

CSOs and SSOs – The Major Source Control Impediment To Sensible Urban Waterway Sediment Remediation

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Challenges of Urban Waterways

- Many users/many stakeholders
 - POTWs
 - Industrial dischargers
 - Neighbors
 - Recreational users
 - Commercial users/navigational interests
 - Waterfront revitalization/brownfield redevelopment
- Chemical contaminants in CSO/SSO discharges
 - PAHs
 - Metals
 - PCBs
 - Pesticides
 - Fertilizers
- Physical stressors (e.g., lack of oxygen, siltation)
- Lack of habitat

National Contaminated Sediment Policy



**Contaminated Sediment Remediation
Guidance for Hazardous Waste Sites**



Risk Management Principle #1: Source Control

- Identifying and controlling sources prior to conducting remediation is critical to the effectiveness of any sediment cleanup
- “In most cases, before any sediment action is taken, project managers should consider the potential for recontamination and factor that potential into the remedy selection process.” *Sediment Guidance*, p. 2-21 (emphasis added)

Source Control is a Watershed Issue



Graphic from U.S. EPA Office of Water



Negative Impact of Failing to Control Sources Prior to Implementing Sediment Remedies



Importance of Source Control

- Source control is key because otherwise, recontamination happens

Recontamination Following Remediation

- Survey of recently completed projects identified 20 sites where recontamination occurred*
 - 8 capping sites
 - 7 dredging sites
 - 5 combination capping & dredging sites
- Sites varied widely in geomorphic and geographic settings
- Included freshwater and estuarine locations

*Source: *Nadeau and Skaggs 2007. Analysis of Recontamination of Completed Sediment Remedial Projects; Proceedings of the 4th International Conference on Remediation of Contaminated Sediments, January 2007; Battelle Press*

Sources of Recontamination

- **Point sources (10 of 20 sites – 50%)**
 - combined sewer overflows (CSOs)
 - storm sewer outfalls (SSOs)
 - municipal sewage treatment plants
- Sediment sources (8 of 20 sites – 40%)
- Runoff sources (8 of 20 sites – 40%)

Recontamination

- ❑ All 20 sites became recontaminated relatively quickly following remediation
- ❑ Not a failure of the initial remedial action
- ❑ Reasons for recontamination:
 - No assessment of source control made prior to remedy selection
 - Incomplete assessment of source control made prior to remedy selection
 - Remediation conducted at locations where source control known to be incomplete
- ❑ Lesson Learned: Source Control is crucial first step

Take Home Message: Source Control Matters

- Recontamination happens
- Source control and the potential for recontamination need to be addressed prior to remediation to avoid significant expenditures of funds where the expected benefits of remediation will be compromised by recontamination

Statutory Tools Affecting Sources of Contaminants to Sediment and Sources of Sediment



U.S. Statutory Tools Affecting Sediment Issues

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
 - Upland source control at hazardous waste sites
 - Contaminated sediment management
- Resource Conservation and Recovery Act (RCRA)
 - Upland source control at hazardous waste sites
 - Contaminated sediment management
- Oil Pollution Act (OPA)
 - Cleanup related to oil spills
- Toxic Substances Control Act (TSCA)
 - Disposal of contaminated sediment

U.S. Statutory Tools Affecting Sediment Issues (cont.)

- Clean Water Act (CWA)
 - NPDES permits
 - Pretreatment program
 - TMDLs
- Clean Air Act (CAA)
 - Deposition of contaminants
- Great Lakes Legacy Act (GLLA)
 - Public/private partnerships to address contaminated sediment in U.S. Great Lakes Areas of Concern
- Coastal Zone Management Act (CZMA)
 - Control non-point pollution sources that affect coastal water quality
 - Participation by states/tribes is voluntary

U.S. Statutory Tools Affecting Sediment Issues (cont.)

- Water Resources Development Act (WRDA)
 - Navigational dredging
 - Limited environmental dredging
- Rivers and Harbors Act
 - Discharge of refuse into navigable waters

Other Regulatory Authorities Affecting Sediment

- States authorized to implement various federal programs (e.g., RCRA, CWA, TSCA)
 - Soil and erosion control programs
- Local governments
 - CWA – Industrial wastewater pretreatment program
 - Stormwater programs
 - Soil and erosion control programs
 - Land use
 - Building codes
 - Drain codes

