The entrance to Great Nowranie Cave, Camooweal.

THE REMOTE KARSTS OF NORTH-WEST QUEENSLAND

Riversleigh – Lawn Hill – Camooweal

– Kent Henderson

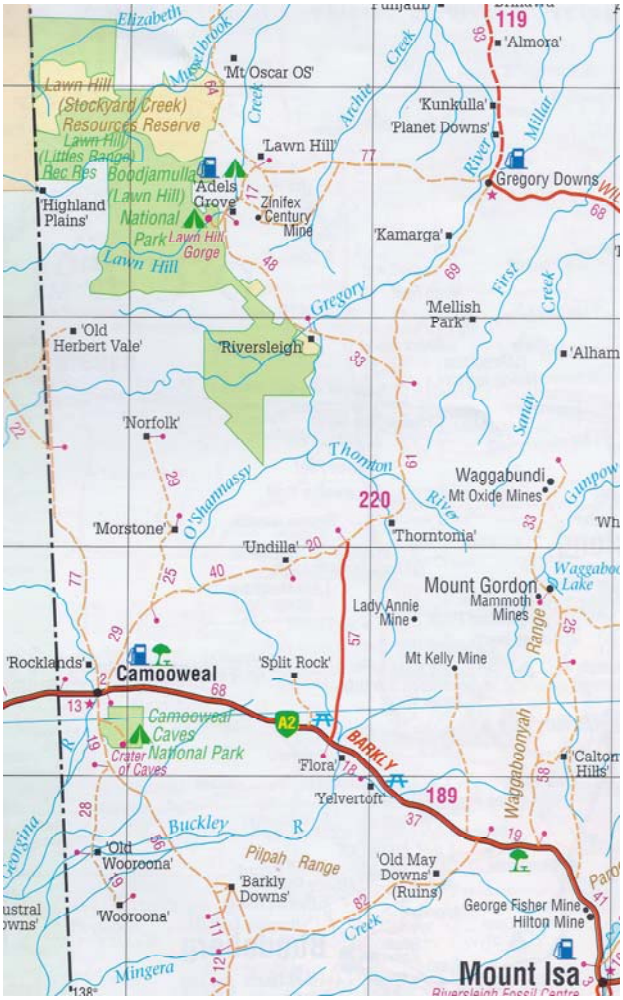
In late May this year I found myself in Mount Isa (north-west Queensland) on business for two weeks, so I 'engineered' a couple days towards the end of my trip to do a bit of karst tourism (as one would!).

The City of Mount Isa (population 24,000) is, itself, a tad remote – being over two hours by air from Brisbane and about ten hours (900 km) by car from Townsville.

There are three interesting karst locations within 'striking distance'. First there is Riversleigh, the World Heritage-listed fossil site (in combination with Naracoorte Caves) 250 km north-west of Mount Isa. Second, there is the wonderful Lawn Hill National Park, about 30 km north of Riversleigh, and third the huge Camooweal karst area – 20 km south of the town of the same name – the town (population 320) being 189 km north-west of Mount Isa (only 13 km from the Northern Territory border). See the adjacent location map.

My first excursion was to Riversleigh, but before doing so I visited the Riversleigh Fossil Centre – the principal 'tourist trap' in Mount Isa. It is very well done (as one would expect) – it is sort-of-like the Wonambi Fossil Centre at Naracoorte, but without all the *moving megafauna*.

Upon entering, one sits in a small auditorium (decorated with fake speleothems…) to watch an introductory video – largely narrated by none other than Sir David Attenborough. Wonderful! One then winds through several short passages of excellent displays to a final room (more displays) – off which is the fossil lab.



A view of a display at the Riversleigh Fossil Centre in Mt. Isa (above) and Dr. John Scanlon talking to tourists in the Fossil Lab (below).

Several tours per day are run into the lab, with interpretation by resident paleontologist Dr. John Scanlon. As a tour was in progress when I got there, I took the liberty of joining it. It was good! I introduced myself to Dr. Scanlon and had a brief chat – unsurprisingly he knew both Steve Bourne and Dr. Liz Reed.

And so to Riversleigh itself. As I knew Steve Bourne had been there before, I phoned him for advice. 'How are you getting there?' said Steve. 'Driving', I replied. 'Fine', said Steve. So off I went…

The first half of the road is sealed, after which is the unsealed bit. The latter was not too bad, my little hire car having no problems. Then I came to a ford over a creek. Not very deep, so through I went. Then I came to another ford, the water being a bit deeper, then another a bit deeper still… Hmmm. Anyway, I got through all these obstacles and thus to Riversleigh.

Riversleigh covers an area of approximately 8,000 ha. The fossils document the evolution and changes of Australia's terrestrial fauna and ecosystems.

