

Elk River Cave Extended by Diving

The Discovery and Exploration of the Murrindal Potholes Eastern Master Cave

Peter Freeman and James Arundale

ELK RIVER CAVE in Buchan, Victoria, was originally explored by the Victorian Limestone Caving Team (VLCT), had 100 m of accessible stream passage, terminated at each end by a sump.

A probe into the downstream sump had been made by diver Stuart Germon during a VLCT trip in September 2006, resulting in the observation that it ended after a few metres in a constriction.

Later Laurie Brown used a makeshift hookah to inspect the upstream sump and Peter Freeman probed it for reachable air-space using rigid blowpipes.

Later still, the blowpipe probing was performed at the downstream sump. No useful knowledge was gained from all this except that any airspaces must be more than 2.5 m away.

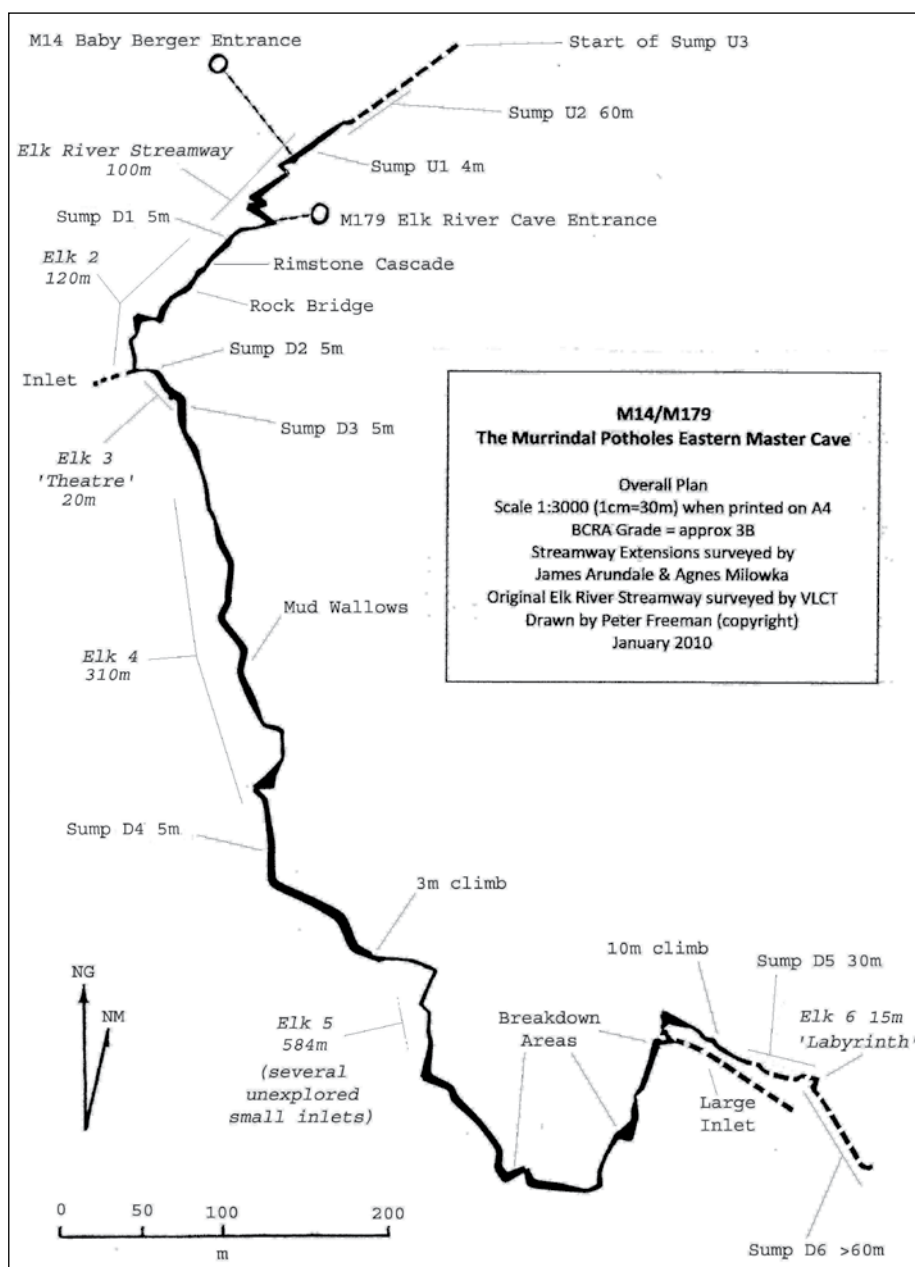
After several visits to the downstream sump, and close observation of the stream passage and its two near-sumps or 'roof-sniffs', Peter concluded that the underwater sections at each end should be relatively short.

