

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

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Shelby County, Indiana is located in the central portion of the state and is situated within the East Fork White River Drainage Basin.

The Bedrock Potentiometric Surface Map (PSM) of Shelby County was mapped by contouring the elevations of over 540 static water-levels reported on well records received over a 50 year period. These wells are completed in bedrock aquifers at various depths and typically under confined conditions (bounded by impermeable layers above and below the water bearing formation). However, some wells were completed under unconfined (not bounded by impermeable layers) settings. The potentiometric surface is a measure of the pressure on water in a water bearing formation. Groundwater levels in an unconfined aquifer system are at atmospheric pressure and will not rise in a well above the top of the water bearing formation, in contrast to water in a confined aquifer which is under hydrostatic pressure and will rise in a well above the top of the water bearing formation.

The Western portion of Shelby County was not mapped due to most water wells in the area being finished in the unconsolidated material overlying the Silurian and Devonian Carbonates. However, in the eastern portion of Shelby County and in nearby Marion and Hancock Counties, the Silurian and Devonian Carbonates Aquifer System is capable of supporting domestic and some high-capacity users.

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 groundwater pumpage. Therefore, current site specific conditions may differ due to local or seasonal variations in measured static water-levels. Because fluctuations in groundwater are typically small, static water-levels can be used to construct a generalized PSM. Groundwater flow is naturally from areas of recharge toward areas of discharge. 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; however, the location of the majority of the water well records used to make the PSM were not field verified. Elevation data were either obtained from topographic maps or a digital elevation

model. Quality control/quality assurance procedures were utilized to refine or remove data where errors were readily apparent.

Bedrock potentiometric surface elevations in Shelby County range from a high of approximately 890 feet mean sea level (msl) in the north-central region of the county, to a low of about 650 feet msl in the central portion of the county. Generalized groundwater flow direction for most of Shelby County is towards major drainage relevant to the East Fork White River Basin. Therefore, groundwater flow is generally toward Big Blue River and Flatrock River.

In Shelby County, unconsolidated sedimentary deposits of varying thickness overlie the bedrock surface (Schrader, 2005). These unconsolidated deposits are generally 60 feet thick or greater throughout most of the county, however, in the southeast portion of the county, the deposits are commonly 30 feet or less with bedrock exposure along the Flatrock River. In areas where bedrock is shallow, the potentiometric surface is commonly under unconfined or semi-confined conditions. Where thicker sediments are present, the potentiometric surface is generally under confined conditions.

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.

Schrader, 2005, Bedrock Aquifer Systems of Shelby County, Indiana: Indiana Department of Natural Resources, Division of Water, Aquifer Systems Map 19-B