



LEGEND

RECENT

- EROSIONAL FEATURES**
- 16 Slump: mixed glacial and bedrock materials; unstable slope
 - 15 Gully, creek valley: thin colluvial cover on valley slopes, thin alluvial materials along streams
- DEPOSITIONAL FEATURES**
- 14 Alluvium: floodplain of small streams; mainly bedded silt and clay, some sand
 - 13 Alluvium: Peace River and Slave River floodplains; mainly bedded sand and silt
 - 12 Alluvial fan: bedded silt, sand and clay; variable in thickness; overlying glaciolacustrine deposits
 - 11 River terrace: old terraces along the Peace River; mainly sand

PLEISTOCENE TO RECENT

- AEOLIAN DEPOSITS**
- 10 Aeolian sand: fine- to medium-grained sand in sheet and dune form; developed from detritic and lacustrine deposits; thickest in dunes, thin to nearly absent between dunes
- PLEISTOCENE**
- GLACIOLACUSTRINE DEPOSITS**
- 9 Sand: bedded sand with some silt and clay; generally thick; level topography
 - 8 Silt and clay: bedded silt and clay with minor sand; generally thick; level topography
- GLACIOFLUVIAL DEPOSITS**
- 7 Outwash sand: medium- to coarse-grained sand with pebbles and small gravel lenses; variable in thickness; level to gently undulating topography
 - 6 Kame: sand and gravel to gravel; poorly sorted; stand out as hills above surrounding level topography
- GLACIAL DEPOSITS**
- 5 Colluviated ground moraine: till composed of clay, silt and sand with some gravel; partly bedded near surface; stable slopes; generally thin
 - 4 Hummocky moraine: till composed of clay, silt and sand with some gravel; generally very thick; topography gently rolling to rolling
 - 3 Ground moraine: till composed of sand, silt and clay with pebbles mantling Devonian bedrock highs; generally thin
 - 2 Ground moraine: till composed of sand, silt and clay with gravel in varying proportions; clayey near Caribou Mountains, gravelly in eastern portion of the area and sandy between; variable in thickness although generally thin; topography level to undulating

