water

MDPI

Supplementary Information

Table S1. HYDRUS iteration criteria and model tolerances used for all simulations

Variable	Value
Maximum number of iterations allowed during any time step in solving the Richard's equation	30
Maximum tolerated absolute change in the value of the water content between two successive iterations during a particular time step for unsaturated region	0.001
Maximum tolerated absolute change in the value of the water content between two successive iterations during a particular time step for saturated region	0.01

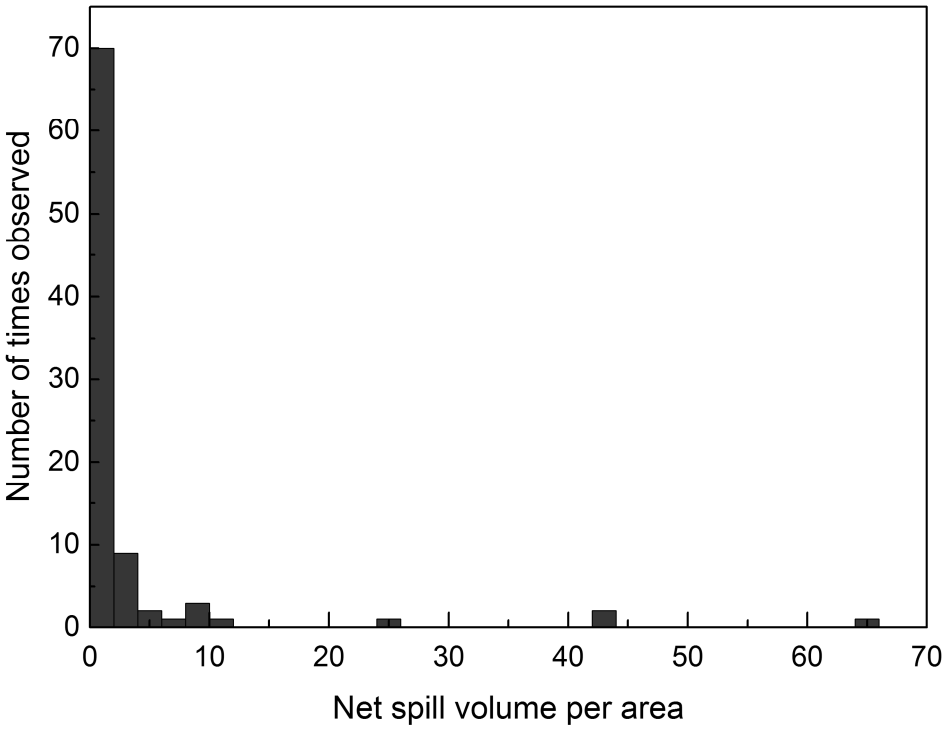

Figure S1. Histogram of spill volume per area or spill depth for produced water spills occurring in counties overlying the South Platte Alluvial Aquifer. These data were used for calculating the produced water spill percentiles.

