Contact
- Defined
- Approximate
- Inferred
- Concealed

Facies change
- Approximate

Mapping precision change
- Map unit grouping at dotted line

Fault, thrust, symbol on hanging wall
- Defined
- Approximate
- Inferred
- Concealed

Fault, back thrust, symbol on hanging wall
- Defined
- Approximate
- Inferred

Fault, transverse
- Approximate
- Inferred

Slump escarpment
- Defined

Fault zone
- Zone of faults with brecciated rock

Anticline, upright
- Approximate
- Inferred

Anticline, overturned
- Approximate
- Inferred

Syncline, upright
- Approximate
- Inferred

Syncline, overturned
- Approximate

Station
- Outcrop visited, attitude not determined

Station (historical)
- Published observation

Bedding, top known
- Inclined
- Vertical, ball on younger side
- Overturned

Bedding, top known (historical)
- Inclined
- Overturned

Bedding, top unknown
- Inclined

Bedding, top unknown (historical)
- Inclined
- Vertical

Wells
- Drilled and cased
- Dry, abandoned
- Oil well
- Gas well
- Gas well, suspended

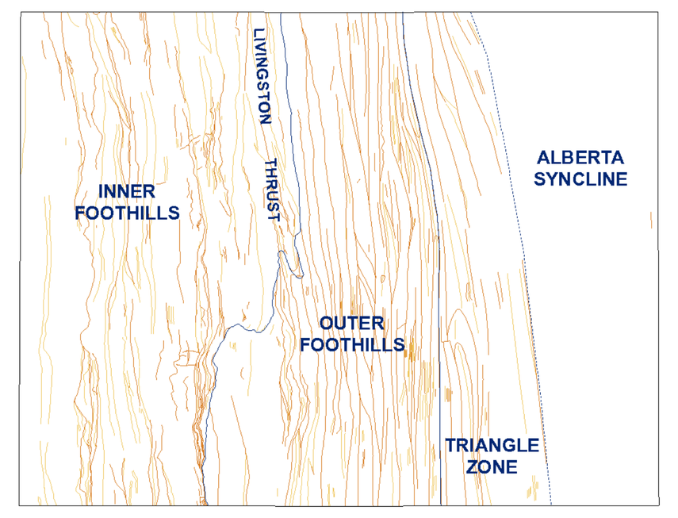


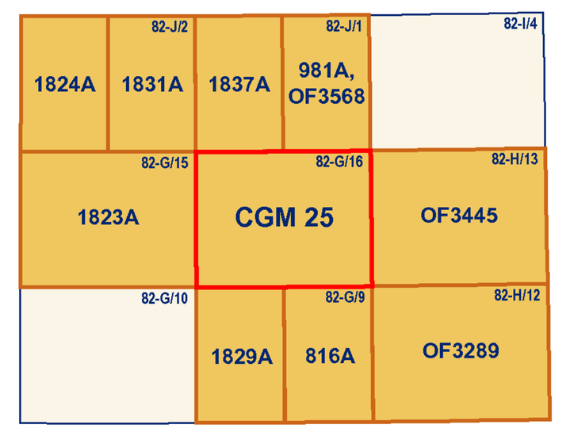
Figure 1. Structural subdivisions.

Abstract

The 1:50 000-scale bedrock geological map of Maycroft (NTS 82-G/16) is the result of geological fieldwork conducted in 1993 through 1996, combined with reinterpretation of pre-existing maps. The area covered by the map extends from the Alberta syncline westward to the inner part of the southern Rocky Mountain Foothills. From east to west, the bedrock geology is characterized by gently dipping Upper Cretaceous to Paleocene clastic strata in the Alberta syncline, a zone of hinterland-vergent thrust faults and folds developed in Upper Cretaceous clastic strata that form the upper detachment of a complex triangle zone, and a broad region of foreland-vergent thrust faults and folds developed in Mississippian to Upper Cretaceous strata. The triangle zone and Livingstone Thrust dominate the structural geology. Deformation is thin skinned and of probable Late Cretaceous to Early Tertiary age. A few east-trending, syndepositional faults affected Mississippian carbonate sedimentation. A depocentre for late Albian explosive volcanism occurs along Daisy Creek.

