

FIELD GEOLOGY MAPS

MORRIS COUNTY, KANSAS

Preliminary Field Geology Maps for

BURDICK

DIAMOND SPRINGS

LOST SPRINGS

1:24,000-Scale Quadrangles

Robert S. Sawin and Ronald R. West

**Kansas Geological Survey
Open-File Report 2011-9**

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 Easley Creek Shale at the base, to the Wellington Formation at the top. Overlying these 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

Base of the Hollenberg Limestone Member, Wellington Formation (*Marker Bed, orange line*)

Top of the Nolans Limestone (Herington Limestone Member)

Base of the Nolans Limestone (Krider Limestone Member)

Top of the Winfield Limestone (Cresswell Limestone Member)

Base of the Winfield Limestone (Stovall Limestone Member)

Base of the Towanda Limestone Member, Doyle Shale (*Marker Bed, purple line*)

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

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	WOLFCAMPIAN	COUNCIL GROVE GROUP	Speiser Sh	
			Funston Ls	
			Blue Rapids Sh	
			Crouse Ls	
			Easly Creek Sh	
			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

(not to scale)

Mapped Contacts

Psf
Pbc
Pec
Pba
Ps
Pbe
Pe
Pg

BURDICK 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-25 = Hillside exposure of Barneston (Fort Riley) Limestone that has been quarried; just north of center of NW NW sec. 20, T.17 S., R.6 E., Morris Co., Kansas; measured and described by W. Ives, 12 August 1953.

MMW-9 = Exposure of Winfield (Grant shale and Stovall limestone) Limestone in stream bank in SE SE sec. 14, T.17 S., R.5 E., Morris Co., Kansas.

MMW–limestone 28, page 26 = Exposures in old quarry of Barneston Limestone with 10 ft of Florence limestone reported; near center of SE sec. 17, T.17 S., R.6 E., Morris Co., Kansas.

MR-264 = Exposure of Nolans (top of lower limestone in Herington) Limestone at 1470 ft in road; 1 digital photo; approximately 200 ft east of center of north line sec. 35, T.16 S., R.5 E., Morris Co., Kansas.



MR-265 = Exposure of Nolans (upper limestone in Herington) Limestone at 1470 ft in road; 1 digital photo; approximately 200 ft east of center of north line SE sec. 34, T.16 S., R.5 E., Morris Co., Kansas.



MR-322 = Exposure of Winfield (Cresswell) Limestone in road and field south of road at 1470 ft, with chert float (Stovall) at 1455 ft in road ditches on both sides of road; 1 digital photo; approximately 300 ft east of center of north line NE NW sec. 25, T.17 S., R.5 E., Morris Co., Kansas.



MR-323 = Exposure of Winfield (Cresswell) Limestone in road at 1450 ft; 1 digital photo; approximately 150 ft west of center of north line NW NW sec. 25, T.17 S., R.5 E., Morris Co., Kansas.



MR-324 = Exposure of Winfield (Cresswell) Limestone in road and road cut on north side of road at 1440 ft, just west of MMW Sec. 9 north of Burdick, Kansas; 2 digital photos; approximately 200 ft east of center of south line SE sec. 14, T.17 S., R.5 E., Morris Co., Kansas.



MR-325 = Exposure of Winfield (Cresswell) Limestone in road with float in fields on both sides of road at 1432 ft, approximately 0.1 mi south of Camp Creek; 1 digital photo; near center of east line NE SE SE sec. 11, T.17 S., R.5 E., Morris Co., Kansas.



MR-326 = Exposure of Winfield (Stovall to lower beds of Cresswell) Limestone in road cut on west side of road, Stovall exposed in road and road ditch on west side of road with base at 1430 ft, 12 ft (hand leveled) of Grant shale and the lower cherty beds of Cresswell limestone in road cut on west side of road approximately 250 ft south of Sixmile Creek; 2 digital photos; near center of east line NE SE SE sec. 2, T.17 S., R.5 E., Morris Co., Kansas.



MR-330 = Exposure of the base of the Herington limestone (fossiliferous, bivalves and gastropods) in road at 1480 ft with Paddock shale below on east side of road; 1 digital photo; near west line sec. 34, T.17 S., R.5 E., Morris Co., Kansas.



