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**Biotransformation of Ammonia and Nutrients from Animal Wastes Leaking into a Karst Aquifer**

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Abstract:

The objective of the project was to evaluate the water quality of two limestone bedrock springs on the Tennessee State University (TSU) campus in Nashville, TN. They were located near a poultry research facility that had a leaky poultry waste storage tank. The TSU springs behind the poultry barns were sampled approximately every week from June through September, 2008. Water quality parameters included temperature, specific conductance, and dissolved oxygen, pH, sulfate, nitrogen, E. coli, and bacteria Biological Activity Reaction Tests (BART). A continuous water-quality monitoring device was installed at one of the springs to measure changes associated with different weather patterns. Water temperatures were very stable, ranging from 16°C in June to 19°C in September. Sulfate concentrations were consistently higher in the spring water than the receiving surface waters, suggesting that surface vegetation may have removed the sulfate. Conversely, nitrogen levels were lower in the spring water (<10 mg/L) than the surface waters, suggesting denitrification by bacteria in the subsurface. Fecal bacteria levels fluctuated randomly with no discernable correlation to weather pattern. BART tests confirmed the presence of denitrifying, iron-reducing, sulfur-reducing, and slime-producing bacteria at each of the springs. Spring discharges decreased at all sites as the drought continued but never decreased below 10 gallons per minute. The data showed that each spring had unique water quality characteristics reflective of the different hydrologic recharge areas that replenish them.

Impact Statement:

Karst springs are vulnerable to surface spills.

Karst springs are very dynamic and change rapidly with rain events.

Category: Watershed Assessment and Restoration

Type of Presentation: Poster Presentation