

Tonganoxie Sandstone Excavation - Highway K7

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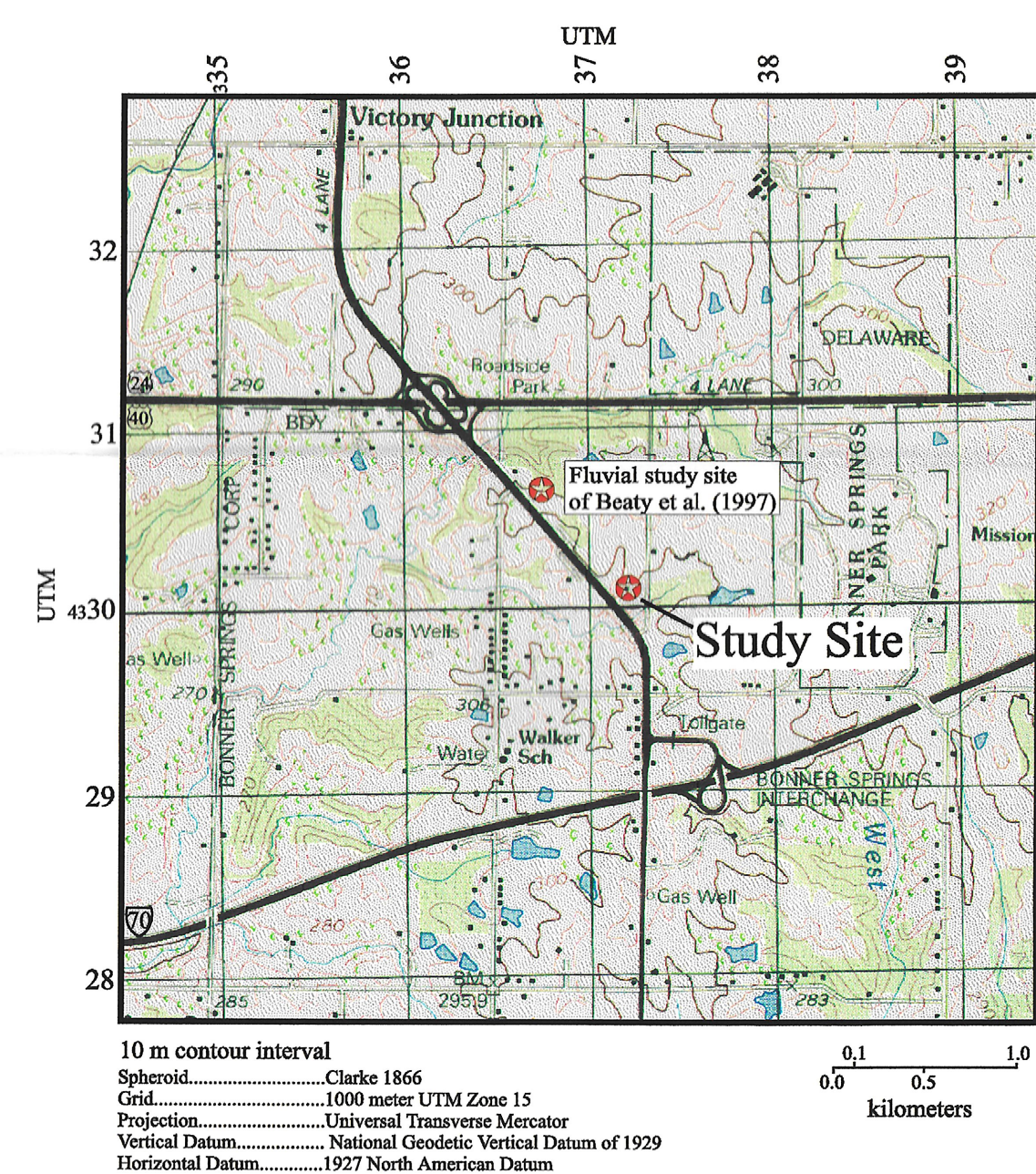


Figure 1. Map showing the location of the Scott's Farm & Home Tonganoxie Sandstone outcrop (NE NE SW sec. 8, T11S, R23E). The site is located on the northeast side of Kansas Highway K-7, Wyandotte County, Kansas. (Modified from 1:50,000 USGS map 7062 III).

