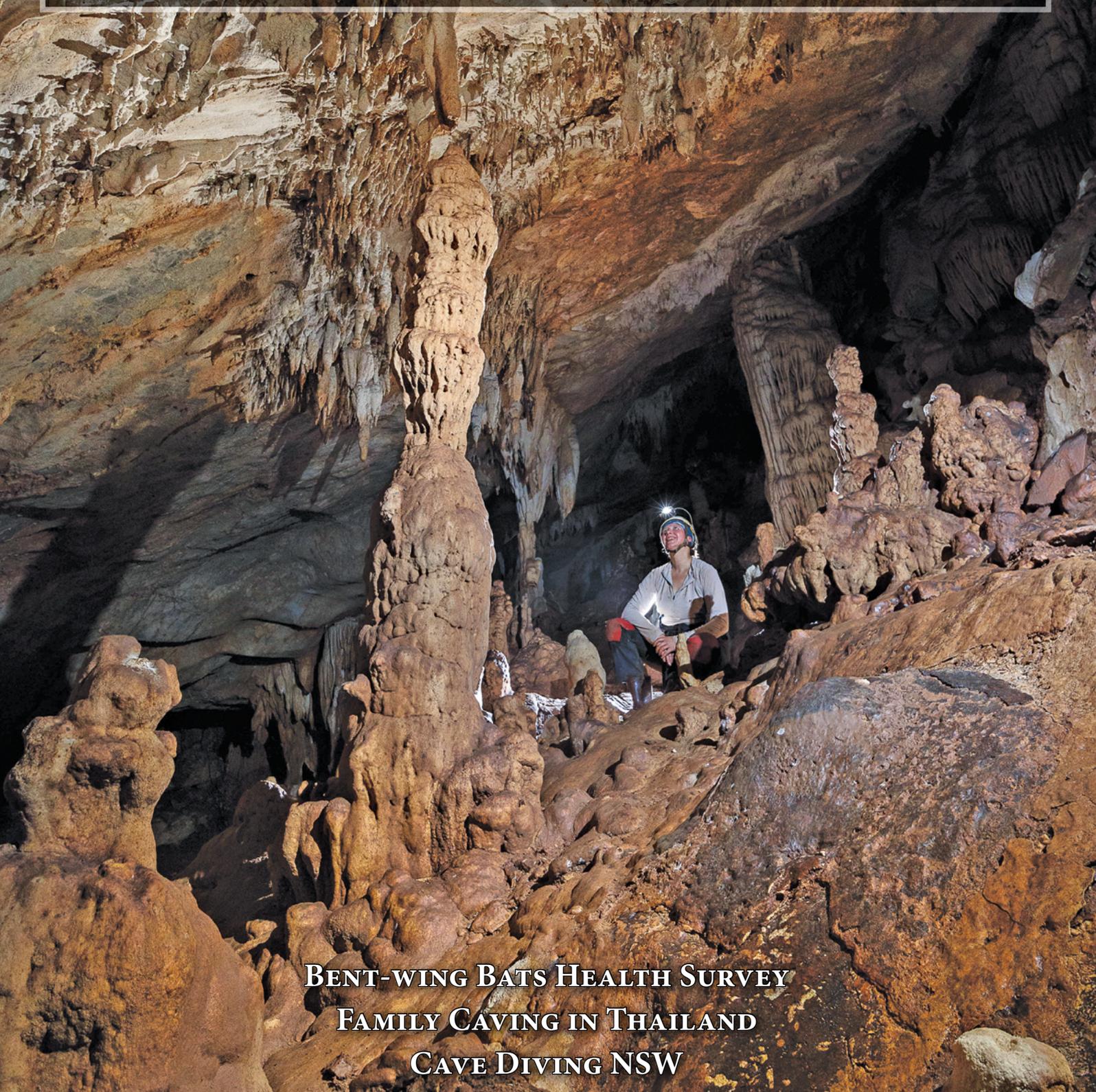


CAVES

The Journal of the Australian Speleological Federation

AUSTRALIA



BENT-WING BATS HEALTH SURVEY
FAMILY CAVING IN THAILAND
CAVE DIVING NSW

COMING EVENTS

This list covers events of interest to anyone seriously interested in caves and karst. The list is just that: if you want further information the contact details for each event are included in the list for you to contact directly. The relevant websites and details of other international and regional events may be listed on the UIS/IUS website www.uis-speleo.org/ or on the ASF website [http://](http://www.caves.org.au)

www.caves.org.au. For international events, the Chair of International Commission (Tim Moulds timothy.moulds@yahoo.com.au) may have extra information. A similar calendar is published in *Caves Australia*. This calendar is for known events in 2018 and early 2019.

2018

9-14 September

International Association of Hydrogeologists Congress, with Topic 7: Advances in Karst and Fractured-rock Hydrogeology, Daejeon, South Korea <http://iah2018.org/>

27-30 September

24th International Cave Bear Symposium, Chepelare, Bulgaria <http://icbs2018.at>

3-6 October

Middle Eastern Speleological Symposium, Antalya, Turkey <http://mess4.com/>.

2-6 October

International Workshop for Women Speleologists in Latin America, Challenges and Perspectives. Viñales, Pinar del Río, Cuba. No further details as yet.

12-18 October

8th Congress of the International Show Caves Association, Genoa, Italy, <http://www.i-s-c-a.com/event/68-8th-isca-congress>

6-10 November

1st Colombian Speleological Congress and 8th Congress of FEALC (Federation of Latin American and Caribbean Speleological Associations), San Gil, Colombia <http://sociedadcolombianadegeologia.org/i-congreso-colombiano-de-espeleologia-y-viii-congreso-espeleologico-de-america-latina-y-el-caribe/>

10-18 November

International Cave Rescue Training, Lozere, France. For details contact dodelinchristian@gmail.com

30 December-4 January 2019

31st Australian Speleological Federation Conference - The Darkness Beneath: Caving Tasmania, Devonport, Tasmania. For more information: <https://asfconference2019.com/general-information/> Presentation: <https://prezi.com/view/KavyRw5tX1ExvDqCr7aY/>

2019 and beyond

23-29 July 2021

The next International Congress of Speleology is the 18th International Congress of Speleology, 23-29 July 2021 (Lyon, France), <http://uis2021.speleos.fr/>

A very useful international calendar is posted on the Speleogenesis Network website at www.speleogenesis.info/directory/calendar/

Many of the meetings listed above are on it but new ones are posted regularly.

Underground Oddities

Grace Matts

HCG

ON A TRIP to Perth about five years ago John Cugley took me to Crystal Cave in Yanchep for a cave tour.

Imagine my surprise to come across this construction in one of the chambers. It's just adjacent to the pathway.

From memory it's about six metres long, with nothing in it. Upon enquiring as to the purpose of this construction I was told it was an earthquake shelter (?!). I wondered about the engineering.

The things you can find in caves — strange.

For further information Google "Earthquake Shelter, Crystal Cave, WA Australia". Seems there's some discussion about removing this shelter. It would be interesting to read any information pertaining to its construction - like why?

Has anyone else met something odd or strange in a cave on their visits anywhere?



JOHN CUGLEY

CAVES AUSTRALIA

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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

Journals are 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.205 September 2018

Australian Speleological Federation

PO Box 388 • Broadway • NSW 2007 • www.caves.org.au

ABN 15 169 919 964

ISSN 1449-2601 • Registered Publication NBQ0005116



ASF

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Cover: *Happy Crayfish Cave, Krabi, Thailand. Photo Bill Nix, assisted by Kate Stephens*

ASF Executive

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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.

EDITORIAL

DESPITE the disappointment of not a single letter to the editor I am happy to report that other contributions are trickling in.

We even made this a 28-page issue to squeeze a few important bits and pieces in.

But CA's appetite is insatiable so I can't permit you to relax – keep writing, please.

A read of this issue reveals some upcoming changes around *Caves Australia*. While the issue of password protection of the PDF version is up for debate at the January conference, the issue of opt-in versus opt-out for electronic versus paper is settled.

From the March 2019 issue (#207) only those people who have indicated a preference to receive a hard copy will do so.

Currently the default is hard copy unless otherwise indicated via the option box on the ASF Membership Database. From January 2019 this default option will swap over.

It is the responsibility of individual members and clubs to ensure the database is accurate.

If you're not sure how to log in and make the changes yourself then consult the individual in your club responsible for membership (membership secretary/ treasurer in most cases).

The December issue will contain an article covering the basics of how to log in and check your status. Don't panic – you have almost six months.



The Northern Caverneers team continues to work tirelessly on the next conference.

Discounted 'early bird' registrations close very soon and many *Spirit of Tasmania* sailings over the December-January period are already booked out.

If you're thinking of attending then now is the time to act. The conference website is bursting with information.

President's Report

CONGRATULATIONS to the Thai Agencies, the Thai people and everyone in the Australian and international caving community involved in the Tham Luang cave rescue.

In what can hopefully be described as a once in a lifetime experience, the skills and knowledge that cavers and cave divers develop through years of experience in their pastime came together to enable an extraordinary rescue.

It was not without loss, though, and our thoughts as an Australian caving community are with the family and friends of former Navy SEAL diver Saman Gunan.

Like many in the Australian caving community, when times are tough or help is needed; he responded to the call and unfortunately paid the ultimate price for his selflessness. May he rest in peace.

A by-product of this extraordinary event is that caves and caving have been in the media more than ever.

During the rescue Australian Cave Rescue Commission Coordinator, Brian Evans, represented the ASF in the mainstream media, writing a well-received article highlighting the intricacies of the rescue.

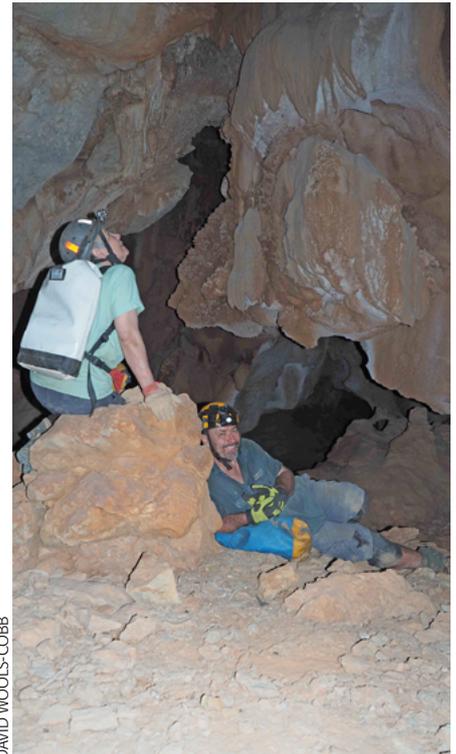
A follow-up piece emphasised the advantages of being involved in official caving clubs and activities when exploring caves to hopefully avoid situations like this.

The recent press coverage is likely to result in a new influx of people interested in ASF clubs and what we do.

Please welcome them and encourage them. By engaging novices in established clubs, we have opportunities to have positive influences on encouraging adherence to environmental, ethical and safe caving practices — a win-win situation for all involved.

On a personal note, I managed to get away caving the other month to the Ningbing, just north of Kununurra, for a couple of weeks of caving.

Sitting around the fire in the evening after a day's caving reminded me of why I go caving.



DAVID WOOLLS-COBB

Caving in the Ningbing with Veronica Schumman

It is the friendship, exploring and documenting caves for future generations and swapping of ideas with others that make this pastime so enjoyable and rewarding.

All these things help contribute to the primary founding objectives of the ASF — protecting the cave and karst environment of Australia.

I hope to catch up with as many of you as possible in Tasmania at the end of the year at The Darkness Beneath ASF Conference. Please do not leave your travel arrangements too late as this is peak tourist time.

During the conference the AGM and council meeting will be held and your input as clubs is invaluable. Make sure you are represented.

The executive has its next meeting in September. Along with the usual agenda items, we will be holding another session facilitated by Steve Milner on the the ASF Strategy as a follow up to the previous session held last year. —John Cugley

Bent-Wing Bats Health Survey

Nicholas White

THE ASF and its members have a policy of protecting cave biota. Cave dwelling bats are the most obvious inhabitants of caves.

Bats suffer from a bad press, as they are associated with disease. In Australia, the Australian bat lyssavirus and Hendravirus in the last 20 years have emerged as diseases threatening people.

The Karst Conservation Fund in 2016 provided funds to Peter Holz, a wildlife veterinarian, for a PhD study on 'Health survey of two subspecies of bent-wing bats (*Miniopterus schreibersii bassanii* and *oceaniensis*)'.

The study is now winding up with a summary in the article on page 7. The findings showed no evidence of the WNS fungus (*Pseudogymnoascus destructans*) but were positive for the histoplasmosis fungus (*Histoplasma capsulatum*) in the Victorian and South Australian populations of bent-wing bats.

As well as the sampling for fungi the bats were examined for other endoparasites and ectoparasites and for evidence of viruses.

Peter Holz has now published his work on presence of viruses.¹ The study design included examination of samples for a number of very significant bat viruses that have impacted human health.

Such diseases are known as zoonotic diseases. In the paragraphs below I comment on the findings.

There was evidence of herpesviruses in the bent-wing bats. This is not surprising as most species of mammals have herpes viruses that are species specific.

There was no evidence of Australian Bat Lyssavirus (ABLV). This virus is related to rabies virus. Infections with ABLV in Australia have resulted in three human deaths to date (1996, 1998, 2013).

Two of the three human infections were transmitted by a bite or scratch from a flying-fox (not dead, sick or injured) and the other was determined to be due to a microbat (Yellow sheath-tailed bat) based on antigenic evidence.



MARVIN MORIATY/JUSFWS

All four flying fox species have been shown to carry ABLV. There is a closely related strain of the virus isolated from the Yellow Sheath-Tailed Bat (*Saccolaimus flaviventris*). To my knowledge the yellow sheath-tailed bat is not normally a cave dwelling bat but there is a maternity colony in one of the lava tubes at Undara.

No other lyssaviruses have been isolated from other microbats but there was some serological evidence of it in sampling undertaken from 1996-2002; this is further discussed below.⁵

Bat researchers and wildlife carers need to be vaccinated with rabies vaccine and maintain an adequate level of anti-rabies antibody.

