



Preliminary Investigations of the Hudson Bay Area Coal Deposits

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**Saskatchewan
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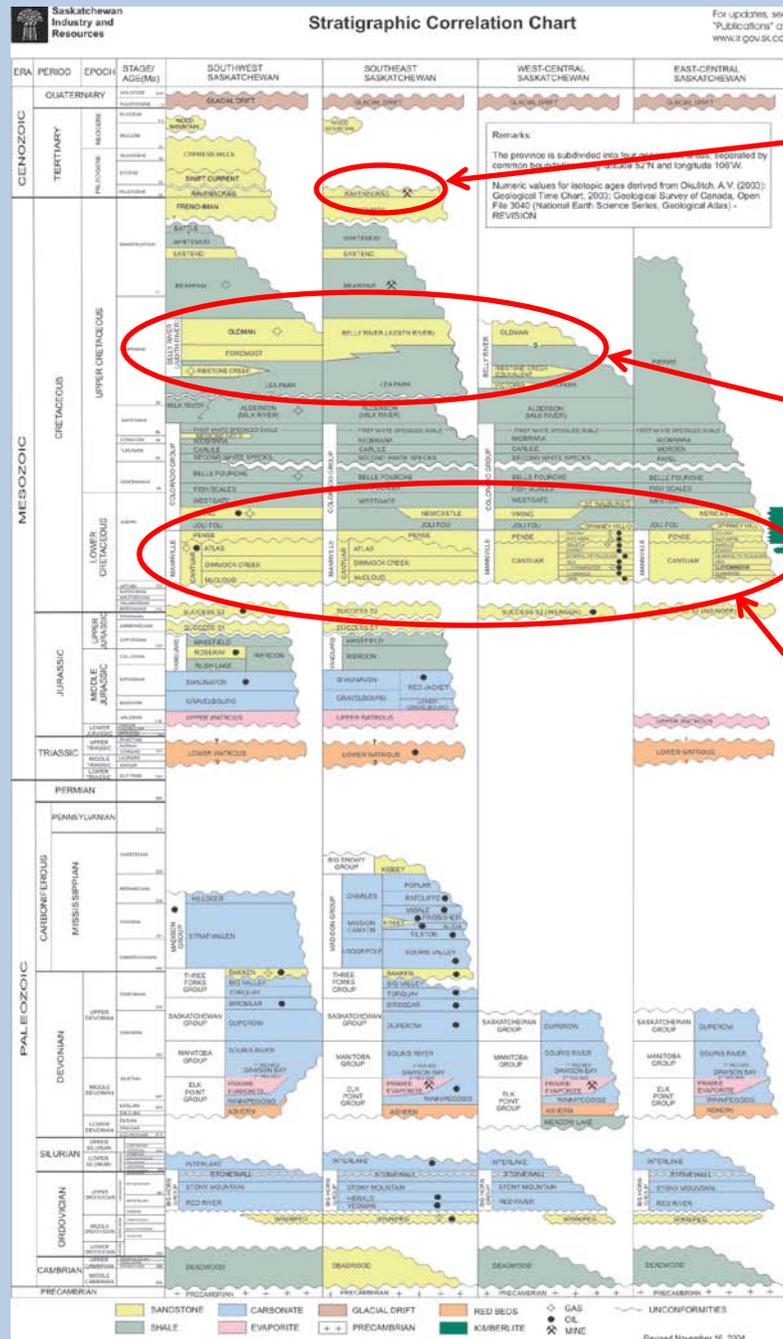


Introduction

- Introduction
- Manville Coals in Saskatchewan
- Historic Geologic Work
- Local Stratigraphy
- Cross Sections
- Conclusion



Three main coal bearing stratigraphic intervals in Saskatchewan



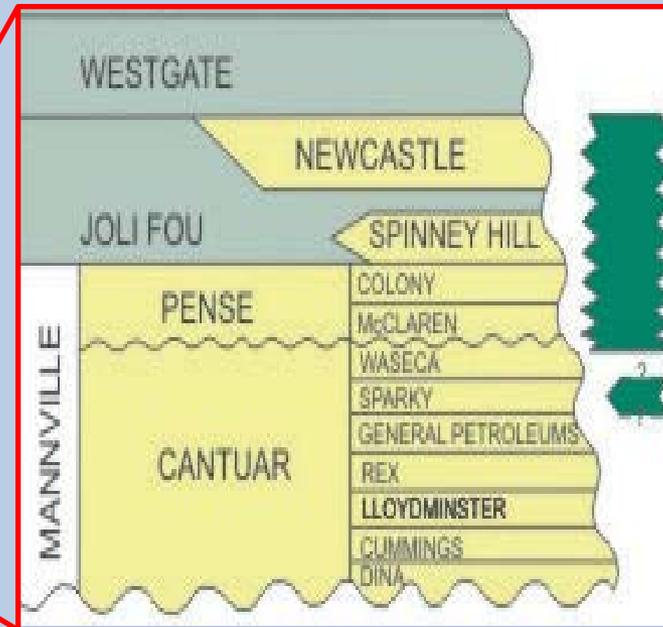
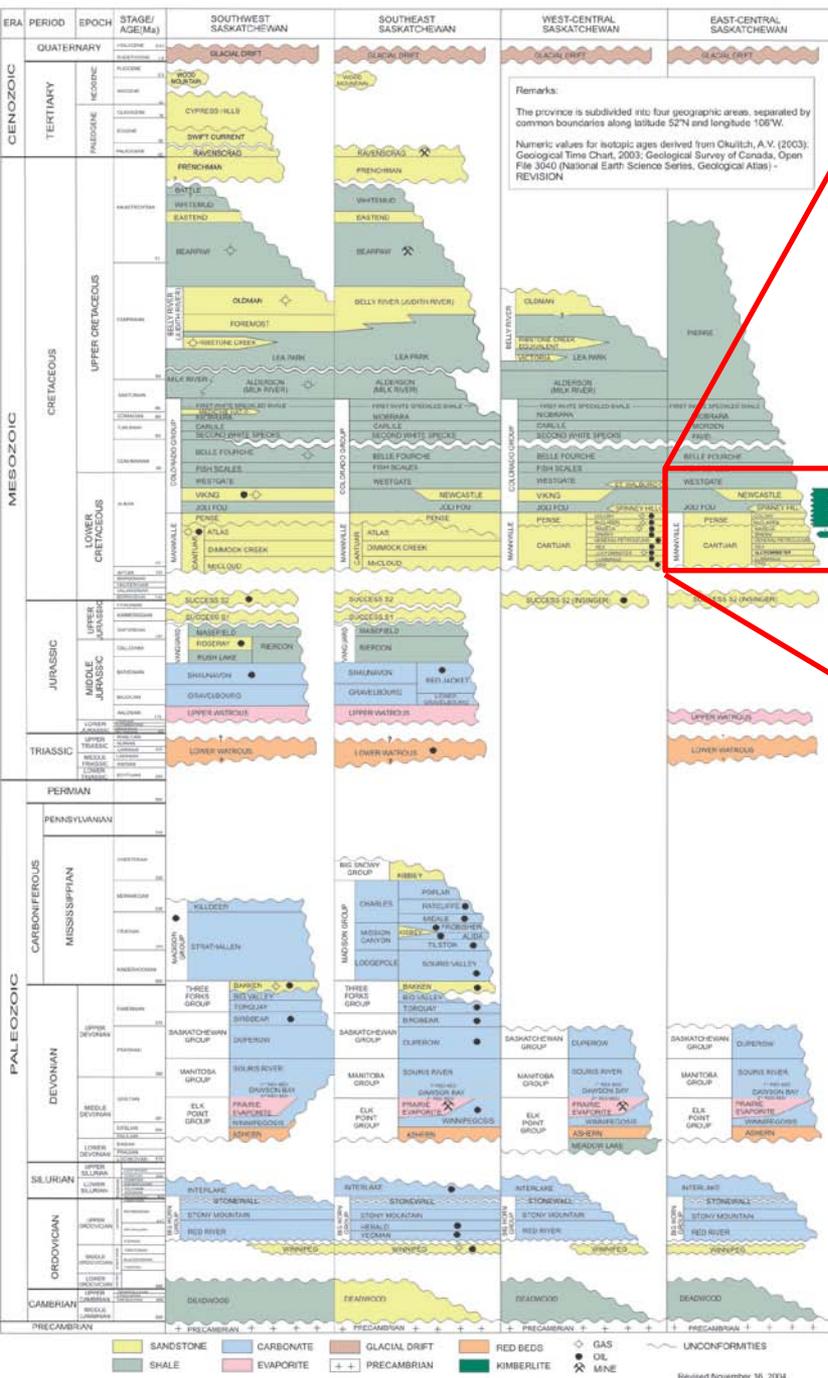
Tertiary
Ravenscrag
Formation
~55-65 M y

