

DINOSAUR DREAMING 2019 FIELD TRIP UPDATE

The three week Dinosaur Dreaming 2019 field season commenced on Sunday 10th February at the Flat Rocks site, near The Caves, south of Inverloch, Victoria. The Dinosaur Dreamers returned to this site after an absence of six years following the discovery of only the second multituberculate mammal jaw from the Early Cretaceous of Australia during a one day exploratory dig in 2017.

The Flat Rocks site was found in 1991 as part of a prospecting program run jointly by Monash University and Museum Victoria. It was the only site along the south coast of Victoria where a concentration of Early Cretaceous fossil bones was found exposed on the surface of the rocky shore platform. Annual excavations began in 1994 and continued for 20 field seasons until 2013 when it was decided that Eric the Red West, a location on the coast of the Otway Ranges, should become the prime focus of the Dinosaur Dreaming project. Excavations at this new site continued until 2017, yielding a number of exciting discoveries including a large theropod dinosaur claw and a large pterosaur vertebra. However, after the discovery of the second *Corriebaatar marywaltersae* multituberculate mammal jaw, the return to the Flat Rocks site became inevitable.

The focus of the three week field season was to find more evidence of *C.marywaltersae*. To that end, excavation manager Nick van Klaveren, whose idea it was to conduct the one day dig in 2017, concentrated most of the excavations along the southern edge of the fossil layer. This area included the lowest part of the fossil layer, situated just above a sandstone layer that was wedged between the lower conglomerate and the underlying mudstone. This part of the fossil layer had been sampled in previous digs and was notorious for containing only bone fragments, isolated small dinosaur teeth, fish jaws and scales and the occasional turtle bone. It represented the edge of the original river channel where the current was much slower than the main channel current and consequently only small bones were deposited.

As expected, the concentration of bones in this part of the fossil layer was quite low and consisted of many incomplete bones, which were not catalogued, and many small fish bones. However, on the very first day a small ornithopod dinosaur tooth was found, which buoyed the volunteers' spirits with the knowledge that more interesting fossils may be discovered.

The only way the fossil bones are found is by breaking them. The sediments in which the fossils are found is a sandstone/mudstone conglomerate, which represents the bed of an ancient river channel that flowed in the Inverloch area approximately 125 million years ago. The rock containing the fossils is carefully removed from the fossil layer and then systematically broken into smaller pieces by the experienced volunteers who check each broken surface looking for a bony or toothy cross-section. This is not an easy task as the conglomerate contains many other remnants other than fossil bones, hence its name. For example, being a river deposit the rock also contains a large amount of plant debris in the form of coal. In fact the coalified (carbonised?) plant deposits are one of the indications that the rock may also contain fossil bones. The conglomerate also contains mud clasts ripped up from the original underlying muddy substrate. Some mud clasts can look suspiciously like a bone in cross-section and it is only experience in identifying hundreds/thousands of fossil bones in cross-section that a volunteer can be confident of making the right decision. If they are still unsure then they are encouraged to ask for a second or third opinion until a consensus is reached.

Exposing the fossil layer at the Flat Rocks site is not a straight forward task as the main part of the fossil layer lies within the inter-tidal zone and is inundated by the high tide each day. Consequently each day the Dinosaur Dreamers would arrive as the tide was receding and commence to pump out the water from the excavations. Once the water level had decreased sufficiently to reveal the layer of

sand that had also been deposited by the previous high tide, the volunteers got to work digging out the sand to expose the underlying fossil layer. This daily process took about two hours to expose the fossil layer before any excavations could be carried out, then approximately three to four hours after low tide the incoming high tide would fill in the excavations all over again.

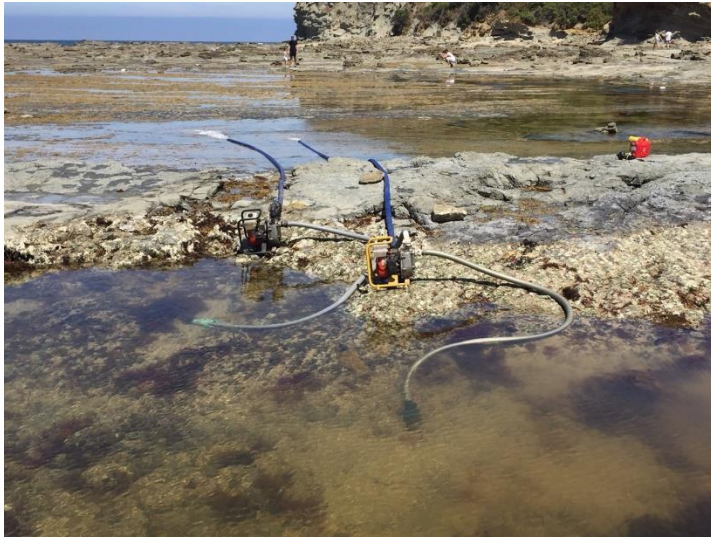
As the field season continued it was decided to expand the excavation area to include a section of the northern edge of the fossil layer, which contained some of the upper most fossil layer; an area where larger bones had been found in previous field seasons. This part of the fossil layer was nicknamed BOB, which was short for “Back Of Bridge”, an area more eastward than lower section we were originally working.

The sediments in this part of the channel contained more and larger mudclasts suggesting faster water flow (?) and although some of the bones were larger, they were not as well preserved as those in the lower sections of the fossil layer.

At the end of the 2019 Dinosaur Dreaming field season we had catalogued just over 300 fossil bones and teeth, including six ornithopod dinosaur teeth, three possible theropod dinosaur teeth and a pterosaur tooth. There were also many interesting cross-sections through small bones that will eventually be identified after preparation. Also, for the first time since excavations began at the Flat Rocks site, we stock piled a quantity of rock that had been removed from the fossil layer but had not been processed. The reason for this was that we only have just over twelve months left on our excavation permit from Parks Victoria and we were concerned that we might run out of time to return to the Flat Rocks site. The stock piled rock will be processed over the next twelve months or so by experienced Dinosaur Dreaming volunteers during a series of rock-breaking weekends and we are confident that new discoveries will be made. Stay tuned.



Flat Rocks site before excavations begin



Pumping the water out of the Dinosaur Dreaming pool



The crew removing the sand from above the fossil layer



Excavating the lower layer of the fossil layer.



Small theropod dinosaur tooth



Cross-section through a dinosaur tail vertebra