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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

JACOB K. JAVITS FEDERAL BUILDING

NEW YORK, NEW YORK 10278-0012

# HUDSON RIVER PCBs SITE
# REASSESSMENT RI/FS
# HUDSON RIVER PCB OVERSIGHT COMMITTEE
# OCTOBER 20, 1993, 7:30 PM
# NEW PALTZ, NEW YORK

## AGENDA

| | |
|---|---|
| Welcome and Introduction (10 min) | Bill McCabe, USEPA<br>Deputy Director |
| Agency/Citizen Activities<br>Relating to the Hudson River (20 min) | Committee Members |
| Reassessment Status Update: (90 min) | |
| Introduction | Al DiBernardo, TAMS<br>Project Manager |
| Ecological Assessment | Helen Chernoff, TAMS |
| Feasibility Study | Bruce Fidler, TAMS |
| Geochemical | Ed Garvey, TAMS |
| Modelling | Jon Butcher, Cadmus |
| Quality Assurance/<br>Database Management | Susan Chapnick, Gradient |
| Summary of Reassessment Activities<br>(10 min) | Douglas Tomchuk, USEPA<br>Project Manager |
| Discussion | Facilitated by:<br>Bill McCabe, USEPA |
| Closing and Adjournment | Bill McCabe, USEPA |

# DESIGN OF HUDSON RIVER ECOLOGICAL RISK ASSESSMENT

- Quantitative Assessment of a Known Contaminant (PCBs) with Historical Data Available
- Concerns of Government Agencies and the Public

# ECOLOGICAL EFFECTS

- Individual Organisms
  - Upper and Lower Hudson River
- Populations
  - Upper Hudson River, Thompson Island Pool
- Communities
  - Upper Hudson River, Thompson Island Pool
- Food Chain/Web
  - Modeling

# COORDINATION

- USEPA
- NYSDEC
- NOAA

Discussion of Work Plan: September 1992

Field Reconnaissance: May 1993

Field Sampling: August 1993

# FIELD SAMPLING EFFORT

- USEPA - Sediment, Benthic Invertebrates and Water Column Sampling

- NYSDEC/NOAA - Resident and Mobile Fish Species Sampling

19 Stations Total

- 10 Stations in Upper Hudson (5 in Thompson Island Pool)

- 9 Stations in Lower Hudson (4 Nat'l Estaurine Sanctuaries)

# SUMMARY OF ECOLOGICAL SAMPLES

| Parameter | Number of Samples |
|---|---|
| Sediment | |
| PCB | 117 |
| TOC | 99 |
| TIC | 40 |
| TC/TN | 40 |
| Metals | 41 |
| Grain Size | 97 |
| Benthic Invertebrates | |
| Sorting | 66 |
| PCB & Lipid Content | 135 |
| Biomass | 52 |
| Abundance & Diversity | 52 |

# DECISION MAKING TOOLS

- Do current levels of PCBs in the Hudson River have the potential to cause adverse health effects in the biota ?

- If so, can we estimate the time required for PCB concentrations to drop to acceptable risk levels ?

# APPROACH

- Incorporate Phase 1
- Update Technology Information
- Utilize Previous Work
- Allow FS Process to Provide Solution

- Remedial Action Objectives
- General Response Actions
- Remedial Technologies and Process Options
- Remedial Alternatives
- Detailed Analysis of Alternatives

# RESPONSE ACTIONS/ ALTERNATIVES CATEGORIES

- No Action or Institutional Actions
- Containment (Capping)
- In Situ Treatment
- Removal / Disposal
- Removal / Ex Situ Treatment / Disposal

# TREATMENT TECHNOLOGIES

- Bioremediation
- Soil Washing
- Solvent Extraction
- Dechlorination
- Thermal Desorption
- Incineration
- Solidification / Stabilization

# DREDGING OPTIONS

- Bank to Bank
- "Hot Spots"
- Behind Dams (Sediment Sinks)

# DISPOSAL OPTIONS

<u>Treated or Untreated Dredge Spoils</u>

- Offsite TSCA Landfill
- Upland TSCA Landfill
- Contained Aquatic Disposal
- Near-shore Confined Disposal Facility (TSCA)
- In-river Confined Disposal Facility (TSCA)
- Upland Confined Disposal Facility (TSCA)

<u>Treated or Low Concentration Dredge Spoils</u>

- Offsite Sanitary Landfill
- Beneficial Use - Sanitary Landfill Cover

# HUDSON RIVER PHASE 3 REPORT - FEASIBILITY STUDY
## INITIAL TECHNOLOGY SCREENING

| GENERAL RESPONSE | REMEDIAL TECHNOLOGY | PROCESS OPTION | DESCRIPTION | SCREENING COMMENTS |
|---|---|---|---|---|
| NO ACTION | NONE | NONE | No remedial or institutional actions. | Required for consideration by NCP. |
| INSTITUTIONAL ACTIONS | MONITORING | WATER COLUMN SAMPLING | Surface water sampling in space or time series at strategic locations. | Potentially applicable. |
| | | SEDIMENT CORING | High resolution coring with analysis for beryllium bearing strata. | Potentially applicable. |
| | | FISH SAMPLING | Periodic sampling of fish flesh to determine trends in PCB uptake and edibility. | Potentially applicable. |
| | | BIOTA SAMPLING | Periodic sampling of benthic and other organisms at strategic locations to determine trends in PCB uptake and species abundance and diversity. | Potentially applicable. |
| | | GROUNDWATER SAMPLING | Installation and periodic sampling of monitoring wells near known or suspected source areas. | Potentially applicable. |
| | | AIR SAMPLING | Periodic or continuous monitoring of airborne PCBs and PCB-bearing particulates at strategic locations to determine emissions and inventory losses. | Potentially applicable; however, may not be necessary with a well-designed water column monitoring program. |
| | SITE USE RESTRICTIONS | FISHING BAN | Continuation of existing fishing bans. | Potentially applicable. |
| | | LIMIT RECREATIONAL USE | Restrict swimming and boating on the river. | Potentially applicable. |
| | | SEDIMENT REMOVAL CONTROLS | Establish operational restrictions on sediment removal activities to control sediment resuspension and downstream transport. Could result in limits on channel maintenance by NYS Thruway Authority Dept. of Canals in contravention of current state constitutional requirements. | Potentially applicable. |

