

A Brief History of South Australian Cave Diving

Peter Horne



(Photo courtesy R&D Keller/ANT Photo Library)

Abstract

It has only been during the past 50 years or so that the waterfilled sections of our caves have begun to surrender some of their secrets. Before the advent of reliable and affordable underwater breathing and lighting equipment, cave explorers were naturally blocked when they encountered subterranean pools and lakes, and the cold and mysterious realm beneath the water's surface was only briefly visited by a handful of brave and adventurous souls who used innovative and often extremely dangerous techniques to push just that little bit further.

With the opening-up of underwater exploration for recreational purposes after World War II (mainly thanks to the development of the Aqua-Lung by Jacques-Yves Cousteau and Emile Gagnan), cavers and divers were quick to realize that they now had a means by which they could finally visit the vast and mysterious "silent world" of the waterfilled caves, a realm which was just crying out to be explored. It was here, at the unique interface between the atmosphere and the subaquatic realm, that the activity known as "cave diving" came into its own.

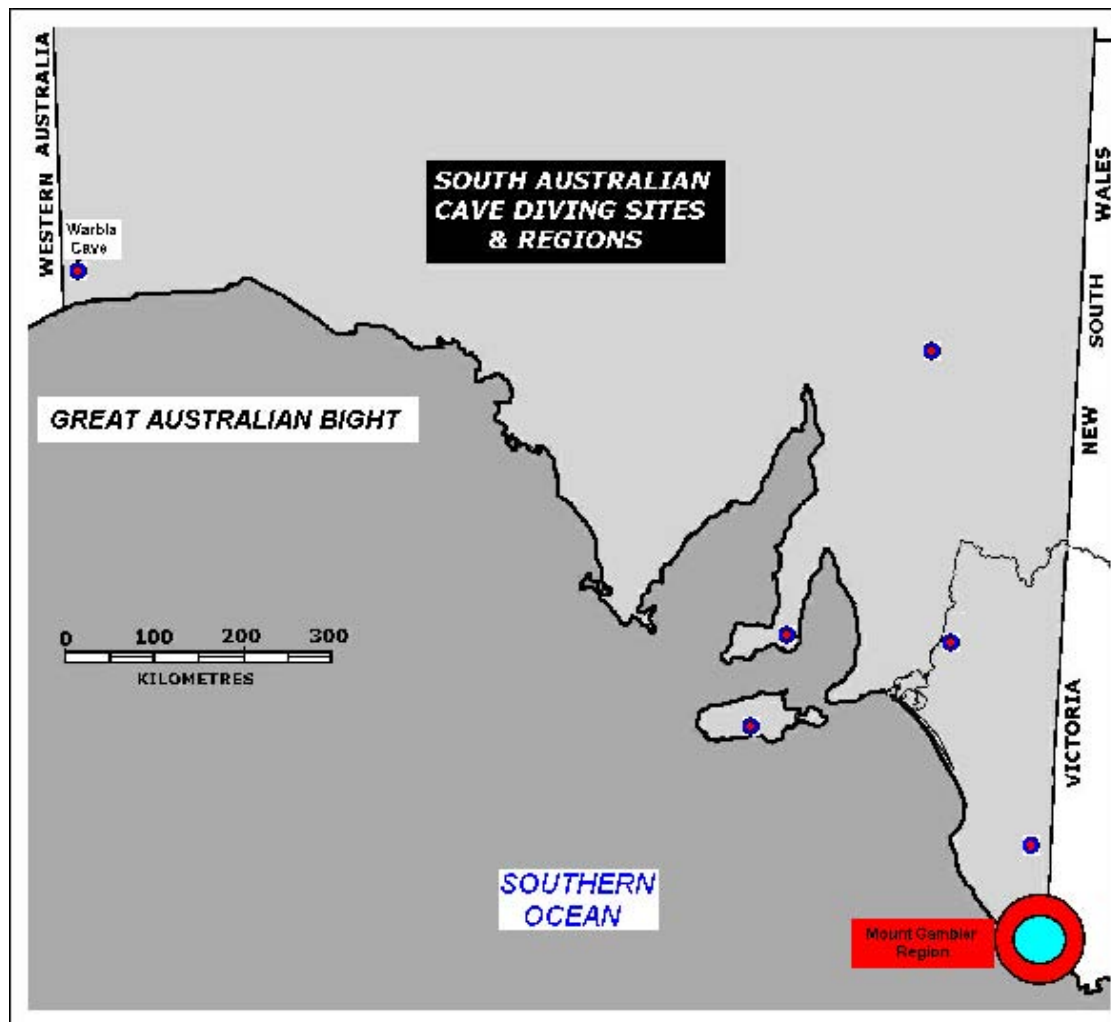
This paper is intended to serve as a basic record of many of those early explorations and discoveries by Australian cave divers, and includes information about other related aspects as well.

The First Explorations

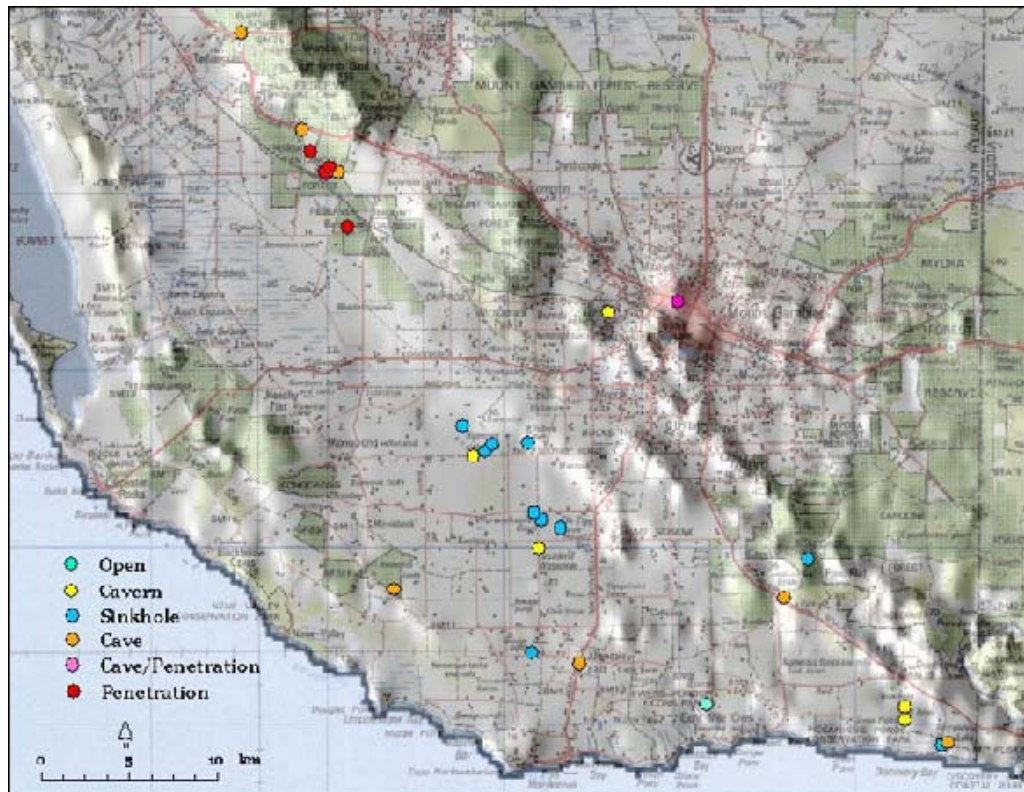
The world's first known cave dive took place in France in March 1878, some 74 years before Australian cave diving commenced, when Nello Ottonelli dived in the Fontaine de Vaucluse (The Fountain of Vaucluse) to a depth of some 23 metres. No doubt other undocumented paddles were

undertaken after that first effort, and in 1922 Norbert Casteret undertook the first successful traverse of two sumped passages in the Grotte de Montespan. In 1936 Graham Balcombe performed the first known British cave dive in Swildons Cave, and ten years after that, Jacques-Yves Cousteau was lucky to survive after he and his dive buddy Frederic Dumas became entangled in their surface-supplied 'safety rope' at a depth of 60 metres whilst under the influence of nitrogen narcosis in the Fountain of Vaucluse.

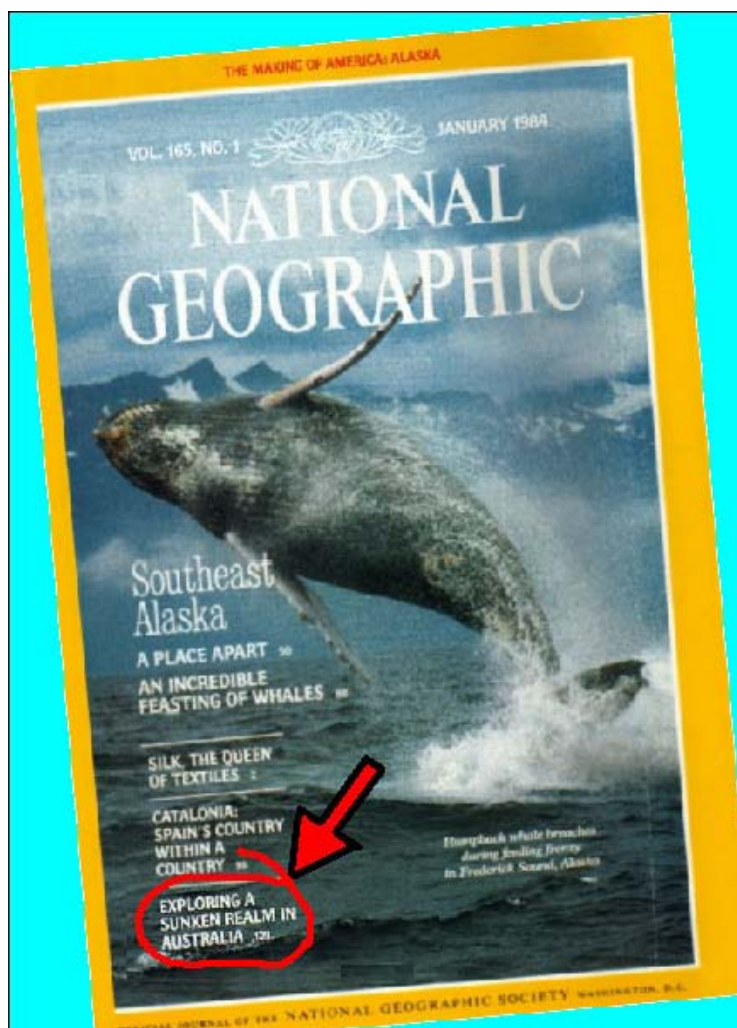
Unfortunately, early records about Australia's first cave dives are very scarce, but the first Australian cave dives known to the author reportedly took place in 1952 at the Imperial Sumps of Jenolan Caves in New South Wales, when Ben Nurse and Denis Burke undertook a series of well-publicized dives using airpumps and hoses. This groundbreaking work coincided with the first known cave dive in the United States the same year, when an unnamed Floridian diver explored a cave called Jugg Hole. Some six years later in early 1958, Bill and Bob Kunert and Jim Palmer performed a pioneering dive at Buchan in Victoria between Royal and Federal caves (often dry but a sump on this occasion), and in May that year John Driscoll and Peter Matthews also continued exploration in Sub-Aqua Cave using oxygen rebreathers and very primitive and bulky rubber dry-suits. In June 1959, John and Peter turned their attention to Dalley's Sinkhole, around the same time that a small number of divers first began to visit Mount Gambier's better-known, more readily-accessible sinkholes.



While South Australia covers a rather large area, more than 99 percent of cave diving activities occur in the extreme south-eastern corner of the state, in the dozens of 'wet' caves and sinkholes which are to be found in the Tertiary limestone of the region.



The general distribution of the major caves and sinkholes showing how many major features follow ancient sand dunes and joints in a NW-SE trend, roughly paralleling the modern-day coastline (graphics courtesy Heike Apps).



The region has long been known internationally for its cave diving sites, as this National Geographic magazine from January 1984 indicates.

Detailed records about Mount Gambier's early diving explorations are especially scarce for this period, but thanks to the memories of a number of earlier divers and cavers, and especially the records of the Cave Exploration Group South Australia (CEGSA) Inc., it is at least known that many pioneering sinkhole dives had been undertaken by the end of the 1950s, including some of the first dives in Kilsbys Hole, Little Blue Lake and Ten-Eighty Sinkhole by Adelaide divers including Peter Girdler and Barry Fowler.

With the realization in the late 1950s/early '60s that Mount Gambier's sinkholes were a divers' paradise came a steady influx of visitors from all around the country, and a number of local divers, in particular Lawrence Arthur "Snow" Raggatt and Philip "Mick" Potter, became almost legendary figures as they discovered and explored one site after another during those early days. Mick and Snow also probably spent more time than anyone else searching for and exploring new sites, even going so far as to fly over the area to spot sinkholes and caves from the air, and they were among the first people to develop local cave diving techniques and to manufacture and import a range of international diving gear.

Compared with the vast range and quality of gear available today, the equipment that these early cave divers needed to obtain, build or modify was quite extraordinary; for example Doug and Sandy Haig bought some ex-Navy Porpoise scuba cylinders in 1959 or thereabouts, and like many other divers they shipped large containers of compressed air to Mount Gambier from C.I.G. (Commonwealth Industrial Gases) in Adelaide so they could decant them without needing a compressor. Snowy's first tank was a 32 cubic-foot steel Porpoise, and he then got twin 28 cubic-foot steel tanks from T.D. Preece (Sydney) with a Sea Hornet regulator. These cylinders consisted of old ex-Army "buffer" cylinders which were originally used to cushion the recoil from big guns! No harness was available for the tanks – the cylinders were simply wired together and supported by a strap worn around the waist, so that the bottles floated up behind him.



Snow Raggatt as a spearo, late 1950s/early 1960s (courtesy Steve Raggatt)

During a lengthy tape-recorded interview by Peter Stace in 1982 as well as during subsequent discussions with the author in the 1980s, Snow explained that he first became interested in diving by watching Italian frogmen during World War II. He later experimented with an old Army gas-mask in the River Murray near Tailem Bend, which at first his younger brother wore while Snow manually blew

air down the tube; this of course wasn't very successful, and they later used a number of small air compressors which eventually saw them reaching a depth of about 6 metres! Snow met his future wife, Jean, in New Zealand during a visit to that fair country, and along with all the other members of Snow's family, Jean was to become an avid scuba diver in the early 1960s. Snow later became a long-haul truck driver in Mount Gambier for Kain & Shelton Transport.

Like many divers of that era (including the author, unfortunately!), Snow began his in-water hobby as a keen spearfisherman, but he was put off of that activity when he saw the incredible wastage of fish after some spearfishing competitions on Kangaroo Island where excess (and unfortunately dead) fish were simply dumped into the sea. Snow's first logged scuba dive took place on May 17, 1962, when he explored Mount Gambier's then crystal-clear Valley Lake to a depth of about 90 feet (i.e. 27 metres); however, he also felt that he might have done some earlier diving which had not been recorded.



Snow Raggatt performing what he believed was probably his first dive, at Port MacDonnell around 1959 (photo courtesy Snow, Jean and Steve Raggatt, 2005; digitally cleaned-up by the author, 2006).

Snow's first sinkhole dive took place on 18 November 1962, in Ten-Eighty Sinkhole on Barnoolut Estate (the sinkhole was then also called Simpson's Hole) which was followed soon afterwards by a dive in The Bullock Hole, and within the next year or so Snow dived in many of the area's sinkholes with members of his family (including Paul and Judy, who even at the age of around 12, dived to 36 metres with Snow) as well as Mick Potter. They were also involved in the building of the jetty at Piccaninnie Ponds with the Mount Gambier Spearfishing and Skindiving Club a couple of years later.

As diving in the sinkholes became more popular once Piccaninnie Ponds became more widely known, Snow established a dive shop in Mount Gambier which he ran with Jean, and sometimes there would be up to 200 people visiting them over a long weekend as well as heaps of sleeping bodies all over the floor in their home! To cater for the vast lack of knowledge or understanding of the risks of sinkhole diving, Snow, along with Mick and the club, ran the first training courses in Ewens Ponds, and there is no doubt that it was largely through their safety-consciousness and innovativeness that risks were minimized as much as possible in that era.



Snow wearing twin scuba cylinders in Ewens Ponds, early 1960s (courtesy Mick Potter and Snow, Jean & Steve Raggatt, 2004).



Jean and Snow Raggatt representing their shop and club at a display, circa 1964 (courtesy Steve, Jean and Snow Raggatt, 2004; digitally cleaned-up by the author, 2006).

Mick Potter got his twin Porpoise cylinders in 1961 and also used the decanting technique to refill them. He dived on moored boats to clear fouled propellers and also dived in the Glenelg River; his regulator was a single-hosed Porpoise Sportsman and he had to stick his tongue into the mouthpiece to stop it from free-flowing. And like many other divers, Mick also at first used a very uncomfortable dry suit called a Dunlop Aquafort which caused painful blood-blistering at depth because it had no inflation system to compensate for the crushing effects of the surrounding water pressure. After enduring this for some months, Mick bought a new Sea Bee wetsuit (very possibly the first in the

country), and later gear was to include a 72 cubic-foot steel bottle, two twin-hose Heinke Merlin regulators of “exceptional quality for the day”, and twin 50 cubic-foot aluminium cylinders which were especially made up for him (pers. comm. Mick Potter, 2004).



Mick Potter with his dry-suit and at the jetty at Piccaninnie Ponds. The wetsuit was the first US Divers suit (made in France) and the Rolleiflex camera (worth \$6,000 at that time!) was in a Hanns Hass housing imported from Norway in late 1963 or early 1964. The weights and weightbelt were made at a club meeting, and the twin aluminium cylinders were evidently the first 3000psi aluminium units used in Australia by civilians, having been imported from France by the Australian Navy (courtesy Snow, Jean & Steve Raggatt, and Mick Potter, 2004; digitally cleaned-up by the author, 2006).

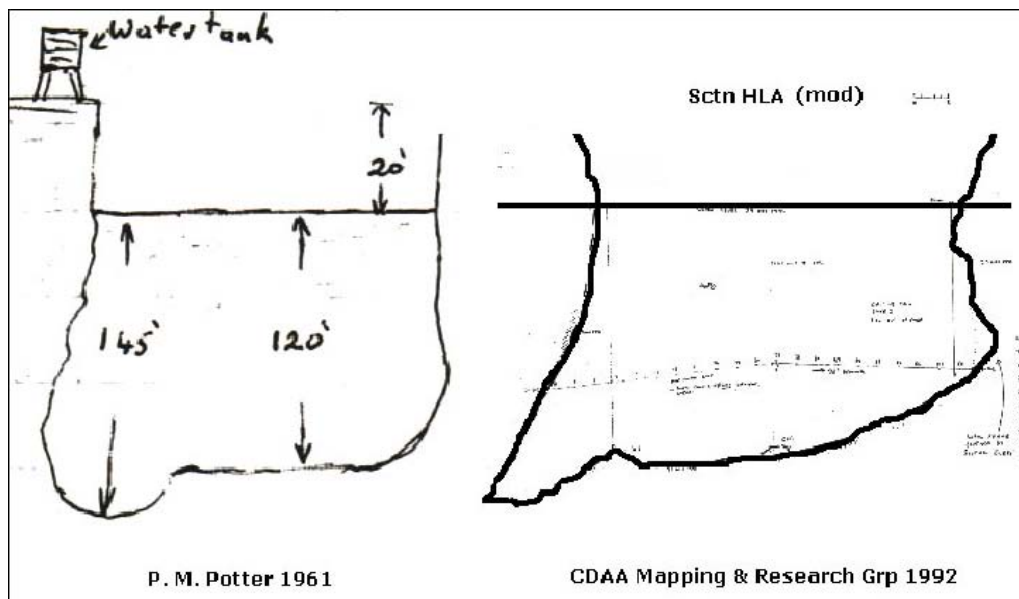
Mick was also one of the very few early divers with the foresight to keep a log of his dives and to also make sketches of some of the places he visited, and back in the mid-1980s he graciously provided a copy of this document to Peter Stace and the author for historical storage. The first deep dive he recorded took place on 13 December 1961 with Dave Burchell in Little Blue Lake; Mick was grossly overweighted and crash-dived to about 10 metres before he luckily managed to halt his descent. He surfaced and made buoyancy corrections before descending again, this time to 36 metres. Then on 23 February 1962, in the company of local pro diver Bob Pulford, Mick explored a small pond called Donovan's, and he then decided to advertise for the formation of the Mount Gambier Spearfishing and Skindiving Club which came into being on 14 March 1962. The following month during Easter, an Adelaide-based CEGSA group explored several caves in the region and formally classified the sinkholes then called Devil's Punchbowl and The Sisters (Devil's Punchbowl is now The Black Hole). They also had some unnamed divers with them who explored three sinkholes – One Tree (a.k.a. Wurwurkooloo), Ela Elap and Kilsby's. These were the first (known) recorded dives in these features.



Comparative shots of Mount Gambier's famous Blue Lake (left) and Little Blue Lake in the late 1990s (by the author and Alex Wyschnja respectively).



Water level comparisons in Little Blue Lake – around 1961/62 (courtesy Graham Went, 1982) and in early 2007 (by the author).



The first known underwater map of a sinkhole, incidentally also of the Little Blue Lake by Mick Potter, based on his first dive; nearly 40 years later and after many dozens of more careful mapping dives, the 'formal' CDAA survey by the author and many others looks disturbingly similar (was it worth the effort and expense?!)

Much of Mick's home-made or modified equipment was of quite a high standard as far as durability was concerned: small torches were made from kitchen sink and petrol pipe fittings and copper pipe, and most used 5 x 1.5 volt batteries. Even back then they had large 12-volt spotlights which were powered by surface-supplied car batteries to explore such places as the Cathedral in Piccaninnie Ponds. Weightbelts were often modified ex-Army belts, the buckles being of a two-ring design with another loop for "quick-release", and the heavy lead weights were home-made, with the molten lead being poured into round tins which had a bar of stainless steel stuck through so that the weights could be slid onto the belts and pinned into place. Eventually Mick and other local club members made their own quick-release wire buckles, and the club often got together to make gear such as camera housings and torches (one of Mick's first camera cases in fact consisted of an old pump-type fire extinguisher which had the ends cut off, a glass port installed and push-bike handlebars attached for handgrips!). Other types of gear included depth gauges which were probably only accurate to within around 10-20%, and Mick also did all of his own valve modifications and servicing.



Dave Burchell established Adelaide's first major dive shop, Adelaide Skin Diving Centre, in Compton Street in the early 1960s, and this is where the ASDC stayed until it finally ceased trading in the late 1990s. Perhaps the shop's most celebrated feature was its unique 22-foot-deep training tank, which Dave manufactured from a scrap metal tube he found in Port Adelaide (pers. comm. Dave Burchell, 2005). Who knows how many people were inspired (like the author) to take up scuba diving after staring in fascination at the divers who were blowing bubbles and waving to them underwater, just beyond the green glass of those windows? The inset photo above shows Dave being assisted from the ocean after performing the State's first "Para-Scuba" jump at Port Noarlunga, where he parachuted into the ocean and then descended to a mini-submarine which brought him to shore! Despite losing his right leg in a train accident during his youth (and not from a shark attack!), Dave lived his life to the full and achieved many remarkable goals (photos courtesy Dave and Ona Burchell, 2004).



ASDC's much-loved bright yellow training tank; divers practicing buddy-breathing techniques can be seen through the front window. The right shot was taken from inside the tank looking out the very same window by the author as he was testing his brand new Praktica camera housing one bright sunny day in 1975 – the fellow in the centre is Paul Lunn, who took over the shop from Dave Burchell, and he was accompanied at that time by Phil Booth (right) and a happy fellow wearing an Underwater Explorers Club T-shirt.



