

Alberta Geological Survey Map 600 Legend **Bedrock Geology of Alberta**



- Kootenay Group ——
- ELK FORMATION: interbedded sandstone, siltstone, mudstone, shale, and locally, chert-pebble

JKF-N FERNIE FORMATION and NIKANASSIN FORMATION	JKF-M FERNIE FORMATION and MINNES GROUP	Hypabyssal Kimberlite: dark grey to black, subvolcanic kimberlite intrusion containing olivine pseudomorphs (mainly serpentine)	DWM sandstone, and anhydrite; nonmarine to marginal marine
NIKANASSIN FORMATION (Jurassic-Cretaceous): dark grey mudstone and generally fine-grained sandstone, includes carbonaceous shale and minor, thin, and impure coal layers in upper part; lower part marine, upper part marginal marine to coastal plain	Minnes Group GORMAN CREEK FORMATION: argillaceous sandstone, siltstone, carbonaceous shale and thin coal layers; nonmarine MONTEITH FORMATION (Jurassic-Cretaceous): very fine to fine-grained sandstone with interbeds of coarser grained quartz sandstone, siltstone, shale, and carbonaceous sediments; marine, marginal marine, and fluvial	Volcaniclastic Kimberlite: grey to dark grey-green pyroclastic (commonly lapilli-bearing olivine crystal tuff) and resedimented volcaniclastic kimberlite, some interlayered with sedimentary rocks, some contain mantle xenoliths; olivine phenocrysts that dominate the mineral assemblage, variably altered to dolomite, serpentine, and calcite UPPER CRETACEOUS MOUNTAIN LAKE VOLCANIC ROCKS: dark greenish-grey to black, pyroclastic (lapilli tuff, ash tuff) and	DMu MUSKEG FORMATION: white and grey anhydrite and gypsum with minor dolostone, limestone, shale, and halite; hypersaline shallow marine to intertidal DPE PRAIRIE EVAPORITE FORMATION: translucent white, grey, and red halite with beds of laminated to crystalline anhydrite and laminated to massive dolostone; minor limestone, shale, carnallite, and sylvite; at the subcrop edge where evaporite minerals have dissolved, there is grey, shale-supported breccia (insoluble residue and clasts from overlying formations); grades northwards into the Muskeg Formation; hypersaline shallow marine to intertidal
FERNIE FORMATION: medium grey to black shale (weakly to strongly fissile); limestone (including phosphatic, cherty, and oolitic varieties); siltstone; sandstone (some phosphatic); locally chert conglomerate at base; marine	FERNIE FORMATION: medium grey to black shale (weakly to strongly fissile); limestone (including phosphatic, cherty, and oolitic varieties); siltstone; sandstone (some phosphatic); locally chert conglomerate at base; marine	KML resedimented volcaniclastic rocks; alkaline and ultrabasic; olivine phenocryst pseudomorphs composed of clay, carbonate, and/or serpentine; clay-rich matrix; interbedded with sandstone and siltstone of the Wapiti Formation	DKR KEG RIVER FORMATION (Methy Formation): beige, brown, or grey, thin-bedded to massive, fine- to medium-crystalline dolostone with minor limestone and shale; often biohermal and vuggy; correlative with Winnipegosis Formation; open-marine platform and reef
UPPER CARBONIFEROUS (Pennsylvanian), PERMIAN, and TRIASSIC	PERMIAN and TRIASSIC	KBM BIRCH MOUNTAINS VOLCANIC ROCKS: grey-green to brown, crater-facies pyroclastic (lapilli and ash tuff) and resedimented volcaniclastic rocks: kimberlite (dominant) and alkali olivine basalt; olivine is	DCh CHINCHAGA FORMATION: laminated white, blue, and grey gypsum or anhydrite with minor shale and dolostone; hypersaline shallow marine to intertidal
ROCKY MOUNTAIN GROUP and SPRAY RIVER GROUP	ISHBEL GROUP and SPRAY RIVER GROUP	variably altered to calcite, dolomite, and magnesite; matrix is dominated by serpentine, calcite, and clay; garnet pyroxenite and granulite xenoliths are absent to abundant; may occur as volcanic pipes	DCR CONTACT RAPIDS FORMATION: green to green-grey, argillaceous dolostone, dolomitic silty shale, and shalv siltstone; marginal marine
 Spray River Group (Triassic) WHITEHORSE FORMATION: light grey weathering, locally sandy limestone and dolostone; red, green, and brown shale and siltstone; small amounts of calcareous and dolomitic sandstone and breccia (solution; intraformational); restricted, nearshore, and open-marine shelf SULPHUR MOUNTAIN FORMATION: rusty-brown to dark grey weathering siltstone, silty shale, shale, silty limestone, dolomitic sandstone, and dolostone; locally carbonaceous; local phosphatic sandstone and/or phosphatic pebble conglomerate; marine (distal to mid shelf) Rocky Mountain Group (Pennsylvanian-Permian) equivalent to undivided Ishbel Group ± undivided Spray Lakes Group 	Spray River Group (Triassic) WHITEHORSE FORMATION: light grey weathering, locally sandy limestone and dolostone; red, green, and brown shale and siltstone; small amounts of calcareous and dolomitic sandstone and breccia (solution; intraformational); restricted, nearshore, and open-marine shelf SULPHUR MOUNTAIN FORMATION: rusty-brown to dark grey weathering siltstone, silty shale, shale, silty limestone, dolomitic sandstone, and dolostone; locally carbonaceous; local phosphatic sandstone and/or phosphatic pebble conglomerate; marine (distal