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PHASE 2 REPORT - REVIEW COPY
FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C - DATA EVALUATION AND INTERPRETATION REPORT
HUDSON RIVER PCBs REASSESSMENT RI/FS

February 1997

For

U.S. Environmental Protection Agency
Region II
and
U.S. Army Corps of Engineers
Kansas City District

Volume 2C
Book 2 of 3

TAMS Consultants, Inc.

The CADMUS Group, Inc.

Gradient Corporation

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Table of Contents

Table of Contents (cont'd)

Table of Contents (cont'd)

Table of Contents (cont'd)

PHASE 2 REPORT - REVIEW COPY
FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C - DATA EVALUATION AND INTERPRETATION REPORT
HUDSON RIVER PCBs REASSESSMENT RI/FS

List of Tables

HRP 002 1955

List of Tables (cont'd)

List of Tables (cont'd)

List of Figures

HRP 002 1958

List of Figures (cont'd)

List of Figures (cont'd)

List of Figures (cont'd)

List of Figures (cont'd)

HRP 002 1962

List of Figures (cont'd)

List of Figures (cont'd)

PHASE 2 REPORT - REVIEW COPY
FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C - DATA EVALUATION AND INTERPRETATION REPORT
HUDSON RIVER PCBs REASSESSMENT RI/FS

List of Plates

List of Plates (cont'd)

TABLES

Table 1-1

Water Column Transect and Flow-Averaged Sampling Stations

Station No.[a]		Location	River Mile[b]	Abbreviation	Alternate Reference
0001	T	Glens Falls	199.5	GF	GF Public Works
0002	T and F	Fenimore Bridge	197.6	FB	Bakers Falls Bridge
0003	T	Remnants	195.5	RMNTS	Remnant Deposits Site
0004	T and F	Rt. 197	194.6	RT 197	Rogers Island, Fort Edward
0005	T and F	Thompson Island Dam	188.5	TID	Crockers Reef Dam
0006	T	Schuylerville	181.3	SCHYLER	Rt 29 Bridge
0007	T	Stillwater	168.3	SW	Near USGS Water Quality Sta. 01331095
0008	T and F	Waterford	156.5	WTFD	Rt 4 Bridge at Waterford
0009	T	Saratoga Springs	NA	SS	Orenda Spring at Saratoga Park
0010	T	Lock 7	193.7[c]	LOCK 7	
0011	T	Batten Kill	182.1[c]	BK	
0012	T	Hoosic River	167.5[c]	HOOS	
0013	T	Mohawk River	156.2[c]	MOH	
0014	T	Green Island Bridge	151.7	GIB	
0015	T	Coxsackie	125.0	COS	
0016	T	Cementon	110.0	CEM	
0017	T	Highland	77.0	HIGH	
0019	T	Mechanicville	165.4	MECH	Mechanicville Public Dock
0020		Performance Evaluation Sample	NA	PE	

Notes:

a. T - Transect Sampling Station
F - Flow-Averaged Sampling Station

b. Water-column transect and flow-averaged samples were collected within a half mile of the river mile noted.

c. Tributary river mile designations correspond to point of confluence with the Hudson River.

Source: TAMS/Gradient Database

Table 1-2
Water-Column Transect and Flow-Averaged Sampling Events

Sampling Event	Sampling Date	Seasonal Conditions
Transect 1	January 29 - February 8, 1993	Winter - Low-Flow
Transect 2	February 19 - February 26, 1993	Winter - Low-Flow
Transect 3	March 26 - March 31, 1993	Spring - Transition from Low-Flow to High-Flow
Transect 4	April 12 - April 14, 1993	Spring - Low-Flow
Transect 5	June 24 - June 30, 1993	Summer - Low-Flow
Transect 6	August 19 - September 1, 1993	Summer - Low-Flow
Transect 8	April 23, 1993	Spring - High-Flow
Flow-Average 1	April 23 - May 8, 1993	Spring - High-Flow
A1[a]	April 23, 25, 27, 29, 1993	Spring - High-Flow
A2[a]	May 1, 3, 5, 7, 1993	Spring - High-Flow
Flow-Average 2	May 12 - May 27, 1993	Spring - Low-Flow
Flow-Average 3	June 6 - June 19, 1993	Spring - Low-Flow
Flow-Average 4	July 6 - July 20, 1993	Summer - Low-Flow
Flow-Average 5	August 2 - August 17, 1993	Summer - Low-Flow
Flow-Average 6	September 9 - September 23, 1993	Summer - Low-Flow

Note:
a. Event includes samples taken only at River Mile 156.6 at Waterford.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Table 1-3

High-Resolution Sediment Core Sample Locations

RIVER MILE	HIGH RESOLUTION CORES	CORE NO.
202.9	Background - Above Feeder Canal	27
197.1	Bakers Falls	28
194.1E	Rogers Island (East Channel)	26
194.2W	Rogers Island (West Channel)	25
191.2	Thompson Island Pool	20
189.3	Thompson Island Pool	23
188.5	Thompson Island Dam	19
185.8	Above Lock No. 5	18
(NA)	Batten Kill	17
177.8	Stillwater Pool	22
177.8	Stillwater Pool	21
(NA)	Hoosic River	24
166.3	Above Lock No. 3	16
159.0	Below Lock No. 1	15
(NA)	Mohawk River	12
143.5	Albany Turning Basin	11
124.1	Stockport	14
99.2	Tivoli Bay	13
88.5	Kingston	10
59.6	Denning's Point	9
54.0	Foundry Cove	8
43.2	Lents Cove	7
43.2	Lents Cove	6
25.0	Piermont Marsh	1
2.4	Mid-Harbor	4
(NA)	Newtown Creek	5
-1.9	Upper NY Bay	2
-2.2	Upper NY Bay	3

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Table 1-4
Phase 2 Target and Non-Target PCB Congeners Used in Analyses
Page 1 of 3

Congener Number[a]	Homologue Group	Congener Name	Conversion Factor[b]	Target[c]
BZ#1	Mono	2-Chlorobiphenyl		Yes
BZ#2	Mono	3-Chlorobiphenyl		Yes
BZ#3	Mono	4-Chlorobiphenyl		Yes
BZ#4	Di	2,2'-Dichlorobiphenyl		Yes
BZ#5	Di	2,3-Dichlorobiphenyl		Yes
BZ#6	Di	2,3'-Dichlorobiphenyl		Yes
BZ#7	Di	2,4-Dichlorobiphenyl		Yes
BZ#8	Di	2,4'-Dichlorobiphenyl		Yes
BZ#9	Di	2,5-Dichlorobiphenyl		Yes
BZ#10	Di	2,6-Dichlorobiphenyl		Yes
BZ#12	Di	3,4-Dichlorobiphenyl		Yes
BZ#15	Di	4,4'-Dichlorobiphenyl		Yes
BZ#16	Tri	2,2',3-Trichlorobiphenyl		Yes
BZ#17	Tri	2,2',4-Trichlorobiphenyl	1.1589	No
BZ#18	Tri	2,2',5-Trichlorobiphenyl		Yes
BZ#19	Tri	2,2',6-Trichlorobiphenyl		Yes
BZ#20	Tri	2,3,3'-Trichlorobiphenyl		No
BZ#22	Tri	2,3,4'-Trichlorobiphenyl		Yes
BZ#23	Tri	2,3,5-Trichlorobiphenyl	0.774	No
BZ#24	Tri	2,3,6-Trichlorobiphenyl	0.708	No
BZ#25	Tri	2,3',4-Trichlorobiphenyl		Yes
BZ#26	Tri	2,3',5-Trichlorobiphenyl		Yes
BZ#27	Tri	2,3',6-Trichlorobiphenyl		Yes
BZ#28	Tri	2,4,4'-Trichlorobiphenyl		Yes
BZ#29	Tri	2,4,5-Trichlorobiphenyl		Yes
BZ#31	Tri	2,4',5-Trichlorobiphenyl		Yes
BZ#32	Tri	2,4',6-Trichlorobiphenyl	0.901	No
BZ#33	Tri	2',3,4-Trichlorobiphenyl	0.894	No
BZ#34	Tri	2',3,5-Trichlorobiphenyl	1.12	No
BZ#37	Tri	3,4,4'-Trichlorobiphenyl		Yes
BZ#40	Tetra	2,2',3,3'-Tetrachlorobiphenyl		Yes
BZ#41	Tetra	2,2',3,4-Tetrachlorobiphenyl		Yes
BZ#42	Tetra	2,2',3,4'-Tetrachlorobiphenyl	0.729	No
BZ#44	Tetra	2,2',3,5'-Tetrachlorobiphenyl		Yes
BZ#45	Tetra	2,2',3,6-Tetrachlorobiphenyl	1.06	No
BZ#47	Tetra	2,2',4,4'-Tetrachlorobiphenyl		Yes
BZ#48	Tetra	2,2',4,5-Tetrachlorobiphenyl	0.926	No
BZ#49	Tetra	2,2',4,5'-Tetrachlorobiphenyl		Yes
BZ#51	Tetra	2,2',4,6'-Tetrachlorobiphenyl	1.009	No
BZ#52	Tetra	2,2',5,5'-Tetrachlorobiphenyl		Yes
BZ#53	Tetra	2,2',5,6'-Tetrachlorobiphenyl		Yes
BZ#56	Tetra	2,3,3',4'-Tetrachlorobiphenyl		Yes
BZ#58	Tetra	2,3,3',5'-Tetrachlorobiphenyl	0.792	No
BZ#60	Tetra	2,3,4,4'-Tetrachlorobiphenyl	0.56	No
BZ#63	Tetra	2,3,4',5-Tetrachlorobiphenyl	0.654	No
BZ#64	Tetra	2,3,4',6-Tetrachlorobiphenyl	0.577	No
BZ#66	Tetra	2,3',4,4'-Tetrachlorobiphenyl		Yes
BZ#67	Tetra	2,3',4,5-Tetrachlorobiphenyl		No
BZ#69	Tetra	2,3',4,6-Tetrachlorobiphenyl	0.731	No
BZ#70	Tetra	2,3',4',5-Tetrachlorobiphenyl		Yes

Table 1-4
Phase 2 Target and Non-Target PCB Congeners Used in Analyses

Congener Number[a]	Homologue Group	Congener Name	Conversion Factor[b]	Target[c]
BZ#74	Tetra	2,4,4',5-Tetrachlorobiphenyl	0.944	No
BZ#75	Tetra	2,4,4',6-Tetrachlorobiphenyl		Yes
BZ#77	Tetra	3,3',4,4'-Tetrachlorobiphenyl		Yes
BZ#82	Penta	2,2',3,3',4-Pentachlorobiphenyl		Yes
BZ#83	Penta	2,2',3,3',5-Pentachlorobiphenyl		Yes
BZ#84	Penta	2,2',3,3',6-Pentachlorobiphenyl		Yes
BZ#85	Penta	2,2',3,4,4'-Pentachlorobiphenyl		Yes
BZ#87	Penta	2,2',3,4,5'-Pentachlorobiphenyl		Yes
BZ#91	Penta	2,2',3,4',6-Pentachlorobiphenyl		Yes
BZ#92	Penta	2,2',3,5,5'-Pentachlorobiphenyl		Yes
BZ#95	Penta	2,2',3,5',6-Pentachlorobiphenyl		Yes
BZ#96	Penta	2,2',3,6,6'-Pentachlorobiphenyl	0.992	No
BZ#97	Penta	2,2',3',4,5-Pentachlorobiphenyl		Yes
BZ#99	Penta	2,2',4,4',5-Pentachlorobiphenyl		Yes
BZ#101&#90	Penta	2,2',4,5,5'-Pentachlorobiphenyl		Yes
BZ#105	Penta	2,3,3',4,4'-Pentachlorobiphenyl		Yes
BZ#107	Penta	2,3,3',4',5-Pentachlorobiphenyl		Yes
BZ#110	Penta	2,3,3',4',6-Pentachlorobiphenyl	0.822	No
BZ#114	Penta	2,3,4,4',5-Pentachlorobiphenyl	0.564	No
BZ#115	Penta	2,3,4,4',6-Pentachlorobiphenyl		Yes
BZ#118	Penta	2,3',4,4',5-Pentachlorobiphenyl		Yes
BZ#119	Penta	2,3',4,4',6-Pentachlorobiphenyl		Yes
BZ#122	Penta	2',3,3',4,5-Pentachlorobiphenyl		Yes
BZ#123	Penta	2',3,4,4',5-Pentachlorobiphenyl		Yes
BZ#126	Penta	3,3',4,4',5-Pentachlorobiphenyl		Yes
BZ#128	Hexa	2,2',3,3',4,4'-Hexachlorobiphenyl		Yes
BZ#129	Hexa	2,2',3,3',4,5-Hexachlorobiphenyl		Yes
BZ#135	Hexa	2,2',3,3',5,6'-Hexachlorobiphenyl		No
BZ#136	Hexa	2,2',3,3',6,6'-Hexachlorobiphenyl		Yes
BZ#137	Hexa	2,2',3,4,4',5-Hexachlorobiphenyl		Yes
BZ#138	Hexa	2,2',3,4,4',5'-Hexachlorobiphenyl		Yes
BZ#140	Hexa	2,2',3,4,4',6'-Hexachlorobiphenyl	0.57	No
BZ#141	Hexa	2,2',3,4,5,5'-Hexachlorobiphenyl		Yes
BZ#143	Hexa	2,2',3,4,5,6'-Hexachlorobiphenyl	0.689	No
BZ#144	Hexa	2,2',3,4,5',6-Hexachlorobiphenyl	0.574	No
BZ#146	Hexa	2,2',3,4',5,5'-Hexachlorobiphenyl	0.562	No
BZ#149	Hexa	2,2',3,4',5',6-Hexachlorobiphenyl		Yes
BZ#151	Hexa	2,2',3,5,5',6-Hexachlorobiphenyl		Yes
BZ#153	Hexa	2,2',4,4',5,5'-Hexachlorobiphenyl		Yes
BZ#156	Hexa	2,3,3',4,4',5-Hexachlorobiphenyl	0.741	No
BZ#157	Hexa	2,3,3',4,4',5'-Hexachlorobiphenyl		Yes
BZ#158	Hexa	2,3,3',4,4',6-Hexachlorobiphenyl		Yes
BZ#167	Hexa	2,3',4,4',5,5'-Hexachlorobiphenyl		Yes
BZ#169	Hexa	3,3',4,4',5,5'-Hexachlorobiphenyl	0.604	No
BZ#170	Hepta	2,2',3,3',4,4',5-Heptachlorobiphenyl		Yes
BZ#171	Hepta	2,2',3,3',4,4',6-Heptachlorobiphenyl		Yes
BZ#172	Hepta	2,2',3,3',4,5,5'-Heptachlorobiphenyl		No
BZ#174	Hepta	2,2',3,3',4,5,6'-Heptachlorobiphenyl	0.609	No
BZ#175	Hepta	2,2',3,3',4,5',6-Heptachlorobiphenyl	0.483	No
BZ#177	Hepta	2,2',3,3',4',5,6-Heptachlorobiphenyl		Yes

Table 1-4
Phase 2 Target and Non-Target PCB Congeners Used in Analyses

Congener Number[a]	Homologue Group	Congener Name	Conversion Factor[b]	Target[c]
BZ#178	Hepta	2,2',3,3',5,5',6-Heptachlorobiphenyl		No
BZ#180	Hepta	2,2',3,4,4',5,5'-Heptachlorobiphenyl		Yes
BZ#183	Hepta	2,2',3,4,4',5',6-Heptachlorobiphenyl		Yes
BZ#184	Hepta	2,2',3,4,4',6,6'-Heptachlorobiphenyl	0.592	No
BZ#185	Hepta	2,2',3,4,5,5',6-Heptachlorobiphenyl		Yes
BZ#187	Hepta	2,2',3,4',5,5',6-Heptachlorobiphenyl		Yes
BZ#189	Hepta	2,3,3',4,4',5,5'-Heptachlorobiphenyl		Yes
BZ#190	Hepta	2,3,3',4,4',5,6-Heptachlorobiphenyl		Yes
BZ#191	Hepta	2,3,3',4,4',5',6-Heptachlorobiphenyl		Yes
BZ#193	Hepta	2,3,3',4',5,5',6-Heptachlorobiphenyl		Yes
BZ#194	Octa	2,2',3,3',4,4',5,5'-Octachlorobiphenyl		Yes
BZ#195	Octa	2,2',3,3',4,4',5,6-Octachlorobiphenyl		Yes
BZ#196	Octa	2,2',3,3',4,4',5',6-Octachlorobiphenyl		Yes
BZ#197	Octa	2,2',3,3',4,4',6,6'-Octachlorobiphenyl	0.489	No
BZ#198	Octa	2,2',3,3',4,5,5',6-Octachlorobiphenyl		Yes
BZ#199	Octa	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		Yes
BZ#200	Octa	2,2',3,3',4,5',6,6'-Octachlorobiphenyl		Yes
BZ#201	Octa	2,2',3,3',4',5,5',6-Octachlorobiphenyl		Yes
BZ#202	Octa	2,2',3,3',5,5',6,6'-Octachlorobiphenyl		Yes
BZ#203	Octa	2,2',3,4,4',5,5',6-Octachlorobiphenyl	0.447	No
BZ#205	Octa	2,3,3',4,4',5,5',6-Octachlorobiphenyl		Yes
BZ#206	Nona	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl		Yes
BZ#207	Nona	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl		Yes
BZ#208	Nona	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl		Yes
BZ#209	Deca	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl		Yes

Homologue Group	Congener Ratio[d]
Mono	3:3
Di	9:12
Tri	18:24
Tetra	23:42
Penta	23:46
Hexa	19:42
Hepta	16:24
Octa	11:12
Nona	3:3
Deca	1:1
Sum	126:209

Source: TAMS/Gradient Database

Notes:

a. BZ # represents congener nomenclature system developed by Ballschmiter & Zell (1980).

b. Conversion factors for non-target congeners.

c. Yes: Target; No: Non-target; No - Cal: Calibrated non-target.

d. Ratio of number of congeners used to total number of congeners in homologue group.

Table 2-1

Summary of Niagara Mohawk Power Corp. RI Data - Queensbury Site

Media	Total PCB Concentrations	Units	Comments
Sediment near RM 210 • Shallow (0 to 9") • Deeper (9" to 18") • Background	 0.2 to 550 <0.1 to 2,000 <0.004 to 0.25	 mg/kg (ppm)	1. Samples collected by NMPC at 169 locations 2. Zones of elevated total PCB concentrations within 100 feet of site's contaminated soils; Aroclor 1242 dominant, lesser amounts of Aroclors 1248 and 1260 3. In general, PCB concentrations decrease with increasing distance from shoreline; river/reservoir approximately 800 ft wide near site 4. RI background samples essentially uncontaminated
Soil	<0.1 to >1,000	mg/kg (ppm)	1. Contaminated zone (soils exceeding 1 ppm cleanup level) extends 600 feet paralleling the shoreline from Corinth Rd. to Hudson River, and 50 to 100 ft in width; Aroclor 1248 dominant 2. Surficial soil samples collected north of Corinth Rd. were essentially uncontaminated
Groundwater	< 1	μg/L	1. Below Aroclor quantitation limits
Surface Water	< 65 - 72	ng/L	1. Eight river water samples were below Aroclor quantitation limits, including a sample at the Town of Queensbury water supply intake, approx. 0.8 miles downstream of site
Fish • Phase I (1992) • Phase II (1993) • Background	 <0.1 to 10 2 to 23 <0.1 to 1.4	 mg/kg-wet (ppm)	1. Four of ten Phase I samples exceeded 2 mg/kg FDA limit 2. Although benthic data are not available, higher concentrations in smallmouth bass, perch, and pumpkinseed, compared to minnows, suggests food chain biomagnification (see Figure 2-1) 3. RI background samples essentially uncontaminated; maximum of 1.4 ppm-wet (76 ppm-lipid) in pumpkinseed sample at Spier Falls pool (approx. RM 214)

Source: Engineering-Science (1994)

Table 2-2

Phase 1 Estimates of PCB Loads to the Lower Hudson

Source	Range of Load Estimates kg/day (lb/day)
Tributaries (not including Upper Hudson River)	0.1-1.0 (0.2-2.3)
Sewage	1.4-2.1 (3-4.6)
Combined Sewers and Stormwater	0.9-1.4 (2-3)
Atmospheric Deposition	0.05-0.23 (0.1-0.5)
Landfill Leachate	0-0.3 (0-0.7)

Source: TAMS/Gradient (1991)

TAMS/Cadmus/Gradient

Table 2-3

Summary of Results of USEPA Study of PCBs in NY/NJ Point Sources[a]

Treatment Plant	Receiving Water	Sum of 50 Congeners (ng/L)	Total PCB Estimate (ng/L)	Aroclor Pattern
Influent to Sewage Treatment Plant During Rainfall Event (Representing Combined Sewer Overflow)				
Passaic Valley	Upper Bay	380	400	1232
Newtown Creek	East River	150	160	1254
North River	Hudson River	150	160	1254
Wards Island	East River	50	55	No Pattern
Sewage Effluent				
Passaic Valley	Upper Bay	90	100	1232
Newtown Creek	East River	40	45	1254
North River	Hudson River	18	20	No Pattern
Wards Island	East River	9	10	No Pattern
Owls Head	Upper Bay	18	20	1232
Tributaries (River Water Samples)				
Hudson River[b] (approx. River Mile 12)		24	26	1248
Passaic River[b]		24	26	1248
Hackensack River[b]		24	26	1248
Raritan River[b]		12	13	1242/1016

Notes:
a. See Plate 2-3 for approximate locations of "tributary" and sewage treatment plant sampling points
b. River samples do not represent "tributary inflow" to the Harbor since the sampling points are located within the tidal estuary and exhibit significant salinities.

TAMS/Cadmus/Gradient

Source: Battelle Ocean Sciences for USEPA (1993)

Table 2-4

Estimates of PCB Loading from Treated Sewage Effluent

Treatment Plant	Receiving Water	Total PCB Estimate (ng/L) (1)	1992 Average Flow (MGD) (2)	Estimated Total PCB Load (lb/day) $(1)x(2)x(8.34x10^{-6} \frac{L \cdot lb}{ng \cdot MG})$
Passaic Valley	Upper Bay	100	278	0.23 (0.11 kg/day)
Newtown Creek	East River	45	297	0.11 (0.05 kg/day)
North River	Hudson River	20	177	0.03 (0.01 kg/day)
Wards Island	East River	10	267	0.02 (0.01 kg/day)
Owls Head	Upper Bay	20	126	0.02 (0.01 kg/day)
Totals			1145	0.42 (0.2 kg/day)

Calculation of Total Load from Sewage:

1. According to Hydroqual (3), approximate total 1989 sewage flow = **2,500 MGD** (includes plants discharging to Hudson River, East River, Upper Bay, Jamaica Bay, Lower Bay, Raritan Bay, Sandy Hook Bay, Arthur Kill, Raritan River, and Hackensack River)

2. Ratio of flow from 5 plants which were analyzed to total flow = 1145/2500 = 0.46

3. Estimate of total PCB load from 2500 MGD of sewage = 0.42 lb/day ÷ 0.46 = **0.91 lb/day (0.4 kg/day)**

   OR

   Assuming mean sewage concentration = 40 ng/L:
   PCB Load = (2500 MGD) × (40 ng/L) × (8.34×10^{-6}) = **0.83 lb/day (0.4 kg/day)**

Notes:
a. 1 MGD (million gallons per day) = 1.55 cfs (cubic feet per second)
b. 1 lb/day = 0.454 kg/day

TAMS/Cadmus/Gradient

Sources: Battelle Ocean Sciences for USEPA (1993); Interstate Sanitation Commission 1992 Annual Report (1993); and Hydroqual, Inc. for USEPA (1991)

Table 3–1

Stepwise Multiple Regression for log($K_{P,a}$) of Key PCB Congeners Showing Sign of Regression Coefficients[a] Determined to be Significant at the 95 Percent Level

PCB Congener	Temperature	[DOC]	[TSS]	$C_{d,a}$ [b]	Flow at Fort Edward
BZ#1	-				-
BZ#8					
BZ#18	-		-		
BZ#28	-		-		
BZ#52	-		-		-
BZ#70	-		-		
BZ#87		+	-		+
BZ#101	-				
BZ#118	-		-		
BZ#138	-		-		+

Notes:

a. - indicates a significant negative regression coefficient.
   + indicates a significant positive regression coefficient.

b. $C_{d,a}$ is the analytically-resolved dissolved-phase concentration of the congener.

Source: TAMS/Gradient Database

Table 3–2
Stepwise Multiple Regression for $\log(K_{POC,a})$ of Key PCB Congeners
Showing Sign of Regression Coefficients[a]
Determined to be Significant at the 95 Percent Level

PCB Congener	Temperature	[DOC]	[TSS]	$C_{d,a}$ [b]	Flow at Fort Edward
BZ#1					
BZ#8					
BZ#18	–				
BZ#28					+
BZ#52	–				
BZ#70	–				
BZ#87					
BZ#101					
BZ#118					+
BZ#138					+

Notes:

a. – indicates a significant negative regression coefficient;
   + indicates a significant positive regression coefficient.

b. $C_{d,a}$ is the analytically-resolved dissolved-phase concentration of the congener.

Source: TAMS/Gradient Database

Table 3–3

Correlation Coefficient Matrix for Explanatory Variables Evaluated for Analysis of PCB Partition Coefficients ($K_{POC,a}$)

	[DOC]	Temperature	[TSS]	Flow	Dissolved Concentration
[DOC]	1.0	0.147	-0.183	-0.530	0.071
Temperature		1.0	-0.042	-0.514	0.008
[TSS]			1.0	0.191	-0.033
Flow				1.0	-0.021
Dissolved Concentration					1.0

Source: TAMS/Gradient Database

Table 3–4
Temperature Slope Factors for Capillary Column Gas Chromatogram Peaks Associated with Key PCB Congeners

PCB Congener	Capillary Column Peak	Slope Estimate
BZ#1	Not resolved	no data
BZ#4	1a	1463.1
BZ#8	1d	no data
BZ#18	2b	1135.1
BZ#28	4d	920.1
BZ#52	6b	1116.7
BZ#70	9b	1337.3
BZ#101	10d	no data
BZ#138	15a	1599.0
BZ#180	18a	529.5

Source: Warren *et al.* (1987) TAMS/Cadmus/Gradient

Table 3–5
Relative Performance of Distribution Coefficient Formulations: Squared Error in Predicting Particulate-Phase PCB Congener Concentration from Dissolved-Phase Concentration

Evaluation Criterion \ Calculation Method for K	Average of Estimates, no Temperature Correction	Average of Estimates, with Temperature Correction	Median of Estimates, no Temperature Correction	Median of Estimates, with Temperature Correction
Mean Squared Error, Predicted from $K_{P,a}$ and [TSS]	30.15	22.90	7.50	7.85
Mean Squared Error, Predicted from $K_{POC,a}$ and [POC]	3.15	3.04	3.51	3.11
Median Squared Error, Predicted from $K_{P,a}$	0.061	0.032	0.013	0.008
Median Squared Error, Predicted from $K_{POC,a}$	0.026	0.017	0.013	0.006

Note: Smaller squared error indicates better fit between observed particulate-phase concentrations and particulate-phase concentrations predicted from observed dissolved concentration using calculated partition coefficients (K) for each congener and equilibrium partitioning assumptions.

Source: TAMS/Gradient Database

Table 3–6a
In-Situ $K_{POC,a}$ **Estimates for Hudson River**
PCB Congeners Corrected to 20°C
Page 1 of 3

HRP 002 1983

$K_{POC,a}$ Corrected to 20° C (L/kg)						
PCB Congener (BZ#)	**Count**	**Median**	**Average**	**Minimum**	**Maximum**	**Standard Deviation**
1	25	143,000	392,000	24,300	3,080,000	747,000
4	4	65,100	202,000	30,600	646,000	297,000
6	17	429,000	680,000	203,000	3,020,000	768,000
7	1	198,000	198,000	198,000	198,000	-
8	22	255,000	432,000	159,000	2,780,000	555,000
9	6	344,000	983,000	124,000	4,270,000	1,620,000
10	10	166,000	233,000	40,300	800,000	221,000
12	10	884,000	1,030,000	282,000	1,840,000	537,000
15	23	1,260,000	3,380,000	483,000	25,100,000	5,960,000
16	20	215,000	273,000	90,500	1,050,000	208,000
18	29	228,000	297,000	112,000	1,470,000	275,000
19	12	155,000	255,000	40,100	1,450,000	387,000
22	34	524,000	716,000	205,000	2,880,000	572,000
25	15	678,000	873,000	332,000	2,280,000	485,000
26	32	586,000	710,000	115,000	3,130,000	521,000
27	20	306,000	440,000	165,000	1,950,000	405,000
28	32	619,000	798,000	280,000	2,380,000	577,000
29	14	580,000	806,000	288,000	2,360,000	584,000
31	30	543,000	723,000	285,000	3,360,000	615,000
37	32	930,000	1,090,000	408,000	2,870,000	645,000
40	34	558,000	697,000	262,000	2,438,000	483,000
41	24	599,000	766,000	315,000	2,870,000	576,000
44	40	558,000	731,000	231,000	4,020,000	651,000
47	33	856,000	948,000	68,600	3,760,000	621,000
49	26	724,000	864,000	357,000	2,340,000	478,000
52	35	607,000	729,000	333,000	2,150,000	438,000
53	21	362,000	689,000	148,000	3,630,000	858,000
56	9	884,000	1,130,0001	313,000	2,920,000	832,000

Table 3–6a

In-Situ $K_{POC,a}$ Estimates for Hudson River PCB Congeners Corrected to 20°C

$K_{POC,a}$ Corrected to 20° C (L/kg)						
PCB Congener (BZ#)	**Count**	**Median**	**Average**	**Minimum**	**Maximum**	**Standard Deviation**
66	33	1,140,000	1,480,000	555,000	4,810,000	943,000
70	38	1,140,000	1,420,000	411,000	5,570,000	1,080,000
77	3	2,190,000	2,420,000	1,020,000	4,050,000	1,530,000
82	12	1,320,000	1,820,000	766,000	6,390,000	1,530,000
83	10	1,440,000	1,670,000	692,000	5,140,000	1,270,000
84	17	918,000	1,060,000	329,000	4,310,000	874,000
85	17	1,540,000	1,790,000	742,000	6,230,000	1,220,000
87	20	1,290,000	1,490,000	420,000	4,820,000	949,000
91	13	1,150,000	1,010,000	394,000	1,970,000	435,000
92	12	1,210,000	1,570,000	521,000	6,280,000	1,530,000
95	9	1,050,000	1,310,000	546,000	3,820,000	962,000
97	18	1,530,000	1,850,000	656,000	6,320,000	1,630,000
99	19	1,640,000	2,030,000	575,000	7,710,000	1,700,000
101	21	1,340,000	1,630,000	366,000	4,760,000	1,100,000
105	5	2,670,000	2,270,000	929,000	3,460,000	997,000
107	7	2,650,000	3,030,000	1,260,000	6,310,000	1,600,000
118	12	2,350,000	2,580,000	1,160,000	7,670,000	1,710,000
119	3	1,360,000	1,520,000	1,310,000	1,890,000	321,000
122	1	3,170,000	3,170,000	3,172,812	3,170,000	-
128	3	2,640,000	2,360,000	1,120,000	3,300,000	1,120,000
136	7	1,920,000	1,800,000	883,000	3,320,000	836,000
137	7	2,530,000	2,590,000	999,000	4,740,000	1,390,000
138	9	2,210,000	2,420,000	976,000	3,960,000	1,000,000
141	5	1,660,000	1,880,000	1,010,000	3,340,000	957,000
149	3	2,320,000	2,300,000	2,140,000	2,440,000	151,000
151	10	2,080,000	2,160,000	852,000	4,240,000	1,040,000

Table 3–6a
***In-Situ* $K_{POC,a}$ Estimates for Hudson River**
PCB Congeners Corrected to 20°C
Page 3of 3

$K_{POC,a}$ Corrected to 20° C (L/kg)						
PCB Congener (BZ#)	**Count**	**Median**	**Average**	**Minimum**	**Maximum**	**Standard Deviation**
153	10	2,770,000	2,970,000	627,000	9,750,000	2,580,000
170	2	2,070,000	2,070,000	794,000	3,350,000	1,810,000
171	1	717,000	717,000	717,000	717,000	-
177	1	846,000	846,000	846,000	846,000	-
180	1	600,000	600,000	600,000	600,000	-
183	1	381,000	381,000	381,000	381,000	-
187	1	690,000	690,000	690,000	690,000	-
191	1	813,000	813,000	813,000	813,000	-
194	1	365,000	365,000	365,000	365,000	-
201	2	1,240,000	1,240,000	793,000	1,680,000	630,000

Source: TAMS/Gradient Database.

Table 3–6b

***In Situ* log ($K_{POC,a}$) Estimates for Hudson River PCB Congeners Corrected to 20°C**

log ($K_{POC,a}$) Corrected to 20° C (L/Kg)						
PCB Congener (BZ#)	Count	Median	Average	Minimum	Maximum	Theoretical log (K_{oc})
1	25	5.15	5.21	4.39	6.49	4.35
4	4	4.80	4.98	4.49	5.81	4.76
6	17	5.63	5.66	5.31	6.48	
7	1	5.30	5.30	5.30	5.30	4.83
8	22	5.41	5.50	5.20	6.44	4.83
9	6	5.53	5.64	5.09	6.63	4.83
10	10	5.22	5.23	4.61	5.90	4.76
12	10	5.95	5.95	5.45	6.27	4.85
15	23	6.10	6.22	5.68	7.40	4.91
16	20	5.33	5.36	4.96	6.02	5.16
18	29	5.36	5.39	5.05	6.17	5.24
19	12	5.19	5.16	4.60	6.16	
22	34	5.72	5.76	5.31	6.46	
25	15	5.83	5.89	5.52	6.36	
26	32	5.77	5.78	5.06	6.50	5.31
27	20	5.49	5.54	5.22	6.29	
28	32	5.79	5.82	5.45	6.38	5.31
29	14	5.76	5.83	5.46	6.37	5.26
31	30	5.73	5.77	5.45	6.53	5.31
37	32	5.97	5.98	5.61	6.46	5.26
40	34	5.75	5.77	5.42	6.39	5.57
41	24	5.78	5.81	5.50	6.46	
44	40	5.75	5.78	5.36	6.60	5.64
47	33	5.93	5.91	4.84	6.58	5.72
49	26	5.86	5.89	5.55	6.37	5.71
52	35	5.78	5.81	5.52	6.33	5.91
53	21	5.56	5.67	5.17	6.56	5.76

Table 3–6b

In Situ log ($K_{POC,a}$) Estimates for Hudson River
PCB Congeners Corrected to 20°C
Page 2 of 3

log ($K_{POC,a}$) Corrected to 20° C (L/Kg)						
PCB Congener (BZ#)	**Count**	**Median**	**Average**	**Minimum**	**Maximum**	**Theoretical log (K_{oc})**
56	9	5.95	5.96	5.49	6.47	
66	33	6.06	6.11	5.74	6.68	5.74
70	38	6.06	6.08	5.61	6.75	5.73
77	3	6.34	6.32	6.01	6.61	5.75
82	12	6.12	6.18	5.88	6.81	
83	10	6.16	6.15	5.84	6.71	6.04
84	17	5.96	5.95	5.52	6.63	
85	17	6.19	6.20	5.87	6.79	
87	20	6.11	6.12	5.62	6.68	6.07
91	13	6.06	5.96	5.60	6.29	
92	12	6.08	6.09	5.72	6.80	
95	9	6.02	6.05	5.74	6.58	6.16
97	18	6.19	6.17	5.82	6.80	
99	19	6.21	6.22	5.76	6.89	6.14
101	21	6.13	6.15	5.56	6.68	6.14
105	5	6.43	6.31	5.97	6.54	
107	7	6.42	6.44	6.10	6.80	
118	12	6.37	6.36	6.06	6.88	
119	3	6.13	6.18	6.12	6.28	
122	1	6.50	6.50	6.50	6.50	
128	3	6.42	6.33	6.05	6.52	6.42
136	7	6.28	6.22	5.95	6.52	6.42
137	7	6.40	6.35	6.00	6.68	
138	9	6.34	6.35	5.99	6.60	6.49
141	5	6.22	6.23	6.01	6.52	
149	3	6.37	6.36	6.33	6.39	

Table 3–6b

***In Situ* log ($K_{POC,a}$) Estimates for Hudson River PCB Congeners Corrected to 20°C**

Page 3 of 3

log ($K_{POC,a}$) Corrected to 20° C (L/Kg)						
PCB Congener (BZ#)	Count	Median	Average	Minimum	Maximum	Theoretical log (K_{oc})
151	10	6.32	6.29	5.93	6.63	
153	10	6.44	6.36	5.80	6.99	6.57
170	2	6.21	6.21	5.90	6.53	6.85
171	1	5.86	5.86	5.86	5.86	6.94
177	1	5.93	5.93	5.93	5.93	
180	1	5.78	5.78	5.78	5.78	6.51
183	1	5.58	5.58	5.58	5.58	
187	1	5.84	5.84	5.84	5.84	6.99
191	1	5.91	5.91	5.91	5.91	
194	1	5.56	5.56	5.56	5.56	7.27
201	2	6.06	6.06	5.90	6.23	

Source: TAMS/Gradient Database; TAMS/Cadmus/Gradier

Note: Theoretical values of log (K_{oc}) are based on Burkhard (1984) as cited in Mackay *et al.* (1992). These represent a consistent set of estimates for partitioning to suspended particulate organic carbon developed from octanol-water partition coefficients. Blanks indicate data not available.

Table 3–7

Three-Phase PCB Partition Coefficient Estimates Using Regression Method[a]

PCB Congener (BZ#)	Sample Size	$\log(K_{POC})$ (L/kg)	$\log(K_{DOC})$ (L/kg)	Intercept probability value	Slope probability value
1	25	5.65	5.77	0.822	0.535
4	15[c]	NC	NC	0.535	0.208
8	22	5.98	5.56	0.346	0.114
18	29	6.07	5,95	0.697	0.112
28	32	6.72	6.12	0.718	0.032
31	30	NC	NC	0.713	0.023
44	40	6.15	5.44	0.390	0.259
52	35	6.10	5.29	0.262	0.299
66	33	6.73	5.80	0.608	0.127
70	38	6.47	5.46	0.366	0.215
101	21	6.11	NC	0.043	0.749
118	12	6.81	5.65	0.556	0.220
138	9	6.49	4.77	0.057	0.558
151	10	6.37	4.87	0.621	0.857
153	10	6.02	NC	0.122	0.367

Notes:

a. Regression method adapted from Brannon *et al.* (1991).

b. NC = Did not yield physically realistic estimate ($K_{POC} < 0$).

c. Analysis for BZ #4 includes samples with suspected blank contamination and a quantitation value within 3 times the blank concentration. Samples with these characteristics are omitted for all other congeners.

Source: TAMS/Gradient Database

Table 3–8

Three-Phase PCB Partition Coefficient Estimates Using Optimization with Temperature Correction to 20°C

PCB Congener (BZ #)	Optimization Method[a]	Estimated log (K_{POC}) (L/kg)	Estimated log (K_{DOC}) (L/kg)	Phase Distribution[b]		
				Dissolved Fraction	DOC Fraction	POC Fraction
1	1	5.65	5.12	0.44	0.28	0.28
4[c]	2	5.19	5.43	0.40	0.51	0.09
8	1	5.67	5.56	0.29	0.51	0.20
18	2	5.40	4.66	0.64	0.14	0.22
28	1	5.84	4.16	0.49	0.03	0.48
31	1	5.80	4.40	0.50	0.06	0.44
44	3	5.85	4.16	0.49	0.03	0.48
52	3	5.82	4.28	0.49	0.05	0.46
66	1	6.27	4.89	0.25	0.09	0.66
70	1	6.15	4.65	0.31	0.07	0.62
101	1	6.18	4.54	0.31	0.05	0.64
118	1	6.41	NC	0.22	0.00	0.78
138	1	6.43	4.86	0.20	0.07	0.73
151	1	6.55	5.09	0.15	0.09	0.76
153	1	6.38	5.00	0.21	0.10	0.69

Notes:

NC not convergent, K_{DOC} estimate goes toward zero.

a. Key to Optimization Methods:
   1. Simultaneous optimization.
   2. Simultaneous optimization with outlier rejection.
   3. Two-stage optimization.

b. Fractional distribution calculated at 20°C with [DOC]=4.79 mg/L and [POC]=1.40 mg/L.

c. Analysis for BZ #4 includes samples with suspected blank contamination and a quantitation value within 3 times the blank concentration. Samples with these characteristics are omitted for all other congeners.

Source: TAMS/Gradient Database

Table 3–9

A Comparison of Two-Phase Sediment log ($K_{OC,a}$) and log ($K_{POC,a}$) Estimates For Hudson River PCB Congeners

GE Peak No.	PCB Congener Identification (BZ#)	Sample Size	GE-Based Mean[a] log ($K_{OC,a}$) (L/kg)	Standard Deviation	Minimum	Maximum	Theoretical log (K_{OC})[b] (L/kg)	Phase 2 Mean log ($K_{POC,a}$)[c] (L/kg)
2	1	80	4.40	0.52	2.83	6.40	4.35	5.21
5	4 & 10	84	4.92	0.70	3.46	8.74	4.71, 4.76	4.98, 5.22
8	8 & 5	84	5.68	0.47	4.77	7.52	4.83, -	5.50, --
14	18 & 15	84	5.75	0.45	4.69	6.89	5.24, 4.91	5.39, 6.22
24	28 & 50	84	6.17	0.54	5.00	7.45	5.31, 5.70	5.82, --
23	31	84	5.92	0.57	4.71	7.34	5.31	5.77
37	44 & 104	78	5.71	0.54	4.20	6.94	5.64, 6.2	5.78, --
31	52 & 73	84	5.72	0.61	4.32	7.07	5.91, -	5.81, --
50	56 & 60	81	5.55	0.50	4.46	6.82	- , 5.67	5.96, --
47	70 & 76 & 61	83	5.87	0.56	4.71	7.22	5.73, -, 5.61	6.08, --, --
48	66 & 93 & 95	84	5.72	0.55	4.64	7.11	5.74, -, 6.16	5.91, --, 6.05
53	101 & 90	84	5.54	0.52	4.33	7.05	6.14, -	6.15, --
69	118 & 149 & 106	84	5.49	0.48	4.33	6.86	-, -, -	6.36, 6.36, --
75	153	48	5.38	0.42	4.11	6.37	6.57	6.36
82	138 & 163	59	5.50	0.47	4.22	6.77	6.49, -	6.35, --
88	187 & 182	52	5.21	0.40	4.05	5.78	5.84, -	6.17, --

Source: TAMS/Gradient Database.

Notes:

a) Quality of fit of the partitioning model is difficult to ascertain for the sediment due to concerns with GE sample handling and compositing procedures, which may have altered the *in situ* phase distribution, so relative predictive ability of mean versus median estimates of the partition coefficient cannot be evaluated. Comparison to water-column partitioning is made on the basis of the mean of all log-transformed estimates of $K_{OC,a}$ for each congener, which should approximate the median arithmetic value for lognormally distributed observations.

b) From Burkhard (1984) as cited in Mackay *et al.* (1992).

c) Two-phase water column estimates, from Table 3-6b.

Table 3–10a

Three-Phase Partition Coefficient Estimates for PCBs in Sediment of the Freshwater Portion of the Hudson River

PCB Congener (BZ#)	Estimated from GE Data			Reported for New Bedford Harbor Sediments[a]		Water Column Partition Coefficient Estimates[b]	
	log K_{OC} (L/kg)	log K_{DOC} (L/kg)	Method[c]	log K_{OC} (L/kg)	log K_{DOC} (L/kg)	log K_{OC} (L/kg)	log K_{DOC} (L/kg)
1	4.41	3.00	3	-	-	5.65	5.12
4 & 10	5.63	5.17	3	4.43	4.55	5.19, -	5.43, -
8 & 5	5.95	4.24	1	4.43	4.55	5.67, -	5.56, -
18 & 15	5.91	3.92	1	5.05, 4.43	4.86, 4.55	5.40, -	4.66, -
22 & 51	5.82	3.44	1	5.05, 5.29	4.86, 5.06	-, -	-, -
28 & 50	6.23	3.10	3	5.05, 5.29	4.86, 5.06	5.84, -	4.16, -
31	6.13	4.49	1	5.05	4.86	5.80	4.40
44 & 104	5.87	4.24	2	5.29, 5.43	5.06, 5.12	5.85, -	4.16, -
52 & 73	6.06	4.71	1	5.29	5.06	5.82, -	4.28, -
66 & 93 & 95	5.70	3.70	1	5.29, 5.43	5.06, 5.12	6.27, -, -	4.89, -, -
70 & 76 & 61	5.91	4.18	2	5.29	5.06	6.15, -, -	4.65, -, -
101 & 90	5.79	4.39	1	5.43	5.12	6.18, -	4.54, -
118 &149 & 106	5.77	4.39	1	5.43, 5.44	5.12, 5.04	6.41, -, -	-, -, -
138 & 163	6.02	4.95	1	5.44	5.04	6.43, -	4.86, -
153	5.60	4.10	1	5.44	5.04	6.38	5.00

Notes:

a. Averages by homologue reported by Burgess et al. (1996) for the 4-8 cm. depth layer.
b. From Table 3–8.
c. Optimization Methods:
   1. Direct optimization.
   2. Direct optimization with outliers deleted.
   3. Conditional optimization based on estimated two-phase $K_{OC,a}$.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Table 3–10b
Predicted Relative Concentration of PCB Congeners in Sediment Porewater for Various Assumptions Regarding Three-Phase PCB Congener Partition Coefficients.

Porewater Concentrations (ng/L) in Equilibrium with 1 mg/kg (Dry Weight) Total Sediment Concentration.

PCB Congener (BZ#)	K_{OC}, K_{DOC} Estimated from GE Data			K_{OC}, K_{DOC} Reported for New Bedford Harbor [a]			K_{OC}, K_{DOC} Estimated from Water Column Data [b]			Observed Median [d]
	Dissolved (ng/L) [c]	DOC-sorbed (ng/L) [c]	Total Porewater (ng/L)	Dissolved (ng/L) [c]	DOC-sorbed (ng/L) [c]	Total Porewater (ng/L)	Dissolved (ng/L) [c]	DOC-sorbed (ng/L) [c]	Total Porewater (ng/L)	Total Porewater (ng/L)
1	2101	78	2179	-	-	-	46	227	273	2180
4 & 10	128	693	821	771	1015	1786	135	1347	1482	850
8 & 5	61	40	101	771	1015	1786	44	591	635	127
18 & 15	67	20	87	185	498	683	84	141	225	109
22 & 51	82	8	90	185	498	683	35	7	42	82
28 & 50	32	1	33	185	498	683	30	16	46	36
31	40	47	87	185	498	683	33	30	63	73
44 & 104	74	58	132	107	454	561	30	16	46	92
52 & 73	48	91	139	107	454	561	31	22	53	111
66, 93, 95	107	20	127	107	454	561	11	32	43	103
70, 76, 61	66	37	103	107	454	561	15	24	39	74
101 & 90	88	80	168	77	378	455	14	18	32	175
118, 149, 106	92	84	176	77	378	455	8	0	8	186
138 & 163	52	171	223	75	307	382	8	21	29	201
153	137	63	200	75	307	382	9	32	41	232

Notes:

a. Averages by homologue reported by Burgess et al. (1996) for the 4-8 cm. depth layer.

b. Calculated for first of multiple congeners listed.

c. Phase distribution computed with porosity = 38.3%, m = 0.837 g/cc, TOC = 18,413 mg/Kg, [DOC] = 37.08 mg/L.

d. Median of observed ratio of porewater concentration (ng/L) to sediment concentration (mg/kg).

Source: TAMS/Gradient Database

Table 3-11
Models for Predicting Flow at Stillwater and Waterford

Stillwater Models

General Model Formulation (see Notes a - c):

Flow = Ao + B*(Gauge 115) + C*(Gauge 114) + D*(Gauge 113) + E*(Gauge 113)^2 + F*(Gauge 109) + G*(Gauge 109)^2 + H*(Gauge 109)^3 + I*(Gauge 104) + J*(Gauge 104)^2 + K*(Gauge 104)^3 + L*(Gauge 103) + M*(Fort Edward Flow)

Coefficient	Units	Model A	Model B	Model C	Model D	Model E	Model F	Model G	Model V[e]
Ao (Intercept)	cfs	-3276049.7337020	-3378402.9482520	-5957242.6098480	926684.2046496	1013923.1756045	185919.0495747	18366545.0134290	270837.0981818
B	cfs/ft	0	0	0	473.3300669	0	0	0	0
C	cfs/ft	0	0	0	813.0709879	0	0	0	0
D	cfs/ft	-22215.1555485	-24174.3361228	-20269.7658305	-27907.2299644	-5040.2093731	-6634.6009283	0	-9114.9039543
E	cfs/ft^2	137.3872350	151.6237246	124.8551945	170.7295079	39.9231368	52.8026899	0	70.3401991
F	cfs/ft	0	0	545.2425207	703.0331240	-21578.9322948	0	-608841.9284429	0
G	cfs/ft^2	0	0	0	0	133.4325059	0	6665.5350524	0
H	cfs/ft^3	0	0	0	0	0	0	-24.0505136	0
I	cfs/ft	252037.1752807	261545.9055682	405649.8142012	475.3636000	0	0	0	0
J	cfs/ft^2	-5095.9312083	-5259.4458537	-8165.2552433	0	0	0	0	0
K	cfs/ft^3	34.3652917	35.2983604	54.8013558	0	0	0	0	0
L	cfs/ft	549.5417837	0	497.9488527	0	0	0	0	0
M	--	0.3955830	0.3645739	0.3708952	0	0.2124434	0.2352177	0.4443368	0

Waterford Models:

General Model Formulation (See Notes a - d):

Flow = Ao + B*(Gauge 113) + C*(Gauge 113)^2 + D*(Gauge 113)^3 + E*(Gauge 109) + F*(Gauge 109)^2 + G*(Gauge 109)^3 + H*(Gauge 104) + I*(Gauge 104)^2 + J*(Gauge 104)^3 + K*(Gauge 103) +L*(Gauge 103)^2 + M*(Gauge 103)^3 + N*(Fort Edward Flow) +O*(Fort Edward Flow-Lag)

Coefficient	Units	Model H	Model I	Model J	Model K	Model L	Model M	Model N	Model W[e]
Ao (Intercept)	cfs	60589328.2249240	-11763551.0063700	51998478.3513660	942511.2282085	158644354.8177900	7965094.5678358	7482988.8714942	12382672.9529970
B	cfs/ft	-2725236.8592380	1518.2932751	-2223606.4751900	18316.9925537	0	-499279.3648327	-574007.9803440	0
C	cfs/ft^2	31824.4729540	0	25711.1721566	-99.8302380	0	5796.5889442	6601.4783119	0
D	cfs/ft^3	-123.8095313	0	-98.9468044	0	0	-22.3356125	-25.1609474	0
E	cfs/ft	905.5135839	0	0	-25667.6932483	-5817960.2146860	-54317.8005877	0	0
F	cfs/ft^2	0	0	0	156.6231076	67571.8552761	328.5094230	0	0
G	cfs/ft^3	0	0	0	0	-261.4070585	0	0	0
H	cfs/ft	878081.3161150	727530.9378804	732822.2618892	-19760.8434590	509508.8910785	526667.1085706	555864.9623411	-699894.1290952
I	cfs/ft^2	-17817.3332271	-14809.8942210	-14911.7412496	203.6555497	-10549.3939164	-10815.0617960	-11370.1754706	13047.6852323
J	cfs/ft^3	120.5397914	100.5247672	101.2333061	0	72.9270266	74.1110955	77.6146718	-79.9944846
K	cfs/ft	258820.2096101	-19214.2996200	0	-16914.3932913	0	0	0	0
L	cfs/ft^2	-8433.8689033	330.4976230	0	291.9458319	0	0	0	0
M	cfs/ft^3	91.9776902	0	0	0	0	0	0	0
N	--	0	0	0	0	0.2230530	0	0	0
O	--	0	0.0616570	0	0	0	-0.0492896	-0.0568143	0

Notes:

a. Models yield Stillwater and Waterford flows in cfs.

b. Gauge reference in the general flow model e.g., Gauge 104, corresponds to the staff gauge measurement in feet.

c. Fort Edward flow reference corresponds to flow measured at Fort Edward in cfs.

d. Fort Edward Flow - Lag reference corresponds to Fort Edward flow, with a one-day lag, in cfs.

e. Guage-only model used during the period March 27 to April 5, 1993.

Source: USGS, NYS Thruway Authority, Office of Canals

Table 3-12
Calculated Flows at Stillwater and Waterford for January 1993 to September 1993

Date	Fort Edward Measured Flow a (cfs)	Stillwater Calculated Flow b (cfs)	Model	Waterford Calculated Flow b (cfs)	Model
1/1/93					
1/2/93		10,700	D	13,800	J
1/3/93		10,500	D	13,500	J
1/4/93		8,100	D	9,800	J
1/5/93		10,100	D	11,500	J
1/6/93	10,300	15,400	E	19,400	L
1/7/93	11,000	15,900	E	20,000	M
1/8/93	10,100	16,000	E	19,300	M
1/9/93	8,870	14,400	E	17,700	M
1/10/93	12,200	13,800	E	15,600	M
1/11/93	6,970	12,000	E	13,700	M
1/12/93	7,110	12,100	E	14,000	M
1/13/93	7,140	12,100	E	13,600	M
1/14/93	7,020	12,200	E	13,900	M
1/15/93	6,760	12,800	E	14,500	M
1/16/93	6,690	12,100	E	14,200	M
1/17/93	6,720	11,700	E	13,400	M
1/18/93	6,610	9,400	Interpolated	12,300	Interpolated
1/19/93	6,120	9,400	Interpolated	9,500	L
1/20/93	6,100	7,900	D	10,300	J
1/21/93	6,260	7,700	D	9,600	J
1/22/93	6,430	8,100	D	10,500	J
1/23/93	6,360	7,900	D	10,000	J
1/24/93	6,700	8,700	D	11,200	J
1/25/93	6,500	9,400	D	12,500	M
1/26/93	6,490	9,000	D	11,300	J
1/27/93	6,100	8,300	D	10,500	J
1/28/93	6,120	7,700	D	9,700	J
1/29/93	6,030	7,800	D	9,800	J
1/30/93		8,100	D	10,300	J
1/31/93		8,400	D	11,000	J
2/1/93		8,900	D	11,600	J
2/2/93	5,150	8,800	D	11,500	J
2/3/93	4,160	8,900	D	11,700	J
2/4/93	4,240	8,500	D	11,300	J
2/5/93	4,210	8,100	D	10,500	J
2/6/93	4,430	7,700	D	9,900	J
2/7/93	5,120	7,900	Interpolated	10,300	Interpolated
2/8/93	4,050	8,100	D	10,800	J
2/9/93	4,160	8,300	D	11,100	J
2/10/93	3,970	7,800	D	10,400	J

Table 3-12
Calculated Flows at Stillwater and Waterford
for January 1993 to September 1993

Date	Fort Edward Measured Flow (cfs)[a]	Stillwater Calculated Flow (cfs)[b]	Model	Waterford Calculated Flow (cfs)[b]	Model
2/11/93	4,320	7,800	B	10,400	J
2/12/93	4,630	7,600	B	9,800	J
2/13/93	4,570	7,500	B	9,800	J
2/14/93	4,500				
2/15/93	4,560				
2/16/93	4,570				
2/17/93	4,710	7,700	B	10,000	J
2/18/93	4,590	7,500	Interpolated	9,700	Interpolated
2/19/93	4,540	7,300	B	9,400	J
2/20/93	4,510	7,400	B	9,500	J
2/21/93	4,610	7,200	B	9,100	J
2/22/93	4,520	6,900	B	8,600	J
2/23/93	4,530	7,300	B	9,300	J
2/24/93	4,510	7,400	B	9,600	J
2/25/93	4,700	7,500	B	9,600	J
2/26/93	4,530	7,400	B	9,600	J
2/27/93	4,570	7,400	B	9,600	J
2/28/93	4,480	7,400	B	9,600	J
3/1/93	4,440	7,000	B	8,800	J
3/2/93	4,460	7,200	B	9,200	J
3/3/93	4,470	7,000	B	8,800	J
3/4/93	4,300	6,900	B	8,800	J
3/5/93	4,570	6,800	B	8,500	J
3/6/93	4,550	6,600	B	8,200	J
3/7/93	4,430	6,600	B	8,200	J
3/8/93	3,000	5,400	Interpolated	6,700	Interpolated
3/9/93	2,880	4,300	B	5,100	J
3/10/93	3,010	4,800	B	6,000	J
3/11/93	2,880	5,200	B	6,800	J
3/12/93	2,890	4,400	B	5,500	J
3/13/93	2,720	4,400	B	5,500	J
3/14/93	2,660	4,800	Interpolated	6,200	Interpolated
3/15/93	2,850	5,300	B	7,000	J
3/16/93	2,500	4,800	B	6,300	J
3/17/93	2,630	4,500	B	5,700	J
3/18/93	3,460	5,100	B	6,300	J
3/19/93	2,870	4,800	Interpolated	6,000	Interpolated
3/20/93	2,890	4,600	B	5,700	J
3/21/93	2,890	4,300	B	5,200	J
3/22/93	2,400	4,200	B	5,300	J
3/23/93	2,660	4,500	B	5,700	J

Table 3-12
Calculated Flows at Stillwater and Waterford
for January 1993 to September 1993

Date	Fort Edward Measured Flow a (cfs)	Stillwater Calculated Flow b (cfs)	Model	Waterford Calculated Flow b (cfs)	Model
3/24/93	2,880	4,700	Interpolated	5,900	Interpolated
3/25/93	2,870	4,800	B	6,100	J
3/26/93	3,310	5,100	Interpolated	6,500	Interpolated
3/27/93	3,300	6,000	V	6,500	W
3/28/93	3,420	9,000	V	9,400	W
3/29/93	4,410	14,300	V	20,400	W
3/30/93	7,350	23,000	V	44,400	W
3/31/93	8,830	22,200	V	37,800	W
4/1/93	10,200	21,000	V	32,600	W
4/2/93	9,440	19,000	V	28,100	W
4/3/93	8,060	15,800	V	29,900	W
4/4/93	7,660	14,800	V	21,300	W
4/5/93	6,310	11,800	V	14,800	W
4/6/93	6,390	11,700	F	15,700	N
4/7/93	6,110	11,500	E	15,400	M
4/8/93	7,010	12,200	E	16,000	M
4/9/93	7,280	12,000	E	15,900	M
4/10/93	10,300	13,900	E	18,600	M
4/11/93	17,200	20,600	E	28,500	M
4/12/93	20,300	26,300	E	33,800	M
4/13/93	18,100	24,400	E	31,800	M
4/14/93	13,500	19,200	E	24,700	M
4/15/93	13,500	17,700	E	21,900	M
4/16/93	14,000	17,100	G	21,200	L
4/17/93	24,900	27,100	Interpolated	32,300	Interpolated
4/18/93	28,800	37,100	E	43,300	M
4/19/93	21,400	30,100	E	35,700	M
4/20/93	16,200	23,300	E	30,100	M
4/21/93	14,000	17,900	E	28,300	Interpolated
4/22/93	19,600	22,100	E	26,600	M
4/23/93	27,900	33,800	E	40,300	K
4/24/93	27,600	36,300	E	47,700	M
4/25/93	27,100	33,900	E	41,800	M
4/26/93	24,300	31,300	E	29,100	K
4/27/93	27,500	33,200	E	38,000	K
4/28/93	25,400	31,000	E	34,000	K
4/29/93	23,300	27,600	E	28,300	K
4/30/93	20,400	25,000	E	26,600	K
5/1/93	16,900	20,300	E	20,000	K
5/2/93	16,100	18,300	E	17,200	K
5/3/93	14,900	18,000	E	16,700	K

Table 3-12
Calculated Flows at Stillwater and Waterford
for January 1993 to September 1993

Date	Fort Edward Measured Flow [a] (cfs)	Stillwater Calculated Flow [b] (cfs)	Model	Waterford Calculated Flow [b] (cfs)	Model
5/4/93	12,300	14,200	E	10,300	H
5/5/93	11,100	13,100	E	10,800	H
5/6/93	8,860	10,200	E	10,600	H
5/7/93	9,040	10,100	E	10,900	H
5/8/93	8,930	9,700	C	10,000	H
5/9/93	8,460	8,900	C	9,300	H
5/10/93	7,830	8,200	C	8,500	H
5/11/93	6,240	6,800	C	7,100	H
5/12/93	5,830	6,600	C	7,100	H
5/13/93	5,830	6,300	C	6,500	H
5/14/93	4,620	6,300	C	6,600	H
5/15/93	4,380	4,900	A	5,200	I
5/16/93	4,570	5,500	A	5,900	I
5/17/93	4,550	5,300	A	5,800	I
5/18/93	4,110	5,000	A	5,500	I
5/19/93	3,740	3,900	A	4,100	I
5/20/93	2,060	3,700	A	4,500	I
5/21/93	2,510	4,100	A	4,800	I
5/22/93	1,850	4,100	C	5,300	H
5/23/93	2,130	5,200	A	7,200	I
5/24/93	1,840	4,500	C	6,300	H
5/25/93	1,080	4,100	C	6,100	H
5/26/93	2,230	4,600	C	6,200	H
5/27/93	2,830	4,600	C	5,600	H
5/28/93	2,900	4,100	C	4,800	H
5/29/93	2,740	4,600	C	5,700	H
5/30/93	2,810	4,400	C	5,300	H
5/31/93	2,520	4,200	C	5,300	H
6/1/93	2,610	3,900	C	4,800	H
6/2/93	2,920	4,300	C	5,300	H
6/3/93	3,120	5,200	C	6,500	H
6/4/93	3,340	5,900	C	7,300	H
6/5/93	2,760	5,500	C	7,100	H
6/6/93	2,570	5,300	C	7,000	H
6/7/93	2,870	5,700	C	7,500	H
6/8/93	2,830	5,500	C	7,200	H
6/9/93	2,910	5,100	C	6,300	H
6/10/93	2,960	5,200	C	6,600	H
6/11/93	3,200	5,200	C	6,400	H
6/12/93	3,740	5,700	C	6,900	H
6/13/93	3,500	5,000	C	5,900	H

Table 3-12
Calculated Flows at Stillwater and Waterford
for January 1993 to September 1993

Date	Fort Edward Measured Flow [a] (cfs)	Stillwater Calculated Flow [b] (cfs)	Model	Waterford Calculated Flow [b] (cfs)	Model
6/14/93	2,920	4,700	C	5,800	H
6/15/93	2,620	4,900	C	6,500	H
6/16/93	3,000	5,600	C	7,600	H
6/17/93	3,300	5,300	C	6,600	H
6/18/93	2,600	4,600	C	5,900	H
6/19/93	2,810	5,000	C	6,600	H
6/20/93	2,970	5,200	C	6,600	H
6/21/93	2,960	5,300	C	7,100	H
6/22/93	3,070	5,900	C	8,000	H
6/23/93	3,510	6,000	C	7,800	H
6/24/93	1,580	3,900	C	5,300	H
6/25/93	2,810	5,400	C	7,200	H
6/26/93	2,560	4,700	C	6,200	H
6/27/93	2,530	4,400	C	5,600	H
6/28/93	2,400	4,300	C	5,500	H
6/29/93	2,570	4,500	C	5,700	H
6/30/93	2,380	4,600	C	6,100	H
7/1/93	2,490	4,700	C	6,100	H
7/2/93	2,360	4,500	C	5,900	H
7/3/93	2,080	4,200	C	5,400	H
7/4/93	2,350	4,600	C	6,100	H
7/5/93	2,290	4,200	C	5,300	H
7/6/93	2,610	4,300	C	5,300	H
7/7/93	2,670	5,000	C	6,700	H
7/8/93	2,530	5,200	C	6,900	H
7/9/93	2,680	4,900	C	6,300	H
7/10/93	2,690	4,900	C	6,300	H
7/11/93	2,520	4,800	C	6,300	H
7/12/93	2,560	4,600	C	6,000	H
7/13/93	2,440	4,400	C	5,600	H
7/14/93	2,520	4,700	C	6,000	H
7/15/93	2,470	4,900	C	6,700	H
7/16/93	2,310	4,600	C	6,000	H
7/17/93	2,340	4,700	C	6,300	H
7/18/93	2,430	4,700	C	6,000	H
7/19/93	2,310	4,500	C	5,800	H
7/20/93	2,180	4,200	C	5,500	H
7/21/93	2,210	4,600	C	6,100	H
7/22/93	2,440	4,800	C	6,400	H
7/23/93	2,410	4,500	C	5,800	H
7/24/93	2,280	4,400	C	5,600	H

Table 3-12
Calculated Flows at Stillwater and Waterford for January 1993 to September 1993

Date	Fort Edward Measured Flow [a] (cfs)	Stillwater Calculated Flow [b] (cfs)	Model	Waterford Calculated Flow [b] (cfs)	Model
7/25/93	2,340	4,400	C	5,700	H
7/26/93	2,280	4,400	C	5,700	H
7/27/93	3,290	5,400	C	6,800	H
7/28/93	2,660	4,900	C	6,300	H
7/29/93	1,990	4,400	C	5,800	H
7/30/93	2,050	4,500	C	6,000	H
7/31/93	2,580	4,800	C	6,300	H
8/1/93	2,770	4,700	C	6,000	H
8/2/93	2,540	4,900	C	6,300	H
8/3/93	2,230	4,400	C	5,700	H
8/4/93	2,440	5,000	C	6,600	H
8/5/93	2,600	4,900	C	6,200	H
8/6/93	2,750	5,000	C	6,400	H
8/7/93	2,460	4,700	C	6,000	H
8/8/93	2,500	4,800	C	6,200	H
8/9/93	2,480	4,600	C	6,000	H
8/10/93	2,350	4,600	C	5,900	H
8/11/93	2,440	4,500	C	5,900	H
8/12/93	2,520	4,700	C	6,000	H
8/13/93	2,480	4,600	C	6,000	H
8/14/93	2,590	4,400	C	5,500	H
8/15/93	2,690	4,800	C	6,200	H
8/16/93	2,640	4,400	C	5,500	H
8/17/93	2,490	4,500	C	5,800	H
8/18/93	2,630	5,000	C	6,600	H
8/19/93	2,290	4,700	C	6,400	H
8/20/93	2,320	4,600	C	6,000	H
8/21/93	2,190	4,300	C	5,600	H
8/22/93	2,800	4,800	C	6,100	H
8/23/93	2,500	4,600	C	6,100	H
8/24/93	2,550	4,400	C	5,300	H
8/25/93	2,810	4,600	C	5,500	H
8/26/93	2,360	4,800	C	6,400	H
8/27/93	2,280	4,800	C	6,400	H
8/28/93	2,540	4,500	C	5,800	H
8/29/93	2,510	4,500	C	5,900	H
8/30/93	2,300	4,700	C	6,300	H
8/31/93	2,370	4,600	C	6,100	H
9/1/93	2,630	4,900	C	6,300	H
9/2/93	2,510	5,000	C	6,600	H
9/3/93	2,500	4,500	C	5,800	H

Table 3-12
Calculated Flows at Stillwater and Waterford
for January 1993 to September 1993

Date	Fort Edward Measured Flow a (cfs)	Stillwater Calculated Flow b (cfs)	Model	Waterford Calculated Flow b (cfs)	Model
9/4/93	2,980	5,000	C	6,200	H
9/5/93	2,870	5,000	C	6,400	H
9/6/93	3,050	5,200	C	6,400	H
9/7/93	2,450	5,000	C	6,500	H
9/8/93	2,240	5,000	C	6,500	H
9/9/93	2,430	5,100	C	6,800	H
9/10/93	1,910	4,700	C	6,600	H
9/11/93	2,830	5,300	C	7,000	H
9/12/93	2,720	5,800	C	7,600	H
9/13/93	2,160	5,300	C	6,900	H
9/14/93	2,830	5,600	C	7,400	H
9/15/93	2,950	5,700	C	7,500	H
9/16/93	2,830	5,400	C	7,000	H
9/17/93	2,700	6,300	C	8,000	H
9/18/93	2,170	4,500	C	6,000	H
9/19/93	2,160	4,600	C	6,100	H
9/20/93	2,480	5,000	C	6,700	H
9/21/93	2,980	5,700	C	7,800	H
9/22/93	2,500	5,300	C	7,300	H
9/23/93	2,070	5,200	C	7,700	H
9/24/93	1,980	4,500	C	6,000	H
9/25/93	2,310	4,900	C	6,500	H
9/26/93	2,490	4,700	C	6,100	H
9/27/93	2,910	5,300	C	6,700	H
9/28/93	2,570	5,400	C	7,400	H
9/29/93	2,880	5,800	C	8,000	H
9/30/93	3,170	4,800	D	5,800	J

Source: TAMS/Gradient Database; and NYS Thruway Authority, Office of Canals.

TAMS/Cadmus/Gradient

Notes:
a. Blank cells indicate that no measurement was reported by the U.S.G.S.
b. Blank cells indicate thatflow was not calculated due to lack of data.

Table 3-13

Summary of Prediction Uncertainty for Stillwater Flow Models

Model Description	Model	Stillwater Flow Regime (cfs)	Percent Uncertainty about Predicted Flow[a]		
			Based on the Central 95% Quantile of the Percent Residual Errors		Based on 2 Standard Deviations of the Percent Residual Errors[b]
			Lower	Upper	
Low-Flow Models Criteria for use of Low-Flow Models: Fort Edward Flow ≤ 8,000 cfs and Stillwater Flow ≤ 10,000 cfs	A	Flow ≤ 4,000	-21.2%	13.6%	17.6%
		4,000 < Flow ≤ 6,000	-11.7%	17.9%	12.8%
		6,000 < Flow ≤ 10,000	-8.3%	-10.6%	10.2%
	B	Flow ≤ 4,000	-23.5%	14.5%	19.8%
		4,000 < Flow ≤ 6,000	-12.7%	17.5%	15.3%
		6,000 < Flow ≤ 10,000	-12.4%	12.3%	12.4%
	C	Flow ≤ 4,000	-18.5%	12.2%	16.8%
		4,000 < Flow ≤ 6,000	-10.8%	13.5%	11.8%
		6,000 < Flow ≤ 10,000	-8.5%	11.2%	10.0%
	D	Flow ≤ 4,000	-24.4%	14.6%	19.6%
		4,000 < Flow ≤ 6,000	-13.7%	15.2%	14.6%
		6,000 < Flow ≤ 10,000	-9.9%	11.7%	11.4%
High Flow Models Criteria for use of High-Flow Models: Fort Edward Flow > 8,000 cfs or Stillwater Flow > 10,000 cfs	E	10,000 < Flow ≤ 14,000	-8.7%	12.2%	11.0%
		Flow > 14,000	-9.4%	7.6%	7.9%
	F	10,000 < Flow ≤ 14,000	-10.1%	13.2%	11.6%
		Flow > 14,000	-10.3%	8.3%	8.3%
	G	10,000 < Flow ≤ 14,000	-12.8%	16.3%	15.6%
		Flow > 14,000	-11.7%	14.8%	11.4%
	V	10,000 < Flow ≤ 14,000	-11.4%	13.8%	13.4%
		Flow > 14,000	-11.2%	8.9%	8.6%

Notes:

a. For Example, the range of prediction uncertainty for a 5,000 cfs flow calculated using Model A is as follows:

Based on the central 95% quantile of the percent residual errors:
Lower Bound: (5,000 cfs + (-0.117 x 5,000 cfs) = 4,415 cfs.
Upper Bound: (5,000 cfs + (0.179 x 5,000 cfs) = 5,895 cfs.

Based on 2 standard deviations of the percent residual errors:
Lower Bound: (5,000 cfs + (-0.128 x 5,000 cfs) = 4,360 cfs.
Upper Bound: (5,000 cfs + (0.128 x 5,000 cfs) = 5,640 cfs.

b. This error is calculated assuming the percent residual errors to be normally distributed. The extent of non-normality in the error distribution can be estimated based on the difference between the absolute values of the upper and lower boundsof the central 95% quantile of the percent residual errors. The smaller the difference between the upper and lower bounds, the more normally distributed the data set.

Source: TAMS/Gradient Database; USGS; and NYS Thruway Authority, Office of Canals

Table 3-14

Summary of Prediction Uncertainty for Waterford Flow Models

Model Description	Model	Waterford Flow Regime (cfs)	Percent Uncertainty about Predicted Flow[a]		
			Based on the Central 95% Quantile of the Percent Residual Errors		Based on 2 Standard Deviations of the Percent Residual Errors[b]
			Lower	Upper	
Low Flow Models Criteria for use of Low-Flow Models: Fort Edward Flow ≤ 8,000 cfs and Waterford Flow ≤ 12,000 cfs	H	Flow ≤ 4,000	-29.4%	14.1%	22.4%
	H	4,000 < Flow ≤ 8,000	-19.2%	19.4%	19.2%
	H	8,000 < Flow ≤ 12,000	-16.5%	20.4%	17.9%
	I	Flow ≤ 4,000	-30.8%	13.7%	22.6%
	I	4,000 < Flow ≤ 8,000	-20.7%	22.3%	20.2%
	I	8,000 < Flow ≤ 12,000	-18.0%	23.0%	18.5%
	J	Flow ≤ 4,000	-36.9%	15.8%	27.6%
	J	4,000 < Flow ≤ 8,000	-25.1%	25.9%	25.8%
	J	8,000 < Flow ≤ 12,000	-21.2%	24.9%	23.1%
High Flow Models Criteria for use of High-Flow Models: Fort Edward Flow > 8,000 cfs or Waterford Flow > 12,000 cfs	K	12,000 < Flow ≤ 14,000	-15.5%	19.0%	17.1%
	K	Flow > 14,000	-10.0%	15.6%	12.0%
	L	12,000 < Flow ≤ 14,000	-24.0%	25.0%	23.0%
	L	Flow > 14,000	-16.5%	24.9%	18.5%
	M	12,000 < Flow ≤ 14,000	-20.2%	21.0%	20.8%
	M	Flow > 14,000	-13.9%	23.4%	17.2%
	N	12,000 < Flow ≤ 14,000	-22.2%	21.6%	22.2%
	N	Flow > 14,000	-14.6%	23.8%	18.6%
	W	12,000 < Flow ≤ 14,000	-33.0%	29.0%	31.8%
	W	Flow > 14,000	-23.7%	24.9%	23.4%

Notes:

a. For Example, the range of prediction uncertainty for a 5,000 cfs flow calculated using Model H is as follows:

Based on the central 95% quantile of the percent residual errors:
Lower Bound: (5,000 cfs + (-0.192 x 5,000 cfs) = 4,040 cfs.
Upper Bound: (5,000 cfs + (0.194 x 5,000 cfs) = 5,970 cfs.

Based on 2 standard deviations of the percent residual errors:
Lower Bound: (5,000 cfs + (-0.192 x 5,000 cfs) = 4,040 cfs.
Upper Bound: (5,000 cfs + (0.192 x 5,000 cfs) = 5,960 cfs.

b. This error is calculated assuming the percent residual errors to be normally distributed. The extent of non-normality in the error distribution can be estimated based on the difference between the absolute values of the upper and lower boundsof the central 95% quantile of the percent residual errors. The smaller the difference between the upper and lower bounds, the more normally distributed the data set.

Source: TAMS/Gradient Database; USGS; and NYS Thruway Authority, Office of Canals

Table 3-15
Summary of River Segment Characteristics

Segment No.	River[a] Mile	PCBs (% of total): Tofflemire, 1980[b] Percentage of Total PCB Mass Stored in Sediments	PCBs (% of total): Tofflemire and Quinn, 1979[c] Percentage of Total PCB Mass Stored in *Hot Spots*	Tributaries
1	199.5-197.2	-	-	-
2	197.2-194.6	1%	1%	-
3	194.6-188.5	41%	62%	Snook & Moses Kills
4	188.5-181.3	22%	23%	Batten Kill
5	181.3-168.2	15%	3%	Fish Creek
6	168.2-156.6	16%	12%	Hoosic River
7	156.2-151.7	4%	0%	Mohawk River

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Notes:

a. River mile designations are based on Phase 2 sampling stations. Segments as reported in NUS (1984) are assigned to the nearest Phase 2 segment.

b. Tofflemire (1980) reported in NUS (1984) as percentage of total PCB mass stored in sediments.

c. Tofflemire and Quinn (1979) reported in NUS (1984) as percentage of total PCB mass stored in *hot spots* .

Table 3-16

Comparison of Water-Column Mass Transport at Rogers Island, Thompson Island Dam and Waterford

		Total PCB Load (kg/d)			Thompson Island Pool		Thompson Island Dam to Waterford	
Seasonal Characteristics	Sampling Event	Rogers Island	Thompson Island Dam	Waterford	Net TIP PCB Load Gain (kg/d)	Percent Load[a]	Net TID PCB Load Gain (kg/d)	Percent Load[a]
Winter - Low Flow	Transect 1	b	0.80	0.97	--	--	0.17	21%
	Transect 2	0.17	0.61	0.38	0.43	248%	-0.23	-37%[f]
Spring - Transition Flow	Transect 3	0.20	1.07	17.7	0.87	425%	16.7	1550%
Spring - High Flow	Transect 4	17.9	18.1[c]	18.3	--	--	--	--
	Flow Average 1	7.15	5.90	d	-1.26	-18%	--	--
Spring/Early Summer - Low Flow	Transect 5	e	1.57	1.19	--	--	-0.38	-24%
	Flow Average 2	0.41	1.48	1.34	1.08	264%	-0.14	-10%
	Flow Average 3	1.29	1.49	1.46	0.19	15%	-0.02	-2%
Summer - Low Flow	Transect 6	0.17	0.67	0.74	0.50	292%	0.07	10%
	Flow Average 4	0.23	1.38	1.19	1.15	507%	-0.19	-14%
	Flow Average 5	0.22	0.87	1.02	0.65	297%	0.15	18%
	Flow Average 6	0.17	0.63	0.88	0.46	268%	0.25	39%
Low Flow Mean		0.49	1.16	1.16				
High Flow Mean		17.9	18.1	18.0				

Notes:

a. Percent Increase = 100 * (Downstream Station - Upstream Station)/Upstream Station.
b. Discrepant Rogers Island sample.
c. Schuylerville load used Thompson Island Dam sample reflected inappropriate degree of dilution by Moses Kill.
d. Waterford samples are inappropriate for comparison due to Lock 1 construction activities.
e. Sediment was disturbed during sample collection.
f. Transport from Schuylerville south did not vary by more than 5%.

Source: TAMS/Gradient Database; USGS; and NYS Thruway Authority, Office of Canals

Table 3 - 17

Application of Dating Criteria to High Resolution Cores

Core # (a)	River Mile	Criterion #1 (b)	Criterion #2 (b)	Criterion #3 (b)	Criterion #4 (b)	Criterion #5 (b)	Criterion #6 (b)
1	25.0	□	□	NA (c)	NA (c)	■	NA (c)
2	-1.9	□	◪	◪	□	□	□
3	-2.2	◪	■ (d)	NA (c,d)	NA (c,d)	□	NA (c,d)
4	2.4	□	■ (d)	NA (c,d)	NA (c,d)	□	NA (c,d)
5	Newtown Creek	■	■	NA (e)	NA (c)	□	NA (c)
6	43.2	□	□	NA (c,f)	□	■ (g)	NA (c)
7	43.2	□	□	NA (c,f)	□	□	NA (c)
8	54.0	□	◪	◪	□	■	□
9	59.6	□	□	■	■	■	□
10	88.5	□	□	◪	□	□	□
11	143.5	□	□ (f)	NA (c,f)	□ (h)	□ (i)	NA (c)
12	Mohawk River	□	□	NA (e)	□	□	□
13	99.2	□	□	◪	□	◪ (g)	□
14	124.1	■	◪	■	NA (c)	□	■
15	159.0	□	□	■	□	■	□
16	166.3	□	□	■	□	□	■
17	Batten Kill	□	□	NA (e)	□	■ (g)	□
18	185.8	□	□	□	□	□	□
19	188.5	□	□	□	□	□	□
20	191.2	□	□	■	□	□	□
21	177.8	□	□	◪	□	□	□
22	177.8	□	◪	NA (c,d)	NA (c,d)	■ (g)	□
23	189.3	□	□	□	□	□	□
24	Hoosic River	■	■	NA (e)	NA (c)	□	NA (c)
25	194.2W	■	■	■	NA (c)	□	NA (c)
26	194.1E	□	□	◪ (j)	□	■ (k)	□
27	202.9	□	◪	◪	■	□	NA (c)
28	197.1	■	■	■	□	□ (g)	NA (c)

Legend:

□ = Meets criterion well.
◪ = Meets criterion.
■ = Does not meet criterion.
NA = Not Applicable

See notes on next page.

Table 3 - 17 (continued)
Application of Dating Criteria to High Resolution Cores

Notes:

a. Shading indicates that a core chronology was established.

b. Core Selection Criteria for Dating.

1. A minimum value of the ^{137}Cs - peak concentration as follows:

River Section	Section Endpoints (River Miles)	Minimum ^{137}Cs - Peak Concentration (pCi/kg)
Freshwater	203 to 153.1	1000
Freshwater Tidal	153 to 60.1	900
Power	60 to 30	1000
Upper New York Bay	29.9 to -2.2	500
Tributaries	NA	500

2. A clear ^{137}Cs peak relating to the 1963 or 1971 event, or a clear and defined time horizon, e.g., a dredge boundary which occurred in a documented year.
3. The ^{137}Cs peak associated with 1963 being clearly deeper than the PCB maximum which has been ascribed to the early 1970s (Bopp, et al.,1982) which indicates a significant deposition rate and low bioturbation.
4. A minimum sedimentation rate of 0.75 cm/yr based on the 1963 or 1971 ^{137}Cs maximum.
5. Presence of ^{7}Be in the surface layer.
6. The sedimentation rates being consistent to within 50 percent when multiple time horizons are available.

c. Insufficient data for determination.

d. Insufficient core depth.

e. No documented PCB releases associated with tributaries.

f. Documented occurrence of dredging event.

g. ^{7}Be was present in a co-located core collected at the same time.

h. The presence of ^{137}Cs at 104 cm depth can provide a minimum approximation of the sedimentation rate since the coring site was dredged in the early 1970s.

i. ^{7}Be was not analyzed soon enough to be measured as deep in the core as expected.

j. Resolution reduced since core contains 8 cm slices.

k. Core location was subsequently observed (Summer 1993) to be exposed to air.

Source: TAMS/Gradient Database

Table 3-18
Estimated Sedimentation Rates for Dated Cores

Core No.	River Mile	Location	Sedimentation Rate (cm/yr)	Main Dating Horizon
2	-1.9	Upper New York Bay	1.6	1963 ^{137}Cs and also 1971 ^{60}Co event
6	43.2	Lents Cove	1.4	1971 ^{137}Cs event
7	43.2	Lents Cove	1.4	1971 ^{137}Cs event
10	88.5	Kingston	1.7	1963 ^{137}Cs event and ^{7}Be
11	143.5	Albany Turning Basin	5	1970 Dredge Event
18	185.8	Above Lock No. 5	0.76	1963 ^{137}Cs Event
19	188.5	Thompson Island Dam	0.9	1963 ^{137}Cs Event
21	177.8	Stillwater Pool	1.1	1963 ^{137}Cs Event
22	177.8	Stillwater Pool	1.7	Match to Core No. 21
23	189.3	Thompson Island Pool	1.2	1963 ^{137}Cs Event
27	202.9	Glens Falls	0.48	1963 ^{137}Cs Event
12	NA	Mohawk	1.9	1963 ^{137}Cs Event
17	NA	Batten Kill	1.3	1963 ^{137}Cs Event
24	NA	Hoosic	>0.87	^{7}Be

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Table 3-19
Comparison of Total PCB Concentrations of Suspended Matter and Surficial Sediment Deposited after 1990

Core Location		Surficial Sediment Total PCB Concentration (mg/kg)	Water-Column Sampling Locations		Water-Column Transect Suspended Solids Total PCB Concentration (mg/kg)	
Thompson Island Pool	RM 188.5	25.1	Rogers Island	RM 194.6	Median	17.3
					Minimum	1.9
					Maximum	21.3
			Thompson Island Dam	RM 188.5	Median	5.3
					Minimum	3.2
					Maximum	7.1
Stillwater Pool	RM 177.8	5.0	Stillwater	RM 168.3		0.4, 2.4, 4.7
Stillwater Pool	RM 177.8	12.5				
Albany Turning Basin	RM 143.5	3.0	Green Island Bridge	RM 151.7		1.2, 1.8, 1.2
Kingston	RM 88.5	0.96	Cementon	RM 110.0		0.8
			Highland	RM 77.0		0.4, 1.5

Source: TAMS/Gradient Database

Table 3-20
Dated Sediment Cores Selected for Historical Water-Column PCB Transport Analysis

Core Number	River Mile	Description
27	202.9	Background
19	188.5	Thompson Island Dam
18	185.8	Above Lock No. 5
21 and 22	177.8	Stillwater Pool
11	143.5	Albany Turning Basin
10	88.5	Kingston
6 and 7 (duplicate cores)	43.2	Lents Cove
2	-1.9	Upper New York Bay
12	NA	Mohawk River
17	NA	Batten Kill
24	NA	Hoosic River

Source: TAMS/Gradient Database

Table 3-21

Cumulative Loading Across the Thompson Island Pool by Homologue Group from GE Data
April 1991 through February 1996

	Total PCBs	Monochloro-Homologues	Dichloro-Homologues	Trichloro-Homologues	Tetrachloro-Homologues	Pentachloro-Homologues	Hexa- and Heptachloro-Homologues
River Mile 194.6 (Rt. 197 Bridge; kg)	2190.3	9.8	248.7	864.7	767.9	205.7	93.5
River Mile 188.5 (Thompson Island Dam; kg)	3188.3	320.6	539.2	1163	859.6	219.1	86.8
Gain in Load across Thompson Island Pool (kg, cumulative)	998	310.8	290.5	298.3	91.7	13.4	-6.7
Gain in Load across Thompson Island Pool (kg/yr)	203.1	63.3	59.1	60.7	18.7	2.7	-1.4
Average Loading Rate at River Mile 188.5 (kg/day)	1.78	0.17	0.3	0.65	0.48	0.12	-0.004

Source: TAMS/Gradient Database

Table 3-22

Breakpoints of Flow Strata (cfs) Used for Total PCB Load Estimation in the Upper Hudson River

Breakpoint #	Fort Edward	Schuylerville	Stillwater	Waterford
1	5000	6000	7000	9000
2	11000	12000	16000	19200
3	20000	23000	25000	30000

Note: The breakpoints are used to develop ratio estimates of PCB load by stratification of the data into four distinct flow regimes, as described in Section 3.3.5.

Source: Analysis of USGS flow data.

TAMS/Cadmus/Gradient

Table 3-23

Estimated Yearly Total PCB Loads (kg/yr) in the Upper Hudson Based on USGS Monitoring[a]

Calendar Year	River Mile 194.3		River Mile 181.3		River Mile 168.2		River Mile 156.6	
	Ratio	Averaging	Ratio	Averaging	Ratio	Averaging	Ratio	Averaging
1977	1414[c] s=1216	2308[c,d] n=3 (3)	2519 s=463	3106 n=37 (33)	2926 s=493	3956 n=36 (35)	2439 s=235	3371 n=60 (49)
1978	544 s=74	544 n=35 (29)	2747 s=294	2497 n=12 (12)	2138 s=234	2087 n=31 (30)	2260 s=205	2218 n=31 (28)
1979	1272 s=390	1321 n=54 (30)	4635 s=1363	5351 n=15 (15)	3008 s=372	3701 n=36 (34)	2963 s=219	3953 n=39 (33)
1980	439 s=30	499 n=55 (25)	760 s=93	834 n=15 (11)	899 s=68	922 n=28 (26)	1007 s=119	892 n=43 (33)
1981	354 s=15	371 n=58 (26)	962 s=70	1652 n=36 (25)	922 s=94	1420 n=33 (28)	1299 s=71	1392 n=26 (24)
1982	374 s=31	388 n=50 (27)	528 s=34	566 n=34 (27)	635 s=51	821 n=44 (29)	818 s=107	966 n=33 (27)
1983	657[e] s=145	619[e] n=44 (33)	997 s=118	1005 n=44 (36)	1612 s=343	1671 n=50 (37)	1191 s=117	1308 n=53 (44)
1984	477 s=152	462 n=32 (23)	830 s=295	678 n=30 (28)	826 s=166	908 n=32 (28)	702 s=139	625 n=39 (30)
1985	294 s=53	275 n=16 (11)	324 s=47	379[d] n=15 (14)	299 s=38	301 n=17 (14)	432 s=29	437[d] n=6 (5)
1986	423 s=80	385 n=28 (23)	320 s=28	321 n=23 (23)	358 s=65	358 n=26 (26)	366 s=24	375 n=26 (23)
1987	197 s=58	301 n=15 (8)	213 s=25	237 n=10 (10)	235 s=89	328[d] n=8 (8)	300 s=59	364[d] n=27 (15)
1988	119 s=39	97 n=38 (21)	83 s=15	79 n=21 (21)	105 s=15	107 n=23 (23)	100 s=15	100 n=21 (21)
1989	445 s=358	247[d] n=23 (12)	195 s=30	201[d] n=20 (20)	200 s=30	212[d] n=19 (19)	151 s=16	169[d] n=26 (24)
1990	398 s=372	341 n=11 (7)	Discontinued		220 s=133	185 n=10 (10)	115 s=32	98 n=11 (11)
1991	185 s=137	138 n=19 (17)			208 s=112	150 n=16 (16)	212 s=101	130 n=16 (16)
1992	825 s=442	951 n=21 (20)			411 s=70	537[d] n=24 (16)	317 s=74	441[d] n=25 (17)
1993	310 s=85	205 n=27(27)			420 s=115	497[f] n=22(22)	229 s=25	244 n=56(38)
1994	90 s=26	85 n=26(26)			f	168[f] n=18(18)	f	177[f] n=2(27)

Notes:

a. Nondetects set at one-half the detection limit

b. Abbreviations:

n = total number of measurements (and number of individual days with measurements)

s = estimated asymptotic standard deviation for ratio estimator

c. Insufficient data

d. Quarter missing; average concentration for year used to estimate load for that quarter

e. Observation of 77 μg/L in one channel omitted from calculation

f. Daily flow data not available; quarterly flow sum extrapolated from Fort Edward

Source: TAMS/Gradient Database; additional data from USGS/WATSTORE.

Table 3-24

Comparison of Calculated Water Column Loads at Rogers Island and Thompson Island Dam for Phase 2, GE and USGS Data

Seasonal Characteristics	Date	Phase 2 Sampling Event	Phase 2[a] (kg/month) Rogers Island			General Electric[b] (kg/month) Rogers Island			USGS[c] (kg/month)
			Rogers Island	Thompson Island Dam	Load Gain (kg/month)	Rogers Island	Thompson Island Dam	Load Gain (kg/month)	Rogers Island
Winter - Low Flow	Jan 93	Transect 1	d	24	--	220	24	-200	
	Feb 93	Transect 2	5.2	18	13	11	19	7.7	18
Spring - Transition Flow	Mar 93	Transect 3	6.1	32	26	17	44	27	18
Spring - High Flow	Apr 93	Transect 4	540	e	--	110	190	80	270
	Apr - May 93	Flow Average 1	215	180	-35	110[f]	190[f]	80[f]	270
Spring/ Early Summer - Low Flow	May 93	Flow Average 2	12	45	32	100	76	-24	270
	Jun 93	Flow Average 3	39	45	5.8	6.1	43	36	270
	Jun 93	Transect 5	g	47	--	6.1	43	36	270
Summer - Low Flow	Jul 93	Flow Average 4	6.8	41	35	12	41	30	h
	Aug 93	Transect 6	5.1	20	15	6.5	32	26	h
	Aug 93	Flow Average 5	6.5	26	19	6.5	32	26	h
	Sep 93	Flow Average 6	5.1	19	14	6.1	24	18	h

Notes:

a. Phase 2 data represent instantaneous or 15-day-mean conditions which were converted to a monthly basis for this table.

b. General Electric data were used to generate monthly average conditions.

c. USGS values were calculated quarterly due to limited data and converted to a monthly basis.

d. Discrepant Rogers Island sample.

e. Thompson Island Dam load could not be calculated due to incomplete mixing of Moses Kill flow.

f. Phase 2 Flow Average Event 1 data which span late April to early May are compared to General Electric data for April since load conditions at Rogers Island are more similar than those for May.

g. Flux could not be calculated due to disturbed sediment included in sample.

h. USGS load was not calculated for the third quarter since only one measurement was available.

Source: TAMS/Gradient Database

Table 3-25

Total PCB Loading Contribution Relative to River Mile 143.5 Near Albany Based On Dated Sediment Cores for 1991 to 1992

Coring Location	PCB/Cs-137 (mg/pCi)	Average PCB/Cs-137[a] (mg/pCi)	Drainage Basin Area (mi^2)	Percentage of Albany Load[b]: Main-Stem Stations		Percentage of Albany Load[b]: Background and Tributaries	
Background (RM 202.9)		0.05	2800				0.3%
Thompson Island Pool (RM 188.5)		19.5	2954		107%		
Above Lock 5 (RM 185.8)		12.9	2996		69%		
Batten Kill-Core 17	0.27	0.77	435			0.2%	0.7%
Batten Kill-Core 33	1.26					1.1%	
Stillwater Pool (RM 177.8)-Core 22	15.9	12.2	3773	112%	83%		
Stillwater Pool (RM 177.8)-Core 21	8.43			55%			
Hoosic River		0.83	712				1%
Mohawk River-core 12	0.29	1.01	3456			2.0%	7%
Mohawk River-core 29	1.74					12.1%	
Upper Hudson Contribution at RM 143.5		5.99	8288		91%		
Total Tributaries							9%
Total Load at Albany							100.0%

Notes:

a. This represents the average PCB/Cs-137 ratio at the coring location for the period 1991-1992.

b. Percentage is calculated as follows:

$$\text{Percentage} = 100 * \frac{\{Area * [\sum PCB]/[Cs\text{-}137]\}_{Station} - \{Area * [\sum PCB]/[Cs\text{-}137]\}_{Background + Tributaries}}{\{Area * [\sum PCB]/[Cs\text{-}137]\}_{RM\ 143.5}}$$

$\sum PCB$ = total PCB concentration on the sediments in mg/kg
Cs-137 = cesium-137 concentration in pCi/kg
Area = drainage basin area in square miles

Source: TAMS/Gradient Database; drainage basin areas from USGS 1982 Gazetteer

Table 4-1

Results of Linear Regression Study – Grain Size Parameter vs Image DN[a]

Reduced 500 kHz Images

Grain Size Parameter[b]	Median Digital Number			Median Digital Number			Standard Deviation Digital number		
	Slope	Intercept	r-Squared	Slope	Intercept	r-Squared	Slope	Intercept	r-Squared
d(15)	-6.713	60.450	0.529	-6.788	61.838	0.526	-1.334	15.428	0.256
d(40)	-5.992	66.337	0.500	-6.073	67.813	0.499	-1.236	16.669	0.261
d(50)	-5.834	68.785	0.484	-5.924	70.315	0.484	-1.245	17.259	0.270
d(70)	-6.128	76.216	0.497	-6.231	77.892	0.499	-1.357	19.001	0.299
d(85)	-6.297	83.653	0.518	-6.403	85.454	0.520	-1.404	20.686	0.315
d(90)	-6.197	86.599	0.498	-6.300	88.443	0.500	-1.379	21.332	0.302
% gravel	0.387	52.458	0.148	0.391	53.757	0.147	0.059	14.042	0.042
% sand	0.404	34.207	0.271	0.412	35.107	0.274	0.109	8.617	0.241
% mud	-0.502	73.154	0.529	-0.511	74.774	0.531	-0.114	18.413	0.334
mean	-6.798	74.409	0.539	-6.896	76.010	0.539	-1.438	18.425	0.295
std. dev.	5.185	47.310	0.013	4.942	49.109	0.012	-0.301	15.278	0.001

Reduced 100 kHz Images

Grain Size Parameter[b]	Median Digital Number			Median Digital Number			Standard Deviation Digital number		
	Slope	Intercept	r-Squared	Slope	Intercept	r-Squared	Slope	Intercept	r-Squared
d(15)	-5.490	52.442	0.325	-5.387	55.219	0.310	-1.004	19.327	0.091
d(40)	-4.994	57.404	0.319	-4.901	60.090	0.304	-0.900	20.212	0.087
d(50)	-4.704	59.120	0.289	-4.617	61.775	0.275	-0.846	20.519	0.078
d(70)	-4.472	63.635	0.243	-4.381	66.180	0.231	-0.795	21.301	0.064
d(85)	-4.343	67.988	0.227	-4.251	70.430	0.215	-0.784	22.127	0.062
d(90)	-4.267	69.989	0.217	-4.175	72.379	0.205	-0.769	22.481	0.059
% gravel	0.510	43.686	0.236	0.489	46.762	0.214	0.061	18.099	0.028
% sand	0.111	43.312	0.019	0.120	45.605	0.022	0.054	15.735	0.038
% mud	-0.328	60.145	0.207	-0.325	62.900	0.202	-0.072	21.117	0.083
mean	-5.231	63.012	0.293	-5.126	65.574	0.279	-0.941	21.220	0.080
std. dev.	11.737	27.841	0.063	11.601	30.926	0.060	2.282	14.578	0.020

Notes:

a. DN= (grain size parameter) * (slope) + (intercept)

b. Correlation among the image digital number (DN) and D(15) to D(90), mean and standard deviation grain-size parameters parameters are based on the phi scale $\left[\text{phi} = \frac{-\log(\text{diameter in mm})}{\log 2} \right]$

Source: TAMS/Gradient Database

Table 4-2

GC-Mass Spectrometer Split-Sample Results for Total PCB Concentrations and Point Values Selected to Represent Reported Ranges for the 1984 Thompson Island Pool Sediment Survey

Split-Sample Comparison						Point Representation	
Mass Spectrometry Category	**Total Number Screened**	**Number of Split Samples**	**Mean (and Standard Deviation) (mg/kg)**	**Median (mg/kg)**	**Log Transform Mean (and Standard Deviation)**	**Used by Brown *et al.* (1988) (mg/kg)**	**Used in current analyses (mg/kg)**
<10 ppm	957	61	15.0 (39.2)	3.30	1.41 (2.45)	15.0	3.3
10–50 ppm	482	347	30.8 (42.6)	18.20	2.76 (1.65)	30.8	18.2
50–100 ppm	71	67	133.6[a] (143.8)	88.7	4.40 (1.23)	134.6	88.7
>100 ppm	26	22	517.9 (1397)	126.3	4.87 (2.84)	517.9	126

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Note:

a. This value is obtained directly from the reported samples. It is slightly different from the actual value used by Brown *et al.* (1988).

Table 4-3

Sample Statistics for Thompson Island Pool
PCB Mass Concentration Estimates, 1984 Sediment Survey

	PCB mass (g/m^2)	Natural log
Number of Locations	1098	1098
Mean	10.92	1.32
Median	3.48	1.25
Standard Deviation	41.65	1.41
Skewness	22.92	0.08
Minimum	0.04	–3.23
Maximum	1218.39	7.10

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Table 4-4

Subreach Variogram Models[a] for Natural Log of PCB Mass Concentration, 1984 Thompson Island Pool Sediment Survey

	Subreach 5 1163000 - 1170100 N	**Subreach 4 1170100 - 1177000 N**	**Subreach 3 1177000 - 1181900 N**	**Subreaches 1 and 2 1181900 - 1191700 N**
Observations	235	320	238	321
Nugget	0.750 (.284)	0.484 (.154)	0.0 (--)	1.54 (.108)
Sill-Nugget	1.520 (.282)	1.092 (.153)	1.733 (.060)	0.203 (.106)
Practical Range (ft)	340 (75)	280 (68)	286 (49)	582 (521)
Anisotropy Ratio	1.0	1.5	2.5	1.0
Major Axis	-	N 10° W	N 35° W	-

Note:
a. Variograms are exponential models, showing fit along the major axis and anisotropy ratio. Standard errors of the coefficients from the least squares estimation are shown in parentheses.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Table 4-5

Total PCB Mass Concentration in the Thompson Island Pool, 1984: Cross Validation Comparison of Lognormal Kriging Results and Observed Values

	Subreach 5 1163000 - 1170100 N	Subreach 4 1170100 - 1177000 N	Subreach 3 1177000 - 1181900 N	Subreaches 1 and 2 1181900 - 1191700 N	All Data
Predicted arithmetic mean (g/m^2)	16.79	11.51	12.09	13.12	13.22
Observed arithmetic mean (g/m^2)	13.66	10.66	10.56	10.26	11.16
Predicted mean of natural logs	1.27	1.54	1.34	1.12	1.32
Observed mean of natural logs	1.31	1.55	1.33	1.11	1.32

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Table 4-6

Exponential Variogram Models for Natural Log of Surface Concentrations in the 1984 Sediment Survey of the Thompson Island Pool

	GC Data (First Structure)	GC Data (Second Structure)	Mass Spectrometry Screening Data	Cross-Variogram
Nugget	0.427	---	0.678	0.377
Sill - Nugget	1.191	0.095	0.458	0.120
Practical Range (ft)	123	750	752	750
Inflation Factor	1.38	1.38	1.0	1.17
Anisotropy Ratio	1.0	1.0	1.0	1.0

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Table 4-7

Summary Results for Kriged Surface Layer Concentration of Total PCBs by Subreach, 1984 Sediment Survey of the Thompson Island Pool

Subreach (with NYS Northing range)	Surface Area (m^2)	Mean Surface PCB Concentration (ppm)
Subreach 5 1163000 - 1170100 N	512,274	33.42
Subreach 4 1170100 - 1177000 N	476,067	35.65
Subreach 3 1177000 - 1181900 N	383,356	28.89
Subreaches 1 and 2 1181900 - 1191700 N	642,683	20.17
Total for All Subreaches	2,024,379	28.72

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Only congeners detected in Aroclor 1242 are represented.

Congener Number[a]	Congener Name	Mass Percent in Aroclor 1242[b]	Mol. Wt. of Congener	Mass Percent[c] / Mol. Wt. (moles/100g of A1242)	Final Dechlorination Product[d]	Final Product Reported?	Mass Reduction Factor[e]	Mass Percent of Final Product[f]	No. of Moles Remaining After Dechlor.
BZ#1	2-Chlorobiphenyl	0.59	189.0	0.0031	BZ#1	Yes	1.00	0.59	0.003098
BZ#3	4-Chlorobiphenyl	0.26	189.0	0.0014	Biphenyl	No	0.00	0.00	0.000000
BZ#4	2,2'-Dichlorobiphenyl	3.13	223.1	0.0140	BZ#4	Yes	1.00	3.13	0.014043
BZ#6	2,3'-Dichlorobiphenyl	1.36	223.1	0.0061	BZ#1	Yes	0.85	1.15	0.006083
BZ#8	2,4'-Dichlorobiphenyl	7.20	223.1	0.0323	BZ#1	Yes	0.85	6.10	0.032287
BZ#9	2,5-Dichlorobiphenyl	0.58	223.1	0.0026	BZ#1	Yes	0.85	0.49	0.002600
BZ#10	2,6-Dichlorobiphenyl	0.22	223.1	0.0010	BZ#10	Yes	1.00	0.22	0.000990
BZ#12	3,4-Dichlorobiphenyl	0.09	223.1	0.0004	Biphenyl	No	0.00	0.00	0.000000
BZ#15	4,4'-Dichlorobiphenyl	1.83	223.1	0.0082	Biphenyl	No	0.00	0.00	0.000000
BZ#16	2,2',3-Trichlorobiphenyl	2.67	257.5	0.0104	BZ#4	Yes	0.87	2.31	0.010361
BZ#17	2,2',4-Trichlorobiphenyl	3.28	257.5	0.0127	BZ#4	Yes	0.87	2.84	0.012725
BZ#18	2,2',5-Trichlorobiphenyl	8.72	257.5	0.0339	BZ#4	Yes	0.87	7.56	0.033872
BZ#19	2,2',6-Trichlorobiphenyl	0.84	257.5	0.0033	BZ#19	Yes	1.00	0.84	0.003257
BZ#20	2,3,3'-Trichlorobiphenyl	0.99	257.5	0.0038	BZ#1	Yes	0.73	0.72	0.003828
BZ#22	2,3,4'-Trichlorobiphenyl	2.59	257.5	0.0101	BZ#1	Yes	0.73	1.90	0.010069
BZ#23	2,3,5-Trichlorobiphenyl	0.07	257.5	0.0003	BZ#1	Yes	0.73	0.05	0.000286
BZ#25	2,3',4-Trichlorobiphenyl	0.55	257.5	0.0021	BZ#1	Yes	0.73	0.40	0.002139
BZ#26	2,3',5-Trichlorobiphenyl	1.53	257.5	0.0059	BZ#1	Yes	0.73	1.12	0.005924
BZ#27	2,3',6-Trichlorobiphenyl	0.53	257.5	0.0021	BZ#10	Yes	0.87	0.46	0.002064
BZ#28	2,4,4'-Trichlorobiphenyl	8.01	257.5	0.0311	BZ#1	Yes	0.73	5.88	0.031109
BZ#29	2,4,5-Trichlorobiphenyl	0.13	257.5	0.0005	BZ#1	Yes	0.73	0.10	0.000522
BZ#31	2,4',5-Trichlorobiphenyl	7.06	257.5	0.0274	BZ#1	Yes	0.73	5.18	0.027416
BZ#32	2,4',6-Trichlorobiphenyl	1.83	257.5	0.0071	BZ#10	Yes	0.87	1.58	0.007101
BZ#33	2',3,4-Trichlorobiphenyl	4.66	257.5	0.0181	BZ#1	Yes	0.73	3.42	0.018092
BZ#34	2',3,5-Trichlorobiphenyl	0.02	257.5	0.0001	BZ#1	Yes	0.73	0.01	0.000077
BZ#37	3,4,4'-Trichlorobiphenyl	1.85	257.5	0.0072	Biphenyl	No	0.00	0.00	0.000000
BZ#41	2,2',3,4-Tetrachlorobiphenyl	1.76	292.0	0.0060	BZ#4	Yes	0.76	1.34	0.006021
BZ#42	2,2',3,4'-Tetrachlorobiphenyl	1.10	292.0	0.0038	BZ#4	Yes	0.76	0.84	0.003758
BZ#44	2,2',3,5'-Tetrachlorobiphenyl	3.61	292.0	0.0124	BZ#4	Yes	0.76	2.76	0.012370
BZ#45	2,2',3,6-Tetrachlorobiphenyl	1.03	292.0	0.0035	BZ#19	Yes	0.88	0.91	0.003535
BZ#47	2,2',4,4'-Tetrachlorobiphenyl	0.73	292.0	0.0025	BZ#4	Yes	0.76	0.56	0.002511
BZ#48	2,2',4,5-Tetrachlorobiphenyl	1.44	292.0	0.0049	BZ#4	Yes	0.76	1.10	0.004927
BZ#49	2,2',4,5'-Tetrachlorobiphenyl	2.93	292.0	0.0100	BZ#4	Yes	0.76	2.24	0.010027
BZ#51	2,2',4,6'-Tetrachlorobiphenyl	0.28	292.0	0.0010	BZ#19	Yes	0.88	0.25	0.000965
BZ#52	2,2',5,5'-Tetrachlorobiphenyl	3.43	292.0	0.0118	BZ#4	Yes	0.76	2.62	0.011761
BZ#53	2,2',5,6'-Tetrachlorobiphenyl	0.75	292.0	0.0026	BZ#19	Yes	0.88	0.66	0.002577
BZ#56	2,3,3',4'-Tetrachlorobiphenyl	1.66	292.0	0.0057	BZ#1	Yes	0.65	1.08	0.005693
BZ#60	2,3,4,4'-Tetrachlorobiphenyl	0.59	292.0	0.0020	BZ#1	Yes	0.65	0.38	0.002027
BZ#63	2,3,4',5-Tetrachlorobiphenyl	0.14	292.0	0.0005	BZ#1	Yes	0.65	0.09	0.000477
BZ#64	2,3,4',6-Tetrachlorobiphenyl	1.70	292.0	0.0058	BZ#10	Yes	0.76	1.30	0.005805

Only congeners detected in Aroclor 1242 are represented.

Congener Number[a]	Congener Name	Mass Percent in Aroclor 1242[b]	Mol. Wt. of Congener	Mass Percent[c] / Mol. Wt. (moles/100g of A1242)	Final Dechlorination Product[d]	Final Product Reported?	Mass Reduction Factor[e]	Mass Percent of Final Product[f]	No. of Moles Remaining After Dechlor.
BZ#66	2,3',4,4'-Tetrachlorobiphenyl	3.46	292.0	0.0119	BZ#1	Yes	0.65	2.24	0.011854
BZ#67	2,3',4,5-Tetrachlorobiphenyl	0.15	292.0	0.0005	BZ#1	Yes	0.65	0.10	0.000517
BZ#70	2,3',4',5-Tetrachlorobiphenyl	3.74	292.0	0.0128	BZ#1	Yes	0.65	2.42	0.012791
BZ#74	2,4,4',5-Tetrachlorobiphenyl	1.90	292.0	0.0065	BZ#1	Yes	0.65	1.23	0.006513
BZ#75	2,4,4',6-Tetrachlorobiphenyl	0.11	292.0	0.0004	BZ#10	Yes	0.76	0.09	0.000382
BZ#77	3,3',4,4'-Tetrachlorobiphenyl	0.35	292.0	0.0012	Biphenyl	No	0.00	0.00	0.000000
BZ#82	2,2',3,3',4-Pentachlorobiphenyl	0.36	326.0	0.0011	BZ#4	Yes	0.68	0.24	0.001089
BZ#83	2,2',3,3',5-Pentachlorobiphenyl	0.11	326.0	0.0003	BZ#4	Yes	0.68	0.07	0.000334
BZ#84	2,2',3,3',6-Pentachlorobiphenyl	0.50	326.0	0.0015	BZ#19	Yes	0.79	0.39	0.001526
BZ#85	2,2',3,4,4'-Pentachlorobiphenyl	0.39	326.0	0.0012	BZ#4	Yes	0.68	0.27	0.001198
BZ#87	2,2',3,4,5'-Pentachlorobiphenyl	0.61	326.0	0.0019	BZ#4	Yes	0.68	0.42	0.001863
BZ#91	2,2',3,4',6-Pentachlorobiphenyl	0.23	326.0	0.0007	BZ#19	Yes	0.79	0.18	0.000707
BZ#92	2,2',3,5,5'-Pentachlorobiphenyl	0.17	326.0	0.0005	BZ#4	Yes	0.68	0.11	0.000512
BZ#95	2,2',3,5',6-Pentachlorobiphenyl	0.07	326.0	0.0002	BZ#19	Yes	0.79	0.06	0.000225
BZ#96	2,2',3,6,6'-Pentachlorobiphenyl	0.08	326.0	0.0003	BZ#54	No	0.00	0.00	0.000000
BZ#97	2,2',3',4,5-Pentachlorobiphenyl	0.48	326.0	0.0015	BZ#4	Yes	0.68	0.33	0.001471
BZ#99	2,2',4,4',5-Pentachlorobiphenyl	0.62	326.0	0.0019	BZ#4	Yes	0.68	0.43	0.001912
BZ#101&#90g	2,2',4,5,5'-Pentachlorobiphenyl	1.02	326.0	0.0031	BZ#4	Yes	0.68	0.70	0.003129
BZ#105	2,3,3',4,4'-Pentachlorobiphenyl	0.55	326.0	0.0017	BZ#1	Yes	0.58	0.32	0.001702
BZ#107	2,3,3',4',5-Pentachlorobiphenyl	0.10	326.0	0.0003	BZ#1	Yes	0.58	0.06	0.000301
BZ#110	2,3,3',4',6-Pentachlorobiphenyl	1.09	326.0	0.0034	BZ#10	Yes	0.68	0.75	0.003351
BZ#114	2,3,4,4',5-Pentachlorobiphenyl	0.06	326.0	0.0002	BZ#1	Yes	0.58	0.03	0.000171
BZ#115	2,3,4,4',6-Pentachlorobiphenyl	0.10	326.0	0.0003	BZ#10	Yes	0.68	0.07	0.000306
BZ#118	2,3',4,4',5-Pentachlorobiphenyl	0.76	326.0	0.0023	BZ#1	Yes	0.58	0.44	0.002338
BZ#119	2,3',4,4',6-Pentachlorobiphenyl	0.06	326.0	0.0002	BZ#10	Yes	0.68	0.04	0.000172
BZ#122	2',3,3',4,5-Pentachlorobiphenyl	0.05	326.0	0.0002	BZ#1	Yes	0.58	0.03	0.000165
BZ#123	2',3,4,4',5-Pentachlorobiphenyl	0.05	326.0	0.0001	BZ#1	Yes	0.58	0.03	0.000148
BZ#128	2,2',3,3',4,4'-Hexachlorobiphenyl	0.08	361.0	0.0002	BZ#4	Yes	0.62	0.05	0.000218
BZ#129	2,2',3,3',4,5-Hexachlorobiphenyl	0.04	361.0	0.0001	BZ#4	Yes	0.62	0.03	0.000124
BZ#136	2,2',3,3',6,6'-Hexachlorobiphenyl	0.05	361.0	0.0001	BZ#54	No	0.00	0.00	0.000000
BZ#137	2,2',3,4,4',5-Hexachlorobiphenyl	0.06	361.0	0.0002	BZ#4	Yes	0.62	0.04	0.000163
BZ#138	2,2',3,4,4',5'-Hexachlorobiphenyl	0.20	361.0	0.0006	BZ#4	Yes	0.62	0.12	0.000553
BZ#141	2,2',3,4,5,5'-Hexachlorobiphenyl	0.06	361.0	0.0002	BZ#4	Yes	0.62	0.04	0.000179
BZ#146	2,2',3,4',5,5'-Hexachlorobiphenyl	0.01	361.0	0.0000	BZ#4	Yes	0.62	0.01	0.000037
BZ#149	2,2',3,4',5',6-Hexachlorobiphenyl	0.13	361.0	0.0004	BZ#19	Yes	0.71	0.09	0.000359

HRP 002 2024

Table 4-8
Dechlorination of Aroclor 1242

Only congeners detected in Aroclor 1242 are represented.

