called **White Nose Syndrome** could affect our native cave-dwelling microbat populations.

White Nose Syndrome is caused by a fungus affecting cave bats. It infects bats during winter, disrupting natural patterns of hibernation. Originating from Europe, the fungus was spread to North America in 2006, where its arrival has resulted in the deaths of over six million microbats. This research is part of a larger project focusing on the susceptibility of Australian bats to White Nose Syndrome aiming to prevent or reduce the negative impacts seen in North America from happening in Australia.

Our current aim is to expand knowledge of the fungi found across caves in South Australia, Victoria and New South Wales. To do this, we hope to **analyse samples taken from caving gear (e.g. boots, caving suits and ropes)**, allowing us to identify which species are commonly found in these caves. Some of these fungi might have the ability to combat the White Nose fungus. Additionally, analyzing the fungal spores on cavers' gear will help us understand how fungal spores move between caves and **where transmission would likely occur**.

This research will also **expand surveillance for the White Nose Syndrome fungus**. While this disease doesn't harm humans, it poses a serious threat to bats and can be deadly. Although the fungus is not believed to be in Australia yet, it is highly likely that it will get introduced before 2030, and this will be the first extensive survey to confirm its absence.

Collaborators on this project include Dr. Lindy Lumsden (Arthur Rylah Institute, DELWP VIC) and Associate Professor Chris Turbill (BatsLab, University of Western Sydney, NSW).

The UoM team is seeking support from members of the Australian caving community, particularly in **South Australia, Victoria and New South Wales**.

Interested individuals will receive sampling kits with sterile swabs to collect samples from their gear after a cave visit, which can be sent back via prepaid envelope. Analysis of samples is scheduled to take place in early to mid-2025.

If you would like to participate or have any questions, please contact:

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# Niggly Cave Project Update

Stephen Fordyce

The Southern Tasmanian Caverneers continue to enjoy the thrill of exploration and relish the misery of Junee-Florentine caving conditions. Painfully detailed trip reports are typically published in STC's *Speleo Spiel*, this article is an attempt to summarise base level Niggly exploration since the last *Caves Australia* update (*Caves Australia* 223, p29). It was originally going to include Delta Variant updates as well, but Ciara has that well and truly covered in her comprehensive article set to be published in this *Caves Australia* edition.

The trips are named for the theme songs, which are played and sung at opportune moments (like to wake up).

Bonus update I'm going to slip in – the last of the scary PVC pipe ladders in Growling Swallet have been removed. Hooray!

## Winter Trip – “Rivers of Babylon”

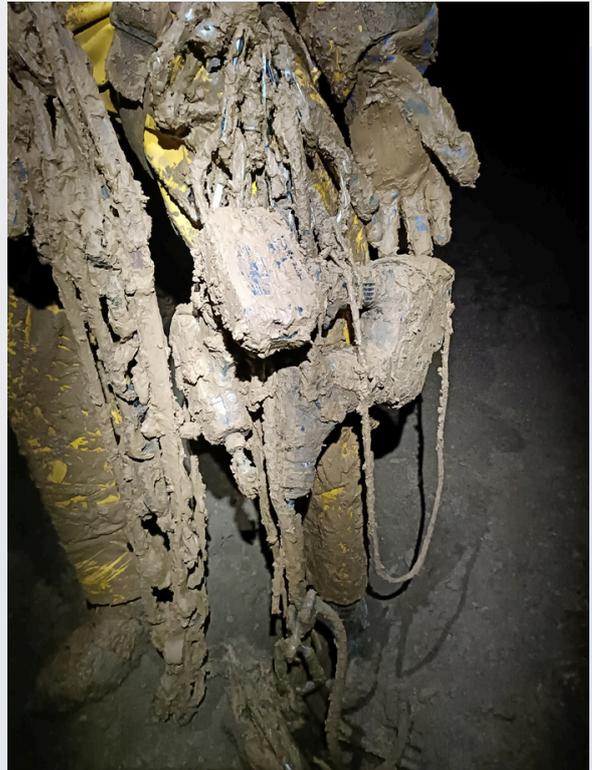
We did the first non-summer trip for several years in July 2023, spending four days underground as usual. We also remembered why these fell out of favour – the cave was wetter, the waterfalls were pumping (although the consequences limited to noise and spray thanks to good rigging) and the level of the main river at the bottom varied somewhat alarmingly. Still, with Bogdan (Bo) Muresan joining the project, good times were had, some nice photos taken and an aid climb “went” spectacularly.

While Henry and I went off poking at a few other things, Bo and Jemma were tasked with traversing over the top of the pitch to the Biohazard Sump, to an upward mud slope on the other side. They got there pretty easily, and it choked. With some confusion over whether that was the objective (it was), and plenty of enthusiasm leftover, they tackled a time-consuming and difficult ~8 m climb to the ceiling. Surprisingly, this was rewarded with a short down-pitch, then barrelling horizontal passage (“Breakfast Jelly”, after Jemma’s morning meal) which went approx. 150 m and ended in another undropped down pitch.

A meander (“The Seaweed Bag”, after the small bag which originally had seaweed garnish in it was repurposed as a supremely inadequate stepping stone between camp mats) came in from the side halfway along. It wasn't pleasant, but with considerable thrutching, was followed some distance to a bigger chamber with rockpile that needed to be pushed another day.

Plans to return the next day and survey the find evaporated when water levels were up and memories of the weather forecast differed.

Still, this was a spectacular lead right at the bottom end of the Mother of God stream, and although heading back upstream, it was diverging from the master cave.



As usual, there was plenty of mud to contend with on the aid climbs – can you spot the drill? - Photo by Stephen Fordyce



Starting off the Lightbulb Climb - Photo by Bogdan Muresan

## Summer Trip – “Most People I Know (Think That I’m Crazy)”

Late January 2024 saw the only push trip of the summer with another four days underground (there was a new year trip planned, but it was called off due to sickness). The return to dry conditions was welcomed, and we planned activities accordingly! This trip also happened to be my 20th Niggly camping trip – I’m still not sure whether to be pleased or aghast about this. The rest of the crew were local stalwarts and veterans, and it was a productive and pleasant one. We even took some 200 W video lights I made (running off drill batteries) and made some nice photos.

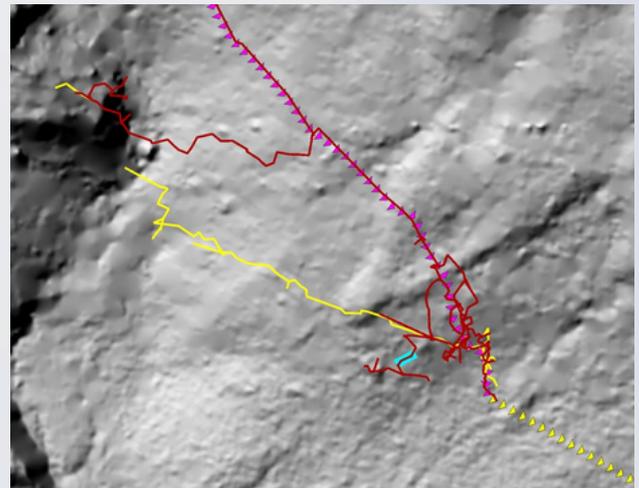
Henry and I took three mm wetsuits and over two days pushed nasty wet leads, following the master cave stream slightly further into the downstream rockpile (Meru) than previously, and tag-teaming a nightmarish roof sniff/squeeze/dig at Auld Lang Slyme down a dry passage off the master cave. After two sessions and a good couple of hours we broke through and the fabled River of Babylon wasn’t all it was cracked up to be. Henry did the bulk of the work and was rewarded with 50 m of nasty little stream passage heading away from the master cave before it needed more digging. I was happy to accept his recommendation that the lead was dead without seeing it for myself.

Meanwhile, Team Giggly (Ciara, Karina, Jemma) plus Petr went off surveying and scooping passage. Breakfast Jelly absorbed a big day, with assorted mud-caked pitches (“Shagadelic” & “Shagalicious”), climbs and other excitement. A small new passage at ceiling level had a howling draught and a bit of grovelling ended at a large dark space with a 15 m+ pitch (“The Temple of Doom”). The take-off will be interesting from horizontal passage 40 cm high. That’s top priority for the next trip (and Seaweed Bag remains in need of survey and a revisit). The Breakfast Jelly survey came to about 300 m and showed this section of the cave going very close (17 m) to the Auld Lang Slyme where Henry and I had been pushing – we may yet get the last laugh, although hopefully not as there was no draught where we were. This also became the most remote area of the system, at 3.1 km from an entrance.

The astute reader may have noticed some movie influences in the names of the new sections. We did in fact have a comprehensive cinematic experience on two evenings – complete with big(gish) screen, popcorn, soft drink and chocolate.

The cave projector kit I originally made for camping in Cocklebiddy was resurrected and brought into Niggly for the first time. As feared, caving and sleeping time were reduced to make room for this luxury, and it is unlikely that future trips will be tolerated without movie nights. *Austin Powers* and *Indiana Jones* featured, as did a complicated shuttle system to transport six people and their bedding to the cinema area with only three pairs of camp shoes.

Niggly continues to slowly give up its secrets, and general enthusiasm for the project is pretty high. The large river isn’t seen again for 5 km (at Junee Cave), providing suitable incentive for all this effort.



Current end of Niggly, yellow line shows new finds. Line of arrows shows master cave stream (magenta known, yellow theorised)



Henry enters Auld Lang Slyme - Photo by Stephen Fordyce



Luckily it was dark in the cave - Photo by Stephen Fordyce



Assorted Mother of God pictures - Photo by Ciara Smart



Assorted Mother of God pictures - Photo by Ciara Smart



Traditional Breakfast Jelly was consumed before visiting the passage of the same name - Photo by Ciara Smart



Assorted Mother of God pictures - Photo by Ciara Smart



Sketching was done - Photo by Stephen Fordyce



No pictures were taken, but lots of survey data was recorded in Breakfast Jelly - Photo by Stephen Fordyce

# JF-761 Delta Variant: An End to the Exploration (and Australian cave depth record extended... a bit)

Ciara Smart

In July 2022, the Australian cave depth record was increased by a whole four metres. The newly discovered JF-761 Delta Variant was fully descended, confirming the connection to JF-237 Niggly Cave. The next year, Delta Variant's final known lead was pushed after an ambitious aid climb. It still took months to transition the rigging from 'exploration' to 'commuter' style, and many more trips to finish the survey. As of 2024, for at least the third time, we're calling the exploration phase of the project finally over, and Delta Variant now operates as an entry route into Niggly.

Little about this large project has been straightforward, just the walk to the cave requires a ninety-minute slog up a hill through thick forest. The caving itself is alpine-style and sustained, with big pitches and annoying, steep squeezes. The environmental conditions of the cave present a major hazard, with an air temperature of 6.5°C, and unavoidable exposure to cold water, thick mud and loose rocks.

Because of the size and complexity of the cave, the full exploration and survey of Delta Variant took no fewer than 30 trips over nearly two years. The exploration was mostly shared among a core group of Southern Tasmanian Caverneers. Notable reoffenders include Jemma Herbert (15 trips), Gabriel Kinzler (13 trips), Stephen Fordyce (13 trips), Ciara Smart (12 trips), Petr Smejkal (11 trips), Henry Garratt (8 trips) and Karina Anders (7 trips). The exploration itself required substantial teamwork, data management, patience and enthusiasm, in addition to hard rigging skills, and a tolerance for heavy bags and late nights. With plenty of trips finishing after midnight, the commitment of time and energy has been immense. For most of the younger STC cavers, Delta Variant has been the most significant exploration project to date. Those involved will walk away having made memories for life.

It's not that many people who can claim to have helped explore the deepest cave in the country, or who have experienced the thrill of tossing rocks off the top of a newly discovered 100 m pitch. Although we can quantify Delta Variant's significance in sheer survey data, importantly, we mostly had fun times. A few people nearly got taken out by errant rocks, but overall, the exploration was well-organised, notionally democratic, and managed as safely as possible.

The bulk of the administration and logistics of the project were managed by Stephen Fordyce, either remotely from Melbourne or on his many FIFO trips. Stephen was also responsible for the COVID-19 theme, ensuring that some of the more obscure elements of that time in our lives will be forever memorialised.



Another dark finish - Photo by Gabriel Kinzler



Ciara, Karina, Jemma, Henry - Photo by selfie



The connection trip - Photo by selfie



Photo by Gabriel Kinzler

The cave has now been fully surveyed, although the eagle-eyed might still notice a few question marks on the map. Primary surveyors and sketchers were Stephen Fordyce, Alan Jackson, Gabriel Kinzler and Ciara Smart. However, surveying can only take place with the support of a team, so thank you to everyone who begrudgingly held a Disto or listened to me moan about getting mud on the sketch paper. Unsurprisingly, the map has been a slow process. It was begun in 2022 by Gabriel Kinzler and me. Gabriel handed over the project to me in late 2023. This has been by far the biggest map I've drawn to date. Unfortunately, I had to learn my lesson about loop closures the hard way - a hazard of mapping a cave under active exploration, but the map is generally to a high standard of accuracy. Having completed this project, I now understand why most large caves never see a final map - it's a momentous amount of work, particularly if you have perfectionist tendencies. It's not made any easier by Illustrator's painfully steep learning curve. The pay-off however, is substantial. The finished map will be of interest to all Australian cavers as it depicts the new entrance series of the deepest cave in the country.

This following article will briefly chart how the exploration took place. The 'trips' detailed below are only one element of the story. There is an unenviable amount of administration that goes into a project of this scale. Countless evenings have been spent processing survey data, drawing maps, writing trip reports and compiling rigging notes. That's in addition to the hours consumed by the sheer mundanity of scrubbing gear, patching plastic suits and packing for the next trip. Adding this to the time spent in cave makes the total people hours in the many hundreds.

For those willing to put in the time, and with a healthy sprinkling of fortune and youngish knees, Delta Variant is an example of the possibilities still hidden in the Junee-Florentine karst area.

But, until the arrival of waterproof robot surveyors, the Junee-Florentine will not give up its secrets to the undeserving. While advancements in technology might have made mapping more precise, or made it faster to drill big holes, it has not reduced the sheer human cooperation needed to chart a new system. Delta Variant extracted its pound of flesh in the form of sweat, more than one surprise poo, multiple plastic suits, several drill batteries, one dead Disto, and regrettably, even a few friendships. But, for those able to bear the very real human and temporal cost, there are still breakthroughs to be made in Australia's deepest karst landscape.



