

CAVES

The Journal of the Australian Speleological Federation

AUSTRALIA



NINGALOO UNDERGROUND
SAVING CLIEFDEN CAVES
ELERY HAMILTON-SMITH

No. 201 • SEPTEMBER 2015

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://www.caves.org.au>. For international events, the Chair of International Commission

(Nicholas White, nicholaswhite@netspace.net.au) may have extra information. However, this calendar is not all events; just some of the main ones. A much more detailed calendar was published in the most recent *ESpeleo*. We do not seem to have any events advertised in Australia for the rest of 2015, only the ASF Council meeting in early January 2016, probably in Sydney. Details of the Council Meeting will be sent out to clubs later this year.

2015

September 7-10

Natural History of the Belubula Valley including the Cliefden Caves and Fossil Hill Linnean Society of NSW Symposium Bathurst, NSW. A symposium to explain, interpret and review recent scientific research on geology, palaeontology, botany, zoology, and speleology of the caves and karst. Details available on the Linnean Society NSW website nsw.org.au/symposia/symposia.html

September 16-20

13th Symposium on Pseudokarst, Czech Republic Organised by Pseudokarst Commission of the UIS. Details available on website: http://konference.osu.cz/pseudokarst/9_contact.html Contact: Jan Lenart jan.lenart@osu.cz
October 5-9 14th Multidisciplinary Conference on Sinkholes and the Engineering & Environmental Impacts of Karst, Rochester, Minnesota USA For 30 years this conference series has been the premier conference for all aspects of karst geoscience and related engineering and environmental issues—and not just sinkholes. It serves as a means for geologists, engineers, and geographers, who study how and where karst develops and how sinkholes form, to interact with engineers and planners, who apply this information to building and maintaining society's infrastructure while protecting our environment. Conference topics include: Karst Development & Mapping, Pro-Active and Remedial Engineering in Karst Terrain, Karst Water Resource Management. More info on: <http://www.sinkholeconference.com/>

October 19-23

National Cave and Karst Management Symposium, Cave City, Kentucky USA More info on: <http://nckms.org/>

October 20-23

2nd International Planetary Caves Conference, Flagstaff, Arizona, USA. Details on: <http://www.hou.usra.edu/meetings/2ndcaves2015/>

November 1-4

Geological Society of America (GSA) Convention, Baltimore, Maryland USA. There are always good karst sessions at this conference. This year there are 8 interesting karst sessions being organized by various eminent karst scientists many of whom are cavers. These sessions are: T118. Extreme Karst: Exploring the Limits of Karstification on Earth and throughout the Solar System; T122. Remote Sensing and Geophysical Imaging in Karst; T114. Advances in Island and Coastal Karst Investigations; T116. Contamination in Karst: Beyond the Case Study; T119. Geological Interactions within the Global Carbon Cycle; T120. Karst Processes and Speleogenesis: Advances in Monitoring, Modeling, and Measurements; T121. New Perspectives in Karst Geomicrobiology and Redox Geochemistry: Advances from 20 Years of Interdisciplinary Research and Exploring Our Future Frontiers; T117. Enhancing the Toolkit for Karst Investigations. For more details see the website: <http://www.geosociety.org/>

November 6-8

1st Asian Speleological Conference-2nd Transkarst Conference Lichuan, Hubei, China Details on: <http://www.asiankarst.com/> Organised by the Institute of Karst Geology and the International Union of Speleology. For more information, contact asian_transkarst2015@yahoo.com

2016

At this time of year anyone thinking of going to events overseas in 2016 needs to start organising things. Here are a few events of interest.

January 24-31

Karstology in Arid Regions, Abu Dhabi, United Arab Emirates, Jointly organized by the Karst Research Institute, Research Centre of the Slovenian Academy of Sciences and Arts (ZRC SAZU) and Emirates Geographical Society. For details and registration see <http://abudhabi.zrc-sazu.si/>

January 27-30

Karst, Groundwater, Contamination, and Public Health, San Juan, Puerto Rico. For details see <http://karstwaters.org/conferences/kgcph/>

April 11-14

DeepKarst 2016, Carlsbad, New Mexico, USA. This conference is focused on hypogenic karst, its theory, management, economic reservoirs, and more. DeepKarst will be held at National Cave and Karst Research Institute (NCKRI) Headquarters in Carlsbad, New Mexico, USA. To register, learn

about field trips, lodging, travel options (you can now fly directly into Carlsbad!), and more, go to <http://deepkarst.org/>. Papers for the conference are due on 15 September 2015. I encourage you to submit yours soon. NCKRI is organizing this conference in cooperation with the Karst Hydrogeology and Speleogenesis Commission of the International Union of Speleology and follows up on the commission's 2009 hypogene conference in Ukraine. If you have any questions, please contact George Veni.

June 13-17

23rd International Conference on Subterranean Biology Fayetteville, Arkansas, USA. For details go to: www.speleobiology.com/icsb2016/

A very useful international calendar is posted on the Speleogenesis Network website <http://www.speleogenesis.info> especially www.speleogenesis.info/directory/calendar/. Many of the meetings listed above are on it but new ones are posted regularly.

How to donate to the ASF Karst Conservation Fund

1. Write a cheque to the ASF Karst Conservation Fund and send to Mrs. Grace Matts 176 William Street, Bankstown, NSW 2200 and indicate whether targeted to the Save Cliefden Caves Appeal or general donation. Include address for sending a receipt.
 2. Direct transfer funds via electronic transfer from your account to the ASF Karst Conservation Fund Account name ASF Karst Conservation Fund at the CBA in Quirindi, NSW BSB 062 594 Account No. 2800 2528 (please indicate purpose of transfer to the Save Cliefden Caves Appeal or general donation and include your address).
 3. The ASF Website www.caves.org.au has a PayPal facility for donations direct to the ASF Karst Conservation Fund. You need to indicate purpose of the donation, and identify yourself with a name and address, so that a receipt can be sent.
- Further information:** phone Nicholas White 03 9328 4154 or email: nicholaswhite@netspace.net.au

STOP PRESS

A new Wellington Caves General Manager has been appointed: Jodie Anderson, who previously was Visitor Experience Officer at Dubbo Zoo.

Jodie has a background in hospitality and event management and has studied environmental science. See Page 14 for details on Wellington Caves.

CAVES AUSTRALIA

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Contact the Advertising 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.

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

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ASF

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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.

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EDITORIAL

AS Ian Curtis is walking the length of the Isle of Skye as I write this (some people will do anything to get out of writing an editorial!), I have been delegated to write the editorial for CA 201.

Since the last issue of Caves Australia, Australia has lost two of our caving greats; Elery Hamilton-Smith and Ben Nurse. These two luminaries will be sadly missed by many in the Australian and overseas caving world. We extend condolences to their families and speleology in Australia will miss them both. There is obituary for Elery in this issue of Caves Australia, and we plan for one for Ben in the next issue.

Unfortunately Alan Jackson has decided that after seven years as Production Manager for Caves Australia, it is time to move on the greener? muddier? more challenging? pastures. As Chair of the Publications Commission I have found Alan has been great to work with and I thank him very sincerely for the energy he has put into making sure the production went well. I will miss his acerbic email comments! We hope to continue using the Hobart-based production team but I am looking around for a volunteer to oversee the production.

This issue has a lot of information about conservation matters; Cliefden, Wellington and Mole Creek. Some of this is of serious concern but there are some good things happening in conservation of caves through the KCF. The Federation has been active in many of these areas and these matters need constant vigilance.

The Ningaloo Conference was a great success and we are now working hard towards making the UIS Congress a similar success. Please offer to help if you can. Many Australians have benefited from attending UIS congresses overseas and we were seriously lobbied to bid for this one. Please help make it a memorable event for the right reasons!

Grace and I were both very honoured to be named Fellows of the Federation at the Council meeting at Ningaloo and we both extend our appreciation of this award. Grace was completely speechless at the Cavers' Dinner; a very rare occurrence!

Susan White
Publications Commission

Caves in an Ancient Land

17th International Congress of Speleology

Denis Marsh

for the Speleo 2017 ICS Organising Commission



17th
International
Congress of
Speleology,
Sydney 2017



AS YOU are aware from the September *ESpeleo*, ASF is hosting the next International Congress of Speleology (17th ICS) in Sydney in July 2017 on behalf of the International Union of Speleology (UIS).

This is the first time the International Congress has been held in Australia and will incorporate the 31st Biennial Conference of the ASF.

The Speleo 2017 ICS Organising Commission of ASF is working hard to make the Congress a success, but we are still seeking more volunteers to join our team to help plan and organise the event and to assist during the event.

Currently the organising Commission has an Executive of five members with a further 15 members assisting as Sub-Committee Chairs or Coordinators of specific tasks. A number of others have volunteered to assist with organisation of pre and post congress field excursions.

The last *ESpeleo* (September 2015) identified a series of tasks to support the existing Sub-Committee Chairs and Coordinators.

The detailed list is not repeated here but

it calls for people to volunteer to assist co-ordinate various tasks.

More areas requiring volunteers to assist will be identified as we progress with the organisation of the Congress.

If you can assist with any of these tasks currently needing resourcing or during the actual running of the Congress in 2017, please contact us at info@speleo2017.com. Please look at the list of tasks in the September *ESpeleo* and see if you can help.

We are also encouraging Australians to think about attending and perhaps take this opportunity to showcase Australia's caves and karst and presenting something to the international caving audience.

For more information visit the Congress website at <http://speleo2017.com> or our Facebook page at <https://www.facebook.com/Speleo2017>.

Subscribe to our mailing list for regular email updates and announcements about the Congress through the link to our Subscribe for Email Updates page: <http://speleo2017.com/Subscribe.html>.

We look forward to your possible assistance in the organisation and attendance at the 17th ICS in Sydney, 23-30 July 2017.



PHOTOS: SONIA TAYLOR-SMITH

Speleosports action at Ningaloo

Ningaloo Underground

The 30th ASF Conference

Compiled by Susan White from material provided by Rod Smith (MSS) and Miles Pierce (VSA)

THIS YEAR Exmouth, in north-west Western Australia, was the site for Ningaloo Underground, the 30th Australian Speleological Federation Conference.

Although a remote location—about as far away from Melbourne in a straight line as it is possible to get and still be in continental Oz—the conference was well attended with more than seventy registrants from around Australia.

Rod had the absolute pleasure of attending and was blown away at how well organised the conference was. It was great to see a mixture of people, some having been to many conferences over the years, and some attending their first, and hopefully not last, conference.

The Exmouth location was chosen to showcase the extensive Cape Range karst that extends along the ocean side of the Exmouth peninsula, a substantive part of which is included in the Cape Range National Park. This, together with the adjacent inshore coral reef, is now a World Heritage listed area.

Arrangements for staging the conference at Exmouth were greatly facilitated by local resident and WASG member, Darren Brooks, who headed up the conference organizing committee.

Three days of Exmouth based pre-conference caving and a three-day camp based post conference trip in the southern part of Cape Range were offered to conference registrants.

These facilitated experiencing this impressive but remote region of karst, much of which is now part of a World Heritage listed area. A full day field trip to the ocean side of the Cape on Wednesday saw the conference participants visit Vlamingh Head and then stop to observe blind gudgeon fish swimming in a small ground water pool close to the road that is hydrologically connected to the nearby ocean and rises and falls with the tides.



MILES PIERCE

The Conference about to start

Another stop was then made at the Milyering Visitors Centre before heading further south to Yardie Creek Gorge. Here we boarded a tourist boat to travel up the lower part of the gorge that is inundated by seawater and observe the rare rock wallabies that live on the gorge cliffs along with ospreys and other native birds. On the return, some opted to follow the walking trail up the dry Mandu Mandu Gorge while others went snorkeling at Turquoise Bay.

