Site: NEDERRI
Break: 2.7
Other: 5/96

34. DMF, 08/02/79
"Analytic Chemistry Report";
PCB Analyses of Flounder, Eel, Tautog, Fluke
(New Bedford).

35. DMF, 08/10/79
"Analytic Chemistry Report";
PCB Analyses of Eel, Tautog, Winter Flounder
(New Bedford samples).

36. DMF, 11/05/79
"Analytic Chemistry Report";
PCB Analyses of Flounder, Scup, Seabass, Hake
(New Bedford).

37. DMF, 10/30/79
"Analytic Chemistry Report";
PCB Analyses of Tautog and Flounder
(New Bedford).

38. DMF, 09/06/79
"Analytic Chemistry Report";
PCB Analyses of Flounder (New Bedford).

39. DMF, 08/22/79
"Analytic Chemistry Report";
PCB Analyses of Eels.

40. DMF, 10/10/79
"Analytic Chemistry Report";
PCB Analyses of Eels and Flounder
(New Bedford).

41. DMF, 10/30/79
"Analytic Chemistry Report";
PCB Analyses of Scup (New Bedford).

42. DMF, 10/03/79
"Analytic Chemistry Report";
PCB Analyses of Bluefish.

45. EPA, 11/79
"Summary of PCB Analysis Results in ppm (mg/kg);
New Bedford, Massachusetts Survey;
May - November 1976".

46. EPA, 09/22/76
"Summary of PCB Data; New Bedford, Massachusetts.

47. EPA, 1977
Table 8 - "PCB Analysis Results; Lobsters".

SDMS DocID 268635

48. EPA, 1977
Table 9 - "PCB Analysis Results; Fish Samples".

49. Farrington, John W. (WHOI), 1979
"PCB Analysis; Results of samples taken in New Bedford Harbor and Buzzards Bay analyzed by Massachusetts State and U.S. Federal labs.

50. Farrington, John W. (WHOI), 01/24/79
"Biogeochemistry of PCBs in New Bedford Harbor and Buzzards Bay, Massachusetts" - Grant Proposal.

51. Farrington, John W. (WHOI), 01/81
"PCB Anaysis of Marine Organisms in the New Bedford Area - Appendix 2".

53. Farrington, J.W. (WHOI), A.C. Davis (WHOI) and J. Sulanowski (BSU), 1981
"Biogeochemistry of PCBs in New Bedford Harbor and Buzzards Bay, Massachusetts".

54. FDA (Boston), 09/10/79
Letter to Dr. John Delaney (L.E.S.); PCB analyses of lobsters and eel.

55. Fitzpatrick, Edward V. (EPA), 11/23/76
Letter to Thomas J. McLoughlin (DEQE); EPA sampling data, 8/10/76.

56. Fitzpatrick, Edward V. (EPA), 03/78
Memo to M. Honman (EPA); "Ambient PCB Sampling in New Bedford" Air.

57. GCA Corp., 1977
"PCB Compounds Emanating from New Bedford Municipal Sewage Sludge Incinerator".

58. DEQE, 02/17/83
Communication to Metcalf & Eddy, Inc. (A.C. Michilini); Analysis of Lobsters.

59. Gidley Laboratories, Inc.
"Chemical Comparison of Fairhaven Sludge and Animal Manure", Table 18 - Project EC-105.

60. Gidley Laboratories, Inc.
"Fall Tests - 1980; Fairhaven Wastewater Treatment Plant Sludge" Gidlab Report CEN-179.

Prof 25

Request by: Area Test 2-1, Briggs

Date: 7/16/79

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: New Bedford Samples

Analyses For: PCBs

Methods Used: G. C.-E. C.

No. of Analyses: 9

Lab No.	Field	Species	PCB's (ppb) Wet Wt Basis	Dry Wt Basis	Mat No
161	1-79-1	Eel	450 *	1050	2EC-A
162	1-79-2	"	730 *	1950	2EC-A
163	1-79-3	"	670 *	1810	2EC-A
164	1-79-4	"	430 *	1060	2EC-A
165	1-79-5	"	430 *	1030	2EC-A
166	1-79-6	"	570 *	1470	2EC-A
167	1-79(1-3)	"	24 *	52	2EC-A
168	1-79(1-6)	Tautog	3.1 *	9.9	2EC-A
169	1-79(7-9)	Winter Flounder	8.0 *	35.0	2EC-A

Comments: Samples were collected on July 10-11, 1979. Samples 161-166 were individual eels previously run as a composite and reported on 6/2/79.

Date: August 10, 1979

J. Der Hovanesian & R. Sarsis

Notes:

Ref 36

Request by: W. L. Griggs

Date: 10/24/79

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: Fish (New Bedford)

Analysis For: PCB's

Methods Used: G.C. - E.C.

No. of Analyses: 9

Results: Lab #	Field #	Species	Wt (gm)	PCB's (ppm) Aroclor	Specs	Det. Lim.	FIL No.
F-251	FFF-79-2	winter flounder	--	0.3	—		40.
F-252	FFF-79-3	windowpane flounder	--	3.7	—		32-
F-253	EE-79-3	red hake	--	<0.1	—		327-
F-254	GGG-79-1	winter flounder	0.34	0.5	—		6.
F-255	EEE-79-1	winter flounder	0.49	0.2	—		262-
F-256	HH-79-1	winter flounder	0.39	[illegible]	—		[illegible]
F-257	HHH-79-2	winter flounder	0.39	0.2	—		27
F-258	II-79-1	scup	0.41	1.3	—		[illegible]
F-259	II-79-2	sea bass	0.41	0.4	—		30.

Comments: Samples were collected by Area Team [illegible] 10/24/79 - 10/26/79

Date: 11/5/79

J. Ferrovecchio & B. Sc[illegible]
Chemist

Rec # 37

Request by: W. L. Brisco

Date: 10/24/79

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: Fish (New Haven)

Analysis For: PCB's

Methods Used: G.C. - I.C.

No. of Analyses: 9

Results: LAB #	FIELD #	SPECIES	WT. (g)	PCB's (ppm) WET WT. BASIS	PCB's (ppm) DRY WT. BASIS	ACC.
P-231	AAA-79-1	tautog	1.72	0.2	—	3[illegible]
P-243	AAA-79-2	tautog	1.00	0.4	—	3[illegible]-A
P-244	BBB-79-1	winter flounder	0.61	1.6	—	[illegible]6
P-245	AAA-79-3	tautog	0.40	0.1	—	320-[illegible]
P-246	EEE-79-1	winter flounder	1.36	0.2	—	266-[illegible]
P-247	CCC-79-2	winter flounder	0.72	0.5	—	64-[illegible]
P-248	DDD-79-1	winter flounder	0.50	0.5	3.8	245-[illegible]
P-249	FFF-79-1	winter flounder	0.26	0.5	—	3[illegible]-[illegible]
P-250	EEE-79-2	windowpane flounder	0.25	0.1	—	3[illegible]-[illegible]

Comments: Samples were collected on 10/16/79 in Area Tear 12

Date: October 30, 1979

J. [illegible]
[illegible]

Request by: L. Briggs

Date: 8/17/79

ANALYTICAL CHEMISTRY REPORT

Sample Name or Code: Flounder (New Bedford)

Analysis For: PCB's

Methods Used: G.C.-E.C.

No. of Analyses: 2

Results: Lab#	Field#	PCB's (ppm) wet wt. basis	dry wt. basis
P-197	G-79(1-3)	12 "	62
P-198	G-79(4-7)	11 "	53

Comments: Samples collected on 8/16/79 by Area Team 2

Date: Sept. 6, 1979

J. Der Hovanesian & R. Sergeic
Chemist

Ref. 39

Request by: L. Briggs

Date: Aug. 17, 1979

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: Eels

Analysis For: PCB's

Methods Used: S.C.E.C.

No. of Analyses: 3

Results: Eels	PCB's (ppm)*	MFF
L-79(2-7)	1.30	294
L-79(3-11)	1.0	294
L-79-7	1.20	294

Comments: *wet weight basis

Date: August 22, 1979

J. Der Kevanesian & P. Sarasian

Chemist

Ref No. 40

Request by: W. L. Bilcess

Date: 9/25/79

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: Fish (New Bedford)

Analysis For: PCB's

Methods Used: G.C. - E.C.

No. of Analyses: 5

Results: Lab #	Field #	Species	PCB's (ppm) Det Ct. Basis	PCB's (ppm) Dry Wt. Basis	MTE No.
P-232	[illegible]-79-2	Fluke	<2.1	[illegible]	308-1
P-233	[illegible]-79-3	Winter Flounder	<3.1	[illegible]	261-1
P-234	[illegible]-79-4	Windowpane Flounder	<3.3	[illegible]	3/1-1
P-235	[illegible]-79-5	Windowpane Flounder	14.3	[illegible]	3/2 A
P-236	[illegible]-79-6	Windowpane Flounder	<3.3	[illegible]	3/3-A

Comments: P-232 was a single female fluke collected on 8/25/79 by Area Team [illegible]

P-233 was a composite of 5 fish collected on 8/25/79 by Area Team [illegible]

P-234 was a composite of 8 fish collected on 8/23/79 by Area Team [illegible]

P-235 was a composite of 9 fish collected on 8/25/79 by Area Team [illegible]

P-236 was a composite of 8 fish collected on 8/25/79 by Area Team [illegible]

Date: October 10, 1979

J. Der Kavanesian S.R. Senior Chemist

Pg 46

Request by: M. L. Briggs

Date: 9/23/79

ANALYTICAL CHEMISTRY REPORT

Sample Name or Code: Bels (New Bedford, Site P)

Analysis For: PCB's

Methods Used: G.C. - E.C.

No. of Analyses: 2

Number:	Lab #	Field #	Wt. (Kg.)	PCB's (ppm) Det Wt. Basis	Dry Wt. Basis	MRF No.
	E-233	P-79-1	0.4	13.2 *	15.1	298-A
	E-220	P-79-2	0.7	1.2 *	1.3	299-A

Comments: Collected by Area Team #2 on 7/26/79

October 10, 1979

J. Der Hovanessian & S. Spaziani
Chemists

Ref #1

Request by: W. L. Bridges

Date: 9/25/79

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: Scup (New Bedford)

Analysis For: PCB's

Methods Used: G.C.-E.C.

No. of Analyses: 1

Analysis	Lab #	Field #	PCB's (ppm) Wet Wt. Basis	Dry Wt. Basis
	P-229	GW 79-1	2.29	10.3

Comments: Sample P-229 was a composite of 10 scup from a total of 31 fish collected on 8/23/79 from the New Bedford area by Area Team 2

Date: October 3, 1979

J. Der Hovanesian & R. Sensiba

Signature

Ref 1/2

Request by: W. L. Briggs

Date: 9/25/79

ANALYTIC CHEMISTRY REPORT

Sample Name or Code: Bluefish

Analysis for: PCB's

Instrument Used: S.C.-E.C.

No. of Analyses: 5

PCB's (ppm)

Results: Lab#	Field#	Wt. (lbs)	Wet Wt. Basis	Dry Wt. Basis	MIT No.
F-226	--	5.5	0.53	2.15	421-6
F-227	--	10	0.80	2.61	423-1
F-228	--	10	0.68	2.26	425-4
F-230	S-79-4	4.8	16.5	55.9	424-4
F-231	S-79-5	2.3	1.41	5.73	423-1

Comments: F-226 - F-228 collected from Cape Cod Bay on 8/26 - 29/79

F-230 - F-231 collected from New Bedford area on 8/30/79

Samples collected by Area Team 2

Date: October 3, 1979

J. Der Hovanessian & S. Sereg[illegible]

Chemist

INFO from EPA site obtained 6/1/81

Summary of PCB Analysis Results in ppm (mg/kg)
New Bedford, Massachusetts Survey
May - November 1976

MHE Not included

Sample Location	Sample Code	Description	Laboratory: EPA Wet Wt.	EPA Dry Wt.	NBL Wet Wt.	NBL Dry Wt.	Cat Cove Wet Wt.	Cat Cove Dry Wt.	L.E.S. Wet Wt.	L.E.S. Dry Wt.
Apponoganset Bay	D-1	Shellfish		3.1	0.20		0.20	1.32		
" "	D-2	Shellfish		3.6	0.20		0.17	1.33		
" "	D-3	Shellfish		5.0			0.47	3.38		
Buzzard's Bay	NB-1	Shellfish					1.30	9.49		
" "	NB-2	Shellfish					0.35	2.78		
" "	NB-3	Shellfish					0.72	5.37		
" "	NB-4	Shellfish					1.81	11.1		
" "	NB-5	Shellfish			0.40		0.41	3.29		
" "	NB-6	Shellfish					0.44	3.08		
Buzzard's Bay	F-1	Shellfish					0.7	7.0		
" "	F-2	Shellfish					3.5	18.0		
" "	F-3	Shellfish					-	-		
" "	F-4	Shellfish					0.06	0.44		
" "	F-5	Shellfish					0.06	0.4		
" "	F-6	Shellfish					0.32	2.35		

Laboratory HTC No.

