

KELLY HILLS CAVES, KANGAROO ISLAND, SOUTH AUSTRALIA : AN UPDATE

Katrina Wills¹

Matthew McDowell²

¹ Senior Guide Kelly Hill Caves

Kelly Hill Cave (KHC) contains the longest-known record of Late Quaternary vertebrates on a land-bridge island anywhere in the world! Both the modern and palaeo-entrances take the form of solution pipes (Figure 1). The modern entrance is apparently home to numerous invertebrates and small vertebrates (Figure 2). The main excavation (Pit 1; Figure 1; 3) has yielded at least 72 species, including 44 mammals, 9 of which had not previously been found on Kangaroo Island.

Staff from Kelly Hill Caves have been working collaboratively with Matt to provide a more natural history focused interpretative story on adventure tours at Kelly Hill Caves. It helps to have Matt's fossil site right alongside the adventure tour path.

Pit one is a 2 metre x 2.5 metre area that has recently been expanded to a depth of 3.6 metres and tells a story of the fauna of Kangaroo Island over the past possible 100,000 years. The excavations have been dated using Radiocarbon, Uranium series and Optical Stimulated Luminescence dating techniques and as of March 2014 the excavations record faunal change from 55kyr to 1kyr but since then almost 2 metres of sediment has been excavated from beneath the oldest known date. In the interest of communicating science to the public Matt has provided labels to the wall of the excavation in pit one to show the ages of the excavation where different colours represent different dating techniques. As visitors go past on their adventure tour they are able to stop at the pit and observe these labels, ask questions and hope, get a better understanding of what a fossil site looks like and how it all works. If Matt and his team are there visitors get an added bonus as they are able to ask him questions directly. Within both pits fossil preservation is excellent and many articulated specimens have been recovered. In addition, megafauna have been found in deeper strata. Mammal species recovered from KHC were examined to assess the effects of late Pleistocene climate change and Holocene

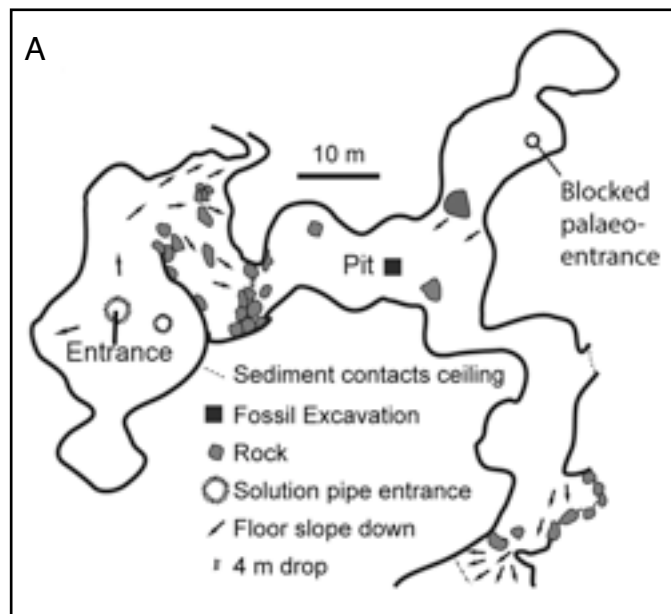


Figure 1

- A.** Part map of Kelly Hill Cave showing the modern and palaeo entrances and the pit location
- B.** Looking into the Modern natural entrance to Kelly Hill Cave
- C.** Looking up into a now-blocked palaeo-entrance to that is thought to be the source of excavated sediments and bones.