The conference was the usual mix of papers and presentations, social events e.g. Welcome BBQ, photo sessions, speleosports and the ASF Council meetings. This is effectively the AGM of ASF and includes the election of half the executive members and the President.

The concluding event was the traditional Cavers Dinner that took place semi-outdoors at the Potshot hotel. During the dinner the recipients of ASF Awards for 2015 were announced. Grace Matts, long time ASF treasurer and VSA's Susan White were made Fellows of the ASF in recognition of their sustained services to the Federation.

Rod Obrien (SUSS) received the Jeff

Butt Award of Distinction for Exploration, specifically in his case for cave diving based exploration. Ian Collette (WASG) and Michael Bradley (SRGWA) both received a Certificate of Merit in recognition of their sustained contributions to caving.

But Rod and Miles were not the only ones who thoroughly enjoyed their experience. Here's a selection of what others thought of the conference.

'I reckon the Ningaloo Conference was not only well organised, but well attended for such time of year and distance from major transport centres. I was particularly interested in the "Wedge and Shim" rock breaking kits espoused by Ian Collette—an ancient method given modern treatment—the follow-up demonstrations on UTube on hard rock were quite illuminating. It would be interesting to hear of any results of tests carried out on the more porous limestone of the WA or SA regions. I intend obtaining some sets for the dolerite of Tasmania

—Norman Poulter OAM

'Geoff (Hyde) was amazed at the way everyone accepted him. There was a positive vibe the whole time.'

—Pat Hyde

'Ric and I had a ball at the conference. Starting with the pre conference field trips, which were well organised, fun, and gave us a great introduction to the Caves of the Cape Range.

'At the conference itself we caught up with old friends, met new ones, and learnt a lot from the excellent talks.

'The post conference field trip was the icing on the cake; a wonderful experience camping, and caving, up on the Cape Range for several days. All this was made possible, and ran smoothly, due to the thorough and efficient efforts of the organising team. Great job, guys. Herding all we cats can't have been easy.'

—Janine McKinnon

'I found the chance to live at close quarters with other cavers was revealing. This was a great experience overall, and the contact with other people attending the conference was for me the most memorable aspect.

'Exmouth was a fantastic, friendly little place, ideal for a caving conference. The caves of the Cape Range were so varied and we were treated to many excellent pre and post conference trips by the organisers.'

—Janice March

'I found the conference committee very welcoming and anxious to help in any way possible. Every one of the WA cavers was a delight: Darren with his generosity and colourful clothing; Greg with his detailed organisation; Fran; Tim; Ian—all so helpful. Loved the caving I did and the walking around on the escarpment. Loved the day



The quiz night

excursion to Yardy and the Ningaloo Reef whale shark watching day. Did I forget to mention that the home brew was pretty good too? A great conference.'

—Ian Curtis

'There were warm welcomes from the organisers. It's hard to mention individuals, because there are always more people behind the scenes who have brought the event together.

However, Fran Head, Ian Collette, Greg Thomas, Darren and Jackie Brooks must be mentioned. Quiet achievers in the town hall kitchen were Ida Newton and Dominique Trouchet preparing food and wash-

ing dishes... In the midst of pre-conference organisation Fran tripped and fractured her lower leg. This 'slight' inconvenience hardly stopped her and Ian from tirelessly working all week, including organising and hosting a mid-week trivia night.

The conference papers flowed without a glitch, Tim Moulds and Greg Thomas keeping the IT organised ... Thanks to everyone.'

—Cathie Plowman

So thank you to all the organisers for putting on such a wonderful conference. If all future conferences are even half as well organised, they will be enjoyed by all.

ASF Awards announced at the Ningaloo Underground Conference

Miles Pierce

Awards Commission Convener

DURING the Cavers' Dinner function held at the conclusion of the biennial conference in Exmouth (WA), 26 June, the following Awards were announced.

Fellowship of ASF

Grace Matts (SSS/ASF) for her long-term dedicated services to the Federation particularly as Treasurer (from 2001); contributions to the Awards Commission: and for assisting with representing ASF at UIS Congress meetings.

Susan White (VSA) for sustained services to the Federation, particularly as co-editor of *Helictite* (since 2000); Convener of the Publications Commission and also for assisting with representing ASF at UIS Congress meetings.

The Jeff Butt Award of Distinction for Exploration

Rod O'Brien (SUSS) for sustained involvement in technical penetration cave diving and underwater cave mapping at Jenolan, other NSW cave areas and interstate, typically in a leadership role, and often 'pushing the boundaries' to further speleological knowledge of flooded cave systems.

Certificate of Merit

Ian Collette (WASG) for his sustained involvement in introducing and instructing cavers in safe vertical techniques, and for taking a lead role in cave rescue exercises in Western Australia and beyond, including rescue equipment development.

Michael Bradley (SRGWA) for sustained involvement in cave surveying and the production of quality cave maps in Western Australia and his other ongoing contributions to SRGWA.

Grace Matts and Ian Collette were present at the dinner and received their awards from Vice President Jim Crockett, acting on behalf of the president, John Cugley.

For the other awardees, representatives of their respective clubs were charged with conveying their awards to them.

■ As well, in the Queen's Birthday Honours List, Susan White received an OAM for service to science, particularly to speleology, and to youth.

Skills(?) Contests at Ningaloo

Fran Head
WASG

PHOTOS: SONIA TAYLOR-SMITH



SRT COMPETITION

For the SRT contest we were fortunate to have the use of Exmouth SES's very substantial abseil tower. Here a couple of ropes were rigged for the 30 m prusik challenge, while Ross Anderson and Al Warild set up a challenging technical course involving rebelay, traverses and crossing of knots.

The winners of the 30 m ascent were no great surprise: it is a well known fact that Greg Thomas, who weighs nothing, can fly, while Asha Lane, in addition to having great fitness and skills, was also motivated by a desperate determination to win the Petzl Stop on offer as a prize. However, Luana Dwyer almost pulled off a shock upset.

The standout results from the evening, though, belong to Janine McKinnon, winner of the women's technical course and the women's Masters (over-55) category in the prussik, where her fast time saw her placed third overall.

Congratulations, Janine—many of us (especially those who trip over things in the garden and spend the conference in plaster) stand in awe of your energy and continuing achievements, as demonstrated by your activities and presentations at the conference.

The full SRT results were as follows.

30 m timed prusik – women

Asha Lane	2.16	<i>Winner</i>
Luana Dwyer	2.18	
Janine McKinnon	2.22	<i>Masters category winner</i>
Sarah Gilbert	2.30	
Janice March	2.57	
Jay Anderson	3.46	
Aimee Leong	4.03	

30 m timed prusik – men

Greg Thomas	1.32	<i>Winner</i>
Ross Anderson	2.16	
Brett Wiltshire	2.27	
Al Warild	2.28	<i>Masters category winner</i>
Danny Wilkinson	2.31	
Weidi Koh	2.40	
Alan Caton	2.54	
Brian Evans	3.05	
Phil Fleming	6.25	

Technical course

Ross Anderson	3.57	<i>Winner – men</i>
Al Warild	4.51	
Ian Collette	7.09	
Janine McKinnon	9.43	<i>Winner – women</i>
Greg Thomas	9.50	
Ros Barnes	11.00	
Janice March	11.48	
Garry Smith	11.56	
Sarah Gilbert	13.34	

SPELEOSPORTS

The Speleosports were held at a local playground on Thursday afternoon, 25 June.

Each team of four had to do a compass reading and distance measurement or estimate by pacing between two set points, before proceeding to the main obstacle course which had been constructed amongst the playground equipment.

First, the 'cave gate' had to be opened while lying under some spaghetti speleothems and using a large selection of keys.

Each team member then clipped on to a rope which was followed maze-like through the playground with numerous pasta and spaghetti speleothems to be avoided and a water hazard going up the slide.

At the 'flying fox' platform more speleothem pasta limited the tread area, with over- and under-exuberance during launch leading to some poor outcomes for the speleothems.

From here one team member had to pass through a series of hanging car tyres and then a different member had to harness up and climb a few metres up a wire rope ladder and swap out a self-locking karabiner.

Base times were adjusted with penalties for inaccurate survey measurements, damage to speleothems and loss of party members in the 'crevasse'.

One team lost two members who dropped off the flying fox into the crevasse.

Surviving members were penalised for time spent in the Coroner's Court.

Placing	Team name	Members	Base time	Time with penalties
1	Flying Orange	Asha Lane, Aimee Leong, Tim Moulds, Brett Wiltshire	7:07	9:17
2	Hillbillies	Ros Barnes, Rod Burton, Grant Elliott, Lara Elliott	8:00	10:53
3	Blind Eels	Janine McKinnon, Rob Susac, Kim Woodcock, Barbara Zakrzewska	8:05	11:22
4	Nameless Team	Luana Dwyer, Fiona McRobie, Andrew Thomas, Danny Wilkinson	8:59	11:44
5	Spunky Speleos	Brian Evans, Garry Smith, Dominique Troughet, David Woolls-Cobb	8:25	11:54
6	Blind Gudgeons	Alan Caton, Jim Crockett, Rod Smith, Steve West	10:00	15:10
7	Christmas Trees	Jay Anderson, Sarah Gilbert, Janice March, Cathie Plowman	11:36	15:48
8	Fantastic 4	Weidi Koh, Rob MacCracken, Cindy Tan, Lisa Zhang	13:25	80 days

Elery Hamilton-Smith AM

28/12/1929 – 27/06/2015

Nicholas White

VSA & ASF

THIS IS a reflection on my association and knowledge of Elery since first meeting him in the mid-1960's.

Elery was instrumental in the formation of the Cave Exploration Group of South Australia in 1955. During this period he was involved in exploration on the Nul-larbor, at Cora Lynn, Naracoorte and other SA caving areas. In particular, he took up an interest in cave biota and cave dwelling bats.

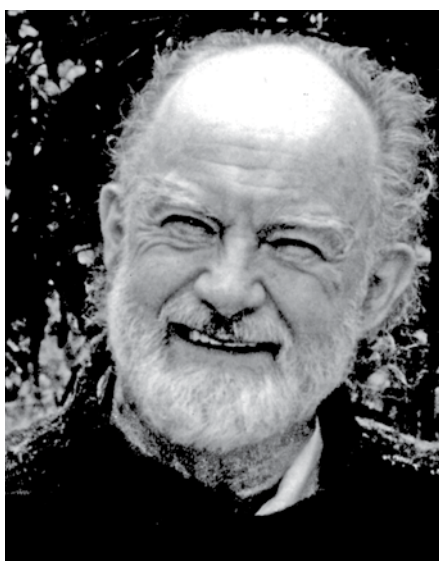
He was instrumental with others across Australia, in the formation of the Australian Speleological Federation (ASF), which came into being with its inaugural Conference in 1956. He was the first Secretary of ASF. In 1955 and 1956 Elery was a Master at Prince Alfred College in Adelaide and also a scoutmaster of one of the College's scout groups.

He took the scouts on several walking trips and also to cave areas on Kangaroo Island and to the Lower Southeast SA. Subsequent to this he moved to Melbourne to take up youth work with the Brotherhood of St Laurence. It was then that he became active in both VCES and SASS.

Elery's interests were cave bats and with David Purchase of CSIRO, initiated a bat-banding scheme. This banding involved frequent trips to the Bat Cave at Naracoorte and the Nowa Nowa Bat Cave.

