

GEOLOGY OF THE METROPLEX

For an online geologic map of Dallas County see www.dgs.org.

The youngest rocks in the Metroplex are Pleistocene river gravels along the Trinity River. They contain the bones of mammoths, ground sloths, saber-toothed tigers, and other Ice Age animals. The river deposits were formed as the Trinity flowed across older rocks. The current-day Trinity River overflows its bank occasionally, causing extensive flooding in its flood plain. Lesson: Don't buy a house in the flood plain.

Most of the older rocks of the Metroplex (older than the Pleistocene gravels) are sedimentary in origin and Cretaceous in age, ranging from approximately 119 million to about 83 million years old. The Pleistocene gravels are less than a million years old. Thus, there is a gap representing eighty million years or so between the youngest Metroplex Cretaceous bed and the oldest Pleistocene gravel that is not represented by rocks in this area. The contact between the Cretaceous and Pleistocene rocks in the Metroplex is an unconformity, a major break in the rock record.

The Cretaceous rocks of the Metroplex were deposited in a series of marine transgressive and regressive events; that is, times when sea level rose, followed by drops in sea level. Distant volcanic eruptions supplied volcanic ash, but the volcanic contribution was minor. Over all, the kinds of rocks and fossils found in each rock unit are reflective of the marine or terrestrial environments that were dominant at the time of deposition. Fossils of dinosaurs, mammals, lizards, and other land dwelling creatures are found in

sedimentary deposits laid down by rivers, streams, and lakes traversing the landscape. Oysters, clams, ammonites, sharks, and fish, among others, inhabited the oceans and are preserved as fossils in the sediments laid down as the seas encroached upon the land. The strata dip gently to the east so that as one travels from Dallas to Fort Worth, the road lies on progressively older rocks. Because sedimentary rocks are originally laid down horizontally, the tilt, or dip, of the strata in the Metroplex is a structural change that occurred after the strata were deposited.

The Black Prairie of Dallas County is part of a rich, flat farmland with deep soil developed on the Eagle Ford Group, Austin Chalk, and Taylor Group. It extends from northeast of Dallas to Austin, paralleling the Balcones Fault Zone, movement along which raised Lower Cretaceous rocks relative to Upper Cretaceous rocks.

The Taylor Group comprises the youngest rocks in our area except for the Pleistocene Trinity Gravel. Fossil fish, sharks, and large marine lizards called mosasaurs are well represented in the Taylor Group.

The Austin Chalk was deposited in clean, relatively deep water. Chalk is a limestone rock composed almost entirely of the fossils of coccoliths, a kind of golden brown algae. To the south of I-30 on the west side of Dallas near Cockerell Hill Road faults in the Austin Chalk are well exposed. The Austin Chalk is resistant to erosion and forms the high ridge - the White Rock Cuesta - on the west side of Dallas. Volcanic ashes in the Austin blew in from eruptions at Pilot Knob, southeast of Austin.

Underlying the Austin Chalk is the Eagle Ford Group, a sequence of dark shale beds with minor amounts of limestone. The Eagle Ford school, for which the rocks were named, is on the south side of I-30. The Eagle Ford is easily eroded. It forms soft slopes on the hills capped by the Austin Chalk. Road cuts along I-30 often show slumping where masses of the Eagle Ford have slid down hill. This happens under houses and apartment buildings too, causing foundation problems and structural damage. Lesson again: Use geology to choose a house. It is better to build on the Austin Chalk than the Eagle Ford unless appropriate engineering steps are taken.

Many kinds of beautiful fossils are found in the Eagle Ford. Among the most famous are plesiosaurs, the kind of animal after which the mythical Loch Ness monster was modeled. Plesiosaurs have been found on the east side of DFW airport.

The Eagle Ford contains a series of volcanic ashes that blew into this area in from eruptions in Arkansas.

Underlying the Eagle Ford is the Woodbine Sand. The Woodbine is a series of river, delta, and near shore deposits. Note that in going from the Woodbine, up through the Eagle Ford, then up to the Austin the grain size of sediments decreases. This reflects a classic transgressive sequence as the sea spread over this area.

