

CAVES

The Journal of the Australian Speleological Federation Inc.



AUSTRALIA



DROUGHT, FIRE, FLOODS AND COVID
VALE KEN MURREY • DIVING THE LETTERBOX
THE WOWIE'S LAIR

No. 216 • JUNE 2021

EDITORIAL

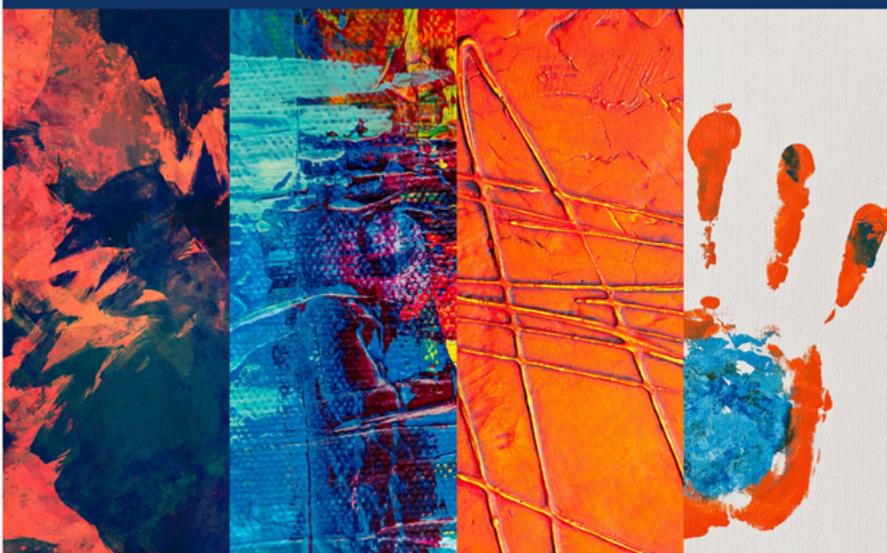
THANKS very much to Sil for doing all the hard work for the March issue; it's back to our normal programming for June.

It's good to see semi-normal caving activity resuming around the country as the caving community and the various land managers negotiate the bureaucratic processes (some more easily than others). Interstate caving still proves to be a risky business, with sporadic snap lockdowns making forward planning a challenge. I look forward to reading about people's recent caving exploits in the September issue (hint, hint). —*Alan Jackson*

CELEBRATE CAVES THROUGH YOUR CREATIVITY

ACKMA, ASF and NZSS invite

All creative arts people of Australasia to celebrate the
International Year of Caves & Karst in 2021



YOUR CHOICE OF MEDIUM - Write a Story, Rhyme, Poem, Song, Sketch, Paint, Sculpt, Photograph or Create a Video.

Four \$500 Ledlenser vouchers and a \$1,000 Grand prize are to be won!

The theme is **Caves and Karst in Australasia**

By submitting your creative piece in an electronic file to asf.caves.competitions@gmail.com you allow ACKMA, ASF & NZSS to showcase your art as part of our celebration of the International Year of Caves and Karst 2021. (See - Conditions of entry)



[Download the terms and conditions](#)

COMING EVENTS

CCOVID-19 is still disrupting international travel and events. Many events are now providing virtual attendance options. Information on UIS-sanctioned events can be viewed at <http://tinyurl.com/y7rgb8ah>

Don't forget that 2021 is the International Year of Caves and Karst. You can find more information about what's going on and what you can do to help the cause at <http://iyck2021.org/>



CAVES AUSTRALIA

Caves Australia is the Journal of the Australian Speleological Federation Inc. and is published quarterly.

This work is © copyright 2021, Australian Speleological Federation Inc., although copyright in articles, photographs and illustrations remains with the authors. Aside from any fair dealings for the purposes of private study, research, criticism or review as permitted under the Australian Copyright Act 1974, no part may be reproduced without the written consent of the author and/or publisher and the inclusion and acknowledgement of the source.

The views expressed in *Caves Australia* are not necessarily those of the Editor or Publisher (the Australian Speleological Federation Inc.) or its Executive, Commissions or Committees.

Editor:

Alan Jackson
Email: alan.jackson@lmrs.com.au

Production and Advertising Manager:

Alan Jackson
Email: alan.jackson@lmrs.com.au

Proofreading:

Susan White
Greg Middleton
Ian Curtis

ASF: asf.caves.info@gmail.com

For all ASF publications:
asf.caves.sales@gmail.com

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

March, June, September and December

Magazine Subscription

Caves Australia is included within ASF membership fees. Subscription to the magazine is also available to non-ASF members at \$40.00 including postage within Australia for one year (four quarterly issues).

Change of address

Notify us immediately of any address changes to ensure delivery of your *Caves Australia*.

Caves Australia

No. 216 June 2021

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



ASF

Contents

Coming Events.....	2
Editorial.....	2
Congratulations to Alan Cummins OAM.....	4
President's Report.....	4
Drought, Fire, Floods and COVID.....	5
Why the caving community needs to become creative	
<i>Garry K. Smith</i>	
Ken Murrey.....	10
<i>Stephen Fordyce</i>	
Janolan 2020 — a reflection.....	11
<i>Scott Melton</i>	
JF-30 The Letterbox.....	13
Sump exploration, 19 March 2021	
<i>Janine McKinnon</i>	
The Whowie's Lair.....	15
<i>Karl Brandt</i>	
New papers from <i>Helictite</i>	17
<i>Greg Middleton, Editor</i>	
Southern Bent-wing Bat and the ASF Karst Conservation Fund.....	18
<i>Nicholas White</i>	
Links for Cavers.....	18
<i>Susan White</i>	
The Southern Bent-wing Bat.....	19
Interim Progress Report — Investigation into its Habitat Use and	
Nightly Foraging Flight Activity	
<i>Amanda Bush</i>	

Cover: Cave diving legend the late Ken Murrey. Photo by Liz Rogers

ASF Executive

President
Senior Vice President
Vice President
Vice President
Vice President
General Secretary
Treasurer
Executive Secretary
Membership Secretary
Non-Executive Vice Presidents:

Sarah Gilbert
Rod Smith
Janine McKinnon
Andrew Stempel
Karen Woodcock
Phil Maynard
Bob Kershaw
Valdi Jonsson
Colin Tyrrell
John Cugley
Graham Pilkington
Grace Matts

Layout and Production by
FB Design, Hobart, Tasmania

WANTED

ARTICLES FOR CAVES AUSTRALIA!

Whether caving, cave diving or generally just caving, *Caves Australia* readers are interested in YOUR story. It is only with YOUR contribution that we can produce a quality magazine for all to enjoy. For writing and style guidelines, contact the Editor or Production Manager.

Congratulations to Alan Cummins OAM

THE ASF warmly congratulates Mr Alan Cummins OAM for being awarded a Medal of the Order of Australia for service to caving in the 2021 Queen Birthday Honours. Alan is a life and founding member of Chillagoe Caving Club, former President on a number of occasions, and has made huge contributions to the Queensland caving community for the past five decades.

Here are some details from the citation:

Mr Alan Erskine CUMMINS, Gordonvale QLD For service to caving.

CHILLAGOE CAVING CLUB

- Founding Member, since 1973.
- Established Cave Camp, 1985.
- Director, Cave Camp, 20 years.
- Life Member, 2008.
- President, number of occasions.
- Range of executive roles.

■ Building and Maintenance Coordinator, current.

■ Cave Leader Training Coordinator.

■ Trip Leader Assessor.

CAVING OTHER

■ Member, Recreational Caving Technical Working Group, Australian Adventure Activity Standard, Outdoor Council of Australia, 2019.

■ Convenor, 28th Biennial Australian Speleological Foundation Conference, 2011.

■ Caving Instructor, Trinity Anglican School and other local schools, since 1990.

SCRIPTURE UNION

■ Member, since 1995.

■ Chaplaincy, Gordonvale Area.

CHURCH OTHER

■ Volunteer, Gideons International in Australia, current.

■ Session Clerk, Gordonvale/Babinda Presbyterian Church, current.

AWARDS AND RECOGNITION

■ Award of Distinction, Australian Speleological Federation, 2011 For committed service in many areas in the leadership and management of Chillagoe Caving Club.

■ Certificate of Merit, Australian Speleological Federation, 1982.

President's Report

SIX MONTHS into 2021 and caving activities have fully ramped up again around the country this year after a quiet 2020.

