



GEOLOGICAL SURVEY OF CANADA

OPEN FILE 5535

**Paskapoo Groundwater Study Part IV: Detailed outcrop
measured sections of the Paskapoo Formation in
the Red Deer region, Alberta**

A.P. Hamblin

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Hamblin, A.P.

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Paskapoo Formation

The Paskapoo Formation and its equivalents represent an important emerging interval of bedrock strata with significant resource potential in western Alberta, where population, agricultural and industrial pressures are mounting. In the early part of the 20th Century, it supplied much of the building stone to create the gracious structures of a young province; for decades, it has provided much of the groundwater for the western part of the province; and with the dawn of a new century, the Paskapoo is now an exploration target for the shallow gas industry. Hamblin (2004) provided a review of the state of knowledge of these rocks, their stratigraphy, sedimentology, paleontology and resource potential, as a launchpad for further studies.

Because the Paskapoo represents the bedrock at surface over its area of occurrence, and has not previously been a major hydrocarbon target, there has been little study of outcrop or subsurface data. This report summarizes outcrop field work along the Red Deer River, in an east-west transect, both eastward and westward of the city of Red Deer, where Paskapoo rocks are intermittently exposed. It is meant to be complementary to two other reports: one on the Paskapoo (and related stratigraphic units) of the Calgary region, and a second describing relevant cores in the central Alberta region (Hamblin, 2007a, 2007b). In this report, the information is presented as 12 standard measured sections (with text descriptions of units and paleocurrent data), which (from east to west) approximate a continuous succession of the lower and middle portions of the formation. Section locations are marked on Fig. 1, and presented as Table 1.

In this region, the lower portion of the Paskapoo Formation is characterized by the stacking of thick, multi-storied fluvial channel sandstone units, and known as the Haynes Member (Demchuk and Hills, 1991). Paleocurrent data indicates sediment dispersal in these channel complexes was toward the east-northeast (Fig. 3). These rocks rest unconformably on the underlying Scollard Formation (characterized by thinly interbedded siltstone, sandstone and numerous thick coal seams). Likewise, the middle portion of the Paskapoo is characterized by thinly interbedded siltstone, sandstone and very minor coal seams, again with sediment dispersal primarily toward the east-northeast, and known as the Lacombe Member (Demchuk and Hills, 1991). These strata represent the youngest consolidated bedrock units in western Alberta.

Acknowledgements

This report has benefited from discussions with Art Sweet who provided many suggestions for improvement. Steve Grasby reviewed the manuscript. Sarah Nakaska, Melanie Myden, Matt Pine and Paul Wozniak compiled and drafted the figures. Final production of the Open File was handled by Paul Wozniak and Sylvia Leong.

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 - 3 (a-d). Summary of paleocurrent data from outcrops.
- Table 1. Locations of measured sections.

References

Demchuk, T.D. and Hills, L.V., 1991. A re-examination of the Paskapoo Formation in the central Alberta Plains: the designation of three new members. *Bulletin of Canadian Petroleum Geology*, v. 39, p. 1263-1269.

Hamblin, A.P. 2004. Paskapoo-Porcupine Hills Formations in western Alberta: Synthesis of regional geology and resource potential. Geological Survey of Canada, Open File 4679, 30p., 1 CD.

Hamblin, A.P. 2007a. Paskapoo Groundwater Study, Part V: Detailed outcrop measured sections of the Scollard, Porcupine Hills and Paskapoo formations in the Calgary region, Alberta. Geological Survey of Canada, Open File 5536, 16p., 1 CD.

Hamblin, A.P. 2007b. Paskapoo Groundwater Study, Part III: Detailed core measured sections of the Paskapoo Formation in central Alberta. Geological Survey of Canada, Open File 5537, 13p., 1CD.

SECTION	MAP GRID (NAD 27)	NTS MAP (1:50,000)	GPS GRID (base)	LAT/LONG (base of section)	MBR
Ardely Bend Composite Section	450910	Delburne 83-A/3	UTM 12U 0344810N 5791567E	52°15'21"/113°16'16"	Haynes
Secret Springs Ranch	377914	Delburne 83-A/3	UTM 12U 0337295N 5790831E	52°15'10"/113°21'49"	Haynes
Jones Creek, Range Road 25-1	324904	Delburne 83-A/3	UTM 12U 0332258N 5790719E	52°14'29"/113°27'25"	Haynes
Gravel Pit Cliff, Range Road 25-4	277924	Red Deer 83A/5	UTM 12U 0327749N 5792460E	52°15'20"/113°31'25"	Haynes
Joffre Bridge Composite Section	229947	Red Deer 83A/5	UTM 12U 0323169N 5794394E	52°16'17"/113°35'30"	Haynes? - Lacombe?
Munce's Hill Roadcut	204995	Red Deer 83A/5	UTM 12U 0320438N 5799614E	52°19'03"/113°38'07"	Lacombe?
Canyon Ski Hill Gully	175965	Red Deer 83A/5	UTM 12U 0317460N 5796720E	52°17'26"/113°40'35"	Lacombe
Burbank Composite Section, Blindman River	123041	Red Deer 83A/5	UTM 12U 0312189N 5804108E	52°21'18"/113°45'29"	Lacombe
Riverbend Golf and Recreation Area	115997	Red Deer 83A/5	UTM 12U 0311214N 5799866E	52°19'01"/113°46'05"	Lacombe
Blindman River, Range Road 28-3	982051	Red Deer 83A/5	UTM 12U 0298164N 5805249E	52°21'37"/113°57'51"	Lacombe
Two Beavers Bend	951756	Innisfail 83A/4	UTM 12U 0295009N 5774845E	52°05'41"/113°59'30"	Lacombe
Dickson Dam	911713	Markerville 83B/1	UTM 11U 0690850N 5771405E	52°03'37"/114°12'58"	Lacombe
Magoc Lake, Chain Parlby Creek		Chain Lakes 83A/11	UTM 12U 0338376N 5825917E	52°33'33"/113°23'03"	Haynes
Spruce Creek Valley, West of Torrington	110385	Torrington 82P/13	UTM 12U 0309757N 5738550E	51°45'56"/113°45'25"	Lacombe

Table 1. Location of Measured Outcrop Sections along Red Deer River, from east to west.

