



# BEDROCK GEOLOGY OF NORTHERN ALBERTA

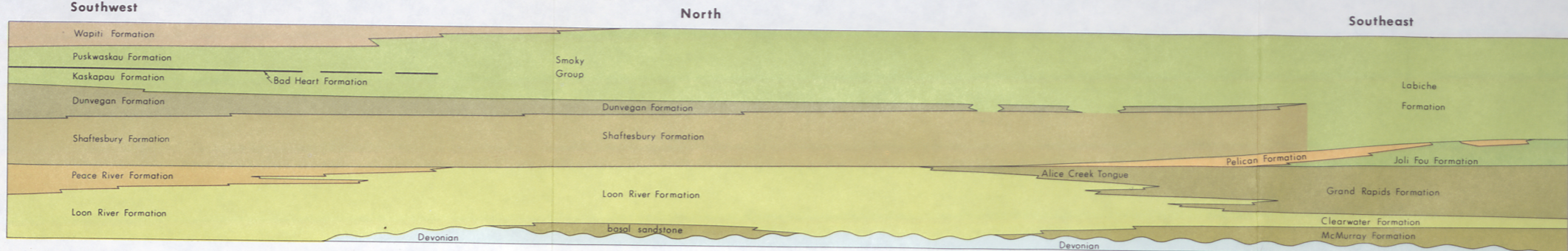
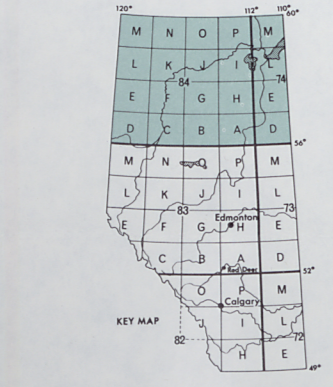
## LEGEND

