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Alberta Energy Regulator

Notes to Accompany Map 600: Bedrock Geology of Alberta

AGS
ALBERTA GEOLOGICAL SURVEY

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Abstract

Map 600 shows the bedrock geology of Alberta at a scale of 1:1 000 000. Alberta Geological Survey staff prepared the map based on new mapping and a compilation of existing maps. This document presents an overview of the methodology used to create Map 600, notes on the treatment of selected stratigraphic units, and a comprehensive list of source and reference materials.

1 Introduction

Map 600 shows the bedrock geology of Alberta at a scale of 1:1 000 000 (Prior et al., 2013). Alberta Geological Survey (AGS) staff prepared the map using new mapping, covering 54% of the area of the province, and a compilation of existing maps (Figure 1). This map supersedes Map 236 (Hamilton et al., 1999) and Map 27 (Green, 1972).

2 Methodology

Map 600 represents the compilation of existing geological maps and new geological mapping by AGS staff. The representations of the Canadian Shield and Athabasca Basin are based exclusively on the compiled maps. Also products of compilation are the geology of the Rocky Mountains and Rocky Mountain Foothills, with rare instances of original geological interpretation (e.g., the interpretation of bedrock geology beneath drift-filled valleys), and the Devonian geology of northeastern Alberta, 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, the Lea Park Formation, and the Belly River Group. In addition, all of the Battle Formation where it underlies the Scollard Formation and most of the Scollard Formation have been remapped. In all, 54% of Map 600 (by area) is derived from entirely new mapping, with the remainder compiled primarily from existing maps with minor amounts of new interpretation.

Mapping included field observations and the creation of three-dimensional models of subsurface stratigraphy based on the interpretation of geophysical logs from oil and gas wells. Each three-dimensional stratigraphic 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. These preliminary contacts were then adjusted to honour outcrop data and the interpretation of the bedrock unit immediately below surficial deposits in individual wells.

Cartographic considerations related to the 1:1 000 000 scale required some smoothing and simplification of geological units and structures, primarily in the Rocky Mountains, Rocky Mountain 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 readability.

3 Compilation Notes

Where Map 600 has been compiled from published maps, the geology represented on Map 600 and the accompanying legend can generally be verified by reviewing the original maps (after allowing for changes imposed by reducing the scale to 1:1 000 000). The published bedrock geology maps used to create the compiled part of Map 600 are listed in the appendix and their geographic extents are shown in Figures 2 to 6. The compilation notes included below provide additional information on selected stratigraphic units that may be useful.

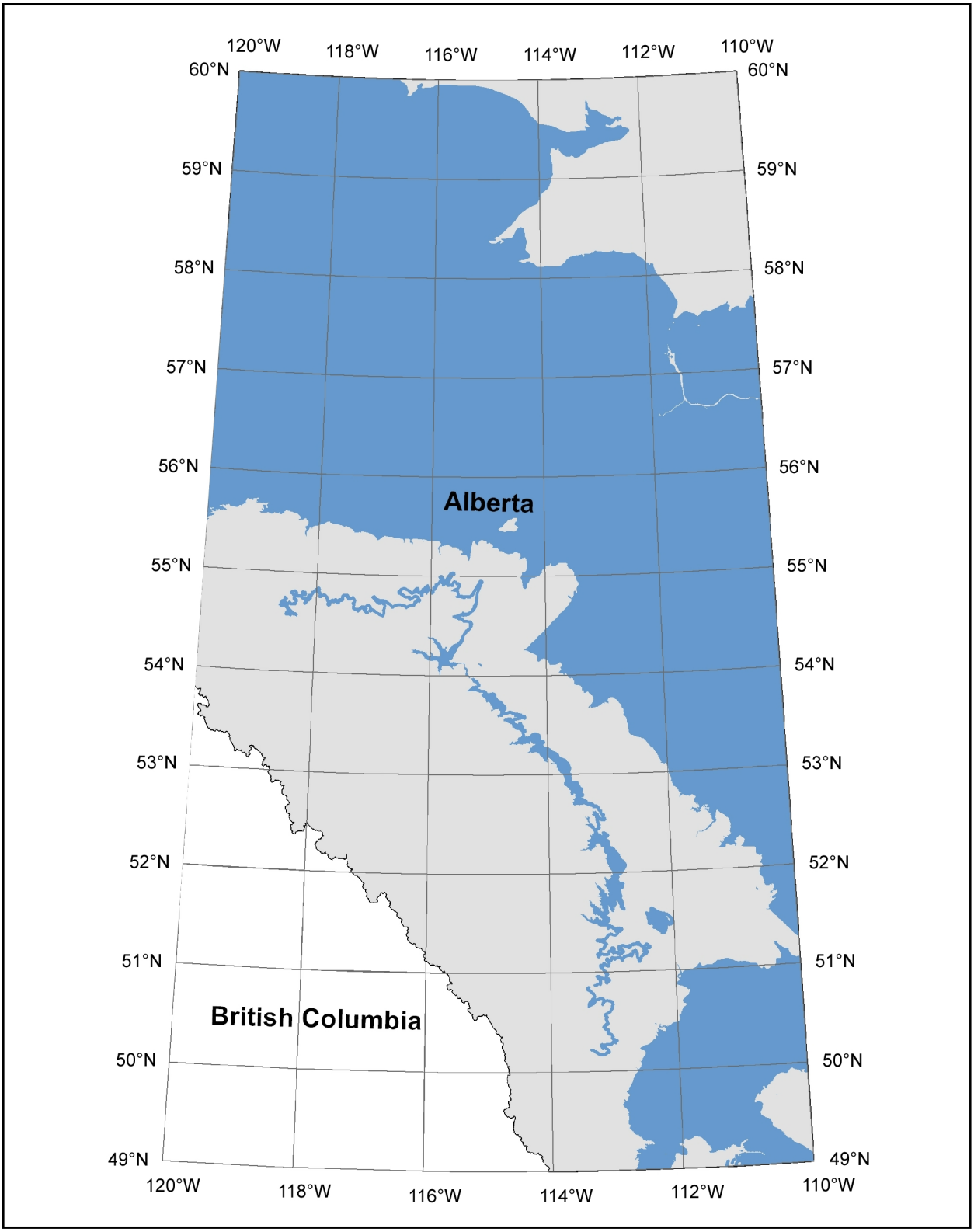

Figure 1. Alberta map showing newly mapped areas (blue) and areas compiled from existing maps (grey).