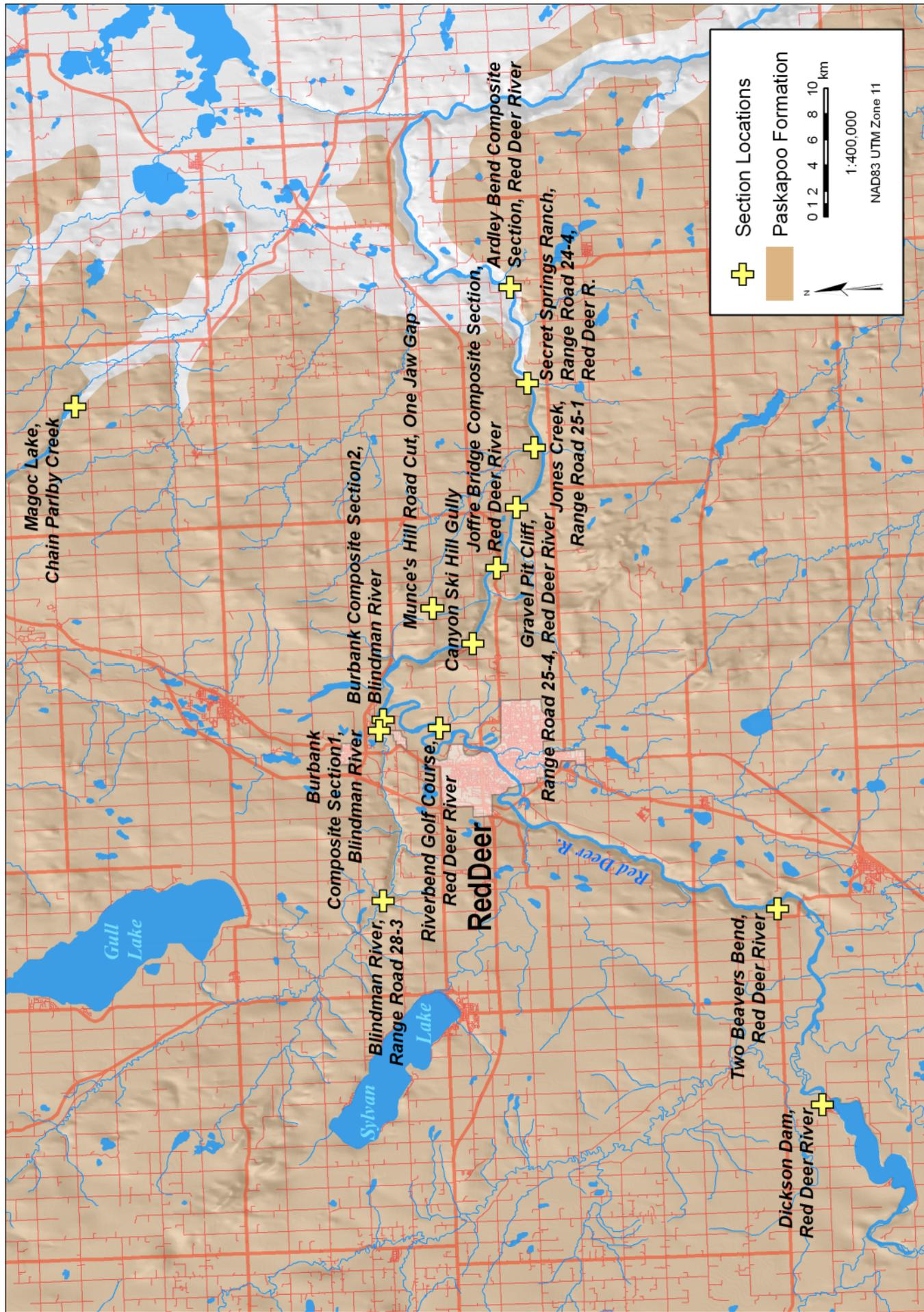


Figure 1. Location map for outcrop sections along Red Deer River.

LEGEND

Conglomerate.....	
Limestone / Dolomitic limestone.....	
Carbonaceous shale.....	
Coal.....	
Siderite concretion bed or calcrete concretions.....	
Bentonite bed.....	
Oolitic bed.....	
Stromatolite bed or individual stromatolites.....	
Lens-shaped bed.....	
Discontinuous scour / gutter fills.....	
Fault.....	
Fractures with slickensides (either structural or pedogenic).....	
Fining-upward Trend.....	
Coarsening-upward Trend.....	
Paleocurrent Indicators.....	
Sampled for Palynology Dating.....	
Sampled for Paleomagnetic Dating.....	
Permeameter Reading.....	
Copper Sulfide Mineralization.....	
Erosive base with rip-ups and granules.....	
Scoured Base.....	
Ball and Pillow.....	
Rip-up Interclasts.....	
Breccia / Flat Pebble Conglomerate.....	
Trough Cross bedding.....	
Ripple Cross Lamination.....	
Climbing Ripples.....	
Low Angle Lamination.....	
Planar Tabular Crossbedding.....	
Inclined Bedding Surfaces (IBS) or Lateral Accretion Surfaces (LA).....	
Inclined Heterolithic Stratification (IHS).....	
Contorted Lamination.....	
Hummocky Cross Stratification (HCS).....	
Water Escape Structure.....	
Roots.....	
Bioturbation / Burrowing.....	
Vertical Burrows (eg. Skolithos).....	
Desiccation Cracks.....	
Fossil shells (pelecypod, gastropod, brachiopod).....	
Dinosaur bone fragments.....	
Carbonized wood fragments.....	
Gypsum nodule bed.....	
Evaporite crystal molds.....	

Figure 2. Legend for Figures 2a-n. The legend is common to Open Files 5535, 5536, and 5537. All symbols might not appear in the accompanying figures of this Open File.

Figure 2a

Ardely Bend Composite Section, Red Deer River (771 m.a.s.l.)
 3km SW of village of Ardley
 Alix 83A/6 451916, Delburne 83A/3 450907
 LSD 8/9 Sec. 7 Twp 38 Rge 23W4
 N 52° 15' 21.4" W 113° 16' 16.1", UTM 12u 0344810N, 5791567E
 Upper Scollard/basal Paskapoo Fms (basal ss channel zone)
 General paleoflow to NNE

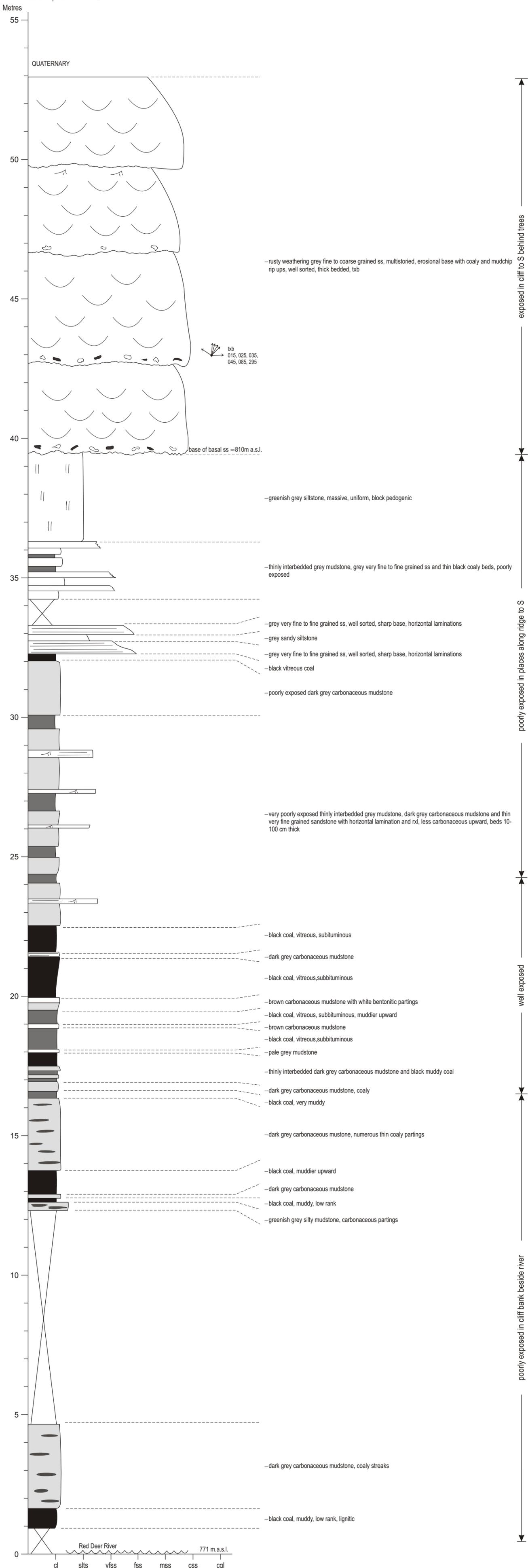
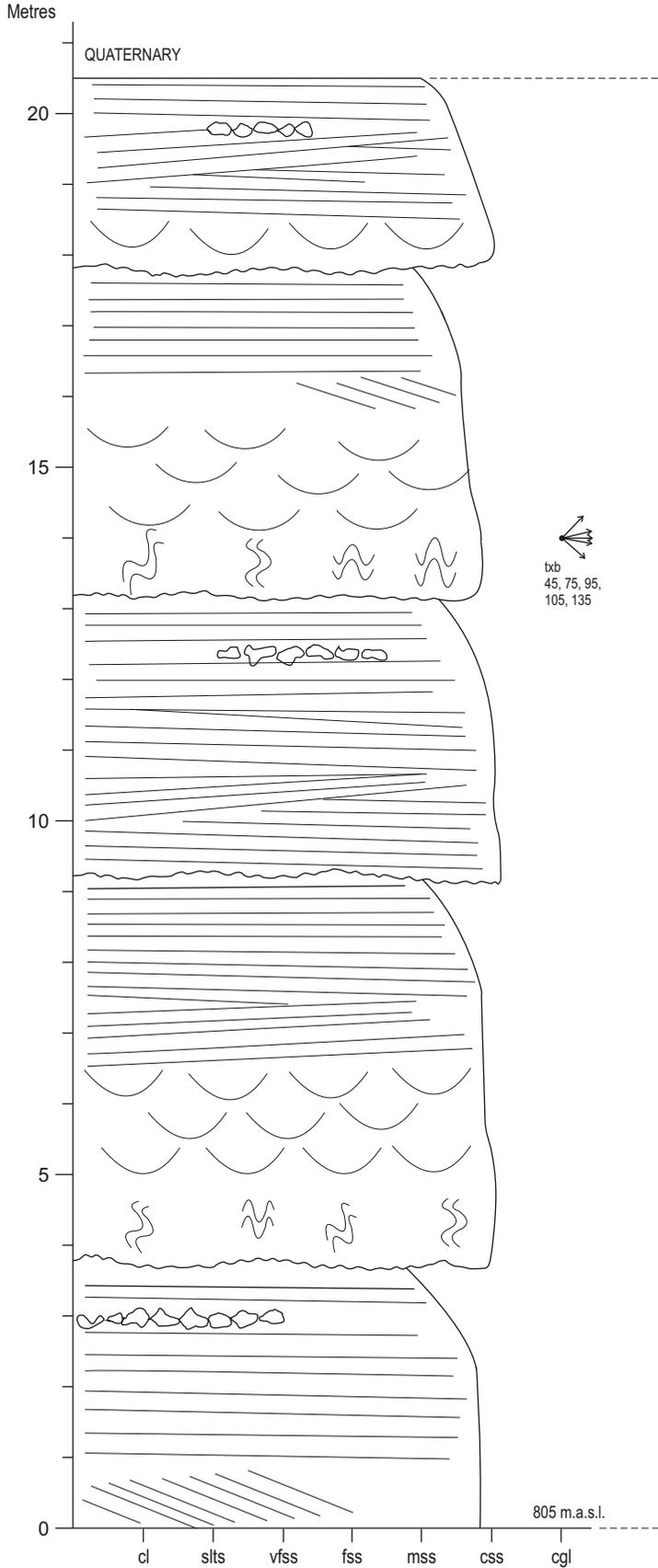