Résumé

La carte géologique à l'échelle de 1/50 000 de la région de Maycroft (Maycroft, SNRC 82-G/16) est le résultat de travaux géologiques menés sur le terrain de 1993 jusqu'en 1996, combinés à la réinterprétation de cartes préexistantes. La région de la carte s'étend du synclinal de l'Alberta vers l'ouest jusqu'à la partie intérieure de la portion sud des contreforts des Rocheuses. D'est en ouest, la géologie du substratum rocheux est caractérisée par des strates clastiques à faible pendage du Crétacé supérieur au Paléocène, dans le synclinal de l'Alberta; une zone de failles de chevauchement et de plis, à vergence vers l'arrière-pays, qui se sont développés dans les strates clastiques du Crétacé supérieur correspondant au décollement supérieur d'une zone triangulaire complexe; et d'une vaste région de failles de chevauchement et de plis à vergence vers l'avant-pays qui se sont développés dans des strates du Mississippien au Crétacé supérieur. La zone triangulaire et le chevauchement de Livingstone dominent la géologie structurale. La déformation est superficielle et date probablement du Crétacé tardif au



National Topographic System reference and index to adjoining published Geological Survey of Canada maps

Cover illustration
Resistant Mississippian carbonate rocks outline the Livingstone anticline, a large, overturned, faulted fold in the hanging wall of the Livingstone Thrust at The Gap, Alberta. View to northwest.
Photograph by M.E. McMechan. 2011-049

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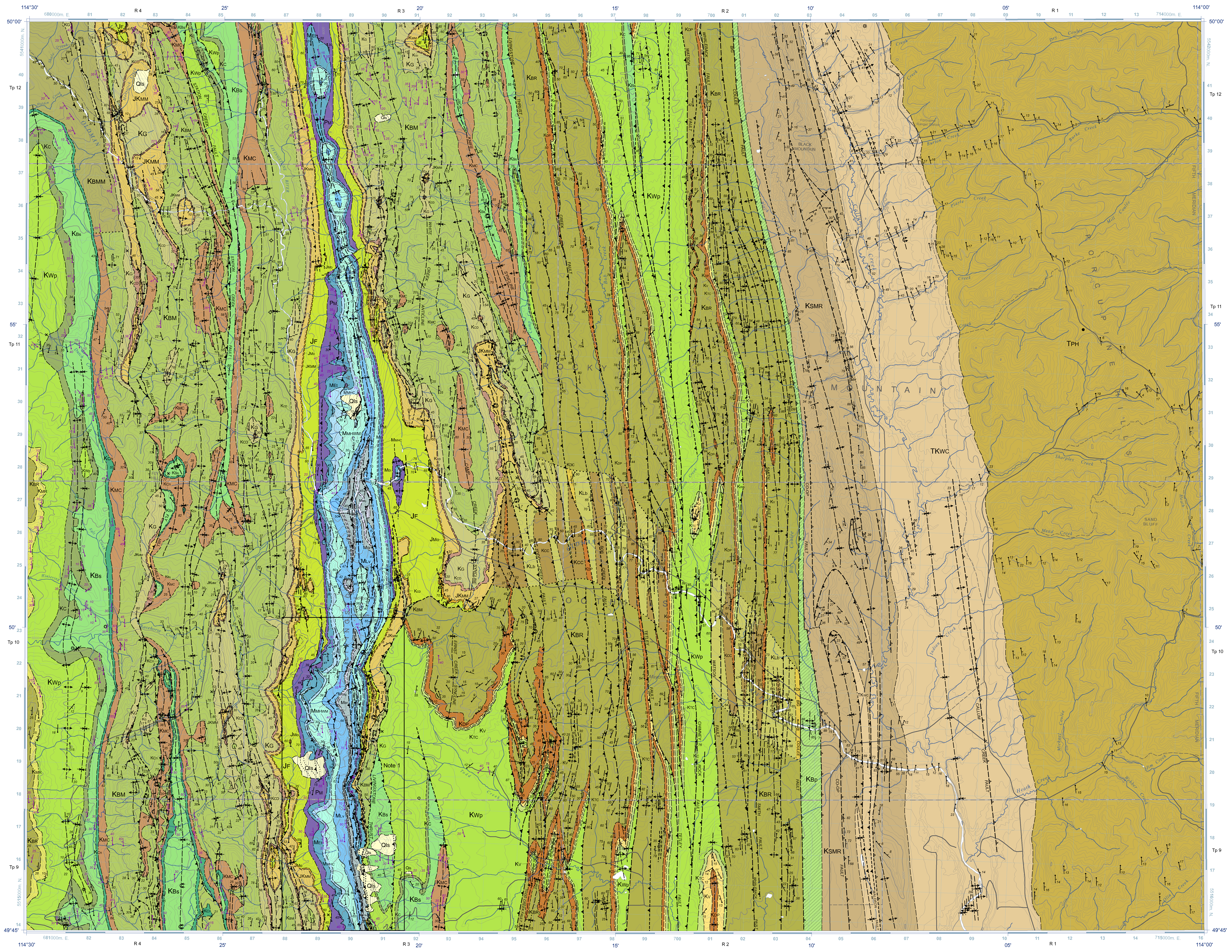
CANADIAN GEOSCIENCE MAP 25

