EPA's Centredale Dialog Meeting
24 April 2006
Rhode Island Dept. of Environmental Management

10:30 am **Coffee for early arrivals**

11:00 am **Opening remarks**
- Review of agenda and groundrules
- Review of EPA goals and hoped for outcome of the dialog
- Introduction of participants

11:30 am **Presentation of site results to date**
- Review of site investigation results including:
  - Description of contamination
  - Geographic boundaries of contamination
  - Review of EPA and PRP removal activities at this site to date
  - Location and/or potential migration of the contamination
  - Human health and ecological risk assessment findings
  - EPA conclusions and findings from the site investigation
- Questions and discussion

12:30 – 1:15 pm **Lunch: Individuals can bring or order out brown bag lunches**

1:15 pm **Discussion of EPA site results [further discussion as needed]**

1:45 pm **Participating parties present their ideas**
- Local jurisdictions and other agencies describe their responsibilities at this site and their needs and interest regarding remedy selection
- Participating parties are invited to discuss their needs and interests as this relates to a remedy selection at this site
- Questions and discussion

2:45 pm **Presentation of EPA remediation goals & remedy selection process**
- Presentation of EPA's remedy selection process and discussion of how this dialog fits into the ROD process
- Review of criteria for remedy selection
- Questions and discussion

3:30 pm **Planning for next meeting**

4:00 pm **Adjourn**

PROPOSED MEETING GROUNDRULES

These groundrules are designed to help guide the parties in productive discussions during this dialog. Once the groundrules have been reviewed and approved by all participants, the facilitator will enforce the groundrules and will seek the support of the entire group in this effort.

- The Centredale dialog is designed to be an informal gathering of interested parties who want to share information and perspectives on issues identified by EPA for discussion.

- Participants are requested to stay focused on, and limit discussion to, the issues identified [i.e., remediation options for the site] for this dialog.

- The facilitator will attempt to ensure that all participants have adequate opportunity to participate in each discussion topic. If any party, or group of parties, seeks to dominate the discussion, the facilitator will move to ensure that all parties are able to effectively contribute to the discussion.

- Participants are requested to listen and consider the opinions of others in an effort to ensure a constructive discussion, and to remain courteous to each other throughout the discussions staying focused on "issues" not on people or personalities.

- Participants can discuss their own comments and participation in this dialog; however, no participant should attempt to quote or otherwise characterize the comments of any other participant. Specific comments are not for attribution unless those comments are your own.

- This dialog will not include any discussion of potential settlements or other communications between EPA and the known "potentially responsible parties [PRPs]" as such issues are outside the scope of this dialog, and inappropriate for public discussion.

- The facilitator will capture the key points made during the meeting and prepare a summary of each meeting. There will be no formal transcript of this dialog.

- Members of the public are welcome to attend.

STATEMENT OF DIALOG GOALS AND OUTCOMES

Goals for the Dialog:

- To engage parties in a conversation that will inform EPA's remedy selection process for the next phase of work at the Centredale Manor Restoration Project (i.e. the Source Area, Allendale and Lyman Mill Ponds and their associated wetlands) prior to EPA finalizing the Feasibility Study and releasing a Proposed Cleanup Plan.

- To share publicly available information and answer questions that might serve to enhance participants' understanding of the historical and current conditions of the site, potential future uses of the site, as well as the potential remedial approaches and EPA's decision making process.

- To allow participants an opportunity to speak directly with one another and EPA about their specific preferences and concerns relating to potential remedial approaches.

- To educate participants, including EPA, about the wide range of shared and competing interests that EPA will consider and attempt to balance in developing remedial approaches.

Desired Outcomes:

- For participants to learn more about the technical and scientific information related to this site and EPA's remedy selection process leading to a Proposed Cleanup Plan.

- For EPA, informed by the preferences and concerns expressed during the dialog, to develop a Proposed Cleanup Plan for formal public comment that not only meets EPA's statutory requirement but addresses, to the greatest extent possible, the interests and concerns of the participants.

Participation:

- EPA's intent is to involve participants in an open discussion of remedy selection. This dialog does not alter EPA's statutory responsibility regarding public involvement in Superfund decisions; nor does it replace or otherwise limit the full implementation of public review and comment requirements for any Record of Decision. This dialog does not in any way limit anyone's participation in the formal public review and comment process; rather, the dialog is intended to augment the existing mechanisms for public input and particularly to allow EPA to get the benefit of earlier input.

CENTREDALE MANOR DIALOG
EXPECTED PARTICIPANTS' CONTACT INFORMATION
[4/17/06]

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How to Get to DEM's Foundry Offices

235 Promenade Street
Providence, RI 02908-5767

From the South

- Follow Interstate 95 North toward Providence
- Take Exit 22C - Providence Place
- Follow to end of ramp and take a right onto Kinsley/Providence Place
- Go to end, and make a U-shaped turn onto Promenade Street, crossing over river and under Rte. 95
- Take first right onto Holden Street
- Take first right onto Beach Street (between buildings)
- Look for visitor parking spaces

