

Hudson - Project Management - Briefings

HUDSON RIVER

Attorney-Client Privileged Communication

Status Report and 1991 Strategy

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January 17, 1991

DEPARTMENT OF THE ARMY, WASHINGTON, D. C.

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HUDSON RIVER

- 1. Background**
- 2. Process Action Plan: GE's Ideal Case**
- 3. Science/Policy Action Plan**
- 4. Government/Public Relations Action Plan**
- 5. Budget**
- 6. Organization**
- 7. Appendix - Process Facts**
- 8. Appendix - Other Materials**



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REGULATORY BACKGROUND

EPA 1984 Decision: No Dredging

- Reasons given were a decreasing PCB threat and uncertainty over dredging technology
- Remnant deposits should be capped, not excavated

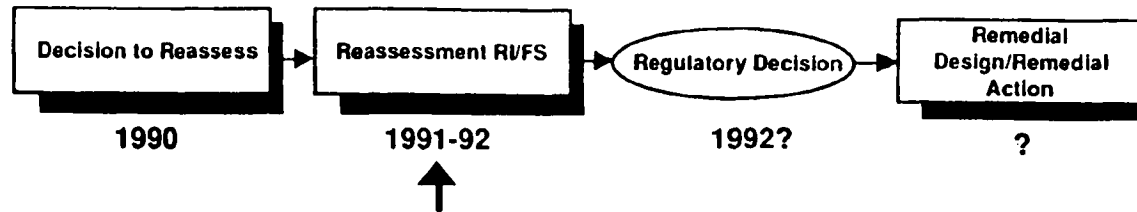
EPA 1990 Decision: Reassess No Dredging Decision

- Reasons:
 - EPA claims new information on PCB threat and dredging technology
 - State pressured EPA
 - CERCLA requirement to revisit all decisions every five years
 - Federal trustees (NOAA and Interior) threatening natural resource damage suit

State 1990-1991 Actions

- Project Sponsor Group pressing for dredging at all levels
- AG considering natural resource damage suit (may not be barred by 1976 settlement)
- State may reconvene Siting Board to locate dredge spoil landfill (unsuccessful attempt in 1988)

REASSESSMENT - PROCESS AND ISSUES



- EPA contractor will perform reassessment; scheduled decision by mid-1992
 - Schedule likely to slip
-

Focus: Is There New Information To Justify Remedial Action?

- EPA will evaluate all existing data
- EPA may collect new data
- EPA will compile all information as the administrative record (basis for the decision)

Public Input

- EPA will consider data from GE
- EPA will consider input from DEC and other interested parties
- Input made at public meetings and through written submissions

Decision Factors

- Nature of the threat from upper Hudson PCBs
- Status of dredging technology: can adverse consequences be avoided; is it worth the cost?
- Status of bioremediation technology: will it work; when will we know?
- Cost of remedial action v. effectiveness
- Public support/opposition
- State pressure

Legal Issues

Redacted

Redacted

Positive Issues

Nature of the Problem

1. Natural processes in the upper River are dechlorinating PCBs to less toxic forms and breaking down PCB materials completely
2. PCB concentrations in fish are decreasing
3. PCB hot spots in the upper Hudson are dispersed with lower concentrations
4. Upper River PCBs are not a significant source of PCBs to the lower River
5. Lower River sources of PCBs are contaminating the fish
6. EPA/DEC data is 7-14 years old, questionable reliability

Dredging

7. Dredging will not reduce PCB levels in the River faster than natural processes
8. Dredging and landfilling will cause greater harm than good
9. The cost and negative consequences of dredging far outweigh its benefits

Biodegradation

10. Biodegradation, natural or accelerated, is more environmentally compatible and effective than dredging

Science

11. PCBs are overregulated because risk is overstated even under current methodology

GE Theme:

- **Current Information Does Not Justify A Change In The 1984 Decision**
- **New Data Shows Support For GE Position**



GE's ACTION PLANS

- PROCESS** -- Build Good Record
- PUBLIC** -- Alter Perception on PCBs and Dredging
- POLITICS** -- Create Support Among Key Actors
- SCIENCE** -- Change regulatory treatment of PCBs

GE's IDEAL CASE

- Detail on 9 issues
- Uniform format
- Dynamics guidelines w/; land 3 mos

NATURE OF THE PROBLEM: PCBs IN RIVER DO NOT THREATEN HEALTH OR ENVIRONMENT; NO CHANGE IN 1984 DECISION JUSTIFIED

1. NATURAL PROCESSES IN THE UPPER RIVER ARE DECHLORINATING PCBs TO LESS TOXIC FORMS AND BREAKING DOWN PCB MOLECULES COMPLETELY Two processes

Evidence Now:

- Dechlorination
 - 70% of 1984 DEC samples show dechlorination from 1977
 - Limited 1990 CRD samples also confirm loss of chlorine from original 1242
- Breakdown of molecules
 - Observed in the lab with natural bacteria
 - Occuring in River; measurement difficult

Map. App - 91

App/Tab 7 - P2

Evidence Being Developed:

- Dechlorination
 - Document further dechlorination since 1984 throughout upper Hudson
 - 1990 Fall sampling (3 hot spots)
 - 1991 sampling (more locations; to be defined based on 1990 results and modeling)
 - Analyze sediments for dechlorination of congeners with highest toxicity
 - 1992 test in River
- Breakdown of molecules
 - Controlled 1991 field test of natural bacteria to breakdown molecules

} Sampling of road's process
} Tests

Likely Outcome:

- Natural dechlorination already demonstrated; question: can we accelerate
- Good science accepts less toxic argument. Must attempt to persuade EPA under current regulatory scheme. Long term change in EPA risk policy needed?
- Rate of breakdown to non-PCBs to be determined by '91 field test

We are right scientifically

BUT
• EPA
• Rate?

Upper vs Lower

2. PCB CONCENTRATIONS IN FISH ARE DECREASING BELOW THE FDA TOLERANCE LEVEL (2 PPM)

Evidence Now:

- Upper River
 - Average concentrations vary by species but are down from 25-500 ppm in 1976 to 10-50 ppm in 1988 -
- Lower River
 - Average striped bass concentration in lower River down to 2.8 ppm from 4.2 ppm (1983-87). Some regions already below 2 ppm for commercial size fish
 - Manhattan College (Thomann) model predicts 50% of lower River striped bass below 2 ppm by 1992; 95% below by 2004 ~~HRF~~

Down but complex?
Best story

Evidence Being Developed:

- Upper River
 - Analyzing fish GE caught in Fall 1990 to determine PCB levels; will also analyze for other contaminants that cause ecological damage
- Lower River
 - DEC has not analyzed 1990 striped bass catch because of budget restraints. GE will offer to analyze if necessary.

ough facts?

Likely Outcome:

- Upper River
 - Concentrations in fish will be above FDA level; they will be higher and will decline slower than in the lower River
- Lower River
 - Striped bass concentrations will be below FDA standard for most regions within several years. Other fish may take longer to meet FDA standard

GE's IDEAL CASE

3. PCB HOT SPOTS (GREATER THAN 50 PPM) IN UPPER HUDSON NO LONGER EXIST: HOT SPOT DREDGING NOT POSSIBLE

Evidence Now:

- 50% reduction in volume during period 1977-84
- Bathymetry and 1990 CRD samples show significant change in River bottom (sediments shifting and dispersing PCBs in addition to biodegradation processes)

App 7-p3

App. p4 + 5

Evidence Being Developed:

- Determining changes that have occurred in PCB concentrations and River bottom since 1984
 - Early results from CRD and Fall 1990 sampling appear to confirm dispersion of hot spots
 - 1991 sampling will define those changes more fully

Likely Outcome:

- Fall sampling shows hot spots are now well below 50 ppm and further dispersed
- Full results of Fall '90-91 sampling should confirm dispersion and render old data moot on this point
- Without hot spots, dredging must be bank-to-bank with greater ecological damage
- But:
 - EPA not bound by hot spot approach; could change approach
 - DEC has established and EPA has applied sediment cleanup standard of 1 ppm at GM Massena

4. UPPER RIVER PCBs ARE NOT A SIGNIFICANT SOURCE OF PCBs TO THE LOWER RIVER

Evidence Now:

- PCB load (lbs transported) is down ten-fold (1979-89)
- Currently estimate transport from upper to lower River to be 300 lbs per year
- Trend is 50% reduction every 3 years
- Historical pattern of higher PCB loads with higher flow conditions (floods) was not followed in 1987-89; loads remained relatively low even under flood conditions

Note: DEC has long argued that a major flood is one of the principal threats because it will cause massive transport of PCBs to the lower River similar to what occurred after the 1974 damn removal

App 7-96

Evidence Being Developed:

- Collecting actual '90-91 transport data
- Modeling flood conditions and various remedies to show short and long term impacts upon transport load and uptake by fish

Likely Outcome:

- Upper River is a minor source of lower River PCBs
- New transport data will show continuation of downward trend
- Results of preliminary model due 3/1 should answer DEC contention about major floods

5. LOWER RIVER SOURCES OF PCBs ARE CONTAMINATING THE FISH

Evidence Now:

- A GE review of records has identified over 100 purchasers/users of PCBs in the regions of the lower River, New York Harbor and Long Island Sound
- GE sediment sampling over two years (87 locations) shows that PCBs in those regions are concentrated in industrial areas and that the variations in concentration are not consistent with a single upper River source
- GE analysis of those sediments also shows an increase in chlorination level in those regions that could not have originated from Aroclor 1242 used by GE

pp 7-8

Note: DEC and EPA already shifting focus from lower River fish to upper River fish and wildlife because of decreasing concentrations in lower River and arguments about other sources

Evidence Being Developed:

- Information on purchasers/users will now be compared to identify best targets (12 industrial targets already identified plus many sewage treatment plants)
- Detailed sampling in 1991 will attempt to pin down case against best targets
- Expert testimony to show mechanisms for fish uptake of PCBs, e.g. fish residence and feeding patterns

Likely Outcome:

- Documentation of other sources of PCBs in the lower River
- GE may have been a major source of PCBs to the lower River in the 1970's but is not currently a major source

GE's IDEAL CASE

DREDGING

1. DREDGING WILL NOT REDUCE PCB LEVELS IN THE RIVER FASTER THAN NATURAL PROCESSES

Evidence Now:

- Upper River
 - PCB sediment and water concentrations already significantly reduced and still declining due to natural processes
 - Hot spot dredging will not remove significant volumes of PCBs because of dispersion of hot spots
- Lower River
 - Manhattan College model finds dredging would reduce fish levels below FDA limit only 5 years earlier than natural processes
 - Upper River dredging would not eliminate lower River sources

Evidence Being Developed:

- Upper River
 - Modeling upper River to determine impacts of dredging v. biodegradation
- Lower River
 - Upper River model will be used to confirm or support assumptions made in Manhattan College model

Likely Outcome:

