

ROP Work Group Update

South River Science Team Expert
Panel Meeting
October 5, 2010



Remedial Action Objectives:

- *Reduce fish tissue Hg levels to < 0.3 mg/kg to allow consumption by humans*
- *Ensure protection of aquatic and terrestrial ecology with respect to Hg exposure*

ROP Task Teams

- Engineering Options
- Methylation and Demethylation Processes
- Trophic Modification

Engineering Options Task Team Members

- Robert Brent, JMU / VADEQ
- Reed Harris, Reed Harris Environmental, Ltd.
- Ralph Turner, RT Geosciences, Inc.
- Dick Jensen, Unique Environmental Services
- Jim Pizzuto, University of Delaware
- Ceil Mancini, URS
- Bill Berti, Jim Dyer, Nancy Grosso, Rich Landis, Mike Liberati, Mike Sherrier, DuPont



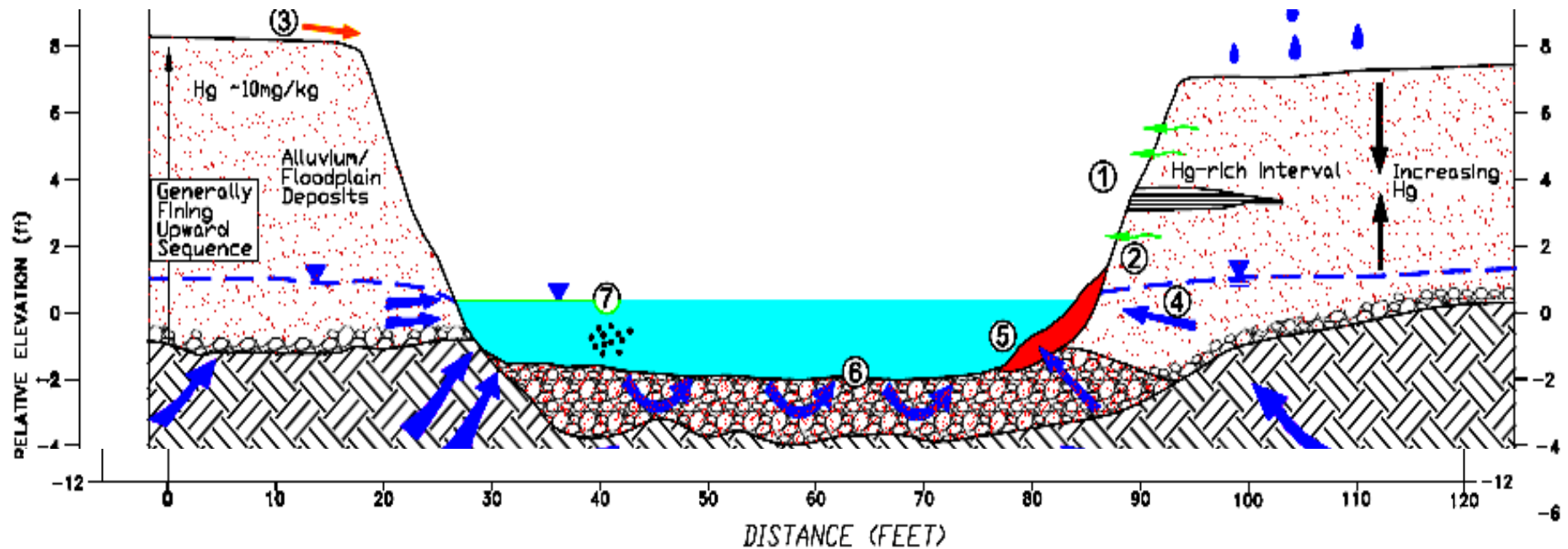
Engineering Options Task Team Purpose and Scope

- Identify, evaluate, and test engineering solutions for the South River system that impact physical transport.
 - Use the conceptual pathway and exposure diagrams as a guide
 - Focus on the technical and scientific aspects of the possible solution
 - Explore and evaluate deployment methods of different technologies
 - Identify and define potential unintended consequences of a technology, and explore tradeoffs
- Evaluate effectiveness of pilot tests in achieving goals, and determine feasibility of implementation on a larger scale.
- Recommend promising technologies to the SRST ROP and SRST for consideration as a remedial alternative.
- Communicate activities and progress to greater South River Science Team



Simplified Schematic of Physical Compartments in South River

- 1 Hg release age deposit (floodplain) and eroding banks
- 2 Interflow during precipitation events
- 3 Overland flow / TSS
- 4 Alluvial groundwater advective flux
- 5 Fine-grained channel margin and other fine-grained deposits
- 6 Hyporheic flow and stream bed pumping
- 7 Fine-grained particles in gravel bed (deep and shallow)



