

GEOLOGIC SUMMARY

GEOLOGIC SETTING

The regional project area is located in the lower Ohio River Valley, and includes the confluence of the Green River with the Ohio River. The landscape of the map area is characterized by low-relief bedrock uplands separated by broad alluvial valleys. Although the area is south of the Pleistocene glacial limit, the Ohio River served as a major outlet for glacial meltwater and entrained sediment during glacial stages. Rapid accumulation of glacial outwash in the main Ohio River Valley and along the mouths of tributaries led to impoundment and extensive deposition of slackwater and lacustrine sediment in the tributary valleys. This lacustrine deposit has a complex and gradational transition with loess mantling adjacent uplands. The loess was primarily derived from the valley-bottom outwash. The uplands are underlain by Pennsylvanian relatively flat-lying, coal-bearing strata.

GEOTECHNICAL BEHAVIOR

The Quaternary deposits identified in the map area exhibit a wide range of grain size and geotechnical behaviors. Grain size distribution is one of the primary factors affecting the behavior of soils for geotechnical, hydrogeologic, and agricultural applications. The grain size distribution of unconsolidated sediments is dominantly controlled by the conditions under which the material was deposited. Low energy environments allow the deposition of fine-grained materials. High energy deposits limit deposition to only coarser grained materials. Eolian processes produce very well sorted (poorly graded) materials. Fluvial processes produce moderate sorted; colluvial processes produce poorly sorted deposits.

