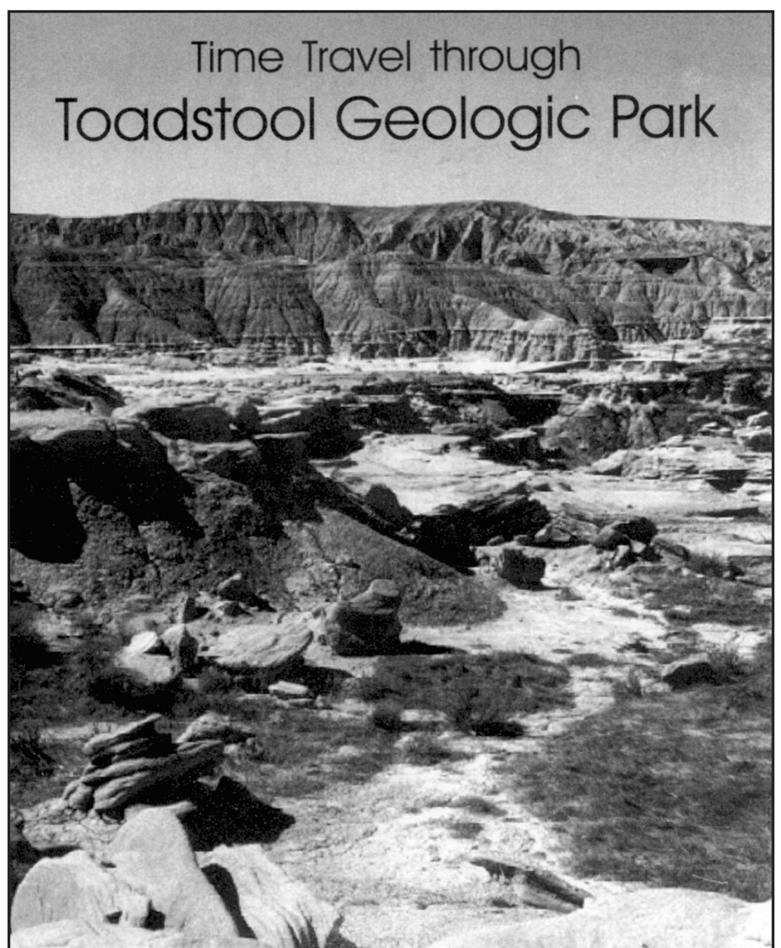
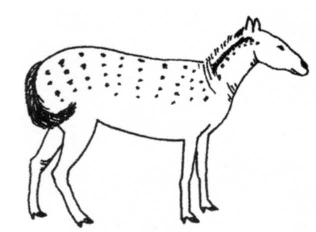


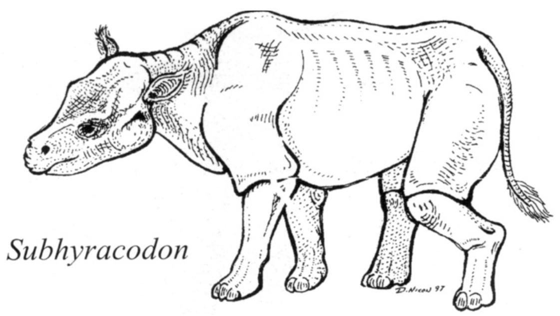
Welcome to Toadstool Geologic Park



Mesohippus

The stark, other-worldly landscape you are about to explore is like no other place in Nebraska. Yet its barren hills and rock-strewn gullies disguise the abundant life it once supported.

Turn the clock back 30 million years and you would find miniature horses, humpless camels, gigantic tortoises, pigs, and even rhinoceroses roaming here. All that remains of these bizarre beasts are bits of bone and tracks imprinted in the once soft mud. Scientists have pieced these clues together to capture what life was like in this ancient river valley millions of years ago.

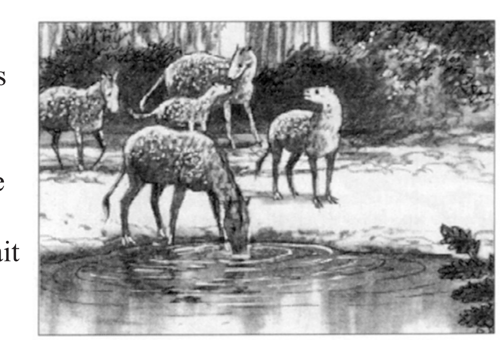


Subhyracodon

"A River Ran Through It"

It was hot and muggy when these prehistoric mammals came to drink on the shores of this broad shallow river. The water current carried volcanic debris that, layer upon layer, formed the rocks you see today. Over time, water and wind sculpted the rock into badlands. These geologic processes preserved, and erosion exposed the record of North America's early Great Plains animals.