MR-331 = Exposure of base of Cresswell limestone in road ditch and drainage on east side of road at 1420 ft just north of Camp Creek; 2 digital photos; approximately 350 ft south of west line sec. 11, T.17 S., R.5 E., Morris Co., Kansas.



MR-332 = Exposure near the base of the Towanda limestone in road at 1430 ft with yellowish brown mudrock below; 1 digital photo; near center of north line sec. 31, T.17 S., R.6 E., Morris Co., Kansas.



MR-333 = Exposure of the base of the Herington limestone on south side of road at 1463 ft with grayish green mudrock below; 1 digital photo; near center of north line NW sec. 22, T.17 S., R.5 E., Morris Co., Kansas.



MR-334 = Exposure of the base of the Herington limestone in road and road ditch on east side of road at 1470 ft with yellowish, gray green mudrock below; 1 digital photo; approximately 150 ft north of west line SW SW sec. 10, T.17 S., R.5 E., Morris Co., Kansas.



MR-335 = Exposure of the base of the Herington limestone in road and road cuts on both sides of road at 1450 ft (best exposure on west side of road), with yellowish, gray green mudrock (Paddock shale) below; 1 digital photo; approximately 300 ft south of NW corner sec. 10, T.17 S., R.5 E., Morris Co., Kansas.



MR-336 = Exposure of the base of the Herington limestone in road at 1450 ft; 1 digital photo; near center of west line sec.34, T.16 S., R.5 E., Morris Co., Kansas.



MR-337 = Base of Winfield (Stovall) Limestone in road and road ditch on south side of road at 1441 ft, with gray green mudrock (Gage shale) below; loose chert is abundant; 1 digital photo; approximately 100 ft east of center of north line NE NW sec. 6, T.17 S., R.6 E., Morris Co., Kansas.



MR-338 = Exposure of Doyle (Towanda limestone) Shale in east bank of Threemile Creek on east side of road at 1393 ft, with mudrock of lower Gage shale well exposed above; 1 digital photo; just north of center of west line NW SW sec. 5, T.17 S., R.6 E., Morris Co., Kansas.



MR-339 = Exposure of unidentified limestone, possibly Towanda, in road and road ditch on east side of road at 1395 ft; 1 digital photo; near center of west line SW SW sec. 8, T.17 S., R6 E., Morris Co., Kansas.



MR-340 = Exposure of 11.0 ft of light brown limestone with crystalline lined vugs and fractures, probably upper Fort Riley, in road and road cut on south side of road at 1395 ft; 1 digital photo; approximately 300 ft west of center of north line NW sec. 17, T.17 S., R.6 E., Morris Co., Kansas.



MR-341 = Exposure of Barneston (Fort Riley rimrock) Limestone in road and field south of road at 1382 ft, approximately 400 ft west of Threemile Creek; 1 digital photo; near center of north line NE sec. 17, T.17 S., R.6 E., Morris Co., Kansas.



MR-342 = Exposure of Barneston (Fort Riley rimrock) Limestone in road and field east of road at 1380 ft, approximately 600 ft south of Sixmile Creek; approximately 800 ft south of center sec. 17, T.17 S., R.6 E., Morris Co., Kansas.



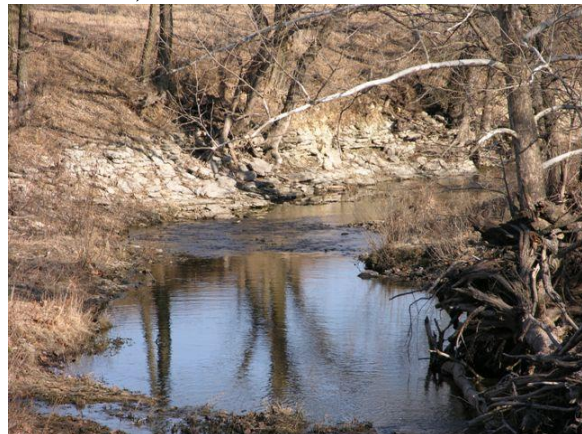
MR-343 = Exposure of Winfield (Stovall) Limestone in trench silo on south side of road at 1470 ft, abundant Stovall chert in road; 2 digital photos; approximately 200 ft east of center of north line NW sec. 30, T.17 S., R.6 E., Morris Co., Kansas.