- CRETACEOUS**
- 28 **WAPITI FORMATION:** grey calcareous feldspathic sandstone, silty shale, bentonite; thin coal beds; non-marine
  - 27 **PUSKASKAU FORMATION:** dark grey fossiliferous shale, silty in upper part; marine
  - 26 **BAD HEART FORMATION:** fine-grained quartzose sandstone, ferruginous oolitic sandstone and mudstone; marine
  - 25 **KASKAPAU FORMATION:** dark grey silty shale, ironstone partings, interbedded in lower part with fine-grained quartzose sandstone and thin beds of ferruginous oolitic mudstone; marine
  - 24b **UNNAMED DARK GREY SHALE,** Caribou Mountains and Buffalo Head Hills
  - 24a **SMOKY GROUP:** dark grey shale and silty shale, ironstone partings and concretions; marine
  - 23 **LARBICHE FORMATION:** dark grey shale and silty shale, ironstone partings and concretions; thin fish scale-bearing silty beds in lower part; marine
  - 22 **DUNVEGAN FORMATION:** grey fine-grained feldspathic sandstone with hard calcareous beds, laminated siltstone and grey silty shale, dolomite to marine
  - 21 **SHAFFESBURY FORMATION:** dark grey fish scale-bearing shale, silty in upper part, ironstone nodules and thin beds of concretions, ironstone, bentonite partings; interbedded locally in lower part with thin silty and sandy intervals; marine
  - 20 **PEACE RIVER FORMATION, CADOTTE MEMBER (upper):** fine-grained quartzose sandstone, **HARMON MEMBER (middle):** dark grey silty shale, **NOTIKEWIN MEMBER (lower):** fine-grained glauconitic sandstone, silty interbeds in lower part; marine
  - 19 **JOLI FOU FORMATION:** dark grey fossiliferous shale, silty interbeds in upper part; marine
  - 18 **PEACE RIVER FORMATION, CADOTTE MEMBER (upper):** fine-grained quartzose sandstone, **HARMON MEMBER (middle):** dark grey silty shale, **NOTIKEWIN MEMBER (lower):** fine-grained glauconitic sandstone, silty interbeds in lower part; marine
  - 17b **ALICE CREEK TONGUE, GRAND RAPIDS FORMATION:** fine-grained quartzose sandstone; marine
  - 17a **GRAND RAPIDS FORMATION:** fine-grained quartzose and feldspathic sandstone, laminated siltstone and silty shale; thin coal beds; dolomite to marine
  - 16b **CLEARWATER FORMATION:** dark grey fossiliferous silty shale, laminated siltstone, fine-grained cherty sandstone, glauconitic sandstone (**WARSKAW MEMBER**) near base; marine
  - 16a **LOON RIVER FORMATION:** dark grey fossiliferous silty shale and laminated siltstone, ironstone nodules and partings; marine
  - 15b **RASAL CRETACEOUS, Wood Buffalo Park:** calcareous quartz sandstone, equivalent in position to **McMURRAY FORMATION** of Athabasca River region
  - 15a **McMURRAY FORMATION:** crossbedded quartzose sandstone and siltstone; oil-impregnated with grey silty shale interbeds in upper part; dolomite
- DEVONIAN**
- 14 **GROSMONT FORMATION:** grey fine-grained granular partly vuggy dolomite; marine
  - 13 **MIKWA FORMATION:** upper member: brownish-grey to olive green, purplish-red mottled, fine-grained limestone, dolomitic limestone and shaly limestone; lower member: dark grey to brownish-grey fine-grained limestone and dolomitic limestone; marine
  - 12c **IRETON FORMATION:** greenish-grey shale and calcareous shale and siltstone; marine
  - 12b **WATERWAYS FORMATION:** grey and greenish-grey shale and argillaceous limestone units alternating with grey and greyish-brown fine-grained and clastic limestone units; marine
  - 12a **HAY RIVER FORMATION:** greenish-grey calcareous shale, argillaceous siltstone and argillaceous limestone; marine
  - 11 **CARIBOU MEMBER, SLAVE POINT FORMATION:** grey and brown fine- to medium-grained limestone and dolomitic limestone; minor shale, gypsum; marine
  - 10c **FORT VERRILLON MEMBER, SLAVE POINT FORMATION:** white and grey gypsum, argillaceous and dolomitic limestone, some dolomite, some fine-grained limestone, dolomitic limestone and green shale; evaporitic
  - 10b **MUSKEG FORMATION:** white and grey gypsum, anhydrite; minor dolomite, salt and shale; evaporitic
  - 10a **NYARLING FORMATION:** white and grey gypsum, argillaceous and dolomitic limestone; some fine-grained limestone and dolomitic limestone; anhydrite, minor dolomite and salt, greenish shale and limestone in subsurface; evaporitic
  - 9 **KEG RIVER FORMATION:** upper member: grey and brown fine- to medium-grained limestone, thin-bedded to massive, locally richly fossiliferous and coarse grained; grey medium-grained dolomite, locally vuggy; lower member: fine-grained brown dolomite and laminated dolomite, locally vuggy; minor limestone; unit locally much brecciated and recemented; marine
  - 8 **CHINCHAGA FORMATION:** white and grey gypsum, argillaceous and dolomitic limestone and anhydrite, some dolomite, dolomitic limestone, red and green shale; some salt in subsurface; evaporitic
  - 7 **FITZGERALD FORMATION:** grey and brown fine- to medium-grained dolomite to sandy dolomite and dolomitic limestone, locally vuggy; grading down into sandstone, siltstone and breccia (**LA LOCHE FORMATION**); marine
  - 6 **MIDDLE DEVONIAN (undivided):** includes **METHY FORMATION:** brown and buff massive porous dolomite, brown to grey thin-bedded dolomite, dolomitic limestone, minor anhydrite and gypsum; **MELLEN RIVER FORMATION:** and **leveled PRAIRIE EVAPORITE FORMATION:** gypsum, anhydrite, grey-green silty and dolomitic shale, minor dolomite; marine to evaporitic.
- PRECAMBRIAN**
- 5 **ATHABASCA FORMATION:** white, grey and red, medium- to coarse-grained sandstone, flat-bedded to strongly crossbedded; local conglomerate and shale beds
  - 4 **METASEDIMENTARY ROCKS:** black and grey quartzite and impure quartzite, biotite schist, phyllite; minor sericite and hornblende schist, phyllonite, amphibolite; variable amounts of pegmatite and granite
  - 3 **GRANITE GNEISS:** predominantly biotite and hornblende granite gneiss; minor amphibolite, schist, foliated granite, pegmatite and other gneisses
  - 2b **GRANITE:** pink to grey, massive to foliated biotite, hornblende and leucocratic granite; local granite pegmatite
  - 2a **UNDIVIDED GRANITIC PLUTONIC ROCKS:** including biotite granite, porphyroblastic and porphyritic granites, some granite gneiss and metasedimentary rocks
  - 1 **PORPHYROBLASTIC GRANITES:** foliated to massive, white, grey and pink biotite granite and quartzite, quartz diorite, with feldspar porphyroblasts; variable amounts of metasedimentary rocks and granite gneiss
- Geological boundary  
 Outcrop location  
 Loose slab, probably from nearby unexposed bedrock  
 Spring  
 Thick drift  
 Sinkhole area  
 Surface contour (contour interval 500 feet)

