

**THE IMPORTANCE OF CHEMICAL REACTIONS  
IN SUBTERRANEAN ESTUARIES: THE CONCENTRATIONS OF TRACE  
METALS AND NUTRIENTS IN SUBMARINE GROUNDWATER SEEPAGE  
AT WEST NECK BAY, LONG ISLAND, NEW YORK**

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**Abstract**

Recent studies have shown that some coastal aquifers need to be classified as “subterranean estuaries,” where sea water mixes with fresh groundwater. Within the estuary, similar chemical reactions observed in surface estuaries (e.g., desorption process) are expected to occur. Although groundwater has been recognized to have a significant impact on coastal environments, most past studies only measured nutrients and trace metal concentrations in inland groundwater, and the chemical reactions in subterranean estuary were not considered. Thus, in order to establish the relative importance of in situ chemical reactions in subterranean estuary, this study has measured dissolved organic matter, inorganic nutrients ( $\text{NO}_3^-$ ,  $\text{NO}_2^-$ ,  $\text{NH}_4^+$ ,  $\text{PO}_4^{3-}$ ), and trace metals (Fe, Mn, Si, Ag, Cd, Cu, Ni, and Zn) in two inland groundwater (26 ft and 8-12 ft deep), intertidal pore-water, and seawater.

West Neck Bay, located within the Peconic Estuary at the eastern end of Long Island, was chosen to be the site of study due to the absence of river discharge, its restricted water exchange with the estuary and the occurrence of Brown Tide. Samples were collected using trace metal clean technique in May (the period of high groundwater flow) and October, 2002. Our preliminary results show that conservative mixing between the Bay’s water and the groundwater could not account for the organic carbon measured in the intertidal pore-water. We are currently measuring the rest of trace metals and inorganic nutrients.