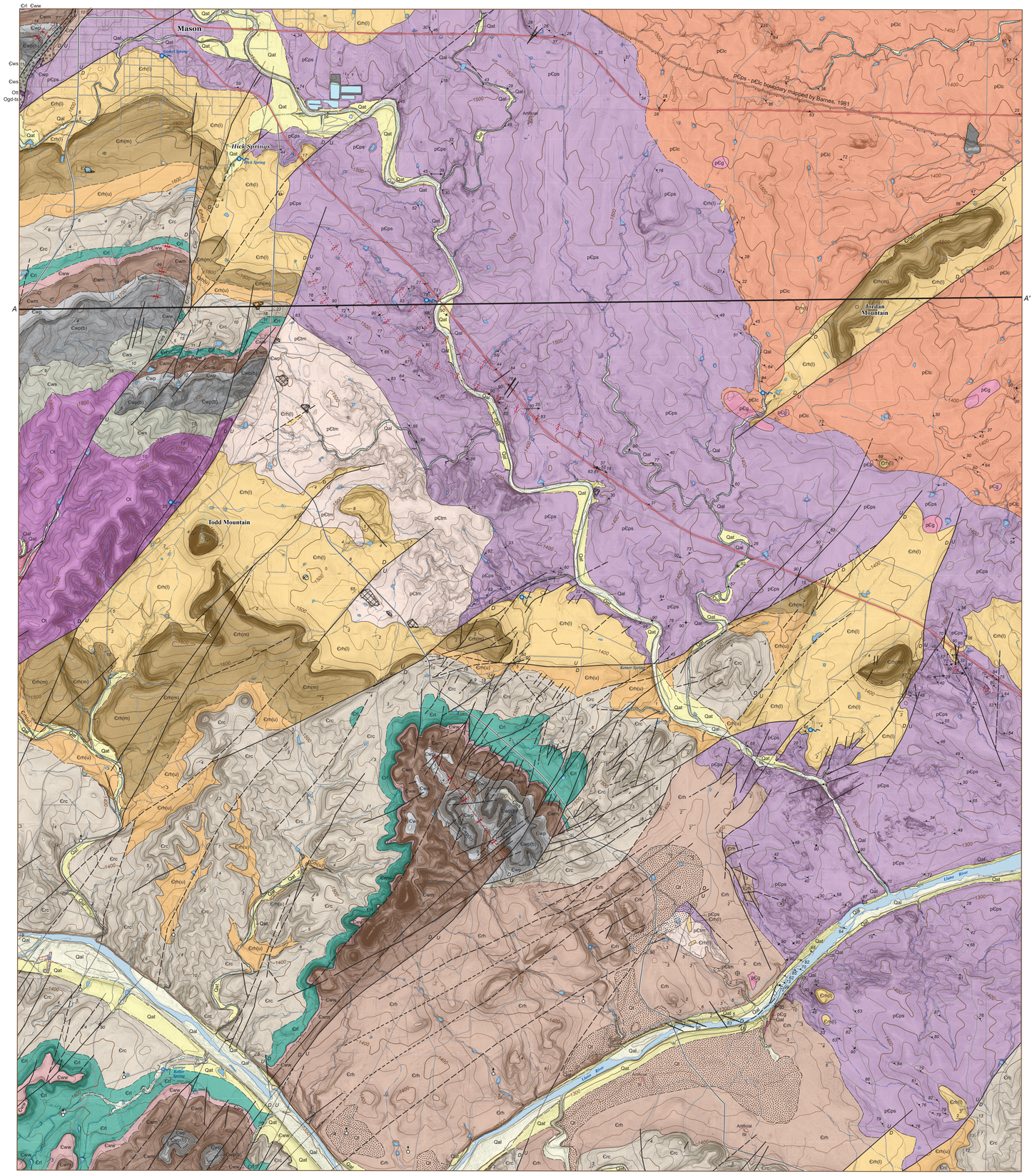
BUREAU OF ECONOMIC GEOLOGY
SCOTT W. TINKER, DIRECTOR JACKSON SCHOOL OF GEOSCIENCES THE UNIVERSITY OF TEXAS AT AUSTIN
In cooperation with the State of Texas Advanced Resource Recovery (STARR) Program
and the U.S. Geological Survey National Cooperative Geologic Mapping Program
under STATEMAP award number G15AC00250, 2022

GEOLOGIC MAP OF THE MASON QUADRANGLE
MASON COUNTY, TEXAS
Open-File Map 259
2022



QUATERNARY

Qal—Alluvium. Unconsolidated gravel, sand, silt, and clay along stream courses and low floodplains of the Llano River and its tributaries; maximum thickness approximately 20–35 ft; includes local bedrock exposures.

