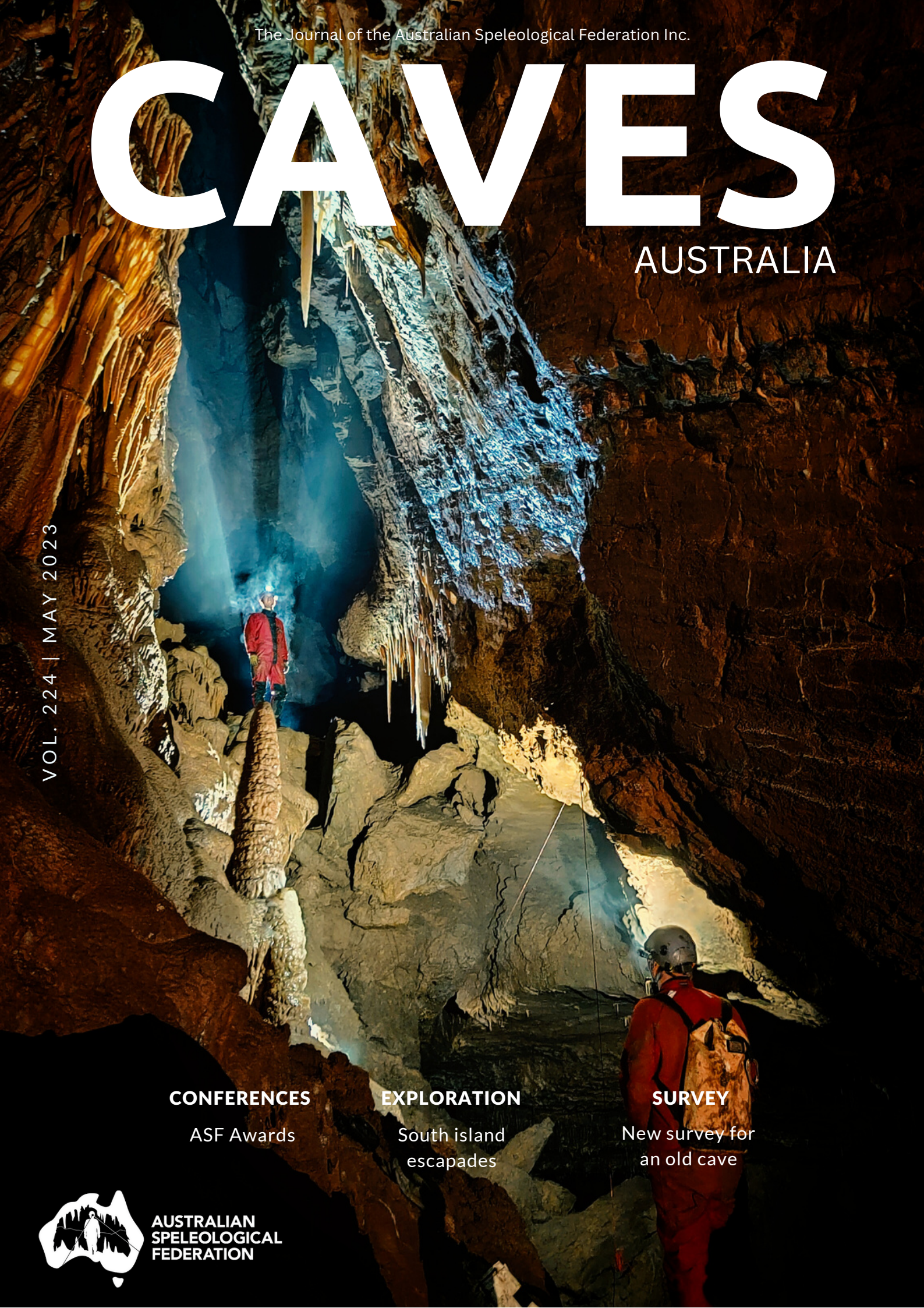
The Journal of the Australian Speleological Federation Inc.

CAVES AUSTRALIA



VOL. 224 | MAY 2023

CONFERENCES

ASF Awards

EXPLORATION

South island escapades

SURVEY

New survey for an old cave

AUSTRALIAN SPELEOLOGICAL FEDERATION

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CAVES
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CAVES AUSTRALIA IS THE JOURNAL OF THE AUSTRALIAN SPELEOLOGICAL FEDERATION INC. AND IS PUBLISHED QUARTERLY.

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EDITORIAL CONTRIBUTIONS ARE WELCOME! FOR CONTRIBUTOR GUIDELINES, CONTACT THE PRODUCTION MANAGER.

ADVERTISING
CONTACT THE PRODUCTION MANAGER FOR COMMERCIAL, CAVING COMMUNITY AND CLASSIFIED RATES. RATES RANGE FROM $5 TO $400 FOR FULL PAGE MONO BACK COVER. DISCOUNTS APPLY FOR PLACEMENTS OF 4 ADVERTS AND AN UP-FRONT PAYMENT.

ISSUE DATES FOR 2023
FEBRUARY, MAY, AUGUST, NOVEMBER

MAGAZINE SUBSCRIPTION
DIGITAL *CAVES AUSTRALIA* IS INCLUDED WITHIN ASF MEMBERSHIP FEES.

COVER: PHOTO BY NADINE MURESAN - TOM ELMS AND NIGEL COOKE AT SCRUBBY CREEK CAVE, BUCHAN, VIC

Photo by Nadine Muresan
in Kubla Khan TAS

No. 224 May 2023
Australian Speleological Federation Inc.
PO Box 388 · Broadway · NSW 2007 · www.caves.org.au
ABN 15 169 919 964
ISSN 1449-2601 · Registered Publication NBQ0005116

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Photo by Janice March - Helictite, Paragon Vaults Herberts Pot, Mole Creek

Photo by Janice March - Ice Maiden, Paragon Vaults Herberts Pot, Mole Creek

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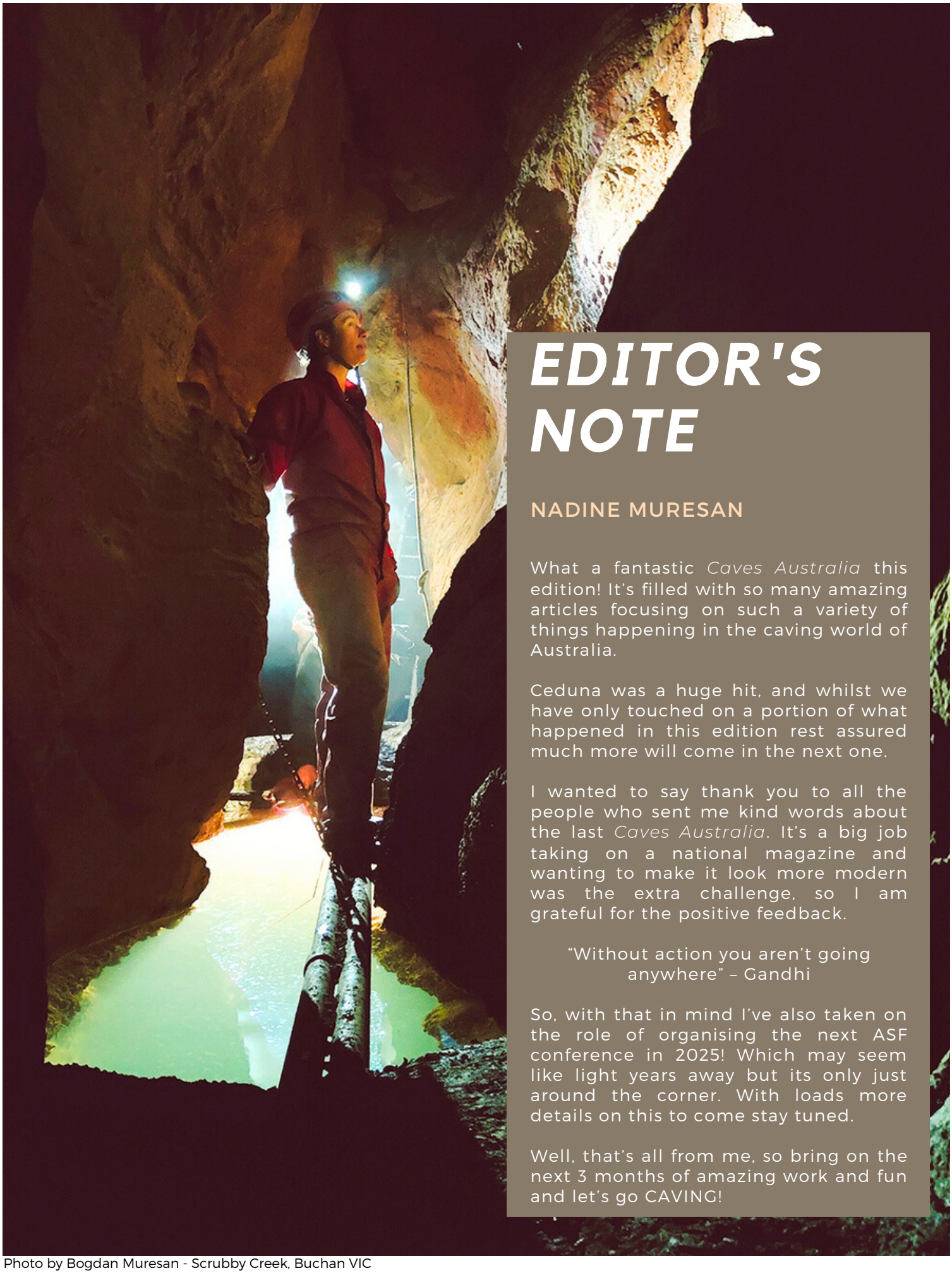
It's Tax time and remember that donations to the Karst Conservation Fund are Tax deductible!
The KCF requires donations to continue to fund projects such as the Cave Animal of the Year, bat studies, cave cricket studies and the White Nose Syndrome University linkage study.
You can easily donate to the KCF by using any of the methods shown on the donate page of the KCF at:
https://www.caves.org.au/conservation/karst-conservation-fund/donating-to-the-fund



EDITOR'S NOTE

NADINE MURESAN

What a fantastic *Caves Australia* this edition! It's filled with so many amazing articles focusing on such a variety of things happening in the caving world of Australia.

Ceduna was a huge hit, and whilst we have only touched on a portion of what happened in this edition rest assured much more will come in the next one.

I wanted to say thank you to all the people who sent me kind words about the last *Caves Australia*. It's a big job taking on a national magazine and wanting to make it look more modern was the extra challenge, so I am grateful for the positive feedback.