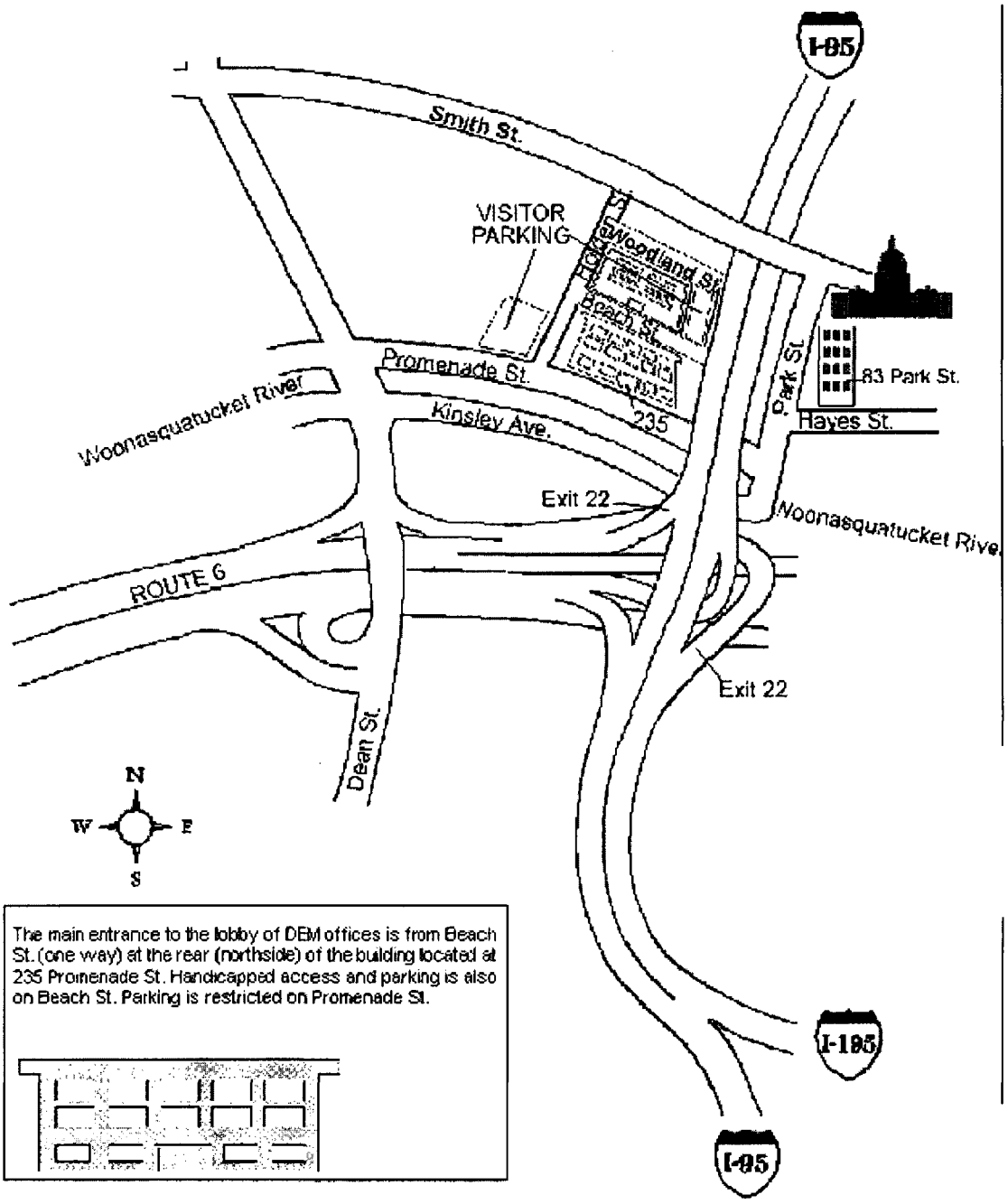
From the North

- Follow Route 146 South and/or Interstate 95 South toward Providence
- Take Exit 22C off of 95 South - Providence Place
- At end of ramp go right onto Kinsley Street
- Take left in front of mall garage
- Take immediate left onto Promenade Street
- Take first right onto Holden Street
- Take first right onto Beach Street (between buildings)
- Look for visitor parking spaces

From the West

- Follow Route 6 toward Providence
- Take the Dean Street/Atwells Avenue Exit.
- Turn left at the traffic light at the top of the ramp onto Dean Street
- Go to bottom of the hill and turn right onto Kinsley Avenue/Providence Place
- Go to end, and make a U-shaped turn onto Promenade Street, crossing over river and under Rte. 95
- Take first right onto Holden Street
- Take first right onto Beach Street (between buildings)
- Look for visitor parking spaces

235 Promenade Street is the first building on the right. Visitor parking is in the lot in the next block on the right and off Beach St. (see map for location)



Site Investigation Results

Centredale Manor Restoration Project
North Providence, RI

1

Presentation Overview

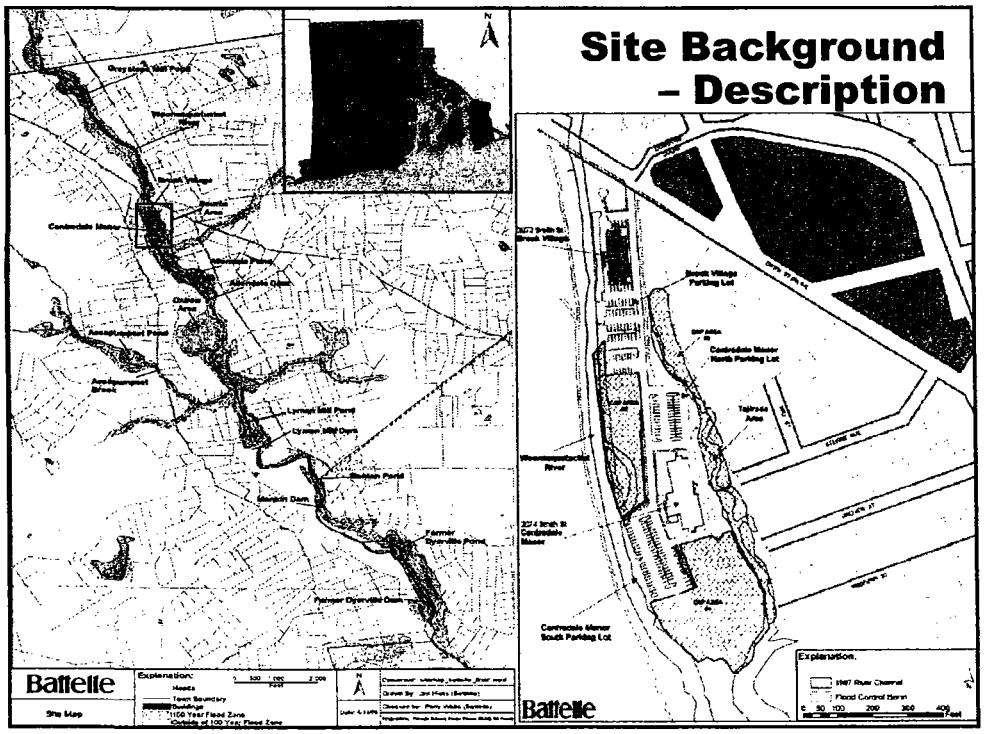
- Introduction
- Site Background
- U.S. EPA and PRP Removal Actions
- Remedial Investigation (RI)
- Ongoing Investigations