Qat—Alluvial terrace. Tributary deposits of gravel (derived from nearby uplands), sand, and calcareous silt and clay, generally unconsolidated but may have local caliche cement; thickness highly variable but maximum of about 20 ft.

Qt—Conglomerates. Conglomerates composed of poorly to well-cemented Paleozoic and Cretaceous chert, limestone, and dolomite cobbles. Remnant alluvium elevated above active and highest flood levels. Heavily vegetated or cleared and cultivated. Units associated with the Llano River and proximal to the southeast to northeast bend in the river. Initially mapped by Wilson (1957) and modified with remote sensing.

PALEOZOIC
Unconformity

FZ—Fault Zone Breccias. Brecciated bedrock. Zones are generally associated with faults and vary from 1-65 ft wide. Traversing the breccia zone, clasts tend to transition from lithologic mixtures dominated by the footwall into mixtures dominated by hanging wall clasts. However, other intervening stratigraphic units can occur. Clasts are angular to rounded and matrix to clast supported. The matrix is commonly a fine-grained, white carbonate material. Locally contain large relatively undeformed blocks (up to 100s of feet across). The Mason Fault zone is an anomalously wide (up to 650 ft) breccia zone described and mapped by Becker (1985).

ELLENBURGER GROUP

Limestone and dolostone. Cherty, non-glauconitic, thick- to thin-bedded, sparingly fossiliferous. Limestones are generally fine-grained, light gray; dolomites are varicolored, microgranular to very coarse crystalline. Dolostones can be siliceous. Two formations are mapped in the area, the Gorman and the Tanyard formations; the top-most Honeycut Formation of the Ellenburger Group is absent (Cloud and Barnes, 1946). Limestone and dolostone subunits of the Ellenburger partially mapped in the study area by Cloud and Barnes (1946) are generally not included in this map. The Ellenburger Group is up to about 900 ft thick.

Ot—Tanyard Formation. Limestone and dolostones. Includes the dolostones of the Staendebach Mbr and the limestones of the Threadgill Mbr. Generally non-glauconitic. Total thickness about 480 ft (Barnes and Bell, 1977).

Ogd-ts—Staendebach Member of Tanyard Formation and lower Gorman Formation, undivided. Dolostones of the undivided Staendebach and lower Gorman mapped by Becker (1985). Light brown to yellowish gray, microgranular to medium-grained, cherty, and poorly bedded. Weather into light brown to brown gray rounded outcrops. Up to 440 ft thick (Becker, 1985). The overlying contact with the upper Gorman Formation limestones is generally sharp and placed at the top of the upper dolostone bed. The contact can be mapped by moderate vegetation change with moderate growth on dolomites (liveoaks especially), and sparse vegetation growth on limestones (Becker, 1985). Small outcrop in the NW portion of the quadrangle.

Ott—Threadgill Member of Tanyard Formation. Limestone. Brownish gray, microcrystalline (micritic), nonglauconitic, to fossiliferous limestone with dolomitic burrows (trace fossils) and occasional chert. Thin- to thickly-bedded (up to several feet). Fossils include sparse gastropods (*Lyrospira gyrocera*) and cephalopods. Pitted and fluted weather surfaces. Relatively resistant to erosion and contains sparse vegetation forming gentle slopes or hilltops (Grote, 1954). Total thickness about 300 ft (Becker, 1987). Threadgill Mbr grades into overlying Staendebach Mbr dolostone, but with more abundant chert. Lower contact is lithologically gradational, but mapped above the highest glauconitic calcarenite of the San Saba Mbr (Becker, 1985; Miller et al., 2012). Limestone and dolostone subunits of the Threadgill Mbr originally mapped by Cloud and Barnes (1946) not included in this map. Very small outcrop in the NW portion of the quadrangle.