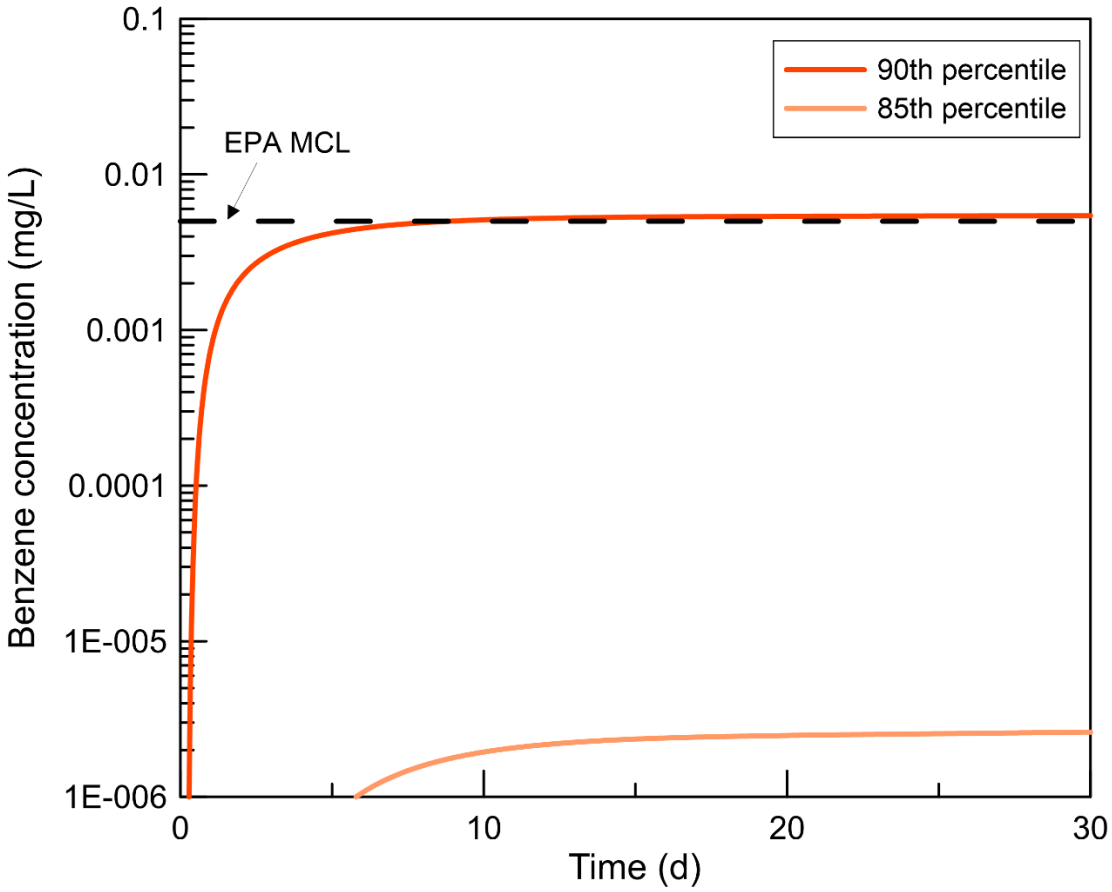

Figure S2. Benzene concentration breakthrough curves for the 90th and 85th percentile spills considering a 2 ft groundwater table and assuming no degradation and no sorption.

