

# Set in Stone

## Learning from Layers of Geology

on the

### Comanche National Grassland

*Includes the  
Picket Wire Canyonlands  
Dinosaur Tracksite*



## Layers of Time

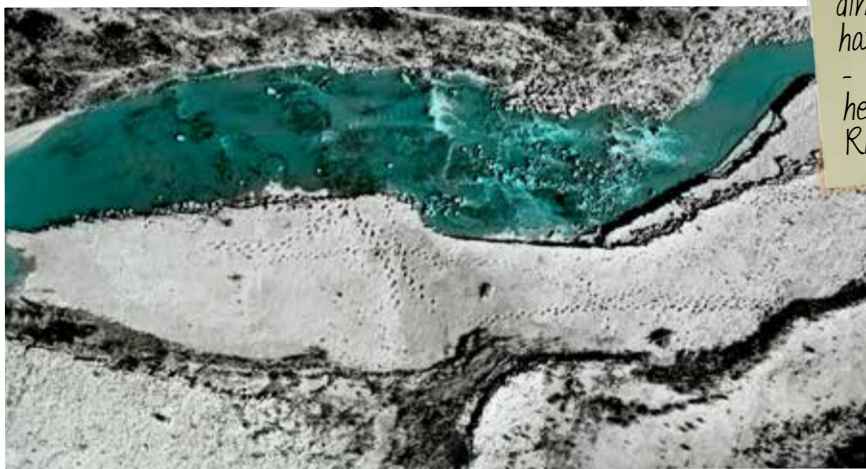
The Comanche National Grassland is internationally renowned for its dinosaur bones and tracks, including one of the largest assemblages of dinosaur trackways in the world. The geologic layers explored here also include fossils from giant amphibians, and sharks and other bony fish that flourished in shallow seas. These layers of time span from 250 to 87 million years ago (the Mesozoic Era).

## Learning from the Layers

The layers of earth on the Comanche National Grassland have much to teach us about our home planet and its transformations over the eons. Can these perspectives on time and change help us contemplate its future? Absolutely! Even questions about climate change and global warming can be explored in the fossil record.

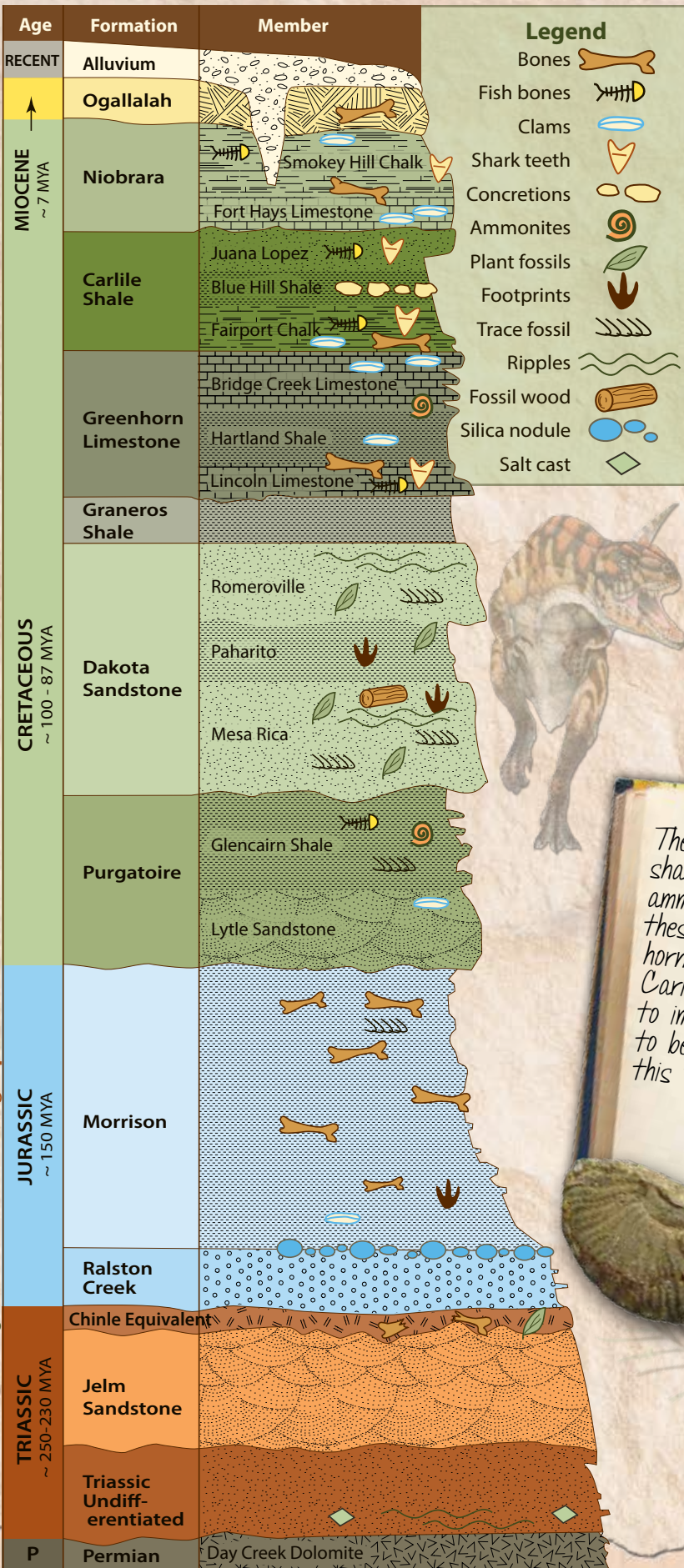
**Photo above:** An Apatosaurus shoulder blade nearly 8' in length was discovered at the Picket Wire Canyonlands, belonging to an animal roughly 100' in length.