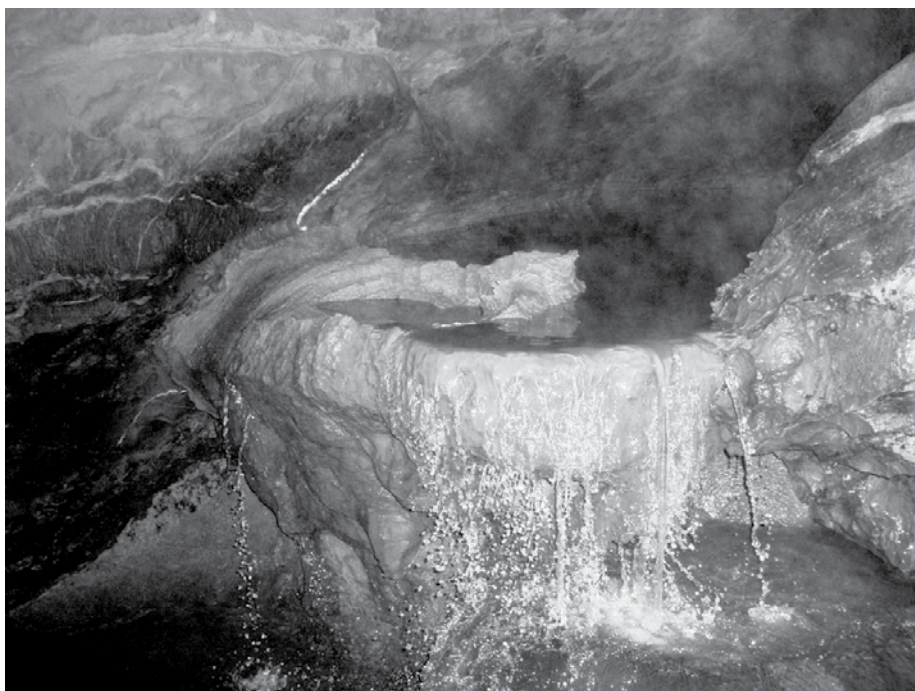
This conclusion was based on the fact that the streamway in this section of the cave runs at a low gradient (much of it seemingly on a band of insoluble chert), and that the roof sniffs themselves are perched by barriers of secondary calcite.

The roof sniffs are probably in the process of building up to become sumps, so the two actual sumps would likely be similar in form.

It was time to try an alternative approach. During a VSA trip in January 2008 Jim Arundale inserted himself into the downstream sump in dry gear and came to the same conclusion as Peter.

A photograph of Stuart's diving attempt





Rimstone Cascade in Elk 2

showed the diver using standard back-mounted tanks. Jim, having grown up caving and cave diving in the UK, reckoned that a "proper" side-mounted system could be a little more productive.

March 2008

Diver – J Arundale

Support – P Freeman, B Nuske, M Effendy

This trip, as with all the others, was made using the M14 Baby Berger entrance: although it is the longer route, 'local politics' dictated that this was the only option open to us. Jim had decided that for the initial examination, a single side mounted 40 cuft tank and wetsuit would be sufficient to gain an understanding of the sumps while not burdening the team with too much equipment.

Peter and Jim went down the cave on the Friday afternoon to rig the pitches and carry the majority of the gear as far as possible. This five hour trip resulted in the cave being completely rigged and all the dive gear on the ledge above the streamway.

On the Saturday morning we were joined by Brett and Meilly who had kindly volunteered their time to assist with the gear on the trip out. Progress through the M14 route to the Elk River Streamway was uneventful. We stored our SRT kits near the Balcony Crawl. The only remaining pitch further down the cave is descended by ladder.

