

# **Eureka Lake Stratigraphy Report**

Ryan Olsen

GO 548/570

4 December 2022

## Table of Contents

Introduction .....	1
Geographic Location .....	1
Methods .....	1
Lithostratigraphic Units .....	1
Scranton Shale Formation.....	1
Happy Hollow Limestone Member .....	2
Elmo Coal Bed .....	2
Cedar Vale Shale Member .....	2
Rulo Limestone Member .....	2
Silver Lake Shale Member .....	2
Bern Limestone Formation.....	2
Burlingame Limestone Member .....	2
Soldier Creek Shale Member .....	2
Wakarusa Limestone Member .....	2
Auburn Shale Formation .....	3
Conclusion .....	3
Figures .....	4
Figure 1 .....	4
Figure 2 .....	5
Figure 3 .....	6
Figure 4 .....	7
Figure 5 .....	8
Figure 6 .....	9
Figure 7 .....	10
Figure 8 .....	11
Figure 9 .....	12
References .....	13

## Introduction

The field trip to the Eureka Lake spillway was conducted on 22 October 2022. The task was to measure the exposed stratigraphy at the location.

## Geographic Location

The Eureka Lake spillway is approximately 53 miles south of Emporia State University by road. The spillway is at the southeast edge of the lake at the south end of the earthwork dam and acts as the primary outlet of Eureka lake into Bachelor Creek.

## 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 cosited of the Scranton Shale, Bern Limestone, and Auburn (partial) formations. *Figure 1* shows the surveyed site with the formations and members overlaid.

### Scranton Shale Formation

The Scranton Shale Formation is partially present at the the site starting with the Happy Hollow Limestone Member as the lowest measurable member

**Happy Hollow Limestone Member.** The Happy Hollow Limestone Member consisted of a layer of exposed weathered limestone light tan in color with a measured thickness from 141 to 186 cm with an average thickness of 159 cm. Because the Happy Hollow Limestone Member could not be fully measured at the site, the lowest point was used as a base point for

measurements.

**Elmo Coal Bed.** The Elmo Coal Bed resides inside the top half of the Scranton Shale Formation to the top of the Bern Limestone Formation. At the survey site a portion of the Elmo Coal Bed was exposed inside the Cedar Vale Shale Member. The Elmo Coal Bed consisted of fissile shaley black coal that was present up to a thickness of 100 cm then pinched out to nothing. At least one large chunk of coal was present at the site, however this chunk was not in its original position therefore was not measured (Figure 3).

**Cedar Vale Shale Member.** The Cedar Vale Shale member consisted of a thick layer of fissile shale with a measured thickness of 273 to 306 cm with an average thickness of 292 cm with a light grey color (Figure 4).

**Rulo Limestone Member.** The Rulo Limestone Member consisted of a thin layer of light orange limestone with thickness of 14 cm and was not visible throughout the site (Figure 4).

**Silver Lake Shale Member.** The Silver Lake Shale Member measured 185 to 147 cm thick with an average thickness of 191 cm. The Silver Lake Shale Member consisted of a well weathered fissile shale with a medium grey color (Figure 4 & 5).

## Bern Limestone Formation

**Burlingame Limestone Member.** The Burlingame Limestone Member measured 88 to 123 cm thick with an average thickness of 108 cm. The limestone of the Burlingame Member had a light tan to light red-brown color and formed a prominent shelf over the Silver Lake Shale Member and base for the Soldier Creek Shale Member (Figure 4-6).

**Soldier Creek Shale Member.** The Soldier Creek Shale Member consisted of a weathered fissile shale with a medium grey color. The Soldier Creek Shale Member measured 185 to 197 cm thick with an average of 191 cm (Figure 5 & 6).

**Wakarusa Limestone Member.** The Wakarusa Limestone Member was composed of three distinct layers the lower two of which formed a long table on top of the Soldier Creek Shale Member, the third topmost was weathered or eroded back significantly from the edge formed by the lower layers. The Wakarusa Limestone Member measured an average thickness of 273 cm and had a medium brown to red-brown color (Figures 5-8)

## Auburn Shale Formation

The Auburn Formation at the survey site consisted of a partially exposed bed of mudstone. The exposed portion was measured to be 117 to 120 cm with an average of 119 cm and was covered in an unmeasured layer of soil. The exposed strata is a highly weathered mudstone that was light orange-yellow in color (Figure 9).

## Conclusion

The trip was interesting, the author has been to the Eureka Lake spillway several times before but not in a capacity to look at the stratigraphy in detail. I hope to return to the area again in a personal capacity to spend more time studying the strata.