MR-344 = Exposure of Barneston (Fort Riley rimrock) Limestone in road at 1390 ft; 1 digital photo; approximately 800 ft north of center of south line sec. 17, T.17 S., R.6 E., Morris Co., Kansas.



MR-345 = Exposure of Matfield (Kinney limestone) Shale in northeast bank of Sixmile Creek southeast of road at 1340 ft; 2 digital photos; approximately 100 ft south and 150 ft west of center of east line SW sec. 17, T.17 S, R.6 E., Morris Co., Kansas.



MR-371 = Exposure of Matfield (Kinney limestone with upper Wymore shale below) Shale with base of Kinney limestone at 1340 ft in creek bank on west side of Mile-and-a-Half Creek on Kassenbaun farm; 1 digital photo; approximately 300 ft south and 100 ft west of center of north line NW sec. 16, T.17 S., R.6 E., Morris Co., Kansas.



MR-372 = Exposure near the base of the Barneston (Florence) Limestone at 1360 ft in south facing hillside along Mile-and-a-Half Creek on Kassenbaun farm; 1 digital photo; near center of SW SE SW sec. 9, T.17 S., R.6 E., Morris Co., Kansas.



MR-373 = Exposure of top of Towanda limestone at 1445 ft along southeast face of old quarry; 1 digital photo; near center of west half NE NE sec. 30, T.17 S., R.6 E., Morris Co., Kansas.



MR-374 = Exposure of Barneston (Fort Riley rimrock) Limestone with base of rimrock at 1420 ft in road and fields on both sides of road; 1 digital photo; near center of north line NW NE NE sec. 32, T.17 S., R.6 E., Morris Co., Kansas.



DIAMOND SPRINGS 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-24a = M-24b = Exposure of Beattie (Florena shale) Limestone northwest of Highway 897 and 500 and roadcut ½ mi south on east side of highway; center SE SE sec. 1, T.17 S., R.6 E., Morris Co., Kansas; measured and described by M. K. Elias in 1935.

M-27 = Exposure from Crouse Limestone to Wreford Limestone; near center sec. 7, T.17 S., R.7 E., Morris Co., Kansas; measured and described by M. K. Elias in 1935 as an “algae exposure.”

MR-216 = Barneston Limestone (Fort Riley rimrock) at 1470 ft exposed in road, road ditch, and pond bank on north side of road; 1 digital photo; near center of south line SE SE SE sec. 29, T.16 S., R.7 E., Morris Co., Kansas.



MR-219 = Barneston Limestone (Fort Riley rimrock) at 1430 ft exposed in road and fields on both sides of; 1 digital photo; near center of west line SW SW SW sec. 26, T.16 S., R.7 E., Morris Co., Kansas.



MR-346 = Exposure of Matfield (top of Kinney limestone) Shale in road cut on west side of road at 1385 ft; 1 digital photo; approximately 350 ft south of center of north line NW NW sec. 14, T.17 S., R.6 E., Morris Co., Kansas.



MR-347 = Exposure of Barneston (estimated base of Florence) Limestone in road and road ditch on east side of road at 1420 ft; 1 digital photo; near center of west line NW SW sec. 11, T.17 S., R.6 E., Morris Co., Kansas.



MR-348 = Exposure of Barneston (base of Fort Riley) Limestone in road at 1458 ft with Oketo Shale Member in road ditches on both sides of road; 1 digital photo; approximately 150 ft south of west line NW NW sec. 11, T.17 S., R.6 E., Morris Co., Kansas.



MR-349 = Exposure of Doyle (Towanda limestone) Shale in road and road ditch on north side of road at 1515 ft, limestone is platy to thin bedded, yellowish brown, “rotten looking”, appears conglomeratic/brecciated in part; 1 digital photo; center of north line NE NE sec. 36, T.16 S., R.6 E., Morris Co., Kansas.



