WYOMING STATE GEOLOGICAL SURVEY
Wallace L. Ulrich
Director and State Geologist
Laramie, Wyoming

Geology - Interpreting the past - Providing for the future

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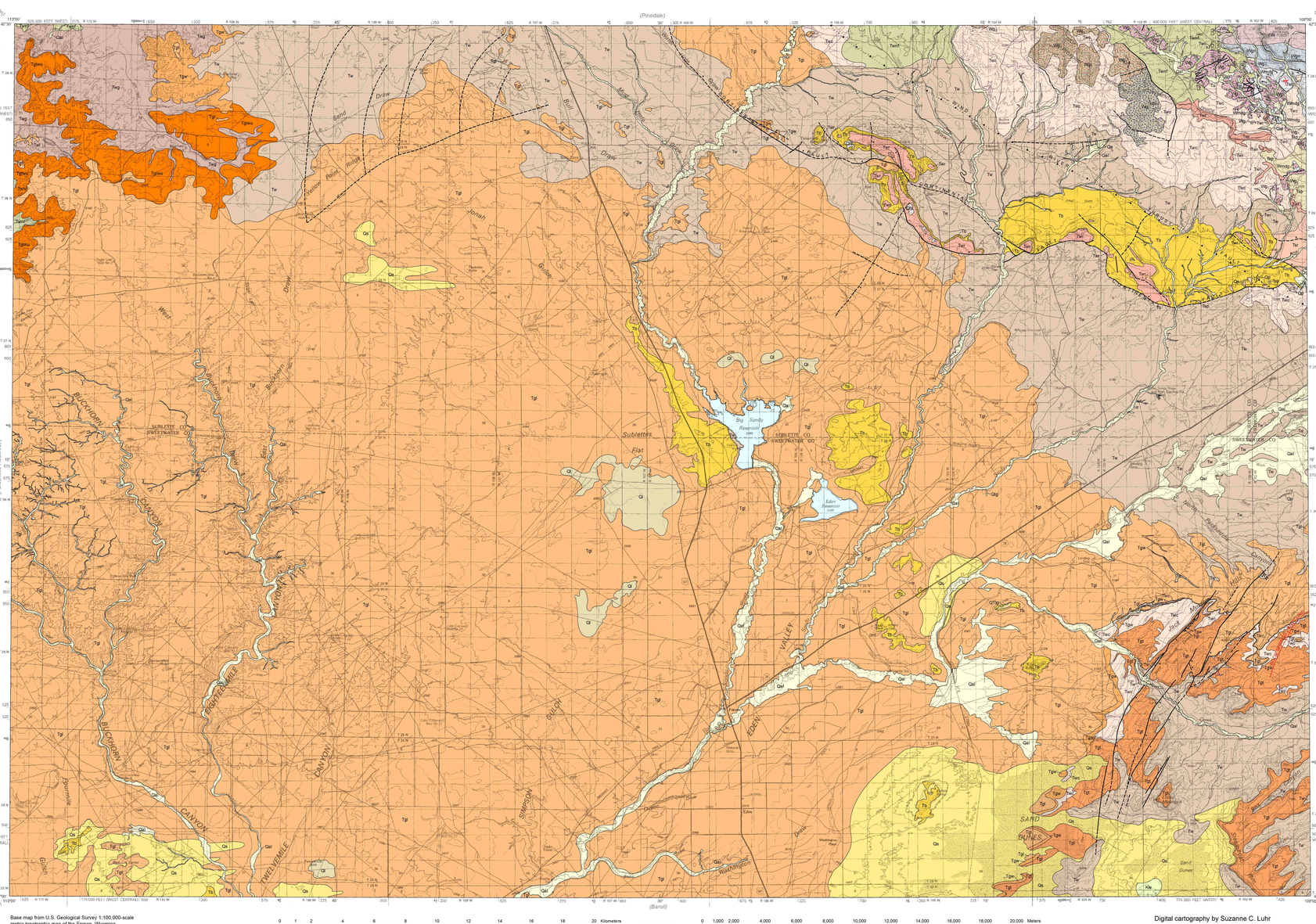
Prepared in cooperation with the U.S. GEOLOGICAL SURVEY

