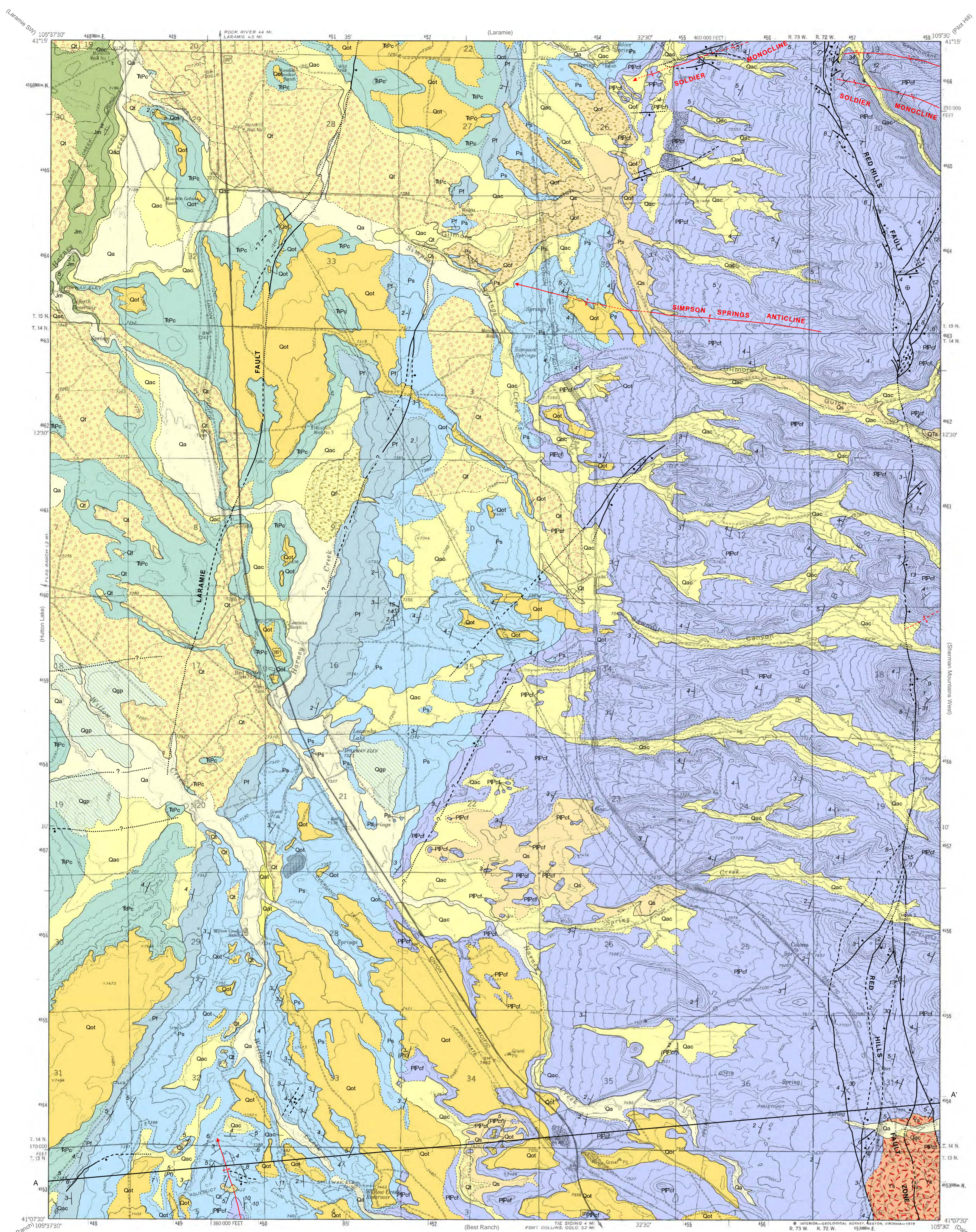


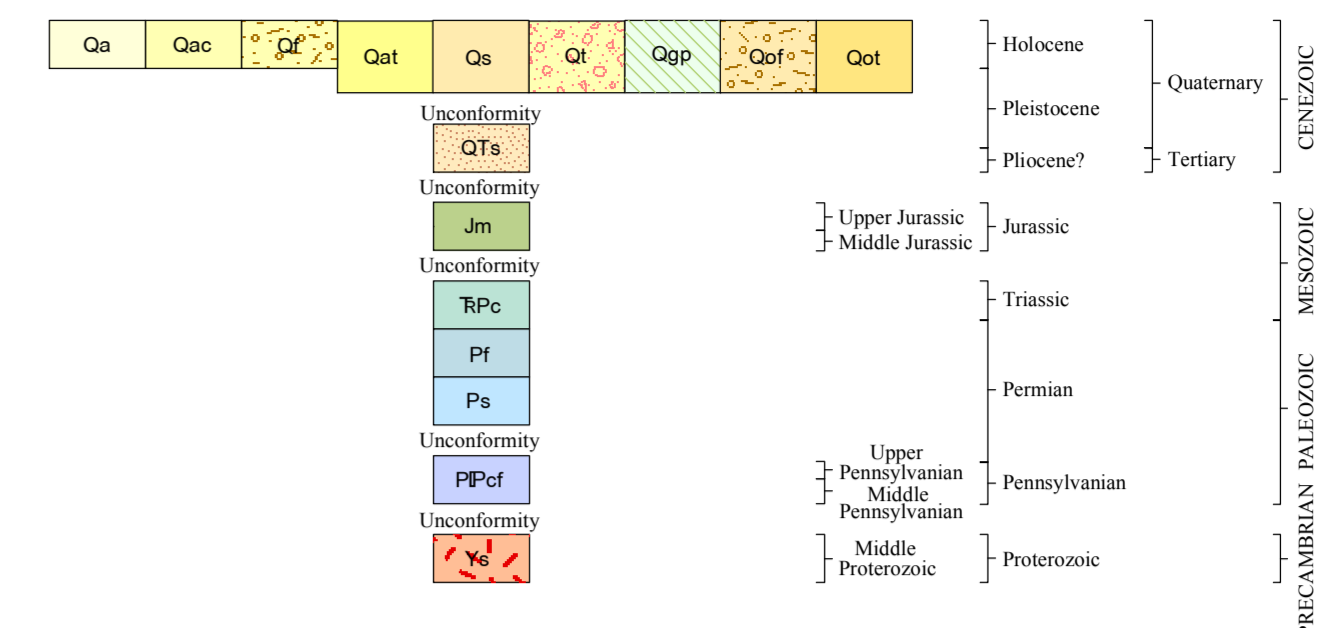


Geology - Interpreting the past to provide for the future



EXPLANATION

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- Holocene surficial deposits**
- Qa** Alluvial deposits—Unconsolidated and poorly consolidated clay, silt, sand, and gravel, mainly in floodplains and lowest stream terraces; thickness 0 to 20 feet (0 to 6 m)
 - Qac** Mixed alluvium and colluvium—Sand, silt, clay, and gravel deposited mainly along intermittent streams; includes slope wash and smaller alluvial fan deposits that coalesce with alluvium; thickness approximately 0 to 20 feet (0 to 6 m)
 - Qaf** Alluvial fan deposits—Poorly sorted clay, silt, and gravel; crudely bedded to nonbedded. Appear to be active, receiving sediments from intermittent stream; may have some debris flow component. Only occurrence is northeast of Red Buttes; thickness 0 to 30 feet (0 to 9 m)
- Holocene and Pleistocene surficial deposits**
- Qat** Mixed alluvium and terrace deposits—Unconsolidated and poorly consolidated clay, silt, sand, and gravel, representing a transition zone between alluvium and terrace deposits. Restricted to a small occurrence along Willow Creek, in the southern part of the map. Thickness approximately 0 to 15 feet (0 to 4.6 m)
 - Qs** Windblown sand deposits—Active and stabilized dunes, made up of very fine to fine-grained sand. Although numerous unmapped small-scale examples occur within the map area, mapped examples occur at the mouth of Gilmore Gulch and southeast of Red Buttes in the Red Buttes housing development. Thickness approximately 0 to 15 feet
 - Qt** Terrace deposits—Beds of coarse sand and gravel with occasional boulders and lenses of silt and clay. Includes fragments of weathered granite and limestone cobbles; their predominance varies depending on source of feeding stream. Occur along present drainages, a few feet (0.6 m) to over 15 feet (4.6 m) above modern flood plains; thickness approximately 0 to 10 feet (0 to 3 m)
 - Qgp** Gypsite deposits—Unconsolidated clay-sized gypsum interbedded with red clay, sand, gravel, and limestone cobbles. Mostly located in stream valleys immediately west of the Laramie fault, probably sourced by solution and erosion of gypsum beds in the upper Satanka and lower Chugwater formations which were brought to the surface or near surface by faulting. Thickness approximately 0 to 20 feet (0 to 6 m)
