EXPLANATION

This map is based on 8,802 data points obtained from water well drillers' logs, petroleum well drillers' logs, geophysical logs, descriptions of cores recovered by the Indiana Geological Survey, seismic refraction records collected by the Indiana Geological Survey, and exposures in active and abandoned quarries.

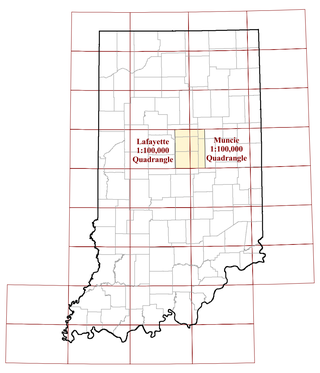
The map was created by modeling the bedrock surface with computer gridding and contouring software. Data points documenting the position of the bedrock surface were initially gridded (60-meter grid spacing) using the minimum curvature gridding algorithm. Drill holes that did not penetrate the bedrock surface were then compared to this preliminary bedrock surface by computing residuals. Wells that did not penetrate the bedrock surface but whose total depth lay below the preliminary bedrock surface were added to the bedrock surface data set as minimum depth data points. The appended data set was gridded a second time using the minimum curvature algorithm and same 60-meter grid spacing. Low areas and closely spaced depressions on this second preliminary bedrock surface revealed the locations and trends of paleovalleys. The lowest elevations within paleovalleys were assumed to be on or close to paleovalley thalwegs. Lines representing the paleovalley thalwegs were drawn by following depressions in the second preliminary bedrock surface map and by connecting nearby lows via the shortest path consistent with the data. The resulting thalweg network was digitized and bedrock surface elevations were assigned to nodes on the thalweg segments based on the lowest data points and regional trends documented by Gray (1982). The appended data set was gridded on the 60-meter grid using the digital thalwegs as breaklines. A 1,600-meter-wide buffer zone centered on the breaklines allowed the breaklines to control gridding in the valleys and prevented the breaklines from distorting the upland surface where data are sparse. This final gridding completed the interpretation of the paleovalleys in the map area.

The upland surface in this interpretation shows a nearly planar, gently sloping surface that extends throughout most of the map area. Paleovalleys that cut into the upland surface are tributaries of the Teays paleovalley that crosses Indiana north of the map area. Dense data in the southeast part of the map reveals that the major paleovalley traversing the map area from east to west is a narrow, deeply incised, meandering valley. Isolated depression contours scattered about the map area are problematic. Drilling records and quarry exposures confirm that karst features are present in the carbonates that underlie the bedrock surface within and near the map area, so the isolated depressions could be additional evidence of paleokarst. The isolated lows on the bedrock surface could also represent segments of poorly documented paleovalleys or erroneous data.

This map is the result of a cooperative mapping agreement between the U.S. Geological Survey and the Indiana Geological Survey. The mapping was supported with USGS National Mapping Program STATEMAP funds and matching funds from the Indiana Geological Survey.

