Hydrogeology and Water Quality Beneath Multi-Species Riparian Buffers in the Bear Creek Watershed, Central Iowa. (S11-schultz171935-Poster)

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Abstract:

Geology below riparian buffers in the Bear Creek watershed influences nitrate removal. Reconstructed riparian buffers have been in place for up to 11 years. Hydrogeologic parameters and water quality data from 67 piezometers (multilevel and nested) in 6 buffers were used to assess controlling factors on nitrate removal. Data indicate nitrate concentrations vary within the watershed. In some locations, high nitrate-N concentrations (> 15 mg/L) coincide with high groundwater velocities (~1 m/d) in coarse sand units below the buffer. In other locations, aquitard-protected sand units below the buffer are characterized by a lack of nitrate-N (< 0.1 mg/L), while above-ambient concentrations (> 5 mg/L) occur in overlying sediments. Nitrate removal is favored in locations with available dissolved organic carbon and low groundwater velocities. Lack of dissolved oxygen in these locations suggests denitrification as the removal mechanism. Based on data from the 6 sites, the groundwater quality benefits of buffers are most dependent on geology, groundwater residence time and geochemical environment and least dependent on the age of the buffer.

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