Centredale Manor Restoration Project Superfund Site

Public Meeting July 21, 2011

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Superfund Process

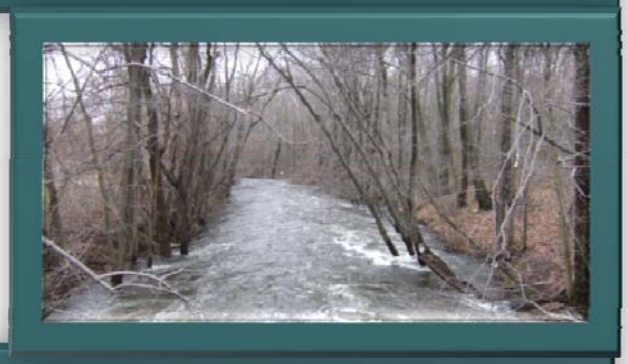
Where we are now

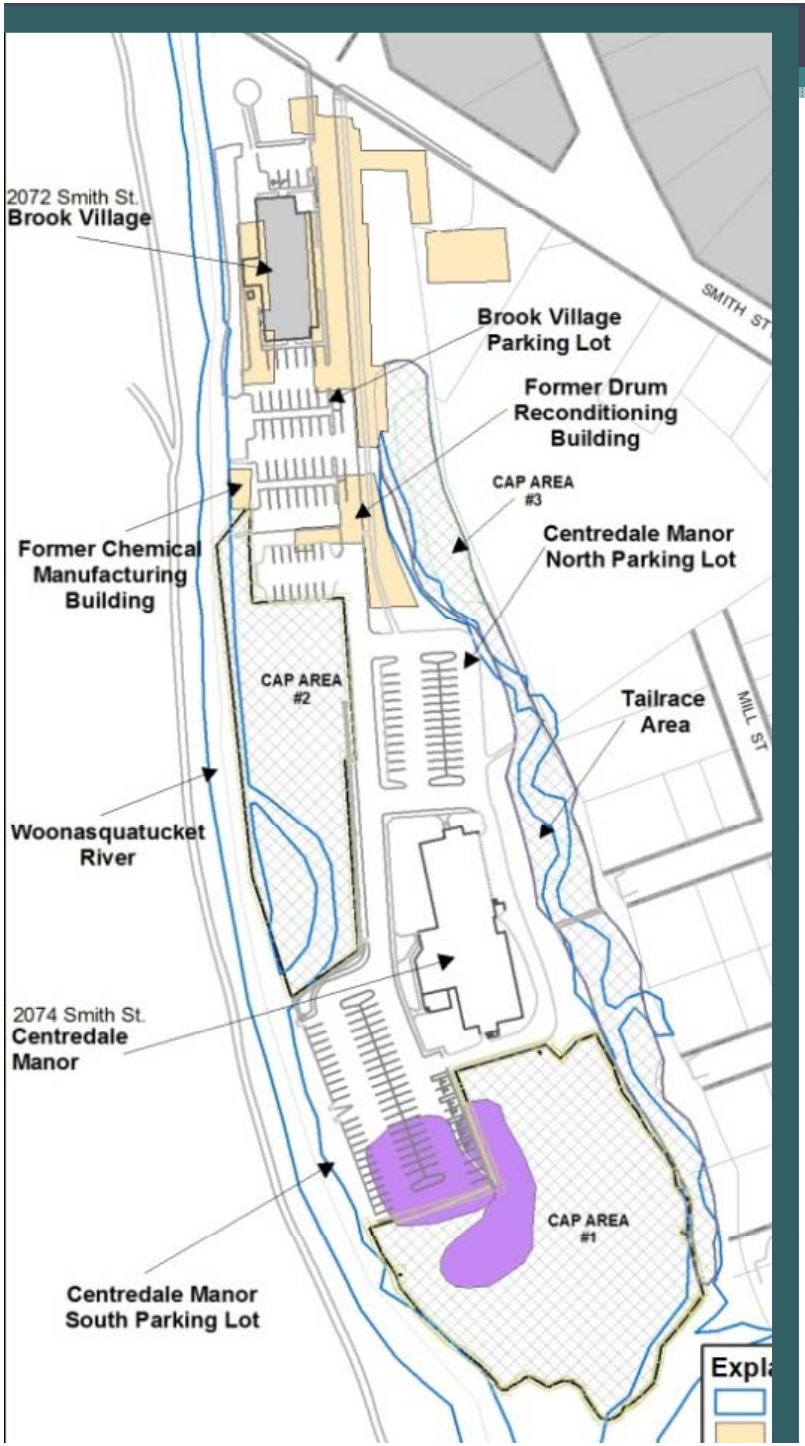
Site Map

SMITHFIELD
NORTH PROVIDENCE
JOHNSTON
Greystone Mill Pond
Woonasquatucket River
Brook Village
Route 44
Enlarged Area on Figure 1-2
Centredale Manor
Allendale Pond
Allendale Dam
Oxbow Area
Abandoned Mill Raceway
Assapumpset Pond
Assapumpset Brook
Lyman Mill Pond
Lyman Mill Dam
NORTH PROVIDENCE
PROVIDENCE
Manton Pond
Manton Dam
Former Dyerville Pond
Former Dyerville Dam
JOHNSTON
RI
N