EXPLANATION OF MAP SYMBOLS

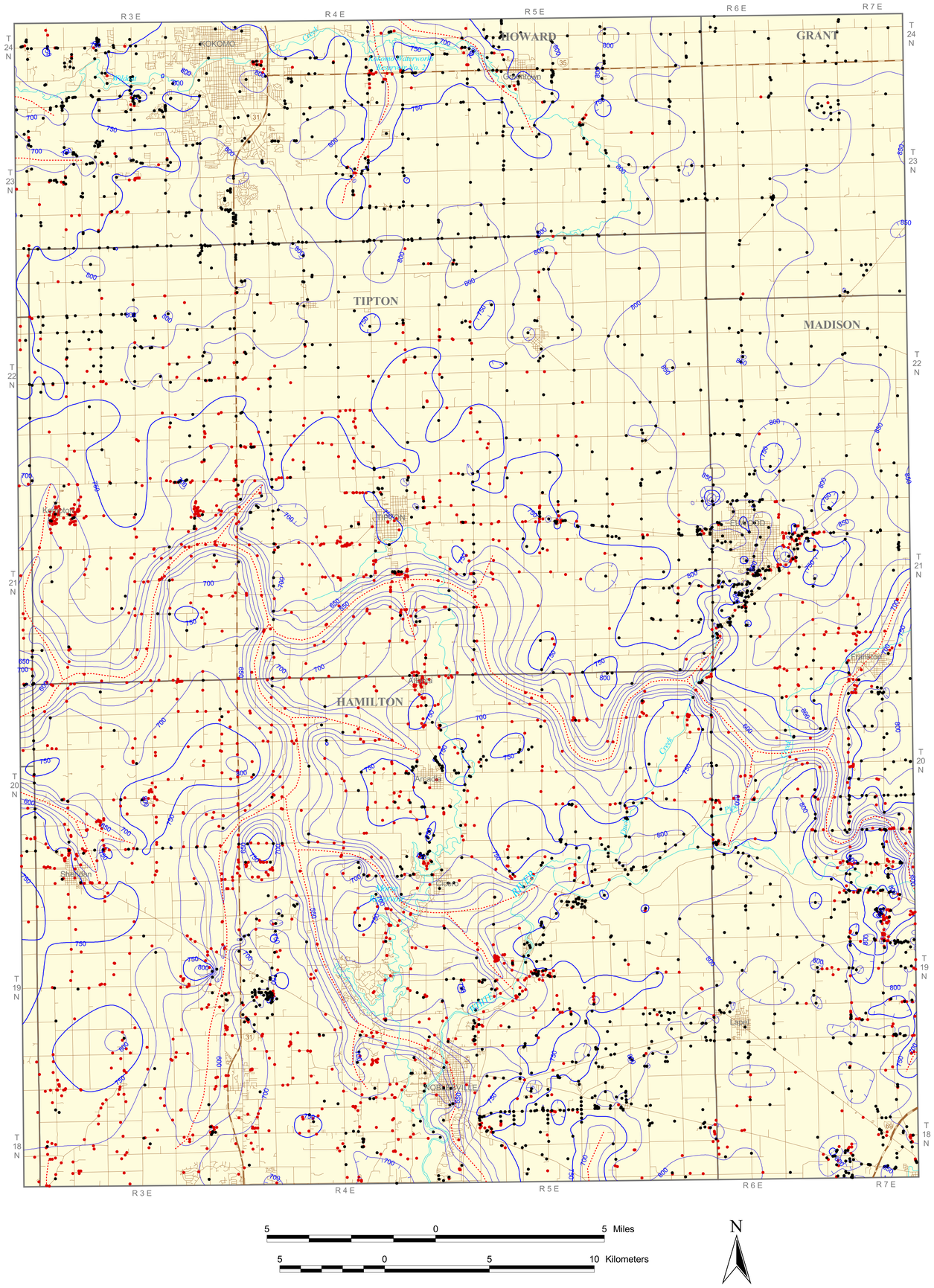
- Bedrock surface contour, approximately located. Drawn on the bedrock surface using computer gridding and contouring software. Contour interval is 50 feet (about 15 meters). Contoured grid is a 60-meter grid aligned with U.S. Geological Survey 30-meter, 1:24,000-scale digital elevation models for the map area. Hachures indicate depression contour and point downhill.
- Inferred paleovalley thalweg, approximately located.
- Data point that documents the elevation of the bedrock surface.
- Data point that documents the minimum depth of the bedrock surface.



Index map of Indiana showing boundaries of 1:100,000 USGS quadrangles. Study area shown in blue.

REFERENCES CITED

Gray, H. H., 1982, Map of Indiana showing topography on the bedrock surface: Indiana Geological Survey Miscellaneous Map 36.



5 0 5 Miles

5 0 5 10 Kilometers

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Digital compilation by Kimberly H. Sowder

Map Showing Elevation of the Bedrock Surface in the Western Quarter of the Muncie and Eastern Quarter of the Lafayette 1:100,000-scale Quadrangles, Central Indiana

By
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2000