MOORE HOLLOW GROUP
Wilburns Formation

Ews—San Saba Member. Calcarenite. Yellowish brown to light gray, medium to coarse-grained, glauconitic, fossiliferous, calcarenite. Well-bedded (up to 10 inches) calcarenite interbedded with micritic limestones with thin recessive silty units. Locally contains intraformational conglomerate interbeds. Unit becomes increasingly micritic, less glauconite and less fossiliferous toward the top. Weathering characteristics include brown limonitic stains and sandy soils. The base of the San Saba is transitional with the underlying Point Peak and defined as the first series of thin-bedded, glauconitic, calcarenite beds. Slope breaks can be used to map the contact depending on whether the Upper Point Peak Bioherm is present. The top of the San Saba is transitional with the overlying Tanyard Formation and generally the last medium- to coarse-grained glauconitic calcarenite. Micritic beds occur within the upper San Saba, similar to the Threadgill. Uncertainty in the upper and lower contacts results in the San Saba thickness reported to vary from 175 ft (Becker, 1985) to 300 ft (Barnes and Bell, 1977).

Point Peak Member

Point Peak Mbr has two distinct subunits: a lower calcareous siltstone and clastic unit, and a discontinuous upper bioherm or stromatolite (microbiolite bioherm) unit. Both units and facies within are described in detail by Lehermann et al. (2020). Total thickness reported to vary from 175 ft (Barnes and Bell, 1977) up to 380 ft thick (Becker, 1985) with the variation attributed to the discontinuous upper bioherm unit.

Ewp(b)—Point Peak, upper bioherm member (informal). Boundstones with thinly layered calcarenites and siltstones. Light gray, white, to darker grey micritic stromatolites (microbiolite bioherms). Stromatolites often contain multiple phases of growth, defined by a white limestone outer structure (rind) up to 30 ft in diameter (in plan view). Bioherms contain an internal dolomitic (darker grey) mudstone containing oval to circular (microbial) textures up to 24 inches in diameter. In profile, relief of ovoid bioherms is up to 15 ft for individual clusters. Thin bedded heterolithic units of calcarenites to siltstones occur between and drape over bioherms with multiple dip directions. Upper Point Peak is generally non-glauconitic (Lehrmann et al., 2020). The top of the Point Peak Mbr is transitional with the San Saba Mbr occurring as the first thin-bedded, glauconitic, calcarenite beds above the bioherms. When present, the upper Point Peak Bioherm is more resistant than the overlying San Saba Mbr and may produces a topographic break. The bioherm facies is often a ridge-forming unit. The unit distinctly appears as having an irregular pattern or texture in outcrop on LiDAR.

Ewp—Point Peak, lower member (informal). Heterolithic clastic rocks. Yellowish to green-gray, thinly bedded and intercalated fine-grained sandstone, siltstones grainstones, and packstones. Beds of varicolored intraformational conglomerates with tabular flat clasts of rounded silty limestone are common. Glauconite is abundant. Locally beds contain ripples, cross-beds, and burrows and trace fossils (Cruziana). Small stratiform stromatolites locally occur within the unit (Lehrmann et al., 2020). Locally distinct index fossils include the "Plectorophia" Zone (brachiopoda) are found near the top and beneath the upper bioherms (Barnes and Bell, 1977). The lower unit is easily eroded and often occurs as eroded flat hilltops or valleys. Unit weathers into a light-colored soil with flaggy siltstone clasts creating locally favorable conditions for agricultural use. Top of the lower unit occurs at the base of the massive overlying stromatolite unit, when present. When stromatolites are absent, the top of the Point Peak Mbr is transitional with the overlying San Saba Mbr and placed below the first glauconitic calcarenite bed (Becker, 1985). The lower contact with the Morgan Creek Limestone is gradational. The base of the Point Peak Mbr is defined as the top of upper-most glauconitic calcarenite and laterally continuous bed. The contact is mapped at a break in slope associated with the bench-forming character of the transition from the resistant Morgan Creek and Point Peak Mbr.

Ewm—Morgan Creek Limestone Member. Calcareous glauconitic sandstones and sandy glauconitic limestones. Quartz sandstone: lower sandstone is 25 ft thick, calcite-cemented, glauconitic, pink to red, fine- to medium-grained, grading upwards from underlying Welge Sandstone into the overlying calcareous units. Limestone (wackestone to grainstone): well-bedded, medium-to-light gray to greenish-grey, fine- to coarse-grained, local sparry cement, glauconitic, and fossiliferous (brachiopods and trilobites). Overall a resistant unit forming ridges and steep hillslopes, consisting of thin to thick bands of aligning vegetation. Upper boundary is gradational and locally defined as a transition from fossiliferous limestones of the Morgan Creek into thin bedded silty limestones and intraformational conglomerate of the Point Peak Mbr. This contact is often at the top of a resistant calcarenite that forms a bench below the more recessive lower Point Peak Mbr. The bench is often vegetated with mesquite trees. The unit is often a ridge-forming unit with laterally continuous beds apparent on LiDAR. Up to 140 ft thick.

