INTRODUCTION

This map presents basic bedrock geologic information that contributes to the characterization of potential aggregate resources, characterization of bedrock aquifer systems, and analysis of the overlying, predominantly glacial deposits. This map is based on data obtained from several thousand records, including petroleum well drillers' logs, geophysical logs, water well drillers' logs, descriptions of cores recovered by the Indiana Geological Survey, seismic refraction records collected by the Indiana Geological Survey, natural exposures in and near the map area, and exposures in active and abandoned quarries. The map was created by modeling the bounding surfaces of mapped units using a computer gridding and contouring program. Each of the computer-modeled boundary surfaces is a 60-meter grid aligned with the U.S. Geological Survey 30-meter, 1:24,000-scale digital elevation model grid to facilitate the development of derivative map products, such as overburden maps. The techniques used to model stratigraphic boundaries are adaptations of techniques described by Hasenmueller (1995, 1998). Subcrop lines shown on the map are computed intersections between stratigraphic unit boundaries and the bedrock surface mapped by Hasenmueller and James (2001). The Trenton Limestone (Ordovician) underlies the entire map area but does not outcrop or subcrop within the map area. The contact between the Trenton and overlying Maquoketa Group (Ordovician) is well documented in and near the map area and, thus, plays a key role in the analysis of regional and local structures. Structural trends and minor features revealed by a surface representing the approximate top of the Trenton were transferred to mapped boundary surfaces by adding isochore intervals.

The map shows the distribution of gently dipping Paleozoic sedimentary rocks subcropping and outcropping on the northeastern flank of the Illinois Basin. The simplicity of the regional structure suggests that the map can be used to make precise predictions of rock-unit distribution. The remoteness of the mapped units – the bedrock surface lies as much as 364 feet below the topographic surface – presence of minor structural features that disrupt the regional trend, unconformities within the Paleozoic rock sequence that complicate boundary surfaces, and imprecisions inherent to some of the data used to construct the map make it inadvisable to regard this map product as the final authority on geologic conditions at specific sites within the map area. The map is a summary and interpretation of geologic information available in the public domain and is intended to serve as a guide to planning cost-effective site-specific evaluations of geologic conditions.

A stratigraphic revision has been incorporated into the map. The base of the Pleasant Mills Formation and Salina Group has been moved from the base of the Limberlost Dolomite Member to the base of the Waldron Member of the Pleasant Mills Formation. The Limberlost Dolomite Member is assigned to the Salamonie Dolomite. This revision of Silurian stratigraphy greatly increases control on the top of the Salamonie Dolomite because the Waldron shale is a distinct lithology that is more frequently and reliably recorded in the records used in the construction of this map. Placing the Pleasant Mills-Salamonie boundary at the base of the Waldron is likely to facilitate subsequent hydrologic and resource assessment studies because the Waldron most likely is an aquitard throughout the map area and is a convenient stratigraphic position for quarry benching.

The trace of the Fortville Fault, shown near the eastern edge of the map, has been slightly modified from previously published maps of the area (Gray, Ault, and Keller, 1987).

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 U.S. Geological Survey National Mapping Program STATEMAP funds and matching funds from the Indiana Geological Survey.

Explanation of Map Symbols

Pm — Mansfield Formation (Pennsylvanian) — Sandstone and shale with minor amounts of coal, underclay, and ironstone.
The Mansfield Formation is the lowest formation in the Raccoon Creek Group which consists of, in descending order, the Staunton, Brazil, and Mansfield Formations. The base of the Mansfield is a regional diachronous unconformity that includes networks of southwestward-trending paleovalleys with relief in excess of 100 feet. The contact between the Mansfield and subjacent Mississippian units is diachronous. The Mansfield rests on the West Baden Group or Blue River Group in the southwestern part of the map area and rocks of the Blue River Group or Sanders Group in the northwestern part of the map area. The full thickness of the Mansfield is not present in the map area.

