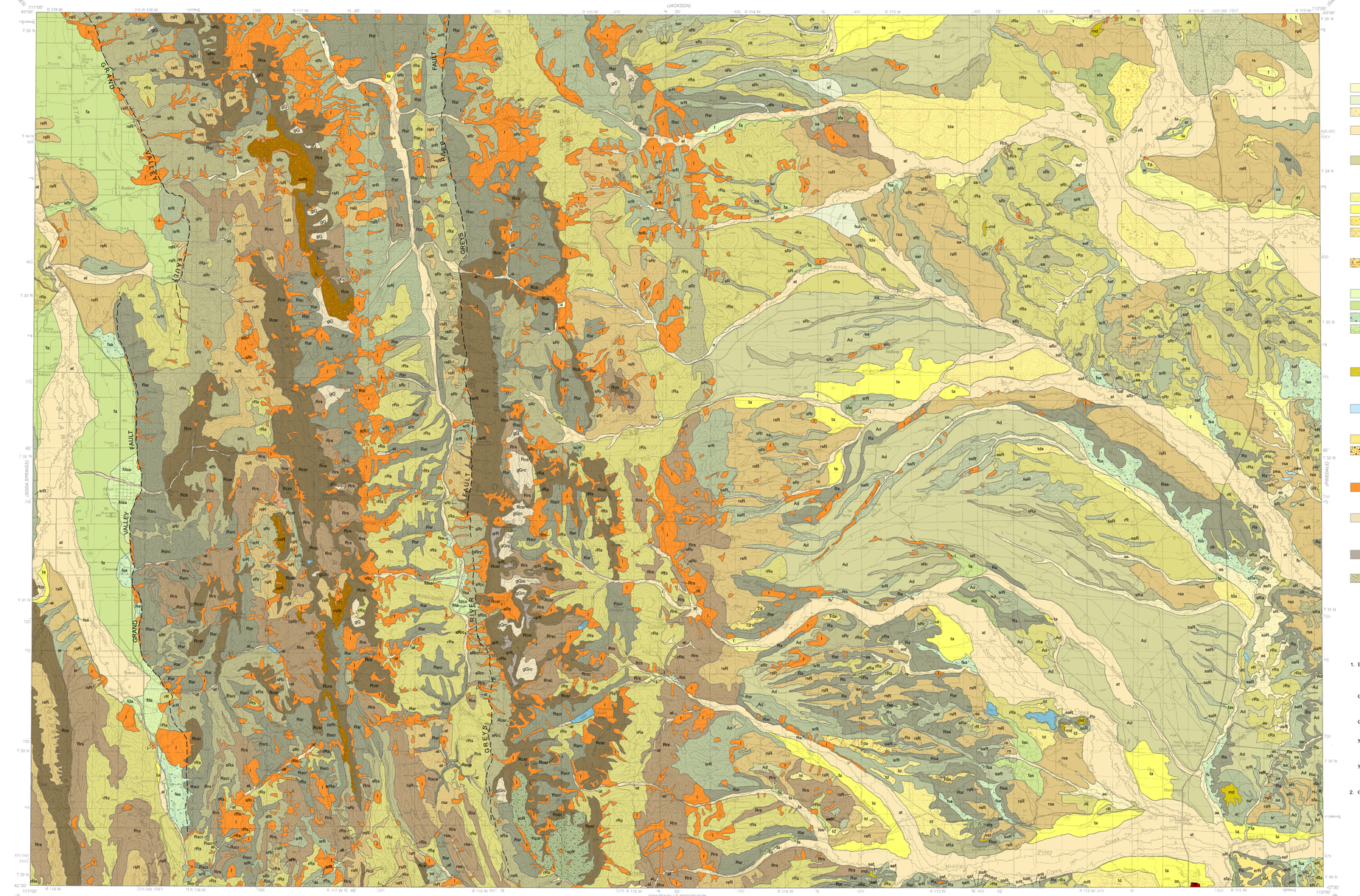
WYOMING STATE GEOLOGICAL SURVEY
Thomas A. Drean, Director and State Geologist
Laramie, Wyoming

Interpreting the past, providing for the future

OPEN FILE REPORT 15-9
Afton 1:100,000-scale
Surficial Geologic Map



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

Base hillshade derived from United States Elevation Data (NED) 10-meter Digital Elevation Model (DEM), 2000; azumith 315, sun angle 45°, vertical exaggeration 1.2

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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0 2 4 6 8 10 12 14 16 18 20 Kilometers
0 1 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

Digital cartography by Justin S. LaForge
Map edited by Suzanne C. Luhr
Prepared in cooperation with and research supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under USGS award number G14AS00006. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

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

compiled and mapped by
Martin C. Larsen, Justin S. LaForge and Seth J. Wittke
2015

MN
GN
0°20'
11°26'
UTM grid convergence (GN) and 2015 magnetic declination (MN) at center of map
Diagram is approximate

DISCLAIMERS

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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 alluvial fan deposits (**asf**), or bedrock outcrops (**asR**)
- Alluvium and terrace deposits (**at**)

Old alluvial plain—A broad, relatively flat deposit formed by the regional erosion of coalescing alluvium and associated alluvial deposits

- Dissected old alluvial plain (**Ad**)

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 (**t**)
- Terrace deposits and alluvium (**ta**)
- Terrace deposits and glacial outwash (**to**)
- 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