Upper Cretaceous
Belly River
Formation
~75-80 M y

Lower Cretaceous
Mannville Group
~105-121 M y



Mannville Group



- All 7 members of Cantuar are coal bearing at various Sask. locales
- Cummings and Lloyd most significant
 - Range from 1 to 3 m up to 5 m
 - Cummings more isolated, Lloyd better developed occurs across paleovalleys and paleo upland terraces.
- Dina (up to 3.3 m) Rex (up to 4.5 m) and General Petroleum (up to 1.5 m)
- Sparky aerially extensive (20,000 km²)

Mannville Coals

Wapawekka Lake area

- Pearson (1961) Exposed 1.2 m (4 ft) thick coal seam

Montreal Lake area

- 9.1 m (30 ft) thick at ~219.5 m (720 ft) depth

Meadow Lake - Big River - Choiceland areas

- Mannville coal seams reported at 183 m (600 ft)

Tobin Lake area

- 1994 Consolidated Pine Channel Gold Corp.
- ~18 m thick coal interval
- Recently re-drilled by Weststar Resources Corp.

Theodore area

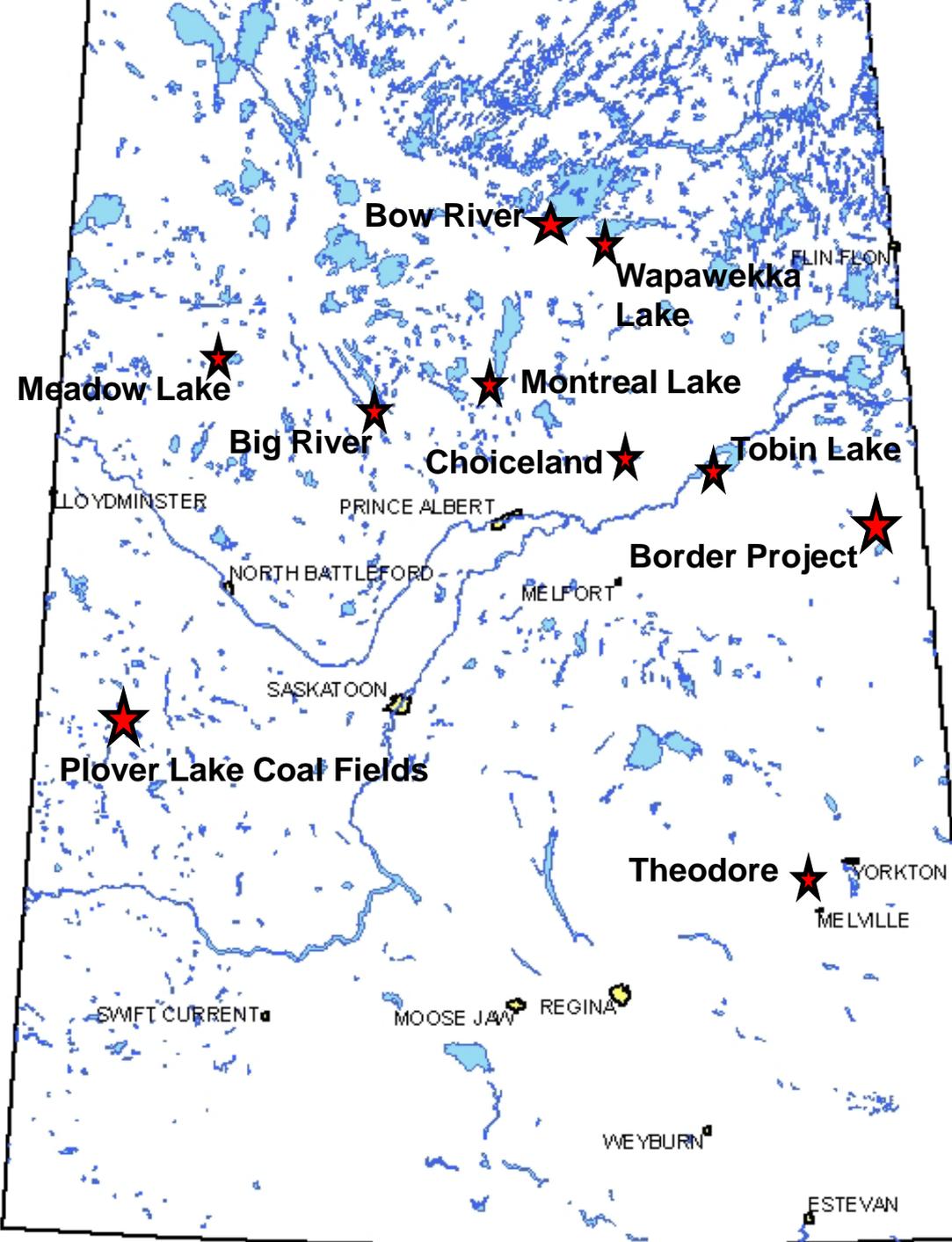
- 12.4 m thick Upper Cantuar Coal reported in 1952 BA Husky Phillips Planview 2-4-25-7

Bow River coal field

- 1970's Brascan Resources
- Near surface deposit est. 65.6 M t net recoverable coal, 88.8 M t potential resource

Plover Lake coal field - Kerrobert area

- Luscar mid 80's investigated
- 1.7 B t of sub-bituminous coal
- 830 m depth (in Sparky Member)
- High hydrostatic pressure + low rock competency = unfeasible