Brendan Moore - Photo by Gabriel Kinzler

### The Depth Determination

In terms of the depth record, the specifics get a bit academic, but for the sticklers and statisticians out there, please read on. JF-237 Niggly Cave and JF-761 Delta Variant are connected to each other at two points, the first connection being made in July 2022 at the base of the Freedom Day pitch. Niggly itself is connected to JF-36 Growling Swallet via the Dreamtime Sump, which is only accessible to divers. For the pedants, Growling Swallet, as the 'lower' numbered cave, technically absorbs Delta Variant and Niggly. Previously, the depth record was calculated from the highest point in the system, the cave tag at the entrance of Niggly to the lowest point in the system, the bottom of the Dreamtime Sump. This came in at 397.5 m. The new upper entrance to Delta Variant sits 4 m higher in elevation, bringing the record to 401 m, or so we assumed...

Henry after the first successful use of Negative RAT Hole  
Photo by Ciara Smart



Screen shot from 7 NEWS

In July 2022, we released a media statement after the connection, which jubilantly declared we had beaten the 400 m mark. In the months after the initial connection, and thanks to the loop closure enabled by the discovery of Negative RAT Hole and a second connection between Niggly and Delta Variant, Stephen Fordyce's data wrangling picked up a few inconsistencies. At the time of publication, it appears that the latest depth is a metre or two shy of 401 m. Who would have thought that a three-decade surveying project might yield such discrepancies?! Dare I speculate that the historic rivalry between the surveyors of JF-270 Tachycardia and Niggly for the title of Australia's deepest cave might still be haunting current generations? Further survey wrestling is required to work out the precise depth, but for the time being, we're sticking with 401 until we can undertake a proper resurvey of a few key sections. Luckily, the second deepest cave in Australia, Tachycardia, is still a fair way off being a serious rival for first place. And after all, the internet archive has memorialised Delta Variant as 401 m deep – and we all know that if you read it on the internet, it must be true.



Successful connection - Photo by Stephen Fordyce

### JF-761 Delta Variant – Exploration Milestones

JF-761 Delta Variant was discovered on 4 January 2022. The discovery should be credited to Stephen Fordyce, who suspected that a major waterfall within JF-237 Niggly was fed by an undiscovered surface stream. Stephen was proven correct with the discovery of an inconspicuous entrance taking significant water. Amusingly, this new entrance sits only four metres away from the Niggly entrance.

A small cliff had concealed its existence for several decades. This new entrance was the first new entrance to the Junee-Florentine master cave streamway discovered since the 1990s, the era in which Niggly itself was discovered.

This new cave starts with a 300 m meander, named the 'Test Station Queue.' This meander is similar in quality to the infamous Tigertooth Passage in Niggly, but uncomfortably wet and annoying for tall people. The sprint record for this meander was set at ten minutes, but for most, the 300 m meander took anywhere from 30-45 minutes of awkward sideways shuffling. It was clear that this was not an ideal entrance to a major new system.



Screen shot from ABC News

The initial push trip was halted by a substantial drop at the end of the meander. This is the 52 m 'Quarantine' pitch, and it signals the start of an impressive pitch series. Dropping Quarantine enabled the discovery of the 163 m 'Daily Cases' pitch. Daily Cases is a spectacular pitch, unarguably one of the best in Australia. It cleanly falls the height of a 50-storey building into a gaping shaft. A major waterfall falls alongside, ensuring a healthy dose of spray and fog to antagonise photographers. The pitch was eventually rigged with eight rebelayes placed slightly offset to enable large parties to transit simultaneously. Initially Daily Cases was accessed from an awkward 16 m pitch beside the streamway, named 'COVIDSafe.' Like the app, this pitch quickly became obsolete when a much better approach was identified on subsequent trips.



Jemma with green eyebrows - Photo by Ciara Smart



Always the mud - Photo by Jemma Herbert

After Daily Cases, there is another wet meander, 'Close Contact,' which contains three short pitches. The next major pitch is the 70 m 'Freedom Day.' After Freedom Day, the final pitch is the 18 m Waterfall pitch, first aid-climbed from within Niggly by Al Warild in December 2017. In May 2019 (see *Speleo Spiel* 433, p.14.) Stephen Fordyce followed Al Warild in climbing up this waterfall from within Niggly and placed a survey tape at the base of Freedom Day.

It took seven months, and eight rigging trips to reach the bottom of Delta Variant's pitches, enabling many individuals to enjoy a taste of big-pitch exploration. In July 2022, a large group descended the full pitch series, sighting Steve's tape at the base of Freedom Day. Karina Anders rigged the final Waterfall pitch, and the group landed in Niggly. The group ascended out of Niggly, derigging the old commuter route. The Australian caving depth record had been increased by a whole four metres - easily claimed thanks to a 3-shot surface survey between the Niggly and Delta Variant tags. Significant media attention followed with dozens of online news articles, four TV interviews and at least ten radio interviews. The media interest was overwhelming, but thankfully short lived.

While Delta Variant is a very vertical cave, there are significant horizontal side passages that were explored simultaneously to the vertical exploration. This includes the 'Nasal Passage,' which has both a 'wet' and 'dry' branch. This is accessed from '5 km Radius,' the large chamber at the base of Quarantine pitch. The Nasal Passage contains several minor pitches, but these terminated in dry chambers.



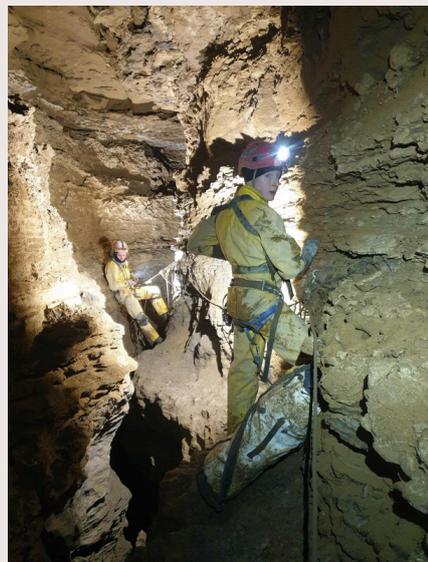
Gabriel Kinzler and Jemma Herbert making plans - Photo by Ciara Smart

The largest horizontal passage is 'Superspreader,' accessed from the junction above Daily Cases. Superspreader contains horizontal passage branching in multiple directions. Superspreader trends upwards, at times requiring significant scrambling. Survey data revealed that the highest point in Superspreader was sitting four metres above surface level. This prompted a flurry of trips to locate this gravity-defying 'Negative Dig.' We hoped that a new entrance into Superspreader would enable us to bypass the tiresome Test Station Queue meander. Parts of Superspreader required some gardening, and were proven highly unstable, particularly 'Pandemonium' where we encountered the novelty of an in-cave landslide. Despite significant effort, no entrance was located from within Superspreader, so the focus turned to attempting to discover the entrance from the surface.



Photo by Gabriel Kinzler

JF-489 Perfect Pitch Pot was identified as a possible connection into Superspreader. It became much more interesting when a surface survey shifted it 30 m, to sit directly over the top of an aven in Superspreader. JF-489 also sits marginally higher than JF-761. A series of trips attempted to dig out a heinous muddy gravel at the base of Perfect Pitch Pot. The dig was truly horrendous. Eventually it was deemed too desperate, and the cave was abandoned. JF-757 False Positive was also discovered from the surface at this time, and identified as another possible connection. It too failed to yield a connection despite hard pushing.



Above Daily Cases - Photo by Stephen Fordyce

Although the connection was looking more unlikely, such was the determination to avoid the Test Station Queue that we persevered with ever more desperate possibilities. We had a suspicion that an aven in Superspreader corresponded to the base of Perfect Pitch Pot. To test this theory, fluorescein was released into the impassable slot at the base of Perfect Pitch Pot. Simultaneously, Jemma Herbert completed an ambitious aid climb up the aven within Superspreader, made more challenging when fluorescein began pouring down from the ceiling. Jemma's eyebrows were green for weeks, but the connection was proven. The two-pitch climb was named 'Phosphorescent Phlegm Pitch.' There was a painful on-rope squeeze between the two pitches, that only just allowed Jemma Herbert, Ciara Smart (and later Henry Garratt) to wriggle through. Unfortunately, the top of the second pitch culminated in another squeeze, spacious enough only for fluorescein, rendering the connection humanly impassable – for this generation anyway. For the next generation, if you can make this connection, you'll add a few precious centimetres to the depth record.



Heavy bags en route to a camping trip - Photo by Ciara Smart

We conceded that Perfect Pitch Pot was a comprehensive write-off, and it was time to call for technical support. Mainland technology was brought in with the arrival of a radio location beacon on loan from the Victorian Speleological Association. This allowed Stephen Fordyce to pinpoint the location of the hypothesized entrance, named 'Negative RAT Hole', from within Superspreader. In communication with a team on the surface via VHF radio, an unassuming knoll was identified as the closest point to a tight climbable rift within Superspreader. The focus on this spot was driven by the indefatigable Petr Smejkal. Petr's hard labour culminated in a connection to Superspreader made in November 2022. Jemma Herbert was able to climb the tight rift within Superspreader and poke her head out into the sunshine. Unfortunately, this was the only part of her body that could fit out the hole, requiring her to exit out of the cave the long way.

On the next trip, Petr applied more of his European expertise to enable skinny humans to fully transit into the vertical rift from the surface. The first few trips down, and particularly up, this entrance were extremely challenging, as the rift was exceptionally tight. The rift has since been made more comfortable, but it remains a demoralizingly compact entrance/exit, especially with large bags of camping gear. Visiting cavers be warned, you would not be the first to be turned away by this entrance. After establishing this entrance, the original entrance, JF-761 was consigned to history, with everyone happy to forget the Test Station Queue.



Henry on the first successful descent of Rat Hole - Photo by Ciara Smart

At 163 m, Daily Cases had failed to break the record for the deepest pitch in Australia, coming in at third place behind the 171 m Bermuda Triangle in Tachycardia, and the 191 m Black Supergiant in Niggly. Survey data revealed that a horizontal traverse beginning at the height of Daily Cases had the potential to connect into the top of the Black Supergiant, which would increase the height of Australia's largest pitch. This added incentive to complete this hair-raising traverse, named 'Vaccine Stroll-Out.' Stephen Fordyce and Lachlan Bailey deserve credit for bolting the initial part of this exposed traverse. Protecting this traverse was difficult as the rock is largely composed of cheesy compressed mud, held in place with crossed fingers and gritted teeth. The only solid rock for the traverse line is at foot level or below, adding incentive not to slip into the 163 m chasm below. Eventually, the rift belled out, becoming too wide to bridge. In November 2022, a crack team of Jemma Herbert and new recruit Henry Garratt, were called in. At just seventeen, Henry kept his cool when a mud ledge on the traverse gave way during his transit. The anchors held, and Henry remained enthusiastic, despite snapping his GRI-GRI in the fall. Jemma and Henry successfully aid-climbed across the widest section of the traverse, setting a tyrolean to allow others to follow. Anyone who has crossed this tyrolean can appreciate the gutsiness of their initial push.

Additional muddy passage was discovered at the far side of the tyrolean, heading towards the Black Supergiant. This soon turned vertical and horribly muddy, yielding the 'Snot Monster' and 'Boogie Monster' pitches. These are not fun pitches, loose and wet, set in uninspiring rock with dubious anchors. In April 2023, Boogie Monster connected into the chamber at the top of the famous Black Supergiant pitch in Niggly. Although we had not extended the Black Supergiant, this connection did facilitate a few of the new generation of STC cavers to experience this ridiculous 191 m freehang (there's a single rebelay 4 m from the top). This also enabled a few tourist trips, including the novelty of the first ever pull-down trip via Niggly. In November 2023, Snot Monster and Boogie Monster were derigged, and everyone breathed a sigh of relief that the anchors had held. Let's never go back there.



Ciara on the walk - Photo by Gabriel Kinzler

Stephen Fordyce, Ben Armstrong, and Henry Garratt deserve mention for their ambitious attempt to install a water-operated bag-hauling counterbalance alongside the 163 m high pitch (Daily Cases), named, 'The Magic Beanstalk.' Despite many days of work, the potential of this ingenious project remains bluntly unfulfilled. The rest of us stayed well away, trying not to get snared in the cobweb of pulley systems and rope at the top of Daily Cases. At one point, on exit, the failure of 'The Magic Beanstalk' saw two cavers at the top of Daily Cases with no bags, and one caver at the bottom with three. The installation of The Magic Beanstalk also saw Henry Garratt nearly squashed with rockfall. Luckily, the first and only ever successful voice connection, from the top to the bottom of Daily Cases, saw him out of the way just in time.



Suboptimal conditions - Photo by Ciara Smart

As of early 2024, there are no active exploration leads in Delta Variant, but the commuter rigging will remain in place for the medium-term to provide access to the ongoing Niggly project. With a few strong aid-climbers in the club, the potential to push upwards leads has also considerably increased. Naturally, as soon as this article goes to print, we're likely to find an overlooked lead. But for now, for at least the third time, we're calling it done.



Ciara rigging - Photo by Gabriel Kinzler

**Project participants:** Karina Anders, Ben Armstrong, Lachlan Bailey, Serena Benjamin, Nina Birss, Rolan Eberhard, Hugh Fitzgerald, Stephen Fordyce, Henry Garratt, Corey Hanrahan, Lauren Hayes, Ben Hazell, Jemma Herbert, Alan Jackson, Anna Jackson, Gabriel Kinzler, Simone Lee, Brendan Moore, John Oxley, Ciara Smart, Patrick (Buddy) Smejkal, Petr Smejkal, Tom Porritt, Djuke Veldhuis.



