

SRST

Overview of SRST ROPs 2015 Activities and First Meeting Synopsis

NR Grosso
February 24, 2015



SRST ROPS Activities 2015

- 1. Design and implement Phase I Interim Measures for SR AOC4 (Anchor QEA / AECOM)** Objective: Prepare preliminary and final design for RRM 0 to 2
- 2. Enhanced Adaptive Management Model (Christy Foran, USACE)**
Objective: Complete spreadsheet model and training to help define and facilitate the SR adaptive management process.
- 3. Dynamic Mercury Cycling Model (Reed Harris)**
Objective: Further refine the conceptual model and mass balance for Hg and MeHg in the aquatic environment under baseline flow and storm conditions.
- 4. Reactive Capping Simulations (Danny Reible, Texas Tech University)**
Objective: Identify capping design element parameters through laboratory mesocosms and modeling.
- 5. Characterization /Treatment of Sediment / Soil (Carol Ptacek, Waterloo)**
Objective: Characterize the leaching behavior of SR soil and sediment and test treatments that can be utilized in the South River.



SRST ROPS Activities 2015

6. Aquanty HydroGeoSphere Modeling (Steve Berg, Aquanty)

Objective: Estimate the post-storm volume of bank face seepage and GW flow to assist in bank stabilization design

7. Pore Water Measurements (Danny Reible, Texas Tech)

Objective: Further explore use of the DGT probes and voltammetry to increase understanding of the bioavailable pool of mercury (methylmercury production) and geochemical processes in the South River.

8. Floodplain Soil Amendment Pilot (JR Flanders, AECOM)

Objective: Test the efficacy of biochar application in floodplain soils to reduce uptake of Hg or MeHg by biota.

9. Biochar – impact on aquatic organisms through direct contact (Mike Newman VIMS) (Will Clements CSU) Laboratory and Field Mesocosm Studies

10. Stable Isotope Analysis (Joel Blum, U Michigan)

Objective: Explore stable Hg isotopes as a tool for forensics and Hg fate and transport



February 18, 2015 ROPs Highlights



Can Biochar-containing structures effectively treat the SR Water Column? (Robert Brent)

- Experiments indicate that biochar is an appropriate material for adsorbing mercury; and remedial options that include biochar should continue to be investigated
- Improved design of biochar filled logs increased porosity and resulted in increased Hg sorption
- Water column treatment is possible if physical contact time can be balanced with the necessarily high flow volumes
- Treatment using instream adsorptive structures is possible, but the engineering feasibility would need to be examined more closely
 - Could it have applications in the reach: RRM 10 – 25 ?



A Wrap-up of Treatment Designs and Experiments

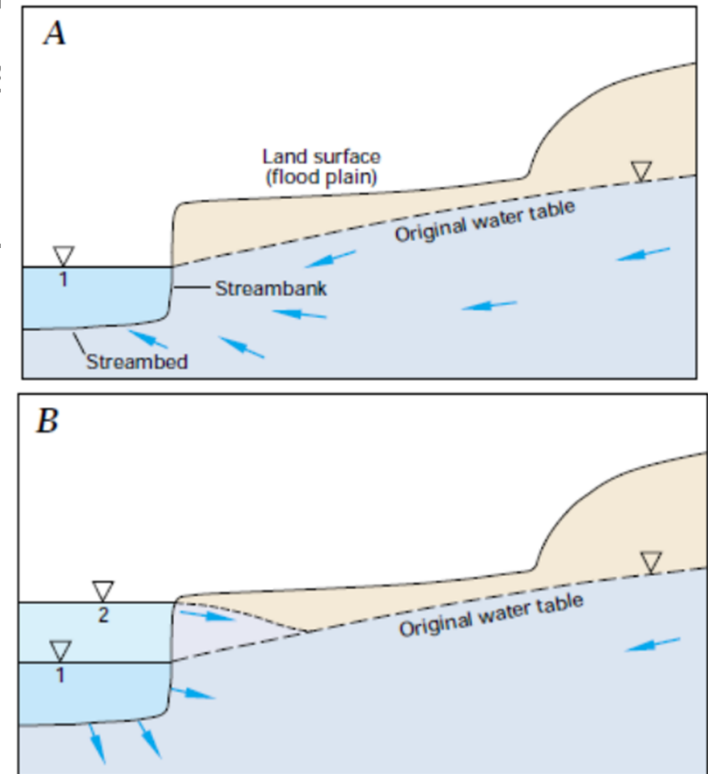
Phase 1 IM Preliminary Design (Clay Patmont)

Location-specific bank designs

- Tailored to specific bank characteristics
 - Mercury concentrations
 - Erosion potential
 - Existing habitat
- Need to balance remedial objectives and landowner/stakeholder needs
- Ongoing discussion with City of Waynesboro and DGIF particularly in reaches with mature stands of trees
- Considerations:
 - How significant is the loading from a BMA?
 - What is the anticipated longevity of a given tree?
 - What vegetative enhancements will yield similar reductions in loading?

Aquanty's GW-SW HydroGeoSphere Model

- Fully coupled GW flow and SW flow model
- Use it at SR to characterize the importance of bank leaching and post storm GW
- Model will estimate Seepage and GW flux for four storm recurrences
- Results will be used to refine Hg loading contribution associated with storms
- Initial results anticipated in April
- Could be used to design field program, as indicated



Naturally Occurring Stable Hg Isotopes (Joel Blum and Spencer Washburn)

- Relative abundance of mass dependent and mass independent fractionation can reveal:
 - Hg sources (including atmospheric)
 - Transport and fate processes such as sorption / desorption and MeHg photochemical demethylation
- Isotopic analysis of solids in SR samples at numerous stations indicate mixing with regional background below RRM 10
- There is evidence that photochemical reduction and loss of Hg(0) is occurring within the suspended fraction
- Mercury isotopes in the SW TSS, from the streambed sediments, bank soils, and solids filtered from GW are all similar
- Next step is to analyze filtered SW and filtered GW





www.shutterstock.com · 104523281

south river
SCIENCE TEAM





south river
SCIENCE TEAM