2

Introduction

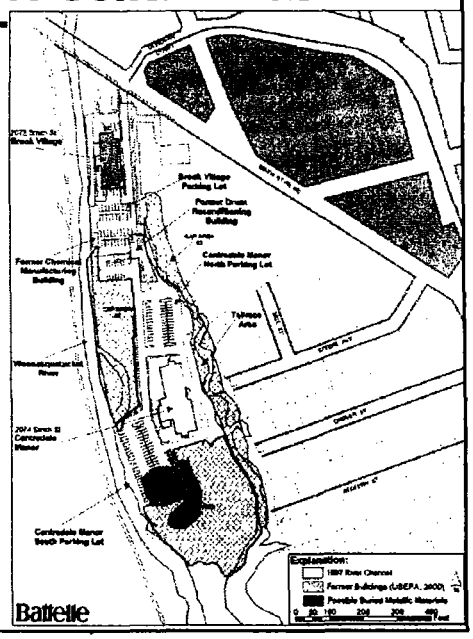
- Remedial Investigation (RI)
  - Site background
  - Sources, nature and extent of contamination
  - Characterize fate and transport of contamination
  - Evaluate potential human health and ecological risks
- Feasibility Study (FS)
  - Evaluate risk management strategies and remedial alternatives
- Where are we today?
  - RI complete
  - FS in progress

3



Site Background – History, Potential Sources of Contamination

- Chemical manufacturing activities
  - Storage and disposal of chemicals in drums, stockpiles and surface impoundments
  - Hexachlorophene manufactured in approximately 1965
- Drum reconditioning operations
  - chemical residues believed to be dumped or burned prior to reconditioning

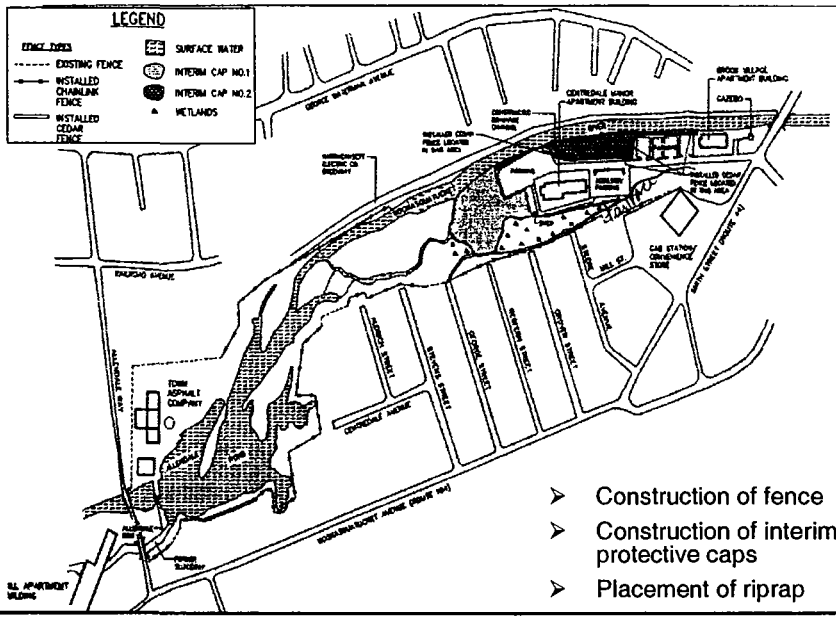


U.S. EPA and PRP Removal Actions

- Time Critical Removal Actions
  - Objective: Reduce the immediate human health threat to residents on and near the site
  - Construction of interim soil caps and fencing
  - Reconstruction of former tailrace
- Non-time Critical Removal Actions
  - Objective: Mitigate unacceptable human health risk and minimize further downstream migration of contaminated river sediment from Allendale Pond
  - Reconstruction of Allendale Dam
  - Delineation and excavation of contaminated floodplain soils

6

Time Critical Removal Actions

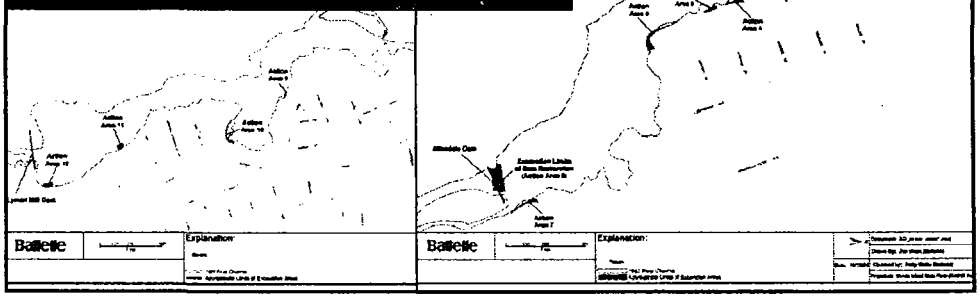


- Construction of fence
- Construction of interim protective caps
- Placement of riprap

7

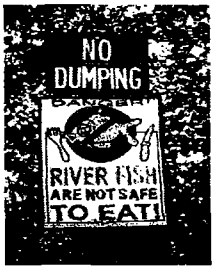
Non-time Critical Removal Actions

- Reconstruction of the Allendale Dam and restoration of Allendale Pond
- Delineation and excavation of contaminated floodplain soils



Do's and Don'ts for the Woonasquatucket River

- Please do not eat fish, turtles, eels, or plants from the Woonasquatucket River
- Please do not wade in the shallow water or swim in the river
- Please obey the warning signs posted along the river
- Walking, jogging, or bike riding along the river are acceptable activities
- Remember to wash thoroughly after any contact with the river water or sediment