"Without action you aren't going anywhere" – Gandhi

So, with that in mind I've also taken on the role of organising the next ASF conference in 2025! Which may seem like light years away but its only just around the corner. With loads more details on this to come stay tuned.

Well, that's all from me, so bring on the next 3 months of amazing work and fun and let's go CAVING!

Photo by Bogdan Muresan - Scrubby Creek, Buchan VIC

PRESIDENT'S REPORT MAY2023

Photo by Alan Pryke - Prostrate Pit

Sarah Gilbert
President

Congratulations to everyone involved in making the recent ASF Conference in Ceduna such a success. After several years of disruption and postponement, it was wonderful to see so many people able to attend. Hosting a conference in a remote area is a regrettable logistical challenge, but it was impressive how far people travelled to reach Ceduna, from WA, far North Queensland, Tasmania and even from Slovenia! Conferences bring together cavers from all over the country and friendships were reacquainted and new ones made. For me it was lovely to meet so many people for the first time, and to finally put faces to names within the ASF.

One of the lasting impressions of the past few weeks for me was a wonderful reminder of the generosity of cavers to help and the strong community within the ASF. Caving is always a team effort and attracts people who are always willing to contribute. This was on full display in Ceduna.

Firstly, congratulation to the organising committee who worked so hard to make the conference a success and overcame all the setbacks and disruptions caused by the covid pandemic. The organising committee had a long task list during the conference, but the event would not have run so smoothly without the help of others.

A huge thank you to everyone who spontaneously stepped up to help – to clear and wash dishes, set up the venue, move furniture around, and for the final pack up and cleaning. The generosity didn't stop in Ceduna but continued into the field trips on the Nullarbor – those who took on passengers, helped transport gear, shared food and a glass of wine, and who took time to lead trips and show people the highlights of the Nullarbor caves. It may be a cliché but it's the small things that make a big difference.

Congratulations also to all the recipients of ASF Awards which were announced at the Ceduna Conference and are given out in recognition of outstanding contributions to Australian caving (see full details in this issue). Having been four years since the last conference, there were a record number of nominations and awards given. Congratulations especially to Bob Kershaw on becoming a Fellow of the ASF, in recognition of his lasting contribution to the ASF and cave exploration in Australia. This award is rarely given, with Bob being the 13th in the history of the ASF.

As well as the formal ASF Awards, congratulations to the recipients of Certificates of Appreciation, awarded by the ASF Executive. There were given to Clare Buswell, Alan Jackson, Cathi Humphrey-Hood and Janine McKinnon in recognition of the huge contributions they have made in the past few years to the ASF Commissions and Executive. Certificates of Appreciation were also awarded to the core Ceduna conference organising committee for keeping on though the pandemic: Dee Trewartha, Heather Duff, Kaiah Fisher, Sarah Gilbert, Sil Iannello, Peter Kraehenbuehl, Pam Payne, Damien Pilkington, Heather Siebert, Matt Smith, and David Mansueto.
Congratulations to everyone!

ASF AWARDS 2023

Miles Pierce - Awards Commission Convener
Photos by Garry K. Smith

During the Caver's Dinner event at the 32nd ASF Conference in Ceduna, April 2023, the president, Sarah Gilbert, announced the following awards and presented them to the awardees or a representative.

Bob Kershaw – Fellowship of the ASF

'For service to the Australian Speleological Federation over a long period of time'
Specifically for:
·Being a highly productive member of the ASF Executive (2009-2021) including service as General Secretary and Treasurer
·Initiating several updates to the ASF Constitution in line with legislative changes and registering the ASF with the Australian Charities and Not-for-profit Commission
·Convening the Galong ASF Conference 2014 and supporting the organisation committee for the UIS Congress 2017
·Extensive contribution to exploration and documentation of caves in the Bendethra, Bullita and Kimberly regions
·Long term service to Illawarra Speleological Society
Acclaimed by the ASF Council: 8th January 2023

Peter Bannink – Edie Smith Award

'For outstanding service to Australian speleology over a long period of time'
Specifically for:
·Extensive exploration in the Northern Territory, Western Australia and Queensland, including in the Fergusson River, Katherine, Gregory National Park, Ning Bing Ranges and Cape York regions
·Being the Northern Territory and Queensland karst numbering coordinator and for extensive record keeping
·Long term services to Top End Speleological Society and Chillagoe Caving Club

Andrew Baker – Award of Distinction

'For recognition of especially notable contributions to speleology'
Specifically for:
·Being a long-term active member and Deputy Captain of the NSW Cave Rescue Squad
·Coordinating major training exercises for CRS
·Strengthening ties between the CRS and the NSW Emergency Services
Long term services to Newcastle and Hunter Valley Speleological Society

Stephen Fordyce – Jeff Butt Award of Distinction for Cave Exploration

'For recognition of especially notable contributions to speleology'
Specifically for:
·Extensive exploration of caves in the *Junee Florentine* area, Tasmania, including cave diving to connect the Niggly Cave and Growling Swallet systems.
·Making technical advancements to increase understanding of cave hydrology in the area
Leading the team who made the Australia cave depth record (-401 m) in Delta Variant cave,

Susan White – Joe Jennings Award of Distinction for Cave Science

'For recognition of especially notable contributions to speleology'
Specifically for:
·Research on the formation of caves in the Bats Ridge karst, western Victoria
·Research into the karst of the Otway Basin, in particular at Glenelg River, Victoria, and Naracoorte, South Australia
·Characterisation of novel flank margin caves and speleothems in the caves of the Nullarbor
Joint editor of the book *Australian Caves and Karst*, 2023

John Brush - Peter Berrill Award of Distinction for Cave Conservation

'For recognition of especially notable contributions to speleology'
Specifically for:
·Campaigning for protection of Yarrangobilly Caves area, NSW
·Advocating for protection of the Coolamon Plain karst in Kosciusko National Park, NSW
Services International Union of Speleology in the area of vulcanospeleology

Melissa Hadley – Certificate of Merit
For valuable services on the Executive of the Newcastle and Hunter Valley Speleological Society and editing of the Newcaves Chronicles

Kim Van Dyk – Certificate of Merit
For significant contributions to exploration in the Buchan-Murrindal area of Victoria over a long period of time, and for contributions to palaeontology and speleological science

Greg Thomas – Certificate of Merit
For significant contributions to exploration especially Easter Cave, WA and on Christmas Island, for commitment to cave conservation, and long-term leadership roles in the Western Australian Speleological Group

Janice Marsh for Significant service to cave rescue organisation, planning and training in Northern Tasmania

Awardees of the ASF Certificate of Appreciation

Fancy dress at the ASF Conference 2023 - Cavers Dinner

CAVING IN THE **MOON**LIGHT

33rd ASF Conference - Buchan Victoria

Sunday 12th January - Saturday 18th Janurary 2025

DATES Sunday 12th January 2025 - Welcome BBQ
Monday 13th - Saturday 18th presentations, caving, speleo sport, skills and much more.

ACTIVITIES A range of local activities will be available during the conference. Kayaking on the Snowy River, zip lines, biking, horse riding and beautiful walks.

COMPETITIONS We will be offering a wide range of categories for showing off your best photographs from around Australia. There will also be a surveying competition for people to show off their best maps.

Photo by Nadine Muresan - Deb Hunter in Scrubby Creek VIC

Photo by Nadine Muresan - Bogdan Muresan and Tom Elms looking over Pot Holes VIC

Photo by Nadine Muresan - Overlooking Buchan VIC

With excitement and anticipation we announce the biennial 33rd ASF conference will be held in Buchan, Victoria from the 12th – 18th January.

Buchan is in the East Gippsland region of Victoria, Australia. The town is adjacent to the Buchan River and a short journey to the Snowy River. Buchan is best known for its caves and has a rich history which is older than the first discovery of the caves themselves.

With many more details to come, we can't wait to host and show you around a beautiful location filled to the brim with caves of all shapes and sizes. Can't wait for you to join us for speleological fun and adventure.

Photo by Nadine Muresan - Tom Elms in Scrubby Creek VIC

Photo by Nadine Muresan - Tom Maggs in Smelly Pot, Pot Holes VIC

Photo by Nadine Muresan - Lily Stewart heading into Goanna, VIC

An Australian's Report of the NZ National Deep Cave Rescue Exercise, followed up with a good dose of expedition caving, 9-26 March 2023

SOUTH ISLAND ESCAPADES

Ciara Smart

Accompanied by: Karina Anders, Jemma Herbert, Ciara Smart (Southern Tasmanian Caverneers), Keith Chatterton, Alex Williams, Kristin Wills (RMIT Outdoors Club), Marcus Thomas (Wellington Caving Group), David Ellacott (Auckland Speleo Group) and many others

New Zealand National Deep Cave Search and Rescue Exercise

Every three years the New Zealand Speleological Association runs a national rescue exercise. This year the exercise was run in Bulmer Cavern, NZ's longest system at 76km and counting. The patient was extracted from roughly -300m in an exercise running continuously from 7am Friday until 10pm Saturday. New Zealand has a dedicated Cave Search and Rescue organisation (CaveSAR). With police support, CaveSAR coordinated the involvement of over 90 participants. I attended the exercise with two others from my club, Karina Anders and Jemma Herbert, and fellow Australians Keith Chatterton and Alex Williams.

On the 10th of March, we arrived bright eyed at the rescue exercise's headquarters. The novelty factor was engaged early, with helicopters being used to ferry dozens of cavers and tonnes of equipment up to the cave entrance. Although the flight was only five minutes, it enabled us to take in the spectacular landscape, with vast slabs of marble exposed on steep alpine mountainsides. We landed at Forward Base, stationed at Bulmer Lake. We were directed to set up tents and rest until called upon as there were already sufficient rescuers underground. This exercise is run very realistically, with teams waiting on the surface until 'tasked' and others sleeping in situ underground during the mandatory break of 1-4am.

Top photo by Ciara Smart - Bulmer Lake
Middle photo by Ciara Smart - Sweet Merch
Bottom photo by Ciara Smart- rescue

Photo by Ciara Smart - Rescue Stretcher

Jemma was called up at 7pm, while Karina and I were not jolted from sleep until 4am. We were placed in a team with fellow Australian Keith Chatterton. We walked to the cave entrance in darkness, hearing keas keening in the pre-dawn stillness. It took us about ninety minutes of easy caving to reach the stretcher. The caving was straightforward, with almost no crawling and no mud! There were many short pitches, most of which had permanent fixed ropes. By the time we reached the stretcher, it was in a chamber where most of the underground teams had spent their compulsory three-hour 'sleep.' Here we met Jemma who reported that it had been a very cold night with most cavers sleeping poorly, even if the thirty cavers squeezed into the small chamber had raised the temperature from 3 to 5˚C. By now (7am Saturday), the exercise had been running for 24 hours. We had a hot breakfast and picked up the stretcher. Each team had a specific task: some teams were tasked with rigging technical sections, others with communicating through the Michie phone, and others with stretcher bearing. All of this was under the supervision of an 'Underground Controller' who swapped out periodically.