His interests included cave invertebrates and he collected these and was particularly interested in cave beetles. The interest in bats continued and he encouraged anyone with an interest to study them. He knew the Bat Cave at Naracoorte well and always maintained that the bent-wing bats there were distinct from the eastern bent-wing bats because of a slightly different breeding cycle; banded bats were seldom captured in the others' territory and the ectoparasites were different in the two groups.

It was not until genetic methods differentiated the two populations and the Naracoorte bat has been re-named the Southern Bent-wing Bat that these differences fell into place. This bat is now critically endangered due to population decline. It is Elery's



records, which are now an important component of research into managing the recovery of the bat population.

Elery was an Honorary Associate at SA Museum in relation to his studies on cave invertebrates. His collecting extended across Australia and included PNG and New Caledonia. It ranged across many phyla but his interests were particularly beetles (*Coleoptera*). His collections are in the SA Museum. They started in 1958 and extended into the 1970s.

Other exploration interests at the time were the Scrubby Creek project, which once a way into the cave was found, led to a big Christmas expedition in 1961 to explore and map what became Scrubby Creek Cave. Despite not being able to swim Elery participated in this trip.

Both VCES and SASS were quite small and Elery recognized this as a problem and initiated a series of meetings, which culminated in the amalgamation of the two clubs to form the Victorian Speleological Association in 1967. VSA has been extremely successful since.

The 1970's were a time of optimism in Australia with the end of the Vietnam War and a change to a Labor government under Gough Whitlam. This brought about new

Federal Government ventures like the Inquiry into the National Estate and funding for matters about the National Estate. Elery was instrumental in backing ASF initiatives for funding for cave documentation and for providing reports on the importance and significance of caves and karst. These are listed below.

He made himself available to plan strategies for cave conservation and better karst management in both Victoria and more widely across Australia.

With others in ASF he helped organise the initial Cave Tourism and Management Conference at Jenolan in 1973. In succeeding years, ASF together with various cave managers in several states held further such conferences, pulling in New Zealand participants as well. From this base it was apparent that cave managers wanted and needed their own Association. ACKMA was thus formed in 1987 out of this need for managers to have their own professional Association. Elery was instrumental in providing the framework for this to happen.

I will not dwell on later events as ACKMA grew legs of its own, but Elery continued with his thrust of providing the ideas and impetus for Naracoorte to become listed under the World Heritage Convention. The Cape Range, Western Australia mining applications were objected to on grounds that they would damage the karst and cave biota.

Elery provided valuable evidence that helped in the mining applications being ultimately rejected. The evidence of the respondents objecting to the mining licence on Cape Range formed the basis of information provided for the inclusion of Cape Range with Ningaloo Reef in the successful nomination for listing as World Heritage.

Elery then looked to a bigger stage. John Watson was instrumental in the IUCN, World Commission on Protected Areas instituting a working group on Caves and Karst. Many Australians were involved in producing a booklet, *Guidelines for cave and karst protection*, and John Watson,

ELERY HAMILTON-SMITH AM

Elery, Dave Gillieson and Kevin Kiernan edited this publication.

Elery in 1997 took over the coordinating role for this IUCN Caves and Karst Task Force and continued in this role until 2009. Elery brought to this his capacity to communicate ideas about the values of caves and karst, in a way which were readily adopted and seized upon within Asia. In particular, both China and Vietnam benefited greatly from his input. Jay Anderson took over in 2009 and this Task Force has become the IUCN Caves and Karst Specialist Group that is a tribute to the Australian input as a more permanent part of IUCN operations.

Elery was a polymath with extremely wide interests. His cave interests extended from an appreciation of their beauty and contents to the better management of caves and karst management. His capacity to encourage and suggest new avenues or approaches to problems was why his influence was so important within ASF and then later in ACKMA and the IUCN.

At a personal level I had many caving trips with Elery, sometimes to catch bats, sometimes to get further away to places such as the Kimberley. I well remember when camping at Windjana Gorge we were awakened by some rain. It was only a few spots but Elery created a lot of noise. He spent a disturbed few hours before dawn as a result. In the morning, he revealed that when camping he always pulled the plugs



VSA COLLECTION

On the ASF's first Nullarbor expedition

on his lilo when he woke up and so spent a rather disturbed rest of the night. It was his early trips to the Nullarbor which really inspired him. One of his regrets in recent years was not being able to join his own club members on the yearly expedition we have to the Nullarbor. He revelled in the discoveries we made on these expeditions. Such a trip was not to be, even though he used to bring it up every time I saw him in the last seven years.

Others have expressed feelings about Elery on various matters, but from my perspective his contribution to cave knowledge and management in Australia, New Zealand and other parts of the world, particularly in East Asia, will be very hard to replicate. It has been my privilege to work in partnership with him to effect changes for better cave and karst management.

Our thoughts are with Angela and Elery's extended family.

Summary of Elery Hamilton-Smith's ASF activities

■ Author of over 2,000 published papers, articles and reports, including about 1,000 cave-related ones which were donated to the ASF Archives.

■ Founding Secretary ASF, 1956-59.

■ ASF President 8 years (1961, then 1963/64/65 then 1971/72/73/74) and the longest serving President.

■ Fellow of ASF (1974) and Honorary Life member of VSA.

■ In 1962, as ASF Conservation Committee, he produced the first ASF report specifically dealing with the need for cave conservation.

■ Convener, Commission on Cave Tourism, 1972-1987. This Commission was co-convened with Roy Skinner and was responsible for conducting seven conferences and the last one in NSW resolved to form what became the Australasian Cave

and Karst Management Association.

■ As part of the Cave Tourism Commission activities, was a significant contributor to or participant in ASF consultant reports on Katherine, Yallingup, Jenolan, Naracoorte and Tantanoola.

■ Convened a Committee to respond to the (Federal Government) Inquiry into the National Estate. Obtained National Estate funding for ASF for social / attitudinal surveys relating to caves (published in *Helictite*). Was instrumental in obtaining funding from which Peter Matthews used to develop a computerised catalogue of Australia's caves, the Australian Karst Index.

■ Convenor, Bat Research Commission 1963-1970s. (This started in 1957 with Jack Mahoney at University of Sydney Geology, but Elery apparently took it over

about December 1963). He produced the early issues of *Bat Research News* which were published by ASF in the 1960s, before scientific research in that field became well established.

■ Convener, Cave Nomenclature Committee late 1960s.

■ Convener, ASF Organisation Committee 1968-1970, resulting in significant and long-lasting structural improvements in the organisation of ASF.

■ Convener, Biology Commission for some years (1970s).

■ Co-convenor International Relations Commission in 1970s.

■ In 2013 he donated to ASF his huge speleological library and papers, including many important books and publications which may be the only copies held in Australia.

When the lesser of two evils is too evil

Cliefden Caves, the Needles Gap and Cranky Rock Dams

Tim Gartrell
SCCA

IT'S A FEW months since the NSW election and a good time to reflect on the challenges ahead for the growing public campaign to save the magnificent Cliefden Caves. The Save Cliefden Caves Association (SCCA) President, Tim Gartrell, reports in on the March 28 election—the promises made that will set the scene for the years ahead—and a major public forum held in Sydney.

As far as politics go, the recent NSW election was a predictable affair. The Baird Coalition government was easily re-elected albeit with a smaller majority as the Foley Labor Opposition regained much of its heartland from the 2011 wipeout. The Greens won three seats in the inner city and north coast and the Rev Fred Nile got the balance of power in the Upper House.

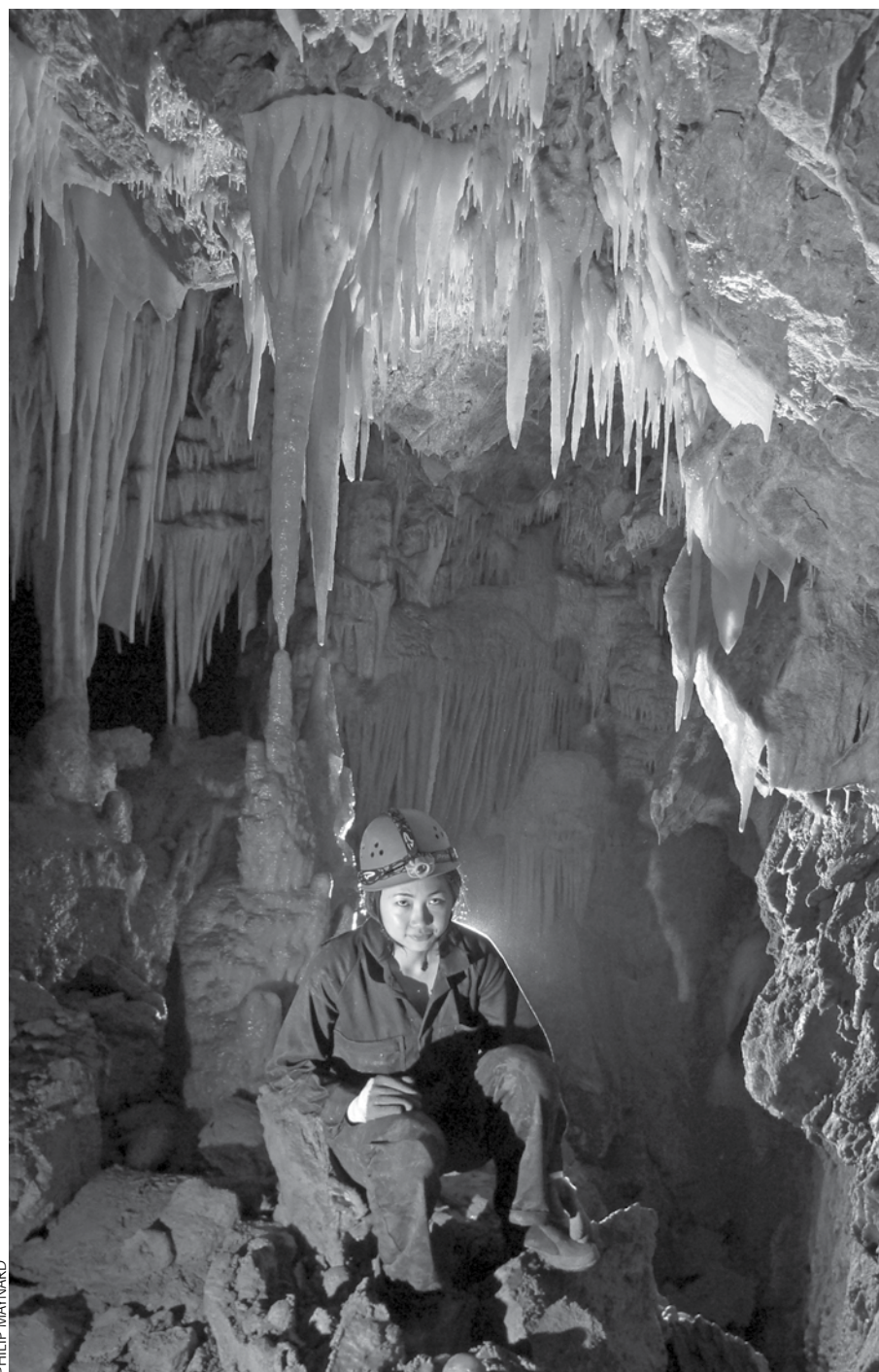
It was in this context that the public campaign to save the Cliefden Caves waged its pre-election campaign.

For any readers who haven't heard about the threat to the caves, here is the short version.

Situated on private property in Central West NSW, the Cliefden Caves have been superbly protected by generations of landowners and the good folk of the Orange Speleological Society. Spurred on by the local Federal National Party MP, John Cobb, the NSW Coalition Government hastily announced that it would proceed to identify a preferred site for a dam on the Belubula River.