Post-exposure prophylaxis is still needed, whether or not the person is vaccinated.² This is why it is inadvisable for cavers to handle bats.

There was no evidence of coronaviruses, filoviruses, henipaviruses or adenoviruses. Further comment is given below.

Pathogenic coronaviruses, which originate in bats, have been shown to spread to other animals and then to humans. These are SARS via civet cats and MERS via camels which cause devastating diseases once transmitted to humans.

The study reported here did not find evidence of coronaviruses in the bats tested although other reports have shown the presence of coronaviruses in Australian

bats.³ The coronaviruses in these reports were unrelated to those associated with Severe Acute Respiratory Syndrome (SARS) or Middle East Respiratory Syndrome (MERS).

The first Hendravirus outbreak involved horses and their carers. It occurred at Hendra near Brisbane in Queensland in 1994. There have been many subsequent horse outbreaks in Queensland and Northern NSW and some seven people have been infected resulting in four deaths. The natural hosts are fruit bats.

Transmission to horses is believed to be through contact with bat urine, body fluids or other excretions. Human horse handlers and veterinary personnel have been infected by exposure to body fluids when handling sick horses, with lethal consequences. A related virus is Nipah Virus whose host are Pteropterid fruit bats.

It was first discovered in 1999 as an overflow infection in humans managing pigs in Malaysia. Since then its range has been extended to Bangladesh and India. Nipah virus is known to spread from human to human. Nipah virus and Hendravirus are closely related and are classified in the henipavirus group.

Ebola virus and Marburg virus are filoviruses, which have caused devastating outbreaks in Africa and are now known to originate with fruit bats. It appears to be the trade in 'bush meat' which introduces it to humans in Africa.

The first discovery of a filovirus was in Marburg, Germany in 1967 when laboratory and animal workers were exposed to infected African green monkeys. The first outbreak of Ebola virus was in 1976 next to the Ebola River in the Democratic Republic of Congo. These viruses both transmit from human to human by exposure to infected body fluids. Customary funeral practices have exacerbated the number of cases during outbreaks and containment of infection needs isolation of patients and strict infection control protocols.

BENT-WING BATS HEALTH SURVEY

SUMMARY

It is reassuring that the bent-wing bat populations in Victoria and South Australia are not positive at present for the virus groups tested. The WNS fungus was not found but the histoplasmosis fungus was detected.

The Southern bent-wing bat populations in SA and Western Victoria as well as the Eastern bent-wing bat population of Eastern Victoria both suffered serious declines in numbers in the last few decades. The studies conducted by Peter Holz do not appear to show any microbiological reasons for these population declines.

Further research is needed to determine why populations of bent-wing bats have

declined in Victoria and South Australia. It may be that Emmi van Harten's studies on 'Population dynamics of the critically endangered Southern Bent-wing Bat', also supported by the Karst Conservation Fund, may provide some reasons behind the population decline over recent decades.

Zoonotic diseases associated with bats have become more common in recent times. The recent outbreaks associated with fruit bats are undoubtedly due to habitat changes and the fruit bat 'camps' are in forest remnants much closer to humans on farms, in villages and towns.

A number of microbats have been shown to have antibodies to ABLV in a screening program using samples of blood and brain

collected from 1996 to 2002 from a range of species. Small numbers of antibody-positive individuals were found in a number of families including cave dwelling groups (*Macroderma*, *Chalinolobus*, *Mormopterus*, *Hipposideros*)⁵. Cavers are advised not to handle bats, especially bats which are sick or injured.

WNS fungus is not known in Australia at present. However, the risk of WNS fungus introduction into Australia is very real. A number of prevention and preparedness activities are under way by the Federal Department of Agriculture and Water Resources together with the Department of Immigration and Border Protection who are tightening up on control procedures.⁴

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Protecting Australian Bats Earns National Award

Source: <http://tinyurl.com/y955kgaa>

AUSTRALIAN bats are better protected against a fungal disease known as white-nose syndrome, thanks to a team effort coordinated by veterinarian Dr Keren Cox-Witton of Wildlife Health Australia.

Dr Cox-Witton's tireless work was recognised in March 2018 with an Australian Biosecurity Award.

Dr Cox-Witton said it was a collaborative effort to better prepare Australia for an incursion of the disease, which has not been found in Australia but has devastated bat populations in the United States and Canada.

'Some very dedicated people were critical to the success of this project,' she said. 'I'd particularly like to recognise Rachel Iglesias from the Department of Agriculture and Water Resources, Nicholas White from the Australian Speleological Federation, a team of experts led by Peter Holz from the University of Melbourne, and my colleagues at Wildlife Health Australia.

'I am very pleased and honoured to receive the award.



Dr Keren Cox-Witton with her Australian Biosecurity Award

'It is good to see that the value of environmental biosecurity, and the intrinsic importance of wildlife, has been recognised at a national level,' Dr Cox-Witton said.

White-nose syndrome is caused by a fungus, *Pseudogymnoascus destructans*, which thrives in cold conditions and affects

hibernating bats in caves. The disease has led to the deaths of millions of insectivorous bats overseas.

The project included assessment of the risk of the disease being introduced into Australia, development of response guidelines in case of an incursion, and advice for those who come into contact with bats on how to recognise and report a suspected case of the disease.

A number of activities were aimed at raising awareness of cavers about the disease and how to avoid introducing the fungus.

Wildlife Health Australia CEO Dr Rupert Woods said that the work of Dr Cox-Witton and others on white-nose syndrome could have wider impacts.

'Most importantly, the project serves as a case study on how to manage the risk of exotic wildlife diseases. It is a great example of how key stakeholders can support the Australian Government and its leadership on important environmental health issues. It is amazing what can be achieved when we all work together,' he said.

Health Survey of Two Subspecies of Bent-Winged Bats

(*Miniopterus orianae bassanii* and *M. o. oceanensis*)

Peter Holz

Faculty of Veterinary and Agricultural Sciences, University of Melbourne

THE southern bent-winged bat (*Miniopterus orianae bassanii*) is listed as critically endangered because its numbers have declined significantly over the past fifty years, and it only uses two breeding caves, at Warrnambool in Victoria and Naracoorte in South Australia.

Despite disease being identified as one of the potential causes contributing to its decline, minimal research has been carried out in this area.

This project surveyed southern bent-winged bats for a range of potential disease causing agents and compared these results with eastern bent-winged bats (*Miniopterus orianae oceanensis*), which have a stable population.

There was some initial speculation that pesticides may have contributed to the decline of the subspecies.

However, preliminary testing of pesticide levels in bat guano in the Victorian southern bent-winged bat breeding cave found that levels were below detection except for DDE (0.01 mg/kg), total DDT (0.065 mg/kg) and dieldrin (0.027 mg/kg).

Similarly for the eastern bent-winged bat guano sample, levels were below detection except for DDE (0.061 mg/kg), total DDT (0.065 mg/kg) and dieldrin (0.027 mg/kg). For the guano sample collected from the breeding cave at Naracoorte, levels were also below detection except for DDE (0.017 mg/kg).

These levels are low compared with those found in bat populations that suffered mortality and declines as a result of pesticide exposure. Consequently no further testing was undertaken and the study focused on examining bats for a range of infectious disease agents.

The agents surveyed included three groups of fungi: *Pseudogymnoascus destructans*, the fungus that causes white-nose syndrome, *Histoplasma capsulatum*, a fungus found in caves capable of causing disease in humans, and fungal skin flora; six groups of viruses: Australian bat lyssavirus, coronaviruses, filoviruses, henipaviruses, adenoviruses and herpesviruses; four external parasites: batflies, mites, ticks and *Riouxgolvania beveridgei*, a worm

found previously in bent-winged bat skin nodules; and two blood parasites: *Polychromophilus melanipherus*, a close relative of the malaria parasite, and haemoplasma, a bacteria that infects red blood cells. Results are in Tables 1 and 2.

One bat sample and one environmental sample tested positive for *P. destructans* by PCR. These samples were submitted to the Australian Animal Health Laboratory for further testing, which indicated that the fungus was not *P. destructans* but a closely related fungus in the same genus. All other samples tested negative.

A white nose syndrome risk assessment was completed for Wildlife Health Australia. This document can be accessed at <https://www.wildlifehealthaustralia.com.au/Portals/0/Documents/ProgramProjects/WNS%20Disease%20Risk%20Analysis%20Australia.pdf>.

While all environmental samples were negative a small number of bats tested positive for *Histoplasma capsulatum*. This was unexpected as bats become infected with the fungus from the environment.

Table 1. Fungus, Herpesvirus and Haemoplasma PCR Results

(Numerator is the number of positive results. Denominator is the total number of samples tested)

	<i>P. destructans</i>	<i>H. capsulatum</i>	Fungal Skin Flora	Herpesvirus	Haemoplasma
Southern bent-winged bat (Victoria)	0/150	10/127 (8%)	66/121 (55%)	73/121 (60%)	4/17 (24%)
Southern bent-winged bat (South Australia)	0/75	16/112 (14%)	42/112 (38%)	22/230 (10%)	2/41 (5%)
Eastern bent-winged bat	0/100	10/151 (7%)	76/151 (50%)	51/116 (44%)	2/25 (8%)
Environment	0/30	0/57			

Table 2. Parasite Results

(Numerator is the number of positive results. Denominator is the total number of samples tested)

	Batflies	Mites	Ticks	<i>Riouxgolvania beveridgei</i>	<i>P. melanipherus</i> (based on blood smear examination)	<i>P. melanipherus</i> (based on PCR)
Southern bent-winged bat (Victoria)	59/189 (31%)	73/188 (36%)	19/188 (14%)	78/188 (41%)	35/61 (57%)	12/13 (92%)
Southern bent-winged bat (South Australia)	68/138 (49%)	66/138 (48%)	5/138 (4%)	12/138 (9%)	43/128 (34%)	22/44 (50%)
Eastern bent-winged bat	28/151 (19%)	45/151 (3%)	10/151 (10%)	1/151 (1%)	22/85 (26%)	13/28 (46%)

HEALTH SURVEY OF TWO SUBSPECIES OF BENT-WINGED BATS

However, the fungus's preferred growth temperature is above 22°C, conditions not found in the caves examined.

It is speculated that the cooler cave climate prevents fungal growth from occurring until the fungus finds its way onto the warmer skin of the bats. Bats are minimally infectious for humans, so the health risk to people working in the caves appears to be low. This is supported by the fact that, after spending three years working in these caves, both myself and one of the bat ecologists remain negative for *H. capsulatum* exposure.

As expected, many of the bats were positive for skin fungi. While a few of the fungi found on the bats have occasionally caused disease in other species none of them have been associated with disease in bats. *Pseudogymnoascus roseus*, an environmental fungus related to *P. destructans*, was identified on one eastern bent-winged bat.

All 213 samples that were tested for Australian bat lyssavirus, coronaviruses, filoviruses, henipaviruses and adenoviruses were negative.

A large number of bats tested positive for herpesviruses. Sequencing indicates that six different viruses are present throughout

CONCLUSIONS

- *P. destructans* was not found on any of the bats or environments surveyed.
- The WNS risk assessment concluded that southern bent-winged bats are at risk from *P. destructans* should it be introduced into Australia, as they occupy caves within the preferred temperature range of the fungus.
- *H. capsulatum* was found on bats but not in the environment, likely because cave temperatures are too low for fungal growth. The risk of humans becoming infected in these caves appears to be low.
- A large number of different fungi were found on the skin of the bats surveyed. While a few of these fungi have caused

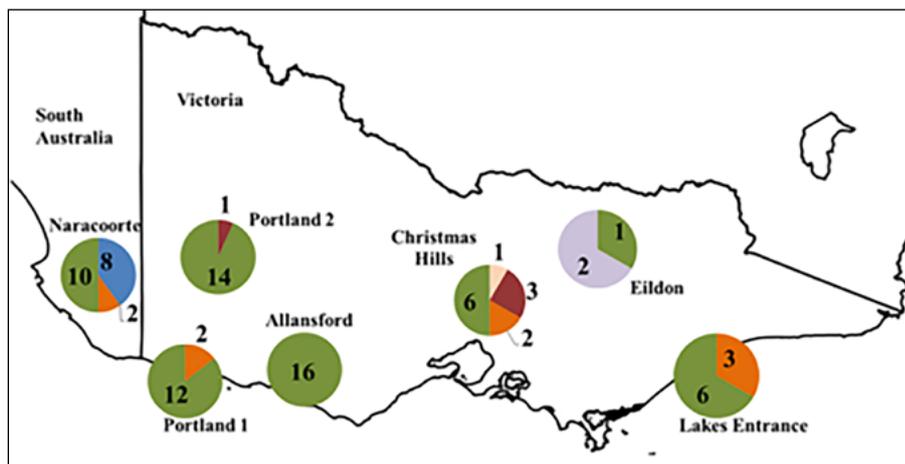


Figure 1. Distribution of herpesviruses detected in each of the seven bent-winged bat locations sampled across Victoria and South Australia. Numbers represent the number of viruses of each type present in the population. D15-like viruses = Green. NG46-like viruses = Orange. N7050-like viruses = Blue. CH20-like viruses = Maroon. E22-like viruses = Lilac. CH6-like viruses = Salmon.

the populations sampled. See Figure 1.

There were no significant differences between the different location groups for the numbers of bats that were positive for haemoplasma, batflies, mites or ticks, but significantly more Victorian southern bent-winged bats were positive for *R. beveridgei* and *P. melanipherus*. Victorian southern bent-winged bats also carried significantly greater burdens of *P. melanipherus* than the

disease in other species, none have caused disease in bats.

- Australian bat lyssavirus, coronaviruses, filoviruses, henipaviruses, and adenoviruses were not found in the bats surveyed.
- Six different herpesviruses were found.
- Bent-winged bats carried a number of different ectoparasites: ticks, mites, batflies and nematodes.
- Bent-winged bats were infected with low numbers of haemoplasmas.
- Bent-winged bats were infected with *P. melanipherus*. PCR is a more accurate method of detecting this parasite than blood smear examination.

other groups. Despite associations having been made between this parasite, anaemia and weight loss in other bat species there were no signs of ill health in the bats surveyed in this study. PCR was a more accurate way of detecting *P. melanipherus* infections than blood smear.

It detected the parasite in numerous samples where it had been missed on blood smear examination.

