

# Turbidites in the Western Interior Cretaceous Seaway: The Known and the Possible

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For the last 25 years, the only widely recognized turbidite deposits in the Western Interior Cretaceous Seaway (WICS) of the Utah-Wyoming foreland have been those of the Lewis Shale (Maastrichtian) in the Great Divide, Washakie and Sand Wash basins of south-central Wyoming and north-central Colorado. Lewis Shale deposits consist of a high diversity of non-reservoir thin-bedded very-fine grained sandstone and mudrock facies in addition to fine-grained, high net-gross (>90%) reservoir sandstone facies associated with channel-lobe elements. Non-reservoir facies constitute the largest volume of Lewis Shale deposits and form the highly aggradational-progradational Lewis shelf-slope margin. Sediment-delivery mechanisms for these facies include (but are not limited to) flood-derived turbidites that yield classic waning-flow Bouma sequences as well as waxing-flow hyperpycnite successions.

The non-reservoir facies of the Lewis shed light on the origins of older (Turonian-Campanian) offshore successions in the WICS, such as the Prairie Canyon Member (PCM) of the Mancos Shale (including the Mancos B) and distal Ferron-Frontier deposits in the Uinta basin of Utah. Mud-rich units in the PCM and distal Ferron-Frontier are similar in terms of facies: very-fine grained sandstone facies dominated by ripple lamination alternating with laminated and ungraded to graded mudrocks, much like the slope and off-lobe elements of the Lewis Shale. These characteristics allow similarity of sediment-delivery processes. In more sand-rich, yet low net-gross (<75%), portions of the older successions, fine-grained sandstone facies include a preponderance of plane-parallel alternating with ripple lamination, and rarely, hummocks and trough crossbedding, to which recent work has attributed a turbidite origin. These more amalgamated facies also range from 10 to 60 miles seaward of the nearest coeval delta fronts, much like Lewis reservoir facies. However, the lack of widespread Lewis-style, high net-gross, amalgamated sand-rich channel-lobe elements in the older units may be a function of hinterland and delta-front paleogeography.