to mid shelf) Ishbel Group (Permian) MOWITCH FORMATION: grey and brown, thick- to thin-bedded, fine- to coarse-grained sandstone containing glauconite, phosphate, gyosum, lenticular chert, and pebble beds; marine	Symbols thrust fault; ornamentation on hanging wall normal fault: ornamentation on banging wall	LA LOCHE FORMATION and FITZGERALD FORMATION FITZGERALD FORMATION: beige, tabular- to wavy-bedded, locally vuggy dolostone to sandy dolostone to dolomitic sandstone; discontinuous; supratidal to marginal marine LA LOCHE FORMATION (Granite Wash): red, green, brown, and grey, poorly to moderately well-sorted, lithic sandstone and extraformational, polymict conglomerate; thing interbeds of shale and siltstone; locally includes a basal regolith of brecciated and oxidized basement rock; discontinuous; nonmarine
	BELCOURT FORMATION: grey and brown, silty to sandy dolostone with chert nodules; marine	 Horman addt, of namentation of nanging wait transverse fault (Rocky Mountains and Foothills); fault, type unspecified (Canadian Shield and Athabasca Basin) anticline; overturned anticline syncline: overturned syncline 	Atnabasca Basin
LOWER CARBONIFEROUS (Mississippian) [and uppermost Devonian]	LOWER CARBONIFEROUS (Mississippian)	mylonite zone; low metamorphic grade (retrograde)	Athabasca Group POt OTHERSIDE FORMATION (Archibald Member): pebbly quartz arenite; grain size up to 8 mm; crossbedding and ripple crossbedding; fluvial
M EXSHAW FORMATION, BANFF FORMATION, and RUNDLE GROUP	M BANFF FORMATION and RUNDLE GROUP	r^{2} , we have the second black to reach the second se	LOCKER LAKE FORMATION
Rundle Group	Rundle Group	Manager Foult Zong	PLk-m Marsin Member: pebbly, fining-upwards, quartz arenite; maximum grain size between 8 and 16 mm; crossbedding and horizontal lamination; fluvial Brudell Member: pebbly guartz arenite with thin conglomerate beds: gradational base and top: fluvial
intraformational conglomerate; open marine to restricted, marginal marine		Monarch Fault Zone	PLk-b Share Marshare askible irregularly are new with this congromerate bods, graduational base and top, novial
MOUNT HEAD FORMATION: yellowish-grey, medium- to thick-bedded, sparsely tossiliterous, silty dolostone with beds of anhydrite, siltstone, solution-collapse breccia, and dolomitized skeletal limestone;	MOUNT HEAD FORMATION: yellowish-grey, medium- to thick-bedded, sparsely fossiliferous, silty dolostone with beds of anhydrite, siltstone, solution-collapse breccia, and dolomitized skeletal limestone;	geological contact	PLk-s Snare Member: pebbly, irregularly coarsening-upwards quartz arenite; maximum grain size from 2 to 16 mm; crossbedding and horizontal lamination; sparse mudstone interbeds are generally less than
TURNER VALLEY FORMATION: medium- to coarse-crystalline, crinoidal limestone and dolostone (Lower and Upper Porous intervals), separated by finely crystalline, dense carbonate (Middle Dense interval); marine SHUNDA FORMATION: light to dark grey, interbedded limestone and dolostone, argillaceous limestone, silty and argillaceous dolostone, siltstone, sandstone, shale, and minor breccia; restricted marine PEKISKO FORMATION: light grey, thick-bedded to massive, crinoidal limestone with subordinate, very fine crystalline limestone, cherty limestone, and dolostone; marine	TURNER VALLEY FORMATION: medium- to coarse-crystalline, crinoidal limestone and dolostone (Lower and Upper Porous intervals), separated by finely crystalline, dense carbonate (Middle Dense interval); marine SHUNDA FORMATION: light to dark grey, interbedded limestone and dolostone, argillaceous limestone, silty and argillaceous dolostone, siltstone, sandstone, shale, and minor breccia; restricted marine PEKISKO FORMATION: light grey, thick-bedded to massive, crinoidal limestone with subordinate, very fine crystalline limestone, cherty limestone, and dolostone; marine	astrobleme (proven or probable); symbol drawn to scale SR: Steen River BC: Bow City EB: Eagle Butte	WOLVERINE POINT FORMATION: recessive, thick beds (commonly >50 cm) of pale red and green mudstone; subordinate, thin interbeds of friable, clay-rich, medium- to fine-grained quartz arenite and siltstone with irregular red and green mottling; thin interbeds of very hard, rounded, green and red intraclasts; pseudomorphed vitric tuff beds up to 3 cm thick contain rare pumice fragments; fluvial and playa lake environments LAZENBY LAKE FORMATION
BANFF FORMATION: dark grey and black shale, argillaceous limestone, limestone, dolostone, chert, siltstone, and sandstone; marine	BANFF FORMATION: dark grey and black shale, argillaceous limestone, limestone, dolostone, chert, siltstone, and sandstone; marine	(s) Alberta Supeline	PLz-I Larter Member: quartz arenite with sparse pebbles (grain size <8 mm); fining upwards; finer grained intervals contain <1% clay intraclasts; fluvial
EXSHAW FORMATION (Devonian-Carboniferous): lower part contains brownish-black to black, organic-		Alberta Syncline Livingstone Thrust	PLz-s Shiels Member: pebbly quartz arenite (pebbles locally >32 mm); fines upwards; rare mudstone and clay intraclasts; fluvial
