Transition from the Belly River through Bearpaw to Horseshoe Canyon Formations in West-Central Alberta Plains

Dongqing Chen*, Andrew Beaton, Cristina Pana, and Willem Langenberg
Alberta Geological Survey
4999-98 Ave., Edmonton, Alberta, T6B 2X3
Dong.Chen@eub.gov.ab.ca

Four successions with three regionally traceable flooding surfaces from the Uppermost Belly River to Lower Horseshoe Canyon formations in the Upper Cretaceous were correlated from the Red Deer to the Athabasca River areas in the Alberta Basin. They are, from the base to the top, the Uppermost Belly River Formation, Belly River-Bearpaw Transitional Zone, Bearpaw Formation, and Bearpaw-Horseshoe Canyon Transitional Zone.

The transgression of the Bearpaw Sea in latest Campanian time resulted in a change in regional environment from a fluvial channel/lacustrine into a coastal plain setting. The first flooding surface at the base of the Belly River-Bearpaw Transitional Zone can be traced northwestward to the McLeod River.

Constrained to the southeast of the McLeod River, the Bearpaw Formation consists of two coarsening-up sequences of marine shale and siltstone. Each sequence is bounded by a flooding surface at its base. The third (maximum) flooding surface at the Upper Bearpaw base can be traced northwestward to the Athabasca River. The first flooding surface is constrained to the west of the city Edmonton where the second and the third flooding surfaces are merged. Lethbridge-Lowest Horseshoe Canyon coals were developed on deltaic plains close to flooding surfaces.

The Lower Bearpaw-Horseshoe Canyon Transitional Zone, ca. 10-55 m in thickness, contains a coarsening-upward to fining-upward sequence composed of deltaic deposits, in which the Lower Drumheller Coal Zone was formed. Above this coal zone, fine siliciclastic sediments of the Upper Bearpaw-Horseshoe Canyon Transitional Zone were deposited.