

# **FIELD GEOLOGY MAPS**

## **MORRIS COUNTY, KANSAS**

**Preliminary Field Geology Maps for**

**AMERICUS**

**LAKE KAHOLA**

**WILSEY SE**

**1:24,000-Scale Quadrangles**

**Robert S. Sawin and Ronald R. West**

**Kansas Geological Survey  
Open-File Report 2012-5**

# MORRIS COUNTY, KANSAS

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PR = Photorevised

## LEGEND

These maps indicate lithostratigraphic units only. No temporal, genetic, or related depositional aspects are meant or implied.

Stratigraphic nomenclature follows:

Zeller, D. E., ed., [1968] 2009, Classification of rocks in Kansas, revised by Kansas Geological Survey Stratigraphic Nomenclature Committee; *in*, The Stratigraphic Succession in Kansas: Kansas Geological Survey, Bulletin 189, 81 p., chart.

The stratigraphic sequence in this report is restricted to the interval from the Johnson Shale at the base, to the Holmesville Shale at the top. Overlying these Carboniferous (Pennsylvanian) and Permian rocks are Quaternary alluvium and terrace deposits. The following lithostratigraphic contacts were mapped in the Morris County quadrangles of this report:

Quaternary alluvium and terrace deposits

Top of the Barneston Limestone (Fort Riley Limestone Member)

Fort Riley Limestone “rimrock” (*Marker Bed, red line*)

Base of Barneston Limestone (Florence Limestone Member)

Top of the Wreford Limestone (Schroyer Limestone Member)

Base of the Wreford Limestone (Threemile Limestone Member)

Base of the Funston Limestone

Base of the Crouse Limestone

Top of the Bader Limestone (Middleburg Limestone Member)

Base of the Bader Limestone (Eiss Limestone Member)

Top of the Beattie Limestone (Morrill Limestone Member)

Base of the Beattie Limestone (Cottonwood Limestone Member)

Top of the Grenola Limestone (Neva Limestone Member)

Base of the Grenola Limestone (Sallyards Limestone Member)

Top of the Red Eagle Limestone (Howe Limestone Member)

Base of the Red Eagle Limestone (Glenrock Limestone Member)

Solid Line = Observed Contact

Dashed Line = Concealed Contact

**Copies of the field maps are open-filed at the Kansas Geological Survey, Lawrence, KS.**

System	Series	Group	Formations	Members
QUATERNARY				Alluvium and Terraces
PERMIAN	WOLFCAMPIAN	SUMNER GP	Wellington	Unnamed mbr
				Hollenberg ls
				Unnamed mbr
			Nolans Ls	Herington ls
				Paddock sh
				Krider ls
		CHASE GROUP	Odell Sh	
			Winfield Ls	Cresswell ls
				Grant sh
				Stovall ls
			Doyle Sh	Gage sh
				Towanda ls
				Holmesville sh
			Barneston Ls	Ft. Riley ls
				Oketo sh
				Florence ls
			Matfield Sh	Blue Springs sh
				Kinney ls
				Wymore sh
			Wreford Ls	Schroyer ls
				Havensville sh
				Threemile ls

(not to scale)

# Mapped Contacts

Qal
Pwe
Pn
Po
Pwi
Pd
"rimrock"
Pb
Pm
Pw



System	Series	Group	Formations	Members
PERMIAN (Pennsylvanian Subsystem)	Wolfcampian	Council Grove	Speiser Sh	
			Funston Ls	
			Blue Rapids Sh	
			Crouse Ls	
			Easley Creek Sh	
CARBONIFEROUS (Pennsylvanian Subsystem)	U. Pennsylvanian	Council Grove	Bader Ls	Middleburg ls
				Hooser sh
				Eiss ls
			Stearns Sh	
			Beattie Ls	Morrill ls
				Florena sh
				Cottonwood ls
			Eskridge Sh	
			Grenola Ls	Neva ls
				Salem Point sh
				Burr ls
				Legion sh
				Sallyards ls
			Roca Sh	
			Red Eagle Ls	Howe ls
				Bennett sh
				Glenrock ls
			Johnson Sh	

(not to scale)

Mapped Contacts

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Psf

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Pbc

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Pec

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Pba

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Ps

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Pbe

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Pe

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Pg

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Pr

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Pre

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Cpj

## AMERICUS QUADRANGLE – MORRIS CO.

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- (2) Control numbers preceded by the letters **MMW** refer to measured sections contained in Mudge, M. R., Matthews, C. W., and Wells, J. D., 1958, Geology and Construction-Material Resources of Morris County, Kansas: U.S. Geological Survey, Bulletin 1060-A, 61 p., 2 plates;
- (3) Control point numbers preceded by the letters **MR** are sites examined and recorded by Sawin and West specifically for this mapping project.

