

METALS IN SURFACE SEDIMENTS OF THE NEW YORK BIGHT  
AND HUDSON CANYON, AUGUST 1981 - PRELIMINARY  
DATA REPORT

Vincent S. Zdanowicz

and

Robert N. Reid

U. S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Northeast Fisheries Center  
Sandy Hook Laboratory  
Highlands, New Jersey 07732

14 May 1982

SHL Report #82-14  
(May, 1982)

## INTRODUCTION

From 10-19 August 1981 NOAA's Northeast Monitoring Program conducted its second annual survey to monitor contaminants in New York Bight sediments and demersal species, and contaminant effects on benthos. Overall objectives of the monitoring program, variables sampled, methods used and results of the summer 1980 survey are given in Reid et al. (in prep.). The present report has been prepared to disseminate preliminary results of metals analyses from the August 1981 cruise.

Data from this report should not be cited without permission of the authors; please contact them for any further information.

## METHODS

Station locations are given in Figure 1 and Table 1. Core samples were taken from Smith-McIntyre bottom grabs, using 2.7 cm diameter plastic cylinders (pre-rinsed with 5% HNO<sub>3</sub>, then DIH<sub>2</sub>O) and frozen immediately. In the laboratory the top 5 cm portion of each was dried (16-20 hours, 60°C) and pulverized, and debris (shells, etc.) removed. Samples were then transferred to cleaned 4 oz. polyethylene containers and stored under ambient conditions.

All reagents used in sample digestions were Analyzed Grade and suitable for trace metal determinations. DI water was of 18 megohm-cm purity. Instrumental determinations were done on a Perkin-Elmer Model 5000 AAS using an air-acetylene flame.

For multi-element digestion the procedure was: an aliquot of dried sediment (3 to 10 g) was weighed into a 100 ml glass beaker, 10 ml of conc.  $\text{HNO}_3$  were added, and the samples placed on ceramic hot plates ( $\sim 70^\circ\text{C}$ ) and evaporated to dryness. When cool, each sample received 5 ml of 8%  $\text{NH}_4\text{Cl}$  (w/v in  $\text{DIH}_2\text{O}$ ), 5 ml of 0.02 M  $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ , and 15 ml of an acid mixture (80 ml conc.  $\text{HNO}_3$  plus 20 ml conc.  $\text{HCl}$  diluted to 1 L with  $\text{DIH}_2\text{O}$ ). After 16 to 20 hours, the samples were again placed on hot plates ( $\sim 70^\circ\text{C}$ ) and the volumes reduced to 10 to 15 ml. Whatman #4 paper was used to filter the leached solids from the solutions as they were transferred to glass graduates and brought to a volume of 25.0 ml using  $\text{DIH}_2\text{O}$ . Reagent blanks were run through the same digestion. NBS #1645 (River Sediment) was included in the analyses for determining recovery.

### RESULTS

Table 2 presents concentrations (ppm, dry wt.) of Ag, Cd, Cr, Cu, Ni, Pb and Zn, based on 1-2 cores/station. Table 3 compares our results for the seven metals with values reported for NBS standards.

## LITERATURE CITED

Reid, R. W. and J. E. O'Reilly. (In preparation). Contaminants in New York Bight and Long Island Sound sediments and demersal species, and contaminant effects on benthos, summer 1980.

Table 1. Latitudes, longitudes and depths for stations sampled on August 1981 New York Bight cruise (AL 81-09).