Congener Number[a]	Congener Name	Mass Percent in Aroclor 1242[b]	Mol. Wt. of Congener	Mass Percent[c] / Mol. Wt. (moles/100g of A1242)	Final Dechlorination Product[d]	Final Product Reported?	Mass Reduction Factor[e]	Mass Percent of Final Product[f]	No. of Moles Remaining After Dechlor.
BZ#153	2,2',4,4',5,5'-Hexachlorobiphenyl	0.12	361.0	0.0003	BZ#4	Yes	0.62	0.07	0.000336
BZ#156	2,3,3',4,4',5-Hexachlorobiphenyl	0.04	361.0	0.0001	BZ#1	Yes	0.52	0.02	0.000120
BZ#157	2,3,3',4,4',5'-Hexachlorobiphenyl	0.09	361.0	0.0002	BZ#1	Yes	0.52	0.05	0.000244
BZ#158	2,3,3',4,4',6-Hexachlorobiphenyl	0.06	361.0	0.0002	BZ#10	Yes	0.62	0.04	0.000168
BZ#167	2,3',4,4',5,5'-Hexachlorobiphenyl	0.04	361.0	0.0001	BZ#1	Yes	0.52	0.02	0.000097
BZ#170	2,2',3,3',4,4',5-Heptachlorobiphenyl	0.06	395.3	0.0001	BZ#4	Yes	0.56	0.03	0.000144
BZ#178	2,2',3,3',5,5',6-Heptachlorobiphenyl	0.06	395.3	0.0001	BZ#19	Yes	0.65	0.04	0.000141
Summary:		**100%**							

Moles/100g A1242 = 0.38

Molecular weight of A1242 = 265.7 g/mole

Mass Remaining = 73.9%

Moles Remaining from a 100g initial mixture = 0.36

Final Molecular Weight = 206.4

Fractional Change in Molecular Weight Relative to A1242 = 0.223

Fractional Change in Mass Relative to A1242 = 0.261

Source: TAMS/Gradient Database

Notes:

a. BZ# represents the congener nomenclature system developed by Ballschmiter & Zell (1980).

b. This mass percentage is normalized to the mass of Aroclor 1242 reported by the Phase 2 analysis. It does not include the 9% of Aroclor 1242 mass not represented by the 126 congeners reported in the Phase 2 method.

c. This value represents the number of moles of the congener in 100g of Aroclor 1242 as reported by the Phase 2 analysis method.

d. This compound represents the fiinal form of the congener after undergoing complete meta- and para- dechlorination.

e. This factor is the fraction of the original congener mass which remains after meta- and para- dechlorination. This factor has been assigned a value of zero (0.00) for congeners whose final dechlorination products are biphenyl and BZ#54, which are not reported in the Phase 2 analytical data.

f. This is the product of the mass percentage and the mass reduction factor. The sum of this column represents the mass of Aroclor 1242 remaining after undergoing complete meta- and para- dechlorination, as would be reported by the Phase 2 method.

g. BZ#90 and BZ#101 are coeluting pentachlorobiphenyls. The structural name given is for BZ#101. However, both breakdown to form BZ#4 and thus they have identical reduction factors. For this analysis, they can be treated as a single entity with no loss of accuracy.

Table 4-9

Molar Dechlorination Product Ratio and Mean Molecular Weight of Various Aroclor Mixtures

Molar Dechlorination Product Ratio (MDPR)

PCB Congener	Mole Fraction[a] Mole Fraction = (Moles BZ#X)/(Total PCBs in moles)		
	Aroclor 1016	Aroclor 1242	Aroclor 1254
BZ#1	0.010	0.008	0.000
BZ#4	0.045	0.038	0.000
BZ#8	0.106	0.086	0.001
BZ#10	0.003	0.003	0.000
BZ#19	0.011	0.009	0.000
Sum (Initial Molar Dechlorination Product Ratio)	0.174	0.144	0.001

Molecular Weight

Aroclor	Mean Molecular Weight[b]	Fractional Molecular Weight Change Relative to Aroclor 1242[b] (ΔMW)
1016	257.9	0.03
1221	204.0	0.23
1232	229.7	0.14
1242	265.7	0.00
1248	291.4	-0.10
1254	327.7	-0.23
1260	372.2	-0.40

Notes:

a. Mole fraction based on chromatographic analysis of Aroclor standards performed as part of Phase 2 investigation.

b. See text (Equations 4-7 and 4-8) for the definition of these terms.

Source: TAMS/Gradient Database

Table 4-10
Representation of Three Aroclor Mixtures by the Phase 2 Analytical Procedure

Mass Basis

Congener Fraction	No. of Congeners[a]	Mass Fraction[b]		
		Aroclor 1016	Aroclor 1242	Aroclor 1254
Ortho-Substituted Congeners With Measured Dechlorination Products	108	0.897	0.866	0.949
Congeners With Unmeasured Dechlorination Products (x)	18	0.036	0.041	0.009
Total Congener Analysis (y)	126	0.933	0.907	0.958
Percent of Mass Lost to Unmeasured Products via Dechlorination[c]		3.9%	4.5%	0.97%

Mole Basis

Congener Fraction	No. of Congeners[a]	Mole Fraction[d]		
		Aroclor 1016	Aroclor 1242	Aroclor 1254
Ortho-Substituted Congeners With Measured Dechlorination Products	108	0.957	0.950	0.991
Congeners With Unmeasured Dechlorination Products (x)	18	0.043	0.050	0.009
Total Congener Analysis (y)	126	1.000	1.000	1.000
Percent of Moles Lost to Unmeasured Products via Dechlorination[c]		4.3%	5.0%	0.89%

Notes:

a. There are 209 different congeners. 126 congeners were quantitated based on commercially available standards during the Phase 2 geochemical sampling program and were determined for all sampled matrices.

b. Based on chromatographic analysis of Aroclor standards performed as part of Phase 2 investigation.

c. This percentage is the ratio of the congeners with unmeasured dechlorination products to the fraction of the total Aroclor represented (i.e. x/y).

d. Mole fraction based solely on congeners represented in Phase 2 analysis.

Source: TAMS/Gradient Database

Table 4-11

Statistics for High Resolution Sediment Core Results
Molar Dechlorination Product and Change in Molecular Weight

Statistic	Molar Dechlorination Product Ratio			Change in Molecular Weight Relative to Aroclor 1242			Expected Mass Loss[a] (%)	
	Upper Hudson	Lower Hudson	Tributaries and Background	Upper Hudson	Lower Hudson	Tributaries and Background	Upper Hudson	Lower Hudson
Mean	0.43	0.11	0.03	0.07	-0.02	-0.28	8.2%	--
Median	0.36	0.10	0.00	0.06	-0.02	-0.22	7.0%	--
Minimum	0.00	0.01	0.00	-0.12	-0.12	-0.67	--	--
Maximum	0.93	0.37	0.79	0.21	0.07	0.10	24.6%	8.2%
No. of Samples	131	68	45	131	68	45	131	68

Notes:

a. Expected mass loss is calculated assuming the change in molecular weight is directly proportional to mass loss as follows:

$$\text{Mass Loss} = \frac{0.261}{0.223} \times \text{Change in Molecular Weight} \times 100$$

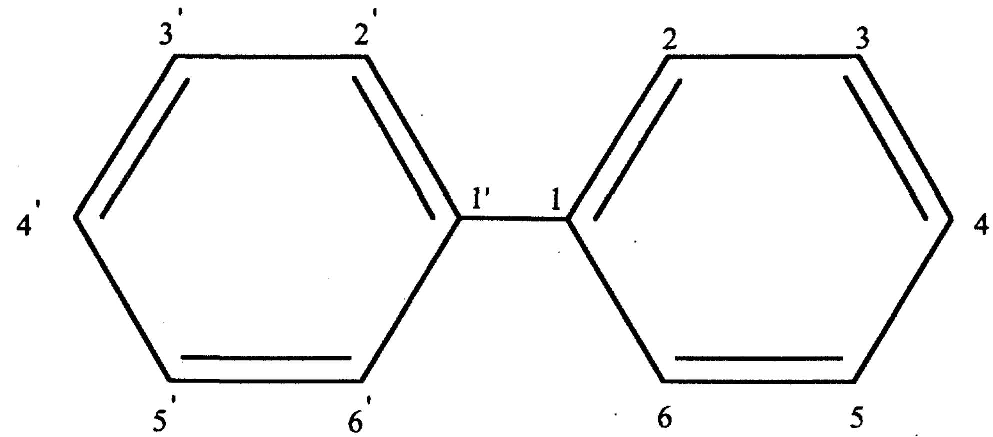
where 0.261 is the maximum theoretical mass loss possible via meta- and para- dechlorination and 0.223 is the maximum theoretical change in molecular weight relative to Aroclor 1242 via meta- and para- dechlorination. Expected mass loss values calculated only for positive values of change in molecular weight. Expected mass loss was not calculated for the background and tributary samples since the evidence strongly indicates that their PCB contamination was not Aroclor 1242-based.

Source: TAMS/Gradient Database

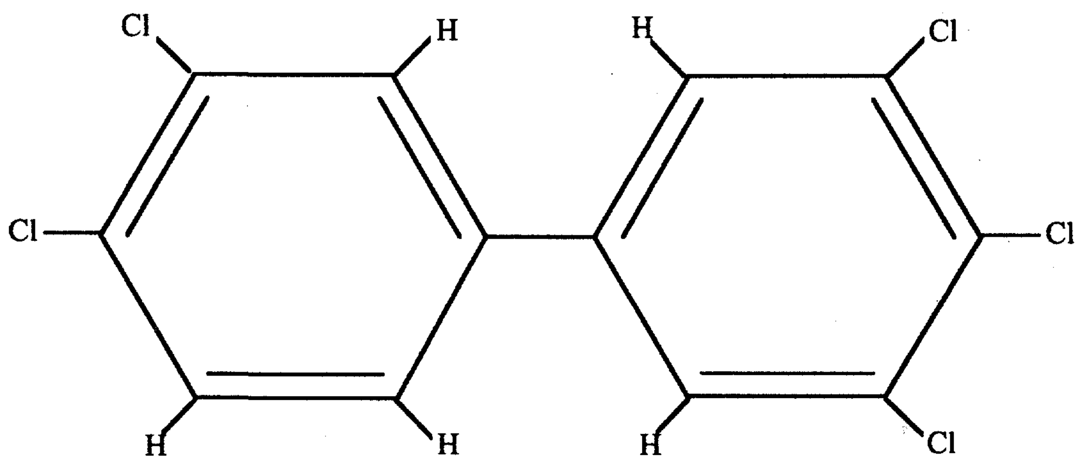
FIGURES

Potential Chlorine Atom Locations
Ortho sites: 2, 6, 2', 6'
Meta sites: 3, 5, 3', 5'
Para sites: 4, 4'

Generic Structure:



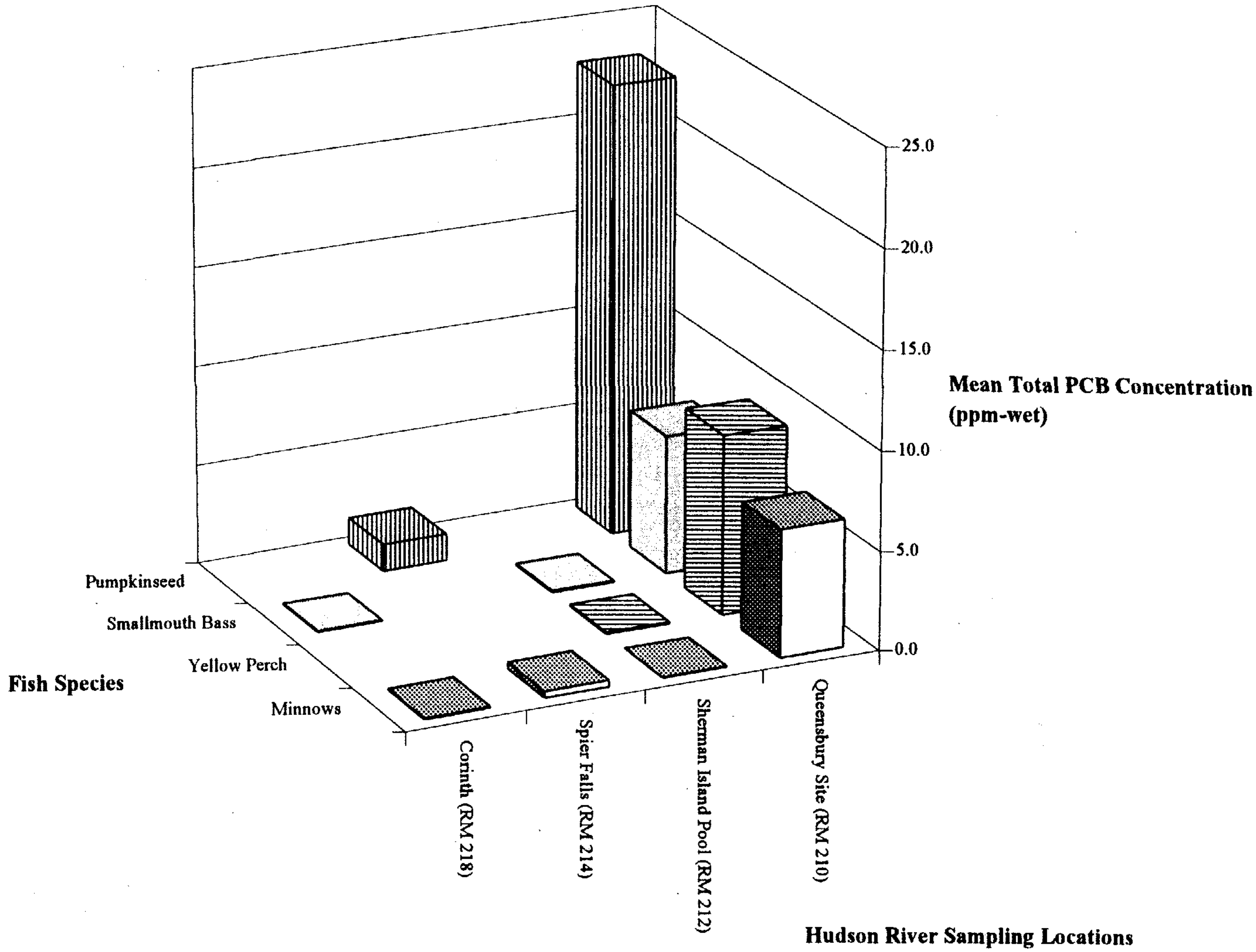
PCB Congener Example



3,3',4,4',5 - pentachlorobiphenyl

TAMS/Cadmus/Gradient

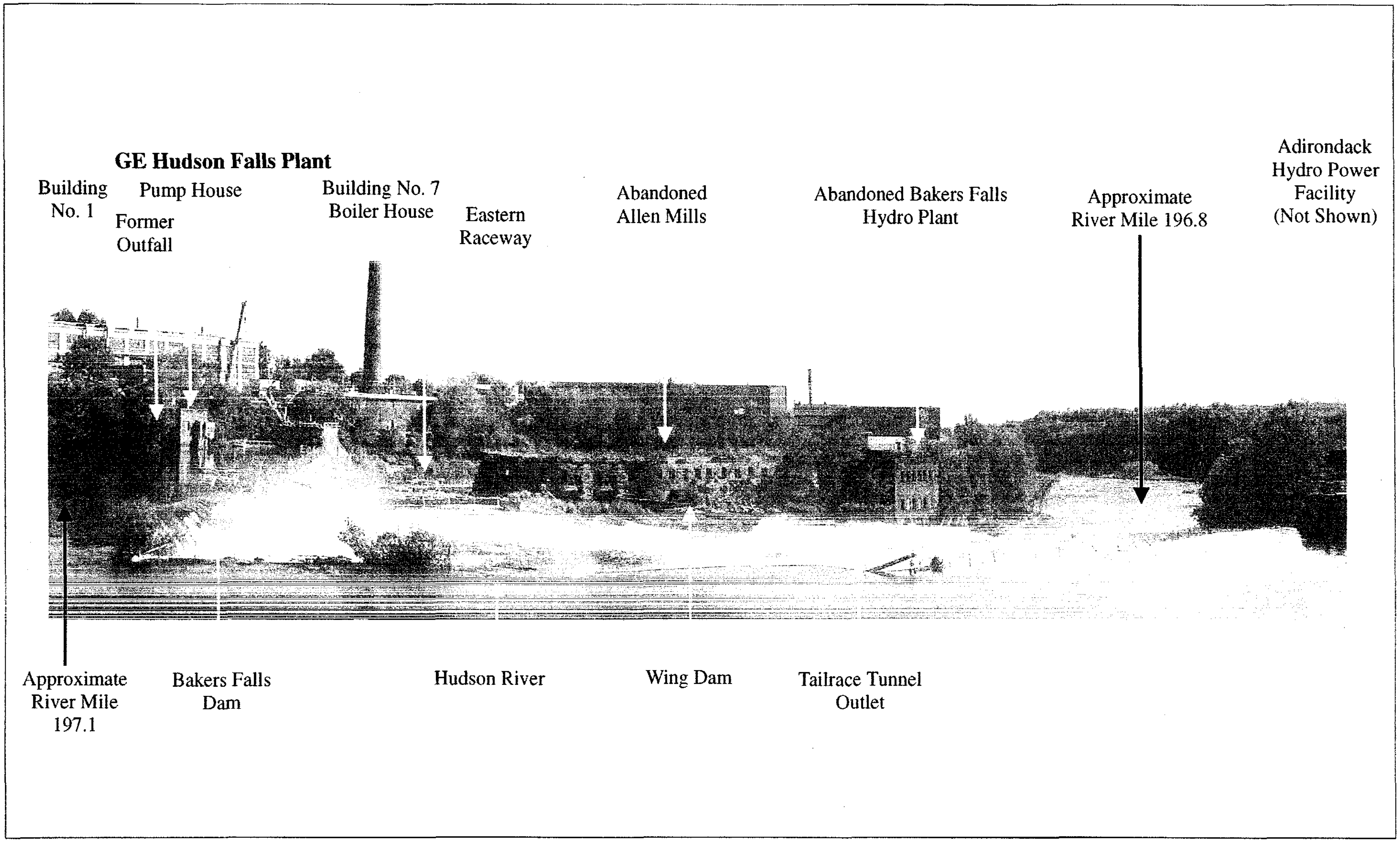
Figure 1-1
PCB Structure



TAMS/Cadmus/Gradient

Source: Engineering-Science (1994)

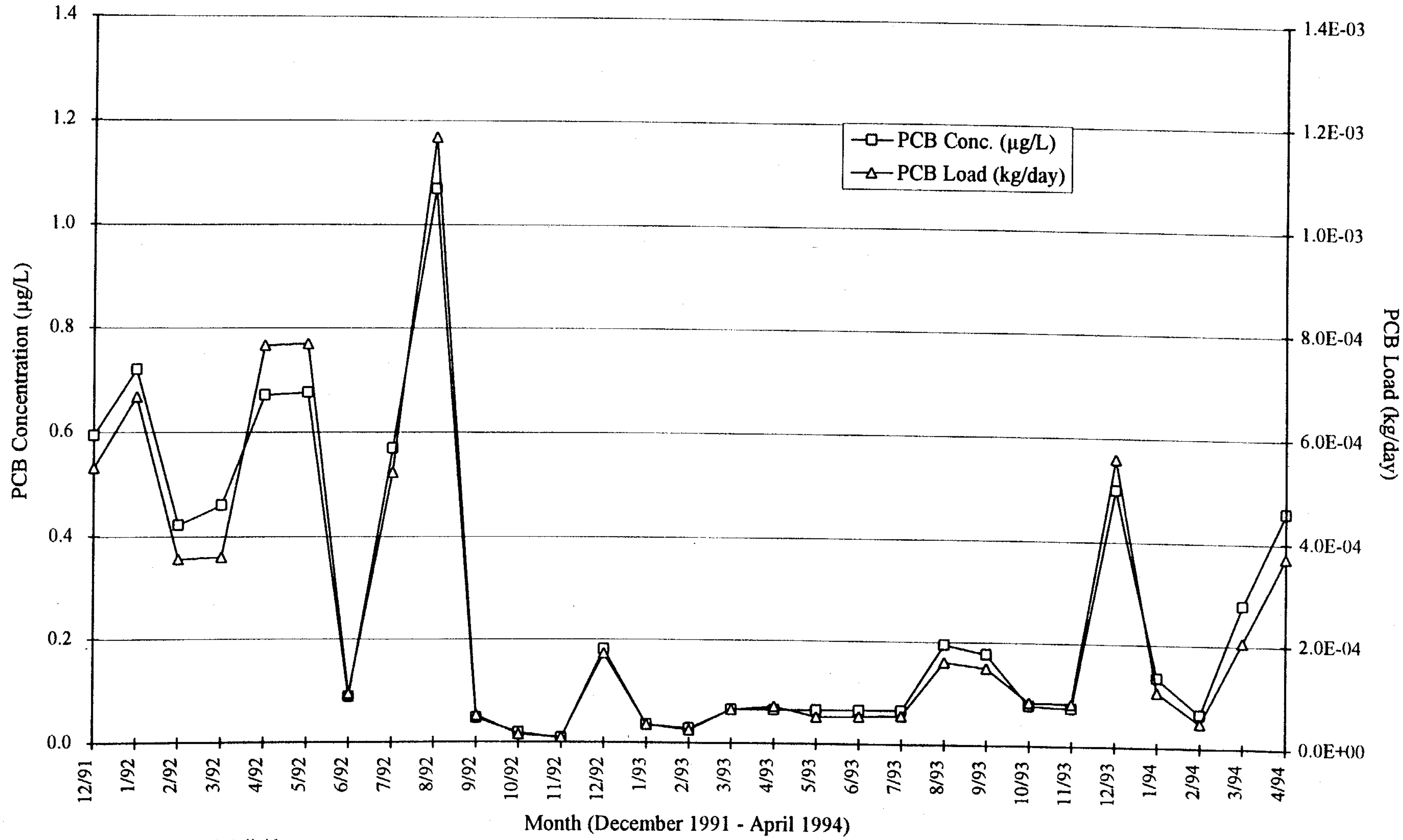
Figure 2-1
Fish PCB Results - Niagara Mohawk Queensbury RI



Source: Image photographed from Old Fenimore Bridge by TAMS Consultants, Inc. on July 24, 1994

TAMS/ Cadmus/ Gradient

Figure 2-2
General Electric Company - Hudson Falls Plant and Vicinity



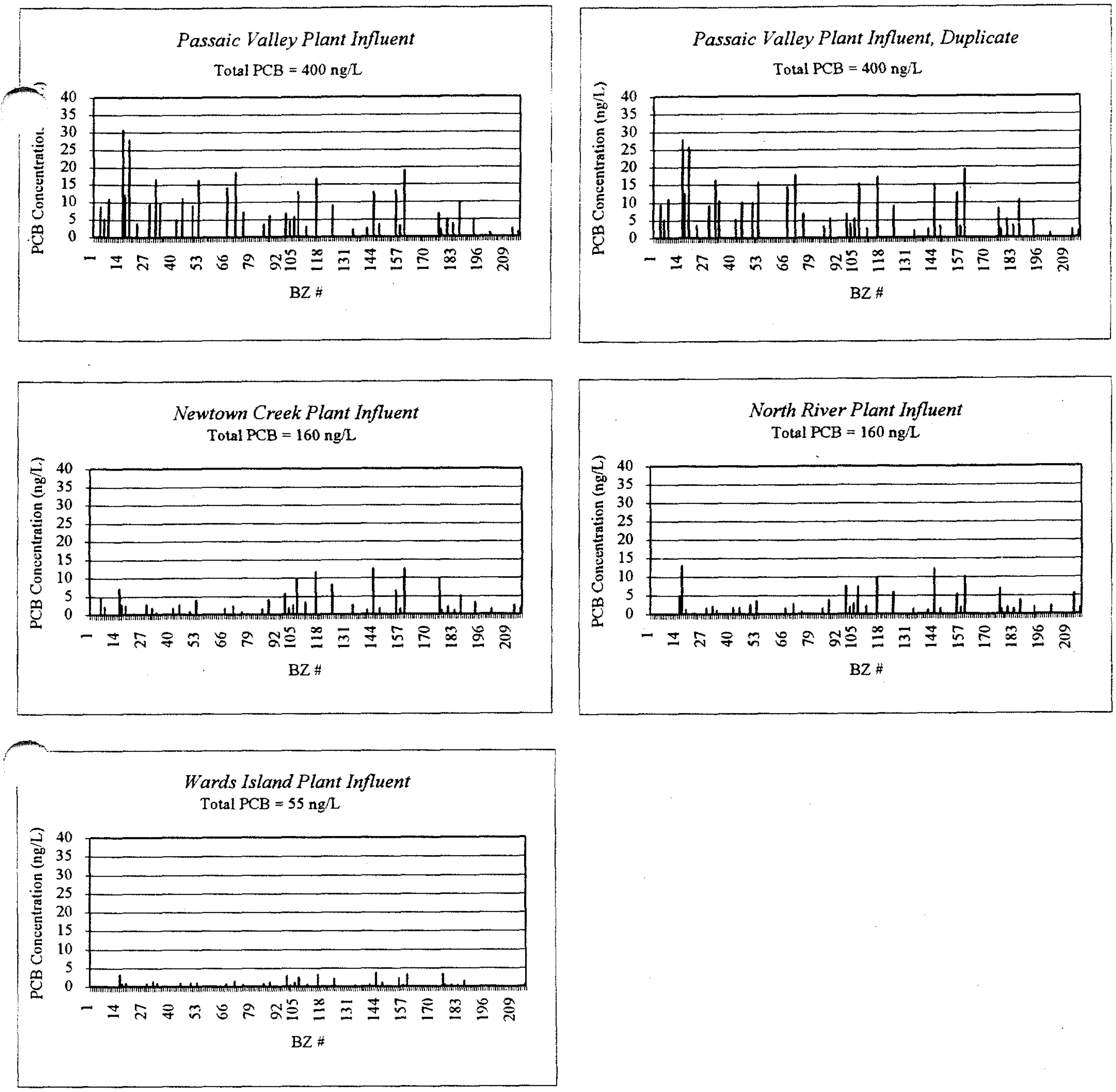
Notes: a) 1 kg/day = 2.2 lb/day
b) Concentrations reported as "< 0.065 µg/L" shown as 0.065 µg/L

TAMS/Cadmus/Gradient

Source: DMR Printout for SPDES NY-0007048 (NYSDEC, 1994b)

Figure 2-3
GE Fort Edward Outfall Discharge Monitoring Report Data

HRP 002 2033

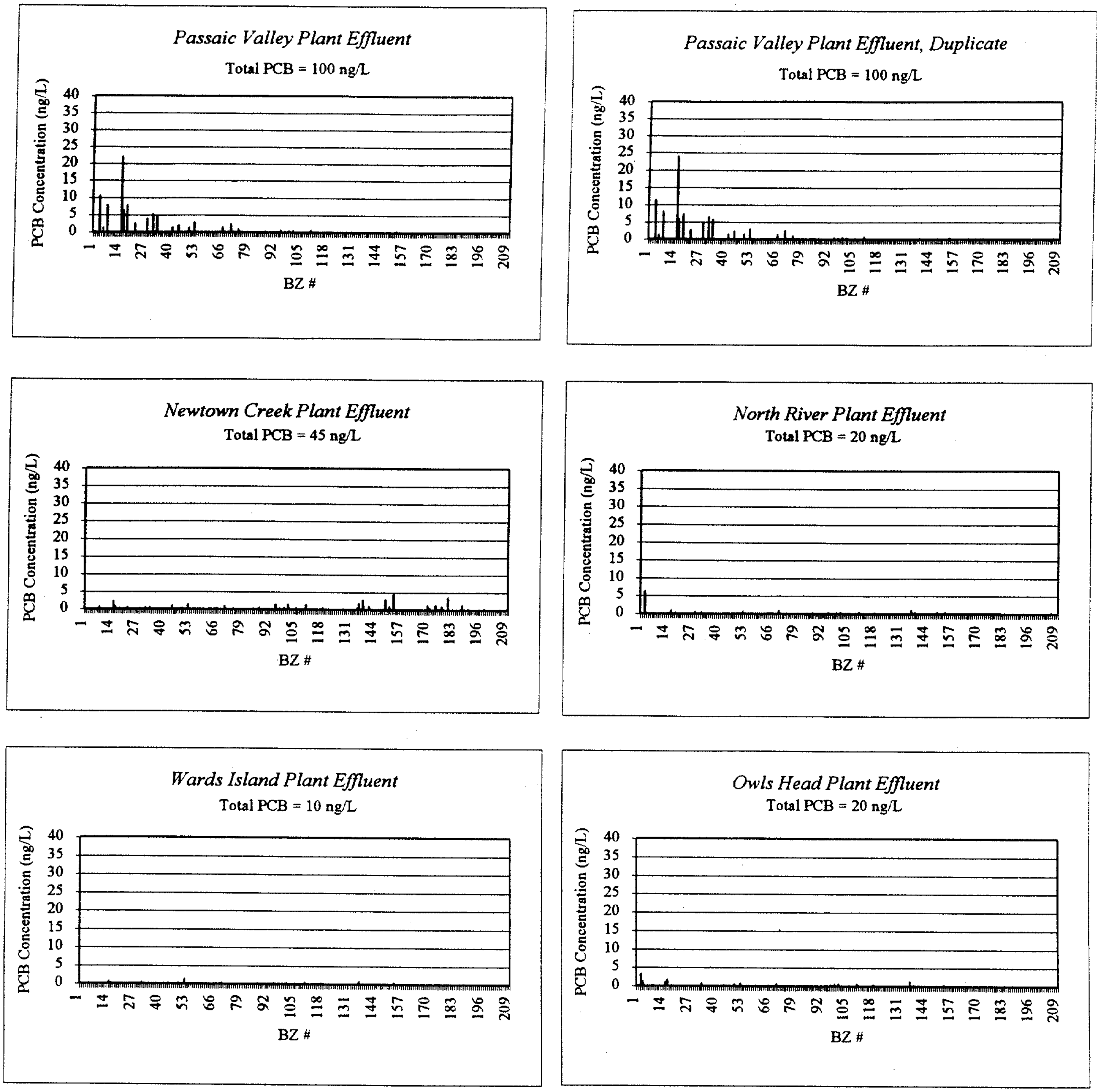


Note: Each graph represents a maximum of 50 congeners

Source: Battelle Ocean Sciences for USEPA (1993)

TAMS/Cadmus/Gradient

Figure 2-4
NY/NJ POTW Influent PCB Data - Congener Basis

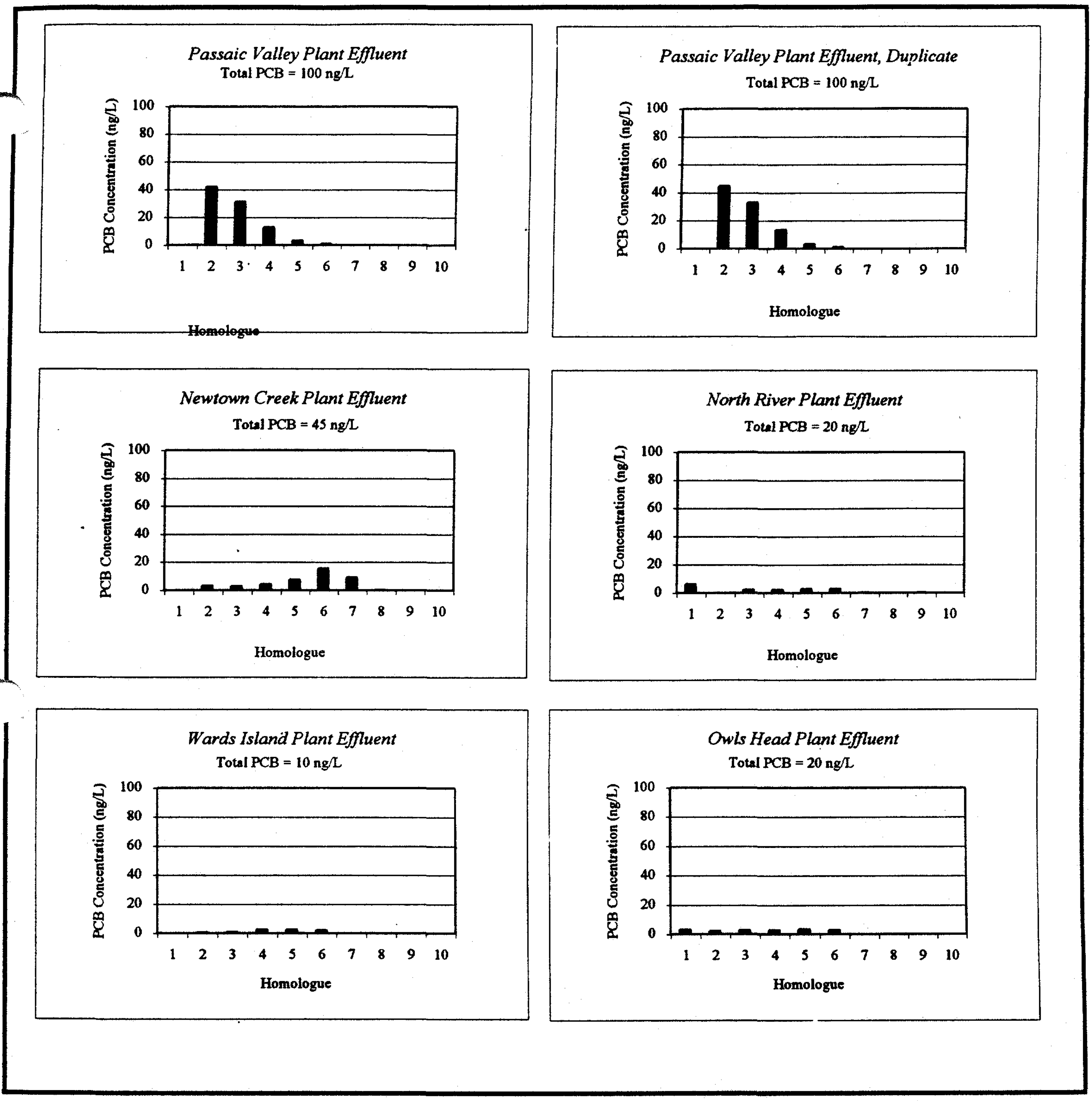


Note: Each graph represents a maximum of 50 congeners

Source: Battelle Ocean Sciences for USEPA (1993)

TAMS/Cadmus/Gradient

Figure 2-6
NY/NJ POTW Effluent PCB Data - Congener Basis

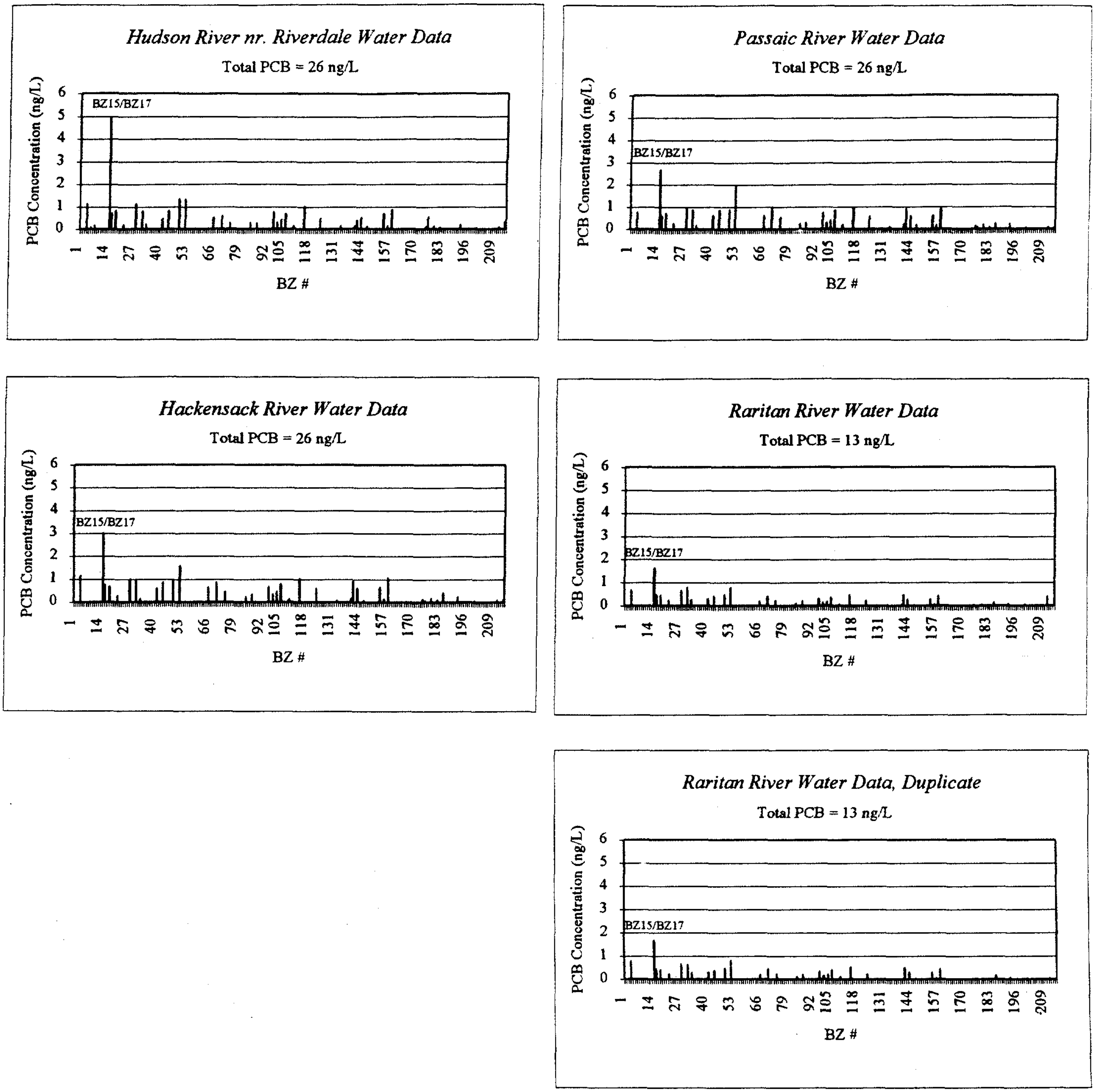


Source: Battelle Ocean Sciences for USEPA (1993)

TAMS/Cadmus/Gradient

Figure 2-7
NY/NJ POTW Effluent PCB Data - Homologue Basis

HRP 002 2036

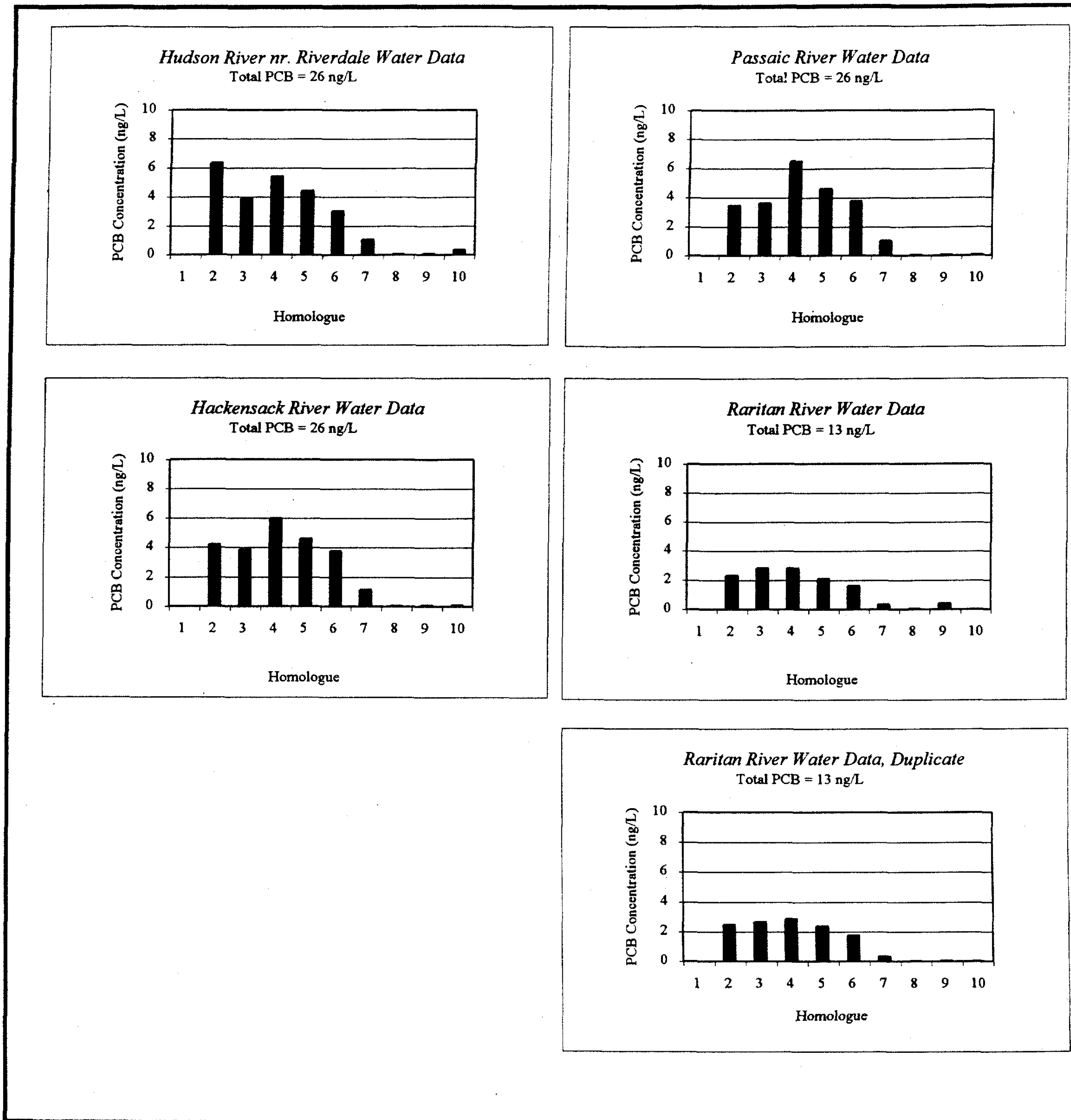


Note: Each graph represents a maximum of 50 congeners

Source: Battelle Ocean Sciences for USEPA (1993)

TAMS/Cadmus/Gradient

Figure 2-8
NY/NJ River Water PCB Data - Congener Basis

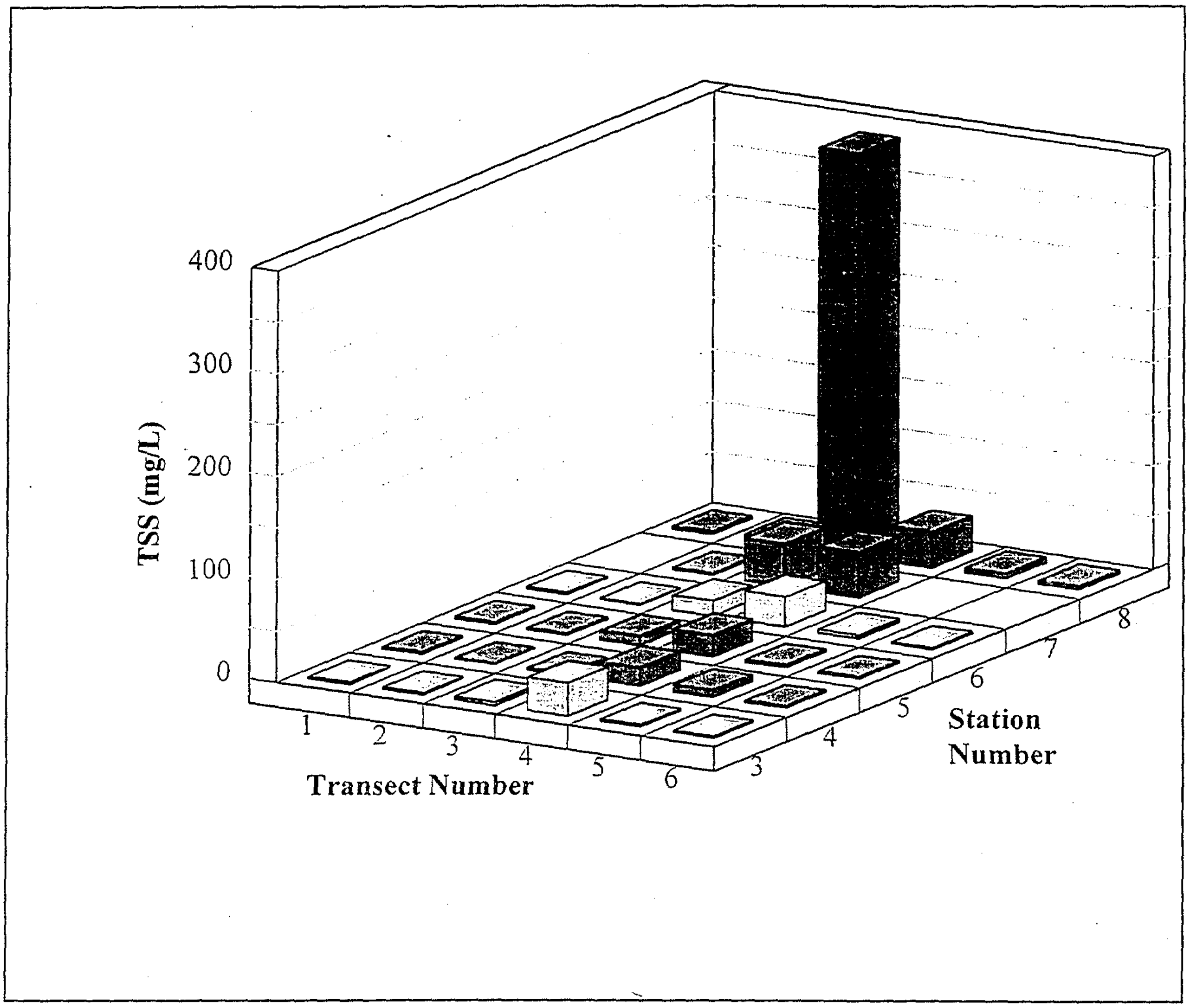


Source: Battelle Ocean Sciences for USEPA (1993)

TAMS/Cadmus/Gradient

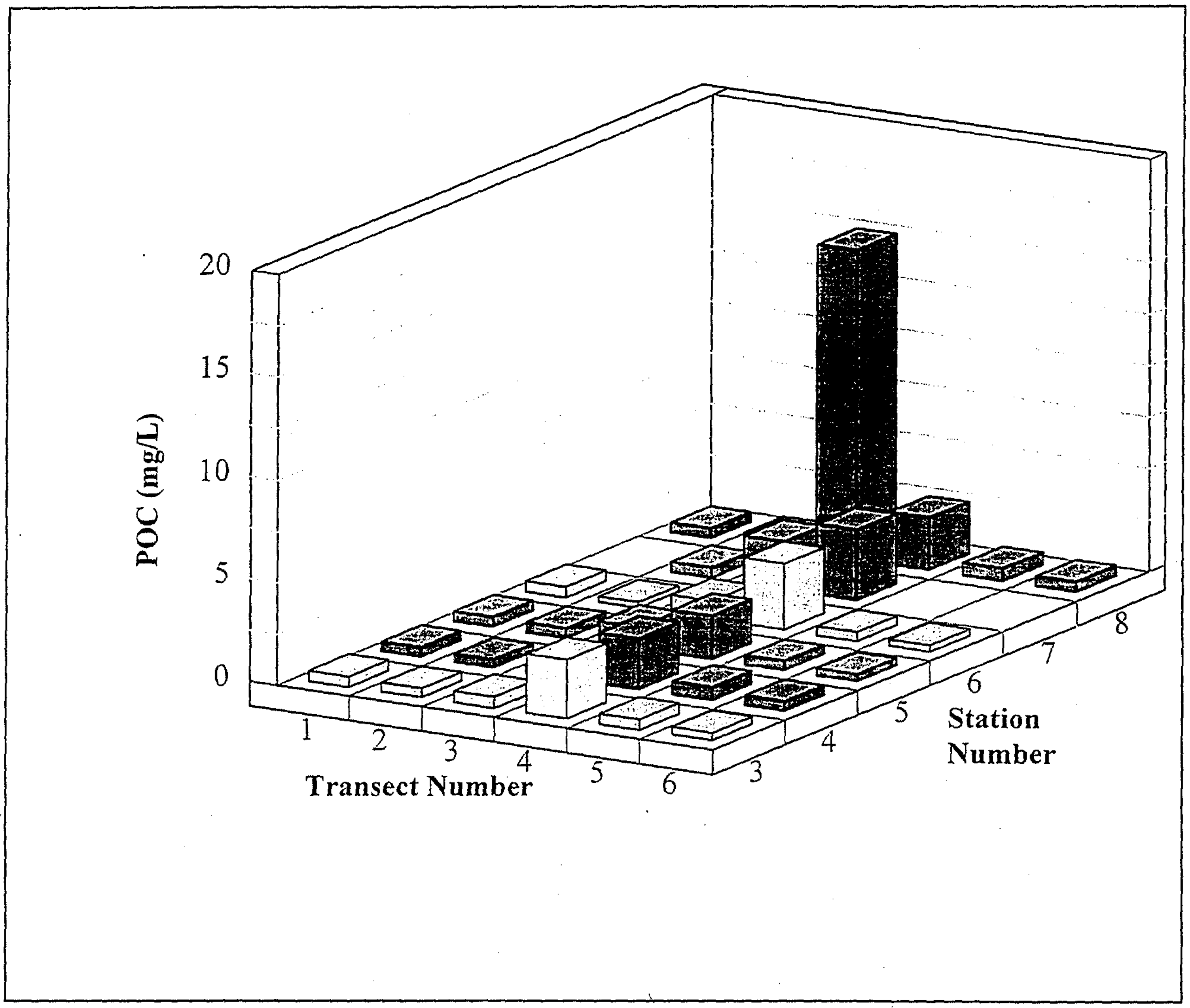
Figure 2-9
NY/NJ River Water PCB Data - Homologue Basis

Figure 3-1
Total Suspended Solids Concentration [TSS], Upper Hudson River Water Column Transects



Source: TAMS/Gradient Database

Figure 3-2
Particulate Organic Carbon [POC],
Upper Hudson River Water Column Transects

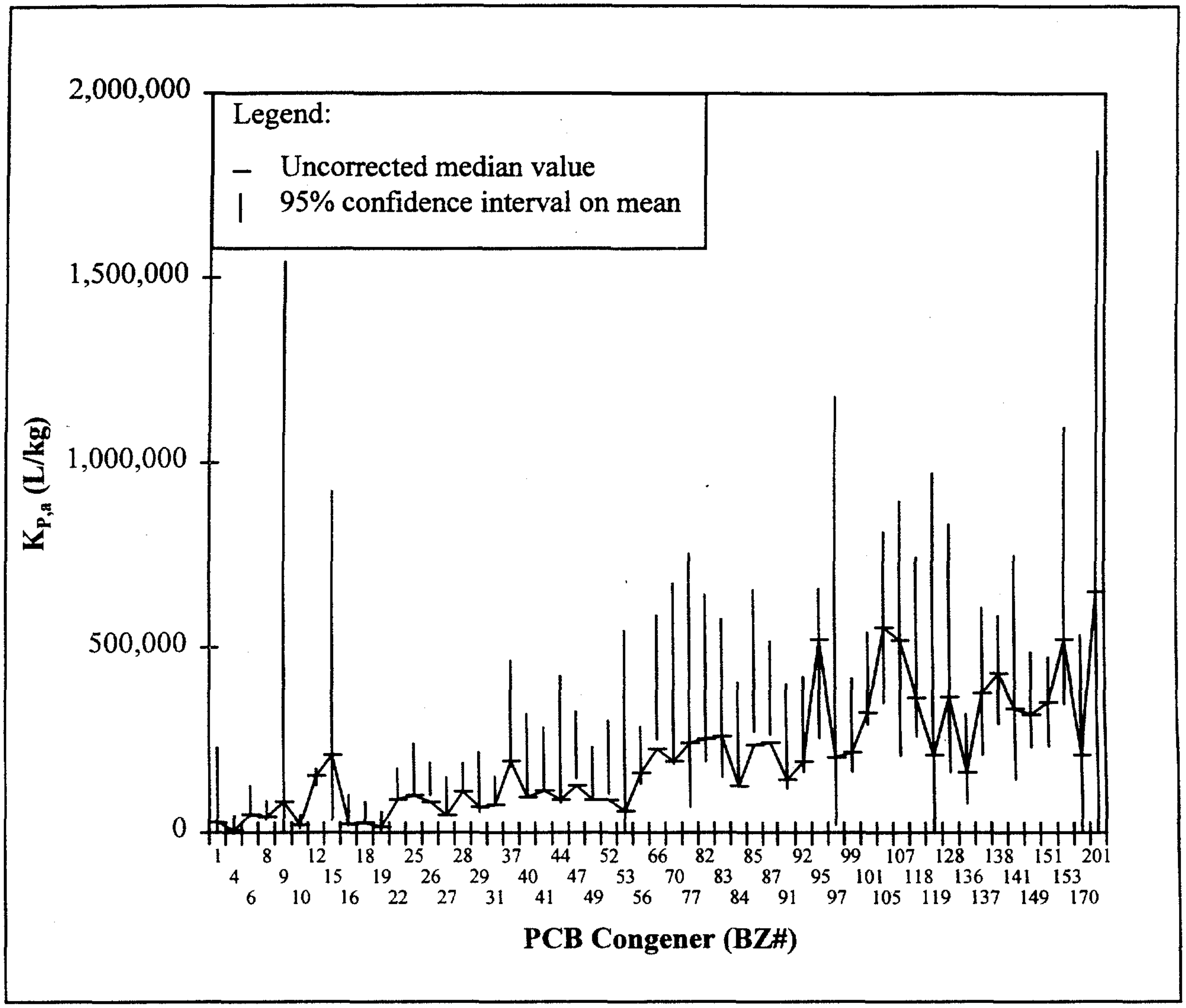


Note: POC concentration calculated from weight loss on ignition data.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-3
Two-Phase Partition Coefficients to Particulate Matter ($K_{P,a}$) for Water-Column Transects



Notes:

a. No temperature correction.

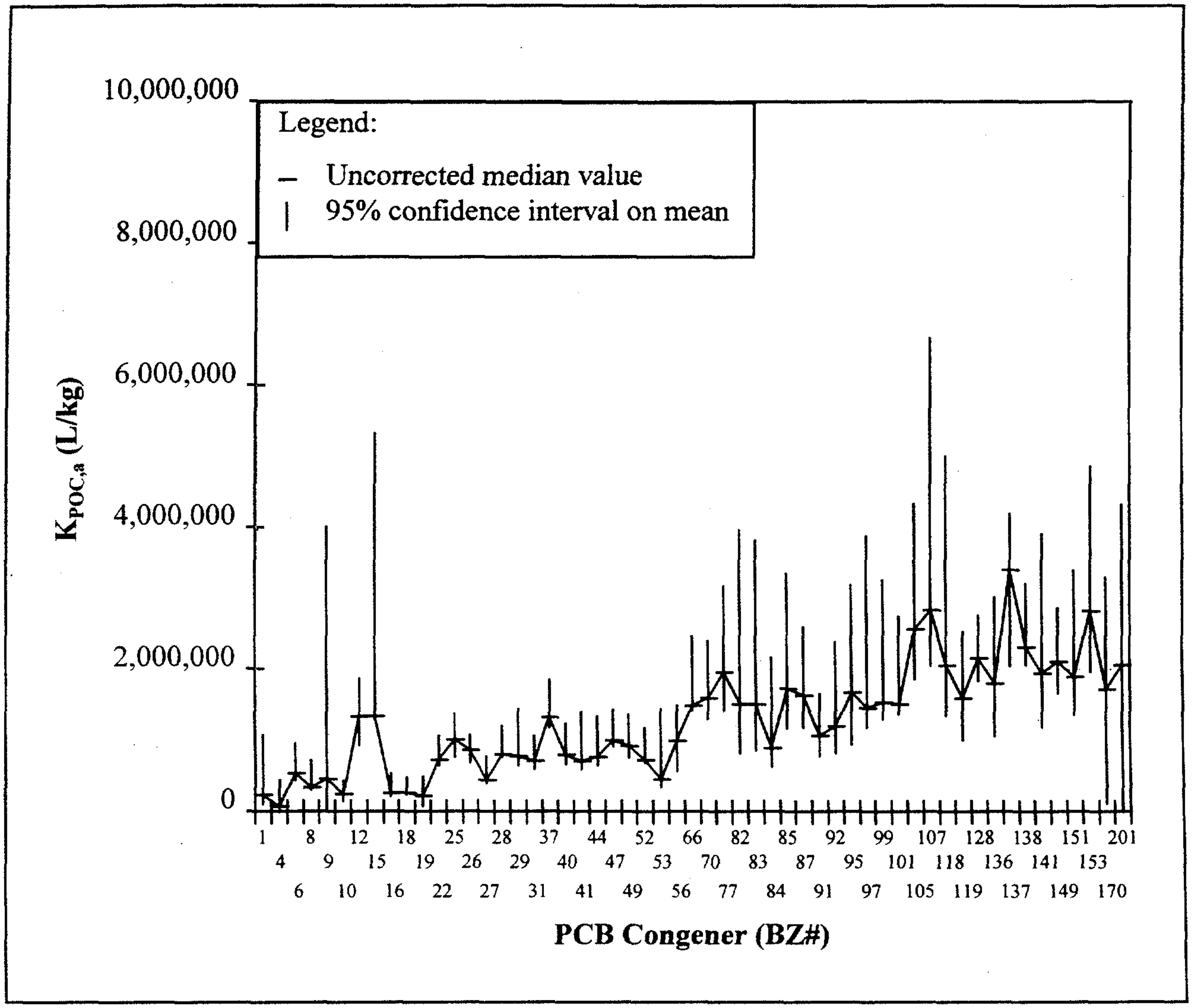
b. Plot includes congeners having at least three samples quantitated for both dissolved and particulate phases.

c. For some congeners with skewed sample distributions the median may be below the confidence interval on the mean.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-4
Two-Phase Partition Coefficients to Particulate Organic Carbon ($K_{POC,a}$) for Water-Column Transects

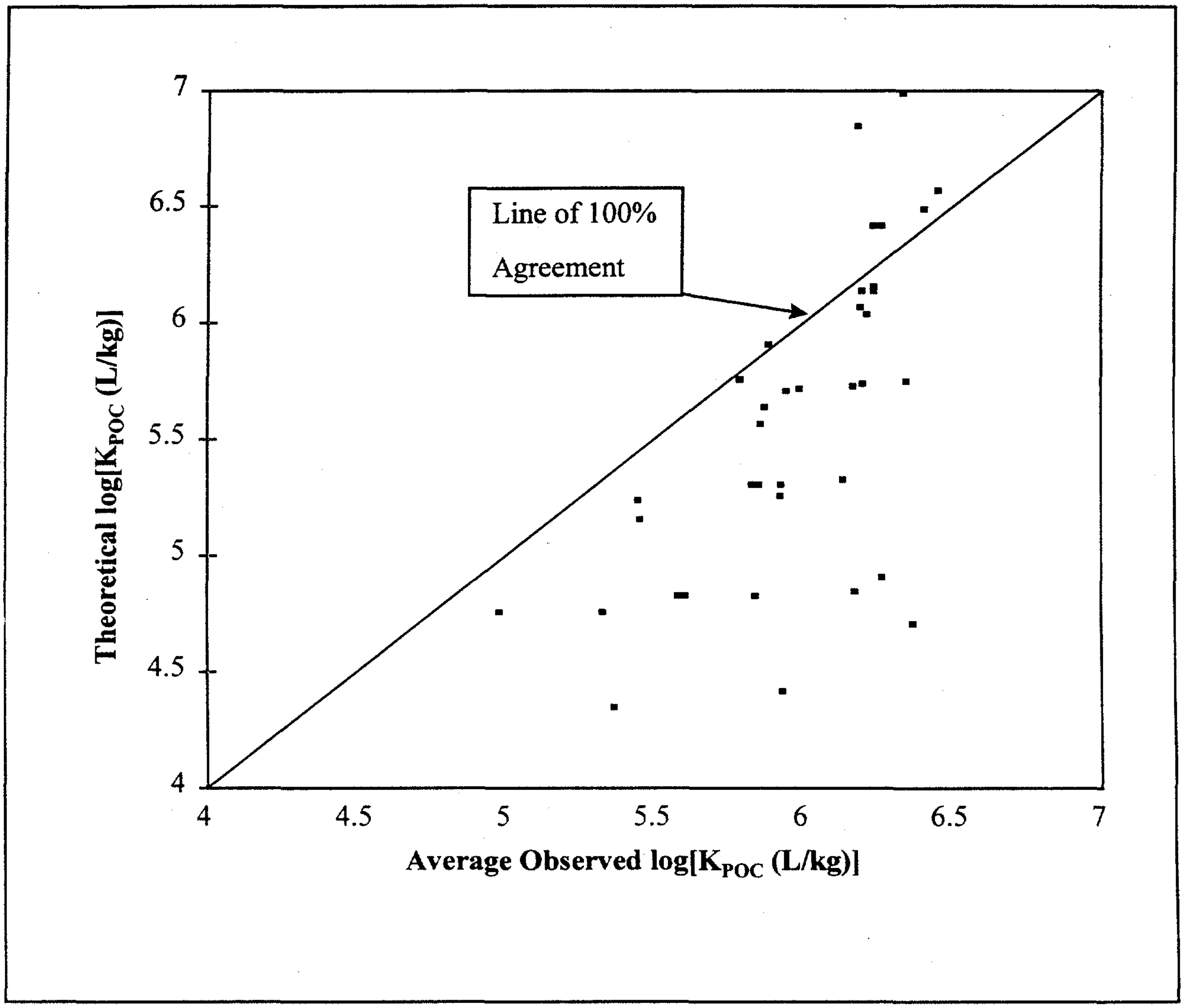


Notes:
a. No temperature correction.
b. Plot includes congeners having at least three samples quantitated for both dissolved and particulate phases.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-5
Observed vs Theoretical Partitioning to Particulate Organic Carbon for PCB Congeners in the Freshwater Hudson

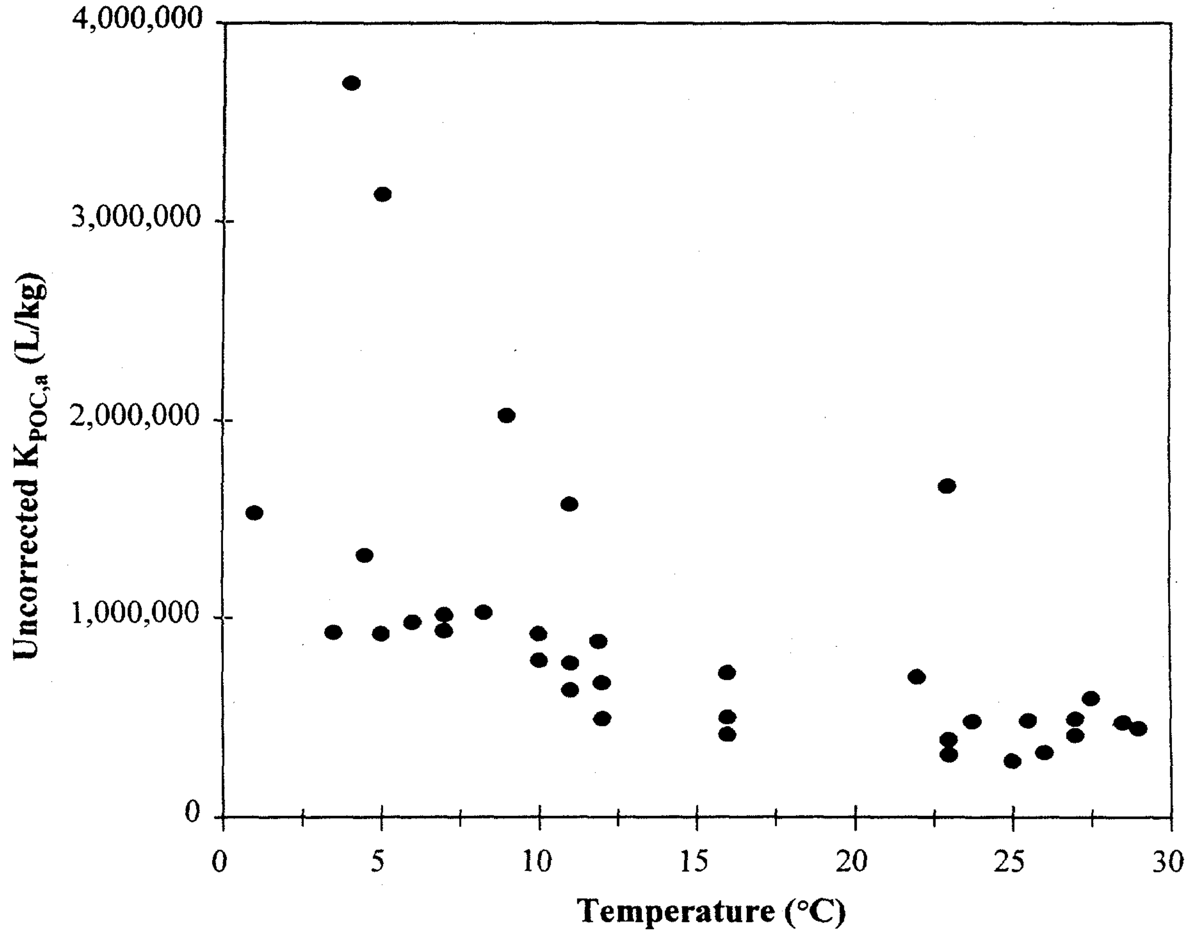


Note: Theoretical values from Mackay *et al.* (1992).

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

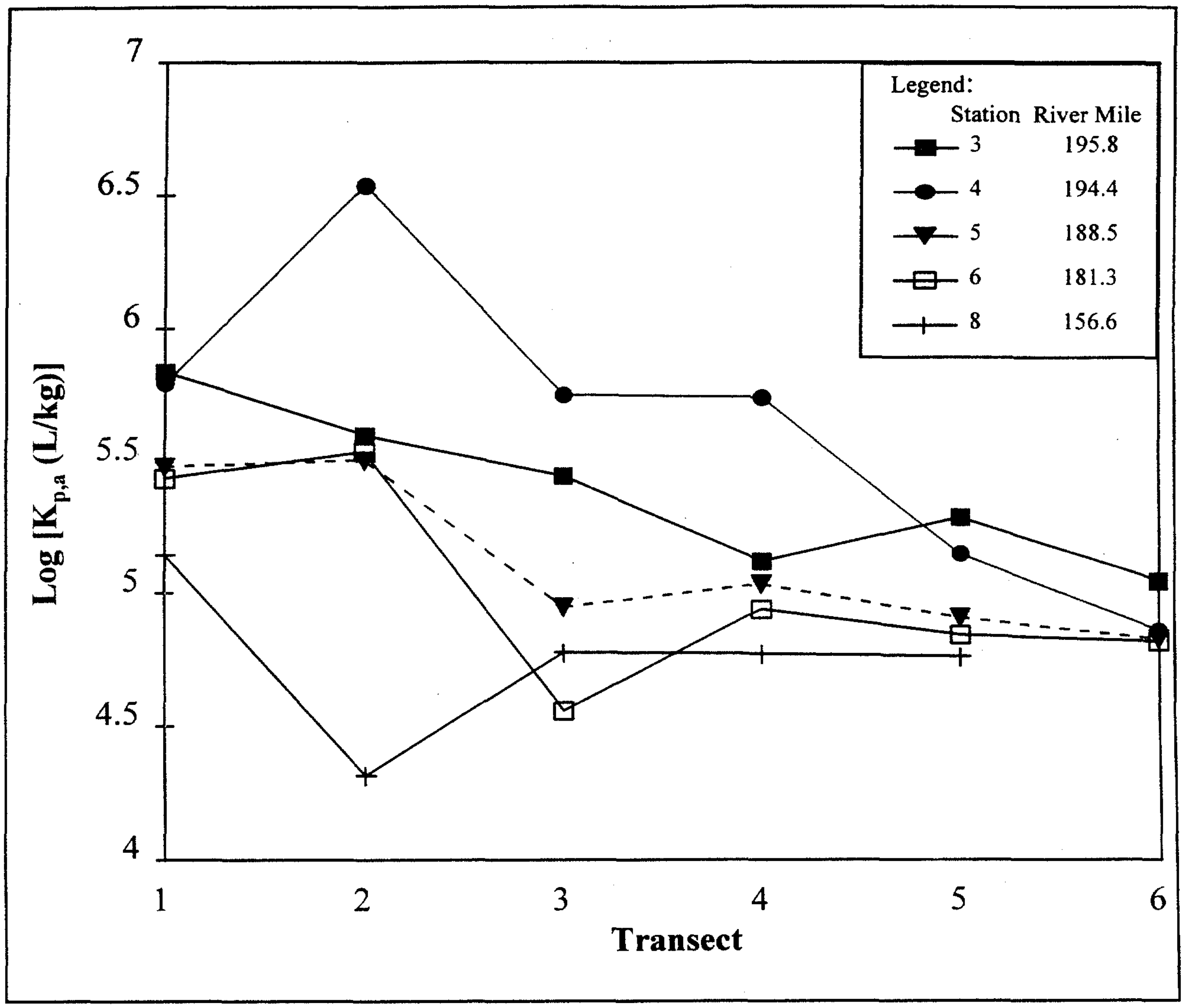
Figure 3-6
$K_{POC,a}$ Estimates vs. Water Temperature for BZ#52, Hudson River Water-Column Transect Samples



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-7
Variation in log $K_{P,a}$ by Transect for BZ#44



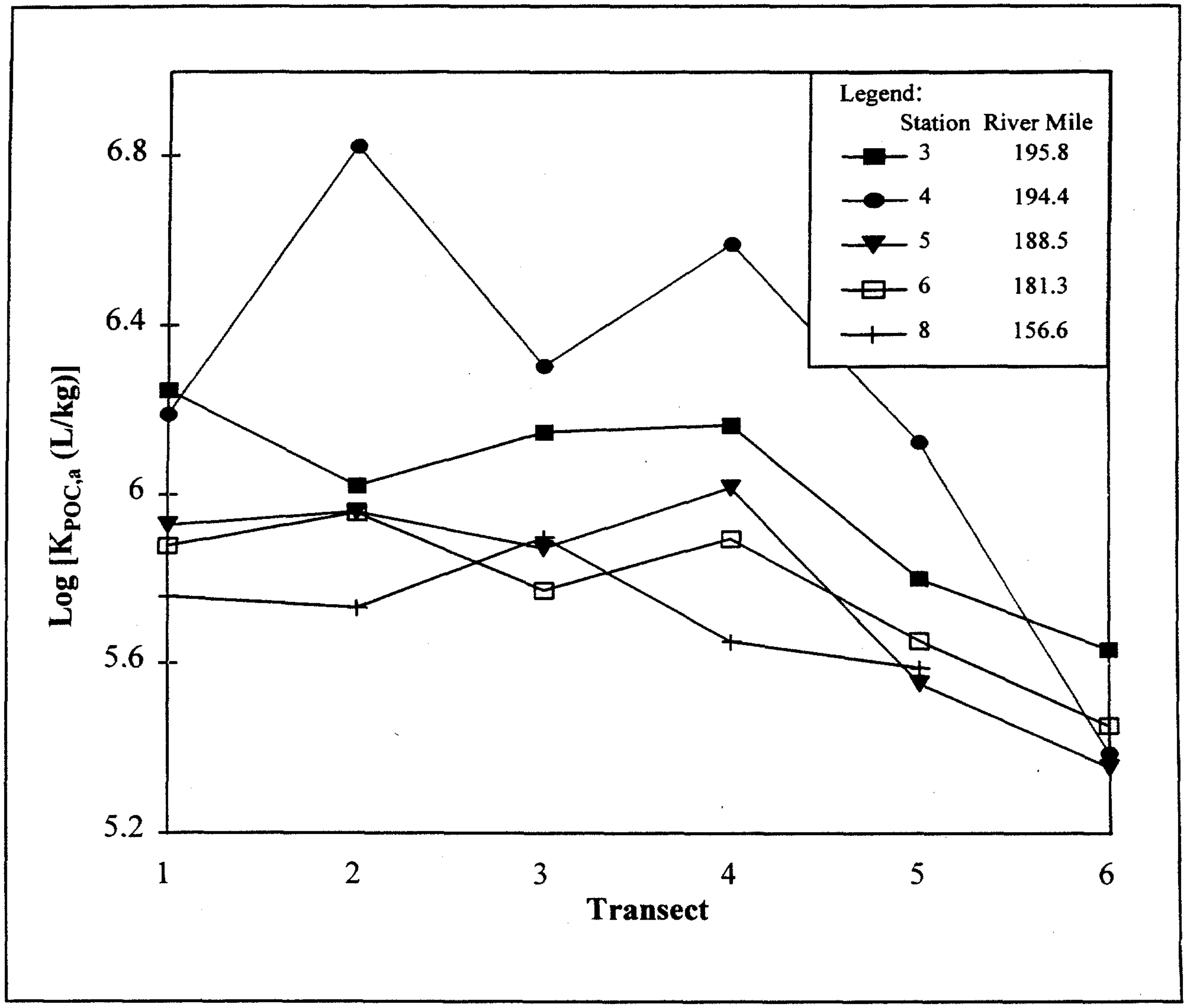
Note: Estimates without temperature correction.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2045

Figure 3-8
Variation in log $K_{POC,a}$ by Transect for BZ#44

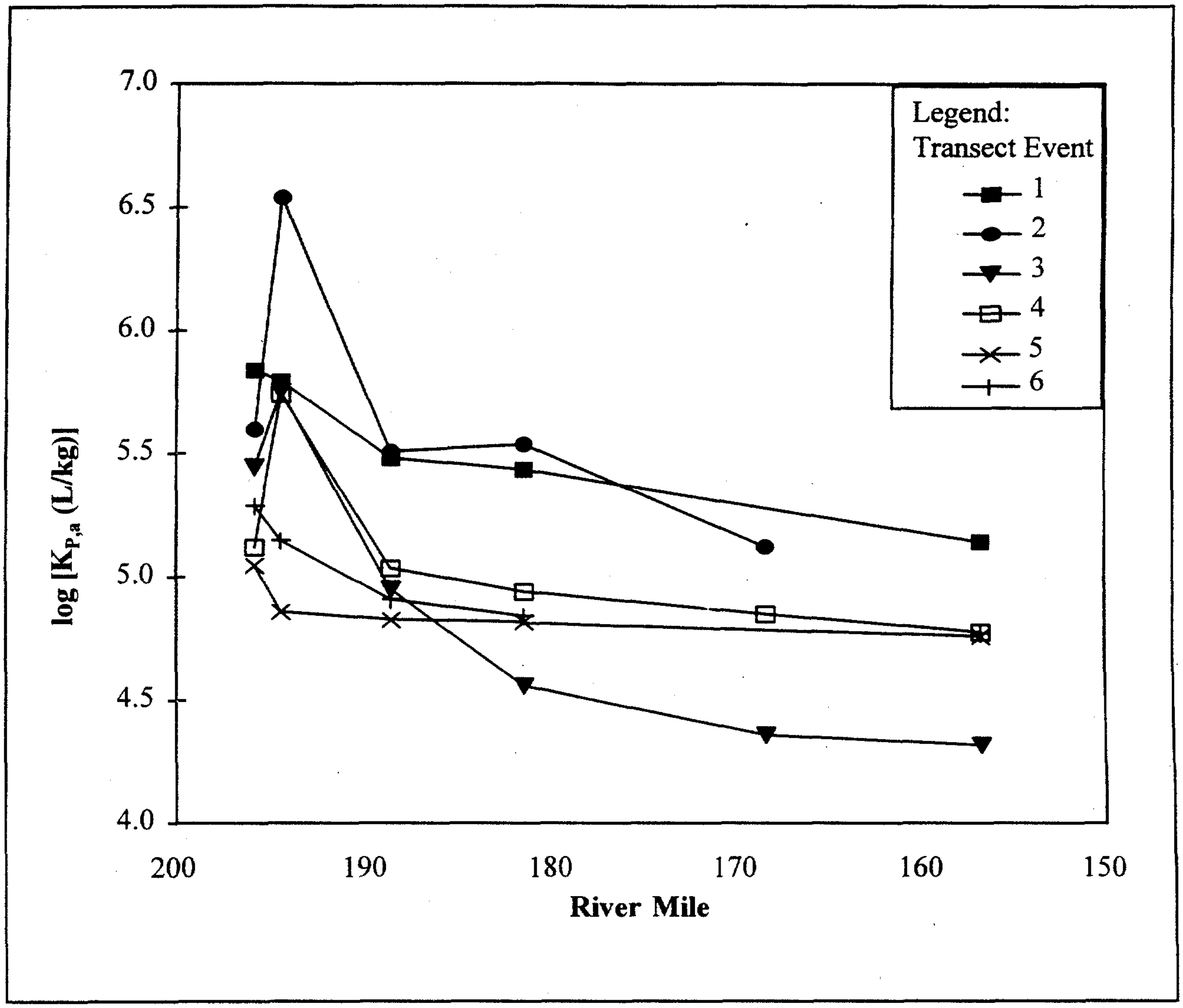


Note: Estimates without temperature correction.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-9
Variation in log $K_{P,a}$ by River Mile for BZ#44

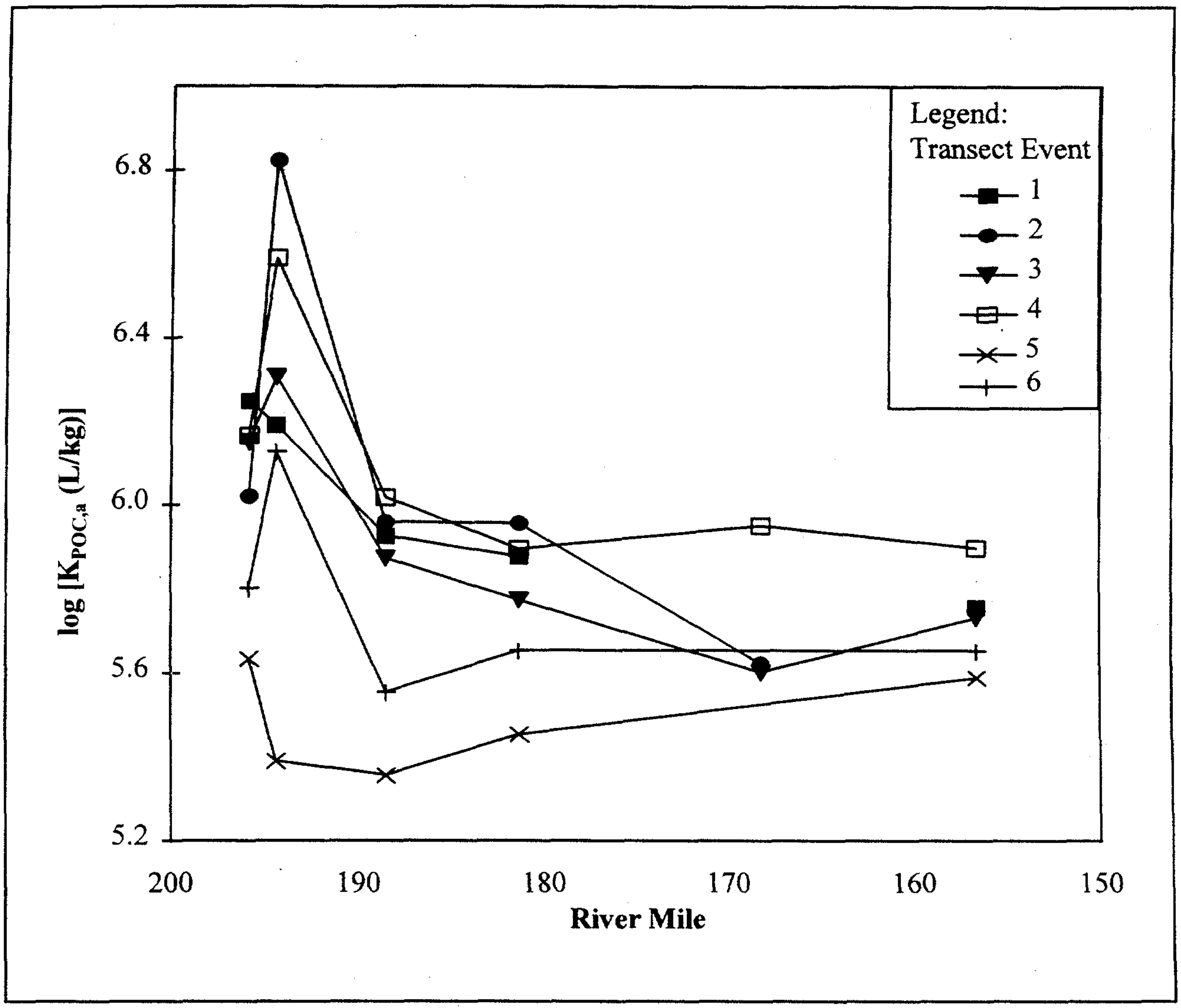


Note: Estimates without temperature correction.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-10
Variation in log $K_{POC,a}$ by River Mile for BZ#44

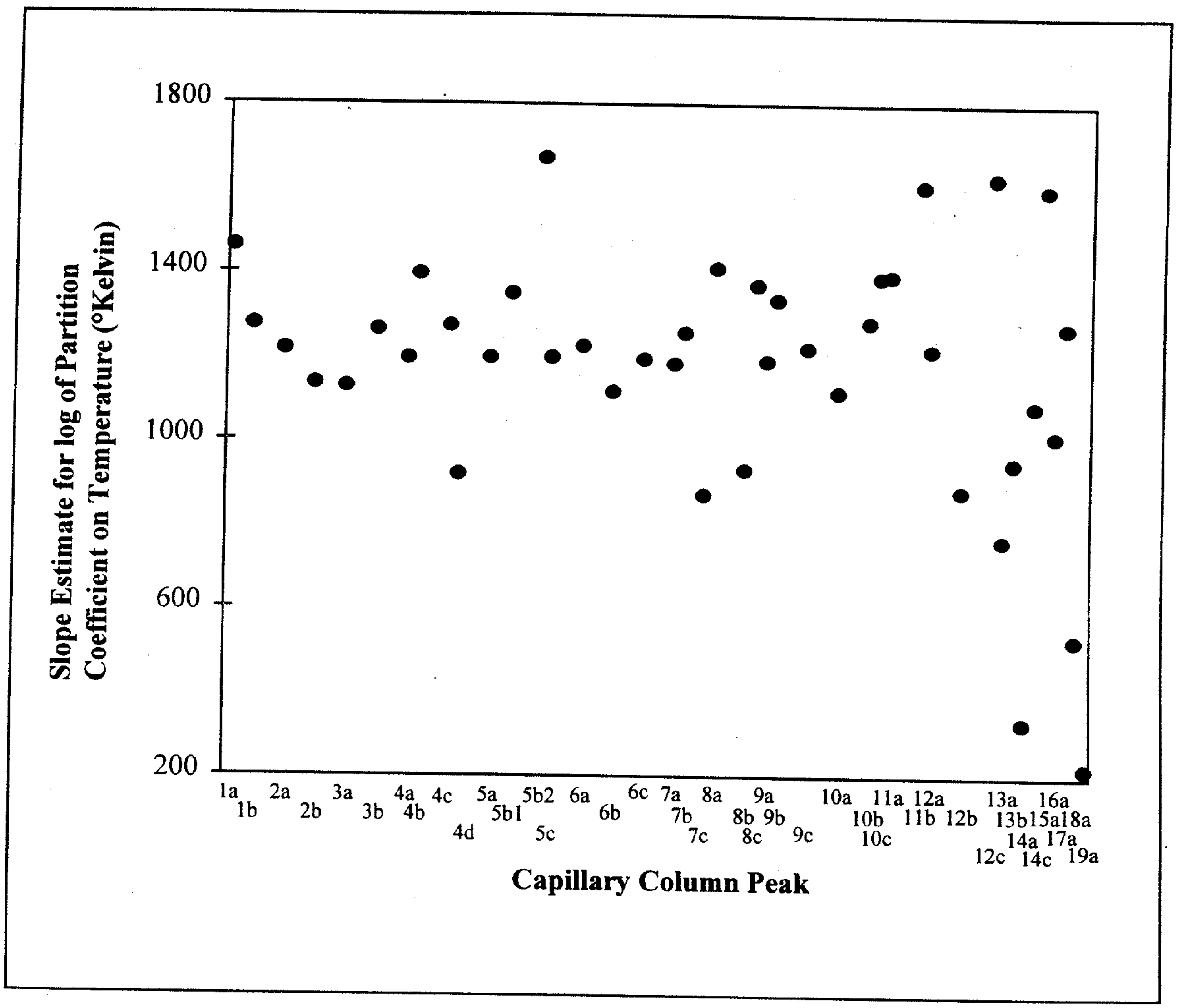


Note: Estimates without temperature correction.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

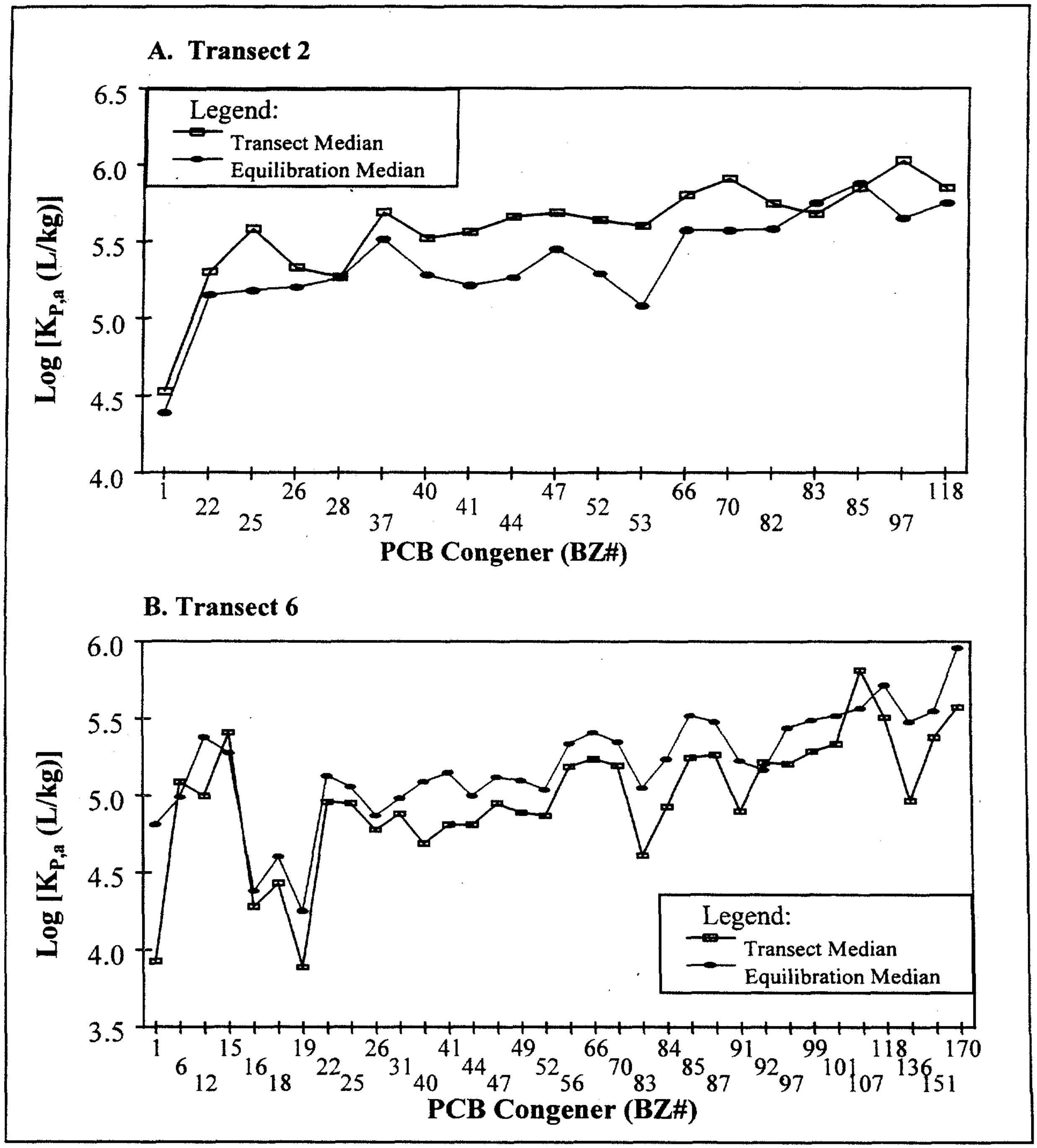
Figure 3-11
Temperature Correction Slope Estimates for PCB Capillary Column Peaks



Source: Warren *et al.* (1987)

TAMS/Cadmus/Gradient

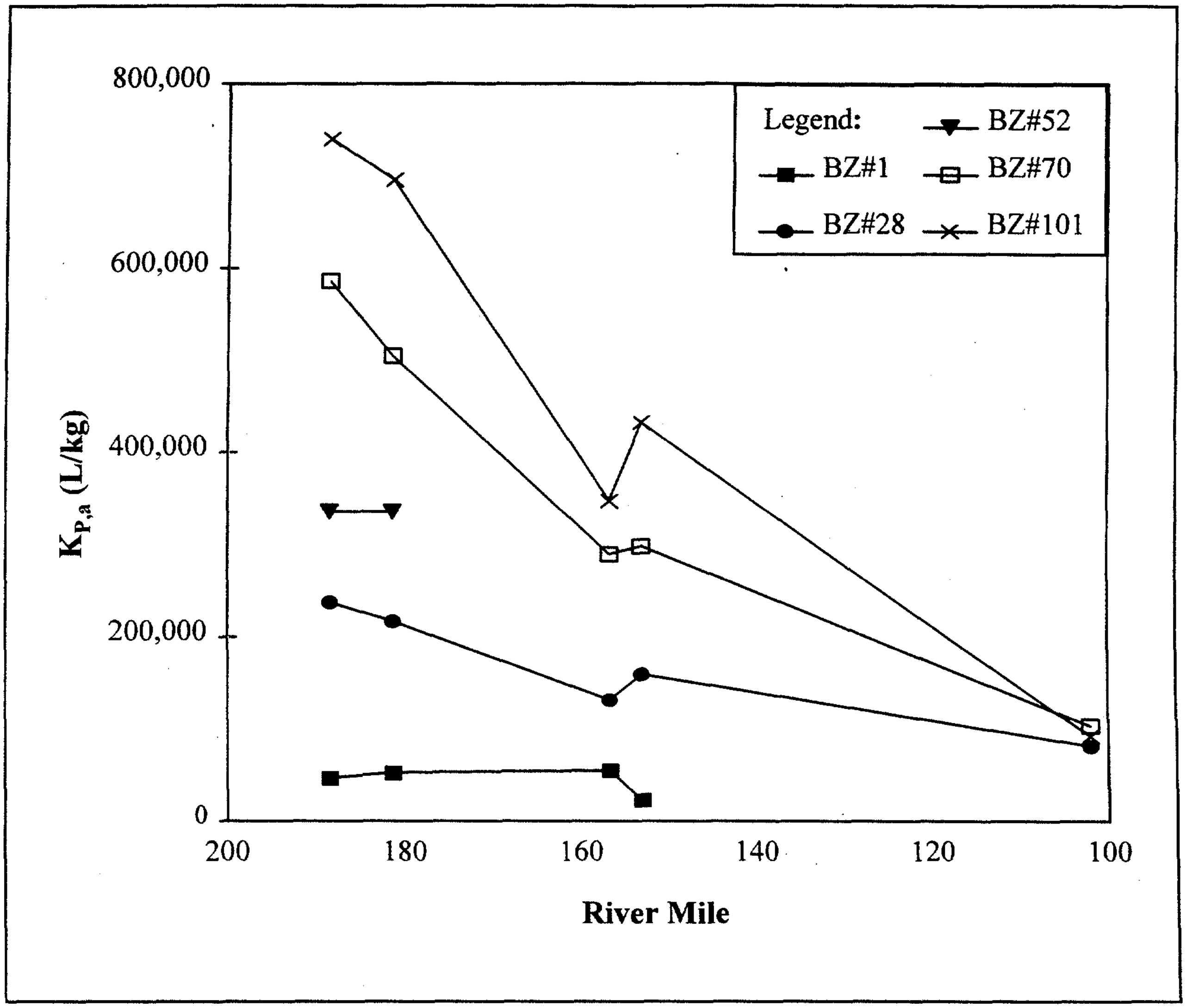
Figure 3-12
Equilibration $K_{P,a}$ Estimates for PCB Partitioning in Hudson River Transect Samples



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-13
$K_{P,a}$ Estimates for Hudson River Transect 1

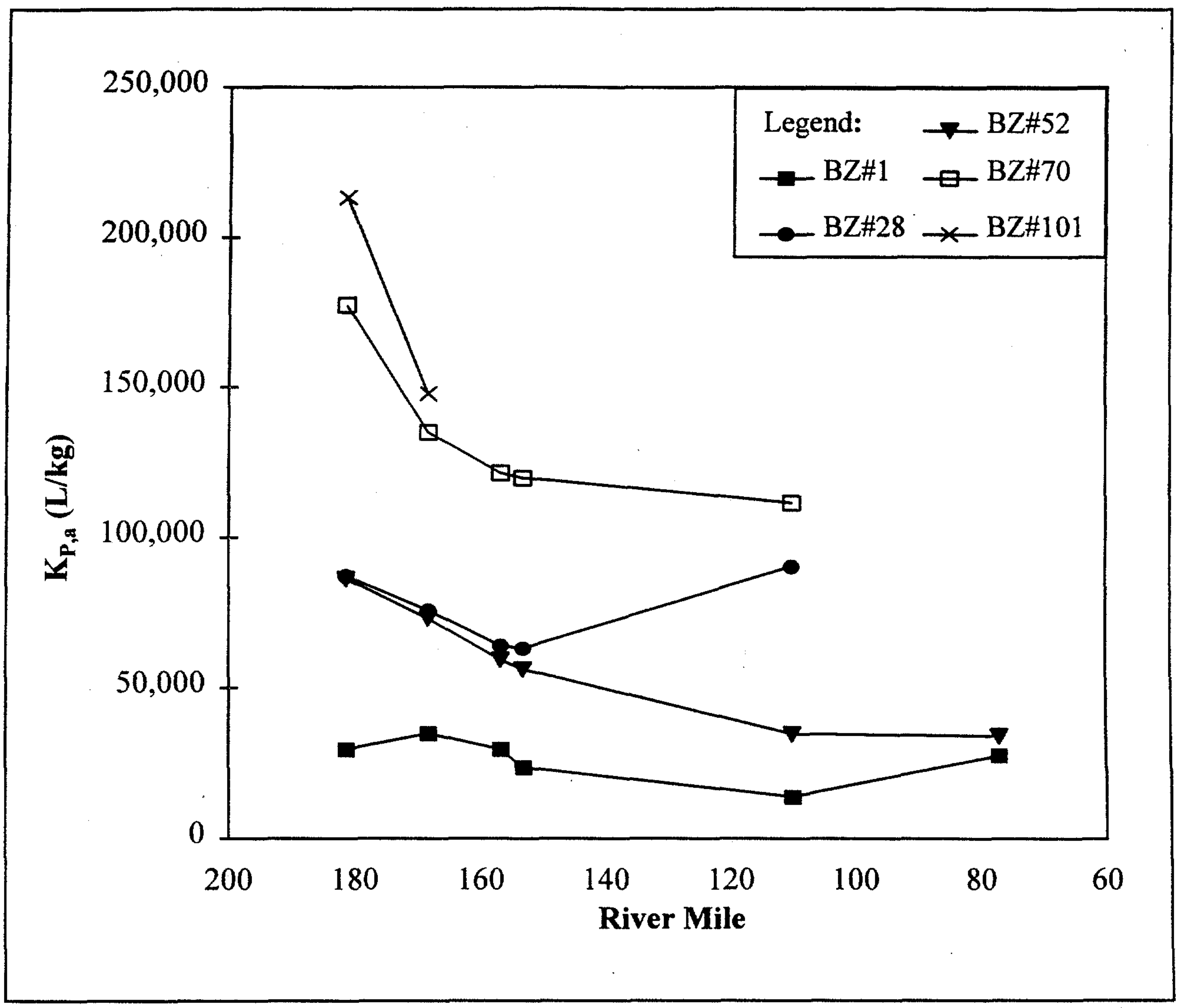


Note: Estimates without temperature correction.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-14
$K_{P,a}$ Estimates for Hudson River Transect 4

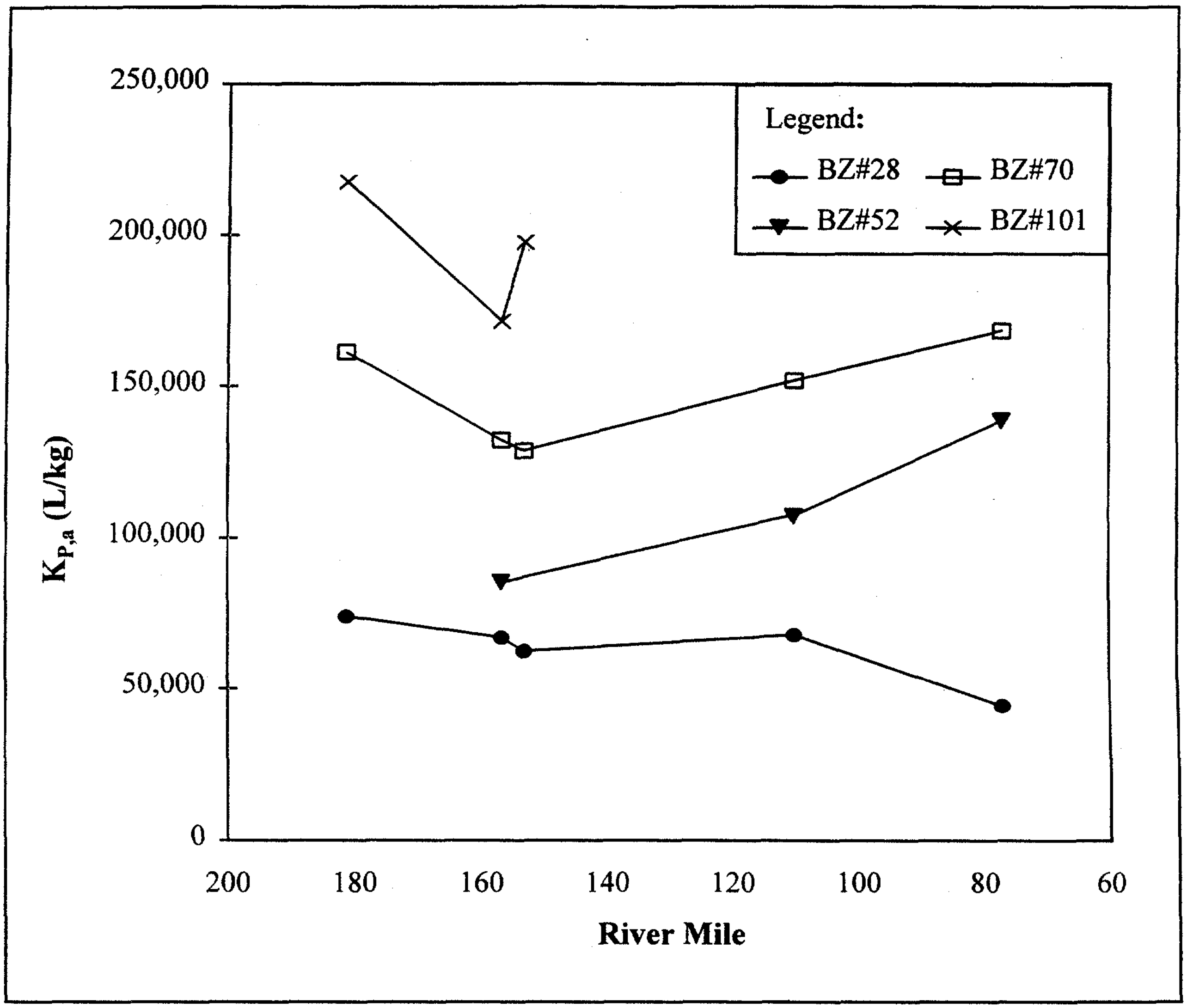


Note: Estimates without temperature correction.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-15
$K_{P,a}$ Estimates for Hudson River Transect 6

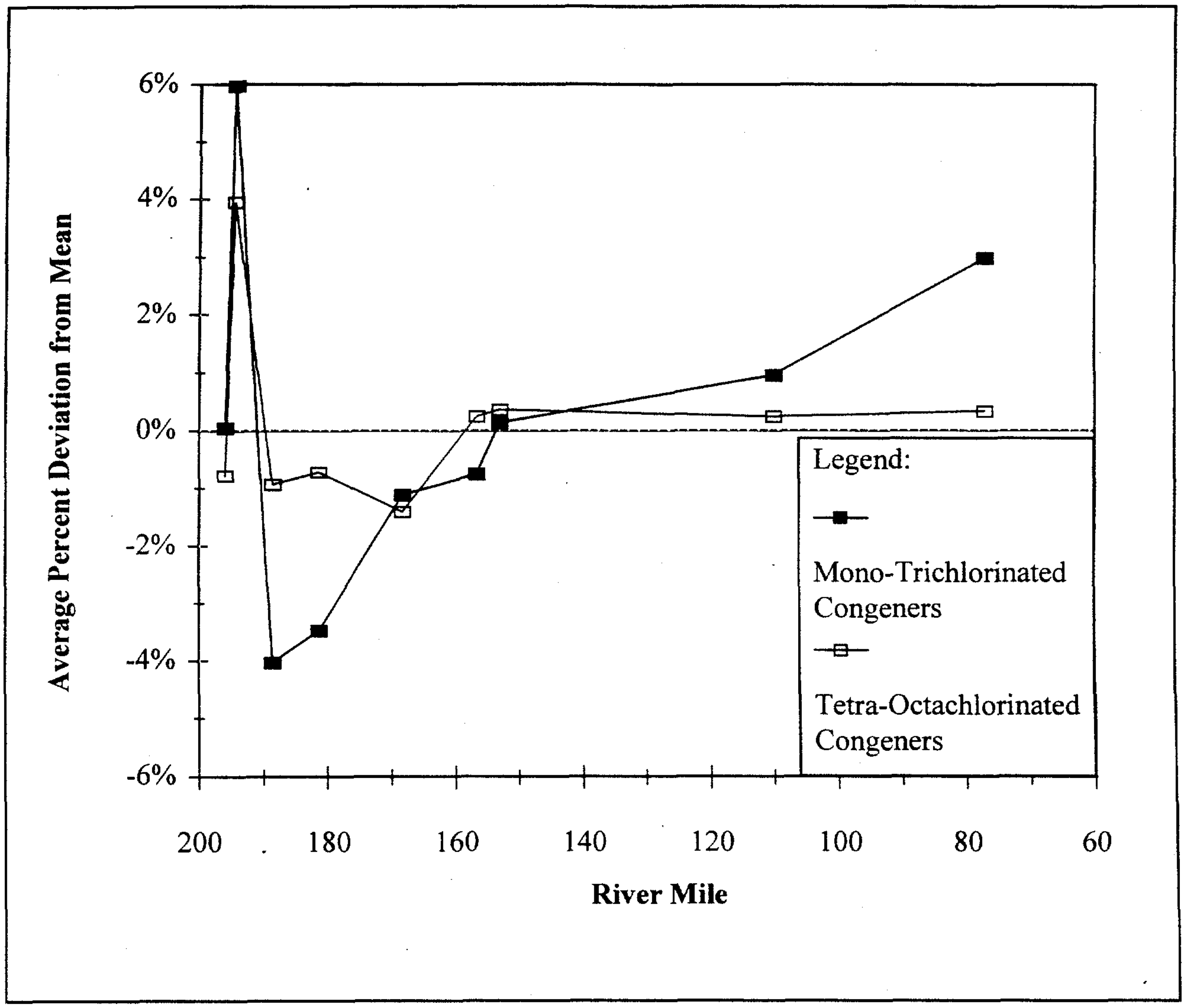


Note: Estimates without temperature correction.

