GEOLOGIC AND STRUCTURE CONTOUR MAP
OF THE WHITEWATER 30' x 60' QUADRANGLE
NORTHEASTERN MONTANA

by

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INTRODUCTION

The distribution of Quaternary alluvium (Qal) on this map was derived principally from interpretation of U.S. Geological Survey 7.5’ topographic quadrangles. The maps by Colton and Patton (1987a, b) provided most of the information on the late Tertiary-early Quaternary deposits (Tsg). The few bedrock contacts depicted on those maps were incorporated into the present geologic map of the Whitewater 30'x 60' quadrangle and extended by maps showing the altitude of the top of the Judith River Formation and Claggett Shale. These latter maps were produced from data in Feltis and others (1981) and from water well logs and microfiche copies of petroleum well logs on file at Montana Bureau of Mines and Geology’s Ground-Water Information Center.

Sandstone of the Judith River Formation generally overlies the Claggett Shale; in some areas, cemented gravel caps the Claggett Shale. Cemented gravels also locally cap the Bearpaw Shale. Along major drainages where glacial or postglacial erosion has cut through the more resistant beds into the shale, landslide deposits in the Claggett and Bearpaw shales are common. Some of the landslides extend for several miles along a stream and may extend back from the stream more than one-half mile.

The map has a bedrock emphasis although bedrock is largely masked by unmapped glacial till. Glacial deposits are mapped in only limited areas and are not differentiated. Structure contours on the tops of the Judith River Formation and Claggett Shale are based on evaluation of well logs. Tertiary and Pleistocene sand and gravel (commonly overlain by till) also mask the bedrock. Most contacts, even where shown as a solid line, should be considered as concealed or approximate.
Figure 1. Location map for Whitewater 30'x60' quadrangle showing areas covered by older geologic maps within the quadrangle (see Sources of Previous Geologic Mapping), and location of adjacent geologic maps published by MBMG.
Correlation Chart of Map Units
Whitewater 30’ x 60’ Quadrangle

Quaternary

| Qal | Qac | Qls | Qao | af | Qg |

Unconformity

Tertiary

Unconformity

| Tsg |

Unconformity

Upper Cretaceous

| Khfh |
| Kb |
| Kjr |
| Kcl |

Figure 2. Correlation chart of map units
MAP UNITS

QUATERNARY

Qal Alluvial deposits (Holocene) — Deposits of gravel, sand, silt or clay in modern channels and flood plains

Qac Alluvium-colluvium (Quaternary) — Includes deposits in alluvial fans and on alluvial terraces, and may include glacial outwash

QIs Landslide deposits (Quaternary)

Qao Older alluvium, pre-Illinoian (Pleistocene) — Possibly the equivalent of the Kintyre Formation of Jensen and Varnes (1964) and Colton and others (1989) in the Glasgow 30’ x 60’ quadrangle

Qg Glacial deposits, undivided (Pleistocene)

af Artificial fill – large remnant pile of rock quarried from Snake Butte to use as rip-rap for Fort Peck Dam

TERTIARY

Tsg Sand and gravel deposits (Miocene-Pliocene) — may include extensive sand and gravel deposits of Pleistocene age

UPPER CRETACEOUS

Khfh Hell Creek and Fox Hills Formations, undivided — Units uncertainly correlated northward into Canada; 20-30 meters (60-100 feet) thick

Kb Bearpaw Shale — 330 meters (1100 feet) thick

Kjr Judith River Formation — 80-140 meters (250-450 feet) thick; thins to the east

Kcl Claggett Shale — 120 meters (400 feet) thick
Contact: dotted where concealed

Significant break in slope between two levels of Qal
REFERENCES

Sources of Geologic Map Data in the Quadrangle


Additional Sources


Whitaker, S.H., 1967, Geology and groundwater resources of the Wood Mountain area (72-G), Saskatchewan Research Council, Geology Division, Map No. 5, scale 1:250,000.