WYOMING STATE GEOLOGICAL SURVEY
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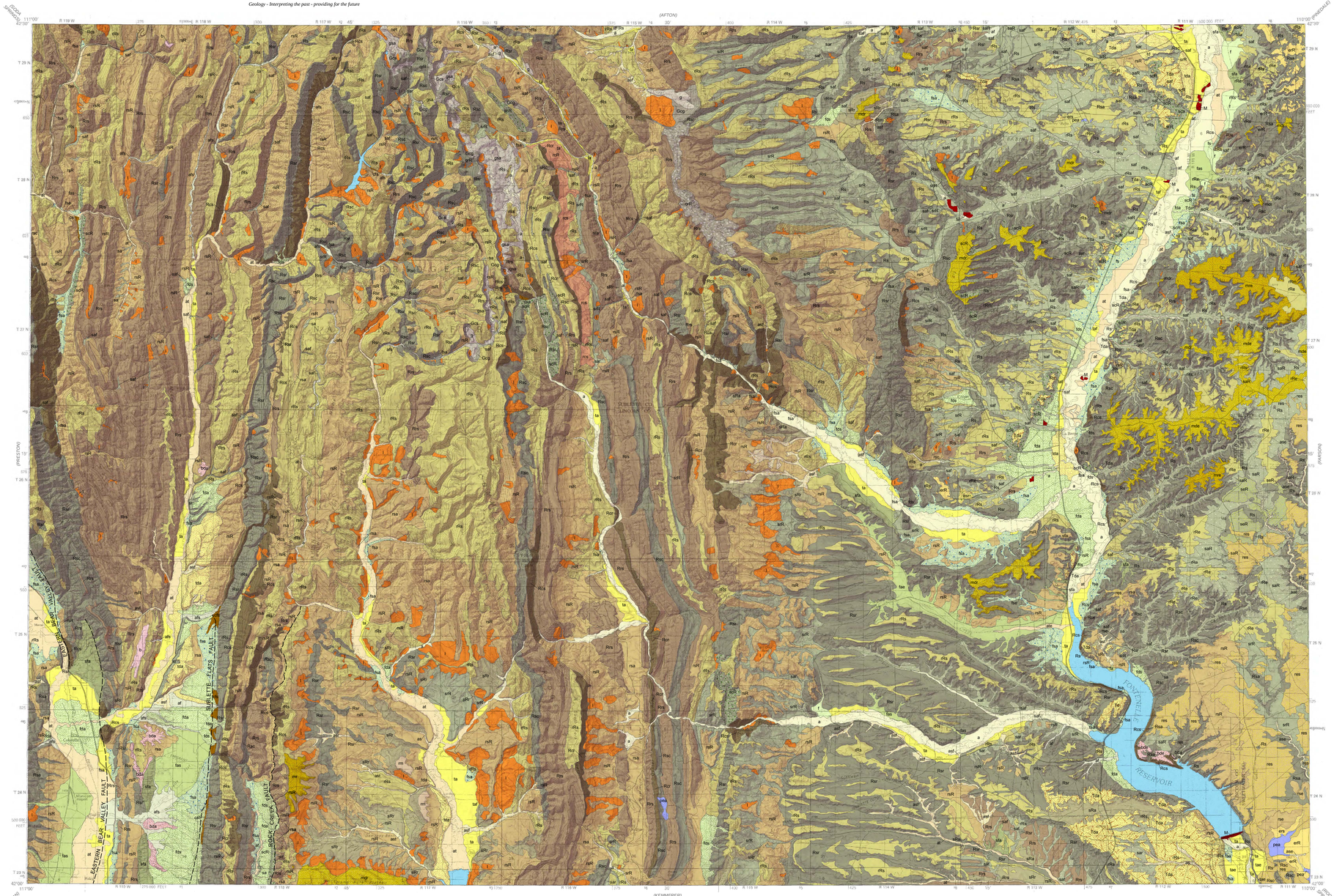
Laramie, Wyoming

