

EXPLANATION

**CORRELATION OF MAP UNITS**

Quaternary	Quaternary	Quaternary
Tertiary	Oligocene	Eocene
Tertiary	Paleocene	
Cretaceous	Upper Cretaceous	Lower Cretaceous
Jurassic	Upper Jurassic	Middle Jurassic
Triassic	Upper and Lower Triassic	
Pennsylvanian	Pennsylvanian	
Mississippian	Lower Mississippian	
Ordovician	Upper and Middle Ordovician	
Cambrian	Lower Cambrian	
Precambrian	Archean	

MAP SYMBOLS

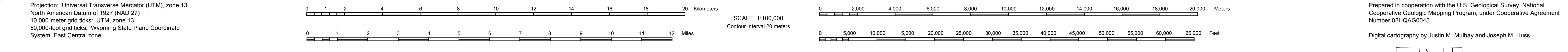
- Formation contact
- Fault—bar and half on downthrow block; no indication on fault trace indicates undetermined movement. Dashed where approximately located, dotted and queried where concealed.
- Thrust fault—Swallow on upthrow block. Dashed where approximately located, dotted and queried where concealed.
- Anticline—Trace of axial plane and direction of plunge compiled from source mapping or determined by field dip measurements and by photo interpretation.
- Monocline—Trace of axial plane compiled from source mapping or determined by field dip measurements and by photo interpretation. Arrows point in direction of dip.

DESCRIPTION OF MAP UNITS

- Surficial deposits**
  - Qa Alluvial deposits (Holocene)**—Unconsolidated and poorly consolidated clay, silt, sand, and gravel, mainly in channels or meander belts of creeks and rivers. Includes lowest terrace deposits in many of stream valleys.
  - Qcl Colluvium (Holocene/Prehistoric)**—Unconsolidated masses of rock fragments and nonsorted to poorly sorted sand, silt, clay, coarse gravel, derived locally through mass wasting. Only larger and thicker masses of slope wash talus on the west and southwest flank of the Horn located in the northeastern part of the map are included.
  - Qm Mixed alluvium and colluvium (Holocene/Prehistoric)**—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 younges low level terrace deposits.
  - Qp Playa lake deposits (Holocene/Prehistoric)**—Silty sand to clayey silt, with poor sorting. Sediments derived from erosion of Clay Shale and deposited in shallow closed basins by wind and water.
  - Qt Terrace deposits (Holocene/Prehistoric)**—Beds of pebbles and cobbles and lenses of silt and sand locally cemented by calcium carbonate. Consist of unconsolidated terraces which occur along present drainages, a few feet to several hundred feet above modern flood plains.
  - Qtr Older alluvial fan deposits (Prehistoric/Pre-Cambrian)**—Boulder gravels in a coarse matrix, subrounded and rounded pebbles, cobbles, and boulders of igneous, metamorphic, and resistant sedimentary rocks, interbedded with lenses of sand and silt. These deposits occur on level to gently sloping surfaces 100 to several hundred feet above present drainages. Some isolated remnants of these fan deposits occur as bench like features on the eastern flanks of the High Uintas Mountains and adjacent folds and the higher fan remnants may be Tertiary in age. The Mesa a large alluvial fan feature trending eastward from the Horn, is included in this category.
- Tertiary sedimentary rocks**
  - Tw7 White River Formation (Oligocene)**—A conglomeratic erosional remnant occurring on mountain upland surfaces toward the summit of the southern Big Horn Mountains on the east side of the map, described by Hise (1955) as probably Oligocene in age. These deposits appear to be Oligocene (?) fill in paleochannels cut in Paleocene and Precambrian rocks. Consists of Precambrian boulders, cobbles, and pebbles embedded in poorly stratified sandstone and bentonitic claystone. Thickness less than 50 feet (description and thickness modified from Hise, 1955 and Ver Ploeg and Greer, 1992).
  - 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. Substratiform and lignitic coal beds and carbonaceous shales occur locally. Thicknesses of over 2400 feet (description based on Kobout, 1957).
  - Tw7 Wasatch conglomerate (?) (Eocene)**—Consolidated lenticular conglomerate beds composed of locally rounded pebbles and cobbles of sedimentary and igneous rocks. Possibly equivalent to the Kingsbury and Mowat Conglomerate Members of the Wasatch. Deposits occur near the confluence of the Middle Fork of the Powder River and Buffalo Creek, on the southeast corner of the Mesa near Mayoworth, and on the southeast flank of Elk Mountain. Thickness from 1930 to 3900 feet (description and thickness from Ver Ploeg, 1998b).
  - Th Fort Union Formation undivided (Paleocene)**—Yellowish-gray sandstone and siltstone, coals and carbonaceous shales, and locally thin lenses of conglomerate. The Lebo and Tullock Members of the Fort Union Formation cannot be differentiated in the northern third of the map. Here the lower 500 feet of the Fort Union Formation includes lower ferruginous calcareous sandstone ledges interbedded with siltstone and shale. Maximum thickness about 3575 feet (Denison and others, 1995).
  - TL Lebo Member**—In the southern two-thirds of the mapped area the Fort Union Formation is divided into the Lebo Member and the Tullock Member. The Lebo Member is light to dark gray very fine grained to conglomeratic sandstone interbedded with varying degrees with gray siltstone, claystone, and carbonaceous shale and thin lenses of coal. Thickness range from 2325 to 3900 feet (description and thickness from Denison and others, 1995).
  - TL Tullock Member**—Distinguished from the conformably overlying Lebo Member by its drab appearance and massive sandstone units. Interbedded tan to buff sandstone, siltstone, dark brown and gray carbonaceous shale, and thin coal beds. Thickness 1000 to 1725 feet (description and thicknesses from Denison and others, 1995).
- Upper Cretaceous rocks**
  - Kf Lance Formation and Fox Hills Sandstone undivided**
  - Kf Lance Formation**—Light gray to light yellowish gray fine- to medium-grained lenticular sandstone interbedded with dark gray shales; some thin beds of brown carbonaceous shale occur in the upper half, bottom 100-300 feet includes light gray fine-grained thin bedded shaly sandstone with parting of dark gray shale. Thickness 1500 to 3225 feet (description and thickness modified from Denison and others, 1990).