Engineering Options Activities for 2010

1. Conceptually design and cost out an amendment pilot
 - Continue lab studies of *SediMite* (*Smithsonian Environmental Research Institute*)
 - Candidate treatments: *SediMite*, biochar (*U Waterloo*)
2. Conduct a survey of eroding banks and HRADs that might be significant sources of loading to the SR (*University of Delaware, Interfluve*)
 - Establish important parameters needed to identify suitable design elements
 - Compile suite of designs desired that span a range in engineering complexity
3. Explore opportunities to partner with VA DCR and DEQ to achieve sediment/bacteria TMDL while reducing bank Hg loading
4. Support development of a mesocosm test system for experimental manipulation at SR (*James Madison University*)
5. Develop a program to identify the significant Hg pools:
 - Establish link between soil in eroding banks and aquatic biota
 - Evaluate the effect of sediment aging with respect to decreased bioavailability
 - Ongoing Projects at *U Waterloo, U Texas at Austin*
6. Bank Stabilization Pilot: Collect and evaluate monitoring data (*URS*)



Conceptual Design for Amendment Pilot

Test the effectiveness of amendments to reduce bioavailability of mercury in river sediment

– Options

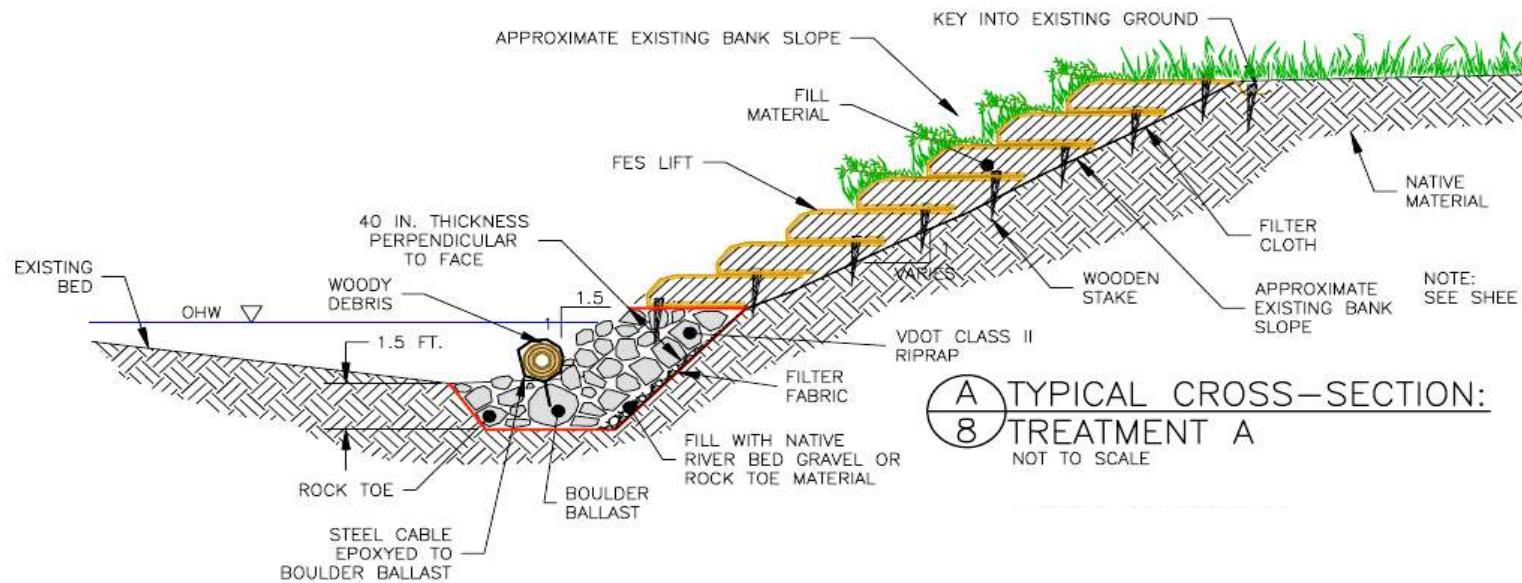
- Deploy carbon amendments in retrievable in situ mesocosms (modeled after Eco Study design)
 - Monitor results in abiotic compartments (e.g. pore water) and benthic biotic compartments
- Deploy amendments in JMU mesocosm test system





South River Bank Stabilization Pilot





Bank Pilot – Construction Sep 2009 to Dec 2009

south river
SCIENCE TEAM