It has been great to see an increase in interclub participation and wider advertising of trips via Facebook and online. Cavers have even been travelling interstate for trips! Victorians and South Australians were allowed into Tasmania for the northern Tas annual cave rescue exercise at Mole Creek recently. SUSS has also enjoyed the open borders for a wet and fun trip to Tassie, and the Ceduna Conference organising team popped over to WA to check out the classic Nullarbor caves for conference field trips next year.

Cavers in NSW have also been able to go caving in National Parks again for the past few months. Thank you to the NSWSC for advocating on behalf of all NSW clubs and persisting with the negotiations with the NPWS Landforms Team to regain access.

The unpredictability of the past year has highlighted the importance of building and maintaining positive relationships with land managers, both state National Parks and private landowners, to enable ongoing access to caves for all cavers.

These relationships have been developed over decades by our clubs and through Speleo Councils, and their collective knowledge is invaluable.

Don't forget to contact local caving clubs when travelling for trips for the latest information on access.

National Volunteers Week (17-23 May) has just gone and it is a reminder of all the valuable work our volunteers do. Neither the ASF nor our Clubs could function without the huge amount of time and energy you all put in to making caving happen in your local area and nationally. Thank you to more than 40 individuals who directly volunteer for the ASF through the executive, commissions and committees, plus ASF delegates from each club who keep our Federation going.



BRIAN EVANS

In March, Australia launched the first event for the International Year of Caves and Karst, with an online screening of Sil Iannello's *Adapted to the Dark* cave cricket documentary drawing viewers from all states and overseas.

Entries are open in our creative arts competition celebrating caves in any medium. Download the PDF with terms and conditions: <https://tinyurl.com/ttk5x2n6> The ASF will also be running a Caves Week promotion for the ASF and clubs in the Spring.

Contact us if you'd like your club to be involved, to highlight your favourite caving area and to tell us all about what makes your club the best!

As we head into winter the northern exploration season is just getting started, while caving in southern Australia involves toughening up in snow melt. Several large expeditions and training exercises are planned over the next few months, bringing together cavers from many clubs to Bullita, Nullarbor, Exmouth, Kangaroo Island, and more... we hope you find many kilometres of new passage to survey, and look forward to reading about your adventures in future issues of *Caves Australia*.



Drought, Fire, Floods and COVID

Why the caving community needs to become creative

Garry K. Smith
NHVSS



Karst covered in grass trees on fire at Timor, Hunter Valley NSW

THE MOST challenging years on record for speleological groups and the caving community at large have undoubtedly been 2019 and 2020, particularly in NSW, where almost no caving occurred in more than 12 months.

Drought, fire, floods and then coronavirus (COVID-19) created an unprecedented chain of events. Planned caving trips had to be cancelled because of the events even though permits had been obtained.

So how did this chain of events begin and why did they line up one after another and affect the caving community over much of Australia? In particular, this article focuses on events in NSW, however, much of what happened in NSW also occurred in other states and territories around Australia.

DROUGHT

El Niño conditions affected Australia's weather pattern over several years and led

to one of the worst droughts on record, particularly through 2017-19. For example, 100 per cent of NSW was declared to be in drought by August 2018 and remained at 98.6 per cent into May 2019. Large areas of Australia and in particular the eastern states had already been drought declared for months and in some regions for years leading up to 2019. Rainforests and heavily vegetated regions were tinder-dry by late autumn 2019 as heat wave conditions created catastrophic fire conditions.

BUSHFIRE

Many caving areas on private land that NHVSS frequented were not accessible, as property owners had concerns about the fire risk. It was also a concern of NHVSS members that we would be using precious tank water from properties that were critically short of water, so we cancelled some planned trips. For example, property own-

ers around Timor Caves in the Hunter Valley had been purchasing tanker loads of water and hay for months, just to keep their breeding stock alive.

Despite the ongoing drought during the last half of 2019, NHVSS members undertook several caving trips on private property where permitted and also held a training day at a local cliff face. One of the highlights in October 2019 was a four-day rafting trip on the Snowy River in Victoria, which used the water flow of an environmental discharge from Lake Jindabyne, part of the Snowy Mountains Hydro Scheme. It was a 780 km, nine-hour drive from Newcastle to Gelantipy, VIC, but worth it since there was virtually no water in most NSW rivers (Burt and Scott 2019, Smith 2020).

On 11 November 2019, almost all NSW National Parks (NPs) and reserves from the Queensland border to Victoria were closed due to the extreme fire conditions created



ANDREW BAKER



Remains of Cottage No. 1 at Jenolan



Remains of Cottage No. 2 at Jenolan

by the combination of high temperatures, strong winds and low humidity.

This meant no public access at all to NSW NPs and included tracks, trails, campgrounds and picnic areas. The closure pretty well put a total stop to caving in NSW NPs from that point on. While it was disappointing that we were locked out, NPs had an obligation to put in place measures to protect public safety and to ensure no-one found themselves trapped if fire started in the predicted extreme conditions. Bear in mind that at the time there were more than 120 bushfires already burning across Queensland and NSW and a state of emergency had been declared for many populated areas. A large number of these fires had been started by dry lightning strikes.

Through December 2019 and well into January 2020 there were several hundred large uncontrolled bushfires burning across Australia and in particular the eastern states. Many of NHVSS's traditional caving areas were devastated by these fires, including Jenolan, Wombeyan, Tuglow, Colong, Church Creek, Kempsey and Yarrangobilly (Plowman and Spate 2020).

National parks remained closed to the public and caving permits were not being issued. Even national parks that had not been affected by bushfires were closed due to the risk of fire. This was understandable as fire and emergency service personnel were stretched to their limit, with large towns on the NSW south coast and eastern Victoria being evacuated and thousands of homes were being reduced to ash.

Occasionally windows of opportunity arise as a result of unprecedented conditions. Severe drought conditions saw the Glenlyon Dam water level down at 2.2 per cent capacity, which exposed the usually submerged Texas Caves. An interclub trip in late November 2019 to visit the Texas and Ashford Caves near the Queensland border was hastily organised thanks to Rod

O'Brien and Cathi Humphrey-Hood. This was one of the few caving areas that could be visited and it was only possible because of the severe drought (O'Brien et al. 2020).

Many fires continued to burn out of control across NSW. One such fire was fast approaching Jenolan. On 1st January 2020 word was received that fire had destroyed the Jenolan Rural Fire Station and three cottages, including the Cavers' Cottage. This meant that Jenolan had substantial work to be done before it could reopen to the general public for accommodation and guided cave tours, let alone catering for cavers. A massive operation began to make the roads and infrastructure safe from fire damaged trees which could fall and to restore power etc.

It looked like work was progressing well and Jenolan was on track to reopen commercial operations by the end of January.

FLOOD

Then in late January 2020 the rain started falling — and did it fall. The country burnt bare by fires now turned to raging torrents in every stream up and down the east coast of Australia. Jenolan Caves had barely reopened for tourists when a massive flood swept through the precinct. The torrents of water overflowed the stormwater channels past Caves House and through The Arch. The ticket and guides' offices were flooded and tonnes of gravel and rock were washed down the valley, covering the road and almost completely filling Blue Lake. The ticket and guides' office buildings were condemned as unsafe and there was a massive job in removing the thick layer of gravel and rock from the roadway past Caves House and through The Arch. Similar flooding also occurred at Wombeyan Caves, resulting in extensive damage.

Again, work got underway at Jenolan to clear the flood debris and rebuild. It looked like work was on track to reopen commer-

cial operations within a couple of months.

Because most of the NSW NP caves were still inaccessible during January and February, the only option for caving clubs was to visit caves on private property or do activities other than caving.

PANDEMIC

On 25th January the first case of coronavirus (COVID-19) was reported in Australia. The term COVID-19 is an acronym that stands for coronavirus disease of 2019. The infected person had arrived in Melbourne on 19th January on a flight from Wuhan, China. By 8th February there were 15 cases reported within Australia and the numbers kept growing. How quickly this changed our everyday activities and our social interaction. On 28th February, Prime Minister Scott Morrison declared a pandemic, activating Australia's emergency health response plan.

On 11th March the World Health Organisation (WHO) General Director, Dr Tedros Adhanom Ghebreyesus, declared a global pandemic.

