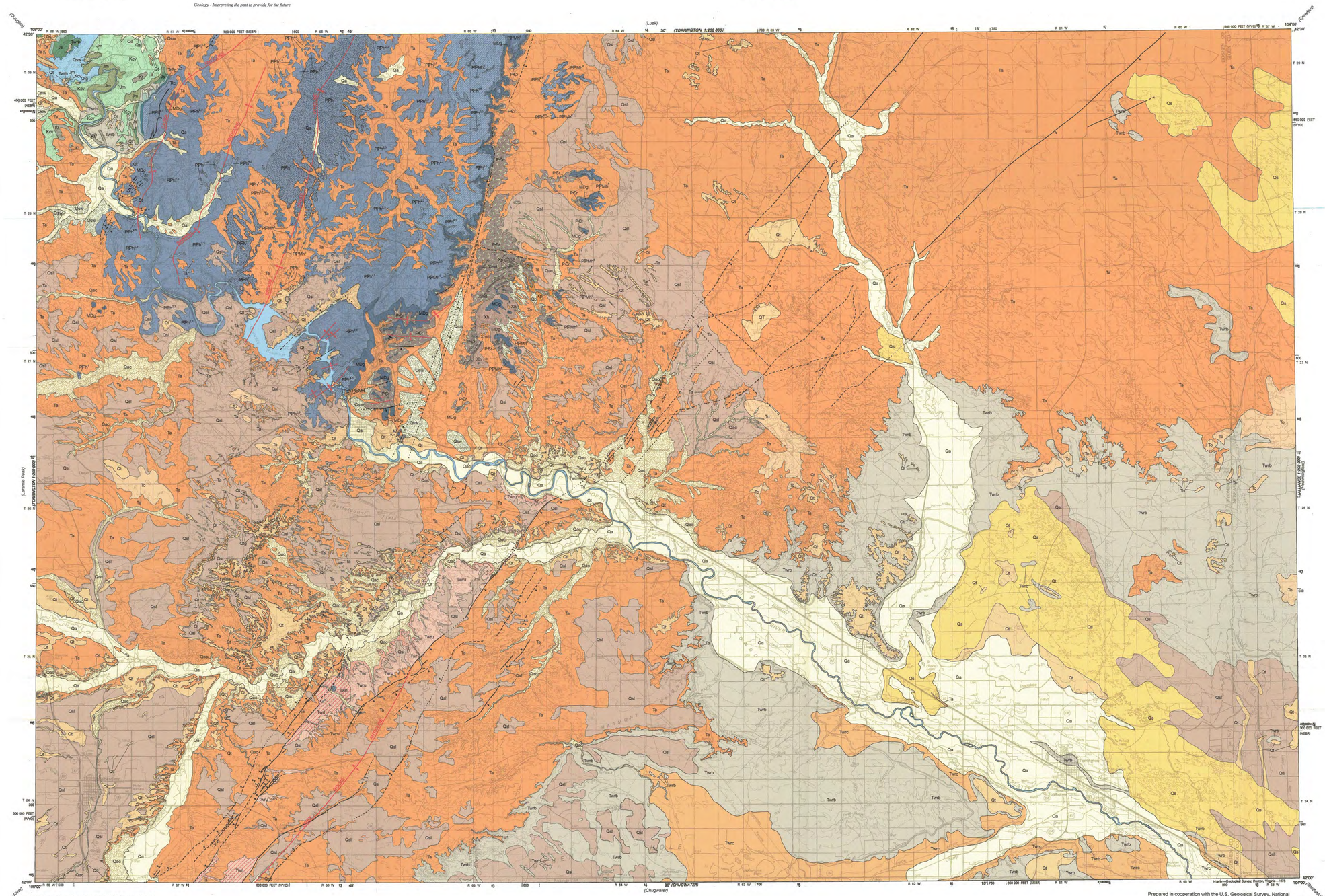
WYOMING STATE GEOLOGICAL SURVEY
Ronald Surdam, State Geologist
Laramie, Wyoming