Since 1983, the preserved remains of thousands of ancient inhabitants of northern Australia have been recovered from Riversleigh. Almost half of what we know about the evolution of Australian mammals in the last thirty million years comes from bones found at a single site in the Riversleigh fossil beds.

The small 'man-made cave' Riversleigh Visitor's Centre (above) and a view inside the same (below).

To quote Sir David Attenborough from the introductory video:

> *Only in one or two places on the surface of our planet, in the course of the last three thousand million years, have conditions been just right to preserve anything like a representative sample of the species living at any particular time. Those places are the rare treasure houses of palaeontology. Riversleigh is one of them.*

I quote from <http://www.riversleigh.com/> which gives a good background:

> *Riversleigh is one of the world's richest Oligo-Miocene mammal records, linking that period (15-25 million years ago) to the predominantly modern assemblages of the Pliocene and Pleistocene epochs. The site provides exceptional examples of middle to late Tertiary mammal assemblages, in a continent whose mammalian evolutionary history has been the most isolated and most distinctive in the world.*
>
> *The extensive fossil deposits at Riversleigh are encased in hard, rough limestone, which was formed in lime-rich freshwater pools. They span a record of mammal evolution of at least 20 million years in length, providing the first records for many distinctive groups of living mammals and now extinct mammals such as marsupial lions.*
>
> *The discovery of the fossils at Riversleigh has profoundly altered the understanding of*

Australia's mid-Cainozoic vertebrate diversity. The remains of a 15 million-year-old monotreme has provided new information about this highly distinctive group of mammals, and several Tertiary thylacines have been identified. Placental mammals are represented by more than 35 bat species and the Riversleigh fossil bat record is the richest in the world.

So, it is a tad special! At Riversleigh, what is known as the 'D Site' is open to the public. It consists of a small-ish (unmanned) Visitor's Centre, and looped track around a small limestone hill. The centre features excellent static displays, and the track has a large number of interpretative signs describing adjacent fossil features. It is all extremely well done.

Interpretive sign and the adjacent fossil assemblage to which it refers, on the Riversleigh Fossil walk (above) and a close up of a further sign (below).

Given its remoteness, I suspect that visitation at Riversleigh is not large – I did not see or pass another vehicle on my trip there, once I had left the main highway. When I arrived at Riversleigh there was one 'grey nomad' couple present, in a four wheel drive, with whom I struck up a pleasant conversation (fortunately, as you will see…).

Mr. Bourne had advised me that, on leaving Riversleigh, one must travel the thirty kilometres north to Lawn Hill. Thus, off I sped, leaving my newly-found 'grey nomad' friends behind. Now, the creek crossings started to get deeper…. And then I reached the proverbial 'bridge too far' with its lovely concrete ford and water flowing rapidly over it. I didn't make it…. I got three-quarters of the way over before my car conked out – that wasn't *too bad* I suppose…

So there I was, stuck in a creek, in just about the remotest part of Australia as you can get… Oh dear! Naturally, I should have been in a four wheel drive. Of course, I sat there cursing Mr. Bourne – who later advised me he had flown in by plane when he visited Riversleigh/Lawn Hill – he'd never been there by road! Nice of him to tell me that! Sigh…

Happily, my salvation was not far behind me, in the persons of my 'grey nomad' friends – whom I knew were also heading to Lawn Hill. Upon arrival, they kindly towed me out of the river. That was something at least. Fortunately, after about half an hour the engine had dried off and I could re-start my car – thankfully!

The downside of my considerable delay with 'wet feet' was that I arrived at Lawn Hill a couple of hours later than envisaged. Thus, most regrettably – as I had to be back in Mt. Isa that night – my visit was very brief, sadly. It amounted to a quick look at the gorge and that was about it. Obviously, I will need to go back at some stage!

Interpretative signage at Lawn Hill.

Boodjamulla (Lawn Hill) National Park is a virtual oasis, with permanent creeks and watercourses, in the parched plains of remote northwestern Queensland.

It features a spectacular gorge lined with remnant vegetation. The open woodlands surrounding the gorge have an understorey of spinifex grass that form bright green clumps. This gave the Park its European name because the hills appeared to be covered in lawn.

The Aboriginal name, Boodjamulla, means Rainbow Serpent Country and comes from the Waanyi people, the traditional owners. The gorge is sacred to these people, who assist in Park management. The National Park has an area of 280,000 ha. The Riversleigh Fossil Site has been included in the Park.

The gorge is in sandstone, but to the west is limestone karst. Thus the creek waters are limestone-saturated. As a result, the creek

surrounds display a number of karst features such as tufa banks. Stunning stuff! Andy Spate tells me that there are also 'karst' features, including caves, in the sandstone.

