Architecture of an intermontain lacustrine lobate delta in the Upper Jurassic to Lower Cretaceous Tantalus Formation at the Whitehorse Coal Mine site, Whitehorse Trough, Yukon.

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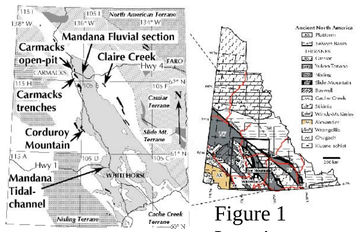


Figure 1 Location

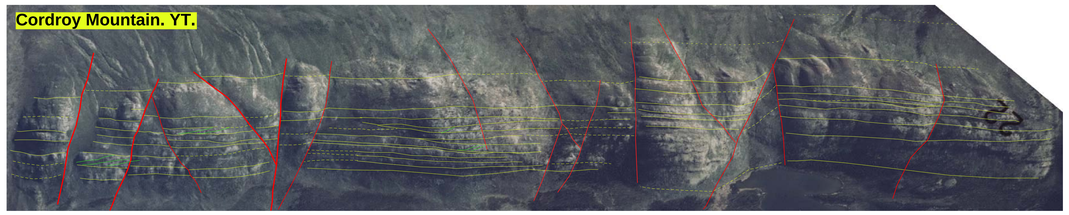


Figure 2: Deep gravel-bed river deposits, Cordroy Mountain. Ridge is about 5 km long.

Figure 3. Meandering gravel-bed river deposits, Claire Creek

Figure 4. Anastomosed stream depoiits, overlying thin coal seam in Tantalus Butte Open pit circa 1979.

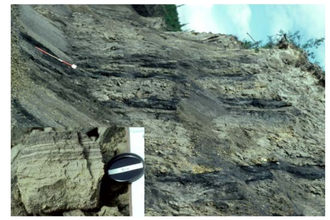


Fig 5. Splay deposits in Tantalus Butte Open Pit.

Tantalus Formation

The Tantalus Formation represents the youngest unit within the Whitehorse Trough (Fig 1). It is dominated by chert-pebble conglomerate, with minor sandstone, mudstone and coal.

Past investigations indicate that the bulk of the conglomerates were deposited in shallow (< 3m) and deep gravel-bed braided rivers. Deep gravel-bed river deposits have been identified at Hootalinqua and Cordroy Mountain, where channels may have been several kilometers wide (Fig 2).

Twelve-meter thick lateral accretion sets in exposures at Claire Creek indicate deposition in meandering gravel-bed rivers (Fig 3; Long 1986, 2005).

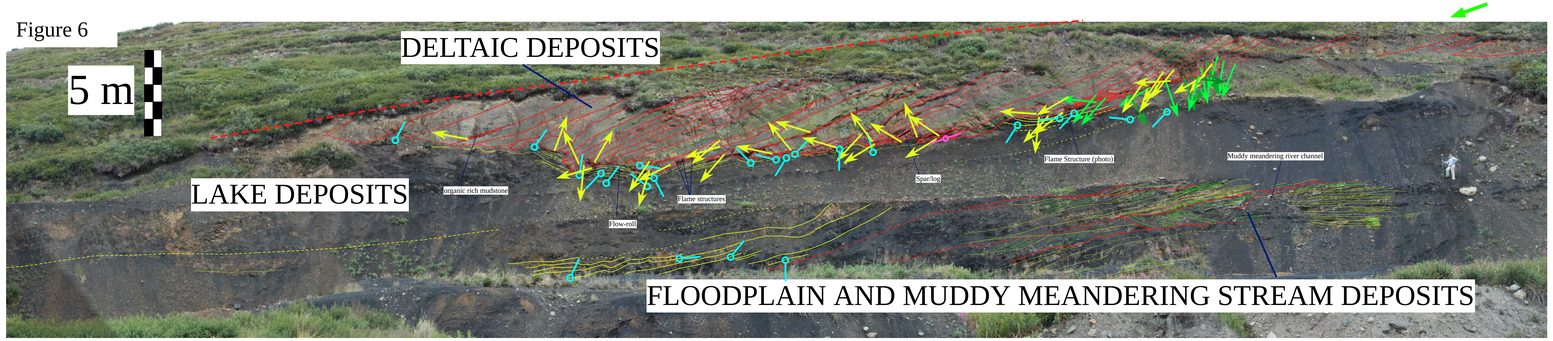
At Carmacks the thickest coal deposits are associated with drag-folds in fine-grained overbank deposits, formed in association with high-constructive anastomosed and single channel, streams (Fig 4, 5).

