

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

By
Randal D. Maier
Division of Water, Resource Assessment Section
September 2014

Union County, Indiana is located in the east-central portion of the state and is within the boundaries of two river basins. The western two-third of the county is located within the Whitewater River Basin and the remaining part of the county is located in the Lower Great Miami River Basin.

The potentiometric surface mapped (PSM) contour elevations represent lines of equal elevation relative to the measured groundwater levels in wells. In general, wells completed in a confined aquifer system are bound by impermeable layers and will have static water levels under hydrostatic pressure causing the water level to rise above the elevation of the aquifer resource. In contrast, an unconfined aquifer system is not bound by impermeable layers; therefore, the water level will not be under hydrostatic pressure and will not rise above the aquifer resource.

Static water level measurements in individual wells used to construct the potentiometric surface map are indicative of the water level at the time of well completion. Therefore, current site specific conditions may differ due to local or seasonal variations in measured static water levels.

Coordinate locations of water well records were physically obtained in the field, determined through address geocoding, or reported on water well records. Elevation data were obtained from a digital elevation model (DEM). Elevation and location quality control/quality assurance procedures were utilized to refine or remove data where errors were readily apparent.

In Union County, wells producing from bedrock deposits are extremely limited with much of the county lacking in data. This is primarily due to bedrock as a limited aquifer resource, and/or available overlying unconsolidated materials. Therefore, potentiometric surface elevation contours have not been extended throughout the majority of the county.

Bedrock for the majority of the county includes shale with interbedded limestone associated with the Ordovician Maquoketa Group Aquifer System, or, carbonate deposits for the northwestern and northeastern areas involving the Silurian and Devonian Carbonates Aquifer System. There are 93 located wells that are completed in bedrock and are utilized towards the mapping of the bedrock potentiometric surface. Depth to bedrock generally ranges from 60 to 123 feet for wells completed in the Silurian and Devonian Carbonates Aquifer System, and 20 to 75 feet for wells in the Ordovician Maquoketa Group.

Potentiometric surface elevations range from a high of 980 feet mean sea level (msl) along the west-central part of the county, to a low of 760 feet msl in the west-central part of the county along a portion of the East Fork Whitewater River. Generalized groundwater flow direction for the county is towards major drainage relevant to the basin. However, due to extremely limited data, potentiometric surface contours are mostly limited to isolated portions of the Whitewater River Basin with groundwater flow generally towards the East Fork Whitewater River and its tributaries. In the Lower Great Miami River Basin, groundwater flow is southeast towards Indian Creek.