Jemma, Ciara, Henry and Karina - Selfie



Ciara sketching - Photo by Gabriel Kinzler

## Nomenclature

- Delta Variant: the eponymous plague.
- Test Station Queue: long meandering annoying passage, much like the annoying 'test station queues' experienced during COVID.
- Quarantine pitch: initially we thought this was a 40 m pitch, so the name was a reference to the French word for forty. It turned out to be longer, at 52 m.
- Alpha Inlet: dry, older inlet, like the 'Alpha' variant which was no longer very active by the time of discovery.
- Omicron Inlet: wet and muddy inlet, new and virulent like the 'Omicron' variant.
- 5 km Radius: reference to the maximum allowable distance to travel from home during lock-down periods.
- COVID-Safe pitch: an app initially designed to assist with identifying exposure to COVID. Like the app, the pitch became defunct.
- Daily Cases pitch: the only thing bigger than this pitch in January 2022 was daily COVID cases.
- Superspreader: long section of horizontal passage going off in multiple unpredictable directions.
- Phosphorescent Phlegm pitch: Sits below JF-489 Perfect Pitch Pot, the drip turned green with fluorescein during the initial aid climb.
- Negative RAT Hole: reference to rapid antigen tests and the fact this entrance was initially understood to be a 'negative dig,' as survey data suggested it sat above surface level. The entrance was eventually connected, but was very tight, like a rat hole. A Negative RAT would allow you to skip the Test Station Queue.
- Pandemonium: reference to the general COVID bedlam, and the chaos experienced in this passage when we triggered an in-cave landslide.
- Positively Negative: A senseless witticism courtesy of Donald Trump.
- Nasal Passages: Where to stick your RAT test.
- Girthy Antivaxxers Shaft: A general dig at the antivax movement and their fear of big shafts.
- Close Contact: Tight, wet meander.
- Freedom Day: Reference to the end of the record-breaking Melbourne lockdown.
- Vaccine Stroll-Out: A difficult, high-level traverse that took a very long time to negotiate, just like the actual Vaccine 'stroll-out'.
- Snot Monster: We all met a few Snot Monsters during COVID, usually an unpleasant encounter, just like this pitch.
- Boogie Monster: Snot Monster's annoying older sibling.
- Ken Behrens Corridor: a corruption of 'Canberrans' – look it up.



Karina Anders enjoying hot chocolate - Photo by Gabriel Kinzler



Anna Jackson bolting - Photo by Gabriel Kinzler



Big loads up the hill - Photo by Ciara Smart



Mud - Photographer unknown



Fort Fordyce - Photo by Gabriel Kinzler



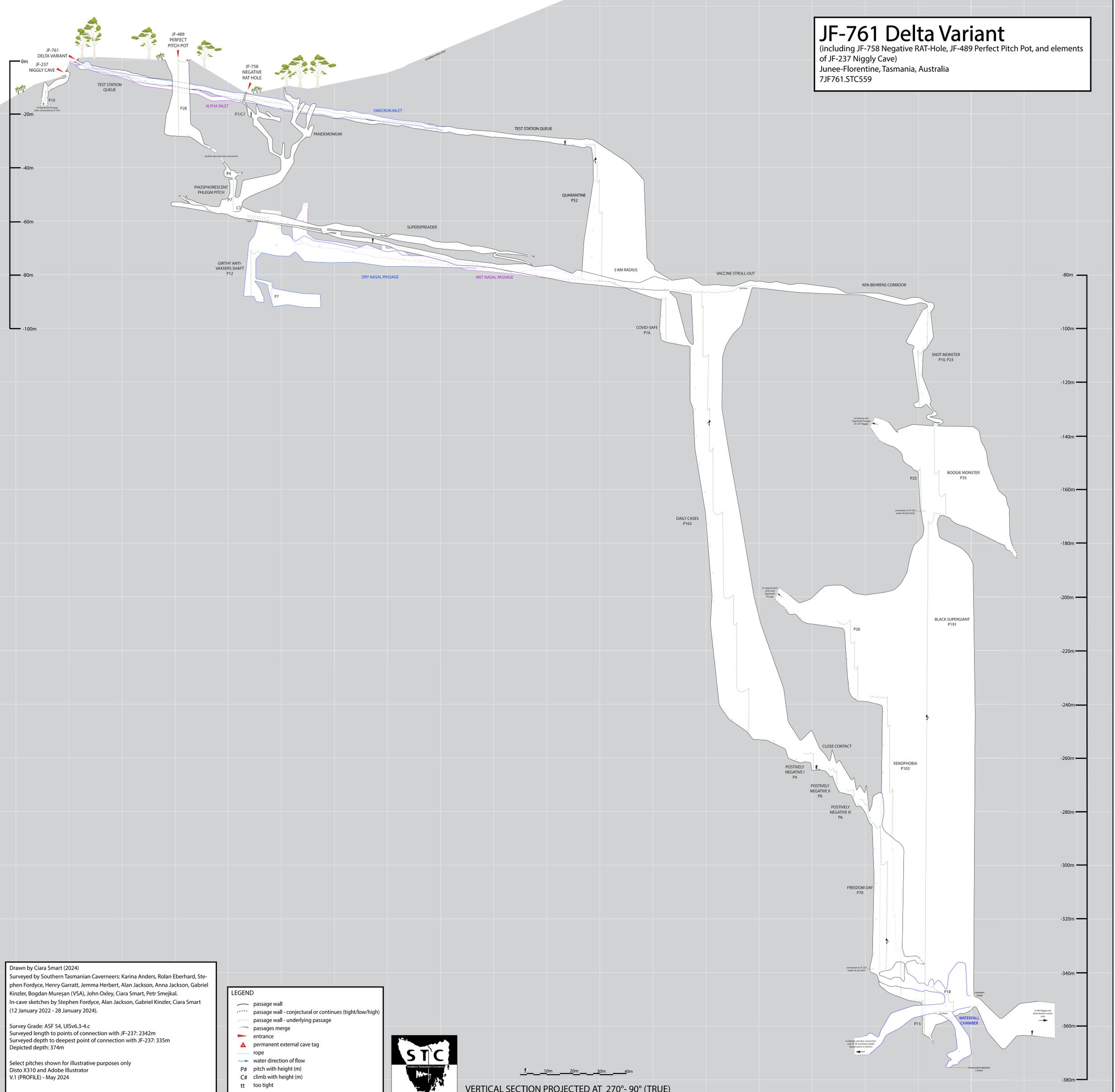
Ciara Smart caving in cold surface conditions - Photo by Gabriel Kinzler



Shiny - Photo by Karina Anders

# JF-761 Delta Variant

(including JF-758 Negative RAT-Hole, JF-489 Perfect Pitch Pot, and elements of JF-237 Niggly Cave)  
 Junee-Florentine, Tasmania, Australia  
 7JF761.STC559



Drawn by Ciara Smart (2024)  
 Surveyed by Southern Tasmanian Caverneers: Karina Anders, Rolan Eberhard, Stephen Fordyce, Henry Garratt, Jemma Herbert, Alan Jackson, Anna Jackson, Gabriel Kinzler, Bogdan Mureşan (VSA), John Oxley, Ciara Smart, Petr Smejkal.  
 In-cave sketches by Stephen Fordyce, Alan Jackson, Gabriel Kinzler, Ciara Smart (12 January 2022 - 28 January 2024).  
 Survey Grade: ASF 54, UISv6.3-4.c  
 Surveyed length to points of connection with JF-237: 2342m  
 Surveyed depth to deepest point of connection with JF-237: 335m  
 Depicted depth: 374m  
 Select pitches shown for illustrative purposes only  
 Disto X310 and Adobe Illustrator  
 V.1 (PROFILE) - May 2024

**LEGEND**

- passage wall
- - - passage wall - conjectural or continues (tight/low/high)
- passage wall - underlying passage
- passages merge
- ▲ entrance
- ▲ permanent external cave tag
- rope
- water direction of flow
- P# pitch with height (m)
- C# climb with height (m)
- tt too tight



VERTICAL SECTION PROJECTED AT 270°- 90° (TRUE)

**JF-761 Delta Variant**  
 (including JF-758 Negative RAT-Hole and elements  
 of JF-237 Niggly Cave)  
 Junee-Florentine, Tasmania, Australia  
 7JF761.STC545



Drawn by Ciara Smart (2022-2024) and Gabriel Kinzler (2022)  
 Surveyed by Southern Tasmanian Cavers: Karina Anders, Rolan Eberhard, Stephen Fordyce, Henry Garratt, Jemma Herbert, Alan Jackson, Anna Jackson, Gabriel Kinzler, Bogdan Muresan (USA), John Oxley, Ciara Smart, Petr Smejkal  
 In-cave sketches by Stephen Fordyce, Alan Jackson, Gabriel Kinzler, Ciara Smart (12 January 2022 - 28 January 2024).  
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 Surveyed depth to deepest point of connection with JF-237: 335m  
 Depicted depth: 374m  
 Disto X310 and Adobe Illustrator  
 V.1 (PLAN) - May 2024

PLAN VIEW

**LEGEND**

passage wall	passage wall - conjectural or continues (tight/low)	passage wall - underlying passage	drop off ledge with height (m) - pointing down	ceiling height change - pointing to lower side	aven	ceiling height (m)	cross-section (with view direction)	direction of floor slope	entrance	permanent external cave tag	relocatable survey station	extended roped traverse/tyrolean	boulders/rocks	log/timber	offset underlying passage	mud	water	water direction of flow (inlet)	water direction of flow (outlet)	stalactite	anthodite	straws	flowstone	helictite	fauna remains	plant root	loose/rockfall danger	pitch with height (m)	P#	C#	climb with height (m)	tt	too tight
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# Fault controlled littoral caves at Bibby Harbour, NSW

Article and images by Garry K. Smith,



Passage about halfway into BH-1

## FORWARD

The Bibby Harbour caves are unusual fault controlled littoral caves that have been created in karst rock, mainly by dissolution as opposed to mechanical erosion. The caves are located in an isolated outcrop of karst within the Myall Lakes National Park. Their locality raises the question of how they formed and why are there not more caves in the area? This short article presents the most likely method of their creation and provides a brief description of the two caves.

These small caves are excellent examples of limestone caves being formed by brackish lake water that has remained at a relatively stable level over thousands of years.

The term 'littoral' relates to the shore of a lake, sea or ocean. In coastal environments, the littoral zone may extend well above the high water mark, which is rarely inundated, to shoreline areas that are permanently submerged. Sea caves along Australia's coastline are generally formed by mechanical erosion as opposed to dissolution i.e. the wave action has created the caves. However, the Bibby Harbour caves have been created by a near stable lake level over a long period of time. The lake surface is generally placid or has small ripples up to 0.1 m high, however occasionally small waves (<0.5 m) are whipped up by strong wind from the north or west. The location of the caves on the lakeshore during their creation would have been generally sheltered from the most prevailing weather events typically from the south or east.

## LOCATION

The karst area is on the north-eastern end of Limestone Hill, overlooking Bibby Harbour. There are no trails to the area and access is via boat or a long walk following overgrown bushtracks from Leggs Camp. A permit is required from the NPWS to visit the caves.

## DESCRIPTION

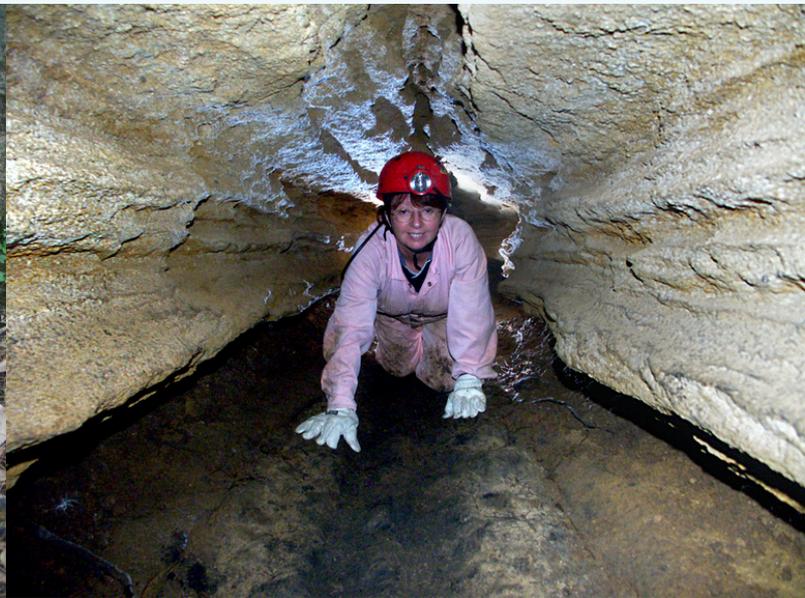
The entrances of the two known caves (BH-1 and BH-2) are within metres of each other, at the base of the extraction face in a small historic quarry. Despite being formed in limestone, these small caves are almost totally devoid of speleothems (formations). There are just a couple of small stunted stalactites, several centimetres long in BH-1.

Bibby Cave (BH-1) is approximately 135 metres long (survey length) and consists of one straight passage from the entrance, then several sharp bends following faults in the limestone toward the back of the cave. There are a number of short passages leading off at right-angles to the main passage, however they only go a metre or two before tapering down to become impassable.

The fault controlled, low-level horizontal passages can only be explored on hands and knees. The floor is mostly fine-grained black earth that can vary from oozy mud to a hard cracked surface, depending on the rainfall at the time. Fine tree roots are growing across the earth floor surface in some locations and there are bunches of fine tree roots hanging from cracks in the ceiling at the very back of the cave. The walls and ceiling contain small but well preserved crinoid fossils.



Entrance to BH-1 in old limestone quarry



The late Sonia Taylor-Smith in BH-1. Note horizontal ridges along walls

The back of the cave contains a high concentration of carbon dioxide (CO<sub>2</sub>) recorded up to 6.5%, most likely due to tree roots which enter the far extremities of the cave (Andrews 1963, Reeves 1999, Smith 1999, 2003, Taylor-Smith 2014). This high concentration of CO<sub>2</sub> in the cave atmosphere makes it very difficult to breath, therefore for safety reasons inexperienced people should not venture too far into this cave. More information about how tree roots increase the CO<sub>2</sub> concentration in caves can be found in the article 'Tree roots influence cave atmosphere and biota', *Caves Australia* No. 221 (Smith 2022).

The other tagged cave (BH-2), is very tight with only about three metres being negotiable and another four metres tapering down to a very narrow slot. It is hardly worth looking at.

These caves and karst area are certainly geologically interesting, however one would not visit the caves expecting to be underground for very long.

### CAVE DEVELOPMENT AND CREATION

One could assume that the two caves located at the base of an old quarry face and only about 1½ metres above the present lake water level, would have once extended another 20 to 30 metres to almost the present lake shore before mining began.

