

SRST 2017 ROPs Activities

- Characterization / Treatment of Sediment / Soil – Biochars (Carol Ptacek, Waterloo)
- Stable Mercury Isotope Analysis (Joel Blum, U Michigan)
- Dynamic Mercury Cycling Model (Reed Harris)
- Post remedy Pore Water Monitoring at Constitution Park (Danny Reible, TTU)
- Floodplain Soil Amendment Pilot (Bill Reese, AECOM)
- Field Verification of Aquanty HydroGeoSphere Model - Advancing the Science (Steve Berg, Aquanty / AECOM) -



Highlights of ORNL – Upper East Fork Poplar Creek (1-19-17)

- Parallels with South River, but some differences
 - UEFPC Loading: 50% from Y-12 facility; 50% from creek and floodplain
 - Average flow: ~50 cfs
 - MeHg increases downstream; DHg and THg decrease downstream
 - Apparent seasonal change in K_D
 - Much remediation focus has been on Y-12 Plant (30 years)
 - Both systems will likely need significant reductions in water concentrations before a fish tissue response is seen
- 3 Major UEFPC Remediation Focus Areas:
 - Soil and GW source control
 - Water and sediment chemistry manipulation
 - Ecological Manipulation



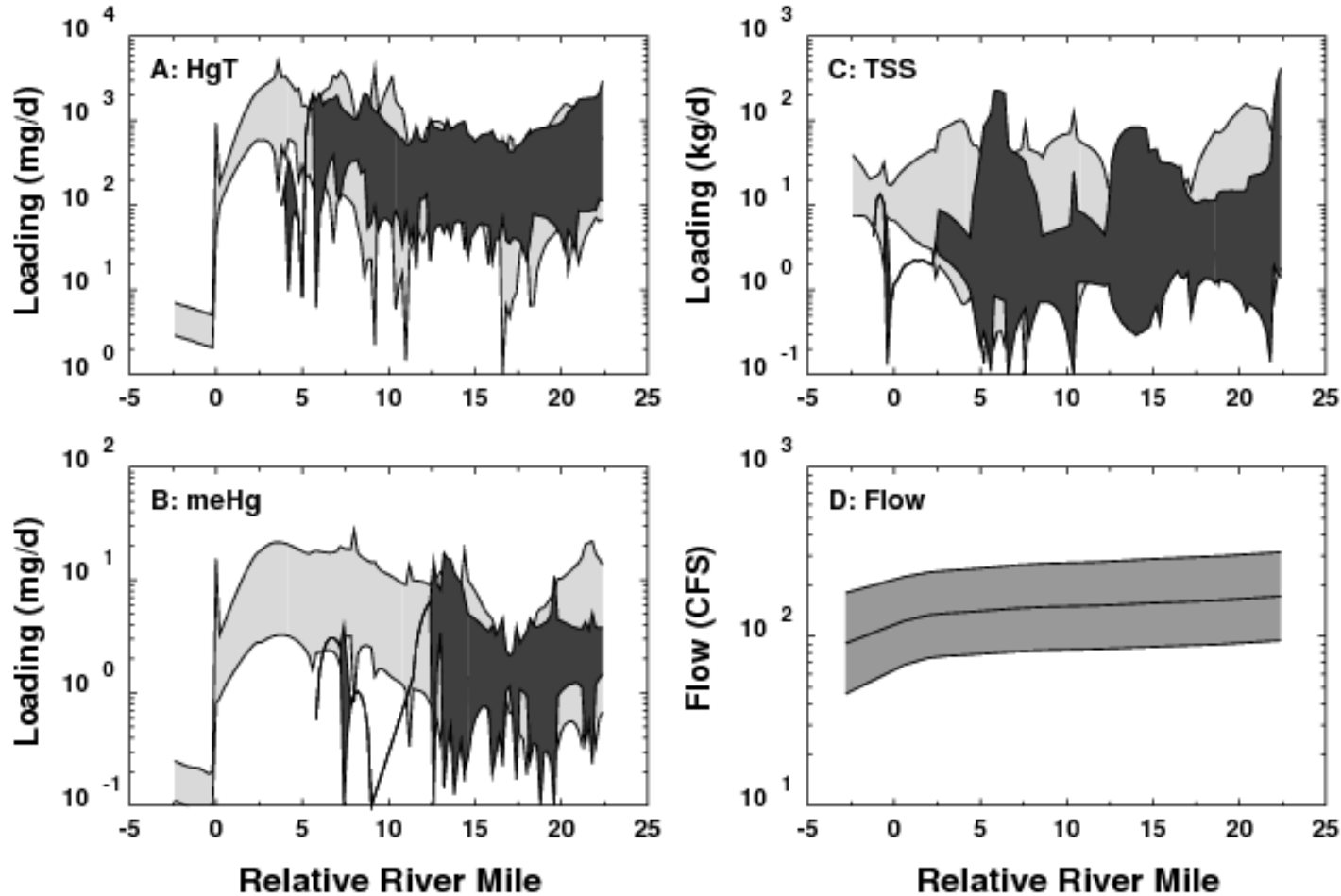
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- Soil and GW Source Control
 - Creek bank soils “HRD” are a visually identifiable layer in the banks (fly ash)
 - Studies include desorption and dissolution / Kinetics and Equilibrium (due to storm, rainfall, groundwater)
 - HRD contains many fines, high moisture content and could result in local MeHg production.
 - Erosion appears to be a significant source of loading to the creek
- Water and Sediment Manipulation
 - Investigating the role of NOM on Hg sorption (inhibiter for amendment effectiveness)
 - Amendments: Thiol-SAMMS, GAC, Sedimite, Biochar, Lignin-based carbon, Organoclay, apatite
 - Evaluating the effects of Cl⁻ (at plant site) on solubility of Hg in storm drains

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- Ecological Manipulation
 - Biodynamic model (considers uptake, loss, growth rates)
 - Exploring restoring native freshwater mussel species to filter Hg from water column – current mesocosm studies
- Other Observations?

HydroQual, 2007 (unpublished)



South River - Spatial profiles of incremental loads of HgT (A), meHg (B), and TSS (C) to the water column at low flow.

Light shaded polygons are positive incremental loads and dark shaded areas are negative loads.

The range of the polygon represents one standard deviation across all months that were evaluated in this study. The flow (D) is plotted as the median and one standard deviation for all months included in this analysis.