PRELIMINARY PRELIMINARY



DRAFT

| GENERAL RESPONSE | REMEDIAL TECHNOLOGY | PROCESS OPTION | DESCRIPTION | SCREENING COMMENTS |
|---|---|---|---|---|
| REMOVAL TECHNOLOGIES | ENVIRONMENTAL DREDGING | MECHANICAL | Sediments removed by direct mechanical force. Types include dipper, bucket (clamshell, orange peel, gradall dragline and bucket ladder), and ladder dredges. Watertight bucket is available for clamshell to reduce sediment resuspension. Sediment is placed in scows, trucks, or hopper barges, or slurried and pumped. | Watertight clamshell potentially applicable with proper operational controls. Other types not applicable due to excessive resuspension of contaminated sediment. |
| | | HYDRAULIC | Centrifugal pumps used to dredge sediments in slurry form. Types include trailing suction, plain suction, dustpan, cutterhead, matchbox, Refresher, Clean-up, waterless, Delta, ooze, and horizontal auger (i.e., Mudcat). Sediment may be placed in hoppers or scows, or pumped for sidecast discharge or through a floating pipeline. | Cutterhead and Mudcat are potentially applicable. Others are too large, inappropriate for the types and depths of sediments to be encountered, or not widely available in the US. |
| | | PNEUMATIC | For pneumatic pump types, hydrostatic pressure differential causes soft or loosened sediments to flow into multiple cylinders under atmospheric pressure or vacuum. Compressed air forces sediment to the surface; check valves maintain direction of flow. Near in situ density removal is possible for soft materials. Discharge is normally through a floating pipeline. Types include Pneuma and Oozer (which may also be equipped with special suction and cutter heads). Airlift types use compressed air to generate currents up a tube which draw sediments to the surface. | Not applicable to the range of sediment types or depths to be encountered. Not widely available in the US. |
| | EXCAVATION | CONVENTIONAL EQUIPMENT | Conventional equipment (clamshell, dragline, gradall, backhoe, bulldozer, etc.) used to remove sediment as a shore-based operation. | Not applicable. Not feasible for broad application. Potentially useful as a component of a dredging program for near-shore areas which are shallow or otherwise inaccessible to dredging vessels. |

| GENERAL RESPONSE | REMEDIAL TECHNOLOGY | PROCESS OPTION | DESCRIPTION | SCREENING COMMENTS |
|---|---|---|---|---|
| EX SITU TREATMENT | DECHLORINATION | KOHPEG (GRC) | Contaminants are extracted from the soil surface into the reagent phase where the PCBs are dechlorinated. The reagents are potassium hydroxide and polyethylene glycol. PCB concentrations of 440-7,300 ppm have been reduced 99% in sediments. | Potentially applicable. |
| | SOLVENT EXTRACTION | B.E.S.T. (RCC) | Triethylamine (TEA) solvent used to separate the PCB/oil fraction from the sediment. The extract is heated to remove the water. TEA is steam stripped from the PCB and oil. The contaminants are destroyed by incineration or other means. Over 97% removal efficiency using 3 extraction steps has been obtained. | Potentially applicable. |
| | | L.E.E.P. (ART INTL.) | PCBs are leached from sediments using acetone, then concentrated in kerosene by liquid-liquid extraction Acetone is recycled, kerosene is destroyed with the PCBs. 99.9% PCB removal was achieved in a study using sediments with initial concentration 33,600 ppm. | Potentially applicable. |
| | | PROPANE EXTRACTION (CF SYSTEMS) | Uses liquified $CO_2$ and hydrocarbon gasses, such as propane and butane, as the extracting medium. PCB removal efficiencies of 90% were achieved in New Bedford Harbor sediments with initial concentrations of 350 - 2,500 ppm. | Potentially applicable. |
| | | ACUREX SOLVENT WASH PROCESS | Removes 50% of PCBs per wash down to a residual level of 2 ppm using proprietary freon-type solvents tailored to the particular sediment. At least 60% solids required for feed. | Not applicable. Fine-grained sediment causes materials handling difficulties - may remain in solvent after settling. |
| | | OH MATERIALS EXTRACTION PROCESS | Methanol used as the extraction solvent. Dried treated sediment is spread out in the open air and periodically turned until methanol remnants are degraded. Efficiencies to 97% are claimed. Solvent is recycled using activated carbon or incinerated. Field testing is underway. | Not applicable. Fine-grained material and water in the feed present difficulties. |

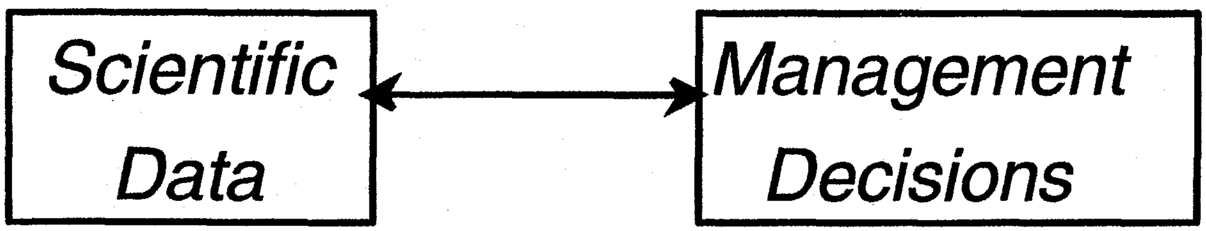
# ROLE OF MODELING IN THE REASSESSMENT

- Predict Future Conditions
- Evaluate Possible Effects of Remedial Actions
- Provide a Rational Basis for Management Decisions