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Kaycee 1:100,000 - scale Geologic Map

- Kf Fox Hills Sandstone and Bearpaw Shale undivided**
- Kf Fox Hills Sandstone**—Brownish gray to yellow brown sandstone interbedded with siltstone and dark sandy shale. The sandstone is characterized as a coarsening upward sequence. The Fox Hills Sandstone is combined with Lance Formation in northern portion of map and with Bearpaw Shale with the remainder of the map. Thickness approximately 200 to 600 feet (thickness from Horn and Richardson, 1958).
- Kf Bearpaw Shale**—Dark greenish gray shale with thin laminae of light gray siltstone; fine-grained sandstone in upper half of unit. Upper 15 feet grades into light colored sandstone of the Fox Hills Formation. Contact with Fox Hills placed at 6-inch bentonite layer. Thickness about 470 feet (thickness from Horn and Richardson, 1958).
- Kmv Mesaverde Formation**—Light gray to yellowish gray fine- to medium-grained sandstone and interbedded dark greenish gray shales, with a brown carbonaceous shale near the top. Capped by the Tepee Sandstone Member, an 8-foot thick white fine-grained crossbedded sandstone. Parkman Sandstone Member in lower part of formation commonly contains brown weathering calcareous concretions. Thickness up to 750 feet (description and thickness modified from Hise, 1955).
- Kg Cody Shale**—Dark gray calcareous fossiliferous marine shale interbedded with light gray fine-grained sandstone, with numerous bentonite beds in the upper two-thirds of the formation. Scattered concretions common throughout the shale units. An upper glauconitic fine-grained shaly sandstone (Shannon Sandstone Member) approximately 100 feet thick occurs about 1800 feet below the top of the formation. Thickness 3000 to 3300 feet (description and thickness modified from Kobout, 1957).
- Kf Frontier Formation**—Gray to black shale, and siltstone, bentonite beds, and "salt and pepper" sandstone. First Wall Creek Sandstone Member forms top and Second Wall Creek Sandstone Member occurs lower in the section. Contact with the underlying Mowry Shale is at the base of a 4 to 6 foot bentonite bed, locally referred to as the "Clay Spur Bentonite." Thickness approximately 850 to 850 feet (description and thickness modified from Ver Ploeg, 1998a).
- Kf Mowry Shale, Muddy Sandstone, and Thermopsis Shale undivided**
- Kf Mowry Shale (Upper Cretaceous)**—Hard, dark gray, siliceous shale that weathers silver gray and contains thin bentonite beds and abundant fish scales. Lower unit is dark gray to black nonresistant shale with thin interbedded white fine-grained ledge-forming sandstone near the base, grading into the underlying Muddy Sandstone. Contact with overlying Frontier Formation is at the base of the persistent "Clay Spur Bentonite." Thickness approximately 350 feet (description and thickness modified from Ver Ploeg, 1998a).
- Kf Muddy Sandstone (Lower Cretaceous)**—Tan to gray fine- to medium-grained friable to well lithified sandstone that is 5 to 30 feet thick. Easily identified by its siliceous color and grains of black minerals (description and thickness modified from Ver Ploeg, 1998a).
- Kf Thermopsis Shale (Lower Cretaceous)**—Dark gray to black soft fissile shale with some interbedded bentonite layers. Bentonite concretions appear in the lower portion of the formation. Thickness 160 to 200 feet (description and thickness modified from Ver Ploeg, 1998a).
- Kfm Cheyenne and Morrison formations undivided**
- Kfm Cheyenne Formation (Lower Cretaceous)**—Basal tan to white coarse-grained sandstone and chert pebble conglomerate, locally crossbedded and overlain by variegated buff to purple claystones interbedded with thin black shale beds, and an upper gray to buff to brown, fine- to coarse-grained resistant shaly sandstone and siltstone, locally referred to as the "Woody Beds." Thickness 100 to 150 feet (description and thickness modified from Hise, 1955 and Ver Ploeg, 1998a).
- Kfm Morrison Formation (Upper Jurassic)**—Pale-green, olive-green, blue-green to maroon and cherty shale variegated calcareous and bentonitic claystones interbedded with lenticular light gray fine-grained friable crossbedded sandstones. Disconformities and bone fragments are common in the upper portion of the section. Thickness 185 to 210 feet (description and thickness modified from Hise, 1955 and Ver Ploeg, 1998a).
- Jg Sundance and Gypsum Spring formations undivided**
- Jg Sundance Formation (Upper and Middle Jurassic)**—Upper part, gray to greenish gray glauconitic shale with an upper layer consisting of shaly shale and calcareous sandstone that weathers brown and is slightly glauconitic. Lower portion is primarily shaly sandstone interbedded with shale. Locally, the lowermost 10-15 feet contains oolitic limestone. The Sundance formation is of marine origin and is characterized by a high content of glauconite and numerous bellerophon fossils. Thickness 200 to 350 feet (description and thickness modified from Hise, 1955 and Ver Ploeg, 1998a).
- Jg Gypsum Spring Formation (Middle Jurassic)**—Reddish brown shale, claystone, and siltstone interbedded with 1 to 3 foot thick limestone and limestone breccia. Light gypsum beds in the lower part of the unit and light gray sandstone in the upper part of the section. Thickness ranges from 0 to 75 feet; the formation pinches out in the northwest central part of the mapped area, south of Pass Creek (description and thickness modified from Ver Ploeg and Greer, 1992).