GEOLOGY

MAYCROFT

Alberta

1:50 000



Coloured legend blocks indicate map units that appear on this map.

QUATERNARY

Qls — **Landslide:** blocks of nearby bedrock.

TERTIARY

TPH — **Porcupine Hills Formation:** sandstone: fine- to coarse-grained, medium- to very thick-bedded, multistoried, buff-weathering, grey, massive to crossbedded; mudstone: massive, rubbly, grey-green; shale: carbonaceous; minor conglomerate: granule to pebble.

CRETACEOUS–TERTIARY

TKWC — **Willow Creek Formation:** mudstone and shale: red, green, grey, and purple, limy caliche nodules common; sandstone: fine- to medium-grained, buff-weathering, grey, commonly crossbedded; minor conglomerate: granule to pebble.

CRETACEOUS

KSMR — **St. Mary River Formation:** sandstone: fine-grained, hard to soft, grey to greenish-grey, rootlets common; silty shale and shale: grey to greenish-grey; shale: carbonaceous; minor limestone (ironstone); coal.

KBp — **Bearpaw Formation:** shale: dark grey, rubbly; sandstone: fine- to very fine-grained, thin-bedded; sandstone: medium- to coarse-grained.

KBR — **Belly River Group:** undivided; mudstone: silty, grey and green; sandstone: grey and green, very fine- to medium-grained, crossbedded; limestone: pedogenic, occurs as concretions or caliche nodules; rare coal; bentonite.

Belly River Group (KCC–KDC)

KDC — **Drywood Creek Formation:** shale: locally carbonaceous, dark grey or greenish-grey, rubbly; sandstone: fine-grained, flaser to wavy bedded; minor coal.

KLb — **Lundbreck Formation:** mudstone and shale: locally carbonaceous, grey to bright yellowish-green or red, caliche nodules and calcrete horizons common; sandstone: medium- to coarse-grained, light to very light grey, medium- to very thick-bedded, crossbedded; limestone: pedogenic, occurs as concretions and caliche hardpans; minor conglomerate: granule.