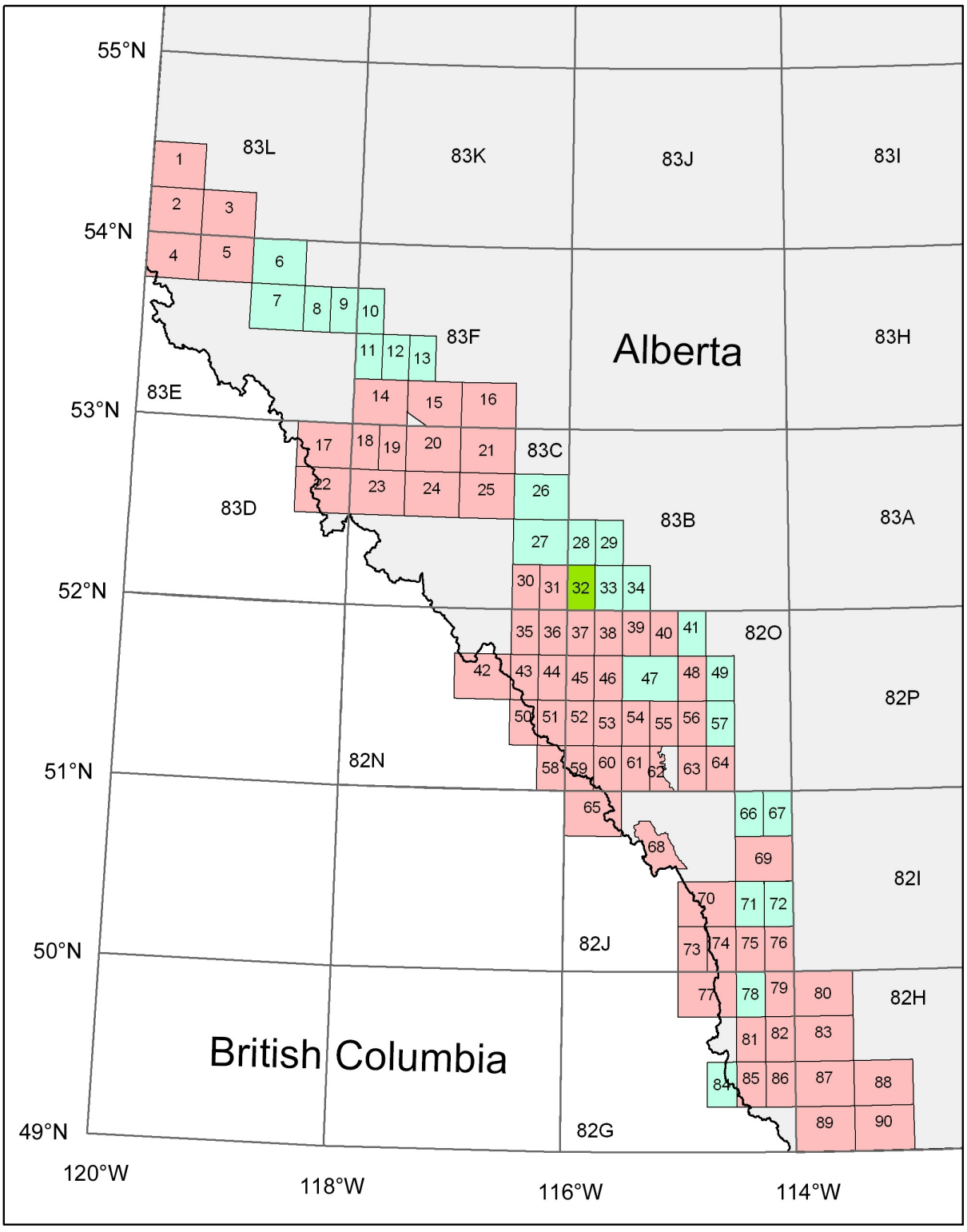

Figure 2. Index map showing the geographic extents of the 1:31 680 (green), 1:50 000 (pink), and 1:63 360 (blue) maps used to compile the Rocky Mountains and Foothills. Numbers correspond to index numbers listed in the appendix.

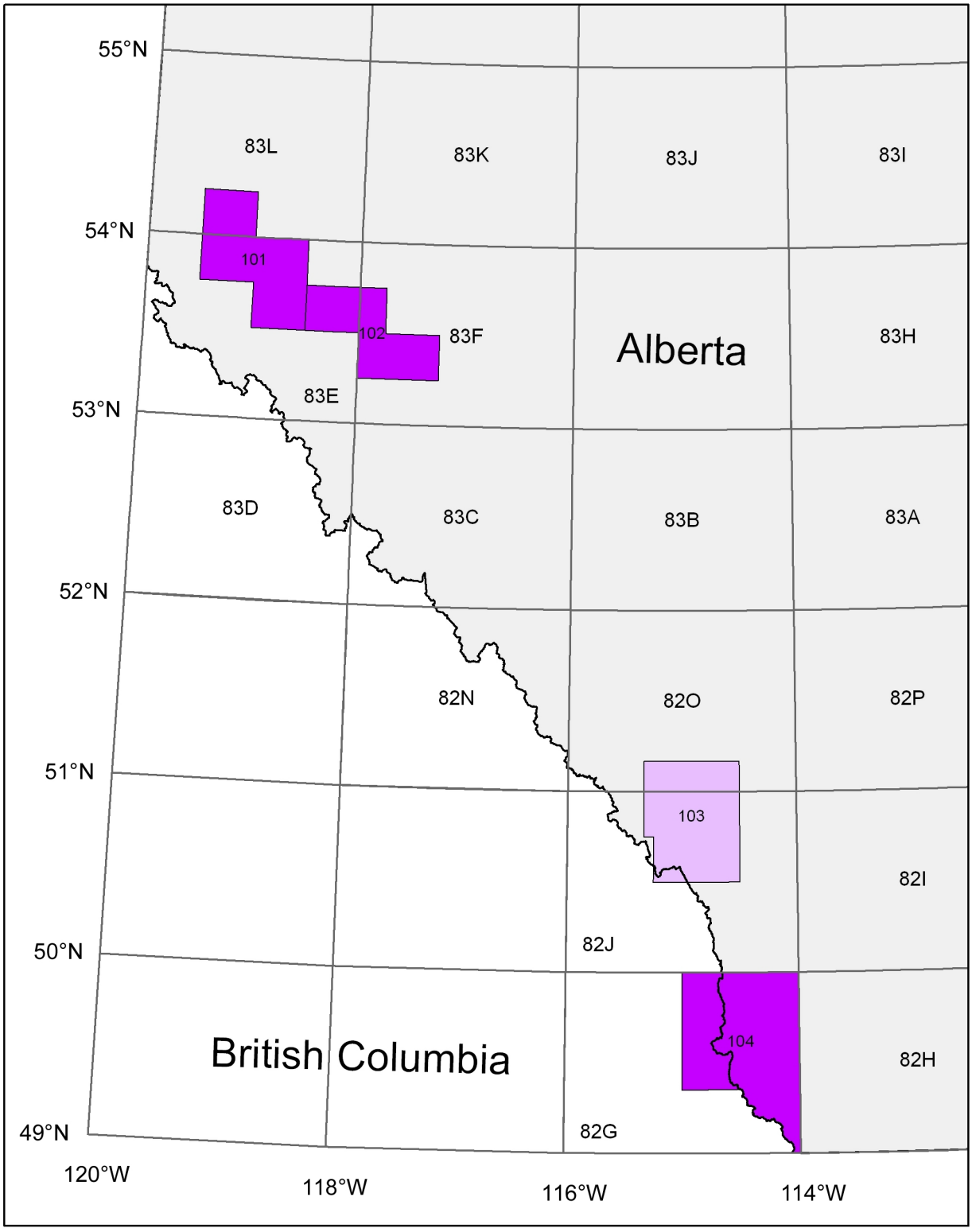

Figure 3. Index map showing the geographic extents of the 1:100 000 (light purple) and 1:126 720 (magenta) maps used to compile the Rocky Mountains and Foothills. Numbers correspond to index numbers listed in the appendix.

