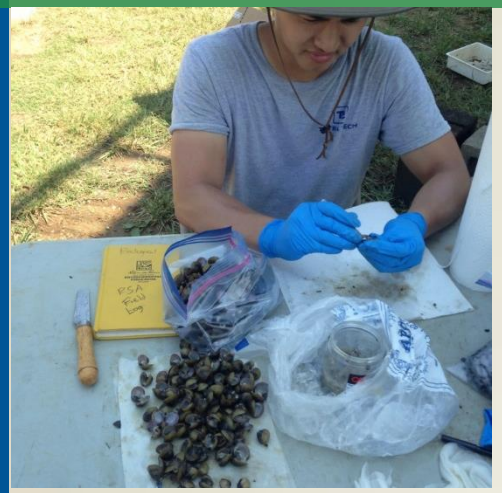



Anacostia River FS Alternative Development: Remedial and Mitigation Methods

June 8, 2017

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Agenda

- How Have Other Rivers Been Cleaned?
- What Are the Anacostia's Unique Challenges?
- Anacostia CSM-Sedimentation, Contamination, Sources
- Conceptual Remedial Alternative Approaches
- Questions

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Summary of Clean-up Approach at Other Contaminated Sediment Sites

Superfund Site	Approach	Cubic yards dredged	Cost	Disposal of Dredged Sediment
Duwamish	-dredging or partial dredging and capping -capping w/ possible activated carbon amendment -enhanced natural recovery (capping with 6-9 inches of clean material) -long term monitoring -institutional controls	960,000	$342,000,000	Offsite at permitted landfill
Hudson River	-dredging -backfill with 1 foot of clean material to isolate residual contamination where appropriate -long term monitoring -institutional controls	2,650,000	$460,000,000	Offsite at permitted landfill
Passaic River	-dredging -engineered cap (sand and armor) -long term monitoring	4,300,000	$1,730,000,000	Offsite at permitted landfill and incineration of sediment deemed hazardous under RCRA
Gowanus Canal	-dredging -in situ stabilization of NAPL impacted native soils -multi-layer cap: treatment, isolation, and armor layers -barrier or interception system at boundary of excavation in turning basin -long term monitoring -institutional controls	588,000	$506,100,000	Offsite thermal treatment and disposal at permitted landfill

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Summary of Clean-up Approach at Other Contaminated Sediment Sites

Superfund Site	Approach	Cubic yards dredged	Cost	Disposal of Dredged Sediment
Onondaga Lake	-dredging or partial dredging and capping -capping (425 acres) -enhanced natural recovery (150 acres in deeper water) -long term monitoring -institutional controls	2,200,000	$450,000,000	Near shore CDF/landfill
Ottawa River	-dredging -long term monitoring -institutional controls	250,000	$50,000,000	Near shore landfill for non-TSCA sediment Offsite for TSCA sediment (about 10% total volume)

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Anacostia Unique Challenges

- Urban River-What is Background?
- Remediation Goals- What is Clean?
- Small Watershed- Not Enough Water
- Potential for Recontamination
- Multiple RP Consent Orders
- National Park Requirements
- Limited Space for Handling Dredge Spoils
- Continued Need for Federal Navigation Channel ?

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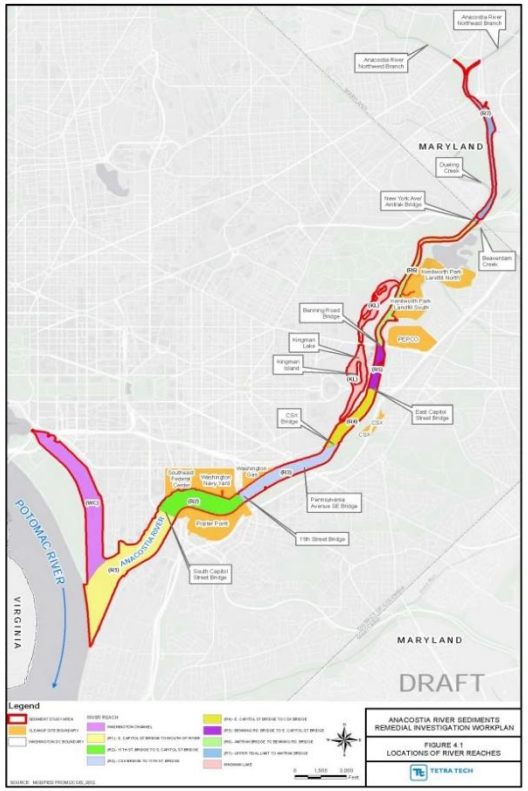
The Anacostia River Development