- Upper River
 - Critical fact will be rate of biodegradation ('91 sampling and modeling will provide this answer)
- Lower River
 - Strong argument unless defects are found in Manhattan College model

2. DREDGING AND LANDFILLING WILL CAUSE GREATER HARM THAN GOOD

Evidence Now:

- No new dredging technology
- Conventional dredging resuspends large amounts of sediment
- Dredging will cause greater erosion of surrounding river bottom and nearby shoreline
- Barge traffic and unloading facility will disrupt other uses of the River for years
- Without hot spots, bank-to-bank dredging will be required with greater ecological consequences

Evidence Being Developed:

- Quantifying the above adverse impacts
- Determining nature and extent of ecological damage

Likely Outcome:

- Harm will be clearly proved by GE
- Good currently measured by EPA's overly conservative risk assessment, therefore, risk is the critical issue

GE's IDEAL CASE

3. THE COST AND NEGATIVE CONSEQUENCES OF DREDGING FAR OUTWEIGH ITS BENEFITS

Evidence Now:

- Under DEC hot spot dredging proposal, dredged material will be over 90% water; transport over large distances and treatment will be very difficult and expensive
- Hot spot dredging is no longer appropriate because of dispersion and reduced concentrations
- Bank-to-bank dredging could exceed \$1 billion
- Benefits less than they would have been in 1984 because of steadily decreasing concentrations in sediment, water, and fish

Evidence Being Developed:

- Quantifying the cost and other negative consequences of dredging, e.g. ecological, navigational

Likely Outcome:

- Bank-to-bank dredging is enormously expensive without corresponding benefits
- Natural river processes will clean River in virtually the same timeframe as dredging
- Bank-to-bank dredging will have substantial negative consequences
- Costs of dredging have risen since the 1984 decision without any corresponding increase in benefits

GE's IDEAL CASE

BIODEGRADATION

1. BIODEGRADATION, NATURAL OR ACCELERATED, IS MORE ENVIRONMENTALLY COMPATIBLE AND EFFECTIVE THAN DREDGING

Evidence Now:

- In the laboratory, anaerobic and aerobic biodegradation dechlorinate and ultimately destroy PCBs
- Natural anaerobic process (dechlorination) in the field already documented

Evidence Being Developed:

- Field demonstration in 1991 of ability to accelerate natural aerobic process through optimizing conditions, e.g. nutrients and type and quantity of bacteria

Selection of site for 1991 aerobic test	Complete
Large scale lab models to define optimum conditions	3/91
Aerobic field test begins	6/91

- Earliest possible demonstration of accelerated anaerobic process is in 1992 based on CR&D assessment of technology and suitable Hudson River sites

Likely Outcome:

- Combined processes to reduce non-PCBs will work but ability to accelerate is still a long shot
 - Only about 50% of PCBs are readily available for bacterial action; the remainder leach out over a long period of time
 - Feasibility and cost of implementation will not be known until after scheduled date for EPA decision

PROCESS ACTION PLAN

Data Development

- GE is developing data for EPA to use in the reassessment, and for GE in litigation if needed
 - EPA data is now 7 - 14 years old and of questionable integrity
 - Without new data, EPA will rely on faulty record
 - Time and better facts will help GE

Tasks

Analysis of existing data

- Disclosed supportive findings on extent of biodegradation, changes in hot spots, and reduction in PCB transport

1990/1991 sampling

- Further confirmation of biodegradation and changes in hot spots
- 1990 results will be basis for design of 1991 sampling

Model of upper River

- Phase I will give preliminary indication of results from more complex Phase II model
- Phase II designed to predict impacts of various remedies and flow conditions on transport and fish concentrations

Budget - TAPS

Pr 2-4

• March of EPA/DEC
USGS and
prev. analysis

Contractor/Status

Law Env. - Complete

• GE - Phase I DM 97-8
• Directed new findings

O'Brien & Gere - Analysis of Phase I - 3+J
1990 samples due 3/1

II - TBD

Sediment/fish
Upper River
PCB, 1 other cont.

Hydroqual - Phase I report due 3/1

- Only way to predict impacts of remediation
- Battle of models; necessary
- Direction of 1991 sampling

Tasks

Risk assessment

- EPA will conduct the assessment
- GE will develop site specific factors to urge upon EPA instead of its overly conservative assumptions

Evaluation of dredging

- Quantification of impacts still necessary

Search for lower River sources

- General evidence already useful in arguments about the benefits of dredging
- Evidence of specific sources would be basis for bringing in other defendants

Contractor/Status

J. Moore - Ongoing

Site specific factors

- Suspended sediment
- Barge traffic
- Technology

Olko Eng. - Preliminary evaluation complete

Harza/Dames & Moore - Ongoing

- 1) Paper search
- 2) Field samples
 - Core p7
 - Aluminates p8
- 3) Compare
- 4) Pin down

Communication With EPA

- Submit facts and arguments to EPA for the record as early and as often as possible
- Continue channels of communication at all levels -- policy, legal, and technical
- Participate in Oversight and Science Committees established by EPA for Hudson reassessment



SCIENCE/POLICY ACTION PLAN

Problem: EPA Over-regulates PCBs

- Regulations based on Cancer Risk Assessment
 - Rat study (1985 - U. Wisc.) using Aroclor 1260
 - 1985 Methodology (interpretation of liver tumors) over predicted cancer potency
- EPA/FDA use 1260 data for all PCB mixtures
 - 1254 (54% CI) and Clophen A-30 (42% CI) mixtures were negative, or very low potency in similar tests
 - 70% of all PCBs, and >98% of GE capacitor PCBs were 1242/1016 (41-42% CI)
- EPA Risk Assessment Methodology based on overly conservative assumptions
 - extrapolation, rat to man: ~ 7x more conservative than FDA
 - extrapolation, high dose to low dose: 10-100x too conservative
 - exposure estimates, e.g., fish consumption, too high
 - picks data from most sensitive species

GE Strategy: Two Major Thrusts

1. Change view of PCBs under current risk methodology

Animal studies

- Re-read all existing animal cancer studies: GE preliminary review, ~ 50% reduction in potency

Timing

6 mos.

Comments

New methodology accepted by EPA.
Independent pathology panel review is next step (J. Moore)

- Based on re-read of slides, convince EPA that:

Cancer potency should be recalculated

Aroclor 1254 data and Clophen A-30 data should be used for calculating risks for similar mixtures

12 mos.

EPA/FDA have been informed about re-read. (EPA has not acted on similar data re dioxin)

EPA has used flimsy excuses in the past to reject these data. The pathology review should resolve these objections.

Note: Earlier plan to do long-term testing on a variety of PCB mixtures was discarded because mixtures could not be prepared—alternative approach with Aroclors was discouraged by consultants. If EPA will not accept Clophen data, we may plan feeding study with 1242/1016.

- Threshold causation levels and mechanism studies

3 yrs.

Build scientific consensus for lower potency of PCBs - publish - address alternative explanations for toxic effects.

Human Health Effects

- Review capacitor worker mortality studies including Sinks (Westinghouse) and Taylor (GE)

1 yr

No consistent excesses of from multiple studies

- Review studies showing minor developmental deficiencies in children of mothers having PCB and other environmental contaminants

1 yr

Neurotoxicological effects is a new area of concern—may be a fall-back position for regulators if cancer concerns less

Note: Mechanism of review is under consideration. Alternatives range from doing under legal privilege to open forum involving scientists and regulators followed by publication

- Complete analysis of GE capacitor worker data—publish in peer-reviewed journal 18 mos Part of continuing CRD study of workers with PCB body burdens - now focusing on clearance rates

**Human data is not used by EPA to determine risk unless it is positive.
Negative data will buttress our arguments that PCB risks are overstated.**

2. Change Risk Assessment Methodology:

A rush of activity in federal government to review and refine risk assessment methodology, highlighted by Clean Air Act mandated National Academy of Sciences review committee and Risk Assessment/Management Commission (GE proposals).

- GE is participating in proposing scientists to serve on review committee
- GE is participating in development of position papers for review by NAS Committee
- GE will be active through DC, CRD and CEP offices in pressing re-evaluation of risk assessment methodology

Promote GE Science Base With Legislators, Regulators and Media

Basic Message:

- PCBs are different, 1260 ≠ 1242 - move EPA to congener specific regulation
- PCB cancer potency factor is over-estimated (Re-read)
- PCB is not a human carcinogen
- Biodegradation occurs
 - dechlorination reduces toxicity
 - bioremediation deserves a chance
- EPA's exposure estimates are unrealistically high
- Neurotoxic effects in children are not attributable to PCBs

Approaches

- Use DC office to gain access to target audiences
 - Establish presence at EPA: Ramsey, Boggs, Hamilton, Schulhof, Abramowicz
 - Educate legislative staff personnel: Hamilton, Abramowicz
 - Educate Media, e.g., A. Gold, NY Times 1/16/91: Batty, Hamilton, Abramowicz, Lanahan
 - Identify potential coalition partners to support Science, Education and Regulatory efforts

**This thrust is applicable to both
generic and Hudson River issues**



4

GOVERNMENT RELATIONS/PUBLIC RELATIONS STRATEGY

- Create climate for "no dredge" decision
- Lead with GE science and factual information about river
- Develop "friends" and organize their support
- Work all levels of government, media, community organizations, academics and scientists
- Establish intelligence network at regulatory agencies
- Tools and Forums:
 - Briefing by the R&D Center
 - One on one meetings
 - City Council and County Commission meetings
 - Public meetings called by local officials
 - News Conferences
 - Mailing list of supporters and other interested persons
 - Brochures, slide show, fact sheets

GOVERNMENT RELATIONS - LOCAL

Challenge:

- To organize responsible local government and opinion leader opposition to the dredge solution and make this opposition clear to EPA through their public participation process, to the state and to the media.

GE Action - Upper Hudson:

- Used EPA announcement of a public hearing in Saratoga County as reason to brief local officials.
- Created permanent allies in most local governments above Troy.

Warren Co.	Town of Half Moon	Village of Hudson Falls
Washington Co.	Town of Waterford	Town of Argyle
Saratoga Co.	Town of Kingsbury	Town of Easton
Rensselaer Co. Executive	Town of Queensbury	Town of Saratoga
City of Mechanicville	Town of Stillwater	Town of Northumberland

- Demonstrated to EPA at first public hearing on December 17 that community overwhelmingly opposed to dredge solution - 180 attendees; 25 spoke in opposition to dredge, 3 for.
- Media response excellent - print and electronic
- EPA has called next meeting for February 11 and we will reactivate community

GOVERNMENT RELATIONS - LOCAL

GE Action - Mid Hudson:

- Suspicion of GE higher, understanding of bioremediation lower, but most opinion still neutral. Must fine tune action plan: Strong environmental groups, no NIMBY attitude.
- Brief local governments on bioremediation and information on river - explain higher PCB concentrations adjacent to their areas - not caused by GE - plant seed that they may have clean up problem.
- Isolate environmental groups that have long advocated dredging by becoming partners with reasonable groups more interested in new technology.
- Find friends - drinking water users, boaters, recreation industry.
- Brief opinion leaders, scientists and academics on bioremediation.
- Prepare for EPA public hearing in the mid-Hudson. Will be tougher than Upper Hudson.

