

Not All IHS Was Created Equal: A Retrospective and Prospective Look at inclined Heterolithic Stratification of tidal-Fluvial Point Bars of the Middle McMurray Formation of Northeastern Alberta, Canada

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Abstract

Within academia and industry, there is a renaissance occurring, reforming our understanding of point bars and more specifically tidal-fluvial point bars of the fluvial-to-marine transition zone. Though early workers (Jackson 1975; 1976;1981; Bridges and Leeder, 1976; Allen et al.,1980, Reineck and Singh, 1980; Mossop and Flach, 1983; Miall, 1985; Thomas et al., 1987; Smith 1988; Wightman and Pemberton, 1997; Hein et al., 2000; Ranger and Gingras, 2001; etc.) of point bars and bars within the fluvial-marine transition provided fundamental insights which guide current thinking, in the past five years, marked advancements have reshaped our understanding of the processes (Willis and Tang, 2010; Dalrymple et al., 2011; Martinus and Van den Berg, 2011; Nittrouer et al., 2012; Ashworth and Lewin, 2012; Sisulak and Dashtgard, 2012; Blum et al., 2013); geomorphological elements (Smith et al.,2009; Hubbard et al., 2011; Musial et al., 2011; Fustic et al., 2012); architectural elements (Labreque et al., 2011; Jablonski 2012; Nardin et al., 2012;) and ultimately the deposits of tidal-fluvial point bars.

This renaissance in tidal-fluvial understanding has largely been spurred by great interest in the bituminous Lower Cretaceous (Aptian-Albian) McMurray Formation which is interpreted to be deposited within the fluvial-marine transition zone. Furthermore, a large proportion of the middle McMurray Formation was deposited within tidal-fluvial point bar environments, which can be dominantly composed of inclined heterolithic stratification (IHS; Thomas et al., 1987). *In Situ* bitumen extraction techniques (i.e., SAGD) appear to be extremely sensitive to reservoir heterogeneity associated with the distribution of this IHS, particularly the silt beds (Strobl et al., 1997; Nardin et al., 2012; Strobl, 2012). This prompted current and ongoing research into the developing a better understanding of 3-dimensional architecture, spatial distribution and depositional processes related to these IHS packages of tidal-fluvial point bars.