Figure 2b

Secret Springs Ranch (2 Hawk Cliff) (E of Range Road 24-4 along Red Deer River) (805 m a.s.l.)
 N 52° 15' 10.0" W 113° 21' 48.7"
 6-9-38-24 W4, UTM 12U 0337295N, 5790831E
 Delburne Sheet 83A/3, 377914 (NAD 27)
 Alix Sheet 83A/6, 382915 (NAD27)
 basal Paskapoo Formation (basal ss channel zone)
 (general paleoflow to E)



—buff weathering grey medium to coarse grained ss, well sorted, salt and pepper, thick bedded, multistoried, each storey 4-5m thick and f-up with erosional base but no pebble lags, massive and uniform appearance, ss body extends laterally along curve of river for 300-400m, no base exposed due to slumping, abundant large txb, horizontal lamination, planar tabular crossbeds, low angle lamination, several horizons of contorted lamination, several horizons of sideritic concretions

Figure 2c

Jones Creek, Range Road 25-1 (5.4km S of Highway 11) (877m a.s.l.)

N52° 14' 29.1" W113° 27' 24.9"

12-1

Delburne sheet 83A/3, 324904 (NAD27)

basal Paskapoo Formation (basal ss channel zone)

(general paleoflow to ENE)

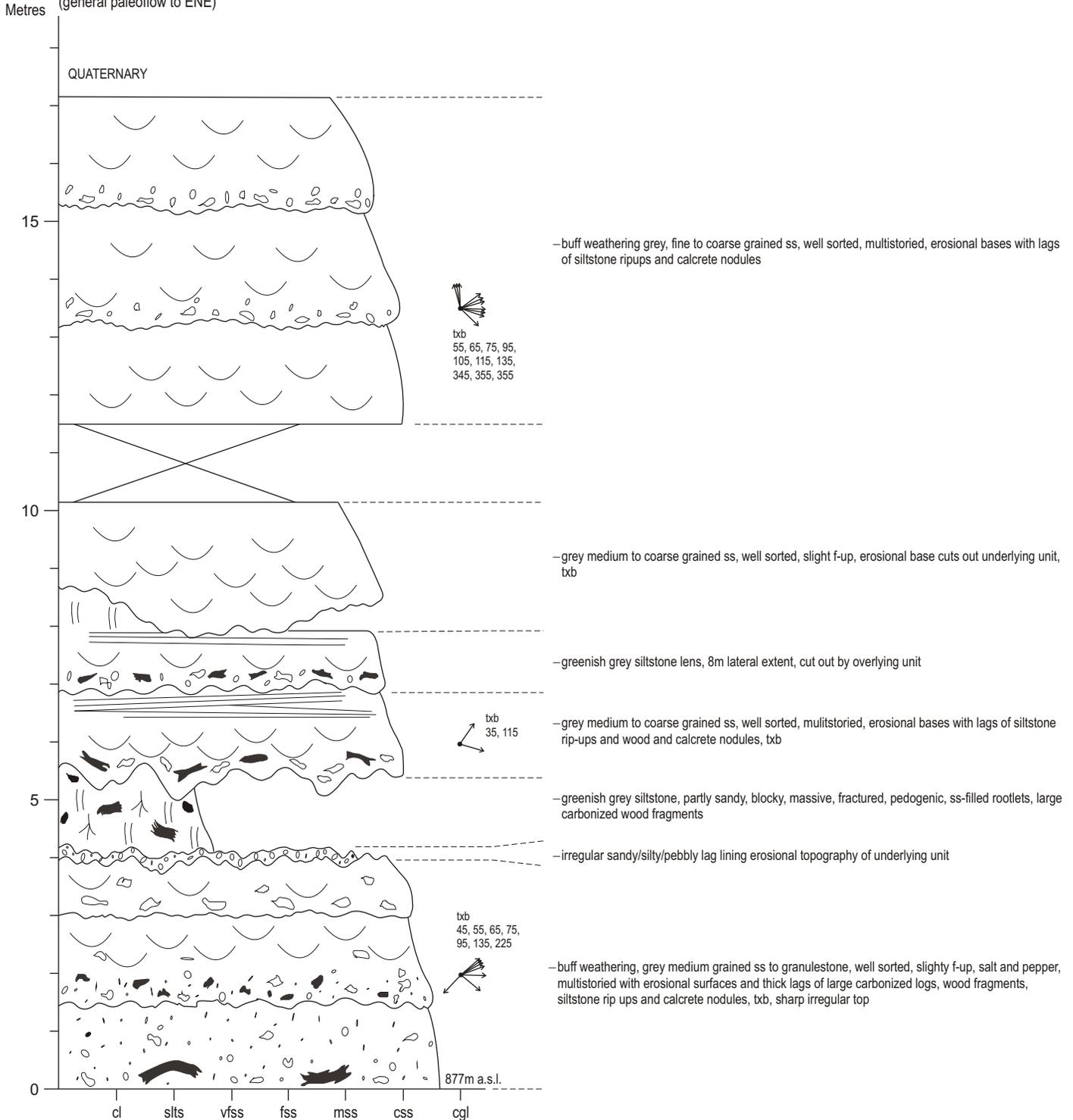


Figure 2d

Gravel Pit Cliff, Range Rd 25-4, Red Deer River (798 m.a.s.)
 East of Joffre Bridge
 N 52° 15' 19.9"W 113° 31' 25.4"
 UTM 12U 0327749N, 5792460E
 12/13-9-38-25W4
 Red Deer Sheet 83A/5, 277924 (NAD 27)
 Lower Paskapoo Formation (basal ss channel zone)
 (general paleoflow to SE)