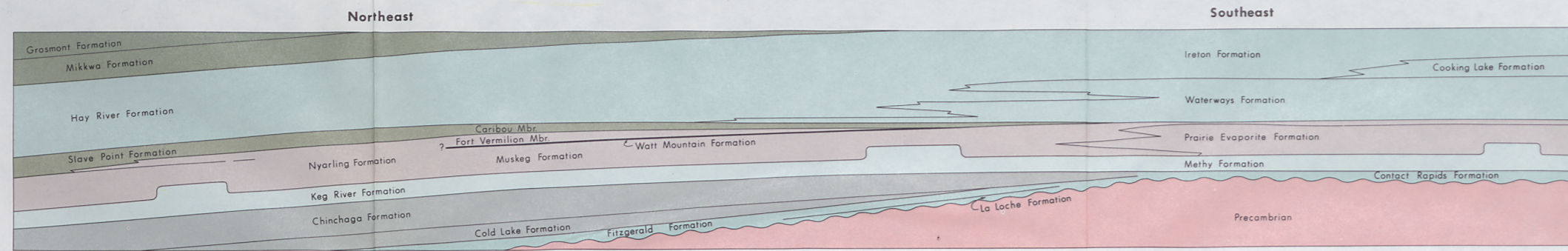
Geology by  
 R. Green and G. B. Mellon, 1962  
 M. A. Carrigy and B. Green, 1965

supplemented by published maps and reports of the Geological Survey of Canada and the Research Council of Alberta.  
 Outcrop data for Dunvegan and Shaffesbury Formations in the vicinities of Cardinal and Bison Lakes supplied by O. Tokarsky, 1966, and for Precambrian areas south of Lake Athabasca by L. A. Byrock and J. D. Goffrey, 1969.

- Highway
- Road
- Township boundary
- Indian reservation
- Railway
- Park boundary



DIAGRAMMATIC CROSS SECTION ILLUSTRATING INTERRELATIONSHIPS OF CRETACEOUS ROCK UNITS



DIAGRAMMATIC CROSS SECTION ILLUSTRATING INTERRELATIONSHIPS OF DEVONIAN ROCK UNITS

DESCRIPTIVE NOTES

PHYSIOGRAPHY

Alberta north of 56 degrees latitude covers an area of approximately 50,000 square miles, divisible into two major physiographic units: the Canadian Shield, which occupies about 6,000 square miles in the northeast corner of the province, and the remaining area, which forms part of the Interior Plains.

The Canadian Shield, composed of igneous, metamorphic and sedimentary rocks of Precambrian age, is an area of low but irregular relief with numerous lakes and, in the northern part, a high proportion of bedrock outcrop. South of Lake Athabasca bedrock outcrops are scarce and the area is referred to as the Interior Plains. Precambrian rocks are largely covered by unconformable deposits of Pleistocene and Recent ages.

The Interior Plains, a region of low to moderate relief, is underlain by gently dipping rocks of Devonian and Cretaceous ages. A dissected plateau, the area consists of a series of generally step-sloped, concordant uplands (Clear, Chinchaga, Camson, Buffalo Head and Thickwood Hills, Caribou and Birch Mountains) which rise one to two thousand feet above the general level of the gently undulating lowlands adjacent to the Hay, Peace and Athabasca Rivers. Locally, the topography is modified by the effects of Pleistocene glaciation, and the entire region is covered by a veneer of unconsolidated glacial, eolian and Recent debris deposits. Most of the region is forested or covered by poorly drained muskeg and swampy deposits, except for partly cultivated areas in the lowlands adjacent to the Peace River and the McKenzie Highway. Due to the thick drift deposits and vegetative cover, bedrock exposures are confined mainly to the valleys of the larger rivers and tributary streams, and along the slumped margins of the upland areas.