Geology - Interpreting the past to provide for the future

USGS science for a changing world

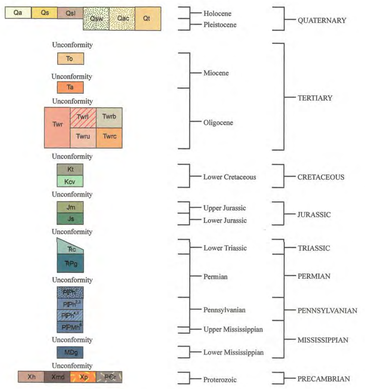
Prepared in cooperation with the
U.S. GEOLOGICAL SURVEY

OPEN FILE REPORT 04-11
Torrington 1:100,000 - scale Geologic Map



EXPLANATION

CORRELATION OF MAP UNITS



MAP SYMBOLS

Contact

Fault- Bar and ball on downthrown block. Dashed where approximated, dotted where concealed.

Anticline- Trace of axial plane and direction of plunge compiled from source mapping or by field dip measurements. Arrows point in direction of dip.

Syncline- Trace of axial plane and direction of plunge compiled from source mapping or by field dip measurements. Arrows point in direction of dip.

DESCRIPTION OF MAP UNITS

Qa **Alluvial Deposits (Holocene)**—Silt, fine-grained sand, and some gravel in the present flood plains, bars, and islands of the principle streams.

Qs **Dune Sand (Holocene)**—Fine-grained, windblown sands.

Qsl **Sand and loess (Holocene)**—Fine-grained residual sand and loess. Thickness from 0 to 40 feet.

Qt **Terrace Gravels (Holocene/Pleistocene)**—Pebble, cobble and boulder deposits containing some silt, fine-grained sand, lenses of bentonitic clay, and locally some ash beds.

Qsw **Slope Wash (Holocene/Pleistocene)**—Pebbles, cobble, and gravels amidst a variegated matrix. Result of mass wasting on steep slopes. Angular blocks of Paleozoic and Precambrian rocks at the base of the steeper slopes of the Haystack Range.

Qac **Mixed Alluvium and Colluvium (Holocene/Pleistocene)**—Unconsolidated to poorly consolidated clay, silt, sand and gravel; mostly in flood plains and low terraces. Thickness 0 to 50 feet.

To **Ogallala Formation Upper Unit (Miocene)**—Fine- to coarse-grained, light- to greenish-, yellowish-, and orange-gray sandstone interbedded and interfingered in upper part with conglomerate, claystone, and freshwater limestone; white to dark-gray vitric tuff beds near top. Lower part has hard "pipy" calcareous sandstone concretions. Thickness 0 to 400 feet.

Ta **Arikaree Formation (Miocene/Oligocene)**—light-gray to buff fine-grained poorly bedded sandstone containing abundant magnetite grains; some siltstone, limestone, and tuff; lenticular conglomerate near base. Thickness 0 to 705 feet.

Twr **White River Formation (Oligocene)**—White to pale pink blocky tuffaceous, bentonitic claystone and lenticular arkosic conglomerate with lenses of thin gray sandstone. Thickness 0 to 1,150 feet.

Tweu **White River Formation, Upper Unit (Oligocene)**—Gray conglomerate facies; gray channel sandstone and conglomerate interbedded with some orange-grey siltstone, components of conglomerate are chiefly Paleozoic and Precambrian rocks in a gray calcareous sandstone matrix. Thickness 0 to 100 feet.

Twrb **Brule Member (Oligocene)**—Pale pink to white argillaceous siltstone with local channel sandstone, limestone, claystone and volcanic ash. Thickness 0 to 450 feet.

Twrl **White River Formation, Lower Unit (Oligocene)**—Red conglomerate facies; red to light-red poorly cemented conglomerate composed chiefly of pebbles, cobbles, and boulders derived from Paleozoic and Precambrian rocks in an orange-red claystone and siltstone matrix. Thickness 0 to 300 feet.

Twrc **Chadron Member (Oligocene)**—Variegated tuffaceous and bentonitic claystone and siltstone, with channel sandstone and conglomerate. The lower portion contains fluvial deposits. Thickness 0 to 700 feet.

Kt **Thermopolis Shale and Muddy Sandstone (Upper Cretaceous)**—The Thermopolis formation consists of black, very fine-grained, fissile, flaky, soft shale. The unit includes many thin, cream-colored bentonite partings, thin ferruginous sandstone, and ironstone laminae. Thickness 100 to 160 feet. The Muddy sandstone member consists of a medium-grained, gray sandstone. The sandstone is clean and has high quartz concentrations. It is interbedded with gray to black shale and bentonite. Thickness 50 to 100 feet.

