

GUIDELINES

No.164 - DECEMBER 2023



Piccaninnie Ponds, circa mid 1970's.
Photo courtesy of Peter Mosse.

THE MAGAZINE OF THE CAVE DIVERS ASSOCIATION OF AUSTRALIA

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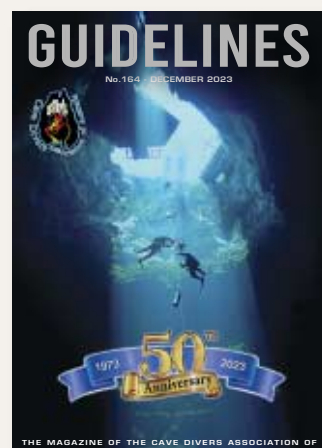
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COVER SHOT: Kilsby's Sinkhole.

Divers are Chris Edwards and Grant Pearce
on deco during Kilsbys Survey Project
Photo by Richard 'Harry' Harris.

CAVE DIVERS ASSOCIATION OF AUSTRALIA

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GUIDELINES is a newsletter of the Cave Divers Association of Australia.

All articles for the following issue are to be sent to the Publications Director,
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Print Post No. PP 100023987

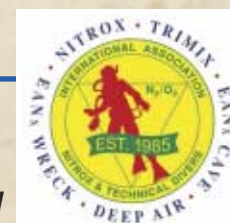
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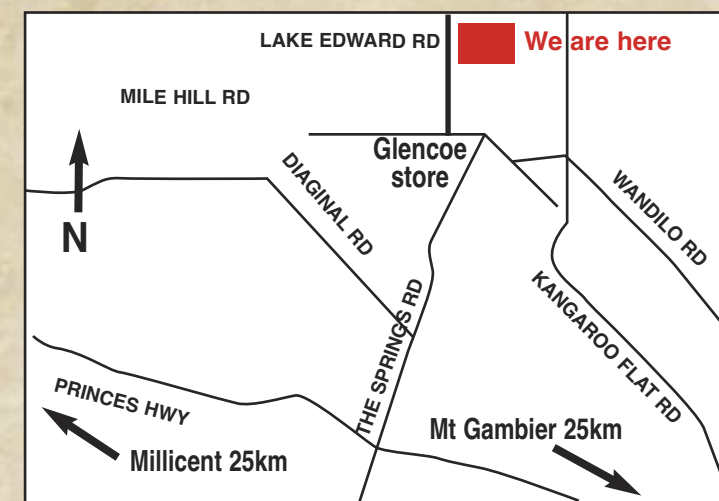
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Fifty years have passed since the formation of the CDAA and this special anniversary addition of Guidelines is an attempt to showcase at least some of the people, places and organisations that have played a role in the Association's rich history.

This Guidelines is special for three intertwined reasons: it celebrates 50 years of the CDAA, it's in A4-format instead of the traditional A5-size, and it's the biggest Guidelines produced in the history of our Association.

In terms of content, this issue offers a diverse mix of stories ranging from our anniversary weekend in Mount Gambier and celebrating our landowners, to cave diving in New South Wales and measuring temperature and humidity in Nullarbor caves.

In our feature article the CDAA's pioneering cave diving couple, David (#1) and Tamsin (#10) Warnes recall the early days of cave diving in Australia and the formation of the CDAA. They talk about diving in Mount Gambier, exploring the Nullarbor and how they first met in Perth. Dave gives insights into the formation of the CDAA in the years leading up to 1973, and reminisces about his farewell to diving at Tank Cave in 2018 at the age of 83. Tamsin recalls being one of the very few female cave divers in Australia in the early 1970s, and becoming the CDAA's first qualified female cave diver.

Elsewhere you can read an interesting 'did you know?' article listing random historical facts about the CDAA and its members. For instance, did you know the number of CDAA members is less than the highest membership card number? Or that mandatory use of twin tanks for cave and penetration diving was only mandated in 1991?

There is also a research story on studying and documenting fossils from caves sites, including Engelbrecht's, Gouldens and Fossil's. A team of passionate CDAA divers embarked on fieldwork in April this year and made exciting discoveries which included fossils of short-faced kangaroos, marsupial lions and small native rats.

As 2023 comes to an end, CDAA members can look back with pride on an Association which started 50 years ago with a handful of pioneering volunteers and have grown to one of the most respected cave diving associations in the world.

Finally, a word of thanks to the outgoing and incoming National Committees for their support and trust. Also, a special mention to our graphic designer Dave Bryant who has worked tirelessly on many levels, including magazine layout, sourcing advertising and of course handling our printers. Dave has been a trusted service provider to the CDAA for 23 years and his dedication is much appreciated.

Leon Rademeyer

Stories, Photos and Advertising enquiries for Guidelines March 2024 - Deadline is Feb. 25th.

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A reflection from the National Director...

Welcome members to this 50th anniversary of your Cave Divers Association of Australia. I've been privileged to be a member for nearly 40 years of that time.

This edition of the guidelines shines a light on 50 years of our CDAA and compiled by Dave Bryant and Leon Rademeyer. Starting from not so pleasant beginnings to international visitors sharing their explorations, discovering the physical limits of deep diving in New Zealand, using cave diving to map water DNA to advanced forensic studies of fossils in our backyard.

There's a phrase, coined by English scientist Sir Issac Newton 'if I have seen further, it is by standing on the shoulders of giants'. Meaning: **we are who we (CDAA) are because of the hard work of the people who came before us.** For me, this describes our CDAA journey by the dedication, passion, and vision of our members to develop the sport of cave diving one step at a time, to be the authority on cave diving in this country for 50 years.

The weekend of 3-5 November was our 50th celebration and a major tie-off point in the history of our organisation, we are still here, improving what we do, and exploring when the darkness beckons. During Friday night prior to our formal celebrations, we hosted an evening of drinks and conversations with our land holders to express our appreciation for generously allowing access to our membership during our 50 years. We also recognised our office bearers, those who take care of the daily operations of our organisation, to whom we are all extremely thankful for their time and service.

Saturday ushered in over 200 plus attendees, to hear a range of presentations, including the panel on Women in Cave Diving, chaired by Andrea Russo. Patrick Widmann sharing stunning images from his latest expeditions, Chris Jewels presenting his UK traversing trip spanning several counties, Joe Monks and Julien Louys from Griffith University revealing findings from their fossils project and Peter Stace presented an outstanding history of the CDAA. Peter reminded us of our turbulent beginnings, how we emerged through a dark period of fatalities, with background calls from the SA Government of the day to shut down the fledgling sport. Indeed, there was no training available to safely navigate the natural conditions of our flooded freshwater caves, equipment was at best a dolphin torch and single cylinder. Fast forward a few years, iconic expeditions into Cocklebidy led by Hugh Morrison were the stuff of legend in cave diving, imagine 'swimming' custom-built sleds full of cylinders to Toad Hall. Chris Brown, Phil Prust, Ron Allum and others too many to mention, pushing beyond the furthest extent of sump two, beating the French distance record. All done with open circuit gear and a few Aqua zip DPVs, pioneering equipment configurations of banded quad cylinders, pushing physically and psychologically barriers.

In my mind, these explorations established an era of gear configuration and training standards that was the Category System of 1-3. Even during this time, there was no formal training; one had to discover what secret skills were needed to practice succeeding into each level. If fortunate, the right tips and tricks were practised in places like West Lakes (Adelaide), where stress test practice and tie-offs to sunken shopping trolleys and tyres consumed weekend, always using fixed wrist tethers/clips. To front up on the day for assessment, was to be at the mercy of no less than six examiners watching every move one made, it was indeed a pass

or fail result. If it was later, candidates were don't come back for 12 months until you get it right. If one passed, the golden handshake was earned the hard way, but the learning curve had only just begun.

Fast forward to an era of structured course content, emphasis on correct technique, gear configuration, actual site training in places you expect to be diving, and the reward of formal certification if successful. From back mount twin independent cylinders, to manifolded Hogarthian systems, to side mount configurations adapted from the UK Cave Diving Group for sump diving. Whilst somewhat unfinished, and often held together with a bicycle tube, side plates and clips, to my mind, side mount configurations developed to better reflected the type of diving that is commensurate of our cave systems. These days, manifold twin sets are not so commonplace at Tank Cave, steadily replaced with of the shelf side mount systems.

Arguably an era of side-mount rebreathers is becoming more appealing, offering the cave diver extended bottom times, additional capacity for distance and depths, using approximately 10% of a cylinder (providing all is working well). Together with advanced DPVs, a trip to Cocklebidy's second sump can be achieved with much less gear, albeit relative to one's budget, experience, and certification.

With Science Sunday almost 200 members returned from the previous day. Julien and Joe ran a hands-on fossil experience. Harry shared the latest news on his use of helium in CCR and how not blow up yourself, while sharing his reasons for considering helium, such as reducing gas density and HPNS at 240 plus metres. Ron Allum was interviewed by Aren Leishman discussing his design of the Deepsea Challenger for filmmaker and explorer James Cameron, who made a record-breaking solo dive to 10,9km to the deepest point on Earth. While we were enthralled by Science Sunday, our Standards Director, Chris Edwards was busy facilitating an instructor's workshop at the Lady Nelson Information Centre. Closing Science Sunday was Ian (Lewy) Lewis (Science Officer) talking about how members interested in trying their hand as a citizen scientist can become involved in science projects at any level.

In closing, both days of the 50th symposium attracted a great deal of interest, Masters of Ceremonies were Meg Anderson and Steve Fordyce. Attendees were frequently rewarded with awesome door prizes (a big thank you to our sponsors for their generosity). A special thank you to Meg for all your time and efforts during the past 12 months organising this very successful 50th celebrations event. And to all who shared an awesome three days.

Cheerio

Grant Pearce, CDAA 1382
National Director



On behalf of the
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Symposium 2023

Incredible milestone for our association

Story by Mathew Rochford - photos by various contributors.



Ian Lewis presenting on Sunday.

Fifty years, what an incredible milestone for our association and what a weekend. My first involvement with one of our symposiums many years ago was when I really came to understand what it meant for us to be an 'association'. Early in my training, site access, how to book dives, permits, indemnities, landowner relationships and the privilege of access all loomed large. While these are rightly a strong focus of our training, it can also be overwhelming and best appreciated upon reflection. Being exposed to how access is managed overseas, hearing from early members about sites we've lost, sites we've opened, and access we have improved helped bring home just how significant our history as an association is.

world-class diving, accommodation, equipment, morning teas, diving supplies and air fills. We are also nothing without our volunteers and landowners, so our Friday evening event was designed



Patrick Widmann.



Stephen Fordyce accepts a box of specially made 'golden anniversary cookies' from Precision Waterjet's Matt Gerbert. Meg Anderson looks on.

specifically for them, and it was fantastic to have a chance to mingle and share our common history.

In addition to our wonderful guest speakers and panellists, a big shout out has to go to our local exploring divers who continue to push and share their stories. I have come to understand laying line is the easy part, the efforts in research and preparation are often nothing short of extraordinary - the very definition of 'making your own luck'.

Saturday night has always been a social event in my experience and this year our official team leader, Meg Anderson

decided to embrace our 50th anniversary with a touch of gold. Having earlier made sure members received a gold cookie token, everyone was encouraged to dress smart, but with a touch of gold. What an enjoyable evening it was.

Last but not least, a special thank you to Meg, Stephen Fordyce and John Vanderleest for putting together the weekend's events. An incredible amount of work goes on behind the scenes to allow these events to run smoothly. I trust you all enjoyed the weekend and it broaden your appreciation of our Association as much as it did for me. Here's to the next 50 years.



Mathew Rochford, Patrick Widmann and Joseph Bicanic.



I reflect on our symposiums as they are our chance each year to come together, to broaden our understanding of what came before us, what is being done to grow, and hear what is going on in the rest of the world. I've been privileged to put together four symposiums and they've all had highlights, but turning 50 somehow seemed special.

Nothing of what we do can be done without our partners, so a big thank you to all our sponsors and particularly those local businesses that work with us to provide our members with symposiums, access to



Mathew Rochford welcomes guests to the 2023 Symposium on Saturday 4 November at the Dress Circle in Mount Gambier.



Austrian cave diver and adventurer Patrick Widmann gave two presentations on Saturday. The first spoke about Mexico and the second about Brazil. Both presentations delved into extreme remote locations, spectacular landscapes, adventure and stunning cave dives.



Peter Stace gives a memorable look back at the first 50 years of the CDAA.



Masters of Ceremonies Stephen Fordyce and Meg Anderson having a good time.



Ron Allum (right) discusses the deep submersible he helped design for James Cameron with Aren Leishman.