PRECAMBRIAN

The Precambrian Shield area comprises a complex of igneous and metamorphic rocks ranging in age from 17 to 2.3 billion years and cut by a number of major and minor fault structures north of Lake Athabasca. An average of 60 per cent of the area is rock outcrop. South of the lake much less outcrop is found; the most extensive outcrop area, between Red Creek and Marguerite River, has bedrock on 25 per cent of the surface.

The GRANITE GNEISS complex contains the oldest rocks—a heterogeneous mixture of biotite and hornblende gneisses with minor bands of metasedimentary rocks and amphibolites. The METASEDIMENTARY ROCKS represent either remnants of paragneiss, parent material or reworked bodies of younger sedimentary material. A metasedimentary band may contain quartz, biotite, amphibole and biotite, hornblende and sericite schists.

DEVONIAN

The Middle Devonian FITZGERALD FORMATION, outcropping at scattered points along Slave River, consists of dolomitic limestone and calcareous shale. The outcrop also extends along the Peace River. The La Lache Formation which rests on Precambrian rocks. Up to 19 feet of La Lache and 26 feet of Fitzgerald Formation are exposed.

The CHINCHAGA FORMATION, exposed extensively in the Escarpment and sinkhole area southeast of Salt River and intermittently along Salt and Slave Rivers, consists of gypsum and minor anhydrite, shale and limestone up to 100 feet thick. In the subsurface westward, the thickness of 250 feet is attained, however, the unit is largely removed by solution east of the escarpment, the Slave River outcrop consisting of the hard shale and minor gypsum. Salt springs, near the Salt River, deposit salt derived from solution of the underlying, unexposed Cold Lake Formation.

The KEG RIVER FORMATION, forming the escarpment along the escarpment west of Salt River, consists of limestone and dolomite up to 200 feet thick. The outcrop also extends along Salt and Slave Rivers, where solution of underlying evaporite drags the unit by 200 feet. Extensively horizontal beds are exposed in places along Salt and Slave Rivers.

The MIDDLE DEVONIAN (undivided) map-unit covers: (1) a large area south of Lakes Claire and Athabasca believed to be underlain by Middle Devonian strata, and (2) the Paleozoic outcrop belt in the Clearwater River valley. Outcrops in area (1) are confined to the Peace and Marguerite Rivers and outcrops of Red Creek, although concentrations of fossiliferous dolomite shale at several localities suggest the proximity of bedrock. All exposures appear to be of the McMurtry Formation (Keg River equivalent) strata—shale and fine-grained dolomite, locally fossiliferous and spore bearing, and with local calcareous breccias. In the Clearwater River valley, where the McMurtry unit reaches a thickness of 200 feet, up to 80 feet of dolomite outcrop at the various falls. The overlying McLean River Formation shale and siltstone and remnants of bedrock Prairie Evaporite (gypsum, anhydrite and evaporitic dolomite and shale) should be represented in the outcrop area, but only salt springs indicate the presence of evaporites in the subsurface.

The NYARLING FORMATION is the map-unit containing equivalents of the subsurface Muskeg (evaporite) and Watt Mountain (shale-siltstone) Formations and the Fort Vermilion (evaporite) Member of the Slave Point Formation. Muskeg Formation, the northern equivalent of the Prairie Evaporite, is up to 750 feet thick west of the Fifth meridian, and consists of anhydrite and dolomite with up to 250 feet of halite. Watt Mountain Formation consists of 20 to 50 feet of greenish shale and siltstone. No outcrops of either rock unit were found; the rock unit boundaries are therefore somewhat hypothetical. FORT VERMILION MEMBER consists of up to 120 feet of anhydrite in subsurface sections; up to 75 feet of gypsum probably of this unit outcrops along the Peace River at Peace Point. The unit then southward to 40 feet at I.O.E. Jack Lakes 8-17-1201 W.S. well and disappears southward away from the lower Peace River region. Solution of the evaporite extension, indicated by extensive sinkhole areas in the lower Peace River area, to an estimated 200-foot maximum along the subsurface zone in Wood Buffalo Park.