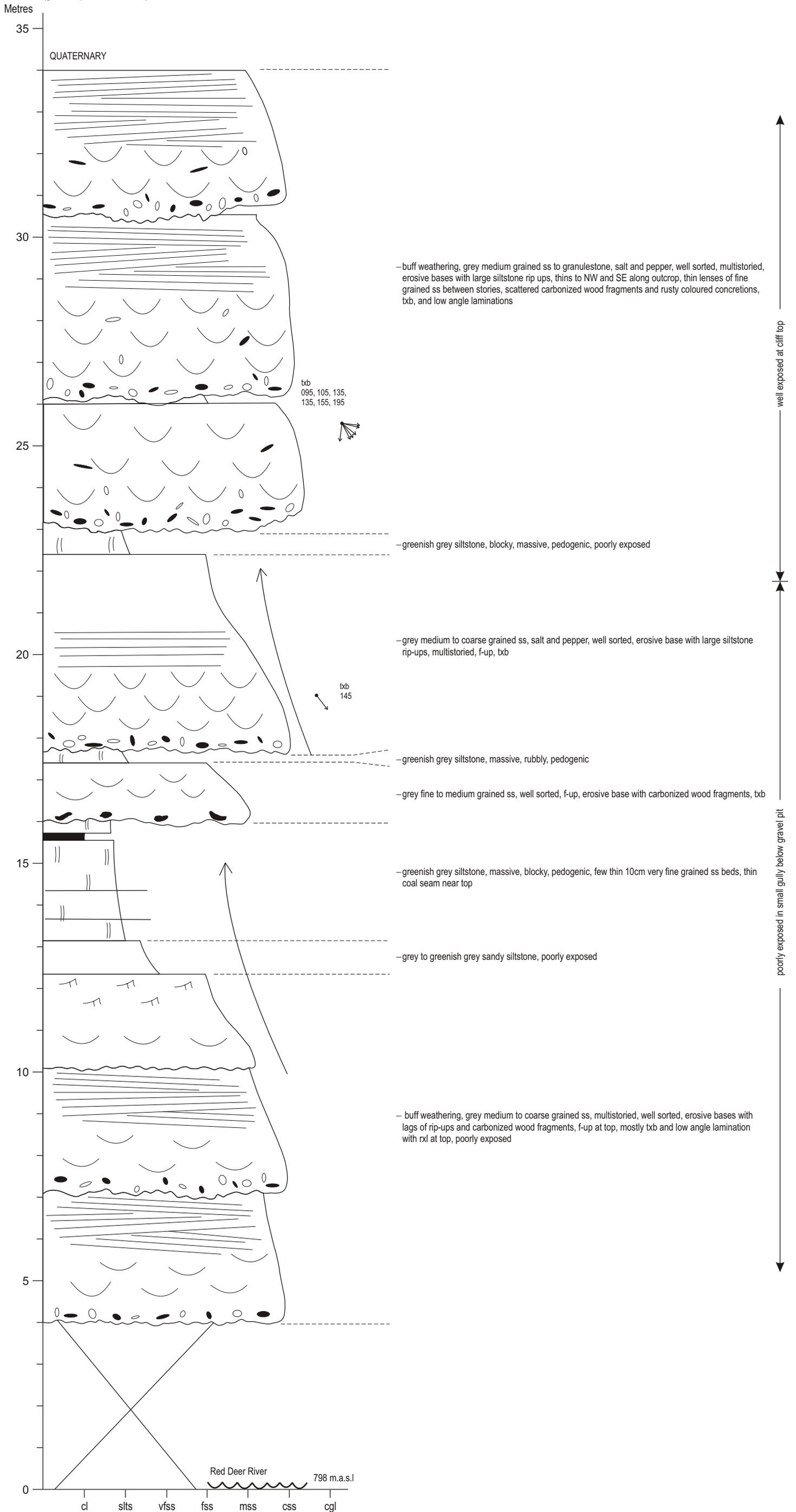


Figure 2e

Joffre Bridge Composite Section, Red Deer River

(east side of river, N of Highway 11 bridge)
 N 52°16'44.4"/W 113°36'06.0"
 4-24-38-26 W4, 808m a.s.l.
 UTM 12U 0323169N, 5794394E
 Red Deer sheet 83A/5, 229946 233943 (NAD 27)
 Middle Paskapoo Formation

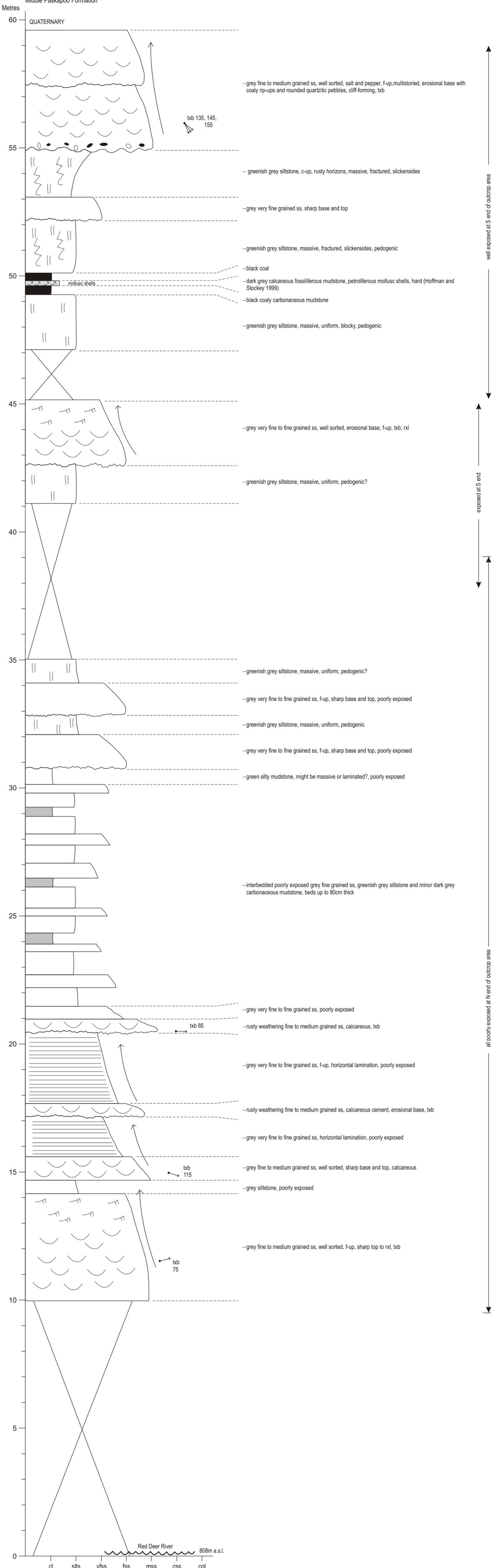


Figure 2f

Munce's Hill Roadcut (One Jaw gap) (12km NE of Red Deer) (986 m a.s.l.)
 N 52° 19' 02.6" W 113° 38' 06.7"
 14-34-38-26 W4, UTM 12U 0320438N, 5799614E
 Red Deer Sheet 83A/5, 203995 (NAD 27)
 middle Paskapoo Formation

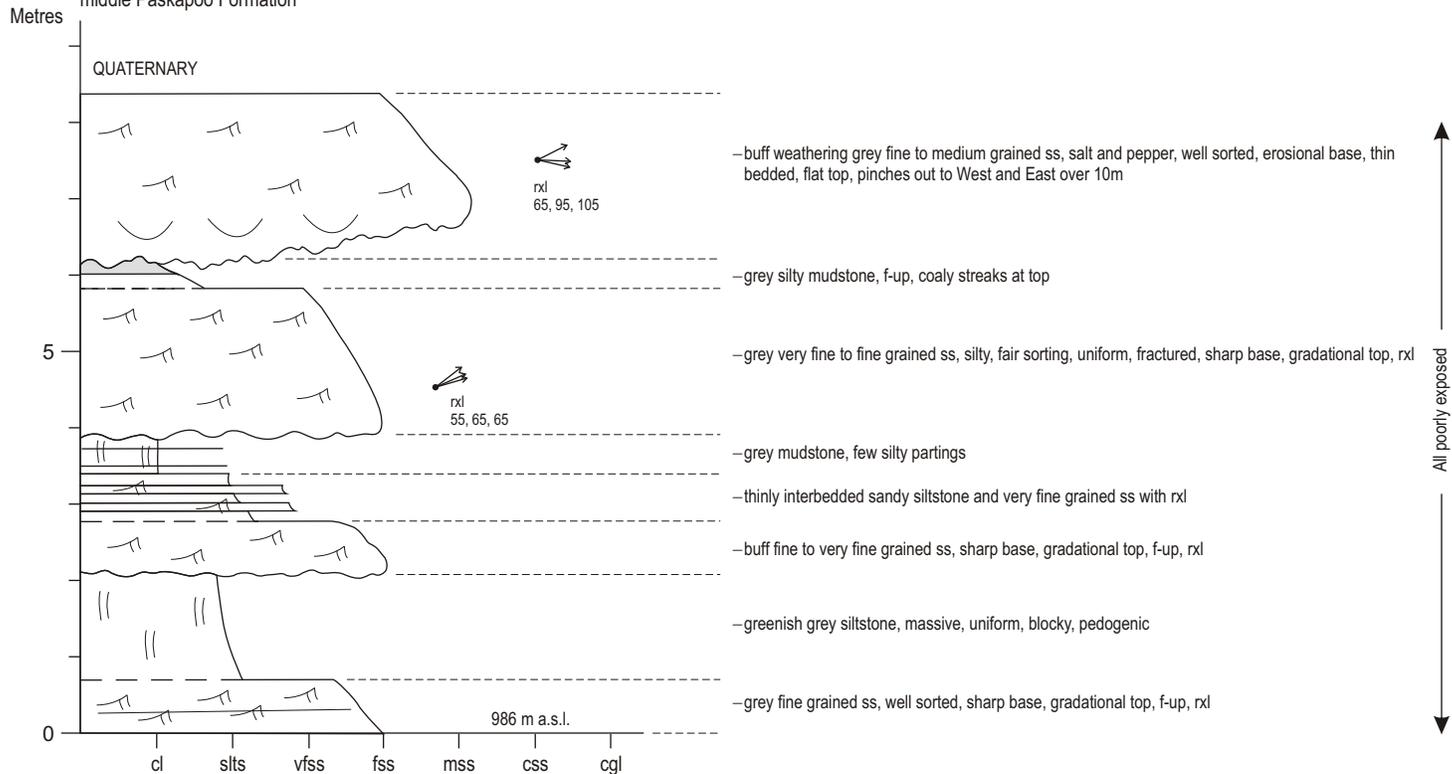


Figure 2g

Canyon Ski Hill Gully (845 m.a.s.l.)
 10km NE of Red Deer, 200m S of ski hill entrance
 N 52° 17' 26.2" W 113° 40' 35.3"
 UTM 12U 0317460 N, 5796720 E
 2-28-38-26 W4
 Red Deer Sheet 83A/5 176965 (NAD 27)
 middle Paskapoo Formation