Geology - Interpreting the past - providing for the future

OPEN FILE REPORT 13-4
Fontenelle Reservoir 1:100,000 - scale
Surficial Geologic Map



Base map from U.S. Geological Survey 1:100,000-scale metric topographic map of the Fontenelle Reservoir, Wyoming Quadrangle, 1982

Base hillshade derived from USDA/NRCS – National Cartography & Geospatial Center 10-meter Digital Elevation Model (DEM), 2000; azimuth 45°, sun angle 45°, vertical exaggeration 1.5

Projection: Universal Transverse Mercator (UTM), zone 12
North American Datum of 1927 (NAD 27)
10,000-meter grid: UTM, zone 12
25,000-foot grid ticks: Wyoming State Plane Coordinate System, west zone
National Geodetic Vertical Datum of 1929

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A digital version of this map is also available on CD-ROM

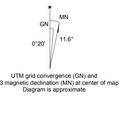
0 2 4 6 8 10 12 14 16 18 20 Kilometers
0 2 4 6 8 10 12 Miles

SCALE 1:100,000
Contour interval 50 meters

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000 Meters
0 5,000 10,000 15,000 20,000 25,000 30,000 35,000 40,000 45,000 50,000 55,000 60,000 65,000 Feet

SURFICIAL GEOLOGIC MAP OF THE FONTENELLE RESERVOIR 30' x 60' QUADRANGLE, LINCOLN, SUBLETTE, AND SWEETWATER COUNTIES, WYOMING

compiled and mapped by
Seth J. Wittke and Edward L. Heffern
2013



UTM grid convergence (GN) and 2013 magnetic declination (MN) at center of map
Diagram is approximate

Digital cartography by Edward L. Heffern and Seth J. Wittke

Map edited by Suzanne C. Luhr

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EXPLANATION

DESCRIPTION AND CLASSIFICATION OF MAP UNITS

Alluvium—Unconsolidated detrital material deposited during recent geologic time by a stream or other body of running water, as a sorted or semi-sorted sediment in the bed of a stream or on its floodplain or delta, or as a cone or fan at the base of a mountain slope; stream and river deposits. Does not include subaqueous deposits in seas, estuaries, lakes, or ponds

- Alluvium (**a**)
- Alluvium and alluvial fan deposits (**af**) with minor components of slopewash (**afs**)
- Alluvium and slopewash (**as**) with minor components of eolian deposits (**ase**), alluvial fan deposits (**asf**), residuum (**asr**), and terrace deposits (**ast**)
- Alluvium and terrace deposits (**at**) with minor components of eolian deposits (**ate**)

Terrace deposits—Relict alluvial deposits on relatively flat, horizontal, or gently inclined surfaces which are bounded by a steeper ascending slope on one side, and a steeper descending slope on the opposite side

- Terrace deposits and alluvium (**ta**) with minor components of eolian deposits (**tae**) and alluvial fan deposits (**taf**)
- Dissected terrace deposits (**td**) with minor components of alluvium (**tda**)

Structural terrace deposits—Terraces cut in bedrock that are mantled with a thin veneer of alluvium

- Structural terrace deposits and alluvium (**Ta**)
- Dissected structural terrace deposits and alluvium (**Tda**)

Alluvial fan deposits—Fan-shaped deposits made by streams or debris flows, where they have run out into a level (or nearly level) plain

- Alluvial fan deposits (**f**)
- Alluvial fan and alluvial deposits (**fa**) with minor components of eolian deposits (**fae**) and slopewash (**fas**)
- Dissected alluvial fan deposits with minor components of alluvium (**fda**) and slopewash (**fds**)
- Alluvial fan and slopewash deposits (**fs**) with minor components of alluvium (**fsa**) and eolian deposits (**fse**)

Bench deposit—A long, narrow, comparatively level area bounded by steeper slopes above and below

- Bench deposit (**b**)
- Dissected bench deposit with minor components of alluvium (**bda**) and eolian deposits (**bde**)