The SLAVE POINT FORMATION (CARBONIFEROUS), consisting of brownish dolomitic limestone and limestone, is well exposed in the Peace River valley. The unit is 170 feet thick in the Peace River valley, and 40 feet at I.O.E. Jack Lakes 8-17-1201 W.S. well and disappears southward away from the lower Peace River region. Solution of the evaporite extension, indicated by extensive sinkhole areas in the lower Peace River area, to an estimated 200-foot maximum along the subsurface zone in Wood Buffalo Park.

The HAY RIVER FORMATION, approximately 1,300 feet thick where complete, is a succession of greenish-grey calcareous shale with fine-grained clay stringers. Limestone beds were more common south of the Peace River as the lower 500 to 600 feet of the unit change facies to the Waterways-Beverhill Lake Formations; the facies change is abruptly placed along the lower Peace River. The name for the formation is used for the Hay River equivalent shales between the Waterways and the overlying Mikwag Formations. The WATERWAYS FORMATION, a succession of greenish-grey calcareous shale and argillaceous limestone alternating with grey and greyish-brown, fine-grained cherty limestone is 600 to 700 feet thick. It is best exposed along the Athabasca River north of Fort McMurray.

The MIKWAG FORMATION, a 400-foot thick succession of limestone and dolomitic limestone with minor shale, grey, green and red shales in color, outcrops along the Peace River in the Vermilion Cliffs area and on Harper Creek to the south, and the overlying GROSBEAK FORMATION is a red, coarsely veined, petrifoliated dolomite 400 feet thick, of which 50 feet is steeply on the Peace River in the Vermilion Cliffs area.

CRETACEOUS

The MEMURAY FORMATION, lying unconformably on Devonian carbonate rocks, is well exposed along the valleys of the Athabasca River and its tributary streams. The unit is from 150 to 300 feet thick, thinning to the north and west beneath the Birch Mountains. It is composed mainly of calcareous shales and thin beds of thin-bedded, limestone. The upper boundary is gradational with the Peace River Formation and thin beds of dolomite and siltstone interbeds in the upper part. To the south the unit passes laterally into marine shale in the upper part of the Peace River Formation. The lower boundary is gradational with the Peace River Formation. The base of the Memuray Formation is marked by a thin glauconitic sandstone called the Wolfman Member, and the upper boundary is gradational with the Grand Rapids Formation.

The LOON RIVER FORMATION underlies a large region in the lowlands adjacent to the Peace and Athabasca Rivers in the northern part of the map-area. It is from 100 to 200 feet thick, thinning to the north and west beneath the Birch Mountains, where it is continuous with the Clearwater Formation. The unit consists of marine dark grey, fossiliferous shale with scattered nodules and thin beds of dolomite and siltstone. The upper boundary is gradational with the Peace River Formation and thin beds of dolomite and siltstone interbeds in the upper part. To the south the unit passes laterally into marine shale in the upper part of the Peace River Formation. The lower boundary is gradational with the Peace River Formation. The base of the Loon River Formation is marked by a thin glauconitic sandstone called the Wolfman Member, and the upper boundary is gradational with the Grand Rapids Formation.

The CLEARWATER FORMATION, consisting of marine dark grey fossiliferous shale, laminated siltstone and thin beds of fine-grained cherty sandstone, is exposed along the Athabasca River and its tributaries. It is about 350 feet thick in the Fort McMurray area, thinning at the exposure of the overlying Grand Rapids Formation toward the north and of the Birch Mountains toward the south. The base of the Clearwater Formation is marked by a thin glauconitic sandstone called the Wolfman Member, and the upper boundary is gradational with the Grand Rapids Formation.