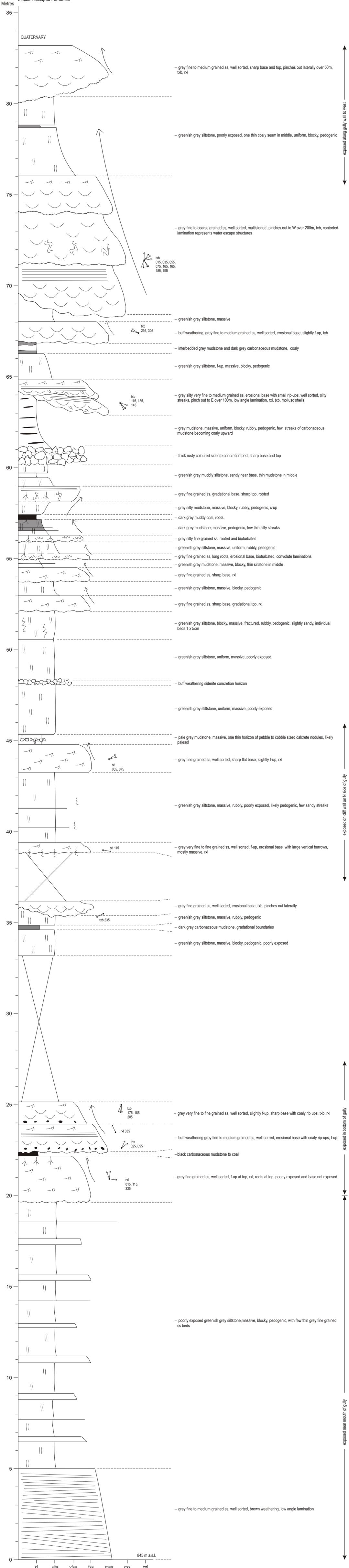


Figure 2h

Burbank Composite Section, Blindman River (824 m.a.s.l.)
 confluence of Blindman and Red Deer Rivers and 1km upstream
 Red Deer 83A/5, 123038, 115045 (NAD 27)
 LSD 15 Sec.13 Rge 39-27W4
 N 52° 21.17' 32" W113° 45.28' 46.06", UTM 12U 0312189N-0311380N 5804108E-5804451E
 Middle Paskapoo Formation, regional dip ~ 0.5-1.0°

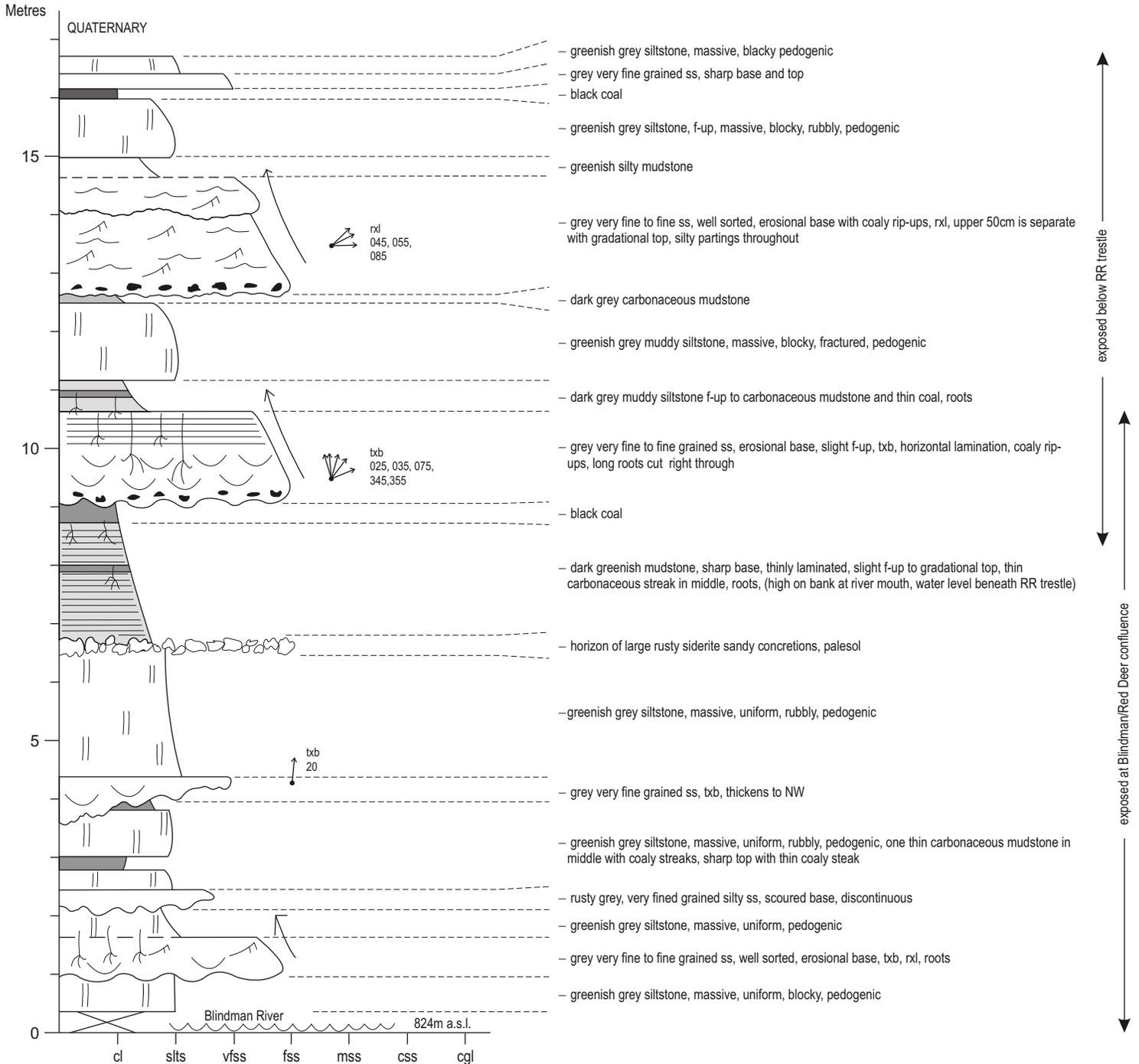


Figure 2i

Riverbend Golf and Recreation Area, Red Deer River (855 m a.s.l.)

