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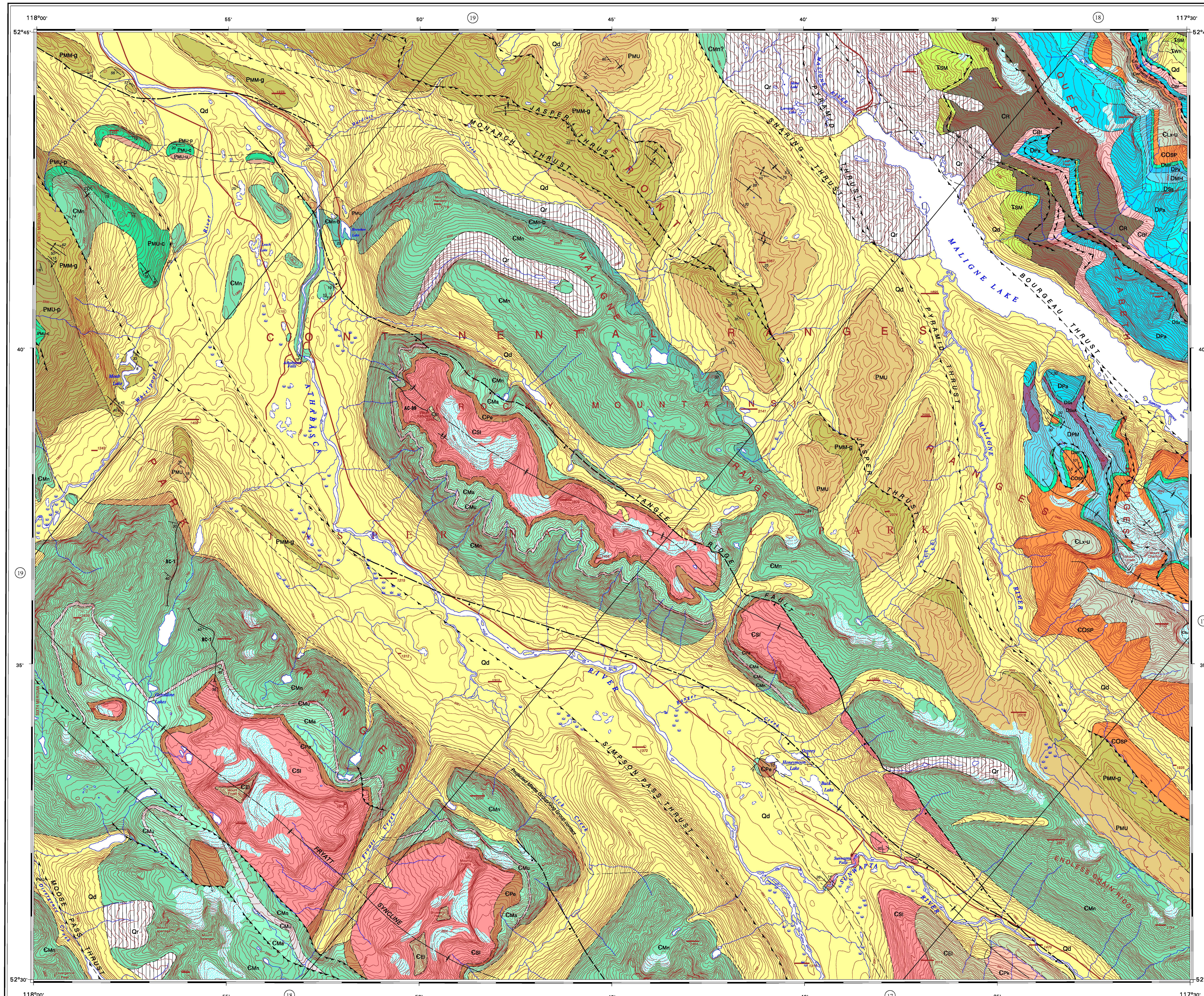
GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA



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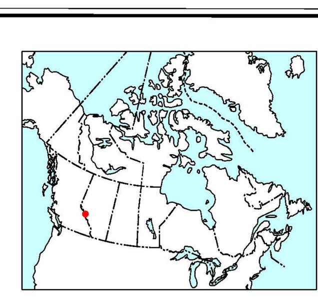