- Tm Chugwater and Goose Egg formations undivided**
- Tm Chugwater Formation (Upper and Lower Triassic)**—Includes Crow Mountain Sandstone Member, Alouva Limestone Member and Red Peak Member, from top to bottom. Crow Mountain is reddish orange sandstone; Alouva is purplish gray limestone; Red Peak is red shale, siltstone and fine-grained sandstone. Thickness 700 to 900 feet (description and thickness modified from Ver Ploeg, 1998).
- Tm Goose Egg Formation (Triassic and Permian)**—Dark red to reddish orange shale and siltstone with interbedded gypsum, limestone, and dolomite, mainly in the lower portion. Local thin conglomeratic lenses made up of Paleozoic limestone, chert, and sandstone cobbles rest near the base of the formation on the upper portion of South River Shale in the south western part of the mapped area. This conglomerate may be equivalent to the Conglomerate member of the Goose Egg Formation in the southwestern part of the High Uintas. Formation thickness 300 to 350 feet (description and thickness from Ver Ploeg, 1998b).
- Tm Tenopys and Amaden formations undivided**
- Tm Tenopys Sandstone (Pennsylvanian)**—White to buff, medium- to fine-grained, massive sandstone; interbedded with thin limestone and dolomite beds, especially toward the base. Upper and middle sandstones are usually characterized by large-scale crossbeds. Thickness ranges from 350 to 400 feet (description and thickness modified from Ver Ploeg, 1998b).
- Tm Amaden Formation (Pennsylvanian and Mississippian)**—Includes from top to bottom, Manchester Limestone Member—gray to purplish limestone and dolomite, interbedded with shale, siltstone, and sandstone; Horseshoe Shale Member—reddish brown to maroon shale and siltstone with thin beds of sandstone and carbonates; and Darwin Sandstone Member (Upper Mississippian)—gray to buff, fine- to medium-grained, crossbedded sandstone. Thickness about 250 to 400 feet (description and thickness modified from Ver Ploeg, 1998b).
- Mn Madison Limestone (Upper and Lower Mississippian)**—Alternating units of light tan to gray limestone and dolomite. Upper portion buff gray limestone with karst surface at the top. Lower portion mainly dolomite and dolomite limestone. The entire formation is fossiliferous; spiriferid brachiopods and solitary terebracels being the most common. Thickness ranges from 250 to 500 feet, thinning toward the south (description and thickness modified from Hise, 1955 and Ver Ploeg, 1998b).
- Od Highgate Dolomite (Upper Ordovician) and Harding Sandstone (Middle Ordovician) undivided**—Gray massive cliff forming dolomite with a 5-foot thick light gray to yellowish brown siliceous sandstone at the base. Some zones of the dolomite and the lower sandstone of the Highgate Dolomite are quite fossiliferous. A highly pitted weathered surface is characteristic of the dolomite member. The basal Harding Sandstone is light gray to red, fine- to medium-grained, siliceous sandstone approximately 30 feet thick. Locally, the basal unit contains primitive fish bones and plates. Total thickness is 200 feet, pinching out in the southwest portion of the mapped area (description and thickness from Ver Ploeg and Greer, 1992).
- Og Gallatin Limestone (Lower Ordovician and Upper Cambrian) and Gros Ventre Formation (Upper and Middle Cambrian) undivided**—Uppermost unit (Gallatin Limestone) contains resistant grayish red limestone and thin beds of flat pebble conglomerate underlain by olive green to yellowish brown, calcareous shale and siltstone. The basal and lower Gros Ventre Formation includes light gray limestone, siltstone, and glauconitic, interbedded with soft yellow green shale and a bed of fine pebble conglomerate. The basal and lower Gros Ventre Formation consists of yellowish brown to reddish brown, friable, medium- to coarse-grained glauconitic sandstone. The two formations are not distinguishable in mapping purposes in this area. Total thickness is 550 to 580 feet (description and thickness modified from Hise, 1955 and Ver Ploeg, 1998b).
- Cz Flathead Sandstone (Middle Cambrian)**—Reddish gray, tan, and light brown medium- to coarse-grained quartz sandstone in beds as much as 3 feet thick; locally conglomeratic and crossbedded. Thin interbeds of green, maroon, and tan siltstone, mainly in the upper portion; arkosic conglomerate in the lower part. Abundant, multicolored brachiopods and fossil stromatolites specimens of the trilobite *Eranthis* sp. are found within the top 2 to 3 feet of the formation. Thickness 500 to 800 feet (description and thickness modified from Hise, 1955 and Ver Ploeg and Greer, 1992).
- Archean rocks**
  - As Metasedimentary and metavolcanic rocks**—Quartzite, hornblende gneiss, foliated marble, and siliceous-bearing calc-silicate rocks. Occurs on the northeast portion of the Horn. Description modified from Hirsch and others (1990).
  - Agn Granitic gneiss**—Composed of quartz, plagioclase, biotite, and microcline. Intruded with quartz granite and amphibolite dikes. Description modified from Hirsch and others (1990) and Palgussay (1961).