Sample Location	Sample Code	Discription	EPA Wet Wt.	EPA Dry Wt.	FDA Wet Wt.	FDA Dry Wt.	Cat Cove Wet Wt.	Cat Cove Dry Wt.	L.E.S Wet Wt.	L.E.S Dry Wt.
Acushnet River	NBS-1	Sediment		59 47.4			34.8	84.5	Ref #	108
" "	NBS-2	Sediment		60 61.3			15.0	17.7		
" "	NBS-3	Sediment		61 77.9				0.48		
" "	NBS-4	Sediment		143	Ref 46					
" "	NBS-5	Sediment		0.5						
" "	NBS-6	Sediment		1.9						
" "	ARS-10	Sediment		620	Ref 46					
Acushnet River	FS-1	Sediment		74.8			28.7	88.0		
" "	FS-2	Sediment		47 21.5			10.5	23.0		
" "	FS-3	Sediment		48 4.1			-	-		
" "	FS-4	Sediment		69 0.3			0.16	0.20		
Acushnet River Popes Island		Blackback Flounder (Filet)					6.0	2.47		
Acushnet River Popes Island		Blackback Flounder (Whole)			10.1 71					
Buzzard's Bay	NB-4	Scup (Whole)					6.1	26.6		
" "	SS-1	Scup (Whole)					11.4	43.2		
" "	SS-1	Tautog					1.18	5.57		

Laboratory

Sample Location	Sample Code	Discription	EPA		FDA		Cat Cove		L.E.S.	
			Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.
Acushnet River Popes Island		Blue Crab					5.57	29.5		
Fairhaven Nastetucket Bay		Blackback Flounder Filet							7.6	
Fairhaven S.E. of Rocky Pt.		Baby Lobster (67 gms)							0.9	
Fairhaven S.E. of Rocky Pt.		Butterfish Filet							0.7	
Dartmouth		Blackback Flounder Filet							3.9	
New Bedford E. of Negro Ledge		Blackback Flounder Filet							19.0	
Dartmouth-S.E. of Ricketsons Pt.		Blackback Flounder Filet							20.0	
New Bedford Negro Ledge		Butterfish							0.9	
New Bedford Henrietta Rock		Blackback Flounder Filet							8.3	
New Bedford E. of Fort Rodman		Lobster Tail Meat							7.4	
New Bedford E. of Fort Rodman		Lobster Claw							16.	

Laboratory

Sample Location	Sample Code	Discription	EPA		FDA		Cat Cove		L.E.S.	
			Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.
New Bedford E. of Fort Rodman		Lobster Tomale							27.0	
New Bedford E. of Fort Rodman		Silver Fluke							6.4	
New Bedford E. of Fort Rodman		Gunner							57.0	
New Bedford E. of Fort Rodman		Fluke							18.0	
New Bedford S. of Hurricane Barrier		Fluke							21.0	
New Bedford N. of Hurricane Barrier		Blackback Flounder							22.0	
New Bedford N. of Hurricane Barrier		Fluke							22.0	
Barnstable Harbor		Flounder Filet					0.05	0.25		
Bass River		Flounder Filet					0.03	0.15		
Wellfleet Harbor		Flounder Filet					0.01	0.05		
Waquoit Bay		Flounder Filet					0.02	0.10		
Essex Bay		Flounder Filet					0.04	0.20		

Sample Location	Sample Code	Discription	Laboratory: EPA Wet Wt.	EPA Dry Wt.	FDA Wet Wt.	FDA Dry Wt.	Cat Cove Wet Wt.	Cat Cove Dry Wt.	L.E.S. Wet Wt.	L.E.S. Dry Wt.
Pleasant Bay		Flounder Filet					0.02	0.10		
Acushnet River .3 km S. of Aerovox		Clam	53 (99)	— Rb 46						
Acushnet River 1.1km S. of Aerovox		Clam	21 (100)	— Rb 46						
Acushnet River 1.8 km of Aerovox		Clam	23 (101)	— Rb 46						
Acushnet River Upstream of Popes Island		Composite Fish (Composite Homogenate)	0.75 102A	3.4 102Z						
" "		Blue Crab (edible portion)	0.99 103A	4.5 103						
" "		American Eel (Composite of 3 Eels portion)	92.0 104A	288.0 104						
Market Sample		Unknown							0.38	105
" "		Quahog							0.30	106
" "		" "							0.63	107
" "		Eel							0.95	108

Sample Location	Sample Code	Discription	Laboratory: EPA Wet Wt.	EPA Dry Wt.	FDA Wet Wt.	FDA Dry Wt.	Cat Cove Wet Wt.	Cat Cove Dry Wt.	L.F.S Wet Wt.	L.F.S Dry Wt.	MTI No
Market Sample		Quahog							1.41		107
" "		" "							1.08		[illegible]
" "		Fish							<0.1		[illegible]
" "		Quahog							0.39		112
" "		Lobster							0.21		[illegible]
" "		Lobster							1.12		113
" "		Lobster							0.32		114
" "		Lobster							<0.1		115
" "		Fish							<0.1		116
" "		Fish							0.76		117
" "		Fish							0.21		118
" "		Fish							0.1		119
Market Sample		#1120 "A" & "B" (water)							Both <0.1		120
Boston Harbor		Smelt							3.9		121

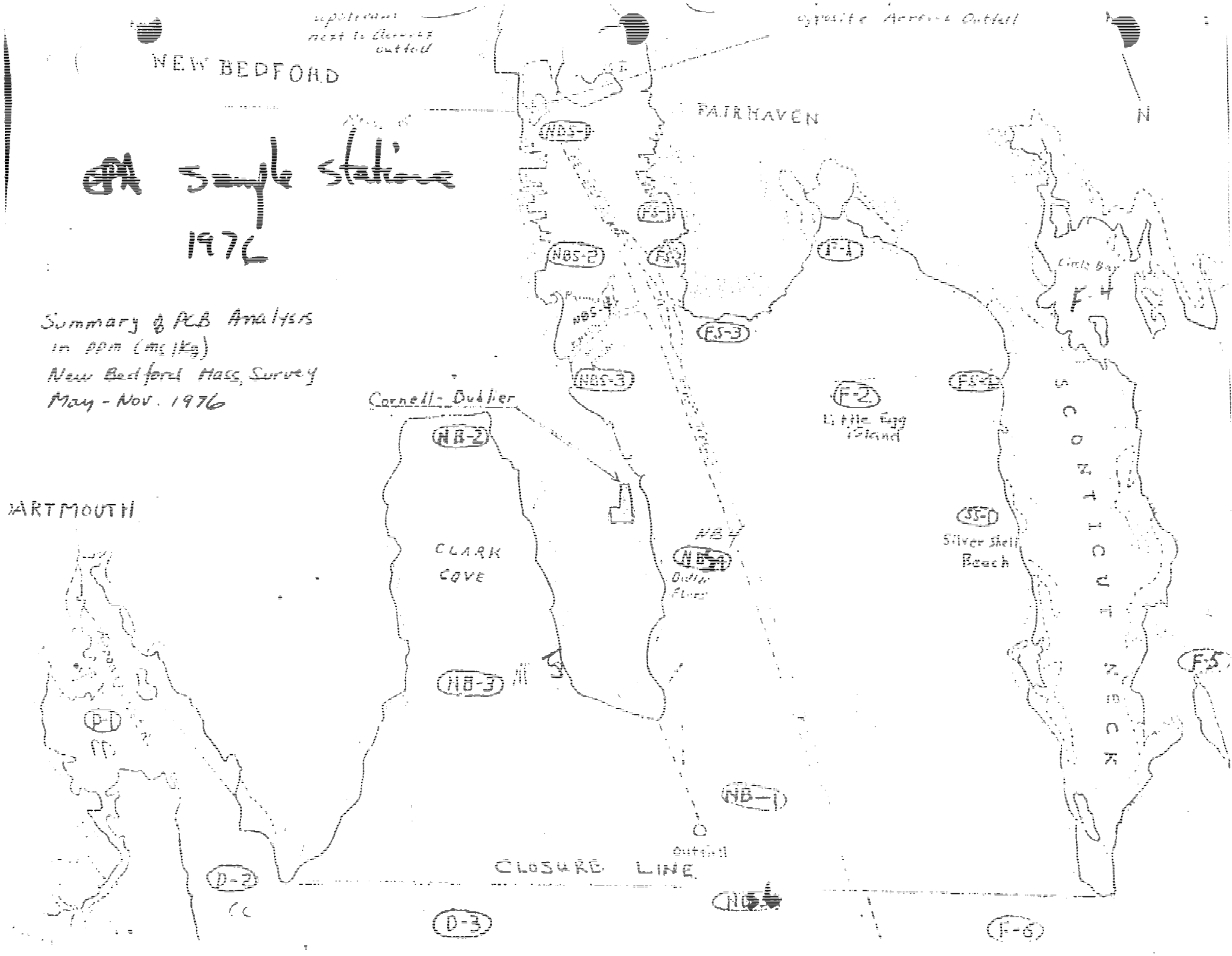
PCB Analysis Results of Lobsters
in
New Bedford, Massachusetts

Sample Location	Sample Code	Sample Date	Laboratory Results ppm* (mg/kg)
Butter Flats	B-1	5/6/77	8.2
Butter Flats	B-2	5/6/77	11.7
Fort Rodman	C-1	5/6/77	7.9
Fort Rodman	C-2	5/6/77	9.3
Egg Island	D-1	5/6/77	6.3
North Ledge	F-1	5/6/77	4.9
North Ledge	F-2	5/6/77	5.8

Pol 151

#1 - 5 ea
F-6 # 49

NOTE:
*PCB reported as mg/kg of 1254 in edible tissue, wet weight


Sample Stations
1976
Summary of PCB Analysis
in ppm (mg/Kg)
New Bedford Mass. Survey
May - Nov. 1976
upstream
next to Aerovox outfall
opposite Aerovox Outfall
NEW BEDFORD
FAIRHAVEN
N
NBS-1
NBS-2
NBS-3
NBS-4
FS-1
FS-2
FS-3
FS-4
F-1
F-2
Little Egg Island
F-4
Little Bay
SCONTICUT NECK
Cornell-Dubilier
NB-2
NB-3
NB-4
Dubin River
CLARK COVE
DARTMOUTH
P-1
D-2
D-3
NB-1
Outfall
CLOSURE LINE
SS-1
Silver Shell Beach
F-5
F-6

Ref 46

Info from EPA file obtained 5-7-81

SUMMARY OF PCB DATA

NEW BEDFORD, MASSACHUSETTS

Date Sampled	Type Sample	Station Description	PCB Value ppb	
		NEW BEDFORD MUNICIPAL WATER SUPPLY		
01/76	Water-grab	Little Quittacas Pond-raw	0.1	142
01/76	Water-grab	Little Quittacas Pond-finished	**N.D.	143

Little Quittacas Pond located in Rochester, Massachusetts, approximately 12 miles North of Aerovox.

Raw water samples taken by Aerovox and analyzed by Woodson-Tenent (6/11/75) showed 1.07 ppb PCBs. 144

		AEROVOX CORPORATION		
01/14/76	Water 8-hr. Comp.	Municipal water supply inlet at the plant	2.4	131
01/14/76	Water 8-hr. Comp.	North Trough Effluent to Acushnet River	51	129
01/15/76	Water 8-hr. Comp.	North Trough Effluent to Acushnet River	29	132
01/14/76	Water 8-hr. Comp.	Sanitary wastes at pump station discharging to WWTP*	400	130
01/15/76	Water 8-hr. Comp.	Sanitary wastes at pump station discharging to WWTP*	72	133
		CORNELL-DUBLIER		
01/14/76	Water-grab	Influent-public water supply in boiler room	**N.D.	135
01/16/76	Water-grab	Influent-public water supply in boiler room	**N.D.	134
01/14/76	Water-8hr. Comp.	Cooling water discharge to WWTP-South Moat	710	3-1
01/16/76	Water-8 hr. Comp.	Cooling water discharge to WWTP-South Moat	460	133

Date Sampled	Type Sample	Station Description	PCB Value ppb	
01/14/76	Water-8 hr. Comp.	Cooling water discharge to WWTP-North Moat	2,900	136
01/16/76	Water-8 hr. Comp.	Cooling water discharge to WWTP-North Moat	580	141
01/14/76	Water-4 hr. Comp.	Boiler room effluent discharge to Acushnet River	110	137
01/16/76	Water-4 hr. Comp.	Boiler room effluent discharge to Acushnet River	41	140
		NEW BEDFORD WWTP		
07/19/76	Water-grab	WWTP influent	106	145
07/19/76	Water-grab	WWTP effluent	119	146
03/26/76	Sludge-grab	Before incineration	73,600	147
04/76	Sludge-grab	Before incineration	30,800	148
		ACUSHNET RIVER		
05/10/76	Sediment-grab	Acushnet River, approximately 60 meters downstream of Aerovox effluent discharge	620,000	65
08/24/76	Soft shell clam	Acushnet River East Bank .3 km down stream of Aerovox effluent discharge	53,000	99
	Soft shell clam	Acushnet River East Bank 1.1 km downstream of Aerovox effluent discharge	21,000	100
	Soft shell clam	Acushnet River East Bank 1.8 km downstream of Aerovox effluent discharge	23,000	101
		NEW BEDFORD HARBOR		
05/10/76	Sediment-grab	New Bedford Harbor approximately 500 meters downstream of Cornell-Dubilier	143,000	62
05/10/76	Sediment-grab	Near WWTP outfall	500	63
05/10/76	Sediment-grab	Near abandoned WWTP outfall	1,900	64

Date Sampled	Type Sample	Station Description	PCB Value ppb
		NEW BEDFORD SANITARY LANDFILL	
3/26/76	Water-grab	Groundwater from monitoring well GW-1	N.D. 149
	Water-grab	Groundwater from monitoring well GW-2	1.0 150
	Water-grab	Groundwater from monitoring well GW-3	N.D. 151
	Water-grab	Groundwater from monitoring well GW-4	N.D. 152
	Leachate seep-grab	Seep from near well GW-3	10 153
	Soil-split	Sample from drilling of monitoring well GW-3 (0-7.5 ft.)	7,500 154
	Soil-split spoon	Sample from drilling of monitoring well GW-3 (15-17 ft.)	N.D. 155
	Soil-split spoon	Sample from drilling of monitoring well GW-3 (15-17 ft.)	N.D. 155A
		DARTMOUTH, MASSACHUSETTS MUNICIPAL WATER SUPPLY	
2/2/76	Water-grab	Gravel packed well-raw water	N.D. 156
2/2/76	Water-grab	Gravel packed well-raw water	N.D. 157

*WWTP-Wastewater treatment plant
**Not detected. This indicates that the PCB level was below the detection limit.