OPEN FILE REPORT 11-6
Farson 1:100,000 - scale
Bedrock Geologic Map



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

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 central and west zones

National Geodetic Vertical Datum of 1929

0 1 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 20 meters

0 1,000 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000 Meters
0 2,500 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 Suzanne C. Luhr

Map editing by Suzanne C. Luhr

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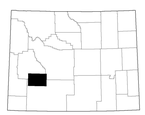
PRELIMINARY BEDROCK GEOLOGIC MAP OF THE FARSON 30' x 60' QUADRANGLE, SWEETWATER, SUBLETTE AND FREMONT COUNTIES, WYOMING

compiled and mapped by

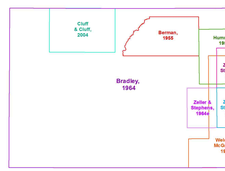
Wayne M. Sutherland and Suzanne C. Luhr

2011

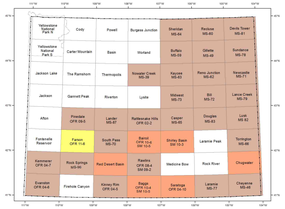


WYOMING QUADRANGLE LOCATION

UTM GRID CONVERGENCE (GN) AND 1980 MAGNETIC DECLINATION (MN) AT CENTER OF MAP DIAGRAM IS APPROXIMATE



INDEX MAP SHOWING SOURCES OF GEOLOGIC DATA



KEY TO ABBREVIATIONS

Wyoming State Geological Survey Maps: Map Series (MS), Open File Report (OFR), and unpublished STATEMAP project (SM)

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

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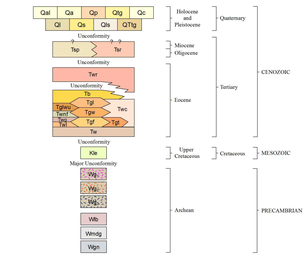
EXPLANATION

CORRELATION OF MAP UNITS



MAP SYMBOLS

Contact—Dotted where concealed or projected beneath younger units

Fault—Displacement unknown; dashed where inferred (approximately located), dotted where concealed

Normal fault—Dashed where inferred (approximately located), dotted where concealed; ball and bar on downthrown block

Strike-slip fault—Dashed where inferred (approximately located), arrows show direction of relative motion

Thrust fault—Wind River Thrust Fault, concealed; sawteeth on upper (tectonically higher) plate

Shear zone—Within Miner's Delight Formation, after Hassel (1988, 1991)

Anticline

Synform

DESCRIPTION OF MAP UNITS

Quaternary surficial deposits

Qal **Alluvium**

Qa **Alluvial fan deposits**—adjacent to faults on the south side of Prospect Mountains

Qp **Pediment**—Silt, sand, and gravel mapped in the east-central part of the quadrangle along divide between Alkali Wash to the north, and Alkali Creek to the south, and in northeast part of quadrangle near the Continental Fault

Qtg **Terrace gravel**—Stratified sand and gravel mapped in the east-central part of the quadrangle about 30 feet above Dry Sandy Creek

Qc **Colluvium**

Ql **Playa lake and other lacustrine deposits**

Qs **Sand dunes**

Qls **Slump blocks or landslides**

Tertiary/Quaternary sedimentary rocks

QTfg **Terrace gravel**—Stratified sand and gravel capping a hill in the Tule Butte area in the southeast part of the quadrangle

Tertiary sedimentary rocks

Tsp **South Pass Formation (Late Oligocene-Early Miocene)**—Up to 350 feet of highly variable, pink to tan and gray, poorly sorted, arkosic, conglomerate with pebble- to boulder-sized (up to 3 feet in diameter) clasts consisting of Precambrian metagreywacke, diabase, granite, and pegmatite in matrix of sandy siltstone and fine-grained tuffaceous sandstone, with some interbedded limestone and volcanic ash. The majority of the material was derived from Precambrian rocks in the Wind River Mountains to the north

