

## **Simultaneous Marine Transgression and Valley Incision in a High Accommodation Setting, Hanna Basin, Wyoming**

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Conventional models of valley incision in tectonically active basins depict fluvial incision and base level (sea level) fall as a paired process-response. Sequence boundaries are considered to be markers of episodes of tectonic uplift and/or lowered base level accompanied by a basinward migration of shoreline position. The Hanna Basin of southern Wyoming changed from being a foreland basin with an east-west drainage pattern during the Campanian to being a block-rotational basin, down-dropping in the east and uplifting in the west, during the Maastrichtian, while maintaining the drainage pattern. Paleovalley fills in the Ferris and Hanna formations (Maastrichtian-Thanebian) are 10-90 m thick, 0.5-2 km wide, and contain mixed fluvial/estuarine medium- to coarse-grained channel belts. Because the Hanna Basin block behaved as a semi-rigid lever, rotating around a pivot point to the east of the Rawlins Uplift, valley incision and base level fall in the west were accompanied by base level rise and in some cases, marine transgression to the east. Sequence boundary formation upstream and filling events downstream were simultaneous and therefore out of phase relative to changes in relative sea level predicted by standard allocyclic models. Tidal influence in these systems occurred during erosion and bypass in the upstream section and sediment sequestration in the downstream section. The influence of tectonic activity, including intrabasinal structures, on valley incision and local base level changes can have dramatic implications for predicted reservoir geometries, facies distribution, and reservoir heterogeneity.