GOVERNMENT RELATIONS - STATE

Challenge:

- State DEC is pro-dredge and influential with Region II EPA
- Jorling wants to proceed with landfill siting process
- Jorling undermines credibility of GE efforts but so far has refused briefing
- DEC is discussing natural resources damage claim with AG
- DEC has targeted GE for increased enforcement elsewhere
- Unclear what Governor's views are

GE Action:

- State Landfill siting board process stopped by GE arguments and NYS Budget constraints
- Ramsey has written to Jorling and Reilly for R&D Center presentation
- Briefed NY State DEC staff in conjunction with EPA Region II
- Briefed NY State Health Commissioner Axelrod and staff - influential with Governor and member of siting board, if ever convened - excellent response
- Brief state legislators (on-going basis)

Next Steps:

- N.Y. Attorney General - Ramsey and Heineman should invite for R&D briefing
- Governor - Welch should meet with Cuomo for summary of briefing. Governor has to be unhappy about bad press on state dredge plan. Also, some rumors that he is not pleased with Jorling at the moment.
- Jorling - Doyle to request meeting with Jorling and Vincent Tese on overall GE issues and concerns in New York

GOVERNMENT RELATIONS - FEDERAL

Challenge:

- EPA will take most conservative bureaucratic approach which means dredge, unless political and public opinion pressure change the game. (Recent GM Massena EPA decision on dredging and the choice of the EPA contractor on GE Hudson project confirm this).

GE Action:

Congress

- Goal is to get Congressional pressure on EPA to increase receptivity to bioremediation
- Lanahan and Abramowicz briefed NY Congressional delegation staff - good response
- Ramsey and Abramowicz to visit principle NY Members and Senators and major committee chairman and staff
- GE Washington office asked to make this a top priority

White House/Administration

- Congressman Solomon to Sununu
- Ramsey will visit with Roger Porter
- Welch and Ramsey to Reilly: R&D Center invitation a possibility

Agency - EPA

- Ramsey to top EPA staff (on going)
- Jack Moore, former EPA deputy administrator, to top EPA staff on need for flexibility particularly on PCB risk assessment
- GE technical team to EPA Region II and to EPA project leader

Agency - Department of Justice

- Key to natural resources damage claim
- Ramsey low key, informal contacts

MEDIA RELATIONS

Challenge:

- To leverage the excellent local media coverage in the Albany area to more national/influential news organizations
- To duplicate positive Upper Hudson media reaction in mid and down state

Upper Hudson papers

- Editorials against dredging - during December 1990
- Schenectady Gazette
- Troy Record
- Saratogian
- Moreau Sun
- Commercial News (Clifton Park)
- Glen Falls Post Star

Albany Area Television:

- All three network affiliates and independent channel 8 (Warren & Washington) gave very favorable coverage to GE December initiatives to explain bioremediation

Upcoming Leverage Possibilities:

- Plan to follow up on NYT editorial board meeting on June 1990 - group was receptive to bioremediation story and we have new information.
- SIPI (Scientists for Information in the Public Interest) has a conference scheduled for January 28 with Dr. Renate Kimbrough, formerly of EPA as the only presenter. She did the major original work associating PCBs with cancer in rats which she now believes was inconclusive. Her message will be that PCBs are not proven to cause cancer in humans, however do cause ecological damage and press has created undo panic through misinformed coverage of the issue. Major science writers in attendance, should be more receptive to GE PCB initiatives.

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* Could be as high as \$6.0

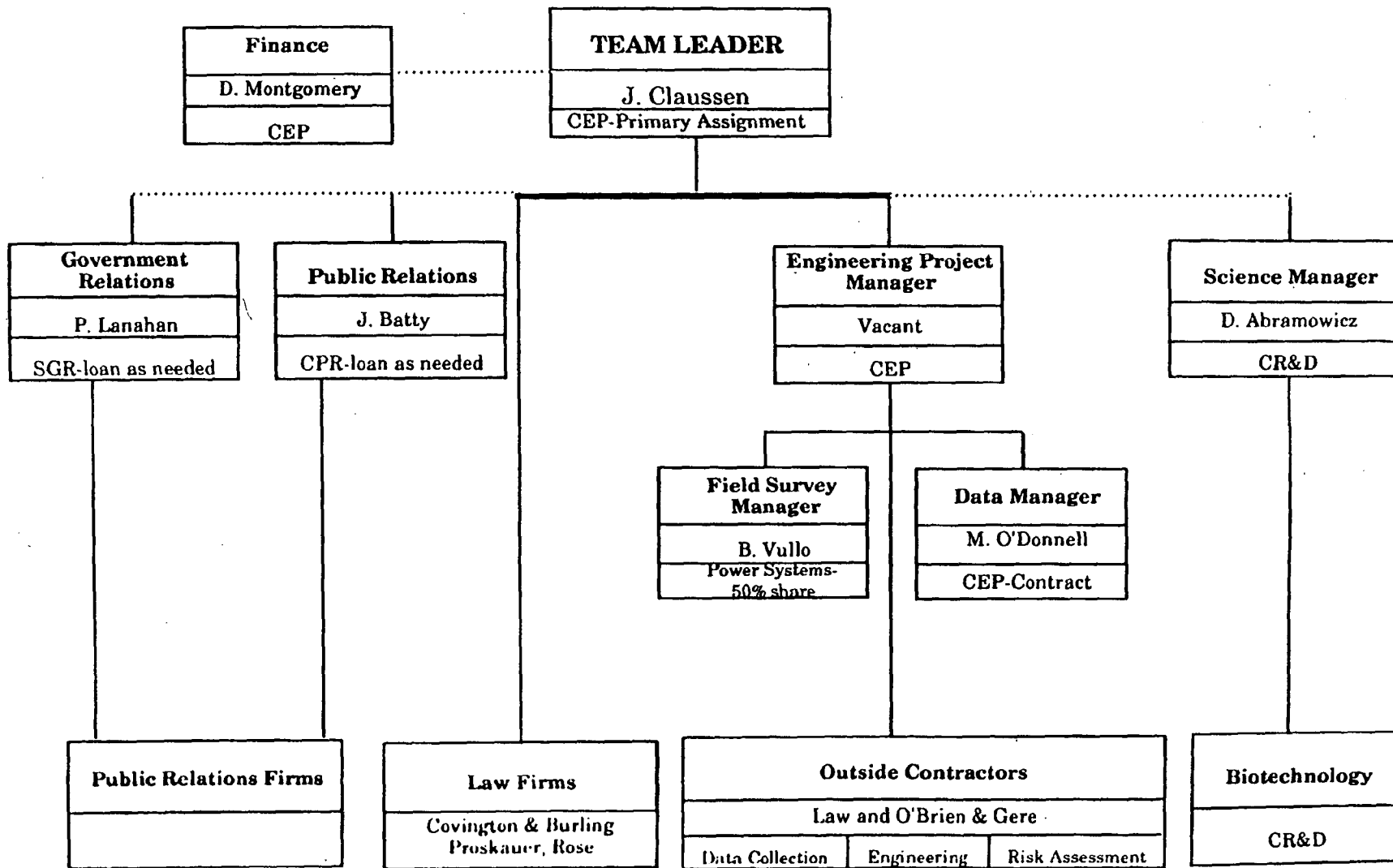
1787

5735

2655*



HUDSON TEAM



CONTRACTORS

- **Law Environmental**

- One of largest national environmental consulting firms
- Broad based experience with strengths in engineering and policy issues
- CEO, Lee Thomas, is former EPA Administrator

- **O'Brien & Gere**

- Largest environmental firm in NYS
- Strength in field work compliments Law
- Credibility with DEC

- **Jack Moore**

- Former EPA Assistant Administrator
- Excellent on risk assessment and strategic policy issues
- Experienced with PCBs

- **Hydroqual**

- Leading firm on modeling of environmental impacts
- Close connections with Dr. Thomann, author of favorable, independent study of dredging