medium- to very thick bedded, calcareous to dolomitic siltstone with subordinate silty limestone; marine		Bale Thiust MicConfiel Thiust	PLz-c Clampitt Member: recessive, pebbly, coarse-grained quartz arenite and medium- to coarse-grained quartz arenite; interbeds up to 20 cm thick of indurated flat-laminated, red hematitic mudstone to very fine grained
DEVONIAN	DEVONIAN	Bayonel Lake Shear Zone Monarch Fault Zone	quartz arenite; fluvial
D YAHATINDA FORMATION, FAIRHOLME GROUP, ALEXO FORMATION, SASSENACH FORMATION, and PALLISER FORMATION	D FAIRHOLME GROUP, SASSENACH FORMATION, and PALLISER FORMATION	Big Coulee Fault Monarch Fault Zone	PLz-h arenite with horizontal lamination and low-angle trough cross-stratification; fluvial
PALLISER FORMATION: cliff-forming, grey to greyish-brown, burrow-mottled, thick-bedded to massive,	PALLISER FORMATION: cliff-forming, grey to greyish-brown, burrow-mottled, thick-bedded to massive,	Bighorn Thrust	PS/MF SMART and MANITOU FALLS FORMATIONS (undifferentiated)
dolomitic limestone; dark grey to black, tossiliterous limestone near the top; shallow marine ALEXO FORMATION: grey and green-grey, thin- to SASSENACH FORMATION: dark grey to	dolomitic limestone; dark grey to black, fossiliterous limestone near the top; shallow marine SASSENACH FORMATION: dark grey to greenish-grey shale and silty shale, limestone, dolostone, silty	Bourgeau Thrust Musica Thrust	PMF MANITOU FALLS FORMATION: quartz arenite and pebbly quartz arenite with intervals of trough- and planar-crossbedding and ripple crosslamination: horizontally bedded, conglomeratic quartz arenite: quartz-
medium-bedded, laminated, argillaceous siltstone and silty greenish-grey shale and silty shale, limestone, dolostone; thick-bedded, vuggy, grey dolostone; marine dolostone, silty carbonate, siltstone, and fine-	carbonate, siltstone, and fine-grained sandstone; basinal	Diazeau Thilust Muskey Thilust Puret Timber Thrust Puret Puret	granule and quartz-pebble conglomerate; very fine grained quartz arenite, siltstone, and mudstone interbeds; fluvial
grained sandstone; basinal		Burnt Thrust Provide Pass Thrust	PS SMART FORMATION: fine- to coarse-grained quartz arenite with trough crossbeds, low-angle crossbeds, beginned in the damage in advantage in advant
Fairholme Group	Fairholme Group		pebbly, mudstone-rich interval is locally present; complete sections typically contain two fining-upwards
Carbonate Buildup Facies Basin Facies SOUTHESK FORMATION: cliff-forming, thick- MOUNT HAWK FORMATION: thin- to medium-bedded.	Carbonate Buildup Facies Basin Facies SOUTHESK FORMATION: cliff-forming, thick- MOUNT HAWK FORMATION: thin- to medium-bedded,	Charles Lake Snear Zone 🐨 Rundle Thrust	FAIR POINT FORMATION: fining-upwards sequence of coarse-grained quartz arenite to granulestone with
bedded to massive, light grey dolostone; reef argillaceous limestone interbedded with thin bands of dark grey calcareous shale; increasing carbonate content	bedded to massive light grey dolostone; reef argillaceous limestone interbedded with thin bands of dark grey calcareous shale; increasing carbonate content	Chetamon Inrust Sawback Inrust	dispersed, polymict pebbles and cobbles; minor interbeds of conglomerate and mudstone; pebbles include quartzite, quartz arenite, mudstone, and granitoid gneiss; fluvial and playa lake environments
upwards and laterally towards carbonate buildups; basinal to near reef	upwards and laterally towards carbonate buildups; basinal to near reef	Image: Clearwater Thrust Image: Simpson Pass Thrust	
CAIRN FORMATION: cliff-forming, medium- PERDRIX FORMATION: bituminous, calcareous shale with	CAIRN FORMATION: cliff-forming, medium- PERDRIX FORMATION: bituminous, calcareous shale with	Image: Optimized Stress Image: Optimized Stress Image: Optimized Stress Image: Optimized Stress Image: Optimized Stress Image: Optimized Stress	
Amphipora and scattered to abundant bulbous increasing in abundance upwards and laterally towards	Amphipora and scattered to abundant bulbous increasing in abundance upwards and laterally towards	(HA) Harrison Fault (SN) Snaring Thrust	Canadian Shield
nodules and stringers of dark grey chert; reef	nodules and stringers of dark grey chert; reef	(☉) Johnston Creek Thrust (℠) Sulphur Mountain Thrust	(Toltoon Meamotic Zone)
overlying carbonate platform (Flume Member) MALIGNE FORMATION: thin-bedded, argillaceous,	overlying carbonate platform (Flume Member) MALIGNE FORMATION: thin-bedded, argillaceous,	W Lewis Thrust	(Tailson magmatic Zone)
fossiliferous limestone; basinal to near reef	fossiliferous limestone; basinal to near reef		PALEOPROTEROZOIC
and dolostone with bulbous stromatoporoids and abundant <i>Amphipora</i> interbedded with thin, argillaceous, and silty dolostone; shallow-marine carbonate platform	and dolostone with bulbous stromatoporoids and abundant <i>Amphipora</i> interbedded with thin, argillaceous, and silty dolostone; shallow-marine carbonate platform		PCp CHIPEWYAN GRANITE: massive to weakly foliated, pink to red granite; includes rafts and xenoliths of basement gneiss and high-grade mylonite