“Spearos” of the early 1960s, with spearguns and drysuits – note the reel on the gun (courtesy Bob Cunningham, 2005).

Over the border in Victoria during Christmas in 1960, John Driscoll discovered a significant amount of new cave using a hookah in Scrubby Creek Cave, and several Western Australian Speleological Group (WASG) divers also undertook the first preliminary assessment of the underwater regions of Weebubbie and Cocklebiddy caves on the Nullarbor Plains sometime around 1961-1963, although the silty conditions they encountered ironically prompted the report that Cocklebiddy apparently “didn’t go”!

Back in the Mount Gambier region, divers from the Sub Aqua Speleological Society of Victoria (SASSV) including Ron Addison, Lorraine Newman, Ed Steet, Peter Robertson, Les Grant, John Noonan, Bill Kunert and Elery Hamilton-Smith explored a number of the larger sinkholes including

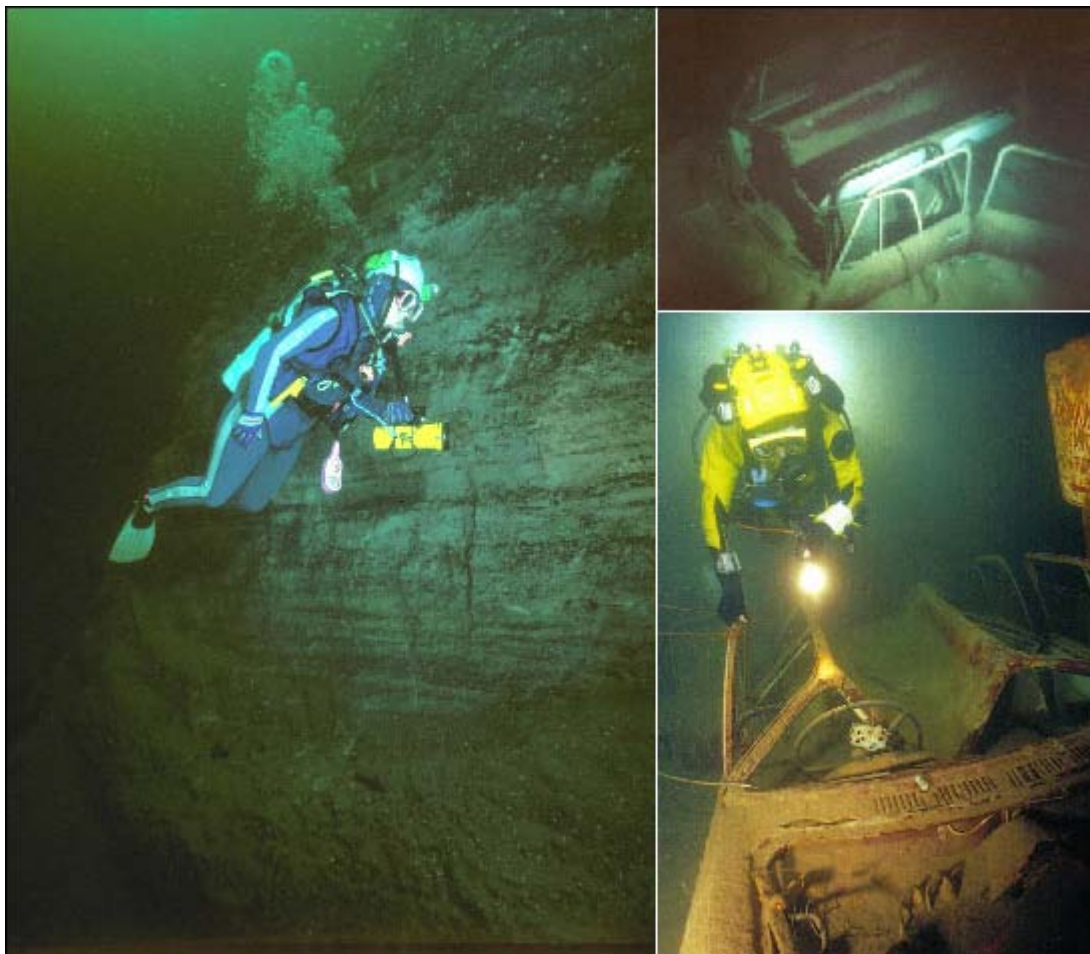
Piccaninnie Ponds which was first dived around 1961 (pers. comm. Ron Addison 2006), although it had long been known about and fished for its eels by the landowner, Max Holloway, who kept a small boat in the ponds long before it was dived.



Pioneering Mount Gambier divers Ron Addison and Dave Warnes, early 1960s (courtesy Ron and Dave in 2006 and 2004 respectively).



Preparing for an early dive in Little Blue Lake, early 1960s – note the redundant dual-tank system and the upside-down configuration which allowed for easy access to the tank valves (courtesy Ron Addison, 2006).



Some general views beneath the surface of Little Blue Lake, 1981-2005
(courtesy Mark Nielsen and Neil Vincent).



Aerial view of the First and Second ponds at Ewens Ponds, mid-1960s
(courtesy Valerie Taylor, mid-1980s).



The landing at Ewens Ponds as it first appeared to the author in 1976 (left), and as the same area looked in the early 1960s (photos by the author and Mick Potter).



One of the more popular sinkhole dives of the region, One Tree Sinkhole, with its One Tree! The first known dives here took place in April 1962 (courtesy Alex Wyschnja, 2005).



A view of the lake surface at One Tree (courtesy Alex Wyschnja).

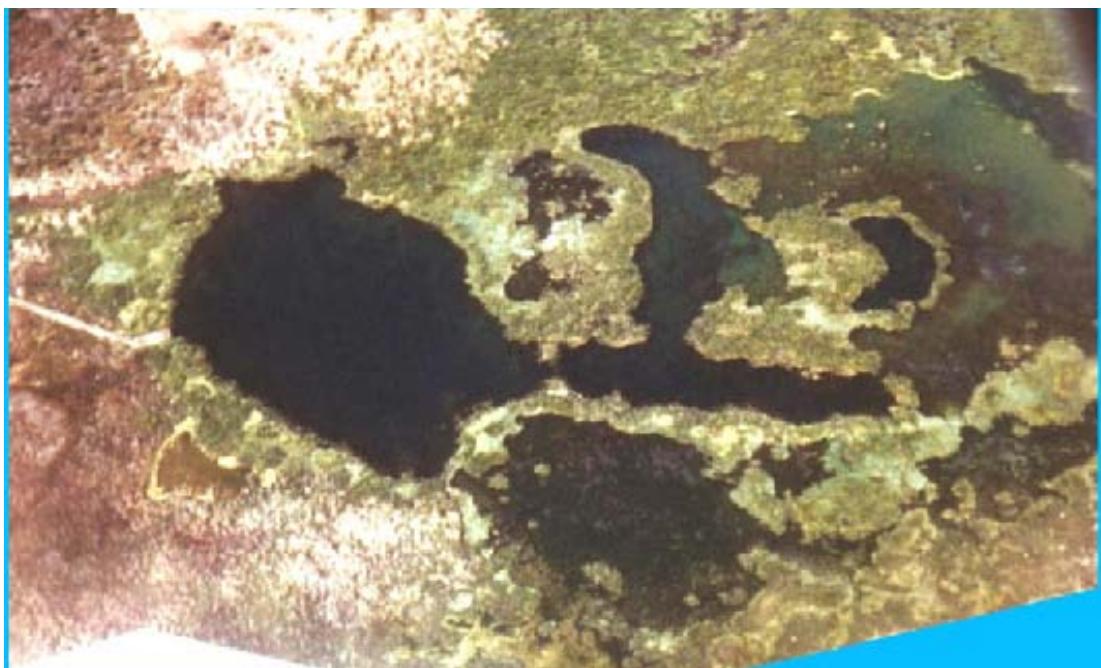


Ela Elap sinkhole, 1980s (courtesy Phil Argy, 1990s).

In mid-1962, hearing of Mick's involvement with diving, some duck-shooters and eel fishermen told him (more as a word of caution than their actual interest in the feature itself) about this waterfilled "bottomless chasm" near the Victorian border which allegedly swallowed a floating tree-trunk and even an entire fence! Mick and Snow located the area from the air, and in the winter of 1962, accompanied by about nine snorkellers from the club, Mick explored Piccaninnie's Chasm with scuba for the first time.



Aerial view of the Piccaninnie Ponds swamps as they appeared in the early 1960s (courtesy Steve, Jean and Snow Raggatt, 2006).



Piccaninnie Ponds from the air, mid-1960s (courtesy Valerie Taylor, 1980s).



Comparative views of divers' access to Piccaninnie Ponds: Mark Nielsen (with the Puddles Kambrook Reel) in 1980 (above), and Ron Addison's mob around 1960 (below) – photos by the author and Ron Addison. We have never had it so good!

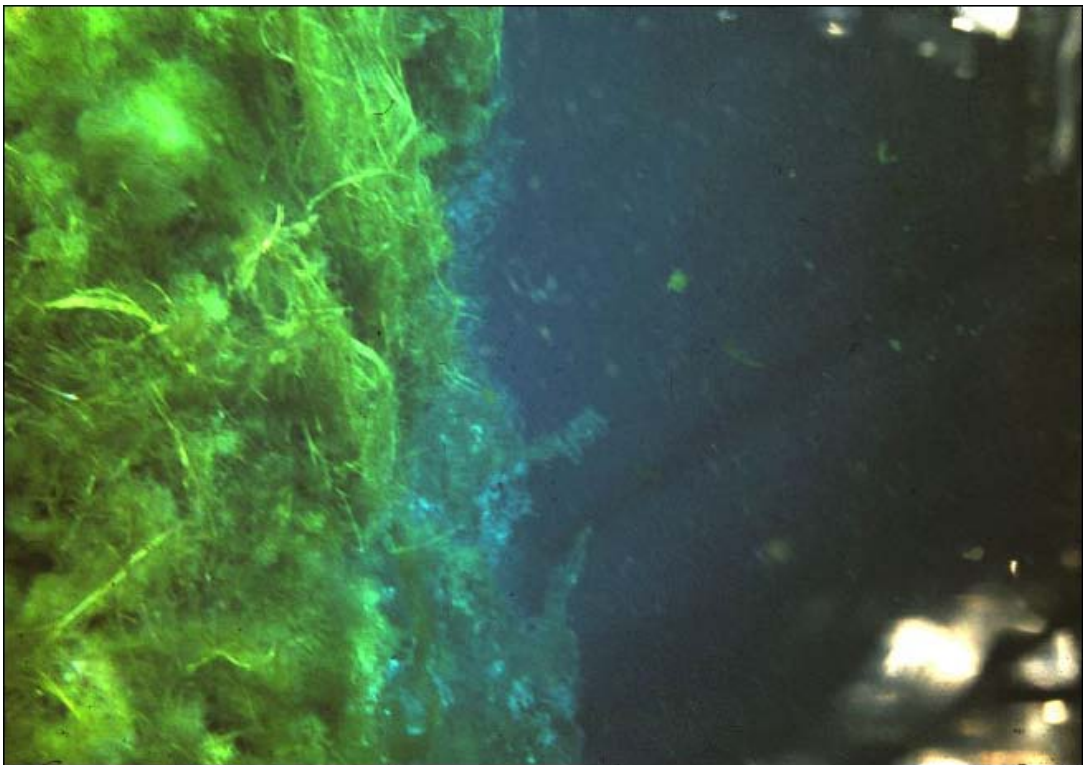


Mick Potter performed a number of other deep dives in Piccaninnie Ponds without incident until 27 January 1964, when he and Brian Rodger were almost killed when they lost contact with their vertical safety rope whilst ascending through near zero-visibility water at a depth of 235 feet in a confined area of the Dog Leg tunnel. As a result of this experience Mick developed a guideline reel which consisted of an open coil of line wrapped around an old cable drum with a stick poked through it. This allowed him to feed out and tie off line as required, thus avoiding the problems of line-traps and snagging around corners which were frequently caused by surface-fed ropes. Similar guideline

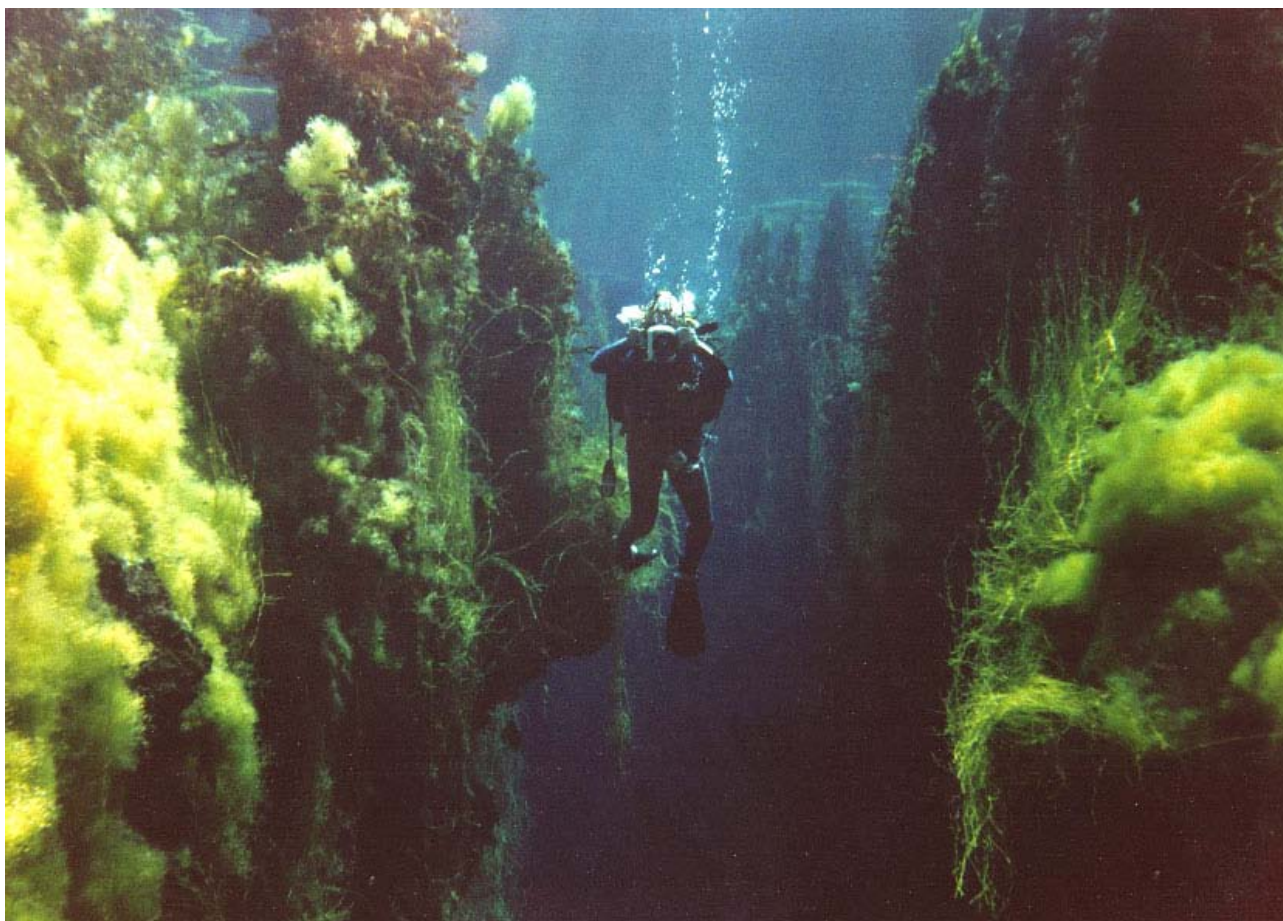
systems were also developed independently overseas, and this innovation of a manageable and continuous line to the surface proved to be one of the most important safety techniques ever developed for cave diving.



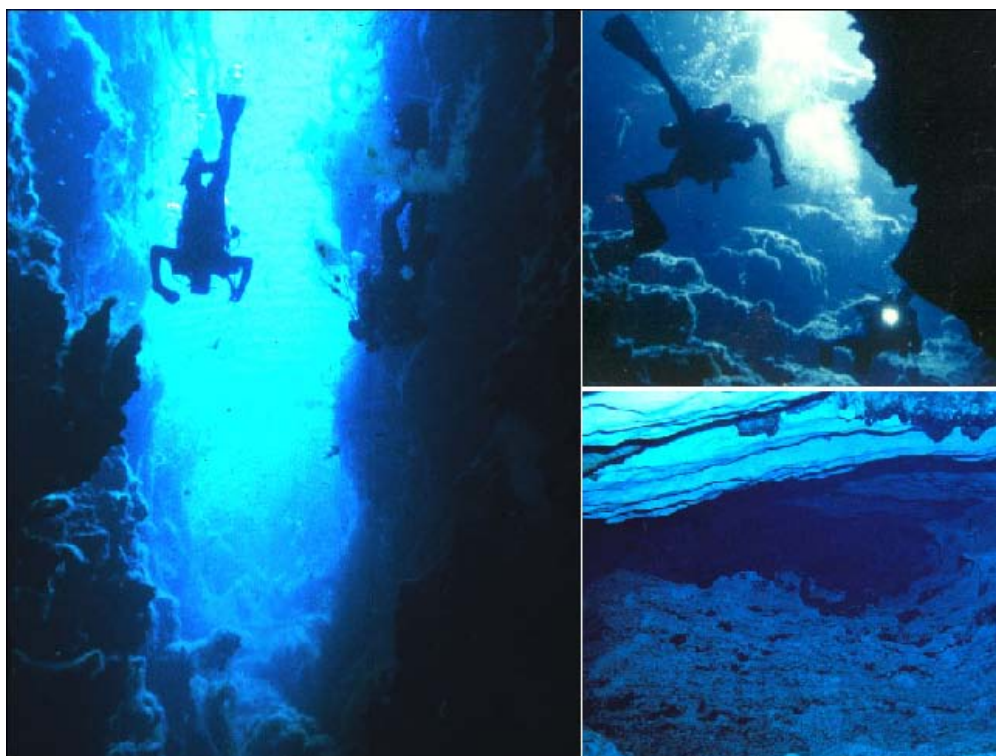
Swimming through the Reed Curtain separating the First Pond from the awesome Chasm (photo by the author).



The spectacular “bottomless” Chasm a diver first sees after swimming through the Reed Curtain – even seasoned spearfishermen have been known to take a few extra breaths here to ensure they don’t plummet out of sight! The limestone Teeth jutting out from the wall are at a depth of about 16 metres (photo by the author, 1977).



The author shooting some video in the very picturesque Chasm (courtesy David Kellett, mid-1990s).



Some general views in the Chasm, and (bottom right) looking down The Dog Leg (photos by the author and Andrew Cox, mid-1980s).



Mick Potter with his twin-hose regulator and the “safety rope” which nearly caused his demise in the early 1960s (courtesy Mick Potter, 1980s).



Three other popular sinkholes – The Sisters, Ten-Eighty and The Black Hole (photos by the author and Andrew Cox, 1980s).



Another spectacular Barnoolut Estate sinkhole – The Bullock Hole (photos by the author, mid-1980s).



Mick first used this reel system just a few months after his Piccaninnie Ponds experience in a true waterfilled cave passage in Engelbrechts Cave, in the heart of the City of Mount Gambier itself. On 4 April 1964, in the company of Dave Burchell, John Lees and Ross Curnow, he dragged his scuba gear down the glass-and-rubble slope in the then rubbish-filled sinkhole to the eastern-side lake to investigate, as he wrote in his logbook, "... a new maze of caves for the City Council. (The) Council flood-lit the cave for us – big publicity. Bottom of cave is 80 feet below ground level, water depth 17 feet, entered cave on right hand side of water, followed tunnel, turned left (and) entered underwater cave. Followed tunnel, came to T-shaped bend, turned to left, followed along tunnel for about 20 feet then turned back (and) followed line out in pitch blackness. Used drum on safety line for first time". From this dive Mick drew up a representative sketch-map of the cave; years later it was realized by other cave divers that had his team merely gone to the ceiling and checked out some of the gaps between the boulders at their furthest penetration they would probably have discovered the large air chamber there as well. It also seems especially ironic that as a result of those early explorations, the newspapers felt that there was no tourism potential in what is today one of Mount Gambier's most important tourist drawcards!

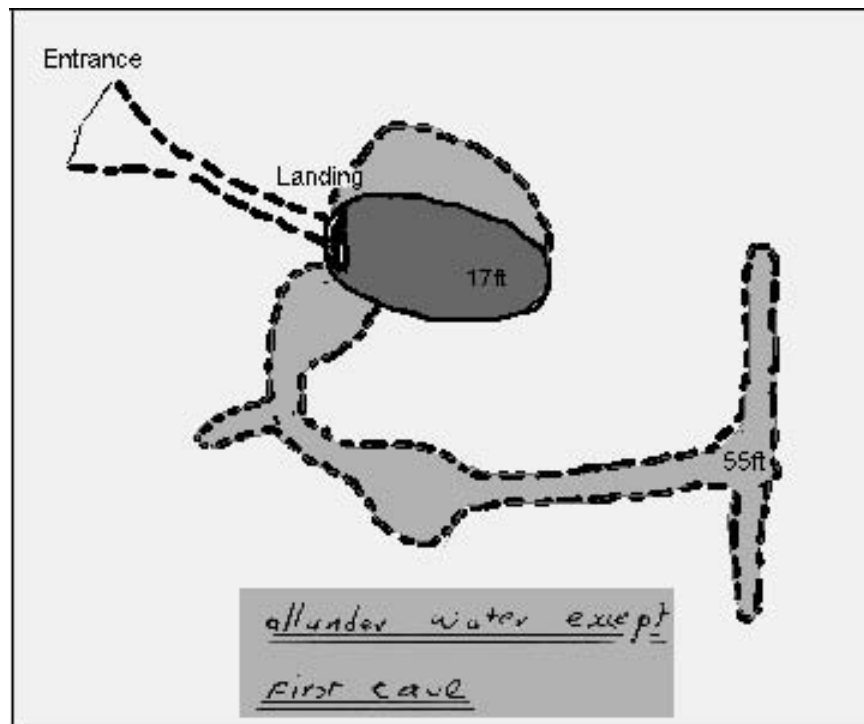
The Border Watch, Tuesday, April 7, 1964—7



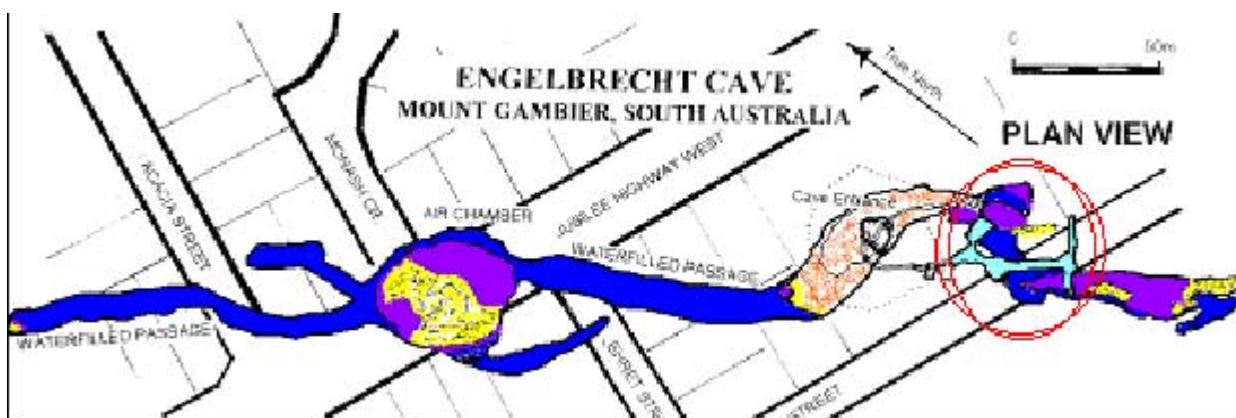
**TOURIST POTENTIAL
NOT IN THIS CAVE**

ENGELBRECHT CAVE does not appear to have any potential for development as a tourist attraction, although its underwater features impressed four divers who explored it on Saturday.