## Figures

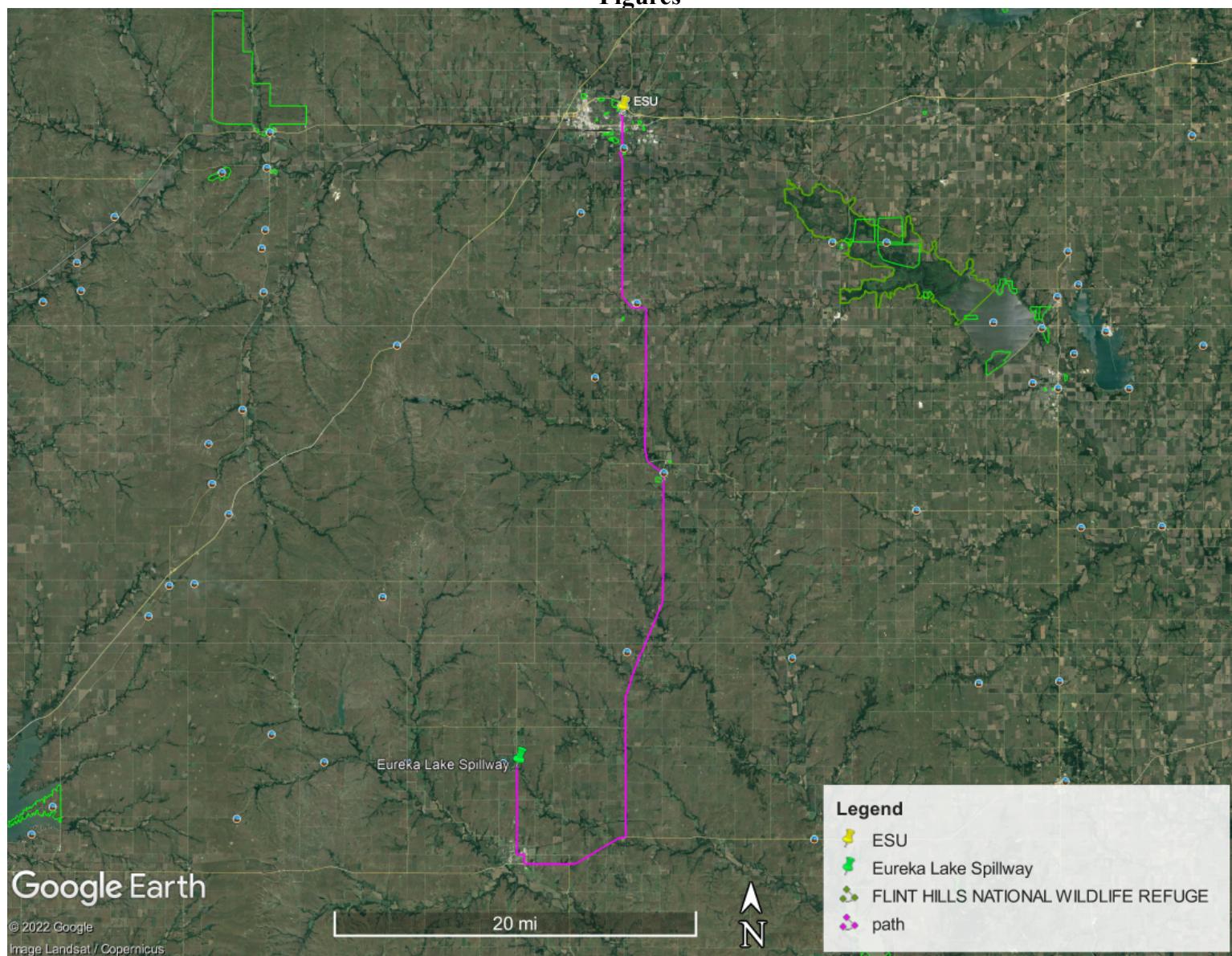


Figure 1. Geographic relationship between Emporia State University and the survey site. *R. Olsen with Google Earth.*