Northcott and McLaughlin
Smith #1
SE NE SW 8-T11S-R23E
(2280EWL, 1840 NSL)

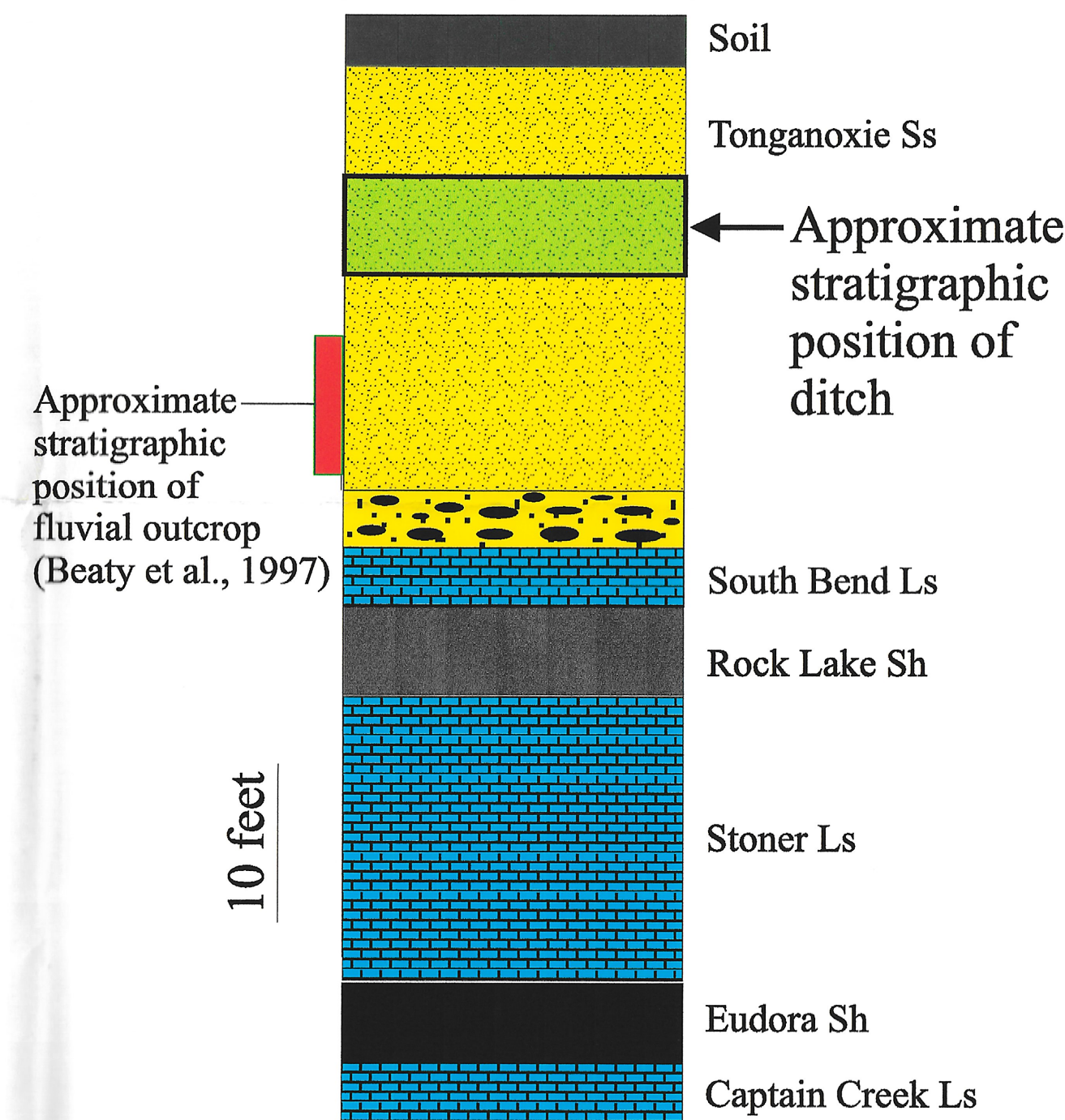


Figure 2. Modified driller's log from Smith #1, a gas well drilled and abandoned in 1931. The well was drilled approximately 150 ft south of the excavation.



Figure 3. A southwestern view of the ditch.



Figure 4. Examining and cleaning the outcrop face.

Introduction

The Pennsylvanian Tonganoxie Sandstone Member of the Stranger Formation (Douglas Group, Virgilian) consists of fluvial, estuarine, and transitional fluvial to estuarine deposits (Feldman et al. 1995). A recently excavated ditch in Wyandotte County, Kansas exposed a 6 feet thick section of the Tonganoxie sandstone (Figure 1). The east-west ditch was excavated for the footing of the north wall of Scott's Farm and Home Center in Bonner Springs. It was located 0.5 miles south of the fluvial outcrop site studied by Beaty et al. (1997), and was filled in March 1998. Because the wall of the ditch is no longer exposed, the purpose of this paper is to provide documentation of the stratigraphy and sedimentology that was visible prior to filling.

