

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

By
Ginger C. Korinek
Division of Water, Resource Assessment Section
June 2013

Whitley County, Indiana is located in the northeast portion of the state bounded by Kosciusko, Noble, Allen, Huntington, and Wabash counties in the west, north, east, south and southwest, respectively. Whitley County is situated within the Upper Wabash River Basin.

The Bedrock Potentiometric Surface Map (PSM) of Whitley County was mapped by contouring the elevations of 370 static water-levels reported on well records received primarily over a 50 year period. These wells are completed in bedrock 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. Groundwater levels in an unconfined aquifer system are at atmospheric pressure and will not rise in a well above the top of the water bearing formation. The potentiometric surface in most wells completed in bedrock within Whitley County rises above the top of the bedrock water bearing formation due to the confining nature of the system. Depth to bedrock in Whitley County ranges from approximately 70 feet in the southern half of the county to as much as 385 feet to the north.

Bedrock potentiometric surface elevation contours have not been extended through the northern and western portions of Whitley 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 wells in these areas are mainly finished in the thick unconsolidated material overlying the Coldwater, Ellsworth, and Antrim Shales along with the Silurian and Devonian Carbonates. Shale is commonly described as an aquitard and, therefore, the system is an extremely limited groundwater resource. However, in the southeastern portion of Whitley County and in nearby Allen and Huntington Counties, the Silurian and Devonian Carbonates Aquifer System is capable of supporting domestic and some high-capacity users.

Static water-level measurements in individual wells used to construct county PSM's are indicative of the water-level near the time of well completion. The groundwater level within an aquifer constantly fluctuates in response to rainfall, evapotranspiration, groundwater movement, and pumpage. Therefore, current site specific conditions may differ due to local or seasonal variations in measured static water-levels. Because fluctuations in groundwater are typically small, static water-levels can be used to construct a generalized PSM. Groundwater flow is

naturally from areas of recharge toward areas of discharge. As a general rule, but certainly not always, groundwater flow approximates the overlying topography and intersects the land surface at major streams. The contours were determined based on the amount of data and the degree of change in water levels between wells in each mapped area.

Data collected to generate PSM were standardized and validated for competency. Universal Transverse Mercator (UTM) coordinates for the water wells were either physically obtained in the field, determined through address geocoding, or determined based on water well records; however, the location of many of the water well records used to make the PSM were not field verified. Elevation data were derived from LiDAR based digital elevation model. Quality control/quality assurance procedures were utilized to refine or remove data where errors were readily apparent.

Bedrock potentiometric surface elevations in Whitley County range from a high of approximately 820 feet mean sea level (msl) in the southeast region of the county, to a low of about 750 feet msl in the far southeast corner of the county. Groundwater flow within Whitley County takes two directions, towards Aboite Creek-Little River in adjacent Allen and Huntington Counties to the southeast, and towards Eel River in the south central and west central parts of the county.

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.