Title: Artificial Recharge of the Mississippi River Valley Alluvial Aquifer: A Water Quality Study

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Poster Abstract: The Mississippi River Valley Alluvial Aquifer (MRVAA) has been the primary source for irrigation in eastern Arkansas since the early 1900s. As crop production expanded across the state, pumping from the MRVAA at a rate faster than it can replenish itself has caused a continuous decline in the water table. With agriculture as the foundation of Arkansas’ economy, a sustainable water supply is essential to this region. The current study focuses on quantifying water quality of on-farm reservoirs and their associated ditches for potential direct injection artificial recharge (AR), the increase in groundwater by artificial means. The sources were compared to nearby groundwater well samples for nitrogen, phosphorus, and sediment to determine the optimal source of recharge based on water quality and conditions that AR would be most ideal (low sediment and dissolved solids). It was hypothesized that on-farm reservoirs would possess a higher water quality when compared to ditches due to reservoirs acting as settling ponds and February would be the most ideal month for AR based on data from the previous field season. Data was analyzed using the Kruskall Wallis test and the Bonferroni multiple pairwise testing procedure.
An Evaluation of Total Solids Methods Used in Sediment from Agricultural Runoff

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Poster Abstract: A standard measure of water quality is the amount of suspended material in the water. Agencies, such as the EPA, the USDA, and the USGS, have implemented several methods to determine the number of sediments that reach waterways according to their specific requirements. The total suspended sediment (TSS) analytical method is traditionally used to determine the total amount of suspended material in aqueous samples, whereas the suspended-sediment concentration (SSC) analytical method standard for measuring suspended materials concentrations in aqueous samples. The measuring process of suspended sediments through subsampling techniques creates challenges to produce undeviating subsamples. The churn splitter technique requires continuous mixing which results in a homogenous sample withdrawn. Hand stirred technique requires the sample to be vigorously agitated to form uniform water/sediment mixture. These various methods require different amounts of time, space, equipment, and energy. This merits the need for an accurate comparison study. The primary objective of this study was to evaluate the differences in water quality analytical techniques among the various sampling and subsampling methodologies. The results from the sampling program were compared to offer recommendations and determine the similarities and differences between SSC and TSS as well as the feasibility of sub-sampling methods according to the various soil types.