MIF # 129

Ref 46

PCB SURVEY

Table I

Station No.	Date Yr.	Mo.	Day	Time Hr. Min.	Sample No.	ppb Total PCB	MIF No
ATOX 01	76	01	14	8 hr. comp.	L2100	51	128
ATOX 02	76	01	14	8 hr. comp.	L2101	400	130
ATOX 03	76	01	14		L2102	2.4	131
ATOX 01	76	01	15	8 hr. comp.	L2103	29	132
ATOX 02	76	01	15	8 hr. comp.	L2104	12	133
● GDED 02	76	01	14	8 hr. comp.	L2125	710	134
● GDED 01	76	01	14	09 45	L2126	—	135
● GDED 04	76	01	14	8 hr. comp.	L2138	2900	136
● GDED 03	76	01	14	4 hr. comp.	L2139	110	137
● GDED 02	76	01	16	8 hr. comp.	L2127	460	138
● GDED 01	76	01	16	12 45	L2128	—	139
● GDED 03	76	01	16	4 hr. comp.	L2147	14	140
● GDED 04	76	01	16	8 hr. comp.	L2146	580	141
GBOS 05	76	01	21	8 hr. comp.	L2129	14	
GBOS 06	76	01	21	8 hr. comp.	L2130	10	
GBOS 05	76	01	21	8 hr. comp.	L2131	30	
GBOS 06	76	01	22	8 hr. comp.	L2132	4.3	
SCRU 01	76	01	22		L2133	9.1	
SCRU 02	76	01	22	15 20	L2134	9.7	
JARD 01	76	01	21	8 hr. comp.	L2113	270	
JARD 02	76	01	21	08 30	L2114	400	
JARD 03	76	01	21	08 40	L2115	19	
BENN 01	76	01	22	09 00	L2116	—	
JARD 01	76	01	22	8 hr. comp.	L2117	75	
SPRA 01	76	01	21	8 hr. comp.	L2105	120	
SPRA 02	76	01	21	13 15	L2106	14	
SPRA 01	76	01	22	8 hr. comp.	L2107	78	
UNIV 01	76	01	28	8 hr. comp.	L2211	13	
UNIV 02	76	01	28	8 hr. comp.	L2212	20	
UNIV 03	76	01	29	12 15	L2213	8.3	
UNIV 04	76	01	28	12 20	L2214	0.5	
UNIV 01	76	01	29	8 hr. comp.	L2215	17	
UNIV 02	76	01	29	8 hr. comp.	L2216	69	
SPRA 03	76	01	22	14 20	L2108	—	

(—) 10.5 ppb
</

TABLE 8

PCB Analysis Results
Lobsters

Sample Location	Sample Number	Sample Date	*Laboratory Results mg/kg (ppm)
Martha's Vineyard	543332	6/30/77	0.10
Cape Cod Canal	543337	7/11/77	0.32
	338		0.13
	339		0.06
	340		0.02
	341		0.05
Westport Coose Berry Neck	543342	7/28/77	0.04
	343		0.03
	344		0.03
	345		0.06
	346		0.02
	347		0.04
	348		0.70
Plymouth	543349	7/27/77	0.05
	350		0.01
	351		0.01

*PCB reported on wet weight basis, as Aroclor 1254

TABLE 9
PCB Analysis Results
Fish Samples

Sample Name	Sample Location	Sample No.	Sample Date	Laboratory Results (ppm) mg/kg Wet Wt. basis	Dry wt. basis
Blue Fish	Cape Cod Canal	--	10/7/77	1.2	4.7
Blue Fish	"	--	10/7/77	0.5	1.3
Blue Fish	"	--	10/7/77	0.6	2.0
Blue Fish	"	--	10/7/77	0.5	1.8
Blue Fish	Martha's Vineyard Vineyard Vineyard, S. Side	--	10/18/77	0.5	1.6
Blue Fish	Barnstable Sandy Neck	--	10/16/77	0.4	1.3
Blue Fish	Cape Cod Bay	--	8/77	0.9	2.2
Blue Fish	Martha's Vineyard Vineyard Vineyard, S. Side	--	10/18/77	1.2	4.8
Striped Bass MSA	--	F-61	10/26/77	0.5	1.9
Striped Bass	--	F-62	10/26/77	0.5	1.8
Striped Bass	--	F-63	10/26/77	0.1	0.3
Striped Bass	--	F-64	10/26/77	0.4	1.6
Striped Bass	--	F-65	10/26/77	0.3	1.0
Striped Bass	--	F-66	10/26/77	0.1	0.4
Striped Bass	--	F-67	10/26/77	0.1	0.3

Ref # 49

PCB Analysis.

Results of samples taken in New Bedford Harbor and Barnards Bay analyzed by Massachusetts State and U.S. Federal labs.

Sediment				Aroclor 1254, 10^{-6} g/g Dry Wt. Laboratory*					
Date	Sample	Location	Site	C.C.	L.E.S.	E.P.A.	F.D.A.	W.H.O.I.	S.M.U.
5/10/76	Sediment (Composite Grab)	Acushnet River	ABS-10	---		620			
			MBS-4	---		140			
			MBS-5	---		2			
			MBS-6	---		0.5			
9/23/76	" "	" "	E	85		67			
			GG	88		75			
			J	18		61			
			DD	23		22			
9/23/76		Outer Harbor	K	0.5		78			
			LL	---		6			
			JJ	0.16		0.1			
5/10/76	Cores Avg. 0-8 cm	Acushnet River Inner Harbor	1		9.0				
			2		3.0				
			3		3.5				
			4		4.6				
			5		5.9				
			6		5.1				
			7		16.0				
			8		17.1				
			9		13.6				
			10		2.4				
			11		4.5				
			12		5.3				
			12A		9.8				
			13		8.6				
			14		2.7				
			15		7.2				
			16		7.0				
			17		7.9				
			19		7.4				
			20		5.2				
		Outer Harbor	22		7.2				
			22A		7.6				
			23		0.4				
	Sediment Grab	Outer Harbor	---					8.4	
	Core 0-4 cm	" "	23					0.2/0.3"	
	Composite Grab	Barnards Bay	14 Stn.						0.077

*Results indicate 10^{-6} g/g dry wt. of Aroclor 1242/1254.

Laboratory Identification:

C.C. -- Massachusetts Division of Marine Fisheries, Cat Cove Marine Laboratory.

L.E.S. -- Massachusetts Department of Environmental Quality Engineering, Lawrence Experimental Station.

E.P.A. -- U.S. Environmental Protection Agency, Florida Lab.

F.D.A. -- U.S. Food & Drug Administration, Boston Lab.

W.H.O.I. -- Woods Hole Oceanographic Institution.

S.M.U. -- Southeastern Massachusetts University.

PCB Analysis.

Results of samples taken in New Bedford Harbor and Buzzards Bay analyzed by Massachusetts State and U.S. Federal Labs.

Shellfish				Aroclor 1254, 10^{-6} g/g Wet Wt. Laboratory					
Date	Sample	Location	Site	G.C.	L.T.S.	E.P.A.	F.D.A.	U.M.D.E.	S.M.U.
						Wet			
9/23/76	M. arenaria (clam)	New Bedford Inner Harbor	D			33			
			B			31			
9/23/76	M. mercenaria (quahog)		P			23			
			MM	1.3					
8/15/79	M. arenaria (clam)		P	13					
8/15/79	C. virginica (oyster)		MM	14					
	M. mercenaria		MM	1.6					
				Wet	Dry	Dry	Wet		
9/23/76	M. mercenaria (quahog)	Outer Harbor	DD	0.2	1.3	3.1	0.2		
			CC	0.17	1.2	3.5	0.2		
			AA	0.47	3.4	5.0	—		
			Q	1.30					
			Z	0.35					
			Y	0.72					
			V	1.81					
			W	0.41					
			X	0.44					
			KK	0.70					
			JJ	3.5					
			OO	0.06					
			PP	0.06					
			HH	0.32					
3/11/78	" "	Buzzards Bay (Bass Hap)	1						0.5
			2						0.2
			3					0.2/0.2*	0.2
			4						0.05
			5						0.2
			6						0.2
			7						0.04
			8						0.08
			9						0.07
			10					0.03/0.03*	0.03
			11						0.13
			12						0.11
			13						0.[illegible]
3/11/78	C. virginica	" "	14						0.07
			15						0.3
			16						0.3
			17						0.2
5/22/78	M. mercenaria		D		0.22				
			L		0.17				
					0.46				
10/2/78	M. edulis (mussel)		LL					16.0/15.0*	
9/9/79	M. mercenaria		CC	0.5					
			Z	1.1					
8/16/79			LL	0.3					
			R	0.5					
			JJ	0.8					
9/25/76	M. edulis	Cape Cod Canal	R.R. Bridge					0.03	
7/19/77		" "	" "					0.03	
10/11/78		Vineyard Sound	Gay Head					0.01	
10/26/78		" "	" "					0.01	
7/28/79		" "	" "					0.01	
7/26/79		" "	" "					0.01	
12/05/79		Georg Bank	Harbor					.012/.040*	
			W. end pebl.					.002/.007*	
3/20/78	A. irradians (scallops)	Cleveland Ledge						0.02/0.03*	

*PCB analysis indicates 10^{-6} g/g wet weight of Aroclor 1242/1254.

PCB Analysis.

Results of samples taken in New Bedford Harbor and Buzzards Bay analyzed by Massachusetts State and U.S. Federal labs.

Date	Crustacea: Sample	Location	Site	Aroclor 1254, 10^{-6} g/g Wet Wt. Laboratory: C.C.	L.E.S.	E.P.A.	F.D.A.	W.H.O.I.	S.M.U.
9/23/79	C. Sapidus (blue crab)	New Bedford Inner Harbor	G	3.6					
			A,B,C			1.0			
8/23/79		" "	H	4.3					
9/23/76	H. americanus (lobster)	New Bedford Outer Harbor	HH	2.6					
			U tail	3.4					
			claw	13.0					
			viscera	17.0					
11/1/76			U tail		7.4				
			claw		16.0				
			viscera		27.0				
11/2/76			T		0.9				
3/14/77			T		1.2				
			S		2.2				
			HH		2.1				
3/16/77			P		1.0				
3/18/77			R		3.1				
3/29/77			P		11.0				
			R		16.0				
5/1/77			R	8.2					
				12.0					
			T	7.9					
				9.3					
			S	6.3					
			HH	4.9					
				3.8					
				0.4					
				0.5					
			CC	0.3					
			AA	0.1					
7/6/78			R	4.7					
			S	1.7					
				2.2					
				5.4					
				1.5					
				1.4					
				2.0					
			T	1.7					
				1.4					
				1.4					
				1.7					
				1.7					
				9.0					
				2.7					
				2.7					
				1.0					
				1.4					
				2.5					
7/9/79			T tail					2.2	
			viscera					86	
			tail					1.0	
			viscera					43	
8/8/79			I				68		
			S				15		
8/14/79			HH				12		
							12		
8/16/79			Q				24		
							30		
							31		
							30		
			K				63		
10/5/79			RR				37		
							11		
			SS				2.9		
			TT				9.4		
			UU				2.3		
			VV				10.0		
			WW				35		
10/19/79			XX				20		
							8.3		
							6.3		
			UU				15		
							7.5		
							6.0		
			SS				6.7		
10/31/79			LLL				7.9		
			MMM				5.0		
			TT				4.9		
			JJJ	6.1	8.5		11		
			KKK	5.5	4.8		7.1		
			ZZ	2.7	3.3		3.8		

Ref 45

(Continued)

PCB Analysis -- Crustacea (Continued)

Crustacea				Aroclor 1254, 10^{-6} g/g Wet Wt. Laboratory					
Date	Sample	Location	Size	C.C.	L.E.S.	E.P.A.	F.D.A.	N.R.C.I.	S.M.U.
7/9/79	*H. taxona* (crab)	Outer Harbor	T					1.4	
	L. pealic (squid)		T					1.5	
5/23/77		Nantucket Sound	Hopscat Bk.		0.02				
5/25/77			Horseshoe Shoal		0.30				
6/30/77	*H. americanus*	Martha's Vineyard	Battbery		0.10				
7/12/77		Cape Cod Canal	Stn. # 3		0.32				
					0.13				
					0.06				
					0.02				
					0.05				
7/27/77		Plymouth	Rocky Point		0.05				
					0.01				
					0.01				
7/28/77		Westport	Gooseberry Neck		0.04				
					0.03				
					0.03				
					0.06				
					0.02				
					0.04				
					0.07				

PCB Analysis.

Results of samples taken in New Bedford Harbor and Buzzards Bay analyzed by Massachusetts State and U.S. Federal Labs.

