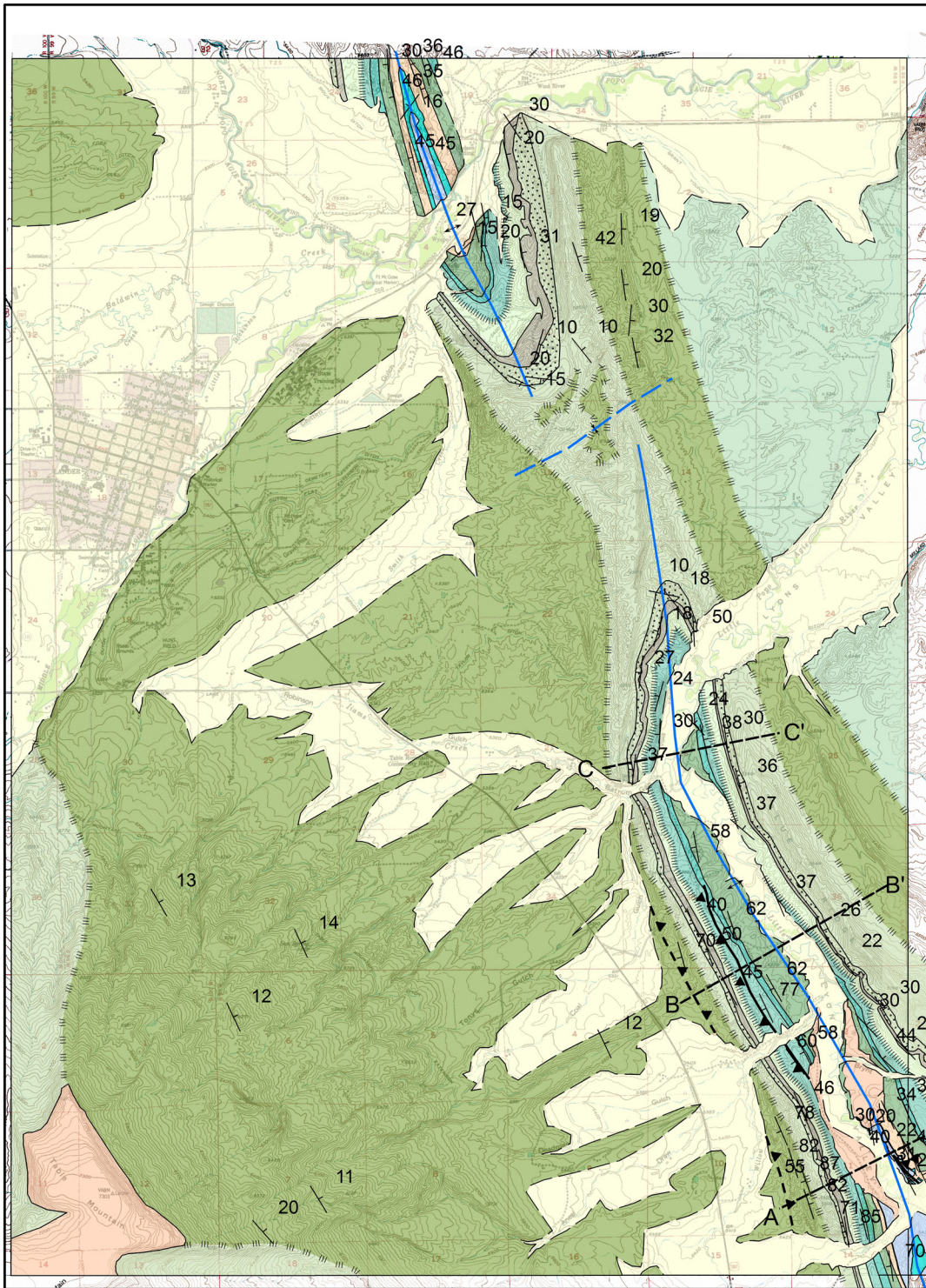


Lander 7.5' Geologic Quadrangle



Geologic Descriptions

- Qal Alluvium (Holocene)—Recently weathered material that was deposited with some identifiable stratification; variable thickness
- Tm Miocene rocks undifferentiated (Miocene)—Conglomerate; forms terraces along the Little Popo Agie River
- Twr White River Formation (Eocene)—Present along ridges creating armored surfaces; basal conglomerate of very poorly sorted Precambrian, Paleozoic, and Mesozoic boulders with poorly sorted sand- and gravel-sized matrix with cross stratification
- Kc Cody Shale—Light-gray fine-grained sandstone and siltstone, poorly lithified, forms badland-type topography; upper part eroded, only 100 feet (30 m) exposed
- Kf Frontier Formation—Light-green fine- to medium-grained quartz sandstone with few lithic fragments; interbedded with fossil-rich siltstone and shale beds. White siltstone with soft gray-black bentonite-rich shale at base, lower contact defined by the appearance of the first non-siliceous sandstone unit overlain by white siltstones. Thickness 1,000 feet (300 m)
- Km Mowry Shale—Silver-gray to white, hard, siliceous, thinly laminated siltstone and interbedded thin sandstone, grades downward into interbedded fissile tan/brown siltstone and sandstone near base. Upper shale beds contain bentonite concentrations. Thickness approximately 450 to 500 feet (140 to 150 m)
- Kmt Mowry Shale, Muddy Sandstone, and Thermopolis Shale undifferentiated—Amalgamated by faulting and internal deformation making identification of individual units tedious and often impossible
- Kms Muddy Sandstone—Hard hematite-cemented fine- to medium-grained dirty quartz sandstone; thickness approximately 25 to 50 feet (8 to 15 m)
- Kt Thermopolis Shale—Dark brown/black shale near top grades into light tan/brown siltstone and sandstone in lower part; underlain by basal rust-stained sandstone; thickness approximately 150 feet (46 m)
- Morrison and Cloverly Formations undivided—Terrestrial deposits of alluvial fans, braided or meandering streams, and lakes; approximately 350 feet (110 m) thick
- Kvj Cloverly Formation (Lower Cretaceous)—Variegated maroon, green, and red claystone and siltstone underlain by stream-laid gravel at base
- Kjr Morrison Formation (Upper Jurassic)—Upper part is red, maroon, green, gray, and brown fine-grained claystone, mustn't be confused with interbedded lenses of coarser channel sandstone, lower part poorly sorted silty sandstone with channels of coarse-grained cross-bedded sandstone
- Kjs Sundance Formation (Middle and Upper Jurassic)—Upper units are pale green glauconite-rich interbedded siltstone, sandstone, and limestone; upper contact is gradational and defined by the lack of glauconite in the basal Morrison sandstone. Lower units are reddish fine-grained quartz sandstone; basal transgressive sandstone unit is identified by mud rip-up clasts, quartz sand grains, and/or ooids; thickness approximately 250 feet (76 m)