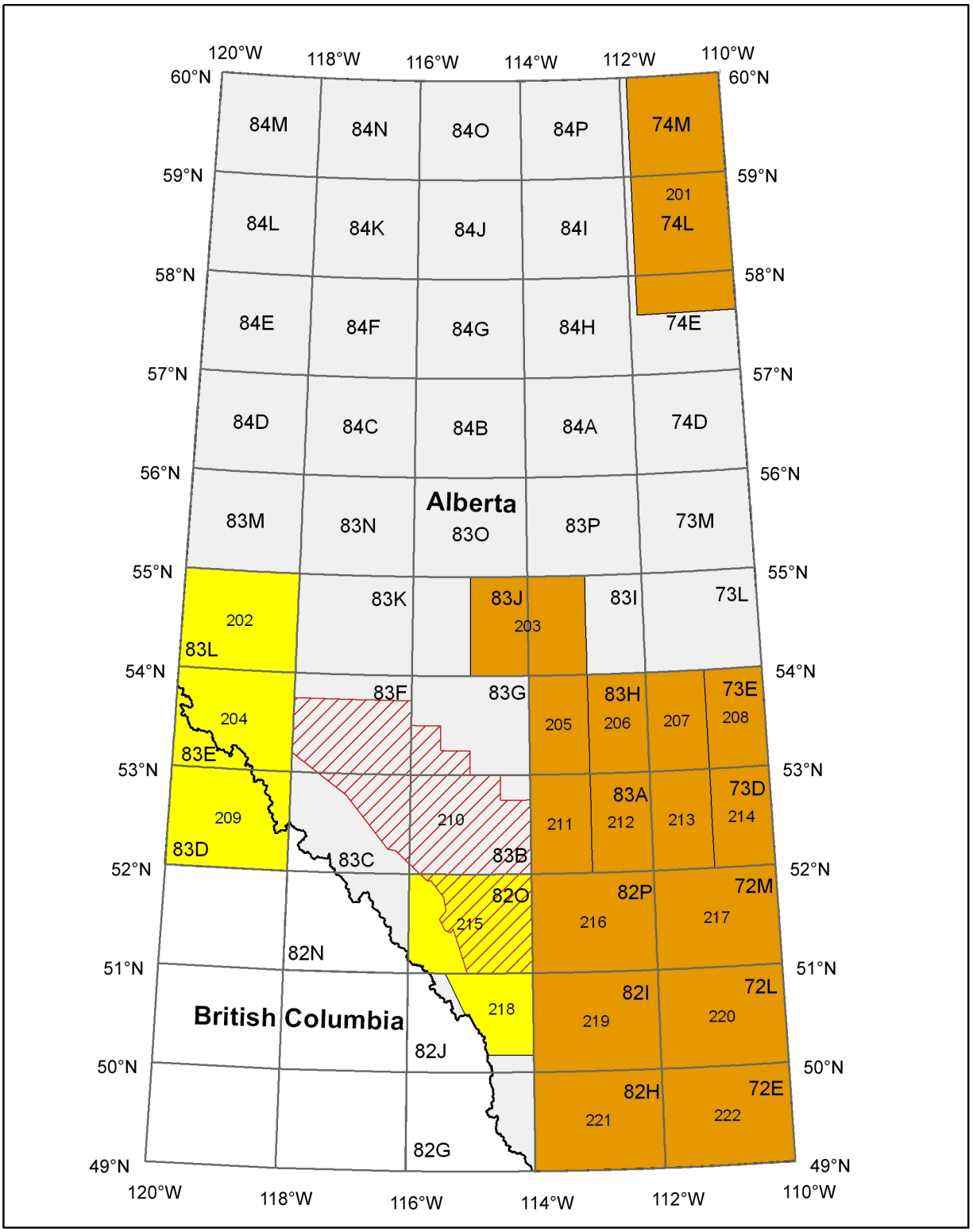

Figure 4. Index map showing the geographic extents of the 1:250 000 (solid yellow and red hatch) and 1:253 440 (orange) maps used for the compiled portion of Map 600. Numbers correspond to index numbers listed in the appendix.

