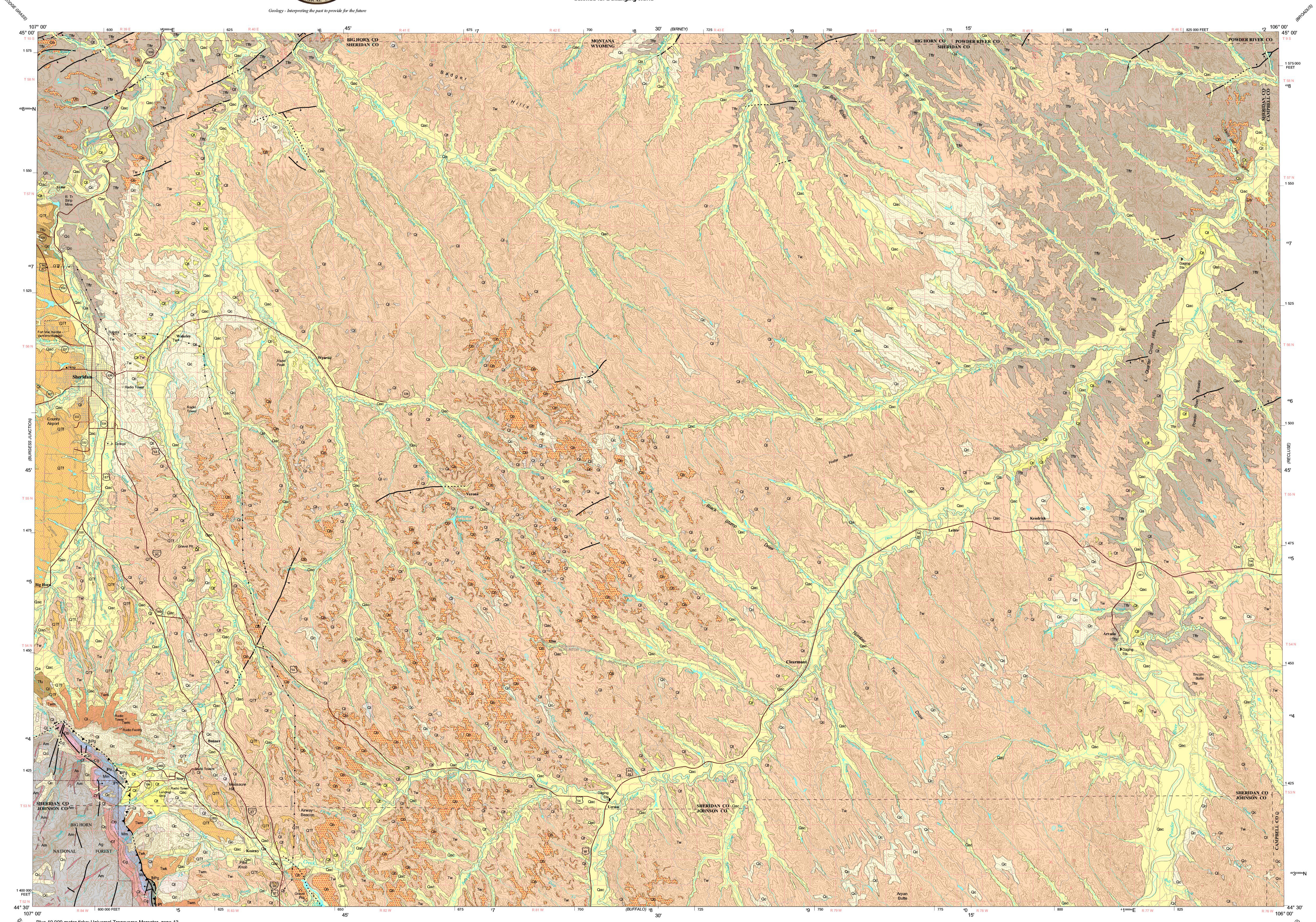
WYOMING STATE GEOLOGICAL SURVEY
Laramie, Wyoming