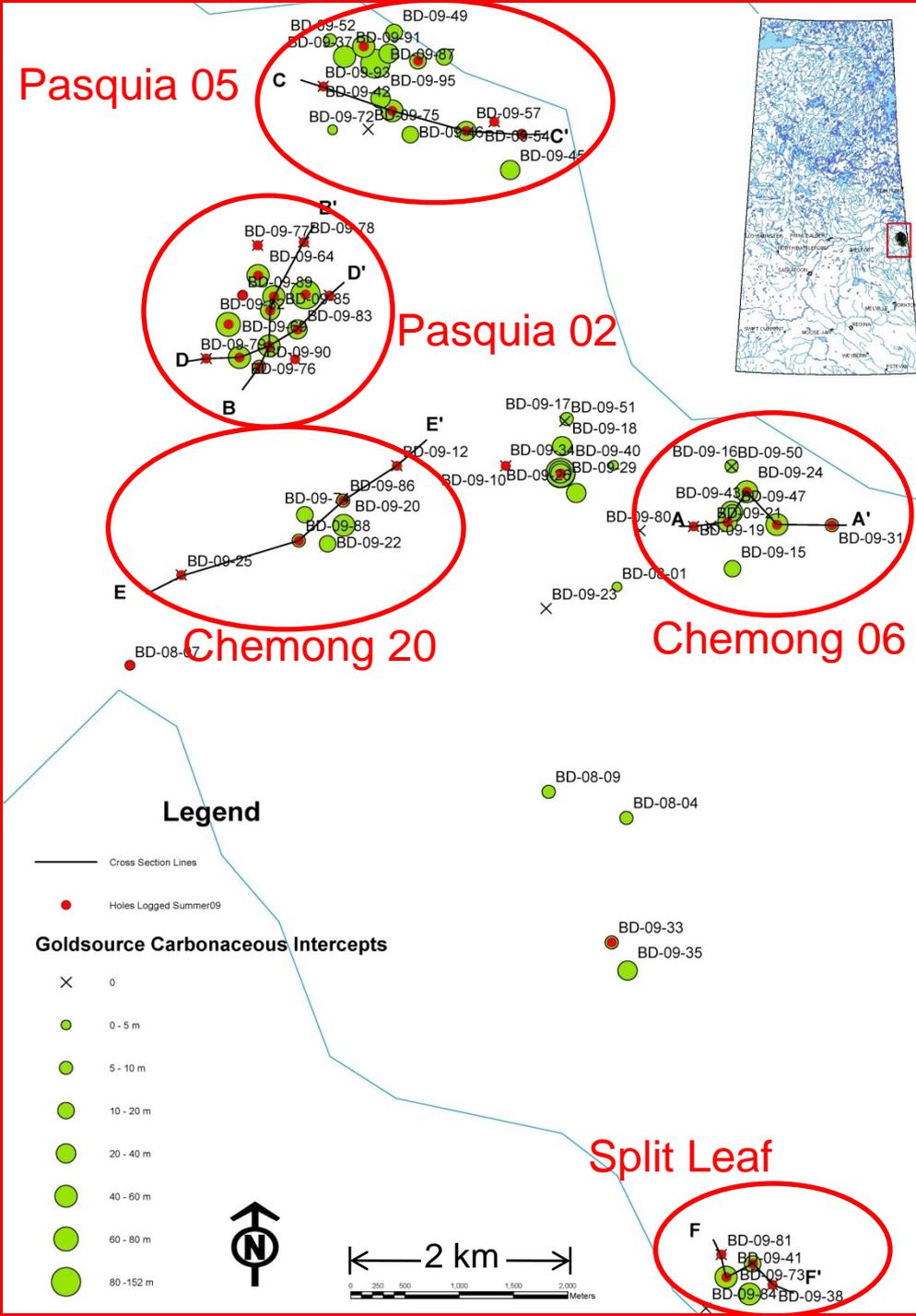


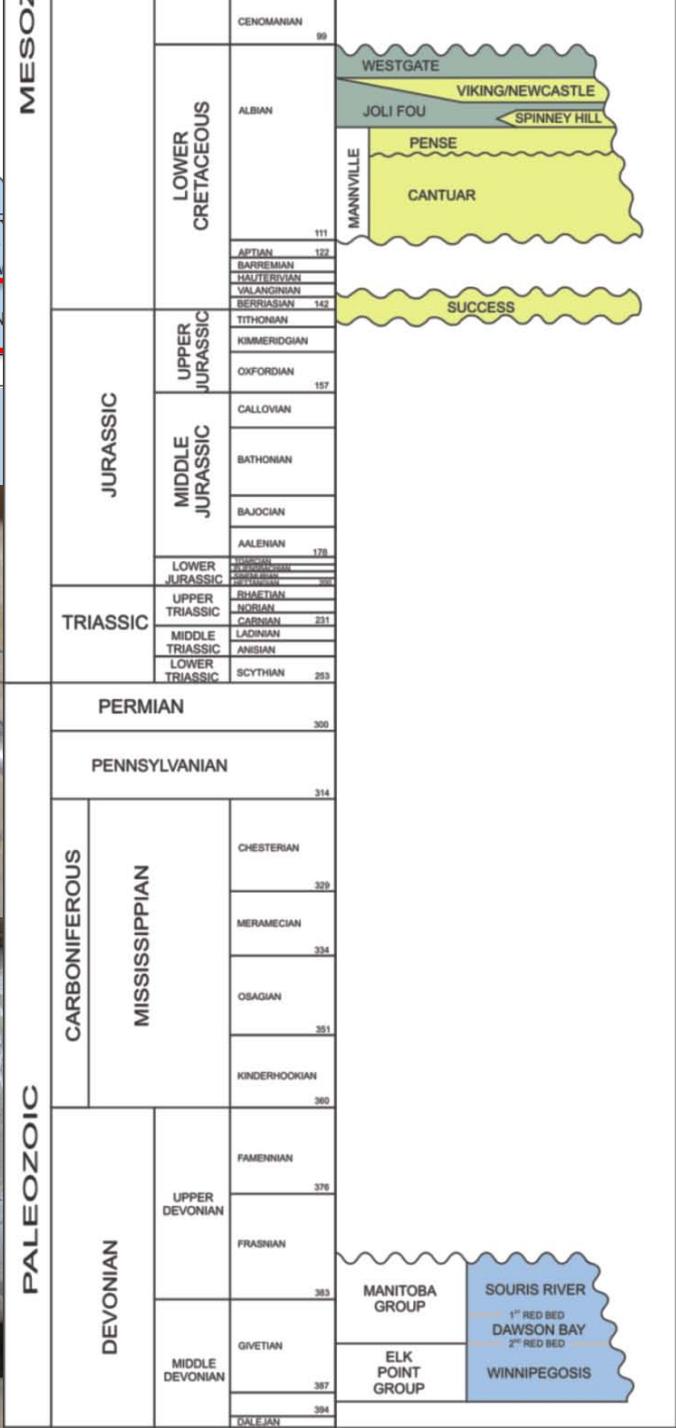
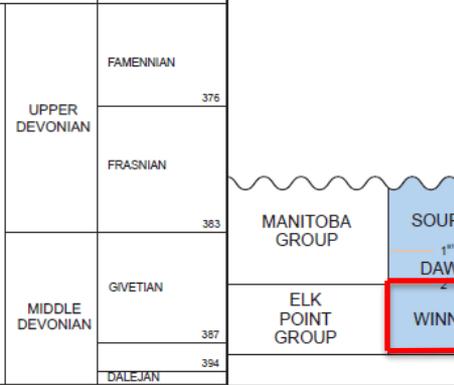
Historic Geologic Work Done in Area

- 1974 Beck mapped Pasquia Hills area
 - Poor outcrop exposure limited mapping to cut banks of streams and rivers
- Saskatchewan Research Council (SRC) – Geology and Groundwater Resources of Pasquia Hills Area (63E-F)
 - Maps compiled from e-logs, driller logs, and well data from oil and gas wells and well-water test holes.
- Christopher, 2003 Jura-Cretaceous Success Formation and Lower Cretaceous Manville Group of Saskatchewan
 - Most detailed work on Manville Group in the province
 - Large regional context
- GSC – Regional Airborne Magnetism and Gravity Surveys
- Scale of deposits unlikely to be detected by historic work

2009 Border Project Logging

- 41 holes logged and correlated with down hole geophysical well logs
- Identified 9 Stratigraphic Formations present in area:
 - Westgate
 - Viking/Newcastle
 - Joli Fou
 - Pense
 - Cantuar
 - Success
 - Souris River
 - Dawson Bay
 - Winnipegosis
- 6 cross-sections across 5 deposits



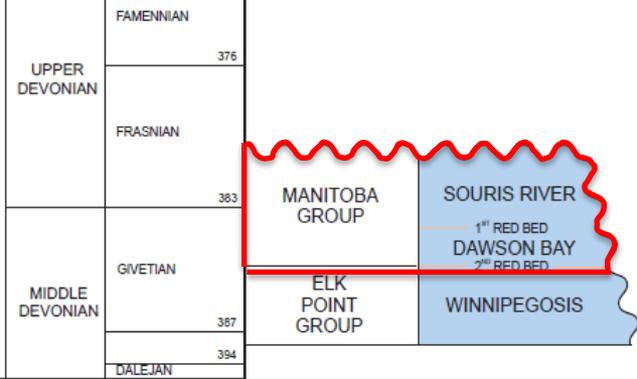


omite

pod and crinoids



- GLACIAL DRIFT
- SHALE
- SANDSTONE
- CARBONATE
- RED BEDS
- UNCONFORMITIES



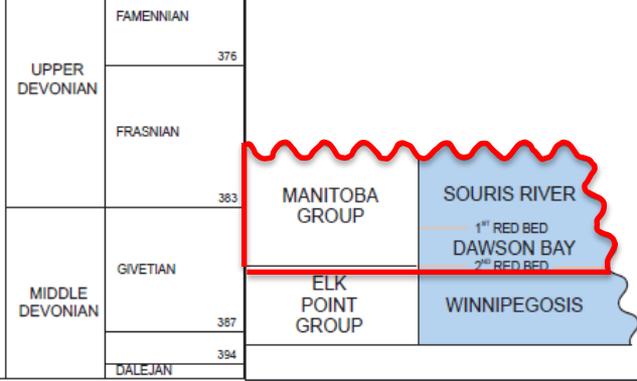
Manitoba Group

Dawson Bay Formation:

Second Red Bed Member:

- Non-fossiliferous dolomitic lime mudstone
- Colour ranges from blue-green to pale brown to brick red
- Red staining is patchy and varies from mild to pervasive
- Unconformably overlies Winnipegosis Formation

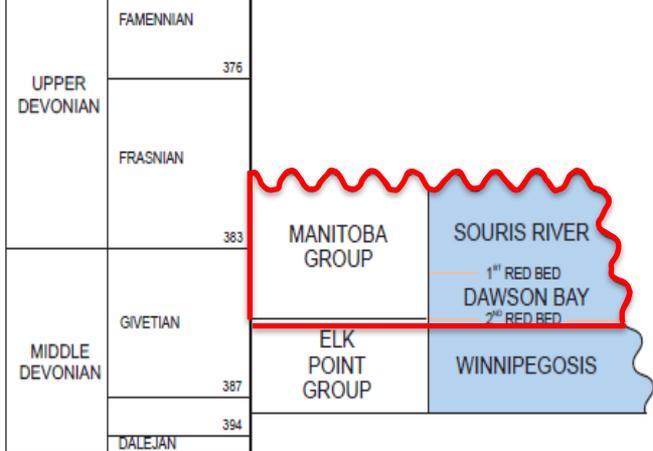




Manitoba Group

- Dawson Bay Formation
 - Hubbard Evaporite Member: Not present
 - Neely Member:
 - finely laminated microcrystalline light-brown coloured limestone with pinpoint vuggy porosity
 - buff-to tan-coloured, fossiliferous limestone with abundant anhydrite. Abundant brachiopods and crinoids.
 - Burr Member:
 - greenish-grey, argillaceous limestone with a mottled texture
 - Brachiopods and crinoids common





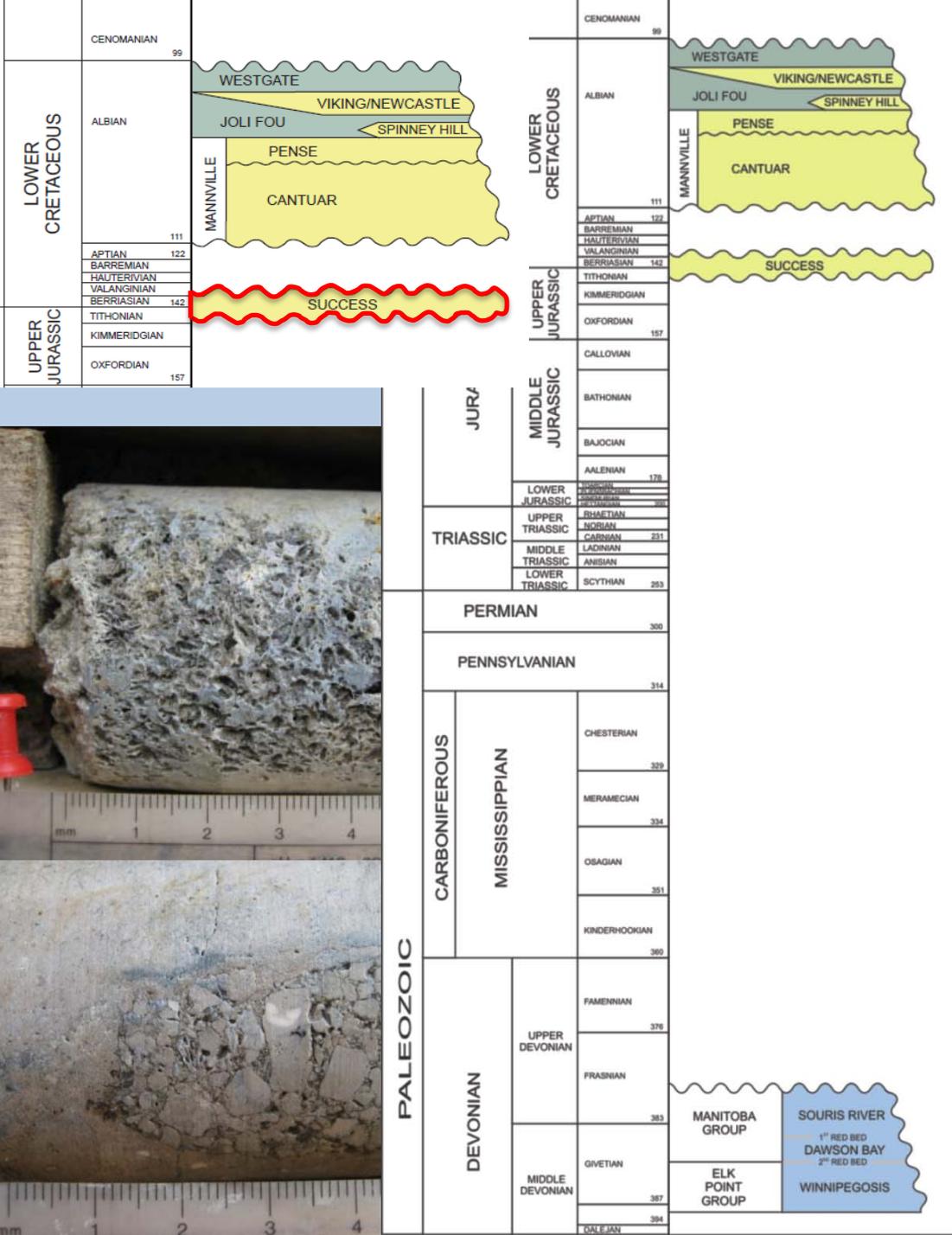
Manitoba Group

Souris River Formation: First Red Beds Member

- Bluish green to red dolomitic limestone
- Red staining patchy to pervasive pale-rust to deep-brick red
- Thickness range 10.5 m to 27.4 m; average ~ 20.5 m.
- Transitional and conformable contact with underlying Dawson Bay