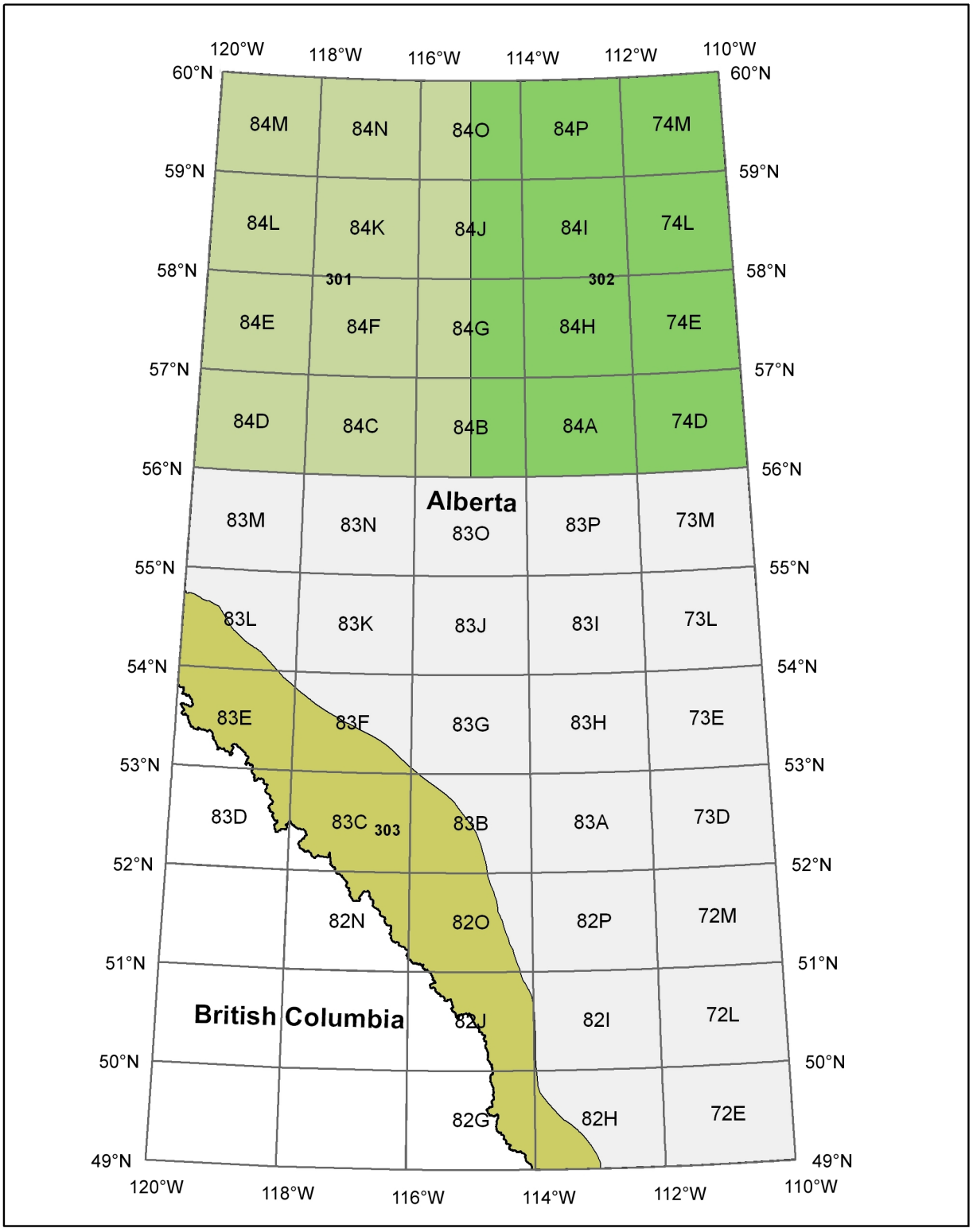

Figure 5. Index map showing the geographic extents of the 1:500 000 maps (shades of green) used for the compiled portion of Map 600. Numbers correspond to index numbers listed in the appendix.

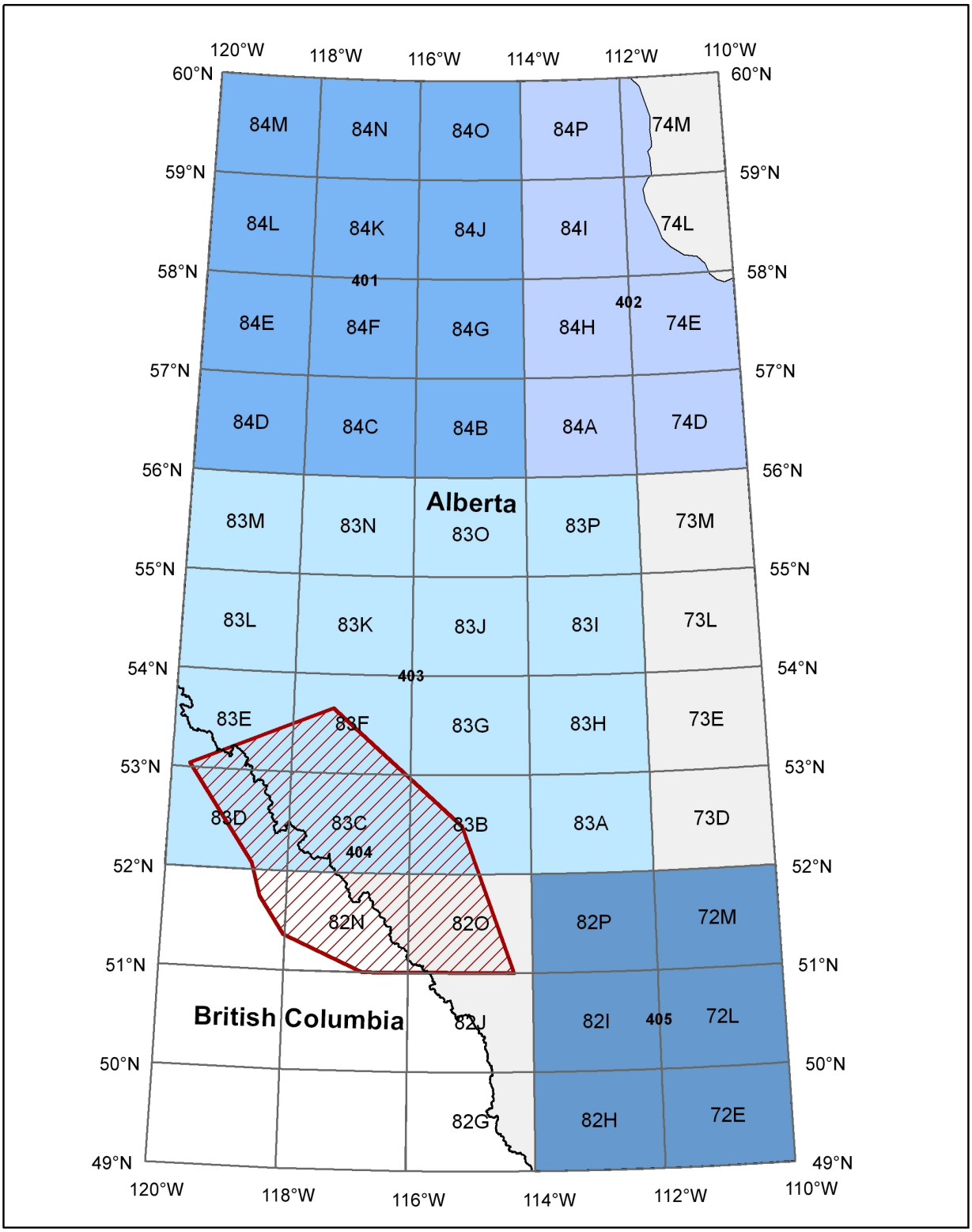

Figure 6. Index map showing the geographic extents of the 1:900 000 (red hatch) and 1:1 000 000 (shades of blue) maps used for the compiled portion of Map 600. Numbers correspond to index numbers listed in the appendix. Map 236, which covers the entire province, was also used for the compilation.

3.1 Haig Brook Formation and Tombstone Mountain Formation (Purcell Supergroup)

The Haig Brook Formation and the overlying Tombstone Mountain Formation are the lowest units of the Purcell Supergroup recognized in Alberta. These formations, which underlie the Waterton Formation, were introduced by Fermor and Price (1983).

3.2 Miette Group

On Map 600, the Miette Group is shown as a single unit (i.e., undivided) due to the restrictions imposed by the 1: 1 000 000 scale. On the Map 600 legend, the Miette Group in the central Alberta Rocky Mountains (e.g., Lake Louise area) is divided into a lower Corral Creek Formation and an upper Hector Formation, in agreement with Aitken (1969) and Price et al. (1980b). Note that the boundary between the Corral Creek Formation and the Hector Formation differs between these two works; the Map 600 legend follows Aitken (1969). In the northern Alberta Rocky Mountains (e.g., Jasper area), the Miette Group on the Map 600 legend is shown to consist of an uppermost, discontinuous dolomite-bearing unit (Byng Formation) that overlies, and locally grades laterally into, the informal unit "siliciclastic strata" (equivalent to undivided Miette Group with the exception of the Byng Formation). This approach was taken because none of the stratigraphic schemes for the Miette Group in the northern Alberta Rocky Mountains, which are briefly reviewed below, seemed entirely appropriate or well established.