We had multiple hours of stretcher bearing, passing several hauls, lowers and Tyroleans (or 'tiroll-e-ans' in Kiwi language). It was interesting to observe the Kiwi's slightly different approach to rescue rigging. Generally, they rigged dual systems off independent anchors, meaning there were two loaded ropes in the system, each capable of completing the task should one rope fail. Overall, their rigging was generally more redundant and arguably safer than the lightweight Tasmanian style, but much slower to install and requiring much more equipment. To an extent these differences can be explained as a function of their greater resourcing and available manpower. We were also introduced to the revolutionary piece of equipment that is a Petzl 'Pulse' bolt. This is an expansion bolt that is far easier to install and remove than fighting with a spanner and concrete screw, although unfortunately they are vastly more expensive.

As the exercise wore on, teams were switched up and tired cavers were replaced with fresh arrivals. Due to time constraints, we skipped one section, enabling us to make the exercise cut-off of 10pm. The next day we were flown off the mountain, followed by full police debrief. The three of us were very pleased to attend this exercise and we took away many pertinent lessons, in addition to some valuable merchandise in a Macpac down jacket! If we ever experience a rescue in a deep vertical system in Australia, we will likely have to call on the New Zealanders for support, so it's important to establish some reciprocal familiarity.

Photo by Ciara Smart - rescue

Photo by Jemma Herbert

EXPEDITION CAVING AT NORTH OWEN

Ciara Smart

A few days after the exercise we took another chopper back up the mountain. We were shocked by the ease of coordinating helicopters, and their relative cheapness. We planned to spend a week searching for new caves on the northern slopes of Mount Owen, then to spend a week exploring in Bulmer Cavern, basing ourselves deep underground at 'Camp 2.5.' We established a bivvy in a large overhang where we were introduced to a flightless bird known as a 'Weka.' Wekas seem to be the Kiwi version of the Tasmanian native hen (aka the Turbo Chook). Initially we were endeared by their brazenness, but their kleptomaniac tendencies quickly became irritating as they attempted to remove anything remotely portable, including carabiners and random items of clothing.

We spent a few days on the surface descending countless vertical shafts, all of which were frustratingly blind. Our lack of success was alleviated by the sheer beauty of the alpine landscape, with dolines in every direction and no scrub to be seen! The scene in Lord of the Rings where they escape the Mines of Moria was filmed in this area.

At the end of three days of glorious but fruitless prospecting, Alex found a promising entrance with a howling pitch. We spent the next day waiting out some poor weather in a nearby hut. Feeling a bit restless, various caving games were instigated, including the infamous cereal box game. As a result, several of the team had to spend the next day nursing self-inflicted injuries, leaving just Jemma and I for the initial push.

We descended the first 40m pitch in an almost clean drop, and to our delight the cave went and went! Over the next few days, everyone got involved and we pushed the cave down to a surveyed depth of -130m, with the cave becoming more spacious and promising with every pitch. Inevitably we ran of time and left it unfinished, despite every indication that it was a goer! Hopefully we'll have another crack next year. We christened it 'Bloody Box Game,' as a nod to overzealous participation.

Photo by Ciara Smart - chopper load

Photo by Ciara Smart - Jemma with chopper load

Photo by Ciara Smart - Helicopter Load

Photo by Alex Williams- Mt Owen Landscape

Photo by Ciara - Jemma in camp kitchen

Photo by Keith Chatterton

Photo by Alex Williams- Camp 2.5

Photo by Ciara - dinner at camp 2.5

Photo by Ciara - Camp 2.5

Photo by Ciara- Karina looking at formations in 'The Soup-Mix'

Bulmer Through Trip

Ciara Smart

We were so captivated by Bloody Box Game that we'd decided to shorten our time in Bulmer Cavern to just three days. On the 22nd, we entered the 'Castle Keep' entrance of Bulmer and descended 500 vertical metres of fixed pitches to 'Camp 2.5.' This is a semi-permanent camp with stashed equipment, so called because it is between Camp 2 and 3. The camp is in a cosy and dry chamber with a boulder table and a surprisingly comfortable rock sofa, all making for an unusually enjoyable camp experience (at least compared to southern Tasmanian caves). The stashed sleeping bags only exuded the faintest whiff of sweat and cheese. The caving in Bulmer was extremely pleasant, with very little crawling or squeezing, and no mud whatsoever! While the air temperature is only 3˚C, it is extremely dry, making it much easier to manage body temperature here than in the caves of Southern Tasmania, which are about 6.5˚C, but wet and muddy.

On our middle day in Bulmer, I went with Keith and Alex to push the 'Snagglepuss' streamway while the others opted for a tourist day. Our attempts to survey were complicated by the unusually high volume of water, which made it impossible to stay dry on the numerous pitches rigged through waterfalls. We persevered until the 3˚C air temperature became too excruciating in our soaked suits. Fortunately, as we called it a day, Alex was able to confirm that the streamway was a dead end.

It took a full day to exit the system which involved negotiating many fixed ropes and several extended traverses. Along the way we were treated to some spectacular decorated passages. We exited via 'Eye in the Sky,' a gaping hole in an almost sheer mountain slope. From there we had to pick our way down a series of cliff lines to the valley floor, no easy feat in the dark. As a result of a retrospectively amusing mix-up with the keys, we spent the night camped beside the cars.

Finishing up with a respectable quantity of survey under our belts, many giggles shared, and one nagging unfinished project to leave behind, we can call the trip a great success. And we finally understand the fuss about Bulmer Cavern which fully deserves its reputation as an exceptional vertical caving destination.

Morphology of Speleothems and Calthemites influenced by man-made structures and biota

Written and photos by Garry K. Smith - NHVSS

At a glance stalactites, flowstone and other calcium carbonate secondary deposits in limestone caves (speleothems) and those growing beneath man-made concrete structures (calthemites), have a similar appearance, however the chemistry involved in their creation is very different. Because of this, straw stalactites can grow several hundred times faster under concrete structures than those in caves.

There are many factors that can influence the size, shape and growth rate of these calcium carbonate secondary deposits. This short article looks at how man-made and biological objects in the solution pathway may be engulfed by the secondary deposit or influence the shape of the deposit.

Man-made objects may includes objects such as pipes, electrical wiring and glass bottles, whereas biological objects could be tree roots, bones and even objects as small as spider webs. Even microscopic organisms can influence the deposition of calcium carbonate. This article includes examples and draws comparisons between speleothems and calthemites.

Before delving into how the morphology of secondary deposits is influenced, it is pertinent to define the terms speleothem and calthemite to avoid confusion and provide greater context to the examples discussed.

Speleothems are secondary deposits formed in caves (Moore 1952). They typically take on the form of stalactites, stalagmites, flowstone, rimstone dams etc. and are most commonly composed of calcium carbonate ($CaCO_3$). Deposition of $CaCO_3$ speleothems occurs when carbon dioxide (CO_2) is degassed from solution. Straw stalactite longitudinal growth is quoted as between 0.2 and 2 mm per year (Ford and Williams 2007, p.291).

Calthemites are secondary deposits formed on or under man-made structures and are derived from concrete, lime, mortar or other calcareous material. They mimic the shapes and forms of cave speleothems. The sight of calthemite is a visual sign that calcium is being leached from the concrete structure and the concrete is gradually degrading. Calthemites are usually composed of calcium carbonate and deposition occurs when CO_2 is absorbed from the air into solution. Straw stalactite longitudinal growth can be up to 2mm per day with ideal conditions (Smith 2016, 2018).

The reactions depositing $CaCO_3$ speleothems and calthemites are distinctly different. The creation of speleothems is commonly associated with near neutral pH to mildly alkaline solutions (pH 7.5 – 8.5) as opposed to calthemites that are usually associated with hyperalkaline solution (pH > 9) and is typically as high as pH13. The chemistry is covered in detail in the paper by Smith (2016).

Fig 1 - Calcite on Chicken Wire - Harry Woods Cave Yarrangobilly June08

Fig 2. Calcite encased bottle placed 1958, next to a stalagmite, Mollochs Chamber - Temple of Baal, Jenolan NSW

Fig 3. Calcite covered treacle tin, Ribbon Cave, Jenolan NSW

Fig 4. Calcite over the power cables in Hill Cave, Abercrombie, NSW

Fig 5. Calthemite deposits on electrical wiring under building

Fig 6. Calthemite flowstone and straws on pipework

Even with ideal conditions to create both types of deposits, calthemites can grow 300 to 400 times faster than speleothems. However, in both reactions the $CaCO_3$ is usually deposited as calcite, which is the most stable polymorph, as opposed to aragonite and vaterite that are less stable.

Calthemites also form in man-made tunnels and mines, excavated into limestone or other calcareous rock. In these circumstances the secondary deposit of $CaCO_3$ may be derived from the calcareous rocks (not concrete), so the chemistry creating these calthemites is the same as speleothem deposition in limestone caves. To avoid confusion this type of calthemite is not dealt with in this article.

The definition of speleothems is very specific in that they are secondary deposits formed in natural caves, whereas calthemites are secondary deposits occurring in, or on man-made structures 'outside' the cave environment.

Parameters influence the morphology of $CaCO_3$ deposits

Speleothem and calthemite straw stalactites typically have a relatively uniform shape, growing vertically down from an attachment point on a roof or ceiling and they generally have a relatively constant outside diameter about the size of a drop of water. Other parameters may cause variations, e.g. changes in diameter due to variations in solution supply, and bending as a result of air movement in a constant direction over a period of time. The straw growth will stop if the solution canal becomes blocked and a helictite may start growing from the straw if a microscopic weep hole forms. There are obviously many variables that can change the morphology of $CaCO_3$ secondary deposits.

As detailed in (Smith 2021a,b) a calthemite straw stalactite's external diameter can vary as a result of the solution drip rate and relatively fast longitudinal growth rate. On the other hand changes in speleothem straw diameter occur less frequently because their very slow growth rate averages out seasonal changes in the drip rate, so there is less chance of an external diameter change.