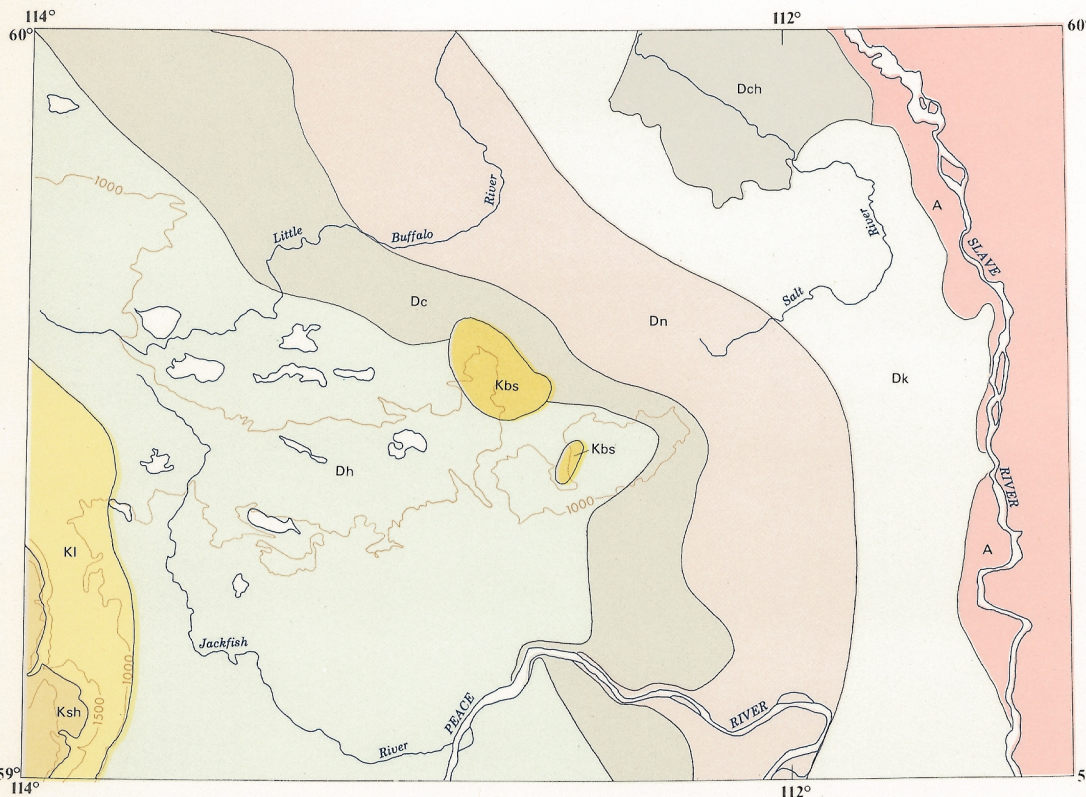
PRECAMBRIAN

- 1 Granite, gneiss and metasedimentary rocks: outcrops form hills and knolls; generally bare
- Geological boundary: defined, approximate, assumed
- Abandoned beach
- Channel scarp (ticks indicate downslope side)
- Glacial meltwater channel
- Bedrock outcrop (not Precambrian)
- Crevasse filling (mainly till)
- Glacial fluting
- Karst area
- Sink hole
- Open sink hole
- Joint sink
- Salt flat: saline spring discharge (mainly sodium chloride)
- Loess: silt and very fine sand, thin to very thin; covering other deposits as shown

Geology by L. A. Bayrock, 1970

BEDROCK GEOLOGY

M. A. Carrey and R. Green, 1965



CRETACEOUS

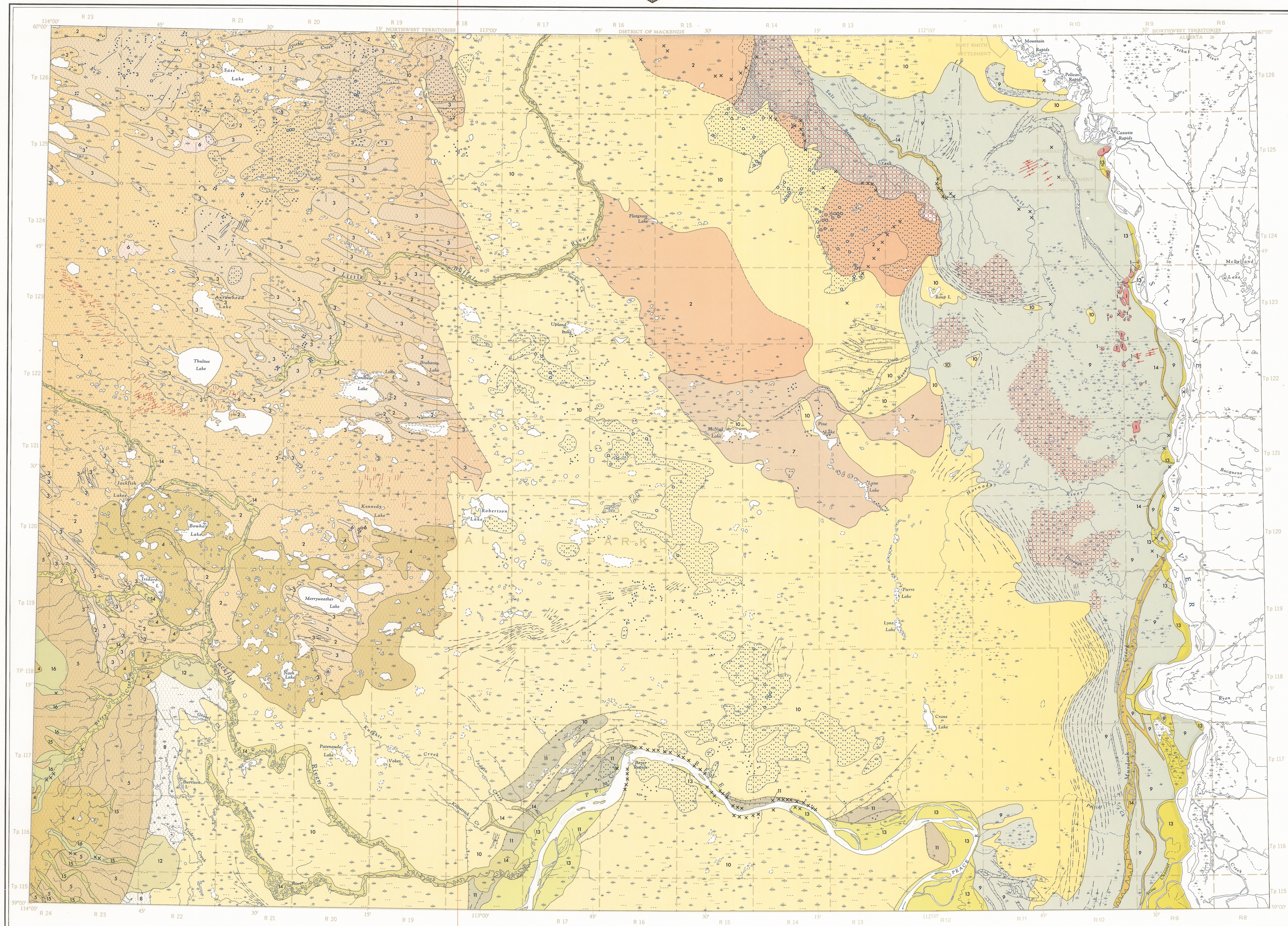
- KR Shalesbury Formation: dark grey shale, silty shale
- KI Loom River Formation: dark grey silty shale, siltstone
- Ks Basal Cretaceous: calcareous quartz sandstone