Site and Surrounding Area

- **Source Area**
  - Brook Village and Centredale Manor apartment complexes
- **Woonasquatucket River**
  - Recognized within the larger Blackstone River drainage as one of the 14 American Heritage Rivers
  - Focus of urban revitalization and watershed restoration
  - Dams, prone to flooding
- **Oxbow**
  - Undeveloped woods
  - 27 acre high value forested wetland





Facility History

- Chemical manufacturing activities: 1943-1970s
- Drum recycling activities: 1952- 1970s
- Potential buried waste

Environmental Actions

1800s	Textile mills and dams constructed
1940s–1970s	Chemical manufacturing and drum recycling activities
1965	Hexachlorophene manufactured
1972	Fire destroys most property structures
1977, 1982	Brook Village and Centredale Manor apartments constructed
1982	RIDEM directed off-site disposal of ~400 drums and 6,000 cubic yards of contaminated soil
1996	Dioxin detected in fish from Woonasquatucket River
1999–2010	Short-term cleanup actions
2000	Becomes a federal Superfund Site
1996–2005	Studies to characterize nature and extent of contamination
2005-2011	Additional studies and feasibility study with cleanup options

Four Short-Term Cleanups

First Short-Term Cleanup 1999-2000

- Construction of 2 interim soil caps in areas prone to flooding

- Installation of fencing to restrict access along Allendale Pond

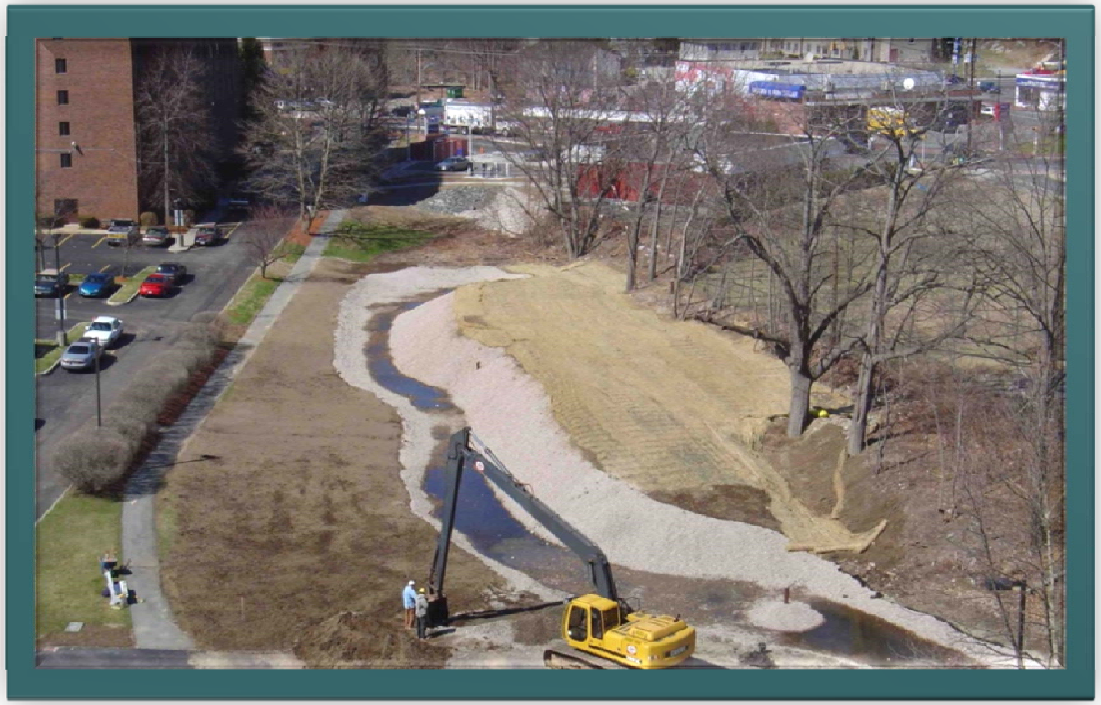
Second Short-Term Cleanup 2001-2003

- Reconstruction of breached Allendale Dam
- Restoration to pre-1991 pond levels
- Excavation of contaminated floodplain soil from residential properties along Allendale and Lyman Mill ponds & off-site disposal

Restored Allendale Dam

Third Short-Term Cleanup 2003-2004

- Installing soil and stone aggregate cap in Source Area's former tailrace



- Reconstruction of

at head of drainage channel

Fourth Short-Term Cleanup:2009-2010

- Focused on discharge of contaminated groundwater into river
- Excavation of soil from Brook Village parking lot & contaminated soil disposed off-site
- Installed cap with impermeable liner

Remedial Investigation

Remedial Investigation

Purpose:

- To better understand site contamination
- Collect information needed to identify any potential human health & ecological risks
- Used to make decisions regarding the long-term cleanup of a site

Remedial Investigation Conclusions

- Control measures taken at Source Area
- Sediment resuspension and downstream transport primary movement of contaminants
- Site contamination enters and builds up in food chain
- Eating fish over long-term primary concern and direct contact with sediment or soil present long-term risks

What was Found in Source Area Soil

- Dioxin, PCBs, VOCs, SVOCs, pesticides and metals above environmental standards
- Contaminant levels generally decrease with depth, with only localized contamination at depths greater than 5 feet
- Majority of contaminated soils located in paved or capped areas
- Buried waste