KCC — **Connelly Creek Formation:** sandstone: fine- to medium-grained, dark to medium grey to grey-green, medium-bedded, current-rippled, crossbedded; mudstone and shale: dark grey to olive-green; rare limestone: bivalve or gastropod coquina.

KDP — **Deadhorse Coulee and Pakowki formations:** undivided.

KPk — **Pakowki Formation:** mudstone and shale: dark grey to greenish-grey, contains distinctive bed of floating chert pebbles at base; minor sandstone: silty, very fine- to fine-grained, grey to olive-grey, thin- to medium-bedded, parallel to current-rippled or hummocky cross-stratified, trace fossils common, interbedded with shale, coarsens and thickens upward. Unit is recessive; typically 25 m to less than 10 m thick. Unconformably overlies Deadhorse Coulee Formation.

KMR — **Milk River Group:** undivided; sandstone: silty, medium grey, very fine- to fine-grained, laminated, platy, thickening upward; shale: silty, dark grey (Telegraph Creek Formation); sandstone: medium- to coarse-grained, light grey, crossbedded, laminated or massive, carbonaceous; siltstone: light grey (Virgelle Formation); sandstone: fine- to medium-grained, light greenish-grey, thin- to thick-bedded, massive, trough crossbedded or current-rippled, may contain mica, chert, and plant debris; shale: silty, greenish-grey, locally orange-weathering (Deadhorse Coulee Formation).

Milk River Group (KTC–KDh)

KDh — **Deadhorse Coulee Formation:** sandstone: fine- to medium-grained, light greenish-grey; thin- to thick-bedded, massive, trough crossbedded, or current-rippled, may contain mica, chert, and plant debris; shale: silty, greenish-grey, rubbly; mudstone and shale: carbonaceous, grey or greenish-grey, locally rusty-weathering, sideritic concretions; minor coal: impure. Overlain unconformably by Pakowki Formation.

KV — **Virgelle Formation:** sandstone: quartz arenite, locally calcareous or iron-bearing, fine- to medium-grained, light grey to white or light brown, very thick-bedded, massive to crossbedded, contains small rusty concretions; sandstone: magnetite quartz arenite; prominent cliff and ridge former.

KTC — **Telegraph Creek Formation:** shale: silty or sandy, dark grey; sandstone: very fine- to fine-grained, light grey, coarsening and thickening upward; siltstone: locally nodular; bentonite: contains limestone concretions; lower and upper contacts gradational.

Alberta Group (KBs–KWp)

KWp — **Wapiabi Formation:** shale: locally calcareous, locally silty, dark grey to black, contains sideritic concretions; siltstone: thin-bedded; sandstone: calcareous, fine-grained, grey, thin-bedded; limestone: contains ammonites.

KC — **Cardium Formation:** sandstone: quartz arenite, fine-grained, grey to dark grey, thin- to medium-bedded, locally crossbedded, crosslaminated, or bioturbated; shale: silty or sandy; conglomerate: granule, at base of unit; limestone: occurs as concretions; contains ammonites and trace fossils.

KBs — **Blackstone Formation:** shale and mudstone: silty, locally calcareous, dark grey to black, sideritic concretions; sandstone: locally tuffaceous, very fine- to fine-grained, grey, thin-bedded; limestone: argillaceous; conglomerate: chert-pebble at base of unit; bentonite; contains ammonites and bivalves.

KCn — **Crowsnest Formation:** tuff: pink sanidine crystal fragments in dark to light green, fine-grained matrix, bedded, local crossbeds; agglomerate: green, pebble to boulder, coarsest and most abundant in Daisy Creek area.

Blairmore Group (KCD–KBMM)

KBMM — **Beaver Mines and Mill Creek formations:** undivided.