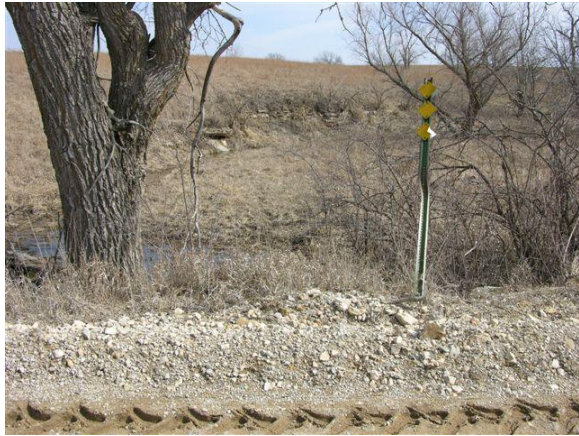
MR-350 = Well exposed Barneston (Fort Riley rimrock) Limestone in ditch and drainage on west side of road at 1520 ft; 1 digital photo; near center of east line NE SE SE sec. 6, T.17 S., R.7 E., Morris Co., Kansas.



MR-351 = Exposure of Barneston (base of Florence) Limestone in stream bank northwest of road at 1480 ft, same as sections M-24a and 24b; 1 digital photo; approximately 200 ft west of center of east line NE SE SE sec. 1 T.17 S., R.6 E., Morris Co., Kansas.



MR-352 = Exposure of Barneston (estimated base of Florence) Limestone in stream cut on east side of road at 1470 ft; 1 digital photo; near center of west line NW SW NW sec. 7, T.17 S., R.7 E., Morris Co., Kansas.



MR-353 = Exposure of Barneston (base of Florence) Limestone in road cut on northwest side of road at 1455 ft; 1 digital photo; just west of center of south line NE NW SW sec. 13, T.17 S., R.6 E., Morris Co., Kansas.



MR-354 = Exposure of Wreford (near top of Schroyer) Limestone in road cuts on both sides of road at 1355 ft; 1 digital photo; near center of south line sec. 14, T.17 S., R.6 E., Morris Co., Kansas.



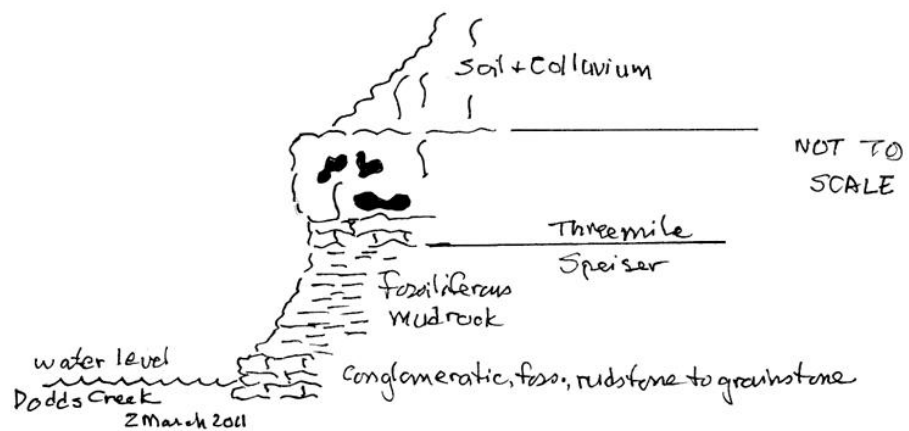
MR-355 = Exposure of Wreford (base of Threemile) Limestone in west bank of Dodds Creek at 1335 ft with fossiliferous mudrocks and limestones of upper Speiser Shale below in east bank; 5 digital photos (1 from the bridge, 1 of contact, and 3 of the chert bed); see graphic section; near center of south line SE SE SW sec. 14, T.17 S., R.6 E., Morris Co., Kansas.



MR-355 (cont)



SITE MR-355 - DIAMOND SPRINGS QUAD. - MORRIS CO., KANSAS



MR-356 = Exposure of presumed base of Funston Limestone in the southeast bank of Silver Creek at 1320 ft; 1 digital photo; near center of west line NE NE sec. 26, T.17 S., R.6 E., Morris Co., Kansas.