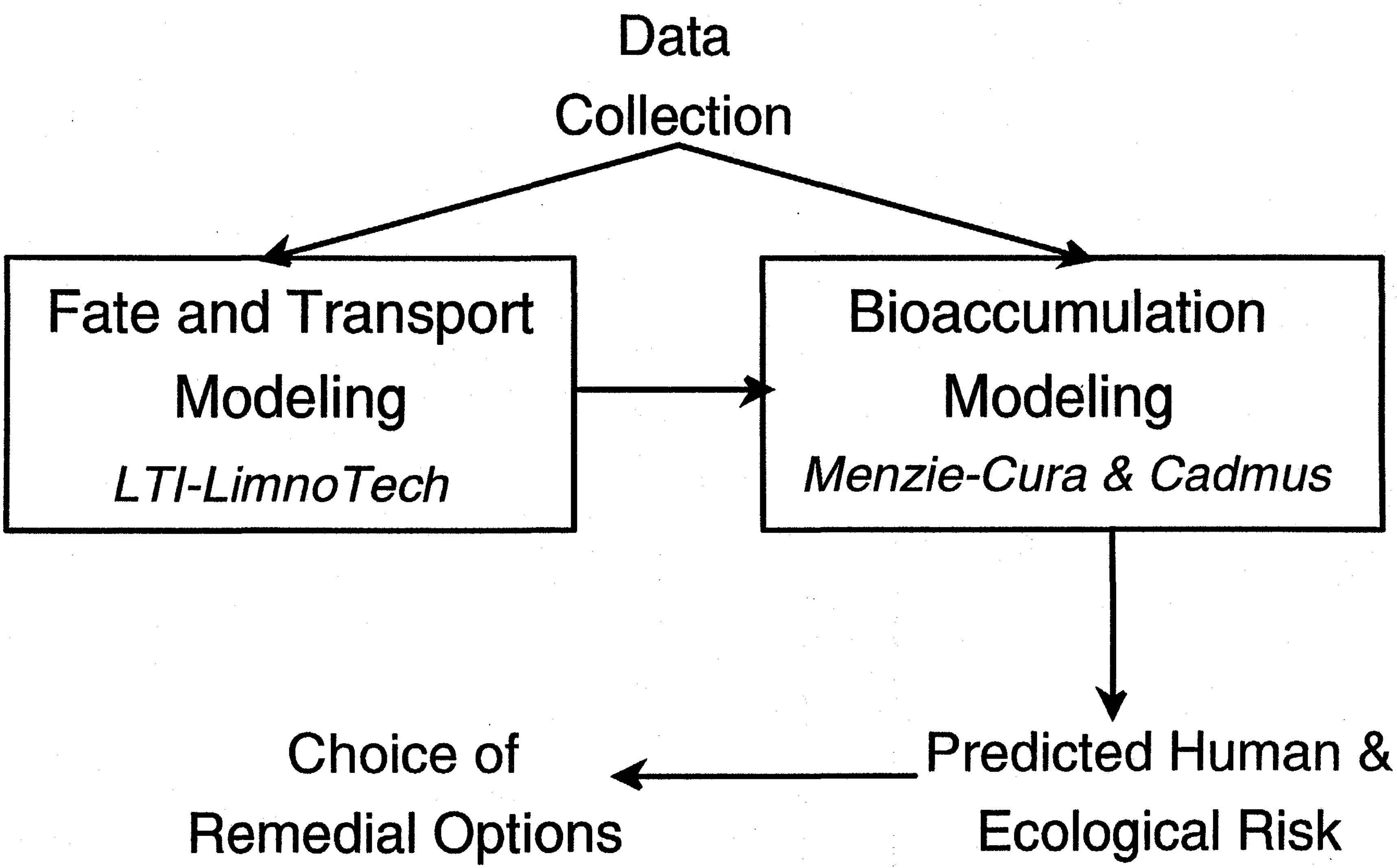
*The modeling effort is focused on practical issues keyed to the management and decision needs of the Reassessment.*