Tsr **Split Rock Formation (Late Oligocene-Early Miocene)**—As much as 750 feet thick of soft, thick-bedded to massive, poorly cemented, tan to light-gray quartz sandstone accompanied by smaller amounts of conglomerate, tuff, pumicite, claystone, and limestone. Discontinuous beds of altered volcanic ash are common and some beds are silicified. East of the Farson Quadrangle, the base is a 20- to 50-foot thick dark-gray conglomerate with angular clasts of Precambrian granite and metagreywacke, interbedded with ashy conglomeratic sandstone. These sandstones differ from other Tertiary age sandstones in that they contain conspicuous well-rounded and frosted grains

Twr **White River Formation (Upper Eocene [Oligocene?])**—As much as 600 feet of white to grayish-orange and brown, sandy tuffaceous siltstone, sandstone, and conglomerate and local beds of altered volcanic ash. Angular grains and abundant tiny black biotite flakes and glass shards are characteristic. A basal unit, up to 80 feet thick, varies from coarse, white, cross-bedded sandstone to a coarse conglomerate with pebbles and boulders of Precambrian igneous and metamorphic rocks. The upper White River caps several buttes along the Continental fault with up to 150 feet of massive, tan to orange and white, unsorted boulder conglomerate (boulders < 2 feet) and lenses of cross-bedded sandstone. The White River unconformably, and in some places angularly, overlies the Bridger Formation, and earlier rock units

Tb **Bridger Formation (Eocene)**—Drab, varicolored, gray to yellowish- and greenish-gray, and grayish brown, dominantly fluviatile, fine, sandy, tuffaceous mudstone, volcanic ash layers that vary in vivid colors from white to deep blue and yellow-green, and some thin, white to buff, cherty limestones. Thickness is about 500 feet in the northern part of quadrangle along the Continental Fault; thins to about 320 feet in the Tule Butte area in the southeastern part of the quadrangle. Often weathers into badlands, which define the base. Often poorly consolidated with lenticular beds that include chert layers, volcanic ash beds, and some marlstone

Green River Formation (Eocene)—The Green River Formation is a pile of lenses of lacustrine sediments surrounded by a large mass of shallow basin-filling fluviatile sediments that comprise the Bridger and Wasatch formations with which the Green River interfingers. Maximum cumulative thickness for the members of the formation within the Farson Quadrangle is about 785 feet. The Green River formation here is subdivided into four units. The Laney Shale Member at the top of the formation is underlain by the Wilkins Peak Member. The Wilkins Peak interfingers with both the Cathedral Bluffs and New Fork Tongues of the Wasatch Formation and overlies the Tipton Tongue of the Green River Formation. The Tipton underlies and partially interfingers with the Cathedral Bluffs Tongue of the Wasatch Formation, interfingers with the Fontenelle Tongue of the Green River Formation, and overlies the main body of the Wasatch Formation. The Fontenelle Tongue interfingers with the lower part of the New Fork Tongue of the Wasatch Formation, which it partly underlies

Tgf **Laney Shale Member of the Green River Formation**—Pale-olive to dull yellow-gray, papery to massive, marlstone, siltstone, and shale, with some white to brown tuff and tuffaceous sandstones, and thin algal limestones; some oil shale may be present. Massive, greenish-gray mudstones that host crocodile and turtle bones, gar-pike scales, and small mammalian remains represent shore phases. The Laney is about 100 feet thick in the northeastern part of the quadrangle, but increases to about 200 to 250 feet in the Jack Morrow Hills in the southeastern part of the quadrangle; it is the most wide-spread outcropping unit within the quadrangle

Tgswu **Laney Shale and Wilkins Peak Members of the Green River Formation undifferentiated**—These units are combined in the northwestern part of the quadrangle

Tgw **Wilkins Peak Member of the Green River Formation**—Thin, regularly bedded, drab, greenish gray to white dolomitic mudstone, marlstone and oil shale, with some white to brown tuff and tuffaceous sandstone and marlstone beds. Absent in northeastern part of the quadrangle; varies from 15 feet to 35 feet thick in the southeastern part. Characterized by abundance of saline minerals and a general lack of vegetation on its brilliant white outcrops, which is conspicuously different than other members of the Green River Formation