Once at the downstream sump, Jim passed the end of the reel to Peter and dropped into the water with a view to moving quickly to stay ahead of the silt. After around 3 m

in a pleasant 75 cm high passage, the floor began to rise and a low bedding constriction was reached. Squirming into this, a point was reached where the passage height reduced to around 30 cm. Tantalisingly, the shimmering of an air surface was glimpsed just beyond the restriction before clouds of silt enveloped the diver and visibility was reduced to zero. The reel was locked off and a return to base made to report progress and discuss options. Three more dives were made, each one pushing slightly further than before. On the fourth dive the helmet and lights were removed as being not required and their bulk restricted progress. At the far point, with his head on one side, the gravel/mud floor slumping in behind him and the single regulator complaining about the quantity of stones in the water, Jim decided that slightly more equipment was going to be needed to get a reasonable safety margin, so a retreat was made.

Once back at base, we decided that enough gas and testosterone remained for an examination of the other sump and we made our way back upstream. Dropping into this sump, it was obvious to Jim that it was going to be short and relatively roomy. After only 4 m Jim surfaced into a reasonable sized passage. Giving two tugs on the line to indicate to Peter that airspace had been reached, Jim made a brief examination of the passage that revealed another sump around ten metres further upstream.

Having plenty of air, Jim dived back through to explain the situation before the second upstream sump was tackled. This one proved to be quite small at the start and required some excavation before entry

could be made. Once in, Jim found that it quickly opened up to be nearly 2 m diameter in crystal clear water. The shimmering air surface proved unusable, but showed that the sump had no depth. After around 15 m the end of the line was reached but the sump could be seen to be continuing. Mindful of the single kit and the awkward entry into the sump, a return was made and some more digging was done to ease the start for the next trip.

And so our trip was over, except for the long haul out. The difficult part of the M14 return from Elk River is, always, getting packs up the Balcony Crawl. We surfaced around 19:00 after eight hours underground and made our way wearily but triumphantly to Homeleigh.

We regarded this visit as highly successful. The original first upstream sump was passed and the second upstream sump was going, so more than 30 m had been added to the cave's length; and the downstream sump was confirmed as a possibility to pass, with air space visible! We began to plan a return to Elk River with more resources for tackling those new end-points.

November 2008

Diver – J Arundale

Support – P Freeman, B Bulled

The follow-up visit had two major objectives: firstly to see if, with the benefit of two tanks, the downstream sump could be dug through, and secondly to continue exploration of the second upstream sump.

Peter and Jim arrived in Buchan on Friday evening and immediately began their preparatory entry to Baby Berger M14. Four tackle bags and two dive tanks were moved through the cave's upper reaches to the pitch head, and the pitch was rigged. Rigging was improved over previous visits, with a nice Y-hang over a clear drop to Photographers Ledge. We exited the cave into a misty drizzle and fading light at 21:00 after only two hours underground.

The following day, with the assistance of Bruce Bulled as far as the pitch head, we headed down again. It didn't seem to take long before we were donning wet suits at the streamway.

Once in the sump, it was obvious that the way through was to follow the right hand wall and, in the rapidly diminishing visibility, the air surface didn't look that far. Comfortable with two tanks, progress was made by scooping the floor out with hands and pushing it up to one side. In this way, the reel could be moved forward in stages, despite the disconcerting feeling of gravel slumping in behind the legs. After several minutes an outstretched hand could just

ELK RIVER CAVE EXTENDED BY DIVING



Jim at the Elk 2 Bridge

J ARUNDALE

that if the water flow could be concentrated through a specific smaller section then the normal flow would carve out a natural channel. This completed, an attempt was made to communicate using the UHF radio. Silence from Peter was interpreted as simply a failure in technology and Jim set off downstream checking out various leads, re-pacing the distance and taking photographs.

Back at the dive base, Jim discovered that a burst-disk was leaking on one of the tanks and an HP hose was torn. A tense dive out ensued and it was decided that due to a lack of spares the following day's diving would also be cancelled. A leisurely trip out saw Peter and Jim back on the surface after seven hours underground.