The caves are completely horizontal with almost no slope throughout the length of the caves. One could confidently suggest that these caves have been formed by the lake water, causing dissolution and erosion of the limestone along natural faults, in an era when the ocean and lake water level were a couple of metres higher than the present. The movement of water within the cave was most likely very minimal, only influenced by wind whipping up waves on the lake and changes in lake level as a result of flood events.

The overlying sedimentary strata and 3m of inferior banded limestone above the solid limestone (containing the two known caves), appears to have prevented vertical cave development from surface groundwater. No other caves or features of significance could be found during a thorough search of Limestone Hill.

Even today the present lake level only experiences a small change after flooding rain, then it returns to an equilibrium within a week or so as the flood water flows down the Myall River to Port Stephens and out to the ocean. Because of the length of the Myall River (92 km), and size of the Myall Lake including the other connected lakes, there is almost no ocean tidal influence on the lake level at the caves. However the Myall Lake is brackish (slightly saline) due to the connection with the sea via the Myall River.

The cave's cross-sections are quite jagged with horizontal ridges running along most of the horizontal passages. These indicate various water levels in the cave over long periods of time, however slight variations in the hardness and purity of the limestone layers would also have an influence on the passage shape. It appears that there has been minimal ingress of surface water or ground water through the limestone, and they have not been of significance in the cave's development.

### FAUNA

The occasional Eastern Horeseshoe Bat (*Rhinolophus megaphyllus*), has been sighted in this cave, however they don't appear to inhabit the areas of cave with high concentrations of CO<sub>2</sub>. Millipedes, spiders, moths and crickets are the main invertebrates found in the caves.



Boats tied up near the Bibby Harbour caves,  
Photo by Joe Sydney



An unusual shaped tree root growing from ceiling in BH-1

## HISTORY

The first mention of limestone at the Myall Lakes appears to be in 'The Maitland Mercury and Hunter River General Advertiser' of 1872, which states, "The Government have reserved from sale, lease, or conditional purchase, the limestone quarries recently discovered on the Myall Lakes" (Anon 1872).

On 10th July, 1882, A. P. Manton applied for a 40 acre portion of the limestone reserve at Bibby Harbour, Myall Lake, county of Gloucester to mine for lime. (Anon 1882, the paper has misprinted the date as 10th July 1883).

An article published in 1887 reported that The Patent Asphaltum Company of N.S.W, "have extensive limestone quarries at Bibby Harbour, Myall Lakes" (Anon 1887), however this appears to be a very much exaggerated claim given the size of the abandoned small quarry at Bibby Harbour, now overgrown with vegetation including lantana and blackberry.

Carne and Jones (1919) (Page 239) reported that the limestone deposit was once mined by a company called the Patent Asphaltum Co. The mine at Bibby Harbour (Reserve was No. 2,699) operated between 1894 and 1914. Another limestone mine was also in operation at McGraths Bay near Swan Point. The quarried limestone and the alumite from the mine at Bulahdelah Mountain was taken across the Myall Lakes by drogher (freight barge) to Port Stephens, from where it was shipped to Sydney and overseas, sometimes it was used as ships' ballast (Garland & Wheeler 1982). It appears that the quarriers were excavated into the eastern point of Limestone Hill until they exposed a dyke up to 6 m wide. The quarry face was about 10 m high at the time. It is assumed that the dyke and the transport costs of shipping the raw material across the Myall Lakes led to the operation's demise.

The annual mining report of 1899, states that 1000 tonnes of limestone flux was mined at the Myall Lakes (Dept. Mines and Agriculture 1899), from the quarry at McGraths Bay, about 6 km west of the Bibby Harbour quarry. The limestone was sent off for use at various smelting-works. This was a much larger quarry, compared to Bibby Harbour.

The parish map of 19th September 1919, shows a 'reserve No. 166 for access' (gazetted on 19th March 1884) which begins at the quarry site and stretches along the shore of the lake to the west. A 'Reserved Road' one chain in width starts at the quarry site and heads south.

After a long battle between conservationists, mining companies, landholders and many other lobby groups, the Myall Lakes National Park was gazetted in April 1972. It consisted of 15,384 hectares, of which 10,080 hectares was lake-beds. A change of State Government and continued lobbying by conservation groups, resulted in the National Park being almost doubled to 29,440 hectares in June 1977 (Garland & Wheeler 1982).

The caves were known of locally for some time but the first speleological trip was by the Newcastle Technical University College Speleo. Soc. (NTUCSS) in 1956 (Matthews 1968). Then it appears Cooranbong Speleological Society becomes aware of the caves in 1958 (Anon. 1958). Members of NTUCSS again visit the caves in April 1959 (Angel 1963). Then P. Murray and R. Paine (NTUCSS) made a grade 4 survey of BH-1 on the 17th Feb. 1963 (Andrews 1963). Sydney Speleo. Soc. visited the caves in 1972 (Middleton 1972). A more accurate survey was undertaken by NHVSS in 1999 (Reeves 1999, Smith 1999, 2003).

## GEOLOGY

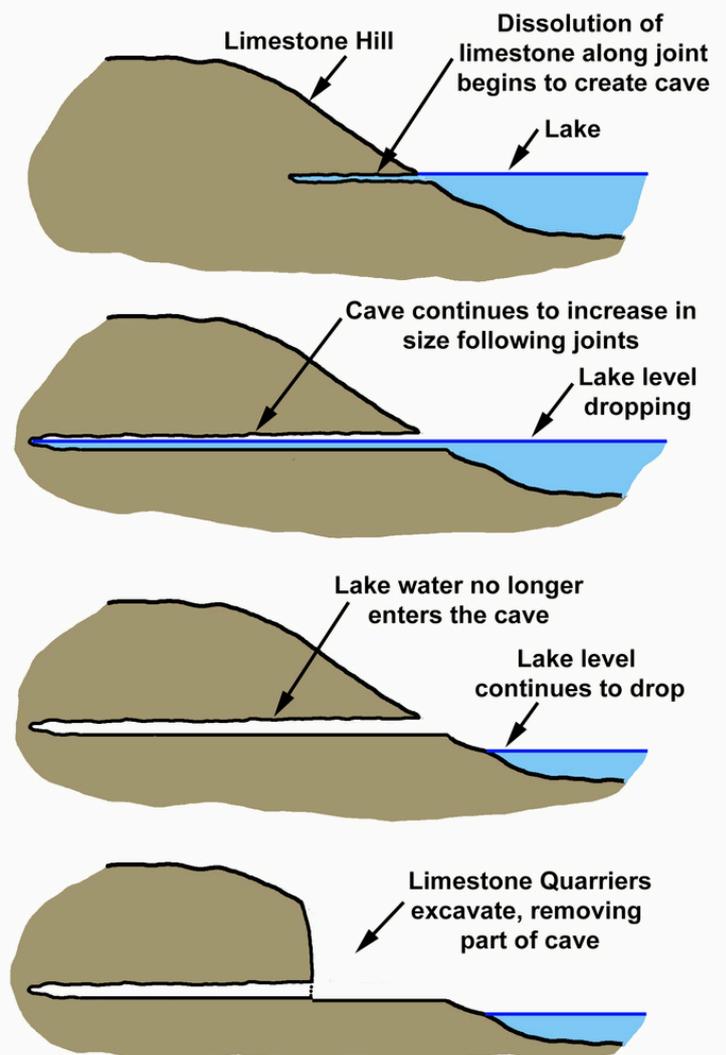
The karst area consists of Carboniferous limestone and other Carboniferous marine rocks. The flat lying limestone bed is exposed along Limestone Hill mainly toward the north-eastern end near Bibby Harbour. The deposit comprises 4.5 m of solid limestone with 3 m of inferior banded limestone above it and overlaid by sedimentary strata. (Lishmund et al. 1986).

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Millipede in BH-1



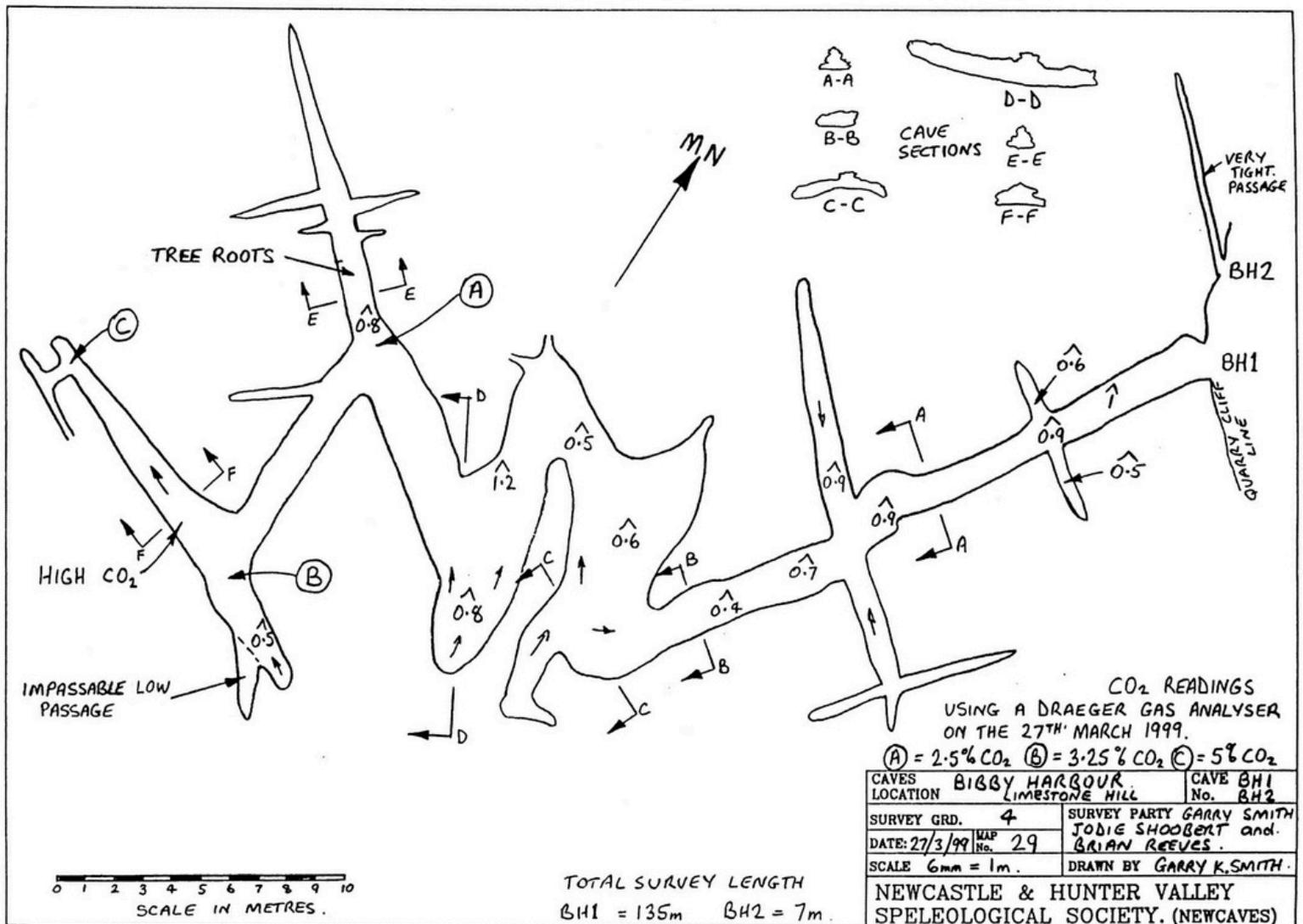
Sequence of events leading to the creation and present topography of Bibby Harbour Caves

Garry K. Smith 2024



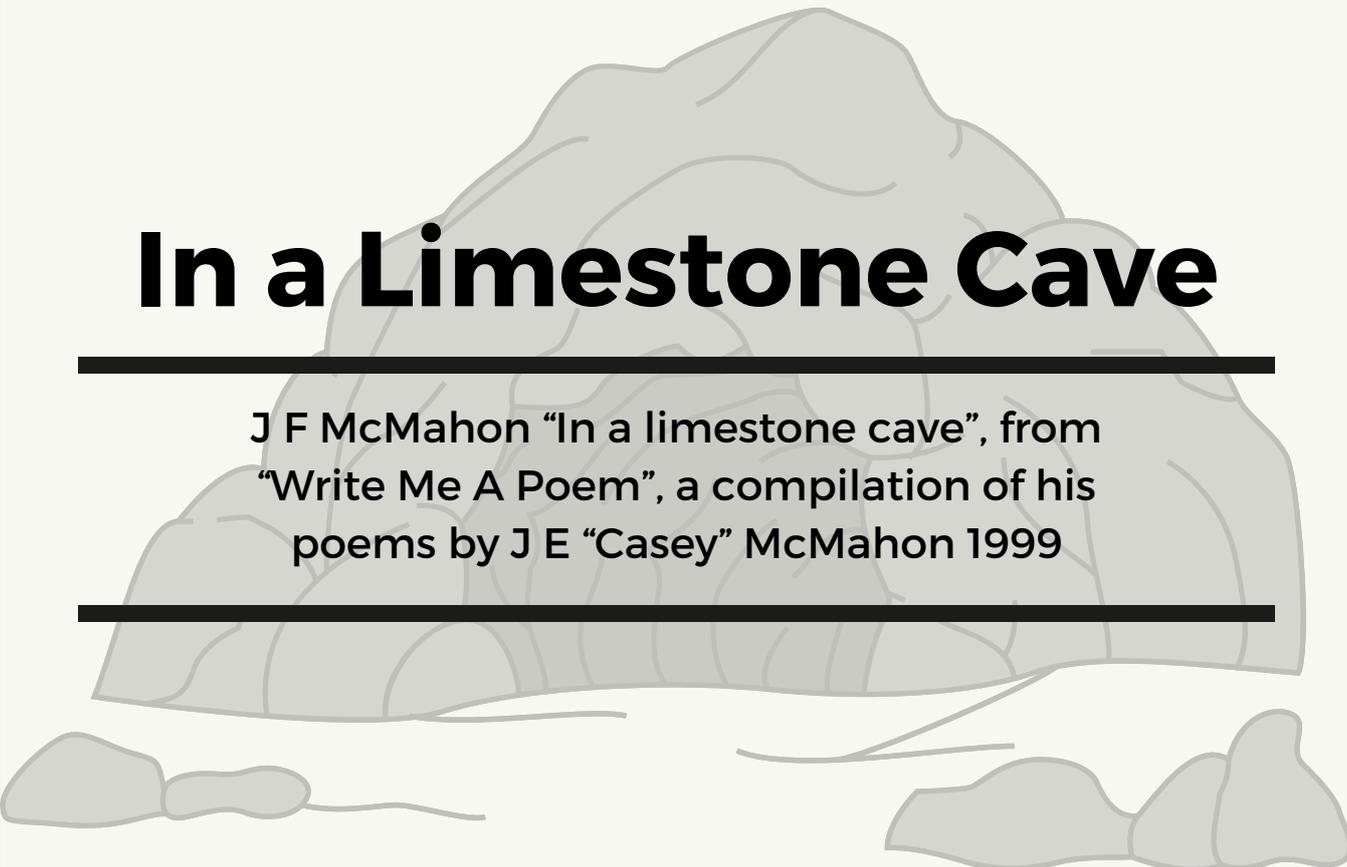
The only Horseshoe bat in BH-1 at time of visit

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Map of Bibby Harbour caves

# In a Limestone Cave



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J F McMahon "In a limestone cave", from  
"Write Me A Poem", a compilation of his  
poems by J E "Casey" McMahon 1999

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In a limestone cave at Buchan,  
I stand with my doubts and fears  
And gaze at the marvels growing  
One inch in three thousand years.