- All bats examined were in good health with no signs of malnutrition or illness. Therefore, it seems unlikely that any of the disease agents surveyed are contributing to the decline in southern bent-winged bat population numbers.
- Victorian southern bent-winged bats were more likely to be positive for herpesviruses, *R. beveridgei* and *P. melanipherus*. While the agents themselves do not appear to be responsible for population declines it is possible that this group of bats is being subjected to an as yet unidentified stressor, which is impacting their immune system and ability to suppress these agents.



Help Wanted and Needed

KARST CONSERVATION FUND COMMISSION: HELP NEEDED

The Fund has a number of projects currently under consideration. To achieve its success, the Commission needs to expand the volunteers involved. In particular we need a Fundraising Co-ordinator and a Communication and Publicity Co-ordinator. If you can help, contact the Chair of the Commission, Nicholas White (Email: karstfundinfo@caves.org.au).

PUBLICATIONS COMMISSION

The commission urgently needs a volunteer to regularly collate the calendar and events for *Caves Australia*, *ESpeleo* and the website. For details contact: Susan White Publications Commission Chair (Email susanqwhite@netspace.net.au)

John Robert Dunkley AM

19 March 1943–1 February 2018

Nicholas White, Susan White

JOHN was born in Sydney in 1943 and attended West Ryde Primary School and Fort Street Boys High School.

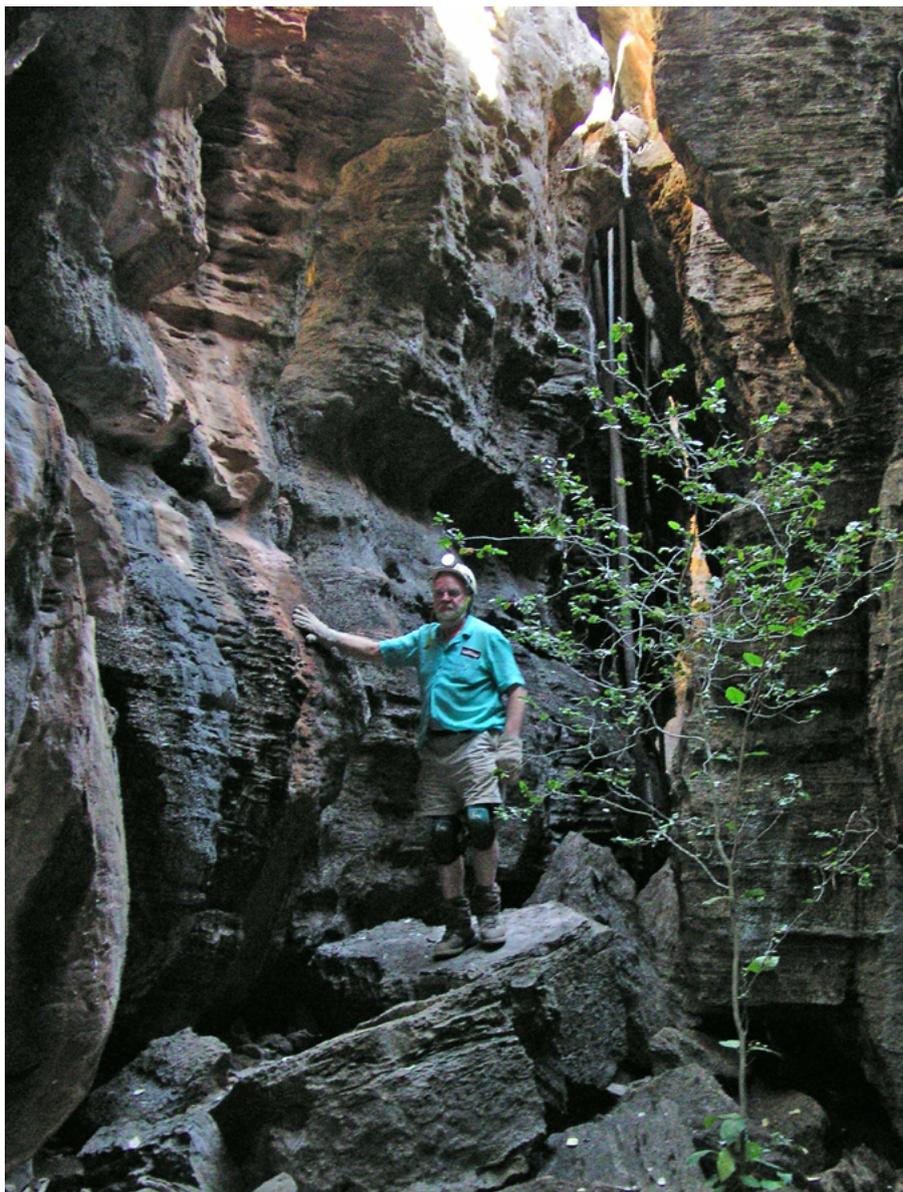
He went to the University of Sydney where he studied geography and economics, followed by a Diploma of Education. He married Jeanette Parkes in 1970. John is survived by Jeanette and his sister Margaret. He became a secondary school teacher, teaching economics, geography and later legal studies, and taught in Sydney state secondary schools and, after moving to Canberra, many of the Canberra high schools.

His passion beyond study and work was caving where he quickly became involved in Sydney University Speleological Society (SUSS) in the early 1960s. This developed into involvement in the operations of the Speleological Research Council (SRC) and ASF as well as the Canberra Speleological Society (CSS) and the Highland Caving Group (HCG). It is difficult to do justice to all of his caving activities.

The caving passion quickly became a feature of his life. As a very keen traveller, he combined his overseas travel with visits to caves and cave areas in many out of the way areas. Many of us have listened to his travelogues of obscure places at ASF conferences: China, Thailand, Eastern Europe, Vietnam, Laos, Burma (Myanmar), South America, Africa and more recently Antarctica, with photos of caves out of train windows and other oddities. Many of these were undertaken well before they were 'discovered' by the guidebooks.

Exploration at Jenolan, discovering new caves and passages, and as well the deep caves of the Nullarbor Plain were being found and explored. John participated in this exploration as well as becoming deeply involved in the publication by the SRC of the findings of both Jenolan and the Nullarbor work.

John's other significant speleological explorations involved expeditions to Thailand and to Bullita in the Northern Territory. John first visited Thailand in



NICHOLAS WHITE

1969 but the project blossomed when he presented a travelogue at the January 1985 ASF Conference in Hobart. The first real speleological trip to Thailand was in May 1985. This became the Thailand Project and John conducted numerous expeditions to the Northern Provinces of Thailand for 15 years. By that time civilisation had intruded and caves found by the expeditions had become show caves with paved

roads and other "improvements". Needless to say these trips discovered numerous caves and burial sites and led to many publications. John tired of this project once civilisation intruded on the activities. It has been continued by several British caving groups but his legacy is acknowledged extensively. The Thailand Project resulted in about 60 publications, including five books, ten management reports,

JOHN ROBERT DUNKLEY AM

24 speleological articles, 15 scientific papers in *Helictite*, *Cave Science*, *Australian Archaeology* etc. and an entry in the *Encyclopedia of Cave and Karst Science*.

A paper on caves at Bullita in Gregory National Park in the Northern Territory was first published in 1989 in the *BCRA Journal*.

This prompted John to organise a very successful trip in 1991 from the Canberra Speleological Society (CSS) with participants from the Top End Speleological Society (TESS). Subsequent trips were held yearly to coincide with school holidays at the start of July.

The Bullita system grew in length each year to the stage now that the main Bullita Cave itself is over 130 km of connected passage and other associated caves in the area, totalling 170 km.

It was on one of these trips in 2005 that John suffered serious heat exhaustion, which marked the end of his remote area caving activities. Further exploration continues with other participants under the auspices of the Jutburra-Gregory Karst Research Special Interest Group.

John had a long-term interest in cave management and cave conservation. With Elery Hamilton-Smith, he instigated and organised the first Cave Management Conferences through the ASF Cave Management Commission.

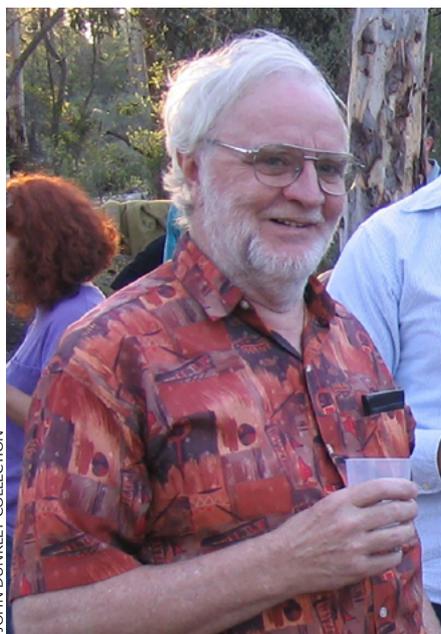
These conferences were extremely successful and they filled a niche that had been empty for professional cave and karst managers. After five ASF and various conferences organised by state management agencies, the Australasian Cave and Karst Management Association (ACKMA) was formed.

John was never quite comfortable in that having participated in such a successful forum for cave managers, it then became an independent organisation. Nevertheless, he remained interested in cave management and worked especially with the Thai authorities to improve cave management in Thailand.

As well as being supportive of the various conservation battles over the years, he became particularly involved in the consequences of the Save Mount Etna Caves campaign driven by CQSS and UQSS that consisted of on-site demonstrations, blockades, public education and legal challenges to the validity of the mining excavation license.

As a consequence of the Mount Etna conservation battle, it was suggested that ASF should establish a tax deductible Gift Fund.

It was John who worked through the successful registration of the ASF as a tax



JOHN DUNKLEY COLLECTION

deductible Gift Fund recipient. The Fund was approved in 2001 and is now known as the ASF Karst Conservation Fund and John was appointed as one of the Fund's inaugural directors.

John was instrumental in seeing this Fund support small and large projects fulfilling the karst conservation aims of the Federation.

There was a long negotiation with Cement Australia about gifting the Mt Etna Quarry and associated facilities to ASF but in the end these were gifted to the Queensland Park Service.

However, the company instead donated a substantial amount of money to the Karst Conservation Fund, which seeded some of the first Fund projects.

He not only explored and documented caves and karst but also was intimately involved in speleological organisations. John's accomplishments and contributions are so numerous over so many years that they almost defy a simple listing.

He became a Member of the General



JOHN DUNKLEY COLLECTION

Division of the Order of Australia in 2013 for significant service to the exploration, science and conservation of caves and karsts. His involvement was extensive and intensive:

■ Authored or co-authored more than 16 publications on caves and their history plus numerous articles.

■ President, Australian Speleological Federation (ASF), 1983-1986 and 2002-2005; Vice- President, 1981, 2000-2001 and 2005-2015; Secretary, 1966-1967; Member, since 1960; Fellow (Life Member) since 2007.

■ President, Sydney University Speleological Society, 1968 and 1970-1972; Secretary, 1963; Librarian, 1964; Member, 1963-1973; Life Member, since 1973.

■ Director, ASF Karst Conservation Fund, since 2001; a Registered Environment Fund.

■ Founding Treasurer, Jenolan Caves Historical and Preservation Society; and served in various executive roles, 1973-2009.

■ President, Canberra Speleological Society, 1983-1985 and 2000-2002.

■ Member, SRC, *Helictite*, (the Journal of Australasian Cave Studies), and member of the ASF *Helictite* Commission 2000-2016.

■ Member of the ASF Library and Grants Commissions. It was his initiative which established the Grants Commission for support for small projects.

John had so many interests and could speak on so many topics including macroeconomics, social history, geography, Australian history, the latest political news, classical music, the history of cinema (especially science fiction movies), caves of any country, Australian and international train schedules and things to see wherever one might be intending to travel in Australia or overseas.

He loved travel and would visit caves along the way. If you wanted a detailed afternoon's conversation on the merits of a hotel or airline, or the best way to get around an overseas city, John was your man.

He loved organising gatherings and parties, whether it was a simple Wednesday lunch or the traditional Boxing Day get-together at their house. His dress sense could be a little quirky. Worn-out trousers and cheap flowery shirts purchased from street vendors in Thailand could often be seen adorning his tall frame. Fashion was not an interest of John's.

We deeply grieve for his untimely passing. We will all miss his quirky but intense interest in all things speleological. The Australian speleological scene will not be the same without him.

The Future of *Caves Australia*

Bob Kershaw

ISS and ASF General Secretary

OVER THE last couple of years Alan Jackson, the editor of *Caves Australia*, the Publications Commission and ASF Executive have been trying to implement the electronic publication and storage of *Caves Australia* for ASF members.

To support the project there have been a number of suggestions made by members, but now we require your feedback to your club and then to the Council meeting in December/January in Devonport. As only the ASF Council can set membership fees, members need to be aware of possible considerations. Personally, I applaud and fully support Alan's efforts to bring the ASF publication into the 21st Century with a pdf edition. ASF is after all an environmental organisation! Alan's aim of a virtual electronic blog style format edition of *Caves Australia* in the near future may take some acceptance by members.

COSTING OF *CAVES AUSTRALIA* AND FUTURE MEMBERSHIP FEES

It has been suggested that membership fees be reduced and those members who wish to receive a printed edition of *Caves Australia* would have a higher membership fee. Some comments from WASG members for a printed copy include:

- 'I have found the hard copies to be useful in that, after I read them, I take the newsletters to school for my students' reference or interest. Some articles have been helpful to students in research assignments and I also encourage students to have a look at articles and photos of interesting places, formations, etc.'
- 'I vote for the print version because I would not make time to read it otherwise... having the print copy makes the difference between a credible journal and spam.'
- 'We would be happy to pay for a copy. Even if the price is \$48 per year, this is not excessive, compared to some other subscriptions we have had in the past.'

Alan has said that after a couple more editions of *Caves Australia* this year, includ-

ing this one (CA205), he will have a more complete set of costings. But so far CA203 cost \$1025 for layout, sub-editing, typesetting, image processing, colour and print management and postage was \$820. Extra work for the PDF web version was \$300.