Charlesworth et al. (1967) divided the Miette Group in the Jasper area into (from base to top) the Meadow Creek Formation, the Old Fort Point Formation, and the Wynd Formation. They also recognized an overlying unit, divisible into a lower sandstone and conglomerate unit and an upper quartzite unit, that they assigned to the Jasper Formation and considered to be the lower part of the Gog Group. Charlesworth et al. (1967) suggested the correlations between the Jasper area and the Lake Louise area presented in Table 1.

Table 1. Jasper area stratigraphy and tentative correlations between the Jasper area and the Lake Louise area (Charlesworth et al., 1967).

Group	Jasper Area	Lake Louise Area
Gog Group (Cambrian)	Jasper Formation	Lower part of Gog Group
Miette Group (Precambrian)	Wynd Formation	Upper part of Hector Formation
	Old Fort Point Formation	Lower part of Hector Formation
	Meadow Creek Formation	Corral Creek Formation

Aitken (1969) agreed with the Miette Group correlations between the Jasper area and the Lake Louise area suggested by Charlesworth et al. (1967). Aitken (1969, p. 197) stated that "the Miette Group of the Lake Louise region can be subdivided into Hector and Corral Creek Formations only by recognition of the unit of purple and green slates with associated limestone-bearing conglomerates … , which makes up the lower part of the Hector Formation and unquestionably corresponds to the old Fort Point Formation."

Mountjoy and Price (1985; 1989) divided the Miette Group in the Jasper area into the informal lower Miette Group (which they identify as being equivalent to the Old Fort Point Formation), the middle Miette Group, and the upper Miette Group (Table 2). The strata shown as the Jasper Formation by

Charlesworth et al. (1967) was mapped by Mountjoy and Price (1985) as part of the upper Miette Group. Mountjoy and Price (1985) also mapped a dolomite-bearing unit that occurs locally at the top of the upper Miette Group above the siliclastic strata (this unit occurs outside of the area mapped by Charlesworth et al., 1967). The dolomite-bearing unit correlates with the Byng Formation of the Mount Robson area (Teitz and Mountjoy, 1985; Glass, 1990). The small area of outcrop mapped as the Meadow Creek Formation by Charlesworth et al. (1967) was mapped by Mountjoy and Price (1985) as being part of the middle Miette Group (grit unit) and to be in fault contact with the Old Fort Formation.

Table 2. Miette Group and lower Gog Group stratigraphy mapped by Mountjoy and Price (1985; 1989) in the Jasper area.

Group	Unit
Gog Group (Lower Cambrian and/or Hadrynian)	McNaughton Formation
Miette Group (Hadrynian)	Upper part of Miette Group Middle part of Miette Group Lower part of Miette Group (equivalent to Old Fort Point Formation)

Unfortunately, the divisions of the Miette Group into lower, middle, and upper parts to the west in British Columbia (e.g., Carey and Simony, 1985), where older Miette Group strata are exposed, do not correspond with those used by Mountjoy and Price (1985, 1989) in the Jasper area.

Hein and McMechan (1994) divided the Miette Group in the Jasper area into the McKale Formation and overlying East Twin Formation as shown in Table 3 (these names were originally applied in British Columbia). In this scheme, the Old Fort Point Formation (identified as Old Fort Point Mbr in Figure 6.9d of Hein and McMechan, 1994) lies within the central part of the McKale Formation. Hein and McMechan (1994) show the Jasper Formation in the Pyramid Mountain area to be bracketed by unconformities above and below and position it stratigraphically between the Miette and Gog groups just below the Proterozoic-Cambrian boundary (Figures 6.8 and 6.9d of Hein and McMechan, 1994).

Table 3. Miette Group and lower Gog Group stratigraphy mapped by Hein and McMechan (1994) in the Jasper area.

	Group	Formation
Lower Cambrian	Gog Group	McNaughton Formation
	unconformity	
Upper Proterozoic	Not assigned to group	Jasper Formation
	unconformity	
	Miette Group	East Twin Formation
		McKale Formation (contains Old Fort Point “Member”)

3.3 Gog Group

The subdivision of the Gog Group into the Fort Mountain, Lake Louise, St. Piran, and Peyto formations (from base to top) in the central part of the Alberta Rocky Mountains follows Aitken (1969) and Desjardin et al. (2010).

3.4 La Loche and Fitzgerald Formations

The La Loche and Fitzgerald formations, which occur at the base of the Devonian succession in northeast Alberta, are relatively thin and locally discontinuous. Information on their distribution is sparse as there are few outcrops in the area, with the exception of those along the Slave River, and relatively few wells have been drilled through the Devonian-Canadian Shield contact. For these reasons, the La Loche and Fitzgerald formations have been combined on Map 600.

3.5 Chinchaga Formation

The extent of the Chinchaga Formation in northeast Alberta (north of 59.5˚N) is based primarily on Green et al. (1970) and Allan and Gleeson (1979).

3.6 Prairie Evaporite Formation

The location of the Prairie Evaporite Formation on Map 600 follows Okulitch (2006b). However, the subcrop width of the formation has been considerably reduced based on the supposition that most of the salt and some of the other evaporite minerals will have undergone dissolution near the bedrock surface.

3.7 Fort Vermilion Formation

The location of the Fort Vermilion Formation on Map 600 primarily follows Okulitch (2006b). However, based on outcrop observations and log descriptions presented by Nielsen (1972), the contact between the Fort Vermilion Formation and overlying Slave Point Formation has been moved several kilometres to the west in the Lake Claire area.

3.8 Banff Formation in the Northwestern Plains

Paleozoic strata are present immediately below surficial deposits in a deeply eroded and probably subglacial channel in Twp. 110, Rge. 3, W 6^{th} Mer. In this area, a restricted segment of a buried valley (paleovalley) has been eroded 200 to 300 m into bedrock (Pawlowicz et al. 2005a). On Map 600, the Paleozoic rocks immediately below the drift are assigned to the lower Carboniferous (Mississippian) Banff Formation based on the interpretation of well logs. This is consistent with the distribution of subsurface units presented by Okulitch (2006a). Ahmad et al. (2009) suggested that erosion extended deeply enough to cut into the top of the Devonian Wabamun Formation.

3.9 Pocaterra Creek Member

The Pocaterra Creek Member is treated as the lower part of the Cadomin Formation (e.g., White and Leckie, 1999). As such, it is included within the Blairmore Group (KBl map unit).

3.10 Dalhousie Sandstone

The Dalhousie Sandstone is not listed in the Map 600 legend. This unit may be represented as part of the Cadomin Formation, as recommended by McLean (1982), or be considered a separate formation (Dalhousie Formation) overlying Cadomin Formation conglomerate (Leckie and Cheel, 1997). Either way, it is included within the Blairmore Group (KBl map unit).

