**Supplemental Figure Legends:**

**Supplemental Figure 1:** Boxplots of the water isotope data collected from each location listed on the x-axis. The top plot is the ∂2H while the bottom plot is the ∂18O.

**Supplemental Figure 2:** Plot of the z-scores for each geochemical parameter through time illustrating the stability of the system. The dashed line represents the split between samples with accompanying biological samples and those without samples.

**Supplemental Figure 3:** Line graph of the 3 alpha diversity metrics through time to demonstrate the lack of seasonal patterns.

**Supplemental Figure 4:** Beta-dispersion of the three beta-diversity metrics used throughout the study illustrating that little difference in measured stability across the three locations.

**Supplemental Figure 5:** The top 10 OTUs in each aquifer which were found in other locations, demonstrating that some OTUs were shared but usually not very abundant in other aquifers.

**Supplemental Figure 6:** UPGMA clustering of both the weighted and unweighted UniFrac results to demonstrate consistent clustering patterns.

**Supplemental Figure 7:** Network diagrams generated using WGCNA with adjacency export thresholds of 0.3 and 0.5. In both cases, the Athens and the Greene locations had greater Edge/Node ratios suggesting that each OTU was correlated to other OTUs, mirroring complexity measurements obtained from the cohesion metric.

**Supplemental Figure 8:** Principal component analyses of Bray-Curtis, βNTI, unweighted UniFrac, and weighted UniFrac metrics with cohesion measurements fitted. Only negative cohesion was significant.

**Supplemental Figure 9:** Mantel correlogram between oxidation-reduction potential and phylogenetic distance.

**Supplemental Table Legends**

**Supplemental Table 1:** Table of geochemical data collected in the three groundwater wells since April/May 2012. Samples with corresponding biological samples are highlighted in light gray.

**Supplemental Table 2:** Table of Mantel statistics results for within-well relationships. Only significant values (as determined by pval3) are presented.

**Supplemental Table 3:** Table of Mantel test results for the complete dataset. Both significant and insignificant comparisons are showed.

**Supplemental Table 4:** OTU table for this study.