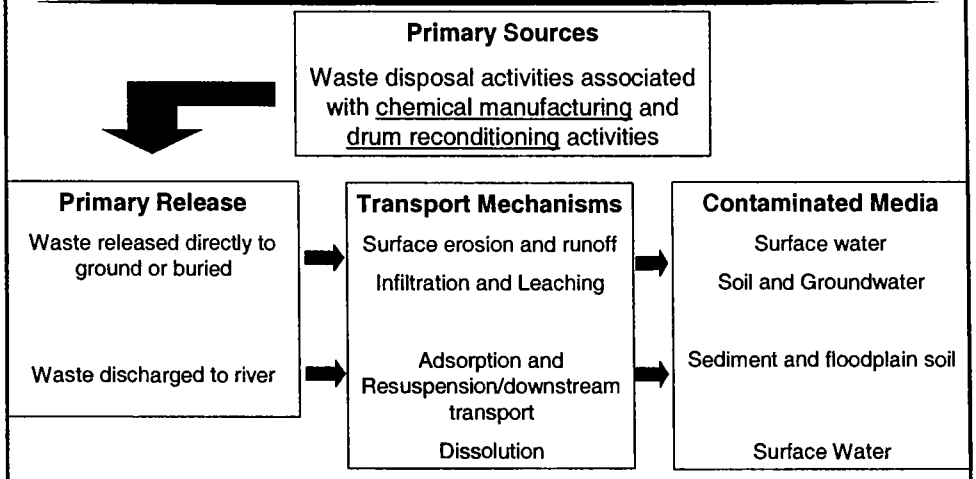


Remedial Investigation – Objectives

- Determine sources, nature and extent of contamination
  - More than 950 soil, 85 groundwater, 290 sediment and 50 surface water samples collected
- Characterize fate and transport of contaminants
  - Processes that influence the movement of contaminants
- Evaluate potential ecological and human health risks
  - Consumption and direct contact

10

Potential Primary (Historical) Sources – Release and Transport Mechanisms



Primary sources of contamination are no longer active

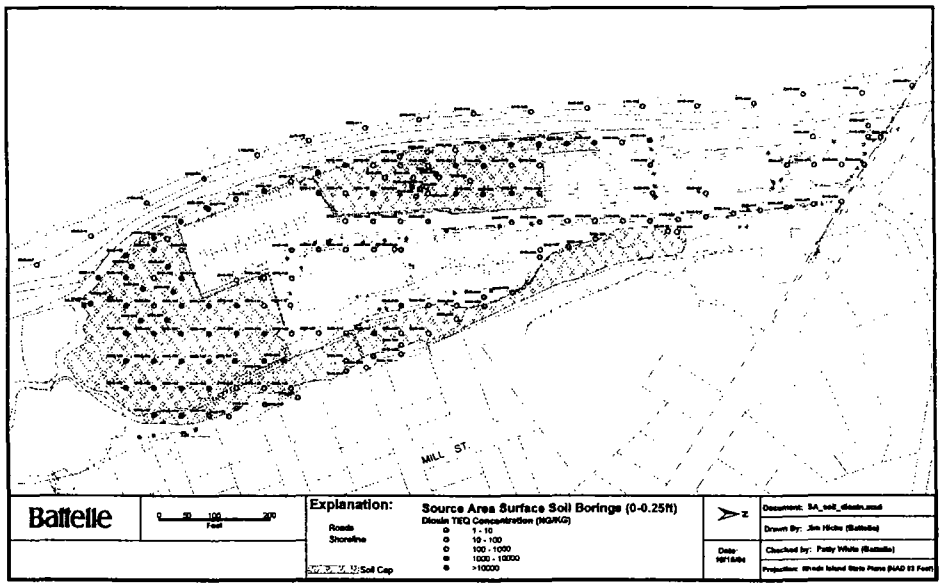
11

Nature and Extent of Contamination – Source Area Soil

- Dioxin, PAHs, PCBs, and several inorganics exceed direct exposure criteria; VOCs less frequently
- Leachability criteria for VOCs exceeded in samples from six locations
- Dioxin concentrations decrease with increasing depth; localized contamination at depths > 5-ft bgs
- PCBs highest in central and southern regions of the source area; upper 2-ft of soil
- Other contaminants had lower concentrations and less widely distributed compared to dioxins and PCBs
- Majority of contaminated soils in areas that are paved or capped

12

Source Area Soil – Dioxin

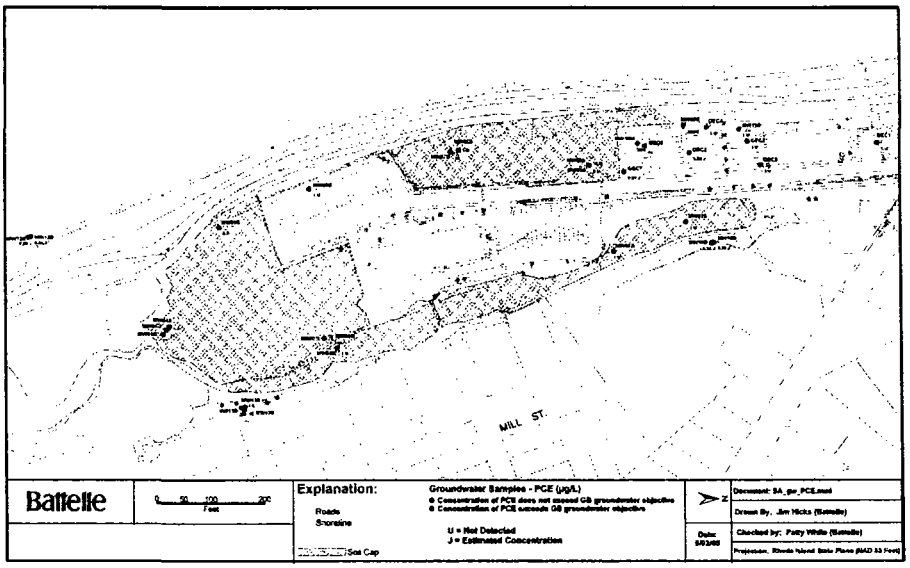


Nature and Extent of Contamination – Source Area Groundwater

- Contamination is not pervasive or widespread
- VOCs typically below RIDEM GB groundwater criteria, except at three wells
- High concentration of dioxin measured at Well MW-05S; dioxin mobilized by the solvents?
- Trace levels of several other contaminants detected in some samples
- Plume of VOC-contaminated groundwater discharge into Woonasquatucket River along east bank
- Groundwater discharge to Allendale Pond contains low levels of VOCs
- Additional investigations conducted to assess whether dioxin is discharging to river

