Alberta RESEARCH

LEGEND

RECENT

DEPOSITIONAL FEATURES

21 *Organic:* muskeg, peat and sedge bog

20 *Colluvium:* thin colluvial material derived from local bedrock

19 *Alluvium:* sand and silt along small streams, gravel and sand along large streams; gravel terraces along large streams

18 *Alluvial fan:* sand and gravel derived from local bedrock; poorly sorted

PLEISTOCENE TO RECENT

AEOLIAN DEPOSITS

17 *Aeolian sand:* fine- to medium-grained sand in sheets and dunes; sand derived from lacustrine and outwash deposits; thickest in dunes, thin to nearly absent between dunes

PLEISTOCENE

GLACIOLACUSTRINE DEPOSITS

16 *Silt, clay and sand:* bedded silt, clay, and sand; generally thick; ice-rafted pebbles common in places

GLACIOFLUVIAL DEPOSITS

15 *Lag gravel:* thin and discontinuous gravel, some sand, confined to areas of eroded till and bedrock

14 *Kame, kame moraine, small esker and related ice-contact deposits:* sand to gravel; generally thick; poorly sorted

13 *Pitted outwash:* gravel with minor sand; generally thick; numerous kettle holes

12 *Outwash gravel:* gravel with minor sand; generally thick; topography level to gently undulating

11 *Outwash sand and gravel:* undifferentiated outwash deposits, generally thick; topography level to gently undulating

10 *Outwash sand:* medium- to coarse-grained sand with pebbles and small gravel lenses; thin to thick; topography level to undulating

9 *Valley train:* gravel with minor sand; generally thick; forms broad terraces; topography level to undulating

GLACIAL DEPOSITS

8 *Sylvan Lake till ground moraine:* continental source; clayey to sandy; generally thin; topography level to undulating

7 *Sylvan Lake till hummocky moraine:* continental source; clayey to sandy; generally thick; topography rolling

6 *Athabasca till ground moraine:* mixed continental and cordilleran source; moderately stony; sandy; generally thin; topography level to undulating

5 *Athabasca till hummocky moraine:* mixed continental and cordilleran source; moderately stony; sandy; generally thick; topography rolling

4 *Jackfish Creek till ground moraine:* Rocky Mountain source; stony, sandy; variable thickness; topography level to undulating

3 *Jackfish Creek till hummocky moraine:* Rocky Mountain source; stony, sandy; generally thick; topography gently rolling

2 *Baseline till:* Rocky Mountain source; stony, sandy; thin to thick; deeply weathered; carbonate free near surface; topography level

DEVONIAN TO PALEOCENE

BEDROCK OUTCROP

1 *Undifferentiated:* mainly sandstone, shale and limestone

Geological boundary: defined, approximate, assumed

Glacial flutings

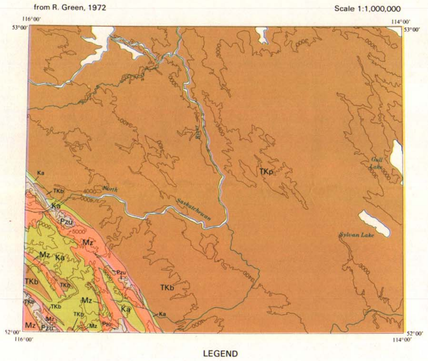
Drumlins (direction of ice movement indicated)

Meltwater channel: large, small

Geology by A. N. Boydell, 1970, 1971,
L. A. Bayrock, 1970, and T. H. F. Reimchen, 1969

BEDROCK GEOLOGY

from R. Green, 1972 — Scale 1:1,000,000



LEGEND

TERTIARY AND CRETACEOUS

TKp *Paskapoo Formation:* grey sandstone, siltstone, mudstone; minor coal

TKb *Brazeau Formation:* chloritic and feldspathic sandstone, blocky grey mudstone; coal beds