Mwb — West Baden Group (Mississippian) — Shale, sandstone, and limestone.
The West Baden Group consists of five thin formations; in descending order these are the Elwren Formation, thin-bedded sandstones; Reelsville Limestone, thin-bedded gray micritic limestone; Sample Formation, shale; Beaver Bend Limestone, calcarenite; and Bethel Formation, shale and fine-grained sandstone. All West Baden formations are present in the map area, but the full thickness of the group is not attained in the map area owing to the group's unconformable contact with the overlying Mansfield Formation and Quaternary erosion.

Mbr — Blue River Group (Mississippian) — Limestone, dolomite, and minor amounts of shale, calcareous sandstone, and chert.
The Blue River Group consists of three formations; in descending order these are the Paoli Limestone, thin-bedded calcarenite and fine-grained limestone; Ste. Genevieve Limestone, calcarenite and calcareous sandstone; and St. Louis Limestone, fine-grained cherty limestones and dolomites. The Blue River Group ranges from 131 to 221 feet in thickness in the map area and averages 178 feet in thickness.

Ms — Sanders Group (Mississippian) — Limestone, cherty limestone, dolomite, and impure carbonate.
The Sanders Group consists of three formations; in descending order these are the Salem Limestone, massive coarse-grained calcarenite; Harrodsburg Limestone, gray cherty calcarenite and fine-grained limestone; and Ramp Creek Formation, predominantly fine-grained cherty limestone and dolomite interbedded with shale. The Sanders Group ranges from 72 to 138 feet in thickness in the map area and averages 121 feet in thickness.

Mske — Edwardsville and Spickert Knob Formations (Mississippian) undifferentiated — Thin-, medium-, and thick-bedded siltstone, shale and fine-grained sandstone with minor amounts of limestone.
The Edwardsville and Spickert Knob Formations are the uppermost formations in the Borden Group, which consists of the Edwardsville Formation, Spickert Knob Formation, and New Providence Shale, in descending order. The Edwardsville is difficult to distinguish from the uppermost beds of the underlying Spickert Knob where the basal member of the Edwardsville, the Floyds Knob Limestone Member, is missing. Such is the case in much of the map area. For that reason the Edwardsville and Spickert Knob are mapped as an undifferentiated unit. The combined thickness of the Edwardsville and Spickert Knob Formations ranges from 511 to 632 feet in thickness and averages 577 feet in thickness in the map area. The base of the Spickert Knob is typically a sharp contact between porous sandstones or siltstones at the base of the Spickert Knob Formation to the New Providence Shale in the map area. The contact between the top of the Edwardsville Formation and overlying Ramp Creek Formation is gradational.

Mnp — New Providence Shale (Mississippian) — Clay shale and silty shale.
The New Providence Shale is the lowest formation in the Borden Group. The New Providence ranges from 71 to 218 feet in thickness and averages 149 feet in thickness in the map area. The soft shales of the New Providence do not crop out in the map area. The contact between the New Providence and the overlying Spickert Knob Formation is typically an abrupt transition from shale to porous sandstone or siltstone in the map area. The contact between the New Providence Shale and underlying Rockford Limestone or New Albany Shale typically is abrupt.

DMnar — Rockford Limestone and New Albany Shale (Mississippian and Devonian) undifferentiated — Organic-rich shale and minor amounts of impure limestone.
The Rockford Limestone, which is rarely more than 10 feet thick, is too thin to map as a separate unit. The Rockford rests conformably on the New Albany Shale. Together the Rockford and New Albany range from 49 to 149 feet, averaging 109 feet in thickness in the map area.

Dm — Muscatatuck Group (Devonian) — Limestone and dolomite.
The Muscatatuck Group consists of two formations; these are, in descending order, the North Vernon Limestone and Jeffersonville Limestone. Muscatatuck formations were not mapped because they are thin and not well documented in the map area. Drillers' logs, especially older drillers' logs in the northeastern part of the map area, refer to the Muscatatuck Group as the "Corniferous Limestone" and do not differentiate units within the Muscatatuck. The contact between the Muscatatuck and overlying New Albany Shale is an abrupt and possibly unconformable transition from limestone to black, organic-rich shale (Droste and Shaver, *in* Shaver, and others, 1986, p. 99). The contact between the Muscatatuck and underlying Silurian rocks is a diachronous regional unconformity. The Muscatatuck rests on the Wabash Formation throughout the map area. The Muscatatuck ranges from 55 to 155 feet in thickness and averages 110 feet in thickness in the map area.

