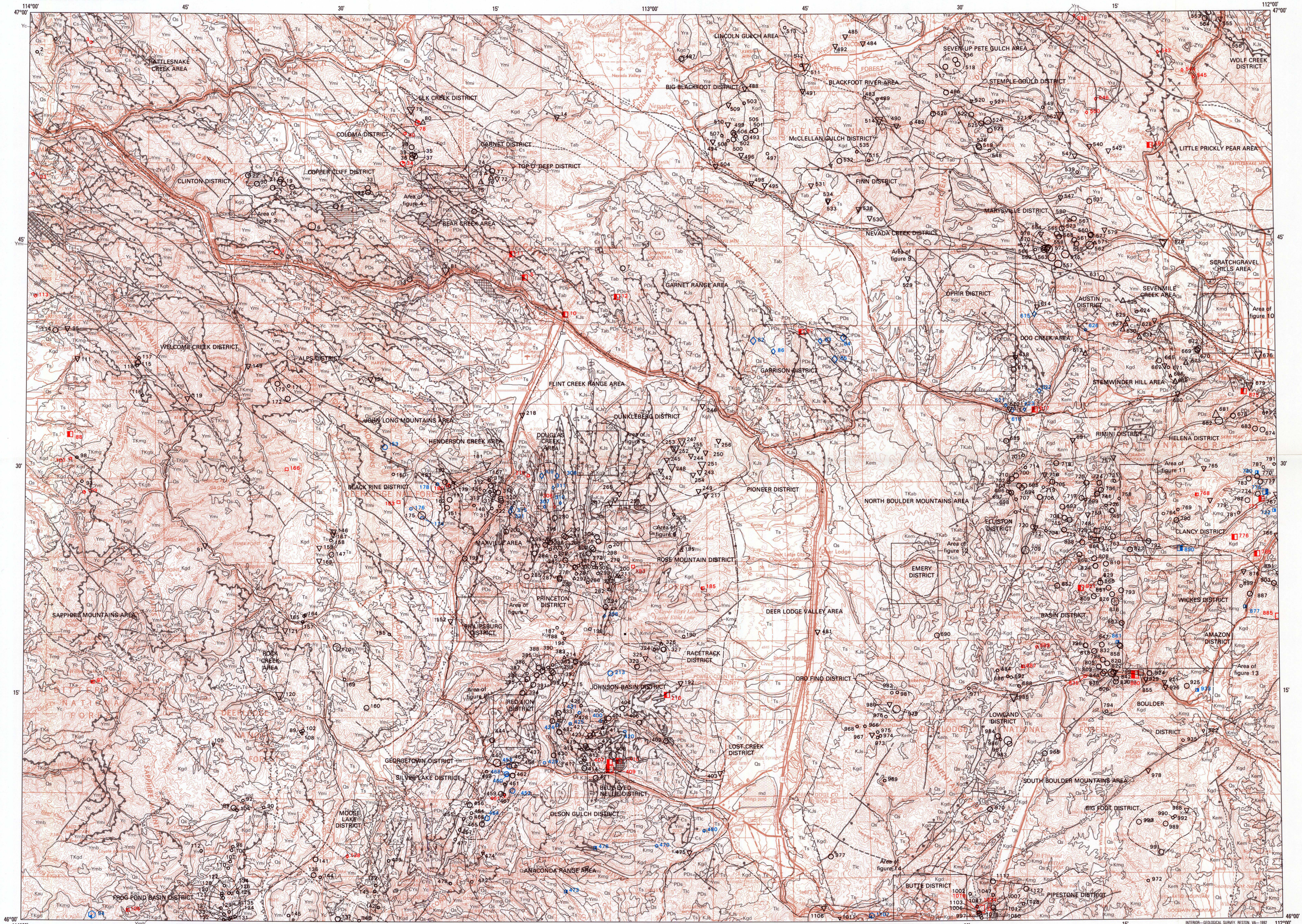
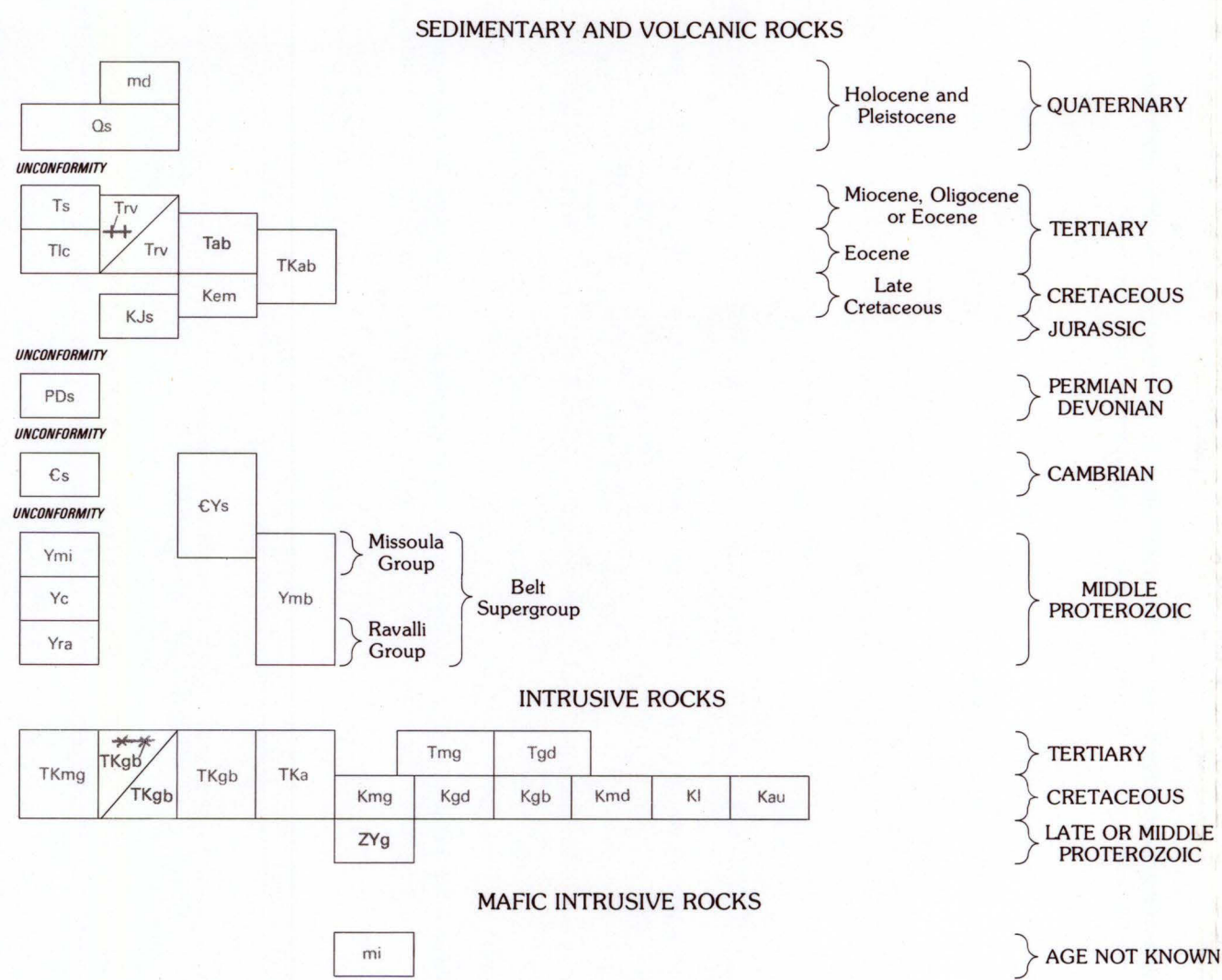




- EXPLANATION FOR MAIN MAP AND FIGURES 3-14**
[Site numbers that accompany symbols on map correspond to mines or prospects described in accompanying pamphlet. Size of symbol denotes status or size of production. Small symbol (○) indicates no or undetermined production, medium-sized symbol (○) indicates production of <\$500,000 or <25,000 tons of ore, and large symbol (○) indicates production of >\$500,000 or >25,000 tons of ore. Mine or prospect symbols without numbers are mine workings on topographic base for which no data are available. These localities were not examined during field investigations.]