My torch brings the colours flashing  
From column and stalagmite,  
While shimmering starlets twinkle  
From ceiling and helictite.

Deep in the age-old mountains  
Where maybe the fairies played,  
Whilst who knows what manner of fauna  
Roamed in the forest glade.

But I'm here in the caves of beauty  
Midst wonderful sights to see,  
Shown in the torch-light flashes,  
Beautiful, weird, I dree.

# Northern Tasmanian Cave Rescue event, 4-5 May 2024

Janice March



Passing the casualty in the stretcher near entrance of Honeycomb Cave, Mole Creek - Photo by Nadine Muresan

Local Tasmanian cavers from Northern Caverneers (9), Mole Creek Caving Club (5) and Southern Tasmanian Caverneers (4) were excited to have mainland visitors from Metropolitan Speleological Society (3), Victorian Speleological Association (6) and Sydney Speleological Society (1) for our autumn cave rescue practice weekend. With travel grant assistance from ACRC, Bogdan (Bo) Muresan from VSA came to show us some new vertical self-rescue techniques and join in our exercise the next day.

Seven ropes were pre-rigged in the tall gum trees around the Honeycomb Cave day use area at Mole Creek Karst National Park, and we hopped into the Croll-to-Croll pickoff technique which was certainly easier than any other method anyone had tried before but still requires regular practice to get all the steps correct. If that fails then the next option would be the Counterbalance pickoff which Bo demonstrated. The Balancier technique could be useful if you are above the casualty who gets stuck on the rope, and Bo showed us that one as well.

We enjoyed lunch in the sun then set up a high tyrolean traverse about 20 metres above the ground between three tall trees. I hadn't climbed as high up in those trees before so was impressed by the view, and we carefully lifted and lowered the stretcher-bound casualty around the circuit. A timely adjournment to the Mole Creek pub was made as several campervans arrived to camp at Wet Caves Reserve and the cold evening air was setting in.



Cave rescue event - Photo by Nadine Muresan



Pickoff Demonstration - Photo by Nadine Muresan

Sunday dawned crisp and clear again, and I'd planned a six stage mini-rescue scenario in Honeycomb Cave using some of the pre-existing anchor points. One team put up the purple heat tent and floated a casualty in the stretcher across a pool of water in the rescue pack raft. They were lucky to find some water in the pool as it has been so dry this year. The casualty, a nurse, will now make an even better patient advocate having experienced several tyroleanes, a tight keyhole squeeze, and lots of uneven stretcher passing. The new full face shield quickly fogged up and had large drops of condensation on the inside. A stiff porous face mask might work better.

Our communications with the Michie phones worked rather well and we have neatly written records describing the gradual transfer of the casualty from the Three Rifts right through to the exit 1.25 hours later, thanks to Marilyn. We also had comms for the derig to ensure safety of all the rescuers in the cave at all times. It would have been good to send in the phone line as soon as we arrived on the scene instead of at the same time as the rigging teams, as it takes quite a while to lay the line.

At the debriefing, various teams mentioned their Michie phone difficulties, which mostly boiled down to user error, and a few suggestions to improve the system. We should synchronise our watches so the comms log is accurate, and we should be mindful of the language cavers use when talking on the phone. Everyone played their part in another successful practice rescue with lots of interstate and intrastate collegiality enjoyed by all.



On the way up - Photo by Bogdan Muresan

# Why would anyone cave dive?

Janine McKinnon

Any cave diver will recognise this as a question they are almost invariably asked when someone discovers they do this. Usually followed by something like; “you are mad”, “you have a death wish”, “what can you possibly enjoy about that” or something similar. The same can be said for cavers, but cave divers get it in amplified form.

The answer is as varied as why we cave of course. Many reasons don't make sense to the general public, or even cavers who are not cave divers. One reason though can be appreciated by almost everyone, I think. The chance to visit somewhere stunningly beautiful with the added bonus that very few people ever get to visit it. The cave systems of Dan's Cave and Ralph's Cave (which connect) on Abaco Island in the Bahamas are arguably the most highly decorated, beautiful and pristine water filled caves in the world. Certainly that have been discovered thus far.

I recently visited these caves for the second time. If they weren't half a planet away, I would go much more frequently.

Unlike the caves of the Yucatan Peninsula in Mexico (where it is an industry training and guiding thousands of visiting cave divers a year), these caves are heavily protected.

Fully qualified cave divers must dive with a guide, and there is only 1 guide operating since these caves were discovered. That guide is Brian Kakuk, who discovered the caves and has done the vast majority of the exploration.

He is extremely protective of the caves, as you can well understand, and only takes groups of 3 divers maximum, usually it is one or two. Where the divers get to visit in this extensive series of passages and chambers depends on their skill level, so no bumping into delicate formations by divers without the control needed to manoeuvre between closely placed fragile formations. This means a skilled diver gets to float between large columns, gour pools, straws, shawls and all the other wonders we see in dry caves. No footprints marring the floor, hand prints on formations, trogging marks, and all the other damage we routinely see in our caves. It is an experience unlike any other.

So next time you catch yourself wondering why anyone would cave dive, imagine yourself being the diver cruising amongst these stunning formations in still, crystal clear, 28C water. Maybe you might just get a glimpse of the attraction.



Janine in Dans Cave, Abaco Island, Bahamas - Photo by Brian Kakuk from Bahamas Underground

# Wolf Hole: Capturing Lake Pluto's Hidden Beauty

By Michael Glazer and Raelene Watson



In Tasmania's Huon Valley, the Hastings Karst region is home to an underground gem, Wolf Hole, a magnet for both explorers and photographers. The cave's secret, Lake Pluto, recently attracted a team led by John Oxley, including Raelene Watson, Michael Glazer, Adrian Hills and Jackson Hills.

The team entered the cave and proceeded horizontally into its quiet magnificence. Inside, they encountered an unusual geological feature: rocks tinged with a mysterious red, sparking a lively discussion and momentarily shifting their focus from the main attraction. Lake Pluto, calm and reflective, captivated the explorers. The water's surface mirrored the rugged cave ceiling, creating a striking contrast. Here, Raelene, an enthusiastic newcomer to caving, took photos with her Galaxy S23 Ultra, capturing the cave's beauty.

Lake Pluto mirroring the stalactites above, creating a mesmerising display of natural symmetry -  
Photo by Raelene Watson

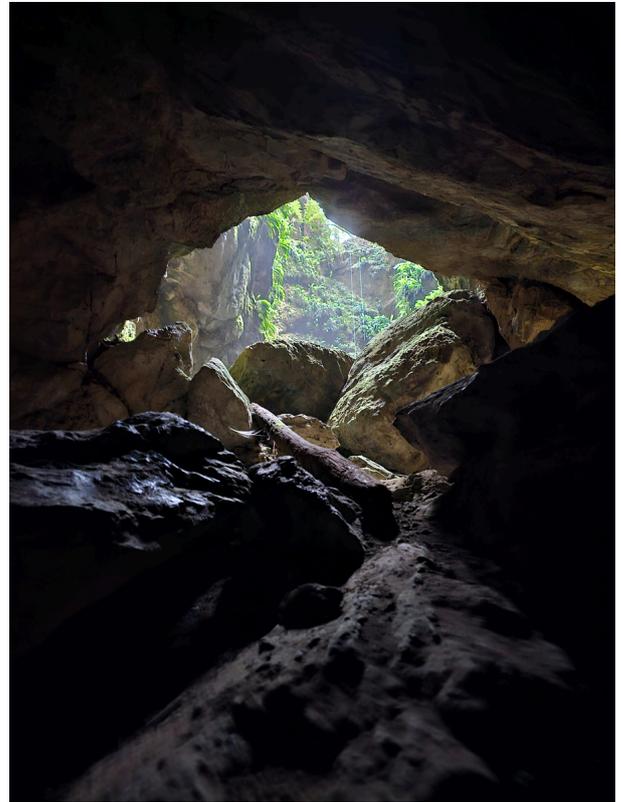


John lighting the way to show off the hidden beauty of Lake Pluto - Photo by Raelene Watson

As Raelene and John concentrated on photographing Lake Pluto, the others explored further. Upon returning, they watched Raelene work meticulously to capture the perfect images. The group later gathered to view her photos, which vividly brought the cave's atmosphere to life.

"Entering Wolf Hole was like entering another realm, where each turn unveiled a new marvel to capture. Taking photos in the dark was exhilarating – the light from our team created the perfect conditions, and time seemed to pause for that perfect shot," Raelene recalled. This brief journey underground has left a lasting impression of discovery and wonder. It highlights the incredible sights lying beneath us, waiting to be captured and shared. "The instant I took the photo, I was unaware of the stunning scene I had captured. It was a perfect mix of light and shadow, a rare moment of beauty in the stillness of Lake Pluto. The joy of that capture was a reminder of the thrill of exploration," she added.

Lake Pluto at Wolf Hole stands as a timeless observer of time and explorers. Through Raelene's lens, we see its story—a peaceful testament to nature's unspoiled beauty and the skill involved in capturing such moments. "Exploring Wolf Hole and its hidden wonders was a shared adventure among friends. The magic of Lake Pluto, seen through my camera, affirmed the extraordinary sights that exist beneath us. Sharing these experiences with fellow explorers is unforgettable. Each photo is a memory of our shared wonder and admiration for the natural beauty around us."



A glimpse of the entrance from within the cave -  
Photo by Raelene Watson



Michael and John taking in the intricacies of the stalactites -  
Photo by Raelene Watson



# Climate Change and Caves

Phil Fleming

Highland Caving Group (HCG) was delighted to have Dr Julia James as guest speaker at our Annual General Meeting on the 12th March 2024 at Beverly Hills, Sydney.

The meeting was attended by 25 members and guests who heard an informative and entertaining talk by Julia on the topic of "Climate Change and Caves".

Julia is a recognized identity on the Australian caving scene and has been active as a speleologist over a number of decades. She is an active member of Sydney Speleological Society (SSS), served as an associate professor of inorganic chemistry at the University of Sydney and was the first woman and only Australian to be elected as president of the International Union of Speleology (UIS). Julia is also a Fellow of Australasian Cave and Karst Management Association (ACKMA) and the Australian Speleological Federation (ASF). She has led expeditions in Australia, New Guinea and overseas and has authored numerous papers and book chapters on caves, speleology and chemistry.

Closer to home, Julia has spent much research and caving time at Jenolan where she has been a leading advisor to cave management authorities there over the years. She organized the first full scale systematic survey of the Jenolan Show Cave System, a project in which HCG played a key role.

Thus, Julia commenced her talk by noting the Jenolan system. Strangely, Jenolan Caves, whilst being a place of great scientific, historical, cultural and scenic importance are yet to be included in the National Heritage list.

Climate change has occurred throughout the Earth's development and Julia encouraged the audience to think in terms of geological time. There have been at least three ice ages before the present. Dating of clay deposits in the Temple of Baal at Jenolan has placed the age of that cave at 340 million years BP in the Carboniferous period. Just in time to be subjected to the effects of the Permian ice age which interestingly only happened in the Southern hemisphere. At that time Australia was much closer to the South Pole.

It was removal of CO<sub>2</sub> from the atmosphere by carbonaceous sea creatures that led to the present ICE AGE. In this ice age, caves and karst in Australia have been subject to repeated glacial periods with shorter warm interglacial periods between. Julia outlined how the "Milankovitch cycles" are thought to explain temperature of the earth's surface and the regular return of cold and warm periods during the Ice Age. These variations in the patterns of the earth's orbit around the sun affect the amount of solar radiation reaching the earth and are important precursors to glaciation.

This led into a discussion of the interesting and important "Devils Hole" studies in the US. This submerged cavern in Death Valley, Nevada has provided an opportunity for radiometric dating to measure climate variation going back about 500 000 years. Oxygen isotope studies of the dated calcite established with great precision the pattern of surface temperature variation in the past.

Climate change is already having a noticeable effect on karst in Australia. In the last few years Jenolan has seen the impact of extreme weather take its toll on the access roads and caves precinct.

At Yarrangobilly, where HCG has been actively exploring the Y-395/Y-6 West Deep Creek system the effect of the 2020 bushfires and subsequent change in rainfall patterns has been apparent both above and below ground during exploration trips over the last four years. What were dry areas pre-2020 have since become streams and waterfalls. A new entrance emerged caused by heavy water flow sinking in the doline. A squeeze passage subjected to sudden and immense water flows is no longer a squeeze.

In conclusion the present climate is a feature of the last interglacial of the Ice Age modified by global warming. The Earth should be expecting to enter into another period of cooling however the current atmospheric CO<sub>2</sub> level of over 400 ppm means that this is unlikely in the near future.

Furthermore karst landscapes and caves are especially sensitive to climate change and whilst cave dating and stable studies isotope have so far produced information on climates in the past it is likely that they can also help to predict future climate change once the effects of human induced greenhouse emissions are taken into account.