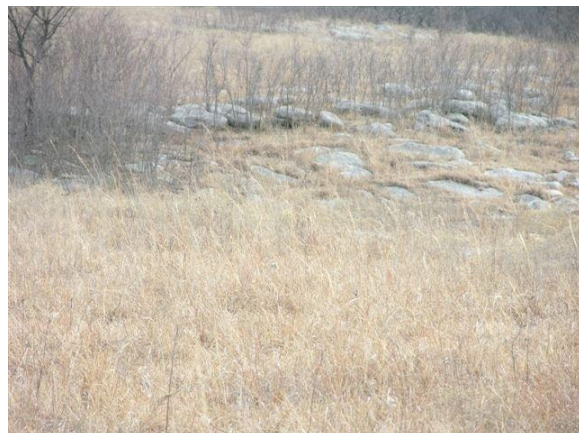
M-22 = Exposure from the Beattie (Cottonwood) Limestone to Bader (Eiss) Limestone in Missouri Pacific Railroad cut in NE NW sec. 36 to SE NW sec. 36, T. 16 S., R. 9 E., Morris Co., Kansas; measured and described by H. G. O'Connor, 7 July 1950. Section was not found.

M-23 = Exposure of Beattie (Cottonwood) Limestone in railroad cut in sec. 36, T. 16 S., R. 9 E., Morris Co., Kansas; measured and described as Location 10 by Imbrie and Laporte, 1 March 1959. Section was not found.

M-29 = MR-445, 446, and 447 = Unnamed sequence of limestones and mudrocks exposed in SE corner sec. 23, T. 17 S., R. 9 E., Morris Co., Kansas; measured and described by M. K. Elias in 1935.

M-32 = MR-440 = Exposure from the Red Eagle (Glenrock) Limestone to the Grenola (Burr) Limestone; near center of east line and extending north downhill, SE sec. 36, T. 17 S., R. 9 E., Morris Co., Kansas; measured and described by J. M. Jewett, 18 July 1947.

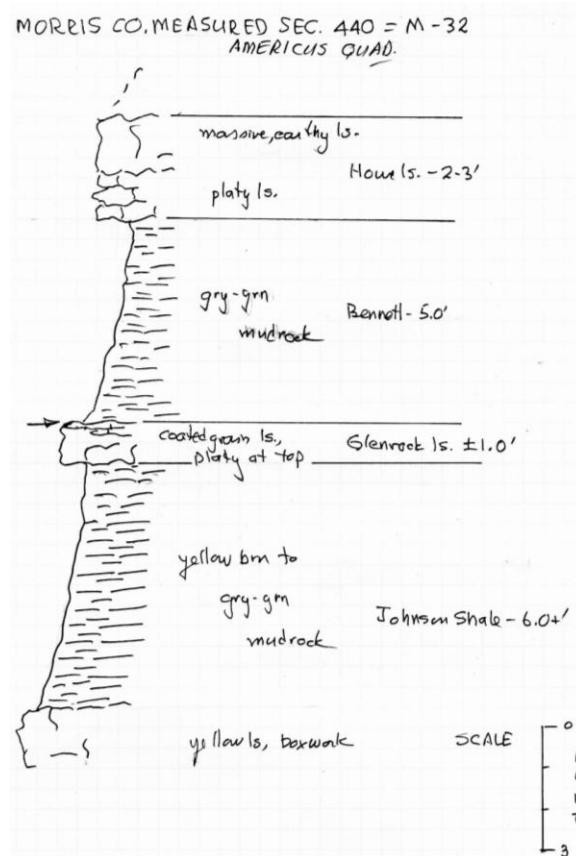
MR-146 = Exposure of Beattie Limestone (Cottonwood) at 1247 ft on a hillside in field south of the road; two digital photos; approximately 200 ft south of center of north line NE NW sec. 1, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-439 = Exposure of Beattie Limestone (Cottonwood) at 1280 ft in field on west side of road; two digital photos; near center of south line SE SE SE sec. 36, T. 17 S., R. 9 E. Morris Co., Kansas.