KMC — **Mill Creek Formation:** sandstone: quartz and chert, fine- to medium-grained, medium- to thick-bedded, crossbedded; and conglomerate: granule to pebble, matrix-supported, fine-grained sublithic; forms distinctive quartzose unit at base; mudstone and siltstone: green, grey, red, local caliche nodules, root structures; sandstone: fine- to coarse-grained, green-grey- to green-yellow-weathering, more arkosic upsection, crossbedded; minor conglomerate: pebble to cobble, with intrusive and volcanic clasts; mudstone: tuffaceous, orange-brown- and yellow-weathering.

KBM — **Beaver Mines Formation:** sandstone: fine-grained, lithic, grey-green, commonly crossbedded; interlayed with siltstone: green-grey; and mudstone: grey, grey-green, and in upper part green and locally reddish; sandstone: feldspathic, medium- to coarse-grained, pebbly, crossbedded, common red-brown-weathering concretions, forms channels up to 30 m thick, mainly in lower part; mudstone; minor conglomerate: pebble to cobble, thick-bedded to massive.

KG — **Gladstone Formation:** sandstone: quartz, medium grey, brown-weathering, fine-grained, hard; interbedded with mudstone: grey, green-grey; mudstone: red and green with a few quartz sandstone interbeds in basal part.

KCD — **Cadomin and Dalhousie formations:** conglomerate: grey, green, black chert and quartzite clast, pebble locally to cobble-sized in west, clast-supported, brown-weathering with minor light grey, quartz sandstone interbeds, very resistant (Cadomin Formation); sandstone: quartz arenite, light grey, fine- to coarse-grained, bedded, local pebble conglomerate layers and lenses (Dalhousie Formation), overlies conglomerate in most areas, underlies conglomerate along ridge crest in Manystick Creek area.

Kootenay Group (JMo–KE)

KE — **Elk Formation:** sandstone: lithic, fine- to coarse-grained, grey; siltstone: carbonaceous; mudstone: silty, carbonaceous; minor coal: bituminous, occurs as thin seams; conglomerate: chert-pebble, medium to light grey; resistant. Lithologies are interbedded.

JURASSIC–CRETACEOUS

JKMM — **Mist Mountain Formation:** shale and mudstone: carbonaceous, dark grey to black; siltstone: light to dark grey, greyish-brown-weathering; sandstone: lithic or quartz arenite, locally carbonaceous, fine- to coarse-grained, light to dark grey; coal: low- to high-volatile, bituminous to semianthracitic, some economic seams; conglomerate: chert- and quartzite-pebble, rare, but conspicuous beds; a few metres of sandstone and siltstone that could be assigned to the Elk Formation occurs at the top in part of the Manystick Creek area.

JURASSIC

JMo — **Morrissey Formation:** sandstone: very fine- to very coarse-grained, light grey, grey- to brownish-grey- or orange-brown-weathering; minor shale and mudstone: carbonaceous. Unit coarsens and becomes better indurated upward.

JF — **Fernie Formation:** basal sandstone: phosphatic, dolomitic, fetid, black, fossiliferous, minor pebbles, 0–1 m thick; lower shale and mudstone: dark grey to black, brownish-grey-weathering, soft, commonly laminated and fissile, may contain concretions and belemnites (Poker Chip Shale); middle sandstone: quartzose, finely laminated, light grey, buff-weathering, with thin grey limestone beds (Rock Creek Member); overlain by shale and limestone: phosphatic, nodular, black, fossiliferous, strongly pyritic grading upward to shale: soft, fissile, grey, with local concretions (Highwood Member); upper shale: fissile, black with siltstone and sandstone: very fine- to fine-grained, thin-bedded, brown-weathering, increasing in content, grain size, and bed thickness upward with local sandstone: massive or crossbedded, fine-grained, brown-weathering in upper part (Passage Beds).

TRIASSIC

Spray River Group

TSM — **Sulphur Mountain Formation:** siltstone: calcareous, dolomitic, and siliceous, red-brown- to brown-weathering, commonly laminated, platy- to flaggy-weathering.