Printing was \$2050. So based on 700 members (regardless of the type of membership but not including O week members), that is \$1.46 for all members for layout and an additional \$1.50 for each of 200 members for the pdf edition. Now the number of printed and posted copies was 500 so that is \$4.10 per printed copy and \$1.64 for postage. Total cost for the printed edition is \$7.20 and \$2.96 (includes both layout costs) for the pdf edition (not including server storage costs).

Edition CA204 cost \$1025 for Layout, sub-editing, typesetting, image processing, colour and print management for *Caves Australia* 204=\$1025 and \$500 for the preparation of compatible interactive PDF version for web (there was more work undertaken this time with links added).

So \$3.96 for the pdf edition and printing and postage was about the same for the hard copy.

So we can extrapolate these figures and say that with more articles photos etc. in the four editions per year, a PDF version is worth \$16 per year at present and that receiving a printed copy is \$28.80 per year. But a full take up of the electronic edition would reduce the PDF to \$8-10 per year per member and fewer printed editions would increase the cost to \$30-\$40 per year for a hard copy.

Colin Tyrrell, our membership secretary, and I have examined the numbers of persons who receive what type of edition. 109 members want the printed edition (especially for those ASF members who do not provide an email address in the membership database), 256 want the PDF edition and the rest have not made up their mind as yet and receive the printed version by default. That may change when ASF introduces an 'opt out' system for receiv-

ing the PDF edition from January 2019. ASF corporate members (clubs) receive a printed copy of *Caves Australia* but there is one corporate member that has opted to receive it electronically. Why do clubs want a printed edition these days? Where a print copy is returned to ASF — and we have to pay excess postage for returned printed editions, \$50 for CA203 — Colin changes that person to a PDF edition if an email address exists for that person.

As the total number of printed copies is reduced the overall printing costs reduces, but will increase on a per copy basis. If a dual-subscription rate (hard versus electronic) was introduced in future, this would make the cost higher to those members receiving the printed edition to cover ASF costs.

Many publications that we read ourselves, for example newspapers, e-books, photographic or 4x4 magazines, have subscriptions at a quarter of the printed edition. So why can't ASF do the same? These publications have a subscription to their product to protect their property and to cover their costs of production.

Well, now to the debate about fees and price of *Caves Australia*. Sure we can reduce fees by \$30 and then increase them for those members who want a pdf by \$10-\$12 and a printed version by \$30 or by nothing if you don't want a *Caves Australia*. But we don't have the administrative volunteer who is going to administer this in terms of the treasurer or membership secretary nor, I doubt, the club person who is going to look after the payments by members in the first place.

So how about, in the short term, we split the difference and give all members a reduction of \$10 in their membership fee and make life easy for everyone? If we ever have an electronic version only, then we reduce the membership fee by a further \$10.00. Simple and administratively acceptable by all parties! But of course that is the call of delegates at the Council meeting. (In the 2001-02 ASF budget the amount in fees set



aside for the publication of the journal was \$12.50.)

We could of course have no *Caves Australia* and give all members a \$30 reduction in membership fees and save Alan the editor, like all editors in ASF before him, the unenviable task of begging for articles for *Caves Australia* like his editorial plea from CA204.

REGARDING STORAGE OF THE PDF AND AVAILABILITY TO THE GENERAL PUBLIC

Storage of the PDF edition is held on one of the ASF servers looked after by Mike Lake. As ASF pays a price for various aspects of ASF administration and IT and the use of hosting our files, the cost of storage of the electronic editions and archive is borne by ASF through your membership fees.

Some members want the PDF edition publicly accessible with no password. A few clubs (SUSS, STC, CCC, FUSSI, HCG) have their newsletter publicly available now and probably expect the same of the ASF's *Caves Australia*. I could be wrong. But current editorial policy is to not publish detailed cave location data or sensitive information which is likely to facilitate or encourage inappropriate cave access.

Other members want the electronic editions of *Caves Australia* password protected to protect our intellectual property and information regarding caves in Australia from becoming publicly available as exists at the moment. You could argue that clubs like CEGSA, VSA, HSC, CSS, MSS and NHVSS who don't have publicly available publications are in this grouping (again this is supposition on my part), but many cave locations are shown on government topographic maps these days and photos and information are readily available on the internet of things if you search well enough.

A few members have suggested that the most recent electronic editions be password protected and then after a year or so placed in the archive which is not password protected. For example, ISS newsletters are uploaded to the National Library's Trove and are accessible after a year has passed. ISS and BMSC only have recent versions of their newsletters available for public download.

We could argue that seeing one of the aims of ASF is to "... provide education and advice to the Australian community on conserving Australia's karst resources", the electronic edition should be freely available to the public to assist in their education regarding karst and caves. On the other hand, this is negated by the first aim of ASF "to

safeguard and protect the natural environment, specifically the cave and karst environment of Australia". Many of us have seen firsthand how the public treats our publicly available karst and cave resources! I will let you decide on this ethical dilemma of ours.

But there is an intertwined economic and legal argument for protecting our intellectual property in *Caves Australia*. The economic argument is based on the fact that *Caves Australia* has a monetary value that has been determined by virtue of the costs of production and distribution, and as we have determined above, is \$30 for a printed edition and \$10-12 for the PDF edition. Now if *Caves Australia* is made publically accessible and free to everyone then it has been decided that it now has no monetary value. So why should members have to "pay" for a worthless product in our membership fees?

This leads onto the legal contractual argument. By giving a membership fee to the ASF for goods (*Caves Australia*) and services (examples include providing public liability insurance cover and moneys for grants and commission functioning) is said to be a contract between members and ASF. Now if *Caves Australia* has been deemed to be free and to be given away in an unprotected way then ASF is not providing part of the contract for a good and members are entitled to a refund for subsequent editions of *Caves Australia* as the product that did have value no longer has its monetary value. Further to this that future membership fees should be reduced by the calculated \$30 per member as the contract is not being fulfilled by ASF. (Our legal members may wish to comment on this further). But in general, anyone who does a 'work' owns the copyright to that 'work' so they would have to give their permission for their 'work' in *Caves Australia* to be freely available.

Further, if I continue this financial argument, as we have no income from membership fees to cover the continual costs of production and distribution of *Caves Australia*, ASF will begin to run at a loss. You could say that we use the ASF reserves to cover these losses but that is not good business practice and could lead to insolvency. And the accountants and auditor would step in and say 'Stop the losses'. That is, stop producing *Caves Australia*.

To have a *Caves Australia* in an electronic format only, that has no associated costs of production, we would require a volunteer to undertake layout, sub-editing, typesetting, image processing, colour and print management. It could then be made available to the public for free. But that still

leaves the argument regarding our intellectual property and whether it should be available with no password protection.

I have been asked "What about the website and all its content — that costs ASF (and therefore its members) money, but is available for free public consumption?" True.

This is an arrangement that started in 2000 to acquire the caves.org.au domain name by delegates at council. The website was later written and maintained by volunteer labour and initially at no cost. Since then the costs of the ASF website are quite manageable at present at \$1320 per year, or approximately \$1.90 per member to continue this service that was introduced many years ago. We recently had a quote to undertake work for \$1250 on the website but managed to get the work done under our existing contract. If we had to pay for the services for the work of our webmaster for the ASF site there would be higher hosting costs, and the membership fee for members may have to increase to cover those overall costs. Alternatively, we may have to stop funding the website if membership fees did not rise to cover those increased costs; regardless that it is now freely available for public viewing. But the reason why the codes and other information is available on the website is that at the 2002 Council meeting it was noted in the minutes "There was some concern that codes such as survey standards should be protected by a password.

The meeting felt that the status quo was adequate, since there is now a general copyright wording on the website, as supplied by John Dunkley.

That is, the delegates agreed that the website provide the information.

An aside to this discussion, is that if we had to pay for the services of an editor of *Caves Australia*, then we might have to consider if we wanted to pay for that service. So thanks to all the editors past and present for their efforts in producing our journal.

There could be other options that I have not thought of that might be presented to the Publications Commission and Council for consideration. But the final decisions are yours, the members, via the Council meeting at Devonport. Please take the time to consider the future of *Caves Australia* as it is a valuable resource for ASF members and researchers while we ponder the aims of ASF in 'Promoting conservation and sustainable management of Australia's cave and karst resources'.

The views expressed above are mine and not necessarily those of the executive.



Family Caving in Krabi, Thailand

Alan Jackson
STC

TRANSITIONING from 'I'm an expedition caver and I'm single' to 'I'm an expedition caver and I'm in a relationship' can be a real challenge.

Taking the next step to 'I'm an expedition caver and I have a child' often proves unachievable; generally one has to go. I've seen many a brave 'weekend' caver disappear into oblivion post child, thus the concept of attempting to leave for weeks at a time on expedition is ludicrous.

My situation is particularly dire — I'm an expedition caver, I'm in a relationship (with a non-caver) and I have two children. But some of us are fortunate enough to be born selfish and lacking empathy and thus struggle on.

I've recently discovered there is middle ground if you can convince your children that caving is fun (I gave up on my partner years ago).

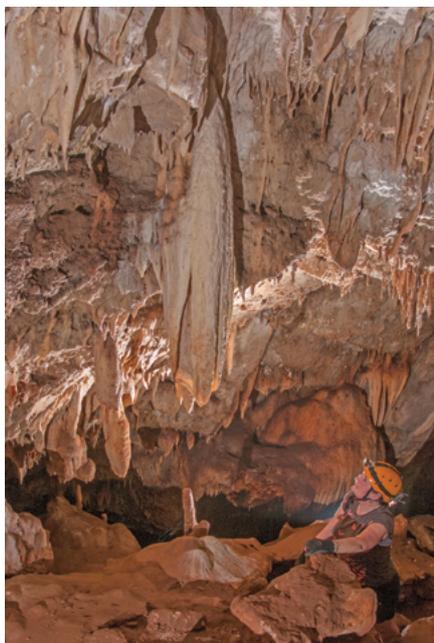
Alternatively, if you start them young enough, you don't even need to consider if they're enjoying it — you just drag them along and if they complain about the mud, bats and oppressive heat you tell them how fortunate they are to be doing overseas trips at their age.

A British caving friend, Imogen Furlong, who had enjoyed around 20 years of unfettered international expedition indulgence, heeded nature's call and joined the 'cavers with children' group in 2012. She'd had enough of it by the end of 2015, selected a 5 km long, 3 km wide, 560 m high lump of limestone (Khao Kayam) in Au Thalane near Krabi, Thailand which appeared devoid of any cave records, and rounded up a bunch of breeding ex-cavers, their partners and their children for a few weeks of 'expedition' in January 2016. It even attracted some cavers without kids.

Our own Tim Moulds, his now wife, Larissa, and step-son Dane attended in 2015. It proved a successful expedition with numerous small (child-friendly) caves located on the more easily reached northern and western sides of the limestone blob. One of the short caves initially terminated



Phreatic Ghost Cave, family style



Happy Crayfish Cave



A family-friendly outing to the coastal karst

in a small sump which, after the application of some Victorian-era child labour, was soon bailed to reveal a short duck/roof sniff and ~1.3 km of quality stream cave to explore — Tham Lek Lek. Buoyed by their finds and the overall success of the expedi-

tion (not a single child was lost ... for long) it was decided to do it again. I joined them, with 11-year-old daughter, Anna, in tow.

Krabi Family Expedition Mark II ran from ~29 December 2017 to around 15 January 2018 and was principally organised by



BILL NIX



Group photo — what could possibly go wrong?

BILL NIX — ASSISTANCE BEV SHADE & KATE STEPHENS



The Main Chamber, Happy Crayfish Cave

Imo Furlong and Tim Moulds. It attracted a plethora of British cavers, a solid bank of Australians, a handful of Yanks, one Danish family, a Russian or three and a touch of Belgium. Children ranged in age from ~1 to 14 years.

It was a big group and was split over two accommodation sites — the Bananas Bungalow (for cheapskates) and Melina's Beachfront Bungalow (for the rich and soft — we're talking a pool, air conditioning, non-bamboo construction materials etc.). The Bananas was the 2016 base and is located 300 m walk from the target limestone; Melina's was a little further down the road but an easily managed distance with a mini-van based at each camp.

It was an interesting dynamic and observing the daily politics of individual couples passive-aggressively negotiating whose turn it was to have a child-free day to

do some 'real caving' was fascinating. I particularly enjoyed picking a side then imposing myself on other couples' arguments for a combination of personal entertainment and a better outcome for the parent who was clearly getting duded. Most attendees ended up with an acceptable balance of activity.

The most challenging task was separating some mothers and their young children so couples could have a childless day in a cave while crèche operators distracted the abandoned children for as long as possible without having to resort to plugging them into electronic entertainment devices.

CAVING

It wasn't all a social experiment, though — we did some caving, too. The big hill (Khao Kayam) had revealed some of its secrets on the northern and western perim-

eter in 2016 but its interior and southern parts were protected by steep (often sheer) terrain and mangrove swamps respectively.

A critical mass of speleologically-frustrated husbands was on hand to catalyse minor epics into the heart of the 'massif' and mud-slugs to the south.

While those attempting to infiltrate the centre returned with epic tales of foolhardy free-climbs, ferocious pinnacle karst and hostile vegetation, few enterable caves were found.

As is usually the case with cavers, the highest aim was to reach the lowest point — the nadir our zenith. The goal was to reach the massive doline in the western interior. Five set out but only three made it to the doline floor for a rushed glimpse at two short-lived wet season sinks and a yearning for more time, but we got there and that's all that counts.