They initially proposed The Needles Gap dam site that would have flooded and devastated the entire site. After lobbying, submissions by OSS, a media campaign by SCCA and a petition with more than 5,000

Tim Gartrell is the President of the Save Cliefden Caves Association and a member of the Orange Speleological Society. Tim first encountered the Cliefden Caves in the 1980s as a young caver when he went on several OSS trips, many of them led by the editor.



Flora Lin in CL13 Yarrowigah cave

signatures, the Government settled on the nearby Cranky Rock site. The Cranky Rock site is, to be blunt, a shocker that must also be opposed—but more about that later.

Sydney Forum - Professor Tim Flannery joins the chorus of concern

Three weeks before the election, the SCCA and its campaign partner, the Nature Conservation Council of NSW, held a public forum in Sydney to raise the alarm about the proposed dam and build further public support.

Guest speaker, 2007 Australian of the Year, Professor Tim Flannery, headed the list of speakers who outlined a strong case for the preservation of the caves, fossil site and other important features at Cliefden.

Opening up, Tim Flannery thanked the crowd of around 150 people and called us to action.

'Nothing ever changes unless good people stand up and give a little bit of their time to do things that are important, like preserve these caves,' he said.

Professor Flannery spelt out the increasingly important role caves have in understanding the past and predicting the future.

'Caves are the nearest things we have to time machines. People do a lot more with caves and cave sediments that reveal much deeper aspects of our own pre-history than you could have imagined 10 years ago.

'Now people think they can take a slice of the sedimentary profile, look at each individual sand grain using new techniques and reconstruct what happened in that cave over time, what sort of animals came and burrowed into the cave surface, who lived there, built a campfire or hunted.

'So we are slowly beginning to unlock a much greater potential for caves to tell us about our past.'

He told us that recently rare DNA from 40,000-year-old megafauna was extracted from remains of a giant species of kangaroo found in a cave in Tasmania.

It was only the unique conditions in the cave that had allowed this crucial link to our past to survive.

Similarly, invertebrates have been discovered living in a cave in northwest WA—the only remnants of a rainforest ecosystem that existed more than 50 million years ago. Their nearest relatives are found in the rainforests of Southern Chile.

Professor Flannery said the Cliefden Caves were under-researched. 'There's a lot of good reasons why you might want to preserve caves, especially caves we know next to nothing about. It would be really foolhardy to rush in and destroy an asset like that and deprive all future community members of the benefits that might derive

from a thorough investigation and proper analysis of what those caves can tell us.'

Not just the caves—an Australian scientific treasure

Respected University of Sydney cave scientist Associate Professor Armstrong Osborne, outlined the scientific importance of the Cliefden Caves.

While the focus of the campaign and the media has been on the caves, Armstrong reminded us of the importance of the other features at the Cliefden site.

'The number one thing at Cliefden and the thing of most demonstrated international scientific importance are the Ordovician fossil sites. This is one of Australia's most important invertebrate fossil localities.

'These ancient fossils dating back 450 million years contain an impressive array of 191 genera and 263 species, including 101 species unique to the area.

'This is the first place in the world where there is a record of animals building themselves up above the waterline. It's one of the few sites where we have both shallow and deep-water fauna preserved.

'It's a locality where over 460 million years ago we shared an ocean with China and there are beasts found here that are only shared with China.'

We heard that there are also other important features at the site—a very rare warm spring associated with the caves that will go under with all the various dam plans, surface karst features that show a complex landscape history, active tufa dams that are uncommon and the unique history of discovery at the site.

Turning to the caves, Armstrong gave further examples of their importance to our scientific knowledge. The first was the Taplow Maze.

'One of the caves at Cliefden is a really complicated maze cave and maze caves are of international scientific interest right now.

'The maze cave is one of the lowest level caves at Cliefden; there are more than 3 kilometres of mapped cave. This means the lowest level Cranky Rock Dam will flood the bottom level of this cave by at least 16 metres.'

Reiterating Tim Flannery, Armstrong pointed to the importance of caves as records of the past.

'Stalagmites are one of the most important sources of information about climate change. They can provide the best records of past climates including evidence of global drying, not just warming.'

Armstrong repeated the importance of further discovery: 'We need to build up our understanding of the caves.'

Flooding the caves for a pipedream—dams don't create more water

The next speaker was the veteran water campaigner, Bev Smiles, President of the Inland Rivers Network (NSW). Bev gave the meeting a broader perspective of the health of the Lachlan River, into which the Belubula River flows.

The Murray-Darling Basin is the biggest river basin in Australia and incorporates the Lachlan and Belubula rivers. A lot has been done to restore its health through the Murray-Darling Basin Plan which aims to restore flows to the river, not remove them!

'One of the key causes of decline in the health of the basin has been the construction of large water storages and over-extraction of water,' Bev told us.

The Murray-Darling Basin Plan identified that the Lachlan system was already over-allocated and a significant amount of state and federal funds have been invested in buying back water licences.

'The Commonwealth has purchased 87,856 megalitres to be returned to the rivers but a new dam will cancel out this benefit.'

Bev Smiles also addressed one of the main myths driving the dam proposals—that a new dam will create water security for the nearby towns.

'Dams don't create water. They were all empty during the millennium drought. The idea of [providing] water security by building more dams is not going to solve our problems; there are many ways to create efficiency of existing water supplies.'

The real reason for the dam, alluded to recently by Federal MP, John Cobb, is mining. 'We know that the key purpose for new storage on the Lachlan is for mining development,' Bev told the meeting.

A local caver's view—history and custodianship

OSS President and editor of this journal Ian Curtis was the next speaker. Ian took the meeting through the 40 year long association between the OSS and the landowners and how this has been a major factor in the preservation of the caves.

OSS, established in the 1950s, has worked hard to preserve the site. They were invited to manage the caves by the local landowners in the 1960s. They have been protecting and preserving the 60 caves and 120 karst features since.

Ian reiterated the environmental significance of the caves but also pointed out the long and impressive social history of the caves—one of the oldest associations between European settlers and caves systems in Australia.

In 1815 the Cliefden Limestone features

CLIEFDEN CAVES, THE NEEDLES GAP AND CRANKY ROCK

were the first to be discovered as Surveyor Evans explored beyond the Blue Mountains. In 1828 Surveyor Richards first entered the caves. Historic graffiti dating back to 1887 exists in Main Cave.

There is also evidence of Indigenous history in the area. Aboriginal remains have been found in one cave and there are scar trees in the area. Early settlers recorded the first inhabitants, the Wiradjuri people as “helpful and friendly”.

OSS has been active since the current threat to the caves emerged, writing submissions and lobbying local politicians. They understand the significant threats presented by all the dam options to not just the caves but the local environment. This was best summed up by Ian’s closing words: ‘There should be no dam on the Belubula River.’

The environment movement rallied behind us

Daisy Barham, from the NSW Nature Conservation Council was the final speaker demonstrating the broader environment movement’s support. Daisy also stressed the broader environmental impacts of the dams. ‘Building dams would send the wrong message to regional communities about how to fix their water concerns.’

Daisy stressed the need for a broader campaign to make MPs aware that we are not just concerned about the caves but are active. She urged everyone to sign the Save Cliefden Caves Association petition, to call and meet with MPs and to write letters to the editor opposing the dams.

Turning around the politicians—progress, but more to be done

There were promising signs in the lead up to the election, thanks to the petitions, media, public campaign and the work done by local cavers in writing submissions and lobbying. Now the election is done, here is where the parties stand.

The NSW Government (Liberal/National Party Coalition)

The Liberal and National parties support the construction of a dam on the Belubula River. They have named Cranky Rock as their preferred dam site in the recently released scoping study commissioned by their Government.

The proposed Cranky Rock dams would inundate the caves. The Needles Gap dam

has also not been ruled out. The NSW Environment Minister said in the last week of the campaign that he would not support any new dam in the state that would have significant environmental impacts.

The NSW Opposition (Labor)

The NSW Opposition is opposed to any dam that would inundate the caves. Labor leader Luke Foley has also made a commitment to protect the Cliefden Caves site with a heritage listing. Labor’s policy states:

‘A NSW Labor government will:

- Commit to ensuring the Orange community has a secure water supply;
- Explore all other options for water security. New dams are the most expensive and environmentally destructive solution to water security;
- Not support any proposal that will inundate Cliefden Caves, including The Needles Gap and Cranky Rock proposals; and
- Pursue NSW Heritage listing for the Caves in recognition of their historical and geological significance.

The NSW Greens

The NSW Greens oppose any new dams in NSW and, in particular, oppose any dams that would flood the caves. The NSW Greens have had a consistently strong opposition to the dams and Greens MLC Jeremy Buckingham has been a very vocal critic on the issue since it arose.

We concluded that the NSW Coalition are the strongest advocates of a dam on the Belubula River and have named Cranky Rock as the preferred site, which would inundate the caves.

As a result we believe they have the worst policy on this issue. The only positive was the Environment Minister’s comments.

NSW Labor’s announcement represents strong opposition to any dam that would impact Cliefden Caves. Their commitment to a heritage listing for Cliefden is welcome and represents forward thinking on the issue. The NSW Greens have had a consistently strong opposition to any dam and have been vocal supporters of the cause.

CONCLUSIONS

With the benefit of hindsight, the response from everyone concerned about the protection of the Cliefden site was sluggish. It took almost a year until the first meetings were called and the media was made aware

of the issue. However, once the campaign got under way that lost ground was quickly made up. The challenge now is to keep up the momentum and not get complacent.

The NSW Government may have taken a tactical retreat to the Cranky Rock site but it’s still a disastrous proposal that will have a major impact on the caves and the local environment.

Indeed, one of the Cranky Rock options is so enormous that it would flood even higher levels than the original Needles Gap proposal.

If Cranky Rock had been proposed first we’d all be up in arms about it, so we shouldn’t fall for the ‘three card trick’ and accept it because it’s been spun as marginally better than the first Needles Gap proposal (which hasn’t been ruled out).

The best way to beat the latest proposals is to:

1. Keep up the public campaign, keep up the pressure – over 7,000 people have signed the petition opposing the dam and thousands more are becoming concerned. Mass opposition to the campaign is central to any victory, it’s the best way to get politicians to do the right thing;
2. Build on the gains made at the election—keep the Labor Opposition and Greens to their commitments and work on the re-elected Government—not all of whom think this is a great idea;
3. Build alliances and work together. It’s not just cavers who are opposed to this, there are scores of environmental groups who are on our side and want to help. Like other iconic campaigns, only a coalition of organisations can take this on and win. This requires cooperation and goodwill, openness and the sharing of information. There is plenty of work to be done by the different groups and not enough resources for it to be done alone;
4. Muster the hard evidence—as Tim Flannery said at the forum, the Cliefden Caves are under-researched. This puts the campaign in a weak position. Cavers know how important the area is but we need to continue to fund and support the research efforts by Armstrong Osborne and others to build the case. The good news is, the more we discover at Cliefden, the more significant it becomes.

Only a concerted campaign that brings all this together can defeat the threat to the caves. The caves won’t save themselves. See you on the campaign trail.

ASF Karst Conservation Fund Initiatives

Nicholas White

Karst Conservation Fund Commission

CONSERVATION of caves is multifaceted. ASF has Codes to support its approach to cave and karst conservation but to adequately espouse better protection or management relies on knowledge. This is where cave exploration and speleological research come together.

The cave conservation campaigns of the past relied on knowledge of the caves and their values for use in the political arena. The Colong and Precipitous Bluff campaigns relied on cave knowledge to prevent quarrying.