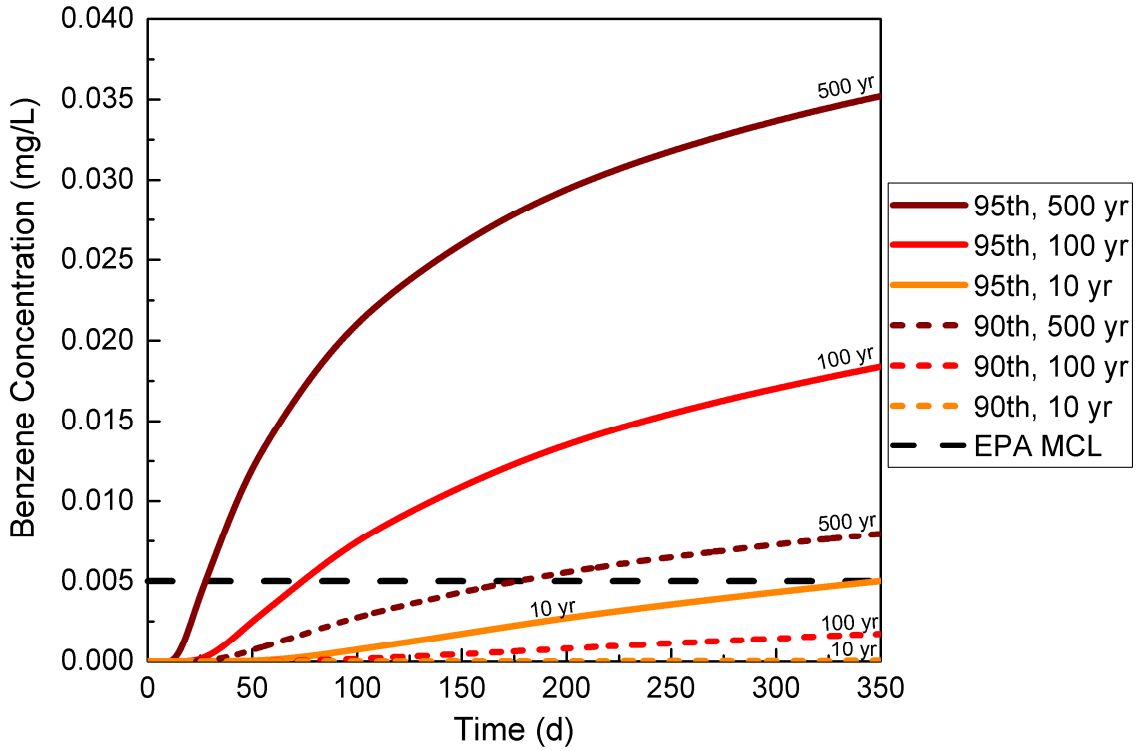

Figure S3. Benzene concentration breakthrough curves predicted at a 10-ft groundwater table assuming no degradation and no sorption with storm events occurring immediately following a spill. Solid lines indicate the 95th percentile spill and dashed lines indicate the 90th spill. Darker reds indicate a larger storm size and more yellow colors indicate a smaller storm size. The black dashed line shows the EPA limit at 5 μg/L.