A major advance had not been made on this visit but much had been learned. The nature of the sump-pool perching had been fully assessed, fairly good photographs had been secured, the second downstream sump had been revisited and side passages had been noted.

August 2009

*Divers – J Arundale, A Milowka
Support – P Freeman, N Wilson*

Although we were desperate to continue the exploration, we were, for various reasons, unable to return for over eight months. However, the team had now expanded by gaining Neil Wilson and Agnes Milowka (Ag). Neil had recently joined the VSA and had expressed an interest in helping, while Ag had returned from the USA, having made some major discoveries and being keen to do the same in Australia.

Neil and Peter had rigged the cave and transported some gear down on the Friday, so Saturday morning's transit was quite quick, compensating for the rather late (11:30) start. Neil improved the efficiency of our travel through Baby Berger by installing a redirect bolt near the Precarious Ledge. The previous trip's modifications to Sump 1 proved to be very successful, so it was with ease that Jim and Ag now passed it and left the non-divers to exit the cave.

Once through, Ag discovered that the waterproof housing on her camera actually wasn't, so the photography was postponed. A full survey was started, but it quickly became apparent that the clinometer had also suffered water ingress and the electronic distometer didn't like the damp, so the survey accuracy was now reduced to compass bearings and estimated distances. At the far end of Elk 2 the inlet on the right was followed for around forty metres past some nice calcite to an ascending rift that could go further with determination.

Back at the pool the way on was discov-

feel a vertical rise in the roof. Encouraged by this, digging continued until one eye could see a large airspace continuing out of sight. More frantic digging and the rest of the head emerged, followed shortly afterwards by the rest of the body.

Two tugs on the line were given to Peter to indicate that airspace had been found, then the gear was jettisoned and Jim skipped off down what was a noticeably larger streamway. After several chambers and a couple of very nice calcite waterfalls, a large circular room with a big pool was reached, with one obvious inlet and in all probability another sump. Conscious of leaving Peter alone for some time, and the prospect of a nasty dive out, Jim decided not to linger and paced out the distance back to the gear.

The dive out was not one of the nicest, taking two attempts and some serious digging and squeezing. We were not really sure who was the most relieved: Peter, to have the nerve racking solo wait over, or Jim to finally get back to airspace on the right side of the sump.

The second objective, that of the upstream sumps, was also tackled, but with the only line reel now left in place through the downstream sump, not much progress could be made apart from installing a permanent line through Upstream Sump 1 and successfully testing a UHF radio system.

The exit from the cave was laborious, even though we left some gear inside for next time. The Balcony Crawl, being body sized and at an angle of around 30 degrees, is horrendous to carry through in the upwards direction, and pack hauling around the corner to Photographers Ledge was

again a damn nuisance. Bruce was waiting at the top of the main pitch—he'd had the day outside (a walk around town, a cafe latte or two ...), but he timed his return perfectly. He admitted to us that he had got lost exiting the cave alone, as do all newcomers in that part of M14. Bruce's help with transporting packs was again most welcome.

So ended our second Elk River diving trip. Again, it was more successful than we had dared to hope. We now had over 150 m of extensions. It left us with many new plans in our heads, and itching to get back.

December 2008

*Diver – J Arundale
Support – P Freeman*

The idea for this trip was to dive on two consecutive days, thus making more efficient use of the inevitable onerous haulage of gear. The objectives were to try and enlarge the downstream sump in order to make it easier and hence safer to pass, to start the survey of the new passage, to take some photographs, and to check out the obvious leads.

With this in mind, Jim and Peter entered the cave on the Thursday afternoon. They had a quick trip down, as the Baby Berger main pitch had been fitted out with bolts and left rigged by Chalky Thomas and Peter during the previous weekend. A little over two hours therefore saw Jim through the downstream sump and UHF radio contact established. This dive again required much "interesting" squeezing, as the previously cleared channel had filled in and levelled out.