Fixed Station Number	Latitude, °N	Longitude, °W	Depth, m
1	40°26.9'	73°48.1'	29
2	40 28.2	73 45.8	27
3	40 28.0	73 43.8	26
4	40 25.0	73 52.0	18
5	40 24.9	73 48.0	35
6	40 25.0	73 46.0	49
7	40 25.0	73 44.0	24
8	40 21.8	73 51.6	27
9	40 21.6	73 47.8	46
10	40 20.2	73 49.1	44
11	40 19.1	73 45.8	49
12	40 12.8	73 44.0	37
13	40 09.8	73 41.9	53
14	39 47.3	72 59.0	80
15	40 01.4	73 25.6	70
16	40 07.6	73 36.8	77
17	40 05.4	73 31.3	77
18	40 25.0	73 53.8	26
19	40 17.0	73 57.8	24
20	40 27.9	73 56.0	13
21	40 30.9	73 47.3	20
22	40 25.9	73 39.0	24
23	39 29.9	74 10.1	18
24	39 55.2	73 55.8	22
25	40 01.9	73 55.1	22
26	39 35.8	73 54.2	26
27	39 39.1	73 39.2	26
28	39 25.5	73 30.6	43
29	40 14.3	73 25.9	40
30	40 14.8	73 25.1	37
31	40 25.6	73 10.9	35
32	40 24.0	72 58.0	40
33	40 34.1	72 37.8	37
34	40 25.8	72 19.8	57
35	40 30.2	72 13.1	55
36	40 08.1	72 51.6	49
37	40 04.9	72 50.2	51
38	40 10.7	72 40.3	57
39	40 14.3	73 02.0	44
40	40 24.9	73 49.7	29
41	40 25.0	73 56.8	11
42	40 21.2	73 56.6	17
43	40 18.9	73 53.7	22
44	40 13.0	73 57.8	18
46	39 52.0	73 15.0	48
50	40 02.3	73 42.8	18
54	40 22.6	73 52.4	20
57	40 17.6	73 51.0	18
60	40 24.3	73 54.3	18
61	40 13.4	73 47.6	33
62	40 21.8	73 41.8	22
63	40 39.5	73 00.0	12
64	40 35.5	73 22.0	11
65	40 33.2	73 37.5	11

Table 1. Continued

Fixed Station Number	Latitude, °N	Longitude, °W	Depth, m
B90	40 34.0	74 02.0	11
H01	40 38.6	74 02.9	12
K01	40 24.0	73 55.0	18
K63	39 43.1	73 33.0	35
K64	39 29.0	73 18.0	35
K65	39 13.0	73 02.0	73
K76	39 58.0	72 07.0	80
K77	40 15.0	72 24.0	57
KV4	39 36.0	72 37.0	79
CAP	40 22.7	73 50.0	29
D01	39 00.0	74 28.0	24
D02	39 50.0	73 57.3	38
D03	39 50.0	74 00.0	20
D04	39 50.0	74 02.7	18
D05	39 54.0	74 02.2	18
D06	39 57.9	74 01.4	20
D07	40 01.9	74 01.7	20
D08	40 01.9	74 00.3	22
D09	40 01.9	73 57.7	22
D10	40 05.6	73 59.5	22
D11	40 09.3	73 58.6	29
OP13	39 20.4	72 58.9	64
OP31	38 44.8	75 01.0	20
OP32	38 31.0	74 57.0	15
120	39 29.2	72 08.5	357
122	39 23.6	72 14.1	338
123	39 24.0	72 19.0	150
124	39 27.2	72 16.6	329
125	39 27.8	72 16.1	567
126	39 28.5	72 15.3	235
128	39 30.3	72 14.8	260
129	39 32.4	72 11.5	152
130	39 33.2	72 17.4	124
131	39 30.5	72 19.7	670
132	39 27.7	72 22.3	128
133	39 29.1	72 30.0	112
134	39 32.7	72 24.2	530
135	39 36.6	72 18.5	113
136	39 35.6	72 24.5	278
137	39 34.9	72 28.5	97
138	39 37.5	72 25.2	417
139	39 40.5	72 21.2	110
140	39 40.8	72 26.3	97
141	39 39.6	72 27.5	212
142	39 38.5	72 28.6	93
143	39 40.7	72 29.3	130
144	39 42.0	72 31.2	82
145	39 45.8	72 27.2	80
146	39 38.0	72 35.7	79
147	39 34.2	72 40.0	75
148	39 36.2	72 50.5	66
149	39 40.9	72 44.8	75
150	39 45.2	72 39.5	70
151	39 49.4	72 34.2	55
152	39 51.8	72 40.3	58
153	39 47.2	72 49.0	70
154	39 41.6	72 53.0	68
155	39 34.9	72 58.5	64
156	39 33.0	73 10.7	38
157	39 40.2	73 18.7	42
158	39 46.2	73 08.2	48
159	39 42.2	73 02.7	49
160	39 45.5	73 00.3	58
162	39 48.5	72 57.8	75

Table 1. Continued

Fixed Station Number	Latitude, °N	Longitude, °W	Depth, m
163	39 49.9	72 57.0	55
164	39 51.2	72 56.0	60
165	39 54.5	72 53.6	53
167	39 52.0	73 02.7	79
168	39 48.0	73 23.0	40
169	39 50.3	73 30.0	33
170	39 55.5	73 37.1	33
171	39 57.2	73 18.0	64
174	39 55.0	73 09.0	70
175	39 40.4	72 28.3	190

Table 2. New York Bight cruise AL 81-09 (10-19 August 1981) concentrations of metals in surface sediments (ppm, dry wt.). Based on a single analysis at each station, except as indicated.