Source: TAMS/Gradient Database

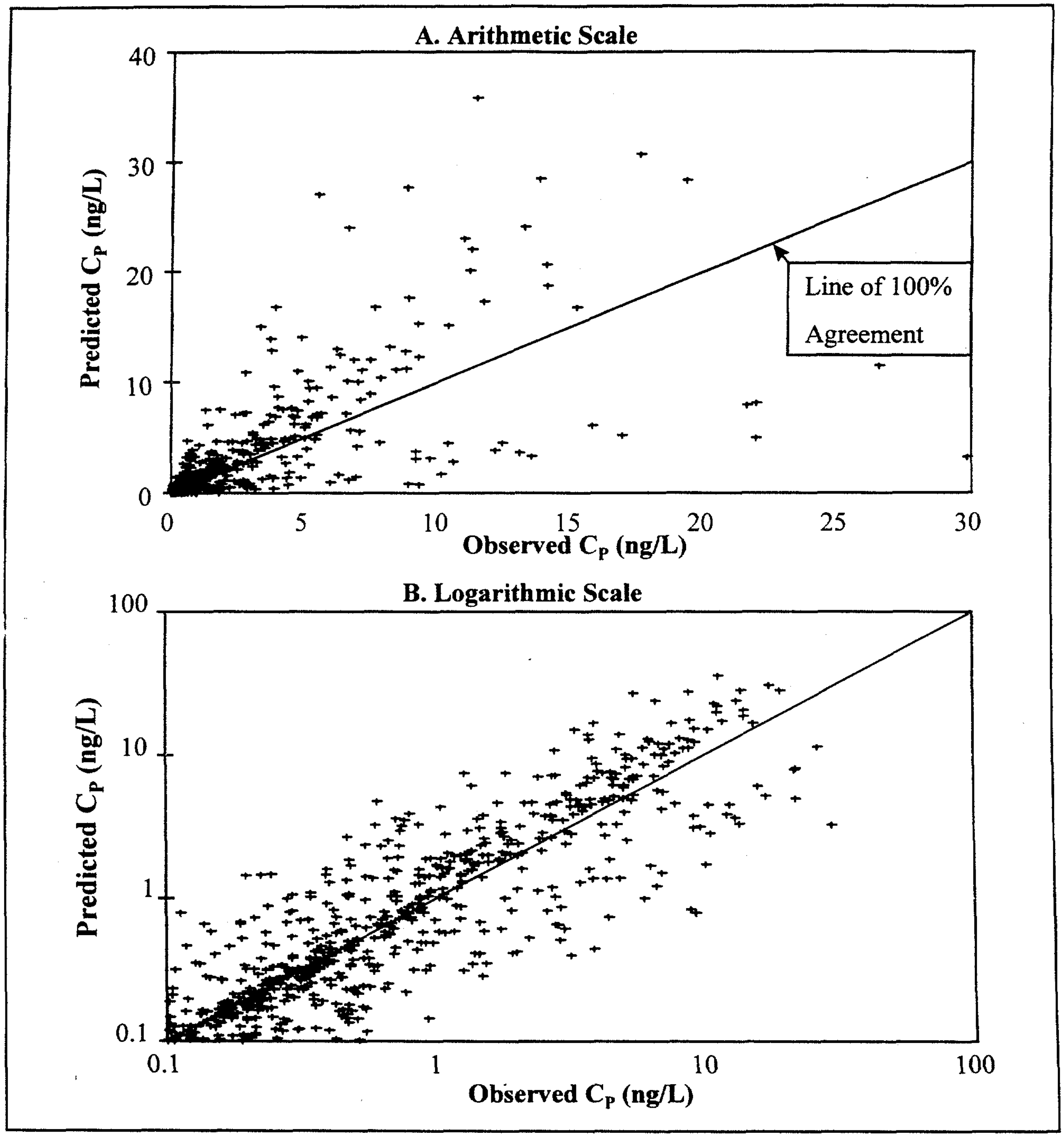
TAMS/Cadmus/Gradient

Figure 3-16
Percent Deviations in log $K_{POC,a}$ Estimates for PCB Congeners by River Mile



Source: TAMS/Gradient Database

Figure 3-17
Prediction of Particulate-Phase PCB Congener Concentration Using $K_{P,a}$ with Temperature Correction

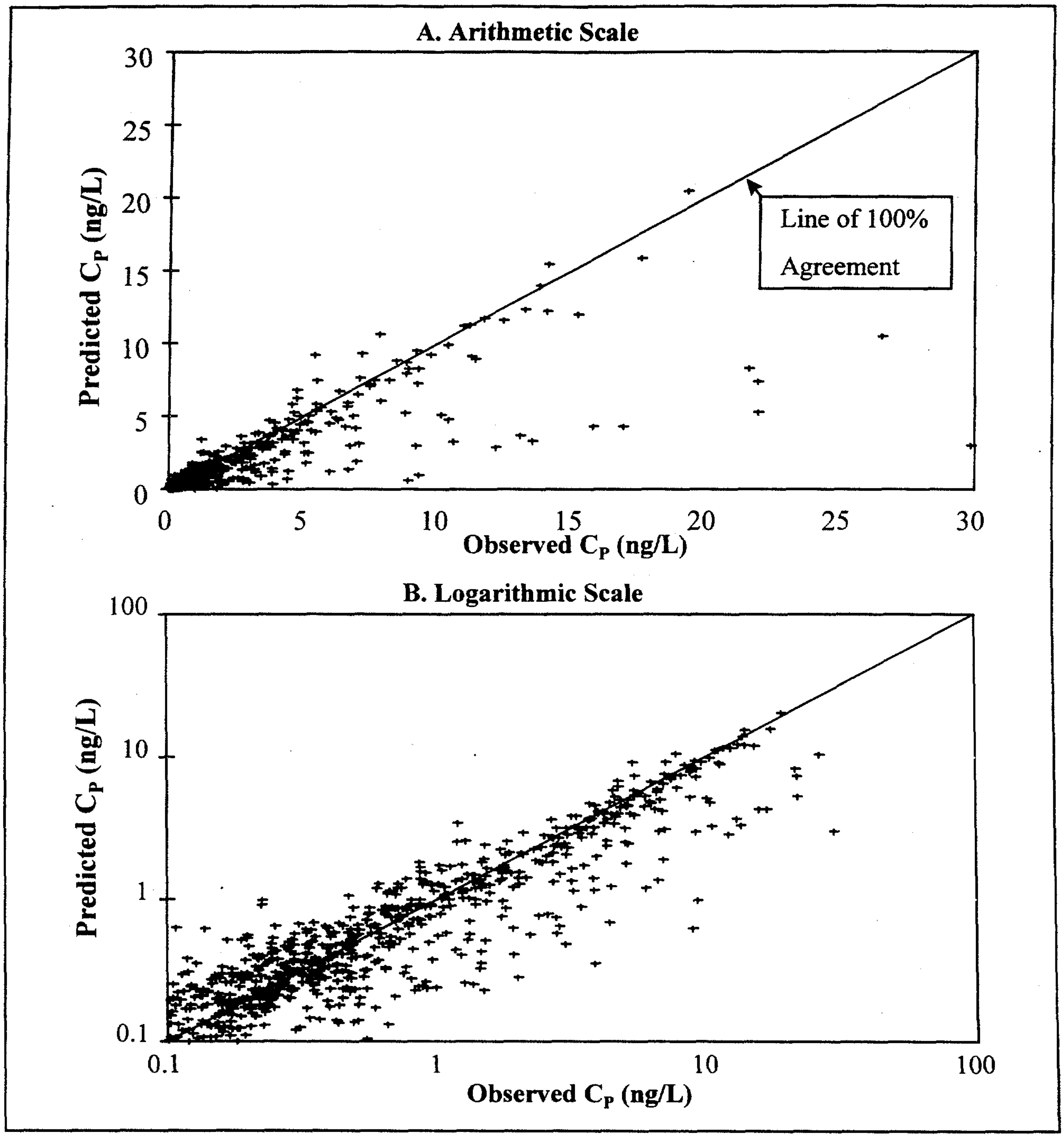


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

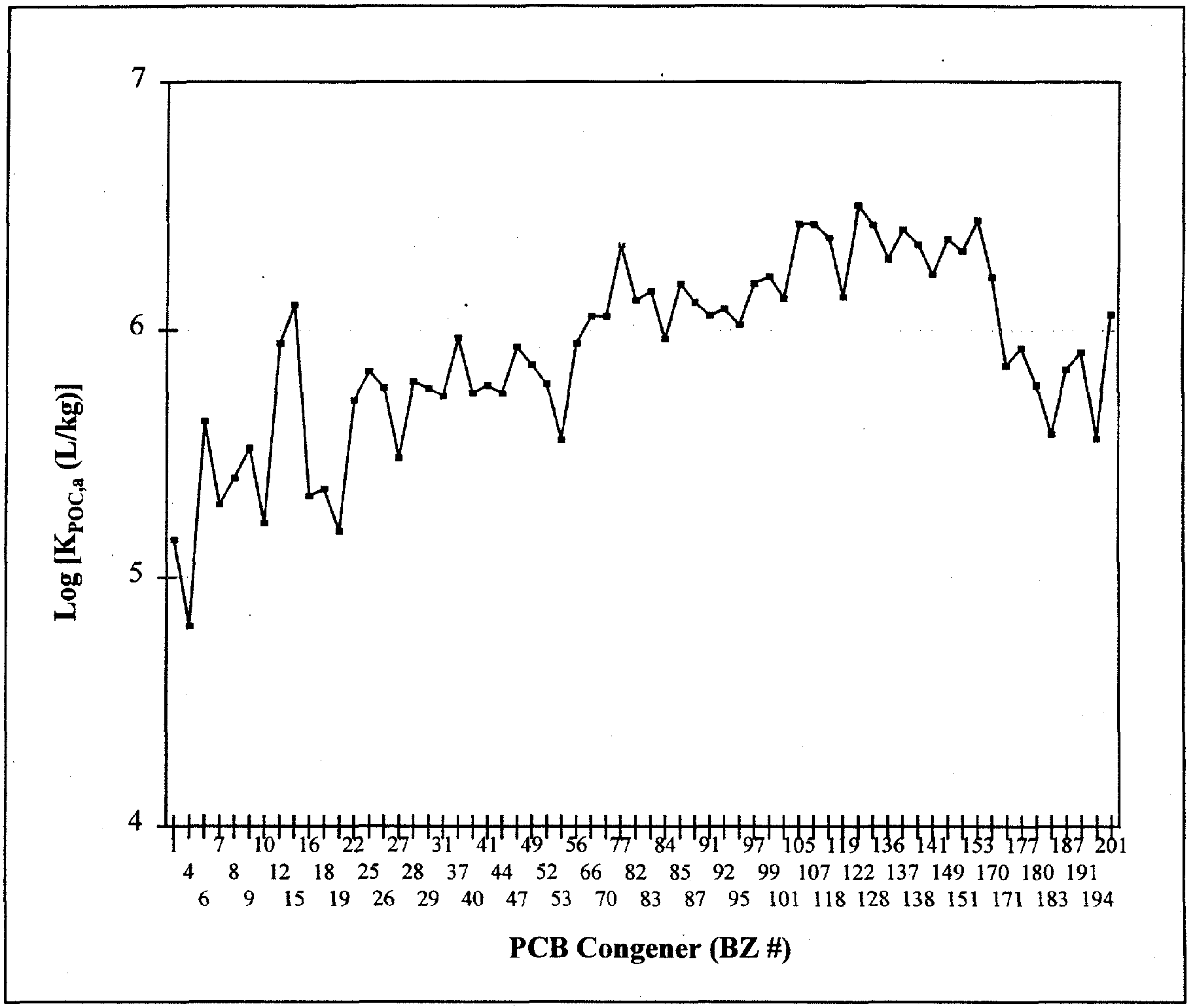
HRP 002 2055

Figure 3-18
Prediction of Particulate-Phase PCB Congener Concentration Using $K_{POC,a}$ with Temperature Correction



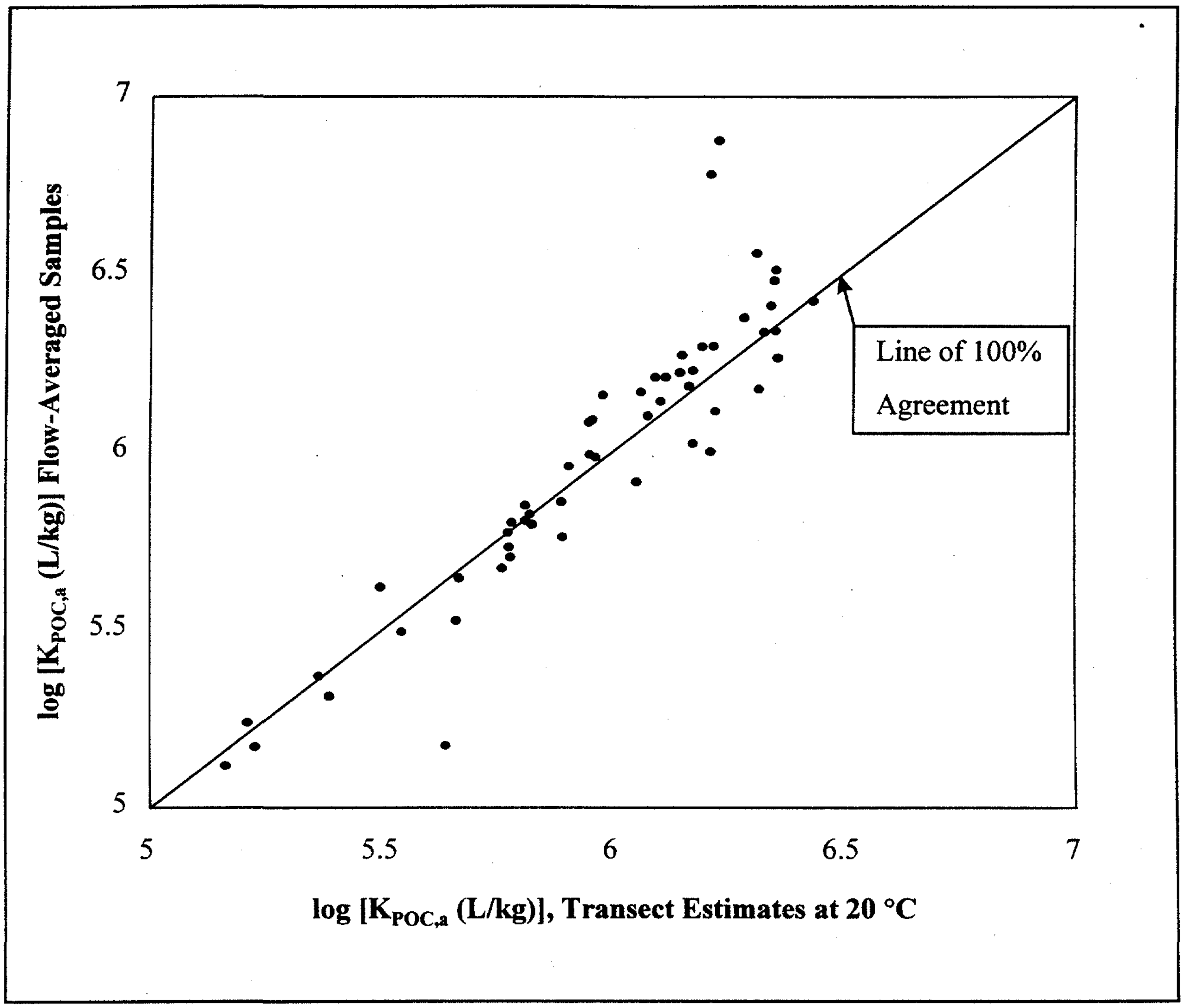
Source: TAMS/Gradient Database

Figure 3-19
Median Values of log $K_{POC,a}$ Corrected to 20 °C



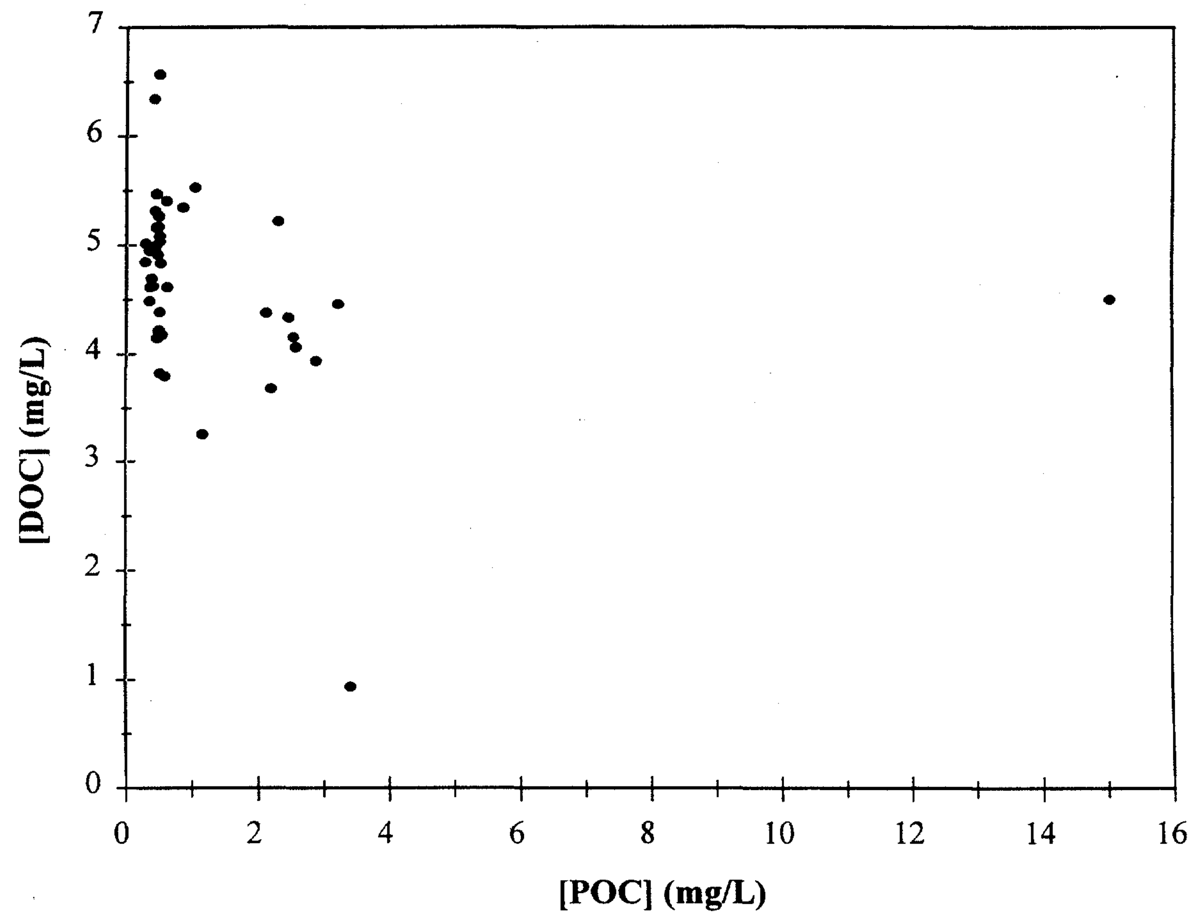
Source: TAMS/Gradient Database

Figure 3-20
PCB Congener $K_{POC,a}$ Estimates for Hudson River Flow-Averaged vs. Transect Samples



Source: TAMS/Gradient Database

Figure 3-21
Relationship of Dissolved and Particulate Organic Carbon Concentrations in Upper Hudson River Transect Samples

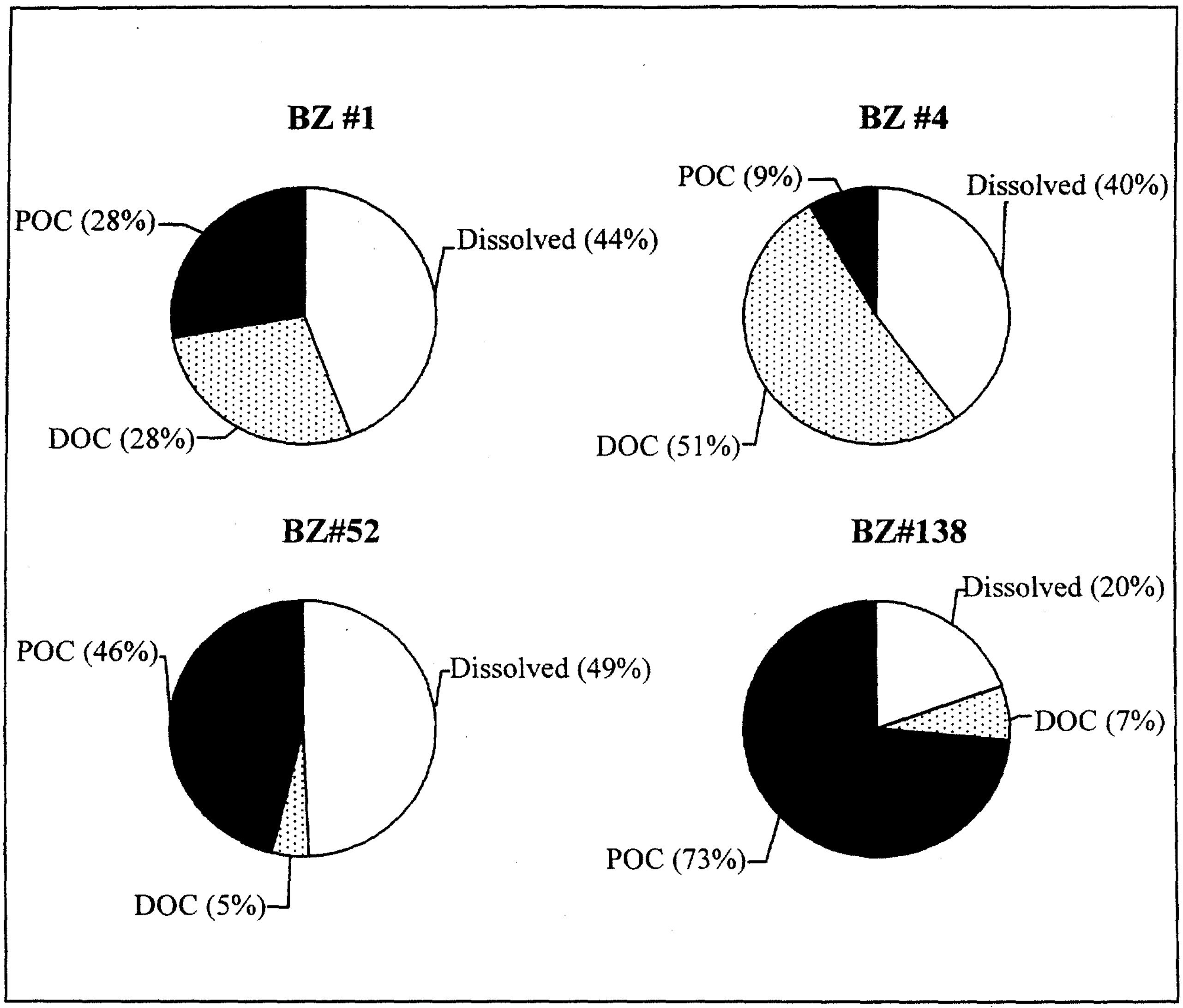


Note: [POC] calculated from weight-loss-on-ignition data.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

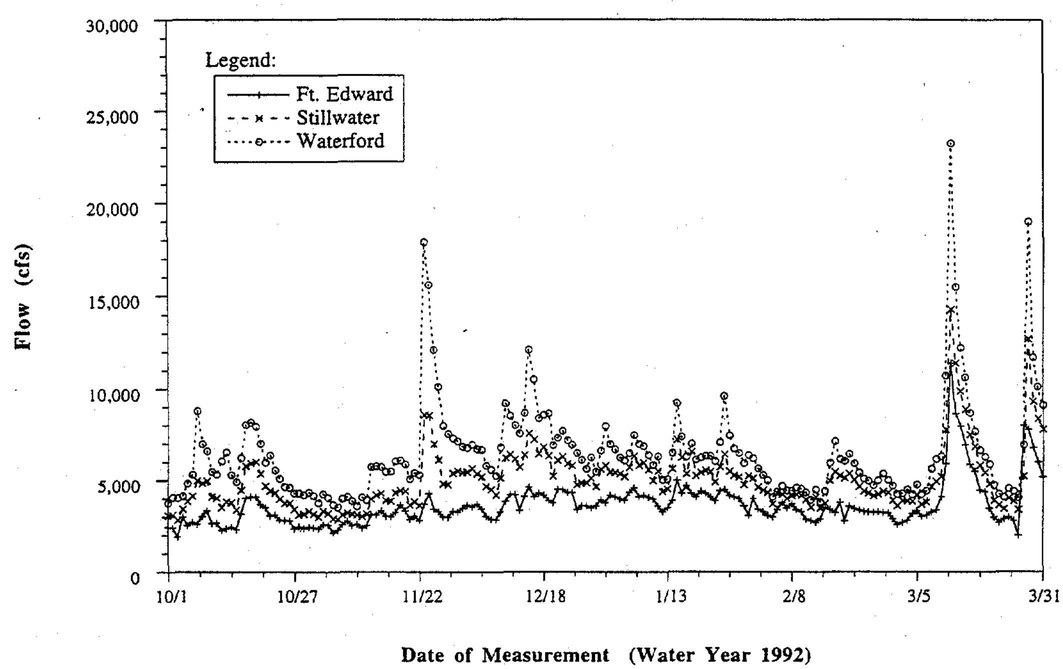
Figure 3-22
Estimated Average Percent Distribution of PCB Congeners among Dissolved, POC, and DOC Phases in Upper Hudson River Water-Column Transect Data



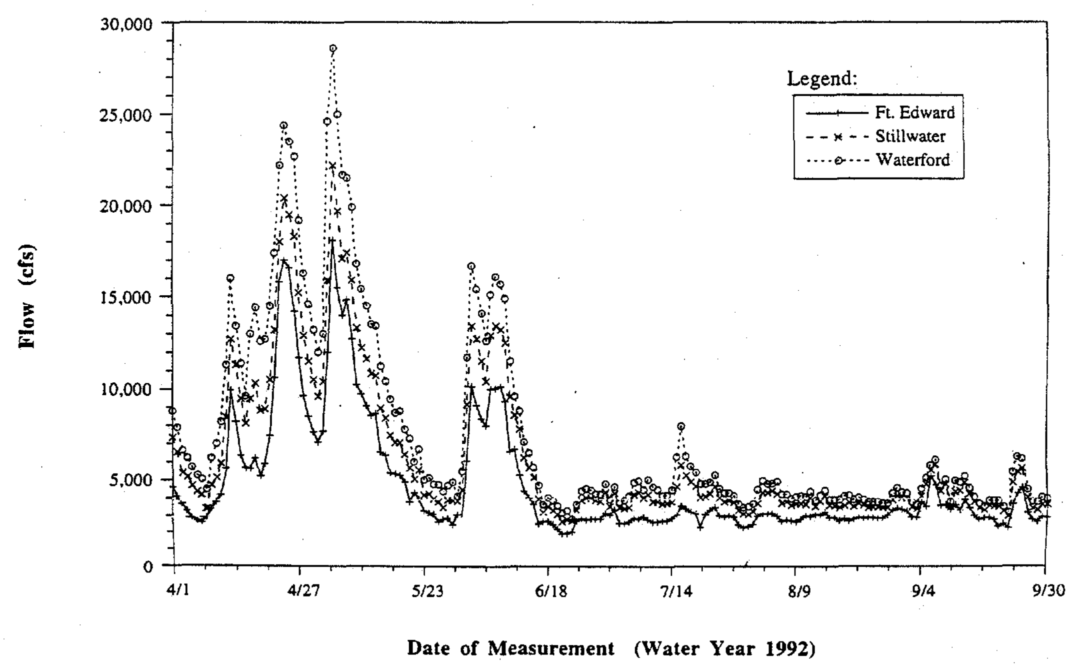
Note: Percentages calculated at mean concentrations observed in Upper Hudson River of DOC = 4.79 mg/L and POC = 1.40 mg/L.

Source: TAMS/Gradient Database

Flow Reported by the USGS for October 1, 1991 through March 31, 1992



Flow Reported by the USGS for April 1, 1992 through September 30, 1992

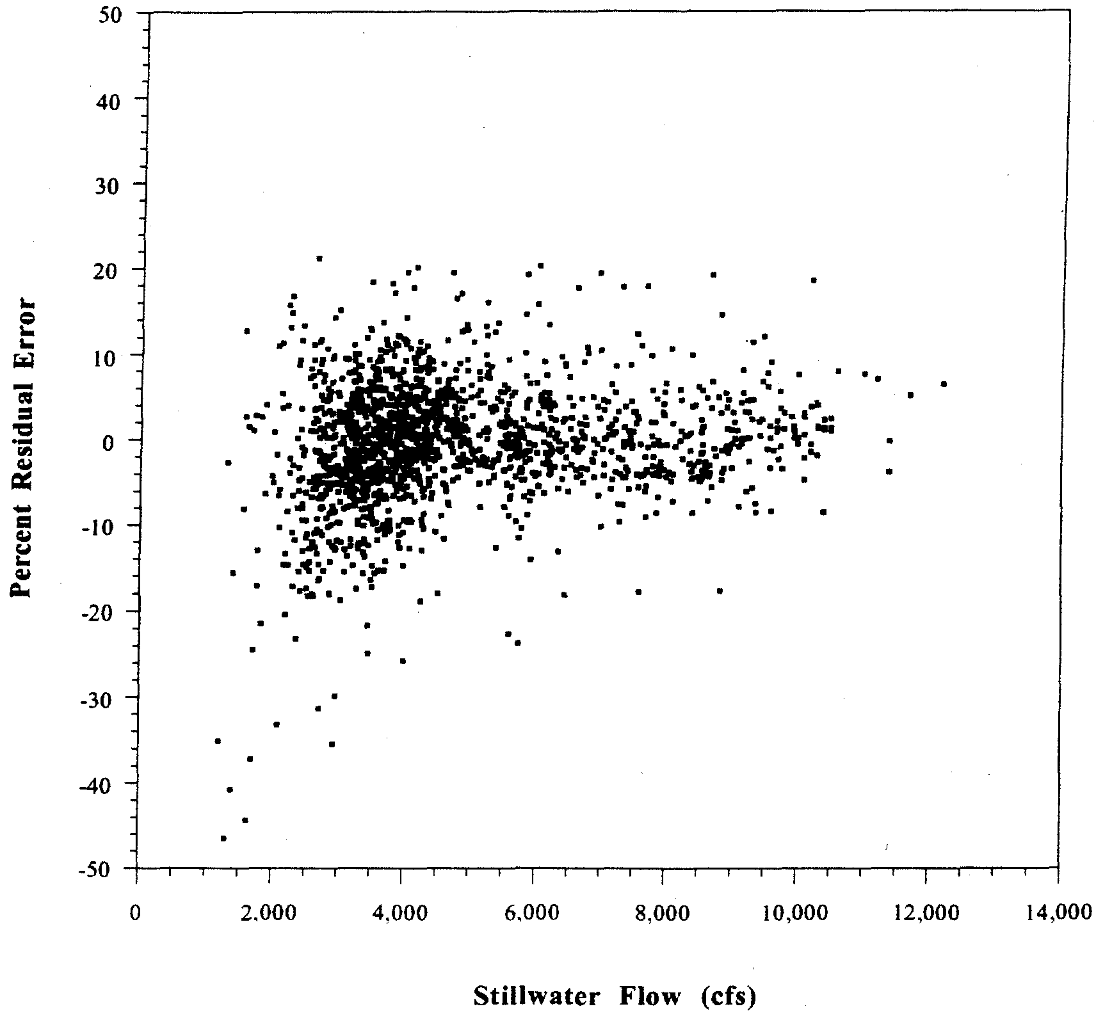


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2061

Figure 3-23
Comparison of USGS Measured Flows at Fort Edward, Stillwater and Waterford for Water Year 1992



Notes:

a. For Stillwater Flow ≤ 4,000 cfs:
97.5% Quantile = 12.2%
2.5% Quantile = -18.5%

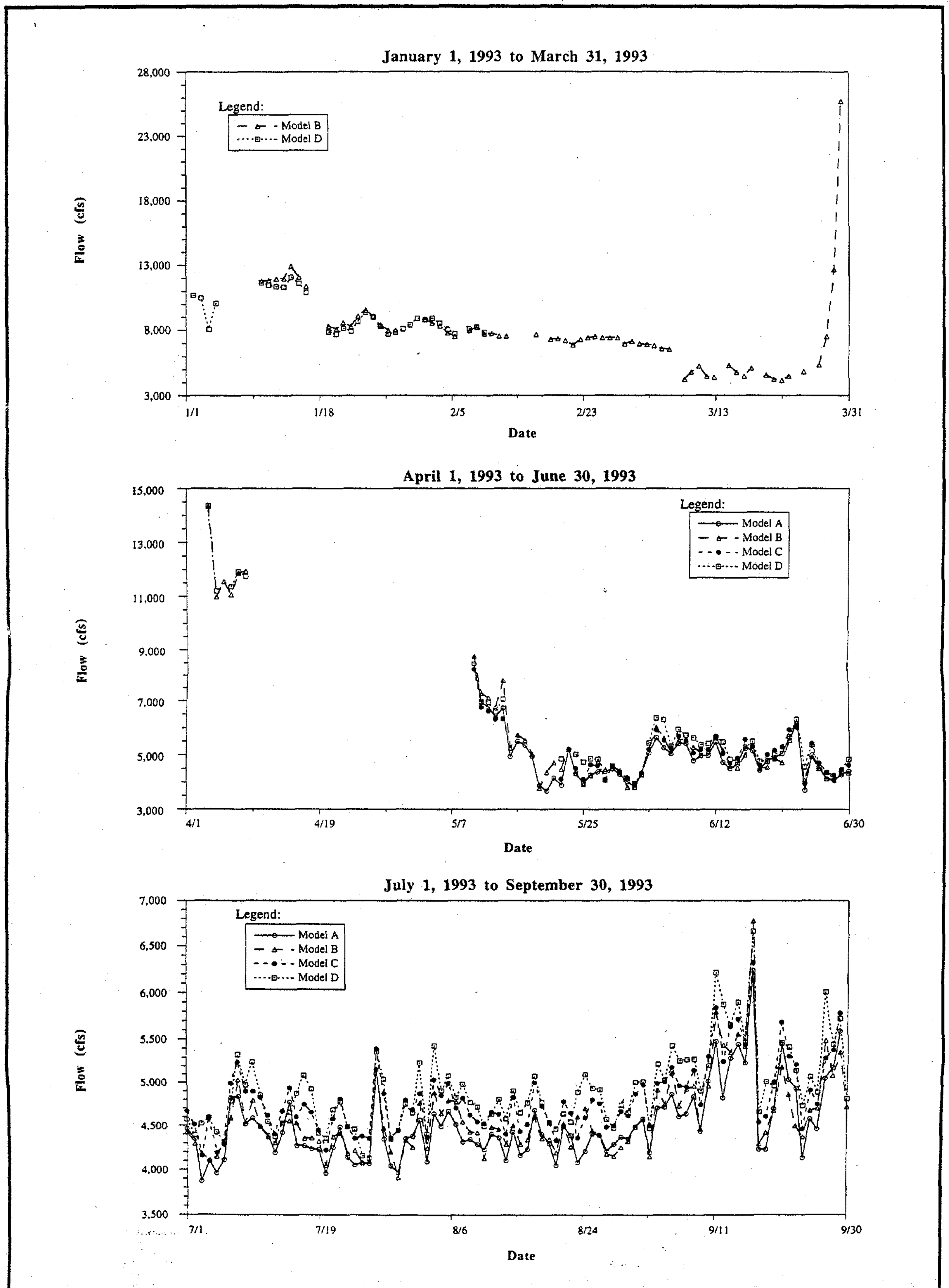
b. For 4,000 cfs < Stillwater Flow ≤ 6,000 cfs:
97.5% Quantile = 13.5%
2.5% Quantile = -10.8%

c. For Stillwater Flow > 6,000 cfs:
97.5% Quantile = 11.2%
2.5% Quantile = -8.5%

Source: NYS Thruway Authority, Office of Canals (1994)

TAMS/Cadmus/Gradient

Figure 3-24
Stillwater Low-Flow Model C Prediction Uncertainty as a Function of Stillwater Flow

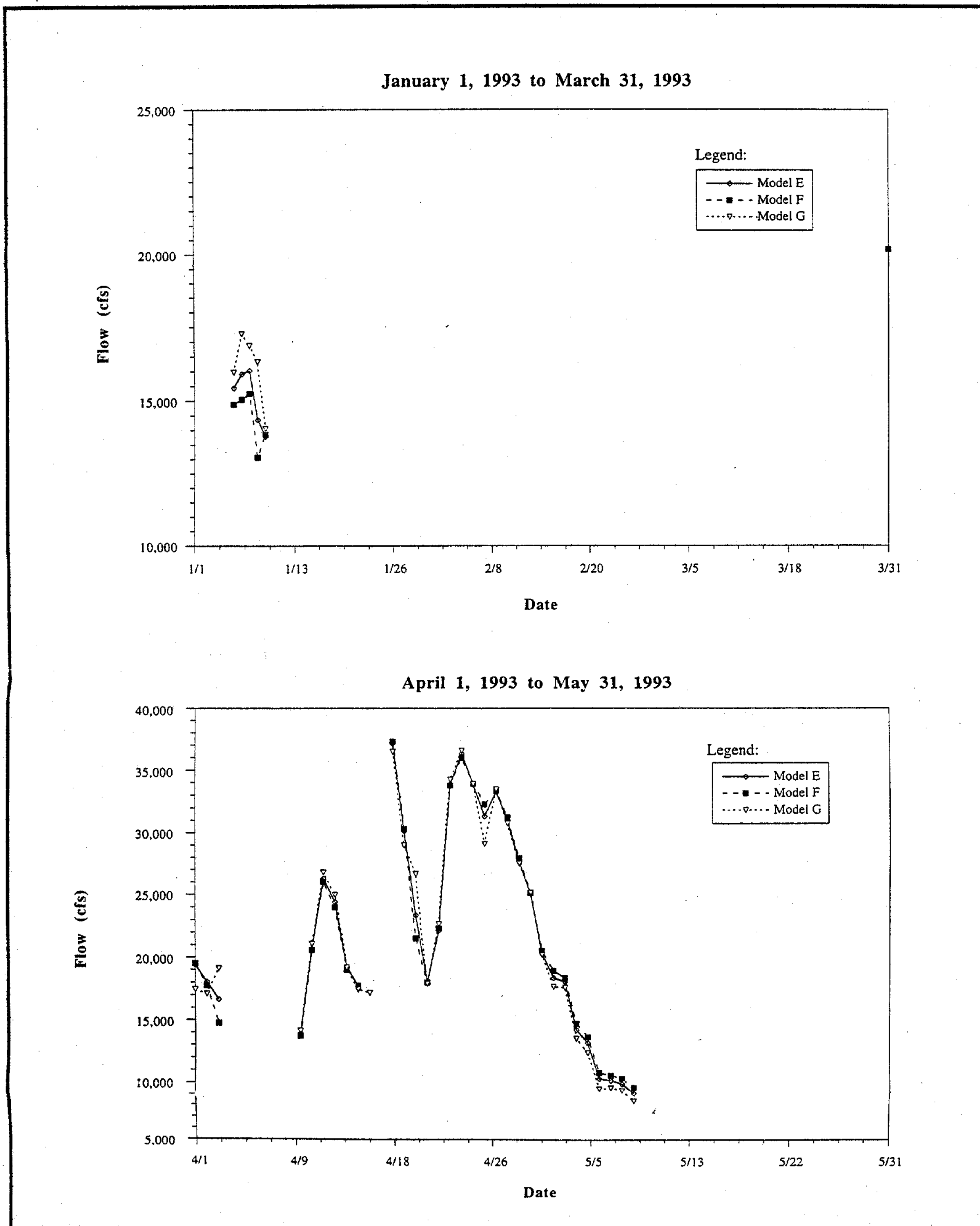


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2063

Figure 3-25
Comparison of Flows Predicted by Stillwater
Low•Flow Models (Fort Edward Flow ≤ 8,000 cfs)

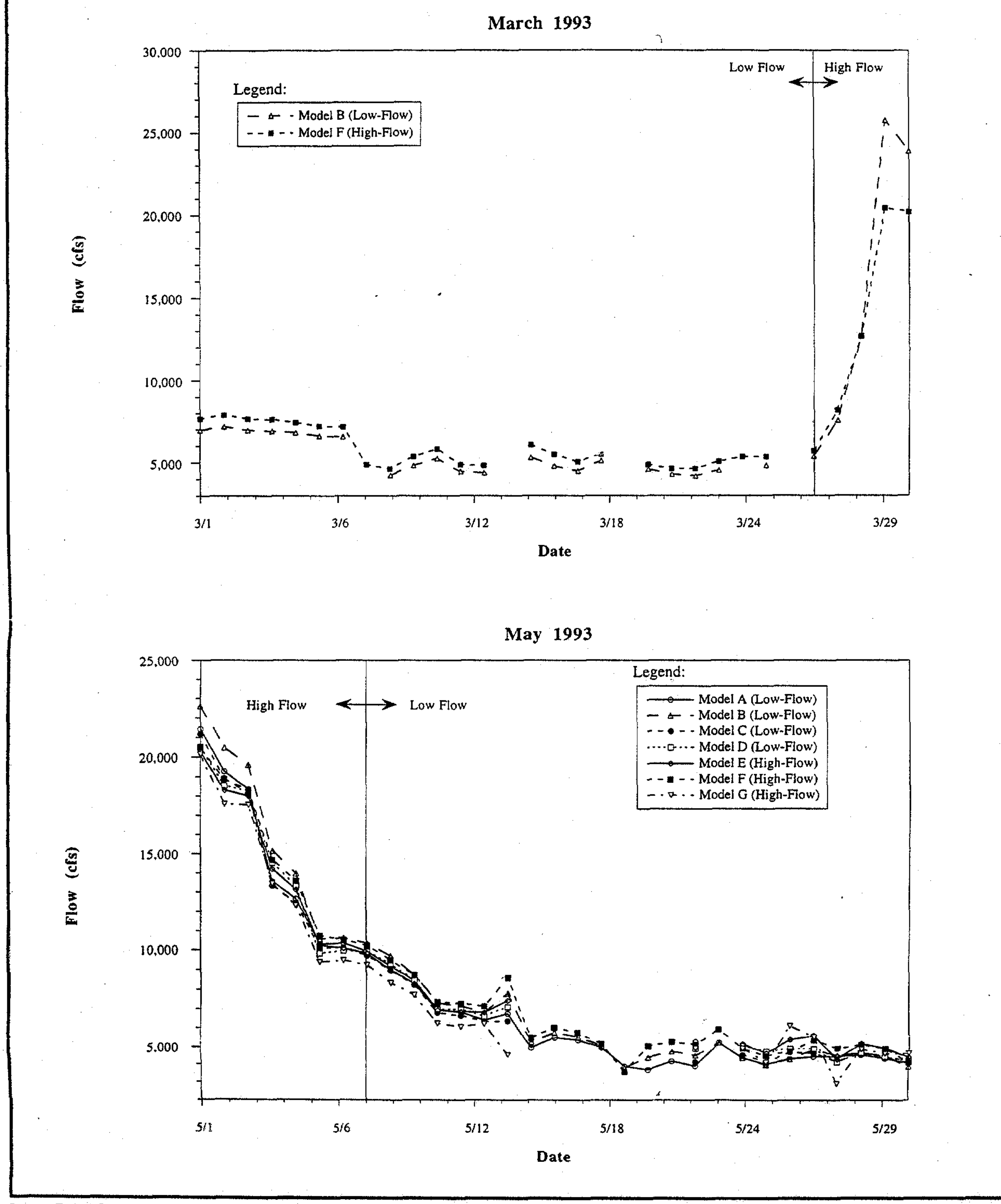


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2064

Figure 3-26
Comparison of Flows Predicted by Stillwater
High-Flow (Fort Edward Flow > 8,000 cfs) Models

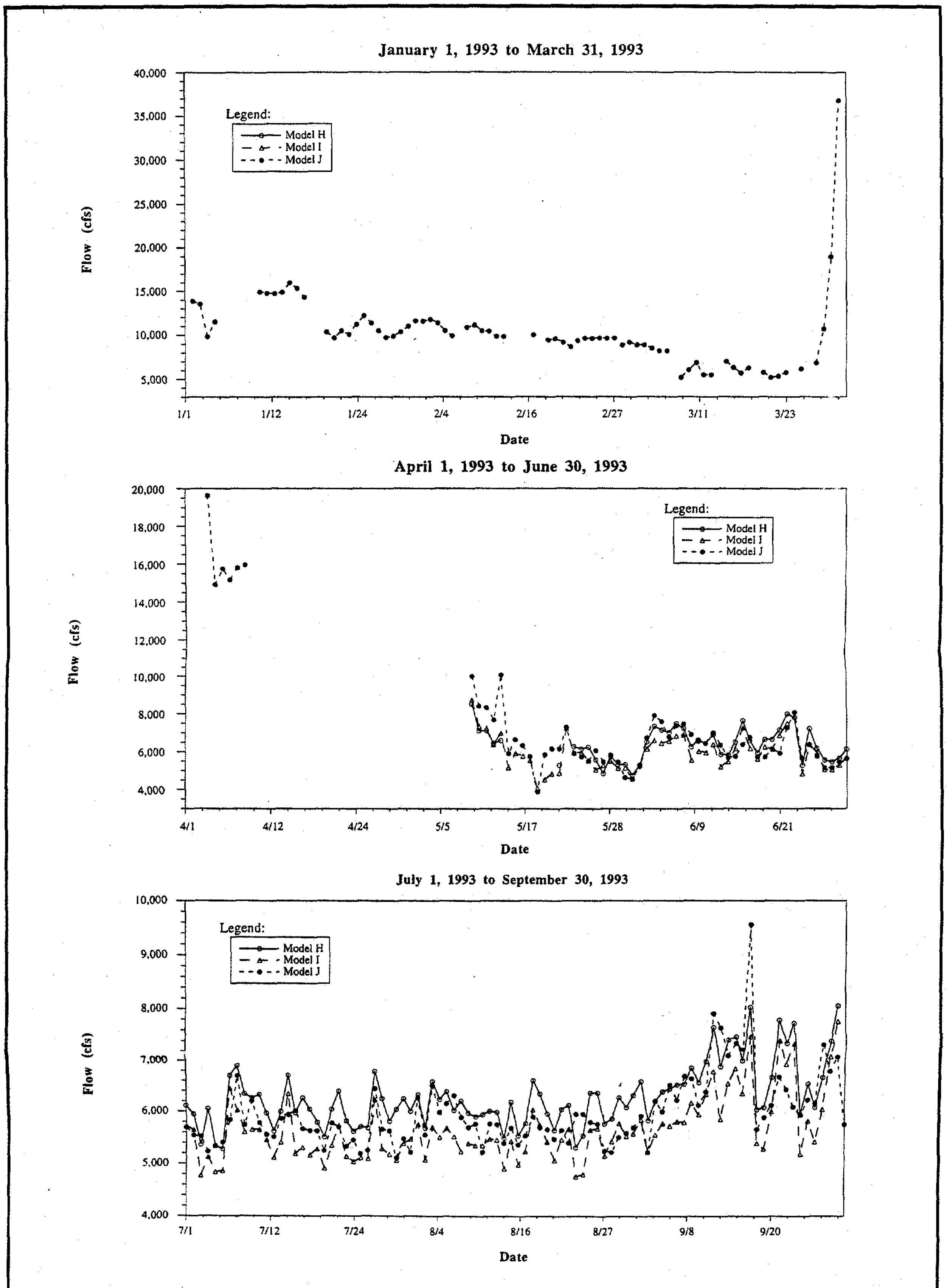


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2065

Figure 3-27
Comparison of Flows Predicted by Stillwater Low-Flow (Fort Edward Flow ≤ 8,000 cfs) and Stillwater High-Flow (Fort Edward Flow > 8,000 cfs) Models

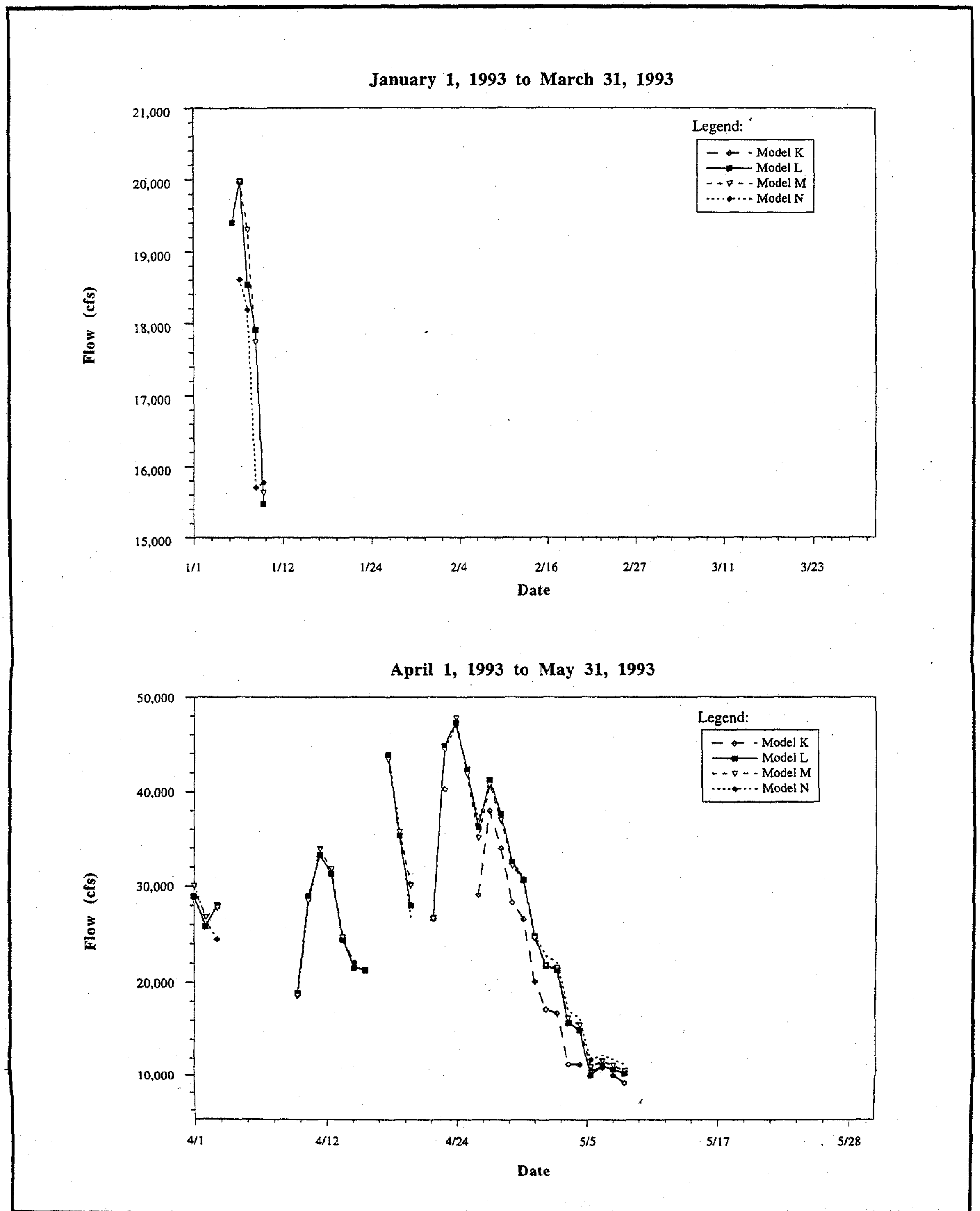


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-28
Comparison of Flows Predicted by Waterford Low-Flow (Fort Edward Flow ≤ 8,000 cfs) Models

HRP 002 2066

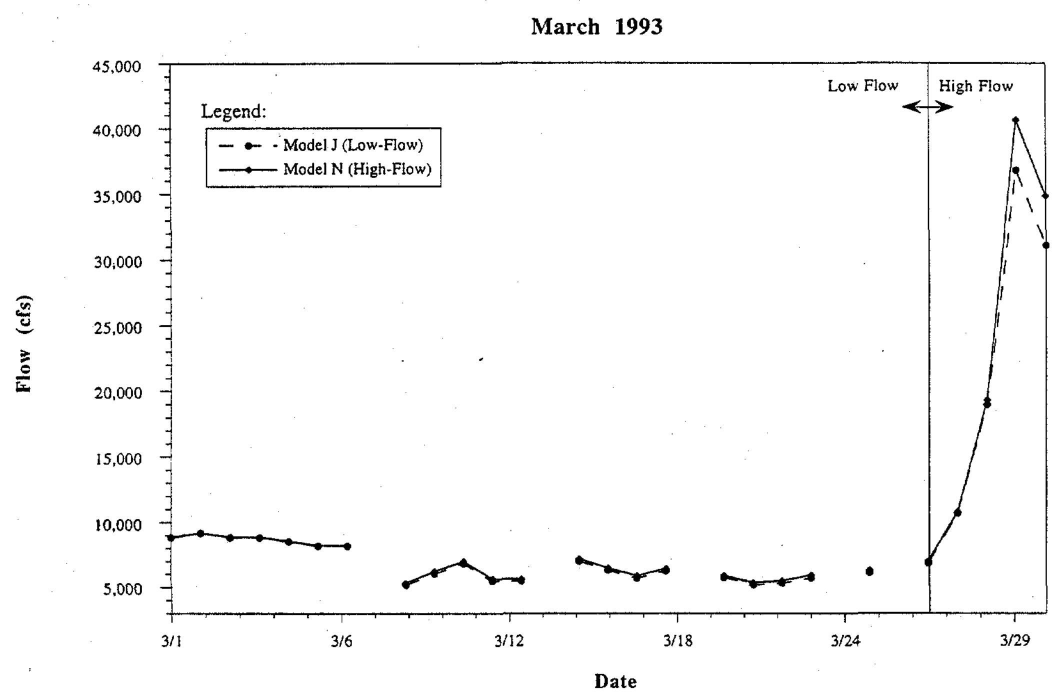


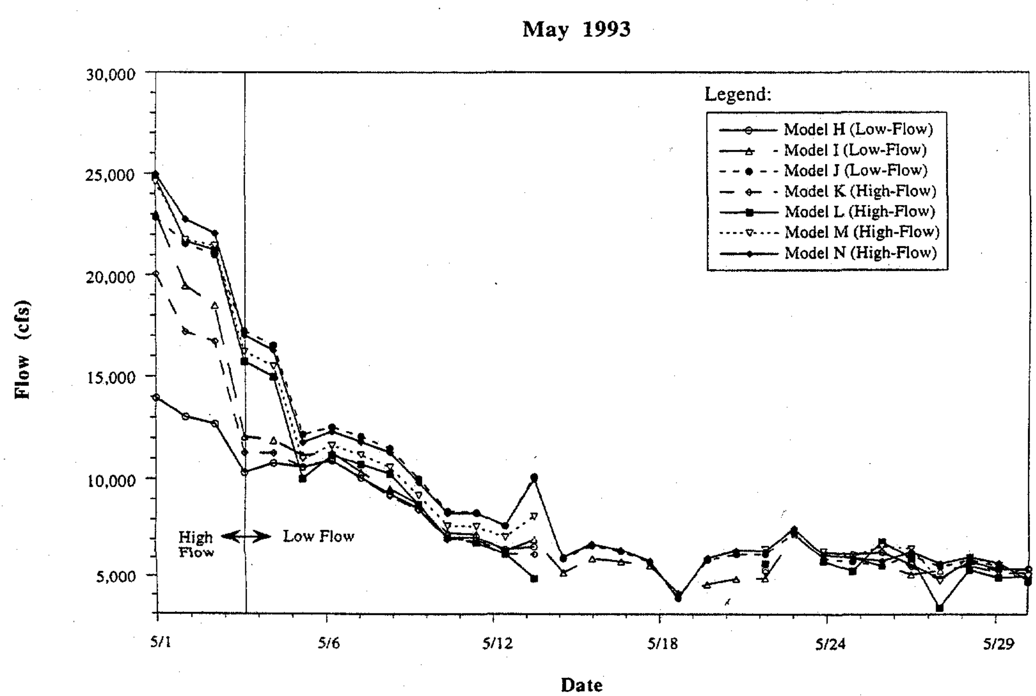
Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2067

Figure 3-29
Comparison of Flows Predicted by Waterford High-Flow (Fort Edward Flow > 8,000 cfs) Models



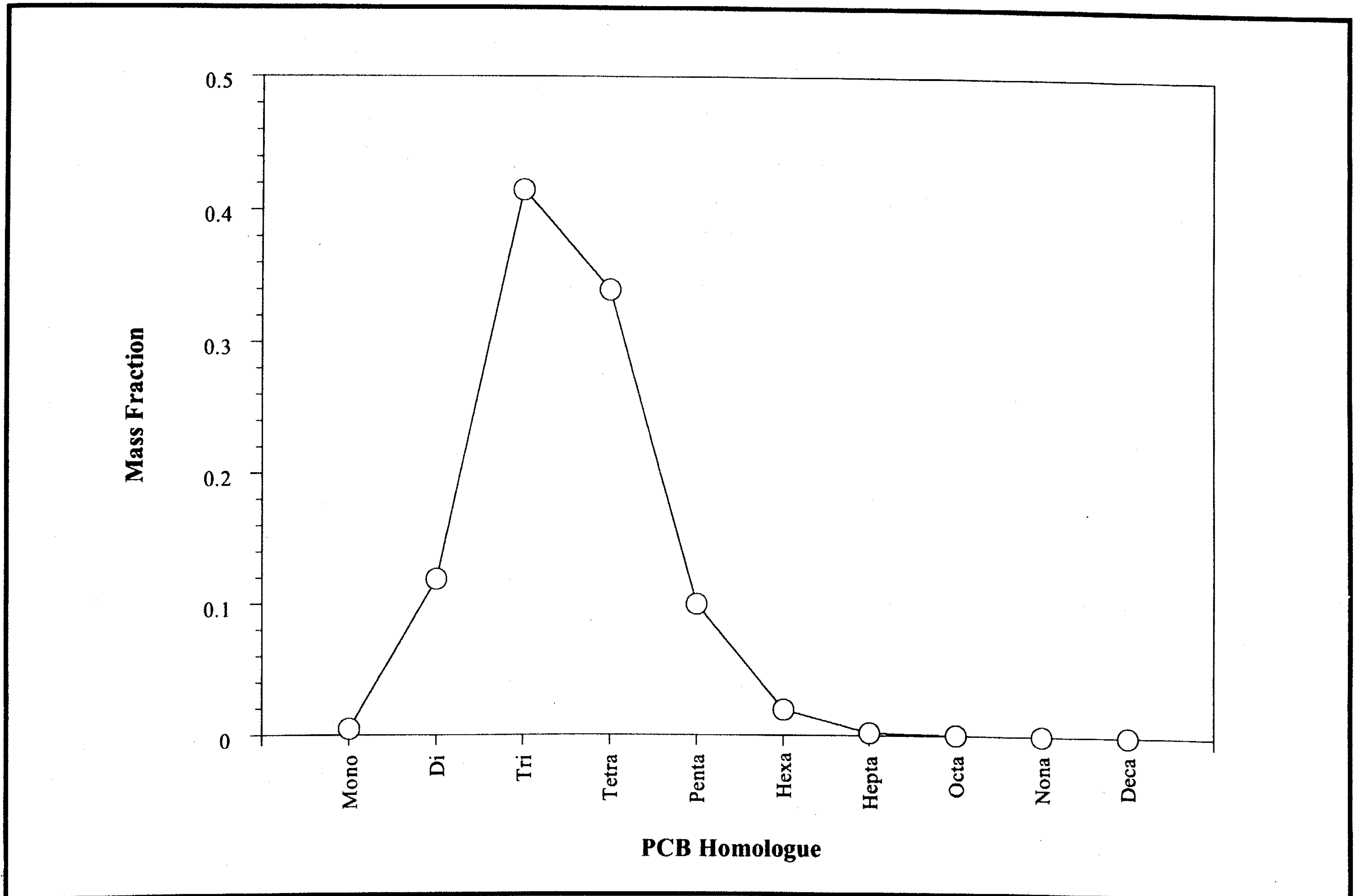


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2068

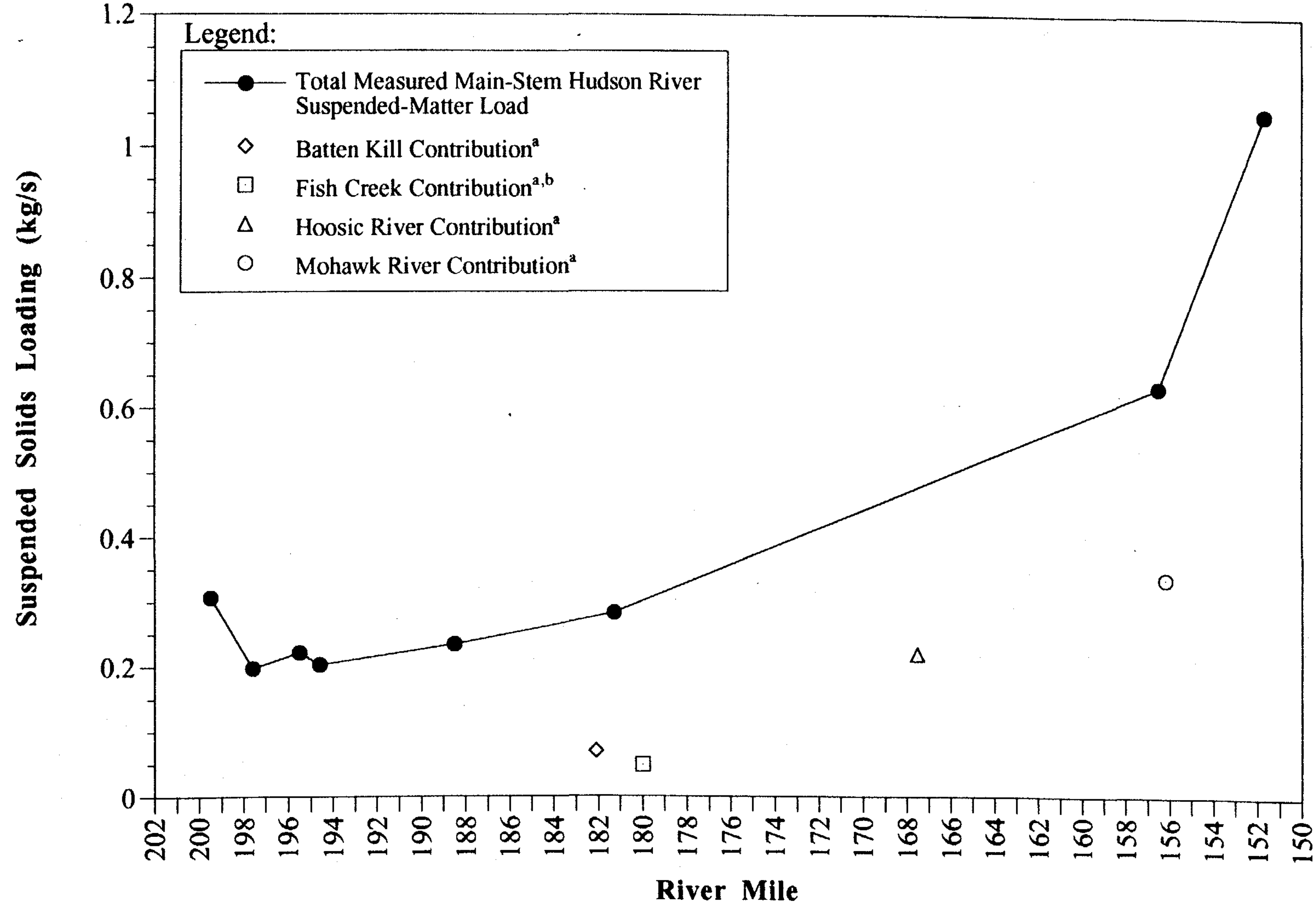
Figure 3-30
Comparison of Flows Predicted by Waterford Low-Flow (Fort Edward Flow ≤ 8,000 cfs) Models and Waterford High-Flow (Fort Edward Flow > 8,000 cfs) Models



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-31
Homologue Distribution of the GE Hudson Falls Facility Source as Characterized by the Transect 1 Remnant Deposit Area (RM 195.8) Sample



Source: TAMS/Gradient Database, USGS (1993a, 1993b), and NYS Thruway Authority, Office of Canals (1994a, 1993)

TAMS/Cadmus/Gradient

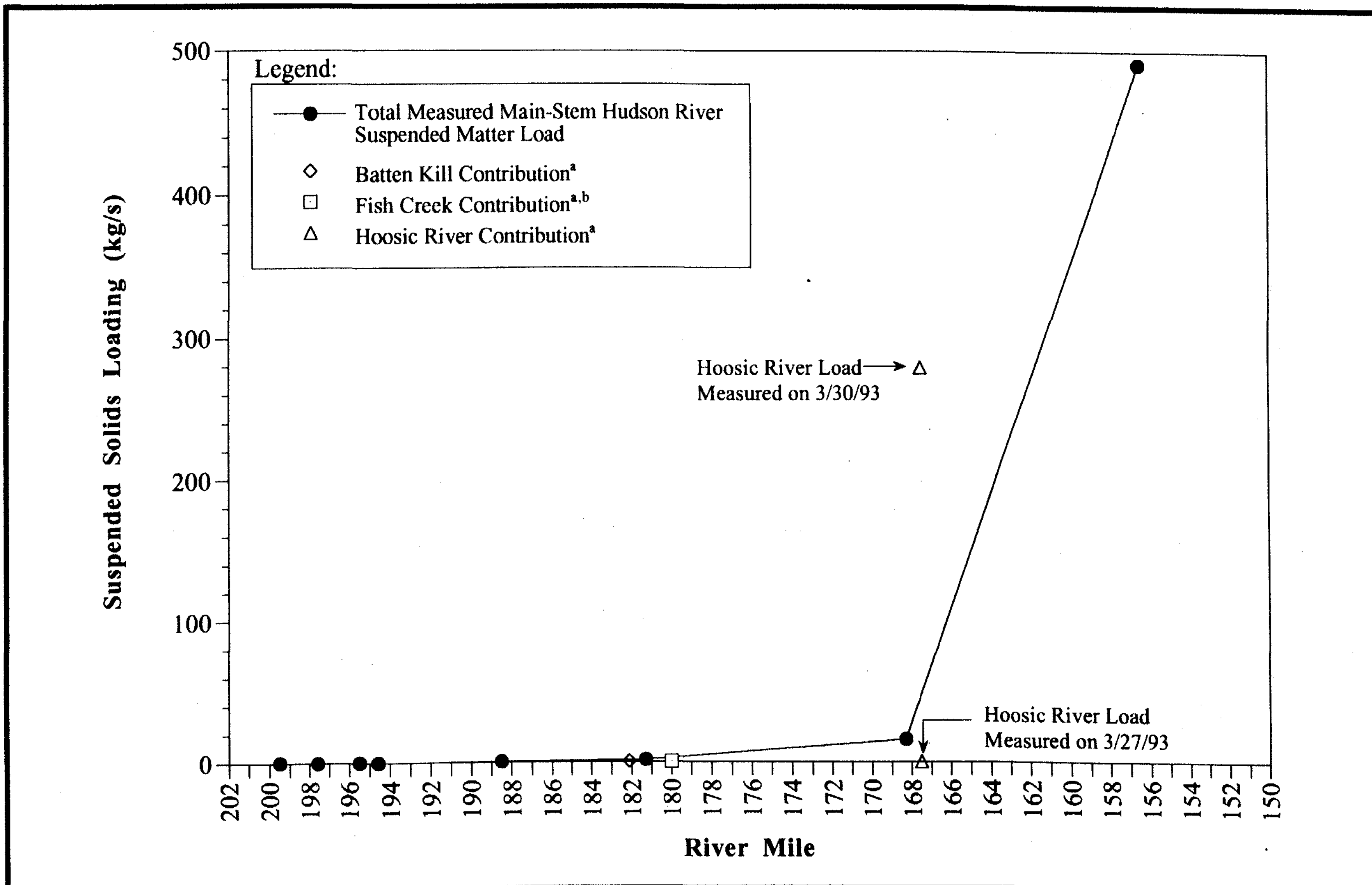
Note:

a) Tributary river mile designations correspond to point of confluence with the Hudson River.

b) Fish Creek suspended matter load is estimated using the suspended solids value for the Batten Kill and a flow estimate based on drainage basin area.

Figure 3-32

Suspended-Matter Loading in the Upper Hudson River - Transect 1 Low-Flow Conditions

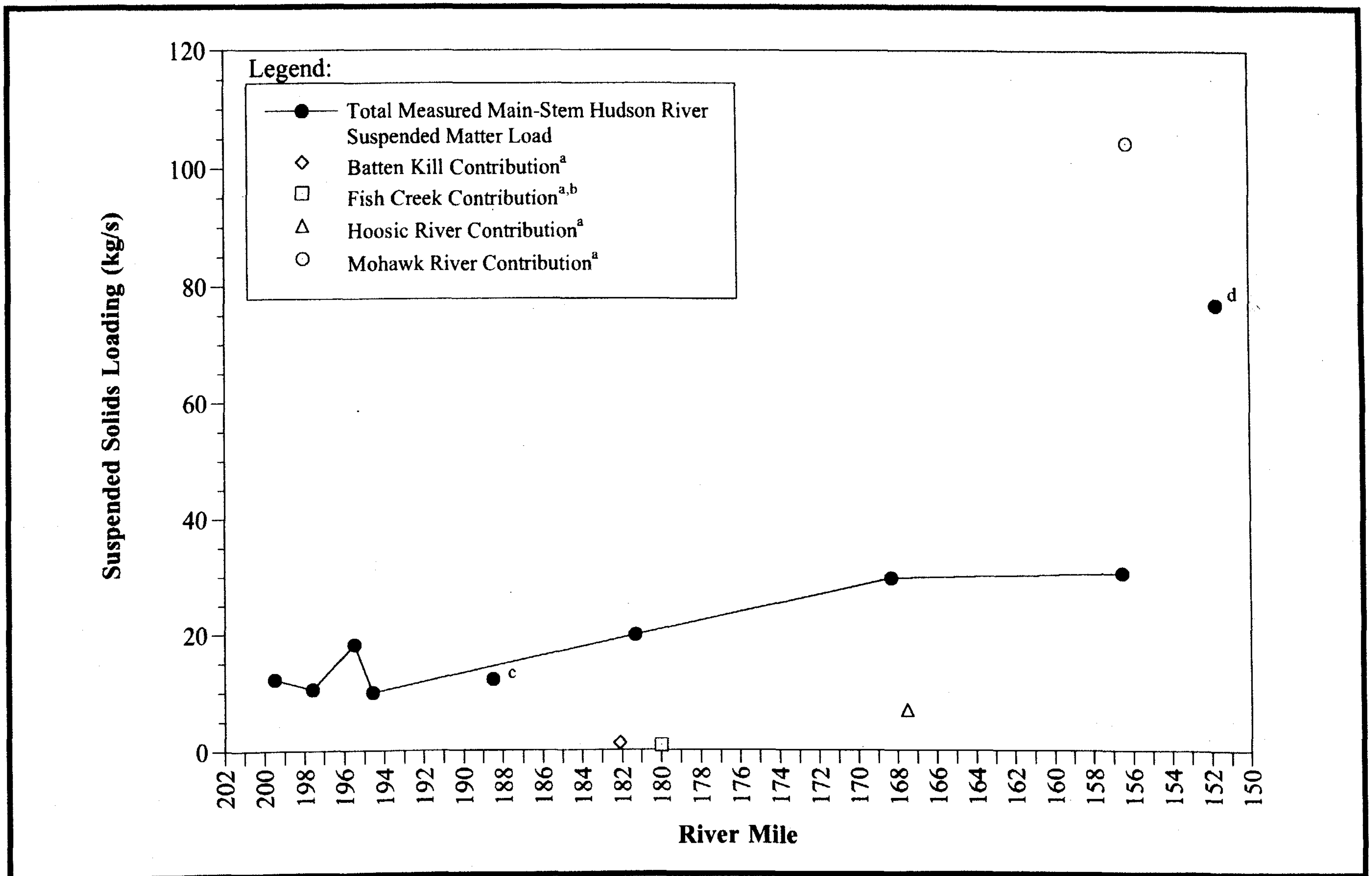


Source: TAMS/Gradient Database, USGS (1993a, 1993b), and NYS Thruway Authority, Office of Canals (1994a, 1993) TAMS/Cadmus/Gradient

Note:

a) Tributary river mile designations correspond to point of confluence with the Hudson River.
b) Fish Creek suspended matter load is estimated using the suspended solids value for the Batten Kill and a flow estimate based on drainage basin area.
c) Scour Event due to onset of spring flood event in lower part of the Upper River.

Figure 3-33
Suspended-Matter Loading in the Upper Hudson River



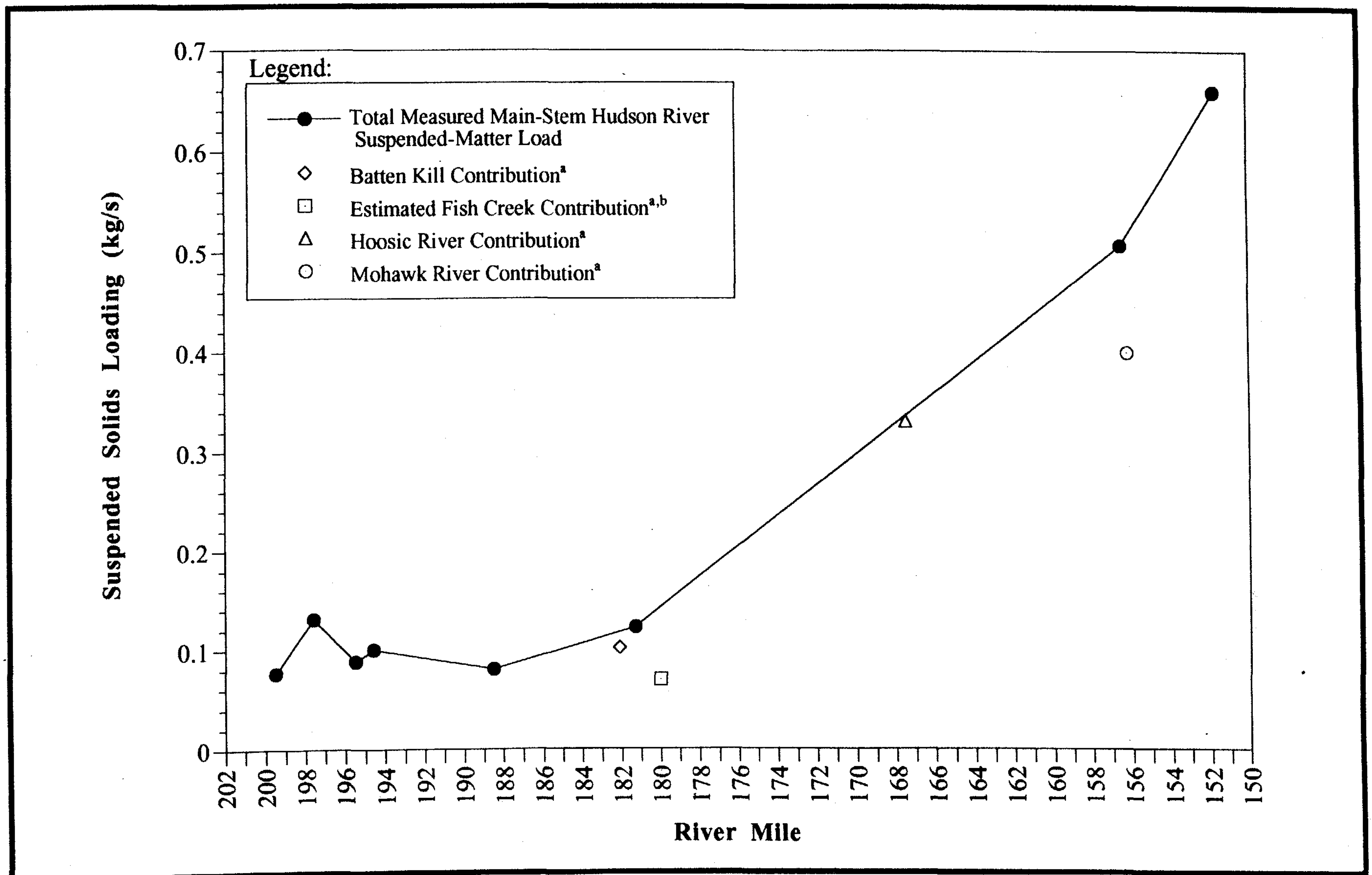
Source: TAMS/Gradient Database, USGS (1993a, 1993b), and NYS Thruway Authority, Office of Canals (1994a, 1993) TAMS/Cadmus/Gradient

Note:

a) Tributary river mile designations correspond to point of confluence with the Hudson River.
b) Fish Creek suspended matter load is estimated using the suspended solids value for the Batten Kill and a flow estimate based on drainage basin area.
c) Sample is believed to over-represent dilution by the Moses Kill due to proximity of sampling location to Moses Kill confluence.
d) Sample is believed to over-represent upstream Main-Stem Hudson River loading due to incomplete mixing of the Mohawk River.

Figure 3-34

Suspended Matter Loading in the Upper Hudson River - Transect 4 High-Flow Conditions



Source: TAMS/Gradient Database, USGS (1993a, 1993b), and NYS Thruway Authority, Office of Canals (1994a, 1993) TAMS/Cadmus/Gradient

Note:

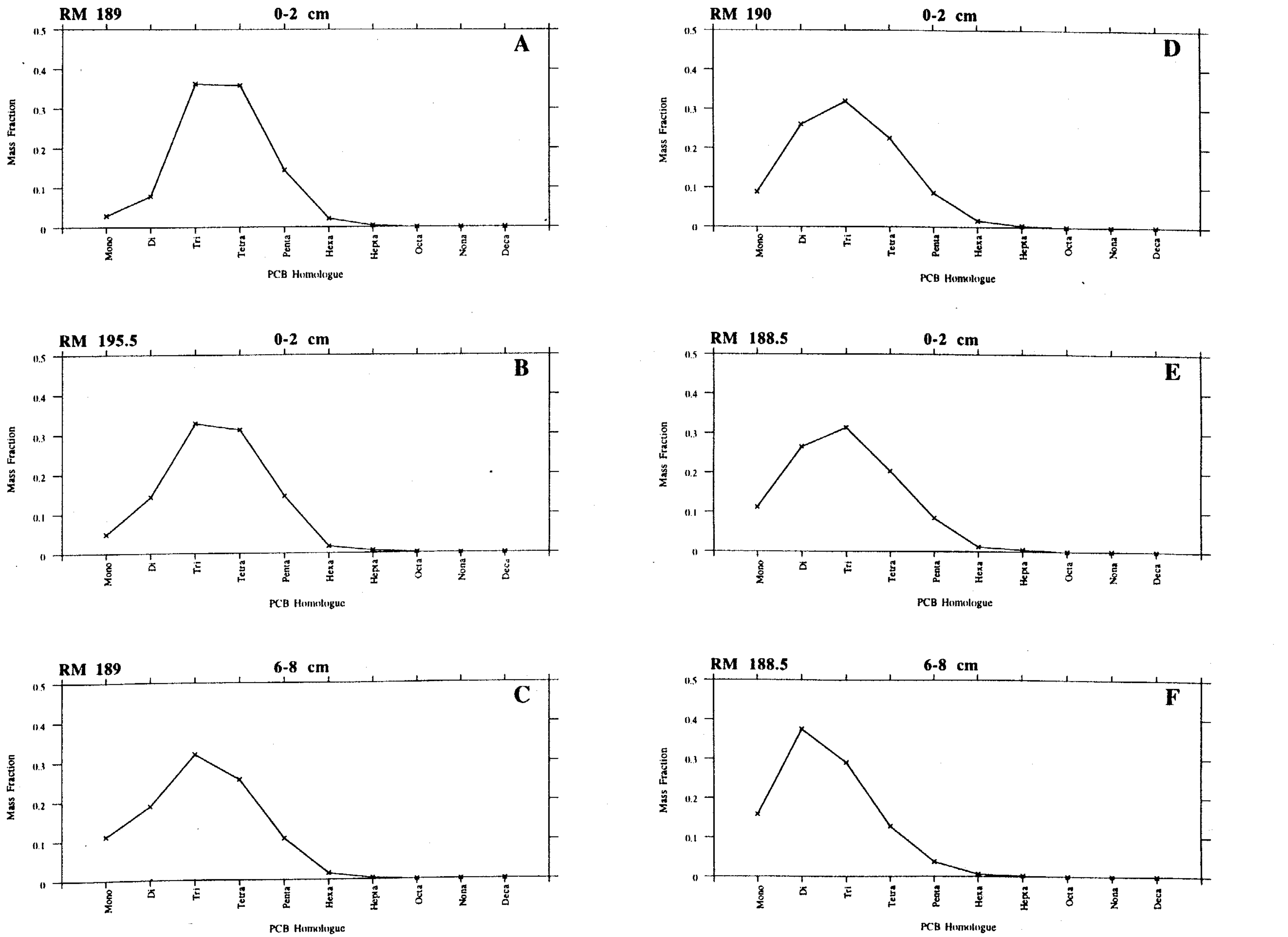
a) Tributary river mile designations correspond to point of confluence with the Hudson River.

b) Fish Creek suspended matter load is estimated using the suspended solids value for the Batten Kill and a flow estimate based on drainage basin area.

Figure 3-35

Suspended-Matter Loading in the Upper Hudson River - Transect 6 Low-Flow Conditions

HRP 002 2073

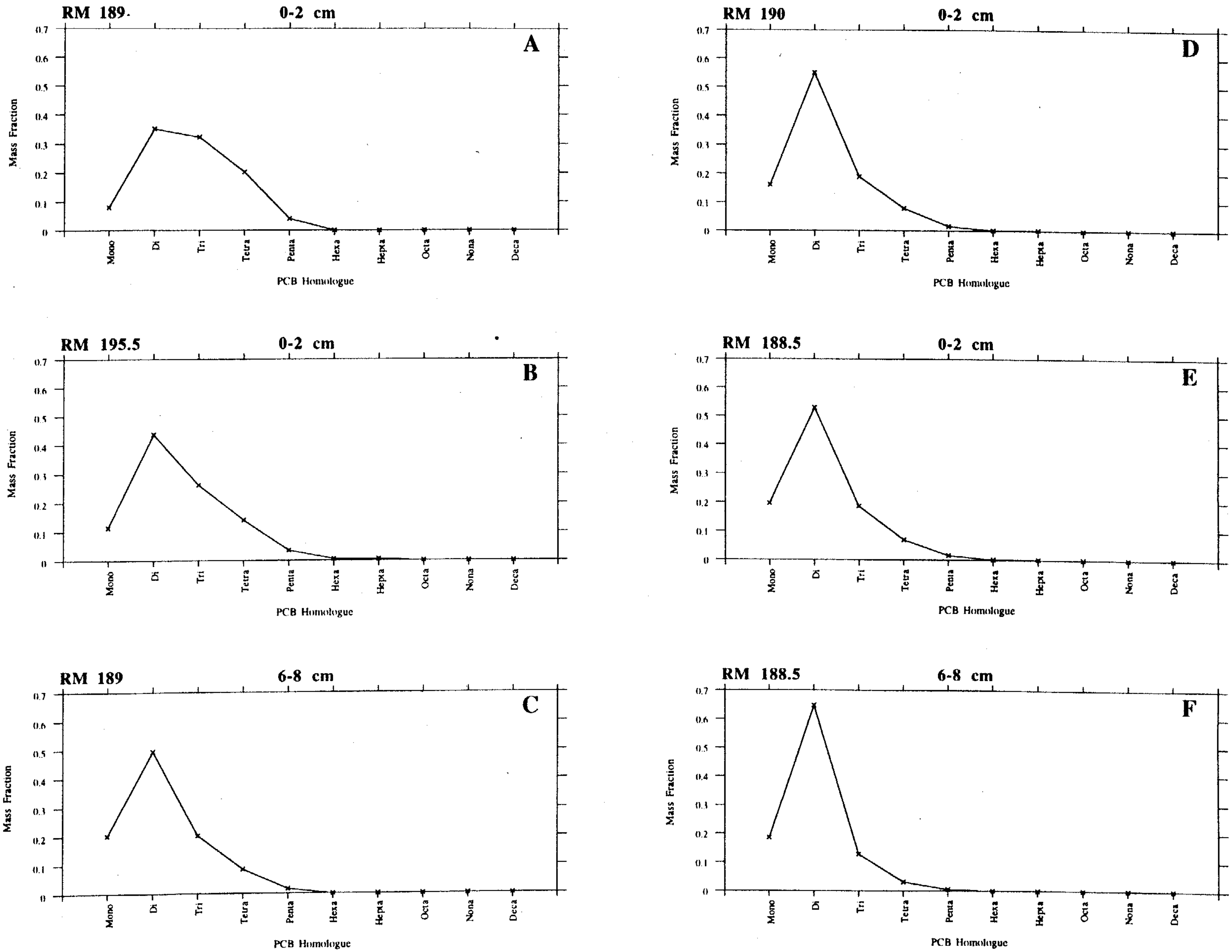


Note:
The level of dechlorination shown in the sediment distribution patterns increases from graph A through F.

Source: TAMS/Gradient Database

TAMS/Cadmus/*Gradient*

Figure 3-36
Sediment Homologue Distributions in the Thompson Island Pool

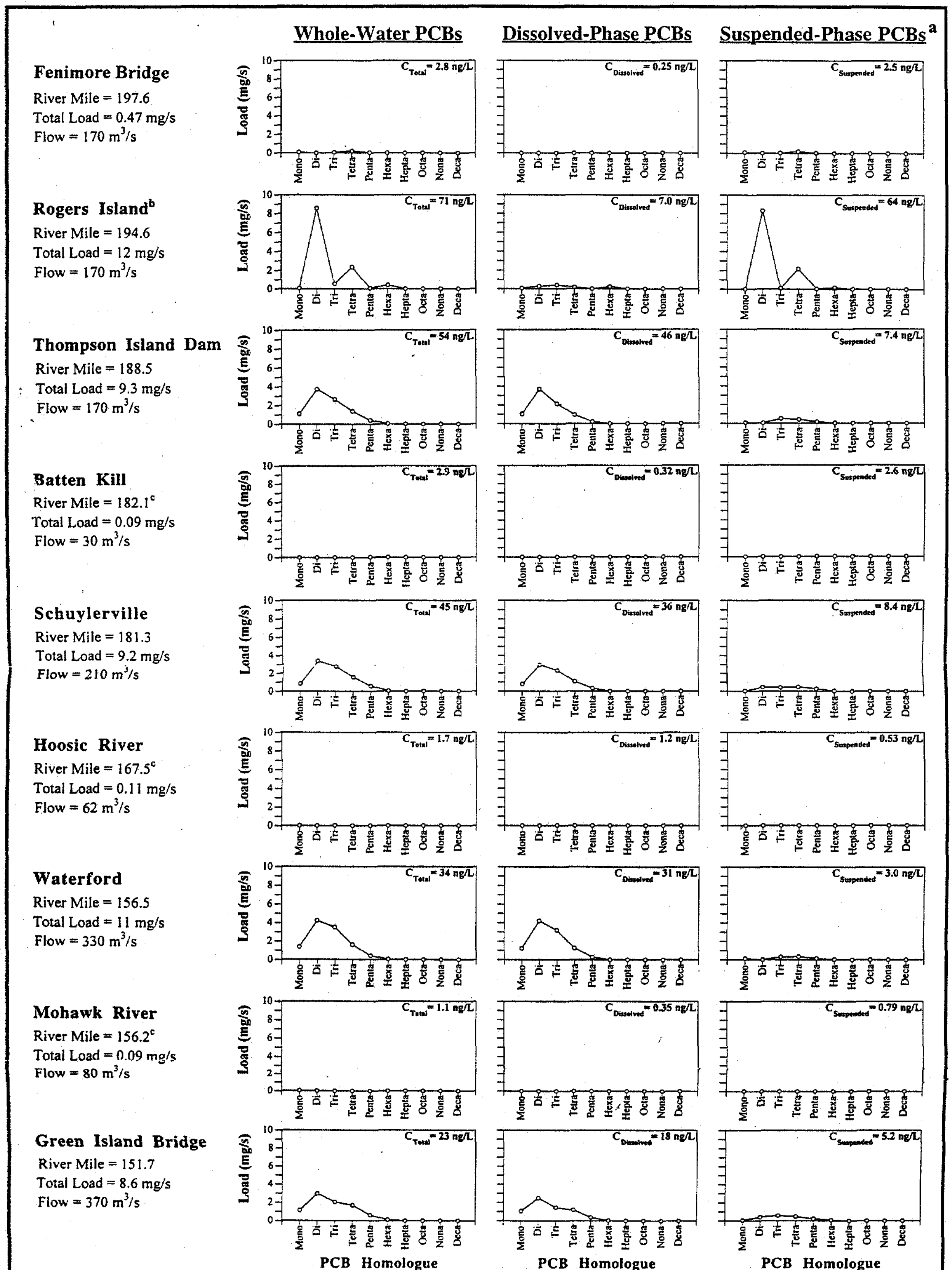


Note:
a. Mass fractions are calculated using the homologue distributions shown in Figure 3-36 and the two phase water column partition coefficients developed in Section 3.1.
b. For congeners with out partition coefficients, the median value of the homologue group was used. For Nona and Deca congeners, the median Octa value was used.

Source: TAMS/Gradient Database

TAMS/Cadmus/*Gradient*

Figure 3-37
Estimated Porewater Homologue Distributions in Sediments from the Thompson Island Pool



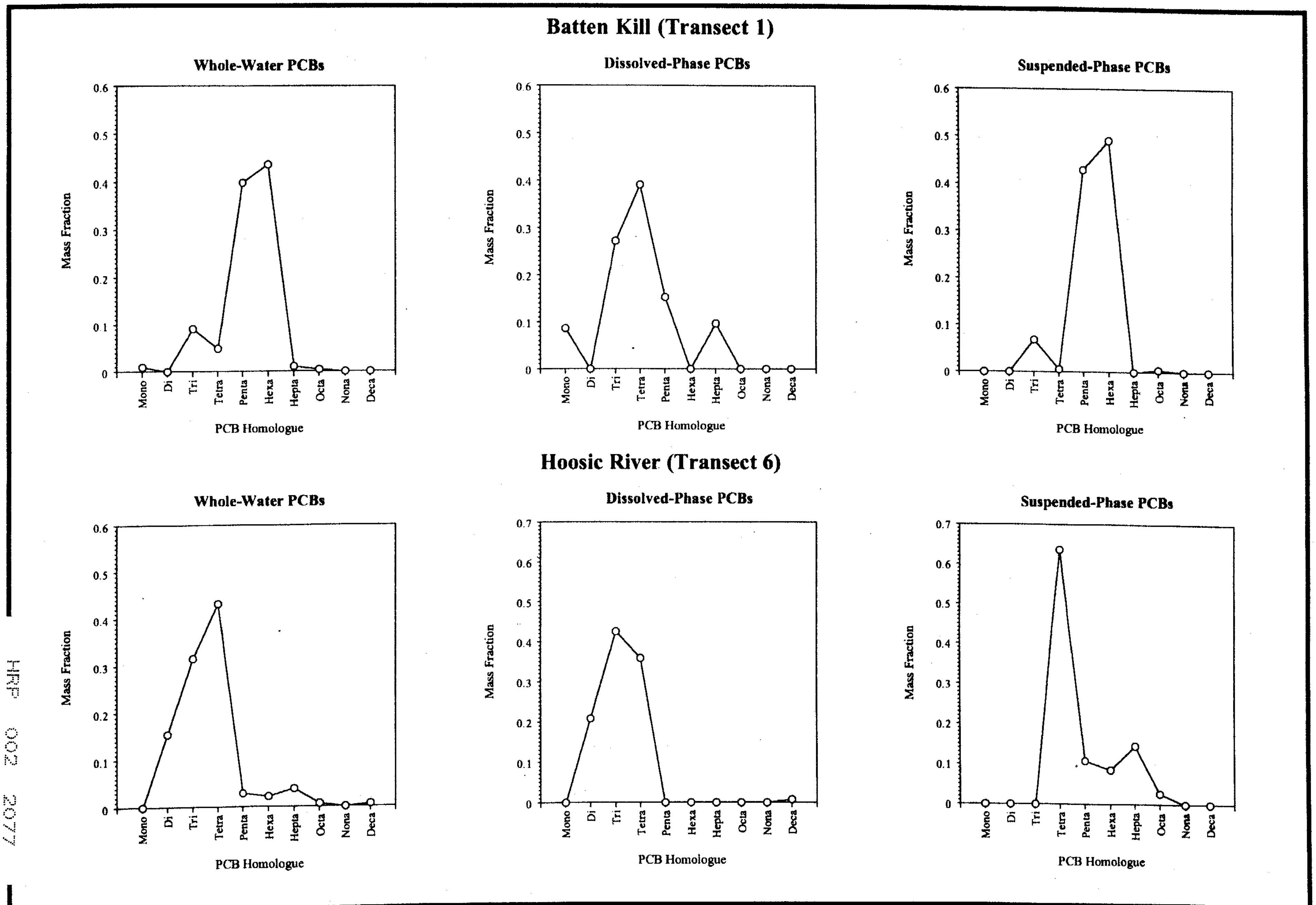
Source: TAMS/Gradient Database, USGS (1993a, 1993b), NYS Thruway Authority, and Office of Canals (1994a, 1993)

TAMS/Cadmus/Gradient

Notes:
a. Suspended-phase PCB concentration in ng/L calculated as function of dry weight concentration (ug/kg) and total suspended solids concentration (mg/L).
b. The homologue pattern measured for this station was unlike any seen in other Phase 2 samples and is considered suspect.
c. Tributary river mile designations correspond to point of confluence with the Hudson River.

Figure 3-38
Upper River Water-Column Instantaneous PCB Loading for Transect 1 Low-Flow Conditions

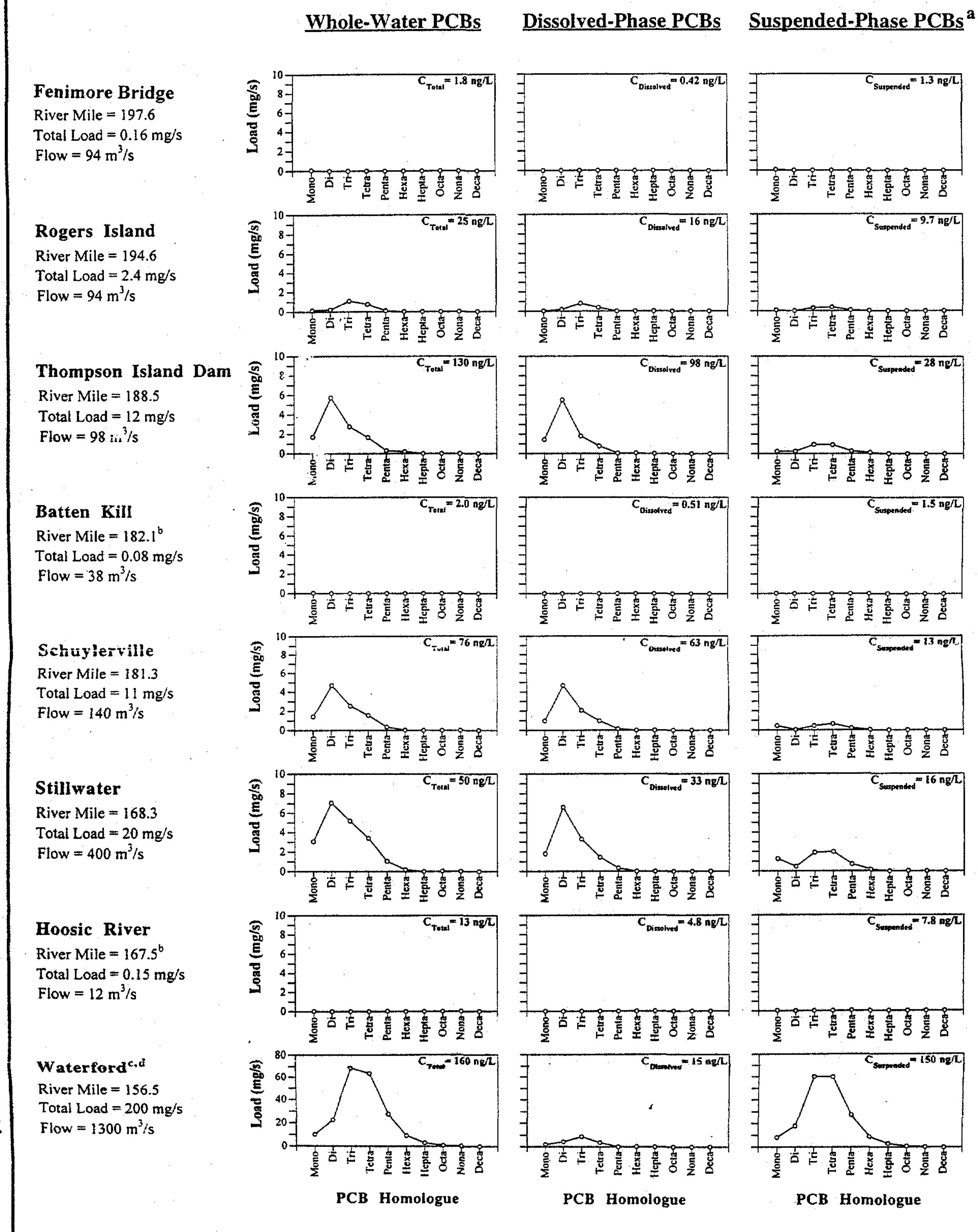
HRP 002 2076



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-39
Typical Homologue Distributions of the Batten Kill and Hoosic River PCB Water-Column Loads

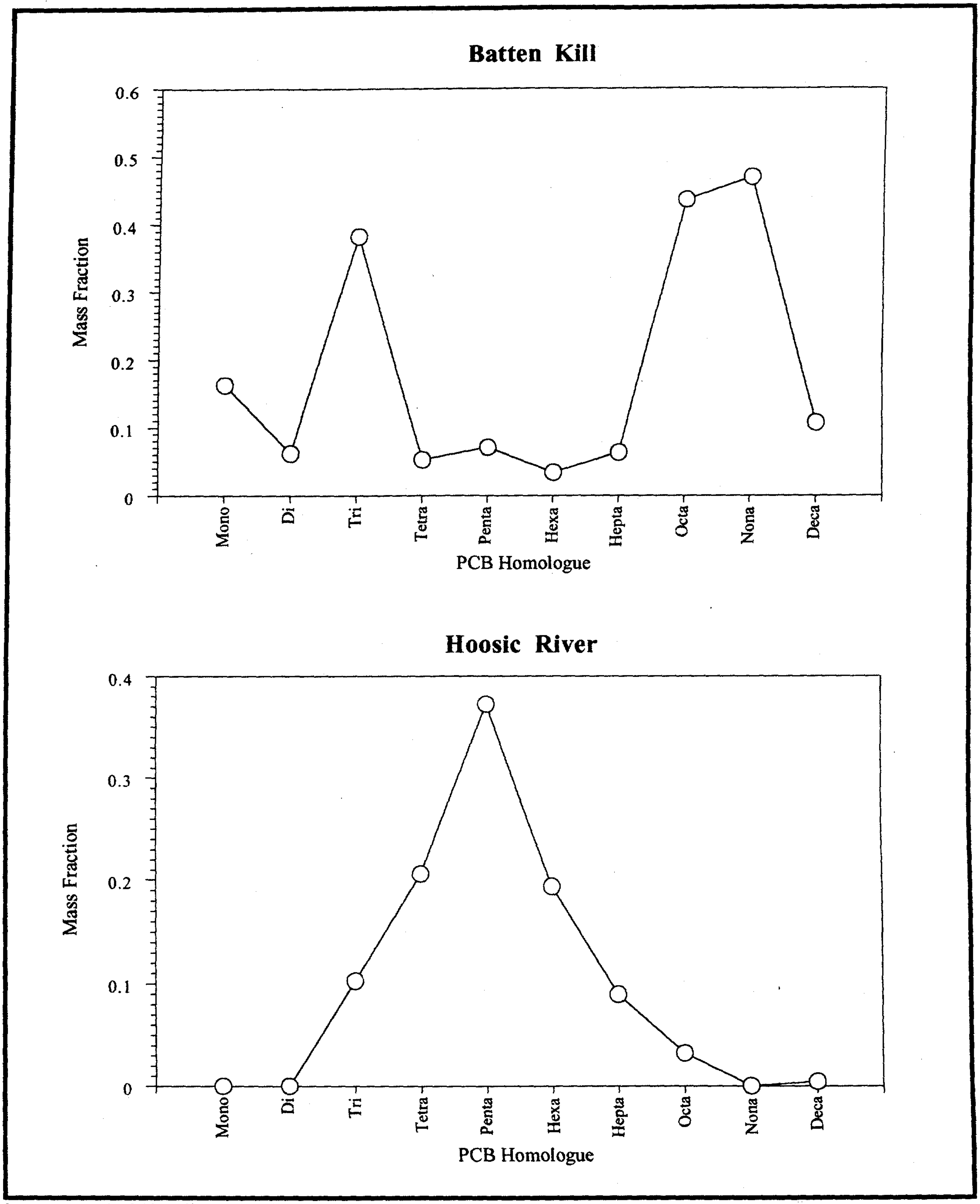


Source: TAMS/Gradient Database, USGS (1993a, 1993b), NYS Thruway Authority, and Office of Canals (1994a, 1993) TAMS/Cadmus/Gradient

Notes:
a. Suspended-phase PCB concentration in ng/L calculated as function of dry weight concentration (ug/kg) and total suspended solids concentration (mg/L).
b. Tributary river mile designations correspond to point of confluence with the Hudson River.
c. Scour event due to onset of spring flood in lower part of the Upper River.
d. Vertical scale expanded to show full scour event loading.

Figure 3-40
Upper River Water-Column Instantaneous PCB Loading for Transect 3
Transition from Low-Flow to High-Flow Conditions

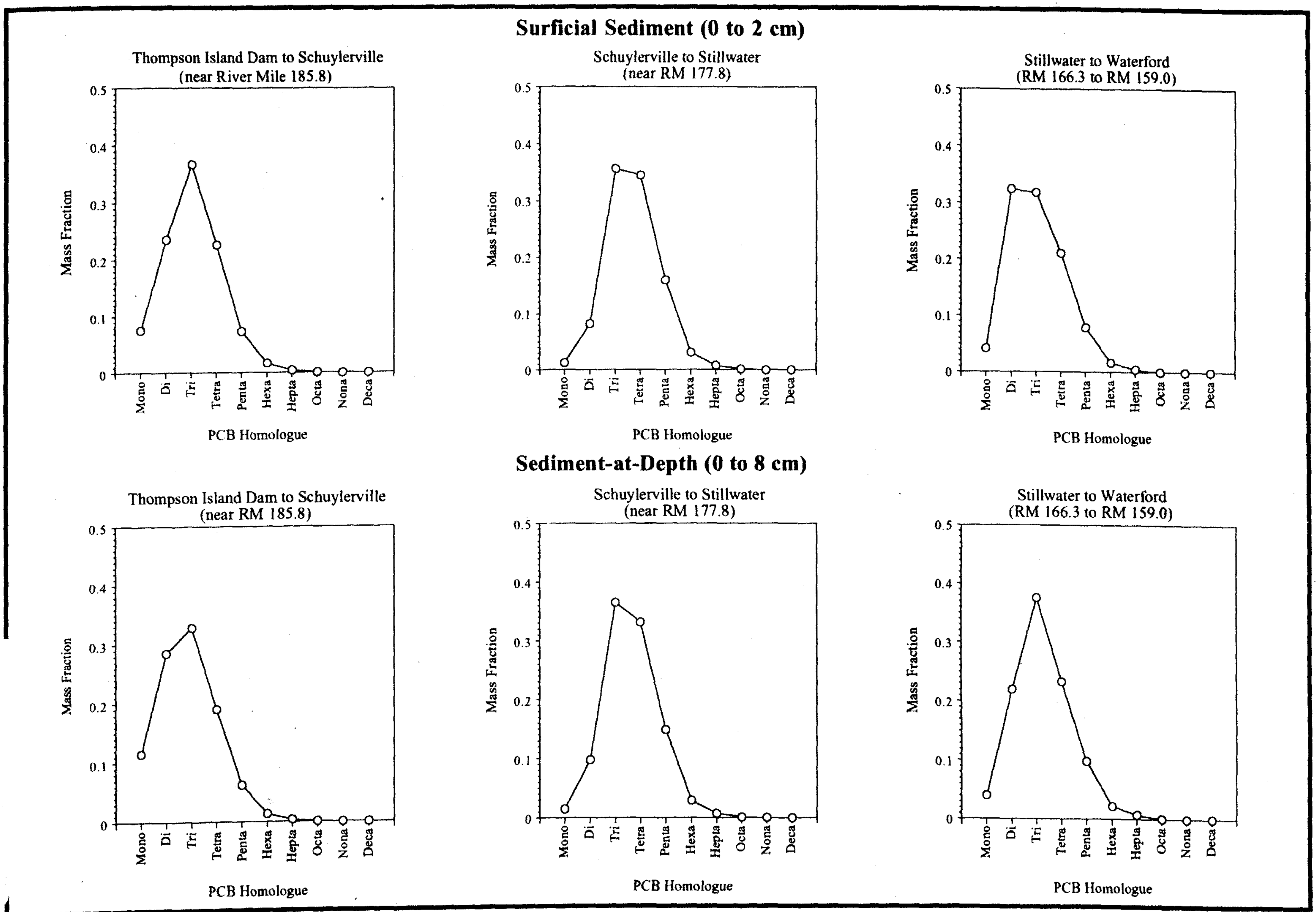
HRP 002 2078



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-41
Homologue Distributions of Surficial Sediments (0 to 2 cm) in the Batten Kill and the Hoosic River

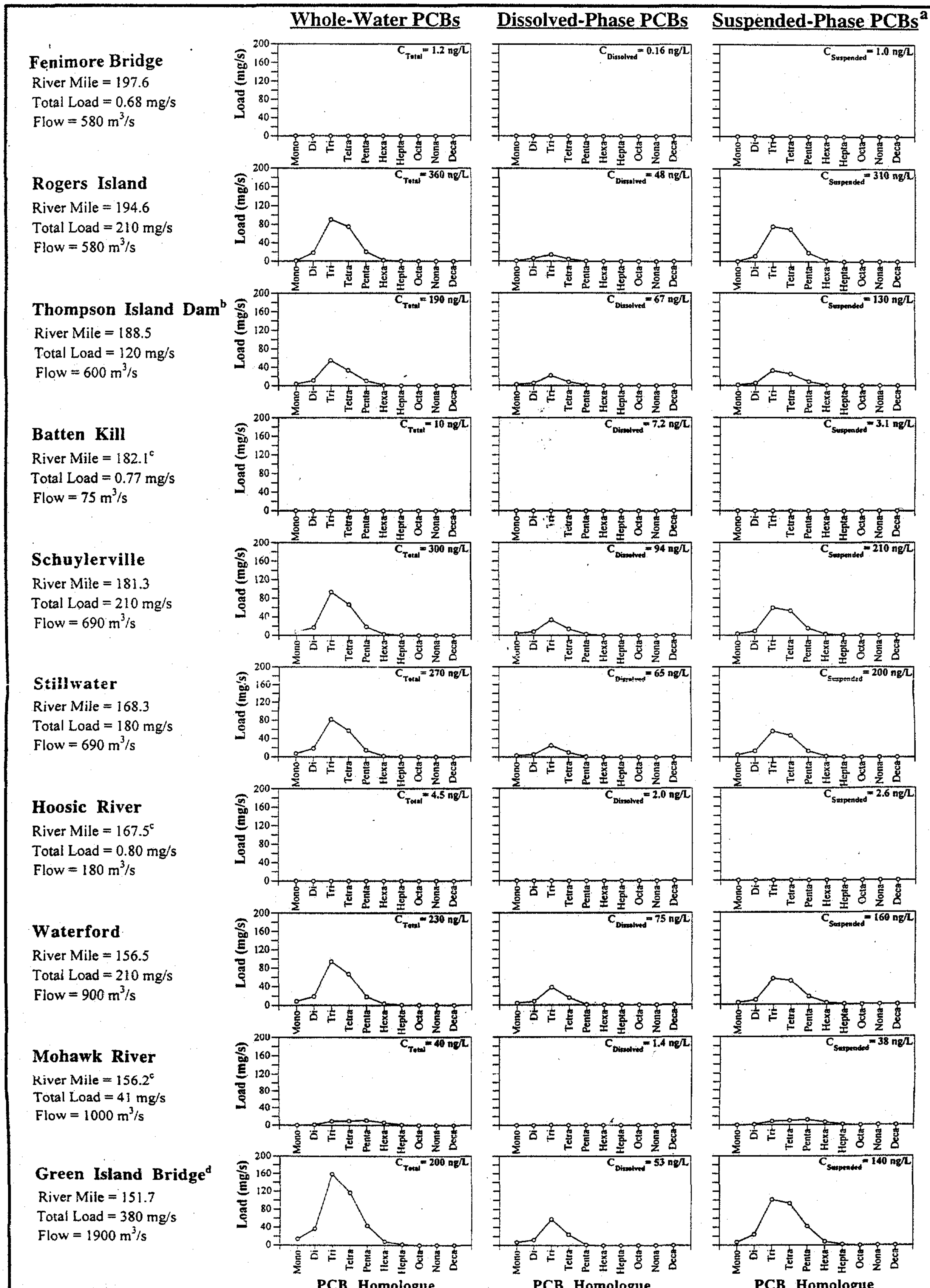


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-42

Sediment Homologue Distributions in the Upper River Reaches below the Thompson Island Dam



Source: TAMS/Gradient Database, USGS (1993a, 1993b), NYS Thruway Authority, and Office of Canals (1994a, 1993)

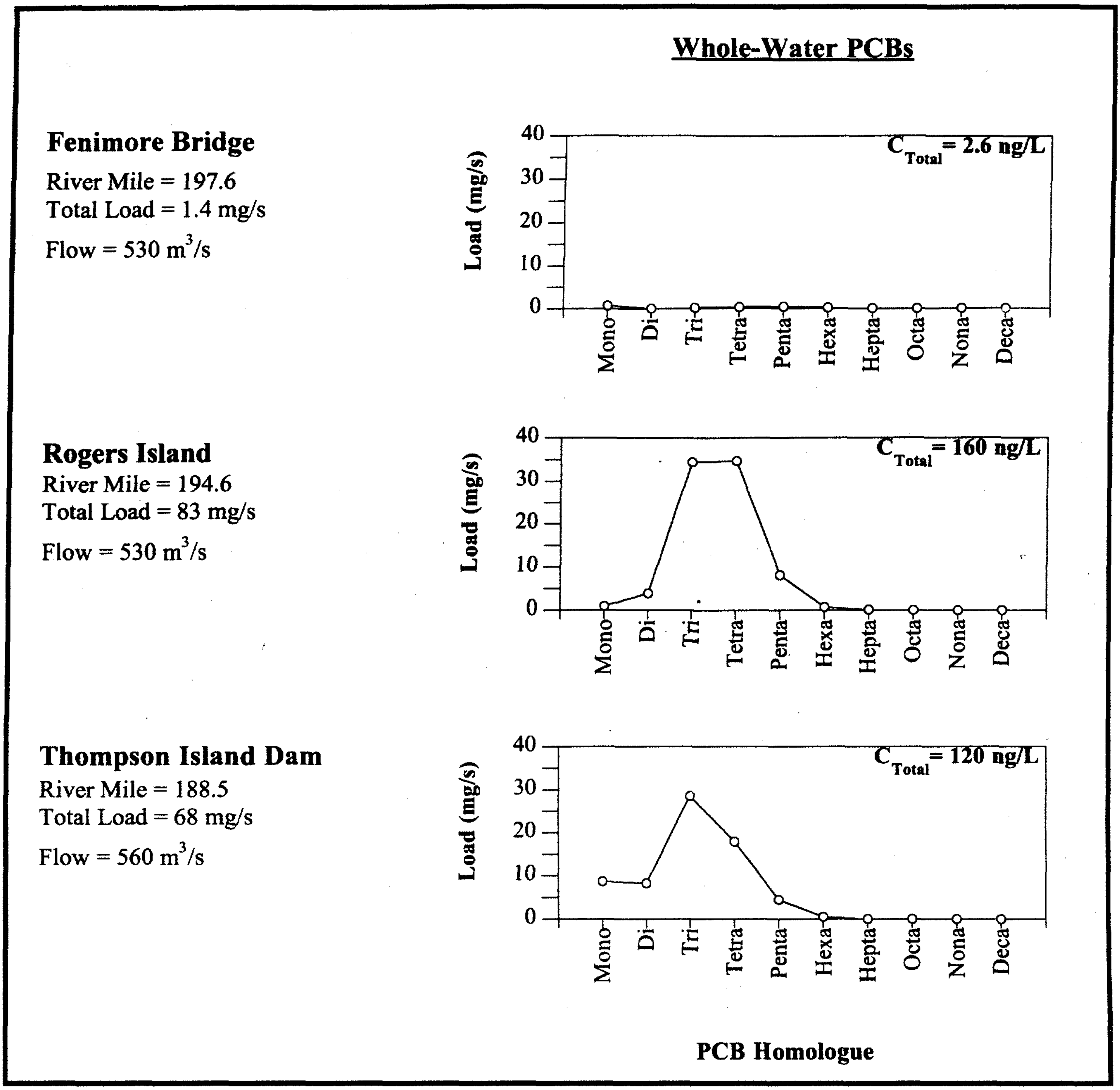
TAMS/Cadmus/Gradient

Notes:

a. Suspended-phase PCB concentration in ng/L calculated as function of dry weight concentration (ug/kg) and total suspended solids concentration (mg/L).
b. Sample is believed to over-represent dilution by Moses Kill due to proximity of sampling location to Moses Kill confluence.
c. Tributary river mile designations correspond to point of confluence with the Hudson River.
d. Sample is believed to over-represent upstream load contribution due to incomplete mixing of the Mohawk River.