- Dissected structural terrace deposits (**Td**) with minor components of 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 slopewash (**fas**)
- Alluvial fan and slopewash deposits (**fs**) with minor components of alluvium (**fsa**)
- Dissected alluvial fan deposits with minor components of alluvium (**fda**), or slopewash with alluvium (**fdsa**)

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 (**md**)

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 (**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**)
- Eolian deposits and bedrock outcrops (**eR**)

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 and glaciated bedrock outcrops (**gG**) with minor components of residuum and colluvium (**gGrc**)

Periglacial deposits—Deposits related to conditions adjacent to glacial margins, such as ice wedges, solifluction, and patterned ground

- Periglacial deposits and residuum with minor components of bedrock outcrops (**qrR**)

Glacial outwash—Alluvial and drift deposits by meltwater streams beyond active glacier ice

- Glacial outwash (**o**)

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**), or bedrock outcrops (**saR**)
- Slopewash and colluvium (**sc**) with minor components of bedrock outcrops (**scR**)
- Slopewash and alluvial fan deposits with minor components of alluvium (**sfa**)
- Slopewash and bedrock outcrops (**sR**) with minor components of alluvium (**sRa**), colluvium (**sRc**), residuum (**sRr**), or residuum and colluvium (**sRrc**)
- Slopewash and residuum (**sr**) with minor components of bedrock outcrops (**srR**), or bedrock outcrops and alluvium (**srRa**)
- Colluvium and slopewash with minor components of bedrock (**csR**), or bedrock with residuum (**csRr**)

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 and slopewash (**rcRs**)
- Residuum and bedrock outcrops (**rR**) with minor components of alluvium (**rRa**), or slopewash (**rRs**)
- Residuum and slopewash (**rs**) with minor components of alluvium (**rsa**), or bedrock outcrops (**rsR**)

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

- Bedrock outcrops and colluvium with minor components of slopewash (**Rcs**), slopewash and residuum (**Rcsr**), or residuum and slopewash (**Rcrs**)
- Bedrock outcrops and residuum with minor components of slopewash (**Rrs**), or slopewash and colluvium (**Rrsc**)
- Bedrock outcrops and slopewash (**Rs**) with minor components of alluvium (**Rsa**), colluvium (**Rsc**), colluvium and alluvium (**Rsca**), colluvium and residuum (**Rser**), residuum (**Rsr**), or residuum and colluvium (**Rsrc**)

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

Grand Valley fault (Star Valley section)—The Grand Valley fault system, comprised of four sections, is considered to be a Quaternary/late Cenozoic to Holocene normal fault, downthrown to the west, and extends 135 km (84 mi) from eastern Idaho into western Wyoming along the base of the Snake and Salt River Ranges. The Star Valley section is a Pleistocene-Holocene normal fault, downthrown to the west, extends roughly 52 km (32 mi) and strikes north-south. Dip along the fault is considered to be 10–70 degrees to the west, but an exact angle is unknown. The scarps are extensive and displacement generally ranges from 5–15 m (16–49 ft) in alluvium. The recurrence interval is variable, and may range from 4–7 ka. The most recent surface-rupturing earthquake occurred at about 5,540±70 ^{14}C yr BP, based on paleoseismology investigations. The Star Valley section fault is considered a Class A fault by the USGS, denoting confirmed Quaternary displacement. Locations are approximate. (McCalpin et al., 2001)

Grey's River fault—The Grey's River fault is a Pleistocene-Holocene normal fault, downthrown to the west and bounds the west side of the Wyoming Range. The fault extends approximately 50 km (31 mi) along a N 3° W strike. Dip along the fault is considered to be 10–70 degrees to the west, but an exact angle is unknown. Complex fault scarps within the densely forested terrain are present at the base of the steep range front and can be traced along much of the length of the fault. Fault scarp displacement generally ranges from 3–11 m (10–36 ft) in alluvium. The recurrence interval is variable, and may range from 2.0–5.2 ka. The most recent event occurred 1,910–2,100 yr BP, based on radiocarbon ages. Average slip rate is believed to range between 0.2 mm (0.008 in) and 1.0 mm (0.04 in)/yr, with considerably faster rates over short intervals. The Greys River fault is considered a Class A fault by the USGS, denoting confirmed Quaternary displacement. Locations are approximate. (McCalpin, 1994)

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(Numbers are noted in INDEX TO SOURCES OF GEOLOGIC MAPPING)

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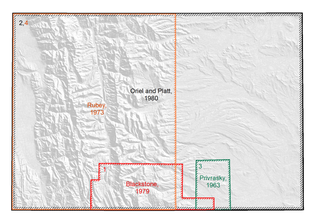

INDEX TO SOURCES OF GEOLOGIC MAPPING

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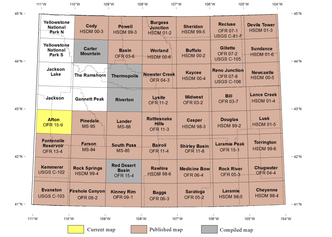

KEY TO ABBREVIATIONS
U.S. Geological Survey maps: Coal Investigation Series (USGS C), Wyoming State Geological Survey maps: Map Series (MS), Open File Report (OFR) and Hazards Section Digital Map (HSDM)

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