Mesa—An isolated, nearly level landmass standing distinctly above the surrounding country, bounded by abrupt or steeply sloping erosion scarps on all sides, and capped by layers of resistant, nearly horizontal rock; a bedrock capped plateau or tableland

- Dissected mesa and eolian deposits (**mde**) or residuum (**mdr**)
- Mesa with residuum (**mr**) and minor components of eolian deposits (**mre**)

Playa lake deposits—Materials deposited from broad, shallow sheets of water which quickly gather and evaporate, leaving mud flats, evaporite deposits, or both (depending on chemical composition of the waters and degree of evaporation)

- Playa deposits with eolian deposits and minor components of alluvium (**pea**)

Eolian deposits—Materials, including sand, silt, and clay, that have been transported and deposited by wind

- Eolian deposits and residuum with minor bedrock outcrops (**erR**) and slopewash (**ers**)
- Eolian deposits and bedrock outcrops with minor components of slopewash (**eRs**)
- Eolian deposits and slopewash with minor components of residuum (**esr**)

Landslide deposits—Soil and rock material that has moved downslope, usually en masse, under gravitational influence; earth and rock which become loosened from a hillside, and slide, flow, or fall down the slope

- Landslide deposits (**l**)

Glacial deposits—Deposits that have been formed through glacial action, such as till and moraine

- Glacial deposits (**g**)
- Glacial deposits and slopewash with minor components of alluvium (**gsa**)

Glaciated bedrock outcrops—Bedrock that has been scoured and carved out by glacial action, such as cirques and horns

- Glaciated bedrock outcrops and colluvium with minor components of glacial deposits (**Geg**) and slopewash (**Ges**)
- Periglacial deposits and residuum with minor components of bedrock outcrops (**qrR**)

Slopewash and colluvium—Slopewash is soil and rock material that has moved down a slope by gravity assisted by running water. Colluvium is a loose, heterogeneous, and incoherent mass of soil material and/or rock fragments deposited by rainwash, sheetwash or slow continuous downslope creep, usually at the foot of a cliff or on the surface of a slope, and deposited there chiefly by gravity

- Slopewash and alluvium (**sa**) with minor components of alluvial fan deposits (**saf**), residuum (**sar**), and bedrock outcrops (**saR**)
- Slopewash and colluvium with minor components of alluvium (**sca**) and bedrock outcrops (**scR**)
- Slopewash and eolian deposits with minor components of bedrock outcrops (**seR**)
- Slopewash and alluvial fan deposits with minor components of alluvium (**sfa**)
- Slopewash and bedrock outcrops with minor components of alluvium (**sRa**), colluvium (**sRc**), and residuum (**sRr**)
- Slopewash and residuum (**sr**) with minor components of alluvial fan deposits (**srf**) and bedrock outcrops (**srR**)
- Colluvium and alluvial fan deposits with minor slopewash (**cfs**)
- Colluvium and slopewash (**cs**) with minor alluvium (**csa**) and alluvial fan deposits (**csf**)

Residuum—A residual deposit remaining in place after the decomposition of bedrock. Residuum is an accumulation of rock debris formed by weathering and remaining essentially in place after all but the least soluble constituents have been removed, usually forming a comparatively thin surface layer concealing the unweathered or partially altered bedrock below

- Residuum and colluvium with minor components of bedrock outcrops (**rcR**) and slopewash (**rcs**)
- Residuum and eolian deposits with minor components of slopewash (**res**)
- Residuum and mesas (**rm**)
- Residuum and bedrock outcrops with minor components of eolian deposits (**rRe**), mesas (**rRm**), and slopewash (**rRs**)
- Residuum and slopewash with minor components of alluvium (**rsa**), colluvium (**rsc**), eolian deposits (**rse**), and bedrock outcrops (**rsR**)

Bedrock outcrops—Areas where the underlying bedrock is exposed and unaltered (usually lithified) at the surface