Some time was now spent in modifying the far side of the sump, with the idea

ered, with the pool leading into a sump. Two tanks were therefore retrieved from Sump 1 and Jim dived with a spool of VB cord. As the visibility had been destroyed during the fumbling around, nothing was seen until emerging from the sump after around five metres into a beautiful balcony pool perched above a two metre rock waterfall. A large passage continued on around a corner. The line was tied off and Jim dived back to split the gear with Ag.

Once both divers were through, the waterfall was down-climbed and the large passage followed for around thirty metres to another very attractive turquoise crystal-clear sump with an obvious roomy passage underwater. Ag strapped on the twin gear and disappeared into the sump. Jim had only a few minutes to ponder the fact that he was now beyond a sump with no dive gear, before Ag returned after another short dive to airspace. The gear was split again and both dived through Sump 3.

Elk 4 started off as a lowish bedding, with a couple of ducks, but quickly developed into a lovely passage, the stream here being noticeably bigger. As the route was followed downstream, a rift passage was encountered with deep mud overlaid by water that made walking strenuous (an area later dubbed 'The Wallows'). Breakdown areas and what may be a fault led to another sump after around 300 m and steps were retraced to collect the gear.

This time Jim dived with just single kit as everything suggested that Sump 4 would be another short dive. This proved true and once both were through, the gear was ditched and the pair headed off into Elk 5. At this point the cave has a much bigger feel again. After several climbs and some large chambers we came across a drop of around 3 m. Initially no easy route down was seen, and so finishing the day's exploration was discussed before Ag free-climbed down. After an absence of only a couple of minutes she returned with the words, "You'd better come and see this," and having proved that it was possible to re-climb the drop, they again set off. This time the passage had changed again, into a tall narrow rift. After passing more climbs and a large dry inlet that could be seen to continue, they finally came to a slanting rift pitch around 10m deep, which dictated the end of exploration for that trip.

Rough pacing out on the return journey gave an estimate between 550 m and 600 m for Elk 5, around 300 m for Elk 4 and 30 m for Elk 3. This coupled with the already known 120 m for Elk 2 gave a total extension of around one kilometre.

The long slog of hauling gear back to the start of the balcony crawl resulted in an



K SMITH

Agnes at Sump 3

overall trip time of nearly thirteen hours and it was two very tired people who wandered into Homeleigh after midnight, although this didn't prevent a bottle or two of wine being opened while the story was retold to Peter, Neil and Lynne until 4:30 am.

The following day was our 'de-rig and retrieval' descent. All four of us participated, and we had the gear out in four hours. As always, dragging each item up the Balcony Crawl was tedious, to put it mildly. When we drove away from Buchan to head home the whole team was elated: it had been an historic weekend, since we now knew for certain that we had found the Master Cave.

Early September 2009

Divers – J Arundale, A Milowka
Support – P Freeman, M Pierce

As usual, the non-diving support crew, this time Peter accompanied by Miles Pierce, had the thankless task of rigging the cave on the Friday night, allowing Jim and Ag a nice quick run through the cave on Saturday morning. The now familiar route to Elk 2 passed without incident. The survey was continued from the line belay at Sump 2. More photos were taken in Elk 3, where an advanced base/gear dump was set up and slightly mashed but dry and tasty sandwiches were eaten.

The survey continued in Elk 4, with Jim learning how to survey on the job. The on-camera flash was proving problematic with water vapour but Ag developed the technique of photographing while moving to stay ahead of the steam and, although not perfect, it did result in some good shots.