Figure 3-43
Upper River Water-Column Instantaneous PCB Loading for Transect 4 High-Flow Conditions

HRP 002 2081



Source: TAMS/Gradient Database, USGS (1993a, 1993b), NYS Thruway Authority, and Office of Canals (1994a, 1993)

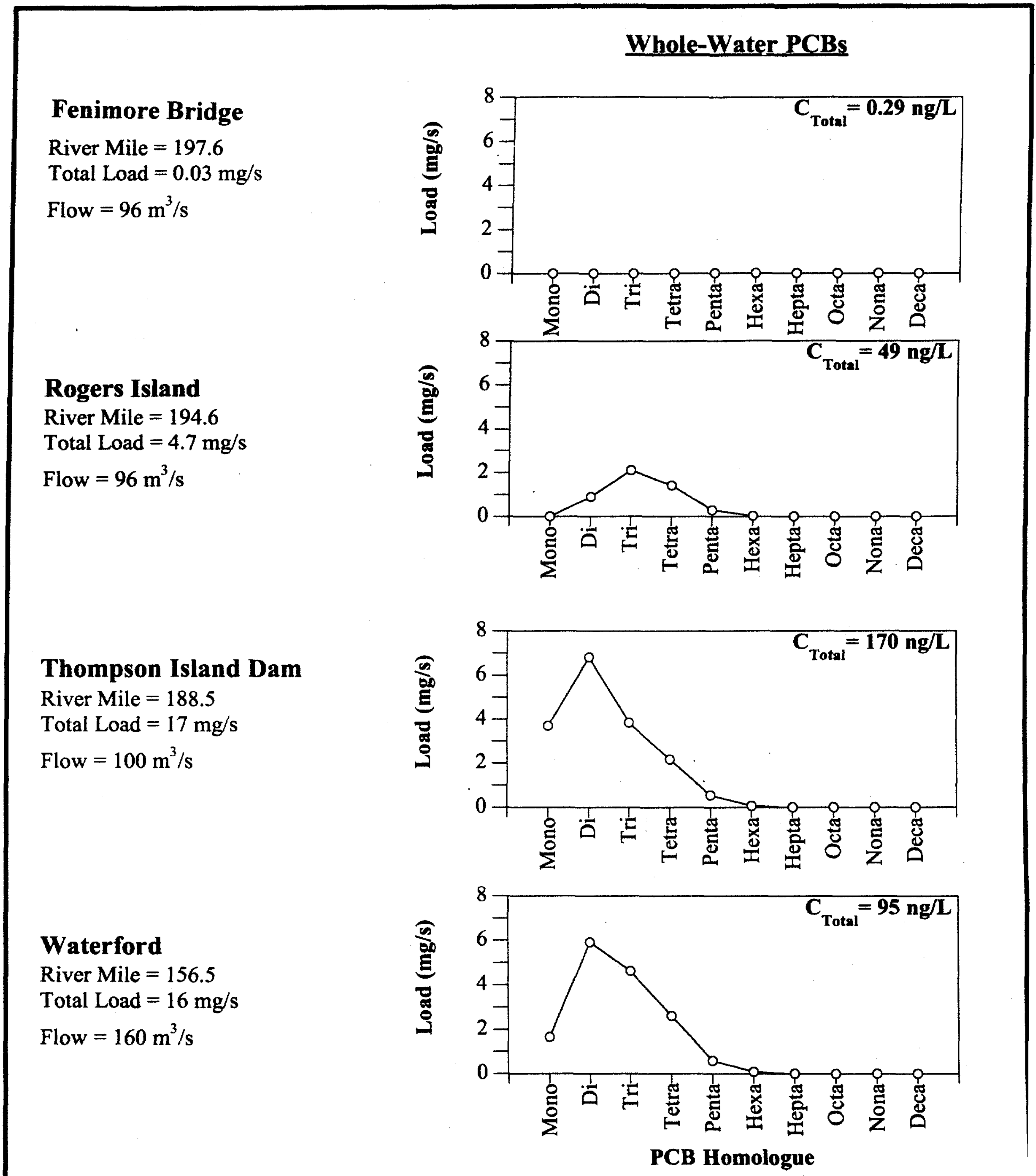
TAMS/Cadmus/Gradie

Notes:

a. Flow-Averaged Event 1 samples were collected during the period of April 23 to May 8, 1993.
b. Samples collected at Waterford are not represented here due to local canal construction which is believed to have influenced the samples.

HRP 002 2082

Figure 3-44
Upper River Water-Column PCB Loading for Flow-Averaged Event 1 High-Flow Conditions



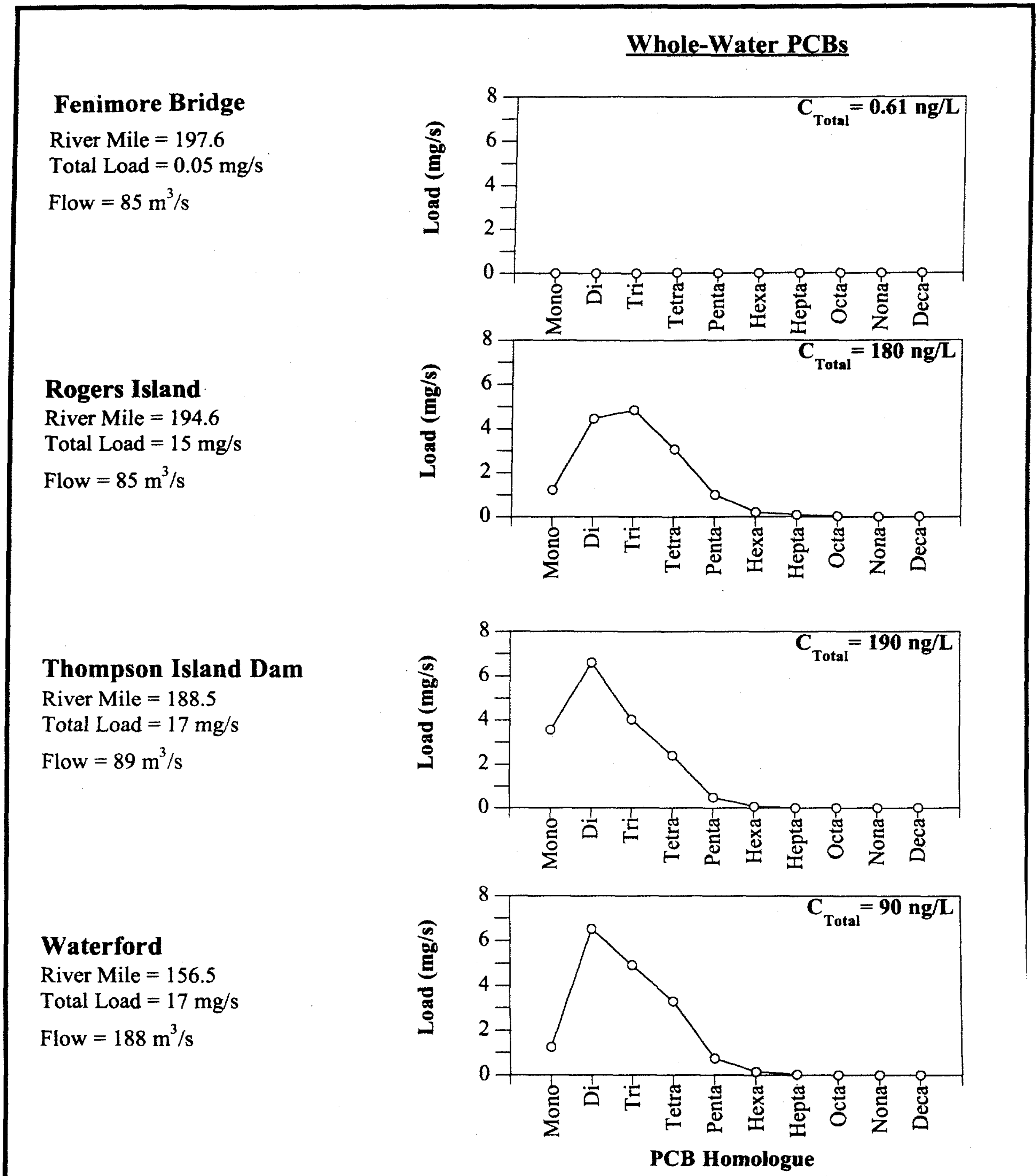
Source: TAMS/Gradient Database, USGS (1993a, 1993b), NYS Thruway Authority, and Office of Canals (1994a, 1993)

Note: Flow-Averaged 2 samples were collected during the period of May 12 to May 27, 1993.

TAMS/Cadmus/Gradient

HRP 002 2083

Figure 3-45
Upper River Water-Column PCB Loading for Flow-Averaged Event 2 Low-Flow Conditions

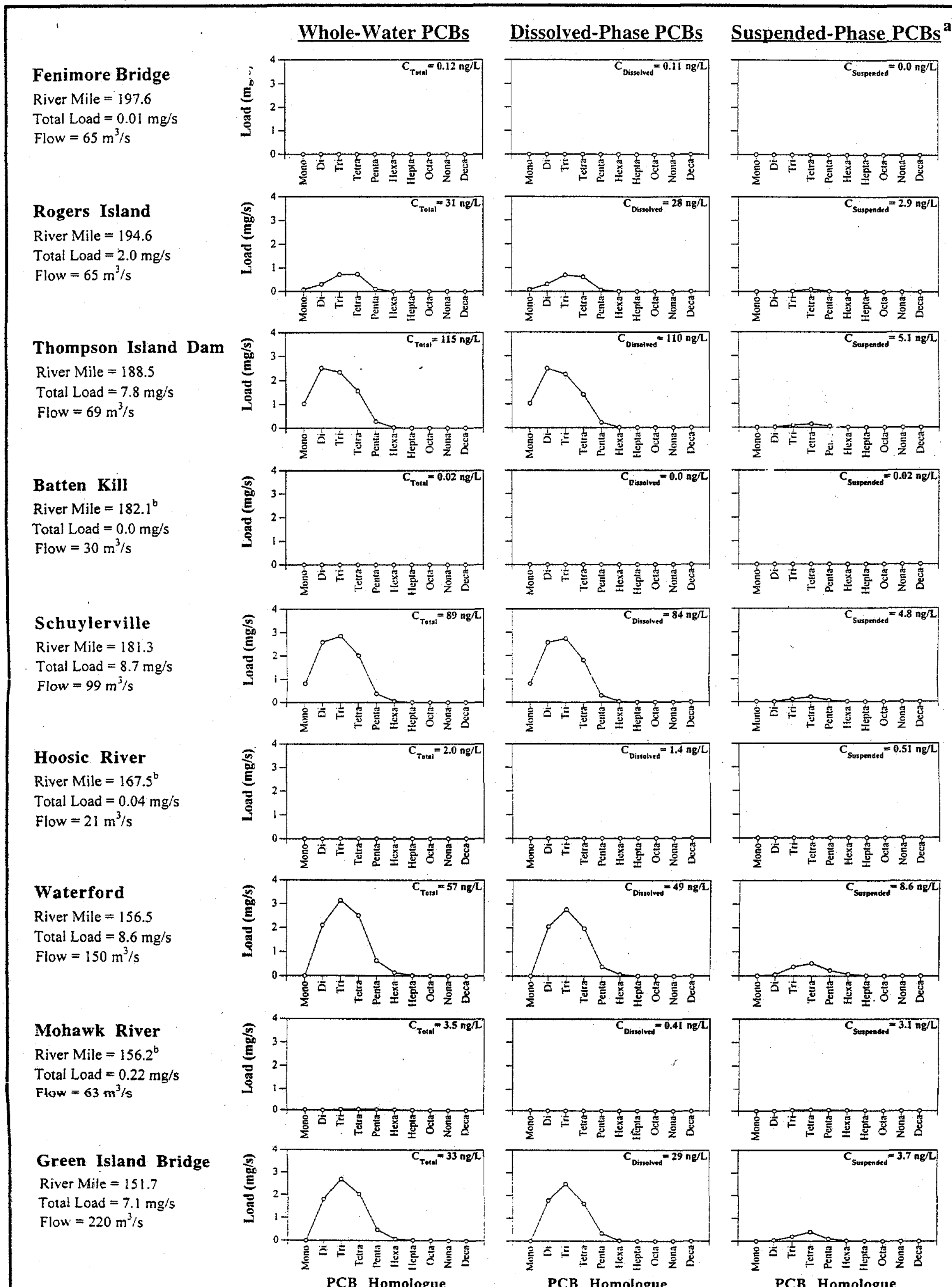


Source: TAMS/Gradient Database, USGS (1993a, 1993b), NYS Thruway Authority, and Office of Canals (1994a, 1993)

Note: Flow-Averaged 3 samples were collected during the period of June 6 to June 19, 1993.

TAMS/Cadmus/Gradie

Figure 3-46
Upper River Water-Column PCB Loading for Flow-Averaged Event 3 Low-Flow Conditions



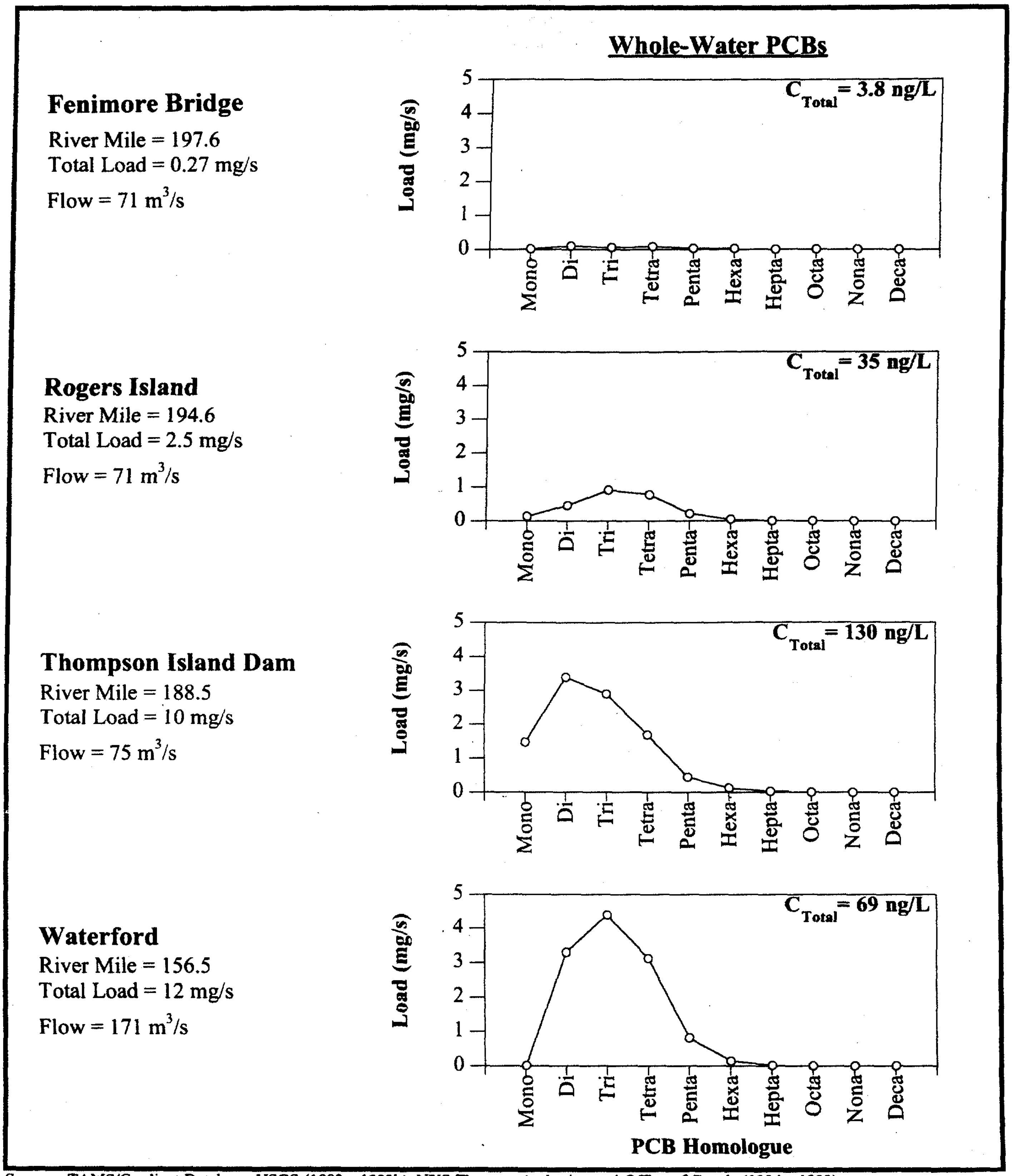
Source: TAMS/Gradient Database, USGS (1993a, 1993b), NYS Thruway Authority, and Office of Canals (1994a, 1993)

TAMS/Cadmus/Gradient

Notes:
a. Suspended-phase PCB concentration in ng/L calculated as function of dry weight concentration (ug/kg) and total suspended solids concentration (mg/L).
b. Tributary river mile designations correspond to point of confluence with the Hudson River.

Figure 3-47
Upper River Water-Column Instantaneous PCB Loading for Transect 6 Low-Flow Conditions

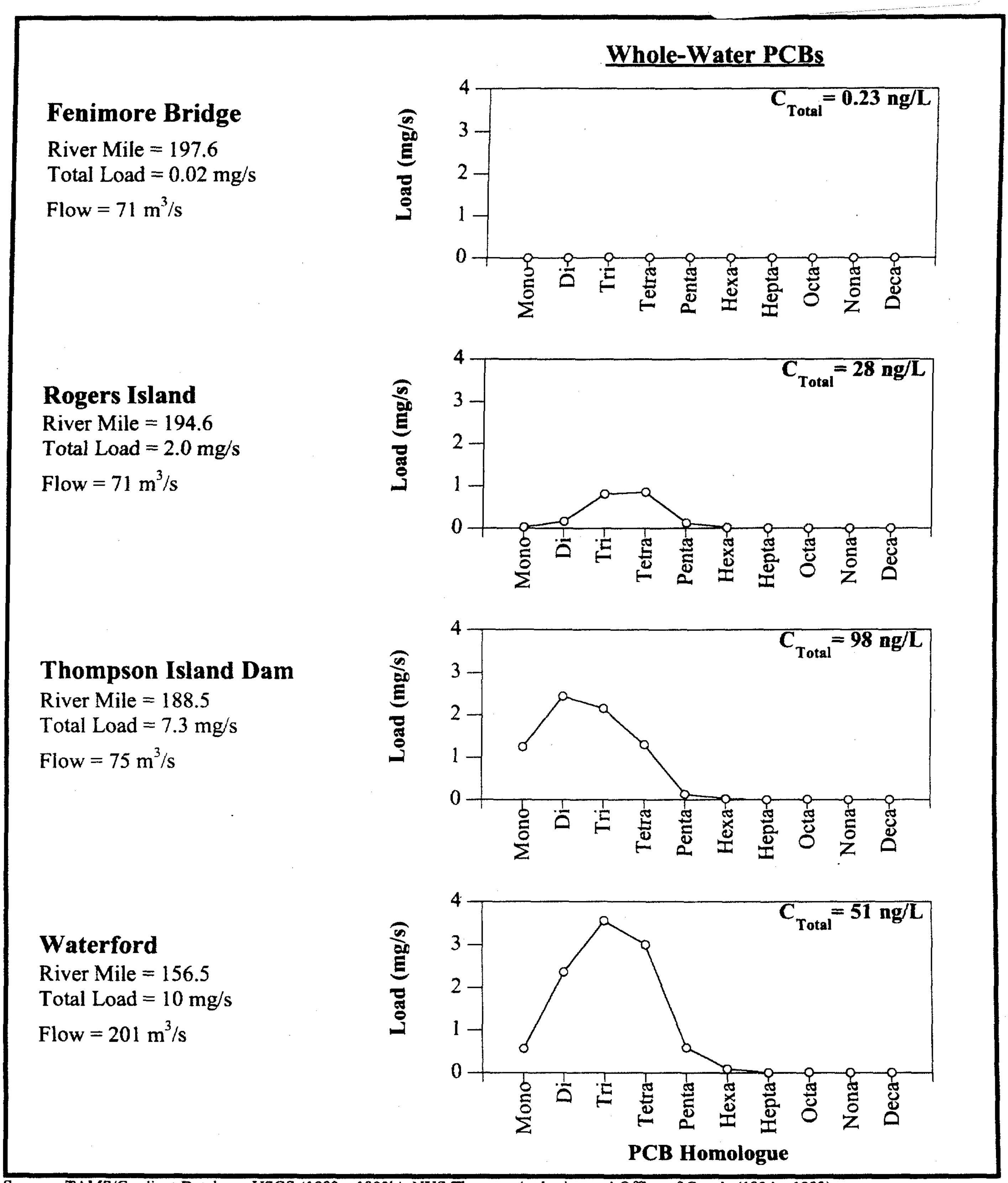
HRP 002 2085



Source: TAMS/Gradient Database, USGS (1993a, 1993b), NYS Thruway Authority, and Office of Canals (1994a, 1993)

Note: Flow-Averaged 5 samples were collected during the period of August 2 to August 17, 1993. TAMS/Cadmus/Gradient

Figure 3-48
Upper River Water-Column PCB Loading for Flow-Averaged Event 5 Low-Flow Conditions

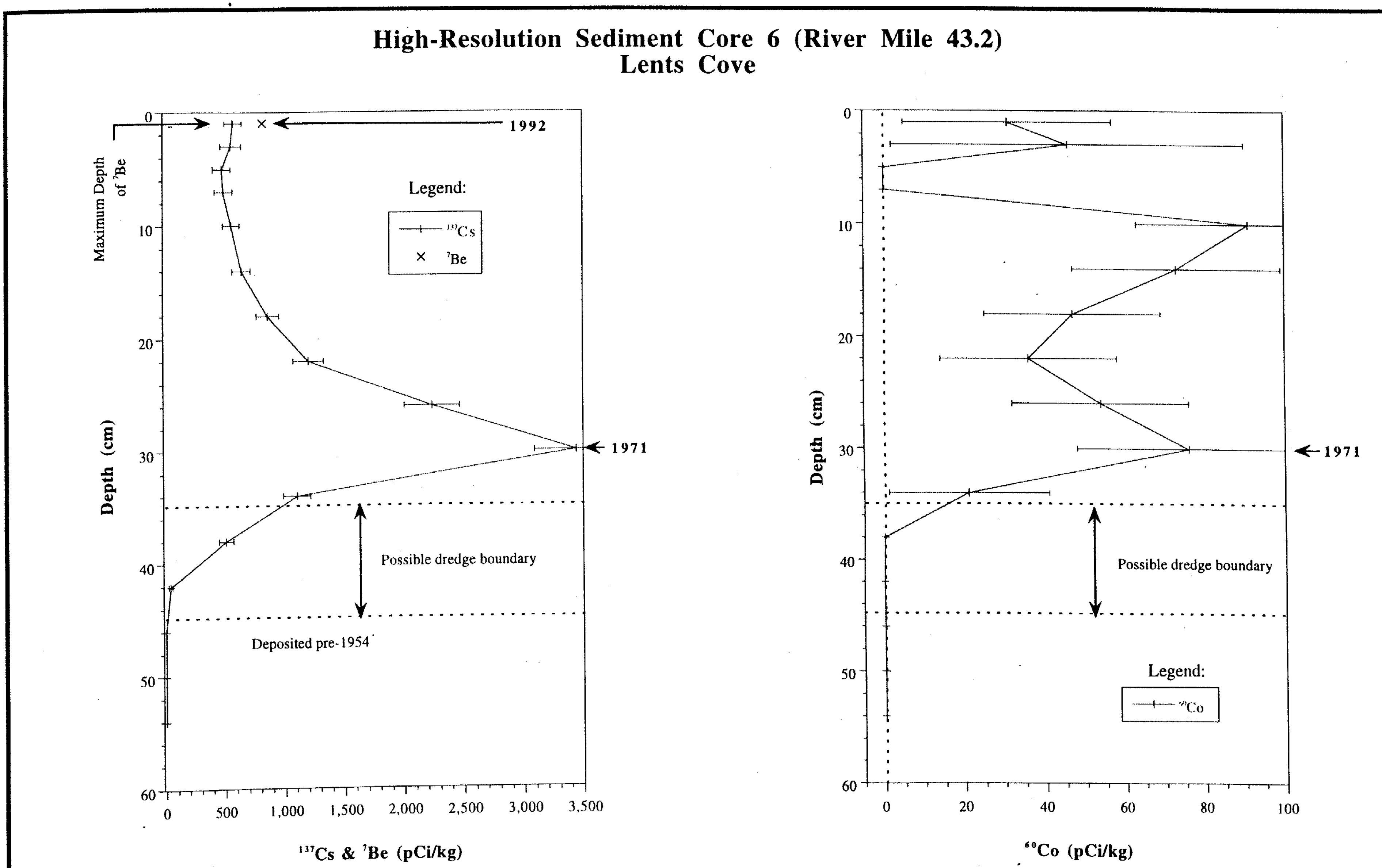


Source: TAMS/Gradient Database, USGS (1993a, 1993b), NYS Thruway Authority, and Office of Canals (1994a, 1993)

Note: Flow-Averaged 6 water column samples were collected during the period of September 9 to September 23, 1993.

TAMS/Cadmus/Gradient

Figure 3-49
Upper River Water-Column PCB Loading for Flow-Averaged Event 6 Low-Flow Conditions



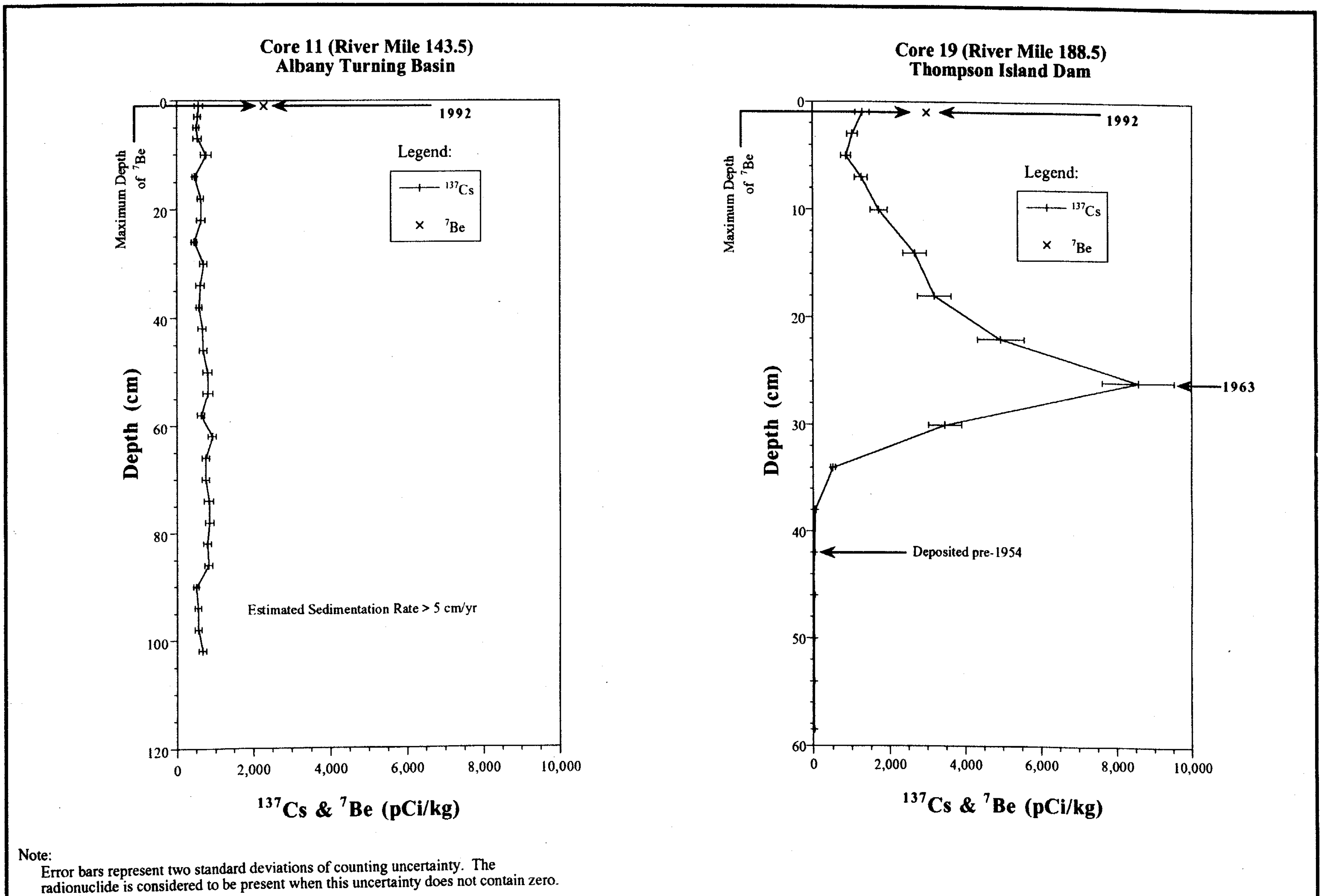
Note:
Error bars represent two standard deviations in counting uncertainty. The radionuclide is considered to be present when this uncertainty does not contain zero.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-50

The Coincidence of the ^{137}Cs and ^{60}Co Maxima at River Mile 43.2 (Core 6)

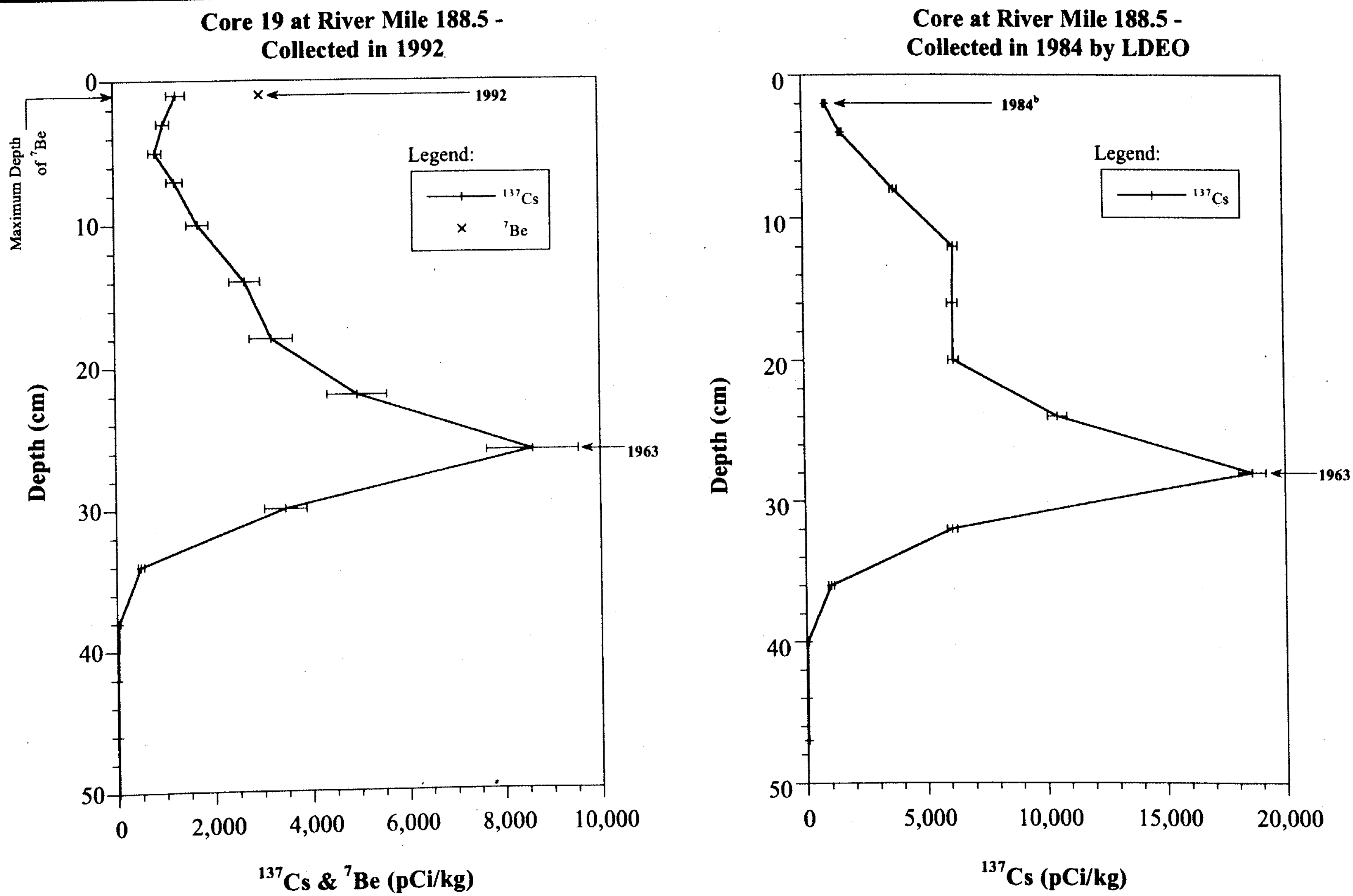


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-51

^{137}Cs Concentrations in High Resolution Sediment Core 11 and Core 19



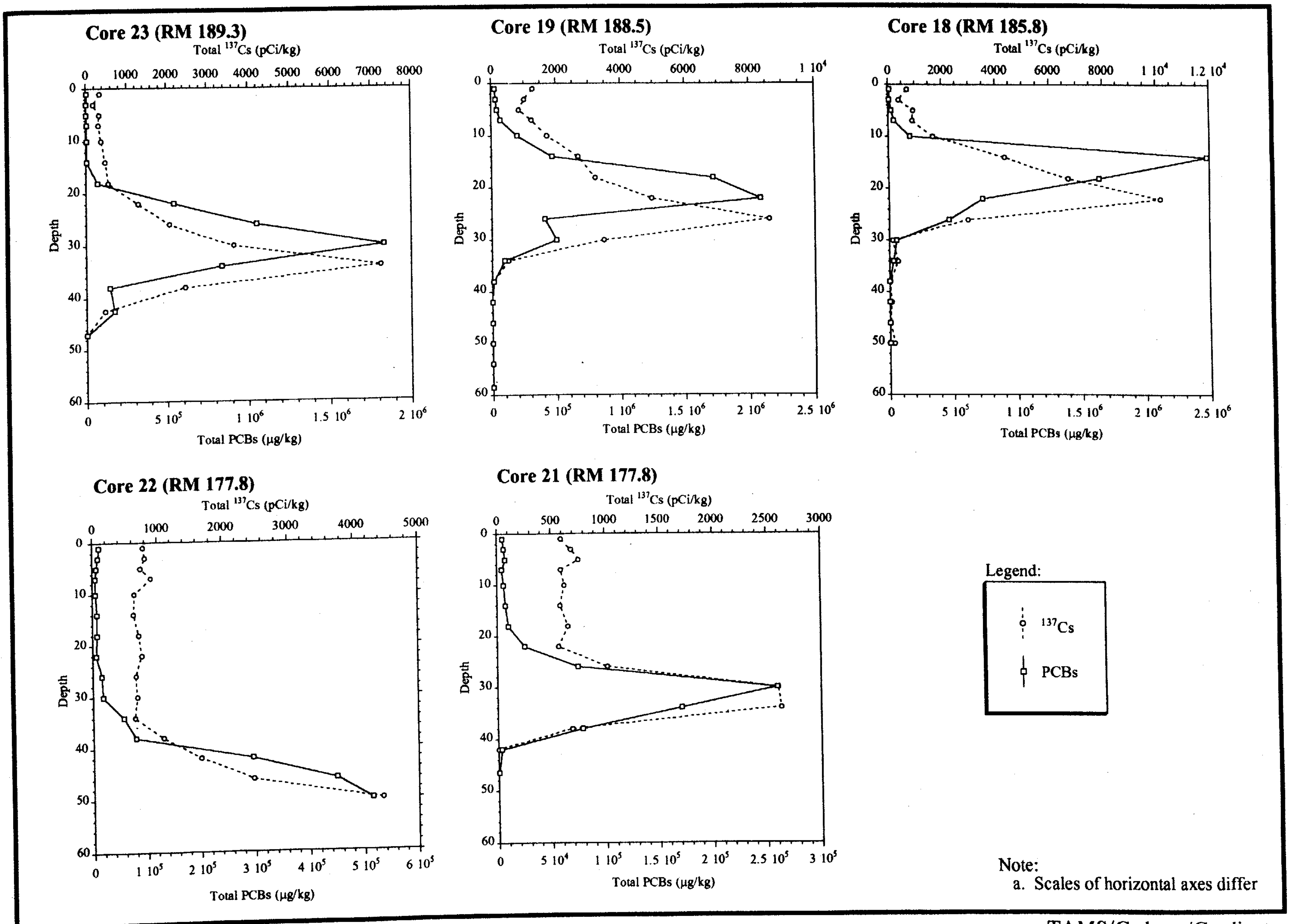
Notes:
a. Error bars represent two standard deviations of counting uncertainty. The radionuclide is considered to be present when this uncertainty does not contain zero.
b. The historical core was not analyzed for ^{7}Be; its core top is assumed to represent the 1984 period of collection.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-52

Comparison of ^{137}Cs Profiles between a Phase 2 High-Resolution Sediment Core and a Historical Core at River Mile 188.5

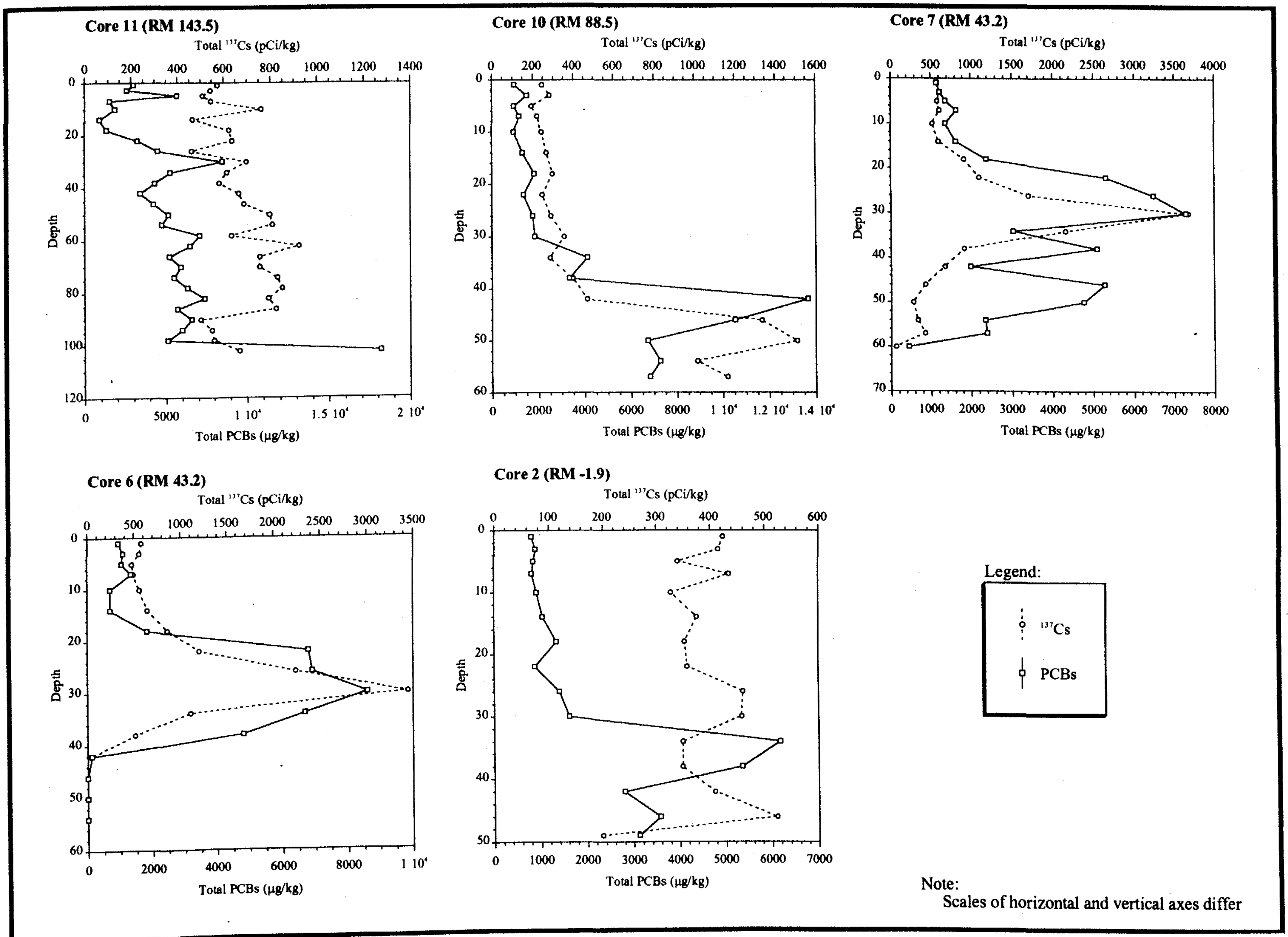


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-53

River High Resolution Sediment Cores Depth vs. ^{137}Cs Concentration and PCB Concentration

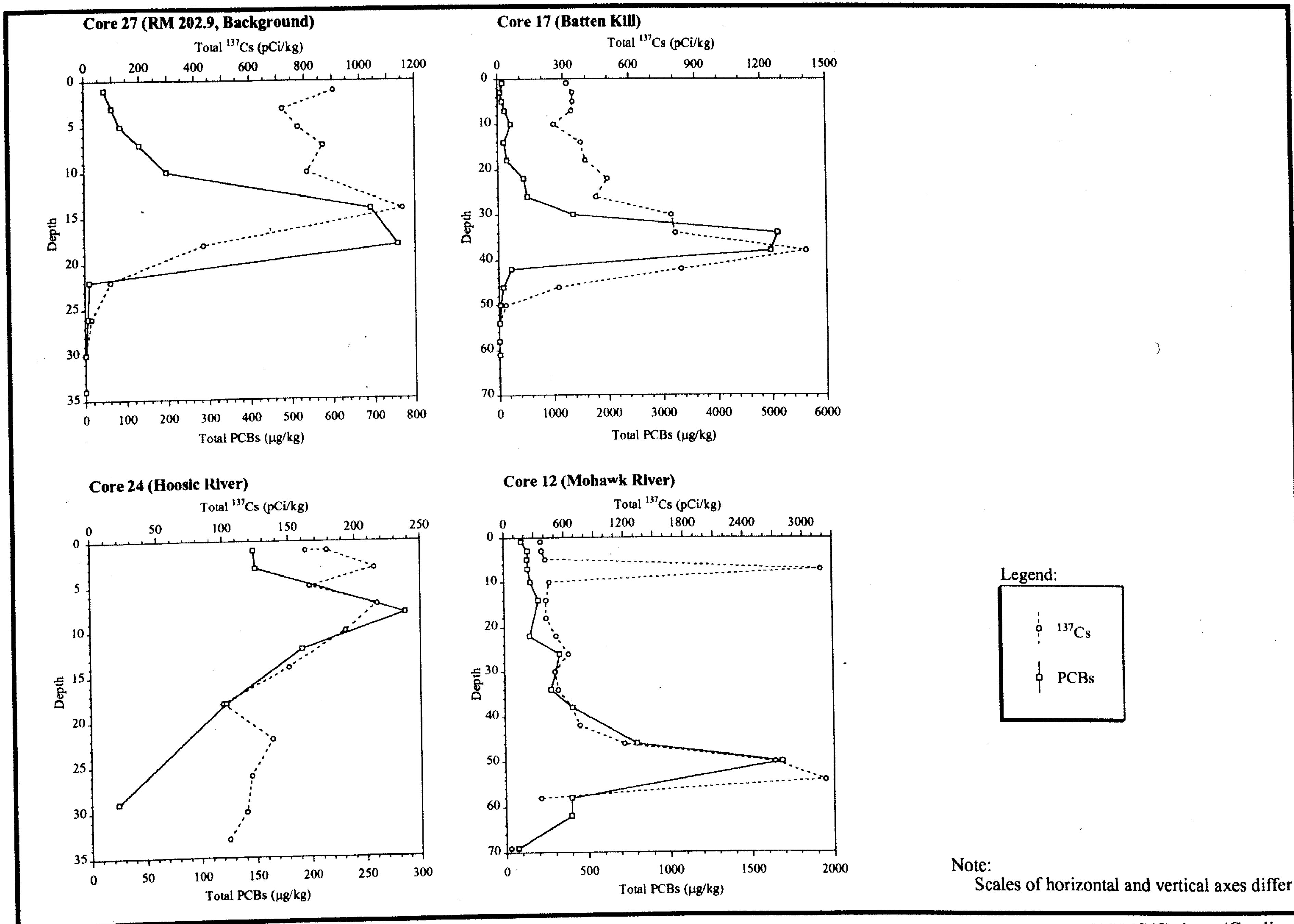


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-54

Lower River High-Resolution Sediment Cores Depth vs. ^{137}Cs Concentration and PCB Concentration



Source: TAMS/Gradient Database

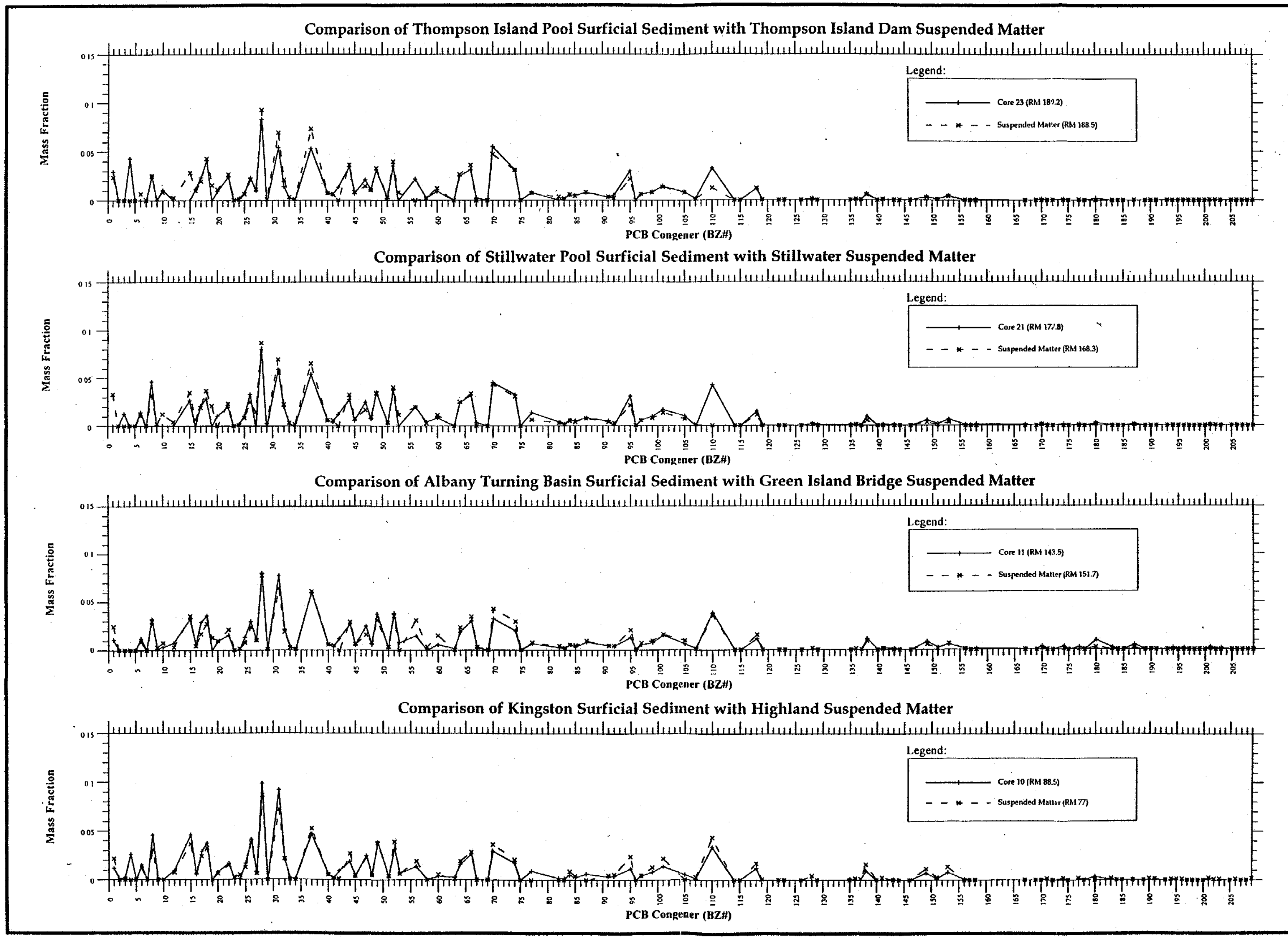
TAMS/Cadmus/Gradient

Figure 3-55

Tributaries and Background High Resolution Sediment Cores

Depth vs. ^{137}Cs Concentration and PCB Concentration

HRP 002 2093

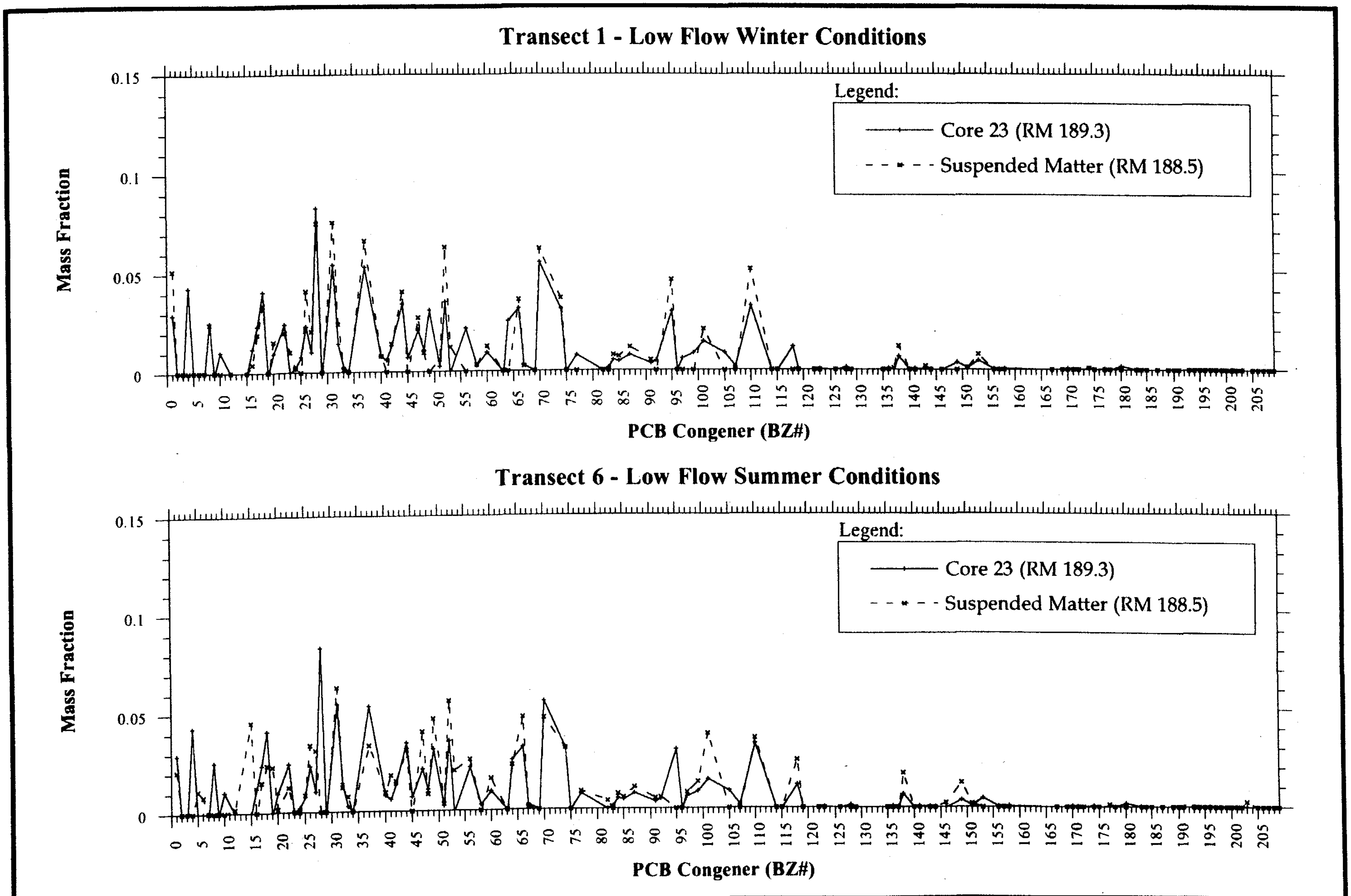


TAMS/Cadmus/Gradient

Source: TAMS/Gradient Database

Figure 3-56
Comparison of the Surficial Sediment Congener Distribution with the Corresponding Transect 4 High-Flow Suspended-Matter Congener Distribution

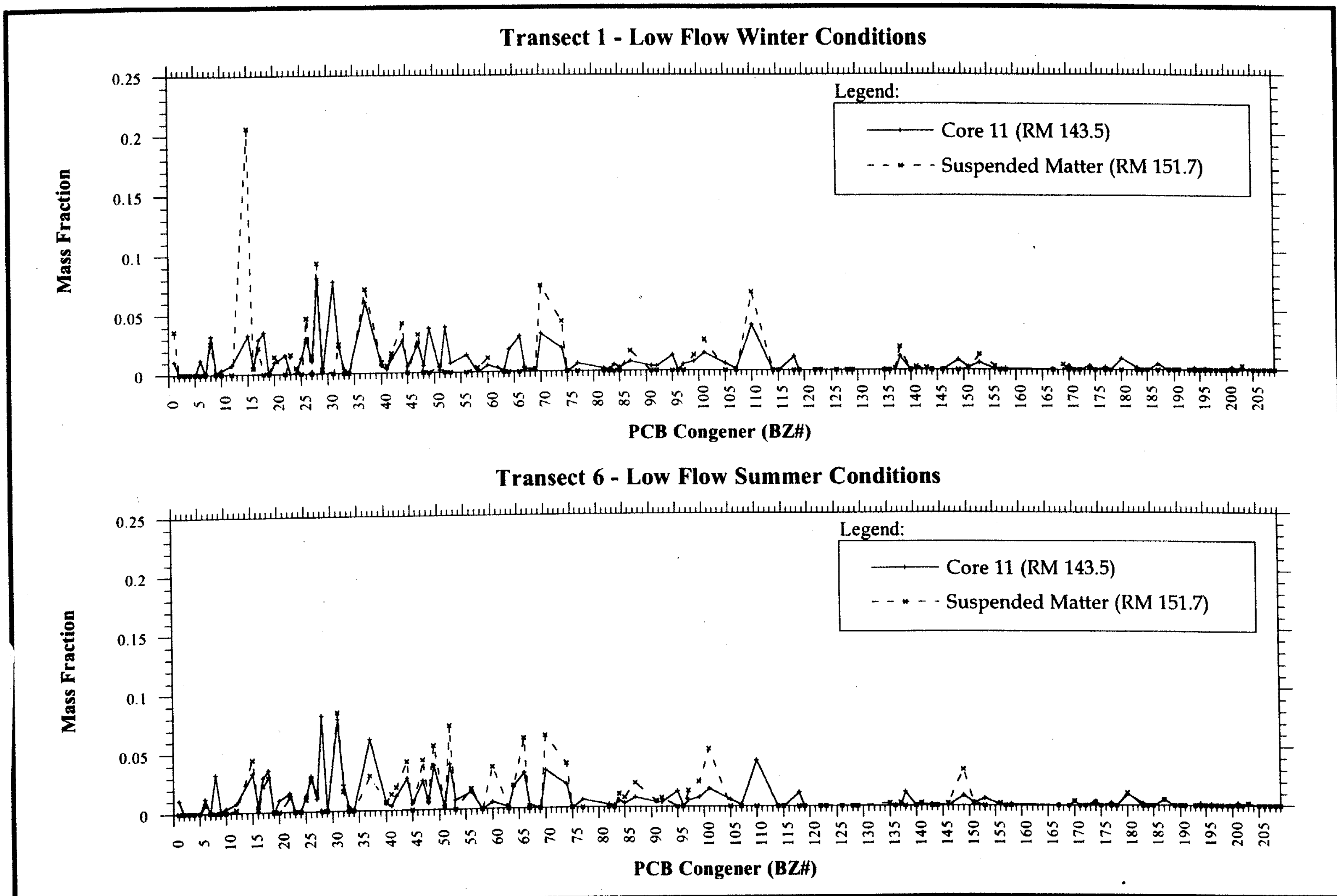
HRP 002 2094



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-57
Comparison of the Thompson Island Pool Surficial Sediment Congener Distribution with the Thompson Island Dam Suspended-Matter Congener Distributions associated with Low-Flow Winter and Summer Conditions

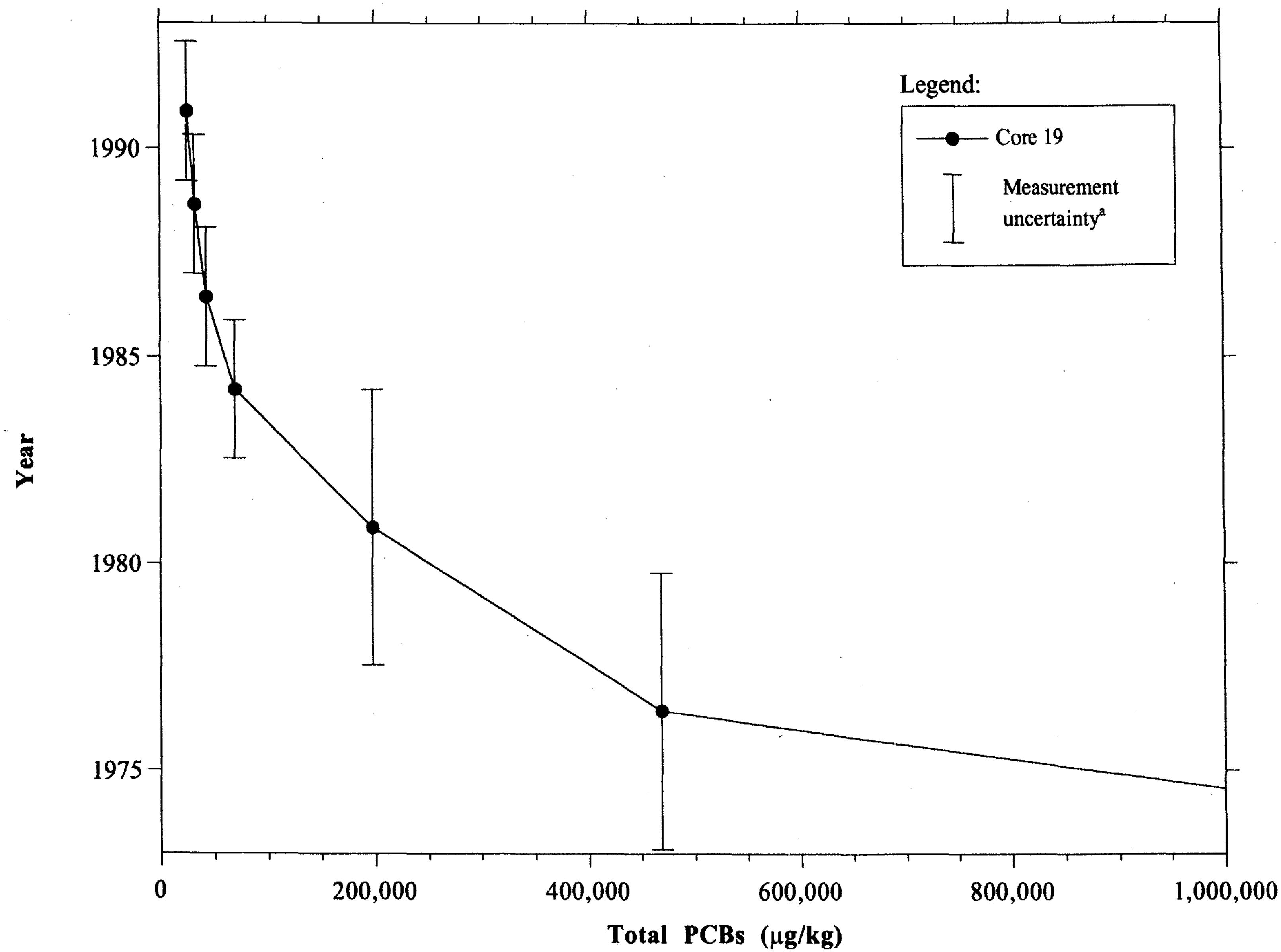


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-58

Comparison of the Albany Turning Basin Surficial Sediment Congener Distribution with the Green Island Bridge Suspended-Matter Congener Distributions associated with Low-Flow Winter and Summer Conditions



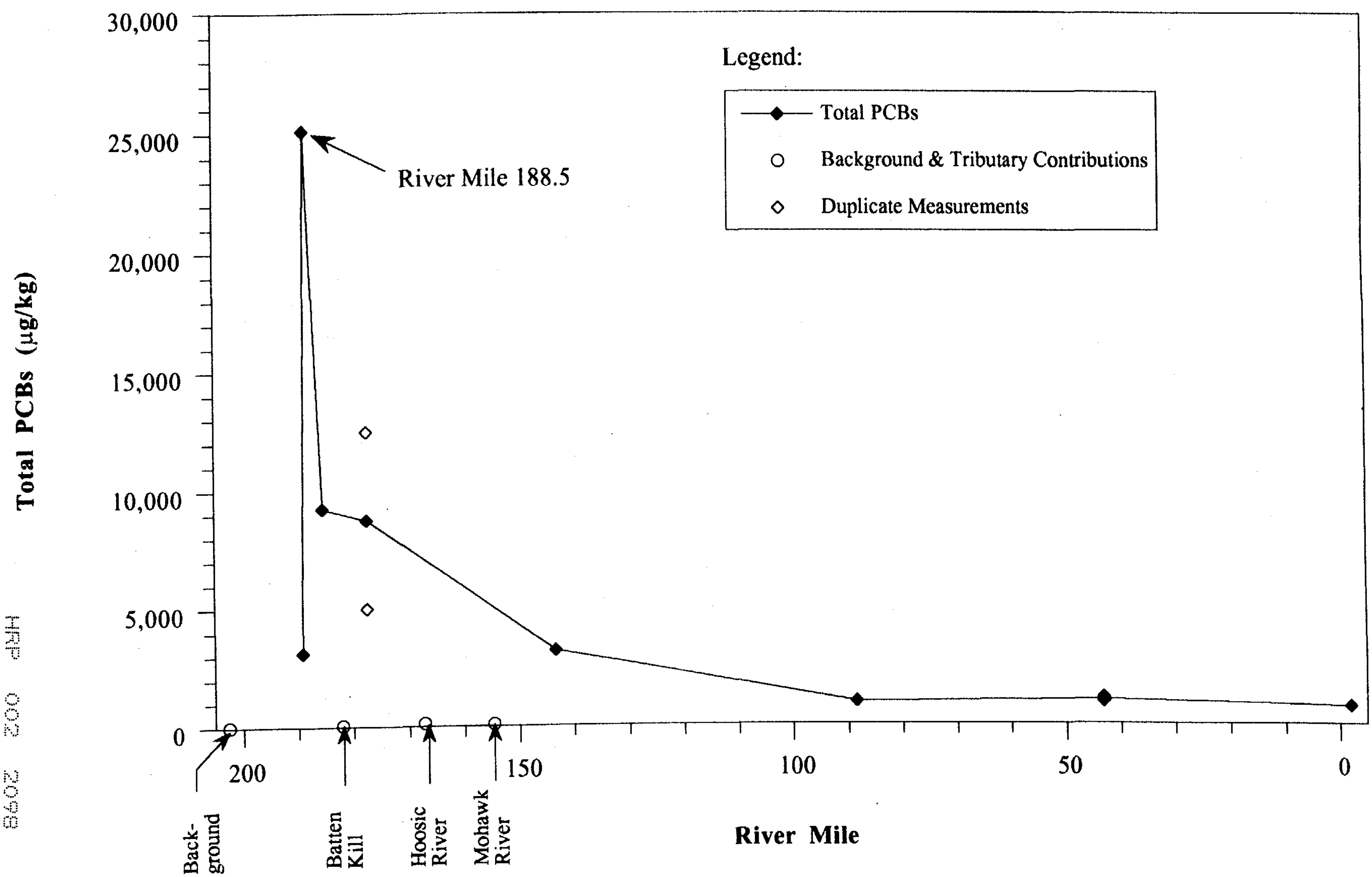
Note:
a. Measurement uncertainty is estimated to be 0.75 * Sample Thickness/Sedimentation Rate.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-59
Total PCBs in Sediment vs. Approximate Year of Deposition at River Mile 188.5 Near the Thompson Island Dam: High Resolution Sediment Core 19

HRP 002 2097

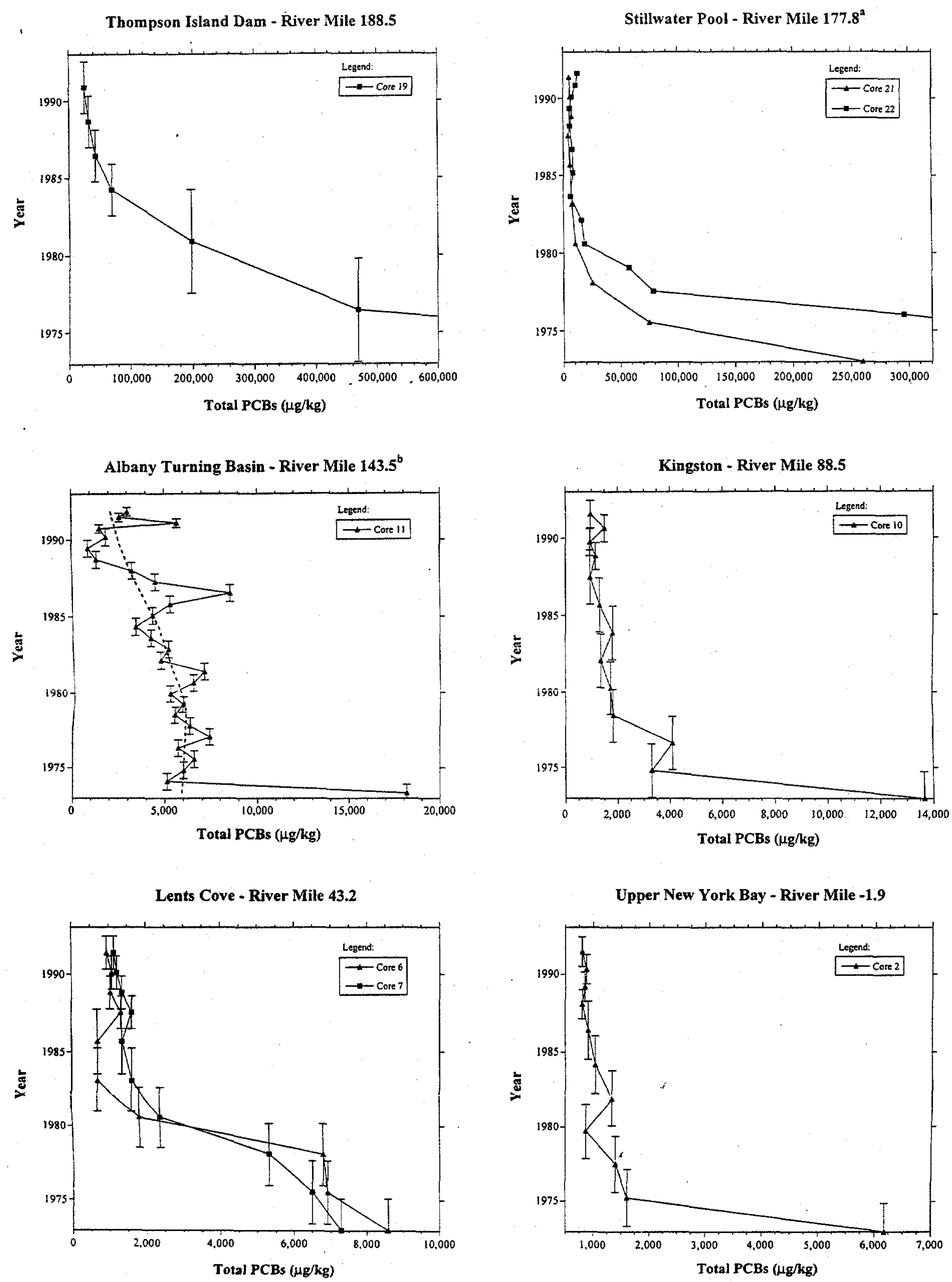


Note:
a. Duplicate pairs exist at River Miles 177.8 and 43.2. The solid symbol represents the mean of the duplicate pair.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-60
Total PCB Content in Sediment Deposited Between 1991 and 1992 vs. River Mile



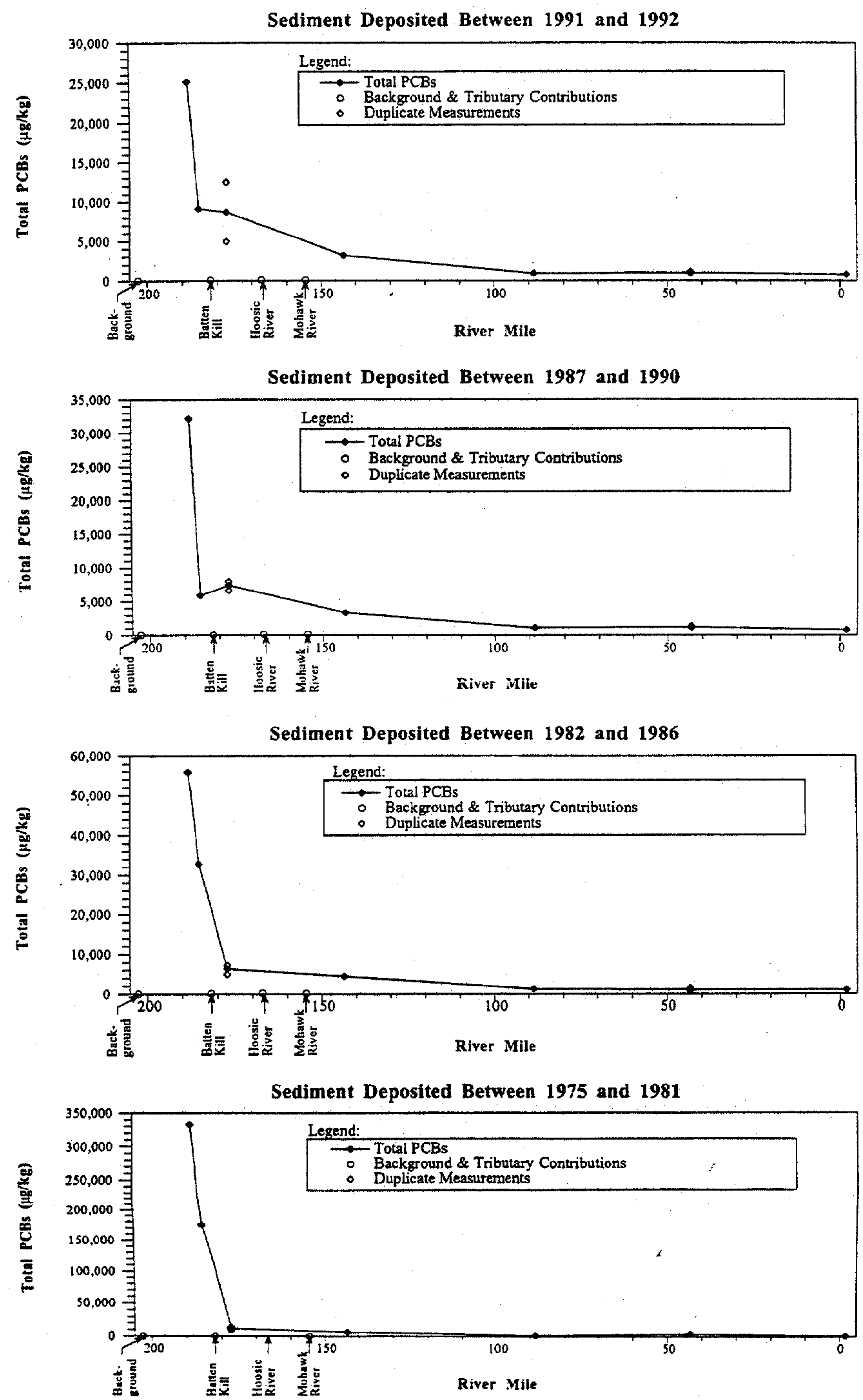
Notes:
a. Measurement uncertainty is not shown in order to improve visual clarity of the data.
b. Dashed line represents a weighted running average of the data and is included for visual reference.
c. For all diagrams, measurement uncertainty ⌶ is estimated to be = 0.75 x sample thickness/sedimentation rate.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2099

Figure 3-61
Total PCBs in Post-1975 Sediment vs. Approximate Year of Deposition in the Hudson River



Note:

a. Vertical axis range increases in successive diagrams as age of sediment represented increases.

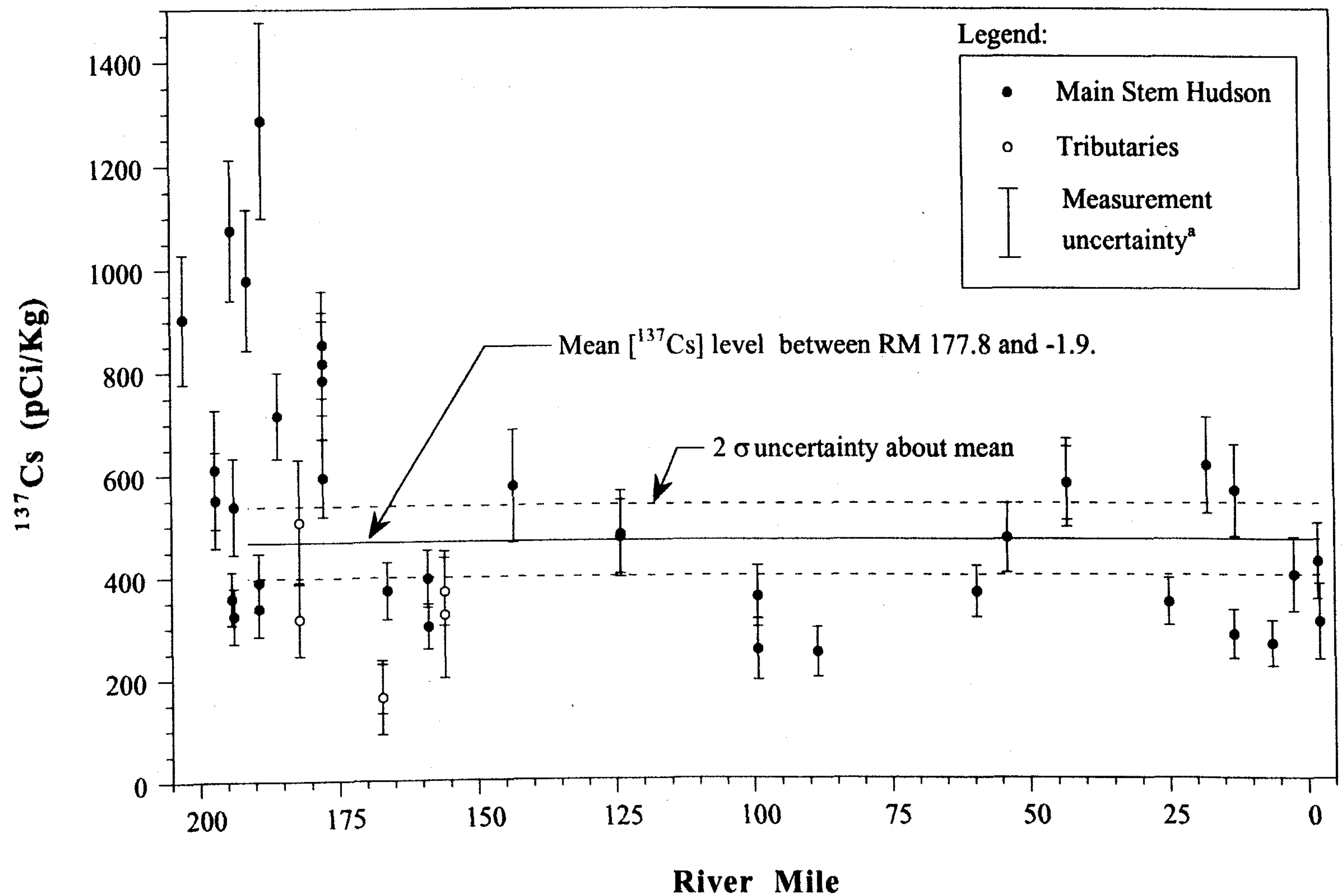
b. Duplicate pairs exist on all graphs at River Miles 177.8 and 43.2. The solid symbol represents the mean of the duplicate pair.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-62
Total PCB Content in Sediment vs. River Mile

HRP 002 2100



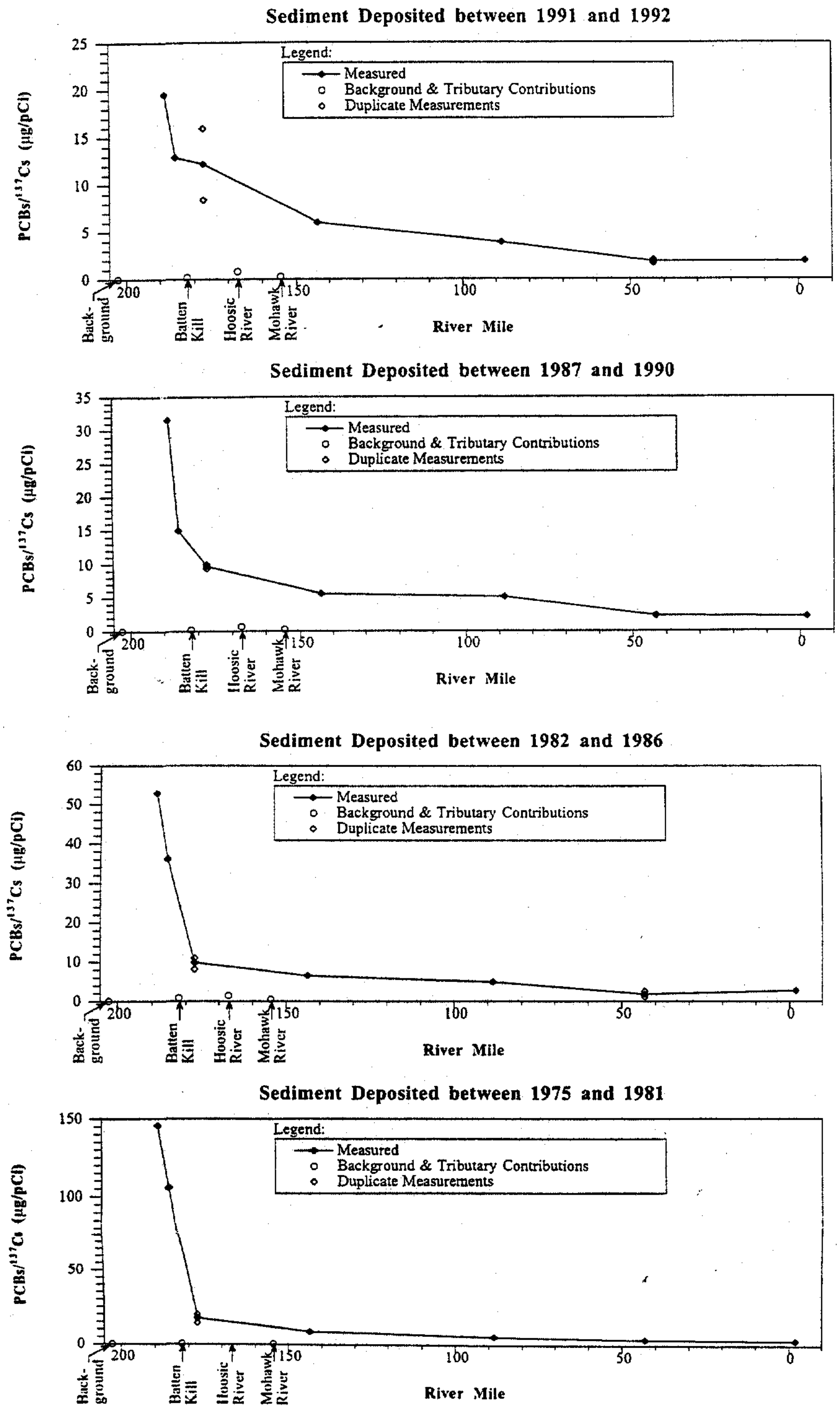
Notes:
a. Measurement uncertainty represents ± two standard deviations (±2σ).

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-63

^{137}Cs Levels in Surface Sediments in the Hudson River Based on High-Resolution Sediment Coring Results



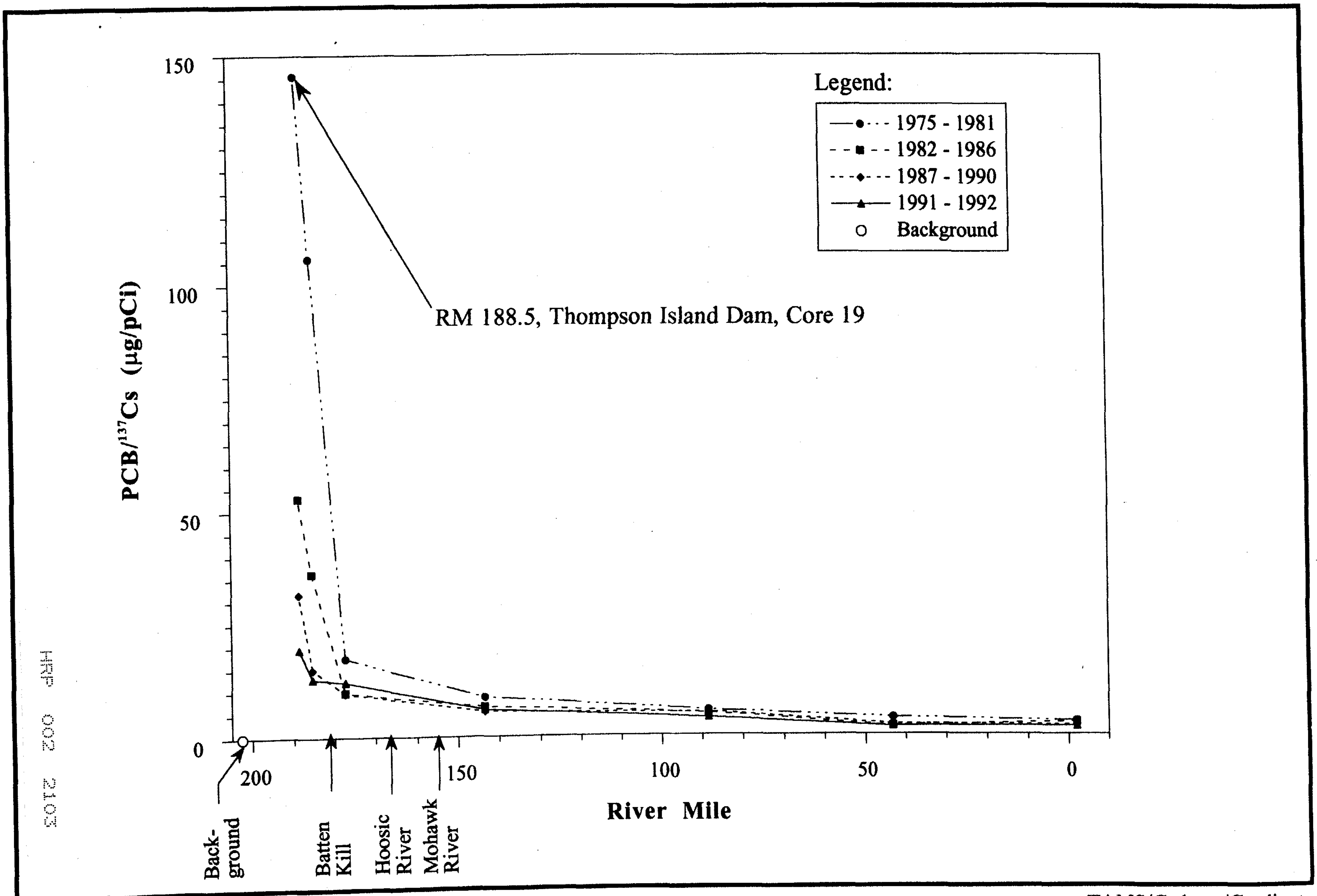
Note:
a. Vertical axis range increases in successive diagrams as age of sediment represented increases.
b. Duplicate pairs exist on all graphs at River Miles 177.8 and 43.2. The solid symbol represents the mean of the duplicate pair.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-64
Total PCBs/^{137}Cs Content in Sediment vs. River Mile

HRP 002 2102



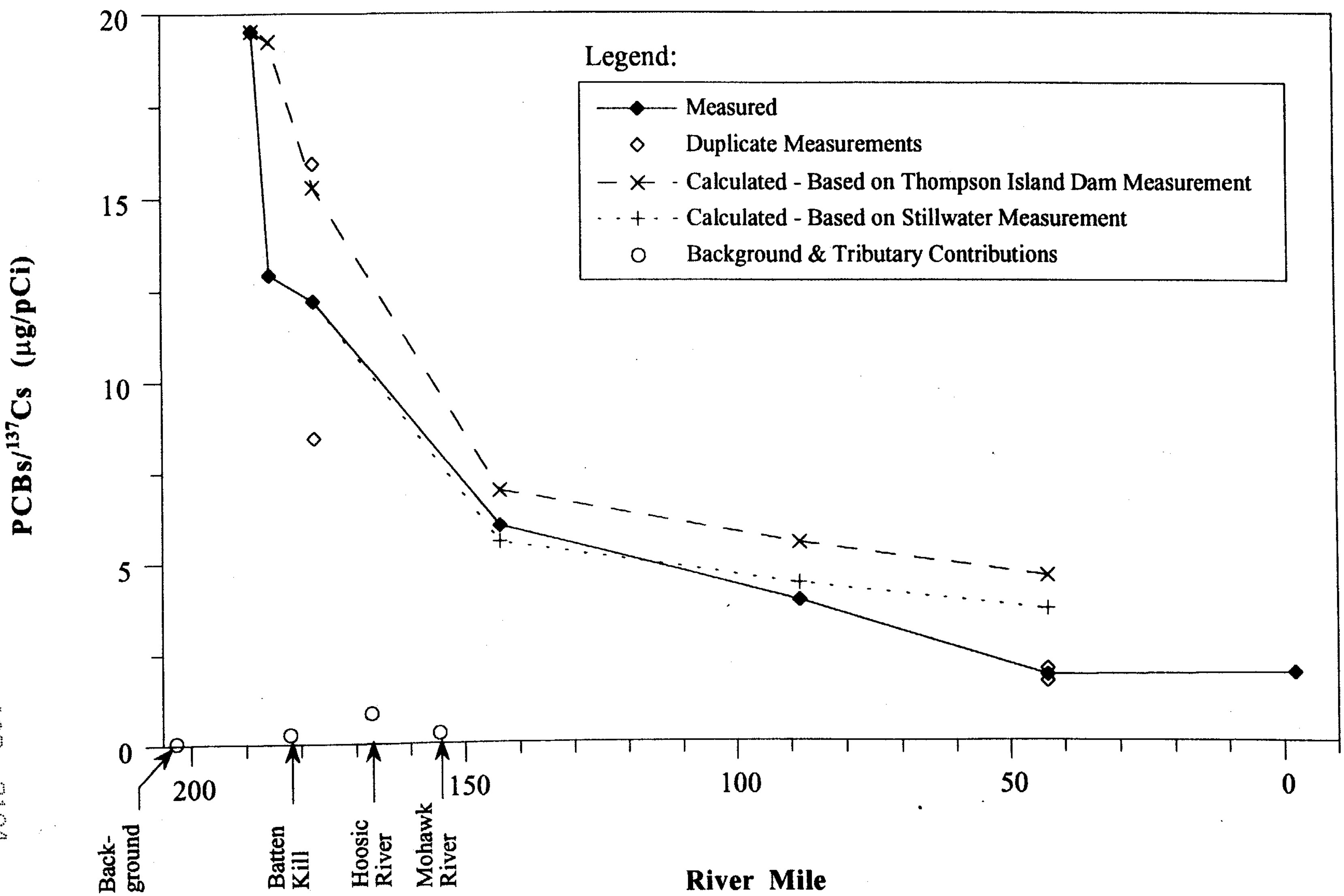
HRP 002 2103

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-65

Time Interval Comparison for Total PCBs/^{137}Cs Ratios: 1975 through 1992



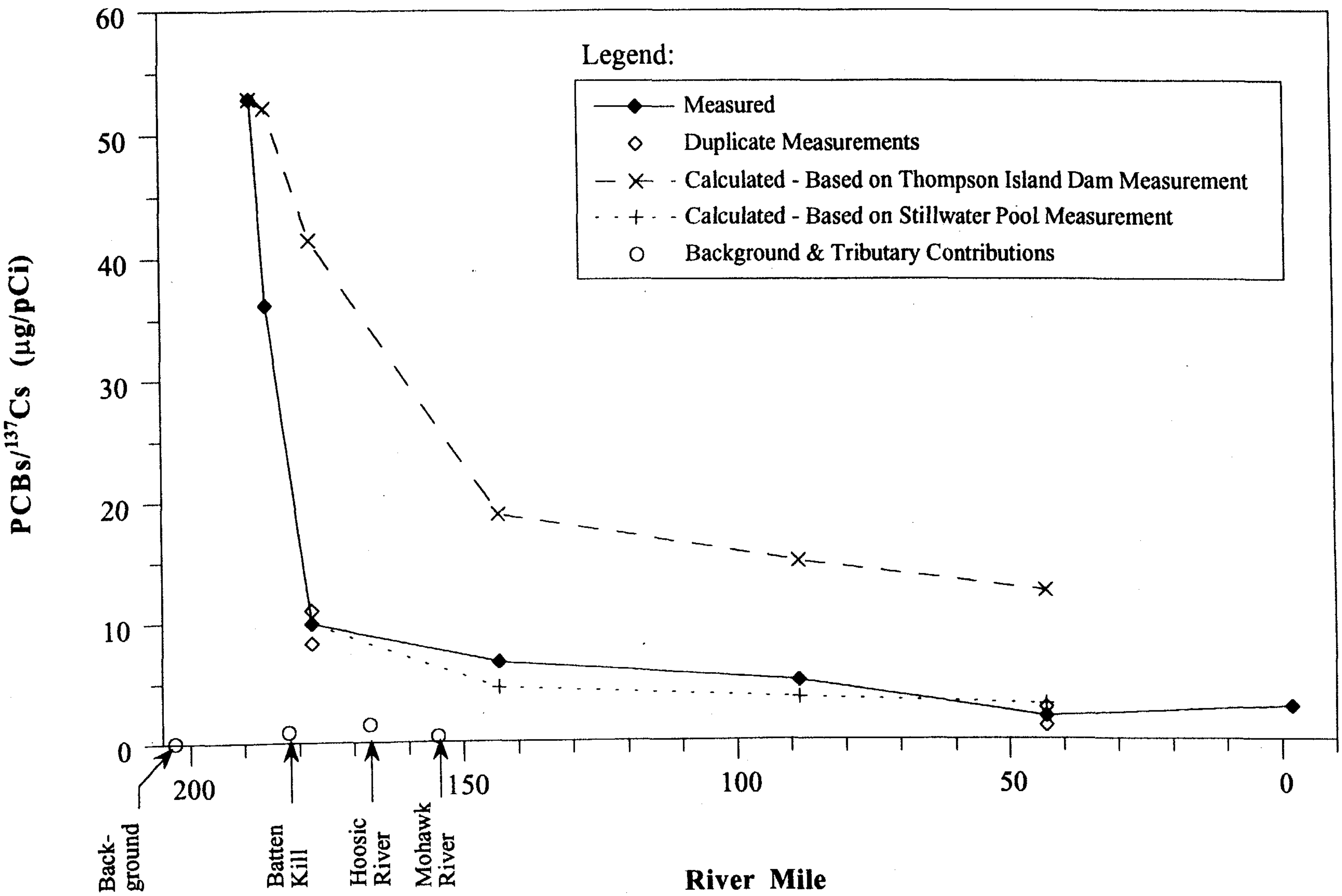
Note:
a. Duplicate pairs exist at River Miles 177.8 and 43.2. The solid symbol represents the mean of the duplicate pair.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-66

Comparison of Measured and Calculated Total PCBs/^{137}Cs Ratios for Sediment Deposited between 1991 and 1992



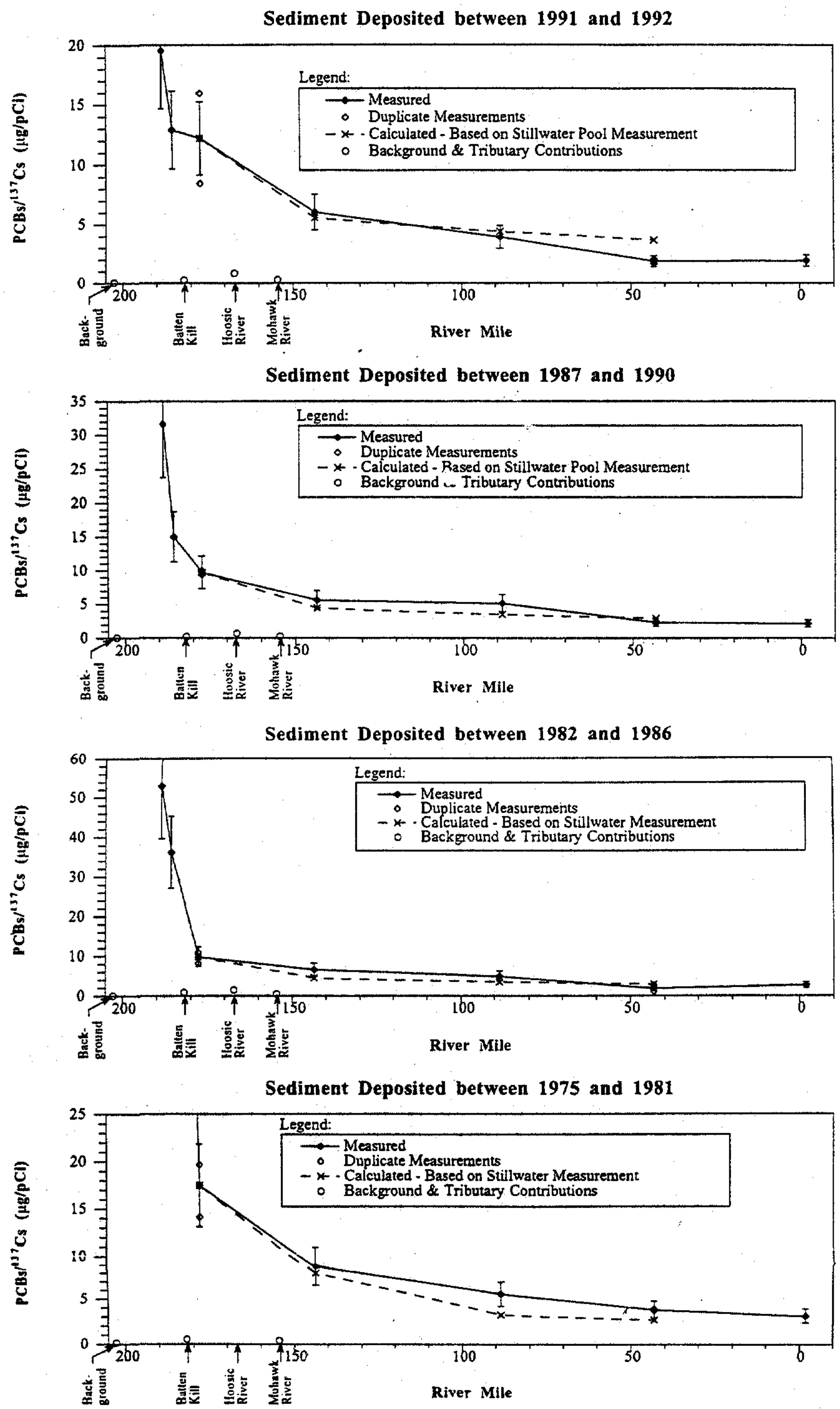
Note:
Duplicate pairs exist at River Miles 177.8 and 43.2. The solid symbol represents the mean of the duplicate pair.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-67

Comparison of Measured and Calculated Total PCBs/^{137}Cs Ratios for Sediment Deposited between 1982 and 1986



Note:
a. Vertical axis range increases in successive diagrams as age of sediment represented increases.
b. Error bars represent ±25% uncertainty in the measured value.
c. Duplicate pairs exist on all graphs at River Miles 177.8 and 43.2. The solid symbol represents the mean of the duplicate pair.

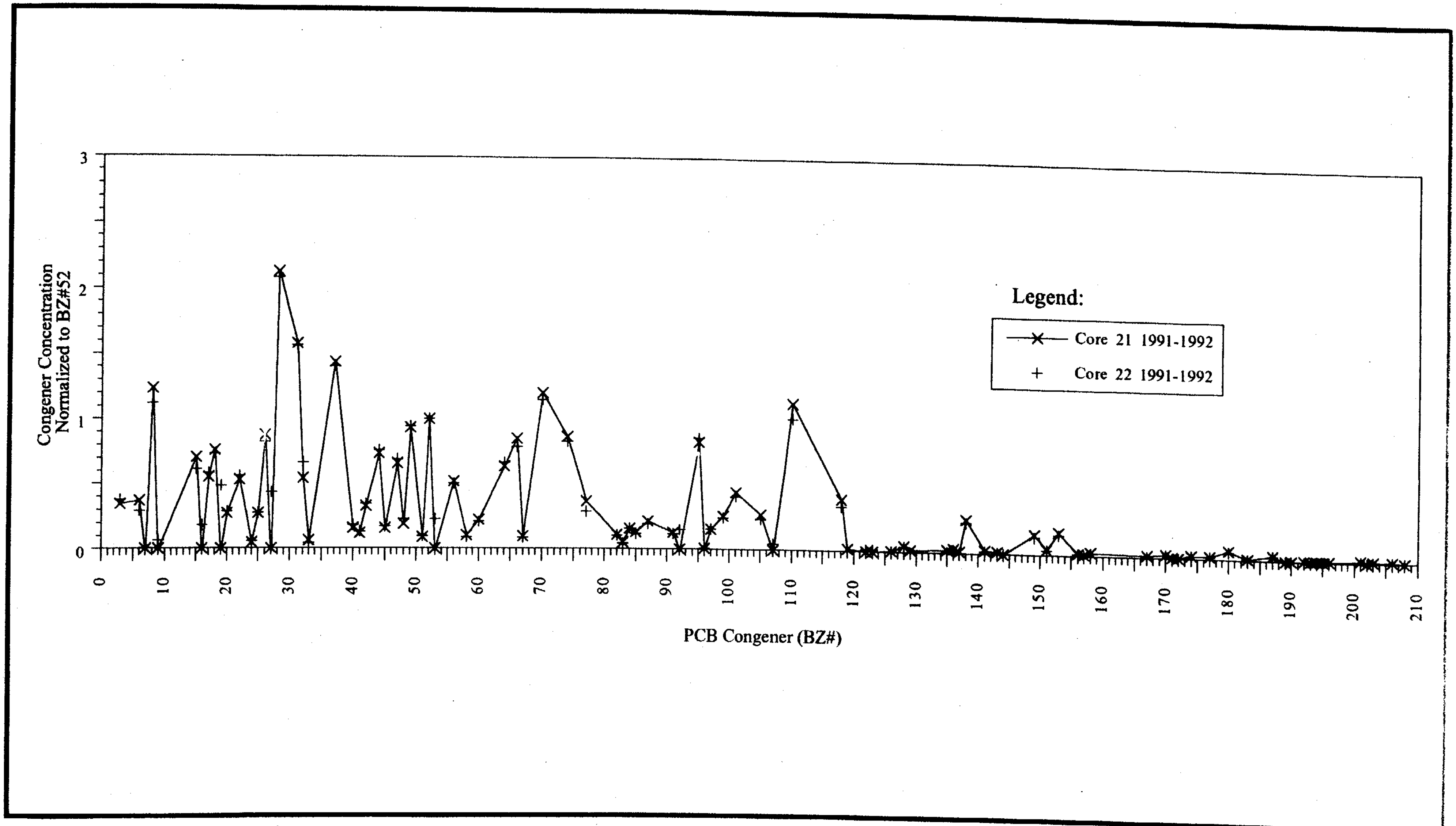
Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2106

Figure 3-68

Total PCBs/^{137}Cs Ratios in Dated Sediment vs. River Mile: A Comparison of Calculated and Measured Results

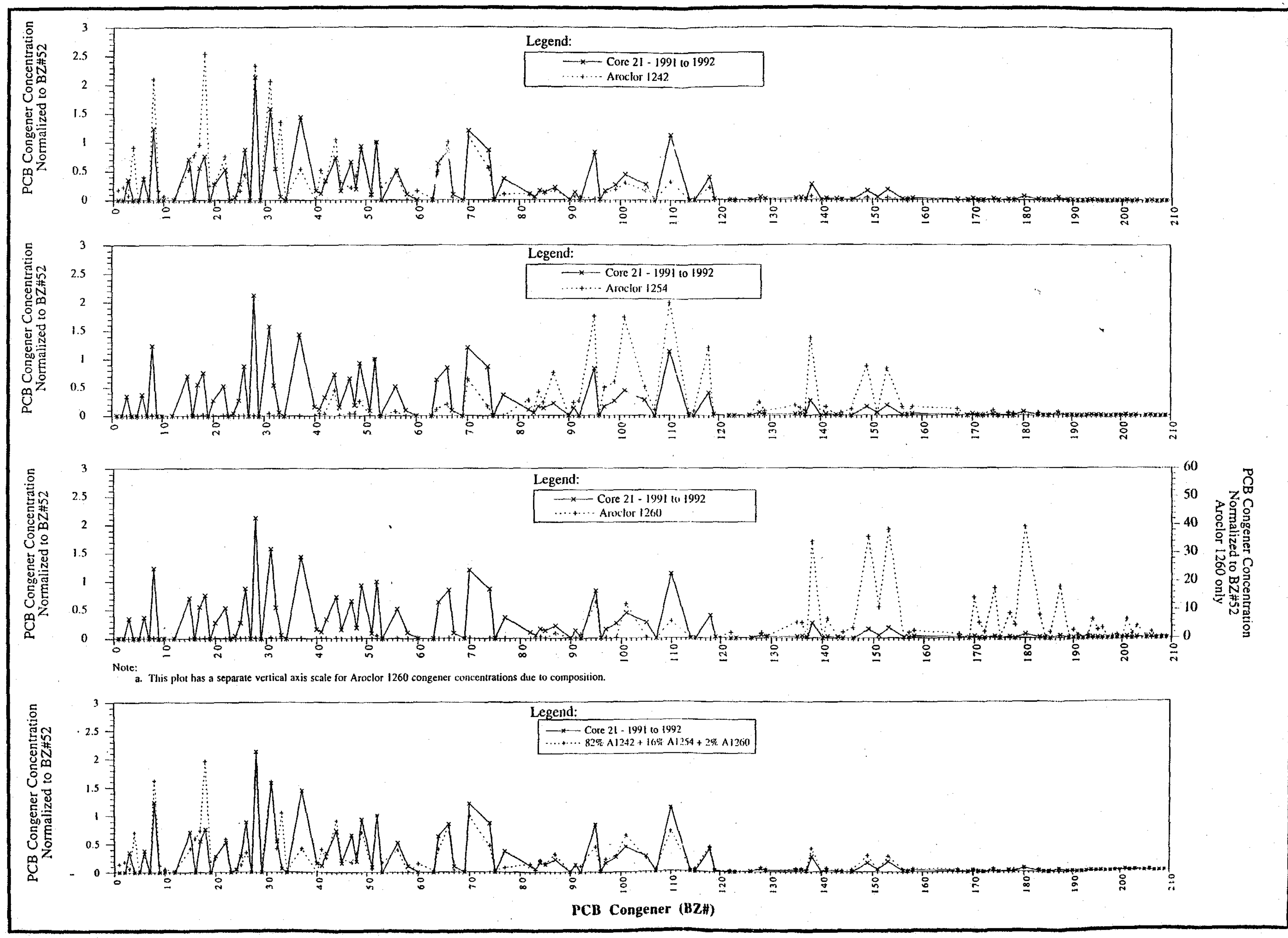


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-69
Comparison of the Duplicate Core Results on a Congener Basis for RM 177.8 near Stillwater for 1991 to 1992

HRP 002 2107

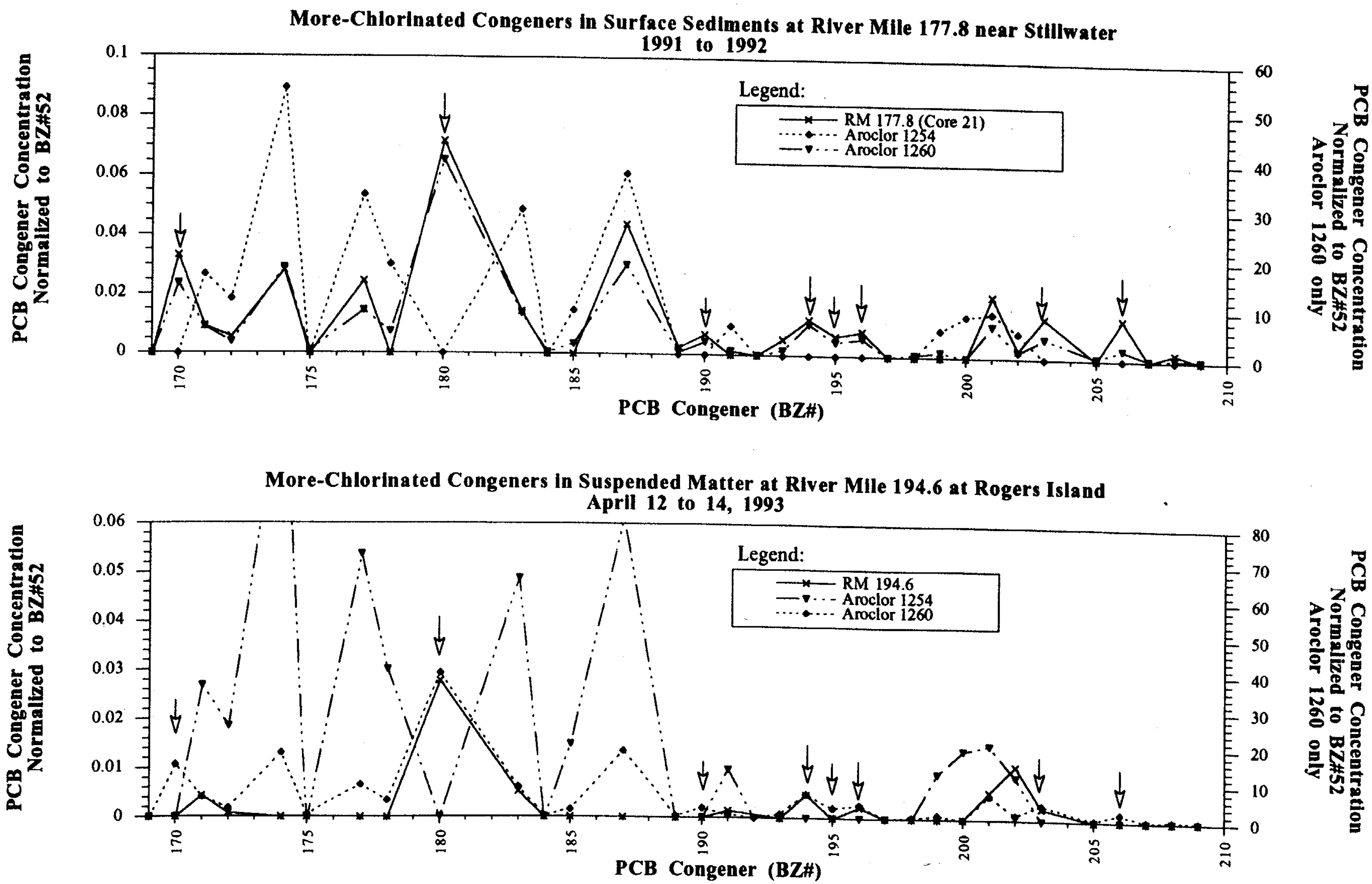


Note:
a. This plot has a separate vertical axis scale for Aroclor 1260 congener concentrations due to composition.