3.11 Ma Butte Formation

The Ma Butte Formation, which is equivalent to the upper part of the Mill Creek Formation (Leckie and Burden, 2001), is included in the KBl map unit (Blairmore Group).

3.12 Shaftesbury Sandstone

Shaftesbury sandstone is an informal name for a previously unrecognized, marine, sandstone-bearing unit within the lower part of the Shaftesbury Formation that outcrops at several locations in the Caribou Mountains. Dufresne et al. (2001) described a sandstone section (95SH52) on the Caribou River (southwestern Caribou Mountains) and assigned it to the Cadotte and Paddy members of the Peace River Formation. The location provided for this section is very near an outcrop of Shaftesbury sandstone located during Map 600 fieldwork. It seems probable that Dufresne et al. (2001) placed the sandstone in the wrong stratigraphic position.

3.13 Muskiki Formation and Kaskapau Formation

Where the Cardium Formation and sandstone-bearing units equivalent to the Cardium Formation are absent, strata equivalent to the Muskiki Formation are included within the Kaskapau Formation. This modification in the placement of the upper Kaskapau Formation contact (at the base of the Bad Heart Formation instead of at the base of the Cardium Formation) follows Green and Mellon (1962) and Green et al. (1970).

3.14 Bad Heart Formation and Marshybank Formation

Subsurface mapping, based on well log interpretation, has identified two northwest trending corridors where the Bad Heart Formation is absent. Projection of these corridors to the bedrock surface results in gaps in the Bad Heart Formation, as shown on Map 600, in the vicinity of Twp. 78, Rge. 11, W 6th Mer., and Twp. 76, Rge. 23, W 5th Mer. Plint (1990) and Donaldson et al. (1998) identified similar gaps in the distribution of the Bad Heart sandstone and attributed them to erosion. Plint (1990) and Donaldson et al. (1998) identify the sandstone west of the western erosional corridor as the Marshybank Formation, which they interpret to be older than the Bad Heart Formation.

3.15 Milk River Formation in the Plains

The Milk River stratigraphic unit has traditionally been assigned formation status in the southern plains of Alberta (e.g., Russell and Landes, 1940; Irish, 1968d, 1971; Green, 1972; Glass, 1990). Okulitch et al. (1996) identified this interval as the Milk River Group on their 1:1 000 000 compilation map covering parts of Alberta, Saskatchewan, and Montana. However, more recent works (e.g., Hamilton et al., 1999; Payenberg et al., 2003; Meyer and Krause, 2006) have continued assigning formation status to this stratigraphic interval in the southern Alberta Plains and this terminology is used for Map 600.

3.16 Milk River Formation (Group) in the Foothills

Stockmal (1995) recommended that Milk River Formation terminology, established in the plains, be introduced into the southern Alberta Foothills (with the same stratigraphic rank). This interval correlates

with the Chungo Member of the Wapiabi Formation (part of the Alberta Group) in the central and northern Alberta Foothills (Stott, 1963). Milk River stratigraphic nomenclature was applied during the mapping of several 1:50 000 map sheets in the southern Alberta Foothills by the Geological Survey of Canada (e.g., Stockmal, 1996, 1998, 2012; Lebel et al., 1997; Lebel and Kisilevsky, 2000; Lebel and Hiebert, 2001; Stockmal and Lebel, 2003). However, the Milk River stratigraphic interval, assigned formation status in the plains, was elevated to group status in the foothills for GSC mapping purposes (see Stockmal, 2004, for discussion).

At a provincial scale, it seems incongruous to have the Milk River stratigraphic interval assigned formation rank in the plains and group rank in the foothills. The Map 600 legend designation "Milk River Formation (Group)" reflects a preference to retain the same stratigraphic rank (i.e., formation) as in the southern Alberta Plains (proposal of Stockmal, 1995).

The Milk River strata in the southern Alberta Foothills form map units deemed too narrow to show on their own at 1:1 000 000 and have been incorporated in the K_{BR} map unit (which also includes the Belly River Group and the Pakowki Formation).

3.17 Lees Lake Formation and Burmis Formation

Strata in the southern Alberta Foothills mapped as Lees Lake Formation or Burmis Formation (Lebel and Williams, 1994; Lebel et al., 1994) are included in the K_{BR} map unit. They are approximately equivalent to the lower and middle parts of the Milk River Formation (Group). Note that Jerzykiewicz and Norris (1994), Lebel and Williams (1994), Lebel et al. (1994), and Jerzykiewicz (1997) include the Lees Lake, Burmis and Pakowki formations within the Alberta Group.

3.18 Oldman Formation and Dinosaur Park Formation

The Oldman Formation of Russell and Landes (1940) was divided by Eberth and Hamblin (1993) into a lower unit, for which they retained the name Oldman Formation, and an upper unit named the Dinosaur Park Formation. Map 600 uses the Eberth and Hamblin (1993) terminology, thereby restricting the Oldman Formation to strata below the Dinosaur Park Formation (the existence of two different definitions for the Oldman Formation, with significant differences in the upper contacts, is regrettable). Map unit $K_{O/DP}$, Oldman and Dinosaur Park formations (undifferentiated), corresponds to the Oldman Formation of Russell and Landes (1940).

3.19 Whitemud Formation and Whitemud Member

Eberth and Braman (2012) defined a Whitemud Member of the Horseshoe Canyon Formation in the west-central Alberta Plains (i.e., reduced the Whitemud stratigraphic unit from formation to member status). This revision, which is applied to Map 600, does not extend to the Whitemud Formation in the Cypress Hills.

3.20 Upland Gravel

The distribution of upland gravel units south of 56˚N is based upon Irish (1968c), Edwards and Scafe (1995), Okulitch et al. (1996), and Fenton et al. (2013). The distribution of upland gravel units north of

56˚N (Clear Hills, Halverson Ridge, and Caribou Mountains) is based on field observations by AGS staff in 2011 and 2012. The resulting map polygons have an overall similarity to those shown by Okulitch (2006a).

3.21 Structural Geology near Township 42, Range 15, West of the 5th Meridian

Map 600 shows the Ancona Thrust (the thrust immediately east of the Brazeau Thrust on Map 600) as a folded thrust near Twp. 42, Rge. 15, W 5th Mer. This interpretation is after Jones (1971), Price et al. (1977), and Jones and Workum (1978).

3.22 Astroblemes

The locations of the Steen River and Eagle Butte astroblemes are shown on Map 236 (Hamilton et al., 1999) and summary descriptions are provided by Grieve (2006). The location of the Bow City impact crater is based on recent AGS subsurface mapping (Glombick, 2010).

3.23 Additional Sources of Information

Table 4 lists additional sources of information related to Map 600 or the accompanying legend.

Table 4. Additional sources of information.

