



LEGEND

RECENT

- EROSIONAL FEATURES**
- 15 Slump: mixed glacial and bedrock materials; unstable slope
 - 14 Gully, creek valley: thin colluvial cover on valley slopes; thin alluvial materials along streams
- ALLUVIAL DEPOSITS**
- 13 Delta: Birch and McIvor Rivers; bedded silt and clay, some sand; variable in thickness
 - 12 Delta: Peace River delta; bedded sand, silt and clay; thick to very thick (portion of delta in map-area inactive)
 - 11 Alluvium: floodplain of small streams; mainly bedded silt and clay; some sand
 - 10 Alluvium: Peace River floodplain; bedded sand and silt
 - 9 Alluvial fan: bedded silt, sand and clay; variable in thickness; overlying glaciolacustrine deposits
 - 8 River terrace: old terraces along the Peace River; mainly sand

PLEISTOCENE TO RECENT

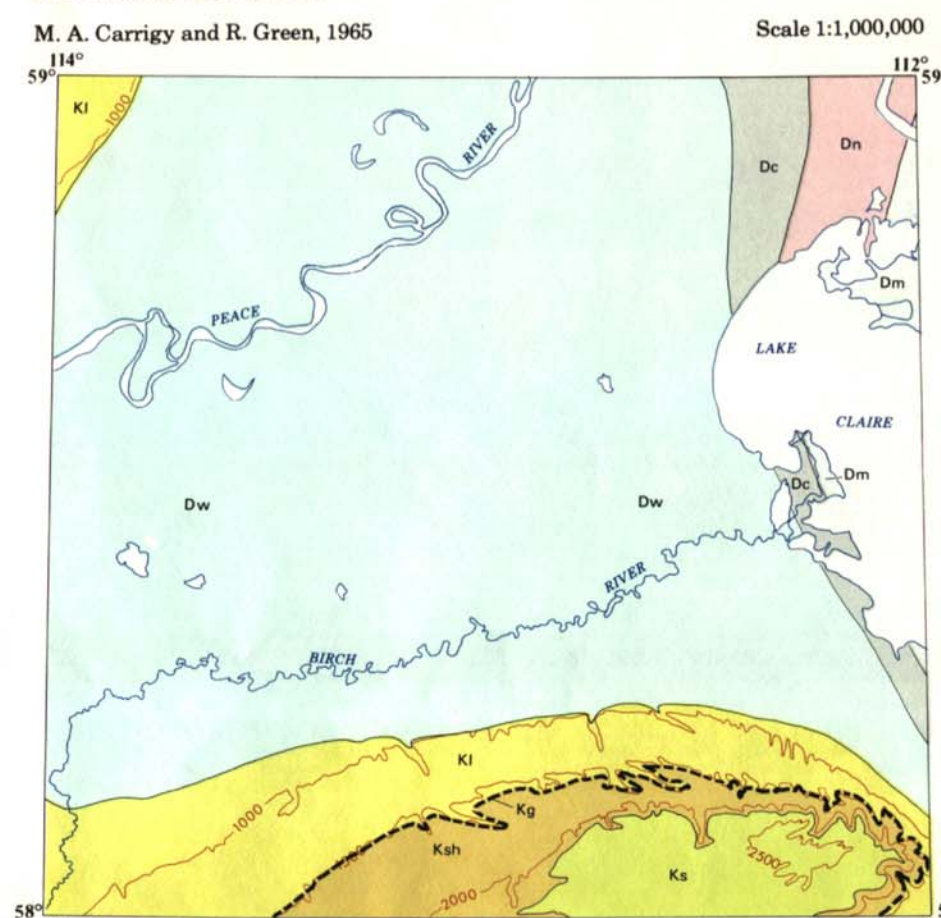
- AEOLIAN DEPOSITS**
- 7 Aeolian sand: fine to medium-grained sand in sheet and dune form; developed from deltaic and lacustrine deposits; thickest in dunes

PLEISTOCENE

- GLACIOLACUSTRINE DEPOSITS**
- 6 Sand: thin sand mantling Devonian bedrock highs
 - 5 Sand: bedded sand with some silt and clay; generally thick; level topography
 - 4 Silt and clay: bedded silt and clay with minor sand; generally thick; level topography
- GLACIAL DEPOSITS**
- 3 Colluviated ground moraine: till composed of clay, silt and sand with some gravel, mantling colluviated slopes; partly bedded near surface; stable slopes; generally thin
 - 2 Hummocky moraine: till composed of clay, silt and sand with some gravel; generally thick; topography undulating to gently rolling
 - 1 Ground moraine: till composed of clay, silt and sand with some gravel; variable thickness; topography level to undulating
- Geological boundary; defined, approximate
- Abandoned beach
- Channel scarp (ticks indicate downslope side)
- Bedrock outcrop
- Glacial fluting
- Karst area
- Open sink hole
- Loess; silt and very fine sand; thin to very thin; covering other deposits as shown