Geology - Interpreting the past to provide for the future

Prepared in cooperation with the U.S.GEOLOGICAL SURVEY

Geologic Hazards Section Digital Map 01-1 (HSDM 01-1)
Preliminary Geologic Map of the Sheridan Quadrangle
1:100,000-Scale Series



CLASSIFICATION OF MAP UNITS

- Qa — Alluvial deposits (Holocene)
- Qc — Colluvium (Holocene)
- Ql — Landslide Deposits (Holocene/Pleistocene)
- Qac — Mixed alluvium and colluvium (Holocene/Pleistocene)
- Qb — Baked and fused rock (Clinker)
- Qt — Terrace deposits (Pleistocene)
- QTf — Older Alluvial fan deposits (Lower Pleistocene/Pliocene?)

Unconformity

- Tw — Wasatch Formation (Eocene and Paleocene)
  - Twm — Moncrief Member
  - Twk — Kingsbury Member
- Tfu — Fort Union Formation Undivided (Paleocene)
  - Tftr — Tongue River Member

Unconformity

- ℞c — Chugwater Formation (Upper and Lower Triassic)
- ℞Pg — Goosegg Formation (Triassic and Permian)
- IPt — Tensleep Sandstone (Pennsylvanian)
- IPa — Amsden Formation (Pennsylvanian)

Unconformity

- Mm — Madison Limestone (Upper and Lower Mississippian)

Unconformity

- Ob — Bighorn Dolomite (Upper and Middle Ordovician))

Unconformity

- €g — Gallatin and Gros Ventre Formations (Upper and Middle Cambrian)
- €f — Flathead Sandstone (Middle Cambrian)

Unconformity

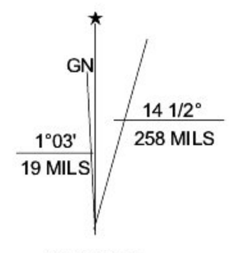
- Am — Mafic Rocks (Archean)
- Ag — Granite Rocks (Archean)
- As — Metasedimentary Rocks (Archean)

MAP SYMBOLS

- formation contact
- fault
- normal fault
- thrust fault
- concealed
- approximate

Blue 10 000-meter ticks: Universal Transverse Mercator, zone 13
25 000-foot grid ticks: Wyoming Coordinate System of 1927, East zone

Digital public land survey, hydrography, hypsography and transportation by U.S. Geological Survey, various years



UTM GRID
DECLINATION AT CENTER OF SHEET
DIAGRAM IS APPROXIMATE

SCALE 1:100 000

KILOMETERS

MILES

FEET

QUADRANGLE LOCATION

This report is preliminary and has not been reviewed for conformity with Wyoming State Geological Survey editorial standards

Prepared in cooperation with the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under Cooperative Agreement Number 00HQAG0123

PRELIMINARY DIGITAL GEOLOGIC MAP OF THE SHERIDAN 30' x 60' QUADRANGLE, SHERIDAN, JOHNSON AND CAMPBELL COUNTIES, WYOMING, AND SOUTHEASTERN MONTANA

mapped and compiled by
Alan J. Ver Ploeg and Cynthia S. Boyd, 2001

digital cartography by
Bret L. Noeker, 2001

GEOLOGIC HAZARDS SECTION DIGITAL MAP 2000-1

(HSDM 2001-1)

PRELIMINARY DIGITAL GEOLOGIC MAP OF THE SHERIDAN 30′ X 60′ QUADRANGLE, JOHNSON AND CAMPBELL COUNTIES, WYOMING AND SOUTHERN MONTANA

Mapped and Compiled by Alan J. Ver Ploeg and Cynthia S. Boyd
Digital cartography by Bret L. Koecker

WYOMING STATE GEOLOGICAL SURVEY

Laramie, Wyoming
2001

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DESCRIPTION OF MAP UNITS

HOLOCENE AND PLEISTOCENE SURFICIAL DEPOSITS

Qa **ALLUVIAL DEPOSITS (HOLOCENE)--**Unconsolidated and poorly consolidated clay, silt, sand, and gravel, mainly in channel or meander belt of creeks and rivers; clay, silt, and sand in Lake DeSmet. Mapped with older alluvium in the upper parts of valleys. Estimated maximum thickness 50 feet (description modified from Hinrichs, 1988).