- Vein and replacement deposits**
○ 6 Base and precious metals (gold, silver, copper, lead, and zinc)
○ 218 Manganese
○ 464 Tungsten
○ 80 Barite
○ 94 Fluorite
- Skarn deposits**
△ 673 Tungsten, gold, copper, silver, and (or) iron
- Porphyry, stockwork, and disseminated deposits**
□ 1016 Copper, molybdenum, and (or) tungsten
□ 750 Gold and silver
- Stratabound deposits**
◇ 543 Copper and silver
◇ 84 Phosphate
- Placer deposits**
▽ 679 Gold, tungsten, and (or) sapphire
- Miscellaneous deposits**
■ 675 Nonmetallic commodities that may include silica, limestone, dolomite, clay, and vermiculite
■ 775 Metallic commodities that may include uranium in veins, copper and manganese in bog deposits, and beryllium in veins and pegmatites
- Approximate boundary of mining district or area**
— Adit
— Prospect
— Mine or quarry
— Shaft

CONVERSION FACTORS		
Multiply	By	To obtain
inches (in)	2.54	centimeters (cm)
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- MAN-MADE DEPOSITS**
md Placer and mill tailings, mine dumps, and slag piles
- SEDIMENTARY AND VOLCANIC ROCKS**
Qs Surficial deposits (Holocene and Pleistocene)—Alluvium, fan and terrace gravel, colluvium, gravel deposits on pediment surfaces, and landslide and travertine deposits (Holocene and Pleistocene); till, glacial lake, and outwash deposits (Pleistocene)
Ts Sedimentary deposits and rocks (Tertiary)—Fan and gravel deposits (Pliocene) on pediment surfaces (Pliocene?) and conglomerate, sandstone, mudstone, and volcanic ash beds (Miocene, Oligocene, or Eocene?)
Tlv Rhyolitic volcanic rocks (Miocene, Oligocene, and Eocene)—In most of quadrangle, consists mainly of rhyolitic, quartz latitic, and latitic volcanic rocks (Oligocene and Miocene). In the Butte quadrangle, the formations of the Snowcrest Range Group (Conover Ranch, Lombard, and Kibbey Formations) are too thin to map as separate formations (Wardlaw, oral communication, 1986). Three Forks Formation occurs only in northeastern part of quadrangle
Ca Sedimentary rocks (Cambrian) and Hasmark Formation (Upper and Middle Cambrian). Also includes the underlying Park Shale, Meagher Limestone, and Wolsey Shale (Middle Cambrian) in northeast part of quadrangle, all of which are laterally equivalent to the Silver Hill Formation (Middle Cambrian) in west, southwest, and northwest parts of quadrangle. Flathead Quartzite at base (Middle Cambrian) present in entire quadrangle
Cs Sedimentary rocks (Cambrian and Middle Proterozoic)—Consists of lower Paleozoic and upper Middle Proterozoic rock units that are structurally superposed or are too thin to show at this scale. Red Lion (Upper Cambrian) and Hasmark (Upper and Middle Cambrian) Formations, Silver Hill Formation (Middle Cambrian), Flathead Quartzite (Middle Cambrian) may be present overlying any of these Middle Proterozoic units (Picher Quartzite, Garnet Range, or McNamara Formations) (Middle Proterozoic)
Cys Sedimentary rocks (Cretaceous and Jurassic)—In northeast corner of quadrangle, consists of Two Medicine Formation, Virgelle Sandstone, Telegraph Creek Formation, Marias River Shale (Upper Cretaceous), and Blackfoot Formation (Lower Cretaceous). In area west, northwest, and north

- of Deer Lodge, consists of Golden Spike Formation and Carter Creek (originally spelled "Carter Creek" by Quinn (1961) and now changed to "Carter Creek" to conform to U.S. Board on Geographic Names), Jens, and Coberly Formations of Gwinn (1961) (Upper Cretaceous); Blackfoot and Kootenai Formations (Lower Cretaceous); Morrison Formation (Upper Jurassic); and Ellis Group (Upper and Middle Jurassic)
Yc Middle Belt carbonate rocks—Mainly consists of upper and middle members of the Wallace Formation west of long 113°30' W. and the laterally equivalent Helena Formation east of long 113°30' W.
