

Impact of Nuisance Flooding on Contaminant Distribution in Coastal Floodplains

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Nuisance flooding due to tidal activity is an understudied phenomenon that could play a significant role in the contamination of coastal soils (ten Veldhuis et al., 2010). It is common for studies to be performed on soil and water health after a major storm such as Hurricane Sandy, but the effectiveness of such studies is reduced by the lack of information on soil and water health prior to the storm (Focazio, Reilly, Simmons., 2016). To study the relationship between tidal flooding and soil contamination, 6 sites within Piermont, NY, were selected for assessment. The contaminants measured in this study are the fecal indicator bacteria (FIB) enterococcus and E. coli, 12 LMW PAH's, and 5 pharmaceuticals. Soil samples were taken along a tidal flooding gradient ranging from subtidal zones to never flooding zones, totalling 13 soil samples and 3 water samples. Average FIB counts for E. coli varied overall but were highest by a significant margin in Zone C prior to spring tide flooding. Enterococcus counts were too high to enumerate in most samples and therefore not useful in studying this relationship. High performance liquid chromatography did not provide any signal of pharmaceuticals in soil, but the water sample taken from the Piermont Baseball Field tested positive for 2 of the 5 pharmaceuticals, while Paradise Avenue only tested positive for 1 of 5. PAH were detected consistently in soil samples while levels in water samples were too low to detect for most compounds. Interestingly, chrysene and pyrene were the only PAH common to both soil and water. Analysis of contamination levels along the flood gradient indicate the effect that nuisance floods have on soil contamination is dependent on relative contamination levels in soil and water prior to flooding.