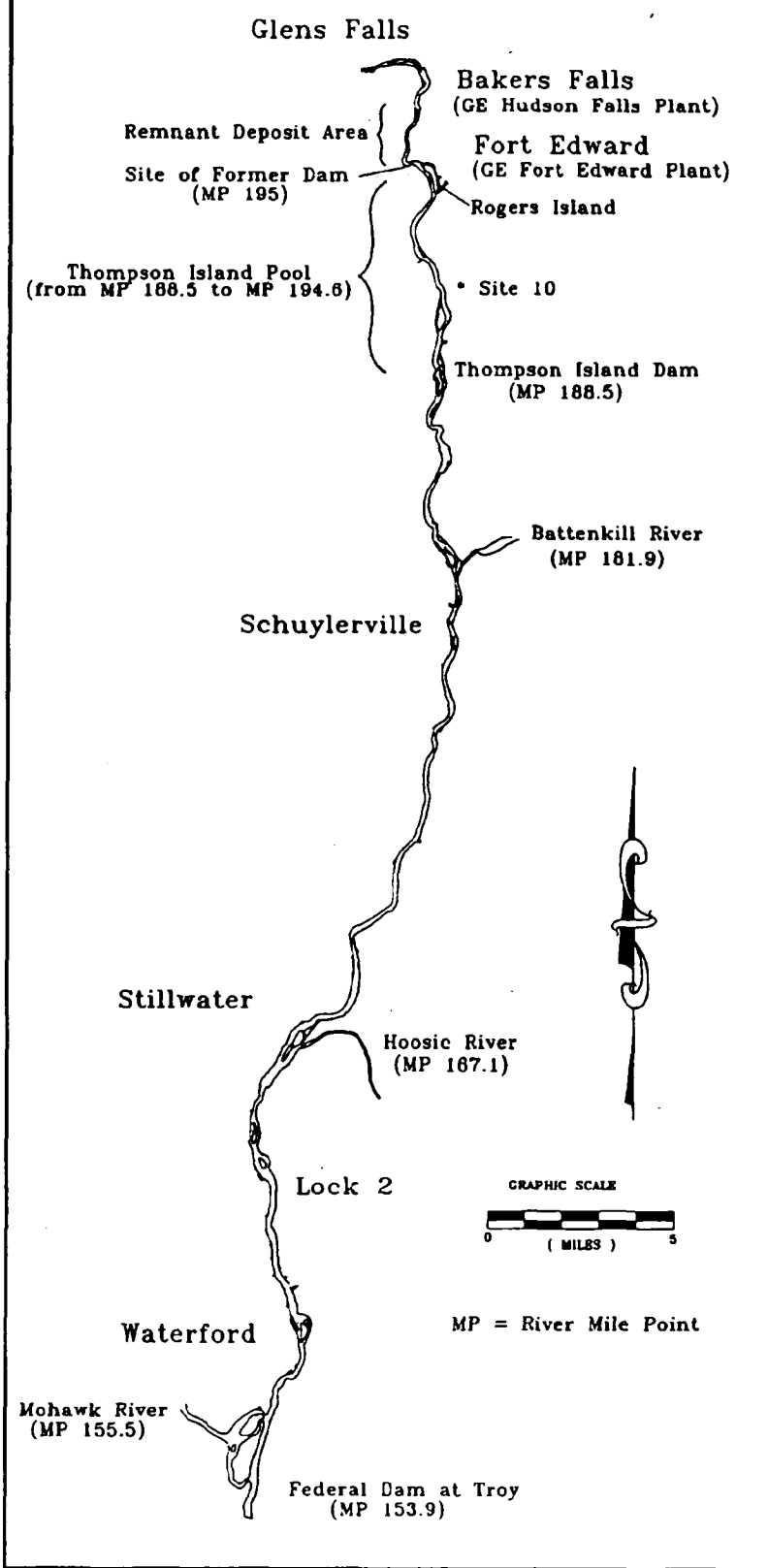
- **Olko Engineering**

- Experienced design firm; involved in dredging projects for over 30 years

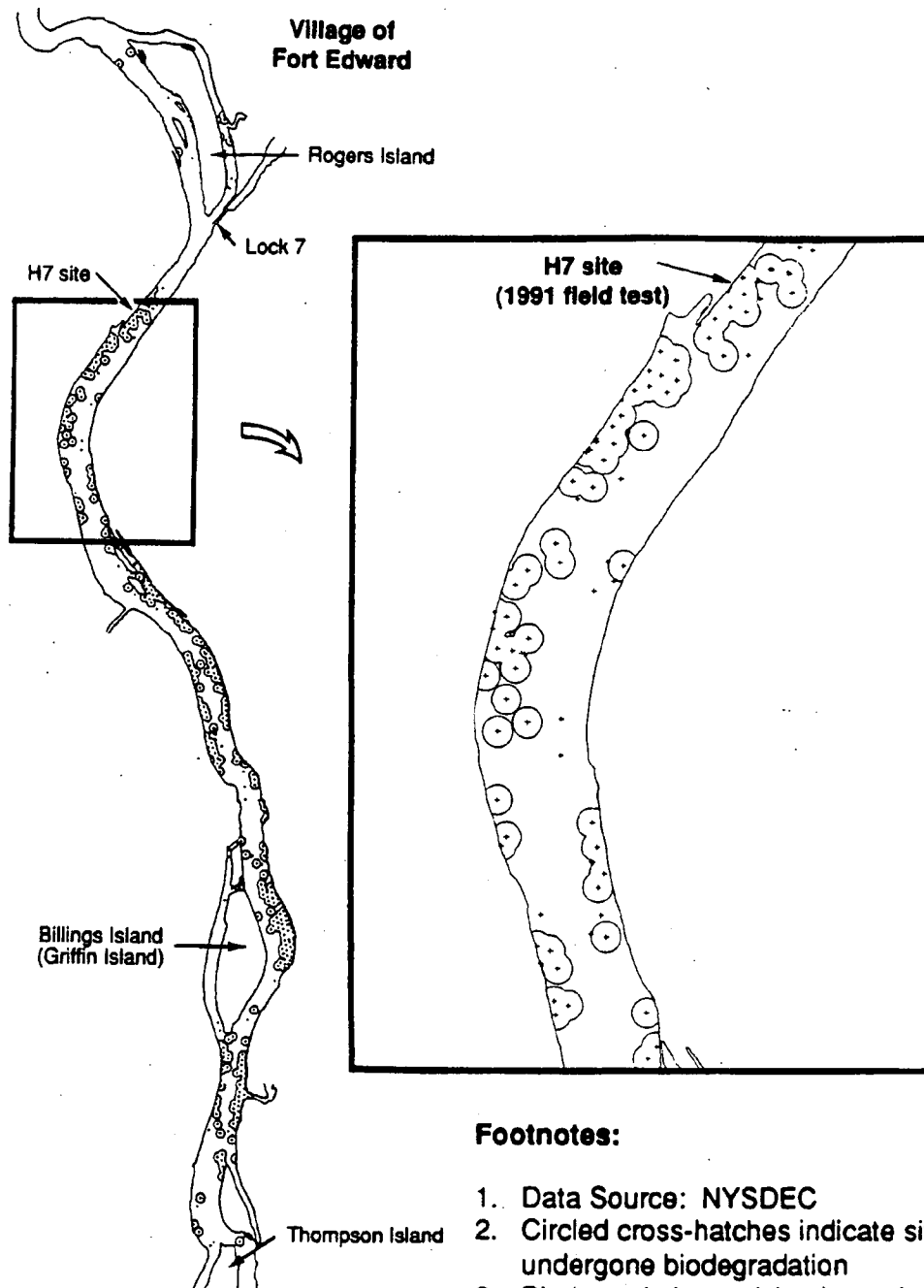
Harza } Jones
Dames & Moore }
Brettle Group } Bird
O H M.



UPPER HUDSON RIVER



Biodegradation In The Upper Hudson

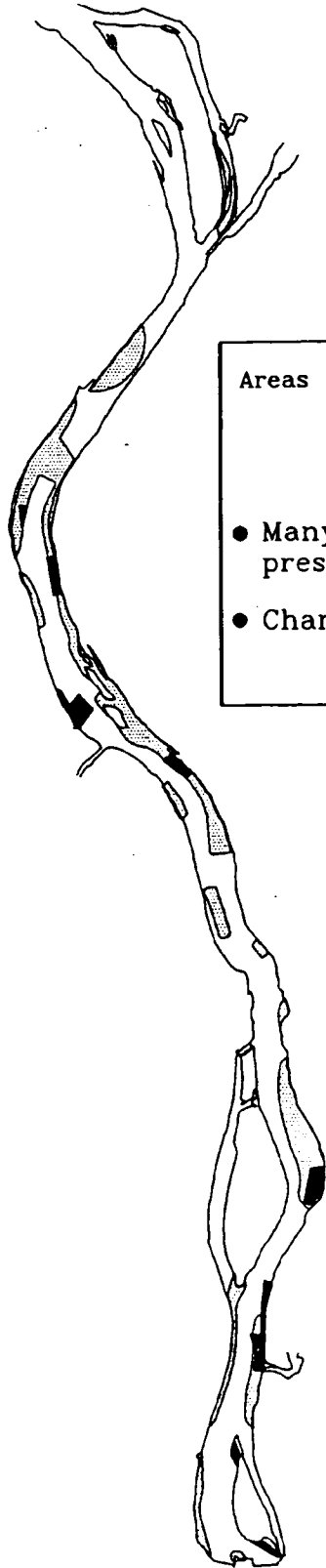


Footnotes:

1. Data Source: NYSDEC
2. Circled cross-hatches indicate sites that have undergone biodegradation
3. Biodegradation activity determined by comparison of chromatogram peaks

- Widespread Biodegradation By 1984
- 70% Of Samples Significantly Altered
- Issue: Reduced Chlorine Content = Reduced Toxicity = Reduced Risk?

THOMPSON ISLAND POOL



Areas of PCB Concentration > 50 PPM

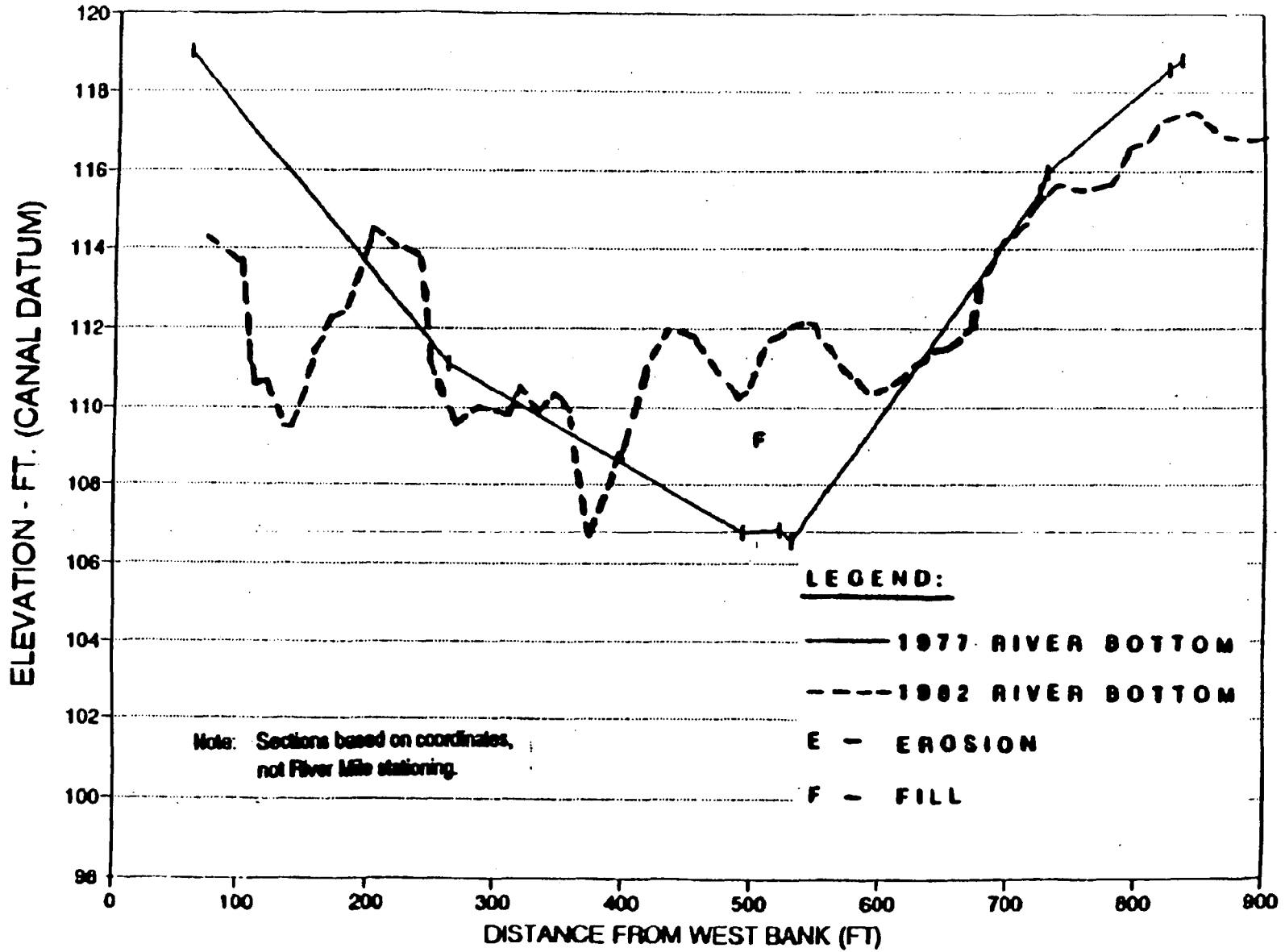
- 1979 Hot Spots
- 1984 Polygons

- Many 1979 Hot Spots no longer present in 1984
- Changes since 1984 ?