Yra Ravalli Group—Consists of Empire, Spokane, and Greyson Formations
Ymb Metamorphosed rocks of the Belt Supergroup—Consists of quartzite, biotite-muscovite schist, quartzofeldspathic gneiss, calc-silicate gneiss, and migmatite. Metamorphosed during Late Cretaceous or early Tertiary time
- INTRUSIVE ROCKS**
Tmg Granitic rocks (Tertiary)—Mainly muscovite-biotite granite and monzogranite
Tgd Granodioritic rocks (Tertiary)—Mainly quartz monzodiorite and granodiorite
TKmg Granitic rocks (Tertiary and Late Cretaceous)—Consists of foliated and nonfoliated biotite-muscovite monzogranite, leucomonzonite, and granodiorite
TKgd Granodioritic rocks (Tertiary and Late Cretaceous)—Mainly foliated and nonfoliated biotite granodiorite, hornblende-biotite granodiorite, tonalite, and quartz diorite
TKgb Gabbroic rocks (Tertiary and Late Cretaceous)—Consists of gabbro, microgabbro, and diorite
TKa Alkaline rocks (Tertiary or Late Cretaceous)—Pyroxenite, leucosyenite, and hornblende syenite
Kmg Granitic rocks (Late Cretaceous)—Mainly granite porphyry, biotite monzogranite porphyry, biotite monzogranite, biotite-muscovite monzogranite, biotite-muscovite granodiorite, quartz monzonite, microleucomonzonite, leucomonzonite, apatite, alkali, and pegmatite
Kgd Granodioritic rocks (Late Cretaceous)—Consists of foliated and nonfoliated biotite-hornblende granodiorite, biotite-hornblende granodiorite porphyry, biotite-hornblende monzogranite, and tonalite
Kgb Gabbroic rocks (Late Cretaceous)—Diorite, diorite porphyry, gabbro, microgabbro, and diorite
Kmd Monzonitic rocks (Late Cretaceous)—Mainly hornblende quartz diorite, granodiorite, tonalite, quartz monzodiorite, diorite, quartz diorite, leucogranodiorite, and augite-hornblende monzonite
Kl Latite (Late Cretaceous)—Sill in northeastern corner of map
Khu Augen gneiss (Late Cretaceous)—Part of the Idaho batholith in southwestern corner of map
- BELT SUPERGROUP (MIDDLE PROTEROZOIC)**
Ymb Missoula Group—Consists of Picher Quartzite, Garnet Range and McNamara Formations, Bonner Quartzite, and Mount Shields, Shepard, and Snowplow Formations

- Gabbroic rocks (Late or Middle Proterozoic)**—Gabbro, microgabbro, and diorite dikes and sills
MAFIC INTRUSIVE ROCKS OF UNCERTAIN AGE
mi Diorite and diorite porphyry, diabase, gabbro, microgabbro, and diorite
- Contact**—Long-dashed where inferred or approximately located; short-dashed where concealed by younger deposits
Normal fault—Ball and bar on apparent downthrown block. Long-dashed where inferred or approximately located; short-dashed where concealed by younger deposits
Strike-slip or oblique-slip fault—Arrows show inferred direction of relative lateral movement. Ball and bar show apparent direction of dip-slip offset. Long-dashed where inferred or approximately located; short-dashed where concealed by younger deposits
Thrust fault—Sawtooth on upper plate. Short-dashed and open sawtooth where concealed by younger deposits
Anticline—Shows trace of axial plane, direction of plunge, and dip directions of limbs. Short-dashed where concealed by younger deposits
Syncline—Shows trace of axial plane, direction of plunge, and dip directions of limbs. Short-dashed where concealed by younger deposits
Overturned anticline—Shows trace of axial plane, direction of plunge, and dip directions of limbs. Short-dashed where concealed by younger deposits
Overturned syncline—Shows trace of axial plane, direction of plunge, and dip directions of limbs. Short-dashed where concealed by younger deposits
- Zone of imbricate thrust faults**
In Mississippian, Devonian, and Cambrian strata
In Wallace and Helena Formations and Missoula Group strata
In Mississippian, Pennsylvanian, Permian, Jurassic, and Cretaceous strata
In Cambrian and Middle Proterozoic strata
Silicified shear zone—In Mississippian and Devonian strata

MAPS SHOWING LOCATIONS OF MINES AND PROSPECTS IN THE BUTTE 1° x 2° QUADRANGLE, WESTERN MONTANA

By
J.E. Elliott, J.S. Loen, K.K. Wise, and M.J. Blaskowski
1992