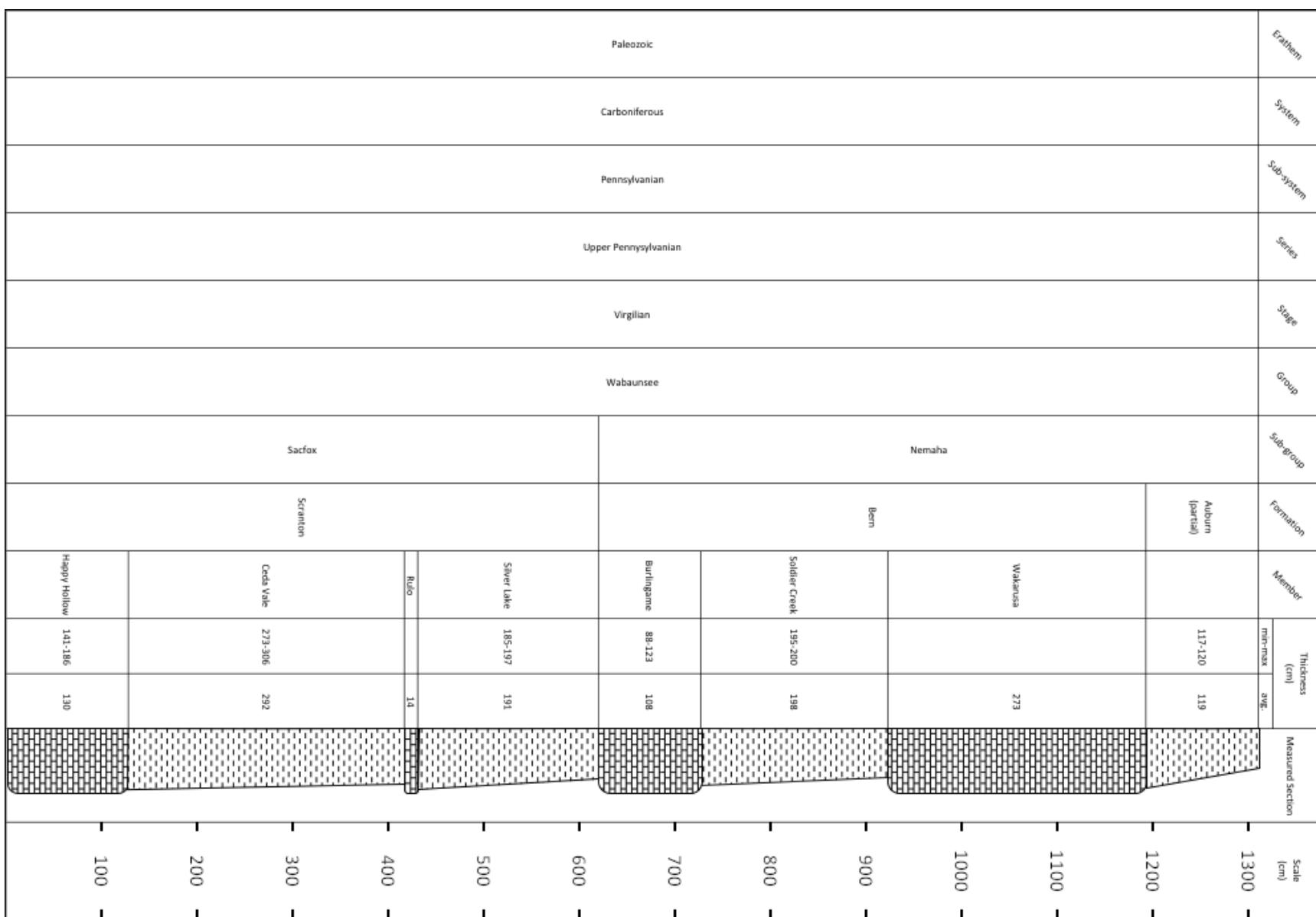


Figure 2. Stratigraphy diagram of the surveyed site. *R. Olsen*.



Figure 3. Large chunk of exposed out of place coal of the Elmo Coal Bed, the chunk is approximately 4 ft tall . *R. Olsen*



Figure 4. Shale of the Cedar Vale and Silver Lake Members, the Rulo Limestone Member is faintly visible between the color change between the prominent shale members. The Burlingame Limestone is visible overhanging the Silver Lake Member *R. Olsen*



Figure 5. From bottom to top: Silver Lake Shale Mbr., Burlingame Limestone Mbr., Soldier Creek Shale Mbr., and a portion of the Wakarusa Limestone Mbr.  
*R. Olsen.*



Figure 6. View of the bottom two layers of the Wakarusa Limestone Member overlaying the Silver Lake Shale Member, with the top of the Burlingame Limestone Member visible in the left quarter of the image. *R. Olsen*.



Figure 7. Limestone of the Wakarusa Member. *R. Olsen*



Figure 8. Limestone of the Wakarusa Member. *R. Olsen*



Figure 9. Mudstone of the Auburn Shale Formation. *R. Olsen*.

## References

Google Earth version 7.3.6.9285 (64-bit), 2022. *Map of GO 548/570 trip from ESU to Eureka Lake Spillway by R. Olsen.*