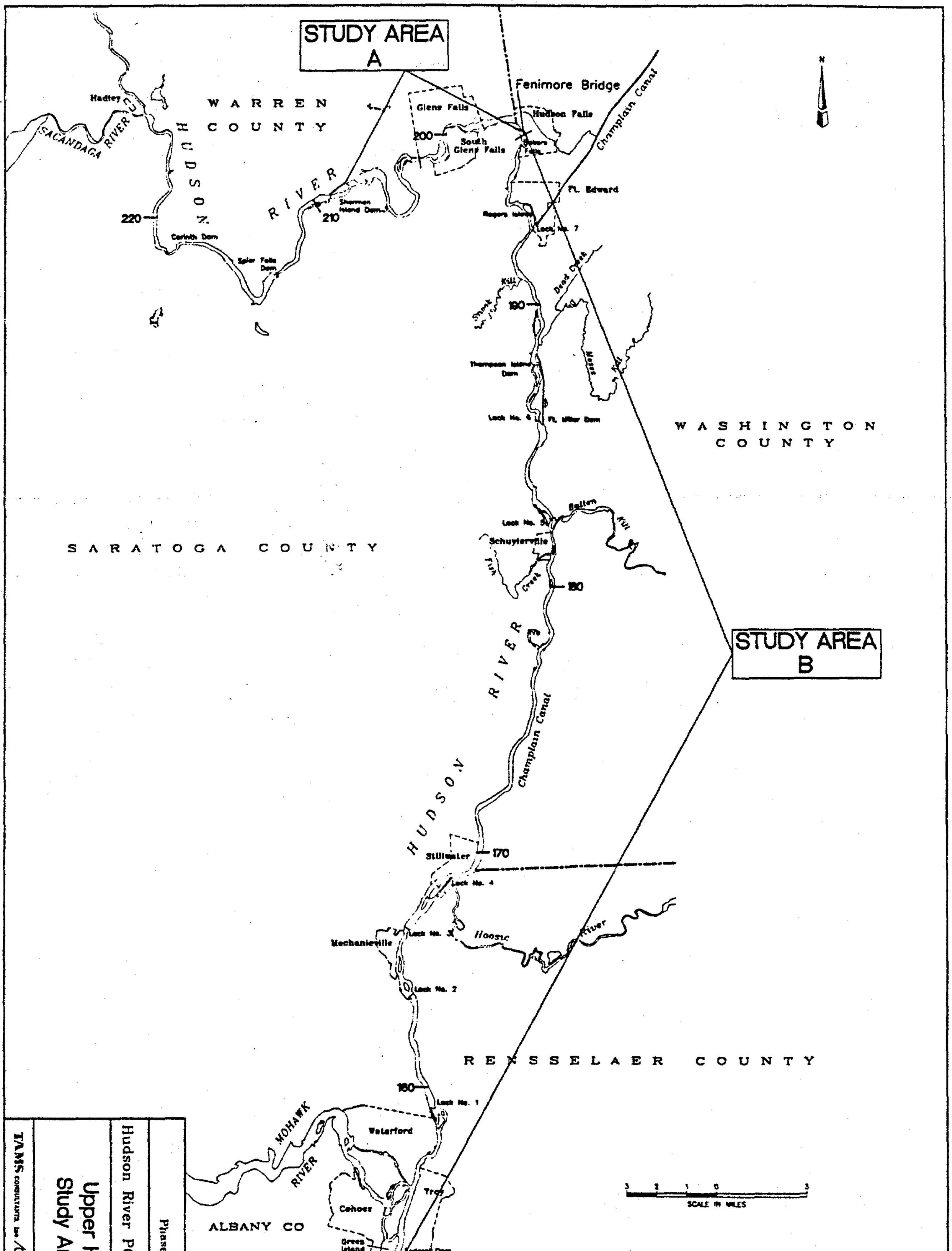
# KEY QUESTIONS ADDRESSED BY MODELING

- When will PCB levels in fish reach acceptable levels under No Action?
- Can remedial actions significantly shorten the time needed to reach acceptable levels?
- Are buried contaminants likely to be "reactivated" by a major flood event?



# ORGANIZATION OF THE MODELING EFFORT






Legend

180 River Mile

Note:

1. Study Area A: Sherman Island Dam to Fenimore Bridge
2. Study Area B: Fenimore Bridge to Federal Dam
3. Actual demarcation between Study Areas A and B is just north of Fenimore Bridge so that Study Area B includes the old Hudson Falls Treatment Plant outfall.

Phase 2B SAP/QAPP

Hudson River PCB Reassessment RI/FS

Upper Hudson River
Study Areas A and B

TAMS consultants inc / Gradient corporation

Figure 3-1

10.10862

# FATE AND TRANSPORT MODELING

- Long-Term Mass Balance Model: Average effects on scale of decades and river reaches.
- Short-Term Event Model: Event-driven model of contaminated sediment erosion in the Thompson Island Pool
- Linked Short- and Long-Term Models: Assess long-term impacts of flood events

# FISHERIES/BIOACCUMULATION MODELING

- Empirical BAF Models: Relate historic body burden to PCBs in water and sediment
- Equilibrium Food Web Model: Steady-state approximation of food chain accumulation using current data collection effort
- Revisit Thomann's Striped Bass model for the Lower Hudson

*Tools to link predicted environmental concentrations to PCB levels in biota*

# SEDIMENT PCB STORES

- What mass of PCBs is stored in Thompson Island Pool sediments?
- How have PCB mass and congener type changed over time?
- 1984 NYSDEC Survey provides a baseline for current investigations

*NYSDEC estimated that the total PCB mass in the Thompson Island Pool sediments in 1984 was 23,200 kilograms (51,156 pounds)*

