

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

by

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Switzerland County is located in southeast Indiana, and is bounded by the counties of Jefferson, Ripley and Ohio to the west, northwest and north, respectively. The state of Kentucky borders the county to the south and east. The entire 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 67 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 maps 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 surface elevations range from a high of 460 feet mean sea level (msl) in the eastern side of the county near Patriot along the Ohio River, to a low of 420 feet msl in the southwest and south-central sections along the Ohio River. Regional groundwater flow direction within the county is generally south towards the Ohio River. Potentiometric contours are not extended through areas of the county where data is lacking and/or unconsolidated deposits are thin or unproductive.

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