GEOLOGIC MAP OF THE KAYCEE 30' x 60' QUADRANGLE, JOHNSON AND CAMPBELL COUNTIES, WYOMING

Compiled and mapped by Alan J. Ver Ploeg, Cynthia S. Boyd, and Justin M. Mulbay 2004

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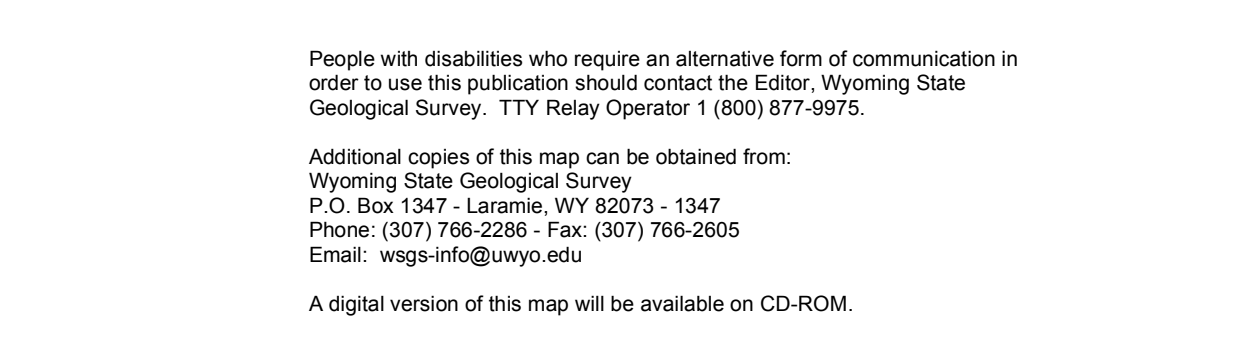
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INDEX SHOWING SOURCES OF GEOLOGIC DATA