The PEACE RIVER FORMATION is exposed along the Peace and Wabasca Rivers south of township 58. It is divisible into three members—Notkewitz (lower) Member: 50 to 75 feet of thin-bedded, fine-grained, glauconitic sandstone and siltstone, grading at the base into silty shale. Heron (middle) Member: marine dark grey shale. Cadotte (upper) Member: fine-grained, oolitic, cherty sandstone with thin coal and silty shale interbeds in the upper part. To the north the unit passes laterally into marine shale in the upper part of the Peace River Formation. The lower boundary is gradational with the Peace River Formation. The base of the Peace River Formation is marked by a thin glauconitic sandstone called the Wolfman Member, and the upper boundary is gradational with the Grand Rapids Formation.

The PELICAN and JOLI FOU FORMATIONS are exposed along the valley of the Athabasca River southwest of Fort McMurray. The lower unit, the Joli Fou, is up to 100 feet thick, consisting of marine dark grey, fossiliferous shale with glauconitic siltstone in the upper part. The Pelican, 40 to 50 feet thick, consists of fine-grained quartzite sand with interbeds of glauconitic silty shale in the lower part. The unit appears to shale out northwest of Fort McMurray; equivalent beds in the Birch Mountains, if present, are included in the basal part of the Shaftesbury Formation.

The SHAFTESBURY FORMATION underlies much of the lowland area adjacent to the Peace, Hay and Chinchaga Rivers in the map-area, extending eastward around the lower slopes of the Caribou Mountains, Buffalo Head Hill and northern margin of the Birch Mountains. The unit is from 800 to 1,000 feet thick, consisting of marine dark grey to black, highly fossiliferous shale, scattered thin benticolite beds and abundant concentrically laminated shales. Thin, laminated, fish scale-bearing shales are present in the lower part, and a fine-grained cherty sandstone interval, 20 to 30 feet thick about 250 feet above the base of the formation, exposed along the north flank of the Caribou Mountains. The Shaftesbury is prone to kermack-slumping in the form of landslides and mudflows, which are associated in places with spontaneous combustion of shales rich in organic matter. The upper boundary with the Devonian Formation appears conformable and gradational from subsurface data, in the southeast part of the map-area, where the Devonian is absent; equivalent beds are included in the LaLache Formation.

The DUNVEGAN FORMATION underlies the lower slopes of the uplands in the southwest part of the map-area, rising to the north and east to form a narrow outcrop band about the upper slopes of the Caribou Mountains and the northern margin of the Birch Mountains. Exposures are generally poor and discontinuous, consisting mainly of fine-grained, pale grey, fossiliferous, calcareous shale with scattered thin calcareous beds, laminated calcareous siltstone and dark grey silty shale. Although fossil remains are scarce, the beds appear to be of algal origin. The unit thins from 500 feet in the southwest to less than 200 feet in the Caribou and Birch Mountains, grading laterally into marine shale of the LaLache Formation in the southeast part of the map-area.

The term SMOKY GROUP is used for a succession of marine, predominantly shaly beds overlying the Dunvegan Formation in the southwest part of the map-area. Where the Dunvegan Formation is absent by facies change in the southeast, the rocks are included with the Shaftesbury Formation as part of the LAKEBIE FORMATION. West of the Peace River, the Smoky Group is divisible into three units. The lower unit, the KASKAPU FORMATION, is about 500 feet thick near the southwest corner of the map-area, thinning to less than 200 feet to the northeast. The lower 50 to 150 feet of strata comprise a succession of fine-grained quartzite sandstone, dark grey silty shale and thin beds of ferruginous oolitic limestone conformably overlying the Dunvegan Formation. The upper 150 to 400 feet consist of marine dark grey, silty shale gradational at the top with the overlying Red Head Formation. The RED HEAD FORMATION, from 10 to 30 feet thick, is composed of dark brown to green, ferruginous, oolitic sandstone and siltstone with thin layers of siderite and calcareous conglomerate. Drilling data show that the unit consists of northwest-trending linear ridges of rock that form substantial reserves of low grade iron ore in the Clear Hills area. The FUSWASKAU FORMATION underlies the upper slopes of the hills in the southwest part of the map-area. It is a poorly exposed, consisting of marine dark grey, fossiliferous shale 300 to 400 feet thick in the Clear Hills. Northwest exposures of marine dark grey shale are present near the headwaters of small streams flowing across the upper surface of the Caribou Mountains and northern part of the Buffalo Head Hills. Overlying the Dunvegan Formation and attaining estimated maximum thickness of at least 400 feet, the shale is correlated with the Smoky Group to the south on the basis of lithology and stratigraphic position.