To an extent the very much more complex successful campaign to stop the damming of the Gordon River stopped the flooding of caves on the Franklin and Lower Gordon Rivers. These caves were very important to for the campaign because the caves had aboriginal occupation and use during the last ice age.

The Newcastle and Hunter Valley Speleological Society together with ASF support, objected to the issuing of a quarry licence on the Timor limestone in the Upper Hunter Valley. This licence was issued but is now highly constrained because of the environmental values of the proposed quarry area: a Commonwealth and state listed endangered eucalypt grassy woodland, a squirrel glider population listed as endangered in NSW, issues regarding monitoring of potential stygofauna in the karst aquifer and should caves be intercepted in quarrying operations. Both the ASF and the Karst Conservation Fund provided funds for the research necessary and for presentation of our objections to the court. The costs were considerable.

Presently, we are faced with further development proposals that could result in loss of caves.

The proposal to build a dam on either the Belubula River or at Cranky Rocks is one such threat that may seriously affect Cliefden Caves and may flood some of the caves. It is understood a site at Cranky Rocks has now had NSW budget funds of \$2 million released to further examine the geology and geography of this site, undertake preliminary design parameters and to

examine the business case. An acceptable report early next year will trigger a full investigation of these factors under state significant infrastructure legislation.

The ASF Karst Conservation Fund is providing funds to the Save Cliefden Caves Campaign. These funds are both for campaign purposes and for research activities to better inform the next stages of the campaign.

Already the bat investigation has shown the caves and river valley have a very rich bat fauna; some of the species are listed as vulnerable or endangered. There are several unique cave invertebrates and further investigation of the cave fauna is underway. Systematic surveying is being undertaken mostly by cavers from SUSS and the geomorphic history of the caves and area is being studied by Ian Houshold.

The Fund is presently funding a number of projects, which include both conservation campaigns and research to better understand Australia's karst estate. These are:

■ **Save Cliefden Caves Campaign.** See above for current information. Water NSW is charged with selecting one of four proposed dam sites. They will report early in 2016 and should a site on the Belubula River be recommended a full study will be undertaken which could get very involved and expensive to mount a successful campaign to prevent damage to the caves.

■ **Stockyard Gully National Park and Beekeepers Reserve, WA Speleogenesis Project.** This is being conducted by Dr Matej Lipar. Funds for the project provide for sample collection and mineralogical analysis and dating. This study builds on Matej's previous studies of the Pinnacles at Nambung, WA and the Petrified Forest at Cape Bridgewater, Victoria.

■ **Population dynamics of the critically endangered Southern Bent-wing Bat, PhD project of Emmi Scherlies of Latrobe University (Bendigo).** The Southern Bent-wing Bat is critically endangered and is dependent on Bat Cave at Naracoorte, SA and Starlight Cave at Warrnambool, Victoria as maternity sites. This cave dwelling bat has significantly declined in recent years.

The funding has provided state of the art equipment to monitor the population at Bat Cave. The use of this equipment will provide answers to critical questions identified in the national recovery plan for the southern bent-wing bat. This will include the movements and survival rates of females, males, adults and young of year. Is one of these cohorts contributing disproportionately to the decline? Emmi will provide updates as the study progresses.

■ **Britannia Creek Cave Project, Silvana Ianello (Federation University, Ballarat)** is mapping the cave and identifying invertebrates in particular zones of the cave. The cave is a granite boulder cave with a stream running through it. It is close to Melbourne and has a lot of recreational caving visits. The cave has glowworms (*Arachnocampa gippslandensis*), numerous other invertebrates and a platypus is sometimes observed in the cave. The study of the biota and the various zones in the cave will assist in better management of the cave.

The Fund has a very wide brief for what it can support. This is because cave and karst conservation in a holistic interpretation embraces everything to do with caves. Obviously the directors of the Fund are judicious with the expenditure of funds and what projects to support. State and Federal governments have never supported karst research with much in the way of research funding. It is significant that the current projects are associated with studies at tertiary institutions. This is a new phenomenon but may be the way of the future in which case to be able to continue supporting such projects the Fund will require lots more donations.

The ASF Karst Conservation Fund has finite resources to support projects. It relies on donations to support cave conservation, cave acquisition, cave protection works or research projects adding to our knowledge of caves. ASF is fortunate that donations to the Fund are tax deductible.

Details of how to donate to the Fund are provided on page 2 of this issue of *Caves Australia*.

What is wrong at Wellington Caves?

Keir Vaughan-Taylor
SUSS

AFTER 30 years attending Wellington Caves' Advisory Group, acting as ASF's stakeholder representative, I no longer felt the Council was acting in the interests of the environment. I have resigned. ASF should not, in my view, be associated with the oncoming mess.

In the 1980s when I first visited Wellington Caves the state of maintenance was, in my view, the second worst in Australia. Paint seemed to be a major marketing tool, with stones across the karst structures behind the kiosk painted red, green and blue—gnome-like colours.

Cathedral Cave's stairs were slopped with white, dribbling road paint, presumably to highlight dangerous edges but looking amazingly tawdry. Cave walls were graffitied with huge, white road-paint arrows indicating the way out for the amazingly geologically challenged.

A right-hand alcove provided handy storage for rubble and industrial detritus. An entrance-way alcove boasted a bogus display of Ben Hall's campfire, with a nearby rusting revolver acting as focus for guide stories undeterred by matters of historical accuracy.

Electricity cables ran along rusting handrails and the finest 1950s lighting system provided an almost continuous illumination, fostering strange photosynthesizing growths. A rotting Bible rested upon a stalagmite imaginatively called 'the Altar'.

Old maps drawn by government geologist, Oliver Trickett, from the late 1890s showed the location of a cave that once had existed in the caravan park. This cave could possibly make a new tourist attraction. Local mythology speaks of a photograph showing a lake inside the cave and someone paddling a corrugated iron canoe on the lake. Everyone who speaks of this myth claims to have a friend who has seen this photograph.

However, it has never been seen by me.

Opinions in this article do not necessarily represent the views of ASF.



Anticline Cave entrance when first exposed

It was also said that the 200 cases of whisky stolen from the golf club could possibly be hidden inside. The longest lasting urban myths are those that can't be disproved.

Wellington Council was reticent about exhuming the cave because of an electricity pole positioned right where the cave was likely to be. The caravan park lessees were uninspired by the prospect of dirt piles in their park and losing a camp site. The caravan park might be full a couple of times a year, so not a major drain on profits.

Rather than disconnect the power lines, extract the power pole and exhume underground cables, Ernie Holland, then Jenolan Caves Head Guide and on Advisory, suggested cave divers could enter a small watery squeeze in the bottom of nearby Limekiln Cave from where it might then be possible to surface inside the buried cave in the caravan park to make an assessment of its possibilities.

Squeezing into McCavity for the first time is a matter of descending into the lower void without scuba gear, reaching up through the squeeze for each tank and putting dive gear on underwater. I manhandled a new-fangled digital underwater video camera, intending to record the base of the electricity pole.

The cavern beneath the Birth Canal Squeeze revealed itself to me through the eyepiece of the video as a large underwater realm with spectacular formations. It was

all completely new. In later years McCavity would become a magnet for cave divers from across Australia and the world. I was to develop a warm affection for Wellington Caves. Nearly every trip revealed a small discovery, although never one quite as significant as McCavity. After some ASF cajoling I was to accept a position on the Advisory Group.

Later, the council provided an excavator and a driver to expose Anticline's entrance. Sadly, in the past the cave entrance was thought to be a handy place to dump rubbish. Getting to the lake required climbing over decaying debris. In the cavern below was a lake, but no canoe, and as to the whisky I can assure you—honest to goodness, I wouldn't lie to you,—there was nothing there.

I ran many SUSS trips to Wellington and also hosted a scout team under the watchful eye of their supervisors but with me as acting trip leader. The scouts were under strict orders to do exactly what the trip leader said. I issued instructions to my young charges to remove the kayak from the top of a nearby white Ford (my Ford). "Don't worry about the owner. He'll never know." We took the vessel down into Anticline where we floated it on the underground lake. Although this was a bright yellow kayak draped with wet, bedraggled scouts we finally had that damned photo of a boat on the underground lake.

The Advisory Group meetings were intended to gradually bring reform to cave presentation and infrastructure. It was a slow business with the council always reluctant to invest ratepayers' dollars. Nevertheless, there were many improvements our Group brought to the caves.

The previous caves manager did a great job wiring and lighting Gaden Cave. He was later instrumental in the mine development. We gradually improved Cathedral's limiting light usage, moving some rubbish out, securing funding for lighting and re-wiring. On the downside, here we are 30 years later and after agitating for cave light-

ing reform it still isn't complete. Even so, much has been done and the recent work has been done well.

Another attraction at Wellington Caves is an old phosphate mine, dug in 1910 by excavating the ancient filled canyons and caves in pursuit of phosphate deposits. In 1910 mine workers dug deep into buried canyons, lining the floors with rails, producing several levels of buttressed floors. Many fossils of macrofauna hailing from the last 200,000 years were unearthed. Most fossils were shipped to eminent experts overseas as part of our subservience to the Australian cultural cringe.

In the local town museum, among the loosely curated bric-à-brac, is a picture of workers on a verandah of a mine building shoving diprotodon hip bones into hessian sacks. Unable to profit, the mine closed, remaining an abandoned relic for years, a fascinating example of early 20th century mining techniques and artifacts.

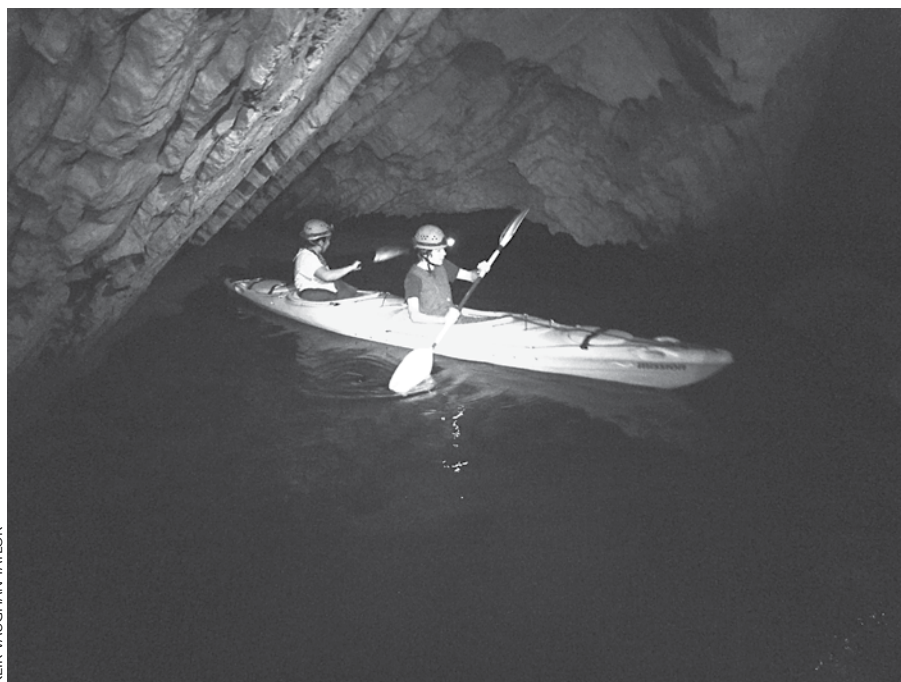
Discussions and urgings by the Advisory Group were able to prompt government to provide a grant to restore the mine before it collapsed. Work could be started and elderly men experienced in traditional pillar and stall carpentry employed to replace the roof supports.