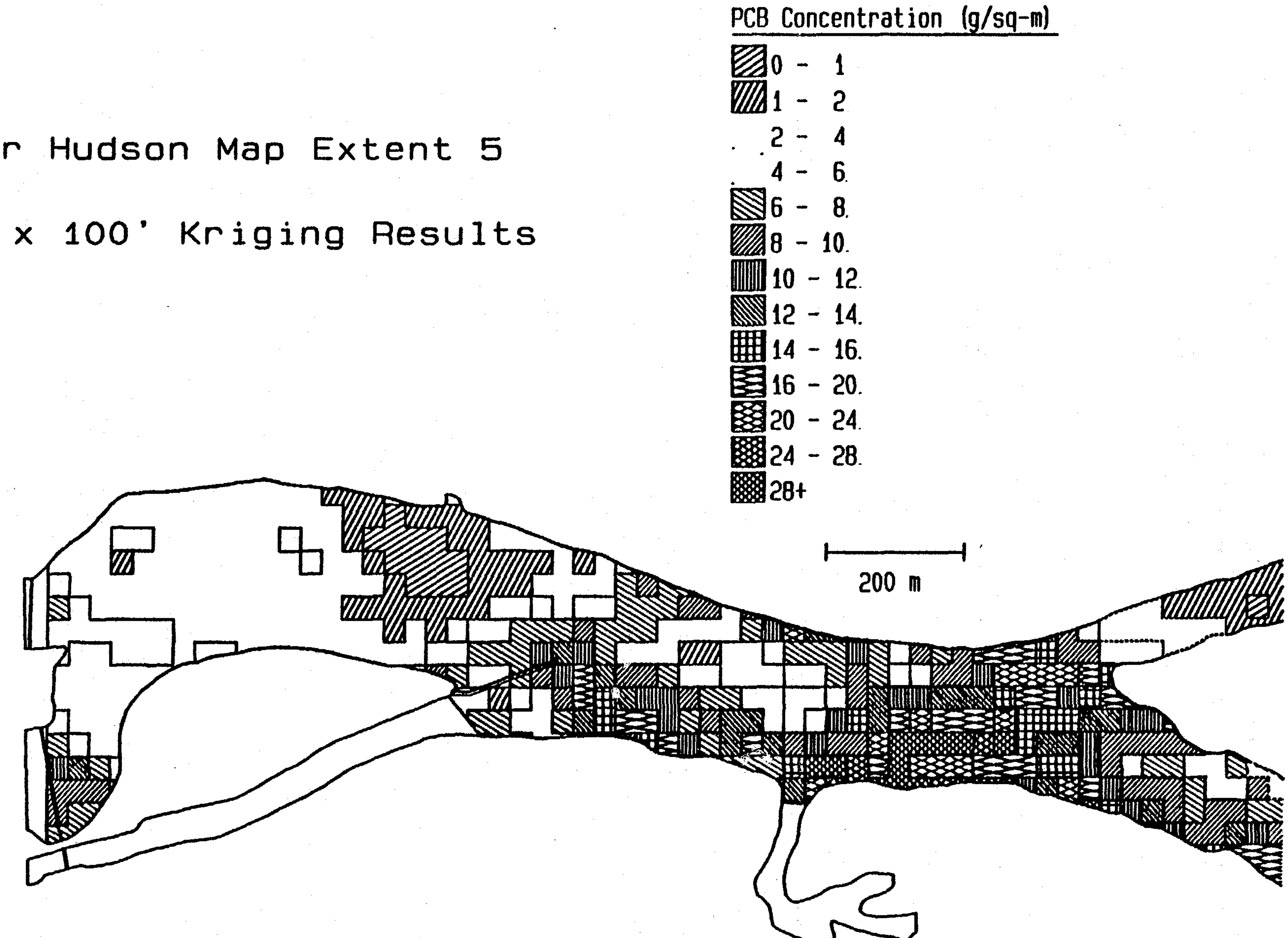
# GEOSTATISTICAL (KRIGING) ANALYSIS

- PCB distribution shows "hotspots" (spatial correlation); also high random variability
- How do we get from point measurements to areal average?
- Use observed spatial correlation pattern to guide interpolation: Kriging

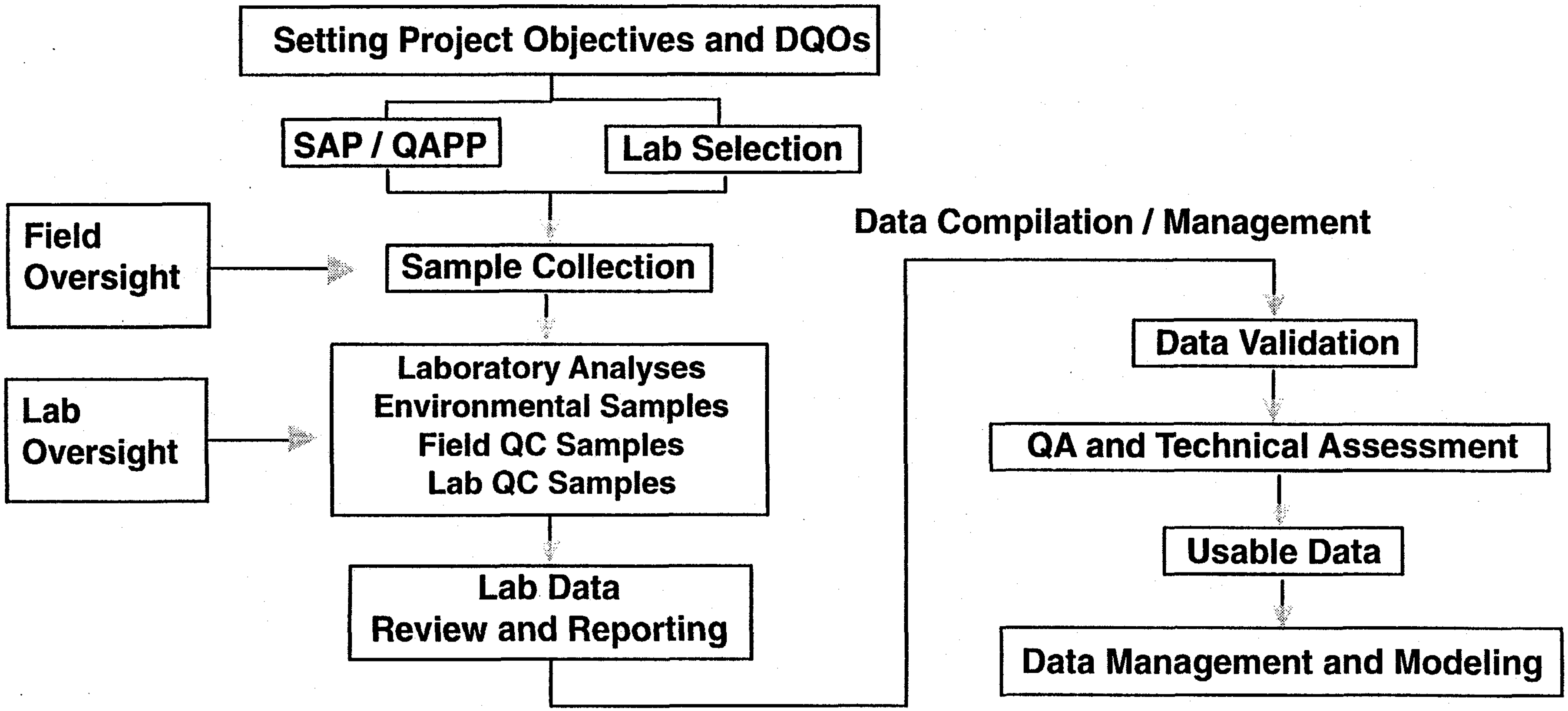
*Kriging is a technique to develop minimum-variance, unbiased estimators for spatially correlated phenomena.*