 - Qot** Older alluvial fan deposits—Poorly sorted clay, silt, sand, and gravel; crudely bedded to nonbedded with some debris flow component. Limestone cobbles are common. Currently inactive and dissected, often occurring as erosional remnants. Graded older terrace deposits toward the west, in the northern part of the map area. Thickness 0 to 20 feet (0 to 6 m)
 - Qol** Older terrace deposits—Beds of coarse sand and gravel with occasional boulders and lenses of silt and clay. Limestone cobbles are common. Older occur as erosional remnants ranging from 20 to 40 feet (6 to 12 m) above present stream floodplains. Some remnants may actually be older alluvial fan remnants. Thickness 0 to 10 feet (0 to 3 m)
 - Qts** Older windblown sand (Pleistocene/Pliocene?)—Mostly unconsolidated light-gray sand and silt interbedded with lenses of gravel and cobbles composed of limestone and sandstone eroded from outcrops of Casper Formation, as well as igneous and metamorphic cobbles from the Precambrian outcrops to the east. Crops out in Gilmore Gulch on the east edge of the map. Additional work is required to definitively establish the age of these deposits. Thickness 0 to nearly 100 feet (0 to nearly 30 m)
- Mesozoic and Paleozoic sedimentary rocks**
- Jm** Morrison Formation (Upper and Middle Jurassic)—Pale-green, olive-green, blue-green to maroon and chalky white variegated calcareous and bentonitic claystones interbedded with thin drab limestones and buff, non-resistant sandstones. Limestone locally contains orange to brown chert inclusions. A thin section of Sundance Formation may exist in the area, but due to few and poor exposures and questionable identification, it is mapped with the Morrison. Thickness 300 to 400 feet (91 to 122 m)
 - TrPc** Chugwater Formation (Triassic and Permian)—Red shale and siltstone with interbedded red to salmon to buff, fine-grained sandstone. Lower part of section contains red shale interbedded with thin to thick gypsum beds, local solution breccia, and banded wavy gypsiferous thin limestone. Sometimes mistaken for part of the Forelle Limestone. This part of the Chugwater along with the underlying Forelle Limestone and Satanka Shale are mapped as Goose Egg