Tgt **Tipton Tongue of the Green River Formation**—Dominated by greenish- to grayish-orange sandstone and siltstone, ostracode marl, oolite, half-inch to 8-inch thick persistent volcanic ash layers, and wide-spread algal layers. Olive-brown, papery shale dominates the lower part. Base is marked by a resistant ledge of grayish-orange fossiliferous limestone that hosts abundant shells of goniobasis. Top characterized as the highest persistent beds of algal balls enclosed by green-gray claystone and sandstone. Up to 300 feet thick near Tule Butte in southeastern part of the quadrangle

Tgf **Fontenelle Tongue of the Green River Formation**—Composed of light gray to buff, soft, flaky marlstone and shale, and is generally sandy near the base and top. May contain some limestone, siltstone, oil shale, and algal layers. Maximum thickness 150- to 250-feet. The Fontenelle is included with the New Fork Tongue of the Wasatch Formation in most of its limited exposure area in the northwestern part of the quadrangle. It is mapped separately in only one location near the western edge of the quadrangle

Twg **New Fork Tongue of the Wasatch Formation and Fontenelle Tongue of the Green River Formation undifferentiated**—Northward thinning of the Fontenelle Tongue, and its merging with the New Fork Tongue of the Wasatch Formation, result in it being mapped with the New Fork Tongue in the northwestern part of the quadrangle

Tw **Wasatch Formation-main body (Eocene)**—Subdivided into four members: the main body or lower part, the Cathedral Bluffs Tongue, the New Fork Tongue, and the La Barge Member. The main body crops out extensively in the eastern and northern parts of the quadrangle where it is about 3,400 feet of reddish- to greenish-gray, variegated and banded, claystone, siltstone, and fine-to medium-grained, muddy, calcareous sandstone, with some interbedded conglomerate

The Cathedral Bluffs Tongue lies above the main body of the Wasatch Formation and the Tipton Tongue of the Green River Formation; it interfingers with the Wilkins Peak Member of the Green River Formation and grades into the New York Tongue where the Wilkins Peak is absent in the northern part of the quadrangle. The New York Tongue may be slightly older than the Cathedral Bluffs in some areas. The La Barge Member of the Wasatch Formation underlies, and partly interfingers with, the New York Tongue of the Wasatch Formation and with the Fontenelle Tongue of the Green River Formation. The New York Tongue interfingers with both the Cathedral Bluffs Tongue, and with the Wilkins Peak Member of the Green River Formation. The La Barge interfingers with the main body of the Wasatch, but unconformably overlies the lowest member of the Wasatch, the Chappo Member, which does not crop out within the quadrangle. Distinctions between the New York, La Barge, and Fontenelle in the northwestern part of the quadrangle are problematic

Twc **Cathedral Bluffs Tongue of the Wasatch Formation**—Coarser than, but similar to, the main body of the Wasatch, and contains gray, alternating with pink and red, layers of mudstone and claystone, brown to yellowish, muddy, fine-to very coarse-grained sandstone, arkose, and conglomerate, and some thin local layers are less common near the mountains where boulder (up to 20 feet diameter) conglomerates characterize the surface, particularly near the Prospect Mountains. Thickness varies from less than 50 feet in the southeastern part of the quadrangle to an estimated 200 feet in the northeast to greater than 700 feet on Pacific Butte, just east of the quadrangle

Twmf **New Fork Tongue of the Wasatch Formation**—Crops out only along the northwestern edge of the quadrangle and is made up of about 65 feet of gray to green sandy mudstone and sandstone interbedded with thin layers of pink to maroon mudstone or clay. Difficult to distinguish from other units, it is mapped together with the Fontenelle Tongue of the Green River Formation or is merged with the main body of the Wasatch

Tsf **La Barge Member of the Wasatch Formation**—Only one outcrop is mapped along the northwestern edge of the quadrangle; comprises red, brown, and variegated mudstone, muddy yellow sandstone, and conglomerate, along with minor pisolitic limestone. Maximum thickness of about 1,640 feet (500 m) west of the Farson Quadrangle