(5km NE of Red Deer off 30th Ave)

N52°19' 01.0"/ W113°46' 04.6"

16-34-38-27 W4, UTM 12U 0311214N, 5799866E

Red Deer Sheet 83A/5, 114997 (NAD 27)

middle Paskapoo Formation

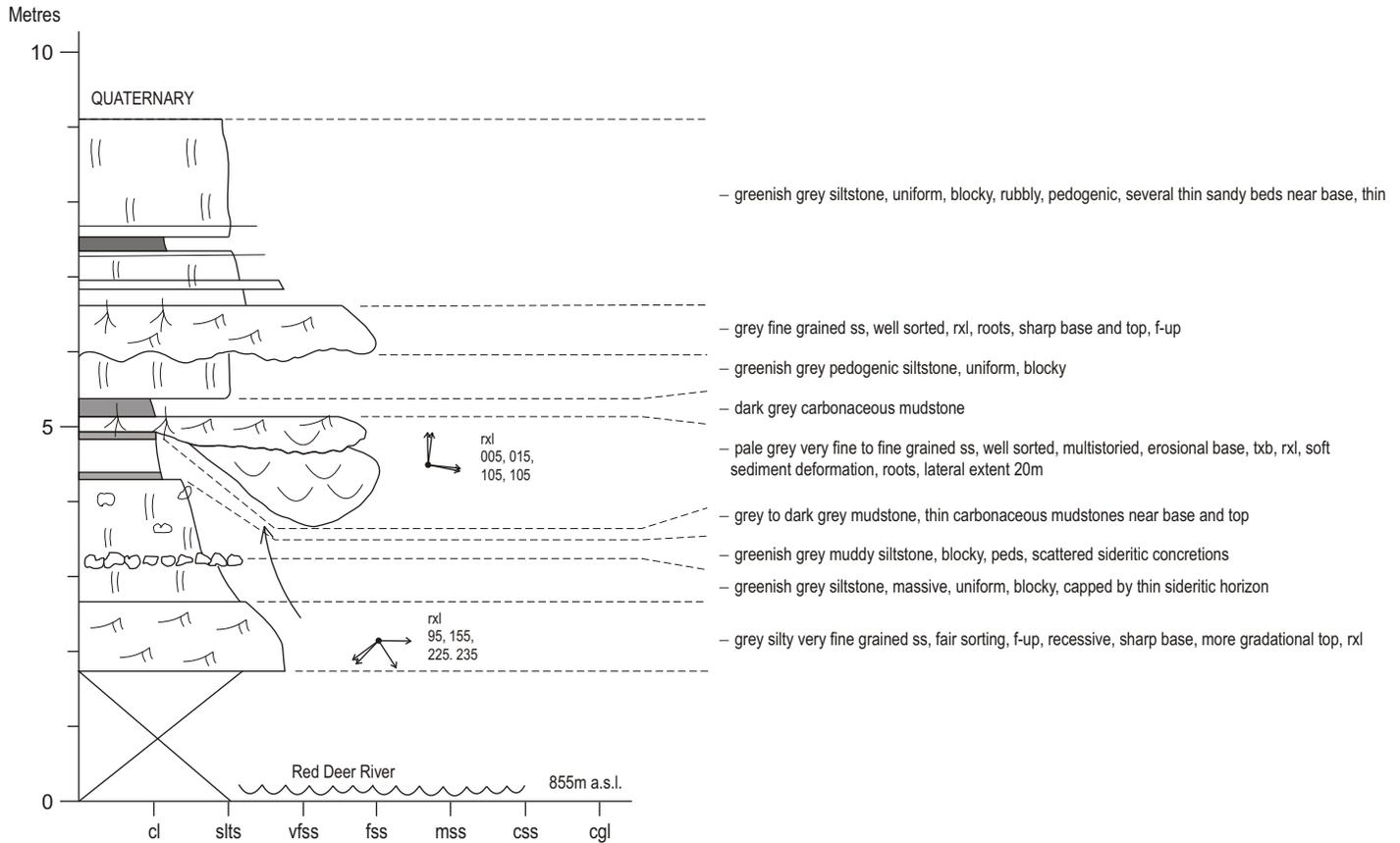


Figure 2j

Blindman River, Range Road 28-3 (865 m.a.s.l.)

11km SW of Blackfalds

Red Deer 83A/5, 982050 (NAD 27)

LSD 16 Sec.16 Twp 39 Rge 28 W4

N 52° 21' 37.3"/W 113° 57' 50.9", UTM 12U 0298164N, 5805249E

Middle to upper Paskapoo Formation

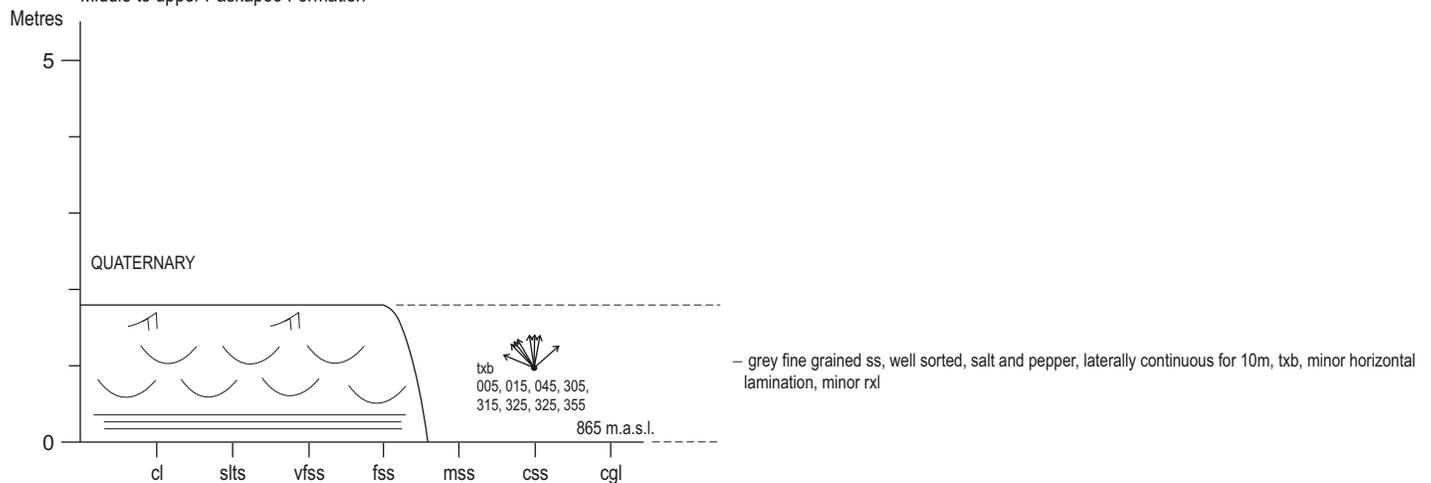


Figure 2k

Two Beavers Bend, Red Deer River (884 m a.s.l.)
 (3km N of Highway 54 Bridge)
 N 52° 05' 41.1" / W 113° 59' 30.5"
 UTM 12U 0295009N, 5774845E
 Innisfail Sheet 83A/4, 951757 (NAD 27)
 middle to upper Paskapoo Formation

