## DECORAH IMPACT CRATER FOSSIL DISCOVERIES

## Unique Fossils offer rare glimpse into ancient marine life.

One of the most interesting features of the Decorah Crater is the fossil record it contains. Many of the fossil species that are preserved in the Winneshiek Shale, the name for the sedimentary deposit that accumulated in the crater basin, have not been found anywhere else on Earth.

In order to access these fossils, the team needed samples of the shale, which was largely buried far underground. Fortunately, the erosive power of the Upper Iowa River had carved down through the landscape over millions of years sufficiently to expose a small section of Winneshiek Shale near Freeport, an unincorporated community neighboring Decorah.

In the summer of 2010, Bob McKay and Paul Liu, both of the Iowa Geological Survey, temporarily dammed a portion of the river in order to expose and excavate some of the shale near the river bank.

The most famous fossil discovery from the Decorah Crater made so far is *Pentecopterus decorahensis*, a giant sea scorpion. Some of the fossilized body parts of *Pentecopterus decorahensis* came from living sea scorpions that were almost 6 feet long! *Pentecopterus de*corahensis is a unique genus and species of eurypterid (yew-RIP-ter-id), and its identification in the Winneshiek Shale has shown that eurypterids evolved at least 9 million years earlier than previously known. Like other arthropods (insects, shrimp, lobsters, etc), eurypterids had a segmented body and jointed limbs in a flexible organic exoskeleton.







## DECORAH IMPACT CRATER FOSSIL DISCOVERIES

The Winneshiek Shale is a rare type of sedimentary deposit called a Lagerstätte, meaning it has extraordinarily wellpreserved fossils. The deep basin of the Decorah Crater created an exceptional environment that was ideal for the preservation of delicate body parts, like the eurypterid exoskeleton pieces found in the shale. The incredible detail in the remains of *Pentecopterus decorahensis* and other types of organisms in the Winneshiek Shale, such as conodonts, jawless fish, and algae, have helped paleontologists gain a better understanding of the evolution of early plant and animal life and the ecology of the ancient seas that covered much of North America during the Ordovician Period.

Many impact craters are eroded away and erased from the surface of the Earth, but because the Decorah Crater was flooded by seawater, it instead became a remarkable repository for sediments that preserved a uniquely detailed record of ancient marine life. Fossil records like the one preserved in the Winneshiek Shale are rare to find, and continued studies of the Decorah Crater may be advancing our understanding of early animal life on Earth for years to come!



PENTECOPTERUS DECORAHENSIS FOSSILS



PAUL LIU WITH SPECIMENS AT IOWA GEOLOGICAL SURVEY REPOSITORY IN IOWA CITY



COULD GROW ALMOST 6 FT TALL!



**OTHER FOUND FOSSILS** 