The four divers, who explored Engelbrecht Cave on Saturday, have a "breather" in the main chamber of the cave. They are Ross Curnow (left), David Burchell, John Lees, and Mick Potter. On the ledge above the water with his back to the camera is Craig Roeger, son of the Town Clerk (Mr. D. H. M. Roeger) who assisted in the exploration. (Picture by Ray Fowler).



Tracing from Mick Potter's sketch of the Eastern Side of Engelbrechts Cave as it appeared in his personal logbook.



The relationship between Mick Potter's sketch and the cave as it is currently known, with his drawing circled in red.

Mick Potter and Snow Raggatt performed dozens of initial underwater explorations together and had many exciting adventures during those early days, including the time in July 1963 that a club member (who would no doubt be somewhat embarrassed if his name was published here) decided to 'visit' Snow and his friends while they were diving in the awesome Hells Hole on a cold and rainy day. Arriving at the top of the 30-metre high overhang, Martin (whoops!) put on his wetsuit and weightbelt and decided to climb down the greasy, slippery knotted rope by hand, without any kind of safety rope.

About one second after he swung onto the rope, Martin no doubt fleetingly experienced a sense of freedom followed by sheer terror during his brief free-fall to the lake below, just missing Snowy by less than two metres before burying himself in the mud at the bottom some 5 metres below the surface. Fortunately he wasn't too stunned to get back to the surface, where he, like the others, was pulled out of the hole on the same greasy rope with a lot of difficulty!



Hells Hole (courtesy Mark Nielsen, circa 1980).



Rubber boat in Hells Hole, circa 1960s (courtesy Ron Addison).

The locals explored many other features between 1963 and 1964, one dive of which involved a preliminary exploration by Bob Pulford in Bungalow Bay Cave in July 1964 (CEGSA Records). The popularity of the pastime also quickly escalated when Piccaninnie Ponds started to be made known to the general diving fraternity, and around 1965 many new divers were becoming involved. Snowy, Mick and the club managed to keep 'Pics' quiet for about 3 years until a group from Adelaide started to talk about what they had been shown in confidence, and it was mainly because of this that Mick and the club then started to teach people how to safely dive, taking them into Ewens Ponds before letting them know where the better (read "deeper"!) dive sites were located.

During this time there were fortunately no fatalities although there were a number of close calls including some decompression injuries and one instance when Jean Raggatt found an unconscious diver (actually the same unfortunate individual who fell into Hells Hole) hovering at a depth of about 10 metres in The Chasm at Piccaninnie Ponds after he passed out from hyperventilation (luckily Jean was able to get him to the surface and back to dry land where he was successfully resuscitated). Another scary incident was the time that a scuba cylinder plummeted some 25 metres down the entrance tube of McKays Shaft, striking Snow's sister a glancing blow on her hip. The first fatal accident occurred in April 1969, shortly after Mick broke away from the club and Snowy had sold the only compressor in the Mount (details of this and later accidents are covered later in this presentation).



McKay's Shaft (courtesy Mark Nielsen, 1980s).

Elery Hamilton-Smith also recently recounted the story of a four year old girl who was a very competent and capable swimmer for her age, being taken by her father to Piccaninnie Ponds in those early days, whereupon she was fitted with a small hand-made facemask and then taken on scuba into the Dog Leg to a depth of 180 feet! Surfacing safely later, she excitedly took off her mask and exclaimed "Wow! That was the best swim EVER!". Now THOSE were the days of REAL adventure! (pers. comm. Elery Hamilton-Smith during the ASF Conference, Jan.2007). Several years later, probably in 1964 (although no records have been located to date), local diver Jock Huxtable performed what is thought to have been the first (solo) dive to about 20 metres depth in The Shaft at Allendale East.



Entrance to The Shaft (during the 1984 CDAA mapping project), and Valerie and Ron Taylor climbing in sometime around 1965 (courtesy Valerie Taylor, 1980s).

While Mount Gambier was becoming known as the “Mecca” of South Australian cave diving, other work occasionally took place elsewhere in the State. One such widely-publicised project involved the first underwater exploration of Narrina Lake Cave during the Easter break of 1967, when a combined CEGSA/South Australian Museum group of researchers and surveyors comprising Peter Robertson, Doug Seton and Alan Waldron explored this shallow, very muddy cave (pers. comm. Grant Gartrell and Peter Robertson, 2005). The divers were linked to a rope fed out from the surface, and they used karabiners to slip along the line. They checked a lead along a 1-1.5m high passage for several minutes before the rope became hard to pull through; Peter explained that when he looked back, he found they had lost almost all visibility due to mud being stirred up, so they decided to abort the dive. However when they signalled for the rope to be held tight by the surface party so they could pull themselves out, the signal was not understood and each pull only resulted in more rope being fed out! The rope also went across to the side of the passage to an area where it was too narrow to pass through, and it was only through the cool-headed efforts of the lead diver, who very gently eased the rope out of the inaccessible flattener and pulled in all the slack (thus allowing the other divers to have a tight rope to follow back to the surface) that the State’s first cave diving accident was not a triple-fatality in the Flinders Ranges.

Although such cave explorations were rare occurrences during those early days, there were still those even then who wanted to utilize their underwater skills to benefit mankind in a more general way. Not a lot is known about scientific cave diving of that era but Graham McKenzie and Brian Brawley were certainly among the first South Australian cave divers to put their skills to use in this manner. Graham was in fact the first person to recognise the potential value of the fossil beds in “The Green Waterhole Cave” (Fossil Cave as it is known today); he passed a small quantity of collected bones to Fred W. Aslin who subsequently coordinated further dives involving Graham and Brian during the next five or six years with Dr Brian Daily of the S.A. Museum, with the January 1968 collection including six sets of skulls and jaws of the extinct marsupial *Sthenurus* sp. Brian also undertook additional bone-collecting dives between 1968 and 1974, and as a result most of the more obvious and important material was collected and preserved.

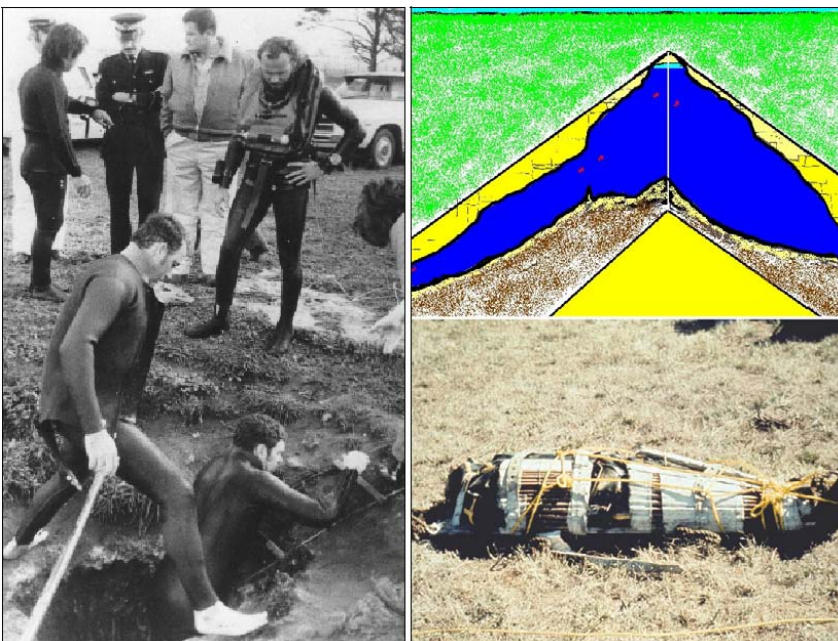
Between 1965 and 1968 the large number of extremely inexperienced and untrained people visiting the deep and silt-prone features of the Mount Gambier area without knowledge about such dangers as nitrogen narcosis, decompression sickness, buoyancy changes caused by compression, hypothermia, or even the simplest of safety lines made many more experienced people believe that it was only a matter of time before someone’s luck ran out. The chances of an accident occurring were also increasing as people tended to discard the use of twin, small cylinders in favour of larger-volume,

single tanks; contents gauges were few and far between (and basically mainly of the “needle-gauge” variety); and buoyancy vests, when used at all, were basically modified inflatable life jackets of the “horse-collar variety” (divers often removed their weightbelts at depth as their wetsuits compressed and they became less buoyant – it wasn’t until the mid-1970s that anything approaching a true “buoyancy-compensator device” with a scuba-fed inflator system first came onto the Australian market).

Many divers also tended to rely on their old faithful ‘J-valve reserve’ mechanisms too much, the same way they did when they were catching crays in the open ocean. Consequently, in April 1969, these fears proved to be well-founded, when two novice divers drowned together at a depth of approximately 60 metres in Kilsbys Hole. The sinkhole was subsequently closed to divers and later taken over by the Defence Department for secret development tests, and after all the hoo-ha had died down a few months later, sinkhole diving activities in the region returned more or less to normal ... but unfortunately, the next two accident-free years were really just “the quiet before the storm”.

In January 1970, the focus on Australia’s cave diving areas swung away to the hot, waterless Nullarbor Desert to the State’s west, when caver Ian Lewis first snorkelled in Weebubbie Cave with an underwater torch, thereupon discovering a massive sump which sparked his desire to take up diving (so that he could return and explore it properly) and commencing a decade of record-breaking discoveries under the Nullarbor. Two years later in 1972, Ian led the first “Nullarbor Cave Diving Expedition” which included such folk as Dave and Tamsin Warnes, Ron Doughton (from Sydney, with his wife and a compressor) and Mike Turner. Phil Prust and Bob Turnbull explored Weebubbie Cave underwater for the first time and Phil also discovered the first 150 metres or so of the enormous underwater passage in Cocklebiddy Cave during this trip.

Back in the Mount Gambier area, the period 1970-1974 was an especially bad time for the cave diving community (not to mention the families and property managers who were also directly involved), when eight divers perished in a number of closely-spaced accidents over just a 16-month period. The first case, in January 1972, involved a young man who ran out of air after following a friend into a low, silty passage with very little air in his cylinder and without a guideline to follow out of the silted-out cave; nine months later in October, a group of three perished together in Alleyn’s Cave after similarly swimming into an enclosed side-cavern through an extremely low and silty duck-under without a safety line; and finally just seven months later in May 1973, a group of four Sydney-based divers died in The Shaft (reportedly the worst civilian multiple-fatality in the world at that time) as a result of diving far deeper than their experience and equipment safely allowed – again, without a continuous guideline to the surface. This last case was by far the most dramatic in the media’s eyes, especially since it took more than seven months before the victims’ bodies could be located and retrieved by members of Adelaide’s Police Underwater Recovery Squad.



The Shaft, 1973 (courtesy Sgt. Marty Harnath, S.A. Police, 1979).



Ponds out of bounds

Picconinny Ponds, east of Port MacDonnell, in the South-East, have been declared out of bounds to swimmers, campers and divers by the director of the SA National Parks Commission (Mr. R. G. Lyons).

Mr. Lyons said last night the area would remain out of bounds until

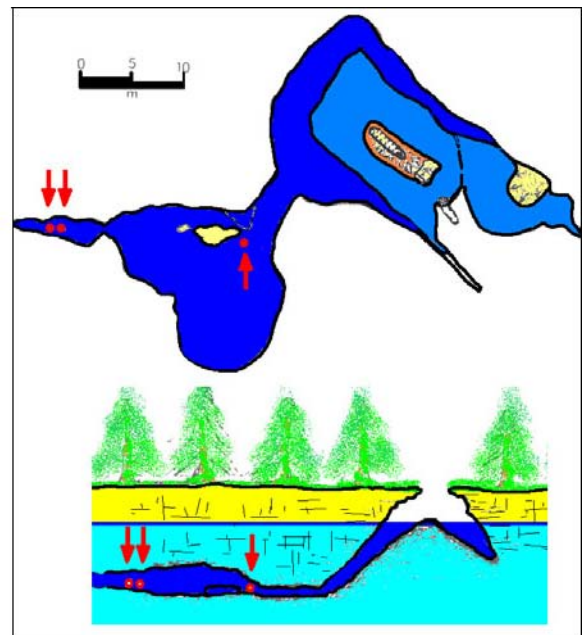
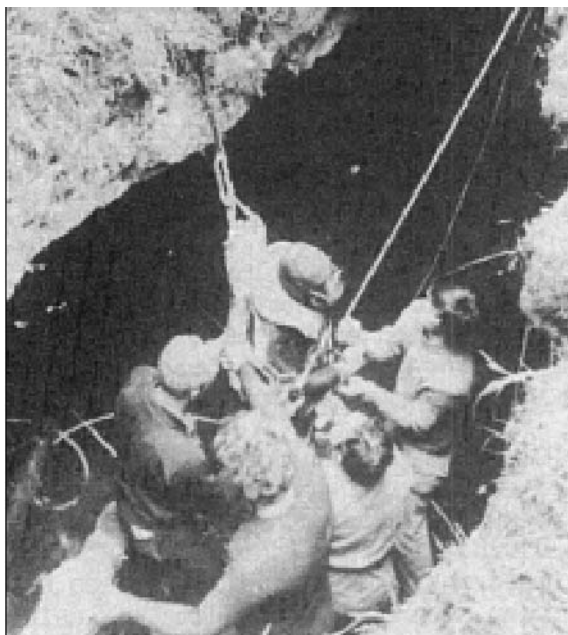
Egon Kelly, 25, of Hampton, Melbourne, had been scuba diving in one of the ponds with a friend when he got into difficulties and was unable to return to the surface.

His body was recovered on Saturday evening by local scuba divers.

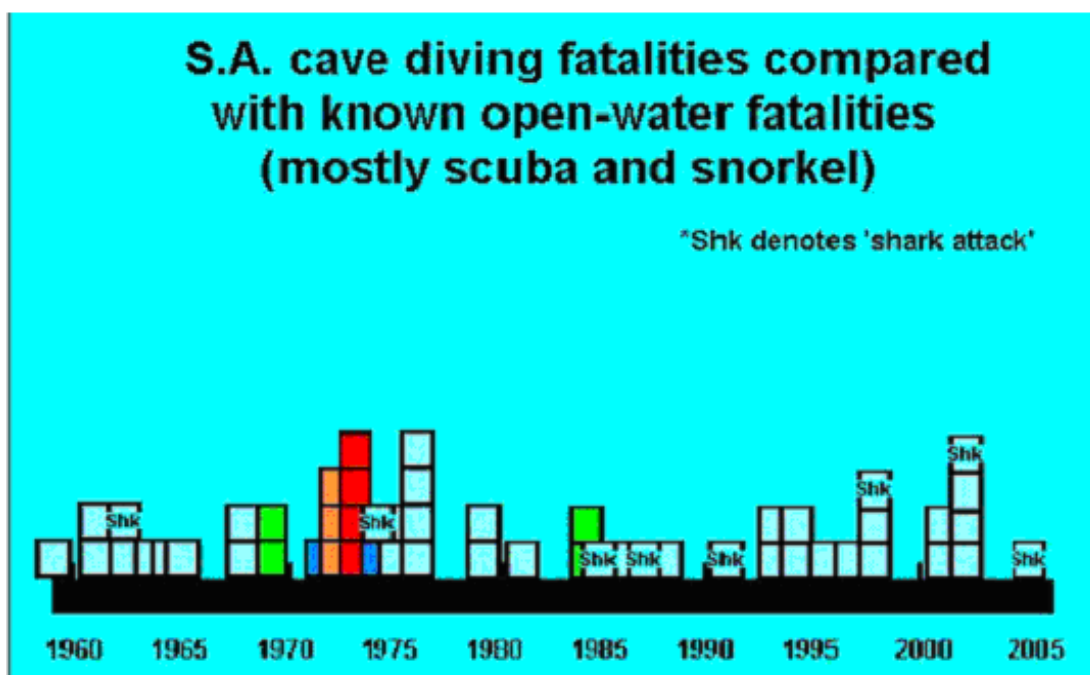
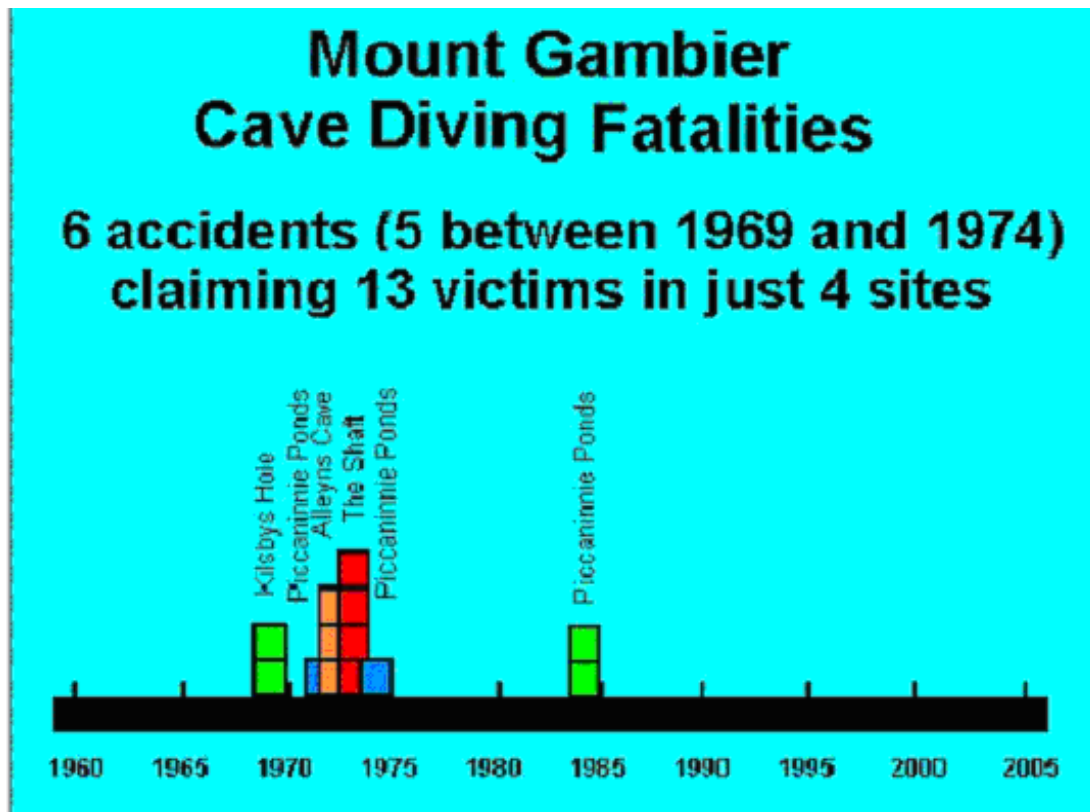
Mr. Lyons said he had instructed the park ranger in the area to erect a notice at the entrance to the ponds declaring the area out of bounds.

He wanted to talk to scuba divers and other bodies connected with water safety, to try to find some way to allow people to enjoy the ponds safely.

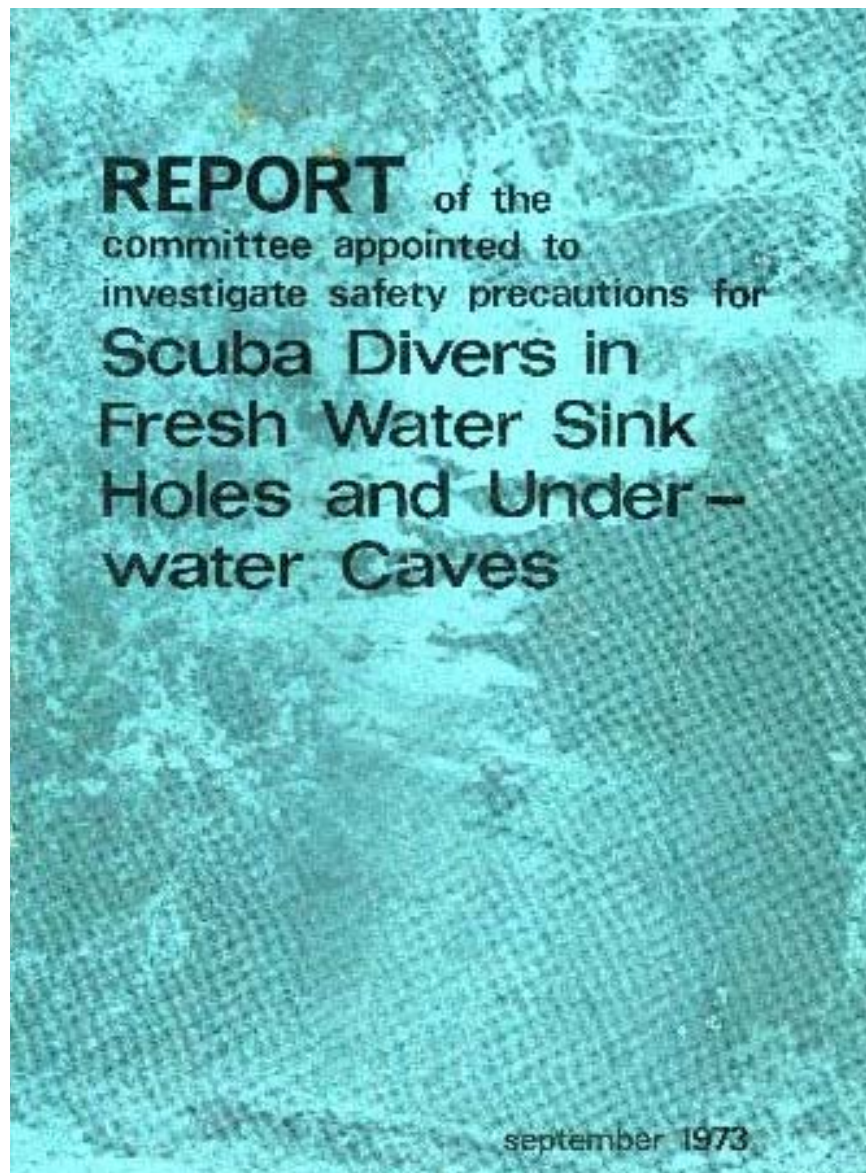
He said he understood Mr. Kelly had little experience in the use of scuba gear, and that he had only a few minutes' training.



Alleyn's ("Death") Cave (courtesy The News, 1979).



The public and political response to this accident was considerable and drawn-out; understandable, perhaps, in view of the fact that it wasn't until some 11 months had passed before the last victim's body was removed from the cave. Because of the public outcry surrounding these accidents and calls from certain quarters for the total banning of all cave diving activities, the Government decided to form "The Committee Appointed To Investigate Safety Precautions for Scuba Divers In Fresh Water Sink Holes and Underwater Caves" which (fortunately for the cave diving community) was very well-represented by divers in the form of Dave Burchell, Peter Christopher (President of the Underwater Explorers Club of S.A.) and Bob Pulford (diving representative for the Mount Gambier Spearfishing and Skindiving Club). The Committee also comprised the Chairman (and Deputy Commissioner of Police), Mr L.D. Draper, the Chief Ranger of Department of Environment and Conservation (Mr G.C. Cornwall) and the Secretary of the Department of Marine and Harbors (Mr R.J. Wight).