Figure 3-70
A Comparison between the Post-1990 Sediment PCB Congener Pattern for Core 21 at River Mile 177.8 near Stillwater and Three Aroclor Mixtures

Source: TAMS/Gradient Database

HRP 002 2108

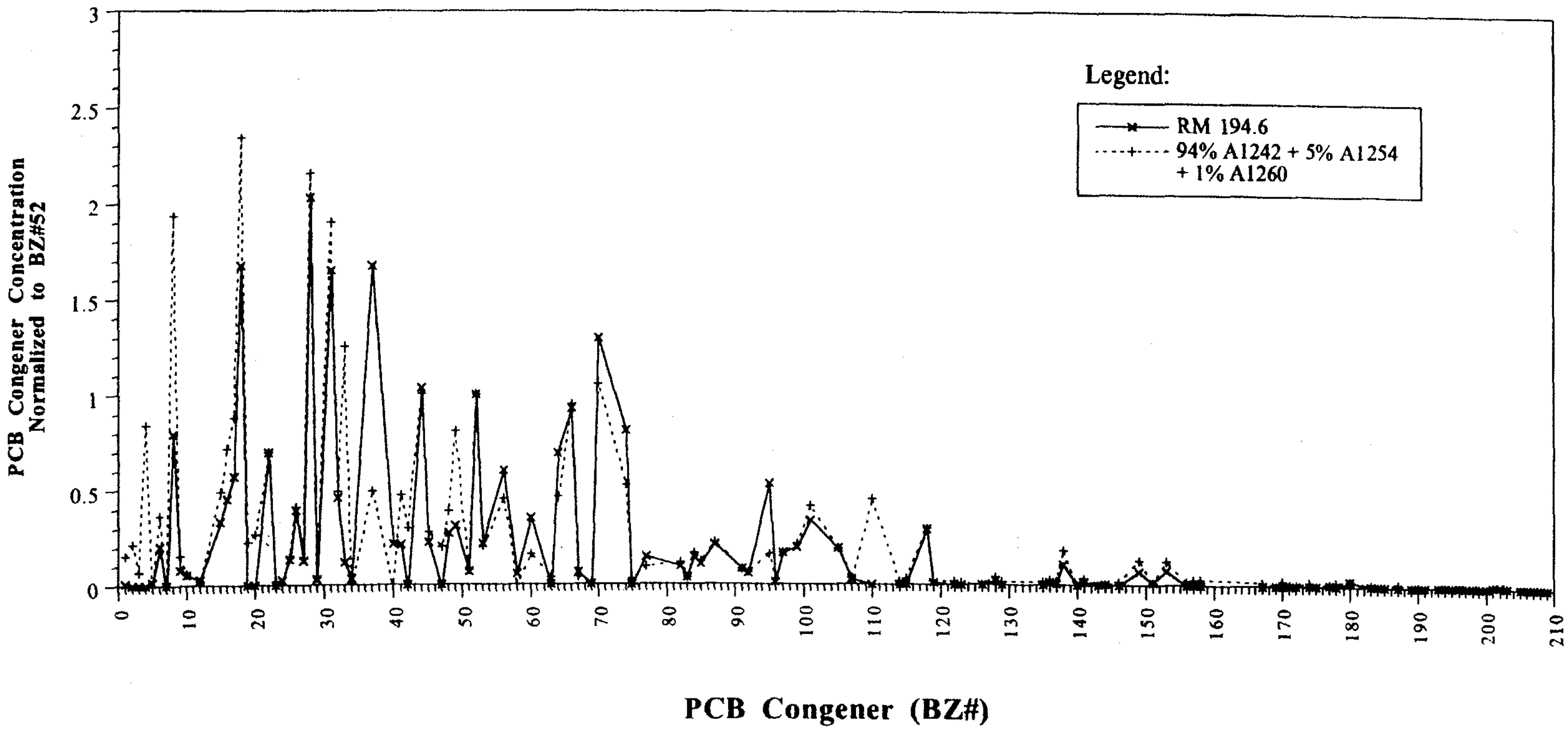


Note:
a. Arrows indicate detected target congeners unique to Aroclor 1260.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-71
Normalized PCB Congener Concentrations in Stillwater 1991 to 1992 Sediments and Rogers Island Suspended Matter vs. Aroclors 1254 and 1260

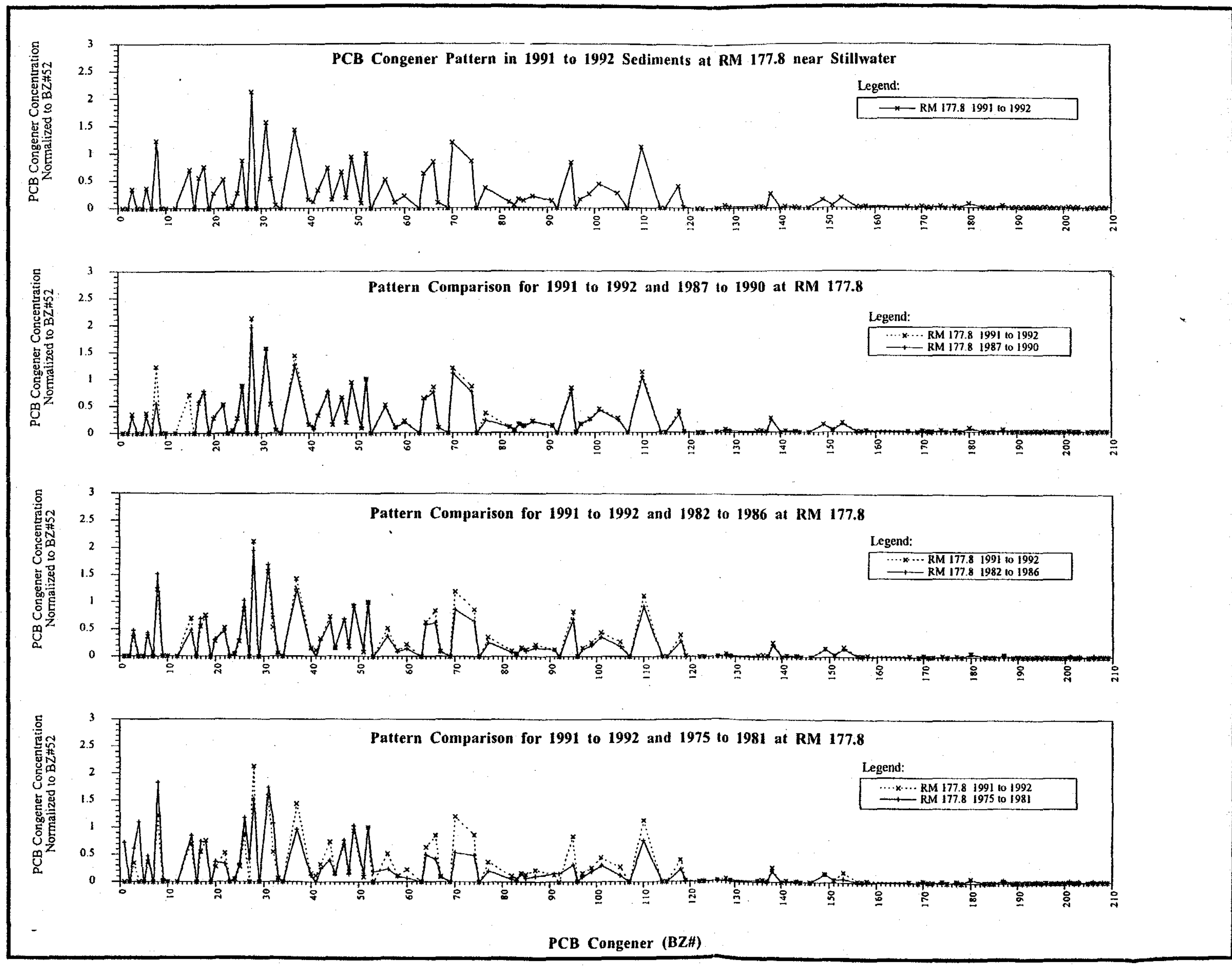


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-72
Comparison of PCB Congener Patterns: Suspended Matter from River Mile 194.6 at Rogers Island for Transect 4, April 12 to 14, 1993 and a Mixture of 94% Aroclor 1242 + 5% Aroclor 1254 + 1% Aroclor 1260

HRP 002 2110

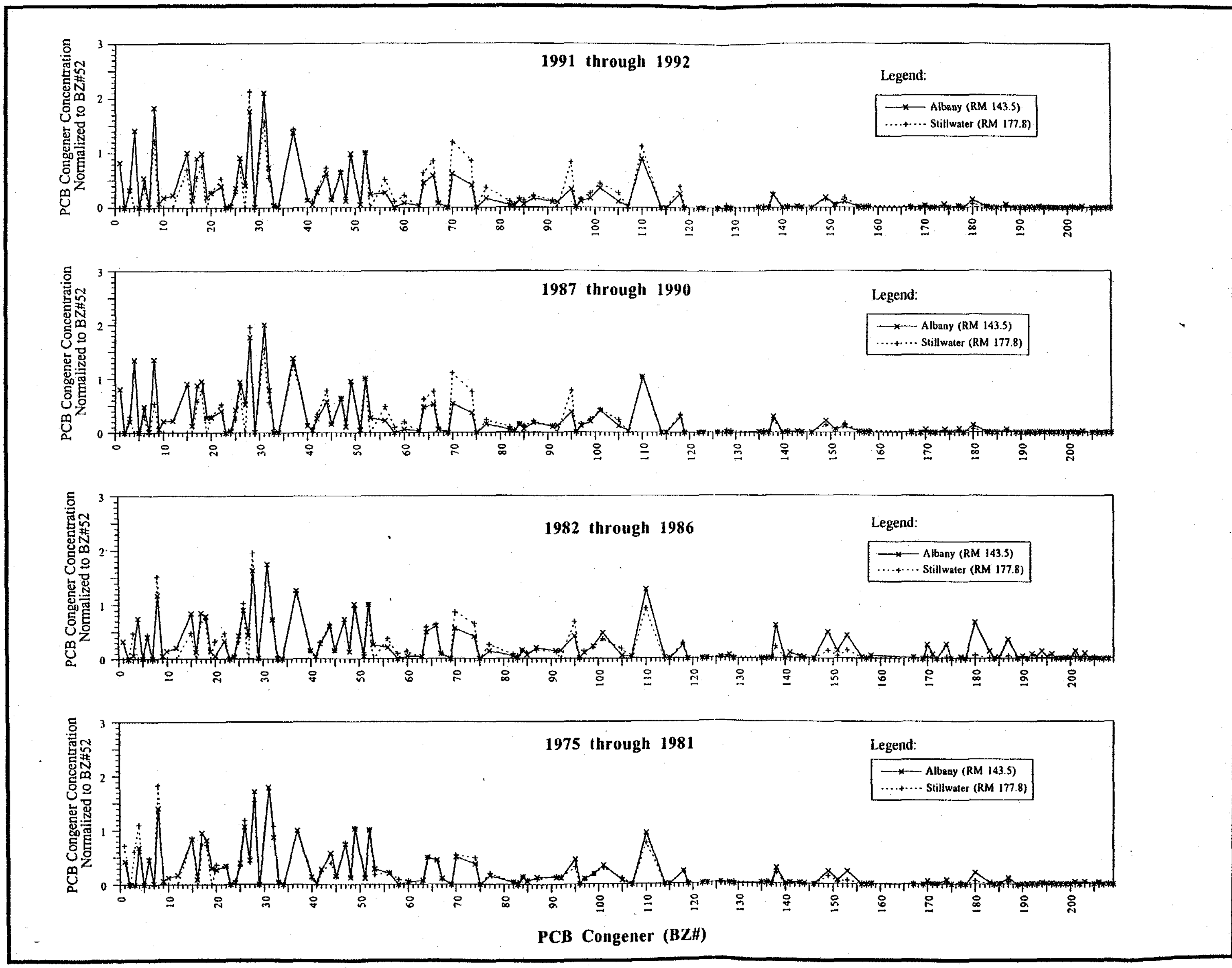


TAMS/Cadmus/Gradient

Source: TAMS/Gradient Database

Figure 3-73
A Comparison between the 1991 to 1992 PCB Congener Pattern at River Mile 177.8 near Stillwater with the Period 1975 to 1990

HRP 002 2111



TAMS/Cadmus/Gradient

Source: TAMS/Gradient Database

Figure 3-74
A Comparison of the PCB Congener Pattern Chronology between River Mile 143.5 near Albany and River Mile 177.8 near Stillwater for 1975 to 1992

HRP 002 2112

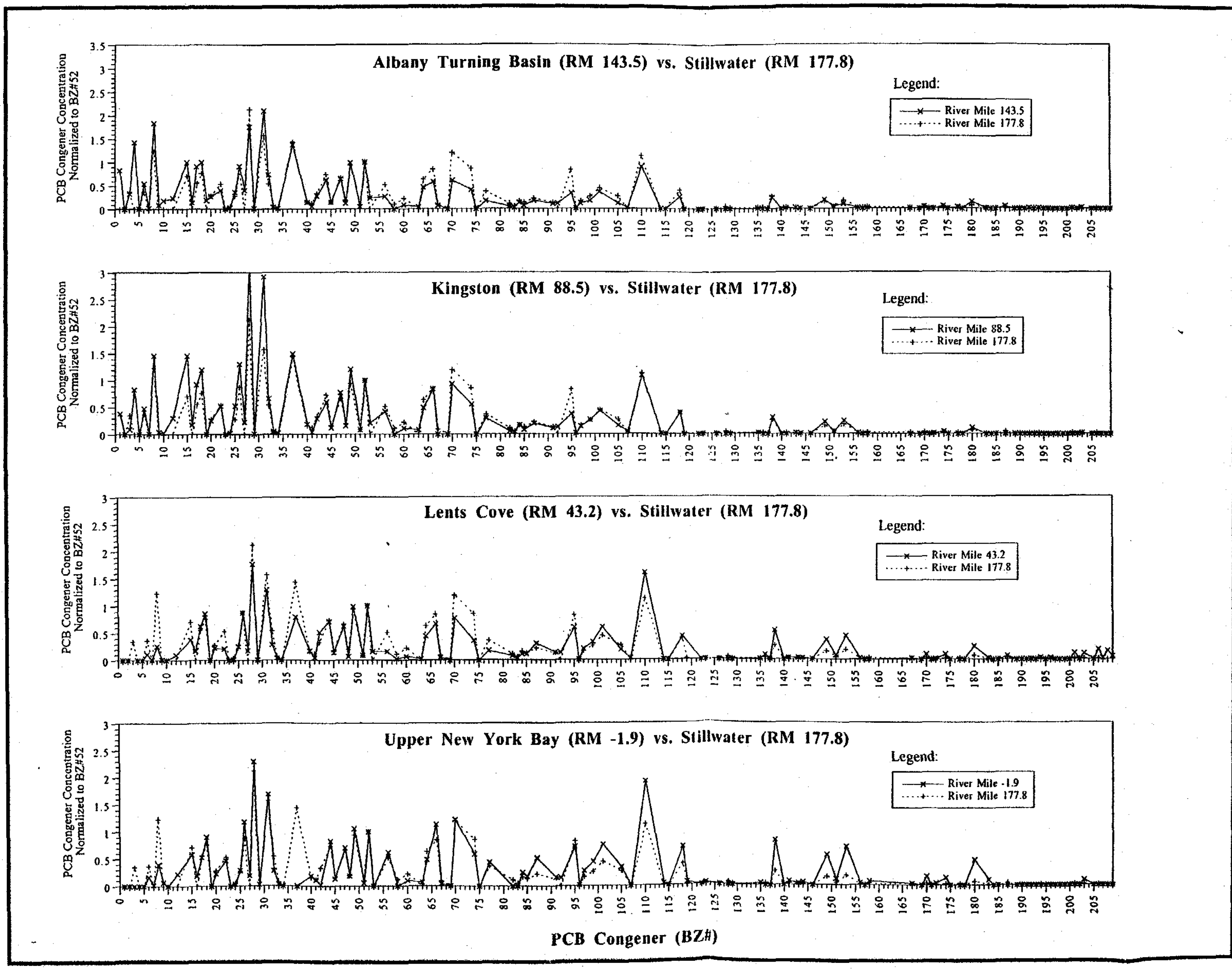
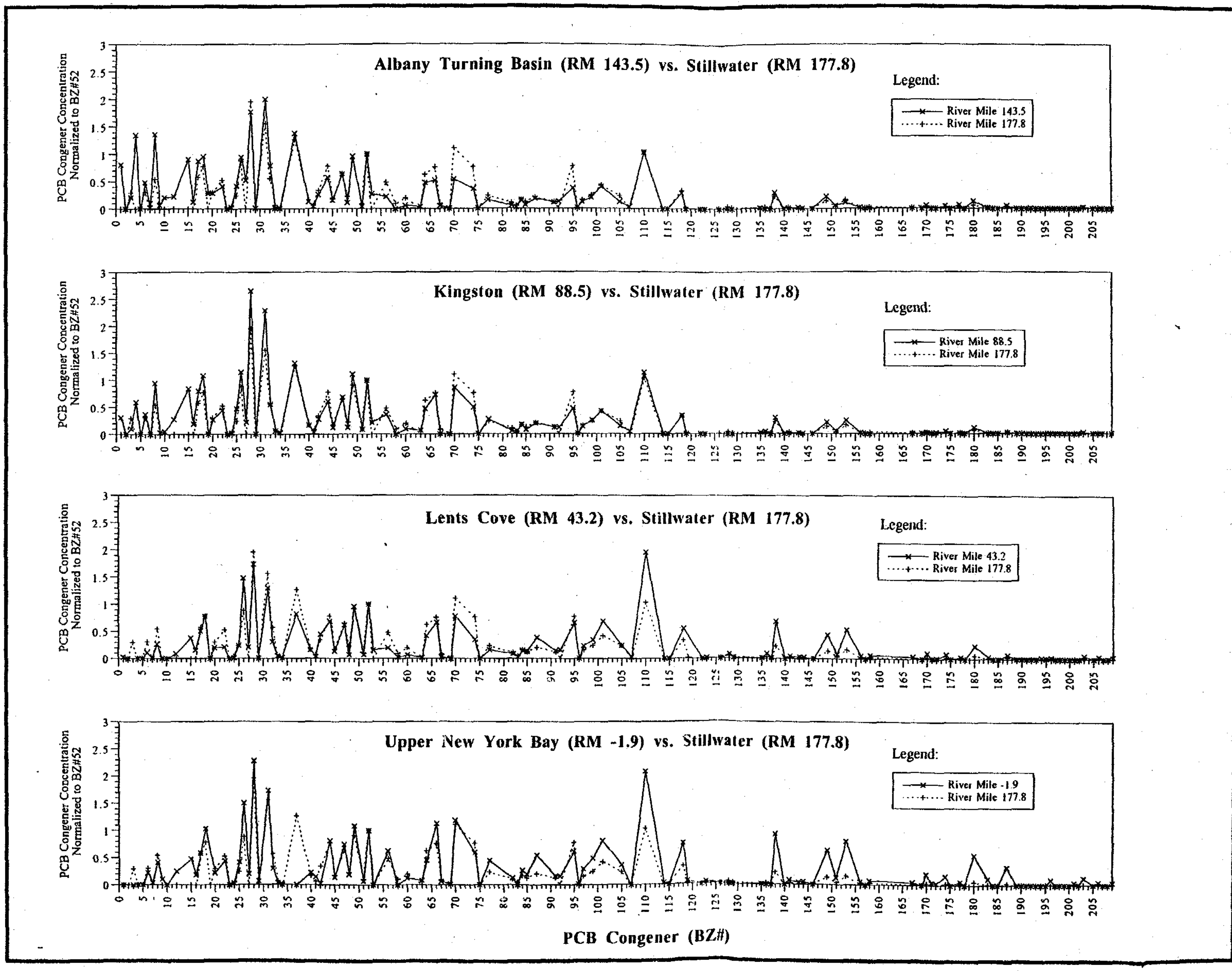


Figure 3-75
A Comparison of the Combined Thompson Island Dam PCB Load Congener Pattern Recorded at Stillwater with Downstream Congener Patterns in Sediments Dated Post-1990

HRP 002 2113

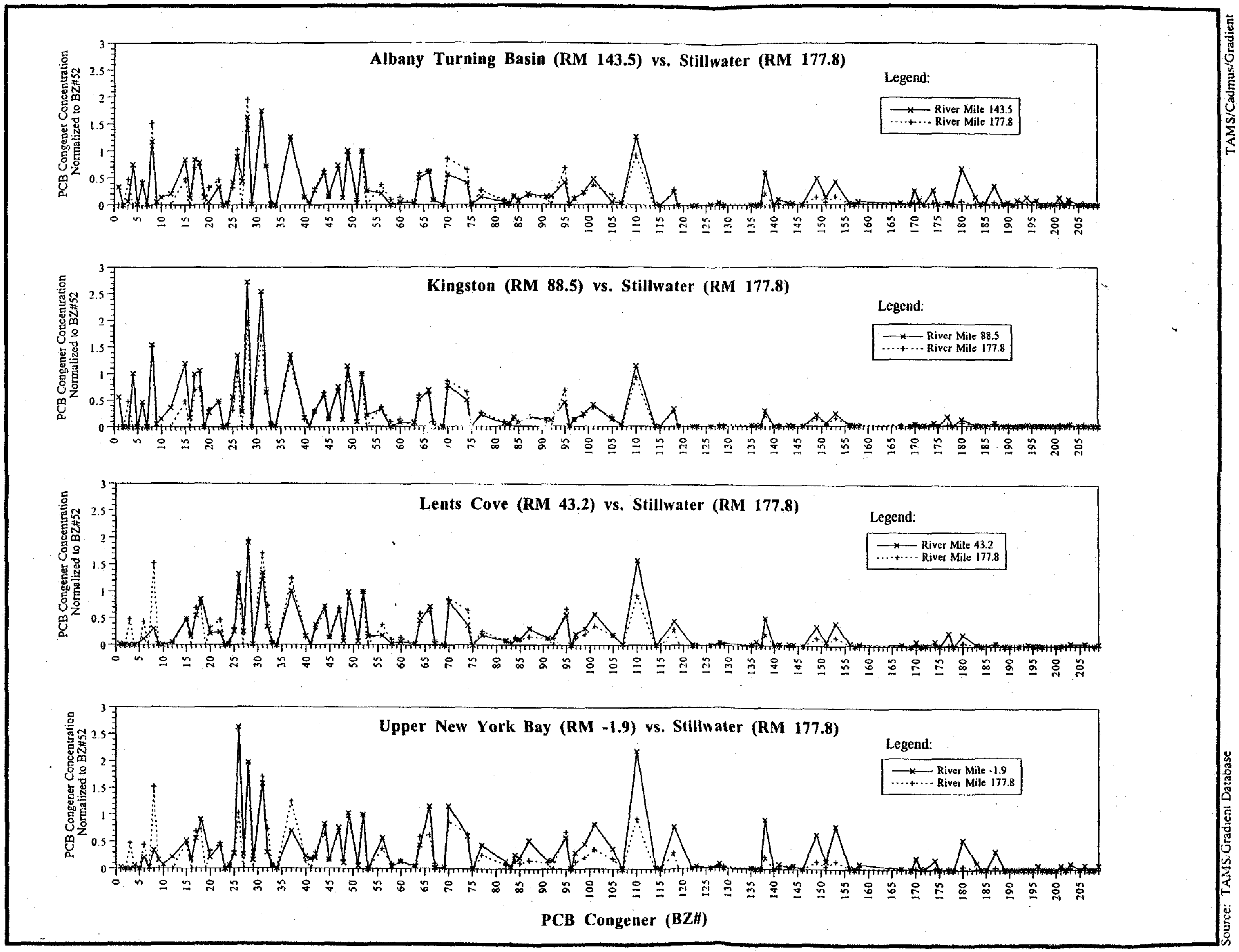


TAMS/Cadmus/Gradient

Source: TAMS/Gradient Database

Figure 3-76
A Comparison of the Combined Thompson Island Dam PCB Load Congener Pattern Recorded at Stillwater with Downstream Congener Patterns in Sediments Dated 1987 to 1990

HRP 002 2114



TAMS/Cadmus/Gradient

Source: TAMS/Gradient Database

Figure 3-77
A Comparison of the Combined Thompson Island Dam PCB Load Congener Pattern Recorded at Stillwater with Downstream Congener Patterns in Sediments Dated 1982 to 1986

HRP 002 2115

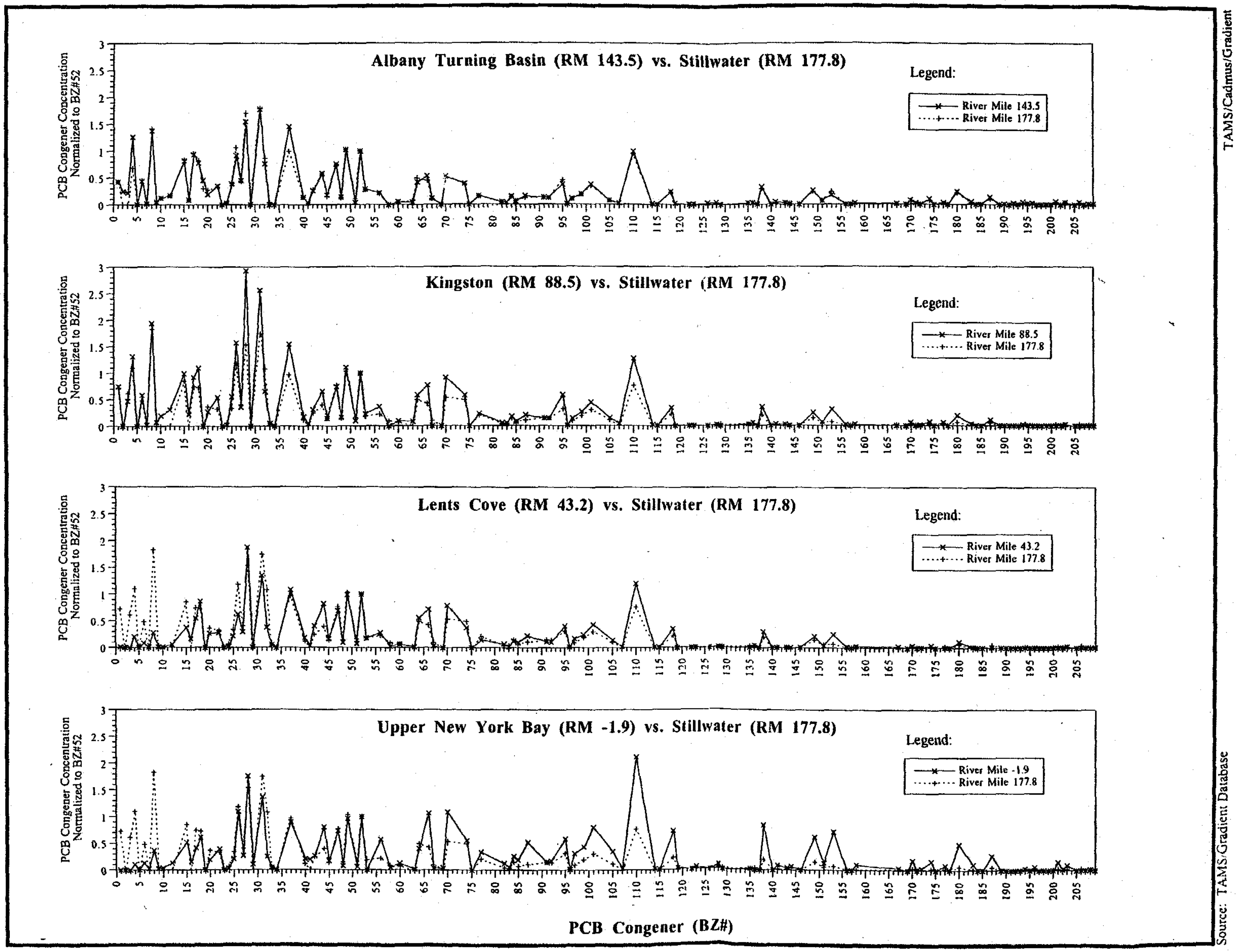
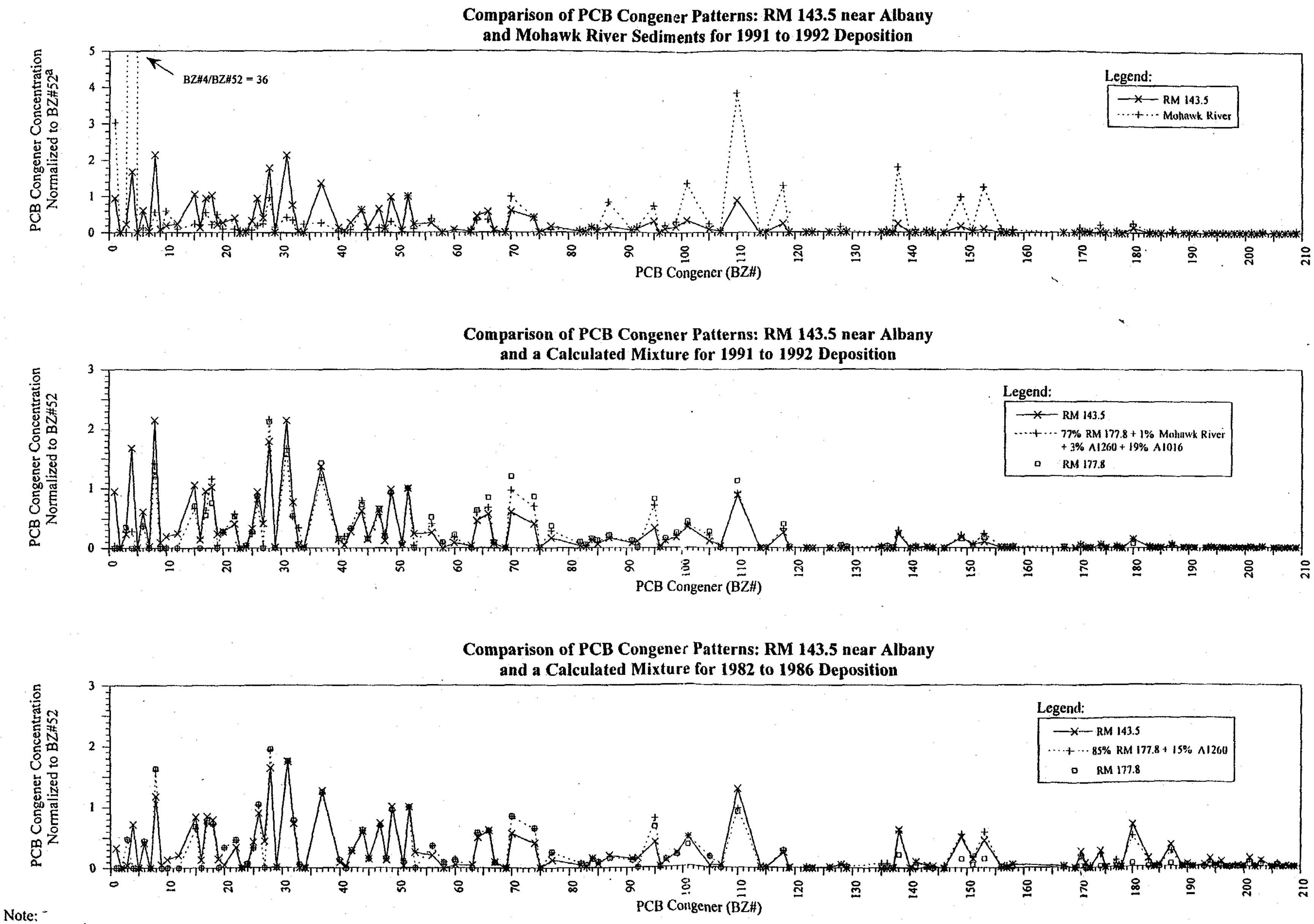


Figure 3-78
A Comparison of the Combined Thompson Island Dam PCB Load Congener Pattern Recorded at Stillwater with Downstream Congener Patterns in Sediments Dated 1975 to 1981

HRP 002 2116



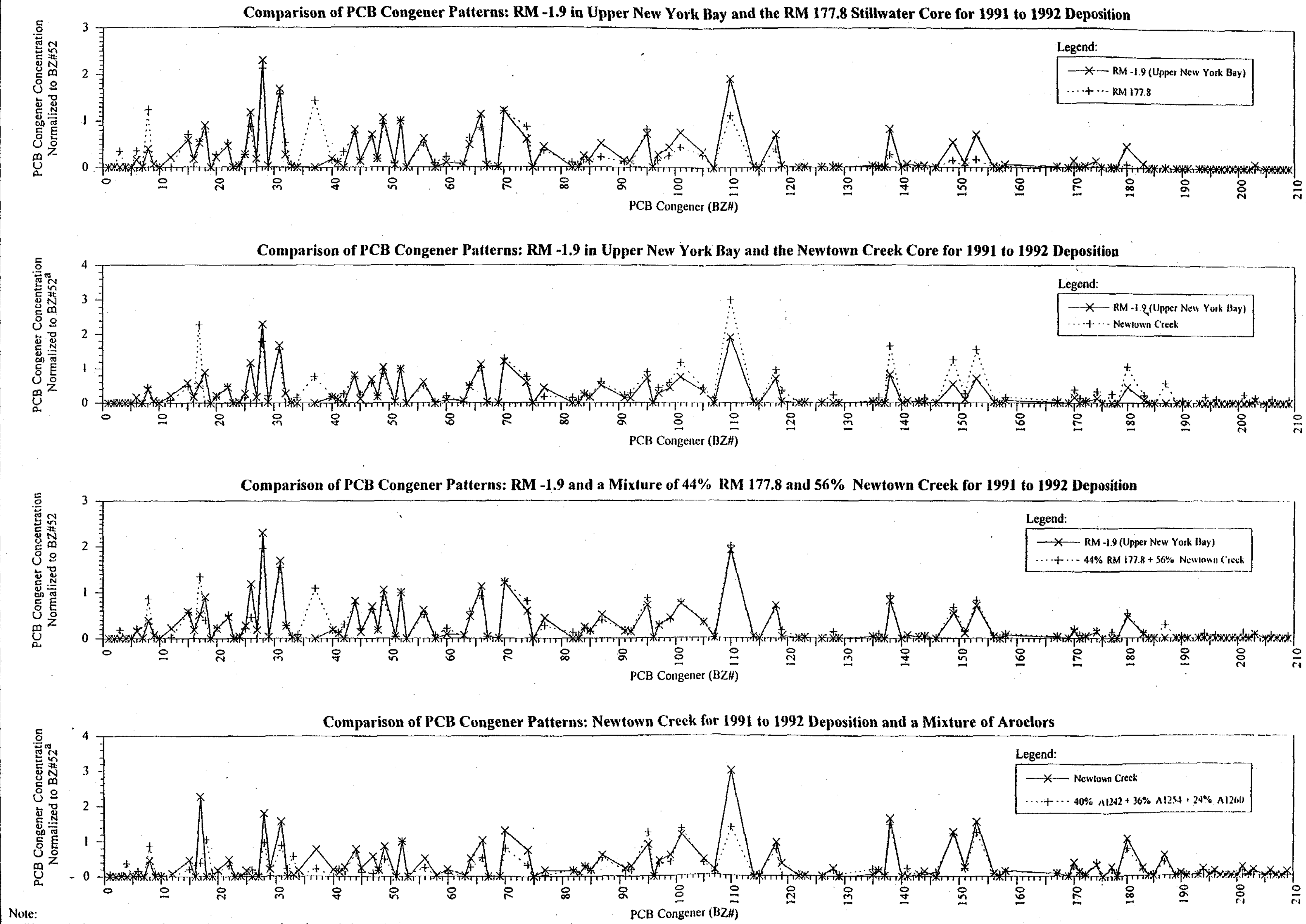
Note:
a. The vertical scale range is increased to accommodate the peak for BZ#110.

TAMS/Cadmus/Gradient

Source: TAMS/Gradient Database

Figure 3-79
Comparison of PCB Congener Patterns at River Mile 143.5

HRP 002 2117

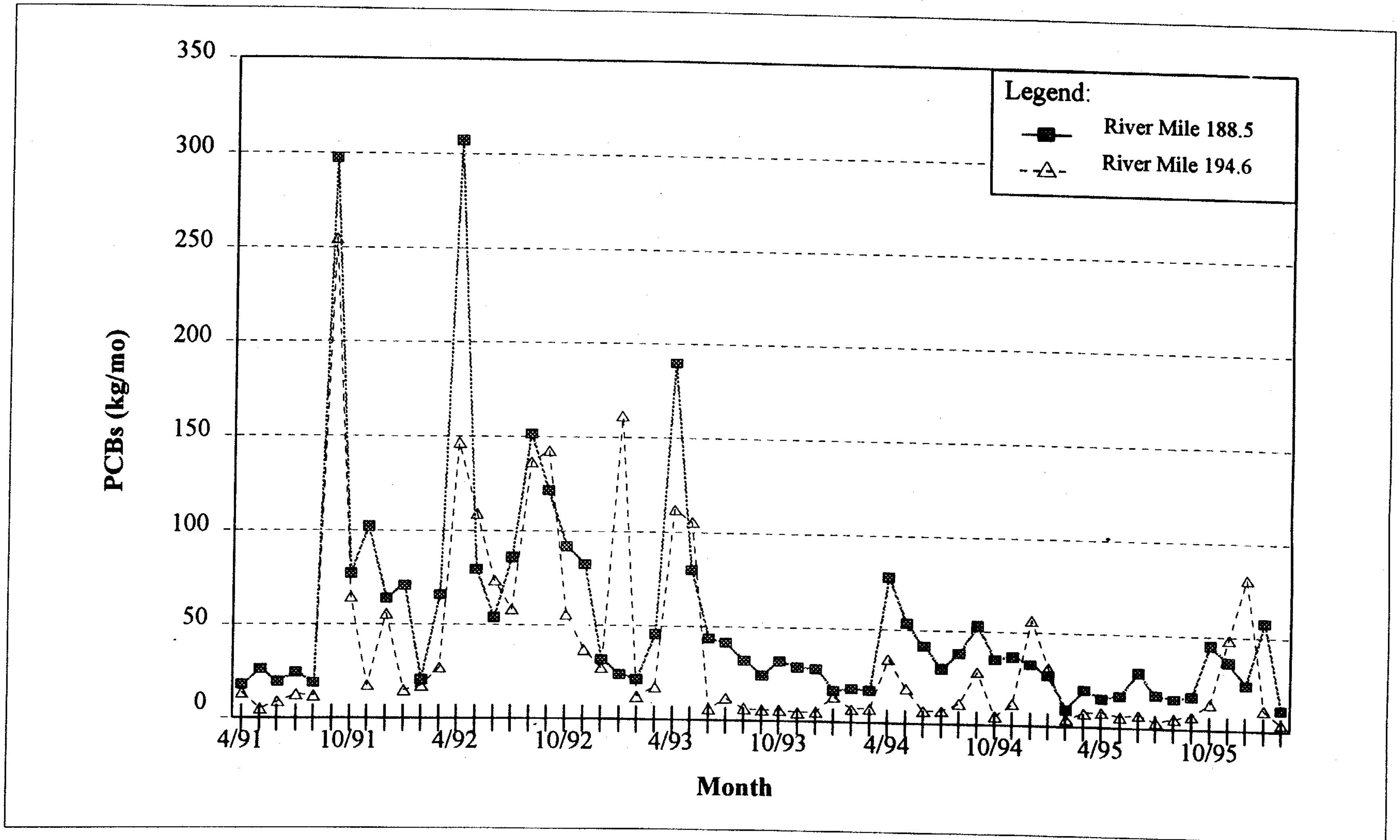


Note:
a. The vertical scale range is increased to accommodate the peak for BZ#110.

Source: TAMS/Gradient Database

Figure 3-80
Comparison of PCB Congener Patterns at River Mile -1.9

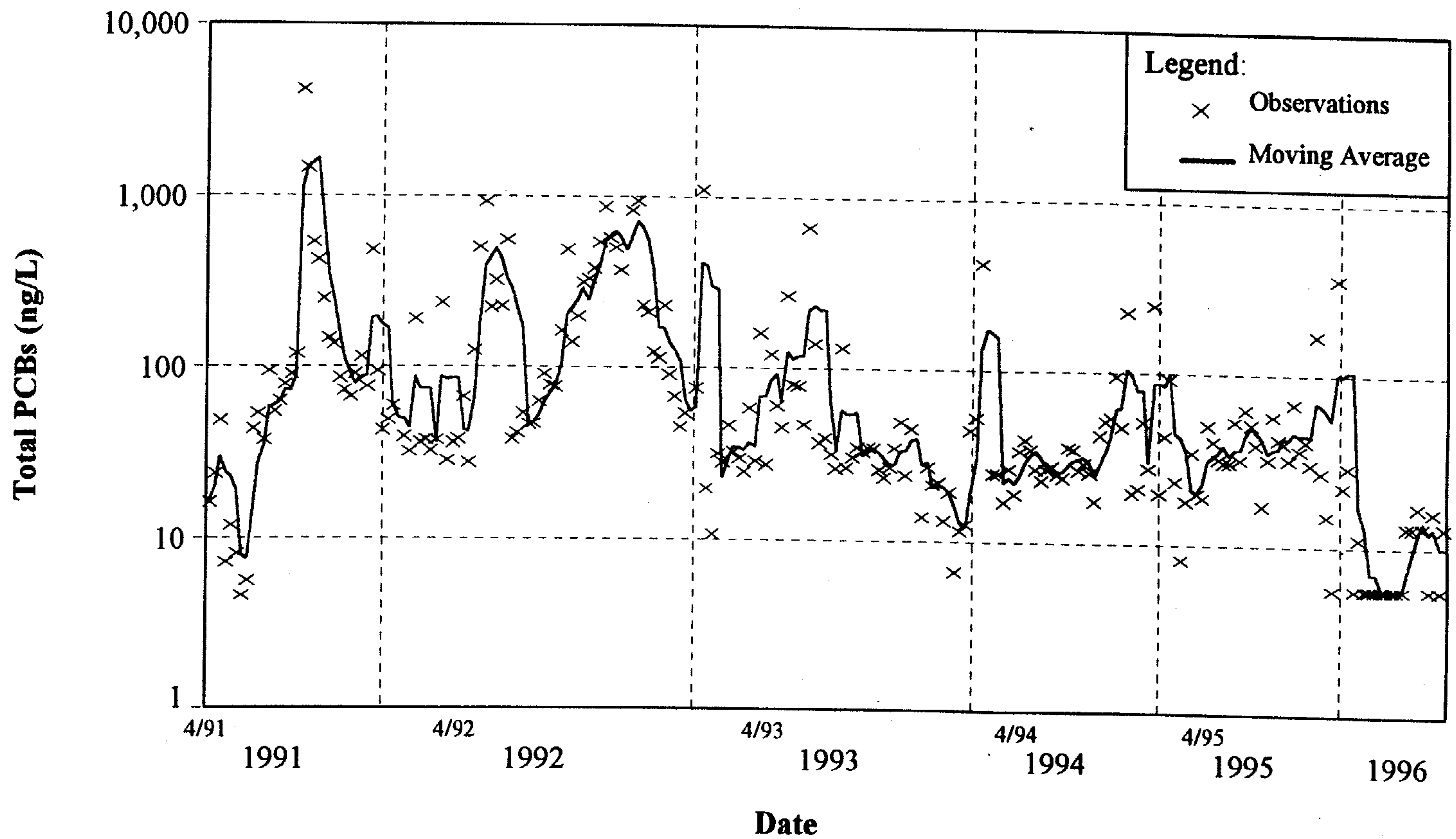
HRP 002 2118



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

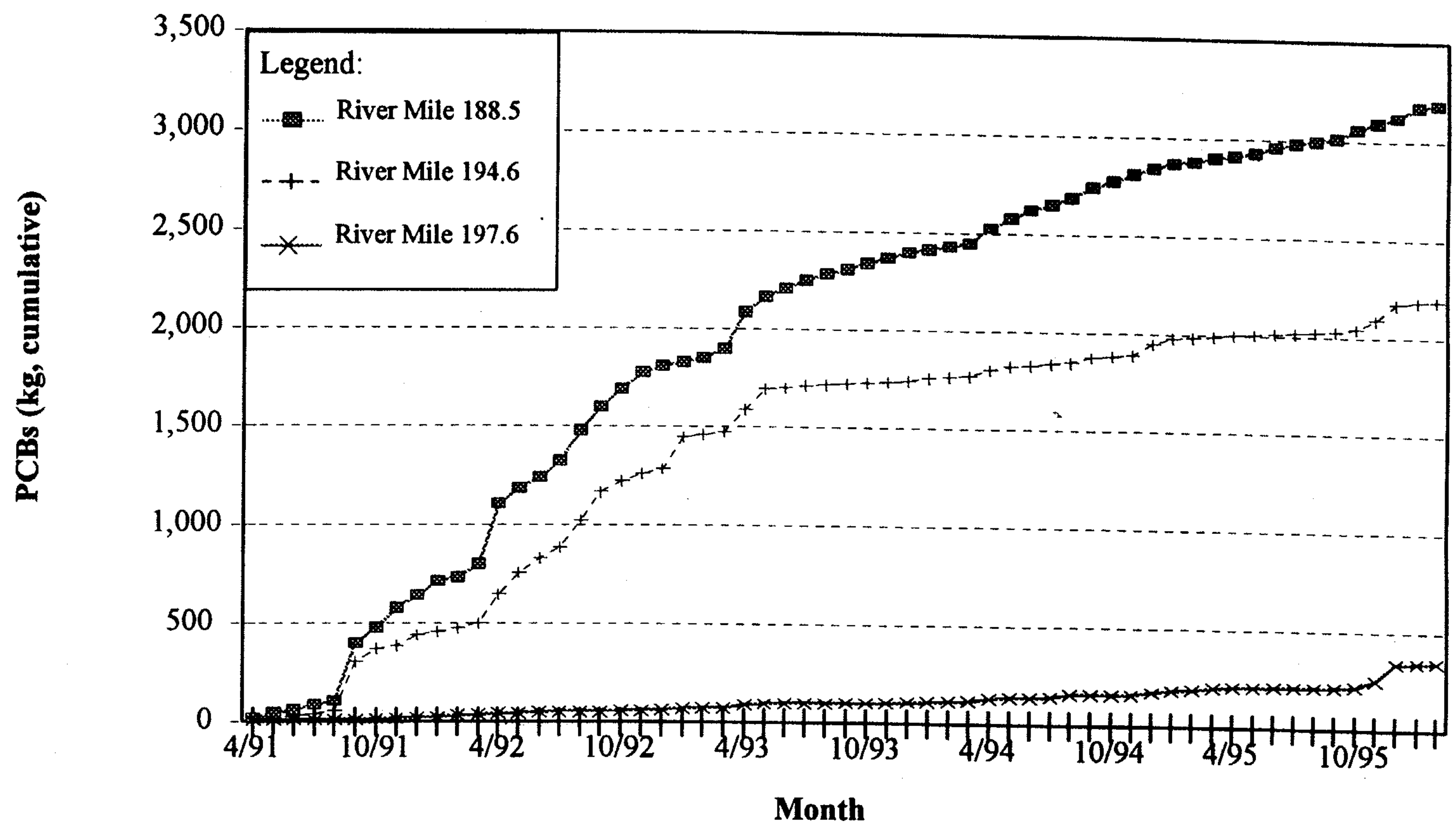
Figure 3-81
Monthly PCB Load, River Mile 194.6 at Rogers Island and River Mile 188.5 at Thompson Island Pool Averaging Estimate on GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

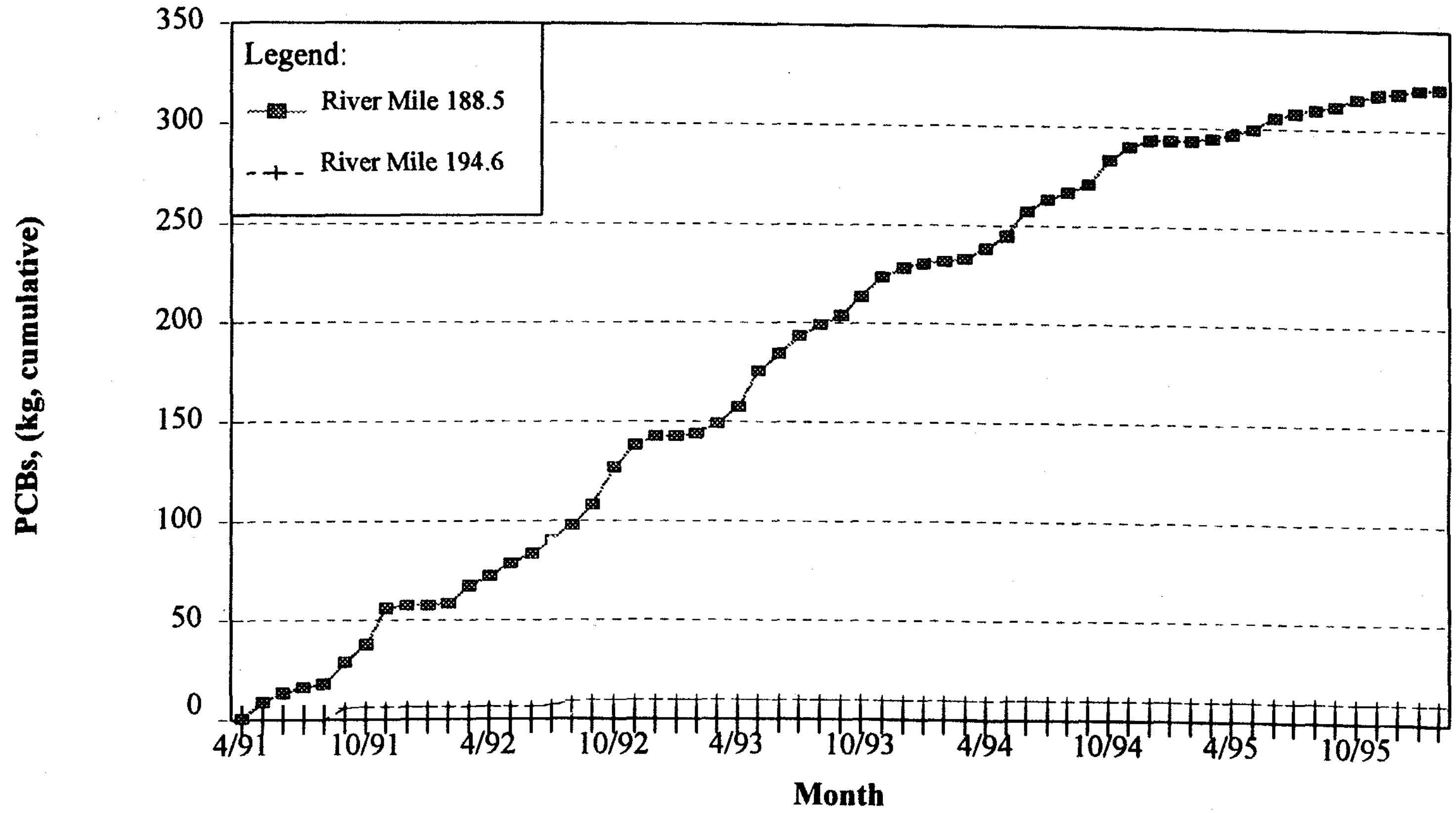
Figure 3-82
Total PCB Concentrations at River Mile 194.6
GE Data, with Moving Average



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

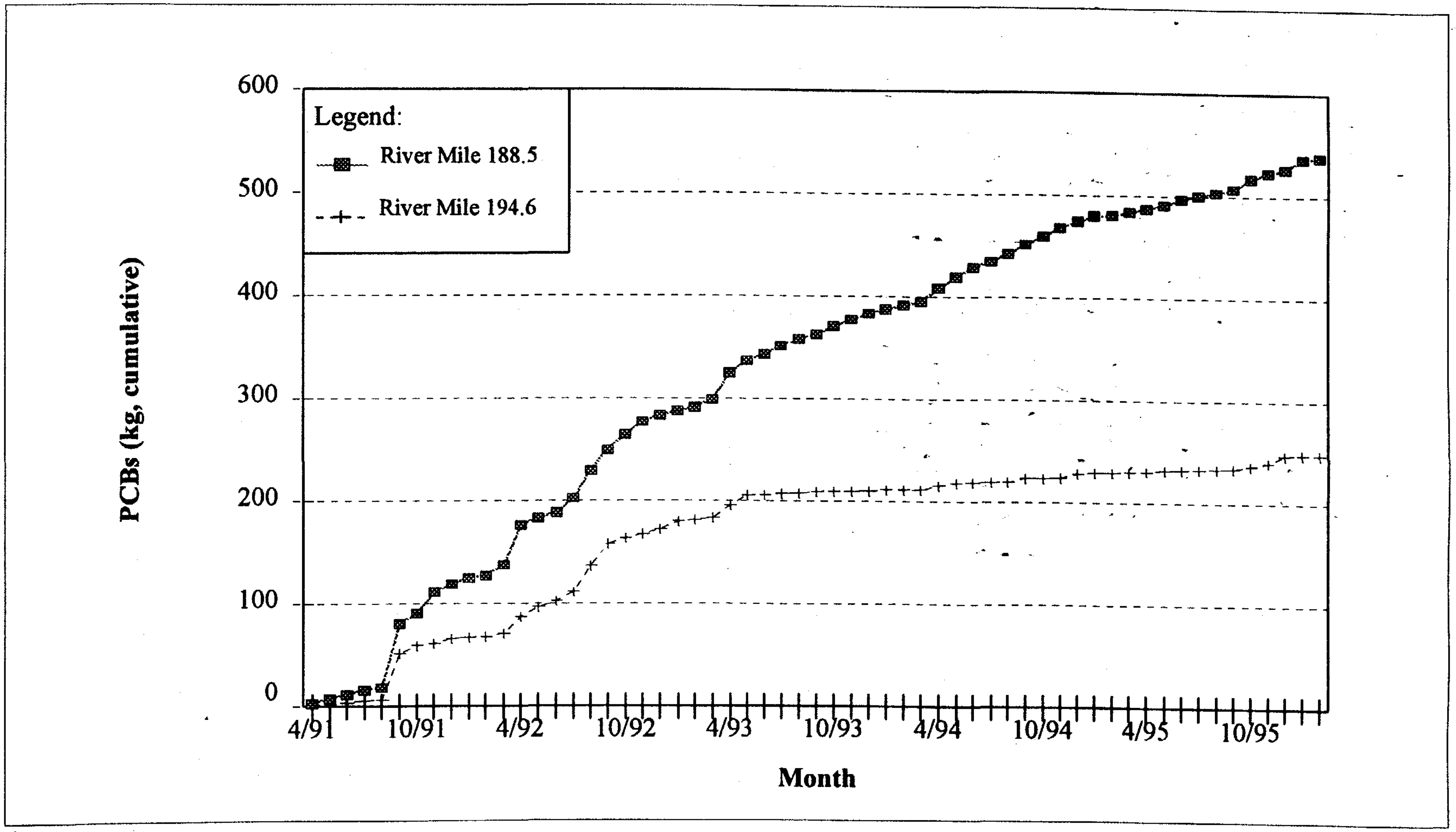
Figure 3-83
Load across the Thompson Island Pool
Total PCBs, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

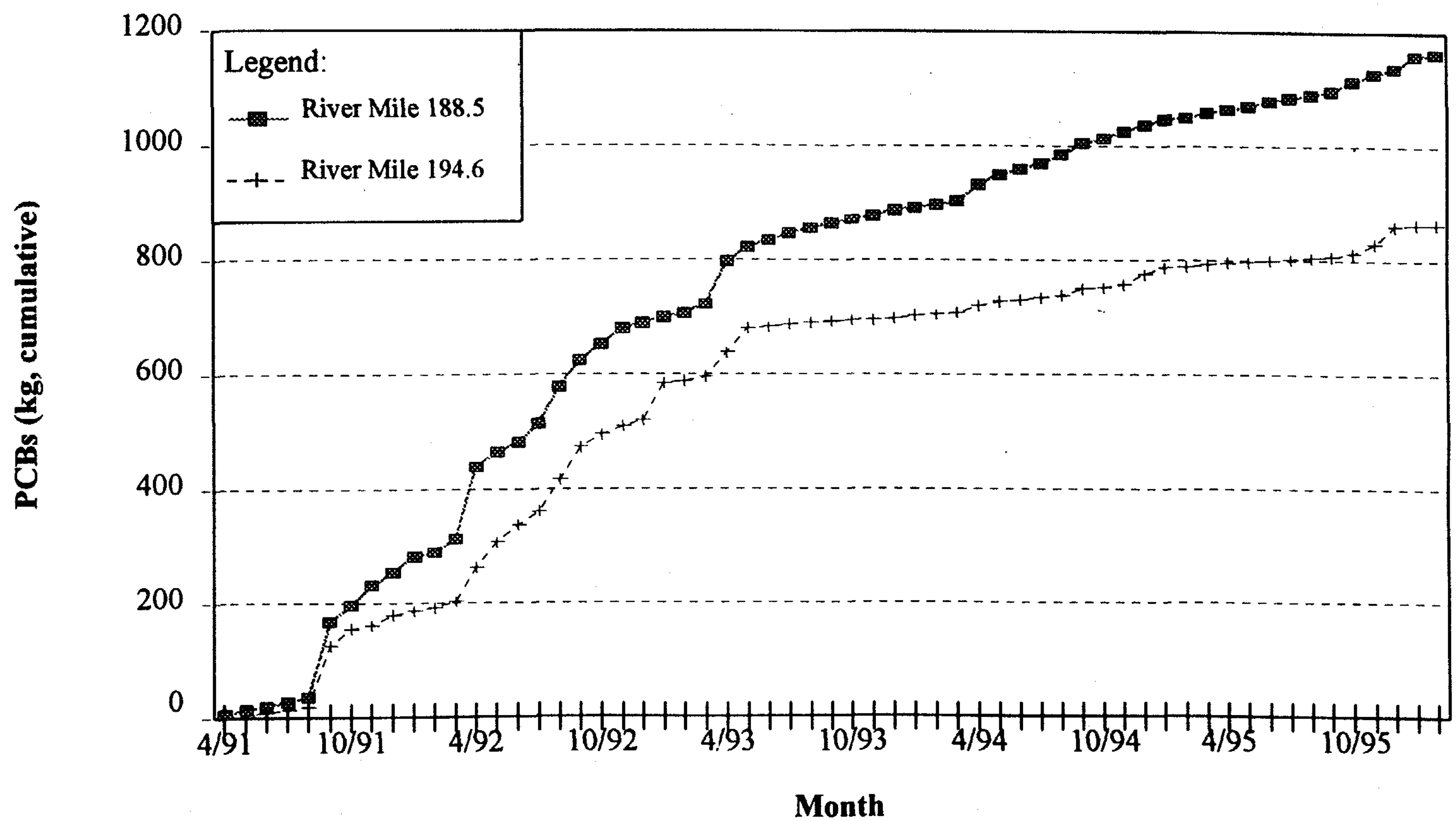
Figure 3-84
Load across the Thompson Island Pool
Mono-Chlorinated PCB Homologues, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

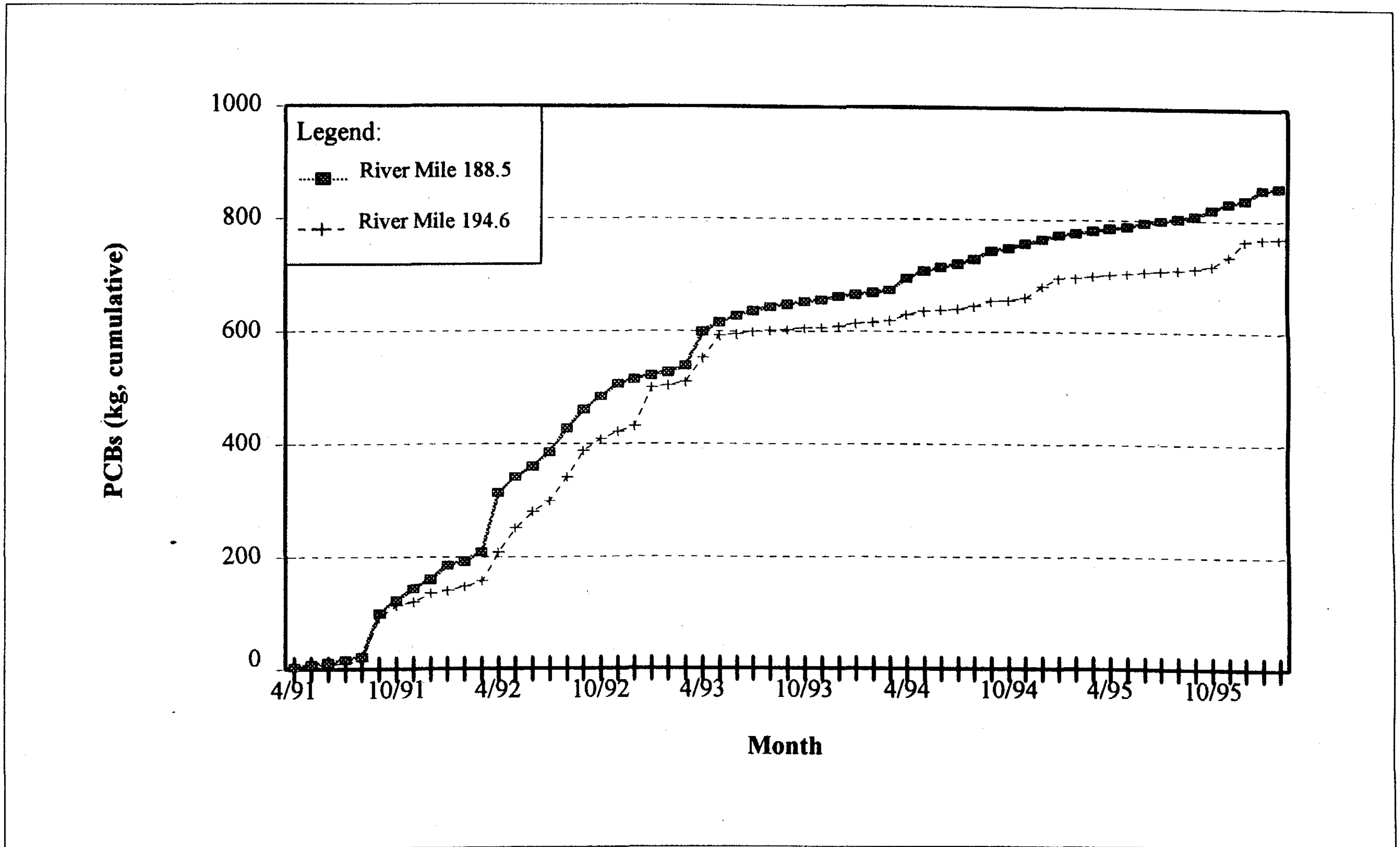
Figure 3-85
Load across the Thompson Island Pool
Di-Chlorinated PCB Homologues, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

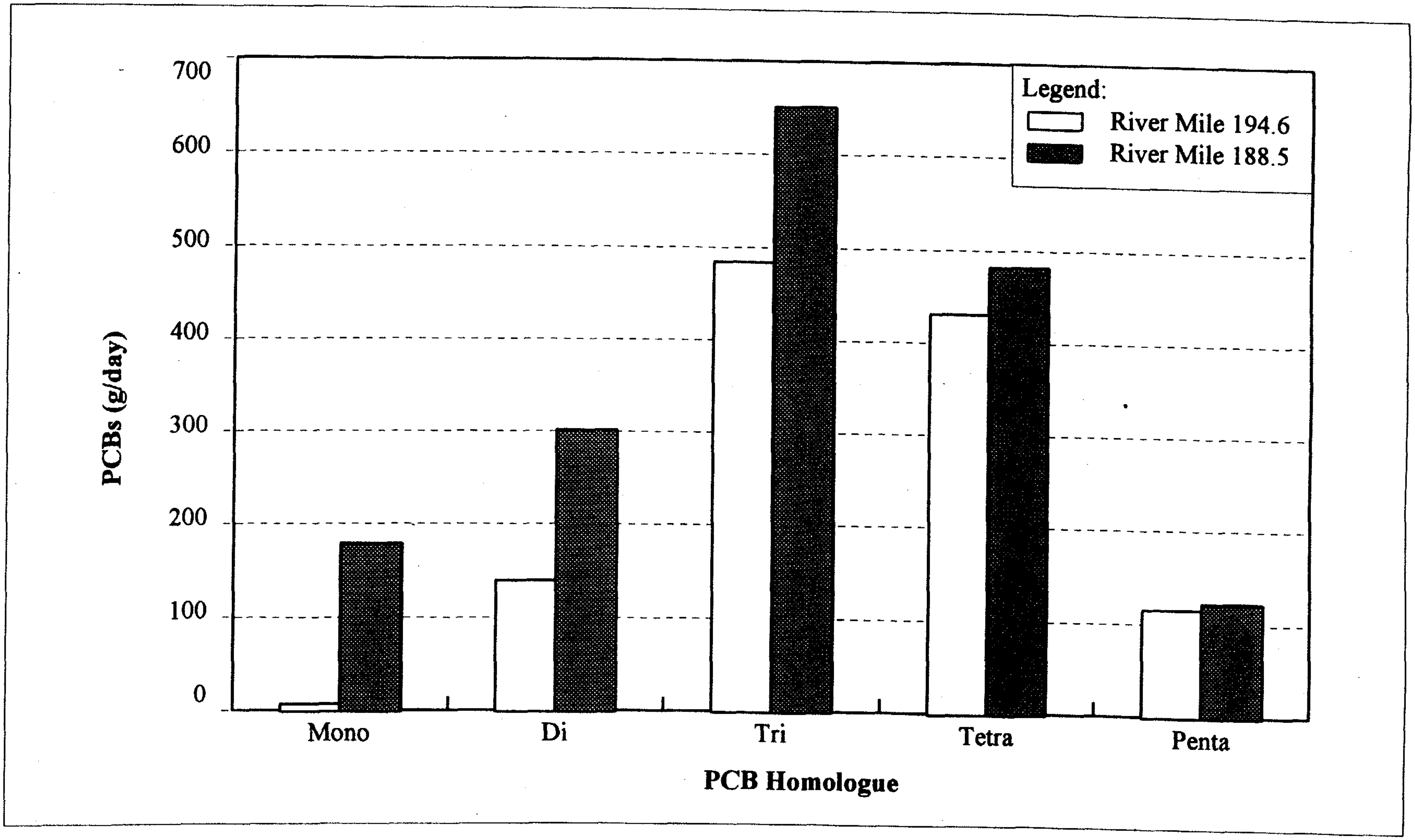
Figure 3-86
Load across the Thompson Island Pool
Tri-Chlorinated PCB Homologues, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-87
Load across the Thompson Island Pool
Tetra-Chlorinated PCB Homologues, GE Data

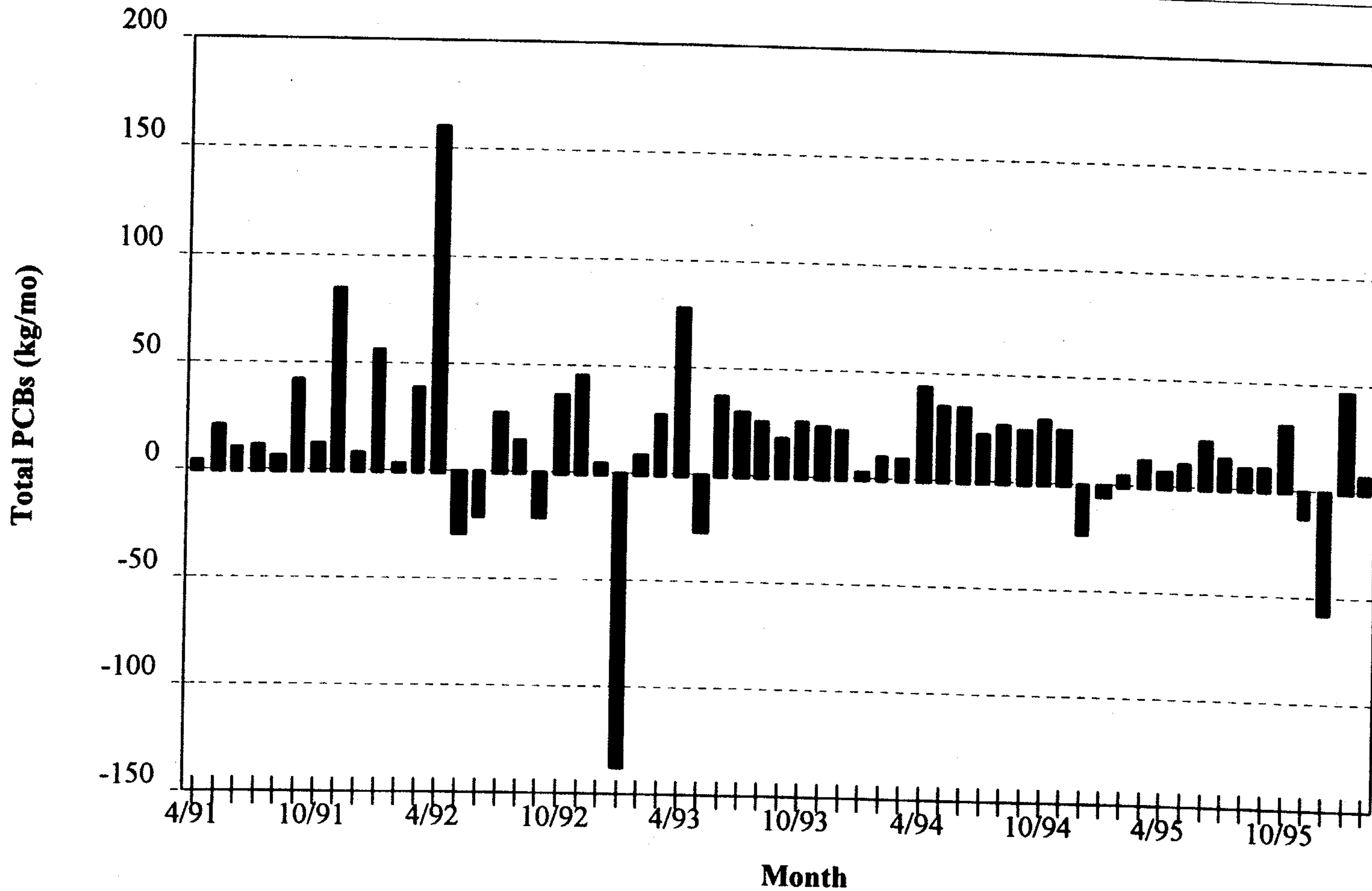


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-88
Average Daily PCB Homologue Load at Rogers Island (River Mile 194.6) and Thompson Island Dam (River Mile 188.5) April 1991 through February 1996, Averaging Estimate on GE Data

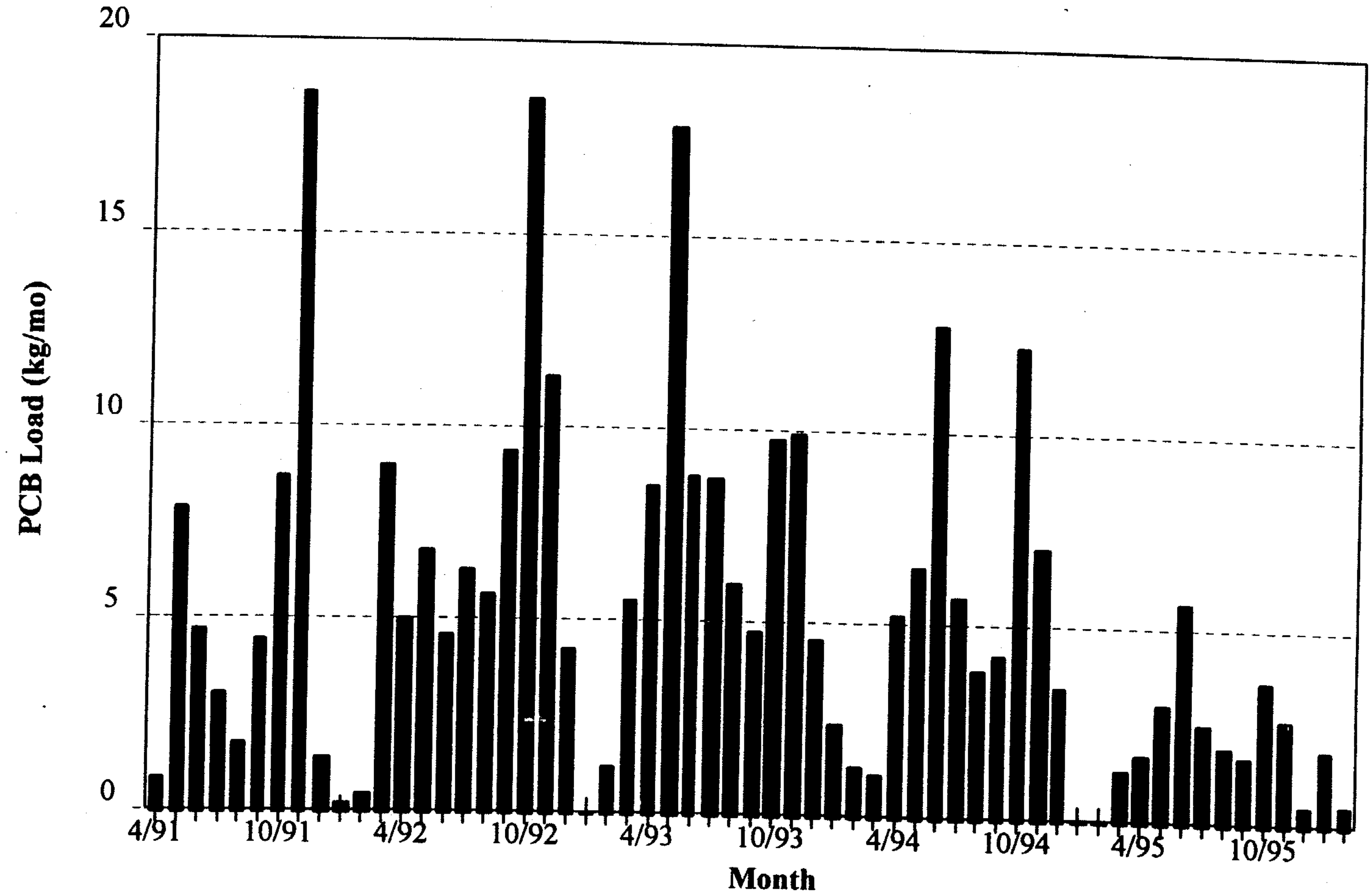
HRP 002 2126



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

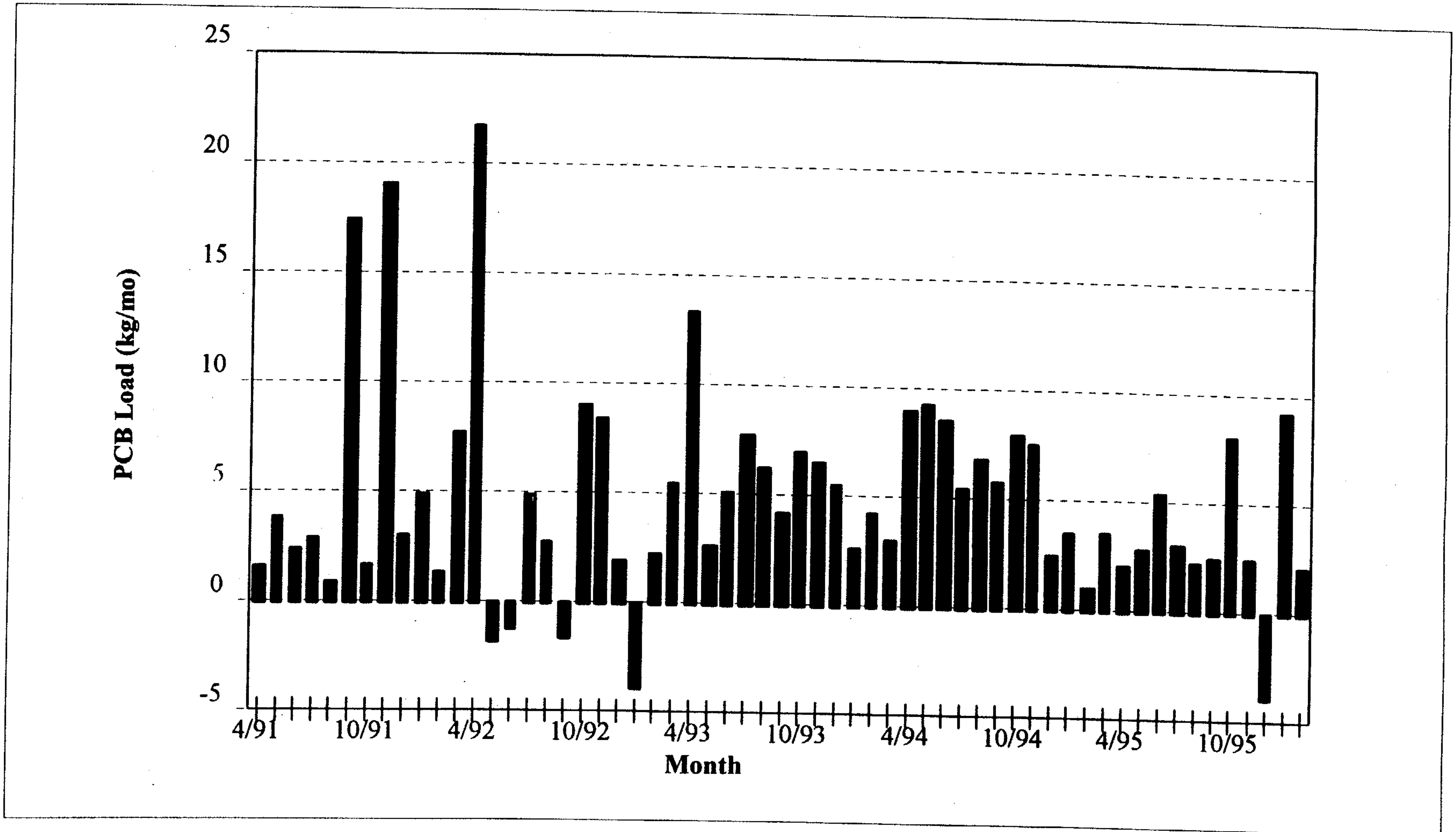
Figure 3-89
Gain across the Thompson Island Pool
Total PCBs, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-90
Gain across the Thompson Island Pool
Mono-Chlorinated PCB Homologues, GE Data

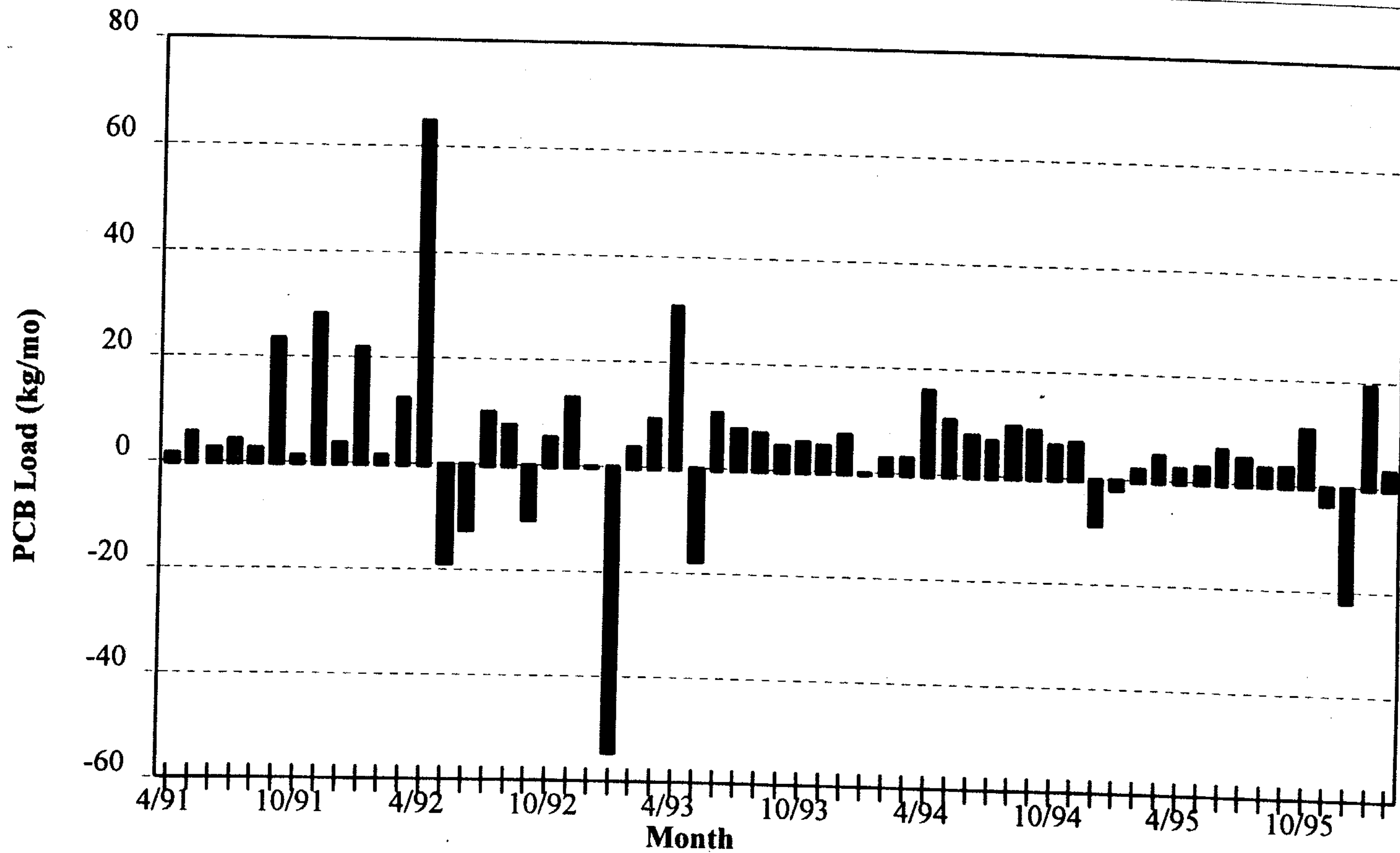


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-91
Gain across the Thompson Island Pool
Di-Chlorinated PCB Homologues, GE Data

HRP 002 2129

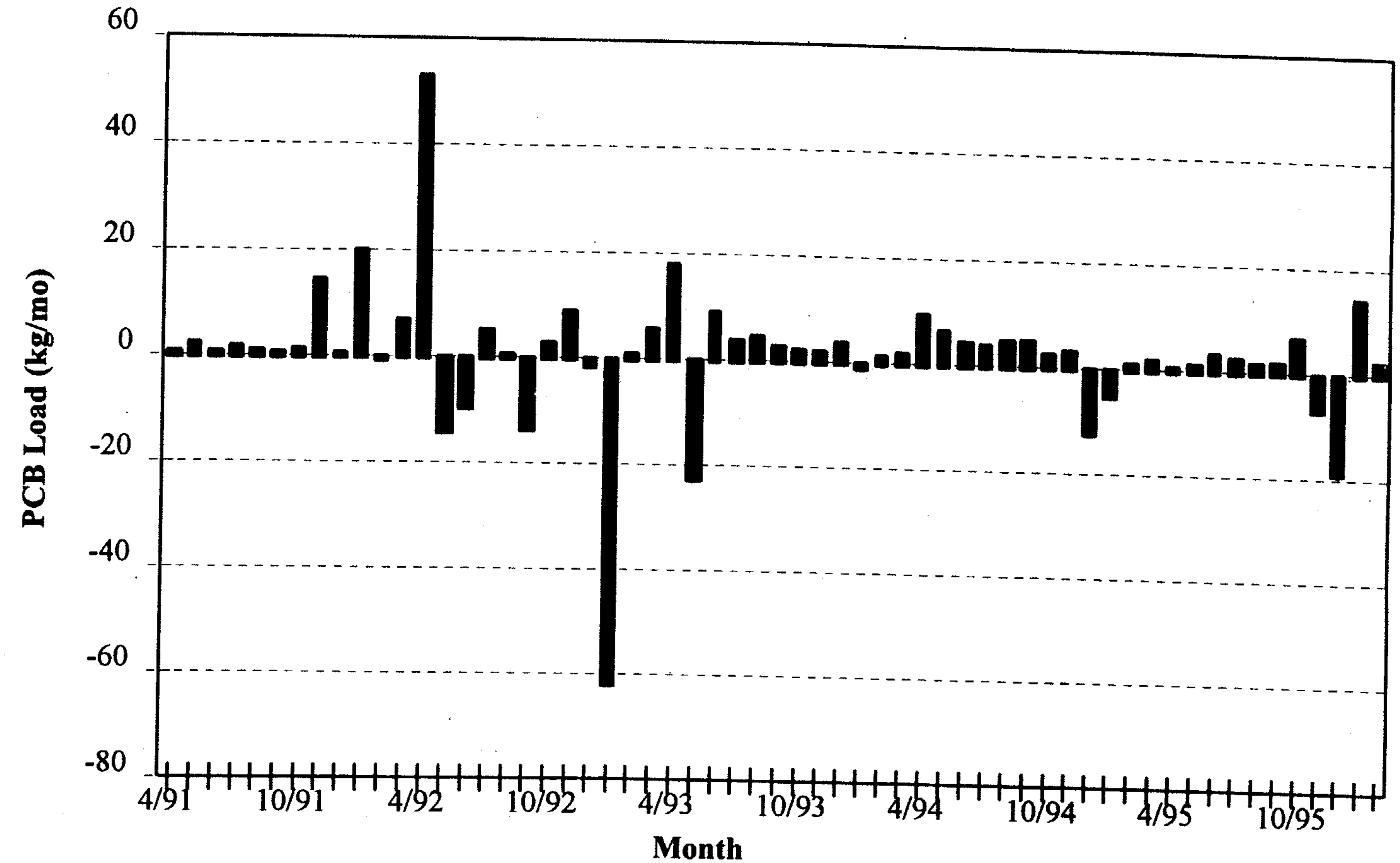


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2130

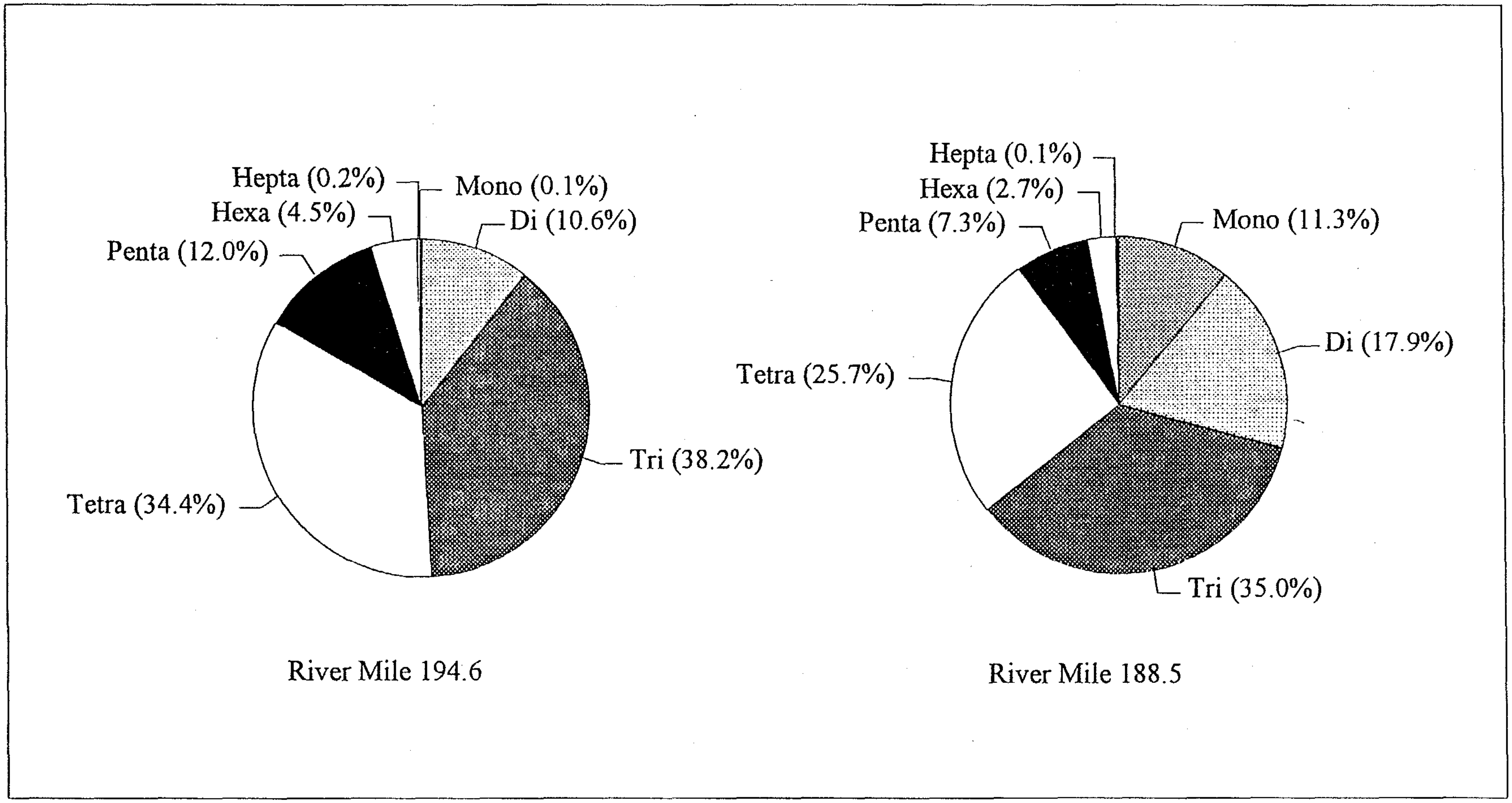
Figure 3-92
Gain across the Thompson Island Pool
Tri-Chlorinated PCB Homologues, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-93
Gain across the Thompson Island Pool
Tetra-Chlorinated PCB Homologues, GE Data

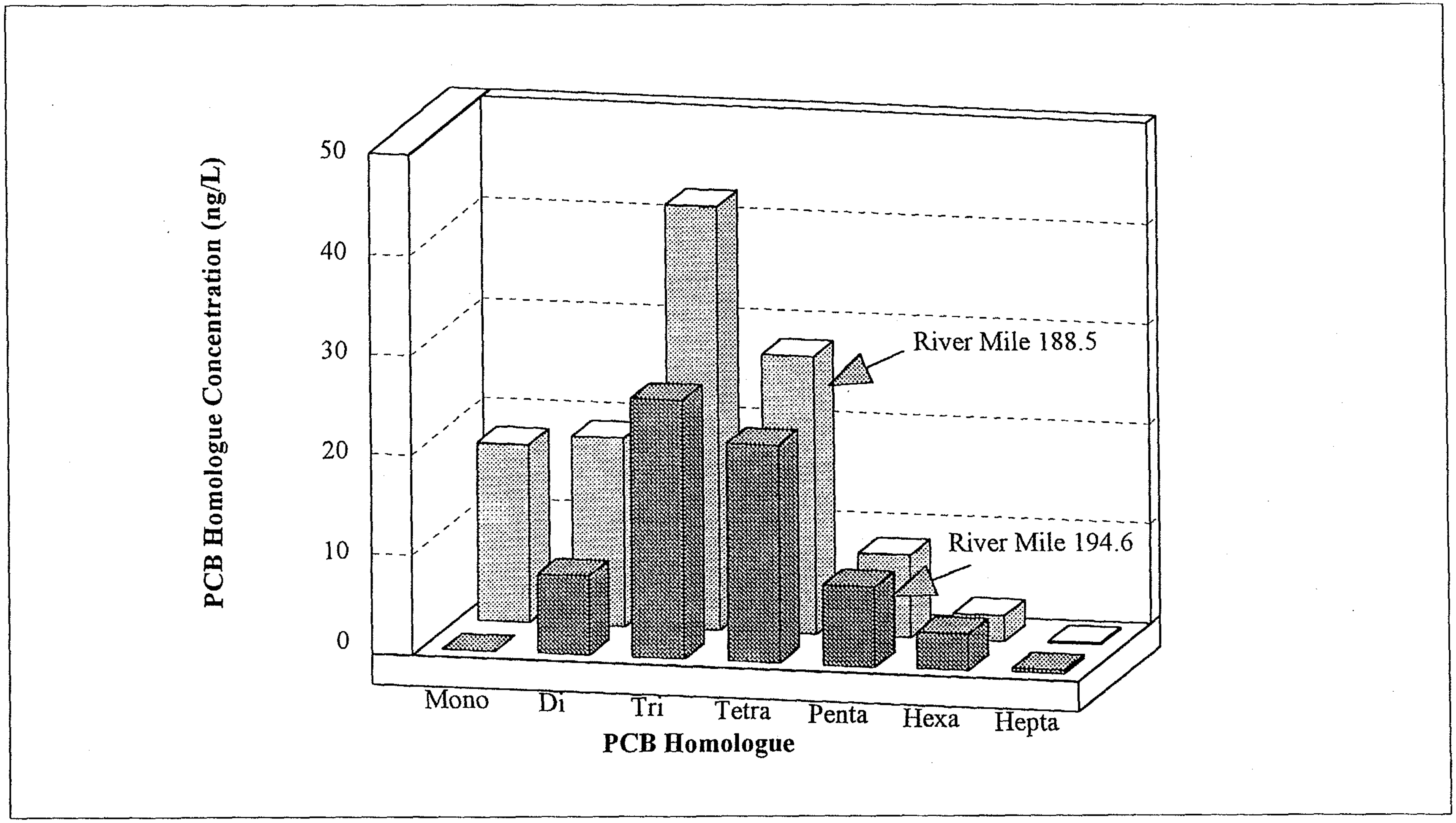


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2132

Figure 3-94
PCB Homologue Composition Change across the Thompson Island Pool
April 1991 through February 1995, GE Data

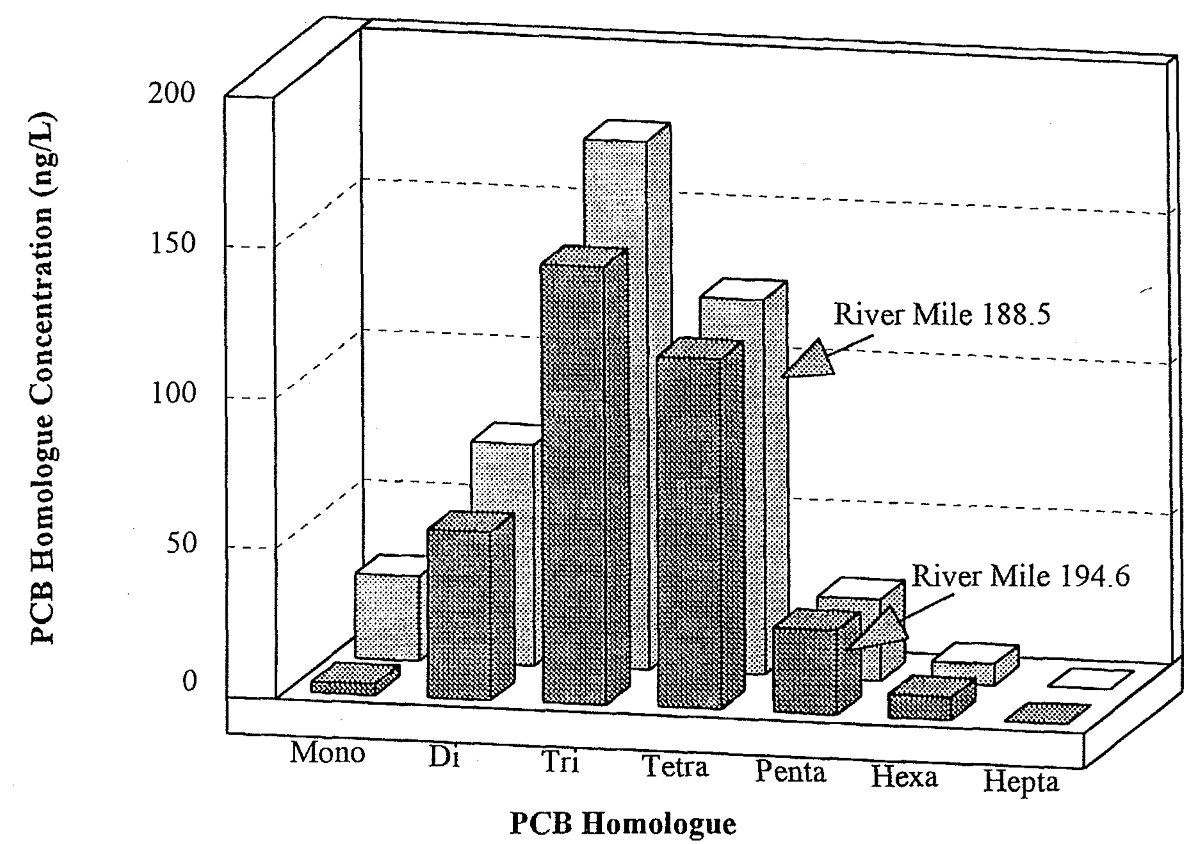


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2133

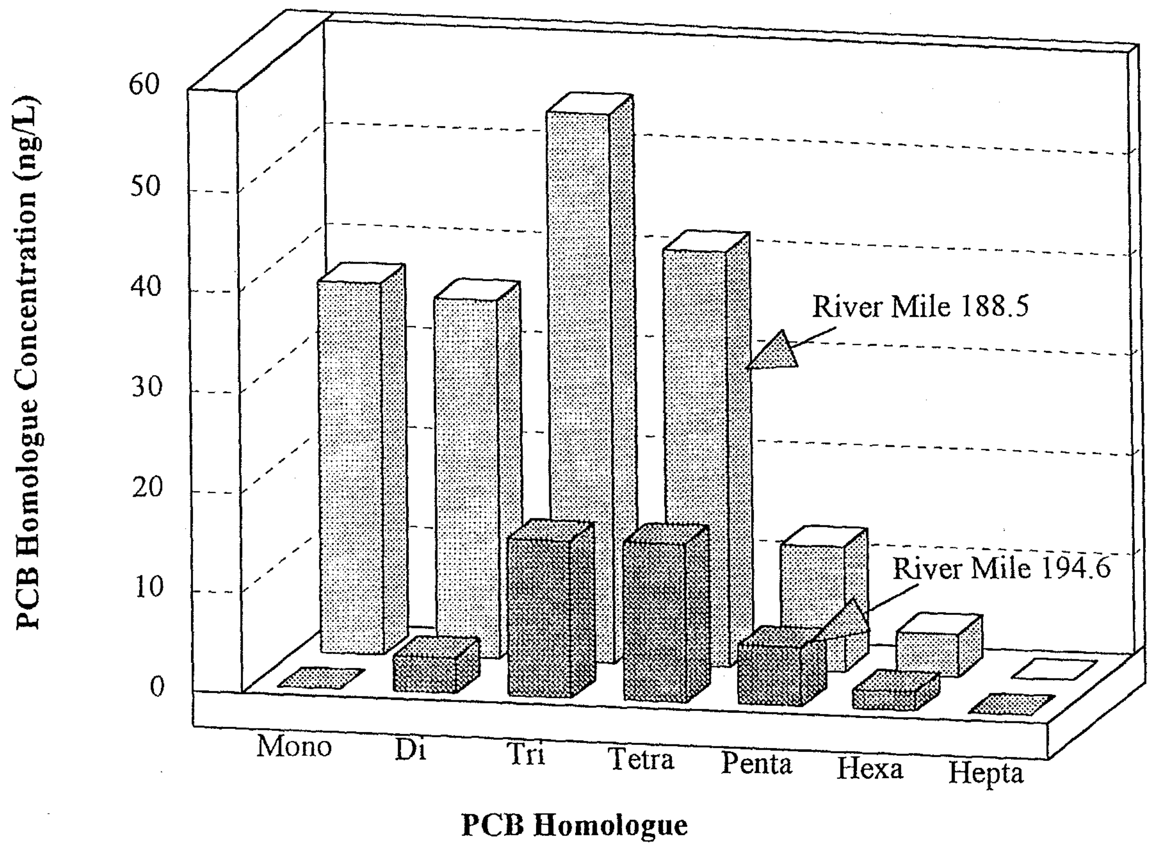
Figure 3-95
Summer PCB Homologue Concentrations
June through August 1991, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

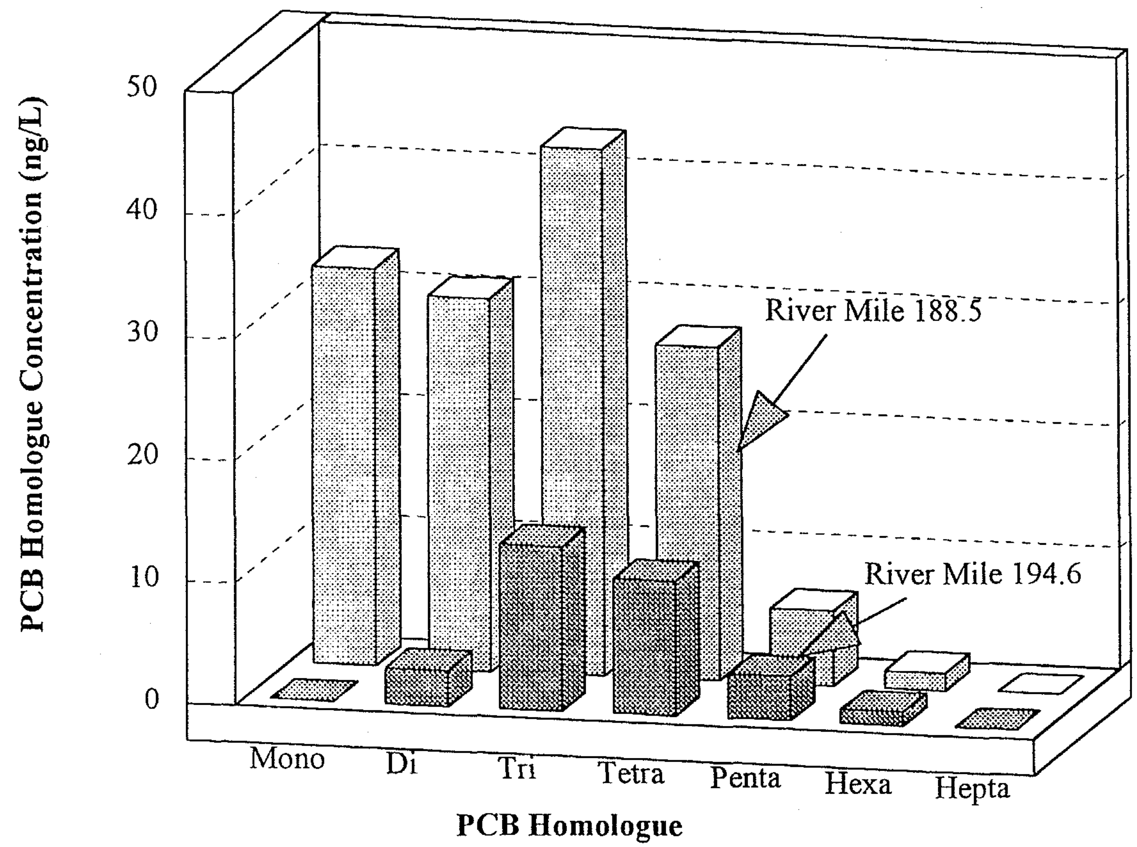
Figure 3-96
Summer PCB Homologue Concentrations
June through August 1992, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

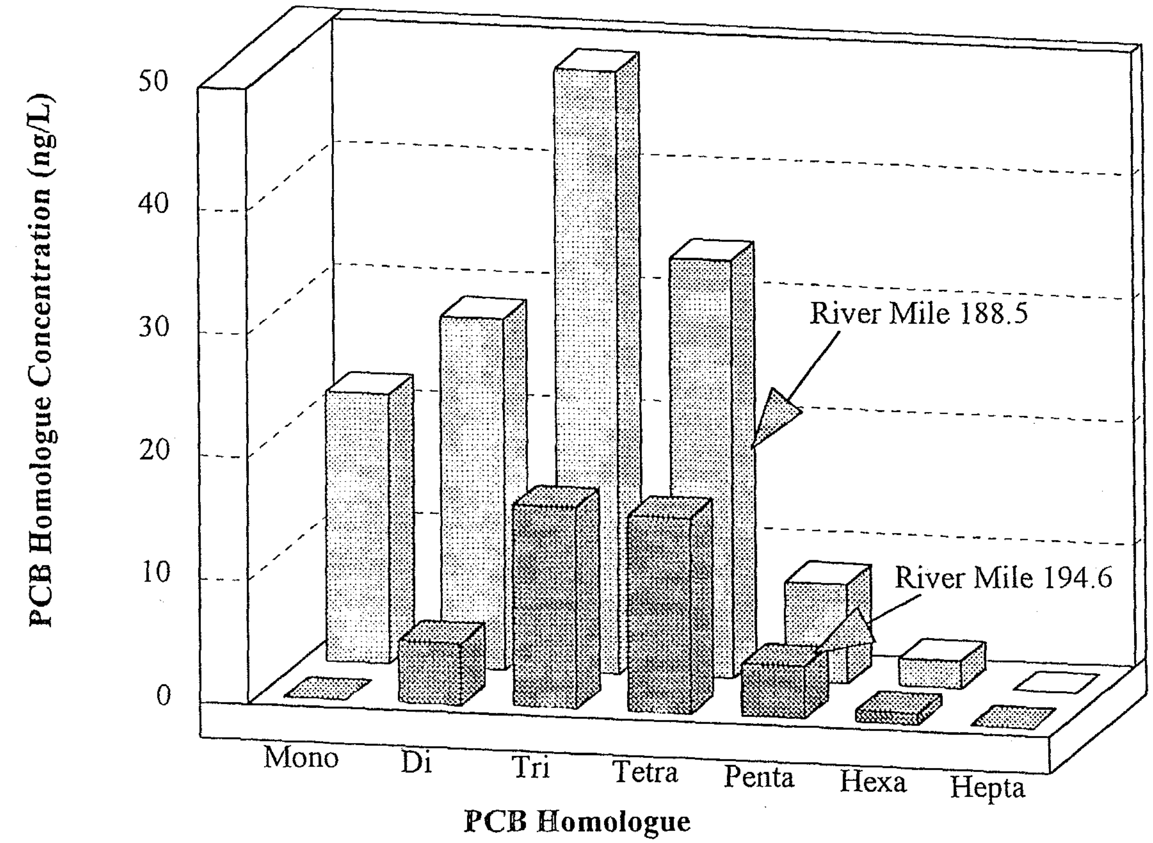
Figure 3-97
Summer PCB Homologue Concentrations
June through August 1993, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-98
Summer PCB Homologue Concentrations
June through August 1994, GE Data

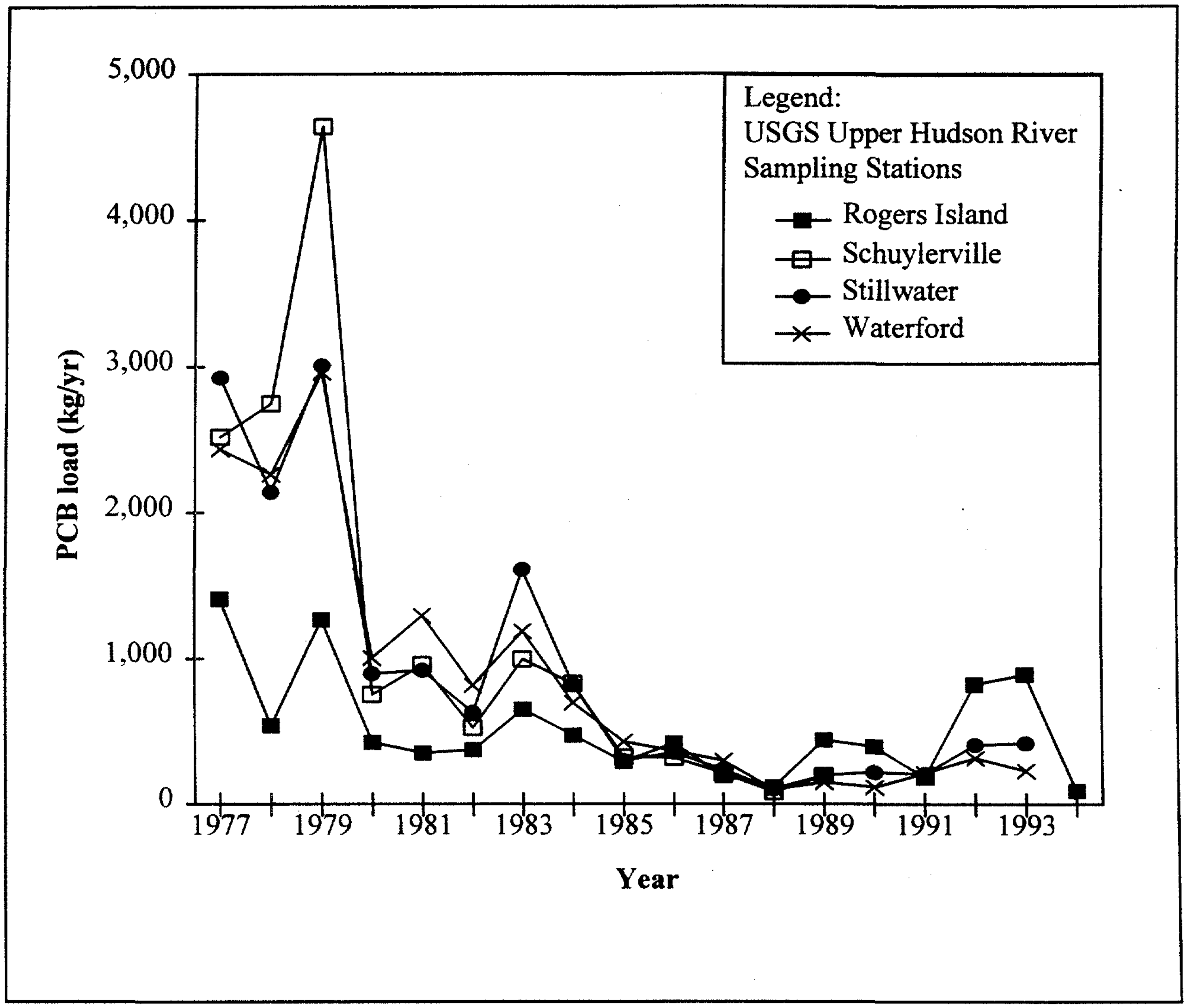


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-99
Summer PCB Homologue Concentrations
June through August 1995, GE Data

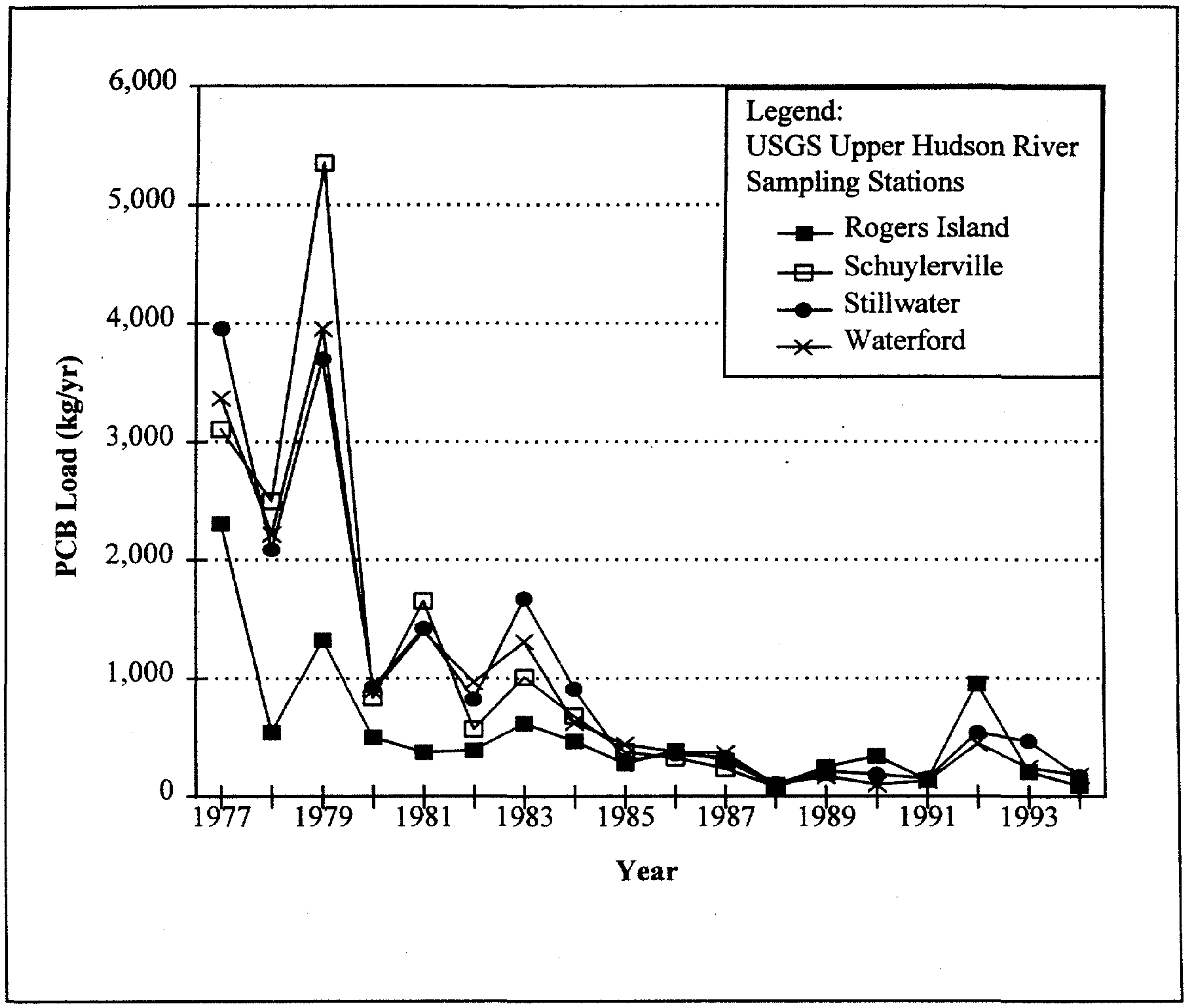
Figure 3-100
Total PCB Load from USGS Data: Ratio Estimator



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

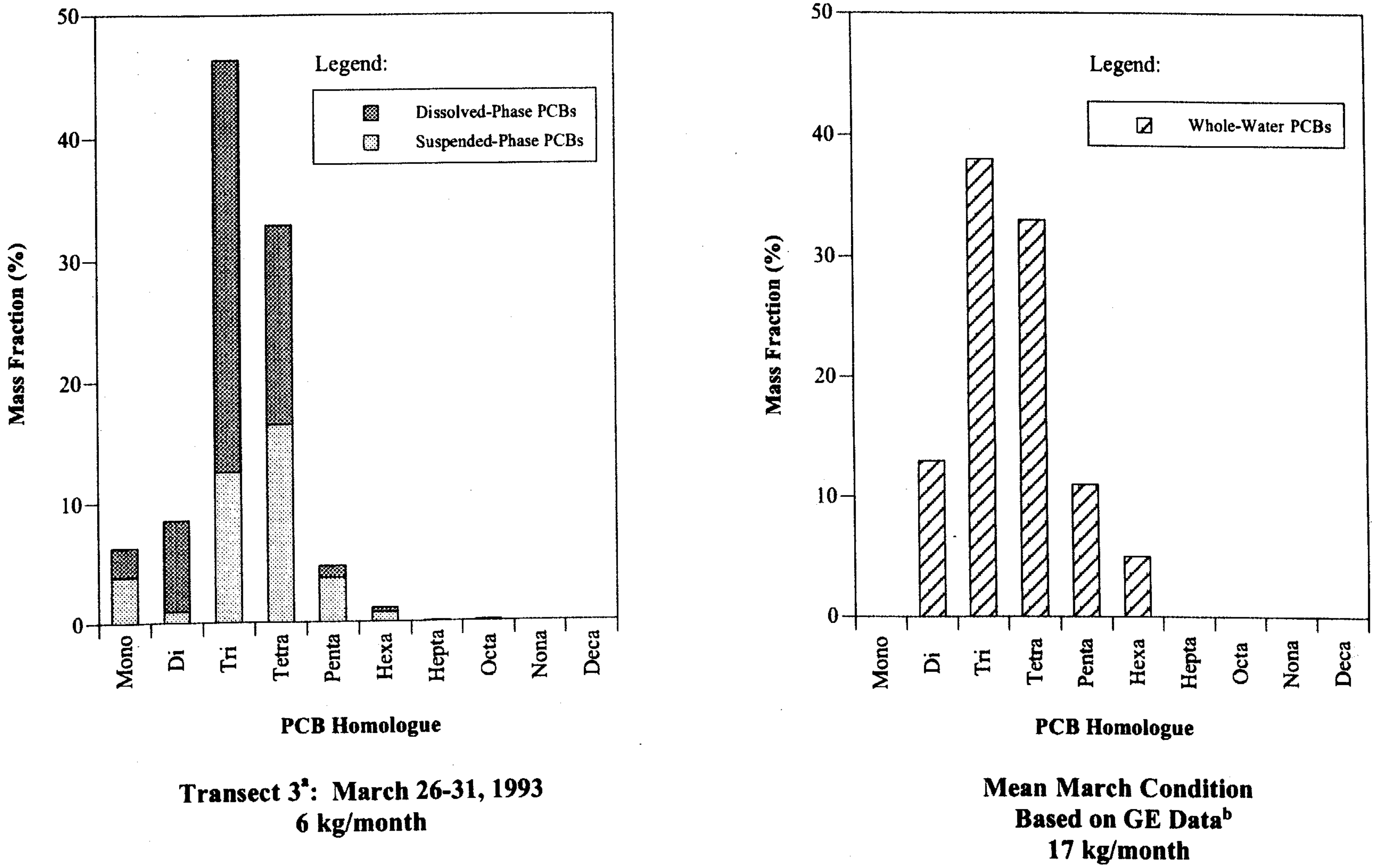
Figure 3-101
Total PCB Load from USGS Data:
Averaging Estimator



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2139



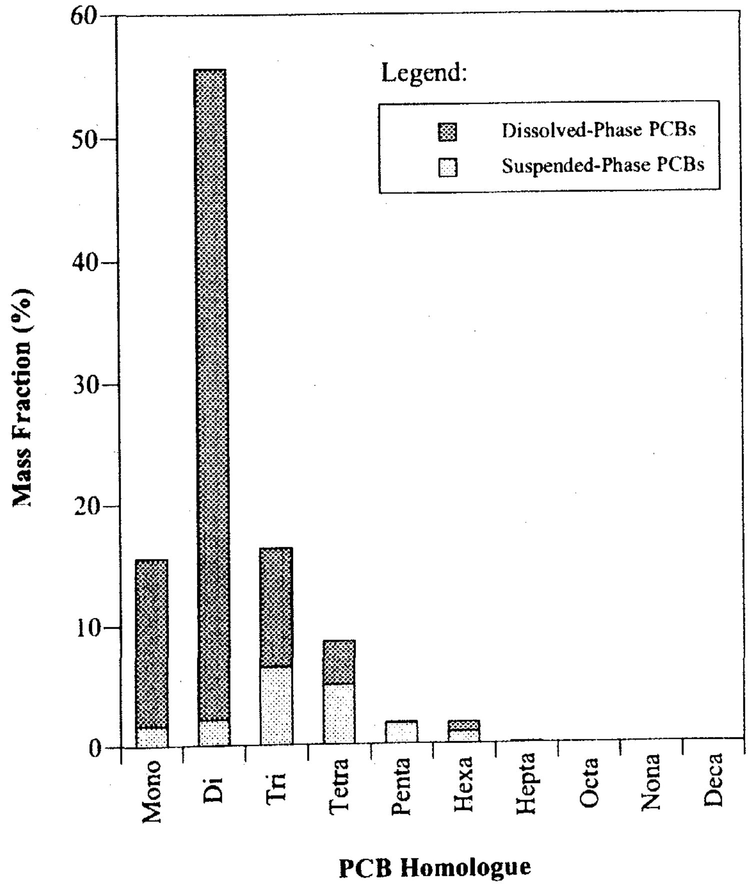
HRP 002 2140

Notes:
a. Loading for Transect 3 converted to monthly basis.
b. Represents whole-water analysis.