DEVONIAN

- Dh Hay River Formation: greenish-grey calcareous shale and siltstone, limestone
- Dc Slave Point Formation: limestone and dolomitic limestone, minor shale and gypsum
- Dn Nyarleng Formation: gypsum, argillaceous and dolomitic gypsum, anhydrite
- Dk Keg River Formation: limestone, dolomite
- Dsh Chinchaga Formation: gypsum, dolomitic gypsum and anhydrite, halite

PRECAMBRIAN

- A Granite plutonic rocks
- Geological boundary
- Surface contour (contour interval 500 feet)

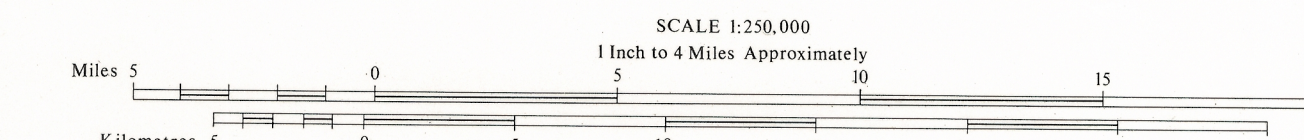


Base map provided by Surveys and Mapping Branch, Department of Energy, Mines and Resources, modified by Surveys Branch, Alberta Department of Highways and Transport

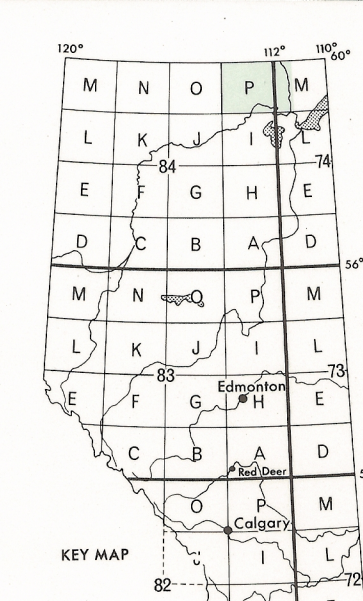
Cartographic editing by J. D. Root

Drawn by F. L. Copeland

- LEGEND**
- River or stream
 - Intermittent river or stream
 - Lake
 - Intermittent lake
 - Township boundary; surveyed, unsurveyed
 - National Park boundary, Indian Reserve boundary



SURFICIAL GEOLOGY PEACE POINT AND FITZGERALD WEST OF 111°20' NTS 84P, 74M



SURFICIAL DEPOSITS AND LANDFORMS

Glacial Deposits

Till, which is unsorted material deposited from a glacier, is divided into two main types on the basis of topography: *ground moraine* has local relief less than 15 feet, and *hummocky moraine* has local relief greater than 15 feet. Hummocky moraine is confined to the southwest part of the Peace Point area, on the eastern slopes of the Caribou Mountains and in the lowlands to the northeast. It is contiguous with ground moraine, which mantles the lower slopes of the Caribou Mountains (*colluviated ground moraine*) and the poorly drained lowlands in the northwest part of the area. In addition, large areas of ground moraine are present in the northeast, partly covered by extensive deposits of aeolian sand. Till in hummocky moraine is greater than 50 feet thick and may exceed 150 feet. Ground moraine is generally less than 50 feet thick and in places is much thinner, especially where it mantles the series of low, oblong, northwest-trending hills (Ninshih Hills) in the northwest, which were formed by differential erosion of Devonian carbonate and evaporite rocks during proglacial (Tertiary?) time.

Till lithology and texture, which largely reflects the composition of the underlying bedrock, varies widely over the map-area. Till close to the Canadian Shield is derived mainly from Precambrian crystalline rocks and contains abundant sand and silt but little clay. Till overlying gypsum bedrock along the escarpment of the Slave River in the northeast corner of the Peace Point area contains up to 50 per cent gypsum. Till associated with Devonian limestones is pink and highly calcareous, in places composed almost entirely of local bedrock. For example, south of the Slave River, escarpment ground moraine resembles limestone rubble with only scattered granitic erratics to confirm its glacial origin. Near the slopes of the Caribou Mountains, underlain by Cretaceous shale, till has a high clay content and is grey where unoxidized. Colluviated ground moraine is made of clayey till which contains numerous small lenses of sorted material.

Glaciofluvial Deposits

Scattered kames are found in the western part of the Peace Point area. Most are moulain kames—stepped, conical hills composed of poorly sorted sand and gravel.

Outwash plains consisting mainly of sand with thin gravel lenses have a much wider distribution in the Peace Point area than indicated on the map. They are exposed over a large area adjacent to Pine Lake in the east-central part of the area but elsewhere are covered by extensive deposits of aeolian sand.

