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Effect of high flow events on spatiotemporal variation of E. coli concentrations in creek sediments

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Sediments can harbor large populations of Escherichia coli often times in greater amounts than the overlying water column. Resuspension of sediments during storm events causes the release of E. coli which drastically changes microbial water quality metrics. It is not well known how populations of E. coli in sediments change in the days following high flow events. We created artificial high flow events in a first order creek and measured E. coli concentrations in water and sediment along a 500 m reach of this creek one day prior to, during, and after one, three, six, and 10 days. The experiment was performed in duplicate. Concentrations of E. coli in water remained high several hours after the high flow events despite turbidity and suspended solids returning to baseline levels. Statistical differences were found between concentrations of E. coli in water and sediment samples before and after high flow events. Correlation between mean E. coli concentrations in water and in sediment over all sampling days varied among replications, and was generally high. Application of three spatio-temporal pattern recognition methods showed that the general spatial pattern of variation of sediment E. coli concentrations along the reach was preserved during the whole month of experimentation. Insights gained from this research will help in microbial water quality forecasting.