

U.S. Environmental Protection Agency  
Environmental Research Laboratory  
Narragansett, R.I.

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Subject: Total organic carbon in New Bedford Harbor  
sediments.

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To: Leroy Folmar

Attached are the data for total organic carbon (TOC) from the sediments in New Bedford Harbor which we used in our toxicity tests. The analysis was performed on the same triplicate samples used in the analysis of PCBs, metals, and PAHs, so we have simply included the values in the appropriate slots in the tables attached. The TOC analysis was performed on a CHN (carbon, hydrogen, and nitrogen) analyzer in the laboratory of Dr. Michael Pilson, at the Graduate School of Oceanography of the University of Rhode Island.

The TOC increased up the harbor by approximately a factor of 3 (4.1% at NBH-5 to 11.3% at NBH-14). The value of TOC at the upper stations is quite high. Total PCBs make a relatively small contribution to the TOC (The total PCBs at NBH-14 are about 0.26% by dry weight.). The TOC in the reference sediments was lower (mean =2.1%) than in the NBH sediments.

PCBs and TOC do covary in the harbor, but the relationship is more nearly exponential than linear. The PCB concentrations increase by more than 2 orders of magnitude, whereas the organic carbon increases by only a factor of 3.



TABLE 1: Comparison of polychlorinated biphenyl concentrations (Based on sums of homologues) in sediment from New Bedford Harbor and sheepshead minnows (*Cyprinodon variegatus*) exposed to these sediments for 28 days. Fish were exposed for 9 days to sediments from Station 14.

Sta	Sediment			Sex	Fish			
	ug PCB/g (dry wt)	TOC (%dry wt)	PCB/TOC (ug/g)		ug PCB/g (wet wt)	ug PCB/g (dry wt)	PCB/LIPID (ug/g)	(PCB/TOC)/ (PCB/LIPID)
REF1	0.03	2.10	1.43	F	ND*	ND*	-	-
				M	0.035	0.10	9.71	0.147
REF2	0.03	2.10	1.43	F	0.11	0.31	36.5	0.039
				M	-	-	-	-
NBH5	10	4.12	243	F	4.42	15.3	530	0.458
				M	5.18	14.7	817	0.297
NBH7	17	6.03	282	F	5.16	16.0	2200	0.128
				M	10.3	29.2	1690	0.167
NBH8	56	7.48	749	F	17.8	55.9	3850	0.195
				M	21.8	62.4	2570	0.291
NBH12	220	9.97	2210	F	55.0	184	6450	0.343
				M	49.6	146	2090	1.06
NBH14	2600	11.3	23000	F	285	908	47600	0.483
				M	329	803	16700	1.38

\* Not detected.

TABLE 2. - Concentration (ug/g dry weight) of polychlorinated biphenyls (Aroclor 1254) and selected metals in sediments from New Bedford Harbor. Values are from triplicate samples from one composite from 9 to 13 ponar dredge samples from each station in New Bedford Harbor that have been tested for their toxicity.

STATION	Aroclor 1254	Cd	Cu	Cr	Fe	Mn	Ni	Ph	Zn	Wet ÷ Dry weight	Organic carbon, %
South Reference*	0.0581	0.155	54.6	47.2	17,100	383	20.0	48.5	134	2.23	2.02
	0.0480	0.189	56.5	49.3	18,200	373	20.6	47.2	140	2.35	2.16
	0.0480	0.099	50.0	44.6	16,200	346	18.9	43.0	124	2.11	2.12
NBH-5	6.95	3.98	401	174	13,900	106	28.3	141	337	2.38	4.12
	7.05	4.35	418	189	14,600	116	30.4	149	349	2.48	4.00
	7.92	4.21	426	192	14,800	115	30.3	149	361	2.48	4.25
NBH-7	12.3	5.73	882	411	21,900	162	39.7	268	546	3.60	6.05
	12.7	5.90	911	416	22,000	162	41.6	274	563	3.64	5.82
	14.9	5.67	882	405	21,500	159	38.8	268	539	3.56	6.21
NBH-6	19.6	10.4	1,570	730	19,700	140	47.9	311	707	2.82	6.30
	18.6	10.2	1,540	709	19,500	139	48.8	306	684	2.79	6.71
	19.8	9.82	1,420	657	17,900	132	45.0	292	634	2.67	6.50
NBH-8	29.2	5.34	1,640	838	22,700	171	37.5	337	470	2.97	8.04
	32.5	5.35	1,620	834	22,800	172	39.6	324	464	2.92	7.71
	31.2	5.43	1,590	814	22,300	172	37.6	321	458	2.94	6.69
NBH-12	256	92.6	2,920	1,810	25,000	195	268	742	2,790	3.73	9.97
	193	70.6	2,350	1,460	21,900	153	215	596	2,260	3.33	9.92
	245	74.4	2,480	1,530	21,100	160	228	637	2,380	3.19	10.0
NBH-14	913	41.6	1,150	690	18,400	176	143	888	2,330	3.66	10.7
	1,140	40.5	1,120	683	17,600	164	139	843	2,300	3.46	12.3
	1,240	39.4	1,070	637	16,800	156	135	789	2,180	3.30	10.8

\* South Reference sediment is from central Long Island Sound (41° 7.95'N and 72° 52.7'W).

TABLE 3 : Concentration (ug/g dry weight) of polychlorinated biphenyls (Aroclor 1254) and selected metals in sediments from New Bedford Harbor. Values are means of triplicate samples from a composite of 9 to 13 Ponar dredge sediment samples from each station in New Bedford Harbor which was used in the fish studies. Concentrations of total organic carbon (in percent) have also been included.

STATION	AROCLOR 1254	Cd	Cu	Cr	Fe	Mn	Ni	Pb	Zn	TOC
REF*	0.051	0.148	53.7	47.0	17100	367	19.8	46.2	133	2.10
NBH-5	7.30	4.18	415	185	14500	112	29.7	147	349	4.12
NBH-6	19.3	10.2	1509	699	19027	137	47.3	303	675	6.50
NBH-7	13.3	5.76	891	410	21800	161	40.0	270	549	6.03
NBH-8	30.9	5.37	1620	829	22600	172	38.2	328	464	7.48
NBH-12	231	79.2	2580	1600	22700	170	237	658	2480	9.97
NBH-14	1100	40.5	1110	670	17600	165	139	840	2270	11.3

\* The reference sediment is from Central Long Island Sound.