

Pre-historic sharks feast on marine reptiles

May 14 2015, by Mikael Siversson



Dr Mikael Siversson examining the jaws of a modern long fin mako shark (*Isurus paucus*). Credit: H.Ryan/WA Museum

As an undergraduate student of geology I had become fascinated by palaeontology—in particular the study of marine vertebrate fossils from the Cretaceous period (145-66 million years ago).

Together with a fellow student I saved up enough money to travel to the USA in search of fossils.

One day we were prospecting a 75 million-year-old floodplain and shallow marine sediments, exposed in spectacularly scenic badland areas of north central Montana.

I was busy dry sieving a lens of marginal marine sand full of perfectly preserved [shark teeth](#) when my friend stumbled across an articulated but headless skeleton of a long-necked plesiosaur lying on its back in estuarine mud.

As we began marking the vertebrae I noticed deep bite marks on one of the [leg bones](#).

Further excavation revealed a few teeth of a large individual of the apex predatory shark *Archaeolamna kopingensis*.

Sharks may lose teeth as they bite into tough prey and a plesiosaur's torso was built like a tank.

The discovery and excavation of the [plesiosaur](#) skeleton and the dramatic story it reveals, with a shark probably weighing several hundred kilograms tearing at its limbs, cemented my desire as a young student to pursue a career in palaeontology.



Cretaceous plesiosaur skeleton. Credit: M. Siversson/WA Museum

In August 2011 a field party from the WA Museum came across another Cretaceous 'crime scene': this time in the Giralia Range, southeast of Exmouth where marine rocks of Early Cretaceous age are well-exposed.

One of the volunteers discovered a few bones lying near the top of a small hill of the Gearle Siltstone, which is approximately 108-107 million years old in this particular area.

The bones looked so well-preserved he initially thought they must have belonged to a modern animal like a sheep or a goat.

I was, however, able to determine that they were in fact of Cretaceous age and belonged to an extinct, dolphin-like marine reptile called an ichthyosaur.

The most complete bone discovered is a surangular bone that, together with several additional bones, makes up the lower jaw in these reptiles.

Upon closer examination I noticed that the incomplete front part of the bone had been nearly completely sheared off at an angle.



Partially severed jaw bone of an ichthyosaur from the Giralia Range. Credit: M.Siversson/WA Museum

Another jaw fragment of the same ichthyosaur has multiple, parallel bite marks probably produced by smaller sharks.

All but one of the shark species co-occurring with ichthyosaurs in the Giralia Range were either small or very rare.

A distant relative of the white shark, belonging in the extinct genus *Dwardius*, was however both common and large enough to potentially prey on ichthyosaurs.



Front tooth of the early Cretaceous shark *Dwardius*, Giralia Range. Credit: M.Siversson/WA Museum

Its fossilised teeth have been found in England, France and now also in Western Australia.

The 'detective' aspect of vertebrate [palaeontology](#), looking for clues on the bones, is an incredibly exciting field of research.

In some cases palaeontologists have found direct evidence of predatory behaviour with tooth-fragments of the predator imbedded in healed bone tissue.

Provided by Science Network WA

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