

Sediment Coring Proposal / Discussion

South River Science Team / Expert Panel Meeting

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Research Activities on the S. River

(ongoing, begun, completed, or considered)

- Fish Tissue Monitoring (on going)
- Fish Gut Study / Food Chain Analysis (underway)
- Intensive Water Column Sampling (underway)
- Historic Landfill Investigation
- *Corbicula* Clam Study
- Mud Mapping (complete)
- Flood Plain Mapping (complete)
- Sediment Sampling (proposed)

Working Hypotheses

- Addressed by this Study

- WH-1: There are extant sources of mercury to the river.
- WH-4: Wetland areas in S. River watershed have increased over 20 y and are significant contributors of MeHg to the river system.

Sediment Sampling Plan

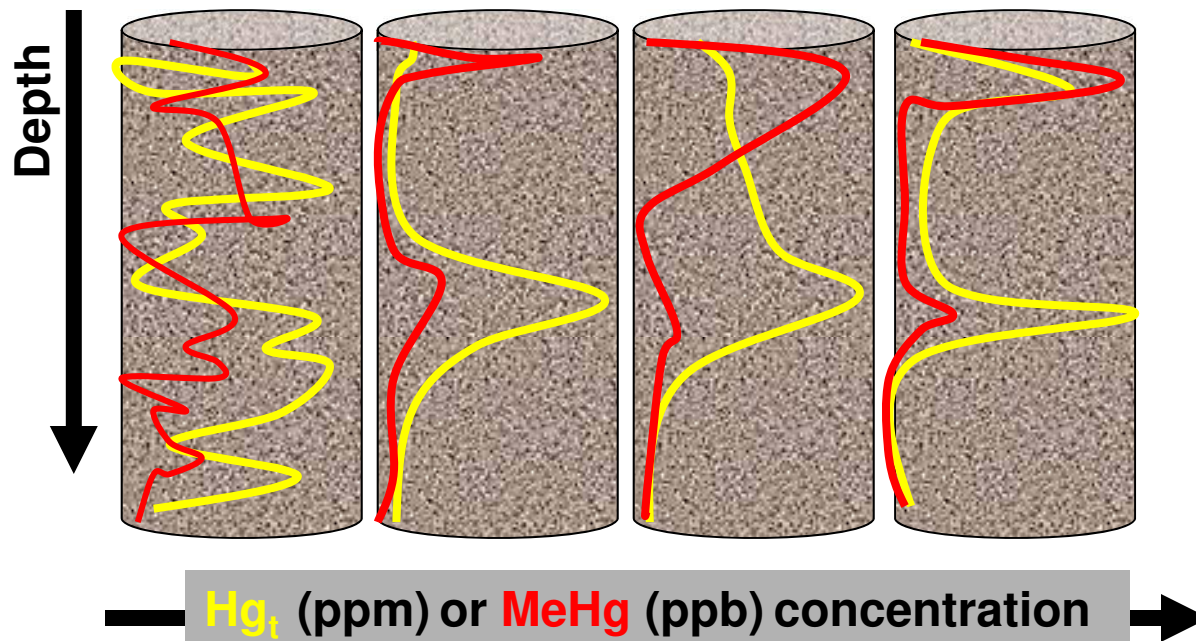
- rationale and goals

- Rationale:
 - Stable sediments will provide a historic record of mercury inputs into the S. River.
- Specific Goals
 - Develop understanding of extent and patterns of Hg_t and MeHg in sediments found in selected depositional areas of the riverbed.
 - Characterize Hg_t and MeHg profiles with depth in selected deep riverbed sediments.
 - Compare Hg profiles in sediment collected in main river and sediments collected from a tributary that cuts through the flood plain.
 - Compare collected data with historic grab sample data when possible.

Sediment Sampling Plan

- Specific Questions to be Answered

- Can we develop a history of mercury inputs to the river from Hg_t and $MeHg$ profiles in vertical cores?
- What is the relationship between Hg_t and $MeHg$ profiles in vertically stratified cores? (coincident? Separated?)
- Are floodplain soils a source of mercury to the river sediments?