Methodology

The ditch and nearby vertical wall were created with a large excavation tool that is essentially a giant circular saw. The tool left large circular marks on the ditch face, which were mostly removed or reduced by using a flat hoe and scraper during preparation of the ditch for photography.

The ditch was photographed using a Kodak DC 210 digital camera, which has a picture resolution of 1152 x 864 pixels. Three sets of photographs were taken of the ditch face. The first consists of photographs with a ten-foot spacing between vertical markers (Figure 5). These photographs were taken from approximately fifteen feet away and centered three feet above the ditch face. The second set of photographs consists of photos with a five-foot spacing between vertical markers (Figure 6). These photos were taken from approximately ten feet away and were centered at the same level as the top of the ditch. The last set of photographs consists of an overview of the site (Figures 3 and 4), and zoomed images of individual areas (Figures 7 and 8). The vertical markers used for all photographs are a Jacob staff or a hoe. Both tools are five feet long, and the Jacob staff has 0.5 feet increments.

The JPEG-format digital photos were downloaded from the camera in and imported into a graphics program for digital enhancement. The sedimentary features imaged in the photographs were enhanced by modifying the color hue and intensity of the image.

Outcrop Description

Approximately 50 feet north of the ditch is an east-west trending vertical outcrop of Tonganoxie sandstone that is stratigraphically higher. A gas well, drilled and abandoned in 1931, was located approximately 150 feet south of the ditch at a surface elevation 3 to 5 feet lower than the surface elevation of the outcrop behind the ditch. Because of the elevation difference, an additional 3 feet of sandstone was added to the measured thickness of sandstone in the original well log (Figure 2). The approximate stratigraphic position of the Tonganoxie succession in the ditch is shown in Figure 2. An additional difference between the original well log and the log shown in Figure 2 is the presence of four feet of conglomerate at the base of the Tonganoxie succession. The original well log reported 8 feet of limestone below a sandstone interval. We interpreted the bottom 4 feet of this interval to be South Bend Limestone. Based upon data from nearby cores and outcrops, and because the South Bend

Limestone in the area is approximately 4 feet thick, the upper 4 feet of this interval is interpreted as conglomerate.

The walls of the ditch (Figures 3 through 8) contained three distinct intervals. Interval 1, the interval from the bottom of the ditch up to the thick green line, is a succession of silt- to very fine-grained sandstone containing sinusoidal crossbed sets that consist of bottomset, foreset, and topset beds. The bottomset beds are subhorizontal with lamina surfaces covered by silty and micaceous sandstone that contains carbonaceous plant remains (see Figure 8). Bottomsets grade laterally into more sharply dipping foreset beds. Foreset lamina boundaries are mantled by silty and micaceous sandstone in areas near the transition to bottomset beds and gradually contain less silt and mica upward along their surfaces. Topset beds are subhorizontal and bounding surfaces are commonly barely perceptible. Interval 1 has an undulatory top, and is interpreted as a tidally-influenced fluvial bar deposit. Interval 2, the interval between the green and yellow lines, consists of interbedded very fine-grained sandstone, siltstone, and shale beds that appear to fill in the relief on the undulatory surface below (top of interval 1). Interval 2 contains sandstone beds with small-scale ripple marks, subhorizontal to contorted siltstone beds, and massive to vaguely laminated shale beds. Interval 2 is interpreted as a mixed sand and mud tidal flat deposit, and is bounded above by a truncation surface (indicated by yellow line). Interval 3, the interval above the truncation surface, is a succession of alternating silt- to very fine-grained sandstone beds. These beds filled by first draping the lowest portions of the channel-form (up to the red line), and then overlapped the truncation surface in a series of horizontal beds. These horizontal beds also consist of alternating silt- to very fine-grained sandstone. Sandstones below the red line in interval 3 are interpreted as a tidal channel deposit, and those above the red line are interpreted as a sandy tidal flat deposit.

References

Beaty, D. S., A. Martinez, and A. W. Walton, 1997. "Combined minipermeameter and ground-penetrating radar characterization of valley-fill sandstones, Upper Pennsylvanian, northeastern Kansas." Proceedings of the Gulf Coast section of the SEPM annual research conference, p. 41-54.

