

**DESCRIPTION OF MAP UNITS**

**Qal** ALLUVIUM (HOLOCENE AND PLEISTOCENE)—includes river gravel along the Madison River

**Tt1** TERTIARY (TERTIARY)—Lava flow, prominent flow bands, red and gray in color, dip to the southwest; lies upon unsectioned pediment gravels north of Snake Lake

**Tt2** PEDIMENT GRAVEL (TERTIARY)—Gravel is chiefly cobbles, but contains lenses of clay, sand, and silt; all identifiable material is of local origin; lies upon thoroughly weathered Pre-Cambrian rocks; more than 60 m (200 ft) thick along the north shore of Snake Lake. The pediment surface is cut smoothly across both gravels and Pre-Cambrian rocks.

**UNCONFORMITY**

**Tt3** FELSITE (TERTIARY)—Intrusive, small plugs of flow-banded felsite; light-gray to dark-reddish in color; contains broken phenocrysts of plagioclase in a groundmass consisting of clay laths of feldspar and cryptocrystalline material, formerly glass; groundmass contains many relic spherules; cuts veins in the lower Hot Springs Mining district. One plug (NW 1/4 sec. 18, T. 3 S., R. 1 E.) near Red Bluff was revealed on a pediment surface and is now partly covered with pediment gravel

**Tt4** INTRUSIVE STOCK (TERTIARY OR CRETACEOUS)—Granite, quartz monzonite, and gneissic granite of Davis, Kinoshita, and Robinson (1965)

**UNCONFORMITY**

**Gc** SEDIMENTARY ROCKS (CAMBRIAN)—Flethead Quartzite and Welsey Shale

**UNCONFORMITY**

**G** TROILITE DIKE (ARCHEAN)—Black, very fine grained, nonfoliated, automorphic granular, highly altered; post-tectonic and probably younger than all of the komatites

**A9** GNEISSIC ROCKS (ARCHEAN)—Granitic to ultrabasic composition, and quartzite. Includes all of the rock types given below

**A9g** MICROCLINE GNEISS (ARCHEAN)—Dominantly microcline, plagioclase, quartz, and biotite; may contain some hornblende; characteristically in thin to medium beds which are parts of thicker units of beds; commonly well foliated; in places foliation is weak to absent and the texture tends to be hypautomorphic; microcline twinning of feldspar is present in all samples; the most abundant rock in the north canyon block between the Bear Trap and Red Bluff faults

**A9g** PLAGIOCLASE GNEISS (ARCHEAN)—Dominantly plagioclase quartz and hornblende or biotite; grades into microcline gneiss with the addition of microcline and becomes biotitic rather than hornblende; well foliated; in thin to medium beds and thicker units of beds; some is schistose; the dominant rock of the middle canyon group; prominent in the quartzite synform; some contains granophyre

**q1,2,3...** QUARTZITE (ARCHEAN)—Beds of nearly pure quartzite; white in color; contains small amounts of biotite, muscovite, or hornblende; the numerals designate mapped units. The quartzite units are difficult to distinguish from each other; nevertheless they are the most distinctive marker units in the metamorphic rocks. Some units probably are discontinuous along strike and may not be as continuous as indicated on the map. They are used chiefly to show the general stratigraphy and structure of the metasediments and interlayered metaigneous rock.

**A** AMPHIBOLITE (ARCHEAN)—Amphibolite and other dark-colored rocks in bedded or layered units; dark gray to black in color; chiefly hornblende or pyroxene; plagioclase varies from abundant to absent; quartz is present in some rocks; most rocks are well foliated and feldspathic; some are thinly bedded and appear to be bedded; others are massive, poorly foliated, and granoblastic; some are serpentinized; all units analyzed chemically are basic to ultrabasic, and are classed as komatites; these rocks are thought to have been flows, sills, and possibly sedimentary detritus derived from flows and tuffs

**P** PORPHYRY DIKES (ARCHEAN)—Chiefly microcline and quartz in varying proportions; most are very coarse grained; some are cut by basic intrusive rocks

**I** INTRUSIVE ROCKS (ARCHEAN)—Pipes, dikes, small plugs, dykes, and masses of irregular shape; one body is funnel-shaped; basic and ultrabasic in composition and rich in magnesium; classed as komatites; contain nickel; some are differentiated; most are altered; many are serpentinized; mineralogy and texture varies greatly because of fractionation, alteration, and metamorphism (see table 1); syntectonic to early post-tectonic in age

- SYMBOLS**
- Contact. Solid line where well known; dashed line where projected long distances between outcrops or where inferred from aerial photographs
  - - - Fault, dashed where inferred; bar and ball on downthrow side
  - Fault showing relative horizontal movement
  - Antiform showing crest line and direction of plunge
  - Synform showing trough line and direction of plunge
  - Strike and dip of beds
  - ⊙ Breccia, showing extent
  - Vein of chalcophy and iron oxide
  - 68 Site of stream sediment sample—Showing number
  - 18 Site of rock sample—Showing number

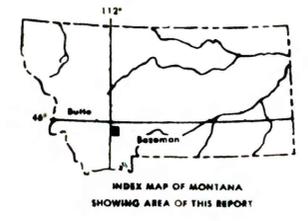


PLATE 1. GEOLOGIC MAP OF THE BEAR TRAP CANYON INSTANT STUDY AREA AND ADJACENT AREAS, SHOWING LOCATION OF SAMPLE SITES, MADISON COUNTY, MONTANA