MR-440 = M-32 = Exposure of Red Eagle (top of Glenrock) Limestone at 1212 ft in road ditch on west side of road; one digital photo; approximately 250 ft south of center of east line sec. 36, T. 17 S., R. 9 E., Morris Co., Kansas.





MR-441 = Exposure of Beattie Limestone (Cottonwood) at 1298 ft in road ditch on south side of road; one digital photo; near center of north line NW NW NW sec. 1, T. 18 S., R. 9 E., Morris Co., Kansas.



MR-442 = Exposure of Grenola (Burr) Limestone at 1248 ft in road and road ditch on east side of road; one digital photo; near center of west line SW NE SW sec. 36, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-443 = Exposure of Grenola (Neva) Limestone at 1261 ft in road; one digital photo; NW corner NE SW sec. 36, T. 17 S., R. 9 E., Morris Co. Kansas.



MR-444 = MMW section 39 = Exposure of limestone in Roca Shale at 1227 ft in road and road ditch on east side of road; two digital photos; approximately 150 ft north of center of east line NE SW sec. 36, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-445 = M-29 in part = Exposure of Grenola (base of Neva) Limestone at 1235 ft in road cut on west side of road; one digital photo; near SE corner sec. 23, T.17 S., R. 9 E., Morris Co. Kansas.



MR-446 = M-29 in part = Exposure of Grenola (base of Burr) Limestone at 1215 ft in road cut on west side of road; one digital photo; approximately 200 ft south of center of west line SW sec. 24, T. 17 S., R. 9 E., Morris Co., Kansas.





MR-447 = M-29 in part = Exposure of Grenola (base of Sallyards) Limestone at 1209 ft in road cut on west side of road; one digital photo; center of west line SW sec. 24, T. 17 S, R. 9 E., Morris Co., Kansas.



MR-448 = Exposure of Grenola (base of Neva) Limestone at 1233 ft in road cut on north side of road; one digital photo; approximately 400 ft west of center of south line SE sec. 12, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-449 = Exposure of Beattie Limestone (Cottonwood) at 1290 ft in hillside near Dunlap Cemetery; one digital photo; approximately 450 ft west and 300 ft south of NE corner sec. 13, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-450 = Exposure of Beattie Limestone (Cottonwood) at 1285 ft in road, road ditches, and fields on both sides of road; one digital photo; approximately 200 ft south of center of east line SE NE sec.12, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-451 = Exposure of Beattie Limestone (base of Cottonwood) at 1260 ft in road and fields on both sides of road; one digital photo; near center of west line SW SE sec. 1, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-452 = Exposure of Grenola (top of Neva) Limestone at 1220 ft in road ditch and field on west side of road; one digital photo; near center of east line NW sec. 1, T. 17 S., R. 9 E., Morris Co., Kansas.





## LAKE KAHOLA QUADRANGLE – MORRIS CO.

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- (2) Control numbers preceded by the letters **MMW** refer to measured sections contained in Mudge, M. R., Matthews, C. W., and Wells, J. D., 1958, Geology and Construction-Material Resources of Morris County, Kansas: U.S. Geological Survey, Bulletin 1060-A, 61 p., 2 plates;
- (3) Control point numbers preceded by the letters **MR** are sites examined and recorded by Sawin and West specifically for this mapping project.

M-20 = Exposure of Beattie (Cottonwood) Limestone in old quarry; near SE corner sec. 33, T. 16 S., R. 9 E., Morris Co., Kansas; measured and described by W. Ives, 12 August 1953. See MR-422.

M-21 = Exposure of unnamed limestone and mudrock sequence in railroad cut; NW corner sec. 33, T. 16 S., R. 9 E., Morris Co., Kansas; measured and described by M. K. Elias in 1935.

M-30 = Exposure from below the Red Eagle (Howe) Limestone to the Grenola (Neva) Limestone; near center of SW SW sec. 26, T. 17 S., R. 9 E., Morris Co., Kansas; measured and described by M. K. Elias in 1935. Section was not found.