After my all-too-brief visit to Lawn Hill, I headed back to Mt. Isa. Clearly, retracing my path via Riversleigh was a tad dicey, so I had to take the long route via Gregory Downs. Such is life…

The next day I headed off on the second leg of my karst adventure. Due to its remoteness, speleological activity at Camooweal has been sporadic, at best. Certainly significant mapping and cave exploration has been done historically, but given the 'largeness' of the karst area (at least 180,000 ha – the NP itself 13,800 ha), clearly much more could be done.

The Camooweal karst area, located in the headwaters of the Georgina River and tributaries, does contain the highest density of cave development in the Barkly region. About sixty karst features including dolines, streamsinks and thirty caves occur within an area of about sixty by thirty km in the vicinity of Camooweal township (Eberhard 2003) – see Figure One.

The 'limestone pavements' surrounding the entrance doline of Great Nowranie Cave.

Exploration by 'organised cavers' began with the Mount Isa Speleological Society (MISS) in the 1950s, but was mainly by the University of Queensland Speleological Society (UQSS), the University of New South Wales Speleological Society (UNSWSS) and Mount Isa Cave Explorers (MICE) in the 1960s, 70s and 80s. MISS, MICE and UQSS have been defunct for some years.

Since then there has been some informal exploration by Mount Isa locals, but the only relatively-recent published work is by Eberhard (2003) and a VSA trip to the Undilla part of the O'Shannassy River, about 70 km NE of Camooweal, in 2003.

The Camooweal landscape is dotted with open sinkholes. Extensive caves are linked by deep vertical shafts. The caves are still growing during the wet season, but during the rest of the year the water table recedes deep into the shafts, leaving the caves dry and dusty. The caves are largely devoid of speleothems. According to Ken Grimes (pers comm.), this is likely caused by a lack of both surface vegetation and of vadose seepage, but sudden flooding may also be a factor.

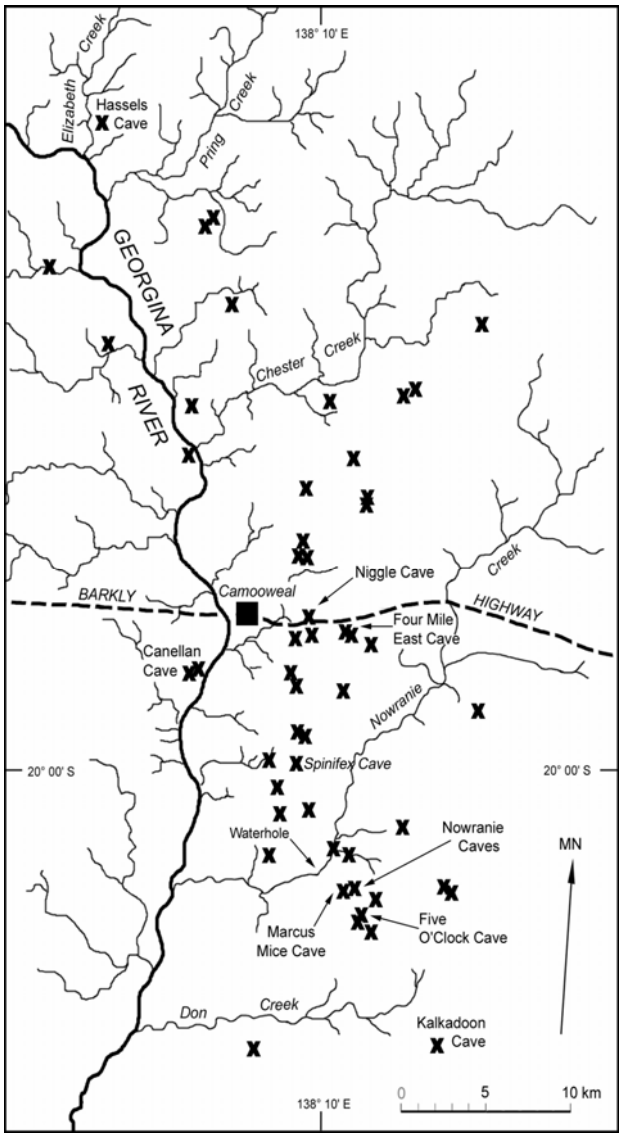


Figure One. Cave locations around the township of Camooweal. From S. Eberhard (2003).

Interpretation Booth at the Camooweal Caves Waterhole camping area.

The picnic area at the Camooweal Caves Waterhole camping area.

The two most noted caves are Great Nowranie and Little Nowranie. Great Nowranie was originally reportedly as one of the largest caves in the area (as per the *Australian Karst Index*), at 290m long and 70m deep, but it was extended in 2002.