- The Anacostia River drains 176 square miles; mostly in Montgomery and Prince George's Counties in Maryland.
- The study area is the lower nine mile tidal area
  - Includes Washington Channel and Kingman Lake

Watershed Map

Source: Anacostia Watershed Society

Study Area Map



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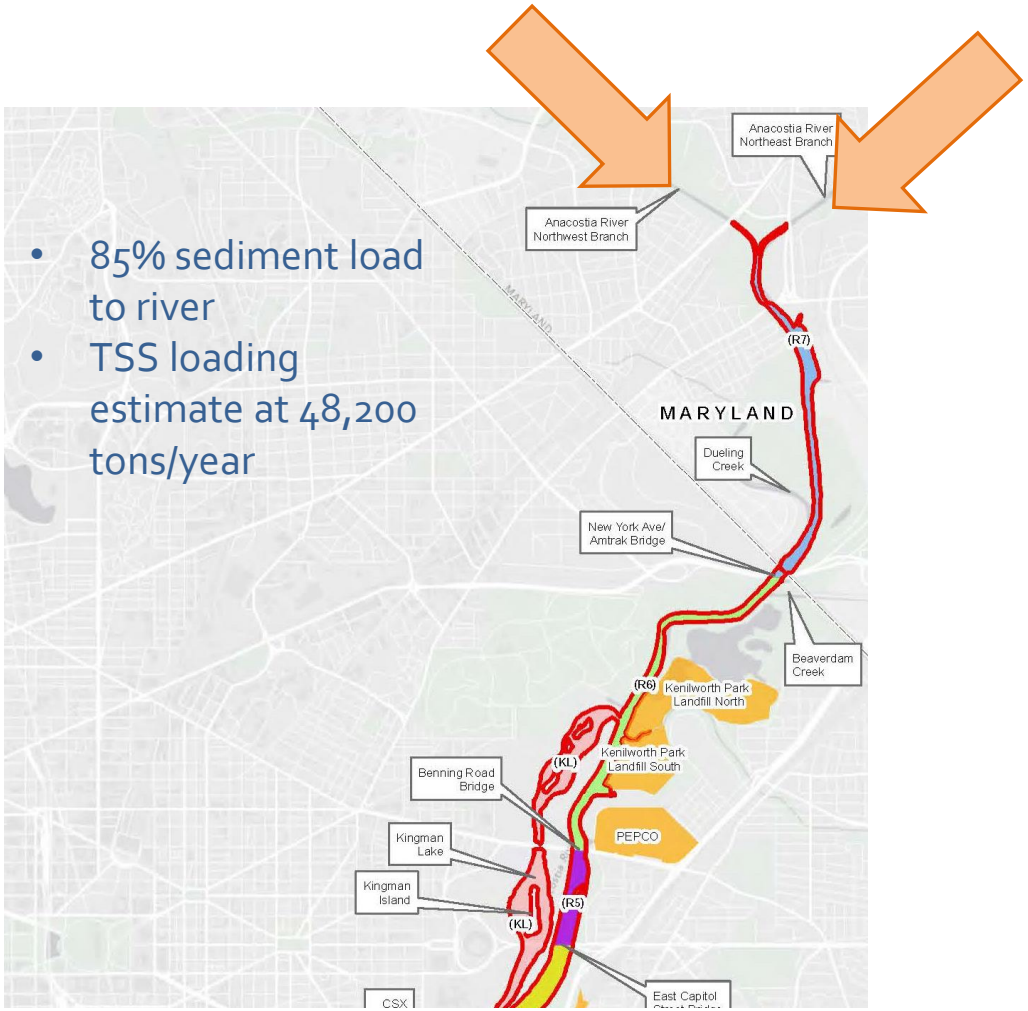
Anacostia River Watershed Upstream of Study Area Supplies the Majority of Sediment

