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Model simulations to assess water table impacts on wastewater storage

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Steady-state pressure heads (h) after wastewater addition for a soil in the moderate hydraulic

Steady-state pressure heads (h) after wastewater addition for a soil in the moderate hydraulic conductivity class. Wastewater was introduced through the pipe in the gravel-filled trench (notch in upper left). X dimension = 1,500 cm; Z dimension = 200 cm. Vertical exaggeration is 2X.

Arkansas uses a unique system for determining the effluent loading rate for onsite wastewater systems. This system is based on storage volume available for wastewater and climatic water in the unsaturated soil above a seasonal water table. Calculation of the storage volume depends on the slope of the effluent surface away from the drainfield trench.

However, measured data that describe the effluent surface slope are limited, and collection of additional data to support slopes assumed for drainfield sizing based on storage volume will require a large investment of time and funds.

In an article recently published in *Vadose Zone Journal*, researchers report on the use of model simulations to evaluate effluent slopes for a range of soil conditions and varying seasonal water table depths.

For most soil and boundary conditions, the simulated effluent slopes were similar, but slightly less than those currently assumed to be used for drainfield-sizing calculations. Additionally, the simulations indicated that the effluent slope increased proportionally with the depth of the seasonal water table depth rather than being static as currently assumed.

These results suggest that model simulations are a viable alternative for developing and accessing regulatory parameters when measured data are limited.

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West, L. T., & Brye, K. R. (2019). Water table impacts on wastewater storage around onsite drainfield trenches: evaluation by model simulation. *Vadose Zone Journal 18* (190020). **https://doi.org/10.2136/vzj2019.02.0020**

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