John Aquilina, then Minister for Land and Water Conservation, addressed a crowd of people outside the phosphate mine's entrance, presenting a cheque for \$500,000. In his speech, he said it was a grant but later I was told it was an interest-free loan and then later again, when reviewing the cave's budget, we seemed to be paying interest. One might ask whom that interest was paid to. This liability on the caves' budget was cited as a reason why the caves should be privatised. Nevertheless, the 'loan' was eventually paid off from caves income.

Armstrong Osborne's and Mike Augee's contribution to the curation of the museum and the design of the phosphate mine presentation is something they should be proud of. Turbulent geology in the deposits of the mine tells a history of floods carrying silt, laden with dead carcasses, cementing thousands of fossils hanging exposed in this matrix.

The fossil story is presented alongside the geology and the heritage of a mine constructed with picks and shovels.

It's all on display now and without the Advisory Group this valuable heritage item would not have survived. The local museum was re-curated, largely by Armstrong, to reflect Wellington's megafauna history with some artistic renditions of ghost bats and giant goannas (*Megalania*). From the Australian Museum we obtained life-sized facsimiles of megafauna, including a giant



Scout exploration 'canoe' in Anticline Cave

snake, megalania and a skull casting of a diprotodon taking prominent position in the museum entrance.

While councils came and went with the changing dynamics of voters, the Advisory Group remained largely unchanged over the years. Towards the end a few more pro-development members joined, but were largely co-operative. Changing governance philosophies brought changes in attitudes to self-governing groups. Councillors openly reported to our meeting that we were thought to be exerting too much influence.

At times weird proposals were raised in Advisory meetings, one such being to fill in the entrance of Anticline because it was unsightly. Councillors tried to placate our protests, reassuring us that a concrete pipe with a hatch would guarantee access for divers. They argued that the cost to landscape the entrance was far too great and something had to be done. I shot my mouth off, arguing that I could get a hundred cavers on site to do the restoration work. Besides, a hatch would ensure the CO₂ build-up would prevent anyone ever visiting the cave again.

Whether to fill in the cave or have a go at restoration went to the vote. It seemed to me that we should be a cave protection group rather than a cave destruction group. To my disappointment, the vote was not overwhelmingly protectionist and Anticline was only just saved from burial—saved by the vote of that lovely woman who knows nothing about caves from the Department of Lands. As former Liberal Prime Minister John Gorton knew, one vote is all it takes.

I didn't get a hundred cavers to come; there were maybe twenty or so. But people

from the area—the Friends of Wellington, National Parks employees, Jenolan guides, people from the local arboretum and of course the usual suspects from SUSS—they came.

The cave's general manager, Chris George, was on a knife-edge about occupational health and safety that day. We had some men and women in their 80s who at first were reticent about their physical ability but who were soon caught up in the project. They couldn't resist being in the hole, passing stones along the rock chains.

Rocks were manually passed to the top and placed in gabions to support the entrance. In so doing we exposed an historic stairway leading to the lake. In the end we had the entrance stabilised and cleaned of rubbish. Ultimately a viewing area was built, thanks to Chris George, but the final steps down to the lake may never be built. While this was a win for the environment it may have been seen as having an undesirable influence on management.

Advisory was treated with increasing disdain. Budgets were no longer presented.

Improvements would be made to the park without notification and costs for unapproved projects would appear on the liability column of our undisclosed budget. You could once find this out by consulting the caves budget which was available on the internet, but lately this has not appeared.

Years ago a proposal to build a Japanese garden was put to the Advisory Group. The deal was, as I remember, that the Japanese would pay for its construction and ongoing maintenance. To us this seemed agreeable and the project went ahead, resulting in fountains, meditational stream environ-

WHAT IS WRONG AT WELLINGTON CAVES?



KEIR VAUGHAN-TAYLOR

Keir satnds on an exposed rock in the Anticline Lake during the drought

ments and wooden things that fill with water, tip up and go 'clonk'. At some stage the cost of two gardeners' salaries and maintenance costs were added to the cave budget—about \$75,000 p.a.

An arbitrary \$30,000 charge for electricity was added to the budget, although there is no relation between the charge and actual consumption. I don't think there is an electricity meter, but we were buying enough electricity to light a small town.

Equally high charges for water and sewerage might be argued as perhaps justified because the solution to removing local effluent was by pumping it 15 km back to Wellington was an expensive one. At least it eliminated the settling pond round the back of the caves.

Ultimately Wellington Caves are controlled by the council and they can charge what they like for whatever they want. Nevertheless, arbitrary charges disconnect the incentive to reduce costs through improvement.

LED lighting and solar panels could significantly reduce electricity consumption but the electricity charges are a flat rate and so there is no incentive to reduce consumption.

In 2014 councillors attended a meeting, presenting a budget consisting of a single line of total costs incurred by the caves. They stated the caves to be a major cost that could only be made profitable if they were privatised. Jenolan was showing the way!

To my mind, council had been using the caves as a milch cow but perhaps had forgotten about the milk.

Many of the budget charges were imaginary sources of income to the council. Any saving or financial improvement made to the park was somehow prevented from

reducing the caves' deficit column.

Ignoring disapproval and alternative suggestions from Advisory, the Caves were rezoned to make development more attractive. The Japanese garden's costs were transferred from the caves budget to that of Wellington's Parks and Gardens, making the budget more attractive to potential lessees of the caravan park. The only interested tenderer pulled out.

The council then commissioned a business plan. The plan was not made available to Advisory.

Later I learned one of the newer Advisory members had drafted the plan but they were advised (ordered?) not to mention this to the rest of the panel or make its contents available. Later that person resigned from the Advisory Group.

A document was presented to our committee that suggested new terms of reference: that our group would only respond when our expertise was asked for. Not really, to my mind, a forum of input for stakeholders.

One of the last meetings I attended, a group of consultants gave a presentation—a new vision for Wellington Caves. Much of the material contained in a glossy brochure used terms, phrases and guidelines which had been lifted from documents previously put together by members of Advisory. As Paul Keating said, "...the only reward for public service is the public good" and so that material was given for the benefit of the caves.

The problem for me was that after the motherhood content the development plan was steeped in flaws, poor design and environmental ignorance.

Colourful architectural plans show dozens of new cabins constructed across a

flood plain, nestled within artificial gardens cradled by an artificial wetland constructed over natural water features that we cavers call dolines.

A camp site is positioned on a karst landscape providing a supporting incline to lay out a tent and sleeping bag. To the south, fibreglass megafauna are poised to act as a tourist attraction viewed from an aerial cable car sweeping over the park from somewhere to somewhere else on the top of the phosphate mine.

Just as the National Party provided millions of dollars for an ill-conceived dam on the Belubula River they also secured \$750,000 for this development

The trouble with feasibility studies is that there are many money leaks into ancillary pockets before a physical act of construction begins. This is why in Australia today we can't manage to build very much. I glimpsed a development plan budget that costed tasks such as choosing the cabin design at tens of thousands of dollars and another not-so-difficult task at high prices—perhaps a job that could be done in a couple of afternoons by one of the council secretaries.

With the \$750,000 whittled away, it might be possible to build one cabin. The rest will have to be funded with a private-public partnership. Phase 1 of the three-phase plan was to build the cabin blocks. The other phases may never be achieved. This frenzy of entrepreneurial vision could explain why many of the shops in Wellington High Street are boarded up.

It was always difficult getting anything done on Advisory but this was a new low. I felt ASF should no longer be associated with the Advisory Group.

After resigning I received a two-line letter from Council accepting my resignation. Campbell Gregory, a past Advisory member and local farmer, took the trouble to write some kind words in a handwritten letter reviewing our achievements, thanking me for my time and regretful for the situation.

There were always strained staff relations, in part because guide staff earn very little, working precious weekends and overtime, sometimes without pay. The caves' general manager resigned, along with some of the guide staff. Wellington Council's Director of Strategic and Planning Services recently departed.

At present there is little management or site maintenance. The last time I was there our megalania replica had been broken in two and the paint was fading badly. A second caves manager was appointed but doesn't seem to be available if you try to ring.

IB-14 Exit Cave, Ida Bay, Tasmania

D'Entrecasteaux River Sumps exploration continued

December 2014

Janine McKinnon
STC

BACKGROUND

Exit Cave is a large, multi-entrance system in southern Tasmania. The left anabranche of the D'Entrecasteaux River sinks at IB-232 D'Entrecasteaux River Third Sink and reappears in D'Entrecasteaux Passage in Exit Cave.

In February and March 2013 I undertook a series of trips to explore and survey the passages between these two points (McKinnon 2014). I was unable to connect the two entrances at this time, but thought another attempt was warranted. So, in late December 2014 I returned to complete some survey tasks and attempt to pass the rockpile that had stopped my progress in 2013. This time I had another diver along to help. I thought this would make the job much easier. I didn't realise how much easier it would be.

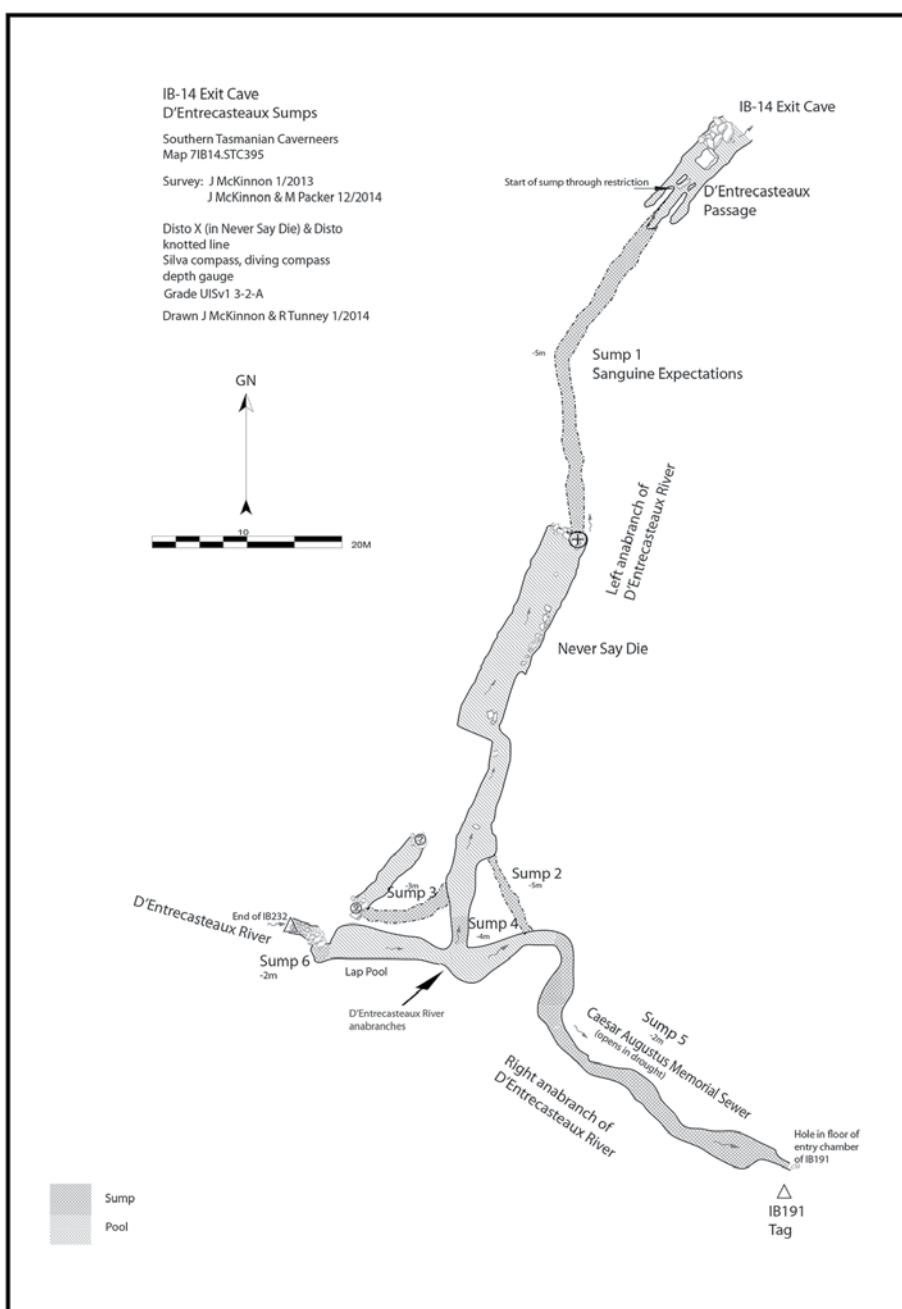
We had chosen this time of year as we were hoping to catch the water levels at the optimum height to continue explorations of the flow. Too early in spring and the levels would be too high to access the site, too late in summer and the low flow conditions makes finding the way on difficult (as my previous attempts had proved).