CRETACEOUS

Ka *Alberta Group:* dark grey shale; some siltstone

MESOZOIC

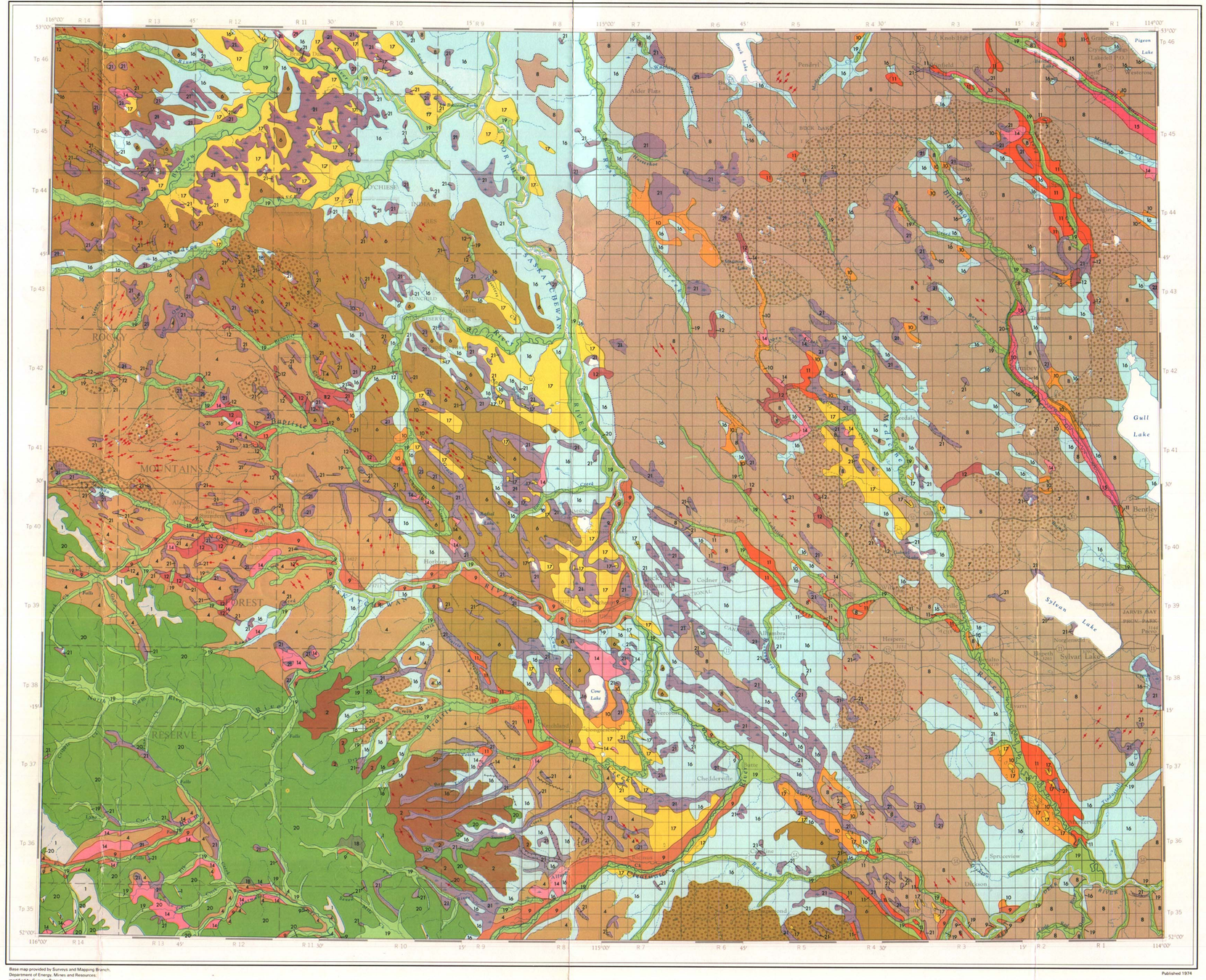
Mz *Lower Cretaceous, Jurassic and Triassic:* siltstone; dark grey and green shale; cherty, siliceous, chloritic and feldspathic sandstones; minor limestone and dolomite

PALEOZOIC

Pzu *Upper Paleozoic:* limestone and dolomite, minor grey shale, siltstone, and chert

