

Kija Blue Trip Report 2005 By John Cugley

14-17/10/05

Participants: John Cugley, David Woods, Donna Cavlovic, Ronnie Atkins and Narelle Susac.

14/10/05

Finally, the big day had arrived. The pre-trip planning was coming together and everyone was in high spirits even though it was still only 6:30am in the morning. We all left Kununurra in Ronnie's Toyota to make our way to meet up with the helicopters that were to transport us out to Kija Blue Sinkhole. After some great roadhouse food (always need something in the stomach when flying) it was off to meet the pilots to discuss loading tactics and remote landing procedures. After evenly loading the two helicopters we were ready to take off. Donna and Narelle took off in the Robinson R44, with Woodsy, Ronnie and me taking off five minutes behind them in a Bell Jet Ranger. It was a great flight out to the sinkhole, with the flight path going over areas that we had explored during the previous couple of years.

The time went really quick, and before too long there it was, Kija Blue! It looked great flying around the sinkhole, while the pilot was looking for somewhere safe to land close by as this would mean that we did not have to carry the gear too far. As the other helicopter (Donna and Narelle's) was smaller, it had landed right near the edge of Kija Blue. Awesome sight. After unloading the helicopters and transporting the gear to the low side of the sinkhole, it was time to say goodbye to the pilots who would return in four days time to pick us up.

We had a group discussion about where to set up camp and taking the weather into consideration (it was very overcast and very hot, pushing 40 before 10:30 – good build up weather), we decided to find a location in the base of the sinkhole to set up camp for the next few days. After setting up a rope and getting our gear and ourselves into the sinkhole, it was time to find a camp spot under one of the overhangs. The only drama that we had of getting into the sinkhole was when Woodsy's bottle of port got smashed in his pack. The big worry being would my one bottle be enough to last the next couple of days, for all of us? Shows why you always need to make sure that you double up on the essentials in case of accidents!

Whilst looking for a spot to camp, the cool water of the big lake was too much of a distraction and we had to go for a swim to cool off. Especially after being in the sun for the last couple of hours. What can I say, but it was just awesome to be there! Looking at this astonishing crystal clear blue lake under a huge overhang, we were all overwhelmed by its splendour.

The water was really refreshing and after our swim, we were all revitalised. It was off to locate our base for the next few days. We found a great spot to set up camp with enough flat spots for all, under a large overhang. It was time for a bite to eat.

After lunch it was time to go and have a walk around the sinkhole to check it out. We came across some old rock paintings, this made for some interesting discussions on their meaning. Also a snakeskin was seen blowing in the breeze, high upon a ledge. Another find was a wooden spear under a very loose rock pile. A smaller lake was discovered that caught the afternoon sun. With shafts of sunlight penetrating the depths, it illuminated the wonders of this place. The aquatic plant life growing in the water was amazing. The brilliant green foliage and the blue water were startling. This made it a great place to have a swim and take some magnificent photos. What a way to spend an afternoon!

After watching two species of bats (*Taphozous georgianus* and *Vespadelus caurinus*) leave their roost on their way to forage it was time for us to do the same. It was to be the first wonderful freeze-dried meal of the trip. This was a first time for some of the team to sample the delights of freeze-dried cuisine. After some chat, it was time to drop off to sleep and dream about this amazing place. During the middle of the night we were woken up by a large thunderstorm that passed overhead. A good decision made earlier meant that we were out of harms way, and not in an exposed location. There was lots of wind, rain, lightning and huge claps of thunder.

15/10/05

We rose with the sun, and had a refreshing wake up swim. After some breakfast, it was decided to head up to the top to do the necessary bodily functions and go for a morning walk. It was very wet up top from the overnight rain and all the watercourses in the area were flowing. Hardly any water had flowed into the sinkhole overnight, so the clarity of the water in the lakes was not affected. We headed off to have a look at a small sinkhole noticed on a map during one of the pre-planning sessions. Unfortunately it amounted to nothing, but a green pocket was noticed down the valley by Woodsy, so it was off to there to have a look. We finally made it after a good hours walk.

It was a rainforest pocket that had suffered from a fire. As the vegetation was thinned out this allowed us to find a massive paperbark tree growing along a creek (one of the largest any of us had seen before). After a bite to eat and a quick look around it was time to head back towards Kija Blue. We walked up a flowing creek, filled up the water bottles and had a quick splash. The weather by this time in the day was very humid and hot. We separated here with Woodsy, Donna and

Ronnie walking up the middle of the valley, back to the sinkhole. Narelle and I took a different route back. We walked up towards a ridge, north of the rainforest pocket then back towards Kija Blue. Our route took us past the blind doline next to Kija Blue. I had a brief look, but nothing of note was found.