The deposition of flowstone is another example where the shape of a secondary deposit is influenced by many factors including: slope of the surface on which deposited, flow rate of solution, solution saturation, evaporation and gas exchange causing deposition etc. The creation of shawls would be another example where shape and thickness is influenced by many parameters. Essentially all secondary deposits are subject to influencing parameters when being created.

Morphology influenced by man-made structures

Cave speleothem morphology and deposition can be influenced greatly when man-made structures and objects are introduced. For example: electrical wiring, handrails, protective barriers, fencing and other objects. Some examples are depicted in Figs 1 to 4. The speleothems cover objects where the drips fall or along the path where solution flows. However in caves this may take many years.

The same process can be said of calthemites forming under man-made structures. These secondary deposits take on similar forms to those in caves when such things as electrical wiring and pipes are encountered. (Figs 5 and 6). These deposits on the other hand can occur in just a few weeks or months.

Fig 7. Calthemite stalactite attached to electrical wiring

Fig 8. Calthemite column & stalactite on electrical wiring

Fig 10 - Calthemite straw shape influenced by Spider web

Such calthemite deposits can engulf obstacles. Examples include a calthemite stalactite hanging from electrical wiring and a column attached to electrical wiring and then forming a stalactite beneath (Figs 7, 8).

Influence of biota

Biota in caves can have a significant affect on the shape of speleothems. Take for example rootsicles in caves where the deposition of calcite covers tree roots, refer to article in *Helictite* No. 47 (Smith 2022). Rootsicles can vary greatly in size from a few centimetres to several metres or more in height (Fig. 9). Calcite can be deposited over roots hanging from the cave roof or in some cases roots growing vertically up from the cave floor. In all cases they are considered to be rootsicles.
There are many other biological objects such as bones, bat guano and flood debris etc, that can be coated by secondary deposits in caves.

Often what is not considered is that even small creatures can influence the deposition of calcium carbonate. Calthemite straw stalactites can be greatly altered by webs made by small spiders. The spider webs in figures 10 and 11, have caused the straws to change direction, as the solution drops engulf a thread and follows it downwards.

The surface tension pulls the drop to one side so as to follow the path of the web. A solution drop that has latched onto a spider web may run down it until meeting a junction of webs where it is held by the solution surface tension in contact with the web. Calcite deposition from the solution then begins to create a stalactite suspended by the spider webs (Fig 11). Even a falling solution drop may be captured by a spider web and begin creating a suspended stalactite (Fig 12, 13). Literature searches did not find any reports regarding the influence of spiderwebs, suggesting that this may be the first time it has been observed.

Even at a micro scale, one method causing deposition of calcite as moonmilk in caves has been reported as being associated with the life cycle of microorganisms and bacteria (Hill and Forti 1997). It should be noted that Hill and Forti, list four origins of moonmilk and state that it is usually composed of calcium carbonate or other carbonate minerals, but can also be less frequently formed from other minerals.

The influence of biota surrounding the deposition of calcium carbonate, particularly in caves, is a diverse subject and there are other examples such as mosses and algae not covered here.

Conclusion

In both speleothems and calthemites, the morphology of calcium carbonate deposits can be influenced by a number of parameters, such as the supply of solution, evaporation, CO_2 exchange, air movement and site of deposition. Manmade objects in the path of solution can also influence the morphology of secondary deposits, however the influence of biota should not be overlooked.

Even small creatures such as spiders, by creating webs can influence the deposition of calthemite straw stalactites. The chance of this occurring in cave speleothems is greatly reduced as spider webs may degrade before there is a chance of calcite deposition along the web. Spider webs influencing the shape and deposition of calcium carbonate from solution may only be a feature that can be observed with calthemites, because deposition is hundreds of times faster than with speleothems.

Fig 11 - Calthemite straw shape influenced by Spider web

Fig 12. Calthemite stalactites and one forming on spider web

Fig 13 - Close up of calthemite stalactites growing on spider web

Acknowledgement

Thankyou to Katerina Fulton for checking the grammar in this article.

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New survey for an old cave
3M-99 Smelly Pot

Bogdan Muresan - VSA

Smelly Pot, (3M-99) is a cave located in the Potholes Reserve near Buchan in east Victoria. This is not a new discovery, the cave was discovered many years ago by members of the VSA. Legend says that on a certain occasion one of the members was trying to make a point on how easy it is to find caves in this area by stating, with a crowbar in he's hand: "You can find a cave anywhere you start digging in Potholes". Then he speared the crowbar in the ground where he was standing. To his disbelief and that of the others present, the bar went in all the way, almost dropping into the ground entirely. Then, with a little bit of digging they opened the entrance to the cave and explored down to -42m.

As part of a wider project of surveying, resurveying and expanding the cave database in the Buchan area, Smelly Pot has been surveyed in 2022, having not been surveyed previously by VSA. What follows is a description and a crude interpretation of forms based on field observation.

The entrance is situated on the east side of a small doline in the northern part of the Potholes Reserve. This doline appears to have developed as a solution doline, although at the moment the surface is covered in crumbled, collapsed bedrock, making it look more like a collapse type doline. The entrance pit is 10m deep and rather narrow in cross section towards the top but then it opens to about 3m wide at the floor level. This pit is lenticular in cross section and the walls have small sized scallops.

The cave has formed along six intersecting fissures. Three fissures running NW-SE and three running NE-SW intersect at approx. 90 degrees. At these intersections three main pits have formed: The Entrance pit - P10; the "Snappy anchor pit" - P8 and the Final pit - P9. These vertical sections are connected by steep slopes covered by angular rocks and boulders. The slopes' fall angles are consistent with the dip of the limestone bedding planes. This morphology can indicate a vadose origin or a vadose stage of these cave passages.

From the entrance down to about -25m deep, the cave walls are clean and the floor sediment consists of angular rocks of various sizes with the majority being under 10cm diameter. The entrance pit, in the top section, is covered by secondary mineral deposit in form of crust, most likely calcite. This crust is thinly covered by organic matter and moss. From -25m to about -37m, the walls and floor are covered in fine, sticky, wet silt and mud. This sediment appears to be coming from another direction and not from the entrance pit. At -30m, where the Final pit starts, there's a parallel pit to the east which then connects at floor level (-37m) with the Final pit. This pit, which we called "the Muddy pit" is larger in diameter than the Final pit and its walls and floor are covered in mud. This pit appears to be the initial course of the water, the older one which was then abandoned in favour of the Final pit. The Final pit is narrower and cleaner. It starts at the same level as the Muddy pit and after about 2m it forms a step, usually with a pool of water, and it narrows down to a lenticular form of under 1m across at its narrow section only to open back up to a large chamber at the base. Water is usually present and it drips down this pit to form a small puddle at its base. The walls here are dark in colour and full of fossils which makes the rock appear sharp and crumbly. Water coming down this way explains why there is no mud in this area. There is no water in the muddy pit. At the bottom of this pit, -37m, there is a large chamber developed along NE-SW direction that turns into a steep, narrow descent towards the SW. The water dripping down the cave walls flows this way and it appears to be the lead with most potential for pushing forward. At about -47m this section becomes too narrow for a caver to fit but it keeps going.

Photo by Nadine Muresan - First pitch

Photo by Nadine Muresan - Mud area

Cave morphometry notes

The length on this map has been calculated as the “combined length of all the centerline segments that constitute the framework of the entire integrated passage system”. This is how Klimchouk defined “cave length” in his "Morphometry of caves" (Klimchouk, 2004) article. This has been calculated by a mixture of plan, profile and survey legs measurements. The length on this map is not the survey length. The survey length exceeds the actual length because the survey centerline or survey leg does not follow the passage centerline or the line along the centre of the passage.

The Denivelation was measured as the vertical difference between the zero point and the lowest point reached in the cave. The zero point is the lowest part of the highest entrance. This cave having just one entrance the zero point was chosen on the lowest side of that entrance.

References

Klimchouk 2004, Morphometry of caves, in Gunn, J. (Ed.) (2004) *Encyclopedia of Caves & Karst Science*, p1121-p1125

Photos by Nadine Muresan - Snappy anchor pitch

Photos by Nadine Muresan - Final pitch

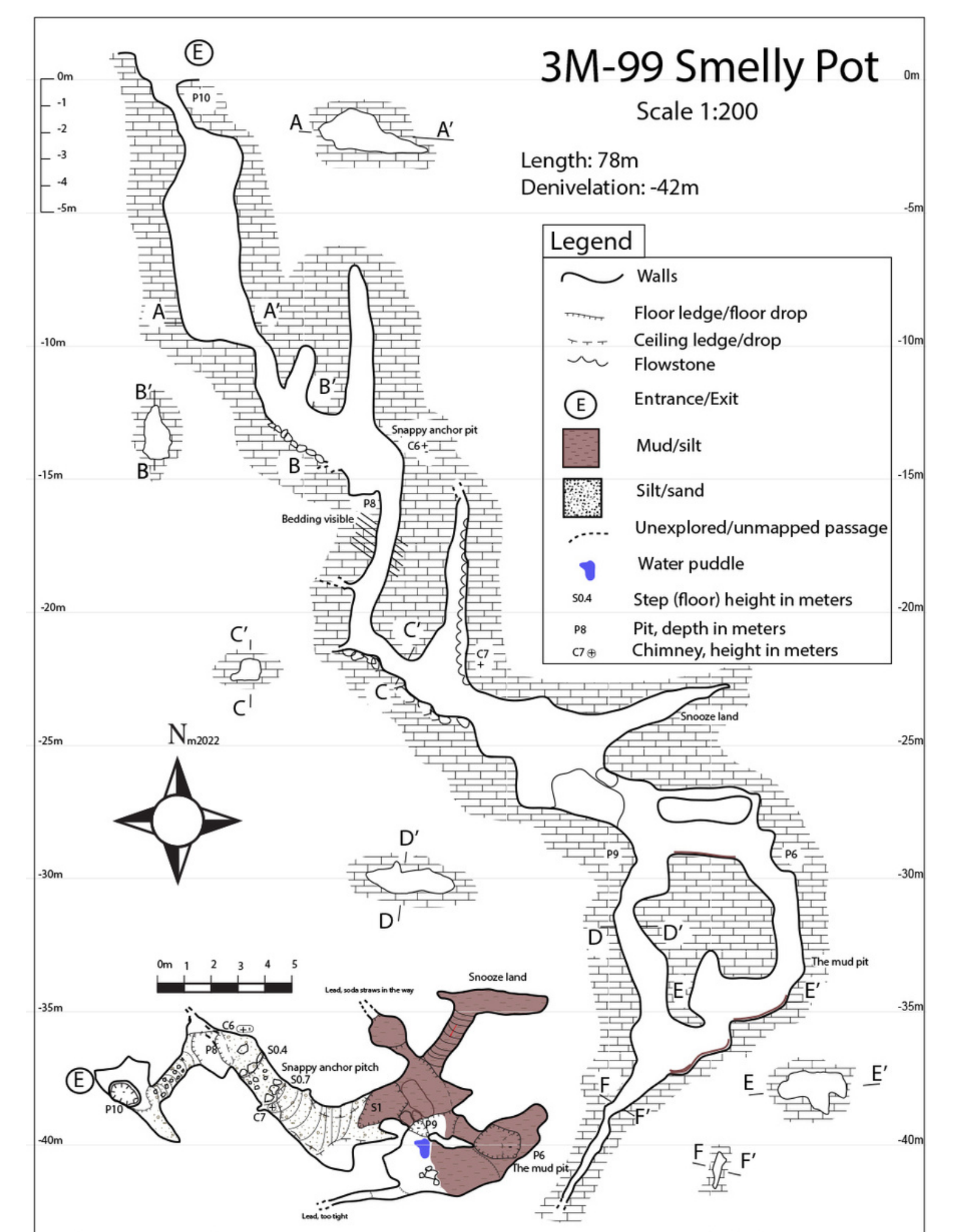
Photos by Nadine Muresan - Bedding visible, bottom of the first pitch