- 85% sediment load to river
- TSS loading estimate at 48,200 tons/year



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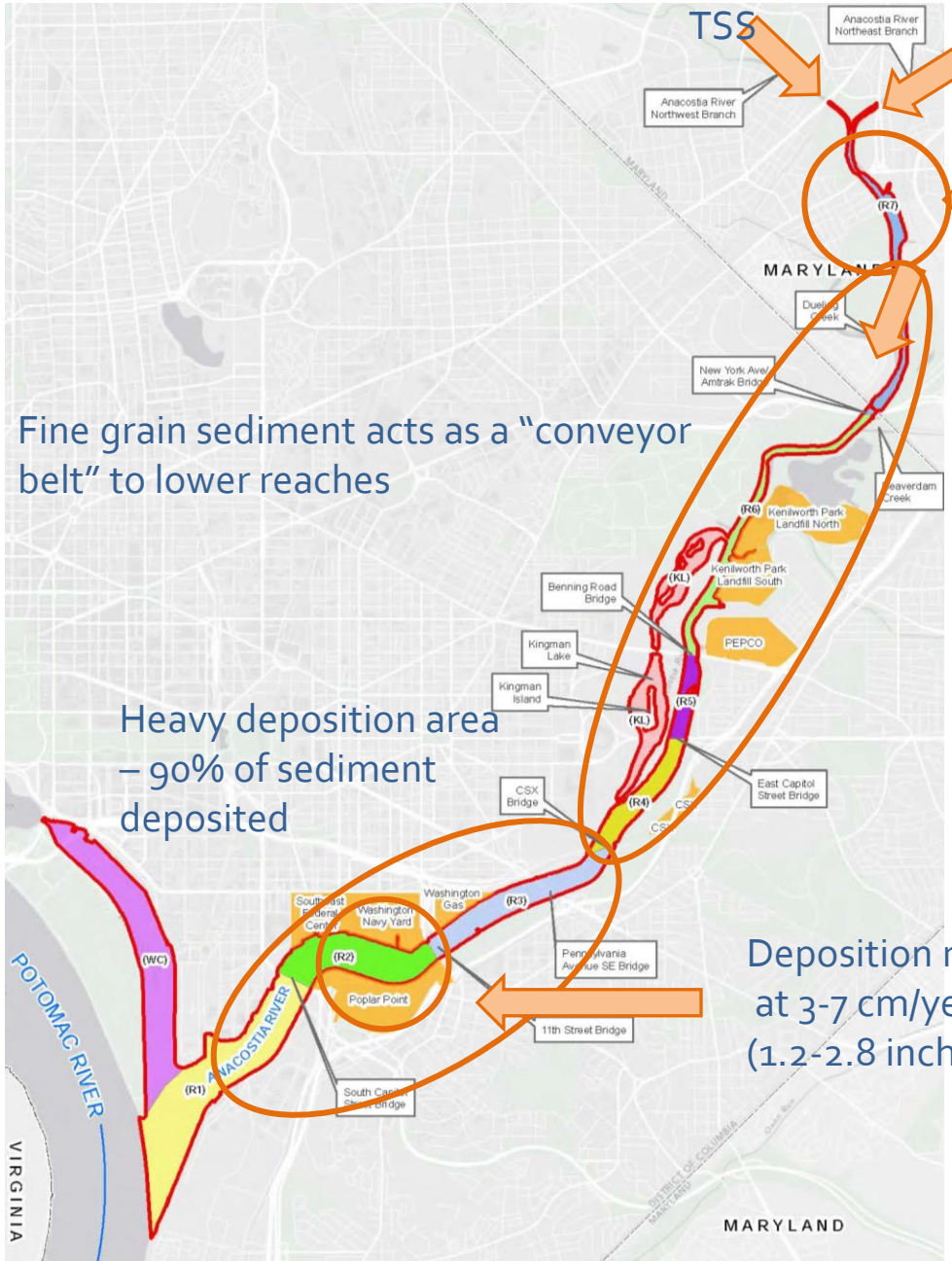
The Anacostia River is Perfectly "Designed" to Settle Sediment in Reach 1,2, and 3



