

# Structural Mapping and Modelling of the Sub-Cretaceous Unconformity and Delineation of Subcropping Formations, West-Central Alberta.

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## Summary

A review of geophysical wireline log and core data in west-central Alberta was undertaken to identify the stratigraphic and structural position of the sub-Cretaceous unconformity, develop an improved model of the unconformity surface, and to map the subcrop extents of lithostratigraphic formations in the study area.

## Introduction

The sub-Cretaceous unconformity is an important regional surface found across the Alberta Basin representing a major erosional event, which exposed Upper Devonian Wabamun to Upper Jurassic/Lower Cretaceous Nikanassin formation strata in the study area (Figure 1). Structural modelling and zero-edge delineation of subcropping formations intersecting this surface are an integral part of a larger project at the Alberta Geological Survey (AGS) to create a provincial-scale 3D geological framework model of the Alberta subsurface.

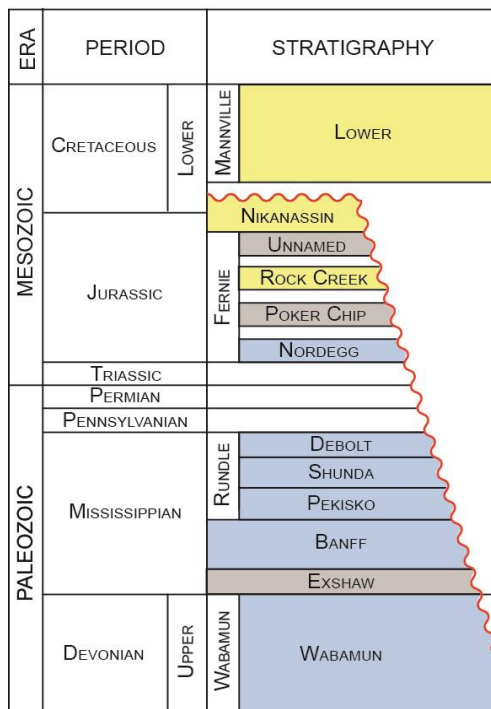


Figure 1. Lithostratigraphy in the study area. The position of the sub-Cretaceous unconformity is highlighted in red.

## Methods

The study area covers UTM map sheets 83G, 83F, 83J and 83K (Figure 2). Geophysical wireline logs for over 3000 wells were reviewed to identify the depth of the unconformity, the corresponding subcropping formation, and other formation picks found below the unconformity surface. Select cores from each subcropping formation were viewed to validate log responses at the unconformity surface. The unconformity picks generated from this study are of high quality and evenly distributed, with a minimum data density of 3 wells per township (where suitable well control was present), thus providing optimal geostatistical modelling conditions.

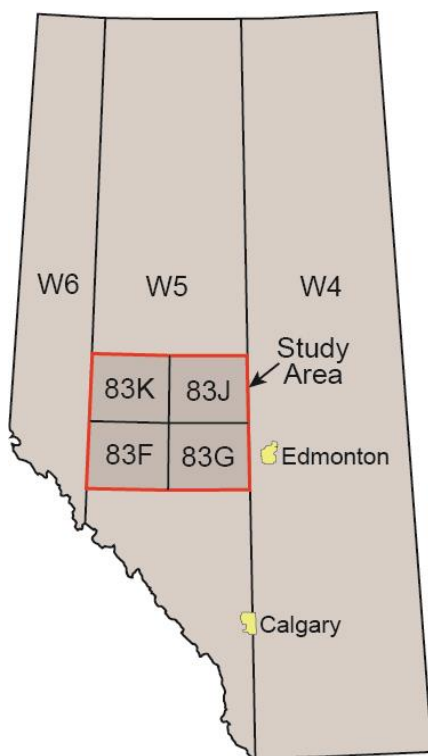


Figure 2. Location of the study area and the 1:250 000 scale UTM map designation in west-central Alberta.

## Conclusions

Subcropping formations in the study area include, in stratigraphically descending order, the Nikanassin, Fernie, Debolt, Pekisko, Shunda, Banff, Exshaw, and Wabamun. The model results of this study were compared with a previous unconformity surface generated using pick data from numerous sources of varying quality, revealing an overall improvement in the surface prediction and enhanced identification of erosional features associated with the sub-Cretaceous unconformity.