dolostone breccia with subordinate quartz sandstone and siltstone; fluvial to estuarine

ORDOVICIAN

Map 600 represents the compilation of existing geological maps and new geological napping by Alberta Geological Survey (AGS) staff. The representations of the Canadian

; maximum grain size between 8 and 16 mm; merate beds; gradational base and top; fluvial quartz arenite; maximum grain size from 2 to mudstone interbeds are generally less than ds (commonly >50 cm) of pale red and green ch, medium- to fine-grained quartz arenite and beds of very hard, rounded, green and red hick contain rare pumice fragments; fluvial and n size <8 mm); fining upwards; finer grained intervals >32 mm); fines upwards; rare mudstone and clay artz arenite and medium- to coarse-grained quartz nated, red hematitic mudstone to very fine grained basal conglomerate grades upwards to quartz oss-stratification; fluvial erentiated) bly quartz arenite with intervals of trough- and ally bedded, conglomeratic quartz arenite; quartzed quartz arenite, siltstone, and mudstone interbeds; enite with trough crossbeds, low-angle crossbeds, bles decrease in abundance upwards; a basal,

to red granite; includes rafts and xenoliths of CHARLES LAKE GRANITOID: massive to foliated K-feldspar megacrystic granite; local feldspar porphyry, equigranular, leucocratic granite, and pegmatite; deformed into amphibolite to greenschist facies protomylonite

to mylonite SLAVE GRANITOID: light grey granite to monzogranite containing feldspar megacrysts, garnet, cordierite, hercynite, and gneissic xenoliths; mylonitic near shear zones with abundant feldspar augen

tabular K-feldspar megacrysts; locally forms tectonite with rods of blue quartz near shear zones

FRANCIS GRANITE: medium-grey granite with 5% to 15% tabular feldspar megacrysts

with 30% to 40% equant, K-feldspar phenocrysts; locally cut by pink granite dikes

gneiss; 30% to 50% lenticular K-feldspar megacrysts; minor amounts of pegmatite

very low grade metamorphic conditions; includes Martyn Lake monzonite plug

equigranular; locally abundant, lenticular, K-feldspar megacrysts

of garnet

PWa

APTa

BURNTWOOD COMPLEX

grades into mylonitic schist

WAUGH LAKE COMPLEX

RUTLEDGE RIVER COMPLEX

MESOARCHEAN to PALEOPROTEROZOIC

TALTSON BASEMENT COMPLEX

A BUTTE GRANODIORITE: medium grey to locally brownish-grey granodiorite with up to 5% feldspar phenocrysts

ARCH LAKE GRANITOID: massive to well-foliated mylonitic granite to syenogranitic gneiss with 30% to 50%

ANDREW LAKE GRANODIORITE: massive to well-foliated biotite-hornblende granodiorite to diorite gneiss

WYLIE LAKE GRANODIORITE: moderately to well-foliated, biotite-rich granite to granodiorite gneiss; typically

FISHING CREEK GRANODIORITE: massive to weakly foliated, quartz-rich granodiorite with 20% to 30%

COLIN LAKE GRANITOID: moderately to well-foliated, lineated, mylonitic, biotite-granite to quartz-diorite

THESIS LAKE GRANITE: dark coloured granite with up to 10% microcline augen in a medium-grained matrix

Low-Grade Metamorphic Tectonite: sericite and/or chlorite schist interlayered with fragmental rocks; locally

Igneous Rocks: mostly mafic igneous rocks (gabbro, basalt, and possibly tuff), variably sheared under low- to

Low-Grade Metamorphic Tectonite: biotite schist, chlorite-sericite-quartz schist, quartz-sericite schist, quartzite

(locally ferruginous, garnetiferous, graphitic); quartzofeldspathic (±muscovite) fragmental rocks; medium- to

coarse-grained, sericitic and/or chloritic, sheared granite and retrogressed granite gneiss; locally abundant

