Mercury (Hg) releases to the South River, Virginia, from a former textile plant in Waynesboro, occurred between 1929 and 1950. Historically-released Hg subsequently accumulated in depositional areas along the river and the floodplain, including the river banks. Changes in hydrology and land use practices resulted in erosion and remobilization of the associated Hg within the near channel. Eroding bank soils with elevated Hg concentrations are the largest single source of Hg to the South River, and are being targeted for remediation. Bank Management Areas (BMAs) for the first phase of remediation (Phase 1) were identified to maximize source control, while minimizing potentially adverse impacts to sensitive habitats. The approach used to balance these factors and identify the Phase 1 BMAs is presented.

INTRODUCTION

The work described in this poster has been performed in conjunction with the South River Science Team (SRST), a multi-stakeholder group including representatives from local, state and federal governments, academia, environmental groups and DuPont. The SRST is a collaborative team created to provide input into the watershed-level, risk-based remediation plan for the South River and its tributaries. The project is focused on reducing Hg loading to the South River and its tributaries to improve fish and wildlife habitat and human health. The purpose of this poster is to present the study site and methods for identifying BMAs as part of the mercury remedy in a complex river system.

STUDY SITE

- Tributary of the South Fork of the Shenandoah River (SFSR) and the Shenandoah River (Figure 1)
- Central Valley section of the Valley and Ridge and the Blue Ridge physiographic provinces
- Phase 1 Interim Measure focuses on first two river miles below the former DuPont plant site

Land Use:
- Industrial (0.29 miles)
- Municipal Infrastructure (0.37 miles)
- Public Park/Recreation (0.37 miles)
- Residential (0.22 miles)

Stakeholders/Advisors:
- City of Waynesboro
- E.I. du Pont de Nemours and Company (DuPont)
- Members of the South River Science Team
- Virginia Department of Environmental Quality
- Virginia Department of Game and Inland Fisheries
- Region III US Environmental Protection Agency

REMEDIAL AND ANCILLARY OBJECTIVES

Bank Erosion
- Reduced Hg loading from bank erosion/leaching of bank soils
- Decrease the impact of shear stress on banks with high erosion potential
- Removal and disposal
- Bank treatments
- Structural stabilization
- Enhanced vegetative stabilization
- Removal and disposal
- Sediment Loading and Hg Concentrations
- Improved riparian and near-bank aquatic habitat functions
- Liner system

METHODS

Weight-of-evidence approach used to identify BMAs within RRMs 0 to 2 that contribute majority of Hg loading. Bank treatments selected to minimize adverse ecological impacts.

RESULTS

- Bank Erosion
- Sediment Loading and Hg Concentrations
- Bank Erosion Rate
- Sediment Loads and Hg Concentrations
- Erosion rates integrated with bank segment length, height, and density data to develop estimates of bank sediment mass loading rates
- Bank soil sampling conducted to characterize the distribution/concentration of Hg in bank soils
- Surficial (0-5 cm)
- Cores

DISCUSSION

A flexible decision-making process, which can be adjusted as remediation action outcomes are better understood and as stakeholder preferences are identified and possibly change over time, will be implemented as part of Phase 1 activities. Short- and Long-term monitoring programs are also being implemented to inform Phase 1 interim measures as part of an iterative learning process.

Criteria for the Selection of Bank Management Areas as Part of the Mercury Remedy in a Complex River System

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