

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

by

Glenn E. Grove

Division of Water, Resource Assessment Section

May 2017

Greene County is located in the west-central portion of Indiana, and is bounded by the counties of Clay, Owen, Monroe, Lawrence, Martin, Daviess, Knox and Sullivan to the north, northeast, east, southeast, south, southwest and west, respectively. Nearly the entire county lies within the White and West Fork White River Basin, however, a relatively small portion in the northwest corner is situated within the Lower Wabash River Basin with another portion in the southeast corner of the county in the East Fork White River Basin.

The Potentiometric Surface Map (PSM) of the bedrock aquifers of Greene County was mapped by contouring the elevations of over 600 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 730 feet mean sea level (msl) in the northeast part of the county, to a low of 470 feet msl in the southwest portion of the county near the White River and Black Creek. The regional groundwater flow direction is generally to the south towards the White River, with localized flow towards the larger tributaries such as Richland Creek and Black Creek. In the Lower Wabash River Basin, regional groundwater flow

is to the west towards the Wabash River. Within the East Fork White River Basin regional flow is generally to the south-southeast toward Indian Creek.

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.