Public opinion was sought and considered by this Committee and the fact that some members of the cave diving community (notably members of FAUI, the Federation of Australian Underwater Instructors) were prepared to try self-regulation was favourably considered; in fact on page 16 of the Committee's report they noted that "...While at Mt. Gambier in the course of its enquiry informal discussions were held with people both resident at and visiting Mt. Gambier and who had a common interest in diving in sink-holes and underwater caves. The obvious concern of these people was that action would be taken to close off holes and caves or in some way destroy them ...suggestion (was) made that a united body would, apart from other benefits, give opportunity for standardization of education and qualifications. Interested persons called a meeting at that time and the Cave Divers Association of Australia was formed, with an interim Committee. That Committee called a meeting of the proposed Association in September, 1973 ..."



They also stated in the report that “ ... As a Committee we are optimistic that the activity of the Cave Divers Association with Australia-wide interests coordinated, would go far towards solving many of the problems associated with sink-hole and underwater cave diving ... we are of the opinion that while a chance exists for achievement of greater underwater cave diving safety by the employment of virtually voluntary remedies, legislative control of the sport should be deferred”. The Committee also went so far as to recommend that “... the cave known as either “S86” or the “Death Cave” situated in Pine Forest F 5.1 (Block 7) Hundred of Hindmarsh be sealed in a manner that preserves its physical condition but prevents access, e.g. an iron grille”. Such awareness of the value of cave conservation was largely the result of representations by many prominent members of the caving community and this recommendation was very commendable, considering the public feelings about the drownings.

The first Committee of the Cave Divers Association of Australia was comprised of Eddie Gertners (President), Alan Day (Vice-President), Frank McGuire (Secretary), Laurie Kristoff (Treasurer) and Committee members David Warnes, Neil Tindal, Roger Townley and Russel Pope, but unfortunately there was widespread resentment within the general diving community when divers realised that they would need to fit into the self-appointed CDAA's ideas of what constituted a good, safe cave diver rather than being members of an already-established dive club, etc. Consequently some divers unfortunately used the cave environment itself to express their feelings about the situation!



A “message” for the newly-formed CDAA at around 10 metres in Allendale Sinkhole!

Even as the CDAA was getting its act into gear during 1973 and 1974, cave diving activities continued to blossom elsewhere around the country. Ron Allum and Al Grundy performed a number of dives in such places as Jenolan, Bungonia, Wyanbene and Cliefden in New South Wales, and Ron (and later, Ian Lewis) investigated some sumps in Yarrangobilly. Also around this time Ian explored 50 metres of virgin underwater passage in a cave near the Glenelg River using a hand-held scuba cylinder, as well as Town Cave at Curramulka on the Yorke Peninsula with Phil Prust assisting from the surface.

In the mid-1970s a series of complex dives was also commenced under the Nullarbor by a number of groups from southern and western Australia. In January 1974, Ian Lewis led the “Second Nullarbor Cave Diving Expedition”, and he and Keith Dekkers, assisted by about 30 other cavers from around Australia, dived every known wet cave except Moonera Tank during that trip. They were the first into Koonalda, Winbirra, Pannikin Plain, Nurina, Mullamullang, Murra-El-Elevyn and Tommy Graham's caves (discovering the first air chamber in Tommy's, with Keith almost reaching the second air chamber), and they eventually totalled some 1.3km of virgin underwater passage all up.

Then in mid-1974 or thereabouts, Phil Prust, Peter Chesson, Denis Whatt and others explored Tommy's again and found the second air chamber, and also discovered about 350m of new passage

in Weebubbie Cave. Around May that year Ian dived S102 and the Henschke Quarry caves near Naracoorte, and also around this time he checked out Coobowie Corner Cave on the Yorke Peninsula with Terry Reardon (which the author dived and mapped some 10 years later in August 1985, being unaware of this earlier exploration). They also dived Lake Hamilton Homestead Cave near Sheringa on the southern Eyre Peninsula.

Tasmania entered the cave diving picture sometime around 1974 as well, when Bill Kinnear and others reportedly discovered 400 metres of submerged passage in Kubla Khan Cave without reaching the end. Back in Mount Gambier, yet another drowning in Piccaninnie Ponds in December 1974 created renewed community concern which was fortunately quickly quelled when it was realised that the victim was not diving within the CDAA's (or National Parks') safety guidelines. This was the last fatality for 10 years until April 1984, when two young men died in Piccaninnie Ponds in what was to be the final accident of the 20th Century.



Headline from the December 1974 Piccaninnie Ponds tragedy

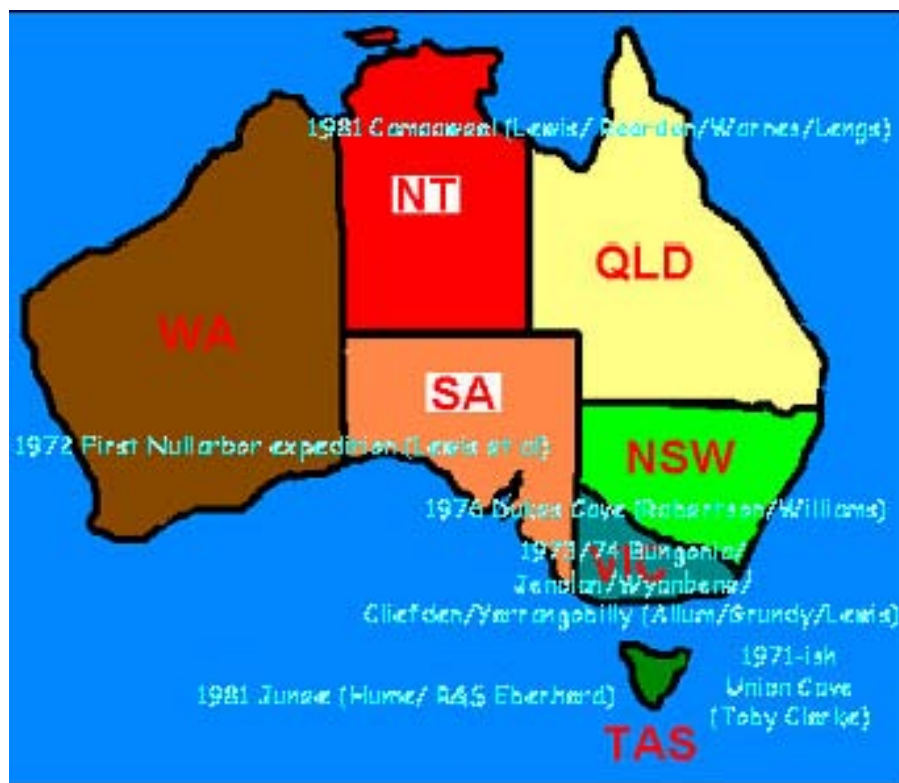


These photos of the 1984 double-fatality, whilst unpleasant to view, are nevertheless an important training aid for cave divers to better understand the need to properly manage guidelines during their dives, demonstrating why it is so essential to minimize or remove all potential snagging and entanglement points (courtesy S.A. Police, 1984).

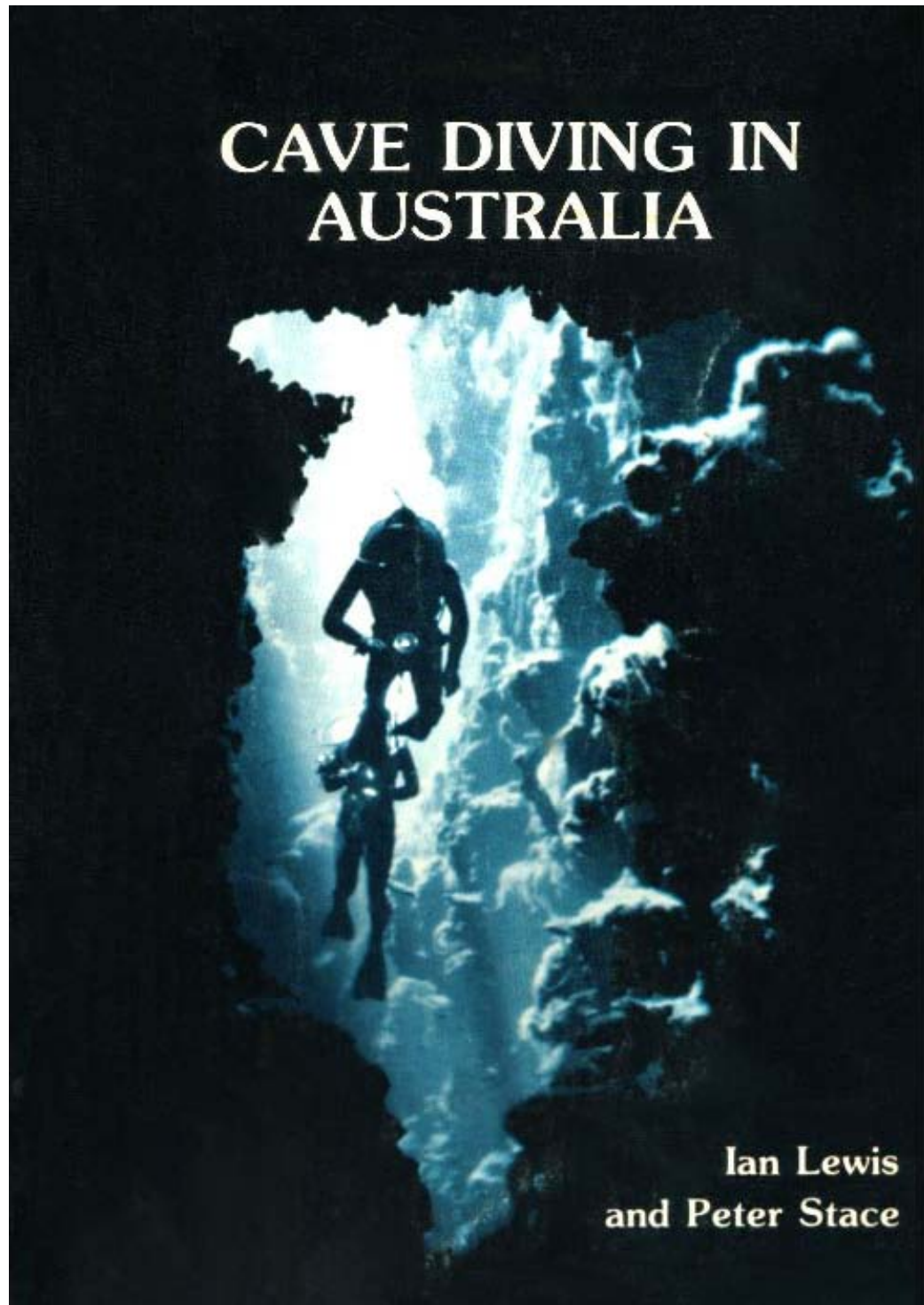
In 1975 Ian Lewis published his comprehensive "South Australian Cave Reference Book" (Occasional Paper Number 5 for CEGSA) detailing all of the caves known in South Australia at that time, and during the period 1975-1979 numerous Nullarbor discoveries dominated the Australian cave diving scene.

In August 1975, Hugh Morrison, Simon Jones and Keith Dekkers made a world-record push to the 550-metre mark in Cocklebidy Cave and also pushed Tommy's to the final rockpile which they explored until the top portion collapsed, and in May the following year Hugh and Dick Beilby, as members of a large combined South Australia/Western Australian team, discovered Cocklebidy's First Rockpile air chamber at the one-kilometre point, and also went about 100m on from the far side. Phil Prust, Dave Warnes and others also explored Murra-El-Elevyn around this time and found the first air chamber in that cave (pers. comm. Phil Prust, 1980s), and also some time in 1976 Peter Robertson and Lou Williams penetrated Dukes Cave in Victoria for a short distance before they were stopped by a restriction.

In early to mid-April 1977, Phil Prust, Peter Stace, Ron Allum and Al and Jo Grundy et al found another 350m in Cocklebidy (totalling 1,520 kilometres) and they also further explored and surveyed Tommy Graham's, Weebubbie and Murra-El-Elevyn caves using RDF equipment which was reportedly designed by Ron Allum. Later in 1977, Hugh Morrison, Simon Jones and Steve Sinclair undertook a 7-hour multi-cylinder dive to around 2100 metres in Cocklebidy, and as Hugh explained to the author in a letter in March 1992, it was during this dive that he "...first used a sledge which Simon made from PVC tubing".



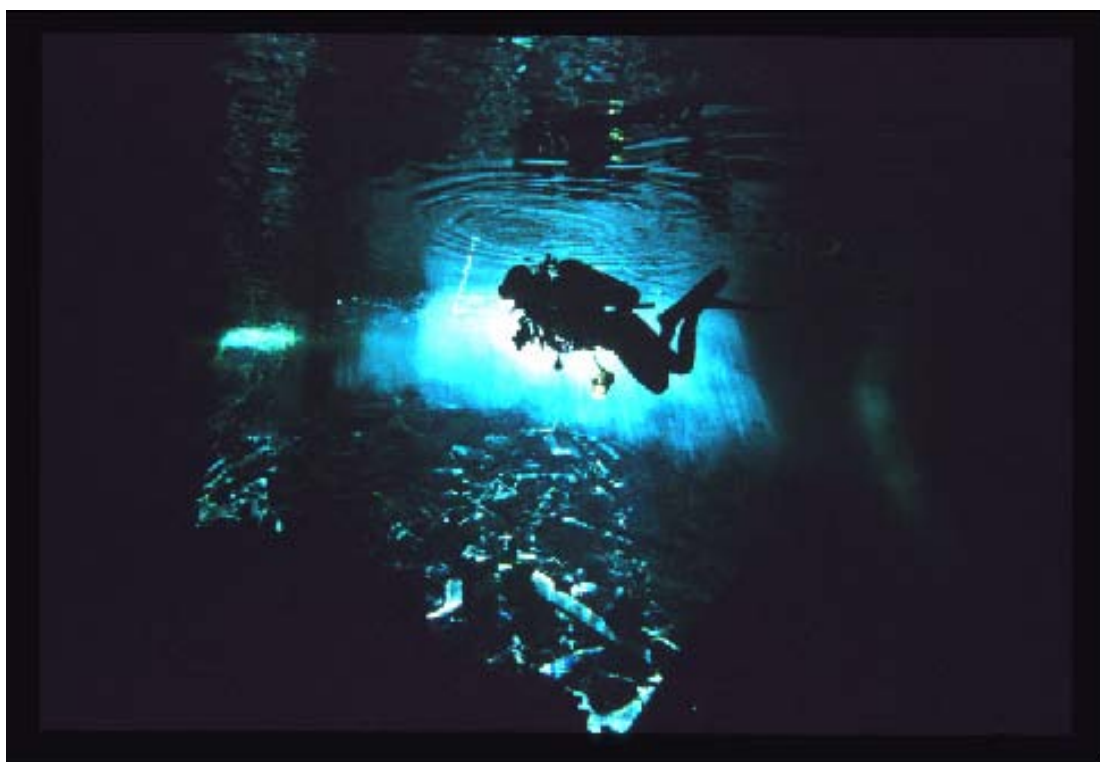
In early 1978 South Australian cave divers Peter Stace, Phil Prust and Ron Allum continued from earlier Tasmanian explorers and discovered more than 1.4 kilometres of arduous, dirty and very cold (4-6°C) passage in a number of different cave systems, especially in Kubla Khan, where a major breakthrough occurred. Also that year, Ron and Phil returned to Cocklebidy and added yet another 300m or so to this enormous cave. In addition, Peter Stace and Ian Lewis checked out a number of "new" sinkholes in the Mount Gambier area including Woolwash Cave, Rubbish Cave, Horse and Cart Sinkhole and Tea Tree Sinkhole, for potential dive sites for CDAA-qualified divers, and Ian and Peter spent much of their dive-time undertaking and drawing-up the first reasonably accurate surveys of the known popular sinkholes and caves of the region for their ground-breaking book, "Cave Diving In Australia", which they published in 1980.



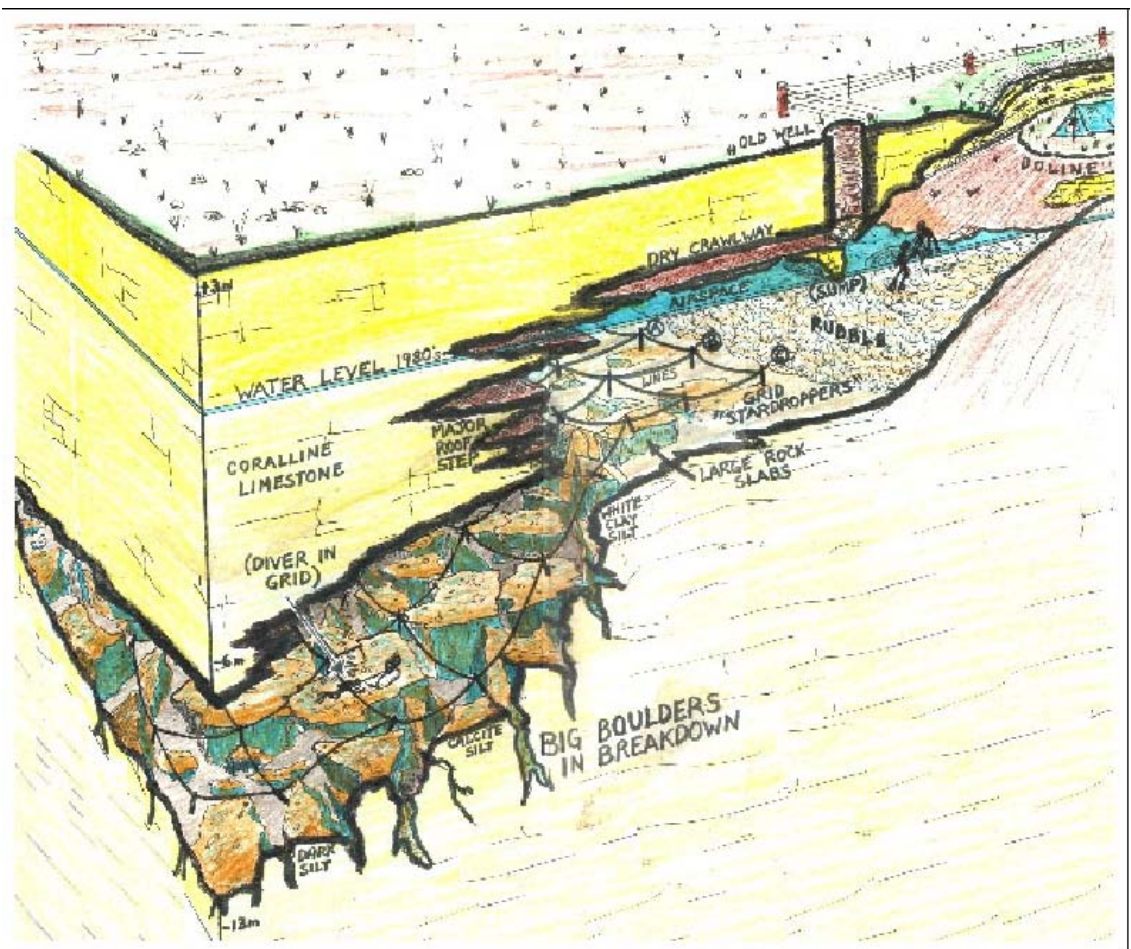
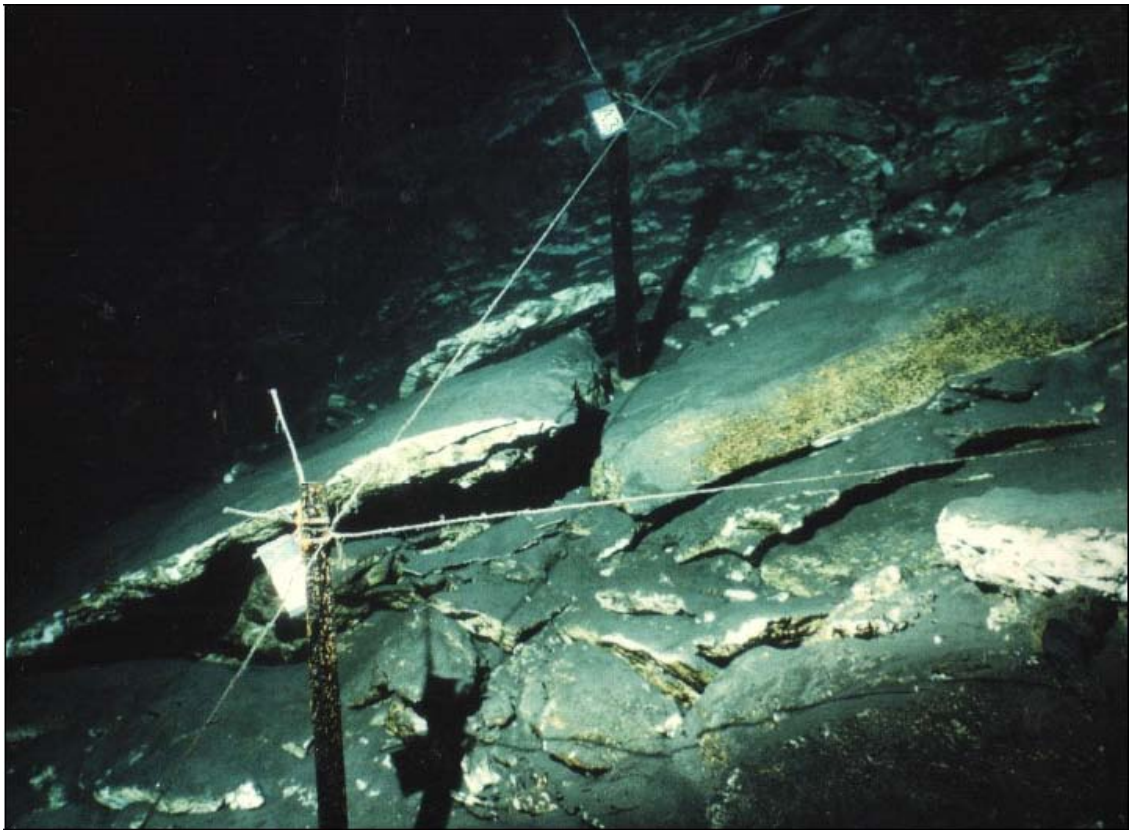
In early 1979, Hugh Morrison was involved in yet another Cocklebidy push, this time using much more sophisticated sleds which could hold 15 scuba cylinders; they also ran a telephone cable out to the First Rockpile and reached a penetration distance of some 3,150 metres. Meanwhile back in Mount Gambier again, Robin and Martin Garrad, Clive Mills, Richard Stanton, Keith Evans, Peter Rogers and Jenny Hiscock, working with Flinders University's palaeontologist Dr Rod Wells, set up a complex star-dropper survey grid in Fossil Cave, and they subsequently recovered hundreds of important bones of extinct Australian animals.



Fossil Cave as it appeared in 1979 (photo by the author).



Just inside the entrance lake (courtesy Andrew Cox, mid-1980s). The star-dropper grid (courtesy Mark Nielsen, 1986).



3D perspective cutaway sketch showing the general layout of Fossil Cave and the survey grid (by the author, not to scale!)

During this period there were also a number of other important explorations and discoveries in the Mount Gambier area; the Eastern Side of Engelbrechts Cave was revisited for the first time since 1964 and more thoroughly explored by Phil Prust, Peter Stace and Ron Allum (resulting in the discovery of the large air chamber there – the first such feature ever found in a Mount Gambier water filled cave), and in May, the unstable, silty and very restrictive Western Side's entry lake was pushed by Ron Allum, who surfaced soon afterwards, reporting that he couldn't see a thing, but also that apparently it "went"! Phil and Peter were also the first to discover the 100m-long main passage on the Western Side but they didn't look up, and it was during a later dive by Ian Lewis and Terry Reardon that they discovered the large air chamber there, along with the other flooded passages leading off from it. The horrible northwestern extension of The Swimthrough and the underwater regions of The Three Sisters were also explored for the first time by members of this group during this period; these were the first dives since the cave had been sealed in the 1960s as a result of extensive pollution which had been caused by a local abattoir in days gone by!