14

Source Area Groundwater – VOCs



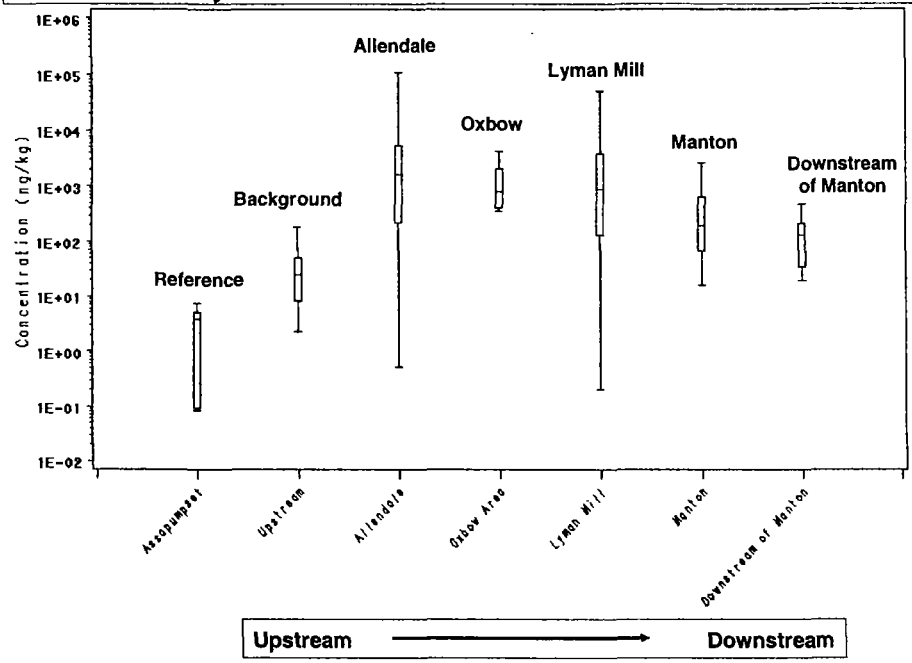
5

Nature and Extent of Contamination – Pond Sediment

- Dioxin concentrations (downstream) significantly higher compared to upstream background
- Concentrations other COCs not significantly different from background, except PCB at Allendale Pond
- Mean concentrations of primary risk drivers highest in Allendale Pond; decrease downstream
- Maximum dioxin concentrations top 1-ft at Allendale and top 1-ft to 2-ft at Lyman Mill
- No significant dioxin contamination prior to 1940
- Maximum dioxin concentrations generally correspond to sediments deposited between 1950 to 1970

16

Sediment, Dioxin TEQ



17

Nature and Extent of Contamination – Allendale and Lyman Mill Soil

- Residential and recreational use soils – areas above EE/CA action level excavated
- Floodplain soils –dioxin TEQ concentrations higher downstream compared to background
  - Over 10x higher in Allendale and Oxbow area
  - Approximately 10x higher in Lyman Mill
- Absence of ecological floodplain habitat along the lower eastern shore of Allendale Pond

18

Potential Secondary (Current) Release and Transport Mechanisms

Source Area

Secondary Release	Transport/Exposure	Contaminated Media
Contaminated soils	Leaching	Groundwater
	Erosion and runoff	Sediment
Contaminated groundwater	Advection	Sediment and surface water

Woonasquatucket River

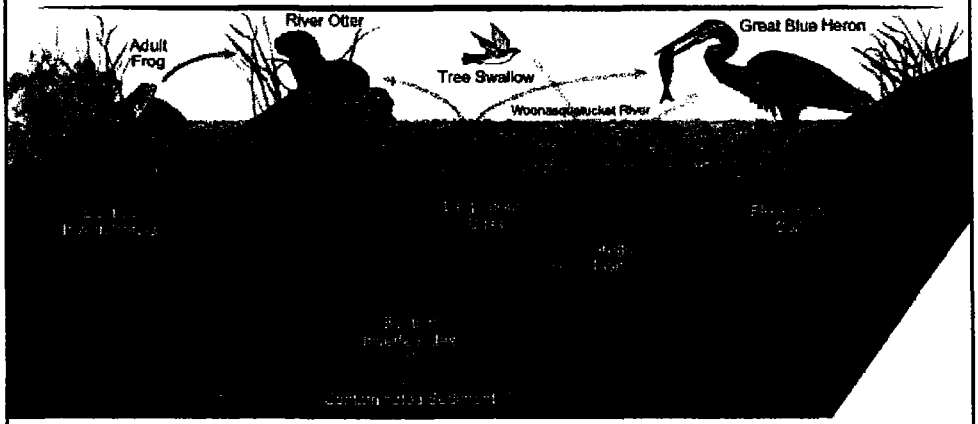
Secondary Release	Transport/Exposure	Contaminated Media
Contaminated sediment	Resuspension and downstream transport	Sediment and floodplain soil
Contaminated sediment, floodplain soil and surface water	Direct contact & ingestion	Biota

Receptors

Human and ecological receptors

Direct contact and ingestion

Baseline Ecological Risk Assessment



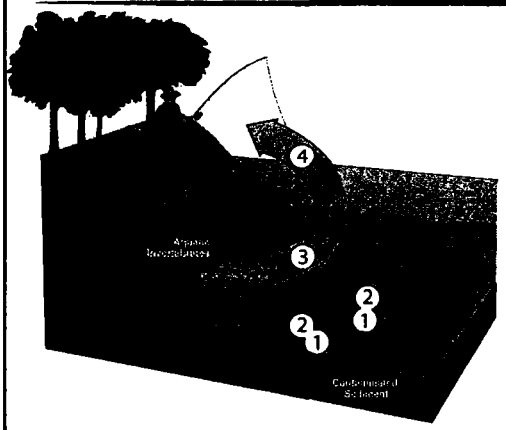
- Ecological receptors – wildlife (birds, fish, mammals), plants, invertebrates, and fish
- Exposure pathways – consumption and direct contact

20

Baseline Ecological Risk Assessment – Major Findings

- Aquatic benthic invertebrate communities appear to be at substantial risk of harm
- Soil invertebrate communities do not appear to be at substantial risk of harm
- Fish, bird, and mammal populations may be at substantial risk of harm from exposure to contaminated sediment
- Bird and mammal populations that consume contaminated prey also may be at substantial risk of harm
- Primary contributors to risk – dioxins and PCBs
- Primary exposure pathway – ingestion of contaminated prey

Baseline Human Health Risk Assessment



- Populations evaluated
  - Residents Living Along the River
  - Visiting Recreational Anglers
  - Commercial/Industrial Employees
  - Subsistence Anglers
- Exposure pathways
  - Fish consumption
  - Direct contact (wading, swimming, fishing)