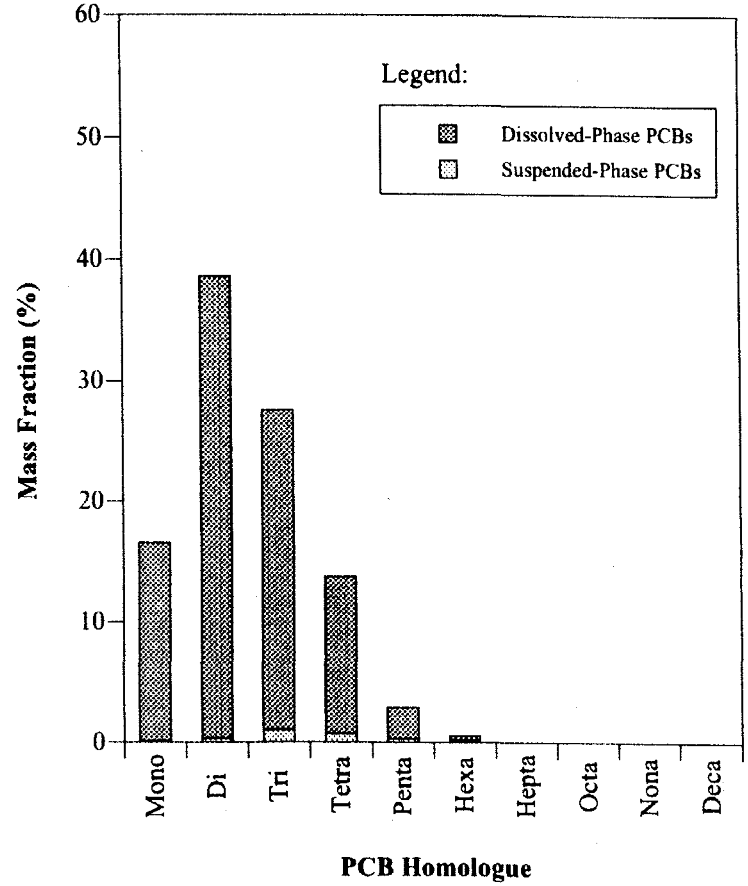
Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-102
Water-Column PCB Homologue Composition at River Mile 194.6 at Rogers Island



Transect 3[a]: March 26 - 31, 1993
26 kg/month



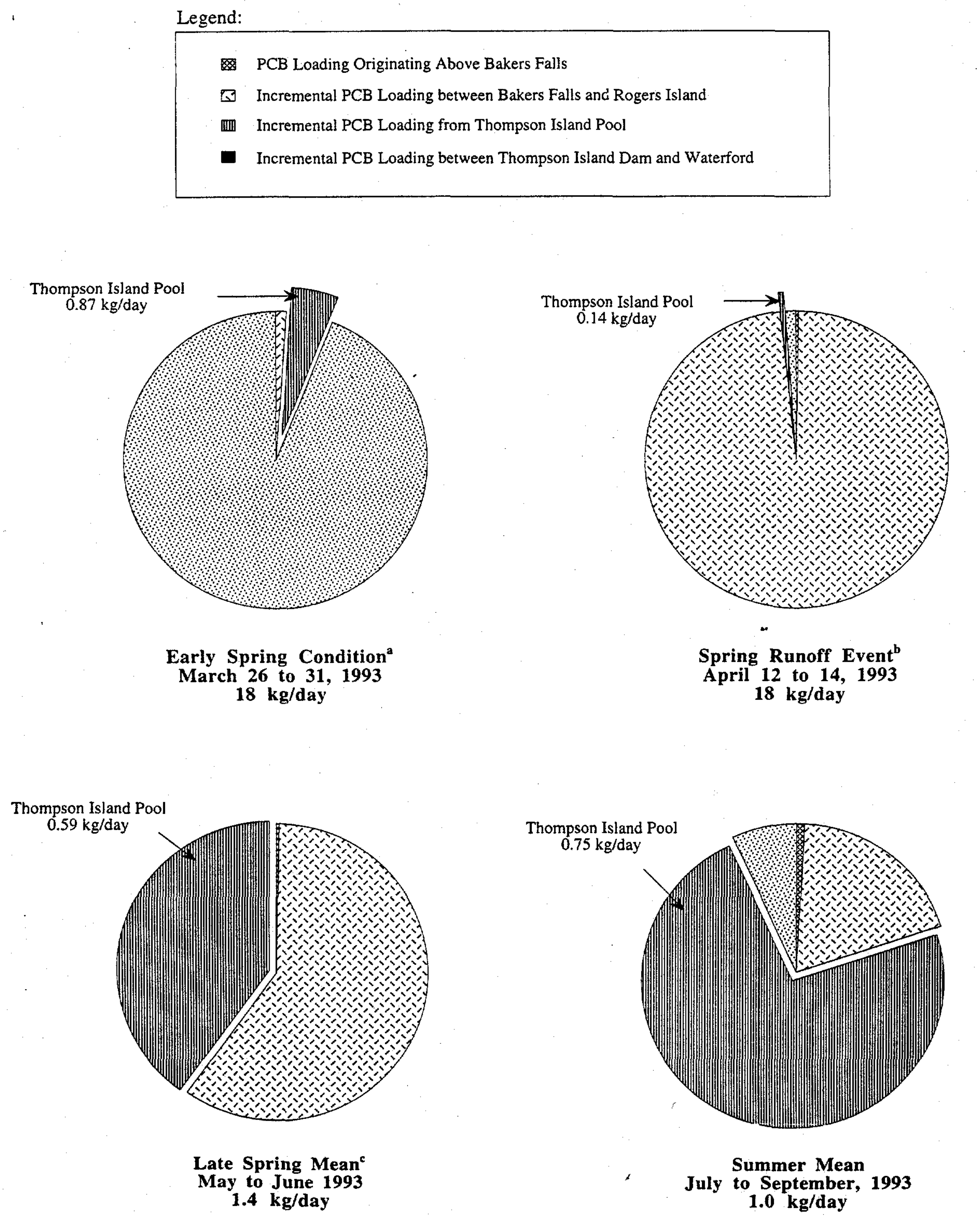
Transect 6[a]: August 19 - September 1, 1993
15 kg/month

Note:
a. Loading for transects converted to monthly basis.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-103
Water-Column PCB Homologue Composition of the Net Thompson Island Pool Load



Notes:

a. The large PCB loading below the Thompson Island Pool is the result of scour of the Hudson River sediments caused by onset of the spring flood event in the Hoosic River.

b. The PCB loading across the Thompson Island Pool is estimated as the difference between the PCB loadings at Schuylerville and Rogers Island since the Thompson Island Dam sample is considered to over-represent dilution by the Moses Kill.

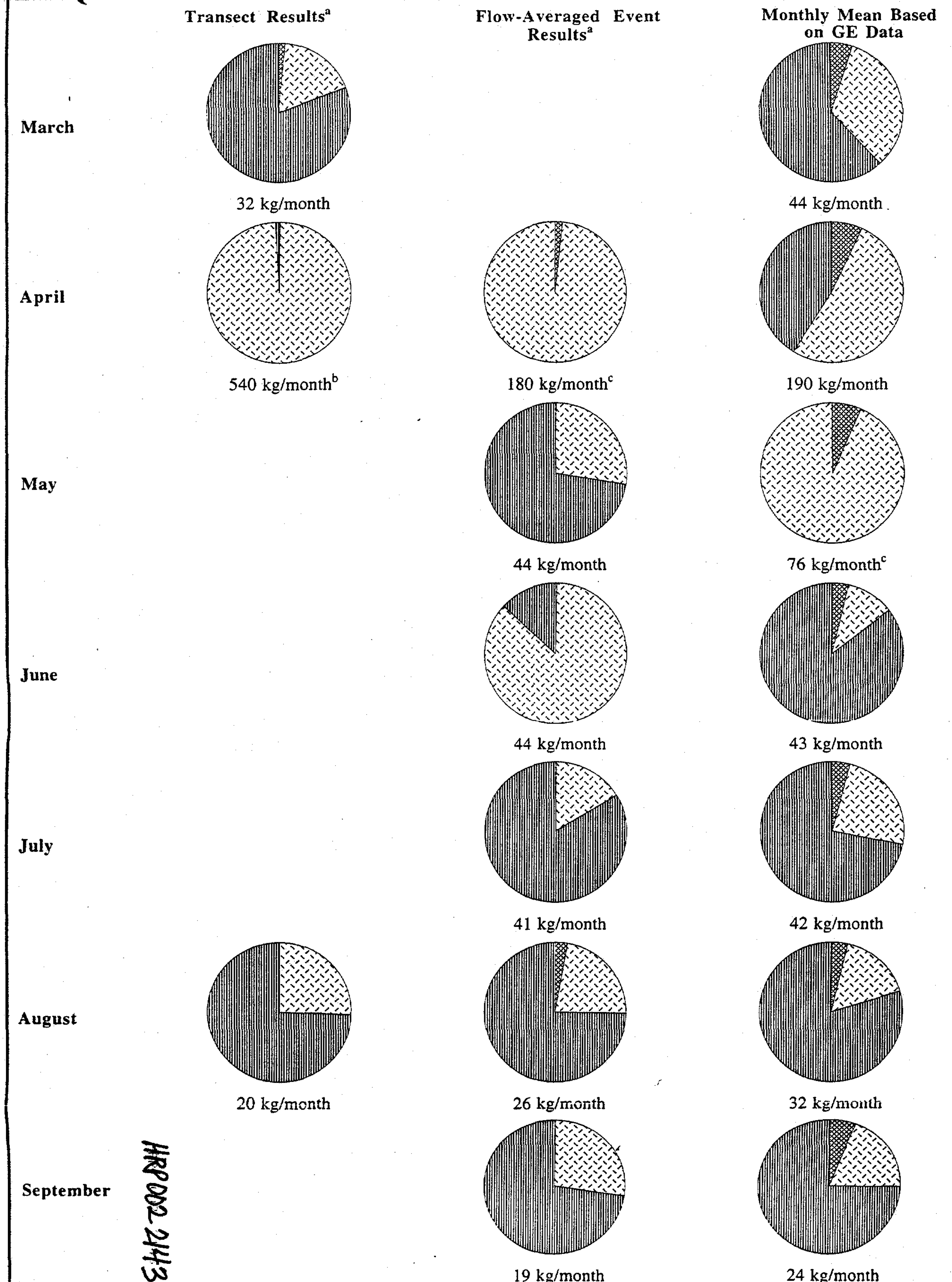
c. The 7% decrease in PCB load between Thompson Island Dam and Waterford is within measurement uncertainty and is not represented here.

Source: TAMS/Gradient Database

TAMS/Cadmus/*Gradient*

HRP 002 2142

Figure 3-104
Comparison of 1993 Upper Hudson River PCB Loadings at Waterford based on Phase 2 Data



HRP 002 2443

Legend:

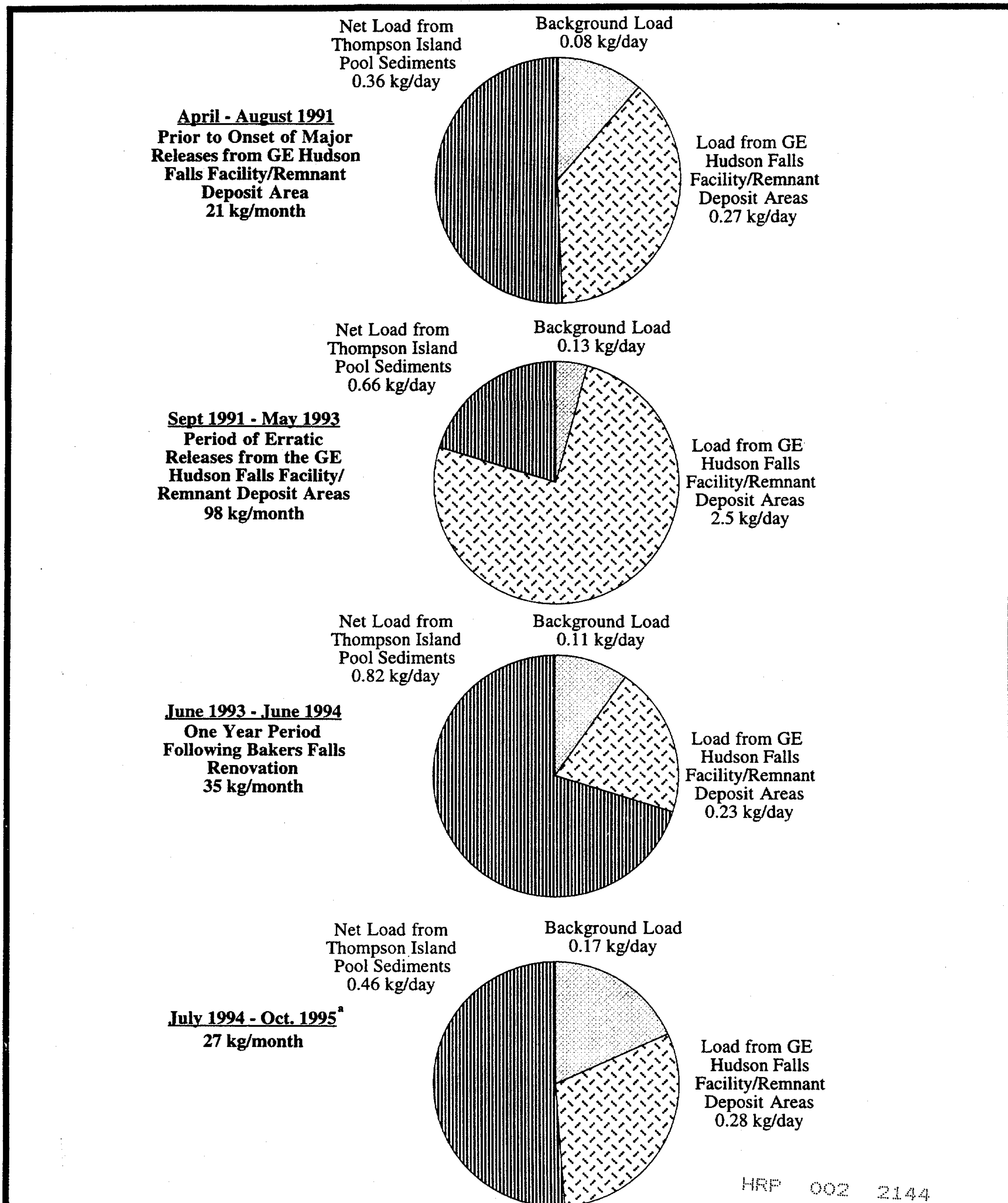
- PCB Loading Originating above Bakers Falls
- Incremental Loading between Bakers Falls and Rogers Island
- Incremental Loading from the Thompson Island Pool

Notes:
a. PCB Loading for transects and flow-averaged events is converted to a monthly basis.
b. The PCB loading across the Thompson Island Pool is estimated as the difference between the PCB loading at Schuylerville and Rogers Island since the Thompson Island Dam sample is considered to over-represent dilution by the Moses Kill.
c. Sampling event exhibits a net decrease in PCB load between Rogers Island and Thompson Island Dam which is not represented here.

Source: TAMS/Gradient Database

TAMS/Cadmus/*Gradient*

Figure 3-105
Comparison of Transect Results, Flow-Averaged Event Results, and Monthly Mean Based on GE Data

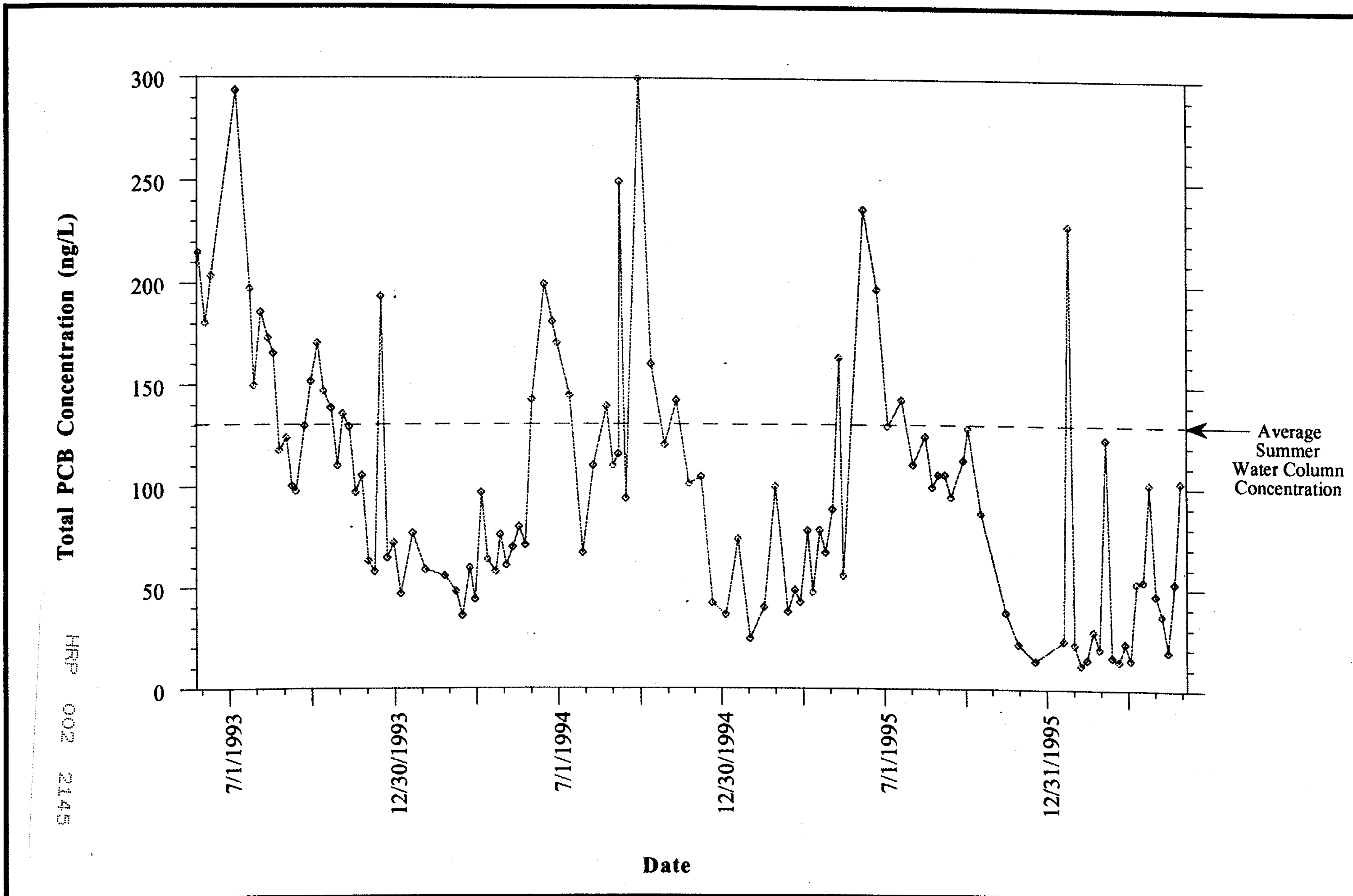


Note
a. Data for November 1995 through February 1996 are not represented here due to two anomalously high background load measurements which were not observed consistently at downstream locations.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

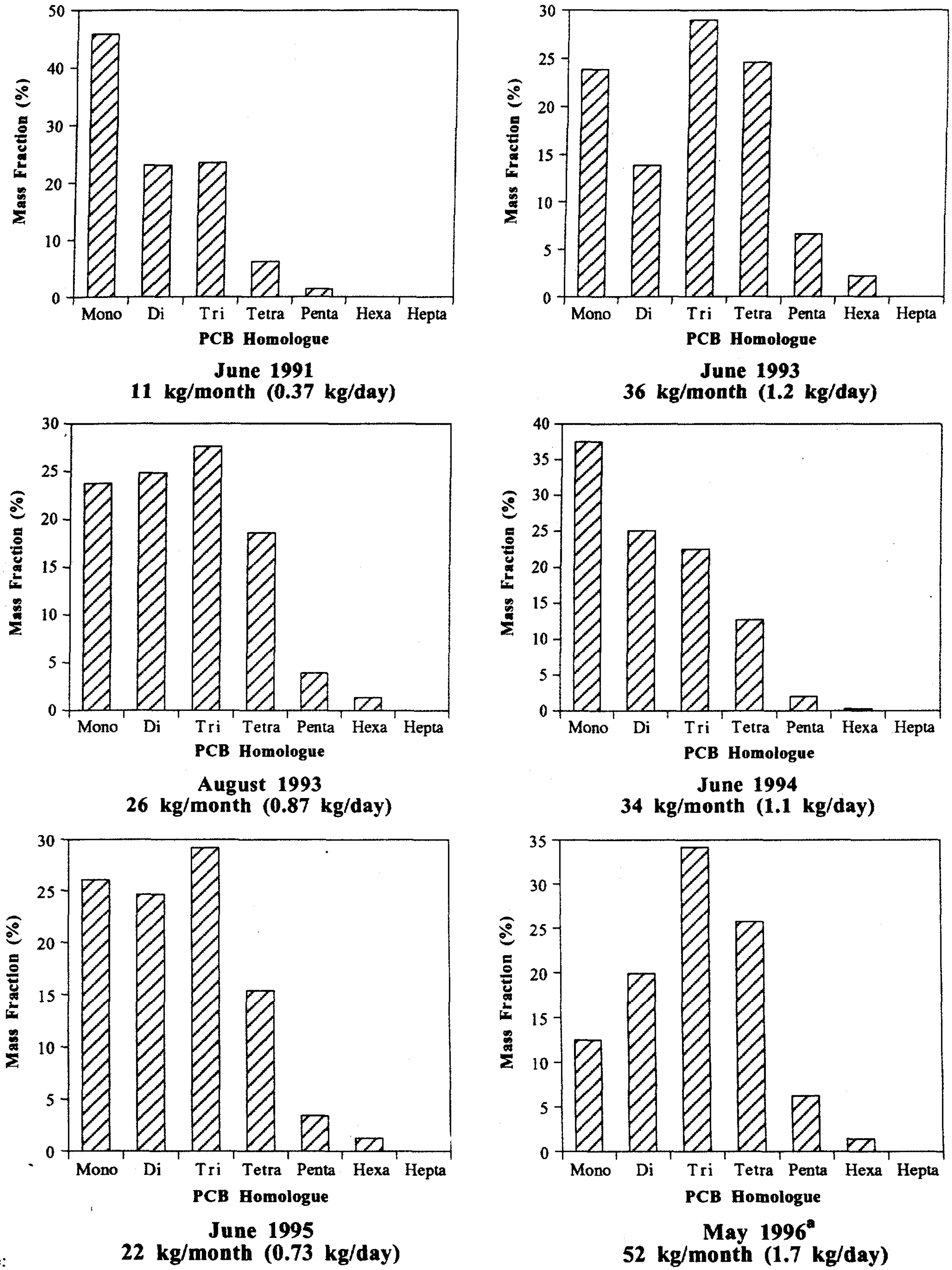
Figure 3-106
Mean PCB Loadings at the Thompson Island Dam From April 1991 through October 1995, GE Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-107
Water Column Total PCB Concentrations at the Thompson Island Dam: June 1993 to May 1996 - GE Data

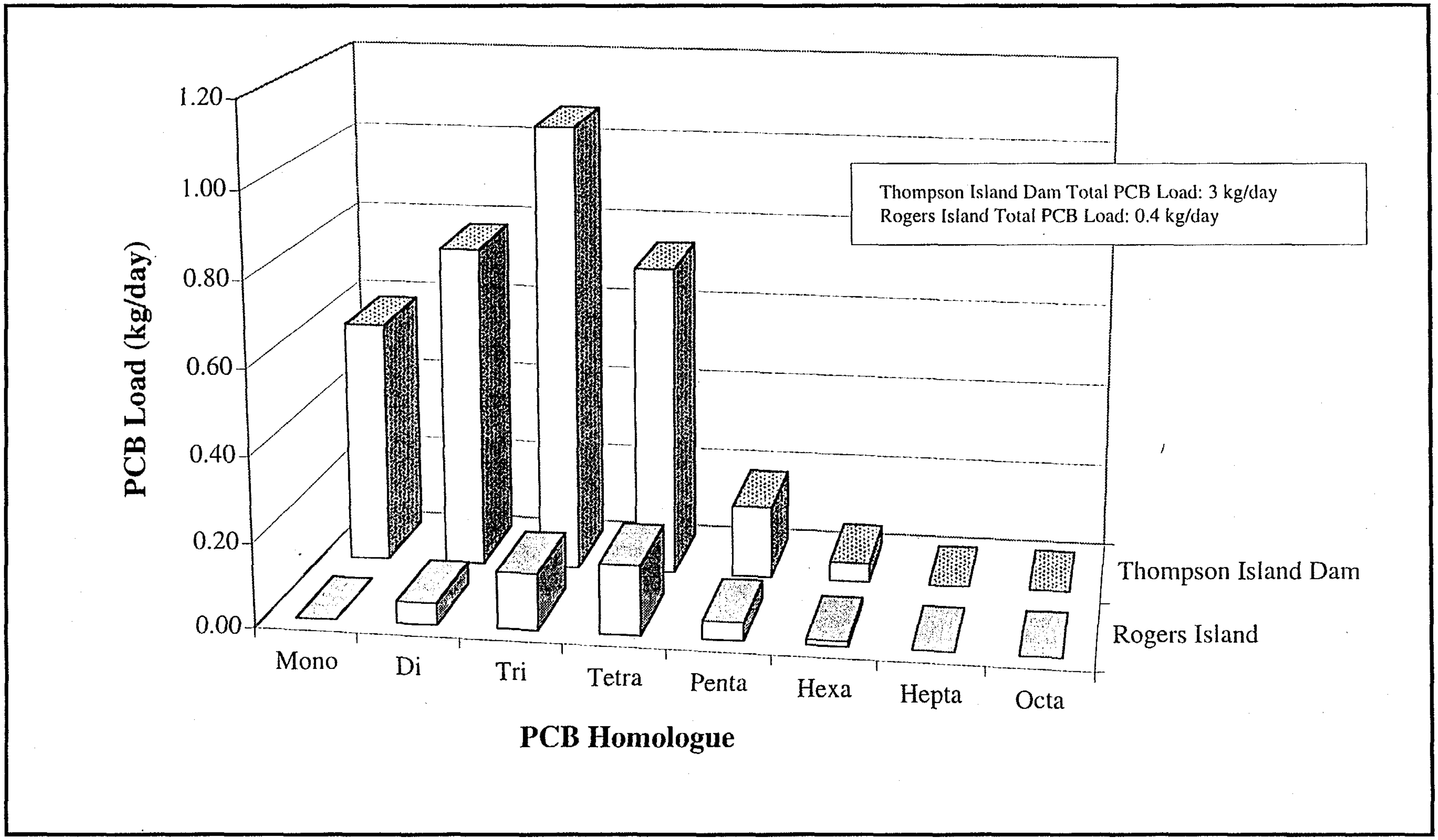


Note:
a. Mass transport is based on instantaneous flow values reported by GE.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-108
PCB Homologue Composition of the Net Thompson Island Pool Load, GE Data

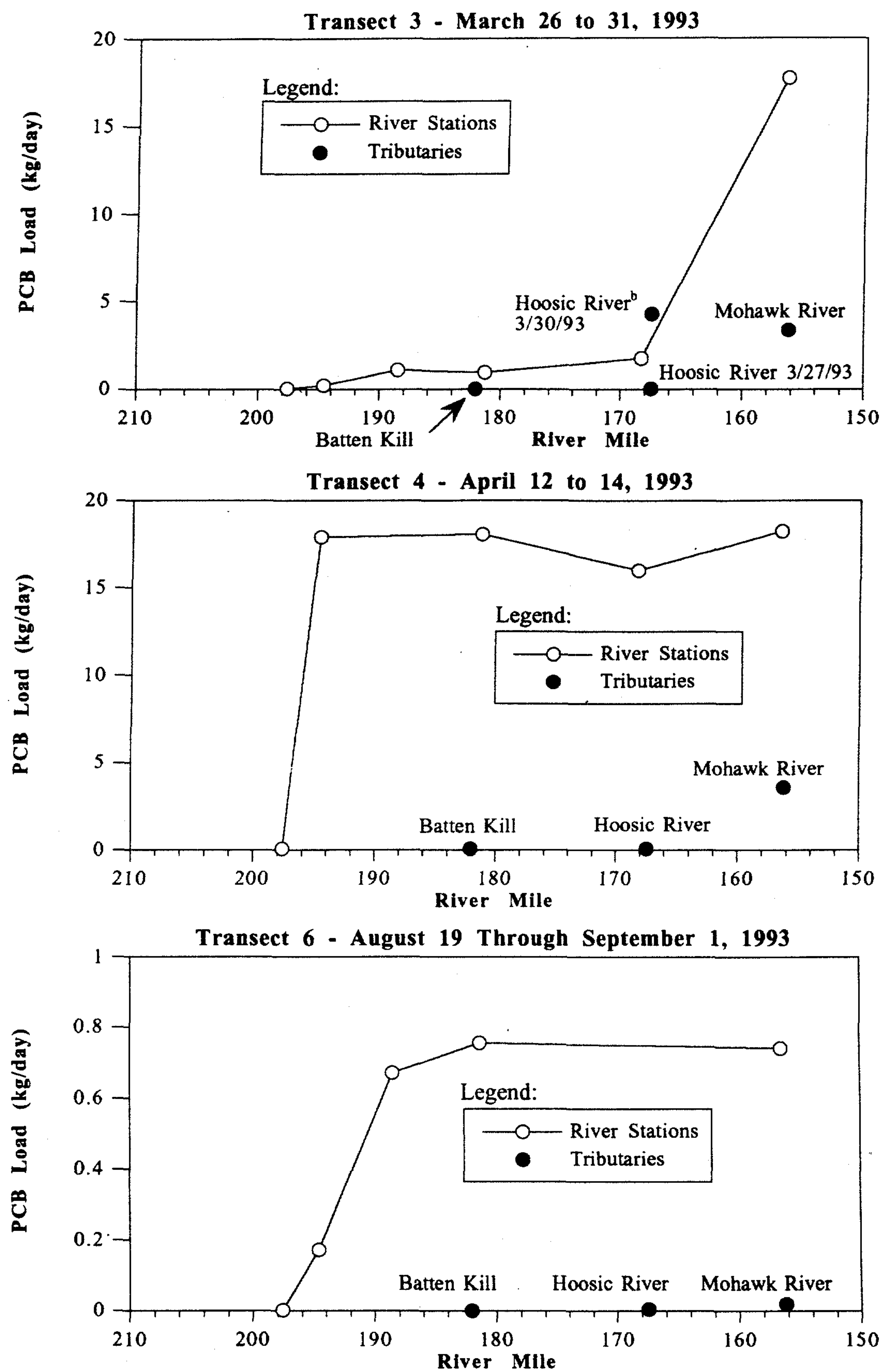


Source: GE Remnant Deposit Monitoring Report Monthly Update, July 5, 1996

TAMS/Cadmus/Gradient

HRP 002 2147

Figure 3-109
Total PCB Load at Rogers Island and the Thompson Island Dam - May 27 1996, GE Data



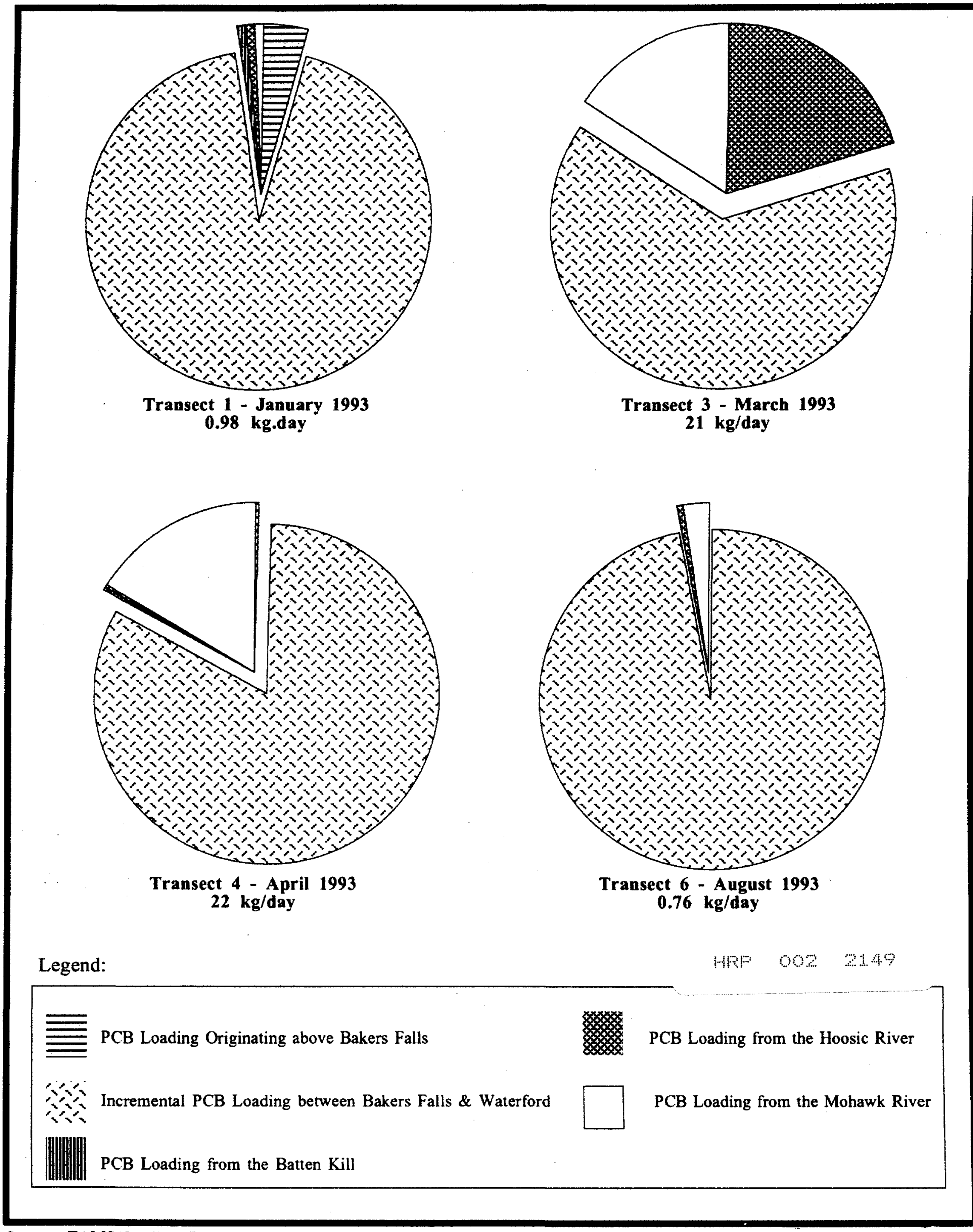
Note:
a. The vertical scale for each plot is adjusted to accommodate the range of loads.
b. Hoosic River dissolved and suspended matter PCB concentrations for 3/27/93 were used here to provide a upper bound estimate on the Hoosic River load.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-110
PCB Load vs. River Mile for Three Phase 2 Water-Column Transects

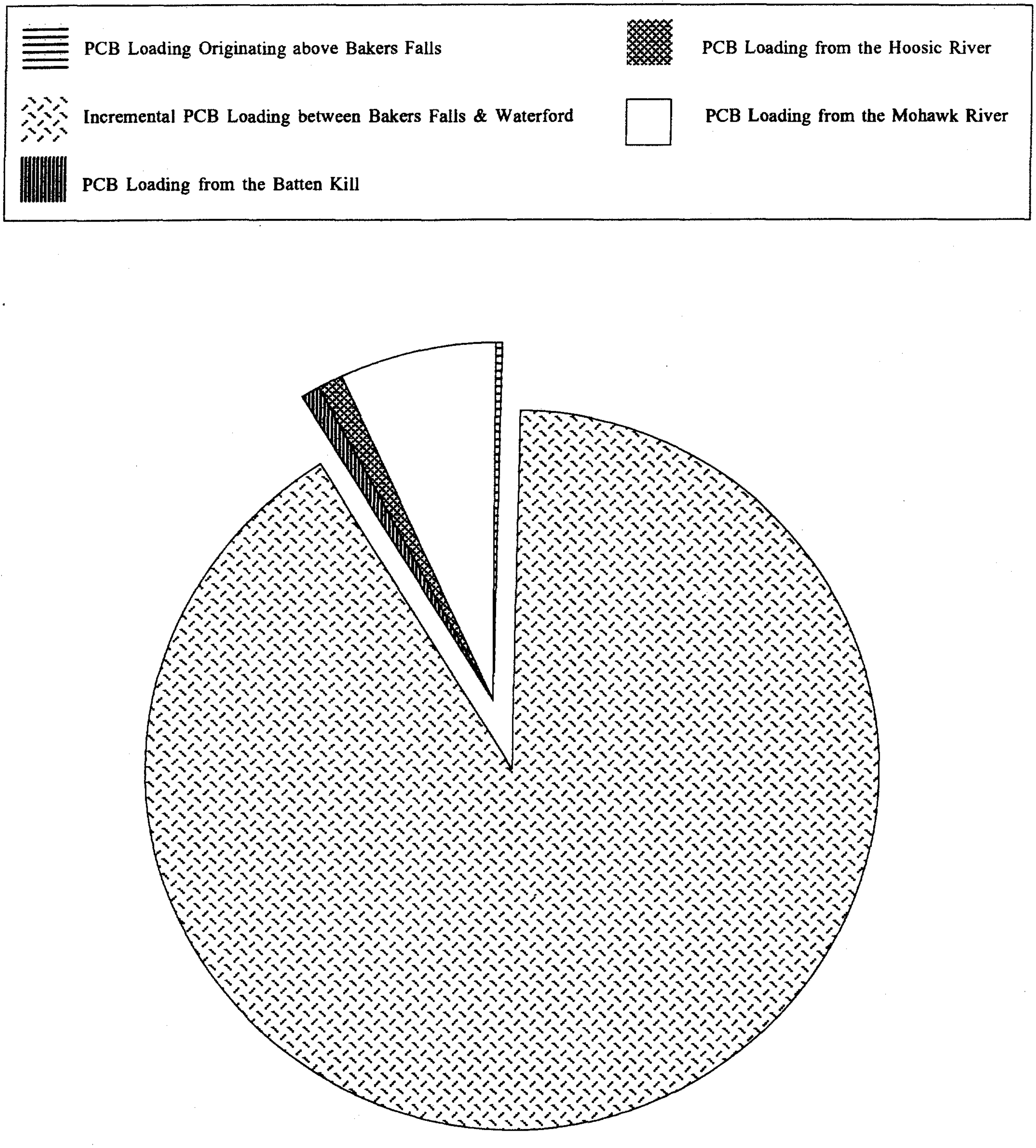
HRP 002 2148



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-111
PCB Loadings to the Hudson River at River Mile 153.9 near Albany based on the Water-Column Transect Sampling

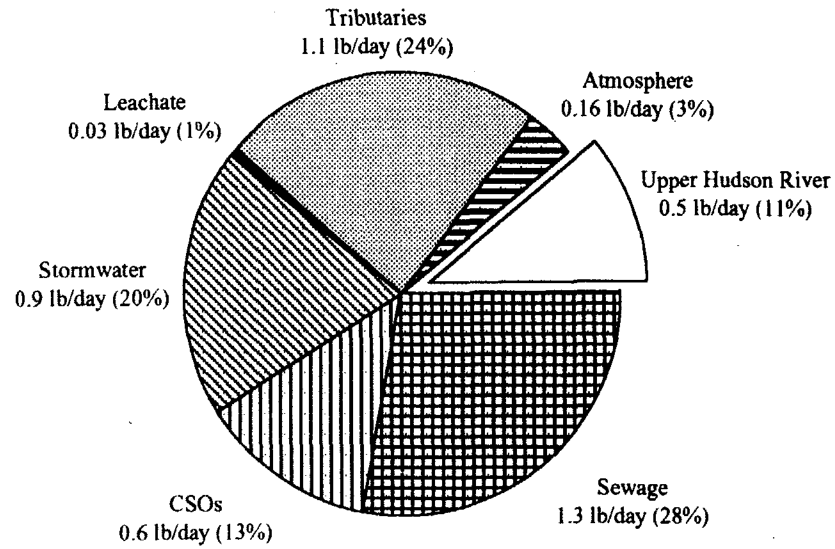


Note: Based on Table 3-25.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 3-112
Fractional PCB Loads at Albany for 1991 to 1992
Based on Dated High-Resolution Sediment Core Results



Projected Total Load = 4.6 lb/day (2.1 kg/day)

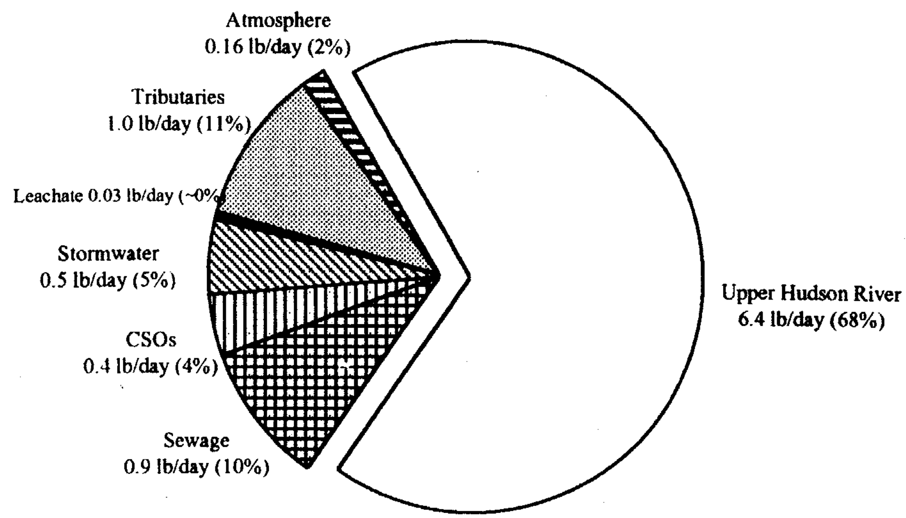
Notes:
a. Exponential decline in Upper Hudson load = 0.2765/year
b. Exponential decline in downstream loads = 0.057/year
c. 1 lb/day = 0.454 kg/day

Source: Thomann, *et al.* (1989 and 1991)

TAMS/Cadmus/Gradient

HRP 002 2151

Figure 3-113
Model-Projected PCB Loadings to Lower Hudson River and Harbor for 1993



Estimated Total Load = 9.4 lb/day (4.3 kg/day)

Notes:

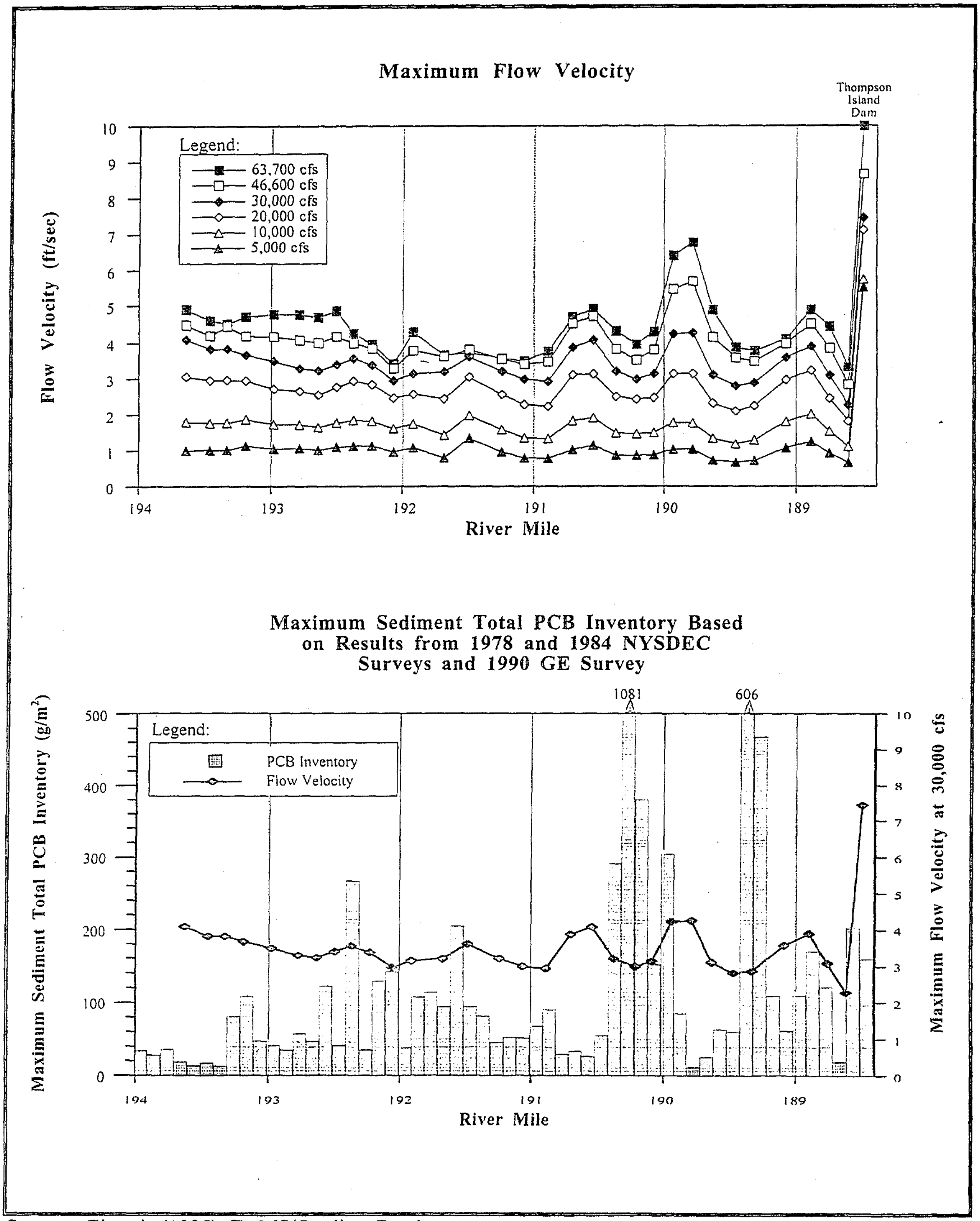
a. Loadings are for 1993 only and should not be used to directly estimate conditions for other time periods (see text for discussion)

b. 1 lb/day = 0.454 kg/day

Source: TAMS/Gradient Database and various others discussed in text at Sections 2.3 and 3.5

TAMS/Cadmus/Gradient

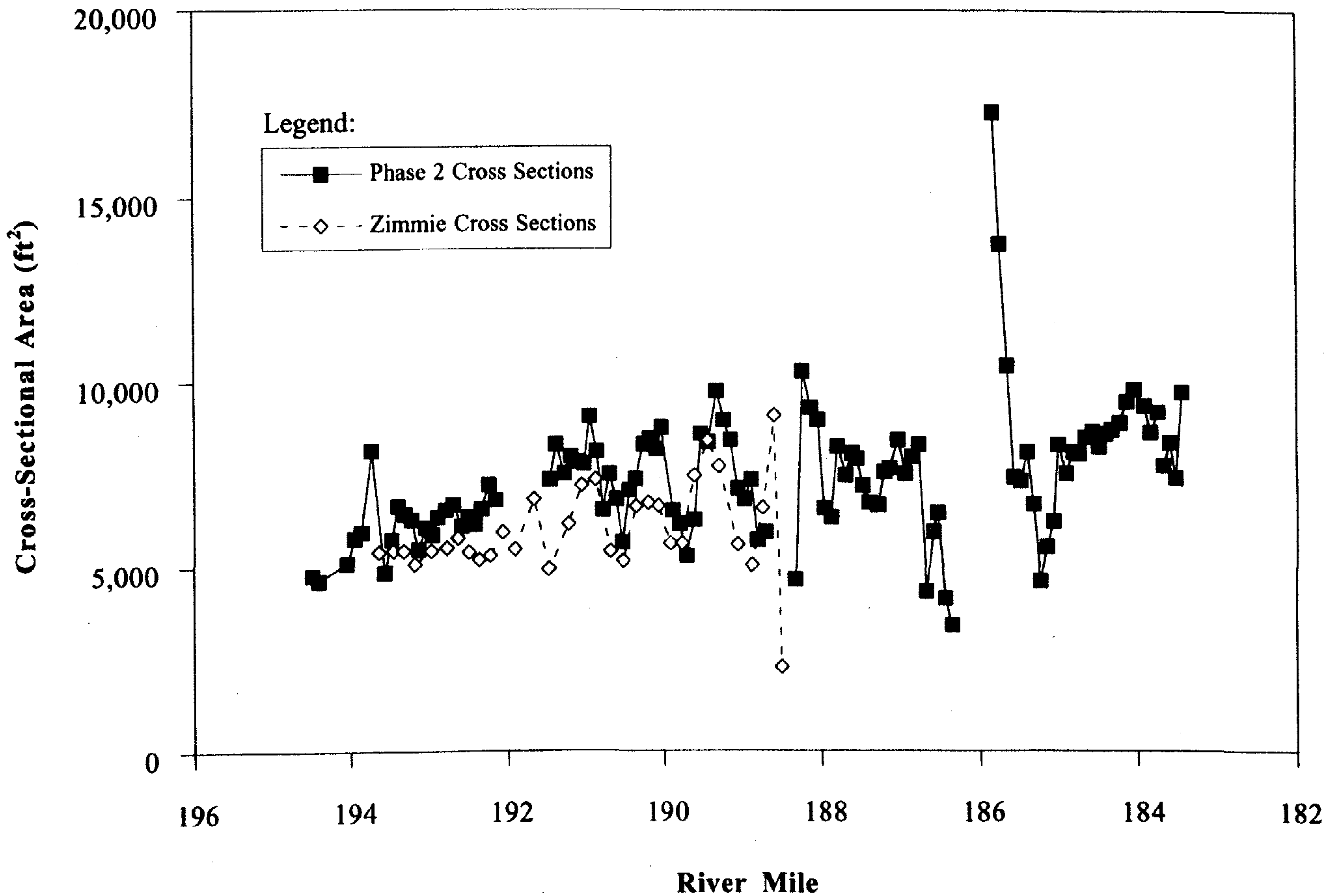
Figure 3-114
Estimated PCB Loadings to Lower Hudson and Harbor for 1993



Sources: Zimmie (1985); TAMS/Gradient Database

TAMS/Cadmus/Gradient

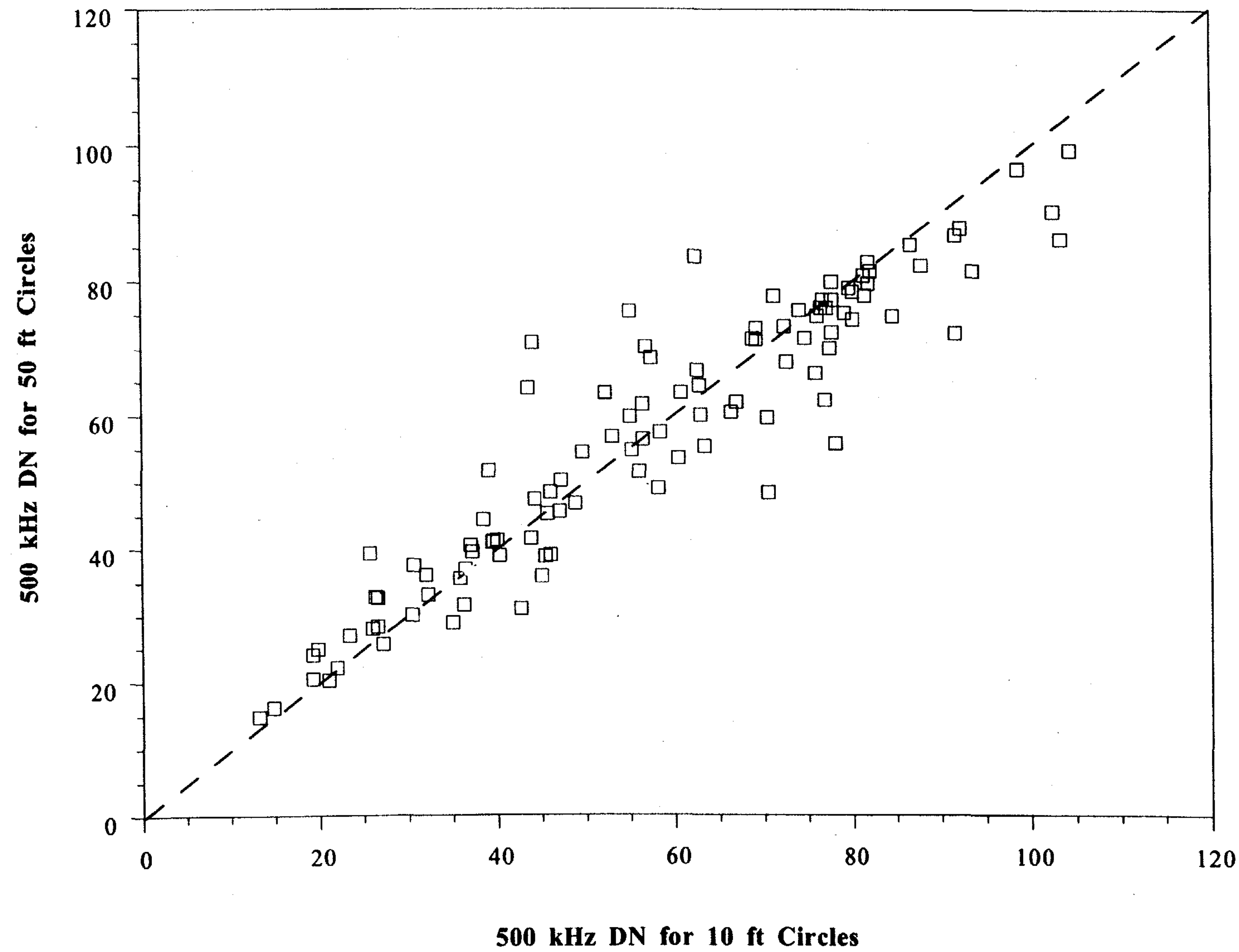
Figure 4-1
A Comparison between River Flow Velocity and Maximum Sediment PCB Inventory by River Mile in the Thompson Island Pool



Source: Zimmie (1985); Phase 2 Bathymetric Survey

TAMS/Cadmus/Gradient

Figure 4-2
Hudson River Cross-Sectional Area for 8400 cfs Flow at Fort Edward

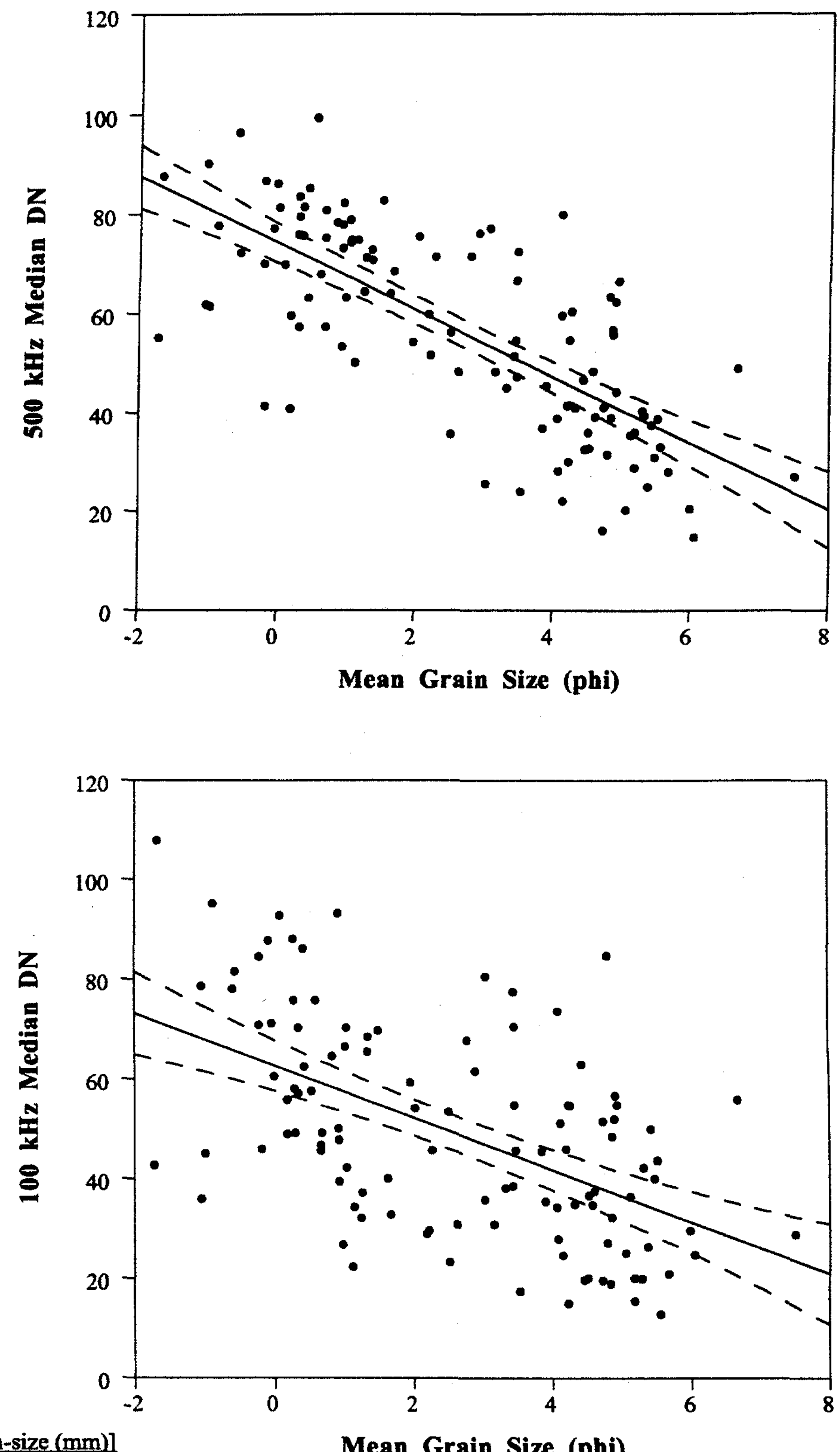


Source: Phase 2 Side-Scan Sonar Images

TAMS/Cadmus/Gradient

Figure 4-3
Comparison of the DN Value for 10 ft and 50 ft Circles at Confirmatory Sampling Sites

HRP 002 2155



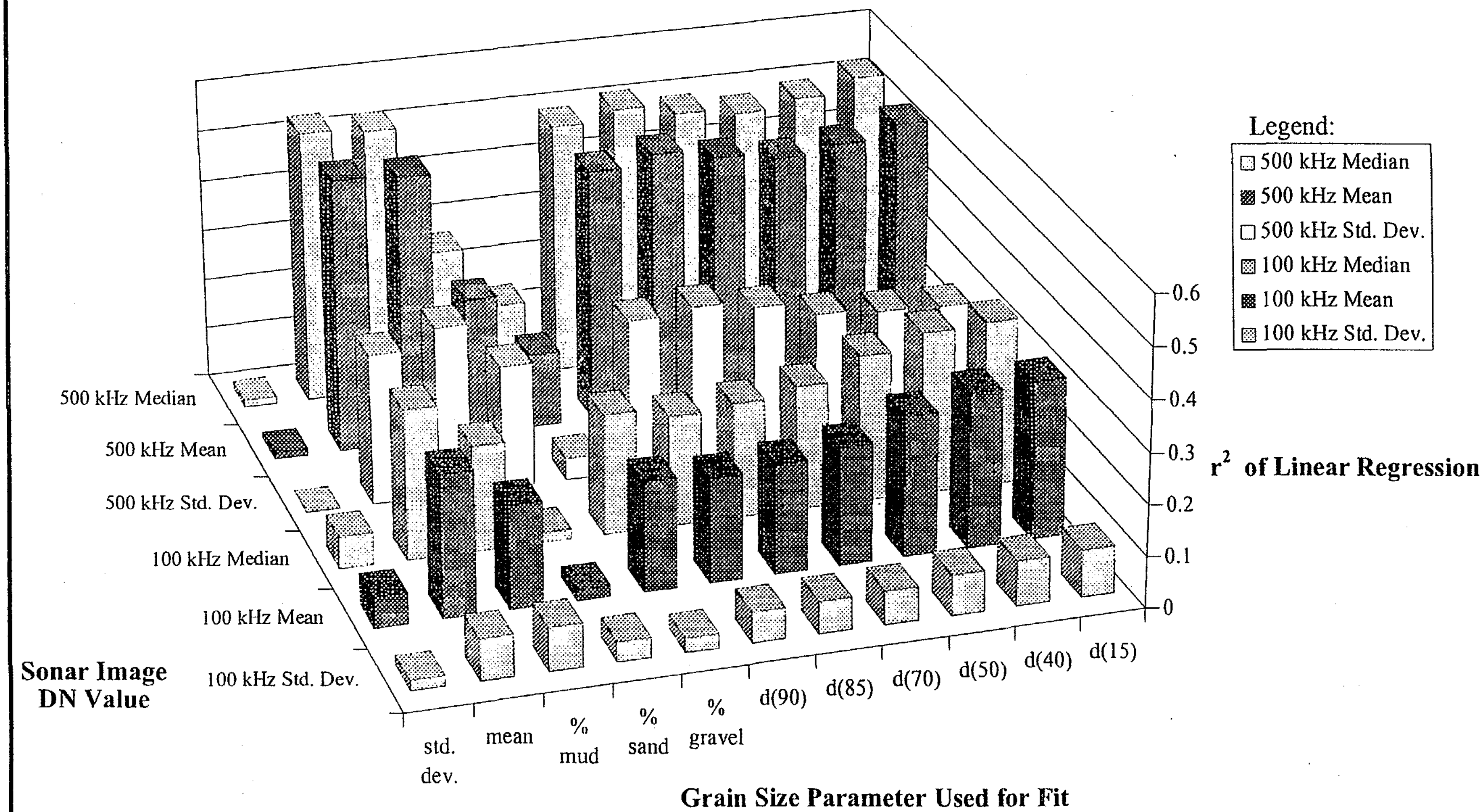
Note:
a. phi = $\frac{\log[\text{grain-size (mm)}]}{\log 2}$

Source: Phase 2 Side-Scan Sonar Images; TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-4
Calibration Plots of DN vs. Grain-Size

HRP 002 2156

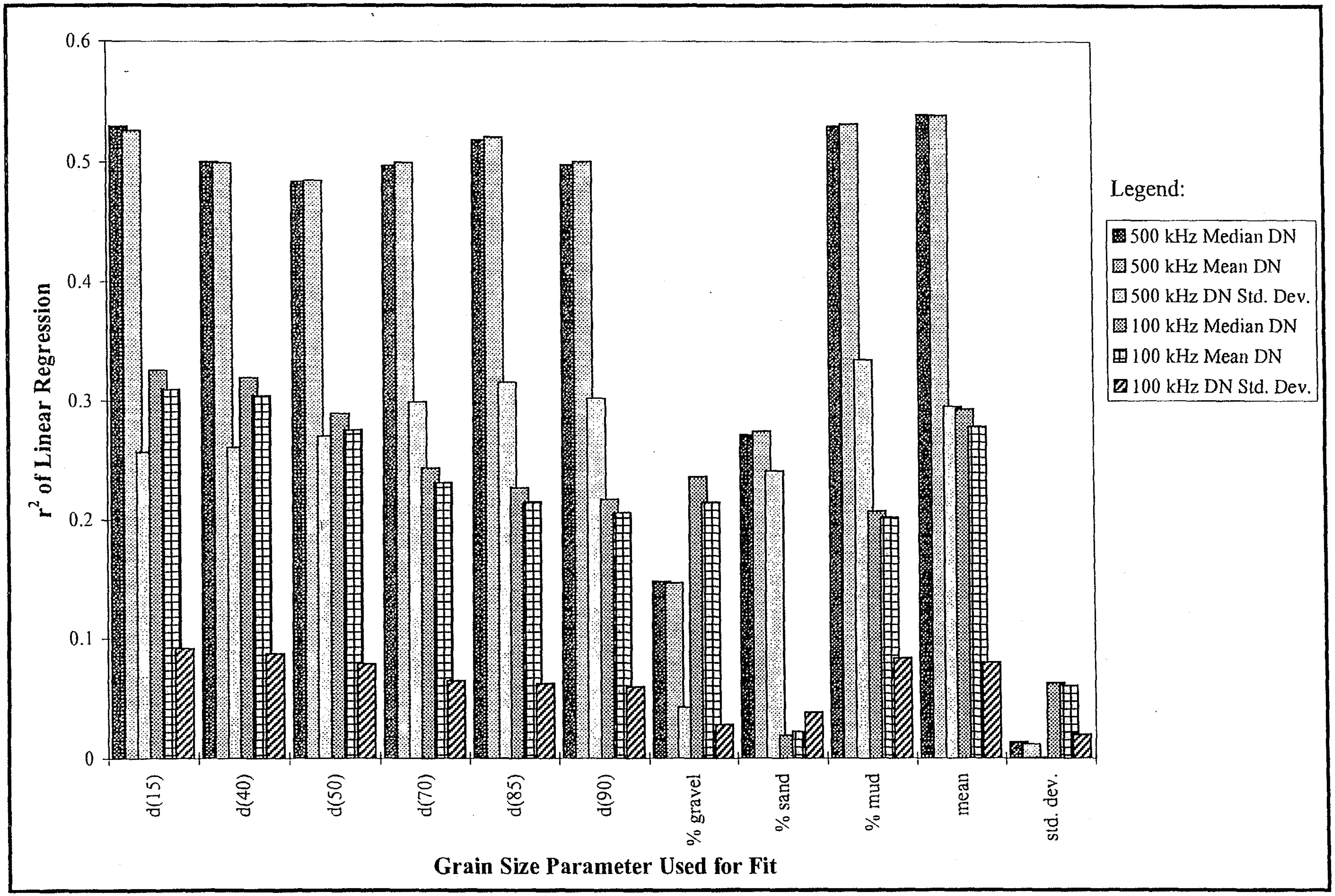


Source: Phase 2 Side-Scan Sonar Images; TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-5
Three-Dimensional Correlation Plot of Digital Number vs. Grain Size

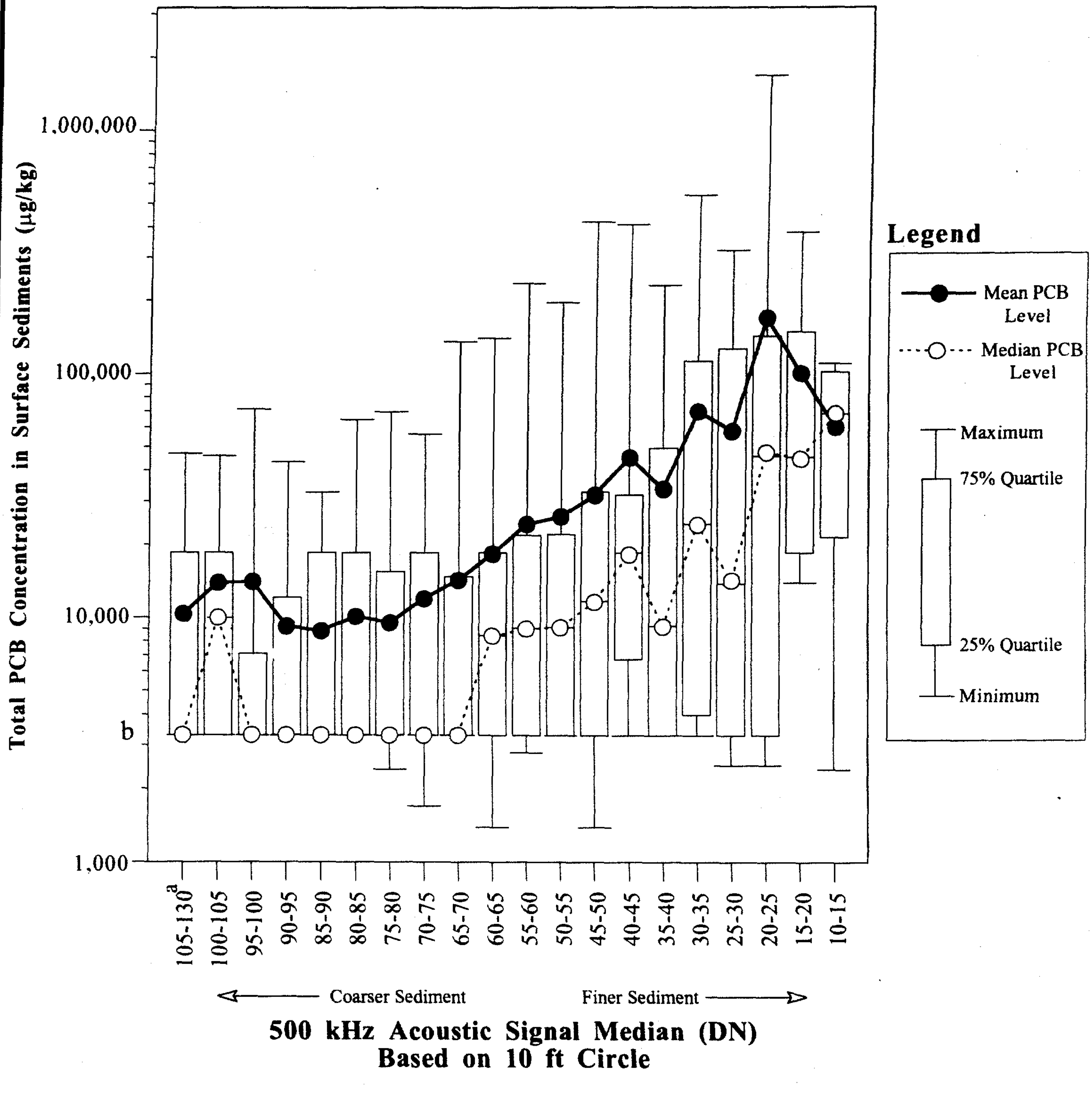
HRP 002 2157



Source: Phase 2 Side-Scan Sonar Images; TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-6
Two-Dimensional Correlation Plot of Digital Number vs. Grain Size



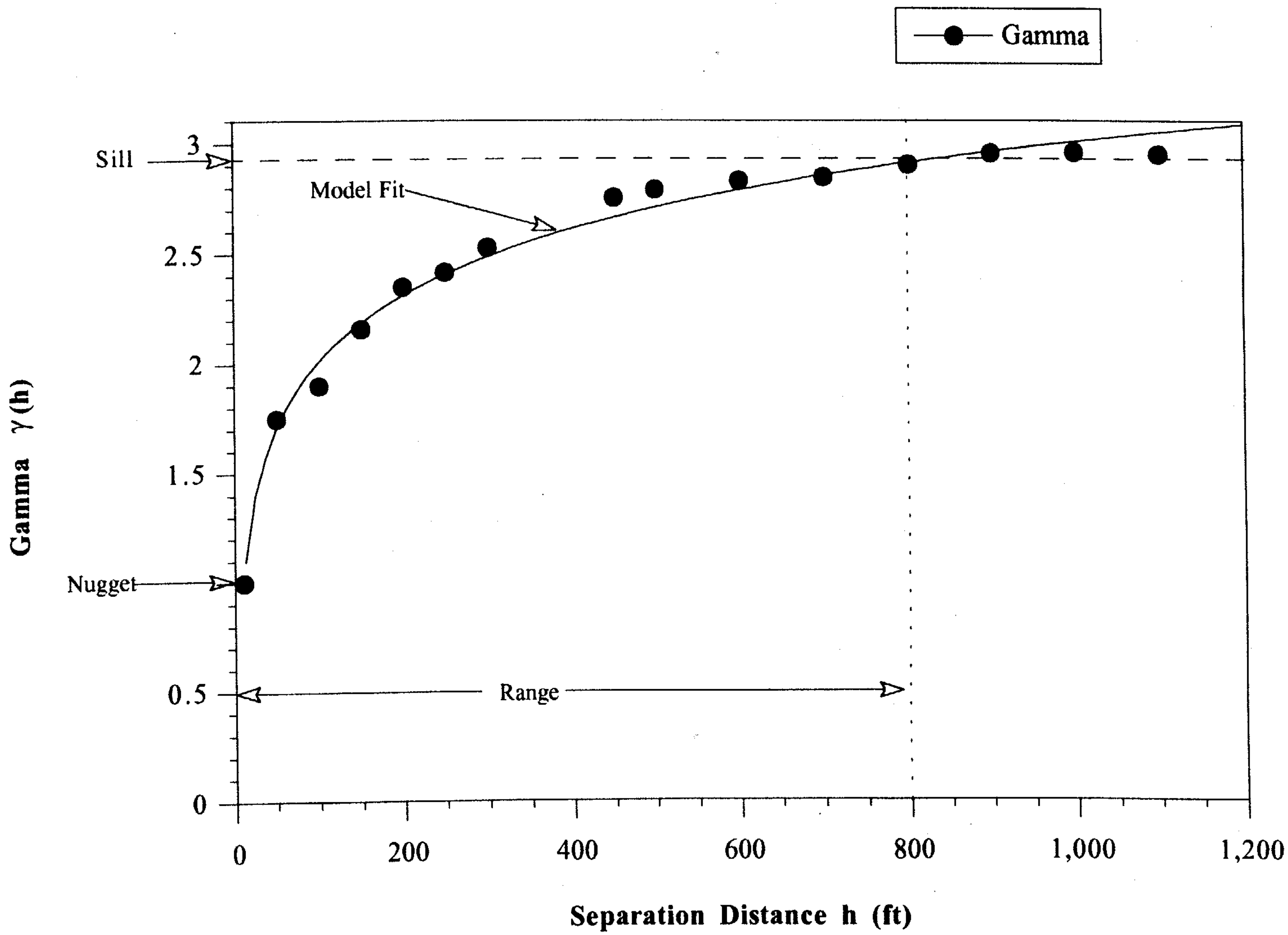
HRP 002 2159

Notes:
a. Increased interval
b. The commonly occurring value of 3300 µg/kg represents the value assigned to NYSDEC sediment samples which were screened as "COLD". See Section 4.2.

Source: Phase 2 Side-Scan Sonar Images; Brown et al, 1988

TAMS/Cadmus/Gradient

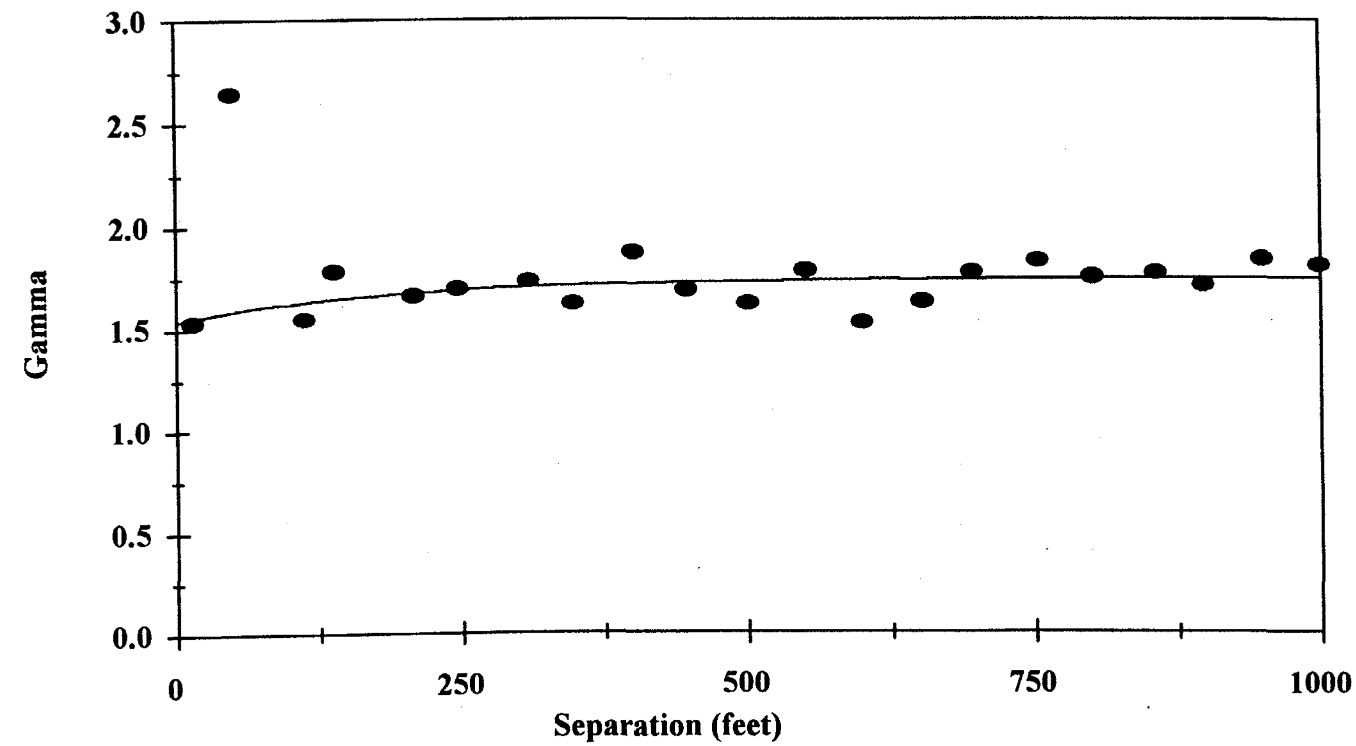
Figure 4-7
Comparison of 500 kHz Acoustic Signal and 1984 NYSDEC PCB Levels in Surface Sediments



TAMS/Cadmus/Gradient

Figure 4-8
Example Semivariogram with Labels

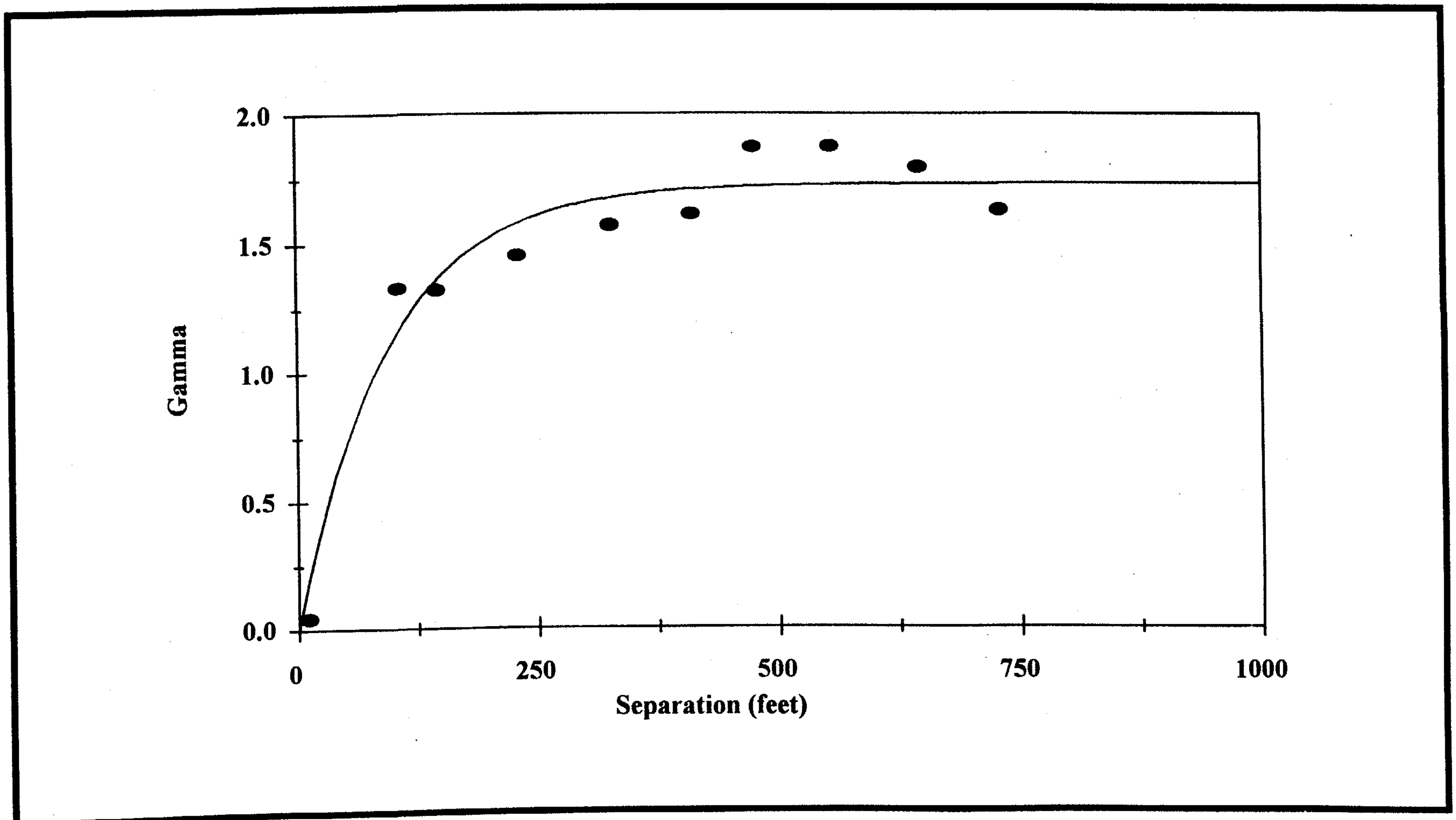
HRP 002 2160



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

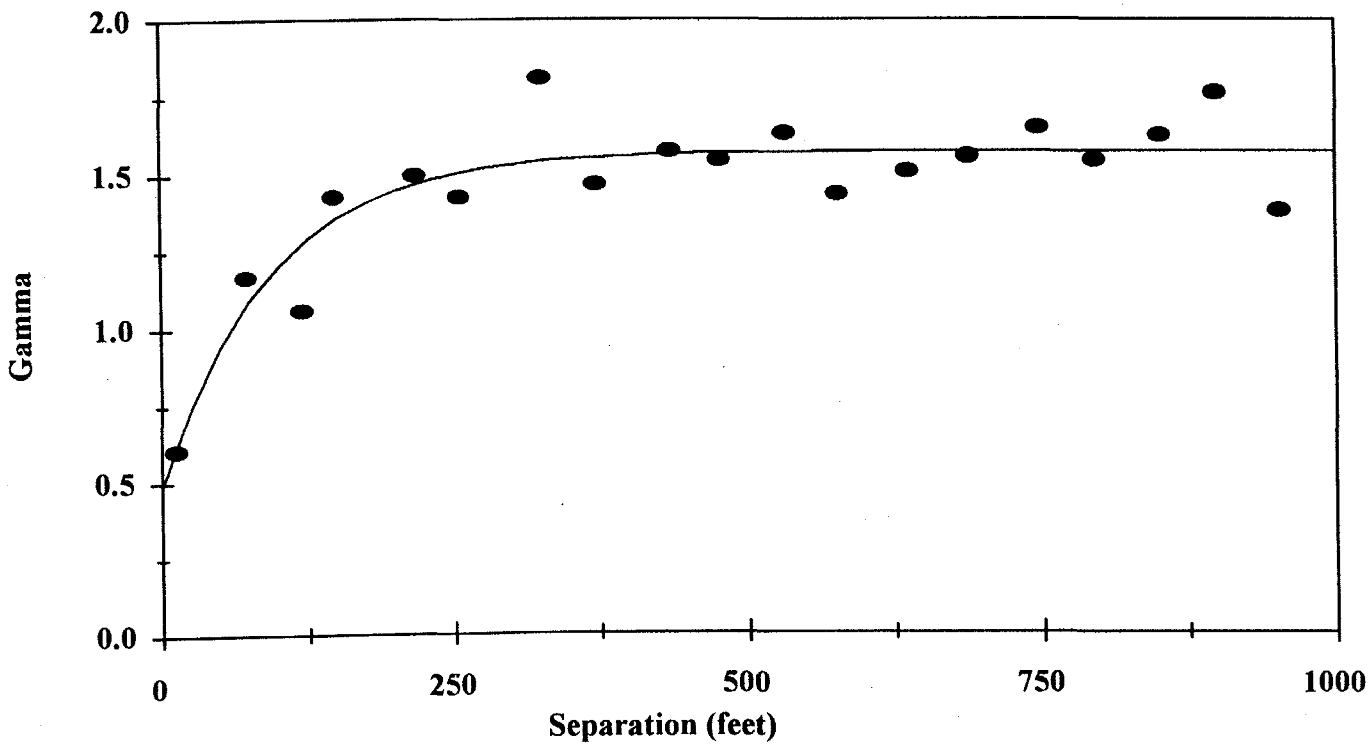
Figure 4-9
Variogram of Natural Log of PCB Mass
Thompson Island Pool, 1984 Sediment Survey
Subreaches 1 and 2, Isotropic Variogram



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-10
Variogram of Natural Log of PCB Mass
Thompson Island Pool, 1984 Sediment Survey
Subreach 3, Major Axis N 35 W

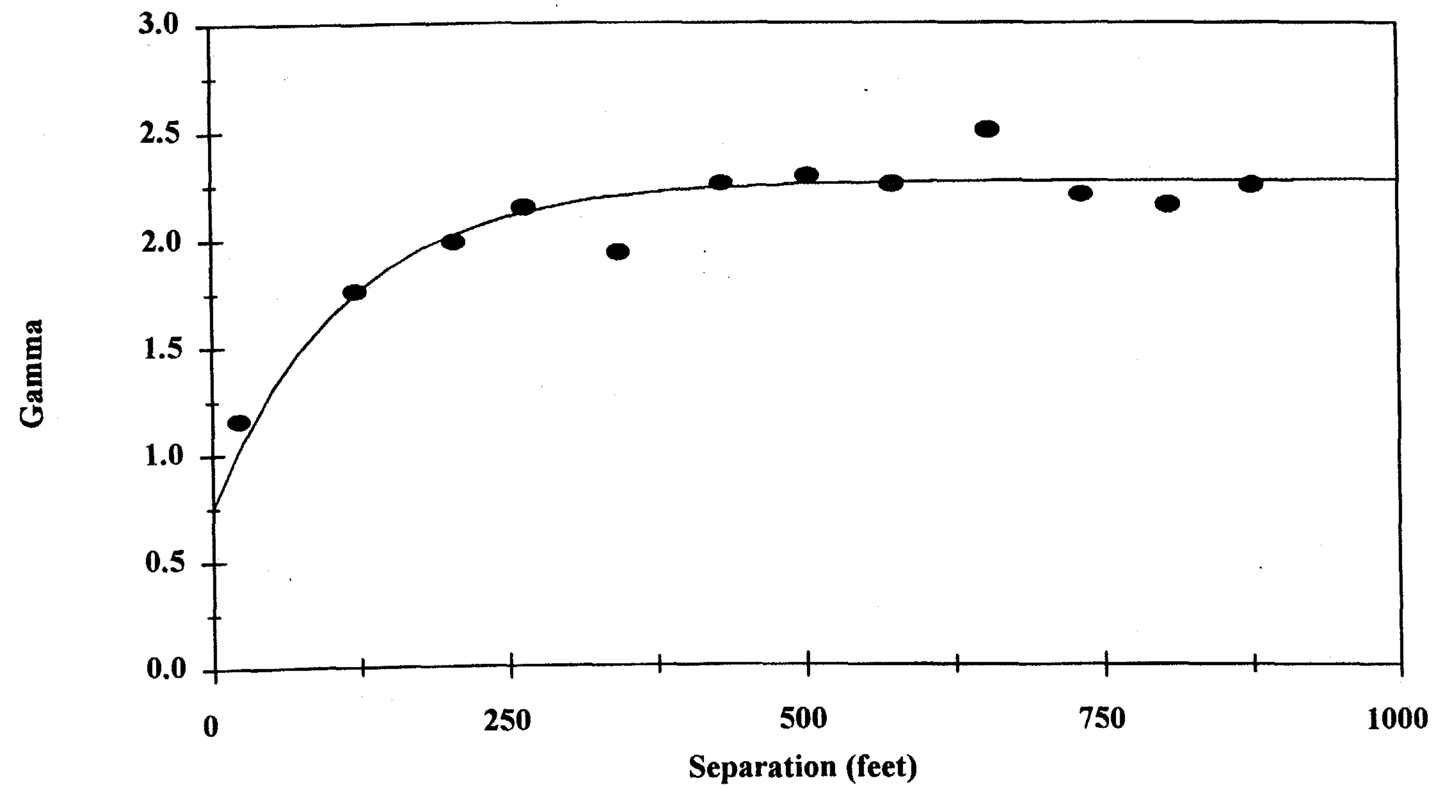


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-11
Variogram of Natural Log of PCB Mass
Thompson Island Pool, 1984 Sediment Survey
Subreach 4, Major Axis N 10 W

HRP 002 2163

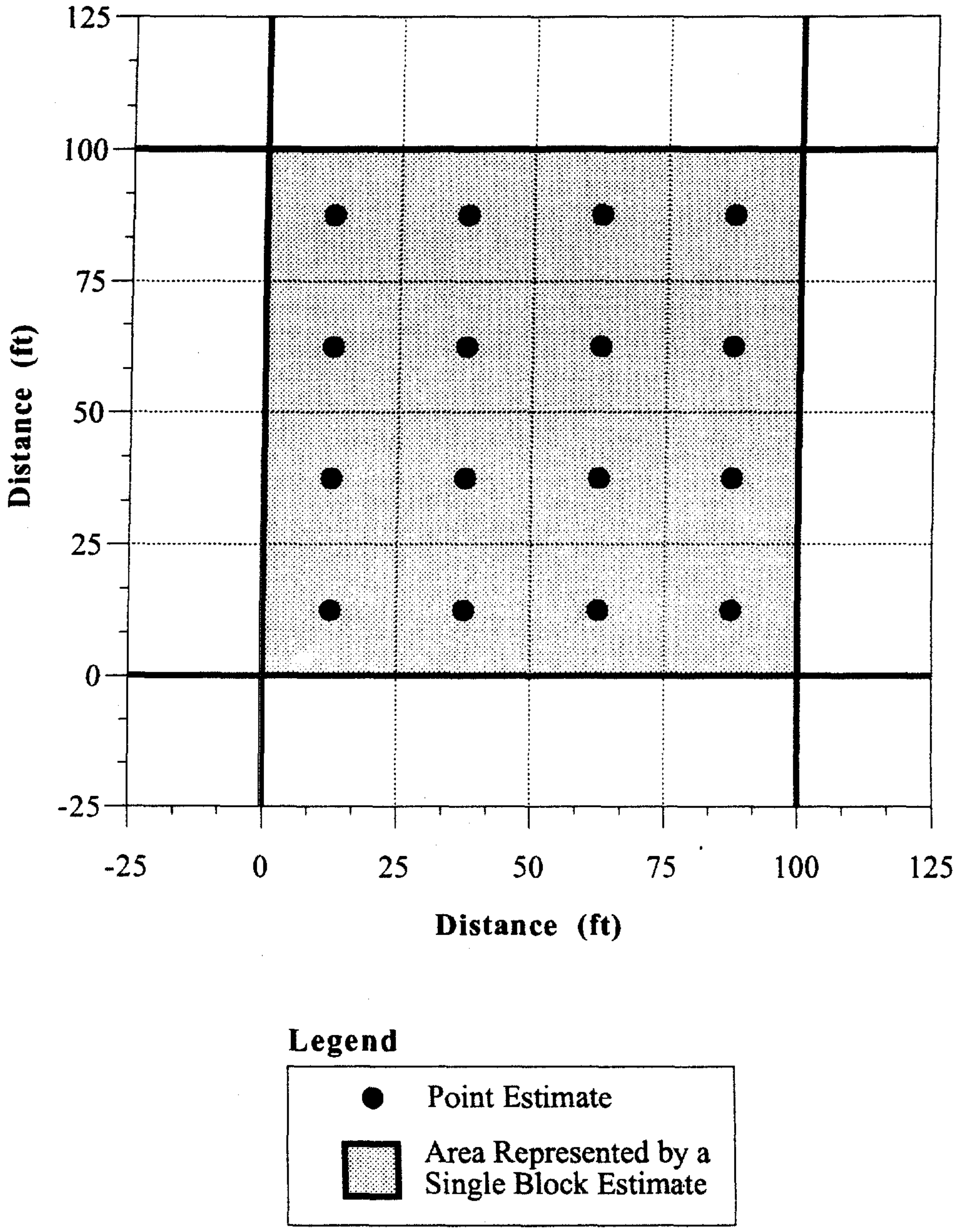


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-12

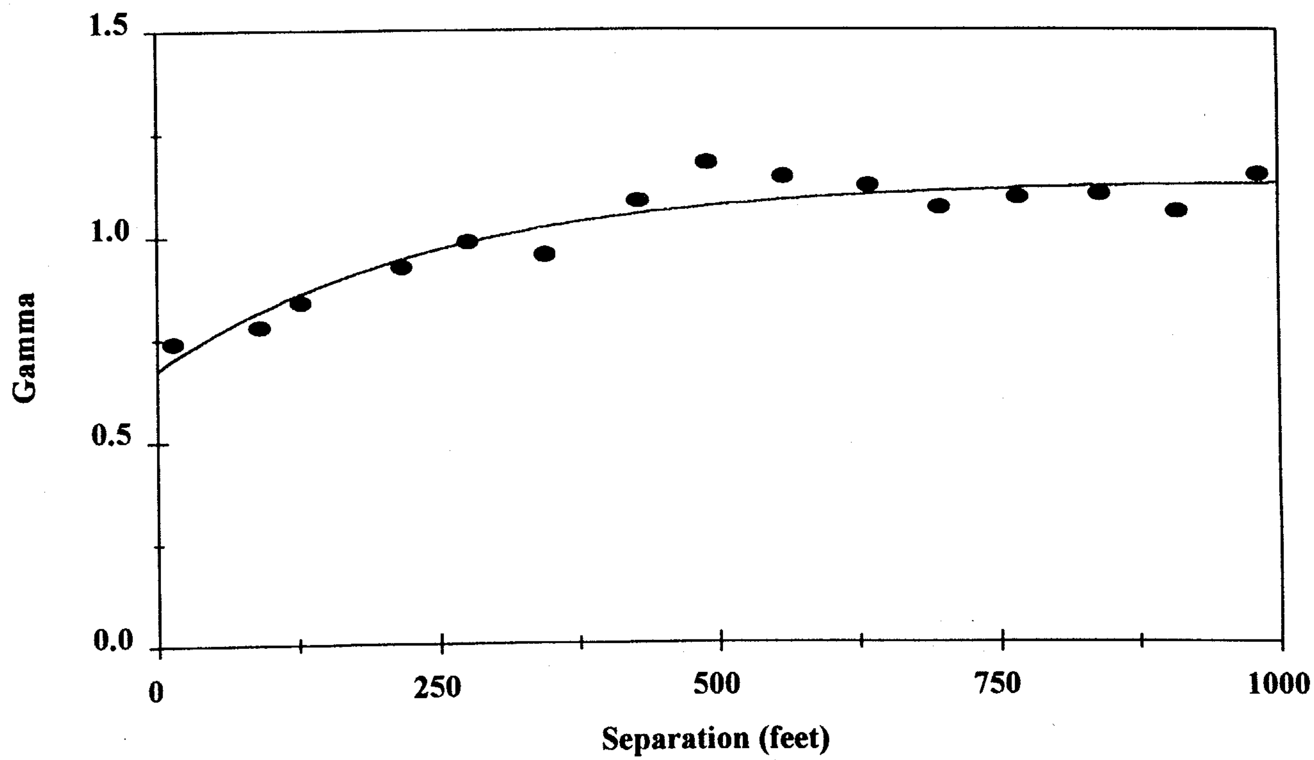
Variogram of Natural Log of PCB Mass
Thompson Island Pool, 1984 Sediment Survey
Subreach 5, Isotropic Variogram



TAMS/Cadmus/Gradient

Figure 4-13
Typical Arrangement of the Point Estimates Used in Generating Block Kriging Values

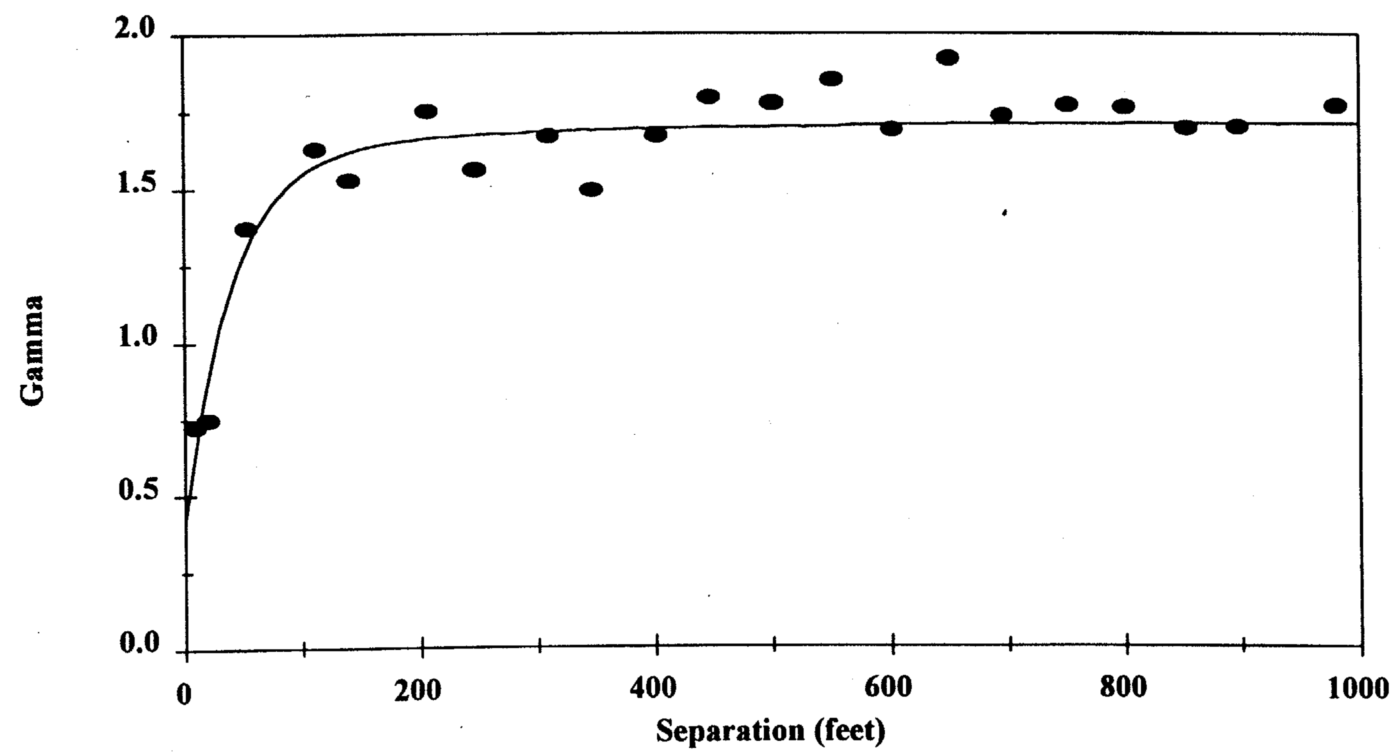
HRP 002 2165



TAMS/Cadmus/Gradient

Source: TAMS/Gradient Database

Figure 4-14
Variogram of Natural Log of Surface PCB Concentration
GC/MS Screening Data
Thompson Island Pool, 1984 Sediment Survey

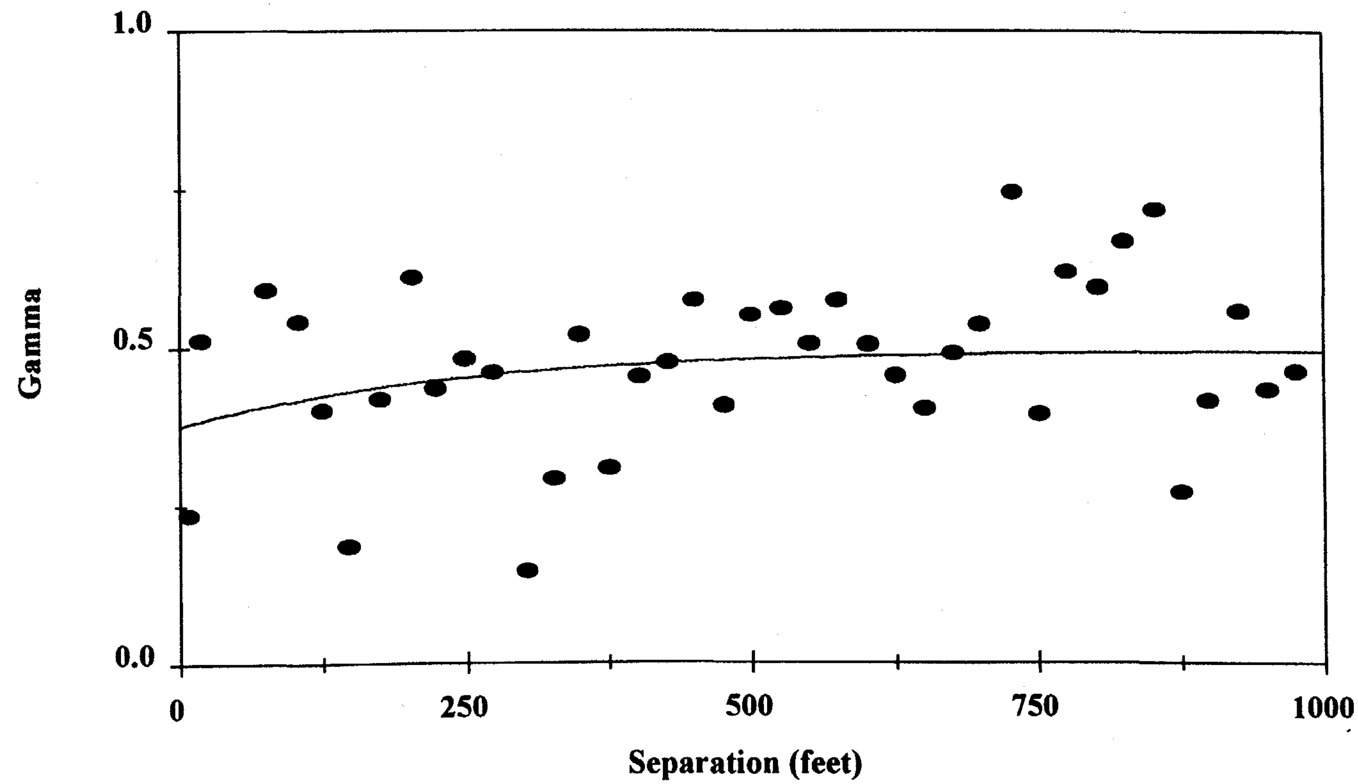


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-15
Variogram of Natural Log of Surface PCB Concentration
GC/ECD Analytical Data
Thompson Island Pool, 1984 Sediment Survey

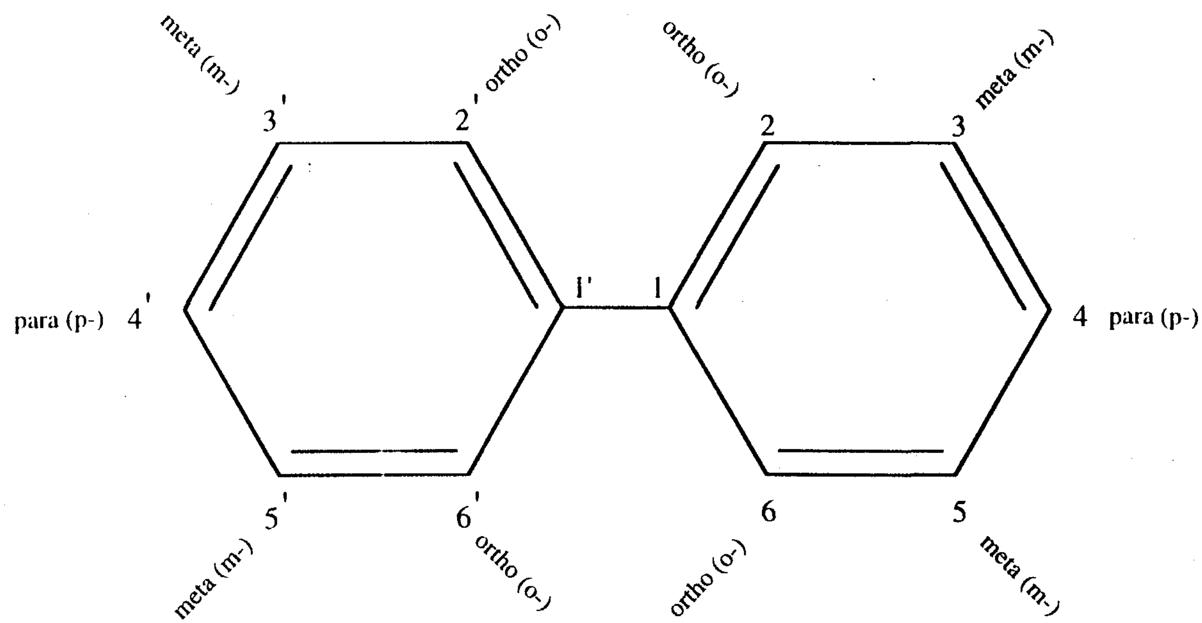
HRP 002 2167



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-16
Variogram of Natural Log of Surface PCB Concentration
Cross-Variogram between GC/ECD and GC/MS Data
Thompson Island Pool, 1984 Sediment Survey