Formation west of the Laramie Basin. Locally, some sandstone erosional outcrops of possible Jelm Formation may occur, but due to their lack of persistence and questionable identification, they are mapped with the Chugwater. One example of possible Jelm Formation occurs east of Harney Creek in sec. 29, T. 15 N., R. 73 W. Thickness 650 to 800 feet (198 to 244 m)
 - Pf** Forelle Limestone (Permian)—Gray to purple, thin bedded, sparsely fossiliferous limestone locally interbedded with red siltstone and thin gypsum laminations and associated solution breccia; wavy outcrops resembling algal structures common; thickness 10 to 30 feet (3 to 9 m)
 - Ps** Satanka Shale (Permian)—Red siltstone and shale (often banded with white- and other-colored zones), soft sandstone, thin limestones, and local gypsum beds, especially near the top. Buff to orange to red, fine-grained sandstone with ripple marks common near base of unit. Gypsum beds in the Satanka are currently being mined south of Red Buttes. Thickness 140 to 200 feet (43 to 61 m)
 - PPcf** Casper and Fountain formations undivided—Mapped together due to the transitional nature of the contact between the Casper and the Fountain; total combined thickness 600 to 800 feet (183 to 244 m)
 - Casper Formation (Permian and Upper and Middle Pennsylvanian)**—Buff to reddish, calcareous to quartzitic, very fine- to coarse-grained, well-cemented subarkosic sandstone interbedded with buff to purplish-gray limestone and dolomite beds, usually micritic and locally fossiliferous. Sandstone often exhibits large-scale festoon cross-bedding, increasing toward the south. The limestone beds are quite thin and less numerous than in the Laramie area and they are the most part absent in the southern part of the map area. Intertongues with underlying Fountain Formation. The Casper Formation serves as the prime aquifer in the map area
 - Fountain Formation (Pennsylvanian)**—Primarily maroon arkosic cross-bedded fine to coarse sandstone and conglomerate interbedded locally with shales and thin limestones; up to 400 feet (122 m) thick
- Precambrian crystalline rocks**
- Sherman Granite (Middle Proterozoic)**—Coarsely crystalline pink granite ranging in age from 1,414 to 1,435 Ma (Mega-annum or millions of years before present). Crops out in the southeast corner of the map area