What was Found in Groundwater

- Source Area contamination above federal standards at 25 out of 37 monitoring wells
- TCE and PCE most common contaminants detected
- Dioxin in groundwater under Brook Village parking lot where it discharges into river
- Likely discharges no longer present after 2009 short-term cleanup action
- Surface water levels for most contaminants comparable with background levels

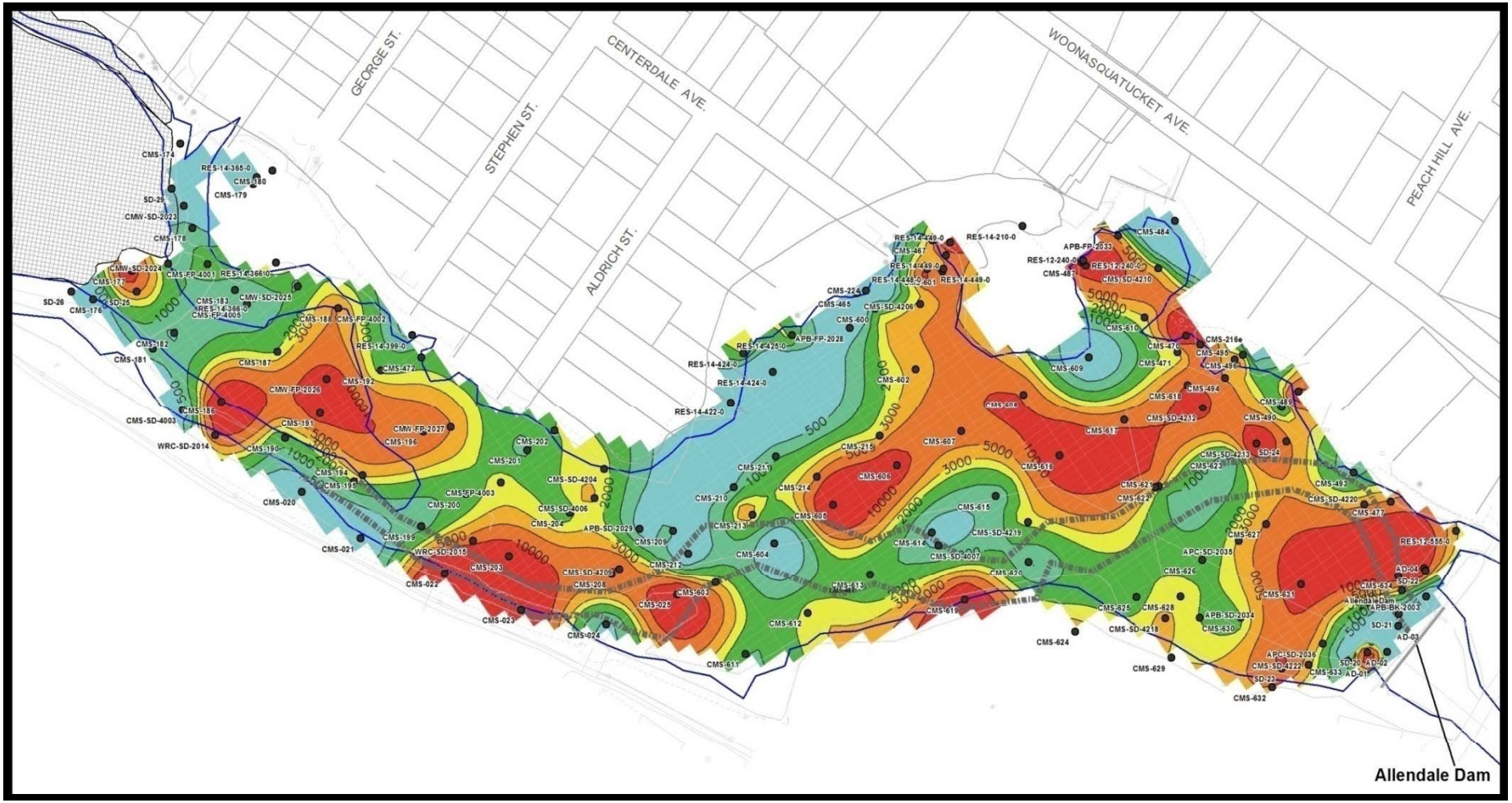
What Was Found in Floodplain Soil

- 2010 Oxbow investigation confirmed widespread contamination with highest levels in areas previously identified
- Wetland below Allendale dam has been a sediment depositional area
- Lower contaminant levels outside areas prone to flooding

