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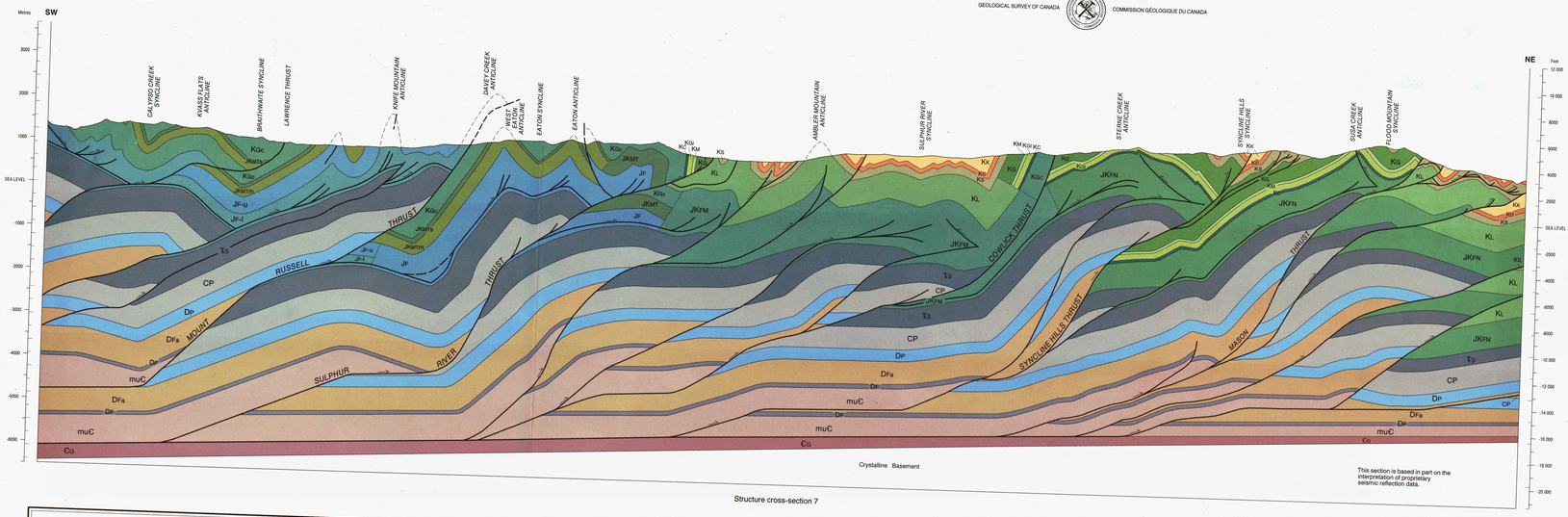
GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA



Structure cross-section 7

Copies of this map may be obtained from the Geological Survey of Canada
601 Booth Street, Ottawa, Ontario K1A 0E9
3303-33rd Street, N.W., Calgary, Alberta T2L 2A7
101 Robson Street, Vancouver, B.C. V6B 5J3

Published 1997

LOCATION MAP

MAP 1904A

GEOLOGY

GRANDE CACHE

WEST OF SIXTH MERIDIAN

ALBERTA

Scale 1:50 000 - Échelle 1/50 000

Kilometres 0 1 2 3 4 Kilomètres

Universal Transverse Mercator Projection
Projection transverse universelle de Mercator

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83L/4	83L/3	83L/2
OF1710	1903A	
83E/13	83E/14	83E/15
OF1710	1904A	
83E/12	83E/11	83E/10

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

Canada

LEGEND

CENOZOIC

QUATERNARY
PLEISTOCENE AND RECENT
- Qvf — *Alluvium, colluvium, till; gravel, sand, silt (shown only where bedrock is covered extensively)*

MESOZOIC

CRETACEOUS
UPPER CRETACEOUS
- Kk — *KASKAPAU FORMATION: shale; dark grey to black, commonly silty, rusty weathering; with sideritic concretions and variable amounts of very thinly interbedded grey, brown weathering siltstone. Calcareous shale; dark grey, silver-grey weathering. Recessive, poorly exposed unit. Mesoscopic faults and folds are common*
- Kd — *DUNVEGAN FORMATION: sandstone; grey, very fine to medium grained, argillaceous, brown weathering, micaceous bedding planes. Mudstone; grey, brown, silty, brown weathering, commonly carbonaceous, laminated, micaceous bedding planes. Sandstone - mudstone in fining upward cycles. Rare lenticular coal seams (<20 cm thick), and medium- to coarse-grained sandstone (quartzose, crossbedded, grey weathering). Relatively resistant marker unit with good topographic expression but usually poorly exposed*

LOWER AND UPPER CRETACEOUS
- Ks — *SHAFTESBURY FORMATION: shale; dark grey, grey or rusty weathering. Red-brown weathering, laminated siltstone interbeds are common near top. Recessive, dark weathering unit*