Amphibolite: gneissic amphibolite; typically medium grained; biotite and small amounts of pyrite are common;

composition ranges from hornblendite to feldspathic-biotite amphibolite; locally includes mafic granulite and

High-Grade Metamorphic Tectonite: impure quartzite and biotite-garnet-sillimanite±cordierite gneiss;

that includes blue-grey quartz and hypersthene; subordinate pegmatitic pods, patches, and dikes

plagioclase, 10% to 20% euhedral K-feldspar, and 5% to 10% biotite as small pods enclosing minor amounts

conglomerate and thin coal layers; nonmarine MIST MOUNTAIN FORMATION (Jurassic-Cretaceous): interbedded sandstone and siltstone with dark grey to black mudstone; rare conglomerate; thin to thick coal seams; nonmarine

MORRISSEY FORMATION: fine- to medium-grained quartz and chert sandstone; rare interbeds of carbonaceous mudstone, siltstone, and coal; marginal marine to nonmarine

FERNIE FORMATION: medium grey to black shale (weakly to strongly fissile); limestone (including phosphatic, cherty, and oolitic varieties); siltstone; sandstone (some phosphatic); locally chert conglomerate at base: marine

UPPER CARBONIFEROUS (Pennsylvanian), PERMIAN, and TRIASSIC

PT SPRAY LAKES GROUP, ISHBEL GROUP, and SPRAY RIVER GROUP

Spray River Group (Triassic)

WHITEHORSE FORMATION: light grey weathering, locally sandy limestone and dolostone; red, green, and brown shale and siltstone; small amounts of calcareous and dolomitic sandstone and breccia (solution; intraformational); restricted, nearshore, and open-marine shelf

SULPHUR MOUNTAIN FORMATION: rusty-brown to dark grey weathering siltstone, silty shale, shale, silty limestone, dolomitic sandstone, and dolostone; locally carbonaceous; local phosphatic sandstone and/or phosphatic pebble conglomerate; marine (distal to mid shelf)

Ishbel Group (Permian) -

RANGER CANYON FORMATION: dark grey chert with a thin, phosphatic basal conglomerate; marine JOHNSON CANYON FORMATION: dark grey, phosphatic, shaly siltstone, calcareous siltstone, and silty carbonate; abundant black chert nodules and burrow fillings; starved marine shelf

Spray Lakes Group (Pennsylvanian) –

KANANASKIS FORMATION: pale grey weathering, thick- and thin-bedded, silty limestone and dolostone with nodules and beds of chert and chert breccia/conglomerate; shallow marine MISTY FORMATION (TUNNEL MOUNTAIN FORMATION): grey, fine-grained, dolomitic sandstone with

minor limestone and chert; marine

LOWER CARBONIFEROUS (Mississippian) [and uppermost Devonian]

EXSHAW FORMATION, BANFF FORMATION, and RUNDLE GROUP

Rundle Group

ETHERINGTON FORMATION: dolomite, limestone, sandy dolomite, very fine grained quartz sandstone (thin beds), siltstone, shale (green to maroon), and oolite; local solution-collapse breccia and thin, intraformational conglomerate; open marine to restricted, marginal marine

MOUNT HEAD FORMATION: yellowish-grey, medium- to thick-bedded, sparsely fossiliferous, silty dolostone with beds of anhydrite, siltstone, solution-collapse breccia, and dolomitized skeletal limestone; abundant nodules and irregular masses of chert; normal to restricted marine

LIVINGSTONE FORMATION: thick, erosion-resistant units of light grey, crinoidal limestone interbedded with thinner zones of darker limestone, dolomitic limestone, and dolostone; chert and sandstone in lower

BANFF FORMATION: dark grey and black shale, argillaceous limestone, limestone, dolostone, chert, siltstone, and sandstone; marine

EXSHAW FORMATION (Devonian-Carboniferous): lower part contains brownish-black to black, organicrich shale locally underlain by a thin, phosphatic sandstone to pebble conglomerate bed; upper part contains medium- to very thick bedded, calcareous to dolomitic siltstone with subordinate silty limestone; marine

DEVONIAN

FAIRHOLME GROUP, ALEXO FORMATION, and PALLISER FORMATION

PALLISER FORMATION: cliff-forming, grey to greyish-brown, burrow-mottled, thick-bedded to massive, dolomitic limestone; dark grey to black, fossiliferous limestone near the top; shallow marine ALEXO FORMATION: grey and green-grey, thin- to medium-bedded, laminated, argillaceous siltstone and silty dolostone; thick-bedded, vuggy, grey dolostone; marine