Source	Comment
Burk (1963)	Cardium Formation
Collom (2001)	Wapiabi Formation and Smoky Group
Eccles (2011)	Kimberlites and related rocks in northern Alberta
Glass (1990)	Rock unit descriptions
Glombick (2010)	Belly River Group
Glombick (2011)	Oldman and Dinosaur Park formations
Hathway (2011a)	Battle Formation
Hathway (2011b)	Horseshoe Canyon, Wapiti, and Battle formations (stratigraphic picks)
Hathway and Prior (2011)	Oldman and Dinosaur Park formations (measured section: Red Deer River)
Hathway et al. (2011a)	Foremost, Oldman, and Dinosaur Park formations (measured section: South Saskatchewan River)
Hathway et al. (2011b)	Foremost and Oldman formations (measured section: South Saskatchewan River)
Hathway et al. (2011c)	Foremost and Oldman formations (measured section: Milk River)
Hathway et al. (2011d)	Bearpaw and Horseshoe Canyon formations (measured section: Red Deer River)
Hay et al. (2012)	Pelican, Westgate, Fish Scales, and Belle Fourche formations (measured section: Athabasca River)
Jerzykiewicz (1997)	Coalspur and Willow Creek formations
Jones (1966)	Cretaceous geology of the Peace River area
Mossop and Shetsen (1994)	Western Canada Sedimentary Basin
Norris (1963)	Devonian geology of northeastern Alberta
Norris and Uyeno (1981)	Devonian geology of northeastern Alberta (Birch River-Lake Claire area)

(continued)

Source	Comment
Ozoray (1980)	Sub-Cretaceous unconformity north of the Caribou Mountains
Pawlowicz et al. (2005b)	Wapiti Formation in the southern Buffalo Head Hills
Ramaekers et al. (2007)	Athabasca Basin
Rukhlov and Pawlowicz (2012)	Sweetgrass Hills intrusions in southern Alberta
Russell (1932)	Monarch Fault Zone (also see Irish, 1968c)
Schneider et al. (2013a)	Grosmont Formation (Harper Creek)
Schneider et al. (2013b)	Grosmont Formation (Peace River)
Schneider et al. (2013c)	Waterways Formation (Athabasca and Clearwater rivers)
Schneider et al. (2013d)	La Loche, Contact Rapids, and Keg River formations (Clearwater River)
Slimmon and Pana (2010)	Athabasca Basin
Stott (1963)	Alberta Group
Stott (1967)	Smoky Group

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Appendix List of Maps Used to Create Compiled Portion of Map 600

Index Number	Author(s) and Year	Map Number	Map Name or Area	Scale	NTS
1	McMechan (1994)	1842A	Two Lakes	1:50000	83L/05
2	McMechan (1997a)	1918A	Kakwa Falls	1:50000	83L/04
3	McMechan (1997b)	1903A	Copton Creek	1:50000	83L/03
4	McMechan (1999)	1950A	Dry Canyon	1:50000	83E/13
5	McMechan (1997c)	1904A	Grande Cache	1:50000	83E/14
6	Lang and Irish (1951)	996A	Pierre Greys Lakes	1:63360	83E/15
7	Irish and Eccles (1964)	1104A	Adams Lookout	1:63360	83E/10
8	Irish (1949)	968A	Moon Creek	1:63360	83E/09W
9	Lang (1949)	963A	Moberly Creek	1:63360	83E/09E
10	Irish (1947)	899A	Gregg Lake	1:63360	83F/12W
11	Lang (1947)	905A	Brule	1:63360	83F/05W
12	Lang (1946)	843A	Entrance	1:63360	83F/05
13	Irish (1945)	838A	Pedley	1:63360	83F/06
14	Mountjoy (2010)	2158A	Miette	1:50000	83F/04
15	Langenberg (1993)	217	Cadomin	1:50000	83F/03
16	Langenberg and LeDrew (2000)	237	Coal Valley	1:50000	83F/02
17	Mountjoy and Price (1985)	1611A	Jasper	1:50000	83D/16
18	Mountjoy and Price (1976)	OF372 (west sheet)	Medicine Lake (west half)	1:50000	83C/13W
19	Mountjoy and Price (1976)	OF372 (east sheet)	Medicine Lake (east half)	1:50000	83C/13E
20	Mountjoy, Price and Lebel (1992)	1830A	Mountain Park	1:50000	83C/14
21	Douglas and Lebel (1993)	1828A	Cardinal River	1:50000	83C/15
22	Mountjoy and Price (1989)	1657A	Amethyst Lakes	1:50000	83D/09
23	Mountjoy, Patenaude and Price (2003a)	2007A	Athabasca Falls	1:50000	83C/12
24	Mountjoy, Patenaude and Price (2003b)	1942A	Southesk Lake	1:50000	83C/11
25	Mountjoy, Windh, Price and Douglas (2002)	1990A	George Creek	1:50000	83C/10
26	Douglas and MacKay (1958)	6-1958	Chungo Creek	1:63360	83C/09
27	Douglas (1956)	55-34	Nordegg	1:63360	83C/08
28	Crombie and Erdman (1947)	884A	Alexo	1:63360	83B/05W
29	Erdman (1947)	885A	Saunders	1:63360	83B/05E
30	Mountjoy and Price (1974a)	1389A	Whiterabbit Creek (west half)	1:50000	83C/01W
31	Mountjoy and Price (1974b)	1388A	Whiterabbit Creek (east half)	1:50000	83C/01E
32	Erdman (1946)	46-22A	Cripple Creek	1:31680	83B/04W
33	Henderson (1946)	883A	Fall Creek	1:63360	83B/04E
34	Henderson (1945)	840A	Tay River	1:63360	83B/03W

(continued)

Index Number	Author(s) and Year	Map Number	Map Name or Area	Scale	NTS
35	Price and Mountjoy (1978a)	1466A	Siffleur River (west half)	1:50000	82N/16W
36	Price and Mountjoy (1978b)	1465A	Siffleur River (east half)	1:50000	82N/16E
37	Ollerenshaw and Price (1971a)	1276A	Scalp Creek (west half)	1:50000	82O/13W
38	Ollerenshaw and Price (1971b)	1275A	Scalp Creek (east half)	1:50000	82O/13E
39	Ollerenshaw (1968)	8-1968	Limestone Mountain	1:50000	82O/14W
40	Ollerenshaw (1970)	7-1969	Marble Mountain	1:50000	82O/14E
41	Beach (1942)	670A	Bearberry	1:63360	82O/15W
42	Price (2005)	2012A	Blaeberry River	1:50000	82N/10
43	Price and Mountjoy (1978c)	1464A	Hector Lake (west half)	1:50000	82N/09W
44	Mountjoy and Price (1978)	1463A	Hector Lake (east half)	1:50000	82N/09E
45	Price (1971a)	1274A	Barrier Mountain (west half)	1:50000	82O/12W
46	Price (1971b)	1273A	Barrier Mountain (east half)	1:50000	82O/12E
47	Ollerenshaw (1966)	11-1965	Burnt Timber Creek	1:63360	82O/11
48	Ollerenshaw (1974)	1387A	Fallentimber Creek (west half)	1:50000	82O/10W
49	MacKay (1939)	548A	Fallentimber (east half)	1:63360	82O/10E
50	Price, Cook, Aitken and Mountjoy (1980a)	1483A	Lake Louise (west half)	1:50000	82N/08W
51	Price, Cook, Aitken and Mountjoy (1980b)	1482A	Lake Louise (east half)	1:50000	82N/08E
52	Price and Mountjoy (1972a)	1297A	Mount Eisenhower (west half)	1:50000	82O/05W
53	Price and Mountjoy (1972b)	1296A	Mount Eisenhower (east half)	1:50000	82O/05E
54	Ollerenshaw and Price (1971c)	1272A	Lake Minnewanka (west half)	1:50000	82O/06W
55	Ollerenshaw (1972a)	1347A	Lake Minnewanka (east half)	1:50000	82O/06E
56	Ollerenshaw (1972b)	1351A	Wildcat Hills (west half)	1:50000	82O/07W
57	Hume and Hage (1941)	652A	Wildcat Hills (east half)	1:63360	82O/07E
58	Price, Mountjoy and Cook (1978)	1476A	Mount Goodsir (east half)	1:50000	82N/01E
59	Price and Mountjoy (1972c)	1295A	Banff (west half)	1:50000	82O/04W
60	Price and Mountjoy (1972d)	1294A	Banff (east half)	1:50000	82O/04E
61	Price (1970a)	1266A	Canmore (west half)	1:50000	82O/03W