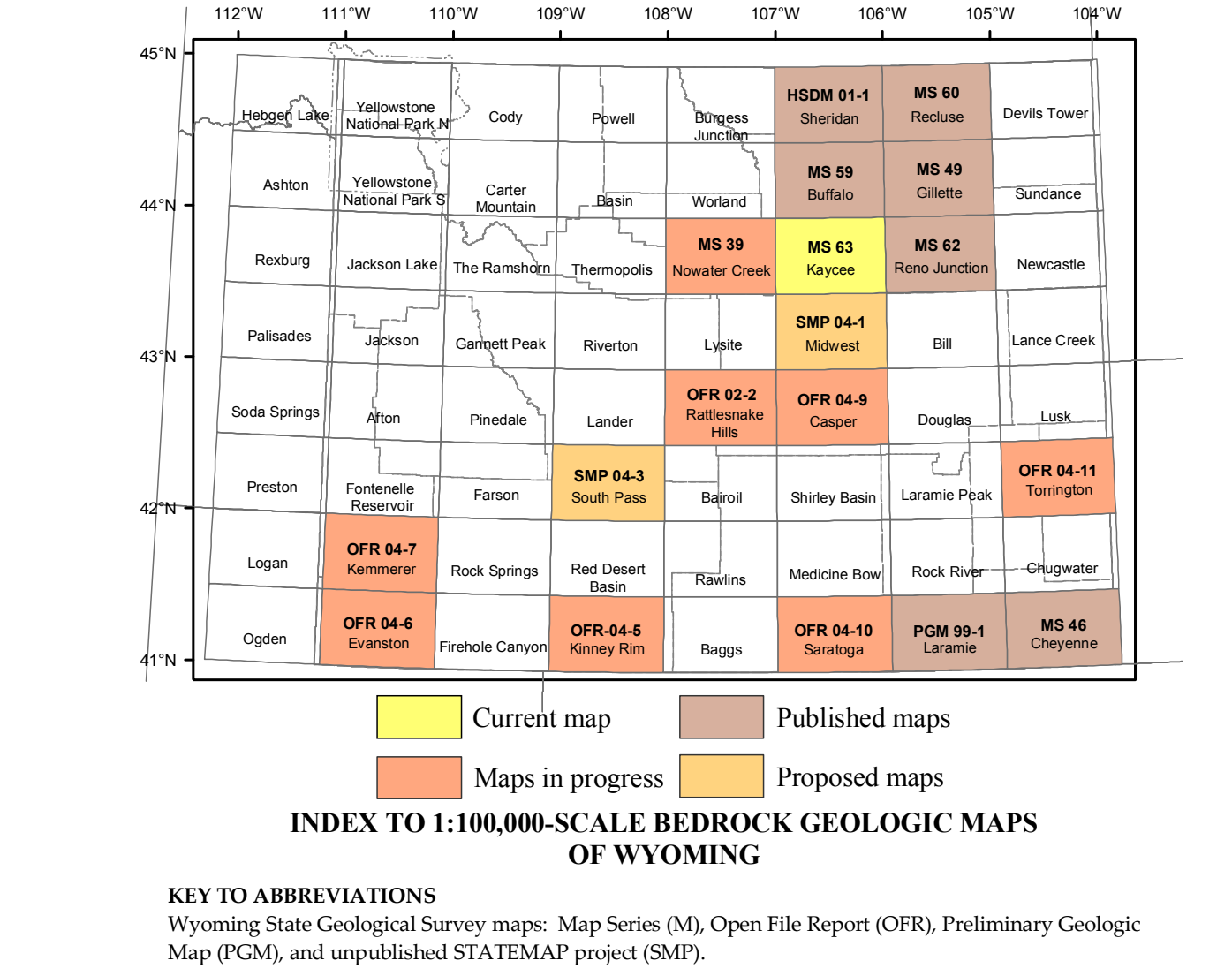
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