Photos: Matt McDowell

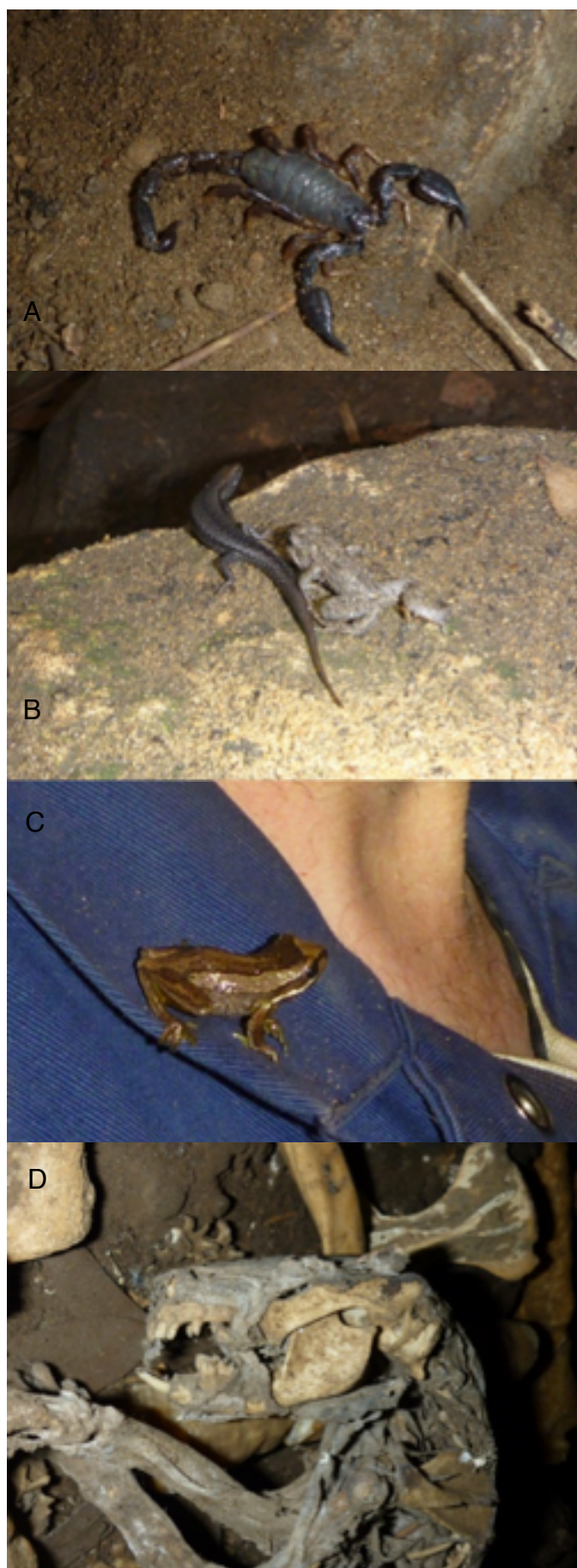


Figure 2 Meet some of the locals that regularly drop in to visit at the natural cave entrance!

- A.** *Scorpion* (*Urodactus* sp. indet.)
B. *Skink* (*Egernia* sp. indet.) and *Common froglet* (*Crinia signifera*)
C. *Brown tree frog* (*Litoria ewingii*)
D. *Common Brushtail Possum mummy* (*Trichosurus vulpecula*)

Photos: C. Burke

isolation due to rising seas. Total species richness, evenness and composition did not vary greatly with time, though relative abundances of ecologically divergent species changed dramatically (McDowell 2013).

Matt and his team have been working on identifying the species from the site and as previously mentioned so far 72 species have been identified with many bird and reptile species still to be identified. Highlights in identification have included the following species of animals:

- Bridled Nailtail Wallaby (most common kangaroo)
- Red kangaroo (identified from DNA only)
- Megafauna
 - ‘*Procoptodon*’ *browneorum* (Extinct short-faced kangaroo)
 - ‘*Procoptodon*’ *gilli* (Extinct short-faced kangaroo)
 - Protemnodon* sp. indet. (Giant wallaby)

Numerous scientists and volunteers have worked collaboratively on the fossil sites and fossils and whenever visiting Kelly Hill Caves are more than happy to answer questions of the Kelly Hill staff or visitors. This allows Kelly Hill Cave staff to gain more knowledge and be able to provide more information to the visitors. The scientists include:

- Dalal Haoucher, James Haile, Daithi Murray, Nicole White, Richard Allcock, Matthew Phillips, Michael Bunce (Ancient DNA)
- Erick Bestland (Palaeosol)
- Linda Ayliffe (Uranium series geochronologist)
- John Hellstrom (Uranium series geochronologist)
- Geraldine Jacobsen (Radiocarbon geochronologist)
- Fiona Bertuch (Radiocarbon geochronologist)
- Lee Arnold (OSL geochronologist)
- Nigel Spooner (OSL geochronologist)
- Sander van der Kaars (Pollen)
- Mark Hutchinson (Reptiles)

Some of the highlights for staff and visitors in the past couple of years have included:



•In 2013, 37 palaeontologists and archaeologists from five different countries visited Kangaroo Island as part of the pre-conference fieldtrip of the 14th Conference on Australasian Vertebrate Evolution, Palaeontology & Systematics (CAVEPS). The fieldtrip, led by Matt and Dr Keryn Walshe (South Australian Museum), visited several palaeontological and archaeological sites on the island, but for many of the visiting scientists, a first-hand view of the scientific research being conducted in KHC was the highlight of the trip. They were also very impressed with both the quality of cave formations and the guiding staff.

•Science Week 2013, over 130 local school children attended Kelly Hill Caves for a day of dry fossil sieving, fossil identification, and observation of wet sieving,

talks on DNA and the fossil history of Kelly Hill Caves.

•March/April 2014 20 Parndana Area School students and over 120 Black Friars College Students visited the fossil site while Matt was on-site. The Parndana students were also able to sieve fossils to help them better understand the fossils.

Ongoing research at KHC will include the pollen record, further dating and identification of bird and reptile species within the site. It is believed that the excavation may record the penultimate glacial period allowing us to compare the effects of the last two global cold periods to see how fauna responds to similar stimuli. Adventure tours with more information from Scientific Research can only get better!

Figure 3

A. McDowell's main Kelly Hill Cave excavation before work began Photo: Sam Arman

B. The excavation September 2013 Photo: M. Barham

C. Shoring installed April 2014 to facilitate excavation to depth of 3.6 m Photo: Matt McDowell

Below. Clockwise from top left. Veronica Pfizner, guide, with 2 visitors: scene in Kelly Hill Cave: adventure tour; the "Fish hook" prior to its accidental breaking. Photos: Steve Bourne