Follow the trail markers along the mile-long loop trail to unravel the park's mysteries. The first 1/4 mile of trail is universally accessible. Beyond that, the trail winds along streambeds, through gullies, and over sandstone rock. Toadstools and trackways await your discovery!



Mesohippus at water's edge

Please leave all relics of the past in place for others to enjoy!

1. Why is it called Toadstool?

The first visitors here in the late 1800s must have felt they were travelling through a land of giant mushrooms. They fancifully labeled the jumble of sandstone slabs resting upon their clay pillars, toadstools. The name stuck.

Toadstools are created by the forces of wind and water, eroding the soft clay faster than the hard sandstone rock that caps it. Erosion eventually collapses the giant toadstools while new ones are forming.

2. Travel Over Gravel

Volcanoes to the west periodically blanketed this area with ash. Water from rain and snow dissolved the ash and seeped into cracks in the clay, where it crystallized. The width of the cracks is the thickness of the gravel pieces. As clay eroded, the hardened minerals and bone fragments of long dead animals became exposed.

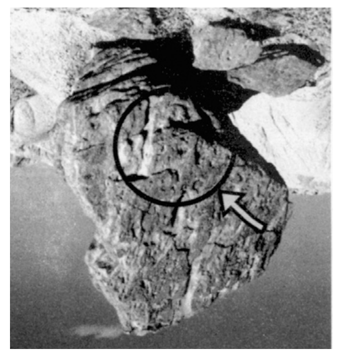
Notice the dark, jagged gravel beneath your feet. This desert pavement is a coarse mixture of silicon dioxide (the same compound as glass) and fossil bone fragments.

Notice the bone protruding out of the ground? The pen in the photo is there to show the relative size of the bone.

Can you detect the bone chips, or fossil fragments?

3. Pocks in the Rocks?

No, they're tracks! Tracks are distinguished from other depressions in the rock because they do not occur randomly. These were made by animals living about thirty million years ago. The toes point in the direction of travel. The size and depth of the tracks indicate the size and weight of the animal that made them. The stride is the distance between tracks made by the same foot. Changes in travel speed are shown by lengthened or shortened strides.



Compare the photograph to the large rock off to your right. Can you see the tracks of a four-legged animal as it made its way across the mud, now hardened to stone? Close inspection of the tracks shows the foot had two toes. Its size and shape are consistent with the entelodonts (giant pigs) of the time. Keep looking. You may see other tracks.

4. Water's Cutting Edge

Over time rushing water has cut away the underside of this cliff. When the bank is undercut enough, the weight of the overhead mass breaks off in large chunks, crashing into the streambed and diverting the stream flows. These badlands erode away at an average of an inch per year. How much change has occurred since you were born?

Seasonal flooding filled prehistoric tracks with mud and silt, preserving then. What tracks will you leave for future visitors to discover?

For More Information Contact

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5. Whose Fault Is It?

Well, no one's really! A geologic fault occurs when underground stresses cause the earth's crust to fracture. Small shifts may go unnoticed, while large movements cause major earthquakes! Rock layers and colors abruptly change at the fault line. Looking west across the drainage, notice the horizontal band of rocks in the cliff face. The band ends suddenly, then continues on approximately 30 feet lower. Could you have felt this "shift" that occurred between 8 and 2 million years ago?

This area requires scrambling up the rocks and a steep walk back to the trail – proceed with caution!

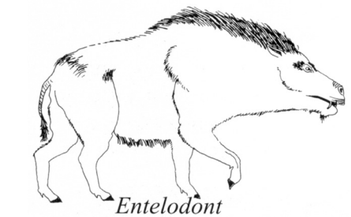
The evidence of this migration is unique. For this time period in North America, this is the longest and most diverse known trackway. The trackways can best be seen in the early morning or late afternoon sun when shadows create contrast. High noon and cloudy conditions make finding the tracks more difficult.

8. Rhinos' Right-of-Way

This trackway, extending nearly 3/4 of a mile, documents one of the longest record of prehistoric mammals in North America 30 million year ago. Even though the footprints are not clear, the patterned imprints tell a story of prehistoric migration.

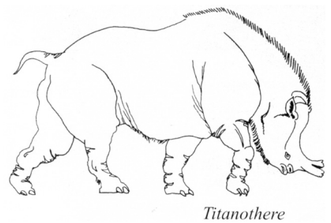
Research on the trackway indicates: the tracks paralleling the streambed belong to two species of rhinoceros that used the stream as a path. A smaller rhinoceros crossed the stream after the larger rhinoceros had passed. Splash marks on the rocks indicate the rhinoceros sped from walking to running through sloppy mud, heading downstream.