Qc **COLLUVIUM (HOLOCENE)—**Unconsolidated, nonsorted to poorly sorted sand, silt, clay, sparse gravel, and masses of rock fragments derived locally through mass wasting; slope wash and talus. Only larger and thicker masses mapped; at sides and heads of valleys mapped with older alluvium. Estimated maximum thickness 10 feet (description modified from Hinrichs, 1988).

Ql **LANDSLIDE DEPOSITS (HOLOCENE/PLEISTOCENE)--**Blocks of bedrock, surficial materials, or loose slope debris that have fallen, slumped, or flowed down moderate to steep slopes, especially those weakened by water and undercutting (description modified from Hinrichs, 1988). Only landslides of approximately 10 acres or larger are shown due to map scale limitations, for more detail on landslides see Hinrichs (1988).

Qac **MIXED ALLUVIUM AND COLLUVIUM (HOLOCENE/PLEISTOCENE)--**Sand, silt, clay, and gravel deposited mainly along intermittent streams and rivers; includes slope wash and smaller alluvial fan deposits that coalesce with alluvium and youngest low level terrace deposits. Estimated maximum thickness 85 feet (description modified from Hinrichs, 1988).

Qb **BAKED AND FUSED ROCK (CLINKER)—**Hard, dense red to orange baked shale and siltstone, and black bubbly sometimes glassy rock formed as overlying strata was altered by burning coal beds in the Wasatch and Fort Union Formations. Talus forms locally where blocks have detached from scarps of baked and fused rock and moved downslope. Occurrences shown on the map are taken from Culbertson and Klett (1975a), Culbertson and Klett (1975b), Kanizay (1978), Kanizay and others (1976), Mapel (1959), Mapel and Dean (1976a), Mapel and Dean (1976b), and Molnia and Orrell (1988). Only outcrops of approximately 10 acres or larger are shown due to map scale limitations, for more detail on clinker occurrences refer to the above listed maps.

Qt **TERRACE DEPOSITS (PLEISTOCENE)--**Beds of pebble and cobble gravels and lenses of silt and sand locally cemented by calcium carbonate. Occur along present drainages, a few feet to over 427 feet above modern flood plains. Estimated maximum thickness 23 feet (description modified from Hinrichs, 1988).

QTf **OLDER ALLUVIAL FAN DEPOSITS (PLEISTOCENE/PLIOCENE?)—**Boulder gravels in a coarse matrix which is at most localities yellowish-brown from hydrous iron oxides; subrounded and rounded pebbles, cobbles, and boulders of igneous, metamorphic, and resistant sedimentary rocks on beveled bedrock surfaces 100 to 590 feet above current drainages. Grade into older mixed alluvium and colluvium deposits on the west side of Goose Creek. Estimated maximum thickness 50 feet (description modified from Hinrichs, 1988).

UNCONFORMITY

TERTIARY SEDIMENTARY DEPOSITS

Tw **WASATCH FORMATION (EOCENE AND PALEOCENE?)—**Lenticular interbeds of gray to light-brown, fine- to coarse-grained, locally conglomeratic, feldspathic to arkosic, crossbedded sandstone; dark- to light-gray or brown or greenish-gray shale, claystone, and siltstone; and subbituminous and lignitic coal beds which grade laterally into carbonaceous shales. Locally coal

beds have burned, altering the overlying units into distinctive resistant clinker beds. Base of formation overlies the Roland coal of Baker (1929) in the western portion of the map and is mapped at the base of the Arvada coal bed in the northeast part of the map (Molnia and Orrell, 1988). Based on palynological data, the age of the lower portion of the Wasatch in the northeast portion of the map is Paleocene (Molnia and Orrell, 1988). However this Paleocene age may not extend to the Wasatch as it is mapped on the west portion of the map. Exposed thickness of 1000 feet (description based on Kanizay, 1978 and Molnia and Orrell, 1988).

