Potentiometric Surface Map of the Bedrock Aquifers of Fayette County, Indiana

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Fayette County, Indiana is located in the east-central portion of the state and is bounded by Rush, Henry, Wayne, Union, and Franklin Counties to the west, northwest, north, east, and south, respectively. Most of the county lies in the Whitewater River Basin which is dominated by narrow ridge tops and narrow deeply incised tributary valleys that flow into the Whitewater River valley. This is in contrast to the gently rolling uplands that dominate the East Fork White River Basin in the northwest and west-central edge of the county.

The Potentiometric Surface Map (PSM) of the bedrock aquifers of Fayette County was mapped by contouring the elevations of 197 static water levels reported on well records received primarily over a 50-year period. The potentiometric surface is a measure of the pressure on water in a water bearing formation. These wells are completed in aquifers at various depths, and typically, under confined conditions (bounded by impermeable layers above and below the water bearing formation). Water in a confined aquifer is under hydrostatic pressure and will rise in a well above the top of the water bearing formation. However, some wells were completed under unconfined (not bounded by impermeable layers) settings. Water in an unconfined aquifer is at atmospheric pressure and will not rise in a well above the top of the aquifer.

Static water-level measurements in individual wells used to construct county PSM's are indicative of the water-level at the time of well completion. The groundwater level within an aquifer constantly fluctuates in response to rainfall, evapotranspiration, groundwater movement and pumpage. Therefore, measured static water-levels in an area may differ due to local or seasonal variations. Because fluctuations in groundwater are typically small, static water-levels can be used to construct a generalized PSM. As a general rule, but certainly not always, groundwater flow approximates the overlying topography and intersects the land surface at major streams.

Universal Transverse Mercator (UTM) coordinates for the water wells were either physically obtained in the field, determined through address geocoding, or reported on water well records. The location of the majority of the water well records used to make the PSM were field verified. Elevation data were obtained from a digital elevation model. Quality control/quality assurance procedures were utilized to refine or remove data where errors were readily apparent.

Potentiometric surface elevations range from a high of 1050 feet mean sea level (msl) in several areas along the west-central county boundary, to a low of 750 feet msl in the south-central section along the Whitewater River where it exits into Franklin County. Groundwater flow direction throughout the majority of the county is primarily towards the Whitewater River and its tributaries. In the northern portion of the county groundwater flow is towards Symonds Creek. However, in the far western portion of the county, around the East Fork White River Basin boundary, groundwater flow is generally to the west.

In Fayette County the bedrock formations within the Ordovician Maquoketa Group primarily include shale with interbedded limestone. The Maquoketa Group which covers the eastern two-thirds of the county is considered a limited groundwater resource. The Silurian and Devonian Carbonates Aquifer System, which subcrops over the western third of the county, typically yields a few gallons per minute although significant drawdowns have also been reported for this system. Bedrock potentiometric surface elevation contours have not been extended throughout much of the county because of the lack of data and/or covered by more prolific unconsolidated deposits that limit the necessity to complete wells in bedrock.

The county PSM can be used to define the regional groundwater flow path and to identify significant areas of groundwater recharge and discharge. County PSM's represent overall regional characteristics and are not intended to be a substitute for site-specific studies.