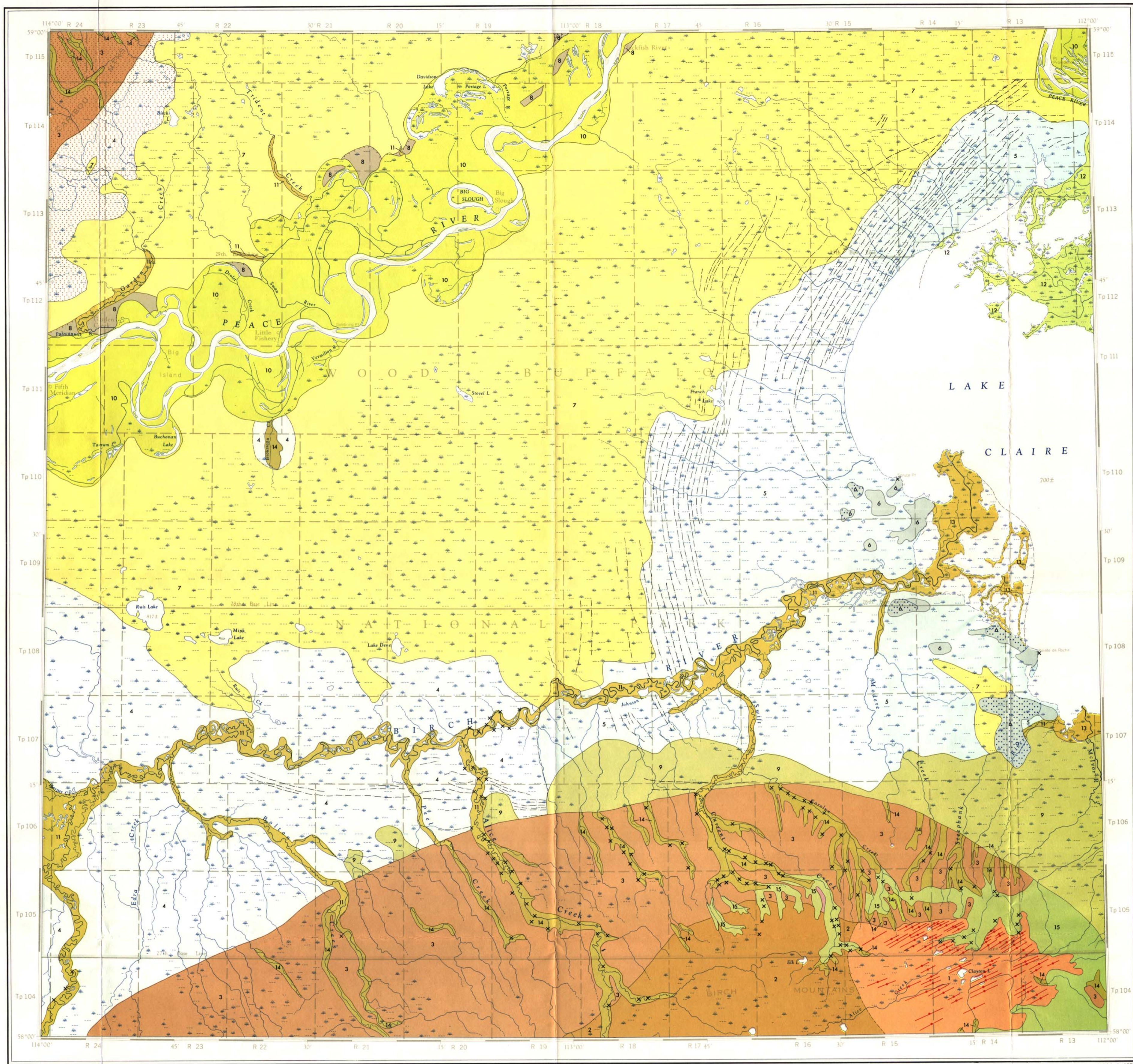
Geology by L. A. Bayrock, 1970

BEDROCK GEOLOGY



LEGEND

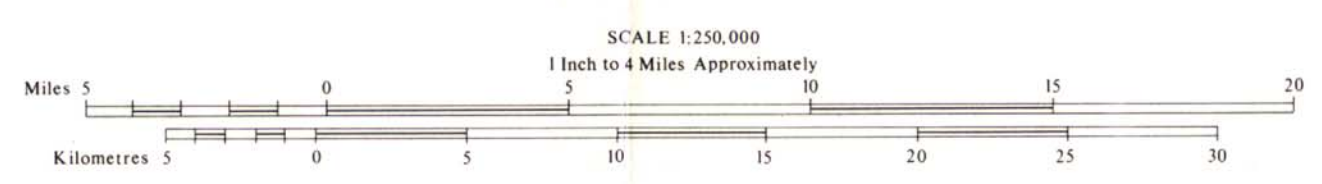
- River or stream
- Intermittent river or stream
- Lake
- Marsh or swamp
- Township boundary; surveyed, unsurveyed
- National Park boundary