M-31 = MR-453 = Exposure from the Grenola (Neva) Limestone to the Beattie (Cottonwood) Limestone at Lake Kahola; near center north line SE SE sec. 34 (probably 33), T. 17 S., R. 9 E., Morris Co., Kansas; measured and described by J. M. Jewett and H. G. O'Connor, 17 July 1947.

MR-145 = Exposure of base of Beattie Limestone (Cottonwood) at 1258 ft on hillside north of road; two digital photos; near center SW SW SE sec. 26, T. 16 S., R. 9 E., Morris Co., Kansas.





MR-154 = Exposure of thick limestone that resembles Crouse Limestone at 1300 ft in road and on both sides of road; two digital photos; near center of north line NW NE NE sec. 34, T. 16 S., R. 9 E., Morris Co., Kansas.



MR-155 = Exposure of limestone at 1289 ft in road and on both sides of road like that seen in MR-154, Crouse Limestone, vertical parts of fence posts are Cottonwood limestone; one digital photo; near center of north line NW NE NW sec. 34, T. 16 S., R. 9 E., Morris Co., Kansas.

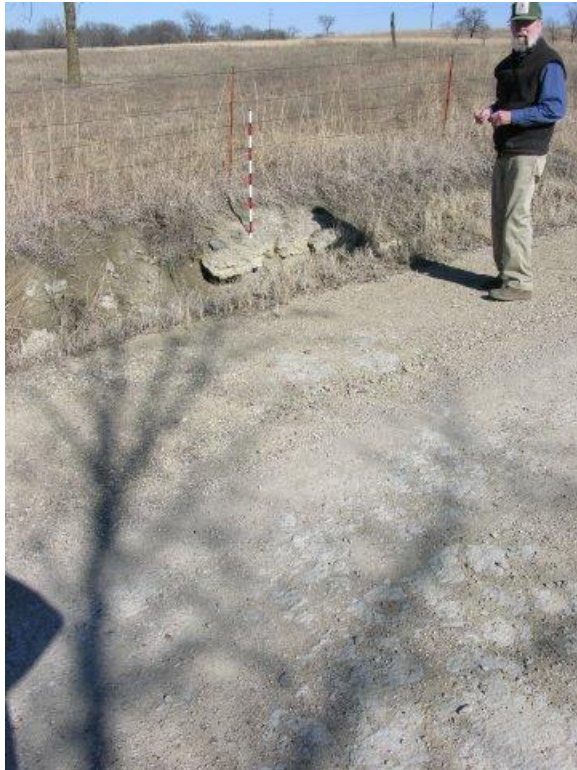


MR-156 = Exposure of base of Crouse Limestone at 1310 ft in road and on both sides of road, like the limestone exposed at MR-154 and MR-155; 3 digital photos, 2 of north side of road and one of south side; approximately 100 ft west of NE corner sec. 33, T. 16 S., R. 9 E., Morris Co., Kansas.





MR-157 = Base of Bader Limestone (Eiss) at 1270 ft in road and road ditches on both sides of road, measured 11 ft of Eiss limestone; two digital photos, one of the base and one of the thick upper Eiss on the south side of road; center north line NE NE sec. 33, T. 16 S, R. 9 E., Morris Co., Kansas.



MR-414 = Exposure of base of Wreford (Threemile) Limestone at 1320 ft in road ditch on north side of road; one digital photo; approximately 100 ft east of center south line SE SW sec. 11, T. 17 S., R. 8 E., Morris Co., Kansas.





MR-415 = Exposure of upper Funston Limestone at 1290 ft on south side of road in west-facing bank of Wolf Creek; thin, platy- to slabby-bedded limestone above a medium to thick limestone bed; two digital photos; approximately 100 ft west of center south line SE SW sec. 11, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-416 = Exposure of Wreford (Schroyer) Limestone, near the top at 1373 ft in road and fields on both sides of road; one digital photo; approximately 100 ft west of SE corner sec. 14, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-417 = Exposure of base of Barneston (Florence) Limestone at 1415 ft in hillside on east side of road; one digital photo; near center of NE SW NW sec. 26, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-419 = Exposure of limestone in Easley Creek at 1250 ft in bluff on south side of road along Four Mile Creek; one digital photo; just south of center of north line NW SE SW sec. 31, T. 16 S., R. 9 E., Morris Co., Kansas.



MR-420 = Exposure of Funston Limestone at 1263 ft in road ditch on north side of road; a moldic, ostracodal limestone; one digital photo; near SW corner SE NE SE., sec. 35, T. 16 S., R. 8 E., Morris Co., Kansas.





