

Potentiometric Surface Map of the Bedrock Aquifers of Randolph County, Indiana

by

Glenn E. Grove

Division of Water, Resource Assessment Section

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Randolph County, Indiana is located in the east-central section of the state and is adjacent to the Ohio border. The northern portion lies within the Upper Wabash River Basin and most of the central section is in the White and West Fork White River Basin. The far east-central portion lies primarily within the Upper Great Miami River Basin, while the southern section lies within the Whitewater River Basin. However, this excludes an extremely small part of the southwest corner that lies in the East Fork White River Basin.

The Potentiometric Surface Map (PSM) of the bedrock aquifers of Randolph County was mapped by contouring the elevations of 599 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 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 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 1150 feet mean sea level (msl) in the southeastern corner of the county, to a low of 930 feet msl in the northwest section.

Groundwater flow direction throughout the majority of the county is primarily to the north-northwest towards the Mississinewa River and the White River. However, in the southern third of the county, along and south of the Whitewater River Basin boundary, groundwater flow is generally south out of the county towards the Whitewater River and its tributaries. Bedrock potentiometric surface elevation contours have not been extended through portions of the county. These areas are lacking in data and/or covered by more prolific unconsolidated deposits that limit the necessity to complete wells in bedrock.

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.