SRST
Overview of SRST ROPs 2015 Activities and First Meeting Synopsis

NR Grosso

February 24, 2015

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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.

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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 or 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

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February 18, 2015 ROPs Highlights

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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 ?

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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?

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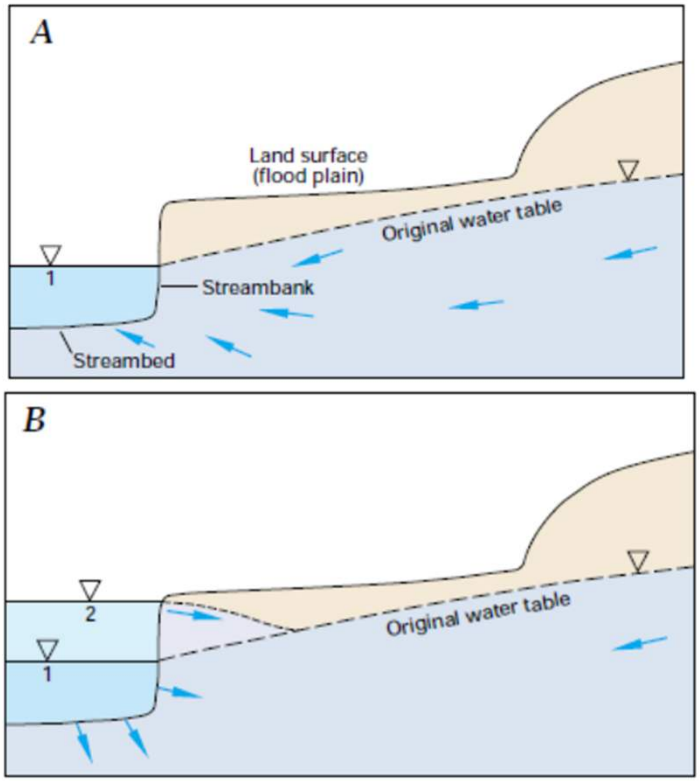
Aquanty's GW-SW HydroGeoSphere Model

- Fully coupled GW flow and SW flow models
- 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



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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

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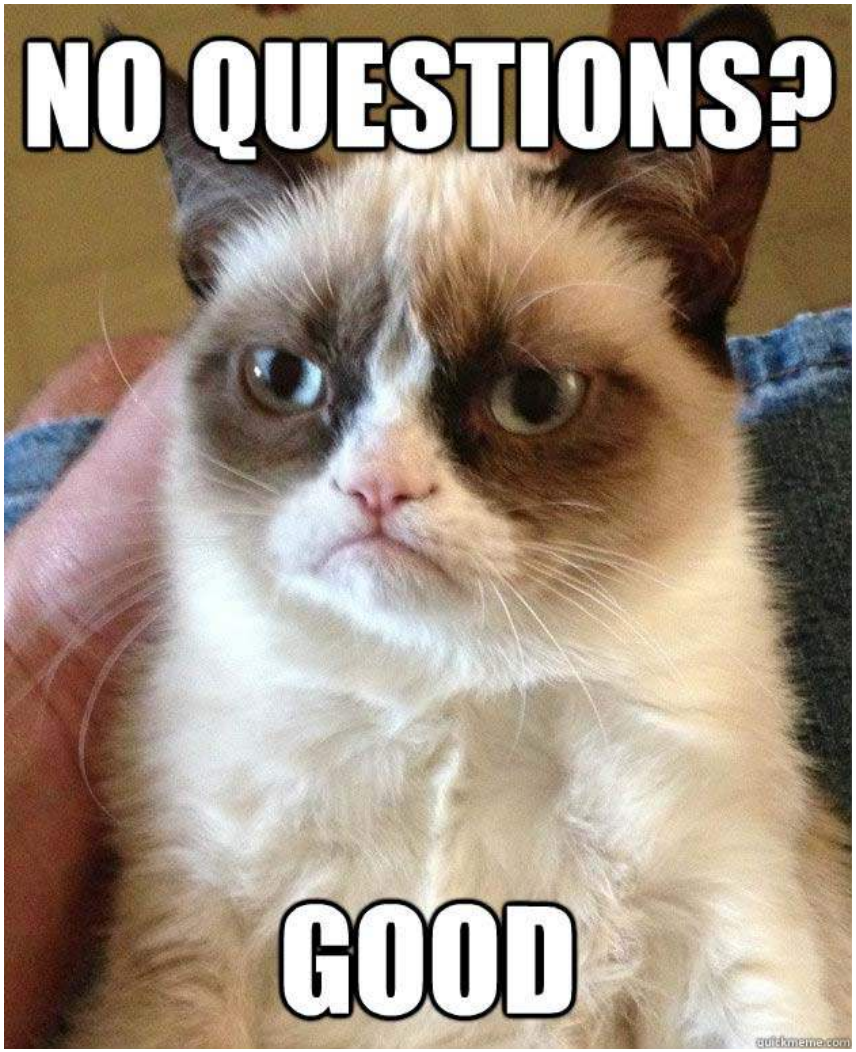

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