

Cagles Mill 1-Day Field Trip - GEOL 440

Objectives:

- 1) Describe facies in the field in your field notebook
- 2) Create a graphic log of the Cagles Mill section
- 3) Write a report that describes and interprets the depositional facies, shows a final graphic log, and describes the geologic history of the outcrop

SAFETY:

- 1) Do not climb the outcrop! Follow the dip of the beds and let the rocks come to you!
- 2) Beware of people behind or below you when walking or hammering.
- 3) Wear a hard hat when you are standing under/near the outcrop, where falling rocks could hit you.
- 4) Step carefully on boulders to avoid spraining an ankle.

On this trip you will describe facies in outcrop from the Pennsylvanian deposits of the Cagles Mill Spillway. The spillway is located in the Lieber State Recreation Area in Indiana. The lake was built in 1952 and is Indiana's first flood control reservoir. A spillway built to contain floodwaters exposes the outcrop we will measure. See attached map for location information.

Your goals today are to:

1. Define and describe depositional facies in the Cagles Mill section. For each facies do a description and interpretation. Ask yourself the following questions:
 - a. **Description**
 - i) **Composition:** What is the rock made up of? QFL if siliclastic. Grain type if carbonate.
 - ii) **Texture:** What is the grain size, sorting, roundness, etc?
 - iii) **Structures:** Are there sedimentary structures? What are they?
 - iv) **Form:** What is the geometry of the beds? Tabular? Lens-like (lenticular)? What types of contacts occur above and below this facies (sharp? gradual?)
 - v) **Association:** Are there characteristic beds or facies that occur above or below the facies?
 - vi) **Fossils:** Are any fossils present? What are they? (If you don't know, describe them or sketch them)
 - b) **Interpretation:** what depositional environment was this facies deposited in?

It is important that you start with a **description** of your facies and that you keep it separate from the **interpretation**. You will likely revise and iterate on your

description and interpretations over the course of the day and while writing the report, keep your data separate from your interpretations.

2. Draw a graphic log that shows how facies change with height. Here are some tips:
 - a. The bottom of your section will be 0m and you will measure up the facies perpendicular to bedding. You do NOT have to measure every bed, just facies.
 - b. DO NOT just draw blocks on your graphic log. Graphic logs need to be **graphic**. Indicate grain size on the x-axis. Use appropriate lithologic patterns (ie. stipple sandstones, draw dashes for mudstones). Indicate sedimentary structures or other elements with symbols on the side of your log.
 - c. Expect to measure about 20m of section and plan for that on your log.
 - d. Take pictures as you measure your section. Pictures can be at many scales, from pictures that show the whole outcrop to pictures that show small sedimentary structures. These can be used as figures in your final report.

Your first graphic log is a draft, it doesn't have to be pretty. You will eventually redraft it and hand in another one.

Before the project is due you will:

- 1) Give a **copy** of field notes (not originals!) to your TA
- 2) Report on the Cagles Mill outcrop with the following information:
 - a) Description of each facies
 - b) Interpretation of depositional environments for each facies, with an explanation of why you chose that interpretation
 - c) A short geologic history of the Cagles Mill outcrop with a series of paleogeographic maps showing the environment at the following times:
 - i) During the deposition of the lowest fine grained material
 - ii) During the deposition of the large coarse grained beds
 - iii) During the deposition of the upper coal
 - iv) During the deposition of the thin sands at the top of the outcrop
 - d) Answer the following question. Imagine that 50 miles to the south, we found a similar outcrop with a similar layer of coal. Would we find a continuous layer of coal we could mine between these two outcrops? Why or why not?