

Potentiometric Surface Map of the Unconsolidated 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 unconsolidated aquifers of Fayette County was mapped by contouring the elevations of 825 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. 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. If the shallow data was sparse or unavailable in an area, deeper wells were used to complement the mapping. 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.

The narrow ridges in the Whitewater River Basin in Fayette County have a limited unconsolidated groundwater aquifer potential. These unconsolidated deposits are typically very thin, generally less than 50 feet in thickness. About two-thirds of the wells in the area are large-diameter bored (bucket wells) that produce from thin seams of coarse-grained material. Typically these wells are constructed at depths of 25 to 50 feet with either 30 or 36 inch diameter

porous casing. The wells are designed to maximize storage and are generally adequate for domestic use (Scott 2011).

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 1060 feet mean sea level (msl) in a couple of areas along the west-central county boundary, to a low of 730 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.

Potentiometric surface elevation contours have not been extended through areas of the county that are lacking data and/or covered by thin or unproductive deposits. Additionally, in many areas of the Whitewater River Basin there are two distinct unconsolidated aquifer systems; one on the upland ridges and the other in the Whitewater River outwash. The transition zone between these aquifer systems is typically indicated by a series of very tight potentiometric surface contour lines or a no data/no aquifer zone.

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.

Scott, 2011, Unconsolidated Aquifer Systems of Fayette County, Indiana, Indiana Department of Natural Resources, Division of Water, Aquifer System Maps 79-A.