

Characteristics of Hydrogeologic Settings in Marion County

From Fleming and others (1993) and Brown and Laudick (2003)

<i>Map Unit</i>	<i>General Description</i>	<i>Degree of Confinement</i>	<i>Rate of Surface Infiltration</i>	<i>Thickness of Vadose Zone (ft)</i>	<i>Position in Flow System</i>	<i>Predominant Hydraulic Gradient</i>	<i>Recharge Potential</i>	<i>Sensitivity to Contamination</i>
A1	Thick sections of sand and gravel interstratified with a few, small, widely scattered till units; White River valley axis	Unconfined	High	5-20	Regional discharge area for all aquifers	Gentle lateral; upward gradient near river in deeper part of system	Very high***	Very high for the uppermost part of system, less for deeper parts
A2	Variable thickness of sand and gravel overlying complexly interbedded sand and gravel and till White River valley margins	Unconfined to semiconfined	High	10-25	Regional discharge area for most pre-Wisconsin aquifers. Recharge area for shallow aquifer system	Gentle lateral for unconfined aquifers; upward for deeper aquifers	Very high***	High for shallow unconfined aquifers; low for deep confined aquifers
A3	Similar to setting A2 but occurs in very narrow bands along the larger streams that cross uplands	Unconfined to semiconfined	High	5-20	Local discharge area for shallow aquifer system and some deeper units**	Gentle lateral for unconfined aquifers; upward for deeper aquifers	High***	High where unconfined; moderately low where confined or semi-confined
B1	Hummocky ridges and mounds composed chiefly of sand and gravel, locally with thin till cap and some lenses of till within; south-central part of county	Unconfined to semiconfined	Moderately high	50-100	Local recharge area for shallow aquifer system	Downward	Moderately high	Moderately to high; greatest where vadose zone is thinnest and till units are absent
B2	Hummocky ridges and mounds composed chiefly of till and lesser sand and gravel in thick, narrow channels; widely scattered	Semiconfined to confined	Low to moderate	25-75*	Local recharge area; especially where sand and gravel bodies are abundant	Downward	Moderately low to moderately high	Low to moderate
C1	Mapped bodies of late Wisconsin sand and gravel capped by less than 10 ft of till; uplands throughout county	Semiconfined	Low to moderate	<10	Local recharge area for shallow aquifer system	Downward	Moderate to moderately high	High for shallow unconfined aquifers; low for deeper confined aquifers
C2	Similar to setting C1, but the till cap is typically greater than 10 ft thick; uplands throughout county	Mostly confined	Low	<10*	Intermediate, with small, highly localized recharge areas	Downward	Moderately low	Low
C3	Thick sections of till, locally with small lenses of sand and gravel; uplands throughout county	Well-confined	Low	<10*	Intermediate	Downward	Low	Low
C4	Valleys of small upland streams, mainly floored by till; upland streams throughout county	Mostly confined	Low	<5*	Local discharge area for shallow system; seepage area for till	Neutral	Low	Low
C5	Sandstone capped by 0-20 ft of glacial sediments; southwest part of county	Unconfined to semiconfined	Low to moderate	20-40*	Local recharge area for sandstone	Downward	Moderate	Low to high; greatest where till cap is thin or absent
C6	Pre-Wisconsin sand and gravel capped by less than 20 ft of till; upland slopes and stream valleys throughout county	Semiconfined to confined	Low to moderate	0-15	Local recharge or discharge area for shallow sand and gravel; seepage area for till**	Variable	Low to moderate	Moderate
C7	Apron of late Wisconsin sand and gravel capped by 10 to 20 ft of discontinuous till. West side of White River north of William's Creek	Semiconfined	Low to moderate	20-30	Local recharge area for shallow sand and gravel	Strong lateral	Moderate to moderately high	Moderate to high; greatest where till cap is thin or absent
C8	Rolling upland bounded by Fall Creek and the White River and centered on Crown Hill. Portions of area underlain by surface sand and gravel, but sparse data make subsurface conditions poorly known	Unconfined to semiconfined	Moderate to moderately high	20-40*	Local recharge area for shallow sand and gravel; groundwater flows laterally into unconfined outwash in adjacent setting A1	Downward and lateral towards White River and Fall Creek	Moderate to moderately high	Moderate to high; greatest where vadose zone is thinnest and till units are thin or absent; evaluate locally

* Perched water table possible in till or on bedrock surface in setting C5.

** Considerable interchange between surface water and groundwater is possible in parts of these settings.

*** For the tops of unconfined aquifers.

References:

Brown, S. E., and Laudick, A. J., eds., 2003, Hydrogeologic framework of Marion County, Indiana—a digital atlas illustrating hydrogeologic terrain and sequence: Indiana Geological Survey Open-File Study 00-14, CD-ROM.

Fleming, A. H., Brown, S. E., and Ferguson, V. R., 1993, Hydrogeologic framework of Marion County, Indiana: Indiana Geological Survey Open-File Study 93-05, 67 p.