Australian Federal and State governments introduced sweeping measures to try to reduce the spread of COVID-19. These included restrictions of travel across Australia, including interstate border closures; travellers from overseas who arrived in Australia after 15th March 2020 were required to self-isolate for 14 days; and cruise ship arrivals were banned. On 17th March the Department of Foreign Affairs and Trade advised Australians overseas to return home. On a more humorous note, Australia-wide there was an unprecedented rush on toilet paper, rice and pasta which quickly emptied supermarket shelves of these products as a result of panic buying. On 18th March Prime Minister Morrison intervened on the issue of panic-buying, declaring: 'Stop hoarding. I can't be more blunt about it. Stop it.'





On left: Guides' and ticket office condemned after sustaining structural damage

To reduce the spread of the virus, the Government, on the advice of medical experts, asked people to observe social distancing of 1.5 metres, wash hands regularly with soap or sanitary wipes, wear face masks in public, work from home and not travel unless essential. Compulsory 14-day supervised hotel quarantine isolation was introduced for residents returning from overseas after 27th March.

As the Government-imposed restrictions continued to increase on a weekly or even daily basis, airlines were forced to cancel flights. For some people cancelled trips due to the coronavirus pandemic came at considerable financial cost with both interstate and overseas flights being cancelled at short notice, which also affected people's holiday leave, booked accommodation, hire vehicles etc. Some airlines refused to pay flight refunds and others only offered credit vouchers valid for one year. An example of this was the cancelled flights for a two-week caving expedition to the Northern Territory, which several NHVSS members had already booked and paid for.

Even tourist cave operators across NSW totally shut down cave tours by mid-March 2020. The administrators at the Jenolan tourist caves were still trying to repair infrastructure after the devastating bushfires and floods, when COVID-19 hit Australia. It was probably an easy decision not to try to reopen Jenolan cave tours till everything

was repaired. However, the ministerial decision from the Office of Environment and Heritage to stop all caving in NSW National Parks probably fuelled the decision to not open for cave tours, despite the government's medical advice that regular use of hand sanitiser and wearing face masks on public transport (an enclosed space) would greatly reduce the spread of the virus. Abercrombie, Wombeyan and Yarrangobilly caves, also managed by the Office of Environment and Heritage, initially closed due to bushfires and floods, remained closed due to COVID-19 directives. This also included closure of their accommodation and camping facilities following their precautionary risk management procedures.

It appears that other private and public cave operators, such as Wee Jasper and Wellington, sought advice from the Department of Health, and probably on the grounds of the 1.5 m social distancing rule, stopped conducting cave tours. However, they also had close relations with Jenolan Caves and likely followed their lead.

The NHVSS executive realised that it was imperative to continue with permissible activities to keep members interested, because a club without activities won't last long. As a consequence, NHVSS trip leaders had to be creative and think outside the box. We had already been planning activities for our society's calendar involving canoeing, bushwalks, canyoning, abseiling

and cross-country skiing because of the droughts, fires and floods. Now we had to consider what activities were permissible within the COVID-19 social distancing, gathering and travel restrictions set in place by the government.

By the end of March several of our society's trips had to be scrapped. Our disruption was minor compared to businesses and people's livelihoods thrown into turmoil. Restaurants, hotels, clubs, gyms, theatres, choirs, non-essential shops and many other businesses were forced to close down due to the Government-imposed regulations aimed at getting the spread of COVID-19 under control.

NHVSS's best plans to be creative and to continue doing activities were becoming more challenging. Our society's monthly meetings were not going to happen unless we came up with an alternative to our normal face to face meetings. Many thanks to Daniel and Melissa for organising internet meetings over Skype and other internet-based video conferencing platforms so our members could hold NHVSS meetings from the safety of our individual homes. These internet meetings worked well under the circumstances, though obviously not as well as gathering at the Cardiff RSL club for a meal and then having a meeting in their boardroom, but it did allow members who lived far afield to participate when they normally could not. This necessity brought



DROUGHT, FIRE, FLOODS AND COVID

on by the pandemic will continue post COVID-19 as NHVSS will incorporate Skype with our face to face meetings for those unable to attend because of distance.

The ASF and NSW Speleological Council also went down the path of holding their executive meetings via the internet.

By mid-April buzz words like 'unprecedented', 'contact tracing', 'community transmission' and 'flatten the curve' were in vogue as authorities ramped up efforts to track down people who could be infected and more restrictions were mooted. From 1st May up to two adults and their dependent children were allowed to visit another household and two-person gathering limits still applied to public places. As the number of community transmissions fell, the government started easing restrictions. After 15th May the NSW Government allowed a maximum of ten people to gather outdoors, provided everyone could remain 1.5 metres apart, up to five visitors per household at a time, while ten guests were permitted at weddings and religious gatherings. Funerals could have up to 20 mourners indoors or 30 outdoors. Most adults maintained social distancing to comply with government regulations, but many schools remained open and large groups of children gathered outside schools and in shopping centres, interacting as they had before the COVID-19 pandemic.

As the year rolled on COVID-19 case numbers fell to zero in NSW and in most other states (except Victoria where a large second wave of infections occurred) which prompted the NSW Government to further relax gathering restrictions.

On 1st July, Wellington Caves, managed by the local council, re-opened Cathedral Cave to the public with reduced numbers on each tour and with COVID protocols in place.

During October 2020 and again on 27th November and 12th December, Colin Tyrrell, President NSW Speleological Council, approached NPWS, and cavers on another occasion approached the Minister of Energy and Environment to get the restrictions eased so caving permits could be issued. A representative from NSW Landforms and Rehabilitation said the policy of prohibiting caving was set in conference with the Minister of Energy and Environment, Matt Kean. They had chosen to take a precautionary approach, despite there being no 'official reason' provided. The representative also said COVID-19 was likely to be contagious in caves because of the enclosed environment and NSW operates under a precautionary risk management approach.

Jenolan Caves opened the Orient and Temple of Baal Cave tours for very

restricted numbers from Monday 2nd November 2020. Only people who had booked accommodation or a restaurant meal at Jenolan could purchase cave tour tickets. By early December tours to Chifley, Lucas and Imperial caves were also open for booking with limited numbers. The more constricted caves and adventure tours remained closed.

It was ironic that most other States and Territories around Australia had continued to operate tourist caves and issue NP caving permits to speleological groups throughout most of the year when all NSW caves were closed because of COVID-19.

As of 1st December the NSW Government COVID-19 regulations permitted up to 50 people to visit a residence, however NSW Health strongly recommends having no more than 30 visitors at a time if the residence had no outdoor area. Weddings, funerals and small hospitality venues were allowed one person per two square metres and dance floors up to 50 indoors and 100 outdoors.

On 12th December 2020 the ABC news announced that all of the Australian States and Territories were open to interstate travellers and the only restriction was that South Australian travellers entering Western Australia were required to quarantine for 14 days upon arrival. All other border crossings were open to travellers with no restrictions. Despite this, NSW National Parks still weren't issuing caving permits.

On 13th December the Manager Landforms and Rehabilitation, NSW NPSW communicated a lengthy response to Colin Tyrrell, stating that the NSW government was considering lifting the temporary suspension of recreational caving in NSW national parks. The response went on to list a number of requirements that must

be followed once the government gave the go-ahead. These included a maximum of six persons on a trip, temperature checks, wearing of approved COVID safety face masks at all times underground and completion of a recreational caving COVID-19 mitigation plan, to name a few.

On 16th December NSW Health announced a new case of COVID-19 in a van driver who transported international and domestic aircrew from the airport to their hotels. This outbreak quickly spread and six days later there were 90 infected people identified across the Northern Beach suburbs of Sydney. Within days of this new case being detected, states and territories reimposed border closures to people travelling from NSW.

At the time of writing this article in late December 2020 there has not been a specific date set for when NSW National Parks will recommence issuing caving permits. Hopefully this situation will change soon. However, the latest COVID-19 outbreak has most likely prolonged the wait for commencement of caving in NPs.

Although the coronavirus pandemic in Australia has had a severe impact on caving and our lives, in general the restrictions that were imposed in Australia have made us one of the lucky countries. We have had one of the lowest infection and death rates worldwide. The swift and decisive actions of our state and federal governments made a huge difference to where we are now.