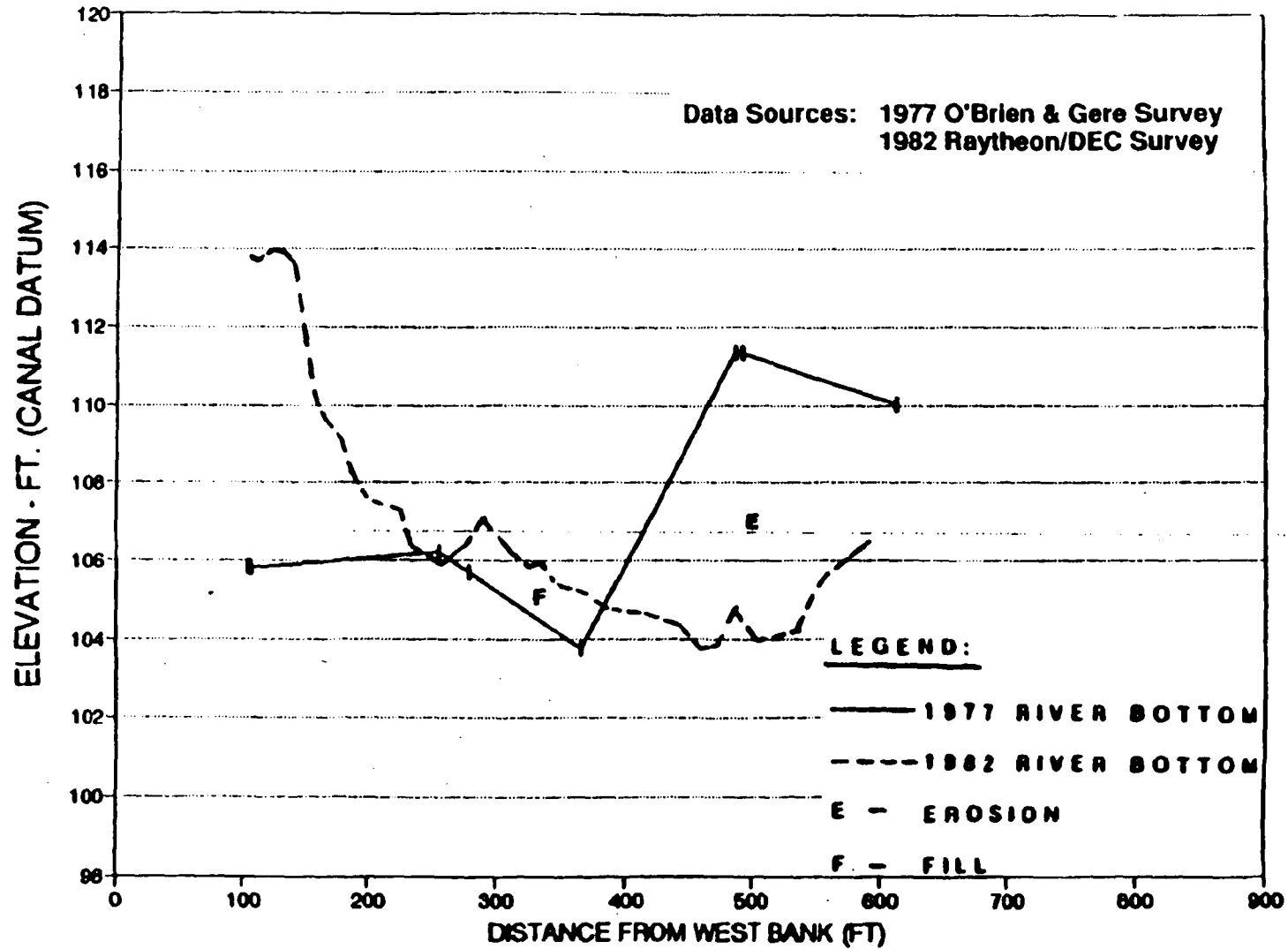
• Source NYSDEC



CROSS SECTION CHANGES - MILE 188.96

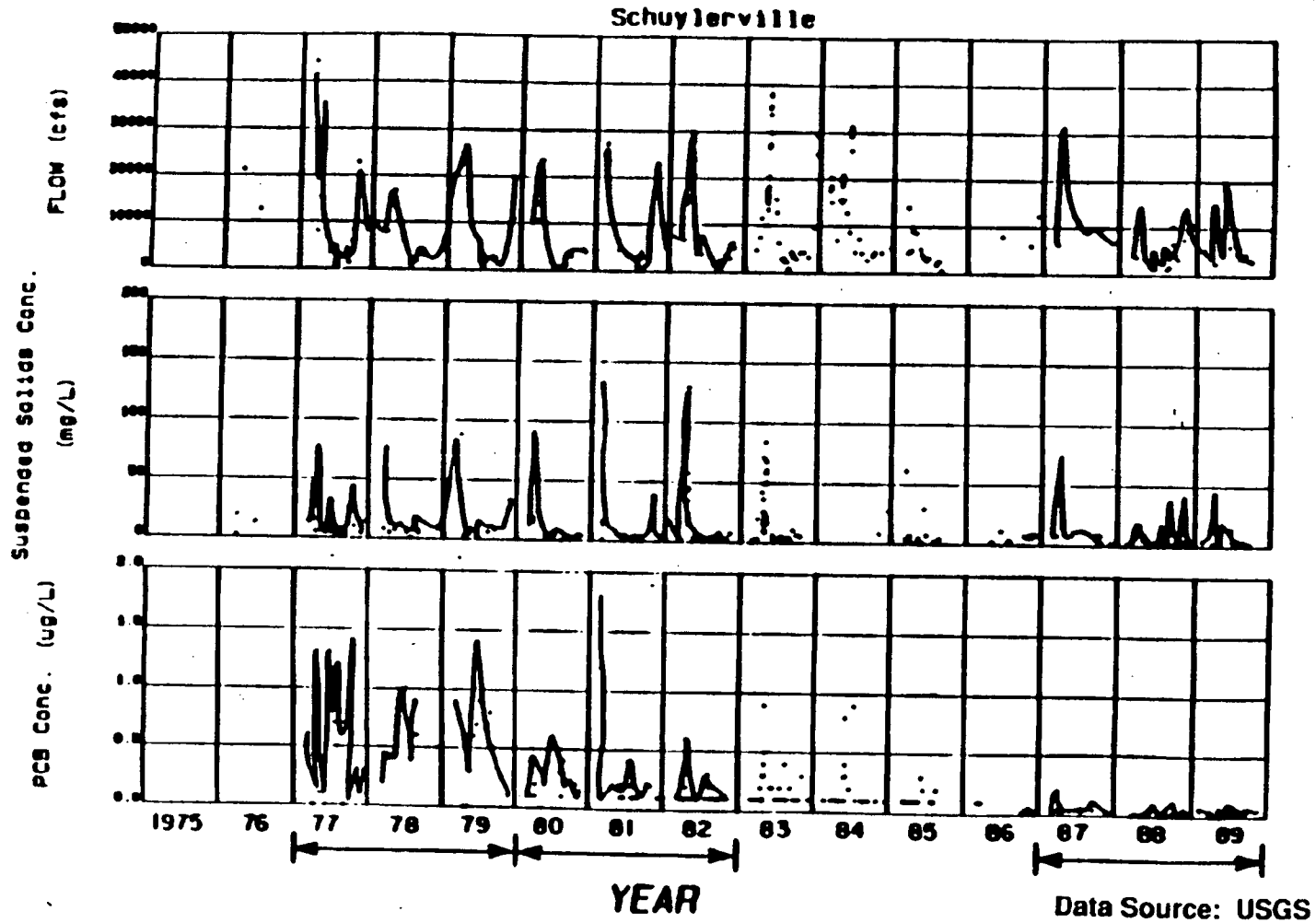


CROSS SECTION CHANGES - MILE 189.20



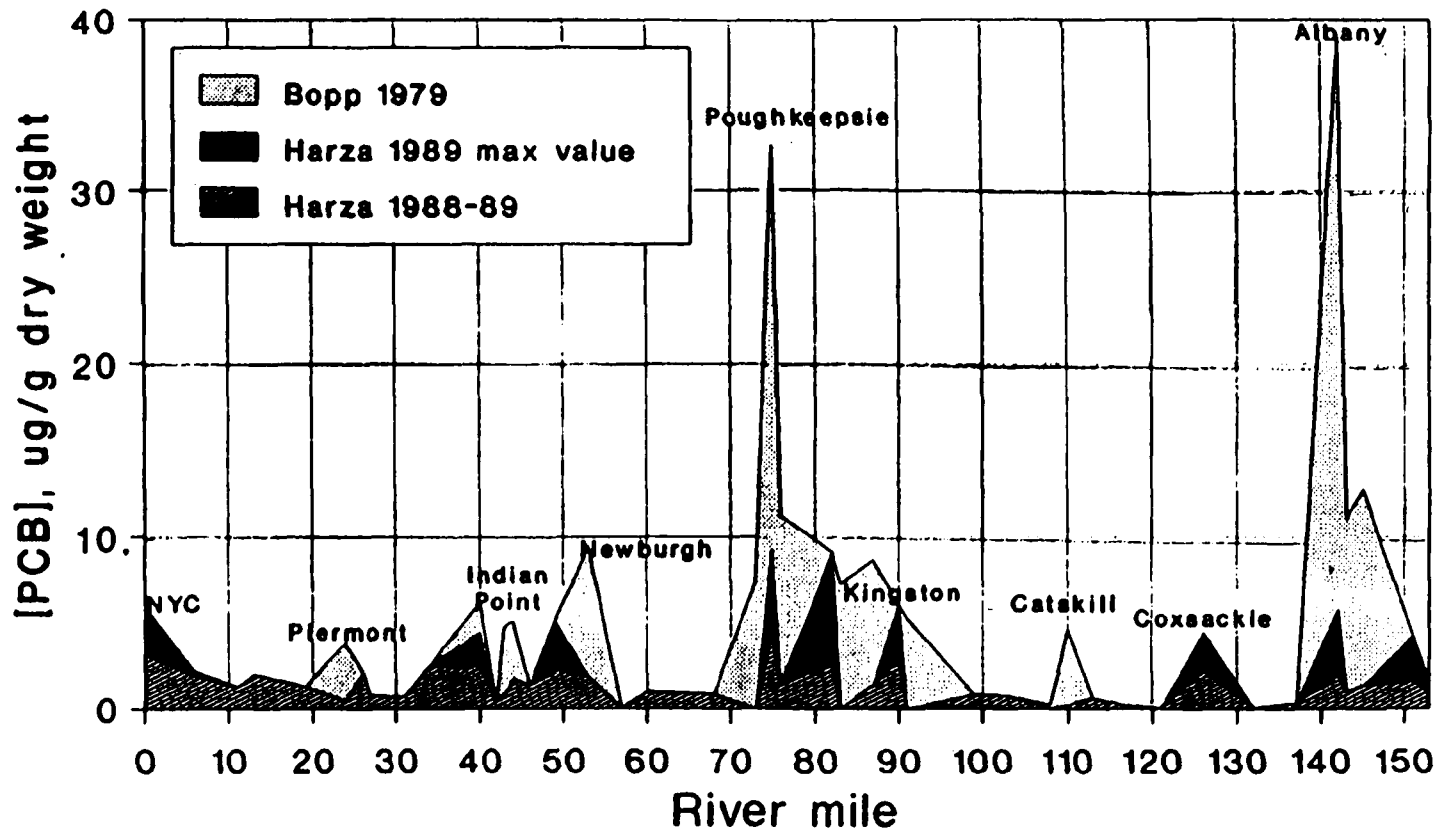
- Bathymetry Data Independently Confirms Changes In The River Bed
- Issues: Degree Of Changes Between 1977-82; Changes Since 1982?

