

Potentiometric Surface Map of the Unconsolidated Aquifers of Jefferson County, Indiana

by

Glenn E. Grove

Division of Water, Resource Assessment Section

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Jefferson County is located in southeast Indiana, and is bounded by the counties of Clark, Scott, Jennings, Ripley and Switzerland to the southwest, west, northwest, north and east, respectively. The state of Kentucky borders the county to the south. The northwest portion of the county lies within the East Fork White River Basin and the rest of the county lies within the Ohio River Basin.

The potentiometric surface is a measure of the pressure on groundwater in a water bearing formation. 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. Water in a confined aquifer, which is under hydrostatic pressure, will rise in a well above the top of the water bearing formation. In contrast, groundwater in an unconfined aquifer, which is at atmospheric pressure, will not rise in a well above the top of the water bearing formation.

Static water-level measurements obtained from individual wells used to construct county potentiometric surface maps 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 potentiometric surface map. As a general rule, but certainly not always, groundwater flow approximates the overlying topography and intersects the land surface at major streams.

The potentiometric surface map of the unconsolidated aquifers was mapped by contouring the elevations of 55 static water-levels reported on well records received primarily over a 50 year period. Universal Transverse Mercator (UTM) coordinates, used in locating 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 potentiometric surface map 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.

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, wells greater than 100 feet in depth were used to complement the mapping.

Potentiometric contours are not extended through areas of the county where data is lacking and/or unconsolidated deposits are thin or unproductive. There are only a few narrow strips along the Ohio River that were mapped. Potentiometric surface elevations range from 430 feet mean sea level (msl) to 420 feet msl along the Ohio River. Groundwater flow direction within the county is towards the Ohio River.

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