APRIL 2021 UPDATE

Storms that lashed the Jenolan caves area in December 2020 had caused a landslide and slope instability of the Two Mile section of road from Oberon to Jenolan. This access road had not yet been reopened. During mid-March 2021, a once-in-a-century



Caving with COVID - Jai White & Murray Dalton in Lawler's Cave on private property near Ellerston NSW





Blue Lake at Jenolan filled with flood debris, 21st February 2020

ANDREW BAKER

rain event battered Australia's east coast over more than a week, causing flooding, widespread evacuations, landslips and Sydney's Warragamba dam to overflow. Many suburbs along the Hawkesbury River were evacuated as floodwaters inundated houses, businesses and roads. Jenolan's nearest official weather station is at Mt Bindo (near Hampton), 24 km to the north. It recorded in excess of 327 mm of rain in that week, and included a new one-day March record of 108 mm on 22nd March.

So much rain fell that the ensuing flood at Jenolan once again washed gravel and silt into Blue Lake, almost completely filling it once again (it had just been cleaned out after the January 2021 floods). The Jenolan caves road from Hartley at a location called Five Mile suffered a landslide on 21st March, which removed a huge amount of earth from beneath one section of the winding stretch of asphalt, leaving the safety barrier dangling precariously in the air. By 23rd March the Two Mile section of road, which was being repaired, had sustained several more landslides. This meant that both road accesses to Jenolan were now closed and management announced on 25th March that the caves would be closed indefinitely

until such times as the roads could be made safe.

UPDATE ON CAVING IN NSW'S NATIONAL PARKS

On 31st March 2021, NPWS advised that caving in NSW national parks and reserves (including karst conservation reserves) could recommence. All applications must include an appropriate recreational caving risk mitigation plan similar to that developed by the NSW Speleo Council. This includes protocols to cover COVID-19 risk management. A special 'Thank you' to Colin Tyrrell for his tireless efforts working with NPWS to resolve the bureaucratic issues which have prevented caving from occurring for such a long period in NSW.

Wombeyan Caves remains closed after sustaining infrastructure damage from floods in late January 2020. Over 9th-10th February 2020 about 400 mm of rain fell at Wombeyan Caves, which caused more infrastructure damage at the caves as well as closure of Wombeyan Caves Road (access from Mittagong), due to 15 rockfalls and numerous wash-a-ways along a 14 km section. Another substantial flooding event occurred in late March 2021, with more

than 200 mm of rain in six days causing more damage. The caves are still closed to tourists as of April 2021 and there is no definite plan as to when or if this main tourist road to Mittagong will be repaired and reopened; the access road from Taralga remains open.

ACKNOWLEDGEMENTS

Thank you to Katerina Fulton for proof-reading this article and helpful suggestions. Personal comments by Colin Tyrrell and Keir Vaughan-Taylor were much appreciated.

REFERENCES

- Burt, D. and Scott, M. 2019. White Water Rafting Snowy River — McKillop's Bridge to Buchan, 2nd-5th October 2019, *Newcaves Chronicles* 53: 48-50.
- O'Brien, R., Humphrey-Hood, C. and Downes, P. 2020. Texas Caves Revisited. *Caves Australia* 211: 28-35.
- Plowman, C. and Spate, A. 2020. Bushfire Damage at Karst Sites. *Caves Australia* 211: 5-6.
- Smith, G. 2020. President's Report: 30th June 2019 to 1st July 2020, *Newcaves Chronicles* 54: 3-4.

Ken Murrey

Stephen Fordyce
VSA

MANY of you would be aware of the sad news that Ken passed away suddenly on 30 March 2021, aged 65.

I will fondly remember many diving and caving trips with Ken, particularly pushing beyond the third upstream sump of Elk River Cave (Buchan, Victoria) and dropping some spectacular new pitches in Ring Hole (Junee-Florentine, Tasmania). He wanted to be doing the good stuff, whatever or wherever it was—bringing along his cheerful personality and plenty of good ideas on improving things.

Ken grew up in Southampton in the UK (he was an excellent soccer and tennis player) and moved to Australia in his early 20s because it seemed like a grand adventure, soon meeting his wife Lily and starting a family.

He had a successful career in IT before an about-face to start and run his own earthmoving business. Ken came to caving and diving later in life but with the energy that he applied to everything. Inevitably, he became a rope and rigging expert as well as a veteran cave diver, with experience in Mt Gambier, Tasmania and the Nullarbor, and he was also an experienced rebreather and sidemount diver. He made some 15 trips into Elk River cave, most as part of the sump diving team.

Serving several years as VSA Training Officer, Ken fostered the development of rope skills for many would-be cavers, generously using and lending his spare personal kit. On one of my early Tassie trips he lent me his spare Pantin, which has turned out to be my most game-changing piece of SRT kit — thanks again, Ken.

Ken had been an active caver, cave diver and sump diver until a few years ago, when he declared that he had better retire and take up something ‘easy’, which turned out to be whitewater kayaking. Ken was not the sort to do things by halves and had already accumulated four kayaks and, by all accounts, a solid reputation in the kayaking community at the time of his untimely passing. He had also discovered the fun of



LIZ MURREY

Classic Ken



LIZ ROGERS

Ken sump diving in upstream Elk River

passing on his love of the outdoors to his young grandchildren.

Some other noteworthy features of Ken include his enjoyment of science fiction (he and Peter Freeman could spend entire weekends discussing the finer points of Isaac Asimov), his breakfast of choice: a

cup of tea and a Mars Bar, and his collection of T-shirts with witty slogans. My personal favourite said ‘Don’t grow up—it’s a trap!’ and I’m glad to say (albeit with a tear in my eye) that Ken never did fall into that trap.

Google ‘6 dollar shirts’ and buy some if you want to avoid growing up (I did).



Jenolan 2020 – a reflection

Scott Melton

THE YEAR started with a place I have held dear to my heart for as long as I can remember, and my place of employment for 27 years, Jenolan Caves, being all but burnt out as a consequence of the Green Wattle Creek fire and its suppression efforts on New Year's Eve 2019.

It was only by dint of superhuman efforts by the NSW Rural Fire Service, NSW Fire and Rescue as well as Jenolan Caves staff that historic Jenolan Caves House and the visitors' precinct were saved. Jenolan Caves was closed and most staff evacuated by 18th December.

The fire did result in the loss of the Cavers' Cottage, our RFS Fire Station and two staff cottages, both of which I had spent time living in. After a mammoth clean up by Jenolan staff along with the RMS, Jenolan was able to reopen on 1st February after a closure lasting 44 days.

By this time we were hearing the rumblings of the growing pandemic but there were other rumblings developing as well. After being open for only six days the decision was made to close again due to a predicted impending major rainfall event. And what an event it was —some 440 mm in 36 hours.

The flood reached a peak in the early hours of Sunday 9th February with 10 cm of water running through the café and the ballroom of Jenolan Caves House despite efforts by staff to build diversion barriers. In places in the main visitors' precinct there was over a metre of accumulated gravel. After another massive clean-up and a closure lasting for seventeen days, Jenolan was able to reopen on the 24th February.

This opening was not to last long, however. By this time the pandemic was ramping up and after being open for only 28 days after the flood, the decision was made to suspend operations at Jenolan Caves for the third time, Cory running our last tour at 5.00 pm on 22nd March.

We had no idea how long this closure would last for or what the future would hold for us. Things overall did not pan out



NSW FIRE & RESCUE, OBERON

Jenolan Caves House threatened by the fire

as many had expected and Jenolan Caves House was able to reopen in early June but it would not be until 2nd November before we could welcome visitors back into the caves. Initially it was just the Orient and Temple of Baal but as of 30th November, the Lucas, Imperial and Chifley Caves as well, albeit with reduced numbers. For the

cave tours, the pandemic closure lasted for a mammoth 224 days. 2020 has certainly been a strange year for many reasons and I am glad that I live in the great country of Australia. The adversity such as the fires, floods and pandemic has bought the spirit of being an Aussie to the fore.

May 2021 be a better year for all of us.



NSW FIRE & RESCUE, OBERON

Fire out of control on BURma Road



POSTSCRIPT — 2021

I closed off the above article with the wish ‘May 2021 be a better year for all of us.’ Maybe I should not have...

