



Surficial geology of a part of the northeast flank of the Bridger Range, Montana
by Verne Keith Schrunk

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE
in Earth Sciences
Montana State University
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Abstract:

The surficial geology of a part of the northeast flank of the Bridger Range, Montana includes such diverse deposits as till, in morainal form, colluvium, talus, landslide debris, and residuum.

Geomorphic evidence in the Fairy Creek basin suggests four distinct glacial advances and retreats. The oldest advance is correlated with the Bull Lake Stage of the classical Rocky Mountain chronology as based on the following criteria at this locality: 1. Till of this age is in a lower stratigraphic position than the other tills here.

2. The moraine representing this advance is furthest downstream from the cirque.

3. The moraine has the most subdued surficial form.

4. There are fewer surface boulders on the moraine of this advance than on the other moraines.

The remaining three advances are correlated with stades I, II, and III of the Pinedale Stage of the classical Rocky Mountain sequence.

As compared to the Bull Lake morainal deposits, Pinedale deposits (1) lie stratigraphically higher, (2) are fresher in appearance, (3) have more boulders exposed at the surface, (4) are of lesser areal extent, and (5) lie nearer to source cirques. Cache Creek and North Fork of Brackett Creek contain all these deposits except for the Pinedale III stade. The South Fork of Brackett Creek, in contrast, displays the three, stades of the Pinedale Stage but not the Bull Lake Stage.

Bedrock in the study area consists of sedimentary strata ranging in age from Late Devonian to Late Cretaceous, though Triassic units are absent. Bedrock, where not covered by till, occurs as isolated patches and knolls and in linear ridges and cliffs.

Land use considerations acknowledge a three-fold division of the study area. The western division is most suitable for its scenic value and should not be developed. The central and eastern divisions could be used for construction of all types, but caution should be used in the eastern division because of steep slopes and considerable quantities of bentonite present in the bedrock and surficial deposits.

SURFICIAL GEOLOGY OF A PART OF THE NORTHEAST
FLANK OF THE BRIDGER RANGE, MONTANA

by

VERNE KEITH SCHRUNK

A thesis submitted in partial fulfillment
of the requirements for the degree

of

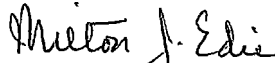
MASTER OF SCIENCE


in

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Approved:


Chairperson, Graduate Committee


Head, Major Department


Graduate Dean

MONTANA STATE UNIVERSITY
Bozeman, Montana

August, 1976

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ABSTRACT

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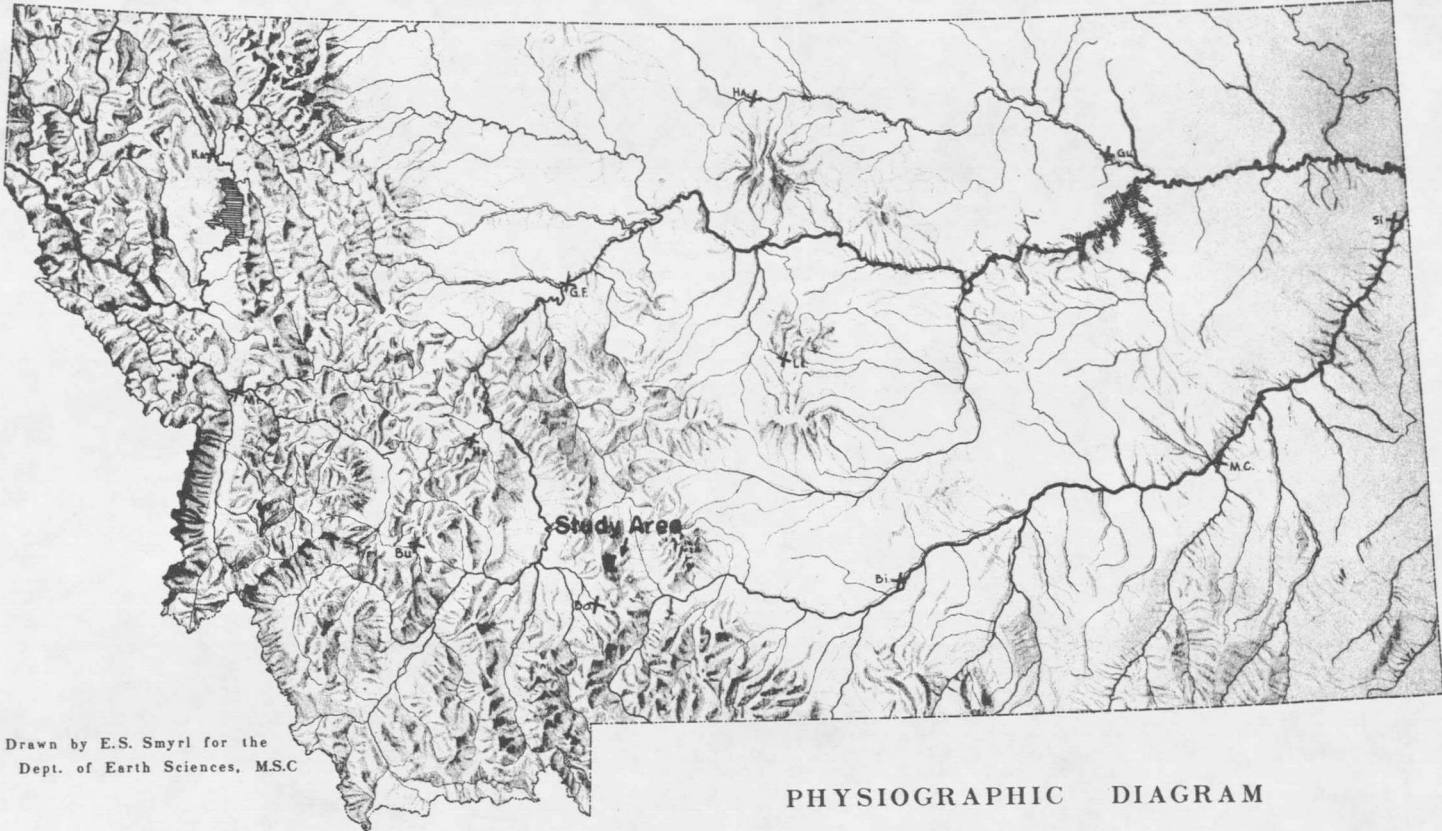
INTRODUCTION

