

## **Lower Cretaceous Sequences at Dinosaur Ridge, Jefferson County, Colorado: New Perspectives on Their Sedimentary History, Correlation, and Sequence Architecture**

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### **ABSTRACT**

The Lower Cretaceous stratigraphic succession at Dinosaur Ridge, west of Denver, Colorado, has been a center of geologic interest and research since ca. 1936 when it was first exposed by road construction. The succession is well known for its numerous saurian trackways and ichnofossil complexes and is of interest as an analog for hydrocarbon exploration in foreland basin deposits. The purpose of this report is to present our recent results and review those of others, including new and previously unpublished radiometric dates, and introduce a new high-resolution stratigraphic section and photomosaic facies maps for the area. Five formations are present at Dinosaur Ridge with at least three stratigraphic sequences that are separated by apparent lowstand surfaces of erosion (LSEs). Sequence 1, the Lytle Sandstone, rests unconformably on the Jurassic Morrison Formation and is separated from the Plainview Sandstone by an apparent disconformity. The Lytle Sandstone is a fluvial channel and flood plain deposit that is fully continental in origin. Sequence 2 is composed of the estuarine Plainview Sandstone, which is separated from the Lytle Sandstone by a local (?) disconformity or transgressive surface of erosion (TSE) and overlain by the marine Skull Creek Shale. The uppermost sequence, Sequence 3, is an incised valley-fill comprised of the upper units of the South Platte Formation (a.k.a., Muddy "J" Sandstone) and is overlain by a marine transgression and highstand succession of the Mowry Shale. Our study, combined with previously published reports, seeks to address, clarify, and potentially resolve some of the geologic problems associated with the Lower Cretaceous section along the Front Range, including:

- Definition of a more precise contact between the Jurassic Morrison Formation and the Cretaceous Lytle Sandstone;
- Timing, depositional setting, and regional correlation of the Lytle Sandstone and how it relates physically to the initiation of the Western Interior foreland basin;
- Apparent differences in depositional timing and initiation of geological processes across the developing foreland basin;
- Different interpretations of the Plainview Sandstone and Skull Creek Shale contact as a TSE versus a gradational facies change, and regional variations in this contact;
- Conflicting lithostratigraphic, biostratigraphic, and radiometric correlations of presumably equivalent formations on either side of the Western Interior seaway; and
- Reconciliation of published facies successions which now show disagreement in terms of number, order, and stacking patterns of parasequences.