MR-421 = Exposure of Beattie (Cottonwood) Limestone at 1243 ft in road ditch on both sides of road (area of M-20); one digital photo; approximately 200 ft south of center of west line SW SW sec. 34, T. 16 S., R. 9 E., Morris Co., Kansas.



MR-422 (near M-20) = Exposure of Beattie (top of Cottonwood) Limestone at 1240 ft in drainage on south side of road; one digital photo; approximately 450 ft west of center of south line sec. 34, T. 16 S., R. 9 E., Morris Co., Kansas.



MR-423 = Exposure of base of Beattie (Cottonwood) Limestone at 1240 ft in road cut on north side of road; one digital photo; approximately 100 ft south of center of north line NE NW NW sec. 2, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-424 = Exposure of Eskridge Shale and Beattie (base of Cottonwood) Limestone at 1215 ft in road cut and hillside on west side of road; one digital photo; approximately 200 ft north of center N/2 sec. 9, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-425 = Exposure of Beattie (top of Cottonwood) Limestone at 1249 ft in road and fields on both sides of road; one digital photo; near center of east line NE NE NE sec. 16, T. 17 S., R. 9 E., Morris Co., Kansas.





MR-426 = Exposure of south dipping Beattie (top of Cottonwood) Limestone at 1246 ft in road and fields on both sides of road; one digital photo; approximately 1200 ft south NE corner sec. 16, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-427 = Exposure of Beattie (top of Cottonwood) Limestone at 1242 ft in road and fields on both sides of road; one digital photo; approximately 1600 ft south NE corner sec. 16, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-428 = Exposure of Beattie (top of Cottonwood) Limestone at 1244 ft in road and fields on both sides of road; one digital photo; center south line SE NW sec. 15, T. 17 S., R. 9 E., Morris Co., Kansas.





MR-429 = Exposure of Grenola (top of Neva) Limestone at 1206 ft in road and fields on both sides of road; one digital photo; near center sec. 15, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-430 = Exposure of base of Crouse Limestone at 1317 ft in road cuts on both sides of road; two digital photos; center east line NE SE sec. 16, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-431 = Exposure of base of Crouse Limestone at 1321 ft in road ditch on east side of road; one digital photo; SW corner sec. 15, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-432 = Exposure of Funston Limestone at 1365 ft in road and fields on both sides of road; one digital photo; near center east line NE NE sec. 21, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-433 = Exposure of Wreford (base of Threemile) Limestone at 1388 ft in road cuts on both sides of road; one digital photo; approximately 800 ft south NE corner sec. 21, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-434 = Exposure of Beattie (top of Cottonwood) Limestone at 1265 ft in road and fields on both sides of road; one digital photo; near center south line SW SW SW sec. 23, T. 17 S., R. 9 E., Morris Co., Kansas.





MR-435 = Exposure of Beattie (top of Cottonwood) Limestone at 1262 ft in road ditch on east side of road; one digital photo; approximately 400 ft south NE corner sec. 28, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-436 = Exposure of base of Crouse Limestone at 1331 ft in road; one digital photo; near center south line SW SW sec. 28, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-437 = Exposure of Wreford (estimated base of Threemile) Limestone at 1390 ft in road; one digital photo; approximately 800 ft west SE corner sec. 29, T. 17 S., R. 9 E., Morris Co., Kansas.





MR-438 = Exposure of Wreford (top of Schroyer) Limestone at 1378 ft in drainage on south side of road; one digital photo; approximately 200 ft east of center north line sec. 2, T. 16 S., R. 8 E., Morris Co., Kansas.



MR-453 = M-31 = Exposure of Beattie (base of Cottonwood) Limestone at 1265 ft in spillway at Lake Kahola; five digital photos; approximately 200 ft north and 200 ft west of center of south line NE sec. 33, T. 17 S., R. 9 E., Morris Co., Kansas. See also the Lake Kahola measured section in Pecchioni, L. L., 1981, Depositional environment of the Eskridge Shale (Lower Permian), M.S. thesis, Kansas State University, 171 p.





MR-453 cont.