Ground Fish				Aroclor 1254, 10^{-6} g/g Wet Wt. Laboratory					
Date	Sample	Location	Site	G.C.	L.H.S.	T.P.A.	F.D.A.	M.B.O.I.	S.M.U.
9/23/76	P. americanus (winter flounder)	New Bedford Inner Harbor	G				10.0		
			G	6.0					
			I	13.0					
11/2/76			I		32				
9/23/76	P. dentatus (flatfish)		I	10.0					
11/2/76			I		22				
9/23/76	A. rostratus (eel)		A,B,C			92.0			
7/10/79			A	140					
				460					
				730					
				470					
				430					
				430					
				570					
				240					
8/22/79			A	33					
				11					
				18					
			F	14					
8/16/79	P. americanus		G	12					
				11					
8/23/79			HH	8.1					
				2.1					
	S. aquosus (windowpane flounder)		HH	5.5					
				14.3					
				8.8					
	S. chrysops (scup)		HH	10.0					
9/23/76	P. americanus	Outer Harbor	LL	5.6					
			EE	2.6					
			BB	11.0					
			FF	11.0					
			GG	5.8					
	P. dentatus		U	7.9					
			L	7.1					
	P. triacanthus (butterfish)		QQ	0.30					
			PP	0.07					
	T. adspersus (cunner)		U	20					
	S. chrysops (scup)		R	6.1					
			II	11.0					
	T. onitis (tautog)		II	11.0					
11/1/76	P. americanus			7.6					
			EE	3.9					
			FF	20					
				19					
	P. dentatus		U	16					
			L	21					
			I	22					
11/2/76	P. triacanthus		QQ		0.70				
			PP		0.90				
11/1/76	T. adspersus		U		57.0				
7/9/79	P. americanus		T					4.0	
7/10/79			LL	7.5					
				8.0					
10/30/79			CC	1.6					
			CCC	0.9					
			DDD	0.8					
			EEE	0.6					
			FFF	0.5					
11/5/79			BBB	0.2					
			FFF	0.5					
			GGG	0.8					
			HHH	1.0					
				0.2					
7/9/79	S. aquosus		T					6.5	
10/30/79			EEE	3.1				3.6	
			FFF	3.7					
7/10/79	P. dentatus		L		21				
			Y	0.2					

(Continued)

[illegible]ysis — Ground Fish (Continued)

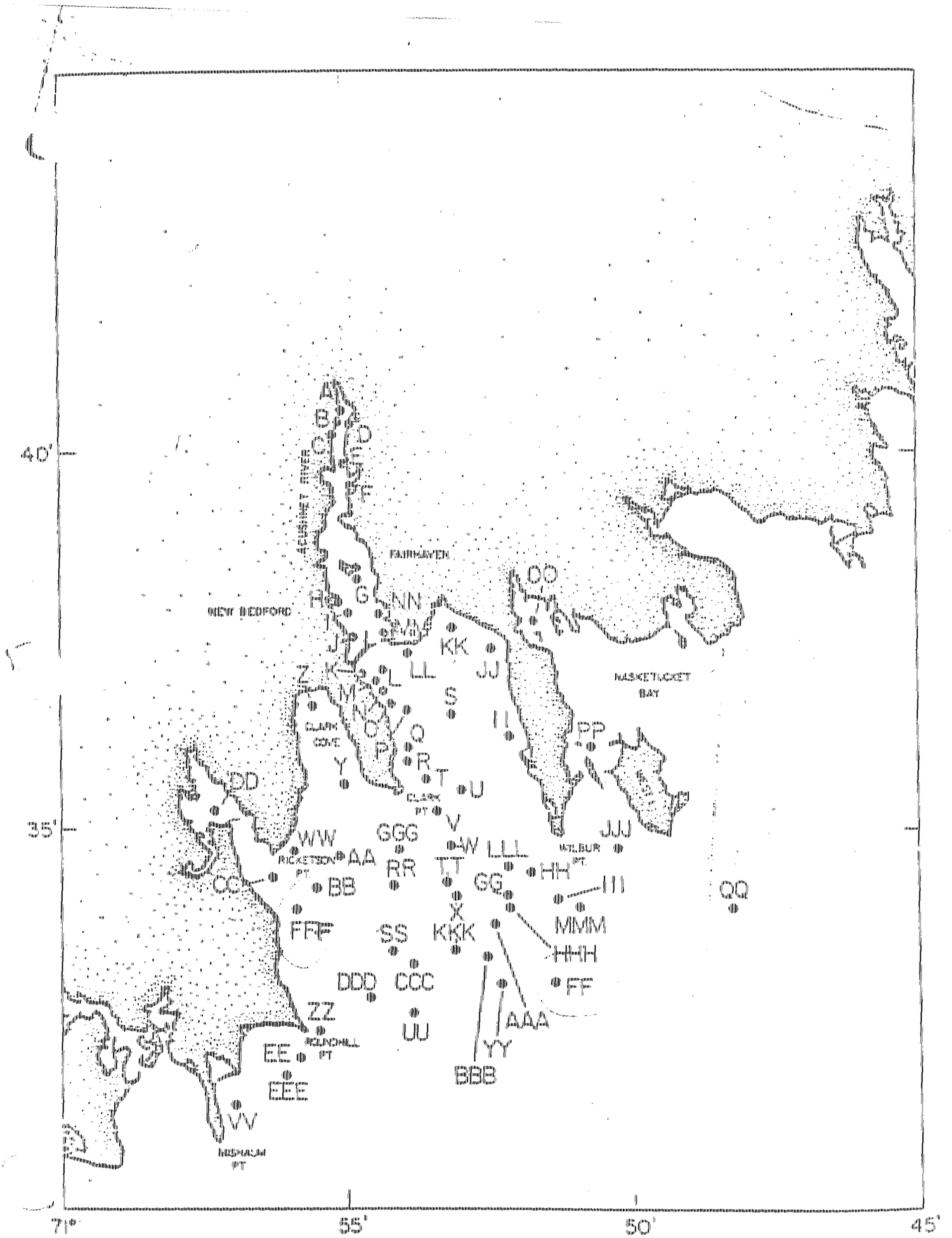
Ground Fish				Aroclor 1254, 10^{-6} g/g Wet Wt. Laboratory					
Date	Sample	Location	Site	C.C.	L.E.S.	E.P.A.	F.D.A.	W.H.O.I.	S.M.U.
7/10/79	*A. rostrata*	Outer Harbor	Q	18					
			R	14					
				24					
				24	41				
				18					
7/26/79			P	12					
7/9/79	*M. cuala* (dogfish)		T					0.25	
7/9/79	*S. chrysops* (scup)		T					2.4	
								2.3	
11/5/79			III	1.3					
7/10/79	*T. onitis* (tautog)		S	1.3					
			LL	2.1					
				1.3					
10/30/79			AAA	0.3					
				0.8					
				0.1					
5/31/77	*P. americanus*	Buzzards Bay	Cleveland Ledge		0.03				
			Kettle Cove		0.06				
5/23/77	*P. dentatus*		Stony Point Dike		0.01				
			Kettle Cove		0.01				
	S. aquosus		Gosnold Rock		0.01				
	S. chrysops		Cleveland Ledge		0.01				
			Kettle Cove		0.15				
	P. chlorops		Cleveland Ledge		0.01				
	T. onitis		Cleveland Ledge		0.12				
	P. carolinus		Kettle Cove		0.04				
	L. erinacea		Kettle Cove		0.11				
5/26/77	*P. americanus*	Nantucket Sound	Horseshoe Shoal		0.02				
	P. dentatus		" "		0.04				
6/21/79	*P. americanus*	Westport River	Hoppy					0.10	
			Hart Branch					0.02	

PCB Analysis.

Results of samples taken in New Bedford Harbor and Buzzards Bay analyzed by Massachusetts State and U.S. Federal Labs.

Blue Fish				Aroclor 1254, 10^{-6} g/g Wet Wt. Laboratory					
Date	Sample	Location	Site	C.C.	L.E.S.	E.P.A.	F.D.A.	W.H.O.I.	S.M.U.
5/21/77	P. pelatrix	New Bedford Outer Harbor	HK	1.0	0.5				
				1.8	0.35				
			HK	0.2					
				0.2					
				0.9					
				0.2					
				0.3					
8/30/79			S	17					
				1.4					
10/2/77		Cape Cod Canal		1.2					
				0.5					
				0.6					
				0.5					
7/25/79				1.3					
				1.2					
8/7/79				0.64					
8/14/79				0.70					
8/10/77		Cape Cod Bay		0.93					
				0.86					
7/27/79				1.0					
8/10/79				0.63					
				0.37					
				0.42					
8/26/79				0.50					
				0.53					
				0.80					
				0.68					
10/16/77		Nantucket Sound		0.40					
10/18/77				0.50					
				1.2					
7/24/79				0.83					
8/6/79		Provincetown		0.89					

Striped Bass				Aroclor 1254, 10^{-6} g/g Wet Wt. Laboratory					
	Sample	Location	Site	C.C.	L.E.S.	E.P.A.	F.D.A.	W.H.O.I.	S.M.U.
4/28/77	M. saxatilis	New Bedford Outer Harbor	HK	0.4	0.11				
5/5/77			HK	0.5	0.21				
5/6/77			HK	1.0	1.4				
5/23/77			S	2.7	1.3				
10/26/77		Cape Cod Canal	Near Maritime	0.5					
				0.5					
				0.1					
				0.4					
				0.3					
				0.1					
				0.1					
8/1/77		Cape Cod Bay Provincetown		0.5					
			Tissue	1.3					
			Viscera	1.1					
			Tissue	0.5					
			Viscera	1.2					
			Tissue	0.5					
			Viscera	1.4					
10/28/77		Nantucket Sound		0.3					
7/5/79		Pleasant Bay		0.34					
				0.53					
				0.29					
				0.24					
				0.24					
7/8/79		Cape Cod Canal		0.2					
7/17/79				0.43					
8/9/79				0.37					
8/10/79				0.52					
8/6/79		Provincetown		0.22					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35'
71°
55'
50'
45'
NEW BEDFORD
FAIRHAVEN
MUSKETUQUIT BAY
CLARK COVE
CLARK PT
WILBUR PT
RICKETSON PT
MENDHILL PT
MISHAUM PT
A
B
C
D
E
F
G
H
J
K
L
M
N
O
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AA
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CC
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LL
MM
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OO
PP
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RR
SS
TT
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BBB
CCC
DDD
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GGG
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III
JJJ
KKK
LLL
MMM