Eww—Welge Sandstone Member. Sandstone. Quartz arenite with silica cement, coarse- to medium-grained, well-sorted with well-rounded quartz grains with quartz overgrowths. Thick bedded (massive) to poorly bedded, non-glauconitic, yellowish-brown to orange in color. Unit generally lacks sedimentary structures and base contains reworked Lion Mountain. Grades into overlying Morgan Creek with the contact placed at the occurrence of carbonate cement and associated heavily vegetated scarps. Important minor aquifer for domestic and livestock use. Up to 25 ft thick.

Riley Formation

Erl—Lion Mountain Member. Sandstone. Glauconitic, quartz-rich, green- to dark brown-colored, fine- to medium-grained, cross-bedded, locally calcite cemented. Contains white sandy limestone lenses composed of calcite cemented phosphatic brachiopod and trilobite coquina. The Lion Mountain is a recessive unit, often forming benches or valleys between more resistive overlying and underlying units. Benches or slopes with sparse vegetation develop deep reddish soil with weathering-produced iron nodules. Locally unit has agricultural use. Becker (1985) reports a thickness up to 55 ft. The contact with the underlying Cap Mountain is placed at the first occurrence of continuous calcarenite and below the first occurrence of discontinuous trilobite coquina. This contact is often as a topographic and vegetation break. When exposed, the contact with the overlying Welge Mbr is sharp. The contact is mapped as as a distinctive densely vegetative slope break and as the most up-slope occurrence of iron-oxide nodules within the soil.

Erc—Cap Mountain Member. Sandstone and limestone. The Cap Mountain Mbr transitions from a lower quartz sandstone with calcite cement, into a mixed calcarenite and siltstone, to a calcarenite (limestone) at the top. Lower quartz sandstone; fine-grained, poorly sorted, glauconitic, dark-yellowish brown to reddish, calcite-cemented, coarse grained sandstone with rounded to angular grains that transitions upward into a middle portion of interbedded siltstone and calcarenite. This middle section grades upward into light olive gray, prominently bedded (thicknesses up to 25 inches), glauconitic, limestone (wackestone to grainstone) with less quartz and more calcareous grains. Fossil fragments include brachiopod shells. The Cap Mountain is a highly resistant, scarp forming unit, forming vegetation lineaments along internal contacts. The unit forms moderately vegetated hills between the upper Hickory and Lion Mountain benches. It grades into the overlying Lion Mountain, but with a sharp slope contrast. Weathered outcrops and soils contain small limonitic concretions near the top. The contact with the underlying Hickory Mbr (quartz and hematite cement) is gradational, but distinct based on the lack of calcareous cement in the Hickory. The contact is placed at the base of the more resistant calcareous cemented, which is often expressed as a topographic scarp and heavily vegetated break in slope. Up to 330 ft thick (Becker, 1985).

Erh—Hickory Sandstone Member, undivided. Quartz sandstone. Subdivided into three informal units (upper, middle, and lower) based upon variations in color, grainsize, porosity, bedding thickness, cementation, and topographic expression. Where not differentiated, the unit generally consists of brown to red quartz sandstones. Diagnostically there is little to no calcite and no glauconite. Locally a major aquifer in the subsurface. The contact with the overlying Cap Mountain is placed at the first resistant calcareous cemented sandstone, which is often expressed as a topographic scarp and heavily vegetated break in slope. About 400 ft thick.

Erh(u)—Upper Hickory (informal). Sandstone. Hematitic quartz arenite. Massive to thinly-bedded, red, medium- to coarse-grained, well-rounded, moderately sorted, friable, hematite and ilmonite cement, and glauconitic at top. Hematite locally forms ooids-like coatings around quartz grains. Poorly exposed recessive unit, forms topographically low benches that develop deep red soils often used for cultivation or agricultural purposes. Unit grades into overlying Cap Mountain, marked by calcite-cemented sandstone with increased resistance and relief in landscape. The unit is locally an aquifer. About 75 ft thick.

