

A Microbial Screening Method for Heavy Metal Contamination in Stream Sediments

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During the summer of 1998 sediment samples were collected from Four Mile Creek (FMC) at the US Department of Energy Savannah River Site. Samples were collected every 200 m from just below a cluster of chemical seepage basins to approximately 14 km downstream. FMC has a documented history of heavy metal contamination with mercury inputs ranging from 0.45 to 9.07 kg year⁻¹. Previous research has indicated a positive association between heavy metal tolerance and antibiotic resistance in bacteria collected from natural environments. We report here the results for FMC which confirm this reported relationship and further show, by statistical modeling and geostatistical variography, that metal contaminated stream reaches can be discriminated from uncontaminated reaches in FMC based on the incidence of antibiotic resistance. These preliminary findings suggest that a biological (i.e., microbial) screening method could be developed to spatially identify metal contaminated stream sediments. In addition, if the relationship between a specific metal and antibiotic can be modeled, the screening method may also allow quantitative estimates of the average metal concentration for a given reach of stream.