Upper Hudson Map Extent 5

100' x 100' Kriging Results



# QUALITY ASSURANCE MANAGEMENT



# APPROACH TO QUALITY ASSURANCE

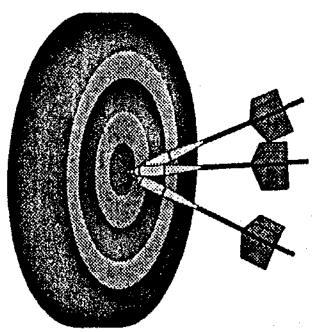
- Integrate QA throughout the program
- Proactive - QA oversight and corrective actions
- Define data needs to meet uses
  - Sampling locations
  - Media (water, sediment, particulates, biota)
  - Chemical and physical testing

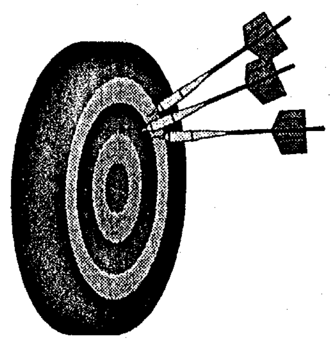
# SAMPLING AND ANALYSIS PLAN (SAP) QUALITY ASSURANCE PROJECT PLAN (QAPP)

- Ensure consistent, high quality data
  - Project approach
  - Project team organization
  - Sampling procedures and custody
  - Project-specific methods: PCB-congeners and others
  - Calibration procedures and criteria
  - Field / laboratory audits; corrective action
  - Data reduction, validation, reporting

# DEFINE QA OBJECTIVES

- Quality assurance objectives for measurement data
    - Precision - variability, reproducibility
    - Accuracy - bias
    - Representativeness - site conditions, heterogeneity
    - Comparability - methods
    - Completeness - amount of data collected
    - Sensitivity - detection levels