MR-357 = Exposure of base of Funston Limestone in west bank of Silver Creek at 1320 ft; 1 digital photo; near center of south line SE SE sec. 23, T.17 S., R.6 E., Morris Co., Kansas.



MR-358 = Exposure of Barneston (Fort Riley rimrock) Limestone in road and road ditch on east side of road and field on west side of road at 1505 ft; 1 digital photo; near center of west line SW NW SW sec. 8, T.17 S., R.7 E., Morris Co., Kansas.



MR-359 = Exposure of Barneston (Fort Riley rimrock) Limestone in road at 1493 ft; 1 digital photo; near center of east line SE NE NE sec. 18, T.17 S., R.7 E., Morris Co., Kansas.



MR-360 = Exposure of Barneston (Fort Riley rimrock) Limestone in road and road ditch on east side of road at 1475 ft; 1 digital photo; near center of east line NE NE sec. 5, T.17 S., R.7 E., Morris Co., Kansas.



MR-361 = Exposure of Wreford (base of Threemile) Limestone in road cut on west side of road at 1330 ft with upper Speiser Shale (fossiliferous mudrock above a conglomeratic-like limestone with a greenish gray mudrock below the approximately 1.0 ft thick limestone) below; 1 digital photo; center of south line sec. 26, T.17 S., R.6 E., Morris Co., Kansas.



MR-362 = Exposure of Funston Limestone in road cut on west side of road at 1317 ft; 1 digital photo; approximately 100 ft north of center of south line SW SW SW sec. 36, T.17 S., R.6 E., Morris Co., Kansas.



MR-363 = Exposure of Wreford (base of Threemile) Limestone in road cut on west side of road at 1345 ft with upper Speiser Shale (fossiliferous mudrock above a conglomeratic-like limestone with a greenish gray mudrock below the approximately 1.0 ft thick limestone) below; 2 digital photos; near center north half sec. 36, T.17 S., R.6 E., Morris Co., Kansas.



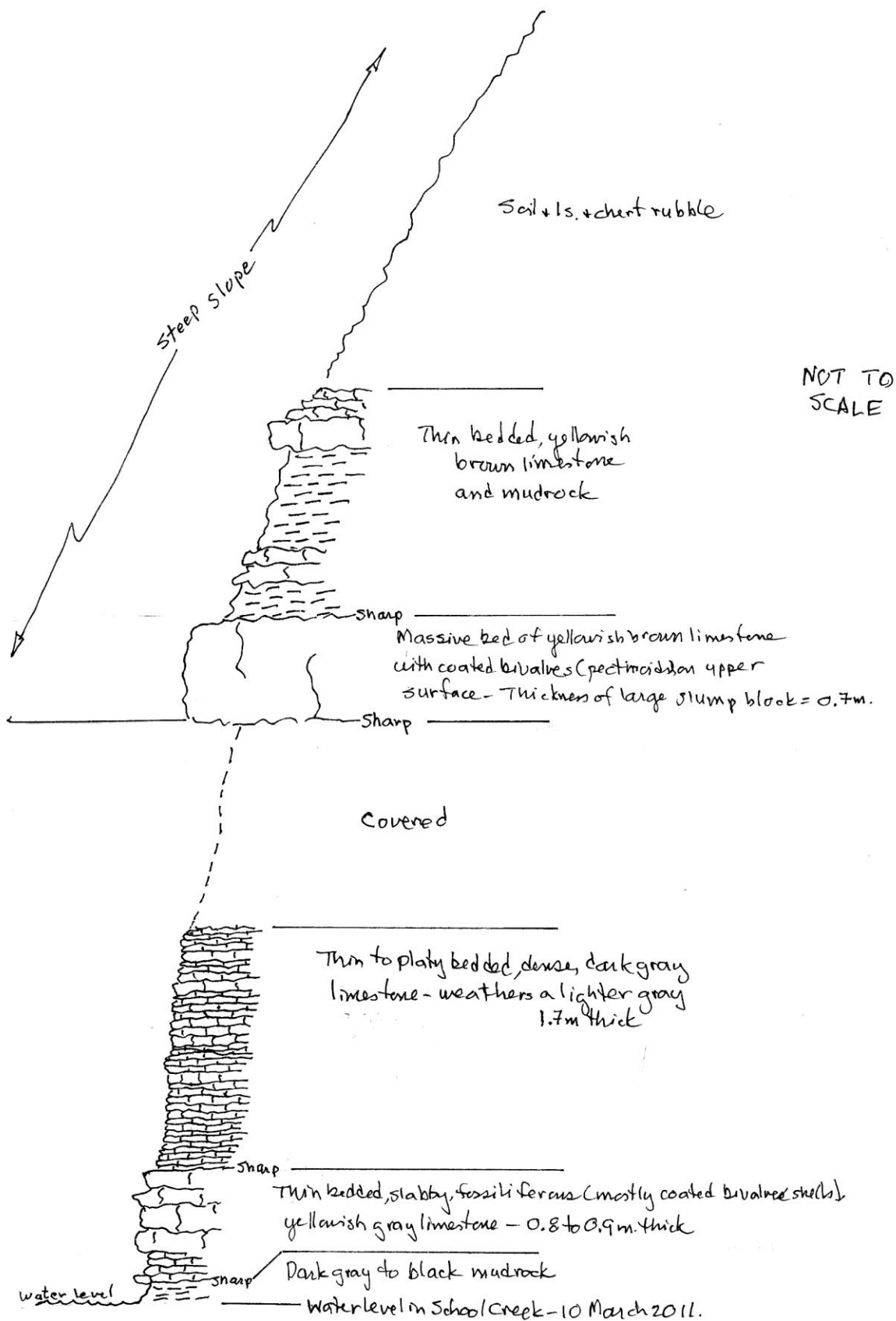
MR-364 = Exposure of Wreford (top of Schroyer) Limestone in road and road ditch on west side of road at 1403 ft; 1 digital photo; near center south half sec. 25, T.17 S., R.6 E., Morris Co., Kansas.