Erh(m)—Middle Hickory (informal). Sandstone. Quartz arenite. Thick- to thin-bedded, with laterally continuous beds, quartz and hematite cement (increasing upward), fine- to coarse-grained, rounded to subrounded, poorly sorted, smaller scale troughcross-bedding, light brown to orangish brown, and phosphatic brachiopods, and abundant trace fossils. Locally silty laminations and interbeds. Laterally continuous mudstone and siltstone interbeds. This unit is indurated and forms ridges, outcrops and low hills owing to a weathering-produced, near-surface lithification process (Brann Johnson, personal communication). The unit is often thickly vegetated. Little to no agriculture and is considered an aquitard (Brann Johnson, personal communication). Up to 145 ft thick.

Erh(l)—Lower Hickory (informal). Sandstone. Quartz arenite. Massive and discontinuous beds, large amplitude trough cross-bedding, very coarse- to medium-grained, quartz and hematite cement, poorly sorted, rounded to subrounded, light to dark brown, friable, locally conglomeratic with feldspar grains, granitic to metamorphic pebbles and at base. Ventifacts described and mapped localities near the base (Alexander, 1952). Very porous and permeable and locally is a major aquifer unit. Recessive and poorly exposed unit that forms topographically low benches with well-developed soils often in agricultural use. Top of the unit is the first resistant, well-cemented sandstone. Variable thickness, ranging from 0 to about 55 ft thick.

MESOPROTEROZOIC
Igneous

pCtm—Town Mountain Suite. Granite. Porphyritic to equigranular, pink, fine- to coarse-grained granite. Composed of pink microcline (up to 3 cm), vitreous gray quartz, cloudy white plagioclase, biotite and hornblende, and containing aplitic to pegmatitic granite dikes and milky quartz veins. Locally topaz-bearing (White, 1960). Microcline phenocrysts locally defines a flow foliation and/or lineation, especially near pluton margins. Weathers to form grus aggregate; where granite is deeply weathered and grus well developed it locally underlies areas in cultivation. Granite exposures occur in the NW corner of the quadrangle and is a continuation of the larger Grit pluton to the north (Grit Quadrangle). Muehlberger et al (1967) interpret this granite body as part of a larger pluton connected in the subsurface to the Mason pluton to the southeast. The Grit pluton is not dated, but the Katemcy Pluton to the north is reported to be 1070 ± 2 Ma (U/Pb zircon age; Walker, 1992).

Metamorphic

pCg—Granite. Granite. Fine- to medium-grained, equigranular, pink granite. Generally small intrusive bodies within the host metamorphic rock. Smaller granitic bodies mapped primarily by Martin (1986).

pClc—Lost Creek Gneiss (Suite). Orthogneiss. Light pink, fine- to medium grained, nonfoliated to very well foliated quartz-feldspar-hornblende-biotite gneiss grading into augen gneiss and migmatite (Mutis-Duplat, 1983). Migmatite zones are observed along Comanche Creek near the Llano River. Outcrops of Lost Creek Gneiss in the Mason quadrangle are usually in the form of rounded knobs (Martin, 1986). Descriptions of the augen and banded granitic gneisses are consistent with LCG being an orthogneiss as described by Hunt (2000) in the adjacent Art Quadrangle to the east. Note that the mapped boundaries and increased area of the Lost Creek Gneiss Suite is based on Martin (1986) and differs considerably from the published maps of Barnes (1981).

pCps—Packsaddle Schist Domain (Supersuite). Schist and gneiss. Variable lithologies poorly and discontinuously exposed include: fine- to coarse-grained, pink to greenish gray and gray, quartz-feldspar-biotite gneiss, quartz-feldspar-magnetite-schist, quartz-muscovite-sillimanite schist, poorly foliated amphibolite, quartz-biotite-hornblende schist, white to grey quartzite; grey quartz-muscovite schist. Locally well-developed aligned minerals define multiple generations of ductile fabrics and folds in all rock types. Metasedimentary and metaigneous supracrustal protoliths consisting of a ca. 1257-1247 Ma (and possibly older) basinal sequence that formed along a continental shelf/slope near an arc (Reese et al., 2000; Mosher, 1998). Soils tend to have quartz fragments and abundant mica.