PENNSYLVANIAN–PERMIAN

Rocky Mountain Supergroup

PM — **Misty Formation:** sandstone: quartz arenite, siliceous, and dolomitic, bedded, with chert nodules and lenses; dolostone: sandy and silty, laminated, grading into sandy siltstone; local breccia conglomerate: grey-weathering, polymictic, very resistant at base.

MISSISSIPPIAN

Rundle Group (MLv–MEt)

MEt — **Etherington Formation:** dolostone: variably sandy and fossiliferous, minor chert nodules, grey; limestone: lime mudstone to skeletal grainstone, locally oolitic, minor chert nodules, grey; sandstone: dolomitic, orange to grey, locally crosslaminated; shale and siltstone: variably calcareous or dolomitic, green or maroon, cyclical recurrence throughout unit; fossil content includes crinoid ossicles, bryozoans, brachiopods, and algae.

Mount Head Formation (MMHWM–MMHC)

MMHC — **Carnarvon Member:** dolostone and limestone: medium- to very thick-bedded, medium and light grey-weathering, local solution collapse and deflation breccia, limestone more common in upper part; minor mudstone: green, maroon, grey, pedogenic in part with calcareous nodules; dolostone: argillaceous, laminated to nodular, plant remains common.

MMHWM — **Wileman, Baril, Salter, Loomis, and Marston members:** dolostone: silty, yellow-grey-weathering, thin-bedded to laminated, ripple crosslaminated, local fenestral fabrics; lime grainstone bands, light grey-weathering, local intraclast breccia; minor solution-collapse breccia; recessive (Wileman Member); dolostone or grainstone: skeletal, light to medium grey, commonly crossbedded, chert common in western exposures; resistant (Baril Member); silty dolostone to dolomitic siltstone: tan- to light grey-weathering, very thin- to thick-bedded, laminated, crosslaminated, fenestral fabrics; solution-collapse breccia, recessive (Salter Member); lime grainstone: ooid to ooid skeletal, light to medium grey, light grey-weathering, thin- to thick-bedded, varies from very resistant- to crumbly-weathering; mudstone: calcareous, grey, platy, forms medial zone locally (Loomis Member); dolostone: dark grey, massive to laminated, commonly calcareous or argillaceous; interbedded with mudstone to marlstone: calcareous, grey and green-grey, brown-weathering, platy; and minor limestone, grey with local pedogenic breccia at top; cyclic; recessive (Marston Member).

MLv — **Livingstone Formation:** limestone: skeletal grainstone, locally dolomitic or cherty, finely to coarsely crystalline, grey, pale grey-weathering, locally vuggy, massive, resistant; dolostone: grey; fossil content includes crinoid ossicles and bryozoans.

MBf — **Banff Formation:** limestone: lime mudstone to skeletal packstone, variably argillaceous and cherty, grey to dark grey, thin- to thick-bedded; siltstone and mudstone: variably calcareous, dark grey to black; chert: black, bedded; shale: black; fossil content includes crinoid ossicles and bryozoans.

MBfg — **Banff Formation, grainstone unit:** lime grainstone: light medium-grey-weathering.

Note 1. *See* Figure 2 for detail of geology in this area.

