BASIN ANALYSIS AND SEQUENCE STRATIGRAPHY TECHNICAL DIVISION

2021-27 Timely Refresh for the Geological Atlas of the Western Canada Sedimentary Basin

Speakers:

- Greg Lynch *PhD, P.Geo., Chair, Atlas Steering Committee*
- Neil Watson *BSc, P.Geo., President, Canadian Society of Petroleum Geologists*

Location: Online

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ABSTRACT:

The 'Geological Atlas of the Western Canada Sedimentary Basin' (Mossop et al., 1994) is a well-known and well-loved treatise, that was wildly successful in achieving its original mandate of establishing a comprehensive stratigraphic framework for the basin, in maps, cross-sections, and text. Serving as a veritable boon to E&P companies both big and small over the last 30 years, it's the first call/go-to manual for a quick look at the big picture, or when delving into new or unfamiliar stratigraphy or corners of this 'Superbasin' (Figure 1). The Atlas has opened doors and made basin entry accessible to all, attracting investment from within and outside of Canada. Countless scoping exercises, as well as planning and strategic discussions have huddled around the Atlas in finding a way forward; its value to the Oil and Gas industry and economic well-being of the whole country can only be described as 'immeasurable'.

Preliminary discussions and planning for the new Atlas project began at the CSPG in the second half of 2020, and a Steering Committee eventually came together with representation from the four western provinces, as well as both the Yukon and NWT territories, the federal government, and industry. With a robust show of interest from the numerous potential authors who were solicited through the fall, and agreement between partnering agencies in the Steering Committee, official launch was announced in January 2021. Much of the impetus for this at the CSPG has also emerged from special events planning for the Centennial celebrations coming up in 2027, which serves as the target date for delivery of the revised Atlas and provides a six-year window to get the work done and published. However, an entirely digital product is being planned, in which case modular or interim publishing of chapters can occur if completed ahead of time.

Points of view on the timeliness of this review vary within the geoscience community but are very supportive for the most part. Reactions range from "this is well overdue" to "so what's new, how are you going to improve on the last edition". It would seem any push-back attests to the high quality of the 1994 edition (Mossop et al., 1994). Certainly, a 30-year shelf life is a good run indeed, but 100s of thousands of wells have been drilled since then, and although the rocks are the same, the science has unabashedly moved forward, and a revisit is in order. The first point of departure begins with the new Atlas extending further into the NWT to include correlative stratigraphy of the Northern Interior Platform, expanding the geographic reach (Figure 1). Also, since 1994, unforeseen paradigm shifts have occurred, including the emergence of unconventional plays and horizontal drilling technology, as well as large-scale oilsands developments and thermal bitumen plays coming online. New Atlas chapters are planned for capturing the explosion of knowledge and insight which have emerged as a result, in key intervals such as the Triassic Montney Formation, or from Devonian organic shales such as the Duvernay, Muskwa, and Canol formations. The Lower Cretaceous will be revisited for similar reasons. The modern digital revolution is also facilitating changes in the way we capture, analyse, and display data in the basin; for instance, one of the objectives of the Atlas, spearheaded by the Alberta Geological

Survey (AGS) and partnering Surveys, is to extend the current 3D model of Alberta into neighbouring provinces and territories in order to cover the entire basin. As well as stratigraphic updates a number of new thematic chapters are planned spanning a broad range of topics. These include abnormal pressures, microseismicity, basin modelling, geodynamics and paleogeography, sequence stratigraphy, ichnology, significant dinosaur and fossil sites, impact structures, carbon capture use and storage, geothermal energy, hydrogeology, formation waters, as well as hydrogen, helium, and lithium resources. Emerging green energy themes which are garnering more and more attention, are noted here.

In the resource sector there are some things we have little control over, such as global market cycles, shifting commodity prices, the political pendulum both national and beyond, or the fate of ambitious infrastructure projects. However, in the interim, as geoscientists, engineers and technical workers we can work in a coordinated manner to provide the best possible understanding of this Superbasin, both for the sake of science, and in order to stay ready for, or even initiate the next big thing, whatever that looks like. A refresh of the Atlas strives to do just that, and the momentum that is currently under-foot is going to carry us there.

REFERENCES:

Mossop, G.D., Shetsen, I., and Madunicky, M. 1994: Geological Atlas of the Western Canada Sedimentary Basin. Calgary, AB: Canadian Society of Petroleum Geologists, 500 p.

Mossop, G.D., Wallace-Dudley, K.E., Smith, G.G., and Harrison, J.C. (comp.) 2004: Sedimentary Basins of Canada; Geological Survey of Canada Open File Map 4673.