HAZARDS

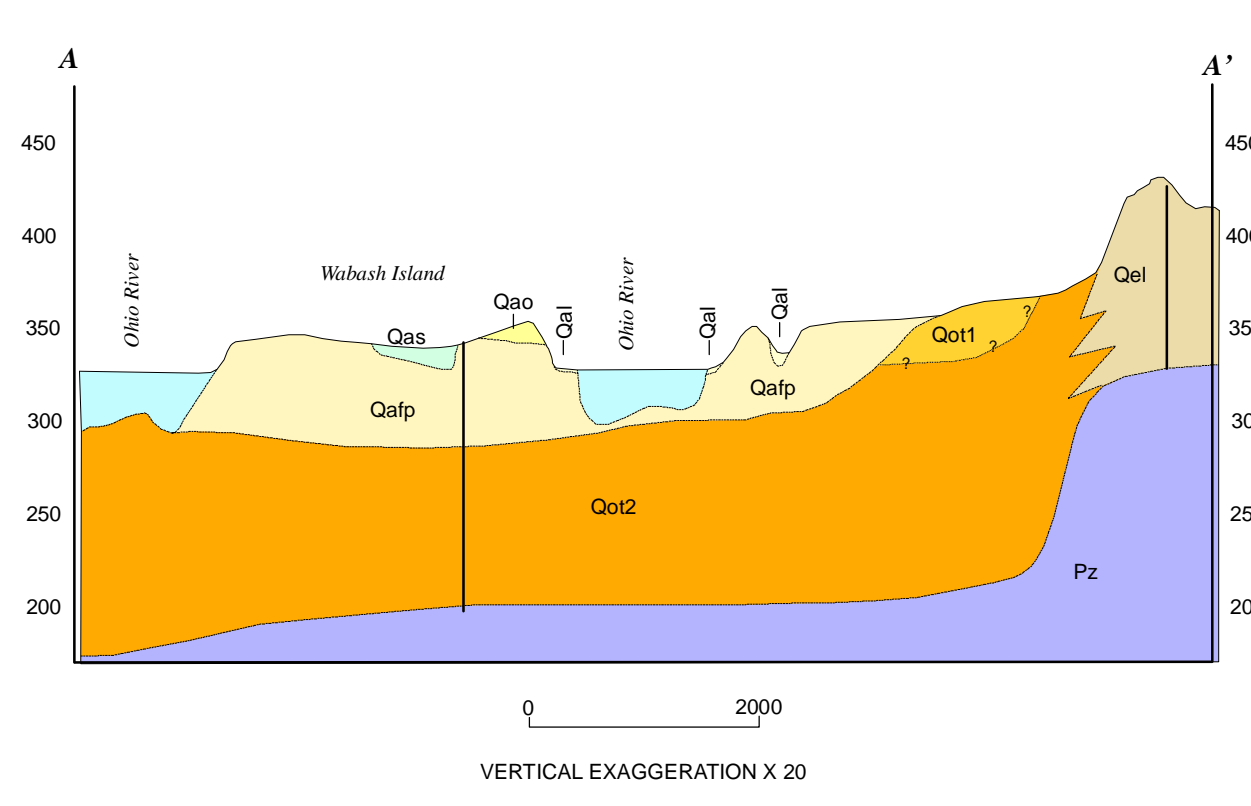
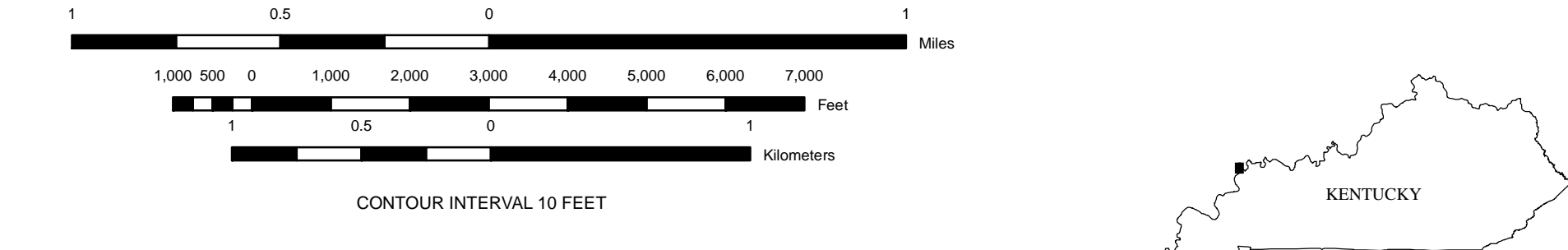
Flooding is a nearly annual occurrence along the Ohio River. Floods in the late winter or early spring commonly inundate low-lying areas in the floodplain. Larger floods occur roughly every 10 to 20 years (eg. 1913, 1945, 1964, 1997), and cover parts of the low terraces. The maximum flood of record in the valley was in 1937, flooding river towns throughout the valley. Only structures on the highest outwash terraces and the lacustrine terrace (Ql) were spared flood damage. The impact of flooding is reflected in land-use patterns through the area. Older homes and businesses have survived on the lacustrine and high outwash terraces, and on the highest parts of low terraces (Qo1, Qo16, Qo19). Trailers and less expensively built homes are constructed on the low terraces. Only barns are found on the high parts of the floodplains (Qalp). The floodplain and low parts of the low terraces are dominantly left to woodlands or used for row-crop agriculture. Most livestock husbandry in the alluvial valleys has been abandoned and is now restricted to upland areas above the 10- to 20-year flood zone. The low-relief lacustrine terrace is locally very poorly drained.

The silt soils that dominate the loess-mantled uplands are highly erodible. Soil piping and associated cover collapses are common hazards as ground water seeps through the silt and is commonly perched above fragfans. Great care must be taken during agricultural operations not to mobilize and lose this valuable resource.

The map area is proximal to the Wabash Valley Seismic Zone and the New Madrid Seismic Zone. Small earthquakes have been felt in the area relatively frequently. The significant thicknesses of unconsolidated sediment (locally as much as 140 feet in the regional map area) raise concerns about ground motion amplification of seismic waves and potential liquefaction. The variations in lithology and thickness between materials in different map units will likely cause different responses of these materials to seismic shaking.

Universal Transverse Mercator projection, zone 16, North American Datum of 1927
Topographic base and cultural features are Kentucky Raster Graphics (KRG) from Kymartian.ky.gov/krgmaps/KRG of WABASH ISLAND

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**QUATERNARY GEOLOGIC MAP OF PART OF THE WABASH ISLAND
7.5-MINUTE QUADRANGLE, WESTERN KENTUCKY**
By Ronald C. Counts
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