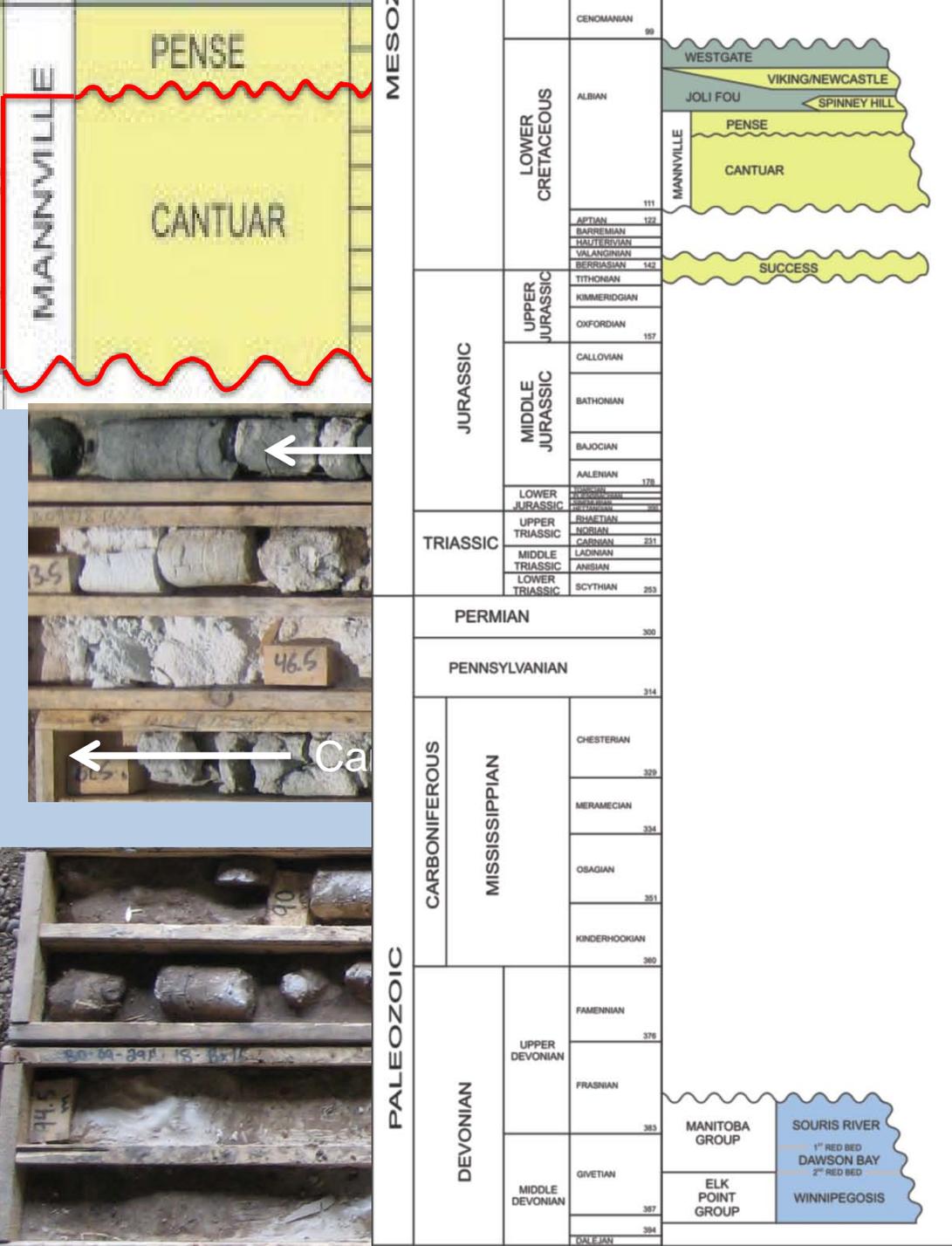
Cretaceous



...l, disconformable units
 ...ne and redbeds intermixed
 ...es
 ...dding angles very common
 ...~38 m.



- GLACIAL DRIFT
- SHALE
- SANDSTONE
- CARBONATE
- RED BEDS
- UNCONFORMITIES



Group

le
 consolidated to non-consolidated,
 me intervals of kaolinitic

0 m; average ~ 40 m.



MANVILLE	PENSE	COLONY	●
	CANTUAR	McCLAREN	●
		WASECA	●
		SPARKY	●
		GENERAL PETROLEUMS	●
		REX	●
		LLOYDMINSTER	●
		CLIMMINGS	●
		DINA	●

Manville Group

Cantuar Formation: Coal

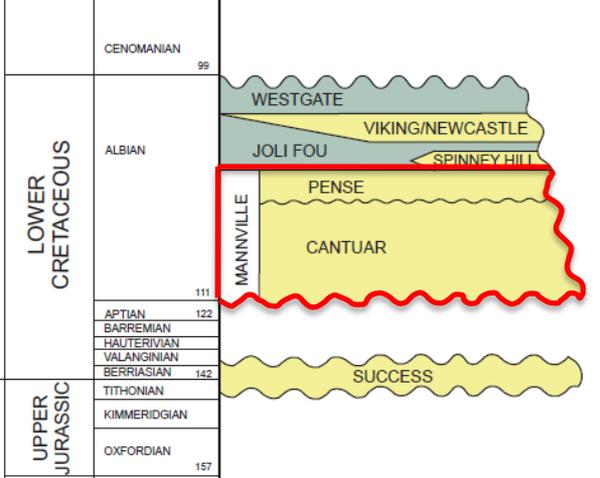
- Dark brown to black
- Dull to vitreous luster



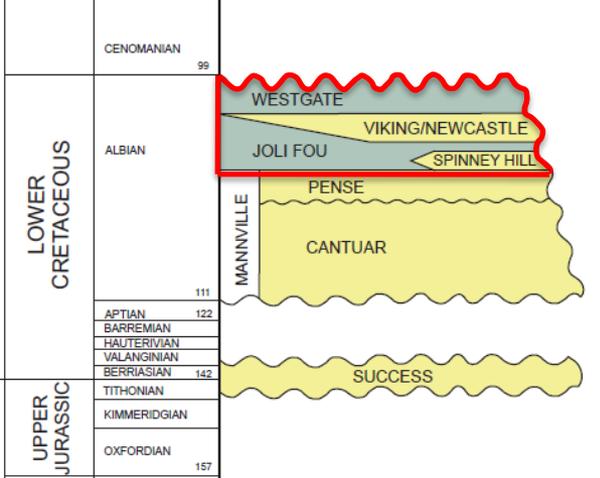
Manville Group

Pense Formation

- Dark greenish grey , glauconitic siltstone to fine grained sandstone with minor interbedded shale
- Thickness: 1.7 m to 5.7 m; average 3.4 m
- Overlies Cantuar on planar disconformity



Colorado Group



Joli Fou Formation:

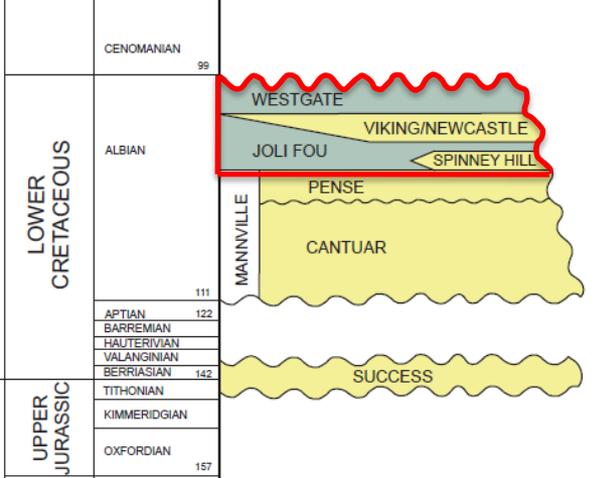
- Dark grey to black, non-calcareous shale with silty laminae and mm to cm scale siltstone interbeds
- Abundant bioturbation
- Thickness: 5.2 m to 52.4 m; average ~ 24.7 m
- Disconformable contact with Manville Group

Spinney Hill Member:

- Dark grey to greenish grey, siltstone interbedded with non-calcareous shales and mudstones
- Common glauconite and cross beds in siltstone portions
- Member top marked by carbonate cement
- Thickness: 4.5 m to 38.1 m; average 12.6 m



