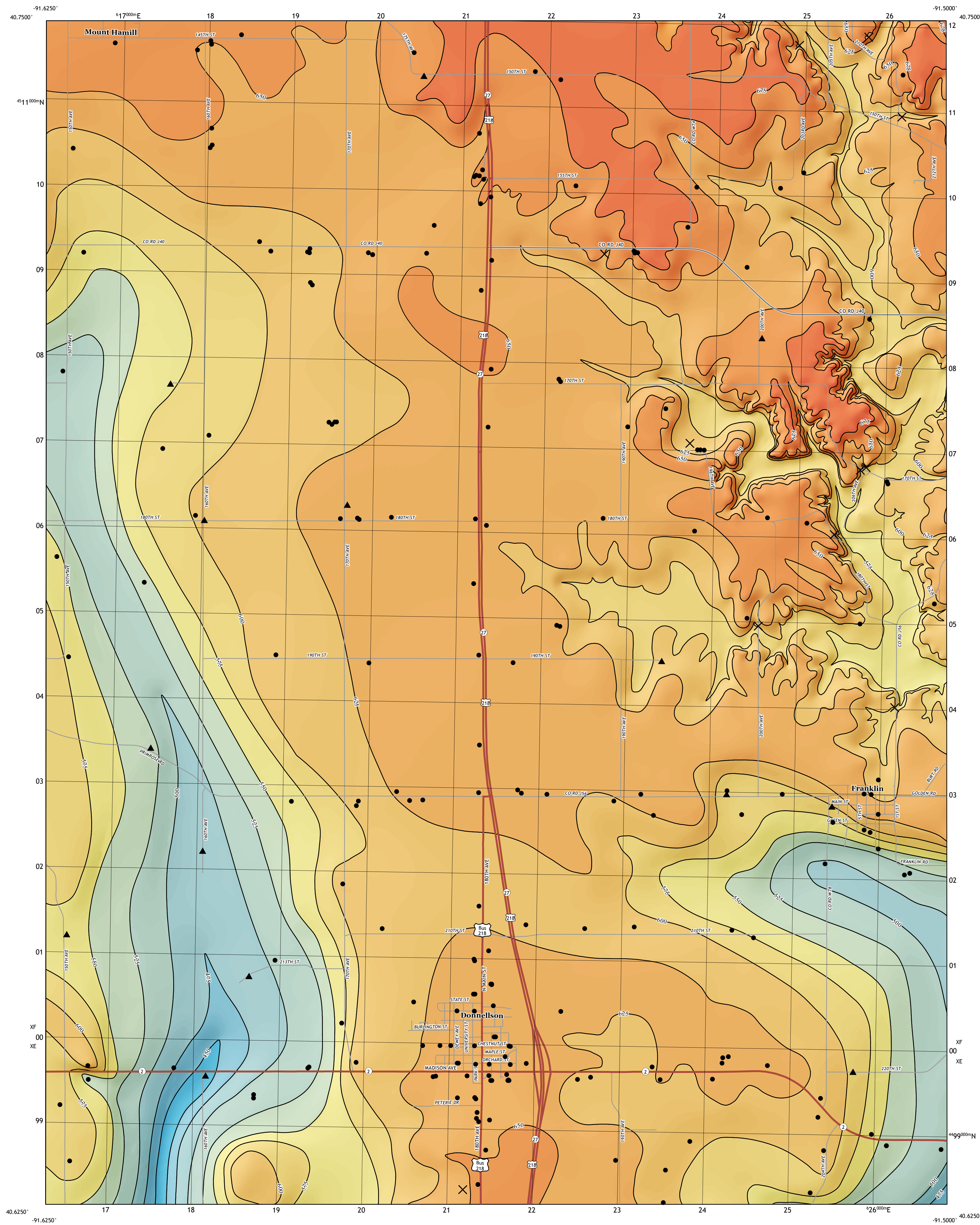


Bedrock Elevation and Quaternary Thickness Maps of the Donnellson 7.5' Quadrangle, Lee County, Iowa

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Open File Map: OFM-20-3

Bedrock Elevation



INTRODUCTION

The Bedrock Elevation and Quaternary Thickness Maps of the Donnellson 7.5' Quadrangle were produced in conjunction with the surficial and bedrock geologic maps. The bedrock surface within the quadrangle, like much of Iowa, is mostly concealed by glacial deposits. The boundary between Paleozoic bedrock and unconsolidated Quaternary materials is likely just as irregular as the land surface itself. Therefore, the thickness of Quaternary deposits varies widely across the quadrangle, generally ranging from 0 to 18 m (0-60 ft) and reaching over 68 m (225 ft) thick in the southwestern portion of the mapping area. In contrast, bedrock exposures are common in the eastern portion of the quadrangle along Sugar Creek and its tributaries.