Fairholme Group

and corals: shallow marine

MIDDLE CAMBRIAN

MESOPROTEROZOIC

PP-I Lower Part

₽P-u

Upper Part

marginal marine

Purcell Supergroup

mC FLATHEAD, GORDON, ELKO, and WINDSOR MOUNTAIN FORMATIONS

mottled dark and light grey limestone in the lower part; marine

pale red to grey mudstone; fluvial to marine

of olive-grey calcareous mudstone near the base of the unit; marine

argillaceous and stromatolitic dolostone; shallow marine (peritidal)

sandstone; dolomitic argillite; argillite; shallow marine

stromatolitic dolostone: marginal marine

and conglomerate; ripple marks and mud cracks common; marginal to nonmarine

quartzite; minor conglomerate; mud cracks; ripple marks; marginal marine

quartz-pebble conglomerate; sandy dolostone; marginal marine

and dolostone; grey and green, thin-bedded argillite; marine

and stromatolitic dolostone; dark grey to black argillite; shallow marine

glauconitic, quartz sandstone, and mottled brown and grey limestone; marine

WINDSOR MOUNTAIN FORMATION: medium to light grey, medium-crystalline, massive dolostone with

ELKO FORMATION: light to medium grey, dolomitic limestone and dolostone, locally with thick interbeds

FLATHEAD FORMATION: interbedded, yellowish-grey, quartz sandstone, conglomerate, quartzite, and

ROOSVILLE FORMATION: green and grey argillite, dolomitic argillite, siltstone, sandstone, and

PHILLIPS FORMATION: red, thin- to very thin bedded, guartz sandstone; siltstone interbedded with argillite

GATEWAY FORMATION: red siltstone and argillite, green argillite, dolomitic argillite, dolomitic sandstone,

dolostone, and sandy dolostone; salt casts, rip-up clasts, mud cracks, and ripple marks locally abundant;

SHEPPARD FORMATION: light grey dolostone and stromatolitic dolostone; red dolomitic siltstone and

SIYEH FORMATION: argillaceous limestone and dolostone; black and green argillite; dolomitic quartzite;

PURCELL LAVA: dark green and reddish-green, chloritized, amygdaloidal, pillowed basalt; shallow marine

GORDON FORMATION: greyish-green, fissile, micaceous shale with interbeds of brown weathering,

Carbonate Buildup Facies	Basin Facies
OUTHESK FORMATION: cliff-forming, nick-bedded to massive, light grey olostone; reef	MOUNT HAWK FORMATION: thin- to medium-bedded, argillaceous limestone interbedded with thin bands of dark grey calcareous shale; increasing carbonate content upwards and laterally towards carbonate buildups; basinal to near reef
ORSATO FORMATION: grey to brownish- lack, fine- to coarse-crystalline dolostone, pocally with Amphipora, stromatoporoids.	PERDRIX FORMATION: bituminous, calcareous shale with nodules or thin nodular beds of dark, argillaceous limestone increasing in abundance upwards and laterally

HOLLEBEKE FORMATION: lower part of grey, yellowish-grey and brownish-grey, fine- and mediumcrystalline dolomite and limestone containing (solution?) breccia; upper part of dark grey and brownish-black, massive to nodular weathering, fine- and very fine crystalline limestone; local thin beds and lenses of (solution?) breccia; shallow marine

towards carbonate buildups; basinal to near reef

LOWER CA

YAHATINDA FORMATION: varicoloured, mainly red, fine-grained to pebbly, detrital dolostone and

[and uppermost Cambrian and lowermost Silurian]

SURVEY PEAK, OUTRAM, TIPPERARY, SKOKI, OWEN CREEK, MOUNT WILSON, and BEAVERFOOT FORMATIONS

- BEAVERFOOT FORMATION (Ordovician-Silurian): grey and light grey, cherty, or silty dolostone and
- limestone; thin shaly limestone at base; dolomitization crosses bedding; marine MOUNT WILSON FORMATION: light grey to white, thin- to thick-bedded and partly cross-stratified, fine- to medium-grained, guartz sandstone and guartzite; marine
- OWEN CREEK FORMATION: partly silty and sandy, yellowish-grey, light grey, very pale orange, and light olive-grey, aphanitic dolostone with minor interbeds of dolomitic mudstone (lower part); dolomitic quartz
- sandstone and siltstone (upper part); marine to peritidal
- SKOKI FORMATION: silty to sandy dolostone and subordinate limestone; oncolites common; shallow marine TIPPERARY FORMATION: thick-bedded, cross-laminated quartzite, very minor dolomitic quartz sandstone,
- silica-rich dolomite, and shaly mudstone; shallow marine
- OUTRAM FORMATION: nodular limestone interbedded with calcareous to siliceous shale and chert; marine SURVEY PEAK FORMATION (Cambrian-Ordovician): calcareous shale, mudstone, and siltstone in lower
- part; cliff-forming limestone in upper part; shallow marine

CAMBRIAN

MIDDLE and UPPER CAMBRIAN (undifferentiated) £

UPPER CAMBRIAN [and uppermost Middle Cambrian]

UEL Lynx Group -

- MISTAYA FORMATION: cliff-forming, thin- to very thick bedded, silty limestone and dolomitic, silty limestone with limestone-pebble conglomerate, oolite, and chert; large stromatolites common; shallow marine BISON CREEK FORMATION: grey and green, calcareous shale interbedded with shaly limestone containing well-developed stromatolites; silty interbeds near the base, limestone-pebble conglomerate bed near the top: shallow marine
- LYELL FORMATION: cliff-forming, massive limestone and dolostone; shallow marine SULLIVAN FORMATION: greenish-grey and brown shale interbedded with thin, platy, oolitic, and bioclastic limestone: marine
- WATERFOWL FORMATION (Middle to Upper Cambrian): cliff-forming, yellow limestone and dolostone with characteristic styolites and beds of oolites and stromatolites; subordinate calcareous siltstone and finegrained sandstone; shallow marine