After getting back down into Kija Blue, it was time for a swim and to have a well earned rest. We all headed off to the lake visited yesterday at mid afternoon. We took advantage of the sun being in the right position to allow for some great photos to be taken underwater of the plant life and beams of sunlight penetrating the water.

Before we knew it, it was time for the bats leave their roost to forage. That meant it was time to have a rationed drink of port and a chat before the serious business of dinner. Once dinner was over, I went for a look in the large chamber where the bats seemed to be roosting. This chamber was quite large, with the roof about head height. There were a lot of large fallen rock slabs all sloping down to several more lakes. I came across another large empty snakeskin. Glad I did not meet its owner! After exploring for an hour it was back to the camp area. After some idle chat everyone drifted off to sleep. We all slept much more peacefully, with no thunderstorm to disturb the dreams.

16/10/06

Surveying day! This was going to be a big day for the East Kimberly crew, as this was the first feature we were going to survey using the recently purchased Disto, which measures distance using a laser beam. It does so very accurately along with minimizing the impact on the cave. As we had two sets of gear (thanks to the club for sending up a set of survey gear), we broke up into two teams. The first team consisted of Donna, Narelle and Ronnie and the second team of Woodsy and myself. A point was located near the south side of the main lake and this was to be the tie in point for the two surveys. The girls headed off to survey the large chamber, with us boys heading off in the other direction, around the main lake. After this was completed, we surveyed around the perimeter of the sinkhole. After a couple of hours, we met up with the girls and closed in the two surveys near the abseil spot.

After a good morning's work, it was time to have some lunch. We sat around eating and comparing drawings and data. After lunch, Woodsy and myself spent the afternoon finishing off several splay shots and side bits of the sinkhole. Narelle got her paints out, and

painted a groovy picture of the main lake. Donna and Ronnie spent their time taking photos of the aboriginal rock art to further document the sinkhole.

One downside of camping in the sinkhole was not getting to watch the sunset so we all went up top in the late afternoon, when the temperature and humidity had dropped to a pleasant level. We found a great vantage point near by, to watch the brilliant colours of the setting sun in this remote area, whilst sipping on the last of the port.

17/10/06

It was a sad day as it was our last morning here before we were to be picked up at midday by the helicopters. The time was spent packing up, making use of the time to get those last photo opportunities and tying up some loose ends of the survey. Whilst having a last look at the bat colonies, Woodsy found more art. The amazing thing was this art was located right next to our campsite! It was then time to start the gear haul back to the surface. Another hot and humid day awaited us up top and the sooner this was completed the better.

We had time for a last swim in the cool refreshing waters! With heavy hearts we exited the sinkhole and made our way to the designated landing point for the helicopters. Right on 12pm the Jet Ranger arrived, which was soon loaded. Some group photos were taken with the help of the pilot. The Robinson was still on its way from its Bungles base. So Woodsy, Ronnie and myself took off leaving Donna and Narelle waiting out in the wilderness for its arrival. Once we landed it was time to unload, get ice for the beers and have a chat. The other two made it back about half an hour later, in time for a nice cool ale. Once the Toyota was loaded it was time to pay for the helicopters – ouch! Even though they cost a bit to charter, they are an excellent way to access those remote sites. We will definitely be using this mode of transport again.

The group got their fix of hamburger, chips and a beer, before heading back to Kununurra with some great memories of a wonderful, awe inspiring site.

Thanks to all the other team members for making this a great trip. We will definitely be heading back to this area the next dry season, to further explore this incredible wilderness area.

SURVEY DATA SUMMARY			
Number Of Stations	56	Included Shots	58
Number Of Loops	3	Total Surveyed	833.9m
Cave Depth			
(Surface to water)	41.7m	Surface Length	140.2m
Surface Width	114m	Average Shot Length	14.4m
Longest Shot	30.3m	Shortest Shot	2.8m
Main Lake Length	826m	Main Lake Width	22.9m

Kija Blue Sinkhole, Kimberley, Western Australia by Paul Hosie

After four years of searching, one of Australia's deepest sinkholes has been rediscovered by ASF cavers.

The rediscovery of this remarkable sinkhole in the remote Kimberley landscape resulted in the partial exploration and mapping of the site by ASF cave divers Ken Smith (CEGSA), Paul Boler (NHVSS) and expedition leader Paul Hosie (WASG) during June 2005. The divers achieved depths of 65m and could see at least another 10 to 20m below into an as-yet unexplored void. Plans are already underway to return with mixed gas and closed circuit rebreathers to continue exploration, mapping and other research in this magnificent site during 2006.