Feldman, H. R., M. R. Gibling, A. W. Archer, W. G. Wightman, and W. P. Lanier, 1995. "Stratigraphic architecture of the Tonganoxie paleovalley fill (Lower Virgilian) in northeastern Kansas." AAPG Bulletin, vol. 79, no. 7, p. 1019-1043.

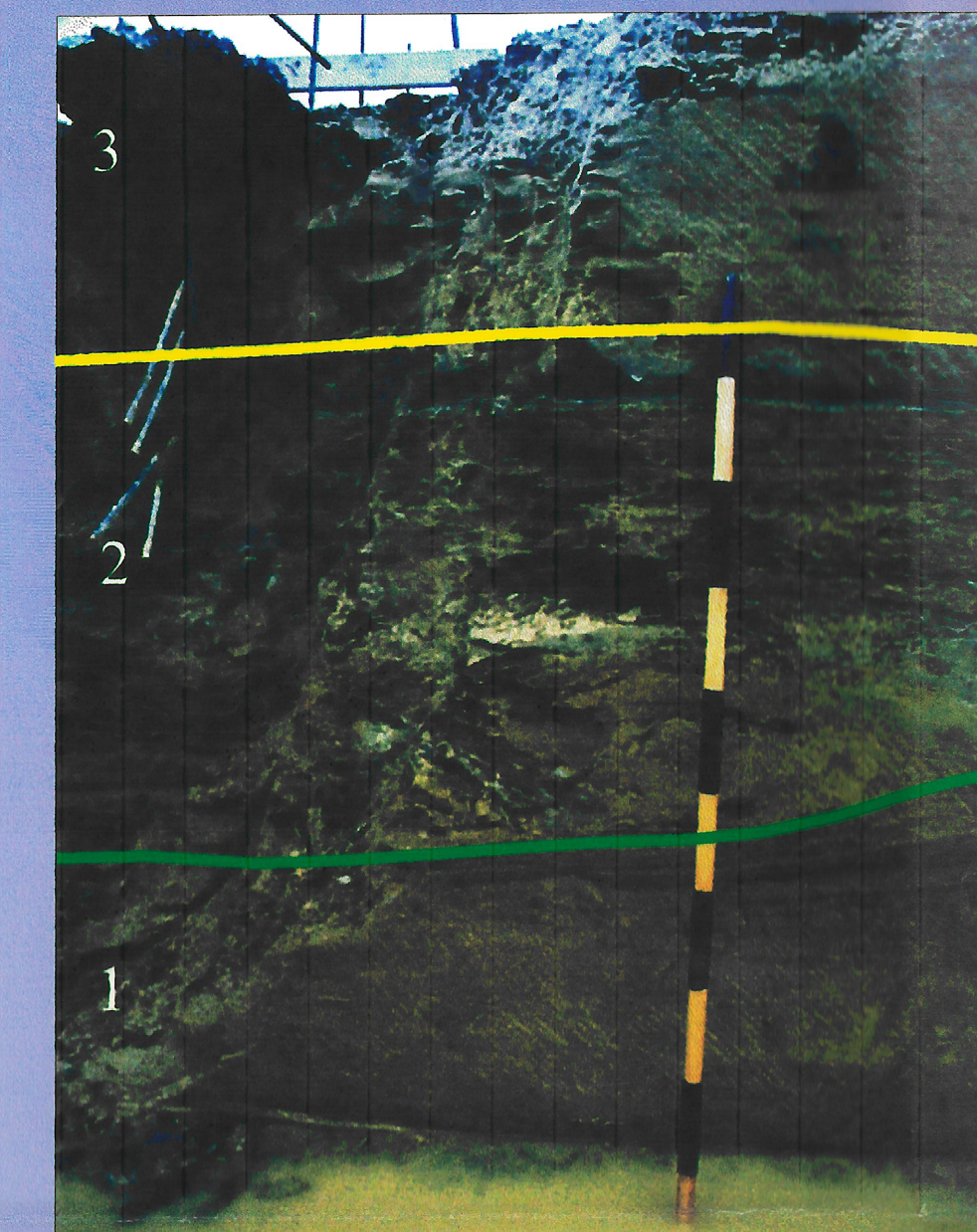


Figure 7. Closeup view of all three intervals.