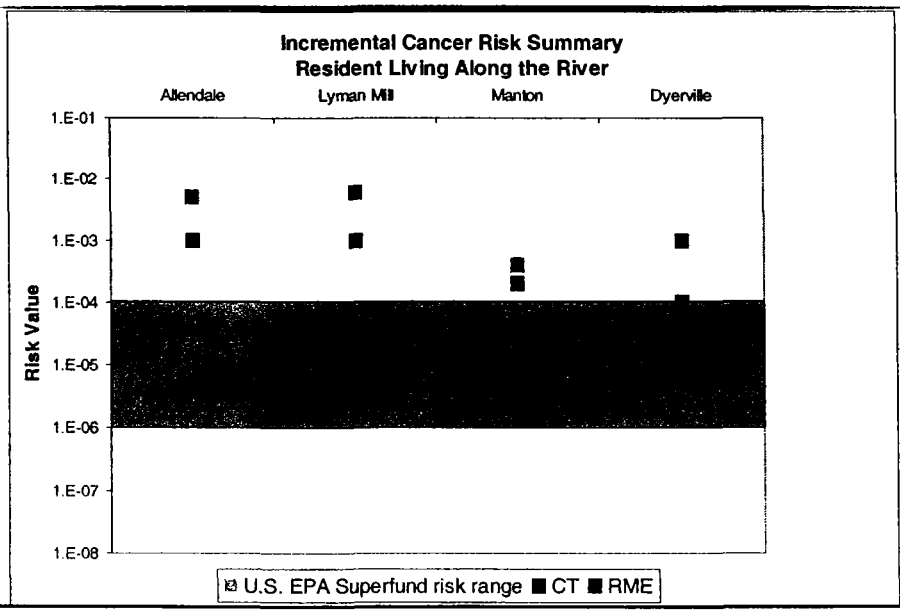
1) Direct (contact) exposure of aquatic insects and fish with sediment
2) Indirect (bioaccumulation) exposure of aquatic insects and fish
3) Fish consume insects
4) People eat contaminated fish

22

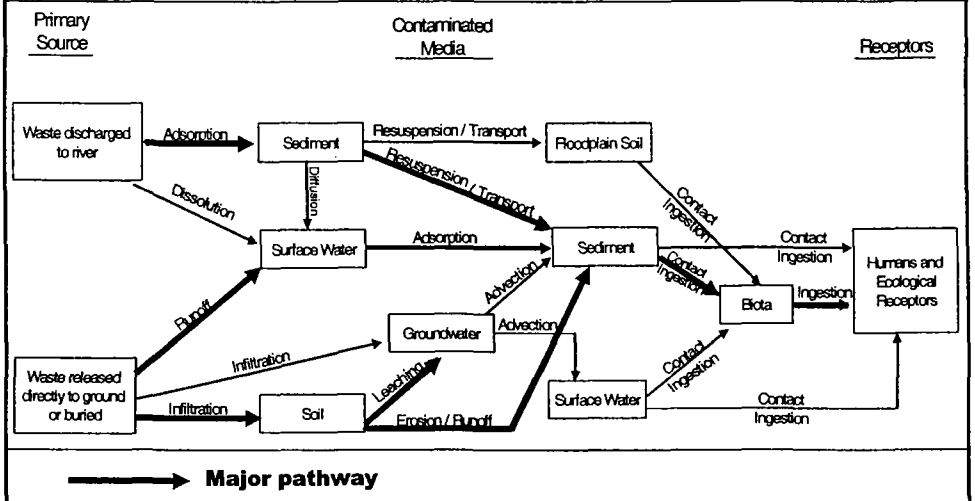
Baseline Human Health Risk Assessment – Major Findings

- Public does not appear to be at risk from coming into contact with surface water and soils
- Workers who come into contact with surface soil at the Fogarty Center do not appear to be at risk
- Residents and visiting recreational anglers may be at risk from coming into contact with sediments from Allendale and Lyman Mill Ponds
- Residents and visiting recreational anglers who eat fish caught at the site appear to be at risk
- Eating contaminated fish appears to be the greatest contributor to cancer and non-cancer risk
- Primary risk drivers are dioxin (cancer) and Aroclor 1254 (non-cancer)

Baseline Human Health Risk Assessment – Major Findings



Conclusions – Conceptual Site Model



25

Conclusions – Contaminated Media

Source Area Soils and Groundwater

- Widespread soil contamination
- Localized groundwater contamination
- Majority areas paved or capped

Pond Sediments

- Downstream reaches – significantly higher dioxin compared to background
- Other COCs not significantly different from background
- Highest dioxin concentrations at Allendale; decrease downstream direction
- No significant dioxin prior to 1940

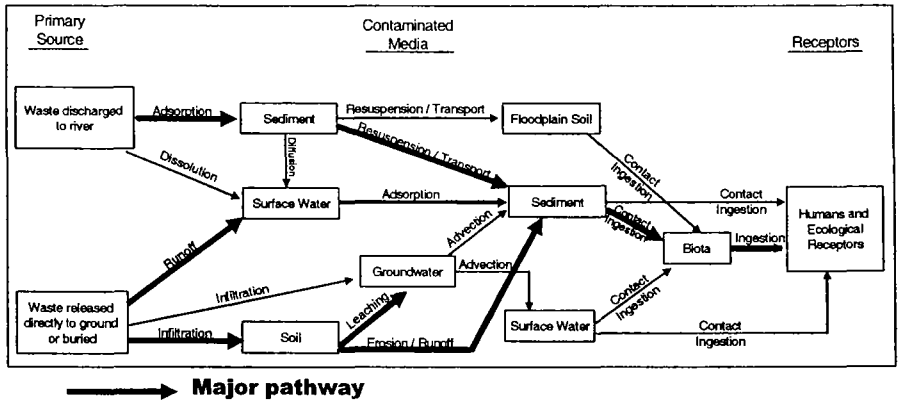
Floodplain Soils

- Dioxin at Allendale and Lyman Mill reaches greater than background
- Ecological habitat areas

26

Conclusions – Secondary Sources/Release

- Contaminated soils → leaching and erosion/runoff
- Contaminated sediments → resuspension and transport
- Bioaccumulation



27

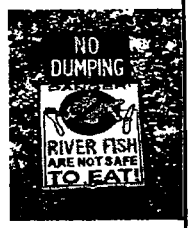
Conclusions – Ecological and Human Health Risks

Ecological

- Fish, bird, and mammal may be at risk
- Primary exposure pathway – consumption of contaminated prey
- Primary risk drivers, dioxin and PCBs
- Greatest risks associated with sediment

