Triassic Rift Basin

National Park Service
U.S. Department of the Interior

Manassas National Battlefield Park

Fossilization within the Culpepper Rift Basin

Long before the battles of Manassas, there was a time in which dinosaurs held their own battle for life right here within the park. When studying the First and Second Battle of Manassas historians can rely on written records to piece together the events which took place. However, when it comes to studying the natural history of the area, scientists aren't so lucky.

In order to understand what the world was like and the creatures that roamed the earth millions of years ago Paleontologists study fossils. Broadly, fossils are the preserved remnants of an organism ranging from skeletal material and shells(body fossils), to nests, fecal matter, and footprints (trace fossils).

Sadly, not all organisms become fossils when they die. Most of the time scavengers swoop in and disarticulate the body, leaving very little material to be fossilized. The remaining material is then exposed to the wind and rain, causing what's left to deteriorate until buried by sediment or until nothing but dust remains. However, if an organism is quickly buried following its death the body tends to stay intact and skeletal matter can be preserved for centuries to come.

In order to ensure fossilization, very specific environmental conditions must be present. To begin with, fossils are almost always found in sedimentary rocks which form as loose sediment accumulates, compressing buried sediment into a rock. Sedimentary rocks are commonly found in desert, lake, coastal, and fluvial environments, each of which may experience rapid periods of sediment accumulation. If skeletal material, footprints, or other evidence of an organism's existence are buried as sediment accumulates then it can undergo fossilization as the sediment is compacted into solid rock around it.

With the help of plate tectonics and erosion, buried sedimentary rocks may once more reach Earth's surface, exposing the fossils lying within. Each fossil is a unique, nonrenewable resource, making paleontological finds worth protecting. Thus, fossils are a key part of the National Park Service's mission to preserve and protect our history for generations to come.

Era	Period	Time (Mya)
Cenozoic	Quaternary	0-2.5
	Neogene	2.5-23
	Paleogene	23-65
Mesozoic	Cretaceous	65-145
	Jurassic	145-200
	Triassic	200-251
Paleozoic	Permian	251-300
	Pennsylvanian	300-318
	Mississippian	318-359
	Devonian	359-416
	Silurian	416-443
	Ordovician	443-488
	Cambrian	488-542
Precambrian		542-4600

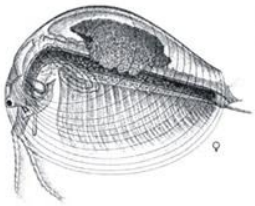
Geologic time scale with the time span of each period recorded in millions of years ago

The dominant geology of Manassas National Battlefield park dates back to the Triassic and Jurassic periods (200-145 million years ago). At the beginning of the Jurassic period the supercontinent Pangea began to split, creating a rift in the continental crust. This rift acted as a slide for recently deposited Triassic sandstones and siltstones causing these rocks to slump down, ultimately forming the Culpepper Rift Basin.

Over time water carried sediment down into the rift basin, fostering the development of a lake-centered habitat. As sediment continuously emptied into the basin, though, the lake bed rose in elevation until the basin was completely filled. Consequently, the organisms which lived and died around the lake left lots of fossils which we continue to discover.

Fossils of Manassas National Battlefield

Fossils

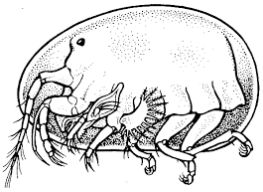


Conchostracans

Fossilized Conchostracans are the most common fossil within the park. Over time, these shrimp-like crustaceans underwent small morphological changes which allow paleontologists to use these fossils to determine the age of rocks. The easiest way to identify these organisms is by the bivalve shell which surrounds the body.

Notostracans

Notostracans are a type of shrimp, distinguishable by their large head shield. While these organisms are still alive today, fossilized Notostracans are very rare. In addition to the presence of rare Notostracans within the park (as pictured to the left), we also have the only Notostracan fossils found from the North American-Jurassic period.



Ostracodes

Ostracods are very small crustaceans with a soft bivalve shell. Because of their small size, approximately 1mm or less, it is very difficult to see these fossils with the naked eye.

Root casts found in Triassic siltstone

1cm

Conchostracan fossil found on the other side.

Trace Fossils

Footprints

If the conditions are right, footprints and trackways can also be preserved, even if the organism itself is not. The fossilized trackway of an aquatic reptile was discovered within the park and named *Gryneddichnium majore*. Paleontologists can't always say which organism made which footprint but we were lucky. While these footprints were successfully assigned to a specific genus, most footprints cannot and are thus given their own scientific name as an Ichnotaxa.

Invertebrate Burrows

Many invertebrates are known to burrow down into loose sand and sediment, creating hollow tunnels. As time goes on these burrows may act as molds for other loose sediment which may fill the burrows or they may simply be preserved as etching on, or within, a rock. Like footprints, invertebrate burrows are difficult to assign to a specific species but they serve as an indicator for shallow freshwater or marine environments.

Other Common Fossils:

- Fish Scales
- Fish Teeth
- Root Casts
- Stromatolites
- Plant Remains
- Insects

Reminder to the Public:

It is illegal to remove fossils from National Parks without a permit. Please remember fossils are non-renewable resources which should be enjoyed by all. If you find a fossil please alert a park ranger so that the park can ensure its preservation for future generations of visitors.