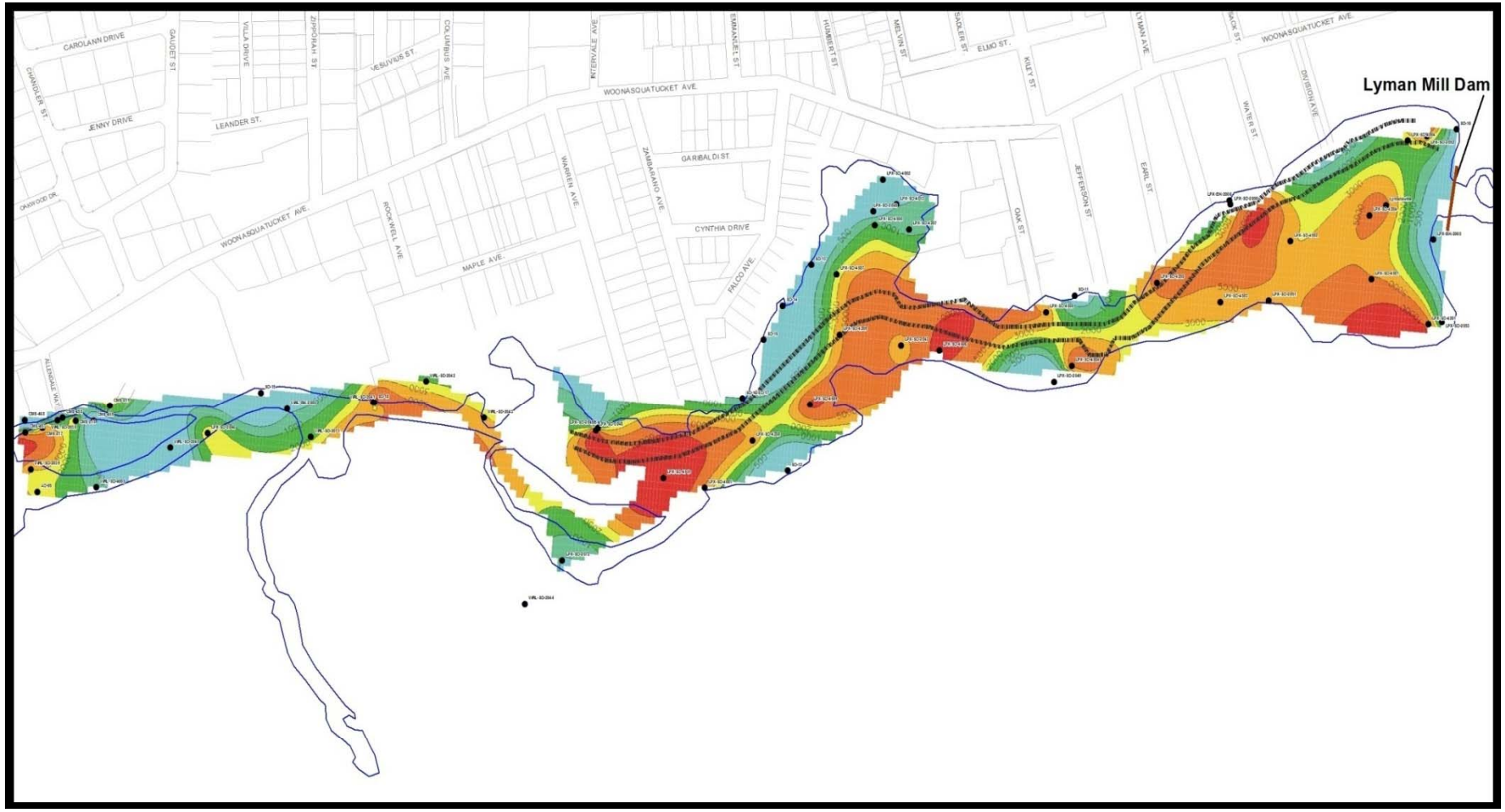
What was Found in Sediment and Fish

- Contamination levels highest in top 1- 2 ft of pond sediment
- Contaminant levels decrease in downstream direction
- Entire sediment footprint for both ponds have elevated dioxin levels, some other chemicals are similar to background
- Fish and other wildlife have elevated levels of dioxin, PCBs and other contaminants

