

A Late Cretaceous, Alluvial Paleoenvironment: the Prince Creek Formation,
North Slope of the Brooks Range, Alaska

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The Prince Creek Formation is a Late Cretaceous, high latitude, dinosaur bearing alluvial succession located along the Colville River north of the Brooks Range, Alaska. Typical facies include very fine-to fine-grained trough cross-laminated/ripple-laminated sandstone, siltstone, mudstone, and coaly shale. Rare, coarser-grained sandstones also occur, but are regionally restricted.

Abundant are drab-colored mudstones and siltstones along with thin (0.1 to 0.5 m) sheet sandstones and coaly shale. Root traces, siderite nodules, Fe-oxide mottling, and blocky structure are common. Non-channelized, fine-grained facies are interpreted as lakes, lake margins, peat-bogs, levees, crevasse splays, and paleosols. Fe-oxide mottling, drab colors, and siderite within stacked, aggregated mudstones suggest that paleosols are cumulative and poorly drained. Dinosaur bones are localized within some fine-grained successions and dinoturbation is rare but present. Bentonites, and tuffs occur throughout and increase in thickness and frequency up-section.

Common, 1 to 3 m thick, very fine-to fine-grained trough cross-laminated/ripple-laminated sandbodies are predominantly single-story. Most contain carbonized root traces, and siderite concretions. These sandbodies occur as thin, ribbon-like channels surrounded by overbank fines, or as extensive sheet sands with prominent lateral accretion surfaces. Ribbon sandbodies are interpreted as non-migrating, low-energy anastomosed channel fills while sheet sandstones are interpreted as low-energy meandering streams.

Rare, multi-story, medium-to coarse-grained sheet sandstones up to 7 m thick are limited in extent. Coarser-grained sandbodies are dominated by lateral accretion and often contain mud rip-up clasts, trough cross-laminations, silicified or carbonized logs, and pebble lags. Large dinosaur bones are found rarely within channel lag deposits. These localized, medium-to coarse-grained sandbodies record the highest energy flows within the Prince Creek Formation and probably represent meandering trunk channels.

Finer-grained facies dominate within the Prince Creek Formation and record low energy stream/flood-plain deposits. Coarser-grained sandbodies suggest local, higher energy environments within a low-lying, wet alluvial plain.