23 KGS database, number indicate depth to bedrock in feet ▲ Landform observation and soil probe △ Landform observation

DISCLAIMER Although these data have been processed successfully on a computer system at the Kentucky Geological Survey (KGS), no warranty, expressed or implied, is made by KGS regarding the utility of the data on any other system, nor shall the act of distribution constitute any such

DRAFT GEOLOGIC QUADRANGLE WAVERLY QUADRANGLE, KY

Alluvium, reworked outwash, Green River scrollwork terrace (Pleistocene -

Alluvium, outwash, low terrace (Pleistocene - Holocene)

Alluvium, outwash, high terrace (Pleistocene)

most of terrace surface is above historic flood zone.

layers of loess inferred to be older than 30,000 years.

Alluvium, abandoned Green River channel (Pleistocene)

Alluvium, Green River paleovalley (Pleistocene)

Upland marginal lacustrine deposits (Pleistocene)

Slackwater deposits, lacustrine terrace (Pleistocene)

estimated to range in age from 23,000 to 18,000 years old.

mapped only where fill significantly changes the elevation.

artificial levees. Mapped only where fill is distinct.

completion of original topographic mapping.

Disturbed bedrock and regolith produced from mining operations.

**Upland gravel (Pliocene-Pleistocene)** 

Bedrock and residuum (Paleozoic)

Artificial fill, engineered fill (Modern)

Artificial fill, mine spoil (Modern)

Artificial fill, other (Modern)

New water (Modern)

Loess (Pleistocene-Holocene)

Sand dunes (Pleistocene – Holocene)

surface topography.

Fine to coarse sand and gravel, with local lenses of silt and clay; gravel includes chert, quartzite, sandstone, siltstone, limestone, and coal; lithologically similar to adjacent outwash terraces; surface mantled with alluvial silty sand and sandy silt; 30 to 45 feet (10 to 15 m) thick; surface forms well-developed, swell-and-swale topography on Ohio River low terrace; deposited as point bar deposits by meandering postglacial Green River; overlies older outwash deposits (Qot2); contact is approximate, inferred from

Fine to coarse sand and gravel, with local lenses of silt and clay; gravel includes chert, quartzite, sandstone, siltstone, igneous and metamorphic rocks, limestone, and coal; lithologically similar to high outwash terrace (Qot2); surface mantled with alluvial silty

sand and sandy silt; 30 to 45 feet (10 to 15 m) thick; surface forms well-developed, low-relief terrace along Ohio River valley, deposited as glacial outwash reworked by

late glacial or post-glacial Ohio River; overlies older outwash deposits (Qot2); contact

Fine to coarse sand and gravel, with local lenses of silt and clay; gravel includes chert.

quartzite, sandstone, siltstone, igneous and metamorphic rocks, limestone, and coal; lithologically similar to adjacent outwash terraces; surface mantled with eolian and

alluvial silty sand and sandy silt; up to 170 feet (52 m) thick; surface forms welldeveloped, dissected terrace along Ohio River valley; deposited as glacial outwash; represents maximum valley filling by glacial outwash valley train deposits; overlies bedrock (Pz) or older alluvial deposits (not differentiated); contact is sharp, drawn at scarp of adjacent terrace or upland; age estimated to be 120,000 to 22,000 years old;

Silt, clayey silt, and fine sand deposited by wind; typically massive; unit thickest (up to 60 feet) near Ohio River valley and thins gradually to the south; mantles bedrock

upland; mapped as bedrock where less than 3 to 5 ft (1 to 1.6 m) thick in uplands; not mapped where locally found on lacustrine terrace (Qlt) and high outwash terraces

(Qot2); estimated to range in age from 22,500 to 10,000 years old; locally includes thin

Very fine to fine sand; locally contains lenses of clayey silt; thickness uncertain, base

not observed; deposited by wind in long, linear ridges; mantled by loess up to 15 ft (5

Clayey silt, silty clay, and silty sand; 30 to 45 feet (10 to 15 m) thick; forms sinuous,

low-lying trough inset into Green River paleovalley (Qapg); represents an abandoned

channel of Green River as it migrated across the high terrace (Qot2); overlies older