MR-365 = Exposure of sequence from Easley Creek through Funston Limestone on west facing bank of School Creek on Senne ranch with base of Crouse Limestone at 1325 ft; 3 digital photos (see graphic section); near center south line SE NE sec. 25, T.17 S., R.6 E., Morris Co., Kansas.



SITE-MR-365-DIAMOND SPRINGS QUAD.- MORRIS CO., KANSAS



MR-366 = Exposure of Wreford (base of Threemile) Limestone in road and in road ditch on north side of road at 1405 ft with upper Speiser Shale (fossiliferous mudrock above a conglomeratic-like limestone with a greenish gray mudrock below the approximately 1.0 ft thick limestone) below; 1 digital photo; near center south line SW sec. 24, T.17 S., R.6 E., Morris Co., Kansas.



MR-367 = Exposure of Barneston (Fort Riley rimrock) Limestone in road at 1412 ft; 1 digital photo; center north line NE NE sec. 35, T.16 S., R.7 E., Morris Co., Kansas.



MR-368 = Exposure of Barneston (Fort Riley rimrock) Limestone in drainage in field on east side of road at 1419 ft; 1 digital photo; near center SW NW sec. 35, T.16 S., R.7 E., Morris Co., Kansas.



MR-369 = Exposure of Barneston (Fort Riley rimrock) Limestone in road at 1480 ft; 1 digital photo; approximately 200 ft west of center of north line NE sec. 33 T.16 S., R.7 E., Morris Co., Kansas.



MR-375 = Exposure near base of Barneston (Florence) Limestone at 1420 ft in road; 1 digital photo; near center of north line NE NE sec. 34, T.17 S., R.6 E., Morris Co., Kansas.



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MMW-3 = Exposure of Wellington Formation including the Hollenberg limestone in road cut in NE NW sec. 5, T.17 S., R.5 E., Morris Co., Kansas.

MMW-4 = Exposure of Nolans Limestone and Odell Shale in road cut in NW NE sec. 31, T.16 S., R.5 E., Morris Co., Kansas.

MR-284 = Exposure of Wellington (Hollenberg limestone) Formation in road ditch on north side of road at 1472 ft; 1 digital photo; approximately 500 ft east of SW corner sec. 28, T.16 S., R.5 E., Morris Co., Kansas.