Richard Harris speaks about extreme deep water cave diving at the Pearce Resurgence in New Zealand.



Julien Louys speaks about cave science, exploring ancient fossilised sites, new discoveries and other findings at the symposium.



Women in Diving panellists Tamara May, Aimee McCran and Liz Butler talk about their adventures and mishaps.

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Stewart Donn and Graeme Sayce.



Pat Corrigan.



Harry with Abi Harwood.



Patrick Widmann & Dave Bryant.



Craig Larkin.



Sue 'glitter fingers' Virgili.



Steven 'Tiny' Meyer.



Gary Barclay.



Kelvyn Ball.



Julien Louys and Joseph Monks.



Joseph Monks, Patrick Widmann and JDZ.

Congratulations to our 2023 prize winners



Jessica Byczkowski (pictured with Faz Atefi) wins a double boat ride from Adelaide Scuba.



Matthew Gray gets his hands on a reel donated by the Allendale General Store.



Patrick Corrigan (right) is the lucky recipient of a pair of rock boots donated by Stewart Donn from Australian Drysuit Repairs.



CDAA National Director Grant Pearce (middle) wins an Arctic undersuit courtesy of Fourth Element. With him are Fourth Element ambassadors Chris Jewell and Tamara May.



Chris David (right) wins a two night stay at 'The Habby' cave diving lodge and receives his prize from Darren Mitchell from Dive Experience and The Habby.



Mark Simpson (left) is the lucky recipient of the Halcyon Focus 2.0 Light which he receives from Halcyon ambassador Ryan Kaczowski.



Aren Leishman (right) receives his Tecline O2 regulator and gauge from Ocean Divers sponsor Jane Bowman.



Damian Bishop (left) is all smiles as he wins a 10 air fills voucher from Darren Mitchell of Dive Experience.



Anita Futterer is the lucky winner of a pair of Hollis F1 fins donated by Diving Adelaide's Damian Bishop.



Barry Opperman wins the Scubapro 200m Expedition Reel and receives his prize from Scubapro ambassador Jane Bowman (left). Ken Smith receives his S-TEK Pure Harness from Scubapro ambassador Richard Harris (middle) while Harris also gives away a pair of Camo fins to Steven Meyer, undergarments to Stewart Donn and a Nova Scotia semidry to Michael Mallis (right).



Richard Harris (left) donates signed copies of his books to lucky book prize winners Peter Stace, Corey Auld, Helen Spencer and John Vanderleest.



Bernie Harrison (right) wins a voucher and d-rings from Precision Waterjet's Matt Gerbert who was also responsible for the CDAA's engraved 50th anniversary cookies.



Richard Lickliter (right) receives a pin index medical oxygen adaptor from TFM Engineering owner Stephen Fordyce.



Carlo Virgili seems delighted with winning the Dive Rite CX2 Handheld Light donated by Tec Dive Gear, while Master of Ceremonies Meg Anderson looks on.



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Ken Smith (left) and Aren Leishman 'bond over pingers' and have the t-shirt to prove it.

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Exploring the unknown



Dave Warnes (right) diving Tank Cave with Adrian Richards in 2010. Photo Ken Smith/Gary Barclay.

David (#1) and Tamsin (#10) Warnes are in many respects the pioneering cave diving couple of the CDAA. Dave has been instrumental in the formation of the association in the early 1970s and its incorporation in 1975, and Tamsin has the honour of being certified the first female diver of the Association at a time when very few women were exploring underwater caves and sinkholes around the world. Leon Rademeyer sat down with the couple in a series of interviews as they recalled their earliest experiences of cave diving in Australia and the formation of the CDAA.

'Just gliding... with a twinset and dive light into the unknown, what a beautiful way to dive,' says Dave (88) from his Adelaide kitchen table as he recalls his early exploits in the caves and sinkholes of Australia.

His mind immediately jumps to Tank Cave on the outskirts of Mount Gambier in South Australia. It's a dive-site which he has visited since the late 1960s, and one with which he has always had a personal connection. 'Tank has always been my favourite, from the first time I explored the entrance with Mike Turner from the UK, to my last dive there in 2018. I truly loved every moment of it,' he says. Dave's last Tank Cave dive was also his farewell to diving in general which made the experience one he would never forget. He

logged a solid 85 minutes with Ken Smith on the day, and at 82 years of age also set the record for the oldest diving member of the CDAA. As fate would have it, Tank was visited on the same day by another group of divers, including Dave's 'special friends' Richard Harris and John Dalla-Zuanna, which made the occasion all the more memorable.

But things were very different at 'windmill cave' in those early days, Dave recalls. 'The cave entrance, if you could call it that, had a windmill overhead and was obstructed by a pile of dilapidated timbers,' he says. 'The entrance to the water was also extremely difficult to navigate, but was later dug out to make access easier until we ended with what we have there today. 'Tank is just a place to which I have returned so many times during my diving days, without ever getting tired of it,' he says.

Sniffing around boats and diving

However, Dave's fascination with diving started more than a decade earlier – in the late 1950s – when he started 'sniffing around boats and diving' as a young

Adelaide tradie. 'I met people who were spearfishing and was soon introduced to scuba divers,' he says. 'Everyone was sort of getting into diving at the time and being an adventurous bloke, I got hooked very quickly.'

Dave's first dive was in the early 1960s off the Adelaide coast with borrowed gear and guided by the British Sub-Aqua Club's training guide for novice divers. 'We had a sub-aqua club book from England which told us how to go down and come up and that was it,' he says. 'It was pretty rough, but that's how all of us dived. There were no dive shops like the ones we have today until the late 1960s. We had to do it on our own.'

The early days in Cairns

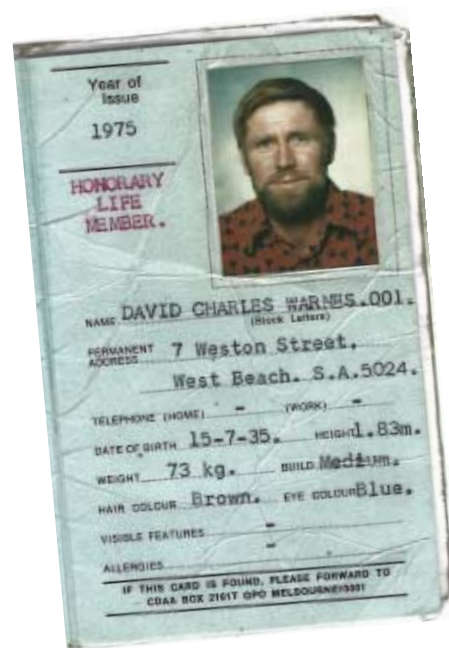
During those early days Dave travelled far and wide to satisfy his passion for diving. Cairns was his preferred destination for winter diving and in summer he travelled to Melbourne where his mother lived. It was in Melbourne where he first got hold of a Porpoise regulator and tank. 'I thought if it was good enough for our navy, it should be good enough for me,' he says. In Cairns Dave dived the Great Barrier Reef, but also ventured inland to the Atherton Tablelands where he took an interest in crater lake diving. 'I dived Lake Eacham and Lake Barrine which were not without near misses,' he says. 'I learnt to dive deeper there which unknowingly prepared me for what was to come.'

Relocating to Mount Gambier

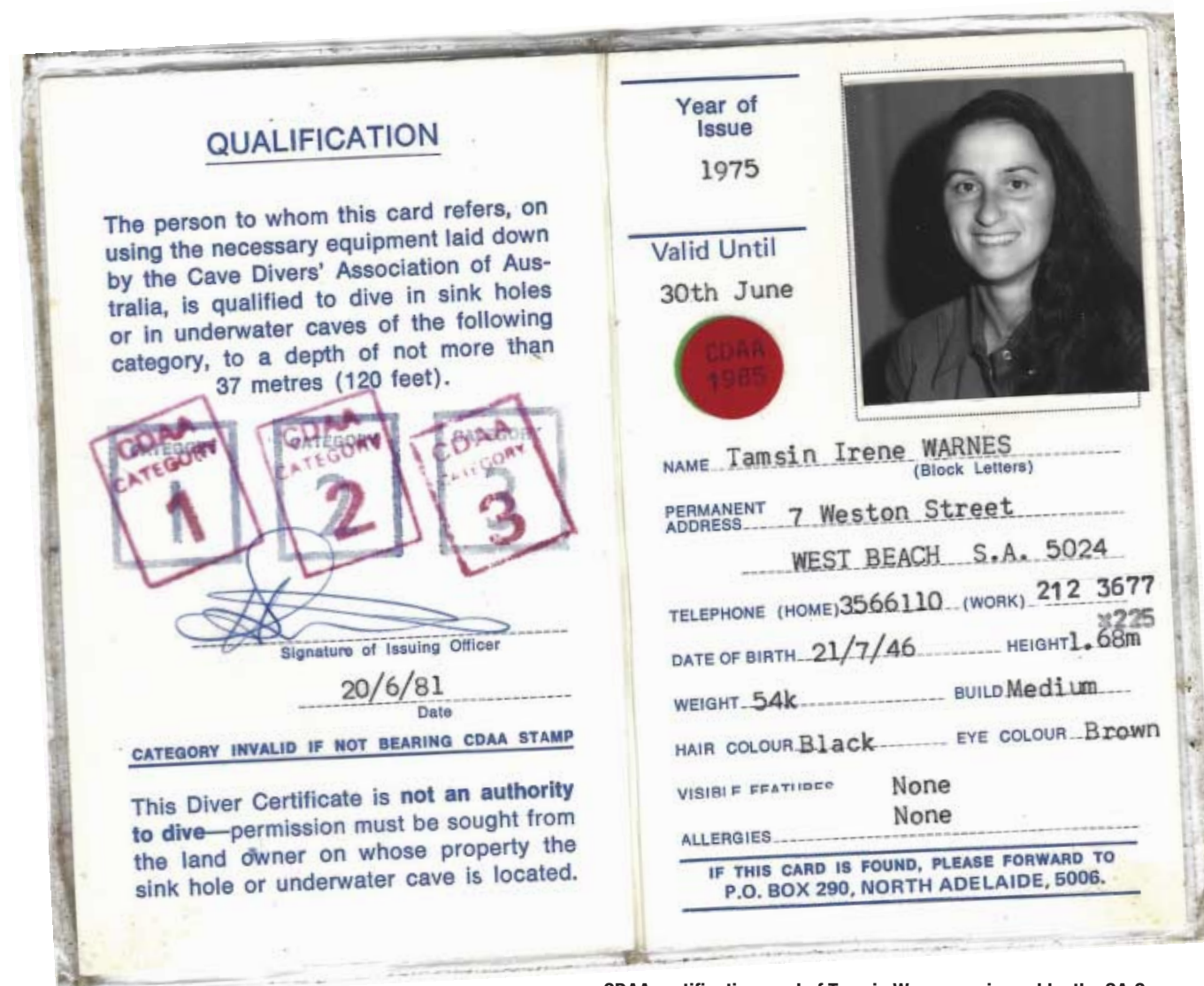
By the end of 1963 Dave relocated to Mount Gambier to 'investigate local cave diving'. He spent considerable time exploring the area for sites that would offer penetration diving. 'When I first arrived in Mount Gambier I dived sinkholes, but soon got tired of it,' he says. 'Sinkholes were just up and down, but I wanted to explore hidden passages to see where they would lead. To that end we started training ourselves in penetration diving. Our passion was exploration and we simply enjoyed doing it.'

Tamsin and the Nullarbor

When Dave was not cave diving, he returned to the ocean whenever he had a chance. One such trip to Perth in 1969 would change his life forever. It was there where he met the 23-year-old Tamsin Jones from Wimmera in north-west Victoria, the woman he would spend the rest of his life with. 'Dave introduced me to diving and he trained me in all forms of diving, from recreational to cave and penetration diving,' says Tamsin (77). 'He was strict, which I appreciated, but was also innovative in the way he dived and used his gear. I initially focussed on beach diving in South Australia in 1970, but soon progressed to cave diving and completed my three category tests successfully between 1972 and 1975.' Tamsin says her first training trip was to Ewen's Ponds with Dave where she practiced buddy-



Dave Warnes' certification card



CDAA certification card of Tamsin Warnes as issued by the SA Government.

breathing among other things. She first dived Piccaninnie Ponds in 1973 and was soon frequenting many of the dive sites in the region as her training and skills progressed.

‘When I received certification, it didn’t really sink in that I was the first woman in the CDAA to achieve that,’ Tamsin says. ‘Very few women were around in cave diving circles in those days, and I felt very isolated to be honest. But, I was committed to my diving and enjoyed it. I even kept a diary of most of my dives and it’s interesting to look back on them today.’