Silty sand, clayey silt and silty clay with minor chert gravel; 30 to 45 feet (10 to 15 m)

thick; includes Beds at Hubert Court of Ray (1965); forms broad, linear trough inset

into and overlying deposits of adjacent high outwash terrace (Qot2) and lacustrine

terrace (Qlt); represents abandoned Pleistocene paleovalley of the Green River; contact

is sharp, drawn at scarp of adjacent high outwash or lacustrine terrace; wood from

Clayey silt, silt, and fine sand; thickness uncertain; surface forms moderate slope and

benched upland areas bordering lacustrine deposits (Qlt); represents complex transition between lacustrine deposits and loess mantling upland; deposits include loess, loess-

derived slopewash, colluvium, lacustrine silt and clay, and lacustrine shoreline

deposits; contacts gradational and approximate, mapped on the basis of topographic

Clayey silt and silty clay; 30 to 45 feet (10 to 15 m) thick, thicker in tributary valleys;

overlying complex deposits of sand, silt, clay and minor gravel; locally mantled by

loess (similar to Qel, not mapped); forms prominent low-relief terrace in tributary

valleys and sheltered portions of Ohio River valley; unit deposited in lacustrine and slackwater environments associated with alluviation of the Ohio River valley by

glacial outwash and resulting impoundment of tributary valleys; underlying material is

of apparent mixed fluvial and fluvio-lacustrine origin; contact with fluvial units is

sharp, and drawn on scarps separating adjacent terraces; contact with eolian and upland units (Qel, Qes, Qltm) is gradational and approximate, inferred by surface topography;

Gravel and medium to coarse sand; pebbles include brown, patina chert, quartz, and

silicified fossils; locally cemented by iron oxide; thickness uncertain; unit found on uplands, covered by loess and poorly exposed; comparable to the Luce Gravel of Ray

Consolidated shale, sandstone, coal, and overlying poorly sorted regolith, comprising

the core of the uplands in the study area; includes areas of loess thinner than 3 to 5 ft (1

Compacted material used as fill for the construction of roads, railroads, buildings, floodwalls, and other engineered structures. Present in all areas of development:

Chaotic, unconsolidated fill material; includes material dredged from creeks to form

Areas of former land which have been removed by active erosion or dredging since the

about 40 feet deep has been radiocarbon dated to  $23,150 \pm 500$  ypb (Ray, 1965).

outwash (Qot2); contact sharp, identified by surface topography; floods occasionally.

is sharp, drawn at scarp of next higher terrace or upland; floods occasionally.

Version 1.0

Contract Report 23

KGS does not guarantee this map or digital data to be free of errors or inaccuracies. Some cultural features originate from data sources other than KGS, and may not align with geologic features on this map. KGS disclaims any responsibility or liability for interpretations from this map or digital data, or decisions based thereon.

The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

# ACKNOWLEDGMENTS

This map was generated using new field mapping and compilation of unpublished and previously published data and was funded in part by the U.S. Geological Survey National Cooperative Mapping Program under the STATEMAP Program authorized by the National Geologic Mapping Act of 1992, Grant No. 06HQPA0003, and by the Kentucky Geological Survey. Field mapping was completed by Steven L. Martin from Januarry 2006 to March 2007, with assistance from William Andrews and Michael Murphy (KGS). Subsurface information was compiled from data on file at the Kentucky Geological

Fairer, G.M., 1975, Geologic map of the Waverly quadrangle, Union and Henderson Counties, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-1220, scale 1:24,000. Jacobs, E.H., 1981, Soil survey of Union and Webster counties, Kentucky: U.S. Department of Agriculture, Soil Conservation Service, 126 p.

Soils, M.P., and Venard, E.A., 2000, Spatial database of the Waverly quadrangle, Union and Henderson Counties, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1220. Adapted from Fairer, G.M., 1975, Geologic map of the Waverly quadrangle, Union and Henderson Counties, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-1220, scale 1:24,000.

# **VERTICAL EXAGGERATION X 20**

QUADRANGLE LOCATION

7.5-MIN QUADRANGLE INDEX