

Geochronology and Sedimentology of the Lower Passaic River, New Jersey

STEVEN L. HUNTLEY¹
RICHARD J. WENNING
STEAVE H. SU
NANCY L. BONNEVIE
*ChemRisk, A Division of McLaren/Hart
Stroudwater Crossing
1685 Congress Street
Portland, Maine 04102*

DENNIS J. PAUSTENBACH
*ChemRisk, A Division of McLaren/Hart
1135 Atlantic Avenue
Alameda, California 94501*

ABSTRACT: In an attempt to characterize localized rates of sediment accretion, 10 sediment cores were collected from the lower reach of the Passaic River, a major tributary of Newark Bay, New Jersey. Sediments were assayed for ^{210}Pb activity at predetermined depths and the rate of sediment accretion (cm yr^{-1}) was estimated from the least squares regression of the log of unsupported activity versus depth. Sediment accretion rates derived from ^{210}Pb measurements (R_{Pb}) were used to predict the depth interval within the core containing sediments deposited around 1954; subsequent ^{137}Cs analyses were focused on this depth interval. Sediment accretion rates derived from ^{137}Cs measurements (R_{Cs}) were extrapolated from the depth of the 1954 horizon. Lead-210 derived sediment accretion rates in cores collected from a sediment bench extending along the inside bend on the southern shore of a meander in the river, ranged from 4.1 cm yr^{-1} to 10.2 cm yr^{-1} and averaged 6.8 cm yr^{-1} . The R_{Cs} estimates for cores from this area ranged from 3.8 cm yr^{-1} to 8.9 cm yr^{-1} and averaged 6.6 cm yr^{-1} . The R_{Cs} for cores collected in a more hydrologically dynamic reach of the river upstream of the sediment bench, were only 0.41 cm yr^{-1} and 0.66 cm yr^{-1} . The results of this investigation indicate that this reach of the lower Passaic River is an area of high sediment accumulation, retaining much of the sediment load deposited from upstream and downstream sources. The rates of sediment accretion in the lower Passaic River are among the highest reported anywhere in the Newark Bay estuary.