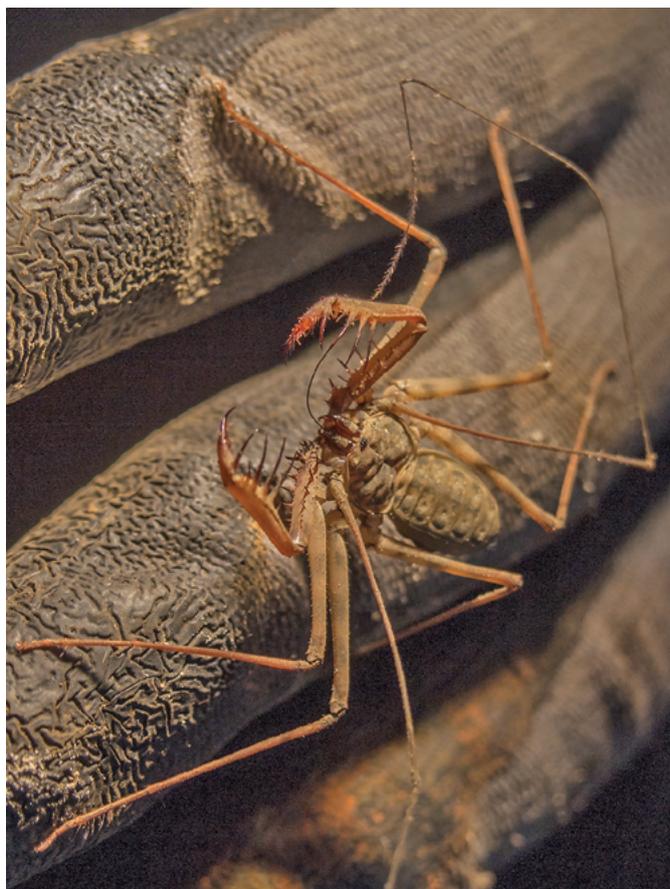




PETER GLANVILLE

PETER GLANVILLE

Hanging about



Whip spider



VLADIMIR YURKENS

PETER GLANVILLE

Mud sloggers



Ridley's cave racer

A couple of outings to the southern perimeter provided a whole new type of misery. There was no uphill but knee-deep mud, mangrove tangles, fast flowing tidal channel swims and vicious oyster-covered rocks ensured plenty of suffering.

There were plenty of caves thrown in to keep it interesting but nothing startling. The plethora of small resurgences actually became a chore with valuable time spent documenting them meaning we didn't even recce half the total southern perimeter — nothing worse than when new caves get in the way of finding new caves. A fascinating series of enclosed tidal (i.e. mangrove-filled) basins connected by short caves were fun to explore.

More small caves (and one medium one ~400 m long, but it was surveyed by an American, so it's probably really only 200 m long in most cavers' eyes) were found

on the northern side of the hill and some climb leads in Tham Lek Lek were pushed, but nothing terribly exciting revealed itself.

Tim Moulds' altercation with a stinging tree to the thigh, however, resulted in some terrible revelations, as the Google cure of choice proved to be 'strip to your underpants, wrap the affected appendage in cling wrap' and sit around drinking beers in a public place.

Sadly, Tim rarely needs much encouragement to get nude and delve into his supply of cling wrap.

The team at Melina's soon lost interest in the original hill and started recceing an area to the north — Khao Nong Chang Tai. It proved fruitful, with numerous short but dry and interesting phreatic caves to explore, all with leisurely access across cultivated fields. 'Phreatic Ghost Cave' was clearly the find of the expedition with

exquisite pale, phreatic, child-friendly chambers, loads of bats and digs to keep the British (and Rob Susac) busy.

Rob's digging got out of hand in the end — somewhere along the line he acquired a digging/walking stick (to which he promptly wrapped a headlamp). This, combined with his beard, dreadlocks, Akubra hat and clay-coated legs and clothing created a character straight out of Middle Earth. He was quickly labelled Radagast the Brown and all he lacked was a team of Rhosgobel rabbits to get around.

Having a team of midgets on hand to help push the digs proved invaluable.

Many potential digs were scouted by children first who would then return and advise whether it was worth digging out for adult access.

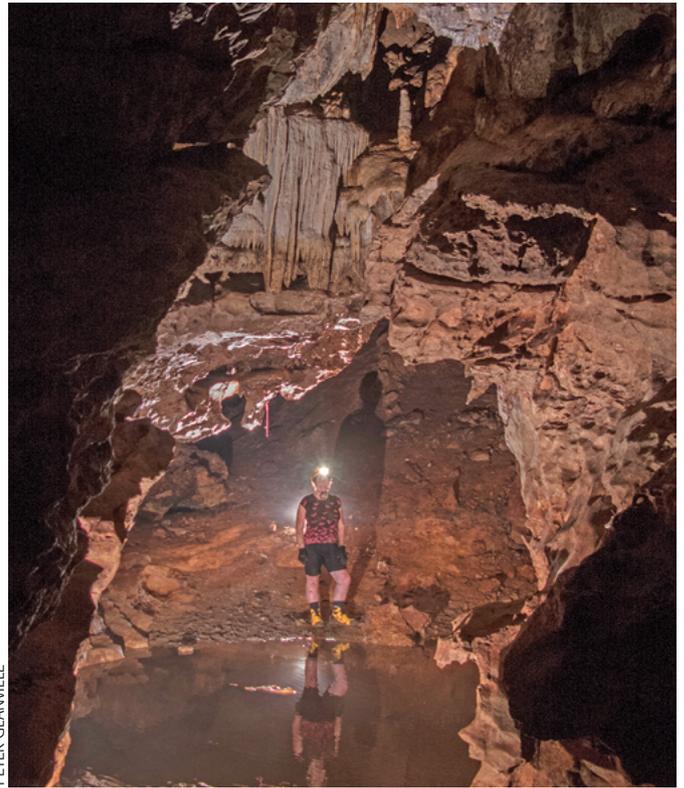
Tim Moulds learnt the hard way that my Anna is a chip off the old block in one of



BILL NIX



'Robaghost the Brown' and Tim after a day out prospecting



PETER GLANVILLE

Feeling reflective in Happy Crayfish Cave



PETER GLANVILLE

Bert de Waele and Paco Murray surveying a new find



TIM MOULDS

Claire Moulds' first ever caving trip with mum Larissa and Grandma Barbara

these digs. Tim had sent Anna in a horrible low passage to survey Phreatic Ghost Cave and then tasked himself with surveying in to the same spot via the easy walking passage option.

Anna was furious when she found a beaming Tim further in the cave. A few days later Anna pushed a nasty uphill flattener (one of Radagast's digs) in a nearby cave, returned a few minutes later assuring us it was worth digging and surveying through.

I found it very tight and advised Tim he should dig more. He did so but still suffered acute 'Sharpie in sternum' syndrome. Hot, sweaty, filthy, cursing and bleeding, Tim was then casually shown the way to a new easy entrance by a satisfied Anna. Revenge is a dish best served hot and sweaty, apparently.

Perhaps the most entertaining of our

subterranean excursions were the dedicated kids' trips. It was like herding cats. Once you have more than five kids it's almost certain that at least one will be whinging, or hitting another, or stealing all the snacks when you're not looking.

The only solace was knowing that you were taking one for the team and somewhere out there was a child-free adult, maybe even a child-free couple, remembering life before children.

CAVING ALTERNATIVES

When not exploration caving, or torturing children in jungle, mangroves or caves, alternative activities abounded.

There were sea-kayaking trips to islands inhabited by a mad monkey, snorkelling and SCUBA tours, long-tail boat rides to spectacular vistas, visits to the Krabi night markets, conventional tourist attrac-

tions (caves, tufa dam swimming pools, mountain-top temples), secluded beaches, countless marine creatures to harass and evening swimming with bioluminescent plankton (quote of the expedition goes to Fraser Stephens who was heard innocently exclaiming to his kids 'look at my magic sparkling wand' — a few people got their kids out of the water after that one).

THE WASH UP

We found 75 previously unrecorded entrances during the expedition, with nearly 1800 m of new cave surveyed in the Khao Kayam area and around 1000 m in Khao Nong Chang Tai.

So maybe there is caving after kids, if you play your cards right. There's even caving WITH kids. Hopefully Anna will be up for a real expedition soon. She claims to have enjoyed this pretend one.



Subterranean biology of the Krabi tower karst, Southern Thailand

Tim Moulds
WASG

LARGE AREAS of Asia are covered in karst with over 1.69 million km² or approximately 10.8 per cent of Asian countries being karst (The University of Auckland, 2017), with some countries such as China containing over 20 per cent karst (Juberthie 2000).

The combination of large amounts of karst, associated with highly productive tropical rainforest and associated large energy inputs has contributed to the evolution of a diverse and abundant fauna inhabiting the caves of this region.

More than 50 karst areas in Asia have limited amounts of biological information regarding their faunas (Deharveng 2004), however, only 14 large karst areas from South East Asia are known relatively well (Deharveng and Bedos 2000). One of the best studied cave systems in Thailand for its biology is Tham Chiang Dao in northern Thailand (Gibert 1987, Deharveng and Bedos 2000, Deharveng and Brouquisse 1986) which contains a diverse fauna of troglobionts, guano dependant fauna and stygofauna.

The tower karst of southern Thailand within Krabi province has been the subject of preliminary examination for biological diversity by speleologists from the UK, USA and Australia over the past two years during the course of cave exploration and mapping. Several caves, namely Tham Lek Lek and Dead Baby Elephant Cave in the Thalane Bay area, have been examined with diversity recorded. The caves show a diverse and abundant guano associated fauna as well as multiple troglolobiotic taxa.

Stygofauna appears to be relatively common in the caves with streams and sumps common in the caves. This fauna is less well recorded with mainly fish reported from various caves including Dead Baby Elephant and Tham Tewada. Stygobiotic amphipods were recorded from several sumps in Tham Lek Lek, leading to the naming of Ankle Biters Sump for one section of this cave.

Tham Lek Lek has several observed troglolobiotic species, mostly observed in the southern end of the cave beyond the first sump, where humidity is maintained at close to 100 per cent. In this area several nocticolid cockroaches have been observed on the walls,



TIM MOULDS

Sparassid spider (Heteropoda sp.)

and a blind ground hunting spider of unknown family is relatively common near isolated guano piles on mud banks.

Other fauna observed in this cave are amblypygid arachnids and sparassid spiders of the genus *Heteropoda*, mainly near entrances. Other predatory species include opiliones and thread legged bugs (*Hemiptera: Reduviidae: Emesinae*).

The entrance series of Dead Baby Elephant Cave contains a large guano covered rock pile which contains an assemblage of guano associated fauna including raphidophorid cave crickets, millipedes, opiliones and sparassid spiders of the genus *Heteropoda*, along with collembola, psocoptera, and the larvae and occasional adults of Tineid moths.

Limited material has been collected in both 2016 and 2018 and is held in the Western Australian Museum (Perth, Australia) and in UK institutions. The formal identification of this material is ongoing.

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Unleashing the potential of *Caves Australia*

Sarah Gilbert
FUSSI & STC

WE ARE approaching a potential turning point for the future of *Caves Australia*, which will be discussed and decided at the next Council Meeting (January 2019): the decision of whether it continues as a newsletter aimed solely at ASF members or whether it is made easily available to the wider community. Personally, I think there are some definite advantages in choosing the latter option.

In this digital age, there is an ever-increasing amount of information available for cave locations via the internet, geocaching and GPS maps.

There are at least a dozen wild caves with their own Wikipedia sites, including some with sensitive cultural heritage, all of which include specific grid coordinates. We have gone beyond the point where we can rely on keeping all cave locations an in-house secret, although I fully support maintaining our editorial standards of not publishing cave locations.

The amount of easily available and unregulated information will only increase with time, as will the corresponding increase of inadvertent damage to these caves due to lack of awareness of appropriate cave visitation skills.

In contrast, public information can also be used for good, where information relating to specific caves has been beneficial for their protection.

The successful saving of the Cliefden Caves was, in part, due to the large public awareness campaign run at national and local levels, covering both digital and print media. This resulted in Cliefden Caves having the most extensive Wikipedia page of all the wild caves listed.

Advocacy for environmental campaigns relies on public education and spreading knowledge of what is there and why it is worth protecting. Caves that are currently known, and those that will inevitably become known, need our protection.

The need for increased advertisement of KCF projects has also been discussed at recent council meetings. We have some details available on the ASF website including current KCF projects, however this can be difficult to maintain as an up to date resource. Active and regular advertising for projects with current information (via *Caves Australia*) could only benefit the KCF and cave conservation as a whole.

In the past seven issues of *Caves Australia* more than 20 per cent of articles published relate to cave conservation. This is closely followed with 18 per cent on exploration and caving, plus an additional 9 per cent science, 6 per cent historic and 4.5 per cent on rescues and training exercises (the remainder being primarily articles relating to recent ASF conferences, the IUS Congress, notable ASF identities, and equipment and book reviews).

The intangible value of *Caves Australia* is in the information it contains; in how the journal can be used to share information, to educate and to promote caving and cave conservation.

To me, this inherent value would only be increased by expanding the readership. The majority of articles already published in *Caves Australia* could be used to promote the protection of caves or to spark the interest of new members to join local clubs and gain skills and experience of how to cave softly.

Making *Caves Australia* publicly available is a chance to be more proactive in karst conservation rather than being reactive to threats or damage that has already occurred.

By increasing the information we make available, we also increase our national impact and influence.

We have our regular *eSpeleo* which is an excellent means of communication between ASF and its members and clubs. Rather than having two overlapping publications with the same readership, the scope and reach of *Caves Australia* could easily be increased for the benefit of cave conservation and the future of caving as a sport. A wider audience may attract new authors to share their experiences and passion for caving; make it more desirable for advertising to offset production costs; a regular page listing caving clubs in each state could attract enquiries from new members. The possibilities to enhance what we already have are endless.

So, I leave you with some parting comments and questions to ponder.

As an ASF member my concern has never been what do I personally get in return for my membership money, but instead how is my money best spent for the benefit of conserving all caves and promoting caving as a sport Australia-wide?

What are our long term goals, and how can we best use the resources available to achieve them?

Do we want to remain an organisation with only inwards communication between members, or do we want to increase the value of *Caves Australia* by using it as a tool for promotion, education and inspiration?



Serious and funny caving incidents

Garry K Smith
NHVSS

THIS ARTICLE is a compilation of caving related incidents over many years with NHVSS, which at the time were not necessarily humorous, but on reflection years later, are now quite amusing.

While they may be entertaining, there are important lessons to be learnt from other people's mishaps and mistakes. Many thanks to co-authors, Pat, Geoff and Sonia, who assisted in compiling the three main reference articles, listed at the conclusion of this article.

In some instances authors of the original articles downplayed the incident to reduce the embarrassment of those concerned; however, I have endeavoured to accurately and truthfully convey each incident.

1. While caving in Kubla Khan Cave, Tasmania in 1998, I was enthusiastically taking photos with multiple flashes set up all around, as members of our party abseiled into the Cairn Hall Chamber next to the River Alph.