Tamsin’s diary shows she first travelled to the Nullarbor with Dave and other divers in 1972, but as a non-diving expedition member. She returned in April 1974 to dive Weebubbie and Tommy Graham’s caves which made a big impression on her. ‘We snorkelled to the end of the lake in Weebubbie, submerged and followed the main tunnel for around 90m to the air chamber before we returned,’ she recalls. ‘The main tunnel was wide and similar to the one in Tommy Graham’s, but the latter went into The Maze which was something special. It was a terrific sensation to swim among these boulders hanging from the ceiling.’

Tamsin says she and Dave returned to the Nullarbor regularly until around 1977 when they bought a boat and returned to ocean diving, especially around the York and Eyre peninsulas. ‘I stopped diving in 1986 when other things became priorities, like overseas family visits and travelling in general,’ she says. ‘I had a good go at diving and am very thankful for that.’



Tamsin Warnes in a cave in the Lower South-East of South Australia.

An association for cave divers

number of divers losing their lives in sinkholes and cave systems. Dave recalls how these fatalities spurred him and other cave divers into action. ‘A good percentage of divers had some knowledge of safety standards, but the majority were ocean divers who did not understand the implications of diving in freshwater caves and sinkholes,’ he says. ‘We were very concerned and formed a steering committee in 1972 to initiate dis-

cussions with all concerned - including the SA Government - on how to establish a self-regulatory body for cave divers. We had in effect established an association for cave divers in Australia.’

Dave says around a year later, in early 1973, an SA Government inquiry was initiated into diver safety after a prolonged public outcry over cave diving fatalities. ‘As the steering committee representing cave divers, we continued our discussions with government and were successful in convincing them that state intervention would not be necessary,’ he says. ‘We could look after ourselves.’



CDAA pioneering couple Tamsin (77) and Dave (88) Warnes at their Adelaide kitchen table in 2023. Photo Leon Rademeyer.

Formation and incorporation

Dave remembers things moved quickly after government intervention was averted. ‘Our steering committee convened a meeting for 29 September 1973 at Allendale East outside Mount Gambier where divers from South Australia and Victoria voted in favour of the formation of the CDAA,’ he says. ‘We also elected a national committee and held our first official CDAA meeting a month later in Mount Gambier. It was a massive relief not only for me, but for everyone involved. The CDAA was officially up and running.’

Dave served as a committee member on that first national committee with Ed Gertner elected president. Around a year later Dave was elected president for the 1974/75 term with the all-important incorporation of the CDAA coming into effect on 24 October 1975.

Number one

For his dedication to Australian cave diving in general and the CDAA in particular, Dave received live membership from the Association and was inducted into its hall of fame. He is also the holder of the coveted ‘number one’ membership card, identifying him as the first official member of his beloved CDAA.



Dave Warnes at the entrance to ‘Windmill Cave’ in the early days of cave exploration in the Mount Gambier region. Photo Mike Turner



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A brief glimpse of the CDAA's 50-year history

by John Vanderleest

Did you know there have been 201 people who have taken on official CDAA roles over the past 50 years? To the quick mathematically minded, it's about 5% of total membership. In addition to these people, there were numerable others who have volunteered for special activities such as site clean-ups, helping out with category-3 exams and organising our AGM events. These are the people who asked: 'what can I do to help?'

Let's take a closer look at some of them:

- Fourteen people lasted less than a year in their official roles, which is an indicator of how tough some of the roles can be.
- Twenty-one people served as President/National Director, but only five served more than two years.
- The three longest serving Presidents/National Directors are Warrick McDonald (10 years), John Vanderleest (seven years) and Lance Mitchell (six years). Warrick and Lance have since been awarded life membership.
- The longest serving National Committee members are John Vanderleest and Warrick McDonald (both 11 years) and John Dalla-Zuanna (nine years and six months). Warrick and John have been awarded life membership.
- Two members served the Association for more than 20 years. They are Greg Ryan and Noel Dillon. Neither have been awarded life membership.
- Seven more people served for more than 15 years. They are Tammie Beattie, Craig Larkin Phil Argy, Ian Lewis, John Vanderleest, Linda Claridge and Gary Barkley. Of these, Ian, Linda and Gary have been awarded life membership.

Some random historical but interesting (to some) stuff:

- ▶ The CDAA was officially formed in 1973, but only incorporated on 24th October 1975.
- ▶ Dave Warnes is member number one, a life member and inducted into the Hall of Fame. His wife Tamsin was the first female member of the CDAA.
- ▶ The first exams were written by Bob Cumberland and Stan Bugg. These exams included buoyancy control, buddy breathing and fixed-line blackout techniques.
- ▶ All divers, regardless of their history were only given a CDAA qualification after they were assessed against Bob and Bill's exam criteria. The assessment of so many divers required the formation of the first examiner body, the members of which, were also required to undertake the same exam.
- ▶ Over a two-year period several hundred cave divers were examined with a significant number failing to obtain a qualification at the level they expected.
- ▶ By 1985 CDAA membership had exceeded 1200, but now floats between around 500 to 600.
- ▶ In 1986, the use of single tanks for Cat 3 testing was upgraded to a single tank with y-valve, single tank with pony bottle or manifold doubles with dual outlet. Cat 3 was the highest level of testing at the time. Mandatory use of twin tanks for cave diving did not happen for another five years.
- ▶ In 1988 the National Committee declared the 37m depth limit was only a recommendation. While this allowed members to dive deeper, the use of Nitrox was only endorsed in 1996, and Trimix was not endorsed for another 10 years.
- ▶ Also in 1988, the new CDAA structure of cavern, sinkhole, cave and penetration was introduced. Along with it came a reclassification of the caves into this new system & compulsory training at all levels.
- ▶ In 1989 Pannikin Plain Cave collapsed, trapping several members. Thirteen people were trapped, with four still underwater when the collapsed happened. Those trapped included Wes Skiles, Rob Palmer, Ron and Robyn Allum, Liz Butler (aka

Wight), Phil Prust, Sonia Tucun, Dirk Stoffels, Colin Oddy, Jamie Hurworth, Lester Jerman, Paul Arbon and Brenton Woolcock. It took a few days to extract the divers, with none injured, but all lost a large amount of equipment which is still buried there today.

- ▶ The first CDAA documented use of rebreathers for cave diving in Australia (John Vanderleest and Andrew Poole) took place in Cocklebidy in 1996, although it is believed that pure oxygen rebreathers were used in the sumps of Buchan Caves in 1958.
- ▶ It was not until 2006 before the first female (Tania Yarra) reached Toad Hall, using a dive scooter. With scooters becoming more accessible, exploration of Cocklebidy had shifted from pushing large sleds to hold the many scuba cylinders needed for the dive, to divers being able to stage bailout cylinders and scooters between rock piles.
- ▶ Tank Cave was purchased in 2010 (National Committee: Steve Trewavis (ND), Andrew Cronan, Jane Bowman, Rob Brennan, Jason Caldwell). Not only did the National Committee have to negotiate the purchase, but also had to deal with the first death in Tank Cave.
- ▶ Also in 2010, Sanctum, an Australian-made cave diving movie produced by James Cameron and CDAA member Andrew Wight, was made. Many CDAA members were involved behind the scenes in the movie.
- ▶ It was not until 2014, some 40 years after the CDAA was formed, that instructors were allowed to teach and self-examine their students at all levels of cave diving.

- ▶ The Thai cave rescue took place in 2018, involving two CDAA members, Richard Harris and Craig Challen. Both were awarded Australian of the Year.
- ▶ In 2023, Richard Harris undertook the first known Hydrox cave dive to a depth of 245m.

And finally, some totally useless information.

- ▶ The number of CDAA members is actually less than the highest card number. In the early days, when membership cards were manually produced, there were two records officers, one located in South Australia and one in Victoria. To make sure the same number was not given to two different people, allocation was done in blocks. This meant that as SA was issuing membership cards from a block in the low 1000s with VIC issuing cards from a block in the high 1000s. To add to the complexity, some of the lower numbers (numbers below 500) that belonged to past members were 'sold' to members originally issued with higher numbers. This means that you can't actually tell how long a person has been a member by simply asking their CDAA number. The only accurate way to tell is by the date of their initial qualification. The block allocation system and re-use of numbers means that we do not know the precise number of people trained, which is likely to be around 300 to 500 less than the highest member number being issued today.

*Note: With a couple of exceptions, all information was obtained from Guidelines.

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Celebrating 50 years of wonderful support from Mount Gambier's landowners

By Peter 'Puddles' Horne

The 50th anniversary of any voluntary organisation is a significant milestone in anyone's book, and as a long-time member of the CDAA, I am really proud to have been associated with the organisation for some 44 of its 50-odd years of existence. One really great aspect of our dealings with the local Mount Gambier community has been how many of us have enjoyed building long-term friendships with locals and landowners/property managers who strongly supported the CDAA and our interests in underwater cave exploration and research over the years. And what better occasion than this year to specially acknowledge these wonderful people?

The earliest known sinkhole dives in the region occurred in the very late 1950s and early '60s in such places as Little Blue Lake, One Tree, Ela Elap, Kilsby's, Ten-Eighty, The Black Hole, The Bullock Hole, Piccanninnie Ponds and The Shaft, most of which were privately owned. During those early times, divers generally didn't seek or require landowner permission to dive in sinkholes – many simply used a gate or jumped a fence to do their dives. Sadly, those carefree pioneering days soon passed with problems of popularity and multiple fatalities resulting in site management issues and increasing legal concerns about insurance, access agreements, public liability, etc. Despite all this, though, the vast majority of farmers who own or manage sinkholes in the Mount Gambier region – where until recently the vast majority of cave diving in Australia was undertaken – are caring and responsible folk who have been very supportive of the CDAA. And while we are very grateful to all landowners who have allowed CDAA members access to their sites, there are a few in particular who I feel need to be especially acknowledged after their decades of support throughout the existence of the Association.

One Tree and Ela Elap – Peter and Jenny Norman

One Tree (aka Wurwurkooloo) and the adjacent Ela Elap sinkhole were reportedly first dived around 1961. The property owners, Peter and Jenny Norman, moved into their house at Lake Windy Lew (named after Peter's WWI veteran uncle, Mr Lewis) in February 1964. Peter has been a farmer his entire life, while Jenny's career saw her becoming a highly-qualified and respected nurse, and their long-term support for the cave diving community is truly legendary.

Peter told me recently that he had always been happy to

allow people to dive in the sinkholes because he always believed that 'young people should be able to come and enjoy themselves at their own risk.' Long-term family friend and CDAA member John Stevens also recently said that 'over a very long period of time, both Jenny and Peter formed many strong ongoing friendships with current and past CDAA members. Jenny and Peter have always been extremely friendly and have always granted diving access to suitably qualified CDAA members that call at their home in Mount Schank. The Normans are truly wonderful and well respected people who clearly get no personal reward other than the knowledge that they are providing the means for us divers to enjoy the activity that we love so much – this is obviously very important to Peter and Jenny and is a measure of their sound personal values and general positive attitude towards assisting people.'



Jenny and Peter proudly displaying their CDAA 40th anniversary certificate.

Kilsby Sinkhole – the Kilsby Family

Kilsby's Hole has been owned and managed by the Kilsby family for many decades. The property was managed by Ross Kilsby and his father Frank in 1983 when the CDAA Research Group (founded by Peter Stace and facilitated by Weapons Research Establishment representative Peter Girdler) undertook the first detailed mapping and scientific study of any Australian waterfilled cave feature some seven years before Ross cut a convenient access ramp to the water's edge in 1990.

Kilsbys was a popular diving site during the late 1960s, when on some days up to 40 carloads of divers waited for their turn to dive – and this was when access to the water was only possible via wobbly rope ladders. The property was closed after the tragic double-fatality in 1969 and when the WRE had used it as a testing facility for the development of Barra sonobuoy technology. It was thus a fairly complex task to negotiate renewed access to the sinkhole for CDAA members, and it is a testament to the Kilsby family's friendliness and willingness to help others that we are still able to do so today.

Also during those early years, a very young Graham Kilsby would often enthusiastically help us lug gear to the water's edge and listen to stories of our underwater activities. Graham and his lovely partner Jo have subsequently done an incredible amount of work (including building high-quality, on-site accommodation) to provide public access to the site, bringing their cenote to international attention. Graham and Jo are also extremely conservation-minded and maintain an ongoing interest in every aspect of their truly spectacular sinkhole.



Richard 'Harry' Harris (left) with Ross and Graham Kilsby



Graham and Jo at the Kilsby Sinkhole property.