Gaps in Law & Policy: Addressing and Preventing Sediment Issues



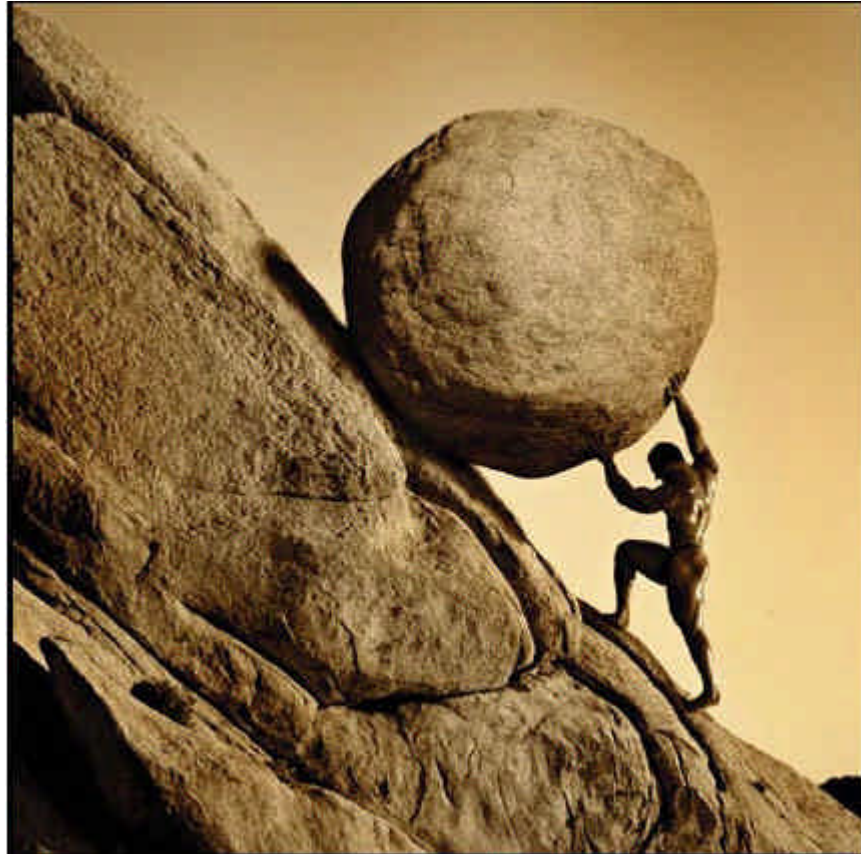
Preventing Recontamination – Big Picture

- ❑ Address Combined Sewer Overflows
 - Stormwater runoff, domestic sewage, and industrial wastewater
 - Infrastructure issues
 - Green infrastructure approaches
- ❑ Address Sanitary Sewer Overflows
 - Domestic sewage and industrial wastewater
 - Infrastructure issues
- ❑ Upland Runoff, Soil and Erosion Control Measures
 - Construction site best management practices
 - U.S. EPA released new effluent limitations for construction sites on December 1, 2009 (expected to reduce sediment and pollutants by 4B lbs/year)
 - Green infrastructure approach to wet weather management (e.g., green roofs, downspout disconnection, permeable pavement, rain gardens, vegetated swales, pocket wetlands, riparian buffers, etc.)
 - Agricultural best management practices

Preventing Recontamination – Big Picture (cont.)

- Address air deposition of contaminants (e.g., mercury)
- Pretreatment Programs for Industrial Wastewater
- Upland Source Control at Hazardous Waste Sites
 - CERCLA Sites
 - RCRA Sites
 - State Sites

Challenges



Preventing Recontamination - Challenges

- Lack of Holistic Approach/Lack of Big Picture
 - Sediment issues are watershed issues
 - Authority to address sediment issues is fragmented (e.g., local ordinances for soil & erosion control, POTWs, municipal separate storm sewer systems, CSOs, various offices within state and federal agencies)
- Lack of Coordination and Policies Between Agencies and Programs
 - E.g., Timing of Superfund remediation decisions v. Office of Water/States/Localities addressing uncontrolled CSO/SSO sources

Preventing Recontamination - Challenges (cont.)

- Incomplete and/or Scarce Potential Sources of Funding
 - Public sources
 - Private sources
 - Timing of funding
 - Lack of adequate funding
- Understanding What is Achievable for a Waterbody and a Watershed
 - Addressing contaminated sediment will not solve all of a waterbody's issues
 - Technical limitations on what can be achieved with sediment management options

San Francisco Bay Case Study



San Francisco Bay PCBs TMDL

- Approved by U.S. EPA March 2010
- PCBs TMDL: 10 kg/year
 - Based on models predicting attainment of numeric target of 10 µg/kg total PCBs in fish tissue
 - Numeric target set to protect human health and wildlife
- Evaluated external sources of PCBs
- Did not quantify internal sources of PCBs

California Regional Water Quality Control Board San Francisco Bay Region Resolution R2-2008-0012 Exhibit A – Proposed Basin Plan Amendment, Water Quality Control Plan for the San Francisco Bay Region to Establish a Total Maximum Daily Load and Implementation Plan for PCBs in the San Francisco Bay

San Francisco Bay PCBs TMDL

	Current Load (kg/yr)	Allocated Load (kg/yr)
Atmospheric Deposition	Net loss	0
Central Valley	11	5
Municipal Wastewater Dischargers	2.3	2
Industrial Wastewater Dischargers	0.035	0.035
Stormwater Runoff	20	3
Total (differs from column sum due to rounding)	33	10

San Francisco Bay PCBs TMDL – Implementation Plan

□ External Sources

- Central Valley – allocation may be achieved by natural attenuation
- Municipal & industrial wastewater dischargers – NPDES permits require best management practices; numeric water quality-based effluent limitations for PCBs
- Stormwater runoff – NPDES stormwater permits require BMPs
- Upland clean-up projects