Colorado Group



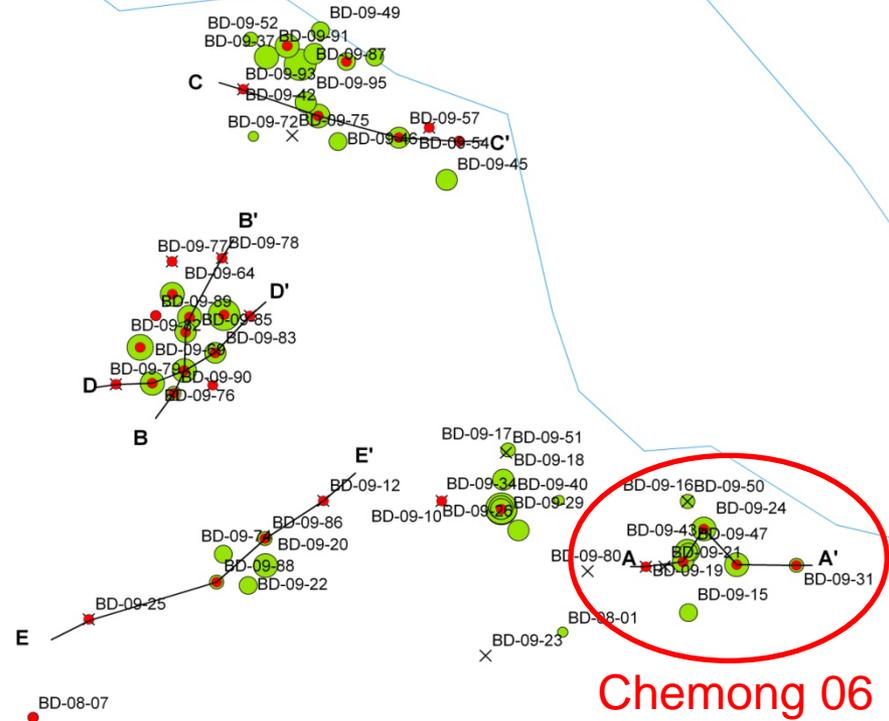
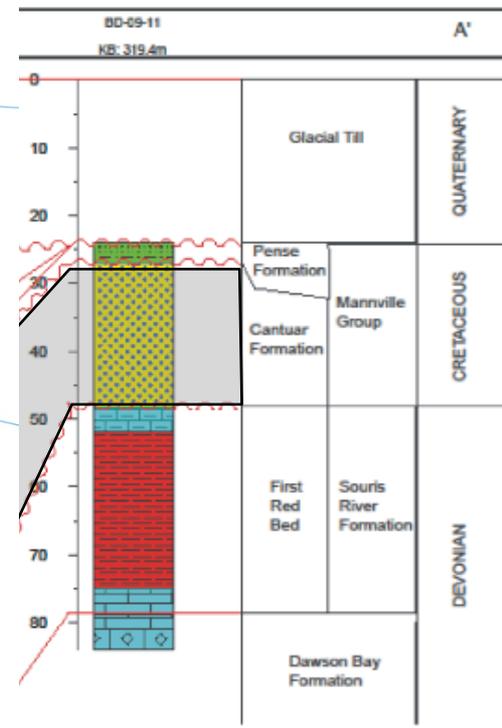
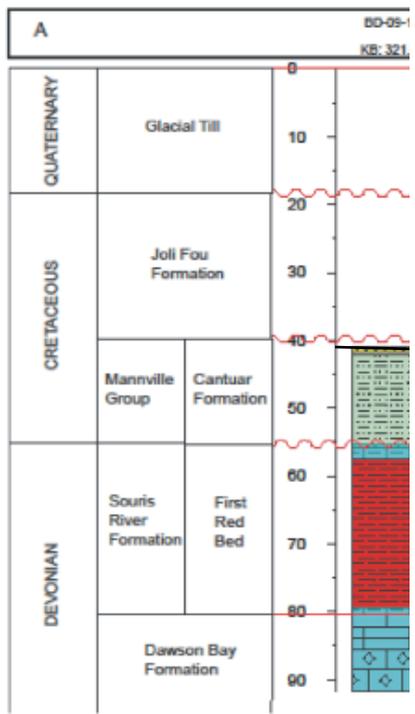
Westgate Formation

- Med.-dark grey non-calcareous shale.
- Common bioturbation and fossil fragments.
- Gradational contact with Viking/ Newcastle.
- Thicknesses ranging from 4.5 m to 18.5 m, averaging 10.2 m

Viking/Newcastle Formation

- Heavily bioturbated pale grey siltstone with alternating thin mudstone layers
- Thicknesses 5.6 m to 8.5 m, average 6.6 m
- Conformably overlies Joli Fou Formation



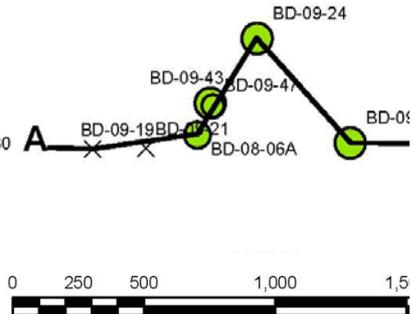


Legend

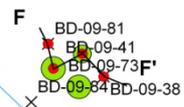
- Cross Section Lines
- Holes Logged Summer'09

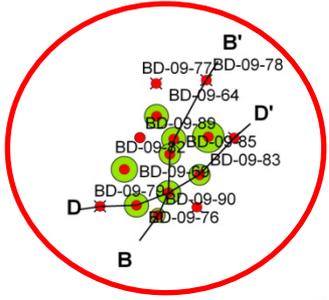
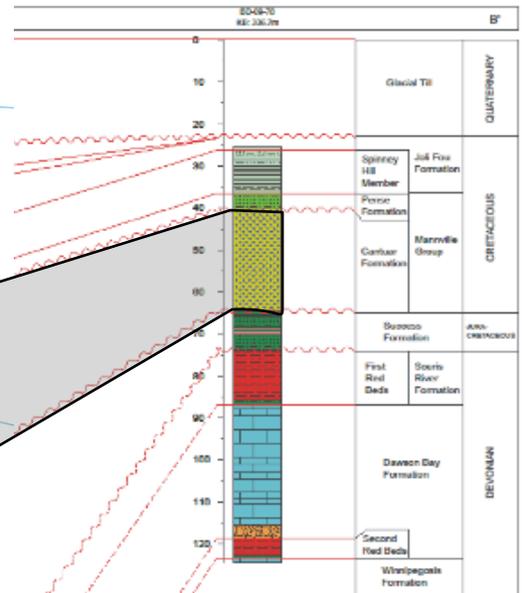
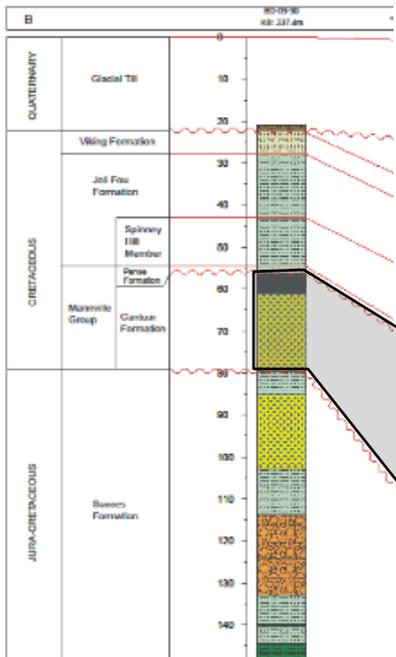
Goldsource Carbon Intercepts

- × 0
- 0 - 5 m
- 5 - 10 m
- 10 - 20 m
- 20 - 40 m
- 40 - 60 m
- 60 - 80 m
- 80 - 152 m