Cretaceous sedimentary rocks

Kle **Lewis Shale (Upper Cretaceous)**—Gray marine shale interbedded with brown and gray lenticular sandstones that often host abundant concretions

Archean rocks

Wg3 **Granite and granite pegmatite (2,545 ± 30 Ma)**—Medium-grained granitic plutons that intrude meta-sedimentary rocks of the Miners Delight Formation in the western part of the South Pass granite-greenstone belt. May be part of the larger Bears Ears pluton in the Wind River Mountains to the north of the Farson Quadrangle

Wg2 **Granite in the northern Prospect Mountains**—Light-colored, medium-grained granite accompanied by dark-gray mafic xenoliths or cross-cutting dikes with unclear field relationships; prevalent epidotization, thin quartz-feldspar veins in outcrop give a partial gneissic appearance, as do felsic-mafic separations in hand specimen. Appearance is similar to Wg_1

Wg1 **Granite in the central and southern Prospect Mountains**—Deeply weathered, light-colored, medium-grained granite. Wg_1 appears to be similar in character and variability to granite Wg_2, but has been subjected to deep weathering; further research needed to determine relationships

Wb **Louis Lake Batholith (2,630 ± 2 Ma)**—Grey, medium- to coarse-grained, equigranular, undeformed biotite-hornblende quartz diorite and local granodiorite with some local magmatic flow foliations

South Pass Greenstone Belt metasedimentary and metaigneous rocks

Wmdg **Miners Delight Formation (2.8 Ga)**—Metagreywacke ranging in thickness from 5,000 to 20,000 feet. Dominated by gray to dark brown and black feldspathic and biotitic metagreywacke, and mica schist; includes: graphitic schist, hornblendic amphibolite with metamorphosed gabbro dikes and sills and basalt flows, fine-grained mafic metavolcanics, chlortie schist, tremolite-actinolite schist, and local interbeds of metaconglomerate, metacarbonate, and metadacite. Granite pegmatite dikes cross-cut the formation in many areas. Hosts several epigenetic shear zone and vein gold deposits east of the Farson Quadrangle

Gneiss Complex

Wgn **gneiss complex**—Felsic gneiss and granite migmatite, interlayered with supracrustal rocks and intruded by granodiorite; intercalated in places with the supracrustal rocks of the greenstone belt. Includes gray quartzofeldspathic gneiss, white augen gneiss, amphibolite, and minor banded iron formation

REFERENCES CITED AND SOURCES OF GEOLOGIC DATA

Bayley, R.W., Proctor, P.D., and Condie, K.C., 1973, Geologic map of the South Pass area, Fremont County, Wyoming: U.S. Geological Survey Professional Paper 793, 39 p., scale 1:48,000.

Berman, J.E., 1955, Geology of Elk Mountain and Tabernacle Butte area, Sublette County, Wyoming: M.A. thesis, University of Wyoming, Laramie, 63 p., scale 1:36,000.

Blackstone, D.L., Jr., 1983, Laramide compressional tectonics, southeastern Wyoming: Contributions to Geology, University of Wyoming, v. 22, p. 1–38.

Bortjer, R.J., 1984, Depositional environments and tectonic significance of the South Pass Formation, southern Wind River Range, Wyoming: M.S. thesis, University of Wyoming, Laramie, 229 p.

Bowker, K.A., 2000, Jonah Field – a shallow sweetspot in the basin-centered gas accumulation of the northern Green River Basin, Wyoming: Search and Discovery Article #10001 (2000), 6 p., *at* www.searchanddiscovery.net/documents/97016/index.htm

Bradley, W.H., 1926, Shore phases of the Green River Formation in northern Sweetwater County, Wyoming: U.S. Geological Survey Professional Paper 140-D, p.121-131, scale 1:250,000.

Bradley, W.H., 1961, Geologic Map of a part of southwestern Wyoming and adjacent states, U.S. Geological Survey Miscellaneous Geologic Investigations Map I-332, scale 1:250,000.