□ Internal Sources

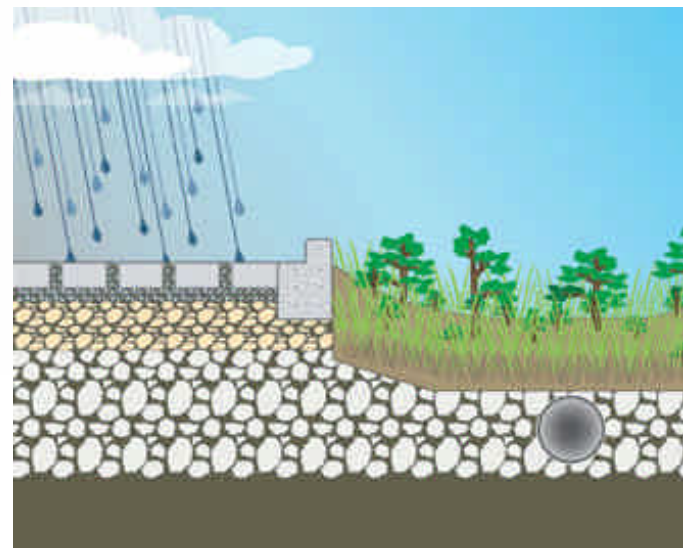
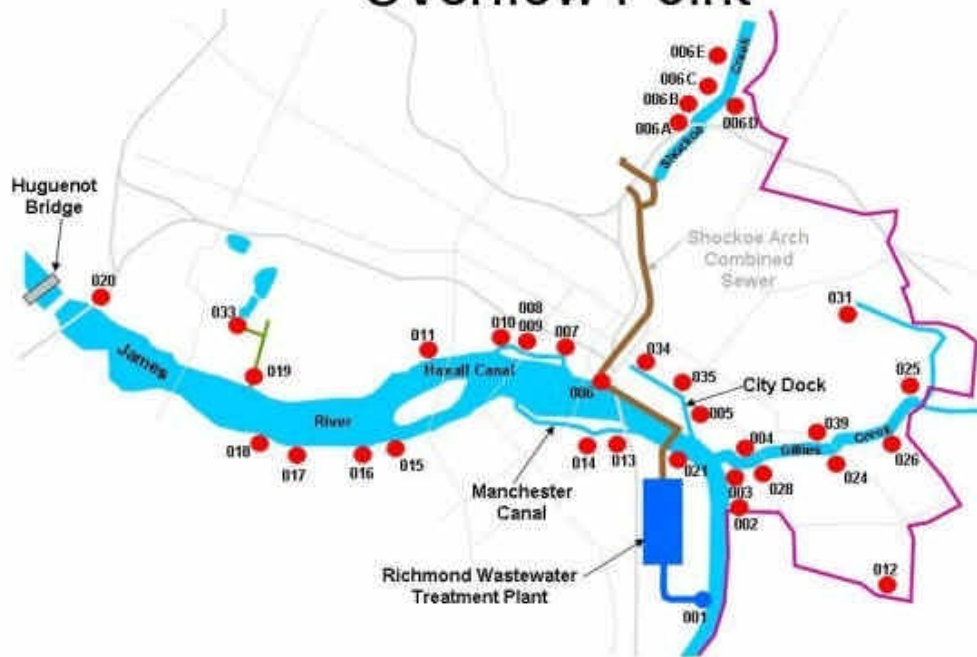
- Investigate and remediate, as needed, PCB-impacted sediment in potential high exposure areas, mostly in specific, near-shore areas

San Francisco Bay PCBs TMDL – Take Home Message

- The numeric target for fish tissue is not anticipated to be reached without addressing external sources of PCBs to San Francisco Bay
 - Targeted sediment remediation is not sufficient
 - External sources, such as stormwater runoff, significantly contribute to PCBs in fish and are the primary target
 - External sources are key - Conclusion reached after Regional Water Quality Control Board and stakeholders holistically evaluated the watershed over a period of years

Actions to Address CSO/SSO Issues

Location of Combined Sewer Overflow Point



Individual Sediment Sites

- Ask These Key Source Control Questions:
 - What steps have been taken to identify sources and are these steps sufficient?
 - Have continuing sources been identified?
 - Will all continuing sources be controlled prior to remediation?
 - If not, should remediation proceed and what accommodations/expectations/plans exist about those sources?

Beyond Individual Sites: Recommended Actions

- Address source control issues
 - Work with U.S. EPA's Office of Water and other stakeholders to tackle source control issues while recognizing the boundaries and limitations of the Superfund Program
- Address timing of response actions
 - Develop a technical bulletin/guidance for determining if, when, and how to proceed with response and/or remedial actions at Superfund sediment sites when source control is an issue

Future

- Commitment to tackle tough, cross-jurisdictional issues
 - Need creative, efficient ways to bring stakeholders together in manner that will produce meaningful results
- Need a watershed-level approach that integrates various authorities and funding sources
 - Holistic view of upland sources of sediment and contaminants
 - Leverage navigational and environmental sediment management projects

For Further Info ...

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