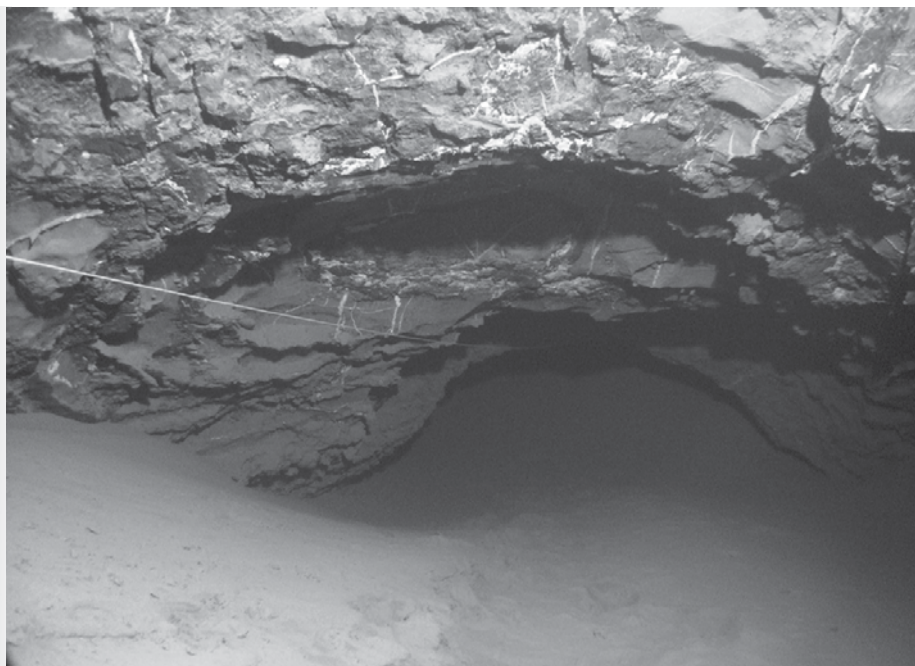
As planned, once in Elk 5 the survey

quality was dropped to distance and bearing only. The idea of rigging a rope on the 3 m climb was thwarted by the lack of natural belays in decent rock, the floor being of clean washed hard limestone with boulders of flaky mudstone. In the end a tape sling was looped optimistically over a slight ridge and Ag and Jim pressed on.

Shortly after the climb, at the start of the 'pretty section', the batteries in the disto gave up the ghost, and with time pressing on we abandoned surveying in preference for photography. Alas, soon after this the second camera battery also died and we took this as a sign to press on to the known end. Reaching the top of the 10 m rift pitch, we had more trouble finding suitable belays, the two obvious well jammed chockstones at the top proving somewhat mobile. With these repositioned halfway down the pitch, the rope was abandoned and Jim free climbed down. Ten metres horizontally from the base of that pitch the passage became out-of-depth in water, but through a roof-lowering to near water level it could be seen to continue.

Ag climbed down the pitch and the duck was passed to a smallish chamber with out-of-depth water and no obvious way on. As Jim had insisted that they would pop out of a hole in the roof of Scrubby Creek Cave, all the diving gear had been left at the previous sump around 600 m away. It was therefore not possible to locate the underwater continuation of the cave passage.

Determined to try to find a Sump 5 bypass, Jim re-climbed the pitch and traversed over the top following where Ag had examined the previous trip. The connection



The dive line through clear water in Sump 3

turned with photographs, survey data and an improved understanding of the nature and layout of the cave. Once again, naturally, we stayed up late. Despite their tiredness, Jim and Agnes needed the wind-down time, and we spent two hours discussing the trip and making notes while all the experiences were fresh. And we may have drunk a little wine.

The following day, the divers woke to find that the support team had already gone back down the cave and retrieved the gear that had been left in there the previous night.

Later September 2009

Divers – J Arundale, A Milowka

Support – P Freeman, N Wilson, D Pierce

The principal objective on this trip was to examine the sump at the end of Elk 5. To avoid carrying too much gear, Ag and Jim had decided to take a tank each to the start of the sump, where Ag would dive on twin three-litre tanks. In addition, Jim would position a spare tank at the exit of Sump 4, in order to secure his escape just in case Ag got too enthusiastic.

After the support team bade the divers farewell and good luck at the first downstream sump, an efficient carry was made through to the end of Elk 5, pausing only briefly to place a bolt at the top of the 3 m climb: a fall resulting in any injury here is something to be avoided.

At the start of Sump 5 Ag kitted up with the three litre tanks and she dropped quickly out of sight, the sump obviously going much deeper than the previous ones. She was only gone around ten minutes before returning to report an easy 30 m sump followed by around 15 m of passage and another sump. The gear was split and both dived to Elk 6 in zero visibility.