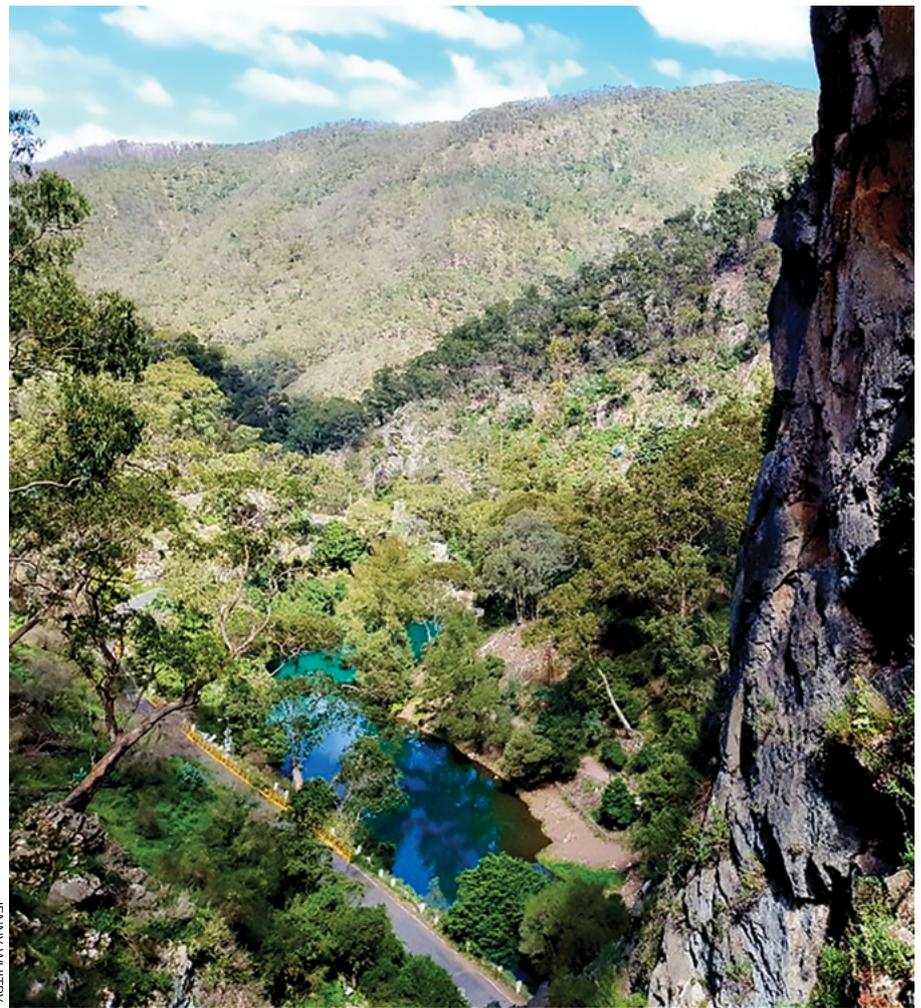
Many said that the 2020 flood was a 1 in 100 year event and many of the guides made reference in their tours to the fact that history was certainly repeating itself when compared with the now historic events of 2019. Jenolan was slowly getting back on track, visitor numbers were starting to rebound and the Blue Lake was restored to its pristine beauty and a new wall valve was installed. The great photo (left) was captured by Jenny Whitby (JCH&PS President) in early March of a newly restored Blue Lake as viewed through Carlotta Arch.

This is one of the most iconic views to be seen at Jenolan Caves and countless photos have been taken of the Blue Lake from this high vantage point. But it was not to last...

We received word that a major rain event was predicted and so the decision was made to close Jenolan to the public and evacuate the majority of staff as of 19th March, leaving just a skeleton crew in the valley. A wise move indeed.

As predicted, the rains returned with a vengeance on the Saturday/Sunday and the Jenolan Valley saw well over 220 mm fall. While not as much rain fell as in February 2020, the water flow behaved in a very different manner. In 2020, the ground was dry with very little vegetation so the water tended to run off quickly which resulted in the large amount of silt, mud and gravel being deposited in the main Jenolan Caves visitor precinct.

This flood also resulted in a fairly even distribution of sediment within the Blue Lake. The 2021 flood behaved in a similar manner but without the same impact in the visitor precinct; however, based on the deposition pattern of the sediments in the Blue Lake, it appears that the majority came from McKeowns Valley via the Devils Coach House. This inflow reached



JENNY WHITBY

to within about a metre of the dam wall. Initial estimates are two to three times the amount of sediment has been deposited this year compared to the 2020 flood. An interesting thing to note is that this year the deposited rocks overall are larger than last year as well. Given the damage to the Five Mile Road, we are not sure when excavation of the lake will occur. It will be a much bigger job than last year's excavation was!

The photos below, supplied from Paul Toole MP's Facebook page, show the amount of washout that has occurred on the Five Mile Hill. It is located a few hun-

dred metres up from the staff cottages. Initial Transport for NSW estimates are that it will take at least a year to come up with a suitable engineering solution plan and subsequent works to restore access to this important Jenolan Caves road. No matter what the solution, it will be innovative!

Jenolan Caves, and Jenolan Caves staff, are resilient and I am sure that we will be back up and running our tours and welcoming Caves House guests before too much longer!

Two one in 100 year floods in 13 months—who could have predicted that!



PAUL TOOLE MP



PAUL TOOLE MP



JF-30 The Letterbox

Sump exploration, 19 March 2021

Party: Serena Benjamin, Janine McKinnon, Ric Tunney.

Janine McKinnon
STC

INTRODUCTION

This cave is situated in the Junee-Florentine caving area of southern Tasmania. The entrance is only a hundred metres, or so, along the outflow river from the resurgence at Junee Cave, and is thus only just above base water level.

The cave is moderately small in dimensions and hands and knees crawling, or stooped walking, are needed for most of the way to the sump, which is approximately 150 m from the entrance. There is a restriction before the sump whose shape gives the name to the cave. Only svelte cavers fit through.

The cave has been known for many years but not visited in decades.

However, in April 2015 Alan Jackson surveyed this cave and found a sump at the end that he thought I might like to check out (Jackson 2015).

Later in April I went for a look and decided it was worth a dive (McKinnon 2015). Thinking it was worth a dive and actually being enthusiastic about doing it aren't exactly the same thing.

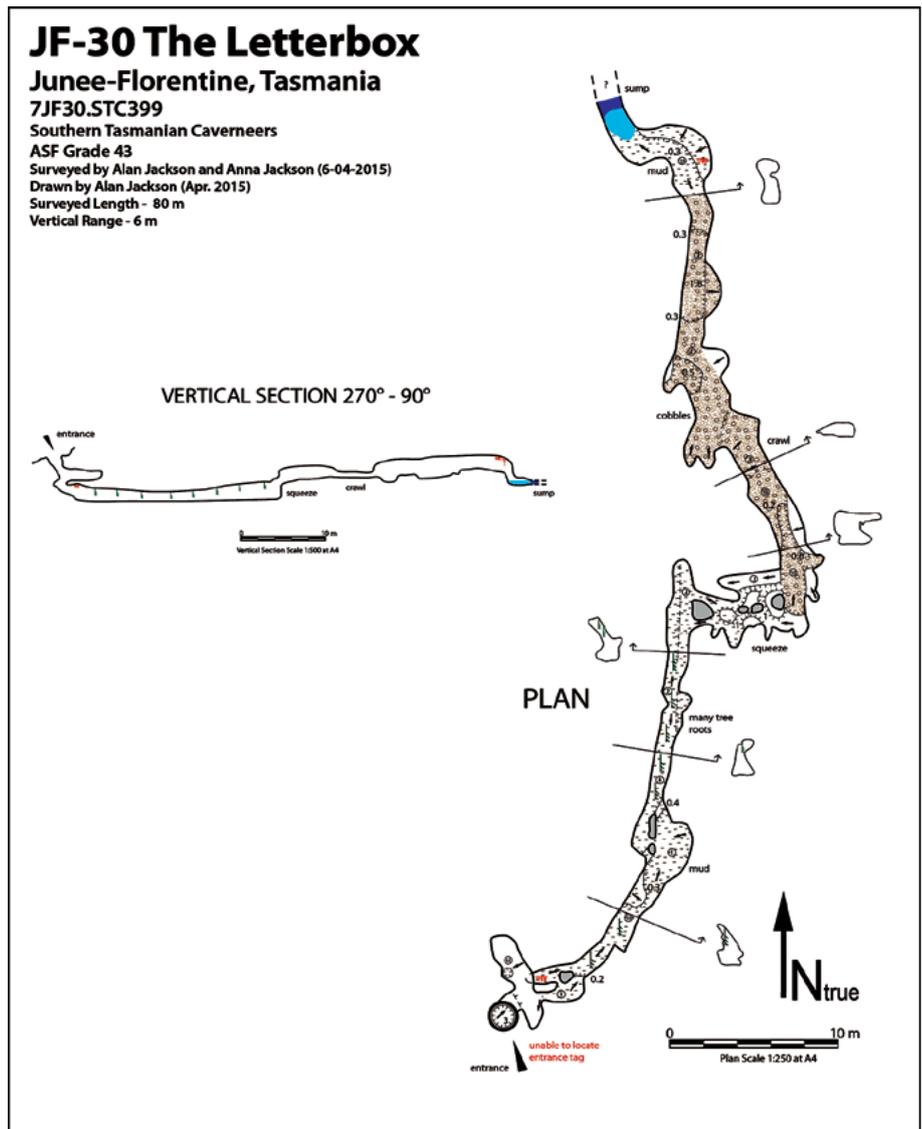
So, it went on my "get around to it soon-ish" list. Soon turned out to be six years later, after sufficient time had passed for my notoriously reliable memory for forgetting the crappy bits to have done its job.