Allendale Sediment Dioxin Contamination

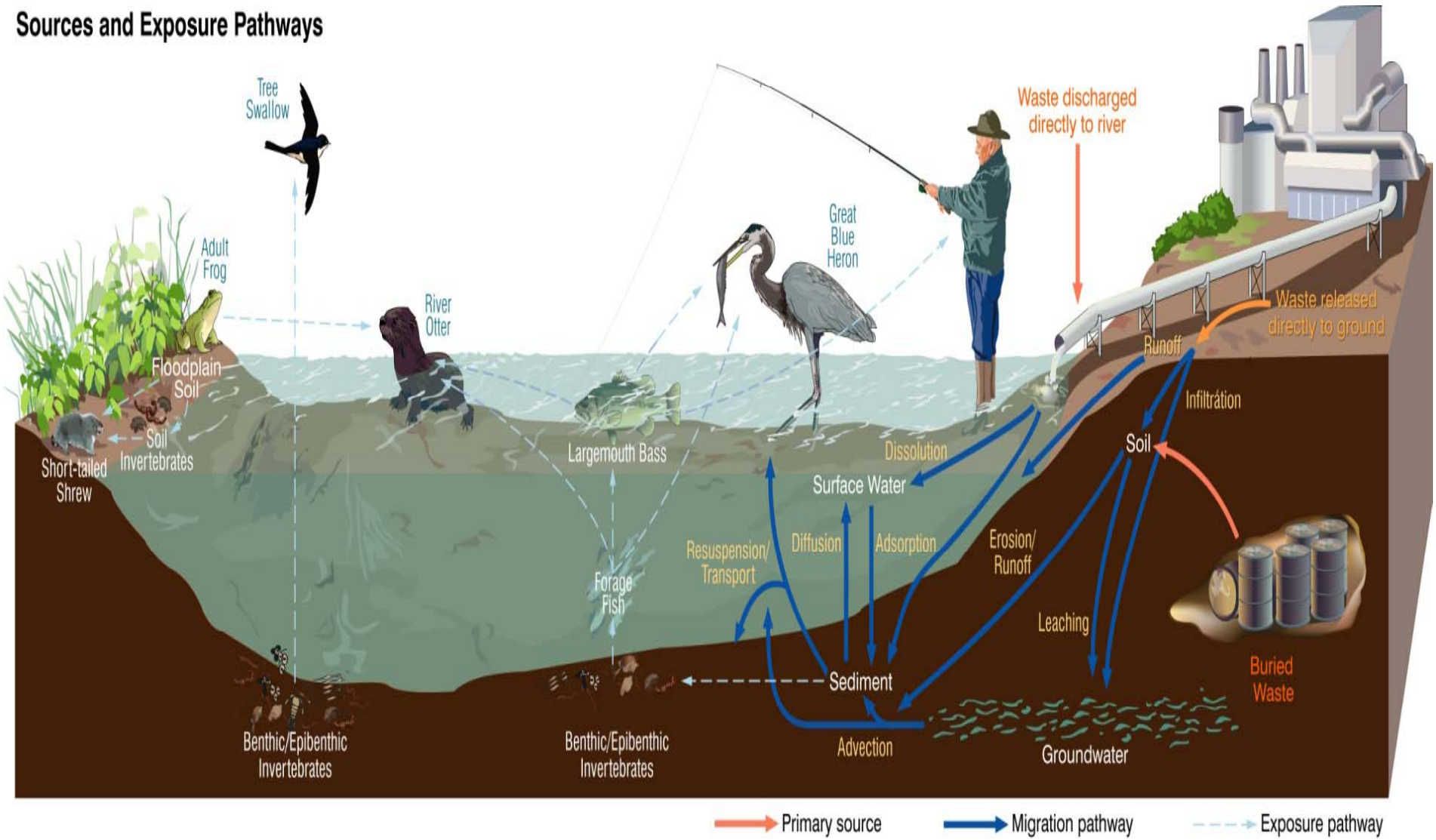


Lyman Mill Sediment Dioxin Contamination



Risk Assessments

Conceptual Site Model



Human Receptors and Exposure Pathways

Fish, Surface Water, Sediment, Soil

Residents Living Along River

- Ingestion of fish
- Ingestion of and dermal contact with surface water, sediment, and floodplain soil

Fish, Surface Water, Sediment, Soil

Visiting Recreational Anglers

- Ingestion of fish
- Ingestion of and dermal contact with surface water, sediment, and floodplain soil

Soil

Passive Recreational Visitors

- Ingestion of and dermal contact with floodplain soil

Site Exposure Assumptions

Eating contaminated fish

Direct contact with contaminated sediment:

- Direct skin contact or accidental ingestion

Assumed exposure frequencies

- Eating fish 350 days a year for 30 years:
  - 14 grams per day (adult)
  - 9.3 grams per day (older child)
  - 4.7 grams per day (young child)
- Direct sediment contact for 30 years:
  - 100 milligrams per day (adult)
  - 200 milligrams per day (child)
  - wade and swim 4 days a week from June to August

How Toxic are Site Contaminants

Used EPA toxicity data to estimate potential non-cancer and cancer health effects

- Non-cancer hazard is comparison of allowable exposure$_t$ o amount of exposure estimated at the site
- Cancer risk is the increased probability of getting cancer

Potential Health Risks

Allendale Pond

- Eating contaminated fish may pose 5 in 1,000 chance of causing cancer and may pose non-cancer health effects 30 times greater than acceptable level of 1 for residents along river and visiting recreational anglers.
- Having direct skin contact with or accidently ingesting contaminated sediment may pose a 2 in 10,000 chance of causing cancer for residents along river.

Lyman Mill Pond

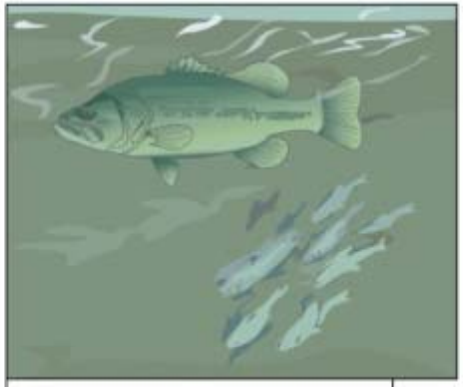
- Eating contaminated fish may pose 6 in 1,000 chance of causing cancer and may pose non-cancer health effects 30 times greater than acceptable level of 1 for residents along river and visiting recreational anglers.
- Having direct skin contact with or accidently ingesting contaminated sediment may pose 3 in 10,000 chance of causing cancer for residents along river.