The WATT FORMATION, upper the Clear and part of the Chinchaga Hills in the southwest portion of the map-area. About 400 feet thick, the unit consists of massive grey, carbonaceous, fossiliferous sandstone and pale grey bentonitic siltstone and shale with thin coal and benticolite beds.

SURFICIAL DEPOSITS

Most of the map-area is covered by unconsolidated glacial, fluvial and lacustrine deposits ranging in thickness from a few to several hundred feet.

The alluvial deposits consist of quartzite and cherty gravel of fluvial origin overlying bedrock in the Clear Hills. Similar deposits are probably present covering other plateau remnants in the region. Quartzite gravels containing minor amounts of granite and volcanic rock pebbles also underlie glacial drift of the Plains area south and east of the Clear Hills, being found at several elevations. The deposits are post-Cretaceous and pre-glacial, although at least some of the fluvial sand and gravel successions preserved in preglacial river valleys are Pleistocene in age.

Glacial sediments of Pleistocene age cover most of the Plains and much of the Canadian Shield. Of variable thickness and lithology, the deposits consist mainly of clays to sandy till and prodigious lacustrine silts and clays. Thick deposits of outwash sand and gravel also are common, especially in the eastern part of the map-area, south of Lake Athabasca.

Unconsolidated fluvial, lacustrine, and eolian sediments of Recent age are scattered throughout the map-area. The thickest accumulation is at the west end of Lake Athabasca, in the delta formed by the Peace and Athabasca Rivers. Large sand dunes are present in the flat terrain east of the Caribou Mountains and also south of Lake Athabasca; smaller dunes are scattered in the map-area.

OUTCROPS

All known outcrops are indicated by symbol except in the following areas:

- (1) the Peace River valley between township 81, range 13, and township 81, range 6, west of 6th meridian;
- (2) the Peace River valley between township 81, range 24, and township 84, range 20, west of 5th meridian;
- (3) the Athabasca River valley between township 81, range 17, and township 87, range 11, west of 4th meridian;
- (4) the Clearwater and lower Christina River valleys;
- (5) north of Lake Athabasca and east of the Slave River and;
- (6) between Marguerite River and Red Creek in townships 100-101, ranges 4-5, west of 4th meridian.

In these specific areas the extensive bedrock outcrops cannot be indicated without obscuring the rock unit boundaries.