In an attempt to stay ahead of the silt, Jim took the remaining line and on single kit floated into Sump 6. The way directly ahead seemed to continue in an awkward looking tight rift, so the obvious deeper route to under the right hand wall was followed. This dropped for around 3 m before seeming to turn back to the original passage direction and continue on roomy. At around 30 m from base, it became obvious that the passage was continuing at a similar depth, and a large convenient block in the middle of the passage suggested that this was far enough on single kit with one light, no fins and only 3 mm cord as dive line.

Back at the start of the sump Ag decided to have a look. Being undeterred by Jim's caution, another twenty metres of line was laid before the way could be seen dropping off to greater depth, and a return was made.

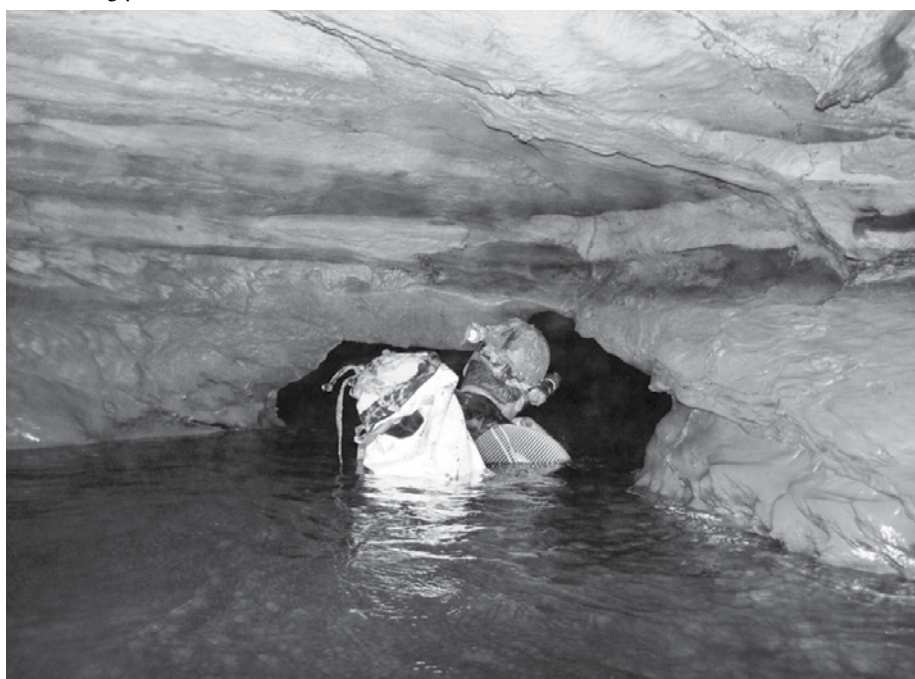
between the upper and lower sections was proved, with Jim dropping rocks on Ag as she also made her way out. This marked the far point for exploration on this trip.

It was decided to re-examine the large dry inlet on the way out. They had been stopped on the previous trip by some lovely mud formations that they thought they could bypass by cutting steps around the edge. This they tried, and it proved marginally successful, with Ag performing some interesting acrobatic manoeuvres on a loose climb. The passage continued to rise gently with a very slippery muddy floor, finally ending after about 70 m in a muddy crawl that could yield more with some excavation. Interestingly, evidence of burnt charcoal was

seen below a tight ascending rift, indicating a connection to the surface. There is also a lower level to this area, which was not examined at this time as the way down is steep and is coated in frictionless mud.

Once again, at Homeleigh, the support crew and surface helpers waited many anxious hours for news, and again deposited sustenance up at the Potholes car park for a pair of tired divers (jam sandwiches and hot tea—becoming rather a tradition already). Jim and Ag finally let them breathe again by parking outside Homeleigh at 02:15. That made fifteen hours in the cave, ten of which were spent beyond the sumps.

That the divers had gained little new length was of no importance. They had re-



A Duck in Elk 4

The various high level passages visible in Elk 6 were explored, but they all seemed to connect back.

Once back in Elk 5 they surveyed out and investigated various inlets, all of which quickly narrowed down but may lead to more passage with some gardening. The resultant survey length was 580 m, which showed that the estimation was damned good as it had been paced out at between 550 and 600 m.

Back in the comfort of Homeleigh, Neil, Darryl, Lynne and Peter had to sit up only until 00:30 this time before the divers returned after a mere twelve hours underground. Again, a long debrief session ensued and they drank a glass or two of wine before they retired.