After positively identifying and locating the sinkhole from a fixed wing aircraft, the three divers and over 350kg of diving and camping equipment were choppered into the site on Monday morning 20th June 2005 in two flights. As the sinkhole is on the side of a hill the helo could only safely land 500m from the sinkhole which is where camp and the compressor were

set up. The landscape around the sinkhole is spectacular Kimberley sandstone - red rocks and spinifex grass. The sinkhole is in fact part of a double doline feature with the second (blind) doline further up the hill to the north. Initial research shows that they have formed in a layer of ancient stromatolitic dolomite beneath the sandstone. A tape ladder was set up and we climbed down to check out the inside of the sinkhole and the access to the water. As can be seen from the photos, the sinkhole is very big. The long axis is 100m, oriented N-S and the narrow E-W axis is 70m wide. There are five lakes distributed around the inside of the sinkhole under enormous overhangs. The two main, deep lakes are on the west (First Lake) and south (Second Lake) sides of the sinkhole. The water level is 35m below the surface on the SW side and 50m below the NE side of the sinkhole and is believed to be a perched water table.

Setting Up

The lakes are stunningly clear, yet distinctly blue coloured, fresh water. In the shallows along the edges of the main lakes the rocks are covered in red and green algae and large aquatic plants which give a beautiful green colour. The rocks on the roof are coloured orange, pink and grey from the sandstone and dolomite

Paul Boler, Paul Hosie and Ken Smith waiting to board the chopper before heading to the Kija Blue site.





and they reflect perfectly on the still water's surface. It really is a stunningly beautiful site and when the sun climbs through the sky during the day, it shines down in to the main lakes creating a spectacular silent light show. Underwater proved to be even better! The equipment had to be lugged to the edge of the sinkhole above the main lake - vertical gear, rebreather, air and oxygen cylinders, dive gear, video equipment, lights and reels. The dive gear was then lowered down and set up at the water's edge. On the first day they only man-

aged one dive before sunset, but it was an impressive beginning. Ken and Paul H dived around the southern end of First Lake and down under the roof until they were on the western side of Second Lake. Having previously agreed to leave exploration of Second Lake to Paul, they followed the base of the wall at -20m back around to First Lake.

First Dive - The Void

The light in the water was deep blue and crystal clear

Kija Blue reflections.



Chopper over the sinkhole.



Ken Smith



Kija Blue lake dive.

but the sun wasn't shining in as it was overcast. Back under First Lake, the wall fell away from -20m down a steep slope into darkness. It beckoned and they followed, Ken first ensuring a good tie off while Paul H followed his progress with the video camera. At -30m a horizontal passage that was big enough to drive a truck along (formed between a large roof step and the sloping rubble floor) headed to the north, but below them it opened further and down they went. At -40m the wall on their left opened up and allowed Ken's 20W HID to spotlight down to depths in excess of 60m. Not wishing to shorten their dive by descending straight down, the divers continued northwards across the talus slope with the roof generally 3-5m above their heads. A large rock at -50m provided a good point to tie the line off and turn the dive. The slope continued large and wide ahead of them with the bottom somewhere below them but nowhere in sight all the way along for the 50m or so traversed at depth. The ascent included several microbubble stops and when the deep blue light from the lake again became visible at about -35m, the stunning beauty of the site was truly appreciated. Paul B was sitting on the rocks patiently waiting, and clearly visible to the divers doing deco from -15m and up. The entrance of the sinkhole was also visible with rock features and trees easily seen some 50m above the

water's surface. Amongst the boulders in the shallows, there was a hive of activity as freshwater snails, beetles and insect larvae-looking critters were observed grazing on the algae and aquatic plants. Specimens were collected for the WA Museum to identify but they do not show the stygobitic (ie cave adapted) features seen in other WA cave diving sites. On surfacing from the dive, gear was prepared for the next day's diving and the team headed back to camp in the day's fading light.

second Dive – Deepest Cave Diving Site in WA!

Tuesday morning began with refilling air cylinders and Paul B heading in to explore the Second Lake. While Paul dived, some breaks in the clouds permitted the sun to shine down into the water for a brief time and illuminate the water and rocks. It was a spectacular light show and the memory cards in the cameras were quickly filled! Paul returned from his dive after one and a half hours and had explored some floor holes along the wall at -20m before discovering a slot between two massive rocks in the floor at the very back of the Second Lake. The Slot dropped from -12m down to -18m where a steeply sloping, narrow passage headed down to the NE. Paul shortly achieved a depth of -40m where he tied off and exited, noting that the passage

was getting bigger as it continued down and the right hand wall had opened up into deep darkness. On the following dive that afternoon, Ken decided to extend Paul B's line while Paul H shot video footage around the Second Lake and extended the Western line down to -60m (and still going). Ken returned out of the Slot after thirty minutes or so and was very excited by what he'd seen. He had extended the line further to -50m depth and it was getting even bigger and deeper! This was proving to be an impressive cave diving site - now WA's deepest cave dive with Weebubbie Cave on the Nullarbor a runner up at -45m. The weather started clearing later in the day and the cameras captured the beautiful scenery surrounding the sinkhole. Tanks were filled, oxygen decanted and gear prepared for the last day of diving for the trip. Paul H recalls: "It was a little sad but we had a full day in front of us and we slept soundly (some with more sound than others as it turned out!)."