PCB Water Concentrations



- PCB Water Concentrations Decreasing
- Changes Since 1984 Dramatic; Transport Less Flow Sensitive
- Similar Pattern At All Locations

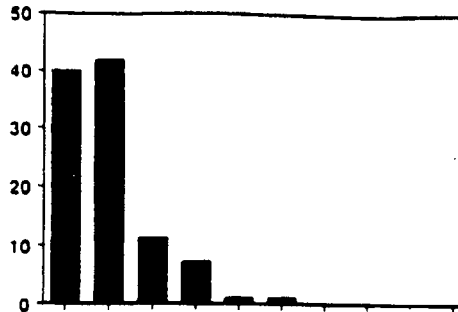
PCB Trends in Surficial Sediments Tidal Hudson River



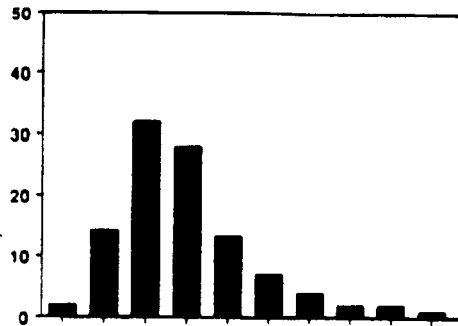
- Variations In Concentrations Not Consistent With Single Upper River Source
- Further Evidence of Multiple Local Sources In The Lower River

Homolog Distribution Shifts In Hudson

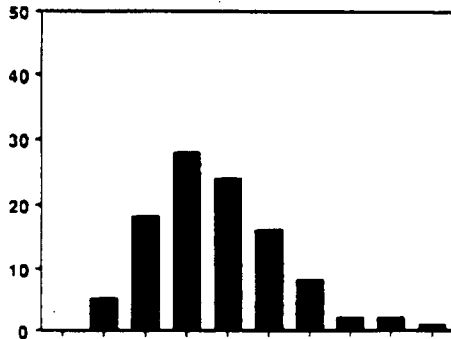
Upper Hudson (H7)



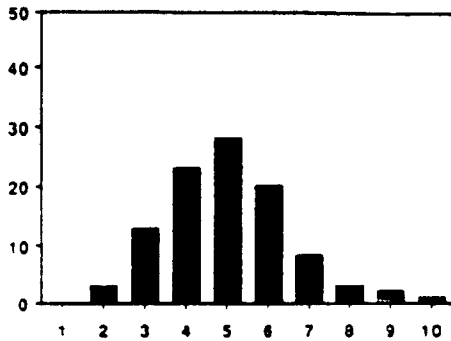
Tidal Hudson River



New York Harbor



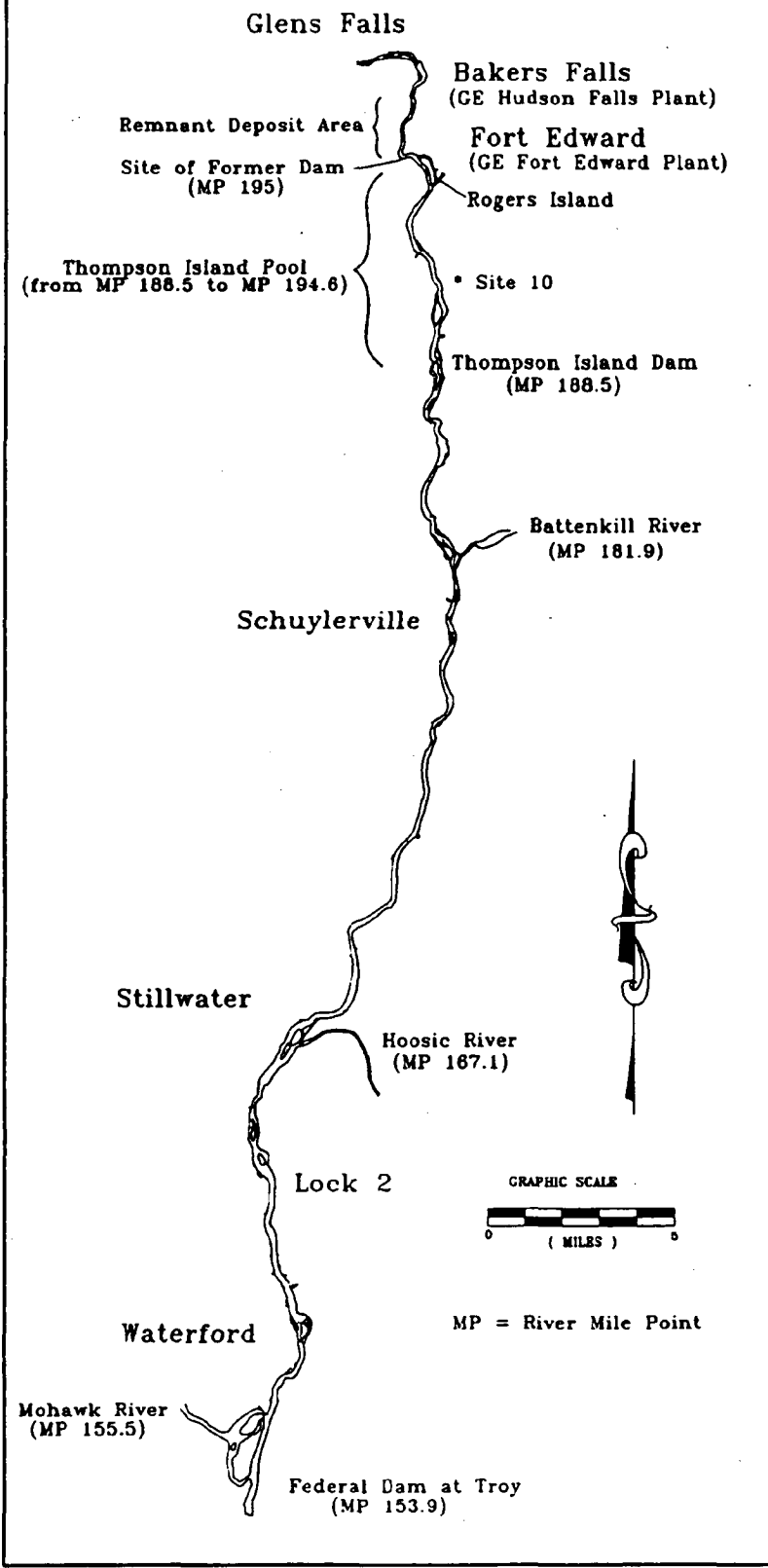
Long Island Sound



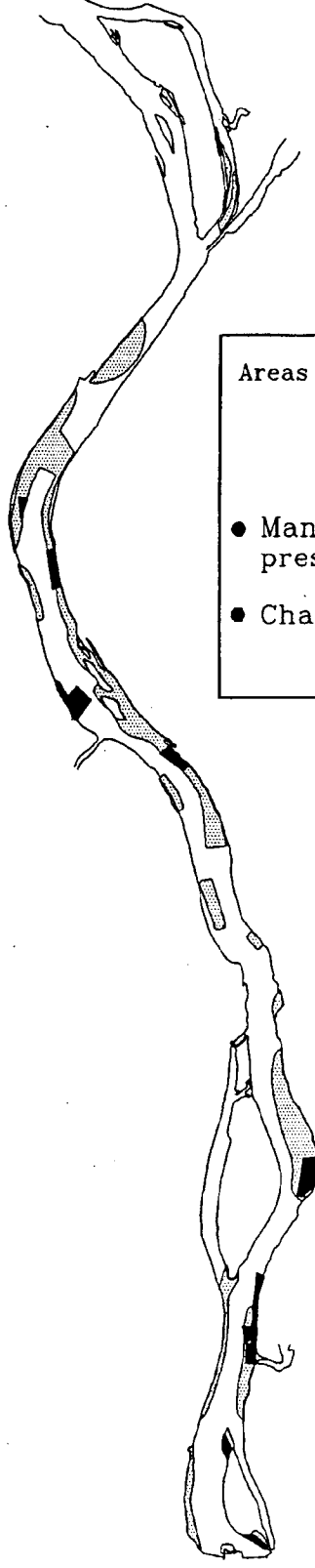
Data Source: 1989 GE Sediment Survey

- Significant Shift To Higher Chlorinated PCBs In Lower River With Evidence of Aroclor 1254, 1260
- Consistent With Thomann Report, Upper River Cannot Be A Significant Source For The Lower River
- Issue: Identification Of Lower River Sources