Ecological Receptors and Exposure Pathways

Surface Water, Sediment, Soil

Terrestrial/Aquatic Invertebrates

- Ingestion of and direct contact with surface water, sediment, and floodplain soils



Biota, Surface Water, Sediment

Forage Fish and Piscivorous (Largemouth Bass) Fish

- Ingestion of and direct contact with surface water and sediment
- Ingestion of aquatic biota

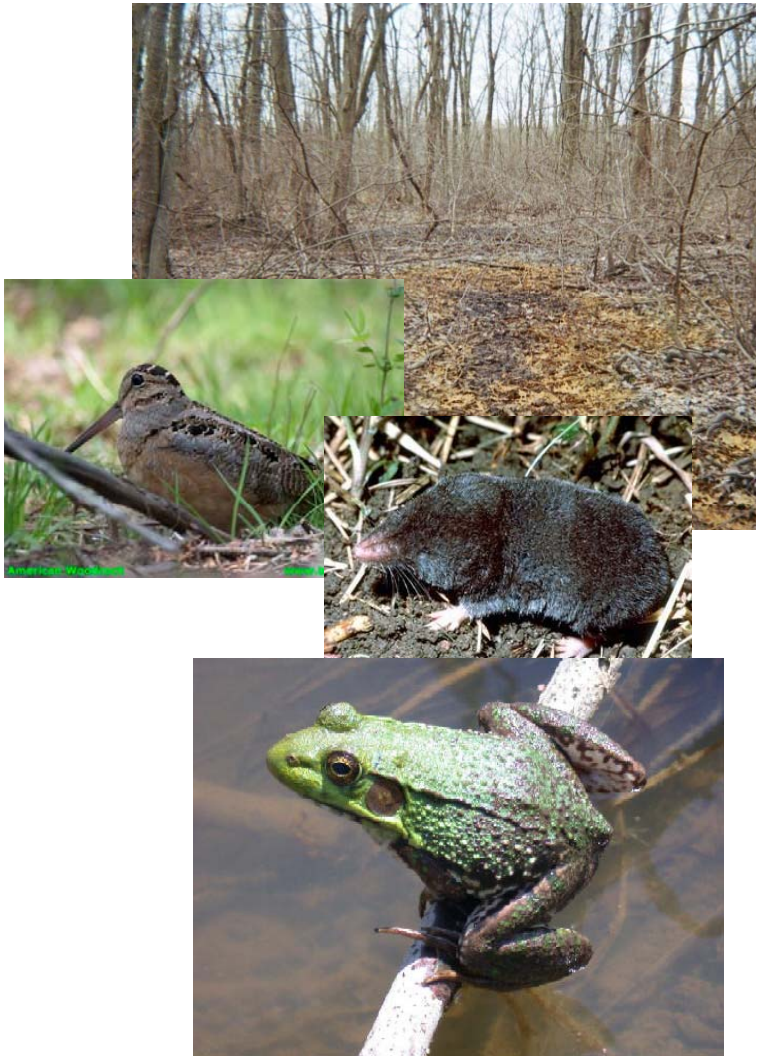
Biota, Surface Water, Sediment, Soil

Piscivorous and Insectivorous Wildlife

- Ingestion of aquatic and floodplain biota
- Ingestion of and direct contact with surface water, sediment, and floodplain soil

THREATS TO THE ENVIRONMENT

- Birds and other wildlife that forage for food in:
  - Allendale Pond aquatic and wetland habitats (1,000 times above acceptable level)
  - Oxbow Area aquatic habitat in between Allendale Pond and Lyman Mill Pond (100 times above acceptable level)
  - Lyman Mill Pond wetland habitats (100 times above acceptable level)
- A high-level of exposure to site contaminants and a significantly reduced egg hatchability was measured in tree swallow populations in Allendale and Lyman Mill Ponds.