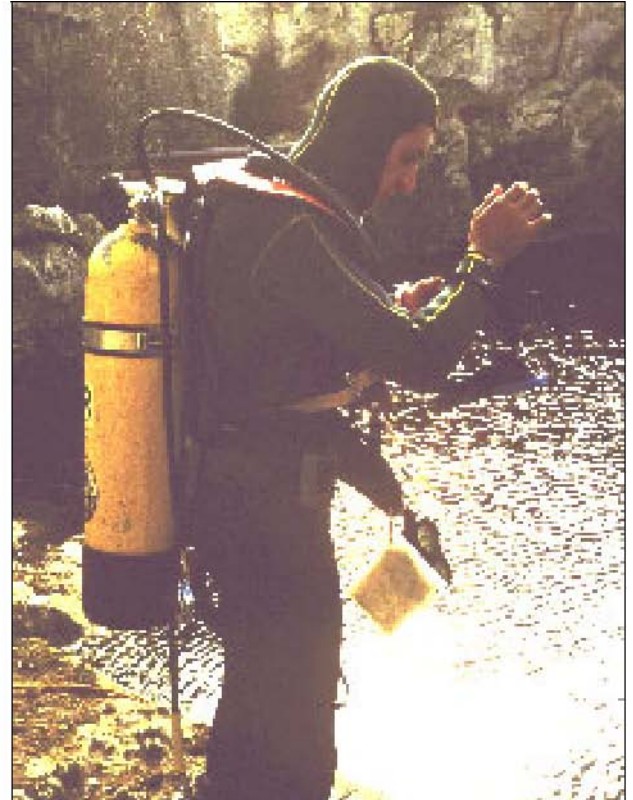
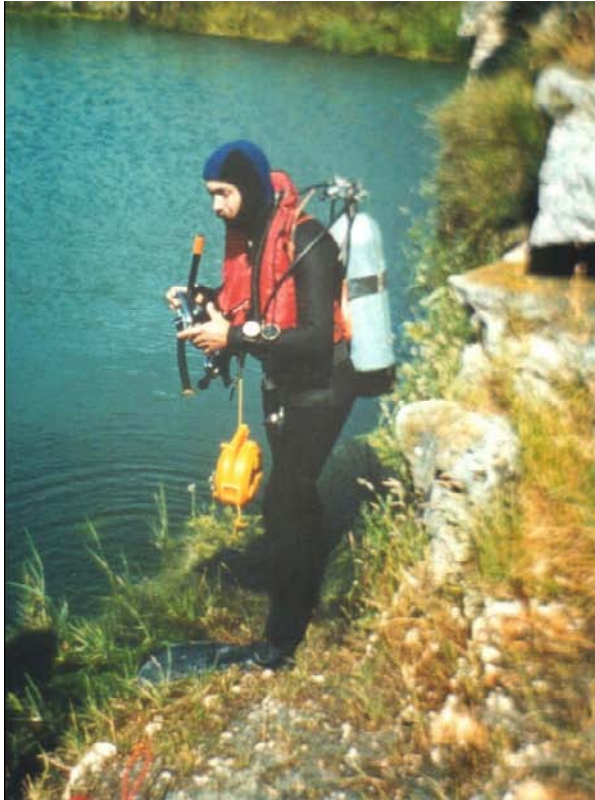
At the end of the 1970s a number of significant discoveries were made in the Jenolan Caves system by a team including Ron Allum, Phil Prust, Ian Lewis, Terry Reardon, Robin Garrad, Jenny Hiscock and Peter Rogers, with many of these occurring in Mammoth Cave (Ice Pick and Slug Lake), Imperial Cave and "Sump 7", which was reportedly "very nasty, silty and with nil flow", while in Tasmania, Frank Salt and Peter Cover discovered a major air chamber and passages in Union Cave and also explored My Cave. Around the same time Stuart Nicholas, Nick Hume and Rolan and Stefan Eberhard undertook a number of explorations in the Junee-Florentine Master (Cave) System. And cave and sinkhole diving in the Mount Gambier region was once again becoming a very popular pastime.

The 1980s – An Explosion of Research and Exploration Activities.

With the commencement of the 1980s came a flood of innovative new diving technologies including better-quality buoyancy systems and more powerful and reliable underwater lighting equipment (especially in America), and cave diving explorations continued not only in South Australia and the Nullarbor but in other States as well. However the vast majority of Australian cave diving activities still occurred within a 30-kilometre radius of Mount Gambier.

Typical gear of this era consisted of a 5mm or 7mm neoprene wetsuit and hood, a heavy weightbelt, a single 72 cubic-foot steel or 88 c/ft aluminium compressed-air scuba cylinder (the author also used a "slingshot Y-valve" configuration on one cylinder so that two regulators could be attached separately), a main regulator and an "octopus" regulator on a tether or neck-strap (in the author's case again, also with a nylon stocking fitted across the mouthpiece to keep silt and rubbish out!) as well as a scuba-feed hose and tank contents/depth gauges, and divers also often carried a large (often home-made) lead-acid battery pack and hand-held torch (the more flashy ones being of the sliding test-tube variety, but most were fixed-beam monsters). Although Fenzy-style inflatable buoyancy vests were all the rage in the mid-1970s, cave divers soon learnt about their limitations in cave environments (they were not good for holding a diver's body in a horizontal position), and back-pack or jacket-style buoyancy systems then became more popular, as did other brands and styles of 'horse-collar' vests (with their CO₂ cartridges removed and plugged, and the neck regions wrapped in tape to minimize upper-body lift when the vest was inflated).

The first inflatable dry suits also began to enter the cave diving scene around this time, and helmet-mounted lights (although long used by cavers and divers in Europe) were first introduced in the Mount Gambier region by the author in 1983 as a simple "hands-free" underwater research and surveying light source after pinching the idea from visiting French cave divers! Such ugly-looking contraptions initially evoked cries of derision from some of our more respected "old-time cave divers", as these early versions were little more than simple low-powered reference lights; the more powerful "standard" helmet-mounted systems which were to later adorn cave divers' heads only came into being several years later, almost as an adjunct to the concept of twin-independent scuba cylinders.



The author and Mark Nielsen demonstrating some of the typical sinkhole-diving gear of the late 1970s at Ela Elap sinkhole: modified Kambrook electric cord reels used as guideline reels, horse-collars vests (again somewhat modified) and single cylinders with J-valve reserve mechanisms were still in common use.

During this period, the author became interested in underwater cave mapping and research work, and in 1980 he collected a range of water samples at various depths from a variety of sinkholes and caves to enable them to be assessed for contaminants such as nitrates and pesticides. Then on 26 January 1981, he stumbled upon some unusual centipede-like animals during a visit to Fossil Cave, so he collected a few and took them to Wolfgang Zeidler, the Curator of Marine Invertebrates at the S.A. Museum (just seeing the jaw-dropping shocked look on Wolfgang's face when he was presented with living specimens of a supposedly 200-million-year extinct beastie was well worth the effort of bringing them back to Adelaide!). Wolfgang went on to formally describe and document the creatures which turned out to be a rare type of crustacean known as a syncarid (species *Koonunga crenarum* as named by Wolfgang), and this simple discovery proved that even basic investigations into the underwater speleological world had not yet been undertaken properly to that time.

Syncarid found in many of Mount Gambier's caves and sinkholes (courtesy Michael Hammer).



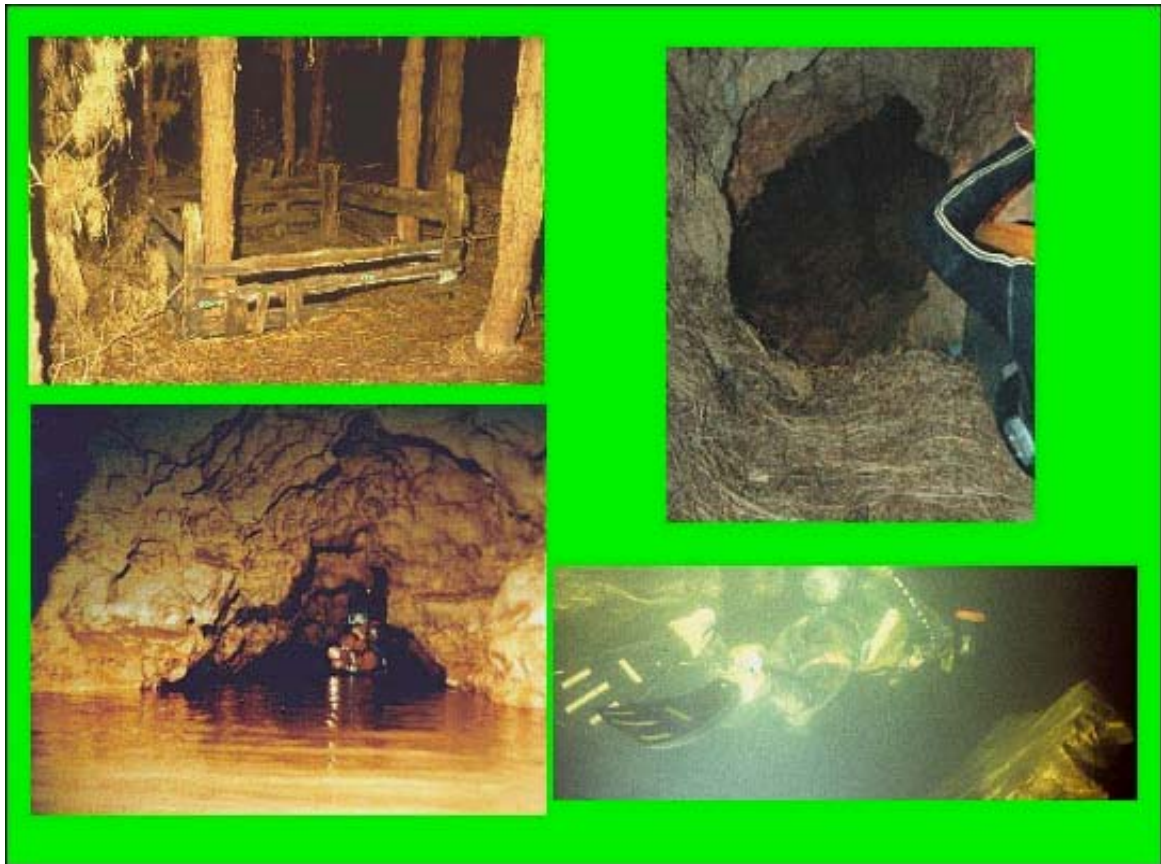
Inspired by this discovery, the author decided to continue along the research line by collecting information about everything unusual that he found in the caves and sinkholes he was exploring around the Mount Gambier region. One area which he especially felt needed greater understanding was the general underwater environment of the sinkholes, so in March 1981 he and Mark Nielsen commenced a year-long, 3-monthly study of the temperature structures of four of the larger sinkholes, One Tree, Ela Elap, Ten-Eighty and The Black Hole. This project resulted in some very interesting findings, and also confirmed that Ela Elap at around 11 degrees Centigrade was indeed the coldest known waterfilled feature in the Mount Gambier area (most of the others were around 14-15°C, although Little Blue Lake went down to 12°C on one occasion; even the 'notoriously-cold' Ewens Ponds and Piccaninnie Ponds hover around the relatively-comfortable 15-16°C mark).



The author recording temperature readings of 11 degrees C at the bottom of Ela Elap while a dive buddy illuminates his slate; a few years later the author put some very basic "Aquaflash" torches on a canoe helmet so that he could write in the dark and read mercury thermometers etc. without needing such additional lighting assistance (courtesy Mark Nielsen, 1981).

The same month that the author and Mark Nielsen commenced the water temperature study of the sinkholes they also explored a feature known as 5L179 near Hells Hole, initially finding a chamber with potential leads running off. Over the course of the next couple of years various rock-shifting efforts enabled the author and others to negotiate one obstacle after another until finally in January 1984, a small, circular lake was seen at the bottom of a narrow vertical fissure, some 30 metres below the ground surface. The author dived this lake in July 1984 using a waist-mounted 16 cubic foot scuba cylinder which allowed him to spider-crawl down the fissure with both hands free before dropping the final two metres into the water, and investigation of this lake revealed a 4m deep flooded passage which contained spectacular white "hanging drapes" of something like the bacterial colonies found in underwater passages in various Nullarbor caves along its 20-metre length. Later in September that year the author also took Dr Keith Walker of Adelaide University's Zoology Department to some of the larger sinkholes where they collected and identified a variety of important and unique specimens.

In February 1981, Nick Hume and Stuart Nicholas undertook their initial exploration of Wolf Hole in Tasmania, and also around that time Pannikin Plain Cave was explored to about 400 metres by Ron Allum, Terry Reardon and Peter Rogers before shortly afterwards being pushed to about 600m (to near a rockpile) by Phil Prust, Jenny Hiscock and Russell Kitt. Far North Queensland's Camooweal area was also visited and assessed for the first time in 1981, when Ian Lewis, Dave Warnes, Terry Reardon and Karl Lengs undertook the first dives in the caves in this area; unfortunately they were not able to make any major discoveries at that time. Around October to December, Nick Hume and Rolan and Stefan Eberhard undertook further major explorations in the Junee system in Tasmania, and during early January 1982, the author accompanied Peter Stace in a check of various features around the Mount Gambier area.



The rediscovery of “144” and the subsequent first explorations of the water-and-airfilled passages underneath a young pine forest (courtesy Peter Stace, Mark Nielsen and Andrew Cox, 1980s).

A number of discoveries were made but the most significant of that trip was what they called “One Forty-Four” or “The Airport Cave” (later known as Sheather’s Cave after a former landowner). This quite extensive horizontally-developed phreatic cave system ended up producing more than half a kilometre of virgin passage (including some interesting sumps!), and it was a totally unexpected discovery considering its location in the relatively thin limestone near Mount Gambier’s aerodrome. This once again showed that there were undoubtedly still many other major Mount Gambier cave systems still awaiting discovery! Within the next few months the author and Peter Stace also undertook the first-ever mapping dives at a number of other little-known sites, including Benara Sinkhole and Bungalow Bay Cave.

‘Best-perspective’
view of “Kambrook-
reel-kid Puddles”
during early
explorations in
“One Forty-Four”
(courtesy Mark
Nielsen).



In March 1982, Glen Netherwood, Peter Ackroyd and Alex Kariko used British-style side-mounts and surface-fed lines to explore a very tight, silty sump in M-4 Cave, and in September Hugh Morrison led another combined SA/WA team to Cocklebidy Cave, resulting in the discovery of Toad Hall, which was explored to the lake on its far side – an extra 500 metres, to a world-record penetration distance of 4,100 metres. Also that year Chris Brown pushed from the 600 metre point to 780m in Pannikin Plain Cave with Phil Prust (using triple cylinders) and found an air chamber; Phil also made a major discovery in Murra-El-Elevyn (with Chris, Ron Allum and Peter Rogers) resulting in a 300% increase in known cave passage.

Around this period Ian Lewis also pushed the small cave in the Third Pond at Ewens to a depth of around 20 metres, where a fierce outflow and very tight flattener passage at an “interesting cross-jointed aquifer outlet” prevented further exploration (Ian’s words as related here don’t really indicate how difficult it was to squeeze along the restriction with his hand-held scuba tank flapping behind him and his mask pushed so hard against his face that he thought his eyeballs were going to pop out!). Also in December 1982, the author and Mark Nielsen checked out a number of nasty little features including The Bullock Head Cave, where the joys of swimming through rolls of rusting wire and rotting garbage really need to be experienced to be appreciated!

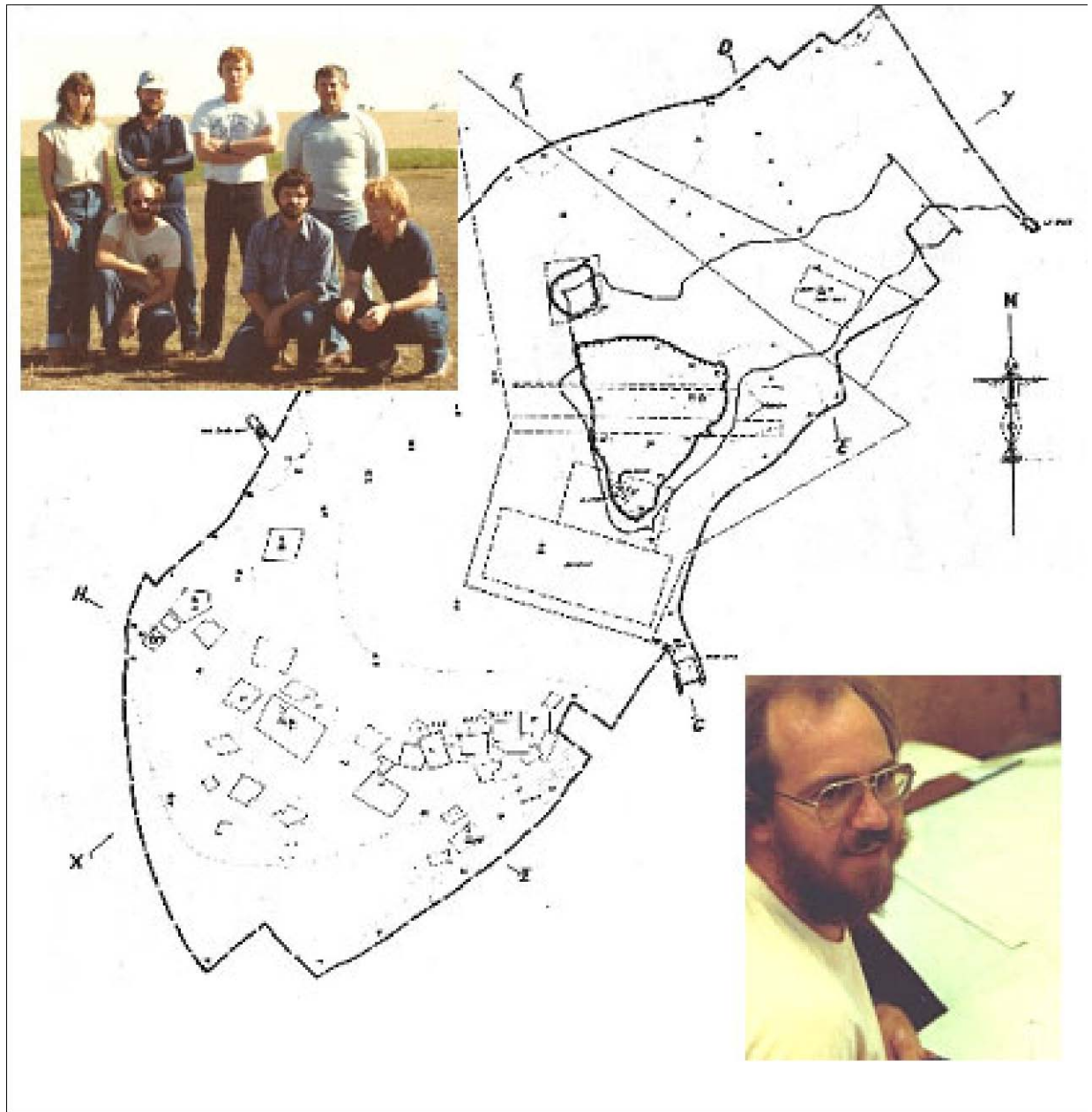


(left photo) The author and Peter Stace after a duckweed-covered grovel in Sinkhole 5L145, (courtesy Barbara Stace) and (right photo) Enjoying the thrill of sliding through the rubbish in Bullock Head Cave – one reason why the author is also known as Peter “Puddles”! (courtesy Mark Nielsen)



Ah, there’s nothing quite like the security offered by the modified Kambrook electric-cord reel and a powerful 12-watt Dacor UL-700 torch! (courtesy Mark Nielsen).

More formalised cave research appeared on the scene in Mount Gambier in early 1983, when Peter Stace, Robin Garrad, Jenny Hiscock and the author formed the core of the CDAA Research Group (the brainchild of Peter Stace), which became a formal subcommittee of the CDAA in March. This rather hurriedly-formed group undertook the first major underwater mapping and general assessment of an Australian sinkhole at Kilsbys Hole over a period of just two weekends, and this also served to re-open access doors which had been closed since the 1969 dual-fatality there.



The Kilsbys Hole mapping team, a draft of the final map and project coordinator Peter Stace caught off-guard by the author (bottom right).



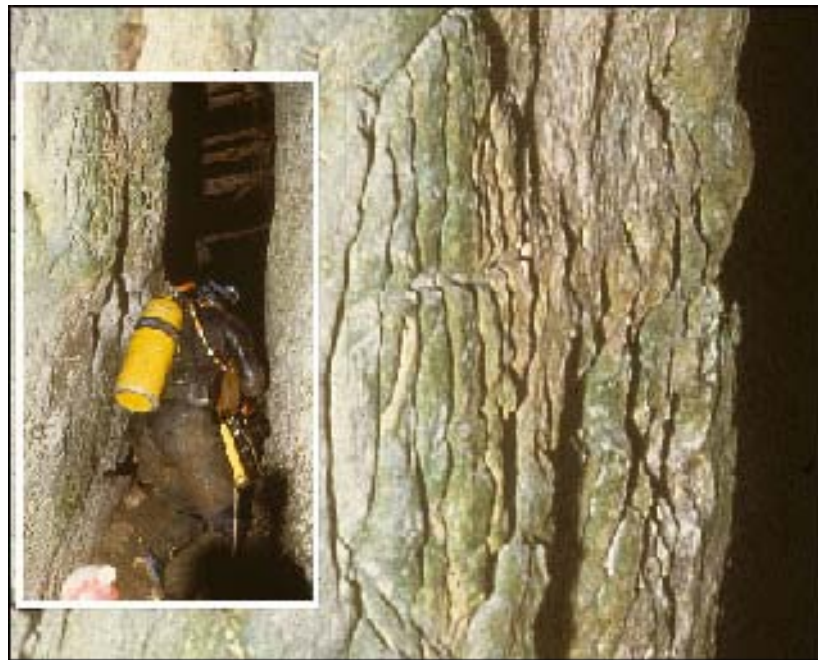
The Kilsbys Hole research party (L to R) – Peter Girdler, Ian Lewis (the one with the cute yellow ducky-fins!), Robin Garrad, Martin Garrad, Jenny Hiscock and Peter Stace or Phil Prust (one or the other!) Note all of the floating support platforms and other gear which covered the lake's surface during those years (photo by the author, 1983).

Back at Dalley's Sinkhole in April 1983, Glen Netherwood and Peter Ackroyd explored a 14m sump and discovered a large cavern, and from April to July Nick Hume, Stefan Eberhard and others explored the Junee system again, along with Welcome Stranger.