MR-454 = Exposure of Bader (top of Middleburg) Limestone at 1280 ft in road ditch on southwest side of road; one digital photo; approximately 100 ft south of center of north line SW sec. 32, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-455 = Exposure of Crouse Limestone at 1312 ft in road cut and field on west side of road; one digital photo; approximately 200 ft east of center of south line SW sec. 32, T. 17 S., R. 9 E., Morris Co., Kansas.



MR-456 = Exposure of Wreford (base of Threemile) Limestone at 1350 ft in road cut on north side of road; one digital photo; approximately 100 ft north of SW corner sec. 31, T. 17 S., R. 9 E., Morris Co., Kansas.



## WILSEY SE QUADRANGLE – MORRIS CO.

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- (3) Control point numbers preceded by the letters **MR** are sites examined and recorded by Sawin and West specifically for this mapping project.

M-10a = M-10b = Exposure of Barneston Limestone in Missouri and Pacific railroad quarry, 1/8 mi south of Nelonick siding; center NE sec. 36, T. 16 S., R. 7 E., Morris Co., Kansas; measured and described by M. K. Elias, 14 June 1935.

M-26 = Exposure of unnamed limestones and mudrocks (appears to be Barneston, Fort Riley limestone, and Oketo shale) along north-south and east-west road ditches; center SW SE sec. 12, T. 17 S., R. 7 E., Morris Co., Kansas; measured and described by H. G. O'Connor, date unknown.

M-28 = Exposure from Barneston (Florence) Limestone to Doyle Shale; near center of east line NE SE sec. 24, T. 17 S., R. 7 E., Morris Co., Kansas; author and date unknown.

MR-174 (near MMW section 14, M-10a and M-10b) = Exposure of Barneston (Fort Riley “rim rock”) Limestone in road and road cut on west side of road at 1379; one digital photo; near center of east line SE NE sec. 36, T. 16 S., R. 7 E., Morris Co., Kansas.





MR-175 = Exposure of Barneston Limestone, sequence from the top of the Florence Limestone Member to the “rim rock” in the Fort Riley Limestone Member in the road ditch and roadcut exposure on the north side of road with the “rim rock” at 1385 ft; three digital photos: upper left photo is of the sequence from the Florence limestone through the Oketo shale and lower Fort Riley limestone; upper right photo is of the upper part of the Oketo shale including a thin limestone, and the lower part of the Fort Riley limestone including the “rim rock;” lower left photo is of the Fort Riley “rim rock” limestone; just north and west of center of south line SE SW sec. 25, T. 16 S., R. 7 E., Morris Co., Kansas.





MR-370 = Exposure of Barneston (Fort Riley “rim rock”) Limestone in road cut on north side of road and along east bank of Fourmile Creek at 1387 ft; one digital photo; just northwest of center of south line sec. 2, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-376 = Exposure of Barneston (top of Florence) Limestone at 1427 ft in a hillside gully; two digital photos; approximately 200 ft north of center of S/2 NW sec. 24, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-377 = Exposure of Barneston (base of Florence) Limestone at 1410 ft in a hillside; three digital photos; center of W/2 NW sec. 24, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-378 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1419 ft in a hillside; one digital photo; approximately 300 ft east of center of NW sec. 24, T. 17 S., R. 7 E., Morris Co., Kansas.





MR-379 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1423 ft in a hillside; one digital photo; approximately 300 ft west of center of N/2 NW sec. 24, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-388 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1397 ft in road; one digital photo; approximately 3700 ft west of SW corner sec. 31, T. 16 S., R. 8 E., Morris Co., Kansas.



MR-389 = Exposure of Matfield (Kinney limestone) Shale at 1356 ft in road ditch on north side of road; one digital photo; approximately 150 ft west of SE corner sec. 32, T. 16 S., R. 8 E., Morris Co., Kansas.



MR-390 = Exposure of Wreford (top of Schroyer) Limestone at 1320 ft in road ditch on east side of road; one digital photo; center south line SE sec. 27, T. 16 S., R. 8 E., Morris Co., Kansas.



MR-391 = Exposure of Matfield (Kinney limestone) Shale at 1335 ft in road; one digital photo; approximately 250 ft south of center of north line NE sec. 34, T. 16 S., R. 8 E., Morris Co., Kansas. NOTE: The interval between the top of the Wreford at MR-390 and the Kinney at MR-391 is 11.5 ft.