(continued)

Index Number	Author(s) and Year	Map Number	Map Name or Area	Scale	NTS
62	Price (1970b)	1265A	Canmore (east half)	1:50000	82O/03E
63	Ollerenshaw (1976a)	1420A	Jumpingpound Creek (west half)	1:50000	82O/02W
64	Ollerenshaw (1976b)	1419A	Jumpingpound Creek (east half)	1:50000	82O/02E
65	McMechan and Leech (2011)	CGM13	Mount Assiniboine	1:50000	82J/13
66	Hume (1941)	667A	Fish Creek (west half)	1:63360	82J/16W
67	Hume (1940)	606A	Midnapore	1:63360	82J/16E
68	McMechan (1998)	1920A	Peter Lougheed Provincial Park	1:50000	82J/10/11/14
69	Lebel and Kisilevsky (2000)	OF3875	Turner Valley	1:50000	82J/09
70	Stockmal (2012)	CGM8	Mount Head	1:50000	82J/07
71	Hume and Hage (1942)	698A	Pekisko Creek	1:63360	82J/08W
72	Hume (1949)	934A	Stimpson Creek	1:63360	82J/08E
73	Price, Grieve and Patenaude (1992a)	1824A	Fording River (west half)	1:50000	82J/02W
74	Norris (1993a)	1831A	Fording River (east half)	1:50000	82J/02E
75	Norris (1993b)	1837A	Langford Creek (west half)	1:50000	82J/01W
76	Stockmal (1998)	OF3568	Langford Creek (east half)	1:50000	82J/01E
77	Price, Grieve and Patenaude (1992b)	1823A	Tornado Mountain	1:50000	82G/15
78	Douglas (1949)	978A	Gap	1:63360	82G/16W
79	Stockmal (1996)	OF3275	Maycroft (east half)	1:50000	82G/16E
80	McMechan (1997d)	OF3445	Granum	1:50000	82H/13
81	Norris (1993c)	1829A	Blairmore (west half)	1:50000	82G/09W
82	Stockmal and Lebel (2003)	OF1653	Blairmore (east half)	1:50000	82G/09E
83	Lebel (1996a)	OF3289	Brocket	1:50000	82H/12
84	Price (1965)	1154A	Flathead (Upper Flathead, east half)	1:63360	82G/07E
85	Norris (1993d)	1838A	Beaver Mines (west half)	1:50000	82G/08W
86	Lebel and Hiebert (2001)	OF4024	Beaver Mines (east half)	1:50000	82G/08E
87	Lebel, Hiebert and Spratt (1997)	OF3543	Pincher Creek	1:50000	82H/05
88	Lebel (1996b)	OF3363	Raley	1:50000	82H/06
89	Lebel, Douglas and Norris (1994)	OF2855	Waterton Lakes	1:50000	82H/04
90	Lebel and Williams (1994)	OF2854	Cardston	1:50000	82H/03
101	Irish (1965a)	1139A	Rocky Mountain Foothills (sheet 1)	1:126720	83E/10/14/15, 83L/03
102	Irish (1965b)	1140A	Rocky Mountain Foothills (sheet 2)	1:126720	83E/09, 83F/05/06/12
103	McMechan (1995)	1865A	Kananaskis Country	1:100000	82J/10/11/14/15, 82O/02/03

(continued)

Index Number	Author(s) and Year	Map Number	Map Name or Area	Scale	NTS
104	Price (1962)	35-1961	Fernie (east half)	1:126720	82G/E
201	Pana (2010)	537	Precambrian Geology of Northeastern Alberta	1:250000	74E, 74L, 74M (parts of)
202	McMechan and Dawson (1995)	1875A	Wapiti	1:250000	83L
203	Feniak (1944)	44-6	Athabasca-Barrhead	1:253440	83I/W and 83J/E
204	Mountjoy (1980)	1499A	Mount Robson	1:250000	83E
205	Rutherford (1939a)	506A	Edmonton	1:253440	83H/W
206	Rutherford (1939b)	505A	Tofield	1:253440	83H/E
207	Crickmay, Hume and Hage (1942a)	674A	Innisfree	1:253440	73E/W
208	Crickmay, Hume and Hage (1942b)	673A	Kitscoty	1:253440	73E/E
209	Murphy (2007)	2110A	Canoe River	1:250000	83D
210	Taerum (2011)		Geology: Central Alberta Foothills and Deformed Plains, Alberta, Bow River to Athabasca River	1:250000	82O, 83B, 83C, 83F (parts of)
211	Rutherford (1939c)	504A	Red Deer	1:253440	83A/W
212	Rutherford (1939d)	503A	Stettler	1:253440	83A/E
213	Warren and Hume (1939a)	502A	Hardisty	1:253440	73D/W
214	Warren and Hume (1939b)	501A	Ribstone Creek	1:253440	73D/E
215	Ollerenshaw (1978)	1457A	Calgary	1:250000	82O
216	Irish (1967a)	5-1967	Drumheller	1:253440	82P
217	Irish (1967b)	21-1966	Oyen	1:253440	72M
218	Ollerenshaw (1975)	OF263	Kananaskis Lakes	1:250000	82J
219	Irish (1968a)	19-1967	Gleichen	1:253440	82I
220	Irish (1968b)	21-1967	Medicine Hat	1:253440	72L
221	Irish (1968c)	20-1967	Lethbridge	1:253440	82H
222	Irish (1968d)	22-1967	Foremost	1:253440	72E
301	Green, Mellon and Carrigy (1970)	24 (west half)	Bedrock Geology of Northern Alberta (west half)	1:500000	84 (part of)
302	Green, Mellon and Carrigy (1970)	24 (east half)	Bedrock Geology of Northern Alberta (east half)	1:500000	74 and 84 (parts of)