LOWER CRETACEOUS
LUSCAR GROUP (Kc - Kg)
- Kg — *GATES FORMATION: sandstone; fine to coarse grained, carbonaceous, cross-bedded, tan or red-brown weathering. Interbedded with carbonaceous shale; grey, brown; carbonaceous siltstone; grey, cross-laminated; coal, beds commonly over 1 m thick; and sandy pebble conglomerate; clast supported, in beds up to 5 m thick. Sandstone; fine grained, well sorted, resistant, brown weathering unit, up to 20 m thick, forms base of succession in many areas.*
- KM — *MOOSEBAR FORMATION: shale; dark grey with ironstone concretions. Sandstone, grey, very fine grained, laminated, very thin to thin bedded, brown weathering, absent in lower part of unit, more common near top. Recessive marker unit*
- KGl — *GLADSTONE FORMATION: sandstone; fine to coarse grained, carbonaceous, crossbedded, orange-brown weathering, and local sandy pebble conglomerate. Interbedded with carbonaceous siltstone, carbonaceous shale and minor coal. Plant remains abundant throughout. Ribbed weathering unit*
- Kc — *CADOMIN FORMATION: conglomerate; pebble to cobble, clast supported in red-brown weathering sandy matrix. Local interbeds of sandstone and siltstone. Resistant, light grey weathering, or black lichen covered marker unit*

→ Kl — *LUSCAR GROUP, undivided. Subsurface only*

MINNES GROUP (JKMTm - KGc)
- KGc — *GORMAN CREEK FORMATION: interlayered sandstone, siltstone, mudstone, carbonaceous shale or coal in repetitive fining upward cycles generally 1 to 5 m thick. Sandstone; fine to coarse grained, carbonaceous, ripple cross-laminated or crossbedded, commonly rich in dark chert, locally conglomeratic, orange or brown weathering. Local, resistant mappable units up to 15 m thick denoted by s on map. Siltstone; grey, carbonaceous, orange or grey weathering. Shale; silty, carbonaceous, grey weathering, commonly grading to coal. An orange-brown weathering succession with few marker units, commonly complexly folded with minor faults*

JURASSIC AND CRETACEOUS
UPPER JURASSIC AND LOWER CRETACEOUS
- JKMTs — *MONTEITH FORMATION (JKMTm - JKMTs) Mixed facies; sandstone; very fine to medium grained, rich in dark chert, ripple cross-laminated, locally carbonaceous, brown weathering. Shale and siltstone; grey, interlaminated, micaceous and carbonaceous parting planes, brown weathering; local carbonate concretions*
- JKMTm — *Marine sandstone facies: sandstone; very fine grained, light brown-grey, laminated, pinkish or light grey weathering with minor grey shale interbeds. Resistant marker unit*

→ JKMT — *MONTEITH FORMATION: undivided. Subsurface only*

JURASSIC
- Jf-u — *FERNIE FORMATION (Jf-l - Jf-u) Upper part (West): Siltstone and silty sandstone; brown-grey, very thin to thin bedded, red-brown weathering, micaceous parting planes, local large orange-brown weathering concretions. Interbedded with shale; grey, silty, brown weathering. Brown, relatively recessive weathering unit with locally mappable resistant intervals 20 to 40 m thick dominated by silty sandstone; base of these intervals denoted by ss on map*
- JF-ue — *Upper part (East): shale; grey, silty, brown weathering. Siltstone; brown-grey, very thin to thin bedded. Sandstone; light grey, quartzose, well cemented, thin bedded, orange-brown weathering, common in upper part of unit*
- Jf-l — *Lower part: shale; dark grey, locally rusty weathering, ironstone concretions; minor quartz sandstone and glauconitic sandstone near base. A few metres of interbedded black shale and dark limestone occurs at base (Nordegg Member). Recessive unit*

→ Jf — *FERNIE FORMATION: undivided*

→ JKFM — *FERNIE FORMATION AND MINNES GROUP, undivided. Subsurface only*

→ JKFN — *FERNIE AND NIKANASSIN FORMATIONS, undivided. Subsurface only*

→ JKN — *NIKANASSIN FORMATION: sandstone; very fine grained, orange-brown weathering, in thin to very thick beds, interbedded with minor dark grey shale, silty shale and argillaceous sandstone in the lower part. Interlayered sandstone, siltstone, mudstone, carbonaceous shale of the upper part is lithologically similar to Gorman Creek Formation. The lower part is resistant weathering; the upper part is a ribbed, generally orange weathering unit*

TRIASSIC
SPRAY RIVER GROUP (TSM - Twh)
- Twh — *WHITEHORSE FORMATION: interbedded silty dolostone, sandstone, siltstone, sandy limestone, intraformational conglomerate, solution breccia, anhydrite, limestone and cherty dolostone. Limestone; light grey weathering with minor dolostone and intraformational conglomerate. A distinctive, brightly weathering, ribbed unit*
- TSM — *SULPHUR MOUNTAIN FORMATION: siltstone, silty limestone; grey, red-brown, platy to flaggy weathering, contains phosphatic fossils. Minor interbedded shale, dolostone and sandstone. A distinctive, red-brown, moderately resistant weathering unit*