TAMS/Cadmus/Gradient

Figure 4-17
Locations of Potential Chlorine Sites on a PCB Molecule

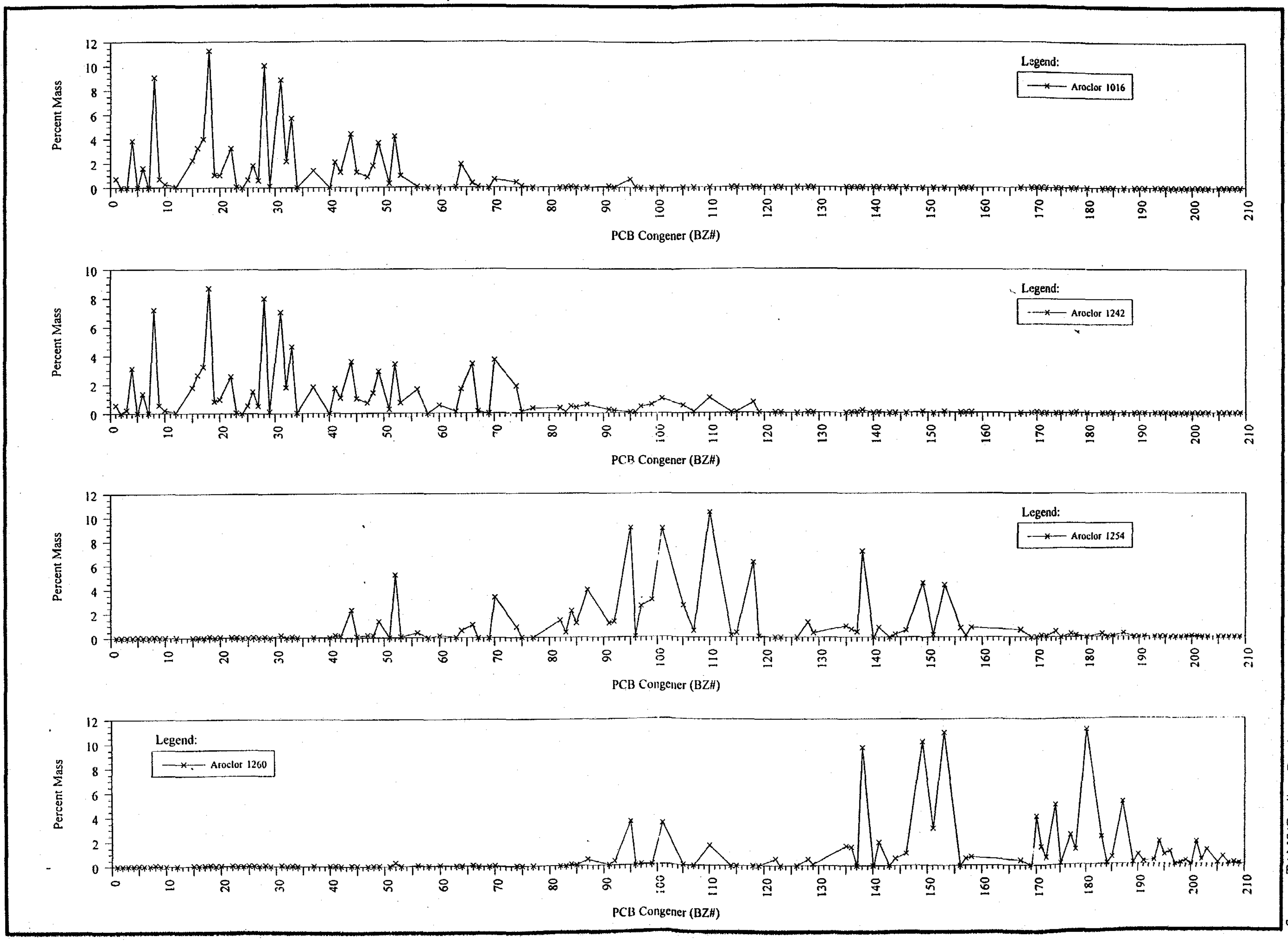
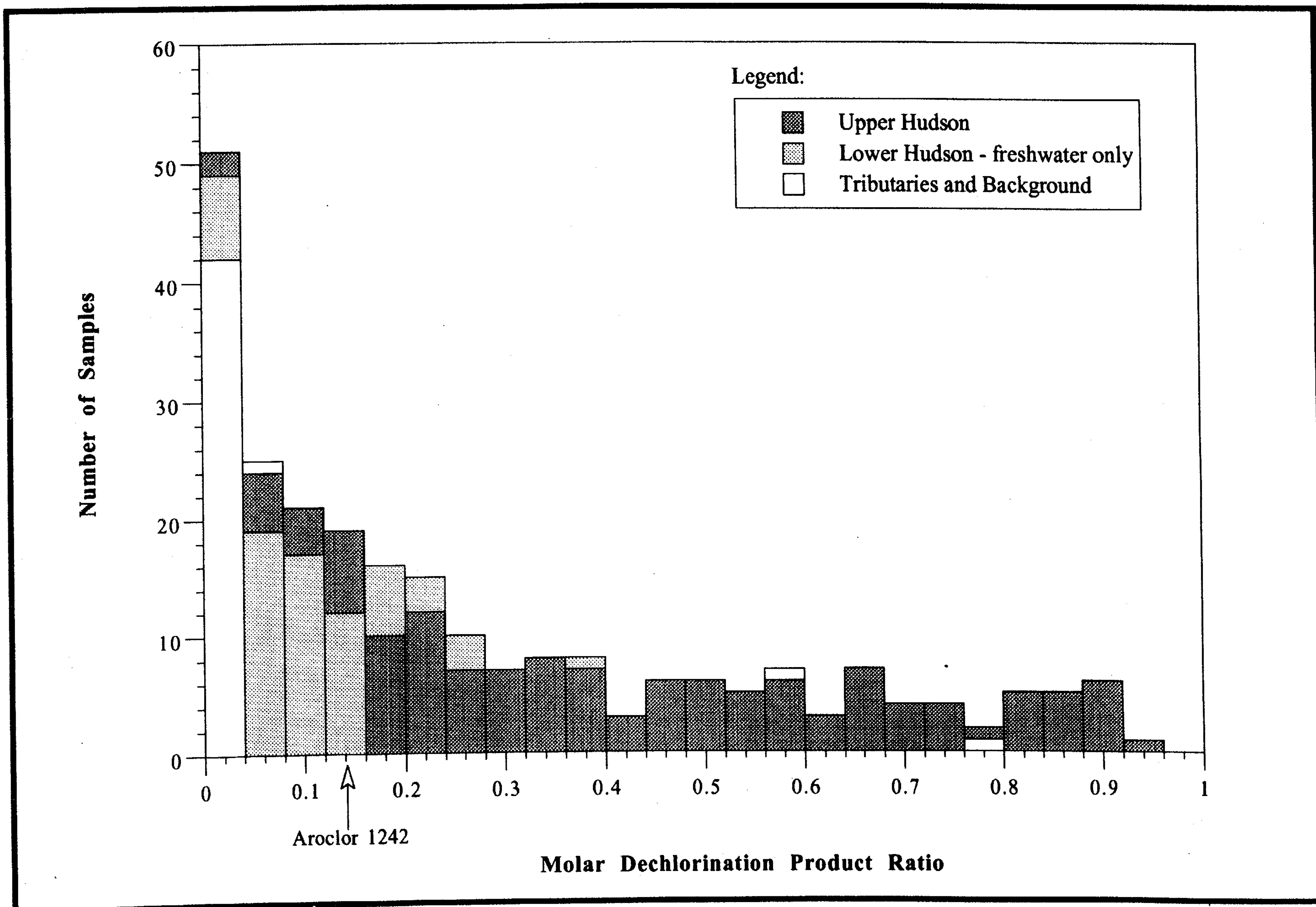


Figure 4-18
Congener Content of Four Aroclor Mixtures

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

HRP 002 2170



Source: TAMS/Gradient Database

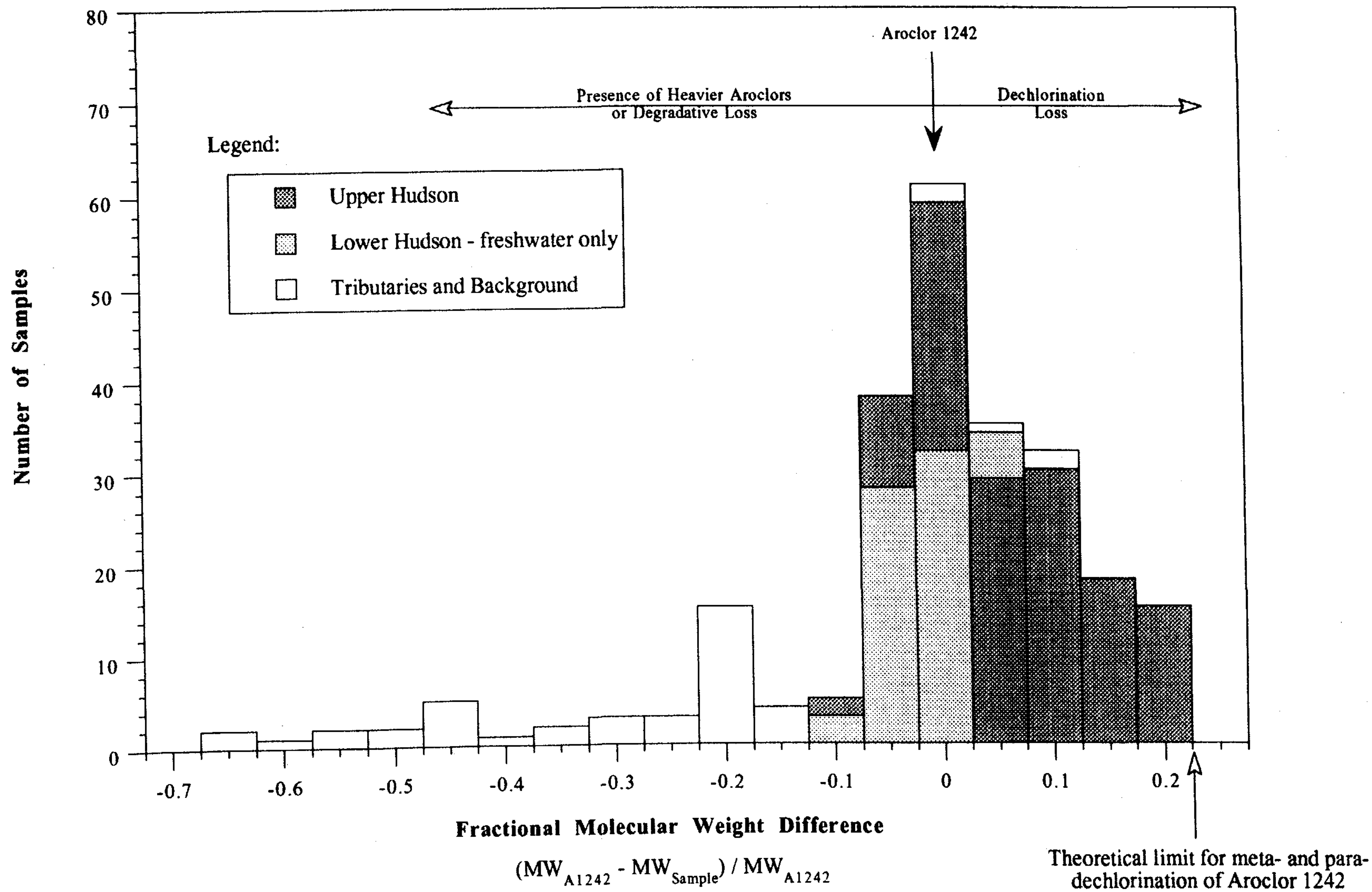
TAMS/Cadmus/Gradient

Figure 4-19

HRP 002 2171

Histogram of the Molar Dechlorination Product Ratio

Results of All Freshwater Post-1954 Sediment Samples



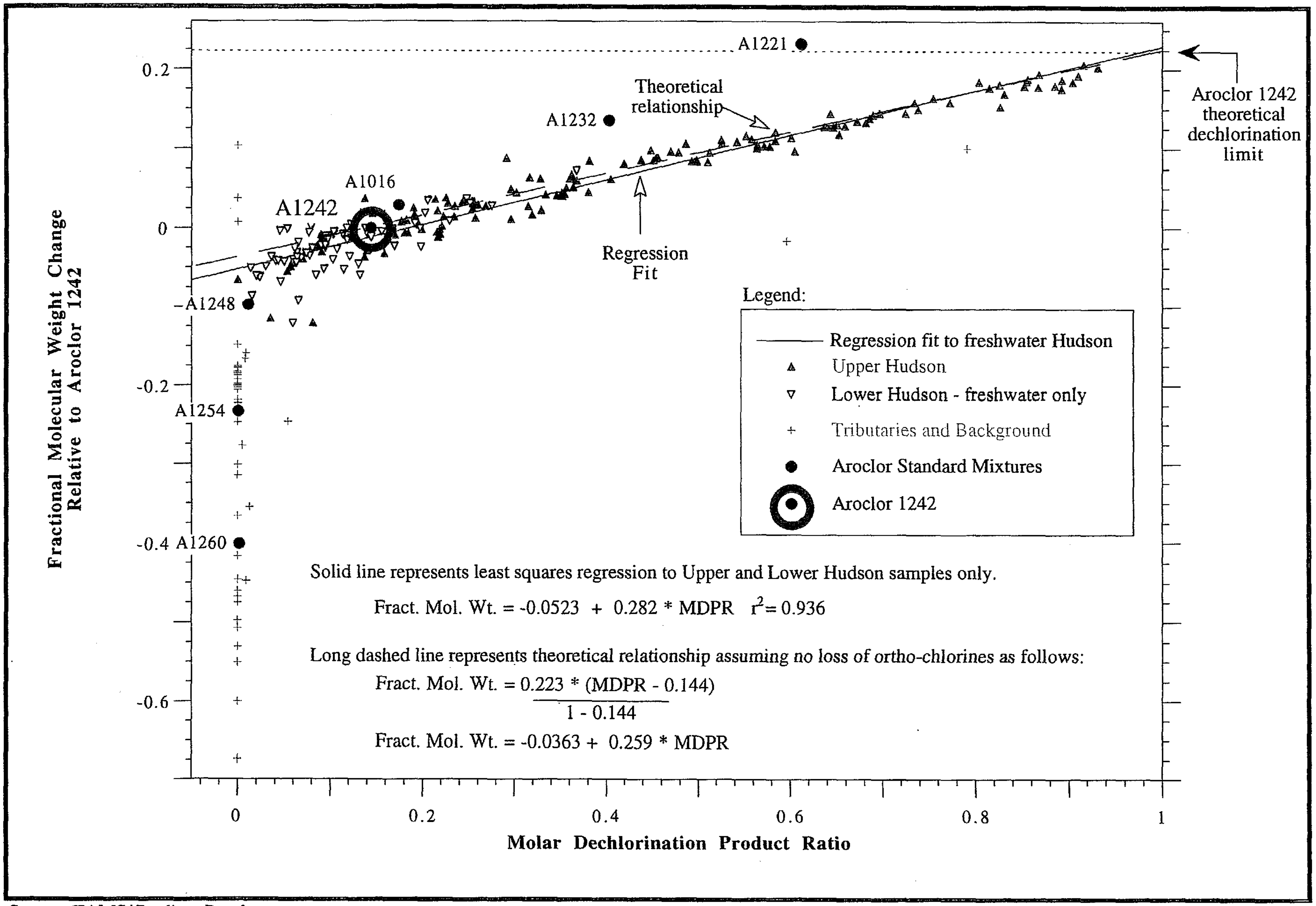
Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-20

Histogram of the Fractional Molecular Weight Difference Relative to Aroclor 1242

Results of All Freshwater Post-1954 High Resolution Sediment Samples

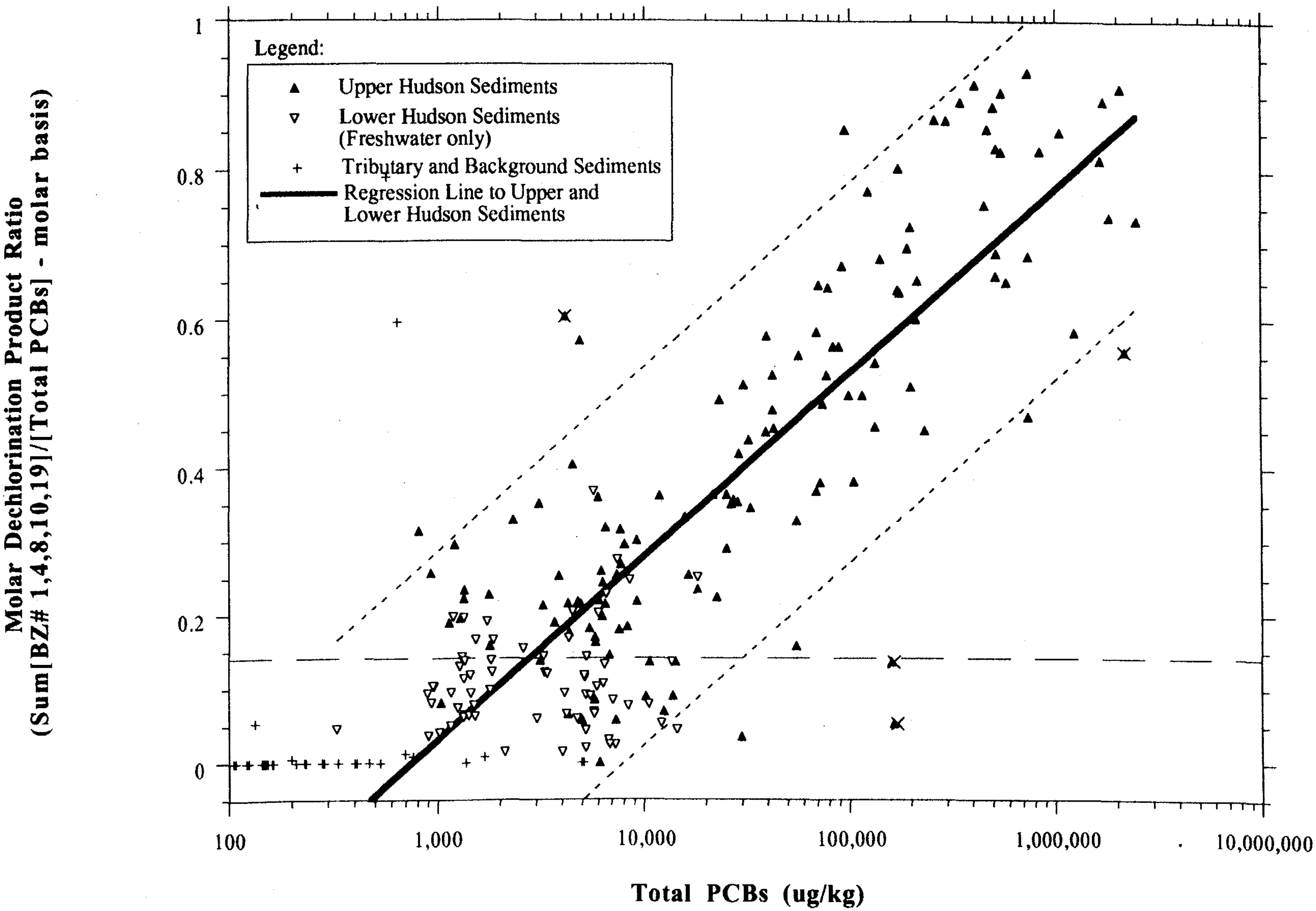


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-21
Comparison Between the Molar Dechlorination Product Ratio and the Fractional Change in Molecular Weight for All Post-1954 Freshwater Sediments

HRP 002 2173



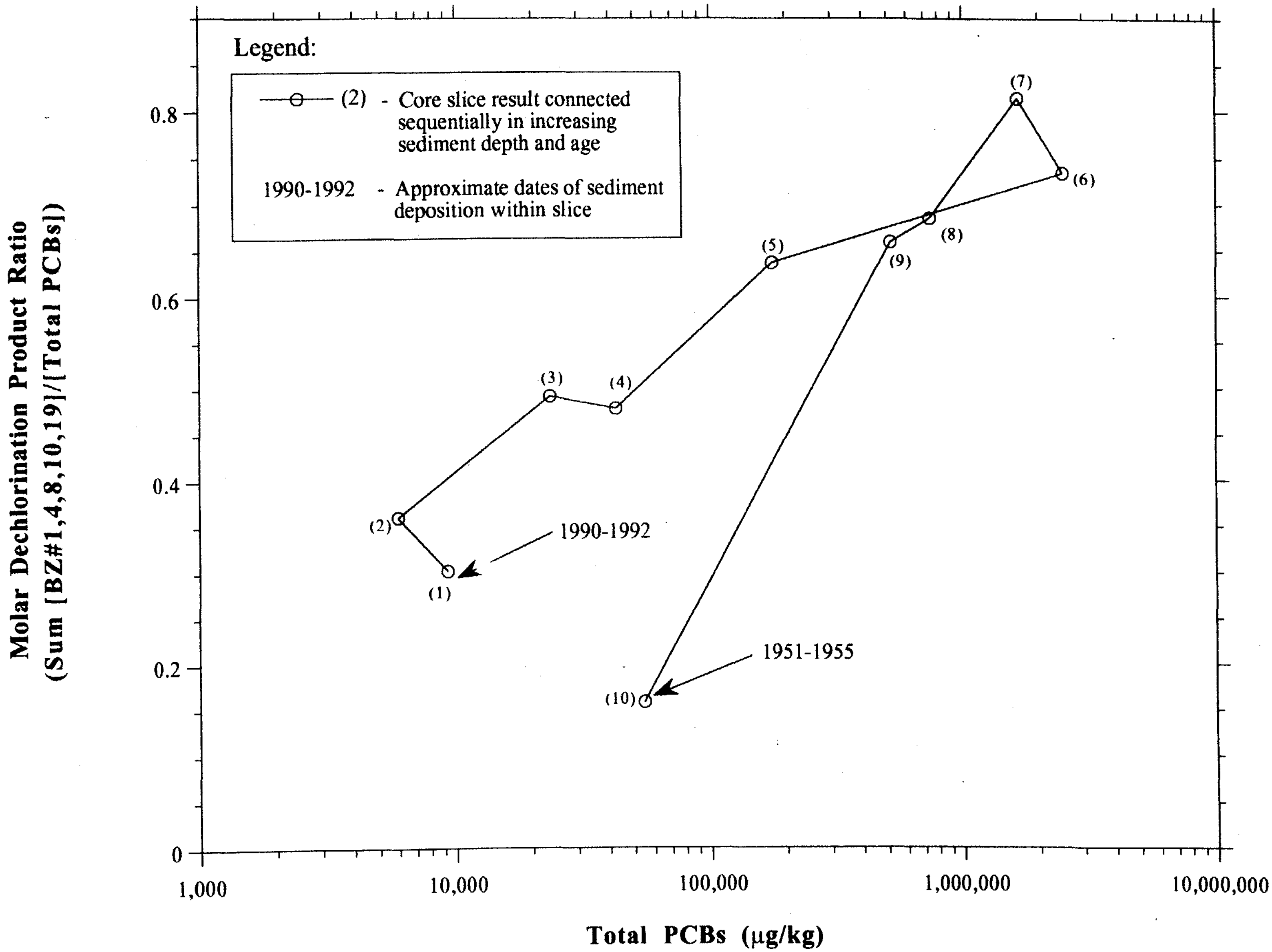
Notes:

1. Solid line represents best fit to all ^{137}Cs-bearing sediments from the Upper and Lower Hudson (r^2= 0.75).
2. Thin dashed lines represent the 95% confidence interval about the regression line for individual measurements.
3. Regression excludes outliers marked with an "X". These outliers were selected based on a statistical analysis of the data.
4. The dashed horizontal line represents the original molar ratio in Aroclor 1242.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-22
Molar Dechlorination Product Ratio vs. Total PCB Concentration in Post-1954 Sediments from the Freshwater Hudson River

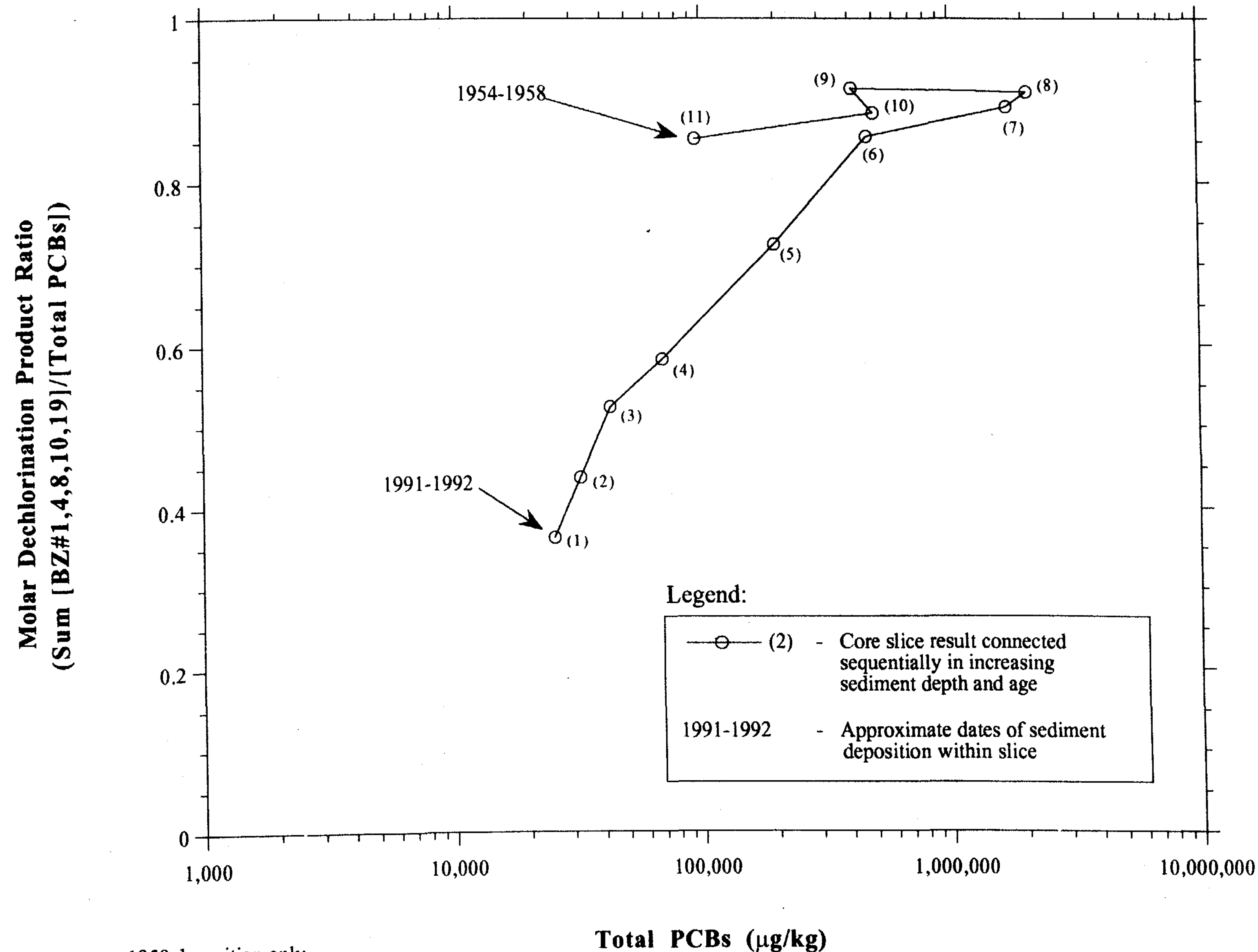


Note:
Diagram represents post-1950 deposition only.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-23
Molar Dechlorination Product Ratio vs. Total PCB Concentration with Depth (Age) in Core 18 at River Mile 185.8



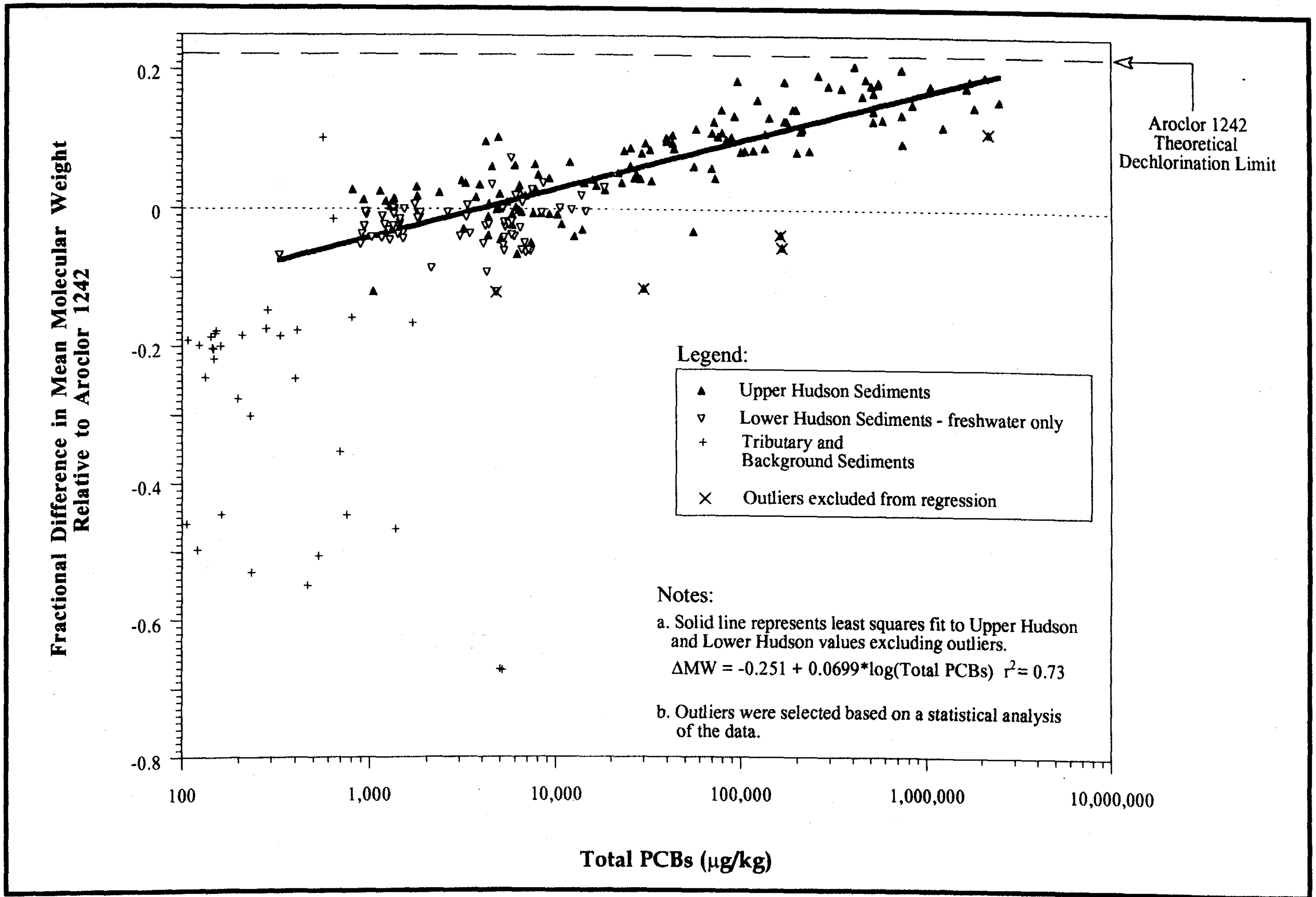
Note:
Diagram represents post-1950 deposition only.

HRP 002 2176

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-24
Molar Dechlorination Product Ratio vs. Total PCB Concentration with Depth (Age) in Core 19 at River Mile 188.5

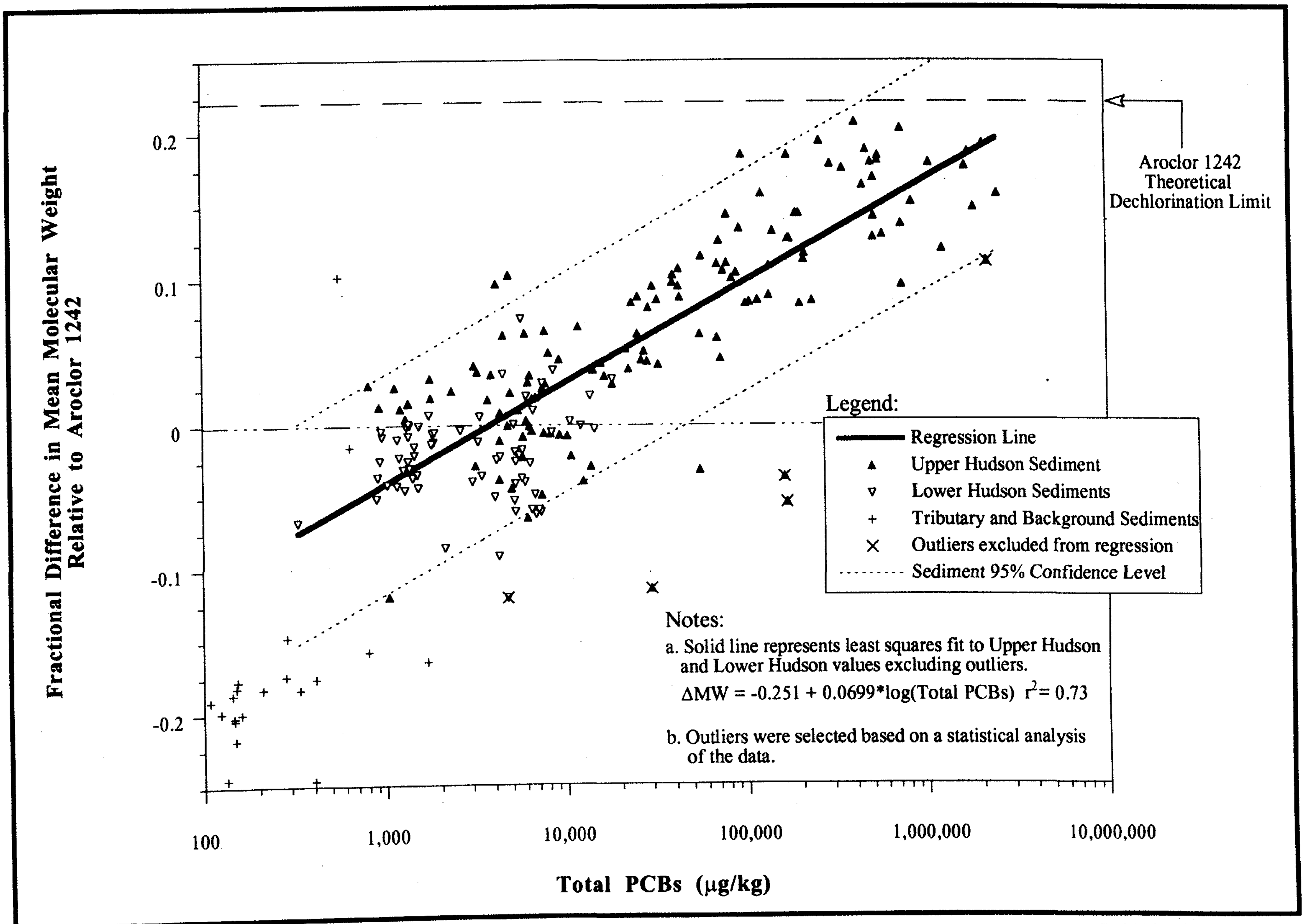


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-25
Fractional Mass Loss as Measured by the Change in Mean Molecular Weight

Represents All Post-1954 Freshwater Sediment Core Data



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-26

Fractional Mass Loss as Measured by the Change in Mean Molecular Weight - Expanded Scale

Represents All Post-1954 Freshwater Sediment Core Data

HRP 002 2178

Figure 4-27a
Molar Dechlorination Product Ratio vs. Depth in
Post-1954 Sediments from the Hudson River

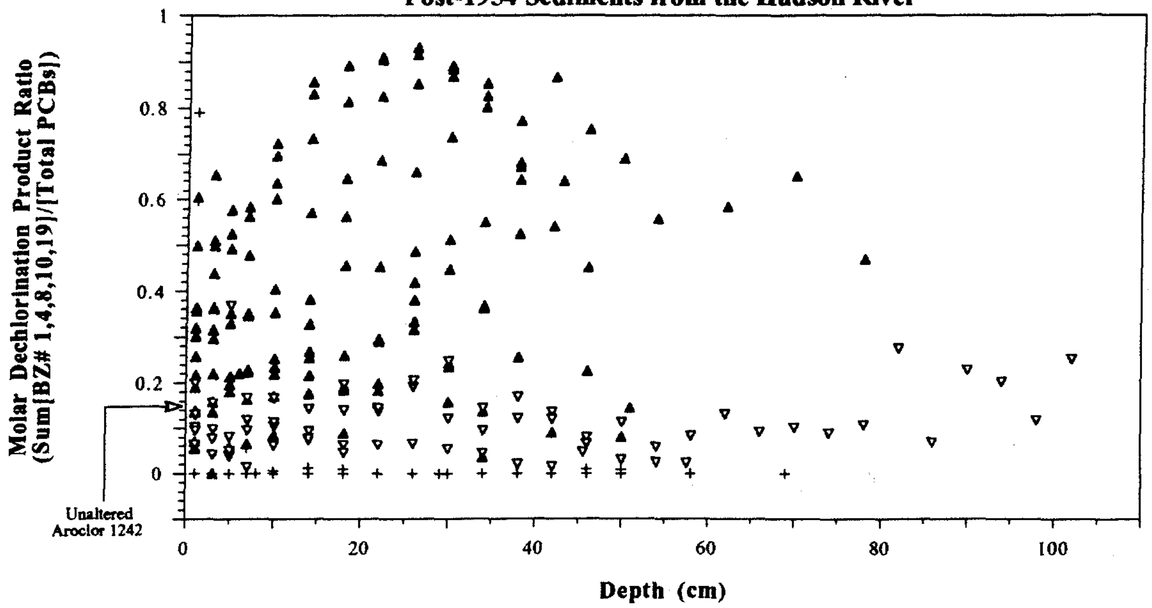
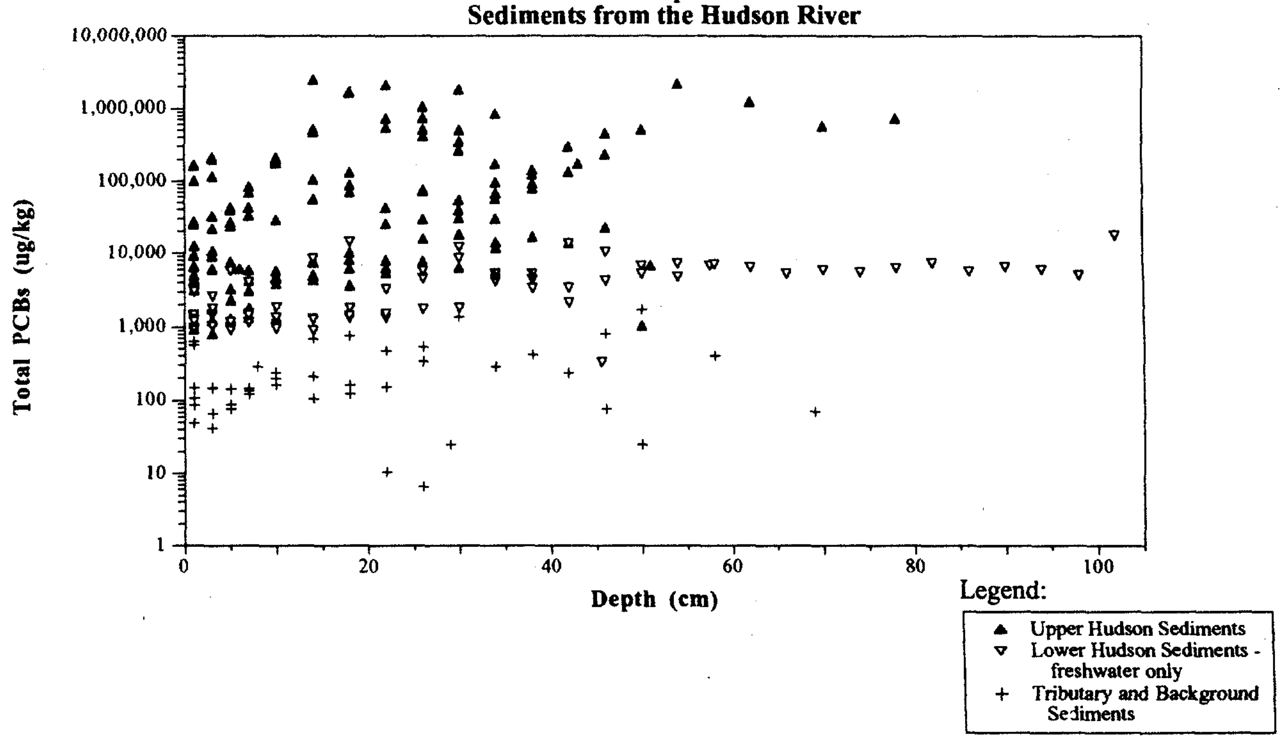


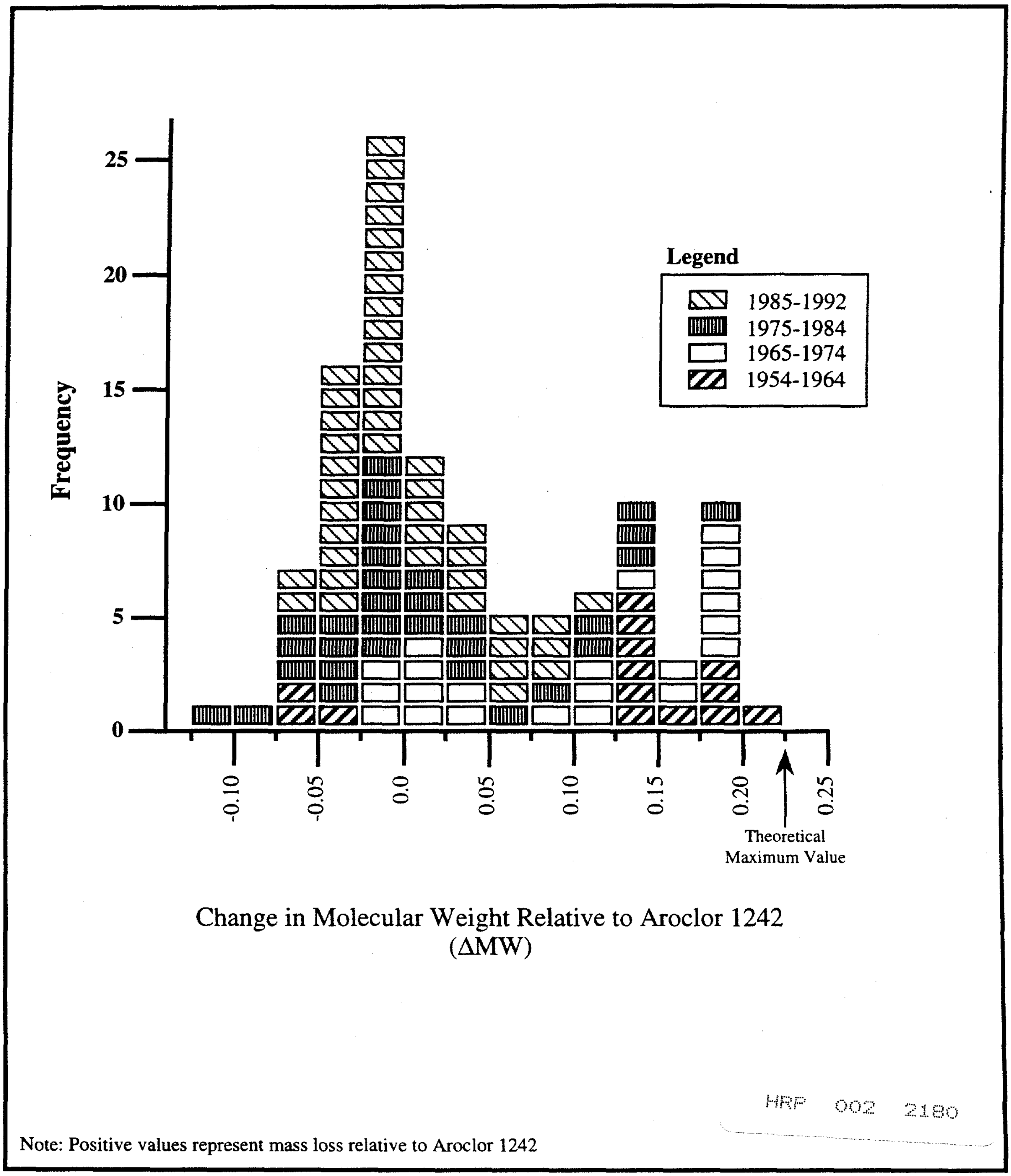
Figure 4-27b
Total PCBs vs. Depth in Post-1954
Sediments from the Hudson River



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

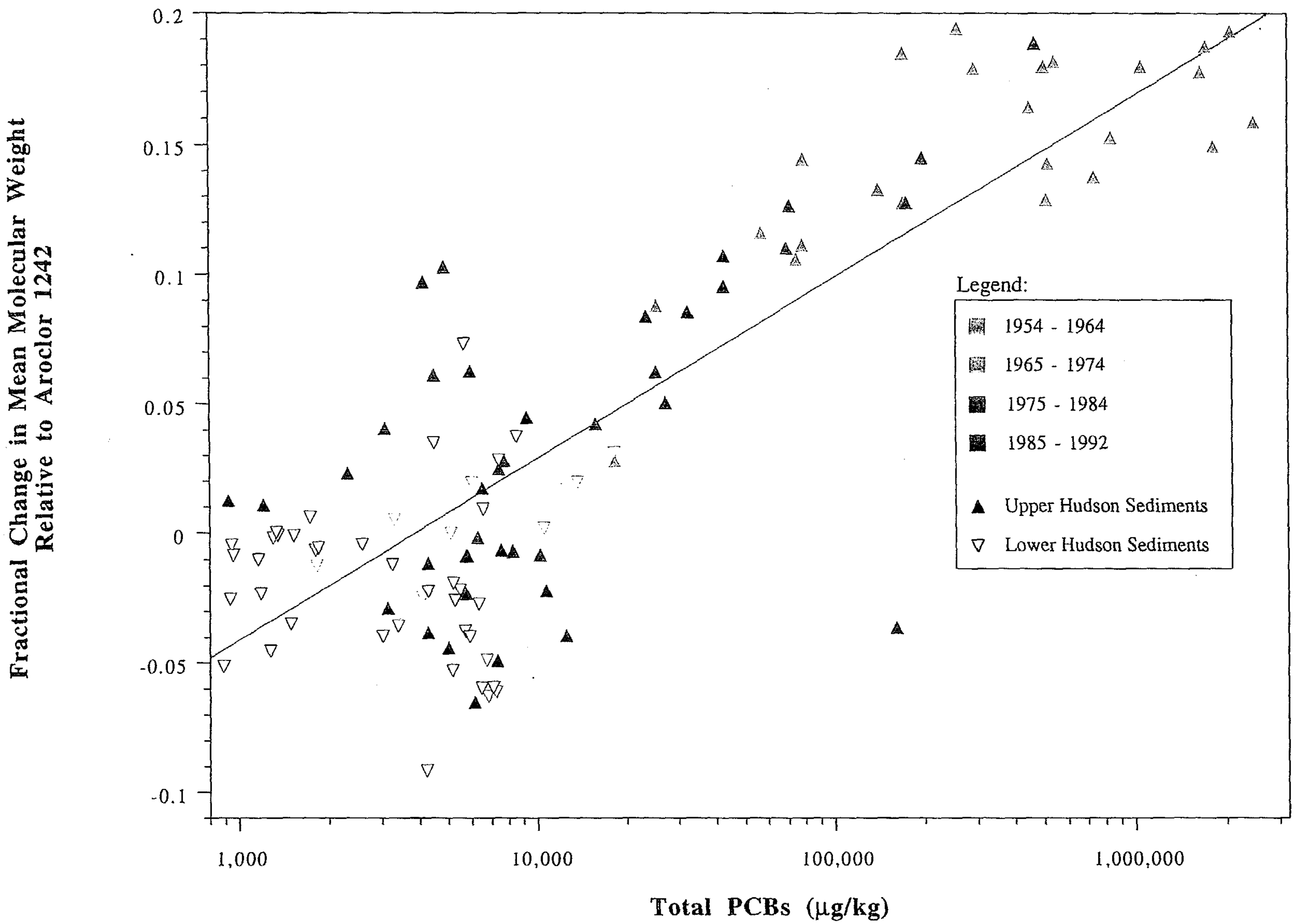
Figure 4-27
Molar Dechlorination Ratio and Total PCB Concentration vs. Depth for Phase 2 Sediment Core Samples



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-28a
Histogram of the Change in Molecular Weight as a Function of Time of Deposition in Post-1954 Dated Sediments from the Hudson River

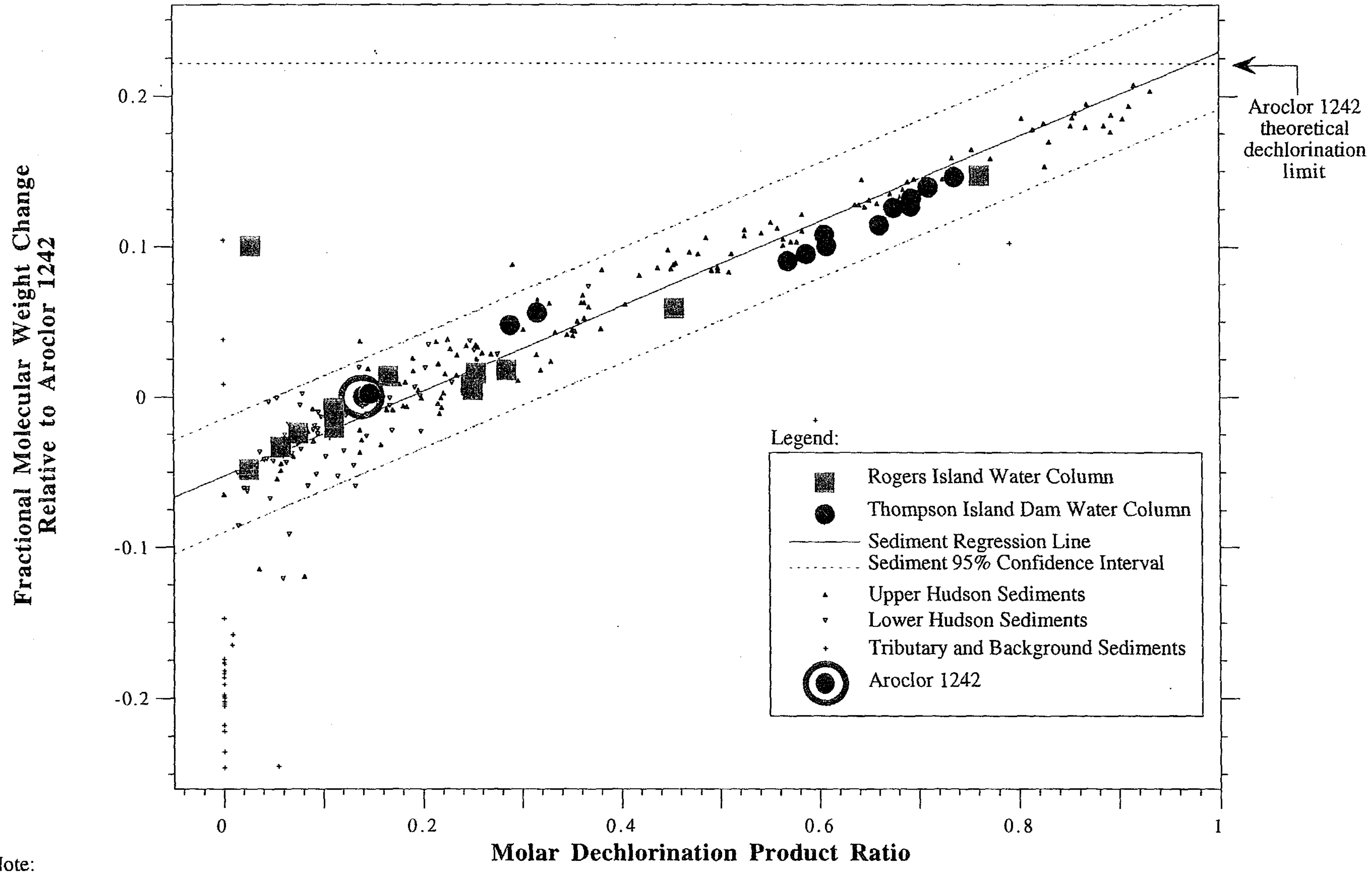


Notes:
a. Background and tributary results excluded.
b. Line represents regression curve from Figure 4-26.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-28b
Fractional Mass Loss as Measured by the Change in Mean Molecular Weight in Post-1954 Dated Sediments from the Hudson River



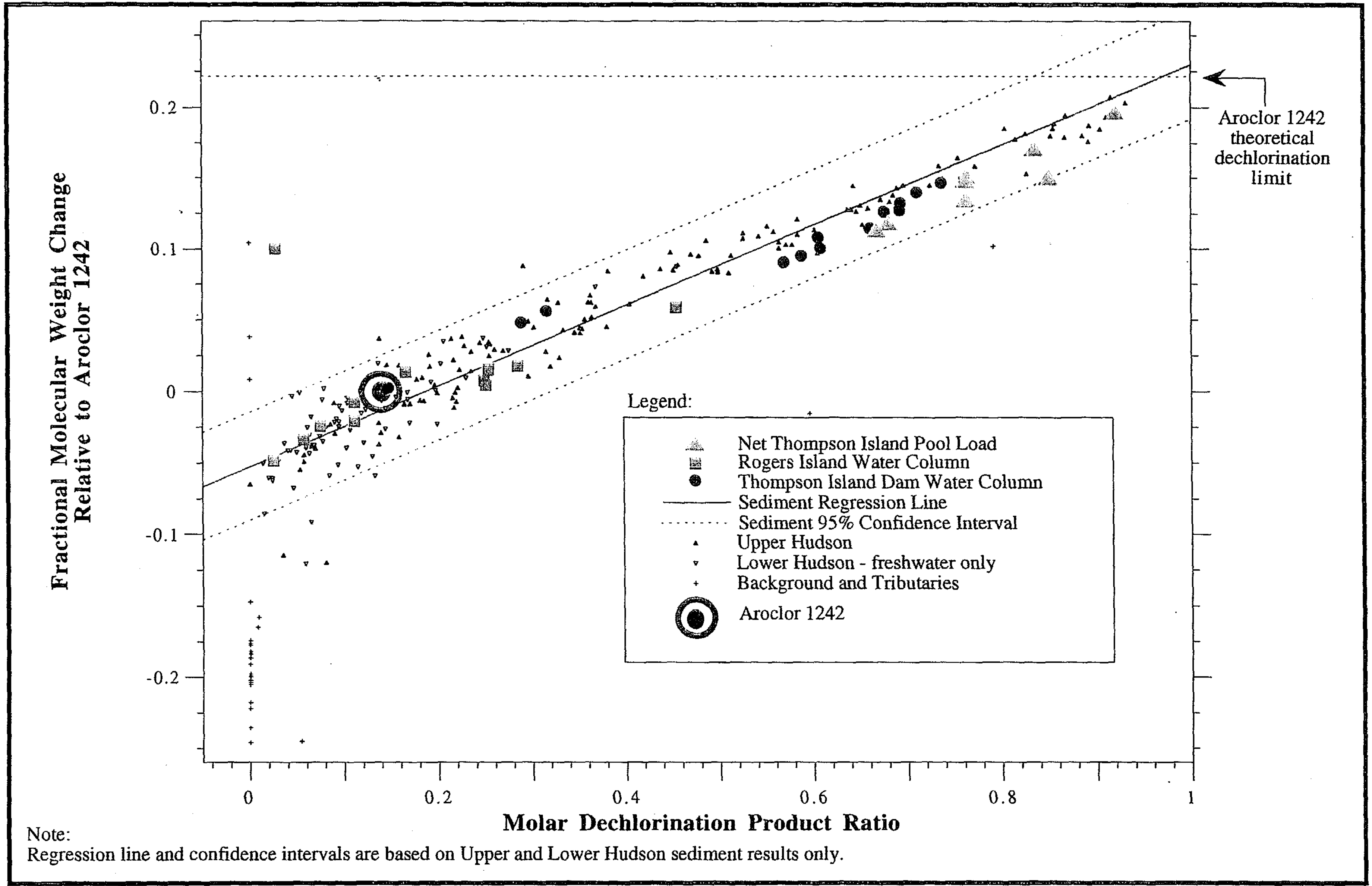
Note:
Regression line and confidence intervals are based on Upper and Lower Hudson sediment results only.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-29
A Comparison Between Sediment and Water Column Samples from Rogers Island and Thompson Island Dam

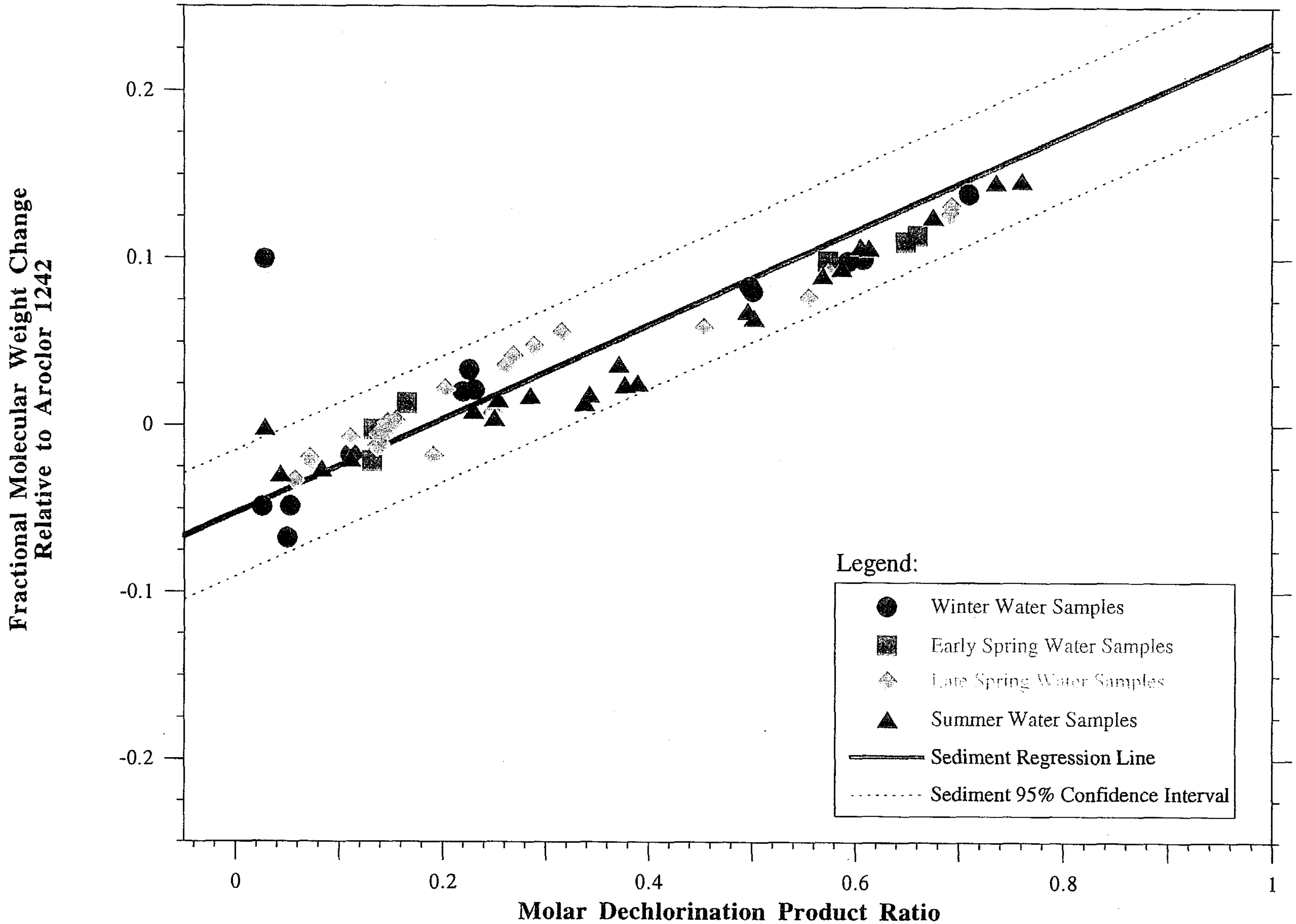
HRP 002 2182



Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-30
A Comparison of the Net Thompson Island Pool Contribution to the Water Column with the Sediments of the Upper Hudson



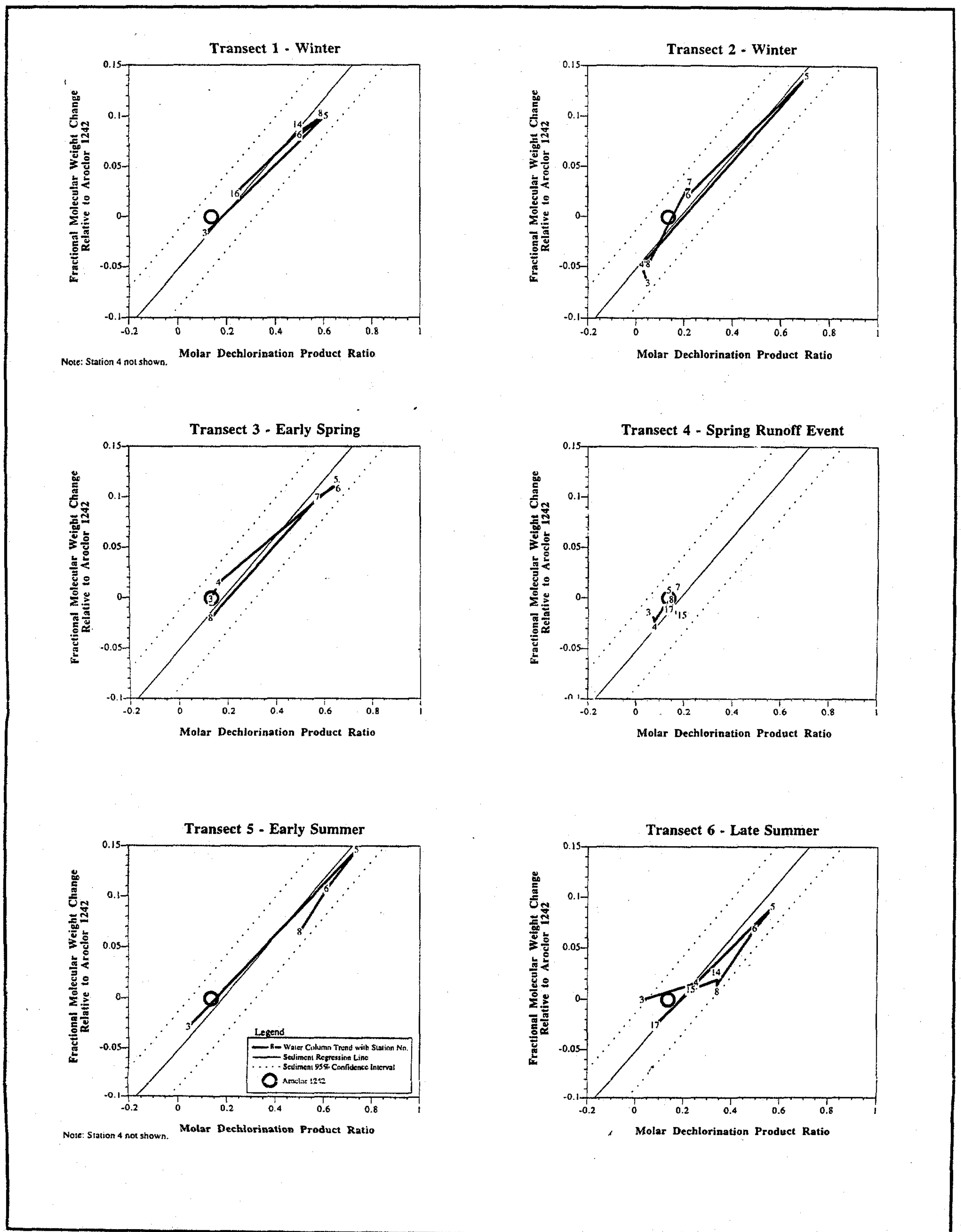
Note:
Regression line and confidence intervals are based on Upper and Lower Hudson sediment results only.
Results represent all main stem Hudson River water samples downstream of Bakers Falls.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-31

Relationship Between Phase 2 Hudson River Water Column Samples and the Sediment Regression Line - Molar Dechlorination Product Ratio vs. Change in Molecular Weight

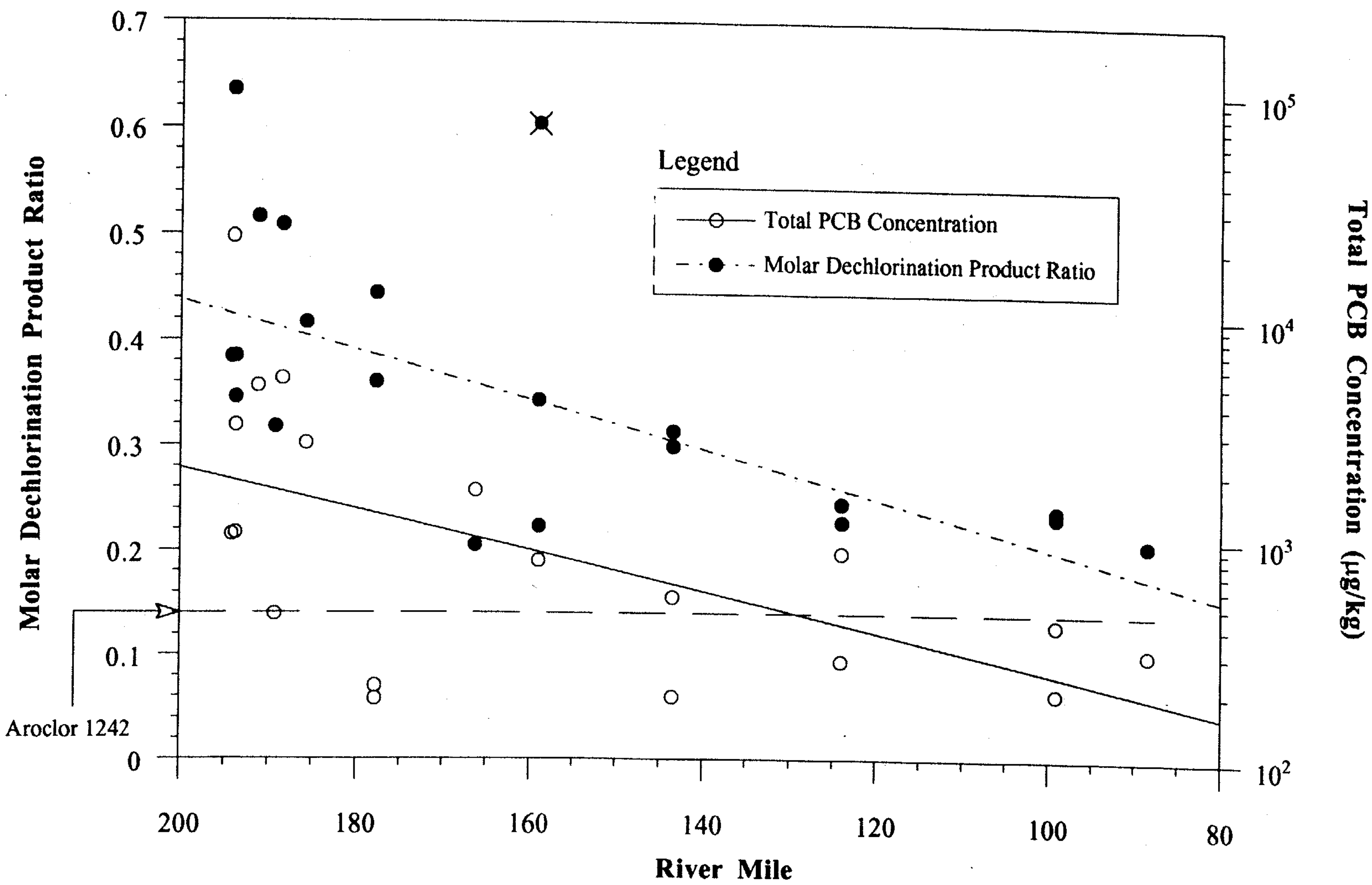


Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-32
Molar Dechlorination Product Ratio vs.
Change in Molecular Weight for Water Column Transects Showing Trend with Station

HRP 002 2185

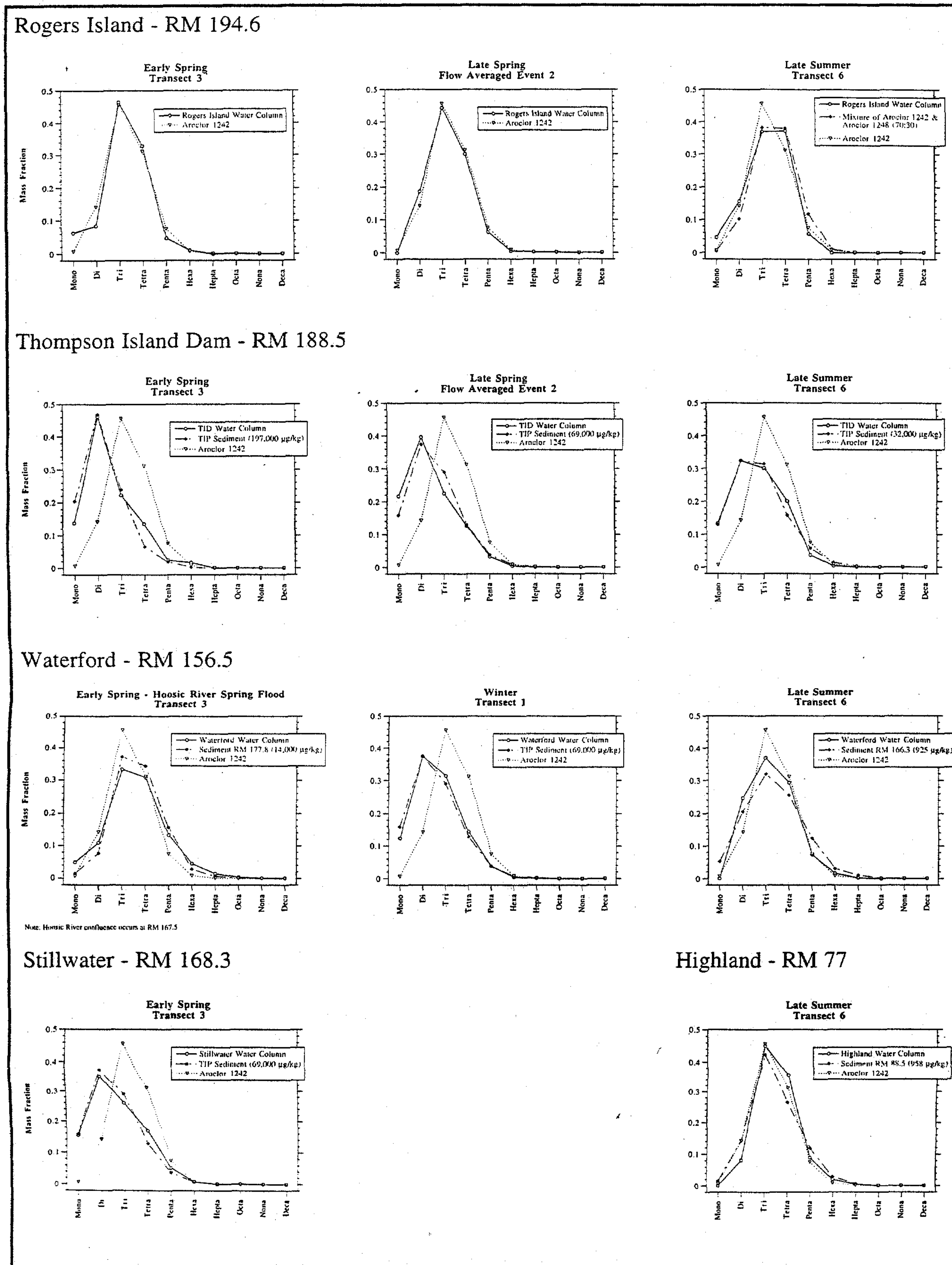


Note:
Value marked with an "X" was considered an outlier and was not used to generate the regression line for the MDPR.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-33
Trend of High Resolution Core Top Molar Dechlorination Ratio and Total PCB Concentration with River Mile



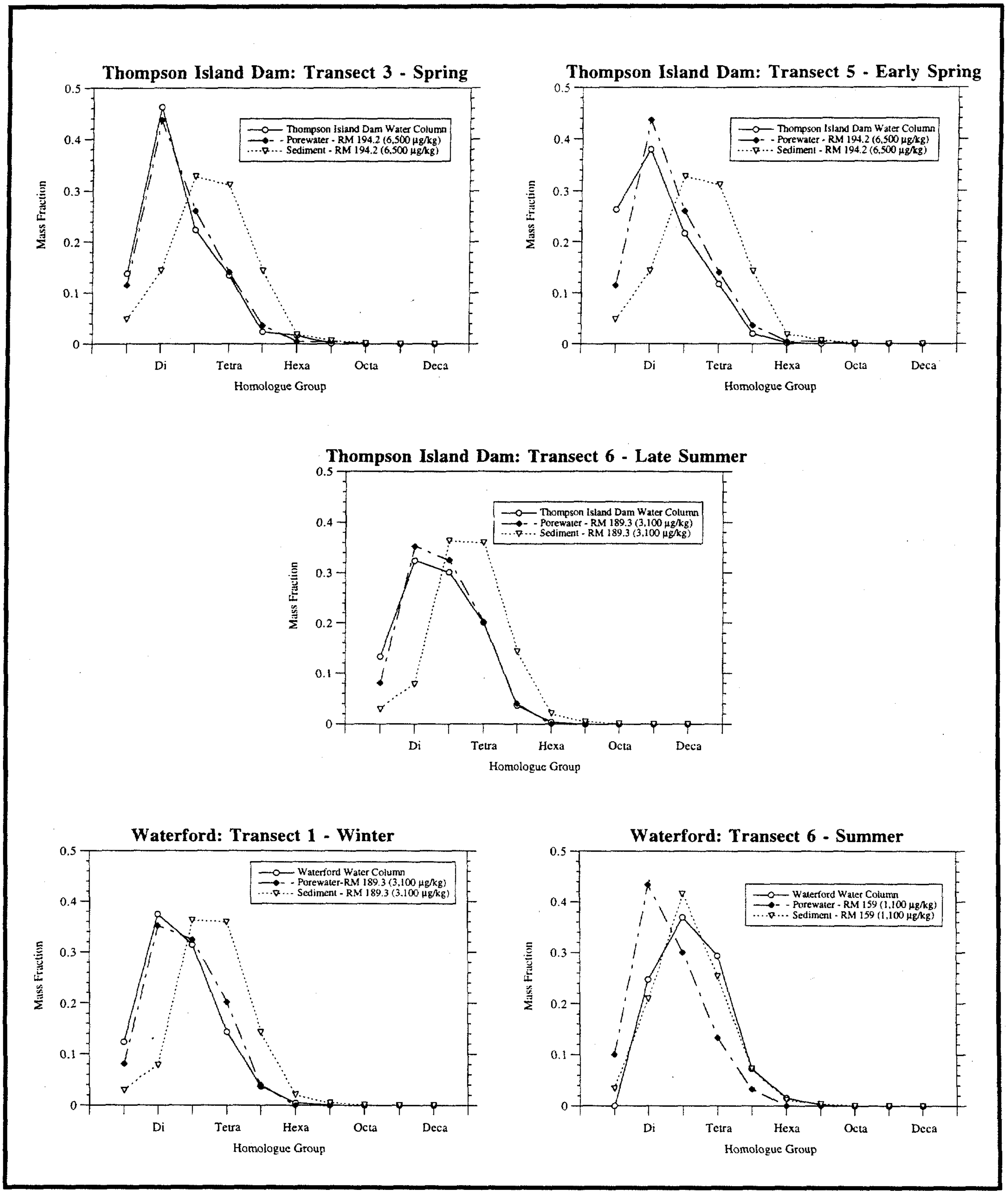
Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Notes:
TID=Thompson Island Dam - RM 188.5
TIP=Thompson Island Pool

HRP 002 2187

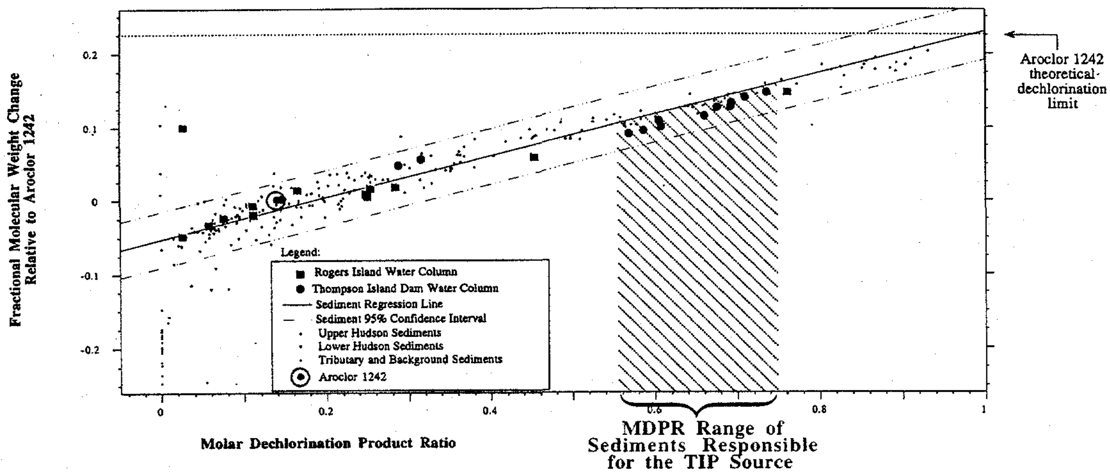
Figure 4-34
A Comparison Among Various Water Column and Sediment Samples on a Homologue Basis



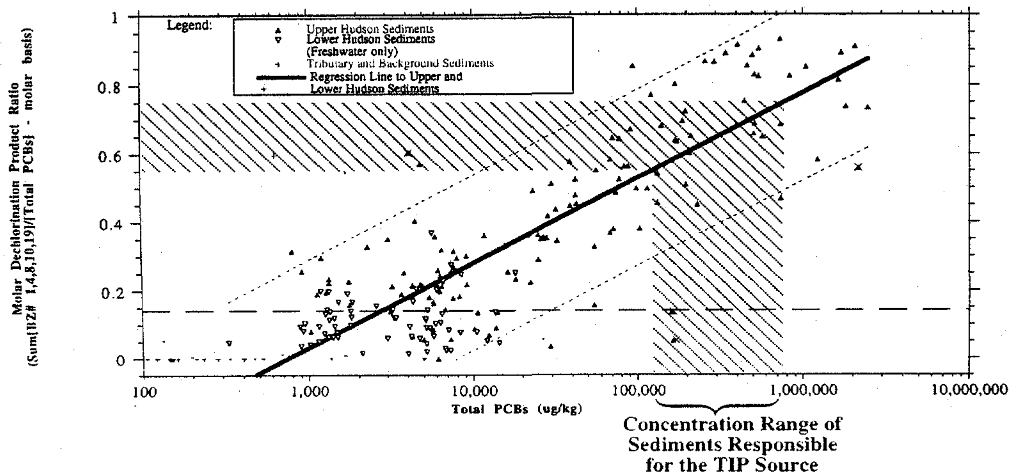
Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

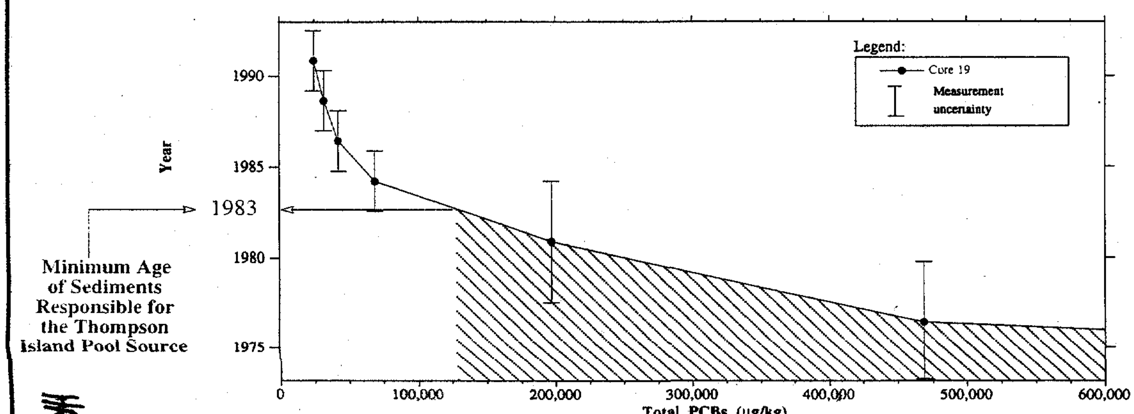
Figure 4-35
Comparison Between Various Water Column and Estimated Porewater Distributions on a Homologue Basis



A Comparison Between Sediment and Water Column Samples from Rogers Island and Thompson Island Dam



Molar Dechlorination Product Ratio vs Total PCB Concentration in Post-1954 Sediments from the Freshwater Hudson River



Total PCBs in Sediment vs. Approximate Year of Deposition at River Mile 188.5 Near the Thompson Island Dam: High Resolution Sediment Core 19

Legend:

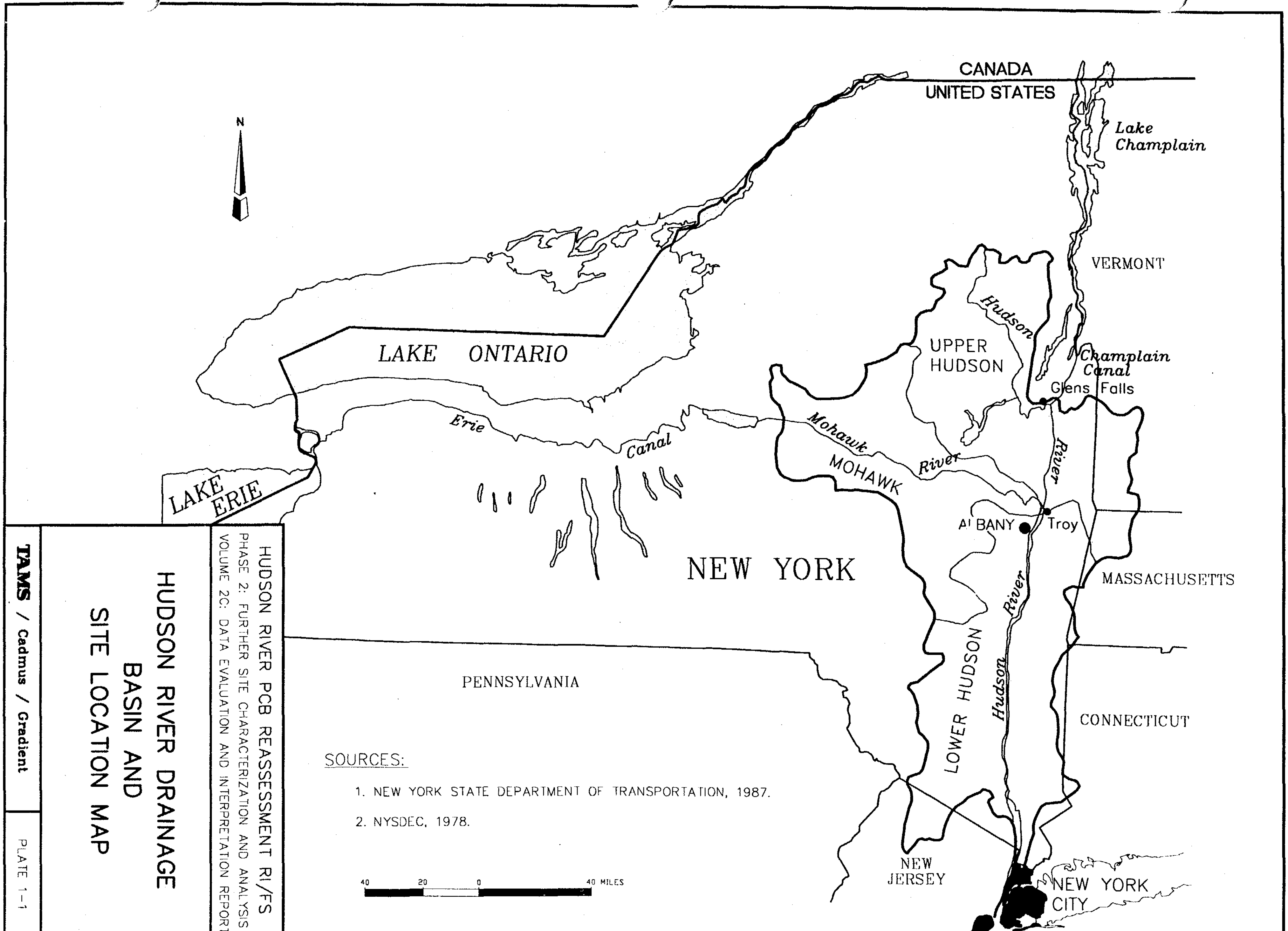
Chart Region Characteristic of the Thompson Island Pool Source.

Note:
For notes regarding the individual figures, see original figures 4-29, 4-26 and 3-59, respectively.

Source: TAMS/Gradient Database

TAMS/Cadmus/Gradient

Figure 4-36
Estimation of the Age of the Sediments Responsible for the Thompson Island Pool Source

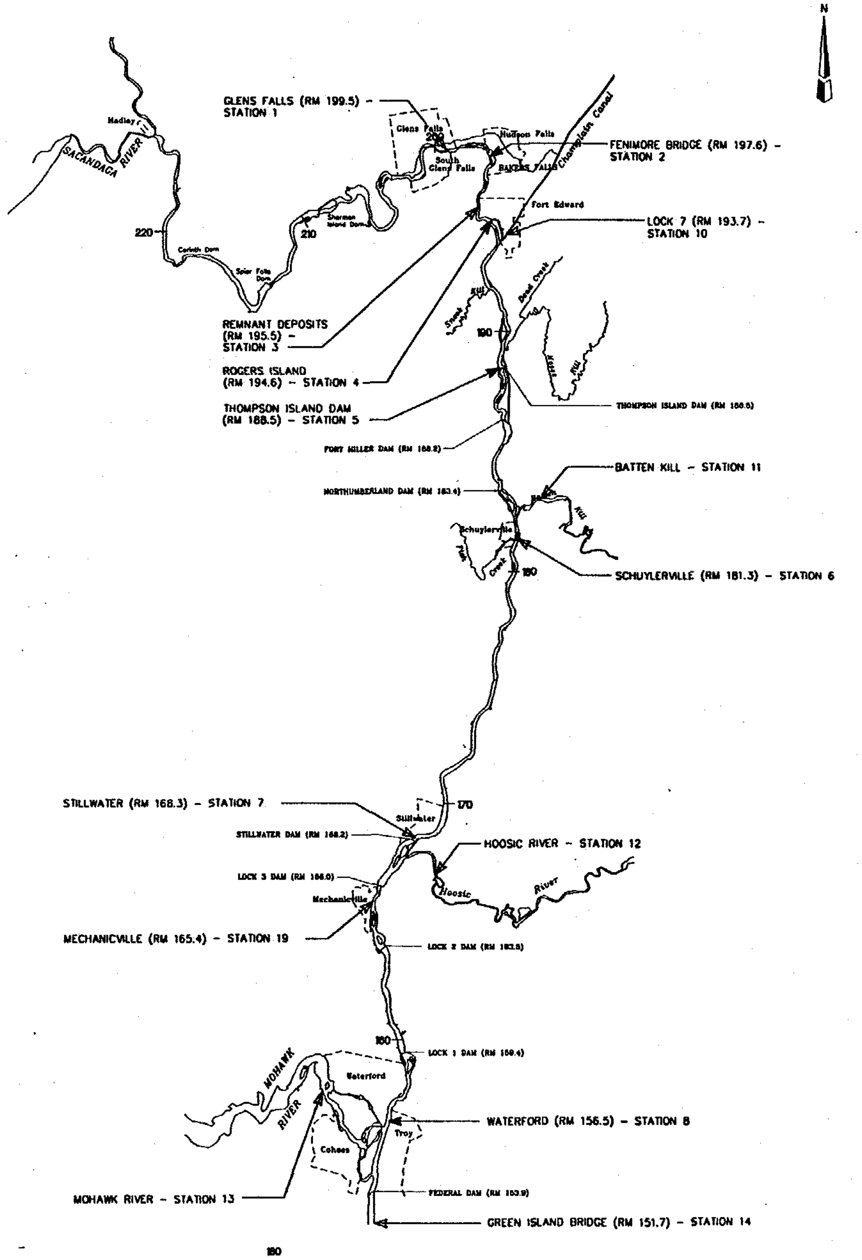


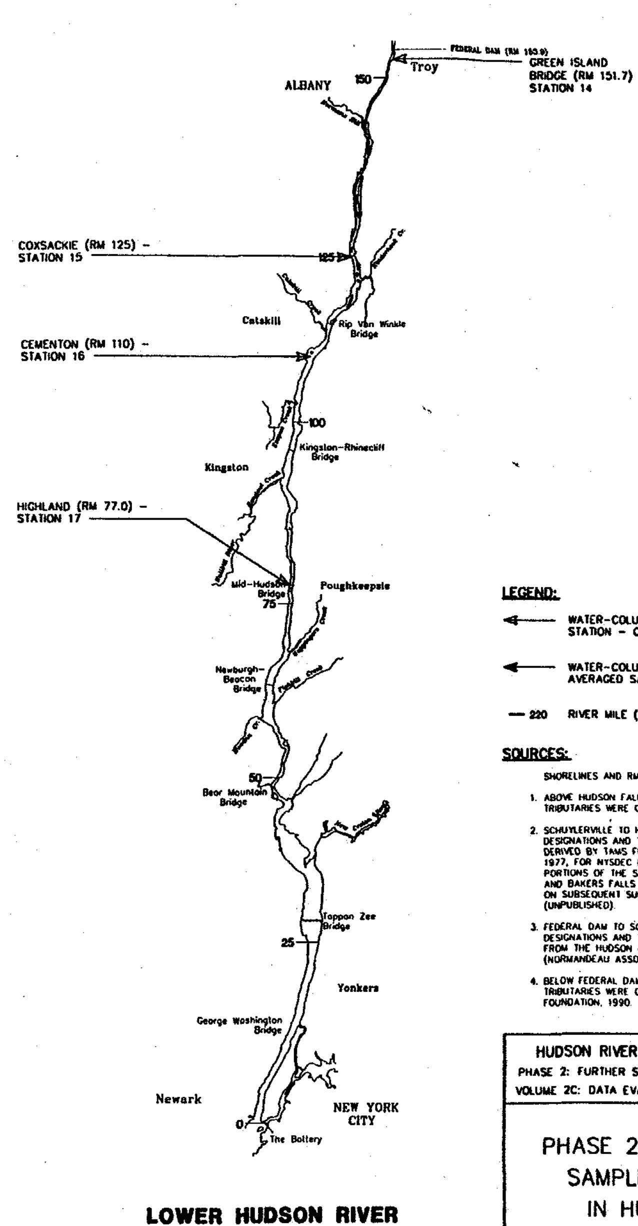
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

HUDSON RIVER DRAINAGE BASIN AND SITE LOCATION MAP

TAMS / **Cadmus** / **Gradient**

PLATE 1-1





LEGEND:

- WATER-COLUMN TRANSECT SAMPLING STATION - ONLY
- WATER-COLUMN TRANSECT AND FLOW-AVERAGED SAMPLING STATION
- 220 RIVER MILE (RM) UPSTREAM OF THE BATTERY

SOURCES:

SHORELINES AND RM DESIGNATIONS ARE APPROXIMATE

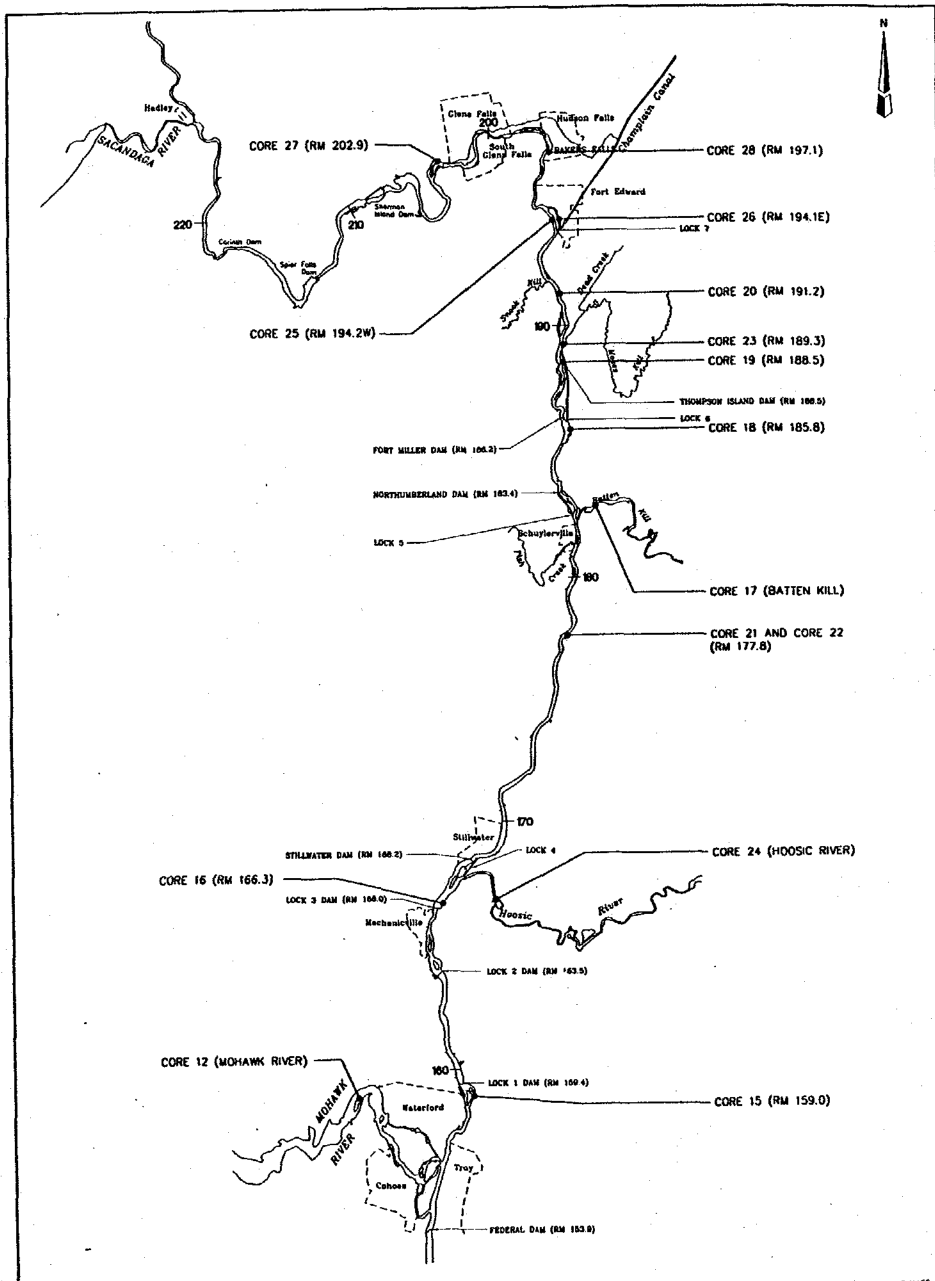
1. ABOVE HUDSON FALLS - SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE OBTAINED FROM USGS TOPOGRAPHIC MAPS
2. SCHUYLERVILLE TO HUDSON FALLS - SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE PRINCIPALLY DERIVED BY TAMS FROM THE HUDSON RIVER SURVEY, 1976-1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977) PORTIONS OF THE SHORELINE AROUND ROGERS ISLAND AND BAKERS FALLS WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1986-1992 (UNPUBLISHED).
3. FEDERAL DAM TO SCHUYLERVILLE - SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE DERIVED BY GE FROM THE HUDSON RIVER SURVEY, 1976-1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977).
4. BELOW FEDERAL DAM - SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE OBTAINED FROM THE HUDSON RIVER FOUNDATION, 1990.

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

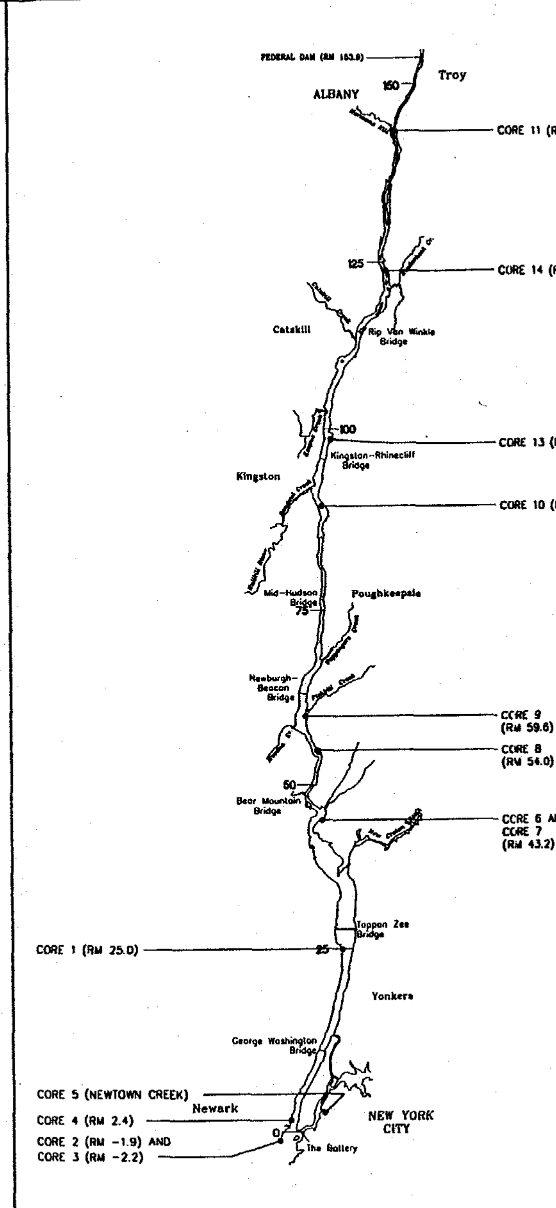
PHASE 2 WATER-COLUMN SAMPLING LOCATIONS IN HUDSON RIVER

TAMS / Cadmus / Gradient | PLATE 1-2

HRP 002 2192



UPPER HUDSON RIVER



LOWER HUDSON RIVER

LEGEND:

- ●——— HIGH-RESOLUTION SEDIMENT CORE SAMPLING LOCATION
- — 220 RIVER MILE (RM) UPSTREAM OF THE BATTERY

NOTE:

CORES WERE LABELED IN CHRONOLOGICAL SEQUENCE, NOT ACCORDING TO LOCATION.

SOURCES:

SHORELINES AND RM DESIGNATIONS ARE APPROXIMATE

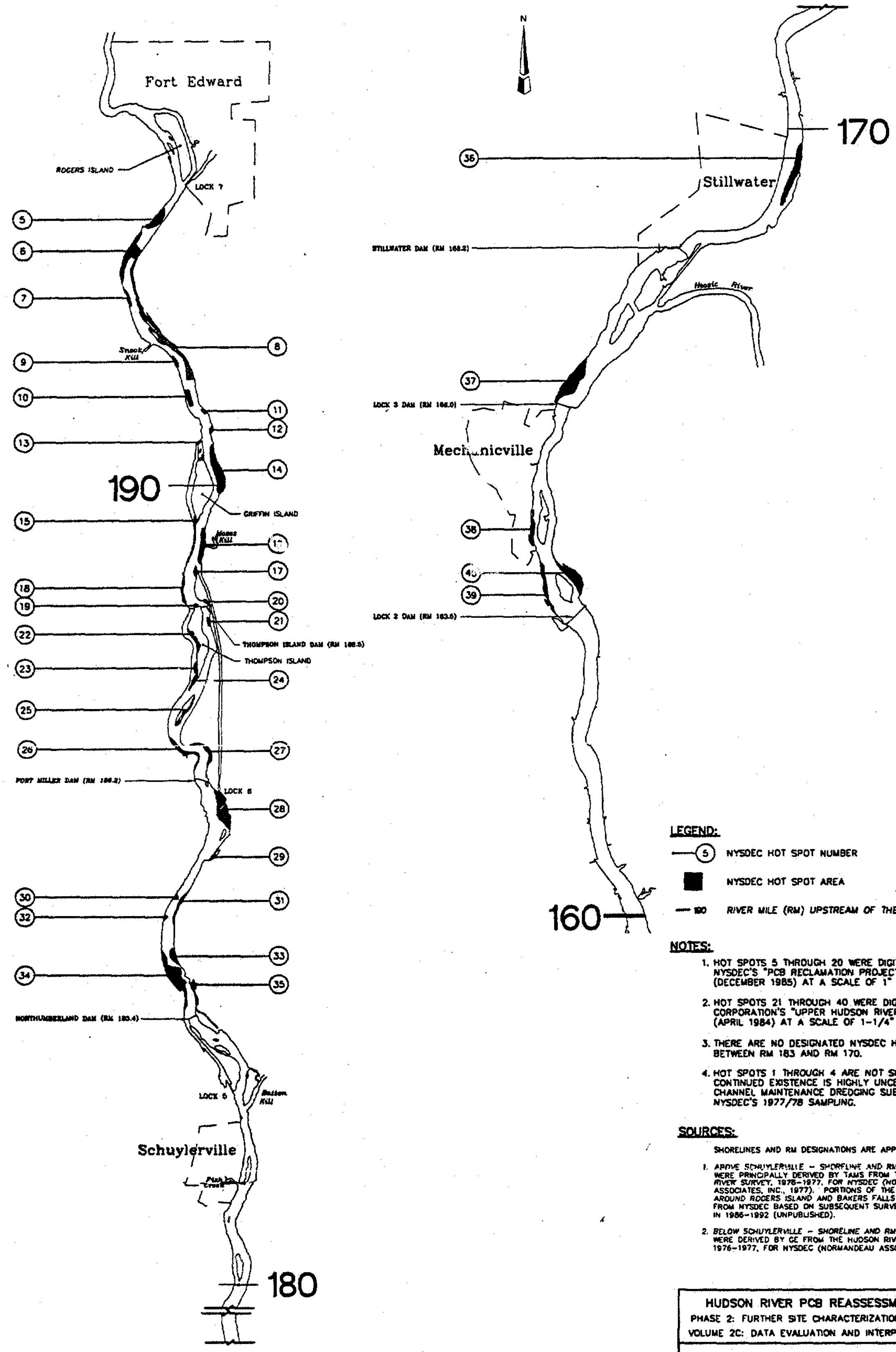
1. ABOVE HUDSON FALLS - SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE OBTAINED FROM USGS TOPOGRAPHIC MAPS.
2. SCHUYLERVILLE TO HUDSON FALLS - SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE PRINCIPALLY DERIVED BY TAMS FROM THE HUDSON RIVER SURVEY, 1976-1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977). PORTIONS OF THE SHORELINE AROUND ROGERS ISLAND AND BAKERS FALLS WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1986-1992 (UNPUBLISHED).
3. FEDERAL DAM TO SCHUYLERVILLE - SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE DERIVED BY GE FROM THE HUDSON RIVER SURVEY, 1976-1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977).
4. BELOW FEDERAL DAM - SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE OBTAINED FROM THE HUDSON RIVER FOUNDATION, 1990

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

PHASE 2
HIGH-RESOLUTION SEDIMENT CORE SAMPLING LOCATIONS IN HUDSON RIVER

TAMS / Cadmus / Gradient | PLATE 1-3

HRP 002 2193



LEGEND:

(5) NYSDEC HOT SPOT NUMBER

NYSDEC HOT SPOT AREA

190 RIVER MILE (RM) UPSTREAM OF THE BATTERY

NOTES:

1. HOT SPOTS 5 THROUGH 20 WERE DIGITIZED FROM NYSDEC'S "PCB RECLAMATION PROJECT" DRAWINGS (DECEMBER 1985) AT A SCALE OF 1" = 200'.
2. HOT SPOTS 21 THROUGH 40 WERE DIGITIZED FROM NUS CORPORATION'S "UPPER HUDSON RIVER AREA" DRAWINGS (APRIL 1984) AT A SCALE OF 1-1/4" = 1 MILE.
3. THERE ARE NO DESIGNATED NYSDEC HOT SPOTS BETWEEN RM 183 AND RM 170.
4. HOT SPOTS 1 THROUGH 4 ARE NOT SHOWN SINCE THEIR CONTINUED EXISTENCE IS HIGHLY UNCERTAIN DUE TO CHANNEL MAINTENANCE DREDGING SUBSEQUENT TO NYSDEC'S 1977/78 SAMPLING.

SOURCES:

SHORELINES AND RM DESIGNATIONS ARE APPROXIMATE.

1. ABOVE SCHUYLERVILLE – SHORELINE AND RM DESIGNATIONS WERE PRINCIPALLY DERIVED BY TAMS FROM THE HUDSON RIVER SURVEY, 1976–1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977). PORTIONS OF THE SHORELINE AROUND ROGERS ISLAND AND BAKERS FALLS WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1986–1992 (UNPUBLISHED).
2. BELOW SCHUYLERVILLE – SHORELINE AND RM DESIGNATIONS WERE DERIVED BY GE FROM THE HUDSON RIVER SURVEY, 1976–1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977).

1/2 1/4 0 1/2 MILE

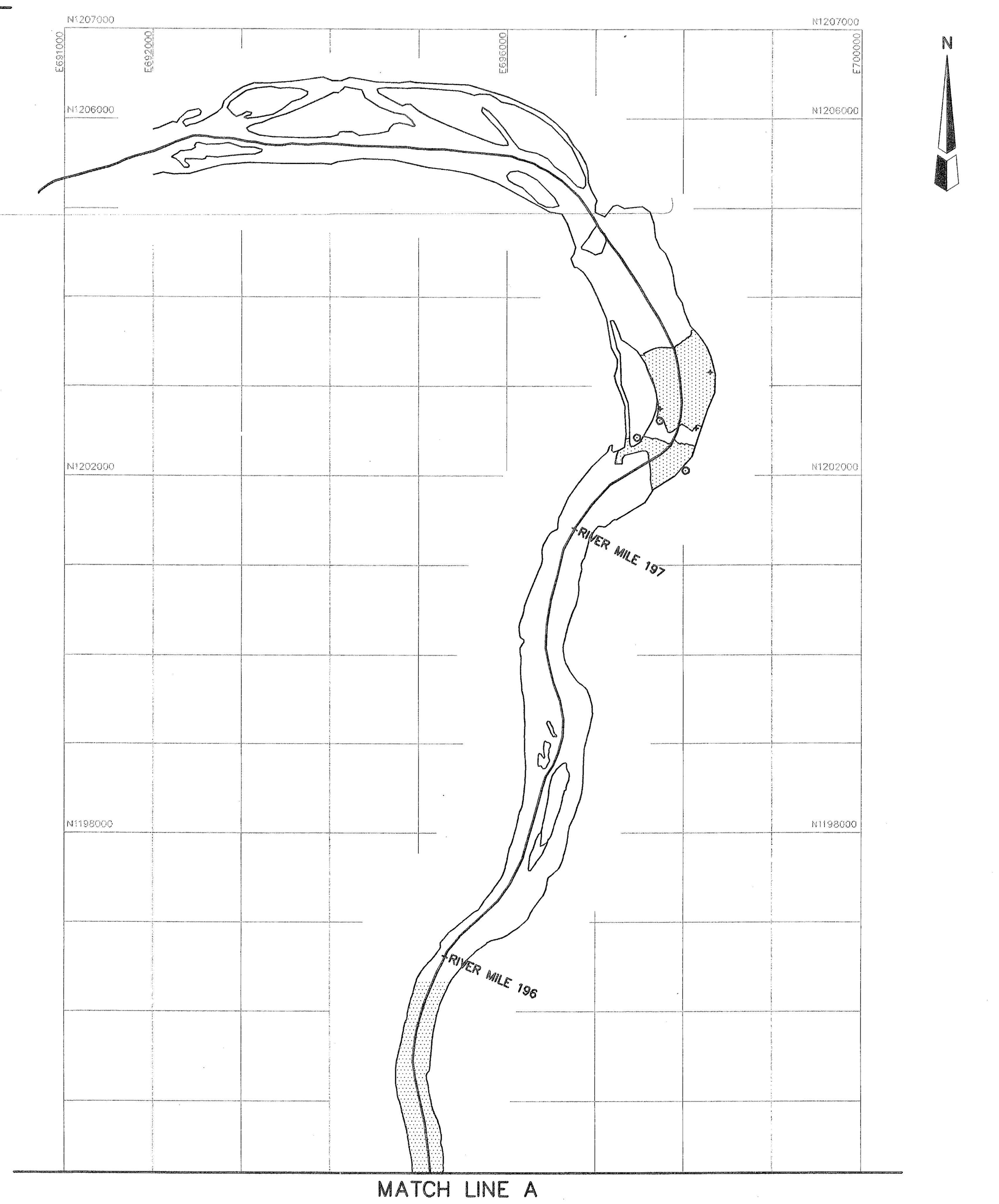
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

NYSDEC HOT SPOT LOCATIONS IN UPPER HUDSON RIVER

TAMS / Cadmus / Gradient

PLATE 1-4

File Name: X:\HUDSON\VOL_C.MOD\PLATES\PLT1-5B.dwg Date: 1-24-97 User: ER



LEGEND:

AREA COVERED BY GEOPHYSICAL SURVEY

o CONFIRMATORY CORE SAMPLE

+ CONFIRMATORY GRAB SAMPLE

SOURCES:

1. SHORELINE IS APPROXIMATE AND WAS PRINCIPALLY DERIVED BY TAMS FROM THE HUDSON RIVER SURVEY, 1976-1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977). PORTIONS OF THE SHORELINE AROUND RM 194 AND RM 197 WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1986-1992 (UNPUBLISHED).