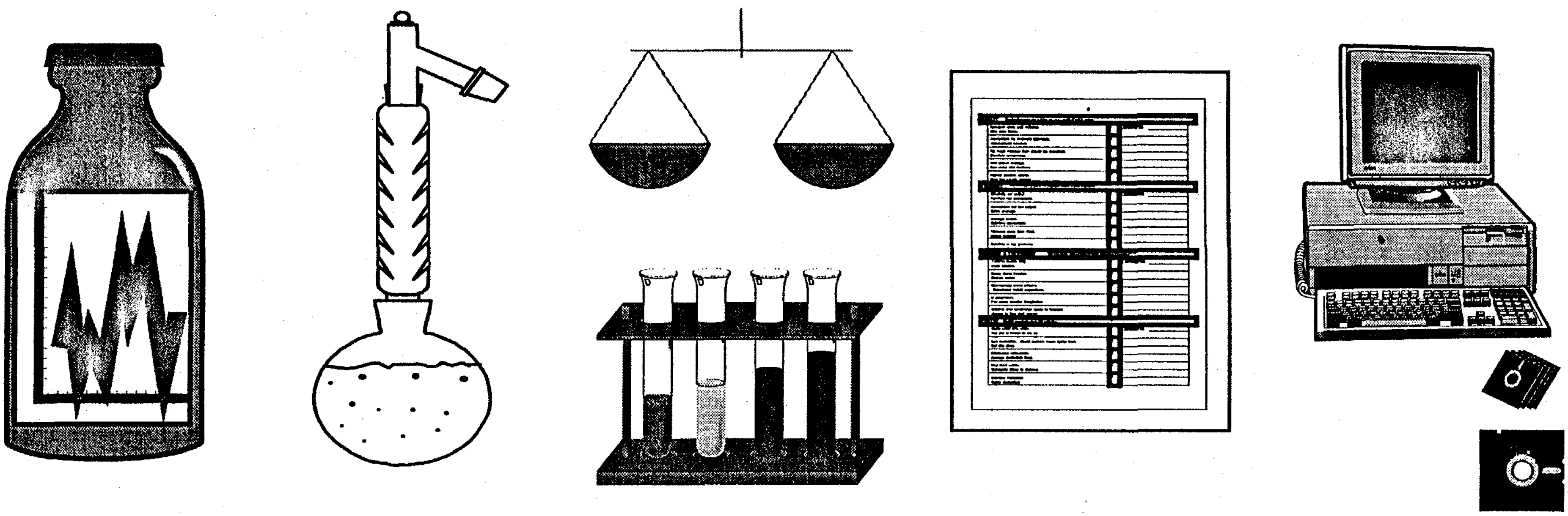




# LABORATORY SELECTION

- On-site comprehensive laboratory audit by experienced analytical chemists

Sample → Preparation → Analysis → Data Review → Reporting and Data Management

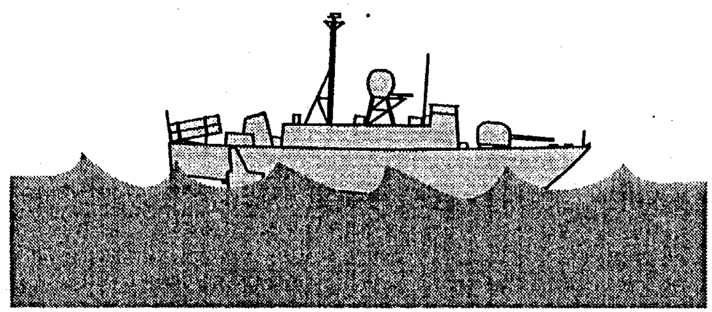


# LABORATORY QA OVERSIGHT

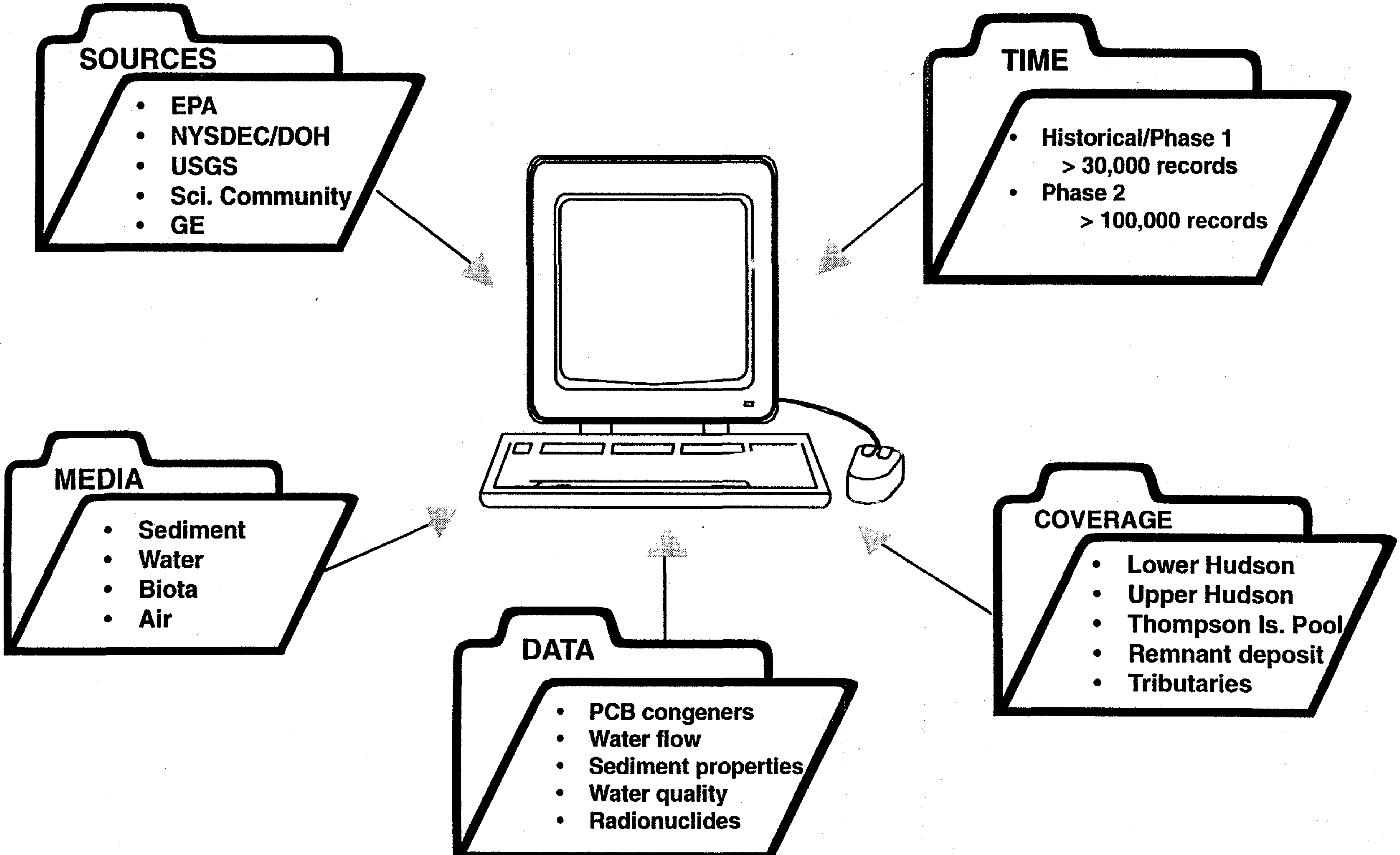
- Monitor key program criteria
- Conduct unannounced laboratory audits
- Blind spike samples = performance evaluations
- Ongoing review of sample analyses
- Real-time implementation of corrective action

# ON-SITE FIELD QA OVERSIGHT

- **Verify documentation and chain-of-custody**
- **Verify sampling techniques**
  - **Decontamination**
  - **Field QC (blanks, duplicates)**
- **Verify field measurement procedures**
- **Containers, preservation, handling, shipment**



# DATABASE MANAGEMENT SYSTEM



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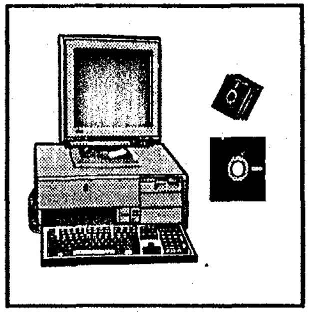
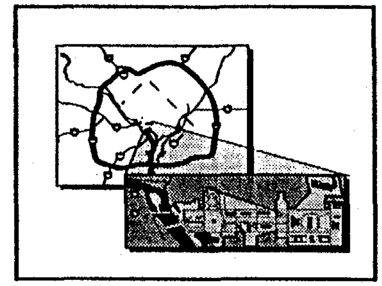
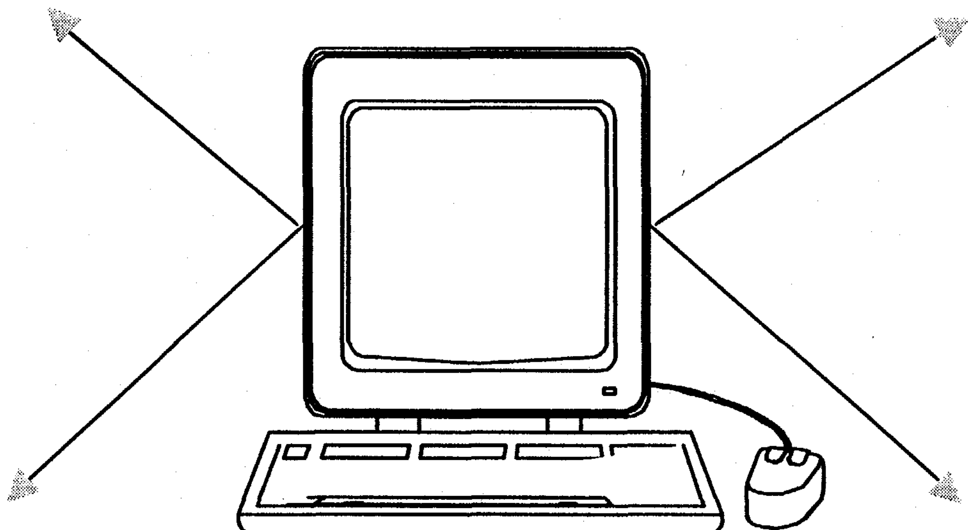
# DATABASE MANAGEMENT SYSTEM