HCG Climate Change and Caves 12 Mar 24

Julia talking about Climate change

# Cave Rescue Communications

Article and images by Deb Hunter

## The deep past of cave rescue communications

Communication between an underground rescue site and the surface during an extraction has long been recognised as essential for many reasons. These include real time updates - each way, factual live reporting, police and emergency services co-ordination and deployment of people and materials. However, real-time communications were limited by clumsy and heavy paraphernalia of the available field telephones, until only about 40 years ago.

Before the development of purpose-built cave rescue communication systems, runners were still required in longer caves because of the limited reach of these bulky lines (e.g. Lovelock, 1963, writing on the attempted rescue of Neil Moss in 1959). In a Northern Tasmania combined services rescue exercise in Rat Hole (Mole Creek) in 2005, I had my own unfortunate experience managing the deployment of a field telephone and communications using it, which could only be trundled (with some difficulty) as far as the start of the Mindless F'n Crawl (the MFC). Our "casualty" was extracted from the far side of a sump prone to flood without notice, about another 200m of tight passage further (Wools-Cobb, 2005). Fortunately, better systems have progressively been adopted since.

## Contemporary cave comms equipment: examples of use

Southern Tasmania held a Deep Cave rescue scenario in 2007 at Mystery Creek Cave, Ida Bay. Participants were Southern Cavers, Police, SES and Parks personnel. The exercise featured the use of purpose-built communications supplied by Joe Sydney and Peter Brady of the NSW Volunteer Rescue Association's Cave Rescue Squad (CRS). The field telephone was used for surface comms, and CRS's Nicola and Michie phones for cave to surface comms. Nicola's signal strength was excellent with its aerial on solid rock at the nearby quarry, reaching some 400 m horizontally x 50 m vertically through the rock.

Northern Tasmania's first experience of purpose-built cave rescue communications equipment was at Honeycomb Cave (Mole Creek) in 2010, when Joe conducted a familiarisation with Michie phones for a multi-club exercise. This was a vast improvement on the field telephone set-up in the 2005 Rat Hole exercise and convinced us of their essential role in cave rescue. Joe donated northern Tasmania six Michies that he built and regular inter-club exercises using them commenced. Soon, with funding assistance of the ASF, a second set of Michies (an improved Mk2 built by members of the CRS) and a couple of kilometres of wire consolidated the capability.

These days, voice and text forms of comms should be appreciated as complementary tools for cave rescue.

## Cave rescue telephones

Michie phones is the name for an earth return single-wire telephone (system) first built in the 1970s in NSW. They are an innovation of academic and electronics whiz Neville Michie (Lake, 2021), first reported in 1974 (Michie, Neville, *The Incredible Long-range Talking Machine*, *Journal of the Sydney Speleological Society*, 1974, 18(11):297). Michie phones and other single wire phones have now been used in Australia and overseas for decades (Lake, 2021). Voice calls enable interactive conversations (speak slowly and clearly!). Typically, several phones are deployed in an incident, one with each team, able to be used anywhere along the line.

## Mount Cripps 2020

Michie phone cave rescue communications were used in the rescue of Tasmanian caver Dave Wools-Cobb from the remote Snowy Mountain Cave in November 2020 (*Caves Australia* 218). Dave's injuries were extensive, following a fall about 8 m off a ladder beside the waterfall. The outcome could have been worse without the comms (and not forgetting thanks to all the caver and SES volunteers). Michies greatly impressed emergency services attending and aided efficiency by communicating what and who was needed when. This application in particular, not the least because it was a real and not a fabricated situation, greatly assisted our credibility as cave rescue experts in the eyes of the Police, who are in control in any rescue situation anywhere.



Michie phone in use at the reel (end of line), Snowy Mountain Cave rescue, October 2020

### Cave radios

Some through-the-ground radio communications systems are made for voice while one type, the CaveLink, is for text messages. While good voice communications demand optimal set up (e.g. of aerial orientation), text messaging uses a lot less power and the message always gets through. There are other benefits too, explained below.

System Nicola is a voice cave radio that has been in use in the UK since the 1990s, revised to Mk4 by 2022 (Nicola Association, 2023). It uses an aerial spread across the ground. NSW's CRS has been using Nicola for years.

The Heyphone is a similar voice radio system in use in the UK e.g. the Mendips (Adafruit, 2018; Grass, 2023). It uses two stakes which are driven into the ground.

The European CaveLink is the text (SMS) radio system that has recently become popular in New Zealand and Australia. Messages can be delivered completely and without error in real time to any cell phone anywhere. Text messaging can convey complex, technical and/or medical information with accuracy, outperforming spoken calls. Printer is optional but really handy as a record.

All these cave radio systems use a pair of antennae to generate a signal that passes through the ground for at least hundreds of metres. CaveLink's manufacturer claims test results of distances up to 1300 m within caves and from the cave to the surface (Zeigler, undated). As Zeigler explains:

- *Because all transmissions are secured by checksums and automatic query, no transmission errors are possible.*
- *A bad link (great distance, atmospheric noise, interferences) just increases the communication time, but will not cause transmission errors.*

CaveLink gave a stellar performance for Richard Harris on the Nullarbor, sending to its GSM modem from 5 km deep inside Cocklebiddy Cave (Clare Buswell, pers. comm. 2024). A handset in Adelaide can receive SMS from anywhere the modem can connect to the cellular network. It looks like FUSSI's old through-the-ground system may be redundant!

You can tell I am a great CaveLink believer.

### New Zealand cave rescue exercise

In 2019, I experienced the Kiwis' enviably efficient integration of land based and cave-to-surface rescue comms. The operational base was located at Motueka, a nearby town. Michie phones were used to communicate between teams and to Entrance Control; and CaveLink communicated precise text messages. UHF was the "land" based method used to rescue base. CaveLink's messages were printed as they were created and provided a permanent record which was referred to as necessary, so that nobody had to note down what happened when.

Imagine being able to spell out the names of drugs required by the medic and request no-mistake calls for x metres of rope or exactly what hardware was required at which rescue team or location.

### Over to you

Cavers around the world have developed voice and text communication tools that make all the difference in cave rescue. They are purpose built with robustness, are compact and are simple to use. However, practise is essential. In rescue exercises, many find it too tempting to confine their play with tech hardware at the expense of familiarising with necessary communications. It seems some cavers just don't understand how important communications are to a successful rescue, efficient working relationships with emergency services and harm minimisation to the casualty.



Michie is use midline in Mystery Creek Cave rescue exercise. Transmission is by the yellow wire, while earth return is by bare hand on the rock



Cave link familiarisations at Honeycomb Cave

Deb Hunter is based at Caveside in northern Tasmania, involved in cave rescue since 1990. Thanks to Clare Buswell for discussion of recent cave rescue communications developments in Australia, and special thanks to Joe Sydney of NSW CRS for helping Tasmania improve cave rescue capacity through using specialist comms.

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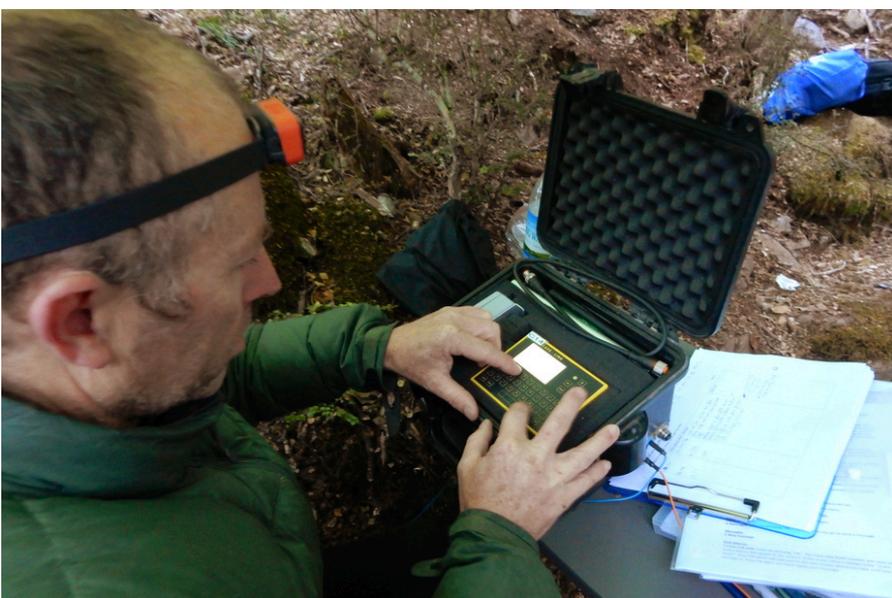
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Cave link at cave entrance 2019 NZ Deep Cave SARex - Photo by Deb Hunter

# Jenolan Cave Rescue March 2024

## NSW Cave Rescue Squad



Cave Rescue operator in the middle of extracting the patient now additional space has been made -  
Photo by NSW Ambulance

### The incident

On Saturday, March 30th of the Easter weekend 2024 a party of six from NUCC were doing a Rho Hole / Ian Carpenter Cave through trip.

Two of the party turned back as the cave was too tight for them and exited the cave without incident. The remaining four continued through to the Watercrawl Squeeze which is the last squeeze before the exit in Ian Carpenter Cave and only some 20 metres from the surface. The first two made it through with only the usual difficulty while the third became trapped and was unable to move forward or back, trapping the fourth member behind him.

The squeeze is basically horizontal, and not incredibly tight, but does have several bends in both the horizontal and vertical planes and has many protruding obstacles. The bends make it more difficult for those with long limbs.

The party spent some time attempting to free the trapped caver, before deciding that they needed help and exited the cave. The trip leader went back into the cave to provide company and whatever assistance he could to the trapped caver.

A member went down to the Jenolan Guides' office to raise the alarm. They called Police and informed the guides. The Jenolan guides acted promptly in triggering their emergency procedures and contacted their senior guide responsible for adventure caves (also a member of NSW Cave Rescue Squad (CRS)) as well as their emergency warden. [~7:30 pm]

The Police were informed that this was a cave for specialist caver rescuers and to ensure that they called CRS. [CRS captain informed about 7:30 pm]

### The response

The CRS Captain sent this message to a list of currently active, operational members: "There's someone stuck in Rho Hole-Ian Carpenter through trip. Anyone available?" It was a little after 8 pm on Easter Saturday.

CRS captain, Al, collected equipment he expected that we'd need: de-obstruction gear (drills, batteries, hammers, plug & feathers, microshaving tools) and had a quick 'research' conversation with another CRS member who knows Rho Hole very well. Allie, Al and Mooresey who all lived relatively close by arrived about 10pm. A local police officer was in control, and two Special Operations Technician (SOT) paramedics and seven VR qualified SES members were already there. The SES members had previously carried out training and rescues from the show caves only.

The police had made the call that no one was to enter the cave until specialist caver-rescuers arrived. This had been Jenolan's advice to them, on the basis that the cave was known to be tight and specialist skills were likely to be needed.

On arrival, Al and Allie entered the cave on a recce, accompanied by one of the SOT paramedics.

They discovered the situation described above. The caver behind the one trapped was OK, although frustrated. At some point she attempted to find her way back through Rho Hole to the other entrance but returned to the Watercrawl Squeeze having decided that was a safer option.

Leaving the SOT with the stuck caver, Al and Allie returned to Mooresy, who'd stayed at the entrance to manage things there. They asked SES to run a Michie phone cable into the cave to the vicinity of the 'casualty' while they returned the ½ km or so to the car park and control point, to report the situation and collect de-obstruction equipment. [time about 12:20 am]

The team provided food and water and reassurance to the stuck caver regularly over the next hours and attempted to calm him so that he could relax enough to find a way out of his predicament.

Al proceeded to drill, chisel and generally remove a bulge immediately in front of the casualty. He worked on reducing the bending required for the next move, often working within centimeters of his head. Removing projections inside the squeeze, beside the casualty would be phase two, should it be necessary.

Meanwhile, another CRS member, David, arrived [~1 am] and, after consulting with Al and Allie, asked Mooresy on the surface to call out as many other CRS people as possible. [~2:40 am] He then placed temporary anchors for the small climb up and down near the entrance as it was thought that the casualty may need help there. The SES team rigged a haul system outside the cave which connected through these anchors, and provided a harness.

Once the bend looked sufficiently bigger, Al withdrew a few metres away, and Allie moved into the squeeze. She has vast amounts of experience in cajoling, calming and supporting cavers in difficulty and is also very good at providing direct, simple instructions which people feel like trying. At the same time, his friend, still behind, was able to remove his boots and guide his feet.

The caver made a little progress, but then caught again. She'd been trying to physically help, by reaching in to pull on the shoulders of his suit, but couldn't get enough grip to do this effectively.

She told him that she'd wriggle out again and send Al in as his longer arms would make the difference.

As she started to withdraw, the caver managed to move just right, and whatever part of his overalls that were caught suddenly released, and he was able to follow her into the little room.

Yooohoo! He'd been freed!

Allie, shepherded him through the remaining few metres and handed him on to David at the climb. Dave and a paramedic popped him into a harness and a tyvek suit so that he may slip through better, and assisted him up the climb whilst the SES provided a haul and belay, and some level of gravitational assistance.

They then assisted him down the little climb and out the entrance. He'd been in the cave since morning on the previous day. Outside, there was food and paramedic care, and he was able to walk with minimal assistance.

Meanwhile, the woman behind him quickly came through the squeeze to Al without needing assistance, but supported by a second paramedic and followed the others out of the cave.

Al and David collected the gear and Michie phone and brought it out of the cave.

SES and paramedics supported the two cavers up the track to the car park - you'll have seen those pictures.

Just before the caver's arrival in the car park, Greg arrived to assist in the rescue, but much to his disappointment, could only help by being in the photos.

The stand-down also went out to the other CRS members on the road. Rod, Steve, Michael, Ruth and Brian were on their way from a variety of directions.



Screenshot of VRA Rescue NSW Caves Squad Captain, Alan Warild, Interview on Today Show

## Things we learned

### About Incidents

- Of course, incidents are likely to be triggered in the evenings, on weekends, and even more likely on long weekends!
- As far as we could tell, the cavers had done well and made generally good decisions. They were adequately equipped and capable enough to expect to do that cave on this day.
- They did the right thing in terms of trying to solve the problem themselves, before seeking assistance when they couldn't.
- Information to the rescuers is terribly sketchy at the beginning, and it's difficult to know how seriously to respond.
- The media were interested! I think that we've got to expect that!
- There was a strong emergency service response.