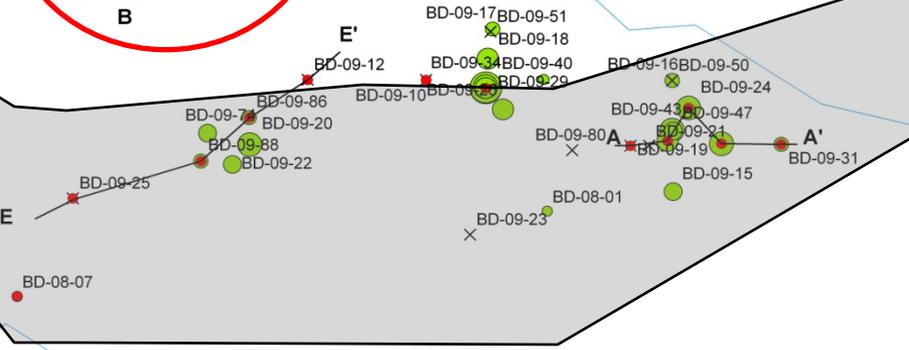


2 km



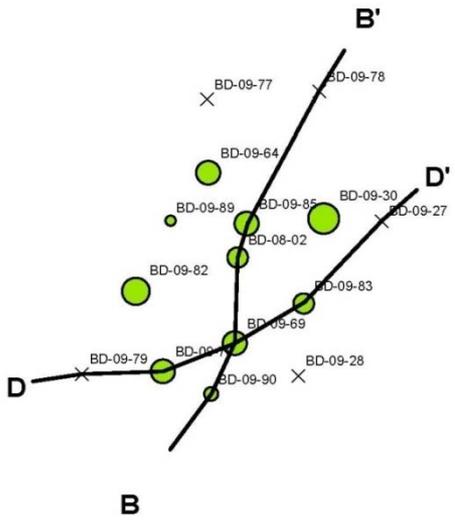


Pasquia 02

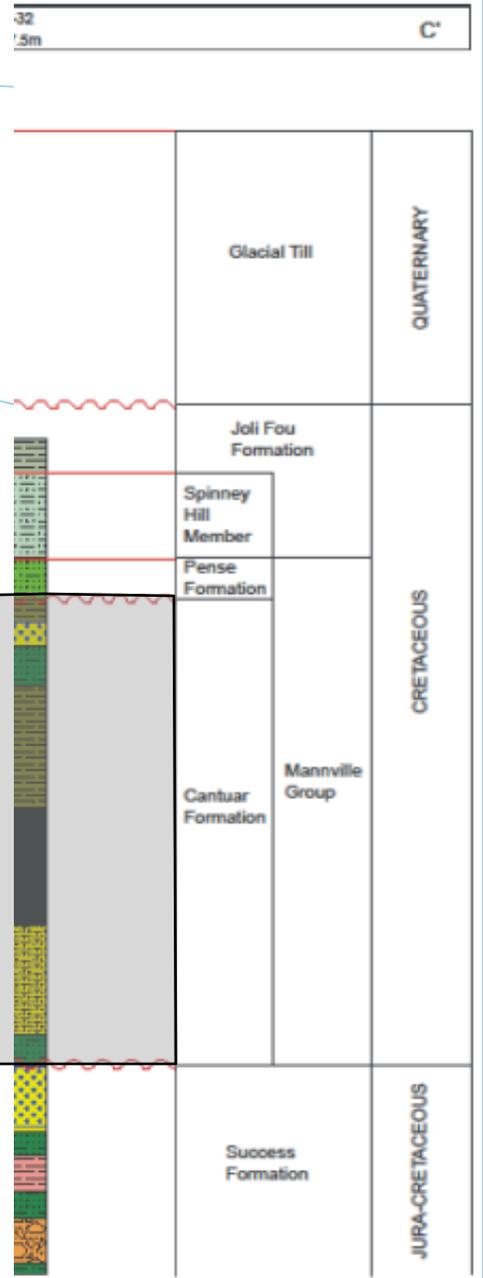
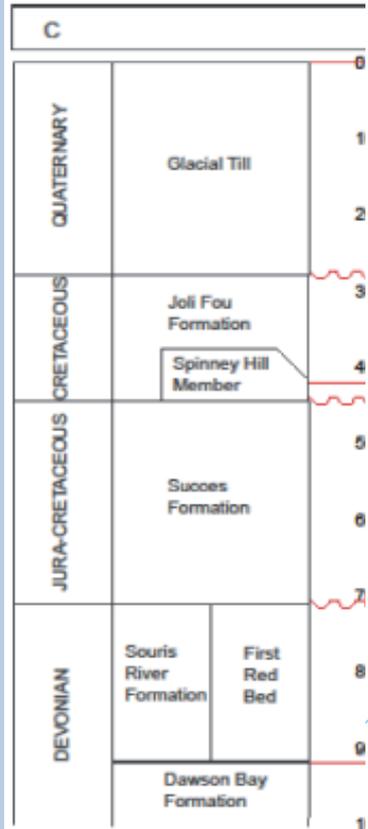


Legend

n Intercepts

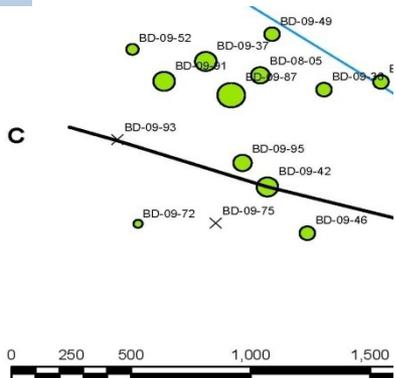
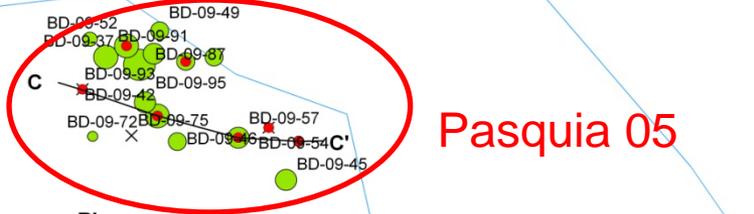


Pasquia 05

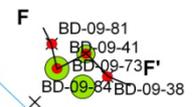


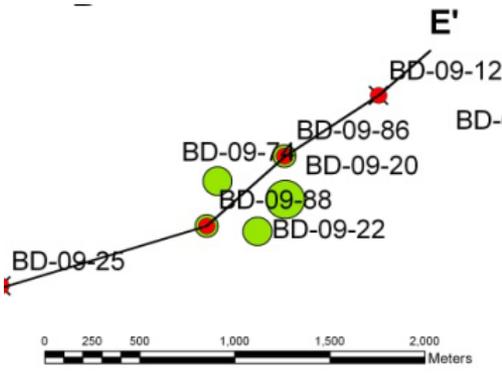
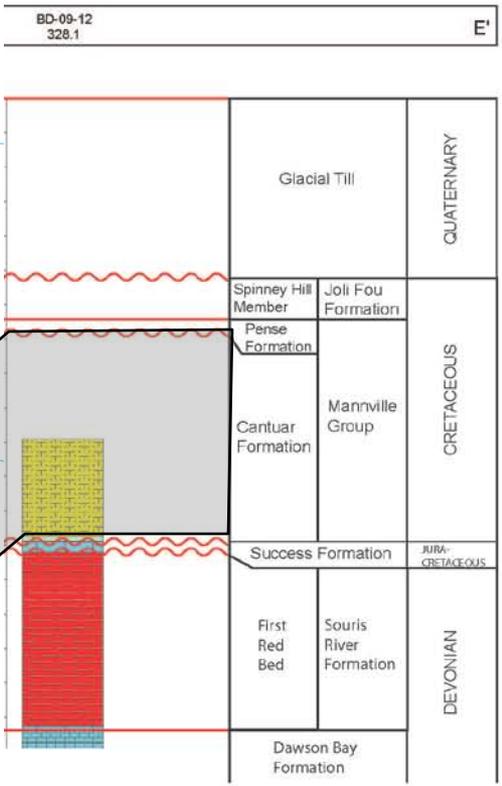
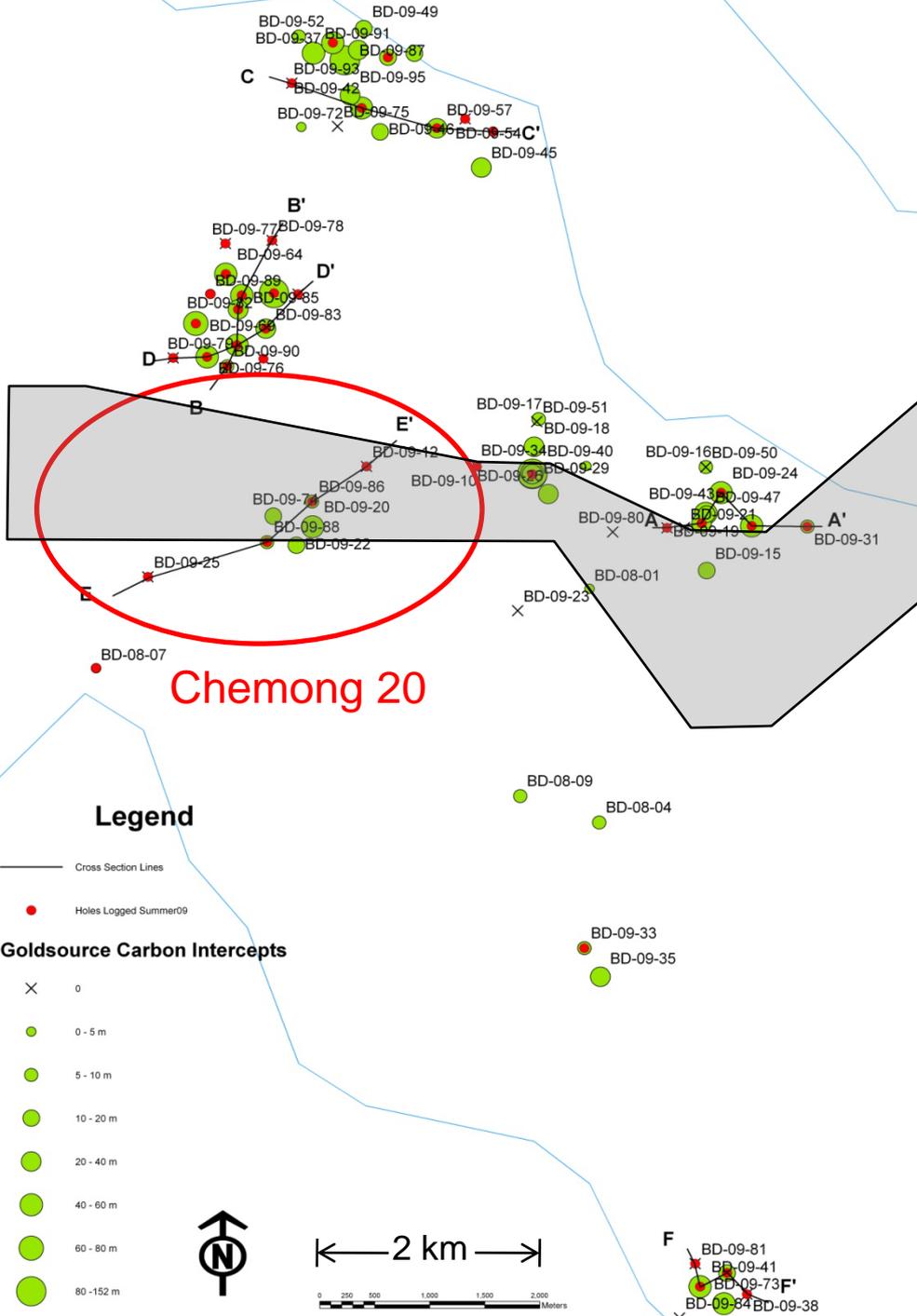
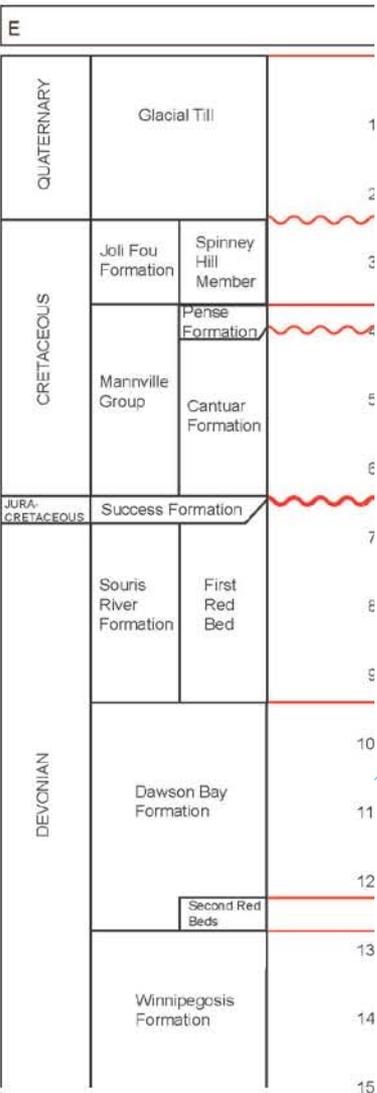
Legend