In my haste to reposition a flash unit, it slipped from my grasp and landed in shallow water. My instinctive reaction was to quickly grab the flash unit to reduce the chance of water damage. Upon grabbing the wet unit, I was hit with a high voltage discharge. The instantaneous electric shock surged through my body, throwing me violently backward and the flash unit was flung high in the air to landed on the dry bank behind me. It was like being hit by a freight train.

Upon regaining my composure, I put on dry leather gloves and gingerly picked up the unit to remove the batteries. It was like handling a bomb ready to explode. Needless to say the next couple of photo opportunities were missed. That was a hard learnt lesson to find out that water entering a flash unit can short circuit the condensers through a person standing in water — the perfect earth.

Note: Despite being a short duration electrical discharge, my flash unit manual quotes 200Vac as the trigger voltage. Other

general literature on camera flash units states that the first condenser output is usually between 350-400Vac and many have a second stage condenser output (which fires the flash) between 1000-3000Vac.

2. Later on that same trip, when wading down a waist deep section of the Alph River in Kubla Khan cave, I didn't notice a few cavers ahead of me carefully negotiating part of the river passage.

The water was murky with silt stirred up by those ahead. Not taking notice of those ahead was a big mistake, as the next step was well over my head and I went right under the freezing cold snow-melt water. I was told later that the only part out of the water was my dry bag containing camera equipment held at a full arm stretch above my head.

If I had only paid more attention to the movements of those ahead, I could have stepped around the deep hole in the river.

3. In November 2001, NHVSS members were invited to a property near Murrurundi to look for caves. After setting up camp, three of us left the others to hike to a nearby waterfall at the headwaters of Pages River.

It was a pleasant walking track through rainforest vegetation. At the 35 m waterfall, I glanced down at my feet to see at least twenty leeches hanging on the outside of each shoe. Panic set in — if there were so many on the outside, how many were inside my shoes?

I stuck my finger down between my sock and shoe and pulled out a slimy slithering ball of leeches, more than ten. Then on the other side of the same shoe, another slimy entangled ball. There was blood running down into my socks and leeches stuck to my legs, feet, hands and shoes.

Then I noticed that every leaf and twig on the ground around me was swaying with leeches, sniffing the air. My two companions had also realised the hopeless situation we were in.

You just can't kill or flick away so many

leeches when they are stuck to everything. I took a quick photo of the falls and we jogged back along the track, with squelchy feet, obviously full of leeches.

At the first available clearing devoid of all vegetation we stopped to clean out the obnoxious, slimy, bloodsucking critters. Well, that was a job and a half. It brought back images of the old movie *African Queen*. We wasted no time in retracing our steps back to camp.

At a large deep pool in the creek, we stripped down, had a wash and did a final de-leech. Brian was the winner in the leech stakes, with blood oozing from many bites on his legs and a big sucker in the middle of his back.

4. A hand-line tape was set up down the entrance climb of GR56, Flowstone Surprise at Glenrock. Jodie climbed down the small narrow pitch, but stopped on a ledge just short of the bottom. A small snake was curled up directly below.

Continued in Jodie's words: 'I called out to the guys at the top, "There's a snake, but I think it's dead". It wasn't moving but it seemed to have its head up looking at me. "What's it look like?" Brian asked from the top. I replied, "It's small, around 30cm long, light brown with a slender tapered head". Brian stuck his head in to try and look while I had my light on it. "That's a tiger snake" he announced. "Is it poisonous?" I asked. "Deadly," was the nonchalant reply. I wasn't deterred though as it hadn't moved at all, so I decided to throw a rock at it to see if was really dead. The first rock missed but it didn't even flinch, the second hit home and it moved. I had the two boys above in hysterics as I exclaimed in my best Steve Irwin voice, "Crikey! Look at her go... oh she's bigger than 30 cm ... oh, she's angry now!"

But then I had the problem of climbing back out without slipping, otherwise I would be delivered straight down to the angry beast I had just thrown rocks at. I had wobbly knees coming out.



SERIOUS AND FUNNY CAVING INCIDENTS

5. While crossing the very cold, swiftly flowing Yarrangobilly River to reach Carcase Cave (Y80) in October 2003, a strong handline was strung across the river to assist those crossing the strong waist-deep current. Brian stripped down to his jocks and began crossing with his dry clothes in a plastic bag held well above the water. When halfway across he lost his footing and grasp on the bag.

The bag went floating down river at a great rate of knots. Those still on the bank set off racing downstream, trying every vantage point to reach the bag of 'dry' clothes. After some time the bag of now very soaked clothes was retrieved. So much for having dry clothes to walk the many kilometres back to the car park.

6. Paul, a Californian caver, joined NHVSS for a two-week caving trip around NSW in 1999. This included a trip to Cliefden when the Belubula River was too high to cross with the 4x4s. Paul volunteered to paddle over the swollen river on an airbed to set up a haul line to get people across safely. Halfway across, a dark object bounced to the surface next to his airbed. In shock and yelling 'Crocodile!' he paddled frantically to the far bank.

Everyone was in hysterics, as he had had a close encounter of a rare kind — with a platypus.

7. Upon returning to the vehicles from a trip into Mammoth Cave, Jenolan in May 1998, the cavers were confronted by a very annoyed wombat, intent on defending its newly established territory near the car park. The cavers were chased around their vehicles by the marauding beast.

One caver with overalls half down was bulldozed over and had several distressing minutes with the snarling wombat partly entangled in the overalls and pinned between his legs. The wombat's chomping teeth were just millimetres from his bare legs.

Somehow the partly undressed caver managed to struggle free and leaped onto a car's open tailgate. Other terrified cavers jumped on to the top bar of a solid pipe gate as the out of control wombat charged back and forth beneath them.

To read all about this story and find out who was involved, refer to *Attack of the Killer Wombat*, *Newcaves Chronicles* No.11, p.58-59

Footnote: We later found out that this particular wombat had been orphaned as a baby after a road accident, then raised by Jenolan staff. Consequently, when it was released into the wild, it was unafraid of humans.

8. Our group was digging out the Eyrie Cave at Timor during October 2008. There were people below ground madly shovelling dirt into buckets, then hooking them onto haul ropes for the surface gang to pull up the entrance pitch and dispose of.

The weather closed in and looked rather threatening; a large tarp was erected over the entrance so work could continue when it started to rain. The only trouble was that the tarp wasn't tensioned properly, so the rainwater couldn't run off. The water just collected in the middle of the tarp until there was a huge dam suspended overhead. An unnamed member of the surface party tried to alleviate the problem, but only made it worse, with the full contents being discharged down the shaft and on to the workers below. What a drenching!

9. In October 2004 NHVSS members visited Glass Cave at Wombeyan. Toward the bottom of the cave one of our members squeezed down through a deep vertical shaft and eventually dropped into a bell shaped chamber some 3 m high.

Another caver passed down his camera so a couple of photos could be taken of some huge cave pearls in the chamber. There was a lot of communication back and forth with instructions how to operate the somewhat dated SLR camera. Once photos were taken it was time for the caver to exit the chamber.

The only trouble was that he could not climb out because at the bottom there were no handholds and the walls were too far apart to chimney out. A handline was lowered down, but the caver could still not get through the tight squeeze at the top, so he stripped down to his underwear and had to be hauled out hanging vertically from a tape. Brute force won the day as he was pulled through the hole like a cork out of a bottle.

10. A NHVSS caver managed to get all the way into Diprotodon Cave at Conomodine NSW, but on the way out got stuck in the Armchair Squeeze. Halfway through this vertical squeeze, one is in the sitting position with almost nothing to grab hold of or push off.

The caver was eventually freed with the assistance of a person below pushing upward and a person above feeding the stuck caver jelly beans for energy.

11. At Gloucester Caves one of our bionic cavers had to use their arms to physically bend a leg with artificial knee and hip joints to get through a tight squeeze. Where there is a will there is a way. This is a real inspiration to able-bodied cavers.

12. At Moparrabah Caves in June 2005, two new club members carried their lunch through the extensive cave system in packs.

As planned, right on midday the cavers exited via another entrance on top of the hill to enjoy lunch in the sun.

Unfortunately their lunches consisted of fresh bananas, which emerged from the cave as a mushy slop distributed evenly throughout their cave packs.

13. In September 1998 at Walli Caves, a caver returned to his old-style tent just as a thunderstorm brought heavy rain. But ants had also determined that the tent, pitched earlier in the day, was a good place to get out of the rain.

They had moved all their eggs and thousands of ants into the cosy space between the airbed ridges and the groundsheet. The caver (Garry Smith) had a biting time clearing ants from his tent while being soaked in the heavy downpour.

14. The same caver and his son erected their tent four times within half an hour on Kangaroo Island.

Each time the tent was erected in a different location, an army of ants would issue from the ground and stream up the guy ropes and over the tent.

Each time a new tent location was chosen, the ground was carefully inspected to ensure there were no ant holes.

The situation was made more amusing by another NHVSS member (Jenny) sitting in the car with a laptop computer typing away at the trip report. Each time she looked up, she was startled to see the tent miraculously pitched in a new place around the campsite.

15. A NHVSS caver was seen drinking from the refreshing waters of the Tuglow Cave underground stream, only to find that upstream several metres was a dead, rather decomposed rat half floating in the water.

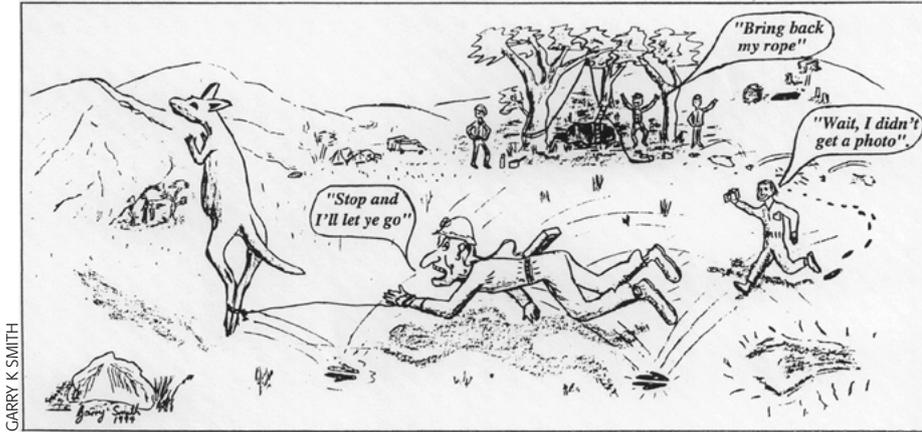
16. A person who has been a regular participant on caving trips over many many years as the support surface party was conned underground by Elaine Turner at Borenore with the lure that the cave was very short and a 'walk through'.

Also, going through the short cave would save a long walk over the mountain to meet the party on the other side.

Well, the cave turned into a rather long underground walk, crawl, climb, with water obstacles and bats.

The non-caver vividly remembers his experience to this very day.

Just ask Geoff Hyde.



GARRY K. SMITH

17. Upon entering a vertical shaft cave at Glenrock in January 1994, the first caver down was confronted by two brightly glowing red eyes peering out of the darkness. After the initial fright he realised that it was a large kangaroo which had survived the 11 m fall down the shaft. The second caver in was told to bring down a blanket.

The first caver held the blanket out like a bullfighter and crash-tackled the kicking roo to the ground while the other caver tied all its legs together. The kangaroo was hauled out of the cave but while being carried away from the entrance shaft it kicked violently and escaped. It had managed to free its front legs and stood erect on hind legs still firmly tied together. Without a second glance it bounded off down the hill and was soon joined by its mate hiding in a nearby bush — it seems a kangaroo can hop just as well with its hind legs tied together. Pat Hyde is still looking for her tent rope tied around the kangaroo's hind legs.

18. In March 1997 members of NHVSS visited Taylors Hill Cave on Kangaroo Island. The National Parks ranger warned about the eight beehives in the entrance overhang when issuing the caving permit. The first caver to peer over the lip of the entrance doline was stung above his eye. A second, more cautious attempt at entering the cave by avoiding the bees' main flight path, saw another caver cover his entire head with a clear plastic bag. It was the first recorded case of a plastic bag face protection for caving.

19. In 2003 a NHVSS caver managed to get his front wheel drive Toyota Camry bogged on the mudflats of Cave Flat at Burrenjack Dam while crossing a small stream. After being pulled out by a large four-wheel drive, he completed a day of caving in the caves exposed by the dam's very low water level. At the end of the day, he thought he could drive back over the boggy stream by travelling at high speed. The horrified passenger hung on for dear life with white knuckles, grasping the above-door safety handle as

the car fishtailed across the mudflats and came to a sudden stop in the deepest mud. Needless to say, the car was towed out of the bog for a second time.

20. In June 2003 NHVSS took members of another caving club to Rebel Cave at Pilchers Mountain. It took 7.5 hours for the six members of the other club to descend and ascend the 23 m pitch. One female (lady) could be heard loudly swearing a constant stream of obscenities all the way up the pitch. She was glowing red and breathing fire by the time she reached the top. We came away from this trip with a greatly expanded vocabulary.

21. On a 2014 trip to Pilchers Mountain it was sprinkling rain as we explored for new caves on the edge of the rainforest. Geoff Hyde decided to stay at the cars to keep out of the rain.

When it stopped raining he set out in search of the others. Sonia heard a 'whoop whoop' sound and asked Garry and Pat if they had heard that bird call before. They all heard the distinctive 'whoop whoop', but none could identify the sound and dismissed it as an unidentified rainforest bird. Little did anyone know till the end of the day that Geoff had been calling out 'Whoop whoop' while searching for the group. He didn't find anyone and returned to the cars.

22. One of our members went caving in Moores Lake cave at Timor. Her excellent caving boots disintegrated in the muddy cave water and by the time she reached the surface, each boot was in four separate pieces. Maybe in future it is better to buy real boots instead of imitation Meccano boots — they will last longer.

23. This final recollection is included so that others don't repeat this type of incident, which had the potential for a disastrous outcome. Our group was in Wyanbene Cave, NSW, during early 1999 and after several hours had reached the obstacle called Andersons Walls. It consists of a narrow rift

with a 7 m vertical wall of rock blocking the passage.