The Barnoolut Sinkholes – Reg and Mary Watson

The property known as Barnoolut Estate, adjacent to the Kilsby property, was also very popular with cave divers for about 30 years between the mid-1960s and mid-'90s, when Ten-Eighty, The Black Hole and The Bullock Hole were visited regularly. During the early 1960s it was owned and/or managed by a Mr Simpson (Ten-Eighty Sinkhole was originally called Simpson's Hole) and in the late 1960s or early '70s Mr and Mrs Reg and Mary Watson took over.

Reg supported the CDAA from the very start and even served on the SA Government Sinkhole Review Committee Landowners Liaison Forum which was set up after the 1984 double-fatality to facilitate communication with the CDAA while the Association developed and implemented its own standards. The onus was on the CDAA to manage and regulate its affairs and to provide input in relation to access requirements, reduction of liability and protection of the environment.

John Stevens remembers Reg as 'always being a gentleman in his dealings with us. There was always a set procedure when visiting the property to dive: you had to be at the back gate to the homestead property at precisely the agreed time with current CDAA card in hand, after the pleasantries had been exchanged Reg would take each card, look at the photo, look at the diver, look at the photo and sometimes look back at the diver again before returning the card without saying a word. After the day's diving was completed, there would always have to be a check in at the back gate letting him know that all was well. Often a bottle of port or good Shiraz was passed to Reg for his time and trouble! By allowing only qualified CDAA members access to the wonderful diving that existed on Barnoolut and for no personal reward, for many years Reg provided an invaluable service to the CDAA and its members who were extremely grateful.'



Reg Watson (left) enjoying the CDAA 40th Anniversary AGM in 2013 with Pete Puddles and John Vanderleest. Photo: Deb Williams.

A few members continued to keep in touch for many years after Reg retired in around 1990, and even though cave diver access was sadly denied after the property changed hands in around 2000, most long-term members of the Association will always appreciate the decades of support that we enjoyed from Reg and Mary in particular. Barnoolut was also managed for some years after Reg's retirement by the very affable Colin and Shirley Traeger, who were always very accommodating to cave divers – especially those who could contribute to Colin's collection of antique bottles!

**The Shaft -
the Ashby Family**

I would also like to give special thanks to the Ashby family who own and manage The Shaft on their Cave View property – a unique and spectacular cave feature of international repute. The late Mr and Mrs Viv and Jean Ashby were wonderful personal friends who graciously allowed cave divers to regain access to their feature via the CDAA Research Group's second project in 1984 after their property had been closed as a result of the shocking quadruple-fatality there in 1973.

Viv and Jean were always keenly interested in our stories and discoveries – they apparently especially loved a 3D-perspective model of their cave which I put together using overhead-transparency sheets back in 1985. You could never just roll up, do your dive and drive off without chatting with Jean about local farming matters first. And while none of the family were interested in the complexities of cave diving, Chris Brown and other technically-minded members were strongly supported by the Ashbys when they introduced mixed gas diving to Mount Gambier in the early 1990s.

The overseeing of access to The Shaft is now under the third generation of the Ashby family, and we are all very fortunate to be able to continue to enjoy this amazing feature through their generosity and support.



Jean, Robert, Trevor and Viv Ashby.

**Engelbrecht Cave -
Jan and Alan**

I'd like to also thank the long-term operators of Engelbrecht Cave, especially Jan Coleman, for their many years of friendly support for the CDAA as well as their tourism promotion and conservation work involving this beautiful cave. Our relationship with these wonderful people has been mutually beneficial.

Jan recently said 'the past 10 years have seen many cave divers access our site. It is always a pleasure to have them visit, but especially so during our business hours as it adds a little something extra to our guided tours. We understand accessing this site is very different from others due to its public nature however the CDAA has been extremely helpful in maintaining our protocols, keeping both the public and their own members safe and happy. We thank the CDAA for their ongoing support and friendships.'



Jan at Engelbrecht's in November 2023.

***These wonderful folks
show how things should be done!***

I'd like to also especially thank the key supportive governmental representatives with whom we have worked over the past 50 years and who often went above and beyond their official duties to support the Association, in particular:

- **SA forestry department representatives Fred Pfeiffer, Mick Underdown, Troy Horn and Trevor Wynniat, who** all strongly supported our efforts to improve access to their sites. Trevor was a critical link between cave divers and ForestrySA, and based on the friendship he developed with cave divers over many years, this working relationship has continued right up to the present time. Trevor also facilitated several major sinkhole clean-ups across the region and arranged cave gating work for convenient platform access to such sites as The Pines, Fossil Cave, Nettlebed and Hells Hole, while Troy was instrumental in designing and installing the excellent tourist interpretive display and divers' tables at The Pines.

- **John Schulz and Mark Watson who** were the dedicated regional coordinators from what was then known as the **SA Department of Lands**, and they were principally responsible for initiating, coordinating and hosting Landowners Liaison Group meetings comprising government representatives and private landowners over many years. Over time, they were able to resolve the different approaches suggested for land access for divers, and improve liaison with the SA Police Underwater Recovery Squad. As principal land managers, their underpinning philosophy was caring for the local landscape and its features which extended to valuing caves and sinkholes. Furthermore, both John and Mark were willing to gain first-hand knowledge of how important they were.

- **SA Police STAR Force/Underwater Recovery Squad reps Marty Harnath, Bob McDonald and Ron Jeffery, who** all strongly supported and advocated for the CDAA. Ron in particular was a crucial representative on the Landowners Liaison Committee where he brought the two very different diving approaches (SAPOL and the CDAA) together. Ron worked closely with CDAA instructors and Committee members to adapt some of our special equipment and training methods to assist his police team in their annual training exercises in the Mount Gambier area, resulting in excellent coordination between the police and the CDAA over the decades since.

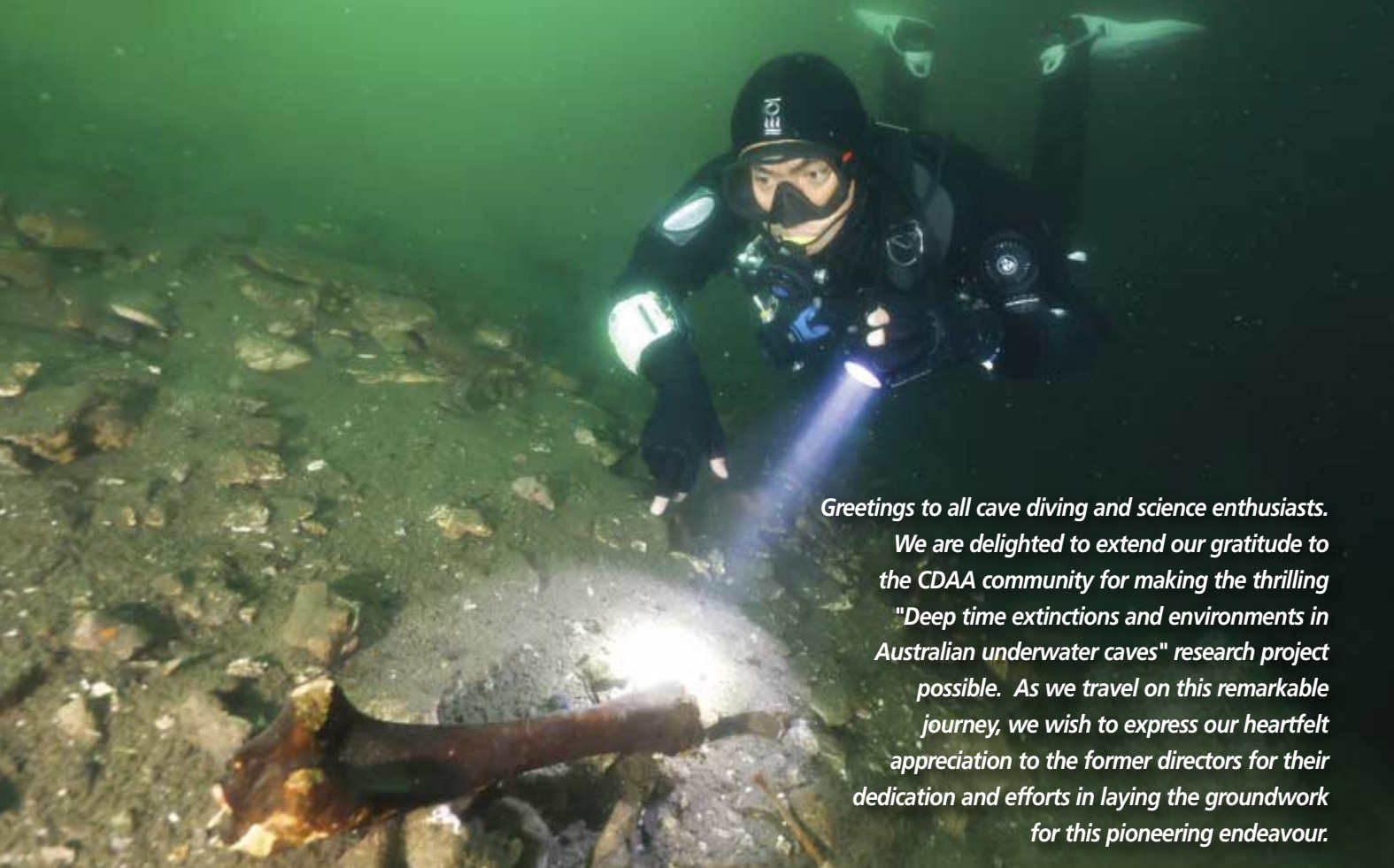
- **National Parks and Wildlife staff who** supported the Association's numerous Piccaninnie Ponds Management Plan submissions and exploration/research activities, along with providing a divers' shelter/prep shed and drop toilet, upgrading and maintaining the walkway to the First Pond and installing the very convenient divers' pontoon there. Former Regional Manager **Lindsay Jolley** was especially supportive in his negotiations with the CDAA before the payment system was implemented.

And finally, I'd like to thank and acknowledge the various **Council representatives and CEOs**, especially **Greg Muller** (Mount Gambier), **Jim McPherson** (Port MacDonnell) and **Frank Brennan** (Millicent) in relation to site access/improvements to assist CDAA members and for supporting and promoting cave diving in a positive way which also benefited our activity's public image.

The great assistance of supportive private and governmental representatives over all these years has resulted in today's relatively safe and popular cave diving, which is a great contribution emerging from the early days of tragedy and public concern about our sport and activity. We are all very grateful and appreciative of their work and friendship over the years, and it has been an honour and a privilege to have known and worked with you all.



Grant Moyle and Annie Rademeyer at the entrance to ForestrySA's Nettlebed Cave on the outskirts of Mount Gambier. Photo: Leon Rademeyer.



Greetings to all cave diving and science enthusiasts. We are delighted to extend our gratitude to the CDAA community for making the thrilling "Deep time extinctions and environments in Australian underwater caves" research project possible. As we travel on this remarkable journey, we wish to express our heartfelt appreciation to the former directors for their dedication and efforts in laying the groundwork for this pioneering endeavour.

Deep time extinctions and environments in Australian underwater caves

Story by Julien Louys ~ Photos by Steve Trewavas

The seeds of this project were sown seven years ago during an intriguing conversation between a new and enthusiastic cave diver and the National Committee at Blue Lake Diving Accommodation in Mount Gambier. It was during this discussion that the idea of studying and documenting fossils from the cave sites emerged, marking the start of an extraordinary adventure in cave conservation, science, and diving.

Over these seven years, the project faced its share of challenges, requiring extensive consultations with various agencies and meticulous paperwork. The unwavering support and commitment of former National Director Peter Wolf and the current National Committee have been instrumental in paving the way for this undertaking. However, the journey to scientific exploration took an unexpected pause when the world was plunged

into the grip of the Covid pandemic, posing new hurdles to overcome.

Nevertheless, Associate Professor Julien Louys managed to secure vital funding of approximately \$260,000 from the Australian Research Council (ARC), through a three-year Linkage Project in collaboration with the CDAA, the South Australian Museum, the universities of Queensland and Adelaide and Griffith University. This project will shed light on the impact of environmental changes on Australia's ancient mammal extinctions, while simultaneously enhancing our understanding of past ecosystems and extinct animals. Moreover, it promises to contribute to vital advancements in geochronological techniques and the data essential for protecting these underwater caves. Julien was also recently suc-



CDAA fieldwork team at Fossil Cave. Below: team members collecting data.



cessful in securing close to \$90,000 from The Australia Pacific Science Hermon Slade Research Fund with geneticist Mark de Bruyn to explore the preservation of ancient DNA in these systems. Although the road was arduous and required cooperation from many different entities, the team persevered, and the first scientific research trip became a reality in April 2023 after obtaining scientific permits for the removal of bones, fossils, and other geological samples.