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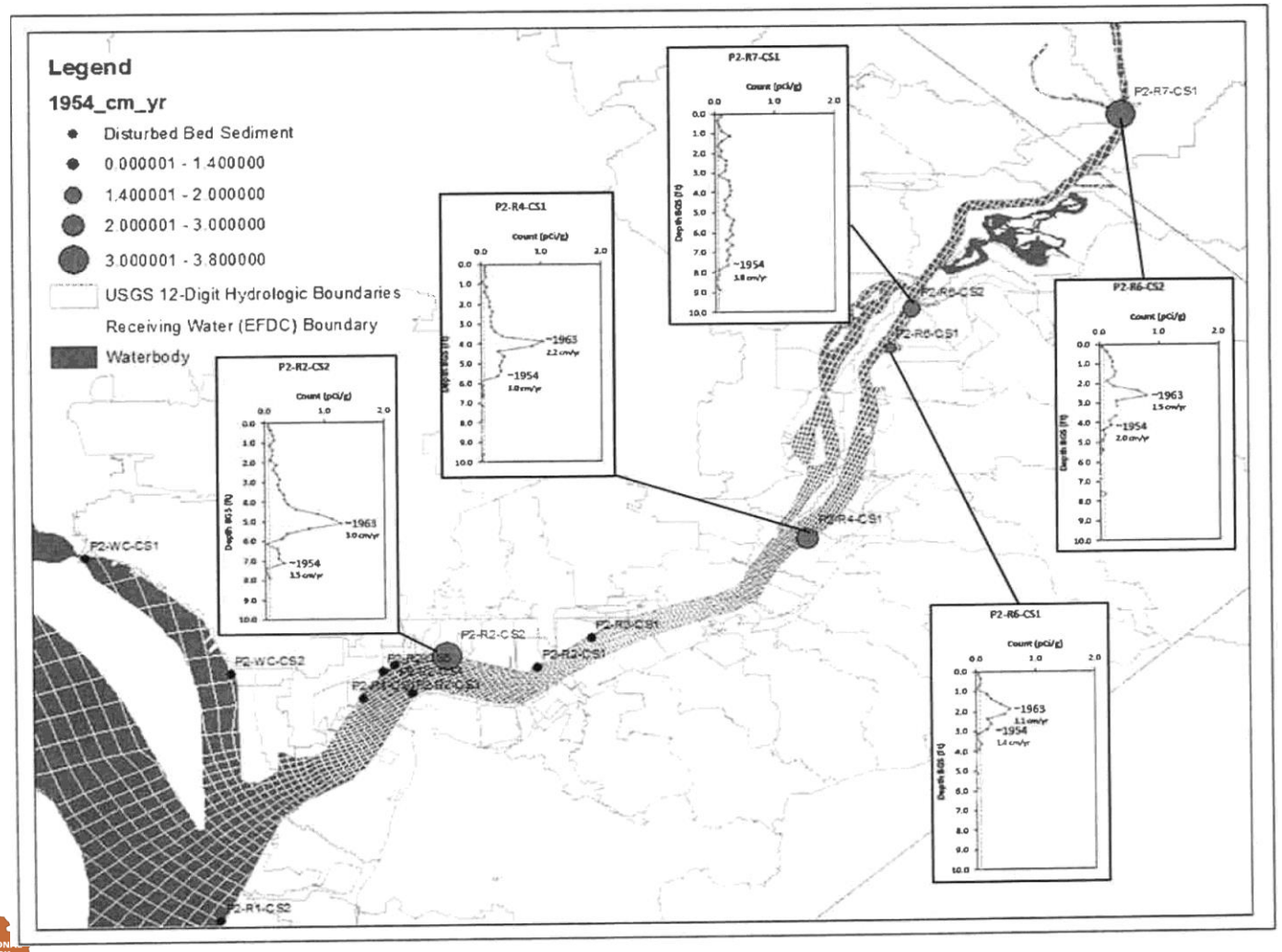
Recent Cesium Samples Confirm Deposition Rate in "Catcher's Mitt" Area