MIDDLE CAMBRIAN

MOUNT WHYTE, CATHEDRAL, STEPHEN, ELDON, PIKA, and ARCTOMYS FORMATIONS

- ARCTOMYS FORMATION: red, green, and grey platy shale, minor siltstone and dolomitic sandstone preserving mud cracks, ripple marks, and salt casts; marginal marine to peritidal
- PIKA FORMATION: thin-bedded limestone with burrowed, dolomitic partings (±dolostone); shale in lower part; oolite and flat-pebble conglomerate beds in upper part; shallow marine
- ELDON FORMATION: cliff-forming, massive, burrow-mottled, dolomitic limestone; cryptalgal laminite; oolite; local coarse-crystalline dolostone; stromatolites; shallow marine to peritidal
- STEPHEN FORMATION: grey to green shale interbedded with thin-bedded, burrowed limestone, oolitic limestone, and limestone-pebble conglomerate; marine
- CATHEDRAL FORMATION: cliff-forming, massive, burrow-mottled, dolomitic limestone and dolostone; shallow marine to peritidal
- MOUNT WHYTE FORMATION: limestone; arenaceous limestone; interbedded oolitic limestone and shale; green shale; thin sandstone and conglomerate beds; marine

LOWER CAMBRIAN

Gog Group – I€G

- **PEYTO FORMATION:** grey to red, oolitic and skeletal limestone and sandy limestone (local dolostone) with minor beds of greenish-grey shale and calcareous sandstone, peloidal limestone and cryptalgal laminite; shallow marine ST. PIRAN FORMATION: light grey to brownish-grey sandstone with greenish silty to sandy shale;
- shallow to marginal marine LAKE LOUISE FORMATION: shale with thin interbeds of siltstone and sandstone; shallow marine
- FORT MOUNTAIN FORMATION: cliff-forming, massive, purplish, fine-grained quartzitic sandstone with bands of silty shale; locally quartzitic basal conglomerate; marine
- NEOPROTEROZOIC
 - Windermere Supergroup Miette Group -
- **GRINNELL FORMATION:** red- and green-banded argillite interbedded with red siltstone and white
- APPEKUNNY FORMATION: green and maroon argillite; white, grey, green, and pale red quartz sandstone; **HECTOR FORMATION:** grey, brown, and green slate with thick beds of coarse-grained, feldspathic sandstone and quartz-pebble conglomerate; basal unit of green and purple slate containing limestone, ALTYN FORMATION: grey, thin-bedded, argillaceous limestone and dolostone; massive, sandy dolostone flat-pebble conglomerate; slope to deep marine basin (includes turbidites)
- CORRAL CREEK FORMATION: grey and greenish-grey slate with thin beds and laminae of siltstone WATERTON FORMATION: grey, green, and red argillaceous dolostone; banded and streaked limestone interbedded with coarse-grained, feldspathic sandstone and pebble conglomerate; slope to deep marine basin (includes turbidites)
- TOMBSTONE MOUNTAIN FORMATION: dark grey argillite, dolomitic argillite, argillaceous dolostone and limestone; marine
- HAIG BROOK FORMATION: lightly coloured, cliff-forming sequence of dolostone, banded and streaked limestone and dolomite, as well as minor argillite; marine

LOWER CAMBRIAN

CAMBRIAN

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UPPER CAMBRIAN

UCL Lynx Group

[and uppermost Middle Cambrian]

sandstone: marine

- Gog Group l€g HOTA FORMATION: light and dark grey, colour-banded, massive limestone and dolostone; correlative with Pevto Formation: marine MAHTO FORMATION: medium- to thick-bedded, bioturbated, burrowed, laminated or cross-bedded quartz sandstone interbedded with thin siltstone and silty shale; rare dolomite; marine

NEOPROTEROZOIC

Windermere Supergroup

Miette Group

- BYNG FORMATION: laterally restricted platform of dolostone (containing stromatolites and pisoliths) with minor shale, siltstone, and guartz sandstone (Yellowhead Carbonate platform); shallow marine; overlies and grades laterally into uppermost siliciclastic strata; shallow marine SILICICLASTIC STRATA: slate (grey, green, purple), siltstone, limestone, and intraformational limestone
- breccia (Old Fort Point Formation in the Jasper area) overlain by and laterally transitional into a variable succession of shale, slate, silty shale, siltstone, sandstone, pebbly sandstone, and conglomerate (approximately equivalent to the Wynd Formation where the Old Fort Point Formation is present); shallow marine, slope, and deep marine (includes turbidites)

MURAL FORMATION: dolostone and limestone with archaeocyathid fragments interbedded with quartz