Bedrock topographic lines were drawn based on borhole data coupled with bedrock outcrop occurrences identified while constructing the Bedrock Geologic Map of the Donnellson 7.5' Quadrangle (OFM-20-1). Where the bedrock surface is exposed or lies within a few feet of the land surface, the bedrock topography essentially mirrors the land surface topography, such as along Sugar Creek in the northeastern part of the map area. Bedrock topographic detail is muted where bedrock is deeper and borhole data is scarce, such as within the bedrock valley in the western part of the map. The thickness of Quaternary materials was generated by subtracting the elevation of the bedrock surface from the land surface elevation. The Surficial Geologic Map of the Donnellson 7.5' Quadrangle (OFM-20-2) provides further information regarding the nature and extent of Quaternary deposits within the mapping area.

METHODOLOGY

The Bedrock Elevation and Quaternary Thickness Maps of the Donnellson 7.5' Quadrangle were constructed using the same datasets as the surficial and bedrock geologic maps. Geologic information utilized included drilling records housed in the Iowa Geological Survey (IGS) GeoSam database, existing maps and technical reports, Iowa Department of Transportation data, and reports from engineering projects and quarry operators. Field reconnaissance of six bedrock outcrops and five quarries was completed as well as the collection of 14 passive seismic data points.

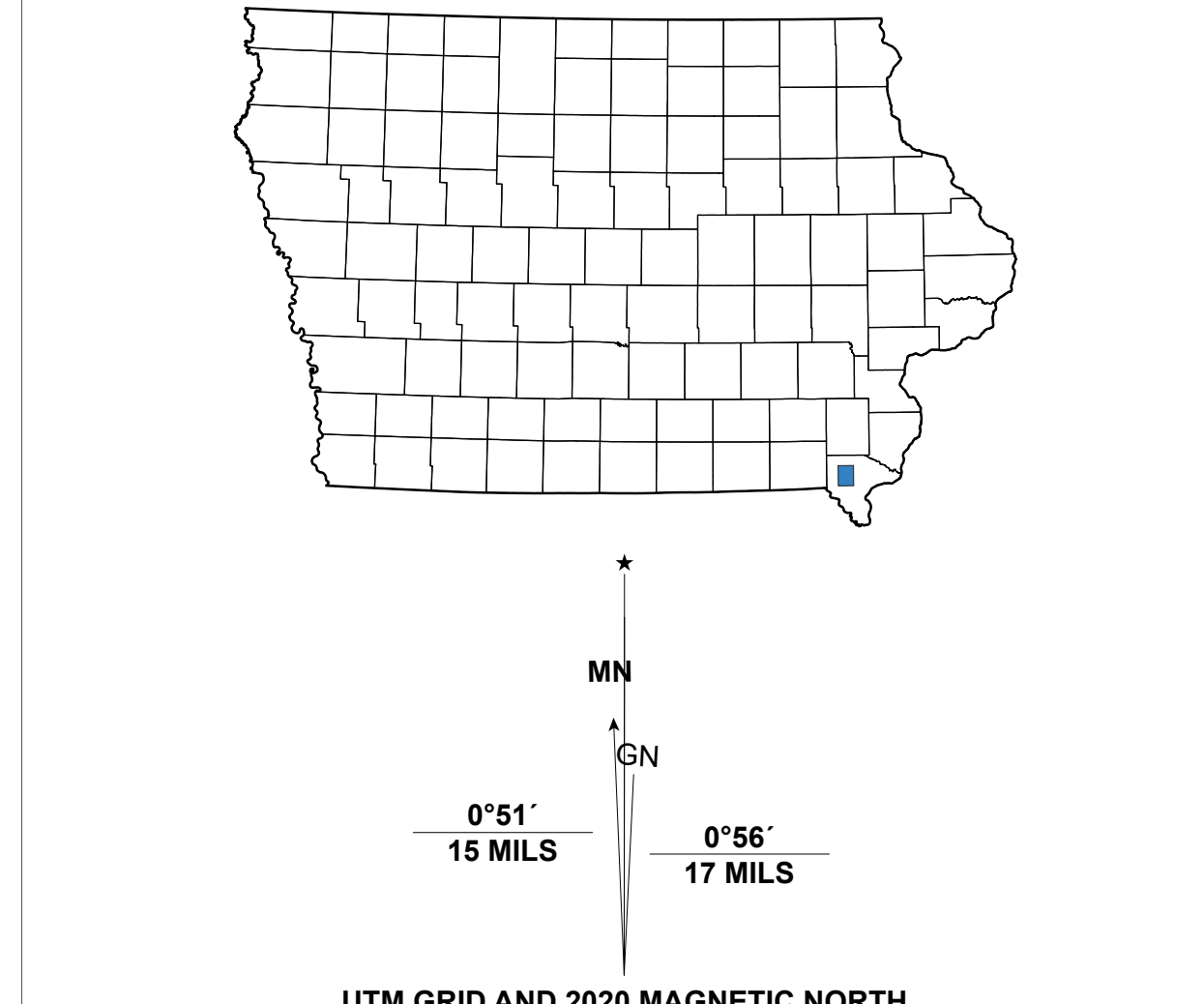
More than 280 boring records from the IGS GeoSam database, including both driller's logs and lithologic descriptions of well cutting samples (strip logs), were evaluated for the Donnellson Quadrangle. Each record was checked for locational accuracy using information from the driller's logs, historic plat books, county assessor information, and direct communication with landowners. The depth to the surficial-bedrock contact was determined for each well and assigned an elevation value by subtracting it from the surface digital elevation model (DEM). These data points provided the framework for the Bedrock Elevation Map. Additional information was gained from an assessment of the Natural Resources Conservation Service county soil survey by identifying soil series that indicate shallow bedrock.