*This aerial photo captures the magic of the tracksite-parallel tracks of sauropod dinosaurs. They must have been herd animals - a discovery made right here at the Purgatoire River in the 1930s!*



Today the Purgatoire River is a deeply carved, rugged, and arid landscape, but imagine it as a deep and lush conifer forest, or a tropical sea. The fossils and landforms of this area are as distinctive a part of the landscape today as the vanished plants, animals, and ecosystems they represent.

Stratigraphic Column of the Comanche National Grassland

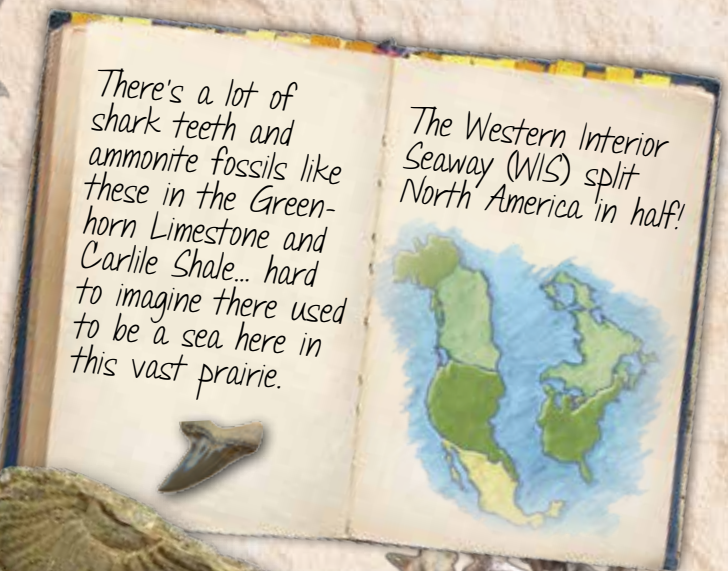


## How to Read a Rock

We know about past environments because the geologic strata and their fossils tell us who lived here and what their environment was like. The type of rock is only part of the story. For example, shallow marine environments often produce sandstone layers with abundant ripple marks and bits of fossil shell; however, sandstones can also form in vast desert dunes. By interpreting the geometry of the rock unit, its internal fabric and its fossils, geologists can learn about the ancient environment in which it was created.



Ripples in this sandstone indicate it was formed in a shallow sea.



MYA = Million Years Ago

## Dinosaur Tracksite

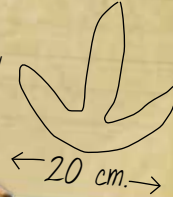
The most famous discovery is the Purgatoire River dinosaur tracksite in Picket Wire Canyonlands. This tracksite contains compelling evidence that sauropod dinosaurs lived in herds while meat-eaters were solitary.

Over 1,300 prints in 100 separate trackways extend across a quarter mile expanse of bedrock where they were preserved—frozen in time—for 150 million years.

Skeletons of many famous dinosaurs such as *Apatosaurus*, *Allosaurus*, *Camarasaurus*, and *Diplodocus* have been excavated from the canyon walls surrounding the trackway.

The Dakota Sandstone has so many tracks, it's sometimes called the "Dinosaur Freeway"! This ornithomimosaur track, and many other types, were preserved in the WLS.

Awesome!



Artwork courtesy of Matt Celeskey and the New Mexico Museum of Natural History and Science

Triassic fossils are from terrestrial animals like this *Desmatosuchus*. During Triassic time, all of the earth's land masses formed a single supercontinent called Pangea.



Rainwater beautifully highlights these sauropod tracks.