MAP SYMBOLS

- Formation contact—Dashed where approximately located
- Fault—Dashed where approximately located, queried where inferred, and dotted where concealed; ball and bar on downthrown block; arrows indicate relative horizontal movement where known
- Anticline—Dashed where approximately located, dotted where concealed; trace of axial plane and direction of plunge determined by field dip measurements and air photo interpretation; shorter arrow indicates apparent dip of steeper limb of asymmetric anticline
- Monocline—Showing direction of plunge; dashed where approximately located, dotted where concealed; trace of axial plane determined by field dip measurements and air photo interpretation (note: axial plane is oblique to dip on several monoclines in northeastern corner of map due to strike-slip faulting); shorter arrow denotes steeper dipping limb
- Strike and dip of beds—Showing angle of dip; formation symbol in parentheses indicates attitude measured for bedding in an exposure that was too small to depict at the present map scale
- Strike and dip of beds—Showing angle of dip; measurements from Lundy (1978) and Nicoll (1963)
- Horizontal beds
- Line of cross section—Circled letters next to faults indicate strike-slip component of movement, T is movement toward observer, A is movement away from observer

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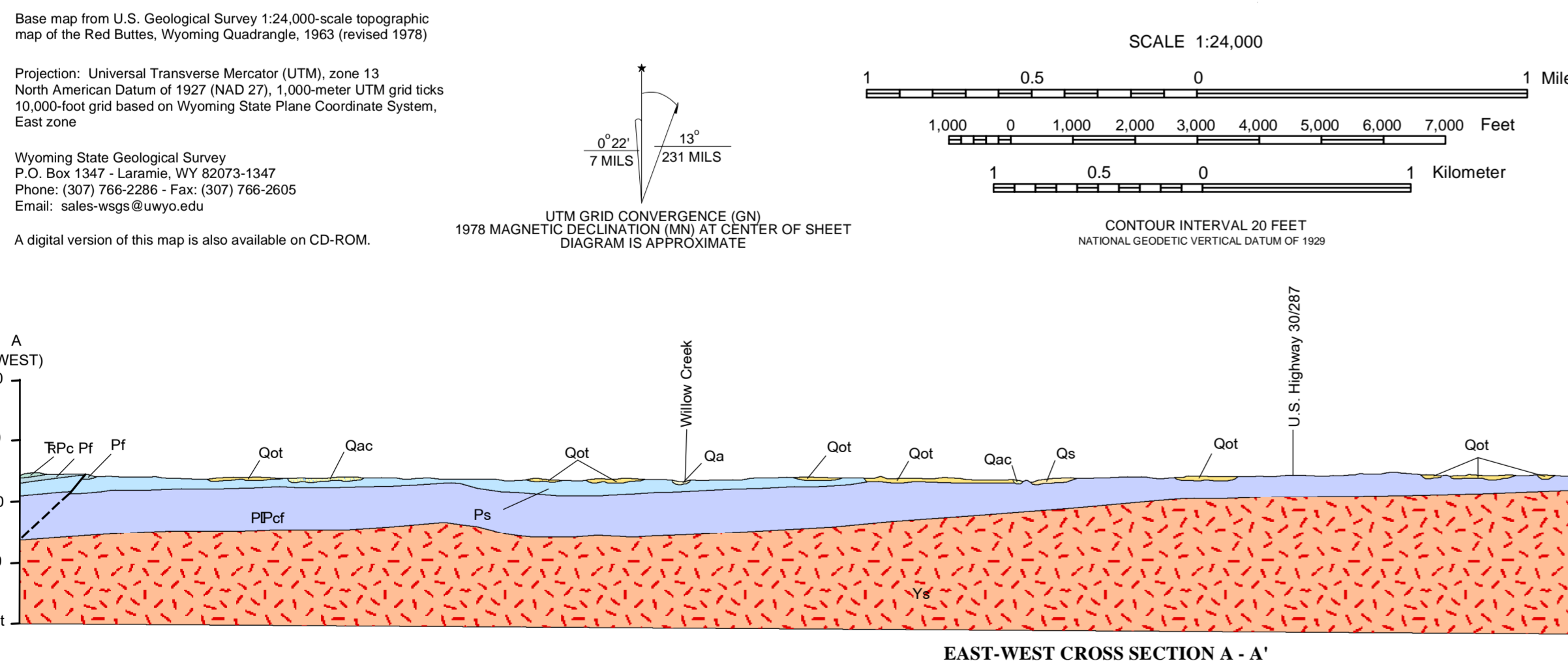
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GEOLOGIC MAP OF THE RED BUTTES QUADRANGLE, ALBANY COUNTY, WYOMING

by
 Alan J. Ver Ploeg
 2007

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WYOMING QUADRANGLE LOCATION