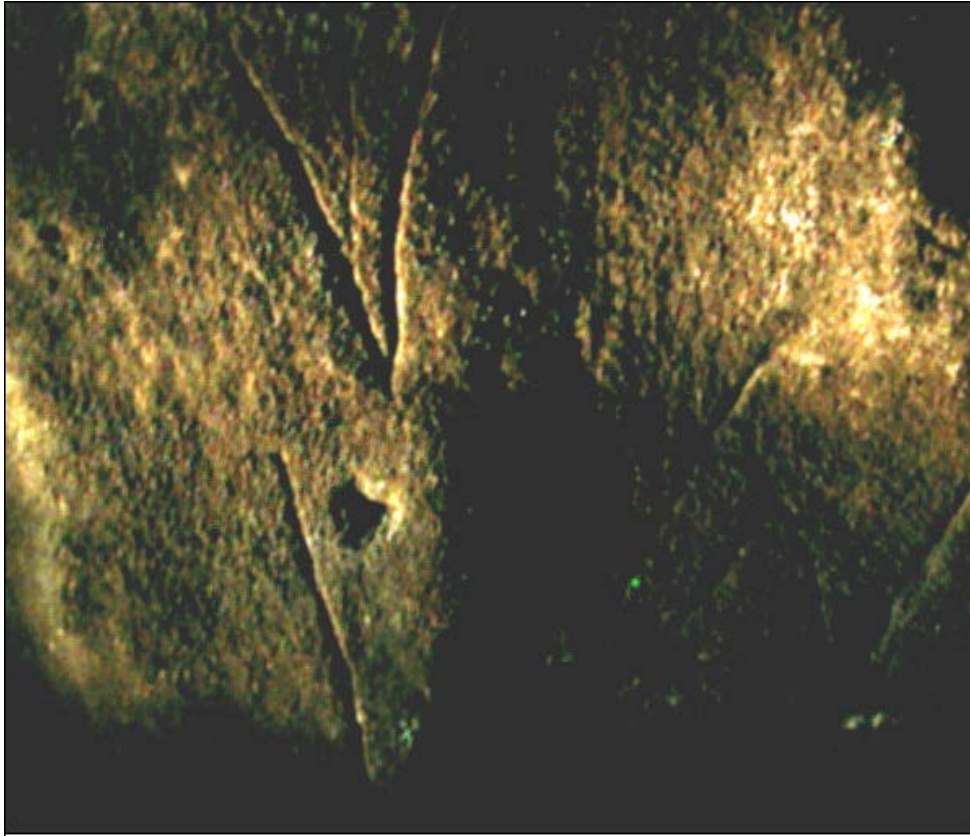
Between March and August, the author in the company of Mark Nielsen and Andrew Cox undertook a range of explorations in various "fissure caves" and other features in the Mount Gambier area, and during these grovels one chance photo happened to highlight an unusual wall feature which nobody in our party realized was an ancient petroglyph which may have been as old as 20,000 or more years. Soon afterwards the author took various petroglyph experts around the caves of the South East and a number were found to contain these rare and important archaeological artefacts which some believe were carved by the very ancient "Tasmanoid" people, the predecessors of today's Aboriginal people who subsequently settled Australia (pers. comm. Dr Neil Draper, Aboriginal Heritage Unit, Dept. for the Environment circa 1985).



Site of the discovery of the first major “petroglyph” wall markings in 1983; an accidental finding which occurred while the author (the diver with the yellow reel) and Andrew “Grovel” Cox were investigating a small deep pool of water there (courtesy Tony Hambling/Rino Dell’Antonio).



Close view of the most significant petroglyph, which was fortunately not disturbed by the bulk of the author groveling underneath! (courtesy Rino Dell’Antonio/Andrew Cox/Tony Hambling).



Other petroglyphs discovered by the author and colleagues in another Mount Gambier Cave (courtesy Richard Harris).

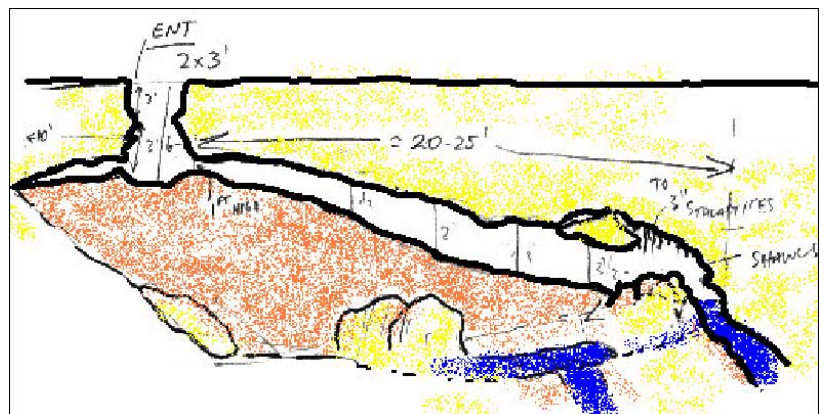
One of Mount Gambier's most important cave explorations took place early in the evening of 9 August 1983. While following up rumoured early dives mentioned by Peter Stace and others over the years, and under a dead-quiet, star-filled sky, the author and Mark Nielsen dragged their dive gear across a paddock to a forbidding little hole hidden underneath a large overturned concrete tank which almost covered it. Pulling the planks of wood away they carefully squeezed through the narrow gap and one by one stepped the metre or so down to a ledge before stepping the final metre down to the floor of the cave. One at a time, they squatted under the entrance so they could get into their tanks before sliding sideways through the 30cm-high gap into the shallow pool further in ... they were completely unaware that they would shortly be sitting in that same (now-muddy) puddle, staring silently at each other in abject amazement – not through shock caused by the dripping-wet cow-poo and mud in which they were covered, but as a result of realising that they had just explored one of the most awesome and picturesque flooded passages they had ever seen, after bumping their way through what they had earlier believed to be just another unlikely muddy grovel in a narrow and unstable submerged rockpile! Thus "Tank Cave" (as the author unfortunately rather boringly named it) entered the cave-diving arena.

Although "the windmill cave" had long been rumoured to be some kind of dive, nobody had ever reported finding the 100 metres or so of spectacularly-clear and completely unmarked passage that the author and Mark had just explored, and Mark returned a few weeks later with another diver to explore further. Unfortunately with the limited access and poor lighting gear of that time, no further explorations were made after that second dive, and attempts to lease the paddock to enable the digging-out and stabilizing of the entrance were unsuccessful. The author then moved on to his many other projects and passed on the discovery to Phil Prust, Chris Brown and Paul Arbon a couple of years later for their "possible interest" in pursuing the difficult access arrangements, in the mistaken belief that the cave did not really have much potential anyway (hundreds of much more thorough explorations since that time subsequently resulted in the discovery and surveying of more than 7 kilometres of spectacular waterfilled passages which run under virtually the entire paddock)!



The original entrance to Tank Cave (photo by Mark Nielsen, during the second trip there) and the first sketch by the author from the first dive.

Author's sketch of the original entrance showing the ceiling just a foot (30cm) above Tank Cave's muddy, cow-poo-covered floor.



One of the hundreds of fascinating and very beautiful passages in Tank Cave (courtesy Neil Vincent, 2006).

European-style cave diving techniques and philosophies reached South Australia in September 1983, when French divers Francis and Eric Le Guen (assisted by Veronique Borel, Jerome Krowicki and Sylvie Goutiere) visited the Mount Gambier area before heading out to Cocklebiddy Cave to set a new world penetration record of 6,000 metres there. Prior to this visit no Australian teams had ever considered the exploration of Cocklebiddy in a competitive light, and considering the hospitality which was extended to them by Adelaidian cave divers many people were extremely offended by the way in which the French subsequently boasted about how they had "broken the Australian record" when it had never been a competition in the eyes of the locals.



Consequently, just over a month later, a large Australian team including Ron Allum, Peter Rogers and Hugh Morrison broke the French (and thus the world) record when Hugh used a single cylinder to squeeze some 240 metres further along a very narrow and silty passage – an astounding display of courage, considering the fact he was alone, with no backup cylinder ... and 6 kilometres from the entrance!! During that trip Chris Brown and Phil Prust also pushed Pannikin Plain Cave to 1,070m and explored 130m or so of a lower section of Warbla Cave; they also explored Warbla's second air chamber for the first time during that trip.

In October and November 1983, Stefan Eberhard, Nick Hume and Peter Clover undertook exploratory dives in the Trowutta Arch and Kubla Khan systems in Tasmania, including making a thru-dive in Kubla Khan, and between March and June 1984 a lot of other Tasmanian progress occurred including further major explorations in Union Cave by Rolan and Stefan Eberhard, more Junee explorations by Nick Hume and Attila Vrana, and Rolan Eberhard's pushes in Pendant Pot/Growling Swallet where he penetrated a 15m tunnel which joined the systems together.

In early 1984 local Mount Gambier crop-duster pilot and diver Peter Blackmore, in the company of Phil Earl and Danny Quintel, discovered Iddlebidy Cave – a flooded single-passage system some 250 metres in length (unfortunately the discoverers chose to keep its location a secret for many years; it was accidentally found by the author later through a bizarre coincidence involving a forestry worker). Later some skull fragments from a young person, possibly aboriginal, were found in the flooded entrance chamber, making this the first waterfilled cave in the area known to contain human remains. In February, after months of negotiations, the first survey of The Shaft commenced; the dive team was selected by the author, Peter Stace and Phil Prust, and this project also served to open the door to more general access to this site for the first time in 10 years (with the much-appreciated support of the landowners, Mr and Mrs Viv and Jean Ashby, and their son Robert).



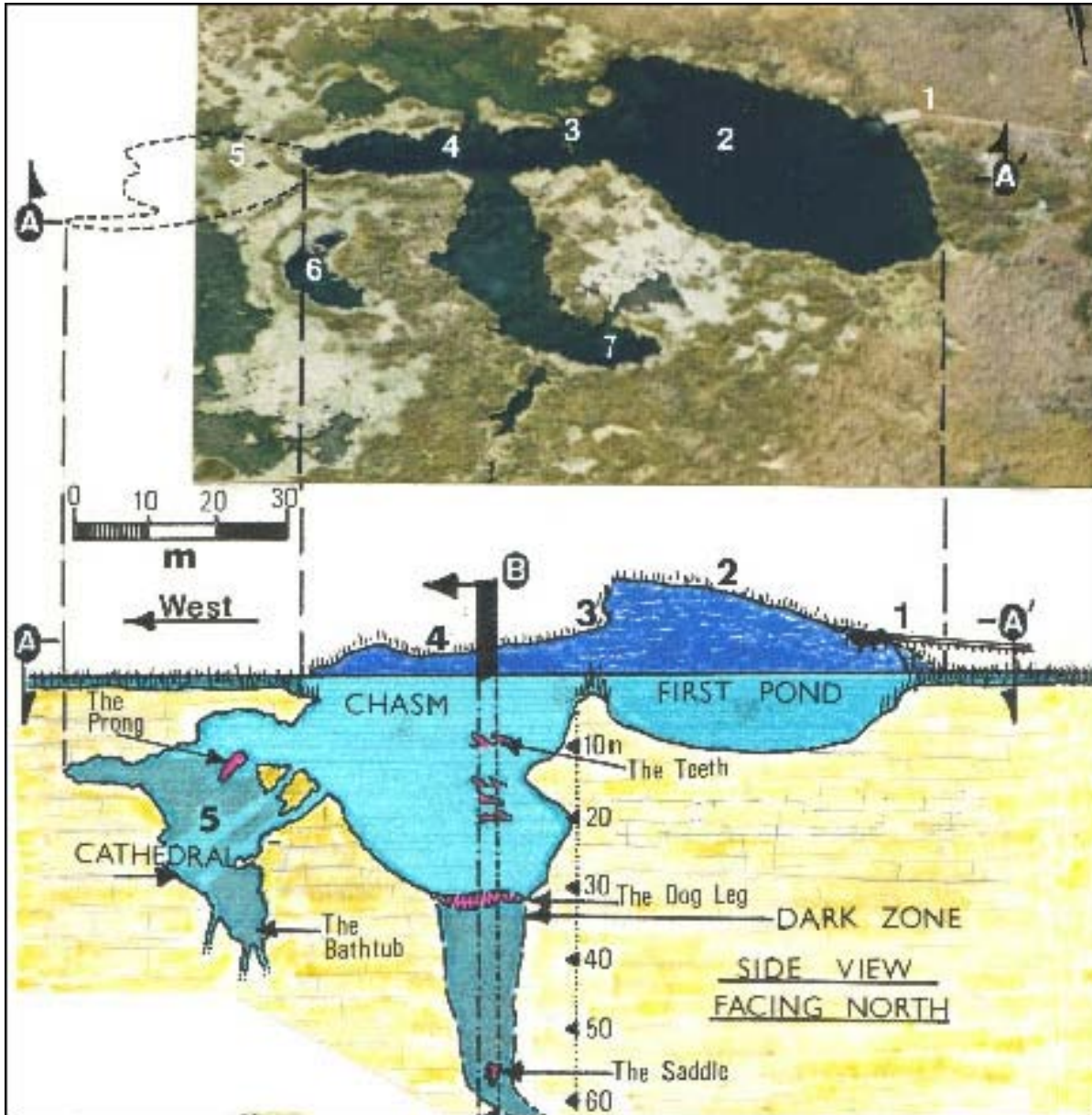
Photo showing the relatively high water level in The Shaft during the 1984 project – the surveyors including Chris Brown (left), Andrew Cox and the author (with the funny hat) were all able to very comfortably utilize the ledge (which is these days several metres above the water) to prepare for their dives with the other team members (courtesy Paul Arbon, 1984).



The wonderful Ashby family – Betty Jean, Robert, Trevor and Bertram 'Viv'; sadly Jean and Viv are now deceased (courtesy the Ashbys, 1980s).

In April 1984, the sixth tragic diving accident occurred (in Piccaninnie Ponds yet again), involving two divers who drowned at about 60 metres after becoming entangled in their line in the Dog Leg. The fact that they broke several key rules (not the least of which was one diver's total lack of cave diving qualifications) again highlighted the importance of the CDAA's role in cave diving issues, and fortunately for the diving community the "killer sinkholes" outcry of yesteryear was not repeated this time. This accident also appeared to have been largely caused by the guideline becoming snagged in a non-standard waist-mounted snap-hook which could not be disentangled by divers affected by nitrogen narcosis and in zero-visibility conditions.

In May 1984, Chris Brown reported finding an interesting passage of about 40m penetration behind the rockpile in The Pines with Paul Arbon, and in August Chris and Paul, along with Phil Prust, checked out the many virgin side-tunnels past the 720m mark in Pannikin Plain cave. Then in November, the author commenced the CDAA's Piccaninnie Ponds Research Project, when the first lines were laid in the cave system. This project resulted in the production of a high-quality map of The Cathedral and main Chasm areas of this famous feature.

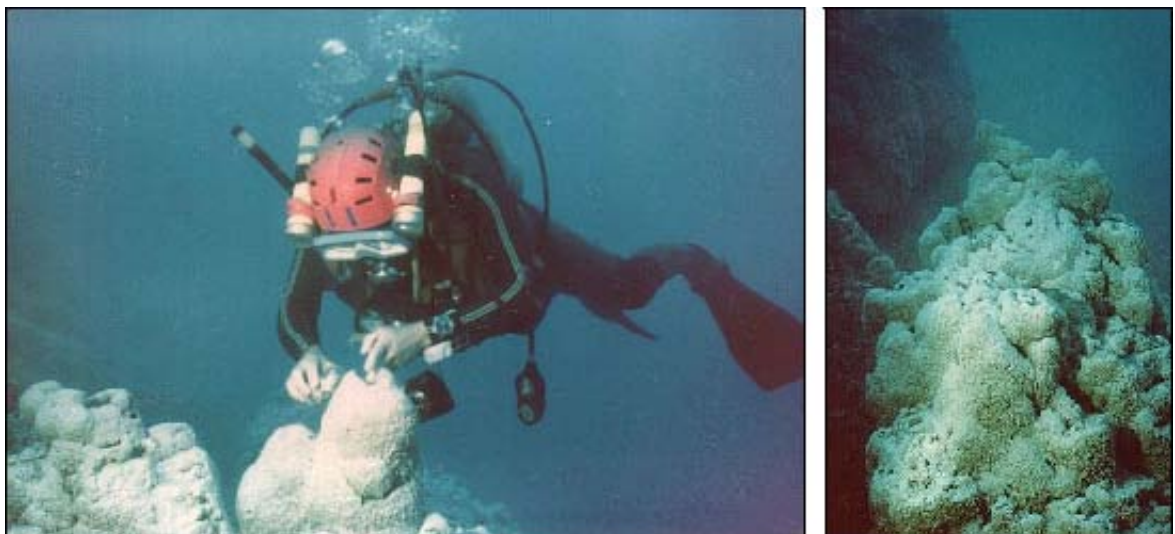


Combined photo/cutaway sketch representation of the main Piccaninnie Ponds system, based on the CDAA Research Group's mapping project which the author coordinated there in 1984 (sketch by the author, photo courtesy Andrew "Grovel" Cox, 1983).

In January 1985, after many months of planning and hot on the heels of the 'Pics Project', the author commenced the Blue Lake Research Project – a week-long effort involving divers and scientists from such institutions as the S.A. Museum and the University of Adelaide, and the first of several such studies over the next few years. This project also provided the impetus for the author to invent a system of standardising underwater visibility observations, using a Secchi Disk – a simple but effective tool in many other underwater visibility applications. Although Blue Lake is a dormant volcano and not a karst feature, it nevertheless contains flora and fauna which is also found in many caves, as well as many other unique features such as enormous stromatolites – some of which sadly had to be sacrificed in the name of science!...



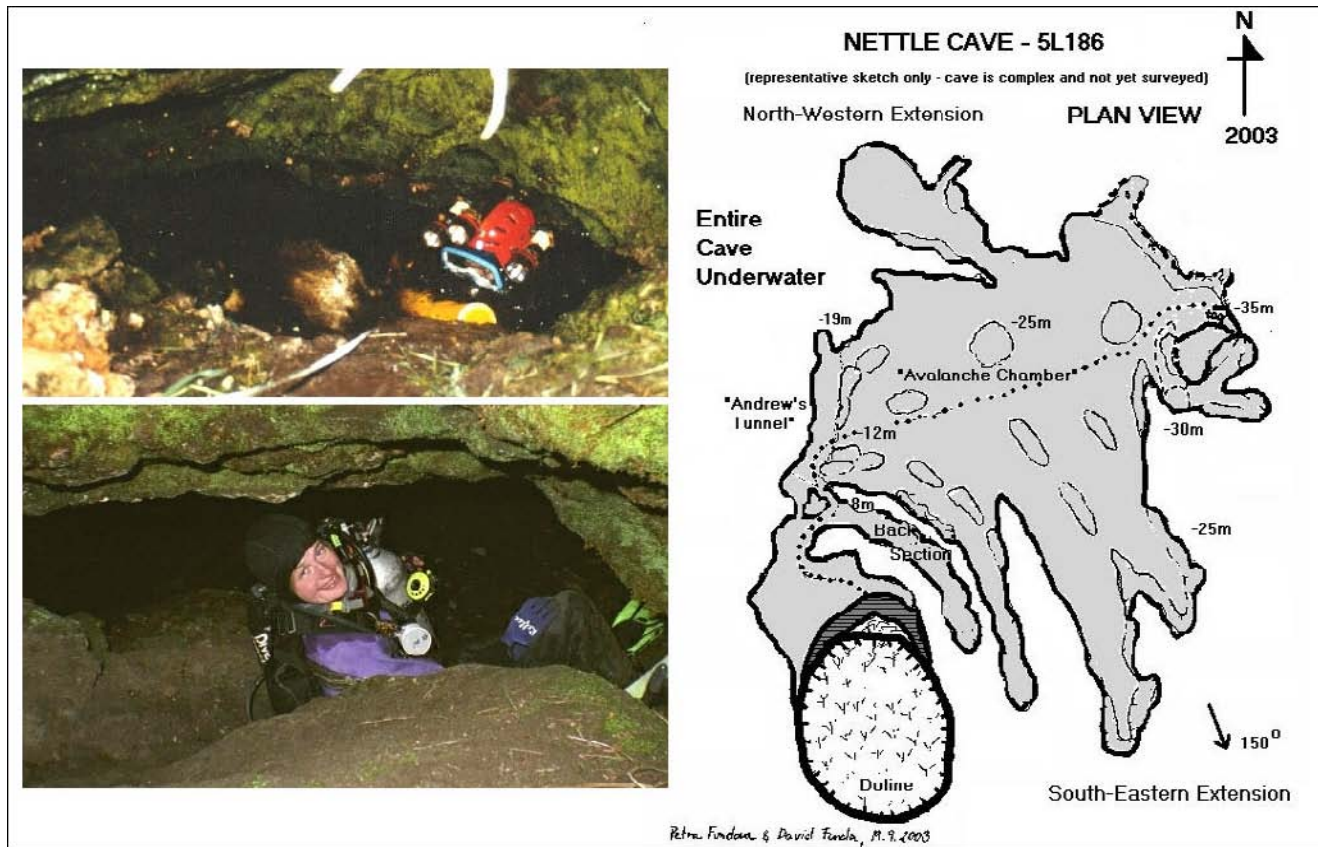
The Blue Lake is a very beautiful place in summer; the blue colour is actually a physical characteristic of the water itself and is replaced at around the 16m point by a foggy grey “mist” comprising small planktonic forms. In the above photos Wolfgang Zeidler passes a plankton net to the author and a diver holds a Secchi disk which when used with a fibreglass tape attached, served as an excellent horizontal-visibility indicator. In the shallows, it was never any clearer than around 20-25 metres, but at depths of around the 50 metre mark it dramatically improved and by 75m it could have been as much as 100m visibility, although it was too dark there to use the disk technique (the illumination across the flat, grey bottom of the lake looks very similar to a full moon on a white sandy beach at midnight). Photos by the author, Andrew Cox and Mark Nielsen.



The author sampling a portion of the amazing “stromatolites” which were discovered in Blue Lake in 1985 (courtesy Mark Nielsen/Andrew Cox).



A few months after the completion of the January 1985 Blue Lake study, the author used one of Ian Lewis's small hand-held scuba cylinders to squeeze into an unnamed hole across the road from The Pines, reaching a maximum depth of just eight metres where a small silty restriction was found. This feature would later be called Stinging Nettle Cave and it would be pushed to around 30 metres deep by David Funda and Petra Fundova in 2003.



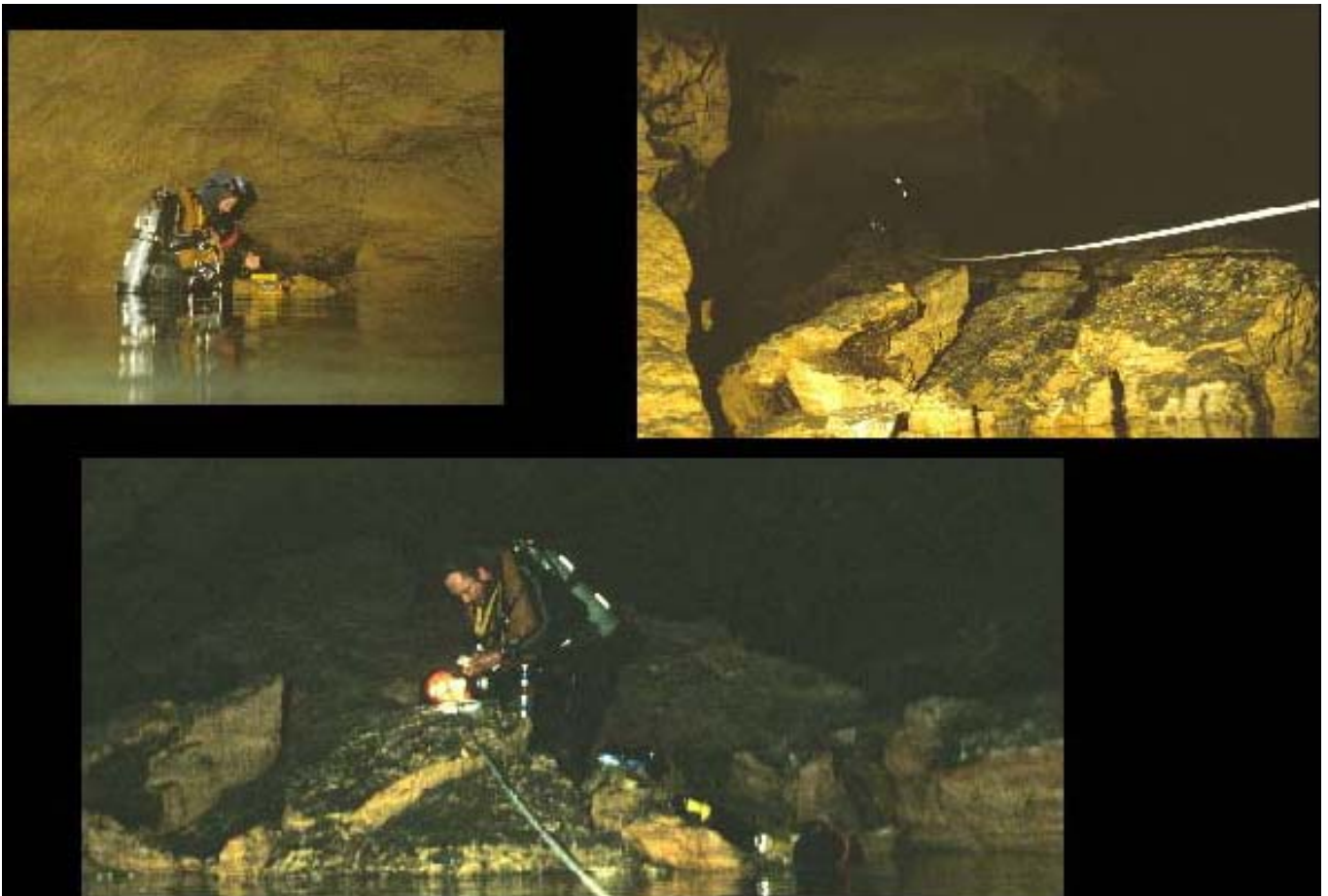
The author using a small hand-held cylinder to check out Stinging Nettle Cave in 1985 (top left) and the same restriction during one of Petra Fundova's dives in 2003 – what a difference a 2m water-level drop can make! (courtesy Dennis Tham and David and Petra Funda, 2003).