Twm **Moncrief Member—**Poorly stratified pale-gray and pale-brown poorly indurated congomerate consisting of round and subround pebbles, cobbles, and boulders of Precambrian granite, gneiss, pegmatite, schist, and diabase, with sparse pebbles and cobbles of quartzite, sandstone, limestone, dolomite, and chert near the base. Thins to the east becoming finer grained as it merges into the main body of the Wasatch Formation. Type locality on north face of Moncrieffe Ridge. Incomplete exposed thickness of 900 feet (description and thickness modified from Hinrichs, 1983).

Twk **Kingsbury Member—**Lenticular beds rounded pebbles and cobbles of limestone, dolomite, quartzite, sandstone, and chert in a matrix of sand and silt and interstratified with beds of light – gray and light greenish-gray shale and sandy shale. Unconformably overlies the Fort Union Formation in the southwest corner of the map. Grades laterally south and east into finer grained units of the main body of the Fort Union Formation. Exposed thickness ranges from 100 to 800 feet along the flanks of the Bighorn Mountains with the greater thicknesses located south of the map area (description and thickness modified from Hinrichs, 1983 and Kanizay and others, 1976).

Tfu **FORT UNION FORMATION UNDIVIDED (PALEOCENE)**—The Wasatch-Fort Union contact is at the top of the Roland coal of Baker (1929) on the western portion of the map and is mapped at the base of the Arvada coal bed in the northeast part of the map (Molnia and Orrell, 1988). Yellowish-gray sandstone and siltstone; coals and carbonaceous shales; and, locally, thin lenses of conglomerate. Not divided into members south of the Tongue River where coals are interbedded with carbonaceous shale and are not well exposed. Exposed thickness of 400 feet as described by Hinrichs (1983).

Tftr **Tongue River Member—**Top is marked by the Roland coal of Baker (1929) and is mapped at the base of the Arvada coal bed in the northeast part of the map (Molnia and Orrell, 1988). Pale yellowish-gray sandstone, fine- to medium-grained, lenticular, and crossbedded with light-gray shale and mudstone. Coal and carbonaceous shale common. Locally coal beds have burned, altering the overlying units into distinctive resistant clinker beds. Exposed thickness ranges from 700 feet in the northeast corner of the map to nearly 1000 feet in the northwest portion of the map (description and thickness modified from Molnia and Orrell, 1988 and Kanizay, 1978).

TRIASSIC, PERMIAN, PENNSYLVANIAN, MISSISSIPPIAN, ORDOVICIAN AND CAMBRIAN SEDIMENTARY DEPOSITS

UNCONFORMITY

Trc **CHUGWATER FORMATION (UPPER AND LOWER TRIASSIC**)—Orange-red silty sandstone, poorly indurated. Incomplete section poorly exposed in the leading edge of the Piney Creek thrust block in the southwest corner of the map. Description modified from Hinrichs (1988).

TrPg **GOOSE EGG FORMATION (TRIASSIC AND PERMIAN)—**Pale-gray and pale-pink very finely crystalline vuggy limestone; gray sandstone and siltstone; and thin beds of red shale. Incomplete section poorly exposed in the leading edge of the Piney Creek thrust block in the southwest corner of the map. Description modified from Hinrichs (1988).

lPt **TENSLEEP SANDSTONE (PENNSYLVANIAN)—**Pale-brown very fine-grained quartz sandstone , mainly calcareous and crossbedded. Thin beds of pink to grayish yellow dolomite with thin chert beds near the base of the formation. Thickness ranges from 300 to 400 feet. Poorly exposed in the leading edge of the Piney Creek thrust block in the southwest corner of the map. Description modified from Hinrichs (1988) and Kanizay (1978).

lPa **AMSDEN FORMATION (PENNSYLVANIAN)—**Thin interbeds of yellowish-gray dolomite, limestone, pink chert, red and gray siltstone, and brown fine-grained sandstone. Thickness about 250 feet. Poorly exposed in the leading edge of the Piney Creek thrust block in the southwest corner of the map. Description modified from Hinrichs (1988).

