Abstract:
Sediments in the Lower Hackensack River tidal creeks were sampled to assess the Post Superstorm Sandy contaminant baselines for chromium and mercury to aid in future ecosystem health monitoring. Of the creeks sampled, this research focused on West Riser Ditch, East Riser Ditch, and Peach Island Creek East. Sediment samples at West and East Riser Ditches showed a negative concentration gradient from the tide gate moving inland. Peach Island Creek East showed consistently higher metal concentrations than the other sampled creeks for both metals and showed a concentration gradient that was positive from the tide gate moving inland. Aerial imagery from 1930 to 2012 was used to identify a spatial relationship between land use over time and tidal creek ecosystem health.

Methodology:
Fifty-three samples collected inland of each tide gate were lab analyzed for chromium and mercury concentrations. The ‘Spline with Barriers’ Spatial Analyst tool was used to interpolate the sample point metal concentrations throughout each of the creek bodies along the Hackensack River and helps visualize potential concentration gradients. Sample points whose Hg and Cr concentrations were higher than the Low Effects Range (LIR) threshold are symbolized as red hazard triangles. Comparing aerial imagery from 1930 and 2012 using remote sensing techniques revealed changes in land use surrounding Peach Island East that have implications on ecosystem health.

Results:
A. Lower Hackensack River Tidal Creek Chromium and Mercury Concentration Gradients

B. Peach Island Creek East: Land Use Over Time in a Geographic Context

Discussion:
Data shows that Peach Island Creek East sediments had significantly higher concentrations of chromium and mercury. Aerial imagery from 1930 to 2012 highlights the changing landscape surrounding Peach Island East’s ecosystem and the relationship between creek ecosystem health and land use over time.

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