- Kjt Gypsum Spring Formation (Middle Jurassic)—Upper units have siltstones interbedded with evaporites and three distinctive limestone units; massive ledge-forming evaporates at base with interbedded Fe2O3 stained red sandstone; upper contact with Nugget sandstone defined by silt grains in the basal Gypsum Spring; approximately 150 to 200 feet (46 to 60 m) thick
- Kju Nugget Sandstone (Jurassic (?) and Triassic (?))—Top part is pinkish/white buff in antiform culminations while Fe2O3-stained red on antiform limbs; composed of friable, fine- to medium-grained quartz sandstone beds which form cliffs of large-scale cross-beds with moderately spaced thin laminations of red and gray siltstone. Middle part is friable, fine-grained sandstone. Lower part is Fe2O3-stained red siltstone and resistive, thinly bedded sandstone. Thickness is approximately 470 feet (140 m)
- Klv Chugwater Group and Dinwoody Formation undivided (Triassic)—Shown on Cross sections A-A' and B-B'; total thickness approximately 1,060 feet (323 m)
- Klc Chugwater Group (Triassic)—Composed of four formations—from top to bottom Popo Agie Formation, Crow Mountain Sandstone, Alcova Limestone, and Red Peak Formation—with a total thickness of approximately 1,000 feet (300 m); upper two members are combined and mapped together
- Klp Popo Agie Formation and Crow Mountain Sandstone undivided—Combined thickness approximately 100 feet (30 m)
- Kpc Popo Agie Formation—Purplish-red mixture of claystone and fine-grained sandstone of lacustrine origin. Upper contact is mustard or ochre-yellow and has calcareous concretions
- Crow Mountain Sandstone—Fe2O3-stained red fine-grained sandstone
- Kta Alcova Limestone—Gray/blue micritic limestone with large stromatolites; resistive to weathering and forms large hogback dip slopes. Approximately 8 to 10 feet (2.4 to 3 m) thick
- Ktr Red Peak Formation—Fe2O3-stained red interbedded fine-grained sandstone and shale that contain large bluffs of sandstone outcrops; thickness approximately 900 feet (270 m)
- Ktd Lower Chugwater Group and Dinwoody Formation undivided (Triassic)—Shown on Cross section C-C'; includes Alcova Limestone, Red Peak Formation, and Dinwoody Formation; total thickness approximately 970 feet (295 m)
- Kte Dinwoody Formation (Triassic)—In subsurface only; red siltstone, buff tan/white dolomitic sandstone, and greenish shale; approximately 60 feet (20 m) thick
- Ktp Park City/Phosphoria formations undivided (Permian)—In subsurface only; mixture of grayish-tan slightly dolomitic carbonates with interspersed mudrock, chert, and two thin layers of phosphates; approximately 250 feet (76 m) thick
- Kts Tensleep Sandstone (Upper and Middle Pennsylvanian)—In subsurface only; tan to white, porous, friable, fine- to medium-grained mature quartz arenite with large scale cross-beds and intercalated carbonate layers; contains intense soft sediment deformation, creating large convoluted bed structures. Thickness approximately 400 feet (120 m)