Station	Ag	Cd	Cr	Cu	Ni	Pb	Zn
21	0.13 2.03	0.15 1.71	18.50 55.34	3.20 57.83	3.98 12.14	19.5 78.5	24.50 128.5
1	1.57	1.32	46.77	42.13	9.64	64.3	103.5
2	0.82	0.71	29.63	22.49	5.93	35.0	60.69
7	0.70	0.97	17.43	24.15	3.64	39.8	62.25
22	0.13 <0.12	0.15 <0.12	8.25 1.34	4.03 0.30	2.00 0.37	13.0 2.2	20.25 3.24
31	<0.13	<0.13	2.78	0.30	0.70	1.8	3.00
32	<0.13	<0.13	1.40	0.30	0.53	2.0	2.05
33	<0.18	<0.18	10.00	2.57	5.11	9.3	17.49
35	<0.18	<0.18	7.38	1.78	3.73	6.4	13.14
34	<0.12	<0.12	4.24	0.74	1.93	3.7	8.18
38	<0.13	<0.13	4.53	0.40	1.08	3.0	4.43
37	<0.13	<0.13	4.75	0.68	2.18	4.0	5.00
39	<0.12	<0.12	3.17	0.37	0.89	2.7	4.18
29	<0.13	<0.13	4.80	0.93	1.73	4.8	10.75
30	6.68	4.93	82.11	164.2	17.49	182.0	285.6
5	4.75 0.71	3.55 0.57	105.0 23.56	130.0 27.85	23.50 12.14	165.0 36.0	245.0 57.12
40	4.65	3.96	128.7	142.0	35.64	188.0	272.3
9	0.11	<0.18	11.36	7.38	4.08	16.7	25.92
11	<0.13	<0.13	6.75	1.95	2.73	8.8	16.25
12	0.40	0.35	20.30	10.25	7.67	24.8	45.05
13	0.36	0.25	17.14	8.68	6.53	21.4	37.49
17	0.25 <0.25	0.40 <0.25	16.34 15.00	7.52 6.10	7.87 8.45	21.3 15.5	41.58 31.50
171	<0.18	<0.18	12.14	3.53	5.96	10.7	21.42
174	<0.25	<0.25	10.50	3.95	8.10	11.5	25.50
167	<0.25 <0.25	<0.25 <0.25	9.55 11.88	3.00 3.37	7.25 8.32	10.5 13.4	22.0 26.73
160	0.20	<0.13	3.88	1.25	3.53	4.8	13.25
159	<0.13	<0.13	8.00	1.85	5.05	5.3	14.50
156	<0.12 <0.13	<0.12 <0.13	3.11 3.43	1.47 1.08	4.56 2.87	2.2 3.3	12.95 11.26



Table 2. Continued

Station	Ag	Cd	Cr	Cu	Ni	Pb	Zn
OP31	<0.18 <0.13	<0.21 <0.13	4.64 1.53	2.03 0.45	3.07 0.75	6.1 2.5	22.85 5.50
OP32	<0.13	<0.13	2.88	0.55	0.95	4.5	8.50
26	<0.13 <0.13	<0.13 <0.13	2.84 2.45	0.32 0.50	1.07 1.38	1.7 1.8	4.26 5.75
27	<0.13	<0.13	1.83	0.50	0.80	2.0	3.83
25	<0.13	<0.13	9.50	1.15	1.95	21.0	26.00
44	<0.13	<0.13	15.00	1.38	3.23	10.8	22.50
19	<0.13	<0.13	3.93	0.40	0.88	2.8	4.20
42	<0.13 <0.13	<0.13 <0.13	10.50 2.40	1.25 0.70	2.25 0.98	14.3 3.3	27.75 5.75
41	<0.13	<0.13	6.50	2.58	3.05	16.0	20.50
20	3.72	2.93	112.6	127.2	26.46	169.0	270.2
18	<0.13	<0.13	4.63	4.65	4.30	9.0	15.75
10	1.33 <0.13	0.98 <0.13	49.59 9.50	49.10 3.13	12.77 3.38	68.7 13.3	86.42 27.00
170	<0.13	<0.13	3.18	0.78	2.08	3.3	9.50
169	<0.12	<0.12	4.03	1.47	2.94	3.7	12.20
K63	0.20 <0.13	<0.13 <0.13	3.65 4.80	0.43 1.60	1.28 3.83	2.3 5.5	7.25 14.25
168	<0.13	<0.13	5.00	1.25	3.40	4.5	12.5
158	<0.13	<0.13	4.30	1.38	4.08	4.8	12.75
162	<0.18	<0.18	11.72	2.98	7.38	12.8	25.56
163	<0.18	<0.18	10.35	2.82	6.82	11.4	21.78
164	0.18	<0.13	7.25	1.23	2.85	7.0	12.00
165	<0.13 <0.13	<0.13 <0.13	5.08 5.10	0.75 1.15	2.73 3.90	4.0 6.5	9.50 12.50
151	<0.13	<0.13	3.71	1.52	4.76	4.2	13.14
150	<0.18	<0.18	8.93	2.50	6.32	9.3	19.64
153	<0.25 <0.12	<0.25 <0.12	7.72 9.42	2.38 1.64	5.89 4.91	9.9 6.7	18.32 16.86
148	<0.13	<0.13	5.13	0.93	2.40	4.3	9.75
154	<0.13	<0.13	6.75	1.25	3.50	7.0	12.75
155	<0.13	<0.13	6.75	1.20	3.20	5.0	12.00
K65	0.18 0.43	0.18 0.18	6.64 8.57	2.03 2.03	4.65 4.96	7.3 8.9	16.70 17.14
147	<0.18	<0.18	7.03	2.07	4.96	7.1	15.71