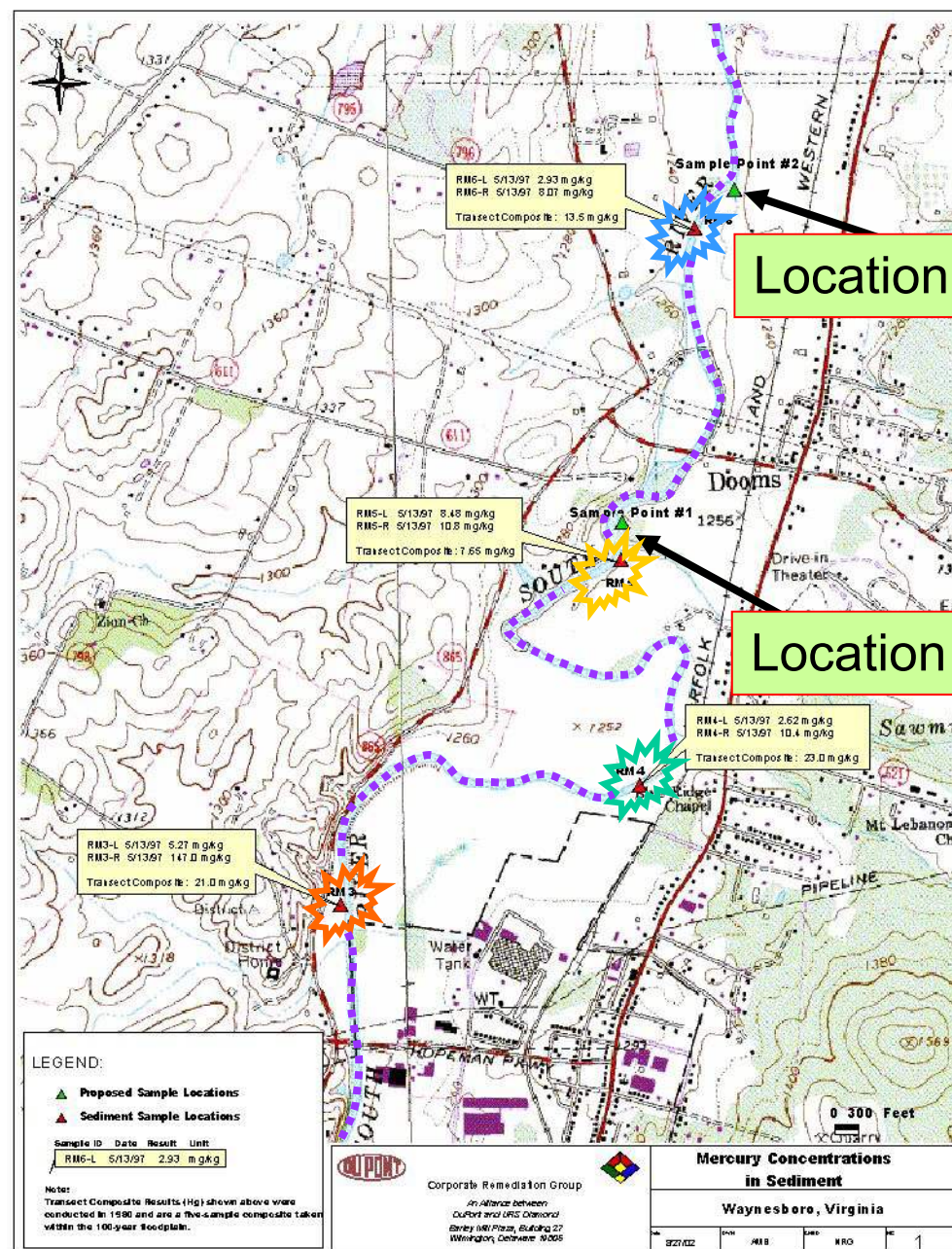
Not to be Answered

- Narrow selection of sample sites precludes broad generalizations about sediments and soils in river bed and floodplain.
- Will not rule out roles of other compartments, such as gravel, cobble, and bedrock areas.
- This work in no way supplants need for other programs proposed or under way..

Sampling Locations

Sediment Hg (ppm)

Left Bank	Right Bank	Transect Composite
2.93	8.07	13.5
8.48	10.8	7.65
2.62	10.4	23.0
5.27	147.0	21.0



Location 1

- Upstream of Dooms Dam



Location 2

- Trib with Wetland



Location 2

- Looking Upstream at Wetland



Wetland Boring

- Showing Stratification



Coring Boat

- For Location 1



Coring Goals/Expectations

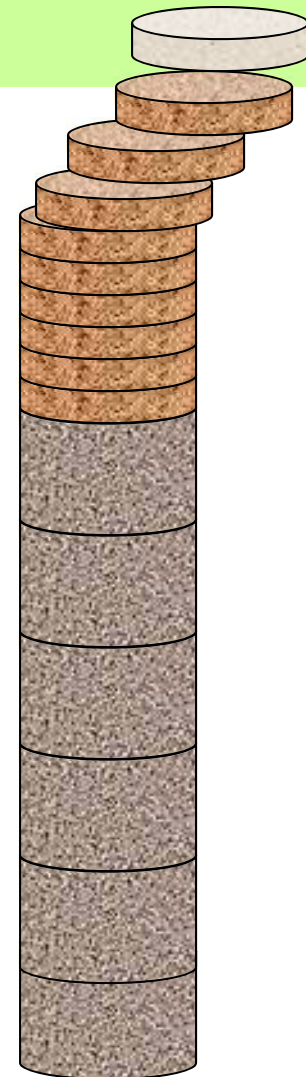
- 20 attempted cores, 10 in each location
- 10-15 good retrieved cores
- 3-4 cores analyzed for each location

Desired Core Characteristics

- 1) 1 meter in length
- 2) Predominantly fine-grained sediments
 - possibly some gradational sand and silt partings.
- 3) Evidence of seasonal deposition
- 4) Evidence of redox gradients at surface
- 5) No obvious anomalies indicating mixing or contamination

Core Analyses

- Core Sections
 - 2 cm intervals to 20 cm;
 - 5 cm remainder of length or to 100 cm
- MeHg each section for top 20 cm and every 10 cm
- Hg total for every section
- TOC every section
- Grain Size for each clear horizon
- $^{137}\text{Cs}/^{210}\text{Pb}$ dating if Hg horizons found



Processing Cores

- Slicing/Dicing/Storing

- Location on DuPont plant site?
- Crew to open/examine in “real time”?
- Photo documentation
- Selection of cores for sectioning/analysis
- Safekeeping of extra cores during analysis
- Allowable “hold times”, technical/regulatory? 28 days for Hg, 48 hrs for MeHg

Experimental Logic

-Cost Optimization