- Ksm Amnsden Formation (Middle and Lower Pennsylvanian and Upper Mississippian)—In subsurface only; interbedded reddish shale and limestone that interfinger with the overlying Tensleep Sandstone
- Ksm Darwin Sandstone at base is a reddish, mature cross-bedded sandstone. Approximately 150 feet thick (46 m)
- Kmm Madison Limestone (Mississippian)—In subsurface only; upper part is cavernous and commonly filled with collapse breccia and reddish mud; most of formation is bluish-gray, massive limestone that has been largely dolomitized with abundant cherty layers. Approximately 400 feet (120 m) thick
- Kmo Bighorn Dolomite (Upper and Middle Ordovician)—In subsurface only; Steamboat Point Member at top is a hard, massive siliceous grayish-white dolomite characterized by its rough or bumpy texture. Lander Sandstone Member at base is a quartz arenite. The upper part of the Bighorn Dolomite has been removed by erosion that also removed the overlying Silurian and Devonian rocks in this part of Wyoming. However, the Devonian Darby Formation, a thinly bedded sandstone and siltstone that overlies uneroded Bighorn in other parts of northwestern Wyoming, is interpreted to be absent or very thin in this study area. Total thickness approximately 150 feet (46 m)
- Kmo Gallatin Limestone (Upper Cambrian)—In subsurface only; bedded limestone and dolostone; upper Open Door Member is a micritic limestone with microbial laminations and a layer of greenish and reddish clasts below the upper bounding lower Durbin Member displays oolitic and glauconitic material. Basal few centimeters is an imbricated intra-formational flat-pebble conglomerate. Thickness is approximately 275 feet (84 m)
- Kmo Gros Ventre Formation (Middle Cambrian)—In subsurface only; pale-green glauconitic shale interbedded with shaly fine-grained sandstone; grades up section into classic limestone containing oolites and conglomerate; common trace fossils of the *Rusophycos* and *Cruziana*; thickness approximately 700 feet (210 m)
- Kmo Flathead Sandstone (Middle Cambrian)—In subsurface only; reddish to maroon medium-grained slightly arkosic quartz sandstone; localized zones of shale. Upper unit is a submatric coarse- to fine-grained orthoquartzitic bedded fine-grained sandstone, clay-rich sandstone, siltstone, and shale, cross-stratified at base with large sandstone channels. Thickness approximately 250 feet (76 m)
- Kmo Crystalline and metamorphic rocks undivided (Precambrian)—In subsurface only; basement rocks composed of migmatite, schist, and granitic gneiss that have been intruded by younger granite



Contacts

- Certain
- Approximate
- Gradational (Approximate)
- Gradational (Known)

Faults

- Thrust (Known)
- Thrust (Inferred)
- Anticline (Certain)
- Syncline (Inferred)

0 237.875 950 1,425 1,900 Meters

Errors in locations of bedding orientation on the map will be manipulated by the Wyoming Geological Survey for the final map product.