

# **Potentiometric Surface Map of the Unconsolidated Aquifers of Warren County, Indiana**

by  
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Warren County is located in the north-central portion of Indiana, adjacent to the state of Illinois to the west, and is bounded by the counties of Benton, Tippecanoe, Fountain, and Vermillion. The entire county lies within the Middle Wabash River Basin.

The Potentiometric Surface Map (PSM) of the unconsolidated aquifers of Warren County was mapped by contouring the elevations of 569 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 are completed under unconfined (not bounded by impermeable layers) settings. The mapped potentiometric surface contours are primarily for the upper 100 feet of the unconsolidated materials and utilize data for wells 100 feet or less in depth. A section of a major buried bedrock valley (Lafayette "Teays" Bedrock Valley System) is located in the northern portion of the county where the unconsolidated deposits are more than 300 feet thick in places. The shallower wells are sparse in this area, thus mapping of this area utilizes the much deeper wells completed in the buried bedrock valley to complement the mapping.

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 aquifer, in contrast to groundwater in a confined aquifer which is under hydrostatic pressure and will rise in a well above the top of the water bearing formation.

Static water-level measurements in individual wells used to construct county PSMs 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 740 feet mean sea level (msl) in the north-central portion of the county, to a low of 480 feet msl in the southeast along the Wabash River. Groundwater flow direction within the majority of the county is generally towards the Wabash River and its major tributaries.

Potentiometric surface elevations have not been extended through areas of the county that lack data and/or are covered by thin or unproductive deposits. These areas are mapped as no aquifer material or limited data zones.

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