This cave completely sumps in wet weather, so it can only be visited during dry spells. That was the second reason it had taken me so long to come back — I seemed to only remember it when it was too wet (amateur psychologists can make what they will from that).

Luckily, we were in the middle of a dry spell after a dry summer when it popped into my mind again (mainly due to data Steve Fordyce was putting around about surface surveys in the area), so it was a good time to do the dive.

DIVE DAY

We had the dive gear distributed across four packs, mainly to keep the weight of each pack reasonable for the dragging



and pushing through the restriction. I had packed the minimum gear needed and was thus diving in a semi-dry suit (which I wore into the cave) and using 2 x 3 litre tanks. If the dive proved extensive then I would come back with bigger tanks! I was not hopeful.

Ric didn't plan to come through the restriction but was helping get the packs that far.

The cave was smaller, crawler and muddier than I remembered (note comment

above about my memory's operation). I went through the restriction first and Serena passed the packs through and then followed. Any tighter and we wouldn't fit.

Ric planned to return in an hour (at 12:30 pm) to help get gear back out from the restriction.

Tie-off points at the sump were almost nonexistent. The cave was smooth mud; wall and floor.

Luckily, I found a small formation about 6 m back from the pool. It was facing down

SERENA BENJAMIN



Janine in the sump

but I managed to tie my line to it; secure I would not call it.

My secondary tie-off point didn't exist so I put a silt stake into the mud and tied to that. Another very dodgy attachment. My plan for line security now was Serena making sure these tie-offs didn't come off, or at least that the line didn't disappear into the sump if they did.

I kitted up at the pool edge as carefully as possible (hoping to keep the water clear) but slid in halfway through the process as it was very slippery.

I now had one very murky sump. One of my fin straps broke as I was putting it on so I decided to do the dive sans fins. I expected the passage to be tight and nasty and short, and thus fins not really needed. Whoops, another mistake that turned out to be.

The sump was zero visibility of still water (flashes of sight now and then) and about 1-1.5 m high and 2 m wide. So there was plenty of space but a problem trying to move with no fins and very floaty (wetsuit-booted) feet. Propulsion was pushing off

from the ceiling as the floor was deep silt/mud.

Of course this meant that more "stuff" rained down from the roof than would have been dislodged by my bubbles alone. Not exactly textbook cave diving style but no one was there to see (or could see if they had been there) and it passed the major test of working.

To be honest, as I kept moving forward I was surprised that I was actually getting somewhere (and not being stopped by the passage becoming too small), and I was even more surprised when I surfaced 10 minutes later in dry passage. I put in another (small) silt stake and tied off the line and cut it.

Then I went for a walk along the new passage. It was very similar to the other side; stand up passage about 1-1.5 m wide and coated everywhere in thick mud, both floor and walls.

This passage twisted and turned a bit and ended in another sump. I would guess it was about 30-50 m of passage. Unfortu-

nately, I didn't have a Disto with me as I hadn't actually expected to find dry passage.

I thought about having a look in the next sump but I had a bit of a problem. I had REALLY thought this dive would go nowhere, so I hadn't had a clear discussion about return times with the others.

I had thought I would be back in 15 minutes! I was worried that if I didn't return for a couple of hours, they would be very worried, and I didn't want to go back through the sump twice more to talk to them, as well as go into this next sump, all on 3 litre tanks. It is blatantly clear that there is a lesson there in not being too pessimistic even if all indicators lead to that belief.

So, I decided to head out and come back to finish (continue) another day. It's not like it's epically hard to get to it, just unpleasant and not a lot of fun.

I had my underwater survey gear but with no visibility I couldn't survey out. As this will always be the case some creative surveying techniques will be needed. Survey by braille coming up.

I surfaced in the main cave just as Ric could be heard arriving back at the outside of the restriction. He said he was expecting me to be back so that reinforced my decision.

So the cave continues. According to Steve Fordyce's surface overlay data, the cave is heading inland towards JD99, The Chairman.

Dye tracing suggests that water from The Chairman DOESN'T come out in Junee Cave, so maybe it comes through this cave? The next sump needs diving. Survey of the dry passage needs doing, survey of first sump too. A job for next summer.

Checking how much line I used through the sump (minus that from primary tie-off to sump edge) I find the sump is roughly 15 m long and shallow.

A short video can be found here. <https://youtu.be/kKyH5i2EyUA>

It is very 'fly on the wall'.

REFERENCES:

Jackson, A. 2015 JF30 The Letterbox. *Speleo Spiel* 407: 3-4.
 McKinnon, J. 2015 Checking out JF30 & JF31. *Speleo Spiel* 407: 6.

SERENA BENJAMIN



Getting somewhere...



The Whowie's Lair

Karl Brandt

OF ALL the legendary Dreamtime creatures, few were as terrifying as the Whowie.

Resembling a twenty-foot long goanna with a frog-like head and six thick legs to support its enormous bulk, the river monster of the Riverina would sneak upon campsites under the cover of darkness and devour as many men, women and children as it possibly could.

Those unfortunate enough not to be swallowed straight away were carried in the creature's mouth to its den, a great cave on the banks of the Murray that stretched for kilometres.

Decades after first reading the vividly-illustrated picture book version of the story, I found myself imagining what it would be like, flaming torch in hand, to journey into the dark depths of the Whowie's lair. Surely if a cave of such proportions still existed, it would be easy enough to find.

The Riverina region, encompassing the Murray and Murrumbidgee drainage zones in southern New South Wales, includes over four-hundred kilometres of the Murray River.

But despite a rich history of exploration along the river's winding banks, no significant cave system has been found. It seemed this monster quest was over before it even began.

But then in 2006 came a breakthrough. Seventy-six years after the story of the Whowie was first published, a re-edited version appeared in a collection titled *Legendary Tales of the Australian Aborigines*. The author was no longer credited as editor W. Ramsay Smith but as the man who gathered the stories in the first place, the renowned Aboriginal preacher, inventor, and author, David Unaipon.

Unaipon, working for the University of Adelaide in the 1920s, collected the traditional tales from his own Ngarrindjeri people of the lower Murray River in South Australia.