Location of the Area

The area of this field study is situated on the northeast flank of the Bridger Range in northeastern Gallatin County, Montana. The Bridger Range is located north and somewhat east of Bozeman, Montana. It is a linear, gently curving range, approximately 30 miles long, forming the eastern flank of the Gallatin Valley. The range is the southeasternmost unit of the Northern Rocky Mountains province of Fenneman (1931).

Specifically, the study area lies in Townships 1 and 2 North, Ranges 6 and 7 East, or approximate latitude $45^{\circ}50'$ to latitude $45^{\circ}56'$, approximate longitude $110^{\circ}52'$ to longitude $110^{\circ}57'$ (see figure 1). The area of study is about 25 square miles. The boundary on the east is Montana Highway 293 or the Sedan Road. The section line marking the center of Township 1 North from the Sedan Road west to the Range crest forms the southern boundary. The western boundary is the knife-edge crest of the Bridger Range. The northern boundary is the section line marking the center of Township 2 North, from the Sedan Road westward to the crest of the Range.

Primary access to the entire eastern flank of the Bridger Range and the study area is via Montana Secondary 293. Direct access to the area of study is by a few Forest Service and old logging roads and



Drawn by E.S. Smyrl for the
Dept. of Earth Sciences, M.S.C

PHYSIOGRAPHIC DIAGRAM

Figure 1. Index map

numerous hiking and game trails. Moderately dense to dense tree and shrub growth somewhat limits observations.

Physiographic Setting

The highest peak in the Bridger Range is Sacajawea Peak at 9665 feet, and it is within the study area. On and forming the western boundary is the crest of the Range averaging from 8500 to 9000 feet in elevation. The crest is very sharp, almost a knife-edge (see figure 2). The crestline is broken in only two places; in the north by Flathead Pass, and in the approximate center of the Range at Ross Pass. For the most part, this ridge rises abruptly from a somewhat dissected upland sloping to the east. Elevations decrease in the foothills east of the Range to about the vicinity of Montana 293. Further eastward from highway 293, the elevations rise sharply to form Battle Ridge and Grassy Mountain. The lowest point in the map area is 5718 feet, and it is in the extreme northeastern corner of the area at Cache Creek along highway 293.

Local relief is quite great in some places and minimal in others depending upon bedrock type and the erosional processes producing the landforms.

Seven major streams drain the area. Three of these streams, the North, Middle and South Forks of Brackett Creek, form the western headwaters of Brackett Creek. A small piece of the North Branch of