→ TS — *SPRAY RIVER GROUP, undivided. Subsurface only*

PERMIAN
- Pu — *BELCOURT AND MOWICH FORMATIONS: skeletal limestone and finely crystalline dolostone with chert and carbonate pebble conglomerate at base (Belcourt Formation). Siliceous or calcareous sandstone with local chert and carbonate lenses and thin chert pebble conglomerate at base (Mowich Formation)*

CARBONIFEROUS
LOWER CARBONIFEROUS
- Cr — *RUNDLE GROUP: limestone; skeletal grainstone, packstone and wackestone. Locally abundant chert nodules and dolostone. Minor shale. Ribbed weathering unit*
- Cbf — *BANFF FORMATION: brown weathering black shale and lime wackestone in thin rhythmic interbeds (lower part; Banff Formation). Brown weathering black shale and skeletal lime grainstone in coarsening upward cycles (upper part; Banff Formation). Recessive, brownish weathering marker unit*

→ CP — *BANFF FORMATION, RUNDLE GROUP, AND BELCOURT AND MOWICH FORMATIONS, undivided. Subsurface only*

DEVONIAN
UPPER DEVONIAN
- DP — *PALLISER FORMATION: limestone; brown-grey, wavy bedded to nodular, dolomitic and burrow mottled. Resistant, weathering unit*

FAIRHOLME GROUP
- DSx — *SOUTHESK FORMATION: dolostone and limestone with stromatoporoids and Amphipora*

PALEOZOIC

SUBSURFACE ONLY
- DFa — *FAIRHOLME GROUP: limestone, dolostone, argillaceous limestone and shale*
- DF — *FLUME FORMATION: limestone, shale*

CAMBRIAN
MIDDLE AND UPPER CAMBRIAN
- muC — *Limestone, dolostone and shale*

LOWER CAMBRIAN
- Cg — *GOG GROUP: quartz sandstone*

- Outcrop examined, bedding attitude not determined
- Geological boundary (defined, approximate, assumed)
- Geological boundary (assumed projection under cover of younger deposits)
- Bedding, tops known (horizontal, inclined, vertical, overturned)
- Bedding, tops unknown (inclined)
- Fault, thrust or reverse, west vergent (teeth indicate upthrust side; defined, approximate, assumed)
- Fault, thrust or reverse, west vergent (assumed projection under cover of younger deposits)
- Fault, thrust or reverse, east vergent (teeth indicate upthrust side; defined, approximate, assumed)
- Fault, thrust or reverse, east vergent (assumed projection under cover of younger deposits)
- Anticline, trace of axial plane (fold upright, overturned; defined, approximate, assumed; arrow indicates direction of plunge)
- Syncline, trace of axial plane (fold upright, overturned; defined, approximate, assumed; arrow indicates direction of plunge)
- Anticline and syncline (assumed projection under cover of younger deposits)
- Monocline (arrow indicates dip direction of steeper limb; approximate)
- Diagrammatic profiles of sets of minor folds (30 to 10 m wavelength) viewed to the northwest. Axial trace indicates the observed extent of the structures
- Minor folds; axis, trend and plunge; anticline, syncline, dextral (z fold), sinistral (s fold), symmetric (w fold)
- Lateral change in lithofacies (denoted by zig-zag perpendicular to map unit contacts)
- Change in mapping precision; stratigraphic subdivisions are amalgamated at dotted line
- Line of section

Geological interpretation by M.E. McMechan, 1990, based on ground and air observations by M.E. McMechan (1982-83, 1990). Studies of vertical airphotos and GSC Map 1044A for Grande Cache map area (Irish and Thorsteinsson, 1956); GSC Preliminary Map 52-26A for Grande Cache map area (east half, Thorsteinsson, 1952); Alberta Research Council map of the Smoky River coal mine area (Langenberg and Wrightson, 1986, in Alberta Research Council Bulletin 56); and an unpublished report prepared by Pearson and Associates for Union Oil of Canada Ltd. (1982) on the coal measures in the Mount Louie area.

Digital cartography by D.A. Lemay, Geological Survey of Canada (Calgary)

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

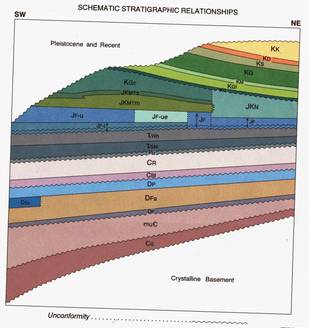
Digital base map at the scale of 1:50 000 from Geomatics Canada, Natural Resources Canada, modified for publication by the Geological Survey of Canada

Copies of the topographical edition covering this map area may be obtained from the Canada Map Office, Natural Resources Canada, Ottawa, Ontario, K1A 0E9

Approximate magnetic declination 1996, 21°49' East, decreasing 8.7' annually

Elevations in feet above mean sea level

SCHEMATIC STRATIGRAPHIC RELATIONSHIPS



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