In October, Stuart Nicholas and Nick Hume explored the Coelacanth Extension in Tassy, and between November 1985 and June 1986 Nick also undertook more explorations in Pendant Pot and Mainline Sump.

In May 1986, the CDAA commenced its Engelbrechts Cave Mapping Project which was coordinated by Andrew Cox, and the following month Peter Ackroyd explored Confession Sump in Dukes Cave for some 18m to a restriction at a depth of six metres. He also re-opened a small hole in Whale Cave and explored 14m of nasty passage without fins, using only a small hand-held scuba cylinder. In August Chris Brown, Paul Arbon and Dennis Thamm organised the first sled-push party to visit Cocklebidy Cave's Toad Hall since 1983 (and the fourth ever); it was also the smallest expedition to that point, and most of the known side tunnels were explored.



A typical Cocklebidy Cave sled dive
(courtesy Ken Smith and Chris Brown, and the 1995 Toad Hall expedition team).



The author noting compass bearings and tape measurements in the Eastern Side air chamber at Engelbrechts Cave (courtesy Mark Nielsen, 1982).

In October 1986, the author formed a new research-oriented cave diving body, the South Australian Underwater Speleological Society (SAUSS) Inc. with a group of scientific and diving friends and associates, and the Society commenced the detailed mapping and study of a number of sites including more work in Fossil Cave, Gouldens Hole, The Pines, Blue Lake, Allendale Sinkhole and Ten-Eighty Sinkhole. Also in October the author participated in an exploration and assessment study of all known major drains and headsprings along the Mount Gambier coastal area with Lands Department's environmental officer, Mark Watson; these visits revealed that most sites required urgent protective measures to be taken. The following month the author and Chris Brown undertook an exploratory and mapping dive in Alleyn's Cave to assist with later access planning and negotiations; other divers involved in that project included Dennis Thamm and Richard Megaw.



SAUSS Project Number 1, in Fossil Cave, carrying on from where the original Flinders Uni teams left off in 1979 (photos by the author).



The main chamber of Fossil Cave, looking out; the boulders and a large portion of the line-grid can be seen in this photo (courtesy Ian Ploenges, 1986).



Flinders Uni researcher Cate Newton spreads the bones out to dry before transporting them back to Adelaide. One particularly stressful moment involved a large German Shepherd which a tourist brought down into the sinkhole while these 30,000 year old bones were all exposed! (photo by the author, 1986).

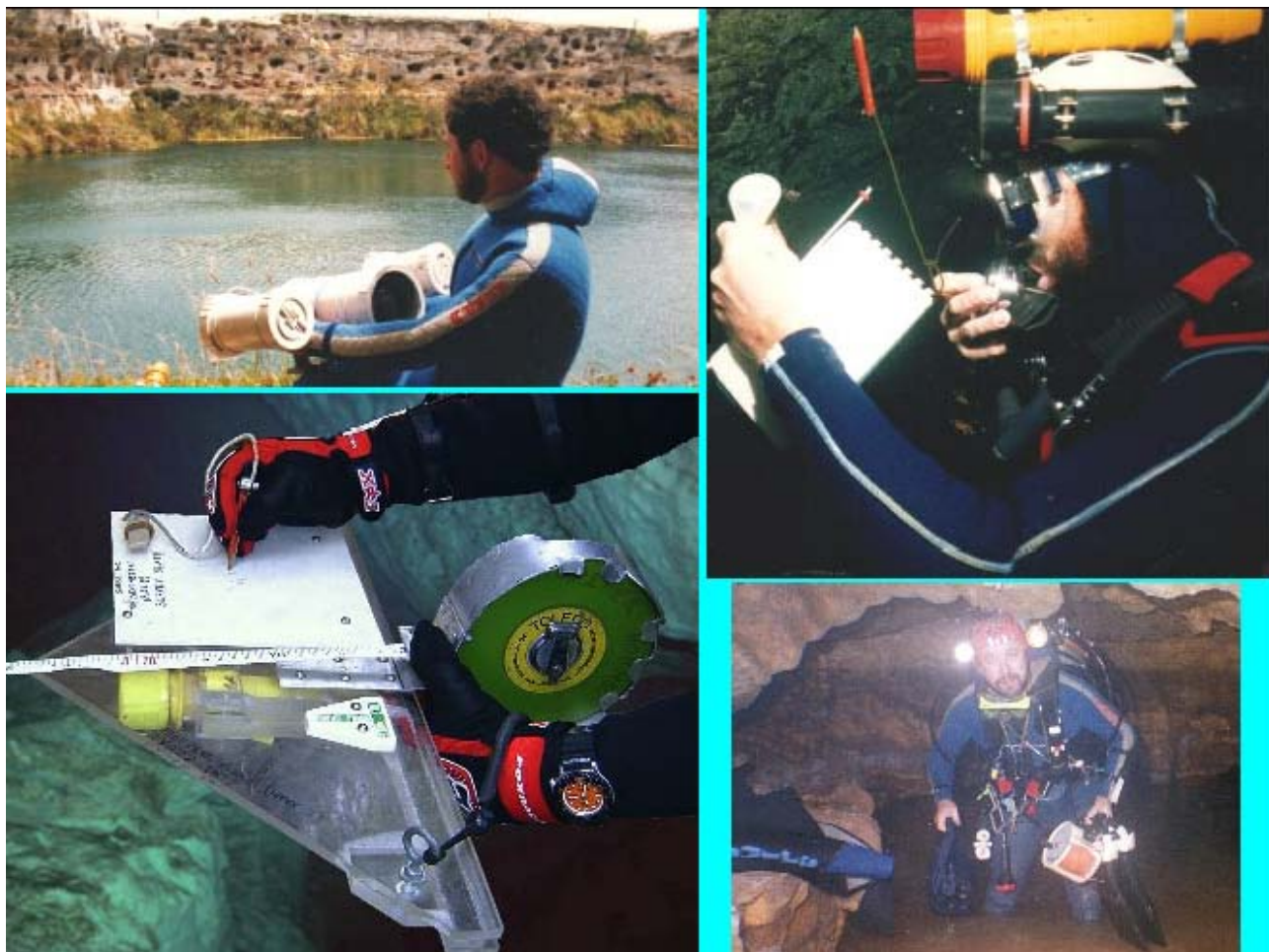


The author and Greg Bulling after a bone-recovery dive in Ten-Eighty Sinkhole, during which some important fossil material was retrieved including a *Diprotodon* femur (courtesy Peter Ginnane, 1986).



First light for this monster bone in many thousands of years!

The next event of significance known to the author occurred in Pannikin Plain Cave in September 1987, when Ron Allum and Chris Brown made yet another major discovery of 600 metres of virgin passage. Peter Rogers and Andrew Wight also discovered the Oval Room and several hundred metres beyond, to near the end of Mega Chamber. Three months later in December, Chris and Peter extended the cave for another 250m and found a collapse with a major lead beyond Mega Chamber. The author was also busy again during this period; in September he worked with Mia Thurgate to re-assess the coastal springs which he had visited the previous year with Mark Watson, and other features including Woolwash Cave were also assessed. Then in December renowned biologist Dr Thomas Iliffe from the Bermuda Biological Station for Research visited Mount Gambier, and with the assistance of the author and his associates Tom visited a number of important biological sites and collected a variety of rare troglobitic life-forms which he scientifically described back home later.



SAUSS projects ranged over a number of areas and subjects, as indicated by these photos (top left clockwise) – Tony Carlisle contemplating videography in The Black Hole, Chris Hales collecting water samples, the author after another survey dive and the survey tool jokingly called the Nielsenometer by the author after Mark Nielsen, who designed and built the unwieldy contraption! (courtesy various people).

In September 1988, Andrew Cox, Ian Lewis and Peter Blackmore undertook the first official CDAA assessment of Iddlebidy Cave, and two months later the “Pannikin Plain Cave Diving Expedition” was organized by Andrew and Liz Wight. This was the first professionally-sponsored, hi-tech scooter-assisted cave diving expedition in Australia, and the team comprised lead divers Phil Prust, Ron Allum, Chris Brown, Paul Arbon, Peter Rogers, Rob Palmer (U.K.) and Wes and Terri Skiles (U.S.A.).

This exceptionally-skilled team pushed the cave to its known end ... and barely escaped from being entombed after a major collapse of the entrance during a flash-flood! This was also the first occasion

when water and speleothem sampling of flooded Nullarbor caves commenced on a large scale, a project which was later to continue under the leadership of Dr Julia James (Sydney University). Two months later in November 1988, a combined team of CDAA and SAUSS divers including Andrew Cox, Greg Bulling, Tony Carlisle (video cameraman) and the author performed a research dive in Iddlebidy Cave, and recommended that the site be opened to small parties of divers on an occasional basis.

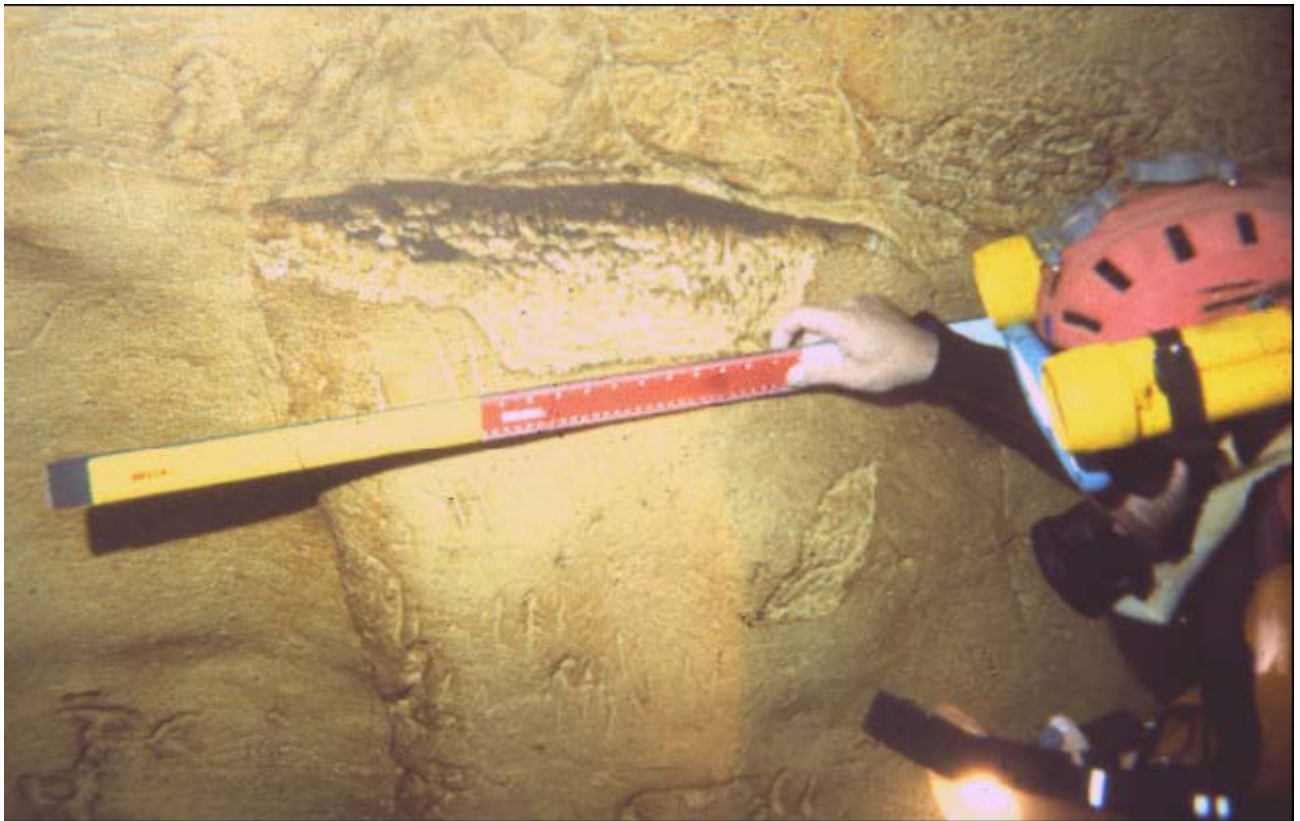


The author carrying a Fossil Cave "bone basket" through Iddlebidy Cave; the basket was an ideal container for the sediment corers (one of which can be seen through the basket's mesh in the photo) along with several large and very fragile glass bottles which were used to collect water samples for pesticide checks (courtesy Greg Bulling).

The following month the author coordinated a CDAA research project involving the assessment of the major sinkholes on Barnoolut, when about a dozen keen divers recorded the physical aspects of Bullock Hole, Ten-Eighty and The Black Hole prior to the re-establishment of regular diving activities after a two-year closure of the property. Also around this period, at Wellington Cave (Limekilns or McCavity Cave) in New South Wales, following reported efforts by earlier cavers during low-water under drought conditions, divers Simon McCartney, Keir Vaughan-Taylor and others explored the main waterfilled chamber of this impressive feature for the first time (pers. comm. Ernie Holland, Jenolan Caves, 1990s).

In May 1989 after a failed attempt several years earlier, Chris Brown and Phil Prust revisited Tank Cave and finally broke through into some of the major extensions, commencing the dives that would result in the discovery of several thousand metres of virgin passage in the next year or so (this project is still going on and to date has involved several dozen divers). In September, with groundwater pollution in the Mount Gambier area becoming topical because of a new copper-chrome-arsenate (CCA) plant being proposed, the author set up a short-term CDAA subcommittee called the "Water Quality Assessment Directorate" which involved the input of Ian Lewis, Maurice Parry and others. One high-nitrate site was located, but fortunately no significant detrimental discoveries were made.

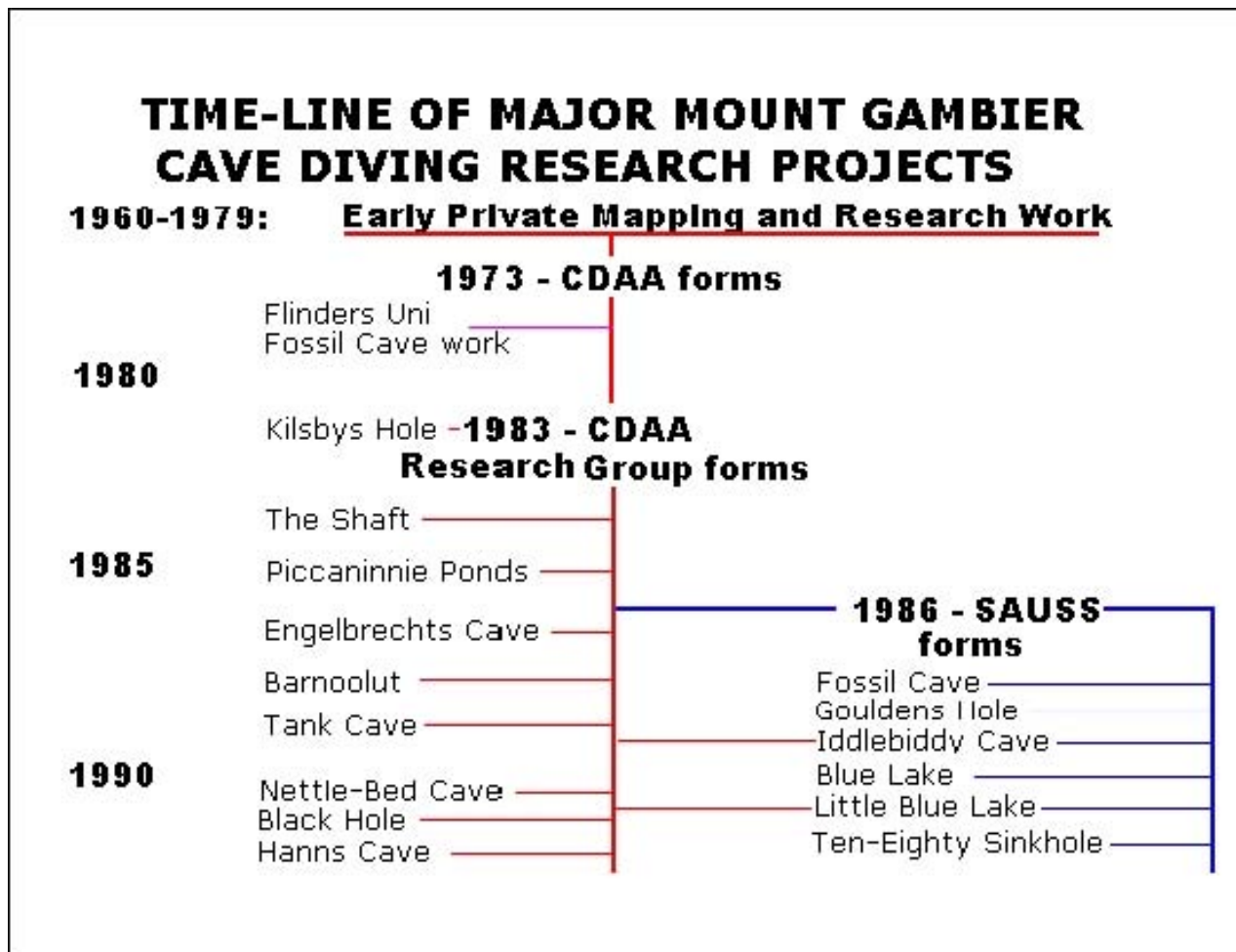
In January 1990, the CDAA Mapping and Research Group commenced its ninth research project, namely the exploration, mapping and scientific assessment of a new feature called Nettle-Bed Cave, around the same time that the Little Blue Lake mapping project also finally got off the ground after some five years in the planning. Nettle-Bed was discovered by Adelaide diver Grant Pearce (with the assistance of Chris Murphy) after he had removed some rocks at the other end of Mud Hole's collapse doline. The site exhibited possible human wall scratchings underwater along with probable mega faunal markings, and the presence of abalone and limpet "tucker" shells in the cave also indicated that considerable community and Aboriginal consultation and research planning was needed before recreational cave divers were able to safely gain access.



Suspected human markings in Nettle-Bed Cave (courtesy Grant Pearce).

The following month the author accompanied noted American cave diving researcher Jeff Bozanic to the "Bone Room" in Ten-Eighty Sinkhole, and in March 1990 Tony Carlisle and Greg Bulling produced an excellent videotape of Warbla Cave, enabling those who could never go there to see its underwater beauties for the first time. In April the following year, Tony and Greg also coordinated the first major videotaping and research/surveying dive to Cocklebidy Cave's Toad Hall, using improved underwater tank/video sleds (this was the 5th team ever to visit Toad Hall). Later in 1990, the author worked with Andrew Cox (the Manager of the CDAA's Research Group) to undertake a series of exploratory dives in the sinkholes on Barnoolut Estate to determine which features might have been worth including in the CDAA's general access list, but unfortunately nothing was found to be suitable for recreational divers although some interesting scientific aspects and sites were identified.

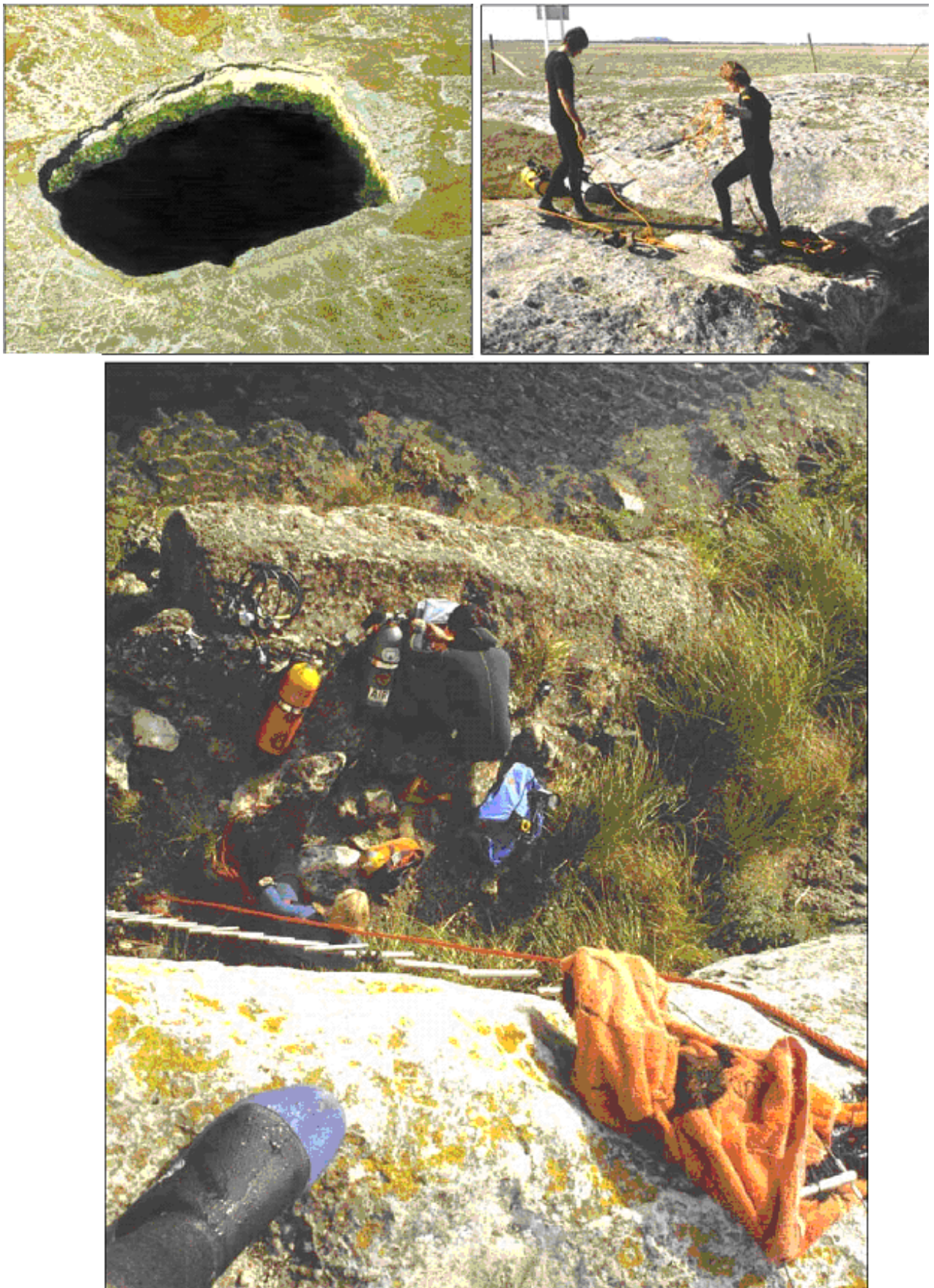
In the middle of 1991 the author assisted Mark Nielsen with the SAUSS mapping project he was running in Ten-Eighty Sinkhole, and in November Peter Ackroyd explored the Prayer Pool in Dukes Cave for several metres after abseiling directly into the water whilst wearing dive gear. This was found to be about 6m deep and some 18 metres penetration distance (sounds strangely familiar!).