GEOLOGICAL BOUNDARIES

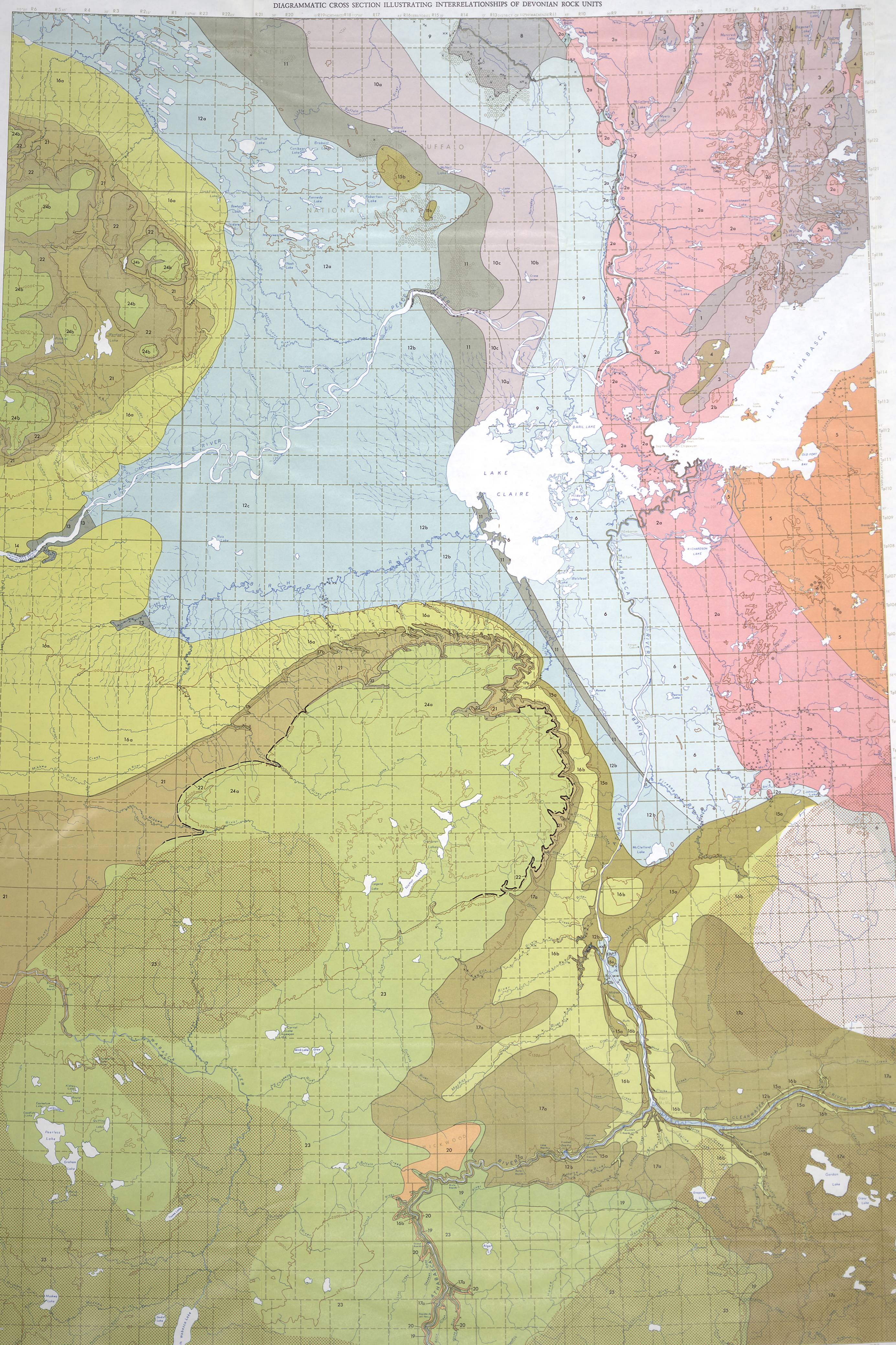
Relatively precise geological boundaries are shown for the Precambrian Shield region north of Lake Athabasca, where approximately 60 per cent of the area is bedrock outcrop. Elsewhere boundaries are limited except along the larger river valleys, therefore, most rock unit boundaries shown are approximate or postulated, and are based on outcrop data supplemented by exploratory well information. Rock-unit boundaries are projected in the land surface except where subsurface data in the Clear Hills, Shaftesbury Formation, and outcrops of the Peace River valley are present near the headwaters of small streams flowing across the upper surface of the Caribou Mountains and northern part of the Buffalo Head Hills. Overlying the Devonian Formation and attaining estimated maximum thickness of at least 400 feet, the shale is correlated with the Smoky Group to the south on the basis of lithology and stratigraphic position.

Where several rock units outcrop along step-sloped valleys of the Athabasca, Clearwater, Peace, and Wabasca Rivers and minor tributary streams, boundaries are shown discontinuously instead of accurately in order to illustrate the presence of all rock units; stream crossing points remain accurately located.

No rock units are shown in the upper Fairbairn River area as no control data are available.

DRIFT

The areas of thick drift, shown by stipple, are indicated by relatively scattered subsurface data, or are postulated from surface morphology (as in the upper Fairbairn River area). Drift, including sand and till units, up to 600 feet thick covers the north flank of Muskeg Mountain and much of the Stoney Mountain area. Similar thicknesses indicate buried valleys beneath the present Lacombe, Loon, Muskeg and upper Wabasca Rivers, and adjacent to the Peace River southwest of Grimshaw. Much of the Cameron Hills area has substantial drift deposits that attain thicknesses of over 1,000 feet, the southwest portion of the Birch Mountains, the Buffalo Head Hill and the Caribou Mountains have thick drift accumulations locally.



EAST HALF — FOR LEGEND SEE WEST HALF