From 3 - 14 April 2023, a team of passionate CDAA divers embarked on fieldwork. The team express their gratitude to CDAA and other land agents for facilitating dive site bookings at Englebrecht's, Gouldens, and Fossil's (Green Water Hole). The initial trip served as a foundation for forthcoming major scientific expeditions, with the aim of collecting baseline data. Exciting discoveries were made, including fossils of short-faced kangaroos, marsupial lions, koalas, and small native rats. The team also conducted sedimentary core collections, all crucial steps in unravelling the mysteries of these underwater caves.

Aiding this groundbreaking exploration were Associate Professor Gilbert Price (University of Queensland) and PhD stu-

dent Meg Walker, who diligently collected and prepared materials for later scientific data collection. The team was also joined by visiting academics, Drs Lee Arnold, Martina Demuro, and Liz Reed from the University of Adelaide, who were immensely impressed by the cave divers' expertise and professionalism.

This is merely the beginning of an extraordinary journey, with many more projects and scientific inquiries to follow. The success of this joint endeavour opens new doors for research collaborations with universities and agencies, seeking answers to questions that were once considered unattainable or inaccessible. We extend our heartfelt thanks to all those who contributed their time and effort to make this project possible. If you are interested in participating, we encourage you to reach out, as future trips will require more divers. We promise it's an adventure you wouldn't want to miss.

Stay tuned for more updates as we continue to explore the depths and uncover the secrets of Australia's underwater caves. Together, we strive to protect and preserve these invaluable natural wonders for generations to come.



Abi finishing her final checks before entering the 'Birth Canal'.

Rebirthed as a NSW cave diver

Story by Daniel Butler and Abi Harwood - Photos by Daniel Butler and Greg Ryan

Being a cave diver in NSW is a difficult gig. You can usually tell those with cave training among the Sydney crew as they fiddle with their steel sidemounts on the boat, their reels rigged separately to their DSMBs and constant questions as to the penetration opportunities on the upcoming wreck dive. The state has a distinct lack of easily accessible fresh water overhead.



Daniel looking back out of the 'Telephone Booth'.

The premier location, Burrinjuck Dam, requires a boat, a compressor and a sense of humour, and most of the other diveable caves require scientific permits. For those who live in NSW the luxury access of Tank Cave lies just over a 14-hour drive away, and the long clear stretches of the Nullarbor, a gentleman's 24 hours away. Disappointingly, those who fund our dive adventures tend to limit our ability to visit such paradises to a few times a year.

However, for those who yearn for fresh water, there is a lesser-known solution (pun intended) much closer to home with visibility to rival the Mount. In fact, despite the laborious access, remoteness and unpopularity of NSW cave diving, it does have something the Mount lacks - decoration. Wellington Caves sit just under five hours from Sydney, and for those keen (or desperate) offer excellent cave diving. Unfortunately for a number of reasons, namely Covid, fires and floods, the caves in Wellington had not been dived since 2018, so we were very glad to get

the opportunity to be the first back in the water.

There is a very small number of diveable caves in Wellington, with the most extensive system known being McCavity Cave. McCavity is the wet component of a dry cave called Limekiln Cave, which lies a mere 100m from the Wellington Caves campsite. It is here that Greg, Abi and I met on Saturday, 9 September. The campsite itself is well equipped for cavers with excellent kitchen, toilet and shower facilities. For those with a bit more class, cabins and powered sites are available. However, Abi and I chose to fly economy on this one and slept in one of the unpowered sites.

Eager to see what we had committed ourselves to and keen to set the cave up, the team commenced lowering gear to the staging room. Limekiln Cave starts with two short descent pitches which take you into the heart of the dry section, 'Central Station'. While a cave ladder fixed to the surface ensured we looked professional, it was at the second pitch that Greg brought out one of the less common items purchased from the cave diving section of Bunnings: a foldable aluminium construction ladder. The ladder, which fit the pitch almost too perfectly, led us down into Central Station. This room was the base of all operations and has a number of tunnels leading out of it. Crawling through the obvious low tunnel on the left brings you to a small



The necessary dive gear laid out on the surface in cave bags

two-person room (the Telephone Booth) with an even smaller puddle on the ground. There is a second body of water further into the cave, where Mitchell's Cave meets McCavity (just). The connecting passage has been linked by a fist bump but is too small to fit through.

The entrance of McCavity is infamously guarded by a tight, partially submerged, no-mount restriction called the 'Birth Canal' - the aforementioned 'puddle'. Despite Greg's reassurance, Abi and I spent a few minutes trying to make it look bigger by illuminating it at different angles. It turns out, regardless of how you look at it, it remains a human sized wiggle-fest.

On Sunday morning after nervously kitting up and climbing down in the Telephone Booth I begun wiggling my way, fins first, into the Birth Canal. The slot doesn't really allow for you to enter with your tanks attached, especially when you are sporting twin 12s. To counter this, as we submerged, we were breathing from a Hookah regulator attached to a tank staged back in Central Station. While admittedly being easier than it looks, the Birth Canal seems to last an eternity as you squirm your way backwards through it. I finally popped through the bottom and into a mud cloud of my own making to find I was sitting in about four metres of water. Greg then lowered my tanks on a rope, one by one, through the hole in response to my rope tugs. I kitted up whilst Abi engaged her inner caterpillar and joined me in the water.

The line leaves the initial mud cloud and darts around a shawl/flowstone feature to the right before leading into the



Abi stacking thanks in the 'Telephone Booth'.



The 'Birth Canal' entrance to McCavity.

centre of a large room with a T-junction. The line was fully intact, however as a testament to its long-term abandonment, it shed a small cloud of silt along its length as we placed our first markers. Heading left from here you start down the 'Long Tunnel'. At this stage I turned to Abi to find her looking at me wide-eyed and dancing in her side-mounts, the view was just so spectacular.

Large yellow and white stalactites reach down from the roof like fingers in the darkness, pointing towards the mounds of calcite flakes which covered the floor. The tunnel itself is large enough that you could comfortably park two to three semi-trailer trucks within it and extends for around 110m. It is roughly triangular with the line running high and amongst a myriad of shawls and stalactites. As you travel along its length you pass a number of notable features with fitting names: the 'Dragon's Teeth', the 'Shaving

Brush' and, most descriptively, the 'Large Black Waterfall Thing'. There are also a number of helictites extending from the walls which have crusted over to look particularly phallic.

Abi and I swam to the end, surfacing in a number of small (foul-aired) avens to admire the decoration, each time emerging with calcite shavings piled on top of our masks. The cave has a couple of small passages which travel off perpendicular to the long tunnel. We explored these passages before turning around to return to the first intersection.

We then head down the other line which wrapped around a boulder with exceptionally distinct banding to a second intersection. Heading left down the 'Northwest Passage' the tunnel narrows to emerge at the end at a mound of flowstone. As we turned to leave we noticed that our bubbles had disturbed the calcite rafts which were now slowly falling to the ground. It was quite pretty, much like snow on a windless night, only the flakes were much larger.

Heading down the other line from the intersection we swam past a number of tree roots on our way to 'Bondi Beach'. As we surfaced here, among a mound of guano, we were greeted by scores of bent-wing bats darting around the chamber. Further around from this point is the 'Hanging Swamp', whose terminal chamber represents the emergency route out of the cave should an accident happen. The Hanging Swamp

gets its name from the numerous tree roots protruding down into the cave from the surface, giving you the feeling you are in an underground jungle. There was even some small grass-like growth along the floor of the cave, which according to Greg, was not there when it was last dived in 2018.

Just prior to the exit, which had me a bit nervous, we did a small jump down a northward tunnel which pinched off at about 20m with the stalactites growing closer and closer to the ground.

Pleasingly, the exit was a surprisingly easier squeeze with your tank-less buoyancy doing most of the work for you. We were greeted by a smiling Greg, who had remained at the surface to help us in and out for the dive. It was a sight very much appreciated as you beached yourself like a whale to get back into the Telephone Booth.

McCavity was significantly more effort than the backward roll you are treated to at Pines, however in terms of beauty, as a result of its submerged decoration, it is quite unmatched and gives a fantastic taster of the preparation involved with trips to the Nullarbor. While the entrance was intimidating, it was made significantly easier by Greg talking us through it. It is a great experience for the NSW cave diver and I am quite looking forward to returning.



The vertical entrance to Limekiln Cave.



Daniel unloading the Hookah tank from the entrance pitch.



The Hookah tank being lowered into 'Central Station'.

Temperature and humidity measurements in Nullarbor caves

Story, photos and illustrations by Matej Lipar and Mateja Ferk. Foreword by Stephen Fordyce.

Even with a foot firmly planted in each world, it still surprises me how little cavers and cave divers overlap, even when it comes to one of our favourite destinations – the Nullarbor. While attending the April 2023 ASF conference in Ceduna, I did a presentation about Nullarbor cave diving. This was followed by Dr Mateja Ferk, representing a group of Slovenian researchers who had been doing some cool science out there, and had some interesting thoughts around the formation of the diveable water table caves. I wasn't aware of their extensive research, and Mateja wasn't aware of the CDAA and how regularly groups dive on the Nullarbor. We chatted at length, and the subject of data loggers in dry chambers beyond sumps came up – I offered to coordinate dive-related devices/data and organise getting divers to place and retrieve them. My Pannikin Plains crew was able to place a logger in Concorde Landing and give loggers to Aren Leishman and company (placed in Tommy Graham's, after Sump 1) and Joe Monks and Damian Bishop (placed in Olwolgin, end of Bilby Passage). In October, Tim Featonby and company placed loggers in Cocklebiddy (the first rock-pile, and Toad Hall). The loggers were small enough to be transported in an empty light canister and the medium sized canister I use to take dry survey kit through sumps. Science is cool for its own sake, but you never know when some obscure bit of data can be applied to cave exploration and lead to a breakthrough into caverns measureless. It has already happened with the dye tracing experiments in Tassie and the discovery of Delta variant. It will be interesting to see what happens on the Nullarbor.



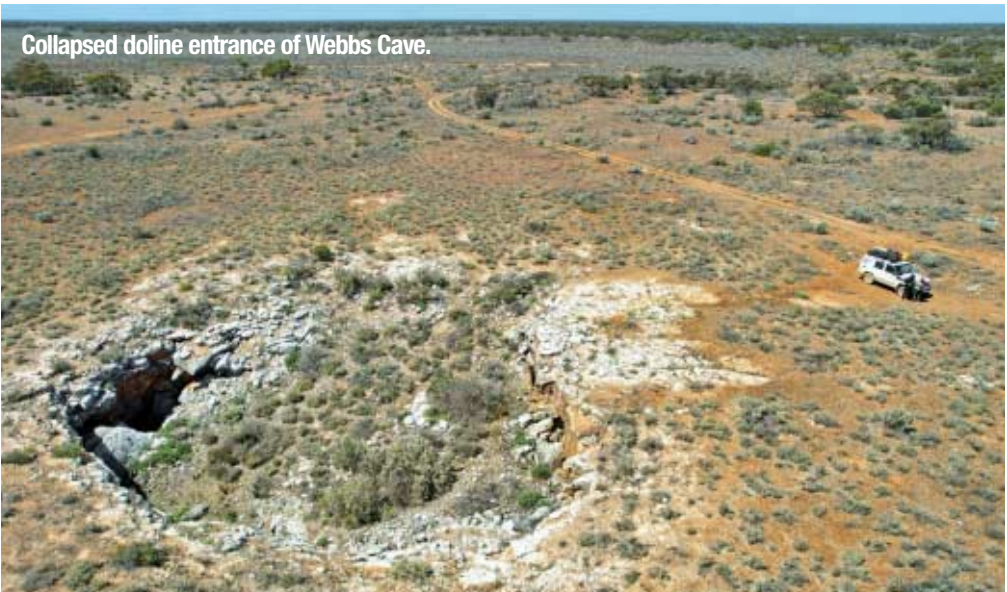
Olwolgin installation
(photo by Joe Monks).

The Nullarbor Plain is characterised by a distinctive karst terrain that mirrors environmental shifts through time. Caves and their clastic and chemical deposits, as well as the very topography and geology of the landscape offer insights into past environments. A deeper understanding of the Nullarbor karst aids in recognising its value, ensuring its proper management, and preserving its essence.