UNCONFORMITY

Mm **MADISON LIMESTONE (UPPER AND LOWER MISSISSIPPIAN**)—Yellowish-gray thick-bedded limestone, dolomitic limestone, and dolomite. Weathers to pale bluish gray. Minor red clay in some cavernous zones in the middle part of the formation from the overlying basal Amsden Formation shales. Pale-brown and gray chert in irregular nodules. Forms prominent cliffs and flatirons on leading edge of the Piney Creek thrust block. Thickness about 600 feet (description modified from Hinrichs, 1988).

UNCONFORMITY

Ob **BIGHORN DOLOMITE (UPPER AND MIDDLE ORDOVICIAN)—**Pale-gray dolomitic limestone and pale-gray and brown massive dolomite in beds as much as 20 feet thick, thinner beds at top. Weathers to rough pitted surface. Sparse nodules and lenses of pale-brow chert on bedding planes, most abundant in middle part. Lower part of formation consists of pale-gray to pale-brown weathering sandstone, fine- to medium-grained, noncalcareous, about 50 feet thick. Forms prominent cliffs and flatirons on leading edge of the Piney Creek thrust block. Total thickness of 350 feet (description modified from Hinrichs, 1988).

UNCONFORMITY

Cg **GALLATIN AND GROS VENTRE FORMATIONS (UPPER AND MIDDLE CAMBRIAN)—**Thin interbeds of gray and greenish-gray silty shale, limestone, gray and brown sandstone, siltstone, and conglomerate of flat limestone pebbles. Forms grass-covered gentle to moderate slopes with sparse outcrops on leading edge of the Piney Creek thrust block. Landslides are common on these outcrops. Thickness ranges from 450 to 650 feet **(**description modified from Hinrichs, 1988).

Cf **FLATHEAD SANDSTONE (MIDDLE CAMBIAN)—**Gray and brown very fine- to medium-grained sandstone in beds as much as 3 feet thick; locally conglomeratic and crossbedded. Thin interbeds of greenish-gray shale and siltstone. Basal unit is a arkosic conglomerate. Thickness 450 to 700 feet, description modified from Hinrichs, 1988).

UNCONFORMITY

ARCHEAN ROCKS

Am **MAFIC ROCKS (ARCHEAN)—**Dikes and small plugs of dark-green to black fine- and medium-crystalline diabase, diorite, gabbro, and peridotite, mostly altered to clay minerals including sericite, chlorite, and serpentine. Generally more resistant to erosion than the surrounding granite, forming rounded ridges and hills. Occur in Piney Creek thrust block west of the overturned or steeply dipping Paleozoic rocks on the leading edge of the block. Description modified from Hinrichs (1988).

Ag **GRANITIC ROCKS (ARCHEAN)—**Gray and pinkish orange granite, quartz monzonite, and quartz diorite, gneissoid in many places. Numerous thin dikes of aplite and unzoned pegmatite. Description modified from Hinrichs (1988).

As **METASEDIMENTARY ROCKS (ARCHEAN)—**Very pale gray and white quartzite; gray and orange-brown quartz-microcline gneiss; and green and white chlorite schist. Description modified from Hinrichs (1988).

MAP SYMBOLS

Formation contact--Dashed where approximately located

Fault--Dashed where approximately located, dotted where concealed. Bar and ball on downthrown block; arrows indicate relative direction of oblique-slip movement. No indication on fault trace indicates undetermined motion.

Thrust fault--Dashed where approximately located, dotted where concealed. Sawteeth on upthrown block.

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