THE APPROACH

The team this year was very small. Just myself, Michael Packer (Pax), my dive buddy and recent discoverer of caving, and Ric Tunney, perennial support, sherpa and general multi-task guy.

The walk to Exit Cave takes between one and one and a half hours, depending how heavy one's pack is. There is a 200 m high saddle to cross. The sump is 20 minutes walking (and a little scrambling) inside the cave.

Thus, getting a load of diving gear to the dive site is hard work unless a reasonable number of sherpas are available; each diver's gear creates four loads. We did not have it easy this year; we had an extra diver and fewer sherpas. So I had prepositioned some



of the gear at the site in early December.

On Boxing Day we three headed into the cave with our first load.

I had anticipated that we would be doing

a fair bit of diving, as we attempted to find an underwater route bypassing the rockpile, and also survey underwater sections. Thus, we each carried twin larger tanks



Lots of room to sort gear

JANINE MCKINNON

and a set of small three-litre tanks. The large ones were to be used for commuting through Sanguine Expectations (SE - the sump in D'Entrecasteaux Passage), and any long dives further into the system, and the small ones were for the shorter daily tasks I envisioned being our main activity. These small tanks we planned to carry back each evening and refill. The large ones would stay in the cave for the whole exercise, and would have sufficient air to complete their tasks safely. That was the plan. A heavier carry than strictly necessary at the beginning and end, and light carries during the project.

The following day, 27 December, we ferried the remaining gear to the dive site and prepared to start.

The thick line that I had placed at the end of activities in 2013, from the surface of the sump pool through the entrance restriction to SE, had been abraded and broken sometime in the intervening twenty months. I had seen this when I inspected the sump after dropping gear a few weeks earlier, so I had carried in a hundred metres of Tels-tra line to replace it, and run a (hopefully) more permanent line all the way through the sump. This was some of the line I had purchased with the ASF grant for re-lining Junee Resurgence in 2014. The grant had allowed for any surplus line to be used for other cave diving lining tasks.

The plan for this first day was to reline the sump and visit the areas of the cave I had explored last time. This would re-familiarise me with the system, and allow Pax to get a feel for it, before starting more difficult tasks. We also thought we might have a poke at that rockpile as a first priority.

THE CONNECTION

I dived first, laid the line, and waited in Never Say Die (NSD) chamber for Pax. Once he arrived we dropped tanks and waded off upstream to explore the system.

The water level was about half a metre higher than 2013, and the flow was visible. This was good.

We passed the line heading into Sump 2, went over the line into Sump 3 (both still taut, so in situ) and swam through the roof sniff in between. We followed the swimming passage to the right to a rockpile. I thought this was the Sump 3 rockpile I found last year. (I now have reasons to doubt that.) I could see large passage through the rockpile at the far Left end, and gaps up through it.

There was a moderate volume of water flowing through the rockpile in many places, and we determined that the rockpile was probably sufficiently leaky to allow for flood flows to be coming through it.

We took off our harnesses and fins. I moved some rocks and started squeezing up. I needed to remove my helmet. I just fitted through, and then started gardening behind me for Pax. Meanwhile, he had found a squeeze way through further to the right, and was down at water level. I had a clear path down the 5 m to the water, and dropped down. We reunited and swam out of the rockpile to find ourselves in Sign Of The Times (SOTT) passage. We were through! We followed this to the entrance of IB-232, where the river sinks to enter Exit Cave, just to be sure we were in the right place. We spent some time exploring the maze of passages in this entrance area. The sink was open but obviously higher than 18 months ago.

We retraced our (swimming) steps to the rockpile. Significant water was flowing through a hole on the RHS (looking downstream) and I crawled through it several metres. The water then sumped. We looked for the permanent marker Alan Jackson had left at the furthest end of his survey of IB-232 in 2013 but couldn't find it. We then went back through the rockpile and headed down stream past the junction back

to NSD and along the smaller passages in that direction.

A few metres past the turn to NSD I found the end of my line through Sump 2. So this short sump cut through the wall from NSD into the passage leading to the main IB 232 flow. This meant that the rockpile I had found on the day I dived through Sump 2 last year, and didn't look closely at because I thought it was not the correct direction, was the rockpile to IB 232. If I had but examined it more closely at the time. Damn. There must be a lesson here.

We continued on, along the muddy crawlways I explored last year. The higher water levels made it swimming and sliding rather than sticky, deep mud crawling, so we moved much more easily and quickly than my progress last year. A few places were short roof sniffs, with a very short duck, but we got through. We went further than I got last year and Pax reached a climb up from the stream where the water suddenly went through slots too small to fit. We decided to return the next day to survey and do the climb.

Ric was waiting back at the base at the start of the passage. We left caving suits and lights at the cave entrance and walked out to the car in an hour with light packs.

SURVEYING

The next day we left all dive kit at the end of the sump, except fins for swimming. We moved to the start of survey Sump 2 position, as a known survey station, and the start of swimming.

We surveyed down to the rockpile, up through the rockpile, and joined in to Alan's permanent station on the rockpile at the end of SOTT, left in March 2013. (Yes, we found it this time.) We then swam back to the junction with NSD passage and started the survey in the other direction.

We surveyed through low passages, in water and with a couple of roof sniffs and a duck, until we couldn't follow the water any further as it disappeared into cracks. There was a climb up here (at yesterday's turn-around point), which we surveyed up, and found ourselves in a dry chamber with access to the surface. We surveyed to the entrance and found a tag, IB-191, which we surveyed to. Another entrance joined to Exit Cave.

This was the end of the day's work. This was the end of our plans for this exercise too, and so we started packing gear for the removal once back at base. We carried all gear back to the cave entrance, in two loads each, and secured some to pick up the next day, and some to carry out then. It was raining as we walked back and the river had risen a little.

IB-14 EXIT CAVE, IDA BAY, TASMANIA

GEAR RETRIEVAL AND TIDYING UP

It had rained heavily during that night and was still pouring the next day, so we deferred the final gear retrieval for three days. When we returned we planned to look at the D'Entrecasteaux River sinks and IB-232 entrances, and survey downstream IB-191 from the entrance chamber as well. The river at Exit Cave was significantly higher, by about 1 m.

IB-232 sumped. We moved on to IB-191 and found that the upstream passage (that we had surveyed on Monday) sumped, too. Pax and I then followed the downstream cave to its terminus in a rockpile with the stream sumping into small, but not impossibly small, passage. This is probably worth a look at during low flow times to see if it is crawlable, or diveable.

FINAL RESULTS

■ Connection and survey from D'Entrecasteaux Passage in Exit Cave through to IB 232 entrance complete.

■ Connection and survey from NSD to IB 191 entrance complete.

■ Labyrinth of side passages in SOTT still not surveyed.

■ Another water connection from downstream end of IB 191 to Exit Cave suspected but not confirmed.

■ NSD accessible with airspace all the way from IB 232 sink in low water conditions.

THOUGHTS

We did not follow the dive line from NSD through Sump 3 to a rockpile, as at the time I thought it was just undercutting the wall and arriving at the rockpile that leads through to SOTT.

This was a big mistake as I now do not think it arrives at the same place as the rockpile we climbed through to SOTT because:

- The survey data from last year points to a different passage.
- The rockpile doesn't look the same (from viewing video taken last year).
- We didn't find the dive line (from last year) near the rockpile we surveyed through this year.
- There were more holes in this year's

rockpile (including the two we climbed through).

I strongly suspect that Sump 3 leads to another rockpile, or a part of the one we were at this year but not accessible from it, with other passage accessed from there. As this is what the survey data says, we have included it on the map.

Another visit in the future to check this Sump 3 terminus should be planned.

Given the very poor visibility in this water, we would not have seen any potential side passages running off underwater along the passages we swam and surveyed. Possible dive exploration along these walls may find additional passages.

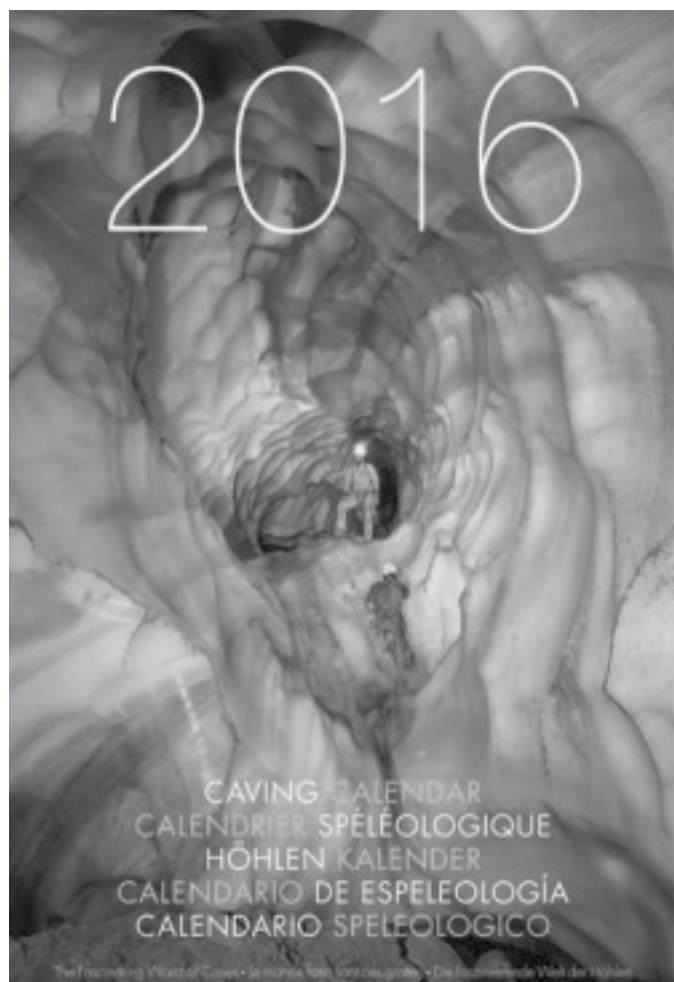
And finally, thanks to ASF for supplying the Telstra line.

If you are interested in viewing a short video of our endeavours, it is on Vimeo. Go to: <https://vimeo.com/118454518>

REFERENCE

McKinnon, J. 2014 Exit Cave, Tasmania. D'Entrecasteaux River Sumps exploration 2013. *Caves Australia* 196: 20-21

Another spectacular calendar



A NUMBER of the 2016 spectacular SpeleoProjects calendars are available without having to deal with international money transfers.