Last Dives – Colossal Room

Wednesday morning dawned bright and clear – the sunrise was beautiful and everyone was excited about the day's diving with the chance to see and film the sun shining down through the clear blue water. Following a strip and temporary repair job to the rebreather's cracked handset (see Paul H's Article in Caves Australia No.166-7), Paul and Ken dived in the water of the First Lake while the sun shone through it. The sunbeams cutting through the water was indeed a mesmerising sight. The dive plan was to extend the line in the Second Lake to a maximum depth of -60m and survey it. Paul H recalls the dive: "Once we had dropped down The Slot, Ken was straight into the task of exploring and surveying. The narrow passage follows the talus slope floor down to the north while the roof is never more than a few metres above. At -45m the floor on the right hand side dropped away steeply while the roof angles only slightly, creating a massive room. I'm excited, because this is like diving in a real cave, not just under a lake of a sinkhole. As we approached a depth of -60m (heading to the north east), the roof is now 10m above us and the boulders on the sloping floor are enormous — the size of caravans and houses. I shot video of the area and used the video light to look around the place, while Ken tied off at -60m and began his survey back up and out. The roof meets the floor at -62m and it is clear to see we have reached the bottom

of the talus slope, out to the west is a vast, flat, plain of silt. The water is crystal clear and the room is colossal – some 100m wide across the base of the talus slope, 10-15m high and at least 50m to the back wall across the silt plain. In the back corner of the room I discovered a 10m diameter, 2m deep pit in the floor where the silt is funneling down to deeper, as yet inaccessible levels - amazing !"

"The ascent and many deco stops following this dive were the most enjoyable because when we eventually popped out of The Slot to complete our 12, 9 and 6m deco stops, the view up to the surface of the Second Lake and out of the sinkhole was breathtaking. The dappled light through the blue water, Ken's exhaust bubbles running up the roof to ripple out onto the water's surface, the vivid green plants in the lake's shallows and the white clouds passing in the blue sky far above was simply mesmerising. What a wonderful place to off-gas!" The final dive was conducted by Paul B who took the remaining open circuit gas and did a 'deepy' down the First Lake where he extended the line a further 50m and visually confirmed that the deepest point on the western side was at least 80m deep. After doing as much deco as possible, Paul B exited and rested while Paul H and Ken lifted all the gear out of the sinkhole to be carried back to the camp and organised into loads for the helicopter the following morning. The helicopter arrived at 8am sharp as pre-arranged and lifted us and all our gear back out of this amazing and remote place. After packing everything back into the car-trailer and making a few very excited phonecalls, they drove for the next two days straight to get back to Perth. Ken and Paul B flew back to Adelaide and Sydney the following day.

Afterword:

Kija Blue, as we have named it (we are trying to find out if there is a traditional name for the site), is a remarkable and spectacular place. We are very privileged to have been able to dive and explore it and could not have done so without the help of Donna Cavlovic, David Woods and John Cugley of WASG in Kununurra. Detailed planning is already underway to return to Kija Blue with a team of trimix qualified, CCR cave divers in July 2006 to explore and survey the entire system as far and as deep as we safely can.

Kija Blue Report By Paul Hosie

Reprinted from The Informer, August 2006.

The cave diving expedition I organised to Kija Blue sinkhole for July 2006 was a great success (if I don't mind saying so myself!). The trip certainly had its risks as we planned to dive well beyond the limits of normal air diving in the cave and it was a great relief when the diving was completed safely and effectively. We have established Kija Blue as Western Australia's deepest cave diving site, which is now Australia's second deepest at more than -110m depth. Better news still, there is more exploration and leads to pursue at the bottom of this beautiful, deep and remote cave diving site in the Kimberley.

After being helicoptered in, the team spent ten days on site and explored the underwater perimeter of the sinkhole to a depth of over -110m. The only deeper cave diving site in Australia is The Shaft at Mt Gambier (-126m). Our team reached -111m, although 'Harry' (CEGSA) could see down another 5m from this point down a slot. There are other leads at the deepest level of Kija Blue which may yet see this being the deepest Australian cave diving site. Plans are already being made for a return trip in the future to investigate this and complete the exploration and mapping of this unique site!

Being located in a tropical area, the massive rainfall of the 2005/2006 Wet Season had a significant impact on the site, altering the distribution of aquatic plant-life in the lakes as well as the size and shape of floor pits seen at -65m depth in the Colossal Room. The water level was significantly higher than our visit in 2005 and the lake water level was measured to drop by 30mm every day as it feeds nearby surface springs.