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



SURFICIAL GEOLOGY
LAKE CLAIRE
NTS 841

SURFICIAL DEPOSITS AND LANDFORMS

Glacial Deposits

Till, which is unsorted material deposited from a glacier, is subdivided on the basis of topography: *ground moraine* has local relief less than 15 feet, and *hummocky moraine* has local relief more than 15 feet. Till is confined to the slopes and upper surfaces of the Birch and Caribou Mountains in the southern and extreme northwestern parts of the area, respectively. Hummocky moraine is present on the muskeg-mantled upper surface of the Birch Mountains in the south, grading easterly into ground moraine with well-developed flatings. Till composition generally approaches that of stony loam; it has equal proportions of sand, silt, and clay with 10 per cent stones of variable sizes. The slopes of the Birch and Caribou Mountains are covered by *colluviated ground moraine* of variable thickness (generally 10 feet or less) containing lenses of sorted material.

Glaciolacustrine Deposits

Thick *glaciolacustrine* sediments mantle glacial deposits (outwash, till) or bedrock throughout the lowlands between the Birch Mountains on the south and the Caribou Mountains in the northwest. Covered by aeolian sand in the central and northern parts of the area, except about the base of the Caribou Mountains, they form the surficial deposits in a broad band extending parallel to the Birch River and about the shores of Lake Claire. In the west the sediments are mainly silt and clay, whereas about the shores of Lake Claire and beneath nearby aeolian deposits they tend to be sandy. The sandy deposits—generally greater than 50 feet thick—are thinner over a series of low bedrock hills along the southwest shore of Lake Claire, which are underlain by limestone and gypsum of Middle Devonian age. The sediments were deposited during the recession of the Late Pleistocene (Wisconsin) ice sheet, when a large proglacial lake occupied the lowland area. This lake received sediments from the glacier lying to the north and east and from the Peace River to the west, which obtained its sediment load from Cretaceous sandstones and shales in northwestern Alberta and adjacent British Columbia. The nonglacial sediments (inwash) contain abundant coal fragments, whereas the glacial (outwash) sediments from the east contain none. The two types of sediment are well exposed in fresh cuts along the banks of the Peace River.

A series of low, elongate sandy *beaches* extend westward from the margin of Lake Claire to the vicinity of range 18 near Birch River. They mark former positions of the receding proglacial lake and are composed of fine to medium-grained sand. They are tilted to the southwest at a slope of 1 to 2 feet per mile as a result of isostatic readjustment following retreat of the ice sheet. Many of the beaches have been reworked by south-easterly winds and are covered by aeolian sand derived from glaciolacustrine deposits.

Aeolian Deposits

Aeolian sand is found as sheet and dune sand covering lake deposits over much of the west-central and northern lowland areas. The dunes are generally large, attaining heights of more than 100 feet; the interdune areas are covered by thin deposits of sheet sand ranging from a few inches to 10 feet thick. The sand is medium to coarse grained and was derived from underlying glaciolacustrine deposits by winds blowing from the south-east (the prevailing wind direction at the present time is from the northwest). The dunes are presently stabilized by vegetation except for small blowouts on some of the larger dunes.

Loess (wind-deposited silt) is found along the slopes of the Caribou Mountains, overlying colluviated till, and also may be present on top of the lacustrine sediments that skirt the base of this highland area. The deposits are from 2 to 3 feet thick where they have been distinguished from underlying materials.

Alluvial Deposits

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 mantle the wide valley floor of the Peace River and some of the smaller river and stream valleys in the south-central lowlands. Peace River alluvium is mainly sand, whereas the alluvium deposited by the smaller streams contains abundant silt and clay.

Alluvial fan deposits are found in the lowlands adjacent to the Birch Mountains in the southwest, overlying sandy glaciolacustrine sediments. They are derived from erosion of soft Cretaceous shales and sandstones and unconsolidated glacial deposits, which form the relatively unstable slopes of the Birch Mountains. The sediments consist of interbedded clay and silt with thin lenses of sand, and are thickest towards the base of the highland area.

Deltaic sediments deposited by the Peace, Birch, and McIvor Rivers extend into Lake Claire along the eastern margin of the area. The Peace River delta (the portion in the map area is inactive) is composed of silty sand, whereas the two smaller deltas are mainly silty clay with minor sand. Lake Claire itself is very shallow and is bottomed by silt and clay.

Erosional Features

These features include *gullies* and *creek valleys* and *slumps*. Sleep, V-shaped stream valleys of recent erosional origin are present on the flanks of the Birch and Caribou Mountains. They are incised in soft, unstable Cretaceous shales and sandstones which are prone to slumping. Large-scale bedrock slumping also is present along the northeast slope of the Birch Mountains.

Organic Deposits

Postglacial accumulations of organic materials, commonly called *muskeg*, mantle surficial deposits over much of the area, including the highlands. The deposits are variable in thickness and grade in places into poorly drained bogs and swamps.