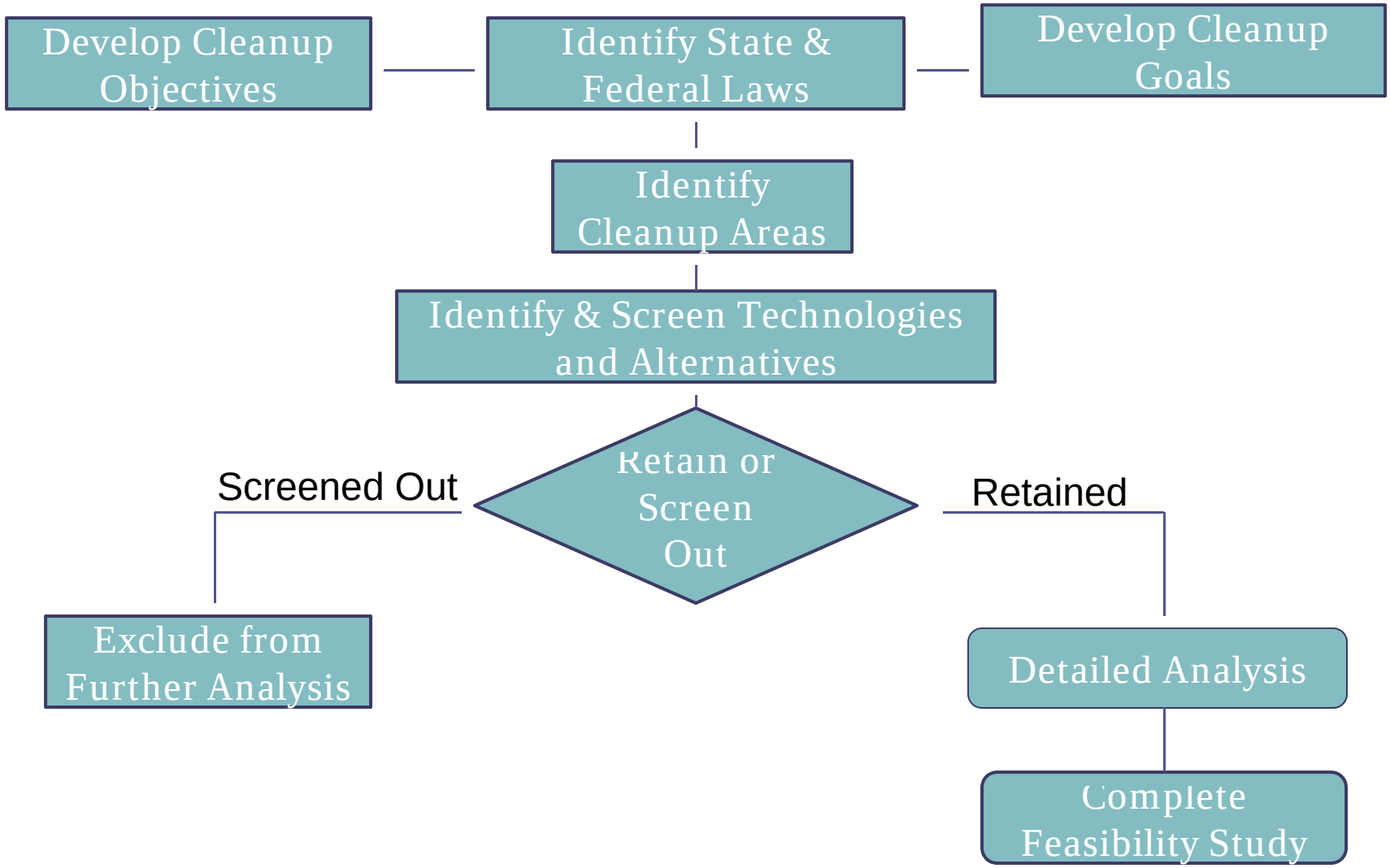
Feasibility Study

Feasibility Study

Purpose:

- Develops cleanup alternatives to address the identified risks and exceedances of environmental standards
- Achieves site cleanup objectives

Feasibility Study



Cleanup Objectives

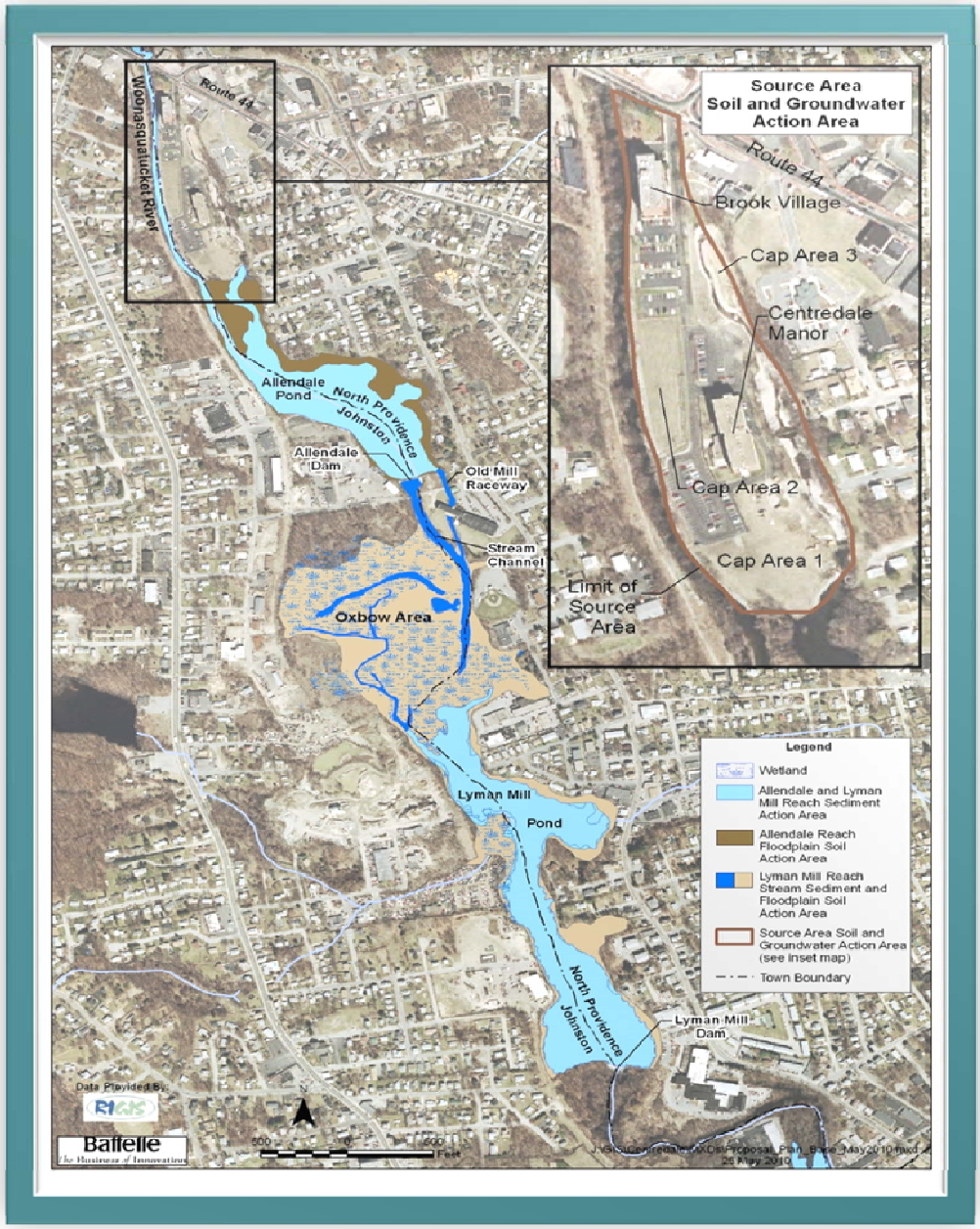
What the cleanup is expected to accomplish:

