

Ground Water Run off Risks

The more driveways,

The more roofs,

The more impervious services....roads, walkways, etc.....

The more Ground water runoff could impact those area that have always been runoff areas from this land including the land south and southwest (Settler's Glen) of this land, the land east of this land, and the woods to the North west.

Building high density homes on this land is a *Giant* experiment for adversely impacting our Ground water. Multiple studies support this:

Studies to Note

Tinker, Jr., John R., 1991, An Analysis of Nitrate-Nitrogen in Ground Water Beneath Unsewered Subdivisions: Ground Water Monitoring Review, V. 11, no.1, p. 141-150.

A study by John Tinker Jr., at 5 subdivisions (2 in La Crosse and 3 in the Eau Claire area)

All showed high nitrate levels on the down gradient side of the ground water flow.

All sites had limited up-gradient agricultural land.

All sites were built on unconsolidated material with higher permeability.

All wells were in the Mt. Simon Sandstone.

The results indicated that nitrogen from septic systems and lawn fertilizer cause nitrate-nitrogen to increase in the groundwater beneath the downgrading side of the subdivisions. In three of the five subdivisions the highest nitrate-nitrogen exceeds the drinking water standard of 10mg/L.

The higher the density of housing, the higher the probability for issues with Ground water contamination.

Gellasch, C.A., Bradbury, K.R., Hart, D.J., and Bahr, J.M., 2013 Characterization of fracture connectivity in siliciclastic bedrock aquifer (Wonewoc, Eau Claire, and Mt. Simon Fm.) near a public supply well (Wisconsin, USA). Hydrogeology Journal, v.21, p.383-399.

In a study by Gellasch et al., 2013, in Madison, Wisconsin. Five fractures in the Cambrian rocks accounted for more than 80% of the total flow of groundwater into the borehole. Leaking urban sewer pipes in the city of Madison, WI have locally contaminated the Mt. Simon Fm. aquifer even though the Mt. Simon Fm aquifer is over 200 feet below the present land surface in Madison, WI. It was predicted during engineering studies that the Mt. Simon Fm. aquifer would be protected from contamination by the overlying Eau Claire Fm. There is conclusive evidence that the Eau Claire Fm. did not function as an effective aquiclude because of incipient fractures (Gellasch, 2013). Similar fracture dominated flow has been observed in all of the other Cambrian siliciclastic bedrock units that occur in the upper-Midwest (Swanson 2006; and Runnel, 2006)

"Impacts of a rural subdivision on groundwater: results of a decade of monitoring" Kenneth R. Bradbury, et. al., October 2015 Wisconsin Geological and Natural History Survey, University of Wisconsin - Extension

The data reported here document long-term changes in groundwater quality, but no measurable change in ground water levels or general flow directions. Wastewater tracers show small but detectable impacts from septic effluent on groundwater quality, as human viruses, pharmaceutical compounds, and artificial sweeteners, all indicators of domestic wastewater. Chloride values increased and nitrate concentrations varied spatially and temporally over the past decade.

The presence of septic effluent tracers (artificial sweeteners) in groundwater indicates that rural subdivisions can impact ground water quality from runoff and effluent from properly constructed and operated, state-of-the-art onsite septic systems. Savannah Valley has a small number of houses (average 1 house/4.88 acres), low housing density and state-of-the art septic systems. Despite these factors, the conversion of agricultural land to a subdivision has had a small but measurable impact on ground water quality. Subdivisions with a higher housing density will have an increased impact and are likely to cause significant aquifer contamination.