Usually the first person chimneys up (free climbs) the rift to the top of the wall, then attaches a ladder and rope for the others to climb. However, this time there was a 20 mm thick rope with many knots in it already attached to the anchor point on top of the wall.

I have always been told not to rely on ropes in caves, particularly if you don't know their history. It looked like a solid nylon rope despite being covered in mud. I got three of us to put all our weight and swing on the rope. When there was no movement, I determined it was safe to use. I climbed up, using the rope as a handline. This made the going much easier, especially with the conveniently spaced knots. Everyone then chimneyed up with the aid of the knotted rope. At the top there is a small platform upon which to stand while the rope is pulled up and tossed down the other side, also about 7 m. I began the descent, but just a little way over the edge, all hell broke loose and I went plummeting to the bottom of the pitch. I landed on my backpack in a pool of muddy water; thankfully, this cushioned my impact. I was shaken and my chest hurt a lot. I must have hit a protruding part of the wall on the way down. An untidy coil of thick rope lay in the muddy water next to me. A close inspection revealed that it was in fact sisal rope and very rotten at the break point near the top of the pitch. Our own rope and ladder were then attached for everyone else to climb down. I was very lucky that the sisal rope had not broken while I was at the very top of the pitch. I had a very painful chest for the rest of the trip and a later medical examination revealed that I had broken the cartilage from the end of one rib. This proves that the old saying, "Don't trust ANY rope which you don't know the history of", is definitely correct.

All the old sisal rope was carried out of the cave.

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Cave Diving New South Wales

2017 Projects Report

Keir Vaughan-Taylor
SUSS

THIS DOCUMENT is a summary of projects and explorations being undertaken by Sydney University Speleological Society cave diving teams. It summarises some ongoing cave diving projects that have, in my opinion, considerable potential.

It should be said that much of the activities and successes over the past few years are the result of ongoing support from management authorities and for this support we are deeply grateful. It has greatly contributed to our knowledge of hydrological karst throughout New South Wales.

In 2018 a major project will be completed, having consumed years of research by Rod OBrien — the imminent publication of a book by Rod about New South Wales' history of cave diving.

Cave diving in Australia started in 1952 with the first dive in Australia being undertaken at Jenolan's Lower River in Mammoth Cave. Rod OBrien has gone to extreme lengths, travelling across Australia interviewing now elderly identities who contributed to the exploration and development of cave diving in Australia. Without Rod's enthusiasm this rich history would have been lost.

JENOLAN

Pool of Cerberus

The Pool of Cerberus is a lake in the Jenolan tourist caves that was first found by early explorer and guide Voss Wiburd. In the 1990s, after repeated diving, SUSS was able to find a way through the obscure passages downstream from the Pool and break through to the outside world, surfacing in Blue Lake.

Dives and dry caving trips in the Cerberus area remain of strong interest to me. Behind the Pool of Cerberus lake the underground river enters unseen though a squeeze hole under a cement bridge that tourists stand along to admire the pristine blue waters. The upstream river can also be accessed by climbing through grotty dry caving that emerges high above a few pools

of water. It was thought to be well-explored but with a little effort we were able to push a little further.

Rock climbing and rope work were used to safely cross a pitch into the plunge pool areas. The Plunge Pools are a series of limestone dissolved 'wells' — multiple pools separated by less than a metre of sharp pinnacled walls. After crossing the plunges, we climbed to an upper passage where we found Voss Wiburd's and Jack Edwards' signatures. Not to be outdone, we (not being handicapped with candles) hung a set of tapes and rope protection around a sharp promontory of rock into a rift. There was revealed yet another 'well' and beyond that another shaft and an abseil descent to water. A possible underwater passage yet to be explored led on from there.

The dive from Twin Bridges downstream towards Cerberus is roomy with very strange geology. The right side going downstream is paralleled by the tourist path that comes out at the top of a stairway overlooking the Pool of Cerberus. The left side of the diving passage is gnarled and a maze both above and below the water line. I had previously found an undocumented aven in the roof of the dive. A dive by myself, Phil Maynard and Rod OBrien in December 2017 returned to this air surface. Climbing out from the water and using aid climbing, we managed to hook tapes round a natural bollard and pull ourselves clear of the water, finding ourselves next to Wiburd's and Edward's signatures. Rather like déjà vu.

In the Cerberus dive just prior to the squeeze that gives access downstream to the Pool of Cerberus is a mysterious pit sinking into a second chamber that is yet to be explored.

River Styx

River Styx Pool is part of the River Cave tour. The water seems to form a river in a canyon and then stops for a while, as though just underneath, and then pops up again as another section of river called the Pool of Reflections. We now know they are



PHIL MAYNARD

Diving the River Styx

separate; the river runs elsewhere. These groups of water are connected to the main stream but in my view are a remnant of a river that flows under Lucas Cave.

Dives in 2016–2017 showed the Styx Pool is much deeper than previously thought. I reached a depth of at least 30 m where the bottom chamber hosts a strange life form. A photograph excised from a

GoPro video gives an idea of what these 'bio-forms' look like. They are unlike anything I have seen before. A future dive should secure better images. Tentative enquiries to experts in this field have met with blank, 'I don't know' responses. We fully intend to use a higher quality camera, obtain better images and hopefully get a bit more interest from experts.

Lower sections of Styx Pool seem to have ongoing passages but in diving the bottom room the silt rolls in rapidly, only giving seconds to see what is going on. The underwater survey of the passages places them a considerable distance away from Styx Pool, so some of us feel it likely that it is linked to water bodies underneath Lucas.

The Styx Pool canyon links back behind the Minarette to pools left of the tourist path in Lucas Cave, where it forms a broken line of pools joining to Lucas Pool. Diving these pools so far has not found any significant connections to deeper water bodies that might lie under the Lucas Cavern collapse. Rod O'Brien years ago dived the shaft in the Pool of Reflections and found a small and uninviting fourth river at Jenolan. There are some pools yet to be examined behind the Minarette.

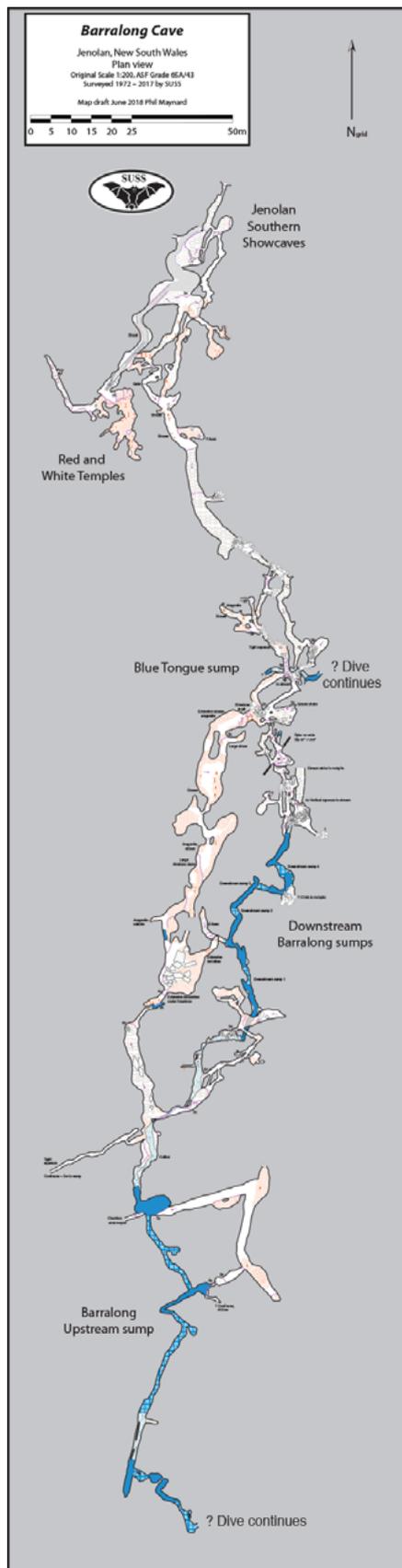
Barralong

Jenolan has two distinct main river systems both emerging in the Blue Lake, one from the north and the other from the south.

Each river has a complex and beautiful cave system surrounding it but there is so much more to find. In the 1960s guides discovered the currently southernmost source of the river, Barralong Cave. The discovery doubled the stretch of the tourist caves into the south, ending at the edge of an upwelling lake feeding the river that emerges at Blue Lake. This is the gateway to an enormous karst area stretching more than 2 km further south. The river in Barralong is likely to be integral to cave development in the south and geologically related to cavernous pits that sink from the surface but never quite connect to the elusive underground river. Such caves include Block Cave, Bottomless Pit, Hefalump Trap and numerous significant dolines appearing near surface river level.

A trip to the back of Barralong has, in the past, meant navigating areas of high decoration and pristine beauty incurring time overheads protecting vulnerable formations. Visits to Barralong are restricted because of the varied and beautiful decoration. To dive the upstream lake all gear has to be containerised in padded cave packs to help reduce possible impacts.

Some years ago Missing Link was found.



It provided a new route through undecorated wet passages, following the actual underground river.

The disadvantage to this route is there is some really sporty crawling through rock-piles and four short sumps, just long enough that they cannot be free-dived. A dive party can now use this route to explore

Barralong's furthest point with minimal impact to the environment. Trip logistics are complicated in that it requires a party of four to help transport gear, all with cave diving experience.

The backmost passages of Barralong remain puzzling and possibly not representative of the entire river flow. There are many grikes and rifts that have not been adequately examined that may take the river through an alternative route. The main focus is at the bottom of a rift that dives into passage blocked by sand. Near this obstacle are above-water leads that need further inspection.

Spider Cave

Spider Cave lies between the tourist caves and Mammoth Cave. Spider was joined to the tourist caves through the Imperial River dives but the connection of Spider to Mammoth is elusive.

Endzone is a puddle of water in the northernmost part of Spider and must ultimately connect to Mammoth. Previous dives at Endzone were highly successful, pushing the limit of exploration close to underneath a doline on the river flat area called the Playing Fields.

Previous geotechnical studies on the Playing Fields revealed a gravity low on the west side. This finding intensified exploration in targeted places in Spider, resulting in finding the extension we now call Endzone. More interestingly, the survey showed a much larger gravity low on the east side of the valley, located under a degraded doline on the side of the hill. We believe the subsequent dives in Spider almost reached the place where the gravity low is shown.

At a higher level than Endzone (55 m below the valley floor) a dry passage may contain an earlier connection that crosses the valley to the cave system on the eastern side.

Such cave development might be found in an abandoned streamway prior to Endzone, but this is all conjecture. Dives previously undertaken some time ago in Spider used bulkier equipment. This acted as an obstacle to pushing against currents in the X-Window dive but even with modern equipment, these are hard dives.

While Spider contains many delicate and beautiful formations, the route to Endzone is robust. After the entrance series and wading upstream in the river, the trip passes through rockpile. Dive trips moving through here will not damage the cave. The Endzone dive should be surveyed to give an accurate position of the furthest exploration point.

Diver reports from the end point suggest a possible surface above, and there may be



Tina Willmore at Widow Sump, Spider Cave

an opportunity to connect into the chamber represented by that gravity low.

Lower River, Mammoth Cave

Exploration upstream in Lower River has been an extraordinary effort led by Rod OBrien, pushing to unexpected depths in tight conditions while experiencing high water flows. My view is that this dive has gone as far as is safely possible and no more exploration is likely. While Lower River harbours the mystery of the cave systems to the north of Mammoth, at this time that exploration prize is only likely to be found by other leads turned up by dry cavers.

Slug Lake, Mammoth Cave

Explorations started by Al Warild and Rod OBrien have lately been largely coordinated by Deborah Johnston and Dave Apperley. This exploration is highly significant, exposing an extension to the known lake Gargle Chamber. An aid climb above the lake led to major dry passages and chambers. While the dive has been surveyed through the underwater restriction at -23 m and up to the surface in Gargle, the pitch and dry caves have yet to be mapped.

In the other direction from the surface, Gargle Chamber was dived by Ron Allum using a helium mix to a depth of 95 m. The lake considered independently from its depth is of unbelievable size. There are significant geological questions yet to be answered about why this geological development is possible – the underwater passage is on a completely different scale to the dry cave that leads to Slug Lake. The dives are difficult and the tasks to accomplish in defining this monster are hard to achieve.

Tuglow

Tuglow is a highly technical dive requiring a strong support team. With a good team we are now transporting dive kit from the top of the cave to the downstream dive

site in less than an hour. The dive line has been extended through a squeeze full of gravel, tied off on a good anchor on the other side, and extended 30 m beyond. The sump has been surveyed as far as the tie-off on the other side of the squeeze.

The puzzle of Tuglow is that the current diving depth is 33 m, putting the dive passage about ten metres below the Kowmung River. The known resurgence T9 is about 18 m above the river, implying a substantial rise in the cave dive should follow, possibly with another dry cave associated with that. There is evidence of multiple resurgences on the hillside, and an assertion by geologist Ian Cooper that one of these resurgences is unrelated to the Tuglow stream.

KOSCIUSKO

Yarrangobilly: Mill Creek Swallet.

Mill Creek is a swallet in a valley near the bottom of cliff faces underneath Yarrangobilly tourist caves. This swallet is like a mini-Tasmanian cave although only for a very short distance — a serpentine stream passage enters a large chamber with fissures in the floor. A series of parallel crawlways drops to a sump with a pleasant dive. A spacious underwater passage is interrupted

by an air chamber halfway along its length. The underwater section continues beyond a short gravel race with a descent then ending in an upward passage blocked by large rounded river stones forced into position by floods. The blockage is at 30 m depth and is likely the low point in a phreatic loop. It should be possible to pull these rocks out and find what lies beyond.

Yarrangobilly: Coppermine

Coppermine is a major resurgence, draining many swallets with a large catchment area. Exploration upstream in Coppermine has an enormous potential for new and undiscovered cave as might be expected by the considerable volume of water emerging from the base of the limestone and pouring into the Yarrangobilly River. In one of the muddy sections of Coppermine's lesser known areas is a small triangular passage with continuous wind perpetually blowing outwards, suggesting a good-sized cave lies behind the hill.

Historically, Ron Allum dived in Coppermine's river wearing back-mounted tanks and found it impossible getting upstream at all. Ron's diving equipment was much bulkier than the low profile buoyancy compensator and side-mount systems we now use.