Sw — Wabash Formation (Silurian) — Limestone, dolomite, and argillaceous or silty dolomite.
The Wabash Formation is subdivided into four irregularly developed named members; these are, in descending order, the Kenneth Limestone, Kokomo Limestone, Liston Creek Limestone, and Mississinewa Shale Members. Only the Liston Creek and Mississinewa are present in the map area. The upper contact of the Wabash Formation is a regional unconformity between Devonian and Silurian rocks. The Wabash Formation ranges from under 50 feet in the southeastern part of the map area to more than 200 feet in thickness in the northwestern part of the map area. The contact between the Wabash Formation and underlying Pleasant Mills Formation is conformable and gradational. The gradation from the Mississinewa Shale Member of the Wabash Formation to the Louisville Limestone Member of the Pleasant Mills Formation is generally an interval of several feet.

Spm — Pleasant Mills Formation (Silurian) — Dolomite, limestone, and argillaceous dolomite.
The Pleasant Mills Formation was proposed by Droste and Shaver (1982, p. 11-17) to include, in descending order, the Louisville Limestone, Waldron, and Limberlost Dolomite Members. It rarely is possible to differentiate the Limberlost Dolomite and underlying Salamonie Dolomite carbonates in the map area. The lithologic change that marks the base of the Waldron Member of the Pleasant Mills Formation is distinct and commonly noted in drillers' logs and other geologic records from the map area; therefore, the Pleasant Mills Formation is herein restricted to the rocks from the top of the Louisville Limestone Member to the base of the Waldron Member, and the Limberlost Dolomite Member is assigned to the Salamonie Dolomite. Both the upper and lower contacts of the Pleasant Mills Formation, as herein defined, are conformable. The Pleasant Mills Formation ranges from 32 to 77 feet in thickness and averages 50 feet in thickness in the map area.

Correlation of Map Units

MAP UNIT	SERIES	SYSTEM
Pm	Morrowan	Pennsylvanian
unconformity		
Mwb	Chesterian	Mississippian
Mbr	Valmeyeran	
Ms		
Mske		
Mnp		
DMnar	Kinderhookian	Devonian
	Chautauquan	
	Senecan	
Dm	Erian	
unconformity		
Sw	Ulsterian	Silurian
	Cayugan	
Spm	Niagran	

Explanation of Map Line Symbols

Contact, approximately located.

Fault trace, approximately located. U, upthrown side; D, downthrown side. Polyline representing fault trace was treated as a breakline when computing structure on the approximate top of the Trenton Limestone.

550 — Structure contour, approximately located. Drawn on the top of the Sanders Group using computer gridding and contouring software to add the interval from the top of the Sanders to structure on the approximate top of the Trenton Limestone. Contour interval is 50 feet (about 16 meters). The computations were carried out on 60-meter grids that extend more than one mile beyond the map area on all sides.

700 — Structure contour, approximately located. Drawn on the top of the Muscatatuck Group using computer gridding and contouring software to add the interval from the top of the Muscatatuck to structure on the approximate top of the Trenton Limestone. Contour interval is 50 feet (about 16 meters). The computations were carried out on 60-meter grids that extend more than one mile beyond the map area on all sides.

