SPATIAL AND TEMPORAL DISTRIBUTION OF HEAVY METALS IN WESTERN LONG ISLAND SOUND

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The western end of the Long Island Sound estuary borders metropolitan New York. Its sediments and waters are severely influenced by anthropogenic activities with potential impact to the local economy that averages $5.5 billion per year. To understand the temporal and spatial distribution of pollutants and their effects on the health of ecosystems, we surveyed the area from the *R/V Hugh Sharp* in the summer of 2006. We collected high-resolution subbottom seismic profiles, multibeam bathymetric data and 25 gravity cores averaging 2m in length. Lead and several other elements were measured with an Innov-X Field Portable x-ray fluorescence spectrometer (XRF) every 5 cm. These measurements were calibrated through wet chemistry, total digestion, XRF-ICP measurements, and to a chronology derived from radiocarbon and short-lived radioisotopes. Pre-industrial (1850) concentrations of Pb average 20 ppm in the study area. Post-industrial concentrations increased from 20ppm to 60 ppm in the upper 20 cm of the cores. Acoustic images show that the morphology of the sea-floor and proximity to the shoreline influence the accumulation of heavy metals. Toxic concentrations (>60 ppm) are found in the deep parts of the Sound (15 – 25 m of water depth) downstream from outcropping bedrock. In contrast, shallow bays near shore (5 -10 m) and areas of scour associated to the outcropping bedrock have low concentrations of Pb. These results show that in order to understand the impact of contaminants on the health of benthic ecosystems it is important to characterize the morphology of the sea-floor and its sedimentation patterns.