McNAUGHTON FORMATION: monotonous, thick sequence of bedded quartz sandstone or quartzite, locally

sandstone, green, calcareous shale, and grey, silty shale; marine

conglomeratic and feldspathic at base; fluvial to shallow marine

Shield and Athabasca Basin are based exclusively on compilation. The geology of the Rocky Mountains and Foothills is also the product of compilation with rare instances of original geological interpretation (e.g., the interpretation of bedrock geology beneath sediment-filled valleys). The Devonian geology of northeastern Alberta is also largely a product of compilation with some reinterpretation based, in part, on field observations. The Cretaceous geology of the Plains throughout most of northern and east-central Alberta is based on new geological mapping of the Fort St. John Group, the Dunvegan Formation, the Smoky Group, the Mannville Group, the Colorado Group, and the Belly River Group. In addition, the Battle Formation (Cretaceous) and the Scollard Formation (Cretaceous-Paleogene) are based on new mapping north of Township 13 and east of Range 5, West of the 6th Meridian.

Mapping included field observations and three-dimensional modelling of subsurface stratigraphy based on the interpretation of geophysical logs from oil and gas wells. Each three-dimensional formation surface was projected to a model of the bedrock surface, and the intersection formed the first approximation of the position of the geological contact at the base of surficial deposits. We then adjusted these preliminary contacts based on outcrop data and the interpretation of the bedrock unit immediately below surficial deposits in individual wells.

Cartographic consideration related to the 1:1 000 000 scale required some smoothing and simplification of geological units and structures, primarily in the Rocky Mountains. Foothills, and Canadian Shield. In the Plains, geological contacts tended to coalesce along major river valleys that cut through several formations. In these areas, we exaggerated the map widths of formations and adjusted the contact positions to improve the map's

Not all structural elements are represented, and structural features that are not expressed in the uppermost bedrock are excluded with the exception of the Steen River impact

Purcell Supergroup, are not shown.

Quaternary deposits and glaciers are not shown (see AGS Map 601 Surficial Geology of

Sources of information for unit descriptions include the Lexicon of Canadian Stratigraphy Volume 4 (Canadian Society of Petroleum Geologists), the Geological Atlas of the Western Canada Sedimentary Basin (Canadian Society of Petroleum Geologists and Alberta Research Council), unit descriptions of previous geological maps, Geological Survey of Canada and Alberta Geological Survey reports, journal articles, observations by Alberta Geological Survey geologists, and reviewer comments.

Inset maps on this legend do not demarcate rigorous terminology boundaries.

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References

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Granitoid Gneiss: typically pink to red, fine- to medium-grained, equigranular gneiss with variable proportions of feldspar, quartz, biotite, and hornblende; interlayered amphibolite gneiss; minor amphibolite and gabbro pods; pegmatite; locally grades to mylonite or migmatite with ptygmatic folding MARGUERITE RIVER COMPLEX APMR

quartz and quartz-tourmaline veins; minor pegmatite

metamorphic pegmatite layers and veins are locally abundant

Granite: white to pink leucogranite and biotite granite containing feldspar phenocrysts; brick red where hematized; typically massive, locally foliated to mylonitic; commonly with minor garnet or garnet-chlorite±biotite clots; includes pegmatitic leucogranite

Arch Lake-Type Granitoid: pink to red, massive to weakly foliated granite to granodiorite; consists of white to red feldspar, quartz, and minor biotite; tabular feldspar phenocrysts from 6 to 15 mm in length

Hornblende Quartz Monzonite: medium to dark greenish-grey, medium- to coarse-grained, massive to foliated monzonite; contains feldspar, hornblende, minor biotite, quartz, and local garnet

Granitoid Gneiss: biotite granodiorite, quartz monzonite, and granite; commonly foliated to mylonitic with clots of garnet and biotite±chloride; locally pegmatitic; includes minor lenses of fine- to medium-grained, massive to slightly banded amphibolite

MIDDLE CAMBRIAN SNAKE INDIAN, ELDON, PIKA, and ARCTOMYS FORMATIONS **ARCTOMYS FORMATION:** red, green, and grey platy shale, minor siltstone and dolomitic sandstone preserving mud cracks, ripple marks, and salt casts; marginal marine to peritidal

SURVEY PEAK FORMATION (Cambrian-Ordovician): calcareous shale, mudstone, and siltstone in lower

part; cliff-forming limestone in upper part; shallow marine

- PIKA FORMATION: thin-bedded limestone with burrowed, dolomitic partings (±dolostone); shale in lower part; oolite and flat-pebble conglomerate beds in upper part; shallow marine ELDON FORMATION: cliff-forming, massive, burrow-mottled, dolomitic limestone; cryptalgal laminite; oolite; local coarse-crystalline dolostone; stromatolites; shallow marine to peritidal
- SNAKE INDIAN FORMATION: red and green, silty shale and siltstone overlain by alternating units of recessive weathering shale and erosion-resistant limestone; marine

MIDDLE and UPPER CAMBRIAN (undifferentiated) readability. thin- to thick-bedded, argillaceous limestone and dolostone with minor interbeds of dolomitic siltstone and

Intrusive rocks in the Rocky Mountains and Foothills, including mafic sills within the

Depositional environments are not well constrained for some units.

Acknowledgements

Notes