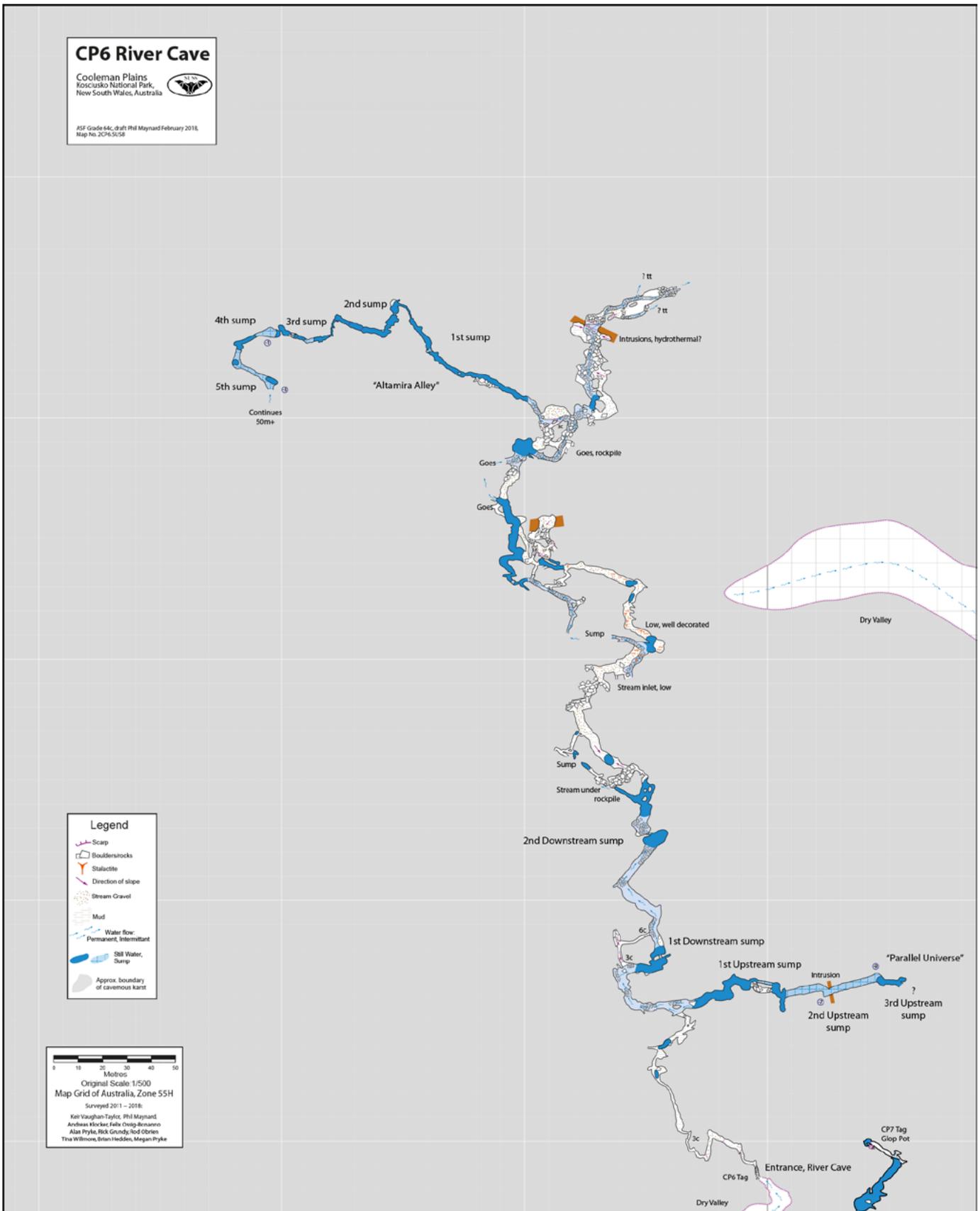
Recent diving (Deborah Johnston using 3-litre side-mounts) found ongoing passage that she had to leave because of her small capacity tanks. The potential of Coppermine seems very good and the cave will undoubtedly be pushed in the near future.

COOLEMAN PLAIN

Having worked Cooleman as an ongoing project for many years, we have made many finds. To a certain extent the cave scientist Joe Jennings' hydrological model of the area is upheld; however, finding new inflowing streams such as Altamera Alley in River Cave suggests his model will be much more complicated than he envisaged.



End of CP6 River Cave — David Rueda-Roca and Rod OBrien surveying



RIVER CAVE/MURRAY CAVE

The part of Murray Cave known to tourists is a long passage that starts as a giant fissure in the cliff and ends in a sump. Decoration is badly damaged by easy public access, but beyond the sump the passages are highly decorated. There is a long section of cave beyond the sump, eventually meet-

ing the active river system and heading upstream before finishing in rockpile collapse.

A voice connection between Murray Cave and downstream River Cave was confirmed on one of our 2017 trips. The downstream survey in River Cave was extended to the absolute end of passable passage on the January 2018 trip, and the

gap between the two surveys is now about thirty metres. The surface above the gap is a massive doline.

Altamira Alley is a major side creek inside River Cave.

Recent diving by Rod O'Brien and Brian Hedden has pushed the limits of the upstream sumps in this creek, with the survey



lagging behind the exploration by more than 50 m.

The survey in upstream River Cave progresses, although the water is cold and usually with poor visibility. The downstream end of Glop Pot is a mere 50 m from River Cave and contains a deep lake that surely must connect to the River Cave water.

The latest surveys in upstream River show it is trending away from Glop Pot, defying our expectations and leading us to call this area Parallel Universe.

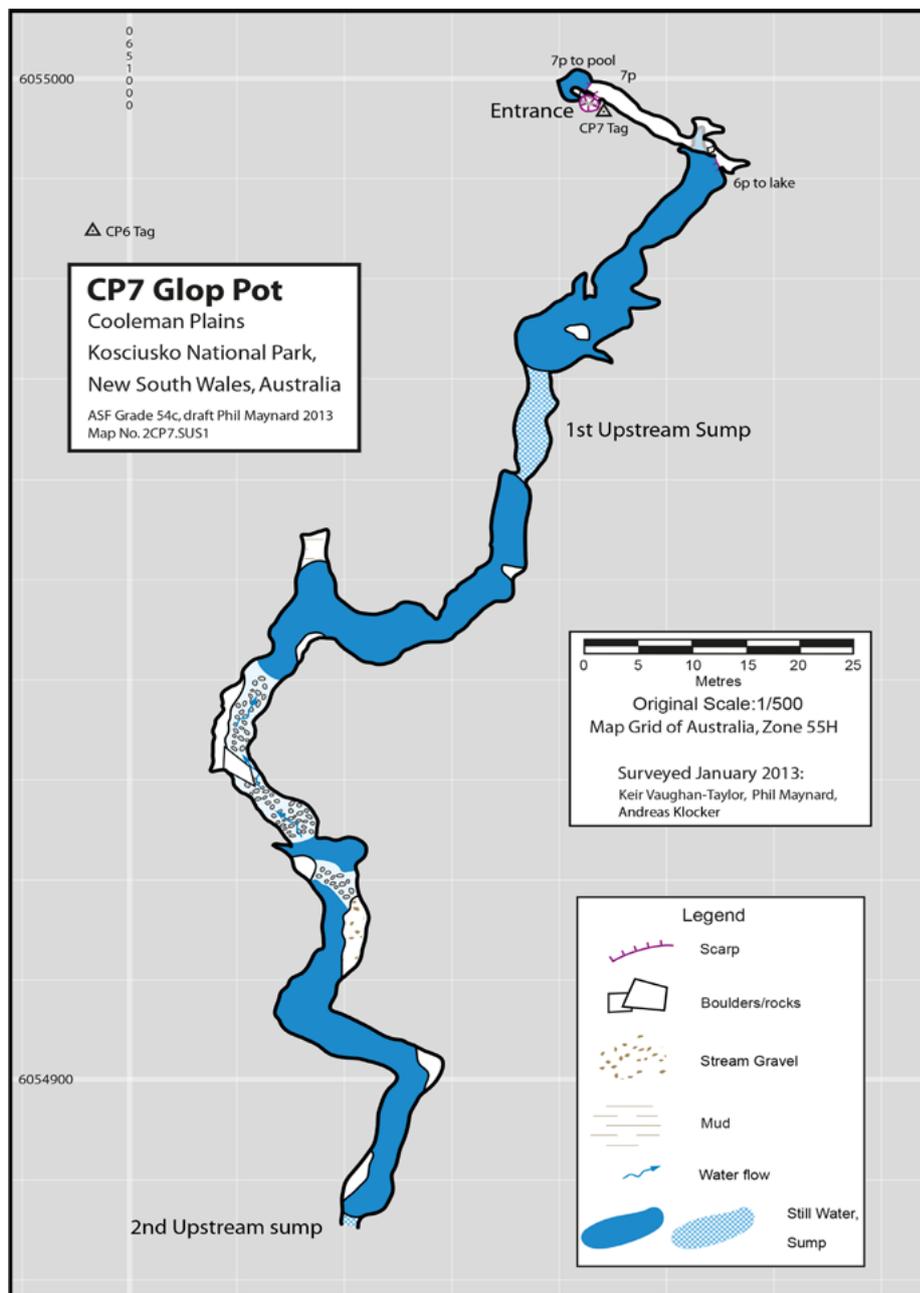
Dives upstream in Glop Pot found hundreds of meters of walk-along passage, half of it surveyed but downstream no passages have been found.

Future visits to River will concentrate on the upstream survey and we still have hope of achieving a connection to Glop Pot. Completed surveys connecting River Cave to Glop Pot and further Glop survey reaching beyond the second upstream sump will be added to River Cave surveys. We anticipate this work will document a cave more than 2 km long.

EASTER CAVE

The Easter Cave area continues to be of interest with surveys inside a number of the local dry caves adding to our knowledge, and the expectation of a river system inside the mountain bypassing the 60 m high cascades/waterfalls.

The known underground river at the Easter resurgence almost immediately has a well-known duck-under, which leads to some sizeable chambers with a flowing river at the base. The upstream end of the cave is a sump which has so far only had one dive. This cave needs exploration and survey.



ASF Conference update

Rescue Exercise

AS WELL AS some presentations and workshops on cave rescue techniques, it has been decided to run a practical exercise as part of the post-conference caving program at a Mole Creek quarry on 6th January 2019.

The goals for this will be:

1. Collaboration and knowledge sharing between rescue-oriented people around Australia;
2. Improving common understanding of techniques used in cave rescue;
3. Construction of tyroleans and hauls/descents; and
4. Casualty packaging and handling.

The planned activities include developing a haul path around the walls of the quarry and building appropriate systems to move the casualty.

Teams will swap jobs and as many people as possible will work with folks they don't know.

Registration for this event will be available during the conference.

We'll be looking for cavers interested in cave rescue and capable of moving themselves through caves using SRT.

Alternate horizontal caving trips will be offered to those not involved on this day.

NORTHERN CAVERNEERS



What's happening at the ASF Conference

30th December 2018–4th January 2019

THE ASF's biennial conference is coming up over the New Year period 2018-19 in Devonport, Tasmania.

The hard-working organising committee is making this event one for the active caving community and is not a boring conference like you might attend for work. Yes, there will be meetings and presentations about many aspects of caving, including a day to discuss cave rescue.

However, there will be ample time for networking with cavers from all over Australia and fun outdoor recreational activities each day on Devonport's river edge cycle paths, mountain bike trails, rivers and beaches. The school has bikes and kayaks to hire for a small fee.

On Wednesday 2 January we'll be taking a break from lectures/presentations for mid-week excursions. Options are listed on the conference website www.asfconference2019.com

They include caving at Gunns Plains in a couple of well-decorated and classically Tasmanian wet caves.

Bushwalking options include a quintessentially Tasmanian tourist destination—the walk around Lake Dove below the towering Cradle Mountain; a more local walk on the Dial Range inland from Penguin with rural and coastal views; and a flatter beachscape walk at Narawntapu National Park.

A spectacular six-pitch wet canyoning trip down Machinery Creek is available to anyone fully kitted out with the correct personal gear and a sense of adventure. If none of these outings is on your bucket list, and you'd rather relax back at camp a bit longer, feel free to join the winery tour, the kids' day out or a self-guided trip to historic Home Hill or the Bass Strait Maritime Centre. You can sign up for these mid-week excursions when you arrive at the conference.

Wednesday's dinner will be catered for at Wings Wildlife Park, a sanctuary for animals both native and imported, located at Gunns Plains.

After a meal, enjoy a leisurely trip in the



JANICE MARCH



JANICE MARCH

Machinery Creek

concession-operated Gunns Plains show cave where musicians will be performing a range of orchestral pieces showcasing the cave's wonderful acoustics. All this is included in your conference fees or child/partner registration. There is an extra (discounted) cost to view the animal enclosures.

Remember to register online soon because the fees increase after the early bird rate expires on September 30. www.asfconference2019.com Book your transport now and if bringing a vehicle, take advantage of our special deal on the *Spirit of Tasmania* ferry.

Join in the conference's friendly atmosphere by camping on the school oval, which has lots of space. Tents will be fine

even if it rains as there are plenty of cooking and relaxation areas undercover and the bathroom facilities in the gym hall are very adequate. If you choose not to camp, there are various hotels within a 10 minute walk of the venue. Be sure to work out your accommodation for pre- and post-conference caving, too, because it is Tasmania's peak tourist season.

We have organised camping and caving huts as the main options for the trips to Mole Creek, Derby and Mt Cripps karst. Please be in touch with Alan Jackson if your bucket list includes caving down south in Ida Bay or the Junee-Florentine karst and be sure to read the information 'Caving in Tasmania', which is on the conference website.

IMPORTANT DATES

Presenters Registration Due (includes presentation titles)	1 September 2018
Early Bird Registration Closes	30 September 2018
Abstract Deadline	1 October 2018
Successful applicants for ASF Grants notified	1 October 2018
Merchandise Orders Close	1 November 2018 (tbc)
Pre-Conference Excursion Booking Deadline	30 November 2018
Photo Competition Entries Close	1 December 2018
Conference Dinner Bookings Close	10 December 2018
On-site Camping Bookings Close	10 December 2018





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