Meltwater channels are channels produced by meltwaters from the glacier. Most of these channels are situated in the eastern part of the area, associated with the lacustrine deposits adjacent to the Slave River. They are floored by sand.

Glaciolacustrine Deposits

Glaciolacustrine sediments are widespread in the area. They comprise the surficial deposits along the eastern margin of the region and over smaller areas in the southwest, at the base of the Caribou Mountains. The eastern deposits form a broad sandy plain on the lowlands adjacent to the Slave River, which narrows southwards due to the onlap of aeolian sand in that direction. In the north the lake sediments consist of well-sorted sand with only small amounts of silt and clay. To the south, near the junction of Peace and Slave Rivers, the deposits consist of medium- to coarse-grained sand and scattered thin clay beds with abundant Cretaceous coal fragments. These sands are inwash materials deposited by the ancestral Peace River in the large proglacial lake which covered the eastern and southern parts of the area in Late Pleistocene (Wisconsin) time. The former boundaries of this lake are marked by numerous subparallel, low sand ridges (beaches), most of which are clustered near the western margin of the lacustrine sand plain covering the Slave River lowlands. Isolated beach ridges also show through the veneer of aeolian sand that covers the central part of the Peace Point area, well to the west of the lacustrine sediments along the Slave River. The ridges probably mark the northern limit of the proglacial lake which flooded the lowlands adjacent to the Peace River; the associated lacustrine sediments now are largely covered by aeolian deposits, except near the base of the Caribou Mountains.

Lacustrine deposits of silty and clayey sand cover a small area near the base of the Caribou Mountains in the southwest, extending to the east under cover of aeolian sands.

Aeolian Deposits

Aeolian sheet and dune sands are the surficial deposits over much of the central and eastern regions, extending southward into the Lake Claire area (NTS Sheet 84I). The dunes are generally large, attaining heights of more than 100 feet, and are separated by deposits of sheet sand a few inches to 10 feet thick. The sand is medium to coarse grained and was derived from underlying lacustrine and outwash and inwash deposits by winds blowing from the southeast (the prevailing wind direction at the present time is from the northwest). The sands are stabilized by vegetation except for small blowouts on some of the larger dunes.

Loess (wind-deposited silt) covers most of the surficial deposits in the western portion of the area west of the central sand dune field. The loess, which is pink, was derived from the extensive lacustrine, outwash and inwash deposits at the time the sand dunes were formed. Near the sand dunes the loess is coarse and may approach very fine sand in texture. To the northwest the loess becomes finer grained, grading into silt. Near the sand dunes loess is more than 6 feet thick; it thins towards the northwest, being only 1 foot thick in the northwestern corner of the area.

Recent Depositional and Erosional Features

Extensive salt flats overlie lacustrine deposits in the northeast, in the lowlands adjacent to the Slave River, resulting from saline Devonian carbonate strata underlain by gypsum and salt beds. Karst development is characterized by two types of sink holes: *circular*, produced by collapse of cave roofs, and *long linear* sink holes, produced by solution along joint planes (joint sinks). Some of the sink holes are open and contain bedrock outcrops. Apparently, karst development has been active since early Tertiary (possibly Cretaceous) time. Present-day karst activity is very strong, for new sink holes are constantly being produced, some of which are in road beds.

Dissected remnants of *old river terraces* are found in places along the Peace River valley. These were incised in glaciolacustrine sediments during the early stages of formation of the Peace River valley and are composed of a thin layer of alluvial sand overlying lacustrine and inwash sediments. No gravel was observed in these terraces or in the more recent alluvial sediments of the Peace River. Recent *alluvial sediments* consisting of bedded sand and silt mantle the wide valley floors of the Peace River and the upper reaches of the Slave River in the southern parts of the area. Small alluvial deposits present along the smaller rivers and streams contain a significant proportion of silt and clay. Where small streams erode till, some gravel may be found in the alluvium.

Alluvial fan deposits cover small areas at the foot of the Caribou Mountains in the southwest, overlying glaciolacustrine silts and clays. They are derived from erosion of soft Cretaceous shales and sandstones and unconsolidated glacial deposits, which form the relatively unstable slopes of the Caribou Mountains. They consist of interbedded clay and silt with thin lenses of sand.

Erosional features include *gullies* and *creek valleys* and *slumps* along the slopes of the Caribou Mountains. They are developed in soft Cretaceous shales and sandstones and derived glacial deposits.

Organic Deposits

Postglacial accumulations of organic materials, commonly called *muskeg*, mantle the surficial deposits over at least half of the area, including the Caribou Mountains in the southwest. The deposits are variable in thickness and grade in places into poorly drained bogs and swamps. Most of the organic deposits contain shallow permafrost.

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