LOCATION MAP

MAP 2007A

GEOLOGY

ATHABASCA FALLS

ALBERTA

Scale 1:50 000/Échelle 1/50 000

kilometres 1 0 1 2 3 4 kilomètres

Universal Transverse Mercator Projection
North American Datum 1983
© Her Majesty the Queen in Right of Canada 2003

Projection transverse universelle de Mercator
Système de référence géodésique nord-américain, 1983
© Sa Majesté la Reine du chef du Canada 2003

83 D/16	83 C/13	83 C/14 1830A
83 D/9	83 C/12 2007A	83 C/11 1942A
83 D/8	83 C/5	83 C/6

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

Canada

LEGEND

CENOZOIC

QUATERNARY
PLEISTOCENE AND RECENT

Qd *Till, alluvium, colluvium.*

Qr *Rock slide and rock glacier.*

MESOZOIC

JURASSIC

JF *FERNIE FORMATION: dark grey to black shale; dark grey sandstone and siltstone; dark grey, silty, argillaceous limestone; brown, limonitic, quartz sandstone.*

TRIASSIC
SPRAY RIVER GROUP (units ꞆSM - ꞆWh)

ꞆWh *WHITEHORSE FORMATION: dolomitic, light grey siltstone and sandstone; red, green, and brown mudstone and siltstone; limestone and dolomite breccia.*

ꞆSM *SULPHUR MOUNTAIN FORMATION: dark grey and brown siltstone and sandstone; thin-bedded, silty mudstone and dolomitic siltstone.*

PALEOZOIC

PERMIAN

PI *ISHBEL GROUP: light grey quartz sandstone; dolomitic sandstone; silty dolomite; chert.*

CARBONIFEROUS
LOWER CARBONIFEROUS
RUNDLE GROUP

CR *MOUNT HEAD FORMATION: dense, dark grey limestone and argillaceous dolomite; grey limestone and calcarenitic limestone; cherty and silty dolomite and limestone.*
TURNER VALLEY FORMATION: light grey, skeletal calcarenite and calcarenitic limestone; cherty limestone; dolomite.
SHUNDA FORMATION: light to dark grey, dense limestone; calcarenitic limestone; cherty limestone.
PEKISKO FORMATION: light grey, skeletal calcarenite; calcarenitic limestone; cherty limestone; dolomite.

CBf *EXSHAW and BANFF FORMATIONS: dark grey, finely crystalline, thin-bedded limestone; dark brownish grey shale; brown, argillaceous siltstone; argillaceous and cherty, skeletal, calcarenitic limestone; argillaceous dolomite; dark brown shale at the base.*

DEVONIAN
UPPER DEVONIAN

DPa *PALLISER FORMATION: thick-bedded and massive, mottled, dolomitic limestone; grey, dense limestone; greyish brown dolomite.*

DSs *SASSENACH FORMATION: fine grained, medium bedded sandstone and siltstone; silty and argillaceous limestone; silty, calcareous, dark grey shale.*

FAIRHOLME GROUP (units DCn - DSx-a, DMF - DMH)
SOUTHESK FORMATION (units DSxP - DSxA)

DSxA *Arcs Member: granular, thick-bedded, light grey limestone; coarsely crystalline, vuggy dolomite.*

DSxG *Grotto Member: brown dolomite with corals, crinoids and vuggy* ***Amphipora*** *(legend only).*

DSxP *Peechee Member: light grey, coarsely crystalline, vuggy dolomite with some corals and* ***Amphipora*** *(legend only).*

DSx *SOUTHESK FORMATION: massive, light grey, cryptocrystalline to finely crystalline limestone; in part calcarenitic; dolomite (legend only).*

DCn *CAIRN FORMATION: massive to thick-bedded, dark brownish grey, medium crystalline dolomite with* ***Amphipora*** *and stromatoporoid beds; dark grey limestone, dolomitic limestone, and dolomite in the lower part; minor chert and breccia (legend only).*

OFF-REEF BASIN FILL

DMH *MOUNT HAWK FORMATION: calcareous mudstone, with grey to brown limestone nodules; argillaceous thin-bedded limestone with brachiopods and corals; recessive.*

DPx *PERDRIX FORMATION: black, bituminous, calcareous, pyritic shale, with calcareous nodules; thin beds in dark grey, argillaceous limestone.*

DPM *MOUNT HAWK and PERDRIX FORMATIONS: undivided.*

DMF *FLUME FORMATION: fine-grained to micritic, cherty, dark grey to brown limestone, in part dolomitic, with* ***Amphipora*** *and stromatoporoids.*
MALIGNE FORMATION: micritic, argillaceous, dark grey, thin-bedded limestone with brachiopods.