Nearly 1.5 km of extra cave passage has been mapped so far, including 500 m of flooded passage explored by cave diving (Eberhard 2003). While Great Nowranie is the deepest (as against the largest) sinkhole in the area, there are others that are much wider and have more volume.

The Barkly Tableland consists of flat-lying beds of the *Camooweal Dolomite* deposited in the middle Cambrian (550 million years ago). Despite the lesser solubility of dolomite in comparison to limestone, and the low rainfall and the subdued relief of the tableland, the density of caves is relatively high, at least in the Camooweal area.

Basically the caves are large, twisting sub-horizontal caverns, often of 'railway tunnel' dimensions, with vertical connections between levels, and vertical access to the surface through collapsed sinkholes or dolines.

The road south of the township becomes a single track after turning off to the east, although it is in quite good condition and can be traversed easily in a normal car (fortunately, in my case).

The karst area over which one passes is largely flat, with a few sparse trees and some low scrub. You would not know you were on a karst plateau. The karst is located under considerable overburden, and unless one comes across a karst-exposing doline, you are effectively unaware of the underlying geology.

Upon arrival at a small carpark, short paths lead to both Great Nowranie and Little Nowranie Caves. These are almost certainly linked underground (Eberhard 2003).

What I found particularly interesting was the exposed karst pavements around the entrances of both caves. They reminded me of the smaller limestone pavements structures near Mt. Gambier in South Australia. They were formed by the action of water percolating the overburden and dissolving fissures in the dolomite underneath – the lot being subsequently exposed when the doline later collapsed, thus creating the cave entrance.

A few kilometres past the Nowranie cark park is the the Caves Waterhole camping area. Bush camping facilities include a pit toilet, picnic tables and a shelter shed, plus quite good interpretative signage.

Certainly, if you are passing through Camooweal, a diversion to the caves is a must – though I would only go in the dry season… While I could wax on at length, I refer readers to the excellent papers of Dr. Stefan Eberhard (on Camooweal) and Dr. Phil Creaser (on Riversleigh) noted below. Both papers are on the Internet.

A view inside the Riversleigh Fossil Centre in Mt. Isa

A Word on Management…

As far as I can determine, there appears to be no extant Management Plan for Riversleigh/Lawn Hill or for Camooweal. I found this surprising, particularly in terms of Riversleigh, given its World Heritage status. That said I saw nothing at any of the sites that indicated profound management problems.

At all three sites, there was appropriate infrastructure and signage and nothing one would expect appeared lacking. Given their remoteness and thus low visitation, I thought the management attention given to each site, even 'hardly-visited' Camooweal, was quite adequate.

ACKNOWLEDGEMENTS

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FOOTNOTE

Coincidentally, shortly after I had written this *trip report*, an article on new fossil discoveries at Riversleigh appeared in *The Australian* (and several other newspapers) on 15 July:

Cave dig uncovers an early life cycle

Skulls found in a Queensland cave have allowed scientists to map for the first time the entire life cycle of an extinct prehistoric species. A team of researchers from the University of New South Wales was exploring the world heritage Riversleigh fossil field, in northwestern Queensland, when they chanced upon the 15 million-year-old cave. Among the hundreds of beautifully preserved fossils found beneath the limestone cave floor were 26 skulls from the Nimbadon, a wombat-like marsupial and major herbivore group before kangaroos.

By comparing the intact skulls from varying stages of the marsupial's life - including as babies in the pouch - scientists were able to map the Nimbadon's life cycle from birth to death in a world-first study.

'We've got skulls representing pouch young all the way through to elderly adults, and that's a first,' said Karen Black from UNSW's School of Biological, Earth and Environmental Studies.

'There is no other fossil deposit (in the world) that has that.'

Dr Black said the marsupials played a significant ecological role in prehistoric Australia. Scientists have been exploring sites at Riversleigh for about 30 years but have never made such a ground-breaking discovery.

'It's not until we begin to crack these rocks open that you realise how many fossils are in there,' Dr Black said.

With the unique sample of skulls and skeletons, scientists will use CT scans to conclude how marsupials' brains developed over time and how this affected their behaviour, functionality and evolution. The discovery of so many Nimbadon alongside galloping kangaroos, a fox-sized thylacine and forest bats was 'really unusual', Dr Black said. It indicated they were roaming in large numbers when they fell through the vertical cave to their deaths.

This mob behaviour suggests the lush, dense vegetation synonymous with early Australia had begun to clear. 'The cave is 15 million years old and samples a period of time when Australia was changing from ... a greenhouse phase to an icehouse phase,' Dr Black said.

'That is particularly important. If we can get an understanding of what was going on at this cave then we would be able to ... predict what's going to happen with climate change in the future with Australia's flora and fauna.'

A view of the Little Nowranie Cave doline.
Note the flat, sparsely-vegetated plain beyond – typical of the whole karst area.