Bradley, W.H., 1964, Geology of the Green River Formation and associated Eocene rocks in southwestern Wyoming and adjacent parts of Colorado and Utah: U.S. Geological Survey Professional Paper 496-A, p. A1-A86, scale 1:250,000.

Cluff, R.M., and Cluff, S.G., 2004, The origin of the Jonah Field, northern Green River Basin, Wyoming, *in* Robinson, J.W., and Shanley, K.W., eds., AAPG Studies in Geology 52 and Rocky Mountain Association of Geologists 2004 Guidebook, p. 127-145.

Denson, N.M., Zeller, H.D., and Stephens, E.V., 1964, South Pass Formation on the southwest flank of the Wind River Mountains, Wyoming, *in* Cohee, G.V., and West, W.S., eds., Changes in stratigraphic nomenclature by the U.S. Geological Survey, U.S. Geological Survey Bulletin 1224-A, p. A27-A29.

Denson, N.M., and Pipiringos, G.N., 1974, Geologic map and sections showing areal distribution of Tertiary rocks near the southeastern terminus of the Wind River Range, Fremont and Sweetwater Counties, Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-835, scale 1:48,000.

Frost, C.D., Frost, B.R., Chamberlain, K.R., and Hulsebosch, T.P., 1998, The Late Archean history of the Wyoming Province as recorded by granitic magmatism in the Wind River Range, Wyoming: Precambrian Research, v. 89, p. 145-173.

Frost, C.D., Fruchey, B.L., Chamberlain, K.R., and Frost, B.R., 2006, Archean crustal growth by lateral accretion of juvenile supracrustal belts in the south-central Wyoming Province: Canadian Journal of Earth Sciences, v. 43, no. 10, p. 1533-1555.

Hausel, W.D., 1986, Geologic map of the Anderson Ridge Quadrangle, Fremont County, Wyoming: Wyoming State Geological Survey Open File Report 86-26, scale 1:24,000.

Hausel, W.D., 1988, Reconnaissance geologic map of the Halls Meadow Spring Quadrangle, Fremont and Sublette Counties, Wyoming: Wyoming State Geological Survey Open File Report 88-8, scale 1:24,000.

Hausel, W.D., 1991, Economic geology of the South Pass granite-greenstone belt, southern Wind River Range, western Wyoming (second printing): Wyoming State Geological Survey Report of Investigations 44, 129 p., scale 1:48,000.

Hausel, W.D., 2006, Geology and geochemistry of the Leucite Hills volcanic field: Wyoming State Geological Survey Report of Investigations 56, 71 p., scale 1:100,000.

Hummel, J.M., 1958, Geology of the Pacific Creek area, Sublette and Fremont Counties, Wyoming: M.A. thesis, University of Wyoming, Laramie, 76 p., scale 1:31,680.

Lillegraven, J.A., 1993, Correlation of Paleogene strata across Wyoming—a user's guide, *in* Snoke, A.W., Steidtmann, J.R., and Roberts, S.B., eds., Geology of Wyoming: Laramie, Wyoming State Geological Survey Memoir 5, p. 414–477 [see "Section S" on p. 442].

Love, J.D., 1961, Splitrock Formation (Miocene) and Moonstone Formation (Pliocene) in central Wyoming: U.S. Geological Survey Bulletin 1121-I, 39 p.

Love. J.D., 1970, Cenozoic geology of the Granite Mountains area, central Wyoming: U.S. Geological Survey Professional Paper 495-C, p. C1-C154, scale 1:125,000.

Love, J.D., Antweiler, J.C., and Mosier, E.L., 1978, A new look at the origin and volume of the Dickie Springs-Oregon Gulch placer gold at the south end of the Wind River Mountains: Wyoming Geological Association Guidebook, 13th Annual Field Conference, p. 379-390.

Love, J.D., and Christiansen, A.C., 1985, Geologic map of Wyoming: U.S. Geological Survey State Map, 3 sheets, scale 1:500,000.

Love, J.D., Christiansen, A.C., and Ver Ploeg, A.J. 1993, Stratigraphic chart showing Phanerozoic nomenclature for the State of Wyoming, Wyoming State Geological Survey Map Series 41.