Following on the heels of the rhinoceros were entelodonts (in-tee'-lo-donts), or giant wild pigs. Their presence is captured in the even-toed tracks. Typical of scavengers, these pigs trailed migrating herds, keeping food within reach.



Entelodont

9. Modern Mammals Emerge

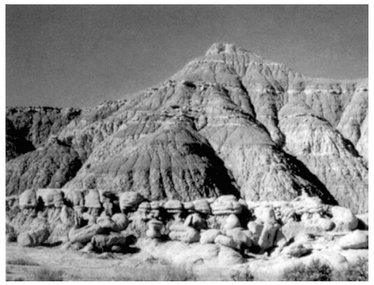


Titanothere

As climate of the nation's Heartland became increasingly arid, the prehistoric forests of Nebraska thinned into savanna, or grassland. The fossils show that some forest animals adapted to drier conditions while others became extinct. Seemingly exotic, yet familiar, animals began to emerge – the ancestors to modern families of dogs, cats, horses, camels, and deer. Others, such as the titanotheres (ti-tan'o-theres) are less familiar. This trackway contains a page in the story of animal evolution early in the history of the Great Plains ecosystem. As you return to the campground, look closely for bits of bone preserved in the claystone. Observe the ripple marks on the surface. They indicate a broad shallow stream, like today's Platte River. Reading the landscape, like the tracks, reveals the history of Toadstool.

6. Cliff Clues

As the rock cliff is undercut by erosion, overhanging rocks break off. When will the next break occur? Since no one can predict this, please view the cliff from a safe distance.



Up the draw from the cliff (south), tiny toadstools continue to take shape as the relentless process of erosion continues.

The geologic processes that created the ancient river, attracted animals to it, and exposed their ancient tracks, are still at work today. What tracks will be captured today for tomorrow's visitors to find? Will scientists one day ponder the traces of our actions here?

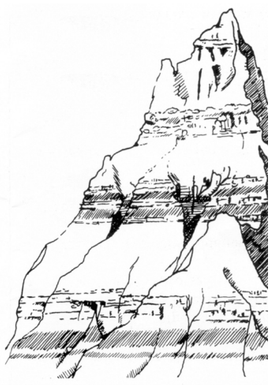
Missing Pages

Toadstool Geologic Park is a key link in understanding the earth's history from 38 to 24 million years ago. Geologists consider it the "type section for the White River Group," meaning that all other similar-aged deposits in North America are compared to the geologic standard designated at Toadstool. It is also the standard for animal fossils of that age – the Eoceneand Oligocene epochs about 30 million years ago.

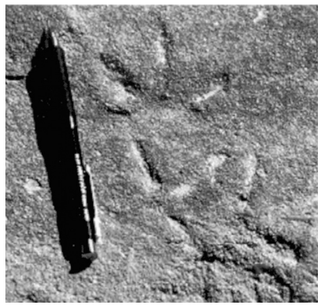
Like tearing pages from a book, removing parts of the fossil record destroys the information it could yield to scientists. When bones or tracks are disturbed, they lose scientific value and become mere curiosities.

Please leave fossils and tracks just as they are. Federal laws and regulations protect these resources on national forests and grasslands, because they belong to us all!

7. Prehistoric Pictures



By now you've noticed two kinds of rock: a light buff-colored claystone and a darker sandstone. The claystone is softer than the sandstone. The sandstone was formed as a sandbar in the river that flowed 30 million years ago. Wildlife attracted to the water left their tracks in the wet sand, some of which were preserved and are now visible today.



In the photo are webbed tracks left by prehistoric ducks. Can you picture them sunning, preening, and dabbling for food on the shore millions of yeas ago? Unfortunately, these tracks were vandalized, destroying information about the animals that left them.

Back to Basics:

These terms of the trade will help you understand your prehistoric journey through Toadstool:

Badlands – refers to rugged arid lands with heavy clay soils that are eroded by wind and water.

Deposition – the result of volcanic and sedimentary processes that result in a "building" process accumulating sediments.

Erosion – A geological process of removing, wearing away and redistributing dust, rock and soil particles.

Paleontology – the study of prehistoric life and processes.

Titanothere – a large distant relative of rhinoceros that browsed on trees and shrubs. The discovery of its large bones gave rise to legends of the "Thunder Horse."

Trackway – preserved animal tracks.

Toadstool – a sandstone slab resting on a clay pedestal, resembling a mushroom.

Fracture – a break in the rock.

Fault – Displacement of rock layers due to fracturing.

Fossils – the remains or traces of prehistoric plant or animal life that have been preserved by natural processes.

The Forest Service wishes to thank the University of Nebraska Trailside Museum for their technical assistance.