

## **Multiple geochemical tracers of submarine groundwater discharge into Jamaica Bay, NY**

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Jamaica Bay is a large shallow lagoon resting on a series of coastal plain aquifers about 300m thick. Groundwater naturally seeps into the Bay across the sea floor although groundwater is no longer exploited to provide potable water for the adjacent populations in Brooklyn and Queens. Direct measurements near the shore at one location (Plumb Beach) showed a tidally modulated, submarine groundwater discharge at rates as high as 9.2 cubic centimeters of groundwater per square centimeter per day at times of low tide. Radium concentration (activity) is elevated in groundwater, and excess radium in the surface water is also indicative of submarine groundwater discharge. Concentrations of short-lived radium isotopes in the open water of the Bay were found to decrease with increasing salinity, that is, toward the inlet to the bay. Ra-223 (half-life = 11.4 d) concentrations ranged from 0.280 dpm/100L at the inlet to as high as 1.221 dpm/100L at places along the interior shoreline. Ra-224 (half-life = 3.64d) ranged from 5.43 dpm/100L to 21.16 dpm/100L. Long-lived Ra isotopes (Ra-226 and Ra-228) will be used to quantify the total SGD flux to the Bay. Strontium isotope ratios (Sr-87/Sr-86) will be used to determine groundwater percentages in several samples, as well as estimate total groundwater input. Changes in the magnitude and chemical quality of submarine groundwater discharge during the 20<sup>th</sup> century may be factors contributing to the alarming loss of marshland in Jamaica Bay.