Photos by Nadine Muresan - Lower section

3M-99 Smelly Pot

Scale 1:200

Length: 78m
Denivelation: -42m



Plan view Scale 1:200

Extended elevation view

Survey by: Bogdan Muresan, Nadine Muresan, Thomas Maggs.
Cartography by Bogdan Muresan. 2022
ASF Grade 65C

Herberts Pot Conservation and Mapping Projects

STEFAN EBERHARD

PHOTO BY STEFAN EBERHARD "HOLY HELL"
MODEL IS STEPHEN JACOBS

Summary

Herberts Pot is one of Australia's classic caves. It has very high speleological and conservation values. The cave has been closed and inaccessible to speleologists for 25 years. This situation is finally changing with the development of a Cave Access Policy (CAP) and Zoning Statement (ZS) by the Parks and Wildlife Service (PWS) who manage the cave. The CAPZS has been developed by PWS with strong involvement of Tasmanian cavers, who have worked together under the broad ambit of the Herberts Pot Conservation Project. The Project is a collaborative initiative formulated under the umbrella of the Tasmanian Speleological Liaison Council (TSLC) whose participating member clubs include the Northern Caverneers, Mole Creek Caving Club, and Southern Tasmanian Caverneers. Cavers volunteered their time and speleological expertise to facilitate the CAPZS process and re-opening of access to the cave. In addition to cave conservation and rescue pre-planning, the project included a major mapping initiative. The Herberts Pot Mapping Project, in turn, was fed into a larger scale mapping project encompassing all the caves which make up the subterranean drainage system of the Mole Creek catchment (see following article). The major motivation behind both mapping projects was to create an integrated digital model of the Mole Creek karst system, to improve understanding and visual appreciation of its extent, complexity and significance.

Background

Herberts Pot was named after Herbert Howe (Figure 1) who previously owned the Mole Creek farm on which the entrance is located. Most of the cave was explored and surveyed by members of the Southern Caving Society (SCS) in the late 1960's and early 1970's. Relationships and trust between the local farmers and cavers were very good in those times, but deteriorated in the 1980's in the wake of a government study (Kiernan 1984) that recommended listing some of the Mole Creek caves, including Herberts Pot, on the register of the national estate. Local landholders were angry and upset at the national estate listing; they felt excluded from the decision-making process, and were afraid that their livelihoods would be threatened. Collateral fallout from this conflict was loss of access to caves, including Herberts Pot and other caves on private land in the Mole Creek system. In 2000 the Tasmanian Parks and Wildlife Service (PWS) purchased two land blocks overlying significant parts of Herberts Pot but not including the entrance which remained on private freehold land. A few years later (2008) the block of land containing the entrance was acquired, which enabled PWS to assert complete control of the cave. PWS installed a gate on the entrance and the cave remained closed, pending a management plan, for a further 11 years until 2019.

Photo courtesy Rod Howe - Figure 1. Herbert Howe, the highest hat in the centre back, at Marthas Creek Culvert.

My ideas for the Herberts Pot Conservation Project began to formulate after hearing the frustration felt by Northern Caverneers, that in spite of the landholder access obstacle being overcome, bureaucratic delays meant they had been denied access to Herberts Pot for another eleven years, and counting. Having recently returned from 17 years in Western Australia, where I witnessed different models of collaboration between cavers and cave managers, I wondered if the enthusiasm, energy and expertise of the Tasmanian caving community could be more fully enabled to increase momentum in developing an access policy for Herberts Pot. In 2018 I pitched my idea to PWS's Karst Ranger at Mole Creek, Chris McMonagle, and he responded that if I put together a proposal PWS would look at it.

I prepared a detailed written proposal and powerpoint presentation. The proposal focused on shared goals, strengths and benefits for cave conservation and cave management, and a vision for sustainable access for speleologists. The draft proposal was circulated to the four Tasmanian caving clubs for critical review and input. The proposal was then presented at a CAPZS planning group meeting in Deloraine in November 2018 where it was unanimously supported by PWS and caving club representatives.

The project entailed numerous field trips to enable cavers to become familiar with the cave, establish routes and fix safety lines, and most importantly, to identify sensitive areas, which were then protected with string lines. Field trips and tasks were coordinated between the caving clubs via a dedicated Dropbox folder which I set up and shared openly with any club member expressing interest. After each field trip, photos and a trip report describing cave conditions, conservation and safety issues were promptly uploaded and shared via the Dropbox. The use of this open sharing platform proved to be a very efficient and constructive means of sharing data, information and photos, thus rapidly building collective knowledge and understanding of the cave.

One of the greatest objective hazards in Herberts Pot is the potential for entrapment by rising floodwaters. While there are ample high and dry levels to wait out a flood event, the main streamway becomes dangerous or impassable due to strong current and submerged sections. The risk of flooding entrapment can be reduced by checking the weather forecast before going underground, and keeping an eye on water levels when underground. Most caving trips occur during the more stable summer-autumn seasons, however heavy rain or snowfall in the Western Tiers catchment can occur in any month (Figure 2).

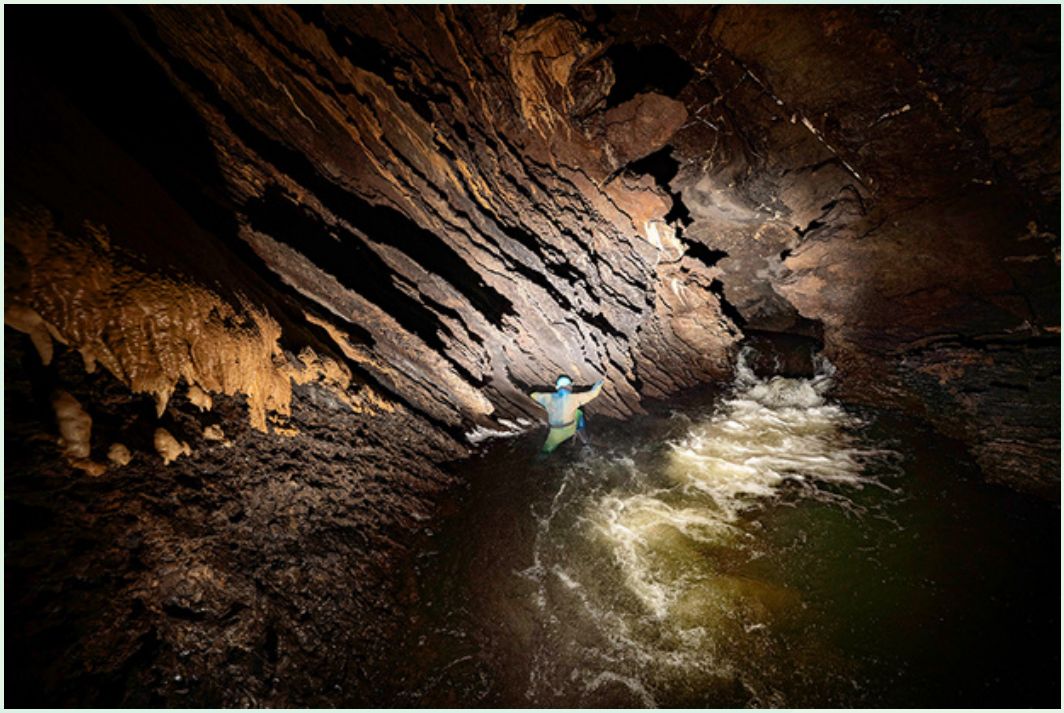


Photo by Stefan Eberhard - Figure 2 Upstream Herberts Pot in high flow conditions July 2021
Stephen Jacobs was unable to progress further upstream from here due to the strong flow and overhangs. This section between The Keyhole and Upstream Waterfall is a magnificent and challenging series of sculpted pools and cascades; among the finest of streamways in the Mole Creek karst.

Herberts Pot Mapping Project

The Southern Caving Society's (SCS) survey of Herberts Pot was finished by Leigh Gleeson, Lindsay Wilson and Graham Bailey in a series of epic trips that included a four day underground camp.The map drawn by Leigh in 1974 remains a showpiece of its time in cave mapping. When I joined SCS in 1980 at the age of 18, Leigh's very large original drawing proudly graced an entire wall of SCS's club room in Hobart.

On my first caving trip with SCS, to Cashions Creek Cave, I followed Leigh as he plunged headfirst into a challenging squeeze immersed in freezing cold streamwater – I was instantly hooked on caving. It wasn't long before I got to experience Herberts for real, and back then in 1980 the farmer allowed us to drive across his paddock and park near the entrance.

Forward 40+ years to the Herberts Pot Conservation Project. To assist navigation in the cave, Leigh's beautiful map of Herberts, which was illegible when reproduced at small scale, was adapted for field use by Glyn Johnson and Peter Bell (Figure 3). Updates included true north and magnetic declination angles, which had shifted significantly since 1974, legible scale bars, and resizing into three separate sheets for easy A4 printing, laminating and field use.