That the Riverina bioregion extends to the lower Murray confirms the search for



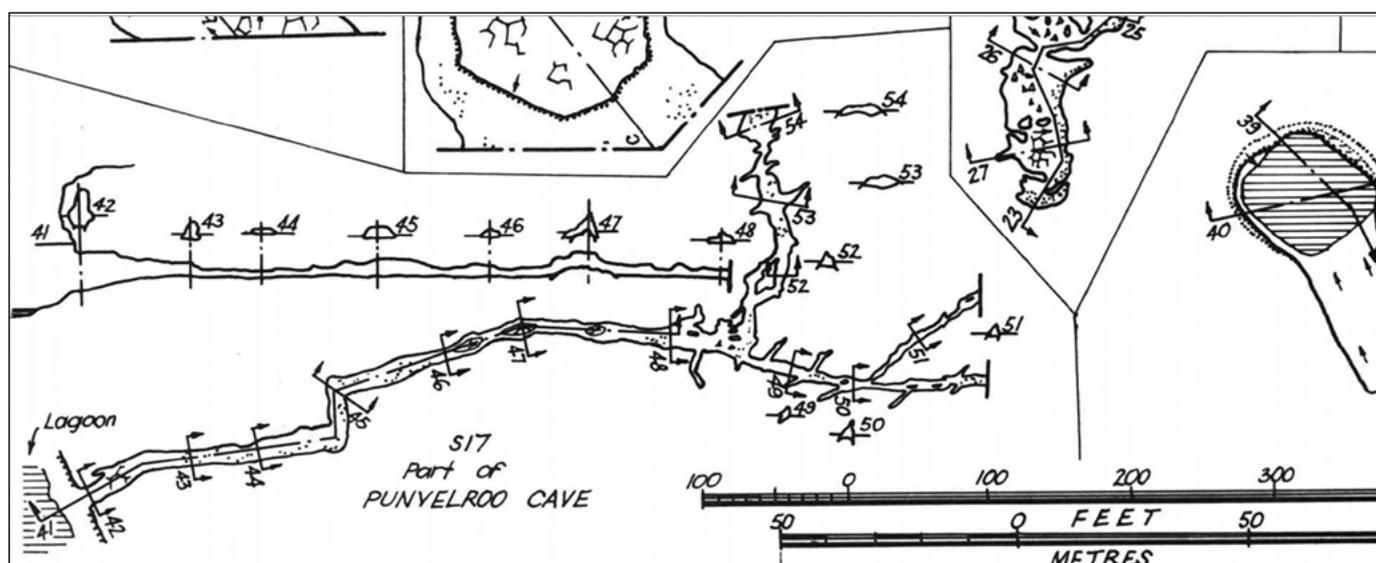
The entrance to 5M-1

the Whowie's lair was centred on the wrong state.

From Murray Bridge, within Ngarrindjeri territory, the river leads north towards Swan Reach. Just south of the town, stretching approximately three kilometres into a sandstone cliff on the riverbank, lies the Punyelroo Cave. Known to settlers

since the late nineteenth century, the cave remains shrouded in mystery.

According to Aboriginal legend, Nooreel, an ancestral crow spirit, fought a terrific battle against Narnooroo, the goanna, at the Nor-West Bend, around seventy kilometres to the north of the cave. The victorious crow used tribal magic to



vanquish the goanna into a hole in the cliff which he then blocked up with stones. But much to Nooreel's surprise, Narnooroo managed to dig himself out through what is now the entrance to Punyelroo.

That the cave was formed by the claws of a giant goanna is an important clue. Some say the story of the Whowie was inspired by a real-life encounter between early Aborigines and *Megalania prisca*, a five-metre long goanna that roamed the outback of Pleistocene Australia and whose fossils have been found in the Naracoorte Caves to the south.

Explorers who climb the rocky slope to Punyelroo's forty-foot high mouth follow in the footsteps of the brave water rat tribe who finally took a stand against their cruel tormentor. Fearing that their people would be wiped out due to the constant attacks,

the tribe journeyed to the cave and after examining the sand outside for footprints, determined that the monster was deep inside.

Upon entering the cave, today's explorers are plunged into a world of darkness. Flickering shadows dance along twisting passageways studded with fossil shells before the roof suddenly dips and rises again. Early legends claimed the cave extended for over one-hundred kilometres before opening up again in the northeast.

However more recent explorations have confirmed that just as the water rat tribe suspected, the cave has only one way in or out.

The tribe wasted no time in gathering up bundles of sticks and stacking them about halfway along the cave with a great heap at

the entrance. Then they set them alight, causing thick smoke to fill the air. Explorers who make it deep into the tunnel before it branches will discover two ancient tree trunks.

Were they washed in by huge flood as is currently believed, or were they deliberately placed, perhaps to fuel a great fire of long ago?

Whatever the answer, the mighty Whowie forced his way towards the entrance, blinded and dazed by the smoke, and was finished off by the tribe's waiting spears.

They say the river monster's spirit lives on, and with the Punyelroo Cave yet to be completely explored, who knows what lies waiting to be discovered in the deep, dark depths of the Whowie's lair.

New papers from *Helictite*

Greg Middleton, Editor

Helictite – Journal of Australasian Speleological Research

THE FIRST two papers of *Helictite* Volume 46 (2021) have been published online.

Yes, *Helictite* took a year off in 2020 when contributions were scarce, but we're now back!

The first paper in Volume 46 is Tiah Bampton's 'Palaeoenvironmental proxies used to reconstruct the Quaternary of Australia: a case study from Naracoorte Caves, South Australia'.

This paper examines the palaeoenvironmental proxies used in Quaternary research, such as marine cores, sediment analysis, palynology, speleothems and isotope analysis, and then considers the par-

ticular proxies in use at Naracoorte Caves and the results being achieved. The well-stratified deposits in caves at Naracoorte have the potential to greatly improve our understanding of changes in climate and fauna in south-eastern Australia during the Quaternary.

In the second paper of Volume 46 now online, 'Some impacts of war on karst environments and caves,' Kevin Kiernan analyses the many impacts, both direct and indirect, that warfare and related military activities can have on karst areas and their caves.

Examples are drawn from across the globe and from conflicts from as far back as

the American Civil War, WWI and WWII and especially in South-East Asia in recent times. Kiernan writes from personal investigations, especially in SE Asia and Europe, and from intensive research.

These papers can now be downloaded from:

<https://helictite.caves.org.au/contents4.html>.

Helictite welcomes new contributors. If you are interested in writing a paper for *Helictite*, please consult 'Information for Contributors' at <https://helictite.caves.org.au/contrib.html>

For contact details see <https://helictite.caves.org.au/admin.html>

Southern Bent-wing Bat and the ASF Karst Conservation Fund

Nicholas White

ASF Karst Conservation Fund

THE Southern Bent-wing Bat (SBWB) is critically endangered. It is cave-dwelling and its range is restricted to the Lower South East of South Australia and Western Victoria.

Its maternity caves are at Naracoorte (Bat Cave) and two in Victoria with the Warrnambool site the main one. The population has declined seriously in recent decades. Recent population estimates put the total at about 40,000.

The original research on the bat focussed on the maternity behaviour of the bat population. Much more information on the bat is needed to determine factors contributing to population decline and this is what has been exercising the minds of karst managers and wildlife biologists.

South Eastern Australia has experienced a series of droughts as well as a changing landscape as farming systems have evolved and intensified. There are a number of wind farms and newer ones proposed. The newer ones are taller with a much larger sweep area than earlier turbines.

It is known that turbines are associated with some bat mortality. The feeding height and migrating behaviour is not sufficiently well known to judge the effects of bigger diameter wind turbines on mortality rates on the bat.

There is an EPBC constituted recovery plan for the SBWB with a national recovery team currently working through critical actions to ensure this recovery is successful.

The ASF Karst Conservation Fund has

supported several projects on the SBWB. Several of these projects have been focussed on discovering new information on the SBWB. These have been:

■ **'Population dynamics of the critically endangered Southern Bent-wing Bat'** was a Latrobe University PhD project of Emmi van Harten. This has recently been completed. One of its important findings was that even in winter there were substantial movements between roosting caves of about 75 kilometres.

■ **'Health survey of two subspecies of bent-wing bats (*Miniopterus schreibersii bassanii* and *oceanensis*)'** This was a University of Melbourne PhD project conducted by Peter Harry Holz and recently completed. The project examined a number of disease possibilities contributing to population decline. None was found and in particular there was no evidence of white nose syndrome fungus in the bent-wing bat populations in Victoria and South Australia. These results have been published in peer reviewed journals.

■ **'Investigation into the Habitat Use and Nightly Foraging Flight Activity of the Southern Bent-wing Bat.'** This is a University of Adelaide PhD project of Amanda Bush. It is aimed at understanding where the bats feed and at what height. It is based on attaching small GPS units with a radio transmitter to the bats. The GPS unit needs to be retrieved to download information. On

page 19 is an interim report on the 2021 findings. The fund supported the GPS monitoring units.

It should be noted that earlier work by Amanda Bush showed that exposure to white light of over-wintering bat colonies resulted in prolonged disturbance of the bats. It is therefore advised that cavers or researchers use red light or cover their white lights with red cellophane to minimise disturbance.

The Wildlife Health Association initiated a risk management biosecurity assessment of the likelihood of the white nose syndrome fungus being introduced into Australia. See 'Qualitative risk assessment: White-nose syndrome in bats in Australia' Peter Holz et al. 2016. *Qualitative risk assessment*: — Wildlife Health Australia

This document is still exercising policy professionals in the Commonwealth Department of Agriculture, Water and the Environment and controls at the border to reduce the risk of white nose syndrome fungus introduction into Australia.

