Fluvial Cut and Fill

Ryan Olsen

GO 548/570

11 December 2022

Table of Contents

Introduction

The field trip to the Eureka Lake spillway was conducted on 29 October 2022. The task was to measure the exposed stratigraphy at the location and observe a fluvial cut and fill from the Quaternary Period.

Geographic Location

The cut and fill site is approximately 70 miles south of Emporia State University by road and is located at a south facing road cut along US Highway 400 between mile markers 348 and 349 (Figure 1).

Methods

Units were measured with a 1.5 meter Jacobs staff marked in 10 centimeter increments using a sightglass. Measurements were taken by groups of two then consolidated and averaged later in class. The averaged measurements were used to create the stratigraphy diagram in *Figure 3*.

Samples were not taken, any descriptive colors by the author are wholly subjective.

Lithostratigraphic Units

The site surveyed consisted of an ancient stream cut into the Ireland Sandstone Member of the Lawrence Shale Formation. It is of note that the sandstone present at the site could potentially be the Tonganoxie Sandstone Member of the Stranger Formation. Both the Lawrence and Stranger formations are part of the Douglas Group.

Lawrence Shale Formation

The Lawrence Shale Formation is the only exposed lithostratigraphic unit present at the survey site.

Ireland Sandstone Member. The Ireland Sandstone Member consists of a bedded layer of exposed weathered sandstone orange-yellow in color with a measured thickness from 100 to

300 cm (Figure 3). Because the The Ireland Sandstone Member could not be fully measured at the site, the lowest and highest points were used for measurements.

The north facing side of the cut was not surveyed but has a weathered dark red-brown color and an unweathered color or red-orange, likely due to it.s moisture content (Figure 4).

Fluvial Fill. The fluvial fill consisted of 3 layers of poorly sorted sediment composed of silt to pebble sized particles of eroded limestone and chert deposited during the Quaternary Period from an upstream location. The cut was deeper on the eastern end, showing that the area surveyed was a section of the stream that curved westward (Figure 3). The direction of stream flow was unable to be determined in the time provided.

The topmost layer of sediment measured 53 to 64 cm thick with an average thickness of 58 cm and a light orange brown color.

The middle layer has a light grey color with a measure thickness of 100 to 107 cm and average of 104 cm. The middle layer of sediment also contained larger particles and more chert than the top and bottom layers.

The bottom layer of sediment measured 40 to 45 cm thick with an average thickness of 43 cm and has a light grey color.

Conclusion

Now knowing what to look for to find ancient stream beds, I plan on attempting to look for any that may be exposed in the area around my family's ranch west of Eureka. It would be interesting to trace and map out the extent of an ancient stream as a GIS project.