The plan of Herberts Pot reveals an intriguingly complex system, with numerous side passages, inlet streams and ancient upper levels, all connecting into the Mole Creek master drain. It soon became clear that the 1974 survey was incomplete. Moreover, a vertical profile of the cave had never been drawn. Few if any of the original survey stations are marked in the cave, creating a challenge for linking in new surveys, however from the original field survey sketches it was possible to identify tie-in points which are close-enough for purpose.

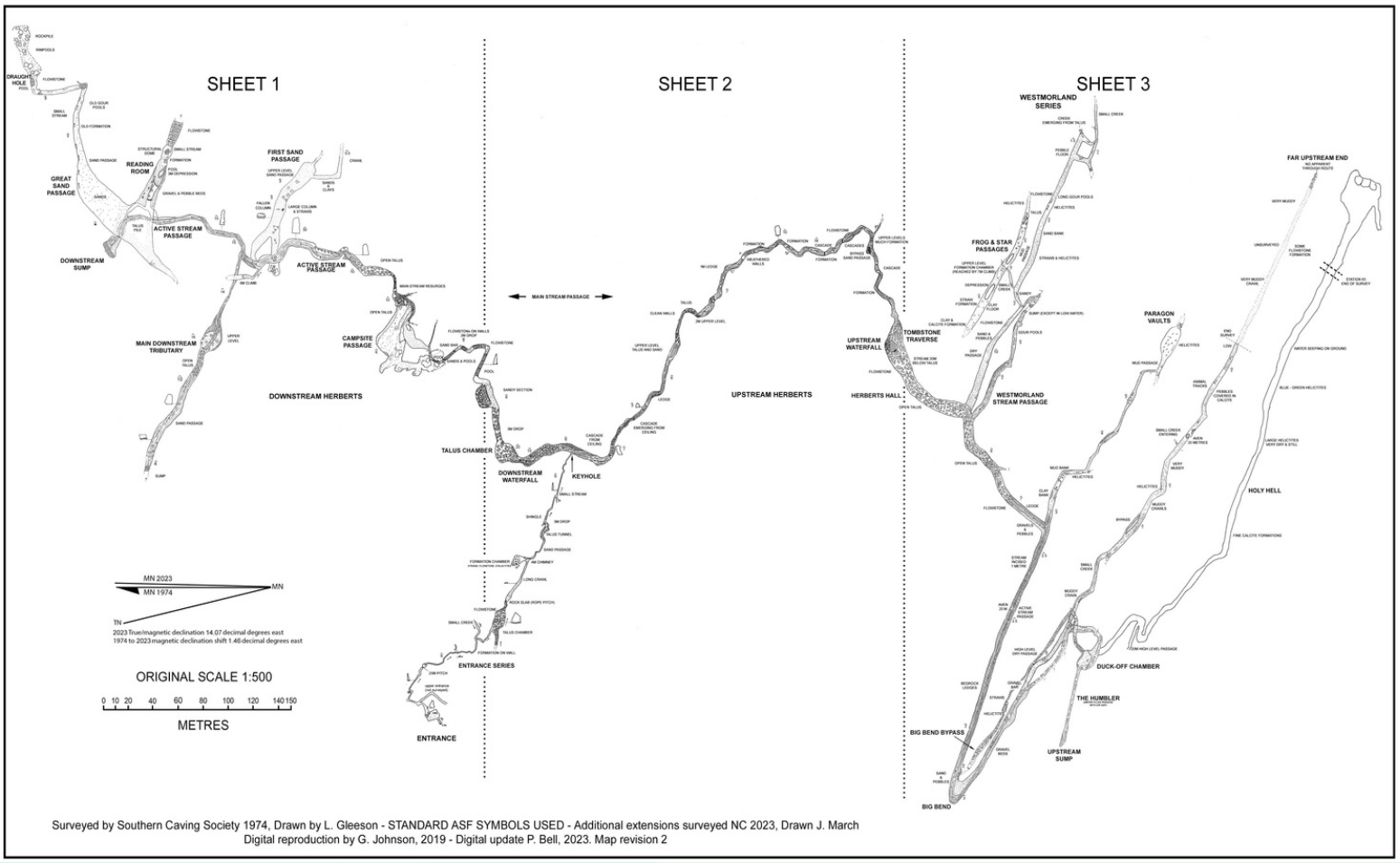


Figure 3. Plan of Herberts Pot. Original drawing by Leigh Gleeson, 1974; digital reproduction and updates Glyn Johnson, 2019; Northern Caverneers, Janice March, Peter Bell 2023.

To improve understanding of the system hydrology, and exploration prospects, a modern digitised version of the Herberts survey was needed. Fortunately this was achieved without having to resurvey the cave. Most of the original 1974 survey data was available as a Compass file – the leg data having been earlier entered by Rolan Eberhard. Using this file and adding the LRUD data from Leigh Gleeson's original field survey notes, Peter Bell constructed preliminary digital plots in Compass. From this base map we identified and corrected a number of errors and anomalies, and established a GPS surface datum and precise elevation for the entrance (Figure 4). The corrected, upgraded and anchored Herberts survey data, working files, and copies of original field notes are also stored in a Dropbox folder and shared with those actively involved with ongoing survey and mapping work in the cave.

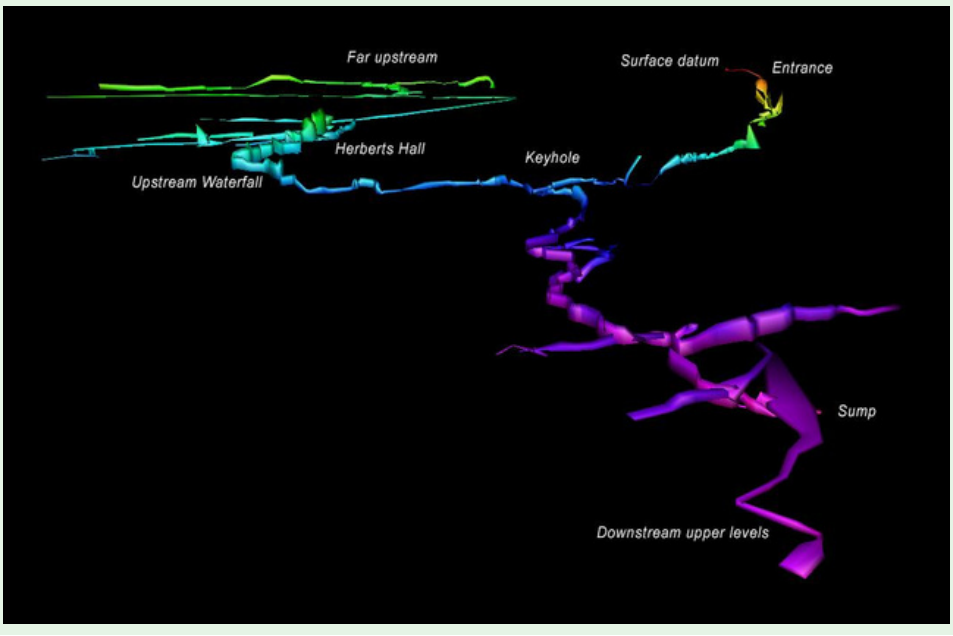


Figure 4. Herberts Pot 3D Compass plot coloured by depth. Prepared by Peter Bell.

Mole Creek Karst System Mapping Project

Stefan Eberhard and Peter Bell

The Mole Creek karst drainage system comprises an extensive network of hydrologically and speleogenetically related caves that ultimately drain to Scotts Rising. I was interested in developing an integrated digital model of the Mole Creek master cave system, to improve understanding and visual appreciation of how each of the caves are related and interconnected. A second aim was to use the mapping model to inform and focus ongoing exploration efforts, especially by cave diving because most of the hydrological connections between caves, earlier proven by dye tracing, are via sumped passages. The system encompasses Westmorland Cave (MC262), Kellys Pot (MC207), Herberts Pot (MC202), Shishkebub (MC155), Dangerous (MC372), Georgies-Wet Cave (MC203), Honeycomb (MC84), The Arch (MC5), Pyramid (MC3), Cow Cave (MC46), Roaring Hole (MC450), and numerous other caves and dolines. Cave diving efforts to date have been reported earlier in *Speleo Spiel* and *Trog* (Figures 1 and 2) with further diving planned for next summer.

Photo by Janice March - Figure 1. Roaring Hole dive and survey team, left to right: Stefan & Bronwen Eberhard, Ben Watkins-Davis, Peter Bell.

