Integrated Restoration/Remediation of a Mercury-Contaminated River

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South River (Virginia) Overview

• Legacy mercury releases
• South River Science Team
  – Conceptual site model
• RCRA regulatory program
  – On- and off-site actions
• Sequential implementation
  – Bank remediation
  – Monitor for habitat and water quality improvements
  – Adaptive management
Phased Implementation in Upper 2 Miles

• Phase 1A
  – Certain City of Waynesboro-owned Bank Management Areas (BMAs)

• Phase 1B
  – Remaining City-owned and non-City-owned BMAs in upper 2 miles
  – Remedy scope informed by outcome of Phase 1A

Roughly 90% of total mercury load to first 2 river miles attributable to 25% of banks
Bank Remedies Based on Mercury Loading

• Primary BMAs
  – Approximately 5% of banks represent roughly 50% of total mercury loading from banks
  – Localized removal and replanting

• Secondary BMAs
  – Approximately 20% of banks represent roughly 40% of total mercury loading from banks (i.e., 90% from Primary + Secondary)
  – Enhanced vegetative stabilization

Cumulative total mercury loading from banks to first 2 river miles
Multiple Design Objectives

- Design criteria
  - Reduce mercury loading
  - Maintain/improve habitat
  - Minimize disruption
  - Improve riverside access for recreation
  - Use proven/effective methods

- Optimize and balance criteria

- Location-specific considerations
  - Slopes determine design elements
  - Existing habitat quality varies

- Demonstrate effectiveness
Primary Bank Management Area Design:
Typical Post-removal Restoration Section

- Stone Toe
- Mixed Biochar and Sand
- Topsoil
- Planted Native Trees and Shrubs
- Salvaged Rootwad
- 2-year Flood
- Ordinary High Water (OHW)
Secondary Bank Management Area Design: Typical Vegetative Stabilization of Banks <60°
Secondary Bank Management Area Design:
Typical Rock Toe Protection of Banks >60°
Bank Management Area Design: Plan View
Bank Management Area Design: Plan View (cont.)

Legend:
- 1250 Existing Contours (ft. interval)
- Approximate Dam
- Project Limits
- Existing Utility
- Existing Tree to Remain (Common Name, DBH)
- Relative River vale
- Existing Paved Walkway
- Coir Fabric Over Planting Substrate
- Coir Fabric Over Geogell
- Toe Rock Placement
- Riverside Access
- Slope Arrow
- Limits of Excavation
- Limits of Stabilization
- Coir Log
- Salvaged Tree

Scale in Feet

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Next Steps

• **Fall 2016:** Implement first Phase 1A BMA

• **Winter/Spring 2017:** Monitor completed BMA
  – Health of trees to remain
  – Stability of installed features

• **2017:** Complete Phase 1A

• Phased construction, monitoring, and adaptive management over 5 to 10 years
Questions/Discussion