Kcv **Cloverly Formation (Lower Cretaceous)**—The Cloverly is chiefly sandstone. The basal sandstone is commonly 50 to 75 feet thick and consists of thin, gray, sparkly, medium-grained noncalcareous sandstone that weathers buff. There is a thin shale unit near the middle of the Cloverly that is mostly gray, but in a few places black or pale pink, very soft, plastic and waxy, and at places interbedded with sand- and siltstones. The upper part of the Cloverly is somewhat more shaly, more ferrugous, and thinner-bedded than the base. It also contains numerous burrows and worm holes. It is often very hard to tell the upper sandstone from the basal sandstone due to their homogeny. Thickness 175 to 320 feet.

Jm **Morrison Formation (Upper Jurassic)**—Dull variegated bentonitic claystone, fine-grained fresh-water limestone, with layers, beds and lenses of tan to gray sandstone. Numerous thin beds of gray fine-grained poorly bedded clayey fresh-water limestone occur in the lower part of the formation, and limestone beds containing cherty algal beds are present near the top. The claystones are dull green, dull pink, purple, and are hard and siliceous. The top of the Morrison formation is marked by a sharp lithologic break and an erosional unconformity. The base is placed at the bottom of a yellowish-buff sandstone, where the most conspicuous erosional break occurs. Thickness 130 to 220 feet.

Js **Sundance Formation (Upper and Middle Jurassic)**—The Sundance formation is divided into two sections. The lower Sundance is characterized by fine-grained, nonglauconitic, limy sandstone, which is commonly red near the top, with persistent shaly and silty zones near the base. The shales are purple, green, and gray, and the siltstones are olive drab. Fossils collected in this layer are Jurassic in age. Thickness for the lower unit is 140 to 220 feet.
The upper Sundance unit consists of glauconitic green shales and shaly sandstone, with a gray, glauconitic, basal sandstone which is up to 30 feet thick. Thickness of the upper unit is 50 to 120 feet.

Trc **Chugwater Formation (Triassic)**—Red shale and siltstone with some red sandstone and shale, and in the lower portion gypsum laminae and along with some anhydrite. The upper part is more limey than the lower part. There is a major unconformity at the top of the layer. Thickness 150 to 435 feet.

MPg **Goose Egg Formation (Triassic and Permian)**—Interbedded red to ocher shales and siltstones, thin limestones, limestone breccias, and gypsum beds. Thickness 197 to 345 feet.

PPh1 **Hartville Formation, Division 1 (Permian)**—Red, silty shale and siltstone, red aeolian sandstone, and limestone. Forms ledges and slopes. Thickness 0 to 300 feet.

PPh2-3 **Hartville Formation, Divisions 2 and 3 (Pennsylvanian)**—Interbedded gray limestone, buff to chalky white limestone and dolomite, pink dolomite, buff aeolian sandstone, gray, red, and maroon silt and claystones, and thin black shale's. Brachiopods are common in the limestone and dolomite layers. Forms ledged slopes and cliffs. Thickness 0 to 300 feet.

PPh4-5 **Hartville Formation, Divisions 4 and 5 (Pennsylvanian)**—Interbedded maroon, pink, and grey siltstones and claystones, gray, brown, and buff limestone, pink dolomite, and thin gray sandstones. Forms smooth slopes with limestone ledges. Thickness 0 to 250 feet.

PPMh6 **Hartville Formation, Division 6 (Pennsylvanian and Upper Mississippian)**—Well indurated maroon to red orthoquartzite. *Forms cliffs and rocky knolls. Deposited on a well developed karst surface, and fills sinkholes and caverns in the underlying* Guernsey limestone. Thickness 0 to 120 feet.

