

The Influence of Stream Geomorphic Complexity on Hyporheic Flow Processes

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Abstract. The scale and distribution of hydraulic and physical elements in a stream have a direct impact on the subsurface flow fields and exchange. Our current project focuses on how geomorphic complexity affects nutrient uptake in impacted headwater streams. A key element of the study is a detailed protocol for characterizing the spatial distribution of physical habitat units composed of relatively distinct combinations of flow hydraulics and textural facies. We are using a detailed physical characterization and nutrient injections in paired segments of a Colorado Front Range urban stream to examine associations among geomorphic complexity, hyporheic flow and nitrogen uptake. Increased exchange across the microbially rich stream bed provides sufficient exposure and ideal conditions to enhance uptake. We summarize previous work on quantifying geomorphic complexity, and describe novel metrics that integrate hydraulic, topographic and textural factors that vary among stream segments.

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