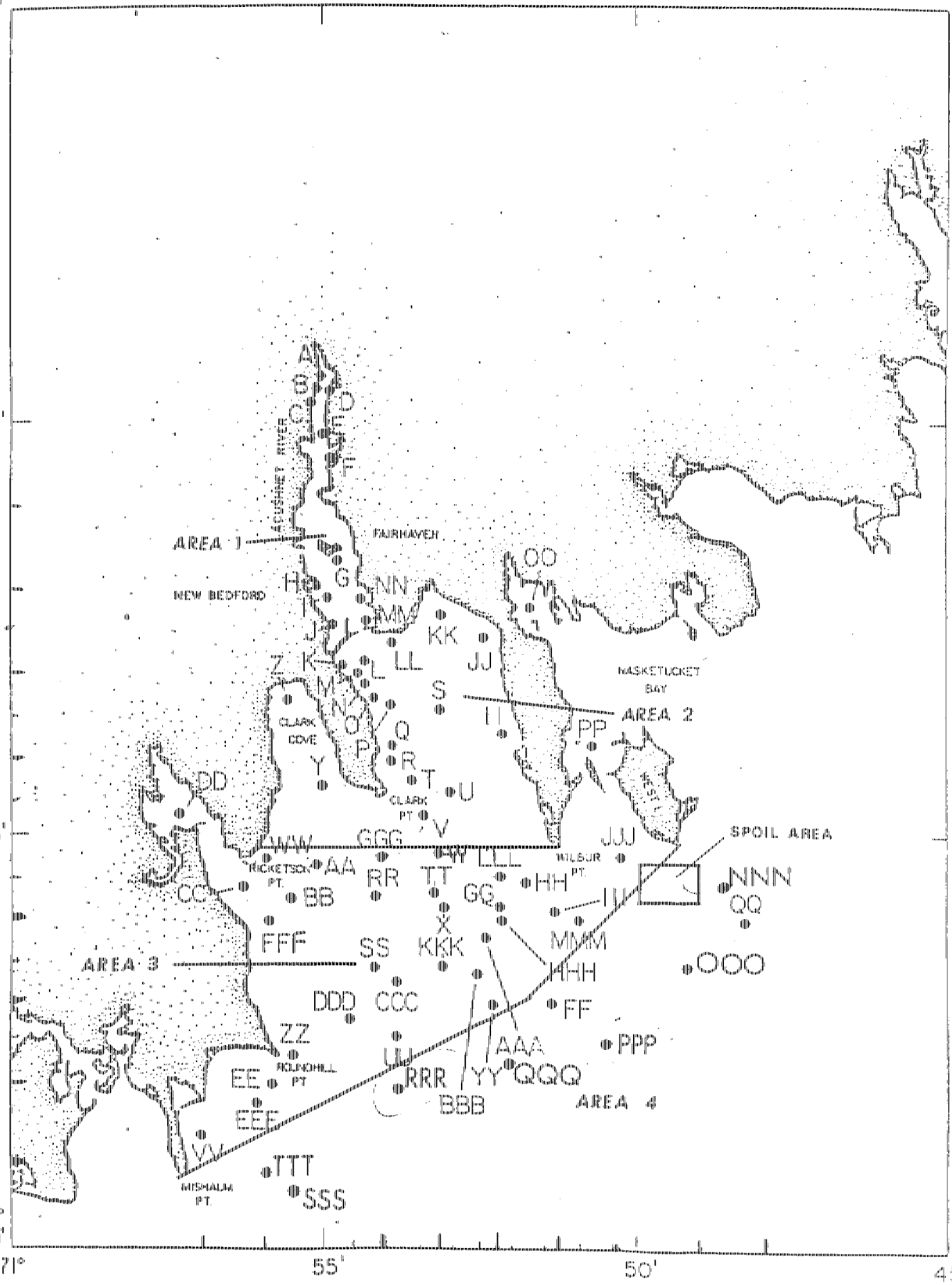
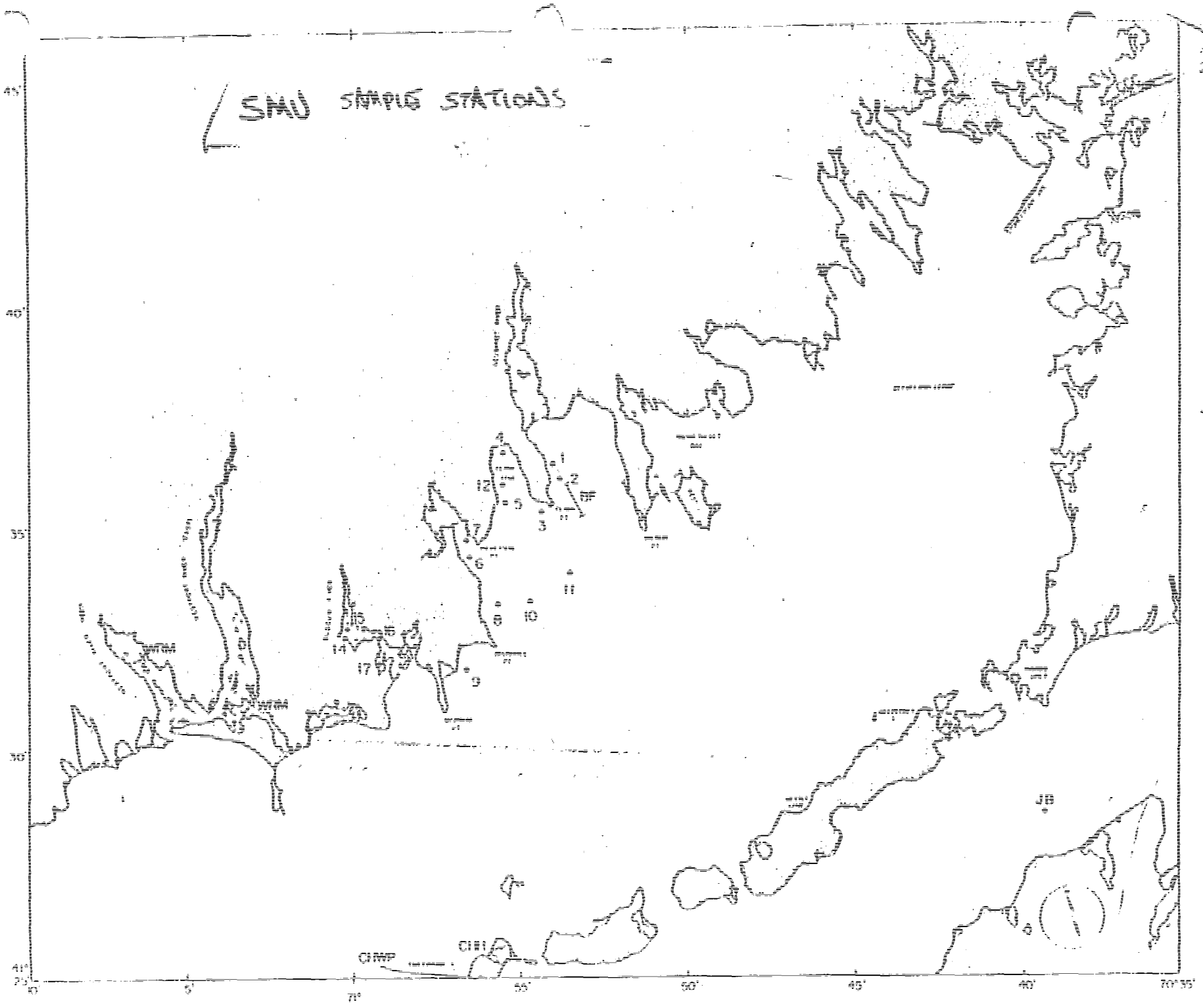
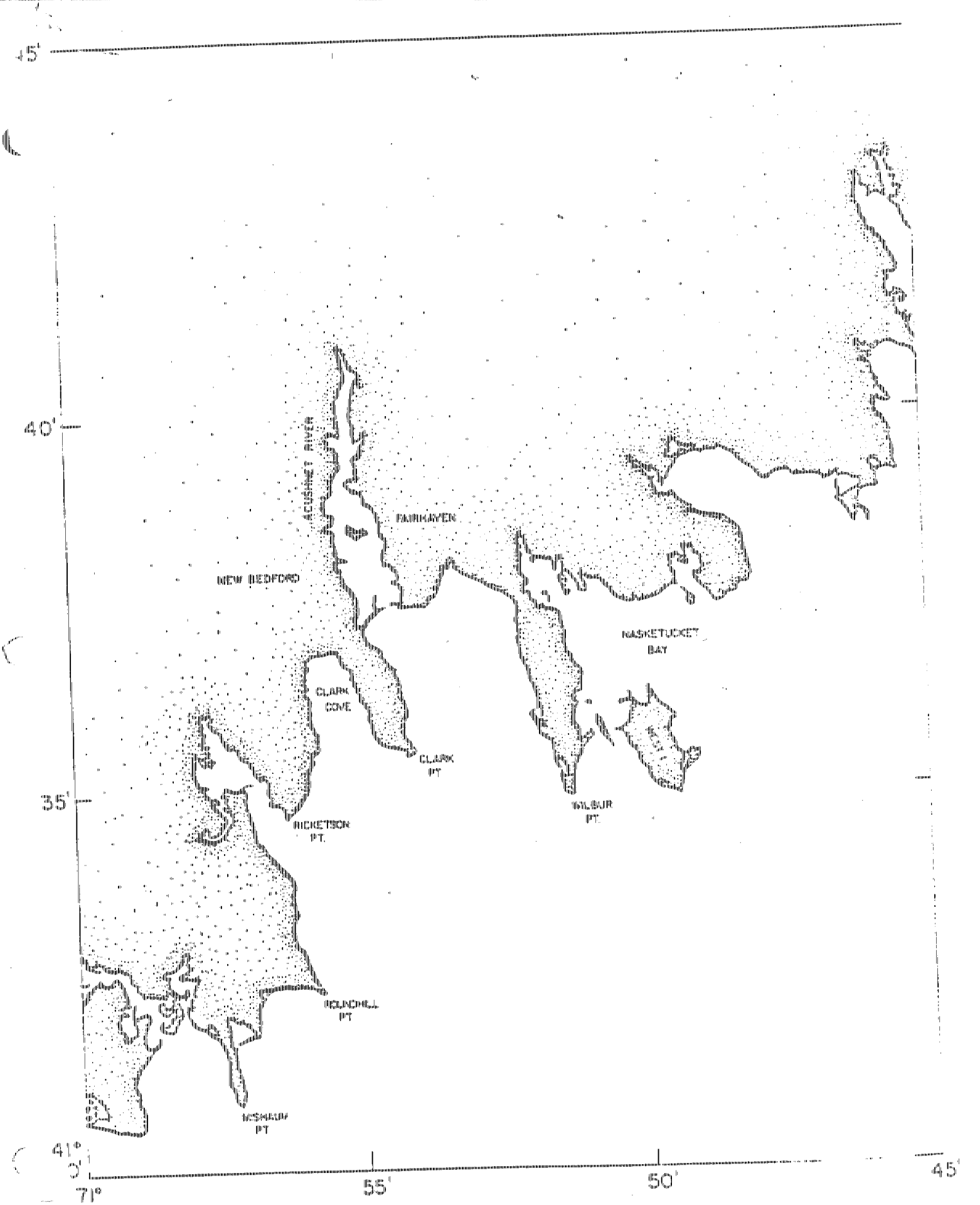


Figure 3. Study area and sampling sites.

DMF stations


SMU SAMPLING STATIONS
CIMP
CIHU
JB
WM
WM
70°35'
40'
45'
50'
55'
70°
5'
10'
35'
30'
25'
41°


45'
40'
35'
41°
3'
71°
55'
50'
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HUDDELL
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HISCOCK
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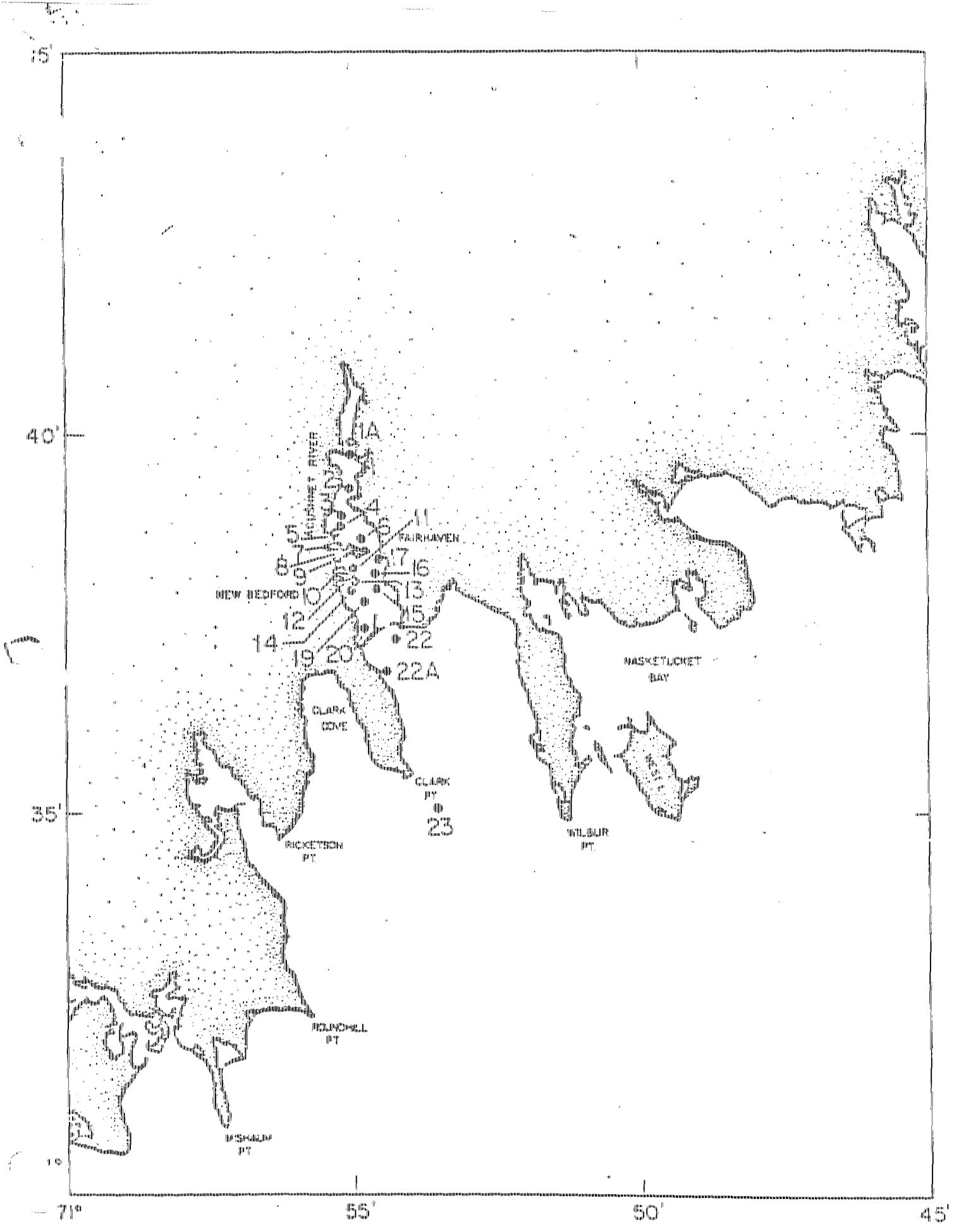
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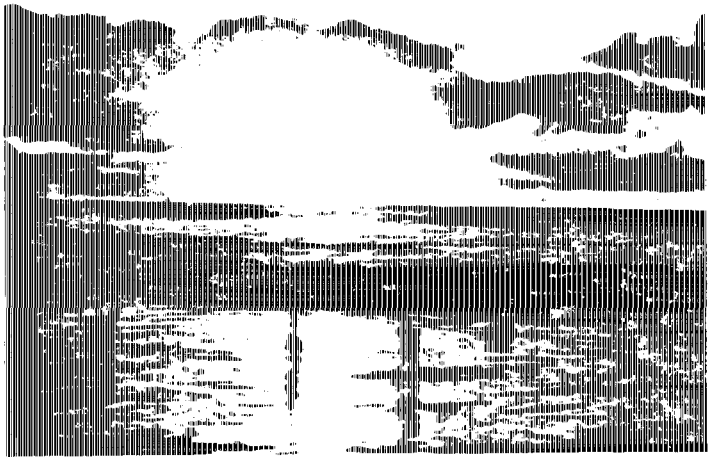
Ref 53

1979-1980 Annual Sea Grant Report Woods Hole Oceanographic Institution



WOODS HOLE OCEANOGRAPHIC INSTITUTION 50 1930 - 1980

Ref #3

Chemical Processes and Pollution

Biogeochemistry of PCBs in New Bedford Harbor and Buzzards Bay, Massachusetts

John W. Farrington, Alan C. Davis, Department of Biology
Jacek Sulanowski, Bridgewater State College

The New Bedford Harbor region is severely polluted with polychlorinated biphenyls (PCBs) — presumably as a result of discharges from electrical component manufacturers in the area. During 1974 and 1975 this problem was recognized, serendipitously, when the late Dr. Max Blumer and colleagues of the Woods Hole Oceanographic Institution analyzed a few sediment samples from the harbor for aromatic hydrocarbons. PCB concentrations were so high that they interfered with aromatic hydrocarbon analyses — a rare phenomena at that time for the New England region. Between 1976 and 1979 surveys of the PCBs in sediments and biota by the then Massachusetts Department of Environmental Quality Engineering, the Massachusetts Division of Fisheries and U.S. Environmental Protection Agency contractors led to the realization that the problem was severe. Figure 1 shows the harbor area and indicates the area closed to the taking of lobsters in 1979 and 1980 due to the fact that PCB concentrations in lobsters in that area exceed 5 ppm (parts per million) wet weight. The Massachusetts Department of Health issued a closure order for the area based on the U.S. Food and Drug Administration's recommendation of a limit of no more than 5 ppm in food.

During that same period our rasearch into the biogeochemistry of pollutant organic compounds and in particular the use of bivalves as sentinel organisms in pollution monitoring led us to approach the state agencies to stimulate an in-depth look at the problem. Limited funds and manpower and a broad range of environmental quality problems had severely taxed the resources of the state agencies. They personally could not research the problem of PCB pollution in that area in depth and thus we took on the task of conducting the research into the biogeochemistry of PCBs in this area.