Geological boundary

Surface contour —3000—



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 F. H. Smith and A. M. Gill

Drawn by D. E. Jacobs

SCALE 1:250,000
1 inch to 4 Miles Approximately

Miles 5 0 5 10 15 20

Kilometres 5 0 5 10 15 20 25 30

LEGEND

River or stream

Intermittent river or stream

Lake

Intermittent lake

Road, hard surface, all weather

Railway

Township boundary

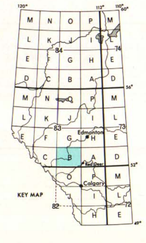
Section line

SURFICIAL GEOLOGY
ROCKY MOUNTAIN HOUSE
NTS 83B

MAPPING COVERAGE

H Helicopter survey

R Road survey



Published 1974

DESCRIPTIVE NOTES

BEDROCK GEOLOGY

The Rocky Mountain House area encompasses parts of the Rocky Mountains, the Foothills, and the Alberta High Plains physiographic regions. The Rocky Mountains, in the southwest, consist of strata of Cambrian to Cretaceous age: Paleozoic carbonate rocks form the main mountain ranges and the outlying Brazeau Range, with less resistant Mesozoic sandstone and shale strata forming the intervening valleys.

The Foothills are a series of northwest-trending ridges and valleys cut by a few east-flowing glaciated river channels. The bedrock is predominantly Jurassic and Cretaceous clastic units: grey and green cherty and chloritic sandstones, dark grey marine shales and a few coal seams.

In the Plains region only one bedrock unit, the Paleocene Paskapoo Formation, is present at the surface. This formation consists of a succession of greyish, calcareous sandstones, siltstones and mudstones which are essentially flat-lying. The more resistant sandstone beds of this unit form sandstone ridges, particularly in the northern part of the map area.

SURFICIAL DEPOSITS AND LANDFORMS

Glacial History

The bedrock surface topography (Carlson, 1971) indicates that the major drainage before glaciation was to the southeast. It appears likely that the present channel of the North Saskatchewan River downstream from Rocky Mountain House developed as a consequence of glacially induced river diversions during Pleistocene time. A number of the preglacial valleys are now buried, and contain sands and gravels, parts of which may be of preglacial age. Other deposits are doubtless of glacial origin, as indicated by the rock types found in the gravels. Although a complete glacial history of this area has not yet been determined, the later Pleistocene sequence of events has been elucidated for the southern part of the region (Boydell, 1972).

The Rocky Mountain House area was affected by at least four Pleistocene ice sheets which originated either in the Rocky Mountains or on the Canadian Shield. The limits of the most recent ice sheets are marked by a zone in which surficial deposits contain materials derived from both the Shield and the Mountains. East of this zone only continental glacial drift is found and to the west only Cordilleran and Rocky Mountain drift.

Till

Several tills are found in the Rocky Mountain House area. The *Hummingbird* till (designated as H on the map and located in Township 36, Range 14) is the oldest till. It does not occur as a surface deposit in the map area, but outcrops at the upper falls of the South Ram River, overlain by Jackfish Creek till. The oldest till forming a surface deposit is the *Baseline* till, which is of Rocky Mountain origin. It is present on the top of plateau-like ridges of the outer Foothills, where it is deeply weathered, the calcium carbonate having been almost totally leached to depths of over six feet.

The *Jackfish Creek* till is a Rocky Mountain till of Late Wisconsin age, which is relatively little weathered and essentially unleached. Generally this till contains an appreciable proportion of carbonate rocks derived from the Rocky Mountains. Over most of the area of its occurrence it is present as ground moraine, but near the towns of Harlech, Alexo, and Ricinus, in the upper Prairie Creek Basin, and on the upper Baptiste River its surface is hummocky. This hummocky phase of the Jackfish Creek till is a recessional moraine of the glacier which flowed down the North Saskatchewan River valley.

The *Athabasca* till occurs in a broad zone between the Jackfish Creek till and the Sylvan Lake till. This mixed till is variable in composition; towards the eastern margin it approaches continental till in composition and towards the western margin Rocky Mountain till. The hummocky phase of the Athabasca till probably represents a terminal moraine of a Late Wisconsin continental advance. Erratics of Rocky Mountain origin occur within the Athabasca till.