UPPER HUDSON RIVER



THOMPSON ISLAND POOL



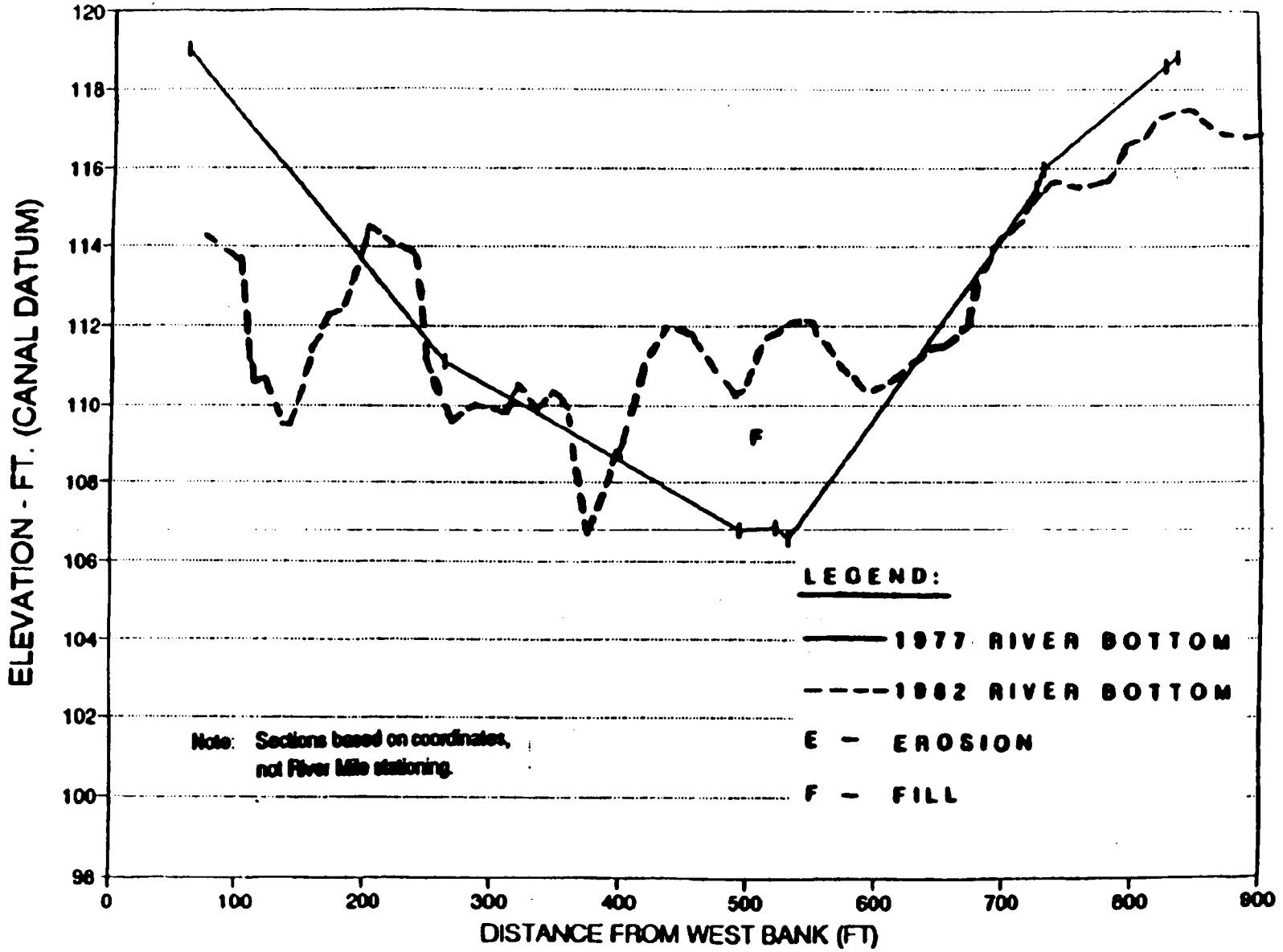
Areas of PCB Concentration > 50 PPM

- ▨ 1979 Hot Spots
- 1984 Polygons

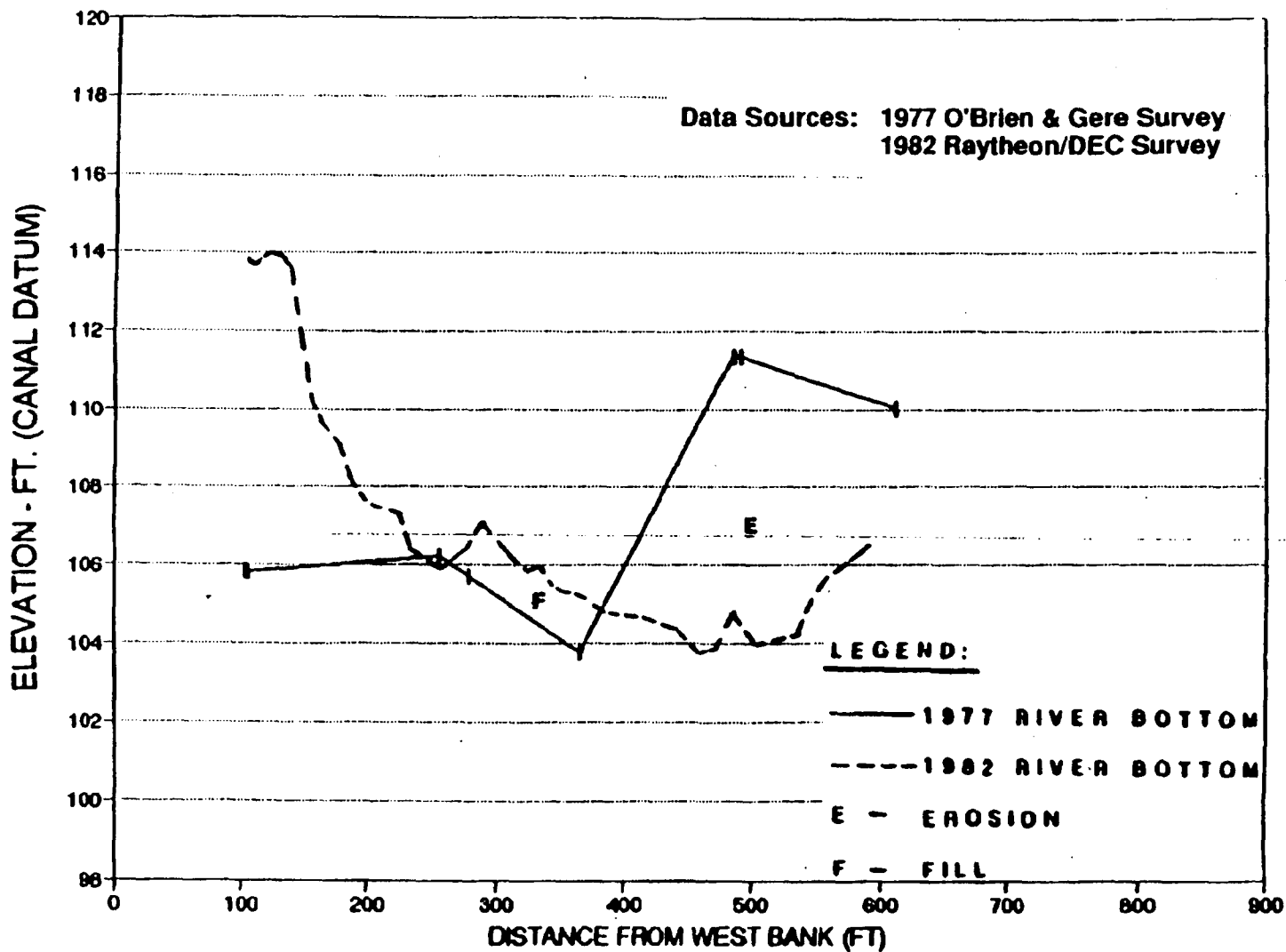
- Many 1979 Hot Spots no longer present in 1984
- Changes since 1984 ?

* Source NYSDEC

CROSS SECTION CHANGES - MILE 188.96

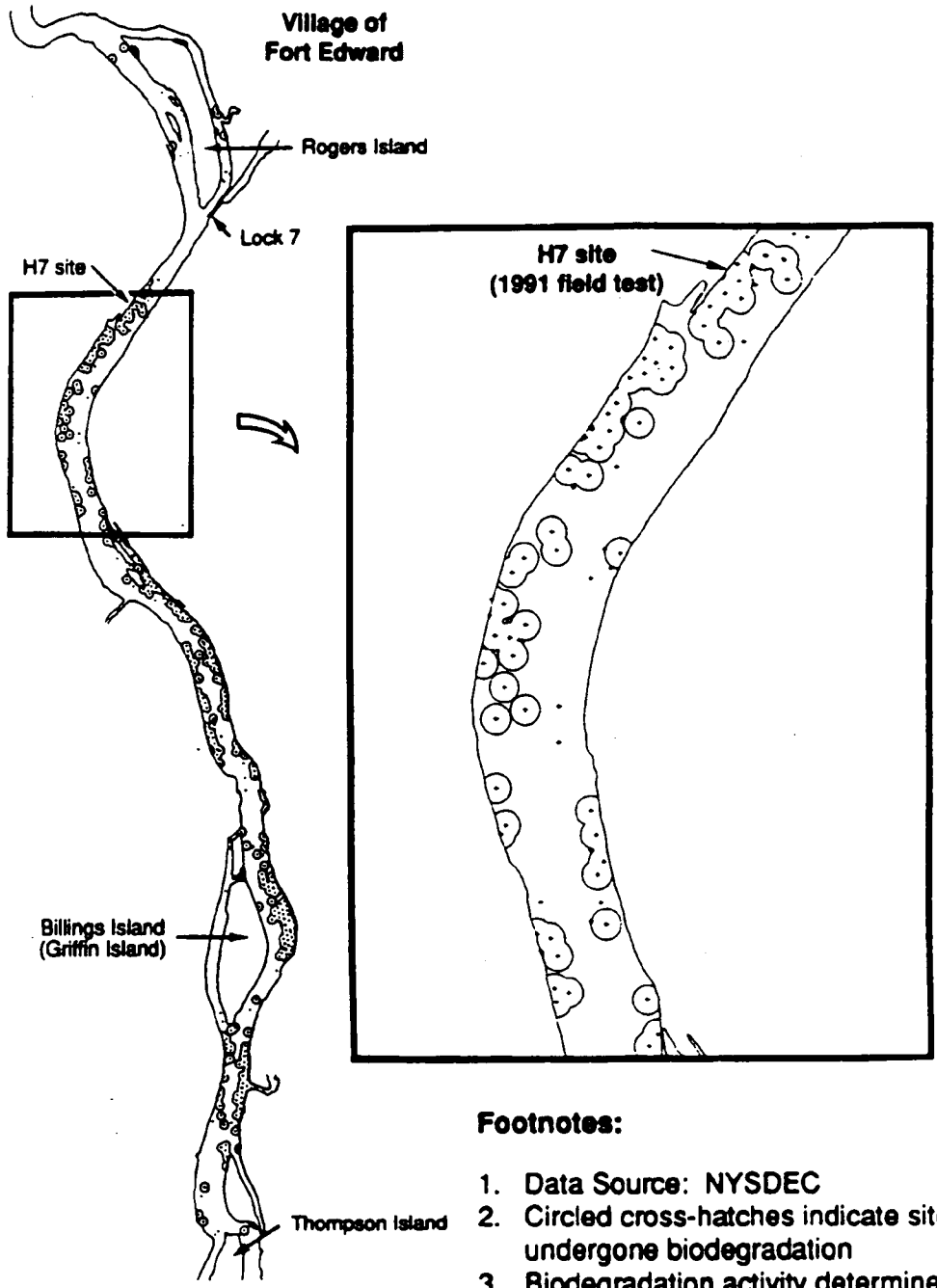


CROSS SECTION CHANGES - MILE 189.20



- Bathymetry Data Independently Confirms Changes In The River Bed
- Issues: Degree Of Changes Between 1977-82; Changes Since 1982?