MR-291 = Exposure of Wellington (Hollenberg limestone) Formation in road at 1472 ft; 1 digital photo; approximately 200 ft east of center of north line sec. 32, T.16 S., R.5 E., Morris Co., Kansas.



MR-311 = Exposure of the base of the Herington limestone in road and road cut on north side of road at 1415 ft; 1 digital photo; approximately 250 ft east of SW corner sec. 30, T.16 S., R.5 E., Morris Co., Kansas.



MR-312 = Exposure of the base of the Herington limestone in road, road ditch, and field north of road at 1420 ft, with Paddock shale below as described by MMW at their section 4, thin limestone in the Paddock exposed in road and also what is probably the Krider limestone; 1 digital photo; approximately 300 ft west of center of north line sec. 31, T.16 S., R.5 E., Morris Co., Kansas. NOTE: This site is approximately 1200 ft due west of MMW-4.



MR-313 = Exposure of Wellington (Hollenberg limestone) Formation in road with estimated base at 1460 ft that caps the hill; 1 digital photo; approximately 650 ft south of NE corner sec. 31, T.16 S., R.5 E., Morris Co., Kansas.



MR-314 = Exposure of Wellington (Hollenberg limestone) Formation near top of hill on the east side of road at 1450 ft with gray green mudrock below; 2 digital photos; approximately 300 ft east of center of west line NW SW sec. 32, T.16 S., R.5 E., Morris Co., Kansas.



MR-315 = MMW-3 = Exposure of Wellington (Hollenberg limestone) Formation in road and road cut on north side of road at 1470 ft; gray green mudrock below Hollenberg exposed in trench silo on north side of road; 2 digital photos (one of road and one of trench silo); approximately 150 ft east of center of north line NW sec. 5, T.17 S., R.5 E., Morris Co., Kansas.



MR-316 = Exposure of Wellington (Hollenberg limestone) Formation in road cut on east side of road with base at 1485 ft; 1 digital photo; approximately 1700 ft north of SW corner sec. 5, T.17 S., R.5 E., Morris Co., Kansas.



MR-317 = Exposure of Wellington (Hollenberg limestone) Formation in road and pond bank on east side of road with base at 1470 ft; 1 digital photo; near center of west line, NW SW NW sec. 20, T.17 S., .5 E., Morris Co., Kansas.



MR-318 = Exposure of Wellington (Hollenberg limestone) Formation in road at 1477 ft; 1 digital photo; approximately 150 ft south of NE corner sec. 30, T.17 S., R.5 E., Morris Co., Kansas.



MR-319 = Exposure of Wellington (Hollenberg limestone) Formation in road at 1468 ft; 1 digital photo; approximately 150 ft south of NW corner sec. 31, T.17 S., R.5 E., Morris Co., Kansas.



MR-320 = Exposure of Wellington (Hollenberg limestone) Formation in road and ditch on north side of road with the top of Hollenberg near 1450 ft; 1 digital photo; near center of south line, SE sec. 4, T.17 S., R.5 E., Morris Co., Kansas.



MR-321 = Exposure of Wellington (Hollenberg limestone?) Formation in road and road ditch on south side of road at 1490 ft just east of Cedar Creek, no contacts; 1 digital photo; near center of north line, NW NE sec. 18, T.17 S., R.5 E., Morris Co., Kansas.



MR-327 = Exposure of Wellington (Hollenberg limestone) Formation in road with yellowish brown mudrock in road ditch on north side of road at 1490 ft; 1 digital photo; near center of south line SW SW SE sec. 20, T.17 S., R.5 E., Morris Co., Kansas.



MR-328 = Exposure of Wellington (Hollenberg limestone) Formation in road and road ditch on north side of road at 1481 ft; 1 digital photo; approximately 150 ft east of center of south line, SW SW sec. 33, T.17 S., R.5 E., Morris Co., Kansas.



MR-329 = Exposure of the base of the Herington limestone in road at 1470 ft with Paddock shale below in road ditch on north side of road; 1 digital photo; approximately 150 ft west of center of south line sec. 33, T.17 S., R.5W., Morris Co., Kansas.