Units DMH, DPx and DMF represent strata deposited basinward from units DCn and DSx, which represent reef-ringed, carbonate buildups.

DF *FAIRHOLME GROUP: undivided (structure sections only).*

CAMBRIAN AND ORDOVICIAN

ꞒOSP *SURVEY PEAK FORMATION: grey, calcareous shale; interbedded with micritic limestone; minor chert; basal part, calcareous, grey to olive shale, with minor limestone, flat-pebble conglomerate siltstone; weathers pale greenish grey.*

CAMBRIAN
UPPER CAMBRIAN
LYNX GROUP (units ꞒWf - ꞒLx-u)

ꞒLx-u *UPPER LYNX GROUP: mainly grey, mottled, microcrystalline, silty dolomite, grading to dolomitic siltstone; commonly laminated, thin to thick bedded; chert nodules.*

ꞒSu *SULLIVAN FORMATION: grey to green shale with thick interbeds of oolitic and fossiliferous limestone, limestone-pebble conglomerate, and orange-weathering dolomite; dolomitic siltstone near the base.*

MIDDLE AND UPPER CAMBRIAN

ꞒWf *WATERFOWL FORMATION: grey to pink, very finely crystalline to microcrystalline dolomite, partly silty and sandy, laminated, thin to thick bedded; minor dolomitic siltstone; chert nodules.*

MIDDLE CAMBRIAN

ꞒAr *ARCTOMYS FORMATION: thinly interbedded, purple-red, green and grey shale; yellow, dolomitic siltstone with ripple marks, mudcracks, and salt casts; and minor, yellow-weathering dolomite.*

ꞒPk *PIKA FORMATION: grey, dense, thin-bedded, flaggy limestone with partings and mottling of dense dolomite; limestone-pebble conglomerate; oolite; dolomitized equivalents; minor shale intervals near the base.*

ꞒEl *ELDON FORMATION: dense, predominantly grey, dolomite-mottled, massive limestone; dolomitized equivalent.*

ꞒSl *SNAKE INDIAN FORMATION: alternating units of limestone and calcareous shale; micritic, resistant, grey, thin-bedded and flaggy limestone, calcareous, grey, recessive shale; silty, red and green shale and siltstone at the base.*

Ꞓ *Undivided (structure sections only).*

LOWER CAMBRIAN

ꞒPe *PEYTO FORMATION: resistant grey to red limestone; ooid and skeletal grainstone and packstone with oncoids, in part with quartz sand, thrombolites, and stromatolites; interfingers with underlying Gog Group.*

LOWER CAMBRIAN AND NEOPROTEROZOIC
GOG GROUP (units ꞒMn-b - ꞒMa)

ꞒMa *MAHTO FORMATION: quartzose, crossbedded sandstone, alternating with thinner beds of silt and silty shale.*

ꞒMu *MURAL FORMATION: micritic limestone; finely crystalline, grey dolomite, with archaeocyathid fragments; massive, some shale interbeds.*

ꞒMn *McNAUGHTON FORMATION: quartzose, crossbedded, massive sandstone.*

ꞒMn-b *McNAUGHTON FORMATION (base): pebble conglomerate and feldspathic sandstone.*

ꞒG *GOG GROUP: massive quartz sandstone; minor pebble conglomerate (structure sections only).*

NEOPROTEROZOIC

NEOPROTEROZOIC
WINDERMERE SUPERGROUP
MIETTE GROUP (units PMM-g - PMU-u)
UPPER MIETTE GROUP (units PMU-p - PMU-u)

