

## **Sedimentology and Stratigraphy of the Lower Schrader Bluff and Prince Creek Formations at Shivugak Bluffs, National Petroleum Reserve - Alaska**

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### **ABSTRACT**

Near horizontal (6° dipping) outcrop exposures of Upper Cretaceous (Santonian-Campanian) strata at Shivugak Bluffs in northern Alaska preserve an extensive record of a clinof orm-topset system. These strata are subdivided lithostratigraphically into proximal shelf, deltaic, and shallow marine deposits of the Schrader Bluff Formation (Fm) and lower delta plain, coastal plain, and fluvial deposits of the continental Prince Creek Fm. Shivugak Bluffs includes 400 m of continuous marine deposits overlain by 140 m of strata containing the marine-continental transition between the lower Schrader Bluff and Prince Creek Fms. The lowermost 400 m of the lower Schrader Bluff Fm is divided into the Rogers Creek, Barrow Trail, and Sentinel Hill members interpreted as recurring deposits of river-dominated deltas comprising distributary mouth bars (DMBs), subaqueous terminal distributary channels (TDCs), interdistributary bays, medial delta front deposits, distal delta front deposits, and prodelta deposits interbedded with proximal shelf deposits. The marine-continental transition is one of the few outcrop expressions of an ancient, muddy, prograding river-dominated deltaic system that contains interdistributary bays that shoal upward into floodbasins with pedogenic modification. An isolated interval of hummocky cross-stratification within the Rogers Creek Member at Shivugak Bluffs is interpreted as wave-reworked DMB-TDC complexes or storm sheets. This investigation focuses on the sedimentology, ichnology, and stratal heterogeneity within a sequence stratigraphic framework to ascertain large-scale cyclical trends in these river-dominated deltaic systems. The Schrader Bluff (West Sak and Tabasco equivalent in the subsurface) and Prince Creek (Ugnu equivalent in the subsurface) Fms are relevant to industry as outcrop analogs for numerous shallow, viscous- to heavy-oil reservoirs on the central North Slope of Alaska.