Eliminate unacceptable risks to human health and the environment

Comply with environmental regulations

Minimize short-term impacts and optimize long-term benefits for wildlife

Minimize potential downstream migration of contaminated sediment or floodplain soil



Cleanup Action Areas

1. Source Area Soil
2. Groundwater
3. Allendale Pond and Lyman Mill Pond Sediment
4. Allendale Floodplain Soil
5. Lyman Mill Stream Sediment and Floodplain Soil (including Oxbow Area)

Site Cleanup Levels

- The Cleanup Level is based on either:
  - Federal or State Regulations
  - Site-Specific Calculated Risks
  - Background
- If several standards exist for the same contaminant then the most stringent one is used
- However, EPA cannot cleanup below background levels

Cleanup Level Examples

Area	Contaminant	Level	Basis
Source Area Soil	Dioxin PCBs	1 part per billion 1 part per million	Federal Regulation
Groundwater in Source Area	Dioxin PCE and TCE	0.03 parts per trillion 5 parts per billion	Federal Regulation
Sediment	Dioxin PCBs	14.7 parts per trillion 0.21 parts per million	Background
Floodplain Soil	Dioxin	35 parts per trillion	Ecological Risk

Fish Target
Dioxin 2.2 parts per trillion
PCBs 0.076 parts per million

General Cleanup Approaches Cleanup Area #1

Source Area Soil

I. Take no action

II. Upgrade or reconstruct existing caps

- Active cleanup $20+ million (will be updated in Feasibility Study addendum)
- Active cleanup to take under 1 year

Cleanup Approach Taken
Cleanup Area #2

Groundwater

- Nearly 2,300 tons of soil shipped off-site to Canada
- 2.5 ft thick cap installed --including a geomembrane
- Two groundwater monitoring wells installed & tested
- Parking lot and landscaping restored
- Approximate cost $2.7 million
- Long-term monitoring will occur

General Cleanup Approaches Cleanup Areas #3-5

I. Take no action

II. Cap or cover contaminated soil and sediment in place

III. Excavate and dispose of contaminated soil & sediment

- Possible combination of II & III
- Replacement of dams with smaller weirs also considered

Disposal and Treatment Options

- Upland Confined Disposal Facility
- Nearshore Confined Disposal Facility
- On-Site Incineration
- Off-Site Disposal/Treatment

Allendale and Lyman Mill Sediment Cleanup Area (Cleanup Area #3)

- Excavation areas from 16 – 40 acres and volumes from 56,000 - 160,000 cubic yards
- Cap with partial excavation
- Loss of open water of up to 23 acres if dams are removed
- Cleanups with Confined Disposal Facility disposal options $35 -65 million
- Cleanups with treatment/off-site disposal are $65 - $120 million

Floodplain Soil (Cleanup Areas #4 & 5)

- Oxbow cleanup approaches being updated in Feasibility Study Addendum
- 20+ acres and 40,000+ cubic yard of contaminated soil and sediment
- Excavation areas from 1/3 to 2/3 of Oxbow/Lyman Mill and all of Allendale areas, thin soil cover over remainder in Oxbow
- Cleanups with upland or near-shore Confined Disposal Facilities $11-18 million
- Each cleanup approach with treatment/off-site disposal about twice the cost of using Confined Disposal Facilities

Review Process

- Contaminated Sediment Technical Advisory Group Review 2004, 2010
- Dialogue Group Meetings
- National Remedy Review Board 2010
  - Stakeholder input to Review Board

Next Steps

The Superfund Process:
from Discovery to Cleanup
assess
Start
Discover a new site.
Evaluate site's contamination level & determine required cleanup type.
Brownfields Program Cleanup
State-led, RCRA or UST Cleanup
Long-term Cleanup
Short-term Cleanup
Short-term actions may be taken to eliminate immediate public health or environmental threats.
Finish
Site complete and ready for future use!
Maintain & monitor site
Site Cleanup
Develop engineering designs
act
Identify those responsible for contamination
Determine type & extent of contamination; evaluate options
Include site on National Priorities List (NPL).
Propose Cleanup Plan
investigate
Choose Cleanup Plan.

In the Meantime…

DON’T

- Don’t Eat Fish, Eels, Turtles, other Wildlife or Plants;
- Don’t Swim or Wade;
- Don't Dig into River Banks.

Use the River Wisely

DO:

- Walk, run, or bike along the river;
- Paddle a canoe or kayak on the river;
- Wash thoroughly after any contact with the river water or sediment.

Questions & Answers