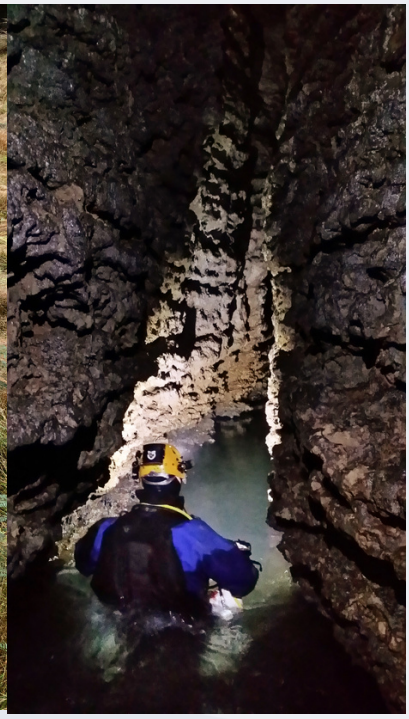
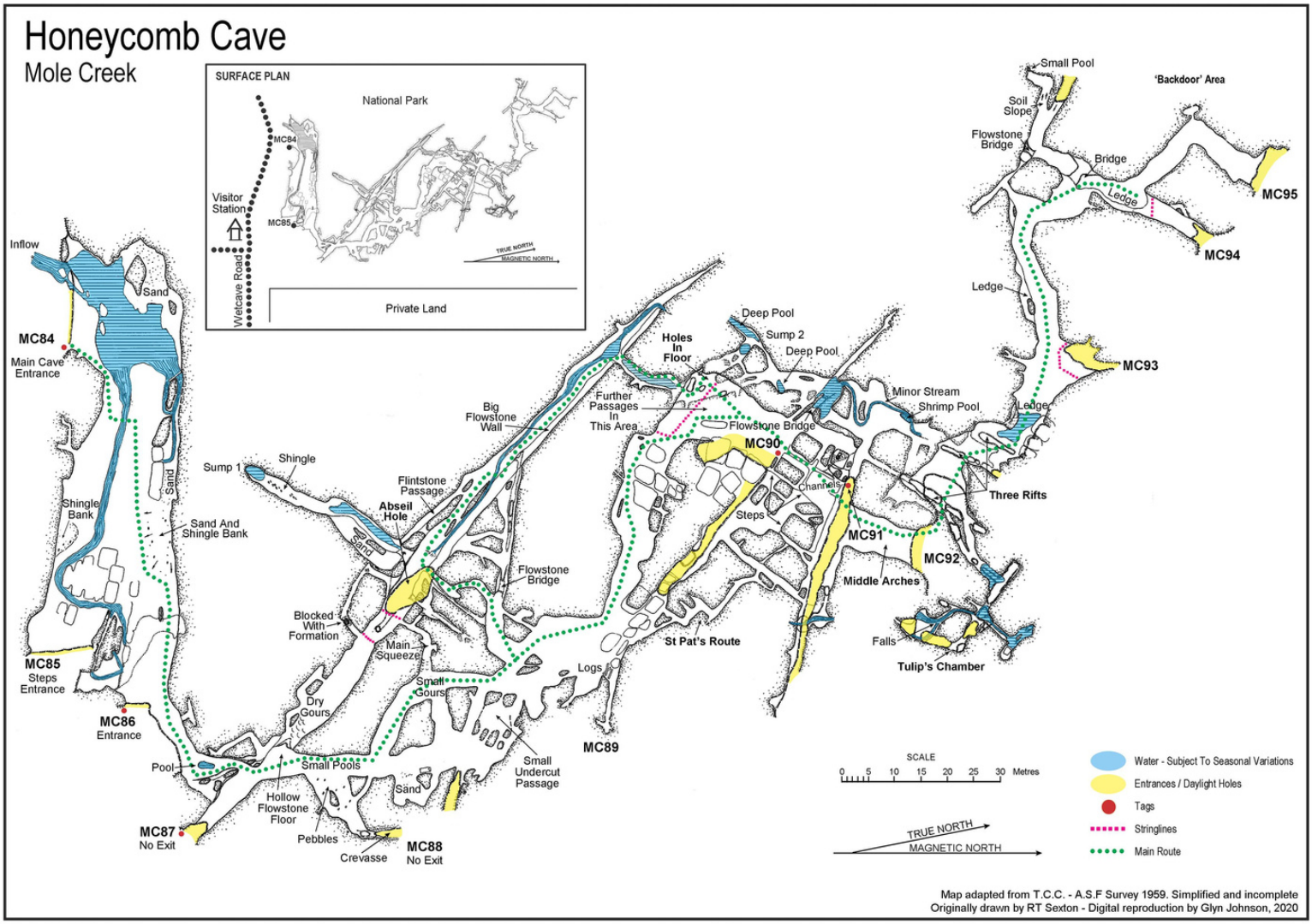


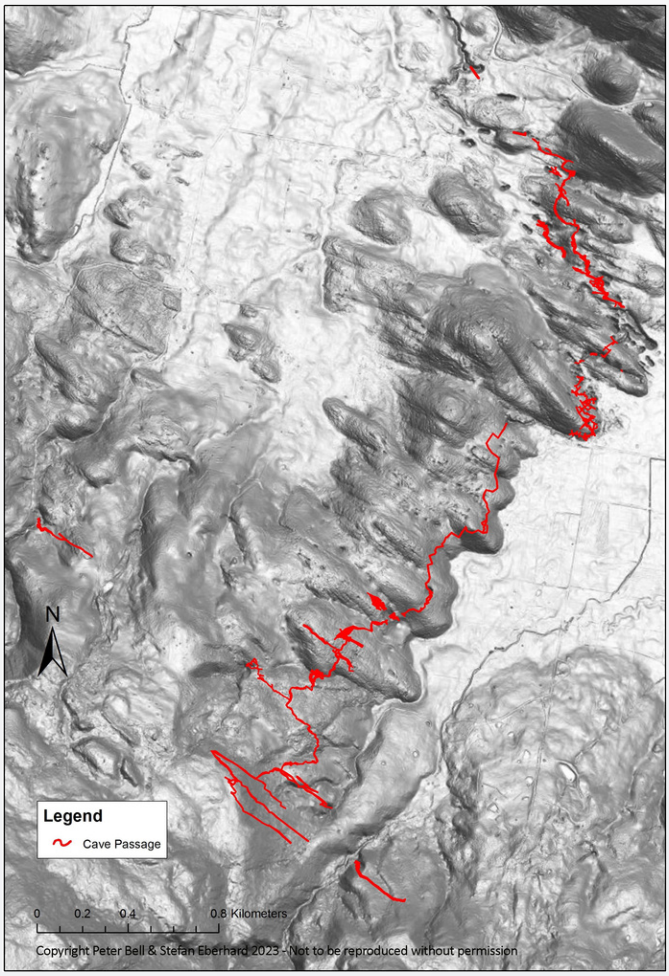
Photo by Ben Watkins-Davis - Figure 2. Roaring Hole downstream sump. Diver Stefan Eberhard.

The mapping part of this project started as a desktop research exercise sourcing historical data and information including cave names, numbers, entrance coordinates, maps, trip reports and the all important cave survey data. Several people generously shared their local knowledge and made survey data and historical reports available – thank you Miles Pierce (VSA), Bob Kershaw (ISS), Steve Jacobs and Dave Butler (NC). Early TCC Northern Branch trip reports and sketch maps from the 1950's and 1960's were a priceless source of information. Tracking down a copy of the original VSA survey notes for Wet Cave was a bonus for Tasmanian speleological archives. Sadly the original survey data for Rob Sexton's 1959 mapping masterpiece of Honeycomb Cave remains missing (not in CEGSA archives). Rob's beautiful map has been digitally reproduced and enhanced by Glyn Johnson to create a modern easy to read field map (Map 1).

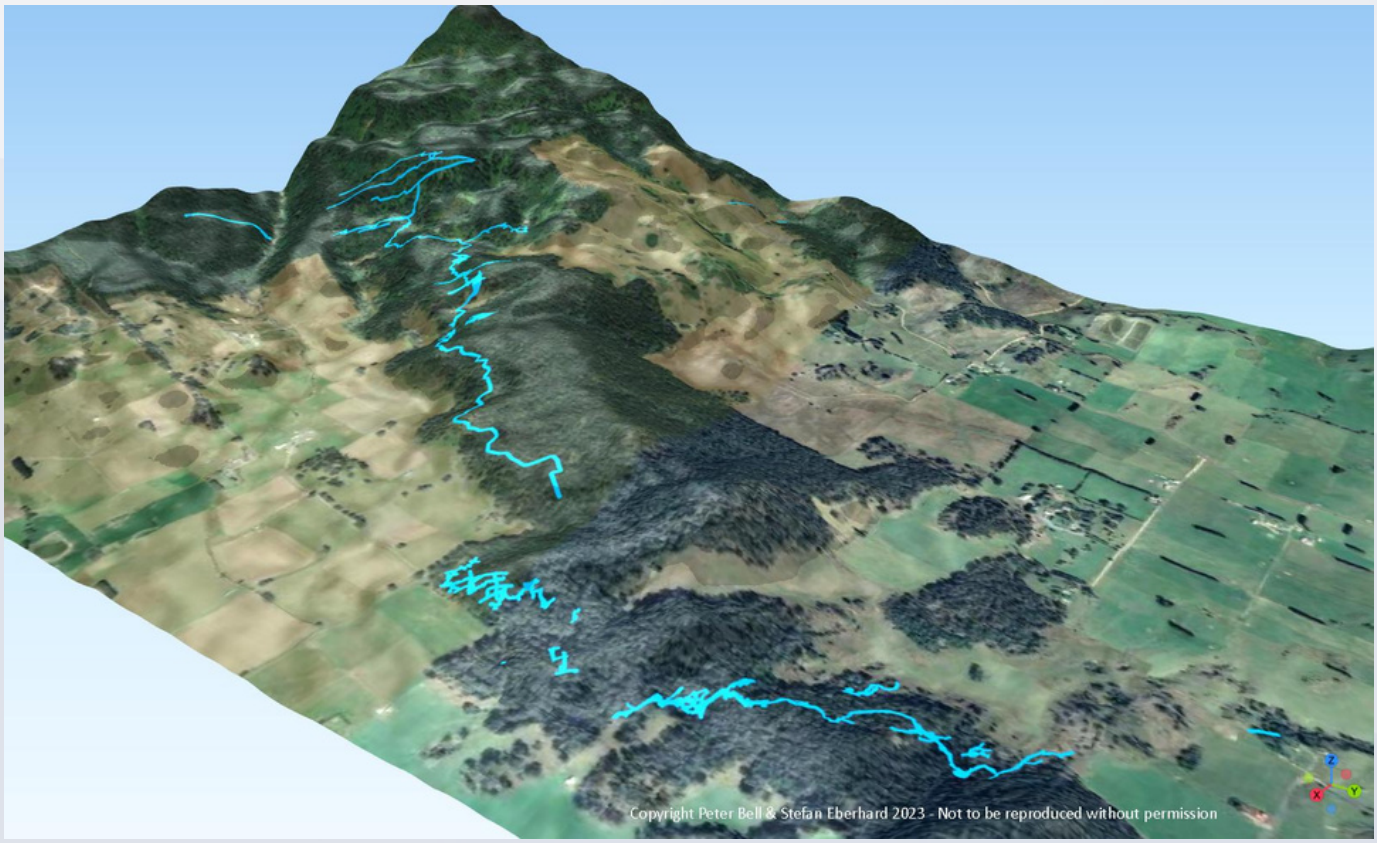


Map 1. Honeycomb Cave, Mole Creek. Original map by Rob Sexton 1959, redrawn and updated by Glyn Johnson, 2020.

In situations where the original data was missing, we were able to regenerate plan data from published plans using a tool in Compass, however elevation data cannot be reverse engineered so easily. This means that to generate vertical profiles and 3D models, Honeycomb and some other caves will need to be resurveyed. Our desktop research was followed by ground-truthing with GPS to verify entrance locations and map additional features. It was surprising how inaccurate some entrance coordinates were, and uncertainty persists around some cave locations and names. Over the decades, some caves have been referred to by different names, and in some cases the same name has been applied to more than one cave. There is still plenty of ground-truthing and cave survey work to be done, especially the numerous smaller caves in the lower part of the drainage system. A conservative estimate of the aggregate surveyed system length is > 12km. Two different visualizations of the Mole Creek karst drainage system, so far as currently mapped, are shown following.