Our objectives were and still are to:

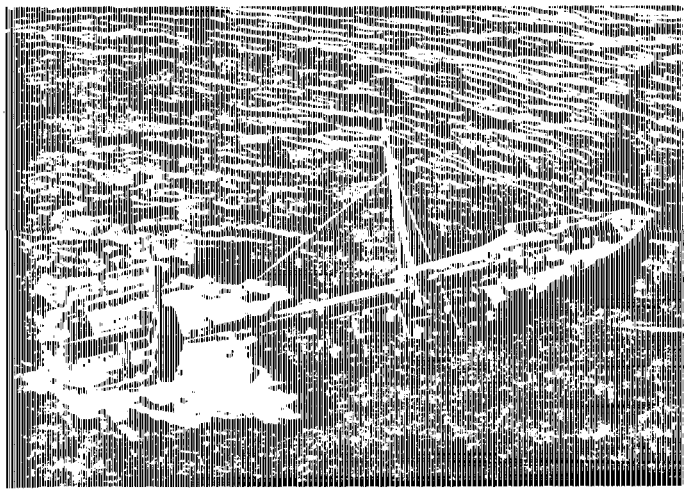
(1) Assess the present state of knowledge of PCB pollution of New Bedford Harbor and Buzzards Bay, Massachusetts.

a. Act as initial coordinating influence to bring together federal, state, city, industrial and university efforts.

b. Assemble and assess available data within the present knowledge of PCB biogeochemistry in coastal areas.

(2) Conduct high resolution trace analyses of selected fish, shellfish, sediment, and suspended particulate samples to more clearly define PCB isomer patterns and to measure polychlorinated dibenzodioxins and polychlorinated dibenzofurans.

(3) Design an effective biogeochemical research and monitoring program for New Bedford Harbor and Buzzards Bay, Massachusetts which will involve federal, state, and local scientists.



Oil tanker *Ocean Eagle* aground in San Juan Harbor. Photograph courtesy U.S. Coast Guard.

We coordinated a workshop in February 1980 which brought together the Massachusetts agencies, federal agencies, several local and state college and university faculty, environmental consulting companies and some local environmental groups to discuss the biological, chemical, geological and physical oceanographic aspects of the problem. Some of the PCB data we compiled from existing data files given to us by participants are given in Table 1. We are now preparing the final draft of the report from the workshop. We have also participated in several meetings of a local steering committee dealing with this problem from the economic, scientific and technical engineering level and convened by State Representative Roger Goyette.

A subset of our own analyses of samples

TABLE 1

PCB Analysis Results of Lobsters, Shellfish, and Fish in New Bedford, Massachusetts and Western Buzzards Bay

Sample Location	Sample Type	Sample Code	Sample Date	Laboratory Results*
New Bedford Harbor Butter Flats	Lobster	B-1	5/6/77	8.2
Butter Flats	Lobster	B-2	5/6/77	11.7
Fort Rodman	Lobster	C-1	5/6/77	7.9
Fort Rodman	Lobster	C-2	5/6/77	9.3
Egg Island	Lobster	D-1	5/6/77	6.3
North Ledge	Lobster	F-1	5/6/77	4.9
North Ledge	Lobster	F-2	5/6/77	5.8
Clark Point	Shellfish	NB-1	5/77-11/77	1.3
Sewage Outfall	Shellfish	NB-2	5/77-11/77	0.35
Clark Cove	Shellfish	NB-3	5/77-11/77	0.72
Butter Flats	Shellfish	NB-4	5/77-11/77	1.81
Buzzards Bay	Shellfish	NB-5	5/77-11/77	0.41
Buzzards Bay	Shellfish	NB-6	5/77-11/77	0.44
New Bedford Harbor	Blackback Flounder-Fillet	None	5/77-11/77	10.1
New Bedford Harbor	Blackback Flounder-Fillet	None	5/77-11/77	19.0
Fairhaven	Blackback Flounder-Fillet	None	5/77-11/77	7.6
Dartmouth	Blackback Flounder-Fillet	None	5/77-11/77	3.9
Dartmouth	Blackback Flounder-Fillet	None	5/77-11/77	20.0

*PCB reported as mg/kg of 1254 in edible tissue — wet weight

from the harbor area are given in Table 2. We have used high resolution glass capillary gas chromatography (GC/GC) and GC/GC-mass spectrometry to make many of our measurements. Two important findings have already been forthcoming. First, a substantial portion of the PCBs in the sediments and several organisms are the 1016 and/or 1242 mixture. Thus, the concentration estimates by the U.S. EPA contractors and state agencies were low in many cases by as much as a factor of two or more, because they used state of the art routine monitoring analytical methods which measured only 1254.

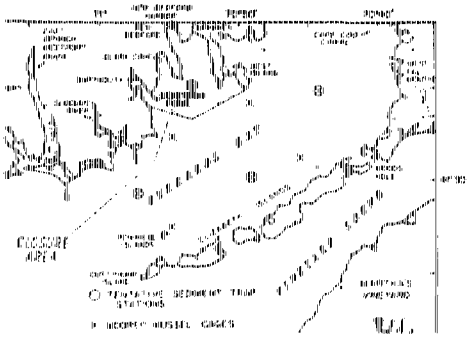


Figure 1.

The second important finding concerns the composition of PCBs in several species of organisms. There is a marked difference in composition when comparing species caught in the same area as illustrated in Figure 2.

We are now pursuing further research into the implications of these data. How can they be used to better understand the processes acting on PCBs in the various components of this ecosystem given the observed distributions. We have set out moored mussel cages to monitor the extent of movement of PCBs from the harbor into Buzzards Bay. Sediment trap, suspended particulate matter, and dissolved PCB measurements for areas of the harbor and Buzzards Bay are planned for the fall, winter and spring of 1980-1981.

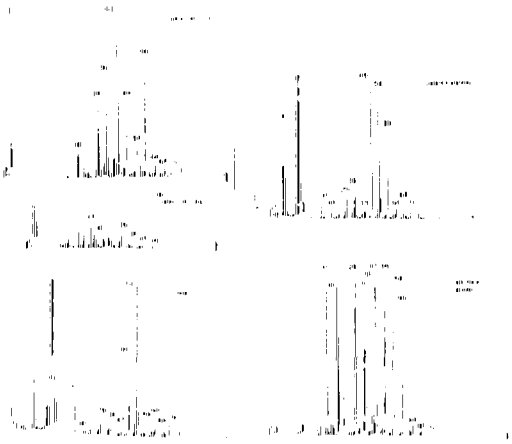


Figure 2. Glass capillary gas chromatograms (electron capture detector) of commercial PCB mixtures and PCB's in selected biota from the New Bedford Harbor area. Numbered peaks correspond to the same compound(s) in each sample.

TABLE 2

Concentrations of PCBs in Organisms and Sediments from New Bedford Harbor and Adjacent Areas of Buzzards Bay, Massachusetts — 1979 Analyses (Farrington and Davis et al.)

Species		Wet Weight	Dry Weight
New Bedford (sampled 7/9/79)			
Outer Harbor, Butler's Flat light			
Parallel with channel or S.E. coast (10^{-6} g, 1254 PCB/g)			
Homarus americanus (lobster)			
Lobster A Muscle		2.2	12.2
Tomale		84	500
Lobster B Muscle		1.0	5.8
Tomale		43	250
Lepropsetta maculata tissue (sand flounder), edible flesh			
3 each (20-28 cm) large	A[a]	7.0	39
	B	6.0	33
3 each (12-15 cm) small	A[a]	3.6	18
	B	3.3	17
Pseudopleuronectes americanus tissue (winter flounder, blackback)			
6 each (15-49 cm)	A[a]	4.0	18
	B	4.1	18
Stenotomus versicolor tissue (scup)			
3 each (16-24 cm) large	A[a]	2.5	11
	B	2.2	9.9
Mustelus canis tissue (doglish)			
2 each (35, 33 cm)	A[a]	0.25	1.3
	B	0.24	1.2
Porontus tracanthus tissue (butterfish)			
45 each, small (approx. 8-10 cm)	A[a]	1.8	8.9
	B	1.6	7.8
Tautogolabrus adspersus tissue (cunner)			
11 each	A[a]	2.3	10.4
	B	2.2	10.1
Neopanopeus texana whole (crab)			
16 each		1.4	7
Loligo pealei whole (squid)			
3 each	A[a]	1.3	Not
	B	1.1	Measured
Westport River, Sampled April 21-29, 1979			
Pseudopleuronectes americanus (blackback, winter flounder)			
	A	.102	Not
	B	.089	Measured
New Bedford Harbor			
Mytilus edulis (10/2/78)		Wet	Dry
(218 homogenized), 10^{-6} g/g		1242 / 1254	1242 / 1254
Duplicates	A	1.8 / 1.7	16.6 / 15.7
	B	1.7 / 1.6	15.6 / 14.8
Mercenaria mercenaria (3/11/78) (from Hatch et al., 1980)			
Station 3		Not Measured	1.59 / 1.46
Station 10			0.22 / 0.20
Buzzards Bay Station B, C.			
0-1 cm sediment		1.8×10^{-9} g 1254 PCB/g dry weight	
Mixed polychaetes		62.8×10^{-9} g/g wet weight	
Nephtys incisa (polychaete)		44.4×10^{-9} g/g wet weight	

[a] Duplicate analyses of homogenized samples of the number of individuals indicated

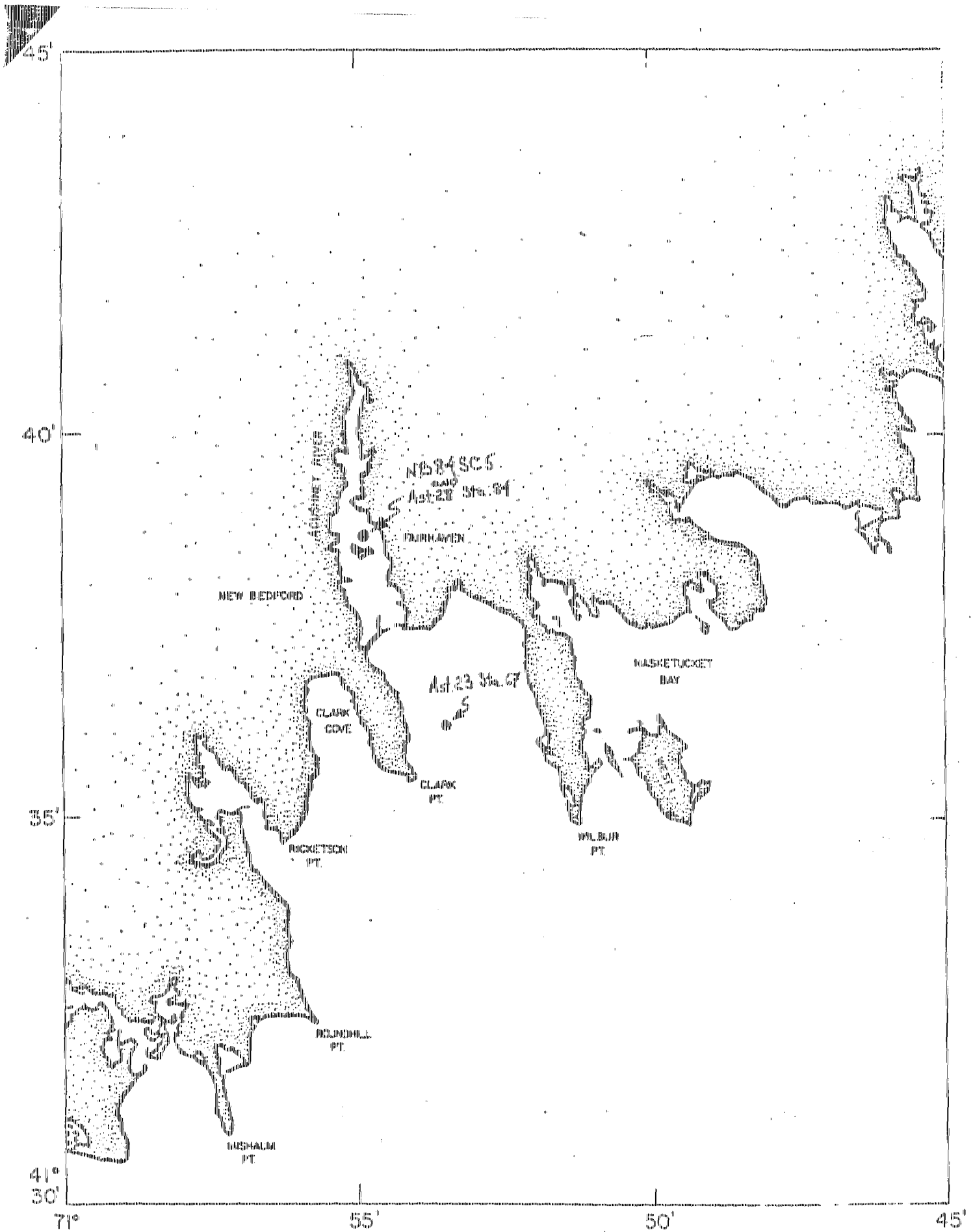
Table I. PCB Analysis of New Bedford Harbor Sediments

Inner Harbor

Sample No.	Depth Interval (cm)		ppm Dry Weight 1254	ppm Dry Weight 1242(1016)	ppm Wet Weight 1254	ppm Wet Weight 1242(1016)
NB 84SC5	0-2	175	48.55	126.58	18.50	48.22
"	2-4	260	65.23	194.71	25.25	75.38
"	4-6	275	72.55	202.86	29.41	82.24
"	6-8	193	46.30	146.90	18.52	58.76
"	14-16	104	28.10	75.52	12.59	33.84
"	20-22	37	9.67	27.56	4.84	13.78
Ast. 28 Sta. 84	0-4	130	25.68	104.69	9.07	36.96
"	4-8	179	41.43	137.98	15.24	50.78
"	0-4 (Reex)	1	0.47	0.72	0.17	0.25

Outer Harbor

Ast. 23 Sta.67 #2	0-4	15	3.20	11.58	1.37	4.94


45'
40'
35'
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30'
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55'
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NB84SC6
Ast-28 Sta. 84
FAIRHAVEN
NEW BEDFORD
Ast 23 Sta. 67
MUSKETUCKET
BAY
CLARK
COVE
CLARK
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PICKETSON
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DILLIBUR
PT.
ROBBINS
PT.
MISHAUM
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FIGURE 1.