- Bedrock outcrops and colluvium with minor components of residuum (**Rcr**) and slopewash (**Rcs**)
- Bedrock outcrops and residuum with minor components of eolian deposits (**Rre**) and slopewash (**Rrs**)
- Bedrock outcrops and slopewash (**Rs**) with minor components of alluvium (**Rsa**), colluvium (**Rsc**), eolian deposits (**Rse**), and residuum (**Rsr**)

Disturbed Ground—Areas that have been disturbed by human earth moving activities, such as large open pit mines, gravel pits, quarries, dams, or oil and gas field settling ponds

- Disturbed ground (**M**)

Water—Areas covered by water in lakes, reservoirs, and perennial streams and rivers

- Water

Quaternary Faults – Faults which show surface offset of Quaternary aged units

Eastern Bear Valley fault—The Eastern Bear Valley fault is considered to be a late Cenozoic to Quaternary normal fault, downthrown to the west, bordering the eastern margin of Bear Valley, Wyoming. The fault extends roughly 47 km and strikes north-south. Dip along the fault is considered to be 60-75 degrees to the west, but an exact angle is unknown. Almost the entire length of the fault is mapped as concealed and thus poorly located. No scarps are known to exist. The recurrence interval is also unknown and the slip rate is believed to be less than 0.2 mm/yr. No historic earthquakes have been associated with this fault. The Eastern Bear Valley fault is considered a Class B fault by the USGS, denoting potential, however unconfirmed, Quaternary displacement. Locations are approximate

Rock Creek fault—The Rock Creek fault is a Pleistocene-Holocene normal fault, downthrown to the west, within the Tunp Range, bounding the western side of Dempsey Ridge and extending north to the West Fork of Hams Fork. The fault extends approximately 41 km along a N5°E strike. Dip along the fault is steep, approximately 60 degrees to the west. Scarps are present along much of the length of the fault. Total displacement on some scarps is as much as 25 m, with isolated scarps of 6-8 m on alluvium. The recurrence interval is variable, and may range from 0.6 to >10 k.y. The most recent event occurred at 3.6 +/- 0.3 ka, based on radiocarbon ages. Average slip rate is believed to range between 0.2 and 1.0 mm/yr, with considerably faster rates over short intervals. The Rock Creek fault is considered a Class A fault by the USGS, denoting confirmed Quaternary displacement. Locations are approximate

Sublette Flat fault—The Sublette Flat fault is a poorly expressed, west-dipping Quaternary normal fault at the eastern margin of Sublette Flat, bounding the western side of Rock Creek Ridge and southern part of the Tunp Range. The fault extends approximately 36 km along a N10°E strike, and is downthrown to the west. Dip along the fault is considered to be 60-80 degrees to the west. Scarps are generally poorly located, but are preserved on fan deposits at the mouth of Pine Creek canyon. The slip rate is believed to be less than 0.2 mm/yr. No historic earthquakes have been associated with this fault. The Sublette Flat fault is considered a Class A fault by the USGS, denoting confirmed Quaternary displacement. Locations are approximate

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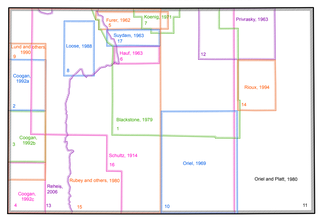
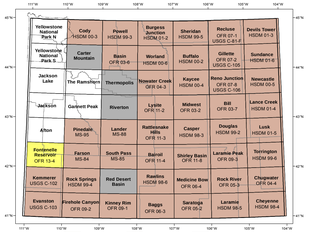


INDEX TO 1:100,000 - SCALE SURFICIAL GEOLOGIC MAPS OF WYOMING



KEY TO ABBREVIATIONS

U.S. Geological Survey maps: Coal Investigation Series (C), Wyoming State Geological Survey maps: Map Series (MS), Open File Report (OFR) and Hazards-Section Digital Map (HSDM)