2. RIVER MILES: THOMPSON ISLAND DAM=RM 188.5.

1000 500 0 1000 FEET

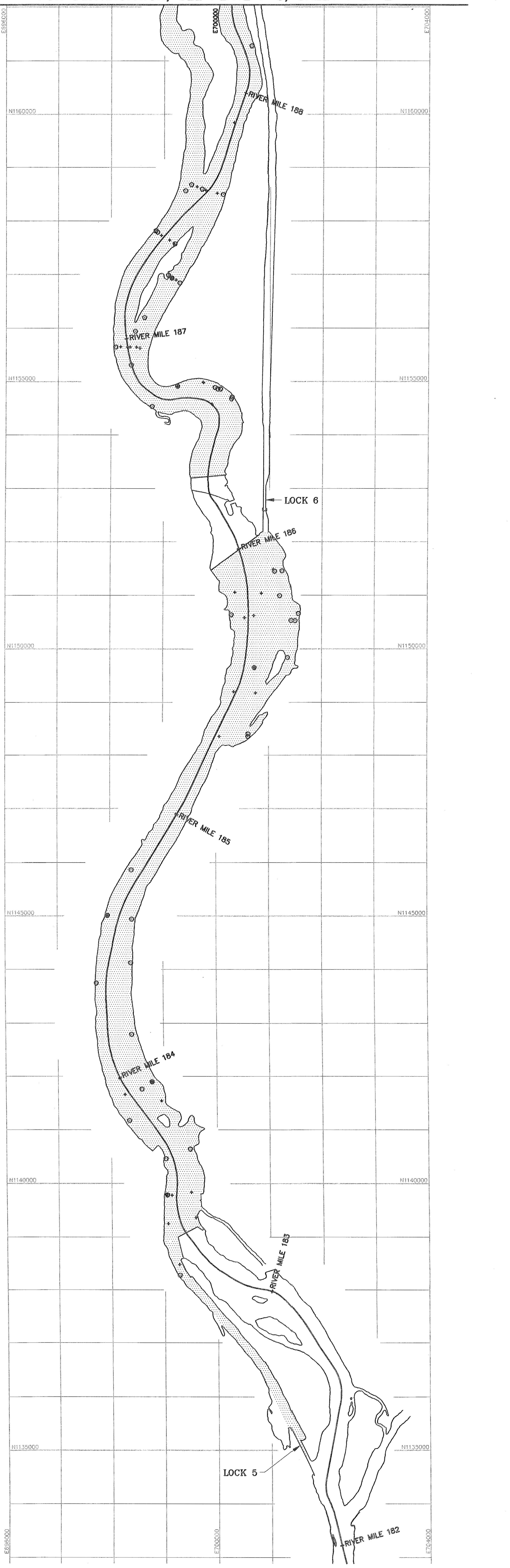
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

GEOPHYSICAL AND CONFIRMATORY SEDIMENT SAMPLING LOCATIONS IN UPPER HUDSON RIVER

TAMS / Cadmus / Gradient

PLATE 1-5
SHEET 1 OF 2

FOR CONTINUATION, SEE PLATE 1-5, SHEET 1 OF 2



LEGEND:

- AREA COVERED BY GEOPHYSICAL SURVEY
- o CONFIRMATORY CORE SAMPLE
- + CONFIRMATORY GRAB SAMPLE

SOURCES:

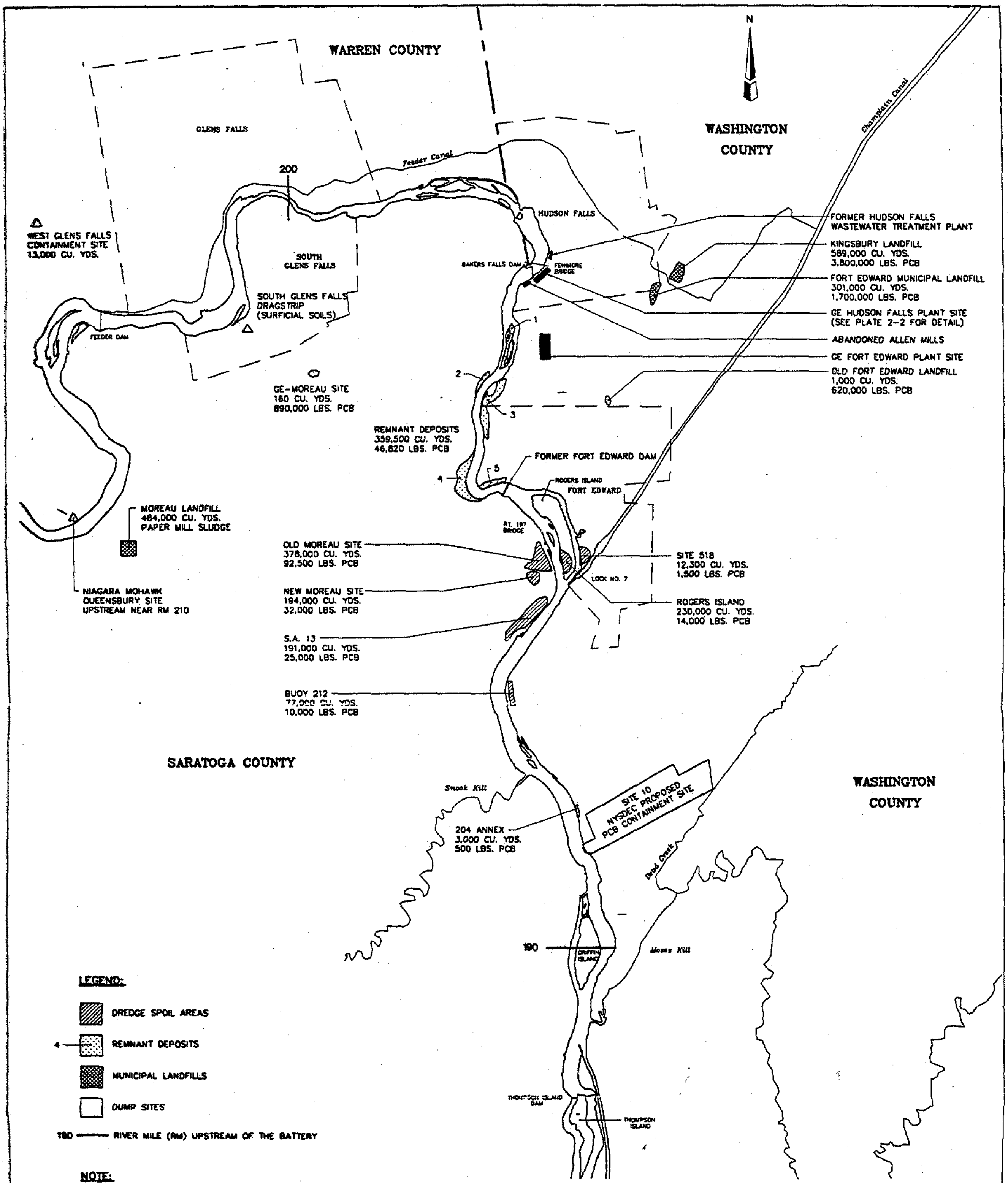
SEE SHEET 1 OF 2

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

GEOPHYSICAL AND CONFIRMATORY SEDIMENT SAMPLING LOCATIONS IN UPPER HUDSON RIVER

TAMS / Cadmus / Gradient

PLATE 1-5
SHEET 2 OF 2



LEGEND:

- DREDGE SPOIL AREAS
- 4 — REMNANT DEPOSITS
- MUNICIPAL LANDFILLS
- DUMP SITES
- 190 —— RIVER MILE (RM) UPSTREAM OF THE BATTERY

NOTE:

1. ADDITIONAL DREDGE SPOIL AREAS:
   A. LOCK 4 – 51,300 CU. YDS., 1,200 LBS. PCB
   B. LOCK 1 – 43,400 CU. YDS., 700 LBS. PCB

SOURCES:

1. SITE LOCATIONS AND DATA (SEDIMENT VOLUMES AND PCB MASS) OBTAINED FROM NYSDEC (1993a) EXCEPT BOUNDARIES OF REMNANT DEPOSIT AREAS 2, 3, 4 AND 5 OBTAINED FROM GENERAL ELECTRIC CO. HUDSON RIVER REMNANT DEPOSIT CHARACTERIZATION (CANONIE ENVIRONMENTAL, 1991). REMNANT DEPOSIT VOLUMES AND PCB MASS OBTAINED FROM NUS (1984).
2. SHORELINE IS APPROXIMATE AND WAS PRINCIPALLY DERIVED FROM THE HUDSON RIVER SURVEY, 1976–1977 FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977). PORTIONS OF THE SHORELINE AROUND ROGERS ISLAND AND BAKERS FALLS WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1986–1992 (UNPUBLISHED). SHORELINE ABOVE HUDSON FALLS AND TRIBUTARIES WERE OBTAINED FROM USGS TOPOGRAPHIC MAPS.

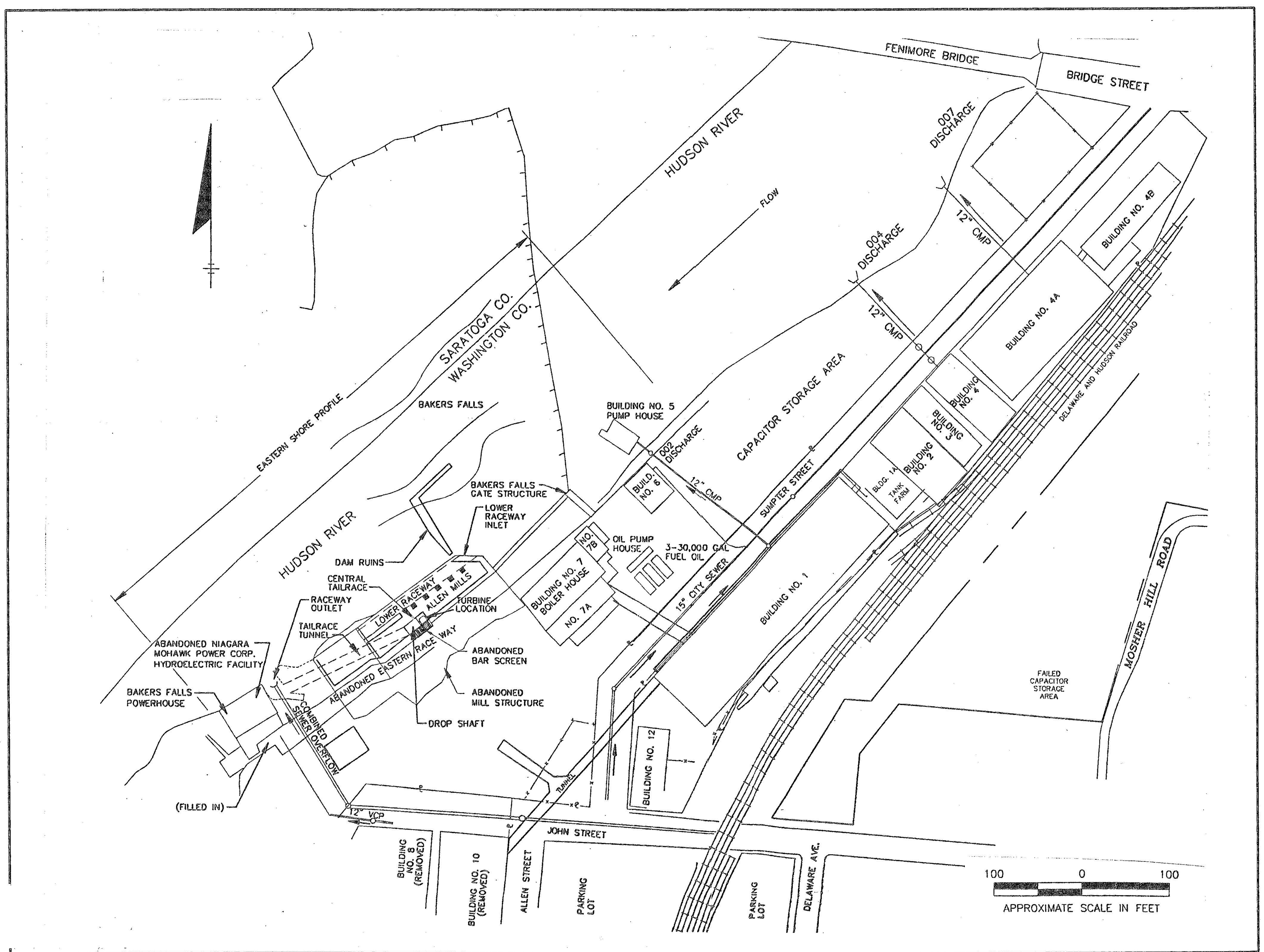
2000 1000 0 2000 FEET

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

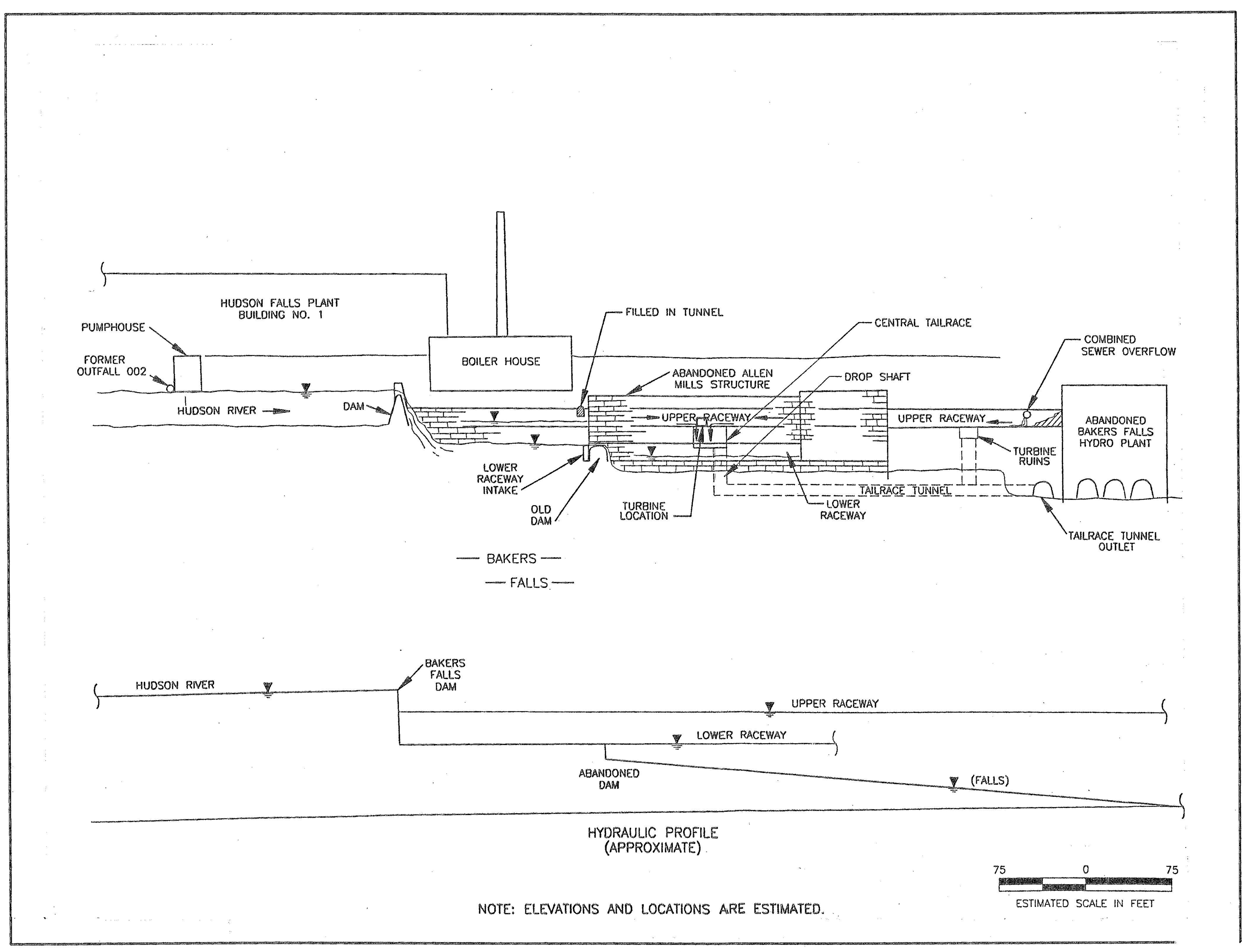
PCB CONTAMINATED SITES IN THE UPPER HUDSON WATERSHED

TAMS / Cadmus / Gradient | PLATE 2-1

SITE PLAN



EASTERN SHORE PROFILE



SOURCE:

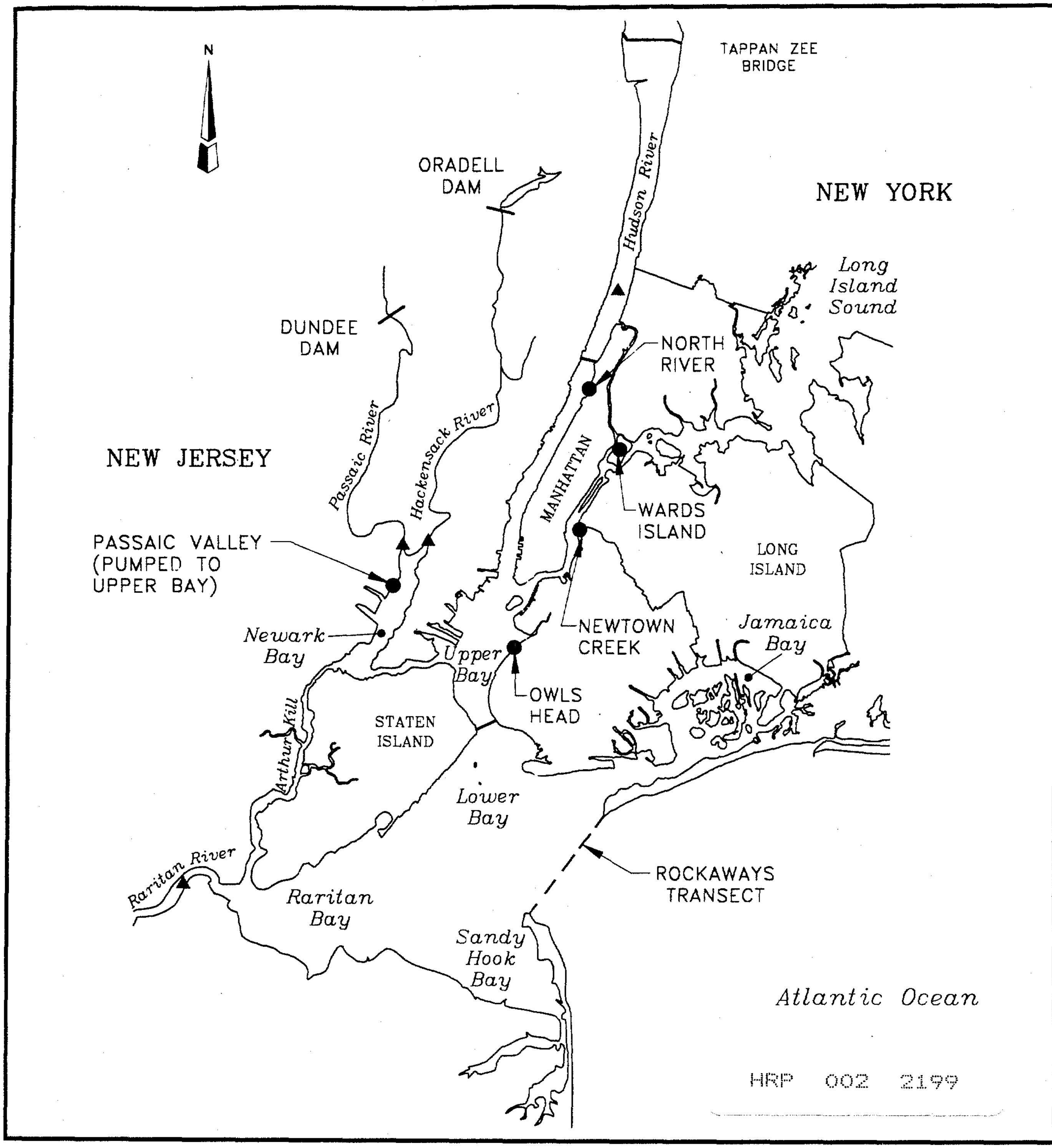
DRAWINGS OBTAINED FROM O'BRIEN & GERE (1994a).

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

GENERAL ELECTRIC
HUDSON FALLS, NY
SITE PLAN AND SHORE PROFILE

TAMS / Cadmus / Gradient

PLATE 2-2



HRP 002 2199

LEGEND:

▲ TRIBUTARY SAMPLING LOCATIONS

● SEWAGE TREATMENT PLANT SAMPLING LOCATIONS

SOURCE:

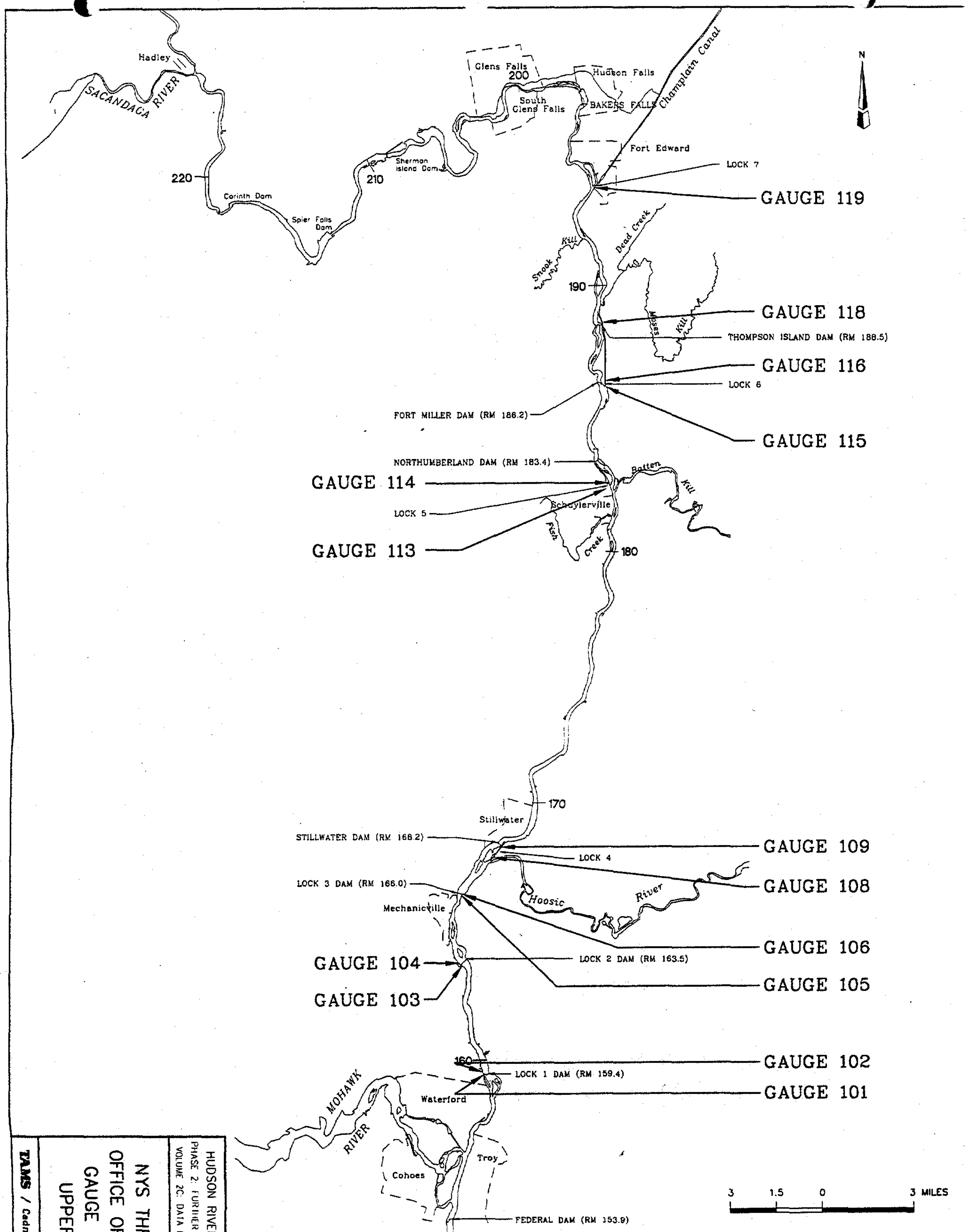
BATTELLE OCEAN SCIENCES FOR USEPA (JANUARY 1993) AND SQUIBB, K.S., ET AL. (JANUARY 1991)

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

USEPA POINT SOURCE SAMPLING LOCATIONS IN NY/NJ HARBOR

TAMS / Cadmus / Gradient

PLATE 2-3



HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

NYS THRUWAY AUTHORITY, OFFICE OF CANALS, STAFFING GAUGE LOCATIONS IN THE UPPER HUDSON RIVER

TAMS / Cadmus / Gradient

PLATE 3-1

LEGEND:

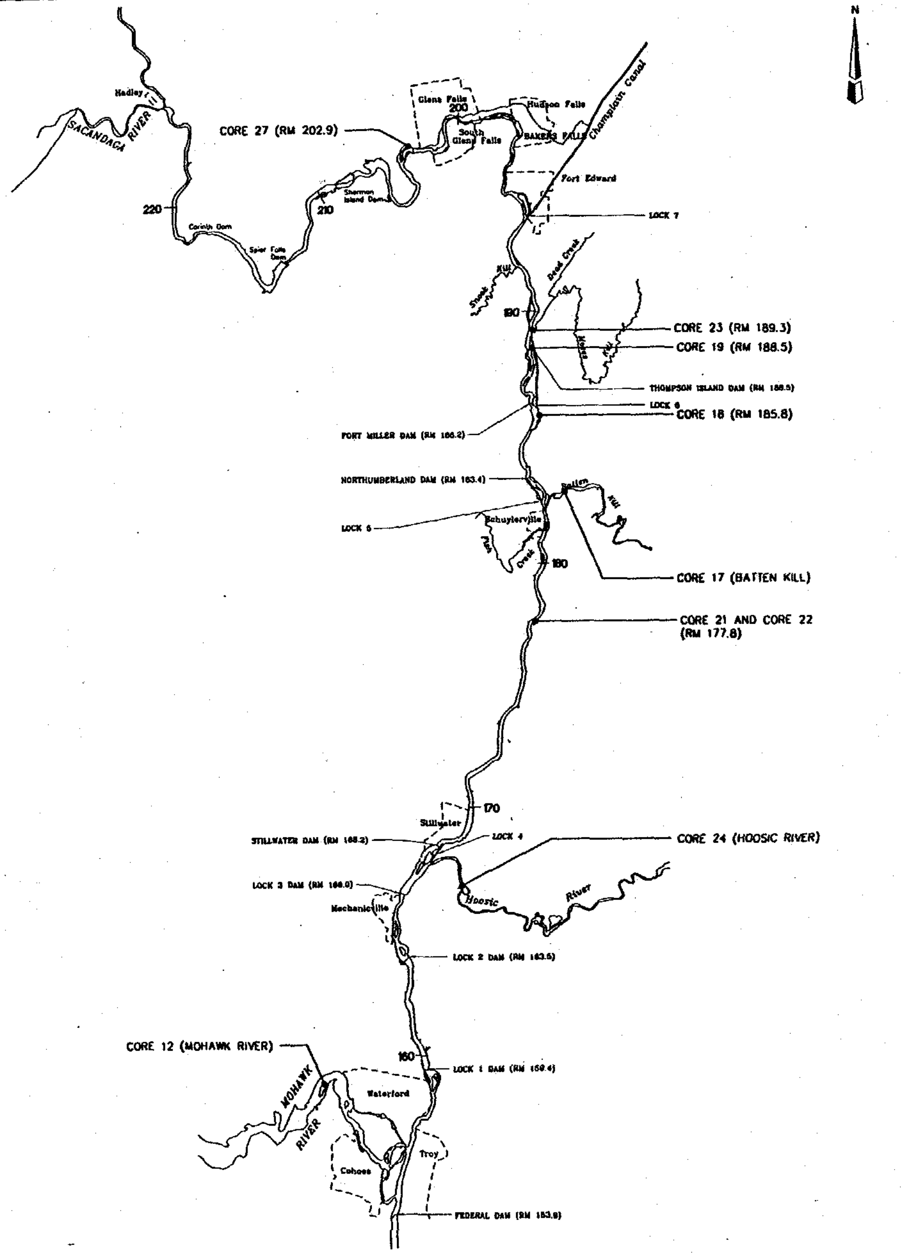
— 220 RIVER MILE (RM) UPSTREAM OF THE BATTERY

SOURCES:

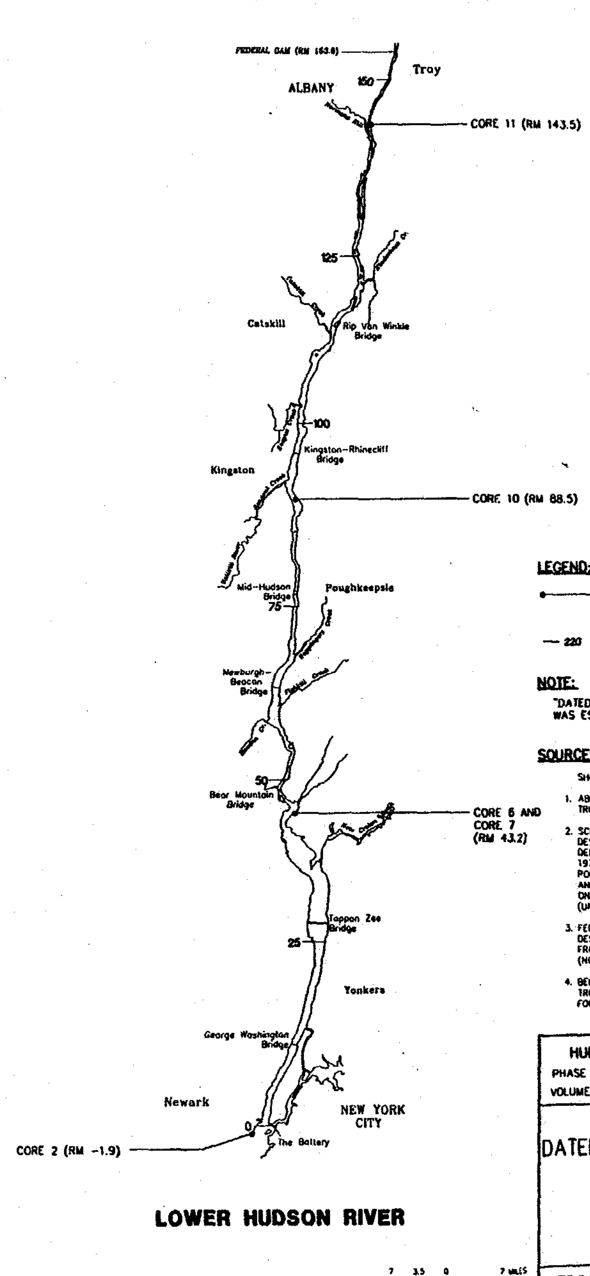
SHORELINES AND RM DESIGNATIONS ARE APPROXIMATE.

1. ABOVE HUDSON FALLS – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE OBTAINED FROM USGS TOPOGRAPHIC MAPS.
2. SCHUYLERVILLE TO HUDSON FALLS – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE PRINCIPALLY DERIVED BY TAMS FROM THE HUDSON RIVER SURVEY, 1976–1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977). PORTIONS OF THE SHORELINE AROUND ROGERS ISLAND AND BAKERS FALLS WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1986–1992 (UNPUBLISHED).
3. FEDERAL DAM TO SCHUYLERVILLE – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE DERIVED BY GE FROM THE HUDSON RIVER SURVEY, 1976–1977 FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977).

HRP 002 2200



UPPER HUDSON RIVER



LOWER HUDSON RIVER

LEGEND:

DATED HIGH-RESOLUTION SEDIMENT CORE LOCATION

— 220 RIVER MILE (RM) UPSTREAM OF THE BATTERY

NOTE:

"DATED" INDICATES THAT A CHRONOLOGY WAS ESTABLISHED FOR THE CORE.

SOURCES:

SHORELINES AND RM DESIGNATIONS ARE APPROXIMATE.

1. ABOVE HUDSON FALLS – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE OBTAINED FROM USGS TOPOGRAPHIC MAPS.
2. SCHUYLERVILLE TO HUDSON FALLS – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE PRINCIPALLY DERIVED BY TAMS FROM THE HUDSON RIVER SURVEY, 1976–1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977). PORTIONS OF THE SHORELINE AROUND ROGERS ISLAND AND BAKERS FALLS WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1986–1992 (UNPUBLISHED).
3. FEDERAL DAM TO SCHUYLERVILLE – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE DERIVED BY GE FROM THE HUDSON RIVER SURVEY, 1976–1977, FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977).
4. BELOW FEDERAL DAM – SHORELINE, RM DESIGNATIONS AND TRIBUTARIES WERE OBTAINED FROM THE HUDSON RIVER FOUNDATION, 1990.

HUDSON RIVER PCB REASSESSMENT RI/FS

PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS

VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

DATED HIGH-RESOLUTION SEDIMENT CORE LOCATIONS IN HUDSON RIVER

TAMS / Cadmus / Gradient | PLATE 3-2

HRP 002 2201

EPA REGION II
SCANNING TRACKING SHEET

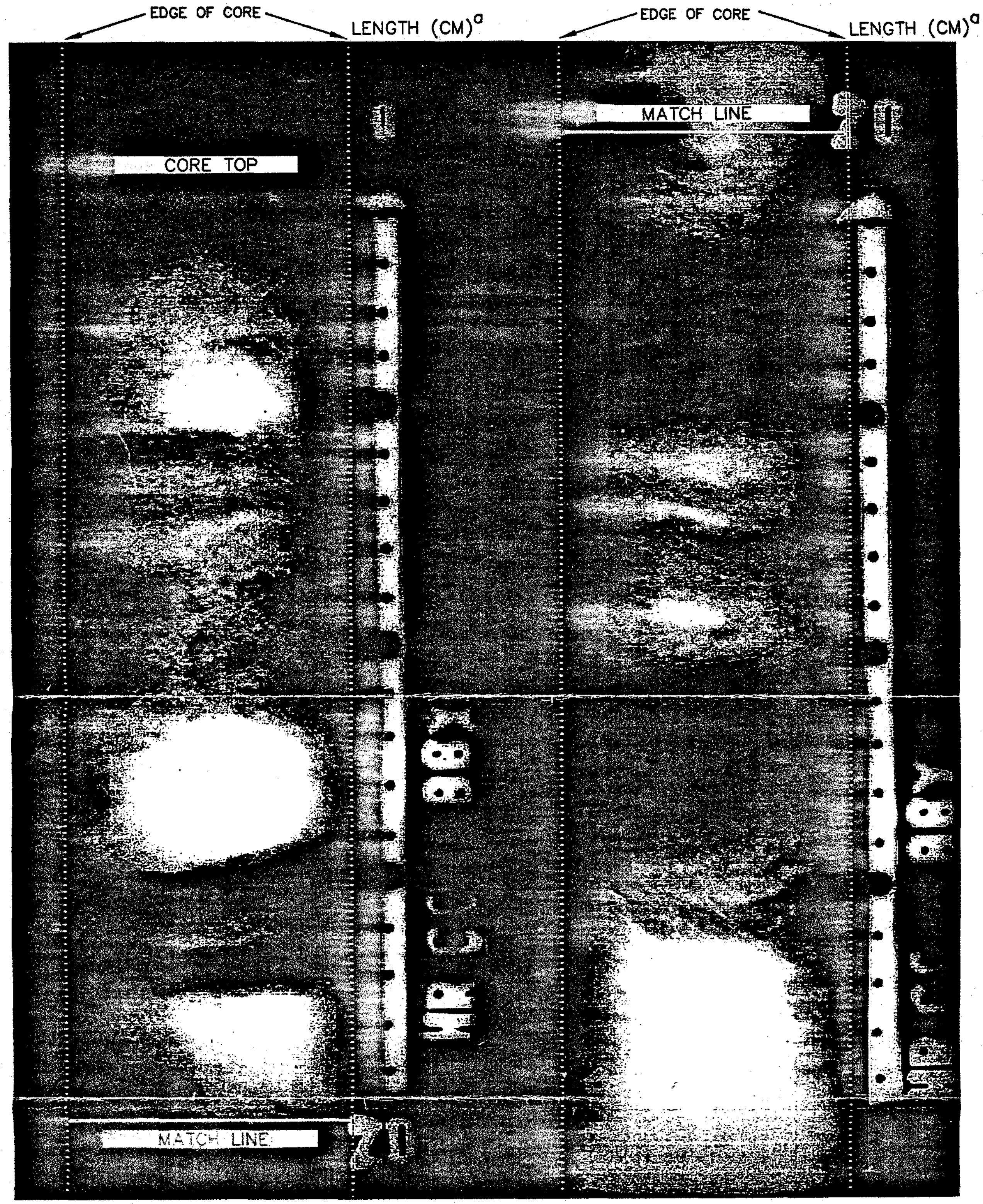
DOC ID # 80109

DOC TITLE/SUBJECT:

PLATE 4-1
HUDSON RIVER PCB UPDATE #1
SIDE SCAN SONAR MOSAIC
OF THE HUDSON RIVER SEDIMENTS
IN THE VICINITY OF HOT SPOT 14

THIS DOCUMENT IS OVERSIZED AND CAN BE LOCATED IN THE ADMINISTRATIVE RECORD FILE AT THE

SUPERFUND RECORDS CENTER
290 BROADWAY, 18TH FLOOR
NEW YORK, NY 10007



NOTES:

a. THE VERTICAL SCALE REPRESENTS APPROXIMATE CORE LENGTH IN CENTIMETERS; EACH MARK CORRESPONDS TO A ONE-CENTIMETER INCREMENT.

b. LIGHT AREAS REPRESENT HIGH DENSITY MATERIAL, GENERALLY SANDS AND GRAVELS. DARK AREAS REPRESENT LOW DENSITY MATERIALS GENERALLY HIGH IN ORGANIC CONTENT.

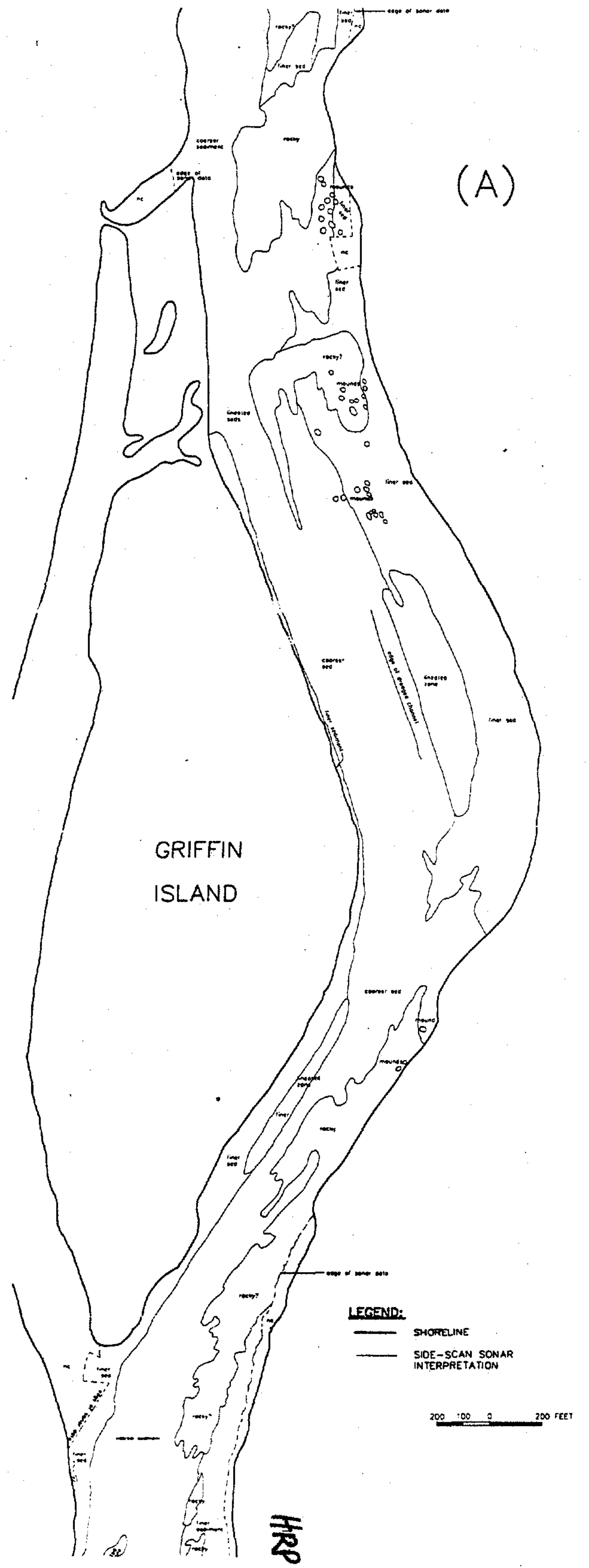
c. A DUPLICATE CORE WAS FOUND TO CONTAIN A LAYER OF WOOD CHIPS AND TWIGS AT A DEPTH OF APPROXIMATELY 15 CM FROM THE CORE TOP.

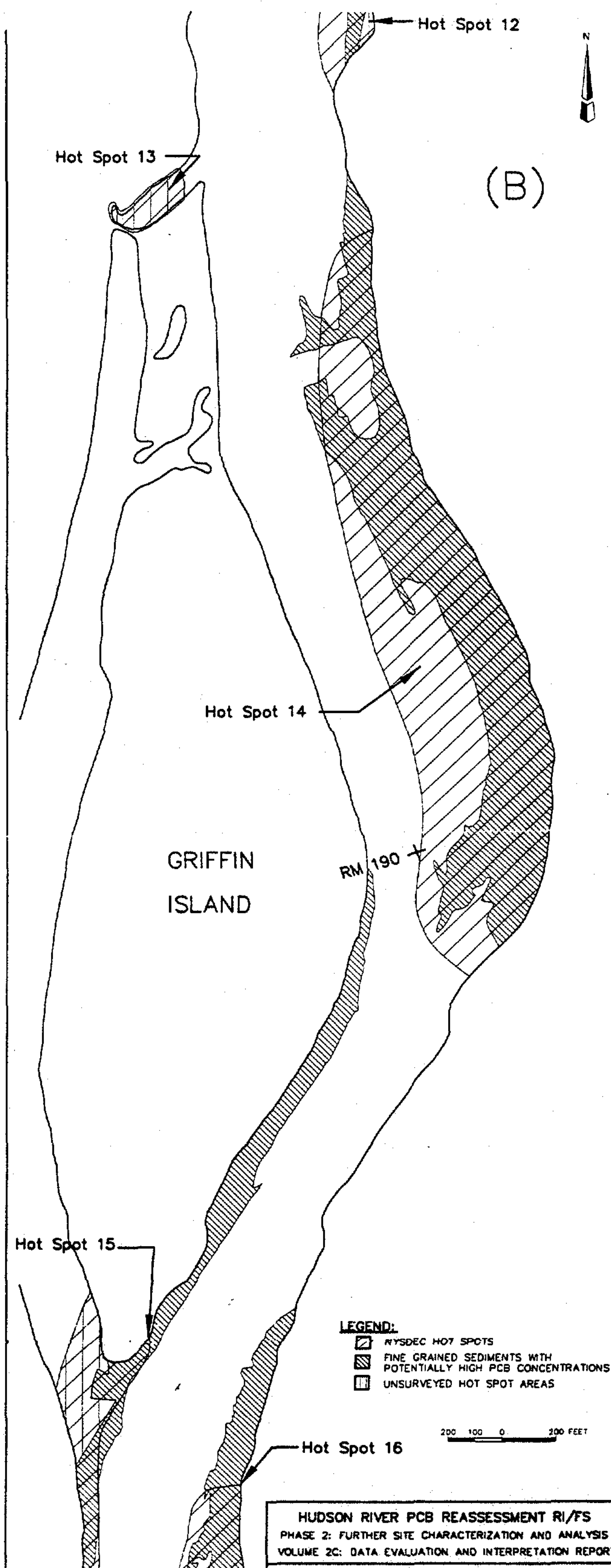
HRP 002 2203

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

X-RADIOGRAPH OF CONFIRMATORY CORE 88
COLLECTED AT APPROXIMATELY RM 187.6,
SOUTH OF THOMPSON ISLAND NEAR HOTSPOT 24

TAMS / Cadmus / Gradient | PLATE 4-2





HRP 002 2204

NOTE:

1. nc = NOT CHARACTERIZED

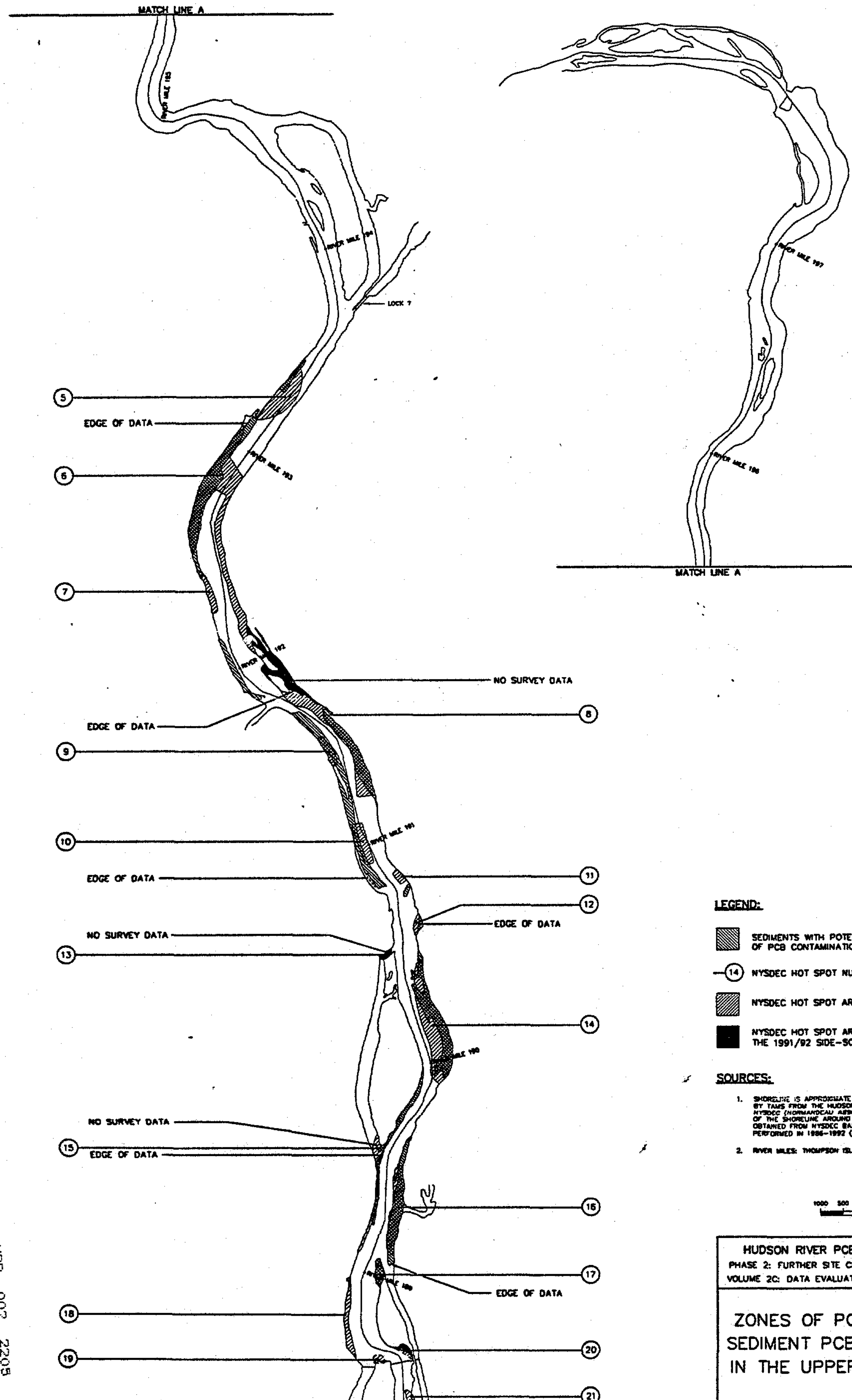
SOURCES:

1. SHORELINE IS APPROXIMATE AND WAS PRINCIPALLY DERIVED BY TAMS FROM THE HUDSON RIVER SURVEY, 1976–1977, PREPARED FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977). PORTIONS OF THE SHORELINE AROUND RM 194 AND RM 197 WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1986–1992 (UNPUBLISHED).
2. RIVER MILES: THOMPSON ISLAND DAM=RM 188.5, RELATIVE TO THE BATTERY (RM 0).

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

INTERPRETATION OF THE 500 kHz SIDE-SCAN SONAR MOSAIC (A) AND COMPARISON OF FINE-GRAINED SEDIMENTS & NYSDEC HOT SPOT AREAS (B) IN THE VICINITY OF HOT SPOT 14

TAMS / Cadmus / Gradient | PLATE 4-3



FOR CONTINUATION, SEE PLATE 4-4, SHEET 2 OF 2

LEGEND:

- SEDIMENTS WITH POTENTIALLY HIGH LEVELS OF PCB CONTAMINATION
- (14) NYSDEC HOT SPOT NUMBER
- NYSDEC HOT SPOT AREAS
- NYSDEC HOT SPOT AREAS NOT COVERED BY THE 1991/92 SIDE-SCAN SONAR SURVEY

SOURCES:

1. SHORELINE IS APPROXIMATE AND WAS PRINCIPALLY DERIVED BY TAMS FROM THE HUDSON RIVER SURVEY, 1976-1977 FOR NYSDEC (NORMANDEAU ASSOCIATES, INC., 1977). PORTIONS OF THE SHORELINE AROUND RM 194 AND RM 197 WERE OBTAINED FROM NYSDEC BASED ON SUBSEQUENT SURVEYS PERFORMED IN 1986-1992 (UNPUBLISHED).
2. RIVER MILES: THOMPSON ISLAND DAM = RM 188.5.

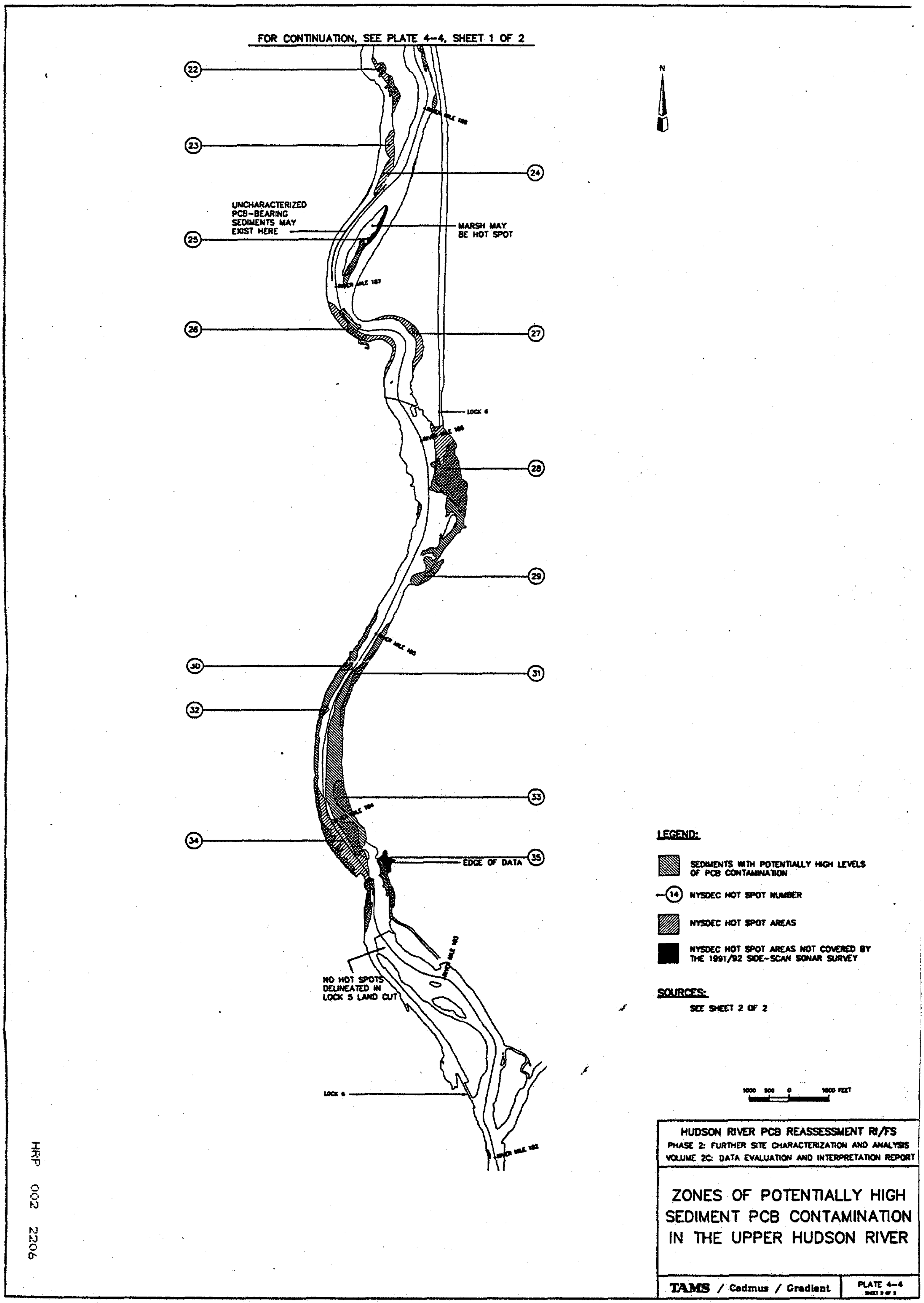
1000 500 0 1000 FEET

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

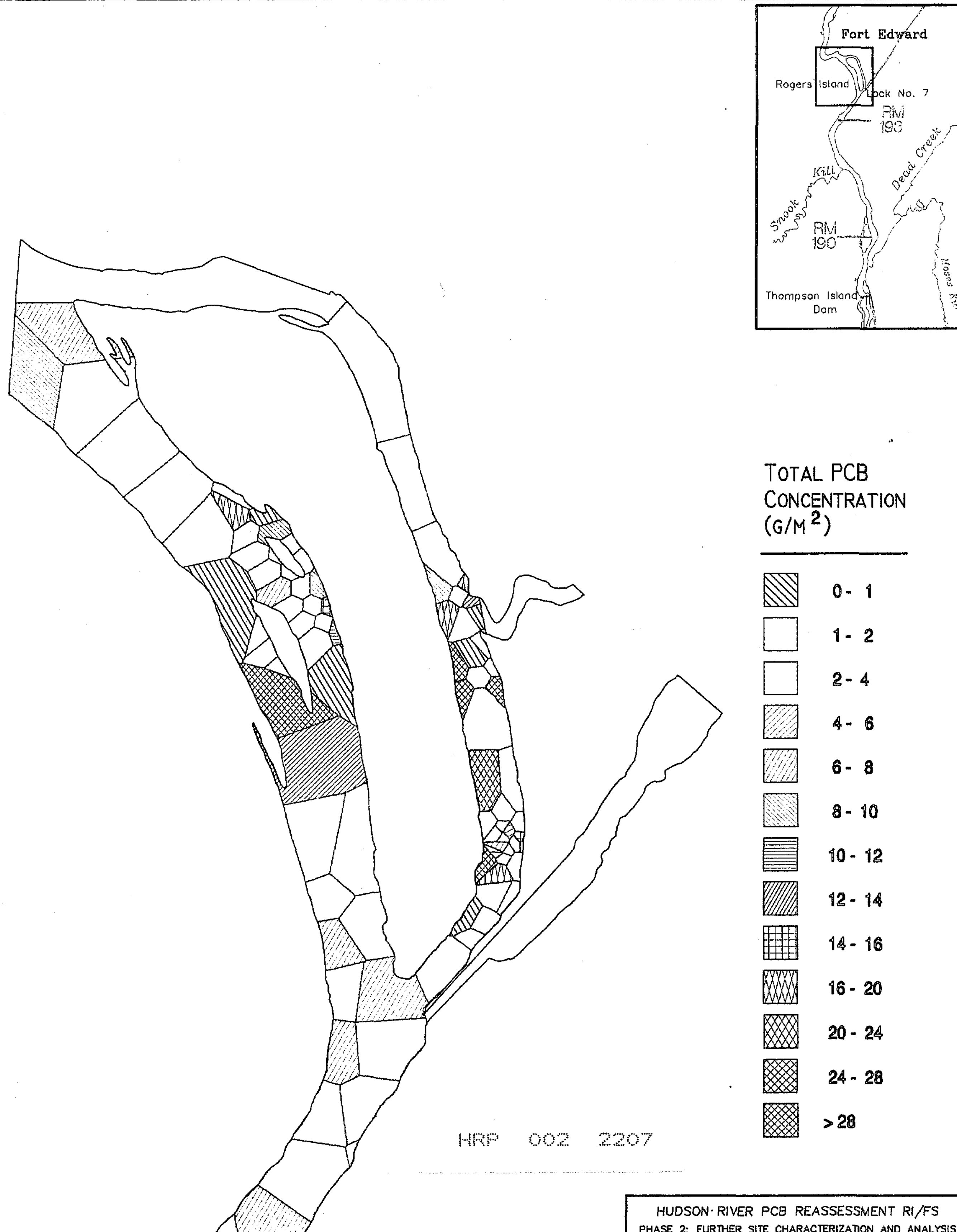
ZONES OF POTENTIALLY HIGH SEDIMENT PCB CONTAMINATION IN THE UPPER HUDSON RIVER

TAMS / Cadmus / Gradient

PLATE 4-4
SHEET 1 OF 2


FOR CONTINUATION, SEE PLATE 4-4, SHEET 1 OF 2
N
22
23
24
UNCHARACTERIZED PCB-BEARING SEDIMENTS MAY EXIST HERE
MARSH MAY BE HOT SPOT
25
26
27
LOCK 6
28
29
30
31
32
33
34
EDGE OF DATA
35
NO HOT SPOTS DELINEATED IN LOCK 5 LAND CUT
LEGEND:
SEDIMENTS WITH POTENTIALLY HIGH LEVELS OF PCB CONTAMINATION
14 NYSDEC HOT SPOT NUMBER
NYSDEC HOT SPOT AREAS
NYSDEC HOT SPOT AREAS NOT COVERED BY THE 1991/92 SIDE-SCAN SONAR SURVEY
SOURCES:
SEE SHEET 2 OF 2
1000 FEET
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT
ZONES OF POTENTIALLY HIGH SEDIMENT PCB CONTAMINATION IN THE UPPER HUDSON RIVER
TAMS / Cadmus / Gradient
PLATE 4-4

HRP 002 2206



N

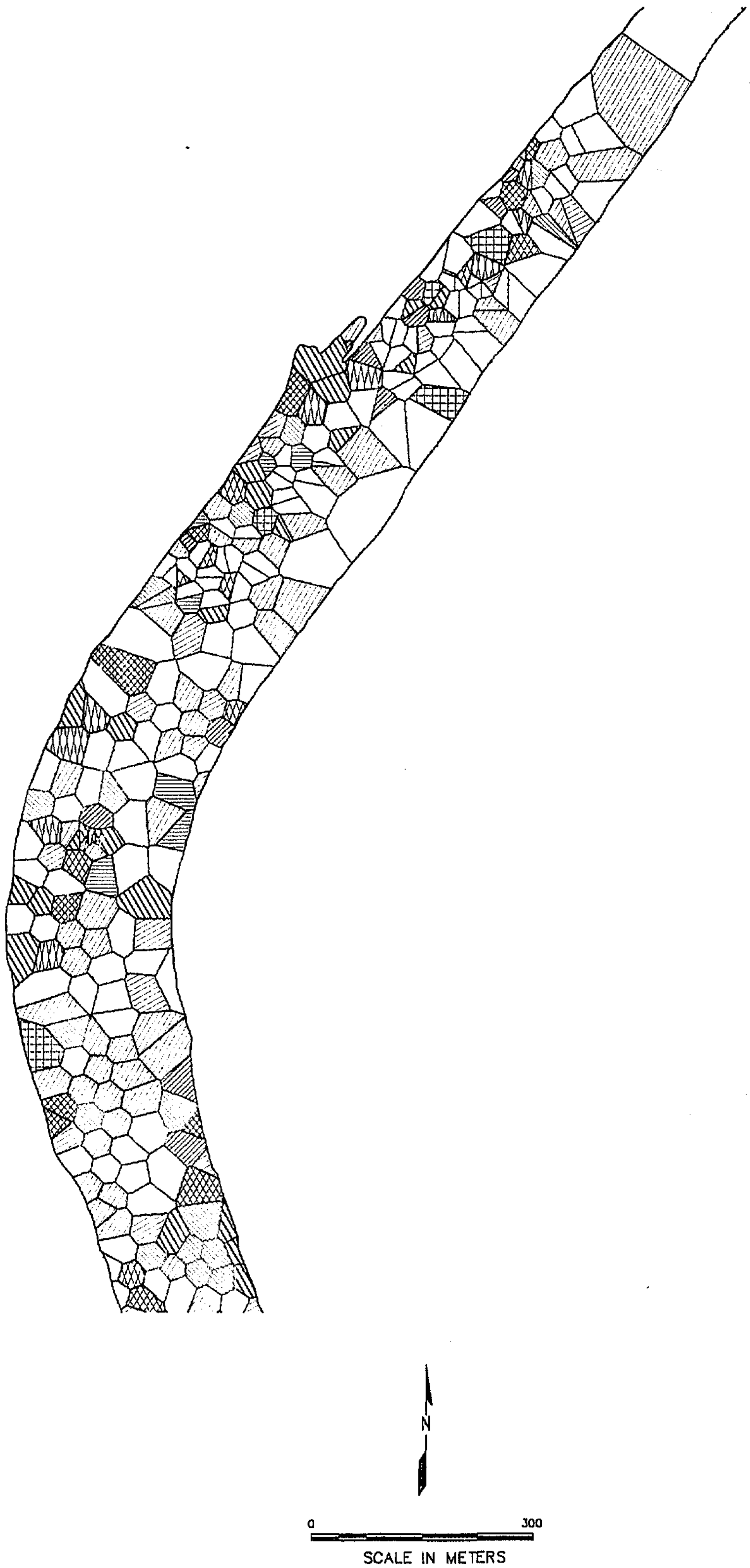
0 300
SCALE IN METERS

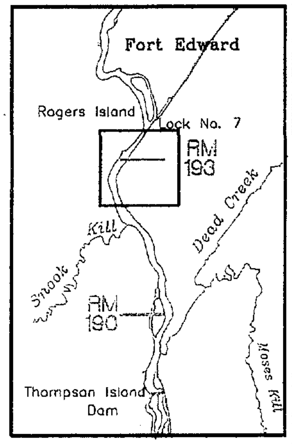
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

POLYGONAL DECLUSTERING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL – SUBREACH 1

TAMS / Cadmus / Gradient

PLATE 4-5





TOTAL PCB CONCENTRATION (G/M^2)

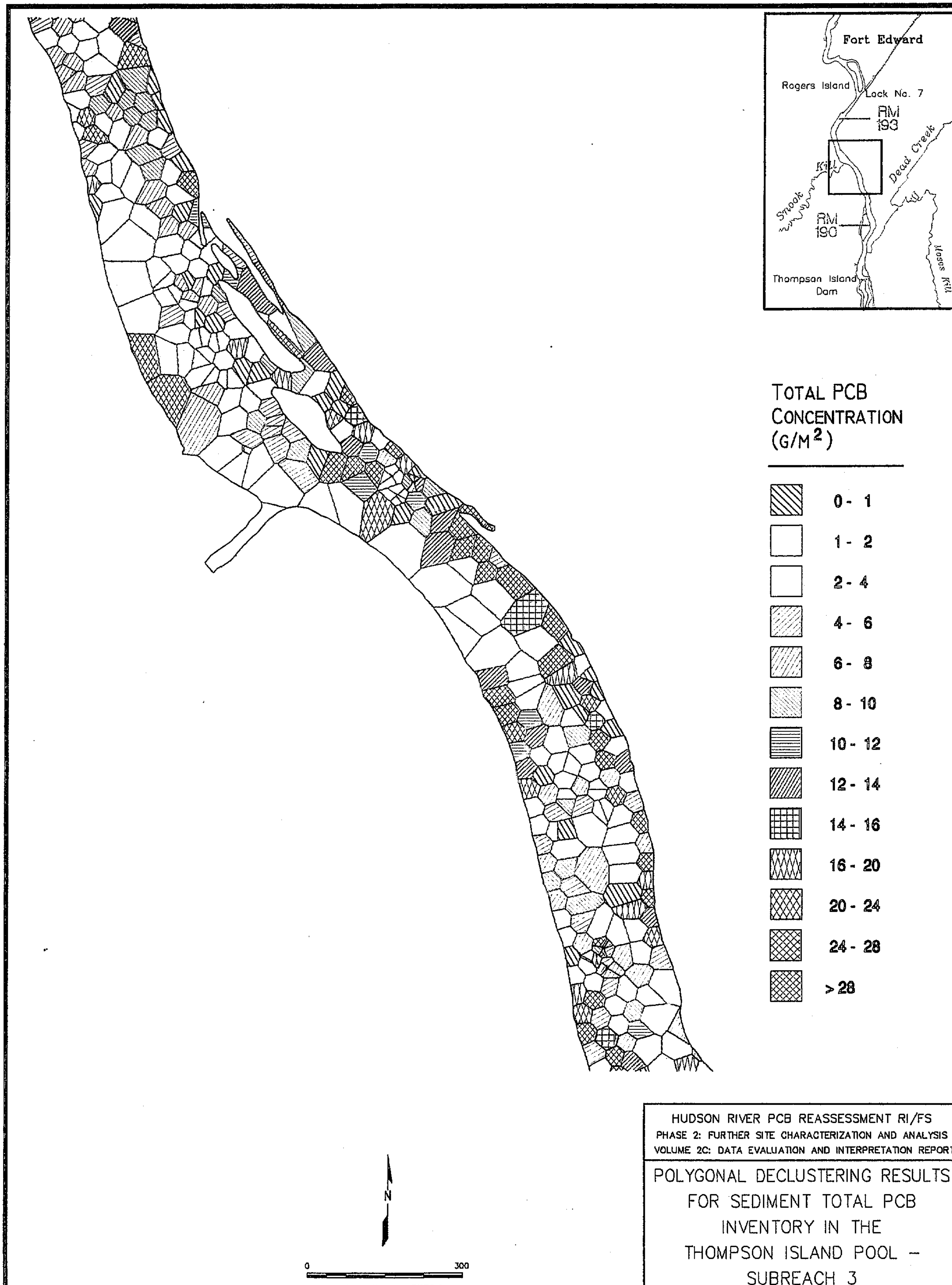
- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16
- 16 - 20
- 20 - 24
- 24 - 28
- > 28

HRP 002 2208

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

POLYGONAL DECLUSTERING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL – SUBREACH 2

TAMS / Cadmus / Gradient | PLATE 4-6

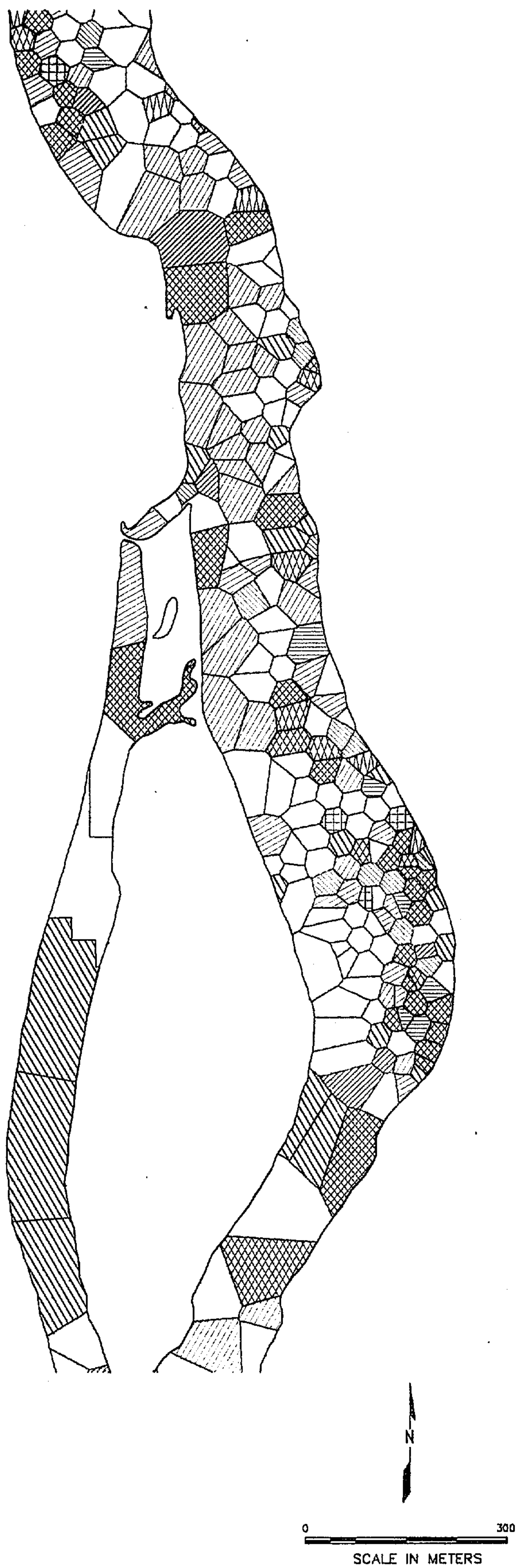


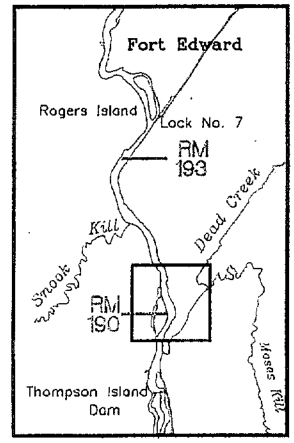
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

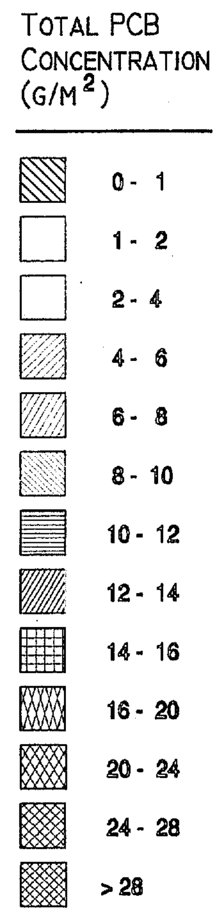
POLYGONAL DECLUSTERING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL - SUBREACH 3

TAMS / Cadmus / Gradient

PLATE 4-7





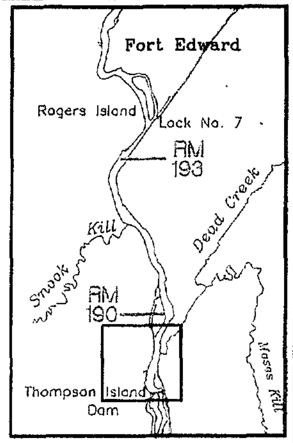


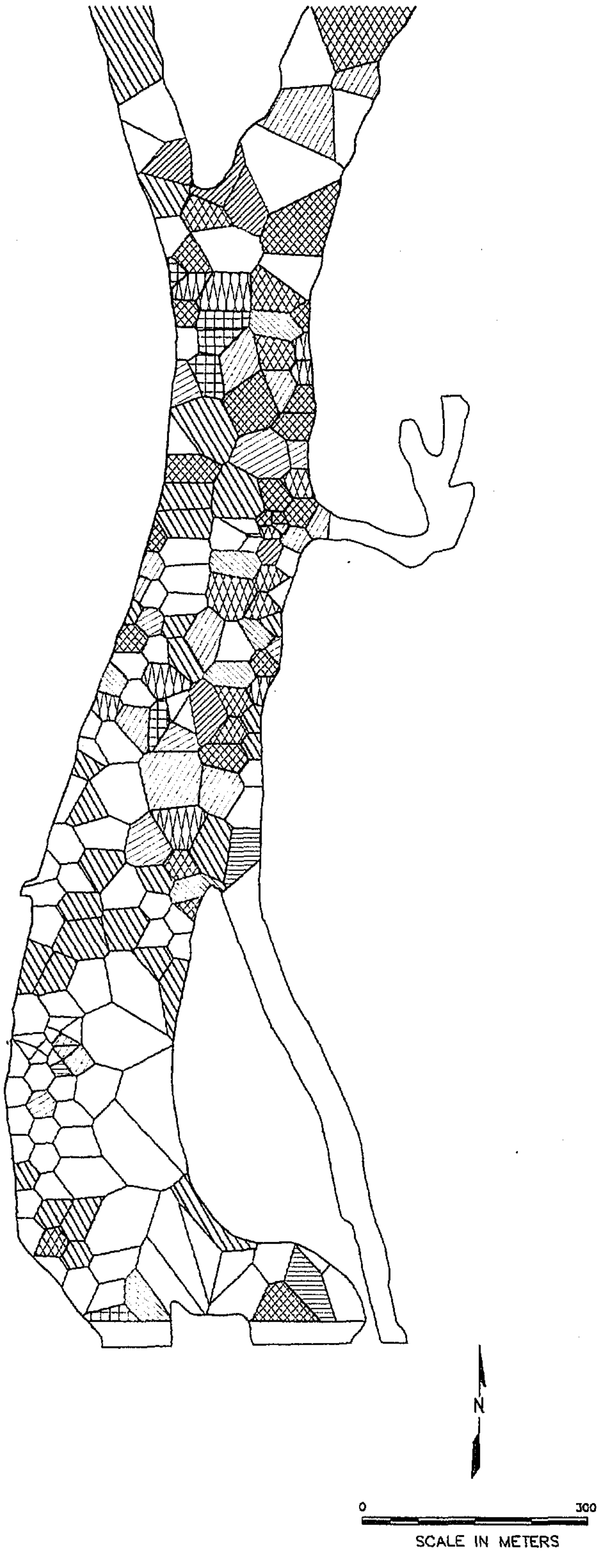
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

POLYGONAL DECLUSTERING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL – SUBREACH 4

TAMS / Cadmus / Gradient

PLATE 4-8





TOTAL PCB CONCENTRATION (G/M^2)

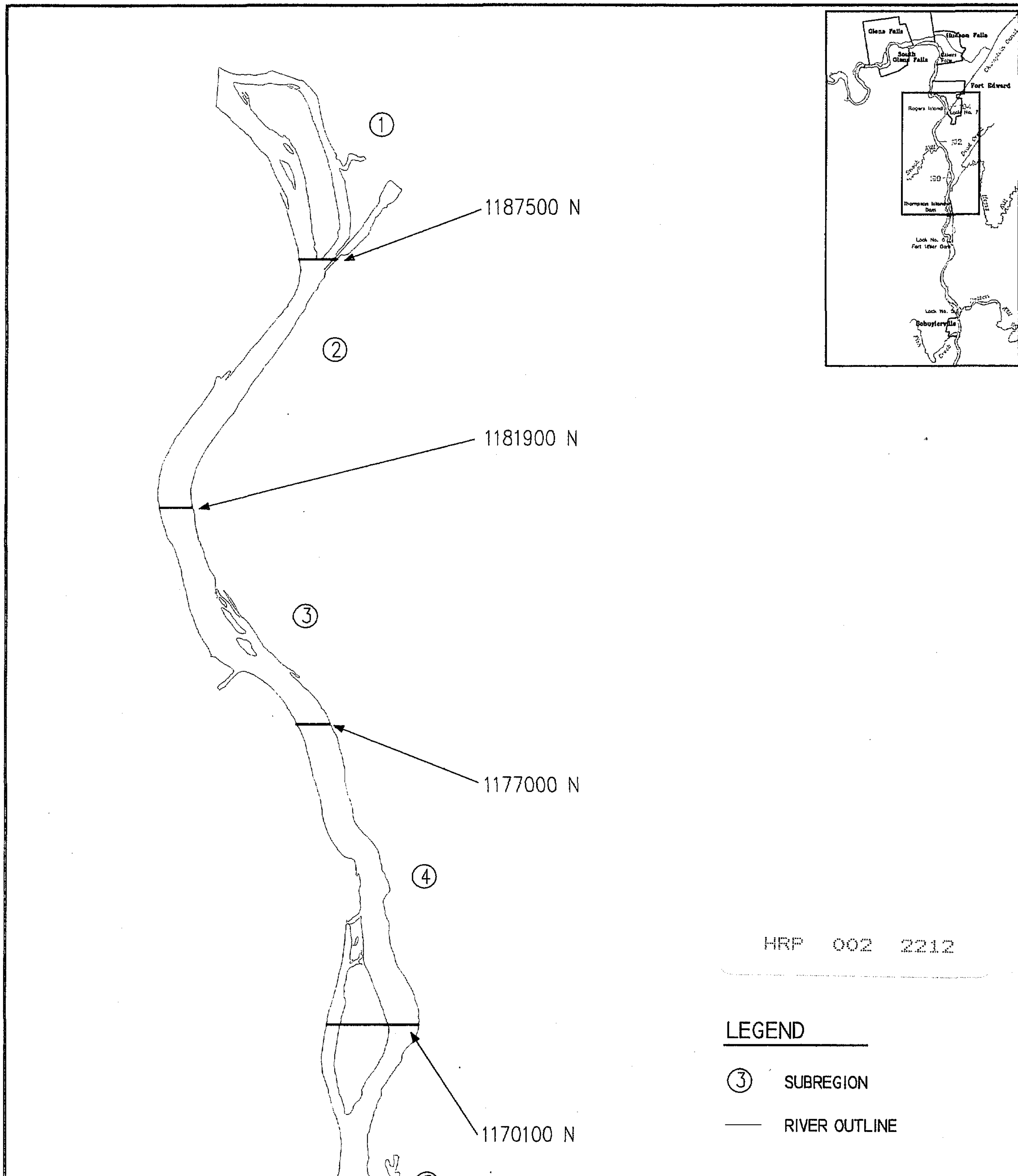
	0 - 1
	1 - 2
	2 - 4
	4 - 6
	6 - 8
	8 - 10
	10 - 12
	12 - 14
	14 - 16
	16 - 20
	20 - 24
	24 - 28
	> 28

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

POLYGONAL DECLUSTERING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL – SUBREACH 5

TAMS / Cadmus / Gradient

PLATE 4-9



0 600
SCALE IN METERS

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

SEGMENTATION OF THE
THOMPSON ISLAND POOL
FOR SEMIVARIOGRAM ANALYSIS

TAMS / Cadmus / Gradient PLATE 4-10

TOTAL PCB CONCENTRATION (G/M^2)

0- 1
1- 2
2- 4
4- 6
6- 8
8- 10
10- 12
12- 14
14- 16
16- 20
20- 24
24- 28
>28

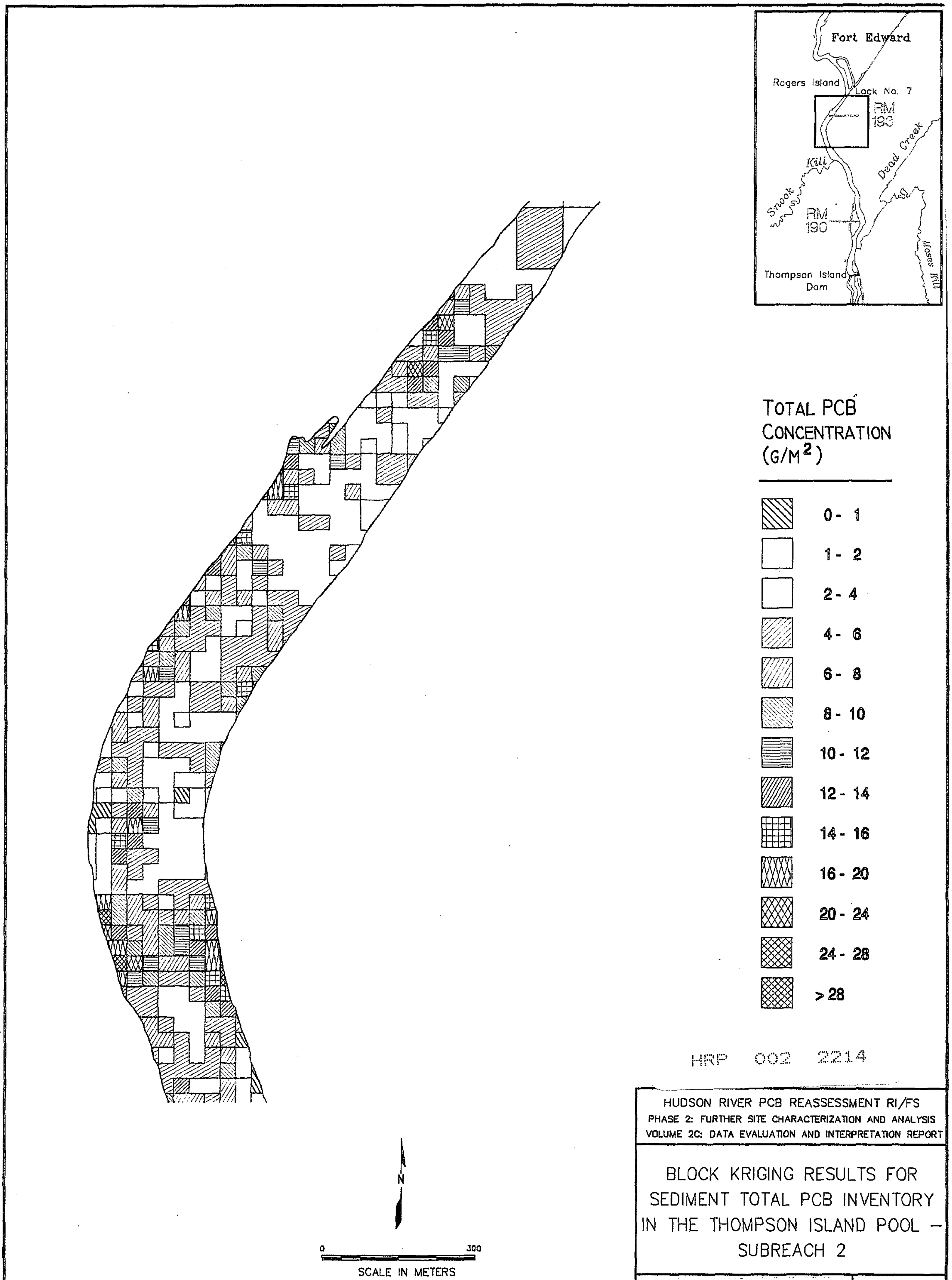
HRP 002 2213

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

BLOCK KRIGING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL – SUBREACH 1

TAMS / Cadmus / Gradient

PLATE 4-11



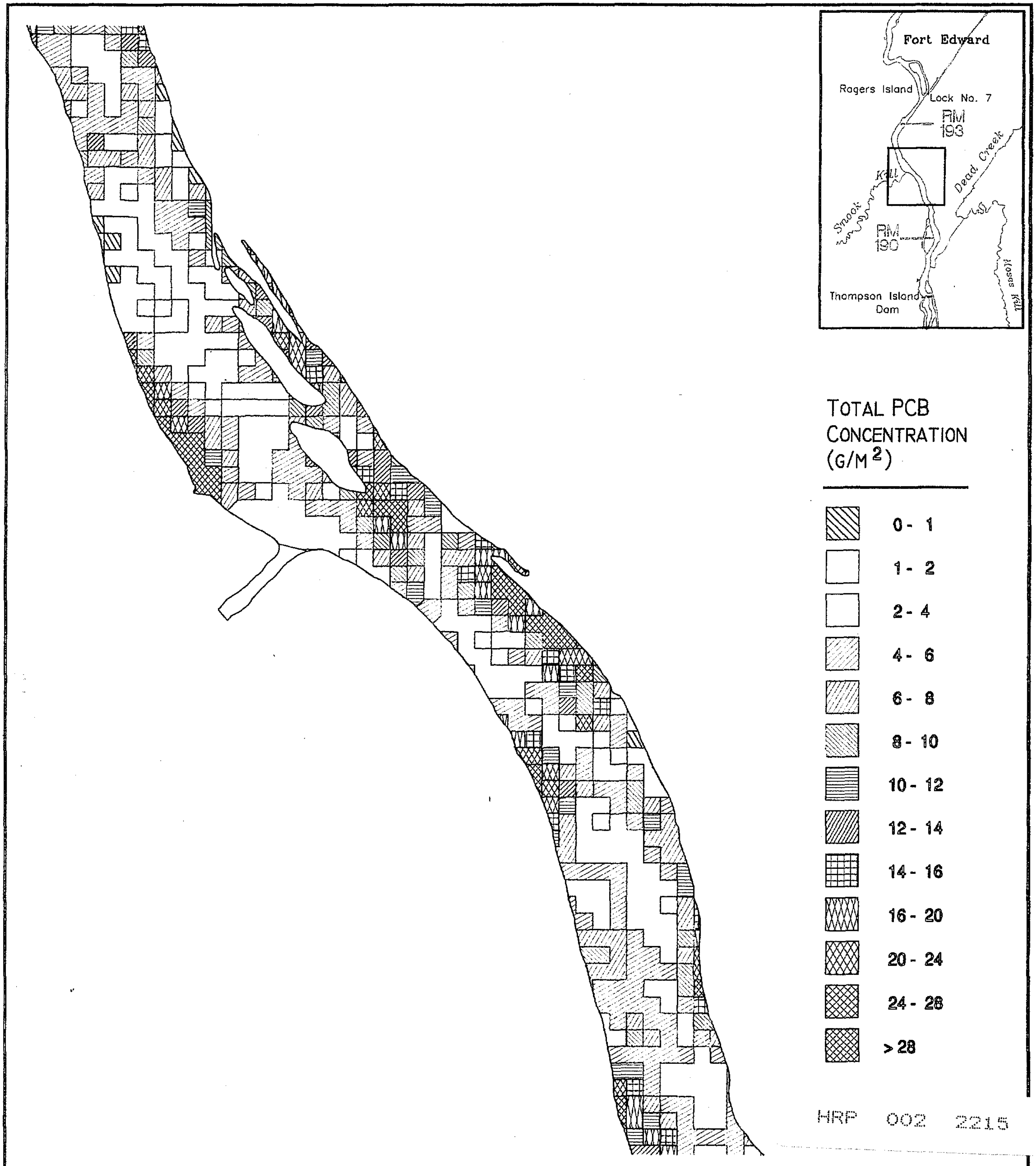
HRP 002 2214

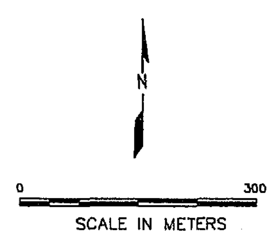
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

BLOCK KRIGING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL – SUBREACH 2

TAMS / Cadmus / Gradient

PLATE 4-12



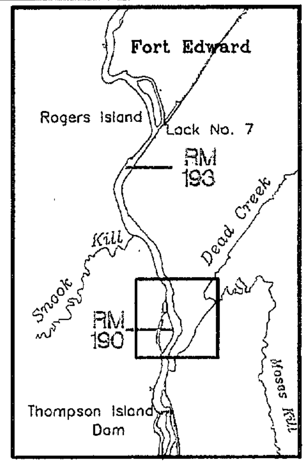


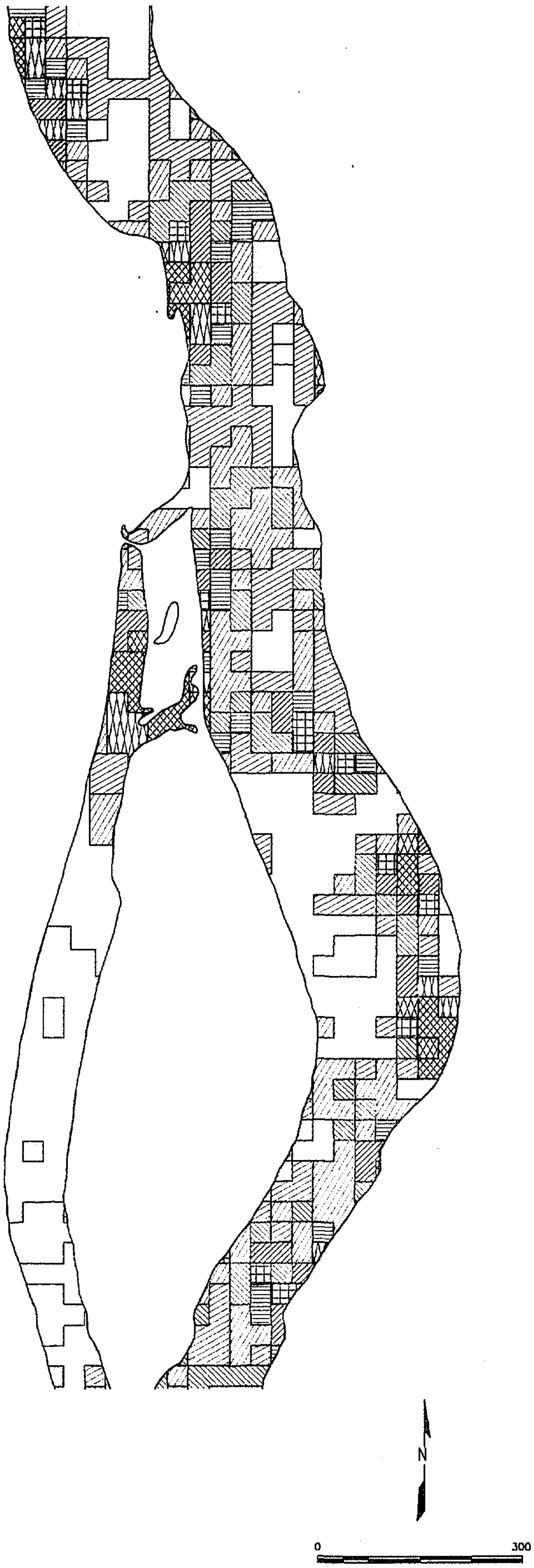
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

BLOCK KRIGING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL – SUBREACH 3

TAMS / Cadmus / Gradient

PLATE 4–13





TOTAL PCB CONCENTRATION (G/M^2)

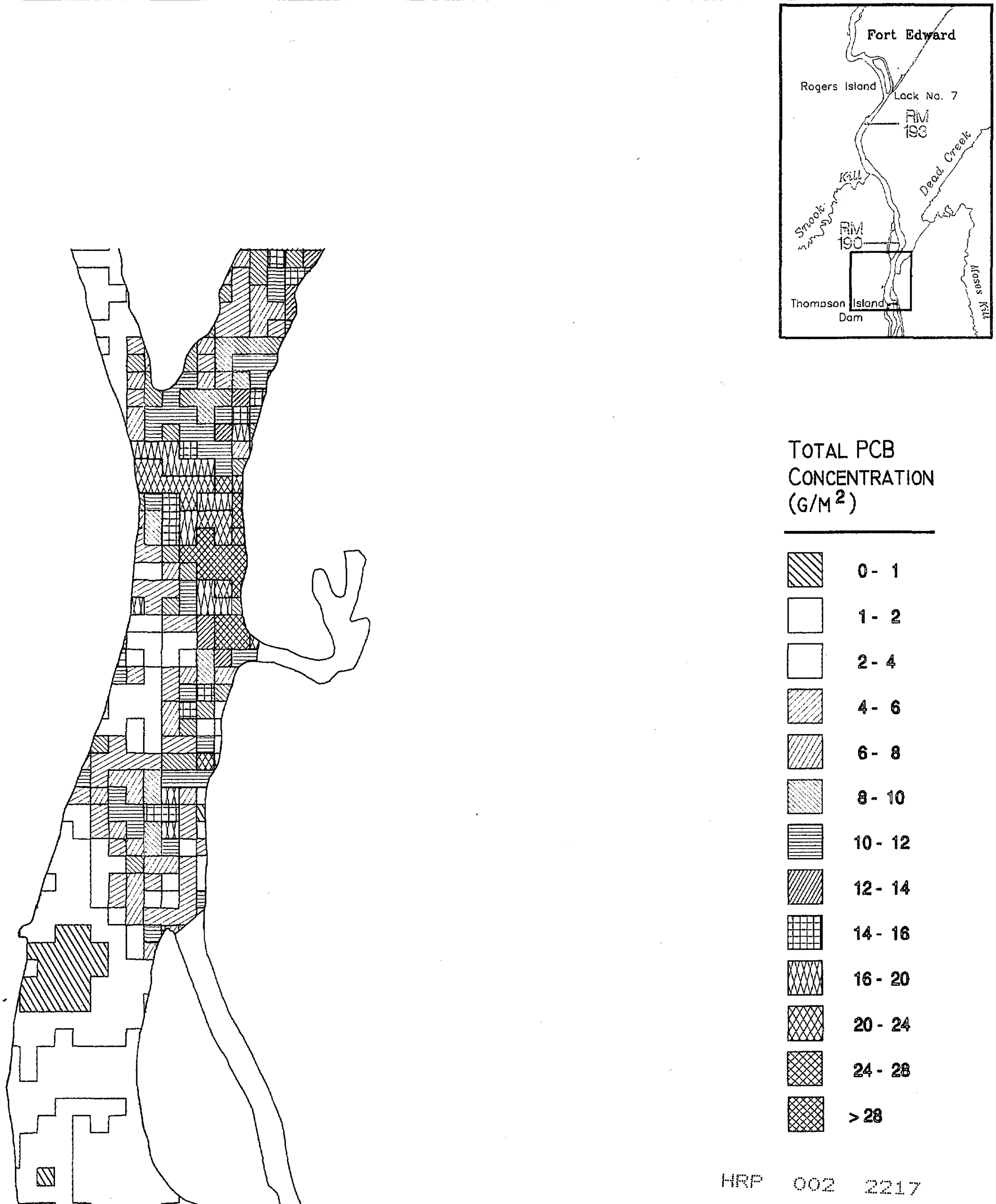
- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16
- 16 - 20
- 20 - 24
- 24 - 28
- > 28

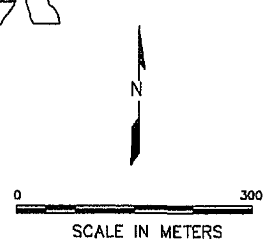
HRP 002 2216

HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

BLOCK KRIGING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL – SUBREACH 4

TAMS / Cadmus / Gradient | PLATE 4-14



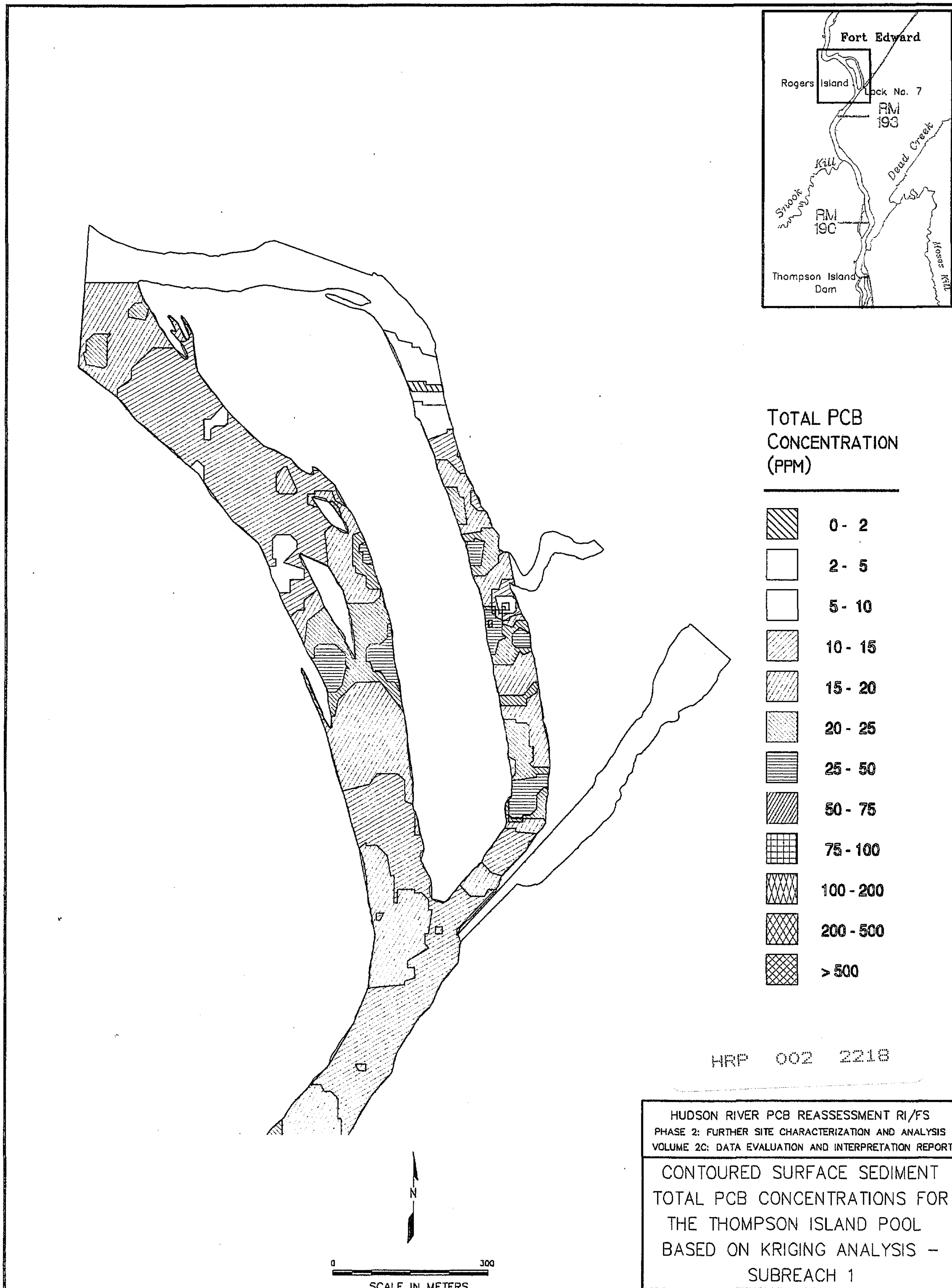


HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

BLOCK KRIGING RESULTS FOR SEDIMENT TOTAL PCB INVENTORY IN THE THOMPSON ISLAND POOL – SUBREACH 5

TAMS / Cadmus / Gradient

PLATE 4–15

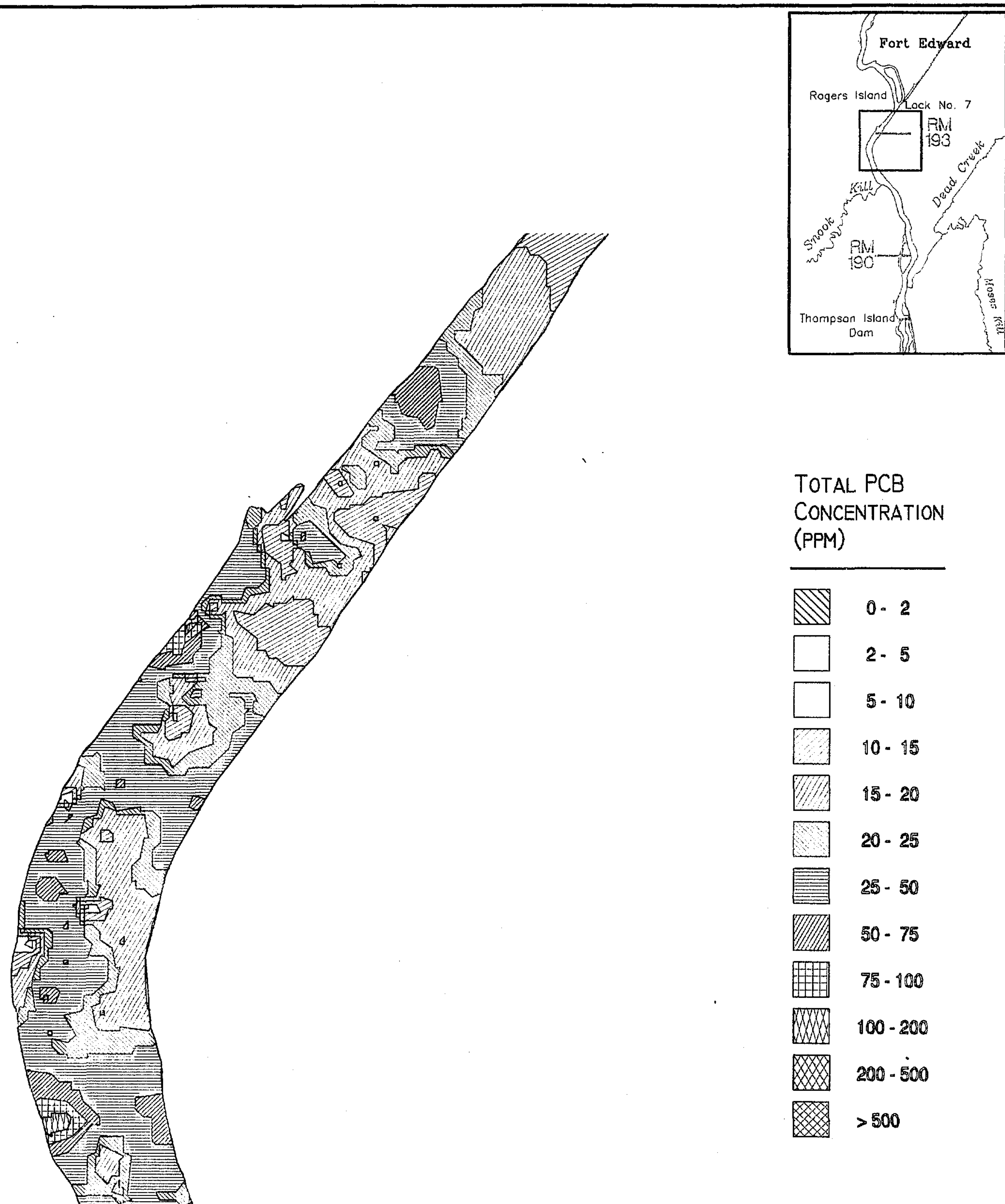


HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

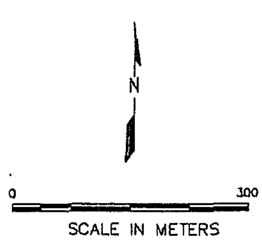
CONTOURED SURFACE SEDIMENT TOTAL PCB CONCENTRATIONS FOR THE THOMPSON ISLAND POOL BASED ON KRIGING ANALYSIS – SUBREACH 1

TAMS / Cadmus / Gradient

PLATE 4-16



HRP 002 2219

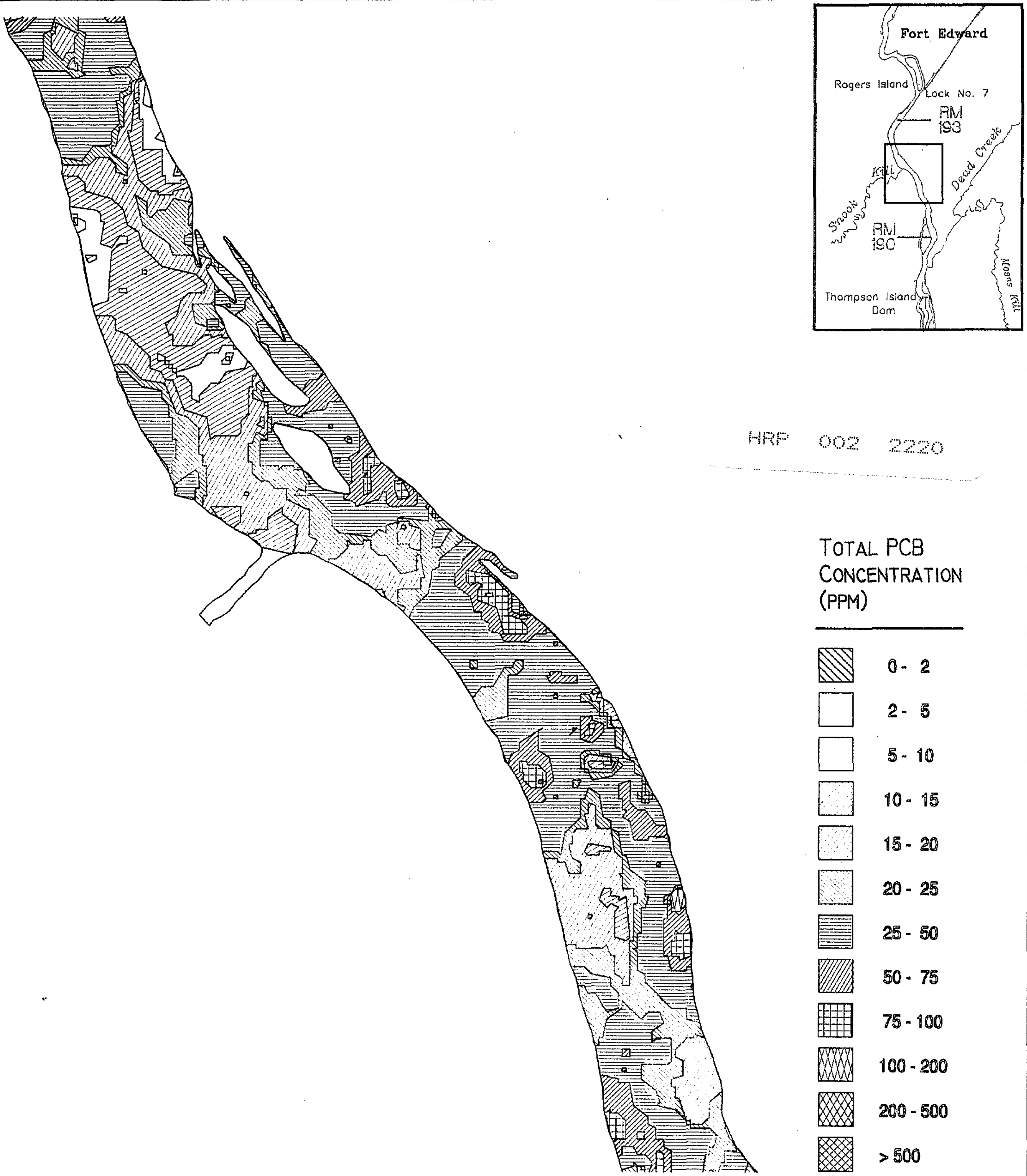


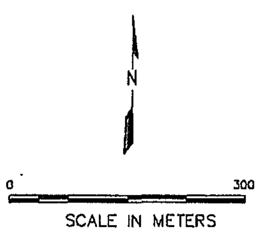
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

CONTOURED SURFACE SEDIMENT TOTAL PCB CONCENTRATIONS FOR THE THOMPSON ISLAND POOL BASED ON KRIGING ANALYSIS – SUBREACH 2

TAMS / Cadmus / Gradient

PLATE 4-17

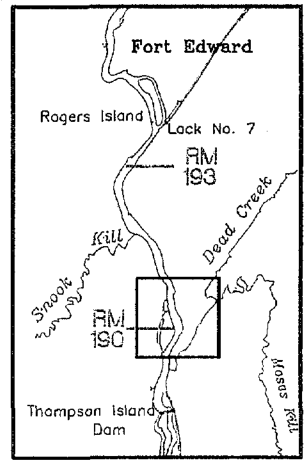


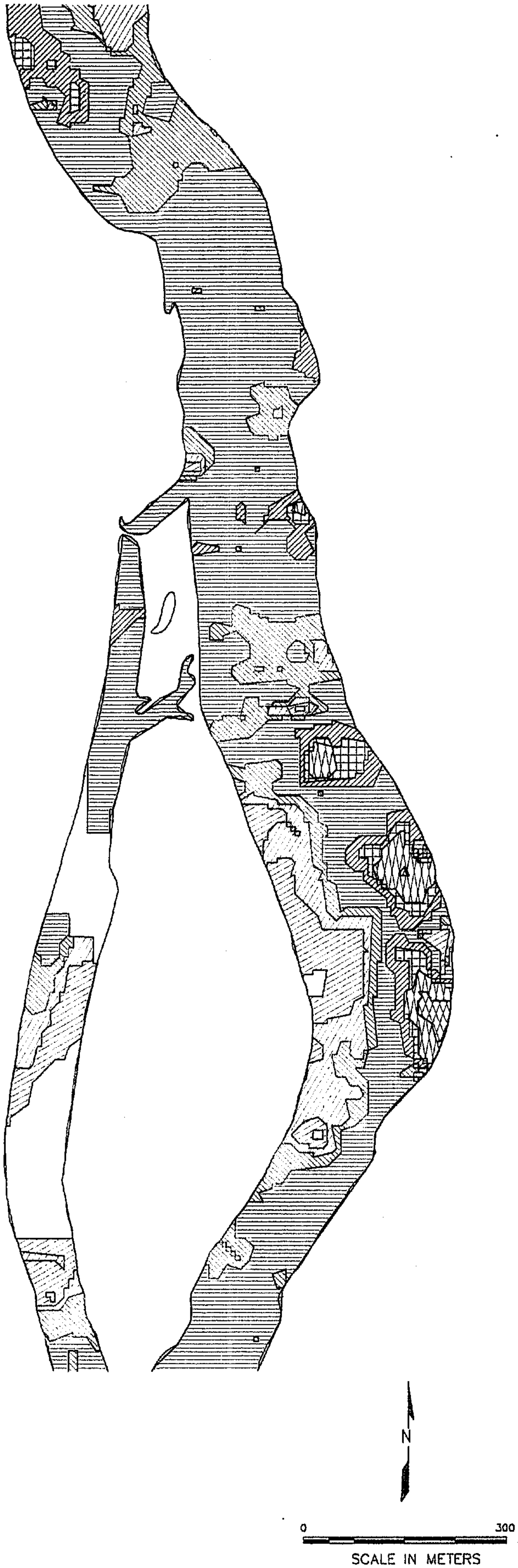


HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

CONTOURED SURFACE SEDIMENT TOTAL PCB CONCENTRATIONS FOR THE THOMPSON ISLAND POOL BASED ON KRIGING ANALYSIS – SUBREACH 3

TAMS / Cadmus / Gradient | PLATE 4–18





TOTAL PCB CONCENTRATION (PPM)

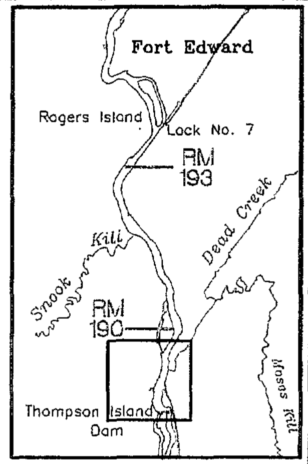
- 0 - 2
- 2 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 200
- 200 - 500
- > 500

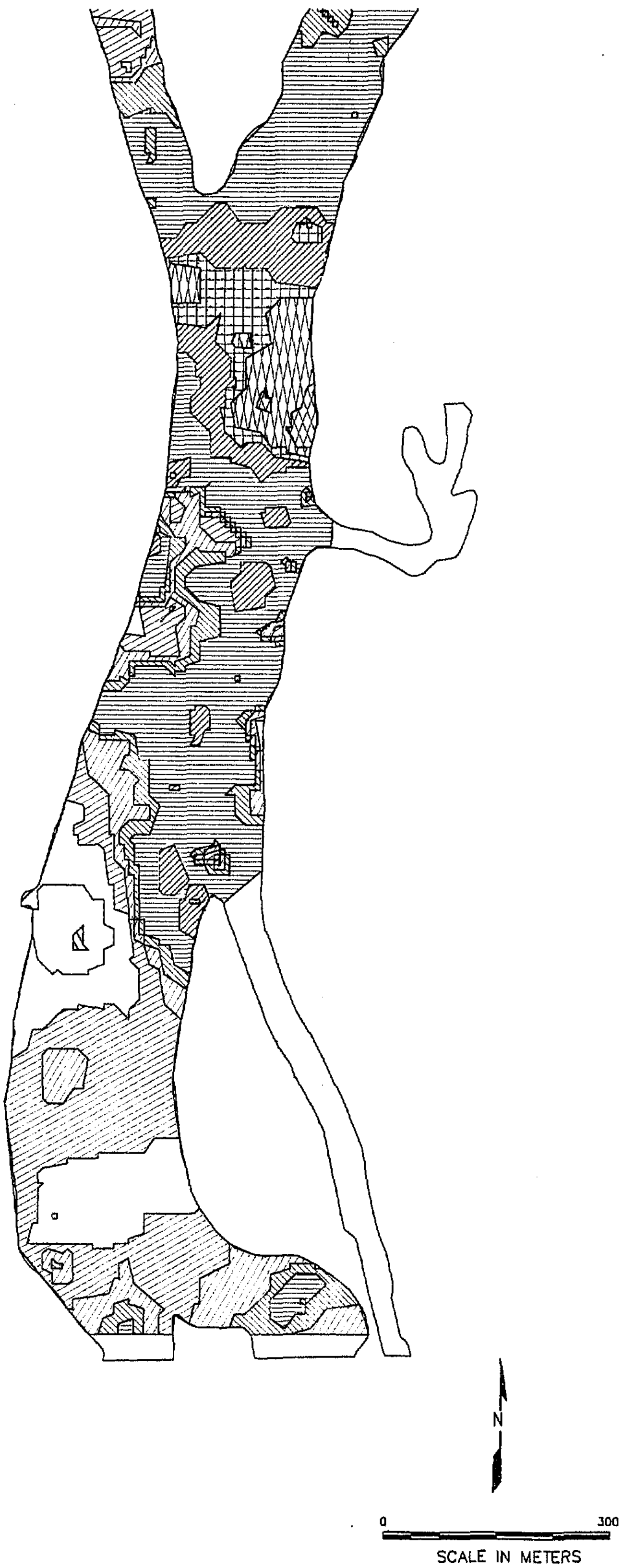
HRP 002 2221

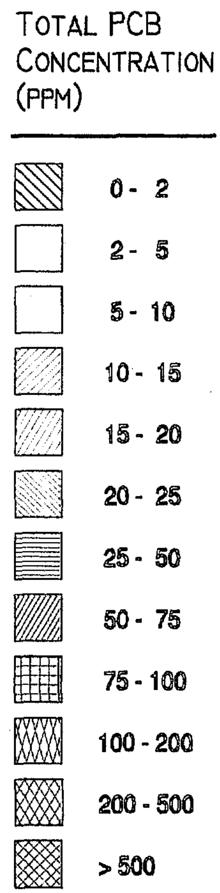
HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

CONTOURED SURFACE SEDIMENT TOTAL PCB CONCENTRATIONS FOR THE THOMPSON ISLAND POOL BASED ON KRIGING ANALYSIS – SUBREACH 4

TAMS / Cadmus / Gradient | PLATE 4-19







HUDSON RIVER PCB REASSESSMENT RI/FS
PHASE 2: FURTHER SITE CHARACTERIZATION AND ANALYSIS
VOLUME 2C: DATA EVALUATION AND INTERPRETATION REPORT

CONTOURED SURFACE SEDIMENT TOTAL PCB CONCENTRATIONS FOR THE THOMPSON ISLAND POOL BASED ON KRIGING ANALYSIS – SUBREACH 5

TAMS / Cadmus / Gradient

PLATE 4-20