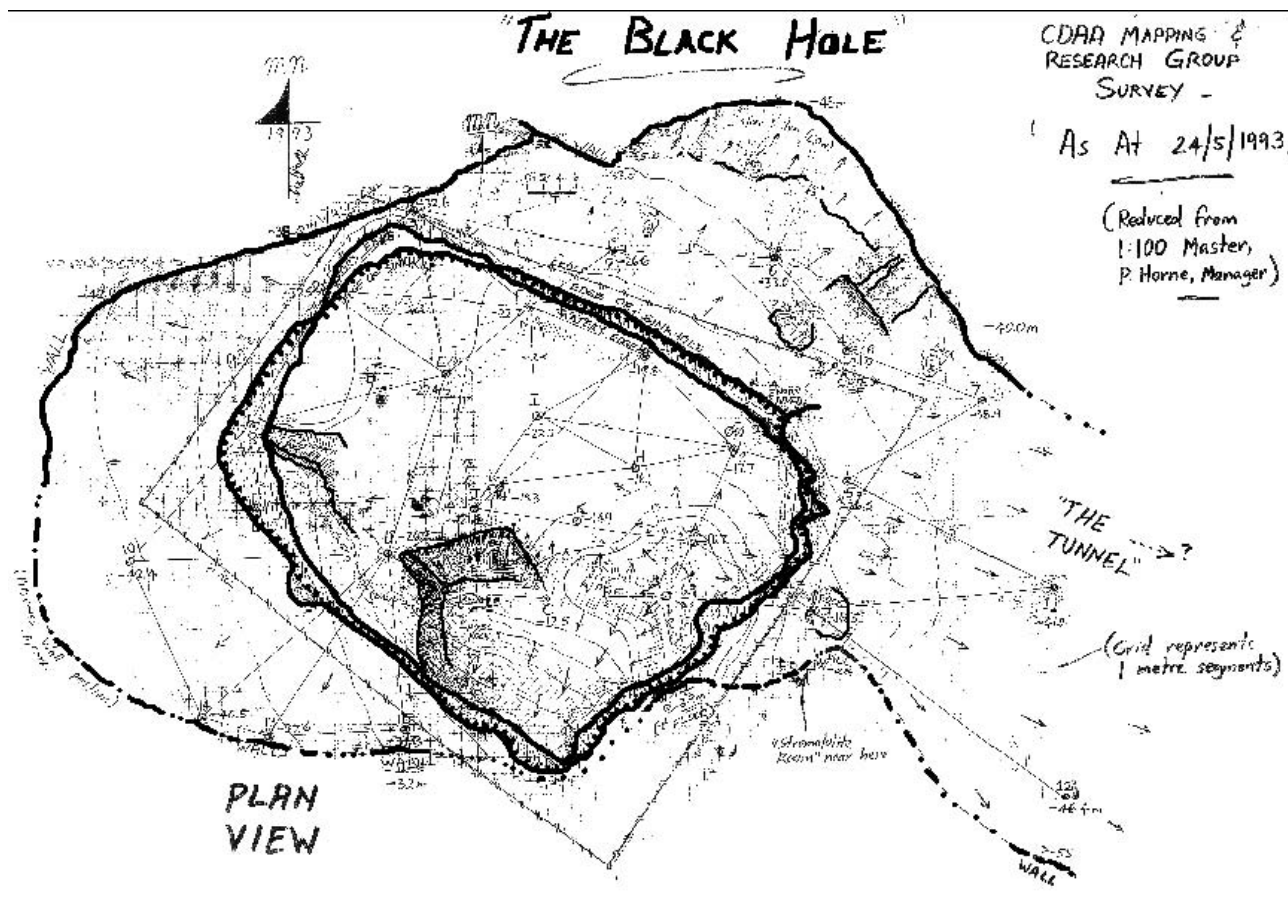
In 1992 a team of some of Australia's most experienced deep cave divers including Ron Allum, Chris Brown and Phil Prust dived to the 87 metre point, around 200 metres in from the entrance, in the Big Tunnel of The Shaft with world famous U.S. cave diving pioneer, Irby Sheck Exley, and years later other deep teams (again including Chris and Phil) would explore the very deepest regions of this awesome cave to around 125 metres on the opposite side of what was long believed to be the deep end and it is tragic that Sheck was to perish just two years after his Shaft visit without having known of these later discoveries.

The mighty Black Hole began to reveal its true nature in 1994 during the first stages of a detailed exploration and surveying project in the sinkhole; the study was coordinated by the author and only stopped when the property changed hands and the site was closed (and the air divers were working at depths approaching 50 metres). And in 1995, two new sites, Hanns Cave and Bakers Cave, were opened up to the general Mount Gambier cave diving community. The same year Chris Brown broke the world record in Cocklebidy Cave yet again by reaching the apparent "real end" of the cave ... but who can know for sure?

Various Black Hole photos by the author, Andrew Cox and Alex Wyschnja.







The Future

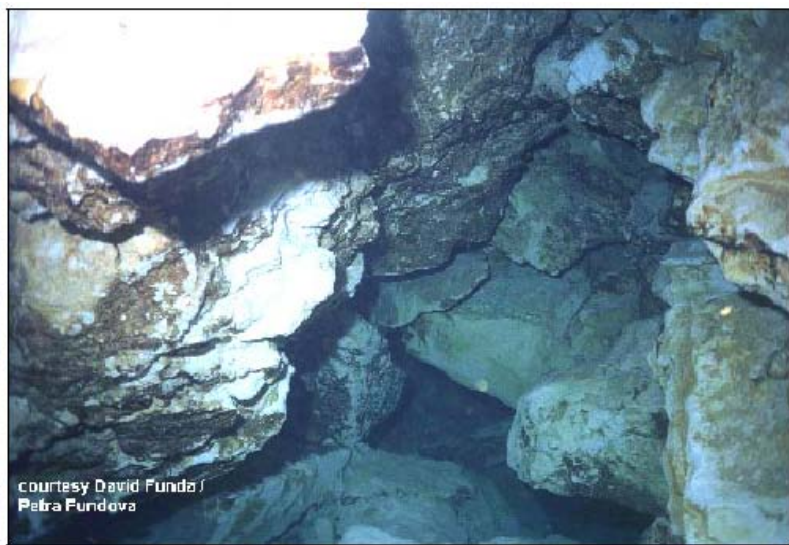
There have been many truly spectacular underwater cave discoveries during the past few years. With thousands of caves now known to exist on the Nullarbor alone, there is a great deal of fascinating speleology to be undertaken in this vast country of ours.

As prominent Western Australian cave diver Paul Hosie mentioned in a report dated March 2004, "after the last of the 'great' cave diving expeditions to push Cocklebidy Cave occurred in 1994, things seemed to quiet down a little. We stood back and looked on in awe at the achievements of the Americans at places like Wakulla Springs, as well as the extensive flooded cave systems of Mexico ... although cave diving still continued in New South Wales and South Eastern Australia, many subsequent visits to the Nullarbor revealed little in the way of exploration or new passages. Had it all been done? Was there nothing left to do but follow line?? Recent discoveries and a new generation of cave diving explorers are showing that exploration of Australia's awesome Nullarbor Plain has only just begun..."

In 1997, Paul, with fellow cave divers Andy Nelson, Craig Challen and Karl Hall dived all of the known wet caves of the Nullarbor and later realised that there were many other diveable caves in the region. Their first breakthrough occurred in Nurina Cave on the Roe Plains, where some 150 metres of virgin underwater passage was explored. To explore this cave, the divers were required to adopt "...sidemount techniques and all the team members learnt underwater surveying skills in order to map the new passages they had found". The cave was subsequently explored to more than 700 metres, with many underwater leads still to be explored. Later in September 2000, while the divers were surveying the main line through Warbla Cave during an expedition coordinated by the Sydney Speleological Society (SUSS), a small low flattener passage was noted high on a wall about 300 metres into the cave; further investigations eventually led to "Lost Lake", revealing to the group that in fact "...there was still a lot of work to be done on the Nullarbor, and all involved now had 'the Exploration Bug'!!".

A lot has happened in the Nullarbor during the last few years in relation to the astounding mega-kilometre discoveries there of such places as Olwolgin and Burnabbie Caves on the Roe Plains, and there was also a major rekindling of the Exploration Bug in Mount Gambier during 2003 and 2004 as well when visiting Czech academics/cave divers David Funda and Petra Fundova bravely pushed many of the “question-mark” areas in numerous Mount Gambier caves and discovered among other places everything extending beyond the Dark Room in The Pines (notably the CCR – the “Crazy Czech Room” or “Closed Circuit Rebreather”) and the deeper, side-mount-only regions of Stinging Nettle Cave across the road from The Pines. And even as this paper was being prepared, the author was aware of yet more spectacular caves which have only just been discovered by such people as Paul Hosie, Dr Richard “Harry” Harris and Ken Smith et al in the Kimberley (Western Australia) and Camooweal, etc.

It is, indeed, really very much ‘early days’ for cave diving in Australia!

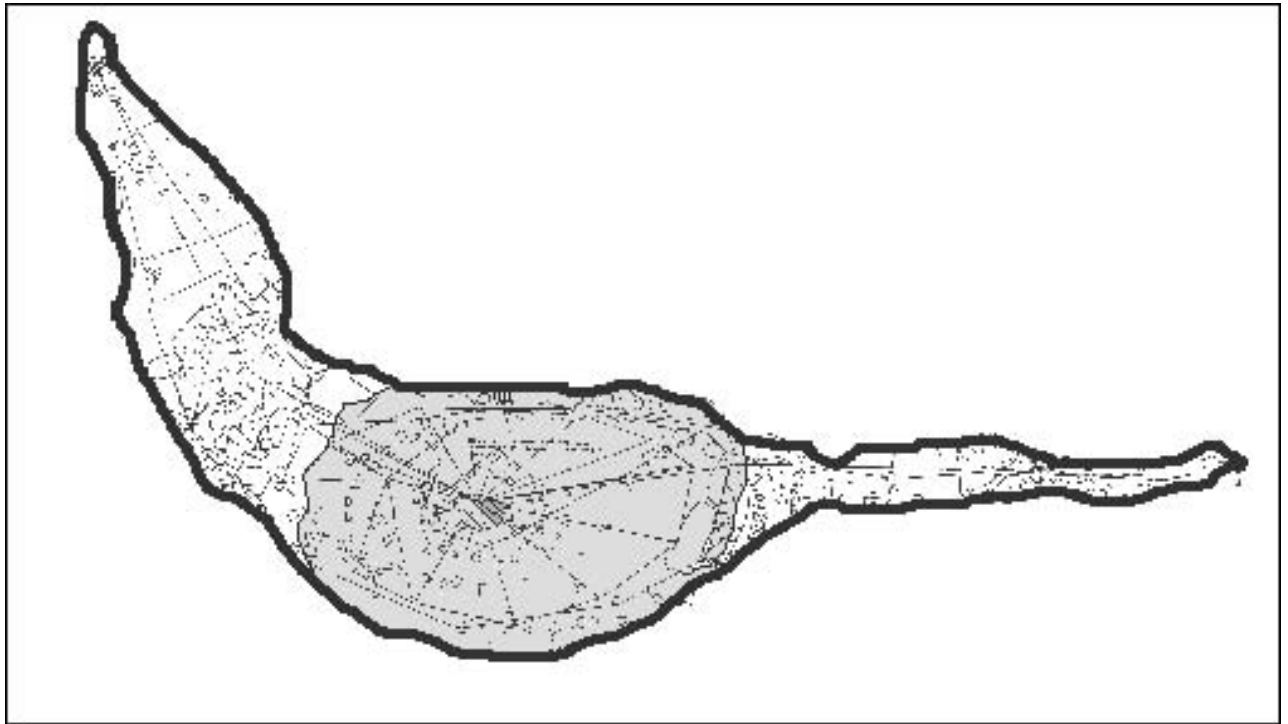


The Pines in the mid-1980s (by the author) and the original squeeze at the end of the Dark Room in 2003 which led to a large area of new cave including the CCR (courtesy Dave & Petra Funda).

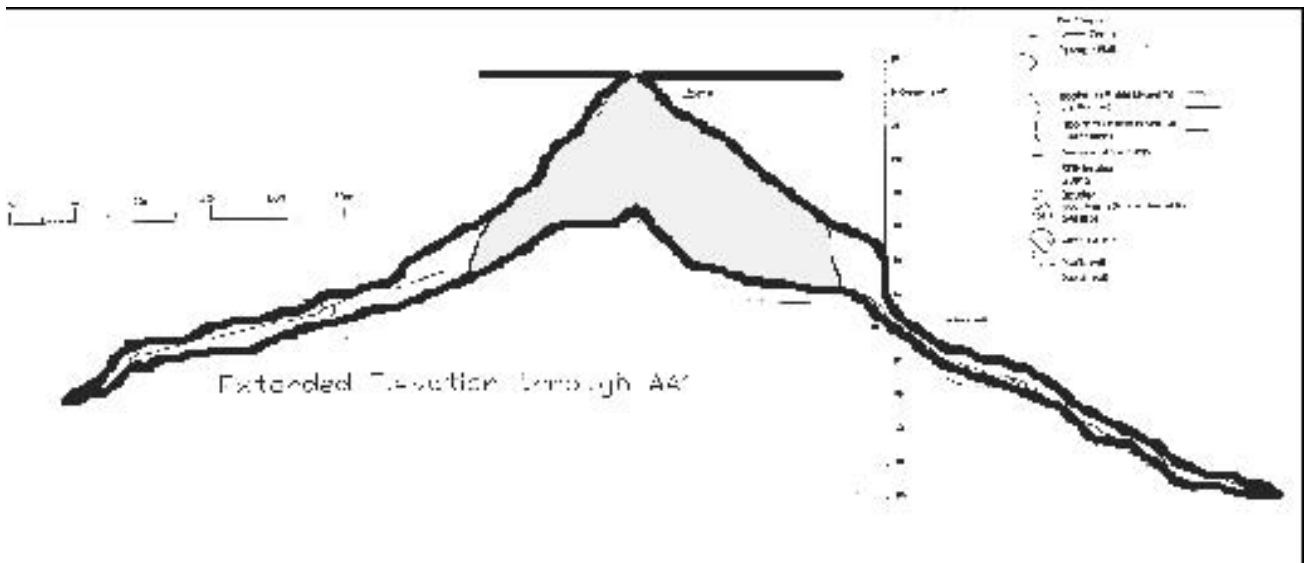


Petra Fundova, Ken Smith, Carlo Virgili and David Funda during the weekend that the Dark Room restriction collapsed, opening up the area to everyone (photo by the author).

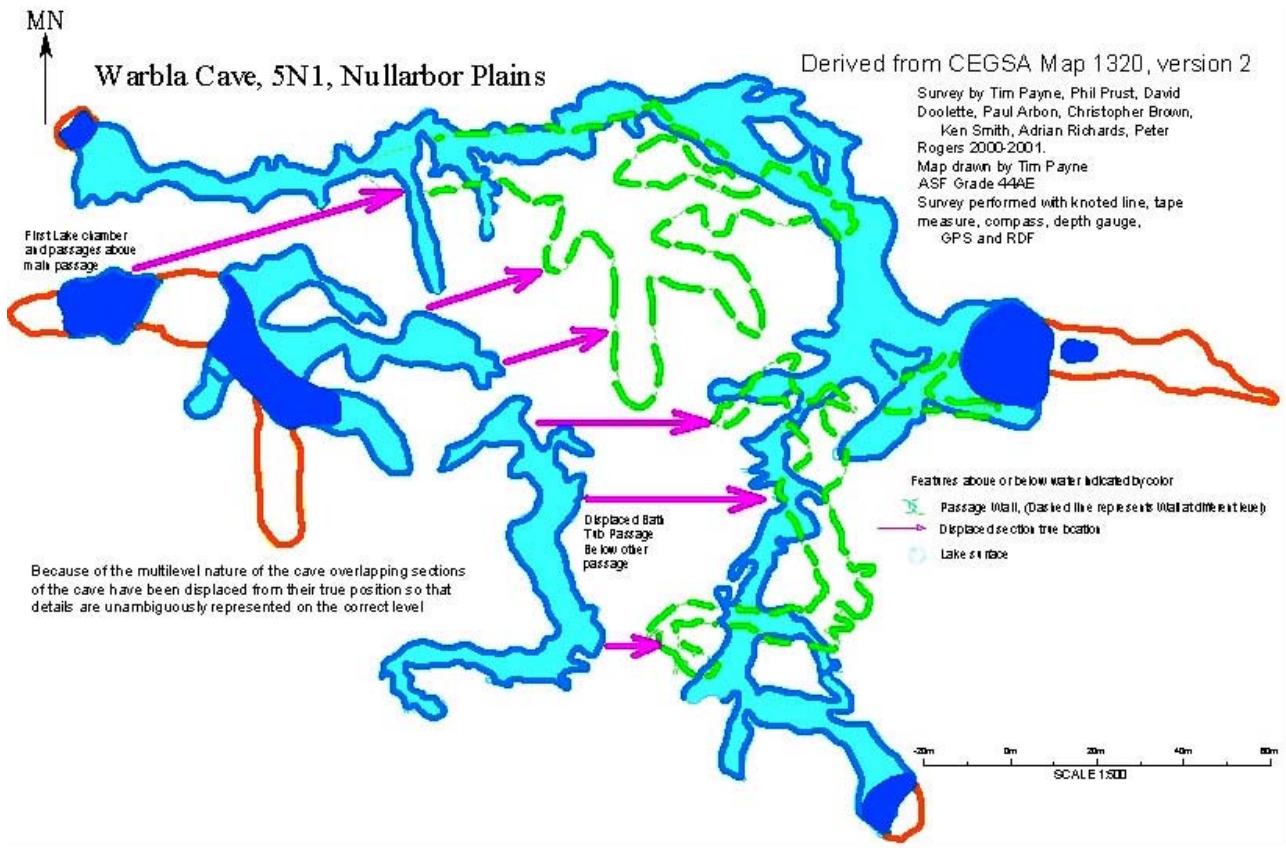
Recent maps of the final exploration and survey of the deepest accessible regions of The Shaft, undertaken using trimix between the mid-1990s and 2006 (with special thanks to Tim Payne and Chris Brown, ASF Cave Diving Group).



PLAN VIEW



LONG SECTION



Another recent and very detailed map by Tim Payne and colleagues.
This time of Warbla Cave on the Nullarbor (again, with thanks to Tim).

Acknowledgements

This necessarily-brief historical summary was produced from a huge amount of much more detailed personal information which was kindly provided to the author by many dozens of people, particularly Dave Warnes, Peter Stace, Mick Potter, Snow Raggatt, Phil Prust, Ian Lewis, Peter Girdler, Chris Brown, Paul Arbon, Bob Cunningham, Doug Haig and Bob Pulford (South Australia); Andrew & Liz Wight and Al Grundy (New South Wales); Stuart Nicholas, Nick Hume and Stefan Eberhard (Tasmania); Peter Robinson, Ron Addison, Peter Ackroyd and Chris Edwards (Victoria); and Paul Hosie and Hugh Morrison (Western Australia). Many others helped to pioneer cave diving in South Australia, and it is only because of the unfortunate lack of published records that the contributions of other early underwater adventurers are not so widely known or acknowledged. It is the author's hope that this paper and presentation will help to serve as a starting point in this regard.

Selected Bibliography and References

- Early European cave divers: CDG Early Diving Milestones, accessed on-line July 2007:
<http://www.cavedivinggroup.org.uk/Essays/History/pre1930.html>
- CDAA Inc. (1981) -Occasional Paper No. 2.
- CDAA Inc. (1983) -Kilsbys Hole (unpublished report).
- CDAA Inc. (1983) -The Shaft (unpublished report).
- CDAA Inc. (1984) -Piccaninnie Ponds Mapping Project 1985 - ISBN 0 7316 7208 9.
- CDAA Inc. (1989) -Barnoolut Estate Sinkholes Environmental Assessment Project
27/12/1988 - ISBN 0 7316 7211 9.
- CEGSA Records – Cave Exploration Group South Australia Inc., PO Box 144, Rundle
Mall, South Australia 5000.
- HALLAM, Dr Neil (1985) -The Biology of Ewens & Piccaninnie Ponds, South Australia -
HABITAT, 13 (1) pp 16-22.
- HORNE, Peter (1982) -Seasonal Temperature Changes in the Waterfilled Sinkholes of the
Lower South East Region of South Australia - A Preliminary Study and
Analysis by Cave Divers, March 1981-82 - ISBN 0 9594383 4 2.
- HORNE, Peter (1985, 1987, 1989 & 1991) - Various personal “Blue Lake” Research
Reports including ISBNs 1 86252 605 2, 0 9594383 1 9 and 0
9594383 2 7.
- HORNE, Peter (1993) -Lower South East Cave Reference Book - ISBN 0 9594383 9 4
(first edition and unpublished revisions).
- LEWIS, Ian and STACE, Peter (1980) -Cave Diving In Australia - ISBN 0 9594963 0 0.
- MARKER, Margaret E. (1975) -The Lower South East of South Australia - A Karst Province -
Report for Dept Geog & Environ. Studies, University of the
Witwatersrand, Johannesburg - ISBN 0 85494 318 8.
- NEWTON, Cate A. (1988) -A Taphonomic & Palaeoecological Analysis of the Green
Waterhole (5L81), A Submerged Late Pleistocene Bone Deposit in the
Lower South East of South Australia - (unpublished Bach. Science Hon
Thesis, School of Bio Sciences, Flinders University).
- NSS-CDS - NATIONAL SPELEOLOGICAL SOCIETY CAVE DIVING SECTION, U.S.A.
(1982) - Cave Diving Manual - Edited by Irby Sheck Exley and India F
Young (Chapter 14).
- PLEDGE, Neville (1980) -Macropodid Skeletons, including: Simosthenurus Tedford, From an
Unusual “Drowned Cave” Deposit in the South East of South Australia -
Rec. South Aust Museum, 18 (6) 131-141.
- SAUSS Inc. (1988) -Fossil Cave (5L81) Underwater Palaeontological & Surveying Project
1986 - ISBN 0 9587507 0 X.
- SAUSS Inc. (1988) -Gouldens Hole Mapping Project - ISBN 0 958707 1 8.
- SAUSS Inc. (1989) -Blue Lake Research Report - ISBN 0 9587507 2 6.
- ZEIDLER, Wolfgang (1985) -A New Species of Crustacean (Syncarida: Anaspidacea:
Koonungidae) From Sinkholes and Caves in the South East of South
Australia - Trans. Royal Soc. South Aust, V109 Pt 3 pp 63-75.