MR-392 = Exposure of Wreford (top of Threemile) Limestone at 1315 ft in an old excavation on the east side of road; one digital photo; near center of south line SE sec. 34, T. 16 S., R. 8 E., Morris Co., Kansas.





MR-393 = Exposure of Wreford (top of Schroyer) Limestone at 1317 ft in road ditch on east side of road; two digital photos (one of exposure in road and one of a stream bank exposure along the southwest bank of a tributary of Fourmile Creek); just south of center of north NW sec. 8, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-394 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1391 ft in road and field north of road; one digital photo; center south line NE NW sec. 1, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-395 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1390 ft in road and road ditch west of road with fossiliferous Oketo shale exposed below; one digital photo; approximately 300 ft north of center of east line sec. 11, T. 17 S., R. 7 E., Morris Co., Kansas.





MR-396 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1400 ft in old quarry on east side of road with fossiliferous Oketo shale exposed below in road ditch on west side of road; one digital photo; approximately 300 ft south of NW corner sec. 13, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-397 = Exposure of Wreford (top of Schroyer) Limestone at 1493 ft on both sides of road and in southwest-facing bank of stream on south side of road; two digital photos; along south line SE SE sec. 23, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-398 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1385 ft in road and fields on both sides of road north of Fourmile Creek; one digital photo; near center of east line SE sec. 12, T. 17 S., R. 7 E., Morris Co., Kansas.





MR-399 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1409 ft in road and field north of road; one digital photo; approximately 100 ft west of center of south line SE sec. 13, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-400 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1398 ft in drainage on east side of road, near M-28; one digital photo; approximately 150 ft north of center of east line NE SE sec. 24, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-401 = Sinkhole on west side of road; one digital photo; near SE corner SE SE SE sec. 24, T. 17 S., R. 7 E., Morris Co., Kansas.



MR-402 = Exposure of Barneston (upper Fort Riley) Limestone at 1430 ft in road and field north of road; two digital photos; approximately 0.75 mi east of SW corner sec. 19, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-403 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1405 ft on east side of road; one digital photo; approximately 0.8 mi east and approximately 0.5 mi south of NW corner sec. 30, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-404 = Exposure of Barneston (Fort Riley “upper rim rock”) Limestone at 1419 ft on north side of road; one digital photo; near center of south line SW sec. 30, T. 17 S., R. 8 E., Morris Co., Kansas.





MR-405 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1440 ft in drainage in field west of road; one digital photo; near center NE SE SE sec. 29, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-406 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1440 ft in road and road ditch on west side of road; one digital photo; near center of west line NW NW sec. 28, T. 17 S., R. 8 E., Morris Co., Kansas



MR-407 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1435 ft in road and fields on both sides of road; one digital photo; near center of south line SE SW sec. 21, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-408 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1462 ft in road, in field on east side of road, and road ditch on west side of road; one digital photo; near center of west line SW SW NW sec. 34, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-409 = Exposure of Barneston (Fort Riley “rim rock”) Limestone at 1469 ft in road; one digital photo; near center of north line NW NE NE., sec. 34, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-410 = Exposure of base of Barneston (Florence) Limestone at 1415 ft in road cuts on both sides of Kansas Highway 177; one digital photo; approximately 200 ft east of center SE SE sec. 16, T. 17 S., R. 8 E., Morris Co., Kansas.





MR-411 = Exposure of top of Wreford (Schroyer) Limestone at 1354 ft in road ditch on west side of road; one digital photo; near center of east line NE NE sec.16, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-412 = Exposure of top of Wreford (Schroyer) Limestone at 1348 ft in road cuts on both sides of Kansas Highway 177; one digital photo; near center SW NE sec. 10, T. 17 S., R. 8 E., Morris Co., Kansas. NOTE: the Schroyer here is a thick bedded, vuggy, sucrosic limestone with nodules of calcium sulfate and chert.



MR-413 = Exposure of Funston Limestone at 1265 ft in southeast bank of Spring Creek with a gray-green mudrock below at water level; two digital photos; approximately 150 ft south of center of north line NW sec. 10, T. 17 S., R. 8 E., Morris Co., Kansas.



MR-418 = Exposure of base of Wreford (Threemile) Limestone at 1310 ft in road cuts on both sides of Kansas Highway 177; one digital photo of exposure on east side); near center of east line SE SE SE sec. 3, T. 17 S., R. 8 E., Morris Co., Kansas.