While understanding its past landscape evolution and environmental changes is crucial, being acquainted with the current climate characteristics of the plain is equally vital. Some of this data is accessible via the Australian Bureau of Meteorology website, but there is a gap when it comes to information on the underground climate – which, though linked to the surface climate, has its unique dynamics. There have been isolated measurements like groundwater and cave temperatures, but these are more indicative of 'weather' rather than consistent 'climate,' which demands systematic, prolonged measurements to discern overarching patterns. To derive meaningful climate insights, data must be accumulated over several years, with reliable climate data typically based on 30-year averages.

Starting from the scratch

First, 10 automatic temperature and humidity loggers were funded by the Australian Speleological Federation Karst Conservation Fund and the Research Centre of the Slovenian Academy of Sciences and Arts. They were installed in October 2019. Three loggers were installed in blowholes where the temperatures can indicate the blowing regime: one logger was installed in a blowhole (6N-3372) next to a track between Forrest and Eucla, the other in a blowhole (6N-2137) at the border of Western Australia and South Australia, and the third one in the entrance blowhole of the Thylacine Hole (6N-63) located about 10km NW from Webb's Cave. The other loggers were installed in caves: one logger at the end bit of the Abrakurrie Cave (6N-3), two loggers in Webb's Cave (6N-132: one is positioned in the chamber with two distinctive pillars, which is deeper in the cave and should reflect the true cave temperature, while the other is positioned at the bottom of the entrance collapse, because considerably colder air is trapped in this part in comparison to the inner cave passages or the outside temperature), two in Mulla-mullang Cave (6N-37: one in the passage before The Dune and the other close to the Smoko Junction), one in Murra-El-Elevyn Cave (6N-47) at the bottom of the collapse chamber close to the underground lake, and the last one in Madura Cave (6N-62) on the Roe Plain about 10km south of Madura Roadhouse, positioned on the left cave wall (when looking deeper into the cave) 10m into the left passage after the main channel splits in two.



Collapsed doline entrance of Webb's Cave.

The caves and blowholes were partly chosen based on their accessibility to provide better chances that some of the cavers would be passing by and could collect data at least once every two years. Nevertheless, they were mainly chosen based on their distribution, morphology and dynamics. We wanted to have a stretch from west to east (from Murra-El-Elevyn Cave in the west to blowhole 6N-2137 at the border of Western



Temperature and humidity logger inside Webb's Cave.



Installation of the logger in Kelly Cave.

Australia and South Australia), to include Roe Plain (Madura Cave), chamber with underground water (Murra-El-Elevyn Cave), deep caves with greater air circulation dynamics (Mulla-mullang Cave), deep caves with smaller air circulation dynamics (Abrakurrie Cave), shallower caves (Webb's Cave) and blowholes. Note that the South Australian part of the Nullarbor Plain is omitted because of the arduous undertaking to obtain permits, and unfeasible costs related to the requirements of accompanying parties during the field work.

Boosting the measurement network

In October 2022, we installed a logger in the Weebubbie Cave (6N-2), positioned at the end of the dry passage next to the underground water. Three loggers were also installed in Kelly Cave (6N-165): one at the entrance part to record variability of air flow, the other two deeper in the cave, each within the opposite parts of the cave.

In April 2023, loggers were also installed in Bunny Cave (6N-512), Nurina Cave (6N-46), Dingo Donga Cave (6N-160) and Old Homestead Cave (6N-83). Cave divers also installed loggers in dry chambers in Panikin Plain Cave (6N-49), Tommy Graham's Cave (6N-56) and Olwolgin Cave (6N-195). In October 2023, two loggers were installed in dry chambers in Cocklebiddy Cave (6N-48).

Technical remarks

We currently use TGP-4500 Tinytag Plus 2 self-contained temperature (resolution $\pm 0.01^{\circ}\text{C}$ or better with a reading range from -25°C to $+85^{\circ}\text{C}$) and relative humidity (resolution $\pm 3.0\%$ or better with a reading range from 0% to 100%) data loggers. TGP-4500 Tinytag Plus 2 data loggers are configured to meet Gemini's (Gemini Data Loggers (UK) Ltd.) quoted accuracy specification during their manufacture. The temperature sensor type is a 10K NTC Thermistor with the response time 25 minutes to 90% FSD in moving air, and is internally mounted, while the RH sensor type is a Capacitive with a response time of 40 seconds to 90% FSD, and is externally mounted. The loggers operate with 1/2AA 3.6V lithium batteries.

The loggers record temperature and humidity data at bi-hourly intervals. The logger can store bi-hourly data for ~1350 days, which is around 3.7 years). The data in the loggers needs to be manually downloaded using a CAB-0007-USB: Tinytag Ultra/Plus/View USB Download Cable and SWCD-0040 Tinytag Explorer software. Although it is recommended (for 100% certified data) to recalibrate loggers every six months, it is not possible due to the remoteness of the Nullarbor Plain. Possible drifts in long-time measurements depend on the level of contamination, however, assumed on the manufacturer's experience, around 80% of loggers are still in specification limits after a year of measurements. We therefore decided to leave the loggers in places for up to four years before replacing them with new cali-

brated loggers when possible. Unless perfectly intact, the old loggers are usually not viable for recalibration due to corrosion of their sensors because of the harsh and windy subterranean environment.

The data contain the time of measurement (GMT+8: Perth, Western Australia), temperature record in °C and relative humidity in %. The first batch of loggers had a maximum seven minute lag time between each other, but later all loggers were set to measure data on the full hour (0:00, 2:00, 4:00, etc). In addition, notes were placed with the loggers, instructing occasional visitors to report the date and time of their visit since the presence of humans can alter the measurements.

The variation of values throughout the year are in predicted ranges and have comparable relationships to climatic data from Eucla (Australian Government Bureau of Meteorology Station No. 11003) and Forrest (Australian Government Bureau of Meteorology station No. 11052) weather stations.

The measured temperatures are also in accordance with previously published data. For example, the multiple-day measurement data of Mullamullang Cave (January 1966: location close to logger GIAM-8) [16] showed variations between 16.7°C to 17.8°C, while our data show January variations between 16.1°C to 17.4°C (2020) and 15.8°C to 17.1°C (2021). The temperature and relative humidity range of Murra-El-Elevyn (13.1°C to 18.9°C; 45.3% to 89.6%) corresponds to a single-visit measurement of 18.3°C and 88% (measured in the 1970s) [17]. Concerning Webbs Cave, the reported single visit temperature measurement of 20°C and relative humidity of 52% [18] (unknown cave location and time) can only be correlated to the range of data measured by the logger closer to the entrance (5.7°C to 20.1°C and 29.5% to 100%), while the logger deeper in the cave only recorded a temperature range between 17.3°C to 18.5°C.

The data-collecting equipment is stored and overseen by Ian Collette from the Western Australian Speleological Group and

Stephen Fordyce from the CDAA. It is meant for Australian caving visitors and expeditions (to most of the above-mentioned caves where loggers are installed) who are prepared to collect data. We will advise visitors how to correctly collect data and change batteries. In terms of loggers installed in dry chambers of underwater caves, the strategy is simply to replace the logger with a new one and collect the data from the old one later. In this way, we can continuously gather data and keep the loggers working without any interruption due to flat batteries or lack of storage capacity.

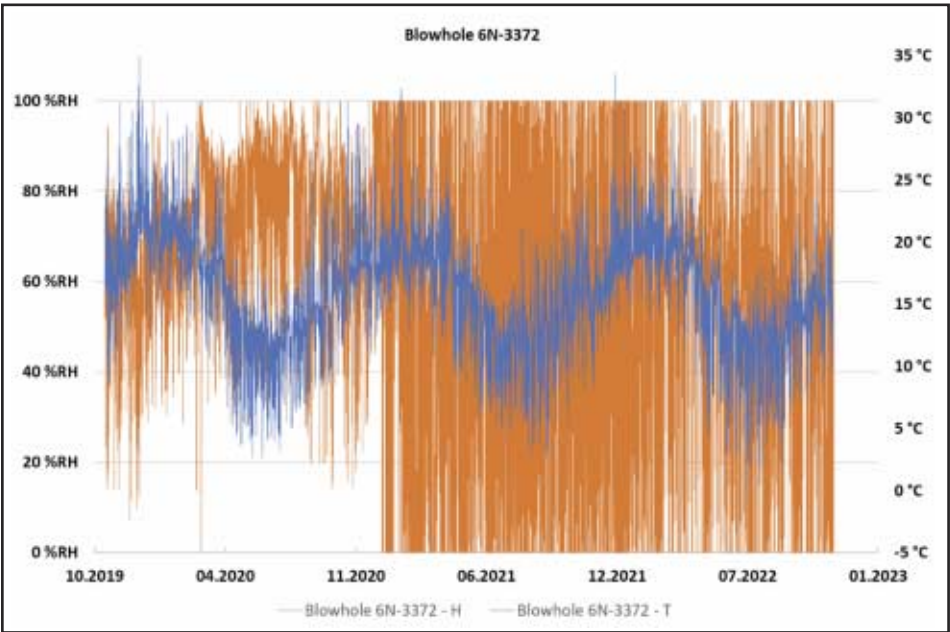
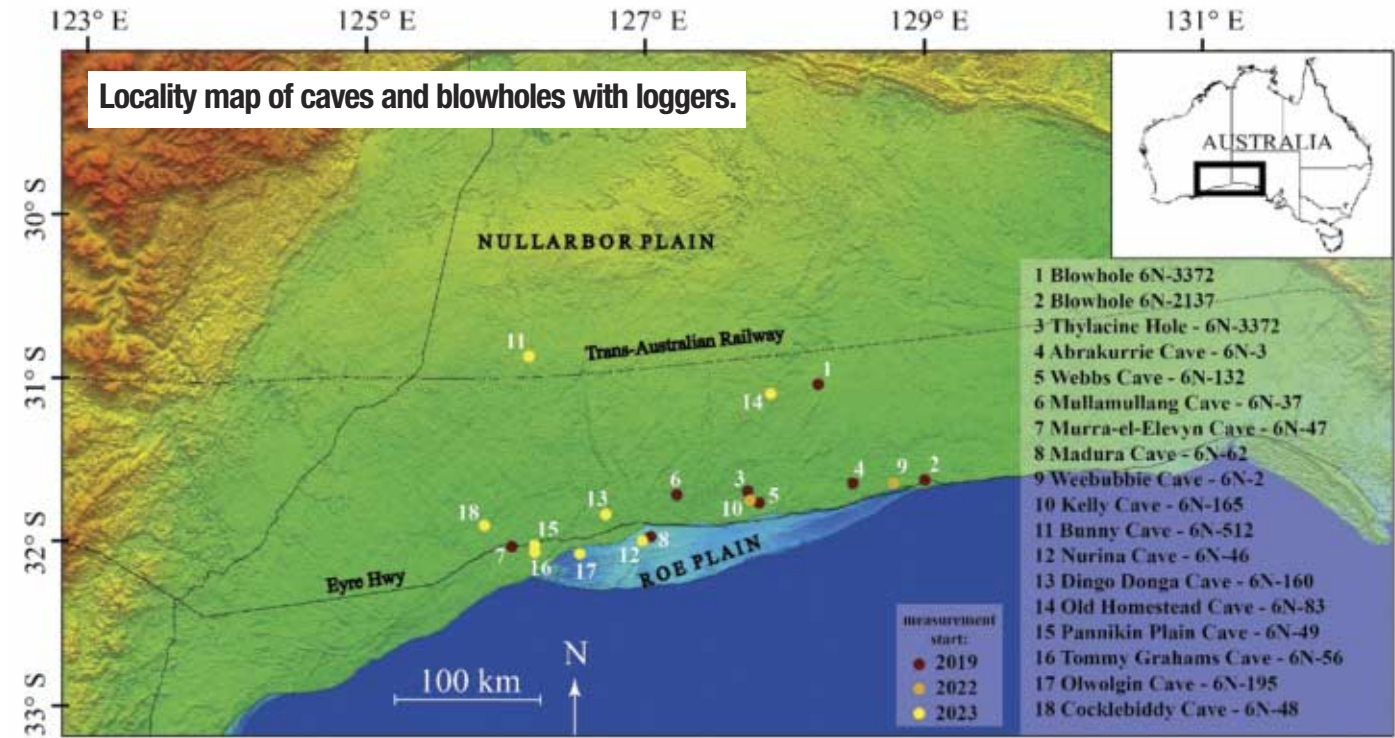
Troubleshoot

It is realistic to except that something can always go wrong. The loggers themselves are relatively reliable, but the outer humidity sensor is eventually destroyed if exposed to the windy, dusty and rainy environment of blowholes in particular. The temperature sensor, on the other hand, is enclosed and sealed so in the event of humidity sensor error, temperature data will still be completely valid.