A number of aquatic fauna species were collected for identification by the WA Museum, including some unusual, tiny, hermit crab-like creatures. More than one kilometre of additional passages were surveyed on this

trip, with more than 60% of that at depths in excess of -60m.

Ken Smith (CEGSA) had newly modified Deep Pingers (radiolocation devices that work through 100m+ of rock) which were used to locate accurate surface positions for 13 different survey points, including some as deep as -100m. It should be noted that the exploration of this deep cave diving site would not have been possible without the use of closed circuit rebreathers as we otherwise would have consumed all the helium needed for the mixed gas during the first few dives.

John Cugley and the Kununurra crew's map of the dry section of the sinkhole now needs to be combined with the underwater survey and pinger data to make a complete map of the site. If you want to see the colour photos which really show off the sinkhole and surrounding countryside's spectacular scenery, please go to www.trimixdivers.com and follow the links under Site Updates to the Kija Blue 2006 Expedition for the maps and photo gallery.

Articles have been published by Richard Harris (CEGSA) accompanied by his beautiful photos in the International technical diving magazine: Advanced Diver Magazine (ADM#24 available on-line), as well as Australian Geographic and Sports Diving Magazine. Presentations have been given by various members of the dive team both locally and internationally, receiving notable responses including the ASF Conference at Mount Gambier (South Australia - Jan 07), OzTek Technical Diving Conference in Sydney (March 07) and the National Speleological Society Cave Diving Section Workshops in Florida, USA (May 07) where the entire team were awarded certificates and plaques for their exploration achievements at Kija Blue.

Clearly, a significant caving and cave diving achievement has been made and all WASG members should be proud that our club is out there actively exploring the vast limestone and dolomite karst systems of our wonderfully diverse countryside!

Return to Kija Blue: Deep Cave Diving Exploration

By Richard Harris (CEGSA)



June 2005 and three cave divers drop into a remote cenote in one of the loneliest parts of the Australian outback. On a quick stopover as part of a caving trip to the Ningbing Ranges to the north, they have no idea what they are about to

find. Three days later they would emerge with a story and images of one of Australia's most spectacular, deep, water filled caves and a resolution to return and fully explore the sinkhole named Kija Blue.

On their return to civilization, word of the stunning beauty of the Kimberley cave quickly spread amongst the Australian cave diving community. I was equally quick to contact the expedition leader Paul Hosie and secure a position on the next trip to more thoroughly explore the hole! The next 12 months were spent planning the adventure to the n'th degree, chartering helicopters and organizing all the items necessary for a large expedition to a remote site. Generator, compressor, communications, first aid and disaster planning, food and sleeping arrangements, gas and dive planning in case the cave went deep, survey, sampling and photographic equipment and finally some sponsorship: amazing how quickly the time flashed by but finally the team was chosen and ready.

Really, this story started six years before our visit, when local caver John Storey located and dived the site with a quick single tank sortie to 30m depth. So stunned

Team photo - Harry, JDZ, Steve, Craig, Ken and Paul.



Richard Harris

Expecting nothing more than a small lake in one corner they planned only three or four short dives to document the site and tick it off Paul's long list of caves to explore. But what they saw in those brief dives amazed them; an azure blue cenote of such clarity, size and depth that they knew they would need to return for a larger and better prepared expedition to fully document the extent of the cave. In addition, the depth of the site (over 75m in one area) meant that more sophisticated equipment and techniques would be required to safely perform the exploration and survey work.

In 2006 Paul Hosie would once again lead the trip. As one of Australia's most prolific cave diver explorers, he has discovered and documented literally miles of submerged passages, especially in the arid Nullarbor region, the Roe Plains and the Ningbing Ranges of the East Kimberley. Also from Perth, Craig Challen (WASG) can claim to be one of the very few divers to have ever dived the final sump of the famous Cocklebidy Cave on the Nullarbor Plain, over six kilometres from the cave entrance. He is also an accomplished deep diver with wrecks like New Zealand's famous Niagara under his belt. The third member of the Western Australian

contingent was Steve James (WASG), an ex-Navy diver and an aerospace engineer with extensive deep CCR diving experience. From the other side of the country comes the "East" team: John Dalla-Zuanna ("JDZ" - ASF), one of Australia's most experienced cave divers, instructors and deep CCR divers; Ken Smith, the softly spoken Adelaide nuclear physicist who brings not only enormous caving & diving experience to the project, but also a myriad



Kija Blue and its Blind Partner. Also showing is the outflow spring at mid-right.

support the deep divers and perform much of the survey work down to -60m. Ken's role also involved the use of his unique "Pingers", an RF emitting device which, when placed in the cave, could be located from the surface and used as adjunct to accurate surveying of the tunnels. The Pingers would certainly prove their worth, being detected through over 120m of rock, at a water depth of -99m!