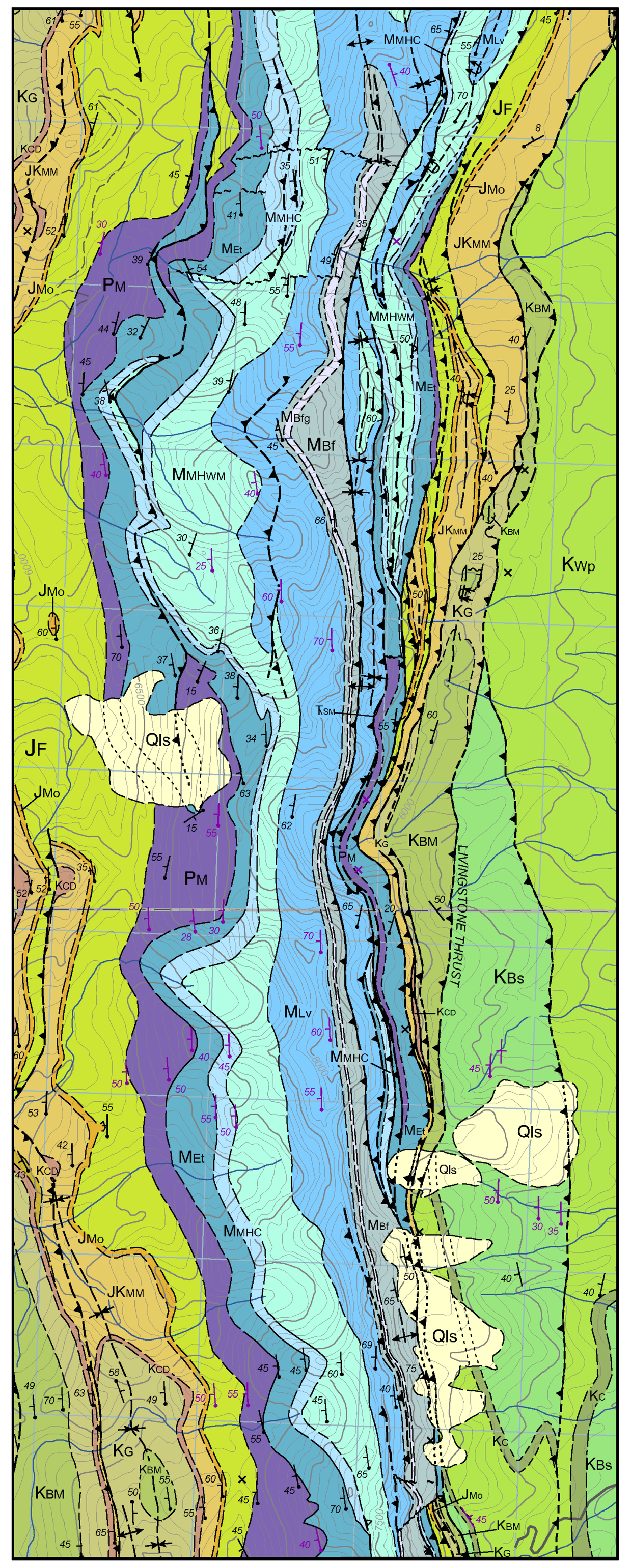


Figure 2. Detailed geological map area denoted by box around 'Note 1' at 1: 30 000 scale.

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Canadian Geoscience Maps

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Geological interpretation by M.E. McMechan and G.S. Stockmal based on ground observations by G.S. Stockmal, 1993–1995 (Stockmal, 1996); ground and air observations by M.E. McMechan, 1995–1996; published geological maps by Douglas (1949, 1950); unpublished thesis mapping by Cooley (2007); and studies of vertical air photographs and high-resolution orthorectified satellite images by G.S. Stockmal and M.E. McMechan.

Geomatics and cartography by F.A. Hardjo and P.R.J. Wozniak

Scientific editing by E. Inglis

GEOLOGY

MAYCROFT

Alberta

1:50 000

1 0 1 2 3 4 km

Map projection Universal Transverse Mercator, zone 11. North American Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications. Elevations in feet above mean sea level

The Township/Range grid provides spatial reference and is not intended for defining legal land ownership. *See* Geological Survey of Canada, Open File 5578 metadata.

Magnetic declination 2013, 14°38'E, decreasing 11.0' annually

The Geological Survey of Canada welcomes corrections or additional information from users.

Data may include additional features not portrayed on this map. *See* documentation accompanying the data. Additional descriptive notes and references are included in the map information document.

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Canada

CANADIAN GEOSCIENCE MAP 25
GEOLOGY
MAYCROFT
Alberta