The exposed tracks probably represent only a fraction of the tracks still buried here. This backhoe is placing blocks to deflect the river's erosive power.



It took 2 guys to carry this *Camarasaurus* fibula!



## Protecting Paleo Resources

The Purgatoire River—the same force that unearthed the Dinosaur Tracksite—has since begun to erode it away. Protecting the site is an ongoing challenge given the river's unpredictable flash flood nature. The Forest Service is working to control erosion so that opportunities for future generations to visit this famous place are not washed away.



A Denver Museum volunteer is using an air scribe to clean an *Apatosaurus* neck vertebrae. He's put in over 3,500 hours. Incredible!



These volunteers love to play in the dirt! Here, they're freeing an *Apatosaurus* pelvis bone from other dinosaur bones, including a *Camarasaurus* cervical rib.

## Volunteers and Partners

Volunteers, researchers, and partnerships with professional organizations are the lifeblood of the Forest Service paleontology program. Partnering institutions such as the Denver Museum of Nature and Science conserve, store, and display fossils, and conduct research. Some fossils are excavated by volunteer groups working with the Forest Service. As a result, geological and paleontological discoveries in Picket Wire Canyonlands continue to be developed in scientific works. Paleontological investigation of places such as the Comanche National Grassland is only beginning—and you can be a part of it! Volunteers have devoted thousands of hours to inventory, record, and preserve fossils on public lands.

Volunteer projects allow the public to work alongside professional paleontologists. The fossils preserved by these field projects then provide further opportunities for museum volunteers. Together, we grow our knowledge about astonishing places of the past.

## Can I Take A Fossil Home With Me?

Many important fossil sites—such as Picket Wire Canyonlands—are closed to *all* collecting without a permit.

However, small samples of **common invertebrate and plant fossils** can be collected from other areas on national forests and grasslands without a permit. Check with local land management offices for details, and with local schools and museums about opportunities to collect fossils with paleontologists as part of a volunteer project.

Visit <http://www.fs.fed.us/geology/> for more information about collecting fossils.

Fossils can be used to date rock layers. This clam impression (*Mytiloides labiatus*) is about 93 million years old.

— WOW —





## EXPLORE!

The round trip hike to the Dinosaur Tracks is 11.3 miles, starting at the Withers Canyon Trailhead. From here, you will descend 250 feet into the canyon. The Picket Wire Trail passes several points of interest enroute to the tracksite.

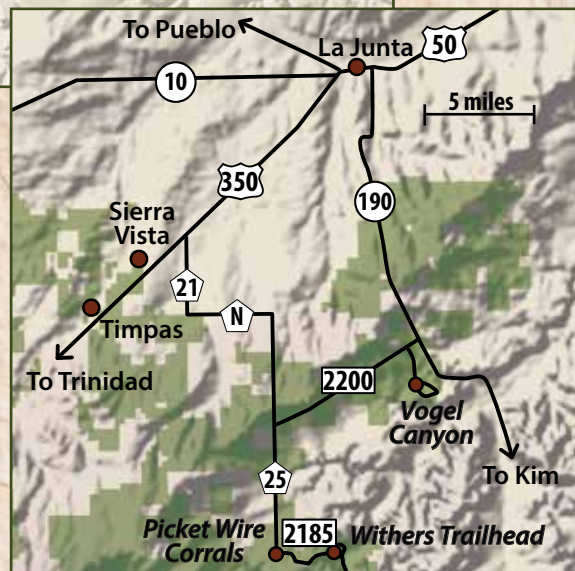
If you have a high-clearance four-wheel drive vehicle, guided auto tours to Picket Wire Canyonlands are available with the Forest Service. Advance reservations are required and there is a fee. For more information contact the Comanche National Grassland office at 719.384.2181, or visit: <http://www.fs.usda.gov/goto/psicc/com>; or <http://www.recreation.gov>.

## Know Before You Go

- Begin with a full tank of gas, a spare tire, and a map.
- Be prepared for sudden weather changes, extreme summer heat, and limited cell phone coverage.
- There is no drinking water available.
- Canyon trails are for hiking, mountain biking, and horseback riding only.
- Picket Wire Canyonlands is closed from dusk until dawn - overnight camping is not allowed.
- *Tread Lightly!* and leave no trace of your visit.

## For More Information

Comanche National Grassland  
1420 E. 3rd St.  
La Junta, CO 81050  
719.384.2181  
<http://www.fs.usda.gov/main/psicc/home>



*During the Jurassic Period, the Purgatoire River valley was a shallow inland lake. In this depiction, large sauropod and smaller ornithischian dinosaurs walk along the muddy shoreline. Horsetail (the "living plant fossil," Equisetum) and conifer forests decorate the shoreline. (Painting by Paul Koroshetz)*