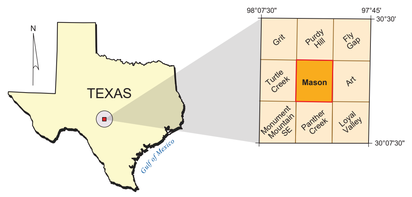
Chronostratigraphy and Correlation of Map Units

Eon	Era	Period	Age (Ma)	Map units	Formation, Group or Division
Phanerozoic	Cenozoic	Quaternary	2.6	Qal	Alluvium
				Qat	Alluviated terrace
				Qt	Terrace
				Unconformity	
				FZ	Fault Zone Breccia (Ouachita orogeny)
				Unconformity	
	Paleozoic	(Lower) Ordovician	~470	Ogt	Gorman Formation
				Ogd-ts	Staendebach Member / Tanyard Formation
				Ots	ELLENBURGER GROUP
				Ot	Threadgill Member
		(Upper) Cambrian	~485	Ews	San Saba Member
				Ewp(b)	Point Peak Member
				Ewp	Wilburns Formation
				Ewm	Morgan Creek Limestone Member
				Eww	Welge Sandstone Member
				Erl	Lion Mountain Member
				Erc	Cap Mountain Member
			~497	Erh	Hickory Member
				Erh(l)	MOORE HOLLOW GROUP / Riley Formation
			~503		
				Great Unconformity	
	Proterozoic	Mesoproterozoic	~1070	pCtm	1070 ± 2 Ma (Katemcy Pluton; U/Pb zircon age) — Town Mountain Granite (Suite)
			~1244	pClc	Metamorphic Rocks: orthogneisses — Lost Creek Domain (Suite)
			~1274	pCps	PACKSADDLE SCHIST DOMAIN (SUPERSUITE)

Chronostratigraphic units and ages from Ewing (2016), and pC ages[1] from Walker (1992) and Barker and Reed (2010).

MAP SYMBOLS

- Contact
- Approximate contact
- Road
- 1700 Elevation; contour interval 20 ft
- Intermittent stream
- Ponds
- Gravel pit
- Spring
- Flowing well
- Well with geologic control.
- Quarry
- Quarry
- Water
- Axial plane
- Axis; lineation
- Dip
- Foliation
- Fracture
- Foliation-vertical
- Fault trend
- Fault; fault
- Dip-horizontal
- Fossilpoints
- Small fault trend
- Small fault (Strike and dip)
- Sinkhole
- Normal fault
- Inferred fault
- Buried fault
- Fabric
- Collapse contact
- Supersuite boundary
- Measured section
- Antiform
- Syncline
- Synform
- Overturned antiform
- Anticline



SCALE 1:24,000

0 1 2 3 MILES

0 1 2 3 4 KILOMETERS

UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 14N NAD 83
CONTOUR INTERVAL 100 FT
DATUM IS MEAN SEA LEVEL

ZONE 14
GN

2020
G-M Angle
4½° (80 MILS) East

To Convert a Magnetic Azimuth to a Grid Azimuth
Add G-M Angle

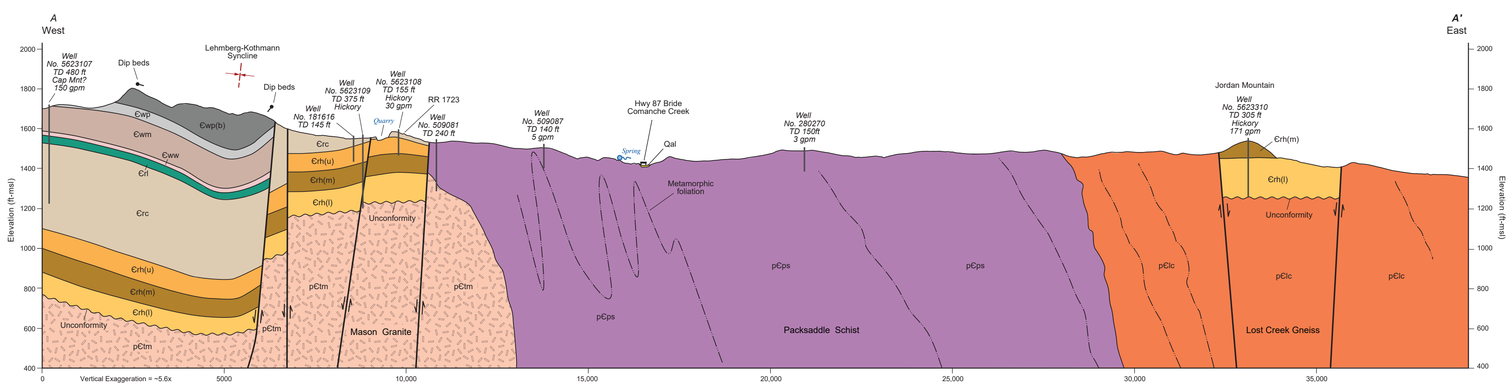
To Convert a Grid Azimuth to a Magnetic Azimuth
Subtract G-M Angle