Given the preponderance of fluvial deposits, it is tempting to interpret all large-scale gravel foresets as either accretionary sets formed at the downstream end of longitudinal braid bars, or if gently inclined, lateral accretion elements from the margins of braid bars, side-bars or meander-bends. This would be a mistake as large-scale foresets exposed at the Whitehorse Coal deposit, behind Mount Granger, were formed as foresets of a Gilbert-style delta which prograded into a small fresh-water lake.

Architectural analysis of the exposure in the coal pit (Fig 6) indicates that the delta was lobate, with minor shifts in distributary mouth position indicated by downlap of some foreset laminae (green lines). The delta prograded several decimeters to meters during each flood event (red lines), with gravel moving down the foresets as grain-fall and grain-flow deposits (Fig 7 and up).

Deformation of underlying lake beds was caused by sediment loading (see below). Minor mudstone laminae on forests are too discontinuous to represent significant permeability barriers.

Figure 6

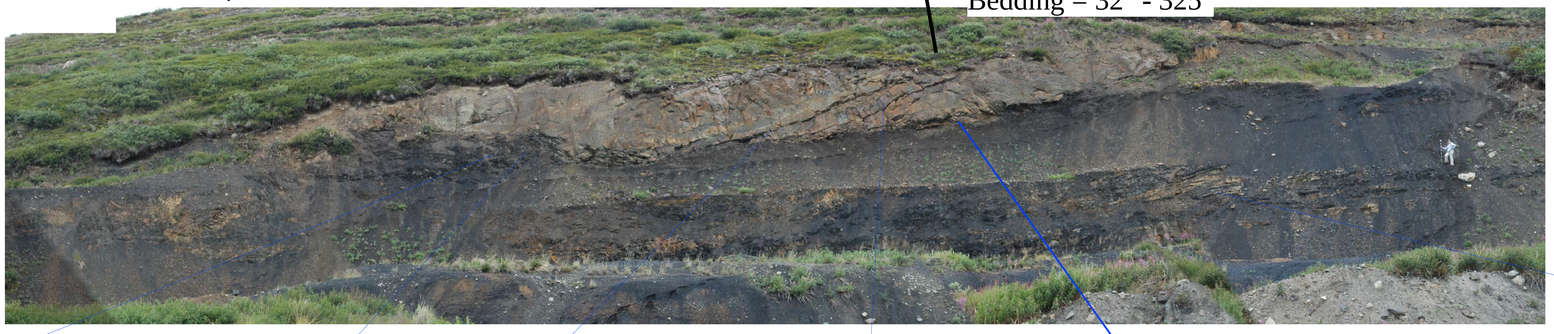


Whitehorse Coal Pit
60°29.599'N, 135°16.007'W

220° 080°

Bedding = 32° - 325°

Foreset dip direction (tilt corrected) shown as arrows oriented so that flow away from the observer is up, and flow towards the observer is down. Pins indicate dip of selected bedding surfaces



Grainflow units with load-structures, deformed by later load application as delta prograded ove basinal muds

Foreset - toe

Foreset - toe

Foreset-detail

Tool-marks on foreset

Load cast in grainflow unit

Fig 7

Matrix supported pebble in sandy grain-flow deposit at base of foreset

Termination of pebble grainflow unit at base of foreset

Grainflow units

Graded granular coarse sand-stone produced by density flow at base of foreset

Distal grainflows

Meandering channel, splay, and floodplain deposits in strata beneath laminated lake deposits. Coal seam is beneath this unit.