### About our response

- We achieved an excellent result. A caver and his friends, experiencing a very bad day, were helped and their day improved! He was assisted out of the cave safely and relatively quickly, given the challenges.
- The members that responded were well prepared for the situation both in the breadth of skills they had amongst them, and the resources they had available to use.

However, there were things that we could improve...

- While the team we fielded was sufficient, a few more would have helped, and if it had been more prolonged or needed larger numbers, we'd have struggled. We are addressing these by:

\* Improving our member callout process - some members did not receive the SMS until after the "success" message was sent. We're looking at several alternatives for this. One possible solution is to use a communication app developed for another emergency service.

\* Deploying ourselves in numbers anyway, despite the fact that the problem may well be solved before we get there.

\* Having a dedicated non-attending co-ordinator who has time (and signal) to be making calls to individuals who have not responded.

- With the person initially making the callout and co-ordinating our response also being the first responder, and having no signal at the entrance, communication about further plans was very challenging. He was also directly busy actually trying to achieve the rescue. Co-ordinating information and our response was spread amongst four or five members and it did work. It may have been better to have someone with good signal and computer access to be the central point for co-ordinating responding members and information to other agencies.
- De-obstruction was essential, as we expect it often to be. It was a bonus that nine of us had trained in that skill within the previous month, and that our gear was at Al's place. Normally, our des-ob kits are stored at our shed in Sydney and would have been two more hours away. We are in the process of making up more kits, and locating some of them with the rope packs we store with members who are likely to be first responders.
- In-cave comms. The Michie-phone provided by the local SES was effective in the cave, although the constricted passage and difficulty laying wire out of harm's way meant that it failed a few times. Eventually we found that the paramedics' UHF radios were intermittently effective for the short distance involved.
- Surface comms. In most respects, the surface comm were as good as we could expect. The cave entrance had no phone signal but this was solved by running the Michie line the 500 m back to the carpark where the phone signal was strong. Once again, having a dedicated coordinator to handle the interface between the closed rescue comms and the rest of the world may have proved useful.

Ultimately, it's worth remembering that cavers trained and prepared for the unique challenges of cave rescue were the solution for this incident. We were well respected and valued on site.

It's in cavers' interests to ensure that some of their number train, practice and equip themselves for rescues in caves, and maintain relationships with other emergency services who will also be called.



Screenshot from Channel 7 NEWS Sydney

## About our support

- The police officer in control at the scene was 100% supportive and keen to provide what we needed.
- The SOT paramedics that we have trained with, many times, were fabulous - independent and comfortable in the cave, trusting of what we do, and utterly reliable in doing the best they could for those being rescued.
- We have trained with the Police Rescue Unit, but they did not attend. The police officer present was from a local station and we had not worked with him before.
- On the ground and at the scene, the SES members were extremely supportive and helpful. They were equipped with useful resources and were willing to do what was needed. Our members did not experience anything other than helpful support.
- Jenolan Caves Trust, managers of the show caves and the land and wild caves around them, on behalf of NPWS, were helpful in triggering a useful emergency response, initially communicating with Police and supporting the operation.
- VRA Rescue: Readers of CA No. 226 November 2023 NSW Cave Rescue Exercise, Bungonia, p12 will remember that cave rescue in NSW operates as a volunteer squad as part of what was called the Volunteer Rescue Association until recently. This organisation supports General Land Rescue squads in many NSW regional towns and villages and also more specialist rescue groups like ourselves. We have operated as part of VRA since 1974 but recently, they have become very supportive and show that they clearly understand our importance in the niche in which we operate.)
- VRA Rescue:
  - \* Offered us a Regional Operations Manager to attend and support us at the control point which we said was unimportant until morning on the Sunday. In retrospect, it may have been useful to have a dedicated coordinator on site.

\* Assisted us greatly in correcting some of the inaccurate media coverage which appeared on Sunday morning and with liaising with other emergency services.

\* Have offered a great deal of congratulations and gratitude, and several potential solutions for the improvements to our response discussed above.

- For those in states other than NSW, VRA Rescue may have started in this state, but is not restricted to operating only in NSW, and is available to support cave rescue across the country. In Tasmania last November, VRA Rescue made the offer to buy better/more in-cave communication systems to be located around the country. The non-availability of suitable systems has so far prevented that. Caver-rescuer groups in other places may want to investigate if this would assist them.

## Media coverage

Links to most of the media coverage can be found at the [CRS Facebook presence](#).

Congratulations to Al and David who bravely and competently spoke the pieces to camera and microphone!

...and thanks to VRA Rescue's media person for helping them and facilitating much of the coverage.

## Something for all cavers to learn...

Caver-rescuers are almost always cavers who have worked out that if something goes wrong on their trip, another caver is going to be best able to help them out. If you are a caver with advanced skills, consider volunteering with your local caver-rescuers.

If you can't do that or just figure that these volunteers are worth supporting, consider making a donation to your local crew...

If you need help with either of these, contact the ACRC.



VRA Cave rescue operator working wire used for single wire earth return loop telephone (Michie phone) - Photo by NSW Ambulance



Some of the team, including Cave Rescue, SES and NUCC cavers outside the entrance to Ian Carpenter at completion of the rescue - Photo by David Taberner



Entrance to the squeeze - Photo by NSW Ambulance

# J20 Rho Hole SIMPLIFIED MAP ONLY

## J24 Ian Carpenter Cave

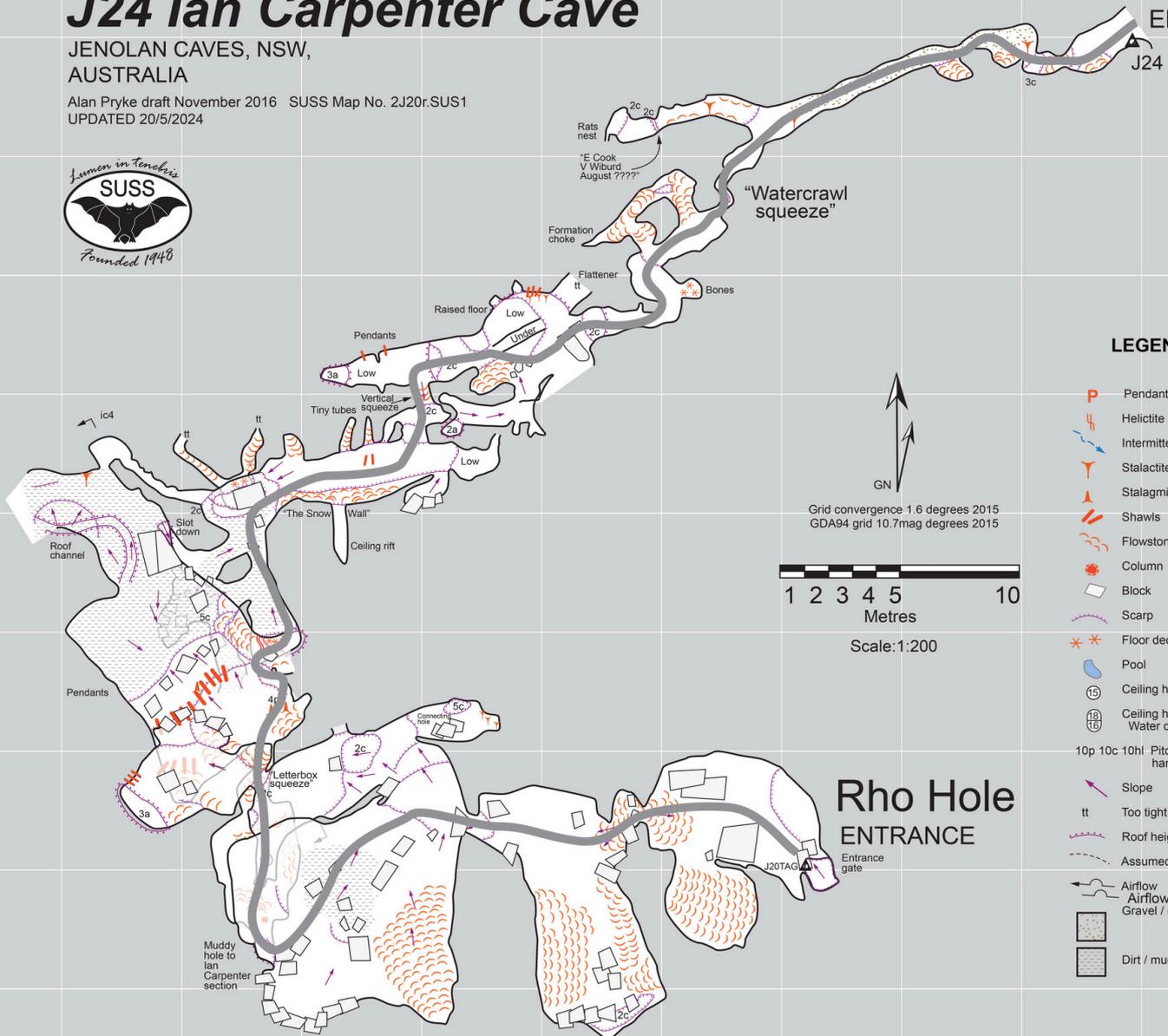
JENOLAN CAVES, NSW,  
AUSTRALIA

Alan Pryke draft November 2016 SUSS Map No. 2J20r.SUS1  
UPDATED 20/5/2024



Ian Carpenter  
Cave  
ENTRANCE

J24

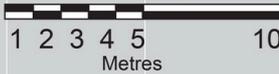


### LEGEND

- P Pendant
- | Helictite
- ~ Intermittent flow
- Y Stalactite
- ^ Stalagmite
- ~ Shawls
- ~ Flowstone
- Column
- Block
- Scarp
- \* Floor decoration
- Pool
- 15 Ceiling height (m)
- 18  
15 Ceiling height/  
Water depth (m)
- 10p 10c 10hl Pitch/climb/  
handline(m)
- ↘ Slope
- tt Too tight
- Roof height change
- Assumed walls
- Airflow
- Airflow
- Gravel / cobbles
- Dirt / mud



Grid convergence 1.6 degrees 2015  
GDA94 grid 10.7mag degrees 2015



Scale: 1:200

Rho Hole  
ENTRANCE

Entrance  
gate

# New South Wales Speleological Council Update

Lachlan Bailey

This is just a short update for all Australian cavers from the New South Wales Speleological Council. For those not familiar with the NSWSC, it's the liaison body for all the ASF clubs in NSW and the ACT. It meets twice a year to discuss and coordinate over matters of interest for all ASF clubs in NSW and the ACT. It also elects an Executive to act on its behalf between meetings, currently led by Peter Dykes as President of the NSWSC.

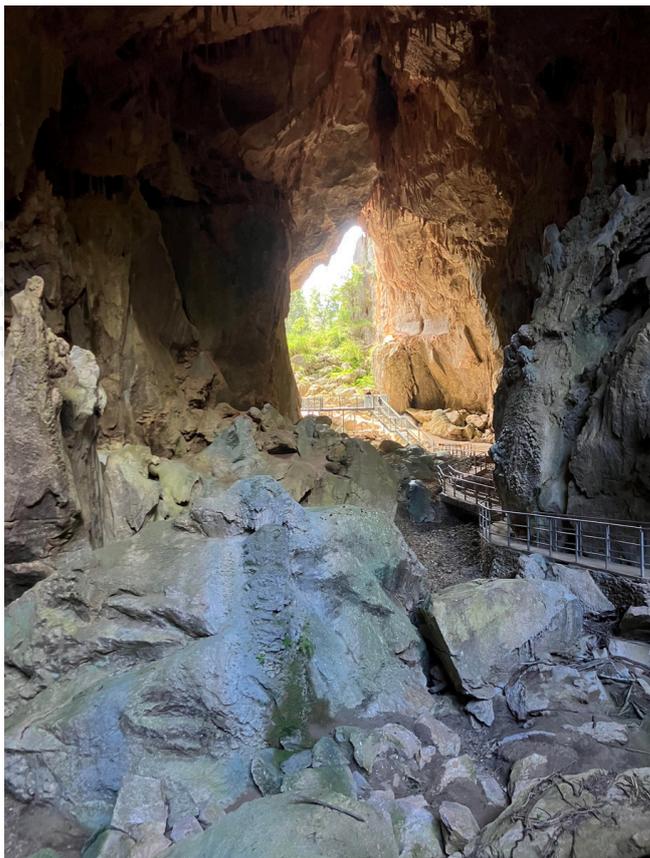


New visitors kiosk at Wombeyan Caves - Photo by Lachlan Bailey



Dip Cave Series 4 Main Chamber pitch. This is one of the two entrances that have had access restored, photo here from 2020. It is currently surrounded by temporary fencing, which will be upgraded to permanent fencing imminently -

Photo by Oxana Repina



Current fixed infrastructure in Victoria Arch, Wombeyan Caves - Photo by Lachlan Bailey

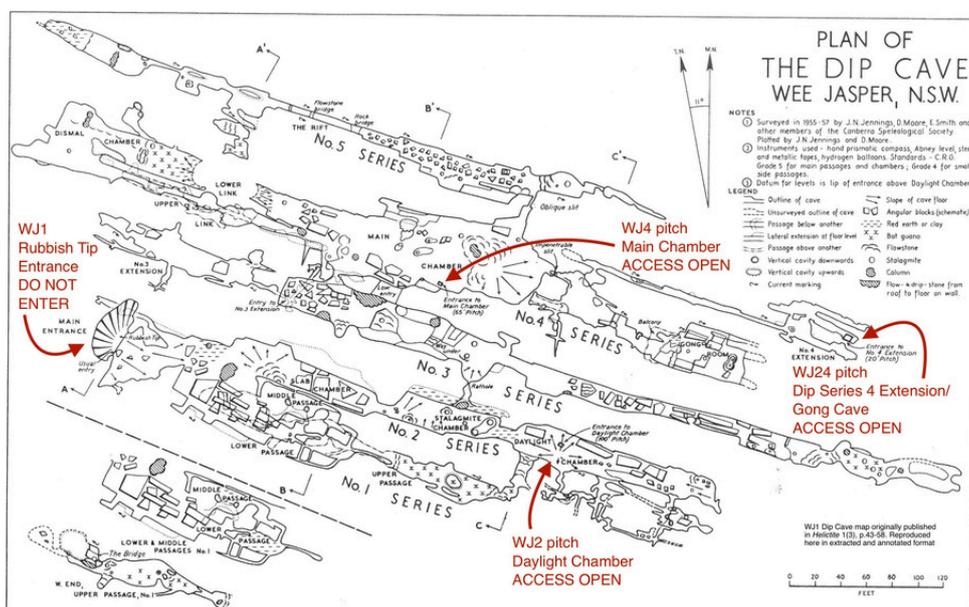
There's been a lot going on in NSW over the last 12 months. So, the NSWSC thought it'd be useful to do an outline of some of the major things that have been happening, so that all cavers were aware of them.