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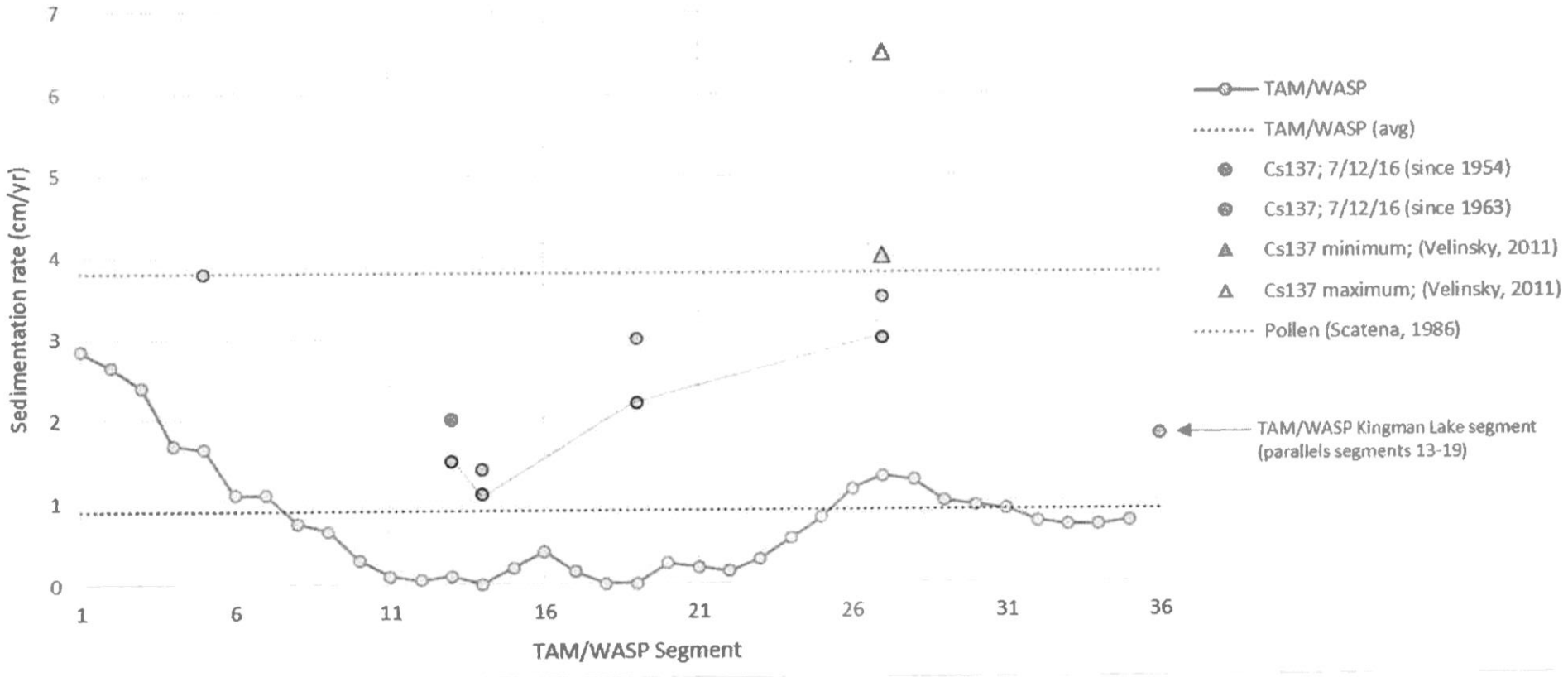