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Honeycomb Cave Entrance Stabilisation Project

Cameron Brooke

Ranger, Parks and Wildlife Service, Great Western Tiers, Mole Creek Field Centre

Deb Hunter

MCCC

Nicholas White

Chair Karst Conservation Fund Commission

THE AIMS of this project were to stabilise and make safely accessible an entrance to Honeycomb Cave.

Being the most obvious entrance, most frequented by the public, it had eroded over the years from a combination of human impact, trafficking in and out of the cave and collapse of an earth bank during an unprecedented flood event.

The works involved construction of a set of limestone steps and a combined small, integral 1 m x 1 m viewing landing, also in limestone. The steps now safely lead visitors to a viewing landing in order to view some of the cave's features.

Coupled with this, the stabilisation of the earth bank has once again restored the natural dynamic equilibrium of this seasonally inundated bank. The provision of a more managed cave entrance is expected to cut down on visitors wandering into the cave at multiple areas and causing unnecessary trafficking damage elsewhere.

The intention of the project was also to bring together a small team of individuals committed to the protection of Honeycomb Cave, and to provide an opportunity for volunteers to learn valuable new skills in drystone walling and rock step laying by a master stonemason.

The project took 135 man and woman hours across seven days. Instrumental to the project were efforts by Deb Hunter MCCC, Ken Higgins MCCC, Janice March NC, Andrew March NC and Eleanor March and Steve Shayler-Appleton, our master stonemason. The project was overseen by Cameron Brooke of PWS. Cameron and PWS would like to thank all those involved in the project and ASF for their kind funding commitment. Special mention of ASF support, funding and Wildcare and Karstcare volunteering efforts will be made on the interpretation board planned for the information shelter at Honeycomb Cave.



Honeycomb's new steps with stonemason on viewing point landing



Detail of integration of existing bank rock structure for viewpoint landing

DEB HUNTER



Material from excavating the steps' foundations backfilled around the tree's exposed roots

The completion of this project represents an important symbolic and environmental remediation step in visitor management at the Wet Cave Block Visitor Services Zone (VSZ) of the Mole Creek Karst National Park (MCKNP). The bringing together of the ASF Karst Conservation Fund, Karst-Care (volunteers from caving clubs) and the Tasmanian Parks and Wildlife Service (PWS) in management of a wild cave is significant. The works site (Honeycomb Cave) receives most of the general public and non-caving club cave traffic outside the show caves at Mole Creek.

An erosion channel developed rapidly after a visit by a large busload of people during prolonged rainy conditions in 2006. The point where they broke through ferns and scrambled down the bank eroded rapidly into a new track. Deb's efforts to block off and redirect foot traffic (and later, revegetation) failed due to constant vandalism. In January 2011, when Westmorland Cave became blocked by landslide, overland flow collapsed and removed some cubic metres of the remaining bank in the vicinity of a small eucalypt tree.

The use of locally mined limestone is chemically neutral and aesthetically compatible with the site. The expert local stonemason's work was consistent with the natural geomorphology of the bank. The lowest steps prevented degradation of toe support in the clay bank ensuring protection from erosion by seasonal inunda-

tion. Design and construction techniques throughout allowed for drainage of episodic overland flows and incorporated a drystone retaining wall for backfilling during bank reconstruction among the exposed roots of, and in the vicinity of, a small eucalypt tree. Spoil from step foundation diggings was used for backfilling, topped by local large woody debris, humus and plants for revegetation. Follow-up hand watering has been necessary because of unseasonably dry conditions.

Other works at this MCKNP VSZ have been limited to revegetation of the northern paddock adjacent to a doline complex and the erection of a nice hut with a Parks Fee box (2010). The hut is to contain static displays explaining access regulations and environmental interpretation.

Cavers have long awaited involvement in work, however the prerequisite Tasmanian Cave Access Policy was only finalised in May. Honeycomb Cave will soon be one of the high priority (high use) caves across the state to be zoned for visitor management. As I write, the PWS Karst Reserve Management Group has only just met. Coming up is cave mapping and draft zoning by a Project Team for each cave, expected to include ASF club cavers. Draft zoning will be subject to review/input by other cave user groups prior to implementation. Implementation may include in-cave route marking and signage defining boundaries between zones.

CAMERON BROOKE



CAMERON BROOKE



Before (upper) and after (lower) repair of the aluminium walkway in the lower entrance of Kubla Khan Cave

As explained above, this work was necessary due to usage but became urgent as a result of a flood event. The cost was \$1,800, which was below budget due to donated stone and material transport. It involved a number of partners to complete it.

The balance of the funds advanced to Parks Tasmania were used in replacing the walkway in the lower entrance to Kubla Khan Cave (see photos). The original walkway was damaged by trees, which had fallen into the doline during a storm event. This walkway stops random walking across the bottom of the doline, which is rich in ferns and algae.

Two objectives were achieved that represent very careful and effective use of funds provided by the ASF Karst Conservation Fund.

How to use the Leica Disto X310 for surface surveying

Bruce Welch
SUSS

IN A CAVE, where it is dark, the Disto works wonderfully. However, on the surface on a sunny day it is impossible to see the red laser dot. In these conditions, it has been necessary to rely on the old compass, clinometer (or forestry compass) and tape measurements.

By attaching a mini compact 15-55x21 adjustable monocular telescope to the Disto you can see the red laser dot at 80 + metres in daylight.

1. Use a Disto X310. It appears that the specification on the receiver is better than that of the older model Disto.
2. Purchase a non-magnetic (ie plastic) mini compact 15-55x21 adjustable monocular telescope (new on eBay for about \$30) and a flash arm bracket (new on eBay for \$3.71).
3. Use a very reflective target (see below).

Both the Disto and the monocular have a standard $\frac{1}{4}$ " camera female thread. By screwing one screw on the flash bracket into the Disto and the other into the monocular you get a very secure and easy-to-handle combination instrument (see photo). I staggered the position of the monocular and the Disto which allows you to get your eye up to the monocular and to adjust the diopter setting if necessary. While the monocular I used can zoom to 55X magnification, I found that 15X magnification is better because it allows you to see a wider area and thus more easily pick up the target.

The Disto/monocular combo can be used hand-held for distances up to about 60 metres. Over that distance it is difficult to hold the instrument steady enough to get a quick reading. To solve this problem I bought a non-magnetic (plastic and aluminium) tripod (new on eBay for about \$30). I did have to replace 2 steel screws in the head with brass screws. If you are going for high accuracy, don't forget to change the setting on the Disto to measure from the tripod mount, not the end of the Disto.

The ability to sight the Disto in the daytime also depends on having a highly reflective object to sight to. I tried various



Disto/Monocular combo (connectors above the ball have since been reduced to approximately 10mm)

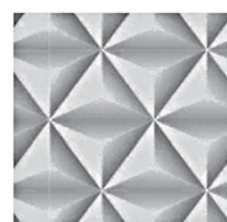
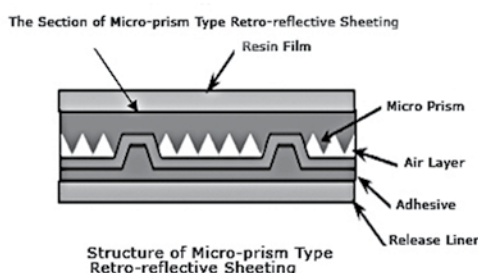
reflective products but found that the only one that really worked well was micro-prism retro-reflective Class 1X material, which is used for roadside traffic warning signs. The use of this type of material also means that the surface does not have to be at 90° to the laser to give a highly visible laser dot.

This retro-reflective target can be hand-held, although to maintain high accuracy it should be mounted either on a stadia pole or a tripod. I managed to pick up a 5m telescopic aluminium stadia on eBay for \$1 and attached a strip of 1X reflector to

the top with markings which aligned with the height graduations on the stadia. These markings can be seen easily at 80+ metres with the monocular.

The software update to the Modified Disto X310 not only gives you the distance, bearing and elevation of each measurement, but it also gives you the corrected distance and height for each leg which makes in-cave (field) sketching of the legs much more accurate.

Readers can contact me for more technical detail: Bruce Welch (02 9569 9928) Email: bruce@bookproduction.org



Microcrystalline Cube of Micro-prism Type Retro-reflective Sheetting

Unusual Caves of Australia

The 'Big Hole' – Postscript #3

Ken Grimes
VSA

THIS has proved to be an interesting series of pieces of information about some unusual caves. This third postscript from Ken Grimes adds further information about these unusual features.

Further to Norm Poulter's articles in *Caves Australia* 196 (p17-18) concerning the 'Big Hole' on the Tablelands Highway, NT, and the postscripts in CA 197 (p.6) and CA 198 (p.22). Dorothy Robinson's note and Lloyd's photo refer to a quite different hole in an area called the Sturt (NB not Stuart!) Plateau, on the Buchanan Highway running west from Dunmarra which is on the Stuart Highway (it's a short cut to Bullita Cave).

Like Norm's Big Hole, his is also a laterite karst sinkhole. The Buchanan High-

way sinkhole is one of a group of holes in the Sturt Plateau area. There have been two scientific papers discussing these sinkholes (McFarlane & Twidale, 1987 and Twidale, 1987 - see details below).

The Sturt Plateau situation is complicated as there is limestone buried beneath the laterite, so the sinks could be subadjacent limestone karst, but the authors think they originated by solution within the laterite (see discussions of laterite Karst in Grimes & Spate, 2008, and White, 2014).

The Grimes and Spate (2008) article in the ACKMA Journal (referenced below) shows a photo (Fig 4) of a bigger sinkhole 800m NE of Lloyd's photo and 300m N of the highway.

That photo and an aerial photo of the

highway sinkhole (taken shortly after it collapsed in the 1982 wet season) also appear in our poster on Laterite Karst (Grimes and Spate, 2009/2011, at the Chillagoe Conference—see below for a DropBox link). You can also see the two sinkholes on Google Earth (the highway one is actually a pair of adjacent sinks). There are others in the area also, but harder to spot.

Both my Laterite Karst papers (and other karst 'grey-literature' publications) are now online at my Research Gate page, https://www.researchgate.net/profile/Ken_Grimes, but you have to sign up (as a private researcher if you are not at a University) before you can download them.

I have given below an alternative link to the poster at Dropbox.

ANNOTATED REFERENCES:

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Grimes, K.G. & Spate, A.P., 2009/2011: Laterite Karst. Poster at 7th International Conference on Geomorphology (AN-ZIAG) 2009, and also at the 28th ASF conference, Chillagoe, 2011.

Online at: <https://www.dropbox.com/s/4d67t9vn8hb0jph/Grimes.2011.LateriteKarstPoster.v23s.pdf>

McFarlane, M.J. and Twidale, C.R., 1987: Karstic features associated with tropical weathering profiles. *Zeitschrift fur Geomorphology(NF)*, Suppl-Bd. 64. pp.73-95. Discusses solutional and related mechanical features (including the collapse dolines on Sturt Plateau) in lateritised material in northern Australia.

Twidale, C.R., 1987: Sinkholes (dolines) in lateritised sediments, western Sturt Plateau, Northern Territory, Australia. *Geomorphology*. Vol 1. pp.33-52.

Another version of the McFarlane & Twidale paper. The paper also mentions Castle Hill, south of Renner Springs on the Stuart Highway (a Laterite mesa with numerous solution pipes and residual pinnacles)

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A mother bat in a sea of pups

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