# Controls on Reservoir Quality and Productivity in the Haynesville Shale, Northwestern Gulf of Mexico Basin

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## ABSTRACT

**Productivity of the Jurassic Haynesville Shale in East Texas and northwest Louisiana is controlled by both reservoir quality and completion quality. Controls on reservoir quality include primary depositional texture, dilution and preservation of organics, bioturbation, overpressure, and thermal maturation. Diagenesis exerts a fundamental control on pore geometry. Primary depositional texture and subtle, systematic rock-fabric changes are predictably controlled by sedimentological and depositional processes. Poorly laminated to massive, light colored, bioturbated mudstone fabrics reflect slow, suspension-dominated deposition and oxygenated bottom-water conditions. Sparsely laminated, dark-colored, organic-rich mudstone fabrics are interpreted to reflect sediment starvation under periods of restricted bottom-water conditions. Bulk rock elemental analysis provides numerous insights into sediment provenance, cyclicity of depositional patterns, and methods of organic matter preservation.**

**Completion quality is controlled by geomechanical rock properties, containment, fluid sensitivity, and fracture conductivity. Minimal vertical stress contrasts due to elevated pore pressures, coupled with reservoir heterogeneity, complicate completion engineering practices. An integrated understanding of fundamental geologic controls on heterogeneity, anisotropy, and fracturability is required to optimize completion quality and reservoir performance in the Haynesville Shale. Additional work is needed to understand controls on fracture initiation and fracture complexity in organic rich, anisotropic shales.**

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