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Major Contaminants of Concern

PCBs- 11.8 ppm maximum, Cove near PEPCO	Draft PRG-676 ppb
Dioxin-0.71 ppb, near Kenilworth and PEPCO	Draft PRG-0.025 ppb
Total PAHs- 1981.6 ppm; off Washington Gas facility	Draft PRG-22.8 ppm
Pesticides (Chlordane)- 4800 ppb, near Navy Yard	Draft PRG-17.6 ppb
Mercury- 380 ppm maximum, end of Washington Channel	Draft PRG- 1.1 ppm
Arsenic- 62 ppm maximum, downstream of PEPCO	Draft PRG- 13.3 ppm
B(a)P-76 ppm, off Washington Gas facility	Draft PRG- 4.13 ppm

- Contaminant Profile-*Animations*
  - *PCBs*
  - *Chlordane*

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NPS Preliminary CSM

- High sedimentation rate in “Catcher’s Mitt”
- Historic contamination effectively buried
- Active sources for pesticides may still remain in Watershed

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Overview of Feasibility Study Process

- Identification of Technologies
- Development of a Range of Alternatives
- Screening Alternatives to Maintain Range
- Evaluation of Alternatives
- Screening of Alternatives against CERCLA nine criteria

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Technologies are Normally Grouped by Activity

- Removal Technologies- tracked excavators, clamshell dredges, hydraulic dredges (e.g., MudCat) etc.
- Transportation Technologies- haul truck, barges, rail, waterline etc.
- Disposal Technologies- landfill, CAD, CDF, ocean disposal etc.
- Capping Technologies- Sand caps, organoclay caps, activated carbon caps etc.
- Mitigation Technologies- ? (*not typically included in remedial alternatives*)

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Compliance with ARARs is one of the Nine CERCLA Criteria's

- **Threshold Criteria**
  1. Overall protection of human health and the environment
  2. Compliance with ARARs (applicable or relevant and appropriate standards)
- **Primary Balancing Criteria**
  3. Long-term effectiveness and permanence
  4. Reduction of toxicity, mobility or volume
  5. Short-term effectiveness
  6. Implementability
  7. Cost
- **Modifying Criteria**
  8. State acceptance
  9. Community acceptance

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Non- Impairment Standard

- *Reestablish and sustain the functionality of the river system including channel stability, wetlands and wildlife habitat, riparian vegetation communities, scenery, resiliency, aesthetic values, and other components of the river system that have been impaired by the release of hazardous substances, that may be impaired by additional releases of hazardous substances, or that may be impaired by remedial action responding to releases or threatened releases of hazardous substances.*

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Feasibility Study - Potential Range of Alternatives

- Alternative 1 - No-Action
- Alternative 2 - Minimal Action (Hot Spot removals)
- Alternative 3 - Capping/Dredging
- Alternative 4 - Capping/Dredging (more extensive)
- Alternative 5 - Complete Removal

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Alternative 2 – Hot Spot Removal

- Hot Spot removal and disposal
  - Interim Remedial Measures?
- Where would the contaminants be disposed?
- Will this alternative be protective and comply with ARARs?
- Least costly alternative
- Adaptive Management?

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Alternatives 3&4 - Dredging/Capping

- Would be developed per River Reach
- Extent of Capping may need to be based on need for Federal Navigation Channel
- Concern for recontamination
- Where would the contaminants be disposed?
- What we have to do to ensure alternative is protective and comply with ARARs?
- Costs can be significant
- Adaptive Management?

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Alternative 5 - Complete Removal

- Complete dredging in all reaches
- Mitigation needs may be extensive for ARAR compliance
- Excessive volume –significant transportation issues
- Highest cost alternative
- Significant concern for recontamination

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Questions?

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