Bedrock elevation contours were digitized manually on screen using ArcGIS software at a 25-foot contour interval. The bedrock elevation raster was generated using interpolations of the bedrock surface created with the 'Topo to Raster' and 'Empirical Bayesian Gridding' tools in ArcMap 10.6. The Quaternary Thickness Map was created by subtracting the bedrock elevation raster values from the surficial DEM raster. The resulting surface was rounded to the nearest integer and contours were generated from this result and then smoothed.

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| <h4>BEDROCK ELEVATION</h4> <table border="0"> <tr><td>≥675</td><td>Red</td></tr> <tr><td>≥650</td><td>Orange-Red</td></tr> <tr><td>≥625</td><td>Orange</td></tr> <tr><td>≥600</td><td>Light Orange</td></tr> <tr><td>≥575</td><td>Yellow-Orange</td></tr> <tr><td>≥550</td><td>Yellow</td></tr> <tr><td>≥525</td><td>Light Green</td></tr> <tr><td>≥500</td><td>Green</td></tr> <tr><td>≥475</td><td>Light Blue-Green</td></tr> <tr><td>≥450</td><td>Blue-Green</td></tr> <tr><td>≥425</td><td>Blue</td></tr> </table> | ≥675 | Red | ≥650 | Orange-Red | ≥625 | Orange | ≥600 | Light Orange | ≥575 | Yellow-Orange | ≥550 | Yellow | ≥525 | Light Green | ≥500 | Green | ≥475 | Light Blue-Green | ≥450 | Blue-Green | ≥425 | Blue | <h4>MAP SYMBOLS</h4> <ul style="list-style-type: none"> × bedrock outcrop ● GeoSam point ▲ geophysics collection point — topographic line — water body — river/stream — quarry or pit <h4>ROAD CLASSIFICATION</h4> <ul style="list-style-type: none"> — U.S. Route — State Route — Local road | <h4>QUATERNARY THICKNESS</h4> <table border="0"> <tr><td>≤25</td><td>Red</td></tr> <tr><td>≤50</td><td>Orange-Red</td></tr> <tr><td>≤75</td><td>Orange</td></tr> <tr><td>≤100</td><td>Light Orange</td></tr> <tr><td>≤125</td><td>Yellow-Orange</td></tr> <tr><td>≤150</td><td>Yellow</td></tr> <tr><td>≤175</td><td>Light Green</td></tr> <tr><td>≤200</td><td>Green</td></tr> <tr><td>≤225</td><td>Light Blue-Green</td></tr> <tr><td>≤250</td><td>Blue-Green</td></tr> </table> | ≤25 | Red | ≤50 | Orange-Red | ≤75 | Orange | ≤100 | Light Orange | ≤125 | Yellow-Orange | ≤150 | Yellow | ≤175 | Light Green | ≤200 | Green | ≤225 | Light Blue-Green | ≤250 | Blue-Green |
| ≥675 | Red | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥650 | Orange-Red | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥625 | Orange | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥600 | Light Orange | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥575 | Yellow-Orange | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥550 | Yellow | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥525 | Light Green | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥500 | Green | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥475 | Light Blue-Green | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥450 | Blue-Green | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥425 | Blue | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤25 | Red | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤50 | Orange-Red | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤75 | Orange | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤100 | Light Orange | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤125 | Yellow-Orange | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤150 | Yellow | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤175 | Light Green | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤200 | Green | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤225 | Light Blue-Green | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤250 | Blue-Green | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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ADJOINING QUADRANGLES
 1 Hillsboro, IA
 2 Sates, IA
 3 Lowell, IA
 4 Farmington, IA
 5 West Point, IA
 6 Croton, IA-MO
 7 Argyle, IA-MO
 8 Nauvoo, IA-IL



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Base map from the USGS Donnellson 7.5' Quadrangle map, published by the US Geological Survey in 2018. Map projection and coordinate system based on Universal Transverse Mercator (UTM Zone 18N, datum NAD83).
 The maps are based on interpretations of the best available information at the time of mapping. Map interpretations are not a substitute for detailed site-specific studies. 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 US Government.
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Quaternary Thickness