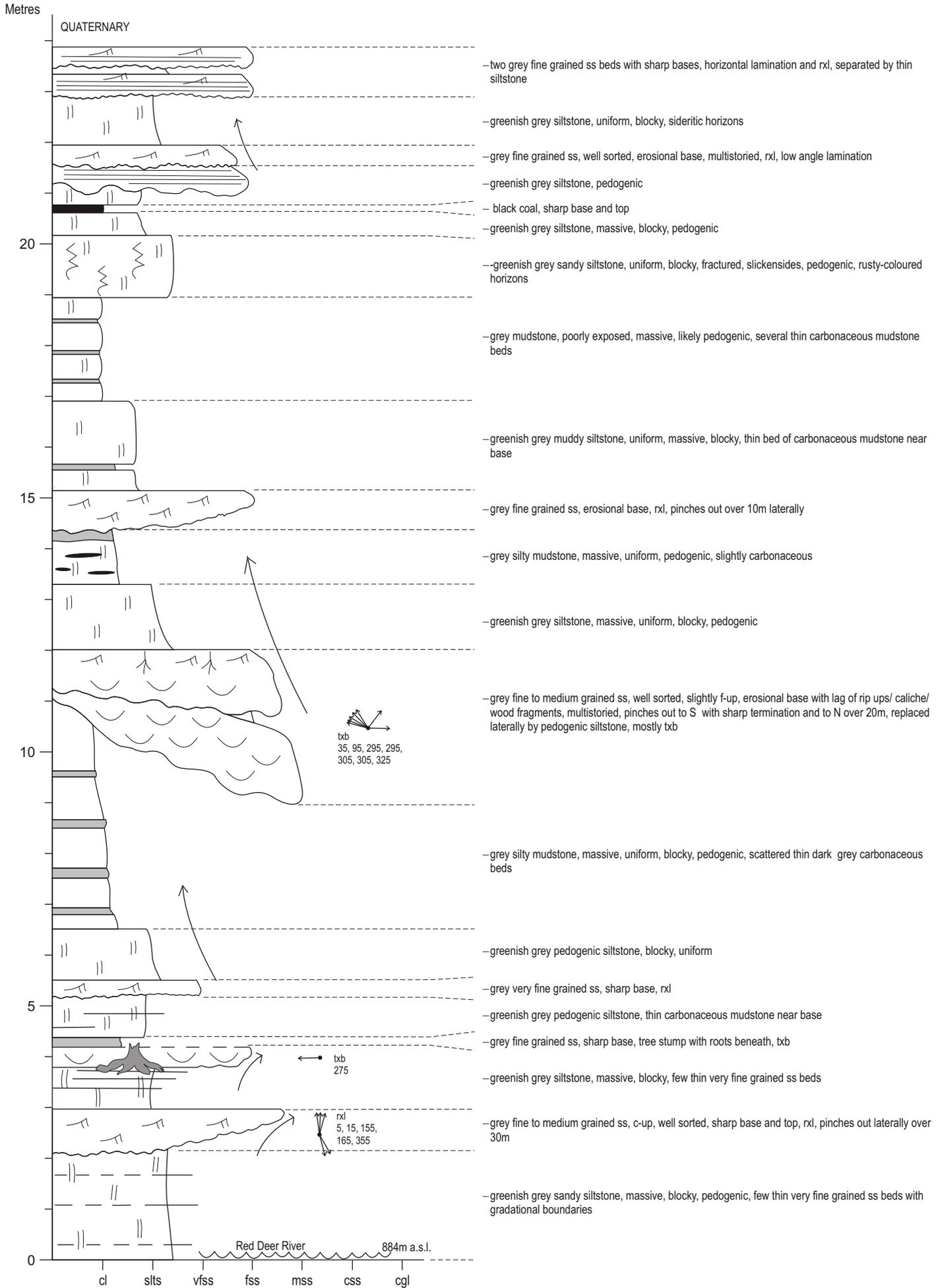


Figure 21

Dickson Dam, Red Deer River (912 m.a.s.l.)

North Valley Picnic Area
 N 52° 03' 38.6" W 114° 12' 53.0"
 UTM 11U 0690850N, 5771405E
 Markerville sheet 83B/1
 911713 (NAD27)
 Upper Paskapoo Formation

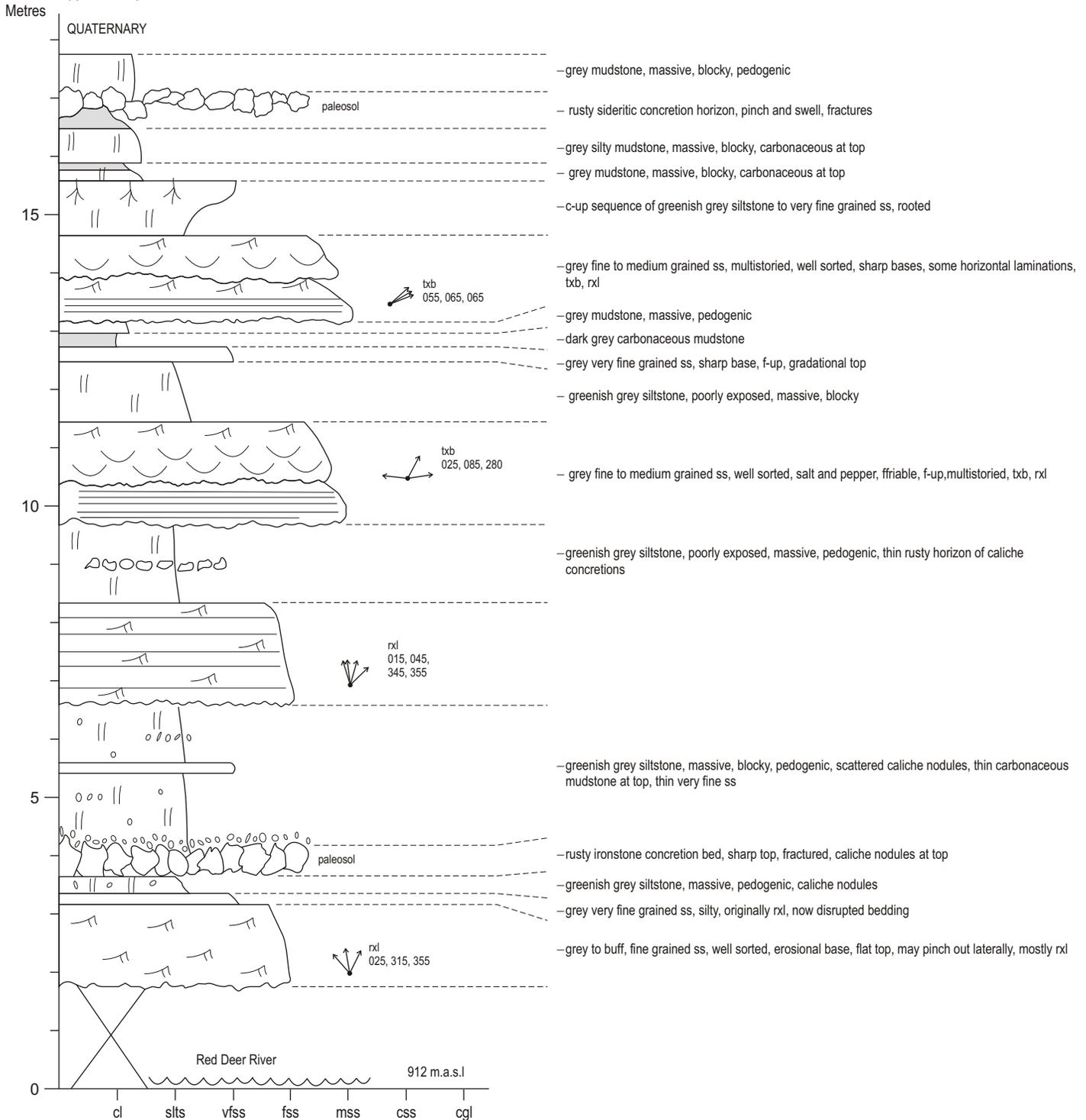


Figure 2m

Magoc Lake, Chain Parlby Creek (808 m.a.s.l.)
 8 Km NE of Clive, large road cut at base of access to lakeshore, cliff facing NNE
 N 52 33' 33", W 113 23' 03", LSD 5 Sec. 27 Twp 41 Rge 24 W4
 UTM 12U 0338376N, 5825917E
 basal Paskapoo