Finally the six cavers from around Australia met up to dive in, survey and document in detail what could be the remotest dive site in the world. Remotest dive in the world? A big statement but one needs to understand a bit more about this part of Australia. The Kimberly in Australia's northwest, an area of over 423,000 square kilometers (larger than the UK), has a population of less than 40,000 people most of whom live in the few major towns like Broome and Kununurra. It is a very large and empty place! The Kimberley can lay claim to some of the world's most ancient geology. The Proterozoic sandstone and dolomite which holds the cenote is 1400 million years old. The massive collapse doline that marks Kija Blue is nearly 100m in length and bordered by sheer 20-30m high walls. The heavy equipment was lowered over one

of home-made electronic radiolocation gadgets ("Pingers") to assist with the cave surveying, not to mention a vastly superior sense of humour. And finally yours truly: an Adelaide doctor, a CCR diver and underwater photographer (CEGSA).

So after a year of organization and planning, the team met up in Kununurra, Western Australia. With over 1400kg of equipment of cave divers in six payloads, we were dropped by helicopter near the base of the cenote. A makeshift camp amongst the spiky spinifex grass was our home for the next ten days while we explored the site. With the knowledge that the cave was at least 75m deep, we divided ourselves into two deep diving buddy pairs (Craig and Steve diving Megalodon rebreathers, myself and JDZ diving a modified KISS and a Prism respectively). Paul Hosie on an Inspiration and Ken Smith on open circuit would

of the precipitous walls to the base, and then carried down the boulder slope to the water's edge.

The exploration of this deep and remote site would not be possible without rebreather technology. Even with rebreathers, significant open circuit gas (for emergency use) would be required if the cave went below 100m. So JDZ and I developed side mounted "bailout" rebreathers. Sadly the "BOBS" as they became known, did not perform to expectations and so the dive planning had to be modified accordingly.

The initial dives into the azure blue waters of Kija left us breathless with excitement (or was that the effort of lugging tanks up and down the hill every day!). The shallow areas of the two main lakes are a photographer's dream; air-clear water, dancing rays of sunlight and rocks blood-stained with speckled algae.



Ken assists Craig for a deep dive.

We rapidly developed a feel for the site over the first two days; and from then on began to systematically explore it. Gradually we worked our way down the talus slopes, over massive boulders of ancient sandstone and under the enormous roof steps from which they had calved, it quickly becoming obvious that the site was larger and more interesting than we could have imagined. In one area, a narrow slot (discovered by diver Paul Boler of NHVSS on the 2005 trip) opened into a large passage which then dropped into a great chamber at -65m depth appropriately called the "Colossal Room". To the west, the slope continued down past -80, -90 then -100m to the perimeter of the cave where the roof sloped down to meet the boulder floor. But in areas where it appeared the end of the cave had been found, a gap between two rocks would lead enticingly into another passage and the cave would continue on. JDZ's "Dallazarium" at -88m was one such lead which held great promise until it opened back out into a section being explored by Steve and Craig. Elsewhere, the "White Peg" line entered a tunnel at around -93m. In subsequent dives we would extend this line by 40-50m at a time into a deep tunnel which descended steadily to -111m depth. With our time on site rapidly drawing to a close, we were into good sized passage several hundred metres from

the cave entrance! At depths over -100m, the penalty for staying too long to explore was hours of decompression. However in the 26°C water, sitting in the sunlit lake off gassing was blissful!

As the dives became deeper and longer (up to seven hours on one notable occasion) it was possible to perform only one per day. The risks of decompression illness are theoretically high doing multi-day deep dives, followed by significant exertion to remove equipment from the cave each day. In fact, each of the four deep divers experienced some symptoms of DCS and also probably pulmonary oxygen toxicity during the week. "Niggles" requiring extended decompression or surface oxygen occurred on two occasions.

Profound fatigue and itchy skin occurred in two other divers. A dry cough and breathlessness were seen after three dives. But in four divers performing a total of approximately 25 dives between -80m and -111m, this was felt to be acceptable. However it shows that even with relatively conservative dive planning, good attention to hydration, no alcohol and plenty of sleep, multi-day deep diving is not without risk. The team was both prepared and trained to perform in water recompression in this remote location for a more serious episode of DCI, and a detailed emergency plan was lodged with local emergency services for evacuation

Paul Hosie and JDZ after a big dive.



KEN SMITH



Steve and Ken at holes in the nearby creek (they go!)