Grid Convergence
0°06' (2 MILS) East
for Center of Sheet

Approximate Magnetic North (MN)
declination, 2022

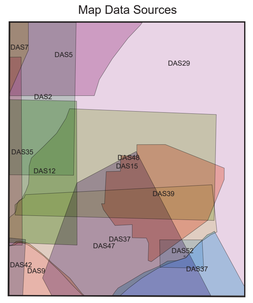
GEOLOGIC MAP OF THE MASON QUADRANGLE MASON COUNTY, TEXAS

Brian B. Hunt, Brann Johnson, Mark Helper, and Andre Droxler
2022



Due to vertical exaggeration and scale, the cross section is simplified and schematic in some areas. Unit thicknesses vary due to apparent dips and structures. Wells and spring projected into line of section. Well information and ID from the TWDB Groundwater database or the Submitted Well Drillers Report Tracking Number. Dip of beds icon at surface represents an apparent dip with vertical exaggeration; elsewhere dip is inferred.

Map Data Sources



Data Source	Citation
DAS2	Alexander, 1952
DAS5	Barnes and Schoefield, 1964
DAS6	Barnes, 1981
DAS7	Becker, 1985
DAS9	Bryant, 1959
DAS12	Duval, 1953
DAS15	Fuller, 1957
DAS29	Martin, 1986
DAS35	Parke, 1953
DAS37	Pool, 1960
DAS39	Schmittle, 1987
DAS41	Sheriff, 1984
DAS42	Sliger, 1957
DAS47	Wilson, 1957
DAS52	Hedgcoxe, 1987
DAS52	Schafer, 2002

Acknowledgments

Geologic mapping was done by integrating numerous unpublished University geology theses with lidar and aerial photos and the authors field visits and experience. Mapping and related activities were supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under STATEMAP award No. G20AC00313 (2021), Jeffery G. Paine, Principle Investigator. GIS layers and digital cartography by Brian B. Hunt. Under the direction of Jason Suarez, graphics, design, and layout by Jana S. Robinson. This work benefited from studies supported by the State of Texas Advanced Resource Recovery (STARR) initiative. This map contains a GeMS database (http://ngmdb.usgs.gov/Info/standards/GeMS).

The authors would like to thank Mr. Frank Brown for his advocacy and support of geologic mapping in the County and his landowner introductions. We are grateful for the support and access of Mason County landowners including: George Brannies (Schep Creek Road), Don Shepard (James River and Mill Creek), Thom Canefiled, Dr. Henry G. Rylander and Lance Abbott (White's Crossing area), Lee Bradley (Hedwigs Hill area), Tony Platino, Sandra Worrell and Tim Underwood (James River) and all other Mason County landowners that granted access and support. We acknowledge and thank Linda McCall at the Bureau of Economic Geology Map Library and archive for many of the historic maps of the area. Most of the historic theses maps were obtained from the Texas A&M Digital Repository and we thank David B. Lowe, Digital Collections Management Librarian, University Libraries, TAMU. Additional maps were obtained through the UT Austin Digital Repository. Thanks to Emma Daniels, borrowing specialist, of the Interlibrary Services, University of Texas Libraries University of Texas at Austin, which also provided some scans of ILS materials.

Disclaimer

The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government. The Bureau of Economic Geology makes no express or implied warranties (including warranties for merchantability and fitness) with respect to the character, functions, or capabilities of the electronic data or products or their appropriateness for any user's purposes. In no event will the Bureau of Economic Geology be liable for any incidental, indirect, special, consequential, or other damages suffered by the user or any other person or entity whether from the use of the electronic services or products, or any failure thereof or otherwise. In no event will the State of Texas' liability to the Requestor or anyone else exceed the fee paid for the electronic service or product. This map and explanatory information is submitted for publication with the understanding that the United States Government is authorized to reproduce and distribute reprints for government use.

References

Alexander, W.L., 1952, Geology of the South Mason Area, Texas. Master's thesis, Texas A&M University.