The next day saw a very rapid de-rig trip, with most of the hard work being done by Darryl and Neil.

November 2009

Divers - J Arundale, A Milowka, M Collins, K Smith

Support - P Freeman, T Matthews

This trip saw an expanded dive team with the addition of SUSS member Michael Collins and CEGSA member Ken Smith. Both Mike and Ken are experienced sump divers and were more than keen to help with the exploration. The non-diving team was supplemented with Ted Matthews (who is, like Mike, a guide at the Jenolan show caves).

The plan for this trip was for Michael and Ken to help haul gear to Sump 5, and then to have a thorough look around and take more photographs in that area whilst Jim and Ag were diving Sump 6.

As was now normal practice, the cave was rigged on the Friday night (by Peter, Ken and Ted) in preparation for the divers' descent next day. The logistics of packing all the gear for four divers delayed the start until lunchtime and the huge amount of gear took quite a while to get to the first sump. At this point the support crew turned back and exited from the cave, as usual. The dive team's slow pace continued through the new sections as they wanted to get underwater shots as the first diver entered the sumps.

Once at the end of Elk 5, Jim dived first, with Ag planning to follow twenty minutes later. On reaching the end of the line in Sump 6, Jim tied on a new reel and swam through a slight dogleg with the depth dropping to a new record for this cave system of 6.9 metres.

Turning to the left, a rising bedding plane was entered, with the roof lowering more quickly than the floor. The left wall now seemed to offer a better route, but progress



K SMITH

10 m rift rlimb leading down to Sump 5

was slowed as some larger boulders required relocating. Since the snoopy loops had been mislaid, Jim optimistically looped the line around several very rounded boulders, hoping this would secure the line.

By this stage the visibility was zero and it was only on breaking out of the bedding plane that an air surface was seen. Thinking this was the end of the sump, Jim rocketed to the surface with visions of more railway-sized tunnels roaring off into the distance. Unfortunately, on surfacing he found himself in a large blind solution pocket with thick dense mud coating everything. Re-submerging in very poor visibility a vague impression of a way on to the left was spotted. Conscious of having been breathing like a steam train and knowing that Ag would soon be arriving with bigger tanks, Jim locked off the reel and jammed it in the wall.

The return out of the sump was made in pretty poor visibility and the divers re-united. After listening to the description, Ag set off, leaving Jim to examine the various high level passages in Elk 6. She returned after around 30 minutes having seen nothing for the entire dive and not really having made much progress due to the poor visibility and issues with the line. A marked dive-slate was left with the reel at the farthest point.

The return journey was much easier with the assistance of Mike and Ken, and so on reaching Uncles Aven it was decided to have a peek upstream. Jim and Ag passed the first upstream sump and Ag continued into Upstream Sump 2. This went for nearly 60 m before surfacing in a low, narrow canal, which ended after fifty metres in a third upstream sump.

Deciding enough was enough and conscious of the time, a retreat was made, and the reunited dive team of four began the long slow haul out. It was only on reaching the bottom of the entrance shaft, when daylight was seen, that they realised how long the trip had taken—nearly 18 hours in all. It was 05:30 am!

Since none of the divers was in shape for more work, and indeed three of them had to get back to Melbourne later that day, the de-rigging and gear retrieval task was postponed from Sunday to Monday and was performed by Peter, Ken and Ted. This allowed a grateful dive team some sleep.

Conclusion

The exploration of what is now perceived to be the Murrindal Potholes Eastern Master Cave continues. The survey published here shows a streamway length of about 1400 m (this does not include the access routes via M14 or M179, or any branches). Under rather trying circumstances our surveys have been of variable standards: they are steadily being refined. Most of the cave has been seen only a limited number of times, so details are sketchy and leads may have been missed.

Much remains to be done, including the relating of the underground environment to surface features, and geological and other scientific aspects of the exploration.

However, there can be no doubt that this is the most important cave find in Eastern Victoria since the major caves were uncovered in the 1900-1910 era. The system's total length of around 1800 m and depth of around 100 m places it high in Victoria's rankings.