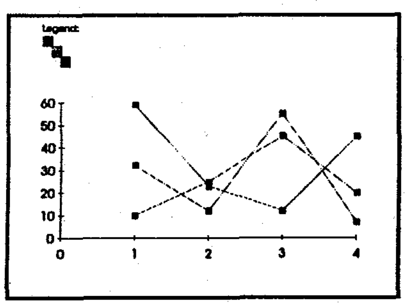


Modeling

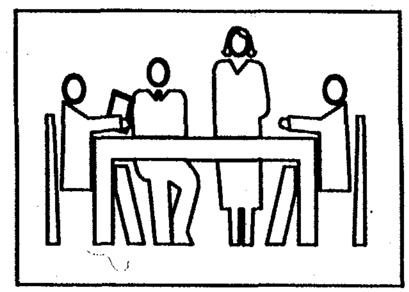


Mapping



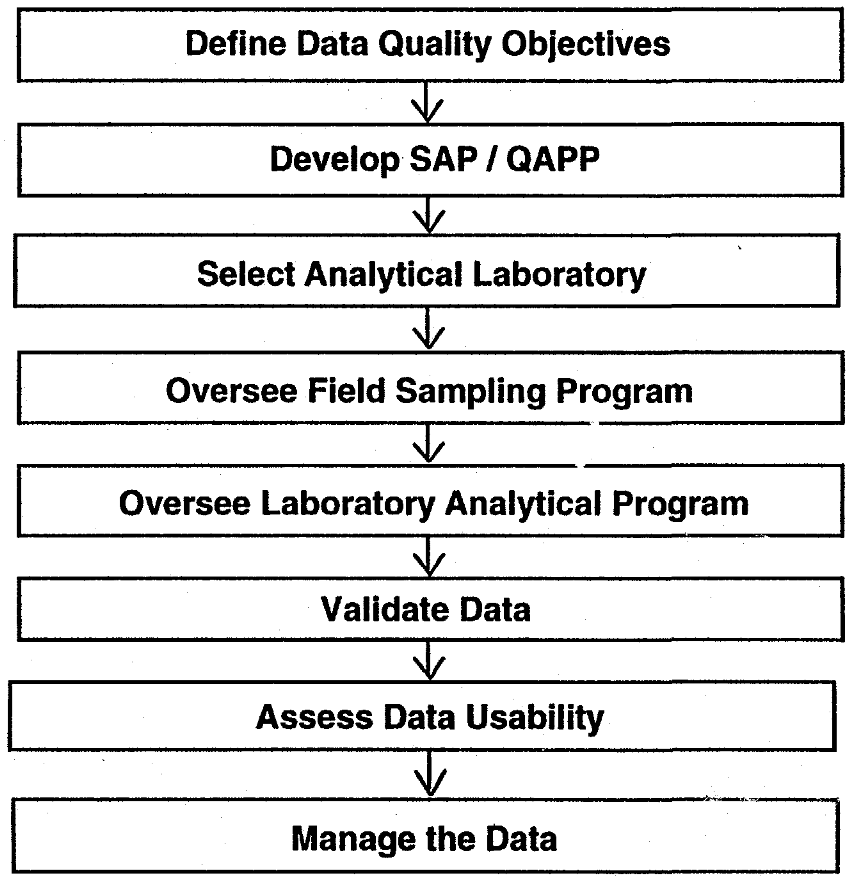



Data Analysis and Statistics



Project Team Decisions

# SUMMARY: DATA QUALITY MANAGEMENT PROGRAM



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278-0012

September 28, 1993

Dear Hudson River Oversight Committee Member:

This letter is to inform you that there will be a meeting of the Hudson River Oversight Committee for EPA's Reassessment of the Hudson River Pcb Superfund site, on Wednesday, October 20, 1993 at 7:30 p.m. The meeting will be held at the New Paltz Town Hall, located at 1 Veterans Drive in New Paltz, New York. (Directions follow body of letter).

As you know, nearly one year has passed since we last held an Oversight Committee meeting, and so the focus of this meeting will be an update by EPA on the progress of the Reassessment and what has transpired during the second phase of our work. I have contacted the Liaison Group Membership apprising them of this meeting, requesting that they contact their appropriate Liaison Group officer with any questions they may have for the Oversight Committee in advance, so that we may create a cohesive and focused agenda. Thank you for your participation, and if you have any questions, you can contact me at 212/264-7214.

Sincerely,

Ann Rychlenski, Community Relations Coordinator
External Programs Division

**Directions to New Paltz Town Hall:** Take NYS Thruway to Exit 18 (New Paltz-Poughkeepsie) - to the light after toll booth, make left at light onto Route 299. Head west on 299 - go across Thruway to light (N. Putt Corners Rd.). Make right onto N. Putt Corners Rd. - after 300-400 yards make the first left onto H.W. DuBois Drive (there's a Freihoffer's on the corner). Go to the end of DuBois Drive (which ends at Route 32N). Make a right onto 32N. You will pass a Stewart's and a wooded lot before you get to a driveway which is Veteran's Drive (across from Drake's Cakes). The red brick building at the end of this drive is your destination - the New Paltz Town Hall.

**HUDSON RIVER PCB OVERSIGHT COMITTEE MEMBERS HIP (HROC)**
(AS OF 9/93)

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