Barker, D. S, and R. M Reed, 2020, Proterozoic Granites of the Llano Uplift, Texas: A Collision-Related Suite Containing Rapakivi and Topaz Granites. Geological Society of America bulletin 122.1-2 (2010): 253–264.

Barnes, V. E. and Bell, W. C., 1977, The Moore Hollow Group of Central Texas: The University of Texas at Austin, Bureau of Economic Geology, Report of Investigations No. 88, 169 p.

Barnes, V. E. and Schofield, D. A., 1964, Potential low-grade iron ore and hydraulic-fracturing sand in Cambrian sandstones, Northwestern Llano Region, Texas: The University of Texas at Austin, Bureau of Economic Geology, Report of Investigations No. 53, 58 p.

Barnes, V.E., 1981, Geologic Atlas of Texas—Llano sheet: The University of Texas at Austin, Bureau of Economic Geology, scale 1:250 000.

Becker, Joseph Ernest, 1985, Structural analysis of the western Llano uplift with emphasis on the Mason fault. Master's thesis, Texas A&M University.

Bryant, George Frank, 1959, Geology of the Schep-Panther Creek Area, Mason County, Texas. Master's thesis, Texas A&M University.

Duvall, Victor Martin (1953). Geology of the South Mason-Llano River area, Texas. Master's thesis, Texas A&M University.

Fuller, Robert Louis (1957). Geology of the Grossville School area, Mason County, Texas. Master's thesis, Texas A&M University.

GeMS, 2020, GeMS (Geologic Map Schema)—A standard format for the digital publication of geologic maps: U.S. Geological Survey Techniques and Methods, book 11, chap. B10, 74 p.

Hedgcoxe, Howard Reiffert, 1987, Development of Secondary Faults Between En Echelon, Oblique-Slip Faults: Examples From Basement Controlled, Small-Fault Systems in the LLano Uplift of Central Texas, M.S. Thesis, Texas A&M University, 110 p.;

Kier, R.S., 1988, Paleozoic strata of the Llano region, Central Texas in Hayward, O.T. eds., Centennial Field Guide Volume 4: South–Central Section of the Geological Society of America, p. 351–360.

Lehrmann, DJ, Droxler, AW, Harris, P, et al. Controls on microbial and oolitic carbonate sedimentation and stratigraphic cyclicity within a mixed carbonate-siliciclastic system: Upper Cambrian Wilberns Formation, Llano Uplift, Mason County, Texas, USA. Depositional Rec. 2020; 6: 276– 308.

Martin, J.O., 1986, Geology of the central portion of the Mason quadrangle, Mason County, Texas [Master's thesis]: Odessa, University of Texas at Permian Basin, 52 p.

Mosher, Sharon, 1998, Tectonic Evolution of the Southern Laurentian Grenville Orogenic Belt. Geological Society of America bulletin 110.11 (1998): 1357–1375.

United States Department of Agriculture (USDA). Texas NAIP Imagery, 2010-10-01. Accessed 2021-03-03.

Parke, Robert Preston (1953). Geology of the southwest Mason-Llano River area, Texas. Master's thesis, Texas A&M University.

Pool, Alexander Stuart, 1960, Geology of the Homer Martin Ranch Area, Mason County, Texas. Master's thesis, Texas A&M University.

Reed, Robert M., 1999, Emplacement and deformation of late syn-orogenic, Grenville-age granites in the Llano Uplift, Central Texas: The University of Texas at Austin, Ph.D. dissertation, 272 p.

Schmittle, J.M., 1987, Brittle Deformation and Cataclasis on the Southwest Flank of the Llano Uplift, Mason County, Texas. Texas A&M Thesis. 141 pg.

Sheriff, A.A., 1984, Precambrian geology of a portion of the Mason quadrangle, Mason County, Texas [Master's thesis]: Odessa, University of Texas at Permian Basin, 50 p.

Sliger, Kenneth Leon, 1957, Geology of the Lower James River area, Mason County, Texas. Master's thesis, Texas A&M University.

United States Geological Survey (USGS), 2018, "Lower Colorado San Bernard Lidar": Texas Natural Resources Information System. https://data.tnris.org/collection/b246f8f7-9c79-4c89-91f7-9c7f44955fca (accessed 10/20/2021).

Wilson, Guilford James, 1957, Geology of the Big Bend of the Llano River area, Mason County, Texas. Master's thesis, Texas A&M University.

Copyright © Bureau of Economic Geology
GAe9838