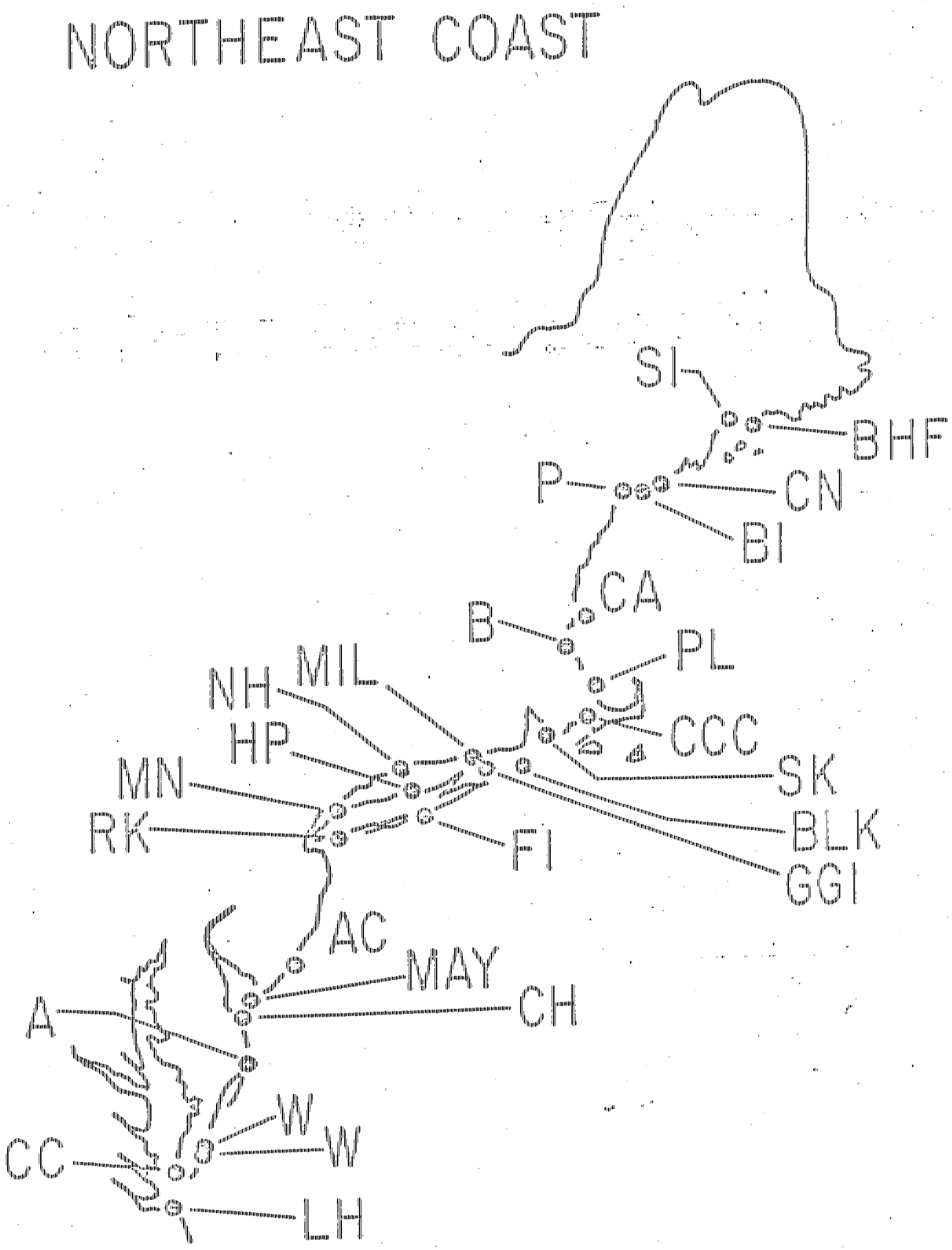
NORTHEAST COAST
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Table 1. PCB Data for New Bedford Harbor and Buzzards Bay Sediments.

Location	10^{-6} g/g dry weight Concentrations
Outer New Bedford Harbor[i] 6/73	8.4
Buzzards Bay, Massachusetts[ii] 8 stations	0.175 - 0.543
New Bedford Harbor[iii] 7 stations - 1977	0.5 - 620

[i] Harvey et al., 1976

[ii] Gilbert et al., 1973-74

[iii] Unpublished data - Massachusetts Department of Environmental Quality Engineering, 1977-78.

Table 2. PCB and DDT compounds in *Mytilus edulis*, East Coast, 1976. Parts per billion (10^{-9} g/g) of the dry weight (Risebrough et al., unpublished data).

Analysis No.	Collection No.	Collection Site	p, p'-DDE	PCB[a]	% moisture
76-1117	GGI-1	Great Gull Island	<25	270	76
1118	BB-1	Ram Is., Buzzards Bay	<43	440	88
1119	BB-2	New Bedford Harbor		110000[b]	88
1120	BB-3	Widows Cove	< 3	550	88
1121		Chatham, Cape Cod	14	120	81

[a]Mixture of tetra-, penta- and hexachlorobiphenyls approximating Aroclor 1254 in composition.

[b]Mixture of bi-, tri- and tetrachlorobiphenyls approximating Aroclor 1242 in composition.

Table 3. U.S. E.P.A. MUSSEL WATCH PROGRAM.
Chlorinated Hydrocarbons in East Coast Mussels. Avg. (10^{-9} g/g dry weight).

Sample Code	Location	Bivalve Type	DDE	DDD	PCB's 1254	PCB's 1260	% Moisture
BHF-760915	Blue Hill Falls	Mussel	3.50	--	14.9	--	87.6
P-760920	Portland	Mussel	< 7.88	--	94.6	--	91.7
B-760922	Boston	Mussel	<44.4	--	635	--	88.0
CCC-760925	Cape Cod Canal	Mussel	<10.5	--	215	--	86.8
SK-760927	Sakonnet Point	Mussel	<10.4	--	120	--	92.1
BLK-761001	Block Island	Mussel	7.85	--	102	--	89.8
NH-761006	New Haven	Mussel	< 7.43	--	129	--	91.8
FI-761011	Fire Island	Mussel	<21.0	--	243	--	91.2
RK-761012	Rockaway	Mussel	<31.9	--	575	--	89.2

(--) - No compound detected.

Table 4. PCB Analysis Results of Lobsters, Shellfish, and Fish in New Bedford, Massachusetts and Western Buzzards Bay. Selected Data.

Sample Location	Sample Type	Sample Code	Sample Date	Laboratory Results ppm* (mg/kg)
New Bedford Harbor				
Butter Flats	Lobster	B-1	5/6/77	8.2
Butter Flats	Lobster	B-2	5/6/77	11.7
Fort Rodman	Lobster	C-1	5/6/77	7.9
Fort Rodman	Lobster	C-2	5/6/77	9.3
Egg Island	Lobster	D-1	5/6/77	6.3
North Ledge	Lobster	F-1	5/6/77	4.9
North Ledge	Lobster	F-2	5/6/77	5.8
Clark Point	Shellfish	NB-1	5/77 - 11/77	1.3
Sewage outfall	Shellfish	NB-2	5/77 - 11/77	0.35
Clark Cove	Shellfish	NB-3	5/77 - 11/77	0.72
Butter Flats	Shellfish	NB-4	5/77 - 11/77	1.81
Buzzards Bay	Shellfish	NB-5	5/77 - 11/77	0.41
Buzzards Bay	Shellfish	NB-6	5/77 - 11/77	0.44
New Bedford Harbor	Blackback flounder-fillet	None	5/77 - 11/77	10.1
New Bedford Harbor	Blackback flounder-fillet	None	5/77 - 11/77	19.0
Fairhaven	Blackback flounder-fillet	None	5/77 - 11/77	7.6
Dartmouth	Blackback flounder-fillet	None	5/77 - 11/77	3.9
Dartmouth	Blackback flounder-fillet	None	5/77 - 11/77	20.0

*PCB reported as mg/kg of 1254 in edible tissue - wet weight.

Table 5. Bluefish and Striped Bass PCB Analyses (unpublished results). D.E.Q.E. Massachusetts.

Date	Location	Concentration (ppm, wet weight basis)
Bluefish Fillets		
10/7/77	Cape Cod Canal A	1.2
	B	0.5
	C	0.6
	D	0.5
10/18/77	Martha's Vineyard Wasque, S. side	0.5
10/16/77	Barnstable Sandy Neck	0.4
Striped Bass Fillets		
A. Massachusetts Coastal Waters; Exact sites unknown to us.		
10/26/77	P-61	0.5
	P-62	0.5
	P-63	0.1
	P-64	0.4
	P-65	0.3
	P-66	0.1
	P-67	0.1
B. Cape Cod Bay, Martha's Vineyard, Provincetown area.		
8/77	Cape Cod Bay	0.5
	Martha's Vineyard	0.3
10/7/77	Provincetown Area	1.3
		0.5
		0.5

Table 6. PCB's in Shellfish from Buzzards Bay, Massachusetts[1]

Sampling site[ii]	Avg. PPM dry wt. 10^{-6} g/g	Wet weight 10^{-6} g/g
1	4.188	0.524
2	1.363	0.170
3	1.751	0.218
4	0.443	0.055
5	1.536	0.192
6	1.418	0.177
7	0.290	0.036
8	0.625	0.078
9	0.537	0.067
10	0.232	0.029
11	1.042	0.130
12	0.879	0.110
13	0.008	0.001
14	0.560	0.070
15	2.566	0.321
16	2.276	0.284
17	1.472	0.184

[1] Hatch et al., (1979).

[ii] See Figure 2.

Table 7. PCB analyses of New Bedford Harbor and Buzzards Bay samples with 1242 mixture present.

Stations (see Figure 2)	(10^{-6} g/g dry weight) 1242 mixture	1254 mixture
3 *Mercenaria*	1.59	1.46
10 *Mercenaria*	0.22	0.20
Cleveland Ledge scallops - 20 March 1978	.185	.215

Table 8. Biogeochemistry of PCB's in the New Bedford Harbor - Buzzards Bay Region. Outline of Plans - 1979.

1.	Preparations for Workshop Meeting - September 1979	July - August 1979
2.	Sampling surface sediments, shellfish, suspended matter, large epibenthos (fish, lobsters)	July - August 1979
3.	Assessment of *Mytilus edulis* sampling stations	August - September 1979
4.	Workshop Meeting	October 1979
5.	Analyses of samples from 2	September 1979 - January 19
6.	Mussel sampling	October - November 1979
7.	Mussel analyses	November 1979 - March 1980
8.	Research Plan Meetings	December 1979
9.	Proposal Preparation and Data Assessment	January 1979 - June 1980
10.	Transplant mussels to New Bedford Harbor	May 1980

Outline of Plans - 1980-81 -- Budget Estimate $80,000

1. Moored mussel cages in Buzzards Bay
2. Sediment trap measurements
3. Particulate measurements by filtration: "Soluble" PCB measurements by *in situ* adsorption
4. Others may propose studies of effects and biogeochemistry

Outline of Plans - 1981-82 -- Budget Estimate $80,000

1. Moored mussel cage- continued and concluded
2. Sediment trap measurements continued and concluded
3. Data assessment and evaluation of transport of PCBs in Buzzards Bay
4. Items 1 & 2 hopefully phased into state-local university cooperative effort. Monitoring and biogeochemical research plan in place.
5. Others continue effects studies.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
FOOD AND DRUG ADMINISTRATION

REF # 24

BOSTON FIELD OFFICE
365 COMMERCIAL STREET
BOSTON, MASSACHUSETTS 02109
TELEPHONE 617-223-5856

September 10, 1979

Dr. John Delaney
Chief Chemist
Lawrence Experiment Station
37 Shattuck Street
Lawrence, Massachusetts 01843

Dear Dr. Delaney:

We have completed the analyses of the 10 samples of lobster and the one eel sample for PCB's, and obtained the following results:

Date Collected	State Collector's Number	F.D.A. Sample Number	Product	PCB (Aroclor #1254) ppm found	MRF No
8/14/79	HH-79-1	79-106-178	Lobster	12.4	1347
8/14/79	HH-79-2	79-106-179	Lobster	11.6	1352
8/8/79	T-79-1	79-106-180	Lobster	68.2	1346
8/8/79	S-79-2	79-106-181	Lobster	15.4	1350
8/16/79	Q-79-2	79-106-182	Lobster	23.8	1362
8/16/79	Q-79-3	79-106-183	Lobster	30.3	1351
8/16/79	Q-79-4	79-106-184	Lobster	31.1	1355
8/16/79	Q-79-5	79-106-185	Lobster	29.6	1363
8/16/79	M-79-6	79-106-186	Lobster	63.4	1356
8/16/79	M-79-7	79-106-187	Lobster	27.4	1364
8/16/79	H-79-(4-7)	79-106-188	Eel	41.3	1932

FOOD AND DRUG ADMINISTRATION

BOSTON FIELD OFFICE
99 COMMERCIAL STREET
BOSTON, MASSACHUSETTS 02109
TELEPHONE 617 223-5856

REF #54

September 10, 1979

Dr. John Delaney
Chief Chemist
Lawrence Experiment Station
37 Shattuck Street
Lawrence, Massachusetts 01843

Dear Dr. Delaney:

We have completed the analyses of the 10 samples of lobster and the one eel sample for PCB's, and obtained the following results:

Date Collected	State Collector's Number	F.D.A. Sample Number	Product	PCB (Aroclor #1254) ppm found	G.M.
8/14/79	3 HH-79-1	79-106-178	Lobster	12.4	5.8
8/14/79	3 HH-79-2	79-106-179	Lobster	11.6	2.5
8/8/79	2 T-79-1	79-106-180	Lobster	68.2	4.3
8/9/79	2 S-79-2	79-106-181	Lobster	15.4	3.1
8/16/79	2 Q-79-2	79-106-189	Lobster	23.8	2.4
8/16/79	2 Q-79-3	79-106-183	Lobster	30.3	—
8/16/79	2 Q-79-4	79-106-184	Lobster	31.1	12.0
8/16/79	2 Q-79-5	79-106-185	Lobster	29.6	10.7
8/16/79	2 M-79-6	79-106-186	Lobster	63.4	0.2
8/16/79	2 M-79-7	79-106-187	Lobster	27.4	7.7
8/16/79	1 H-79-(4-7)	79-106-188	Eel	41.3	11.5

REFERENCES

EPA Criteria Document (1976). Cirteria Document for PCB's. Massachusetts Audubon Society, prepared for the U.S. Environmental Protection Agency. U.S. Dept. of Commerce, National Technical Information Service PB-255 397.