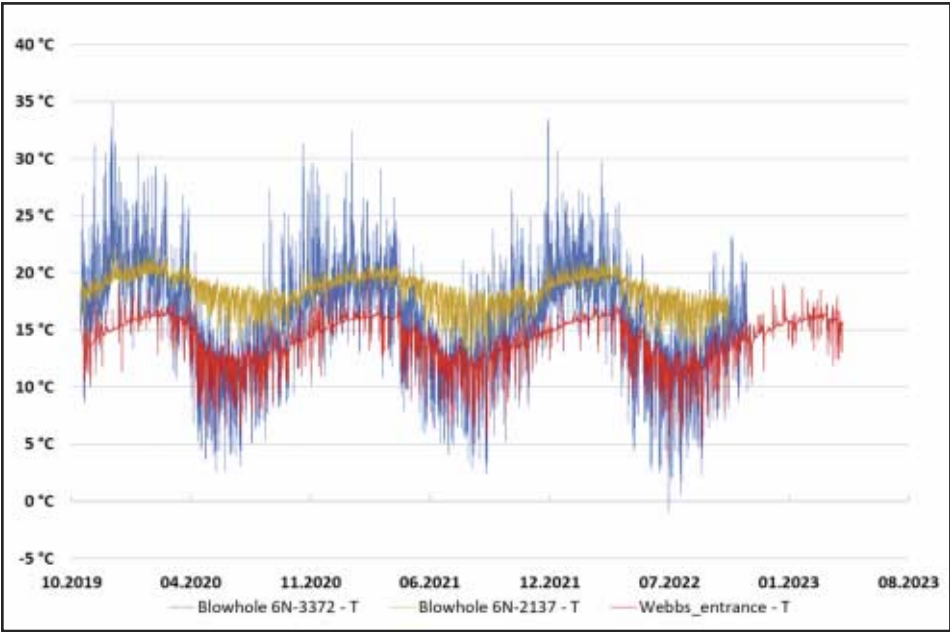
In April 2023, we noticed the logger in blowhole 6N-3372 was missing (last seen in November 2022), and the logger in blowhole 6N-2137 was damaged (possibly with a screwdriver). These two cases indicate possible vandalism (both blowholes are next to the road/track), and to prevent further incidents we believe monitoring less apparent blowholes (further from the roads or tracks) could be a solution.

The data

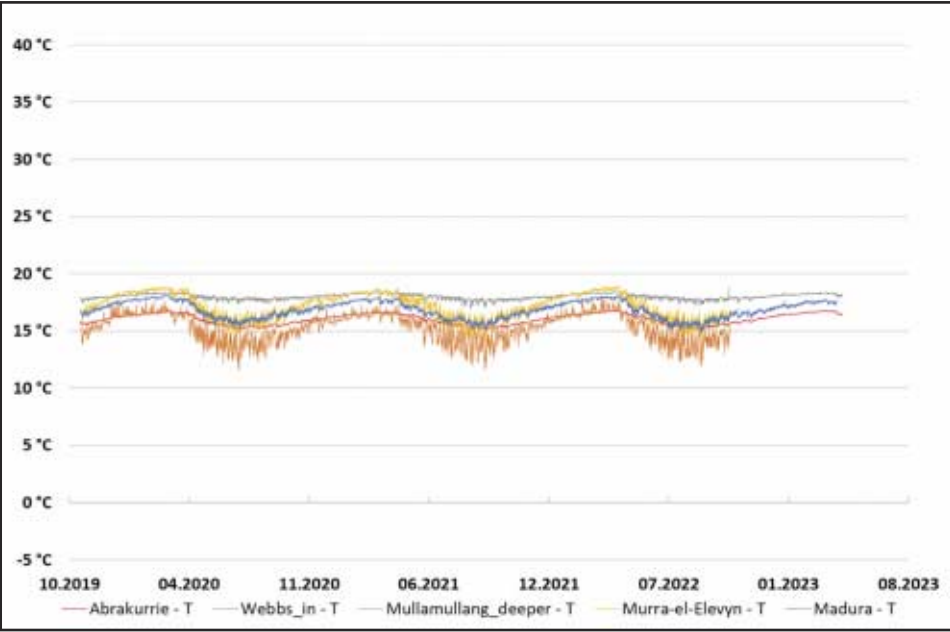
Monitoring temperature and relative humidity in caves plays a crucial role in understanding subterranean climatic systems and their correlation to the external environment. The temperature inside caves is typically linked to the prevailing external climate and can serve as an indicator of the average annual surface temperature. Deeper cave regions typically exhibit stable temperatures and near-saturation levels of relative humidity,



Faulty humidity values (often 0% or 100%) after around a year of logging due to dust covered and corroded sensor.



Temperature variation of blowholes and Webbs Cave entrance, which also shows well ventilated entrance part.



Temperature variations in caves - note the difference between the variation magnitude when compared to blowholes

whereas shallower cave sections or those nearer to cave entrances may experience significant airflow and ventilation.

Temperature and relative humidity data are essential components in gaining insights into various aspects, including the formation of speleothems, the impact of climate on cave-dwelling fauna, the effects of tourism, etc. The data is therefore freely available to anyone and can be accessed in the PANGAEA repository. The lag between data collection and publishing may exceed six months, thus requests can be made directly to us for up-to-date data.

The first dataset (<https://doi.org/10.1594/PANGAEA.939075>) includes a paper with cave descriptions: (<https://doi.org/10.3390/data7030030>).

Acknowledgement

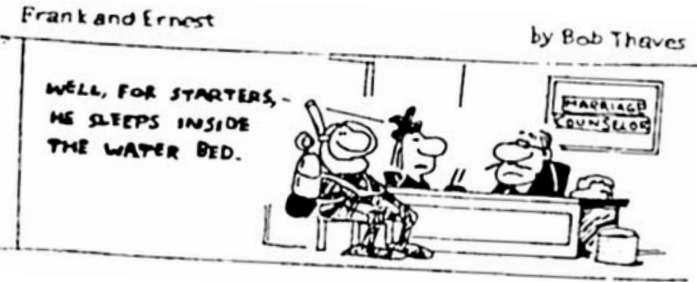
Nullarbor trips and field work are usually time consuming and costly, so we again thank the ASF Karst Conservation Fund for funding scientific research on the northern part of the Plain and climatic research in the caves. In addition, our work was also supported by the Research Centre of the Slovenian Academy of Sciences and Arts, and the Slovenian Research Agency (current projects P6-0101 and J6-50213).

We also want to thank everyone who has helped to expand our knowledge of the Nullarbor karst. Our gratitude also goes to the Western Australian Speleological Group for their field support, data collection and equipment management in respect of the loggers. We are also thrilled and grateful for the support of Stephen Fordyce and members of the CDAA for their help, and Tim Featonby for providing previous in-cave data.

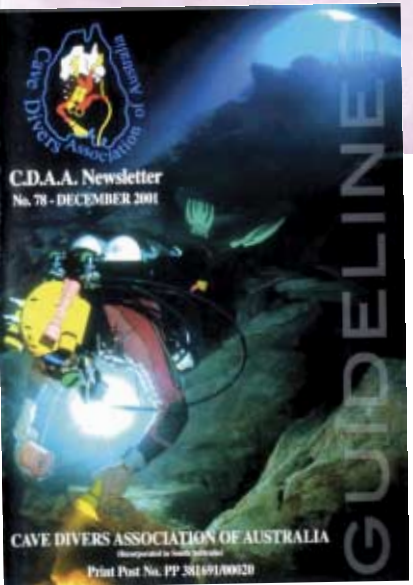
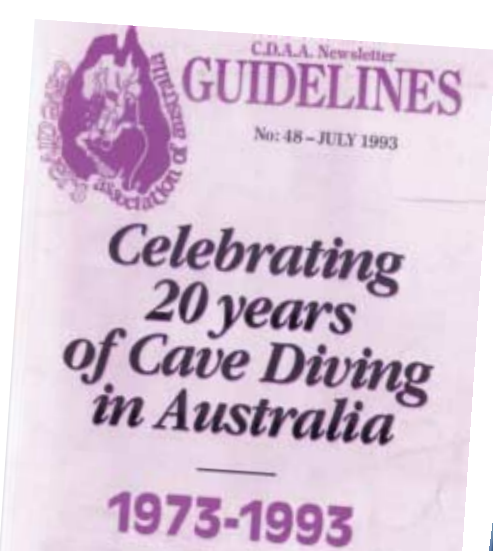
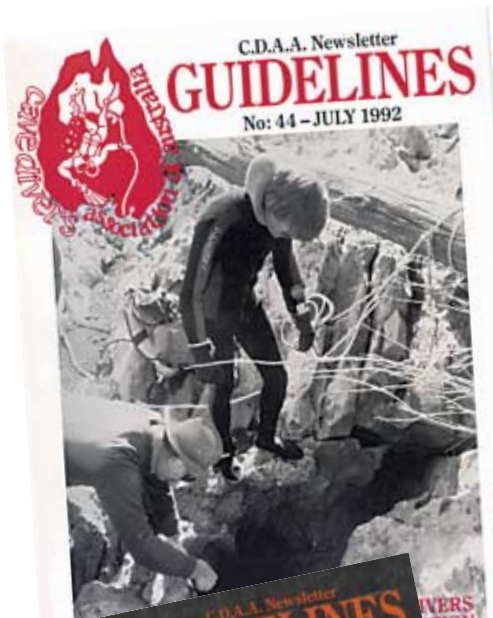
Guidelines, the early years...



THE COMPLETE BRAVE DIVER



FINANCIAL REPORT		VICTORIA	SOUTH AUSTRALIA
Balance at October 1981		\$2009.77	\$1446.01
Income 1981/82		3099.55	3222.12
Expenses 1981/82		2669.32	3513.35
Balance at 18th September 1982		\$2440.00	\$1154.78
Major Incomes			
Annual fees + interest		2094.55	2021.27
Sales (t-shirts, publications, guideline, etc.)		1005.00	450.00
			750.85 (from Vic)
		\$3099.55	\$3222.12
Major Expenses			
VICTORIA			SOUTH AUSTRALIA
Printing	\$ 276.00	Printing	\$1032.63
Records Office	206.30	Secretarial	495.93
T-Shirts	771.00	Electric Stapler	415.95
Postage	269.50	Postage	258.81
Stationary	177.67	Stationary	204.65
Telephone	28.00	Telephone	167.57
Test Fees	16.00	Testing	55.00
S.A. fences etc.	750.85	Signs and Fences	312.00
		Filing Cabinets	247.00
		G.P.O.	58.00
		Hall Hire	34.75
		Guideline	211.50
		Misc.	49.46
			\$3513.35

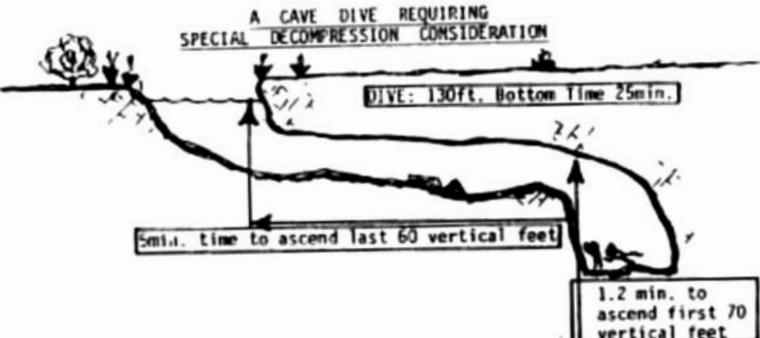


PENETRATION DECOMPRESSION

The following article has been reproduced from a paper presented at a National Speleological Society (U.S.) Convention in the early 1970s. Although it was written for American cave divers, it is still worthy of consideration in planning your next dive in some of Mount Gambier's larger sinkholes.

How you use your tables, be they U.S. Navy, A.S.2299 or RNPL, and whether you use them safely, is as important as any other part of your dive plan.

PLAN YOUR DIVE - DIVE YOUR PLAN.

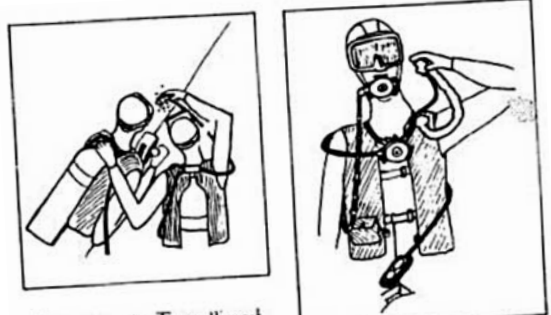


The divers have completed a twenty-five minute dive to 130 feet. U.S. Navy Air Decompression Tables call for 10 minutes at the 10 foot stop. But the swim out of the cave will not allow the proper rate of ascent of 60 feet per minute and the last 60 feet of ascent took 5 minutes instead of 1. So, special corrective steps must be taken to adjust the decompression time in order for the tables to give adequate protection. According to the above-mentioned tables, if you are unable to maintain the 60 feet per minute reduction in pressure (such as swimming out of an underwater cave) the following procedure should be followed:-

The following is a cutting from the Mt. Gambier "Border Watch" of 31st July, 1979.

