Grain Size Correlation to Metals and Bacteria Concentration in Hudson River Sediments

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Pollution in the Hudson River has a long history as a hot-button issue, not only ecologically, but politically and ethically as well. Understanding sources, transport, fate, and the best remediation procedures for this pollution is an on-going effort by the scientific community of New York and beyond. Hudson River sediments are known as a sink for contaminants such as fecal bacteria and metals. It is also known that bacteria have an affinity for small particulate matter, which increases their rate of sedimentation (Gannon, 1983). To determine the strength of the correlation between grain size and bacteria, as well as grain size and metals, 20 sediment surface grabs were obtained from the George Washington Bridge area of the Hudson River. Grain size was measured using sieves and a Coulter Counter, and three bacteria measures were taken, total coliform, *Escherichia coli*, and enterococcus using Idexx Laboratories' Enterolert and Coliert tests. Metal concentrations were measured using an x-ray fluorescent spectrometer. To account for the effect of sediment age on bacteria concentration, the samples were gamma counted to indicate the presence of Beryllium-7, a radionuclide naturally produced by cosmic-ray interactions with atmospheric components (Parker 1962) that has a half-life of 53.12 days. Bacteria, particularly enterococcus, used as the EPA standard for effluent water quality, were most abundant in grain sizes under .02 microns. Of the metals measured, Rubidium, Potassium and Titanium showed the highest negative correlation to grain size, while Calcium, Strontium and Zirconium showed a positive correlation, and Lead and Copper showed the least correspondence.