Human Health

- Higher cancer and non-cancer risk downstream
- Primary exposure pathway – fish consumption
- Primary risk drivers, dioxin and PCBs
- Allendale and Lyman Mill Ponds pose greatest risk



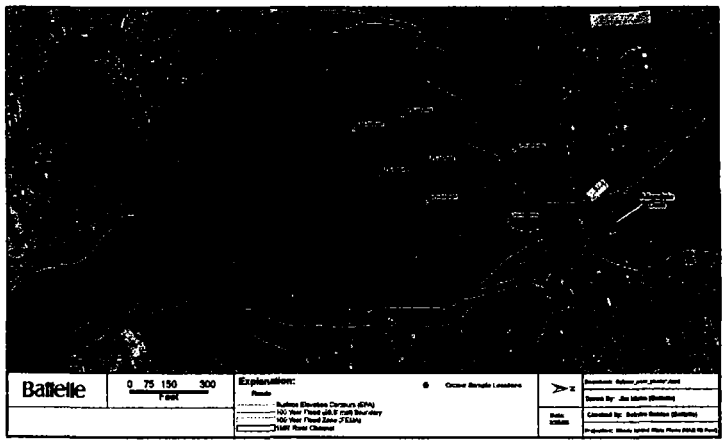
28

Ongoing Investigations

- Oxbow Area Risk Assessment
  - Evaluate potential risk to environment and human health
- Feasibility Study
  - Evaluate risk management strategies and remedial alternatives

29

Oxbow Area Risk Assessment



- Receptors – wildlife (woodcock, shrew, and raccoon) passive recreational user
- Exposure pathways – ingestion and skin contact

30

Feasibility Study

- Action areas – Source Area and reaches of Allendale and Lyman Mill
- Assumes dams remain in place
- Develops remedial action objectives (RAOs)
- Identifies PRGs and cleanup goals
- Identifies areas and volumes of contaminated media
- Identifies, develops, and screens range of alternatives
- Cleanup implemented from upstream to downstream direction

31

The Nine Criteria For Choosing a Cleanup

EPA has developed nine criteria to be used to evaluate remedial alternatives to ensure all important considerations are factored into remedy selection decisions. These criteria are derived from the statutory requirements of Section 121 CERCLA, particularly the long-term effectiveness and related consideration specified in Section 121(b)(1), as well as other additional technical and policy considerations that have proven to be important for selecting among remedial alternatives.

Threshold Criteria: The two most important criteria are statutory requirements that must be satisfied by any alternative in order for it to be eligible for selection.

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (assuming a reasonable maximum exposure) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** addresses whether a remedy will meet all of the applicable, relevant or appropriate federal and state environmental statutes, regulations and requirements or whether a waiver can be justified.

Primary Balancing Criteria: Five primary balancing criteria are used to identify major trade-offs between remedial alternatives. These trade-offs are ultimately balanced to identify the preferred alternative and to select the final remedy.

3. **Long-term effectiveness and permanence** refers to the ability of a remedy to maintain reliable protection of human health and the environment overtime, once cleanup goals have been met.

4. **Reduction of toxicity, mobility or volume through treatment** is the anticipated performance of the treatment technologies a remedy may employ, that is, does the alternative reduce the harmful effects of the contaminants, the spread of contaminants, and the amount of contaminated material through treatment?

5. **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.

6. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option (i.e. treatment machinery, space at an approved disposal facility).

7. **Cost** includes estimated capital and operation and maintenance costs, and net present worth costs.

Modifying Criteria: These criteria may not be considered fully until after the formal public comment period on the Proposed Plan and RI/FS report is complete, although EPA works with the State and community throughout the project.

8. **State Acceptance** addresses the support agency's comments. Where the State or other Federal agency is the lead agency, EPA's acceptance of the selected remedy should be addressed under this criterion. State views on compliance with State ARARs are especially important.

9. **Community Acceptance** refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS report.

Overview of EPA Contaminated Sediment Remediation Guidance

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U.S. EPA New England Region
Office of Site Remediation and Restoration

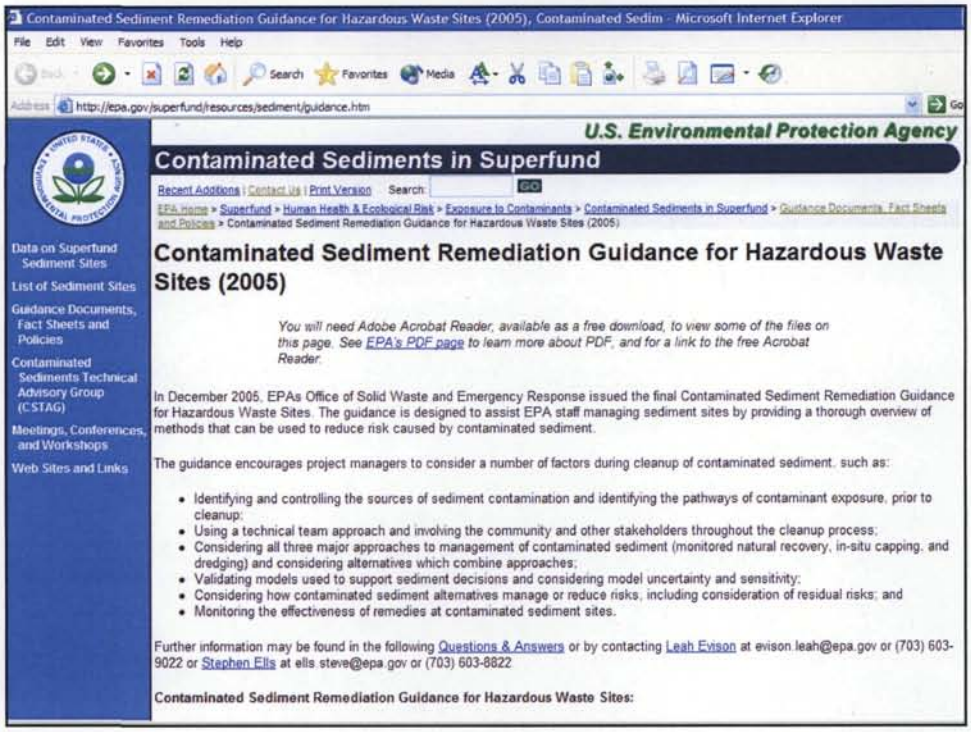
Centredale Dialog Meeting
RIDEM, Providence, Rhode Island
24 April 2006