Biodegradation In The Upper Hudson

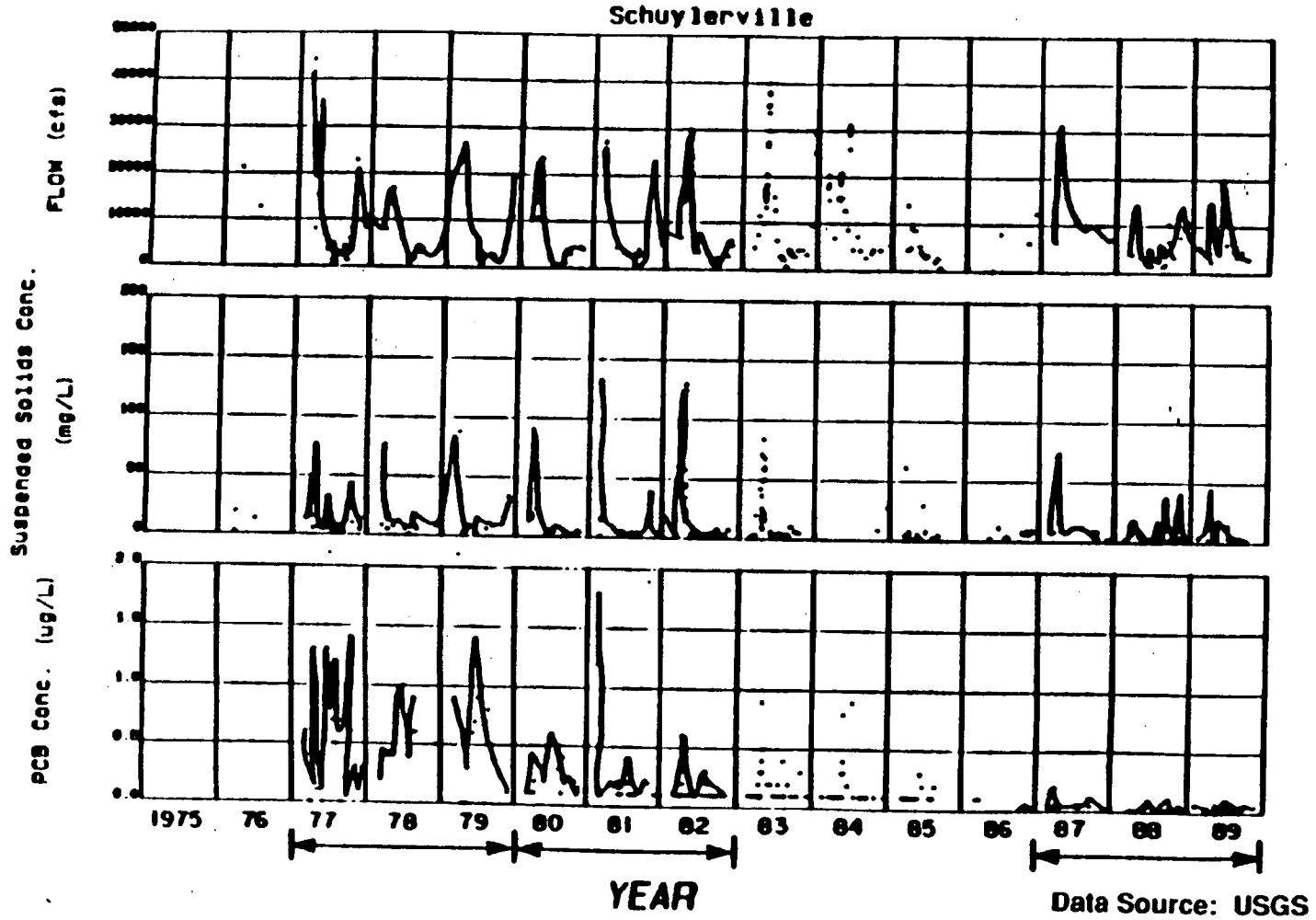


Footnotes:

1. Data Source: NYSDEC
2. Circled cross-hatches indicate sites that have undergone biodegradation
3. Biodegradation activity determined by comparison of chromatogram peaks

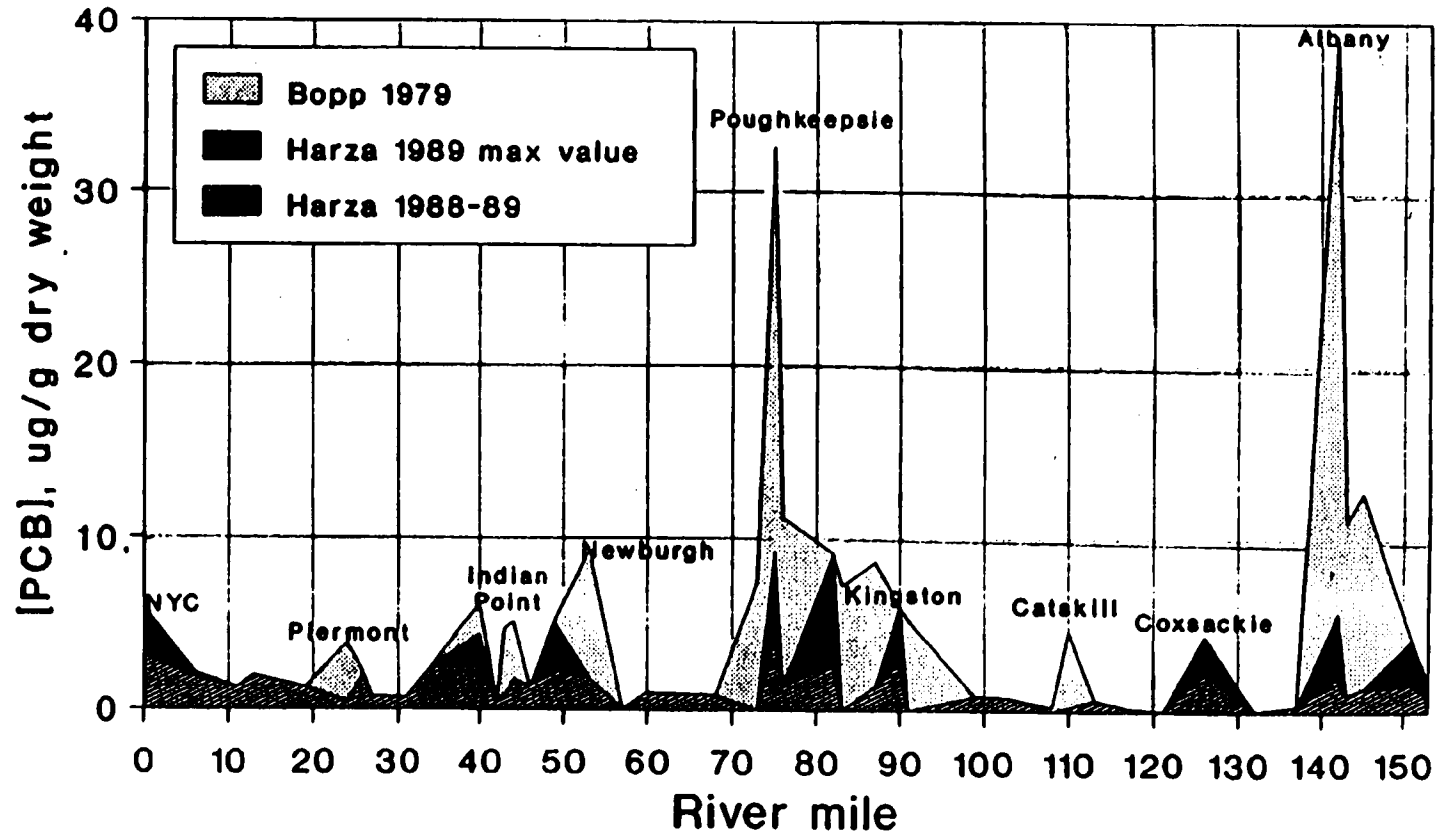
• Widespread Biodegradation By 1984
• 70% Of Samples Significantly Altered
• Issue: Reduced Chlorine Content = Reduced Toxicity = Reduced Risk?

PCB Water Concentrations



- PCB Water Concentrations Decreasing
- Changes Since 1984 Dramatic; Transport Less Flow Sensitive
- Similar Pattern At All Locations

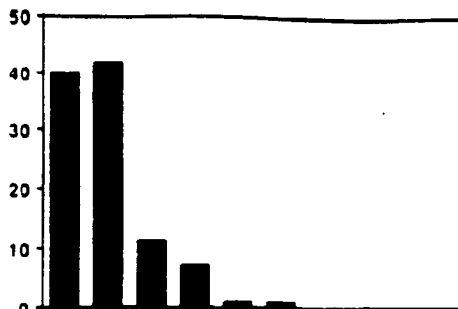
PCB Trends in Surficial Sediments Tidal Hudson River



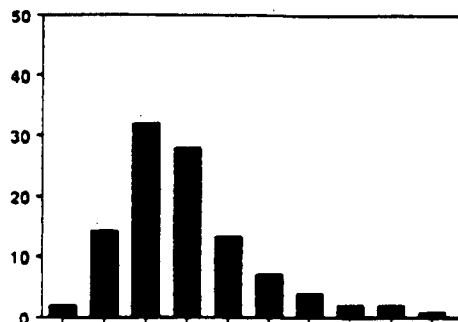
- Variations in Concentrations Not Consistent With Single Upper River Source
- Further Evidence of Multiple Local Sources in The Lower River

Homolog Distribution Shifts In Hudson

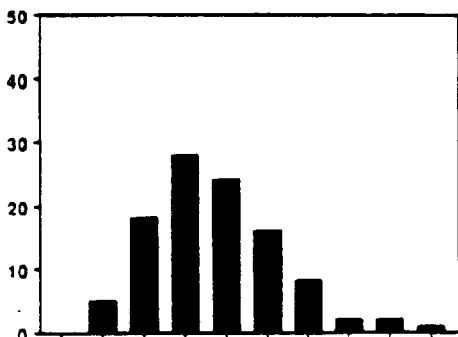
Upper Hudson (H7)



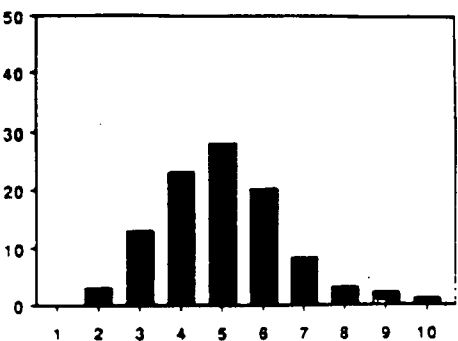
Tidal Hudson River



New York Harbor



Long Island Sound



Data Source: 1989 GE Sediment Survey

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BUDGET AND PROJECT CONTROLS

- Discrete tasks assigned that
 - Support specific GE arguments; and
 - Will have the greatest impact
- Budgets and schedules established for each task
- Costs and performance tracked by monthly reports (Primavera Project Management Software)
- All contractor assignments incorporated into Primavera system, including key CR&D activities
- Monthly project status review meetings