PMU-u *Upper Unit: silty, dark grey to black shale with variable amounts of pebbly sandstone; local paraconglomerate with large dolomite clasts at base.*

PMU-c *Carbonate Unit: finely crystalline, light brown to grey dolomite, locally with stromatolites and pisolites; massive, grades into PM-u; occurs at more than one stratigraphic level.*

PMU-p *Pelite Unit: silty, brown to dark grey, finely laminated shale and pelite; minor sandstone and siltstone interbeds.*

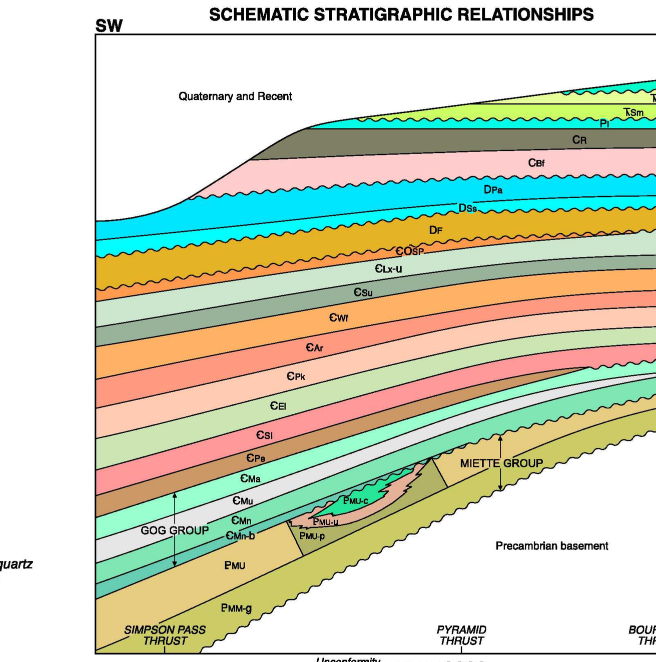
PMU *UPPER MIETTE GROUP: silty argillite and mudstone; feldspathic sandstone and granule conglomerate.*

PMM-g *MIDDLE MIETTE GROUP: feldspathic sandstone, granule and pebble conglomerate; siltstone, interbedded with thick argillite units.*

Geological boundary (defined, approximate, assumed)
Geological boundary (assumed projection under cover of younger deposits)
Bedding, top known (inclined) 10
Thrust fault (defined, approximate; teeth indicate upthrust side)
Thrust fault (assumed projection under cover of younger deposits)
Normal fault (defined, approximate; solid circle indicates downthrown side)
Normal fault (assumed projection under cover of younger deposits; solid circle indicates downthrown side)
Anticline and syncline (defined; overturned, arrow indicates plunge)
Anticline and syncline (assumed projection under cover of younger deposits)
Stratigraphic section, locus of measurement (number refers to internal cataloguing system). **AC***-studied by J.D. Aitken;* **BC***-studied by B. Corneil* AC
Line of structure section 18 18

SCHEMATIC STRATIGRAPHIC RELATIONSHIPS

SW NE



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1955: Geology of portion of Sunwapta and Southesk map-areas. Jasper National Park, Alberta, Canada; 5th Annual Field Conference Guidebook, Alberta Society of Petroleum Geologists, p. 69–116.

Geology by E.W. Mountjoy and R.A. Price based on fieldwork and studies of vertical air photographs by E.W. Mountjoy and R.A. Price (1964-1967) and E.W. Mountjoy (1996-2000).
Geology of extreme southwest corner partly based on R. Hughes (1955).
Structure cross-sections by E.W. Mountjoy with contributions by R.A. Price.
Acknowledgments to G. Dolce for digitizing and help with structure cross-sections

Digital cartography by E. Macey, 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 from data compiled by Geomatics Canada, modified by the Geological Survey of Canada (Calgary)

Mean magnetic declination 2003, 19°5' East, decreasing 11.0' annually

Elevations in metres above mean sea level

Structure cross-sections 17, 18, and 19 accompany this map

Recommended citation:
Mountjoy, E.W. and Price, R.A.
2003: Geology, Athabasca Falls, Alberta; Geological Survey of Canada, Map 2007A, scale 1:50 000.