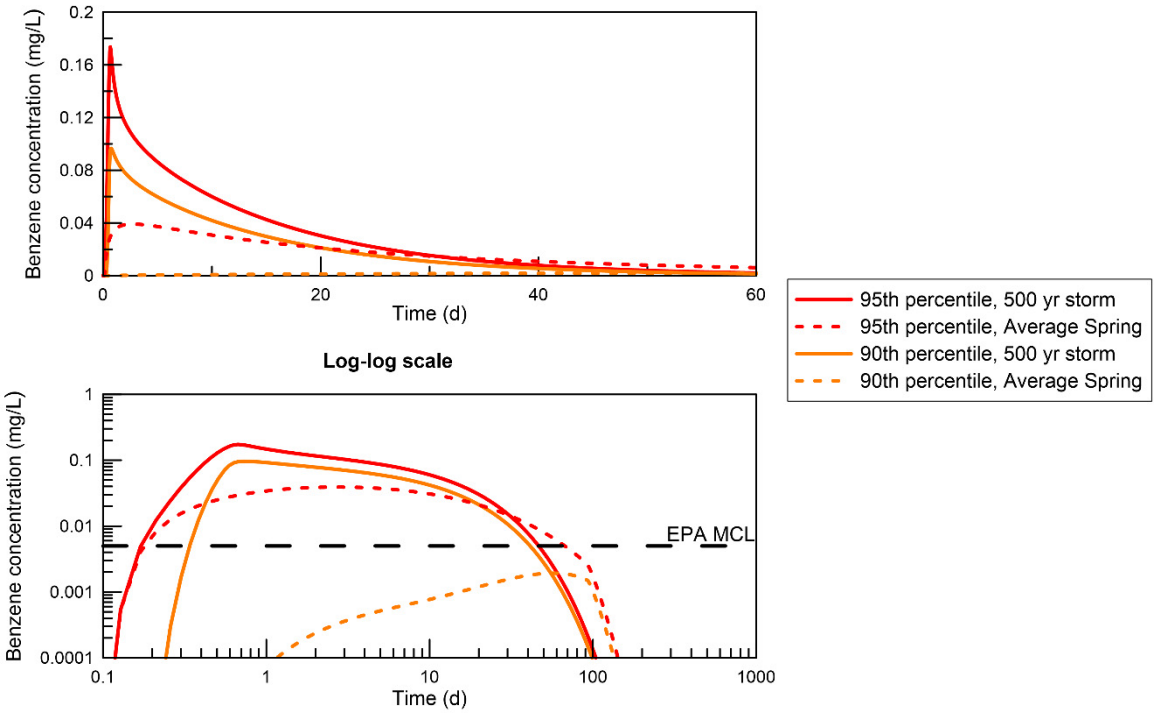

Figure S4. Benzene concentration breakthrough curves for a 2-ft water table considering sorption and degradation with precipitation events occurring immediately following a spill. This plot compares the 500 year storm to an average spring (April-May-June), with the same total precipitation depth but different precipitation rates.

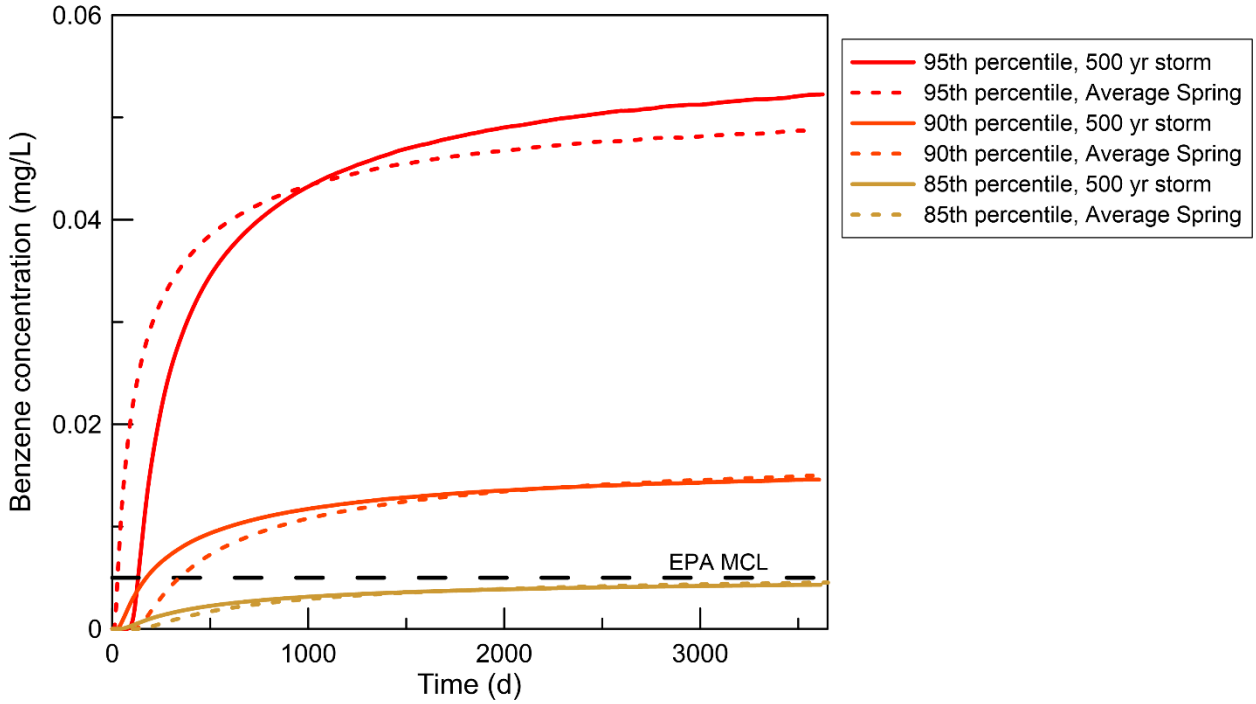

Figure S5. Benzene concentration breakthrough curves for a 10-ft water table considering conservative transport with precipitation events occurring immediately following a spill. This plot compares the 500 year storm to an average spring (April-May-June), with the same total precipitation depth but different precipitation rates.