IN THE LAW COURTS PONDS' DIVE COST \$100

DIVING in Piccaninnie Ponds Conservation Park, near Nelson without permission of the National Parks and Wildlife Service cost three Strathalbyn men \$100 and costs of \$10 in the Mount Gambier Court on Friday. The Wildlife Service alleged that the men had dived in the well known ponds on May 18.



CDAA INSTRUCTORS

Any Instructor wishing material contact - Peter Grills 0419 820 920

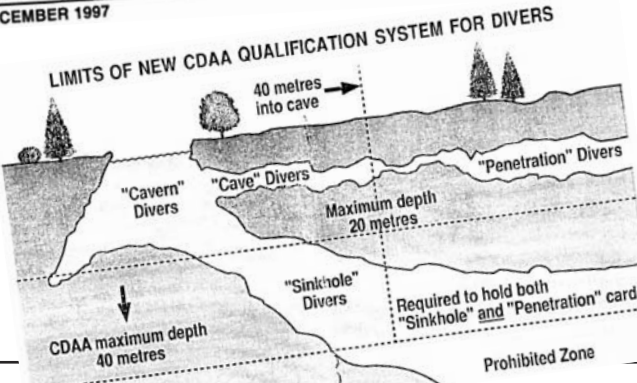
STANDARDS DIRECTOR:

Glen Harrison

Telephone: 0418 846 602

(email) harrison.glen@saugov.sa.gov.au

INSTRUCTOR	CN	S	C	STATE	PHONE	INSTRUCTOR	CN	S	C	STATE	PHONE
NSW & ACT	Nick Jones Ron Allum Terry Cummins Peter Grills Ian Lewis Gary Norgard David Ogilvie Andrew Robertson Des Walters Andrew Wright Liz Wight Frank West	. .	ACT NSW NSW NSW ACT NSW NSW NSW NSW NSW NSW NSW	015 851 313 m (02) 9552 8348 h (02) 9417 2800 w (049) 48 7848 h See top of page (049) 68 4588 h (02) 9977 4355 w 018 412 563 m (060) 411 405 w (02) 9428 2176 (02) 9428 2176 049 636 497		VICTORIA	Stephen Arnel Bill Barnhardt Jane Bowman Stan Bugg Brian Cornell John Dalla - Zuanna Chris Edwards Barry Heard John Mc Cormick Specialist Non-Teaching Warrick McDonald Tony Richardson Bob Wealthy Frank Ziegler	. .			



CDAA Newsletter GUIDELINES No: 40 - JULY 1991

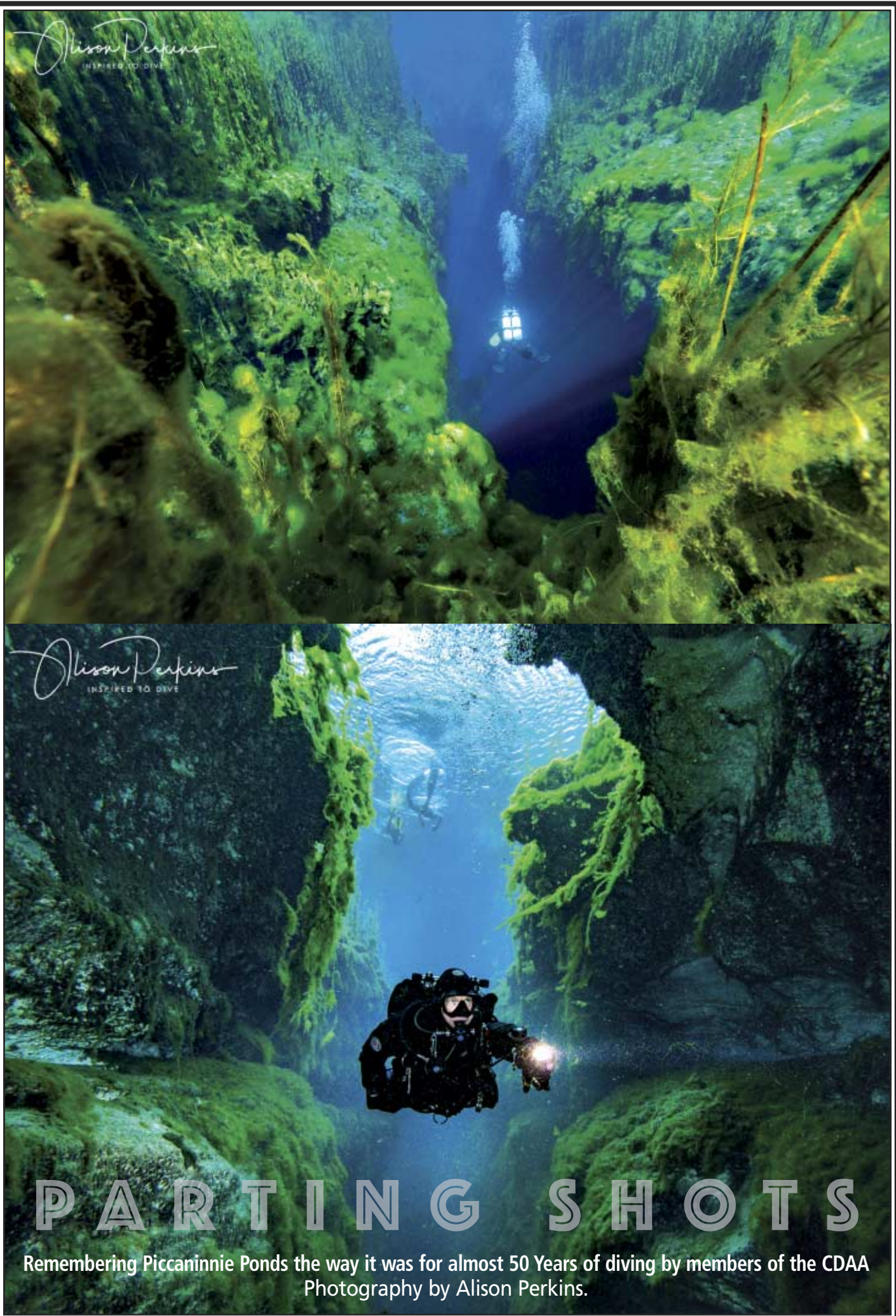


Back Row: (left to right) Tony Davis, Greg Bulling, Noel Dillon, Bill Barnhardt, Neil Vincent, Ian Lewis. Second Row: Peter Horne, Nick Jones, John Vanderleest. Third Row: John Dalla Zuanna, Peter Girdler, Steve Arnel, Tony Richardson, Andrew Cox, Phil Prust. Front Row: Lance Mitchell, Glen Harrison, Alan Jolliffe, Barry Heard, Chris Brown, Liz Wight, Terry Cummins. Absent: Andy Kirk, Phil Mann.















CDAA WEB PAGE

<http://artemis.eng.monash.edu.au/CDAA/>

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CDAA INSTRUCTORS

NAME	Basic Cave	Adv. Cave	NAME	Basic Cave	Adv. Cave
NEW SOUTH WALES					
 FEATONBY, Tim (CDAA 3327) Worwong Heights, NSW Mob: 0402 129 253 E: tim.featonby@hotmail.com	Yes	Yes	 DALE, Steve (CDAA 3926) Mob: 0468 417 211 Email: info@extremewatersport.com.au	Yes	Yes
 Ryan Duchatel CDAA 4983 Mobile: 0419 268 714 E: ryan@totalimmersiondiving.com.au	Yes		 EDWARDS, Chris (CDAA 2247) Mob: 0417 116 372 Email: chrisedwards01@me.com	Yes	Yes
SOUTH AUSTRALIA					
 BISHOP, Damian (CDAA 4738) Mob: 0433 345 743 E: Damian.bishop@live.com.au	Yes		 LEE, Hee Man (CDAA 5064) Mob: 0413 422 850 E: htdlee@hotmail.com	Yes	Yes
 PAYNE, Timothy (CDAA 2640) Mob: 0448 147 927 E: Tim@divessentials.com	Yes	Yes	 WILSON, John (CDAA 4283) Mob: 0408 030 401 E: john@bajtycscuba.com	Yes	
VICTORIA					
 BARCLAY, Gary (CDAA 1735) Mob: 0407 527 921 E: garind@bigpond.com	Yes	Yes	 BICANIC, Josip (CDAA 4691) Mob: 0412 571 779 Email: joseph_1@me.com	Yes	Yes
 BOWMAN, Jane (CDAA 1880) Mob: 0407 566 455 E: janebowman@hotmail.com	Yes	Yes	 PAVNIER, Geoff (CDAA 3784) Mob: 0407 445 112 E: gpavnt600@bigpond.com	Yes	Yes
 CLANDIGE, Linda (CDAA 2214) Mob: 0408 052 070 E: garind@ipji.com.au	Yes	Yes			
 DALA-ZUJANNA, John (CDAA 236) Mob: 0407 887 060 E: jdz@paintandcustom.com.au	Yes	Yes			

EMERGENCY PLANNING INFORMATION

TIPS FOR EFFECTIVE EMERGENCY MANAGEMENT

- Always inform someone (who is not part of your dive team) of your dive plan
- Be prepared, and ensure you can provide critical information (such as your location) to emergency services when required
- Always plan your dive and dive your plan!
- Be trained to administer First Aid and CPR. It's better to have it and not need it, than need it and not know what to do!

ACCIDENT/INCIDENT RESPONSE:

In the event of an incident or accident, CDAA members are to:

1. Assist the person or persons injured.
2. Contact emergency services (if needed) and provide clear and accurate information:
 - a. **WHAT** is the emergency?
 - b. **WHERE** is the emergency? Provide relevant information – street address, GPS coordinates, nearby landmarks.
 - c. **HOW** do emergency services access the site? If possible, direct another member to meet emergency services at the road or a nearby intersection and direct them towards the emergency
 - d. Provide the **NAME** of the injured person/s
 - e. Provide **YOUR NAME** and contact details.
3. While you are waiting for emergency services record as much relevant information as possible, including times, names and contact details and events leading to incident.
4. Contact the CDAA National Director and/or the CDAA Site Director as soon as possible

MISSING/OVERDUE DIVER:

In the event that a diver has not returned to the surface by the expected time, it is important that members act quickly as time is of the essence. As a guide, if a diver is 15 MINUTES or more over their expected run-time, members are advised to:

1. Contact the CDAA Search & Recovery (SAR) Officer. In the event that the SAR Officer cannot be contacted, call the National Director, or Site Director. Follow the directions provided by the SAR Officer or relevant Director.
2. Provide as much information as you can – names of the missing divers, summary of the dive plan, time the divers entered the water, equipment configuration used, expected run time, time overdue.
3. Establish an appropriate course of action. Consideration should be given to the dive plan, extent of penetration and gas reserves of the missing/overdue divers. Are there are other divers on site (or nearby) who may be able to assist with an emergency search. *Note: a search should ONLY be considered if divers available are suitably experienced, equipped, and have sufficient (additional) gas to undertake a search and provide assistance.*
4. If no other divers are available to conduct a search or the missing/overdue divers are not located and have not otherwise returned within the timeframe decided, enact the **ACCIDENT/INCIDENT RESPONSE** procedures listed above.

DECEASED DIVER:

1. If a diver is found to be deceased within the cave, do not disturb the scene. If possible, try to note down pertinent information - location, position, remaining gas, computer runtime, then return to the surface as soon as possible.
2. Contact the CDAA National Director and the CDAA Search & Recovery (SAR) Officer immediately. The SAR Officer will liaise with the relevant authorities as required.

NOTE: Members are advised not to make any statements regarding incidents or accidents to members of the public, to landowners, to the media, or via any other platform/media. Please direct all associated enquiries to the National Director for comment.

EMERGENCY CONTACT DETAILS

Police, Ambulance, Fire	000 or 112 (mobile)	CDAA National Director – Grant Pearce 0438 833 103
State Emergency Services	132 500	CDAA Site Director – Kelvin Ball 0428 842 259
Mt Gambier Hospital	8721 1200	CDAA SAR Officer – Richard Harris 0417 177 830
Divers Emergency Service (DAN)	1800 088 200	CDAA SAR Officer – Phillip Croker 0423 393 347