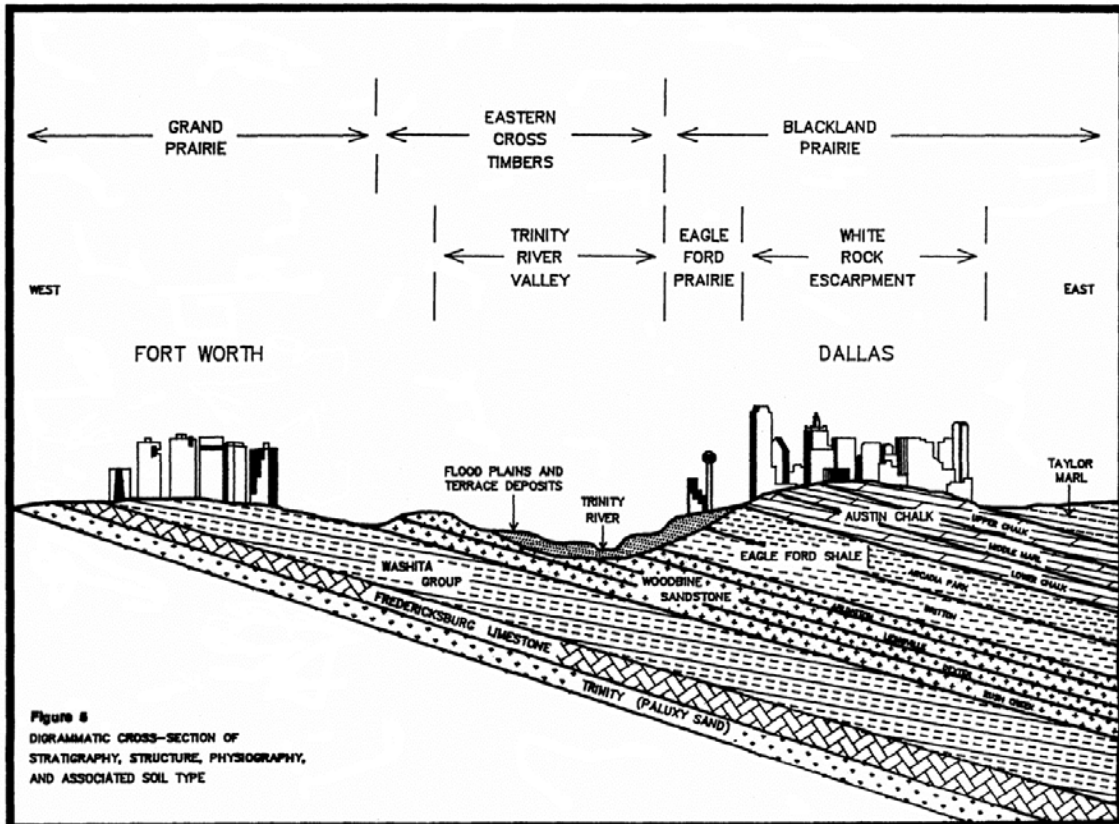
The Woodbine has both marine and terrestrial fossils because of the mixed depositional environments bordering the sea. The youngest dinosaurs in Texas (96 million years old) are found in the Woodbine. The farthest east in

Texas where dinosaurs are found is in the Woodbine on the west side of DFW airport. Other fossils include diverse invertebrates, excellent angiosperm leaves, fish, shark teeth, turtles, crocodiles, dinosaur tracks, and an opossum.

Because the Woodbine is sandy, it allows water to percolate down and therefore stays wet. The result is that it supports tree growth because trees can obtain water through their deep roots during dry spells. The band of trees crossing the prairie and growing on the Woodbine is called the Eastern Cross Timbers.

Below the Woodbine is a series of limestones comprising the Washita and Fredericksburg groups. The Fort Worth Prairie is developed on these rocks. While these rocks generally represent more strictly marine conditions than the Woodbine, nodosaurid dinosaurs and a pterosaur are found. There are also plentiful invertebrates, shark teeth, and fish.

The Trinity is again predominately terrestrial except for a marine incursion called the Glen Rose. Dinosaurs and other land dwelling animals are particularly abundant in the Trinity, but there are also many fish. The sandy layers of the Trinity support tree growth giving rise to the Western Cross Timbers, which crosses the western part of the Fort Worth Prairie.



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