NEW MAP OF THE SURFICIAL GEOLOGY OF THE LORAIN AND PUT-IN-BAY 30 X 60 MINUTE QUADRANGLES, OHIO

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ABSTRACT

A map depicting the surficial geology of the Lorain and Put-in-Bay 30 x 60 minute (1:100,000-scale) quadrangles has been produced by the Ohio Department of Natural Resources, Division of Geological Survey. Surficial deposits were mapped at 1:24,000 scale for 36 7.5-minute quadrangles, compiled digitally using GIS technology, and converted into a full-color, print-on-demand, 1:100,000-scale, surficial-geology map which includes all or portions of Erie, Huron, Lorain, Lucas, Sandusky, and Seneca Counties in north-central Ohio. Data sources include field mapping, county soil surveys, Ohio Department of Transportation and Ohio EPA boring logs, engineering logs, water-well logs, theses, and published and unpublished geologic and hydrogeologic reports.

Map polygons were attributed using a stack-unit designator that indicates the thickness and stratigraphic sequence of major material units (e.g., till, gravel, sand, silt, and clay), from the surface down to and including the uppermost bedrock unit. Several regional material trends stand out on the map, including large areas of lacustrine clay and silt landward of Lake Erie, the prominence of shallow bedrock paralleling the Lake Erie shoreline, a deltaic sequence deposited during higher levels of water of ancestral Lake Erie, the locally widespread and thick organic and marl deposits, and the expanse of Wisconsinan-age till mantling most of the quadrangles. The map text explains how to read the map, provides lithologic descriptions of mapped glacial and bedrock units, and offers other explanatory information.

A GIS Geodatabase contains spatial information on each polygon and data attributes of the stack units that can be queried on the basis of material types and thickness to quickly create derivative maps. Potential queries for derivative maps might include isolating clay and silt deposits for identification of potential geohazards, identification of sand and gravel deposits for aggregate exploration, or depicting the areas of thick glacial till for the identification of potentially favorable solid-waste disposal sites.

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CONSTRUCTION OF THIS MAP

The Ohio Department of Natural Resources, Division of Geological Survey, Geologic Mapping and Industrial Minerals Group has compiled a series of maps that show the three-dimensional framework of the surficial geology from the surface down to and including the uppermost bedrock unit. This mapping includes the Lorain/Put-in-Bay 30 X 60 minute quadrangles (scale = 1:100,000) located in north central Ohio.

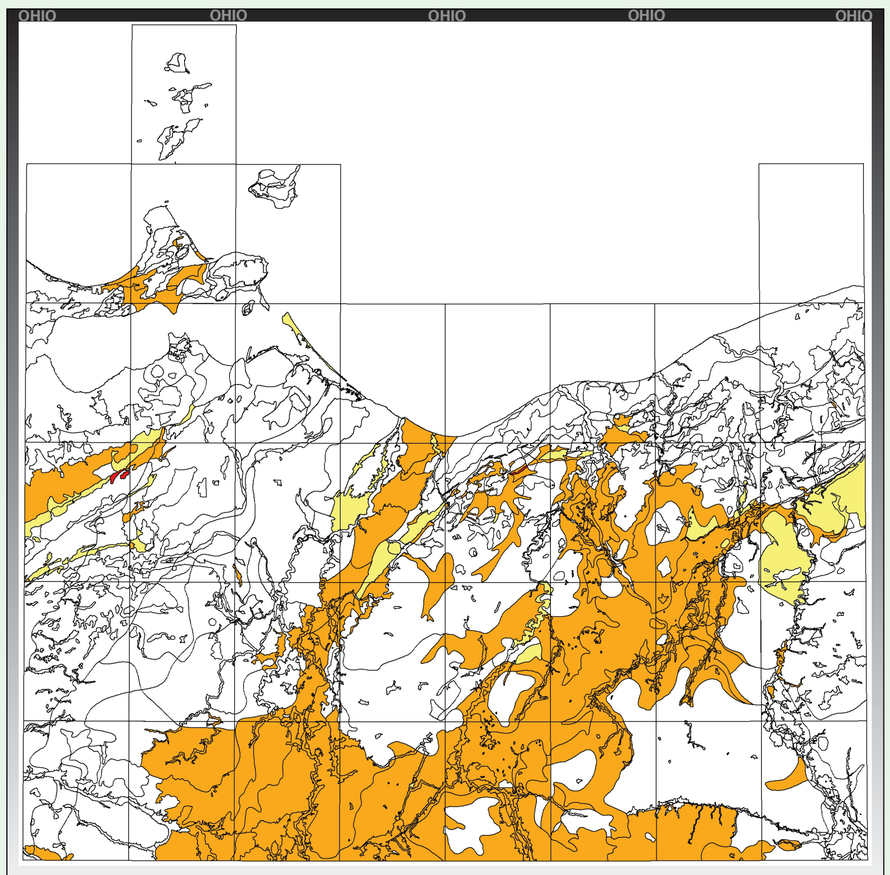
- The map **colors** depict the uppermost continuous unit and are intended to assist in visualizing the surface geology of the area (for example; green = till, red and orange = sand and/or gravel, blue and purple = clay and silt)
- **Polygons** define boundaries of the vertical sequence indicated by the stack unit description within the polygon that is composed of letters, numbers and modifiers.
- **Letters, numbers,** and **modifiers** are arranged in stacks to depict the vertical sequence of lithologic units for a polygon. Simple abbreviations are used for ease of reading.
  - o**Letter** abbreviations indicate lithology (for example: SG = sand and gravel, T = till, and L = silt).
  - o**Numbers** indicate average thickness in tens of feet (e.g. 2 = 20 feet thick, plus or minus 50%).
  - o**Modifiers** indicate areal extent. A minus {-} sign following a number indicates the maximum thickness for that unit in areas such as a buried valley or ridge. Parentheses () indicate that a unit has a patchy or discontinuous distribution and is missing in portions of that map-unit area.