The ASF Karst Conservation Fund is supporting a just-approved ARC linkage project with Chris Turbill of Western Sydney University: 'Vulnerability of Australian bats to white-nose syndrome — a catastrophic fungal disease.' This project is to support four postgraduate students and is spread over several years. ASF is providing some funds and has indicated assistance with record material on caves plus field support where needed.

Links for Cavers

Susan White

AS MANY cavers over the past year may have been rather restricted in the amount of 'real' caving that has been able to be done, they have been trawling the web for relevant YouTube and other information for some armchair caving at least.

Here are some links to material some of you might find interesting. Apologies to those of you who already have seen some or all of them.

Sooty Layers in Stalagmites Record Human Activity in Caves — Eos

<https://tinyurl.com/48dytc7y>

Naracoorte Caves: A Rolls-Royce record of biodiversity

<https://tinyurl.com/4d84z996>

Lengthy but with some interesting bits

<https://tinyurl.com/3wfm9jdp>

Major cave system in the Philippines with interesting history. Much evidence of sea level change.

<https://tinyurl.com/jcy8fd44>

Cave Diving

<https://tinyurl.com/3zab7mn3>

Interesting links between caving and other activities

<https://tinyurl.com/463nmy3z>

Groundwater and karst

<https://tinyurl.com/p277hk9a>

Caving in US

<https://tinyurl.com/mfkbp3uy>

Mexico

<https://tinyurl.com/yzf5uj7b>

International

<https://tinyurl.com/24brdh2t>

<https://tinyurl.com/fwkadeh9>

Macedonia

<https://tinyurl.com/7ksurs7r>



The Southern Bent-wing Bat

Interim Progress Report – Investigation into its Habitat Use and Nightly Foraging Flight Activity

Amanda Bush
University of Adelaide

THE Southern Bent-wing Bat is a small, critically endangered, insectivorous bat that relies solely on a small number of caves in which to roost.

The range of these bats is restricted to south-west Victoria and south-east South Australia. They breed in only three maternity caves and move regularly between these caves and non-breeding cave roosts. The number of Southern Bent-wing Bats has declined markedly in recent decades, and they are predicted to continue to decline into the future.

It is likely that a number of factors have contributed to this decline, including landscape-scale habitat modification (e.g., clearing of forests and draining of wetlands), disturbance or closure of their cave roosts, climate change (particularly worsening droughts) and a reduction in their insect prey.

Knowing where Southern Bent-wing Bats forage at night is crucial to inform efforts to protect and restore foraging habitat. However, investigating the foraging ecology of these bats has proved difficult due to their small size (< 20 g) and fast flight.

Funds from the Australian Speleological Federation Inc Karst Conservation Fund have contributed to a PhD project using miniature GPS trackers (< 1.5g) to follow nightly foraging flights. In February 2021, 50 bats were fitted with trackers at two non-breeding caves in south-west Victoria. Due to their small size and limited battery life, the trackers can record locations for between one and four evenings depending on the frequency of sampling. The trackers are glued onto the back of the bats and fall off within a few days or weeks.

As the data can only be downloaded from the trackers if they are retrieved, it is critical that these devices are found. Small VHF units attached to the GPS trackers transmit a signal to assist with finding these tiny devices.

The range of the VHF transmitter is typically less than 200 metres once the devices are on the ground, making a search



Figure 1. A Southern Bent-wing Bat fitted with GPS tracker and the size of GPS tracker compared to 1 cent coin. Strips of reflective tape are attached to make them more visible if they have fallen off within a cave.



Figure 2. Hourly point locations of an individual Southern Bent-wing Bat from 23:30 to 3:30.

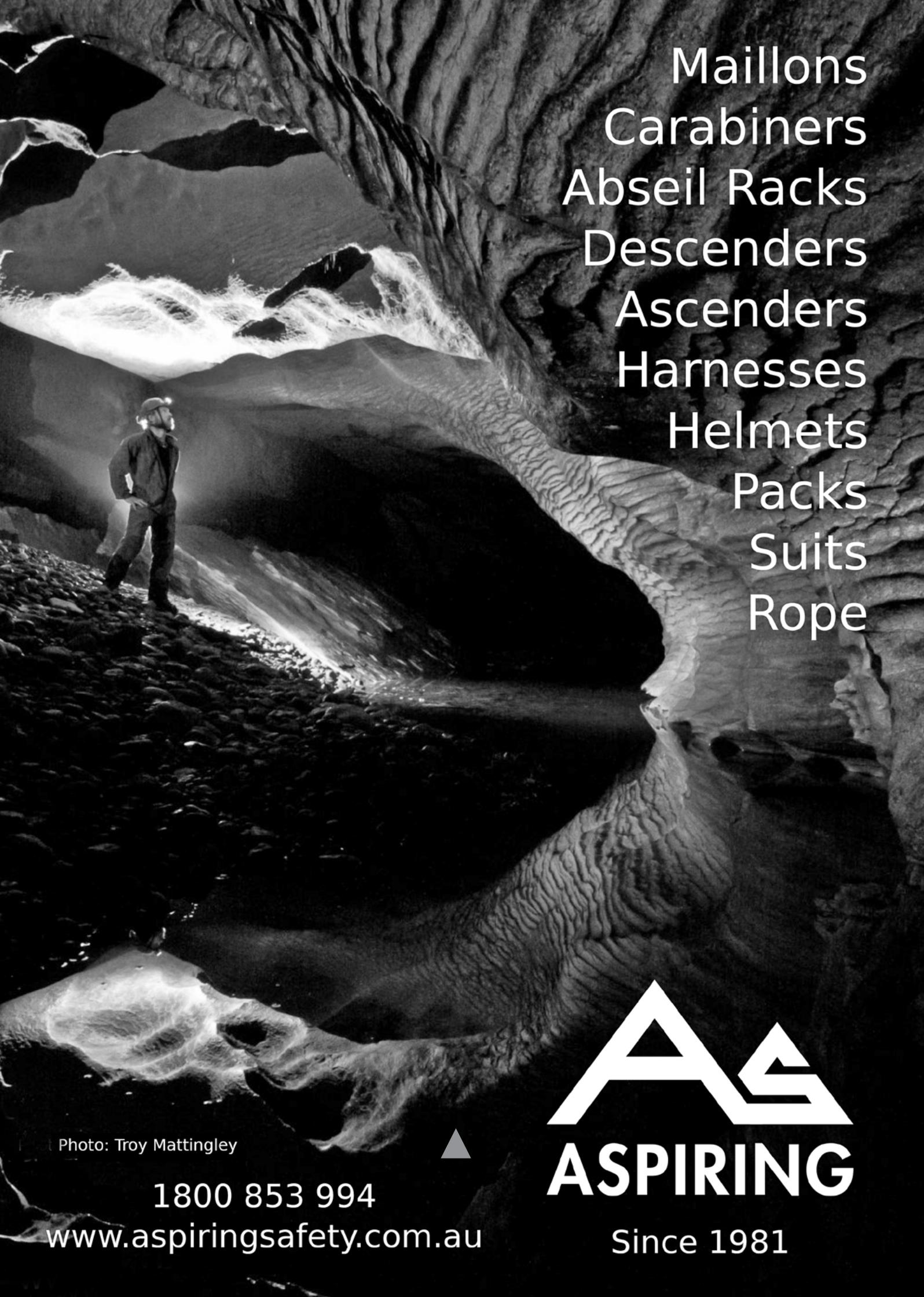
over a large area a bit like finding a needle in a haystack.

Despite these challenges, foraging location data has now been obtained for 20 individuals, including more than 600 point locations. These data are currently being analysed to identify the habitats over which bats spend most of their time foraging. Individuals were typically foraging up to 50-80 km from their roost cave.

The project is also yielding information on the distances flown by bats each night, whether bats favour particular geographic areas for foraging, and the typical flight speeds of this species.

To estimate the vertical and horizontal accuracy of the GPS devices, a field test will be conducted in which a number of units will be flown by a drone, and the drone location will be recorded from a ground station at the same time as the units are sampling.

This test will demonstrate whether vertical accuracy is sufficient to provide reliable data on flight heights which is important for assessing the risks posed to the species by windfarm development.



Maillons
Carabiners
Abseil Racks
Descenders
Ascenders
Harnesses
Helmets
Packs
Suits
Rope

Photo: Troy Mattingley

1800 853 994
www.aspiringsafety.com.au

AS
ASPIRING

Since 1981