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Bacterial Survival in a Hudson River Sediment Core

Past research has shown that fecal bacteria are ubiquitous in the Hudson River. Rainfalls typically result in Combined Sewage Overflows (CSO), which cause a release of fecal matter and lead to health concerns because the released bacteria are possibly pathogenic. The goal of our work is to explore the potential for long-term bacterial survival in the Hudson River sediment. A meter-long gravity core was collected aboard the research vessel *Seawolf* from the Hudson Highlands. We were able to quantify bacterial concentrations in the sediment using the Quanti-tray method, detecting for *Escherichia coli* and *Enterococcus*. We chose these two indicators because they are the most commonly used for the presence of pathogens in both fresh and brackish water. Total metal profiles in the sediment cores were determined using X-ray fluorescence, scanning for the presence of lead and copper in order to compare these sediment profiles with a dated core collected from the same location. This enabled us to estimate deposition dates of reach depth in the new core. Thirty depths representing approximately 80 years of depositional history were examined for fecal bacteria. Surprisingly, results showed the presence of surviving *E. coli* in sediments dating to as early as the 1940s, while *Entero* was absent from all depths. These results were confirmed using molecular assays, indicating that bacterial survival is prolonged due to the sedimentation process.