BIOGRAPHY:

Greg Lynch is a Professional Geologist with a PhD from the University of Alberta. He has had a research career with the Geological Survey of Canada, and subsequent exploration career with Shell. Greg is a Past President of the Canadian Society of Petroleum Geologists.

Neil Watson is a Professional Geologist and President of the Canadian Society of Petroleum Geologists. At work Neil is Director of Geology at Enlighten Geoscience Ltd.

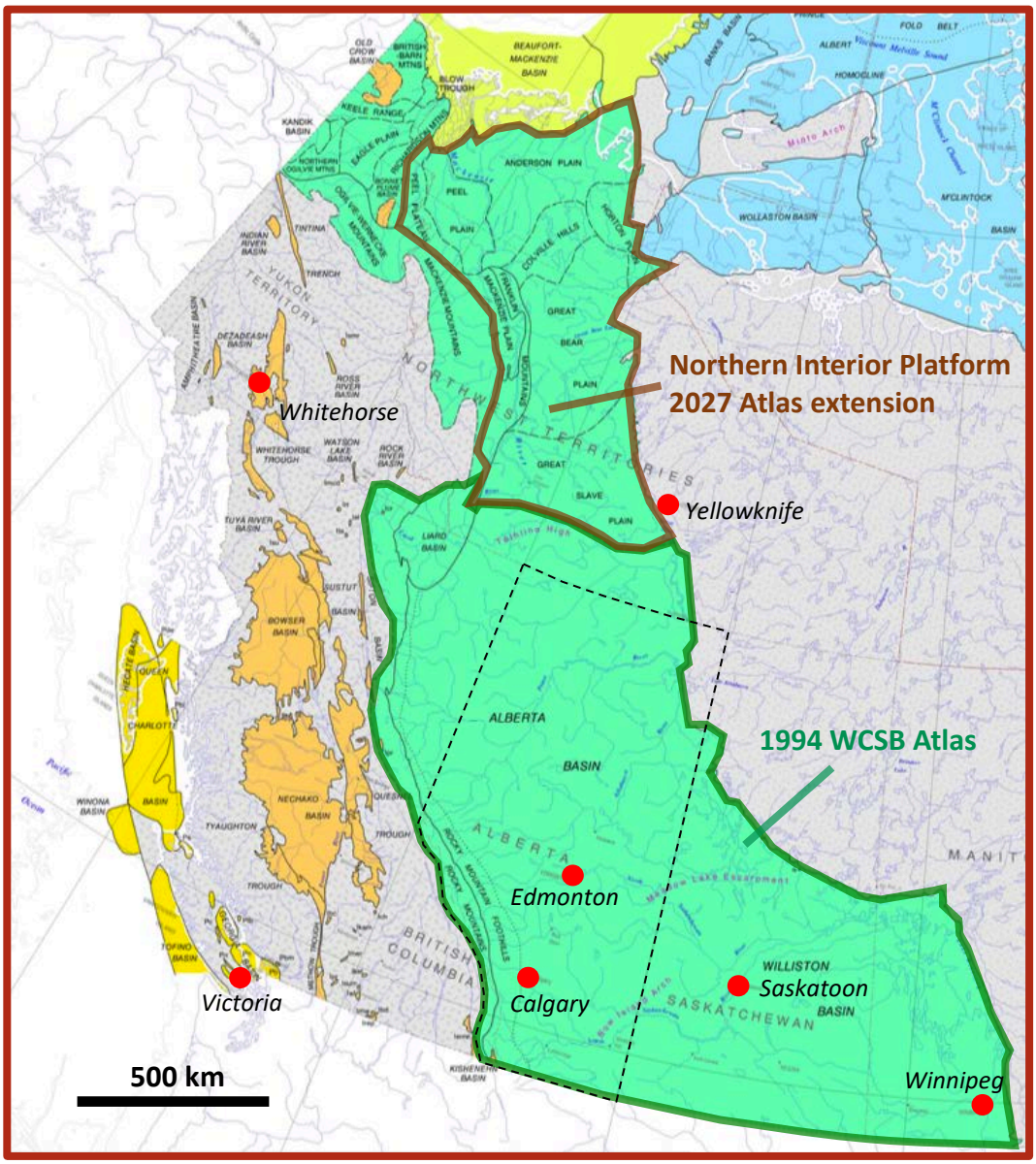

Figure 1. Outline of Western Canada Sedimentary Basin, and proposed extension of Atlas into Northern Interior Platform. Red dots are cities with representation on the Atlas Steering Committee, including provincial, territorial, and federal government surveys, as well as industry representation and the CSPG. Figure adapted from Mossop et al. (2004).