Giger, W. and M. Blumer (1974). Polycyclic aromatic hydrocarbons in the environment: Isolation and characterization by chromatography, visible, ultraviolet and mass spectrometry. Anal. Chem., 46: 1663-1671.

Gilbert, T., A. Clay, A. Barker (1973-74). "Site Selection and Study of Ecological Effects of Disposal of Dredged Materials in Buzzards Bay, Massachusetts". New England Aquarium Report to U.S. Army Corps of Engineers, New England Division.

Goldberg, E. N. et al. (1978). "The Mussel Watch". Environmental Conservation, 5: 101-125.

Harvey, G. R. and W. Steinhauer (1976). Biogeochemistry of PCB and DDT in the North Atlantic. Chapter 15 in Environmental Biogeochemistry, Vol. 1, Jerome O. Nriagu (ed.). Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan 48106.

Harvey, G. R. and C. S. Giam (1976). Chapter 2. Polychlorinated Biphenyls and DDT Compounds in Strategies for Marine Pollution Monitoring. E. N. Goldberg (ed.).

Hatch, W., P. D. Brady, D. W. Allen, A. Davis, J. W. Farrington (1979). PCB distribution in the New Bedford Harbor region as indicated by tissue concentration of the edible clam *Mercenaria mercenaria*. (In preparation).

Rhoads, D. (1973). The influence of deposit feeding benthos on water turbidity and nutrient recycling. Am. Jour. of Science, 273: 1-22.

Stoffers, P., C. Summerhayes, V. Förstner, S. R. Patchineelam (1977). Copper and other heavy metal contamination in sediments from New Bedford Harbor Massachusetts: A Preliminary Note, Environmental Science and Technology, 11: 819-821.

Summerhayes, C., J. P. Ellis, P. Stoffer, S. Briggs, M. G. Fitzgerald (1977). Fine-grained sediment and industrial waste distribution and dispersal in New Bedford Harbor and Western Buzzards Bay, Massachusetts. W.H.O.I. Technical Report 76-115.

Young, D. R., T. C. Heesen, D. J. McDermott (1976). An offshore biomonitoring system for chlorinated hydrocarbons. Marine Pollution Bulletin, 7: 156-159.

Ref #56

DRAFT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

March 1978

DATE:

SUBJECT: Ambient PCB Sampling in New Bedford

NB landfill

FROM: Edward V. Fitzpatrick, Director
Surveillance and Analysis Division

TO: M. Hohman, Director
Air and Hazardous Materials Division

In response to your request, members of the Air Section in cooperation with Mark Allen of Environmental Science and Engineering (ESE), conducted a field sampling program at four potential sources of PCB emissions in New Bedford, New Bedford Municipal Landfill, Aerovox Industries, Cornell Dublier Electric Corporation and New Bedford Municipal Sludge Incinerator. In addition, Jim Leydon of the Occupational Safety and Health Administration (OSHA) collected two samples representing worker's exposure to PCB's from within the Aerovox Industries' plant.

Two different sampling methods were utilized in this field sampling program - one method was developed by ESE and consisted of a modified "Hi-vol" with porous polyurethane foam as the collection media. After sample collection, these samples were returned to ESE in Gainsville, Florida, for subsequent analysis. This sampling method was utilized at all sites sampled in the study with the exception of the measurements made by OSHA within the Aerovox plant. These samples were collected by the second method, which was developed by the Technical Support Branch of Region I and utilized Florisil as the collection medium. Replicate samples were run with the Florisil method at selected sites where higher concentrations were expected, to determine the precision of the Florisil method and to assess the comparability of these two methods. The analysis of the Florisil samples were run at Region I, Surveillance and Analysis Division.

RESULTS

Table I is a summary of the analysis conducted by the laboratories of ESE and Region I, Surveillance and Analysis Division, on the air samples collected for the study. For the most part, the co-located samples agreed reasonably well between methods; however, the Florisil method always gave higher results. The agreement between replicate Florisil samples was excellent. The site downwind of the Aerovox Company produced the only ambient air samples which showed substantial PCB emission impact. This is not surprising when one looks at the magnitude of PCB levels recorded within the plant. The study results show that the New Bedford Landfill is not an appreciable wintertime source of air-borne PCB emissions and does not appear to have an impact on residential areas.

SAMPLING PROGRAM

1. New Bedford Municipal Landfill - three sampling sites were selected; an upwind site, a site on the landfill itself, and a downwind site representative of population exposure in a residential area. The upwind site was located in the New Bedford Airport parking lot, 1300 meters north of the landfill site. The landfill site was located in the identical area sampled previously by ESE in June of 1977. The downwind site was located at the end of Elmwood Street off of Hathway Street, 1300 meters southwest of the landfill site. This area is on the edge of a single family residential area and was the closest population exposure downwind of the landfill.

The actual sampling took place on January 17, 1978. The day was characterized by cloudy skies with light snow falling throughout the day. The winds were light (0 - 5 mph) and variable (northeast to southeast).

The ground was frozen with a surface temperature of -1/2°C. There was an inch or two of snow covering the ground in most areas. The air temperature averaged -2°C for the sampling period.

A total of three samples were taken - one at each site, utilizing ESE's sampling technique and equipment. In addition, two florisil samples were collected at the landfill site and also at the downwind site. All samples were collected over a four hour period.

2. Cornell Dublier Company - two sites were sampled for this part of the study. The upwind site was located 400 meters north northwest of Cornell Dublier on East Rodney French Boulevard. The downwind site was located 400 meters southwest of Cornell Dublier on Cleveland Street off of Rodney Street. This site was situated in a single family residential area and was within 100 meters of Roosevelt Junior High School.

These samples were taken on January 19, 1978. The day was partly cloudy with light north to northeast winds averaging less than 5 mph. The air temperature was 0°C.

One "Hi-vol" method sample was taken at each site and two Florisil samples were taken at the downwind site only. The samples collected were of three hours duration.

3. New Bedford Sludge Incinerator - three hour "Hi-vol" samples were collected on January 24, 1978, at an upwind site 35 meters southwest of the incinerator's stack and at a downwind site 110 meters northeast of the plant. Due to physical constraints, it was impossible to locate the downwind site proximate to a residential area.

This sampling day was clear and had a strong southwest wind of 15 - 20 mph. The air temperature averaged 3°C for the sampling period.

4. Aerovox Industries, Inc. - two ambient sampling sites were selected

an upwind site 800 meters southwest of the facility on Desautel Street, and a downwind site in a single family residential area 400 meters northeast of the plant on Bittnau Street.

The sampling took place on January 27, 1978, and consisted of two 3 hour "Hi-vol" samples, one at each site, and two 3 hour Florisil samples taken at the downwind site. The day was characterized by cloudy skies, an air temperatire of -1°C and gusty southwest to westerly winds varying from 10 to 25 mph.

Additional sampling at Aerovox was performed by OSHA. In plant samples were taken for at least seven hours at two locations. One location sampled was in the impregnation room where capacitors are filled with PCB, and the other location was in the area where the tap hole on the capacitors are soldered. It was originally planned to conduct the ambient sampling around the plant and the in plant sampling on the same day, but conflicts in schedules prevented this. The in plant sampling was performed on March 1, 1978, using the Florisil method of sampling.

AOI:cb:03/31/78:DRAFT

cc.
Tom Spittler
Dan Wason, Solid Waste Program
Sue Sanders, Toxics Program
Val Dostanzo, Air Quality
Jim Hughes, OSHA
EUF

V 80-159-615 26.0g. F: 202 ml. P: 79 ml.

$26.0 \frac{202}{219.9} \frac{79}{100} = 18.86g.$

V 80-159-616 22.6g. F: 192 ml. P: 89 ml.

$22.6 \frac{192}{221.2} \frac{89}{100} = 21.32g.$

V 80-159-617 26.0g. F: 200 ml. P: 85 ml.

$26.0 \frac{200}{219.9} \frac{85}{100} = 20.10g.$

No contraction value was used, 26.8% water value for canned lobsters

	MFE No.	Bat SFD	OK FDA	OK Calc	2/85 P.C.B.
V 80-159-613	906 -	2.0	E 4.3	4.4	E 3.5 ug/g
614	907 -	C 8.9	E 2.8	3.7	E 2.3 "
615	908 -	C 2.2	E 7.9	5.1	E 5.5 "
616	909 -	~~5.4~~	E 2.8	2.0	E 1.4 "
617	910 -	C 3.5	E 7.0	4.9	E 3.6 "
			REF #71	REF #151	

SFD State Food & Drug

FDA Fed " " "

Cal Cove Marine Studies

125 ppb PCB Reuno Sys. Stat.

Ref #57

New Bedford Sludge Incinerator
Ambient air Sampling Results for PCBs:

March 1977

3/1/77

	PCB Concentration*	
UPWIND	38 ng/m^3	1204
	58 ng/m^3	1204A
DOWNWIND	150 ng/m^3	1210
	240 ng/m^3	1210A

3/3/77

UPWIND -	20 ng/m^3	1211
DOWNWIND -	95 ng/m^3	1212
	110 ng/m^3	1212A

* Results are reported in (ng/m^3) = Nanograms per cubic meter

OBTAIN REPORT FROM GCA IRON CO

INFO FROM EPA FILE

REF #63

Q.7:

This is the working equation for calculating the wt. of lotta sample.

$$g = S \times (F/T) \times (P/100)$$

S = gm of sample

F = volume of filtered acetonitrile extract

T = Total volume (ml H_2O in sample + ml acetonitrile added - correction in ml for volume contraction)

P = ml petroleum ether extract recovered

100 = ml petroleum ether into which residues were partitioned.

e.g. $\frac{F}{T}$ T = 26 gms (.768) + 200 ml = 219.9 ml

.768 = wt. value of canned beans

ht correction value used

2-11-80 5 PCB Blanks for FDA Quality Assurance Test

2-12-80 PCB's for F.D.A. Quality Assurance Test

INV 80-159-613 working sample 26.0 g. F: 200 ml. P: 81 ml

$$26.0 \; \frac{200}{219.9} \; \frac{81}{100} = 19.15 \text{ g.}$$

INV 80-159-614 working sample 28.0 g. F: 206 ml. P: 25 ml

$$28.0 \; \frac{206}{221.5} \; \frac{25}{100} = 19.53 \text{ g.}$$

Pa 4 of 9

CHEMICAL COMPARISON OF FAIRHAVEN
SLUDGE AND ANIMAL MANURE

INCOMPLETE TABLE

TABLE #18 -- PROJECT EC-105

CHEMICAL FACTOR	A FEDERAL GUIDELINE LIMITS	B FAIRHAVEN SLUDGE #3-A	C ANIMAL MANURE MAXIMUM	D COMMERCIAL FERTILIZER
1. Zinc	2,000	650	247	1,262
2. Copper	1,000	250	40.8	359
3. Nickel	200	12	No Data	83
4. Chromium	1,000	16	No Data	No Data
5. Mercury	10	< 2	No Data	No Data
6. Cadmium	10	5	No Data	79
7. Boron	100	Inc.	52	No Data
8. Arsenic	No Standard	< 1.5	No Data	No Data
9. Cobalt	No Standard	0.2	4.7	No Data
10. P.C.B.	10 (FDA)	< 2.5	No Data	No Data
11. Lead	1,000	330	No Data	710
12. Molybdenum	No Standard	Inc.	4.2	No Data

NOTE: 1. Boron Limit from U.S.D.A., Chaney -- 1973.

2. P.C.B. Limit from F.D.A.

3. Data for Column "C" from Atkinson, Giles and DesJardins, "Trace Element Content of Farm-land Manure." Canadian Journal of Agricultural Science, 34:76-80 (1954).

March 4, 1978

P. T. Gidley

GIDLEY LABORATORIES, INC.
Chemical and Environmental Sciences
Fairhaven, Massachusetts, U.S.A.

plp

FALL TESTS—1980

FAIRHAVEN WASTE WATER TREATMENT PLANT SLUDGE

GIDLAB REPORT CEN-179

FACTOR	FEDERAL GUIDELINES EPA/USDA	FAIRHAVEN SLUDGE
Cadmium	10	7.0
Chromium	1000	80
Copper	1000	675
Cobalt	No Standard	23
Lead	1000	280
Mercury	10	<0.2
Nickel	200	46
Selenium	No Standard	<0.5
P.C.B.	10 (FDA)	<0.5

NOTES:

1. Samples collected by Alfred Raphael, Superintendent of Fairhaven Waste Water Treatment Plant (August) and dried to constant weight.

2. Figures in parts per million = milligrams per kilogram

October 8, 1980

P. T. Gidley

GIDLEY LABORATORIES, INC.
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