

Title: Coupling streambed dynamics with nutrient and fine sediment transport in mountainous watersheds

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Project Abstract: In mountainous watersheds, rivers typically have an armor layer of coarse sediment that protects the finer subsurface from erosion. Armor layer motion during high magnitude flows releases the fine sediment present in the subsurface layer, which may be enriched in Phosphorus (P) and Particulate Organic Carbon (POC). Therefore, armor layer transport could explain temporal variations in POC, suspended sediment (SS), and various forms of P exported from many watersheds. In addition, streambed concentrations of these constituents may depend on whether a reach is losing or gaining. We are currently measuring armor layer motion, as well as streambed and river concentrations of POC, P, and fine sediment using detailed field measurements in two reaches (one gaining, one losing) in La Jara Creek in Valles Caldera National Preserve, NM. Our measurements will occur over two summer monsoon and two snowmelt seasons to document temporal changes in armor layer motion, streambed nutrient and sediment release, and surface and groundwater exchange. We have completed field instrument installation and have started our first monsoon season of monitoring. Our study addresses how perturbations, such as the sequence and magnitude of droughts and floods, constrain biogeochemical nutrient cycling and impact subsequent temporal variations in nutrient and fine sediment export from mountainous watersheds.