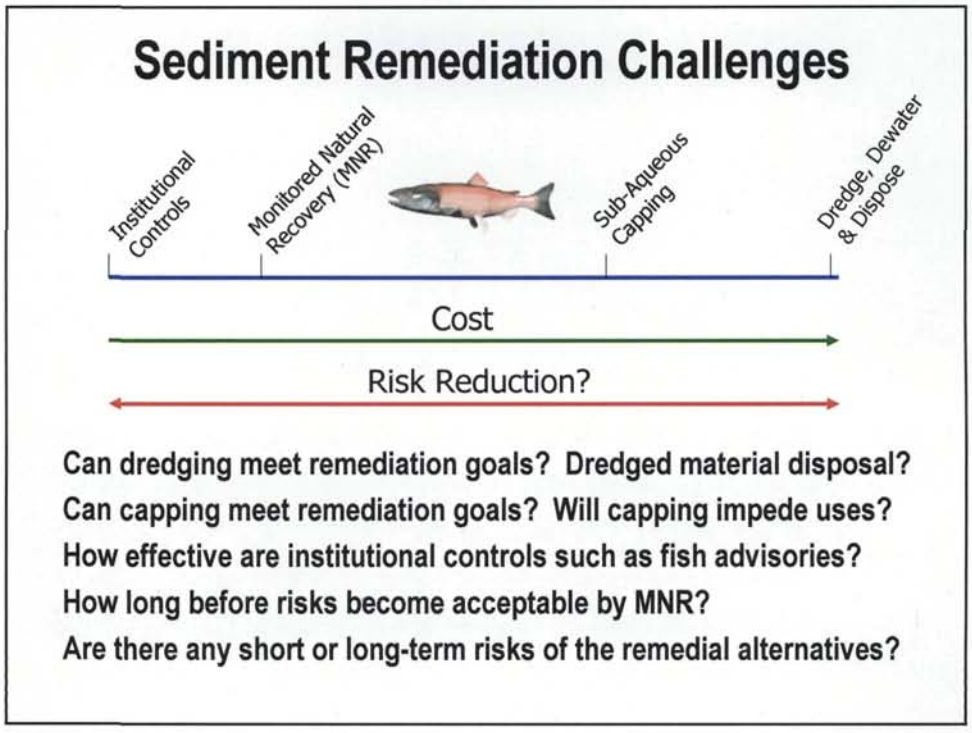
Risk Management Principles #1-6

Control sources early
Involve the community early and often
Coordinate with States, local governments, Tribes, and natural resource Trustees
Develop/and refine a conceptual site model that considers sediment stability
Use an iterative approach in risk-based framework
Evaluate assumptions and uncertainties associated with site characterization data/models

Risk Management Principles #7-11

Select site, project and sediment-specific risk management that will achieve risk-based goals
Ensure that cleanup levels are clearly tied to risk management goals
Maximize the effectiveness of institutional controls and recognize their limitations
Design remedies to minimize short-term risks while achieving long-term protection
Monitor during and after sediment remediation to assess and document remedy effectiveness





Long-term effectiveness/permanence

1. Magnitude of residual risk
2. Adequacy and reliability of controls to manage treatment residuals and untreated waste

This means, evaluate:

Dredging residuals

On-site disposal areas

Sub-aqueous capping

MNR of sediment

What conditions are conducive to monitored natural recovery?

MNR is observed and will continue at a rate that will reduce risks within an acceptable time frame

Human exposure risk is low and can be reasonably managed by Institutional Controls w/in time frame

Sediment bed is stable and expected to remain so

Chemicals of concern are:

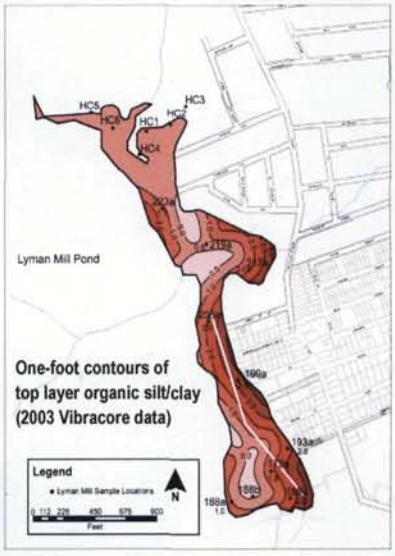
- Decreasing in biota and sediment
- Low in concentration and are dispersed
- Not prone to bioaccumulate

What conditions are conducive to sub-aqueous capping?

- Suitable cap material is available
- Compatible with other uses/infrastructures
- Water depths are adequate for anticipated uses
- No vessel anchoring or mooring
- Range of hydrodynamic conditions can be accommodated (flood velocities, ice scour)
- Low chance of ground water discharge through the cap that could create unacceptable releases
- Sediment has sufficient strength to support cap
- Contamination covers contiguous areas

Capping can reduce risk in 3 ways

- <u>Physical isolation</u> of contamination is sufficient to reduce exposure
- <u>Stabilization</u> of underlying sediment against erosion, particle resuspension and transport
- <u>Chemical isolation</u> of contamination is sufficient to reduce chemical mobilization and migration



What conditions are conducive to dredging or excavation?

- Suitable disposal site is available
- Areas are available or staging and material handling
- Navigational dredging is already planned
- Water depth is adequate to accommodate equipment (*i.e.*, draft of barge, excavation in the dry)
- Over-dredging is feasible (bedrock absent or limited)
- Low incidence of submerged debris
- Contaminant concentrations are high and cover discrete areas

All aspects of dredging or excavation should be evaluated

- Debris removal
- Sediment removal
- Materials transport
- Equipment staging
- De-watering
- Treatment
- Disposal

Monitoring during and after the remedial action is essential

- Assess compliance w/design & performance stds.
- Assess short-term remedy performance and effectiveness in achieving target cleanup levels
- Evaluate long-term remedy effectiveness in achieving RAOs and reducing risks
- Remedy is reviewed after five-years

How is it decided if the remedy was successful?

- The selected sediment chemical or biological cleanup levels have been met and maintained over time in the long run
- All relevant risks have been reduced to acceptable levels for the anticipated future uses of the water body (*e.g.*, RAOs in the ROD have been met)

QUESTIONS?