



# South River Remedial Options Program

South River Science Team Meeting

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# South River Remedial Options Program (ROP)

**Proposed program wherein we will review, evaluate and test promising remediation strategies for the South River**

## **Current Site Understanding**

- Characterization of sources and loadings ongoing.
- Working hypotheses and conceptual system model are continuously updated and refined.

## **➤Evaluating options now**

- Optimization of current investigations
- Initiation of new investigations to help refine the toolbox of alternatives.

# South River Remedial Action Objectives

**Reduce fish tissue Hg levels to concentrations that would allow consumption by humans**

**Ensure protection of aquatic and terrestrial ecology with respect to Hg exposure**

# Remediation Challenge

**Based on multiple possible sources and pathways of mercury, the following initial questions were posed by the team:**

- What can be done to reduce introduction of Hg-bearing solids into the aquatic system?
  - Grosso, Landis, Liberati, Morrison, Flanders
- What can be done to reduce dissolved mercury in water?
  - Turner, Sherrier, Dyer, Jensen
- What can be done to inhibit production of methyl mercury?
  - Flanders, Mack and Turner
- What can be done to reduce overall the effect of Hg on the biological system and food web?
  - Dyer, Berti, Morrison

# Broadest Range of Remedies – Brainstorm Results

## Baseline Condition

- Monitored Natural Recovery

## Engineering and Treatment

- Physical Actions
  - Hydraulic modification / stage controls
  - Flood control measures
  - Filling of ditches / backwaters
  - Management of large woody debris
  - Isolation of eroding banks
  - Soil covers
  - Capping of storage deposits (permeable, impermeable, reactive)
  - Sediment traps to treat
  - Removal

## Engineering and Treatment (cont.)

- Treatment
  - Increase sorption of Hg (GAC, XB-1, clay, humus, bauxite)
  - Addition of Hg-binding ligands or ion exchange reagents
  - Phytoremediation
  - Ultra filtration
  - Thermal desorption

## Administrative Controls

- Fish exchange program
- BMPs for cattle / erosion control
- Floodplain conservation easement
- Providing alternate food supply for fish

**CAUTION: NONE OF THESE HAVE BEEN VETTED FOR EFFECTIVENESS OR FEASIBILITY**

# Considerations for Mercury Remediation

**Effective management of Mercury in the environment largely unproven**

**Mercury is the most challenging of all potential contaminants**

- Real threat of unintended consequences
- Risk of actions, duration and tradeoffs

**South River is relatively high energy and dynamic – delivery of treatment and permanence of actions major considerations**

**Recommended Approach:**

- Test thoroughly at bench scale
- Field pilot cautiously
- Define success

# Initial Activities – SR ROP

## Paper Studies / Literature Review:

- Effects Selenium on biological uptake / metabolism of mercury in biota (Flanders)
- Case Study Review: full scale and pilot studies of mercury remediation sites / key learnings (Turner)
- State of the science for water treatment and soil stabilization (Dyer)
- Effect of nutrients on a Hg-contaminated aquatic system (Flanders)
- Food Web Management as an effective strategy (Morrison with Newman)

## Initial Activities – SR ROP

### Laboratory Testing / University Studies:

- Bench scale testing of activated carbon and XB-1 as effective Hg binding agents in soil and sediment (Exponent / University of Maryland – Baltimore County / Smithsonian)
- Hg Characterization: speciation in soils and sediments, effects of wetting and drying and testing of amendments (Waterloo University)
- Assessment of bioavailability of mercury and methylation potential (Rutgers University)
- Characterizing water chemistry of the 001 outfall (2008) and treatment alternatives analysis (2009) (DuPont Engineering)

### Field Pilot

- Bank Restoration Pilot