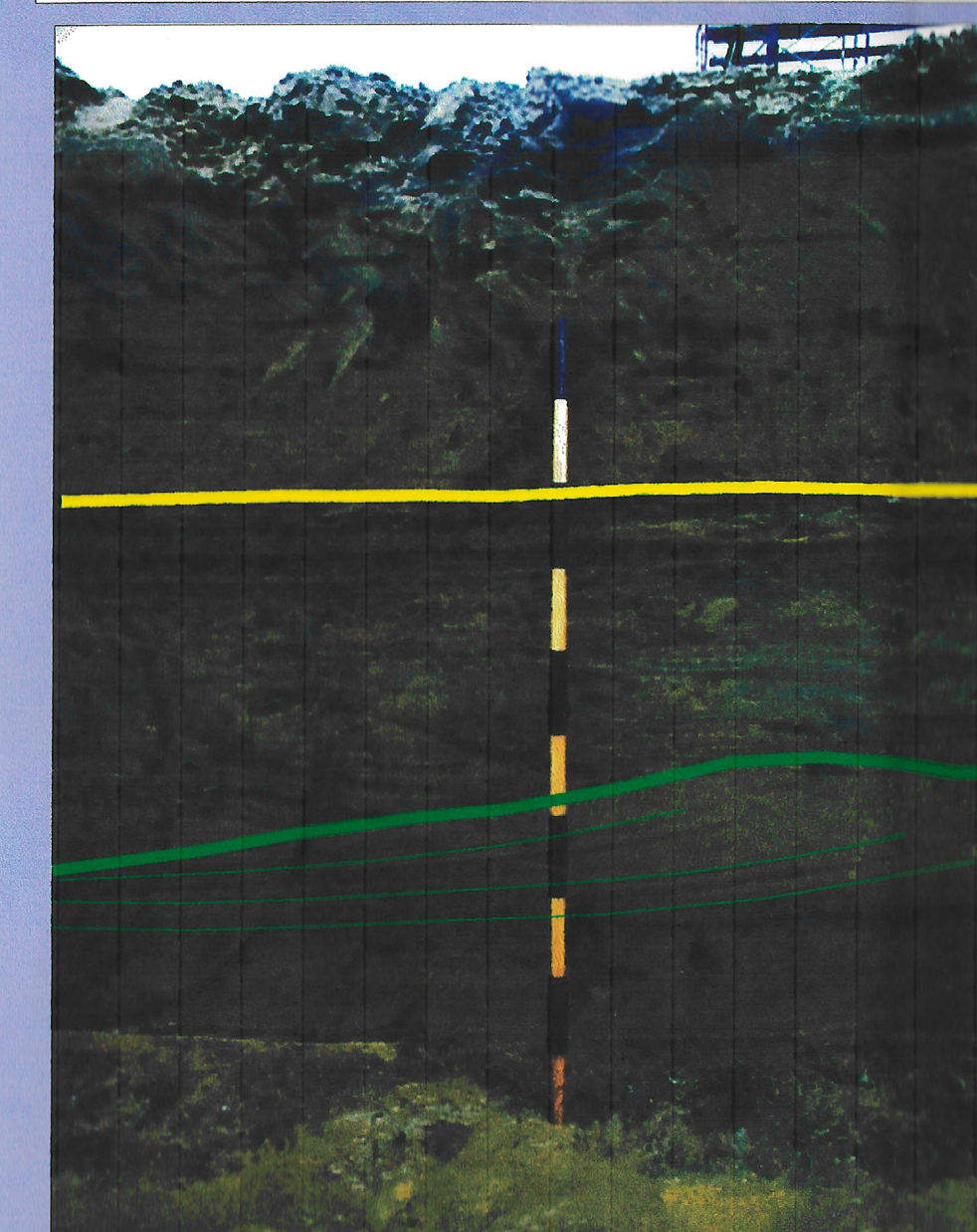


Figure 8. Closeup view of sinusoidal crossbeds.

Figure 5. Photomosaic and interpretations of 130 ft of the ditch exposure.

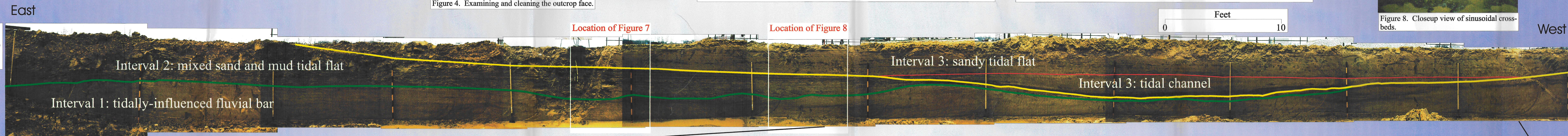


Figure 6a. Photomosaic showing closeup of channel.



Figure 6b. Interpreted bounding surfaces from the closeup photomosaic above.