Table 2. Continued

Station	Ag	Cd	Cr	Cu	Ni	Pb	Zn
146	<0.18	<0.18	7.46	2.38	5.50	8.2	17.40
144	<0.18	<0.18	7.09	2.36	5.16	6.8	17.98
145	<0.18	<0.18	7.14	1.79	4.36	6.1	15.35
K76	<0.25	<0.25	11.02	3.26	6.16	7.5	17.03
122	<0.25	0.30	11.00	5.15	10.15	8.5	26.00
123	0.21	0.28	10.91	3.27	9.50	7.4	25.70
124	<0.25	0.25	13.00	4.80	9.85	8.5	26.00
125	<0.25	0.25	13.86	6.73	11.39	5.9	28.22
126	0.30	0.35	25.50	12.45	19.50	12.5	46.00
128	<0.25 <0.25	0.25 0.30	16.34 12.97	4.21 5.49	10.15 11.48	8.9 8.5	33.17 28.44
129	0.39	0.32	13.92	3.50	9.28	6.8	24.99
130	0.18	0.29	11.42	3.36	9.64	7.5	25.70
131	0.35	0.30	-	13.75	24.50	19.0	58.00
132	0.21	0.32	9.53	3.53	9.88	8.1	24.00
133	0.35	0.35	12.50	4.05	8.90	8.0	25.00
134	0.18 0.70	0.45 0.35	30.44 20.50	13.07 7.90	22.95 14.00	19.5 13.5	54.39 36.00
135	0.29	0.29	12.14	3.78	9.64	7.5	24.28
139	0.18	0.29	10.35	3.11	8.21	7.5	19.99
138	0.45	0.35	24.75	8.71	15.84	13.4	39.60
137	<0.18	0.18	7.14	2.41	6.25	6.4	16.33
142	<0.18	<0.18	6.13	2.17	5.01	6.0	17.15
141	<0.26 <0.13	0.20 0.13	9.47 4.65	3.64 1.48	7.22 3.48	5.6 4.3	19.46 11.00
175	0.90	0.50	20.96	7.88	15.97	10.5	35.43
143	<0.18	<0.18	5.78	1.93	4.50	5.0	14.64
63	<0.13	0.13	1.45	0.45	0.63	2.3	3.43
64	<0.13	<0.13	2.40	0.88	0.80	4.3	7.25
65	<0.12	<0.12	1.94	0.75	0.85	3.5	8.72

Table 3. Comparison of Sandy Hook Laboratory metal analyses with values reported for NBS standards.

NBS #1645 - River Sediment

		Ag	Cd	Cr	Cu	Ni	Pb	Zn
		-	10.2	2.96%	109	45.8	714	1720
NBS Value			<u>+1.5</u>	<u>+.28</u>	<u>+19</u>	<u>+2.9</u>	<u>+28</u>	<u>+169</u>
Our Value	$\bar{x}$	2.73	9.21	2.68%	104	37.9	683	1666
	S.D.	.48	.52	.23	7.0	2.4	68.4	120
% Recovery		-	90	91	95	83	96	97