The *Sylvan Lake* till was deposited by the continental ice sheet which originated in the Keewatin region of the Canadian Shield. It contains numerous erratics of Precambrian rock types. Generally it is clayey in texture, with little leaching or weathering. Over most of the area of its occurrence it is present as ground moraine. The hummocky portion of the till represents, in parts, a recessional moraine.

Glaciofluvial Deposits and Landforms

Valley train outwash deposits derived from mountain glaciers are present in the southwestern portion of the map area along major rivers as well as some creeks. Generally, the valley train deposits are gravel, but in the downstream portions large sand lenses and layers are found.

Outwash plains and related outwash deposits with nearly level surfaces have been differentiated where possible in terms of predominantly sand or predominantly gravel. Undifferentiated outwash deposits and those consisting of sand and gravel are grouped together as *outwash sand and gravel*. Two gravel *pitted outwash plains* are present, located adjacent to the Baptiste River in the western portion of the area.

Kames, kame moraines, eskers and all other ice-contact fluvial deposits are classified on the map as one unit. Generally, the ice-contact deposits are made of poorly sorted and poorly stratified sand and gravel. Gravel predominates in the deposits derived from mountain glaciers, as in the South Ram River and Clearwater River areas, and sand in those from the continental ice sheet, as for example, near Cow Lake. Thin *lag gravels* occur in scattered locations along two meltwater channels in the northeastern portion of the area; these resulted from erosion of till and bedrock by glacial meltwaters during the last recessional stages of the continental ice sheet in the area. Small, thin deposits of sand and numerous bedrock outcrops also occur in these two places.

Glaciolacustrine Deposits

Numerous glacial lakes, most of which resulted from impounding of meltwaters by the continental ice sheet, existed in the area during the recession of the glaciers. In texture the lacustrine deposits range from clay through silt to sand. Most lacustrine sand deposits have subsequently been modified by wind action. No beaches were found in association with the former lakes. In certain locations the lacustrine deposits contain pebbles derived from drifting icebergs in the lakes. In the vicinity of Chedderville and also south of the Brazeau Reservoir (Tp. 45, R. 11) ice-rafted pebbles are so numerous that the lacustrine deposits have a texture similar to that of till. Generally the surface of the lacustrine plains is nearly level, but north of the town of Eckville and in the vicinity of Caroline the surface is hummocky, resembling that of hummocky moraine.

Aeolian Deposits

Numerous sand dune fields are present throughout the area. Most dunes are of the U-shaped variety and the sand, which in most cases is of glaciolacustrine origin, may reach several tens of feet in thickness. The effective wind direction for the formation of the dunes was from the northwest. No active dunes now exist, due to stabilization by vegetation. Fine- to medium-grained aeolian sheet sand is quite often encountered between the dunes; but this is generally patchy and quite thin. In many places the interdune areas are now filled with muskeg.

Recent Deposits

There are only two *alluvial fans* of mappable size (Tp. 36, Rs. 11 and 12), although many smaller ones are present in the area. The fans, which range in texture from very coarse gravel to sand, are made of material eroded from the bedrock which is exposed on the mountains above.

Colluvium mantles the bedrock over very extensive areas in the Foothills. This colluvium is thin, often less than 10 inches, and is derived from the immediately underlying bedrock. No till or other glacial deposit is present in these areas except for very occasional glacial erratics. The erratics indicate that at one time all of the Foothills in the map area were covered by an ice sheet originating in the mountains, but that later erosion removed most of the glacial drift. The Baseline till is believed to have been deposited during this glaciation.

Recent *alluvial* deposits are present along most of the streams in the map area. Larger rivers carry gravel, and alluvial terraces are often present. Sand and silt deposits are present along small streams.

Postglacial accumulations of *organic materials*, commonly called muskeg or sedge and peat bogs, cover large portions of the area. Most of the muskegs in the area are shallow but some may attain thicknesses of over thirty feet.

REFERENCES:

Boydell, A. N. (1972): Multiple Glaciation in the Foothills, Rocky Mountain House Area, Alberta; unpublished Ph.D. thesis, University of Calgary, 128 pages.

Carlson, V. A. (1971): Bedrock topography of the Rocky Mountain House area NTS 83B, Alberta; Res. Coun. Alberta map, scale 1:250,000.