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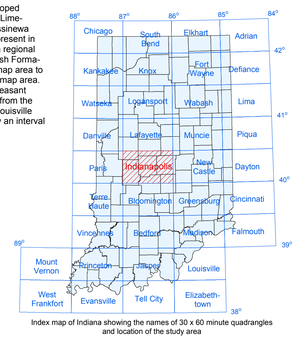
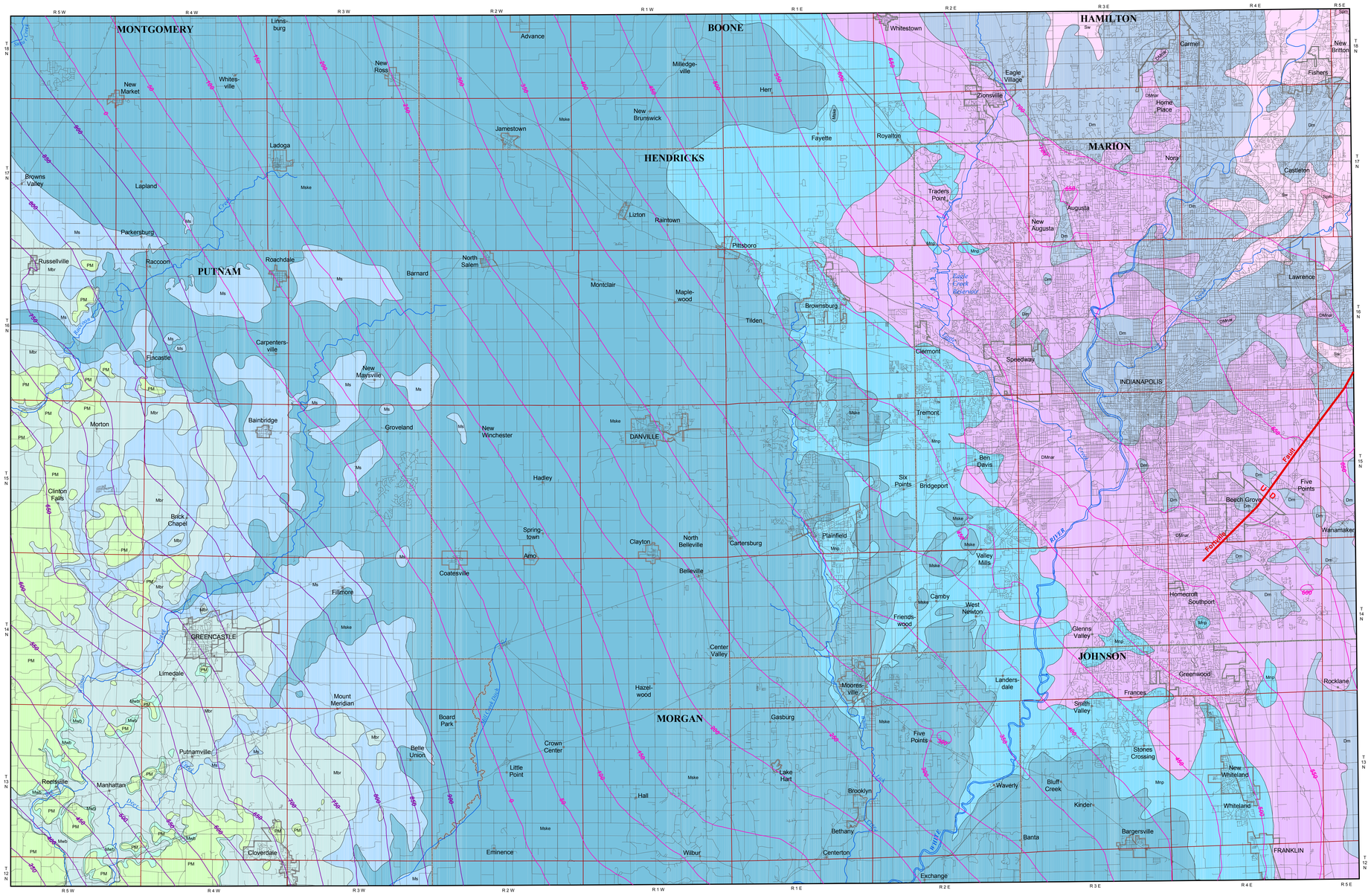


Index map of Indiana showing the names of 30 x 60 minute quadrangles and location of the study area



Reconnaissance Bedrock Geologic Map of the Indianapolis 30 x 60 Minute Quadrangle, Central Indiana

compiled by
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2001

Digital compilation by Paul N. Irwin and Kimberly H. Sowder