Figures

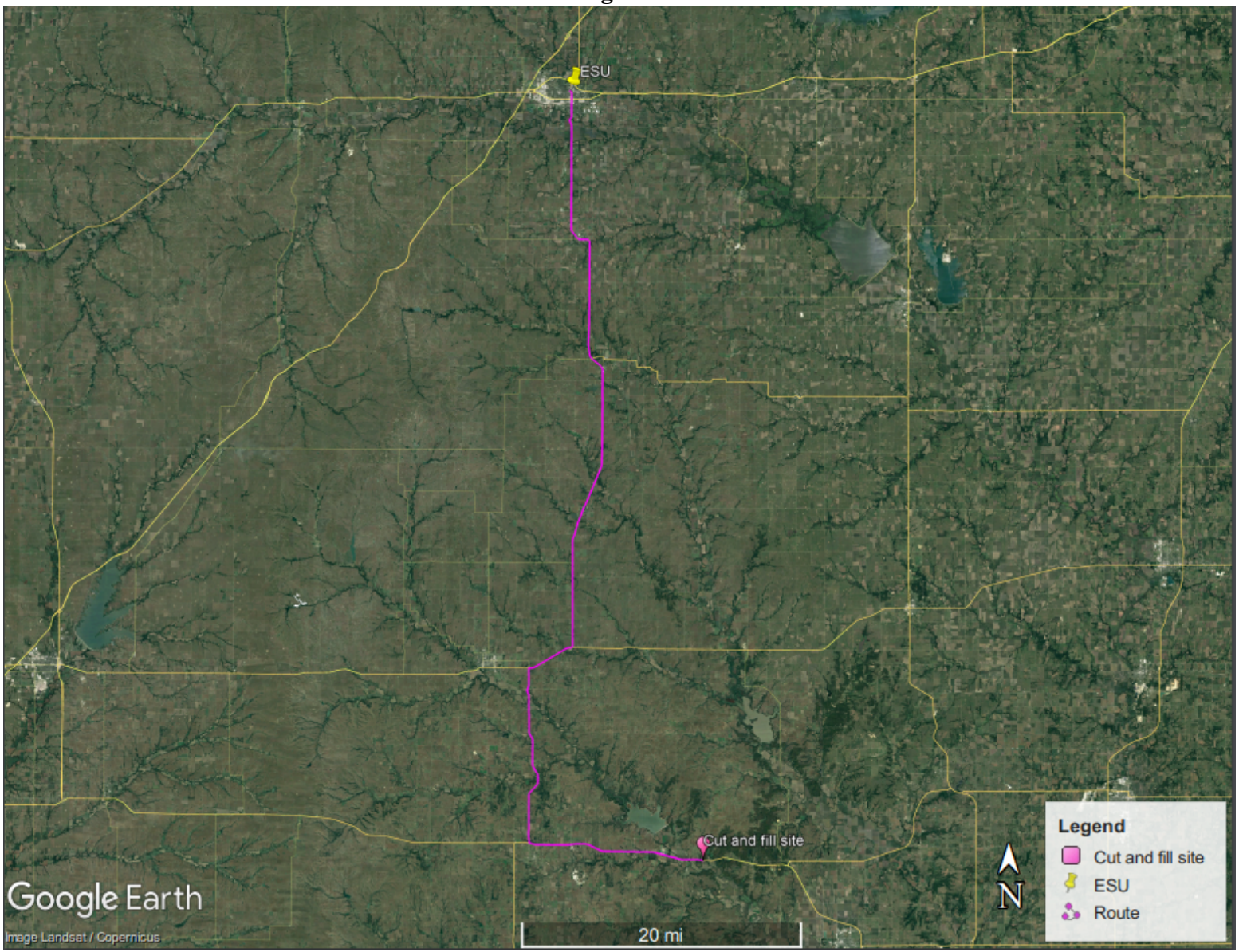


Figure 1. Geographic relationship between Emporia State University and the survey site. *R. Olsen with Google Earth.*

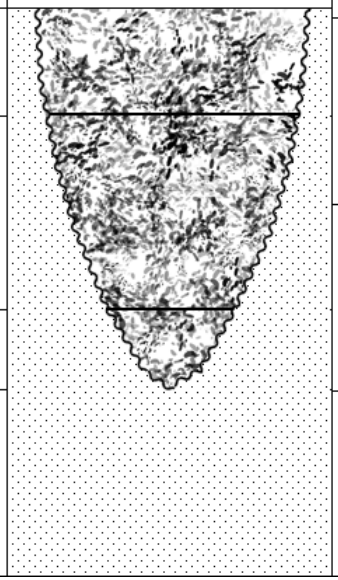
Erathem	System	Sub-system	Series	Stage	Group	Formation	Member	Thickness (cm) min-max	Fill (at thickest point)	Thickness (cm) min-max	Thickness (cm) avg.	Measured Section	Scale (cm)
Paleozoic	Carboniferous	Pennsylvanian	Upper Pennsylvanian	Missourian	Douglas	Soil		46					400
						Lawrence Shale	Ireland Sandstone (partial)	100-305	Top	43-64	58		300
									Middle	100-107	104		200
									Bottom	40-45	43		100

Figure 2. Stratigraphy diagram of the surveyed site. *R. Olsen.*

Figure 3. The south facing portion of the road cut with approximate layer boundaries drawn. *R. Olsen*

Figure 4. The north facing portion of the road cut, the drastic change of Ireland Sandstone is evident when compared to *Figure 3*. *R. Olsen*

References

Google Earth version 7.3.6.9285 (64-bit), 2022. *Map of GO 548/570 trip from ESU to cut and fill sitr by R. Olsen.*