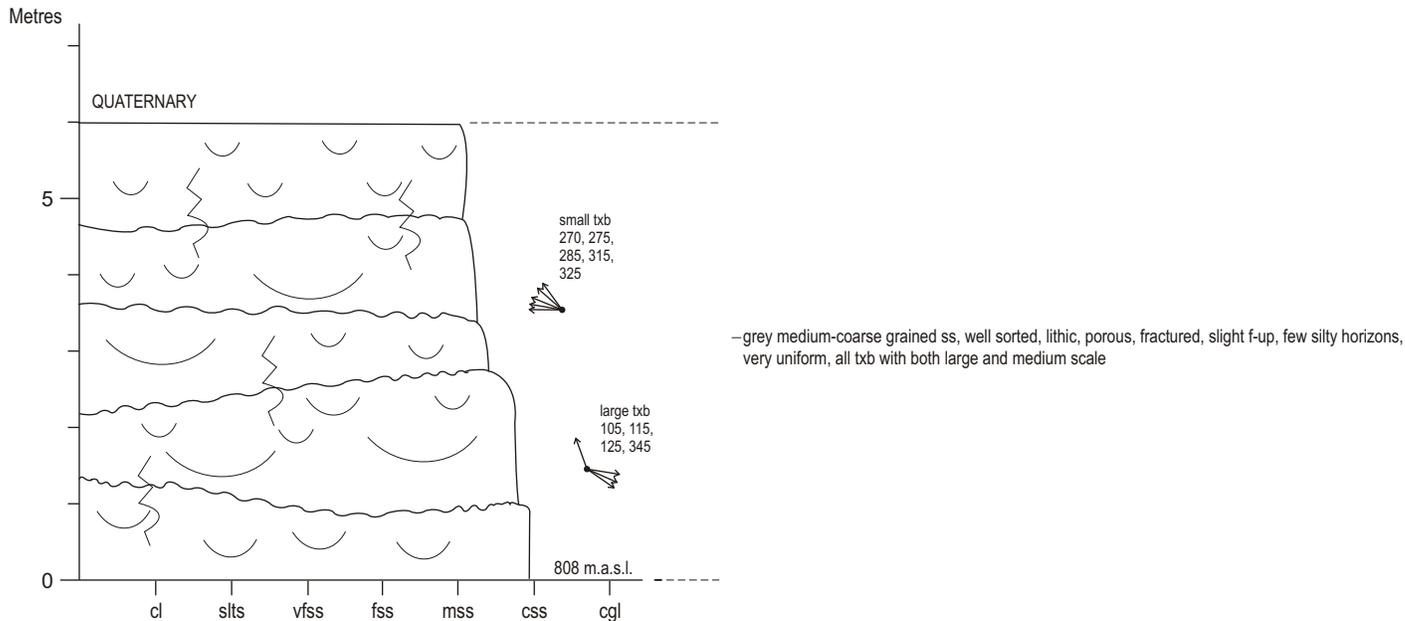
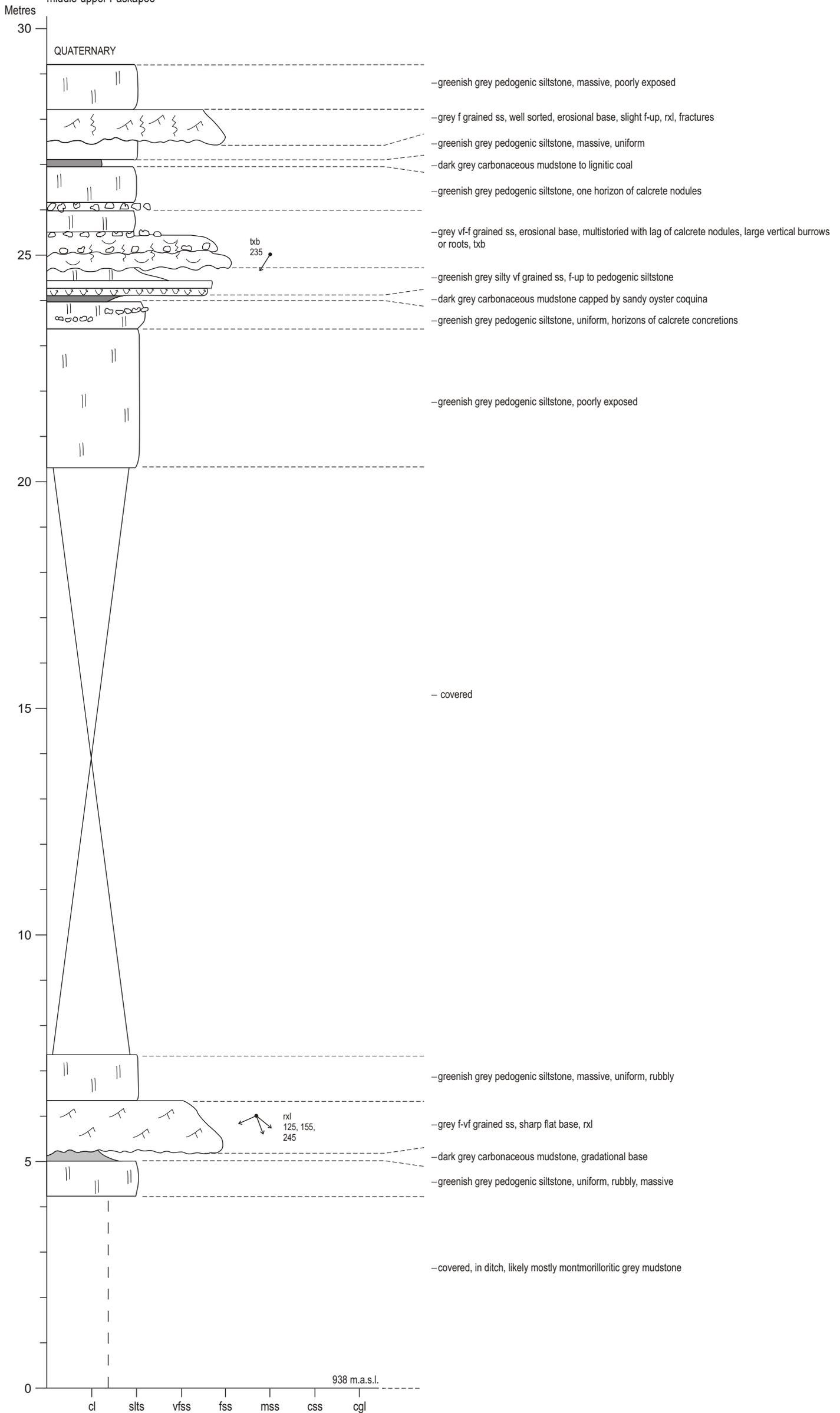


Figure 2n

Spruce Creek Valley, West of Torrington (938 m.a.s.l.)
 (small road cuts on S side of gravel road)
 4-27-32-27 W4 N 51°45'55"/W 113°45'13" at base
 UTM 12U 0309990N, 5738529E at base
 middle-upper Paskapoo



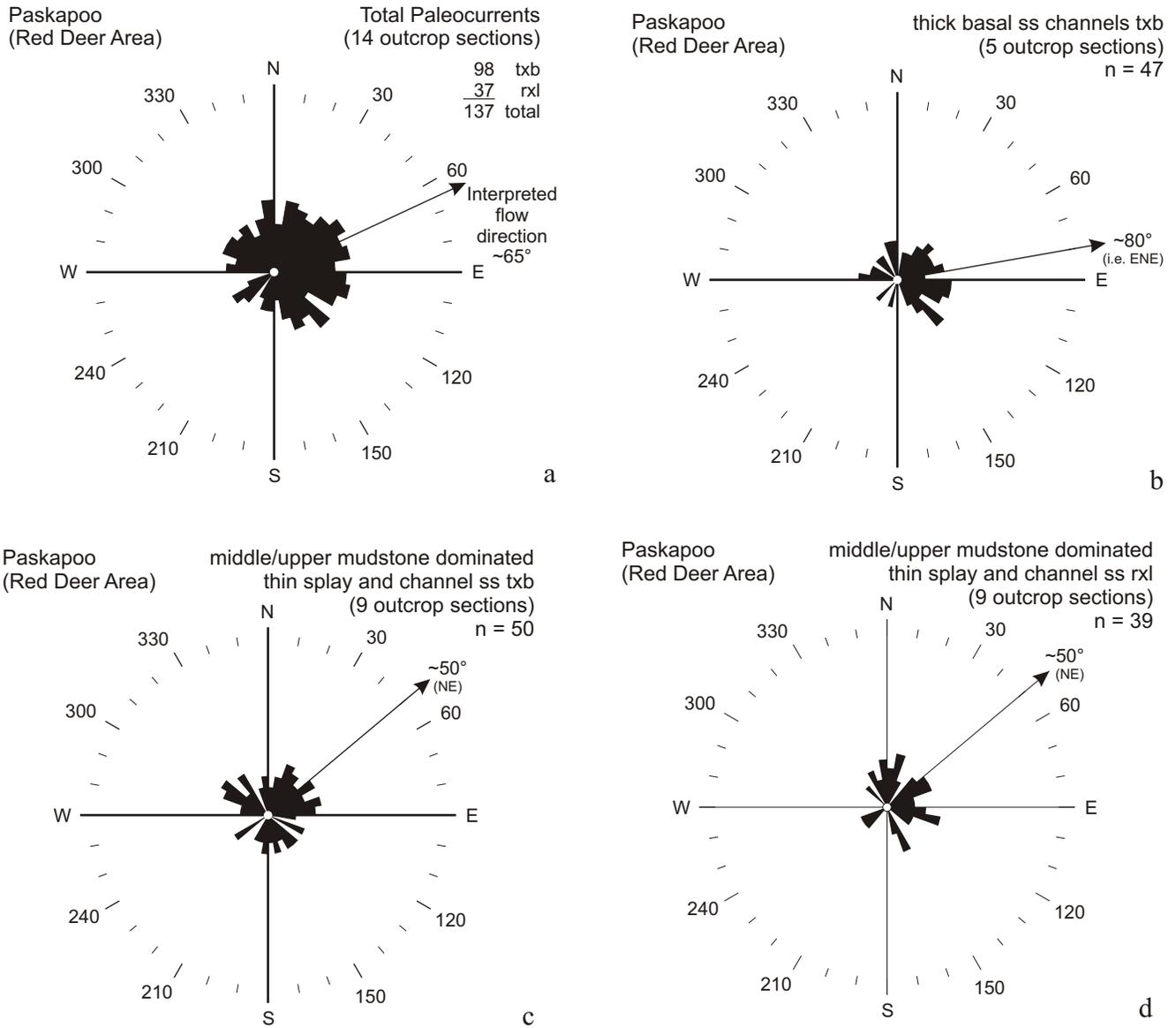


Figure 3a-d. Summary of paleocurrent data from outcrops.