MDg **Guernsey Formation (Lower Mississippian and Upper Devonian)**—The Guernsey formation contains an upper limestone unit of early Mississippian age and a lower unit of Devonian age. The lower unit is around 65 feet thick, consists of thin-bedded, slabby, fine-grained, hard, brittle, silty, purple to gray dolomite interbedded with hard dolomitic purple shale and siltstone. About four feet of pink arkose with abundant feldspar and white quartz grains and pebbles occurs at the base. In the southern part of the area where the Cambrian quartzite is present, the arkose rests on the pre-Cambrian. The dolomitic layer is probably Devonian. The upper limestone unit of the Guernsey formation consists of hard, gray, cherty, coarsely crystalline, coarsely bedded limestone averaging about 135 feet in thickness. The chert has variety of colors and there are predominant dark-brown quartzitic layers and nodules in this unit. The upper unit is Mississippian in age and the surface is highly irregular, with many local variations (marked, general thickening of formation towards the northwest). Total thickness (in Hartville area) is 140 to 260 feet thick. Sando and Sandberg (1987) divide this formation into the Madison Limestone, Englewood Formation, and Fremont Canyon Sandstone.

Xh **Haystack Range Granite**—Pink, coarse- to medium-grained, massive to foliated, inequigranular biotite granite and lesser fine-grained granite. Fine-grained phase grades into or forms into dikes in the coarse-grained facies. Constitutes a granite dome in the Haystack Range. Rb-Sr whole rock age 1.72 Ga.

Xmd **Metadiabase Dikes**—Dark, greenish-black, medium-grained hornblende-plagioclase-quartz metadiabase; granular amphibole east of the Hartville fault. Veins strike north-northwest except on the north side of the Haystack Range Granite (Xh) dome. Age approximately 2.0 Ga.

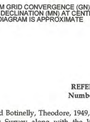
Xp **Pegmatites related to Haystack Range Granite**—White to gray, coarse-grained, zoned to unzoned feldspar-quartz-muscovite-tourmaline granitic dikes; contains accessory biotite, garnet, and beryl. Most abundant on the north side of the Haystack Granite dome. Estimated thickness 100-150 meters.

PCx **Pre-Cambrian rocks**—brown, coarse-grained weathered granite, quartzite, banded gneiss and schist, and gneissic granite cut by white quartz dikes and veins.

Projection: Universal Transverse Mercator (UTM), zone 12
North American Datum of 1927 (NAD 27)
10,000-meter grid ticks: UTM, zone 12
25,000-foot grid ticks: Wyoming State Plane Coordinate System, West and West Central Zones

SCALE 1:100,000
Contour Interval 20 meters

0 1 2 4 6 8 10 12 14 16 18 20 Kilometers
0 1 2 3 4 5 6 7 8 9 10 11 12 Miles
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



UTM GRID CONVERGENCE (GN)
1982 MAGNETIC DECLINATION (MN) AT CENTER OF SHEET
DIAGRAM IS APPROXIMATE

GEOLOGIC MAP OF THE TORRINGTON 30' x 60' QUADRANGLE, GOSHEN AND PLATTE COUNTIES, WYOMING AND SCOTTS BLUFF AND SIOUX COUNTIES, NEBRASKA

by

Fred McLaughlin and Ray E. Harris, 2004

Prepared in cooperation with the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under Cooperative Agreement Number 03HQAG0097

Digital cartography by Fred McLaughlin and Justin M. Mulbay

WYOMING QUADRANGLE LOCATION

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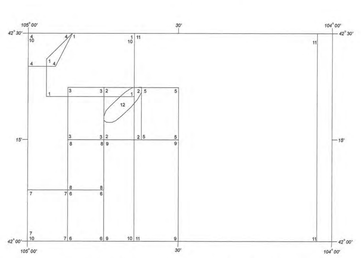

INDEX SHOWING SOURCES OF GEOLOGIC DATA

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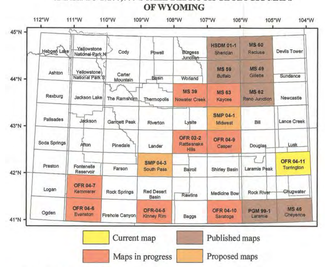
INDEX TO 1:100,000-SCALE BEDROCK GEOLOGIC MAPS OF WYOMING



KEY TO ABBREVIATIONS

Wyoming State Geological Survey maps: Map Series (MS), Open File Report (OFR), Preliminary Geologic Map (PGM), and unpublished STATEMAP project (SMP).