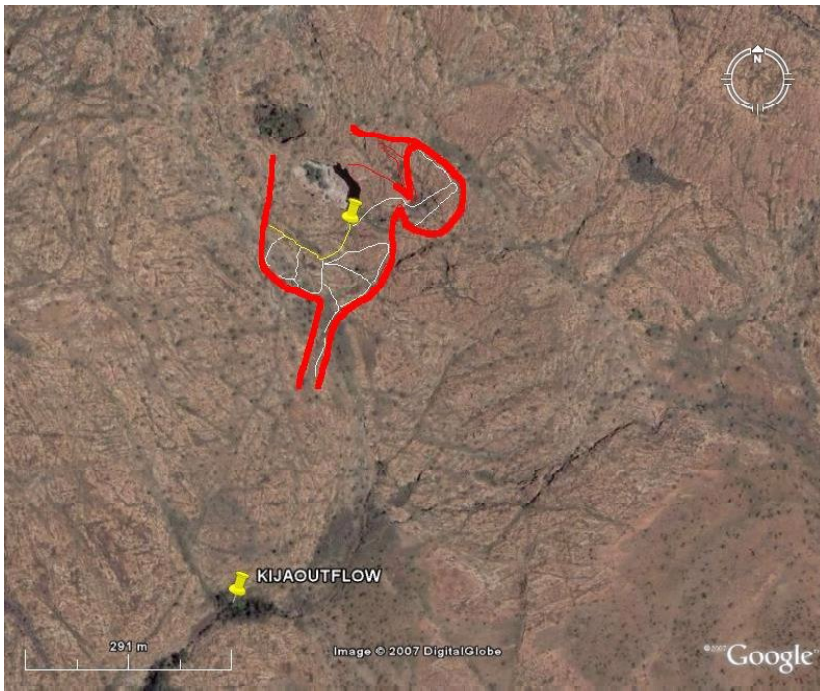
of a casualty to the nearest decompression chamber or medical facilities if required.

This account of the final dive in Kija Blue illustrates some of the issues we faced:

“Leaving the surface at 0830hrs, Steve James and I headed down the main line for our final exploration dive, both breathing trimix 8/75 on the ‘breathers’. We quickly left the daylight zone of the main lake and descended down the steep talus slope over massive dolomite boulders past -60, -70 and -80m until the bottom started to level off at -90m and the guideline headed to the right. In this area the rocks were carpeted in a thick layer of brown Kimberley silt which rapidly obscured all vision if disturbed, so we proceeded with great care from this point. Reaching a fork in the line,

Steve headed to the right to retrieve one of Ken’s pingers at -99m while I headed left to continue extending the line. Only 10m further on, I had my first problem; broken line waving in the breeze with no sign of the other part of the line! Tying on a small “jump” reel, I decided to head up to the right to see if I could find either the other half or the line that Steve had followed. Very soon I came across another line which I assumed to be Steve’s. I secured my jump reel to it and continued further into the cave, quickly meeting Steve coming back through the silt, who was signaling that he couldn’t find the pinger. So as planned, he returned to the junction behind us to wait for me whilst I pushed on into the cave. Before long I broke into clear water and continued, luckily finding the pinger about 50m further in. Moving on into the cave, I located the end of my previous line, noting two possible ways forward; one down at -115m and one up and to the right. I pushed off gently and began to lay more line down into the deeper lead when a low rumble warned me of a very large rock cascading down just behind me where I had pushed off with my hand. Visibility instantly turned to zero all around. Given that I

was already headed into a new area, I pressed on assuming it would bring me into clear water. However all I could feel in the murk was solid rock in all directions so I was obviously headed in the wrong direction. I reeled in line back to where I thought the rock had collapsed and attempted to move up towards the other lead. Same result...rock in all directions! I could feel my stress level building, knowing that every minute here was costing me many minutes of decompression on the way out of the cave, so I tied off the line and followed it back to where the pinger was clipped off. Gathering that up, I continued to head out of the cave. I reached the point where my jump reel joined the line and decided to remove that and follow Steve’s line out of the cave (a quicker and easier route). As I was starting to remove the jump reel I found some slack in the line I was on. Pulling it towards me I found a second



Kija Google map - plan view with the outflow. By JDZ

minutes at over -95m, giving us nearly four hours of decompression ahead."