Map 2. Mole Creek cave system (red) overlain on LiDAR imagery. Cave data sources: Southern Caving Society, Southern Tasmanian Caverneers, Northern Caverneers, Bob Kershaw (ISS), Miles Pierce (VSA), Stefan Eberhard, Janice March, Peter Bell (NC). Lidar data from LIST, State of Tasmania. Map compiled by Peter Bell



Map 3. Digital elevation model of the Mole Creek system looking upstream towards the Western Tiers with mapped cave passages draped in blue. Cave data sources as per Map 1, Google Terrain plotted in QGIS by Peter Bell.

Mudblocks, Great Sand passage

First Sand passage decoration

Decoration, Great Sand passage

INTRODUCING HERBERTS POT

Written and photos by Janice March, Northern Caverneers

'A masterpiece of a cave' is an apt description of Herberts Pot 7MC-202, one of the finest streamway caves in Australia, located 5 kilometres south of Mole Creek in northern Tasmania. With 5.7 kilometres of surveyed passages, it is the longest cave at Mole Creek.

I had heard about Herberts Pot from older club members: how there was a scraggy old rope on a waterfall climb, and how the landowner had closed off access in the 1980s to all but a few trips. Memories were fading but the older members seemed sad that we could not go to Herberts any longer. So my interest in the cave was piqued when I heard that the land above the cave had been acquired by the Crown in the 2000s, and in 2013 it became part of the Tasmanian Wilderness World Heritage Area as part of the Mole Creek Karst National Park.

Unfortunately, fellow cavers had been to see the shiny new gate that had been installed over the entrance by PWS officers and there was real frustration at being denied access, with no clear timeframe for change to this situation. So it was a relief when Stefan Eberhard suggested his proposal (see his article above) in 2018. The Herberts Pot Conservation Project gave Tasmanian club cavers access while we familiarised ourselves with the cave in order to be able to contribute to the CAPSZ which would in turn allow future controlled access for all cavers. In the process we would recommend and help implement management strategies to reduce caver impacts in Herberts Pot.

Little did I know that I would spend over 100 hours of my life underground in Herberts Pot over the next four years and dozens more walking the hour to and from the cave, writing trip reports and wrangling survey data. Altogether there have been about 26 trips since 2019 and a total of at least 600 hours spent underground by all cavers involved. Local PWS Karst Ranger, Chris McMonagle is impressed by the dedication of cavers and appreciates the amount of information generated by the Herberts Pot Conservation Project. The dozens of photos on the Dropbox help PWS officers understand what we are seeing and doing in the cave.

A new walking track across public land was marked and has since been improved by partial re-routing and marking with reflectors. Early trips focussed on replacing fixed ropes on the climbs and STC members were involved in placing permanent anchors using glue-in P-hangers at the entrance, on the 25 metre pitch in the entrance series, and on a climb known as the Tombstone Traverse about two hours into the cave.

Stefan conducted a reconnaissance ecological survey to identify fauna and habitats vulnerable to caving impacts. The small streamway in the entrance series was found to contain crustaceans and molluscs vulnerable to being trampled underfoot. Cavers can minimise their impact by not stomping through pools in this section.

Re-exploration of the cave progressed with monthly trips heading either upstream or downstream after the first one hour obstacle course from the entrance to the junction with the active streamway. It is strenuous exercise and the first hour is along narrow, descending, mostly walking passage interspersed with belly crawling, squeezing, down-climbing and chimneying, so not easy for larger-sized cavers. I soon learned not to ask for volunteers for the next trip until people had had a chance to recover from the last one!

Downstream we found the high dry 15 metre x 15 metre chamber where the 1974 Southern Caving Society (SCS) survey team camped for four nights, but they had left it off their survey. Stefan and Peter Bell reconstructed the original data and tidied up the survey to include areas that had been left off. This updated survey was printed off and carried around in the chest pocket of my trogsuit on many a trip so I could learn my way around and record how long the various sections of the cave take to move through. Northern Tasmanian cavers weren't used to 8-10 hour trips and having to eat dinner in the dark back at the car.

The active streamway has several dry side passages which are an absolute delight. As expected of a Mole Creek cave there are some highly decorated sections

Ringtail possum skull

Calcite riddled limestone boulder

Climbing around deep pools upstream

Decoration, Paragon Vaults

Animal prints, Westmorland Stream passage

with the Paragon Vaults rivalling local cave Genghis Khan for photogenic anthodites, but it is well protected by over three hours of hard caving to get there. Holy Hell passage is even more exotic and more well-hidden, and is set to be a 'no-go-zone' in the Cave Access Policy Zoning Statement. This incredible passage has a little paper sign hanging on a string across the passage left by the original explorers warning anyone who absolutely must go in, to take extreme care of the rare and delicate decorations.

Northern Caverneer Steve Jacobs dug up historical trip reports about the original exploration of Herberts Pot and we realised that Frog and Star passage had not been mentioned by name on the survey. Other names were created for large unnamed passages such as Great Sand Passage and even for individual speleothems such as the Ice Maiden. The Reading Room was named when we found an old pair of 1970s mens spectacles resting on a flowstone for 50 years.

Because we were re-exploring a virtually pristine cave which was flooded to the ceiling of its whole downstream half in the 2016 floods, preserving sediments and floors was key to our conservation efforts. We soon implemented a comprehensive string-lining program with the Tasmanian government karst officer, Rolan Eberhard providing the stainless steel skewers and a few kilometres of white venetian blind cord. The aim is to narrow the track across soft substrates in the side passages and reduce mud transfer. Elsewhere, marine grade silver reflective tape 1 centimetre x 1 centimetre adhered to stainless steel tabs have been cable-tied onto rocks to mark the route through flood prone stream passage rockfalls where string-lines were not feasible. We did this to help with navigation and reduce the chance of cavers requiring a rescue due to exposure or exhaustion after being lost in the cave.

A rescue pre-plan has been prepared by Deb Hunter with assistance from keen cave rescuers and we hope that visiting ASF cavers take care, don't cave beyond their abilities, and stick to their turn-around times.

Once the Cave Access Policy is signed off by PWS regional managers, potentially as soon as May 2023, the cave will be a Restricted Access cave accessible by permit to ASF cavers or equivalent, the same as most other popular caves at Mole Creek. A PWS Notesheet containing some basic information will be sent out to permit holders. No local guides will be required, but convincing a local caver to come along would be worthwhile as the access track becomes easily overgrown.

However, unlike other Mole Creek caves, Herberts Pot is in a league similar to southern Tasmanian caves. A trip to downstream Herberts would likely take eight hours and upstream a bit longer, plus one hour each way on a rough taped route to reach the cave. I usually come out muddy, tired, and very bruised but exhilarated.

Collaboration by all club members during this project has been exemplary with several interclub trips being organised. Thanks must go to all Tasmanian cavers who have been involved with the Herberts Pot Conservation Project over the past four years.

Stringlining

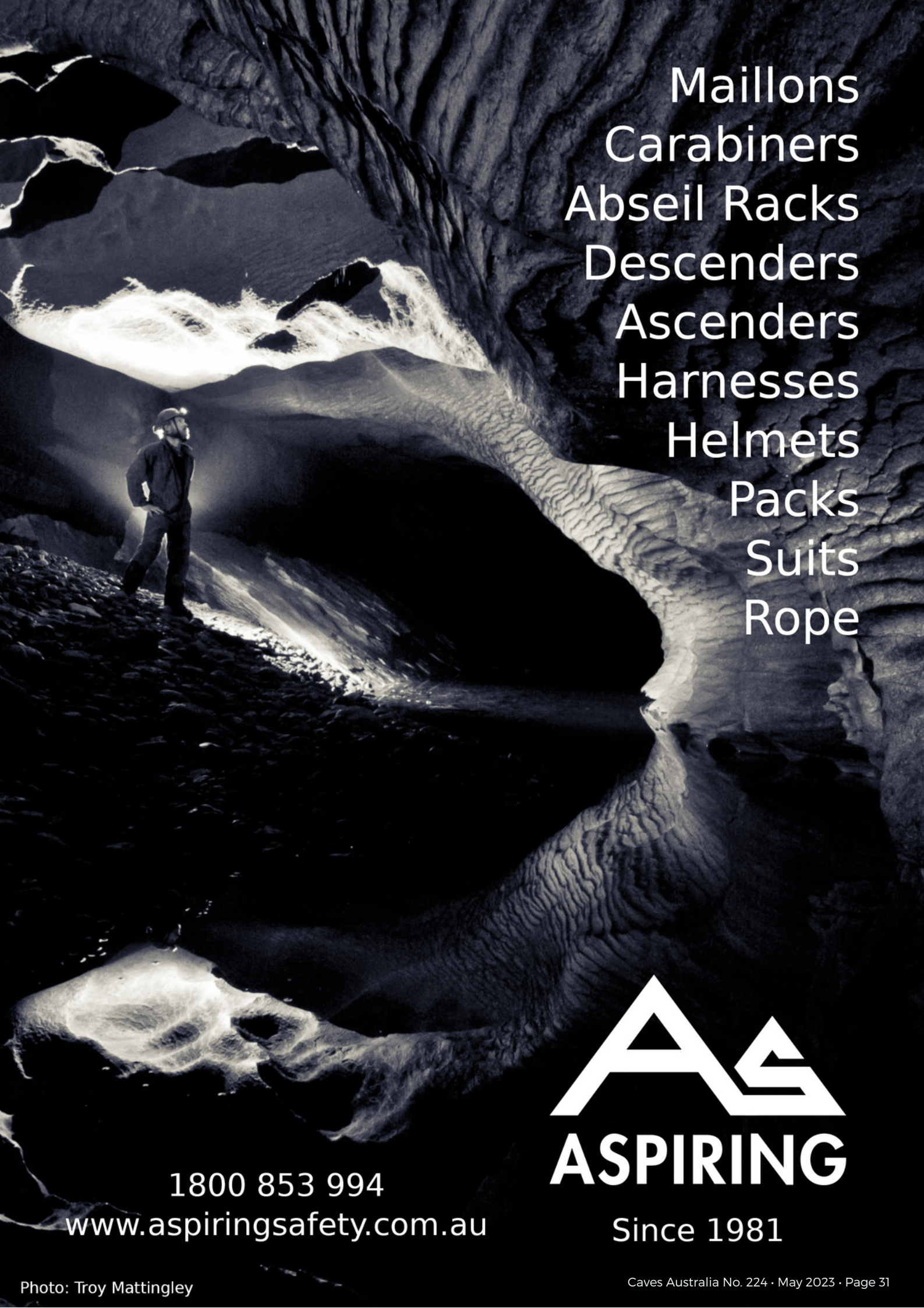


Photo: Troy Mattingley