McGee, L.C., 1983, Laramide sedimentation, folding and faulting, southern Wind River Range, Wyoming: M.S. thesis, University of Wyoming, Laramie, 92 p., scale 1:8,000.

Naee, R.L., 1939, Geology of the northwest part of the Red Desert, Sweetwater and Fremont Counties, Wyoming: Wyoming State Geological Survey Bulletin 27, 51 p., scale 1:126,720.

Oriel, S.S., and Platt, L.B., 1980, Geologic map of the Preston 1° x 2° Quadrangle, southeastern Idaho and western Wyoming: U.S. Geological Survey Miscellaneous Investigations Series I-1127, scale 1:250,000.

Roehler, H.W., 1977, Geologic map of the Rock Springs uplift and adjacent areas, Sweetwater County, Wyoming: U.S. Geological Survey Open File Report 77-242, scale 1:250,000.

Scott, J., and Sutherland, W.M., 2009, Preliminary geologic map of the Pinedale 30' x 60' Quadrangle, Sublette and Fremont Counties, Wyoming: Wyoming State Geological Survey Open File Report 09-5, scale 1:100,000.

Steidtmann, J.R., and others, 1986, Geometry, distribution, and provenance of tectonic conglomerates along the southern margin of the Wind River Range, Wyoming, *in* Peterson, J.A., ed., Paleotectonics and sedimentation in the Rocky Mountain region, United States: American Association of Petroleum Geologists Memoir 41, p. 321-332.

Stuckless, J.S., Hedge, C.E., Worl, R.G., Simmons, K.R., Nkomo, I.T., and Wenner, D.B., 1985, Isotopic studies of the late Archean plutonic rocks of the Wind River Range, Wyoming: Geological Society of America Bulletin, July 1985, v. 96, p. 850-860.

Stuckless, J.S., 1989, Petrogenesis of two contrasting Late Archean granitoids, Wind River Range, Wyoming: U.S. Geological Survey Professional Paper 1491, 38 p.

Sutherland, W.M. and Hausel, W.D., 2006, Geologic map of the South Pass 30' x 60' Quadrangle: Wyoming State Geological Survey Map Series 70, scale 1:100,000.

Welder, G.E., and McGreevy, L.J., 1966, Ground-water reconnaissance of the Great Divide and Washakie Basins and some adjacent areas, southwestern Wyoming: U.S. Geological Survey Hydrologic Investigations Atlas HA-219, scale 1:250,000.

West, R.M., 1973, Geology and mammalian paleontology of the New Fork-Big Sandy area, Sublette County, Wyoming: Fieldiana Geology, v. 29, March 23, 1973, p. 1-193.

Zeller, H.D., and Stephens, E.V., 1964a, Geology of the Continental Peak quadrangle, Fremont and Sweetwater Counties: U.S. Geological Survey Miscellaneous Field Studies Map MF-292, scale 1:24,000.

Zeller, H.D., and Stephens, E.V., 1964b, Geology of the Pacific Springs quadrangle, Fremont and Sweetwater Counties: U.S. Geological Survey Miscellaneous Field Studies Map MF-294, scale 1:24,000.

Zeller, H.D., and Stephens, E.V., 1964c, Geology of the NE¼ of the Essex Mountain quadrangle, Sweetwater County: U.S. Geological Survey Miscellaneous Field Studies Map MF-285, scale 1:24,000.

Zeller, H.D., and Stephens, E.V., 1964d, Geology of the Hay Meadow Reservoir quadrangle, Sublette, Fremont, and Sweetwater Counties: U.S. Geological Survey Miscellaneous Field Studies Map MF-295, scale 1:24,000.

Zeller, H.D., and Stephens, E.V., 1964e, Geology of the Tule Butte quadrangle, Sweetwater County, Wyoming: U.S. Geological Survey Miscellaneous Field Studies Map MF-297, scale 1:24,000.

Zeller, H.D., and Stephens, E.V., 1969, Geology of the Oregon Buttes area, Sweetwater, Sublette, and Fremont Counties, southwestern Wyoming: U.S. Geological Survey Bulletin 1256, 60 p., scale 1:48,000.