

Albian-Cenomanian Stratigraphy and Petroleum Systems, Eagle Plain Basin, Yukon

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Introduction

Eagle Plain is an underexplored basin in northern Yukon with known hydrocarbon potential (Figure 1). The middle to Upper Cretaceous succession underlies the majority of Eagle Plain at surface. The middle to Late Albian Parkin Formation and Cenomanian Fishing Branch Formation are the focus of this study (Figure 2). The Cenomanian Fishing Branch Formation flowed 3300mcf/day of gas from the Chance G-08 well on production test.

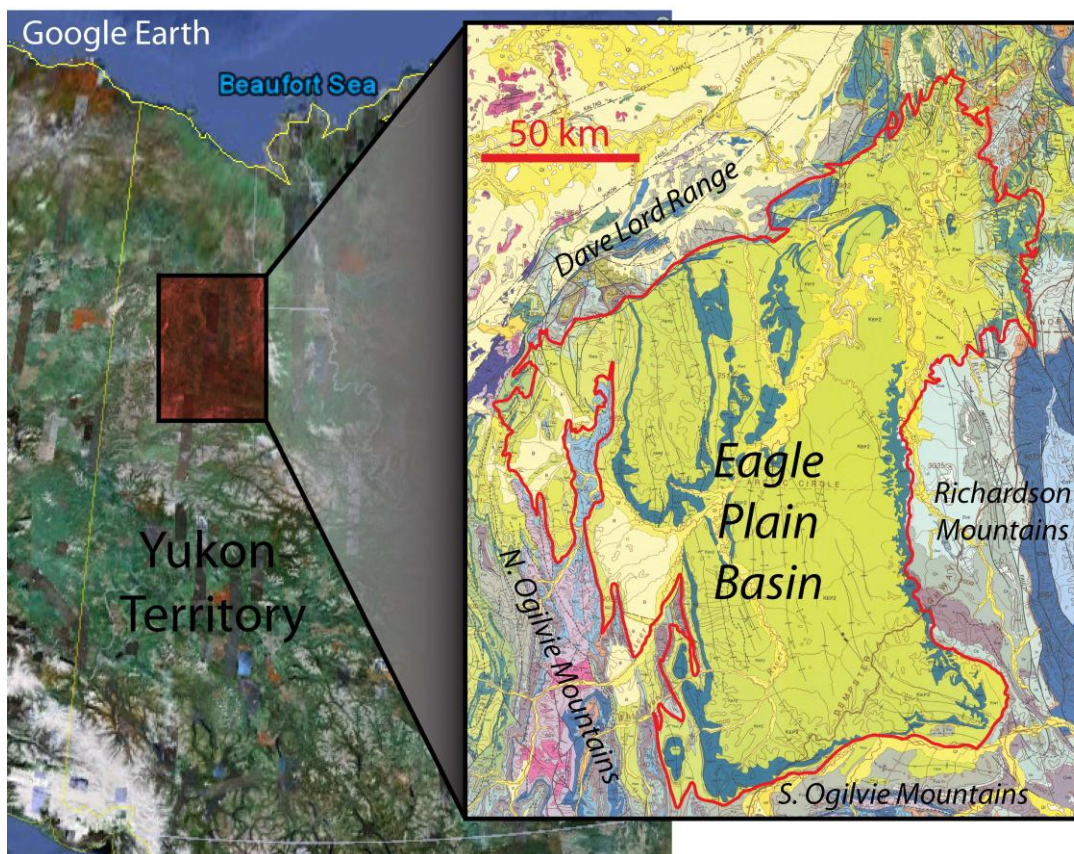


Figure 1: Geological map of northern Yukon Territory indicating location of the Eagle Plain Basin (outlined in red) and major geomorphological elements. Cretaceous bedrock (green and blue-green on map) underlies the majority of Eagle Plain at surface. (Modified from Norris, 1984)