- Dip Cave, Wee Jasper: there's been running access issues surrounding entry to WJ1 Dip Cave at Wee Jasper since early 2020. NSW Crown Lands had closed all access to the cave due to concerns about asbestos contamination in the 'Rubbish Tip' entrance to the cave. This closure has been prolonged, and the NSWSC and its representatives have been pushing to ensure access to the cave is restored, and any works at the cave are conducted sensitively. Last year the NSWSC was involved in submitting a GIPA (NSW freedom of information) request to gain clarity on the current state of works there.
- The NSWSC is pleased to be able announce to all cavers that through our advocacy, access to Dip Cave through the two vertical entrances has been restored. These are the pitches into Dip Series 4 and Series 2. Unfortunately, access via the Rubbish Tip entrance remains closed, pending remediation of the asbestos contamination. NSW Crown Lands has accepted the NSWSC as an interested party to be consulted before any further works occur, so hopefully we will be able to ensure a sensitive outcome.

- Jenolan Caves: the NSWSC has a standing representative on the Jenolan Caves Stakeholder Reference group. Many thanks to both Stephanie Murphy and Justin Wilkinson, who have filled this role over the past few years. This role has provided much feedback on the infrastructure development occurring at Jenolan over the past few years. Recently, it has been tasked with providing feedback on alternative transport access options to Jenolan, focussing on aerial funicular, gondola and tramway options. The NSWSC representative has been advocating for the long-term continuation of the Stakeholder Reference Group, and an expansion of its scope to cover the entirety of the Jenolan Karst Conservation Reserve. Representatives of the NSWSC have also been active in supporting the Jenolan Cottage Association in seeking an extension of the current memorandum of understanding covering use of two of the Binda Cottages.
- Wombeyan Caves: the NSWSC would like to remind all cavers that access to permits at Wombeyan Caves has resumed. This is currently occurring under mostly the same conditions and process as was in place prior to closure of the Wombeyan Karst Conservation Reserve in May 2022. The NSWSC provided Wombeyan KCR management with significant feedback on the nature of their proposed works in 2022, as we had some significant concerns about the impact of the proposed works on the caves. At least some of our concerns have been addressed in the final outcomes, with the footprint and impact of the infrastructure in Victoria Arch being somewhat reduced. The NSWSC is focussing on trying to improve access to Wombeyan for cavers in this updated access environment.
- The term for the speleological representatives Kosciuszko Speleological Reference Group (KSRG) expired in early 2024. The KSRG's area of interest covers many of the major karst areas in southern NSW. The NSWSC would like to thank all the previous representatives for the time spent representing cavers on the KSRG. All four representatives wished to renominate, were nominated by the NSWSC to the KSRG, and accepted as continuing representatives. Their term is set for two years, until early 2026. The NSWSC would like to encourage any cavers interested in the Kosciuszko NP karst areas to consider putting in a nomination to the NSWSC for one of the positions when that period expires.
- The NSWSC has been conducting a review of cave and karst documentation responsibilities, as allocated to different clubs. This has been somewhat successful, updating details for a majority of karst areas. However, several karst areas have effectively lost documenters, and no longer have associated documentation. This has strongly highlighted the continuing lack of a widely accepted and accessible national cave and karst information database. The lack of interoperable capacity for collating cave information has become critical and it is urgent for change to occur at a national level.

This is only a short summary of five important developments related to the NSWSC. Plenty of clubs and cavers have been busy with their own projects, with science, training, documentation and exploration occurring at many NSW karst areas, both major and minor. That is, in itself, a separate and extensive article!

If you'd like more information on any of the items mentioned here, please feel free to contact the NSWSC Executive at [asf.caves.nswsc@gmail.com](mailto:asf.caves.nswsc@gmail.com).



Plan map of WJ1 Dip Cave noting access restrictions on the four major entrances to the cave

# We spent 2 years in deep underground caves to bring this extraordinary fossil to light

Tim Ziegler



Tim Ziegler with the fossil at Museums Victoria Research Institute.  
Photo by Tim Carrafa. Source Museums Victoria

Pitch-black darkness. Crushing squeezes, muddy passages, icy waterfalls. bats and spiders. Abseiling over ledges into the unknown. How far would you go for a fossil?

On a two-year retrieval mission of nearly 60 hours in an underground cave, we met our limits – and went beyond.

The limestone slope of Potholes Cave Reserve is found in Gunaikurnai Country, north of the township of Buchan in eastern Victoria.

Here, the river valley is peppered with shadowy entrances to underground caves. Portals barely large enough to permit a willing caver open into kilometres of subterranean passages encrusted with delicate crystals twinkling in torchlight.

In one of them, Nightshade Cave, the Museums Victoria Research Institute led a team of recreational cavers and Parks Victoria rangers to excavate an extraordinary fossil: a near-complete skeleton of the extinct short-faced kangaroo *Simosthenurus occidentalis*. In June this year, it will appear on display at Melbourne Museum.

## It started with an unusual skull

As is so often the case in palaeontology, the discovery began with engaged citizens out in nature. In 2011, a local caving group first entered Nightshade Cave through an opening previously blocked by soil. One of the group, Joshua Van Dyk, sighted an unusual animal skull.

Recognising its potential significance, he reported the find to Melbourne Museum. However, Van Dyk reckoned it was irretrievable, appearing to be crushed under boulders in a narrow vertical collapse. The cave was gated shut to protect its contents, and a decade passed quietly.

In 2021, I took an interest in the intriguing find. Members of the Victorian Speleological Association were only too happy to assist a return to the cave. Rigging a ropeline, we abseiled down a tight ten-metre rift, emptying our lungs to pass tight points in midair. We corkscrewed into a narrow passage and wormed, single-file, through low-domed chambers hung with dripping stalactites and plastered by popcorn-like calcite formations.

Descending deeper, the cave transformed into tall, narrow, clean-walled rifts, full of dark recesses. Hours passed as we circuited the passages, until a shout echoed around: found again! We scrambled to a chimney-like chute stacked with pinned boulders, to come eye to eye with an ancient.

On reaching it, I felt sudden grief: the beautiful fossilised skull had in the intervening years begun to collapse. It seemed that, despite its long survival, the fossil was newly vulnerable – from little more than the altered air currents and changing humidity caused by the new cave entrance.

We strengthened the exposed bones with protective resins, but exited the cave having left them in place: more time would be needed to plan their retrieval.



Palaeontologist Tim Ziegler retrieving fossil bones of *S. occidentalis* from Nightshade Cave. Photo by Rob French. Source Museums Victoria



Tim Ziegler holding a fossil bone from the *S. occidentalis* specimen. Photo by Tim Carrafa. Source Museums Victoria

### A painstaking retrieval

On our return trips, I carefully brushed away fine layers of mud and we photographed and packed the newly freed fossils. The skull had a deep muzzle, with robust jaws and teeth that marked it as a short-faced (sthenurine) kangaroo.

Behind it were more bones. It was a marvel to see vertebrae, shoulders and hips, limbs and a narrow ribcage: many of the bones were wholly undisturbed and still in their original positions. This was a single animal, not a random scattering of bones. It felt like a fossil holy grail.

A detailed comparison to fossils in the Museums Victoria State Collection gave our skeleton its identification as *Simosthenurus occidentalis*. Comprising 150 preserved bones, it is the most complete fossil skeleton found in a Victorian cave to date.

That it is a juvenile rather than adult kangaroo further distinguishes it from other examples of the species. Its teeth show little wear, its skull bones are still unfused, and its limb ends had not yet joined, suggesting it was still young at its time of death.

From the size of its limbs, we estimate it weighed around 80 kilograms – as much as an average person – but might have grown half as large again had it reached adulthood.



The fossil skeleton in a secluded alcove of the cave. Photo by Rob French. Source - Museums Victoria

### Australia's extinct megafauna

Short-faced kangaroos appear in Australia's fossil record from 10 to 15 million years ago, as widespread rainforests began to give way to drier habitats. They became particularly diverse during the shift toward our current arid climate in the later part of the Pleistocene Epoch, from around 500,000 years ago.

But in a pulse of extinction around 45,000 years ago, they vanished across the continent, along with up to 85% of Australia's megafauna. Radiocarbon dating by the Australian Nuclear Science & Technology Organisation dated the skeleton's burial to 49,400 years ago. This means our *S. occidentalis* was among the very last of its kind.

Today, the hills of eastern Gippsland host a precious population of the brush-tailed rock-wallaby, a vulnerable species. Once, they shared the country with larger kin.

A key idea under investigation is whether sthenurine kangaroos walked with a striding gait, rather than hopped. The skeleton we found has a uniquely complete vertebral column, providing new insights we couldn't get from isolated bones. With the benefit of detailed 3D models, this near-complete skeleton can also be studied from anywhere in the world.

This fossil, along with others from Nightshade Cave, is now housed and cared for in perpetuity at Melbourne Museum. Through Museums Victoria Research Institute, we can preserve a link to its once home of East Gippsland, while opening a door to global research.

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The fossil skeleton of *S. occidentalis*. Photo by Tim Carrafa. Source Museums Victoria



The fossil skull of *S. occidentalis*. Photo by Tim Carrafa. Source Museums Victoria



Tim Ziegler with the fossil at Museums Victoria Research Institute. Photo by Tim Carrafa. Source Museums Victoria

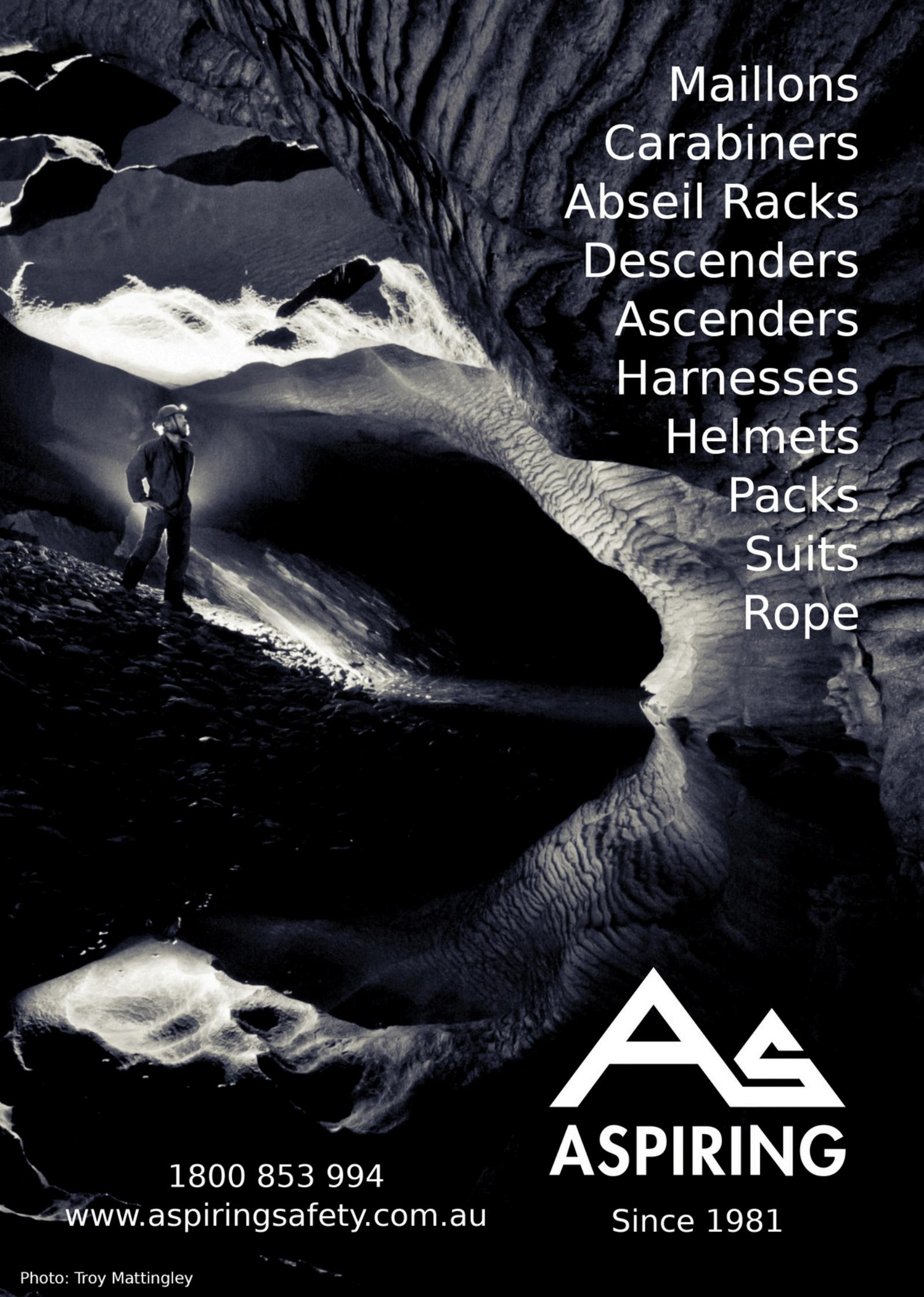
## *Simosthenurus occidentalis*

WHOLE BODY RECONSTRUCTION  
ADULT - LATERAL VIEW



TRUSLER 2024

Artistic reconstruction of *Simosthenurus occidentalis*.  
Art by Peter Trusler. Source Museums Victoria

A black and white photograph of a person standing in a cave. The person is wearing a helmet and a jacket, and is looking towards a waterfall. The cave walls are textured and the lighting is dramatic, highlighting the person and the waterfall.

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