

# **Potentiometric Surface Map of the Unconsolidated 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 Unconsolidated Potentiometric Surface Map (PSM) of the unconsolidated aquifers of Shelby County was mapped by contouring the elevations of approximately 1,150 static water-levels reported on well records received primarily over a 50 year period. 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). 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. Water in an unconfined aquifer is 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.

Portions of Shelby County were not mapped due to a lack of water well data and/or limited water bearing deposits. These areas are generally considered to have limited aquifer resources leaving it difficult to represent accurate PSM elevations (Schrader 2005).

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 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 wells 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.

Unconsolidated static water levels in Shelby County range from a high of approximately 900 feet mean sea level (msl) in the east-central region of the county, to a low of about 640 feet msl in the southwest 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.

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, Unconsolidated Aquifer Systems of Shelby County, Indiana: Indiana Department of Natural Resources, Division of Water, Aquifer Systems Map 19-A