# Comparison of Texas Shale Plays - Geologic Characteristics and Implications for Production of the Eagle Ford/Tuscaloosa Marine Shale, Haynesville/Bossier, Wolfcamp/Bone Springs, and Barnett/Woodford Plays

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## Abstract

Texas shale plays are some of the world's most prolific oil and gas producers and have been compared to many shale plays worldwide. However, a comparative study of the geologic characteristics of the Texas shale plays has yet to be presented. This study compares the carbonate-dominated shales of the Eagle Ford and Haynesville formations. The silica-dominated shales of the Barnett/Woodford and Wolfcamp/Bone Springs formations and the argillaceous-dominated shales of the Tuscaloosa Marine Shale. Knowing the impact of the shales' depositional environments on background mineralogy is important because it directly influences the shale's quality (porosity, permeability, brittleness).

The carbonate-dominated Eagle Ford and Haynesville/Bossier shales exhibit pore networks dominated by interparticle pores between calcite grains, intraparticle pores within skeletal grains, and organic matter. These units were bordered by carbonate platforms that sourced carbonate debris into the basins. The Barnett/Woodford and Wolfcamp/Bone Springs shales were deposited in deep-water environments influenced by siliceous skeletal grains and invariable shedding of carbonate and silica-dominated turbidites into the basin. These shales are dominated by interparticle and intraparticle pores between silica and clay grains, but most of the porosity in these shales is related to organic-matter nanopores. Although the Tuscaloosa Marine Shale is the same age as the carbonate-dominated Eagle Ford Shale, the depositional setting was mainly siliciclastic, and argillaceous sediments were shed into the basin by Lower Cretaceous deltas. This shale contains inter- and intraparticle porosity between clay and organic-matter pores.

Knowledge of the depositional setting and history, source and sediment transport, and environmental conditions in a shale play provide insight into pore networks, porosity, permeability, and brittleness of the rocks forming the shale play. These insights can be applied to other shale plays.