Data sources include

- USDA-SCS county soils maps
- ODNR, Division of Water well logs
- Ohio Department of Transportation bridge boring logs
- Ohio EPA test borings
- Engineering boring logs
- Seismic refraction profiles (P and S wave)
- Field notes, published reports, and other data
- Open-file bedrock-topography maps at 7.5-minute scale define the thickness of drift and the location and depth of buried bedrock valleys
- Open-file bedrock-geology maps define the uppermost bedrock unit.

DERIVITIVE MAP PRODUCTS

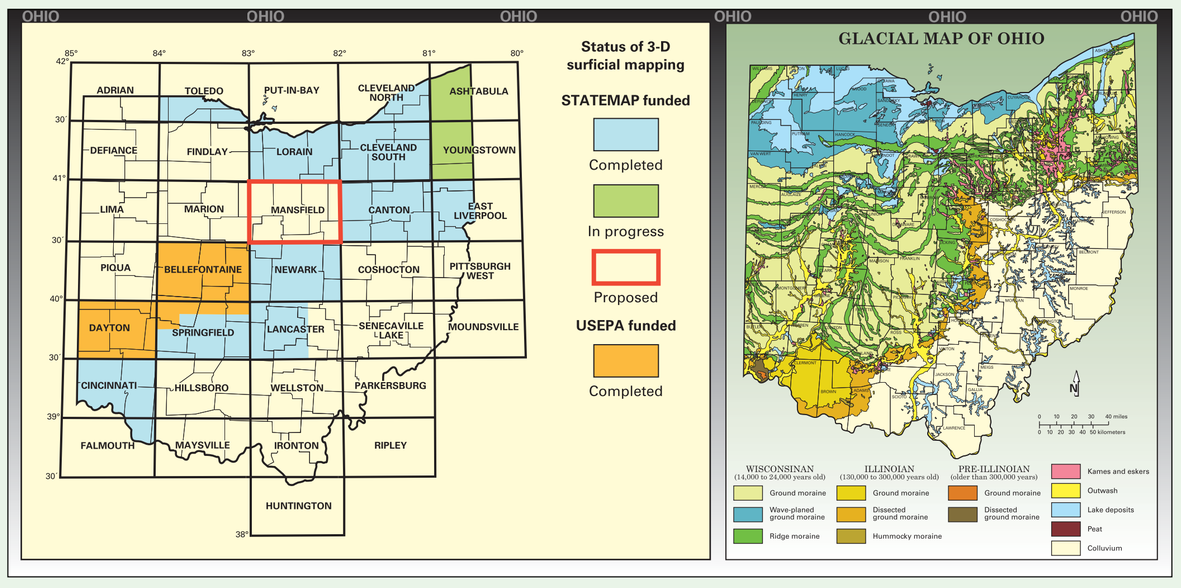
The Lorain/Put-in-Bay 30 X 60 minute map is a digital product. Polygons and stack unit information are in ArcGIS file format and can be sorted by lithology and thickness to create derivative maps for a variety of uses. The example below is a derivative product showing polygons that contain layers of sand, sand and gravel, or gravel that are greater than 20 feet thick. Mineral companies use this style of map to delineate areas of economic natural aggregate (sand and gravel) for potential exploration. Water-well drillers could use this map to delineate areas of thick coarse deposits that may contain abundant water.



Digitally derived map showing areas of sand and gravel greater than 20 feet thick in the Lorain/Put-in-Bay 30 X 60 minute quadrangles

MAPPING STATUS

The Ohio Geological Survey has been creating this style of surficial map since 1997 and to date has 41% of the state of Ohio (321 of 788 7.5 minute-scale quadrangles) completed. The long-range plan for surficial mapping in Ohio is to first map densely populated major metropolitan areas (e.g. Cincinnati, Columbus, and Cleveland). These areas are complete or in progress. Mapping will proceed to rapidly developing interstate highway corridors in glaciated portions of northern and western Ohio such as Interstate-71 and Interstate-75. Interstate highway corridors in glaciated areas of the state are experiencing major economic development and related population growth. Land-use planning and industrial development in these corridors will greatly benefit from the three-dimensional mapping that this effort will provide. After completion of the major portions of glaciated Ohio, mapping will proceed to largely unglaciated terrain of southeastern Ohio where thick deposits of outwash and landslide-prone glaciolacustrine sediments occupy large portions of present-day and former river valleys.



GEOLOGIC MAPPING COALITION