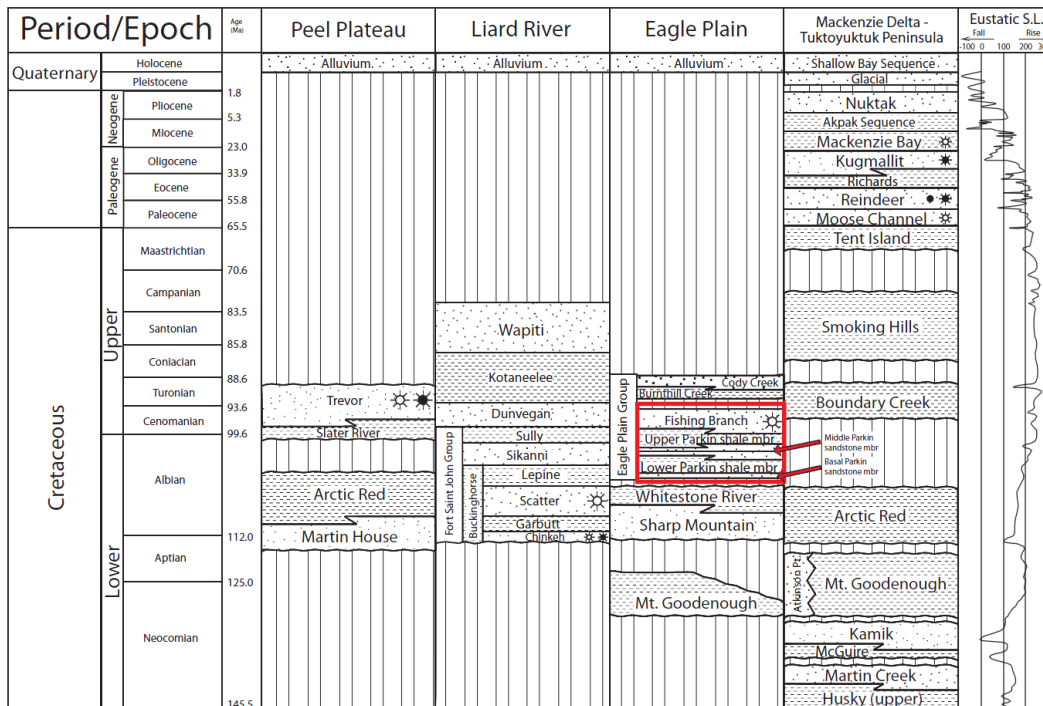


Figure 2: Cretaceous to recent stratigraphy of Eagle Plain area and other basins of northern Canada. Red box outlines the interval of focus for this study (Compiled from this study, Dixon, 1992a; Hadlari, 2009; Jowett, 2007).

Method

Previous studies of the Cretaceous interval are based on lithostratigraphic principles (i.e. Dixon, 1992b). Recent outcrop study yielded insights that allow for revision of the middle to Upper Cretaceous stratigraphy, en route to a high resolution sequence stratigraphic framework for the succession (Jackson et al., 2010). By employing stratigraphic principles with outcrop and core data, sedimentology, petrography, biostratigraphy and source rock analysis, we present an updated appraisal of the hydrocarbon prospectivity for the basin.

Discussion

Potential reservoir units in a variety of marine depositional environments are identified in the basal Parkin sandstone member, middle Parkin sandstone member, and Fishing Branch Formation. Previous exploration efforts in the 1950's and 60's targeted deeper Paleozoic reservoirs in Laramide-aged structural traps. However, evidence from this study emphasizes the potential for stratigraphic and combined traps. The presence of a significant slope with at least 100m of relief western Eagle Plain suggests new conceptual play opportunities associated with sand delivery to the shelf edge.

Cretaceous source rocks are rich in woody gas-prone kerogen and are immature in much of Eagle Plain. The presence of oil staining with yellow streaming fluorescence in coarse grained facies of the basal Parkin sandstone member in the North Parkin C-33 well supports potential for lateral and/or vertical migration from deeper Paleozoic source rocks.

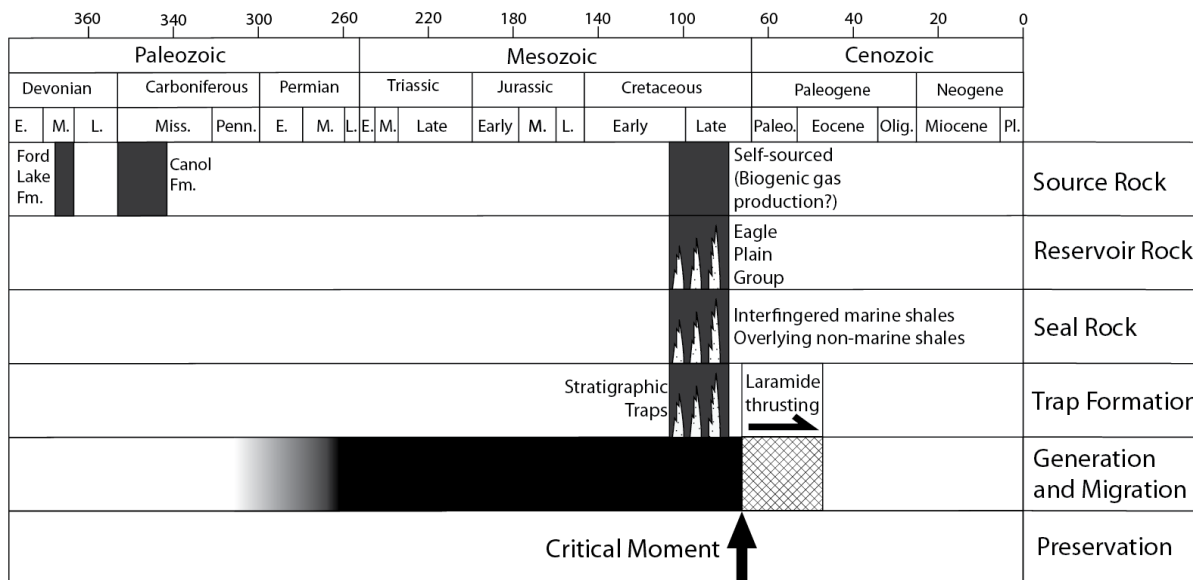


Figure 3: Petroleum systems chart for middle to Upper Cretaceous reservoirs in Eagle Plain.

Conclusions

Refinement of the stratigraphic framework is important for understanding regional sedimentation patterns, basin morphology, and the distribution of reservoir facies within the Cretaceous strata of Eagle Plain. Very large oil and gas fields have been discovered in comparable stratigraphically confined reservoirs around the world, and could easily have been overlooked in Eagle Plain where extensive gaps in well control occur. The Eagle Plain Group represents a prospective shallow target for primarily gas and merits attention for future exploration activity.

Acknowledgements

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References

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