- Cross Section Lines
 - Holes Logged Summer 09
- Goldsource Carbon Intercepts**
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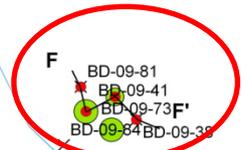
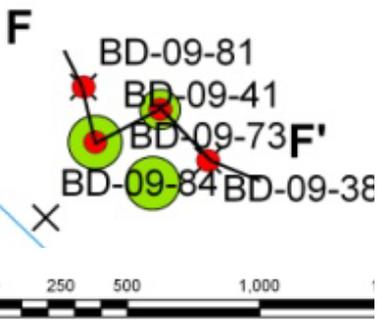
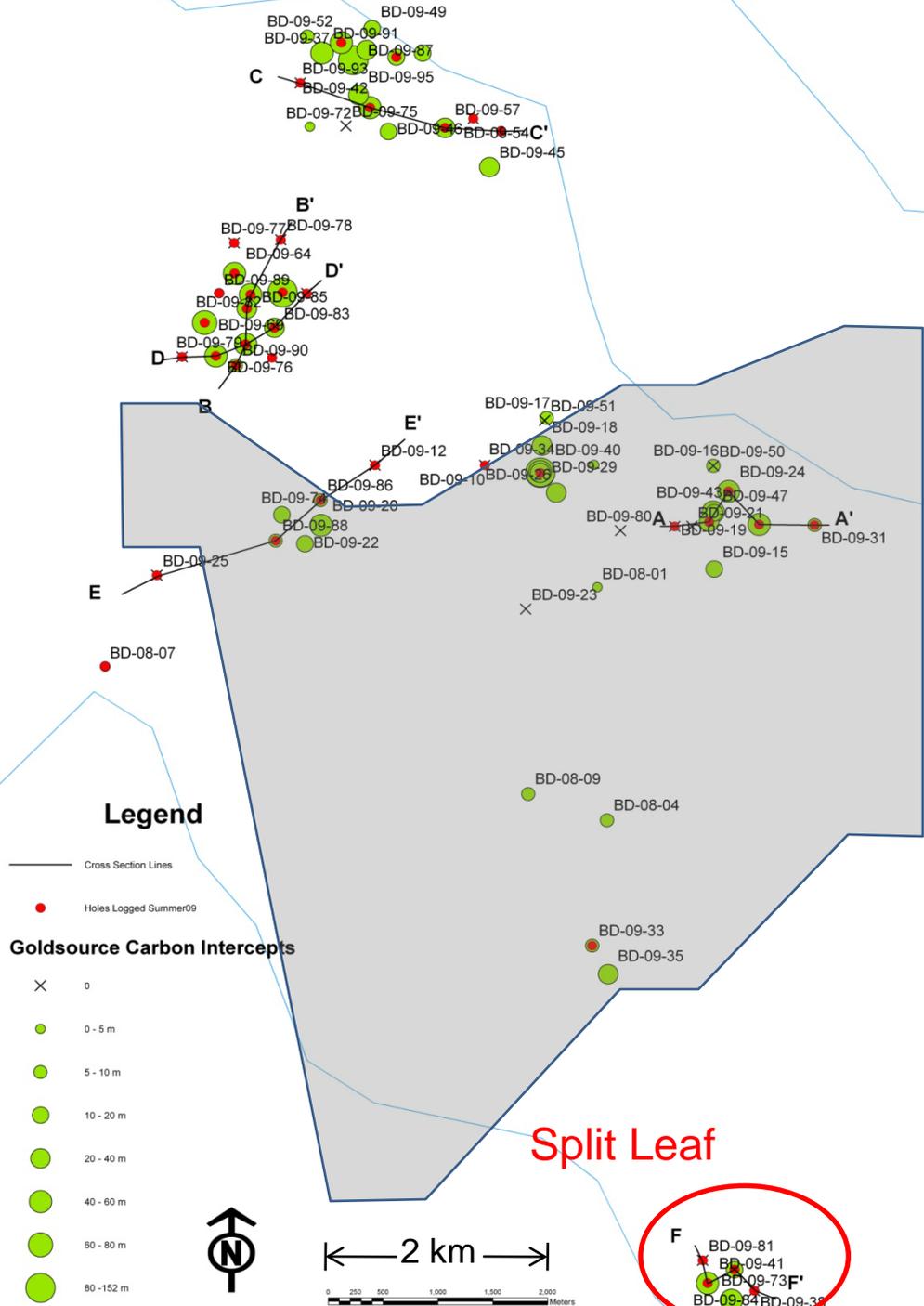
2 km





F	
QUATERNARY	Glacial Till
CRETACEOUS	Joli Fou Formation
	Spinney Hill Member
	Pense Formation
Mannville Group	Cantuar Formation
	Success Formation
JURA-CRETACEOUS	
DEVONIAN	Souris River Formation
	First Red Bed
	Dawson Bay Formation

F'	
Glacial Till	QUATERNARY
Cantuar Formation	CRETACEOUS
Mannville Group	
Success Formation	JURA-CRETACEOUS



Split Leaf

Conclusions

- Cantuar Formation is infilling pre-existing paleo-topographic lows created on Devonian surface and on top of remnants of Success Formation
- Mechanisms for creating accommodation space:
 - Karsting
 - Faulting
 - Paleo-topography
- Sediments in sub-basins underwent subsidence (potentially from peat to coal compaction)
- Further work is needed



Thank you.

For more information or questions
pertaining to this presentation please
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