Typically we exited the cave just before dark and trudged down the rocky hill below the sinkhole back to camp. As dusk fell, temperatures plummeted from the warm 32°C during the day, to only 4 or 5°C at night. Real desert weather! JDZ swung into action showing his prowess in the kitchen, producing nightly culinary delights from a single burner camp stove. Ken swung into action with his endless repertoire of jokes and stories which left us weak with laughter. Gas mixing and the transfer of survey data into Ken's laptop took us through to the nightly sky show of meteors and the brilliance of the Milky Way. By 9pm the ancient sandstone reverberated with the sound of six snoring cave divers giving the cicadas a fair run for their money!

loose end! What was going on? It was one thing to find a broken line on the way into a cave, but much more worrying on the way out! Only after the dive did I realize that I had jumped from the broken end of my line to the other broken half. The line must have been broken by another rock fall that I had encountered in an earlier dive in this highly unstable area! I had definitely had enough of this dive and I knew Steve would be starting to worry. I hastily tidied up the loose end, retraced my steps down the jump and back to the junction through more silty water. Steve was indeed very pleased to see me, and we exited the cave having spent 38

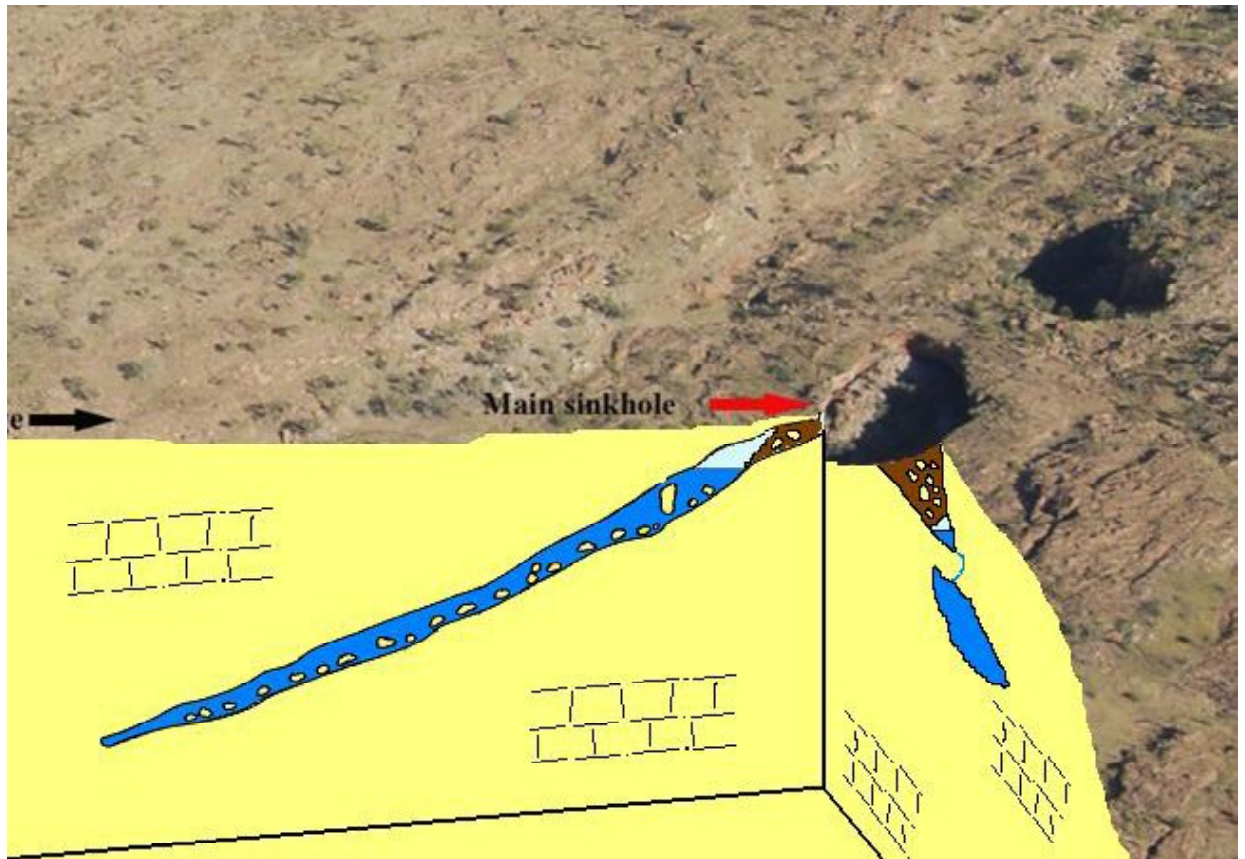
Day ten and with the diving finished, a long day of extracting all the gear from the cave and flying back to town in the helos was followed by a few celebratory beers. We were pleased that we had safely explored and mapped a large part of this enormous and beautiful site in the remotest part of the Australian outback. Over a kilometer of new line had been laid and surveyed in this unforgiving environment. Water, rock and fauna samples had been sent to the Western Australian Museum to further increase the existing knowledge of the cave. And the best part of all? The big question mark on the map at the bottom of the cave, and plenty

of shallow leads left to explore which means we'll have to do it all again in the future!

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Above: Kija Blue isometric view and Below: Kija elevation map. Maps by Ken Smith.

